COUNTY OF SAN MATEO
PLANNING AND BUILDING DEPARTMENT

DATE: March 18, 2021

TO: Zoning Hearing Officer

FROM: Planning Staff

SUBJECT: Consideration of a Grading Permit, pursuant to Section 9283 of the County Ordinance Code, for 1,870 cubic yards of grading to construct a future two-story single-family residence, road and driveway improvements, and retaining walls, located on a vacant parcel at the end of Foxwood Road, in the unincorporated Los Trancos Woods area of San Mateo County. The project also includes the removal of nine significant trees.

County File Number: PLN 2018-00204 (Stagg)

PROPOSAL

The applicant is seeking a Grading Permit to construct a future two-story single-family residence, new driveway and associated road improvements to Foxwood Road on a vacant parcel at the end of Foxwood Road. The project involves 1,870 cubic yards (c.y.) of grading (1,150 c.y. of cut and 360 c.y. of fill) on an approximately 50,400 sq. ft. parcel.

The project will require the removal of nine significant trees greater than 12 inches in diameter in size. Removal is requested due to the poor health of the trees or because the trees are too close to or within the proposed construction area.

RECOMMENDATION

That the Zoning Hearing Officer approve the Grading Permit County File Number PLN 2018-00204, by making the required findings and adopting the conditions of approval in Attachment A.

BACKGROUND

Report Prepared By: Olivia Boo, Project Planner, 650/363-1818

Applicant/Owner: David and Jenny Stagg

Location: Foxwood Road, Los Trancos Woods

APN: 080-092-240

Size: 50,400 sq. ft.

Parcel Legality: Legal lot per approved and recorded Lot Line Adjustment, File No PLN 2015-00296.

Existing Zoning: R-1/S-83 District (Los Trancos Woods)

General Plan Designation: Low Density Residential

Sphere-of-Influence: Portola Valley

Existing Land Use: Undeveloped with low growing vegetation and mature trees.

Water Supply: Domestic water supply will be provided by California Water Service Company.

Sewage Disposal: West Bay Sanitary District

Flood Zone: The project parcel is in Flood Zone X (area of minimal flooding), pursuant to Federal Emergency Management Agency, Flood Insurance Rate Map, Community Panel 06081C0402E, effective October 16, 2012.

Environmental Evaluation: Categorically exempt pursuant to Section, 15303, 3(a), relating to the construction of one single-family residence in an urban, residential zone.

Setting: The property is vacant with mature trees. The property is accessed by a 200-foot-long dirt driveway, that extends south from Foxwood Road and enters the north side of the property. The property is moderately sloped upwards to the south, towards the rear of the parcel. The site is located at the end of Foxwood Road with Ramona Road, 61 feet to the east. The parcel is bounded by developed property and Foxwood Road to the north, undeveloped property to the south, east and west. The topography of the parcel slopes down to the east.

DISCUSSION

A. KEY ISSUES

1. Conformance with the County General Plan

Staff has reviewed the project and determined that the project is in conformance with all applicable General Plan Policies, including the following:

Vegetative, Water, Fish and Wildlife Resources

Policy 1.23 (*Regulate Development to Protect Vegetative, Water, Fish and Wildlife Resources*), Policy 1.24 (*Regulate Location, Density and Design of Development to Protect Vegetative, Water, Fish and Wildlife Resources*), and Policy 1.25 (*Protect Vegetative Resource*) seek to regulate land use, density and design, and development activities to protect vegetative, water, fish and wildlife resources; to mitigate to the extent possible, significant adverse impact; ensure development will minimize the removal of vegetative resources, protect vegetation which enhances microclimate, stabilizes slopes.

The 50,400 sq. ft. project parcel is located in an urban residential subdivision that consists of mild to moderate slopes. According to the California Natural Diversity Database (CNDDB), there are no federal or state threated special status plant or animal species identified on the project site.

The project will require the removal of nine significant trees. The County's Significant Tree Ordinance excludes the requirement of a separate tree removal permit when tree cutting has been authorized as part of a separate permit approval process in which the provisions of the tree ordinance have been considered and applied. The ArborWorks arborist report states seven trees are all structurally flawed and show decline in the canopy which pose a hazard. The canopies on the seven trees have signs of significant stress due to competing for sunlight and prolonged drought from recent years. Removal is recommended to eliminate hazard and prevent property damage Two bay trees, located in the left side yard, beyond the future house footprint are proposed for removal. They are within the footprint of the area to be graded just behind the property. The grading is required in order to construct a retaining wall for hillside stability. The trees proposed for removal are the minimum necessary to accommodate the proposed house, new access driveway, and retaining walls. The ArborWorks arborist report recommends maintenance pruning and hazard reduction pruning, to include crown cleaning, for the trees that will remain. The report also notes that during and after the demolition and construction that the Critical Root Zone (CRZ) be protected by placement of trench plates over the surface roots to protect against large equipment damage, that no roots larger than 2 inches in diameter are to be cut, and that no roots are to be cut within 10 feet of the base of a trunk, among others.

The project is conditioned to require the submittal of a revegetation plan at the building permit stage for review and approval by the Planning Department. Tree replacement is conditioned for a 1:1 ratio with a minimum 15-gallon size of indigenous drought tolerant tree species the trees that will remain, a tree protection pre-site inspection is required to ensure proper tree

protection measures are installed prior to construction for any trees not approved for removal.

Soil Resources

Policy 2.17 (*Regulate Development to Minimize Soil Erosion and Sedimentation*) and Policy 2.23 (*Regulate Excavation, Grading, Filling, and Land Clearing Activities Against Accelerated Soil Erosion*) seek to regulate development to minimize soil erosion and sedimentation; and regulate excavation, grading, filling and land clearing to protect against accelerated soil erosion and sedimentation.

The proposed driveway is approximately 200 feet long. A large fire truck turnaround is proposed at the end of the driveway, on the southeast side of the future single-family residence, that will lead to the attached two-car garage. The project proposes 1,870 cubic yards (c.y.) of grading (1,150 c.y. of cut and 360 c.y. of fill). The driveway and single-family residence are proposed to be located in the front half of the property; the residence being located in mostly flat area. The area of overall disturbance has an approximate slope of 26 percent. Conditions have been included to require an erosion control plan prepared by a civil engineer that includes a temporary aggregate construction entrance and driveway, fiber rolls, silt fence and onsite inlet protection. The silt fence and fiber rolls will be required on the downslope (along the south property line) with review and approval by the Planning staff. The project is also conditioned to prohibit grading during the wet season (October 1 through April 30) to avoid the increased potential for soil erosion (unless an Exception to the Winter Grading Moratorium is granted by the Community Development Director). As mentioned, a tree protection pre-site inspection is required to ensure trees that remain are properly protected prior to the start of construction.

Visual Quality

Policy 4.15 (*Appearance of New Development*) , Policy 4.25 (*Location of Structures*), Policy 4.26 (*Earthwork Operations*), Policy 4.29 (*Trees and Vegetation*), and Policy 4.31(*Public Utilities*) seek to protect the natural visual character and quality of scenic areas by regulating the appearance of new development to promote good design, site relationship, and other aesthetic considerations; locate, site and design all structures and paved areas to carefully conform with the natural vegetation, landforms and topography of the site so that their presence is compatible with the pre-existing character of the site, to minimize the impacts of noise, light, glare and odors on adjacent properties and roads; minimizing grading operations, make graded areas blend with adjacent landforms through the use of contour grading rather than harsh cutting; preserve trees and natural vegetation except where removal is required for approved development or

safety; replace vegetation and trees removed whenever possible, use native plant materials or vegetation compatible with the surrounding vegetation, climate, soil, ecological characteristics of the region, placing utilities underground.

The project scope includes construction of a new driveway that leads to the property and a proposed single-family residence. The new driveway will sit at an elevation of 976 feet, with the fire turnaround portion constructed at an elevation of 988 feet. Given the length of the new secluded driveway, the single-family residence will not be visible from the Foxwood Road public right-of-way.

Because the future single-family residence and new driveway will be proposed within the front portion of the parcel, the rear half of the property will retain the natural character of the area and be preserved.

Nine significant trees are proposed for removal, the minimum necessary to accommodate the proposed development since these trees are within or near the footprint of the development. Foxwood Road and driveway improvements will follow the topography lines of the parcel leading up to the building footprint. Grading totaling 1,870 cubic yards is necessary to provide access to the parcel and the required fire truck turnaround adjacent to the residence.

Water Supply and Wastewater

Policy 10.10 (*Water Suppliers in Urban Areas*) and Policy 11.5 (*Wastewater Management in Urban Areas*) consider water systems as the preferred method of water supply in urban areas and considers sewage systems as the appropriate method of wastewater management in urban areas, encourages the extension of sewerage systems to serve unincorporated urban areas.

The future single-family residence will be served by California Water Service Company. California Water Service Company has reviewed the project and conditionally approved the project. The project will be served by West Bay Sanitary District and has received conditional approval from the District.

Geotechnical Hazards

Policy 15.20 (*Review Criteria for Locating Development in Geotechnical Hazard Areas*) and Policy 15.21 (*Requirement for Detailed Geotechnical Investigations*) sees to avoid siting structures in areas where they are jeopardized by geotechnical hazards; avoiding construction in steeply sloped areas (generally above 30 percent), unless appropriate structural design measures are incorporated to ensure safety and reduce hazardous

conditions; and to required geotechnical investigation for development projects that may be located in an area of geotechnical hazard.
The submitted 2015 Geologic Investigation report prepared by Murray Engineers, Inc. reported the property is located within the Alquist-Priolo Earthquake Fault Zone and within a very large ancient landslide complex. Murray Engineers evaluated the site (mapping and exploratory borings to 26.5 feet) and concluded that landslide risk is low, slope stability is stable, and that the chance of fault rupture is low. Provided the recommendations in the report are followed, including drilled pier construction for the residence and stitch pier retaining walls, the site is suitable for construction. Given the age of the current report, the applicant will submit a revised report indicating current conditions, hazards and mitigations, and addressing current building codes, at the time of building permit submittal.

The project requires compliance with all seismic design criteria of the current California Building Code. The plans and geotechnical report have been reviewed and conditionally approved by the County Geotechnical Section.

Fire Hazards

Policy 15.27(c) (*Appropriate Land Uses and Densities in Fire Hazard Areas*), Policy 15.28 (b) (*Review Criteria for Locating Development in Fire Hazard Areas*) and Policy 15.31 (*Standards for Road Access for Fire Protection Vehicles to Serve New Development*) in urban areas, consider higher density land uses to be appropriate if development can be served by CDF/County Fire Department, a fire protection district or a city fire department, adequate access for fire protection vehicles is available and sufficient water supply and fire flow can be guaranteed; when development is proposed in hazardous fire areas, require that it be reviewed by the County Fire Warden to ensure that building materials, access, vegetative clearances from structures, fire flows and water supplies are adequate for fire protection purposes and in conformance to the fire policies of the General Plan; consider the adequacy of access for fire protection vehicles during review of any new development proposal; determine the adequacy of access through evaluation of length of dead end roads, turning radius for fire vehicles, turnout requirements, road widths and shoulders and other road improvement considerations for conformance with the standards of the agency responsible for fire protection for the site proposed for development.

As noted on the plans, the project driveway shows a fire turnaround proposed to meet fire access requirements. The project is located in an SRA high fire hazard area, the project has been reviewed by Woodside Fire and conditionally approved pending compliance with the conditions required by Woodside Fire Protection District as noted in Attachment A.

2. Conformance with Zoning Regulations

The project is located within the R-1/S-83 (Single-Family/Combining District) Zoning District. The proposed project complies with the development standards set forth by the County Zoning Regulations as outlined below. Zoning review of the residence will occur once building plans have been submitted.

Development Standard	Required	Proposed
Minimum Building Site	7,500 sq. ft.	50,400 sq. ft. (existing)
Minimum Side Yard	5 ft.	37 ft. (Left side) 34 ft. (Right side)
Minimum Front Yard	20 ft.	52 ft.
Minimum Rear Yard	20 ft.	175 ft.
Maximum Building Height	36 ft.	None proposed
Lot Coverage	40% Maximum Allowed	None proposed
Floor Area Ratio	3,200 s.f.	None proposed

3. Conformance with the Grading Regulations

The following findings must be made in order to issue a Grading Permit for this project. Staff's review of the project is discussed below.

a. *That the granting of the permit will not have a significant adverse effect on the environment.*

The grading plan for the proposed project has been prepared by a licensed civil engineer, (Lea and Braze Engineering, Inc.) and has been reviewed and preliminarily approved by the Department of Public Works and the Building Department Civil Section. The project site has also undergone a geotechnical study by Murray Engineers, Inc. which has been reviewed and preliminarily approved by the County's Geotechnical Section for soil stability. The site-specific recommendations contained within the Murray Engineers, Inc. report along with the recommendations from other reviewing agencies have been included as conditions of approval. Implementation of these conditions will prevent significant adverse impacts on the environment.

b. *That the project conforms to the criteria of Chapter 5 of the San Mateo County Building Regulations, including the standards referenced in Section 9296.*

The project, as proposed and conditioned, conforms to the standards in the Grading Ordinance, including those relative to an erosion and sediment control plan, grading, dust control plan, fire safety, timing restrictions of grading activity, and geotechnical reports. Erosion and sediment control measures will be inspected prior to construction commencing and must remain in place during grading, demolition and construction activities. A dust control plan must be submitted for approval and implemented for the duration of construction. The proposed grading plan was prepared by a licensed civil engineer and reviewed for adequacy by the Department of Public Works. As mentioned above, a geotechnical report was also prepared for this site and reviewed by the County's Geotechnical Section. Due to the County's Winter Grading moratorium, grading is only allowed between April 30 and October 1. If the applicant wishes to perform grading activities during the wet season, they must apply for an exception from the Winter Grading Moratorium and will be subject to more stringent erosion control measures, monitoring and inspections.

c. *That the project is consistent with the General Plan.*

The General Plan designation for this site is Low Density Residential. The proposed construction and associated grading for a new single-family residence with attached two-car garage, driveway improvements and retaining walls is in-fill development which is consistent with the land use density allowed by this General Plan designation. As discussed in the General Plan Compliance Section of this report Section A.1, this project, as conditioned, complies with all applicable General Plan goals and policies.

The project is consistent with the provisions of the Significant Tree Removal Ordinance, the provisions of which must be considered and applied as part of the grading permit approval process (Significant Tree Removal Ordinance Section 12.020.1(e)). Noticing in the form of a site poster was posted in front of the subject property from March 9, 2021 until March 18, 2021 while the proposed project design has minimized the removal of significant trees by placing the proposed structures in an area of the parcel that is least impactful to the surrounding significant trees.

B. ENVIRONMENTAL REVIEW

This project is categorically exempt from environmental review pursuant to the California Environmental Quality Act (CEQA) Guidelines Section 15303, Class 3(a), relating to the construction of one single-family residence in an urban, residential zone.

C. REVIEWING AGENCIES

Building Inspection Section
Geotechnical Section
Department of Public Works
Woodside Fire Protection District
California Water Service Company
West Bay Sanitary District

ATTACHMENTS

A. Attachment A
B. Vicinity Map
C. Plans
D. ArborWorks Arborist Reports
E. Murray Engineers, Inc. Geotechnical Report, Dated 9/2015
F. Murray Engineers, Inc. Geotechnical Report, Dated 2/2021
G. Site Photos
H. Tree Removal Plan

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COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT A

Attachment A

County of San Mateo
Planning and Building Department

RECOMMENDED FINDINGS AND CONDITIONS OF APPROVAL

Permit or Project File Number: PLN 2018-00204 Hearing Date: March 18, 2021

Prepared By: Olivia Boo, Project Planner For Adoption By: Zoning Hearing Officer

RECOMMENDED FINDINGS

Regarding the Environmental Review, Find:

1. This project is categorically exempt from environmental review pursuant to the California Environmental Quality Act (CEQA) Guidelines Section 15303, Class 3, relating to the construction of small structures, including a single-family residence, attached two-car garage, driveway improvements, retaining walls and associated utilities in a residential zone.

Regarding the Grading Permit, Find:

2. That the granting of the permit will not have a significant adverse effect on the environment. As discussed in this staff report, the project has received preliminary approval from the Department of Public Works and the County' Civil Section. The project site has also undergone a geotechnical study by Murray Engineers, Inc. which has been reviewed and preliminarily approved by the County's Geotechnical Section for soil stability. The site-specific recommendations contained within the Murray Engineers, Inc. report along with the recommendations from other reviewing agencies have been included as conditions of approval. Implementation of these conditions will prevent significant adverse impacts on the environment.

3. That the project conforms to the criteria of Chapter 5 of the San Mateo County Ordinance Code*, including the standards referenced in Section 9296.* Planning staff, the Geotechnical Section, Civil Section and the Department of Public Works have reviewed the project and determined it conforms to the standards in the Grading Ordinance, including those relative to an erosion and sediment control plan, grading, dust control plan, fire safety, timing restrictions of grading activity, and geotechnical reports.

4. That the project is consistent with the General Plan. The proposed construction and associated grading for a new single-family residence with attached two-car garage, driveway improvements and retaining walls is consistent with the land use allowed by this General Plan designation. As discussed in the General Plan Compliance Section of this report Section A.1, this project, as conditioned, complies with all applicable General Plan goals and policies.

   The project is consistent with the provisions of the Significant Tree Removal Ordinance, the provisions of which must be considered and applied as part of the grading permit approval process (Significant Tree Removal Ordinance Section 12.020.1(e)). Noticing in the form of a site poster was posted in front of the subject property from March 9, 2021 until March 18, 2021 while the proposed project design has minimized the removal of significant trees by placing the proposed structures in an area of the parcel that is least impactful to the surrounding significant trees.

RECOMMENDED CONDITIONS OF APPROVAL

Current Planning Section

1. The approval applies only to the proposal as described in this report and materials submitted for review and approval by the Zoning Hearing Officer March 18, 2021. The Community Development Director may approve minor revisions or modifications to the project if they are found to be consistent with the intent of, and in substantial conformance with this approval.

2. This permit shall be valid for one (1) year from the date of final approval, in which time a valid building permit shall be issued and a completed inspection (to the satisfaction of the Building Inspection Section) shall have occurred within 365 days of issuance. Any extension of these permits shall require submittal of a written request for permit extension and payment of applicable extension fees sixty (60) days prior to the expiration date.

3. The applicant shall submit the approved exterior color and material specifications as part of the building permit submittal for review and approval by the Community Development Director.

4. Prior to scheduling a final inspection, color verification shall occur in the field after the applicant has applied the approved material and colors. The applicant shall be required to maintain the approved materials and colors.

5. No grading shall be allowed during the winter season (October 1 to April 30) or during any rain event to avoid potential soil erosion unless a prior written request by the applicant is submitted to the Community Development Director in the form of a completed application for an Exception to the Winter Grading Moratorium at least two (2) week prior to the projected commencement of grading activities

stating the date when grading will begin for consideration, and approval is granted by the Community Development Director.

6. The property owner shall adhere to the San Mateo Countywide Stormwater Pollution Prevention Program "General Construction and Site Supervision Guidelines," including, but not limited to, the following:

   a. Delineation with field markers of clearing limits, easements, setbacks, sensitive or critical areas, buffer zones, trees, and drainage courses within the vicinity of areas to be disturbed by construction and/or grading.

   b. Protection of adjacent properties and undisturbed areas from construction impacts using vegetative buffer strips, sediment barriers or filters, dikes, mulching, or other measures as appropriate.

   c. Performing clearing and earth-moving activities only during dry weather.

   d. Stabilization of all denuded areas and maintenance of erosion control measures continuously between October 1 and April 30.

   e. Storage, handling, and disposal of construction materials and wastes properly, so as to prevent their contact with stormwater.

   f. Control and prevention of the discharge of all potential pollutants, including pavement cutting wastes, paints, concrete, petroleum products, chemicals, wash water or sediments, and non-stormwater discharges, to storm drains and watercourses.

   g. Use of sediment controls or filtration to remove sediment when dewatering the site and obtain all necessary permits.

   h. Avoiding cleaning, fueling, or maintaining vehicles on-site, except in a designated area where wash water is contained and treated.

   i. Limiting and timing application of pesticides and fertilizers to prevent polluted runoff.

   j. Limiting construction access routes and stabilization of designated access points.

   k. Avoiding tracking dirt or other materials off-site; cleaning off-site paved areas and sidewalks using dry sweeping methods.

   l. Training and providing instruction to all employees and subcontractors regarding the Watershed Protection Maintenance Standards and construction Best Management Practices.

m. Additional Best Management Practices in addition to those shown on the plans may be required by the Building Inspector to maintain effective stormwater management during construction activities. Any water leaving the site shall always be clear and running slowly.

n. Failure to install or maintain these measures will result in stoppage of construction until the corrections have been made and fees paid for staff enforcement time.

7. The applicant shall apply for a building permit and shall adhere to all requirements from the Building Inspection Section, the Drainage Section, the Geotechnical Section, the Woodside Fire Protection District, the West Bay Sanitary District, and the California Water Service Company.

8. No site disturbance shall occur, including any grading or vegetation removal, until a building permit has been issued.

9. To reduce the impact of construction activities on neighboring properties, comply with the following:

   a. All debris shall be contained on-site; a dumpster or trash bin shall be provided on-site during construction to prevent debris from blowing onto adjacent properties. The applicant shall monitor the site to ensure that trash is picked up and appropriately disposed of daily.

   b. The applicant shall remove all construction equipment from the site upon completion of the use and/or need of each piece of equipment which shall include but not be limited to tractors, back hoes, cement mixers, etc.

   c. The applicant shall ensure that no construction-related vehicles shall impede through traffic along the right-of-way on El Granada Boulevard. All construction vehicles shall be parked on-site outside the public right-of-way or in locations which do not impede safe access on El Granada Boulevard. There shall be no storage of construction vehicles in the public right-of-way.

10. Noise sources associated with demolition, construction, repair, remodeling, or grading of any real property shall be limited to the hours from 7:00 a.m. to 6:00 p.m. weekdays and 9:00 a.m. to 5:00 p.m. Saturdays. Said activities are prohibited on Sundays, Thanksgiving and Christmas (San Mateo County Ordinance Code Section 4.88.360).

11. At the building permit application stage, if a landscape plan is proposed, the project shall demonstrate compliance with the Water Efficient Landscape Ordinance (WELO) and provide the required forms. WELO applies to new landscape projects equal to or greater than 500 sq. ft. and rehabilitated landscape projects equal to or greater than 2,500 square feet. A prescriptive checklist is

available as a compliance option for projects under 2,500 square feet. The Performance approach is applicable to new and/or rehabilitated landscape projects over 2,500 square feet. The proposal shall indicate the total size of landscaping (measured in square feet) to determine Performance or Prescription WELO review, wucol numbers, species and quantity and indicate whether irrigation is proposed.

12. The applicant shall implement the following dust control measures during grading and construction activities:

    a. Water all active construction and grading areas at least twice daily.

    b. Cover all truck hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.

    c. Apply water two times daily or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at the project site.

    d. Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public street/roads.

    e. Enclose, cover, water twice daily or apply (non -toxic) soil binders to exposed stockpiles (dirt, sand, etc.).

13. Erosion control and tree protection inspections are required prior to the issuance of a building permit for grading, construction and demolition purposes, as the project requires the protection of significant trees. Once all review agencies have approved the building permit, the applicant will be notified that an approved copy of the Erosion Control and Tree Protection Plan are ready for issuance. Once the erosion control and tree protection measures have been installed per the approved plans, contact Planning Department staff to schedule a pre-site inspection. A $144 inspection fee will be added to the building permit for the inspection. If this initial pre site inspection is not approved, an additional inspection fee will be assessed for each required re inspection until the erosion control and tree protection measures are deemed adequate by the Building Inspection Section and Planning Department staff.

14. Prior to the required Pre-Site Inspection, the project arborist shall number the trees on site and clearly mark the significant and non-significant trees proposed for removal. Numbering of the trees shall match the building plans and any submitted arborist report.

15. The applicant shall plant on site a total of nine (9) trees using at least 15-galon size stock for all the trees removed. Tree replanting shall be required prior to the final building inspection approval. A final inspection by the Planning Department will be added to the building permit.

Grading Conditions

16. No grading shall be allowed during the winter season (October 1 to April 30) to avoid potential soil erosion. The applicant shall submit a letter to the Current Planning Section, a minimum of two (2) weeks prior to commencement of grading, stating the date when grading will begin. A Winter Grading Exception may be granted for grading during the winter season at the discretion of the Community Development Director.

17. The applicant shall include an erosion and sediment control plan to comply with the County's Erosion Control Guidelines on the plans submitted for the building permit. This plan shall identify the type and location of erosion control measures to be installed upon the commencement of construction in order to maintain the stability of the site and prevent erosion and sedimentation off-site.

18. No grading activities shall commence until the property owner has been issued a grading permit (issued as the "hard card" with all necessary information filled out and signatures obtained) by the Current Planning Section.

19. Prior to any land disturbance and throughout the grading operation, the property owner shall implement the erosion control plan, as prepared and signed by the engineer of record and approved by the decision maker. Revisions to the approved erosion control plan shall be prepared and signed by the engineer and submitted to the Community Development Director for review and approval.

20. An Erosion Control Pre-Site Inspection shall be conducted prior to the issuance of a grading permit "hard card" and building permit to ensure the approved erosion control and/or tree protection measures are installed adequately prior to the start of ground disturbing activities.

21. Prior to issuance of the grading permit "hard card," the property owner shall submit a schedule of all grading operations to the Current Planning Section, subject to review and approval by the Current Planning Section. The submitted schedule shall include a schedule for winterizing the site. If the schedule of grading operations calls for the grading to be completed in one grading season, then the winterizing plan shall be considered a contingent plan to be implemented if work falls behind schedule. All submitted schedules shall represent the work in detail and shall project the grading operations through to completion.

22. It shall be the responsibility of the engineer of record to regularly inspect the erosion control measures for the duration of all grading remediation activities, especially after major storm events, and determine that they are functioning as designed and that proper maintenance is being performed. Deficiencies shall be immediately corrected, as determined by and implemented under the observation of the engineer of record.

23. For the final approval of the grading permit, the property owner shall ensure the performance of the following activities within thirty (30) days of the completion of grading at the project site: (a) The engineer shall submit written certification that all grading has been completed in conformance with the approved plans, conditions of approval/mitigation measures, and the Grading Regulations, to the Department of Public Works and the Planning and Building Department's Geotechnical Engineer, and (b) The geotechnical consultant shall observe and approve all applicable work during construction and sign Section II of the Geotechnical Consultant Approval form, for submittal to the Planning and Building Department's Geotechnical Engineer and the Current Planning Section.

Building Inspection Section

24. A building permit is required.

Drainage Section

25. Final Grading and Drainage Plan to be stamped and signed by a registered Civil Engineer. Site stormwater infiltration/retention system(s) need to be sized and located appropriately to mitigate the amount of stormwater resulting from the new development, and sufficient flows need to be routed to the systems to make them effective. Currently only a small portion of the new project impervious area is routed to the proposed retention feature and/or effective landscaping infiltration areas, and the proposed retention system is smaller than the size specified by the provided calculations.

26. Final Drainage Report shall be stamped and signed by a registered Civil Engineer, including confirmation that existing storm drain line adjacent to Foxwood Road and downstream flowpath can handle additional flows from strip drain. If necessary, install protection at storm drain outlet.

27. Updated C3 and C6 Checklist, including completed Worksheets A through C.

Geotechnical Section

28. A detailed grading report shall be provided along with geotechnical report (or combined), to include but not limited to: construction staging, geologic hazards mitigation, safety precautions, geo-structure designs, and geotechnical consultant responsibilities.

Department of Public Works

29. No proposed construction work within the County right-of-way shall begin until County requirements for the issuance of an encroachment permit, including review of the plans, have been met and an encroachment permit issued. Applicant shall contact a Department of Public Works Inspector 48 hours prior to commencing work in the right-of-way.

30. Prior to the issuance of the Building Permit, the applicant will be required to provide payment of "roadway mitigation fees" based on the square footage (assessable space) of the proposed building per Ordinance #3277.

Woodside Fire Protection District

31. Address shall be clearly posted and visible from the street with a minimum four (4) inch numbers on contrasting background.

32. Vegetation along the driveway must have a 13 foot 6 -inch vertical clearance and a 12-foot 18-inch minimum width clearance.

33. Defensible space must be in compliance at the time of final inspection (www.woodsidefire.org).

34. Driveway access must be a 40-degree radius from the direction off Foxwood Drive to driveway direction. This shall be shown on the building plans.

35. Driveway grades over 15 percent need to consist of roughed brushed concert. No grades over 20 percent allowed. Approved finish subject to approval by Woodside Fire Protection District.

36. All areas of crushed stone will need to support the weight of a fire truck of 50,000 pounds.

37. Project must be inspected by a Woodside Fire Protection District inspector upon completion.

California Water Service Company

38. Any improvements to the water system will be at the owner's expense including main extensions, additional service or fire protection needs, including Public or Private, all storm and sewer lines must have separation from Water of 10 foot horizontal separation and 1 foot vertical separation below the water main or service line, service lines which go through one property to another property must have a legal easement granted with documentation submitted to California Water Service Company before installation.

West Bay Sanitary District

39. The existing 4-inch lateral connected to the SSMH may be the stub installed for this future property. It is the contractor's responsibility to confirm.

40. Any sewer line running along the Right-Of-Way shall be an 8-inch sewer main extension per District standards with manholes at every turn.

41. Any sewer lateral running though an adjacent property shall have a private dedicated easement.

42. The sewer lateral shall have a property clean out within 5 feet of the first property the lateral enters.

43. Homeowner shall submit plans to West Bay Sanitary District for review.

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COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT B

San Mateo County

County San Mateo, CA

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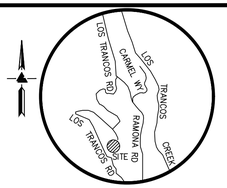
1: 2,257

COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT C

STAGG RESIDENCE
FOXWOOD ROAD
PORTOLA VALLEY, CA
(UNINCORPORATED SAN MATEO COUNTY)



VICINITY MAP
NO SCALE

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		BOUNDARY
		PROPERTY LINE
		RETAINING WALL
		LANDSCAPE RETAINING WALL
	RW RW	RAINWATER TIGHTLINE
	SUB	SUBDRAIN LINE
	TL	TIGHTLINE
SD	SD	STORM DRAIN LINE
SS	SS	SANITARY SEWER LINE
W	W	WATER LINE
G	G	GAS LINE
P	P	PRESSURE LINE
JT	JT	JOINT TRENCH
		SET BACK LINE
		CONCRETE VALLEY GUTTER
		EARTHEN SWALE
CB	CB	CATCH BASIN
JB	JB	JUNCTION BOX
AD	AD	AREA DRAIN
SDMH	SDMH	CURB INLET
SSMH	SSMH	STORM DRAIN MANHOLE
222.57 INV	222.57 INV	FIRE HYDRANT
		SANITARY SEWER MANHOLE
		STREET SIGN
	D	SPOT ELEVATION
		FLOW DIRECTION
		DEMOLISH/REMOVE
		BENCHMARK
200	200	CONTOURS
XX" TREE		TREE TO BE REMOVED

ABBREVIATIONS

AB	AGGREGATE BASE	LF	LINEAR FEET
AC	ASPHALT CONCRETE	MAX	MAXIMUM
ACC	ACCESSIBLE	MH	MANHOLE
AD	AREA DRAIN	MIN	MINIMUM
BC	BEGINNING OF CURVE	MON.	MONUMENT
B & D	BEARING & DISTANCE	MRO	METERED RELEASE OUTLET
BM	BENCHMARK	(N)	NEW
BUB	BUBBLER BOX	NO.	NUMBER
BW/FG	BOTTOM OF WALL/FINISH GRADE	NTS	NOT TO SCALE
		O.C.	ON CENTER
CB	CATCH BASIN	O/	OVER
C & G	CURB AND GUTTER	(PA)	PLANTING AREA
℄	CENTER LINE	PED	PEDESTRIAN
CPP	CORRUGATED PLASTIC PIPE (SMOOTH INTERIOR)	PIV	POST INDICATOR VALVE
		PSS	PUBLIC SERVICES EASEMENT
CO	CLEANOUT	ℙ	PROPERTY LINE
COTG	CLEANOUT TO GRADE	PP	POWER POLE
CONC	CONCRETE	PUE	PUBLIC UTILITY EASEMENT
CONST	CONSTRUCT or –TION	PVC	POLYVINYL CHLORIDE
CONC COR	CONCRETE CORNER	R	RADIUS
CY	CUBIC YARD	RCP	REINFORCED CONCRETE PIPE
D	DIAMETER	RIM	RIM ELEVATION
DI	DROP INLET	RW	RAINWATER
DIP	DUCTILE IRON PIPE	R/W	RIGHT OF WAY
EA	EACH	S	SLOPE
EC	END OF CURVE	S.A.D.	SEE ARCHITECTURAL DRAWINGS
EG	EXISTING GRADE	SAN	SANITARY
EL	ELEVATIONS	SD	STORM DRAIN
EP	EDGE OF PAVEMENT	SDMH	STORM DRAIN MANHOLE
EQ	EQUIPMENT	SHT	SHEET
EW	EACH WAY	S.L.D.	SEE LANDSCAPE DRAWINGS
(E)	EXISTING	SPEC	SPECIFICATION
FC	FACE OF CURB	SS	SANITARY SEWER
FF	FINISHED FLOOR	SSCO	SANITARY SEWER CLEANOUT
FG	FINISHED GRADE	SSMH	SANITARY SEWER MANHOLE
FH	FIRE HYDRANT	ST.	STREET
FL	FLOW LINE	STA	STATION
FS	FINISHED SURFACE	STD	STANDARD
G	GAS	STRUCT	STRUCTURAL
GA	GAGE OR GAUGE	T	TELEPHONE
GB	GRADE BREAK	TC	TOP OF CURB
HDPE	HIGH DENSITY CORRUGATED POLYETHYLENE PIPE	TOW	TOP OF WALL
		TEMP	TEMPORARY
HORIZ	HORIZONTAL	TP	TOP OF PAVEMENT
HI PT	HIGH POINT	TW/FG	TOP OF WALL/FINISH GRADE
H&T	HUB & TACK	TYP	TYPICAL
ID	INSIDE DIAMETER	VC	VERTICAL CURVE
INV	INVERT ELEVATION	VCP	VITRIFIED CLAY PIPE
JB	JUNCTION BOX	VERT	VERTICAL
JT	JOINT TRENCH	W/	WITH
JP	JOINT UTILITY POLE	W, WL	WATER LINE
L	LENGTH	WM	WATER METER
LNDG	LANDING	WWF	WELDED WIRE FABRIC

WEST BAY SANITARY SEWER DISTRICT NOTES:

SANITARY SEWER CONNECTION AND TESTING MUST BE MADE IN THE PRESENCE OF A SEWER DISTRICT REPRESENTATIVE.

THE SEWER DISTRICT OFFICE SHALL BE CONTACTED AT (650) 321-0384 TO SCHEDULE INSPECTIONS. INSPECTIONS MUST BE SCHEDULED A MINIMUM OF ONE WORKING DAY PRIOR TO THE INSPECTION. NO INSPECTIONS SHALL OCCUR ON FRIDAYS, WEEKENDS OR HOLIDAYS UNLESS SPECIAL ARRANGEMENTS ARE MADE WITH THE SEWER DISTRICT.

CARE MUST BE TAKEN TO PROTECT EXISTING SEWER DISTRICT FACILITIES WHEN A NEW SEWER LATERAL AND CONNECTION IS INSTALLED. ANY DAMAGE TO THE SEWER DISTRICT FACILITIES DURING THE INSTALLATION OF THE NEW LATERAL SHALL BE REPAIRED BY THE APPLICANT PER THE SEWER DISTRICT STANDARD DETAILS AT THE APPLICANT'S EXPENSE. THE SEWER DISTRICT MUST BE NOTIFIED OF ANY DAMAGES TO THE SANITARY SEWER FACILITIES AND ANY REPAIRS MUST BE INSPECTED BY A SEWER DISTRICT REPRESENTATIVE.

CARE MUST BE TAKEN TO PROTECT EXISTING SEWER LATERALS AND CONNECTIONS FROM NEIGHBORING PROPERTIES WHEN A NEW SEWER LATERAL AND CONNECTION IS INSTALLED. ANY DAMAGE TO THE LATERALS OR CONNECTIONS DURING THE INSTALLATION OF THE NEW LATERAL SHALL BE REPAIRED BY THE APPLICANT PER THE SEWER DISTRICT STANDARD DETAILS AT THE APPLICANT'S EXPENSE. THE SEWER DISTRICT MUST BE NOTIFIED OF ANY DAMAGES TO THE SANITARY SEWER FACILITIES AND ANY REPAIRS MUST BE INSPECTED BY A SEWER DISTRICT REPRESENTATIVE.

THE EXISTING SEWER LATERAL CONNECTION SHALL BE REMOVED AND THE SEWER DISTRICT MANHOLE REPAIRED. A MINIMUM OF 12" OF THE ABANDONED LATERAL UPSTREAM FROM THE PREVIOUS CONNECTION POINT SHALL BE PLUGGED.

THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL CONSTRUCTION DEBRIS IN THE MANHOLE AFTER THE LATERAL CONNECTION HAS BEEN MADE. CARE MUST BE TAKEN TO PREVENT CONSTRUCTION DEBRIS FROM ENTERING THE SEWER SYSTEM DURING THE ABANDONMENT OF THE EXISTING SEWER LATERAL AND INSTALLATION OF THE NEW SEWER LATERAL CONNECTION. IF THE SEWER DISTRICT DISCOVERS THAT CONSTRUCTION DEBRIS HAS ENTERED THE SEWER SYSTEM, THE APPLICANT SHALL BE RESPONSIBLE FOR CLEANING AND PROVIDING VIDEO INSPECTION OF THE DOWNSTREAM PORTIONS OF THE SEWER MAINS TO THE SEWER DISTRICT'S SATISFACTION.

SEWER NOTES:
FOR SEWER DEPTHS FROM MINIMUM COVER UNDISTURBED SOIL WHERE TO 5 FEET, USE STANDARD WYE CONNECTION. FOR DEPTHS BELOW 5 FEET, USE STANDARD C-900 U200 PIPE TEE CONNECTION WITH SLOPING RISER AS SHOWN. TAP-TITE CONNECTIONS MAY BE USED WHERE APPLICABLE.

WHEN SEWER IS AT MINIMUM DEPTH, HOLD SERVICE LINE TO MINIMUM SLOPE AND LESSEN COVER AT PROPERTY LINE. OTHERWISE 3 FEET OF COVER TO OFFICIAL GRADE IS REQUIRED AT PROPERTY LINE.

THE LOCATION OF ALL SEWER LATERALS SHALL BE MARKED WITH A LETTER 'S' ON TOP OF CURB OR BACK OF WALK.

ALL SERVICE TEES OR WYES SHALL BE MANUFACTURER'S STANDARD FITTINGS. CONNECTION CLOSURE SHALL BE BY STANDARD BAND SEAL COUPLINGS WITH 316 STAINLESS STEEL SHEAR RING ON SERVICE ADDITIONS. NO PIPE BREAKING AND CONCRETE PATCHING WILL BE PERMITTED, ONLY NEATLY SNAPPED OR SAWCUT LENGTHS WL BE ALLOW.

8 GAUGE COPPER WIRE FOR TRACING PURPOSES SHALL BE PLACED ON ALL NEW LATERALS AND REPLACEMENT LATERALS WHEN EXCAVATION IS FROM MAIN LINE TO THE PROPERTY UNE CLEANOUT. WIRE TO BE BROUGHT TO RISER WITH TWO FEET COILED INSIDE BOX.

TAP-TIE AND TEE CONNECTIONS ARE NOT ALLOWED IN TERMINATING SEWER MAINS (MOST UPSTREAM LINE).

CONTRACTOR SHALL PLACE ROOT CONTROL FABRIC OVER ALL JOINTS AS SHOWN ON WEST BAY SANITARY DISTRICT DETAIL NO. 13. 8. CONTRACTOR SHALL INSTALL BEDDING AND BACKFILL MATERIAL AS SHOWN ON WEST BAY SANITARY DISTRICT DETAIL NO. 8.

PIPE COVER:

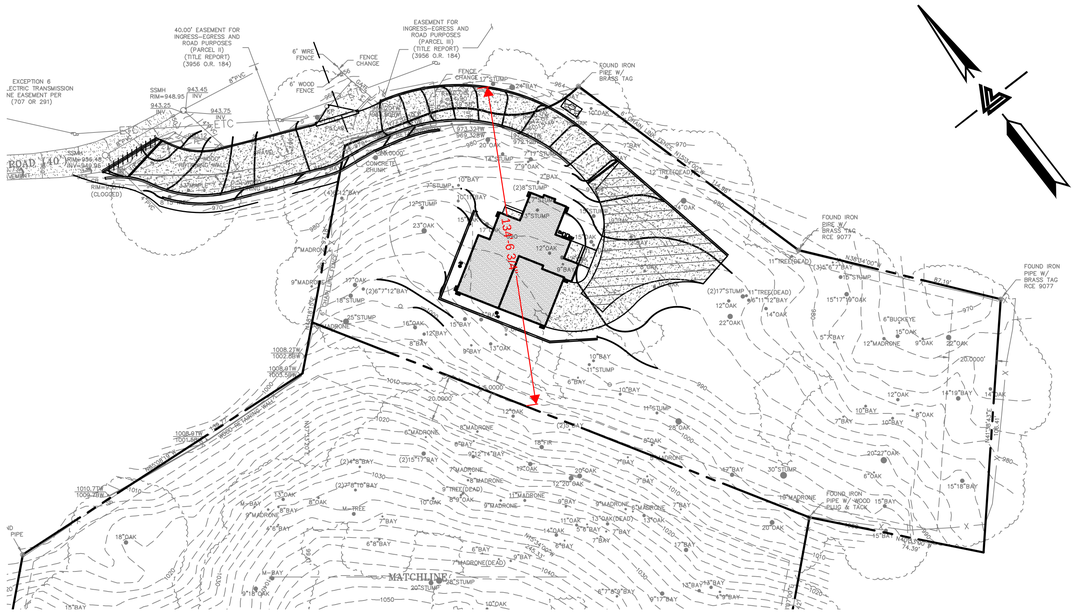
LESS THAN 36'	DIP CLASS 50 OR 51 PVC C900 CLASS 200
36" OR DEEPER	PVC C900 CLASS 150

SEWER INSPECTION PERMIT (SIP)NOTE:

SEWER INSPECTION PERMITS (SIP) MUST BE SUBMITTED AND OBTAINED BY THE APPLICANT OR CONTRACTOR (INDEPENDENT OF TOWN REVIEW AND APPROVAL) FOR:
A. THE INSPECTION OF THE PROPOSED SEWER DISTRICT STANDARD CLEANOUT AT THE PROPERTY LINE.
B. THE INSPECTION OF THE NEW LATERAL CONNECTION AT THE SEWER MAIN.
C. THE INSPECTION OF THE LATERAL BETWEEN THE PROPERTY LINE CLEANOUT AND THE SEWER DISTRICT MAIN
D. THE REMOVAL OF THE EXISTING LATERAL CONNECTION AND SEWER MAIN REPAIR

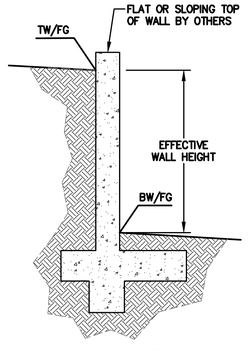
RETAINING WALL NOTES

1. TW/FG REPRESENTS FINISHED EARTHEN GRADE OR PAVEMENT ELEVATION AT TOP OF WALL, NOT ACTUAL TOP OF WALL MATERIAL. BW/FG REPRESENTS FINISH EARTHEN GRADE OR PAVEMENT ELEVATION AT BOTTOM OF WALL NOT INCLUDING FILL FOUNDATION. GRADES INDICATED ON THESE PLANS REFER TO THE FINISHED GRADES ADJACENT TO THE RETAINING WALL, NOT INCLUDING FOOTING, FREEBOARD, ETC.
2. DIMENSIONS SHOWN IN BRACKETS SHOWN AS [X.X'] DENOTE THE EFFECTIVE WALL HEIGHT ONLY. THE ACTUAL WALL HEIGHT AND DEPTH MAY DIFFER DUE TO CONSTRUCTION REQUIREMENTS.
3. REFER TO SPECIFIC WALL CONSTRUCTION DETAIL FOR STRUCTURAL ELEMENTS, FREEBOARD, AND EMBEDMENT.
4. REFER TO ARCHITECTURAL, LANDSCAPE ARCHITECTURE, AND/OR STRUCTURAL PLANS FOR DETAILS, WALL ELEVATIONS, SUBDRAINAGE, WATERPROOFING, FINISHES, COLORS, STEEL REINFORCING, MATERIALS, ETC. PROVIDE CLIPS OR OTHER MEANS OF SECURING FINISH MATERIALS AS NECESSARY (WET SET INTO THE WALL).
5. ALL RETAINING WALLS SHOULD HAVE A BACK-OF-WALL SUB-SURFACE DRAINAGE SYSTEM INCLUDING WEEPHOLES TO PREVENT HYDROSTATIC PRESSURE.
6. SEE DETAIL SHEET FOR SPECIFIC INFORMATION.
7. PROVIDE GUARDRAIL (WHERE APPLICABLE AND DESIGNED BY OTHERS) AS REQUIRED FOR GRADE SEPARATION OF 30 INCHES OR MORE MEASURED 5' HORIZONTALLY FROM FACE OF WALL, PER CBC.



KEY MAP
1" = 30'

SCHEMATIC RETAINING WALL
PLEASE NOTE THE DETAIL ABOVE IS SCHEMATIC ONLY AND DOES NOT PERTAIN TO ANY SPECIFIC RETAINING WALL LOCATED ON-SITE.



NOTE:
FOR CONSTRUCTION STAKING SCHEDULING OR QUOTATIONS PLEASE CONTACT GREG BRAZE AT LEA & BRAZE ENGINEERING (510)887-4086 EXT 116. aabaya@leabraze.com

EASEMENT NOTE

EASEMENTS SHOWN ARE PER PRELIMINARY TITLE REPORT PREPARED BY FIRST AMERICAN TITLE COMPANY, ORDER NO. 2701-4934547, DATED JUNE 2, 2015.

EASEMENTS FOR WATER PIPES, ELECTRIC LIGHT POLES AND WIRES, WITH INGRESS AND EGRESS ARE LISTED IN DOCUMENTS (590 O.R. 351), (628 O.R. 17) AND (2949 O.R. 409). THE EXACT LOCATIONS OF SAID EASEMENTS ARE NOT DESCRIBED.
EASEMENT FOR UTILITIES IS LISTED IN DOCUMENT (2716 OR 488) AND EASEMENT FOR WATER FORCE MAINS AND TANK SITES LISTED IN DOCUMENT (2886 OR 568). SAID EASEMENTS DO NOT AFFECT SUBJECT PROPERTY.

SITE BENCHMARK

SURVEY CONTROL POINT
MAG AND SHINER SET IN ASPHALT
ELEVATION = 950.93'
(NGVD 29)

BENCHMARK

TOWN OF PORTOLA VALLEY BENCHMARK "PV33"
3.5" BRASS DISK IN MONUMENT WELL STAMPED "PV33"
42' NORTHWEST OF CATCH BASIN, 18' SOUTHEAST OF STREET MONUMENT AT THE INTERSECTION OF BUCK MEADOW DRIVE AND BLUE OAKS COURT
ELEVATION = 858.53'
(NGVD 29)

NOTES

ALL DISTANCES AND DIMENSIONS ARE IN FEET AND DECIMALS OF A FOOT.

UNDERGROUND UTILITY LOCATION IS BASED ON SURFACE EVIDENCE.

BUILDING FOOTPRINTS ARE SHOWN AT GROUND LEVEL.

FINISH FLOOR ELEVATIONS ARE TAKEN AT DOOR THRESHOLD (EXTERIOR)

ESTIMATED EARTHWORK QUANTITIES

CUBIC YARDS	WITHIN BUILDING FOOTPRINT	OUTSIDE BUILDING FOOTPRINT	TOTAL CUBIC YARDS
CUT	660	490	1150
FILL	0	360	360
TOTAL	660	850	1510
EXPORT	790 CUBIC YARDS		

NOTE:
GRADING QUANTITIES REPRESENT BANK YARDAGE. IT DOES NOT INCLUDE ANY SWELLING OR SHRINKAGE FACTORS AND IS INTENDED TO REPRESENT IN-SITU CONDITIONS. QUANTITIES DO NOT INCLUDE OVER-EXCAVATION, TRENCHING, STRUCTURAL FOUNDATIONS OR PIERS, OR POOL EXCAVATION (IF ANY). NOTE ADDITIONAL EARTHWORKS, SUCH AS KEYWAYS OR BENCHING MAY BE REQUIRED BY THE GEOTECHNICAL ENGINEER IN THE FIELD AT TIME OF CONSTRUCTION. CONTRACTOR TO VERIFY QUANTITIES.

1-800-227-2600 CALL BEFORE YOU DIG USA UNDERGROUND SERVICE ALERT

* BUILDING PAD NOTE:
ADJUST PAD LEVEL AS REQUIRED. REFER TO STRUCTURAL PLANS FOR SLAB SECTION OR CRAWL SPACE DEPTH TO ESTABLISH PAD LEVEL.

OWNER'S INFORMATION

OWNER:
STAGG RESIDENCE
FOXWOOD ROAD
PORTOLA VALLEY, CA

APN: 080-092-240

REFERENCES

THIS GRADING AND DRAINAGE PLAN IS SUPPLEMENTAL TO:
1. TOPOGRAPHIC SURVEY BY LEA & BRAZE ENGINEERING, ENTITLED;
"TOPOGRAPHY"
FOXWOOD ROAD
PORTOLA VALLEY, CA
DATED: 9-16-14
JOB#2140624
2. SITE PLAN BY SITE WEST ENTITLED:
"SITE PLAN"
FOXWOOD ROAD
PORTOLA VALLEY, CA
3. SOIL REPORT BY MURRAY ENGINEERS. ENTITLED:
"GEOTECHNICAL INVESTIGATION"
123 MAIN ST
PORTOLA VALLEY, CA
JOB# 1997-1R1
DATE: SEPTEMBER 2015

THE CONTRACTOR SHALL REFER TO THE ABOVE NOTED SURVEY AND PLAN, AND SHALL VERIFY BOTH EXISTING AND PROPOSED ITEMS ACCORDING TO THEM.

SHEET INDEX

REGISTERED PROFESSIONAL ENGINEER JAMES TOBY No. 63127 CIVIL STATE OF CALIFORNIA ORIGINAL SIGNATURES IN BLUE INK

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS
BAY AREA REGION
2495 INDUSTRIAL PKWY WEST
HAYWARD, CALIFORNIA 94545
(P) (510) 887-4086
(F) (510) 887-3019

SACRAMENTO REGION
3017 DOUGLAS BLVD, # 300
ROSEVILLE, CA 95661
(P) (916)966-1338
(F) (510)797-7363
WWW.LEABRAZE.COM

STAGG RESIDENCE
FOXWOOD RD
PORTOLA VALLEY, CALIFORNIA
UNINCORPORATED SAN MATEO COUNTY
APN: 080-092-240

TITLE SHEET

REVISIONS	BY
–	–
–	–
–	–
–	–
–	–

JOB NO:	2170748
DATE:	02-04-19
SCALE:	AS NOTED
DESIGN BY:	MG
DRAWN BY:	MG
SHEET NO:	C-1.0

1 OF 2 SHEETS

SCALE: 1" = 10'

(N) 14 FT DRIVEWAY. PROVIDE BRUSHED CONCRETE PAVING AT SLOPE >15%

(N) RIP-RAP ENERGY DISSIPATER.

(E) TREE TO REMAIN AND TO BE PROTECTED. REFER TO TP-1.0. PROVIDED BY OWNER.

(E) CONCRETE DRIVEWAY TO NEIGHBORING LOT TO REMAIN

CONFORM (N) EDGE OF PAVEMENT TO (E) DRIVEWAY

(N) CONCRETE SWALE

(E) TREE TO REMAIN AND TO BE PROTECTED. REFER TO TP-1.0. PROVIDED BY OWNER.

(E) GRAVEL DRIVEWAY TO BE REMOVED

(N) 18 FT DRIVEWAY AT PORTION SERVING 2 SINGLE FAMILY RESIDENCES. PROVIDE BRUSHED CONCRETE PAVING AT SLOPE >15%

PROVIDE (N) CONNECTION TO JOINT POLE

PROVIDE (N) FIRE PROTECTION LINE

REMOVE (E) HEADER WALL

(N) VERTICAL CURB

(N) TRENCH DRAIN -TYP.

PROVIDE (N) WATER METER AT STREET FRONTAGE

CONNECT (N) SD LINE TO (E) 10" CMP

FOXWOOD ROAD (40')

BUBBLER

REMOVE (E) WOOD RETAINING WALL

(N) SITE WALL MAX HEIGHT: 6 FT -TYP.

(N) EARTHEN SWALE -TYP.

PROPOSED (N) LINE OF ACCESS EASEMENT

RELEASE WALL SUBDRAINAGE INTO (E) STREET FLOW LINE AT (N) BUBBLER

CONNECT (N) SS LINE INTO (E) MANHOLE

REMOVE (E) WOOD RETAINING WALL

(N) 4" PVC TIGHT LINE -TYP.

[2] (N) STEPS 12" TREAD, 6" RISE

(N) CONCRETE LANDING -TYP.

(N) HOUSE
FF: 989.25
PAD: 985.75 FT

(N) GARAGE
SLAB: 988.50

(N) TRENCH DRAIN -TYP.

(N) DRIVEWAY APRON ASPHALTIC PAVING

BUBBLER

(N) WOODSIDE STANDARD FIRETRUCK TURNAROUND

[2] (N) STEPS 12" TREAD 6" RISE

(E) TREES TO REMAIN AND TO BE PROTECTED. REFER TO TP-1.0. PROVIDED BY OWNER.

(N) RETENTION SYSTEM

(N) TREE PROTECTION FENCING -TYP.

(N) EARTHEN SWALE -TYP.

(E) TREE TO BE REMOVED. -TYP.

(N) SPLASHBLOCK AT RAINWATER LEADER -TYP.

(N) AREA DRAIN -TYP.

(N) 4" PERFORATED PVC SUBDRAIN LINE -TYP.

(E) TREES TO REMAIN AND TO BE PROTECTED. REFER TO TP-1.0. PROVIDED BY OWNER.

(N) TREE PROTECTION FENCING -TYP.

5.0000'

20.0000'

REGISTERED PROFESSIONAL ENGINEER
JAMES TOBY
No. 63127
CIVIL
STATE OF CALIFORNIA
ORIGINAL SIGNATURES IN BLUE INK

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STAGG RESIDENCE
FOXWOOD RD
PORTOLA VALLEY, CALIFORNIA

UNINCORPORATED SAN MATEO COUNTY APN: 080-092-240

PRELIMINARY SITE DEVELOPMENT PLAN

REVISIONS	BY
-	-
-	-
-	-
-	-
-	-

JOB NO:	2170748
DATE:	02-04-19
SCALE:	AS NOTED
DESIGN BY:	MG
DRAWN BY:	MG

SHEET NO:

C-2.0

2 OF 2 SHEETS

COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT D

ArborWorks
Professional Tree Care... Naturally

CA Contractor 879506

August 9, 2018 (Updated June, 4 2019)

David Stagg
Parcel # 080-092-060 and/or 080-092-240
Foxwood Road
Portola Valley, California 94028
408-771-6710
dstagg@comtelsys.com

On May 25th, 2018, I inspected the trees at Parcel #080-092-060 (new number 080-092-240) on Foxwood Road in Portola Valley, California. Although the recommendations in this report are based on sound and accepted arboricultural practices, author cannot be held responsible for the final outcome of the recommendations or any liabilities associated with this project. Tree inspections, in this case, do not cover all internal cavities, condition of the root system nor non-visible structural defects or disease.

Please consider my observations as noted below on the trees to be preserved:

Tree #	Species	DBH	Height	Spread	Health
A	Quercus lobata – Valley Oak	24"	60'	60'	Good
B	Quercus agrifolia - Coast Live Oak	23"	55'	60'	Good
C	Quercus lobata – Valley Oak	12"	35'	35'	Good
D	Quercus lobata – Valley Oak	20"	60'	60'	Good

Recommendations - After reviewing the San Mateo County Tree Protection and Preservation Ordinance, it is my recommendation to the maintain health and preserve the structural integrity of the tree that maintenance pruning (MP) and hazard reduction pruning (HRP) to include crown cleaning be performed. During and after the demolition and construction process it is my recommendation the CRZ (critical root zone) be protected by placement of trench plates over the surface roots where large equipment will be driving over them. No roots larger than 2 inches in diameter will be cut and no roots will be cut within 10 feet of the base of the trunk.

Heavy equipment and excessive foot traffic should be avoided within the CRZ. There should be no construction spoils (i.e. concrete, paint, solvents, etc..) disposed of in or near the CRZ. Also, there should be no trenching or underground boring within the CRZ.

Additionally, any demolition and construction activity will be performed outside of the drip line of all of the existing trees. Therefore this protects the health of all of existing trees that are to be preserved. In addition, I am recommending the application of Cambistat on the Oak trees after the construction is complete which will encourage new fine root growth with cultural practices such as mulch to create a favorable environment for recovery from the stress of construction. Cambistat will increase the longevity of trees growing in stressful conditions and increase fine root density.

If you have questions or require any additional information, please do not hesitate to contact me. You may contact me on my cell phone at 408-348-5442 or by email at rmathey@arborworksinc.com. Thank you in advance for your prompt consideration in this matter.

Regards,

Rich Mathey

Rich Mathey
Certified Arborist WI 1084-A

ArborWorks
Professional Tree Care... Naturally

CA Contractor 879506

June 5, 2018 (Updated June 4, 2019)

David Stagg
Parcel # 080-092-060 and/or 080-092-240
Foxwood Road
Portola Valley, California 94028
408-771-6710
dstagg@comtelsys.com

On May 25th, 2018, I inspected the trees at Parcel #080-092-060 (new number 080-092-240) on Foxwood Road in Portola Valley, California. Although the recommendations in this report are based on sound and accepted arboricultural practices, author cannot be held responsible for the final outcome of the recommendations or any liabilities associated with this project. Tree inspections, in this case, do not cover all internal cavities, condition of the root system nor non-visible structural defects or disease.

Please consider my observations as noted below:

Tree # 1

Subject tree – *Quercus lobata* – Valley Oak tree

DBH – 20 inches

Height – Approximately 55 feet

Spread – Approximately 50 feet

Tree # 2

Subject tree – *Quercus lobata* – Valley Oak tree (just above the driveway)

DBH – 20 inches

Height – Approximately 50 feet

Spread – Approximately 55 feet

Tree # 3

Subject tree – *Quercus lobata* – Valley Oak tree

DBH – 12 inches

Height – Approximately 30 feet

Spread – Approximately 25 feet

Tree # 4

Subject tree – *Quercus lobata* – Valley Oak tree

DBH – 17 inches

Height – Approximately 50 feet

Spread – Approximately 40 feet

Tree # 5

Subject tree – *Quercus lobata* – Valley Oak tree (leaning)

DBH – 21 inches

Height – Approximately 55 feet

Spread – Approximately 45 feet

Tree # 6

Subject tree – *Quercus agrifolia* – Coast Live Oak tree

DBH – 15 inches

Height – Approximately 40 feet

Spread – Approximately 25 feet

Tree # 7

Subject tree – *Quercus lobata* – Valley Oak tree

DBH – 17 inches

Height – Approximately 45 feet

Spread – Approximately 35 feet

Structural Defects – The trees are all structurally flawed and show decline in the canopy which pose a hazard. The canopies on all the trees have signs of significant stress and due to competition for sunlight and prolonged drought in recent years.

Recommendations – The trees should be considered a hazard and removal of trees is recommended to prevent further damage to the property and/or persons.

If you have questions or require any additional information, please do not hesitate to contact me. You may contact me on my cell phone at 408-348-5442 or by email at rmathey@arborworksinc.com. Thank you in advance for your prompt consideration in this matter.

Regards,

Rich Mathey

Rich Mathey
Certified Arborist WI 1084-A

COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT E

GEOTECHNICAL & ENGINEERING GEOLOGIC INVESTIGATION PROPOSED RESIDENCE APN 080-092-060, FOXWOOD ROAD SAN MATEO COUNTY, CALIFORNIA

THIS REPORT HAS BEEN PREPARED FOR:

GROVER WICKERSHAM

1227 LOS TRANCOS ROAD

PORTOLA VALLEY, CALIFORNIA 94028

SEPTEMBER 2015

MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

MURRAY
ENGINEERS INC
GEOTECHNICAL SERVICES

September 2, 2015
Project No. 1997-1R1

Grover Wickersham
1227 Los Trancos Road
Portola Valley, California 94028

RE: GEOTECHNICAL & ENGINEERING GEOLOGIC INVESTIGATION, PROPOSED RESIDENCE, APN 080-092-060, FOXWOOD ROAD, SAN MATEO COUNTY, CALIFORNIA

Dear Mr. Wickersham:

We are pleased to present the results of our geotechnical and engineering geologic investigation relating to the design and construction of a new residence and associated improvements on your property, APN 080-092-060, on Foxwood Road in unincorporated San Mateo County, California. This report summarizes the results of our field, laboratory, and engineering work, and presents conclusions and recommendations concerning the geologic and geotechnical engineering aspects of the project.

The conclusions and recommendations presented in this report are contingent on our review and approval of the project plans and our observation and testing of the geotechnical aspects of the construction.

If you have any questions concerning our investigation, please call.

Sincerely,
MURRAY ENGINEERS, INC.

Kaysea A. Porter, P.G. 9269
Project Geologist

Mark F. Baumann, C.E.G. 1787
Principal Engineering Geologist

REGISTERED PROFESSIONAL ENGINEER
ANDREW D. MURRAY
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Exp. 3/31/16
CIVIL
STATE OF CALIFORNIA

Andrew D. Murray, P.E.
Principal Engineer

KAP:MFB:ADM

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INTRODUCTION

This report presents the results of our geotechnical and engineering geologic investigation relating to the design and construction of the proposed residence and associated improvements on the Wickersham property, APN 080-092-060, on Foxwood Road in the unincorporated Los Trancos Woods area of San Mateo County. The project location is indicated on the Vicinity Map, Figure A-1. The purpose of our investigation was to evaluate the geotechnical and engineering geologic conditions on the property and to provide conclusions relating to the geotechnical and engineering geologic feasibility of site development and geotechnical design criteria and recommendations for the design and construction of the proposed residence and associated improvements.

A draft fault and geotechnical report was prepared for the property in 1997 by Upp Geotechnology, Inc. At the time of the investigation, our principal engineering geologist was employed by Upp Geotechnology, Inc. and was the lead geologic investigator for the project. The subsurface exploration performed during the 1997 investigation is presented in this report.

Project Description

The undeveloped, hillside property is located at the end of Foxwood Road. The property is accessed by a short dirt road that leads up to a gently sloping building pad in the central portion of the site. The project will include construction of a single-story, pre-fabricated Blu Homes residence in the northern portion of the property. As currently proposed, the residence will include a partial basement beneath the downhill side and the uphill wing will have raised wood floors over a crawlspace. The basement will be cut into the sloping hillside and will daylight along its east side. A raised wood deck is planned along the north side (rear) of the residence and a basement-level patio will be located beneath the deck. An attached carport is planned at the front of the residence. Access to the site will be provided along the existing dirt road. We anticipate that retaining walls will be required along the driveway to support existing cuts and to retain fill along the downhill side. We anticipate that structural loads for the new improvements will be relatively light and typical of residential construction. The layout of the proposed improvements is shown on the Figure A-2, Site Plan & Engineering Geologic Map.

Scope of Services

We performed the following services in accordance with our agreement dated May 23, 2014 (executed on June 4, 2014):

- Reviewed published geologic maps to evaluate the prevailing geologic and seismic conditions on the site and in the site vicinity
- Reviewed a draft copy of a prior geotechnical and geologic report prepared for the property by Upp Geotechnology, Inc. for the property, as well as a report by them for the adjacent property to the west
- Performed an engineering geologic reconnaissance of the site and surrounding areas
- Explored the subsurface conditions on the site by drilling, sampling, and logging four exploratory borings in the area of the proposed improvements
- Performed laboratory testing on selected soil samples for soil classification and to evaluate engineering properties of the subsurface materials
- Performed engineering geologic analyses to evaluate the hazard of surface fault rupture and seismic slope stability
- Performed geotechnical engineering analyses to evaluate the site conditions and to develop geotechnical engineering design criteria for the proposed improvements
- Prepared this report presenting a summary of our investigation and our geotechnical conclusions and recommendations

GEOLOGIC & SEISMIC CONDITIONS

Geologic Overview

The referenced property is located along the northeast side of the central Santa Cruz Mountains, a northwest-trending range within the California Coast Ranges geomorphic province. The site is situated on a moderately to steeply sloping, northeast-facing hillside at an approximately elevation of 1,000 feet above mean sea level (see Figure A-1). According to the Geologic Map of the Mindego Hill Quadrangle (Dibblee and others, 2007), the site is located within the limits of a large landslide complex (Qls) that encompasses the entire Los Trancos Woods area. At depth, the ancient landslide appears to be underlain by Santa Clara Formation (Qsc), Butano Formation (Tbu), and Franciscan Assemblage greenstone (fg) and sandstone (fs). According to Dibblee and others (2007), the Franciscan bedrock is in faulted contact with Santa Clara Formation bedrock along the San Andreas fault. Based on Dibblee's mapping, the San Andreas fault is located along the northeastern property boundary. An in-depth discussion of the local faulting is presented in the Faulting & Seismicity section, below. A copy of the relevant portion of the geologic map is presented on Figure A-3, Vicinity Geologic Map.

Dibblee's mapping is consistent with the Preliminary Map of Landslide Deposits in San Mateo County (Brabb and Pampeyan, 1972). Specifically, the County landslide map depicts the Los Trancos Woods area as being underlain by a very large probable landslide that extends from near the top of the ridgeline to the west of the site down into Los Trancos Creek to the east (see Figure A-4, Vicinity Landslide Map).

According to the State of California Seismic Hazard Zones map for the Mindego Quadrangle (California Geological Survey, 2005a), the site is located within an area considered potentially susceptible to earthquake-induced landsliding. The entire Los Trancos Woods area and much of the moderately steep to steep hillsides in the vicinity are similarly classified (see Figure A-5, State Seismic Hazard Zones Map).

Faulting & Seismicity

Geologists and seismologists recognize the San Francisco Bay Area as one of the most active seismic regions in the United States. There are three major faults that trend in a northwest direction through the Bay Area, which have generated about 12 earthquakes per century large enough to cause significant structural damage. These earthquakes occur on faults that are part of the San Andreas fault system, which extends for at least 700 miles along the California Coast, and includes the San Andreas, Hayward, and Calaveras faults. As noted above, Dibblee and others (2007) map the main trace of the San Andreas fault along the northeastern property boundary (see Figure A-3). However, according to the State earthquake fault zones map for the area (California Division of Mines & Geology, 1974), the main trace of the San Andreas fault is located along the southwestern property boundary and an inferred trace is mapped approximately 200 feet to the northeast of the site. Because of the proximity of these fault traces, the property is located within a State fault hazard zone, formerly known as an Alquist-Priolo special studies zone (see Figure A-6, Vicinity Active Fault Zones Map). The Hayward and Calaveras faults are located approximately 19 and 23 miles northeast of the site, respectively.

Seismic and geologic experts convened by the U.S. Geological Survey, California Geological Survey, and the Southern California Earthquake Center conclude that there is a 63 percent probability for at least one "large" earthquake of magnitude 6.7 or larger in the Bay Area before the year 2038. The northern portion of the San Andreas fault is estimated to have a 21 percent probability of producing a magnitude 6.7 or larger earthquake by the year 2038 (Working Group on California Earthquake Probabilities, 2008).

AERIAL PHOTOGRAPH REVIEW

Two sets of stereographic aerial photographs taken in 1943 and 1963 were reviewed at the U.S. Geological Survey's library in Menlo Park to aid in evaluating the engineering geologic

conditions at the site and in the site vicinity. In addition, we reviewed both Google Earth imagery and LiDAR (light detecting and ranging) imagery available as a Google Earth KMZ file (GEON, 2010) to assess local landsliding and faulting.

The topography of the hillside in the Los Trancos Woods area between Coal Mine Ridge to the southwest and Los Trancos Creek to the northeast is heavily forested, but appears irregular and hummocky. The irregular, hummocky nature of the topography is suggestive of past landsliding approximately consistent with the early mapping by Brabb and Pampeyan (1972) and later work by Dibblee and others (2007). In the two sets of aerial photographs, the actual site location is not easily identifiable due to the dense tree cover; however the general area of the site is obvious based on larger-scale topographic features. The location of the site is obvious on the LiDAR imagery.

On both sets of the stereographic aerial photographs and on the LiDAR imagery, the San Andreas fault appears as a relatively linear, but highly subdued trough or bench extending from southeast to northwest through the central portion of Los Trancos Woods approximately 150 feet from the southwestern property boundary and approximately 225 to 250 feet southwest of the proposed building site. This interpretation is consistent with the location of the main trace shown on the State earthquake fault zones map (see Figure A-6).

Based on the LiDAR imagery, the site is located in the central portion of a relatively uniform slope that extends down from a broad trough formed by the San Andreas fault to the west of the site down to Ramona Road to the east. Subtle tonal variations on the slope in the upper (western) portion of the site are suggestive of shallow landsliding (see dormant shallow landslide areas "Dsls" on Figure A-2). A moderately large, recent landslide is located to the south of the property and extends through the southern-most portion of the site. The landslide is defined by a prominent head scarp, a subdued scarp along the northern lateral margin, and a prominent drainage along the southern lateral margin. The landslide measures approximately 250 feet long from its head scarp down to Ramona Road and is approximately 110 feet wide (see recent landslide "Rls" on Figure A-2).

PRIOR CONSULTANTS' REPORTS

A draft fault location and geotechnical report was prepared for the property in 1997 by Upp Geotechnology, Inc. (UGI). At the time of the investigation, our principal engineering geologist was employed by UGI and was the lead geologic investigator for the project. The report was never finalized or submitted to the County for review; however, a draft copy was provided to the property owner. The purpose of the investigation was to evaluate the geologic and soil engineering conditions of the property; to evaluate the feasibility of site development with respect to faulting and landsliding, and to provide geotechnical

recommendations for future development. As part of their investigation, UGI reviewed prior consultants' reports for the property and nearby properties; explored the subsurface conditions by excavating two fault exploration trenches, two exploration pits, and a large diameter boring and performed a quantitative slope stability analyses to evaluate the relative stability of the hillside. The subsurface exploration was performed in July 1996.

Based on UGI's review, a geologic and soil and foundation investigation was conducted at the site by JCP in 1981 and a geotechnical reconnaissance was performed in 1983. The investigation included the excavation of an approximately 90-foot long fault trench up to approximately 10 feet deep in the southern portion of the subject property (see Figure A-2). A copy of the trench log was not available for our review; however, based on JCP's interpretation, the trench encountered 4 to 6 feet of topsoil and colluvium underlain by Santa Clara Formation bedrock. According to the report, JCP did not observe evidence of faulting in the trench. JCP did not observe any evidence of landsliding on the property; however, they noted an active landslide to the south of the property in excess of 100 feet from the proposed building site. JCP's 1983 geotechnical reconnaissance was performed to address the landsliding in the southern portion of the property, which occurred during the 1982/83 winter. Based on their reconnaissance, JCP noted that the landslide was approximately 240 feet long, extending from Ramona Road upslope and depositing debris on to Ramona Road. They also noted that the landslide was approximately 100 to 120 feet wide and encroached approximately 30 to 40 feet on to the south side of the property. JCP concluded that the cut slope along the uphill side of Ramona Road either caused the landslide or compromised the stability of an existing older landslide. This feature appears to correspond with the recent landsliding identified on the LiDAR imagery and the recent landslide area (Rls) shown on Figure A-2.

As noted above, UGI excavated two fault exploration trenches, two exploration pits, and a large-diameter boring. The locations of the trenches, pits, and the large-diameter boring are shown on Figure A-2. The trenches, which were excavated to a depth of approximately 12 feet, encountered approximately 2 to 4 feet of clayey silt colluvial soil underlain by material that was interpreted as old landslide deposits. In Trench 1, the old landslide deposits are composed of interlayered sequences of silty clay, sandy clay, and clayey silt and in Trench 2, the old landslide deposits are composed of weathered sandstone and siltstone. The exploration pits, which were excavated to depths of 13.5 to 14 feet, encountered similar materials. No evidence of faulting was observed in the trenches or the exploration pits. The large-diameter boring was excavated to a depth of 32 feet and downhole-logged to evaluate the deeper subsurface conditions. The boring encountered similar subsurface conditions, including approximately 4 feet of clayey silt colluvium underlain by old landslide deposits consisting of interlayered silty clay, gravelly clay, and clayey sand. No evidence of active or recent landsliding was observed in the 32-foot deep excavation. No free groundwater was

observed in any of the excavations. Draft copies of UGI's fault trench logs, pit logs, and the log of the large-diameter boring are presented in Appendix D.

In 1996, UGI performed a geologic and geotechnical investigation for an accessory structure on the property immediately west of the Foxwood Road property at 1227 Los Trancos Road. The results of this investigation were presented in a report dated November 14, 1996. As part of the investigation, UGI excavated two fault exploration trenches, one on the property at 1227 Los Trancos Road and one on the undeveloped property to the north (APN 080-092-060). Both trenches encountered active faulting characterized by a 5- to 7-foot wide zone of sheared soil and clayey fault gouge located approximately 190 feet southwest of the proposed building site on the subject property. In addition, the east end of the trench at 1227 Los Trancos Road encountered a landslide failure surface and landslide debris, which appears to correspond with the upper limits of the shallow landslide identified on the LiDAR imagery in the southwestern corner of the property and the dormant shallow landslide area (Dsls) shown on Figure A-2.

SITE EXPLORATION & RECONNAISSANCE

Exploration Program

Our principal engineering geologist performed a preliminary reconnaissance on May 16, 2014. Engineering geologic reconnaissance and mapping were performed by our senior staff geologist on June 17, 2014. Subsequently, on June 20, 2014, the subsurface conditions on the site were evaluated by excavating, sampling, and logging four exploratory borings to depths of approximately 23.5 to 26.5 feet in the area of the proposed residence and driveway at the approximate locations shown on Figure A-2. The boring locations were approximately determined by measuring distance from trees shown on the site plan using a tape measure and should be considered accurate only to the degree implied by the mapping technique used.

The borings were advanced using a track-mounted CME-55 drill rig equipped with 6-inch diameter continuous flight augers. Soil samples were collected with split-spoon samplers that were driven with a 140-pound hammer repeatedly dropped from a height of 30 inches using an automatic-trip hammer. The split-spoon samplers included 3-inch and 2.5-inch outside diameter (O.D.) samplers, and a 2-inch O.D. Standard Penetration Test sampler. The sampler types used are indicated on the logs at the appropriate depths. The number of hammer blows required to drive the samplers were recorded in 6-inch increments for the length of the 18-inch long sampler barrels. The associated blow count data, which is the sum of the second and third 6-inch increment, is presented on the boring logs as sampling resistance in blows per foot. The blow counts for the 2.5- and 3-inch samplers have been adjusted to Standard Penetration Test blow counts for sampler size; however, they have not

been adjusted for other factors, such as hammer efficiency. The logs of the borings are presented in Appendix B as Figures B-1 through B-4. Also included in Appendix B are Figure B-5, Key to Boring Logs; Figure B-6, Unified Soil Classification System; and Figure B-7, Key to Bedrock Descriptions.

Our staff geologist logged the borings in general accordance with the Unified Soil Classification System. The boring logs show our interpretation of the subsurface conditions at the location and on the date indicated, and it is not warranted that these conditions are representative of the subsurface conditions at other locations and times. In addition, the stratification lines shown on the log represent approximate boundaries between the soil materials and the transitions may be gradual. Soil samples recovered from the boring were retained for visual classification, laboratory testing, and for evaluation by our principal engineering geologist.

Site Description

The undeveloped, irregular-shaped property is located at the south end of Foxwood Road, a short cul-de-sac off Los Trancos Road. The property measures approximately 280 feet long by 180 feet deep and is bounded by a developed property and Foxwood Road to the north, and undeveloped properties to the south, east and west. The ground surface across the property slopes down to the east with approximately 70 to 80 feet of a vertical relief (see Figure A-2).

The site is accessed by a dirt driveway extending south from Foxwood Road and entering the north side of the property. The driveway was constructed using cut and fill grading techniques. The fill slope on the downhill (east) side is approximately 3 and 8 feet high and has a gradient of approximately 1.5:1 (horizontal to vertical). The cut slope on the uphill (west) side is between approximately 3 and 6 feet high. The southern-most portion of the cut, which is immediately north of the site has a gradient of approximately 1.5:1 to 2:1. The central approximately 70 feet is supported by a 4-foot tall steel I-beam and wood lagging retaining wall. At the time of our investigation, the retaining wall appeared to be performing adequately with no obvious signs of distress. The southern portion of the cut has a gradient of approximately 1.5:1 (see Figure A-2 and Figure A-7, Geologic Cross-Section A-A').

The driveway extends into the central portion of the property and leads to a relatively level natural bench that appears to have been modified slightly by grading. The bench is approximately 130 feet long and 20 to 30 feet wide and slopes very gently to the east. To the west of the bench, the ground surface slopes up steeply to the adjoining property with an average gradient of approximately 2:1. The ground surface in the northern portion of this slope is relatively uniform and appears to be undisturbed. The north end of the bench slopes up gently to the northwest. To the east of the bench, the ground surface slopes down

gently to moderately to the driveway (see Figure A-2 and Figure A-7). Off-site, to the east of the driveway, the ground surface slopes down at a gradient of approximately 2:1 to 2.5:1 for a distance of approximately 130 to 150 feet to Ramona Road.

Drainage across the property is generally characterized as uncontrolled sheet flow to the east. Sheet flow in the northern two-thirds of the site is intercepted by the driveway and is directed down the driveway to the northwest. Sheet flow in the southern third of the property flows into a broad, topographic depression in the southern-most portion of the property and the off-site to the east.

Landsliding

Based on our reconnaissance and mapping, it appears that two dormant shallow landslides (Dsls) are located on the steep slope in the western portion of the property (see Figure A-2). The northern-most feature, which is located upslope from the proposed building site near the west end of UGI's Trench 1, is characterized by a subdued, arcuate topography measuring approximately 65 feet wide by 35 feet wide. No evidence of this feature was observed in UGI's trench. The southern dormant shallow landslide is approximately 150 feet long and the head region is located on the adjacent properties to the west of the site. The uphill portion of this feature is up to approximately 70 feet wide and it tapers to approximately 20 feet wide near the south end of the bench on the subject property. This feature is also characterized by subdued arcuate topography and its upper limits were identified by UGI in their fault trench at 1227 Los Trancos Road (Upp Geotechnology, Inc., 1996).

A dormant landslide (Dls) is located at the south end of the bench that extends through the central portion of the property. This feature is approximately 120 to 140 feet long and approximately 60 feet wide and is characterized by a moderately steep, subdued head scarp at the south end of the bench and irregular topography across the southern portion of the site (see Figure A-2).

The south side of the dormant landslide is truncated by the recent landslide (Rls) described by UGI (1997) in their review of the 1983 geotechnical reconnaissance letter by JCP. Based on our reconnaissance and mapping, the recent landslide encroaches approximately 35 feet onto the southern-most portion of the property and is characterized by a distinct, relatively un-weathered and near vertical lateral scarp and highly irregular topography. The recent landslide and is located at least 150 feet south of the proposed residence and 110 feet from the proposed carport (see Figure A-2).

Subsurface Conditions

Boring B-1, located along the north side of the proposed residence, encountered approximately 6 feet of colluvium consisting of stiff to very stiff clayey to sandy silt underlain by older colluvium consisting of hard silty clay. At a depth of approximately 15 feet, the older colluvium is underlain by very severely weathered sandstone, which we interpret as a relatively intact block of Santa Clara Formation that has been displaced during ancient landsliding. The ancient landslide deposits persisted to the bottom of the boring at a depth of 26.5 feet.

Boring B-2, located along the east side of the proposed residence, encountered approximately 1.5 feet of colluvium consisting of stiff clayey silt underlain by older colluvium consisting of hard silty clay with gravel. Ancient landslide deposits consisting of very severely weathered sandstone and siltstone were encountered beneath the older colluvium at a depth of approximately 13 feet and persisted to the bottom of the boring at a depth of 26.5 feet.

Boring B-3, located at the south end of the bench near the dormant landslide, encountered approximately 6.5 feet of stiff clayey silt and silty clay colluvium underlain by older colluvium consisting of hard silty clay with gravel. At a depth of approximately 13 feet, the older colluvium is underlain by ancient landslide deposits consisting of hard silty clay with abundant gravel. The ancient landslide deposits persisted to the bottom of the boring at a depth of 26.5.

Boring B-4, located along the downhill side of the driveway, encountered approximately 3 feet of stiff silty clay fill underlain by approximately 3 feet of very stiff silty clay colluvium. Older colluvium consisting of very stiff to hard silty clay with trace gravel was encountered beneath the fill and colluvium at a depth of 6 feet. Ancient landslide deposits very severely weathered sandstone was encountered beneath the older colluvium at a depth of approximately 14 feet and persisted to the bottom of the boring at a depth of 23.5 feet below ground surface, where practical drilling and sampling refusal was encountered.

Groundwater

Free groundwater was not encountered in any of the exploratory borings at the time of drilling. We note that fluctuations in the level of groundwater can occur due to variations in temperature, rainfall, and other factors that may not have been evident at the time our observations were made.

Laboratory Testing

Based on laboratory testing of material collected from Boring B-3 at a depth of approximately 1.5 to 3 feet below ground surface, the colluvial soil has a low potential for expansion with a plasticity index of 9 percent and a liquid limit of 38 percent (see Figure C-1, Liquid & Plastic Limits Test Report).

A consolidated-undrained direct shear strength test and a staged consolidated-undrained triaxial shear test were performed on relatively undisturbed samples of the ancient landslide deposits by Cooper Testing Laboratory located in Palo Alto. The direct shear test was performed on a sample composed of very severely weathered sandstone recovered from Boring B-1 at a depth of 15.5 feet. The testing yielded an internal friction angle of 45 degrees and a cohesion value of 965 pounds per square foot (see Figure C-2, Direct Shear Test Data). The staged triaxial shear test was performed on a similar sample from Boring B-2 at a depth of 20.5 feet and yielded an internal friction angle of 37 degrees and a cohesion value of 0 pounds per square foot (see Figure C-3, Triaxial Test Data).

SLOPE STABILITY ANALYSIS

A quantitative seismic slope stability analysis was performed in general accordance with the guidelines outlined in the following publications:

- Special Publication 117A: Guidelines for Evaluating and Mitigating Seismic Hazards in California (California Geological Survey, 2008)
- Recommended Procedures for Implementation of DMG Special Publication 117 - Guidelines for Analyzing and Mitigating Landslide Hazards in California (Blake and others, 2002)

The analysis included a pseudo-static evaluation of slope stability along Cross-Section A-A' to evaluate the relative stability of the site during strong ground shaking associated with a large earthquake on the nearby San Andreas fault. The analysis was performed using the computer program Slide 6.0 utilizing the Modified Bishop method to search for the critical circular failure surface and calculate the factor of safety against sliding. The critical failure surface is defined as the surface with the lowest calculated factor of safety. In general, factors of safety greater than 1.0 indicate a stable condition, while factors of safety less than 1.0 indicate an unstable condition. The pseudo-static analyses utilized a seismic coefficient (k) of 0.30 determined in accordance with Special Publication 117A for a threshold displacement of 15 centimeters using a peak ground acceleration of 0.63g with a 10 percent chance of exceedance in 50 years obtained from the interactive U.S. Geological Survey Earthquake Hazards Program web site (U.S. Geological Survey, 2008).

Stratigraphic boundaries utilized for the analysis were derived from our subsurface investigation and the subsurface investigation performed by UGI (1997). Strength values for the colluvium and older colluvium were obtained from Table 2.1 of the Seismic Hazard Report for the Mindego Hill Quadrangle (California Geological Survey, 2005b) based on fill and Holocene soil deposits and included a phi value of 25 degrees and a cohesion value of 610 pounds per square foot (psf). Based on our experience, we judged that the strength values obtained by laboratory testing on samples of the ancient landslide deposits were unconservatively high, likely due to testing on relatively intact samples of displaced Santa Clara Formation bedrock. Therefore, strength values for the ancient landslide deposits were based on the more conservative values that we have used on several projects in the area, and included a phi value of 30 degrees and a cohesion value of 500 psf. Based on the subsurface conditions at the site, it is our opinion that these strength values are appropriately conservative. Because of the elevated topographic position of the site and the absence of groundwater in our exploratory borings and the large diameter boring by UGI (1997), our analysis did not include a high groundwater level.

The stability analysis yielded a critical failure surface extending through the ancient landslide deposits with a calculated factor of safety of 1.17 (see Figure A-8, Slope Stability Analysis). It should be noted that computer-aided slope stability analyses are mathematical models of slopes and subsurface materials, and they contain many assumptions. Slope stability analyses and the generated factors of safety should only be used to indicate general slope stability trends. In general, factors of safety below 1.00 indicate a potential failure. However, a slope with a factor of safety of less than 1.00 will not necessarily fail but the probability of failure will be greater than that in a slope with a higher factor of safety. Conversely, a slope with a factor of safety greater than 1.00 may fail but the probability of stability is higher than that in a slope with a lower factor of safety.

CONCLUSIONS

Based on our investigation, it is our opinion that the site is suitable for the proposed residential development, provided that the recommendations presented in this report are incorporated in the design and construction of the project. In our opinion, the primary geotechnical constraints to the project are the potential for downhill creep of the surficial colluvial soil, the potential for shallow landsliding on the steeper slope in the uphill portion of the property and along the driveway, the potential for reactivation of deeper dormant and recent landslides in the southern portion of the property, and the potential for strong to violent ground shaking during a moderate to large earthquake on the San Andreas fault or one of the other nearby active faults.

Based on our investigation, it appears that the site is blanketed by a relatively thin veneer of surficial colluvial soil underlain by hard older colluvium and ancient landslide deposits. In addition, along the downhill side of the driveway, the colluvial soil is overlain by a relatively thin wedge of relatively weak fill. Where located on or adjacent to the moderately sloping portions of the property, the colluvial soil and fill will be prone to downhill creep under the force of gravity. Because of the potential for downhill creep of the colluvial soil and fill, in our opinion, these materials should not be relied on for support of the proposed residence and decks, the carport, or site retaining walls. Based on our investigation, it is our opinion that the older colluvium and ancient landslide deposits that underlie the colluvium should provide adequate support for the foundations of the proposed improvements, provided that the improvements are designed and constructed in accordance with the recommendations presented in this report. A detailed discussion of local landsliding and faulting is presented below.

Geologic Hazards

As part of this investigation, we evaluated the potential for geologic hazards to impact the proposed development. The results of our evaluation are presented below:

- Landsliding – Based on our investigation, it appears that the site is located within the limits of a very large ancient landslide complex that is mapped as underlying most of the Los Trancos Woods area. An analysis of the potential for this ancient landslide to experience movement during an earthquake is not practical to perform as part of an investigation for a single site. However, based on our experience, this landslide feature is generally considered by most geologists working in the area to be stable under current climatic conditions. The presence of this feature has not precluded continued development in the Los Trancos Woods area. In our opinion, the risk of significant movement of this feature is low; therefore, it is our opinion that risk of significant impact to the proposed improvements is low.

  Based on our slope stability analysis, in our opinion, the potential for a 10- to 20-foot deep, earthquake-induced landslide at the site is low. The pseudo-static slope stability analysis performed across the property and through the proposed building site yielded a critical failure surface with a factor of safety of 1.17. In accordance with the State's Special Publication 117A, slopes that have a pseudo-static factor of safety greater than 1.0 using can be considered stable.

  As discussed above, a recent landslide that was active in 1982/83 is located to the south of the site and encroaches approximately 35 feet onto the southern-most portion of the property. The recent landslide is located approximately 150 feet from the proposed residence and approximately 110 feet from the proposed carport. A

dormant landslide is located immediately north of the recent landslide and extends up to the relatively level bench that extends through the site. The age of the dormant landslide is unknown; however, it is clearly older than the recent landslide. The dormant landslide is located approximately 90 feet from the proposed residence and approximately 55 feet from the proposed carport. In our opinion, there is a moderate potential for reactivation of the recent and dormant landslides. Given the distance of the residence and carport from these landslides, reactivation of these features should not constitute an immediate threat to the structural integrity of the structures. However, reactivation of these features could impact the proposed driveway and any planned parking area or landscape improvement. In our opinion, if the driveway or parking areas will be located within 20 feet of the dormant landslide, consideration should be given to installing a retaining wall to isolate the improvements from the potentially unstable area.

We did not observe any evidence of active landsliding on the site. However, given the moderately steep slopes above the proposed residence and along the downhill side of the driveway, the occurrence of a new shallow landslide in these areas cannot be excluded. A new shallow landslide could be triggered by excessive precipitation and/or strong ground shaking associated with an earthquake. In our opinion, a new shallow landslide should not pose a significant hazard to the proposed improvements, provided that the improvements are designed and constructed in accordance with the recommendations presented in this report. In addition, excessive precipitation and/or strong ground shaking could cause reactivation of the dormant shallow landslides located on the moderately steep slope in the upper portion of the property. Reactivation of these features could result in the deposition of soil debris onto the building pad in the parking area at the end of the driveway and in the landscape area along the uphill side of the residence. Given the shallow nature and limited size of the northern-most dormant shallow landslide and because it is at least 25 feet from the proposed residence, in our opinion, the potential for soil debris from this landslide to impact the residence is low. To reduce the potential for debris deposition onto the building pad, consideration should be given to installing a debris walls at the base of the slope below the dormant shallow landslide areas.

It should be noted that although our knowledge of the causes and mechanisms of landslides has greatly increased in recent years, it is not yet possible to predict with certainty when and where all landslides will occur. At some time over the span of thousands of years, most hillsides will experience landslide movement as mountains are reduced to plains. Therefore, an unknown level of risk is always present to structures located in hilly terrain. Owners of property in these areas must be aware of and be willing to accept this risk.

- Fault Rupture – Although the site is located within the San Andreas fault zone, based on our review and reconnaissance, and the subsurface exploration by UGI on the property in 1997 and on the adjacent property to the west in 1996, it is our opinion that no active or potentially active faults cross the proposed building area in the northern portion of the site. The exploratory trenches by UGI on the site encountered relatively uniform subsurface conditions across the building site and no evidence of faulting, such as offset soil horizons or sheared and disturbed soil was noted in their report or on their trench logs. Based on the exploratory trenching by UGI on the adjacent property to the west at 1227 Los Trancos Road, it appears that the main trace of the San Andreas fault is located approximately 190 feet to the west of the proposed residence on the subject property. Given the absence of fault-related features through the building site and the documented location of the San Andreas fault to the west, it is our opinion that the potential for fault rupture to occur at the site in the area of the proposed residence is low.

- Ground Shaking - As noted in the Faulting and Seismicity section above, moderate to large earthquakes are probable along several active faults in the greater Bay Area. Therefore, strong to very violent ground shaking should be expected at some time during the design life of the proposed residence and associated improvements. In our opinion, the new residence should be designed in accordance with current earthquake resistant standards, including the 2013 California Building Code and design parameters presented in this report. It should be clearly understood that the building code and the design parameters presented in this report will not prevent damage to structures; rather they are intended to prevent catastrophic collapse.

- Differential Compaction – During moderate and large earthquakes, soft or loose, natural or fill soils can become densified and settle, often unevenly across a site. Based on our investigation, the site is underlain by hard ancient landslide deposits at relatively shallow depth. In our opinion, these materials do not appear to be susceptible to differential compaction. Therefore, it is our opinion that the potential for differential compaction to occur at the site and impact the residence is low. However, a thin wedge of relatively weak fill is located along the downhill side of the driveway. In our opinion, differential compaction of this material presents a moderate risk of distress to the driveway. In our opinion, this risk can be mitigated by removing the relatively weak fill and replacing it as a properly compacted, engineered fill.

RECOMMENDATIONS

We recommend that the proposed residence, including the basement and attached decks, as well as the carport and site retaining walls be supported on drilled piers gaining support in

the underlying older colluvium and ancient landslide deposits. We recommend that the cut slope along the uphill side of the driveway and the fill along the downhill side be retained with conventional retaining walls supported on drilled piers. To limit the potential for long-term settlement of the driveway, the existing fill along the downhill side of the driveway should be removed and replaced as properly engineered fill. We recommend that consideration be given to installing a stitch pier retaining wall along the south end of the building pad to reduce the potential for upslope encroachment of the dormant and recent landslides onto the building pad and potential impact to the upper portion of the driveway and any proposed parking area. A stitch pier retaining wall is a series of closely spaced drilled piers that form a below-grade retaining wall. In addition, to reduce the potential for soil debris to encroach upon the building pad, consideration should be given to installing a pier-supported debris wall at the base of the slope along the uphill side of the residence and parking area. Detailed foundation, grading, and drainage recommendations and geotechnical design criteria are presented below.

2013 CBC EARTHQUAKE DESIGN PARAMETERS

Site-specific earthquake design parameters have been developed based on the procedures described in Chapter 16, Section 1613 of the 2013 California Building Code (California Building Standards Commission, 2013). These procedures utilize State standardized spectral acceleration values for maximum considered earthquake ground motion taking into account historical seismicity, available paleoseismic data, and activity rates along known fault traces, as well as site-specified soil and landslide deposit response characteristics. Contour maps of Class B bedrock horizontal spectral acceleration values for the State of California are included as figures in Chapter 16 of the 2013 CBC, representing both short (0.2 seconds) and long (1.0 second) periods of spectral response and taking into account 5 percent of critical damping. The U.S. Geological Survey (2014) has prepared an online seismic design value application tool, based on the 2010 ASCE with a July 2013 CBC errata, for public use, that allows for site-specific adjustments of these acceleration values for different subsurface conditions, which are defined by site classes. Based on coordinates derived from Google Earth, the existing residence is approximately located at latitude 37.34811 and longitude -122.19793. Given these coordinates and based on our subsurface investigation, in accordance with guidelines presented in the 2013 CBC, the following seismic design parameters will apply for this site:

- Site Class C – Soil Profile Name: Very Dense Soil and Soft Rock (Table 1613.5.2)
- Mapped Spectral Accelerations for 0.2 second Period: S_S= 2.892 (Site Class B)
- Mapped Spectral Accelerations for a 1-second Period: S_1= 1.241 (Site Class B)
- Design Spectral Accelerations for 0.2 second Period: S_{DS}= 1.886 (Site Class C)
- Design Spectral Accelerations for a 1-second Period: S_{D1}= 1.075 (Site Class C)

FOUNDATIONS

Drilled Piers

We recommend that the residence, including the basement and attached decks, the detached carport, retaining walls, and debris walls, if utilized, be supported on drilled, reinforced, cast-in-place concrete friction piers. Drilled piers for the residence, decks, and carport should be at least 16 inches in diameter and should extend at least 14 feet into the underlying older colluvium and/or ancient landslide deposits. Piers for site retaining walls and debris walls should extend at least 8 feet into the older colluvium and/or ancient landslide deposits or to a depth equal to the height of the retaining wall plus the thickness of non-supportive soil at the top of the pier, whichever is deeper. Because of the potential for reactivation of the dormant landslide in the southern portion of the property, piers for site retaining walls located within 10 feet of this feature should be embedded at least 15 feet into the ancient landslide deposits and should not rely on the older colluvium for support. In general, drilled piers should be spaced no closer than approximately three pier diameters, center-to-center.

Drilled piers should be designed to resist dead plus live loads using an allowable skin friction value of 400 pounds per square foot (psf) for the depth of the pier in the older colluvium and/or ancient landslide deposits with a one-third increase allowed for transient loads, including wind and seismic forces. Any portion of the piers in fill or surficial colluvium and any point-bearing resistance should be neglected for support of vertical loads.

To resist lateral creep of the near surface soils, we recommend that piers be designed to resist an active soil pressure equal to an equivalent fluid weight of 85 pounds per cubic foot, acting over 2-pier diameters in the downhill direction over the depth of the piers embedded in the surficial colluvial soil. The depth of the active loads from the fill and colluvium will vary slightly at individual pier locations. Based on our subsurface investigation, we anticipate active soil depths up to approximately 6 feet along the downhill side of the residence. To avoid over-design and to facilitate pier construction, we suggest that the project structural engineer develop a pier table that provides required pier embedment depth into supportive older colluvium and/or ancient landslide deposits based on depth of overlying non-supportive material from 0 to 6 feet. Piers for site retaining walls located within 10 feet of the dormant landslide in the southern portion of the property, should assume active soil depths of up to 12 feet.

The active loads from soil creep and other lateral loads may be resisted by passive earth pressure based upon an equivalent fluid pressure of 350 pounds per cubic foot, acting on 2 times the projected area for the depth of the pier in the older colluvium and/or ancient landslide deposits. Any passive resistance corresponding to the creep zone described above should be neglected.

Actual pier diameter, depth, and reinforcing should be determined by the project structural engineer based on the preceding design criteria and structural requirements.

The bottoms of the pier excavations should be substantially free of all loose cuttings and soil slough prior to the installation of reinforcing steel and the placement of concrete. In addition, any appreciable amount of water, which may accumulate in the pier excavations, should be pumped prior to placing concrete. Alternatively, the concrete may be placed using the tremie method to displace the water. A representative of Murray Engineers, Inc. should observe the pier drilling to evaluate whether piers are sufficiently embedded in the supportive material and that the pier excavations are properly prepared. The pier depths recommended above may require adjustment, if differing conditions are encountered during drilling. Pier excavations should be filled with concrete as soon as practical after drilling to minimize the potential for caving.

Based on our engineering judgment, we anticipate that thirty-year differential settlement due to static loads should not exceed ½-inch across any 20-foot span of pier-supported structures.

Grade Beams

To create a relatively rigid structure, we recommend that the piers for the residence and carport be interconnected with grade beams spaced no more than approximately 20 feet laterally and longitudinally. Grade beams for site retaining walls should be provided based on structural requirements. Perimeter grade beams for at-grade portions of the residence and carport should extend at least 6 inches below crawlspace grade or bottom of slab subgrade to reduce the potential for infiltration of surface runoff under the structures. Grade beam reinforcing should be determined by the project structural engineer based on the preceding design criteria and structural requirements.

BASEMENT & SITE RETAINING WALLS

Basement and site retaining walls should be supported on foundations designed in accordance with the recommendations provided previously. Basement walls should be provided with waterproofing that is integrally designed and constructed with the basement slab floor waterproofing (see Structural Slab section, below). Damp-proofing or waterproofing of other walls should be included in areas where wall moisture would be undesirable, such as at living spaces or where wall finishes could be impacted by concrete moisture. The project architect or a waterproofing consultant should provide detailed recommendations for damp-proofing or waterproofing, as necessary.

Lateral Earth Pressures

Retaining walls should be designed to resist lateral earth pressure from the adjoining natural soils, backfill, and any anticipated surcharge loads. Assuming that the backfill behind the wall will be level (e.g., not sloping upward) and that adequate drainage will be incorporated as recommended below, we recommend that unrestrained retaining walls be designed to resist an equivalent fluid pressure of 45 pounds per cubic foot (pcf) plus one-third of any anticipated surcharge loads. Walls restrained from movement at the top should be designed to resist an equivalent fluid pressure of 45 pcf plus a uniform pressure of 8H psf, where H is the height in feet of the retained soil. Restrained walls should also be designed to resist an additional uniform pressure equal to one-half of any surcharge loads applied at the surface. Where backfill behind the wall will be sloping upward from the wall, we recommend that the equivalent fluid pressures given above be increased by 3 pcf for each 4-degree increase in slope inclination.

In accordance with the 2013 CBC, where applicable, retaining walls should also be designed to resist lateral earth pressure from seismic loading. We recommend that seismic loading be based on a uniform pressure of 12H psf/foot of wall height, where H is the height in feet of the retained soil. The allowable passive pressures provided for retaining wall foundations may be increased by one-third for short-term seismic forces.

Retaining Wall Drainage

We recommend that retaining walls include a subsurface drainage system to mitigate the buildup of water pressure from surface water infiltration and other possible sources of water. The basement wall drainage system should be integral with the basement slab floor drainage system (see Structural Slab section, below).

Retaining wall backdrains should consist of a minimum 4-inch diameter, perforated rigid pipe, Schedule 40 or SDR 35 (or equivalent) with the perforations facing down, resting on about a 2- to 3-inch thick layer of crushed rock. The perforated pipe should be placed within a minimum 8-inch deep by 12-inch wide trench excavated below basement subgrade elevation at the perimeter of the basement walls or at the base of site retaining walls. Subdrain pipes should be bedded and backfilled with ½- to ¾-inch clean crushed rock separated from the native soil with a geotextile filter fabric, such as TC Mirafi 140N or equivalent. The crushed rock backfill should extend vertically to within 18 inches of the finished grade and laterally at least 12 inches from the rear face of the wall. The crushed rock should be compacted with a jumping jack or vibratory plate compactor in lifts not exceeding 12 inches in loose thickness. The upper 18 inches of backfill should consist of native soil, which should be compacted in accordance with the Compaction section of this report to mitigate infiltration of surface water into the subdrain systems. The preceding

recommendations are presented schematically on Figure A-9, Basement Subdrain System Alternative A.

As an alternative to crushed rock, Miradrain, Enkadrain, or other geosynthetic drainage panels approved by this office may be used for retaining wall drainage. If used, the drainage panels should extend from a depth of 18 inches below finish grade to the base of the retaining wall. An approximate 2-foot section of crushed rock wrapped in filter fabric should be placed around the drainpipe, as discussed previously, or a pre-fabricated collection system, such as manufactured by Hydroduct, may be used. Geosynthetic drainage panels should be installed in strict compliance with manufacturer's recommendations with filter fabric against the crushed rock and soil backfill. The preceding recommendations are presented schematically on Figure A-11, Basement Subdrain System Alternative B.

Subdrain pipes should be sloped at a minimum of 1.5 percent and should be connected to rigid, solid (non-perforated) discharge pipes to convey any collected water to a suitable discharge location downslope from walls. The subdrain pipes should be provided with cleanout risers at their up-gradient ends and at most sharp directional changes to facilitate maintenance. All surface drainage pipes, including those connected to downspouts and area drains should be kept completely separate from the retaining wall drainage systems.

Backfill

Backfill placed behind the walls should be compacted in accordance with the specifications outlined in Table 1 of the Compaction section of this report using light compaction equipment.

STITCH PIER RETAINING WALL

If a stitch pier retaining wall is planned along the south end of the building pad to reduce the potential for upslope encroachment of the dormant and recent landslides onto the building pad, we recommend that concrete stitch piers have a minimum diameter of 24 inches and be spaced on 5-foot centers (e.g. 3 feet between adjacent piers). The stitch piers should be embedded at least 15 feet into the ancient landslide deposits. Based on our subsurface exploration and our observations at the site, we anticipate that there may be as much as approximately 13 feet of non-supportive colluvium and potentially unstable older colluvium at the south end of the building pad (see Boring B-3). With this active soil depth, we anticipate that stitch piers in this area could be as deep as approximately 28 feet. Please note, that the recommended stitch pier depth and diameter are minimum pier dimensions and that other structural criterion, such as the need to resist lateral creep forces, may necessitate larger diameter or deeper piers.

The piers should be designed to resist dead plus live loads using an allowable skin friction value of 400 psf for the length of the pier in the supportive ancient landslide deposits with a one-third increase allowed for transient loads seismic forces. The length of the stitch piers in the colluvium, and any point-bearing resistance should be neglected for support of vertical loads.

The stitch piers should be designed to resist lateral loads associated with downhill creep of the colluvial soil using an active soil pressure equal to an equivalent fluid weight of 85 pcf acting over the tributary area of the stitch piers (5 feet). Based on our subsurface exploration and our observations at the site, we anticipate an active soil depth of approximately 13. The actual depth of non-supportive should be evaluated by Murray Engineers, Inc. in the field during construction.

Lateral loads may be resisted by passive earth pressure based upon an equivalent fluid pressure of 350 pcf, acting on 1.5 times the projected area of the pier for the length of the pier in the supportive ancient landslide deposits. The portion of the pier in the non-supportive colluvium should be neglected for support of lateral loads.

Piers should be reinforced with steel I-beams or steel reinforcing cages extending the full depth of the pier. Actual pier reinforcing should be determined by the structural engineer based on the design criteria presented above.

CONCRETE SLABS

We anticipate that concrete slabs will be used for the basement floor and the carport floor, and may be used for the driveway, exterior patios, and walkways. We recommend that basement floor be designed and constructed as a structural slab supported on drilled piers. To carport floor may be designed as a structural slab or a slab-on-grade. If slabs are used for the driveway, patios, and walkways, we assume that these will be constructed as conventional slabs-on-grade.

Structural Slabs

Structural slabs should be supported on drilled piers designed in accordance with the recommendations provided above for support of the residence and carport. As noted above, the basement slab floor should be provided with waterproofing that is integrally designed with the basement wall waterproofing. We recommend that the basement floor slab be underlain by a subdrain system consisting of at least 4 inches of ½- to ¾-inch clean crushed rock underlain by filter fabric. To facilitate drainage below the slab, the subgrade soil beneath the mat should be sloped at an inclination of approximately 1.5 percent to a

perimeter trench where the retaining wall drainage pipe will be located (see Figures A-9 and A-10).

In our opinion, if the carport floor is constructed as a structural slab, it may be constructed over natural grade. However, if there is a possibility that the carport will be enclosed in the future, to reduce the potential for slab dampness from soil moisture vapors, we recommend that the slab be underlain by a vapor retarder consisting of a highly durable membrane not less than 10 mils thick (such as Stego Wrap Vapor Barrier by Stego Industries, LLC or equivalent) underlain by a capillary break consisting of 4 inches of ½- to ¾-inch crushed rock.

Slabs-on-Grade

If the carport floor and driveway are constructed as slabs-on-grade, we recommend that they be underlain by at least 8 inches of Class 2 aggregate baserock. Slabs-on-grade for exterior patios and walkways should be underlain by at least 6 inches of Class 2 aggregate baserock. Prior to placement of the baserock, the subgrade soils should be scarified and moisture conditioned, as necessary, to a depth of approximately 6 inches and recompacted in accordance with the Compaction section of this report.

As noted above, if there is a possibility that the carport will be enclosed in the future, we recommend that the slab be underlain by a vapor retarder consisting of a highly durable membrane not less than 10 mils thick (such as Stego Wrap Vapor Barrier by Stego Industries, LLC or equivalent) underlain by a capillary break consisting of 4 inches of ½- to ¾-inch crushed rock.

In general, exterior slabs-on-grade should be designed as "free-floating" slabs, structurally isolated from adjacent foundations. Slabs-on-grade should be provided with control joints at spacing of not more than about 10 feet. The project structural engineer should provide slab reinforcing based on anticipated use and loading.

Vapor Retarder Considerations

Based on our understanding, two opposing schools of thought currently prevail concerning protection of the vapor retarder during construction. Some believe that 2 inches of sand should be placed above the vapor retarder to protect it from damage during construction and also to provide a small reservoir of moisture (when slightly wetted just prior to concrete placement) to benefit the concrete curing process. Still others believe that protection of the vapor retarder and/or curing of concrete are not as critical design considerations when compared to the possibility of entrapment of moisture in the sand above the vapor retarder and below the slab. The presence of moisture in the sand could lead to post-construction

absorption of the trapped moisture through the slab and result in mold or mildew forming at the upper surface of the slab.

We understand that recent trends are to use a highly durable vapor retarder membrane (at least 10 mils thick) without the protective sand covering for interior slabs surfaced with floor coverings including, but not limited to, carpet, wood, or glued tiles and linoleum. However, it is also noted that several special considerations are required to reduce the potential for concrete edge curling if sand will not be used, including slightly higher placement of reinforcement steel and a water-cement ratio not exceeding 0.5 (Holland and Walker, 1998). We recommend that you consult with other members of your design team, such as your structural engineer, architect, and waterproofing consultant for further guidance on this matter.

FLEXIBLE HARDSCAPE

We anticipate that hardscape, such as asphaltic concrete or sand-set pavers or flagstone may be utilized as part of the proposed construction. Specifically, asphalt or pavers may be used for the driveway and parking areas and pavers or flagstone may be used for exterior patios and walkways.

Asphalt Driveway & Parking Areas

If the driveway and parking areas are surfaced with asphalt, we recommend that the asphalt be at least 2.5 inches thick and that it be underlain by at least 8 inches of Class 2 aggregate baserock (R-value of 78). Prior to placement of baserock, the surficial soil should be scarified to a depth of approximately 6 inches and compacted in accordance with the Compaction section of this report. If soft subgrade conditions are encountered at subgrade elevation along the driveway, it may be advisable to increase the depth of the recompacted subgrade or increase the thickness of the baserock.

Sand-set Pavers

If pavers are planned for the driveway or parking areas, we recommend that they be underlain by at least 8 inches of Class 2 aggregate baserock. If pavers are planned for patios and walkways, we recommend that they be underlain by at least 6 inches of Class 2 aggregate baserock. Prior to placement of baserock, the surficial soil should be scarified to a depth of approximately 6 inches and recompacted in accordance with the Compaction section of this report. If soft subgrade conditions are encountered at subgrade elevation along the driveway, it may be advisable to increase the depth of the recompacted subgrade or increase the thickness of the baserock.

EARTHWORK

A moderate amount of earthwork is anticipated as part of the project, including cuts for the basement, minor cuts and fills for the driveway and parking area, recompaction of existing fill along the driveway, backfilling retaining walls, subgrade preparation beneath slabs and flexible hardscapes, and backfill of utility trenches. Because of the local landslide conditions, we recommend against the use of unretained fill at the site. The proposed earthwork should be performed in accordance with the following recommendations. If more significant earthwork is planned, we should review the extent of this work and modify the recommendations presented below, as necessary.

Clearing & Site Preparation

Initially, the proposed improvement areas should be cleared of obstructions, including trees within the building footprint. Holes or depressions resulting from the removal of underground obstructions below proposed subgrade levels, such root balls, should be backfilled with engineered fill, placed and compacted in accordance with the recommendations provided below. In addition, if backfill associated with the trenches and pits by JCP and UGI is encountered during construction, it may be advisable to remove the backfill and replace it with properly engineered fill. After clearing, the proposed improvement areas should be stripped to a sufficient depth to remove surface vegetation and organic-laden topsoil. The stripped material should not be used as engineered fill; however, it may be stockpiled and used for landscaping purposes.

Material for Fill

All on-site soils below the stripped layer having an organic content of less than 3 percent organic material by volume (ASTM D 2974) should be suitable for use as engineered fill outside the proposed building footprint. In general, fill material should not contain rocks or pieces larger than 6 inches in greatest dimension, and should contain no more than 15 percent larger than 2.5 inches. Any required imported fill should be predominantly granular material or low plasticity material with a plasticity index of less than approximately 15 percent. Any proposed fill for import should be approved by Murray Engineers, Inc. prior to importing to the site. Our approval process may require index testing to evaluate the plasticity of the soil; therefore, it is important that we receive samples of any proposed import material at least 3 days prior to planned importing. Class 2 aggregate baserock should meet the specifications outlined in the Caltrans Standard Specifications, latest edition.

Compaction

Prior to fill placement, the surface to receive the fill should be scarified to a depth of 6 inches, moisture conditioned or aerated, as necessary to near optimum moisture, and then

compacted in accordance with the recommendations presented below. Any proposed engineered fill should be compacted in uniform lifts no thicker than 8 inches in uncompacted thickness, conditioned to the appropriate moisture content, and compacted to the minimum specifications listed in Table 1 below. The relative compaction and moisture content specified in Table 1 is relative to ASTM D 1557, latest edition. Compacted lifts should be firm and non-yielding under the weight of compaction equipment prior to the placement of successive lifts.

Table 1 Compaction Specifications

Fill Element	Relative Compaction*	Moisture Content*
General fill for raising of site grades, driveway, patio areas, and retaining wall backfill (fill up to 4 feet thick)	90 percent	Near optimum
For fills greater than 4 feet thick, including basement retaining wall backfill	93 percent	Near optimum
Upper 6 inches of subgrade beneath hardscape	90 percent	Near optimum
Baserock under hardscape	95 percent	Near optimum
½- to ¾-inch Crushed Rock - Compact with at least 3 passes of a vibratory plate with lift-thickness $\leq$ 12 inches.	see note at left	Not critical
Backfill of utility trenches using on-site soil	90 percent	Near optimum
Backfill of utility trenches using imported sand	90 percent	Near optimum

*Relative to ASTM D 1557, latest edition.

Final Slopes

Any proposed cut slopes in the surficial soil should have gradients no steeper than 3:1 (horizontal to vertical) and proposed fill slopes should have gradients no steeper than 2:1. As noted above, unretained fill slopes should be avoided. In general, all fill slopes should be over-filled and then cut back to proposed final slope gradients. All graded surfaces or areas disturbed by construction should be revegetated prior to the onset of the rainy season following construction to mitigate excessive soil erosion. If vegetation is not established, other erosion control provision should be employed. Ground cover, once established should be properly maintained to provide long-term erosion control.

Shoring, Temporary Slopes & Trench Excavations

The contractor should be responsible for all temporary slopes and trenches excavated at the site and design and construction of any required shoring or bracing. Shoring and bracing should be provided in accordance with all applicable local, state, and federal safety

regulations, including the current OSHA excavation and trench safety standards. Because of the potential for variable soil conditions, field modifications of temporary cut slopes may be required. Unstable materials encountered on the slopes during the excavation should be trimmed off even if this requires cutting the slope back at flatter inclinations.

SITE DRAINAGE

Control of surface water is critical for projects constructed in hillside areas. Roof run-off, rain, and irrigation water should not be allowed to pond near the residence, carport, or on exterior slabs. The proposed residence and carport should be provided with roof gutters and downspouts. Downspout drainage should preferably be collected in closed pipe systems and routed to an at-grade energy dissipater or other suitable discharge outlet, approved by this office. We not that discharge onto splash blocks may be acceptable from a geotechnical perspective provided that the discharge will not create ponding or excessive erosion. The finished gradients around the residence should be designed to drain surface water away from the proposed residence, slabs, and yard areas to suitable discharge points. Where such surface gradients are difficult to achieve, we recommend that area drains or surface drainage swales be installed to collect surface water and convey it away from the residence.

Surface runoff should not be allowed to flow over the top of any artificial slope. The ground surface at the top of the slope should be graded to slope away from the slope or a berm or lined drainage ditch should be provided at the top of the slope. In addition, retaining walls at the bases of descending slopes should be provided with lined drainage swales along their uphill side to collect surface water from above. All collected water should be conveyed away from the development area by buried closed conduit and discharged onto an energy dissipater at an appropriate downslope location.

We recommend that annual maintenance of the surface drainage systems be performed. This maintenance should include inspection and testing to make sure that roof gutters and downspouts are in good working order and do not leak; inspection and flushing of area drains to make sure that they are free of debris and are in good working order; and inspection of surface drainage outfall locations to verify that introduced water flows freely through the discharge pipes and that no excessive erosion has occurred. If erosion is detected, this office should be contacted to evaluate its extent and to provide mitigation recommendations, if needed.

REQUIRED FUTURE SERVICES

Plan Review

To better assure conformance of the final design documents with the recommendations presented in this report and to better comply with the building department's requirements, Murray Engineers, Inc. must review the completed project plans prior to construction. We recommend that the following note be added to the project plans:

- The geotechnical aspects of the construction, including drilled pier excavations, retaining wall backdrains and backfill, placement and compaction of engineered fill, slab subgrade preparation, and the installation of surface and subsurface drainage control systems should be performed in accordance with the recommendations of the geotechnical report prepared by Murray Engineers, Inc., dated September 2, 2015. Murray Engineers, Inc. should be provided at least 48 hours advance notification (650-559-9980) of any geotechnical aspects of the construction and should be present to observe and test the earthwork, foundation, and drainage installation phases of the project.

Construction Observation Services

Murray Engineers, Inc. should observe and test the earthwork and foundation phases of construction in order to a) confirm that subsurface conditions exposed during construction are substantially the same as those interpolated from our limited subsurface exploration, on which the analysis and design were based; b) observe compliance with the geotechnical design concepts, specifications, and recommendations; and c) allow design changes in the event that subsurface conditions differ from those anticipated. The recommendations in this report are based on limited subsurface information. The nature and extent of variation across the site may not become evident until construction. If variations are exposed during construction, it may be necessary to re-evaluate our recommendations.

LIMITATIONS

This report has been prepared for the sole use of Grover Wickersham, specifically for developing geotechnical design criteria relating to design and construction of the proposed residence and associated improvements on the property, APN 080-092-060, on Foxwood Road in unincorporated San Mateo County, California. The opinions presented in this report are based upon information obtained from prior consultants' reports, borings at widely separated locations, site reconnaissance, and upon local experience and engineering judgment. Our opinions have been formulated in accordance with generally accepted engineering geologic and geotechnical engineering practices that exist in the San Francisco Bay Area at the time this report was prepared. The recommendations presented in this

report are based on the assumption that soil and geologic conditions at or between borings do not deviate substantially from those encountered. It should be understood that geotechnical issues may become apparent during the course of construction that were not apparent at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred. In addition, we are not responsible for data presented by others.

The recommendations provided in this report are based on the assumption that we will be retained to provide the Required Future Services described above to better evaluate the site conditions and to evaluate compliance with our recommendations. If we are not retained for these services, Murray Engineers, Inc. cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of this report by others. Furthermore, if another geotechnical consultant is retained for follow-up service to this report, Murray Engineers, Inc. will at that time cease to be the Engineer-of-Record.

The opinions presented in this report are valid as of the present date for the property evaluated. Changes in the condition of a property can occur with the passage of time, whether due to natural processes or the works of man, on this or adjacent properties. In addition, changes in applicable standards of practice can occur, whether from legislation or the broadening of knowledge. Accordingly, the opinions presented in this report may be invalidated, wholly or partially, by changes outside of our control. Therefore, this report is subject to review and should not be relied upon after a period of three years, nor should it be used, or is it applicable, for any property other than that evaluated.

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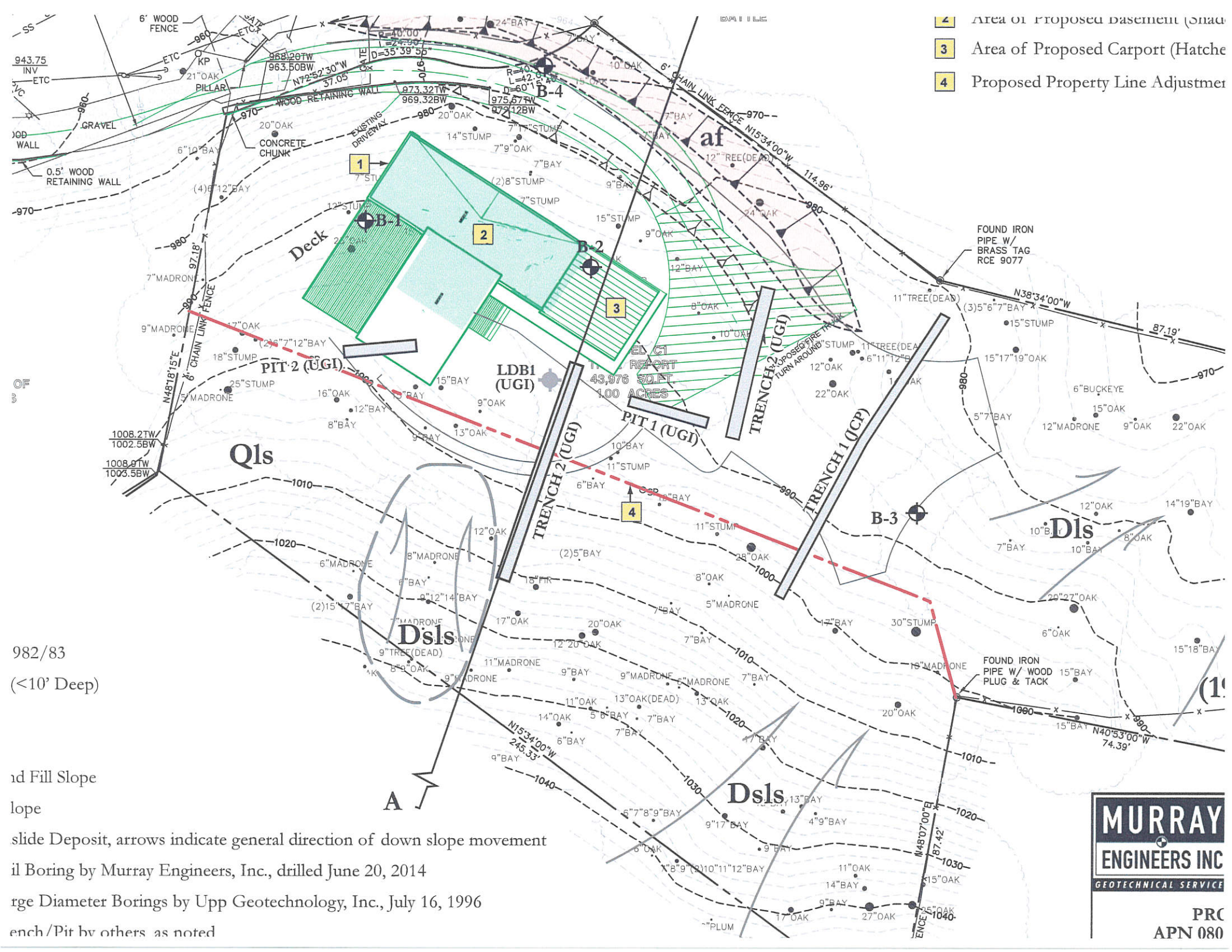
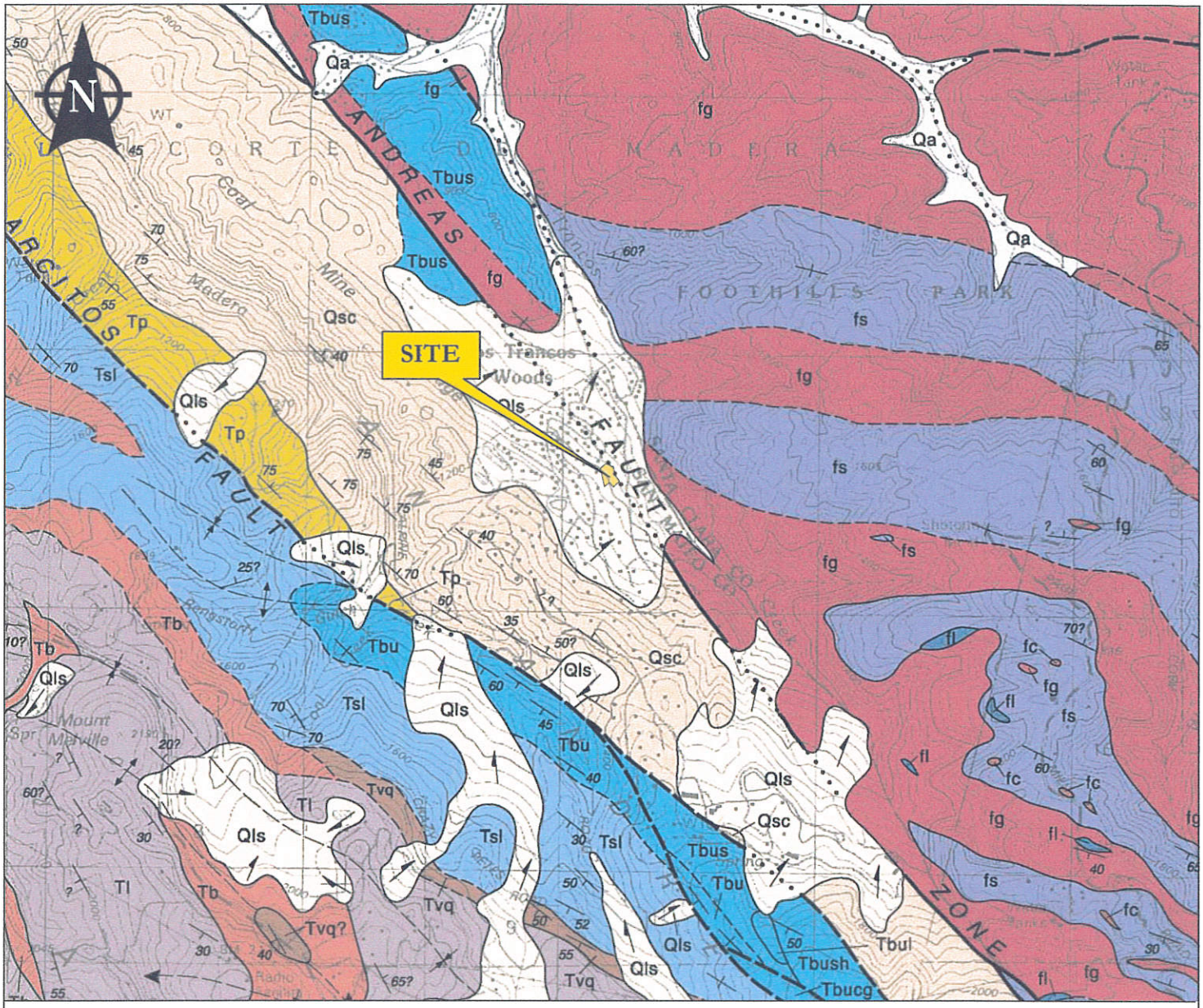
Base: USGS Topographic Map Mindego Hill Quadrangle, 7.5 Minute Series, 1997 Scale: 1 inch = 2,000 feet

MURRAY ENGINEERS INC GEOTECHNICAL SERVICES	PROPOSED RESIDENCE APN 080-092-060 FOXWOOD ROAD SAN MATEO COUNTY, CALIFORNIA	VICINITY MAP
	PROJECT NO. 1997-1R1 / SEPTEMBER 2015	FIGURE A-1


2 Area of Proposed Basement (Shad
3 Area of Proposed Carport (Hatche
4 Proposed Property Line Adjustmer
B-1
B-2
B-3
B-4
LDB1 (UGI)
PIT 1 (UGI)
PIT 2 (UGI)
TRENCH 1 (JCP)
TRENCH 2 (UGI)
TRENCH 3 (UGI)
Deck
af
Qls
Dsls
Dls
A
FOUND IRON PIPE W/ BRASS TAG RCE 9077
FOUND IRON PIPE W/ WOOD PLUG & TACK
6' WOOD FENCE
6' CHAIN LINK FENCE
0.5' WOOD RETAINING WALL
CONCRETE CHUNK
EXISTING DRIVEWAY
GRAVEL
PILLAR
N15°34'00"W 114.96'
N38°34'00"W 87.19'
N40°53'00"W 74.39'
N15°34'00"W 245.33'
N48°07'00"E 87.42'
N48°18'15"E 97.18'
982/83
(<10' Deep)
ıd Fill Slope
lope
slide Deposit, arrows indicate general direction of down slope movement
il Boring by Murray Engineers, Inc., drilled June 20, 2014
rge Diameter Borings by Upp Geotechnology, Inc., July 16, 1996
ench/Pit by others, as noted
MURRAY ENGINEERS INC
GEOTECHNICAL SERVICE
PRC
APN 080



Legend & Selected Map Symbols

Qls	Landslide Debris
Qsc	Santa Clara Formation
Tp	Purisima Formation
Tbu	Butano Formation
fs	Franciscan Assemblage Sandstone
fg	Franciscan Assemblage Greenstone

Geologic Contact, dashed where inferred or indefinite

Fault, dashed where inferred or indefinite, dotted where concealed, queried where uncertain

35 Strike and dip of bedding

Direction of landslide movement

Base: Geologic Map of the Mindego Hill Quadrangle, Dibblee, 2007

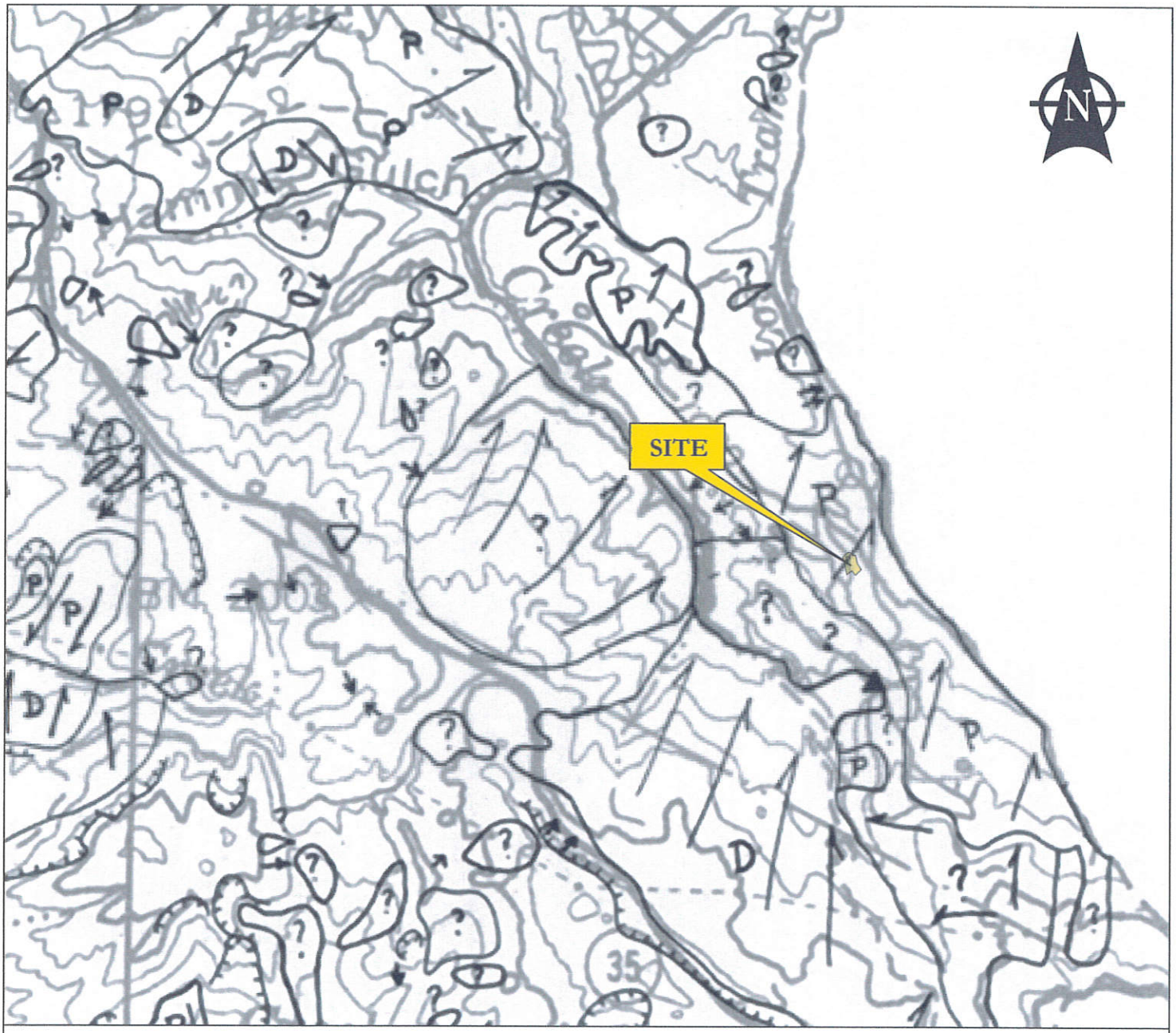
 Scale: 1 inch = 2,000 feet

MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

PROPOSED RESIDENCE
APN 080-092-060 FOXWOOD ROAD
SAN MATEO COUNTY, CALIFORNIA

VICINITY GEOLOGIC MAP

PROJECT NO. 1997-1R1 | **SEPTEMBER 2015** | **FIGURE A-3**



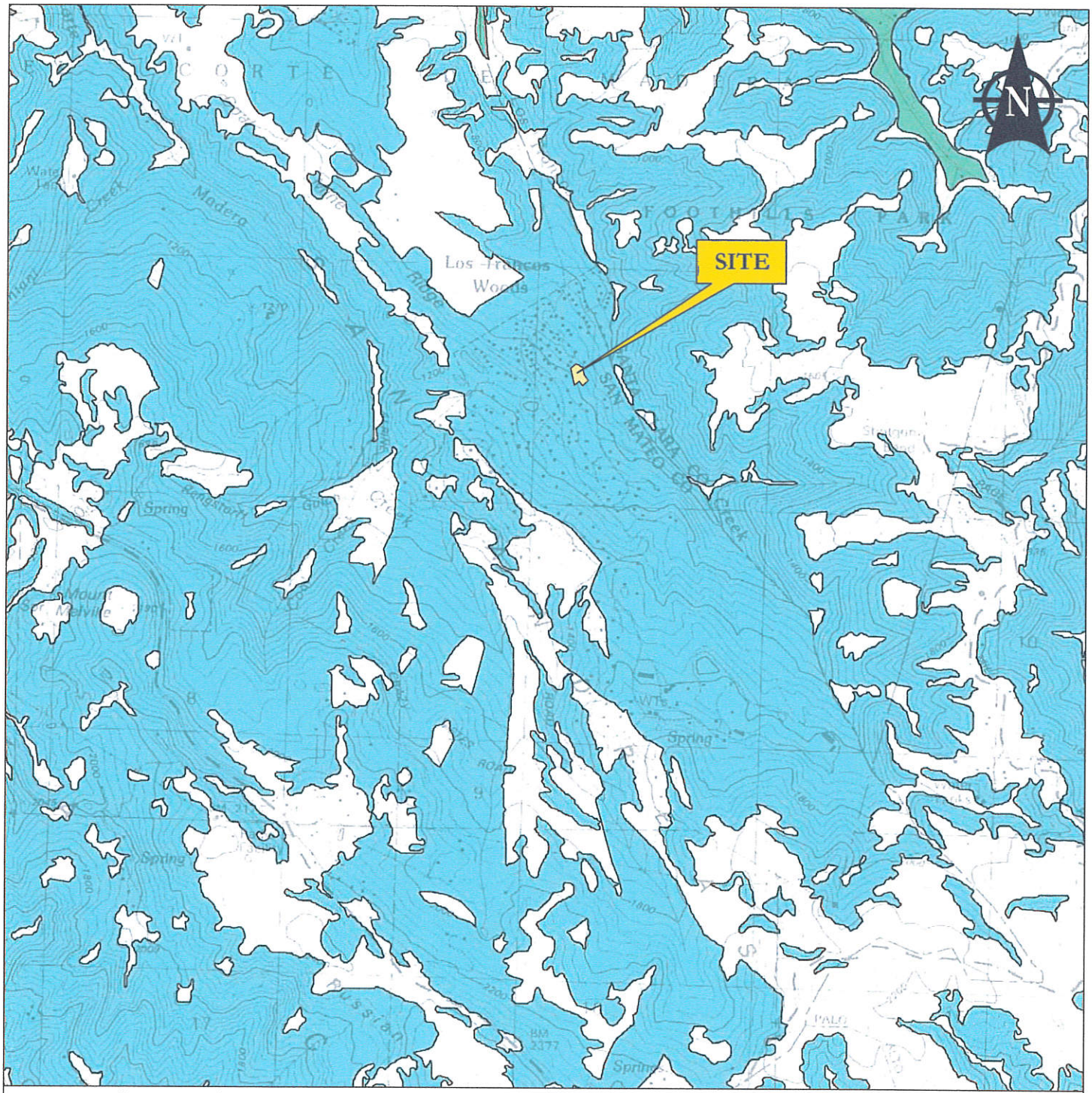
Legend

Large landslide deposit, more than 500 feet in maximum dimension. Arrows indicate general direction of downslope movement. D: definite landslide deposit; P: probable landslide deposit; ? questionable landslide deposit; A: active landslide deposit; hatchures indicate approximate location of an inferred main scarp.

▲ ← Small landslide deposit, 50 to 500 feet in maximum dimension. Arrow indicates general direction of downslope movement. Solid triangle indicates mapped in field.

Base: Preliminary Map of Landslide Deposits in San Mateo County, California, by E.E. Brabb & E.H. Pampeyan, 1972. Approximate Scale: 1 inch = 2,000 feet.

MURRAY ENGINEERS INC GEOTECHNICAL SERVICES	PROPOSED RESIDENCE APN 080-092-060 FOXWOOD ROAD SAN MATEO COUNTY, CALIFORNIA	VICINITY LANDSLIDE DEPOSITS MAP
	PROJECT NO. 1997-1R1 | SEPTEMBER 2015	FIGURE A-4



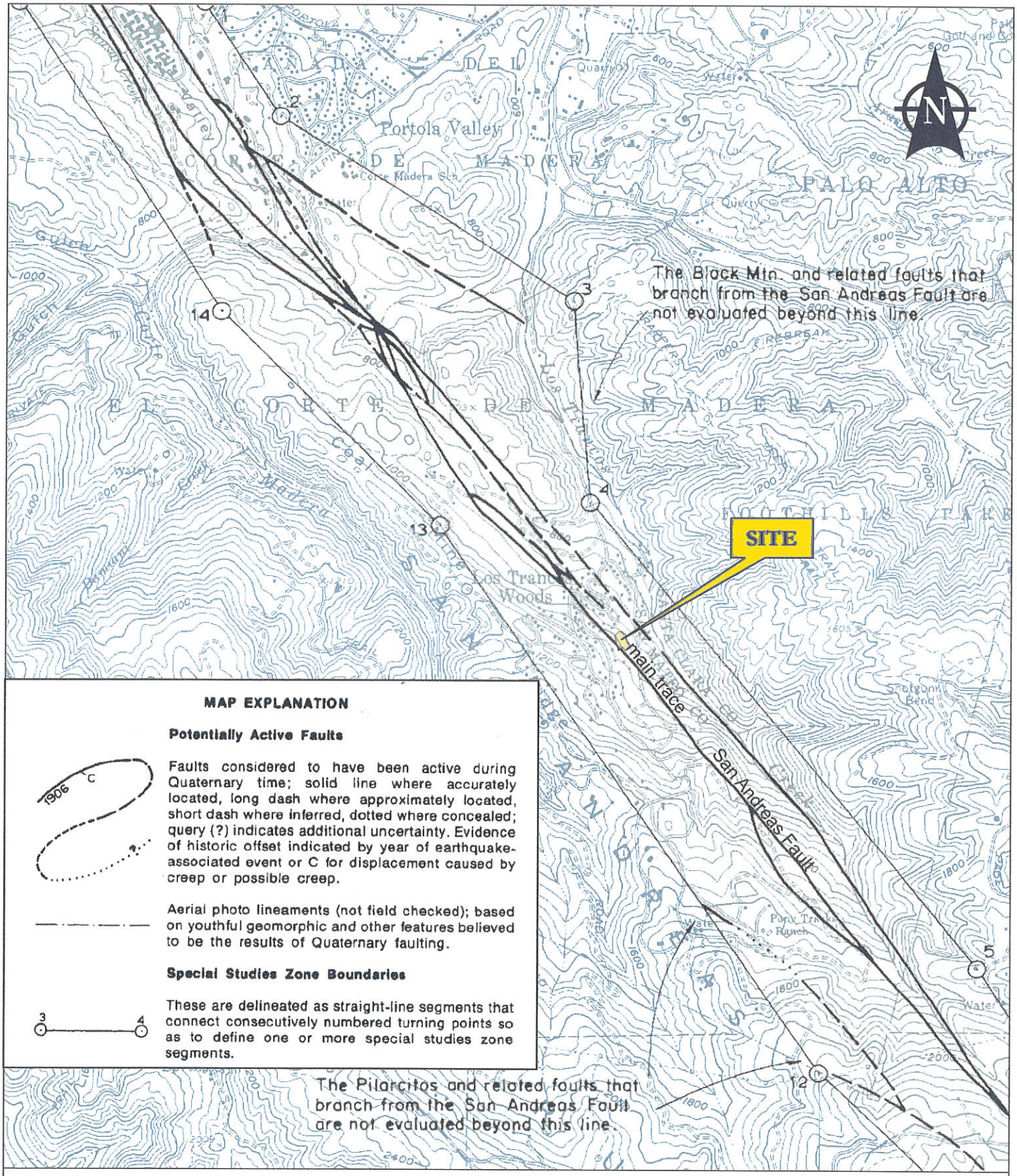
Legend

Areas where historic occurrence of liquefaction, or local, geological, geotechnical and groundwater conditions indicate a potential for earthquake-induced liquefaction

Areas where previous occurence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for earthquake-induced landslide

Base: State of California Seismic Hazard Zones, Mindego Hill Quadrangle, California Geological Survey released August 11, 2005 Scale: 1 inch = 2,000 feet

MURRAY ENGINEERS INC GEOTECHNICAL SERVICES	PROPOSED RESIDENCE APN 080-092-060 FOXWOOD ROAD SAN MATEO COUNTY, CALIFORNIA	VICINITY SEISMIC HAZARD ZONES MAP
	PROJECT NO. 1997-1R1 / SEPTEMBER 2015	FIGURE A-5



Base: State of California Special Studies Zones, Mindego Hill Quadrangle, 1974. Scale: 1 inch = 2,000 feet

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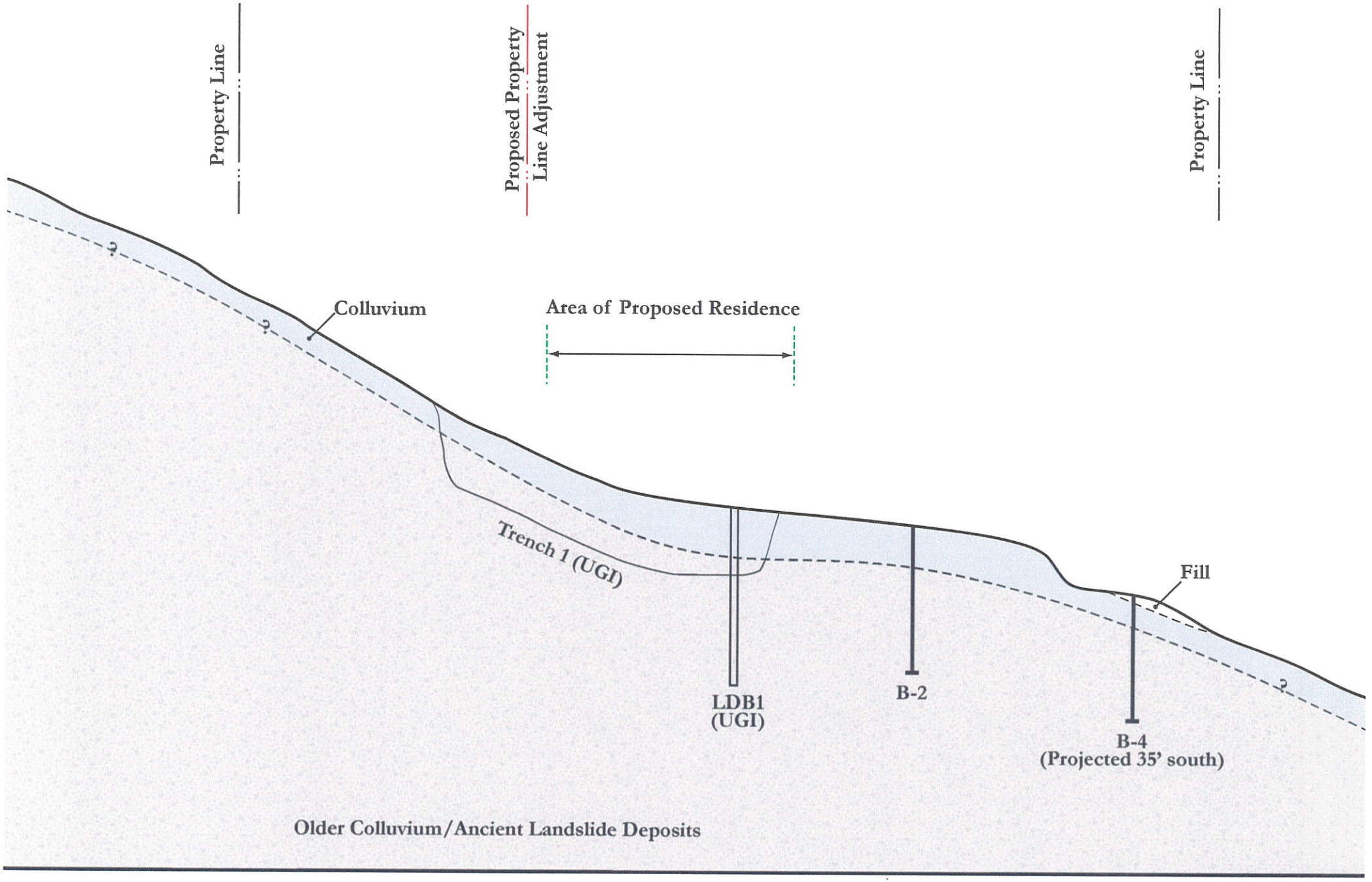
PROPOSED RESIDENCE APN 080-092-060 FOXWOOD ROAD SAN MATEO COUNTY, CALIFORNIA		VICINITY ACTIVE FAULT ZONES MAP
PROJECT NO. 1997-1R1	SEPTEMBER 2015	FIGURE A-6



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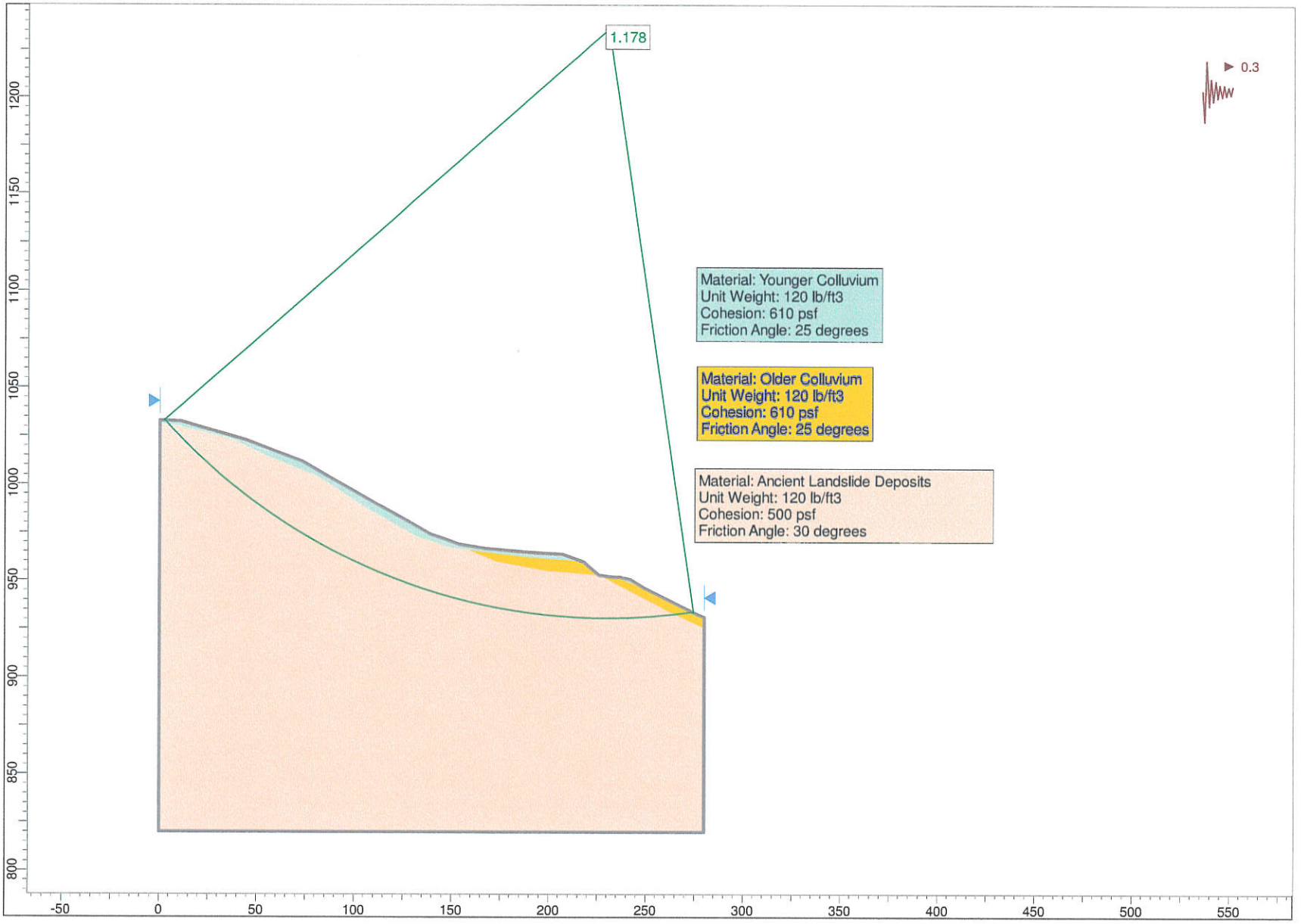

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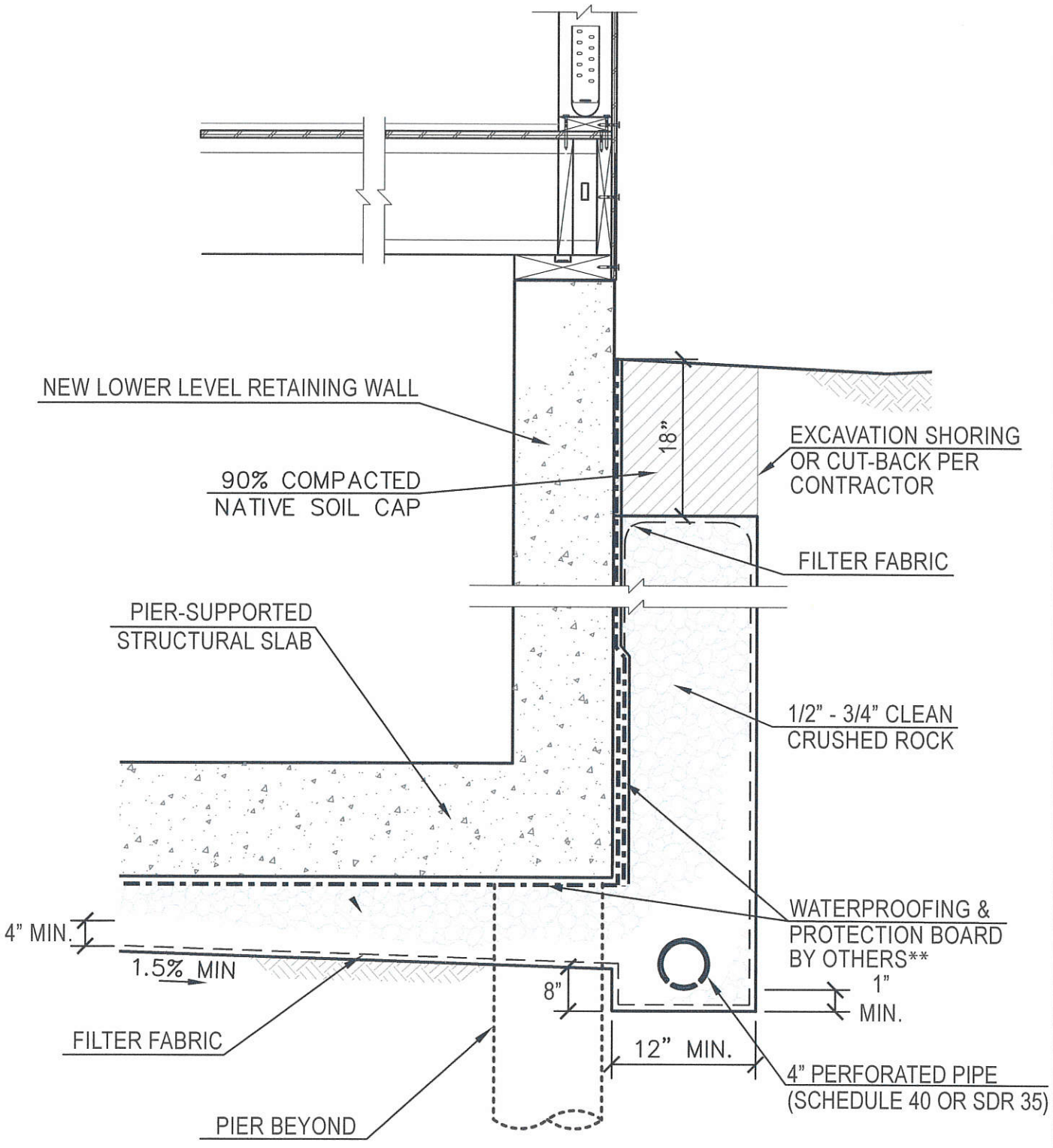
GEOTECHNICAL SERVICES

PROPOSED RESIDENCE
APN 080-092-060 FOXWOOD ROAD
SAN MATEO COUNTY, CALIFORNIA

PSEUDO-STATIC SLOPE STABILITY ANALYSIS

PROJECT NO. 1997-1R1 | **SEPTEMBER 2015** | **FIGURE A-8**

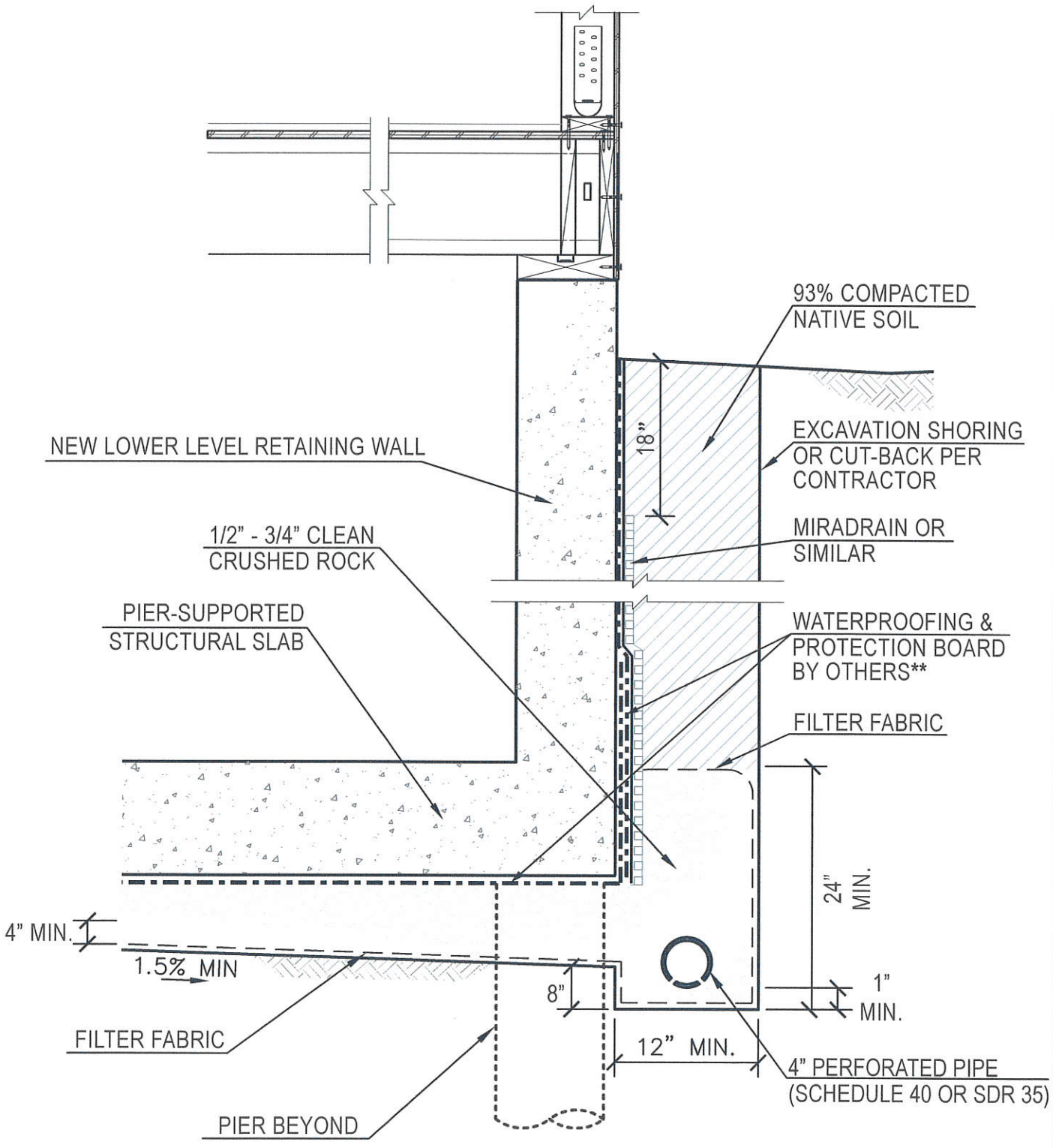


NOT TO SCALE

** MiraDRAIN is not recommended as protection board for waterproofing

Note: This diagram is provided solely to schematically depict the recommendations presented in this report for the basement and basement retaining wall subdrainage. Reference to the basement slab and wall, framing, waterproofing, and extent of excavation are only shown for clarity.

MURRAY ENGINEERS INC GEOTECHNICAL SERVICES	PROPOSED RESIDENCE APN 080-092-060 FOXWOOD ROAD SAN MATEO COUNTY, CALIFORNIA	BASEMENT SUBDRAIN SYSTEM ALTERNATIVE A
	PROJECT NO. 1997-1R1 / DECEMBER 2014	FIGURE A-9



NOT TO SCALE

** MiraDRAIN is not recommended as protection board for waterproofing

Note: This diagram is provided solely to schematically depict the recommendations presented in this report for the basement and basement retaining wall subdrainage. Reference to the basement slab and wall, framing, waterproofing, and extent of excavation are only shown for clarity.

MURRAY ENGINEERS INC GEOTECHNICAL SERVICES	PROPOSED RESIDENCE APN 080-092-060 FOXWOOD ROAD SAN MATEO COUNTY, CALIFORNIA	BASEMENT SUBDRAIN SYSTEM ALTERNATIVE B
	PROJECT NO. 1997-1R1 / SEPTEMBER 2015	FIGURE A-10

Date(s) Drilled **June 20, 2014**	Logged By **CT**	Checked By **MFB**
Drilling Method **Continuous Flight Auger**	Drill Bit Size/Type **6 inch rock bit**	Total Depth of Borehole **26.5 feet bgs**
Drill Rig Type **Track Mounted CME 55**	Drilling Contractor **Britton Exploration, Inc.**	Approximate Surface Elevation **991 feet (relative)**
Groundwater Level and Date Measured **Not Encountered ATD**	Sampling Method(s) **3" OD, 2.5" OD, & 2" OD SPT Split Spoon Samplers**	Hammer Data **140 lb, 30 in drop**
Borehole Backfill **Cuttings**	Location **Northern side of proposed residence**	

Elevation, feet	Depth, feet	Sample Type	Sampling Resistance, blows/foot	Relative Consistency	USCS Symbol	MATERIAL DESCRIPTION	Water Content, %	Dry Density (PCF)
970	0		15	Stiff to Very Stiff	ML	CLAYEY to SANDY SILT, light yellow brown, homogeneous, low to medium plasticity, trace roots, 75% subrounded to subangular gravels (Colluvium)	6	
			35					
			31				8	97
965	5		29				11	
							9	
			33	Hard	CL/CH	SILTY CLAY, dark yellowish brown, slightly heterogeneous, medium plasticity, 5-25% subrounded to subangular sandstone clasts, slightly moist (Older Colluvium)	10	120
			36				10	
960	10		54				15	112
			55				13	
			38				10	
955	15						16	110
			45	Soft*	BR	SANDSTONE, dark yellowish brown to dark olive brown, 5% subrounded gravels, consisting predominantly of sandstone in a very severely weathered silty sandstone matrix (Ancient Landslide Deposits)	16	
950	20		22			*designates hardness of bedrock (see Figure B-7)	15	
945	25		31				13	
940	30					Bottom of Boring at 26.5 feet bgs		

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MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

PROPOSED RESIDENCE
APN 080-092-060 FOXWOOD ROAD
SAN MATEO COUNTY, CALIFORNIA

LOG OF BORING B-1

PROJECT NO. 1997-1R1 | SEPTEMBER 2015 | FIGURE B-1

Date(s) Drilled **June 20, 2014**	Logged By **CT**	Checked By **MFB**
Drilling Method **Continuous Flight Auger**	Drill Bit Size/Type **6 inch rock bit**	Total Depth of Borehole **26.5 feet bgs**
Drill Rig Type **Track Mounted CME 55**	Drilling Contractor **Britton Exploration, Inc.**	Approximate Surface Elevation **990 feet (relative)**
Groundwater Level and Date Measured **Not Encountered ATD**	Sampling Method(s) **3" OD, 2.5" OD, & 2" OD SPT Split Spoon Samplers**	Hammer Data **140 lb, 30 in drop**
Borehole Backfill **Cuttings**	Location **Eastern side of proposed residence**	

Elevation, feet	Depth, feet	Sample Type	Sampling Resistance, blows/foot	Relative Consistency	USCS Symbol	MATERIAL DESCRIPTION	Water Content, %	Dry Density (PCF)
969	0		14	Stiff	ML	CLAYEY SILT dark yellowish brown, slightly heterogeneous, low to medium plasticity, <5% coarse to very coarse sand, <5% subangular gravels, slightly moist (Colluvium)	9	
				Hard	CL		8	115
			45			SILTY CLAY with GRAVEL, dark yellowish brown, heterogeneous, medium plasticity fines, gravel is subangular to subrounded shale and sandstone (Older Colluvium)	7	
964	5						8	
			36				10	
							9	
959	10							
				Soft*	BR	SANDSTONE, dark yellowish brown to dark olive brown, 5% subrounded gravels, very severely weathered, slightly moist (Ancient Landslide Deposits)		
954	15		46				13	120
949	20		60				11	
				Soft*	BR	SILTSTONE, dark yellowish brown to dark olive brown and dark gray, <5% fine grained sandstone interbeds, very severely weathered, moist (Ancient Landslide Deposits)		
944	25		33				16	115
						*designates hardness of bedrock (see Figure B-7)		
939	30					Bottom of Boring at 26.5 feet bgs		

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MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

PROPOSED RESIDENCE
APN 080-092-060 FOXWOOD ROAD
SAN MATEO COUNTY, CALIFORNIA

LOG OF BORING B-2

PROJECT NO. 1997-1R1 | SEPTEMBER 2015 | FIGURE B-2

Date(s) Drilled **June 20, 2014**	Logged By **CT**	Checked By **MFB**
Drilling Method **Continuous Flight Auger**	Drill Bit Size/Type **6 inch rock bit**	Total Depth of Borehole **26.5 feet bgs**
Drill Rig Type **Track Mounted CME 55**	Drilling Contractor **Britton Exploration, Inc.**	Approximate Surface Elevation **989 feet (relative)**
Groundwater Level and Date Measured **Not Encountered ATD**	Sampling Method(s) **3" OD, 2.5" OD, & 2" OD SPT Split Spoon Samplers**	Hammer Data **140 lb, 30 in drop**
Borehole Backfill **Cuttings**	Location **South end of bench**	

Elevation, feet	Depth, feet	Sample Type	Sampling Resistance, blows/foot	Relative Consistency	USCS Symbol	MATERIAL DESCRIPTION	Water Content, %	Dry Density (PCF)
968	0		12	Stiff	ML	CLAYEY SILT, dark brown, homogeneous, low to medium plasticity, ~5-20% subangular to subrounded gravels, trace rootlets, slightly moist (Colluvium)	9	
							11	
			12			PI=9%; LL=38% (sample from 1.5 to 3 feet)	13	
963	5			Stiff	CL	SILTY CLAY, dark brown, homogeneous, medium to high plasticity, < 5% very coarse sand, < 5% very fine gravel, very moist (Colluvium)	11	
							13	102
			32	Hard	CL			
			38			SILTY CLAY, dark yellowish brown, slightly heterogeneous, medium to high plasticity, subrounded gravel consisting predominantly of sandstone and siltstone, slightly moist (Older Colluvium)	11	
958	10						13	106
				Hard	CL	SILTY CLAY with GRAVEL, dark yellowish brown, heterogeneous, 5-20% subrounded sandstone gravel, slightly moist (Ancient Landslide Deposits)		
953	15		90/10"				12	
948	20		92/11"				12	
943	25		49				16	115
938	30					Bottom of Boring at 26.5 feet bgs		

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MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

PROPOSED RESIDENCE
APN 080-092-060 FOXWOOD ROAD
SAN MATEO COUNTY, CALIFORNIA

LOG OF BORING B-3

PROJECT NO. 1997-1R1 | SEPTEMBER 2015 | FIGURE B-3

Date(s) Drilled **June 20, 2014**	Logged By **CT**	Checked By **MFB**
Drilling Method **Continuous Flight Auger**	Drill Bit Size/Type **6 inch rock bit**	Total Depth of Borehole **23.5 feet bgs**
Drill Rig Type **Track Mounted CME 55**	Drilling Contractor **Britton Exploration, Inc.**	Approximate Surface Elevation **971 feet (relative)**
Groundwater Level and Date Measured **Not Encountered ATD**	Sampling Method(s) **3" OD, 2.5" OD, & 2" OD SPT Split Spoon Samplers**	Hammer Data **140 lb, 30 in drop**
Borehole Backfill **Cuttings**	Location **Downhill side of driveway**	

Elevation, feet	Depth, feet	Sample Type	Sampling Resistance, blows/foot	Relative Consistency	USCS Symbol	MATERIAL DESCRIPTION	Water Content, %	Dry Density (PCF)
96	0		12	Stiff	CL	FILL: SILTY CLAY, brown, homogeneous, moderate to high plasticity, ~5-20% subangular to subrounded gravels, trace rootlets, slightly moist	8 11 11	
91	5		12	Very Stiff	CL	SILTY CLAY, dark brown, homogeneous, medium plasticity fines, slightly moist (Colluvium)	10 9	
86	10		27 31	Very Stiff to Hard	CL	SILTY CLAY, dark yellowish brown, heterogeneous, trace subangular to subrounded sandstone gravel, slightly moist (Older Colluvium)	8 25	91
81	15		78/10"	Medium*	BR	SANDSTONE, dark yellowish brown to dark olive brown, 5% subrounded gravels, consisting predominantly of sandstone in a very severely weathered silty sandstone matrix (Ancient Landslide Deposits) *designates hardness of bedrock (see Figure B-7)	10	
76	20		50/3.5"				4	
71	25					Bottom of Boring at 23.5 feet bgs		
66	30							

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MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

PROPOSED RESIDENCE
APN 080-092-060 FOXWOOD ROAD
SAN MATEO COUNTY, CALIFORNIA

LOG OF BORING B-4

PROJECT NO. 1997-1R1 | SEPTEMBER 2015 | FIGURE B-4

Elevation, feet	Depth, feet	Sample Type	Sampling Resistance, blows/foot	Relative Consistency	USCS Symbol	MATERIAL DESCRIPTION	Water Content, %	Pocket Pen Comp. Strength, TSF	Dry Density (PCF)
1	2	3	4	5	6	7	8	9	10

COLUMN DESCRIPTIONS

1. **Elevation, feet:** Elevation (MSL, feet)
2. **Depth, feet:** Depth in feet below the ground surface.
3. **Sample Type:** Type of soil sample collected at the depth interval shown.
4. **Sampling Resistance, blows/foot:** Number of blows required to advance the sampler 12 inches or the distance shown. Blow counts for the 3.0-inch O.D. and 2.5-inch O.D. samplers have been corrected for sampler size to SPT values using conversion factors of 0.65 and 0.77, respectively.
5. **Relative Consistency:** Relative consistency of the subsurface material.
6. **USCS Symbol:** USCS symbol of the subsurface material.
7. **MATERIAL DESCRIPTION:** Description of material encountered. May include consistency, moisture, color, and other descriptive text.
8. **Water Content, %:** Water content of the soil sample, expressed as percentage of dry weight of sample.
9. **Pocket Pen Comp. Strength, TSF:** Approximate unconfined compressive strength in tons per square foot.
10. **Dry Density (PCF):** Dry weight per unit volume of soil sample measured in laboratory in pounds per cubic foot.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)

TYPICAL MATERIAL GRAPHIC SYMBOLS

- Sandstone
- Well graded GRAVEL (GW)
- Poorly graded GRAVEL (GP)
- Well graded GRAVEL with Silt (GW-GM)
- Well graded GRAVEL with Clay (GW-GC)
- Poorly graded GRAVEL with Silt (GP-GM)
- Poorly graded GRAVEL with Clay (GP-GC)
- Silty GRAVEL (GM)
- Clayey GRAVEL (GC)
- Well graded SAND (SW)
- Poorly graded SAND (SP)
- Well graded SAND with Silt (SW-SM)
- Well graded SAND with Clay (SW-SC)
- Poorly graded SAND with Silt (SP-SM)
- Poorly graded SAND with Clay (SP-SC)
- Silty SAND (SM)
- Clayey SAND (SC)
- SILT, SILT w/SAND, SANDY SILT (ML)
- Lean CLAY, CLAY w/SAND, SANDY CLAY (CL)
- SILT, SILT w/SAND, SANDY SILT (MH)
- Fat CLAY, CLAY w/SAND, SANDY CLAY (CH)
- SILT, SILT with SAND, SANDY SILT (ML-MH)
- Lean-Fat CLAY, CLAY w/SAND, SANDY CLAY (CL-CH)
- SILTY CLAY (CL-ML)
- Lean CLAY/PEAT (CL-OL)
- Fat CLAY/SILT (CH-MH)
- Fat CLAY/PEAT (CH-OH)
- Silty SAND to Sandy SILT (SM-ML)
- Silty SAND to Sandy SILT (SM-MH)
- Clayey SAND to Sandy CLAY (SC-CL)
- Clayey SAND to Sandy CLAY (SC-CH)
- SILT to CLAY (CL/ML)
- Silty to Clayey SAND (SC/SM)

TYPICAL SAMPLER GRAPHIC SYMBOLS

- 2 inch-OD Unlined Split Spoon (SPT)
- 2.5 inch-OD Unlined Split Spoon
- 3 inch-OD Unlined Split Spoon
- Shelby Tube (thin-walled, fixed head)
- Grab Sample
- Bulk Sample
- Pitcher Sample
- Other Sampler

OTHER GRAPHIC SYMBOLS

- Water level (at time of drilling, ATD)
- Water level (after waiting a given time)
- Minor change in material properties within a stratum
- Inferred or gradational contact between strata
- Queried contact between strata

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

PRIMARY DIVISIONS			SOIL TYPE	SECONDARY DIVISIONS
COARSE GRAINED SOILS *(<50% Fines)*	GRAVEL	CLEAN GRAVEL *(<5% Fines)*	**GW**	Well graded gravel, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravel or gravel-sand mixtures, little or no fines.
		GRAVEL *with* FINES	**GM**	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SAND	CLEAN SAND *(<5% Fines)*	**SW**	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SAND *with* FINES	**SM**	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS *(>50% Fines)*	SILT AND CLAY *Liquid limit <50%*		**ML**	Inorganic silts and very fine sands, with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, lean clays.
			OL	Organic silts and organic clays of low plasticity.
	SILT AND CLAY *Liquid limit >50%*		**MH**	Inorganic silt, micaceous or diatomaceous fine sandy or silty soil.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			**Pt**	Peat and other highly organic soils.

RELATIVE DENSITY

SAND & GRAVEL	BLOWS/FOOT*
VERY LOOSE	0 to 4
LOOSE	4 to 10
MEDIUM DENSE	10 to 30
DENSE	30 to 50
VERY DENSE	OVER 50

CONSISTENCY

SILT & CLAY	STRENGTH^	BLOWS/FOOT*
VERY SOFT	0 to 0.25	0 to 2
SOFT	0.25 to 0.5	2 to 4
MEDIUM STIFF	0.5 to 1	4 to 8
STIFF	1 to 2	8 to 16
VERY STIFF	2 to 4	16 to 32
HARD	OVER 4	OVER 32

GRAIN SIZES

BOULDERS	COBBLES	GRAVEL		SAND			SILT & CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	

12" 3" 3/4" 4 10 40 200

SIEVE OPENINGS U.S. STANDARD SERIES SIEVE

Classification is based on the Unified Soil Classification System; fines refer to soil passing a No. 200 sieve.

*Standard penetration test (SPT) resistance using a 140-pound hammer falling 30 inches on a 2-inch outside diameter split spoon sampler; blow counts for the 3.0-inch O.D. and 2.5-inch O.D. samplers have been corrected for sampler size to SPT values using conversion factors of 0.65 and 0.77, respectively.

^ Shear strength in tons/sq. ft. as estimated by SPT resistance, field and laboratory tests, and/or visual observation.

MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

PROPOSED RESIDENCE
APN 080-092-060 FOXWOOD ROAD
SAN MATEO COUNTY, CALIFORNIA

UNIFIED SOIL CLASSIFICATION SYSTEM

PROJECT NO. 1997-1R1 | **SEPTEMBER 2015** | **FIGURE B-6**

WEATHERING

Fresh
Rock fresh, crystals bright, few joints may show slight staining. Rock rings under hammer if crystalline.

Very Slight
Rock generally fresh, joints stained, some joints may show thin clay coatings, crystals in broken face show bright. Rock rings under hammer if crystalline.

Slight
Rock generally fresh, joints stained, and discoloration extends into rock up to 1 inch. Joints may contain clay. In granitoid rocks some occasional feldspar crystals are dull and discolored. Crystalline rocks ring under hammer.

Moderate
Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some are clayey. Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock.

Moderately Severe
All rock excepts quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist's pick. Rock goes "clunk" when struck.

Severe
All rock except quartz discolored or stained. Rock "fabric" clear and evident, but reduced in strength to strong soil. In granitoid rocks, all feldspars kaolinized to some extent. Some fragments of strong rock usually left.

Very Severe
All rock except quartz discolored and stained. Rock "fabric" discernible, but mass effectively reduced to "soil" with only fragments of strong rock remaining.

Complete
Rock reduced to "soil". Rock fabric not discernible or discernible only in small scattered locations. Quartz may be present as dikes or stringers.

HARDNESS

Very Hard
Cannot be scratched with knife or sharp pick. Hand specimens requires several hard blows of geologist's hammer.

Hard
Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.

Moderately Hard
Can be scratched with knife or pick. Gouges or grooves to 1/4 inch deep can be excavated by hard blow of point of a geologist's pick. Hard specimen can be detached by moderate blow.

Medium
Can be grooved or gouged 1/16 inch deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1 inch maximum size by hard blows of the point of geologist's pick.

Soft
Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.

Very Soft
Can be carved with knife. Can be excavated readily with point of pick. Pieces 1 inch or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.

JOINT BEDDING & FOLIATION SPACING

Spacing	Joints	Bedding & Foliation
Less than 2 in.	Very Close	Very Thin
2 in to 1 ft.	Close	Thin
1 ft. to 3 ft.	Moderately Close	Medium
3 ft. to 10 ft.	Wide	Thick
More than 10 ft.	Very Wide	Very Thick

ROCK QUALITY DESIGNATOR (RQD)

RQD, as a percentage	Descriptor
Exceeding 90	Excellent
90 to 75	Good
75 to 50	Fair
50 to 25	Poor
Less than 25	Very Poor

MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

PROPOSED RESIDENCE
APN 080-092-060 FOXWOOD ROAD
SAN MATEO COUNTY, CALIFORNIA

KEY TO BEDROCK DESCRIPTIONS

PROJECT NO. 1997-1R1 | SEPTEMBER 2015 | FIGURE B-7

APPENDIX C

LABORATORY TESTS

Samples from the subsurface exploration were selected for tests to evaluate the physical and engineering properties of the soils. The tests performed are briefly described below.

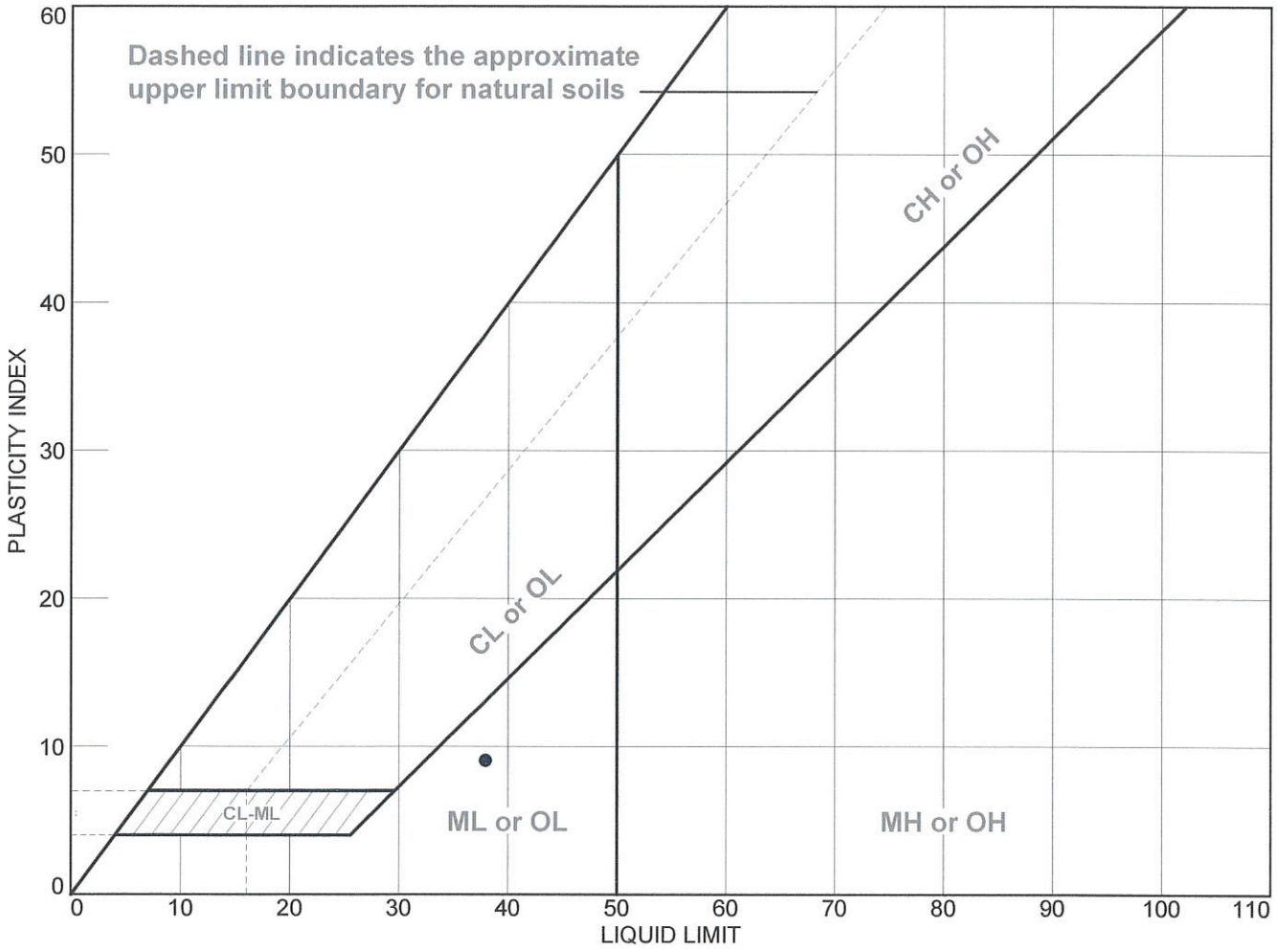
The natural moisture content was evaluated in general accordance with ASTM D 2216 on most samples recovered from the borings. This test determines the moisture content representative of field conditions at the time the samples were collected. The results are presented on the boring log at the appropriate sample depths.

The Atterberg Limits were evaluated on one sample in accordance with ASTM D 4318. The Atterberg limits are the moisture content within which the soil is workable or plastic. The results are presented in Figure C-1 and on the boring log at the appropriate sample depth.

Direct shear strength testing was performed by Cooper Testing Laboratory on a one sample in accordance with ASTM D3080m. This test measures the angle of internal friction (phi) and cohesion (C) of the soil. The results of this test are presented in Figure C-2 and on the boring log, at the appropriate sample depth.

Triaxial testing was performed by Cooper Testing Laboratory on one sample in accordance with ASTM D4767m and the results of this testing are presented as Figure C-3 and on the boring log, at the appropriate sample depth.

LIQUID & PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring 3	1	1.5' to 3'	11.2	29	38	9	ML

MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

PROPOSED RESIDENCE APN 080-092-060 FOXWOOD ROAD SAN MATEO COUNTY, CALIFORNIA		LIQUID & PLASTIC LIMITS TEST REPORT
PROJECT NO. 1997-1R1	SEPTEMBER 2015	FIGURE C-1

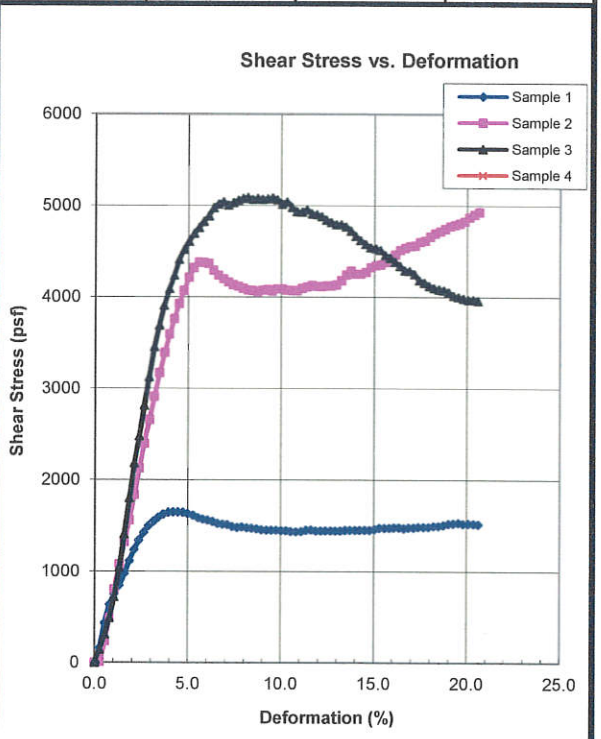
Consolidated Undrained Direct Shear (ASTM D3080M)

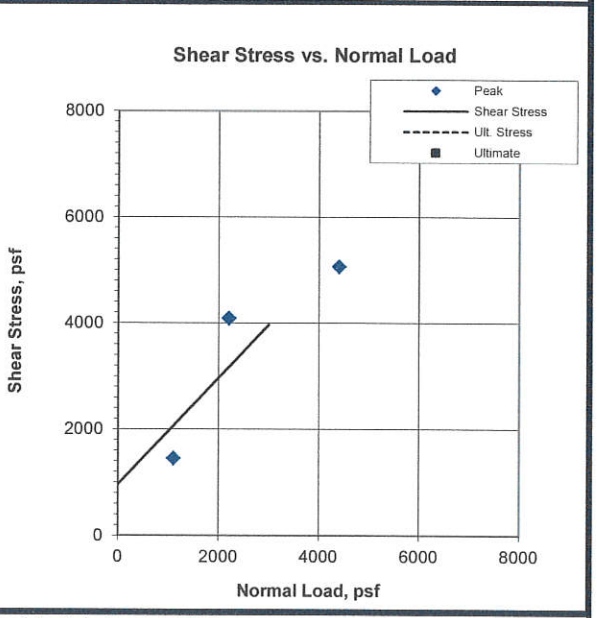
COOPER TESTING LABORATORY

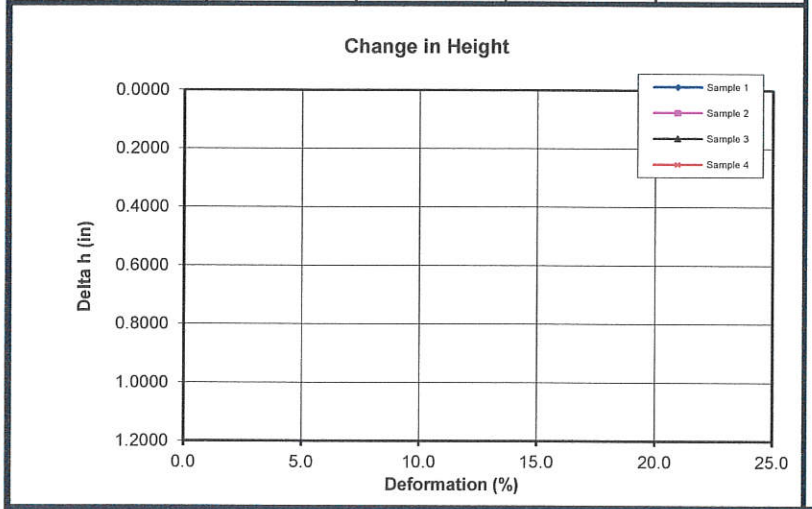
CTL Job #:	560-143	Project #:	1997-1	By:	MD
Client:	Murray Engineers	Date:	7/10/2014	Checked:	PJ
Project Name:	Wickersham	Remolding Info:			

Specimen Data	1	2	3	4
Boring:	B-1	B-1	B-1	
Sample:	1	1	1	
Depth (ft):	15.5-16	15.5-16	15.5-16	
Visual Description:	Dark Yellowish Brown Clayey SAND, trace Gravel	Dark Yellowish Brown Clayey SAND, trace Gravel	Dark Yellowish Brown Clayey SAND, trace Gravel	
Normal Load (psf)	1100	2200	4400	
Dry Mass of Specimen (g)	93.1	97.3	92.2	
Initial Height (in)	1.03	1.04	1.02	
Initial Diameter (in)	1.93	1.93	1.93	
Initial Void Ratio	0.434	0.377	0.431	
Initial Moisture (%)	10.4	9.7	10.2	
Initial Wet Density (pcf)	129.7	134.4	129.8	
Initial Dry Density (pcf)	117.5	122.4	117.8	
Initial Saturation (%)	64.5	69.9	63.8	
ΔHeight Consol (in)	-0.0049	0.0000	0.0226	
At Test Void Ratio	0.441	0.377	0.400	
At Test Moisture (%)	15.9	13.9	14.3	
At Test Wet Density (pcf)	135.7	139.5	137.7	
At Test Dry Density (pcf)	117.1	122.5	120.5	
At Test Saturation (%)	97.7	99.3	96.4	
Strain Rate (%/min)	1.3	1.2	1.1	
Strengths Picked at	10%	10%	10%	
Shear Stress (psf)	1452	4090	5065	
ΔHeight (in) at 10%				
Ultimate Stress (psf)				

Phi (deg)	45.0	Ult. Phi (deg)	45.0
Cohesion (psf)	965	Ult. Cohesion (psf)	965







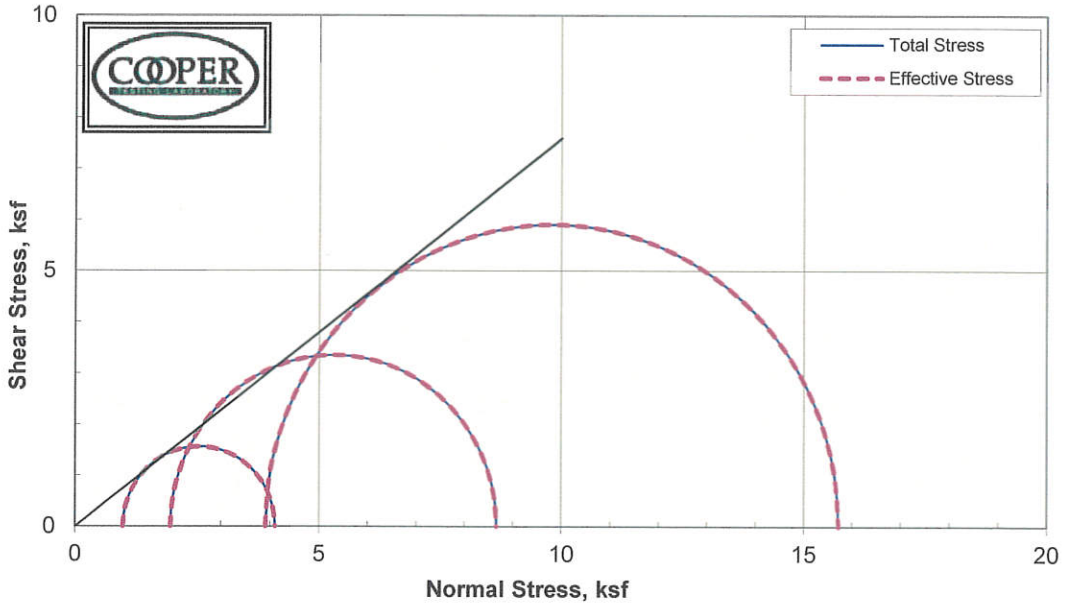
Remarks: *DS-CU* A fully undrained condition may not be attained in this test. ΔH is not measured during

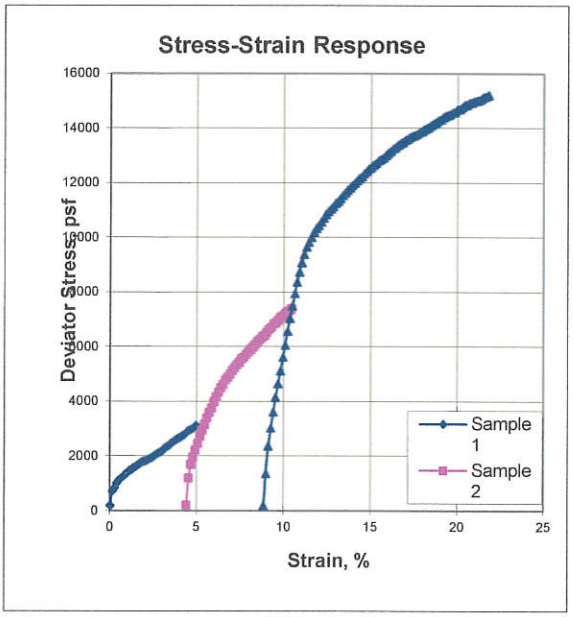
MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

PROPOSED RESIDENCE
APN 080-092-060 FOXWOOD ROAD
SAN MATEO COUNTY, CALIFORNIA

DIRECT SHEAR TEST RESULTS

PROJECT NO. 1997-1R1 | SEPTEMBER 2015 | FIGURE C-2





Sample:	1	2	3
MC, %	11.7		
Dry Dens., pcf.	120.4		
Sat. %	78.8		
Void Ratio	0.400		
Diameter in	1.91		
Height, in	4.00		
	Final		
MC, %	16.9	16.4	16.1
Dry Dens., pcf.	123.0	124.3	125.0
Sat. %	100.0	100.0	100.0
Void Ratio	0.457	0.442	0.435
Diameter, in	1.88	1.92	1.95
Height, in	4.03	3.83	3.68
Cell, psi	45.4	52.4	66.3
BP, psi	38.6	38.8	39.2
	Effective Stresses At:		
Strain, %	5.0	5.0	5.0
Deviator ksf	3.120	6.704	11.815
Excess PP	0.000	0.000	0.000
Sigma 1	4.099	8.663	15.717
Sigma 3	0.979	1.958	3.902
P, ksf	2.539	5.311	9.810
Q, ksf	1.560	3.352	5.908
Stress Ratio	4.187	4.423	4.028
Rate in/min	0.0201	0.0199	0.0196

Total C	**0**	**Effective C**	**0.00**
Total Phi	**37.2**	**Effective Phi**	**#DIV/0!**

Job No.: 560-143 **Date:** 7/17/2014

Client: Murray Engineers BY:DC

Project: Wickersham - 1997-1

Sample Grayish Brown CLAY w/ Sand

Description:

Location: B-2;2 @ 20.5-21'

Remarks: Staged Test - Values picked at 5% strain. Pore pressure was not monitored during test at clients request. Only the total stress is reported.

MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

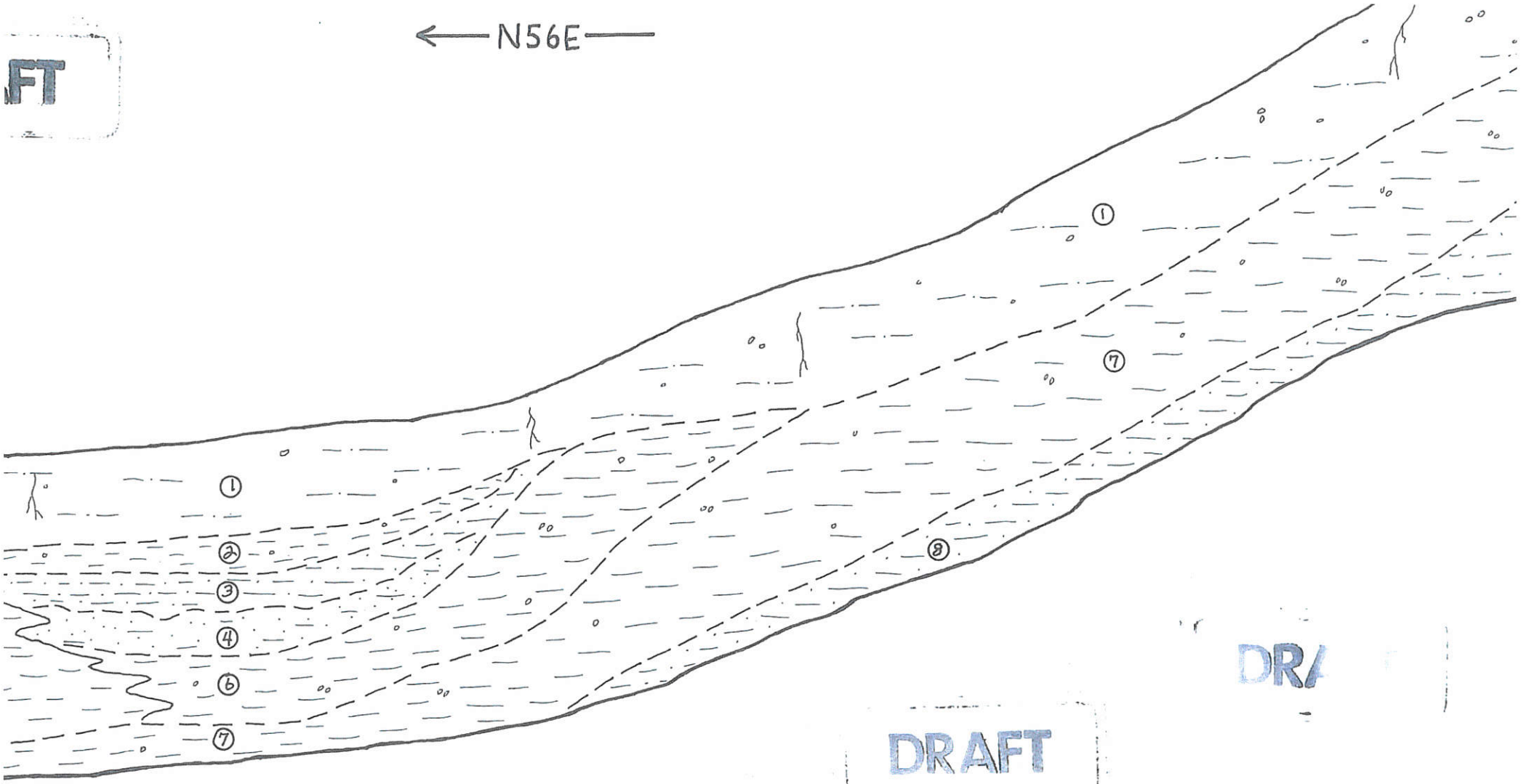
PROPOSED RESIDENCE
APN 080-092-060 FOXWOOD ROAD
SAN MATEO COUNTY, CALIFORNIA

STAGED TRIAXIAL SHEAR TEST RESULTS

PROJECT NO. 1997-1R1 | SEPTEMBER 2015 | FIGURE C-3

APPENDIX D

UPP GEOTECHNOLOGY, INC. – 130 FOXWOOD ROAD



greyish brown (2.5Y 5/2); 20-30% coarse sand and subangular to subrounded gravel; abundant roots; lack of soil structure indicating downhill creep (Colluvium)

k yellowish brown (10YR 4/4); <5% subrounded gravel; relatively homogeneous; slightly ium)

ery dark greyish brown (10YR 4/4); <5% subrounded to subangular gravel; homogeneous; ium)

rk yellowish brown (10YR 4/4); <5% subrounded to subangular gravel; 10-15% coarse sand; ous; irregular gradational contact with unit 3 above (Older colluvium)

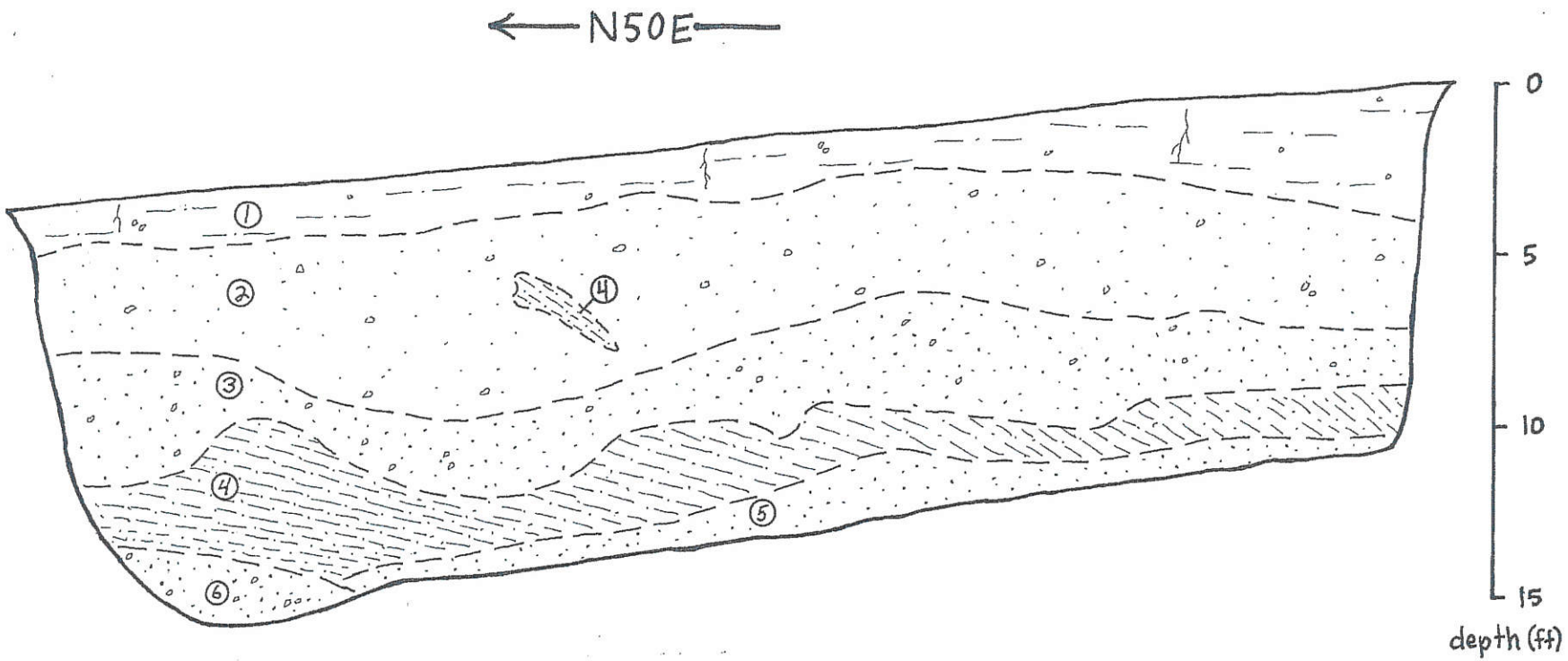
k yellowish brown (10YR 4/4) and grey (10YR 5/1) evenly mottled; relatively homogeneous; vium/Old Landslide Debris)

6. **SILTY CLAY**; very dark grey (10YR 3/1); 10-15% coarse-grained sand and gravel; relat moist (Older Colluvium/Old Landslide Debris)

7. **SILTY CLAY**; dark greyish brown (10YR 4/2) and very dark grey (10YR 3/1); faintly mo sand and subrounded gravel; relatively heterogeneous; slightly moist (Older Colluvium/Old I

8. **CLAYEY SILT**; light olive brown (2.5Y 5/3); homogeneous; occasional narrow lenses of SI moist (Older Colluvium/Old Landslide Debris)

LOG OF FAULT EXPLORATION TRENCH



brown (2.5Y 5/2); 20-30% coarse sand and subangular to subrounded gravel; t roots; lack of soil structure indicating downhill creep (Colluvium)

n (10YR 4/3) 20-30% rounded to subangular gravels up to 3" in diameter in a silty ; medium dense; faint relic rock texture (Completely Weathered Bedrock/Old

E; brown (10YR 4/3) to dark yellowish brown (10YR 4/6); gravel is fine-grained; proximately 2" in diameter; relatively homogeneous; dense (Bedrock/Old Landslide

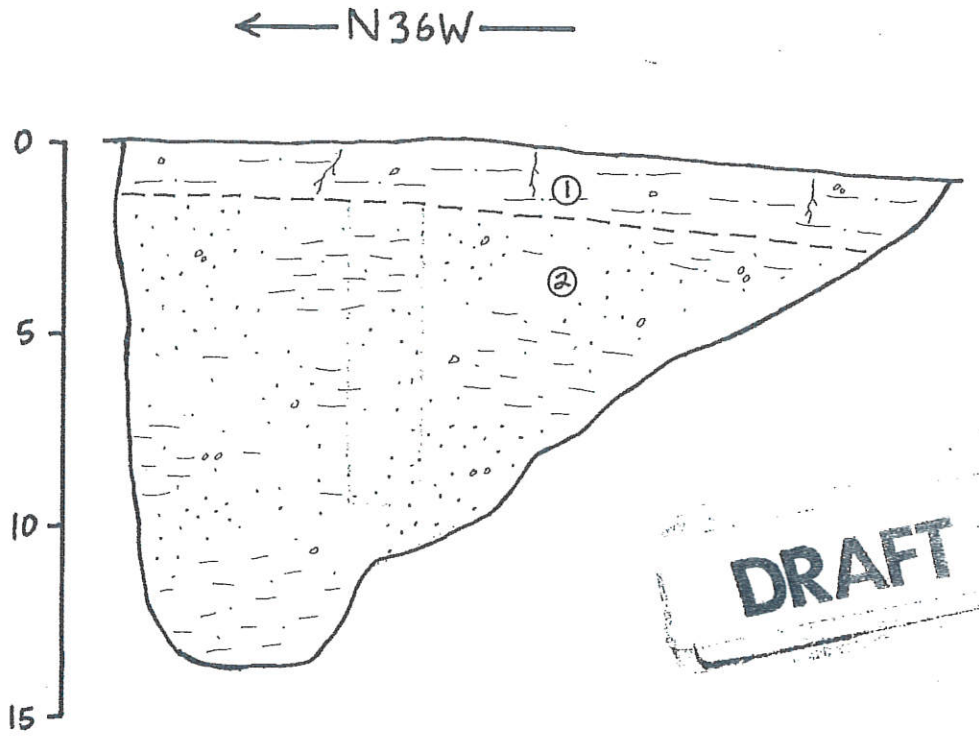
t yellowish brown (2.5Y 6/4) and grey (2.5Y 5/1); mottled oxide staining; moderately ce rootlets (Bedrock/Old Landslide Debris)

ht olive brown (2.5Y 5/3) and dark yellowish brown (10YR 4/6); oxide staining; ately weathered (Bedrock/Old Landslide Debris)

E; dark yellowish brown (10YR 4/6); fine to coarse gravel in a silty sand matrix;

LOG OF FAULT EXPLORATION TRENCH

LANDS OF WICKERS



1. **CLAYEY SILT**; greyish brown (2.5Y 5/2); 20-30% coarse sand and subangular to subrounded gravel; heterogeneous; dry; abundant roots; lack of soil structure indicating downhill creep (Colluvium)

2. **GRAVELLY CLAY, CLAYEY SAND, and SILTY CLAY**; variegated color; 5-20% gravel; heterogeneous (Older Colluvium/Older Landslide Debris)

LOGGED BY: M. Baumann; UPP GEOTECHNOLOGY, INC.; July 26, 1996

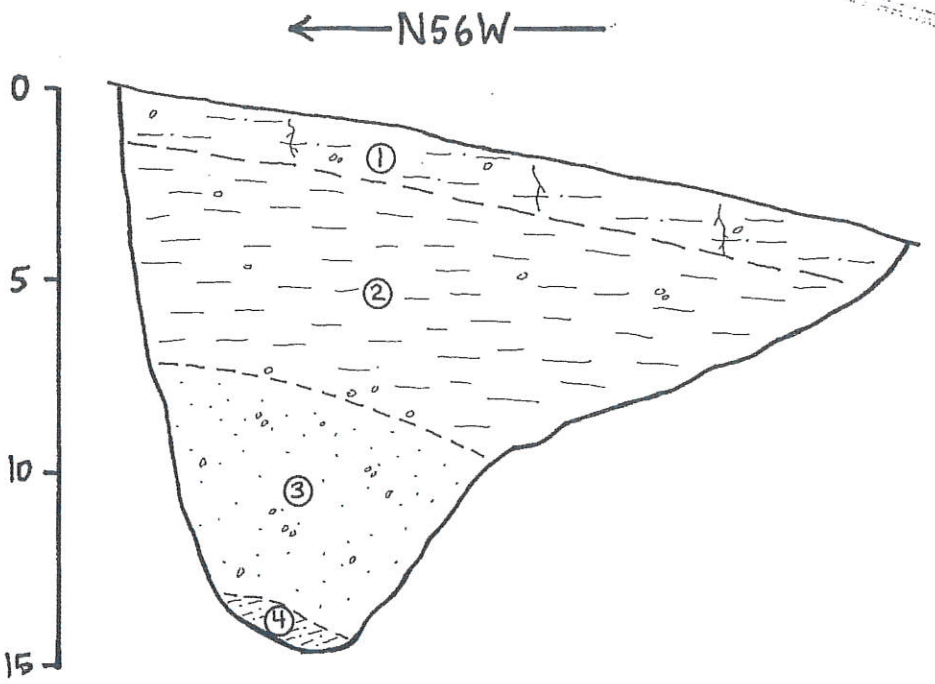
LOG OF EXPLORATION PIT 1

UPP GEOTECHNOLOGY, INC.
Engineering Geology • Geotechnical Engineering

LANDS OF WICKERSHAM
130 Foxwood Road
San Mateo County, California

APPROVED BY	SCALE	PROJECT NO.	DATE	FIGURE D-3
	1" = 5'	1530.2R1	September 1997	

DRAFT



1. **CLAYEY SILT**; greyish brown (2.5Y 5/2); 20-30% coarse sand and subangular to subrounded gravel; heterogeneous; dry; abundant roots; lack of soil structure indicating downhill creep (Colluvium)

2. **SILTY CLAY**; dark greyish brown (10YR 4/2) and very dark grey (10YR 3/1); faintly mottled; 10-15% coarse sand and subrounded gravel; relatively heterogeneous; slightly moist (Older Colluvium/Old Landslide Debris)

3. **GRAVELLY SAND**; brown (10YR 4/3) 20-30% rounded to subangular gravels up to 3" in diameter in a silty sand matrix; heterogeneous; medium dense; faint relic rock texture (Older Colluvium/Old Landslide Debris)

4. **SANDY SILTSTONE**; light yellowish brown (2.5Y 6/4) and grey (2.5Y 5/1); mottled oxide staining; moderately fractured; homogeneous; trace rootlets (Bedrock/Old Landslide Debris)

DRAFT

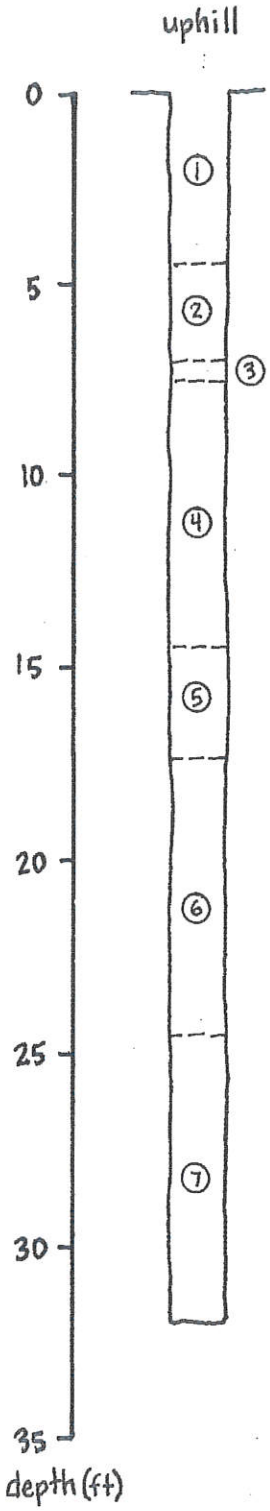
LOGGED BY: M. Baumann; UPP GEOTECHNOLOGY, INC.; July 26, 1996

LOG OF EXPLORATION PIT 2

UPP GEOTECHNOLOGY, INC.
Engineering Geology • Geotechnical Engineering

LANDS OF WICKERSHAM
130 Foxwood Road
San Mateo County, California

APPROVED BY	SCALE	PROJECT NO.	DATE	FIGURE D-4
	1" = 5'	1530.2R1	September 1997	



DRAFT

1. **CLAYEY SILT**; dark yellowish brown; 5-10% subrounded gravel up to ¼" in diameter; homogeneous; slightly moist (Colluvium)

2. **SILTY CLAY**; dark brown; 5% subrounded gravel up to 2" in diameter; homogeneous; moist; trace deacying rootlets (Older Colluvium/Old Landslide Debris)

3. **GRAVELLY CLAY**; dark greyish brown; 30-40% subangular to subrounded gravel up to ½" in diameter; heterogeneous; moist (Older Colluvium/Old Landslide Debris)

4. **SILTY CLAY**; greyish brown; 10-20% sand <5% angular to subrounded gravel up to ½" in diameter; relatively homogeneous; moist; scattered decaying rootlets (Older Colluvium/Old Landslide Debris)

5. **SILTY CLAY**; brown; 10-20% sand; 5-10% subangular gravel up to 1" in diameter; slightly heterogeneous; moist; occasional rootlets with grey weathering halos (Older Colluvium/Old Landslide Debris)

6. **SILTY CLAY**; dark yellowish brown; <5% angular gravel up to 1" in diameter; relatively homogeneous moist; trace decayed rootlets with grey weathering halos (Older Colluvium/Old Landslide Debris)

7. **CLAYEY SAND**; olive brown; 10-20% subrounded gravel up to 1½" in diameter; heterogeneous; moist; occasional charcoal fragments (Older Colluvium/Old Landslide Debris)

DRAFT

LOGGED BY: M. Baumann; UPP GEOTECHNOLOGY, INC.; July 16, 1996

LOG OF LARGE DIAMETER BORING

UPP GEOTECHNOLOGY, INC.
Engineering Geology • Geotechnical Engineering

LANDS OF WICKERSHAM
130 Foxwood Road
San Mateo County, California

APPROVED BY	SCALE	PROJECT NO.	DATE	FIGURE D-5
	1" = 5'	1530.2R1	September 1997	

COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT F

MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

February 16, 2021
Project No. 3176-1L1

David Stagg
653 Mountain View Avenue
Mountain View, California 94041

RE: REPORT UPDATE & SUPPLEMENTAL GEOTECHNICAL INVESTIGATION STAGG RESIDENCE APN 080-092-060, FOXWOOD ROAD SAN MATEO COUNTY, CALIFORNIA

Dear Mr. Stagg:

As requested, we have conducted a supplemental investigation and prepared this report update and supplemental geotechnical investigation letter with recommendations for the proposed development of your property, APN 080-092-060, on Foxwood Road in unincorporated San Mateo County. We previously performed a geotechnical and engineering geologic investigation for a new residence on the property for the previous owner. The results of that investigation were presented in our report dated September 2, 2015. A copy of the geotechnical and engineering geologic report is appended to this letter. The currently proposed development concept is slightly different than the development concept addressed by our original investigation and includes improvements to the access driveway and site grading that were not contemplated by the original investigation.

The purpose of our supplemental investigation was to evaluate the proposed driveway improvements, the scope of the currently proposed grading, and the adequacy of the previously provided geotechnical recommendations for the currently proposed project. In addition, this letter provides recommendations to supplement those presented in our original report. As the basis for this report update and supplemental recommendations, we have reviewed our prior report and the preliminary site development plans by Lea and Braze Engineering, Inc., performed a reconnaissance of the site, excavated two exploratory borings along the lower portion of the proposed driveway, and performed supplemental geotechnical analyses.

PROJECT DESCRIPTION & DISCUSSION

At the time of our original investigation, the project included the construction of a pre-fabricated residence in the gently sloping northern portion of the property and a carport to the south of the residence. The residence was going to be a two-story structure with one level above grade and a partial basement. At the time of the investigation, the scope of future driveway improvements was not defined; however, we anticipated that retaining walls would be required to support cuts and fills along the driveway alignment through the property.

As currently proposed, the project will include construction of a single-family residence in the same location as the originally proposed structure. The currently proposed residence will have a modified footprint and will not include a basement, but will have an attached garage. The existing grade in the house site will be lowered by approximately 6 feet and retaining walls will be constructed along the north and west sides of the residence to accommodate

the grade change. The existing dirt access road that leads up to the building site will be widened, including the lower portion, which extends through the neighboring property to the west. The upper portion of the driveway on the subject property will be widened by constructing a retaining wall and filling along the downhill side of the existing alignment and an existing retaining wall along the uphill side of this portion of the driveway will be replaced with a new retaining wall. The lower portion of the driveway on the neighboring property will be widened by cutting into the slope on the uphill side and constructing two, approximately 6 feet tall tiered retaining walls. Earthwork quantities are preliminarily indicated as 1,150 cubic yards of cut and 360 cubic yards of fill and the balance of the excavated material will be disposed of off-site. The layout of the currently proposed improvements is shown on Figure 1, Site Plan & Engineering Geologic Map.

Our original investigation included a review of a prior consultant's subsurface exploration, engineering geologic reconnaissance and mapping, and excavation of four exploratory borings. The results of our mapping and the locations of our exploratory borings and prior consultants' exploration trenches, exploration pits, and a large diameter boring are shown on the site plan (see Figure 1). Logs of our original exploratory borings and available excavation logs by one of the previous consultants are presented in our original report (see Appendix). Our investigation also included a pseudo-static slope stability analysis to evaluate the potential for seismically-induced landsliding at the proposed building site. Based on our original investigation, it was our opinion that the previously proposed site development was feasible and we provided recommendations for supporting the residence and retaining walls on drilled piers.

SITE RECONNAISSANCE & SUPPLEMENTAL SUBSURFACE EXPLORATION

A site reconnaissance was performed by our principal engineering geologist on March 25, 2019 to evaluate the surficial site conditions along the proposed driveway alignment and around the proposed building area. Based on our reconnaissance, there do not appear to be any significant changes to the surficial site conditions since the completion of our original investigation. The lower portion of the proposed driveway alignment crosses a steep hillside. The existing driveway is approximately 10 to 12 feet wide and was primarily constructed by cutting into the natural grade along the uphill side. The cut along the uphill side of the driveway is approximately 10 to 15 feet tall and has a slope of approximately 1.5:1 (horizontal to vertical). The ground surface along the downhill side of the driveway has a slope of approximately 1.5:1. A minor wedge of fill supported by a non-engineered wood post and lagging retaining wall is located along the downhill side of the driveway adjacent to Foxwood Road (see Figure 1).

On January 24, 2020, we advanced two exploratory borings along the lower portion of the driveway alignment on the neighboring property to the west of the site to supplement the subsurface exploration performed during our original investigation. The locations of the borings are shown on the site plan (see Figure 1) and detailed logs of the borings are presented on Figures 2 and 3, Log of Borings B-5 and B-6, respectively. The borings have been sequentially numbered to correspond to the borings that were advanced during our original investigation. The borings were advanced using continuous sampling methods in accordance with the procedures described in the original report and were logged by our staff geologist in accordance with the Unified Soil Classification System and the Key to Bedrock descriptions presented in our original report (see Appendix).

Below a thin veneer of gravel surfacing the driveway, both borings encountered stiff to very stiff clayey surficial colluvium underlain by hard older colluvium consisting of lean clay with gravel. The surficial colluvium extended to a depth of 8 feet in Boring B-5 and 6 feet in Boring B-6. The hard older colluvium persisted to the bottom of both borings at depths of 12 feet. Free groundwater was not encountered in the exploratory borings at the time of drilling; however, fluctuations in the level of groundwater can occur due to variations in rainfall, landscaping, and other factors that may not have been evident at the time our measurements were made.

CONCLUSIONS & RECOMMENDATIONS

Based on our review, site reconnaissance, and supplemental subsurface exploration, it is our opinion that the conclusions presented in our original report are valid and the recommendations presented in the report, as supplemented below, may be used for the design and construction of the currently proposed project.

As noted in our original report, a dormant shallow landslide is located on the hillside above the proposed building site. This feature is characterized by an approximately 60-foot long by 30-foot wide subtle topographic depression located on the adjacent property to the west. As currently proposed, the residence will be located approximately 20 feet downslope from this feature. We recommend that a debris wall be constructed along the western property boundary to mitigate the potential for reactivation of this dormant shallow landslide or a new shallow landslide to affect the proposed residence. The recommended location and length of the debris wall are shown on Figure 1 and design recommendations are presented below.

The recommendations presented in our original report (see Appendix), as supplemented below, should be used for the design and construction of the proposed residence and associated improvements.

Earthwork

Any proposed earthwork should be performed in accordance with the recommendations presented in our original report. As noted in the report, because of local landsliding, we recommend against the use of any unretained fill, including minor fill along the lower portion of the driveway. This office should observe the site grading, including initial site clearing, building pad excavation, and excavations for the driveway retaining walls, and should observe the placement and test the compaction of engineered fill.

Because of the sloping site conditions and local landsliding, the contractor should anticipate that temporary cut slopes may be subject to sloughing or more significant failure, especially if temporary cut slopes are exposed during the rainy season. To reduce the potential for failure of temporary cut slopes for retaining walls, we suggest that consideration be given to utilizing top-down construction techniques for retaining walls greater than 4 feet tall, particularly, the tiered retaining walls on the adjacent property along the lower portion of the driveway.

We suggest that the general contractor provide a construction sequencing plan for our review prior to the start of construction. In addition, if construction will take place during the rainy season, we recommend that a temporary construction storm water control plan be developed by the project civil engineer and implemented prior to the onset of winter storms.

Seismic Design Criteria

Based on the location of the site at latitude 37.347835 and longitude -122.197655, our subsurface investigation and engineering judgment, and the site class definitions presented in Chapter 20 of Minimum Design Loads and Associated Criteria for Buildings and other Structures (ASCE 7-16) (American Society of Civil Engineers, 2017), in accordance with Chapter 16, Section 1613 of the 2019 California Building Code (California Building Standards Commission, 2019), we recommend that the design of the project be based on the following updated seismic design criteria.

- Site Class C – Soil Profile Name: Very Dense Soil and Soft Rock (Table 1613.5.2)
- Mapped Spectral Accelerations for 0.2 second Period: S_S= 2.475 g (Site Class B)
- Mapped Spectral Accelerations for a 1-second Period: S_1= 1.034 g (Site Class B)
- Design Spectral Accelerations for 0.2 second Period: S_{DS}= 1.98 g (Site Class C)
- Design Spectral Accelerations for a 1-second Period: S_{D1}= 0.965 g (Site Class C)

The preceding seismic design criteria was developed using the Structural Engineers Association of California (SEAOC) and California's Office of Statewide Health Planning and Development (OSHPD) online seismic design value application (https://seismicmaps.org) using ASCE 7-16 as the design code reference document.

Retaining Wall Foundations

We recommend that proposed site retaining walls be supported on drilled, reinforced, cast-in-place concrete friction piers designed in accordance with the recommendations provided in our original report. Specifically, drilled piers for site retaining walls should be at least 16 inches in diameter and should extend at least 8 feet into the older colluvium and/or ancient landslide deposits or to a depth into these supportive materials that is at least equal to the height of the proposed wall plus the depth of any non-supportive fill or colluvial soil encountered in the upper portion of the drilled pier, whichever is deeper.

As recommended in our original report, drilled piers should be designed to resist active soil creep loads, which we estimate to be up to approximately 6 feet below existing grade. Therefore, retaining wall piers constructed at existing grade should be designed to resist at least 6 feet of soil creep. Where excavations remove then non-supportive colluvial soil, the depth of active soil creep loads may be reduced by 1 foot for every foot of excavation.

Debris Wall

We recommend that a debris wall be constructed along the western property line above the proposed residence to intercept soil debris that may be generated by reactivation of the dormant shallow landslide above the house site. The debris wall should extend at least 3 feet above grade, as measured along the uphill side of the wall and it should be supported on drilled piers designed in accordance with the recommendations for retaining wall piers.

Because of the limited length and assumed shallow depth of the dormant landslide, the debris wall does not need to be designed for impact loads; however, it should be designed for conventional retaining wall loading under the assumption that debris will eventually be collected along the uphill side of the wall.

LIMITATIONS

These supplemental recommendations have been developed in accordance with geotechnical engineering principles and practices generally accepted at this time and location. We make no warranty, either expressed or implied.

Sincerely,

MURRAY ENGINEERS, INC.

Thomas P. Strider, G.I.T.
Staff Geologist

Mark F. Baumann, C.E.G.
Principal Engineering Geologist

John A. Stillman, G.E., C.E.G. 1868
Principal Geotechnical Engineer

TPS:MFB:JAS

Attachments: Figure 1, Site Plan & Engineering Geologic Map
Figure 2, Boring B-5
Figure 3, Boring B-6

Appendix: Geotechnical & Engineering Geologic Report

Copies: Addressee (4)
Lea & Braze Engineering, Inc. (email)
Attn: Mr. Jim Toby, P.E.

KEY NOTES

1. Area of Proposed Residence (Shaded)
2. Proposed Retaining Walls (Shaded)
3. Area of Proposed Driveway and Parking (Stippled)
4. Proposed Debris Wall (Shaded)

LEGEND

- **af** Artificial Fill
- **Rls** Recent Landslide, Active in 1982/83
- **Dsls** Dormant Shallow Landslide (<10' Deep)
- **Dls** Dormant Landslide
- **Ols** Old Landslide Deposits
- Approximate Limits of Fill and Fill Slope
- Approximate Limits of Cut Slope
- Approximate Limits of Landslide Deposit, arrows indicate general direction of down slope movement
- **B-1** Approximate Location of Soil Boring by Murray Engineers, Inc., June 20, 2014 & January 24, 2020
- **LDB1 (UGI)** Approximate Location of Large Diameter Borings by Upp Geotechnology, Inc., July 16, 1996
- Approximate Location of Trench/Pit by others, as noted
- **A A'** Location of Cross-Sections (see Figure A-7)

Base: Preliminary Site Development Plan by Lea & Braze Engineering, Inc., March 5, 2020
Approximate Scale: 1 inch = 30 feet

MURRAY ENGINEERS INC GEOTECHNICAL SERVICES	SITE PLAN & ENGINEERING GEOLOGIC MAP
STAGG RESIDENCE APN 080-092-060 FOXWOOD ROAD SAN MATEO COUNTY, CALIFORNIA	
PROJECT NO. 3176-1L1	FEBRUARY 2021 — FIGURE 1

Date(s) Drilled **January 24, 2020**	Logged By **MM**	Checked By **MB**
Drilling Method **Continuous Sampling**	Drill Bit Size/Type **N/A**	Total Depth of Borehole **12 feet bgs**
Drill Rig Type **N/A**	Drilling Contractor **Access Soil Drilling, Inc.**	Approximate Surface Elevation **964 feet (relative)**
Groundwater Level and Date Measured **Not Encountered ATD**	Sampling Method(s) **3" OD, 2.5" OD, & 2" OD SPT Split Spoon Samplers**	Hammer Data **140 lb, 30 in drop, rope & cathead**
Borehole Backfill **Cuttings**	Location **Lower portion of driveway alignment**	

Elevation, feet	Depth, feet	Sample Type	Sampling Resistance, blows/foot	Relative Consistency	USCS Symbol	MATERIAL DESCRIPTION	Water Content, %	Torvane Shear Strength (TSF)	Pocket Pen Comp. Strength, TSF
964	0			Stiff to Very Stiff	CL	LEAN CLAY, yellowish to olive brown, homogeneous, low plasticity, trace angular to subrounded gravel, moist (Older Colluvium)	14	1.1	>4.5
			12				17		2.5
									4.0
							19	0.8	
									4.0
								0.5	>4.5
959	5		22				16		
								0.5	4.5
									3.0
							12		
									3.3
				Hard	CL	LEAN CLAY with GRAVEL, yellowish to brown, homogeneous, low plasticity, with angular to subrounded gravel, slightly moist to dry (Older Colluvium)		0.5	2.8
			52				11		
954	10								
							8		
						Bottom of Boring at 12 feet bgs			
949	15								

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MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

STAGG RESIDENCE
APN 080-092-060 FOXWOOD ROAD
SAN MATEO COUNTY, CALIFORNIA

LOG OF BORING B-5

PROJECT NO. 3176-1R1 | **FEBRUARY 2021** | **FIGURE 2**

Date(s) Drilled **January 24, 2020**	Logged By **MM**	Checked By **MB**
Drilling Method **Continuous Sampling**	Drill Bit Size/Type **N/A**	Total Depth of Borehole **12 feet bgs**
Drill Rig Type **N/A**	Drilling Contractor **Access Soil Drilling, Inc.**	Approximate Surface Elevation **958 feet (relative)**
Groundwater Level and Date Measured **Not Encountered ATD**	Sampling Method(s) **3" OD, 2.5" OD, & 2" OD SPT Split Spoon Samplers**	Hammer Data **140 lb, 30 in drop, rope & cathead**
Borehole Backfill **Cuttings**	Location **Lower portion of driveway alignment**	

Elevation, feet	Depth, feet	Sample Type	Sampling Resistance, blows/foot	Relative Consistency	USCS Symbol	MATERIAL DESCRIPTION	Water Content, %	Torvane Shear Strength (TSF)	Pocket Pen Comp. Strength, TSF
958	0			Stiff	CL	LEAN CLAY, yellowish to olive brown, homogeneous, low plasticity, trace angular to subrounded gravel, moist (Colluvium)	17	1.0	>4.5
			10					0.8	3.3
							19	0.4	2.8
				Very Stiff	CL	LEAN CLAY, dark brown, homogeneous, low plasticity, trace angular gravel, moist (Colluvium)	20	0.6	3.8
								0.4	2.0
953	5		18				20	0.6	>4.5
				Hard	CL	LEAN CLAY with GRAVEL, yellowish to brown, homogeneous, low plasticity, with angular to subrounded gravel, moist (Older Colluvium)	20		2.8
									3.8
			35				23	0.5	2.8
948	10								
							15		
943	15					Bottom of Boring at 12 feet bgs			

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MURRAY ENGINEERS INC
GEOTECHNICAL SERVICES

STAGG RESIDENCE
APN 080-092-060 FOXWOOD ROAD
SAN MATEO COUNTY, CALIFORNIA

LOG OF BORING B-6

PROJECT NO. 3176-1R1 | **FEBRUARY 2021** | **FIGURE 3**

APPENDIX I

GEOTECHNICAL & ENGINEERING GEOLOGIC INVESTIGATION
STAGG RESIDENCE
APN 080-092-060, FOXWOOD ROAD
SAN MATEO COUNTY, CALIFORNIA

SEPTEMBER 2, 2015

MURRAY
ENGINEERS INC

COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

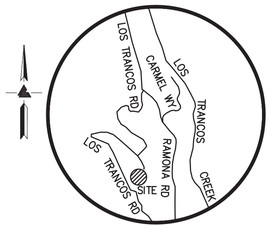
ATTACHMENT G

Entrance to property

Continuation of driveway

COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT H



VICINITY MAP
NO SCALE

NOTES
ALL DISTANCES AND DIMENSIONS ARE IN FEET AND DECIMALS OF A FOOT.

UNDERGROUND UTILITY LOCATION IS BASED ON SURFACE EVIDENCE.

BUILDING FOOTPRINTS ARE SHOWN AT GROUND LEVEL.

FINISH FLOOR ELEVATIONS ARE TAKEN AT DOOR THRESHOLD (EXTERIOR)

EASEMENT NOTE
EASEMENTS SHOWN ARE PER PRELIMINARY TITLE REPORT PREPARED BY FIRST AMERICAN TITLE COMPANY, ORDER NO. 2701-4934547, DATED JUNE 2, 2015.

EASEMENTS FOR WATER PIPES, ELECTRIC LIGHT POLES AND WIRES, WITH INGRESS AND EGRESS ARE LISTED IN DOCUMENTS (590 O.R. 351), (628 O.R. 17) AND (2949 O.R. 409). THE EXACT LOCATIONS OF SAID EASEMENTS ARE NOT DESCRIBED.
EASEMENT FOR UTILITIES IS LISTED IN DOCUMENT (2716 OR 486) AND EASEMENT FOR WATER FORCE MAINS AND TANK SITES LISTED IN DOCUMENT (2886 OR 568). SAID EASEMENTS DO NOT AFFECT SUBJECT PROPERTY.

BENCHMARK
TOWN OF PORTOLA VALLEY BENCHMARK "PV33"
3.5" BRASS DISK IN MONUMENT WELL STAMPED "PV33"
42' NORTHWEST OF CATCH BASIN, 18' SOUTHEAST OF STREET MONUMENT AT THE INTERSECTION OF BUCK MEADOW DRIVE AND BLUE OAKS COURT
ELEVATION = 858.53'
(NGVD 29)

SITE BENCHMARK
SURVEY CONTROL POINT
MAG AND SHINER SET IN ASPHALT
ELEVATION = 950.93'
(NGVD 29)

LEGEND AND NOTES

BOUNDARY LINE	FIRE HYDRANT	STANDPIPE	
ETC — ELECTRICAL/TELEPHONE/CABLE TV OVERHEAD LINE	FL	FLOW LINE	TW	TOP OF RETAINING WALL
TV/T — CABLE TV/TELEPHONE OVERHEAD LINE	GM	GAS METER	TOS	TOP OF SLAB
EASEMENT	GUY ANCHOR	WM	WATER METER
INV	INVERT	WV	WATER VALVE

Tree Removal Legend:
- Tree #1 through #7 - X-Tree equal to or greater than 12" in diameter to be removed
  - (As identified in attached **Arborist Report** dated 6/5/2018 (updated 8/9/2018) by Arbor Works)
  - (Shown with a red cloud around the exact tree for purposes of clarity)
- X - Tree less than 12' in diameter to be removed
- X - Stump to be removed

Tree Protection Legend
- Tree #A through #D - Tree equal to or greater than 12" in diameter to be protected
  - (As identified in attached **Tree Protection Plan** dated 8/9/2018 by Arbor Works)
  - (Shown with a purple circle around the exact tree for purposes of clarity)
- DNE - (Denotes a tree that does not exist in this location and/or was previously removed)

PARCEL C

PARCEL 1
TITLE REPORT
46,976 SQ.FT.
1.00 ACRES

LANDS OF WEISS

LANDS OF BATTLE

LANDS OF CLARKE

S OF ESEN

MATCHLINE

0 8 16 32
SCALE: 1" = 16'

LICENSED LAND SURVEYOR
GREGORY P. BRAZE
No. 7628
Exp. 12-31-18
STATE OF CALIFORNIA
ORIGINAL SIGNATURES IN BLUE INK

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS · LAND SURVEYORS
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SACRAMENTO REGION
3017 DOUGLAS BLVD, # 300
ROSEVILLE, CA 95661
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WWW.LEABRAZE.COM

1227 LOS TRANCOS ROAD
SAN MATEO COUNTY
CALIFORNIA

APN: 080-092-060, 200, 210

SAN MATEO COUNTY

TOPOGRAPHIC SURVEY

REVISIONS	BY
–	–
–	–
–	–
–	–
–	–

JOB NO:	2140624
DATE:	9-16-14
SCALE:	1" = 16'
DRAWN BY:	DB
SHEET NO:	

SU2

2 OF 2 SHEETS