Appendix A

Geotechnical and Geologic Investigation Proposed Residential Development Hodges Area, Fitness Center, and Athletic Field

ROCKRIDGE GEOTECHNICAL

Prepared for **North Coast Land Holdings, LLC**

GEOTECHNICAL AND GEOLOGIC INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
HODGES AREA, FITNESS CENTER, AND ATHLETIC FIELD
GOLDEN GATE BAPTIST SEMINARY
201 SEMINARY DRIVE
MILL VALLEY, CALIFORNIA

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April 11, 2025
Project No. 24-2568

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ROCKRIDGE GEOTECHNICAL

April 11, 2025
Project No. 24-2568

North Coast Land Holdings, LLC
c/o Craig Stringer, Centric Construction
201 Seminary Drive
Mill Valley, California 94941

Subject: Geotechnical and Geologic Investigation
Proposed Residential Development
Hodges Area, Fitness Center, and Athletic Field
Golden Gate Baptist Seminary
201 Seminary Drive
Mill Valley, California

Dear Craig:

We are pleased to present the results of our geotechnical and geologic investigation for the proposed development to be constructed at the Hodges area, fitness center, and athletic field as part of the redevelopment of the Golden Gate Baptist Seminary located at 201 Seminary Drive in Mill Valley, California. Our investigation was performed in accordance with our proposal dated October 3, 2024 and subsequent budget increase request, dated December 2, 2024.

The Hodges area is bordered by Hodges Drive to the south, Oliver Lane to the north, and Shuck Drive to the east and west. The area is currently occupied by one- to two-story multi-family residential buildings and an asphalt-paved parking area in the southern portion of the area. The Hodges area is north of the athletic field.

Current plans are to demolish the existing improvements in the Hodges area and construct three residential buildings fronting Hodges and Shuck drives. Other improvements associated with this phase of work include construction of a fitness center above the southeastern corner of the athletic field and placement of fill on the athletic field. The athletic field is planned to be filled with the cut material from other phases of work at the site, with a proposed height of up to 30 feet assuming a 2:1 (horizontal to vertical) slope.

Based on the results of our geotechnical investigation, we conclude there are no major geotechnical issues that would preclude development of the site as proposed. The primary geotechnical concerns for the proposed buildings are the presence of heterogeneous fill and providing adequate foundation support for the proposed improvements. The primary geotechnical concern for the athletic field is the placement of fill above the existing subsurface soil. Because of the differential thickness of cut and fill beneath the proposed eastern building at the Hodges area, we conclude the building should be supported on a mat foundation bearing on

improved ground. The proposed western building in the Hodges area may be supported on spread footings or drilled piers gaining support in bedrock. Because of the thick fill encountered in the vicinity of the proposed fitness center, the proposed fitness center may be supported on a mat foundation bearing on improved ground.

The recommendations contained in our report are based on limited subsurface exploration. Consequently, variations between expected and actual subsurface conditions may be encountered during construction. Therefore, we should be engaged to observe site preparation, shoring and soil nail installation (if needed), and foundation installation, during which time we may make changes to our recommendations if deemed necessary.

We appreciate the opportunity to provide our services to you on this project. Should you have any questions, please call.

Sincerely,
ROCKRIDGE GEOTECHNICAL, INC.



Date: 4/11/2025

Craig S. Shields, P.E., G.E.
Principal Engineer



Eric W. Ford, P.G.
Professional Geologist

Date: 4/11/2025

Enclosure

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APPENDIX B

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Logs of Borings by Donald Herzog & Associates

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GEOTECHNICAL AND GEOLOGIC INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
HODGES AREA, FITNESS CENTER, AND ATHLETIC FIELD
GOLDEN GATE BAPTIST SEMINARY
201 SEMINARY DRIVE
MILL VALLEY, CALIFORNIA

1.0 INTRODUCTION

This report presents the results of the geotechnical and geologic investigation performed by Rockridge Geotechnical, Inc. for the proposed development to be constructed at the Hodges area, fitness center, and athletic field as part of the redevelopment of the Golden Gate Baptist Seminary at 201 Seminary Drive in Mill Valley, California. The subject property is irregularly shaped and comprises two contiguous parcels encompassing a total area of about 73 acres, as shown in the Site Location Map (Figure 1).

The Hodges area is bordered by Hodges Drive to the south, Oliver Lane to the north, and Shuck Drive to the east and west, as shown in the Site Plan (Figure 3). The area is currently occupied by one- to two-story multi-family residential buildings and an asphalt-paved parking area in the southern portion of the area. The Hodges area is north of the athletic field.

Current plans are to demolish the existing improvements in the Hodges area and construct three residential buildings fronting Hodges and Shuck drives. Other improvements associated with this phase of work include construction of a fitness center above the southeastern corner of the athletic field and placement of fill on the athletic field. The athletic field will be filled with the cut material from other phases of work at the site, with a proposed height of up to 30 feet assuming a 2:1 (horizontal to vertical) slope.

2.0 SCOPE OF SERVICES

Our investigation was performed in accordance with our proposal dated October 3, 2024, and subsequent budget increase request, dated December 2, 2024. Our scope of services consisted of exploring subsurface conditions at the site by reviewing existing subsurface information for the vicinity, drilling eight test borings, performing five dynamic penetrometer tests, advancing two

hand-auger borings, performing laboratory testing on selected soil samples, and performing engineering analyses to develop conclusions and recommendations regarding:

- soil and groundwater conditions at the site
- site seismicity and seismic hazards, including slope stability
- the most appropriate foundation type(s) for the proposed buildings
- design criteria for the recommended foundation type(s), including vertical and lateral capacities
- estimates of foundation settlement
- foundation setback from the top of existing and proposed slopes
- design parameters for design of retaining walls
- site grading and fill placement, including inclination of permanent cut and fill slopes
- subgrade preparation for slab-on-grade floors and concrete flatwork
- 2022 California Building Code (CBC) site class and design spectral response acceleration parameters
- corrosivity of the near-surface soil and the potential effects on buried concrete and metal structures and foundations
- construction considerations.

3.0 FIELD INVESTIGATION AND LABORATORY TESTING

We explored the subsurface conditions at the site by performing a geologic reconnaissance, reviewing existing subsurface data for the vicinity, drilling eight test borings, performing five dynamic penetrometer tests, advancing two hand-auger borings, and performing laboratory testing on selected soil samples. Prior to drilling our test borings, we obtained a drilling permit from Marin County Environmental Health Services (MCEHS). We also contacted Underground Service Alert (USA), as required by law, and retained C. Cruz Sub-Surface Locators of Milpitas, California, a private utility locator, to check the boring locations to reduce the potential for encountering buried utilities during our field investigation. Details of our field investigation and laboratory testing are presented in this section.

3.1 Geologic Reconnaissance

The Hodges site lies in the western-central part of the Seminary property, upslope and north of Hodges Drive, south of Oliver Lane and to the east and west of Shuck Drive that wraps around the site. The eastern half of the area is characterized by a notable drainage ravine that originates upslope to the north and extends downward to the south across Rice Lane, Oliver Lane and Hodges Drive where the drainage originally terminated into the northeast corner of the embayment (wetland and marsh) now occupied by the Seminary athletic field. The ravine and associated drainage swale were apparently filled in during grading for the construction of the residential buildings in the Hodges area. The western half of the proposed Hodges development lies along a short spur-ridge that extends downward to the south along the east side of Shuck Drive which borders the western side of the development. Residential buildings along Oliver Lane and Hodges Drive lie along the southern slopes of this ridge that has been extensively graded, cut and benched to accommodate the development.

The Seminary athletic field has been constructed in a U-shaped embayment that extends eastward into the Strawberry Peninsula. The embayment has been extensively cut, graded and filled to accommodate the athletic field that apparently lies on fill placed over the existing wetlands and marsh. The surrounding slopes to the north, south and east have been graded to approximately 2.5:1 (horizontal to vertical).

The available geologic maps show most of the Hodges and Seminary athletic field site lying on colluvium (Qc) with sandstone and shale (Ks) outcrops mapped upslope to the north and east and artificial fill over Bay Mud (Qaf/Qm) mapped along the western edge of the athletic field (Rice et al., 1976). A more generalized map shows the slopes of the Hodges area lying on Franciscan Complex mélange and the athletic field lying on artificial fill and alluvium (Blake et al., 2000).

During our geologic reconnaissance, we observed Franciscan Complex sandstone and shale (Ks) in a road cut along Oliver Lane and within a v-ditch drainage at the intersection of Shuck Drive and Gilbert Drive. The sandstone was yellowish brown to light yellowish brown, oxidized black and yellowish red, fine grained, moderately hard, friable to weak, very thin to thick bedded,

closely fractured, and moderately weathered. Minor shale beds are dark gray and fissile, locally. We measured bedding attitudes of N 90°W to N 80°E, dipping 35°-60° NE.

Where not exposed, we anticipate the bedrock is relatively shallow (less than 4 feet depth) across the ridge along the western part of the proposed development other than within the broad colluvium-filled swales described above where colluvium is up to approximately 20 feet thick.

Two prominent drainage swales originate north and upslope from the Judson Lane and Oliver Lane area and extend downward along the eastern side of the prominent bedrock ridge described above. DHA mapped these two features as shallow earthflow, slumps, and colluvial soils in their 1982 report. The drainage swales combine near Oliver Lane and form a broad ravine and drainage that contains up to 20 feet of fill and colluvium encountered within our exploratory boring (H-B-3) along Hodges Drive near the Gill Hall.

3.2 Test Borings

Eight test borings, designated as H-B-1 through H-B-8, were drilled on January 28 and 29, 2025 by Stapleton Engineering and Exploration of Santa Rosa, California at the approximate locations shown in Figure 3. The borings were drilled using hydraulic drilling equipment mounted on a skid steer equipped with 4-inch-diameter solid-stem flight augers. The borings were drilled to depths of about 3 to 25.5 feet below the ground surface (bgs).

During drilling, our field engineer logged the soil and bedrock encountered and obtained representative samples for visual classification and laboratory testing. The boring logs are presented in Figures A-1 through A-8 in Appendix A. The soil and rock encountered in the borings were classified in accordance with the classification systems presented in Figures A-15 and A-16, respectively.

Soil samples were obtained using:

- Modified California (MC) split-barrel sampler with a 3.0-inch outside diameter and 2.5-inch inside diameter, lined with 2.43-inch inside diameter stainless steel tubes.
- Standard Penetration Test (SPT) split-barrel sampler with a 2.0-inch outside and 1.5-inch inside diameter; the sampler was designed to accommodate liners, but liners were not used.

The samplers were driven with a 140-pound rope-and-cathead safety hammer falling about 30 inches per drop. The samplers were driven up to 18 inches, and the hammer blows required to drive the samplers were recorded every 6 inches and are presented in the boring logs. A "blow count" is defined as the number of hammer blows per 6 inches of penetration or 50 blows for 6 inches or less of penetration. The blow counts required to drive the MC and SPT samplers were converted to approximate SPT N-values using factors of 0.7 and 1.2, respectively, to account for sampler type, approximate hammer energy, and the fact that the SPT sampler was designed to accommodate liners, but liners were not used. The blow counts used for this conversion were the last two blow counts if the sampler was advanced more than 12 inches or the last one blow count if the sampler was advanced 12 inches or less. The converted SPT N-values are presented in the boring logs.

Upon completion of drilling, the boreholes were backfilled with neat cement grout in accordance with MCEHS requirements. The soil cuttings were left on-site near the boreholes.

3.3 Dynamic Penetrometer Tests

On January 22, 2025, we performed five DPTs, designated as H-DPT-1 through H-DPT-5, at the approximate locations within the athletic field shown in Figure 3.

The DPTs were performed following the methodology presented in the technical paper titled *A Portable Dynamic Penetrometer for Geotechnical Investigations*, prepared by J.R. Triggs and P.D. Simpson (Triggs & Simpson, 1990). The DPTs consisted of manually driving a 1.4-inch-diameter, cone-tipped probe with a 35-pound hammer falling 15 inches. The blow counts required to drive the probe were recorded at 10-centimeter intervals and converted to SPT N-values for use in our engineering analyses. H-DPT-1 through H-DPT-4 were advanced to practical refusal, which is defined as more than 50 blows per 10-centimeter interval, at depths between about 4.3 and 14.1 feet bgs. H-DPT-5 was advanced to a depth of about 16.4 feet bgs, but did not encounter refusal. The results of the DPTs are presented in Figures A-9 through A-14 in Appendix A.

3.4 Hand-Auger Borings

Our field engineers also advanced two hand-auger borings, designated as H-HA-1 and H-HA-5, on January 22, 2025, adjacent to H-DPT-1 and H-DPT-5, respectively. The borings were advanced using a 3-inch-diameter hand auger to depths of 3.5 and 2.5 bgs, each terminating due to practical refusal in cobbles. Our field engineer obtained soil samples at several depths for visual classification and laboratory testing. Upon completion, the boreholes were backfilled with soil cuttings. Logs of the borings are presented in Figures A-9 and A-14. The soil encountered in our borings was classified in accordance with the classification chart shown in Figure A-15.

3.5 Laboratory Testing

We re-examined the soil samples in our office to confirm the field classifications and selected representative samples for laboratory testing. Soil samples were tested by B. Hillebrandt Soils Testing, Inc. of Alamo, California and Rockridge Geotechnical, Inc., to measure moisture content, plasticity, and particle size distribution. Soil corrosivity testing was performed by Project X Corrosion Engineering, Inc. of Murrieta, California on two samples from the borings. The results of the laboratory tests are presented in the boring logs and in Appendix B.

4.0 DATA REVIEW

For our geotechnical report, we reviewed available subsurface information for the project site. Specifically, we reviewed the following reports:

- *Preliminary Geotechnical Design Report, The Seminary, 201 Seminary Drive, Mill Valley, California*, prepared by Purcell, Rhoades & Associates (PRA), dated June 8, 2016.
- *Report, Geotechnical Reconnaissance for Master Plan, Golden Gate Baptist Theological Seminary, Strawberry Point, Mill Valley, California*, prepared by Donald Herzog and Associates, Inc. (DHA), dated May 19, 1982.

As part of PRA's investigation in April and May 2010, they advanced eight hand-auger borings to a maximum depth of 5 feet below the ground surface (bgs) and drilled 10 exploratory borings using either a truck-mounted Mobile B-24 drill rig or a portable Minuteman rig equipped with 4-inch-diameter augers. The B-24 rig used a 140-pound hammer to drive samples and the

Minuteman rig used a 70-pound hammer to drive samples. PRA did not drill any borings in the vicinity of the Hodges area, fitness center, or athletic field.

As part of DHA's investigation between 1979 and 1982, they drilled six test borings using a truck-mounted drill rig equipped with hollow-stem augers, advanced four exploratory probes, and excavated 23 test pits using a backhoe. DHA issued three geotechnical reports between 1979 and 1982. As part of their overall investigations for the entire site, DHA drilled 29 borings. Three test borings were drilled in the athletic field. The borings, designated as Boring 27 through Boring 29, were drilled to depths of about 13 to about 18 feet bgs. All three borings terminated in bedrock, consisting of sandstone, siltstone, and shale.

All borings and test pits included in the PRA and DHA reports are shown in the Overall Investigation Plan (Figure 2). The DHA borings drilled in the athletic field are shown in Figure 3, and the logs are presented in Appendix C.

5.0 SITE HISTORY – AERIAL PHOTOGRAPH REVIEW

The development history of the site was compiled by reviewing historical aerial photographs from Pacific Aerial Surveys (1946, 1950, 1963, and 1982), with supplemental images downloaded from the UC Santa Barbara Library (1931, 1947, 1952, and 1965) and Google Earth aerial images from 1987 to 2023. A summary of the aerial photographs reviewed for the site is presented in Table 1.

TABLE 1
Aerial Photography Review

Date	Photo Number	Scale	Type
5/19/31	C_1595, 7, 8,18	1:12,000	B&W
1/1/47	GS-CP 5-4	1:23,600	B&W
11/8/50	AV41-06-30	1:15,000	B&W
1/1/52	DRH-1952, 1K-6,2k-48	1:20,000	B&W
7/9/63	AV550-04-18	1:36,000	B&W
5/1/65	CAS 65-130, 39-166, 167	1:12,000	B&W
5/3/82	AV-2140-06-25	1:12,000	B&W

The earliest vertical aerial photographs of the site taken in 1931 show the site undeveloped. The area is characterized by rolling hills and a prominent east-to-west trending ridge with sparse vegetation and faint ranch roads. There are several drainage gullies to the south of the site that extend downwards from the prominent ridge into Richardson Bay, but are several hundred feet from the site.

The area of the future Seminary athletic field area is occupied by a U-shaped embayment that extends inland to the east approximately 400 feet into the Strawberry Peninsula. The embayment is occupied by a wetland or marsh and sinuous drainage channels extending out into Richardson Bay are clearly visible. There is a small reservoir in the southeast corner of the embayment at the future site of the Seminary athletic field. A notable drainage (swale) is visible from the current Foreman and Gilbert drives intersection extending downward to the reservoir.

The Hodges area is clearly visible and the sloping hillside that extends downward to the south into the prominent embayment described above appears to be blanketed by grassland and shows no scars or slope stability issues. There is a prominent arcuate-shaped ravine and associated drainage swale that originates near the top of the ridge near where Richardson Drive currently exists. The drainage extends downward to the south where the Oliver Lane parking lot currently

exists and into the northeast corner of the prominent U-shaped embayment (wetland) that is now occupied by the Seminary athletic field, near the current location of Gill Hall. There is a light-colored sediment that is potentially alluvial fan at the terminus of the drainage that appears to overlie the wetland in this area. There appear to be no other signs of slope instability.

The 1946 and 1947 photographs show notable livestock trails, but no other notable changes to the site. No notable slope stability issues are visible.

The 1950 and 1952 photographs show substantial development to the north of the site, but there is no development in the site vicinity. There has been a road constructed near the alignment of Seminary Drive that extends around the embayment and wetland described above. The reservoir within the embayment appears dry. The drainage swale that extends upward to the southeast is clearly visible and there is notable dark vegetation lining the channel. No notable slope stability issues are visible.

The 1963 photographs show most of the Golden Gate Seminary buildings, roads, and parking lots have been constructed. Hodges Drive, Shuck Drive, and Oliver Lane and the residential buildings along these roads are visible and appear to be under construction as several areas appear unfinished. It appears that the drainage swale described above has been filled in across the Oliver Lane parking area and downward to the south across Hodges Drive for the construction of the Hodges residential buildings.

The embayment area appears to have been graded and enlarged for the athletic field and the slopes surrounding the field appear cut and/or graded to the current shape and gradient and the prominent drainage swale has been graded over near the current benched parking lots near the intersection of the current Foreman Drive and Gilbert Drive. The outboard western edge of the embayment at Richardson Bay appears to contain fill and Seminary Drive has been constructed and extends across the fill wedge.

The surrounding area has been almost completely developed with only minor areas undeveloped, most notably houses along the top of the ridge and along Ricardo Road to the north have been

constructed. Villa Laguna and the future Strawberry Shores Apartments are not yet constructed. No notable slope stability issues are visible.

The 1965 photographs show most of the Golden Gate Seminary buildings, roads, and parking lots have been constructed. The Hodges area buildings appear complete, and the athletic field appears complete with a grass surface. Grading appears fresh and many of the slopes and landscaped areas still appear barren with a few young trees dispersed across the slopes. Villa Laguna and the future Strawberry Shores Apartments are not yet constructed. No notable slope stability issues are visible.

Google Earth aerial photos from May 1982 show that many more residential dwellings have been constructed on the site. Villa Laguna and the Strawberry Shores Apartments have been constructed and the v-ditch that lies at the top of the cut made for Villa Laguna is visible. No other notable stability issues are visible.

Google Earth images from July 1993 through July 2023 show the site similar to current site conditions. No notable slope stability issues are visible.

6.0 SUBSURFACE CONDITIONS

The bedrock in the area is mapped as Jurassic- to late Cretaceous-age [~200 – 65 million years ago (Ma)] Franciscan Complex mélange consisting of sandstone, shale, chert, greenstone and serpentinite (Rice et al., 1976; Blake et al, 2000). Locally, bedrock is overlain by Quaternary-age (1.8 Ma to the present) colluvium, alluvium, landslide deposits and artificial fill. A geologic map of the site vicinity is presented in Figure 4. The published map is based on a compilation of limited data and subsurface conditions may vary.

The results of our field investigation indicate the eastern half of the Hodges area is blanketed by artificial fill over colluvium. We logged fill over colluvium in borings H-B-1, H-B-2 and H-B-3 to depths of 8, 15 and 20 feet, respectively, and where encountered, the colluvium consists of sandy clay with gravel and clayey sand with gravel with a thickness of about 1 to 10 feet. The eastern half of the Hodges area is primarily underlain with shallow colluvium over sandstone and

shale bedrock. Exploratory borings H-B-4, H-B-5 and H-B-6 all encountered low to moderately hard sandstone and/or shale bedrock at around 1 foot below the ground surface.

The results of our field investigation also indicate that the eastern part of the Seminary athletic field area was cut into bedrock, graded and leveled with artificial fill. Our DPTs encountered soft to stiff soil ranging in depths between 3.5 feet at DPT-1/HA-1 in the northeast corner to greater than 16.5 feet in the middle and southern parts of the field where DPT-2, DPT-3 and DPT-4 encountered hammer refusal at 13.2, 8.5 and 11.5 feet, respectively and DPT-5 did not reach refusal to a depth of 16.5 feet. DHA (1982) encountered fill consisting of soft to stiff clay and loose to medium dense sand and gravel with a cumulative thickness of about 8 to 9 feet thick overlying sandstone, sandstone and shale within exploratory borings 27, 28 and 29 in the same area.

We explored the crest of the eastern slope of the Seminary athletic field with borings H-B-7 and H-B-8, which were advanced to depths of 21.5 and 25.5 feet, respectively. Both borings encountered artificial fill and/or colluvium consisting of decomposed sandstone and shale gravel to boulders with stiff to very stiff sandy clay matrix to the final depth explored. This suggests the benches along the southeast corner of the athletic field are predominately comprised of thick fill wedges of graded rock and soil.

Atterberg limits tests performed on near-surface samples from H-B-1, H-B-4, and H-B-7 at depths between 1 and 5.5 feet bgs indicate the near-surface soil has relatively low expansion potential with plasticity indices (PIs) of 2 to 14.

6.1 Groundwater

We encountered groundwater in exploratory borings H-B-2 and H-B-3 at a depth of about 15 feet below grade. These borings lie approximately within or near the thalweg (channel apex) of the prominent drainage swale that extends from north to south across central-eastern half of the site.

We did not encounter free groundwater within exploratory borings at the Seminary athletic field nor did DHA during their 1982 field investigation. However, we did encounter groundwater

within exploratory boring H-B-8 at 23 feet along Foreman Drive along the crest of the eastern side of the athletic field.

Groundwater levels may vary seasonally and depend on a variety of factors, such as landscape irrigation in the site vicinity and seasonal rainfall. Considering the site topography, there is potential for groundwater flowing through pervious zones in the underlying bedrock to be present. Perched groundwater and seasonal springs are present within the general site vicinity.

7.0 SEISMIC CONSIDERATIONS

7.1 Regional Seismicity

The site is located within the Coast Ranges Geomorphic Province of California, which is characterized by northwest-trending valleys and ridges. These topographic features are controlled by folds and faults that resulted from the collision of the Farallon and North American plates and subsequent strike-slip faulting along the San Andreas Fault system. The San Andreas Fault is more than 600 miles long and extends from Point Arena in the north to the Gulf of California in the south. The Coast Ranges Geomorphic Province is bounded on the east by the Great Valley and on the west by the Pacific Ocean.

The major active faults in the area are the San Andreas, Hayward, and San Gregorio faults. These and other faults in the region are shown in Figure 4. For these and other active faults within a 50-kilometer radius of the site, the distance from the site and estimated characteristic moment magnitude[1] [Petersen et al. (2014) & Thompson et al. (2016)] are summarized in Table 2. These references are based on the Third Uniform California Earthquake Rupture Forecast (UCERF3), prepared by Field et al. (2013).

[1] Moment magnitude (M_w) is an energy-based scale and provides a physically meaningful measure of the size of a faulting event. Moment magnitude is directly related to average slip and fault rupture area.

TABLE 2
Regional Faults and Seismicity

Fault Segment	Approximate Distance from Site (km)	Direction from Site	Characteristic Moment Magnitude
Total North San Andreas (SAO+SAN+SAP+SAS)	12	West	8.04
North San Andreas (Peninsula, SAP)	12	West	7.38
San Gregorio (North)	14	West	7.44
North San Andreas (North Coast, SAN)	14	West	7.52
Total Hayward + Rodgers Creek (RC+HN+HS+HE)	17	Northeast	7.58
Hayward (North, HN)	17	Northeast	6.90
Hayward (South, HS)	31	East	7.00
Rodgers Creek - Healdsburg	32	North	7.19
West Napa	38	Northeast	6.97
Mount Diablo Thrust North CFM	40	East	6.72
Concord	40	East	6.45
Green Valley	40	East	6.30
Total Calaveras (CN+CC+CS+CE)	41	East	7.43
Calaveras (North, CN)	41	East	6.86
Mount Diablo Thrust	41	East	6.67
Clayton	49	East	6.57
Monte Vista - Shannon	49	Southeast	7.14

Damaging earthquakes have occurred along many of these faults in recorded history, as depicted in Figure 5 (USGS, 2021). Notable historic earthquakes which have impacted the Bay Area in recorded history include:

- 1838 San Andreas Earthquake, M_w = 7.4 (estimated)
- 1865 San Andreas Earthquake, M_w = 6.5 (estimated)
- 1868 Hayward Earthquake, M_w = 7.0 (estimated)
- 1906 Great San Francisco Earthquake (San Andreas Fault), M_w = 7.9 (estimated)
- 1989 Loma Prieta Earthquake (San Andreas Fault), M_w = 6.9
- 2014 West Napa Earthquake, M_w = 6.0

As a part of the UCERF3 project, researchers estimated that the probability of at least one $M_w \geq 6.7$ earthquake occurring in the greater San Francisco Bay Area during a 30-year period (starting in 2014) is 72 percent. The highest probabilities are assigned to sections of the Hayward (South), Calaveras (Central), and San Andreas (Santa Cruz Mountains) faults. The respective probabilities are approximately 25, 21, and 17 percent.

7.2 Geologic Hazards

Because the site is in a seismically active region, we evaluated the potential for earthquake-induced geologic hazards including ground shaking, ground surface rupture, liquefaction,[2] lateral spreading,[3] and cyclic densification.[4] We used the results of our investigation to evaluate the potential of these phenomena occurring at the site.

7.2.1 Ground Shaking

The seismicity of the site is governed by the activity of the San Andreas Fault, although ground shaking from future earthquakes on other faults, including the Hayward and San Gregorio faults, will also be felt at the site. The intensity of earthquake ground motion at the site will depend upon the characteristics of the generating fault, distance to the earthquake epicenter, and magnitude and duration of the earthquake. We judge strong to very strong ground shaking could occur at the site during a large earthquake on one of the nearby faults.

7.2.2 Ground Surface Rupture

Historically, ground surface displacements closely follow the trace of geologically young faults. The site is not within an Earthquake Fault Zone, as defined by the Alquist-Priolo Earthquake Fault Zoning Act, and no known active or potentially active faults exist on the site. Therefore, we conclude the probability of fault offset at the site from a known active fault to be very low. In a

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[2] Liquefaction is a phenomenon where loose, saturated, cohesionless soil experiences temporary reduction in strength during cyclic loading such as that produced by earthquakes.

[3] Lateral spreading is a phenomenon in which surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. Upon reaching mobilization, the surficial blocks are transported downslope or in the direction of a free face by earthquake and gravitational forces.

[4] Cyclic densification is a phenomenon in which non-saturated, cohesionless soil is compacted by earthquake vibrations, causing ground-surface settlement.

seismically active area, the remote possibility exists for future faulting in areas where no faults previously existed; however, we conclude the probability of surface faulting, and consequently secondary ground failure from previously unknown faults, is very low.

7.2.3 Liquefaction and Liquefaction-Induced Settlement

When saturated, cohesionless soil liquefies, it experiences a temporary loss of shear strength created by a transient rise in excess pore pressure generated by a strong ground motion. Soil susceptible to liquefaction includes loose to medium dense sand and gravel, low-plasticity silt, and some low-plasticity clay deposits. Flow failure, lateral spreading, differential settlement, loss of bearing strength, ground fissures, and sand boils are evidence of excess pore pressure generation and liquefaction.

The site has **not** been mapped within a zone of liquefaction susceptibility as shown on the map titled *Liquefaction Susceptibility Hazards Map, San Francisco Bay Region OFR 00-44* (USGS, 2000). However, we encountered medium dense clayey sand with gravel in H-B-2 and H-B-8 that is potentially susceptible to liquefaction-induced settlement.

Our analyses were performed using an assumed high groundwater depth of 15 feet bgs for the "during earthquake" groundwater level in the vicinity of H-B-2 and 20 feet bgs in the vicinity of H-B-8, due to the change in grades between the two boring locations. In accordance with the 2022 CBC, we used a peak ground acceleration of 0.58 times gravity (g) in our liquefaction evaluation; this peak ground acceleration is consistent with the Maximum Considered Earthquake Geometric Mean (MCE_G) peak ground acceleration adjusted for site effects (PGA_M). We also used a moment magnitude 8.04 earthquake, which is consistent with the characteristic moment magnitude for the San Andreas fault event, as presented in Table 2.

Our liquefaction analyses indicate the medium dense clayey sand present between depths of approximately 18 and 21.5 feet bgs in H-B-2 and approximately 20 and 24 feet bgs in H-B-8 is susceptible to liquefaction during a major earthquake. Based on the results of our analyses, we estimate total "free-field" ground settlement associated with liquefaction after an MCE event generating a PGA_M of 0.58g will be less than 1/4 inch in the vicinity of H-B-2 and less than 3/4 inch in the vicinity of H-B-8. We estimate liquefaction-induced differential settlement will be

less than 1/4 inch in the vicinity of H-B-2 and less than 1/2 inch in the vicinity of H-B-8 over a horizontal distance of 30 feet.

In the remaining borings, bedrock was encountered at depths of 0 to 9.25 feet bgs, with either cohesive soil or dense to very dense clayey sand above the bedrock. Bedrock is not susceptible to liquefaction. Furthermore, the soil present above the bedrock is not susceptible to liquefaction due to its cohesion or relative density. Therefore, we conclude the potential for liquefaction and liquefaction-induced ground failures, such as lateral spreading, to occur in the vicinity of the remaining borings during a major earthquake is very low.

7.2.4 Cyclic Densification

Cyclic densification (also referred to as differential compaction) of non-saturated sand (sand above the groundwater table) can occur during an earthquake, resulting in settlement of the ground surface and overlying improvements. The results of the previous field investigations and our field investigation indicate the soil above the groundwater at the site is not susceptible to cyclic densification due to its cohesion or relative density. Therefore, we conclude the potential for ground surface settlement resulting from cyclic densification at the site is very low.

7.2.5 Slope Stability

We reviewed the potential for expansive soil, landslides and liquefaction at the site as mapped by the County of Marin; marinmap.org. The area has been mapped as high potential for expansive soils. The area has been designated as an area of "mostly landslide" and as having a very low susceptibility to liquefaction (Marin Map; Knudsen *et al.*, 2000).

The relative stability of upland slopes in the area is assessed in geology for planning report for central and southeastern Marin County that designates the western half of the Hodges site as mostly lying within Zone 1, the most stable category. This zone includes resistant rock that is either exposed or is covered only by shallow colluvium or soil. Also included in this zone are broad, relatively level areas along tops of ridges or in valley bottoms that may be underlain by material that is quite weak (such as Franciscan mélange matrix and alluvium) but occupies a relatively stable position. The Regional Landslide Hazard Map (Figure 6) shows the eastern part

of the Hodges site, most of the Seminary athletic field and surrounding graded slopes lying on Zone 3 – Areas where the steepness of the slopes approaches the stability limits of the underlying geologic materials (Rice, 1976; Figure 6).

During our geologic reconnaissance, we identified and evaluated the broad graded and artificially filled ravine that extends downslope between the Oliver Lane parking area and Gill Hall and Hodges Drive. This area is the confluence of multiple ravines with associated drainage swales that originate upslope that were described by DHA being areas of shallow earthflows, slumps and colluvial soils. We identified relatively thick fill deposits of up to 10 feet thick overlying colluvium and alluvial deposits with high groundwater at the Oliver Lane parking area and extending downslope to Gill Hall. Although we did not observe any slope stability issues other than minor erosion and gullying, we conclude there is potential for slope movement and erosion in this area during heavy rain events.

Provided the proposed buildings and retaining walls are constructed in accordance with the standard of care for excavations and the recommendations presented in this report, and we are given the opportunity to observe actual conditions exposed during excavation and construction of below-grade structures, we conclude the potential for the proposed development to be adversely impacted by slope instability would be low.

8.0 DISCUSSION AND CONCLUSIONS

From a geotechnical standpoint, we conclude the site can be developed as planned, provided the recommendations presented in this report are incorporated into the project plans and specifications and implemented during construction. The primary geotechnical concerns for the proposed buildings are the presence of heterogeneous fill underlying some of the areas to be developed and providing adequate foundation support for the proposed improvements. The primary geotechnical concern for the athletic field is the placement of fill above the existing undocumented fill.

8.1 Foundation Support and Settlement

Hodges Area Multi-Family Buildings

Preliminary grading plans[5] indicate the residences in the eastern part of the Hodges area will primarily be constructed within cuts of up to about 10 feet and fills of up to about 12 feet. We encountered bedrock at a depth of about 9.5 feet bgs (H-B-1) in the northern portion of the proposed eastern building footprint and did not encounter bedrock in the southwestern portion of the building to a maximum depth of 21.5 feet bgs (H-B-3). The northern portion of the proposed eastern building will likely be underlain by bedrock and the southern portion will be underlain by engineered fill. Because of the differential thickness of cut and fill beneath the proposed eastern building, we conclude the proposed eastern building may be supported on a mat foundation bearing on ground improved with drilled displacement columns (DDCs) bearing in native colluvium or bedrock. Assuming the eastern building is supported on a mat foundation bearing on ground improved with DDCs constructed in accordance with the recommendations presented in our report, we estimate the building would experience less than 1 inch of total settlement and differential settlement on the order of 1/2 inch over a horizontal distance of 30 feet.

The residences in the western part of the Hodges area will be constructed within cuts of between 5 to 25 feet. We encountered bedrock between 1 and 5 feet bgs in the vicinity of the western building. We conclude the western building may be supported on spread footings bearing on bedrock. Alternatively, the western building may be supported on drilled piers. Assuming the western building is supported on spread footings or drilled piers constructed in accordance with the recommendations presented in our report, we estimate the building would experience less than 3/4 inch of total settlement and differential settlement on the order of 1/2 inch over a horizontal distance of 30 feet.

Fitness Center

Based on review of historic aerial photographs, the proposed fitness center lies within a previously backfilled drainage swale. We encountered up to 25 feet of fill in H-B-7 and H-B-8 and did not encounter native material. The fill is not suitable for foundation support in its current

[5] Plan set titled *Grading Plans, The Seminary,* prepared by CSW/Stuber-Stroeh Engineering Group, Inc., dated February 7, 2024

condition. We conclude the proposed fitness center building may be supported on a mat foundation bearing on ground improved with drilled displacement columns (DDCs) bearing in native colluvium or bedrock. Prior to ground improvement design, we recommend drilling additional boring(s) in the area to characterize the depth to native soil/bedrock.

Assuming the fitness center is supported on a mat foundation bearing on ground improved with DDCs constructed in accordance with the recommendations presented in our report, we estimate the building would experience less than 1 inch of total settlement and differential settlement on the order of 1/2 inch over a horizontal distance of 30 feet.

Recommendations for spread footings, drilled piers, and mat foundations bearing on improved ground are presented in Section 9.2

8.2 Ground Improvement

A mat foundation bearing on improved ground would be an acceptable foundation option for the proposed eastern Hodges area building and the proposed fitness center, provided the soil improvement extends to a depth that will reduce differential settlement under static conditions to a tolerable level. There are several types of ground improvement that may be utilized to mitigate and/or transfer building loads below the fill at the site. We consider DDCs to be the most economical ground improvement method for this project because of the depth of the fill; however, other types of ground improvement, such as vibratory stone columns or compacted aggregate columns, such as Geopiers, are acceptable alternatives to DDCs. Ground improvement systems are typically installed under design-build contracts by specialty contractors.

DDCs are installed by advancing a continuous flight, hollow-stem auger that mostly displaces the soil and then pumping a sand-cement mixture into the hole under pressure as the auger is withdrawn. DDCs result in low vibration during installation and generate little to no drilling spoils for offhaul. The required size, spacing, length, and strength should be evaluated by the design-build ground improvement contractor, based on the desired level of improvement. We recommend a preliminary design, including calculations of static and seismic settlement, be prepared by the ground improvement contractor and be submitted for our review. For planning purposes, ground improvement elements can be assumed to extend to at least 20 feet bgs within

the proposed eastern Hodges area building and 30 feet bgs within the proposed fitness center, pending confirmation boring(s) in the vicinity of the proposed fitness center. Final total and differential static settlement should be provided by the ground improvement design-build contractor. The Structural Engineer and Architect should confirm these settlements are acceptable prior to bidding. Additionally, the mat should be designed to span between ground improvement elements.

8.3 Excavation in Rock

Excavations and drilling in rock may be required for construction of the new buildings, including temporary shoring (if needed) and footings. Where encountered in the PRA and DHA borings and test pits, the bedrock is generally moderately to deeply weathered, soft to low hardness, friable sandstone and shale, and becomes harder with depth. The rock varies substantially in hardness and degree of weathering. We anticipate weathered rock can be excavated with a backhoe; however, excavation of harder rock that will require the use of hydraulic breaking equipment (i.e., a hoe ram) may be encountered. Therefore, the contractors involved in foundation installation should be prepared to excavate hard rock, including the possibility of hydraulic breaking equipment, and should bid the project accordingly. The material descriptions and SPT N-values presented in the PRA and DHA borings and test pits should be evaluated by the contractor when bidding the project and selecting appropriate equipment.

8.4 Athletic Field Engineered Fill Placement

We understand the spoils from other areas of the development will be placed as engineered fill within the athletic field. Based on discussions with the civil engineer for the project, we understand up to 30 feet of fill may be placed in the athletic field area, assuming a 2:1 (horizontal to vertical) slope. In DHA's borings, bedrock was encountered between about 8.5 to 14 feet bgs. In our DPTs, we encountered refusal between depths of about 4.3 and 14.1 feet bgs, with refusal encountered at earlier depths moving closer to the slope at the northern side of the field. H-DPT-5 did not encounter refusal and is likely within a thicker fill area than the rest of the athletic field based on aerial imagery.

We understand improvements will not be constructed above the fill. Engineered fill will undergo settlement during placement and continue to settle for after grading. We estimate total post-grading settlement of a properly engineered and compacted 30-foot-thick fill layer meeting the compaction recommendations presented in Section 9.1 will be on the order of 2 inches, with differential settlement on the order of 1 inch across a 30-foot horizontal distance.

If a fill slope will be constructed using the spoils from other areas, a keyway should be excavated into firm colluvium/bedrock and proper drainage should be installed in the fill slope. Additional recommendations for the fill placement within the athletic field are presented in Section 9.1.

8.5 Soil Corrosivity

Corrosivity tests were performed by Project X Corrosion Engineering of Murrieta, California on soil samples obtained from borings H-B-1 and H-B-7 at depths of 2.5 and 5 feet bgs, respectively. The corrosivity test results are presented in Appendix B.

Many factors can affect the corrosion potential of soil including, but not limited to, resistivity, pH, and chloride and sulfate concentrations. Based on the minimum soil resistivity measurements of 3,618 and 3,551 ohm-cm, we conclude the soil is "corrosive" to buried metal (Roberge, 2018). Accordingly, all buried iron, steel, cast iron, galvanized steel, and dielectric-coated steel or iron should be protected against corrosion depending upon the critical nature of the structure. If it is necessary to have metal in contact with soil, a corrosion engineer should be consulted to provide recommendations for corrosion protection.

The results of the pH tests (7.4 and 7.2) indicate the near-surface soil is "negligibly corrosive" to buried metallic and concrete structures. The chloride ion concentrations (16.7 and 29.5 mg/kg) indicate the chlorides in the near-surface soil are "negligibly corrosive" to buried metallic structures and reinforcing steel in concrete structures below ground. The results also indicate the sulfate ion concentrations (15.9 and 27.5 mg/kg) are sufficiently low such that sulfates do not pose a threat to buried concrete and mortars.

9.0 RECOMMENDATIONS

Our recommendations for site preparation and grading, foundation design, and other geotechnical aspects of the project are presented in this section.

9.1 Site Preparation, Grading, and Fill Placement

Site demolition should include the removal of existing pavements, foundations, and underground utilities, if any, where the new structures are proposed. In general, abandoned underground utilities should be removed to the property line or service connections and properly capped or plugged with concrete. Where existing utility lines are outside the proposed building footprints and will not interfere with the proposed construction, they may be abandoned in-place provided the lines are filled with lean concrete or cement grout to the property line. Voids resulting from demolition activities should be properly backfilled with compacted fill following the recommendations provided later in this section.

In areas that will receive fill or improvements (i.e., new floor slabs, building pads, concrete flatwork), the soil subgrade exposed should be scarified to a depth of at least 8 inches, moisture-conditioned to above optimum moisture content, and compacted to at least 90 percent relative compaction.[6] The soil subgrade should be kept moist until it is covered by fill. Scarification and re-compaction will not be required where bedrock is exposed at finished subgrade elevation. If zones of poorly compacted undocumented fill or weak/unstable soil are encountered during site preparation and grading within future building pads, the fill or weak/unstable soil should be overexcavated under the observation of our field engineer and replaced as properly compacted fill.

Fill should consist of on-site soil or imported (select) fill that is free of organic matter, contains no rocks or lumps larger than 3 inches in greatest dimension, and be approved by the Geotechnical Engineer. Imported select fill should also have a liquid limit less than 40 and plasticity index less than 12 and be approved by the Geotechnical Engineer. Samples of proposed

[6] Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same material, as determined by the ASTM D1557 laboratory compaction procedure.

imported fill material should be submitted to the Geotechnical Engineer at least three business days prior to use at the site. The grading contractor should provide analytical test results or other suitable environmental documentation indicating the imported fill is free of hazardous materials at least three days before use at the site.

Fill should be placed in horizontal lifts not exceeding 8 inches in uncompacted thickness, moisture-conditioned to above optimum moisture content, and compacted to at least 90 percent relative compaction. Fill consisting of clean sand or gravel (defined as poorly graded soil with less than 5 percent fines by weight) or greater than 5 feet in thickness should be compacted to at least 95 percent relative compaction. Fill placement within the upper 12 inches of vehicular pavement soil subgrade should also be compacted to at least 95 percent relative compaction and be non-yielding.

9.1.1 Athletic Field Fill Placement

Assuming a fill slope will be constructed as part of the athletic field fill placement, the proposed buttress, keyway, and subdrain details are shown in Figure 7. The keyway should extend at least 4 feet into competent colluvium/bedrock and be a minimum of 10 feet wide at its base. The bottom of the keyway should be graded level or inclined slightly into the slope to resist downslope fill movement. The side slopes of the keyway should not be steeper than 1:1.

Once the site has been stripped and prepared, subdrains should be installed in the keyway at the base of the newly placed fill to reduce the potential for buildup of hydrostatic pressures within the fill. A detail for a typical keyway subdrain is shown in Figure 7. The subdrain should consist of a 6-inch-diameter perforated SDR 35 PVC pipe with the perforations facing down. The perforated pipe should be covered by Class 2 permeable material. The subdrain pipe should be sloped to drain at a minimum gradient of 1 percent to a 6-inch-diameter, solid PVC pipe with water-tight connections to transport groundwater to a suitable discharge location. Cleanouts should be provided for each length of pipe with a bend sharper than 45 degrees and at approximately 100-foot intervals for straight pipes.

The fill used to backfill the slope should be benched into colluvium, bedrock, or competent soil, as determined by our field engineer or geologist at the time of grading. The inclination of the

final fill slope should not be steeper than 2:1 (horizontal to vertical). The proposed buttress fill, as shown in Figure 7, should contain soil with a PI of 15 or less.

If additional fill will be placed in the vicinity of H-DPT-5 and keyed into the existing slope to the east of the field along the edge of Gilbert Drive, test pit(s) should be excavated in the vicinity to determine the depth to competent material consisting of either firm native soil, colluvium, or bedrock.

9.1.2 Utility Trench Backfill

Excavations for utility trenches can generally be made with a backhoe; however, in deeper cuts, hard zones of bedrock may be encountered where a hoe-ram may be needed to excavate the trench. All trenches should conform to the current CAL-OSHA requirements. To provide uniform support, pipes or conduits should be bedded on a minimum of 4 inches of clean sand or fine gravel. After the pipes and conduits are tested, inspected (if required), and approved, they should be covered to a depth of 6 inches with sand or fine gravel, which should be mechanically tamped.

New footings should be bottomed below an imaginary line extending up at a 1.5:1 (horizontal to vertical) inclination from the base of existing or new utility trenches. Alternatively, the portion of the utility trench (excluding bedding) that is below the 1.5:1 line can be backfilled with CLSM with a 28-day unconfined compressive strength of at least 100 pounds per square inch (psi) or Class 2 aggregate base compacted to at least 95 percent relative compaction.

Backfill for utility trenches and other excavations is also considered fill and should be placed and compacted in accordance with the recommendations previously presented. If imported clean sand or imported clean gravel (defined as soil with less than 5 percent fines) is used as backfill, it should be compacted to at least 95 percent relative compaction. Jetting of trench backfill should not be permitted. Special care should be taken when backfilling utility trenches in pavement areas. Poor compaction may cause excessive settlements, resulting in damage to the pavement section.

9.1.3 Exterior Concrete Flatwork

We recommend a minimum of 4 inches of Class 2 aggregate base be placed beneath proposed exterior concrete flatwork, including sidewalks; the aggregate base should extend at least 6 inches beyond the slab edges where the flatwork is adjacent to landscaping. Class 2 aggregate base placed beneath exterior slabs-on-grade not subject to vehicular loading, such as patios and sidewalks, should be moisture-conditioned to near optimum moisture content, and compacted to at least 90 percent relative compaction. Prior to placement of the aggregate base, the subgrade should be scarified to a depth of at least 8 inches, moisture-conditioned to at least 2 percent above optimum moisture content, and compacted to at least 90 percent relative compaction. Scarification and compaction of the subgrade is not required where intact bedrock is exposed at the subgrade elevation; however, material loosened by the excavation process should be removed prior to placement of the aggregate base.

9.1.4 Temporary Slopes

Where space permits, the sides of the proposed excavations may be sloped. Temporary slopes in the native colluvium/residual soil should be sloped no steeper than 1:1 (horizontal to vertical), assuming no evidence of groundwater or seepage is present. In the case of seepage/groundwater, the native soil should be sloped no steeper than 1.5:1 (horizontal to vertical). Allowable inclinations for temporary slopes in bedrock will depend on bedrock quality and the orientation of joints and fractures. For planning purposes, an allowable slope inclination of ½:1 in bedrock may be assumed; however, a geologist should examine the bedrock to confirm there is no adverse orientation of joints and fractures that may result in instability of the cuts. During construction, we should observe cut slopes to verify the inclinations are appropriate for the conditions encountered.

9.1.5 Permanent Cut and Fill Slopes

Permanent slopes consisting of engineered fill and cut slopes in stiff native soil should be inclined no steeper than 2:1 (horizontal to vertical). For planning purposes, an inclination of 1.5:1 should be assumed for permanent cut slopes in bedrock. All permanent cut slopes in bedrock should be observed during grading by a geologist for signs of adverse orientation of

joints and fractures. Should such adverse slope conditions be detected by the geologist during grading, remedial alternatives will be provided at that time based on the exposed conditions.

9.2 Surface and Subsurface Drainage

Recommendations for surface and subsurface drainage are presented in the following sections.

9.2.1 Surface Drainage

Positive surface drainage should be provided around the buildings to direct surface water away from the foundations. Grades around the buildings should be designed by the Civil Engineer and conform to the requirements of the 2022 CBC, which will help minimize stormwater accumulation adjacent to foundations. In addition, roof downspouts should be discharged into controlled drainage facilities to keep water away from the foundations. The use of water-intensive landscaping around the perimeter of the buildings should be avoided.

Care should be taken to minimize the potential for subsurface water to collect beneath pavements and pedestrian walkways. Where landscape beds and tree wells are immediately adjacent to pavements, we recommend vertical cutoff barriers be incorporated into the design to prevent irrigation water from saturating the subgrade and aggregate base. These barriers may consist of either flexible impermeable membranes or deepened concrete curbs.

9.2.2 Subsurface Drainage

Because the proposed buildings in the Hodges area will be constructed by cutting into a hillside, there is potential for perched water to be present in the cut. Further, because residual soil and bedrock will be exposed near the ground surface in the cuts to construct the building pads, infiltration of rainwater into the ground will likely be slow. To mitigate the potential for perched water to adversely impact the proposed development, we recommend a foundation subdrain be installed adjacent to the entire perimeter of each building. The subdrain trench should be at least one foot wide and extend at least 18 inches below grade but should not extend below the bottom of spread footings. The bottom of the subdrain trench should slope at a minimum inclination of one percent to a suitable outlet. A perforated 4-inch-diameter Schedule 40 PVC pipe should be placed (with perforations facing down) at the bottom of the trench with a gradient of at least one

percent and underlain by 2 inches of Class 2 permeable material. The trench should then be backfilled with Class 2 permeable material to within 6 inches of the ground surface. As an alternative to Class 2 permeable, ¾-inch drain rock completely wrapped in filter fabric may be used. Regardless of the type of gravel used, a filter sock should not be placed around the perforated pipe. The trench should be capped with at least 6 inches of low-permeability soil or a concrete slab. A cleanout should be installed at the high end of the pipe to allow for flushing of the subdrain if necessary.

If significant seepage is observed during construction, subdrains beneath the building slab-on-grade floors may also be warranted.

9.3 Foundations

Recommendations for foundations are presented in the following sections.

9.3.1 Spread Footings

Spread footings may be used to support the proposed building in the western part of the Hodges area. Spread footings should bottom at least 18 inches below the lowest adjacent ground surface and bottom in residual soil/bedrock. Spread footings situated near a slope should be setback at least 5 feet horizontally from the top of the slope. Alternatively, the footings may be deepened such that there is at least 7 feet of horizontal distance between the bottom edge of the footing and the face of the slope.

Spread footings may be designed using an allowable bearing pressure of 4,000 pounds per square foot (psf) for dead-plus-live loads; this allowable bearing pressure may be increased by one-third for total design loads, which include wind and seismic forces. The allowable bearing pressures for dead-plus-live and total loads include factors of safety of at least 2.0 and 1.5, respectively. We estimate total and differential settlement of properly constructed footings designed using the recommended bearing pressure will be less than 3/4 inch and 1/2 inch over a 30-foot horizontal distance, respectively.

Lateral loads may be resisted by a combination of passive pressures on the vertical faces of the footings and friction between the bottoms of the footings and the supporting soil. To compute

lateral resistance, we recommend using an equivalent fluid weight of 400 pounds per cubic foot (pcf) in bedrock. The upper foot of soil should be ignored for lateral resistance unless confined by a slab. Lateral resistance should also be ignored where there is less than 7 feet of horizontal distance between the footing and the face of the slope. Frictional resistance should be computed using base friction coefficients of 0.35 and 0.50 in residual soil and bedrock, respectively. The passive pressure and frictional resistance values include a factor of safety of at least 1.5 and may be used in combination without further reduction.

Footing excavations should be free of standing water, debris, and weak and disturbed materials prior to placing concrete. The bottoms and sides of the footing excavations should be maintained in a moist condition until concrete is placed. We should check footing excavations prior to placement of reinforcing steel.

9.3.2 Drilled Piers

Drilled piers may be used as an alternative to spread footings in the vicinity of the western part of the Hodges area. Drilled piers should be at least 16 inches in diameter and spaced at least three diameters on center. Drilled piers should be designed to derive their axial capacity from skin friction in bedrock. Where drilled piers are installed on ground sloping at 4:1 or steeper, they should extend at least 10 feet below the bottom of the grade beam and at least 5 feet into bedrock. To compute axial capacity for dead-plus-live loads acting in compression, we recommend using an allowable skin friction value of 1,500 psf in bedrock. Skin friction in soil above the bedrock and end bearing should be ignored for vertical support. This skin friction value may be increased by one-third for total load conditions. To compute uplift resistance for the piers, the same skin friction values provided for dead-plus-live loads may be used.

To compute lateral resistance, we recommend using an equivalent fluid weight of 400 pcf in bedrock with a maximum pressure of 4,000 psf. The passive pressure may be assumed to act over a width of three pier diameters, or center-to-center spacing between piers, whichever distance is shorter. The upper foot of bedrock should be ignored for lateral resistance unless confined by a slab; soil above the bedrock should also be ignored for lateral resistance. Where the pier is near or on a sloped surface, the depth where the bedrock can be relied upon for lateral

resistance is beneath where there is at least 7 feet of horizontal distance between the pier and the face of the slope. The passive pressure value includes a factor of safety of at least 1.5. We should perform lateral pier analyses to check pier-head deflection once the pier lengths have been determined.

Drilled piers should be installed by a qualified contractor with demonstrated experience in this type of foundation and subsurface conditions, including drilling into bedrock. The bottoms of the pier holes should be free of debris and water before the placement of concrete. If groundwater is encountered during pier drilling, the pier hole should be pumped dry prior to placement of concrete. If the hole cannot be pumped dry prior to placement of concrete, then the concrete should be placed by tremie methods.

Concrete used for pier construction should be discharged vertically using a hose to tremie fill the drilled holes to reduce aggregate segregation. Under no circumstances should concrete be allowed to free-fall against either the steel reinforcement or the sides of the excavation during pouring. Concrete should be placed in the pier holes within 24 hours of completion of drilling if groundwater is encountered.

9.3.3 Mat Foundation Bearing on Improved Ground

A mat foundation bearing on improved ground may be used to support the proposed building in the eastern portion of the Hodges area and the fitness center. For preliminary design of a mat foundation bearing on ground improved with DDCs, we recommend DDCs extend into colluvium/residual soil/bedrock. In the eastern portion of the Hodges area, DDCs may extend to a depth of about 15 feet on the upslope (west) side of the building and to a depth of about 30 feet on the downslope (east) side of the building. As discussed previously, an additional boring should be drilled in the vicinity of the fitness center to determine the depth to residual soil/bedrock, but we did not encounter residual soil/bedrock in our borings drilled to a maximum depth of 25 feet bgs.

We anticipate the DDC ground improvement system described in Section 8.2, if properly designed and constructed, should be capable of increasing the maximum allowable bearing pressure to 4,000 psf for dead-plus-live loads and 5,300 psf for total loads. For design of the mat

bearing on improved ground, we recommend using a preliminary modulus of vertical subgrade reaction of 25 pounds per cubic inch (pci) for dead-plus-live loads and 35 pci for total loads; these values have been reduced to account for the size of the mat. Once the Structural Engineer estimates the distribution of bearing stress on the bottom of the mat, we should review the distribution and revise the modulus of vertical subgrade reaction, if appropriate.

The final design's allowable bearing pressures, estimated settlements, and modulus of vertical subgrade reaction should be evaluated by the design-build ground improvement contractor, as these values will be based on the diameter, depth, and spacing of the ground improvement elements.

Lateral loads may be resisted by a combination of passive pressure on the vertical faces of the mat and friction between the bottoms of the mat and the supporting soil. To compute passive resistance, we recommend using an allowable equivalent fluid weight of 260 pounds per cubic foot (pcf). The upper foot of soil should be ignored unless confined by a slab or pavement. The allowable friction factor will depend on whether the mat is directly underlain by improved soil, a vapor retarder, or a waterproofing membrane. If the mat is supported directly on improved soil, an allowable base friction coefficient of 0.5 may be used in design. If a vapor retarder or a waterproofing membrane that is not bentonite-based, such as Preprufe, are used, a base friction factor of 0.20 should be used. For bentonite-based water proofing membranes, such as Paraseal or Voltex, a friction factor of 0.12 should be used. Friction factors for other types of waterproofing membranes can be provided upon request. The passive pressure and frictional resistance values include a factor of safety of at least 1.5 and may be used in combination without further reduction.

The mat subgrade should be free of standing water, debris, and disturbed materials prior to placing concrete. The mat subgrade should be compacted and prepared following the recommendations presented in Section 9.1. A mud slab may be placed on the elevator pit subgrade to provide a working surface for application of waterproofing material.

9.4 Concrete Slabs-on-Grade

The subgrade for new concrete slab-on-grade floors should be prepared in accordance with our recommendations in Section 8.1. If bedrock is exposed at the finished subgrade elevation, it is not necessary to scarify the surface; however, the subgrade should be free of loose material.

Where water vapor transmission through the floor slab is considered detrimental, we recommend installing a capillary moisture break and water vapor retarder beneath the floor slab. A capillary moisture break consists of at least 4 inches of ASTM No. 56 or No. 57 aggregate meeting the gradations shown in Table 3. The aggregate should be compacted using vibratory equipment. The capillary moisture break can be eliminated for buildings supported on a mat foundation bearing on improved ground.

TABLE 3
Recommended Capillary Break Gradation

Sieve Size	Percentage Passing Sieve	
	ASTM No. 56	ASTM No. 57
1-1/2 inch	100	100
1 inch	90 – 100	95 – 100
3/4 inch	40 – 85	--
1/2 inch	10 – 40	25 – 60
3/8 inch	0 – 15	--
No. 4	0 – 5	0 – 10
No. 8	--	0 – 5

The vapor retarder should meet the requirements for Class A vapor retarders stated in ASTM E1745. The vapor retarder should be placed in accordance with the requirements of ASTM E1643. These requirements include overlapping seams by 6 inches, taping seams, and sealing penetrations in the vapor retarder.

Concrete mixes with high water/cement (w/c) ratios result in excess water in the concrete, which increases the cure time and can result in excessive vapor transmission through the slab. Where the concrete is poured directly over the vapor retarder, we recommend the w/c ratio of the

concrete not exceed 0.45. Water should not be added to the concrete mix in the field. If necessary, workability should be increased by adding plasticizers. In addition, the slab should be properly cured. Before the floor covering is placed, the contractor should check that the concrete surface and moisture emission levels (if emission testing is required) meet the manufacturer's requirements.

9.5 Retaining Walls

Permanent retaining walls should be designed to resist lateral earth pressures imposed by the retained soil, as well as a surcharge pressure from nearby foundations and vehicles where appropriate. In addition, because the site is in a seismically active area, retaining walls that retain more than 6 feet of soil should be designed for the more critical of static or seismic conditions.

For static conditions, we recommend restrained and unrestrained walls that retain soil be designed for the lateral earth pressures presented in Table 4. Walls that will retain more than 6 feet of soil will need to be designed for the more critical of static or seismic conditions.

TABLE 4
Lateral Earth Pressures for Retaining Wall Design (Drained Conditions)

Soil Backfill Inclination	Active Static Condition (Unrestrained)	At-Rest Static Condition (Restrained)	Seismic Conditions (Unrestrained)	Seismic Condition (Restrained)
Level	34 pcf	54 pcf	34 pcf + 14 pcf	34 pcf + 32 pcf
4:1	39 pcf	62 pcf	39 pcf + 16 pcf	39 pcf + 37 pcf
3:1	41 pcf	65 pcf	41 pcf + 17 pcf	41 pcf + 39 pcf
2:1	48 pcf	76 pcf	48 pcf + 20 pcf	48 pcf + 45 pcf

Where walls retain bedrock, a lateral earth pressure of 20 pcf may be used for both restrained and unrestrained conditions. A seismic increment is not needed where walls retain bedrock.

Where there will be vehicular traffic behind the top of a permanent wall within a horizontal distance equal to 1.5 times the height of the wall, the wall should be designed for vehicular surcharge of 50 psf over the upper 10 feet of the wall. Where existing foundations are supported above a "zone-of-influence" line extending up from a permanent wall at an inclination of 1.5:1

(horizontal to vertical), the wall should be designed for surcharge pressure. The magnitude of the surcharge pressure will need to be evaluated on a case-by-case basis.

The recommended lateral earth pressures for "drained" conditions assume the walls are backdrained above the water table to prevent the buildup of hydrostatic pressure. Although site retaining walls will be above the groundwater level, water can accumulate behind the walls from other sources, such as rainfall, irrigation, and broken water lines. One acceptable method for backdraining a site retaining wall is to place a prefabricated drainage panel against the back of the wall. The drainage panel should extend down to a perforated PVC collector pipe at the base of the wall. The pipe should be surrounded by at least 4 inches of Caltrans Class 2 permeable material or 3/4-inch drain rock wrapped in filter fabric (Mirafi 140NC or equivalent). The pipe should be sloped to drain by gravity to a suitable outlet. For below-grade retaining walls, such as elevator pit walls, the walls may be designed for "undrained" earth pressures of 75 and 90 pcf for bedrock and soil, respectively, over their entire height, in which case the drainage system may be omitted. To protect against moisture migration, below-grade retaining walls should be waterproofed and water stops should be placed at all construction joints.

Site retaining walls may be supported on spread footings bearing on firm native soil/colluvium and designed in accordance with the recommendations presented above in Section 9.3.1.

9.5.1 Soil Nails

Several computer programs, such as SNAIL (California Department of Transportation, updated August 21, 2018) and SNAP_2 (FHWA 2016), are available for designing a soil-nail wall. SNAIL uses a force limit equilibrium for the stability analyses of soil nails; the failure planes are assumed bi-linear if they pass through the toe of the wall and tri-linear if they pass beyond the toe of the wall. SNAP also uses a limit equilibrium design method (Bishop's) and allows soil-nail wall design using allowable stress design (ASD). Internal failure modes include nail pullout and nail tensile failure analysis, along with nail head and facing element analysis for temporary and permanent conditions. External failure modes include global stability, sliding, and bearing capacity analyses.

Soil-nail systems are typically installed under a design-build contract by specialty contractors; therefore, we are not providing a specific design; however, we are providing estimated input parameters for preliminary design. The actual capacities and lengths should be determined by the design-build contractor with experience designing, building, and testing soil-nail walls in similar soil conditions. We should review the design prior to installation. For preliminary design, we recommend the input parameters presented in Table 5.

TABLE 5
Recommended Input Parameters for Design of Soil-Nail Walls

Soil Type	Total Density (pcf)	Ultimate Bond Strength (psf) (Factor of Safety = 1.0)	Shear Strength Parameters	
			c[1] (psf)	ϕ[2] (deg)
Bedrock	145	5,000	4,000	0

Notes:
[1] Cohesion intercept or undrained shear strength, without a factor of safety
[2] Angle of internal friction, without a factor of safety

We should review the design plans and design calculations prior to their issuance for construction to check for conformance with our recommendations. The design of the walls should also include appropriate testing of soil nails.

9.6 Seismic Design

The latitude and longitude of the site are 37.8898° and -122.5071°, respectively. For design per the 2022 CBC, we recommend the following:

- Site Class C (very dense soil and soft rock)
- S_S = 1.50g, S_1 = 0.60g
- F_a = 1.2, F_v = 1.4
- S_{MS} = 1.80g, S_{M1} = 0.84g
- S_{DS} = 1.20g, S_{D1} = 0.56g
- Seismic Design Category D for Risk Factors I, II, and III

10.0 ADDITIONAL GEOTECHNICAL SERVICES

Prior to construction, we should review the project plans and specifications to check that they conform to the intent of our recommendations. During construction, our field engineer should observe shoring/soil nail installation (if needed), ground improvement, foundation excavations prior to placement of reinforcing steel and perform field density testing to check subgrade preparation and fill compaction. These observations will allow us to compare actual with anticipated soil conditions and to check the contractor's work conforms to the geotechnical aspects of the plans and specifications.

11.0 LIMITATIONS

This geotechnical investigation has been conducted in accordance with the standard of care commonly used as state-of-practice in the profession. No other warranties are either expressed or implied. The recommendations made in this report assume that the subsurface conditions do not deviate appreciably from those disclosed in our field investigation, geologic reconnaissance, and the PRA and DHA field investigations. If any variations or undesirable conditions are encountered during construction, we should be notified so additional recommendations can be made. The foundation recommendations presented in this report are developed exclusively for the proposed development described in this report and are not valid for other locations and construction in the site vicinity.

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ROCKRIDGE GEOTECHNICAL

FIGURES



Reference: Base map from a drawing titled "Master Plan", dated March 1, 2024.

0 500 Feet

Approximate scale

HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

ROCKRIDGE GEOTECHNICAL

SITE LOCATION MAP

Date 02/04/25	Project No. 24-2568	Figure 1



EXPLANATION

- RBS-B-2 — Approximate location of boring by Rockridge Geotechnical, Inc., November 7 & 8, 2024
- DPT-1 — Approximate location of dynamic penetrometer test by Rockridge Geotechnical, Inc., November 7, 2024
- RG-TP-1 — Approximate location of test pit logged by Rockridge Geotech, Inc., March through June 2024
- B-1 — Approximate location of boring by Rockridge Geotechnical, Inc., April 11-12, 2024
- B-2 — Approximate location of boring by Rockridge Geotechnical, Inc., June 4, 2024
- B-8 — Approximate location of boring performed by Purcell, Rhoades & Associates, 2010 to 2016
- DHA-B-15 — Approximate location of boring performed by Donald Herzog & Associates, between 1979 and 1982
- DHA-B-1 — Approximate location of boring performed by Donald Herzog & Associates, August 1979
- DHA-TP-10 — Approximate location of test pit performed by Donald Herzog & Associates, 1979 to 1982
- HA-1 — Approximate location of boring by Rockridge Geotechnical, Inc., December 20, 2024
- J-B-6 — Approximate location of boring by Rockridge Geotechnical, Inc., January 6-13, 2025
- J-TP-8 — Approximate location of test pit logged by Rockridge Geotech, Inc., January 6-13, 2025
- CCRC-B-1 — Approximate location of boring by Rockridge Geotechnical, Inc., January 6-13, 2025
- H-B-1 — Approximate location of boring by Rockridge Geotechnical, Inc., January 28-29, 2025
- H-DPT-1 — Approximate location of dynamic penetrometer test and hand-auger boring by Rockridge Geotechnical, Inc., January 14, 2025

Reference: Base map from a drawing titled "Master Plan", dated March 1, 2024.

0 350 Feet

Approximate scale

HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

OVERALL INVESTIGATION PLAN

Date 02/04/25	Project No. 24-2568	Figure 2

ROCKRIDGE GEOTECHNICAL



EXPLANATION

H-B-1 — Approximate location of boring by Rockridge Geotechnical, Inc., January 28-29, 2025

H-DPT-1 — Approximate location of dynamic penetrometer test and hand-auger boring by Rockridge Geotechnical, Inc., January 14, 2025

DHA-B-27 — Approximate location of boring performed by Donald Herzog & Associates, August 1979

Approximate areas of thick colluvium (H-B-1 through H-B-3) and thick fill during previous grading (H-B-7 and H-B-8)

N

0 120 Feet

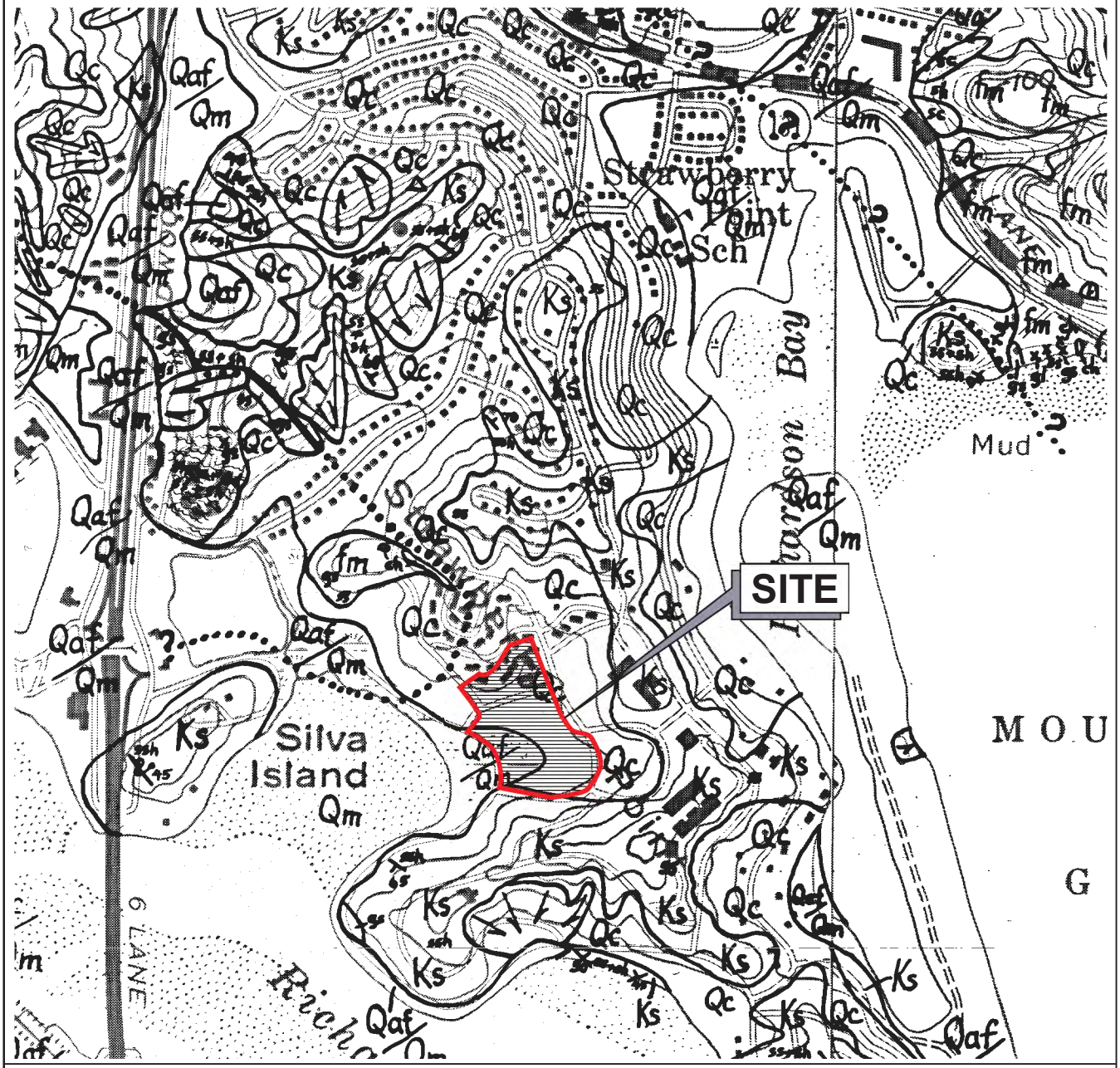
Approximate scale

HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

SITE PLAN

Date 03/10/25	Project No. 24-2568	Figure 3

ROCKRIDGE GEOTECHNICAL



Base map: Geology of the Tiburon Peninsula, Sausalito, and Adjacent Areas
Marin County, California
Rice, S.J. and Smith, T.C., 1976

Geologic Units:

Qaf	artificial fill (Quaternary)
Qaf/Qm	artificial fill placed on bay mud (Quaternary)
Qm	Bay Mud (Quaternary)
Qc	colluvium (Quaternary)
Ks	sandstone and shale (Cretaceous)
ss	sandstone (Cretaceous and/or Jurassic)
sh	shale (Cretaceous and/or Jurassic)
ssh	sandstone and shale (Cretaceous and/or Jurassic)
fm	Franciscan Melange (Jurassic)
gl	metamorphic rocks (Jurassic)
gs	greenstone (Jurassic)
ch	chert (Jurassic)

Symbol Explanation

Contact between map units - solid where accurately located, dashed where approximately located; short dash where inferred; dotted where concealed.

Fault - solid where accurately located, dashed where approximately located; short dash where inferred; dotted where concealed, queried where uncertain.

Debris flow landslide (Quaternary)

Block slump landslide (Quaternary)

0 1,000 2,000 Feet

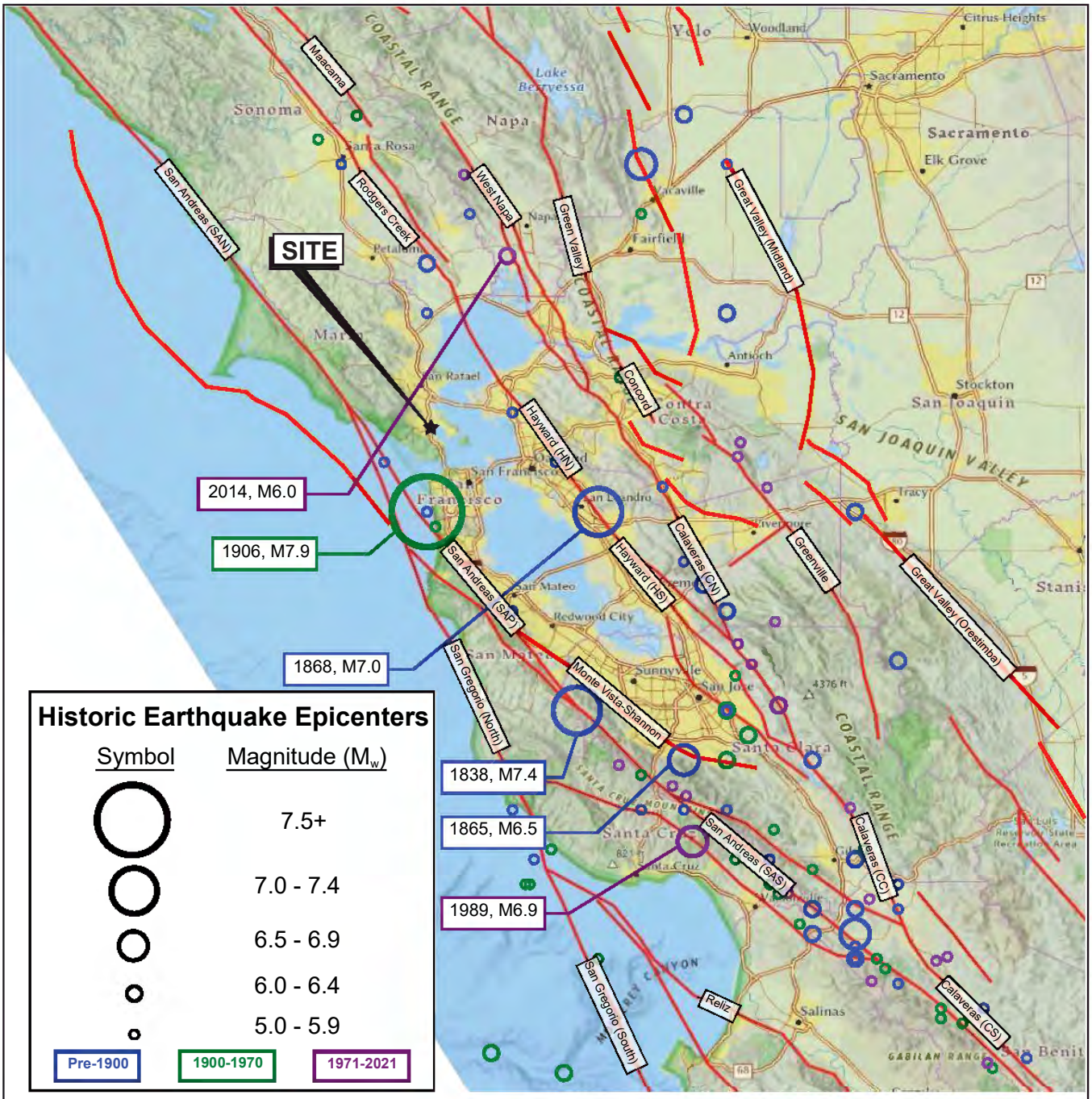
Approximate scale

HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

ROCKRIDGE GEOTECHNICAL

REGIONAL GEOLOGIC MAP

Date 02/04/24 | Project No. 24-2568 | Figure 4



HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

REGIONAL FAULT AND HISTORIC SEISMICITY MAP

ROCKRIDGE GEOTECHNICAL

Date 02/04/24	Project No. 24-2568	Figure 5



EXPLANATION

Decreasing stability →

1	2	3	4

Base Map: Interpretation of the Relative Stability of Upland Slopes in the Tiburon Peninsula, Sausalito, and Adjacent Areas, Marin County, CA by Salem J. Rice, 1976.

These criteria were combined to yield the map's 4-value scale indicating the relative stability of slopes.

Zone 1 - The most stable category. This zone includes resistant rock that is either exposed or is covered only by shallow colluvium or soil. Also included in this zone are broad, relatively level areas along the tops of ridges or in valley bottoms that may be underlain by material that is quite weak (such as Franciscan melange matrix and alluvium) but occupies a relatively stable position. Some landslide deposits that have moved to relatively stable positions at or beyond the base of the slopes from which they were derived are also included in zone 1.

Zone 2 - Includes narrow ridge and spur crests that are underlain by relatively competent bedrock, but are flanked by steep, potentially unstable slopes.

Zone 3 - Areas where the steepness of the slopes approaches the stability limits of the underlying geological materials. Some landslide deposits that appear to have relatively more stable positions than those classified within zone 4 are also shown here.

Zone 4 - The least stable category. This includes most landslide deposits in upslope areas, whether presently active or not, and slopes on which there is substantial evidence of downslope creep of the surface materials. These areas should be considered naturally unstable, subject to potential failure even in the absence of man's activities and influences. Banks along deeply incised streams are also included in zone 4.

These judgments are interpretive, and apply generally to large areas. Within each area conditions may range locally in detail through all stability categories. Hence, an area designated 1 may locally contain unmapped landslides, and an area designated 4 may locally contain relatively stable sites.

0 1,000 Feet

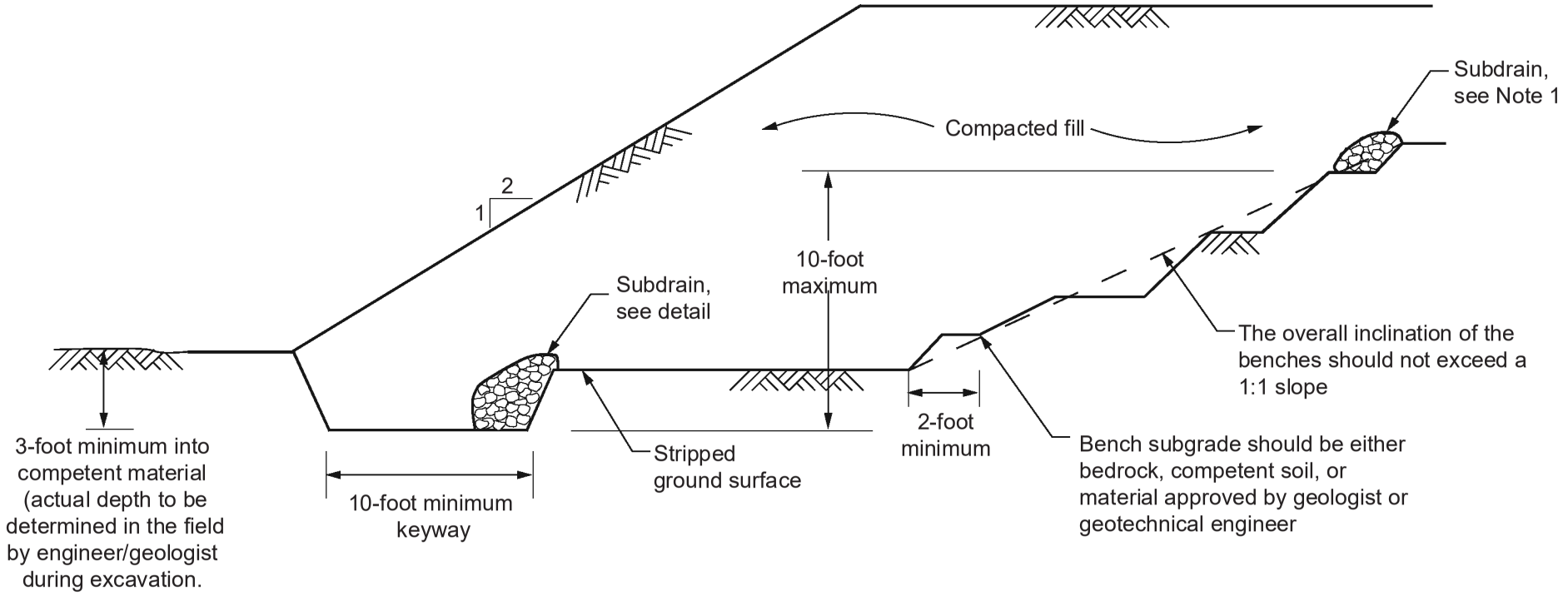
Approximate scale

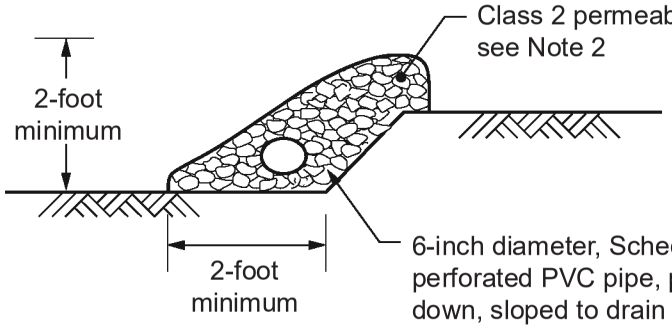
HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

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REGIONAL LANDSLIDE HAZARD MAP

Date 03/19/25	Project No. 24-2568	Figure 6





Notes:
1. Additional subdrains may be required where seepage is observed.
2. Drain rock should be clean, free draining, and meet the requirement for Class 2 permeable material in Section 68 of Caltrans Standard Specifications.

HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

ROCKRIDGE GEOTECHNICAL

TYPICAL KEYWAY AND SIDEHILL DRAIN DETAILS

Date 03/18/25	Project No. 24-2568	Figure 7

ROCKRIDGE GEOTECHNICAL

APPENDIX A
Logs of Borings and Dynamic Penetrometer Test Results

PROJECT: **HODGES AND ATHLETIC FIELD AREA**
201 SEMINARY DRIVE
Mill Valley, California

Log of Boring H-B-1

Boring location: See Site Plan, Figure 2
Date started: 01/29/2025 Date finished: 01/29/2025
Drilling method: 4.5-inch-diameter solid-stem auger
Logged by: J. Lei
Drilled by: Stapleton Engineering & Exploration
Rig: Portable Bobcat Rig
Hammer weight/drop: 140 lbs./30 inches Hammer type: Rope & cathead safety hammer
Sampler: Modified California (MC), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: Blows/ 6"	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content,%	Dry Density Lbs/Cu Ft
0						grass						
1						SANDY CLAY (CL) brown, medium stiff to stiff, fine to medium sand, rootlets						
2												
3	MC		4 4 7	8		Soil Corrosivity Test; see Appendix B LL = 26, PI = 9; see Appendix B					19.6	106
4					CL							
5						stiff to very stiff						
6	MC		5 8 13	15								
7												
8												
9	MC		16 20 33	37	SC	CLAYEY SAND with GRAVEL (SC) yellow-brown, dense, moist, fine to coarse sand, fine sub-rounded gravel						
10						SHALE/SILTSTONE red-brown, low hardness, friable, moderately weathered						
11												
12						SILTSTONE yellow-brown, low hardness, soft, moderately weathered						
13	SPT		50/6"	60/6"								
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

Boring terminated at a depth of 13.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] MC and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.7 and 1.2, respectively, to account for sampler type and hammer energy.

ROCKRIDGE GEOTECHNICAL

Project No.: 24-2568
Figure: A-1

PROJECT:	HODGES AND ATHLETIC FIELD AREA 201 SEMINARY DRIVE Mill Valley, California	**Log of Boring H-B-2** PAGE 1 OF 1

Boring location:	See Site Plan, Figure 2	Logged by:	J. Lei
Date started:	01/29/2025	Drilled by:	Stapleton Engineering & Exploration
Date finished:	01/29/2025	Rig:	Portable Bobcat Rig
Drilling method:	4.5-inch-diameter solid-stem auger		
Hammer weight/drop:	140 lbs./30 inches	Hammer type:	Rope & cathead safety hammer
Sampler:	Modified California (MC), Standard Penetration Test (SPT)		

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: Blows/ 6"	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content,%	Dry Density Lbs/Cu Ft
1						SANDY CLAY with GRAVEL (CL) dark brown and red-brown, stiff, moist, fine to coarse sand, fine to coarse subangular to subrounded gravel						
2	MC		8 7 8	11		brown						
3					CL	yellow-brown, hard						
4	MC		8 35 50	60								
5						brown and light brown, very stiff						
6	MC		8 14 9	16								
7					SC	CLAYEY SAND with GRAVEL (SC) olive-brown and red-brown, medium dense, moist, fine to coarse sand, fine to coarse subangular to subrounded gravel					7.5	100
8	MC		2 2 6	6		brown and gray, loose, fine to medium sand				72	25.9	102
9					CL	CLAY with SAND (CL) olive and olive-gray, medium stiff, moist, fine to medium sand Particle Size Distribution; see Appendix B						
10						SANDY CLAY (CL) yellow and red-yellow, very stiff, moist, fine to coarse sand, trace fine angular gravel						
11	MC		6 14 20	24								
12												
13												
14												
15			6			▽ (01/19/2025; 5:35 PM)						
16	MC		11	19	CL	wet						
17			16									
18												
19												
20			13									
21	SPT		26 50/3"	91/9"								
22						SANDSTONE yellow-brown, low hardness, friable, moderately weathered						
23												
24												
25												
26												
27												
28												
29												
30												

Boring terminated at a depth of 21.25 feet below ground surface.
Boring backfilled with cement grout.
Groundwater encountered at a depth of 15 feet during drilling.

[1]MC and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.7 and 1.2, respectively, to account for sampler type and hammer energy.
Note: The hole was inclined at the depth of 5 feet. We drilled an adjacent hole less than 1 foot to 5 feet and drove samples.

ROCKRIDGE GEOTECHNICAL

Project No.:	Figure:
24-2568	A-2

PROJECT:	HODGES AND ATHLETIC FIELD AREA 201 SEMINARY DRIVE Mill Valley, California	**Log of Boring H-B-3** PAGE 1 OF 1

Boring location:	See Site Plan, Figure 2	Logged by:	J. Lei
Date started:	01/29/2025	Drilled by:	Stapleton Engineering & Exploration
Date finished:	01/29/2025	Rig:	Portable Bobcat Rig
Drilling method:	4.5-inch-diameter solid-stem auger		
Hammer weight/drop:	140 lbs./30 inches	Hammer type:	Rope & cathead safety hammer
Sampler:	Modified California (MC)		

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: Blows/ 6"	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content,%	Dry Density Lbs/Cu Ft
0						2 inches of asphalt concrete 3 inches of aggregate base						
1	MC		6 6 4	7	CL	SANDY CLAY with GRAVEL (CL) yellow-brown and olive gray, medium stiff, moist, fine to coarse sand, fine to coarse angular to subangular gravel						
3	MC		9 11 9	14		red-brown, yellow, and olive, stiff, fine to coarse sand olive and olive-gray, trace fine angular gravel					14.3	117
5	MC		4 5 8	9	SC CL	CLAYEY SAND with GRAVEL (SC) yellow-brown and yellow, medium dense, moist, fine to coarse sand, fine to coarse subangular to angular gravel SANDY CLAY with GRAVEL (CL) red-brown, stiff, moist, fine to coarse sand, fine to coarse angular to subangular gravel				63	26.4	100
7	MC		7 10 14	17		SANDY CLAY (CL) yellow and yellow-brown, stiff, moist, fine to medium sand, trace fine subangular gravel Particle Size Distribution; see Appendix B yellow-brown and olive-gray, very stiff						
9	MC		5 8 12	14		stiff, fine sand						
11					CL							
15	MC		6 9 10	13		∇ (01/29/2025; 1:15 PM) wet, fine to coarse sand						
19	MC		10 17 20	26	SC	CLAYEY SAND and GRAVEL (SC) red-yellow, yellow, and yellow-brown, medium dense, wet, medium to coarse sand, fine subangular to sub-rounded gravel Particle Size Distribution; see Appendix B				22	13.7	128
30												

Boring terminated at a depth of 21.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater encountered at a depth of 15 feet during drilling.

[1] MC blow counts for the last two increments were converted to SPT N-Values using a factor of 0.7 to account for sampler type and hammer energy.

ROCKRIDGE GEOTECHNICAL

Project No.:	Figure:
24-2568	A-3

PROJECT: **HODGES AND ATHLETIC FIELD AREA**
201 SEMINARY DRIVE
Mill Valley, California

Log of Boring H-B-4

Boring location: See Site Plan, Figure 2
Date started: 01/29/2025 Date finished: 01/29/2025
Drilling method: 4.5-inch-diameter solid-stem auger
Logged by: J. Lei
Drilled by: Stapleton Engineering & Exploration
Rig: Portable Bobcat Rig
Hammer weight/drop: 140 lbs./30 inches Hammer type: Rope & cathead safety hammer
Sampler: Modified California (MC), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: Blows/ 6"	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content,%	Dry Density Lbs/Cu Ft
1					CL	SANDY CLAY (CL) dark brown, very stiff, moist, fine sand, trace rootlets LL = 30, PI = 11; see Appendix B						
2	MC		6 15 19	24							19.4	109
3						SANDSTONE yellow and yellow-brown, low hardness, friable, moderately weathered LL = 21, PI = 2; see Appendix B					10.4	127
4	SPT		8 29 47	91								
5												
6	SPT		50/1"	60/1"								
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

Boring terminated at a depth of 5'-7" below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] MC and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.7 and 1.2, respectively, to account for sampler type and hammer energy.

ROCKRIDGE GEOTECHNICAL

Project No.: 24-2568
Figure: A-4

PROJECT: **HODGES AND ATHLETIC FIELD AREA**
201 SEMINARY DRIVE
Mill Valley, California

Log of Boring H-B-5

Boring location: See Site Plan, Figure 2
Date started: 01/28/2025 Date finished: 01/28/2025
Drilling method: 4.5-inch-diameter solid-stem auger
Logged by: J. Lei
Drilled by: Stapleton Engineering & Exploration
Rig: Portable Bobcat Rig
Hammer weight/drop: 140 lbs./30 inches Hammer type: Rope & cathead safety hammer
Sampler: Modified California (MC), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: Blows/ 6"	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content,%	Dry Density Lbs/Cu Ft
1	MC		23	35/3"	CL	SANDY CLAY (CL) dark brown, hard, moist, fine sand						
2			50/3"									
3	SPT		50/1"	60/1"		SANDSTONE yellow-brown and brown, low hardness, weak, moderately weathered						
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

Boring terminated at a depth of 3'-1" below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] MC and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.7 and 1.2, respectively, to account for sampler type and hammer energy.

ROCKRIDGE GEOTECHNICAL

Project No.: 24-2568
Figure: A-5

PROJECT:	HODGES AND ATHLETIC FIELD AREA 201 SEMINARY DRIVE Mill Valley, California	**Log of Boring H-B-6** PAGE 1 OF 1

Boring location:	See Site Plan, Figure 2	Logged by:	J. Lei
Date started:	01/28/2025	Drilled by:	Stapleton Engineering & Exploration
Date finished:	01/28/2025	Rig:	Portable Bobcat Rig
Drilling method:	4.5-inch-diameter solid-stem auger		
Hammer weight/drop:	140 lbs./30 inches	Hammer type:	Rope & cathead safety hammer
Sampler:	Modified California (MC), Standard Penetration Test (SPT)		

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: Blows/ 6"	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content,%	Dry Density Lbs/Cu Ft
1						Topsoil						
2	MC		16 18 29	33		SHALE brown, low hardness, weak, moderatgely weathered						
3												
4	SPT		16 20 12	38								
5						SANDSTONE yellow and yellow-brown, low hardness, weak, moderately weathered						
6	SPT		5 44 50/4"	113/ 10"								
7												
8	SPT		31 50/4"	60/4"								
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

Boring terminated at a depth of 7'-10" below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] MC and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.7 and 1.2, respectively, to account for sampler type and hammer energy.

ROCKRIDGE GEOTECHNICAL

Project No.: 24-2568

Figure: A-6

PROJECT:	HODGES AND ATHLETIC FIELD AREA 201 SEMINARY DRIVE Mill Valley, California	**Log of Boring H-B-7** PAGE 1 OF 1

Boring location:	See Site Plan, Figure 2	Logged by:	J. Lei
Date started:	01/28/2025	Drilled by:	Stapleton Engineering & Exploration
Date finished:	01/28/2025	Rig:	Portable Bobcat Rig
Drilling method:	4.5-inch-diameter solid-stem auger		
Hammer weight/drop:	140 lbs./30 inches	Hammer type:	Rope & cathead safety hammer
Sampler:	Modified California (MC), Standard Penetration Test (SPT)		

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: Blows/ 6"	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content,%	Dry Density Lbs/Cu Ft
1	MC		4 9 15	17	CL	SANDY CLAY with GRAVEL (CL) red-brown, very stiff, moist, fine to coarse sand, fine subangular to subrounded gravel						
2						brown						
3	MC		14 13 8	15	SC	CLAYEY SAND with GRAVEL (SC) yellow-brown and brown, medium dense, moist, fine to coarse sand, fine to coarse angular to subangular gravel						
4												
5	MC		4 6 14	14	CL	SANDY CLAY (CL) yellow, stiff to very stiff, moist, fine sand, trace fine sub-angular gravel and rootlets yellow and yellow-brown, stiff, moist, fine to coarse sand, trace fine subangular to subrounded gravel, rootlets LL = 32, PI = 14; see Appendix B Soil Corrosivity Test; see Appendix B					17.7	110
6												
7	MC		12 16 23	27								
8												
9	SPT		13 17 16	40	SC	CLAYEY SAND with GRAVEL (SC) red-gray and yellow-brown, dense, moist, fine to coarse sand, fine to coarse subangular to subrounded gravel FILL						
10												
11												
12												
13												
14												
15	SPT		28 10 7	20		olive-brown, medium dense						
16												
17												
18												
19												
20	SPT		15 11 11	26	GC	CLAYEY GRAVEL with SAND (GC) olive-brown, medium dense, moist, medium to coarse sand, fine subangular to subrounded gravel						
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

Boring terminated at a depth of 21.5' below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] MC and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.7 and 1.2, respectively, to account for sampler type and hammer energy.

ROCKRIDGE GEOTECHNICAL

Project No.: 24-2568

Figure: A-7

PROJECT:	HODGES AND ATHLETIC FIELD AREA 201 SEMINARY DRIVE Mill Valley, California	**Log of Boring H-B-8** PAGE 1 OF 1

Boring location:	See Site Plan, Figure 2	Logged by:	J. Lei
Date started:	01/29/2025	Drilled by:	Stapleton Engineering & Exploration
Date finished:	01/29/2025	Rig:	Portable Bobcat Rig
Drilling method:	4.5-inch-diameter solid-stem auger		
Hammer weight/drop:	140 lbs./30 inches	Hammer type:	Rope & cathead safety hammer
Sampler:	Modified California (MC), Standard Penetration Test (SPT)		

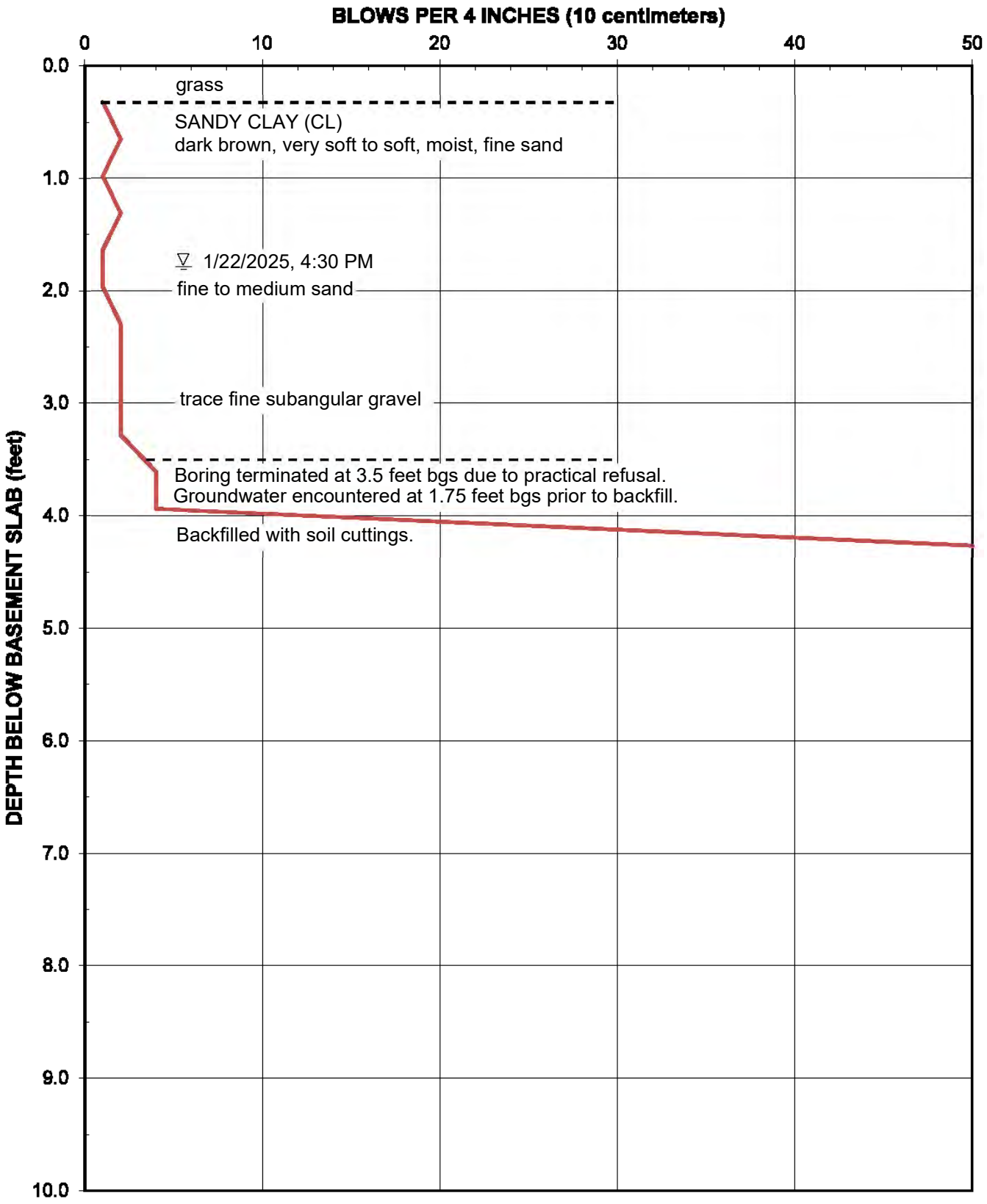
DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: Blows/ 6"	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content,%	Dry Density Lbs/Cu Ft
1						SANDY CLAY with GRAVEL (CL) red-brown and red-yellow, stiff, moist, fine to medium sand, fine angular to subangular gravel, rootlets						
2	MC		8 7 11	13		yellow and red-yellow						
3						brown, very stiff, wood debris						
4	MC		12 12 12	17								
5						stiff						
6	MC		6 10 9	13		red-brown and gray, fine to coarse subangular to sub-rounded gravel						
7						brown						
8	MC		5 10 8	13		fine to coarse sand						
9												
10					CL	olive-gray						
11	MC		5 9 8	12								
12						FILL						
13												
14												
15						dark brown and brown						
16	MC		7 7 6	9								
17												
18												
19												
20						yellow-brown and brown, very stiff						
21	MC		12 13 13	18		CLAYEY SAND with GRAVEL (SC) yellow-brown, medium dense, moist to wet, fine to coarse sand, fine to coarse subangular to subrounded gravel						
22					SC	light brown						
23						▽ (01/29/2025; 10:45 AM)						
24												
25	SPT		3 4 5	11	CL	SANDY CLAY with GRAVEL (CL) olive-gray, stiff, wet, fine to coarse sand, fine to coarse subangular to subrounded gravel						
26												
27												
28												
29												
30												

Boring terminated at a depth of 25.5' below ground surface.
Boring backfilled with cement grout.
Groundwater encountered at a depth of 23 feet during drilling.

[1] MC and SPT blow counts for the last two increments were converted to SPT N-Values using factors of 0.7 and 1.2, respectively, to account for sampler type and hammer energy.

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Project No.:	Figure:
24-2568	A-8

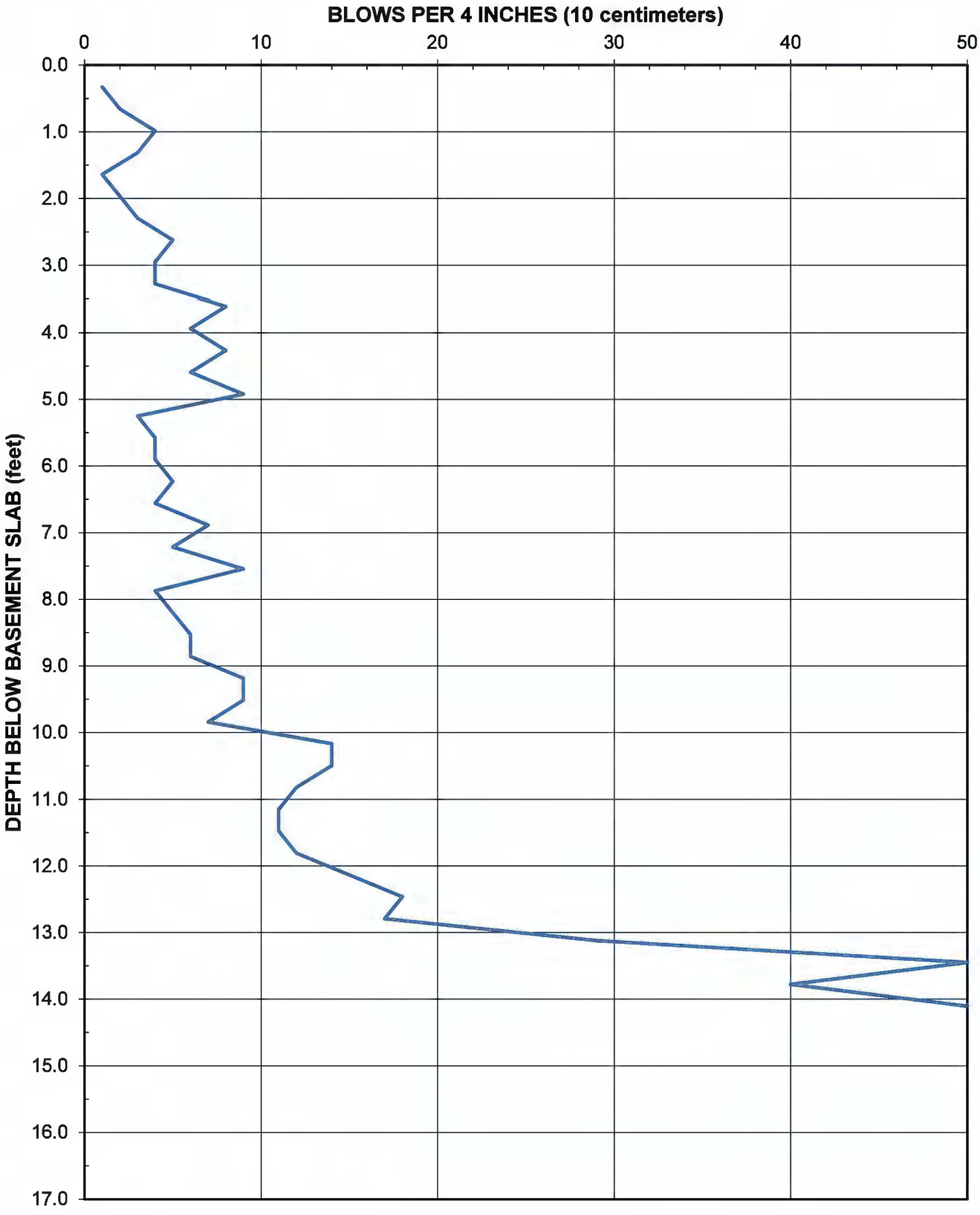


HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

DYNAMIC PENETROMETER TEST AND BORING RESULTS
H-DPT-1 & H-HA-1

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Date: 1/23/2025	Project No. 24-2568	Figure A-9

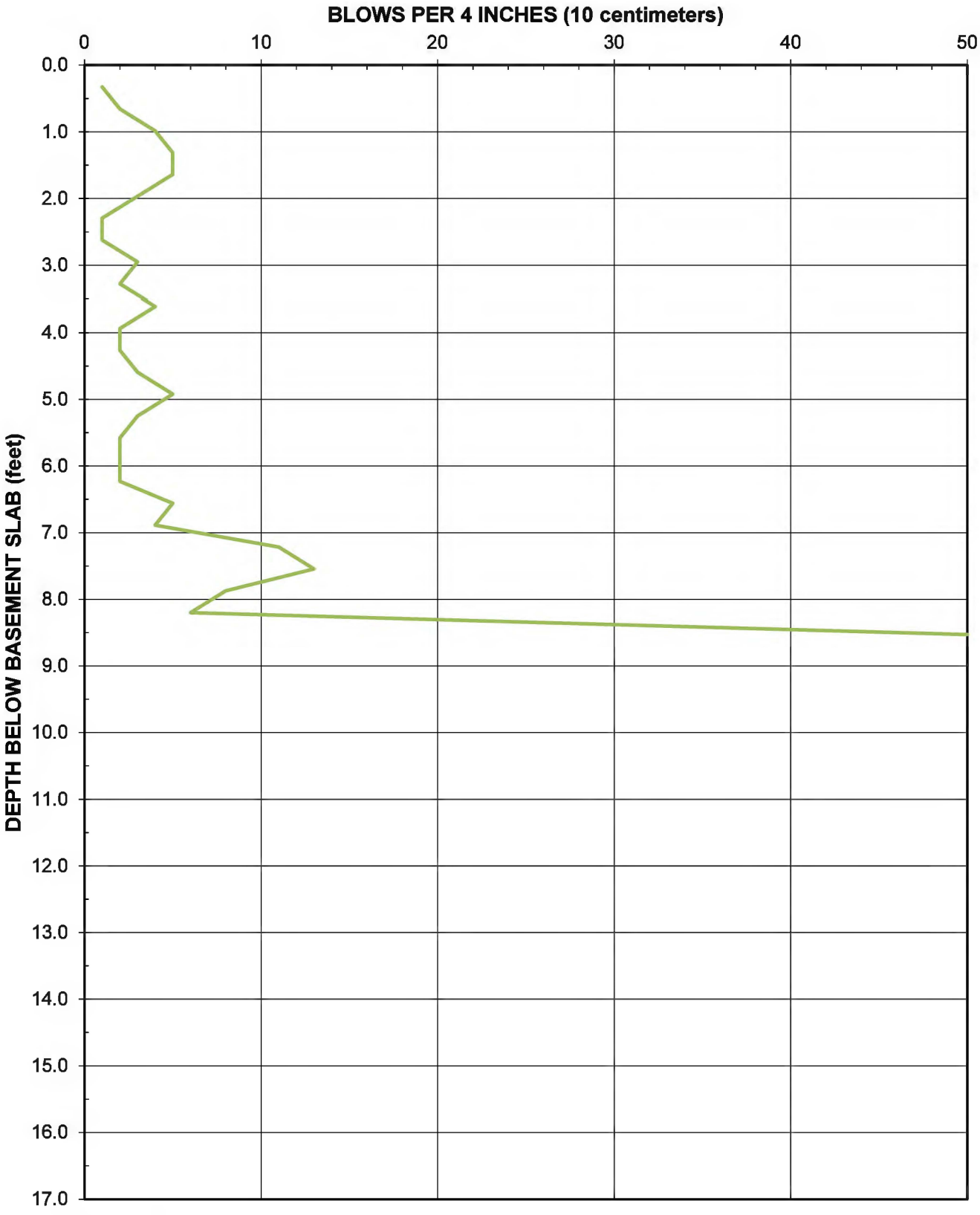


HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

DYNAMIC PENETROMETER
TEST RESULTS
H-DPT-2

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Date: 1/23/2025	Project No. 24-2568	Figure A-10

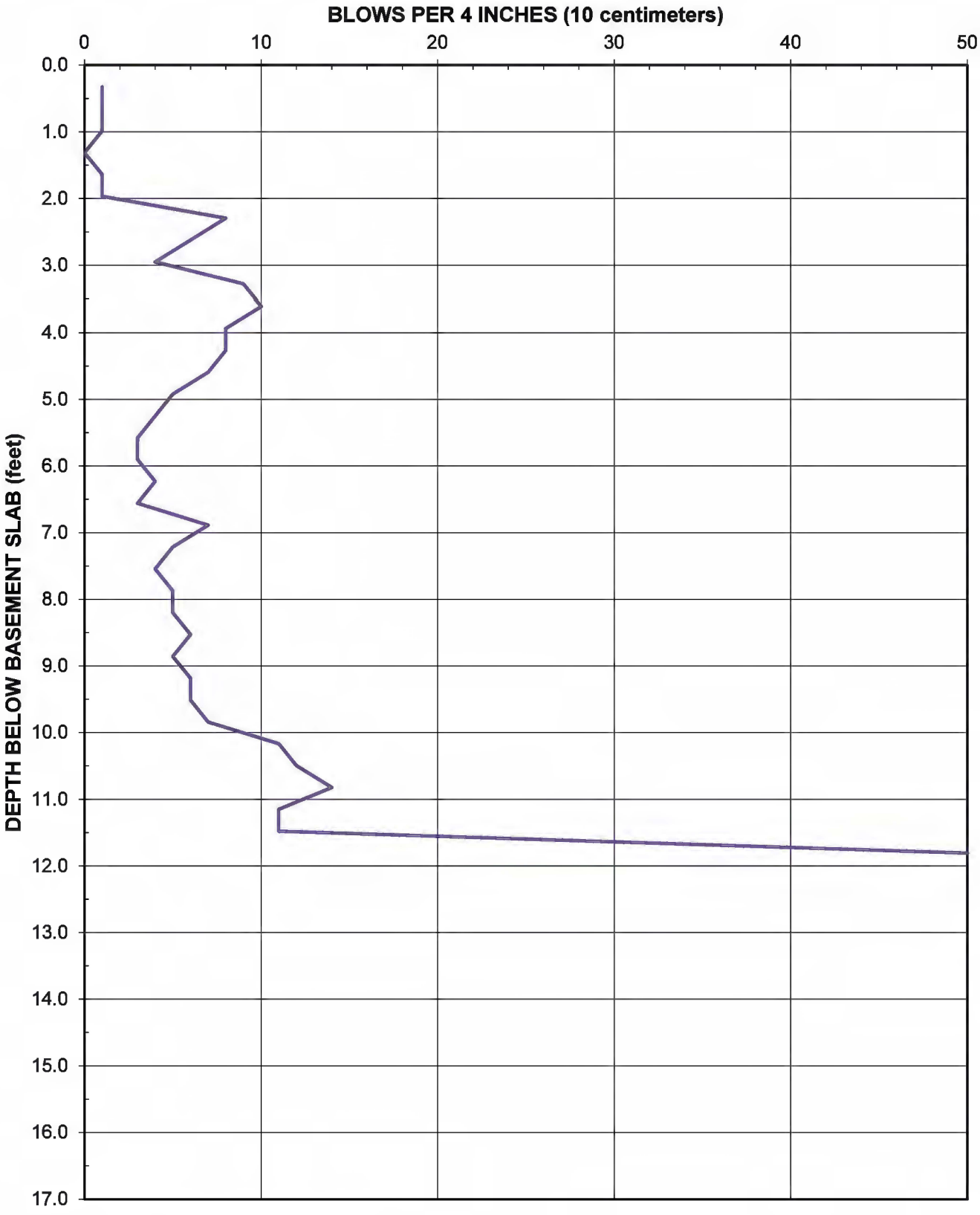


HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

DYNAMIC PENETROMETER
TEST RESULTS
H-DPT-3

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Date: 1/23/2025	Project No. 24-2568	Figure A-11

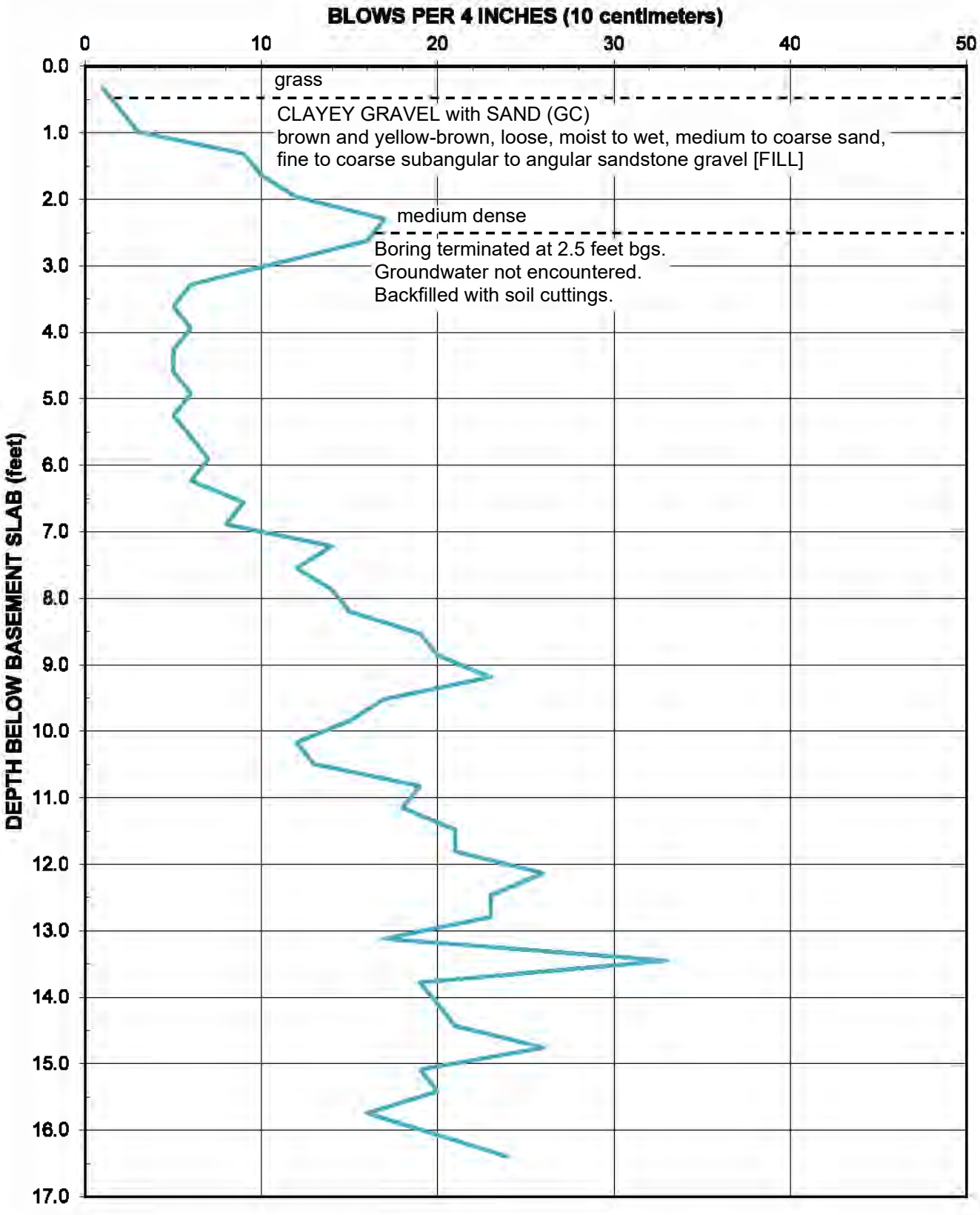


HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

DYNAMIC PENETROMETER
TEST RESULTS
H-DPT-4

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Date: 1/23/2025	Project No. 24-2568	Figure A-12



HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

DYNAMIC PENETROMETER
TEST AND BORING RESULTS
H-DPT-5 & H-HA-5

ROCKRIDGE GEOTECHNICAL

Date: 1/23/2025	Project No. 24-2568	Figure A-13

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions		Symbols	Typical Names
Coarse-Grained Soils (more than half of soil > no. 200 sieve size)	Gravels (More than half of coarse fraction > no. 4 sieve size)	**GW**	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	Sands (More than half of coarse fraction < no. 4 sieve size)	**SW**	Well-graded sands or gravelly sands, little or no fines
		SP	Poorly-graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
Fine -Grained Soils (more than half of soil < no. 200 sieve size)	Silts and Clays LL = < 50	**ML**	Inorganic silts and clayey silts of low plasticity, sandy silts, gravelly silts
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	Silts and Clays LL = > 50	**MH**	Inorganic silts of high plasticity
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic silts and clays of high plasticity
Highly Organic Soils		**PT**	Peat and other highly organic soils

GRAIN SIZE CHART

Classification	Range of Grain Sizes	
	U.S. Standard Sieve Size	Grain Size in Millimeters
Boulders	Above 12"	Above 305
Cobbles	12" to 3"	305 to 76.2
Gravel coarse fine	3" to No. 4 3" to 3/4" 3/4" to No. 4	76.2 to 4.76 76.2 to 19.1 19.1 to 4.76
Sand coarse medium fine	No. 4 to No. 200 No. 4 to No. 10 No. 10 to No. 40 No. 40 to No. 200	4.76 to 0.075 4.76 to 2.00 2.00 to 0.420 0.420 to 0.075
Silt and Clay	Below No. 200	Below 0.075

Unstabilized groundwater level

Stabilized groundwater level

SAMPLE DESIGNATIONS/SYMBOLS

Sample taken with California or Modified California split-barrel sampler. Darkened area indicates soil recovered

Classification sample taken with Standard Penetration Test sampler

Undisturbed sample taken with thin-walled tube

Disturbed sample

Sampling attempted with no recovery

Core sample

Analytical laboratory sample

Sample taken with Direct Push sampler

Sonic

SAMPLER TYPE

C Core barrel

CA California split-barrel sampler with 2.5-inch outside diameter and a 1.93-inch inside diameter

D&M Dames & Moore piston sampler using 2.5-inch outside diameter, thin-walled tube

O Osterberg piston sampler using 3.0-inch outside diameter, thin-walled Shelby tube

PT Pitcher tube sampler using 3.0-inch outside diameter, thin-walled Shelby tube

MC Modified California sampler with a 3.0-inch outside diameter and a 2.43-inch inside diameter

SPT Standard Penetration Test (SPT) split-barrel sampler with a 2.0-inch outside diameter and a 1.38- or 1.5-inch inside diameter (refer to text)

ST Shelby Tube (3.0-inch outside diameter, thin-walled tube) advanced with hydraulic pressure

HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

ROCKRIDGE GEOTECHNICAL

CLASSIFICATION CHART

Date 02/04/24 | Project No. 24-2568 | Figure A-14

I FRACTURING

Intensity	Size of Pieces in Feet
Very little fractured	Greater than 4.0
Occasionally fractured	1.0 to 4.0
Moderately fractured	0.5 to 1.0
Closely fractured	0.1 to 0.5
Intensely fractured	0.05 to 0.1
Crushed	Less than 0.05

II HARDNESS

1. **Soft** - reserved for plastic material alone.
2. **Low hardness** - can be gouged deeply or carved easily with a knife blade.
3. **Moderately hard** - can be readily scratched by a knife blade; scratch leaves a heavy trace of dust and is readily visible after the powder has been blown away.
4. **Hard** - can be scratched with difficulty; scratch produced a little powder and is often faintly visible.
5. **Very hard** - cannot be scratched with knife blade; leaves a metallic streak.

III STRENGTH

1. **Plastic** or very low strength.
2. **Friable** - crumbles easily by rubbing with fingers.
3. **Weak** - an unfractured specimen of such material will crumble under light hammer blows.
4. **Moderately strong** - specimen will withstand a few heavy hammer blows before breaking.
5. **Strong** - specimen will withstand a few heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.
6. **Very strong** - specimen will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.

IV WEATHERING - The physical and chemical disintegration and decomposition of rocks and minerals by natural processes such as oxidation, reduction, hydration, solution, carbonation, and freezing and thawing.

D. Deep - moderate to complete mineral decomposition; extensive disintegration; deep and thorough discoloration; many fractures, all extensively coated or filled with oxides, carbonates and/or clay or silt.

M. Moderate - slight change or partial decomposition of minerals; little disintegration; cementation little to unaffected. Moderate to occasionally intense discoloration. Moderately coated fractures.

L. Little - no megascopic decomposition of minerals; little of no effect on normal cementation. Slight and intermittent, or localized discoloration. Few stains on fracture surfaces.

F. Fresh - unaffected by weathering agents. No disintegration of discoloration. Fractures usually less numerous than joints.

ADDITIONAL COMMENTS:

V CONSOLIDATION OF SEDIMENTARY ROCKS: usually determined from unweathered samples. Largely dependent on cementation.

U = unconsolidated
P = poorly consolidated
M = moderately consolidated
W = well consolidated

VI BEDDING OF SEDIMENTARY ROCKS

Splitting Property	Thickness	Stratification
Massive	Greater than 4.0 ft.	very thick-bedded
Blocky	2.0 to 4.0 ft.	thick bedded
Slabby	0.2 to 2.0 ft.	thin bedded
Flaggy	0.05 to 0.2 ft.	very thin-bedded
Shaly or platy	0.01 to 0.05 ft.	laminated
Papery	less than 0.01	thinly laminated

HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

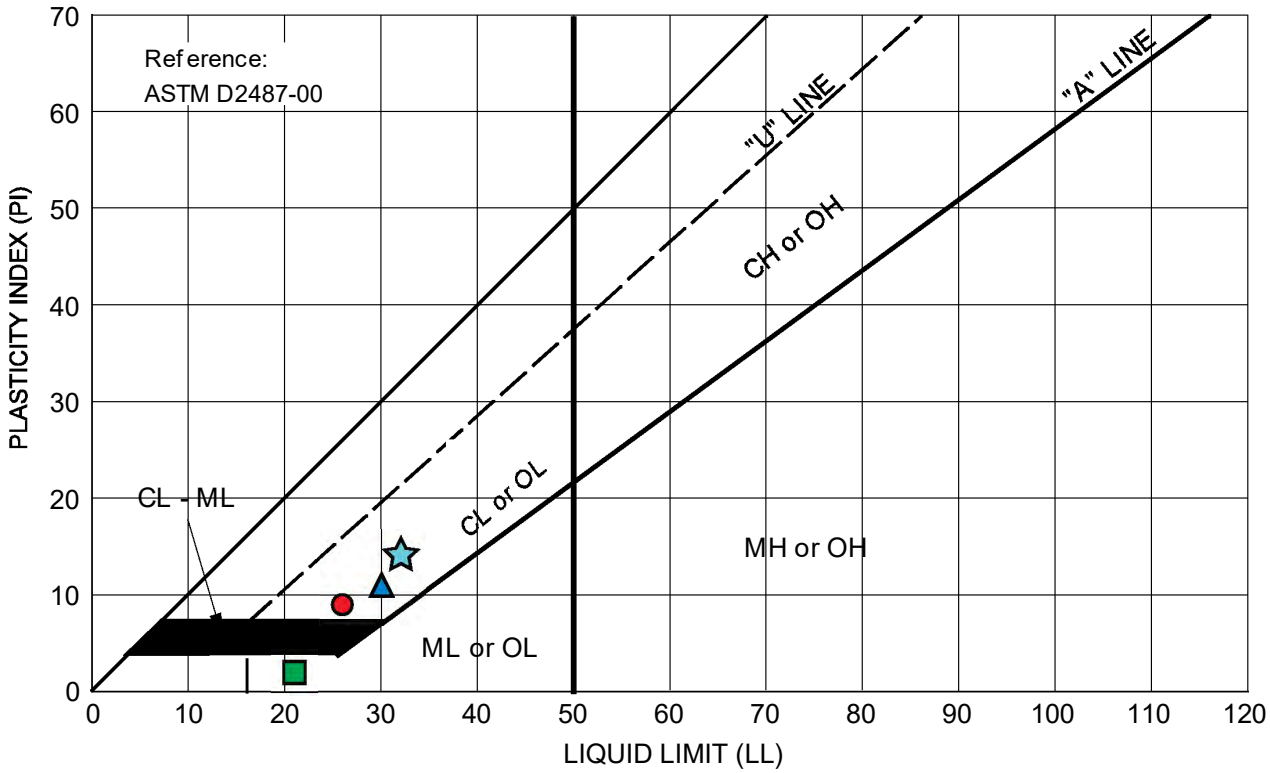
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PHYSICAL PROPERTIES CRITERIA FOR ROCK DESCRIPTIONS

Date 02/04/24	Project No. 24-2568	Figure A-15

ROCKRIDGE GEOTECHNICAL

APPENDIX B
Laboratory Test Results



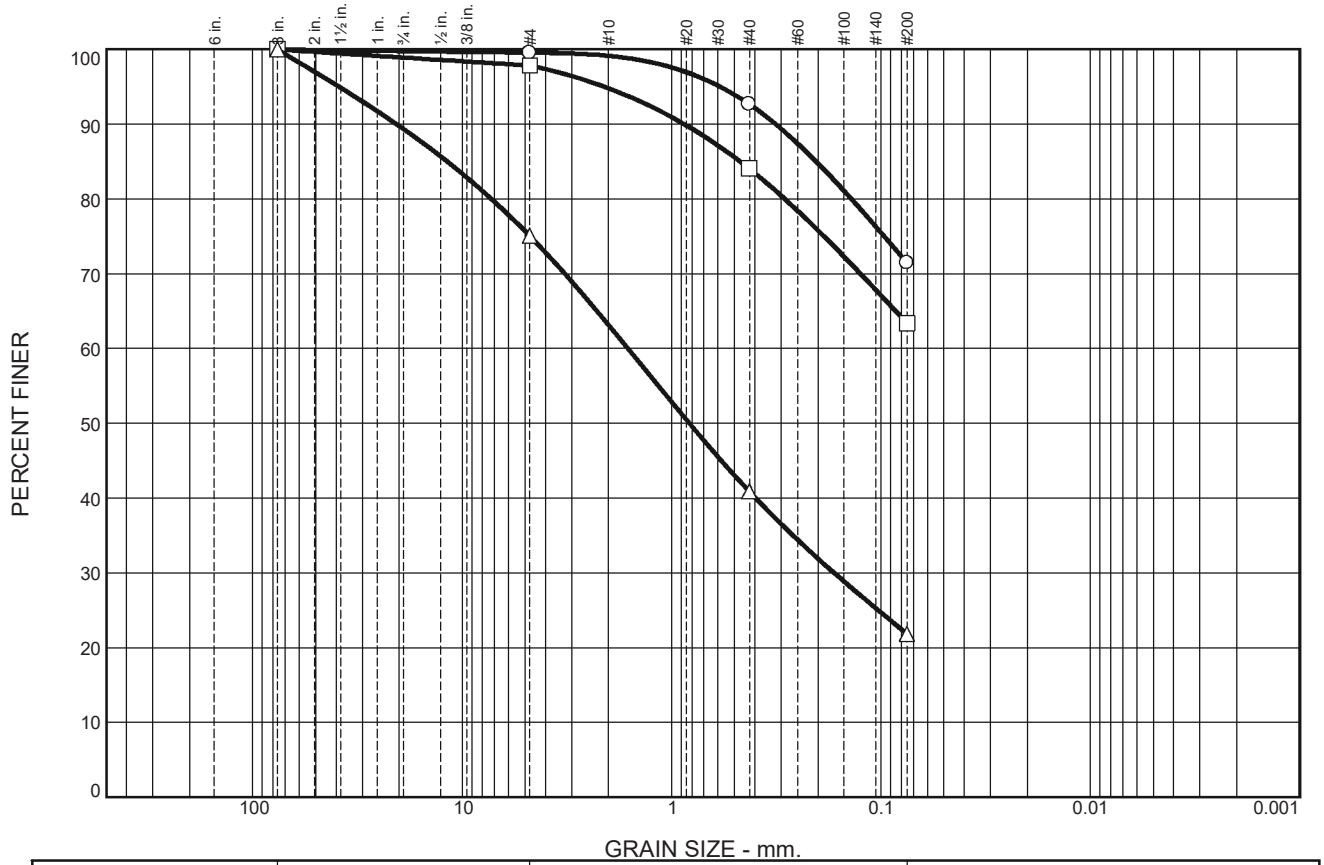
Symbol	Source	Description and Classification	Natural M.C. (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
●	H-B-1 at 3.0 feet	SANDY CLAY (CL), brown	19.6	26	9	--
▲	H-B-4 at 1.0 feet	SANDY CLAY (CL), dark brown	19.4	30	11	--
■	H-B-4 at 1.5 feet	SANDSTONE, yellow and yellow-brown	10.4	21	2	--
★	H-B-7 at 5.5 feet	SANDY CLAY (CL), yellow and yellow-brown	17.7	32	14	--

HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

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PLASTICITY CHART

Date 03/10/25 | Project No. 24-2568 | Figure B-1



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.4		28.1			71.5	
□	0.0	2.1		34.5			63.4	
△	0.0	24.9		53.3			21.8	

SOIL DATA

SYMBOL	SOURCE	DEPTH (ft.)	Material Description	USCS
○	H-B-2	8.0'	CLAY with SAND, olive and olive-gray	CL
□	H-B-3	6.0'	SANDY CLAY, yellow and yellow-brown	CL
△	H-B-3	20.5'	CLAYEY SAND with GRAVEL, red-yellow, yellow, and yellow-brown	SC

HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

ROCKRIDGE GEOTECHNICAL

PARTICLE SIZE DISTRIBUTION REPORT

Date 03/18/25 | Project No. 24-2568 | Figure B-2

Project X
Corrosion Engineering
Corrosion Control – Soil, Water, Metallurgy Testing Lab

REPORT S250207A

Bore# / Description	Depth	ASTM D4327 Sulfates SO_4^{2-}		ASTM D4327 Chlorides Cl^-		ASTM G187 Resistivity As Rec'd / Minimum		ASTM G51 pH	ASTM G200 Redox	EM 4500-D Sulfide S^{2-}	ASTM D4327 Nitrate NO_3^-	ASTM D6919 Ammonium NH_4^+	ASTM D6919 Lithium Li^+	ASTM D6919 Sodium Na^+	ASTM D6919 Potassium K^+	ASTM D6919 Magnesium Mg^{2+}	ASTM D6919 Calcium Ca^{2+}	ASTM D4327 Fluoride F_2^{2-}	ASTM D4327 Phosphate PO_4^{3-}
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ω-cm)	(Ω-cm)		(mV)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
H-B-1: SANDY CLAY (CL), brown	2.5	15.9	0.0016	16.7	0.0017	3,819	3,618	7.4	125	1.89	6.1	0.9	ND	16.5	2.7	18.9	48.8	4.8	3.2
H-B-7: SANDY CLAY (CL), yellow and yellow-brown	5.0	27.5	0.0028	29.5	0.0030	4,690	3,551	7.2	130	2.55	12.4	0.6	ND	35.1	5.4	21.1	57.4	6.9	2.0

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract
PPM = mg/kg (soil) = mg/L (Liquid)

For AWWA 105C: 0-3mg/kg sulfide = Negative; 3-6mg/kg = trace; >6mg/kg = Positive

Note: Sometimes a bad sulfate hit is a contaminated spot. Typical fertilizers are Potassium chloride, ammonium sulfate or ammonium sulfate nitrate (ASN). So this is another reason why testing full corrosion series is good because we then have the data to see if those other ingredients are present meaning the soil sample is just fertilizer-contaminated soil. This can happen often when the soil samples collected are simply surface scoops. This is why it's best to dig in a foot, throw away the top and test the deeper stuff. Dairy farms are also notorious for these items.

If one sample pops up much more corrosive than all others, we would recommend collecting more samples surrounding the problem sample location to determine if the peak is isolated to it. This allows us to conclude it was a contaminated sample and able to declare it an outlier.

29990 Technology Dr., Suite 13, Murrieta, CA 92563 Tel: 213-928-7213 Fax: 951-226-1720
www.projectxcorrosion.com

HODGES AND ATHLETIC FIELD AREA
201 SEMINARY DRIVE
Mill Valley, California

ROCKRIDGE GEOTECHNICAL

SOIL CORROSIVITY TEST RESULTS

Date 03/10/25 | Project No. 24-2568 | Figure B-3

ROCKRIDGE GEOTECHNICAL

APPENDIX C
Logs of Borings by Donald Herzog & Associates

LOG OF BORING 27

Equipment Hollow Stem Auger

Elevation 17± Date 4/14/82

Laboratory Tests	Drill Rate (min/ft)	Drill Pressure (psi)	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample
						0	
UC = 2200 psf			13	13	116		
UC = 1200 psf			25	21	108	5	
UC = 2300 psf			50/4"	10	91		
						10	
						15	

DARK BROWN SANDY SILT (ML) (FILL)

DARK BROWN SILTY SANDY GRAVEL (GM) medium dense, wet to saturated (FILL)

MOTTLED GRAY-BROWN SILTY SAND (SM) with occasional gravel, medium dense, wet

MOTTLED BROWN-ORANGE-GRAY SANDY SILT (ML) medium stiff, wet

GRAY-BROWN SHALE intensely fractured, moderaately hard to hard, deeply weathered, steeply dipping

BOTTOM OF HOLE

No free water encountered

DONALD HERZOG & ASSOCIATES
Consulting Soil & Foundation Engineers

Job No: 994.1 Appr: Date 4/27/82

LOG OF BORING 27

Golden Gate Baptist Seminary
Mill Valley, California

PLATE 5

LOG OF BORING 28

Equipment: Hollow Stem Auger

Elevation: 17+ Date: 4/14/82

Laboratory Tests	Drill Rate (min/ft)	Drill Pressure (psi)	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample
UC = 2200 psf			11 16	8	118	0	
UC = 300 psf			9	28	89		
UC = 700 psf			11	22	108	5	
UC = 800 psf			16	24	100		
UC = 1200 psf			35	18	111	10	
UC = 2200 psf			65	14	123		
						15	
			100/3"				
						20	

DARK BROWN CLAYEY SILT (ML) med. stiff, wet to saturated (FILL)

DARK GRAY CLAYEY GRAVEL (GC) medium dense, wet (FILL)

MOTTLED DARK GRAY SILT CLAY (CL) medium stiff, saturated

MOTTLED ORANGE-BROWN CLAYEY SAND (SC) medium dense, saturated, with angular rock fragments

MOTTLED ORANGE-BROWN SANDY CLAY med. stiff, saturated--less sand at 8.5', wet

MOTTLED ORANGE-GRAY CLAYEY SILT (ML) stiff to very stiff, moist

ORANGE-BROWN CLAYEY SANDSTONE with gray silt inclusions, low hardness, friable

GRAY-BROWN SILTSTONE moderately hard, weak, deeply weathered

BOTTOM OF HOLE

No free water encountered

CL

DONALD HERZOG & ASSOCIATES
Consulting Soil & Foundation Engineers

Job No: 994.1 Appr: Date 4/27/82

LOG OF BORING 28

Golden Gate Baptist Seminary
Mill Valley, California

PLATE 6

LOG OF BORING 29

Equipment: Hollow Stem Auger

Elevation: 17± Date: 4/14/82

Laboratory Tests	Drill Rate (min/ft)	Drill Pressure (psi)	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample
UC = 1200 psf			14 12	18	117	0	
UC = 800 psf			14	28	91	5	
UC = 2200 psf			60	11	123	10	
						15	



DARK BROWN SANDY SILT (ML)
medium dense, wet (FILL)

DARK GRAY SILTY GRAVEL (GM)
medium dense, wet (FILL)

DARK BROWN SANDY SILT (ML)
medium stiff, wet, high organic content (?bay deposit)

GRAY-BROWN SHEARED SHALE
intensely fractured, moderately hard, friable, deeply weathered

BOTTOM OF HOLE

No free water encountered

DONALD HERZOG & ASSOCIATES
Consulting Soil & Foundation Engineers

Job No: 994.1 Appr: Date: 4/27/82

LOG OF BORING 29

Golden Gate Baptist Seminary
Mill Valley, California

PLATE 7

Appendix B

Updated LOS Assessment Memo

FEHR PEERS

Memorandum

Date: August 14, 2025

To: Tanya Jones, Ascent Environmental

From: Bob Grandy and John Holmes

Subject: Marin North Coast Land Holdings (NCLH) - Level of Service (LOS) Assessment

SF21-1170

This memorandum provides a LOS Assessment for County Merits Findings to identify whether study intersections would meet the County LOS standard with the addition of NCLH project traffic. This assessment may not be used to determine CEQA impacts but may inform decisions about potential conditions of approval.

Comments received during the Draft EIR public review period requested that new traffic counts be collected. Because of questions about how changes in post-pandemic travel behavior may affect vehicle trips, new traffic counts were collected in February 2025 during the same AM and PM peak periods on a Tuesday with schools in session with no precipitation. A comparison of the total peak hour counts for the six study intersections indicate that the sum of all AM and PM peak hour volumes was 0.4 percent higher in 2025, the sum of AM peak hour volumes was 2.3 percent higher in 2025, and the sum of PM peak hour volumes was 1.4 percent lower in 2025. Although the difference in trips counted in 2021 and 2025 is minimal, based on consultation with County staff, the analysis in the LOS Assessment Memo is updated using the 2025 traffic counts and a seventh study intersection is added.

Study Intersections

The LOS Assessment is conducted for the following intersections. **Figure 1** shows the street network and location of the study intersections. **Figure 2** shows the project trip distribution.

1. US 101 northbound ramps/Redwood Highway Frontage Road/De Silva Island Road
2. US 101 southbound ramps/Redwood Highway Frontage Road
3. Redwood Highway Frontage Road/Seminary Drive
4. Tiburon Boulevard/E. Strawberry Drive
5. E. Strawberry Drive/Herring Drive
6. Seminary Drive/Ricardo Road/Vista Del Sol
7. Redwood Highway Frontage Road/Tiburon Boulevard

County LOS Standard

Policy TR-1.2 and Implementation Plan TR-1.e of the existing Marin Countywide Plan establishes LOS D or better for urban and suburban arterials and LOS E or better for freeways and rural expressways. Only the Congestion Management Program specified roadway and highway segments operating at a lower LOS than the standard in 1991 are grandfathered and may continue to operate at the lower LOS standard until such time as the roads are improved or the traffic load or demand is reduced or diverted. Unless determined to be infeasible, alternatives that reduce fossil fuels and single occupancy vehicle use should be considered a priority over infrastructure improvements such as road widening.

Intersection LOS Definitions, which identify LOS based on vehicle delay, for the signalized and stop controlled intersections evaluated in this LOS Assessment are based on the Sixth Edition (latest version) of the Highway Capacity Manual.

Study Scenarios

The transportation modeling and analysis was conducted for the following scenarios.

- Existing Conditions – existing setting based on traffic counts collected in February 2025.
- Existing Plus Project – addition of the increment of project trips, between existing and proposed development levels, to existing traffic counts.
- 2040 No Project – conditions with 2040 land use forecasts and transportation infrastructure assumptions for Unincorporated Marin County based on the 2040 horizon year for the Transportation Authority of Marin Demand Model (TAMDM).
- 2040 Plus Project – conditions with 2040 land use forecasts and transportation infrastructure assumptions for the proposed project.

Existing Study Intersection Traffic Counts

As noted above, new traffic counts for the study intersections were collected in February 2025, and the LOS analysis has been updated for the Existing and Existing plus Project Condition scenarios to build on the 2025 traffic counts. The 2025 counts were collected during the same AM and PM peak periods on a Tuesday with schools in session with no precipitation. The heaviest pedestrian and bicycle volumes occurred at the intersection of Redwood Highway Frontage Road and the US 101 southbound ramps, where a total of 45 were counted during the AM peak hour and 19 during the PM peak hour. The percentage of heavy vehicles at this intersection was two percent during the AM peak hour and one percent during the PM peak hour. Pedestrian and bicycle count volumes at the remaining intersections ranged from a total of one to thirty per hour, with a range of a total of one to thirteen per hour for the three study intersections located within the Strawberry community during the peak hours.

2040 No Project Transportation System

The following roadway improvements or transportation programs, as provided by Transportation Authority of Marin (TAM) staff, are incorporated in the 2040 No Project scenario.

- Minor Highway Improvements – Highway Interchange Improvements, Bicycle/Pedestrian Crossings, and Auxiliary Lanes
- Minor Roadway Projects – Highway Safety Improvement Program (HSIP) Projects and Sea Level Rise Improvements
- Minor Transit Improvements – Fleet expansion/facilities, Access to Transit, and Transit Service Expansion
- New Bicycle & Pedestrian Facilities including North South Greenway Projects, SMART Multi Use Path, Cross Marin Bikeway, Approaches to Richmond San Rafael Bridge, Safe Pathways Projects, Small Safety Projects, and Safe Route to Transit Projects
- Management Systems – Ramp Metering Phase 1 & 2, and Innovative Technology
- Safety and Security – Safe Routes to School Program and Crossing Guard Program
- Travel Demand Management – TDM Program, Alternative Fuels Program, and Traveler Information Programs
- Multimodal Streetscape Improvements – Local Road Improvements

Travel Model Validation

The following section describes the methodology for forecasts developed for this LOS Assessment.

The forecasts generated for this LOS assessment were produced using the Transportation Authority of Marin Demand Model (TAMDM). For this assessment, the 2015 base year for TAMDM was updated and validated for a new 2019 base year for the City of San Rafael General Plan Update. A key reason for applying the updated 2019 base year is that it includes the SMART rail system that was not in place in 2015. This analysis includes a 2040 No Project scenario that is based on the TAMDM horizon year and reflects land use changes and transportation improvements consistent with the San Rafael General Plan 2040 adopted in 2021. The 2019 base year model developed for the San Rafael General Plan Update was validated based on model confidence thresholds defined in the California Transportation Commission 2017 RTP guidelines.

For this project, the network and land use inputs for the study area for the model's 2019 base year were reviewed and enhanced to provide the level of detail necessary for the study. A model validation was performed for the study sub-area and model validation measures in the RTP guidelines were met for the 2019 base year for 73 study road segments in the study area as shown in **Table 1** below.

Table 1: Study Area Model Validation Results (2017 California RTP Guidelines)

Validation Measure	AM Peak Period (4-Hour)	PM Peak Period (4-Hour)	Daily	Threshold
Volume-to-Count Ratio (Sum of all locations)[1] =	0.96	1.07	0.98	None specified[2]
Percent of Links within Caltrans Deviation Allowance[1] =	79.5%	75.3%	79.5%	At Least 75%
Percent Root Mean Square Error (RMSE)[1] =	30.5%	23.0%	19.3%	Below 40%
Correlation Coefficient[1] =	0.98	0.99	0.99	At Least 0.88
Number of Links/Validation Locations =	73	73	73	

Source: Fehr & Peers.
Notes:
1. Static Validation Criteria and Thresholds, 2017 California Regional Transportation Plan Guidelines, California Transportation Commission.
2. Although no specific threshold is specified, a threshold of "within 10%" of the sum of all locations was applied.

Project Description

The academic campus is currently tenant-occupied by Olivet University, a private Christian university. As of September 2020, at the time of the NOP, enrollment consisted of approximately 100 students on campus. Approximately 27 percent of the housing units were occupied by university affiliated residents at the time of the NOP. The remaining students, faculty, and staff live off-site and commute to the campus. The academic campus is currently staffed with approximately 24 employees. The existing 3,000-sf daycare facility occupies the southern portion of the Academic Campus Planning Area and is located in the academic building. The daycare serves the families of the academic campus, residents connected with the campus, and other southern Marin County community residents. Current enrollment is approximately 60 children, with approximately 16 total staff. Eight to 12 staff are working onsite on any given day, depending on the age of the children enrolled that particular day. In total, there are 145 existing residential units within the project site. This includes 16 market-rate studios, 54 one-bedroom housing units, 54 two-bedroom housing units, 18 three-bedroom housing units, and 3 single-family residences. There are also 66 dormitory rooms with 7 shared kitchens. The existing housing is occupied by approximately 320 residents,[1] including general public occupants as well as students, faculty, staff, and families affiliated with the academic campus.

The proposed project includes reconfiguration of the existing academic campus to improve accessibility and facilitate construction of new residential uses in the Chapel Hill and Shuck Drive Knoll Planning Areas. The existing academic building, cafeteria, and library would be retained in their current locations. The administration building would be renovated and would include the

[1] Based on occupancy estimates provided by applicant.

addition of a 15,800-sf structure along the northern façade of the existing building. The academic campus would continue to be occupied by a university or college, with a maximum enrollment of 1,000 higher education students.

The proposed project would retain some housing units, replace existing housing, and increase the total number of residences. The applicant proposes to retain 13 existing residential units within the project site and replace remaining residential units with new housing. Proposed new housing would include replacement of 139 residential units and construction of 184 new units consisting of single-family and multi-family residences, as well as a residential care facility (counted as one residential unit but supporting up to 155 residents). A total of 324 residential units would be constructed. A total of 70 residential units would be affordable housing for low-income residents. The affordable units will be inclusionary; dispersed throughout the project site; and comparable in location, size, and exterior design to the remaining units in the overall residential development. For the purposes of this traffic assessment, all the residential units were assumed to be available for lease to the broader community since there would be no restricted units.

The proposed project would include a new 267,354-sf residential care facility located in the eastern portion of the project site, within the Dormitory Hill Planning Area, situated northwest of the academic campus and north of the central tiered parking lot. The residential care facility would be designed to serve adults 55 and older with capacity to house up to 170 residents. The housing would consist of up to 100 independent living apartments and 50 assisted living and memory care residences. In addition to the proposed housing, the residential care facility would include public dining, wellness, and lounge areas, as well as support and back-of-house facilities for Certified Medical Technical personnel.

The proposed project includes a new facility that would contain a 3,000-sf daycare and a 17,000-sf fitness center. The daycare and fitness center would be located in a shared facility that would be situated in the central portion of the project site, east of the Seminary Playing Field and west of the three-tiered parking lot. The existing daycare would continue to operate on-site but would be relocated from the academic building into the new space within the proposed daycare and fitness center. Enrollment at the daycare would be limited to the current enrollment of 60 children, with preference given to families in the community. Fitness center membership would be limited to on-site residents, affiliates of the academic campus, and residents of the surrounding community that are within walking distance of the facility.

Buildout of the project would increase the total number of parking spaces from 608 existing spaces to 944 parking spaces. Of the existing residential parking spaces, 51 spaces would be retained, and an additional 652 residential parking spaces would be added for residential housing and the residential care facility, resulting in a total of 703 residential parking spaces on the project site.

Vehicular access to the project site from US 101 would not be altered for the project. The project does not include proposed off-site transportation infrastructure improvements between the project and the US 101 freeway.

The project would be designed to encourage pedestrian and bicycle transportation, including features such as complete streets elements, secure bicycle parking, trails and walkways, and Class III bike routes on interior streets. The existing circulation pattern would be maintained but would be enhanced with pedestrian and bicycle path connections. Off-site improvements include a road and walkway extension at Gilbert Drive, a walkway extension from Herring Drive to Strawberry Drive, and walkway improvements along Mission Drive.

Project Trip Generation

The purpose of the vehicular trip generation estimate is to approximate the number of new vehicle trips entering and exiting the site for various purposes (e.g., residential, employee, student, and visitor trips) during a selected time period. The proposed project will contain a mix of land uses including a new daycare and fitness center, new residential care facility, upgrades to existing housing and construction of new housing, and renovation of academic campus buildings. **Table 2** presents the revised buildout development program as of July 2025.

Table 2: Project Land Use Program

Land Use	Units	Total
Day Care Center	Square Feet / Children	3,000 / 60
Fitness Center	Square Feet	17,000
Residential Care Facility	Square Feet / Residents	267,354 / 170
Assisted Living and Memory Care Residences	Units / Residents	50 / 40
Independent Living Residences	Units / Residents	100 / 130
Academic Campus	Students / Faculty & Staff	1,000 / 240
Residential – Single Family Units	Dwelling Units (DU)	11
Residential – Multi-Family Units (market)	Dwelling Units (DU)	255
Residential – Multi-Family Units (affordable)	Dwelling Units (DU)	70

Source: Ascent Environmental, July 2025.

Trip Generation Methodology

The project site is currently occupied by academic and residential uses. The trip generation assessment identifies the total number of external vehicle trips generated by the project site at build-out as well as the net number of trips generated by subtracting the number of trips generated by existing uses from trips generated by project build-out. The trip generation assessment also considers internal trip making between the academic uses, residential uses, day care, and fitness center. Because the project description does not include dedicated housing for

the academic campus, the build-out trip generation assessment is based on traditional travel relationships between the adjacent uses.

Current accepted methodologies, such as the Institute of Transportation Engineers' (ITE) *Trip Generation* methodology, are primarily based on data collected at suburban, single-use, freestanding sites. These defining characteristics limit their applicability to mixed-use or multi-use development projects, such as this project, which, given its land use mix, design features, and setting, would include characteristics that influence travel behavior differently from typical single-use suburban developments. Thus, traditional data and methodologies, such as ITE, would not accurately estimate the project vehicle trip generation.

In response to the limitations in the ITE methodology, and to provide a straightforward and empirically validated method of estimating vehicle trip generation at mixed-use developments, the US Environmental Protection Agency (EPA) sponsored a national study of trip generation characteristics of multi-use sites. Travel survey data was gathered from 239 mixed-use developments (MXDs) in six major metropolitan regions and correlated with characteristics of the sites and their surroundings. The findings indicate that the amount of external traffic generated is affected by a wide variety of factors including the mix of employment and residents, the overall size and density of the development, the internal connectivity for walking or driving among land uses, the availability of transit service, and the surrounding trip destinations within the immediate area outside the project site.

These characteristics were related to trip behavior observed at the study development sites using statistical techniques. These statistical relationships produced equations, known as the EPA MXD model, which allow predicting external vehicle trip reduction as a function of the MXD characteristics. Applying external vehicle trip reduction percentage to "raw trips," as predicted by ITE, produces an estimate for the number of vehicle trips traveling into or out of the site.

The MXD model has been approved for use by the EPA.[2] It has also been peer-reviewed in the ASCE Journal of Urban Planning and Development,[3] peer-reviewed in a 2012 TRB paper evaluating various smart growth trip generation methodologies,[4] recommended by SANDAG for use on mixed-use smart growth developments,[5] promoted in an American Planning Association

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[2] Trip Generation Tool for Mixed-Use Developments (2012). www.epa.gov/dced/mxd_tripgeneration.html

[3] "Traffic Generated by Mixed-Use Developments—Six-Region Study Using Consistent Built Environmental Measures." Journal of Urban Planning and Development, 137(3), 248–261.

[4] Shafizadeh, Kevan et al. "Evaluation of the Operation and Accuracy of Available Smart Growth Trip Generation Methodologies for Use in California." Presented at 91st Annual Meeting of the Transportation Research Board, Washington, D.C., 2012.

[5] SANDAG Smart Growth Trip Generation and Parking Study. http://www.sandag.org/index.asp?projectid=378&fuseaction=projects.detail

(APA) Planning Advisory Service (PAS)[6] which recommended it for evaluating traffic generation of mixed-use and other forms of smart growth. It has also been used successfully in multiple certified EIRs in California.

Internal Capture

Internal trips are responsible for an 8% reduction of daily external vehicle trips, a 16% reduction of AM peak hour external vehicle trips, and a 17% reduction of PM peak hour external vehicle trips. Some examples of an internal trip would be a parent living in one of the project dwelling units dropping off a student at the day care center, a person living in one of the project dwelling units working at or attending classes at the campus, or a student exercising at the fitness center. Some of these trips would potentially still occur by vehicle, though they would remain internal to the larger project site.

Project Trip Generation

Input values were collected for the MXD model for use in application on the project trip generation. The MXD model uses internal project information such as land use mix, project area, intersection density, and transit stop placement as well as local and regional demographic data such as average household size and vehicle ownership, employment within one mile of the site, and employment within a 30-minute transit trip.

In addition, the MXD model was used to estimate the total number of trips generated by the existing land uses, which include a day care center, 145 residential dwelling units, and a 66-bed dormitory, and the existing academic campus. The total net trip generation for the project consists of the MXD estimated project trips minus the MXD estimated existing trips.

Table 3 summarizes the estimated trip generation for the project using the MXD methodology for a typical weekday. As shown in **Table 3**, the project is estimated to generate 2,570 net new daily vehicle trips, with 178 net new trips during the AM peak hour, and 226 net new trips during the PM peak hour.

[6] Walters, Jerry et al. "Getting Trip Generation Right – Eliminating the Bias Against Mixed Use Development." American Planning Association. May 2013.

Table 3: Project Trip Generation

Land Use	Units	ITE Code	Daily Trips	Weekday Am Peak Hour			Weekday Pm Peak Hour		
				In	Out	Total	In	Out	Total
Build-out Trips Generated by Project Site									
Day Care Center	3 ksf	565	245	25	22	47	22	25	47
Fitness Center	17 ksf	495	490	21	11	32	35	40	75
Residential Care Facility									
Assisted Living/Memory Care Residences	50 units	254	130	5	4	9	5	7	12
Independent Living Residences	100 units	255	247	10	5	15	7	12	19
Academic Campus	1,000 students	550	1,560	117	33	150	48	102	150
Residential – Single Family Units	11	210	104	2	6	8	6	4	10
Residential – Multi-Family Units (market)	255	220	1,719	24	78	102	82	48	130
Residential – Multi-Family Units (affordable)	70	223	337	7	18	25	19	13	32
Total Gross Project Trips (Build-out)			**4,832**	**211**	**177**	**388**	**224**	**251**	**475**
Build-out Reductions									
Internal Capture			(396)	(34)	(28)	(62)	(38)	(42)	(80)
External (Walk, Bike, and Transit)			(198)	(8)	(7)	(15)	(6)	(8)	(14)
Build-out External Trip Reduction			**(594)**	**(42)**	**(35)**	**(77)**	**(44)**	**(50)**	**(94)**
Existing Trips Generated by Project Site									
Day Care Center	3 ksf	565	245	25	22	47	22	25	47
Academic Campus	100 students	550	156	12	3	15	5	10	15
Residential – Single Family Units	3 units	210	28	1	1	2	2	1	3
Residential – Multi-Family Units	142 units	220	986	16	51	67	52	30	82
Residential – Student Dormitory	66 rooms	223	408	7	12	19	14	14	27
Total Gross Project Trips (Existing)			**1,823**	**61**	**89**	**150**	**95**	**80**	**174**
Existing Reductions									
Internal Capture			(100)	(5)	(7)	(12)	(8)	(6)	(14)
External (Walk, Bike, and Transit)			(55)	(2)	(3)	(5)	(3)	(2)	(5)
Existing External Trip Reduction			**(155)**	**(7)**	**(10)**	**(17)**	**(11)**	**(8)**	**(19)**
EXTERNAL PROJECT TRIPS			**4,238**	**169**	**142**	**311**	**180**	**201**	**381**
NET NEW PROJECT TRIPS			**2,570**	**115**	**63**	**178**	**96**	**129**	**226**

Source: Fehr & Peers, Institute of Transportation Engineers Trip Generation (11th Edition), US EPA MXD Model.

LOS Assessment Results

The LOS assessment for the study intersections for the four scenarios is based on existing intersection geometrics with one exception. The intersection of Tiburon Blvd. and E. Strawberry Dr. currently has free right turn movements on the eastbound, southbound, and northbound approaches. The SR 131 (Tiburon Boulevard) Capital Preventive Maintenance Project being implemented by Caltrans between US 101 and the Town of Tiburon will remove the free right turn lane from northbound East Strawberry Drive onto eastbound SR 131 (Tiburon Boulevard) that is in the southeast quadrant of the intersection of Tiburon Boulevard and E. Strawberry Drive. As such, the analysis of cumulative LOS conditions at the intersection is based on elimination of the northbound free right turn lane.

Table 4 summarizes the LOS assessment results for the seven study intersections for the four study scenarios. The intersections would operate at LOS D or better conditions under all scenarios. The intersection of Tiburon Blvd. and E. Strawberry Dr. would operate at LOS D conditions for the cumulative scenarios, due to a combination of the elimination of the northbound free right turn lane and growth in volumes.

Figures 3 through 6 show the intersection turn movement counts for all scenarios. LOS calculation sheets are provided in **Attachment A**.

Table 4: Level of Service Assessment

INTERSECTION	TRAFFIC CONTROL	PEAK HOUR	LOS ASSESSMENT STUDY SCENARIOS			
			EXISTING	EXISTING + PROJECT	CUMULATIVE	CUMULATIVE + PROJECT
1. Redwood Hwy Frontage Road & NB 101 Ramps	Signal	AM	B, 20.0	C, 20.4	C, 23.0	C, 24.7
		PM	C, 23.0	C, 23.4	C, 28.5	C, 31.1
2. Redwood Hwy Frontage Road & SB 101 Ramps	All Way Stop	AM	B, 13.8	C, 15.5	C, 22.1	D, 27.3
		PM	B, 13.6	C, 15.5	C, 17.5	C, 21.4
3. Redwood Hwy Frontage Road & Seminary Dr.	Signal	AM	B, 11.4	B, 14.3	B, 11.8	B, 14.7
		PM	B, 10.1	B, 14.2	B, 11.3	B, 17.9
4. Tiburon Blvd. & E. Strawberry Dr.	Signal	AM	C, 27.9	C, 28.1	D, 40.6	D, 41.2
		PM	C, 30.3	C, 30.5	D, 36.4	D, 37.0
5. E. Strawberry Dr. & Herring St.	All Way Stop	AM	A, 7.3	A, 7.4	A, 7.5	A, 7.6
		PM	A, 7.4	A, 7.4	A, 7.6	A, 7.7
6. Seminary Dr. & Ricardo Rd.	All Way Stop	AM	A, 8.9	B, 10.2	A, 9.7	B, 11.5
		PM	A, 9.4	B, 11.7	A, 10.0	B, 12.9
7. Redwood Hwy Frontage Road & Tiburon Blvd.	Signal	AM	B, 17.4	B, 17.6	C, 20.7	C, 20.9
		PM	C, 20.3	C, 20.5	C, 24.3	C, 24.6

Source: Fehr & Peers.

Summary

The proposed project would add 178 net new project trips during the AM peak hour and 226 net new project trips during the PM peak hour. The majority of these net new trips would travel to and from the west via Seminary Drive to the Redwood Highway Frontage Road where access to US 101 as well as commercial uses along the frontage road including the Strawberry Village Shopping Center is provided.

The intersections would operate at LOS D or better conditions under all scenarios, which meets the County LOS standard. No roadway or intersection changes would be required to meet the LOS standard.

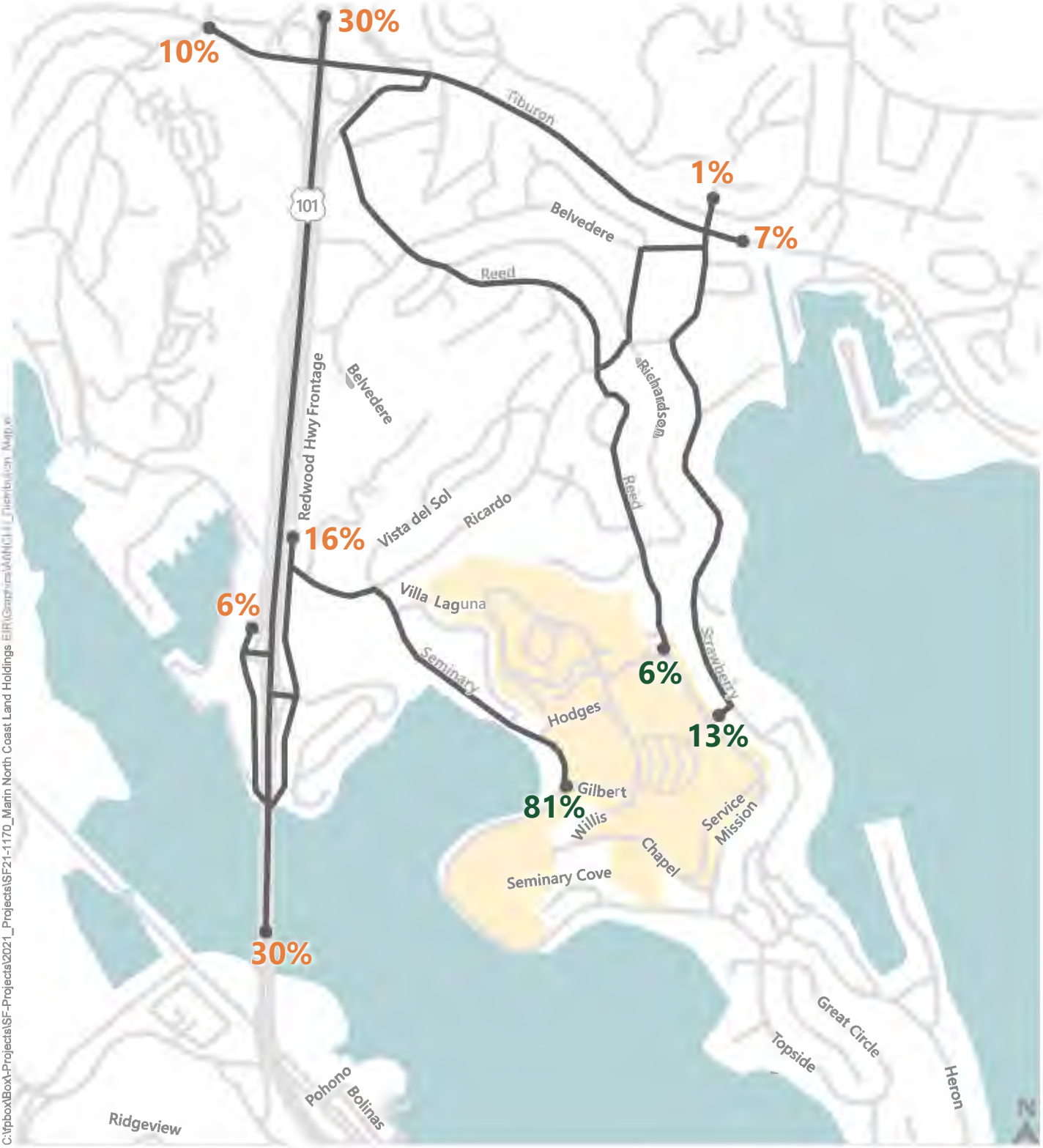


X Study Intersection

Project Area

Figure 1

North Coast Land Holding
Project Study Intersections



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X% Percent of Trips at Project Origin/Destination

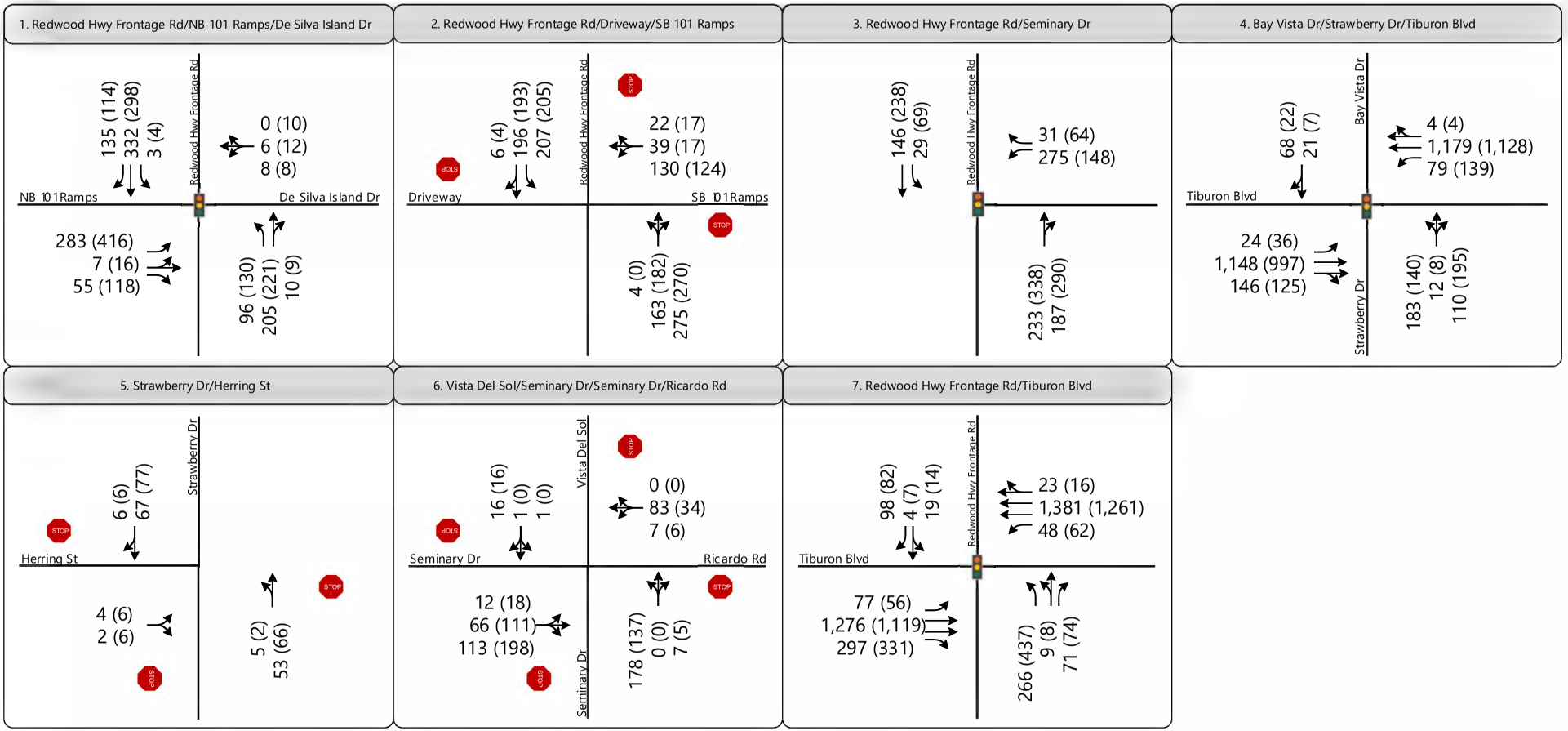
X% Percent of Trips at External Origin/Destination

Vehicle Route

Project Area

Figure 2

North Coast Land Holding
Project Trip Distribution

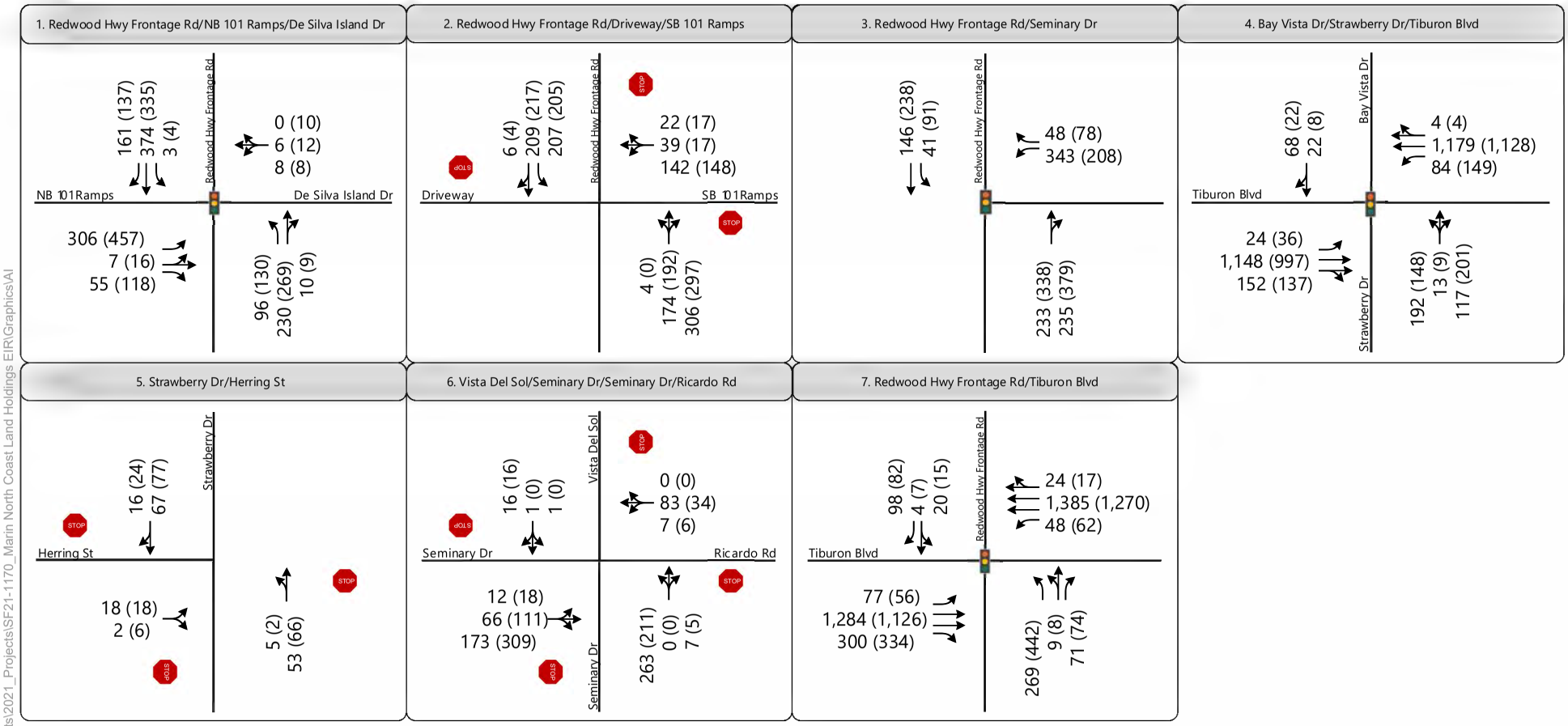


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Figure 3

North Coast Land Holding

Intersection Turn Movement Counts: 2025 Existing Conditions

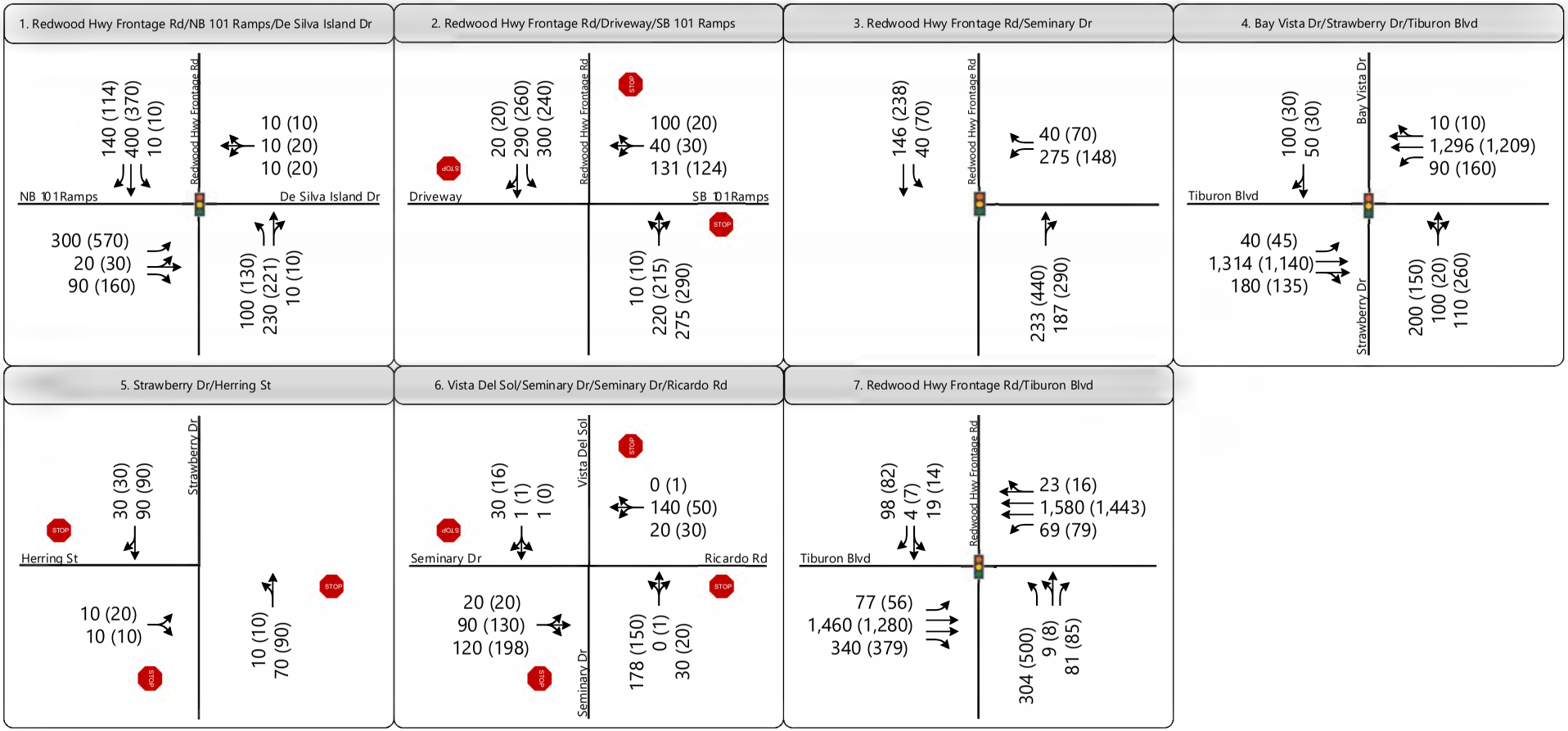


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Figure 4

North Coast Land Holding

Intersection Turn Movement Counts: 2025 Existing + Project Conditions



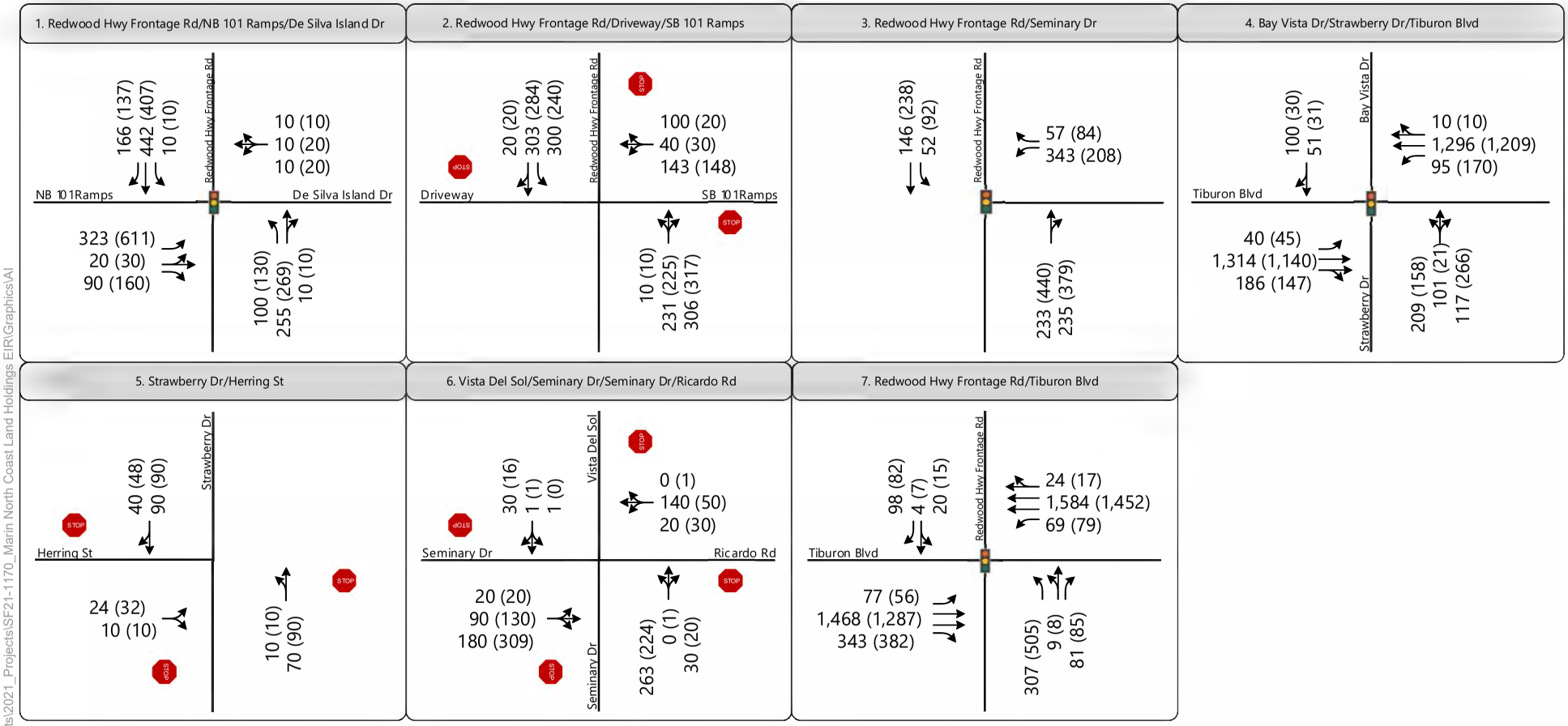
AM (PM)

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Figure 5

North Coast Land Holding

Intersection Turn Movement Counts: Cumulative No Project Conditions



AM (PM)

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Figure 6

North Coast Land Holding

Intersection Turn Movement Counts: Cumulative + Project Conditions

Appendix C

Updated TIS documents

FINAL

North Coast Land Holdings

Transportation Impact Study

Prepared for:
County of Marin

August 2025

SF21-1170

FEHR & PEERS

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I. INTRODUCTION

This updated report addresses the impacts that transportation and land use changes related to the North Coast Land Holding Project would have on vehicle miles traveled (VMT), pedestrian and bicycle facilities, transit service, emergency access, and safety.

Project Study Area

The approximately 127-acre project site is located on the former Golden Gate Baptist Theological Seminary campus property in the community of Strawberry, a census-designated place in unincorporated Marin County. The campus is generally bounded by Seminary Drive, East Strawberry Drive, Ricardo Road, and Richardson Drive.

Regional access to the project site is available from US Highway 101 (US 101) and State Route 131 (SR 131; Tiburon Boulevard). From US 101 off-ramps, ingress to the project site is available through the Redwood Highway Frontage Road to Seminary Drive, and egress returning to the freeway on-ramps is available through Seminary Drive and the Highway Frontage Road to US 101 on-ramp. The project site is accessible from Seminary Drive at Hodges Drive and Gilbert Drive. Other access points to the project site include Mission Drive, East Strawberry Drive, Chapel Drive, and Reed Boulevard.

Project Description

The academic campus is currently tenant-occupied by Olivet University, a private Christian university. As of September 2020, at the time of the NOP, enrollment consisted of approximately 100 students on campus. Approximately 27 percent of the housing units were occupied by university affiliated residents at the time of the NOP. The remaining students, faculty, and staff live off-site and commute to the campus. The academic campus is staffed with approximately 24 employees. The existing 3,000-sf daycare facility occupies the southern portion of the Academic Campus Planning Area and is located in the academic building. The daycare serves the families of the academic campus, residents connected with the campus, and other southern Marin County community residents. Current enrollment is approximately 60 children, with approximately 16 total staff. Eight to 12 staff are working onsite on any given day, depending on the age of the children enrolled that particular day. In total, there are 145 existing residential units within the project site. This includes 16 market-rate studios, 54 one-bedroom housing units, 54 two-bedroom housing units, 18 three-bedroom housing units, and 3 single-family residences. There are also 66 dormitory rooms with 7 shared kitchens. The existing housing is occupied by approximately 320 residents,[1] including general public occupants as well as students, faculty, staff, and families affiliated with the academic campus.

[1] Based on occupancy estimates provided by applicant.

The proposed project includes reconfiguration of the existing academic campus to improve accessibility and facilitate construction of new residential uses in the Chapel Hill and Shuck Drive Knoll Planning Areas. The existing academic building, cafeteria, and library would be retained in their current locations. The administration building would be renovated and would include the addition of a 15,800-sf structure along the northern façade of the existing building. The academic campus would continue to be occupied by a university or college, with a maximum enrollment of 1,000 higher education students.

The proposed project would retain some housing units, replace existing housing, and increase the total number of residences. The applicant proposes to retain 13 existing residential units within the project site and replace remaining residential units with new housing. Proposed new housing would include replacement of 139 residential units and construction of 184 new units consisting of single-family and multi-family residences, as well as a residential care facility (counted as one residential unit but supporting up to 155 residents). A total of 324 residential units would be constructed. A total of 70 residential units would be affordable housing for low-income residents. The affordable units will be inclusionary; dispersed throughout the project site; and comparable in location, size, and exterior design to the remaining units in the overall residential development. For the purposes of this traffic assessment, all the residential units were assumed to be available for lease to the broader community since there would be no restricted units.

The proposed project would include a new 267,354-sf residential care facility located in the eastern portion of the project site, within the Dormitory Hill Planning Area, situated northwest of the academic campus and north of the central tiered parking lot. The residential care facility would be designed to serve adults 55 and older with capacity to house up to 170 residents. The housing would consist of up to 100 independent living apartments and 50 assisted living and memory care residences. In addition to the proposed housing, the residential care facility would include public dining, wellness, and lounge areas, as well as support and back-of-house facilities for Certified Medical Technical personnel.

The proposed project includes a new facility that would contain a 3,000-sf daycare and a 17,000-sf fitness center. The daycare and fitness center would be located in a shared facility that would be situated in the central portion of the project site, east of the Seminary Playing Field and west of the three-tiered parking lot. The existing daycare would continue to operate on-site but would be relocated from the academic building into the new space within the proposed daycare and fitness center. Enrollment at the daycare would be limited to the current enrollment of 60 children, with preference given to families in the community. Fitness center membership would be limited to on-site residents, affiliates of the academic campus, and residents of the surrounding community that are within walking distance of the facility.

Buildout of the project would increase the total number of parking spaces from 608 existing spaces to 944 parking spaces. Of the existing residential parking spaces, 51 spaces would be retained, and an additional 652 residential parking spaces would be added for residential housing and the residential care facility, resulting in a total of 703 residential parking spaces on the project site.

Vehicular access to the project site from US 101 would not be altered for the project. The project does not include proposed off-site transportation infrastructure improvements between the project and the US 101 freeway.

The project would be designed to encourage pedestrian and bicycle transportation, including features such as complete streets elements, secure bicycle parking, trails and walkways, and Class III bike routes on interior streets. The existing circulation pattern would be maintained but would be enhanced with pedestrian and bicycle path connections. Off-site improvements include a road and walkway extension at Gilbert Drive, a walkway extension from Herring Drive to Strawberry Drive, and walkway improvements along Mission Drive.

Report Organization

The remainder of this report is divided into the following chapters:

Chapter 2 – Environmental Setting describes the existing transportation network in the proposed project study area, including the surrounding roadway network. Additionally, this section describes the pedestrian facilities, bicycle facilities, public transit network, emergency service access, and safety data.

Chapter 3 – Methodology describes the study analysis scenarios, the 2040 No Project transportation system, VMT forecasts, and standards of significance.

Chapter 4 – Impact Assessment describes the anticipated VMT for the Proposed Project and identifies the extent to which the Proposed Project would impact the transportation system.

II. ENVIRONMENTAL SETTING

Terminology

The following are definitions for terms used in this section.

- **Vehicle miles traveled (VMT)**. A measure of network use or efficiency that accounts for the number of daily vehicle trips generated times the length or distance of those trips. VMT is generally expressed as VMT per capita for a typical weekday. For instance, the 2013 average daily residential VMT per capita for the nine county Bay Area region was 15.3 miles per person per day.
- **Greenhouse gases (GHG)**. Gases in the atmosphere that absorb infrared light, thereby retaining heat in the atmosphere and contributing to a greenhouse effect.

Regulatory Framework

This section summarizes key federal, state, regional, and local regulations and programs related to transportation impacts resulting from the proposed project.

Federal Regulations

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) of 1990 prohibits discrimination against people with disabilities in several areas including employment, transportation, public accommodations, and access to state and local government' programs and services. The ADA applies to both public and private ground transportation providers. Key requirements include providing accessible access routes and paths of travel, accessible transit service and vehicles, accessible transit stops, accessible parking spaces, and accessible transport communication systems.

The U.S. Access Board publishes guidelines under ADA that address access to sidewalks and streets, crosswalks, curb ramps, pedestrian signals, on-street parking, and other components of public right-of-way. The guidelines also review shared use paths, which are designed primarily for use by bicyclists and pedestrians for transportation and recreation purposes.

Public Right-of-Way Accessibility Guidelines (PROWAG)

PROWAG are minimum guidelines issued under Title II of the ADA by the U.S. Access Board in September 2023 for the accessibility of pedestrian facilities in the public right-of-way. These guidelines ensure that facilities used by pedestrians, such as sidewalks and crosswalks, constructed or altered in the public right-of-way are readily accessible to and usable by pedestrians with disabilities.

State Regulations

Senate Bill (SB) 743

With the passage of SB 743 (September 27, 2013) and the subsequent adoption of revised California Environmental Quality Act (CEQA) Guidelines in 2019, level of service (LOS) can no longer be used as a criterion for identifying significant transportation impacts for most projects under CEQA. LOS measures the average amount of delay experienced by vehicle drivers at an intersection during the most congested time of day, while the new CEQA metric (vehicle miles traveled, or VMT) measures the total number of daily miles traveled by vehicles on the roadway network and the impacts on the environment from those miles traveled.

In other words, SB 743 changes the focus of transportation impact analysis in CEQA from measuring impacts to drivers, to measuring the impact of driving. Land use projects with one or more of the following characteristics would have lesser VMT impacts:

- Higher land use densities
- Mix of project uses
- Support of a citywide jobs-housing balance (i.e., provide housing in a job rich area, or vice versa)
- Proximity to the core of a region
- Proximity to high quality transit service
- Located in highly walkable or bikeable areas

This shift in transportation impact criteria is expected to better align transportation impact analysis and mitigation outcomes with the state's goals to reduce GHG emissions, encourage infill development, and improve public health through more active transportation. Specific to SB 743, Section 15064.3(c) of the revised Guidelines states that, "a lead agency may elect to be governed by the provisions of this section immediately. Beginning on July 1, 2020, the provisions of this section shall apply statewide." However, CEQA Statute Section 21099(b)(2) states that, "upon certification of the guidelines by the Secretary of the Natural Resources Agency pursuant to this section, automobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion, shall not be considered a significant impact on the environment pursuant to this division, except in locations specifically identified in the Guidelines."

Although the State's Office of Planning and Research provides recommendations for adopting new VMT analysis guidelines, lead agencies have the final say in designing their methodology. Lead agencies must select their preferred method of estimating and forecasting VMT, their preferred significance thresholds for baseline and cumulative conditions, and the mitigation strategies they consider feasible. Lead agencies must prove that their selected analysis methodology aligns with SB 743's goals to promote infill development, reduce GHGs, and reduce VMT.

California Department of Transportation

Caltrans is responsible for operating and maintaining the State Highway System. In the project vicinity, US 101 falls under Caltrans jurisdiction. Caltrans provides administrative support for transportation programming decisions made by the California Transportation Commission for state funding programs. The State Transportation Improvement Program is a multiyear capital improvement program that sets priorities and funds transportation projects envisioned in long-range transportation plans.

Transportation Impact Study Guide (TISG)

The TISG replaced the Guide for the Preparation of Traffic Impact Studies (Caltrans, 2002) for use with local development projects and went into effect July 1, 2020. The TISG was prepared by Caltrans to provide guidance to lead agencies regarding Caltrans review of a land use project or plan's transportation analysis using a VMT metric. This guidance is not binding and is intended to be a reference and informational document.

Interim Local Development Intergovernmental Review (LDIGR) Safety Review Practitioners Guidance

The Interim Safety Review Practitioners Guidance (Caltrans, December 18, 2020) provides guidance to district staff and other Caltrans personnel, lead agencies, developers, and consultants conducting safety reviews for proposed land use projects and plans affecting the State Highway System.

Deputy Directive DD-64-R1 – Complete Streets – Integrating the Transportation System

Caltrans provides for the needs of travelers of all ages and abilities in all programming, planning, design, construction, operations, and maintenance activities and products on the State Highway System. Caltrans views all transportation improvements as opportunities to improve safety, access, and mobility for all travelers in California and recognizes bicycles, pedestrians, and transit modes as integral elements of the transportation system.

Caltrans develops multimodal projects in balance with community goals, plans, and values. Implicit in these objectives is addressing the safety and mobility needs of bicyclists, pedestrians, and transit users in all projects, regardless of funding. Bicycle, pedestrian, and transit travel is facilitated by creating "complete streets," beginning early in the system planning process and continuing through project delivery and maintenance, and operations.

Regional Plans and Regulations

Plan Bay Area 2050

Plan Bay Area is the Bay Area's Regional Transportation Plan (RTP)/Sustainable Community Strategy (SCS). *Plan Bay Area* 2050, adopted jointly by the Association of Bay Area Governments (ABAG) and MTC on October 21, 2021, is the current version of the plan. The 2050 *Plan Bay Area* is an update to the 2013 *Plan Bay Area*, with updated planning assumptions that incorporate key economic, demographic, and financial trends from the last several years. This document describes how the San Francisco Bay Area will develop

over the next three decades and the SCS integrates transportation, land use, and housing to meet GHG reduction targets set by California Air Resources Board (CARB).

Bay Area Clean Air Plan

The Bay Area Air Quality Management District (BAAQMD) adopted the 2017 *Clean Air Plan, Spare the Air, Cool the Climate* (Clean Air Plan) on April 19, 2017. The 2017 Clean Air Plan also lays the groundwork for reducing GHG emissions in the Bay Area to meet the state's 2030 GHG reduction target and 2050 GHG reduction goal. It also includes a vision for the Bay Area in a post-carbon year 2050 that encompasses the following:

- Walk, bicycle, and use public transit for the majority of trips and use electric-powered autonomous public transit fleets.
- Incubate and produce clean energy technologies.
- A comprehensive multipollutant control strategy has been developed to be implemented in the next three to five years to address public health and climate change and to set a pathway to achieve the 2050 vision. The control strategy includes 85 control measures to reduce emissions of ozone, particulate matter, toxic air contaminants, and GHG from a full range of emission sources. These control measures cover eight sectors that contribute to GHG emissions including transportation. The control strategy includes the following relevant priorities that relate to the transportation sector:
    - Decrease demand for fossil fuels (gasoline, diesel, and natural gas).
    - Increase efficiency of the energy and transportation systems.
    - Reduce demand for vehicle travel, and high-carbon goods and services.
    - Electrify the transportation and building sectors.

Bay Area Commuter Benefits Plan

Under Air District Regulation 14, Model Source Emissions Reduction Measures, Rule 1, Bay Area Commuter Benefits Program, employers with 50 or more full-time employees within the BAAQMD are required to register and offer commuter benefits to employees. In partnership with the BAAQMD and the MTC, the rule's purpose is to improve air quality, reduce GHG emissions, and decrease the Bay Area's traffic congestion by encouraging employees to use alternative commute modes, such as transit, vanpool, carpool, bicycling, and walking. The benefits program allows employees to choose from one of four commuter benefit options including a pre-tax benefit, employer-provided subsidy, employer-provided transit, and alternative commute benefit.

Local Regulations

Marin Countywide Plan

The Marin Countywide Plan was adopted on November 6, 2007 and last updated in 2015. It sets forth overarching goals and objectives related to transportation and circulation in the context of planned land use within the unincorporated county.

Relevant transportation goals and policy statements from the Transportation and Circulation Element of the General Plan are provided below.

- **TR-1.1: Manage Travel Demand**. Improve the operating efficiency of the transportation system by reducing vehicle travel demand and provide opportunities for other modes of travel. Before funding transportation improvements consider alternatives—such as Transportation Demand Management (TDM)—and prioritize projects that will reduce fossil fuel use and reduce single-occupancy vehicle trips.
- **TR-1.4: Share the Costs for Improvements**. Require new development to pay for or otherwise improve its fair share of the transportation system impacts.
- **TR-1.5: Require Necessary Transportation Improvements**. Require necessary transportation improvements to be in place, or otherwise guaranteed to result in their timely installation, before or concurrent with new developments. In evaluating whether a transportation improvement is necessary, the county shall consider alternatives to the improvement consistent with Policy TR-1.1, Manage Travel Demand, and the extent to which the improvement will offset the traffic impacts generated by proposed and expected development and restore acceptable traffic levels of service.
- **TR-1.8: Reduce Vehicle Miles Traveled (VMT)**. Reduce the rate of increase for total vehicle miles traveled by single-occupant automobile to not exceed the population growth rate.
- **TR-2.1: Improve the Bicycle and Pedestrian Network**. Promote adequate bicycle and pedestrian links, to the extent feasible, throughout the county, including streetscape improvements and standards that are safe and pedestrian and bicycle friendly.
- **TR-2.2: Provide New Bicycle and Pedestrian Facilities**. Where appropriate, require new development to provide trails or roadways and paths for use by bicycles and/or on-street bicycle and pedestrian facilities. In-lieu fees may be accepted if warranted in certain cases.
- **TR-3.1: Encourage and Support the Expansion of Local Bus and Ferry Services**. Encourage expansion and improvement of local bus and ferry services to all areas of the county.

The Countywide Plan contains the following Implementation Program regarding vehicle miles traveled (VMT).

- **TR-1.*s*: VMT Reduction Monitoring and Implementation and Transportation Demand Management Program.** Develop and implement a countywide program for monitoring and reducing VMT consistent with state and regional efforts and based on information from state and regional planning agencies. Identify and require in new developments specific transportation demand management (TDM) strategies for reducing the VMT below levels that would otherwise

occur. Consider the following types of strategies for inclusion in the VMT Reduction Monitoring and Implementation and Transportation Demand Management Program:

- Increased transit.
- All new residential projects consisting of 25 units or more should be located within 1/2 mile of a transit node, shuttle service, or bus route with regularly scheduled, daily service.
- New multi-family projects consisting of 25 units or more should include TDM measures, such as reduced parking for affordable or senior projects, subsidized public transportation passes, or ride-matching programs, based on site-specific review. For market-rate projects, consider TDM programs such as charging parking fees separate from rent.
- Safe, convenient connections should be provided to existing pedestrian and bicycle facilities, and secure bicycle parking should be provided in new non-residential developments.
- TDM should be required for new or expanded projects with 50 employees or more, including programs such as parking cash out, subsidized transit passes, ride-sharing incentives, and bicycle storage facilities.

Marin County Municipal Code

The ordinances of the County of Marin are codified in the Marin County Code. Title 24 of the Marin County Code establishes standards of improvement and construction for the development of land within the unincorporated area of Marin County. Section 24.04.110 sets forth minimum widths and Section 24.04.120 sets forth maximum grades for streets. The minimum paved width for a limited residential road is 20 feet with shoulders or 24 feet with curbs; for a minor residential road it is 28 feet; for a residential road it is 36 feet; and for a collector road it is 40 feet. Maximum grades are 6% for arterial and collector roads, 12% for residential roads, and 18% for minor and limited residential roads.

County of Marin Bicycle and Pedestrian Master Plan

The Marin County Unincorporated Area Bicycle and Pedestrian Plan (Plan) was adopted on February 27, 2018. The update to the Plan was completed as part of a countywide effort to update all local bicycle and pedestrian master plans and focuses on specific recommendations for the unincorporated areas of Marin County. Relevant transportation goal and policy statements from the Plan are listed below.

- **Goal 1 Increased Bicyclists and Pedestrian Access** – Expand bicycle and pedestrian facilities and access in and between neighborhoods, employment centers, shopping areas, schools, and recreational sites, in pursuit of the Marin Countywide Plan goal of having 20% of all trips made by walking or biking by 2020 and add a 2030 goal of 25% bicycling and walking mode share. Provide facilities that are accessible to the greatest number of users.
- **Goal 2 Bicycle Transportation** – Make the bicycle an integral part of daily life in Marin County, particularly for trips of less than five miles, by implementing and maintaining a bikeway network, providing end-of-trip facilities, improving bicycle/transit integration, encouraging bicycle use, and making bicycling safer and more convenient for people of all ages and abilities.

- **Goal 3 Pedestrian Transportation** – Encourage walking as a daily form of transportation in Marin County by completing a pedestrian network that services short trips and transit, improving the quality of the pedestrian environment, improving the health of all citizens, and increasing safety, convenience, and access opportunities for all users.

Relevant proposed bicycle improvements from the Plan in the study area are listed below.

- Class II bike lane on Tiburon Boulevard from US 101 to Trestle Glen Boulevard
- Class II bike lane on the Redwood Highway Frontage Road on the east side of US 101 from Tiburon Boulevard to just south of the signalized intersection of US 101 northbound ramps/De Silva Island Drive
- Class II bike lane on Seminary Drive from the Redwood Highway Frontage Road to Gilbert Drive

Existing Conditions

Street System

The project area is mostly composed of local roads with single travel lanes in each direction, typically with unmarked lanes. A few notable collector roads (e.g., Seminary Drive, E Strawberry Drive) have more formal striping and connect to arterials such as Tiburon Boulevard and eventually Highway 101. Other properties of significant streets observed are summarized in **Table 1** below.

Table 1: Significant Streets in Study Area

Name	Class	Lanes
Highway 101	Freeway	5 NB travel lanes, 4 SB travel lanes
Tiburon Boulevard	Arterial (not county maintained)	2 in each direction
Redwood Highway Frontage Road (east)	Collector	1 travel lane in each direction, on-street parking on one side
Redwood Highway Frontage Road (west)	Collector (not county maintained)	1 travel lane in each direction, on-street parking on one side
Seminary Drive	Collector	1 travel lane in each direction, on-street parking on both sides
E Strawberry Drive	Collector	1 travel lane in each direction, on-street parking on one side
Belvedere Drive	Collector	1 travel lane in each direction, on-street parking on both sides
Reed Boulevard	Local	No marked lanes, on-street parking curb on one side
Ricardo Road	Local	1 travel lane in each direction, on-street parking on both sides
Vista del Sol	Local	No marked lanes
Chapel Drive	Local	No marked lanes
Mission Drive	Local	No marked lanes
Gilbert Drive	Local	No marked lanes
Herring Drive	Local (not county maintained)	No marked lanes
Hodges Drive	Local (not county maintained)	No marked lanes
Storer Drive	Local (not county maintained)	No marked lanes
Shuck Drive	Local (not county maintained)	No marked lanes

Figure 1 also maps these streets of significance within the study area.

Pedestrian Facilities

Most of the study area outside of the immediate project site does not have dedicated walkways for pedestrians in the form of sidewalks. Walkway segments along several primary pedestrian routes serving the project area were verified, including the following roads:

- Seminary Drive
- E Strawberry Drive
- Chapel Drive
- Mission Drive
- Belvedere Drive and Reed Boulevard adjacent to the Strawberry Village Shopping Center
- Knoll Lane
- Redwood Highway Frontage Road (east side)

Many sidewalks were found to have gaps that required pedestrians to temporarily enter vehicle travel lanes to proceed (e.g., Knoll Lane) or were replaced with dirt trails at geographically challenging points (e.g., Seminary Drive). In one example, there is no sidewalk in a segment of E Strawberry Drive between Harbor Cove Way and Island Drive where the roadway is split into two levels due to steep terrain, leaving little space between vehicle travel lanes and the adjacent homes. For other streets, sidewalks exist only on one side of the road for long stretches (e.g., Chapel Drive and Mission Drive).



Sidewalks also narrowed (to less than 4 feet wide) along some roads, such as along segments of E Strawberry Drive and Redwood Highway Frontage Road.

A map of observed pedestrian walkways and trails serving the project area is provided in **Figure 2**.

Bicycle Facilities

Caltrans recognizes four classifications of bicycle facilities.

- Class I – commonly referred to as bike paths, are facilities separated from automobile traffic for the exclusive use of bicyclists.
- Class II – commonly referred to as bike lanes, are dedicated facilities for bicyclists immediately adjacent to automobile traffic.
- Class III – commonly referred to as bike routes, are on-street routes where bicyclists and automobiles share the road.
- Class IV – commonly referred to as cycle tracks or protected bike lanes, are facilities that combine elements of Class I and Class II facilities to offer an exclusive bicycle route immediately adjacent to a roadway similar to a Class II facility, while providing a physical separation from traffic with raised curb, plastic delineators, or parked automobiles.

There are no documented Class I or Class IV bicycle facilities in the project study area, with most roads having no facilities at all. Four roads have noted significant (classed) facilities in county documents and official data sources such as Marin GeoHub as shown in **Table 2** below.

Table 2: Existing Bicycle Facilities

Road	Documented Class
Seminary Drive	Class II
E Strawberry Drive	Class III
Belvedere Drive	Class III
Redwood Highway Frontage Road	Class III

However, signage to suggest the roadways are meant to be shared between automobiles and bicyclists is lacking along most of the claimed Class III routes. The addition of pavement markings (such as sharrows) would increase the visibility and discoverability of these routes.



Along Seminary Drive, there is a segment of the road (roughly between Ricardo Road and Hodges Drive) that is signed as a shared bike route (Class III) in between two Class II segments. Most of the Class III facilities in the community do not have signs or striping designating them as such.



Another Class II segment is located along the north side of Belvedere Drive between Bayview Terrace and Ricardo Road.



Another short segment of a Class II facility is located on the north side of Tiburon Boulevard just east of Highway 101.



These findings are summarized in the map of all bicycling facilities (**Figure 3**).

Transit Facilities

Regional Bus Service by Golden Gate Transit

The Golden Gate Bridge and Highway Transportation District (GGBHTD) operates two fixed-route transit services: Golden Gate Transit (GGT) regional bus service and Golden Gate Ferry (GGF).

Regional bus service began in 1972 and is currently provided on 8 fixed routes as of June 2022 (a greatly reduced post-pandemic schedule from a prior peak of 28 routes). These routes fall into two categories:

- **Regional** routes provide daily service throughout the day and evening between San Francisco, Marin, Sonoma, and Contra Costa Counties. These include Routes 101, 130, 150, and 580.
- **Commute** routes provide service primarily during weekday morning and afternoon peak periods between San Francisco, Marin, and Sonoma Counties. These include Routes 114, 132, 154, and 172.

Golden Gate Transit serves the project area primarily via three routes that make stops at two bus pad stations along the side of Highway 101: the Seminary Drive Bus Pad and Tiburon Wye Bus Pad. The Seminary Drive Bus Pad also doubles as a park-and-ride station with a small, attached no-fee parking lot.



The three routes that stop at these bus pads are:

- Route 130 (Regional): San Rafael – Marin City – Sausalito – San Francisco
- Route 132 (Commute): San Anselmo – San Rafael – San Francisco
- Route 150 (Regional): San Rafael – Marin City – San Francisco

There is another set of pads to the south of the project area (the Pohono Street Park & Ride and the Manzanita Park & Ride) which also acts as stops for Route 132, 150, and Route 114—the last of which traverses through Mill Valley with a terminus at E Blithedale Avenue and Tower Drive / Kipling Drive, near the Tiburon Wye Bus Pad.

Local Bus Service by Marin Transit

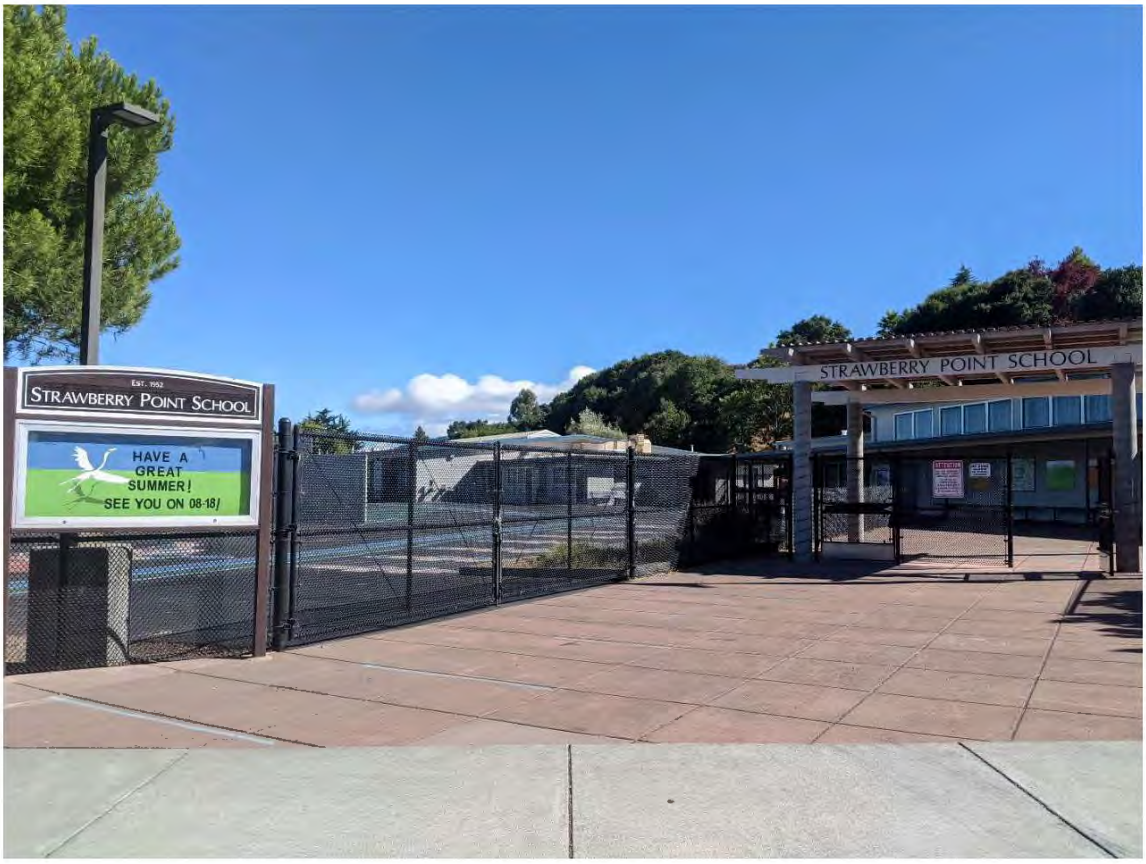
Marin Transit provides a total of 19 fixed routes as of July 2022, including nine local routes, six community shuttle routes, two rural fixed routes (a.k.a. West Marin Stagecoach), and one Muir Woods shuttle service within Marin County. Marin Transit also offers Connect, an on-demand service available approximately 2.5 miles around each SMART station in Marin County. Marin Transit bus and shuttle services carried over 3.2 million passenger trips per year before 2020.

Marin Transit owns 113 transit vehicles including 13 community shuttles, 6 stagecoach vehicles, 35 paratransit vehicles, 4 Connect vans, 15 narrow-bodied rural buses, 28 hybrid diesel-electric buses, 10 articulated buses, and 2 battery electric buses as of 2020.

Marin Transit sells 1-day and 31-day passes, each good for unlimited rides during the valid period. The 31-day pass costs $40 for adults and youth and $20 for seniors and persons with disabilities. A 1-day pass,

purchasable on a bus, costs $5 for adults and $2.50 for seniors, youth, and persons with disabilities. A one-way cash fare costs $2 for adults and $1 for seniors, youth, and persons with disabilities. Transit is free for children five and under (up to two per adult).

Marin Transit also offers an annual Youth Pass through Marin County schools such as Strawberry Point School in the study area. With the pass, registered Marin County students and youth ages 18 and under ride on local routes in Marin without paying any additional fare. The Youth Pass costs $325 per year.



Local transit routes that serve the study area include the following:

- Route 17 (Local): San Rafael – Strawberry – Mill Valley – Marin City – Sausalito
- Route 22 (Local): San Rafael – San Anselmo – Ross – College of Marin – Larkspur – Corte Madera – Strawberry – Marin City
- Route 36 (Local): Canal – San Rafael – Hwy 101 – Marin City
- Route 71 (Local): Sausalito – Marin City – San Rafael – Ignacio – Novato
- Route 219 (Community Shuttle): Tiburon – Strawberry – Seminary

Routes 17, 22, 36, and 219 make notable stops around the Strawberry Village Shopping Center and also have stops that are walkable to the Seminary Drive and Tiburon Wye bus pads where riders can transfer to Route 71 or Golden Gate Transit regional routes.

The West Marin Stagecoach Route 61 also makes a stop at the Pohono Street Park & Ride and the Manzanita Park & Ride to the south of the project area.

Both Marin Transit and Golden Gate Transit routes and stops are summarized in **Figure 4**.

Mobility Services and Programs

Shared Mobility Options

According to the Shared-Use Mobility Center, shared mobility is defined as transportation services and resources that are shared among users, either concurrently or one after another. The services are grouped into five different shared mobility typologies:

- Bike-sharing/Scooter-sharing
- Carsharing
- Ride-sharing/Ride-hailing
- Public Transit
- Microtransit (e.g., shared scooters)/Shuttles

Bike-sharing, carsharing, scooter-sharing, or microtransit services are not currently provided in the study area. They are, however, provided in many other Bay Area cities.

Traditional ride-sharing includes carpooling, vanpooling, and real-time matching of drivers and passengers through mobile apps in which the passenger pays a share of the trip cost. Ride-hailing providers such as Uber and Lyft use online platforms to connect passengers with drivers who use personal, non-commercial, vehicles. UberPool and Lyft Line are ride-sharing options that allow drivers to carry multiple passengers who split the cost of a trip. Uber has also partnered with the Transportation Authority of Marin as part of the Connect2Transit program which includes the Marin Transit Connect on-demand service.

Taxis and limos are regulated for-hire vehicles. Numerous companies provide these services in the study area.

Emergency Vehicle Access

Southern Marin Fire Protection District (SMFD) Station 9 Strawberry is the fire station that serves the project site and the surrounding Strawberry community. The station is located at 308 Reed Boulevard, roughly in the center of the Strawberry community and a few hundred feet north of the intersection of Reed Boulevard/Storer Drive and the northern boundary of the project site. In addition to the Strawberry community, Station 9 Strawberry serves from Mill Valley to Tiburon to the Golden Gate Bridge. The station serves portions of the Golden Gate National Recreational Area (GGNRA) and US 101 north to the Paradise Drive interchange in Corte Madera.

Based on consultation with SMFD Chiefs,[2] the following are primary egress routes from the station based on the call destination.

- Project Site: south on Reed Boulevard.
- Redwood Highway Frontage Road/US 101 South/US 101 North: north on Reed Boulevard, west on Meda Lane, and west on Ricardo Road/Seminary Drive to Redwood Highway Frontage Road.
- Tiburon: north of Reed Boulevard, east on Ricardo Road/Ricardo Lane, and north on E Strawberry Drive to Tiburon Boulevard (SR 131).
- Seminary Drive: south on Reed Boulevard, west on Storer Drive, south on Shuck Drive, and west on Hodges Drive.
- South Strawberry Area: south on Reed Boulevard, east on Storer Drive, and east on Herring Drive to E Strawberry Drive.



[2] July 21, 2022, calls with Chief Ted Petersen and Adam Vollmer.

Transportation Safety

The 2018 Marin Travel Safety Plan was a collaborative effort between unincorporated Marin County and all 11 incorporated cities and towns. The purpose was to provide a systemic safety analysis for motorists, motorcyclists, bicyclists, and pedestrians on non-state arterial and collector roadways. The Plan was funded through a Systemic Safety Program grant provided by Caltrans. The intent was to provide a proactive collision analysis, identify high risk locations and collision patterns, develop a list of systemic low-cost and longer-term countermeasures, and help secure funding to address key safety issues.

During the five-year period in which crashes were evaluated, 22.6% of all crashes in the county occurred in Unincorporated Marin County, lower than the county's 26% share of the total county population. Notable collision profiles in Unincorporated Marin County include high rates of bicycle collisions, pedestrian collisions involving senior over the age of 65, speed related collisions, motorcycle collisions, and collisions with vehicles hitting fixed objects. According to the California Office of Traffic Safety, in 2019 Marin County ranked among the top 10 California counties for collisions where victims were killed and/or injured involving pedestrians, pedestrians 65 or older, and bicyclists.

The 2018 Marin Travel Safety Plan identified safety countermeasures for 12 corridors and 13 intersections in Unincorporated Marin County. This includes a corridor improvement to the Redwood Highway Frontage Road from the US 101 ramp to De Silva Island Road. The corridor improvements included improved signal timing and detection, enhanced pedestrian crossing improvements, guardrail, and bike lanes (green pain through the intersection to delineate conflict zones). Intersection improvements were identified at the East Blithedale Avenue/Tower Drive/Kipling Drive intersection including improved signal timing and detection and enhanced pedestrian crossing improvements. Subsequent to completion of the Plan, Marin County received $2.8 million in Highway Safety Improvement Program (HSIP) grant funds from Caltrans to implement safety countermeasures identified in the plan at 51 signalized intersections in unincorporated Marin County and within 11 incorporated cities.

Collision History

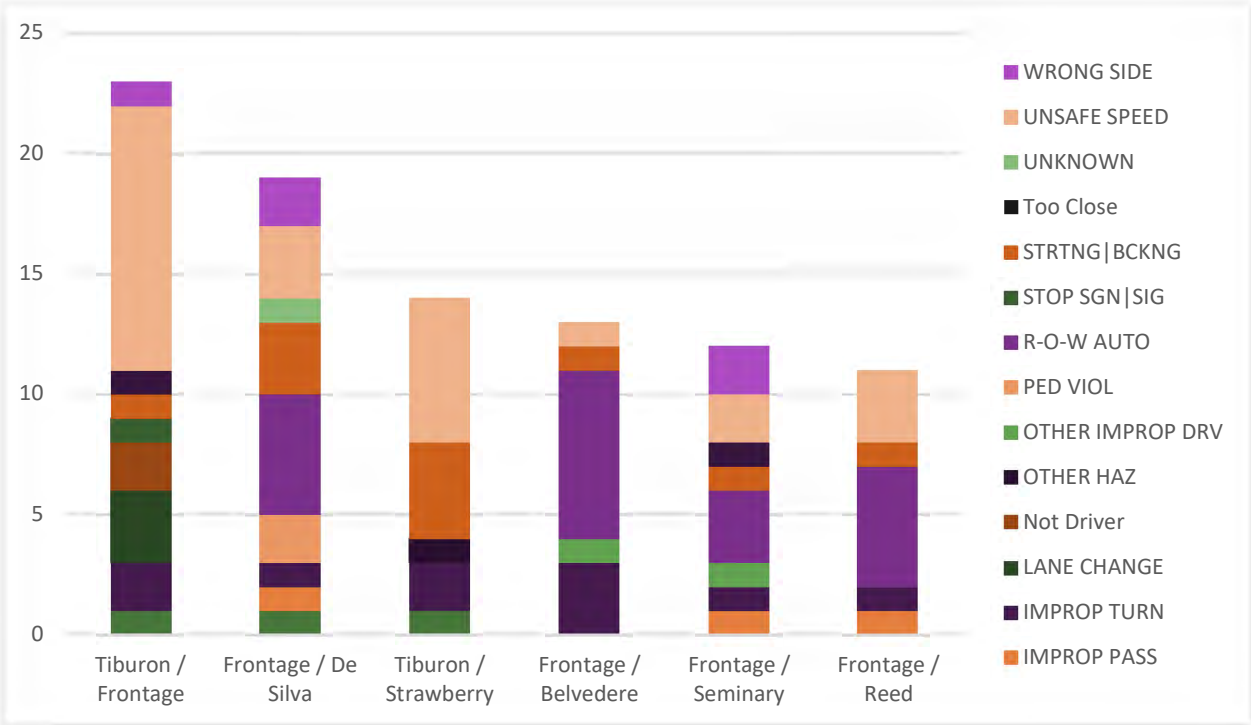
In the five years between 2015-2019, there were 168 collisions identified in the project study area from California SWITRS data. 67% of collisions (113) only involved property damage primarily to vehicles while 33% (55) resulted in injury to vehicle occupants (45), pedestrians (3), or bicyclists (7).

A review of crash data from 2015-2019 reveals that certain intersections in the study area are more prone to collisions and injuries than others. **Table 3** below provides details for all intersections with more than two collisions over that five-year period.

Table 3: Study Area Collision Data

Intersection	Collisions	w/Injury	Primary Collision Factor
Tiburon Blvd (SR-131) / Redwood Hwy Frontage Rd	23	7 (30%)	11 Unsafe Speed (48%)
Redwood Hwy Frontage Rd / De Silva Island	19	8 (42%)	5 R-O-W Auto (26%)
Tiburon Blvd (SR-131) / E Strawberry Dr	14	8 (57%)	6 Unsafe Speed (43%)
Redwood Hwy Frontage Rd / Belvedere Dr	13	1 (8%)	7 R-O-W Auto (54%)
Redwood Hwy Frontage Rd / Seminary Dr	12	2 (17%)	3 R-O-W Auto (25%)
Redwood Hwy Frontage Rd / Reed Blvd	11	3 (27%)	5 R-O-W Auto (27%)
E Strawberry Dr / Belvedere Dr	6	3 (50%)	2 Improper Turn, R-O-W Auto (33%)
Tiburon Blvd (SR-131) / Knoll Ln	6	1 (17%)	3 Unsafe Speed (50%)
Reed Blvd / Belvedere Dr	5	3 (60%)	2 Improper Pass (40%)
E Strawberry Dr / Strawberry Dr	5	2 (40%)	Various
E Strawberry Dr / Harbor Cove	4	1 (25%)	2 Improper Turn (50%)
Redwood Hwy Frontage Rd / US-101	4	1 (25%)	Various
E Strawberry Dr / Cassidy Ln	3	1 (33%)	Various
Reed Blvd / Knoll Ln	3	1 (33%)	2 Improper Turn (67%)
Tiburon Blvd (SR-131) / US-101	3	2 (67%)	2 Unsafe Speed (67%)
Ricardo Rd / Richardson Dr	3	0 (0%)	Various
Seminary Dr / Hodges Dr	3	0 (0%)	Various

Across all crashes, the most prominent collision factor was Unsafe Speed (41 out of the 168 total), followed by R-O-W Auto (28) and Improper Turn (27). A total of 17 collisions (10.1%) involved drivers under the influence of drugs or alcohol. The chart below shows the distribution of collision factors for the most crash-prone intersections.



Other relevant statistics from the collision data include the following:

- 120/168 (71%) of collisions occurred during the daytime
- 41/168 (24%) of collisions involved a parked vehicle or other fixed object
    - Two collisions involved an animal
- 54 (32%) collisions were rear-ends, 41 (24%) were sideswipes, and 30 (18%) were broadside collisions
    - Six collisions were head-on and two involved an overturned vehicle

Figure 1: Existing Street System



Figure 2: Pedestrian Facilities

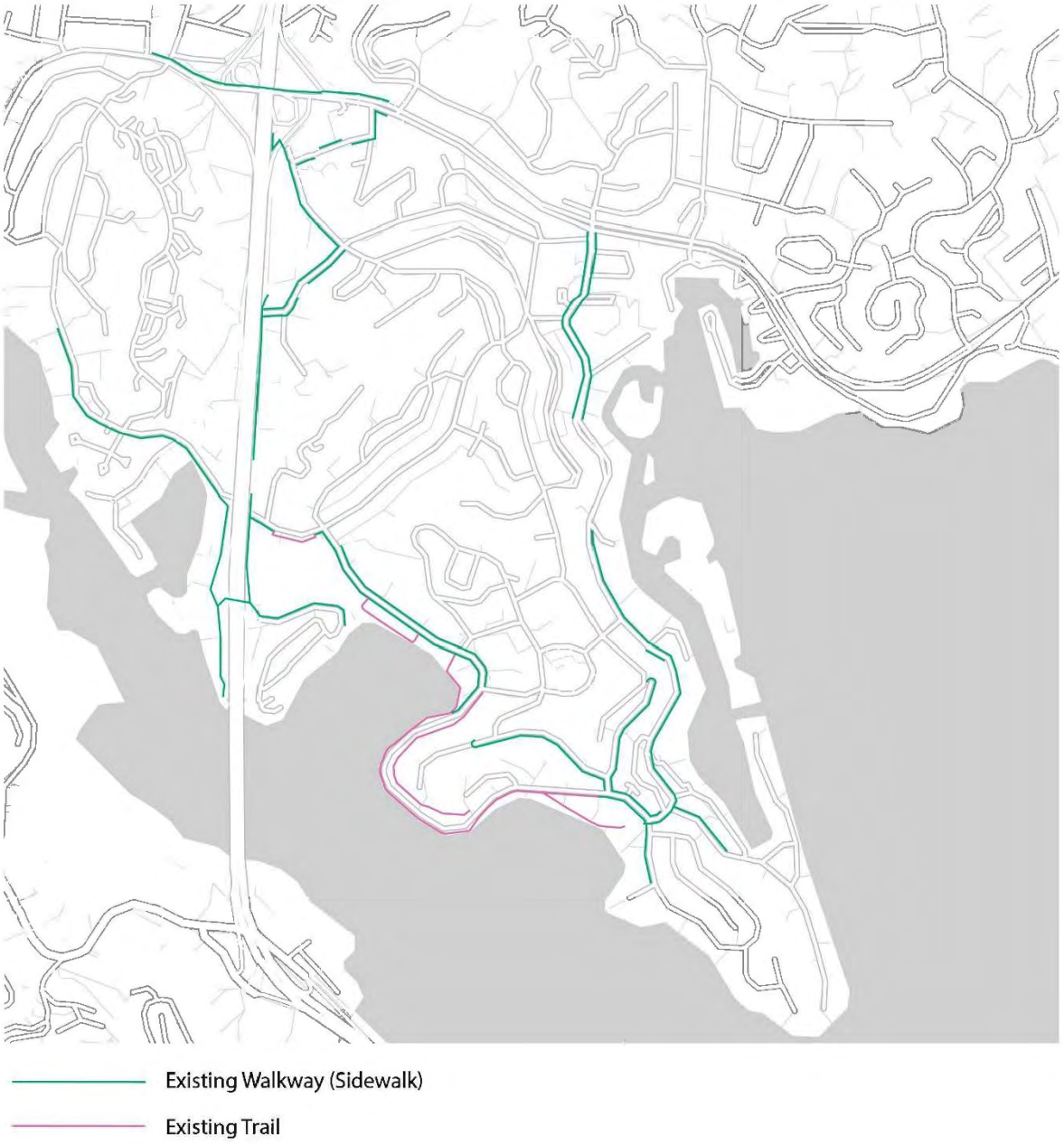


Figure 3: Bicycle Facilities

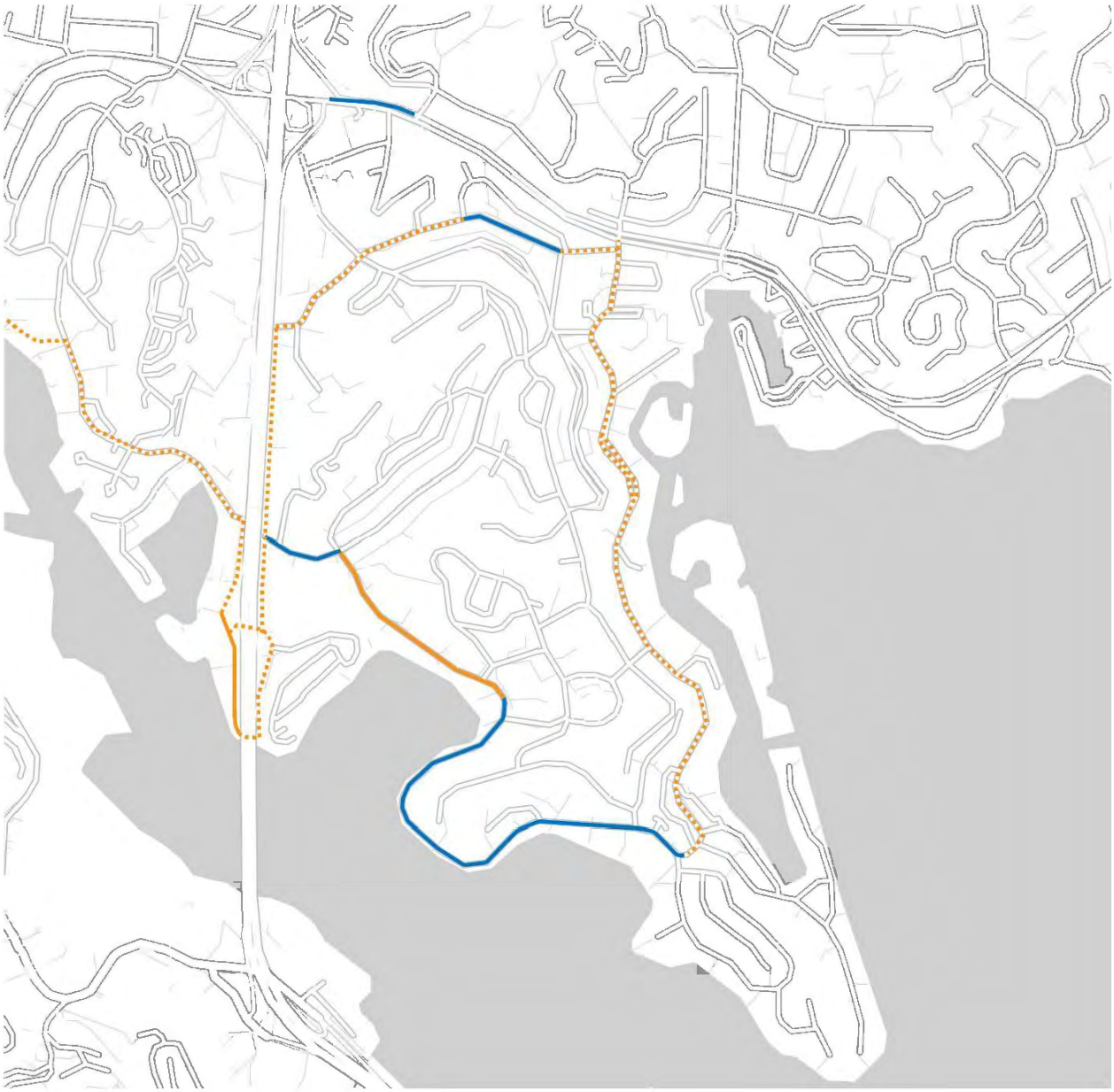
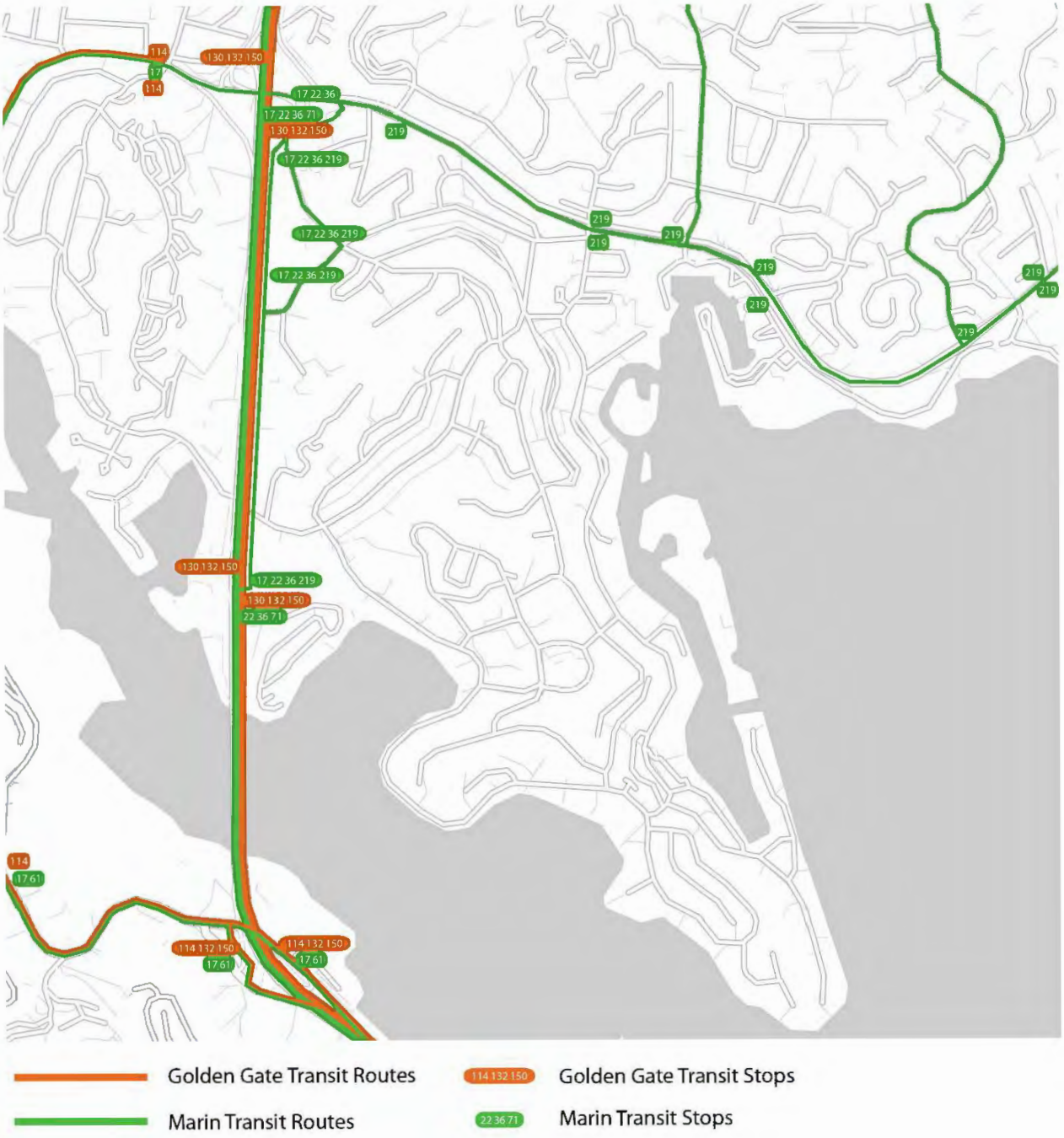


Figure 4: Existing Transit Facilities and Network



III. METHODOLOGY

Analysis Scenarios

The transportation modeling and analysis was conducted for the following scenarios.

- Existing Conditions – existing setting based on traffic counts collected in December 2021. This scenario serves as the baseline or point of comparison for environmental impact significance determinations related to the proposed project.
- 2040 No Project – conditions with 2040 land use forecasts and transportation infrastructure assumptions for Unincorporated Marin County based on Plan Bay Area 2040 as developed by MTC.
- 2040 Plus Project – conditions with 2040 land use forecasts and transportation infrastructure assumptions for the proposed project.

2040 No Project Transportation System

The following roadway improvements or transportation programs, as provided by Transportation Authority of Marin (TAM) staff, are incorporated in the 2040 No Project scenario.

- Minor Highway Improvements – Highway Interchange Improvements, Bicycle/Pedestrian Crossings, and Auxiliary Lanes
- Minor Roadway Projects – Highway Safety Improvement Program (HSIP) Projects and Sea Level Rise Improvements
- Minor Transit Improvements – Fleet expansion/facilities, Access to Transit, and Transit Service Expansion
- New Bicycle & Pedestrian Facilities including North South Greenway Projects, SMART Multi Use Path, Cross Marin Bikeway, Approaches to Richmond San Rafael Bridge, Safe Pathways Projects, Small Safety Projects, and Safe Route to Transit Projects
- Management Systems – Ramp Metering Phase 1 & 2, and Innovative Technology
- Safety and Security – Safe Routes to School Program and Crossing Guard Program
- Travel Demand Management – TDM Program, Alternative Fuels Program, and Traveler Information Programs
- Multimodal Streetscape Improvements – Local Road Improvements

Project Trip Generation

The purpose of the vehicular trip generation estimate is to approximate the number of new vehicle trips entering and exiting the site for various purposes (e.g., residential, employee, student, and visitor trips) during a selected time period. The proposed Project will contain a mix of land uses including a new

daycare and fitness center, new residential care facility, upgrades to existing housing and construction of new housing, and renovation of academic campus buildings. **Table 4** presents the buildout development program as of July, 2025.

Table 4: Project Land Use Program

Land Use	Units	Total
Day Care Center	Square Feet / Children	3,000 / 60
Fitness Center	Square Feet	17,000
Residential Care Facility	Square Feet / Residents	267,354 / 170
Assisted Living and Memory Care Residences	Units / Residents	50 / 40
Independent Living Residences	Units / Residents	100 / 130
Academic Campus	Students / Faculty & Staff	1,000 / 240
Residential – Single Family Units	Dwelling Units (DU)	11
Residential – Multi-Family Units (market)	Dwelling Units (DU)	255
Residential – Multi-Family Units (affordable)	Dwelling Units (DU)	70

Source: Ascent Environmental, 2022.

Trip Generation Methodology

The project site is currently occupied by academic and residential uses. The trip generation assessment identifies the total number of external vehicle trips generated by the project site at build-out as well as the net number of trips generated by subtracting the number of trips generated by project build-out from trips generated by existing uses. The trip generation assessment also considers internal trip making between the academic uses, residential uses, day care, and fitness center. Because the project description does not include dedicated housing for the academic campus, the build-out trip generation assessment is based on traditional travel relationships between the adjacent uses.

Current accepted methodologies, such as the Institute of Transportation Engineers' (ITE) *Trip Generation* methodology, are primarily based on data collected at suburban, single-use, freestanding sites. These defining characteristics limit their applicability to mixed-use or multi-use development projects, such as this project, which, given its land use mix, design features, and setting, would include characteristics that influence travel behavior differently from typical single-use suburban developments. Thus, traditional data and methodologies, such as ITE, would not accurately estimate the project vehicle trip generation.

In response to the limitations in the ITE methodology, and to provide a straightforward and empirically validated method of estimating vehicle trip generation at mixed-use developments, the US Environmental Protection Agency (EPA) sponsored a national study of trip generation characteristics of multi-use sites. Travel survey data was gathered from 239 mixed-use developments (MXDs) in six major metropolitan regions and correlated with characteristics of the sites and their surroundings. The findings indicate that the amount of external traffic generated is affected by a wide variety of factors including the mix of employment and residents, the overall size and density of the development, the internal connectivity for walking or

driving among land uses, the availability of transit service, and the surrounding trip destinations within the immediate area outside the project site.

These characteristics were related to trip behavior observed at the study development sites using statistical techniques. These statistical relationships produced equations, known as the EPA MXD model, which allow predicting external vehicle trip reduction as a function of the MXD characteristics. Applying external vehicle trip reduction percentage to "raw trips," as predicted by ITE, produces an estimate for the number of vehicle trips traveling into or out of the site.

The MXD model has been approved for use by the EPA.[3] It has also been peer-reviewed in the ASCE Journal of Urban Planning and Development,[4] peer-reviewed in a 2012 TRB paper evaluating various smart growth trip generation methodologies,[5] recommended by SANDAG for use on mixed-use smart growth developments,[6] promoted in an American Planning Association (APA) Planning Advisory Service (PAS)[7] which recommended it for evaluating traffic generation of mixed-use and other forms of smart growth. It has also been used successfully in multiple certified EIRs in California.

Internal Capture

Internal trips are responsible for an 8% reduction of daily external vehicle trips, a 16% reduction of AM peak hour external vehicle trips, and a 17% reduction of PM peak hour external vehicle trips. Some examples of an internal trip would be a parent living in one of the project dwelling units dropping off a student at the day care center, a person living in one of the project dwelling units working at or attending classes at the campus, or a student exercising at the fitness center. Some of these trips would potentially still occur by vehicle, though they would remain internal to the larger project site.

Project Trip Generation

Input values were collected for the MXD model for use in application on the project trip generation. The MXD model uses internal project information such as land use mix, project area, intersection density, and transit stop placement as well as local and regional demographic data such as average household size and

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[3] Trip Generation Tool for Mixed-Use Developments (2012). www.epa.gov/dced/mxd_tripgeneration.html

[4] "Traffic Generated by Mixed-Use Developments—Six-Region Study Using Consistent Built Environmental Measures." Journal of Urban Planning and Development, 137(3), 248–261.

[5] Shafizadeh, Kevan et al. "Evaluation of the Operation and Accuracy of Available Smart Growth Trip Generation Methodologies for Use in California." Presented at 91st Annual Meeting of the Transportation Research Board, Washington, D.C., 2012.

[6] SANDAG Smart Growth Trip Generation and Parking Study. http://www.sandag.org/index.asp?projectid=378&fuseaction=projects.detail

[7] Walters, Jerry et al. "Getting Trip Generation Right – Eliminating the Bias Against Mixed Use Development." American Planning Association. May 2013.

vehicle ownership, employment within one mile of the site, and employment within a 30-minute transit trip.

In addition, the MXD model was used to estimate the total number of trips generated by the existing land uses, which include a day care center, 145 residential dwelling units, and a 66-bed dormitory, and the existing academic campus. The total net trip generation for the project consists of the MXD estimated project trips minus the MXD estimated existing trips.

Table 5 summarizes the estimated trip generation for the project using the MXD methodology for a typical weekday. As shown in Table 5, the project is estimated to generate 2,570 net new daily vehicle trips, with 178 net new trips during the AM peak hour, and 226 net new trips during the PM peak hour.

Table 5: Project Trip Generation

Land Use	Units	ITE Code	Daily Trips	Weekday Am Peak Hour			Weekday Pm Peak Hour		
				In	Out	Total	In	Out	Total
Build-out Trips Generated by Project Site									
Day Care Center	3 ksf	565	245	25	22	47	22	25	47
Fitness Center	17 ksf	495	490	21	11	32	35	40	75
Residential Care Facility									
Assisted Living/Memory Care Residences	50 units	254	130	5	4	9	5	7	12
Independent Living Residences	100 units	255	247	10	5	15	7	12	19
Academic Campus	1,000 students	550	1,560	117	33	150	48	102	150
Residential – Single Family Units	11	210	104	2	6	8	6	4	10
Residential – Multi-Family Units (market)	255	220	1,719	24	78	102	82	48	130
Residential – Multi-Family Units (affordable)	70	223	337	7	18	25	19	13	32
Total Gross Project Trips (Build-out)			**4,832**	**211**	**177**	**388**	**224**	**251**	**475**
Build-out Reductions									
Internal Capture			(396)	(34)	(28)	(62)	(38)	(42)	(80)
External (Walk, Bike, and Transit)			(198)	(8)	(7)	(15)	(6)	(8)	(14)
Build-out External Trip Reduction			**(594)**	**(42)**	**(35)**	**(77)**	**(44)**	**(50)**	**(94)**
Existing Trips Generated by Project Site									
Day Care Center	3 ksf	565	245	25	22	47	22	25	47
Academic Campus	100 students	550	156	12	3	15	5	10	15
Residential – Single Family Units	3 units	210	28	1	1	2	2	1	3
Residential – Multi-Family Units	142 units	220	986	16	51	67	52	30	82
Residential – Student Dormitory	66 rooms	223	408	7	12	19	14	14	27
Total Gross Project Trips (Existing)			**1,823**	**61**	**89**	**150**	**95**	**80**	**174**
Existing Reductions									
Internal Capture			(100)	(5)	(7)	(12)	(8)	(6)	(14)
External (Walk, Bike, and Transit)			(55)	(2)	(3)	(5)	(3)	(2)	(5)
Existing External Trip Reduction			**(155)**	**(7)**	**(10)**	**(17)**	**(11)**	**(8)**	**(19)**
EXTERNAL PROJECT TRIPS			**4,238**	**169**	**142**	**311**	**180**	**201**	**381**
NET NEW PROJECT TRIPS			**2,570**	**115**	**63**	**178**	**96**	**129**	**226**

Source: Fehr & Peers, Institute of Transportation Engineers Trip Generation (11th Edition), US EPA MXD Model.

Project Parking Generation

The required parking supply for development projects in Marin County is specified in Section 24.04.340 of the Marin County Municipal Code. The municipal code specifies parking requirements for the residential components of the project but does not provide parking requirements for a college campus. According to the municipal code, the project is required to provide a total of 695 parking spaces for the proposed residential uses[8] as updated effective August 2025, which would be accommodated by the proposal to provide 703 parking spaces. To supplement the above information on required parking supply per County municipal code, because the municipal codes does not include parking requirements for a college campus, the following is an assessment of estimated parking demand levels for the proposed project uses.

The purpose of the parking generation estimate is to approximate the peak parking demand levels for various purposes (e.g., residential, employee, student, and visitor trips) for a typical weekday. Parking demand levels are estimated based on peak parking rates identified in ITE *Parking Generation* manuals that are based on surveys conducted for individual land use categories throughout the US. This assessment does not assume shared parking of facilities between the residential and academic campus areas. **Table 6** summarizes the estimated build-out parking demand for the project for a typical weekday.

Table 6: Project Peak Weekday Parking Demand

Land Use	ITE Land Use Code	ITE Edition	Units	Total	Parking Rate	Parking Demand
Day Care Center	565	5th	KSF	3	2.45	7
Fitness Center	492	5th	KSF	17	4.73	80
Assisted Living	254	5th	UNITS	50	0.4	20
Independent Living	253	5th	UNITS	100	0.3	30
Academic Campus	550	5th	TOTAL POP	1240	0.28	347
Residential – Single Family	210	4th	UNITS	11	1.83	20
Residential – Multi-Family	221	5th	UNITS	255	1.31	334
Residential – Affordable	223	5th	UNITS	70	0.99	69
					TOTAL	**907**

Source: ITE Parking Generation (5th and 4th Editions); Fehr & Peers.
Notes: KSF=1,000 square feet; TOTAL POP=campus students, faculty, and staff.

The parking demand estimate of 907 spaces represents the number of parked vehicles during a weekday peak period. The desired parking supply is based on providing additional parking such that occupancy

[8] The project is proposed to provide an average of approximately 2.2 bedrooms per affordable housing unit. The exact number of bedrooms would be described in the final Affordable Housing Plan at the time of the County's merits review of the project.

levels do not exceed a threshold such as 90%. Application of a 90% threshold would result in a total parking supply of about 1,008 parking spaces at build-out. This includes about 370 parking spaces for the 255 multi-family residential units, 385 parking spaces for the academic campus, 90 parking spaces for the fitness center, and 77 parking spaces for the affordable multi-family residential units.

VMT Forecasts

This section describes the methodology for VMT forecasts developed for this transportation assessment and as supporting data for other assessments in the CEQA document including the GHG assessment. The new CEQA Guidelines Section 15064.3(b)(4) establishes that the lead agency has discretion to choose the most appropriate methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household or in any other measure. A lead agency may use models to estimate a project's vehicle miles traveled and may revise those estimates to reflect professional judgment based on substantial evidence.

The VMT forecasts generated for this CEQA assessment were produced using the Transportation Authority of Marin Demand Model (TAMDM). For this CEQA assessment, the 2015 base year for TAMDM was updated and validated for a new 2019 base year for the City of San Rafael General Plan Update. A key reason for applying the updated 2019 base year is that it includes the SMART rail system that was not in place in 2015. This analysis includes a 2040 No Project scenario that is based on the TAMDM horizon year and reflects land use changes and transportation improvements consistent with the San Rafael General Plan 2040 adopted in 2021. The 2019 base year model developed for the San Rafael General Plan Update was validated based on model confidence thresholds defined in the California Transportation Commission 2017 RTP guidelines.

For this project, the network and land use inputs for the study area for the model's 2019 base year were reviewed and enhanced to provide the level of detail necessary for the study. A model validation was performed for the study sub-area and model validation measures in the RTP guidelines were met for the 2019 base year for 73 study road segments in the study area as shown in **Table 7** below.

The VMT estimates were produced using the updated 2019 TAMDM model for all 1,400 analysis zones within Marin County as well as for the entire Bay Area.

Table 7: Project Study Area Model Validation Results (2017 California RTP Guidelines)

Validation Measure	AM Peak Period (4-Hour)	PM Peak Period (4-Hour)	Daily	Threshold
Volume-to-Count Ratio (Sum of all locations)[1] =	0.96	1.07	0.98	None specified[2]
Percent of Links within Caltrans Deviation Allowance[1] =	79.5%	75.3%	79.5%	At Least 75%
Percent Root Mean Square Error (RMSE)[1] =	30.5%	23.0%	19.3%	Below 40%
Correlation Coefficient[1] =	0.98	0.99	0.99	At Least 0.88
Number of Links/Validation Locations =	73	73	73	

Source: Fehr & Peers.
Notes:
1. Static Validation Criteria and Thresholds, 2017 California Regional Transportation Plan Guidelines, California Transportation Commission.
2. Although no specific threshold is specified, a threshold of "within 10%" of the sum of all locations was applied.

Standards of Significance

The general standard applied for determining transportation impacts is whether a project conflicts with or is inconsistent with CEQA Guidelines Section 15064.3(b) which provides the criteria for analyzing transportation impacts. For land use projects, this involves assessing whether VMT exceeds an applicable threshold of significance.

Vehicle Miles Traveled (VMT)

CEQA Guidelines section 15064.3, subdivision (b) identifies criteria for analyzing transportation impacts. For land use projects, the section indicates that vehicle miles traveled (VMT) exceeding an applicable threshold of significance may indicate a significant impact. The section indicates that projects that decrease VMT in a project area compared to existing conditions should be presumed to have a less than significant transportation impact. The section also indicates that projects within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor should generally be presumed to cause a less than significant transportation impact.

CEQA section 15064.3 (b) also indicates that a lead agency has discretion to choose the most appropriate methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household or in any other measure. A lead agency may use models to estimate a project's vehicle miles traveled and may revise those estimates to reflect professional judgment based on substantial evidence.

Marin County has not adopted CEQA thresholds of significance to determine the significance of transportation impacts of projects for VMT. As such, the VMT thresholds applied for this project are ad hoc VMT thresholds developed in consultation with Marin County staff based on goals and policies in the Marin Countywide Plan and informed by state and regional efforts.

The Marin Countywide Plan includes the following relevant goals and policy statements for VMT in the Transportation and Circulation Element.

- **TR-1.8: Reduce Vehicle Miles Traveled (VMT)**. Reduce the rate of increase for total vehicle miles traveled by single-occupant automobile to not exceed the population growth rate.

The Countywide Plan contains the following Implementation Program regarding vehicle miles traveled (VMT).

- **TR-1.s: VMT Reduction Monitoring and Implementation and Transportation Demand Management Program.** Develop and implement a countywide program for monitoring and reducing VMT consistent with state and regional efforts and based on information from state and regional planning agencies. Identify and require in new developments specific transportation demand management (TDM) strategies for reducing the VMT below levels that would otherwise occur. Consider the following types of strategies for inclusion in the VMT Reduction Monitoring and Implementation and Transportation Demand Management Program:

- Increased transit.
- All new residential projects consisting of 25 units or more should be located within 1/2 mile of a transit node, shuttle service, or bus route with regularly scheduled, daily service.
- New multi-family projects consisting of 25 units or more should include TDM measures, such as reduced parking for affordable or senior projects, subsidized public transportation passes, or ride-matching programs, based on site-specific review. For market-rate projects, consider TDM programs such as charging parking fees separate from rent.
- Safe, convenient connections should be provided to existing pedestrian and bicycle facilities, and secure bicycle parking should be provided in new non-residential developments.
- TDM should be required for new or expanded projects with 50 employees or more, including programs such as parking cash out, subsidized transit passes, ride-sharing incentives, and bicycle storage facilities.

The policies and programs identified in the Countywide Plan call for reducing the rate of VMT increase and implementation of a countywide program for monitoring and reducing VMT consistent with state and regional efforts and based on information from state and regional planning agencies. To help lead agencies with implementation of updated CEQA guidelines related to analyzing transportation impacts, the Governor's Office of Planning and Research (OPR) provides advice and recommendations in a *Technical Advisory*.[9] The 2018 OPR Technical Advisory indicates that "achieving a 15 percent lower per capita (residential) or per employee (office) VMT than existing development is both generally achievable and is supported by evidence that connects this level of reduction to the State's emissions goals". The 15 percent threshold was originally tied to the 2017 Scoping Plan prepared by the California Air Resources Board (ARB). That plan was updated by ARB in 2022 and now contains a 30 percent below 2019 level recommendation for statewide VMT to achieve the state's goal of carbon neutrality by 2045. The ad hoc VMT threshold applied for this assessment is 30 percent below 2019 VMT levels and evaluates the project's change in vehicle miles traveled on a per capita basis.

For mixed-use projects, the 2018 OPR Technical Advisory advises that lead agencies can evaluate each component of a mixed-use project independently and apply the significance threshold for each project type included (e.g., residential and retail). Because the project description does not include a permanent dedication of project housing for campus students or employees, VMT impacts for this project are determined separately for the residential uses and the academic campus uses.

For the assessment of residential uses, VMT impacts would be significant if the project exceeds the following threshold:

- Home-based VMT per resident exceeds 30% below average 2019 rate for full nine-county Bay Area.

[9] Governor's Office of Planning and Research, *Technical Advisory on Evaluating Transportation Impacts in CEQA*, 2018.

Neither the Marin Countywide Plan nor the 2018 OPR Technical Advisory provides guidance on developing a VMT significance threshold for academic campuses. Development of a VMT threshold for the academic campus use considered the intent of the Countywide Plan, CEQA Guidelines, and OPR guidance. The VMT significance threshold also considered thresholds applied for previous CEQA VMT assessments of land use projects by University of California (UC) and California State University (CSU) campuses. While the methodology and thresholds varied depending on the context of the land use project being evaluated, a common approach for UC and CSU campuses is that the proposed project VMT per service population (i.e., total students, faculty, and staff) rate was compared to a value of 15 percent below baseline conditions, which in most cases was the current campus VMT per service population rate but in a few cases were the overall regional or citywide VMT per service population rate. The 15 percent value was based on the OPR Technical Advisory that was relevant at the time of those studies. The VMT threshold applied for the proposed academic campus uses involves comparing the total VMT per service population for build-out of the proposed campus uses to the VMT per service population of existing campus uses and updating the threshold value to be consistent with the most current ARB VMT reduction recommendations.

For the assessment of academic campus uses, VMT impacts would be significant if the project exceeds the following threshold:

- Total Planned Campus VMT per service population (i.e., students, faculty, and staff) exceeds 30% below the 2019 Campus VMT per service population.

Bicycle/Pedestrian

Bicycle/pedestrian impacts would be significant if the project:

- Would conflict with a program, plan, ordinance, or policy addressing bicycle and pedestrian facilities
- Does not include provisions for pedestrian and bicycle circulation and bicycle and motorcycle parking and security

Transit

Transit impacts would be significant if the project:

- Would conflict with a program, plan, ordinance, or policy addressing transit services or facilities

Site Circulation

Site circulation impacts would be significant if the project:

- Conflicts with a program, project, ordinance, or policy addressing the circulation system
- Does not have adequate parking or internal circulation capacity to accommodate projected traffic so that off-site areas are not adversely impacted

Emergency Vehicle Access

Emergency access impacts would be significant if the project:

- Results in inadequate emergency access

Transportation Safety

Safety impacts would be significant if the project:

- Would substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

IV. IMPACT ASSESSMENT

The section addresses potential transportation impacts related to vehicle miles traveled (VMT), pedestrian facilities, bicycle facilities, transit services, site circulation, emergency vehicle access, cumulative VMT, and construction traffic.

Vehicle Miles Traveled

IMPACT TRAN-1 Implementation of the proposed project would generate an increase in vehicle miles traveled (VMT) that may have a significant impact on the environment.

Implementation of the proposed project by 2040 would result in a total of up to about 850 residents (i.e., 680 residents of the 336 single family and multi-family units, 170 new residents for the residential care facility), 1,000 students, and 310 employees (240 campus employees, 36 new employees for the residential care facility, and 34 new employees for the fitness center).

The following impact assessment separately evaluates VMT impacts for the residential uses (single family, multi-family, and residential care facility residents) and the campus (students, faculty, and staff).

Existing plus Project VMT for Residential Uses

For this assessment of Existing plus Project VMT for residential uses, the 2015 baseline version and 2019 forecast year of the TAMDM countywide travel demand model were not applied to estimate existing plus project VMT for residential uses because travel conditions for residential uses have changed since 2015 due to a number of factors, most notably the effects of the Covid Pandemic and shifts in travel patterns including a significant increase in work from home levels, reduced commuting, and increased local travel. A "post-Covid" version of the TAMDM model is not currently available.

In recent years, big data companies have expanded their capabilities and are able to estimate vehicle trip rates and vehicle trip lengths for residents that can be used to estimate VMT per capita for discrete areas. Recent post-Covid data from these big data companies more accurately represents actual travel activity occurring today than the 2015 horizon year of the TAMDM model as it is based on contemporary data collected from a large database of mobile devices over the course of a year and the VMT rates are calculated based on trips from start to finish with no boundaries. Fehr & Peers developed specifications and obtained data from big data provider StreetLight, and subsequently developed VMT per capita estimates for residential uses by Census Block Group. StreetLight uses a large database of location-based service (LBS) data from GPS enabled devices and connected vehicle data to provide anonymized vehicle trip rate and vehicle trip length data by census block group for designated time periods by trip purpose and type of traveler. This data is available for 2019 and 2022.

The 2019 VMT per capita estimates are used to identify the baseline and applicable threshold, which is 30 percent below the regional average for 2019. The 2022 VMT per capita estimates were evaluated for four

census block groups that include the project site to identify estimates of project Home VMT per capita, as future residents of the proposed project housing are anticipated to have similar VMT per capita rates as existing residents in the surrounding neighborhoods. The following VMT per capita rates were identified.

- Existing plus Project Average Home VMT per capita (2022 data): 19.1
- Regional Average Home VMT per capita (2019 data): 19.6
- Threshold: 30 percent below Regional Average VMT per capita (2019 data): 13.7

The Existing plus Project Average Home-Based VMT per capita is estimated to be 19.1, which is 39 percent higher than the regional VMT threshold of 13.7.

IMPACT 1a – VMT for Residential Uses

The effect of VMT generated by the proposed residential uses, under Existing plus Project conditions, is considered a **significant impact** as the Home-Based VMT per capita for the residential units would not be 30 percent below the regional Home-Based VMT per capita threshold.

Mitigation Measure 1a: TDM Measures. As noted above, the Countywide Plan contains Implementation Program **TR-1.*s*: VMT Reduction Monitoring and Implementation and Transportation Demand Management Program** regarding vehicle miles traveled (VMT). The implementation program requires that the County develop and implement a VMT Reduction Monitoring and Implementation and Transportation Demand Management Program (TDM). This policy indicates that development of a TDM program is the preferred VMT reduction method for Marin County. A countywide TDM program has not yet been developed. Absent any countywide VMT reduction program, it likely would be infeasible for any new residential project in high VMT generating areas such as the Strawberry community to achieve VMT reductions of more than 30 percent through traditional transit, bike, or walk strategies, especially considering the uncertainty about how work from home (which is resulting in increased non-work vehicle trip making around residential areas) will play out over time.

Based on the remote location of the campus, the high incomes of residents of the market rate units, and the distance to transit stops, it is not anticipated that traditional Transportation Demand Management (TDM) measures to encourage increased use of transit, bicycle or pedestrian travel to the campus would be effective in significantly reducing VMT. The establishment of a dedicated level of remote course work and office hours may reduce VMT depending on how schedules are structured. It is anticipated that the most effective VMT reduction measure would be a permanent dedication of a substantial share of the market rate housing units for campus faculty and staff.

Prior to the issuance of the first building permit in the first phase of development, the project applicant shall develop a Transportation Demand Management (TDM) program for the proposed market residential units, including any anticipated phasing, and shall submit the TDM program to the County Planning Department for review and approval. The TDM program shall achieve a 39% reduction in weekday home-

based VMT per resident generated by the proposed market single family and multi-family residential uses to reduce impacts to a less-than-significant level.

The project applicant shall be responsible for preparing and implementing the TDM Program. The project applicant shall be responsible for funding and overseeing the delivery of trip reduction/TDM proposed programs and strategies to achieve the maximum feasible trip reduction as determined in collaboration with County staff, which may include, but are not limited to, the following:

1. Permanent dedication of market residential units for use by academic campus employees or students;
2. Dedicated shuttle for residents of market units and/or academic campus employees and/or students;
3. Establishment of carpool, buspool, or vanpool programs in coordination with Marin Transit;
4. Vanpool purchase incentives;
5. Cash allowances, passes or other public transit subsidies and purchase incentives;
6. Parking fees set at levels sufficient to incentivize alternative modes;
7. Full or partial parking subsidies for ride-sharing vehicles;
8. Bicycle programs including bike purchase incentives, storage, maintenance program, and on-site education program;
9. On-site bike share program;
10. Dedicated employee or student housing for adjacent campus;
11. Designation of an on-site transportation coordinator for the project.
12. Coordination with Golden Gate Transit and Marin Transit to increase transit service in the project area.

The project applicant shall be responsible for preparing and submitting annual monitoring reports to the County in order to demonstrate the effectiveness of the approved TDM program.

Even with implementation of Mitigation Measure 1a, because the effectiveness of VMT reduction strategies is not certain, the proposed residential uses may not achieve the overall VMT threshold reduction level. Disruptive changes to transportation such as transportation network companies (i.e., Uber, Lyft), increased delivery services (Amazon, UPS, FedEx, food, etc.), and autonomous vehicles may increase VMT beyond current levels.

Significance after Mitigation: A VMT reduction of 39 percent would be required to reduce Existing plus Project VMT rates to more than 30 percent below the existing regional average. The total estimated VMT reduction for the residential uses with traditional TDM measures is 5 percent, unless a significant level of housing is dedicated employee or student housing for the adjacent campus, based on the surrounding community context for the project. As such, after mitigation, the existing plus project VMT impact would be **Significant and Unavoidable** for the market residential uses.

Existing plus Project VMT for Campus Uses

For this assessment of Existing plus Project VMT for campus uses, a 2019 version of the TAMDM countywide travel demand model was applied to estimate existing plus project VMT per service population (i.e., faculty, staff, and students). Given the small size of the existing campus and the remote nature of classes in recent years, as well as the fact that mobile device travel data from providers such as Streetlight is aggregated to zones and not available at the parcel level for privacy reasons, this data cannot be used to estimate VMT for this project.

Table 8 provides a summary of the VMT forecasts for the campus elements of the proposed project including the fitness center and day care center uses. OPR does not provide a VMT threshold for university campuses. For the purposes of this assessment, Total VMT forecasts are prepared for both the existing campus and future campus. The Total VMT forecasts are then divided by the service population (i.e., students, faculty, and staff) to develop a VMT per capita value. The campus uses would be considered to result in a significant VMT impact if the Existing plus Project campus VMT per capita exceeds a level of 30% below the existing campus VMT per capita. The VMT forecasts indicate that the proposed campus uses would result in an Existing plus Project VMT per service population that is 30% below the VMT per service population for existing campus uses.

Table 8: Daily Vehicle Miles Traveled (VMT) for Campus Uses

Scenario	Total Campus VMT	Total Campus VMT Per Service Population
BASELINE (2019)	1,688	13.61
EXISTING PLUS PROJECT	11,883	9.58
PERCENT CHANGE – 2040 Plus Total VMT for Campus Uses per Service Population Rate Compared to Baseline (2019) Rate for Existing Campus Uses		
EXISTING PLUS PROJECT		-30%

Notes:
1. Service population = campus students, faculty, and staff. The current estimated service population for campus uses is 124 and the proposed population for campus uses would be 1,240 at build-out.

Source: Fehr & Peers.

IMPACT 1b – VMT for Campus Uses

The effect of VMT generated by the proposed campus uses, under Existing plus Project conditions, is considered a **less-than-significant impact**.

Pedestrian

IMPACT TRAN-2 Implementation of the proposed project would not result in potential conflicts with adopted policies, plans or programs regarding pedestrian facilities that may have a significant impact on the environment.

The current project site has pedestrian paths that link buildings within the academic campus area, between the academic campus and the adjacent dormitory hill area, and between parking lots and adjacent multi-family residential units. There are no sidewalks along the internal project streets, which range from about 20 to 30 feet in width.

Goal 1 of the Marin County Bicycle and Pedestrian Master Plan is to expand bicycle and pedestrian facilities and access in and between neighborhoods, employment centers, shopping areas, schools, and recreational sites, in pursuit of the Marin Countywide Plan goal of having 20% of all trips made by walking or biking by 2020 and add a 2030 goal of 25% bicycling and walking mode share. Goal 2 of the Plan is to encourage walking as a daily form of transportation in Marin County by completing a pedestrian network that services short trips and transit.

The proposed project includes the provision of new trails and walkways within the academic campus area as well as within the residential planning areas. New pedestrian facilities would be provided along Gilbert Drive, Hodges Drive, Mission Drive, Shuck Drive, and Storer Drive.

The bus hub located at the US 101/Seminary Drive interchange is a walking distance of about 0.75 miles from the entrance to the project site and about 1.2 miles to the academic campus area. Bus routes serving the Seminary Drive Bus Pad and bus stops at the US 101/Seminary Drive interchange include Marin Transit routes 17 (Downtown San Rafael-Sausalito), 22 (Downtown San Rafael-Marin City), 36 (Canal-Marin City), 71 (Novato-Marin City), and 219 (Tiburon-Strawberry) as well as Golden Gate Transit routes 130 (San Rafael-San Francisco), 132 (San Anselmo-San Francisco), and 150 (San Rafael-San Francisco). There are currently pedestrian facilities between these bus stops along US 101 and the entrance to the project site. The new trails and walkways described above within the project site would provide continuous pedestrian facilities between the US 101 bus hub and the academic campus area as well as new residential units.

A bus stop located on Tiburon Boulevard just east of East Strawberry Drive, about a one mile walk from the academic campus area, is served by Marin Transit 219 (Tiburon-Strawberry). There is no sidewalk on East Strawberry Drive between Harbor Cove Way and Island Drive, a distance of about 0.3 miles. Most of this roadway segment is split level, with the southbound travel lane at a higher elevation than the northbound travel lane, with a shoulder that is used for parking.

Impact TRAN-2: Implementation of the proposed project would not result in conflicts with adopted policies, plans, or programs or otherwise decrease the performance or safety of pedestrian facilities.

Significance without Mitigation: Less than Significant.

Bicycle

IMPACT TRAN-3 Implementation of the proposed project would not result in potential conflicts with adopted policies, plans or programs regarding bicycle facilities that may have a significant impact on the environment.

Relevant transportation goals and policy statements from the Transportation and Circulation Element of the General Plan require new development to provide new bicycle and pedestrian facilities.

A Class II bike lane is currently provided on Seminary Drive between Gilbert Drive and Weatherly Drive. The remainder of Seminary Drive is designated in the Marin County Bicycle and Pedestrian Master Plan as an existing Class III route that is proposed to be a Class II bike lane. The segment of the Redwood Highway Frontage Road on the east side of US 101 is similarly designated in the Bicycle and Pedestrian Master Plan as an existing Class III route that is proposed to be a Class II bike lane. The segment of the Redwood Highway Frontage Road on the west side of US 101 is designated as an existing Class III route from Hamilton Drive to the south. East Strawberry Drive (from Tiburon Boulevard to Weatherly Drive) and Belvedere Drive (from East Strawberry Drive to Redwood Highway Frontage Road) are designated as existing Class III routes. Class II bike lanes are dedicated facilities for bicyclists immediately adjacent to automobile traffic and Class III routes are on-street routes where bicyclists and automobiles share the road. There are currently no markings or signage of the Class III routes in the study area.

The Bicycle and Pedestrian Master Plan shows the following planned bicycle facilities in the study area:

- Class II bike lane on Tiburon Boulevard from US 101 to Trestle Glen Boulevard
- Class II bike lane on the Redwood Highway Frontage Road on the east side of US 101 from Tiburon Boulevard to just south of the signalized intersection of US 101 northbound ramps/De Silva Island Drive
- Class II bike lane on Seminary Drive from the Redwood Highway Frontage Road to Gilbert Drive

As mentioned earlier, Goal 1 of the Marin County Bicycle and Pedestrian Master Plan is to expand bicycle and pedestrian facilities and access in and between neighborhoods, employment centers, shopping areas, schools, and recreational sites. Goal 2 of the Plan is to make the bicycle an integral part of daily life in Marin County, particularly for trips of less than five miles, by implementing and maintaining a bikeway network, providing end-of-trip facilities, improving bicycle/transit integration, encouraging bicycle use, and making bicycling safer and more convenient for people of all ages and abilities. County of Marin staff have indicated that the project will be required to construct bike lanes along the project frontage on Seminary Drive.

The proposed project includes the designation of Class III bike routes on internal streets including Chapel Drive, Gilbert Drive, Hodges Drive, Shuck Drive, Storer Drive and Willis Drive. The most direct route for future campus affiliates or residents wishing to access regional bike facilities would be to travel north along East Strawberry Drive to planned new bike facilities along Tiburon Boulevard or travel west along Seminary Drive to the Redwood Highway Frontage Road to Hamilton Drive to the North-South Greenway.

Impact TRAN-3: Implementation of the proposed project would not result in conflicts with adopted policies, plans, or programs or otherwise decrease the performance or safety of bicycle facilities.

Significance without Mitigation: Less than Significant.

Transit

IMPACT TRAN-4 Implementation of the proposed project would not result in potential conflicts with adopted policies, plans or programs regarding public transit that may have a significant impact on the environment.

The bus hub located at the US 101/Seminary Drive interchange is a walking distance of about 0.75 miles from the entrance to the project site and about 1.2 miles to the academic campus area. Bus routes serving the Seminary Drive Bus Pad and bus stops at the US 101/Seminary Drive interchange include Marin Transit routes 17 (Downtown San Rafael-Sausalito), 22 (Downtown San Rafael-Marin City), 36 (Canal-Marin City), 71 (Novato-Marin City), and 219 (Tiburon-Strawberry) as well as Golden Gate Transit routes 130 (San Rafael-San Francisco), 132 (San Anselmo-San Francisco), and 150 (San Rafael-San Francisco). A bus stop located on Tiburon Boulevard just east of East Strawberry Drive, about a one mile walk from the academic campus area, is served by Marin Transit 219 (Tiburon-Strawberry).

In 2019, 66% of workers living in the Strawberry census designated place drove alone to work, 12.3% worked from home, 8.4% carpooled, 8% took transit, 4.7% walked, and the balance commuted via motorcycle.[10]

Transit agencies throughout the Bay Area have seen substantial declines in ridership due to COVID. The monthly bus ridership for all Golden Gate transit routes was 105,347 in May 2022, about 39% of the pre-COVID ridership level of 270,372 in May 2019. The monthly bus ridership for all Marin transit routes was 229,604 in March 2022, about 85% of the pre-COVID ridership level of 270,669 in March 2019.

Policy TR-3.1 in the Marin Countywide Plan calls for encouraging the expansion and improvement of local bus and ferry services to all areas of the county.

Impact TRAN-4: Implementation of the proposed project would not result in conflicts with adopted policies, plans, or programs or otherwise decrease the performance or safety of transit facilities or services.

Significance without Mitigation: Less than Significant.

[10] *Data USA*, Deloitte, Data Wheel, and Professor Cesar Hidalgo.

Safety

IMPACT TRAN-5 Implementation of the proposed project would substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) that may have a significant impact on the environment..

As detailed in the project description, the project involves renovation of an existing academic campus, relocation of an existing daycare center, construction of a new fitness center and residential care facility, upgrades to existing housing and construction of new housing, retention and access improvements to existing open space and recreation areas, and the provision of new bicycle and pedestrian paths within the project site.

The project would be subject to review by County staff, thus ensuring all Federal and County standards and regulations regarding design, accessibility, and safety would be met. Federal accessibility standards and regulations are identified in ADA and PROWAG guidelines. The project would be required to comply with County of Marin roadway design standards as identified in the Uniform Construction Standards (Marin County 2018a) and Marin County Code (Marin County 2022), including those identified in Chapter 19.05, pertaining to regulations regarding streets improvements abutting building sites, and Title 24 of the Marin County Code, which includes the County's Development Standards. Section 24.04.110 sets forth minimum widths, and Section 24.04.120 sets forth minimum grades for streets. The minimum paved width for a limited residential road is 20 feet with shoulders or 24 feet with curbs. For a minor residential road, the minimum paved road width is 28 feet; for a residential road it is 36 feet; and for a collector road it is 40 feet. Maximum grades are 6 percent for arterial and collector roads, 12 percent for residential roads, and 18 percent for minor and limited residential roads.

Hodges Drive and Gilbert Drive would serve as the main access to Seminary Drive for residential and campus uses, respectively, and would each carry more than 1,000 daily vehicle trips at build-out; thus, both roadways would be classified as collector streets under the Marin County Code (Appendix Q). The streets within the project site range in width from approximately 20 feet to 28 feet without shoulders; thus, the existing roadways do not satisfy the minimum required width for collector and local streets (i.e., 40 feet and 36 feet, respectively).

A total of 608 parking spaces are currently located throughout the project site including 311 residential parking spaces and 297 parking spaces for the academic campus. The project would provide a total of 944 parking spaces in a three-tiered parking lot and in underground garages in residential structures and garages in duplexes. This includes 51 existing residential spaces, 467 spaces for new residential development, 185 spaces for the residential care facility, and 241 spaces for the academic campus. Table 6 in this TIS shows that a total of 907 parking stalls would be necessary to meet demand during a typical weekday. Based on Marin County Municipal Code parking requirements as well as the estimated parking demand based on ITE parking rates, the parking provided for residential uses would be adequate. However, the 241 parking spaces for the academic campus would not be sufficient to meet demand at build-out, thus resulting in a secondary impact would occur caused by overflow parking potentially

impacting emergency vehicle access and impacting cyclists using on-street bike lanes that could be blocked illegally by parked campus vehicles. An additional 144 parking spaces would be required to meet the estimated demand for the academic campus. Approximately 60 percent of the proposed academic campus build-out could be accommodated with the proposed parking supply.

Given the location of academic uses on the eastern end of the project site, the most likely location for spillover parking to occur would be on the west side of East Strawberry Drive, both north and south of Herring Drive. The shoulder on the west side of East Strawberry Drive along this segment is about seven feet wide, which is sufficient for a parked vehicle; however, there is no sidewalk on the west side of East Strawberry Drive in this area. Students or employees parking on this portion of East Strawberry Drive would either walk in the southbound travel lane or cross the street twice to use the sidewalk on the east side of the roadway, creating potential conflicts between pedestrians and vehicles. Therefore, because some of the internal roadways would not meet County roadway width requirements and the project would not supply the necessary number of parking spaces to avoid parking spillover, the project could potentially result in a substantial increase in transportation hazards related to operations.

Impact TRAN-5: Implementation of the proposed project would substantially increase hazards due to a geometric design feature that would result in a significant impact.

Streets within the project site do not meet County design standards regarding roadway widths and may not meet ADA or PROWAG accessibility guidelines. As planned, the project would not provide adequate parking supply for the academic campus, which could result in parking spill over on surrounding streets where sidewalks and crosswalks do not exist; thus resulting in potential conflicts between pedestrians and vehicles. For these reasons, the project could substantially increase hazards due to a geometric design feature or incompatible uses. Therefore, this impact would be **potentially significant.**

> **Mitigation Measure 5a: Meet ADA and PROWAG guidelines for transportation accessibility. Widen Hodges Drive and Gilbert Drive to Meet County of Marin Roadway Standards** The project applicant shall provide roadway, parking, and pedestrian facilities that meet ADA and PROWAG guidelines. The project applicant shall incorporate into the project the widening of Hodges Drive and Gilbert Drive to meet County of Marin roadway design standards as identified in Municipal Code Section 24.04.110. The project shall be subject to review by County of Marin Public Works staff to ensure all County requirements and regulations are met and ensure the safe movement of all modes of transportation navigating the project site. The project applicant shall submit a waiver request for any existing or planned road, pedestrian, bicycle, transit, or parking facilities or services on the site that will not meet County roadway, ADA, or PROWAG standards.
>
> **Mitigation Measure 5b: Implement Measures to Reduce Parking Demand and/or Increase Supply for the Academic Campus** At build-out of the academic campus, it is estimated that there would be a parking deficit of 144 parking spaces. To address this deficit and the resulting secondary impacts, the project applicant shall prioritize implementation of parking reduction measures for faculty, staff, and students of the academic campus. Based on the remote location of the campus, it is not anticipated that traditional Transportation Demand Management (TDM)

measures to encourage increased use of transit, bicycle or pedestrian travel to the campus would be effective without substantial incentives and a dedicated shuttle service to campus. The establishment of a dedicated level of remote course work and office hours may reduce parking demand depending on how schedules are structured. It is anticipated that the most effective parking demand reduction measure would be a permanent dedication of a share of the market rate housing units for campus faculty and staff, which would also reduce VMT impacts for the project housing uses. Prior to expanding the academic campus beyond 50 percent of the proposed build-out, the project applicant shall submit a parking study that documents academic campus parking usage and any parking overflow onto adjacent residential streets (based on surveys and analysis conducted by an independent professional transportation consultant approved by County staff) as well as the status of all parking demand reduction measures. The study shall verify that campus parking occupancy levels do not exceed 90 percent. Should there be excess parking occupancy and overflow conditions, the project applicant shall implement additional parking reduction measures and/or new parking supply improvements to address parking shortfalls before any additional campus expansion. All parking shall be located on the project site and within the vicinity of the facility that it serves. Off-site overflow parking is not an acceptable strategy.

Significance after Mitigation: Implementation of Mitigation Measure 5a requires the project applicant to design internal roadways to meet County of Marin design standards, and Mitigation Measure 5b requires the project applicant to implement parking reduction and/or supply measures to meet anticipated demand of the academic campus. The implementation of the mitigation measures identified above would reduce safety impacts exacerbated by the project. Therefore, the impact would be **less than significant with mitigation incorporated.**

Emergency Vehicle Access

IMPACT TRAN-6 Implementation of the proposed project would not result in potential conflicts with adopted policies, plans or programs regarding emergency vehicle access that may have a significant impact on the environment.

Emergency vehicle access impacts would be significant if the project resulted in inadequate emergency access. This assessment reviews both the ability of emergency vehicles to access the project site as well as the effect of added vehicle trips on key egress routes through the Strawberry community for fire vehicles from Southern Marin Fire Protection District (SMFD) Station 9 Strawberry.

Access to the project site for emergency vehicles is provided via multiple connections to Seminary Drive on the west and south, Reed Avenue on the north and Herring Drive on the east. Fire Station 9 Strawberry is located about 400 feet north of the campus on Reed Avenue, providing a high level of emergency vehicle access to the site. Other first responders would most likely access the campus via US 101, the ramps onto the Redwood Highway Frontage Road, and Seminary Drive. The existing connections to the project site provide adequate access for emergency vehicles.

As noted earlier, based on consultation with SMFD Chiefs, the following are the primary egress routes for fire trucks from Station 9 Strawberry through the Strawberry community based on the call destination and streets where the project would add vehicle trips.

- Redwood Highway Frontage Road/US 101 South/US 101 North: north on Reed Boulevard, west on Meda Lane, and west on Ricardo Road/Seminary Drive to Redwood Highway Frontage Road.
- Tiburon: north of Reed Boulevard, east on Ricardo Road/Ricardo Lane, and north on E Strawberry Drive to Tiburon Boulevard (SR 131).

As shown in Table 5, the project would result in a net addition of about 180 vehicle trips during a weekday AM peak hour and 230 vehicle trips during a weekday PM peak hour. The following is an estimated trip distribution of the added vehicles on key routes based on count data collected at the project site and throughout the Strawberry community.

- TO WEST (via Seminary Drive to Redwood Frontage Road): 85% of housing trips, 80% of campus trips
- TO NORTH (via E Strawberry Drive): 13% of housing trips, 18% of campus trips
- TO NORTH (via Reed Boulevard): 2% of housing trips, 2% of campus trips

The proposed project would add the following number of net new trips to the following key fire egress routes.

- TO WEST (segment of Seminary Drive just east of Redwood Hwy Frontage Road)
    - AM Peak Hour – adds 145 net peak trips

- PM Peak Hour – adds 185 net peak trips

- TO NORTH (segment of Reed Boulevard just north of Storer Drive)
  - AM Peak Hour – adds 5 net peak trips
  - PM Peak Hour – adds 5 net peak trips

- TO NORTH (segment of E Strawberry Drive just south of Tiburon Boulevard)
  - AM Peak Hour – adds 30 net peak trips
  - PM Peak Hour – adds 40 net peak trips

The proposed project would add the greatest level of net new peak hour trips to the segment of Seminary Drive just east of Redwood Highway Frontage Road, with about 145 net new peak hour trips during the AM peak hour and 185 net new trips during the PM peak hour. That represents an increase in existing volumes of about 28% during the AM peak hour and 35% during the PM peak hour. Under Cumulative plus Project conditions, the westbound delay during the AM peak hour at the Redwood Highway Frontage Road/Seminary Drive intersection would increase from about 19 to 23 seconds per vehicle (westbound approach during the AM peak hour changes from Level of Service B to C) with added project trips. This level of added traffic is potentially significant to response times for fire trucks along this segment of Seminary Drive from Station 9 Strawberry.

Impact TRAN-6: Implementation of the proposed project would potentially result in conflicts with adopted policies, plans, or programs or otherwise decrease emergency vehicle access. This is due to the potential impact of added vehicle trips on the segment of Seminary Drive, east of the Redwood Highway Frontage Road, on response times for fire trucks from Station 9 Strawberry.

> **Mitigation Measure TRAN-6 (Install and Activate Emergency Vehicle Preemption Devices):** The project applicant shall be responsible for designing, obtaining permits, installing, and activating emergency vehicle preemption equipment subject to agency approvals and oversight. This includes emergency vehicle preemption detection technology in the traffic signals at the intersections of Redwood Highway Frontage Road/Seminary Drive and Redwood Highway Frontage Road/US 101 northbound ramps/De Silva Island Drive. The project applicant shall also be responsible for purchasing, installing, and activating emergency vehicle preemption emitting devices in seven fire station vehicles housed at Strawberry Fire Station 9 (Southern Marin Fire District). The measures shall be in place and activated prior to increasing the student enrollment above 100 or the number of occupied residential units above 145. The emergency preemption vehicle technology shall be reviewed and approved by the Southern Marin Fire Protection District, County Transportation Division, and Caltrans prior to installation.

The implementation of Mitigation Measure TRAN-6 would require the project applicant to purchase, install, and activate emergency vehicle preemption devices in the traffic signals at the intersections of Redwood Highway Frontage Road/Seminary Drive and Redwood Highway Frontage Road/US 101 northbound ramps/De Silva Island Drive as well as seven fire station vehicles housed at Southern Marin Fire District Strawberry Fire Station 9. Mitigation Measure 3.14-4 would help maintain vehicular flow

during emergency response by prioritizing right-of-way for emergency vehicles traveling from Fire Station 9 to US 101.

Significance after Mitigation: Less than Significant.

Construction Traffic

IMPACT TRAN-7 Implementation of the proposed project would generate construction traffic that may have a significant impact on the environment.

Construction of the entire project would take approximately four years and would be initiated in 2023 and completed by 2027. Buildout of the project is proposed to occur within several phases categorized by the project components: residential development, academic uses, and landscaping and site improvements. The construction labor force would fluctuate depending on the phase of work. The approximate number of on-site workers could range from 10-160 people depending on project component and phase. All construction staging would occur within the project site. The project would require approximately 220,000 cubic yards of cut and fill, which would be balanced on-site.

In conformance with Marin County Development Code Section 6.70.030, construction activities would occur between the hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, and from 9:00 a.m. to 5:00 p.m. on Saturdays. The operation of loud noise-generating construction equipment (e.g., backhoes, generators, and jackhammers) would be limited to the hours of 8:00 a.m. to 5:00 p.m., Monday through Friday. Construction activities would be prohibited on Sundays and holidays.

Construction of the proposed project, including site preparation and construction, and delivery activities, would generate employee trips and a variety of construction-related vehicles. Construction activities would include disruptions to the transportation network near the project site, including the possibility of temporary lane closures, street closures, sidewalk closures, and bikeway closures. This may impact the movement of agricultural vehicles and equipment during construction. Bicycle and transit access may also be disrupted. These activities could result in degraded roadway conditions.

Impact TRAN-7: Implementation of the proposed project would result in the addition of construction traffic that would result in a significant impact.

> **Mitigation Measure 7: Construction Traffic Control Plan**. Prior to any construction activities for the proposed project, the applicant shall prepare a detailed Construction Traffic Control Plan and submit it for review and approval by the County Department of Public Works. The applicant and the county shall consult with Caltrans, Golden Gate Transit, Marin Transit, Southern Marin Fire Protection District (SMFD) Station 9 Strawberry staff, and other local emergency service providers for their input prior to approving the Plan. The plan shall ensure that acceptable operating conditions on local roadways and freeway facilities are maintained during construction. At a minimum, the plan shall include:
>
> - The number of truck trips, time, and day of street closures
> - Time of day of arrival and departure of trucks
> - Limitations on the size and type of trucks, provision of a staging area with a limitation on the number of trucks that can be waiting
> - Provision of a truck circulation pattern

- Provision of a driveway access plan so that safe vehicular, pedestrian, and bicycle movements are maintained (e.g., steel plates, minimum distances of open trenches, and private vehicle pick-up and drop-off areas)
- Maintain safe and efficient access routes for emergency vehicles
- Maintain safe and efficient access routes for vehicles
- Manual traffic control when necessary
- Proper advance warning and posted signage concerning street closures
- Provisions for pedestrian safety

A copy of the construction traffic control plan shall be submitted to local emergency response agencies and these agencies shall be notified at least 14 days before the commencement of construction that would partially or fully obstruct roadways.

Mitigation Measure 7 would reduce the construction traffic impacts to a less-than-significant level.

Significance after Mitigation: Less than significant

Cumulative VMT

IMPACT TRAN-8 The change in VMT would be cumulatively considerable.

Cumulative plus Project VMT for Residential Uses

VMT forecasts[11] generated from the TAMDM countywide travel demand model indicate that Home-based VMT per resident is forecast to decline by about five percent at both the regional and Marin County levels between 2015 and 2040. Because the long-term trend of VMT rates is forecast to decrease slightly, the Existing plus Project VMT assessment described in IMPACT TRAN-1 is applicable to determining that the project's market residential uses would have a considerable contribution to cumulative VMT impacts and the project's campus uses would have a less than considerable contribution to cumulative VMT impacts.

IMPACT 8a – VMT for Residential Uses

The cumulative effect of VMT generated by proposed project residential uses is considered a **significant impact**.

> **Mitigation Measure 8a: Implement Mitigation Measure 1a**.
>
> **Significance after Mitigation:** The most effective VMT mitigation strategies for residential uses would be a permanent dedication of a portion of the housing for campus employees or students. A VMT reduction of more than 30 percent would be required to reduce Cumulative plus Project VMT rates to more than 30 percent below the existing regional average. The total potential VMT reduction for the market residential uses is 5 percent, unless a significant level of housing is dedicated employee or student housing for the adjacent campus, based on the surrounding community context for the project. As such, after mitigation, the cumulative project VMT impact would be **Significant and Unavoidable** for the residential uses.

Cumulative plus Project VMT for Campus Uses

IMPACT 8b – VMT for Campus Uses

The effect of VMT generated by the proposed campus uses, under Cumulative plus Project conditions, is considered a **less-than-significant impact**.

[11] Kevin Johnson to Derek McGill memorandum, November 2, 2020, "2015 & 2040 TAMDM Marin County VMT Estimates".

Appendix D

Existing Intersections Review Memo

FEHR PEERS

Memorandum

Date: August 29, 2025

To: John Neville - Marin County Transportation Division
Tammy Taylor and Rachel Reid – Marin County Community Development Agency
Brandon Halter – Marin County Chief Deputy County Counsel
Tanya Jones, Jazmin Amini, Tristan Evert, and Curtis Alling – Ascent Environmental

From: Bob Grandy, Erin Ferguson, and Nina Price, Fehr & Peers

Subject: Existing Intersections Review Memo

SF21-1170

Introduction

The North Coast Land Holdings Project (Project) has applied for entitlements to renovate and redevelop the former Golden Gate Baptist Theological Seminary property on the Strawberry Peninsula in unincorporated Marin County. The proposed development would include renovation of existing academic buildings, relocation of an existing daycare center, construction of a new fitness center, construction of a new residential care facility, upgrades to existing housing and construction of new housing, retention of and access improvements to existing open space and recreation areas, and creation of new bicycle and pedestrian paths within the property (project).

During public review of the Draft Environmental Impact Report (DEIR), comments were received related to existing intersection issues on roadways throughout the Strawberry Peninsula. The comments described existing safety concerns and assertions that added traffic from the project would create a safety impact. Regarding concerns that added traffic from the project would create a safety impact, pursuant to Public Resources Code Section 21099 "Automobile congestion or delay itself does not constitute a significant environmental impact (Public Resources Code, §21099(b)(2)), and traffic safety should not be used as a proxy for road capacity"[1]. A review of the *2018 Marin County Travel Safety Plan: Systemic Safety Analysis* for the DEIR indicated that no street segments or intersections within the Strawberry community were located on the High Collision Network Study Corridors & Intersections. The High Collision Network identified in the

[1] *Local Development Review (LDR) Safety Review Practitioner's Guidance*, page 8, Caltrans Division of Safety Programs, February 2024.

plan includes 68 road segments and 93 intersections throughout the county that have a higher potential risk for future fatal or severe injury collisions based on a blending of historic collision data and systemic collision factors. The segment of Redwood Highway Frontage Road adjacent to the intersection of US 101 NB Ramps/De Silva Island Road was an identified High Collision Network corridor segment in the 2018 Plan, and the countermeasures identified in the plan have since been implemented. A *2024 Marin County Local Road Safety Plan* (LRSP) updated the 2018 Plan. Based on a review of updated collision data that was conducted for the recently completed 2024 LRSP, no street segments or intersections within the Strawberry community are located on the 2024 High Collision Network Study Corridors & Intersections. The DEIR also reviewed collision data for a five-year period between 2015 and 2019. Based on the above considerations, the DEIR analysis determined that none of the intersections on the peninsula, including those identified in public comments, would experience significant traffic safety changes and the topic of traffic delay or congestion is no longer a consequence considered to be a significant adverse environmental impact under CEQA.

Nonetheless, based on consultation with County staff, it was decided that a review of existing intersection issues would be prepared to provide information in response to community concerns, which can become part of the County's consideration of the merits of the project and the potential for defining conditions of approval.

Fehr & Peers conducted the review through field observations and collision analysis of eight locations mentioned in the DEIR public comments, as well as three additional locations with the highest collision frequency. Based on the review, Fehr & Peers identified potential measures at several of the locations that are shown in **Figure 1.** The following memorandum provides a summary of Fehr & Peers observations and potential approaches to addressing existing intersection issues on the Strawberry Peninsula.

Figure 1. Study Locations for Assessing Existing Intersection Conditions



Collision History

The Transportation Impact Study (April 2024) that supports the DEIR transportation assessment includes transportation safety data. Collision history data is provided for the five-year window between 2015 and 2019. The intersections with the greatest number of collisions over that period are located on Tiburon Boulevard (SR-131) and the Redwood Highway Frontage Road where traffic activity levels are considerably higher than on local residential streets within the Strawberry community. The intersections with the most collisions reported within the Strawberry community average about one collision reported per year. Across all collisions, the most prominent collision factor was unsafe speed, followed by Right-of-Way (R-O-W) auto[2], and improper turn. See Appendix A of this memo for the full description of collision data for the 2015 through 2019 period from the DEIR transportation assessment.

Public comments received on the DEIR requested updated collision data, with a focus on fatal and injury collisions. **Figure 2** below shows a map of collision data from the Transportation Injury Mapping System (TIMS)[3] – a geocoded database of all California fatal and injury collisions - for the Strawberry Peninsula study area, bounded by the Redwood Highway Frontage Road on the west, Tiburon Boulevard on the north, and the San Francisco Bay on the east and south for the five-year period from September 2019 through September 2024. Data for 2023 and 2024 are considered provisional, which means they are based on records provided by the California Highway Patrol (CHP) up until March 6, 2025 and subject to change as new or modified records are provided by the CHP.

No fatalities were among the reported collisions in the more recent five-year period. As with the data from 2015 through 2019, most of the reported collisions involved vehicles and were located along the Redwood Highway Frontage Road and Tiburon Boulevard.

Two collisions involved pedestrians, one at the intersection of Redwood Highway Frontage Road/Reed Boulevard and one at the intersection of E. Strawberry Drive/Harbor Cove Way.

- The pedestrian collision with a possible injury at the Redwood Highway Frontage Road/Reed Boulevard intersection involved a vehicle (hit and run) traveling northbound and a pedestrian traveling westbound.
- The pedestrian collision with a suspected minor injury at the E. Strawberry Drive/Harbor Cove Way intersection involved a vehicle (hit and run) making a southbound left turn and a pedestrian traveling westbound.

[2] Right-of-Way auto collision factor is where one of the vehicles involved failed to yield the right-of-way (legal and practical right of one vehicle to proceed in a certain way over another), causing the collision.
[3] https://tims.berkeley.edu/

Internal to the Strawberry community, four collisions involved bicycles on Seminary Way and E. Strawberry Drive which was observed to be a popular route for recreational cyclists. The four collisions involved suspected severe injuries and are summarized below. The last two collisions listed below were located on Strawberry Drive south of the campus access at Herring Drive.

- The bicycle collision at the Seminary Drive/Gilbert Drive intersection involved two bicycles. Both cyclists were traveling southbound on Seminary Drive. No vehicles were involved.
- The bicycle collision on the south leg of the Tiburon Boulevard/E. Strawberry Drive Intersection involved a youth cyclist traveling in the westbound direction on the south side (i.e., traveling wrong way) of Tiburon Boulevard and a vehicle driver (hit and run) traveling southbound.
- The bicycle collision at the Seminary Drive/Harbor Point Drive intersection was a collision with a vehicle (hit and run) and a cyclist, both traveling northbound. The violation category was unsafe speed for the vehicle driver.
- The bicycle collision at the Seminary Drive/Great Circle Drive intersection was a solo collision with a youth cyclist traveling eastbound. No vehicles were involved.

A fifth collision involving a cyclist with a suspected minor injury occurred at the Richardson Drive/Ricardo Road intersection involving a vehicle (hit and run) making a northbound left turn and a cyclist making an eastbound right turn. Marin County recently received grant funding to make improvements to the segment of Ricardo Lane between Richardson Drive and E. Strawberry Drive that includes improvements at both intersections and construction of sidewalk improvements between the intersections.

Current Relevant Conditions

The speed limit for all internal streets within the Strawberry Community is 25 miles per hour with two exceptions. The speed limit for the segment of Seminary Drive south of Gilbert Drive is posted at 35 miles per hour. The segment of E. Strawberry Drive adjacent to Strawberry Point School was recently changed from 25 miles per hour to 15 miles per hour when children are present.

Most of the study area outside of the immediate project site does not have dedicated walkways for pedestrians in the form of sidewalks. Relevant exceptions near the study locations where sidewalks are located include the east side of E. Strawberry Drive from Strawberry Point Elementary School south to Harbor Cove Way, the south side of Belvedere Drive west of E. Strawberry Drive, the east side of Redwood Highway Frontage Road, and Belvedere Drive and Reed Boulevard adjacent to the Strawberry Village Shopping Center. There is also a path along

the south side of Seminary Drive and east of commercial uses along the Redwood Highway Frontage Road that is used by pedestrians and cyclists traveling from the Seminary Drive/Ricardo Lane intersection to the Redwood Highway Frontage Road/US 101 Northbound Ramps (Seminary ramp) intersection.

Bicycle lanes are marked with pavement striping along Seminary Drive between approximately Gilbert Drive and Chapel Drive.

Figure 2. Injury Collisions[4] from September 2019 to September 2024



[4] There were no fatal collisions in the five-year window.

Relevant Measures Implemented in Recent Years

The following is a summary of relevant traffic control or intersection improvement measures implemented by Marin County or Caltrans at the study locations.

- Change in speed limit on segment of E. Strawberry Drive, adjacent to Strawberry Point School, from 25 miles per hour to 15 miles per hour when children are present..
- School Zone signage and striping along E. Strawberry Drive between Belvedere Drive and Harbor Cove Way adjacent to the Strawberry Point Elementary School and Strawberry Recreation Center. This includes speed reduction flashing signs northbound (i.e., in the downhill direction on E. Strawberry Drive, between Harbor Cove Way and Ricardo Lane, approaching the school and recreation center.
- Crosswalk markings and Rectangular Rapid Flashing Beacon (RRFB) on E. Strawberry Drive just north of the Strawberry Point Elementary School driveways.
- Intersection improvements and striping improvements along Belvedere Drive between Redwood Highway Frontage Road and E. Strawberry Drive to manage travel speeds along this cut-through route. This includes intersection improvements on Belvedere Drive at Reed Boulevard and Bayview Terrace.
- Intersection improvements at Redwood Highway and US 101 Northbound Ramps (Seminary ramps).

Planned Measures

The following is a summary of planned measures by Marin County or Caltrans at the study locations.

- The Transportation Authority of Marin (TAM) Executive Committee, at its March 2025 meeting, recommended distribution of grant funding for Safe Routes to Schools projects that includes grant funding to construct a sidewalk on Ricardo Lane (between East Strawberry Drive and Richardson Drive) and make other improvements the intersections of Ricardo Lane with East Strawberry Drive, Richardson Drive, and Ricardo Road. This segment of Ricardo Lane is an active pedestrian route for students and parents walking to the Strawberry Point Elementary School and the Strawberry Recreation Center.
- Caltrans is planning an improvement project along Tiburon Way (State Route 131) between US 101 and the City of Tiburon that includes modifications to the intersection of Tiburon Way and E. Strawberry Drive. The SR 131 Capital Preventive Maintenance Project is in the design phase. The location is approximately 1,000 feet west of US-101 interchange to the Tiburon Boulevard/Main Street intersection. The project will enhance and complete streets and support active modes of transportation by bridging a gap in the transportation network and improve bicycle access throughout the area. The project will address a major gap in the overall active transportation network on SR 131 between

East Strawberry Drive and Greenwood Cove Drive by constructing a Class I bikeway. It will also provide a Class IV bikeway at the US 101/SR 131 interchange between Tower Drive and Strawberry Drive. At the intersection of Tiburon Boulevard and E. Strawberry Drive, the project will remove the free right turn lane from East Strawberry Drive onto eastbound SR 131 (Tiburon Boulevard) that is in the southeast quadrant. The final design is scheduled for the summer of 2025 and construction is set to be complete in the winter of 2027.

Observations of Existing Intersection Issues and Potential Measures

The following is a description of the review of existing intersection conditions that was conducted based on field observations and collision analysis for eight locations mentioned in the DEIR public comments. Based on the review, potential approaches to addressing existing intersection issues are identified at several of the locations. It is recommended that Southern Marin Fire District review, provide comment, and collaborate with the Marin County Transportation Division on final design approvals for items #1, 6, and 10 below.

1. Reed Boulevard – Storer Drive to Richardson Drive

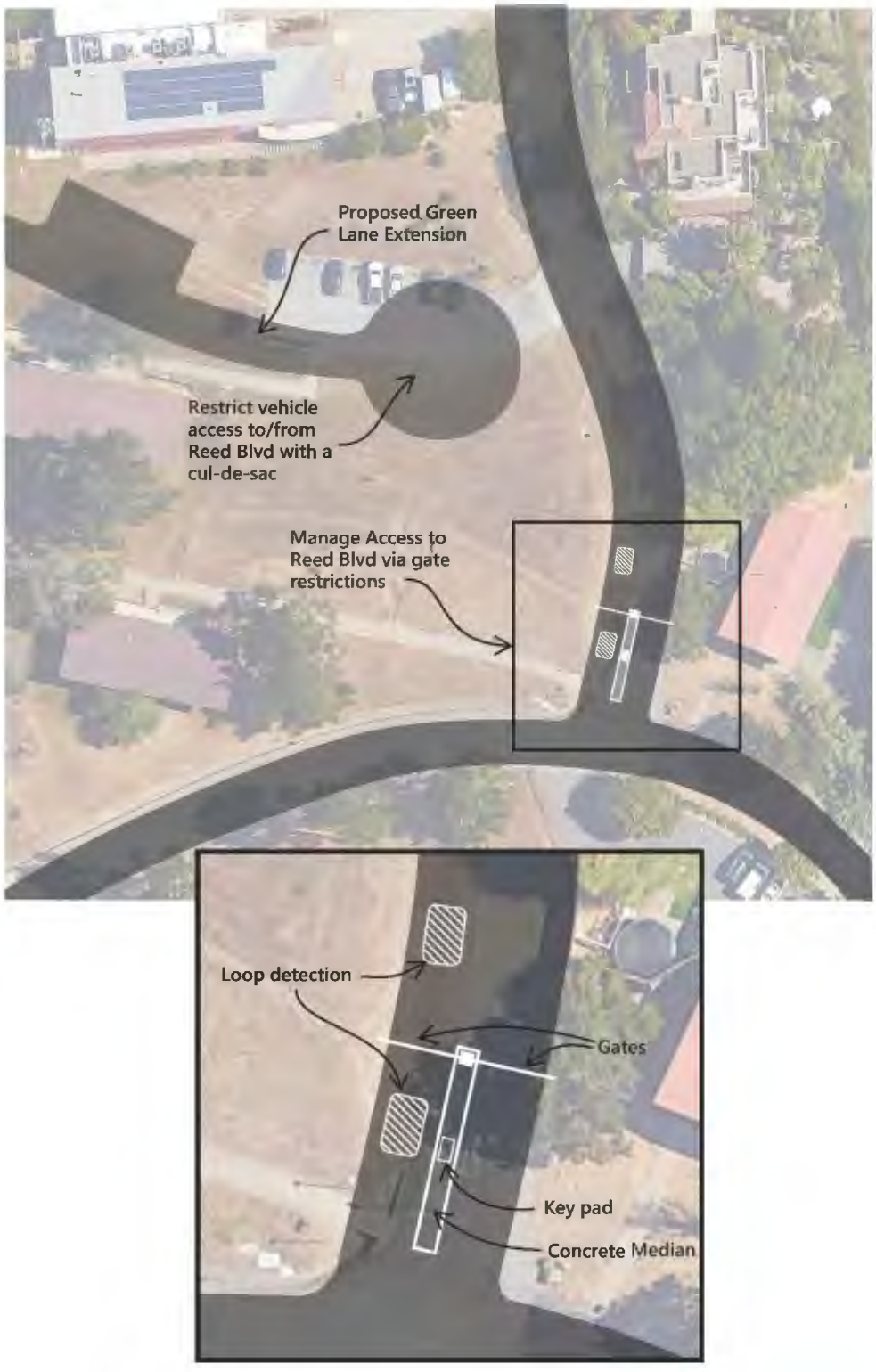
The segment of Reed Boulevard between Storer Drive and Richardson Drive is directly adjacent to the project and provides access to Southern Marin Fire District Station No. 9. This segment of Reed Boulevard is approximately 18' wide, does not have sidewalks, and is steeply graded at the south end between Storer Drive and the Fire Station. Reed Boulevard also serves five private residential driveways to the north of Green Lane. Public comments received on the DEIR express concerns that project generated trips may affect pedestrian safety and operations associated with the fire station driveway and vehicles pulling in and out of private driveways. No fatal or injury collisions were reported on the segment of Reed Boulevard between Storer Drive and Ricardo Road for the five-year period from September 2019 through September 2024.

Potential Measures

Potential measures to address the steep narrow section of Reed Boulevard include the following:

- Repave and widen Reed Boulevard between Storer Drive and north of the Fire Station driveway which would provide more clearance for emergency vehicles and pedestrians walking in the roadway.
- Eliminate the planned connection of the east end of Green Lane at Reed Boulevard and provide a cul-de-sac or a vehicle turnaround at the east end of the new street extension, which would direct vehicle traffic from the proposed new housing units on Green Lane to Shuck Drive. [Note: The project site plan includes an extension of Green Lane, currently a short (about 130 feet) dead-end street used for parked cars, to the west to connect with Shuck Drive. The new segment of Green Drive would serve about 20 new housing units and provide access from the new units to both Reed Boulevard and Shuck Drive.]

An illustration of a potential approach to gating the southern end of the segment of Reed Boulevard and eliminating the planned connection of the east end of Green Lane to Reed Boulevard is shown on the following page. The gate provided for southbound vehicles on Reed Boulevard could be used by residents of private homes during an emergency to evacuate.


Proposed Green Lane Extension
Restrict vehicle access to/from Reed Blvd with a cul-de-sac
Manage Access to Reed Blvd via gate restrictions
Loop detection
Gates
Key pad
Concrete Median

2. Reed Boulevard and Redwood Highway Frontage Road

The intersection of Reed Boulevard and the Redwood Highway Frontage Road is a T-intersection with side-street stop-control. Just east of the intersection along the Frontage Road, there are two closely spaced driveways serving a small business center parking lot. There is a marked crosswalk across the east leg to facilitate access to a bus stop along US-101. Public comments received on the DEIR describe possible conflicts between vehicles exiting and entering the driveways, pedestrians crossing at the east leg, and poor sight lines for the minor street under the existing condition. Three vehicle injury collisions and one pedestrian injury collision were reported at the intersection or the approaches for the five-year period from September 2019 through September 2024.

Potential Measures

Several approaches could be implemented to address the existing conditions.

- Install treatments for an uncontrolled crossing on the east leg, including advanced "Yield Here to Pedestrians" signs and yield pavement markings, curb extensions, and a Rectangular Rapid Flashing Beacon.
- Remove parking on the east of Reed from the Frontage Road to Knoll Lane and install a sidewalk. Install an ADA ramp at the north end of the sidewalk where it connects to the marked crossing.
- Install a barrier across the business center driveways along the Frontage Road to enforce internal circulation in the parking lot and access to and from the parking lot via Knoll Lane.

An illustration of the above potential measure for the business center driveways is shown below.



3. Ricardo Road east of Seminary Drive

Ricardo Road is a two-lane road with parking on both sides and no sidewalks. It is 52 feet wide with 13-foot vehicles lanes and 13foot wide parking lanes. Public comments received on the DEIR expressed concerns about speeds along Ricardo Road.. No fatal or injury collisions were reported on the segment of Ricardo Road between Seminary Drive and Richardson Drive for the five-year period from September 2019 through September 2024.

Potential Measures

Potential measures to address existing speeding concerns include the following:

- Radar flashing speed feedback signs at mid-segment locations in both directions
- Visually narrow the lanes by restriping the corridor with the following features in both directions: 8' parking lane, 5' bike lane, 2' buffer, 11' drive lane
- At the intersection of Ricardo Road and Seminary Drive, install a high visibility crosswalk on the east leg

4. Seminary Drive and Hodges Drive/Gilbert Drive

The intersections of Seminary Drive with Hodges Drive and Gilbert Drive are closely spaced T intersections with side-street stop-control. Seminary Drive is a connector street through Strawberry Point and serves heavy bicycle traffic; Public comments received on the DEIR expressed concerns about existing speeds along Seminary and sight distance limitations for vehicles exiting the project site on Hodges and Gilbert. One severe injury involving a bicycle was reported on Seminary Drive at Gilbert Drive for the five-year period from September 2019 through September 2024.

Potential Measures

Potential measures to address existing speeding and sight distance limitation concerns include the following:

- Prohibit parking on the east side (project frontage) of Seminary between Hodges and Gilbert. Prohibit parking on the west side of Seminary for about 90 feet opposite Gilbert. Install red curb and signage.
- Radar flashing speed feedback signs on northbound Seminary to the south of Gilbert in the segment where speed limit reduction from 35 mph to 25 mph occurs.

5. Seminary Drive and Chapel Drive

The intersection of Seminary Drive and Chapel Drive is a T intersection with side-street stop-control. Public comments received on the DEIR expressed concerns about existing speeds along

Seminary and sight line limitations. No fatal or injury collisions were reported on Seminary Drive at Chapel Drive for the five-year period from September 2019 through September 2024.

Potential Measures

Potential measures to address existing speeding and sight line limitation concerns include the following:

- Extend the red curb on the northeast corner to the east about 100 feet to the existing driveway. Add bike lane icons and mark the bike lanes east of the intersection.

6. E. Strawberry Drive from Belvedere Drive to Ricardo Lane

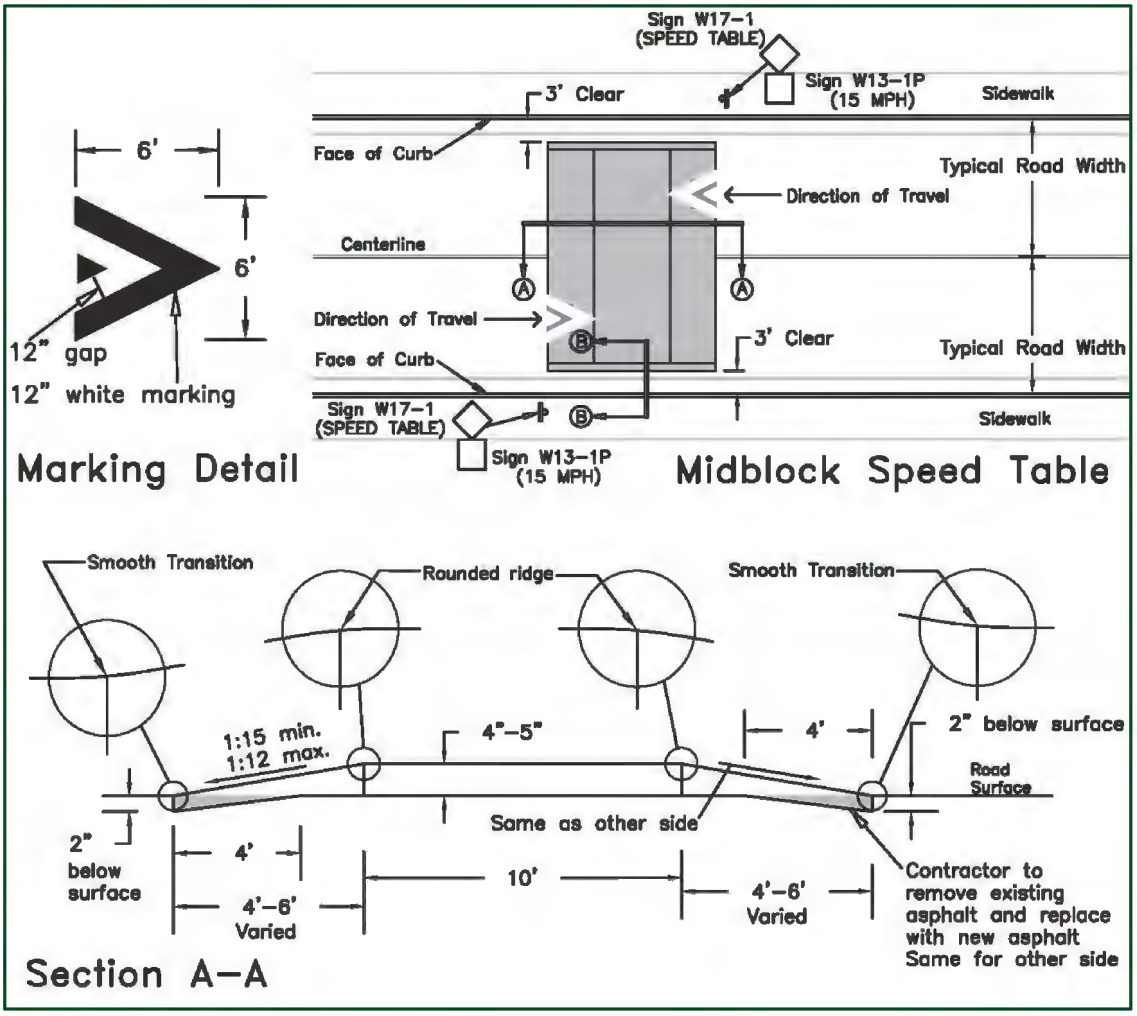
The segment of E. Strawberry Drive from Belvedere Drive to Ricardo Lane serves heavy morning and afternoon peak vehicle, bike, and pedestrian traffic for drop-off and pick-up operations of the Strawberry Point School on the east side of the street and the Strawberry recreation center on the west side of the street. There is a steep downhill grade on northbound E. Strawberry Drive between Ricardo Lane and the school, in addition to roadway curvature which limits sight lines. From 2019 to 2024, there were four injury collisions on this segment, two of which involved a person biking.

Potential Measures

The County of Marin has developed concept plans and recently received grant funding to install sidewalk improvements on Ricardo Lane between E. Strawberry Drive and Richardson Drive as well as intersection improvements at either end of the one-block segment. The following are additional potential measures for E. Strawberry Drive from Belvedere Drive to Ricardo Lane.

- Restripe pavement markings and installed new signs along E. Strawberry Drive from Belvedere Drive to Harbor Cove Way.
- Install white flex posts along the west edge line adjacent to the crosswalk to prevent cars from bypassing queued vehicles waiting to enter the school parking lots on the shoulder.
- Install yellow flex posts on the center line between the recreation center driveway and Ricardo Lane to prevent pedestrians from crossing in this section.
- Install a raised crosswalk at the existing crosswalk and RRFP between the school and recreation center. This raised crosswalk, along with the crosswalk on the south leg of the E. Strawberry Drive/Belvedere intersection, would manage speeds along the segment of E. Strawberry Drive between Tiburon Boulevard and Ricardo Lane. This measure, including design plans, would require consultation and approval from the Southern Marin Fire District.

Typical design details for a speed table, similar in plan and profile to a raised crosswalk, are provided below.


Sign W17-1
(SPEED TABLE)
Sign W13-1P
(15 MPH)
3' Clear
Sidewalk
Face of Curb
Typical Road Width
Direction of Travel
Centerline
Direction of Travel
3' Clear
Face of Curb
Typical Road Width
Sign W17-1
(SPEED TABLE)
Sign W13-1P
(15 MPH)
Sidewalk
6'
6'
12" gap
12" white marking
Marking Detail
Midblock Speed Table
Smooth Transition
Rounded ridge
Smooth Transition
1:15 min.
1:12 max.
4"-5"
4'
2" below surface
Road Surface
Same as other side
2"
below
surface
4'
4'-6'
Varied
10'
4'-6'
Varied
Contractor to
remove existing
asphalt and replace
with new asphalt
Same for other side
Section A-A

7. 300 block of E. Strawberry Drive

Strawberry Drive is a north-south, two-lane connector on the east side of Strawberry Point. The 300 block of Strawberry includes a 1,300-foot segment in which the northbound and southbound lanes are split at separate elevations with a steeply graded hill between them. Public comments received on the DEIR expressed concerns about the lack of guardrail on the southbound (uphill) side, where the narrow roadway runs directly along the steep hillside. No fatal or injury collisions were reported on the 300 block of E. Strawberry Drive for the five-year period from September 2019 through September 2024.

Potential Measures

A potential approach to address existing concerns regarding the lack of a guardrail on the southbound side of Strawberry Drive where the narrow roadway runs directly along the steep hillside includes the following

- Install metal beam guardrail along the east (left) side of the southbound vehicle lane.

8. Redwood Highway Frontage Road and US 101 Northbound Seminary Ramps

The interchange just north of the Richardson Bay Freeway Bridge intersects with the Redwood Highway Frontage Road and provides ramps to and from US 101 northbound. North of the interchange is a bicycle and pedestrian bridge across US 101 and a park and ride lot; a bus stop is also located in a slip lane between ramps. Public comments received on the DEIR express concerns related to hazards for students who use the bridge to bike and walk to Mill Valley Middle School or Tamalpais High School. A school crossing guard was observed at the crosswalk on the north leg of the intersection during morning and mid-afternoon school travel periods. Five vehicle injury collisions were reported at the intersection or the approaches for the five-year period from September 2019 through September 2024.

Potential Measures

The following strategies would help ameliorate existing limitations in visibility of people walking and biking through the intersection and separate modes in time.

- High visibility cross walk on the north leg with advanced stop bar.
- Install a No-Right-Turn-on-red signal head or blank-out sign for the southbound right turn that is activated when the pedestrian push button is activated on the north leg.
- Install bicycle conflict markings for southbound bikes through the intersection.

High-Collision Locations

The following is a description of a review that was based on field observations and collision analysis for three locations with the highest collision frequency history that were not the specific

subject of comments received on the Draft EIR. Based on the review of existing intersection conditions, potential measures are identified at one of the locations.

9. Redwood Highway Frontage Road and Seminary Drive

The intersection of the Frontage Road and Seminary Drive is a signalized T intersection. Between 2015 and 2019 there were 12 collisions at the intersection, two of which resulted in injury. From 2019 to 2024, there was only one injury collision just south of the intersection. The intersection has a high visibility crosswalk on the east leg with pedestrian push buttons as well as separate left turn lanes on the southbound and westbound approaches. One vehicle injury collision was reported at the intersection for the five-year period from September 2019 through September 2024. No additional measures are suggested.

10. E. Strawberry Drive and Belvedere Drive

The intersection of E. Strawberry Drive and Belvedere Drive is a side street stop-controlled T-intersection, which is about 50 feet south of the E. Strawberry and Tiburon Blvd signalized intersection. From 2015 to 2019 there were 6 collisions at this location, 3 of which resulted in injury. From 2019 to 2024, there were 2 injury collisions including a severe injury collision with a bike. The close spacing of the two intersections along E. Strawberry Drive, the free right turn lane from eastbound Tiburon Boulevard onto southbound E. Strawberry Drive that allows right turning vehicles to make the movement at relatively high speeds, and the stop control on two of the three legs of the E. Strawberry Drive/Belvedere Drive intersection creates potentially hazardous conditions for eastbound vehicles turning from Belvedere Drive onto E. Strawberry Drive or northbound vehicles making the left turn from E. Strawberry Drive onto Belvedere Drive who may not have sufficient decision time given the limited sight distance to see conflicting vehicles on southbound E. Strawberry Drive.

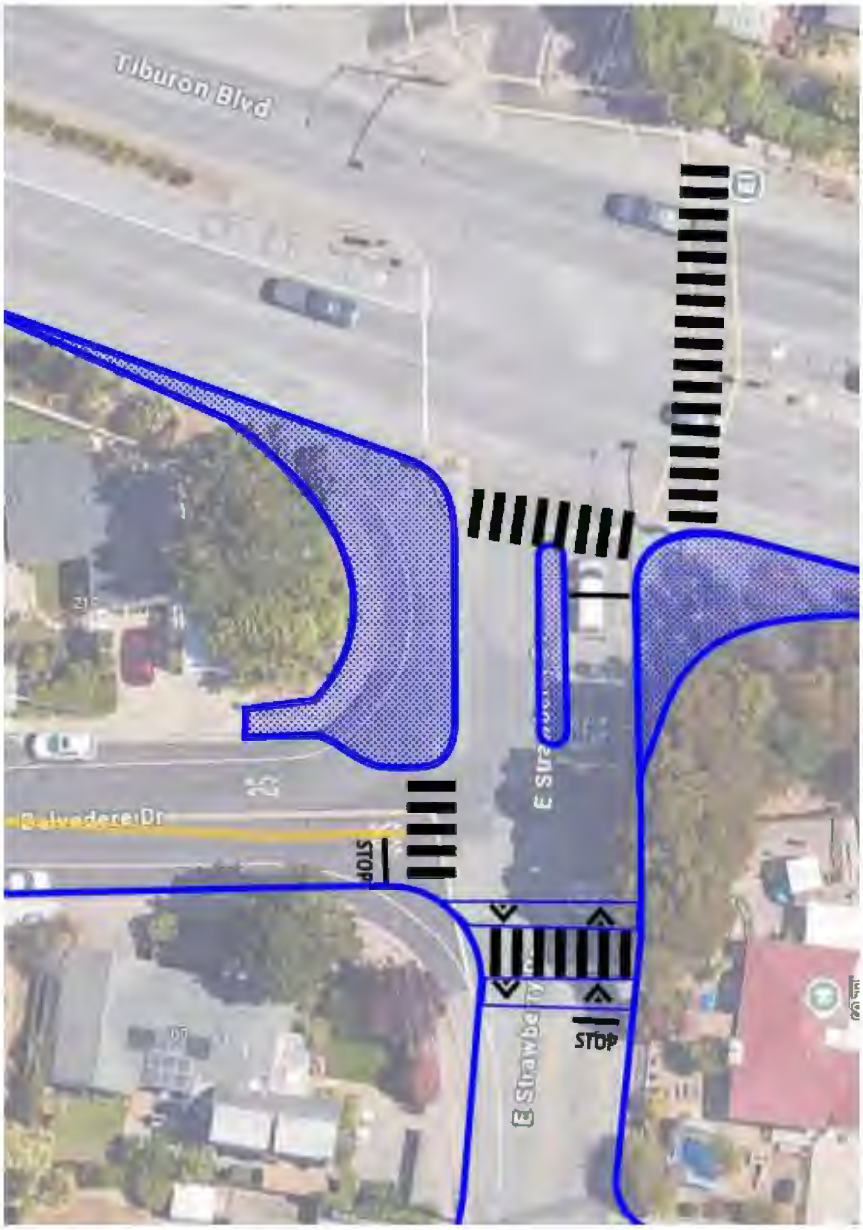
As noted previously, the SR 131 (Tiburon Boulevard) Capital Preventive Maintenance Project being implemented by Caltrans between US 101 and the City of Tiburon will remove the free right turn lane from northbound East Strawberry Drive onto eastbound SR 131 (Tiburon Boulevard) that is in the southeast quadrant of the intersection of Tiburon Boulevard and E. Strawberry Drive.

Potential Measures

Strategies to address the existing potential sight-distance issues include the following:

- Remove the free right turn lane from eastbound Tiburon Boulevard (SR 131) onto southbound East Strawberry Drive that is in the southwest quadrant, with new curb extensions that reduce the right turn turning radii to 20-25’.
- Install a stop sign for northbound E. Strawberry at Belvedere Drive and a raised crosswalk across the south leg of the intersection.

An illustration of the above potential measures, including the planned Caltrans measure on the southeast quadrant of the intersection of Tiburon Boulevard and E. Strawberry Drive, is shown below.



11. Reed Boulevard and Belvedere Drive

The all-way stop-controlled intersection of Reed Boulevard and Belvedere Drive was recently improved in late 2019/early 2020. From 2015-2019 there were 5 collisions at the intersection, three of which resulted in injury. From 2019-2024 (after intersection improvements were installed) no fatal or injury collisions were reported. No additional measures are suggested.

Appendix A

DISCUSSION OF COLLISION DATA FOR 2015 THROUGH 2019

Excerpt from North Coast Land Holdings Transportation Impact Study (April 2024)

Note: the data described in this appendix includes property damage only collisions from 2015-2019.

The 2018 Marin Travel Safety Plan was a collaborative effort between unincorporated Marin County and all 11 incorporated cities and towns. The purpose was to provide a systemic safety analysis for motorists, motorcyclists, bicyclists, and pedestrians on non-state arterial and collector roadways. The Plan was funded through a Systemic Safety Program grant provided by Caltrans. The intent was to provide a proactive collision analysis, identify high risk locations and collision patterns, develop a list of systemic low-cost and longer-term countermeasures, and help secure funding to address key safety issues.

During the five-year period in which collisions were evaluated, 22.6% of all collisions in the county occurred in Unincorporated Marin County, lower than the county's 26% share of the total county population. Notable collision profiles in Unincorporated Marin County include high rates of bicycle collisions, pedestrian collisions involving senior over the age of 65, speed related collisions, motorcycle collisions, and collisions with vehicles hitting fixed objects. According to the California Office of Traffic Safety, in 2019 Marin County ranked among the top 10 California counties for collisions where victims were killed and/or injured involving pedestrians, pedestrians 65 or older, and bicyclists.

The 2018 Marin Travel Safety Plan identified safety countermeasures for 12 corridors and 13 intersections in unincorporated Marin County. This includes a corridor improvement to the Redwood Highway Frontage Road from the US 101 ramp to De Silva Island Road. The corridor improvements included improved signal timing and detection, enhanced pedestrian crossing improvements, guardrail, and bike lanes (green paint through the intersection to delineate conflict zones). Intersection improvements were identified at the East Blithedale Avenue/Tower Drive/Kipling Drive intersection including improved signal timing and detection and enhanced pedestrian crossing improvements. Subsequent to completion of the Plan, Marin County received $2.8 million in Highway Safety Improvement Program (HSIP) grant funds from Caltrans to implement safety countermeasures identified in the plan at 51 signalized intersections in unincorporated Marin County and within 11 incorporated cities.

Collision History

In the five years between 2015-2019, there were 168 collisions identified in the project study area from California SWITRS[5] data. 67% of collisions (113) only involved property damage primarily to vehicles while 33% (55) resulted in injury to vehicle occupants (45), pedestrians (3), or bicyclists (7).

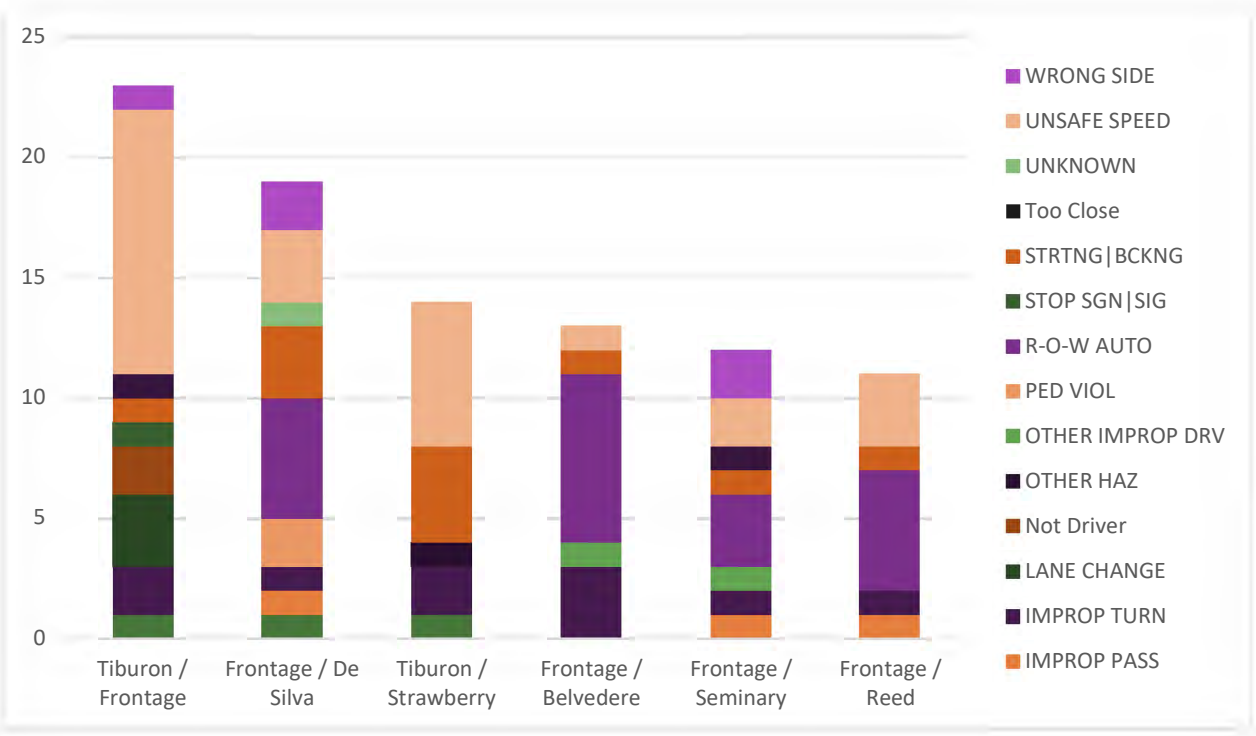
[5] SWITRS is the Statewide Integrated Traffic Records System, a database that collects and processes data from traffic collisions in California.

A review of collision data from 2015-2019 reveals that certain intersections in the study area are more prone to collisions and injuries than others. **Table 1** below provides details for all intersections with more than two collisions over that five-year period.

Table 1: Study Area Collision Data

Intersection	Collisions	w/Injury	Primary Collision Factor
Tiburon Blvd (SR-131) / Redwood Hwy Frontage Rd	23	7 (30%)	11 Unsafe Speed (48%)
Redwood Hwy Frontage Rd / De Silva Island	19	8 (42%)	5 R-O-W Auto (26%)
Tiburon Blvd (SR-131) / E Strawberry Dr	14	8 (57%)	6 Unsafe Speed (43%)
Redwood Hwy Frontage Rd / Belvedere Dr	13	1 (8%)	7 R-O-W Auto (54%)
Redwood Hwy Frontage Rd / Seminary Dr	12	2 (17%)	3 R-O-W Auto (25%)
Redwood Hwy Frontage Rd / Reed Blvd	11	3 (27%)	5 R-O-W Auto (27%)
E Strawberry Dr / Belvedere Dr	6	3 (50%)	2 Improper Turn, R-O-W Auto (33%)
Tiburon Blvd (SR-131) / Knoll Ln	6	1 (17%)	3 Unsafe Speed (50%)
Reed Blvd / Belvedere Dr	5	4 (60%)	2 Improper Pass (40%)
E Strawberry Dr / Strawberry Dr	5	2 (40%)	Various
E Strawberry Dr / Harbor Cove	4	1 (25%)	2 Improper Turn (50%)
Redwood Hwy Frontage Rd / US-101	4	1 (25%)	Various
E Strawberry Dr / Cassidy Ln	3	1 (33%)	Various
Reed Blvd / Knoll Ln	3	1 (33%)	2 Improper Turn (67%)
Tiburon Blvd (SR-131) / US-101	3	2 (67%)	2 Unsafe Speed (67%)
Ricardo Rd / Richardson Dr	3	0 (0%)	Various
Seminary Dr / Hodges Dr	3	0 (0%)	Various

Across all collisions, the most prominent collision factor was Unsafe Speed (41 out of the 168 total), followed by R-O-W Auto (28) and Improper Turn (27). A total of 17 collisions (10.1%) involved drivers under the influence of drugs or alcohol. The chart below shows the distribution of collision factors for the most collision-prone intersections.



Other relevant statistics from the collision data include the following:

- 120/168 (71%) of collisions occurred during the daytime
- 41/168 (24%) of collisions involved a parked vehicle or other fixed object
    - Two collisions involved an animal
- 54 (32%) collisions were rear-ends, 41 (24%) were sideswipes, and 30 (18%) were broadside collisions
    - Six collisions were head-on and two involved an overturned vehicle

Appendix E

Maintenance Shed Site Visit,
May 15, 2025

Memo

455 Capitol Mall, Suite 300
Sacramento, CA 95814
916.444.7301

Date: May 20, 2025

To: Tammy Taylor
Marin County Community Development Agency

From: Kelley Kelso, CPESC, QSD/QSP, QISP
Ascent

Subject: North Coast Land Holdings, LLC, Project Environmental Impact Report
Maintenance Shed Site Visit, May 15, 2025

The proposed North Coast Land Holdings project includes the demolition of a maintenance shed that has been used by the Baptist Seminary in years past and is currently being used to maintain the property. It is located near the intersection of Shuck Drive and Oliver Lane. A Phase 1 Environmental Site Assessment (ESA) was performed for the project in 2014 by The Consulting Group. The ESA concluded that there are no Recognized Environmental Conditions on the site, in other words, no apparent substantial contamination. The ESA information supported a Draft Environmental Impact Report (EIR) conclusion of a less-than-significant environmental impact related to hazardous materials contamination that might potentially occur as a result of demolition and project construction.

There were public comments received on the Draft EIR regarding the lack of reference to the maintenance shed in the Phase 1 ESA. Therefore, a Senior Environmental Scientist from Ascent with experience performing ESA fieldwork, Kelley Kelso, CPESC, QSD/QSP, QISP, performed a site visit of the maintenance shed as part of the County of Marin's obligation to make a good faith effort in its environmental analysis and responses to public comment. This memo summarizes for use in the EIR the observations made by a qualified professional during the site visit and supplements substantial evidence provided in the Phase 1 ESA; however, it is not a Phase 1 or 2 ESA.

Ms. Kelso was shown the site by Bruce Jones, Applicant's representative, and Robin Fies, County of Marin County CDA representative, on May 15, 2025. Bruce expressed he was not aware of any hazardous substance contamination or petroleum contamination of the soil around the maintenance shed area. The buildings in the project area have the potential to include lead-based paint but no paint was observed flaking from the maintenance shed. Kelley walked the entire maintenance shed site and focused on the hazardous materials stored within the maintenance shed, the underground storage tank adjacent to the maintenance shed, and the hydraulic lift inside the maintenance shed. These features were included in the public comments on the Draft EIR.

Chemicals Inside the Maintenance Shed

There are chemicals typically used in routine landscape maintenance and equipment maintenance, including oil, lubricant, and gasoline, stored inside the maintenance shed (Photo 1). There is no evidence of any spills of these chemicals or any evidence of contamination around the maintenance shed from these materials (Photo 2).

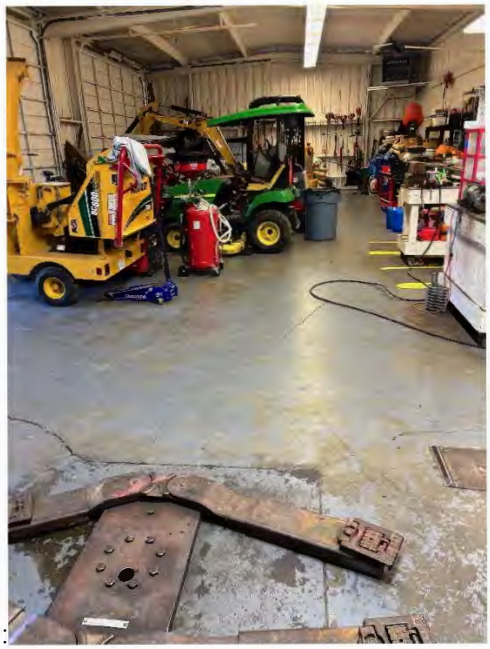


Photo 1: Chemicals stored within maintenance shed



Photo 2: Front of maintenance shed; no evidence of spills

Underground Storage Tank

An underground storage tank (UST) was used by the seminary to provide fuel for landscaping equipment. According to Mr. Jones, the tank has not been used and has remained empty for approximately 30 years. There is no stained soil or odors of fuel or other chemicals at or surrounding the location of the tank that would indicate a spill, fuel leak, or fuel fumes. Photos 3 through 6 show the tank location and surrounding area.



Photo 3: View of UST area facing west; no evidence of contamination



Photo 4: View of UST area facing south; no evidence of contamination



Photo 5: Area surrounding UST; no evidence of contamination



Photo 6: Close up of above ground component of UST; no stained soil or other contamination evidence.

Hydraulic Lift Inside the Maintenance Shed

There is a hydraulic lift inside the maintenance shed; it is operated by compressed air pressure, not hydraulic fluid. There is an enclosed subsurface cylindrical component of the lift. There is no evidence surrounding the maintenance shed of any leak associated with the hydraulic lift. Photo 7 shows the lift inside the maintenance shed.

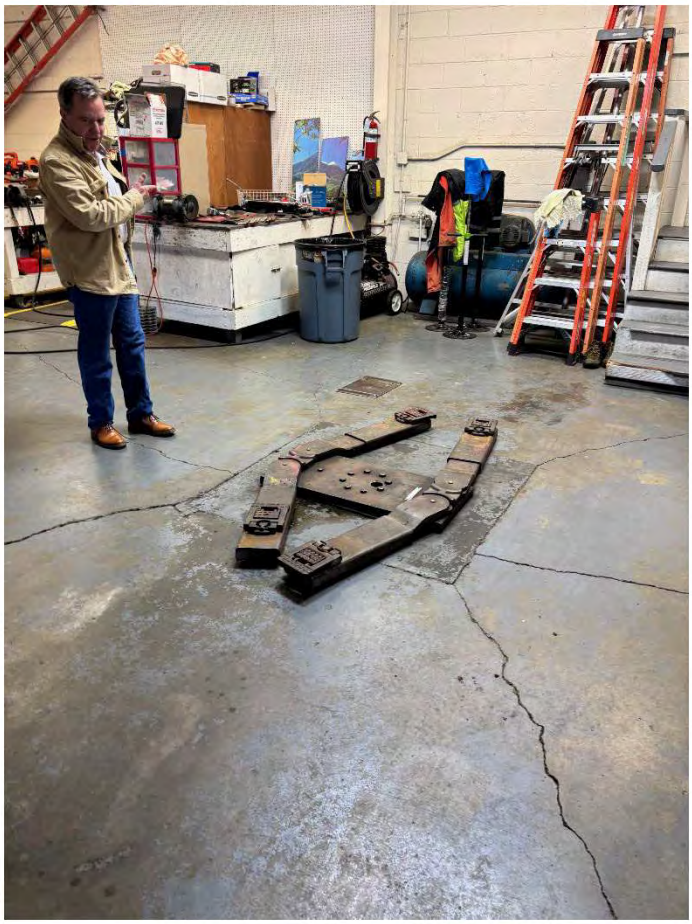


Photo 7: Hydraulic lift inside maintenance building; operated by compressed air; no evidence of contamination

Adjacent Food Garden

Notably, the operators of the maintenance shed are growing produce in a food garden down slope from the maintenance shed (Photo 8). It demonstrates the operator's confidence about the absence of harmful contamination in soils around the shed.

Conclusion

No evidence of hazardous material spills; soil contamination from petroleum, oil, lubricants, or other chemicals; or fuel or chemical odors or fumes were observed in the vicinity of the maintenance shed during the May 15, 2025 site visit. The information from the site visit supports the Draft EIR conclusion that the proposed project would result in a less-than-significant environmental impact related to hazardous materials.



Photo 8: Garden down slope of the maintenance building