**From:** Valeria Bentorkia-Moran
**To:** BOS Legislation, (BOS)
**Cc:** Emily Lowther Brough; tcatalano@reubenlaw.com
**Subject:** Re: File No. 250134 | Appeal of CEQA Determination (Exemption)
**Date:** Friday, April 4, 2025 1:42:47 PM
**Attachments:** image001.png
2132 HOA Appeal ltr 4.4.25 w EXs.pdf

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Dear Board of Supervisors:

Please find the attached correspondence from attorney Emily L. Brough regarding the above referenced matter.

Kind regards,
**Valeria Bentorkia-Moran**
Legal Administrative Assistant

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Please see our website for information about our East Bay and Monterey office locations.
**Please Note Our New San Francisco Address.**

ZACKS & FREEDMAN PC

April 4, 2025

San Francisco Board of Supervisors Via Email
1 Dr. Carlton B. Goodlett Place
Room 244
San Francisco, CA 94102
bos.legislation@sfgov.org

Re: File No. 250134
Appeal of CEQA Determination (Exemption)
Proposed 2142 22nd Street Project (2024-005274PRJ)
Hearing: April 15, 2025 at 2:00 p.m.

Dear Board of Supervisors:

My office represents appellant 2132 & 2136 22nd Street HOA ("Appellant") in the above-referenced matter. On January 30, 2025, Appellant filed a timely Letter of Appeal, challenging the Planning Dept.'s December 18, 2024 California Environmental Quality Act (CEQA) Determination that the proposed 2142 22nd Street project ("Project") is exempt from CEQA review under CEQA Guidelines Sections 15301 and 15303 ("Exemption"). Appellant's building is located immediately next door to the Project at issue in this appeal.

The proposed Project is for construction of a new 40-foot-tall, six-story over basement, 9,195-gross-square-foot, residential building with five dwelling units in the Portero Hill district of San Francisco. The Project first requires (1) demolition of an existing 75 yr. old single-family home and (2) excavation of 1,050 cubic yards of soil, to a depth of approximately 30.5 feet below grade at the Project site.

The Project is planned on a significantly sloped site that that is subject to the San Francisco Slope and Seismic Hazard Zone Protection Act ("SSHZP Act") and:

(1) Exceeds an average slope of 4 horizontal to 1 vertical (4H:1V / 25%) and reaches over a 40% grade in some areas; (Topographic Map of San Francisco: 4H:1V Slope; also see **Exhibit A,** screenshot of Project site; **Exhibit B**, Project Report p. 6.)
(2) Is located in the California Seismic Hazard "Liquefaction" Zone; (California Seismic Hazard Zone Map; also see **Exhibit C,** screenshot of Project site.)
(3) Contains potentially asbestos-laden Serpentine Bedrock; (**Exhibit B**, Project Report p. 6, Fig 4) and
(4) Contains a potentially Significant and/or Landmark Tree as defined by San Francisco Public Works. (**Exhibit D;** https://sfpublicworks.org/services/significant-and-landmark-trees.)

Despite these significant environmental factors and risks at the Project site, the Project sponsor has not even retained a licensed geologist to identify and define the risks involved, in violation of the San Francisco Building Code and SSHZP Act. Moreover, the single report the Project Sponsor has obtained, from Adept Construction Solutions, Inc. ("Project Report") is deficient in multiple ways. First, the Project Report erroneously states that the Project site is *not* in a California Seismic Hazard "Liquefaction" Zone (See, **Exhibit B**, Project Report p. 11.), when the link to the State Map on the Planning Dept.'s website plainly shows that it *is* in a California Seismic Hazard "Liquefaction" Zone (California Seismic Hazard Zone Map; also see **Exhibit C,** screenshot of Project site.).

Second, the Project Report fails to adequately investigate the above-identified risks at the site, which in turn result in inadequate recommendations for the risks involved. For example, despite there being a risk of asbestos fibers contained in the known underlying Serpentine Bedrock (see, Cal. Code Regs. tit. 17, § 93105), no licensed geologist has been retained to opine on the risks associated with excavating Serpentine, nor to propose any mitigation to address the risk of these fibers becoming airborne. (**Exhibit B**, Project Report; **Exhibit E** Declaration of Alan Kropp, GE ("Kropp Dec.").) Moreover, the soil investigation that has been carried out is also woefully inadequate. (*Ibid.*) The Project calls for excavating to 30.5 feet in depth. However, the deepest borehole made at the Project site was only 5 feet in depth. (**Exhibit B**, Project Report pp. 6-7; see discussion in **Exhibit E**, Kropp Dec.) And, testing was only done on the first couple of feet of soil at the Project site. (**Exhibit B**, Project Report pp. 8-9; see discussion in **Exhibit E**, Kropp Dec.)

Moreover, despite not proposing proper mitigation for the significant environmental risks at the site, the Project Report further opines that excavation and construction of foundations at the Project site is challenging because of:

> 1. A very steep topography and small size of the lot which limits the size of equipment that can be used for excavations;
> 2. Bedrock composition coupled with site access restricts the size of drilling equipment necessary for deep piers;
> 3. Neighboring buildings adjacent to proposed excavations will require some form of temporary shoring.

(**Exhibit B**, Project Report p. 13.) The Project Report concludes that: "It is imperative in structural engineering and shoring design to consider architectural and structural design of the improvements located along subject site eastern property lines, *and especially the basement depth of the [Appellant's] building.*" (**Exhibit B**, Project Report p. 14 (emphasis added.).)

As detailed further below, the Planning Dept. has approved illegal construction activities and a CEQA Exemption for a Project with indisputable environmental impacts. The Board should therefore overturn the Planning Dept.'s Exemption and return the Project to department staff for additional environmental review.

## Applicable Law: CEQA and the "Exceptions" to "Exemptions".

Categorical CEQA exemptions are allowed for certain classes of activities that can be shown not to have significant effects on the environment. (Pub. Res. Code § 21084(a).) Public agencies utilizing CEQA exemptions must support their determination that a particular project is exempt with substantial evidence that supports each element of the exemption. (Pub. Res. Code § 21168.5.) A court will reverse an agency's use of an exemption if the court finds evidence a project may have an adverse impact on the environment. (*Dunn Edwards Corp. v. Bay Area Air Quality*

*Management Dist.* (1992) 9 Cal.App.4th 644, 656 [disapproved on unrelated grounds in *W. States Petroleum Assn. v. Superior Ct.* (1995) 9 Cal.4th 559, 570].)

Moreover, while several exemptions to CEQA exist, exceptions to these exemptions apply where certain environmental risks could be present. As applicable here, "[a] categorical exemption ***shall not be used*** for an activity where there is a ***reasonable possibility*** that the activity will have a significant effect on the environment due to ***unusual circumstances***." (Cal. Code Regs. tit. 14 ["Guidelines"], § 15300.2 ["Unusual Circumstances Exception"], emph. added.) In addition, "[a] categorical exemption shall not be used for a project which may result in damage to scenic resources, including but not limited to, trees . . . ." (Guidelines § 15300.2 ["Scenic Resources Exception"].)

On December 18, 2024, the Planning Dept. exempted the Project under CEQA Guidelines section 15301 (Class 1), which exempts demolition and removal of single-family residences. (Guidelines § 15301(l)), and CEQA Guidelines section 15303 (Class 3), which exempts structures designed for a maximum of six dwelling units in urban areas (Guidelines § 15303(b)). However, all of the available evidence shows that the Project is not eligible for a categorical exemption under CEQA because exceptions apply to the Project site.

First, the Unusual Circumstances Exception applies to the Project because unusual circumstances on the site indicate there is a reasonable possibility that the proposed Project will have a significant effect on the environment. The Project is planned on a *substantially* sloped site (up to 40%) located in a State Liquefaction Hazard Zone and subject to the SSHZP Act—and has not even had a licensed geologist evaluation, as required by law. In addition, Serpentine Bedrock underlies the Project site, which is known to contain asbestos fibers that can become airborne when excavated. The Project Report, while deficient for the reasons stated above, further identifies concerns related to construction related activities such as shoring, excavation, and potential impacts on Appellant's next-door property. Indeed, the City's Exemption even admits the Project could present potentially significant impacts concerning the site's steep slope. (See, Exemption p. 2.)

Second, the Scenic Resources Exception applies because there is a potentially Significant and/or Landmark Tree located on the Project site that has not been considered during Project planning.

## The Unusual Circumstances Exception applies to the Project Because it is Proposed on a Site Subject to Both the San Francisco Slope and Seismic Hazard Zone Protection Act and Located on a State Seismic Hazard "Liquefaction" Zone, and Contains Potentially Toxic Serpentine Bedrock.

Under the Unusual Circumstances Exception "a challenger must prove both unusual circumstances and a significant environmental effect that is due to those circumstances." (*Citizens for Env't Resp. v. State ex rel. 14th Dist. Ag. Assn.* (2015) 242 Cal.App.4th 555, 574.) And,"[o]nce an unusual circumstance is proved under this method, then the party need only show a *reasonable possibility* of a significant effect due to that unusual circumstance." (*Ibid*, original italics.)

A project's "unusual circumstances relate to some feature of the project that distinguishes the project from other features in the exempt class." (*Citizens for Env't Resp. v. State ex rel. 14th Dist. Ag. Assn.* (2015) 242 Cal.App.4th 555, 574. emphasis added; also see, *Azusa Land Reclamation Co. v. Main San Gabriel Basin Watermaster* (1997) 52 Cal.App.4th 1165, 1207, [courts view circumstances as unusual within the meaning of the exemption when "the circumstances of a particular *project* differ from the general circumstances of the *projects* covered by a particular categorical exemption . . . ." italics added.].)

Here, unusual circumstances exist at the Project site, which plainly distinguishes the Project from those in the exempt classes cited by the Planning Dept. The Project Site is located in an area subject to the SSHZP Act. (SF Building Code § 106A.4.1.4 et seq.) The Topographic Map of San Francisco: 4H:1V Slope shows that the Project site exceeds an average slope of 4 horizontal to 1 vertical (4H:1V). (Also see, **Exhibit A,** screenshot of Project site.) The Project Report identifies the site slope as steep as a 40%+ grade in some places. (**Exhibit B**, Project Report p. 6.) The Project Site is also located in a "Liquefaction Zone" per the California Seismic Hazard Zone Map. (Also see **Exhibit C,** screenshot of Project site.) The State's Seismic Hazard "Liquefaction" Zone consists of "[a]reas where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation . . . would be required." (See, California Seismic Hazard Zone Map.)

The Project is therefore subject to the SSHZP Act's requirements. (SFBC § 106A4.1.4.3.) Under the SSHZP Act:

> Because landslides, earth movement, ground shaking, drainage issues, and subsidence are likely to occur on or near **steeply sloped properties and within other defined areas causing severe damage and destruction to public and private improvements, the Board of Supervisors finds that the public health, safety, and welfare is best protected** if the Building Official causes permit applications for the construction of new buildings or structures and certain other construction work on property subject to the Slope and Seismic Hazard Zone Protection Act to undergo additional review for structural integrity and effect on hillside or slope stability.

(SFBC § 106A4.1.4.2, emph. add.) Moreover, the SSHZP Act itself contemplates CEQA review:

> The requirements for projects subject to the Slope and Seismic Hazard Zone Protection Act are in addition to all other applicable laws and regulations**, including any and all requirements for environmental review under the California Environmental Quality Act; compliance with the requirements contained herein does not excuse a project sponsor from compliance with any other applicable laws and regulations**.

(SFBC § 106A4.1.4.2, emph. add.)

SF Building Code § 106A.4.1.4.4 requires that ***both*** a licensed geologist and licensed geotechnical engineer be retained for any project subject to the SSHZP Act, to identify and define the risks involved with any building construction:

> All permit applications submitted to the Central Permit Bureau for construction work on properties subject to the Slope and Seismic Hazard Zone Protection Act shall include report(s) prepared and signed **by both a licensed geologist and a licensed geotechnical engineer identifying areas of potential slope instability, defining potential risks of development due to geological and geotechnical factors**, including information required by this section 106A.4.1.4.4 and Departmental guidelines and regulations, and making recommendations regarding the proposed development.

(SFBC § 106A.4.1.4.4)

According to Project information, construction will involve excavation of approximately 1,050 cubic yards of soil, and the Project sponsor intends to excavate 30.5 feet below grade, on a slope of greater than 25%—and up to over 40%.[1]

The Unusual Circumstances Exception plainly applies here, despite the Planning Dept.'s downplayed contention that "[i]t is not unusual for a residential development to occur in a residential area on a steeply sloped lot in San Francisco." (Planning Dept. 3/11/25 Response to Appeal, p. 5.) The significantly sloped Project site (up to over 40%) is both located in a State Liquefaction Zone and subject to SSHZP Act. A side-by-side comparison of the Topographic Map of San Francisco: 4H:1V Slope and California Seismic Hazard Zone Map show that both of these hazardous conditions are not normally present in a residential Project site. In addition to this unusual circumstance, Serpentine Bedrock underlies the Project site, which is known to contain asbestos fibers that can become airborne when excavated. While Serpentine Bedrock is present in various areas in the City, when combined with the significant slope grade, shoring, excavation concerns identified by the Project Report, the potential impacts become unusual for a construction site. The Exemption itself even admits the Project could present potentially significant impacts. (See, Exemption p. 2.) Even despite all the risks present at the site, there has not been sufficient geological investigation, and the Project applicant has failed to retain a licensed geologist as required by the SSHZP Act. (See, **Exhibits A-E**.)

Taken together, these are not "normal" site conditions in San Francisco. (*Ibid.*) Rather, they constitute "unusual circumstances" that plainly present "a *reasonable possibility* of a significant [environmental] effect." (*Citizens for Env't Resp.*, *supra*, 242 Cal.App.4th at p. 574.) Thus, the Board should grant the appeal and require further environmental review.

## The Scenic Resources Exception Applies to the Project Because There is Potentially a Significant and/or Landmark Tree located on the Project Site.

CEQA's Scenic Resources Exception provides "[a] categorical exemption shall not be used for a project which may result in damage to *scenic resources*, including but not limited to, trees . . . ." (Guidelines § 15300.2, emph. add.) Relatedly, San Francisco protects its trees as "an essential part of the City's aesthetic environment" that "bring[s] beauty to our neighborhoods and commercial districts." (SFPW Code § 801.)

Here, a very large, mature Hollyleaf Cherry tree is located at the Project site, and is in grave danger of being negatively impacted by the construction of the Project's proposed five-unit building and related excavation. (Exhibit D.) Appellant has recently learned from the San Francisco Department of Public Works that this Hollyleaf Cherry tree may be considered "Significant" under the San Francisco Public Works Code:

> [A] significant tree shall be a tree: . . . on privately owned-property with any portion of its trunk within 10 feet of the public right-of-way, and . . . that satisfies at least one of the following criteria: (a) a diameter at breast height (DBH) in excess of twelve (12) inches, (b) a height in excess of twenty (20) feet, or (c) a canopy in excess of fifteen (15) feet.

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[1] Under San Francisco Building Code § 3307 and California Civil Code § 832, the applicant is required to take action to protect the adjoining property from any damage associated with the excavation.

(SFPW Code § 810A.) The local Code heightens requirements for any request to remove a Significant Tree, as well as imposes additional requirements for "measures to protect such significant trees on a construction site against damage to trunk, roots, and branches . . . ." (SFPW Code § 810A(d).) Further:

> It shall be unlawful for any person to engage in any construction work on private or public property without first taking steps to protect Street Trees, Significant Trees, and Landmark Trees from damage, including damage caused by soil compaction or contamination, excavation, or placement of concrete or other pavement or foundation material . . . . If any construction work results in the Injury or damage to such Trees, the responsible party(ies) may be subject to the penalties set forth in Section 811 of this Article.

(SFPW Code § 808(c).)

Appellant anticipates that the DPW site visit to determine whether the Hollyleaf Cherry Tree on the Project site is a Significant Tree (and potentially even a Landmark Tree, per SFPW Code § 808) will occur within the coming weeks. Nonetheless, regardless of whether the tree meets the local Code definition of a Significant Tree, it meets the definition of a scenic resource under San Francsico Code and CEQA's Scenic Resources Exception. Further environmental review is therefore required.

## **CONCLUSION**

Pursuant to the above, Appellant respectfully requests the Board grant the appeal, overturn the Planning Dept.'s Exemption and return the Project to department staff for additional environmental review.

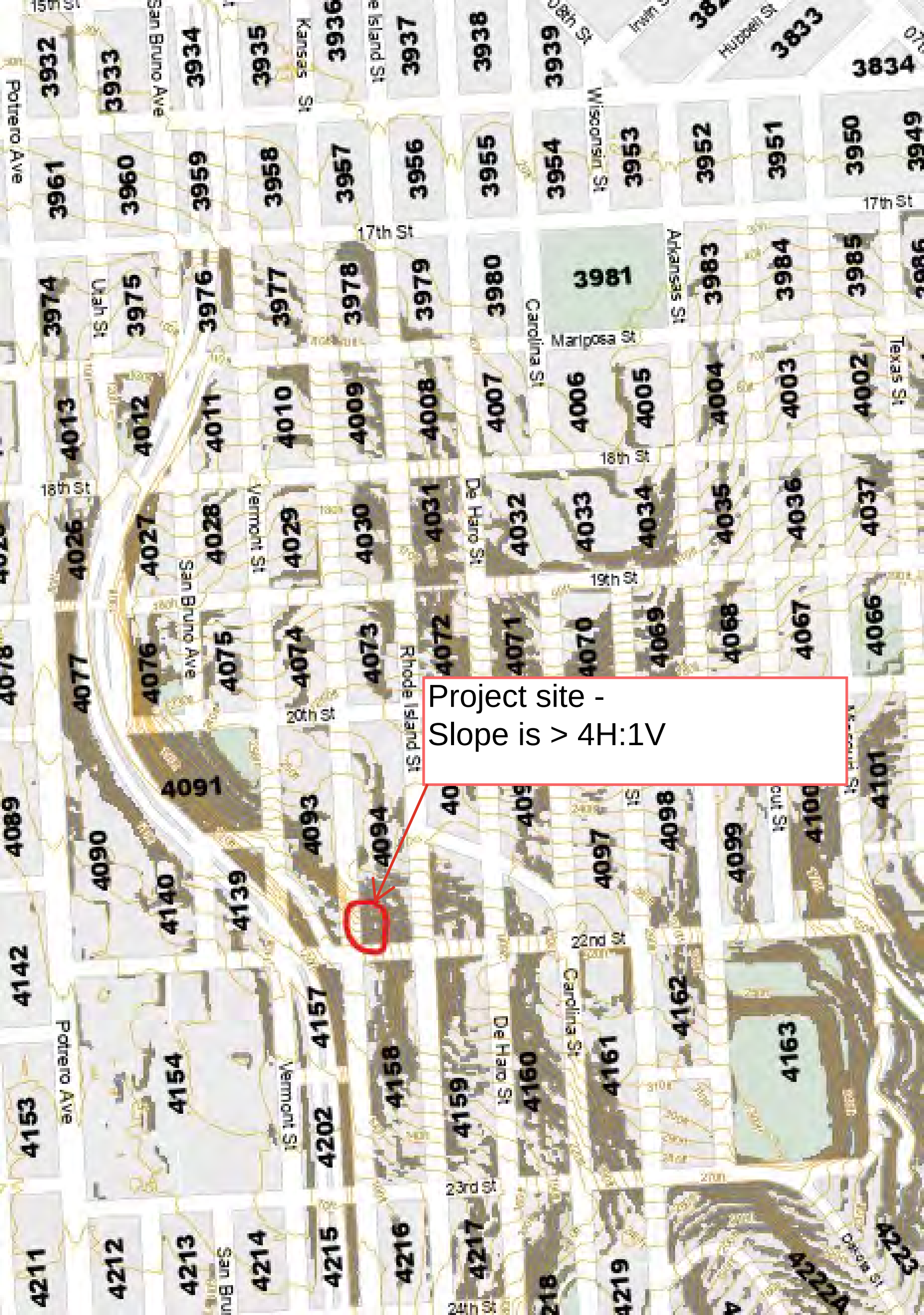
Very truly yours,

ZACKS & FREEDMAN, PC

Emily L. Brough
Attorneys for Appellant
2132 & 2136 22nd Street HOA

Enclosures: Exhibits A-E.

EXHIBIT A



Project site -
Slope is > 4H:1V

EXHIBIT B

AdEPT
Construction Solutions Inc.

MTR INC

# GEOTECHNICAL INVESTIGATION

## December 20, 2023

**PROJECT:**
2022-0116
2142 22nd Street,
San Francisco, CA

**PREPARED BY:**

Kleyner

IGOR M KLEYNER
No. GE2873
Exp. 09/30/25

IGOR M KLEYNER
No. C 68621
Exp. 09/30/25

Igor Gary Kleyner, Ph.D., C.E., G.E.
Registered Geotechnical Engineer No. 2873

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| | |
|---|---|
| **Date** | December 2, 2023 |
| **Project No.** | 2023-0116 |
| **Subject**: | Geotechnical Investigation<br>2142 22nd Street,<br>San Francisco, CA |

Dear Client:

As authorized, **Adept Construction Solutions, Inc**./MTR, Inc. has completed a geotechnical investigation for the proposed improvements to occur at the subject site at 2142 22nd Street, San Francisco, California. The purpose of this investigation was to explore subsurface conditions and obtain geotechnical data to be used in the demolition of the existing residential structure, excavations, design and construction of the new building.

Map of the area shows that the site is at or near a landslide potential zone in the southern portion (Figure 5). No indication of any land slide at subject property was observed. Additionally, the site is adjacent to a landslide hazard zone that extends west of the subject area (Undeveloped Kansas Street sloping area).

Our findings indicate that the site is suitable for the proposed construction from a geotechnical engineering perspective provided that the recommendations presented in this report are followed.

## 1.0 INTRODUCTION

Adept Construction Solutions Inc., in collaboration with its geotechnical division, Modern Technology Resources Inc., was retained to serve as a geotechnical engineer of record at the project site 2142 22nd Street, San Francisco, California, Project No. 2023-0116 (Fig.1and Fig. 2). In this report, we present the results of our foundation investigation for the proposed construction to occur at the subject property. The investigation was conducted by identifying site conditions, performing excavations, and testing properties of the excavated material. Included in this report are: relevant maps, USGS seismic design parameters, excavation data, and site plans. We stand ready to review structural engineering plans for conformance with geotechnical recommendations.

The geotechnical reports and geotechnical review and compliance letters will be submitted to the Department of Building Inspections. Unless we are hired to review structural plans and perform on-site reviews and observations during construction stage of the project or they are coordinated with our firm, Adept Construction Solutions, Inc./MTR, Inc. will not be held responsible for compliance with geotechnical recommendations presented in this report.

## 2.0 PROPOSED CONSTRUCTION

To our knowledge, the proposed improvements to occur at the subject property will include full demolition of the existing building, site grading, relatively deep excavations and construction of the four to five stories concrete and wood framed multi-family building with lower 2 stories that are partially or fully below grade thus requiring relatively high retaining wall system in conjunction with possible temporary shoring.

## 3.0 SCOPE OF WORK

The purpose of this investigation was to explore the soils and geological conditions at the subject property, evaluate any potential geological hazards and to provide recommendations for the planned improvements.

The scope of services for this investigation included:

- Site reconnaissance;
- Subsurface excavations;
- Sampling of soil;
- A review of published literature relevant to the project;

- Preparation of this report.

The investigation did not include screening of the site for any potentially hazardous or corrosive materials.

## 4.0 SITE INVESTIGATION

An initial site reconnaissance and subsurface exploration was performed by Igor Kleyner, Registered Civil and Geotechnical Engineer. Field reconnaissance included observation and excavation at the project site. Subsequent laboratory analysis and investigation results support our data. Based on available and collected information, we were able to make geotechnical engineering recommendations that adhere to current building codes and criteria.

### 4.1 SITE DETAILS

The subject property 2142 22nd Street (APN 4094-038), located in the Potrero District of San Francisco approximately 1/5 mile east of Highway 101consists of an existing single-family residence. It is located on the western slopes of Potrero Hill. The site is bound by 22nd Street to the south and neighboring property 971 Kansas Street (APN 4094-039) to the north. To the west the site is bound by City property (undeveloped portion of the Kansas Street right of way) and to the east by the neighboring properties 2132 & 2136 22nd street (APN 4094-079 & 4094-080). This “corner” lot is 25’ wide and 100’ long and consists of the approximately 40’ leveled area on the elevated northern side. Elevations above the sea level at the site range from approximately 190’ at the northern boundary of the property to 145’ at the southern boundary (Figure 3).

The existing house is situated on the relatively leveled pad at the upper portion of the subject site area. The front and rear yard contains a number of dilapidated rock/concretes retaining wall terraces leading down the steep slope to the bottom of the lot. The yard area is overgrown with brush and grub vegetation.

The house appears to be approximately over 75 years old. The structure is wood framed, two stories in height, and is constructed on shallow footings and slab-on-grade. The existing house supposed to be fully demolished and new 4 to 5 stories multi-family residential building cut into the steep sloping southern portion to be built on the property.

Topography of the general area and of the site slopes downward to the south-west at variable inclinations due to natural geologic evolution and, to a lesser degree, the past earthwork operations associated with the intermittent development of this older residential neighborhood. Generally, site grades decline steeply southward at l.2:1 to 2.4:1 declination (horizontal to vertical) that continues with less slope to the west. Topographical Survey of subject property should be incorporated into any structural engineering design in order to provide future geotechnical evaluation and design reviews.

During our reconnaissance of the site, we did not observe any areas of major instability and no major slides have been mapped on the property. However, we did observe dilapidated and partially deformed rock/concretes retaining wall terraces and indications of minor sloughing and erosion type downhill movement of the surface soils at random locations across the steep slopes.

## 4.2 SUBSURFACE INVESTIGATION

### 4.2.1 Geologic.

We reviewed published geological literature that was relevant to the project site. According to the Geologic Map of the San Francisco North 7.5' Quadrangle (Vicinity Geologic Map, Figure 4), 2142 22nd Street and the adjacent areas are situated on serpentine bedrock (sp). Serpentine is of the Franciscan Complex and is Late Jurassic to Cretaceous-aged (66 to 164 million years old).

Serpentine is typically bluish gray mottled with dark green and brown. The serpentine, along with other mixtures of Franciscan rocks, forms the ridges of Potrero Hill. The hill is surrounded by a broad area of younger, low-lying sedimentary deposits. Serpentine is relatively competent and will typically lack a thick soil mantle. Soil situated above serpentine is typically has silt and clay material. Earthquake stability of the unit is rated high (Schlocker, 1974). The contact between bedrock and other deposits can be observed in general at the 1-4 feet depth.

### 4.2.2 Excavations.

Personnel from this office visited the project site at 2142 22nd Street, San Francisco, California on December, 1, 2023 to explore subsurface conditions and collect samples for laboratory analysis. We performed a total of four excavations at the project site to reveal the underlying conditions.

- Borehole-1 was excavated to a depth of 5'. In the first 1' of the borehole, we encountered moist, loose fill soil with organic content. The underlying 2' revealed loose to medium dense sandy soil with low plasticity silty fines and serpentine bedrock remnants. This material was under layered by very severely to severely weathered serpentine bedrock with clay and silt inclusions. Hardness in this layer ranged from soft to medium hard. No free groundwater was detected.

- Borehole-2 encountered approximately 1/2’ of loose fill with organic content at the top. We then encountered loose to medium dense sandy soil with low plasticity silty fines and serpentine debris. This material was followed at the depth of 1.5-2 feet by very severely to severely weathered, soft to medium hard serpentine bedrock with clay and silt to a depth of 3’. The remaining 1’ of the borehole revealed weathered, medium hard serpentine bedrock with silt and clay inclusions. No free groundwater was detected.
- Borehole-3 encountered 6” of loose fill with organic content at the top. We then encountered loose to medium dense sandy soil with low plasticity silty fines and serpentine gravel followed by very severely to severely weathered, soft to medium hard serpentine bedrock with clay and silt. No free groundwater was detected.

- Trench-1 was dug to a maximum of 4 feet. Loose fill soil with organic content was encountered in the first foot. The remainder of the excavation revealed severely weathered serpentine bedrock, less weathered with depth, massive with silt and clay inclusions and seams. No free groundwater was detected.

Detailed locations and logs of boring and excavation are found in Appendix A. See also Unified Soil Classification System and Key to Bedrock Descriptions in Appendix B.

Please note that the drilling resistance encountered in the borings and resistance to excavation indicated that the bedrock materials graded less weathered and more competent with depth. Free groundwater was not observed in our borings and probably exists at depths somewhat greater than those explored. However, based on the hillside location of the property and our experience in the general area of the site, it is our opinion that groundwater seepage may be encountered at the site, in the required excavations and behind retaining walls, particularly after prolonged rains in the wet season.

We wish to point out that the exploration at the subject site was extended to the maximum depth possible (practical refusal) with a small size equipment available to be used on the very steep slope of the small site with restricted access.

We also observed serpentine outcrops in the area of the undeveloped Kansas street right of way. The conditions of this material in general correspond to the subject site bedrock

### 4.2.3 Laboratory Testing.

Tests were performed as per procedures in ASTM D2487-11. In boreholes and trench majority of particles in the collected soil samples were retained in the No. 200 and up sieves, indicating mostly sandy soil with low plastic silty fine material Sieve test results can be found below.

| | | | | | |
|---|---|---|---|---|---|
| BH 1 | | | | | |
| 1’ | | | | | |
| Oven Dry Sample = | | 225.4 | | | |
| Sieve # | Opening (mm) | Mass Retained (g) | % of Total | Cumm. % | % Finer |
| No. 4 | 4.75 | 20.6 | 9.14 | 9.14 | 90.86 |
| No. 10 | 2 | 21.05 | 9.34 | 18.48 | 81.52 |
| No. 20 | 0.85 | 40.86 | 18.13 | 36.61 | 63.39 |
| No. 40 | 0.425 | 34.05 | 15.11 | 51.71 | 48.29 |
| No.200 | 0.075 | 92.15 | 40.88 | 92.60 | 7.40 |
| Pan | 0.01 | 16.63 | 7.38 | 99.97 | 0.03 |
| | | 225.34 | | | |

| | | | | | |
|---|---|---|---|---|---|
| BH 1 | | | | | |
| 2’ | | | | | |
| Oven Dry Sample = | | 224.9 | | | |
| Sieve # | Opening (mm) | Mass Retained (g) | % of Total | Cumm. % | % Finer |
| No. 4 | 4.75 | 21.48 | 9.55 | 9.55 | 90.45 |
| No. 10 | 2 | 39.33 | 17.49 | 27.04 | 72.96 |
| No. 20 | 0.85 | 37.61 | 16.72 | 43.76 | 56.24 |
| No. 40 | 0.425 | 27.86 | 12.39 | 56.15 | 43.85 |
| No.200 | 0.075 | 92.15 | 40.97 | 97.12 | 2.88 |

| | | | | | |
|---|---|---|---|---|---|
| Pan | 0.01 | 6.35 | 2.82 | 99.95 | 0.05 |
| | | 224.78 | | | |
| BH 3 | | | | | |
| 1’6” | | | | | |
| Oven Dry Sample = | | 146.9 | | | |
| Sieve # | Opening (mm) | Mass Retained (g) | % of Total | Cumm. % | % Finer |
| No. 4 | 4.75 | 4.22 | 2.87 | 2.87 | 97.13 |
| No. 10 | 2 | 6 | 4.08 | 6.96 | 93.04 |
| No. 20 | 0.85 | 11.78 | 8.02 | 14.98 | 85.02 |
| No. 40 | 0.425 | 16.36 | 11.14 | 26.11 | 73.89 |
| No.200 | 0.075 | 92.15 | 62.73 | 88.84 | 11.16 |
| Pan | 0.01 | 16.29 | 11.09 | 99.93 | 0.07 |
| | | 146.8 | | | |
| BH 3 | | | | | |
| 2’6” | | | | | |
| Oven Dry Sample = | | 220.2 | | | |
| Sieve # | Opening (mm) | Mass Retained (g) | % of Total | Cumm. % | % Finer |
| No. 4 | 4.75 | 22.51 | 10.22 | 10.22 | 89.78 |
| No. 10 | 2 | 33.45 | 15.19 | 25.41 | 74.59 |
| No. 20 | 0.85 | 34.76 | 15.79 | 41.20 | 58.80 |
| No. 40 | 0.425 | 21.54 | 9.78 | 50.98 | 49.02 |
| No.200 | 0.075 | 92.15 | 41.85 | 92.83 | 7.17 |
| Pan | 0.01 | 15.74 | 7.15 | 99.98 | 0.02 |
| | | 220.15 | | | |

| | | | | | |
|---|---|---|---|---|---|
| BH 4 | | | | | |
| 1’6” | | | | | |
| Oven Dry Sample = | | 234.4 | | | |
| Sieve # | Opening (mm) | Mass Retained (g) | % of Total | Cumm. % | % Finer |
| No. 4 | 4.75 | 83.15 | 35.47 | 35.47 | 64.53 |
| No. 10 | 2 | 22.37 | 9.54 | 45.02 | 54.98 |
| No. 20 | 0.85 | 20.02 | 8.54 | 53.56 | 46.44 |
| No. 40 | 0.425 | 15.52 | 6.62 | 60.18 | 39.82 |
| No.200 | 0.075 | 92.15 | 39.31 | 99.49 | 0.51 |
| Pan | 0.01 | 1.14 | 0.49 | 99.98 | 0.02 |
| | | 234.35 | | | |

## 4.3 GEOLOGIC HAZARDS

The San Francisco Bay Area is in a seismically active region of the United States. Fault movement can be frequent and unpredictable; therefore, the Bay Area is highly susceptible to the effects of earthquakes, landslides, and other geologic hazards. Understanding the geological conditions at the project site significantly aids in construction and other civil engineering tasks. The following hazards with potential to impact the proposed construction are summarized below.

### 4.3.1 Landslides & Earthquake-Induced Land sliding.

Landslide potential is mapped in the southern portion of the parcel area (Figure 5). Additionally, the site is adjacent to a landslide hazard zone that extends west of the subject area.

During our excavations, we encountered relatively thin soil envelope over the bedrock. The soil is loose to medium dense up to 2-3 feet depth. The topsoil may pose some potential for soil erosion. However, solid concrete retaining structures, based on and embedded into the bedrock will mitigate landslide danger especially in a medium to strong strength earthquake. We also suggest utilize the rock bolts to facilitate earth materials retention during construction operation. We will observe for geological hazards during construction and make geotechnical recommendations as necessary.

### 4.3.2 Excavation Stability.

Relatively thick sections of native soil and bedrock materials will be exposed in excavations. All construction excavations should be made with temporary slopes or shored as recommended by the geotechnical engineer of record in this report and during construction. The shoring design recommendations including suggested shoring means and methods can be found in Appendix D.

### 4.3.3 Water Seepage & Existing Drainage Pipes.

Seepage may be encountered in temporary excavations and existing drainage pipes during construction. Install new drainage systems as it is recommended by the geotechnical engineer of record in this report and during construction.

### 4.3.4 Seismic Ground Shaking.

Intensities of an earthquake are strongly dependent on the distance from the ruptured fault and geological character of the ground. Earthquake effects must be considered due to the site's proximity to several active faults in the Bay Area. Any improvements should be designed according to current earthquake standards. The ASCE 7-16 Standard design parameters for current building code are included in this report in *Appendix C.*

### 4.3.5 Fault-Rupture & The Alquist-Priolo Act.

No known active faults directly intersect the project site at 2142 22nd Street, San Francisco. The nearest fault trace is the active San Andreas Fault, mapped approximately 5.4 miles west of the project site. The active Hayward Fault, which runs roughly parallel to the San Andreas and exhibits similar tectonic characteristics, is mapped 15.4 miles east.

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to prevent the construction of buildings used for human occupancy on the surface trace of active faults. We examined the current Alquist-Priolo Fault Zoning Map for the San Francisco North quadrangle, and found that the project site does not lie within this zone. Therefore, based on our reconnaissance and review of published maps, we conclude that the subject building will not be located across the active faults, and that the risk for surface fault-rupture is very low.

### 4.3.6 Liquefaction.

No liquefaction hazard potential is identified at the site address (*Figure 5*). Local geological, geotechnical, and groundwater conditions do not indicate a potential for permanent ground displacements. According to published maps, mitigation measures defined in Public Resources Code Section 2693(c) will not be required. We will observe soil material during excavations to confirm this information and suggest mitigation measures if necessary.

### 4.3.7 Soil Erosion Control.

Exposed soil is subject to varying degrees of erosion from surface water, and in some degree, from wind scour. Erosion control measures should be implemented at the time of construction and after construction completion.

### 4.3.8 Groundwater.

Our recent excavation conducted on December 1, 2023 did not encounter ground water at depth 5 feet below ground level. We acknowledge that fluctuations in groundwater level may occur due to variations in rainfall, landscaping, and other natural and human factors which may not have been evident during our measurements.

### 4.3.9 Tsunami Inundation.

We examined the official Tsunami Inundation Map created for the City & County of San Francisco, and found that the project site is not at risk of possible tsunami inundation during an earthquake event. The map incorporates both local and distant tsunami sources.

## 4.4 SEISMICITY

### 4.4.1 Regional Tectonics.

The San Francisco Bay Area is seismically active due to the region’s proximity to a major plate boundary. The Pacific Plate, located west of the project site, moves northwest relative to the North American Plate to the east, at a rate of about two inches per year. Movement between the plates is accommodated by right-lateral slip-on fault systems, most notably along the San Andreas Fault Zone which has slipped approximately 200 miles over 23 million years.

The San Andreas Fault is a complex system of parallel and interconnecting faults, and fault activity varies along sections of the fault. Related active faults of interest in the Bay Area include the major San Gregorio, Hayward, and Calaveras Fault Zones, and other fault splinters of lesser activity such as the Rodgers Creek Fault, Concord-Green Valley Fault, and the Greenville Fault. Faults are all roughly parallel to one another, and exhibit primarily right-lateral motion along with a small vertical component. Fault motion is responsible for many large magnitude earthquakes, such as the 7.9 Great San Francisco Earthquake in 1906 and the 6.9 Loma Prieta Earthquake in 1989 (Figure 7). Understanding these fault systems and their relationship to the San Francisco Bay region is key to the longevity of the area’s growing population and urban developments.

### 4.4.2 Fault Distances.

According to the California Geological Survey, an active fault is defined as causing surface displacement within Holocene time (*the last ~11,000 years*). The locations of the five nearest active faults are described below (Figure 6). All faults are generally northwest trending.

Active fault distances from project site.

| Active Fault | Approximate Distance from Project Site | | Orientation from Project Site |
|---|---|---|---|
| **San Andreas** | 6.4 mi | 10.3 km | West |
| **San Gregorio** | 9.1 mi | 14.6 km | West to southwest |
| **Hayward** | 14.4 mi | 23.5 km | East |
| **Mt. Diablo** | 25 mi | 40.2 km | East |
| **Calaveras** | 25 mi | 40.2 km | East to southeast |

### 4.4.3 U.S. Geological Survey Seismic Design Parameters.

The U.S. Geological Survey calculates gridded values of seismic design parameters. The tool is built in accordance with design code procedures and earthquake hazard information. It should be noted that these parameters will not prevent damage to existing structures; their main purpose is to prevent catastrophic collapse. The complete report is found in Appendix C. Parameters based on Site

Class D Classification "Stiff Soil" and Risk Category I/II/III are summarized below:

| PARAMETER | ASCE 7[2] |
|---|---:|
| $S_S$ | 1.5 |
| $S_1$ | 0.6 |
| $S_{MS}$ | 1.8 |
| $S_{M1}$ | TBD |
| $S_{DS}$ | 1.2 |
| $S_{D1}$ | TBD |
| $F_A$ | 1.2 |
| $F_V$ | TBD |
| $F_{PGA}$ | 1.2 |
| PGA | 0.606 |
| $PGA_M$ | 0.728 |

# 5.0 CONCLUSIONS AND RECOMMENDATIONS

## 5.1 DISCUSSION & CONCLUSIONS

It is our opinion that, from a soil and foundation engineering standpoint, the site is suitable for construction, provided that the recommendations presented in this report are incorporated into the proposed project.

The main challenge from geotechnical perspective at the subject site it requires relatively tall retaining wall system as well as foundation embedment into bedrock.

Excavation and construction of foundations is challenging for the following reasons:

1. A very steep topography and small size of the lot which limits the size of equipment that can be used for excavations;
2. Bedrock composition coupled with site access restricts the size of drilling equipment necessary for deep piers;
3. Neighboring buildings adjacent to proposed excavations will required some form of temporary shoring.

We suggest the following geotechnical considerations should be strongly considered in the structural design of the new building and site engineering:

According to the initial design of the proposed building deep excavations required and large volume of the soil and rock needs to be removed from the site. Shoring of this excavation especially at the eastern and northern sides may be necessary and, depending on temporary shoring design may require cooperation of the neighbors. We suggest conceptual design reducing the volume of exaction and simplifying the shoring. The shoring recommendations are given in Appendix D.

For the permanent retaining wall along northern property line, the perimeter and interior walls of the building, together with foundation embedment, can serve as a counterforce element enhancing the bearing capacity of the retaining wall system. Some of the building floors should have enough rigidity to provide restraining of the retaining walls.

As a foundation of the building/retaining walls we suggest to use combination of the spread/linear footings grid and structural slab (mat slab) embedded into bedrock.

It is imperative in structural engineering and shoring design to consider architectural and structural design of the improvements located along subject site eastern property lines, and especially the basement depth of the neighboring building.

Means and methods of construction should be considered in the structural design of the retaining walls and foundations and application of the following geotechnical recommendations.

### 5.2 RECOMMENDATIONS

Based on our investigations we can provide geotechnical recommendations for the projects at 2142 22nd Street, which satisfy the intent of 2019 California Building Code.

Detailed geotechnical design criteria, including soil and foundation engineering recommendations, are presented in the subsequent sections of this report.

## 6.0 GEOTECHNICAL DESIGN CRITERIA

The following geotechnical design criteria are based on the information presented above and adheres to generally accepted geotechnical practices.

## 6.1 EARTHWORK OPERATIONS

### 6.1.1 Demolition & Clearing.

The existing building at 2142 22nd Street supposed to be fully demolished. The area of the proposed improvement should be cleared of all obstructions including natural vegetation and debris.

After removal of the debris, areas to be graded and excavated should be cleared of deleterious materials, and vegetation, and then stripped of the upper soils containing roots and organic matter. All the cleared and stripped materials should be hauled off the site.

### 6.1.2 Excavation.

Significant excavations will be required. The conceptual excavations plan can be found at Appendix D1. We expect that excavations at the site can be conducted with conventional equipment, although difficulties due to lot size may be expected because of the shallow bedrock and ripping at some locations may be required. Excavations extending deeper into the bedrock may require extra effort, such as heavy ripping, hoe-rams, or jack- hammering. We anticipate that the bedrock will become harder and more massive with increasing depth. We suggest to use light equipment and jack-hammering to prevent substantial fracturing and weaking of the rock mass surrounding excavation. Approximate excavation optimum and possible conditions are shown in Figure 0.1

A monitoring program should be established to evaluate the effects of the construction on the surrounding buildings

Temporary Shoring that may be implemented in this area should have maximum allowable deformation 0.25 inches. Maximum temporary slope if required should not be steeper than 1 horizontals to 1 vertical.

### 6.1.3 Over-Excavation.

Because of the specifics of the site the proposed building should be founded on the bedrock. The soil if encountered, at the foundation base level should be over excavated and replaced by control strength material. If weak bedrock or soil inclusion is encountered, it should be over excavated and replaced by the control strength material. The depth and extent of excavation should be approved in the field by the geotechnical engineer prior to beginning of work.

### 6.1.4 Engineering Fill.

We do not expect significant structural soil fill at this project, except in some fringe areas. Also, engineered fill can be used to fill some empty spaces inside building to increase its stability. Existing soil removed during excavation should not be used as engineered fill. Prior to delivery to the site, proposed import should be tested in our laboratory to verify its suitability for use as structural fill and, if found to be suitable, further tested to estimate the water content and density at which it should be placed.

All engineered fill materials placed at the site should not contain rocks or lumps greater than 6-inches in greatest dimension with not more than 15 percent larger than 2½-inches.

All engineered fill placed at the site should be compacted to at least 95 percent relative compaction by mechanical means only, as determined by ASTM Test Designation D1557. The fill materials should be placed in lifts not exceeding 8-inches in un-compacted thickness.

### 6.1.5 Shoring.

Because steepness of the subject site, requiring heigh retaining wall and its small footprint limiting temporary slope utilization, temporary shoring may be an important element of design and construction.

Foundation elevation and base of excavation for the neighboring building at the eastern property should be used to define the surcharge loads on the shoring and permanent structures of the subject property.

Our experience with temporary shoring operations indicates that settlements of adjacent structures and improvements on the order of 1/4 inch could occur even if the shoring operations are carefully performed by an experienced specialty subcontractor. Therefore, we recommend that the structural engineer and specialty contractor take all possible measures to reduce the potential for settlement of the adjacent buildings and yard areas.

We recommend that the temporary shoring be installed by a professional contractor experienced in such work. We recommend that the excavation operations, installation of temporary shoring and retaining wall construction be performed during the dry months of the year (May through October) to avoid potential problems that can occur during the wet season, particularly after periods of prolonged rainfall. The detailed shoring recommendations are given in Appendix D.

### 6.1.6 Temporary Slopes.

Temporary slopes may be used in the time of excavation and mostly in northern and western directions inside of subject property along contour lines. If temporary excavations will be needed in public right of way, the SFDPW permit will be required.

Temporary slopes will need to be laid back in conformance with OSHA standards at safe inclinations, or temporary shoring will have to be installed. Temporary slopes should have a maximum vertical face of 3-feet with temporary cut slopes above the vertical face having a maximum inclination of 1/2:1 (horizontal to vertical) in approved by geotechnical engineer bedrock and clayey materials. If poor quality materials or seepage are encountered in the excavations the temporary slopes will have to be appropriately flattened. Conversely, if very competent bedrock material is exposed during the excavation operations the inclination of the temporary slopes may be up to 15 degrees from vertical. The materials exposed in the excavations should be evaluated by geotechnical engineer during the initial stages of the excavation operations and continues geotechnical observations in the process of excavations is required..

### 6.1.7 Finished Slopes.

We recommend that any new cut and fill slopes at the site have a maximum slope of 2:1 (horizontal to vertical). The tops of cut slopes should be rounded and compacted to reduce the risk of erosion. Fill and cut slopes should be planted with vegetation to resist erosion, or protected from erosion by other measures, upon completion of grading. Surface water runoff should be intercepted and diverted away from the tops and toes of cut and fill slopes by using berms or ditches.

### 6.1.8 Drainage & Erosion Control.

Where any cut and fill slopes are exposed or existing slopes are left at their present inclinations, erosion and surface sloughing could occur, thus requiring periodic maintenance of the slopes.

Concentrated water should not be allowed to flow across any slopes as erosion or weakening of surface soils could occur. Control of surface water runoff may require the construction of a concrete lined surface ditch to intercept rainwater runoff during periods of heavy precipitation. Please note, that natural colored concrete, such as tan or brown, will eliminate or minimize the visual impact of the recommended ditch on the hillside. The ditch should be sloped to drain toward catch basins and the collected water should be transported through closed pipes to suitable discharge facilities. The ditch and catch basins will require periodic cleaning and maintenance to function properly.

We recommend that all new cut and/or fil slopes and any existing slopes that are disturbed during the construction operations be covered with jute mesh (or the equivalent) and heavily planted with both a fast-growing variety of plant and with a permanent variety of ground cover. Site irrigation should be done only as required for plant survival.

We recommend that civil drainage plan, satisfying requirements of the SFPUC be prepared as a component of the design documentation. In site drainage construction SCH 35 minimum, pipes should be used. Specific surface and subsurface drainage requirements for retaining walls are presented below in the" Retaining Walls" section of this report.

Most of the site will be occupied by building. We recommend that rainwater collected on the roof of the building be transported through gutters, down spouts and closed pipes to approved discharge facilities.

## 6.2. RETAINING WALLS

Because, two stories of the house are partially underground, some building exterior walls also serve as retaining walls, which are the most important structural element of the proposed building. Two stories high retaining wall may be installed in garage and high retaining walls will be installed along the side property lines in order to create new living space and utilize lot size to it's maximum potential.

Retaining walls that will be utilized in the house must be designed to resist lateral earth pressures and any additional lateral pressure that may be caused by surcharge loads applied at the ground surface behind the walls. We recommend that unrestrained walls with a level surface or with a sloping surface flatter than 4:1 be designed to resist an equivalent fluid pressure of 50 pounds per cubic foot. Where the sloping surface is at an inclination of 2:1 or steeper, the unrestrained walls should be designed to resist an equivalent fluid pressure of 75 pounds per cubic foot. For walls with a sloping surface at an inclination between 4:1 and 2:1, a straight-line interpolation between the 50 and 75 pounds per cubic foot may be used. In this project restrained retaining wall with several layers of rock-bolts may be utilized. According to the geotechnical engineering practice for several layers restrained wall we recommend use trapezoidal load diagram.

If grouted rock bolt shoring system with permanent bolts will be utilized at this project, the active equivalent fluid pressure may be reduced to 30 pcf and 45 pcf for level and steep conditions correspondently.

We recommend that restrained walls be designed to resist the equivalent pressures given above, plus an additional uniform lateral pressure of 10H pounds per square foot, where H equals the height of backfill above the top of the wall footing in feet.

If the structural engineer determines that there are surcharge loads on any of the walls, they should be designed for an additional uniform lateral pressure equal to one-third or one-half of the anticipated surcharge load depending on whether the wall is unrestrained or restrained.

The above pressures assume that sufficient drainage will be provided behind the walls to prevent the build-up of hydrostatic pressures from surface and subsurface water infiltration. Adequate drainage may be provided by a sub-drain system consisting of 4-inch diameter perforated pipes SCH 35 min bedded in the permeable material. The permeable material should consist of clean gravel that is wrapped with a synthetic filter fabric. Alternatively, the drainage blanket could consist of a prefabricated drainage structure such as Mirafi Miradrain.

The bottom of the collector drainpipe should be at least 12 inches below lowest adjacent grade. Aggregate drainage blankets should be at least 1 foot in width and extend to within 1 foot of the surface. The uppermost 1-foot should be backfilled with compacted native soil to exclude surface water. The sub-drain pipes should be connected to a system of closed pipes that lead to the city storm drainage facilities. Any building walls should be appropriately waterproofed by an approved foundation waterproofing system.

Lined surface ditches should be provided behind any retaining walls that will have exposed sloping surfaces draining towards them. These ditches will collect runoff water from the slopes, and should be sloped to drain into the discharge facilities. The top of the walls should extend to at least 1-foot above the ditch.

A seismic pressure increment equivalent to a rectangular pressure distribution of 10•H pounds per square foot may be used, where H is the height of the soil retained in feet.

Wall backfill should consist of soil that is spread in level lifts not exceeding 8 inches in thickness. Each lift should be brought to at least optimum moisture content and compacted to no less than 90 percent relative compaction, per ASTM test designation D 1557. Retaining walls may yield slightly during backfilling. Therefore, walls should be properly braced during the backfilling operations.

Where migration of moisture through retaining walls would be detrimental or undesirable, retaining walls should be waterproofed as specified by the project architect or structural engineer. Building retaining walls should be water- proofed by a positive method such as hot-mopping.

Retaining walls should be supported on footings designed in accordance with the recommendations presented below. A minimum factor of safety of 1.5 against overturning and sliding should be used in the design of retaining walls.

The above retaining walls drainage provide the relive of the retaining wall loading. The basement waterproofing details should be designed by architect according to the basement occupancy requirements. Adept Construction Solutions, Inc. is available to consult regarding waterproofing applications.

## 6.3 FOUNDATIONS

### 6.3.1 Spread Footings.

To support prosed building structure the grid of spread footings embedded into bedrock can be used. In the design of the spread footings as an element of the foundations the following are the design parameters to be used.

Spread footings should extend at least 24 inches below lowest adjacent grade and 12 inches into the bedrock and should be deepened as necessary to provide at least 10 feet of horizontal clearance between the portions of footings designed to impose passive pressures and the face of the nearest slope or retaining wall. The bearing capacity of the foundation should be less than 2,000 psf for dead plus sustained live loads and 3,000 psf for total loads including wind or seismic loads

If foundation will be installed below 10 feet from ground surface, the bearing capacity of the foundation should be less than 3,000 psf for dead plus sustained live loads and 4,000 psf for total loads including wind or seismic loads

Resistance to lateral pressures can be obtained from passive earth pressures against the face of the footing and soil friction along the base of footings. A passive pressure equivalent to that obtained using a fluid weight of 300 pounds per cubic foot (pcf) and a friction factor of 0.26 may be used to resist lateral forces and sliding in soil. These values include a safety factor of 1.5 and may be used in combination without reduction. Passive pressures should be neglected within 12 inches of the ground surface in areas not confined by slabs or pavements.

Also, the footings and slab floor structure could be enhanced by providing additional steel reinforcement; so it will help stiffen the performance of the concrete slab work. Stiffening merely means adding additional reinforcement above minimum requirements of the Building Code so as to provide better long-term performance

### 6.3.2. Mat Foundation/Structural Slab

Because building small footprint spread footings can be combined into the mat slab/structural slab.

Consideration should be given to installing permanent piers or even rock anchors through the portions of the foundation to resist lateral loads; in our experience, drilling of tie-backs in hard rock is usually faster and more economical than drilling of piers in the same material. It is our opinion that if embedded into and bears on the bedrock materials, the structural slab can contribute to the bearing capacity of foundations, working as a mat slab.

A modulus of vertical subgrade reaction of 60 tons per cubic foot may be used for elastic analyses of the mat foundation. The bearing capacity of the mat foundation should be less than 2,000 psf for dead plus sustained live loads, and 3,000 psf for total loads including wind or seismic loads. Localized increases in bearing pressures of up to 5,000 psf may be utilized. The weight of the mat may be ignored in computing allowable bearing pressures. The mat should be designed to span an unsupported distance of 8-feet at mat interior and 5-feet at the mat perimeter edges and corners.

The foundation should be stepped if necessary to produce level tops and bottoms. A passive equivalent fluid pressure of 350 pounds per cubic and a friction factor of 0.26 may be used to resist lateral forces and sliding. Where a vapor retarder is placed beneath the mat, a base friction coefficient of 0.20 should be used. The passive pressure and frictional resistance values include a factor of safety of at least 1.5 and may be used in combination without reduction. Passive pressures should be disregarded in areas with less than 10-feet of horizontal soil confinement and for the uppermost 1ft of foundation depth.

### 6.3.3 Drilled Pier

Drilled, cast-in-place, reinforced concrete piers may be used for retaining walls, shoring and foundations. Because, of the constrained site conditions only smaller drilling equipment probably will be available to drill piers/solder piles, thus limiting their diameter. If used in permanent foundation solder beams should be corrosion protected.

Larger diameter (for example18 inches) short foundation piers can be drilled from the basement floor level into the bedrock. Piers should be designed for a maximum allowable skin friction of 500 psf for combined dead plus sustained live loads. The above values may be increased by one-third for total loads, including the effect of seismic or wind forces. The weight of the foundation concrete extending below grade may be disregarded. Disregard top 2 feet of pier length in bearing capacity calculations.

Resistance to lateral displacement of individual piers will be generated primarily by passive earth pressures acting against two pier diameters. We recommend a passive pressure equal to an equivalent fluid weighing 350 pounds per square foot per foot of depth. This value can be assumed to be acting against 2 times the diameter of the individual pile’s shafts starting at a depth of 2-feet below the grade beams or structural slab. Passive pressures should be disregarded in areas with less than 10 feet of horizontal soil confinement.

The spacing of the piers should be determined by the structural engineer, but in no case shall the center-to-center spacing of the piers be closer than three pier diameters. Our office should be commissioned to test, observe and approve piers installation.

We wish to emphasize that, as our experience shows, hard bedrock or hard debris materials may be encountered during the drilled pier excavations, particularly at locations where the piers are extended to appreciable depths.

Where groundwater is encountered during pier shaft drilling, it should be removed by pumping, or the concrete must be placed by the tremie method. If the pier shafts will not stand open, temporary casing may be necessary to support the sides of the pier shafts until concrete is placed. Concrete should not be allowed to free fall more than 5 feet to avoid segregation of the aggregate.

### 6.3.4. Vapor Retarder and Waterproofing.

If water vapor moving through the mat or slab on grade is considered detrimental, we recommend installing a water vapor retarder beneath the mat. The vapor retarder can be placed directly on the soil subgrade. A vapor retarder is generally not required in parking garages because there is sufficient air circulation to limit condensation of moisture on the mat surface; however, as a minimum, we recommend a vapor retarder be placed beneath the mat foundation in any enclosed rooms (such as the electrical room), residences, storage areas, and areas that will receive a floor covering.

The vapor retarder should meet the requirements for Class B vapor retarders stated in ASTM El745. The vapor retarder should be placed in accordance with the requirements of ASTM E1643. These requirements include overlapping seams by six inches, taping seams, and sealing penetrations in the vapor retarder.

If required by the structural engineer, the vapor retarder may be covered with two inches of sand to aid in curing the concrete and to protect the vapor retarder during slab construction. The sand overlying the vapor retarder should be moist at the time concrete is placed. However, excess water trapped in the sand could eventually be transmitted as vapor through the mat. Therefore, if rain is forecast prior to pouring the mat, the sand should be covered with plastic sheeting to avoid wetting. If the sand becomes wet, concrete should not be placed until the sand has been dried or replaced.

Concrete mixes with high water/cement (w/c) ratios result in excess water in the concrete, which increases the cure time and results in excessive vapor transmission through the mat. Therefore, concrete for the mat foundation should have a low w/c ratio - less than 0.50. If the concrete is poured directly over the vapor retarder (no sand layer), we recommend the w/c ratio of the concrete not exceed 0.45 and water not be added in the field. If necessary, workability should be increased by adding plasticizers. In addition, the concrete for the mat should be properly cured. Before floor coverings, if any, are placed, the contractor should check that the concrete surface and the moisture emission levels (if emission testing is required) meet the manufacturer's requirements.

Below grade waterproofing and proper drainage shall be of extreme importance during design and construction. Separate waterproofing means and methods as well as engineering of the waterproofing and drainage systems must be incorporated into project documents, reviewed and approved by geotechnical engineer and DBI.

Special inspections for foundation drainage and waterproofing systems on this project are advised to be required.

Thus, we conclude that the site is suitable for proposed residential and commercial development from a geotechnical and geo-hazards standpoint. However, our office observation and testing during earthworks and foundation installation will be required to confirm subsoil investigation information.

## 7.0 FOLLOW-UP GEOTECHNICAL SERVICES

Recommendations are based on the assumption that this office or other highly qualified geotechnical engineer will be commissioned to perform the following services:

- Observe, test, and advise during grading and excavation operations.
- Observe, test, and advise during foundation and piers installation.
- Observe and advise during grade beams and retaining walls construction.
- Observe, test, and advise during utility trench backfilling and landscaping.

## 8.0 LIMITATIONS

The recommendations contained in this report are based on the plans and data that have been provided to us. Any change in that plan, information, and data will render our recommendations invalid unless we are commissioned to review the changes and make the necessary modifications and/or additions to our recommendations. Our services have been provided in accordance with generally accepted geotechnical engineering practices. No warranties are made, express or implied, as to the professional opinions or advice provided. Recommendations contained in this report are valid for a period of 2 years; after 2 years they must be reviewed by this firm to determine whether or not they still apply. Should you have any questions related to the contents of this geotechnical report, please do not hesitate to contact our office.

Sincerely,

Kleyner

IGOR M KLEYNER
No. GE2873
Exp. 09/30/25

IGOR M KLEYNER
No. C 68621
Exp. 09/30/25

**Igor Gary Kleyner**,
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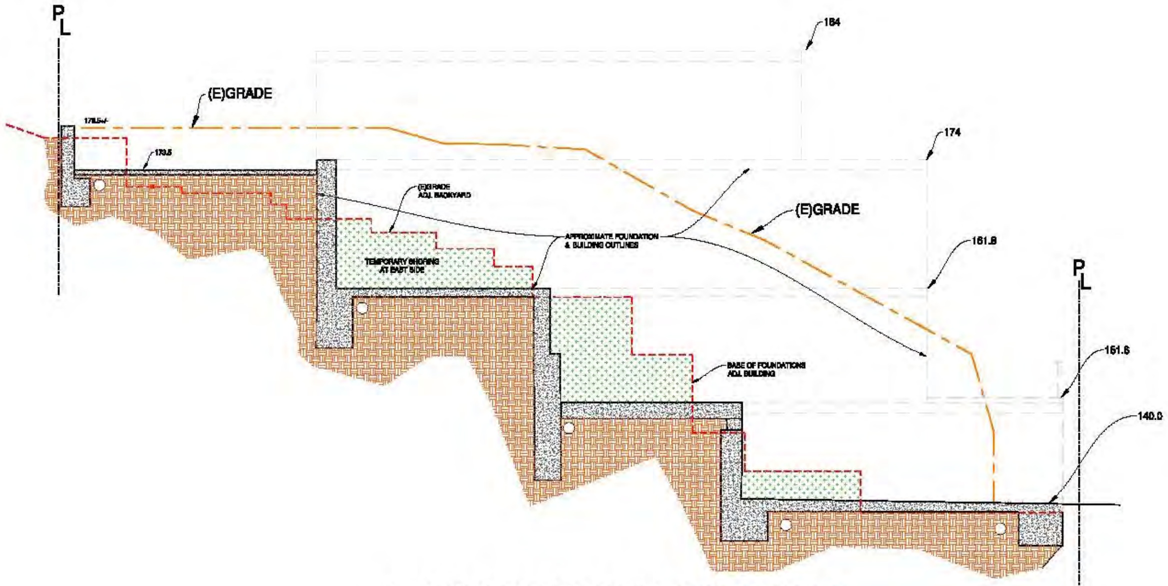
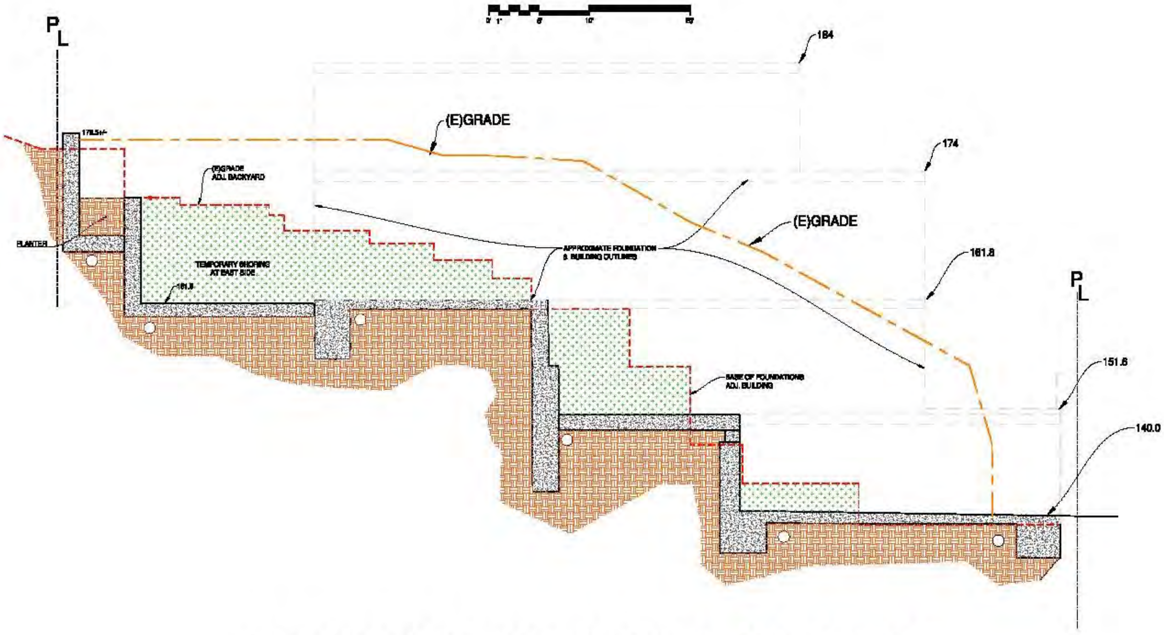
# 10.0 FIGURE

FIGURE 0.1 POSSIBLE EXCAVATION DIAGRAMS



EXCAVATION DIAGRAM

0' 1' 5' 10' 20'



POTENTIAL EXCAVATION DIAGRAM

0' 1' 5' 10' 20'

Base: San Francisco Property Information Map.
https://sfplanninggis.org/pim/
Acccessed: December 2023

Construction Solutions Inc.

PROJECT ADDRESS: 2142 22 Street,
San Francisco, CA

PARCEL MAP

PROJECT NO.: 2023-0116

DATE: 12/1/2023

Figure-1

Base: Google Maps, San Francisco City MAP

AdEPT Construction Solutions Inc.

PROJECT ADDRESS: 2142 22 Street,
San Francisco, CA

PROJECT NO.: 2023-0116

DATE: 12/1/2023

VICINITY MAP

Figure-2

Base: USGS Topographic Map, San Francisco Northl Quandrangle, 7.5-Minute Series, 2018. Site elevation approximately 197 feet.

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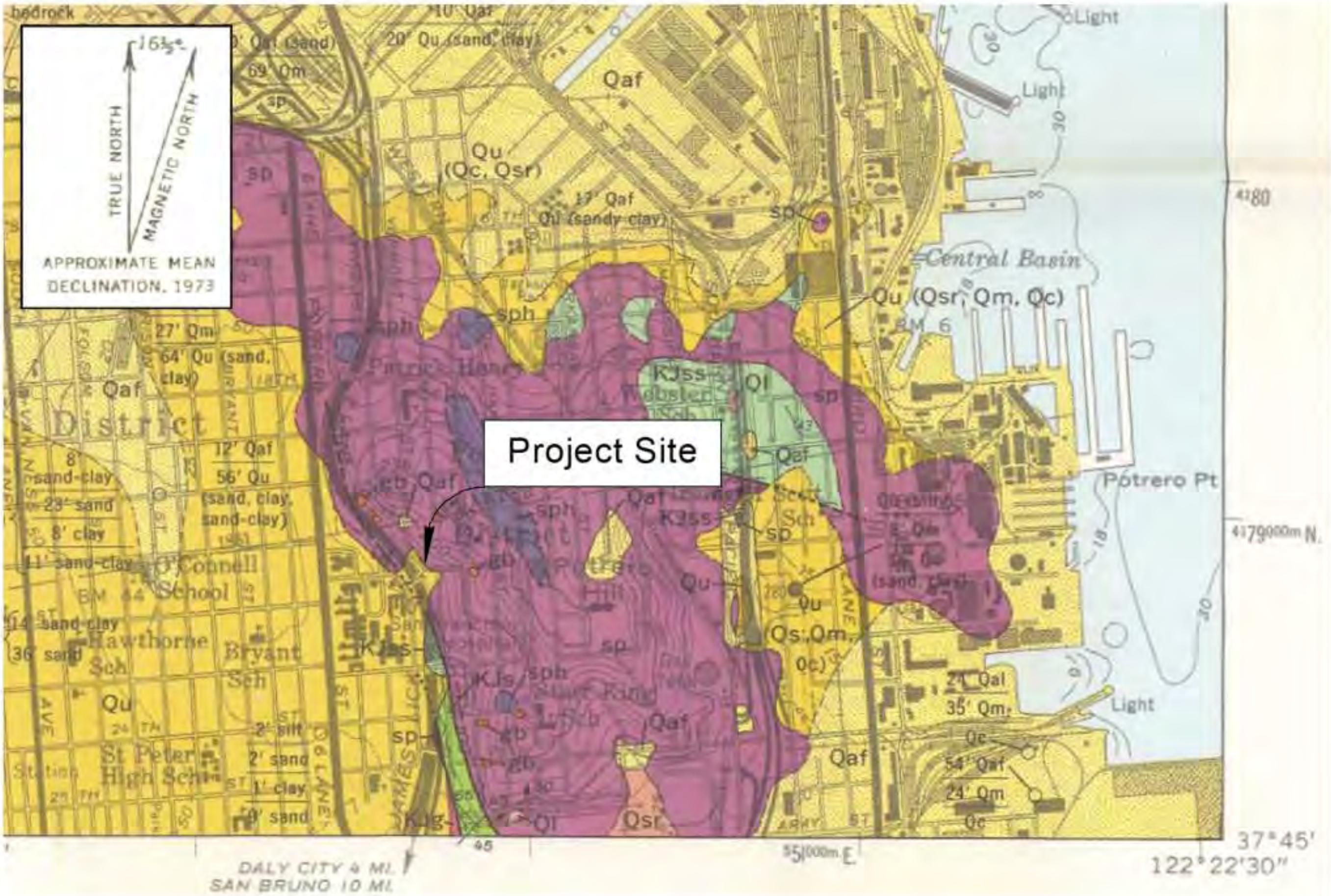
PROJECT ADDRESS: 2142 22 Street,
San Francisco, CA

TOPOGRAPHIC MAP

PROJECT NO.: 2023-0116

DATE: 12/1/2023

Figure-3



## LEGEND & SELECTED MAP SYMBOLS

**QUATERNARY**

| | |
|---|---|
| Qaf | Artifical fill |
| Qsr | Slope debris |
| Qu | Surficial deposits |

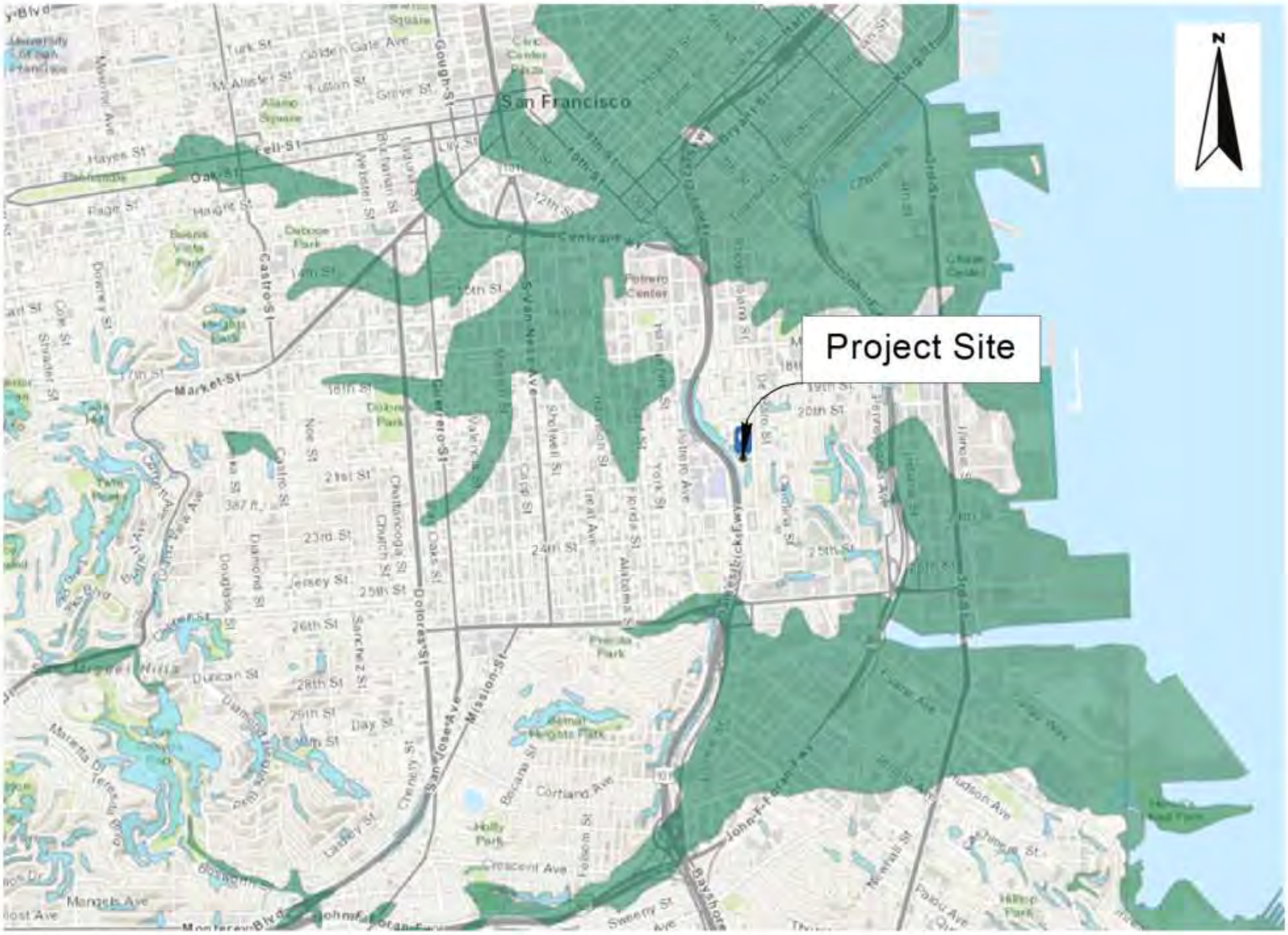
**JURASSIC AND CRETACEOUS**

| | |
|---|---|
| sph | Serpentine, hard |
| sp | Serpentine |
| gb | Gabbro |
| KJss | Sandstone |
| KJs | Sandstone and shale |

| | |
|---|---|
| 40° | Strike and dip, of beds or bedding |
| 36 | Geologic contact, dashed where inferred, dotted where concealed, queried where uncertain |
| U D 10 | Fault, dashed where inferred, dotted where concealed, queried where uncertain |
| 47' Qd<br>100' Qu (clay, sand, sand-clay) | Abbreviated columnar section, stratigraphic sequence and approx. thickness in feet based on logs of boreholes and excavations |

Base: Geologic Map of the San Francisco North Quandrangle, San Francisco and Marin Counties, California. 7.5-Minutes Series. Schlocker, J. 1974. Contour Interval = 25 feet.

| | | | |
|---|---|---|---|
| AdEPT Construction Solutions Inc. | PROJECT ADDRESS: 2142 22 Street, San Francisco, CA | | GEOLOGICAL MAP |
| | PROJECT NO.: 2023-0116 | DATE: 12/1/2023 | Figure-4 |



## LEGEND

Colors may vary due to transparency and overlapping data.

**Fault Traces**

- —— Accurately Located
- — — Approximately Located
- ?— — Approximately Located, Queried
- - - - Inferred
- - ? - Inferred, Queried
- ······ Concealed
- ?······ Concealed, Queried
- — - - Aerial Photo Lineament

**Fault Zone**

🟨

**Liquefaction Zone**

🟩

**Landslide Zone**

🟦

**Liquefaction Landslide Overlap Zone**

🟧

**Area Not Evaluated for Liquefaction or Landslides**

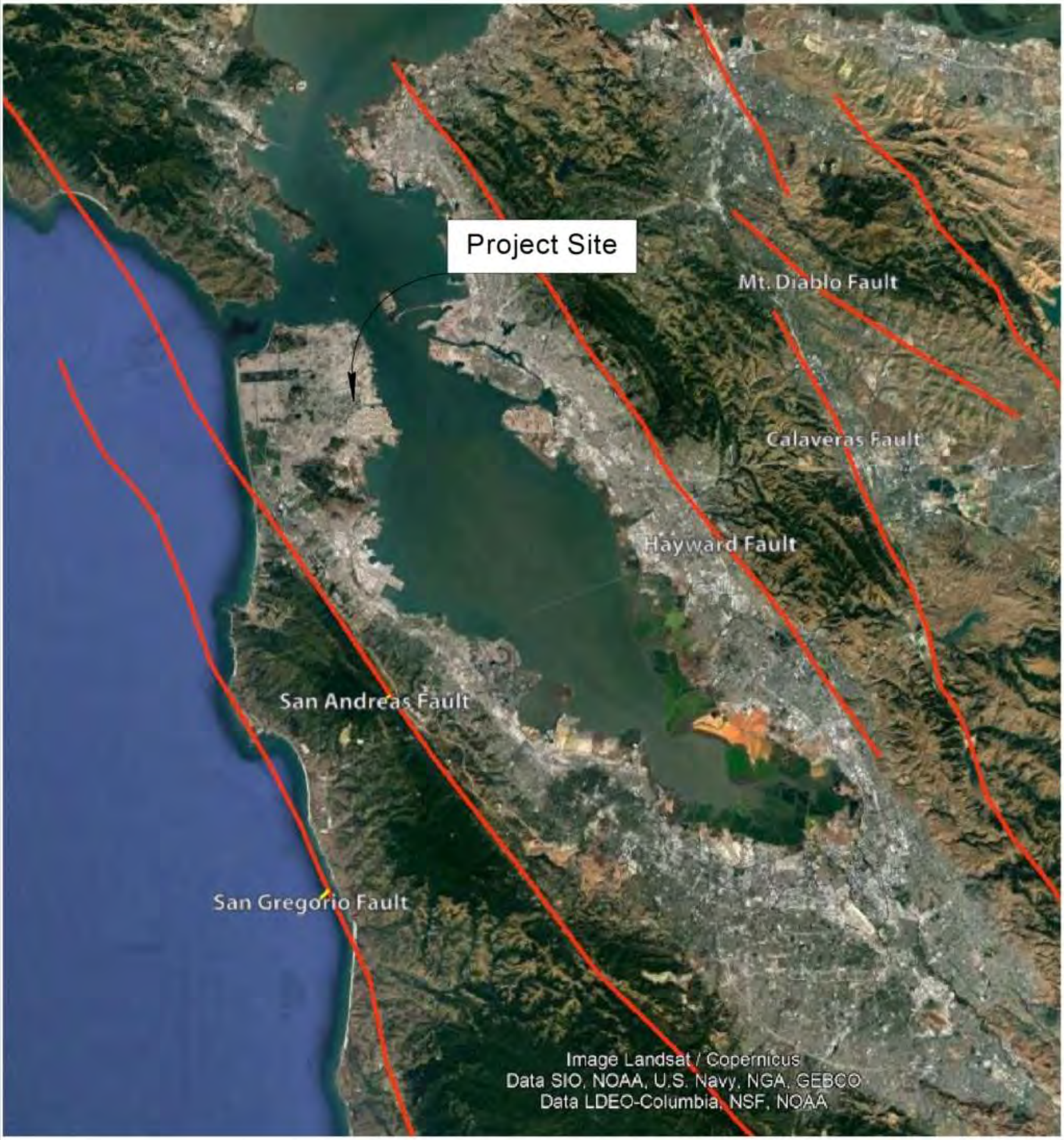
☐

**Parcels**

- 🟥 Parcel is in an Earthquake Fault Zone, a Liquefaction Zone, and a Landslide Zone
- 🟩 Parcel is in an Earthquake Fault Zone and a Liquefaction Zone
- 🟦 Parcel is in an Earthquake Fault Zone and a Landslide Zone
- 🟨 Parcel is in an Earthquake Fault Zone
- 🟧 Parcel is in a Liquefaction Zone and Landslide Zone
- 🟩 Parcel is in a Liquefaction Zone
- 🟦 Parcel is in a Landslide Zone
- ⬜ Parcel is not in a zone or has not been evaluated

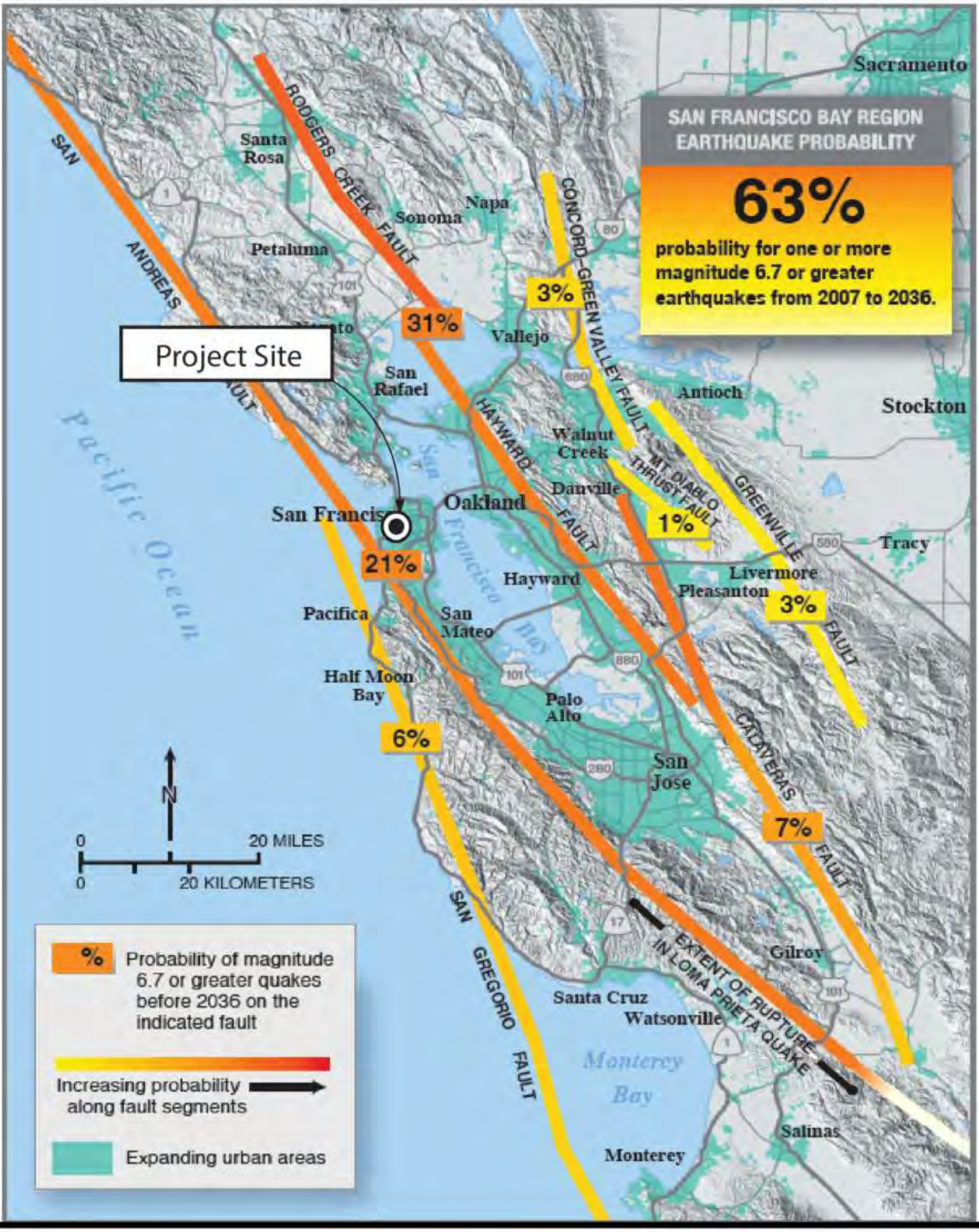
Base: State of California Seismic Hazard Zones Map, San Francisco Quadrangle, 7.5 Minute Series, 2000/ California Division of Mines and Geology, Open-File Report 2000-009.

| | | | |
|---|---|---|---|
| AdEPT Construction Solutions Inc. | PROJECT ADDRESS: | 2142 22 Street,<br>San Francisco, CA | STATE SEISMIC HAZARD ZONES MAP |
| | PROJECT NO.: 2023-0116 | DATE: 12/1/2023 | Figure-5 |



Base: Quaternary Faults Database, the U.S. Geological Survey, and (or) the National Atlas of the United States of America

| | | | |
|---|---|---|---|
| AdEPT<br>Construction Solutions Inc. | PROJECT ADDRESS: 2142 22 Street,<br>San Francisco, CA | | FAULT<br>MAP |
| | PROJECT NO.: 2023-0116 | DATE: 12/1/2023 | Figure-6 |



Base: The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2): U.S. Geological Survey Open-File Peport 2022-0113; California Geological Survey Special Report 203214. By: the Working Group on California Earthquake Probabilities (2007), 2008.

| | | | |
|---|---|---|---|
| AdEPT<br>Construction Solutions Inc. | PROJECT ADDRESS: | 2142 22 Street,<br>San Francisco, CA | EARTHQUAKE PROBABLITIES AND FAULT MAP |
| | PROJECT NO.: 2023-0116 | DATE: 12/1/2023 | Figure-7 |

# APPENDIX A

12/1/2023

Construction Solutions Inc.

PROJECT ADDRESS: 2142 22 Street,
San Francisco, CA.

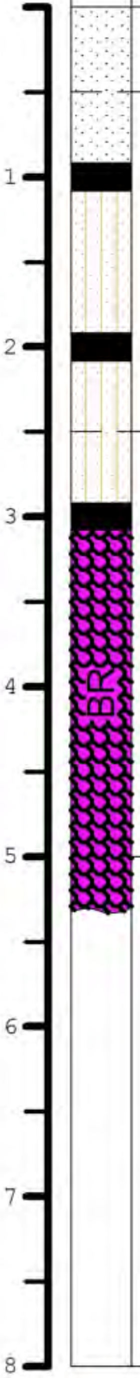
EXCAVATION LOCATION

PROJECT NO.: 2023-0116

DATE: 12/1/2023

APPENDIX A

| | | |
|---|---|---|
| **DATE DRILLED**<br>12/1/2023 | **LOGGED/CHECKED BY:**<br>Igor Kleyner | **APPROX. SURFACE ELEVATION (FT)**<br>167 |
| **DRILLING METHOD**<br>Power Auger | **DRILLED BIT SIZE**<br>2"-3" | **TOTAL DEPTH OF BOREHOLE (FT)**<br>5' |
| **GROUNDWATER LEVEL/DATE MEASURED**<br>No water detected | **SAMPLING METHOD(S)**<br>Disturbed | **HAMMER DATA**<br>Dynamic Cone Penetration Test |
| **BOREHOLE BACKFILL**<br>Native Soil/Cement | **LOCATION**<br>2142 22 Street, San Francisco CA. | |

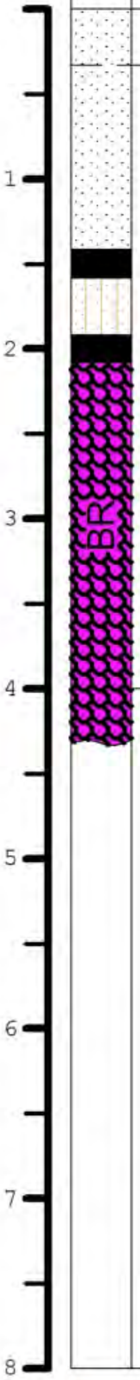


| DEPTH (FT) | SOIL SAMPLE TYPE | SAMPLING RESISTANCE (BLOWS/FOOT) SPT EQ | RELATIVE HARDNESS/ CONSISTENCY | SOUL/ROCK TYPE | MOISTURE CONTENT % | MATERIAL DESCRIPTION |
|---|---|---|---|---|---|---|
| | | | | | | Top soil - loose, moist with organic content. |
| 1 | | 12 | Loose to Medium Dense | SP-SM | 19.62 | Loose to medium dense sandy soil with low plasticity silty fines and serpentine gravel. |
| 2 | | 20 | Medium Dense | SP-SM | 21.09 | Rock reduced to soil rock fabric not discernible. |
| 3 | | 40+ | Soft Bedrock | SM | 17.44 | Very severe to severe weadthered, soft to medium hard serpentine bedrock with clay & silt seams. |
| | | | | SP | | Refusal to light power handheld drilling auger equipment. |
| 5 | | | | | | No ground water detected. |

AdEPT Construction Solutions Inc.

| | | |
|---|---|---|
| PROJECT ADDRESS: 2142 22 Street, San Francisco, CA. | | LOG OF BORING BH - 1 |
| PROJECT NO.: 2023-0116 | DATE: 12/1/2023 | APPENDIX A |

| | | |
|---|---|---|
| **DATE DRILLED**<br>12/1/2023 | **LOGGED/CHECKED BY:**<br>Igor Kleyner | **APPROX. SURFACE ELEVATION (FT)**<br>170 |
| **DRILLING METHOD**<br>Power Auger | **DRILLED BIT SIZE**<br>2"-3" | **TOTAL DEPTH OF BOREHOLE (FT)**<br>4' |
| **GROUNDWATER LEVEL/DATE MEASURED**<br>No water detected | **SAMPLING METHOD(S)**<br>Disturbed | **HAMMER DATA**<br>Dynamic Cone Penetration Test |
| **BOREHOLE BACKFILL**<br>Native Soil/Cement | **LOCATION**<br>2142 22 Street, San Francisco CA. | |



| DEPTH (FT) | SOIL SAMPLE TYPE | SAMPLING RESISTANCE (BLOWS/FOOT) SPT EQ | RELATIVE HARDNESS/ CONSISTENCY | SOUL/ROCK TYPE | MOISTURE CONTENT % | MATERIAL DESCRIPTION |
|---|---|---|---|---|---|---|
| | | | | | | Top soil - loose, moist with organic. |
| | | 10 | Loose to Medium Dense | SM | 13.08 | Loose to medium dense sandy soil with low plasticity silty fines and serpentine gravel. |
| | | | Soft to Medium Hard Bedrock | SP | | |
| | | | | | | Serpentine bedrock.<br>Soft to medium hard serpentine bedrock.<br>Refusal to light auger drilling. |

AdEPT Construction Solutions Inc.

| | | |
|---|---|---|
| PROJECT ADDRESS: 2142 22 Street, San Francisco, CA. | | LOG OF BORING BH - 2 |
| PROJECT NO.: 2023-0116 | DATE: 12/1/2023 | APPENDIX A |

**DATE DRILLED** 12/1/2023

**LOGGED/CHECKED BY:** Igor Kleyner

**APPROX. SURFACE ELEVATION (FT)** 175

**DRILLING METHOD** Power Auger

**DRILLED BIT SIZE** 2"-3"

**TOTAL DEPTH OF BOREHOLE (FT)** 4'

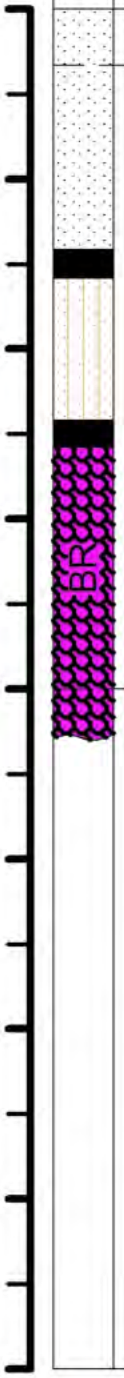
**GROUNDWATER LEVEL/DATE MEASURED** No water detected

**SAMPLING METHOD(S)** Disturbed

**HAMMER DATA** Dynamic Cone Penetration Test

**BOREHOLE BACKFILL** Native Soil/Cement

**LOCATION** 2142 22 Street, San Francisco CA.



| DEPTH (FT) | SOIL SAMPLE TYPE | SAMPLING RESISTANCE (BLOWS/FOOT) SPT EQ | RELATIVE HARDNESS/ CONSISTENCY | SOUL/ROCK TYPE | MOISTURE CONTENT % | MATERIAL DESCRIPTION |
|---|---|---|---|---|---|---|
| | | | | | | Top soil - loose, moist with organic. |
| | | 7 | Loose | SM | 18.92 | Loose sandy soil with low plastic fines and serpentine gravel rock reduced mostly to soil, rock fabric not discernible. |
| | | 40 | Weathered Bedrock | SP | | Very severe to sever weadthered soft to medium hard serpentine bedrock with clay & silt inclusions. |
| | | | | | | Practical refusal to light power auger drilling. |

AdEPT Construction Solutions Inc.

| | | | |
|---|---|---|---|
| PROJECT ADDRESS: | 2142 22 Street,<br>San Francisco, CA. | | LOG OF BORING<br>BH - 3 |
| PROJECT NO.: 2023-0116 | | DATE: 12/1/2023 | APPENDIX A |

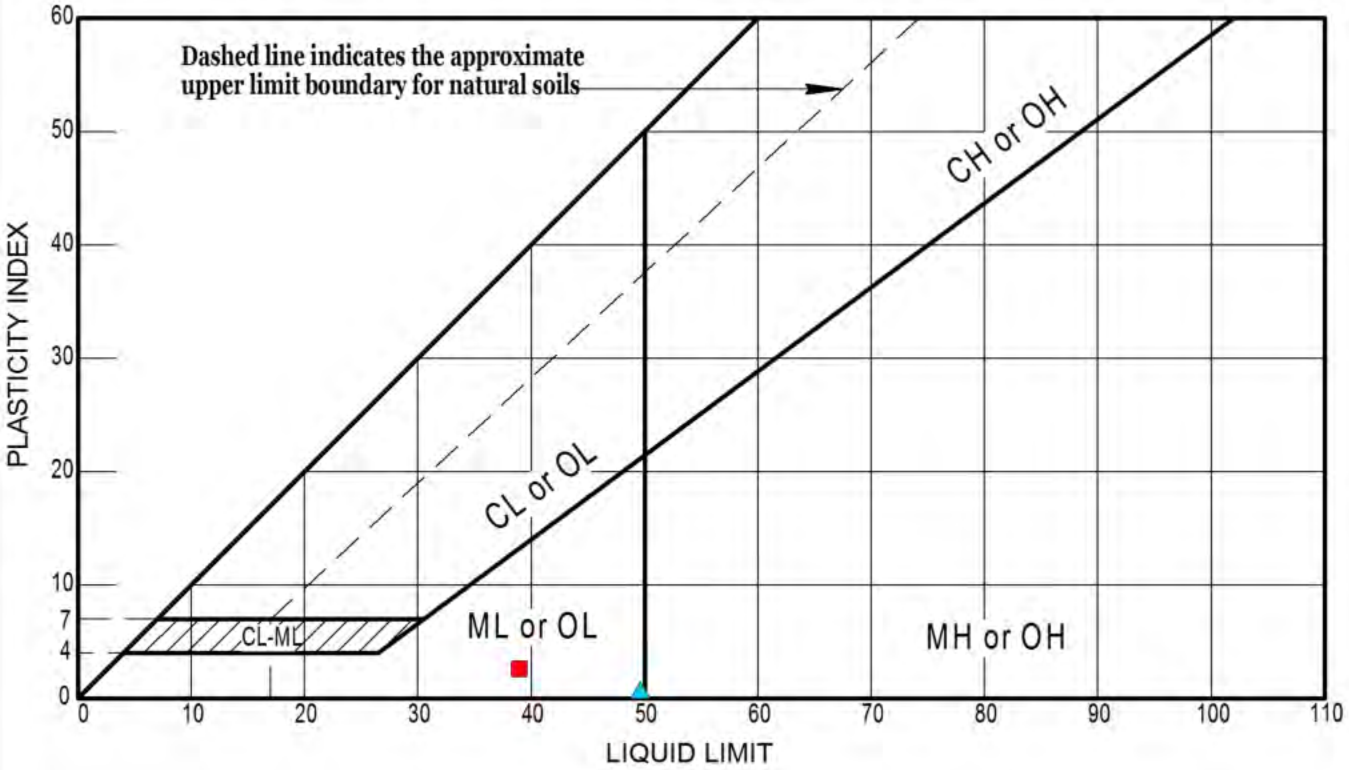
| | | |
|---|---|---|
| **DATE DRILLED**<br>12/1/2023 | **LOGGED/CHECKED BY:**<br>Igor Kleyner | **APPROX. SURFACE ELEVATION (FT)**<br>176 |
| **DRILLING METHOD**<br>ExeavationPower Auger | **DRILLED BIT SIZE**<br>2"-3"/Manual | **TOTAL DEPTH OF BOREHOLE (FT)**<br>4' |
| **GROUNDWATER LEVEL/DATE MEASURED**<br>No water detected | **SAMPLING METHOD(S)**<br>Disturbed | **HAMMER DATA**<br>N/A |
| **BOREHOLE BACKFILL**<br>Native Soil/Cement | **LOCATION**<br>2142 22 Street, San Francisco CA. | |

| DEPTH (FT) | SOIL SAMPLE TYPE | SAMPLING RESISTANCE (BLOWS/FOOT) SPT EQ | RELATIVE HARDNESS/ CONSISTENCY | SOUL/ROCK TYPE | MOISTURE CONTENT % | MATERIAL DESCRIPTION |
|---|---|---|---|---|---|---|
| | | | Loose | | | Loose, moist fill soil with organic content. |
| | | | Very Soft to Soft & Medium Serpentine | SP | 30.70 | Very severe weadthered serpentine to severe weathered with depth. |
| | | | | | 43.03 | Rock change to moderately severe weathered. |
| | | | | | 25.95 | Rock can be excavated with geologist's pick. Significant portion of rock show discoloration & moderate weathering soft to medium hard massive. |

| | | | |
|---|---|---|---|
| AdEPT Construction Solutions Inc. | PROJECT ADDRESS: 2142 22 Street, San Francisco, CA. | | LOG OF BORING TRENCH |
| | PROJECT NO.: 2023-0116 | DATE: 12/1/2023 | APPENDIX A |

# APPENDIX B

# LIQUID AND PLASTIC LIMITS TEST REPORT



## SOIL DATA

| | SOURCE | SAMPLE NO. | DEPTH, ft | NATURAL WATER CONTENT, W (%) | PLASTIC LIMIT, PL (%) | LIQUID LIMIT, LL (%) | PLASTICITI INDEX, LL-PL (%) | LIQUIDITY INDEX, W-PL / LL-PL | USCS |
|---|---|---|---|---|---|---|---|---|---|
| ● | BH 1 | 1 ■ | 2' | 40.51 | 36.31 | 38.94 | 2.63 | 1.60 | SP-SM |
| ● | BH 4 | 2 ▲ | 3' | 49.74 | 49.11 | 49.61 | 0.50 | 1.26 | SP |

| | | | |
|---|---|---|---|
| AdEPT Construction Solutions Inc. | PROJECT ADDRESS: 2142 22 Street,<br>San Francisco, CA | | PLASTICITY TEST |
| | PROJECT NO.: 2023-0116 | DATE: 12/1/2023 | APPENDIX B |

**Tested By:** Igor Kleyner

## RELATIVE DENSITY OF FINE-GRAINED (COHESIVE) SOILS
(Cohesive Silt, Clayey Silt, and Clay)

| RELATIVE CONSISTENCY | N. SPT BLOWS/FOOT* | STRENGTH^ | MANUAL PENETRATION TEST |
|---|---|---|---|
| VERY SOFT | <2 | <0.25 | Easy several inches by fist |
| SOFT | 2 - 4 | 0.25 - 0.5 | Easy several inches by thumb |
| MEDIUM STIFF | 4 - 8 | 0.5 - 1 | Moderate several inches by thumb |
| STIFF | 8 - 15 | 1 - 2 | Readily indented by thumb |
| VERY STIFF | 15 - 30 | 2 - 4 | Readily indented by thumbnail |
| HARD | 30+ | 4+ | Difficulty by thumbnail |

## RELATIVE DENSITY OF COARSE-GRAINED (COHESIONLESS) SOILS
(Cohesionless Silt, Sand, and Gravel)

| RELATIVE DENSITY | N. SPT BLOWS/FOOT* | FIELD TEST FOR RELATIVE DENSITY OF SAND |
|---|---|---|
| VERY LOOSE | 0 - 4 | Easily penetrated with 1/2" reinforcing rod pushed by hand |
| LOOSE | 4 - 10 | Easily penetrated with 1/2" reinforcing rod pushed by hand |
| MEDIUM DENSE | 10 - 30 | Penetrated one foot with 1/2" reinforcing rod driven with 5-lb hammer |
| DENSE | 30 - 50 | Penetrated one foot with 1/2" reinforcing rod driven with 5-lb hammer |
| VERY DENSE | 50+ | Penetrated only a few inches 1/2" reinforcing rod driven with 5-lb hammer |

## GRAIN SIZES

| BOULDERS | COBBLES | GRAVEL | | SAND | | | SILT & CLAY |
|---|---|---|---|---|---|---|---|
| | | COARSE | FINE | COARSE | MEDIUM | FINE | |
| 12" | 3" | 3/4" | #4 | #10 | #40 | #200 | |

U.S. STANDARD SERIES SIEVE OPENINGS

## MOISTURE CONTENT

| | |
|---|---|
| DRY | Dusty, dry to the touch |
| MOIST | Damp but no visible water near optimum |
| WET | Visible free water, saturated, over optimum |

## UNIFIED SOIL CLASSIFICATION SYSTEM
(From ASTM D-2488 & 2487-90)

| MAJOR DIVISIONS | | | GROUP SYMBOL | TYPICAL DESCRIPTION |
|---|---|---|---|---|
| **Coarse-Grained Soils** *(more than 50% retained on No. 200 sieve)* | **Gravels** *(more than 50% of coarse fraction retained on No. 4 sieve)* | **Clean Gravels** *(less than 5% fines)* | GW | Well-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines |
| | | | GP | Poorly-Graded Gravels, Gravel-Sand Mixtures |
| | | **Gravels with Fines** *(more than 12% fines)* | GM | Silty Gravels, Gravel-Sand-Silt Mixtures |
| | | | GC | Clayey Gravels, Gravel-Sand-Clay Mixtures |
| | **Sands** *(50% or more of coarse fraction passes through No. 4 sieve)* | **Clean Sands** *(less than 5% fines)* | SW | Well-Graded Sands, Gravelly Sands, Little or No Fines |
| | | | SP | Poorly-Graded Sand, Gravelly Sands, Little or No Fines |
| | | **Sands with Fines** *(more than 12% fines)* | SM | Silty Sands, Sand-Silt Mixtures |
| | | | SC | Clayey Sands, Sand-Clay Mixtures |
| **Fine-Grained Soils** *(50% or more passes No. 200 sieve)* | **Silts and Clays** *(liquid limit less than 50)* | **Inorganic** | ML | Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity |
| | | | CL | Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays |
| | | **Organic** | OL | Organic Silts and Organic Silty Clays of Low Plasticity |
| | **Silts and Clays** *(liquid limit 50 or more)* | **Inorganic** | CH | Inorganic Clays of Medium to High Plasticity, Sandy Fat Clay, Gravelly Fat Clay |
| | | | MH | Inorganic Silts, Micaceous or Diatomaceous Fine Sands or Silty Soils, Elastic Silt |
| | | **Organic** | OH | Organic Clays of Medium to High Plasticity, Organic Silts |
| **Highly Organic Soils** | | | PT | Peat, Humus, Swamp Soils with High Organic Content (See D-4427-92) |

## NOTES

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

*Standard Penetration Test (SPT) Resistance, using a 140-lb hammer falling 30 inches on a 2-inch split spoon sampler, blow counts for coarse-grained soils have been standardized to SPT counts by factors of 0.8 and 0.7 for the 2.5-inch and 3-inch samplers, respectively.

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

◩ 2-inch-ID sample

■ Bulk sample

◪ SPT sample

| AdEPT Construction Solutions Inc. | PROJECT ADDRESS: 2142 22 Street, San Francisco, CA | | KEY TO SOUL DESCRIPTIONS |
|---|---|---|---|
| | PROJECT NO. 2023-0116 | DATE: 12/1/2023 | APPENDIX B |

## WEATHERING

### FRESH
ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.

### VERY SLIGHT
ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS, CRYSTALS IN BROKEN FACE SHOW BRIGHT. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.

### SLIGHT
ROCK GENERALLY FRESH, JOINTS STAINED, AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER.

### MODERATE
SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED; SOME ARE CLAYEY. ROCK HAS DULL SOUND UNDER HAMMER AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.

### MODERATELY SEVERE
ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRAINED ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH GEOLOGIST'S PICK. ROCK GOES "CLUNK" WHEN STRUCK.

### SEVERE
ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK "FABRIC" CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS, ALL FELDSPARS KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY LEFT.

### VERY SEVERE
ALL ROCK EXCEPT QUARTS DISCOLORED AND STAINED. ROCK "FABRIC" DISCERNIBLE, BUT MASS EFFECTIVELY REDUCED TO "SOIL" WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING.

### COMPLETE
ROCK REDUCED TO "SOIL". ROCK FABRIC NOT DISCERNIBLE OR DISCERNIBLE ONLY IN SMALL SCATTERED LOCATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS.

## HARDNESS

### VERY HARD
CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK. HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF GEOLOGIST'S HAMMER.

### HARD
CAN BE SCRATCHED WITH KNIFE OR PICK ONLY WITH DIFFICULTY. HARD BLOW OF HAMMER REQUIRED TO DETACH HAND SPECIMEN.

### MODERATELY HARD
CAN BE SCRATCHED WITH KNIFE OR PICK. GOUGES OR GROOVES TO 1/4 INCH DEEP CAN BE EXCAVATED BY HARD BLOW OF POINT OF A GEOLOGIST'S PICK. HARD SPECIMEN CAN BE DETACHED BY MODERATE BLOW.

### MEDIUM
CAN BE GROOVED OR GOUGED 1/16 INCH DEEP BY FIRM PRESSURE ON KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES ABOUT 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.

### SOFT
CAN BE GOUGED OR GROOVED READILY WITH KNIFE OR PICK POINT. CAN BE EXCAVATED IN CHIPS TO PIECES SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL THINK PIECES CAN BE BROKEN BY FINGER PRESSURE.

### VERY SOFT
CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN WITH FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

## JOINT BEDDING AND FOLIATION SPACING

| SPACING | JOINTS | BEDDING & FOLATION |
|---|---|---|
| LESS THAN 2 IN. | VERY CLOSE | VERY THIN |
| 2 IN. TO 1 FT. | CLOSE | THIN |
| 1 FT. TO 3 FT. | MODERATELY CLOSE | MEDIUM |
| 3 FT. TO 10 FT. | WIDE | THICK |
| MORE THAN 10 FT. | VERY WIDE | VERY THICK |

## ROCK QUALITY DESIGNATOR (RQD)

| RQD, AS A PERCENTAGE | DESCRIPTOR |
|---|---|
| EXCEEDING 90 | EXCELLENT |
| 90 TO 75 | GOOD |
| 75 TO 50 | FAIR |
| 50 TO 25 | POOR |
| LESS THAN 25 | VERY POOR |

AdEPT
Construction Solutions Inc.

PROJECT ADDRESS: 2142 22 Street,
San Francisco, CA

KEY TO BEDROCK DESCRIPTIONS

PROJECT NO. 2023-0116

DATE: 12/1/2023

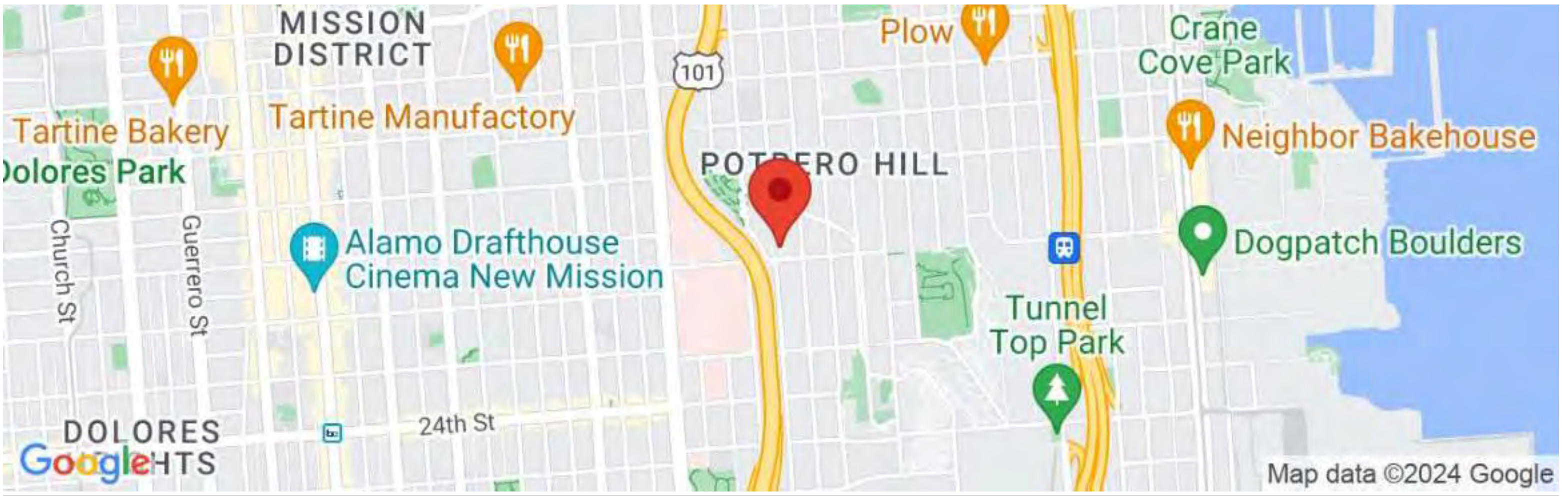
APPENDIX B

# APPENDIX C

USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout* error.
USGS web services are now operational so this tool should work as expected.

# 2142 22nd St, San Francisco, CA 94107, USA

## Latitude, Longitude: 37.7574028, -122.4026645



| | |
|---|---|
| **Date** | 1/3/2024, 10:32:34 AM |
| **Design Code Reference Document** | ASCE7-16 |
| **Risk Category** | III |
| **Site Class** | D - Default (See Section 11.4.3) |

| Type | Value | Description |
|---|---|---|
| $S_S$ | 1.5 | $MCE_R$ ground motion. (for 0.2 second period) |
| $S_1$ | 0.6 | $MCE_R$ ground motion. (for 1.0s period) |
| $S_{MS}$ | 1.8 | Site-modified spectral acceleration value |
| $S_{M1}$ | null -See Section 11.4.8 | Site-modified spectral acceleration value |
| $S_{DS}$ | 1.2 | Numeric seismic design value at 0.2 second SA |
| $S_{D1}$ | null -See Section 11.4.8 | Numeric seismic design value at 1.0 second SA |

| Type | Value | Description |
|---|---|---|
| SDC | null -See Section 11.4.8 | Seismic design category |
| $F_a$ | 1.2 | Site amplification factor at 0.2 second |
| $F_v$ | null -See Section 11.4.8 | Site amplification factor at 1.0 second |
| PGA | 0.573 | $MCE_G$ peak ground acceleration |
| $F_{PGA}$ | 1.2 | Site amplification factor at PGA |
| $PGA_M$ | 0.688 | Site modified peak ground acceleration |
| $T_L$ | 12 | Long-period transition period in seconds |
| SsRT | 1.779 | Probabilistic risk-targeted ground motion. (0.2 second) |
| SsUH | 1.917 | Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration |
| SsD | 1.5 | Factored deterministic acceleration value. (0.2 second) |
| S1RT | 0.701 | Probabilistic risk-targeted ground motion. (1.0 second) |
| S1UH | 0.771 | Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration. |
| S1D | 0.6 | Factored deterministic acceleration value. (1.0 second) |
| PGAd | 0.573 | Factored deterministic acceleration value. (Peak Ground Acceleration) |
| $PGA_{UH}$ | 0.761 | Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration |
| $C_{RS}$ | 0.928 | Mapped value of the risk coefficient at short periods |
| $C_{R1}$ | 0.909 | Mapped value of the risk coefficient at a period of 1 s |

| Type | Value | Description |
|---|---|---|
| $C_V$ | 1.4 | Vertical coefficient |

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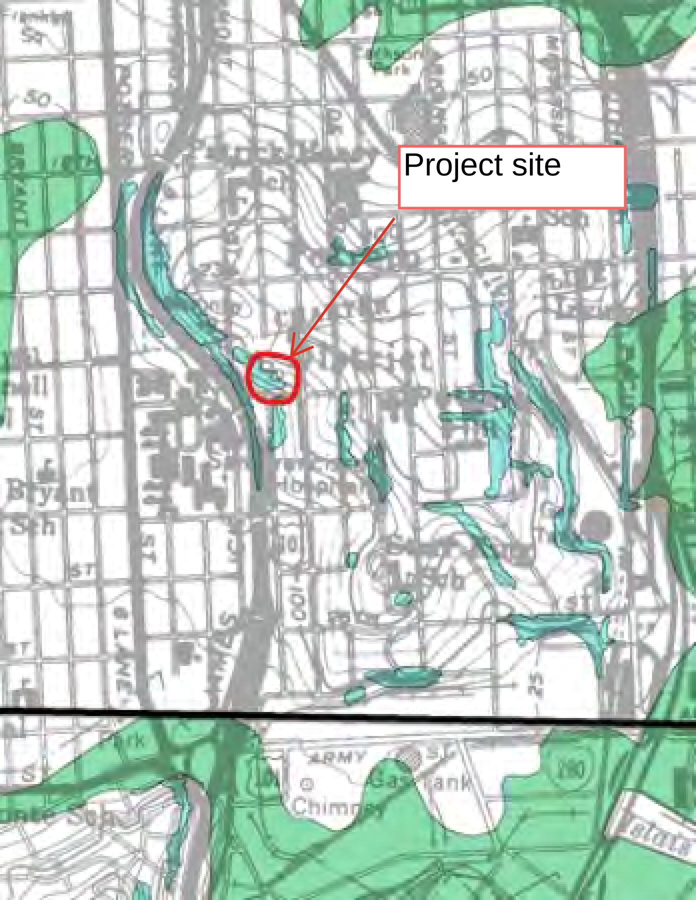
# EXHIBIT C



Project site

# EXHIBIT D

EXHIBIT E

I, Alan Kropp, Declare:

1. I am the Principal of Alan Kropp Associates, Inc., Geotechnical Consultants. I make this declaration based on personal knowledge of the following facts. If called as a witness to testify, I could and would competently testify thereto.
2. I am a Civil Engineer and Geotechnical Engineer, licensed by the State of California, with license Nos. #23921-Civil and #487-Geotechnical.
3. I obtained my bachelor's degree from California State Polytechnic College, Pomona, in 1971 in Civil Engineering, and my Master's Degree from the University of California, Berkeley, in Geotechnical Engineering in 1973.
4. I have actively worked in Civil and Geotechnical Engineering since the early 1970's, and own the firm Alan Kropp & Associates, Inc. located in Berkeley, California. My firm specializes in Geotechnical Engineering. I have testified many times in deposition and have qualified many times over the years as an expert witness in trial as a Geotechnical Engineer.
5. A true correct copy of my CV is attached hereto as Exhibit 1.
6. I have been retained by Zacks & Freedman, PC to review the plans, documents and reports related to the proposed residential construction project located at 2142 22$^{nd}$ Street, San Francisco CA. I visited the site of the proposed project on March 28, 2025, and I have reviewed the following documents related to this project:

a. Architectural Plans, "22nd Street Condominiums, 2142 22nd Street, San Francisco, CA", drawn by Studio/BANAA, dated 8/10/24, 10 sheets

b. "JCP-LGS Residential Property Disclosure Reports, 2136 22nd Street, San Francisco, San Francisco County, CA", by JCP-LGS Disclosures, dated 9/18/12

c. "Geotechnical Investigation, 2142 22nd Street, San Francisco, CA ", by Adept Construction Solutions, dated 12/20/23

7. According to my professional opinion, there are several environmental risks and related concerns I have about this project that have not yet been adequately addressed. Of paramount concern, is the fact that it does not appear that the project sponsor has identified a certified engineering geologist to analyze the steeply sloped project site and underlying geologic conditions. The project site falls within the San Francisco Slope and Seismic Hazard Zone Protection Act, therefore this site requires a certified engineering geologist to provide a geologic study of the project.
8. Relatedly, the 2-5 ft. deep borings drilled at the site, (according to the project report) are deficient in both depth and testing given that there is anticipated to be excavation

at a depth of up to 30.5 feet. When performing this large of an excavation, it is crucial to understand the site's complete subsurface profile. This is very important because once the subsurface profile is understood, temporary shoring must be designed according to that particular subsurface profile. While the project report makes a vague reference to shoring, it makes no specific conclusions although the report mentions rock anchors or bolting may be needed to protect next door properties. In order to adequately protect next door properties, it is critical to understand the stability of the materials present and how they are to be supported. Furthermore, rock anchors or bolts cannot be extended under adjacent properties without the permission of the adjacent property owners. It does not appear that adequate geologic information has been investigated to date given the absence of a certified engineering geologist and the minimal borings drilled that are described in the project report are insufficient to adequately inform of the subsurface composition.

9. Given the presence of serpentinite bedrock which sometimes contains hazardous asbestos that can become airborne during the type of proposed excavations at the site, an evaluation of that hazard must be assessed.

I declare under the penalty of perjury under the laws of the State of California that the foregoing is true and correct, and this declaration was executed April __4__, 2025 in Berkeley, California.

Alan Kropp

Alan Kropp, GE

# EXHIBIT 1

ALAN KROPP
& ASSOCIATES, INC.

GEOTECHNICAL
CONSULTANTS

## RESUME

Name: Alan Kropp

Education: California State Polytechnic College, Pomona, BSCE, 1971, Civil Engineering
University of California, Berkeley, MSCE, 1973, Geotechnical Engineering

Professional Societies:
American Society of Civil Engineers – Including Invited Member, National Committee Drafting "Standards for Design of Residential Foundations on Expansive Soils"
Geoprofessional Business Association
CalGeo Association
International Conference of Building Officials
International Erosion Control Association
Earthquake Engineering Research Institute – Including Member of EERI State Earthquake Clearinghouse Advisory Committee
Seismological Society of America
Structural Engineers Association of Northern California
American Society for Testing and Materials

Registration: Civil Engineer, California, #23921, July 1973
Geotechnical Engineer, California, #487, September 1987

Experience:
May 1978 - present
Alan Kropp & Associates, Berkeley, California
Principal Engineer
Perform foundation investigations and geological or fault evaluations for hillside residences, churches, condominiums, subdivisions, office and commercial buildings, shopping centers, warehouses, bridges, and dams. Investigate landslides and building distress, residential foundations, parking lots, and provide expert witness testimony. Also provide consultations on pavement design, deep site improvement, and development of seismic design criteria. Most projects located in Western United States, but additional projects in Italy, Japan, Nepal, Puerto Rico, Canada, Taiwan, Turkey, and China.

August 1975 - May 1978
Peter Kaldveer and Associates, Oakland, California
Associate (1977-78), Project Engineer (1975-77)
Managed foundation investigations, geological evaluations and seismic response analyses for projects including major hillside residential development, cluster of high-rise apartment towers and reconstruction of major container cargo terminal. Included overall responsibility for field investigation, laboratory testing, engineering analyses and report writing. Trained and supervised daily activities of two staff engineers. Responsible for technical development of firm.

July 1972 - August 1975
Lowney/Kaldveer Associates, Oakland, California
Project Engineer (1974-75), Senior Engineer (1973-74), Staff Engineer (1972-73)
Performed foundation investigations and geological evaluations of projects including schools, hospitals, warehouses, pipelines, commercial buildings, and military buildings, as well as other facilities. Included responsibility for field investigation, laboratory testing, engineering analysis and report writing.

## Representative Publications

"Probabilistic Liquefaction Evaluation of a Riverfront Site," Proceedings, Canadian National Conference on Earthquake Engineering, Vancouver, British Columbia, 1983

"Landslide Investigation Utilizing Electric Cone Penetration Testing," Co-Authored with James French, Proceedings, Use of In-Situ Tests in Geotechnical Engineering, American Society of Civil Engineers Specialty Conference, Blacksburg, Virginia, 1986

"A Comparison of Published Ground Motion Parameters," Proceedings, 3rd International Conference on Soil Dynamics and Earthquake Engineering, Princeton, New Jersey, 1987

"Existing Pile Load Capacity Evaluation," Proceedings, Second International Conference on Case Histories in Geotechnical Engineering, St. Louis, Missouri, 1988

"Air Photo Interpretation - A Consultant's Perspective," Co-Authored with Michael Thomas, Proceedings, 24th Symposium on Engineering Geology & Soils Engineering, Coeur d'Alene, Idaho, 1988

"Biotechnical Stabilization of a Debris Flow Scar," Co-Authored with Michael Thomas and Andrea Lucas, Proceedings, 20th International Conference on Erosion Control, Vancouver, British Columbia, 1989

"Preliminary Report on the Principal Geotechnical Aspects of the October 17, 1989 Loma Prieta Earthquake," Co-Authored with R.B. Seed, S.E. Dickensen, M.F. Riemer, J.D. Bray, N. Sitar, J.K. Mitchell, I.M. Idriss, R.E. Kayen, L.F. Harder, Jr., and M.S. Power, University of California at Berkeley, Earthquake Engineering Research Center Report 90-05, 1990

"Ground Failure in Downtown Santa Cruz," Co-Authored with Michael Thomas, Association of Engineering Geologists, Loma Prieta Earthquake Special Publication No. 1, 1991

"Ground Failure During Loma Prieta Earthquake - Downtown Santa Cruz," Co-Authored with Michael Thomas, Proceedings, Second International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, St. Louis, Missouri, 1991

"Importance of Drainage in Biotechnical Stabilization Projects," Proceedings, National Science Foundation Workshop on Biotechnical Stabilization, Ann Arbor, Michigan, 1991

"Partial Landslide Repair By Buttress Filling," Co-Authored with Michael Thomas, in Rockfall Prediction and Control and Landslide Case Histories, Transportation Research Board, Transportation Research Record 1343, 1992

"Stabilization of Debris Flow Scar Using Soil Bioengineering," Co-Authored with Michael Thomas, in Rockfall Prediction and Control and Landslide Case Histories, Transportation Research Board, Transportation Research Record 1343, 1992

"Earthflow Evaluation and Control: A Case History," Co-Authored with Michael Thomas, Proceedings, Stability and Performance of Slopes and Embankments - II, Berkeley, California, 1992

Invited Paper: "Field Wetting Tests on a Collapsible Soil Fill," Co-Authored with David McMahon and Sandra Houston, 1st International Symposium on the Engineering Characteristics of Arid Soils, Proceedings Edited by P.G. Fookes and R.H.G. Parry, London, England, 1993

Invited Paper: "Case History of a Collapsible Soil Fill," Co-Authored with David J. McMahon and Sandra L. Houston, in Vertical and Horizontal Deformations of Foundations and Embankments. Edited by Albert T. Yeung and Guy Y. Felio, Society of Civil Engineers, American Society of Civil Engineers, Geotechnical Special Publication 40, Settlement '94 Specialty Conference, College Station, Texas, 1994

"The Performance of Hillside Fills During the Northridge Earthquake," Co-Authored with David McMahon, Jonathan Stewart, and Jonathan Bray, Third International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, St. Louis, Missouri, 1995

"Seismic Performance of Hillside Fills," Co-Authored with David McMahon, Jonathan Stewart, and Jonathan Bray, in Landslides Under Static and Dynamic Conditions - Analysis, Monitoring and Mitigation, Edited by David K. Keefer and Carlton L. Ho, American Society of Civil Engineers, Geotechnical Special Publication 52, 1995

"Maps and Descriptions of Liquefaction and Associated Effects - The Loma Prieta, California, Earthquake of October 17, 1989," Co-Authored with John C. Tinsley, John A. Egan, Robert E. Kayen, Michael J. Bennett, and Thomas L. Holzer, in The Loma Prieta, California, Earthquake of October 17, 1989 – Liquefaction, T.L. Holzer, Editor, United States Geological Survey, Professional Paper 1551-B, 1998

"CPT, DMT and Shear Wave Velocity Evaluation of Liquefaction Sites in Santa Cruz and Treasure Island," Co-Authored with R.D. Hryciw and S.E. Shewbridge, in The Loma Prieta, California, Earthquake of October 17, 1989 – Liquefaction, T.L. Holzer, Editor, United States Geological Survey, Professional Paper 1551-B, 1998

"Possible Costs Associated with Investigating and Mitigating Some Geologic Hazards in Rural Parts of San Mateo County, California," Co-Authored with Earl E. Brabb, Sebastian Roberts, William R. Cotton, Robert H. Wright, and Erik N. Zinn, United States Geological Survey, Open File Report 00-127, 2000

"Comparison of Laboratory Data and Field Performance for Fills Subject to Hydrocompression" and "Proposed Compaction Specifications to Minimize Hydrocompression-Induced settlements in Fills Supporting Residential Structures," Each Co-Authored with David J. McMahon, in Constructing and Controlling Compaction of Earth Fills, David W. Shanklin, Keith R. Rademacher and James R. Talbot, Editors, American Society for Testing and Materials, STP 1384, 2000

"Seismic Performance of Hillside Fills," Co-Authored with Jonathan P. Stewart, Jonathan D. Bray, David J. McMahon, and Patrick M. Smith, Journal of Geotechnical and Geoenvironmental Engineering, American Society of Civil Engineers, November 2001, Volume 127, Number 11

"Residential Design Approaches Over Earthquake-Induced Ground Shearing," Co-Authored with James Lott, 11th International Conference on Soil Dynamics and Earthquake Engineering and 3rd International Conference on Earthquake Geotechnical Engineering, Proceedings Edited By A. Doolin, A. Kammerer, T. Nogami, R.B. Seed and I. Towhata, Berkeley, California, 2004

"Fault-Related Landslide at Cragmont School, Stop 6" in The Hayward Fault (Chapter 17), Doris Sloan and Donald Wells, Co-Coordinators, 1906 San Francisco Earthquake Centennial Field Guides, Edited by Carol Prentice, Judith Scotchmoor, Eldridge Moores, and Jon Kiland, Geological Society of America, Field Guide 7, Boulder, Colorado, 2006

"Cragmont School Landslide, Stop 3" and "Blakemont Landslide, Stop 4," in Bay Area Landslides and Hayward Fault, Tour 3, Fourth International Conference on Geotechnical Earthquake Engineering and Soil Dynamics, Sacramento, California, 2008

"Survey of Residential Foundation Design Practice on Expansive Soils in the San Francisco Bay Area," Journal of Performance of Constructed Facilities, American Society of Civil Engineers, February 2011, Volume 25, Issue 1

"Geologic Hazard Abatement Districts: A Response to Landslide Control," Geo-Strata Magazine, American Society of Civil Engineers Geo-Institute, March/April 2013

## Representative Lectures

"Field Investigations," "Landslide Causes," "Debris Flows" and "Control, Prevention and Repair of Landslides," University of Wisconsin (Madison), National Technical Course on Slope Stability and Landslides, San Francisco (1984, 1985), Madison (1986), San Diego (1987), Tacoma (1988), San Diego (1989), Denver (1990), Berkeley (1991, 1992)

"Engineering Aspects of Landslides," Legal Issues and Landslides, Sponsored by San Francisco Barrister's Club, San Francisco, March 31, 1984

"Slope Stability," Soil Engineer's License Review Course, University of California, Berkeley, 1987-1992 (annually)

"Techniques and Costs of Landslide Repair," Geotechnical Group, Washington D.C. Chapter of American Society of Civil Engineers, McLean, Virginia, 1987

"Analysis of Landslides" and "Landslide Repair Examples," Landslide Hazard Analysis and Mitigation Conference, ABAG Training Institute, Oakland (1988), Palo Alto (1988)

"Causes of Slope Failure" and "Landslide Repair Examples," Erosion Control and Slope Protection Short Course, University of California (Davis), 1988

"Grading to Stabilize Landslides," "Drainage Methods to Stabilize Landslides," and "Debris Flow Stabilization," University of Wisconsin (Madison), National Course on Practical Slope Restoration Methods, San Diego (1989), Denver (1990), Berkeley (1991, 1992)

"Ground Failure in Downtown Santa Cruz Induced by the Loma Prieta Earthquake," 85th Annual Meeting of the Seismological Society of America, Santa Cruz, 1990

"Improved Hillslope Stabilization with Biotechnical Methods," and "Case Histories of Biotechnical Repair," Biotechnical Slope Protection and Erosion Control Short Course, University of Michigan (Ann Arbor), 1990, 1991, 1992

"Why a Geotechnical Engineer Should Use Soil Bioengineering," University of Wisconsin (Madison), National Technical Conference on Using Vegetation and Structures to Control Erosion, Protect Slopes, and Restore Environmental Quality, Berkeley, 1993

"Debris Flow Stabilization Techniques in North America," International Sabo Symposium, Design of Resorts Exposition, Wakayama City, Japan, 1994

"Hydrocompression - An Evaluation of Current Practice," Presented at "Fills in the Urban Environment: Design, Construction and Performance," American Society of Civil Engineers, National Convention, San Diego, 1995

"California Landslides and Engineering Solutions," University of Wisconsin (Madison), National Short Course on Slope Stability and Landslides, San Francisco, 1996, 1997

"Landslide Repair," Panel Presentation with Lee Abramson and Jeff Bachhuber, Geotechnical Group, San Francisco Section of the American Society of Civil Engineers, Oakland, October 1996

"Characterizing and Mitigating Hill Slope Hazards," Panel Presentation with Jeff Bachhuber, Joel Baldwin, Bill Cotton, Keith

Knudsen and J. David Rogers, Conference: El Niño – Bay Area Hazards and Opportunities, Association of Bay Area Governments, Oakland, December 1997

"Forensic Geotechnical Engineering," Panel Presentation with Eugene Bass and J. David Rogers, Geotechnical Group, San Francisco Section of the American Society of Civil Engineers, Oakland, April 1998

"Role of Geotechnical Consultants in Assessing Safety of Homes and Roads," Conference: El Niño – Storm Lessons Learned in the Bay Area, Association of Bay Area Governments, Oakland, June 1998

"Landslide Case Histories" and "Data Sources for Landslide Studies," University of Wisconsin (Madison), National Short Course on Slope Stability and Landslides, Westwood Village, 2001, 2002, 2003

"Field Investigations of Landslides" and "Debris Flows," University of Wisconsin (Madison), National Short Course on Slope Stability and Landslides, San Francisco Area (2004-2009, annually)

"Engineer's Standard of Care," Liability and Loss Prevention Workshop, San Francisco ASCE Geotechnical Group, April 15, 2008

"Bay Area GeoEngineering History Project," Co-Authored with J. David Rogers, 26th GeoEngineering Lecture Series Dinner, May 9, 2008

"Geotechnical Engineering 101: Defending a Soils Case," Co-Speaker with Sam Palmer, Litigating Construction Defect Claims in Nevada, State Bar of Nevada and Association of Defense Counsel of Northern California and Nevada, Reno, Nevada (October 9, 2008) and Las Vegas, Nevada (October 10, 2008)

"Berkeley Hills Landslide-Induced Property Line Movement under Both Static and Earthquake Conditions" and "New Construction on Existing Landslides in Urban Areas Regulated by California Seismic Hazard Mapping Act," Co-Authored with Wayne Magnusen, Third Conference on Earthquake Hazards in the Eastern San Francisco Bay Area, Hayward, California, October 22-26, 2008

"Soil Conditions and Seismic Response of the Kathmandu Valley," Nepal Engineer's Association, Kathmandu, Nepal, November 11, 2008

"La Conchita Landslide Risk Assessment", Co-Authored with Laurie Johnson, Wayne Magnusen and Christopher Hitchcock, American Geophysical Union, Fall Meeting, December 10, 2009

Invited Presentation: "Lateral Fill Extension" in session Titled "Laboratory Characterization of Soil Behavior for Application to Expansive Fill Slopes," American Society of Civil Engineers, National Geo-Congress – Stability and Performance of Slopes and Embankments III, San Diego, California, March 6, 2013

"Geotechnical Observations and Considerations – Buildings Overlying Fault Rupture," Surface Fault Rupture – New Mitigation Concepts and Political Challenges, Los Angeles Section of the Association of Engineering Geologists, May 10, 2013

"California Landslide Source Area Bio-Stabilization," 11th International Symposium on Mitigation of Geo-Disasters in Asia, Himalayan Landslide Society, Kathmandu, Nepal, October 26, 2013

"Earthquake Preparedness," Safety Stand Down Fair, United States Navy, Naval Air Station North Island (Coronado), December 6, 2013

"Source of Water Key to Understanding Landslide Causation," Co-Authored with James Joyce and Jean Moran, 12th International Symposium on Geo-Disaster Reduction, Fullerton, California, September 6, 2014 (Selected as Outstanding Paper of Symposium)