

Soils Report

For: Burnt Ranch Estates Mutual Water Company Burnt Ranch, CA 95527

Report Provided For: Burnt Ranch Estates Mutual Water Company PO Box 102 Burnt Ranch, CA 95527

Report Provided By:

Trinity Valley Consulting Engineers, Inc. 67 Walnut Way, PO Box 1567 Willow Creek, California 95573 (530) 623-3000 Fax: (530) 629-3011

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Main Office 67 Walnut Way Willow Creek CA 95573 (530) 629.3000 Weaverville Office 2200 Main Street Weaverville CA 96093 (530) 623.4446



TRINITY VALLEY CONSULTING ENGINEERS, INC Engineering - Surveying - Land Planning - Construction Management

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Introduction

Trinity Valley Consulting Engineers, Inc. (TVCE) was secured by The Burnt Ranch Estates Mutual Water Company - BREMWC (client) to evaluate the existing conditions for the Burnt Ranch Estates. The client is proposing domestic water treatment, storage, and distribution upgrades within the Burnt Ranch Estates Community.

The proposed Burnt Ranch Estates Community Water System Improvement Project will mainly provide upgrades and increased capacity to the existing water treatment, storage and distribution system. The goal is to add two additional water storage tanks, replace the entire distribution system, replace all fire hydrants and replace all water meters. This project will not increase the number of water service connections. Furthermore, this project does not alter the existing water right held by the Burnt Ranch Estates Mutual Water Company BREMWC. McDonald Creek is the source of water for BREMWCO and is gathered from a dam on BREMWC property. The proposed activities do not involve disturbance of the water inlet nor the riparian corridor through which the creek flows.

The following is an outline of our findings and recommendations.

Project Site Location

Upper Water Tank:

The existing main tank is located on assessor parcel number (APN) 008-790-003-000. The existing tank is rectangular and is constructed of concrete blocks. It is approximately 20' x 15' and sits on a flat area cut into on a moderately steep hillside, which was excavated and constructed on in the mid-1970s. The plan is to extend this flat to the north by extending the excavated area into the same hillside to bring its new angle of repose to a stable condition. The area to be excavated into is part of the cut slope created during the original construction and part the native hillside. The existing slope ranges from 30-50% in steepness. The area to be excavated occupies about 0.25 acres. It is presently covered with a moderately dense mixture of brush and trees. The proposed water tank will be 80,000-gallon bolted steel tank with concrete foundation.

Lower Water Tank:

The lower tank is located on APN: 008-800-005-000 and is approximately 0.25-acre lot owned by the BREMWC, about 1 mile from Highway 299 on Pony Express Way. Like the upper tank, the existing lower tank is comprised of concrete blocks and was constructed in the 1970s. The old tank will be removed and the new tank located on the same site. The new tank will be approximately 40,000 gallon and constructed from bolted steel with a concrete foundation. The site is clear of all vegetation. This area is naturally flat and was graded to accept the current tank in the 1970s. Very little new grading will be necessary in order to accommodate the new tank.

Water Mains:

The length of the main water line is approximately 10,000 feet. It largely runs underneath the main access roads, Horseshoe Lane, Pony Express Way, and Stage Coach Drive. These

roads are County maintained. The plan is to replace the aging water line, which is a combination of galvanized and plastic pipe, with new HDPE water lines, to the start of each domestic inlet, including shut off valves and cross connection prevention devices. Existing water mains will be removed where encountered and abandoned in place otherwise.

Project Site Geology

The site is located in Burnt Ranch. The site lies within Klamath Mountain Geomorphic Province (Irwin, 1966), and geologically, within the Rattlesnake Creek Terrane (Irwin, 1972). The site is mapped as being underlain by a large dormant-old Quaternary landslide deposit (Qls) that flanks from the eastern terminus of a northeasterly spur that originates from South Forth Mountain. The pond site appears to lie within the highly rounded scarp of this dormant slide body. Subjacent to the landslide deposit, Middle Jurassic to Permian age Broken formation of volcanic rocks (JT_RPrc) and mélange of the Rattlesnake Creek Terrane are present. Irwin (2010) describes this formation as dominantly sheared and dislocated mafic volcanic rocks, including pillow basalt, flows, tuffs, volcanic breccia, and volcanoclastic rocks that containing locally interbedded red and gray to black, thin bedded radiolarian chert, minor amounts of intermediate and silicic volcanic rocks, and lenses and knockers of serpentinite (um) which is dominantly serpentinized peridotite but includes metasomatized mafic rocks of uncertain origin as well as minor amounts of sheared-in volcanic rocks and chert.

Proposed Project

The proposed project for this site is to perform a general soils investigation to evaluate present-day site conditions and provide general recommendations for the developments associated with the project. The developments will mainly consist of constructing water tanks, retaining walls, and installation of water lines.

Soil and Site Conditions

A field investigation was conducted by TVCE on May 21, 2023 for visual observation and soil sample collection. This investigation consisted of site observations, general observations of the location of the proposed development, and collection of soil samples (see attachment 4). In addition, a desktop reconnaissance was conducted utilizing available public databases.

Site Soil Evaluation

Conservatively, site soils will yield a bearing pressure of one thousand five hundred (1,500) pounds per square foot (psf) for vertical bearing and one hundred (100) psf for lateral bearing (2022 California Building Code, Table 1806.2).

Seismic and Hazards Considerations

The parcel is located near the Mad River fault zone which is located approximately 22 miles to the west of the project site. The Mad River Fault Zone (Fault ID # 13) is considered active by the State of California, with the last surface rupture within the last 15,000 years.

The following coefficients shall be used for seismic design (See Attachment 6 for Seismic Hazard Data):

D
1.94 g
0.73 g
1.2
1.5
1.54 g
1.06 g
D
IV
1.5

Based on the location and geographical setting, the project site lies outside any flood prone areas. The <u>https://amplify.asce.org/</u>project parcel has not been mapped within a FEMA flood area (FIRM Panel 750 of 2075).

Non-engineered fill soils are not present on-site within the anticipated building footprints. However, if encountered during excavation of foundation elements, undocumented and/or non-engineered fill soil should be considered unsuitable as foundational load bearing soils due to the potential for excessive total and differential settlement. It will be required to over-excavate (approximately 3' to 8') so foundational elements be founded on suitablydense, in-place and undisturbed native granular soils. A qualified professional shall inspect the subgrade of all foundational elements.

Due to the site soils, depth to groundwater, and distance to the nearest known quaternary fault, the potential for liquefaction, surface rupture, soil strength loss, or faulting at this site is <u>Low</u>. Mitigations to hazards associated with the proposed development are those described in the section above and in the following recommendations prescribed within the following *Recommendations* Section.

Conclusion

This report documents the history, present conditions and subsurface materials, as well as the geologic hazards associated with the site. Included in this report are design and construction recommendations based on the site conditions encountered, the requirements of the 2022 CBC and County of Trinity grading ordinance. Based on our review of historical data, site exploration and observations, it is in our opinion that if our site-specific recommendations are implemented as intended, then no further actions will be necessary.

Recommendations

The following recommendations are general recommendations for any future grading activities to be performed:

Site Preparation

All earthwork, including but not limited to, site clearing, grubbing, and stripping should be conducted during dry weather conditions, generally mid-April through mid-October.

Strip and remove all topsoil and vegetation from the project area, and for a minimum of three feet to the outside of the working area.

Any undocumented fill soils, fine-grained residual soils, and any other debris encountered at or below the existing ground surface shall be removed at the locations receiving any potential fills.

Fills

Fills shall be constructed as controlled and compacted engineered fills and fillslopes graded to no steeper than 2:1 (h:v) without written approval of a qualified design professional.

Fills should be free of: 1) organics, 2) rocks larger than 3-inches in diameter, and 3) other deleterious materials.

Fill material should be placed in loose lifts no more than 8-inches thick, at uniform moisture content at or near optimum, and compacted mechanically.

Sufficient testing and inspection should be performed to monitor the suitability of fill materials and assure compliance with the recommended compaction standards.

Fill, if required, may be imported for use as non-expansive structural fill beneath floor slabs and for pavement subgrade. Select fill should be a soil/rock mixture free of organic material and other deleterious material. The select fill material should contain low plasticity clay, well-graded sand, and/or gravel. Select fill should contain no rocks larger than 3 inches in greatest dimension, nor more than 15 percent larger than 2 inches. Additionally, the material should meet the following specifications:

> Plasticity index: <12 Liquid Limit: <30 Percent passing No. 200 sieve: 50 maximum, 5 minimum

Aggregate base material may be used for pavement subgrade, placed beneath footings or floor slabs, used as trench backfill, or used as roadway surfacing. This material should meet the requirements in the Caltrans Standard Specifications for Class 2 Aggregate Base (3/4-inch maximum particle size).

Compaction Standards

Fills shall be compacted in 8-inch loose lifts with clean native materials at optimum moisture content as determined by testing and approved by the engineer. Non-structural fills shall be compacted to a firm unyielding surface as approved by engineer.

It is recommended that any materials proposed for structural fill material to support any foundations or structural building elements, and associated utilities be compacted as specified below:

Fill Placement Location	Compaction Recommendations (ASTM D 1557-Modified Proctor)	Moisture Content (Percent Optimum)
Structural fill supporting footings	95%	-1 to +3 percent
Structural fill supporting slabs-on-grade	90%	-1 to +3 percent
Structural fill placed within 3 feet beyond the perimeter of the building pad	90%	-1 to +3 percent
Utility trenches within building and any pavement areas	95%	-1 to +3 percent
Utility trenches beneath landscape and grass areas	90%	-1 to +3 percent

Drainage and Landscaping

The site should be graded to provide drainage such that no water is allowed to: 1) pond anywhere on the site, 2) migrate beneath the proposed developments, or 3) pond at the base of cuts.

Site drainage/run-off should be directed away from all fill slopes. Impermeable surfaces should be minimized to encourage infiltration.

Roadways – Gravel Surface

The upper six inches of graveled roadways supporting vehicle loadings should be compacted to a firm and unyielding surface that is stable under construction traffic prior to placement of aggregate base. Aggregate base rock supporting vehicle traffic shall be a minimum of 4 inches of $\frac{3}{4}$ " minus and a maximum of 1-1/2" minus.

Roadways – Paved Surface

The upper six inches of pavement subgrades supporting vehicle loadings should be scarified, moisture conditioned to at least the optimum moisture content and uniformly compacted to at least 95 percent of the ASTM D1557 maximum dry, and must be stable under construction traffic prior to placement of aggregate base. Final subgrade processing and compaction should be performed just prior to placement of aggregate base, after construction of underground utilities is complete.

Setback Requirements

We recommend that the face of the footings be set back at least twenty feet (20') from a break in top of slopes. Given the minimal setback from the break in slope, the greater embedment is recommended to provide vertical and lateral support for the foundation without detrimental settlement. Where slope is steeper than 1:1, the required setback shall be measured from an imaginary plane at 45 degrees to the horizontal, projected upwards from the toe of the slope.

Foundational Design Recommendations

All foundations should be constructed of reinforced concrete. The following foundation recommendations assume a one-story commercial structure will be constructed on this site. In our opinion, the proposed structure can be supported by mat slab or a stiffen slab on grade provided that the foundation is designed to resist differential settlement of the underlying soil. A foundation of this type is suitable for site conditions provided that it is constructed in accordance with our recommendations and specifications and designed to meet the standards of the 2019 CBC.

Below are additional recommendations associated with the foundation development: *Footings*

- Foundations are not anticipated to be located in areas of undocumented fill or fill soils of varying depth. A foundation system for this site should be rigid to limit potential structural damage due to differential settlement resulting from liquefaction;
- If necessary to mitigate undocumented fill soils excavate and replace with suitable engineered fill, placed and compacted as recommended. Alternately, footings may be built on controlled low strength material (CLSM, e.g., concrete slurry) backfilled footing trenches, excavated into the bearing soil indicated in this report;
- Foundations should be embedded a minimum of 12 inches into suitably dense, undisturbed native bearing soils. Based on the soil profile observed in the building footprint, the base of footings should therefore be approximately 18 inches below existing grade, at minimum; or engineered for differential settlement

- Footings within 20 feet (at minimum) of the top of slope should be embedded approximately 2 feet below finished grade;
- Minimum width of footings should be 12 inches, and the minimum thickness should be 6 inches, per CBC Section 1809.

Floor Slab Design

- The stiffened concrete floor slab-on-grade or mat slab should have a minimum thickness as specified by the engineer, and should be reinforced and underlain by at least 6 inches of compacted select fill consisting of 4 inches of Class 1, Type A permeable material (per Caltrans), or an approved equivalent, to act as a capillary moisture break, and 1 inch of sand as described below;
- To reduce the possibility of moisture migration through any floor slab-on-grade, a minimum 6 mil plastic membrane (vapor retarder) should be placed on the prepared of Class 1, Type A gravel subgrade;
- Joints between the sheets and utility piping openings should be lapped and taped;
- Care should be taken during construction to protect the plastic membrane against punctures. To protect the membrane during steel and concrete placement, and to provide for a better concrete finish, cover the membrane within at least 1 inch of clean sand;
- The difference, if any, between the 6 inches of select fill and sand under the slab and the depth to firm undisturbed native soil may be made up with additional select fill or engineered fill that is placed as specified in the Structural Fill section of this report.
- If bearing on undisturbed / native soil is not obtained, slab shall be designed with sufficient stiffness so as to resist differential settlement.

<u>Grading</u>

Grading must meet compliance with the California Building Code (2019) Appendix J, County of Trinity Grading Ordinance and ASTM regulations.

All cuts and fills shall be setback at a minimum of ten (10) feet from all ascending and descending slopes greater than 30%.

Any grading or structures shall be in conformance with the most recent version of the California Building Code (CBC).

Final site grading shall not create areas of concentrated flow over the existing fill slopes. An inspection of the subgrade must be inspected by a qualified professional. Subsequent visits during and at project termination will be required for quality assurance and control.

Erosion Control

Site-specific erosion/sediment control and stabilization recommendations are presented in the bulleted list below. As used herein, *exposed soil areas* and *disturbed areas* include all grading and excavation work performed in connection with the proposed project.

- Storm water erosion and pollution prevention measures should be taken as soon as possible prior to the onset of the winter rains.
- Trinity County Erosion Control Standards should be viewed as *minimum* standards for erosion and sediment control at this site.
- Revegetate all disturbed areas immediately by seeding with Caltrans erosion control mix (or equivalent).
- To protect against erosion, heavily mulch all exposed soil areas with straw, or an approved alternate material.
- Poke the straw mulch into the upper 2 inches of the soil to limit loss of straw.
- Stake straw wattles parallel to slope contours into any side cast fills.
- Install silt fencing at toes of any new side cast fill slopes.
- Replant the site with trees and shrubs native to the area.
- Cover any soil stockpiles with 6-mil (min) plastic sheeting, securely anchored to prevent wind disturbance.
- Native gravel-surfaced roadways to the proposed residence and other areas where vehicle traffic may occur; should be maintained in good condition.
- Drive and park vehicles only on gravel-paved areas during wet weather.
- Monitor the site before and after runoff-generating rainfall events to verify suitable and appropriate functioning of all erosion-control measures.
- Promptly repair all erosion-control measures as needed.

Limitations

This report, recommendations, and conclusions are solely intended for the site discussed above. The information contained in this report is only intended for use at the stated site using the stated uses. This report should not be used as justification for any other project or site, and only be used for information purposes if referenced and reviewed for other projects. TVCE recognize that the site is in a dynamically active area and conditions can and will change. TVCE has used the best professional judgment to assess the present and future risks and assist the landowner in proposing development that does not increase the risk to the resources present in the project area or subject the landowner to untenable hazards. If conditions different from those described in this report are encountered during construction, the project engineer/builder/owner should contact this office to review the new conditions and evaluate their bearing on the validity of any recommendations provided herein.

The opinions presented herein have been developed using a degree of care and skill ordinarily exercised, under similar circumstances, by reputable civil engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report.

The analyses and recommendations contained in this report are based on the data obtained from subsurface exploration. The methods used indicate subsurface conditions only at the specific locations where soils were observed, and only to the depths penetrated, and cannot always be relied on to accurately reflect stratigraphic heterogeneity that commonly exist between sampling locations.

Do not apply any of this report's conclusions or recommendations if the nature, design, or location of the project changes. If changes are contemplated, the author of this report should be consulted to review the impact on the applicability of the recommendations in this report. The author of this report is not responsible for any claims, damages, or liability associated with any other party's interpretation or the subsurface data or reuse this report for other projects or at other locations without written consent.

Please contact TVCE at (530) 629-3000 if any questions may arise.

Eric Keyes Professional Engineer, P.E. C 90533

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ATTACHMENT 1:

Location Map

ATTACHMENT 2:

Site Map

ATTACHMENT 3:

Geology Map

ATTACHMENT 4:

Soil Exploration

ATTACHMENT 5:

Soil Log

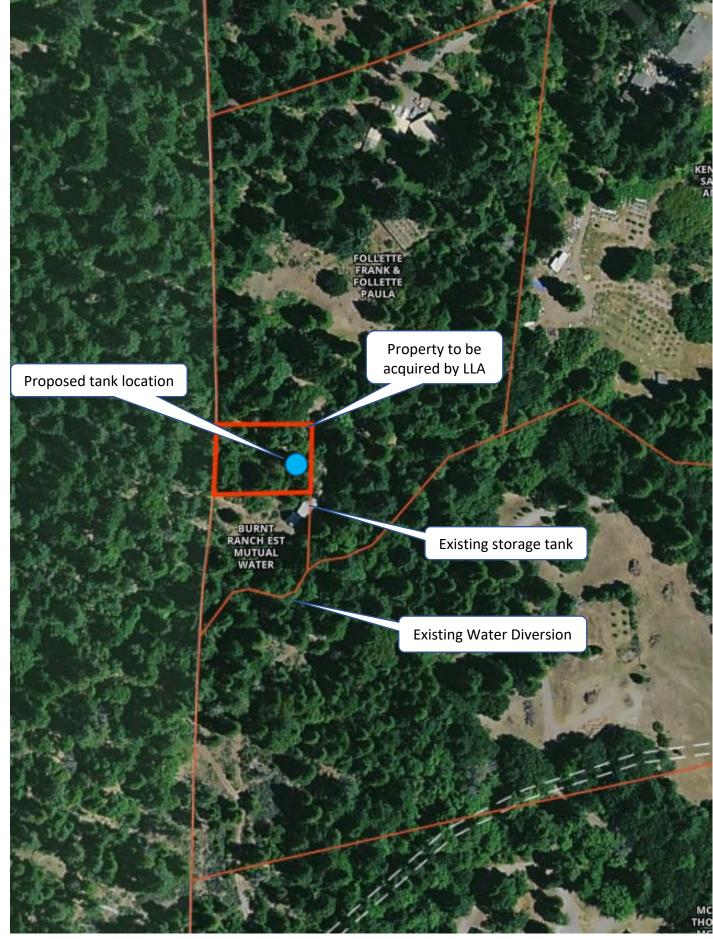
ATTACHMENT 6:

ASCE Seismic Hazards

BURNT RANCH ESTATES MUTUAL WATER COMPNAY - OVERALL SITE PLAN



BURNT RANCH ESTATES MUTUAL WATER COMPNAY – TANKS SITE EXPANDED VIEW

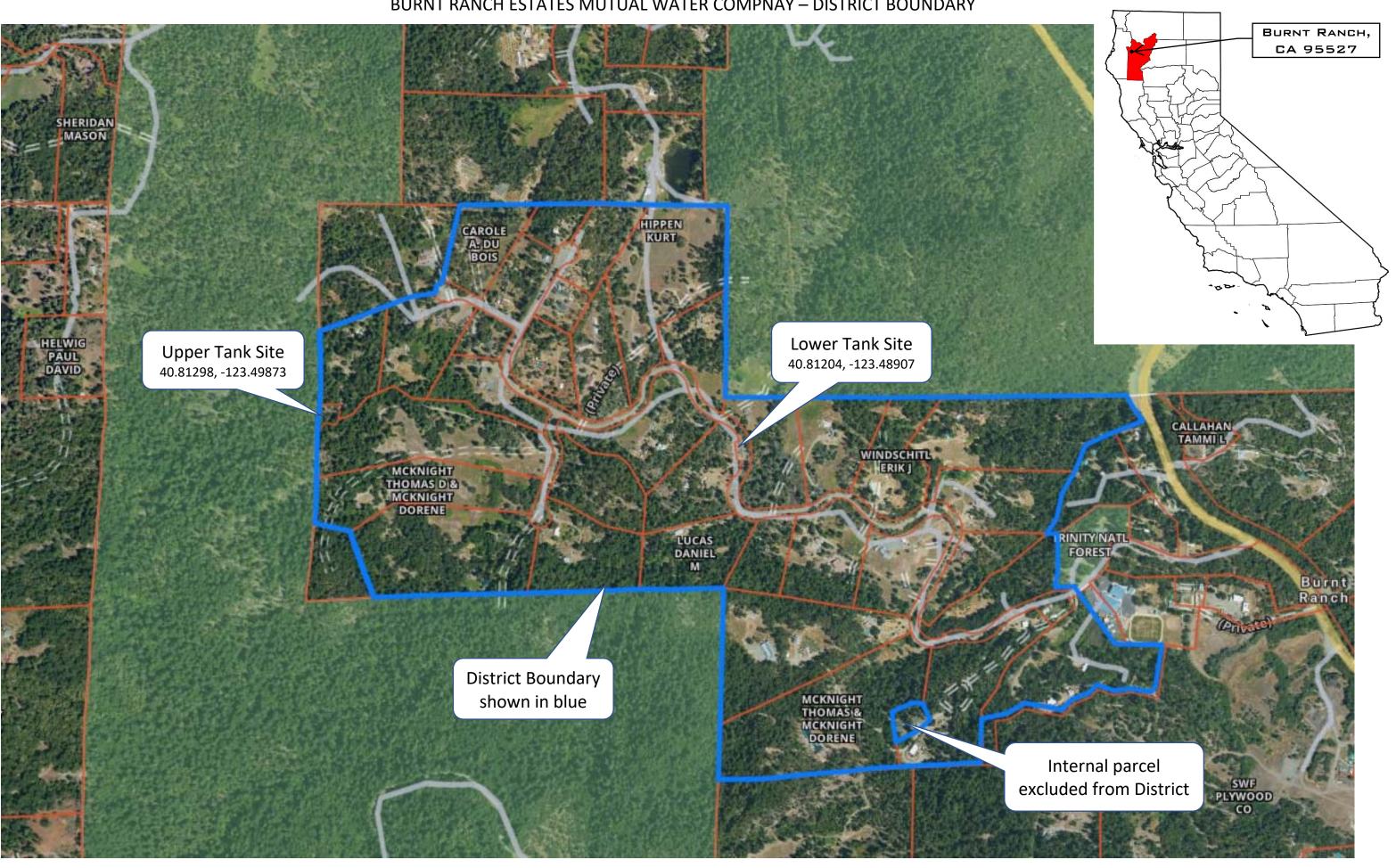




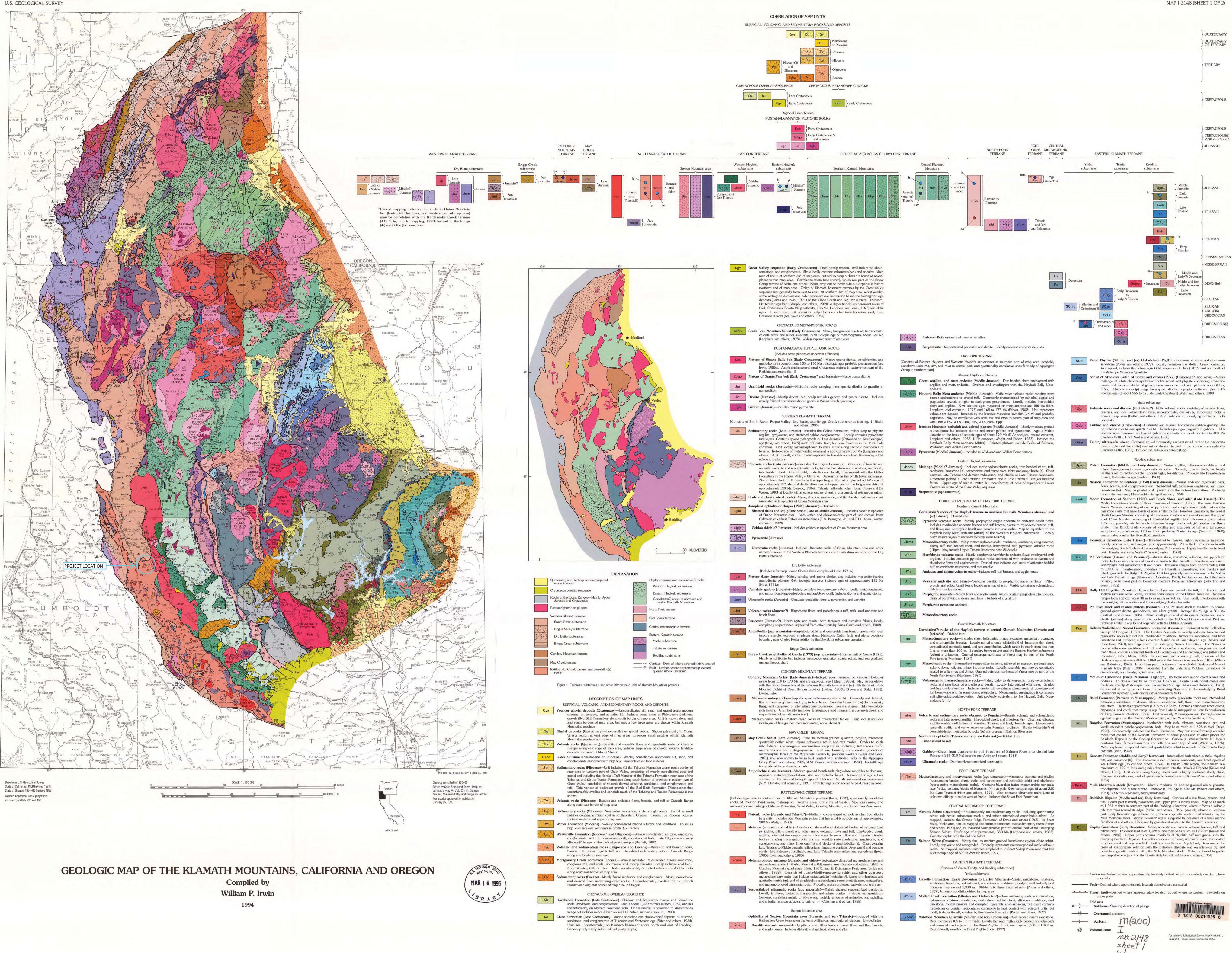
UPPER TANK SITE

LOWER TANK SITE

BURNT RANCH ESTATES MUTUAL WATER COMPNAY – DISTRICT BOUNDARY







	Butte subterrane
	Dry Butte subterrane
-	[Includes informally named Chetco River complex of Hotz (1971a)]
Jp	Plutons (Late Jurassic)—Mainly tonalite and quartz diorite; also includes muscovite-bearing granodiorite plutons; K-Ar isotopic analyses indicate ages of approximately 153 Ma (Hotz, 1971a)
lcg, + + +	Cumulate gabbro (Jurassic)—Mainly cumulate two-pyroxene gabbro, locally metamorphosed, and minor hornblende-plagioclase metagabbro; locally includes diorite and quartz diorite
um	Ultramafic rocks (Jurassic)—Cumulate peridotite, dunite, pyroxenite, and wehrlite

+++sgb++++	Gabbro—Both layered and massive varieties
ssp	Serpentinite—Serpentinized peridotite and dunite. Locally contains chromite deposits HAYFORK TERRANE
correlative i	f Eastern Hayfork and Western Hayfork subterranes in southern part of map area, probably units ms, mv, and mvs in central part, and questionably correlative units formerly of Applegate orthern part]
Jho	Western Hayfork subterrane Chert, argillite, and meta-andesite (Middle Jurassic)—Thin-bedded chert interlayered with
	argillite and meta-andesite. Overlies and interfingers with the Hayfork Bally Meta- andesite
<u>ؗ؞ٚڿۜٵؚٚ</u> ؙۄڷؠؖڰڿ؉	Hayfork Bally Meta-andesite (Middle Jurassic)—Mafic volcaniclastic rocks ranging from coarse agglomerate to crystal tuff. Commonly characterized by euhedral augite and plagioclase crystals in light- to dark-green groundmass. Locally includes thin-bedded chert and argillite. K-Ar isotopic ages measured on meta-andesite are 156 Ma (M.A. Lanphere, oral commun., 1977) and 168 to 177 Ma (Fahan, 1982). Unit represents volcanic-arc deposit. Intruded by the Ironside Mountain batholith (Jhim) and probably cogenetic. May be correlative with units mv and mvs in central part of map area and with units JRpv, JRh, JRa, JRv, JRp, and JRpp
Jhim	Ironside Mountain batholith and related plutons (Middle Jurassic)—Mostly medium-grained monzodiorite but includes diorite and minor gabbro and pyroxenite. Age is Middle Jurassic on the basis of isotopic ages of about 170 Ma (K-Ar analyses, revised constant, Lanphere and others, 1968; U-Pb analyses, Wright and Fahan, 1988). Intrudes the Hayfork Bally Meta-andesite (Jhhb). Related plutons include Forks of Salmon, Wildwood, and Walker Point plutons
Jhpx	Pyroxenite (Middle? Jurassic)—Included in Wildwood and Walker Point plutons
Jehm	Eastern Hayfork subterrane Melange (Middle? Jurassic)—Includes mafic volcaniclastic rocks, thin-bedded chert, tuff,
	sandstone, limestone (Is), serpentinite, and minor mica schist and amphibolite (a). Chert contains Late Triassic and Jurassic radiolarians and Middle or Late Triassic conodonts. Limestone yielded a Late Permian ammonite and a Late Permian Tethyan fusulinid fauna. Upper age of unit is limited by unconformity at base of superjacent Lower Cretaceous strata of the Great Valley sequence
ehsp	Serpentinite (age uncertain)
	CORRELATIVE(?) ROCKS OF HAYFORK TERRANE Northern Klamath Mountains
	Correlative(?) rocks of the Hayfork terrane in northern Klamath Mountains (Jurassic and (or) Triassic)—Divided into:
ͺͺͺͺ ϓͺͺͺͺ ͺͺͺͺ	Pyroxene volcanic rocks—Mainly porphyritic augite andesite to andesitic basalt flows. Includes interbedded andesitic breccia and tuff breccia; dacitic to rhyodacitic breccia, tuff, and flows; and porphyritic basalt and basaltic intrusive rocks. May be equivalent to the Hayfork Bally Meta-andesite (Jhhb) of the Western Hayfork subterrane. Locally
Jīrms	contains interlayers of metasedimentary rocks (JTrms) Metasedimentary rocks—Mildly metamorphosed shale, mudstone, sandstone, conglomerate,
Jīkh	 cherty tuff, thin-bedded chert, and marble. Interlayered with pyroxene volcanic rocks (JFpv). May include Upper Triassic limestone near Wilderville Hornblende volcanic rocks—Mainly porphyritic homblende andesite flows interlayered with argillite. Includes andesitic pyroclastic rocks interbedded with andesitic to dacitic and rhyodacitic flows and agglomerates. Dashed lines indicate local units of aphanitic bedded
Jīka	tuff, volcaniclastic mudstone, and rare marble Andesitic and dacitic volcanic rocks—Includes tuff, tuff breccia, and agglomerate
JÆv	Vesicular andesite and basalt—Vesicular basaltic to porphyritic andesitic flows. Pillow breccia and pillow basalt found locally near top of unit. Marble containing volcaniclastic debris is locally present
Jītp	Porphyritic andesite —Mostly flows and agglomerate, which contain plagioclase phenocrysts, clasts of porphyritic andesite, and local interbeds of crystal tuff
JT≹pp	Porphyritic pyroxene andesite
JRs	Metasedimentary rocks Central Klamath Mountains
	Correlative(?) rocks of the Hayfork terrane in central Klamath Mountains (Jurassic and
ms	 (or) older)—Divided into: Metasedimentary rocks—Includes slate, feldspathic metagraywacke, metachert, quartzite, and chert-argillite breccia. Locally contains pods (olistoliths?) of limestone (Is), chert, serpentinized peridotite (um), and rare amphibolite, which range in length from less than 1 m to more than 100 m. Boundary between unit and the Eastern Hayfork subterrane (Jehm) is unknown. Queried outcrops northeast of Yreka may be part of the North Fork terrane (Mortimer, 1984)
mv	Metavolcanic rocks—Intermediate-composition to felsic, pillowed to massive, predominantly aphyric flows, tuff, and minor intrusive rocks. Locally resemble and may be genetically related to units mvs and Jhhb. Queried outcrops northeast of Yreka may be part of the North Fork terrane (Mortimer, 1984)
૾ઽૺ૽૿ૼૹૺૼૼૼૼૼૼૼૼૼૼ	Volcanogenic metasedimentary rocks—Mainly pale- to dark-greenish gray volcaniclastic rocks and rare flows of andesite and basalt. Locally interbedded with slate. Graded bedding locally abundant. Includes crystal tuff containing phenocrysts of pyroxene and (or) hornblende and, in some cases, plagioclase. Metamorphic assemblage is commonly actinolite-epidote-albite-biotite. Unit probably equivalent to the Hayfork Bally Meta- andesite (Jhhb)
nfvs	NORTH FORK TERRANE Volcanic and sedimentary rocks (Jurassic to Permian)—Basaltic volcanic and volcaniclastic rocks and interlayered argillite, thin-bedded chert, and limestone (Is). Chert and siliceous argillite contain radiolarians of Permian, Triassic, and Early Jurassic ages. Limestone is
nfd	 argante contain radioarians of remnan, massic, and Early subassic ages. Entrestorie is generally oolitic, and some lenses contain Permian fusulinids. Blocks (olistoliths?) of blueschist-facies metavolcanic rocks (bs) are present in Salmon River area North Fork ophiolite (Triassic and (or) late Paleozoic)—Divided into: Diabase and basalt
**************************************	Gabbro—Zircon from plagiogranite pod in gabbro of Salmon River area yielded late Paleozoic (265–310 Ma) isotopic age (Ando and others, 1983) Ultramafic rocks—Dominantly serpentinized harzburgite
Contraction of the local sectors of the local secto	FORT JONES TERRANE
fjm	Metasedimentary and metavolcanic rocks (age uncertain)—Micaceous quartzite and phyllite (representing bedded chert, shale, and sandstone) and actinolitic schist and phyllonite (representing metavolcanic rocks). Contains blueschist-facies metamorphic minerals; near Yreka, contains blocks of blueschist (×) that yield K-Ar isotopic ages of about 220 Ma (Late Triassic) (Hotz and others, 1977). Also contains ultramafic rocks (um) of unknown affinity in outlier west of Yreka. Includes the Stuart Fork Formation
Da	CENTRAL METAMORPHIC TERRANE Abrams Schist (Devonian)—Predominantly metasedimentary rocks, including quartz-mica
	schist, calc schist, micaceous marble, and minor intercalated amphibolite schist. As mapped, includes the Grouse Ridge Formation of Davis and others (1965). In Scott Valley-Yreka area, unit as mapped also includes unnamed metasedimentary rocks (Potter and others, 1977) and, in undivided southernmost part of terrane, part of the underlying Salmon Schist. Rb-Sr age of approximately 380 Ma (Lanphere and others, 1968). Cometamorphic with the Salmon Schist
Ds	Salmon Schist (Devonian)—Mostly fine- to medium-grained hornblende-epidote-albite schist. Locally phyllonitic and retrograded. Probably represents metamorphosed mafic volcanic rocks. As mapped, includes unnamed amphibolite in Scott Valley-Yreka area that has K-Ar isotopic age of 390 to 399 Ma (Hotz, 1977)
	EASTERN KLAMATH TERRANE [Consists of Yreka, Trinity, and Redding subterranes]
DSg	Yreka subterrane Gazelle Formation (Early Devonian to Early? Silurian)—Shale, mudstone, siltstone, sandstone, limestone, bedded chert, and siliceous mudstone; poorly to well bedded; total
SOmc	thickness may exceed 1,300 m. Divided into three informal units (Potter and others, 1977), but units not distinguished in map area Moffett Creek Formation (Silurian and Ordovician?)—Tan-weathering shale and mudstone,
SOam	 calcareous siltstone, sandstone, and minor bedded chert, siliceous mudstone, and limestone; mostly massive and disrupted; generally unfossiliferous, but chert contains Ordovician or Silurian radiolarians; commonly in fault contact with adjacent units, but locally is depositionally overlain by the Gazelle Formation (Potter and others, 1977) Antelope Mountain Quartzite (Silurian and (or) Ordovician)—Well-bedded quartz sandstone. Beds commonly 0.5 to 1.5 m thick. Locally thin and rhythmically bedded. Includes beds
	and lenses of chert adjacent to the Duzel Phyllite. Thickness may be 1,500 to 1,700 m. Depositionally overlies the Duzel Phyllite (Hotz, 1977)

MISCELLANEOUS INVESTIGATIONS SERIES



Job No. 1754.04 Page 1 of 4

Date: 06/19/2023

Report to: Burnt Ranch Estates Mutual Water PO Box 102 Burnt Ranch, CA 95527

RE: APN: N/A

Sampled By: J. McKnight

TP #: 1A, 1B, 1C

Date Tested: 06/16/2023

Depth: 2', 5', 9'

. .

Sample Description: Soil

Date Sampled: 05/21/2023

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analys	is	TP-1A	TP-1B	TP-1C
	Sand:	74%	66%	62%
	Clay:	14%	14%	17%
	Silt:	12%	20%	21%
	Zone Classification:	2	2	2

Bulk Density: N/A

Comments:

Zone 1 - Soils in this zone are very high in sand content. They readily accept effluent, but because of their low silt and clay content, they provide minimal filtration. These soils demand greater separation distances from ground water.

Zone 2 - Soils in this zone provide adequate percolation rates and filtration to effluent. They are suitable for use of a conventional system without further testing.

Zone 3 - Soils in this zone are expected to provide filtration of effluent, but their ability at a suitable rate is questionable. These soils require wet-weather percolation tests to verify their suitability for effluent disposal by conventional leachfield methods.

Zone 4 - Soils in this zone are unsuitable for a conventional leach field because of their severe limitations for accepting effluent.

Josh McKnight, P.E.

Soil Texture Analysis Worksheet

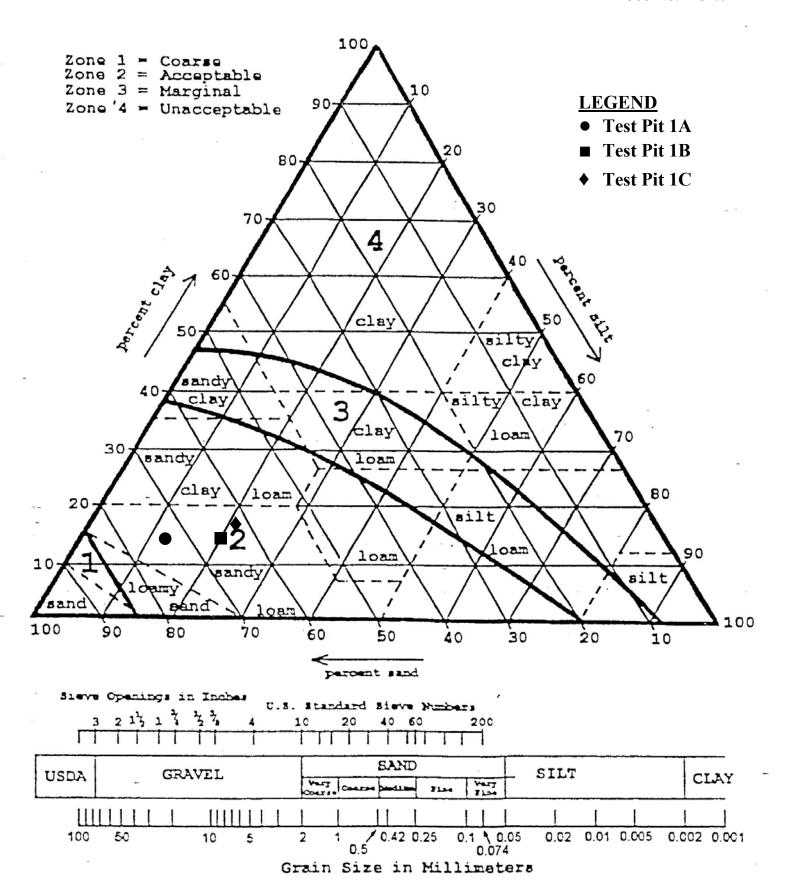
Job Name: BREMW - Drought Resilience Job No.: 1754.04 Performed By: J. McKnight

Hole #	TP-1A	TP-1B	TP-1C	
Depth (ft)	2	5	9	
Oven Dry Weight (g)	100	100	100	
Starting Time	1435	1430	1455	
Temp @ 40 Sec	62	62	64	
Hydrometer Reading @ 40 sec	34	42	45	
Composite Correction	7.7	7.7	7.3	
True Density @ 40 sec	26.3	34.3	37.7	
Temp @ 2 Hours	73	73	74	
Hydrometer Reading @ 2 Hours	19	19	22	
Composite Correction	5.5	5.5	5.3	
True Density @ 2 hours	13.5	13.5	16.7	
% Sand	74	66	62	
% Clay	14	14	17	
% Silt	12	20	21	
Soil Zone	2	2	2	
Classification	Sandy Loam	Sandy Loam	Sandy Loam	

Job Name: BREMW - Drought Resilience Job No.: 1754.04

Test Pit Number	TP-1A	TP-1B	TP-1C	
Percolation Rate (minutes per inch)	16	16	16	
Application Rate (gallons per day per square foot)	0.7	0.7	0.7	

BREMW – Drought Resilience Project APN: N/A Job No. 1754.04





Job No. 1754.04 Page 1 of 4

Date: 06/19/2023

Report to: Burnt Ranch Estates Mutual Water PO Box 102 Burnt Ranch, CA 95527

RE: APN: N/A

Sampled By: J. McKnight

TP #: 2A, 2B, 2C

Date Tested: 06/16/2023

Depth: 2', 5', 9'

Sample Description: Soil

Date Sampled: 05/21/2023

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analys	sis	TP-2A	TP-2B	TP-2C
	Sand:	69%	73%	69%
	Clay:	12%	9%	11%
	Silt:	19%	18%	20%
	Zone Classification:	2	2	2

Bulk Density: N/A

Comments:

Zone 1 - Soils in this zone are very high in sand content. They readily accept effluent, but because of their low silt and clay content, they provide minimal filtration. These soils demand greater separation distances from ground water.

Zone 2 - Soils in this zone provide adequate percolation rates and filtration to effluent. They are suitable for use of a conventional system without further testing.

Zone 3 - Soils in this zone are expected to provide filtration of effluent, but their ability at a suitable rate is questionable. These soils require wet-weather percolation tests to verify their suitability for effluent disposal by conventional leachfield methods.

Zone 4 - Soils in this zone are unsuitable for a conventional leach field because of their severe limitations for accepting effluent.

Josh McKnight, P.E.

Soil Texture Analysis Worksheet

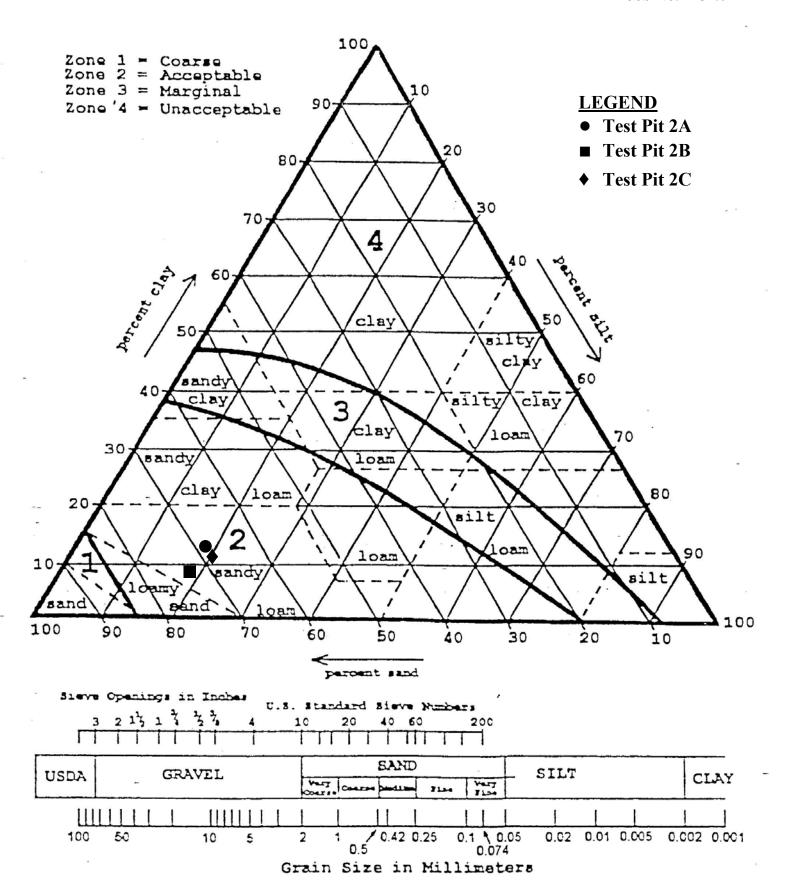
Job Name: BREMW - Drought Resilience Job No.: 1754.04 Performed By: J. McKnight

Hole #	TP-2A	TP-2B	TP-2C	
Depth (ft)	2	5	9	
Oven Dry Weight (g)	100	100	100	
Starting Time	1440	1445	1500	
Temp @ 40 Sec	65	66	64	
Hydrometer Reading @ 40 sec	38	34	38	
Composite Correction	7.1	6.9	7.3	
True Density @ 40 sec	30.9	27.1	30.7	
Temp @ 2 Hours	73	74	74	
Hydrometer Reading @ 2 Hours	17	14	16	
Composite Correction	5.5	5.3	5.3	
True Density @ 2 hours	11.5	8.7	10.7	
% Sand	69	73	69	
% Clay	12	9	11	
% Silt	19	18	20	
Soil Zone	2	2	2	
Classification	Sandy Loam	Sandy Loam	Sandy Loam	

Job Name: BREMW - Drought Resilience Job No.: 1754.04

Test Pit Number	TP-2A	TP-2B	TP-2C	
Percolation Rate (minutes per inch)	16	16	16	
Application Rate (gallons per day per square foot)	0.7	0.7	0.7	

BREMW – Drought Resilience Project APN: N/A Job No. 1754.04





Job No. 1754.04 Page 1 of 4

Date: 06/19/2023

Report to: Burnt Ranch Estates Mutual Water PO Box 102 Burnt Ranch, CA 95527

RE: APN: N/A

Sampled By: J. McKnight

TP #: 3A, 3B, 3C

Date Tested: 06/12/2023

Depth: 2', 5', 8'

Sample Description: Soil

Date Sampled: 05/21/2023

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analy	/sis	TP-3A	TP-3B	TP-3C
-	Sand:	79%	61%	62%
	Clay:	9%	13%	13%
	Silt:	12%	26%	25%
	Zone Classification:	2	2	2

Bulk Density: N/A

Comments:

Zone 1 - Soils in this zone are very high in sand content. They readily accept effluent, but because of their low silt and clay content, they provide minimal filtration. These soils demand greater separation distances from ground water.

Zone 2 - Soils in this zone provide adequate percolation rates and filtration to effluent. They are suitable for use of a conventional system without further testing.

Zone 3 - Soils in this zone are expected to provide filtration of effluent, but their ability at a suitable rate is questionable. These soils require wet-weather percolation tests to verify their suitability for effluent disposal by conventional leachfield methods.

Zone 4 - Soils in this zone are unsuitable for a conventional leach field because of their severe limitations for accepting effluent.

Josh McKnight, P.E.

Soil Texture Analysis Worksheet

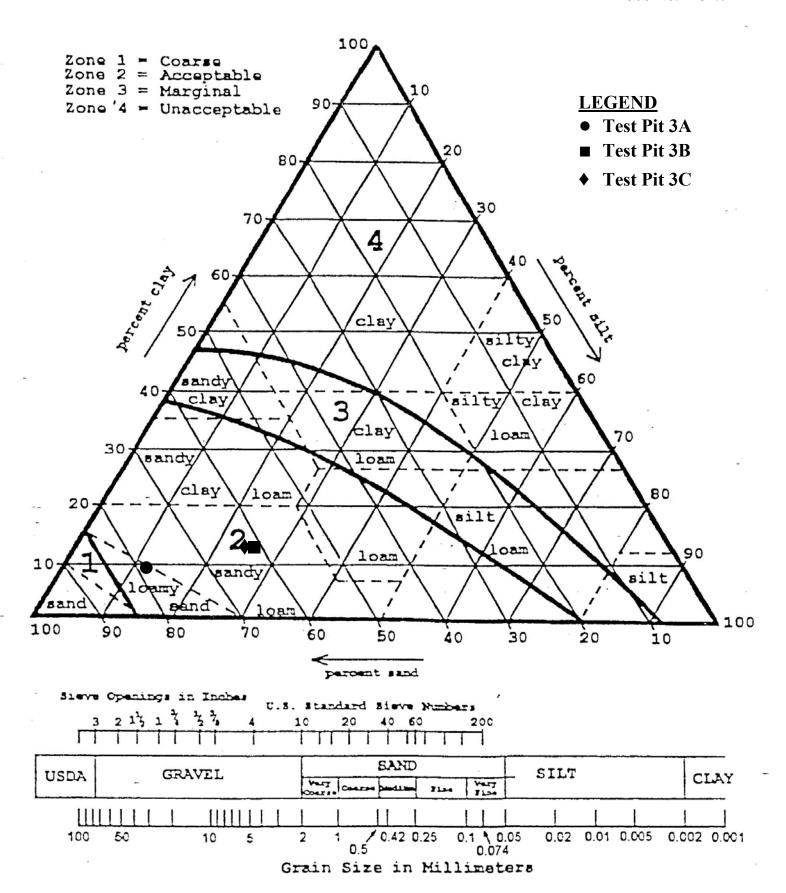
Job Name: BREMW - Drought Resilience Job No.: 1754.04 Performed By: J. McKnight

Hole #	TP-3A	TP-3B	TP-3C	
Depth (ft)	2	5	8	
Oven Dry Weight (g)	100	100	100	
Starting Time	0915	0925	0910	
Temp @ 40 Sec	65	66	65	
Hydrometer Reading @ 40 sec	28	46	45	
Composite Correction	7.1	6.9	7.1	
True Density @ 40 sec	20.9	39.1	37.9	
Temp @ 2 Hours	74	74	75	
Hydrometer Reading @ 2 Hours	14	18	18	
Composite Correction	5.3	5.3	5.1	
True Density @ 2 hours	8.7	12.7	12.9	
% Sand	79	61	62	
% Clay	9	13	13	
% Silt	12	26	25	
Soil Zone	2	2	2	
Classification	Sandy Loam	Sandy Loam	Sandy Loam	

Job Name: BREMW - Drought Resilience Job No.: 1754.04

Test Pit Number	TP-3A	TP-3B	TP-3C	
Percolation Rate (minutes per inch)	16	16	16	
Application Rate (gallons per day per square foot)	0.7	0.7	0.7	

BREMW – Drought Resilience Project APN: N/A Job No. 1754.04





Job No. 1754.04 Page 1 of 4

Date: 06/19/2023

Report to: Burnt Ranch Estates Mutual Water PO Box 102 Burnt Ranch, CA 95527

RE: APN: N/A

TP #: 4A, 4B, 5A, 5B

Depth: 2', 5'

Sampled By: J. McKnight

Date Tested: 06/16/2023 06/12/2023 Date Sampled: 05/21/2023

Sample Description: Soil

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analysis	TP-4A	TP-4B	TP-5A	TP-5B
Sand:	58%	67%	42%	62%
Clay:	15%	12%	23%	16%
Silt:	27%	21%	35%	22%
Zone Classification:	2	2	2	2

Bulk Density: N/A

Comments:

Zone 1 - Soils in this zone are very high in sand content. They readily accept effluent, but because of their low silt and clay content, they provide minimal filtration. These soils demand greater separation distances from ground water.

Zone 2 - Soils in this zone provide adequate percolation rates and filtration to effluent. They are suitable for use of a conventional system without further testing.

Zone 3 - Soils in this zone are expected to provide filtration of effluent, but their ability at a suitable rate is questionable. These soils require wet-weather percolation tests to verify their suitability for effluent disposal by conventional leachfield methods.

Zone 4 - Soils in this zone are unsuitable for a conventional leach field because of their severe limitations for accepting effluent.

Josh McKnight, P.E.

Soil Texture Analysis Worksheet

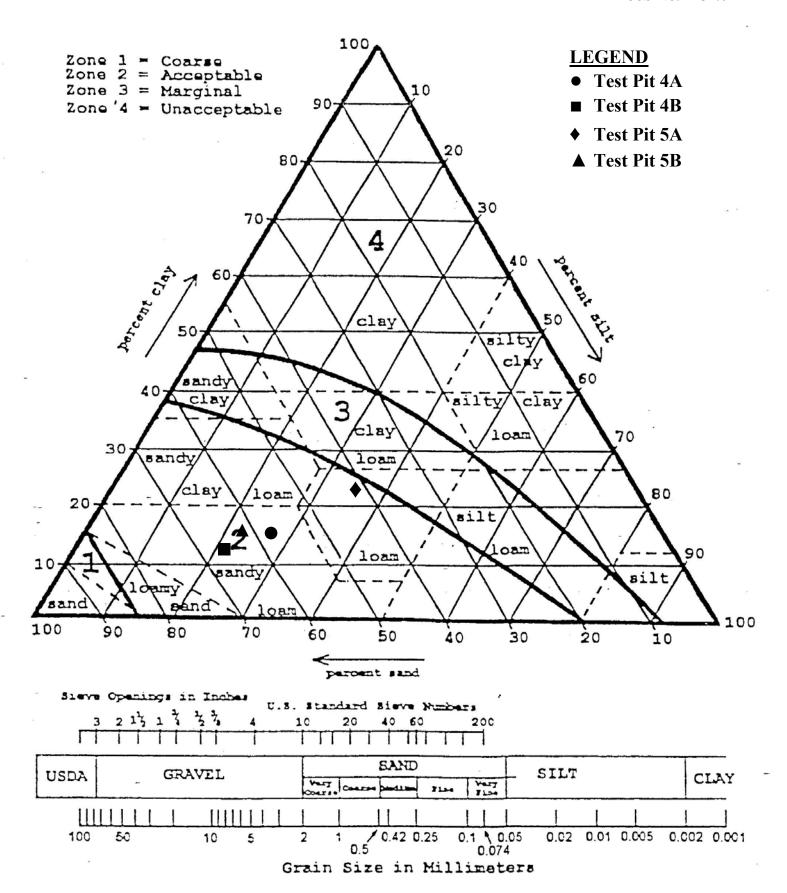
Job Name: BREMW - Drought Resilience Job No.: 1754.04 Performed By: J. McKnight

Hole #	TP-4A	TP-4B	TP-5A	TP-5B
Depth (ft)	2	5	2	5
Oven Dry Weight (g)	100	100	100	100
Starting Time	1450	1505	0935	0930
Temp @ 40 Sec	63	64	65	65
Hydrometer Reading @ 40 sec	50	40	65	45
Composite Correction	7.5	7.3	7.1	7.1
True Density @ 40 sec	42.5	32.7	57.9	37.9
Temp @ 2 Hours	72	73	74	74
Hydrometer Reading @ 2 Hours	21	17	28	21
Composite Correction	5.7	5.5	5.3	5.3
True Density @ 2 hours	15.3	11.5	22.7	15.7
% Sand	58	67	42	62
% Clay	15	12	23	16
% Silt	27	21	35	22
Soil Zone	2	2	2	2
	Sandy	Sandy		Sandy
Classification	Loam	Loam	Loam	Loam

Job Name: BREMW - Drought Resilience Job No.: 1754.04

Test Pit Number	TP-4A	TP-4B	TP-5A	TP-5B
Percolation Rate (minutes per inch)	16	16	30	16
Application Rate (gallons per day per square foot)	0.7	0.7	0.6	0.7

BREMW – Drought Resilience Project APN: N/A Job No. 1754.04



Project Name: BREMWC

Project No: 1754

Date: 5/21/23

Test Pit #: TP-1

Burnt Ranch, CA 95527

Hole Depths: 3' x 6' x 9'

Groundwater Elevation: N/A

Logged by: E. Keyes

Excavation Method: Backhoe

JNIT DRY WEIGHT, PSF **WATER CONTENT %** SOIL TYPE - USCS SAMPLE TYPE / NUMBER **DESCRIPTION & REMARKS BLOWS / FT** IOISTURE CONSIST ROFILE COLOR DEPTH -1 -2 Light Brown with small amounts of clay pockets; medium BRN Damp FIRM SC plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam) TP-1A **-**-3 -4 Light Brown with small amounts of clay pockets; medium BRN SC FIRM Damp plasticity; mixture of sand, silt, and clay (USDA TP-1B -5 Classification - Sandy Loam) -6 -7 -8 Light Brown with small amounts of clay pockets; medium BRN FIRM SC Damp plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam) TP-1C -9 --10 Maximum depth of Test Pit (9ft)/ No Bedrock/Groundwater Encountered

Project Name: BREMWC

Project No: 1754

Date: 5/21/23

Test Pit #: TP-2

Hole Depths: 3' x 6' x 9'

Logged by: E. Keyes

Excavation Method: Backhoe

Burnt Ranch, CA 95527

Groundwater Elevation: N/A

Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam) Light Brown with small amounts of clay pockets; medium	Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam)	DESCRIPTION & REMARKS
BRN	BRN	COLOR
Damp	Damp	MOISTURE
FIRM	FIRM	CONSIST.
SC	SC	SOIL TYPE - USCS
5 6 7 7 8		DEPTH
		PROFILE
TP-2B	TP-2A	SAMPLE TYPE / NUMBER
		BLOWS / FT
		WATER CONTENT %
		UNIT DRY WEIGHT, PSF

--10

Maximum depth of Test Pit (9ft)/ No Bedrock/Groundwater Encountered

Project Name: BREMWC

Project No: 1754

Date: 5/21/23

Test Pit #: TP-3

Burnt Ranch, CA 95527

Hole Depths: 3' x 6' x 8'

Groundwater Elevation: N/A

Logged by: E. Keyes

Excavation Method: Backhoe

JNIT DRY WEIGHT, PSF **WATER CONTENT %** SOIL TYPE - USCS SAMPLE TYPE / NUMBER **DESCRIPTION & REMARKS** BLOWS / FT IOISTURE CONSIST ROFILE COLOR DEPTH -1 -2 Light Brown with small amounts of clay pockets; medium BRN Damp FIRM SC plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam) TP-3A **-**-3 -4 Light Brown with small amounts of clay pockets; medium BRN SC FIRM Damp plasticity; mixture of sand, silt, and clay (USDA TP-3B -5 Classification - Sandy Loam) -6 -7 TP-3C -8 Light Brown with small amounts of clay pockets; medium BRN FIRM SC Damp plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam) -9 --10 Maximum depth of Test Pit (8ft)/ No Bedrock/Groundwater Encountered

TRINITY VALLEY CONSULTING ENGINEERS, INC. Post Office Box 1567 / Willow Creek, CA 95573 (530) 629-3000

Project Name: BREMWC

Project No: 1754

Date: 5/21/23

Test Pit #: TP-4 & 5

Hole Depths: 3' x 6' x 5'

Burnt Ranch, CA 95527

Groundwater Elevation: N/A

Logged by: E. Keyes

Excavation Method: Backhoe

DESCRIPTION & REMARKS	COLOR	MOISTURE	CONSIST.	SOIL TYPE - USCS	DEPTH	PROFILE	SAMPLE TYPE / NUMBER	BLOWS / FT	WATER CONTENT %	UNIT DRY WEIGHT, PSF
Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam) Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam)	BRN	<u></u> Damp Damp	FIRM	sc sc			<u>0 Z</u> TP-4A TP-5A TP-5B	<u> </u>		
Maximum depth of Test Pit (5ft)/ No Bedrock/Groundwater Encountered					6 7 8 9 10					



ASCE Hazards Report

Standard:ASCE/SEI 7-22Risk Category:IVSoil Class:Default

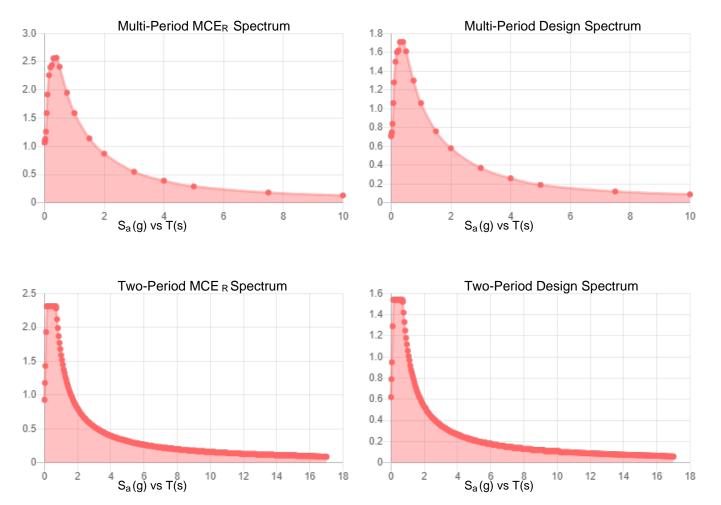
Latitude: 40.814244 Longitude: -123.494544 Elevation: 1975.6349810319973 ft (NAVD 88)





Site Soil Class: Results:	Default			
PGA M :	0.99	T _L :	16	
S _{MS} :	2.31	S _s :	1.94	
S _{M1} :	1.59	S ₁ :	0.73	
S _{DS} :	1.54	V _{S30} :	260	
S _{D1} :	1.06			

Seismic Design Category: D



 $\label{eq:MCER} \mbox{Vertical Response Spectrum} \\ \mbox{Vertical ground motion data has not yet been made} \\ \mbox{available by USGS.} \\$

Design Vertical Response Spectrum Vertical ground motion data has not yet been made available by USGS.



Data Accessed:

Tue Apr 09 2024

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.



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