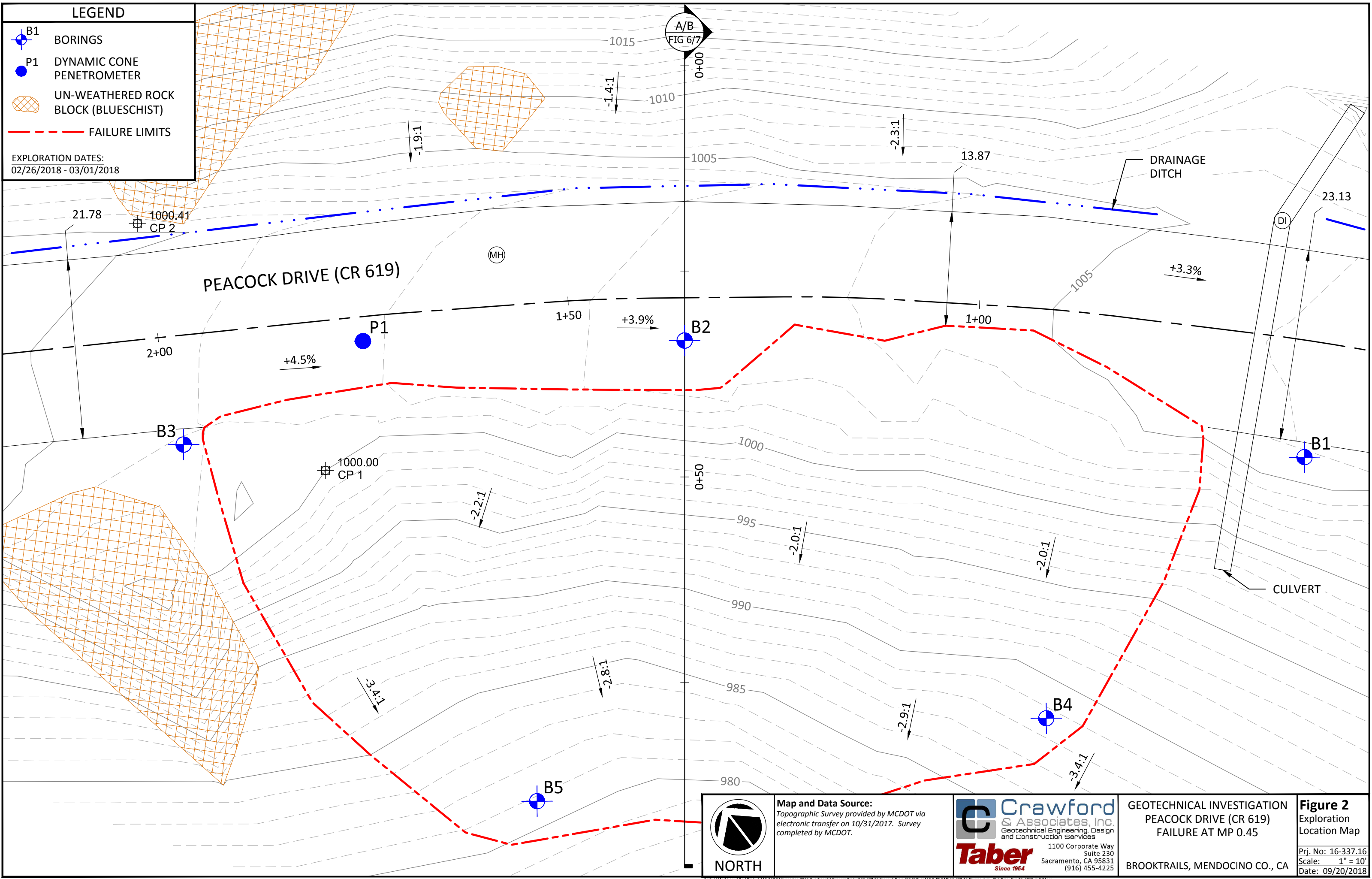


LEGEND

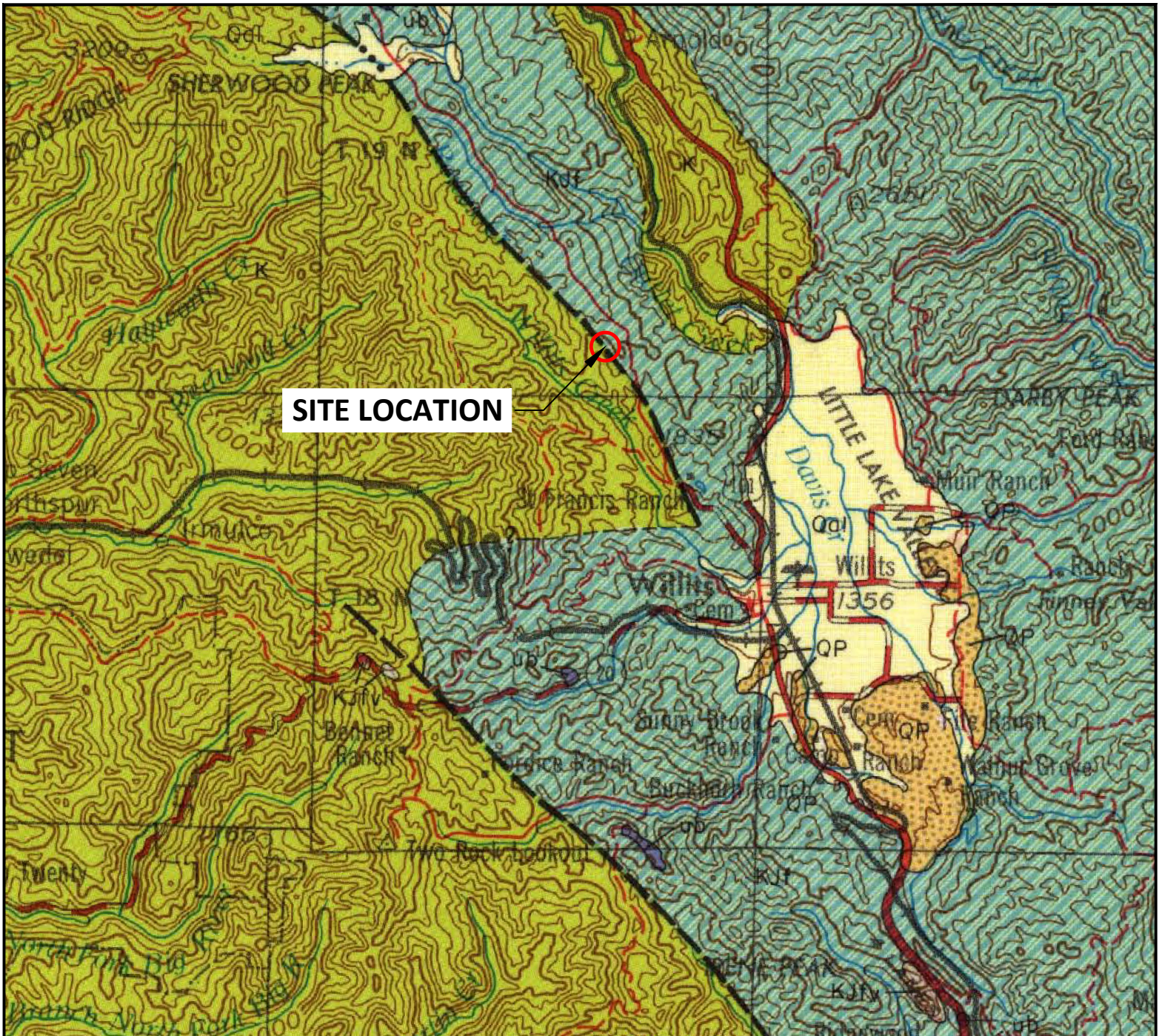
- B1 BORINGS
- P1 DYNAMIC CONE PENETROMETER
- UN-WEATHERED ROCK BLOCK (BLUESCHIST)
- FAILURE LIMITS

EXPLORATION DATES:
02/26/2018 - 03/01/2018



 NORTH	Map and Data Source: Topographic Survey provided by MCDOT via electronic transfer on 10/31/2017. Survey completed by MCDOT.	 Crawford & Associates, Inc. Geotechnical Engineering, Design and Construction Services 1100 Corporate Way Suite 230 Sacramento, CA 95831 (916) 455-4225	GEOTECHNICAL INVESTIGATION PEACOCK DRIVE (CR 619) FAILURE AT MP 0.45	Figure 2 Exploration Location Map
	 Taber Since 1954			

Path: \\Mac\Home\Box\Projects\16-337.X Mendocino 2016 Quadrennial Support Project\16-337.16 Peacock Drive (CR 619) at MP 0.45\CAD\16-337.16-Figures.dwg Plot Date: Sep 19, 2018 at 8:34pm



SITE LOCATION

LEGEND

Geologic Formations



Alluvium (Recent) - alluvial materials (sand, silt, clay); valley fill.



Undivided Marine Sedimentary Rocks (Cretaceous) - sandstone, shale, and conglomerate.



Franciscan Formation (Jurassic-Cretaceous) - sandstone, shale, chert, and conglomerate, with locally small areas of greenstone, limestone, basalt, schist, and related metamorphic rocks.



CONTACT

(Dashed where approximately located, gradational or inferred)



FAULT

(Dashed where approximately located)



NORTH

Map Source:

Jennings, C.W. and Strand, R.G., 1960, *Geologic Map of California, Ukiah Sheet*, California Division of Mines and Geology, Scale 1:250,000



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Taber
Since 1954

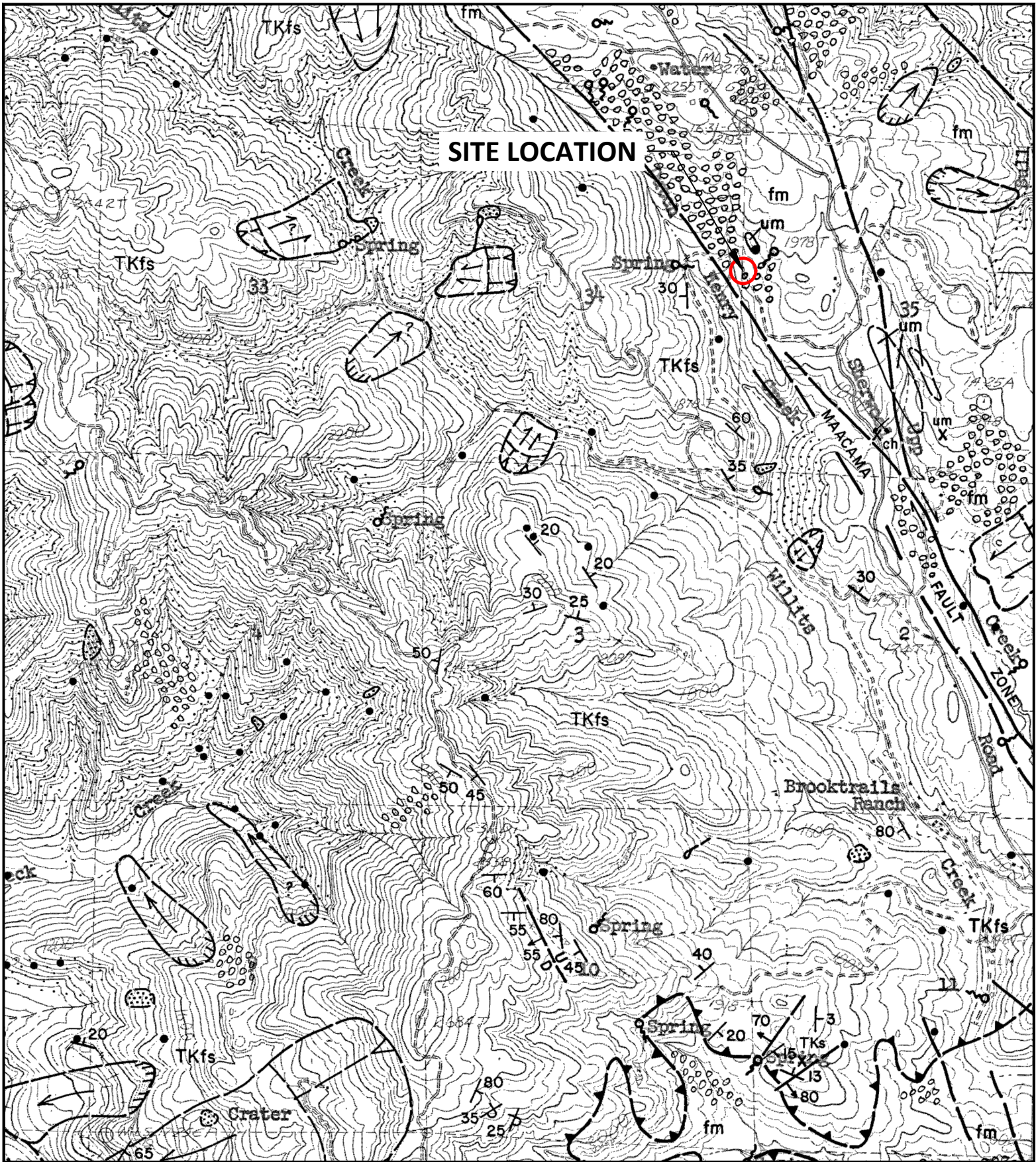
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**GEOTECHNICAL INVESTIGATION
PEACOCK DRIVE (CR 619)
FAILURE AT MP 0.45**

BROOKTRAILS, MENDOCINO CO., CA

Figure 3
Regional
Geologic Map

Prj. No: 16-337.16
Scale: 1" = 10,000'
Date: 06/20/2018



SEE FIGURE 4B FOR LEGEND



NORTH

Map Source:

Kilbourne, R.T., 1984, *Geology and Geomorphic Features Related to Landsliding, Willits NW (Burbeck) 7.5' Quadrangle, OFR 84-19, California Division of Mines and Geology, Scale 1:24,000*



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GEOTECHNICAL INVESTIGATION
 PEACOCK DRIVE (CR 619)
 FAILURE AT MP 0.45

BROOKTRAILS, MENDOCINO CO., CA

Figure 4A
 Landslide and
 Geologic Map

Prj. No: 16-337.16
 Scale: 1" = 2,000'
 Date: 06/20/2018

EXPLANATION



TRANSLATIONAL/ROTATIONAL SLIDE: relatively cohesive slide mass with a failure plane that is deep-seated in comparison to that of a debris slide of similar areal extent; sense of motion along slide plane is linear in a translational slide and arcuate or "rotational" in a rotational slide; complex versions with rotational heads and translational movement or earthflows downslope are common; translational movement along a planar joint or bedding discontinuity may be referred to as a block glide; \curvearrowright indicates scarp, \leftarrow indicates direction of movement; solid where active, dashed where dormant, queried where uncertain.



EARTHFLOW: mass movement resulting from slow to rapid flowage of saturated soil and debris in a semiviscous, highly plastic state; after initial failure, the flow may move, or creep, seasonally in response to destabilizing forces; \curvearrowright indicates scarp, \leftarrow indicates direction of movement; solid where active, dashed where dormant, queried where uncertain.



DEBRIS SLIDE: unconsolidated rock, colluvium, and soil that has moved slowly to rapidly downslope along a relatively steep (generally greater than 45 percent), shallow translational failure plane; forms steep, unvegetated scars in the head region and irregular hummocky deposits (when present) in the toe region; scars likely to ravel and remain unvegetated for many years; revegetated scars recognized by steep, even-faceted slope and light-bulb shape; includes scarp and slide deposits; solid where active, dashed where dormant.



DEBRIS FLOW/TORRENT TRACK: long stretches of bare, generally unstably stream channel banks scoured and eroded by the extremely rapid movement of water-laden debris; commonly triggered by debris sliding in the upper part of the drainage during high intensity storms; scoured debris may be deposited downslope as a tangled mass of organic material in a matrix of rock and soil; debris may be reactivated or washed away during subsequent events; solid where active, dashed where dormant.



DEBRIS SLIDE SLOPE: geomorphic feature characterized by steep (generally greater than 65 percent), slopes that have been sculpted by numerous debris slide events; vegetated soils and colluvium above shallow soil/bedrock interface may be disrupted by active debris slides or bedrock exposed by former debris sliding; slopes near angle of repose may be relatively stable except where weak bedding planes and extensive bedrock joints and fractures parallel slope.

• **ACTIVE SLIDE:** too small to delineate at this scale.



DISRUPTED GROUND: irregular ground surface caused by complex landsliding processes resulting in features that are indistinguishable or too small to delineate individually at this scale; also may include areas affected by downslope creep, expansive soils, and/or gully erosion; boundaries usually are indistinct.

Q

LACUSTRINE DEPOSITS (Holocene): flat-lying, uncemented alluvial deposits of fine sand and silt containing significant amounts of organic matter.

Qf

ALLUVIAL FAN DEPOSITS (Holocene): fan-shaped deposits of unconsolidated, poorly sorted sand and gravel; found in lowlands at the mouth of steep drainage canyons; deposits may represent material transported by debris torrents.

Q

ALLUVIUM (Holocene): unconsolidated, fine-grained sand and silt along modern river flood plains; minor amounts of gravel in channel areas.

TKs

SANDSTONE (Tertiary-Cretaceous): deeply weathered, gently folded, massive sandstone with small amounts of mudstone; overlying, in fault contact, or possibly within TKfs unit.

TKfs

COASTAL BELT FRANCISCAN (Tertiary-Cretaceous): well consolidated, elastic sedimentary rocks; includes arkosic sandstone, pebble conglomerate, and shale, with small amounts of limestone; sandstone and conglomerate units predominant on ridgetops; streams tend to lie in less competent, sheared shale; on the Willits NW quadrangle, TKfs beds are generally homoclinally folded to strike NW and dip moderately to the NE except where they are disrupted near fault contacts.

fm

FRANCISCAN MELANGE (Tertiary-Cretaceous): pervasively sheared argillaceous matrix surrounding pebble-sized to individually mappable blocks of graywacke, sandstone, greenstone, chert, schist, serpentine, and serpentinized ultramafic rocks; the highly erodible, sheared shale matrix generally is unstable and prone to landsliding, even on gentle slopes; locally the melange is indistinguishable from fault gouge of the Maacama fault zone.

ss graywacke, sandstone

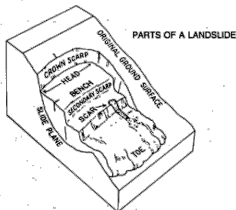
gs greenstone and metamorphosed volcanic rock

ch chert

um serpentine and serpentinized ultramafic rocks

sch greenschist

ls limestone



LITHOLOGIC CONTACT: solid where well located, dashed where approximately located; faults and lineaments are sometimes used to depict contacts when such features coincide.

X

ROCK OUTCROP: too small to delineate at this scale.



FAULT: solid where well located, dashed where approximately located, dotted where concealed or inferred, queried where uncertain; usually associated with highly sheared, landslide-prone fault gouge; arrows (\rightleftarrows) and letters (D=Down U=Up) indicate sense of movement.



THRUST FAULT: solid where well located, dashed where approximately located; barbs on upper plate.



LINEAMENT: linear feature of unknown origin observed on aerial photographs; usually associated with more erodible portions of rock units such as fault gouge.

45

STRIKE AND DIP OF BEDDING: does not apply to Quaternary units; when appearing in these units the symbol represents underlying bedrock exposed in small outcrops along stream channel banks.

30

STRIKE AND DIP OF OVERTURNED BEDDING

0

HORIZONTAL BEDDING

7

STRIKE OF VERTICAL BEDDING

70

STRIKE AND DIP OF FAULT

0

SPRING

30

MARSH

X

QUARRY OR BORROW PIT

REFERENCES

- California Department of Forestry, 1981 Cal Aero Photos: Photos CDF-ALL-UK; Flight 7/9/81; Frames 21-21 to 21-28, 23-21 to 23-28, and 25-20 to 25-28; black and white, scale 1:24,000.
- California Division of Mines and Geology, 1984, Alquist-Priolo Special Studies Zone Map of the Willits NW 7.5-minute quadrangle, scale 1:24,000.
- California Division of Mines and Geology, 1976-1983, Geologic review of Timber Harvesting Plans: Unpublished field studies conducted for the California Department of Forestry.
- Durham, J., 1979, Geologic map, Willits 15-minute quadrangle: California Department of Forestry, Title II Geologic Data Compilation Project, unpublished, scale 1:62,500.
- Kramer, J.C., 1976, Geology and tectonic implications of the Coastal Belt Franciscan, Fort Bragg-Willits area, northern Coast Ranges, California: Unpublished Ph.D. Thesis, University of California, Davis, 128 pages.
- Pampeyan, E.H., Harsh, P.W., and Coakley, J.M., 1981, Preliminary map showing recently active breaks along the Maacama fault zone between Laytonville and Hopland, Mendocino County, California: United States Geological Survey, Miscellaneous Field Studies Map, MF 1217, scale 1:24,000.

SOURCES OF GEOLOGIC DATA

Geologic data were compiled from aerial photo interpretation, field reconnaissance, and the modification of published and unpublished geologic maps listed in references above. The author was assisted in field and office studies by Charles Smith and Jerald Rich.

- Mapping from aerial photo interpretation, previously existing geologic data, and reconnaissance level field work.
- Mapping from aerial photo interpretation and previously existing geologic data; field access not available.



ACTIVITY OF LANDSLIDES

Active or probably active - presently moving or recently moved. Distinct topographic slide features present, i.e. sharp barren scarps, cracks, jacked-up trees. Major revegetation has not occurred.

Dormant - little evidence of recent movement. Slide features modified by weathering and erosion. Vegetation generally well established. Some mass movements may have developed under climatic conditions different from today. Causes of failure may remain and movement could be renewed.

RATES OF LANDSLIDE MOVEMENT*

10 ft/sec or more	= extremely rapid
1 ft/min-10 ft/sec	= very rapid
5 ft/day-1 ft/min	= rapid
5 ft/mo-5 ft/day	= moderate
5 ft/yr-5 ft/mo	= slow
1 ft/yr-5 ft/yr	= very slow
1 ft/yr or less	= extremely slow

*Modified from Varnes, D.J., 1978, Slope movement types and processes. In Landslides: Analysis and Control, Transportation Research Board, National Academy of Sciences, Washington, D.C., Special Report 176, Figure 2.1.

SEE FIGURE 4A FOR MAP



Map Source:

Kilbourne, R.T., 1984, *Geology and Geomorphic Features Related to Landsliding, Willits NW (Burbeck) 7.5' Quadrangle, OFR 84-19, California Division of Mines and Geology, Scale 1:24,000*

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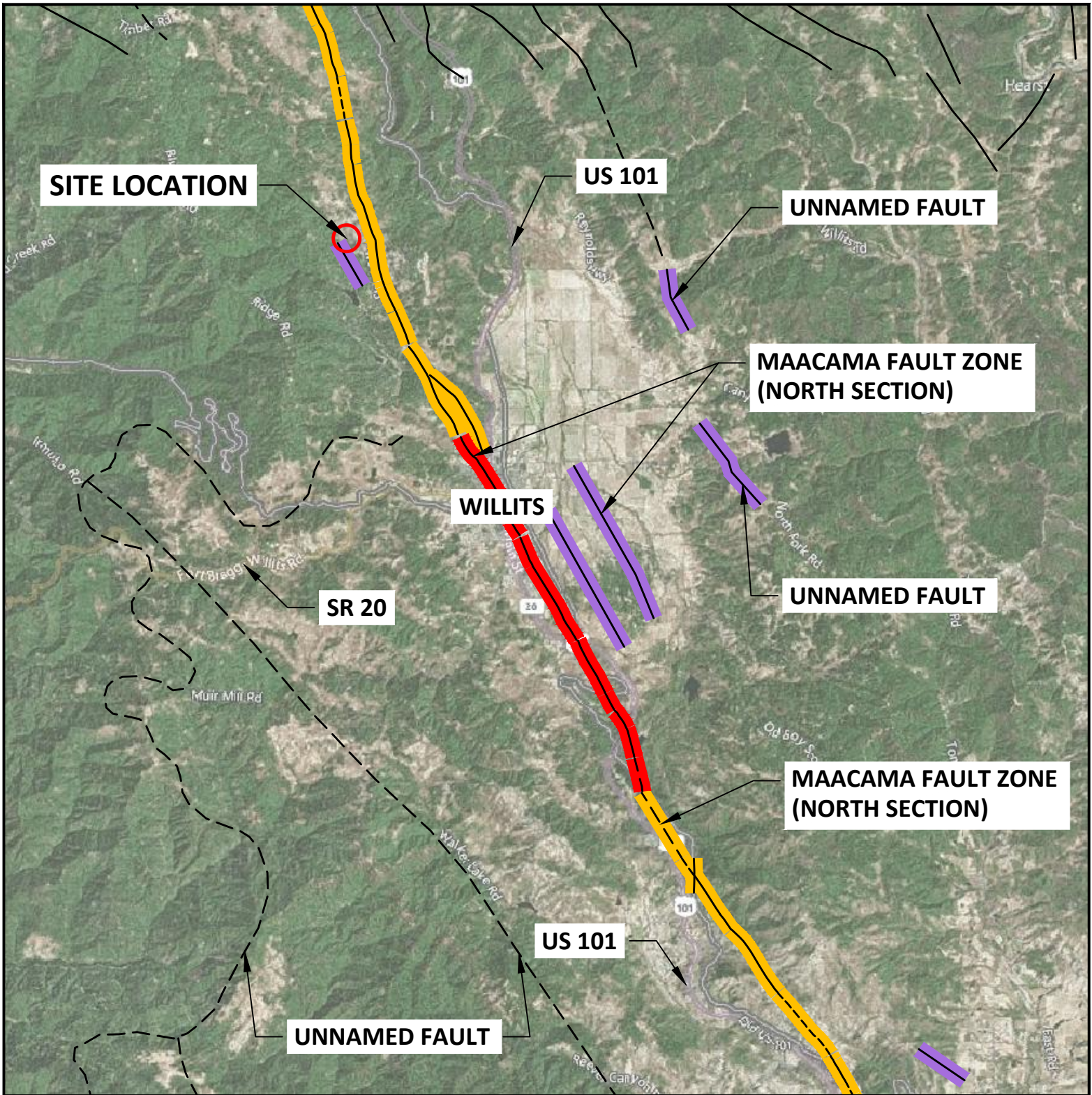
Taber
 Since 1954

GEOTECHNICAL INVESTIGATION
PEACOCK DRIVE (CR 619)
FAILURE AT MP 0.45

BROOKTRAILS, MENDOCINO CO., CA

Figure 4B
 Landslide and Geologic Map Legend

Prj. No: 16-337.16
 Scale: N/A
 Date: 06/20/2018



LEGEND

CGS Faults (Last Activity Age)

- █ <200 years (Historic)
- █ <11,700 years (Holocene)
- █ <700,000 years (Late Quaternary)

CGS Faults (Last Activity Age)

- █ <1.6 million years (Quaternary)
- █ >1.6 million years (Pre-Quaternary)

Fault Location

- Certain
- Approx. or Inferred
- Concealed



NORTH

Map and Data Sources:

1. Basemap via AutoCAD Civil 3D geolocation tool
2. Fault data via CGS Fault Activity Map of California 2010 GIS data

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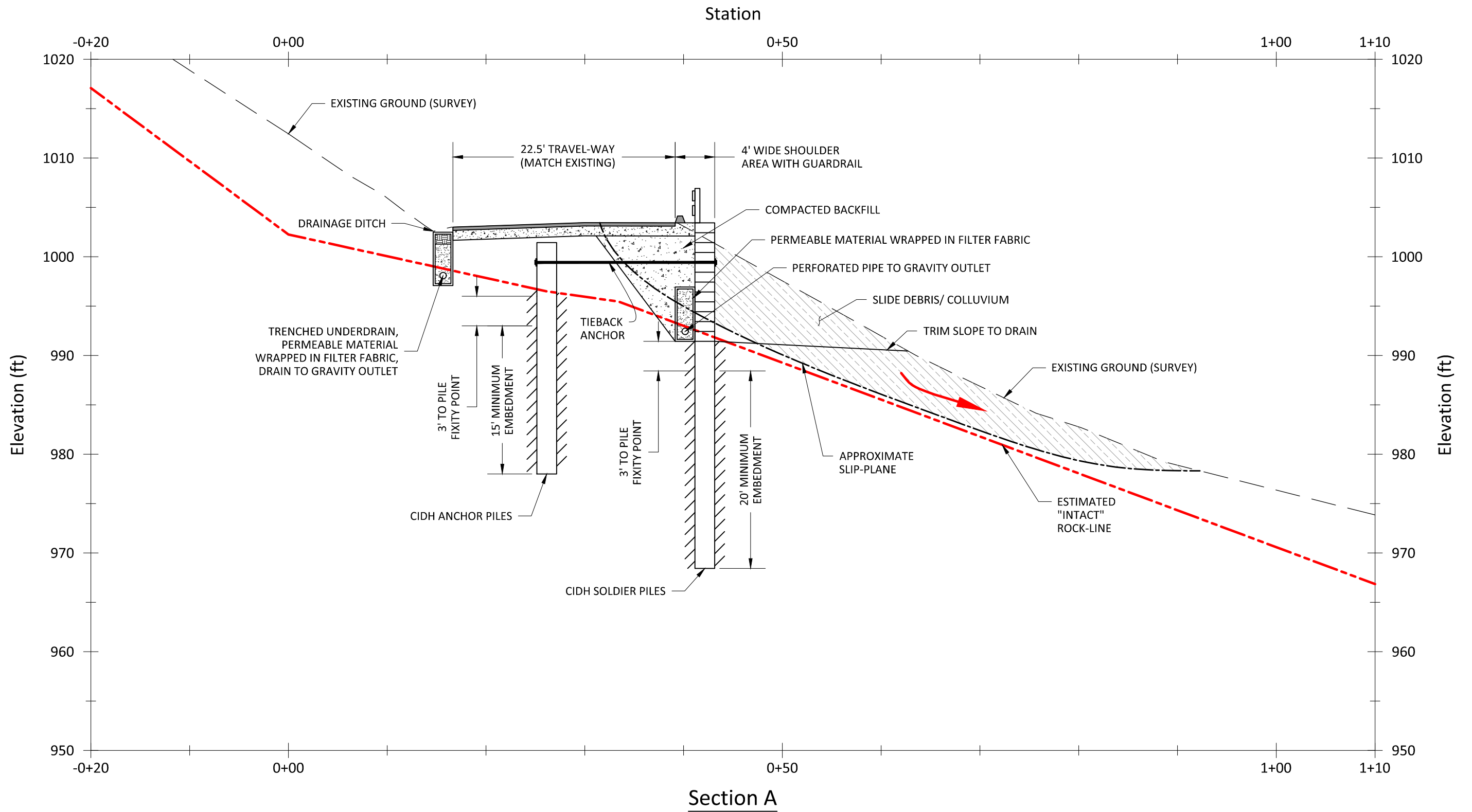
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GEOTECHNICAL INVESTIGATION
PEACOCK DRIVE (CR 619)
FAILURE AT MP 0.45

BROOKTRAILS, MENDOCINO CO., CA

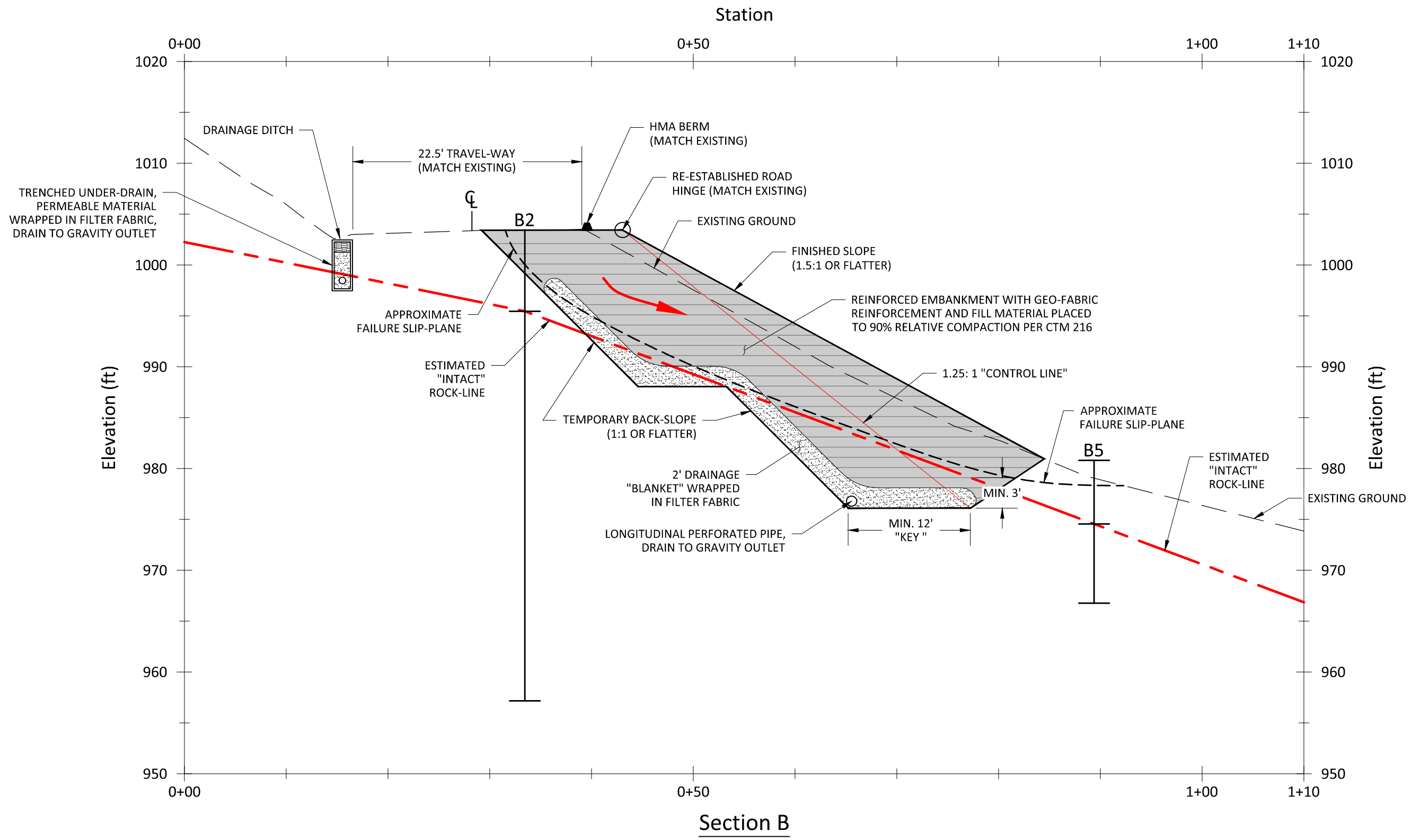
Figure 5
 Fault Activity
 Map

Prj. No: 16-337.16
 Scale: 1" = 10,000'
 Date: 06/20/2018



<p>NORTH</p>	<p>Data Source: Topographic Survey provided by MCDOT via electronic transfer on 10/31/2017. Survey completed by MCDOT.</p>	 Crawford & Associates, Inc. Geotechnical Engineering, Design and Construction Services 1100 Corporate Way Suite 230 Sacramento, CA 95831 (916) 455-4225 	<p>GEOTECHNICAL INVESTIGATION PEACOCK DRIVE (CR 619) FAILURE AT MP 0.45</p>	<p>Figure 6 Typical Section Soldier Pile Tieback Wall</p>
	<p>Prj. No: 16-337.16 Scale: 1" = 10' Date: 09/20/2018</p>			<p>BROOKTRAILS, MENDOCINO CO., CA</p>

Path: \\Mac\Home\Box\Projects\16-337.X Mendocino 2016 Quadrennial Support Project\16-337.16 Peacock Drive (CR 619) at MP 0.45\CAD\16-337.16-Figures.dwg Plot Date: Sep 20, 2018 at 5:53pm



Section B

<p>NORTH</p>	<p>Data Source: Topographic Survey provided by MCDOT via electronic transfer on 10/31/2017. Survey completed by MCDOT.</p>	 Crawford & Associates, Inc. Geotechnical Engineering, Design and Construction Services 1100 Corporate Way Suite 230 Sacramento, CA 95831 (916) 455-4225 	<p>GEOTECHNICAL INVESTIGATION PEACOCK DRIVE (CR 619) FAILURE AT MP 0.45</p>	<p>Figure 7 Typical Section Reinforced Embankment Prj. No: 16-337.16 Scale: 1" = 10' Date: 09/20/2018</p>
	<p>BROOKTRAILS, MENDOCINO CO., CA</p>			

Path: \\Mac\Home\Box\Projects\16-337.X Mendocino 2016 Quadrennial Support Project\16-337.16 Peacock Drive (CR 619) at MP 0.45\CAD\16-337.16-Figures.dwg Plot Date: Sep 19, 2018 at 8:35pm

BORING LOGS LEGEND
BORING LOGS

GROUP SYMBOLS AND NAMES

Graphic / Symbol	Group Names	Graphic / Symbol	Group Names
	Well-graded GRAVEL		Lean CLAY
	Well-graded GRAVEL with SAND		Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY
	Poorly graded GRAVEL		SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
	Poorly graded GRAVEL with SAND		SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
	Well-graded GRAVEL with SILT		SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
	Well-graded GRAVEL with SILT and SAND		
	Well-graded GRAVEL with CLAY (or SILTY CLAY)		ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
	Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
	Poorly graded GRAVEL with SILT		ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
	Poorly graded GRAVEL with SILT and SAND		
	Poorly graded GRAVEL with CLAY (or SILTY CLAY)		Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
	Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
	SILTY GRAVEL		Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
	SILTY GRAVEL with SAND		
	CLAYEY GRAVEL		ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
	CLAYEY GRAVEL with SAND		
	SILTY, CLAYEY GRAVEL		ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY elastic ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	SILTY, CLAYEY GRAVEL with SAND		
	Well-graded SAND		ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND
	Well-graded SAND with GRAVEL		
	Poorly graded SAND		
	Poorly graded SAND with GRAVEL		
	Well-graded SAND with SILT		
	Well-graded SAND with SILT and GRAVEL		
	Well-graded SAND with CLAY (or SILTY CLAY)		
	Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		
	Poorly graded SAND with SILT		
	Poorly graded SAND with SILT and GRAVEL		
	Poorly graded SAND with CLAY (or SILTY CLAY)		
	Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		
	SILTY SAND		
	SILTY SAND with GRAVEL		
	CLAYEY SAND		
	CLAYEY SAND with GRAVEL		
	SILTY, CLAYEY SAND		
	SILTY, CLAYEY SAND with GRAVEL		
	PEAT		
	COBBLES		
	COBBLES and BOULDERS BOULDERS		

FIELD AND LABORATORY TESTS

- C** Consolidation (ASTM D 2435)
- CL** Collapse Potential (ASTM D 4546)
- CP** Compaction Curve (CTM 216)
- CR** Corrosion, Sulfates, Chlorides (CTM 643, CTM 417, CTM 422)
- CU** Consolidated Undrained Triaxial (ASTM D 4767)
- DR** Drained Residual Shear Strength (ASTM D 6467)
- DS** Direct Shear (ASTM D 3080)
- EI** Expansion Index (ASTM D 4829)
- M** Moisture Content (ASTM D 2216)
- OC** Organic Content (ASTM D 2974)
- P** Permeability (CTM 220)
- PA** Particle Size Analysis (ASTM D 422)
- PI** Liquid Limit, Plastic Limit, Plasticity Index (AASHTO T 89, AASHTO T 90)
- PL** Point Load Index (ASTM D 5731)
- PM** Pressure Meter
- R** R-Value (CTM 301)
- SE** Sand Equivalent (CTM 217)
- SG** Specific Gravity (AASHTO T 100)
- SW** Swell Potential (ASTM D 4546)
- UC** Unconfined Compression - Soil (ASTM D 2166)
Unconfined Compression - Rock (ASTM D 7012-C)
- UU** Unconsolidated Undrained Triaxial (ASTM D 2850)
- UW** Unit Weight (ASTM D 7263)

SAMPLER GRAPHIC SYMBOLS

- Standard Penetration Test (SPT)
- Standard California Sampler (ID 2.5 in.)
- Modified California Sampler (ID 2.0 in.)
- Shelby Tube
- Piston Sampler
- NX Rock Core
- HQ Rock Core
- Bulk Sample
- Other (see remarks)

DRILLING METHOD SYMBOLS

- Auger Drilling
- Rotary Drilling
- Dynamic Cone or Hand Driven
- Diamond Core

WATER LEVEL SYMBOLS

- First Water Level Reading (during drilling)
- Static Water Level Reading (short-term)
- Static Water Level Reading (long-term)

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010) with Errata Sheet (2015).

CONSISTENCY OF COHESIVE SOILS

Descriptor	Unconfined Compressive Strength (tsf)	Pocket Penetrometer (tsf)	Torvane (tsf)	Field Approximation
Very Soft	< 0.25	< 0.25	< 0.12	Easily penetrated several inches by fist
Soft	0.25 - 0.50	0.25 - 0.50	0.12 - 0.25	Easily penetrated several inches by thumb
Medium Stiff	0.50 - 1.0	0.50 - 1.0	0.25 - 0.50	Can be penetrated several inches by thumb with moderate effort
Stiff	1.0 - 2.0	1.0 - 2.0	0.50 - 1.0	Readily indented by thumb but penetrated only with great effort
Very Stiff	2.0 - 4.0	2.0 - 4.0	1.0 - 2.0	Readily indented by thumbnail
Hard	> 4.0	> 4.0	> 2.0	Indented by thumbnail with difficulty

APPARENT DENSITY OF COHESIONLESS SOILS

Descriptor	SPT N ₆₀ (blows / 12 inches)
Very Loose	0 - 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

MOISTURE

Descriptor	Criteria
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

Descriptor	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

SOIL PARTICLE SIZE

Descriptor	Size	
Boulder	> 12 inches	
Cobble	3 to 12 inches	
Gravel	Coarse	3/4 inch to 3 inches
	Fine	No. 4 Sieve to 3/4 inch
Sand	Coarse	No. 10 Sieve to No. 4 Sieve
	Medium	No. 40 Sieve to No. 10 Sieve
	Fine	No. 200 Sieve to No. 40 Sieve
Silt and Clay	Passing No. 200 Sieve	

PLASTICITY OF FINE-GRAINED SOILS

Descriptor	Criteria
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

CEMENTATION

Descriptor	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010).

ROCK GRAPHIC SYMBOLS



IGNEOUS ROCK



SEDIMENTARY ROCK



METAMORPHIC ROCK

BEDDING SPACING

Descriptor	Thickness or Spacing
Massive	> 10 ft
Very thickly bedded	3 ft - 10 ft
Thickly bedded	1 ft - 3 ft
Moderately bedded	4 in - 1 ft
Thinly bedded	1 in - 4 in
Very thinly bedded	1/4 in - 1 in
Laminated	< 1/4 in

WEATHERING DESCRIPTORS FOR INTACT ROCK

Descriptor	Diagnostic Features					General Characteristics
	Chemical Weathering-Discoloration-Oxidation		Mechanical Weathering and Grain Boundary Conditions	Texture and Solutioning		
	Body of Rock	Fracture Surfaces		Texture	Solutioning	
Fresh	No discoloration, not oxidized	No discoloration or oxidation	No separation, intact (tight)	No change	No solutioning	Hammer rings when crystalline rocks are struck.
Slightly Weathered	Discoloration or oxidation is limited to surface of, or short distance from, fractures; some feldspar crystals are dull	Minor to complete discoloration or oxidation of most surfaces	No visible separation, intact (tight)	Preserved	Minor leaching of some soluble minerals may be noted	Hammer rings when crystalline rocks are struck. Body of rock not weakened.
Moderately Weathered	Discoloration or oxidation extends from fractures usually throughout; Fe-Mg minerals are "rusty"; feldspar crystals are "cloudy"	All fracture surfaces are discolored or oxidized	Partial separation of boundaries visible	Generally preserved	Soluble minerals may be mostly leached	Hammer does not ring when rock is struck. Body of rock is slightly weakened.
Intensely Weathered	Discoloration or oxidation throughout; all feldspars and Fe-Mg minerals are altered to clay to some extent; or chemical alteration produces in situ disaggregation (refer to grain boundary conditions)	All fracture surfaces are discolored or oxidized; surfaces are friable	Partial separation, rock is friable; in semi-arid conditions, granitics are disaggregated	Altered by chemical disintegration such as via hydration or argillation	Leaching of soluble minerals may be complete	Dull sound when struck with hammer; usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness such as incipient or hairline fractures or veinlets. Rock is significantly weakened.
Decomposed	Discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and Fe-Mg minerals are completely altered to clay		Complete separation of grain boundaries (disaggregated)	Resembles a soil; partial or complete remnant rock structure may be preserved; leaching of soluble minerals usually complete		Can be granulated by hand. Resistant minerals such as quartz may be present as "stringers" or "dikes".

Note: Combination descriptors (such as "slightly weathered to fresh") are used where equal distribution of both weathering characteristics is present over significant intervals or where characteristics present are "in between" the diagnostic feature. However, combination descriptors should not be used where significant identifiable zones can be delineated. Only two adjacent descriptors shall be combined. "Very intensely weathered" is the combination descriptor for "decomposed to intensely weathered".

PERCENT CORE RECOVERY (REC)

$$\frac{\sum \text{Length of the recovered core pieces (in.)}}{\text{Total length of core run (in.)}} \times 100$$

ROCK QUALITY DESIGNATION (RQD)

$$\frac{\sum \text{Length of intact core pieces} > 4 \text{ in.}}{\text{Total length of core run (in.)}} \times 100$$

Note: RQD* indicates soundness criteria not met

ROCK HARDNESS

Descriptor	Criteria
Extremely Hard	Specimen cannot be scratched with pocket knife or sharp pick; can only be chipped with repeated heavy hammer blows
Very hard	Specimen cannot be scratched with pocket knife or sharp pick; breaks with repeated heavy hammer blows
Hard	Specimen can be scratched with pocket knife or sharp pick with heavy pressure; heavy hammer blows required to break specimen
Moderately Hard	Specimen can be scratched with pocket knife or sharp pick with light or moderate pressure; breaks with moderate hammer blows
Moderately Soft	Specimen can be grooved 1/16 in. with pocket knife or sharp pick with moderate or heavy pressure; breaks with light hammer blow or heavy hand pressure
Soft	Specimen can be grooved or gouged with pocket knife or sharp pick with light pressure, breaks with light to moderate hand pressure
Very Soft	Specimen can be readily indented, grooved, or gouged with fingernail, or carved with pocket knife; breaks with light manual pressure.

FRACTURE DENSITY

Descriptor	Criteria
Unfractured	No fractures
Very Slightly Fractured	Core lengths greater than 3 ft.
Slightly Fractured	Core lengths mostly from 1 ft. to 3 ft.
Moderately Fractured	Core lengths mostly from 4 in. to 1 ft.
Intensely Fractured	Core lengths mostly from 1 in. to 4 in.
Very Intensely Fractured	Mostly chips and fragments.

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010).

LOG OF BORING B1

PROJECT NO: 16-337.16
 PROJECT: Peacock Drive MP 0.45
 LOCATION: Peacock Dr. (CR 619), Willits
 CITY/COUNTY: Mendocino
 CLIENT: MCDOT
 LOGGED BY: MVG
 DEPTH OF BORING: 51.5 (ft)

BEGIN DATE: 2/26/18
 COMPLETION DATE: 2/26/18
 SURFACE ELEVATION: 1005.8 (ft)*
 WATER DEPTH: 3.0 (ft)
 READING TAKEN: 2/26/18
 HAMMER EFFICIENCY: 81.5 (%)

DRILLING CONTRACTOR: Clear Heart Drilling, Inc.
 DRILLING METHOD: Hollow-Stem Auger (7" OD, 3.25" ID)
 DRILL RIG: Deeprock - DR8K (Track)
 HAMMER TYPE: Automatic, 140 lbs, 30" drop
 SAMPLER TYPE & SIZE: SPT (ID 1.4"), BULK
 BOREHOLE DIAMETER: 7"
 BACKFILL METHOD: Cement Grout

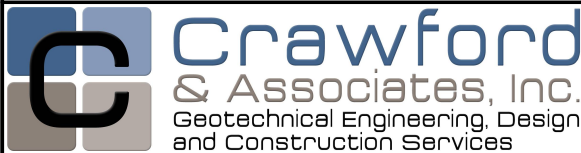
FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
ELEV (ft)	DEPTH (ft)	SAMPLE	SAMPLE NO	BLOWS PER 6 INCH	BLOWS PER FOOT				POCKET PEN. (TSF)	RQD (%)	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE (%)			
1004	0	X	0				100	60	25			42			Direct Shear phi = 27.2 deg, c = 65 psf Chemical Analysis pH = 6.57 Min. Res. = 1630 ohm-cm Chloride = 4.3 ppm Sulfate = 5.5 ppm Perched GW(?), water seepage from nearby flowing creek UC = 2664 psf	
1002	1	X														
1000	2	X	1	3	8	2.75	100			19.9	97.6					
998	3	X		3												
996	4	X		5												
994	5	X														
992	6	X	2	4	15	>4.50	67									
990	7	X		6												
988	8	X		9												
986	9	X														
984	10	X	3	6	50	>4.50	67			10.6	114.3					
982	11	X		12												
980	12	X		13												
978	13	X		14												
976	14	X		15												
974	15	X	4	17	35	>4.50	67			7.8	119.7					
972	16	X		18						6	122.8					
970	17	X		17												
968	18	X		16												
966	19	X		16												
964	20	X	5	10	33		67			7.3	122.9					
962	21	X		17												
960	22	X		16												
958	23	X														
956	24	X														
954	25	X														
952	26	X														
950	27	X														
948	28	X														
946	29	X														
944	30	X	6	11	20		67									
942	31	X		11												
940	32	X		9												
938	33	X														



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PROJECT NUMBER: 16-337.16
 PROJECT: Peacock Drive MP 0.45
 BORING: B1
 ENTRY BY: MVG/GL
 CHECKED BY: RRR SHEET 1 of 2

ELEV (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY							REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 INCH	BLOWS PER FOOT	POCKET PEN. (TSF)				RQD (%)	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE	DRILL METHOD	
972	34						SEDIMENTARY ROCK (Shale) <i>(continued)</i> .										
970	35																
968	36																
966	37																
966	38																
964	39																
964	40	X	7	10	21		Soft to moderately soft.	72									
964	41			10													
964	42			11													
962	43																
962	44																
960	45																
960	46																
958	47																
958	48																
956	49																
956	50	X	8	16	55		Intensely weathered.	83									
956	51			25													
956	52			30													
954	52						Bottom of borehole at 51.5 ft bgs										
954	53						Backfilled with 7, 94lbs bags of portland cement grout and 70 gals of water										
952	54						*Elevation Reference: CP 1, Elev. 1000.00 feet per MCDOT topographic survey										
950	55																
950	56																
948	57																
948	58																
946	59																
946	60																
944	61																
944	62																
942	63																
942	64																
940	65																
940	66																
938	67																
938	68																
936	69																
936	70																
934	71																
934	72																



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PROJECT NUMBER: 16-337.16
 PROJECT: Peacock Drive MP 0.45
 BORING: B1
 ENTRY BY: MVG/GL
 CHECKED BY: RRH

LOG OF BORING B2

PROJECT NO: 16-337.16
 PROJECT: Peacock Drive MP 0.45
 LOCATION: Peacock Dr. (CR 619), Willits
 CITY/COUNTY: Mendocino
 CLIENT: MCDOT
 LOGGED BY: MVG
 DEPTH OF BORING: 46.29 (ft)

BEGIN DATE: 2/27/18
 COMPLETION DATE: 2/28/18
 SURFACE ELEVATION: 1003.5 (ft)*
 SURFACE CONDITION: HMA
 WATER DEPTH: Not Encountered (ft)
 READING TAKEN: 2/28/18
 HAMMER EFFICIENCY: 81.5 (%)

DRILLING CONTRACTOR: Clear Heart Drilling, Inc.
 DRILLING METHOD: Hollow-Stem Auger (7" OD, 3.25" ID)
 DRILL RIG: Deeprack - DR8K (Track)
 HAMMER TYPE: Automatic, 140 lbs, 30" drop
 SAMPLER TYPE & SIZE: SPT (ID 1.4")
 BOREHOLE DIAMETER: 7"
 BACKFILL METHOD: Cement Grout

ELEV (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY						REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 INCH	BLOWS PER FOOT				POCKET PEN. (TSF)	RQD (%)	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE (%)	D. DENSITY (PCF)		% PASSING 200 SIEVE	DRILL METHOD
1002	0						ASPHALT (4").										
	1						AGGREGATE BASE (6").										
	2						SANDY lean CLAY (CL); brown to dark brown; moist; trace fine GRAVEL; about 25 to 30% coarse to fine SAND; medium plasticity, medium to high toughness fines [FILL].										
998	5	X	1	22	19		(Graywacke COBBLE).	6									Hard drilling at 5'
	6			12													
	7			7													
996	8						SEDIMENTARY ROCK (SHALE), clay, tan, intensely weathered [FRANCISCAN MELANGE].										
	9																
992	10	X	2	11	43			67									
	11			15													
	12			28								10	113.6				
	13																
988	15	X	3	15	66		Gray, intensely to moderately weathered, very soft, with lenses altered to CLAY (<1").	67									
	16			25													
	17			41								8.1	123.1				
	18																
984	20	X	4	16	41		Dark gray, moderately weathered, moderately hard.	67									
	21			22													
	22			19								7.2	123.4				
	23																
978	25	X	5	17	58		Fresh, very soft.	67									
	26			22													
	27			36													
	28																
974	30	X	6	11	39		Decomposed, fractures filled with Calcite; (Lean CLAY (CL), hard).	100									
	31			17													
	32			22								7.4	126.8				UC = 5918 psf
	33																



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PROJECT NUMBER: 16-337.16
 PROJECT: Peacock Drive MP 0.45
 BORING: B2
 ENTRY BY: MVG/GL
 CHECKED BY: RRR

ELEV (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY						REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 INCH	BLOWS PER FOOT	POCKET PEN. (TSF)				RQD (%)	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE		DRILL METHOD
970	33						SEDIMENTARY ROCK (Shale) (continued).										
968	35		7	8 8 10	18		(Lean CLAY with SAND (CL), hard).	72				10.4	126.1				
966	36					4.25											
964	37																
962	38																
960	39																
958	40		8	8 10 20	30		Very intensely weathered, very soft.	100									
956	41					>4.50											
954	42																
952	43																
950	44																
948	45		9	50/3.5	REF	>4.50	Moderately weathered, moderately soft.	86									
946	46		10	50/3.5	REF	>4.50		100									Auger refusal at 46'
944	47						Bottom of borehole at 46.3 ft bgs										
942	48						Backfilled with 6, 94lbs bags of portland cement grout and 60 gals of water										
940	49						*Elevation Reference: CP 1, Elev. 1000.00 feet per MCDOT topographic survey										
938	50																
936	51																
934	52																
932	53																
	54																
	55																
	56																
	57																
	58																
	59																
	60																
	61																
	62																
	63																
	64																
	65																
	66																
	67																
	68																
	69																
	70																
	71																
	72																



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PROJECT NUMBER: 16-337.16
 PROJECT: Peacock Drive MP 0.45
 BORING: B2
 ENTRY BY: MVG/GL
 CHECKED BY: RRR

LOG OF BORING P1

PROJECT NO: 16-337.16	BEGIN DATE: 3/1/18	DRILLING CONTRACTOR: Clear Heart Drilling, Inc.
PROJECT: Peacock Drive MP 0.45	COMPLETION DATE: 3/1/18	DRILLING METHOD: Dynamic Cone Penetrometer (2" OD)
LOCATION: Peacock Dr. (CR 619), Willits	SURFACE ELEVATION: 1001.9 (ft)*	DRILL RIG: Deeptek - DR8K (Track)
CITY/COUNTY: Mendocino	SURFACE CONDITION: HMA	HAMMER TYPE: Automatic, 140 lbs, 30" drop
CLIENT: MCDOT	WATER DEPTH: Not Encountered (ft)	SAMPLER TYPE & SIZE: N/A
LOGGED BY: MVG	READING TAKEN: 3/1/18	BOREHOLE DIAMETER: 2"
DEPTH OF BORING: 29.58 (ft)	HAMMER EFFICIENCY: 81.5 (%)	BACKFILL METHOD: Cement Grout

ELEV (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY						DRILL METHOD	CASING DEPTH	REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 INCH	BLOWS PER FOOT	POCKET PEN. (TSF)					LIQUID LIMIT	PLASTIC LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE				
1000	0																		
998	2																	HSA used as casing	
996	4				14		20												
994	6				26		40												
992	8				21		60												
990	10				14		80												
988	12				12														
986	14				12														
984	16				19														
982	18				32														
980	20				23														
978	22				21														
976	24				14														
974	26				19														
972	28				15														
970	30				11													100/7" at 29'	
968	32				15														
966	34				100														
						REFUSAL.													
						Bottom of borehole at 29.6 ft bgs													
						Backfilled with 0.5, 94lbs bag of portland cement grout and 10 gals of water													
						*Elevation Reference: CP 1, Elev. 1000.00 feet per MCDOT topographic survey													



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PROJECT NUMBER: 16-337.16
 PROJECT: Peacock Drive MP 0.45
 BORING: P1
 ENTRY BY: MVG/GL
 CHECKED BY: RRR

LOG OF BORING B3

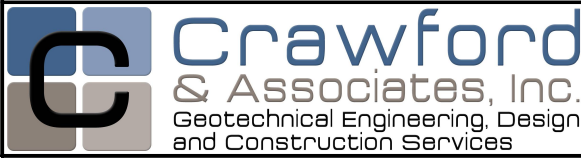
PROJECT NO: 16-337.16
 PROJECT: Peacock Drive MP 0.45
 LOCATION: Peacock Dr. (CR 619), Willits
 CITY/COUNTY: Mendocino
 CLIENT: MCDOT
 LOGGED BY: MVG
 DEPTH OF BORING: 17 (ft)

BEGIN DATE: 2/27/18
 COMPLETION DATE: 2/27/18
 SURFACE ELEVATION: 1001.1 (ft)*
 WATER DEPTH: Not Encountered (ft)
 READING TAKEN: 2/27/18
 HAMMER EFFICIENCY: 81.5 (%)

DRILLING CONTRACTOR: Clear Heart Drilling, Inc.
 DRILLING METHOD: Hollow-Stem Auger (7" OD, 3.25" ID)
 DRILL RIG: Deeprock - DR8K (Track)
 HAMMER TYPE: Automatic, 140 lbs, 30" drop
 SAMPLER TYPE & SIZE: SPT (ID 1.4")
 BOREHOLE DIAMETER: 7"
 BACKFILL METHOD: Cement Grout

ELEV (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY						DRILL METHOD	CASING DEPTH	REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 INCH	BLOWS PER FOOT	POCKET PEN. (TSF)				RQD (%)	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE				
1000	1						SANDY lean CLAY (CL); gray; moist; about 5% fine, subangular GRAVEL; about 25% coarse to fine SAND; medium plasticity, medium to high toughness fines [FILL].												
998	2																		
996	3																		
994	4																		
992	5																		
	6	X	1	7 8 11	19	>4.50	Hard; dark gray mottled with green; moist; about 49% medium to fine SAND; with decomposed Eclogite.	72											
990	7																		
988	8																		
	9						SEDIMENTARY ROCK (SANDSTONE), fine sand, tan, intensely to moderately weathered, oxidized [FRANCISCAN MELANGE].	72											
986	10	X	2	8 9 8	17														
984	11																		
	12						SEDIMENTARY ROCK (SHALE), clay, dark gray, decomposed, (Lean CLAY with SAND (CL), hard, moist).	83											
982	13																		
980	14																		
	15	X	3	4 6 7	13	>4.50													
978	16																		
976	17		4	50/0"	REF		Bottom of borehole at 17.0 ft bgs												
974	18						Backfilled with 2.5, 94lbs bags of portland cement grout and 15 gals of water												
972	19						*Elevation Reference: CP 1, Elev. 1000.00 feet per MCDOT topographic survey												
970	20																		
	21																		
	22																		
	23																		
	24																		
	25																		
	26																		
	27																		
	28																		
	29																		
	30																		
	31																		
	32																		
	33																		

Auger refusal at 17', interpreted as contact with Blueschist outcrop just west of B3



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PROJECT NUMBER: 16-337.16
 PROJECT: Peacock Drive MP 0.45
 BORING: B3
 ENTRY BY: MVG/GL
 CHECKED BY: RRR SHEET 1 of 1

LOG OF BORING B4

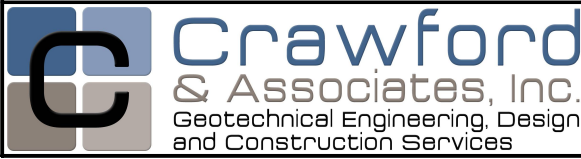
PROJECT NO: 16-337.16
 PROJECT: Peacock Drive MP 0.45
 LOCATION: Peacock Dr. (CR 619), Willits
 CITY/COUNTY: Mendocino
 CLIENT: MCDOT
 LOGGED BY: MVG
 DEPTH OF BORING: 26.5 (ft)

BEGIN DATE: 2/27/18
 COMPLETION DATE: 2/27/18
 SURFACE ELEVATION: 988.6 (ft)*
 SURFACE CONDITION: Dirt/Grass
 WATER DEPTH: 20.0 (ft)
 READING TAKEN: 2/27/18
 HAMMER EFFICIENCY: 60 (%)

DRILLING CONTRACTOR: Clear Heart Drilling, Inc.
 DRILLING METHOD: Solid-Stem Auger (4" OD)
 DRILL RIG: Remote Access Drill (Portable)
 HAMMER TYPE: Cathead, 140 lbs, 30" drop
 SAMPLER TYPE & SIZE: SPT (ID 1.4"), BULK
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Cement Grout

ELEV (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY						REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 INCH	BLOWS PER FOOT					POCKET PEN. (TSF)	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE	
988	0						CLAYEY SAND (SC); brown to dark brown; moist; about 5 to 10% fine, angular GRAVEL, max. 1 in. dia.; coarse to fine SAND; medium plasticity, medium to high toughness fines [RESIDUAL SOIL].									
986	1															
984	2															
982	3															
980	4															
978	5		1	5	13		Medium dense; about 54% SAND.	100								
976	6		5	8		1.50										
974	7		A					100								
972	8															
970	9															
968	10		2	16	29		SANDY lean CLAY (CL); hard; dark brown; moist; about 5 to 10% fine GRAVEL; about 25% coarse to fine SAND; medium plasticity, high toughness fines.	83								
966	11			18		>4.50										
964	12															
962	13															
960	14															
958	15		3	19	83/12		Fresh, Blueschist COBBLE.	100								
956	16			33		>4.50										
954	17			50/6"												
952	18															
950	19						SEDIMENTARY ROCK (SHALE), clay, brown, very intensely weathered, very soft to soft, partially decomposed to CLAY [FRANCISCAN MELANGE].									
948	20		4	21	64			78								
946	21			32												
944	22			32												
942	23															
940	24															
938	25		5	19	62		Dark gray, moderately weathered, soft, moderately thin veins filled with Calcite.	50								
936	26			30												
934	27			32												
932	28						Bottom of borehole at 26.5 ft bgs									
930	29						Backfilled with 1.5, 94lbs bags of portland cement grout and 11 gals of water									
928	30						*Elevation Reference: CP 1, Elev. 1000.00 feet per MCDOT topographic survey									
926	31															
924	32															
922	33															

Chemical Analysis
 pH = 7.73
 Min. Res. = 2680 ohm-cm
 Chloride = 4.8 ppm
 Sulfate = 47.6 ppm



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PROJECT NUMBER: 16-337.16
 PROJECT: Peacock Drive MP 0.45
 BORING: B4
 ENTRY BY: MVG/GL
 CHECKED BY: RRR SHEET 1 of 1

LOG OF BORING B5

PROJECT NO: 16-337.16
 PROJECT: Peacock Drive MP 0.45
 LOCATION: Peacock Dr. (CR 619), Willits
 CITY/COUNTY: Mendocino
 CLIENT: MCDOT
 LOGGED BY: MVG
 DEPTH OF BORING: 14 (ft)

BEGIN DATE: 2/27/18
 COMPLETION DATE: 2/27/18
 SURFACE ELEVATION: 980.8 (ft)*
 SURFACE CONDITION: Dirt/Grass
 WATER DEPTH: Not Encountered (ft)
 READING TAKEN: 2/27/18
 HAMMER EFFICIENCY: 60 (%)

DRILLING CONTRACTOR: Clear Heart Drilling, Inc.
 DRILLING METHOD: Solid-Stem Auger (4" OD)
 DRILL RIG: Remote Access Drill (Portable)
 HAMMER TYPE: Cathead, 140 lbs, 30" drop
 SAMPLER TYPE & SIZE: SPT (ID 1.4"), BULK
 BOREHOLE DIAMETER: 4"
 BACKFILL METHOD: Cement Grout

ELEV (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY						REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 INCH	BLOWS PER FOOT				POCKET PEN. (TSF)	RQD (%)	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE (%)	D. DENSITY (PCF)		% PASSING 200 SIEVE	
980	0		0														
978	1						SANDY lean CLAY (CL); brown to dark brown; moist; about 5 to 10% fine, subangular GRAVEL; about 20 to 25% coarse to fine SAND; medium plasticity, medium to high toughness fines [RESIDUAL SOIL].	100	48	22							
976	2																
974	3																
972	4																
970	5		1	4	16		Very stiff.	72									
968	6			5													
966	7			11			SEDIMENTARY ROCK (SHALE), clay, dark gray, intensely weathered, soft to moderately soft [FRANCISCAN MELANGE].										
964	8																
962	9																
960	10		2	9	24			100									
958	11			12													
956	12			12							14.3	117.3					
954	13																
952	14		3	50/0"	REF		Bottom of borehole at 14.0 ft bgs										Auger refusal at 14'
950	15						Backfilled with 1, 94lbs bag of portland cement grout and 5 gals of water										
948	16						*Elevation Reference: CP 1, Elev. 1000.00 feet per MCDOT topographic survey										



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PROJECT NUMBER: 16-337.16
 PROJECT: Peacock Drive MP 0.45
 BORING: B5
 ENTRY BY: MVG/GL
 CHECKED BY: RRR

LABORATORY AND FIELD TEST SUMMARY



Project Name: Peacock Drive MP 0.45
 CAInc File No: 16-337.16
 Date: 7/16/18
 Technician: AC

MOISTURE-DENSITY TESTS - D2216

	1	2	3	4	5
Sample No.	B1-1A	B1-3A	B1-4B	B1-4A	B1-5A
USCS Symbol	CL	CL	W.Rock	W.Rock	W.Rock
Depth (ft.)	6	16	20.5	16	26
Sample Length (in.)	5.180	5.132	3.446	3.737	5.119
Diameter (in.)	1.414	1.410	1.393	1.433	1.418
Sample Volume (ft ³)	0.00471	0.00464	0.00304	0.00349	0.00468
Total Mass Soil+Tube (g)	380.6	396.7	177.9	340.9	414.1
Mass of Tube (g)	130.9	130.8	0.0	135.1	134.3
Tare No.	B7	H19	C16	F7	B20
Tare (g)	21.0	13.5	13.7	13.8	13.7
Wet Soil + Tare (g)	71.6	67.3	61.0	63.3	70.7
Dry Soil + Tare (g)	63.2	62.1	57.5	60.5	66.9
Dry Soil (g)	42.2	48.6	43.8	46.7	53.1
Water (g)	8.4	5.1	3.4	2.8	3.9
Moisture (%)	19.9	10.6	7.8	6.0	7.3
Dry Density (pcf)	97.6	114.3	119.7	122.8	122.9

Notes:



Project Name: Peacock Drive MP 0.45
 CAInc File No: 16-337.16
 Date: 7/16/18
 Technician: AC

MOISTURE-DENSITY TESTS - D2216

	1	2	3	4	5
Sample No.	B2-2A	B2-3A	B2-4A	B2-6A	B2-7A
USCS Symbol	W.Rock	W.Rock	W.Rock	W.Rock	W.Rock
Depth (ft.)	16	16	21	30.5	36
Sample Length (in.)	3.720	5.457	4.820	3.402	5.823
Diameter (in.)	1.422	1.416	1.408	1.386	1.421
Sample Volume (ft ³)	0.00342	0.00497	0.00434	0.00297	0.00534
Total Mass Soil+Tube (g)	323.4	433.9	394.0	183.4	468.6
Mass of Tube (g)	129.7	133.7	133.4	0.0	130.9
Tare No.	G23	H6	C1	D15	A6
Tare (g)	13.5	13.3	13.9	20.9	13.7
Wet Soil + Tare (g)	73.9	78.1	73.6	66.6	70.0
Dry Soil + Tare (g)	68.4	73.3	69.5	63.4	64.6
Dry Soil (g)	54.9	60.0	55.6	42.5	51.0
Water (g)	5.5	4.9	4.0	3.1	5.3
Moisture (%)	10.0	8.1	7.2	7.4	10.4
Dry Density (pcf)	113.6	123.1	123.4	126.8	126.1

Notes:



Project Name: Peacock Drive MP 0.45
 CAInc File No: 16-337.16
 Date: 7/16/18
 Technician: AC

MOISTURE-DENSITY TESTS - D2216

	1	2	3	4	5
Sample No.	B3-2A	B4-2A	B4-4A	B5-2A	
USCS Symbol	W.Rock	W.Rock	W.Rock	W.Rock	
Depth (ft.)	11	11	21	11	
Sample Length (in.)	5.011	4.457	5.765	5.171	
Diameter (in.)	1.411	1.406	1.413	1.413	
Sample Volume (ft ³)	0.00454	0.00400	0.00523	0.00469	
Total Mass Soil+Tube (g)	374.2	349.4	467.7	415.9	
Mass of Tube (g)	134.4	134.3	130.0	130.6	
Tare No.	G25	B11	G20	B13	
Tare (g)	13.5	20.9	13.6	13.8	
Wet Soil + Tare (g)	63.3	82.8	71.3	73.2	
Dry Soil + Tare (g)	59.5	80.6	65.5	65.8	
Dry Soil (g)	46.0	59.7	51.9	51.9	
Water (g)	3.8	2.2	5.8	7.4	
Moisture (%)	8.3	3.6	11.2	14.3	
Dry Density (pcf)	107.6	114.3	128.0	117.3	

Notes:

Project Name: Peacock Drive MP 0.45

CAInc File No: 16-337.16

Date: 7/11/18

Technician: AC

200 Wash - ASTM D1140

Method A

Max Particle Size (100% Passing)	Standard Sieve Size	Recommended Min Mass of Test Specimens
2 mm or less	No. 10	20 g
4.75 mm	No. 4	100 g
9.5 mm	3/8 "	500 g
19.0 mm	3/4 "	2.5 kg
37.5 mm	1 1/2 "	10 kg
75.0 mm	3 "	50 kg

Table from 6.2 of ASTM D1140

Sample No.	B1-Bulk	B3-1A	B4-1A		
USCS Symbol	SC	CL	SC		
Depth (ft.)	0-5	6	6		
Tare No.	P2	R14	R15		
Tare (g)	126.9	129.8	130.7		
Dry Soil + Tare (g)	318.4	387.4	384.6		
Dry Mass before (g)	191.5	257.6	253.9		
Dry Mass after (g)	111.0	126.1	138.1		
Percent Fines (%)	42	51	46		

Notes:

Project Name: Peacock Drive MP 0.45

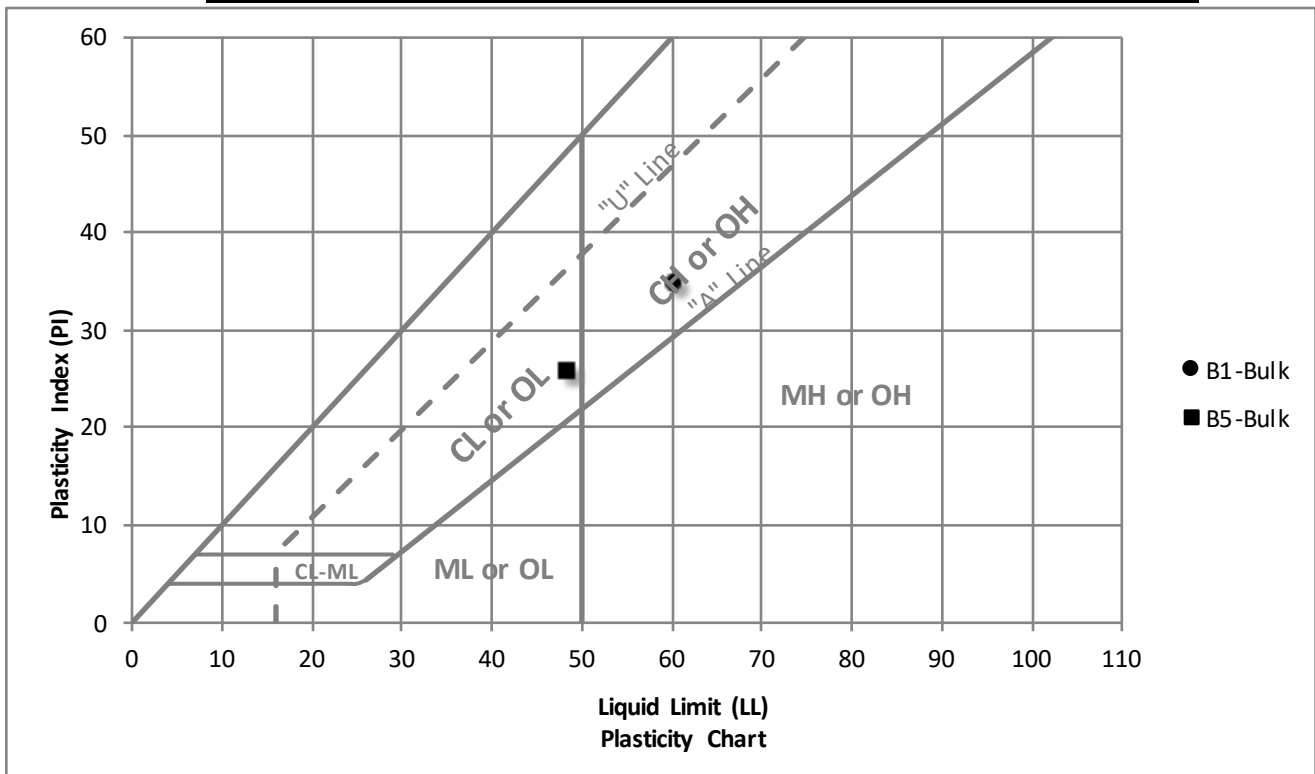
CAInc File No: 16-337.16

Date: 7/26/18

Technician: GL

Plastic Index - ASTM D4318

Sample ID	Depth (ft)	Liquid Limit	Plastic Limit	PI
B1-Bulk	0-5	60	25	35
B5-Bulk	0-5	48	22	26



Project Name: Peacock Drive MP 0.45

CAInc File No: 16-337.16

Date: 7/5/18

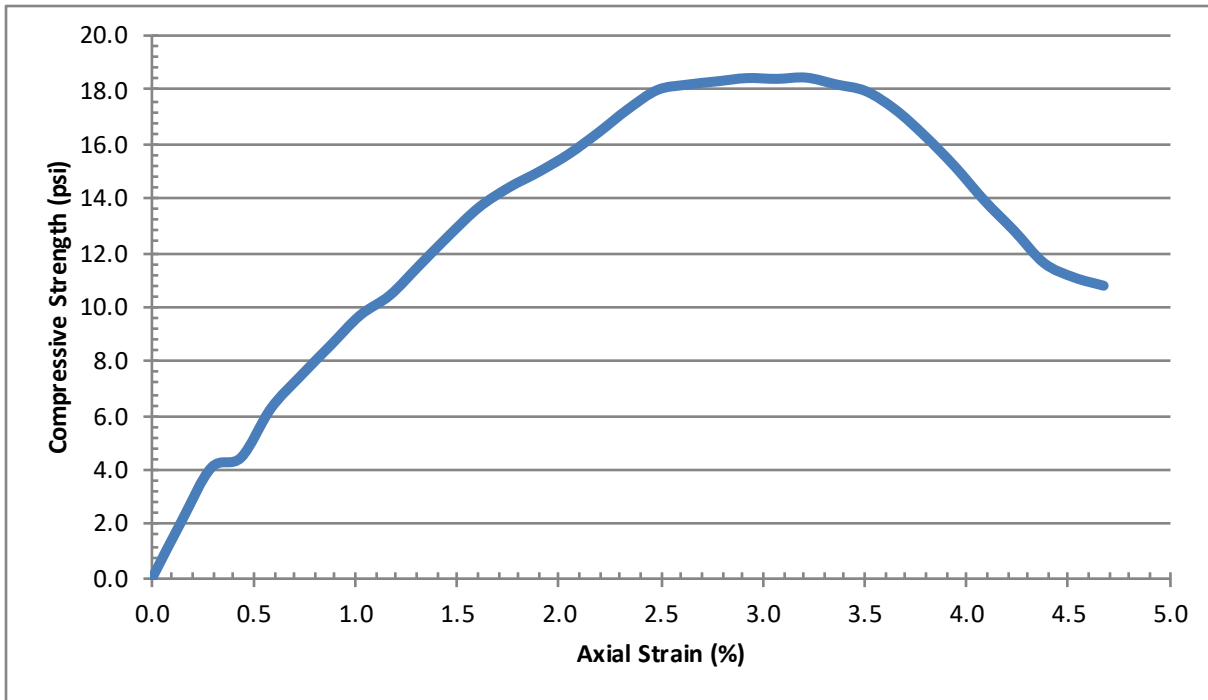
Technician: HFW

Sample ID: B1-4B

Depth (ft): 20.5

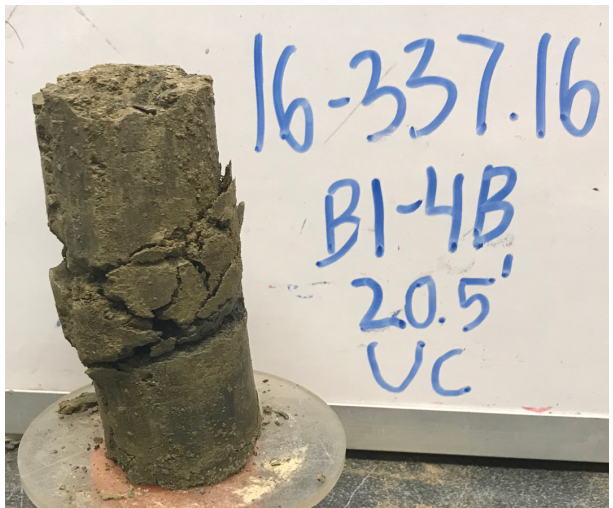
USCS Classification: W.Rock

UNCONFINED COMPRESSION TEST - D2166



Dry Density (pcf) 119.7
Water Content (%) 7.8

Unconfined Compressive Strength (psi) 18.5
Unconfined Compressive Strength (psf) 2664
Shear Strength (psf) 1332
 Average Height (in) 3.446
 Average Diameter (in) 1.393
 Rate of strain (%) 0.5
 Strain at Failure (%) 3.2



Notes:

Project Name: Peacock Drive MP 0.45

CAInc File No: 16-337.16

Date: 7/5/18

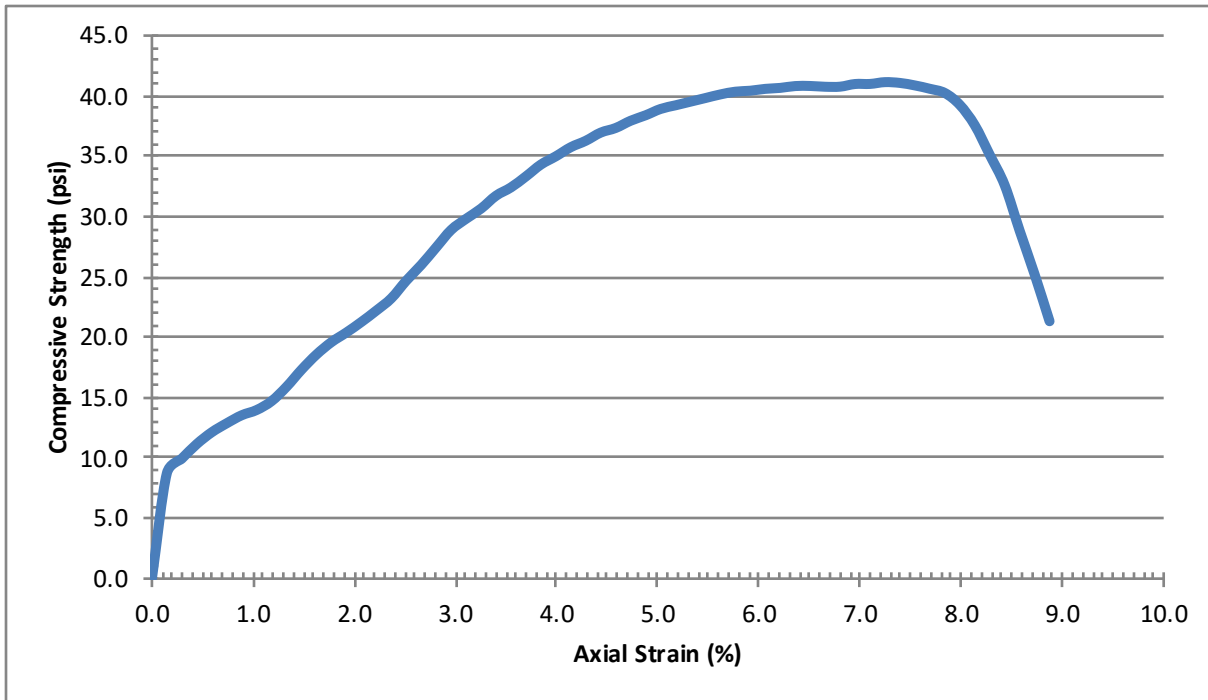
Technician: HFW

Sample ID: B2-6A

Depth (ft): 30.5

USCS Classification: W.Rock

UNCONFINED COMPRESSION TEST - D2166



Dry Density (pcf) 126.8
Water Content (%) 7.4

Unconfined Compressive Strength (psi) 41.1

Unconfined Compressive Strength (psf) 5918

Shear Strength (psf) 2959.2

Average Height (in) 3.402

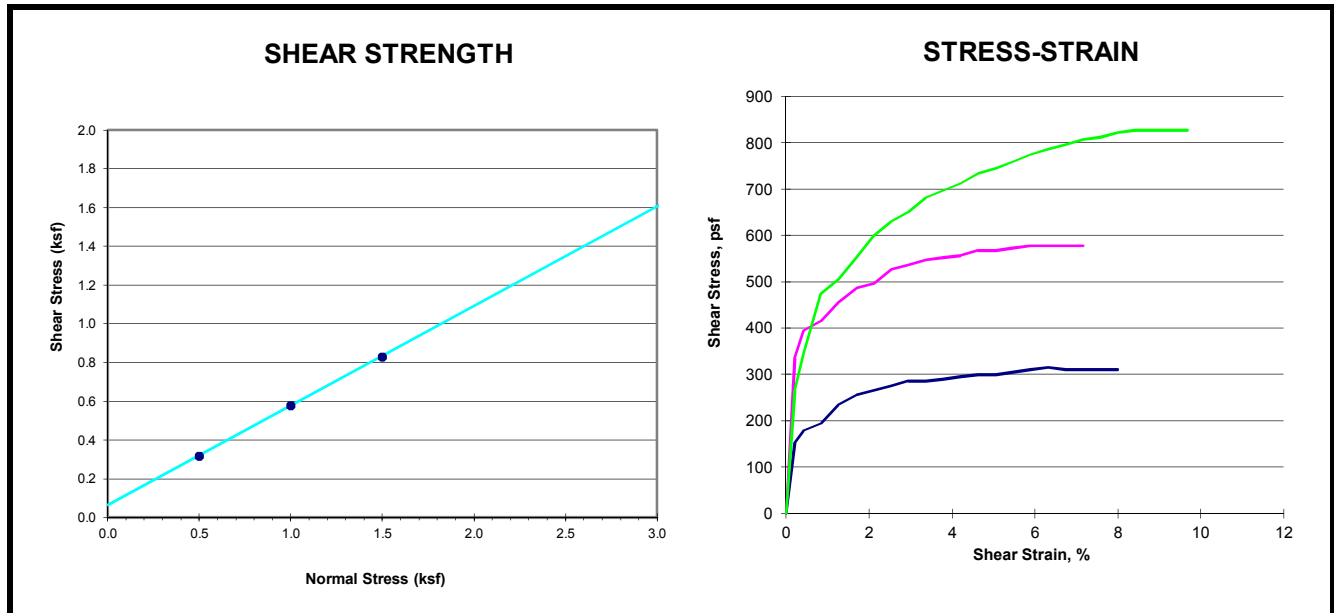
Average Diameter (in) 1.386

Rate of strain (%) 0.5

Strain at Failure (%) 7.2

Notes:





Sample Description Remolded to Approximately 90% of Wet Density of CTM 216

Boring Number	B1-Bulk
Sample Depth (feet)	
Material Description	Dark Gray CLAY

Initial Conditions at Start of Test


Sample ID (psf)	500	1000	1500
Height (inch)	1.00	1.00	1.00
Diameter (inch)	2.375	2.375	2.375
Moisture Content (%)	13.0	14.3	14.2
Wet Density (g/cm ³)	1.92	1.92	1.92
Dry Density (pcf)	106.3	105.0	105.0
Estimated Specific Gravity	2.75	2.75	2.75
Saturation (%)	58.1	61.8	61.5

Shear Test Conditions

Strain Rate (%/min)	0.160	0.166	0.167
Major Principle Stress at Failure (psf)	315	577	827
Strain at Failure (%)	6.32	5.89	8.42

Test Results

ϕ , degrees	27.2
c, psf	65

 <p>Geocon Consultants, Inc. 3160 Gold Valley Drive, Suite 800 Rancho Cordova, California 95742 Telephone: (916) 852-9118 Fax: (916) 852-9132</p>	<p>Direct Shear Strength Test (ASTM D3080)</p> <p>Project: Crawford Lab 16-337.16</p> <p>Location:</p> <p>Number: S9763-05-132</p> <p>Figure:</p>
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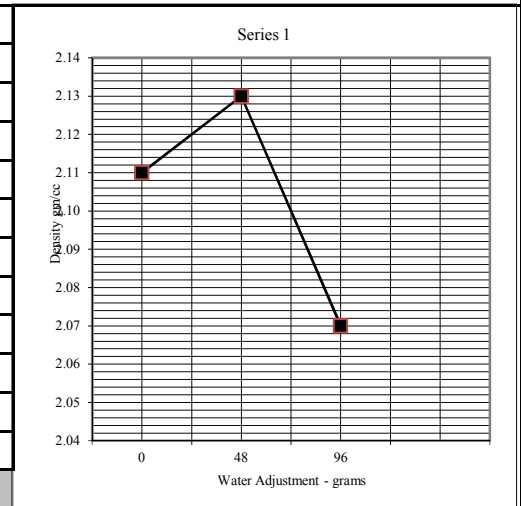
Project Number	S9763-05-132	SAMPLE I.D.	B1-Bulk
Project Name	Crawford 16.337.16 Peacock Drive		
Client Name	Crawford and Associates		
Date	Wednesday, July 18, 2018		

IMPACT TEST DATA

I	Initial Wet Weight of Test Specimen (g)	2400			
	Increment	1	2	3	4
	Water Adjustment (g)	0	48	96	
J	Tamper Reading	10.8	10.7	11	
K	Adjusted Wet Density (g/cc)	2.11	2.13	2.07	

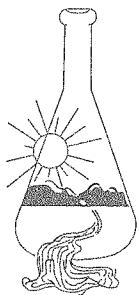
ROCK CORRECTION

L	Total Sample Weight	
	< 3/4-inch (g)	
M	+ 3/4 - inch Weight in Air (g)	
N	+ 3/4 - inch Weight in Water (g)	
O	+ 3/4 - Inch Volume (M-N)	
P	% + 3/4 inch 100(M/L)	
Q	% - 3/4 inch 100-P	
R	Density of + 3/4 inch (M/O)	
S	(% + 3/4 - inch)/Density of + 3/4 - inch (P/R)	
T	(% - 3/4 - inch)/Density of - 3/4 - inch (Q/K)	
U	Sum of S and T (S + T)	
V	Average Adjusted Wet Density (100/U)	



+ 3/4 - inch Aggregate Adjustment (Y)

% + 3/4 - inch (P)	Adjustment	% Moisture by CTM 226				
20 or Less	1.00	Increment	1	2	3	4
21 - 25	0.99	Pan I.D.		Pan 9		
26 - 30	0.98	Tare (g)		232		
31 - 35	0.97	Wet Wt (g)		2722.8		
36 - 40	0.96	Dry Wt (g)		2427.6		
41 - 45	0.95	Water Wt (g)		295.2		
46 - 50	0.94	% Water		13.4%		



Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 07/11/2018
Date Submitted 07/05/2018

To: Hailey Wagenman
Crawford & Associates, Inc.
1100 Corporate Way STE. 230
Sacramento, CA 95831-6120

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 16-337.16 MP 0.45 Site ID : BULK B1@0-5FT.
Thank you for your business.

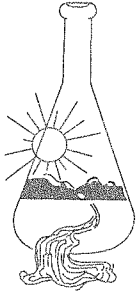
* For future reference to this analysis please use SUN # 77466-161809.

EVALUATION FOR SOIL CORROSION

Soil pH	6.57		
Minimum Resistivity	1.63	ohm-cm (x1000)	
Chloride	4.3 ppm	00.00043	%
Sulfate	5.5 ppm	00.00055	%

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422



Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
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Date Reported 07/11/2018
Date Submitted 07/05/2018

To: Hailey Wagenman
Crawford & Associates, Inc.
1100 Corporate Way STE. 230
Sacramento, CA 95831-6120

From: Gene Oliphant, Ph.D. \ Randy Horney *GH*
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 16-337.16 MP 0.45 Site ID : B4-2A@11FT.
Thank you for your business.

* For future reference to this analysis please use SUN # 77466-161810.

EVALUATION FOR SOIL CORROSION

Soil pH	7.73		
Minimum Resistivity	2.68 ohm-cm (x1000)		
Chloride	4.8 ppm	00.00048	%
Sulfate	47.6 ppm	00.00476	%

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422