Mills Lane Storm Drain Improvements Project

Mills Lane, St. Helena, CA

Initial Study/Mitigated Negative Declaration

Technical Appendices

CITY OF ST. HELENA

September 2021

Lead Agency:

City of St. Helena
Public Works Department
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St. Helena, CA 94574

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Assistant Engineer

APPENDIX A

Geotechnical Study Report

RGH CONSULTANTS

Experience is the difference

GEOTECHNICAL STUDY REPORT

MILLS LANE STORM DRAIN IMPROVEMENTS
MILLS LANE
ST. HELENA, CALIFORNIA

Project Number:

6498.12.PW.2

Prepared For:

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TABLE OF CONTENTS

INTRODUCTION

This report presents the results of our geotechnical study for the storm drain to be constructed along Mills Lane in St. Helena, California. We understand that the project entails construction of a new storm drain along Mills Lane that will extend from Highway 29 to the Napa River. The storm drain will be approximately 4,900 feet long and will outfall into the river approximately 600 feet east of the end of Mills Lane. The storm drain will be 36 inches in diameter at the Highway 29 connection and increase to 60 inches in diameter at the outfall in the Napa River. We understand that the trench bottom will vary from about 6 feet in depth at the western end to possibly about 14 feet in depth at the outfall. The site location is shown on Plate 1, Appendix A.

SCOPE

The purpose of our study, as outlined in our Agreement between Consultant and Subconsultant dated October 20, 2020, was to generate geotechnical information for the design and construction of the project. Our scope of services included reviewing selected published geologic data pertinent to the site; evaluating the subsurface conditions with borings and laboratory tests; analyzing the field and laboratory data; and presenting this report with the following geotechnical information:

1. A brief description of the soil and groundwater conditions observed during our study;

2. A discussion of seismic hazards that may affect the proposed alignments; and

3. Conclusions and recommendations regarding:

    a. Primary geotechnical engineering concerns and mitigating measures, as applicable;

    b. Trench excavation characteristics;

    c. Lateral forces for shoring design, as applicable;

    d. Trench backfill requirements; and

    e. Supplemental geotechnical engineering services.

STUDY

Site Exploration

We reviewed our previous geotechnical studies in the vicinity and selected geologic references pertinent to the site. Boring logs from a geotechnical study for the Mills Lane Commercial Project (RGH, 2001) and test pit logs from the St. Helena Custom Crush Winery (RGH, 2018) were reviewed for this study and are presented in Appendix B. The locations of the borings and test pits are presented on the Exploration Plan, Plate 2. The geologic literature reviewed is listed in Appendix C.

On October 27 and 28, 2020, we performed a geotechnical reconnaissance of the site and explored the subsurface conditions along the pipeline alignment by drilling eight borings to depths ranging from about 10 to 21 feet. The borings were drilled with a truck-mounted drill rig equipped with 6-inch diameter, solid stem augers and 8-inch diameter, hollow stem augers at the approximate locations shown on the Exploration Plan, Plate 2. The boring locations were determined approximately by pacing their distance from features shown on the Exploration Plan and should be considered accurate only to the degree implied by the method used. Our staff engineer located and logged the borings and obtained samples of the materials encountered for visual examination, classification, and laboratory testing.

Relatively undisturbed samples were obtained from the borings at selected intervals by driving a 2.43-inch inside diameter, split spoon sampler, containing 6-inch-long brass liners, using a 140-pound hammer dropping approximately 30 inches. The sampler was driven 12 to 18 inches. The blows required to drive each 6-inch increment were recorded and the blows required to drive the last 12 inches, or portion thereof, were converted to equivalent Standard Penetration Test (SPT) blow counts for correlation with empirical data. Disturbed samples were also obtained at selected depths by driving a 1.375-inch inside diameter (2-inch outside diameter) SPT sampler, without liners or rings, using a 140-pound hammer dropping approximately 30 inches. The sampler was driven 12 to 18 inches, the blows to drive each 6-inch increment were recorded, and the blows required to drive the final 12 inches, or portion thereof, are provided on the boring logs. A disturbed “bulk” sample was also obtained at a selected depth of about 1½ feet from boring B-4 and placed in a plastic bag.

The logs of the borings showing the materials encountered, groundwater conditions, converted blow counts, and sample depths are presented on Plates 3 through 10. The soil is described in accordance with the Unified Soil Classification System, outlined on Plate 11.

The boring logs show our interpretation of the subsurface soil and groundwater conditions on the date and at the locations indicated. Subsurface conditions may vary at other locations and times. Our interpretation is based on visual inspection of soil samples, laboratory test results, and interpretation of drilling and sampling resistance. The location of the soil boundaries should be considered approximate. The transition between soil types may be gradual.

Laboratory Testing

The samples obtained from the borings were transported to our office and re-examined to verify soil classifications, evaluate characteristics, and assign tests pertinent to our analysis. Selected samples were laboratory tested to determine their water content, dry density, particle size distribution, and shear

strength. Water content, dry density, percent of silt and clay (<#200 sieve), and shear strength test results are presented on the boring logs. These results plus the particle size distribution plots are presented on Plates 12 through 35.

SITE CONDITIONS

General

Napa County is located within the California Coast Range geomorphic province. This province is a geologically complex and seismically active region characterized by sub-parallel northwest-trending faults, mountain ranges and valleys. The oldest bedrock units are the Jurassic-Cretaceous Franciscan Complex and Great Valley sequence sediments originally deposited in a marine environment. Subsequently, younger rocks such as the Tertiary-age Sonoma Volcanics group, the Plio-Pleistocene-age Clear Lake Volcanics and sedimentary rocks such as the Guinda, Domengine, Petaluma, Wilson Grove, Cache, Huichica and Glen Ellen formations were deposited throughout the province. Extensive folding and thrust faulting during late Cretaceous through early Tertiary geologic time created complex geologic conditions that underlie the highly varied topography of today. In valleys, the bedrock is covered by thick alluvial soil.

Geology

Published geologic maps (Fox, K.F., Jr., et al., 1973) indicate the alignment is underlain by alluvial fan deposits headward to terrace deposits (Qyf). The deposits are shown to consist of moderately sorted fine sand and silt and gravel.

Landslides

Published landslide maps (Dwyer, 1976) do not indicate large-scale slope instability at the site, and we did not observe active landslides at the site during our study.

Surface and Subsurface

The pipeline alignment crosses generally level terrain except at the bank of the Napa River. The alignment extends along the asphalt paved road until it ends about 600 feet east of the Napa River, where the alignment transitions to dirt vineyard roads. The shoulders are generally covered with seasonal grasses and weeds, except where there is existing development. These areas are generally gravel driveways and shoulders or consist of bushes and trees.

Borings SD-1 through SD-4, which were drilled in the paved road, encountered about 3 to 4 inches of asphalt over 6½ to 11 inches of aggregate base. Below the aggregate base and outside of paved areas, our borings and laboratory tests indicate that the alignment is underlain by layers of medium stiff to very stiff clay and silt with varying amounts of sand and occasional gravel and layers of loose to medium

dense sand with varying amounts of clay and occasional gravel. A detailed description of the subsurface conditions found in our borings is given on Plates 3 through 10, Appendix A. A detailed description of the subsurface conditions found in borings and test pits performed by RGH for nearby projects are presented in logs included in Appendix B.

Corrosion Potential

Mapping by the Natural Resources Conservation Service (2020) indicates that the corrosion potential of the near surface soil is low to high for uncoated steel and low for concrete. Performing corrosivity tests to verify these values was not part of our requested and/or proposed scope of work. Should the need arise, we would be pleased to provide a proposal to evaluate these characteristics.

Groundwater

Free groundwater was not observed in our borings at the time of drilling. These borings were drilled in October of this year when we expect the groundwater elevation to be lower. Borings drilled for the project on Mills Lane (RGH, 2001) encountered groundwater as shallow as 13 feet below the ground surface. Those borings were drilled in April of 2001, which is at the tail end of the rainy season. This is a time period when we expect the groundwater level to be near its highest for the year. Supplemental exploration performed on the Mills Lane property encountered groundwater between about 5½ to 7 feet (RGH, 2017). These borings were drilled in January of 2017, when we would expect groundwater to be higher. Fluctuation in the groundwater level typically occurs because of a variation in rainfall intensity, duration, and other factors such as flooding and periodic irrigation.

DISCUSSION AND CONCLUSIONS

Geotechnical Issues

General

Based on our study, we judge the proposed storm drain can be built as planned, provided the recommendations presented in this report are incorporated into their design and construction. The primary geotechnical concerns during design and construction of the project are:

1. The stability of trench walls during construction; and
2. The potential for encountering groundwater and saturated, heaving sands for deeper trench excavations.

Trench Excavation Characteristics

Based on the mapped geologic conditions described herein and the subsurface conditions encountered in our borings, the soil along the alignment should be excavatable with conventional excavation equipment such as a moderate sized excavator. Trench excavation stability is discussed in the subsequent section.

Trench Excavation Stability

Trench excavations will encounter asphalt underlain by aggregate base. Aggregate base is a material made up of mostly sand and gravel with some minor amount of fine-grained soil, which is usually predominantly silt. With little fines, aggregate base can be prone to instability when exposed in a trench excavation.

In general, below the aggregate base and outside of paved areas, trench excavations will encounter clays, silts, and sands. Medium stiff to very stiff clays and silts, such as those encountered at the site, can appear to be stable when first exposed but will lose strength over time and will fail unpredictably if left unsupported. In addition, layers of loose to medium dense sand were encountered in our borings. Some of these sand layers have relatively low fines (percentage of silt and clay) content. Sand with low fines content can be susceptible to caving if left unsupported. There is evidence that groundwater could rise to within 5½ to 7 feet of the ground surface at certain times of the year. This means that groundwater could impact the trench as it gets deeper. It has been our experience that when the confinement for sand is removed, such as in a trench excavation, the saturated sand can flow into the trench. This is not only its own instability issue, but it further reduces the stability of the overlying clay.

Utility trench excavations may cross existing utility trenches. These trenches could be for live utilities or those that have been previously abandoned. In either case, caving of the backfill from these trenches into the trench excavation should be anticipated and planned.

Based on the above information and our experience in the area, trenches need to be shored during construction as recommended herein and in accordance with OSHA regulations. The trench shoring system needs to be able to extend to the bottom of the planned trench excavations.

Saturated Heaving Sands

As discussed previously, our borings only encountered native sand at varying depths. Along some stretches of the pipeline, sand could be present at the bottom of the trench excavation. There is also evidence that groundwater has risen to within 5½ to 7 feet of the ground surface. If groundwater rises to these levels, the sands encountered in our borings could become saturated. Saturated sand that is encountered in trench excavation bottoms can become very unstable and exhibit "pumping" behavior when it is unloaded by the removal of the confining pressure of the trench spoils above and adjacent to it. If saturated sand is encountered in the bottom of trench excavations, it may be necessary to overexcavate a portion of these soils and replace them with additional bedding material to achieve the desired support of the pipeline, as discussed in the "Recommendations" section of this report.

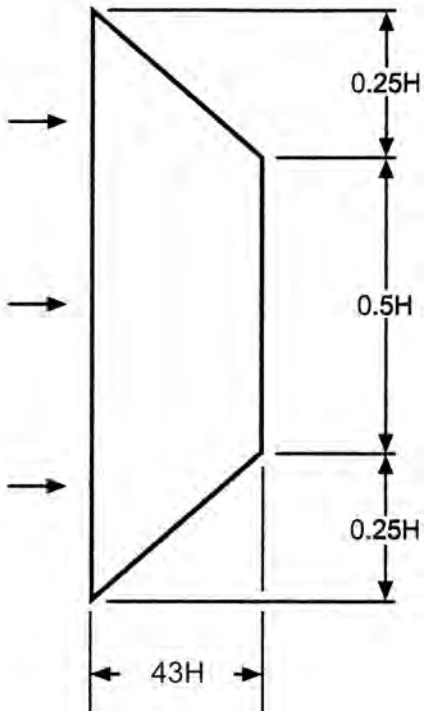
Excavation Dewatering

As discussed previously, groundwater was not encountered within the planned excavation depth in our borings that were drilled in the fall of what has been a below normal rainfall year for the area. As discussed previously, there is evidence that groundwater has risen to within 5½ to 7 feet of the ground surface at times in the past. Therefore, it is possible that groundwater will rise to higher elevations during and shortly after the rainy season, which can last into June in the project area. Therefore, it is possible that deeper trench excavations, especially those required on the eastern end of the pipeline, may need to be dewatered in order to install the pipe. The dewatering system may be able to consist of isolated points within the trench excavation that will facilitate dewatering sections of the trench where work is being performed. If larger volumes of water are entering the trench, the dewatering system can consist of a series of well points spread along the portion of the pipeline alignment to be dewatered. Water is pumped from these well points and discharged into a storage tank for disposal off site. Dewatering will likely need to occur prior to excavation of the trenches in order to lower the groundwater level below the proposed trench bottoms. Groundwater will need to be lowered to at least 3 feet below the bottom of the trenches and at least 3 feet beyond the sidewalls.

RECOMMENDATIONS

Temporary Excavations

Temporary excavations for pipeline trenches should be shored in accordance with OSHA requirements and per the recommendations set forth herein. Shoring should be capable of supporting an active pressure of 43H in pounds per square foot (where H is the height of the trench wall in feet) in a trapezoidal distribution as shown below:



The shoring and safety of excavations is solely the responsibility of the contractor. Attention is drawn to the State of California Safety Orders dealing with “Excavations and Trenches.”

Dewatering

As stated previously, dewatering may be required in order to construct portions of the proposed pipeline. The project plans and specifications should require that the general contractor be responsible for the design, operation and maintenance of the temporary dewatering system. If required, dewatering should occur prior to excavation of the trenches in order to lower the groundwater level to below the proposed excavation bottoms. Groundwater should be lowered to at least 3 feet below the bottom of the excavations.

Unstable Trench Excavation Bottoms

Where unstable trench bottoms are observed, additional excavation should be performed to provide space for at least 24 inches of ballast rock (2 to 4 inches in size), or other materials capable of bridging the weaker materials to provide adequate bedding support. A geotextile filter fabric, such as Mirafi 160N or equivalent, should be wrapped around this material. The depth of excavation and the need for fabric should be evaluated and determined during construction.

Trench Backfill

Trench backfill materials should meet the requirements of the City of St. Helena. Trench backfill should be placed and compacted in accordance with the requirements of the City of St. Helena. Jetting or ponding of trench backfill to aid in achieving the recommended degree of compaction should not be attempted. The top of the trench within paved areas should be finished in accordance with the requirements of the City of St. Helena.

Riverbank Stabilization

When open cut trenching for the outfall into the river, care must be taken to reduce adverse impacts to the riverbank and to restore the bank to a condition more stable than the existing condition. In addition to guidelines set forth by agencies having jurisdiction, the storm drain should be installed, and riverbank restored as recommended herein.

The storm drain trench should be excavated through the riverbank as planned. The excavations should be shored and dewatered in accordance with the previous recommendations.

Once the storm drain has been backfilled per the recommendations presented herein and the requirements of the City of St. Helena, the riverbank should be re-established. Riverbank fill should be keyed and benched into the surrounding riverbank face for a distance of at least 5 feet on either side of the trench. Fill should be placed in thin horizontal lifts (approximately 8 inches thick), moisture conditioned to near-optimum moisture content, and compacted to at least 90 percent of the maximum dry density per ASTM test standard D-1557. The fill materials should be free of perishable matter and rocks or lumps over 6 inches in diameter and must be approved by the geotechnical engineer prior to use. We anticipate the excavated materials, less the oversize rock fraction, should be suitable for use as backfill and bank grading. The suitability of the on-site soils for use as fill should be verified during grading.

Immediately after construction, the riverbank should be planted with native, deep-rooted plants that establish quickly. Plants should be monitored during critical establishment phase to ensure they will provide erosion protection. A landscape architect or river habitat restoration consultant experienced in local river channel restoration should be retained to provide detailed plans and recommendations for establishing lasting cover.

Maintenance

Periodic land maintenance, especially at the riverbank, will be required. Surface and subsurface drainage facilities should be checked frequently and cleaned and maintained as necessary or at least annually. Condition of the river bank should be checked regularly. A dense growth of deep-rooted ground cover must be maintained on all slopes to reduce sloughing and erosion. Sloughing and erosion that occurs must be repaired promptly before it can enlarge.

Supplemental Services

Pre-Bid Meeting

It has been our experience that contractors bidding on the project often contact us to discuss the geotechnical aspects. Informal contacts between RGH Consultants (RGH) and an individual contractor could result in incomplete or misinterpreted information being provided to the contractor. Therefore, we recommend a pre-bid meeting be held to answer any questions about the report prior to submittal of bids. If this is not possible, questions or clarifications regarding this report should be directed to the project owner or their designated representative. After consultation with RGH, the project owner or their representative should provide clarifications or additional information to all contractors bidding the job.

Plan and Specifications Review

Coordination between the design team and the geotechnical engineer is recommended to assure that the design is compatible with the soil, geologic and groundwater conditions encountered during our study. RGH recommends that we be retained to review the project plans and specifications to determine if they are consistent with our recommendations. In the event we are not retained to perform this recommended review, we will assume no responsibility for misinterpretation of our recommendations.

Construction Observation and Testing

Prior to construction, a meeting should be held at the site that includes, but is not limited to, the owner or owner's representative, the general contractor, the grading contractor, the foundation contractor, the underground contractor, any specialty contractors, the project civil engineer, other members of the project design team and RGH. This meeting should serve as a time to discuss and answer questions regarding the recommendations presented herein and to establish the coordination procedure between the contractors and RGH.

In addition, we should be retained to monitor all soil related work during construction. If, during construction, we observe subsurface conditions different from those encountered during the explorations, we should be allowed to amend our recommendations accordingly. If different conditions are observed by others, or appear to be present beneath excavations, RGH should be advised at once so that these conditions may be evaluated and our recommendations reviewed and updated, if warranted. The validity of recommendations made in this report is contingent upon our being notified and retained to review the changed conditions.

If more than 18 months have elapsed between the submission of this report and the start of work at the site, or if conditions have changed because of natural causes or construction operations at, or adjacent to, the site, the recommendations made in this report may no longer be valid or appropriate. In such case, we recommend that we be retained to review this report and verify the applicability of the conclusions and recommendations or modify the same considering the time lapsed or changed conditions. The validity of recommendations made in this report is contingent upon such review.

These supplemental services are performed on an as-requested basis and are in addition to this geotechnical study. We cannot accept responsibility for items that we are not notified to observe or for changed conditions we are not allowed to review.

LIMITATIONS

This report has been prepared by RGH for the exclusive use of BKF Engineers and the City of St. Helena and their consultants as an aid in the design and construction of the proposed improvements described in this report.

The validity of the recommendations contained in this report depends upon an adequate testing and monitoring program during the construction phase. Unless the construction monitoring and testing program is provided by our firm, we will not be held responsible for compliance with design recommendations presented in this report and other addendum submitted as part of this report.

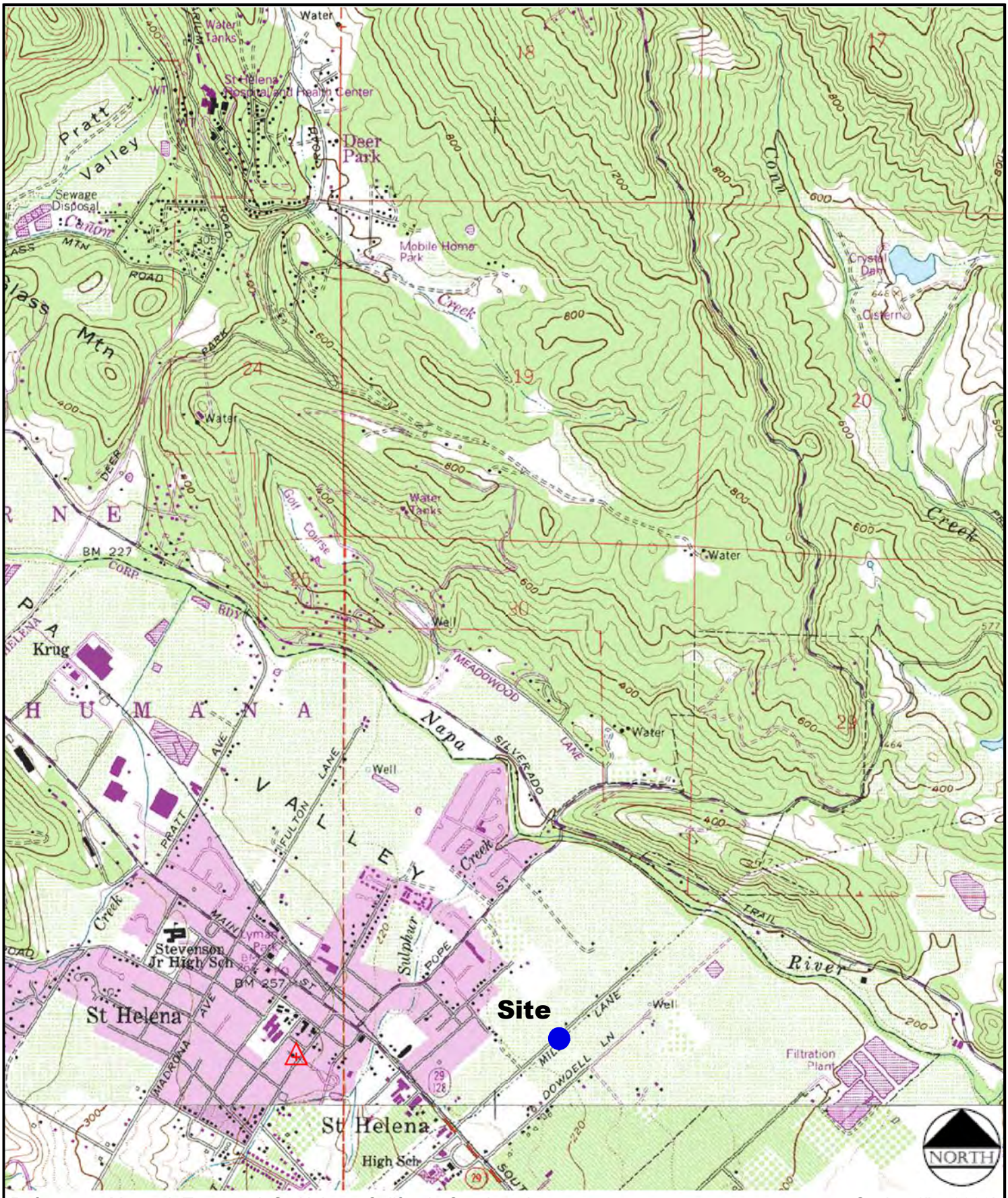
Our services consist of professional opinions and conclusions developed in accordance with generally accepted geotechnical engineering principles and practices. We provide no warranty, either expressed or implied. Our conclusions and recommendations are based on the information provided to us regarding the proposed construction, the results of our field exploration, laboratory testing program, and professional judgment. Verification of our conclusions and recommendations is subject to our review of the project plans and specifications, and our observation of construction.

The borings represent the subsurface conditions at the locations and on the date indicated. It is not warranted that they are representative of such conditions elsewhere or at other times. Site conditions and cultural features described in the text of this report are those existing at the time of our field exploration and may not necessarily be the same or comparable at other times.

The scope of our services did not include an environmental assessment or a study of the presence or absence of toxic mold and/or hazardous, toxic or corrosive materials in the soil, surface water, groundwater or air (on, below or around this site), nor did it include an evaluation or study for the presence or absence of wetlands. These studies should be conducted under separate cover, scope and fee and should be provided by a qualified expert in those fields.

APPENDIX A - PLATES

LIST OF PLATES



Reference: Maptech Topoquad, St. Helena, California Quadrangle

Scale: 1" = 2000'

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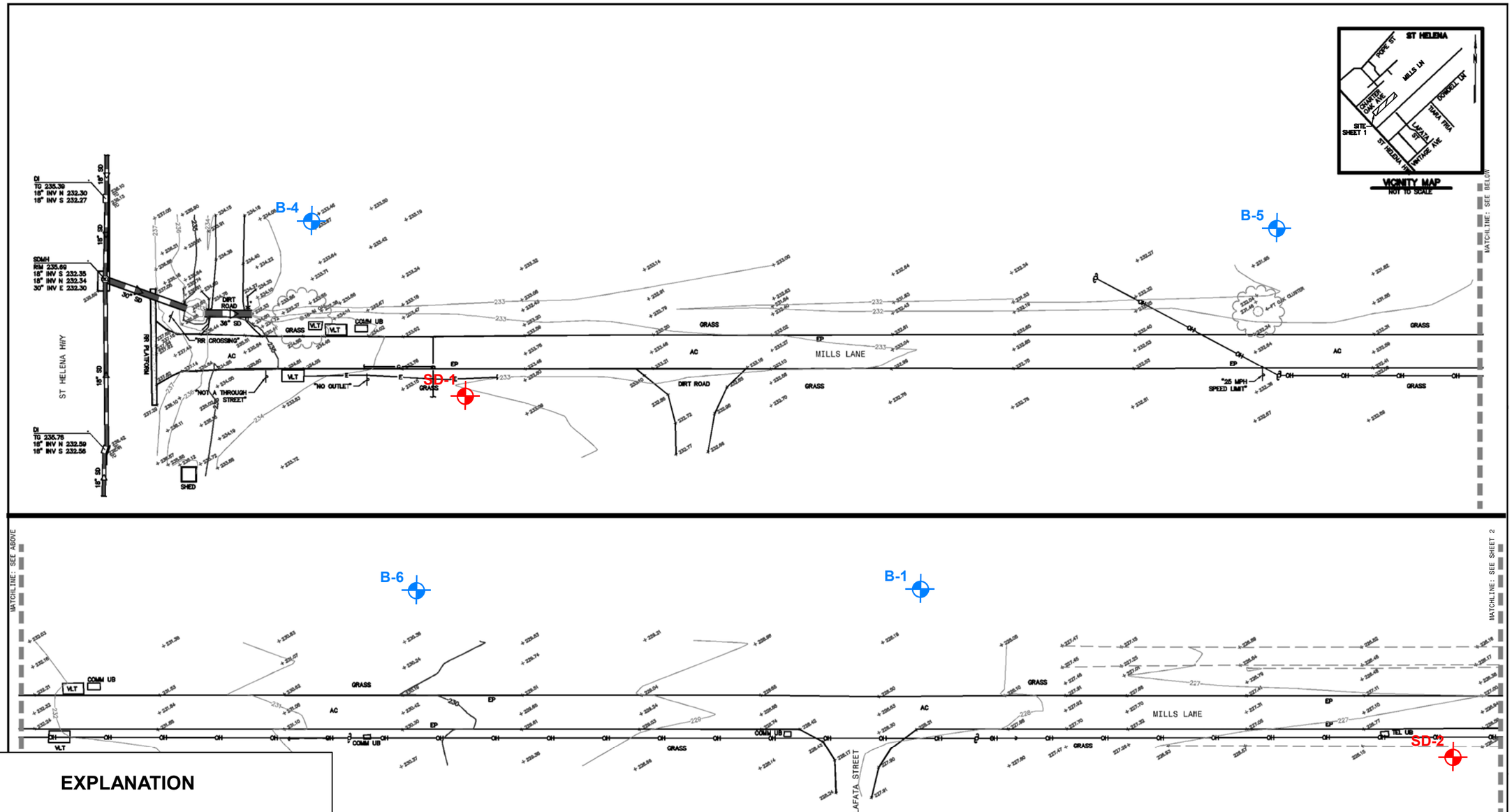
Job No: 6498.12.PW.2 | Date: DEC 2020

SITE LOCATION MAP
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
1



EXPLANATION

SD-3 Storm Drain Boring Location and Number

B-3 Boring Location and Number (RGH, 2001)

40 0 40 feet

TP-1, TP-4, TP-5 are aproximately 80 - 100 feet off Mills Lane (RGH, 2018)

Reference: Plan Set titled Mills Lane Storm Drain Improvements, Sheet 1 of 4, by BKF Engineers

Scale: 1" = 40'

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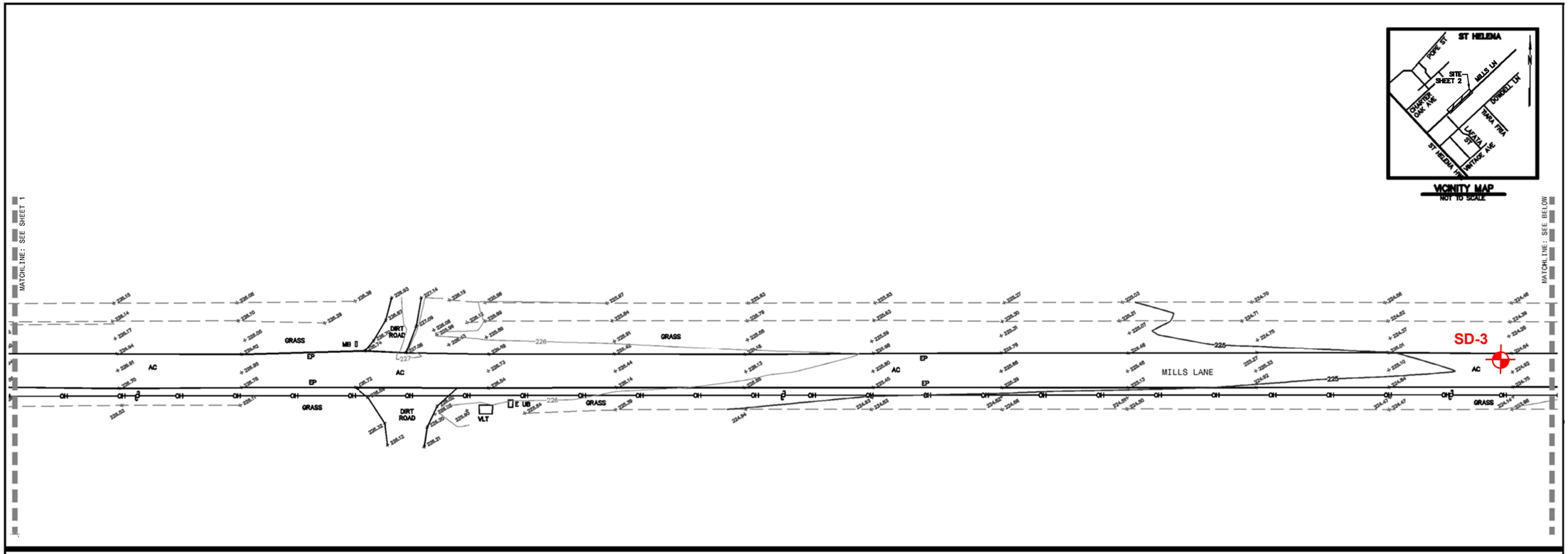
Job No: 6498.12.PW.1 | Date: DEC 2020

EXPLORATION PLAN
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
2 A



EXPLANATION

SD-3 Storm Drain Boring Location and Number

40 0 40 feet

Reference: Plan Set titled Mills Lane Storm Drain Improvements, Sheet 2 of 4, by BKF Engineers

Scale: 1" = 40'

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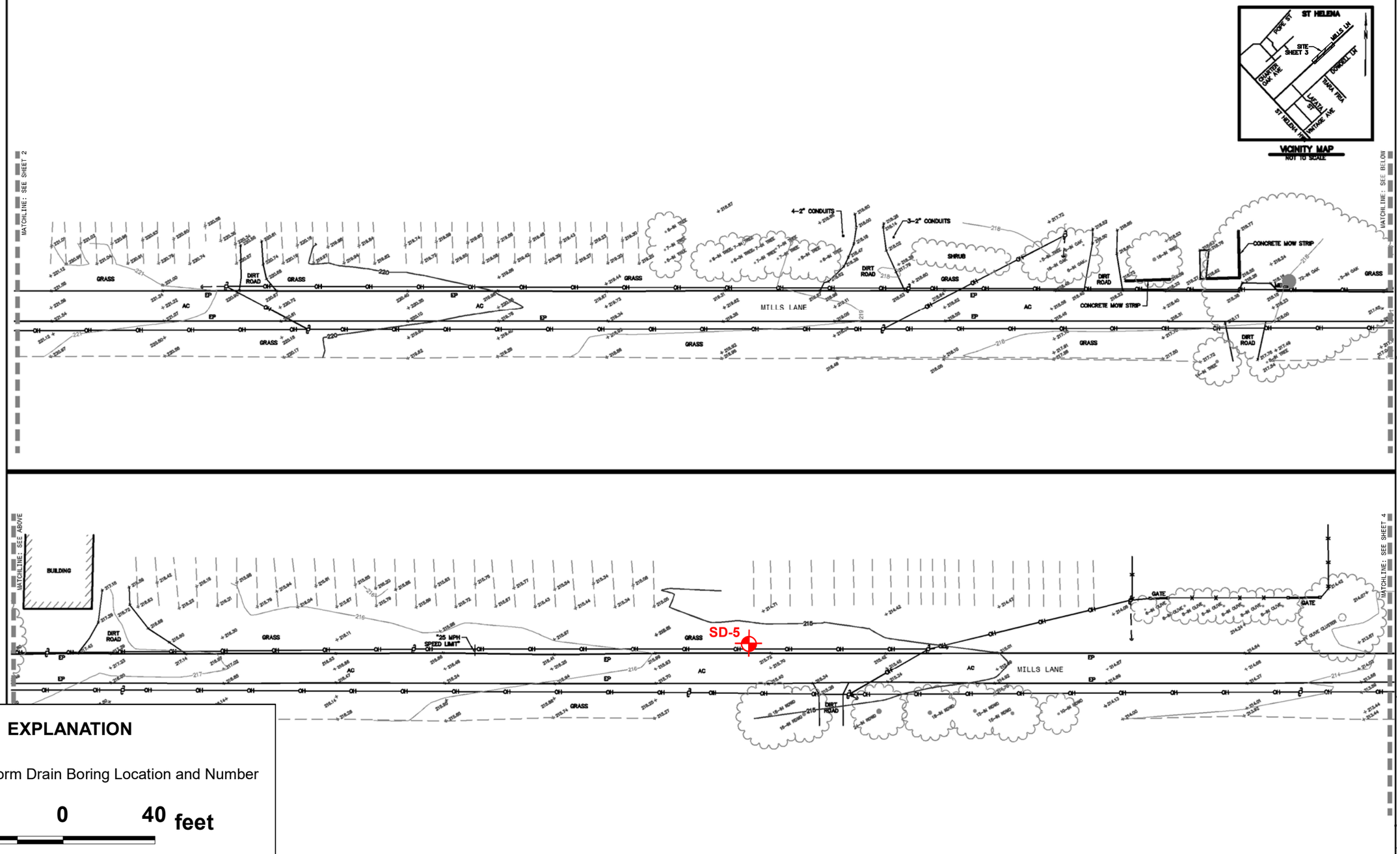
EXPLORATION PLAN
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
2 B



EXPLANATION

SD-3 Storm Drain Boring Location and Number

40 0 40 feet

Reference: Plan Set titled Mills Lane Storm Drain Improvements, Sheet 3 of 4, by BKF Engineers

Scale: 1" = 40'

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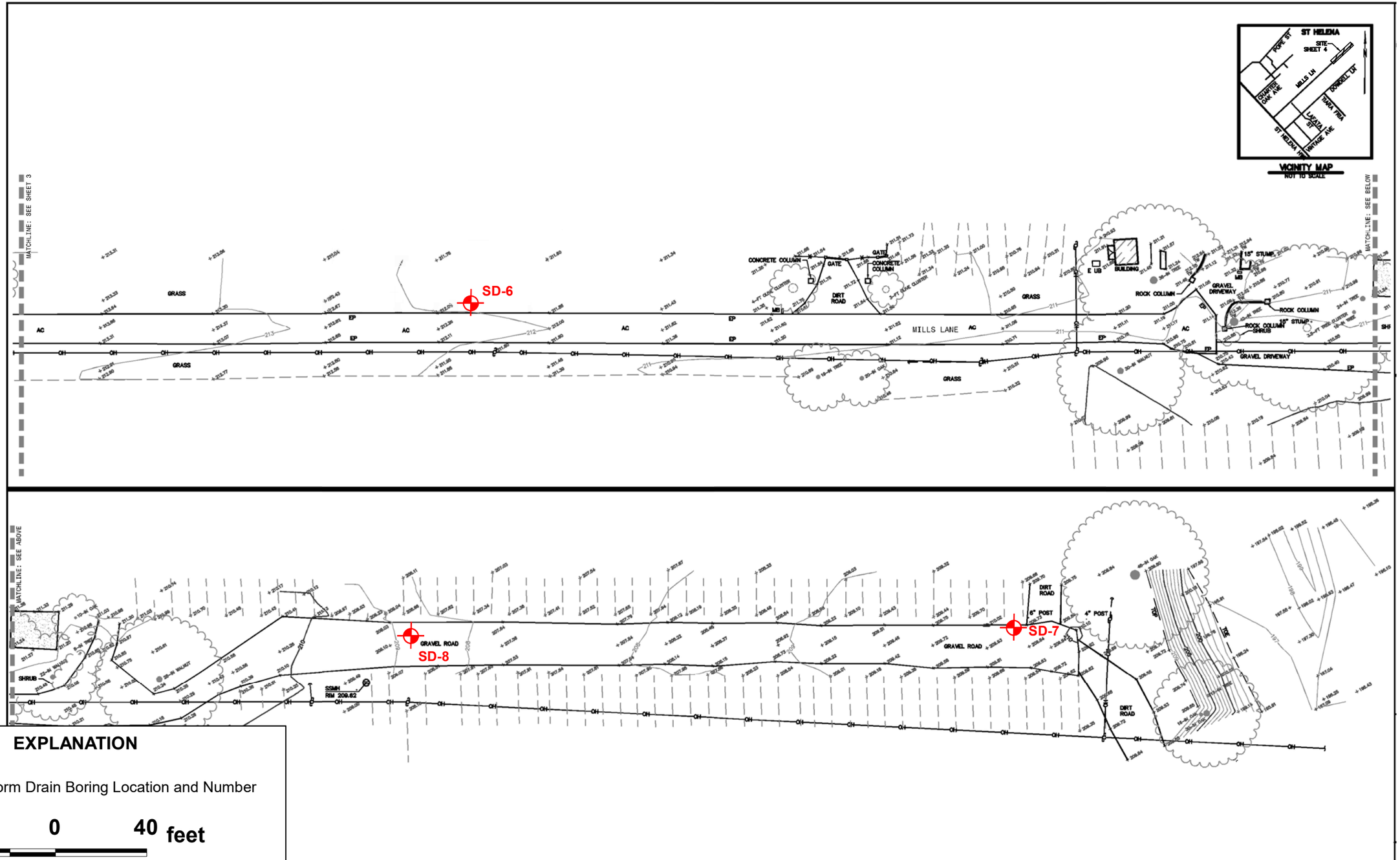
Job No: 6498.12.PW.1 | Date: DEC 2020

EXPLORATION PLAN
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
2 C



EXPLANATION

SD-3 Storm Drain Boring Location and Number

40 0 40 feet

Reference: Plan Set titled Mills Lane Storm Drain Improvements, Sheet 4 of 4, by BKF Engineers

Scale: 1" = 40'

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Job No: 6498.12.PW.1 | Date: DEC 2020

EXPLORATION PLAN
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
2 D

Date Drilled **10/27/20**	Logged By **AKU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6 inch**	Total Depth of Borehole **10 1/2 feet**
Drill Rig Type **B-53 Mobile**	Drilling Contractor **Pearson**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level **No Groundwater Encountered**	Sampling Method(s) **Modified California**	Hammer Data **140 lb. 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				4" ASPHALT OVER 6 1/2" AGGREGATE BASE								
				DARK BROWN CLAYEY SAND (SC), loose, moist, trace gravel								
		8			105.2	16.8						Su = 1,828.5 psf
		10		DARK BROWN SANDY CLAY (CH), medium stiff to stiff, moist, trace gravel								
5												
		7			110.5	16.8						Su = 1,208.5 psf
				BROWN CLAYEY SAND (SC), medium dense, moist, trace gravel								
10		19					44.7					
				Boring terminated at 10 1/2 feet No groundwater encountered								
15												
20												
25												

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Job No: 6498.12.PW.2 | Date: DEC 2020

LOG OF STORM DRAIN SD-1
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE **3**

Date Drilled **10/27/20**	Logged By **AKU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6 inch**	Total Depth of Borehole **10 feet**
Drill Rig Type **B-53 Mobile**	Drilling Contractor **Pearson**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level **No Groundwater Encountered**	Sampling Method(s) **Modified California**	Hammer Data **140 lb. 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				3 1/2" ASPHALT OVER 7" AGGREGATE BASE								
				DARK BROWN SAND WITH CLAY (SP-SC), loose to medium dense, moist								
		13			109.9	12.5						Su = 3,769.5 psf
		8										
5				BROWN SANDY CLAY (CH), medium stiff, trace gravel								
		7			108	17.9						Su = 2,029 psf
		6										
10				Boring terminated at 10 feet No groundwater encountered								
15												
20												
25												

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Job No: 6498.12.PW.2 | Date: DEC 2020

LOG OF STORM DRAIN SD-2
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE **4**

Date Drilled **10/27/20**	Logged By **AKU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6 inch**	Total Depth of Borehole **11 1/2 feet**
Drill Rig Type **B-53 Mobile**	Drilling Contractor **Pearson**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level **No Groundwater Encountered**	Sampling Method(s) **Modified California**	Hammer Data **140 lb. 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				3 1/2" ASPHALT OVER 11" AGGREGATE BASE								
		11		DARK BROWN SANDY CLAY WITH GRAVEL (CH), stiff, moist	120.1	9.4						Su = 3,253 psf
		11										
5		8		DARK BROWN SANDY CLAY WITH GRAVEL (CH), medium stiff, moist	116.8	11.0						Su = 2,336.5 psf
				GRAY BROWN CLAYEY SAND WITH GRAVEL (SC), medium dense, moist								
10		13					13.6					
				Boring terminated at 11 1/2 feet No groundwater encountered								
15												
20												
25												

RGH CONSULTANTS

Job No: 6498.12.PW.2 | Date: DEC 2020

LOG OF STORM DRAIN SD-3

Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE **5**

Date Drilled **10/27/20**	Logged By **AKU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6 inch**	Total Depth of Borehole **10 1/2 feet**
Drill Rig Type **B-53 Mobile**	Drilling Contractor **Pearson**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level **No Groundwater Encountered**	Sampling Method(s) **Bulk, Modified California**	Hammer Data **140 lb. 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				3" ASPHALT OVER 7" AGGREGATE BASE								
				LIGHT BROWN SILTY SAND WITH GRAVEL (SM), medium dense, moist								
		12										
5				BROWN SAND WITH CLAY AND GRAVEL (SP-SC), very loose, moist								
		4		DARK BROWN SANDY SILT (ML), soft, moist			9.0					
				BROWN CLAY WITH SAND (CH), stiff, moist, trace gravel								
10		10			104.9	22.5						Su = 2,849.5 psf
				Boring terminated at 10 1/2 feet No groundwater encountered								
15												
20												
25												

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Job No: 6498.12.PW.2 | Date: DEC 2020

LOG OF STORM DRAIN SD-4

Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE **6**

Date Drilled **10/27/20**	Logged By **AKU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6 inch**	Total Depth of Borehole **15 feet**
Drill Rig Type **B-53 Mobile**	Drilling Contractor **Pearson**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level **No Groundwater Encountered**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140 lb. 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				BROWN SANDY SILT (ML), medium stiff to very stiff, dry to moist, trace gravel								
		17										
		6			87	10.1						Su = 1,572.5 psf
				BROWN SANDY CLAY (CL), stiff, moist								
5		13			100	12.1						Su = 2,514 psf
				BROWN CLAYEY SAND WITH GRAVEL (SC), medium dense, moist								
		12					32.4					
				BROWN SANDY CLAY (CH), stiff, moist								
10												
		25		BROWN CLAYEY SAND WITH GRAVEL (SC), medium dense, moist			13.9					
		20										
15				Boring terminated at 15 feet No groundwater encountered								
20												
25												

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Job No: 6498.12.PW.2 | Date: DEC 2020

LOG OF STORM DRAIN SD-5
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
7

Date Drilled **10/27/20**	Logged By **AKU**	Checked By **EGC**
Drilling Method **Solid Stem Auger**	Drill Bit Size/Type **6 inch**	Total Depth of Borehole **15 feet**
Drill Rig Type **B-53 Mobile**	Drilling Contractor **Pearson**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level **No Groundwater Encountered**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140 lb. 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				GRAY BROWN CLAY WITH SAND (CL), stiff, dry to moist, rootlets to 4 1/2 feet, trace gravel								
		9			86.5	11.3						Su = 3,117 psf
		15					60.2					
5		12										
				GRAY BROWN CLAYEY SAND WITH GRAVEL (SC), medium dense, moist								
		26					22.2					
10				BROWN SANDY CLAY (CH), stiff to very stiff, moist								
		19			116.7	12.8						Su = 7,854 psf
		10										
15				Boring terminated at 15 feet No groundwater encountered								
20												
25												

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LOG OF STORM DRAIN SD-6

Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE **8**

Date Drilled **10/28/20**	Logged By **AKU**	Checked By **EGC**
Drilling Method **Hollow Stem Auger**	Drill Bit Size/Type **8 inch**	Total Depth of Borehole **21 feet**
Drill Rig Type **B-53 Mobile**	Drilling Contractor **Pearson**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level **No Groundwater Encountered**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140 lb. 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				BROWN SANDY SILT (ML), stiff to medium stiff, dry to moist, rootlets to 4 1/2 feet								
		11										
		6			88.1	12.7						Su = 2,709.5 psf
5				BROWN SANDY CLAY (CL), stiff, moist, rootlets to 5 1/2 feet								
		10			97.1	12.7						Su = 2,398.5 psf
		12		BROWN SANDY CLAY (CH), stiff, moist, mottled orange starting at 13 feet	106.8	17.5						Su = 3,667 psf
10												
		13			105.6	19.1						Su = 2,603 psf
15												
				BROWN CLAYEY SAND WITH GRAVEL (SC), medium dense, moist			26.9					
20		8		BROWN SANDY CLAY (CH), medium stiff, moist								
				Boring terminated at 21 feet No groundwater encountered								
25												

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Job No: 6498.12.PW.2 | Date: DEC 2020

LOG OF STORM DRAIN SD-7
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE **9**

Date Drilled **10/28/20**	Logged By **AKU**	Checked By **EGC**
Drilling Method **Hollow Stem Auger**	Drill Bit Size/Type **8 inch**	Total Depth of Borehole **21 feet**
Drill Rig Type **B-53 Mobile**	Drilling Contractor **Pearson**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level **No Groundwater Encountered**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140 lb. 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				DARK BROWN SANDY SILT (MH), stiff, dry to moist, rootlets								
		11										
		8			105	12.6						Su = 2,150.5 psf
5				BROWN SILTY SAND (SM), loose, moist, trace gravel, rootlets to 5 1/2 feet								
		8			97.8	11.6						Su = 1,791 psf
				DARK BROWN SANDY CLAY (CH), stiff, moist, trace gravel								
		9			111.8	16.7						Su = 2,608.5 psf
10												
		13		BROWN SANDY CLAY WITH GRAVEL (CH), medium stiff to stiff, moist	121.8	13.8						Su = 1,366.5 psf
15												
		8										
20		7										
				Boring terminated at 21 feet No groundwater encountered								
25												

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Job No: 6498.12.PW.2 | Date: DEC 2020

LOG OF STORM DRAIN SD-8
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
10

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9	10	11	12	13

COLUMN DESCRIPTIONS

1 Depth (feet): Depth in feet below the ground surface.
2 Sample Type: Type of soil sample collected at the depth interval shown.
3 Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
4 Graphic Log: Graphic depiction of the subsurface material encountered.
5 MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
6 Dry Density (pcf): Dry density, in pcf.
7 Water Content (%): Water content, percent.
8 % <#200 Sieve: % <#200 Sieve
9 PI, %: Plasticity Index, expressed as a water content.
10 LL, %: Liquid Limit, expressed as a water content.
11 Expansion Index (EI): Expansion Index (EI)
12 UC, ksf: Unconfined compressive strength, in kips per square foot.
13 REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel. Su, psf: Undrained Shear Strength, in pounds per square foot (psf)

FIELD AND LABORATORY TEST ABBREVIATIONS

LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
Su: Undrained Shear Strength, in pounds per square foot (psf)

MATERIAL GRAPHIC SYMBOLS

Asphaltic Concrete (AC)
Fat CLAY, CLAY w/SAND, SANDY CLAY (CH)
Lean CLAY, CLAY w/SAND, SANDY CLAY (CL)
SILT, SILT w/SAND, SANDY SILT (MH)
SILT, SILT w/SAND, SANDY SILT (ML)
Clayey SAND (SC)
Silty SAND (SM)
Poorly graded SAND with Clay (SP-SC)

TYPICAL SAMPLER GRAPHIC SYMBOLS

Bulk Sample
2.5-inch-ID Modified California w/ brass liners
2-inch-OD unlined split spoon (SPT)

OTHER GRAPHIC SYMBOLS

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

GENERAL NOTES

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

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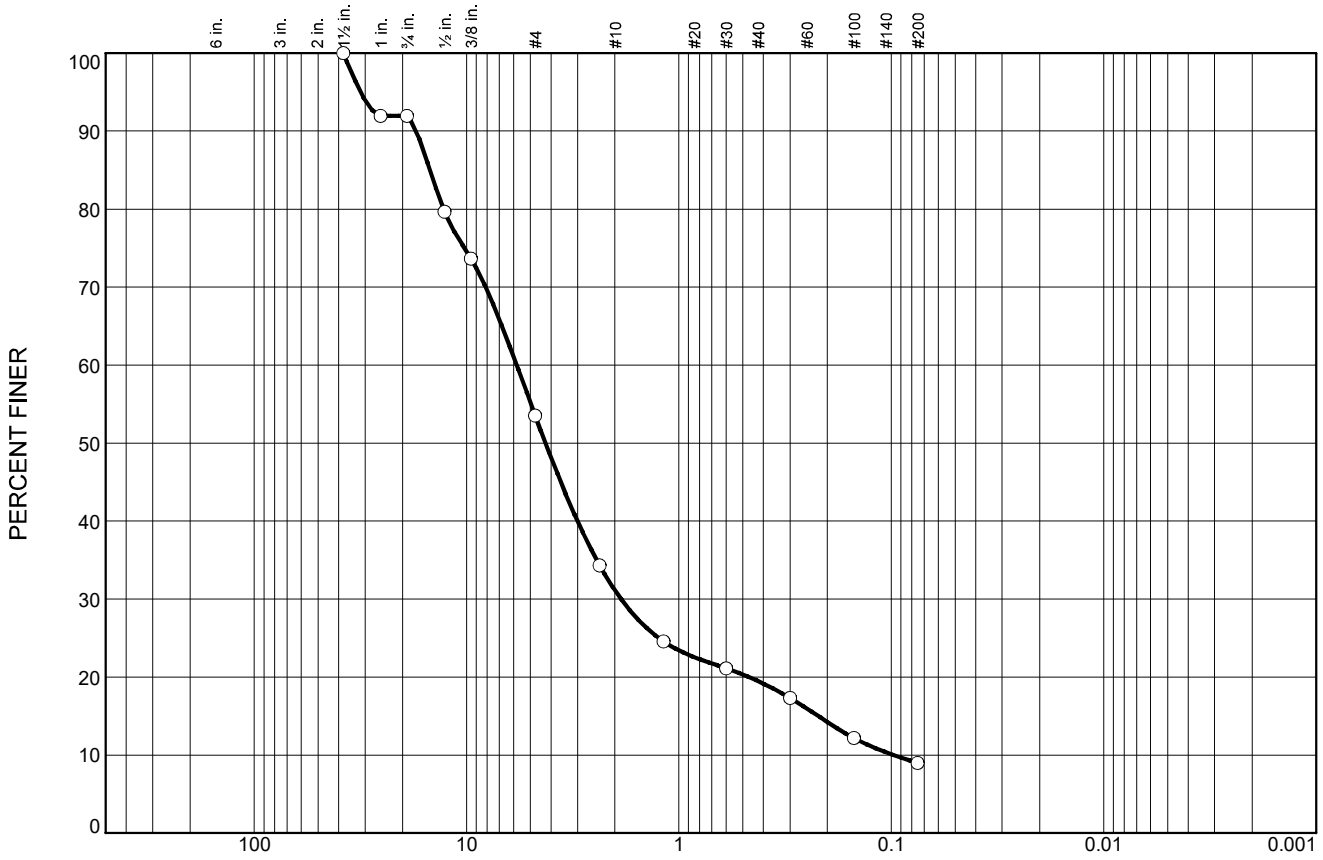
Job No: 6498.12.PW.2 | Date: DEC 2020

SOIL CLASSIFICATION AND KEY TO TEST DATA

Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
11

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	8.0	38.5	22.4	11.6	10.5	9.0	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	SD-4		5.5'	Brown Sand W/ Clay & Gravel (SP-SC)	SP-SC

Project: Mills Lane Storm Drain Improvements

Project No.: 6948.12.PW.2 Figure

Tested By: SAM Checked By: SCW

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Job No: 6498.12.PW.2 Date: DEC 2020

PARTICLE SIZE ANALYSIS
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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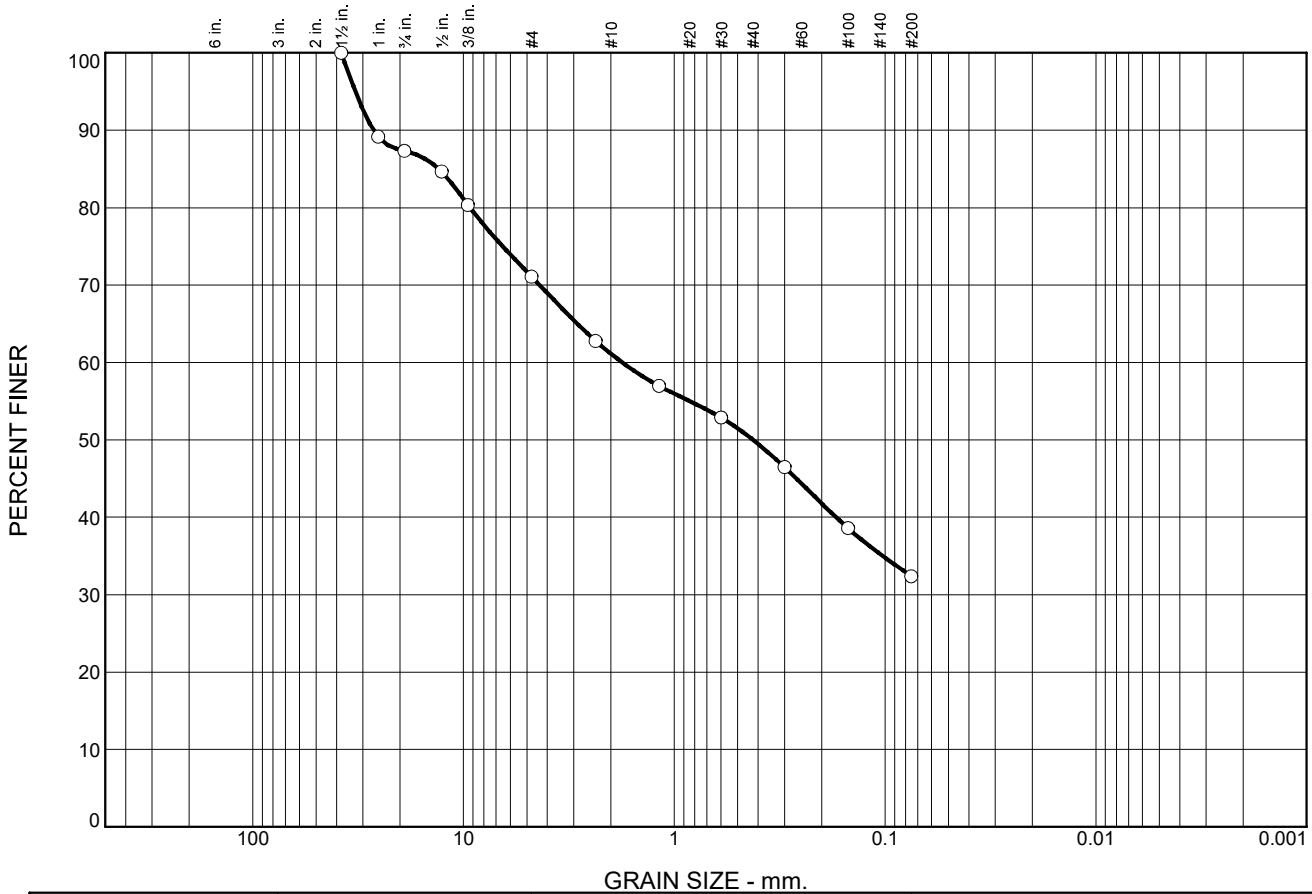
Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	12.7	16.2	10.0	11.1	17.6	32.4	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	SD-5		7.5' + 8.0'	Brown Clayey Sand W/ Gravel (SC)	SC

Project: Mills Lane Storm Drain Improvements

Project No.: 6948.12.PW.2 Figure

Tested By: SAM Checked By: SCW

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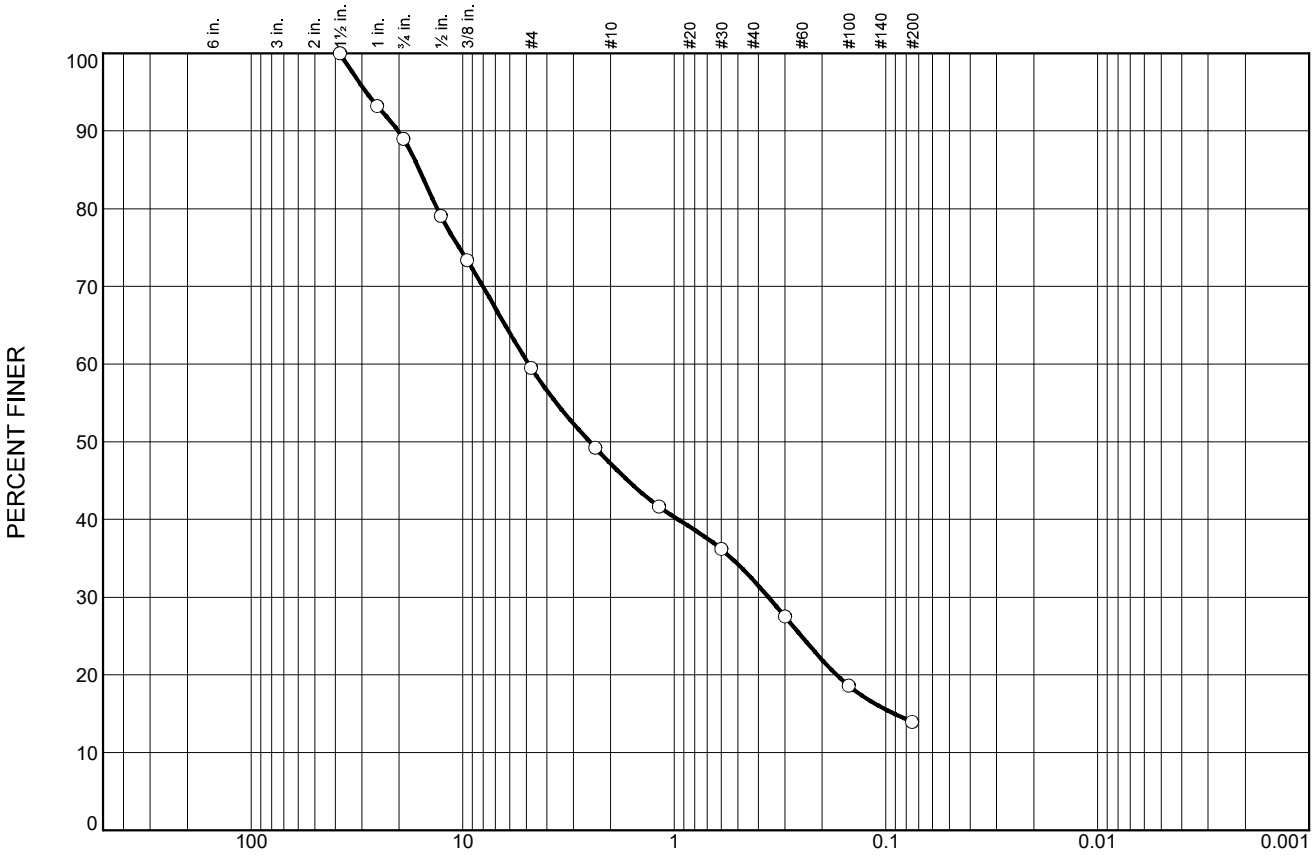
Job No: 6498.12.PW.2 Date: DEC 2020

PARTICLE SIZE ANALYSIS
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
13

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	11.0	29.5	12.3	14.9	18.4	13.9	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	SD-5		13.0' + 14.0'	Brown Clayey Sand W/ Gravel (SC)	SC

Client:

Project: Mills Lane Storm Drain Improvements

Project No.: 6948.12.PW.2 Figure

Tested By: SAM Checked By: SCW

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Job No: 6498.12.PW.2 Date: DEC 2020

PARTICLE SIZE ANALYSIS

Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE

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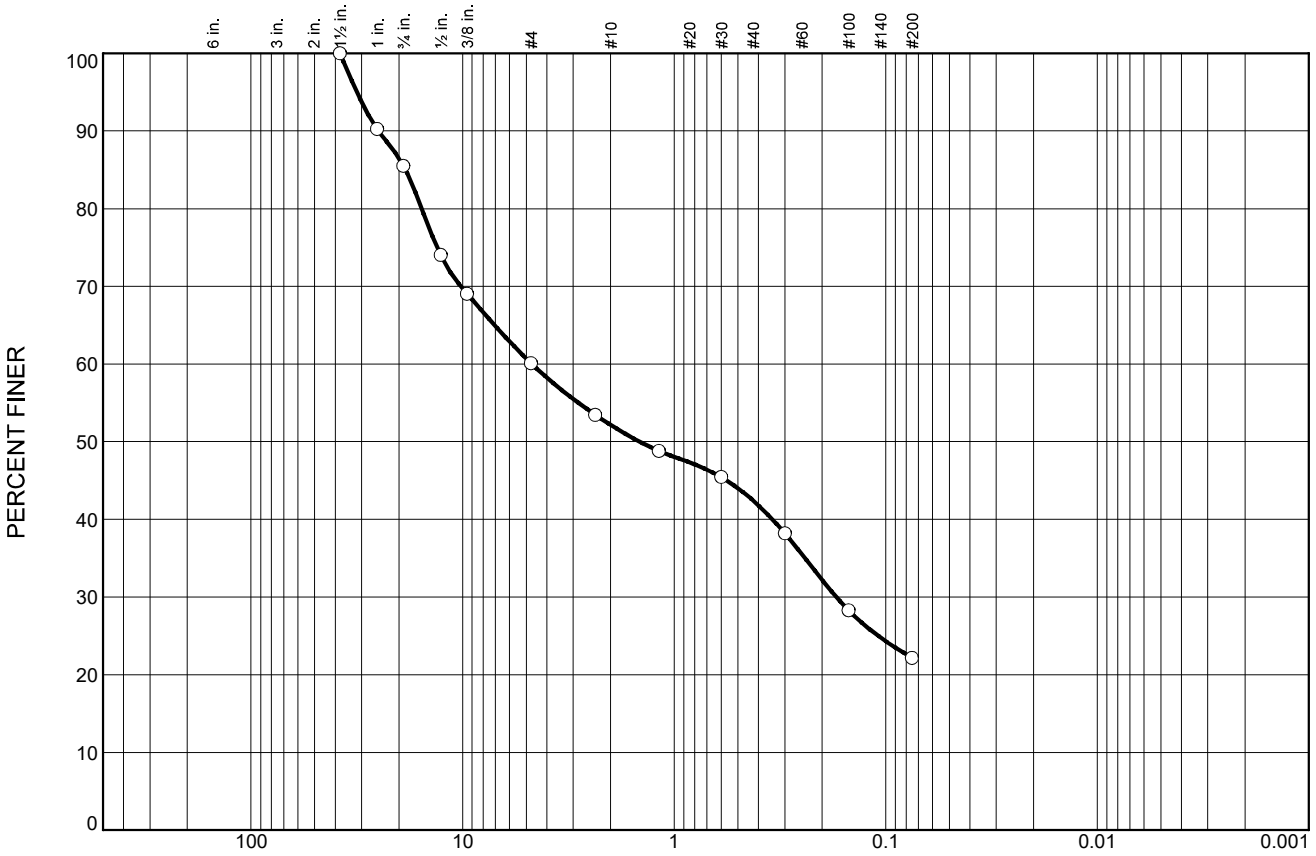
Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	14.5	25.4	7.9	9.7	20.3	22.2	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	SD-6		7.5' + 8.0'	Brown Clayey Sand W/ Gravel (SC)	SC

Project: Mills Lane Storm Drain Improvements

Project No.: 6948.12.PW.2 Figure

Tested By: SAM Checked By: SCW

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Job No: 6498.12.PW.2 Date: DEC 2020

PARTICLE SIZE ANALYSIS
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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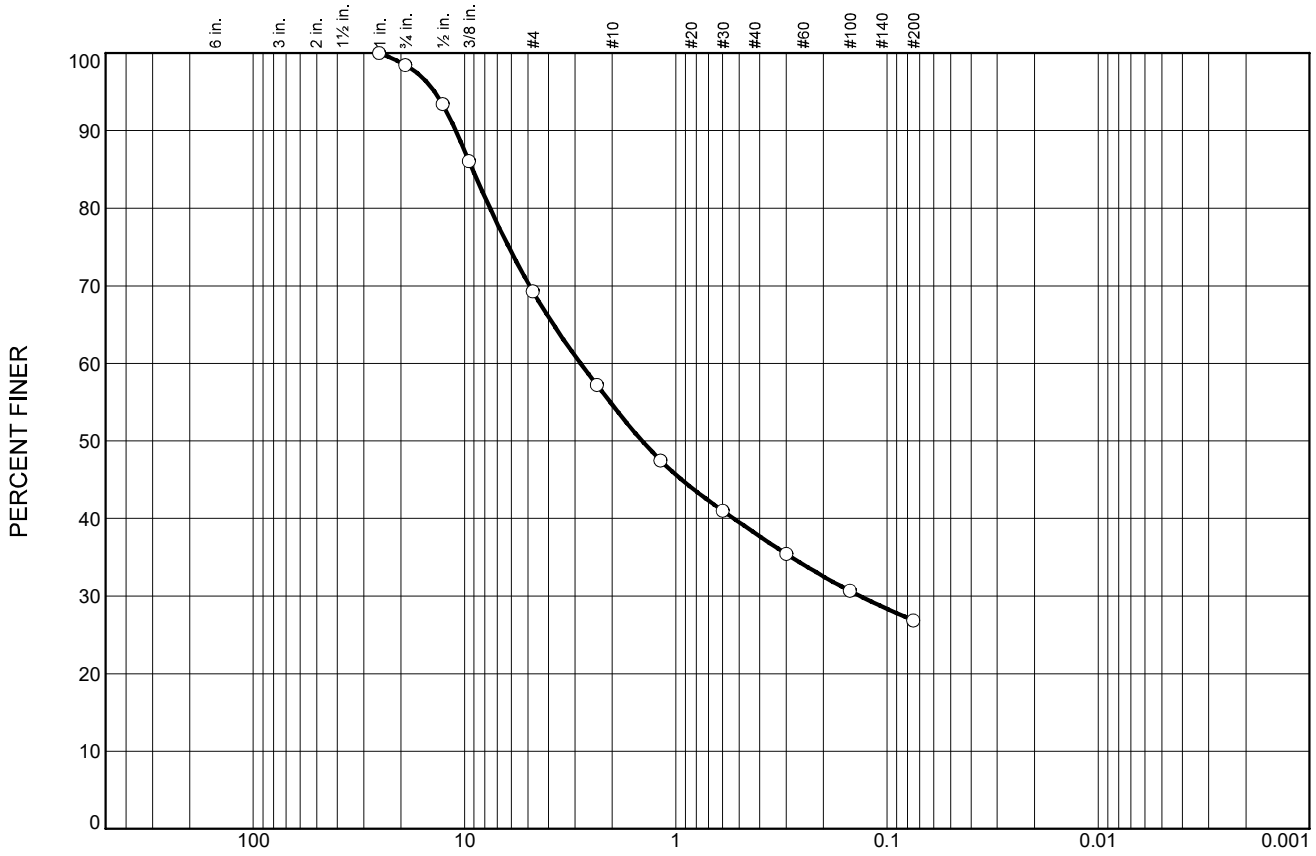
Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	1.5	29.2	14.6	16.5	11.3	26.9	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	SD-7		19.0'	Brown Clayey Sand W/ Gravel (SC)	SC

Project: Mills Lane Storm Drain Improvements

Project No.: 6948.12.PW.2 Figure

Tested By: SAM Checked By: SCW

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Job No: 6498.12.PW.2 Date: DEC 2020

PARTICLE SIZE ANALYSIS
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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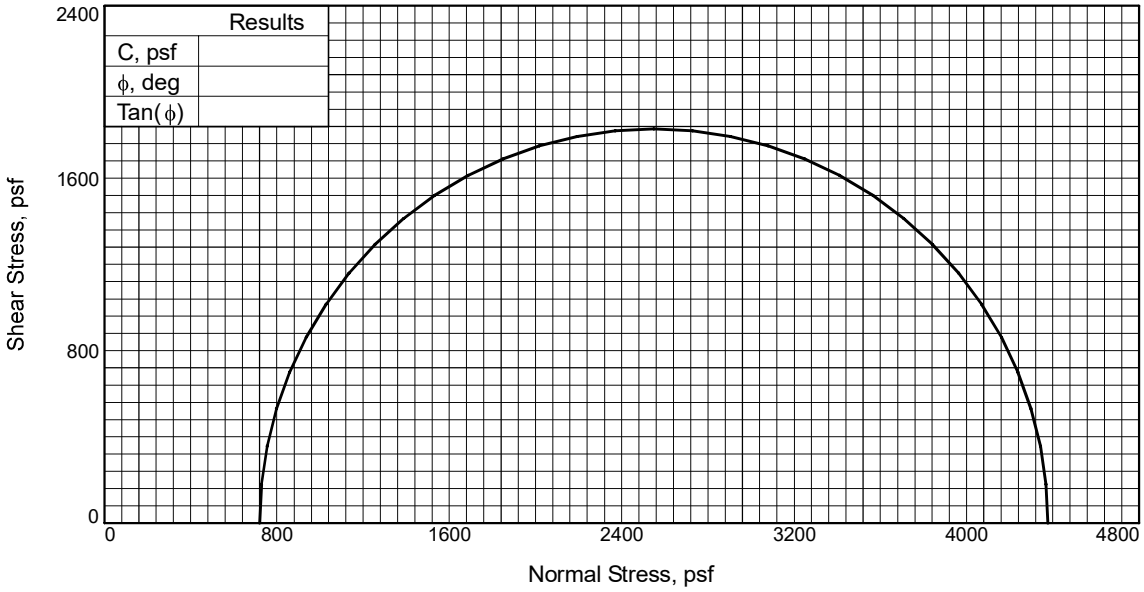

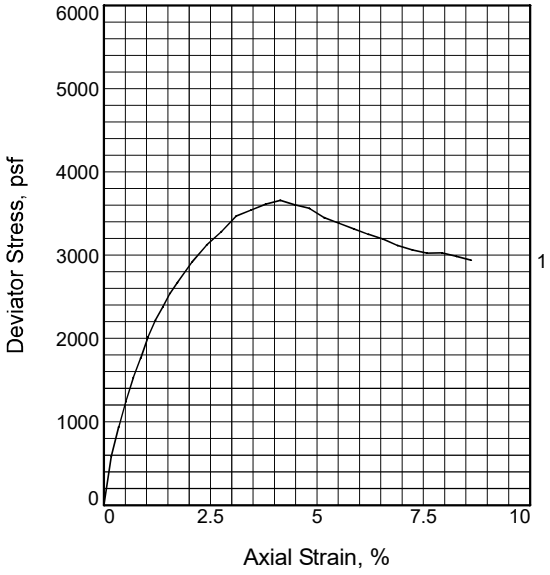

Sample No.		1
Initial	Water Content, %	16.8
	Dry Density, pcf	105.2
	Saturation, %	75.5
	Void Ratio	0.6027
	Diameter, in.	2.40
	Height, in.	5.80
At Test	Water Content, %	16.8
	Dry Density, pcf	105.2
	Saturation, %	75.5
	Void Ratio	0.6027
	Diameter, in.	2.40
	Height, in.	5.80
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		3657
Strain, %		4.1
Ult. Stress, psf		3657
Strain, %		4.1
σ_1 Failure, psf		4377
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Clayey Sand (SC)

Assumed Specific Gravity= 2.70

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-1 Depth: 2.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SAA Checked By: SCW

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Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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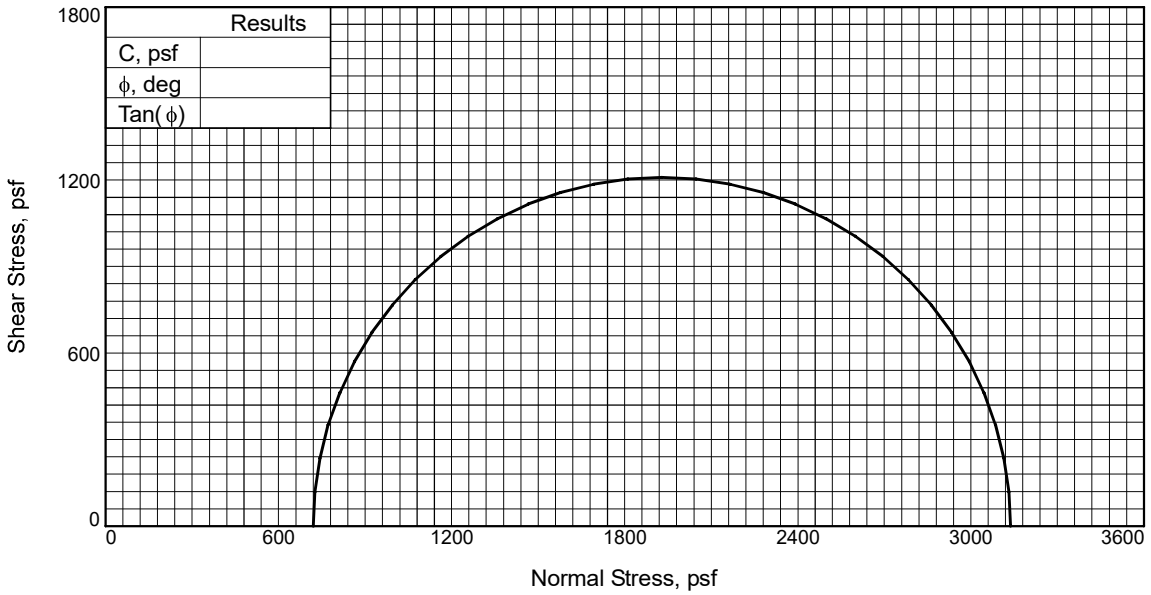

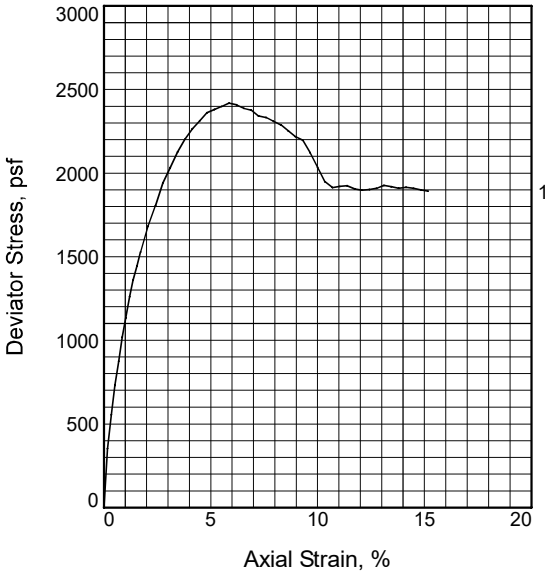

Sample No.		1
Initial	Water Content, %	17.9
	Dry Density, pcf	110.5
	Saturation, %	92.1
	Void Ratio	0.5250
	Diameter, in.	2.40
	Height, in.	5.80
At Test	Water Content, %	17.9
	Dry Density, pcf	110.5
	Saturation, %	92.1
	Void Ratio	0.5250
	Diameter, in.	2.40
	Height, in.	5.80
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		2417
Strain, %		5.9
Ult. Stress, psf		2417
Strain, %		5.9
σ_1 Failure, psf		3137
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Sandy Clay (CL)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-1 Depth: 6.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SAM Checked By: SCW

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Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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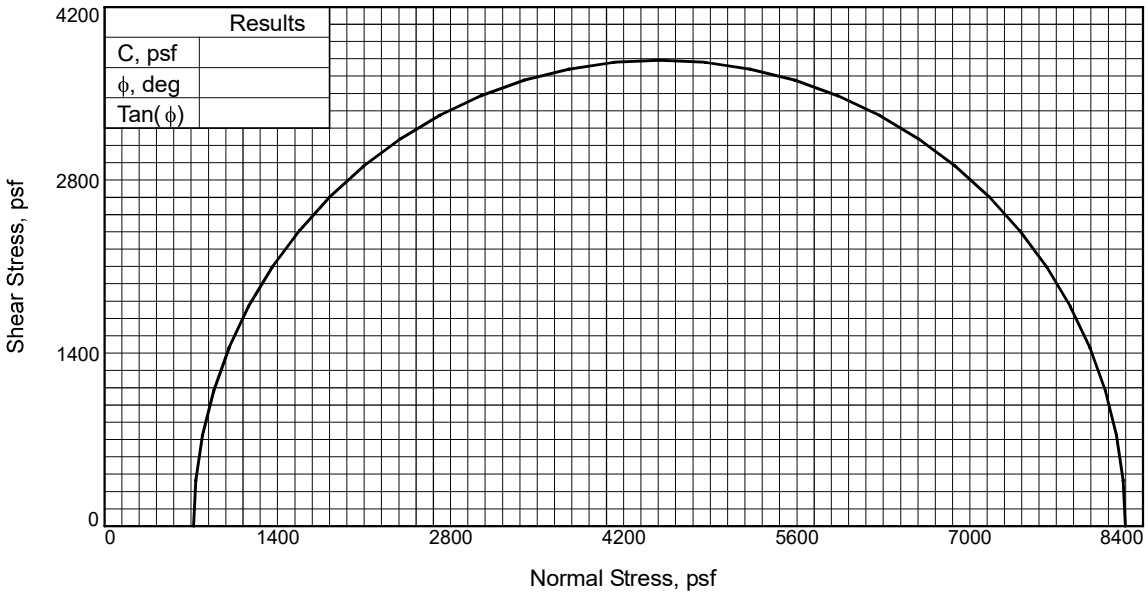

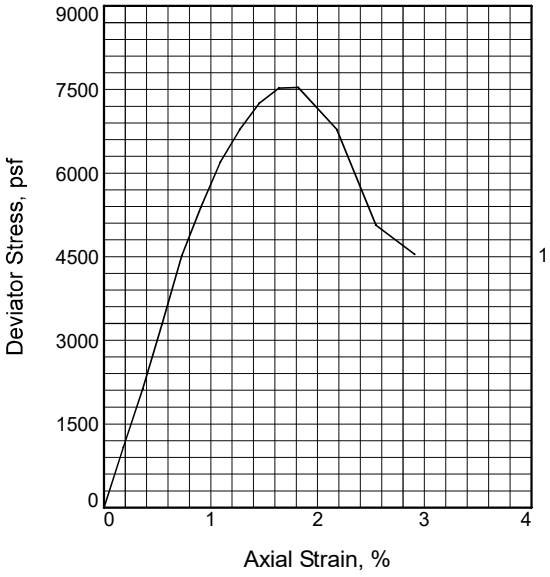

Sample No.		1
Initial	Water Content, %	12.5
	Dry Density, pcf	109.9
	Saturation, %	63.3
	Void Ratio	0.5337
	Diameter, in.	2.42
	Height, in.	5.50
At Test	Water Content, %	12.5
	Dry Density, pcf	109.9
	Saturation, %	63.3
	Void Ratio	0.5337
	Diameter, in.	2.42
	Height, in.	5.50
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		7539
Strain, %		1.8
Ult. Stress, psf		7539
Strain, %		1.8
σ_1 Failure, psf		8259
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Sand W/ Clay (SP-SC)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-2 Depth: 2.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SAM Checked By: SCW

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Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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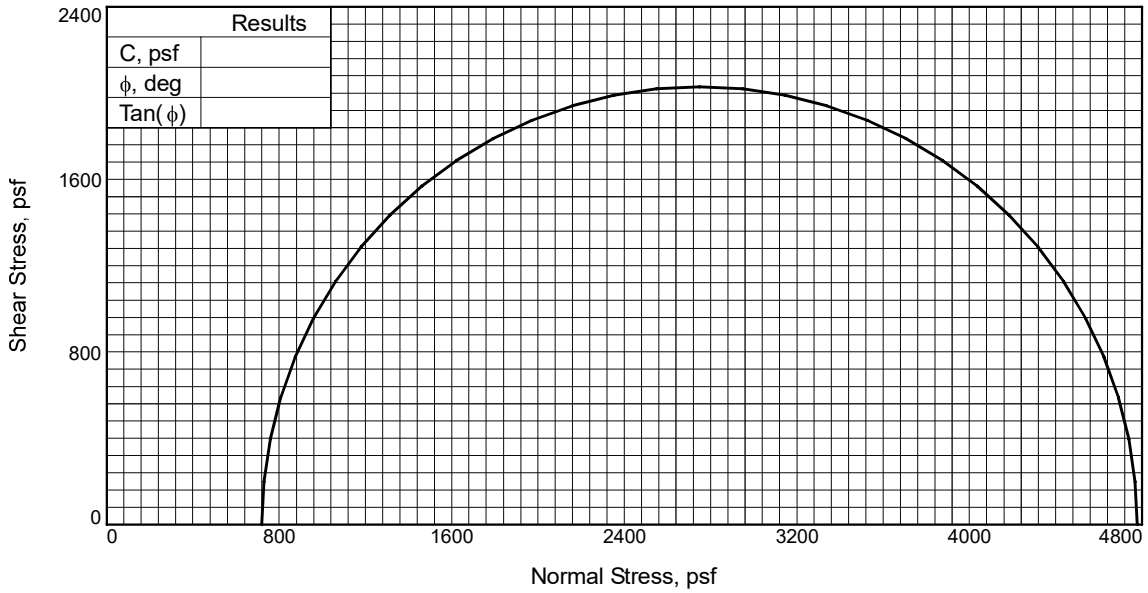

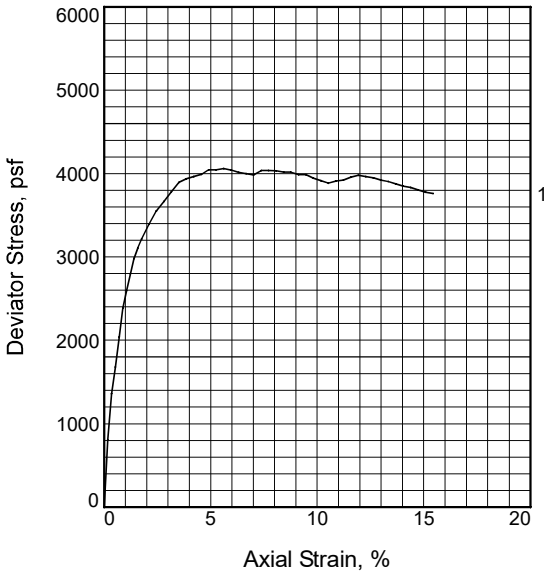

Sample No.		1
Initial	Water Content, %	17.9
	Dry Density, pcf	108.0
	Saturation, %	86.4
	Void Ratio	0.5604
	Diameter, in.	2.40
	Height, in.	5.70
At Test	Water Content, %	20.8
	Dry Density, pcf	108.0
	Saturation, %	100.0
	Void Ratio	0.5604
	Diameter, in.	2.40
	Height, in.	5.70
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		4058
Strain, %		5.6
Ult. Stress, psf		4058
Strain, %		5.6
σ_1 Failure, psf		4778
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Clayey Sand (SC)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-2 Depth: 6.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SAA Checked By: SCW

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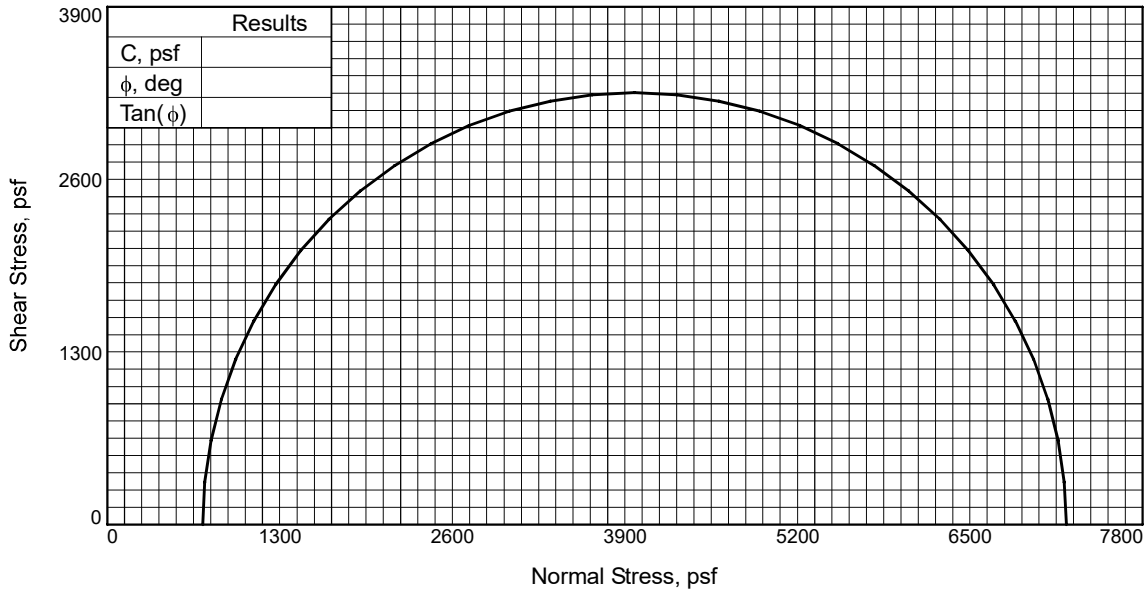
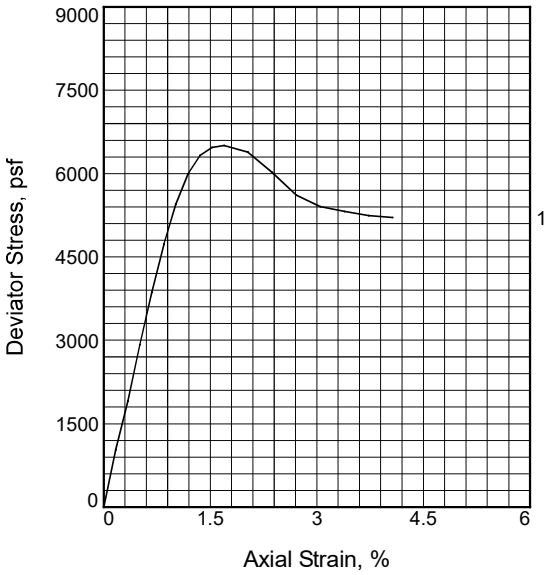
Job No: 6498.12.PW.2 Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
20





Sample No.		1
Initial	Water Content, %	9.4
	Dry Density, pcf	120.1
	Saturation, %	62.6
	Void Ratio	0.4039
	Diameter, in.	2.40
	Height, in.	5.90
At Test	Water Content, %	9.4
	Dry Density, pcf	120.1
	Saturation, %	62.6
	Void Ratio	0.4039
	Diameter, in.	2.40
	Height, in.	5.90
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		6506
Strain, %		1.7
Ult. Stress, psf		6506
Strain, %		1.7
σ_1 Failure, psf		7226
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Sandy Clay (CH)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-3 Depth: 2.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SAA Checked By: SCW

RGH CONSULTANTS

Job No: 6498.12.PW.2 Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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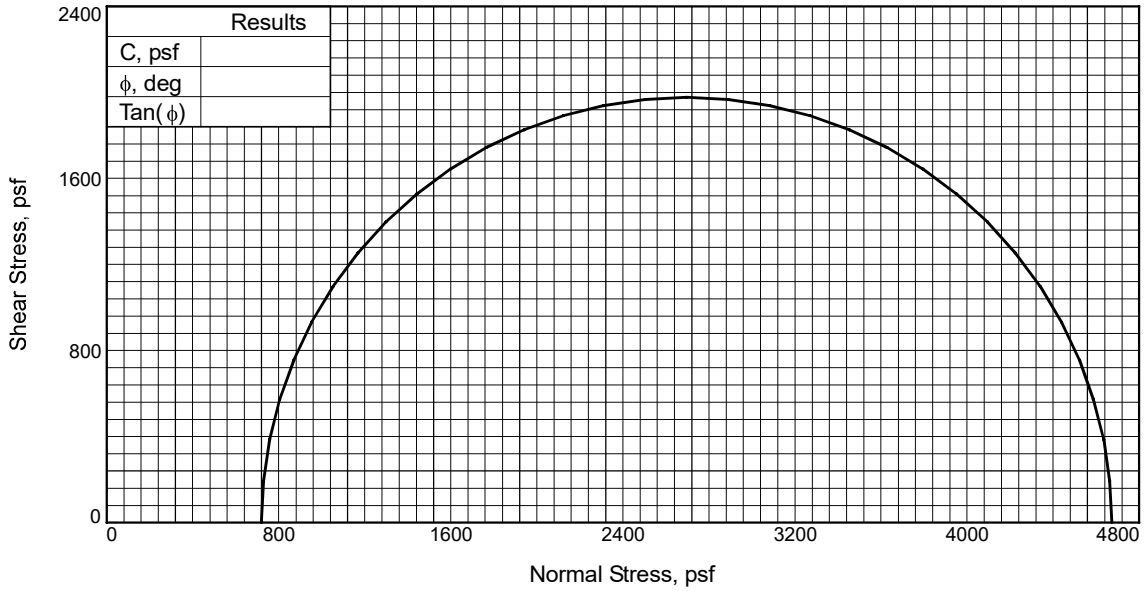

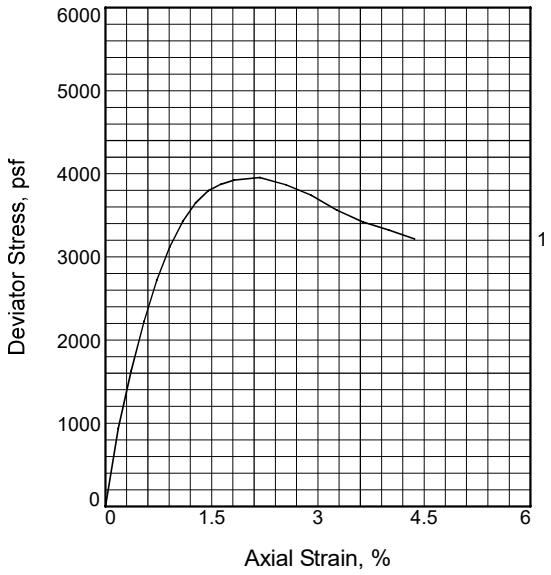

Sample No.		1
Initial	Water Content, %	11.0
	Dry Density, pcf	116.8
	Saturation, %	67.1
	Void Ratio	0.4428
	Diameter, in.	2.42
	Height, in.	5.50
At Test	Water Content, %	11.0
	Dry Density, pcf	116.8
	Saturation, %	67.1
	Void Ratio	0.4428
	Diameter, in.	2.42
	Height, in.	5.50
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		3953
Strain, %		2.2
Ult. Stress, psf		3953
Strain, %		2.2
σ_1 Failure, psf		4673
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Dark Brown Clayey Sand W/ Gravel (SC)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-3 Depth: 6.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SCW Checked By: SAM

RGH CONSULTANTS

Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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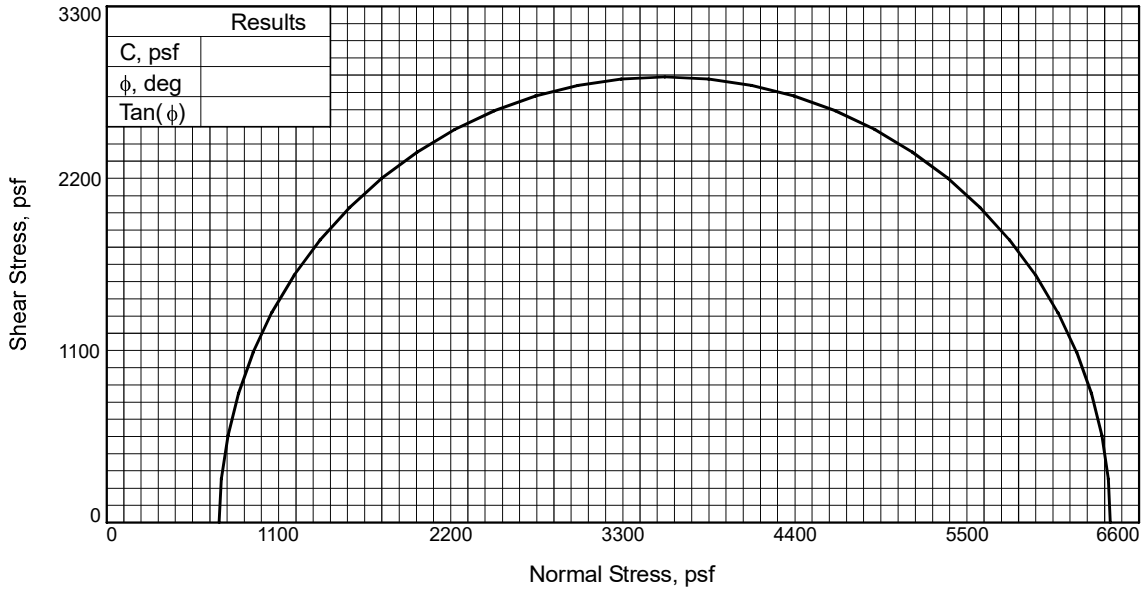

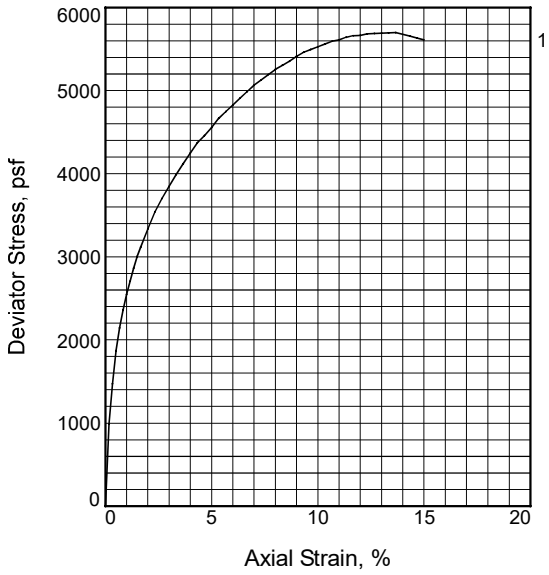

Sample No.		1
Initial	Water Content, %	22.5
	Dry Density, pcf	104.9
	Saturation, %	99.9
	Void Ratio	0.6071
	Diameter, in.	2.39
	Height, in.	6.00
At Test	Water Content, %	22.5
	Dry Density, pcf	104.9
	Saturation, %	99.9
	Void Ratio	0.6071
	Diameter, in.	2.39
	Height, in.	6.00
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		5698
Strain, %		13.7
Ult. Stress, psf		5698
Strain, %		13.7
σ_1 Failure, psf		6418
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Clay W/ Sand (CH)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-4 Depth: 10.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SAM Checked By: SCW

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Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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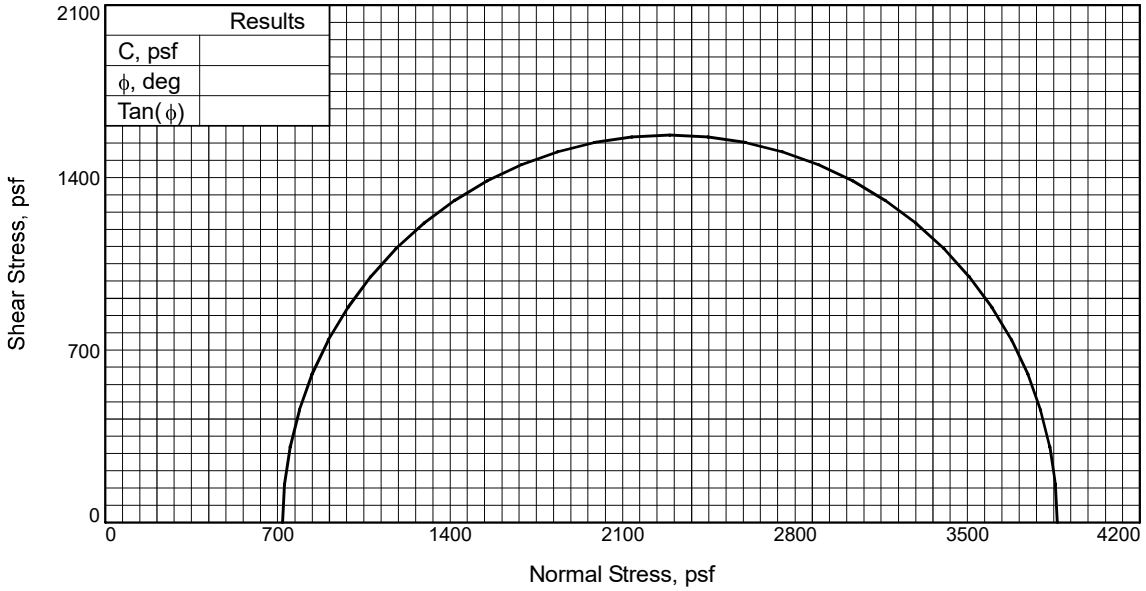

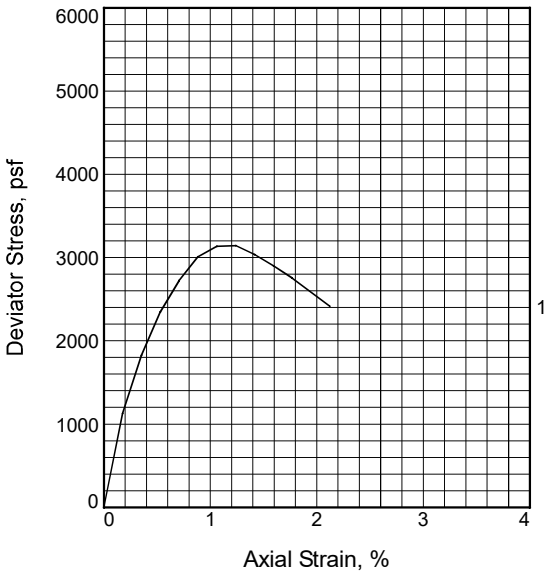

Sample No.		1
Initial	Water Content, %	10.1
	Dry Density, pcf	87.0
	Saturation, %	28.9
	Void Ratio	0.9380
	Diameter, in.	2.40
	Height, in.	5.65
At Test	Water Content, %	10.1
	Dry Density, pcf	87.0
	Saturation, %	28.9
	Void Ratio	0.9380
	Diameter, in.	2.40
	Height, in.	5.65
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		3145
Strain, %		1.2
Ult. Stress, psf		3145
Strain, %		1.2
σ_1 Failure, psf		3865
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Silty Sand (SM)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-5 Depth: 3.5'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SAA Checked By: SCW

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Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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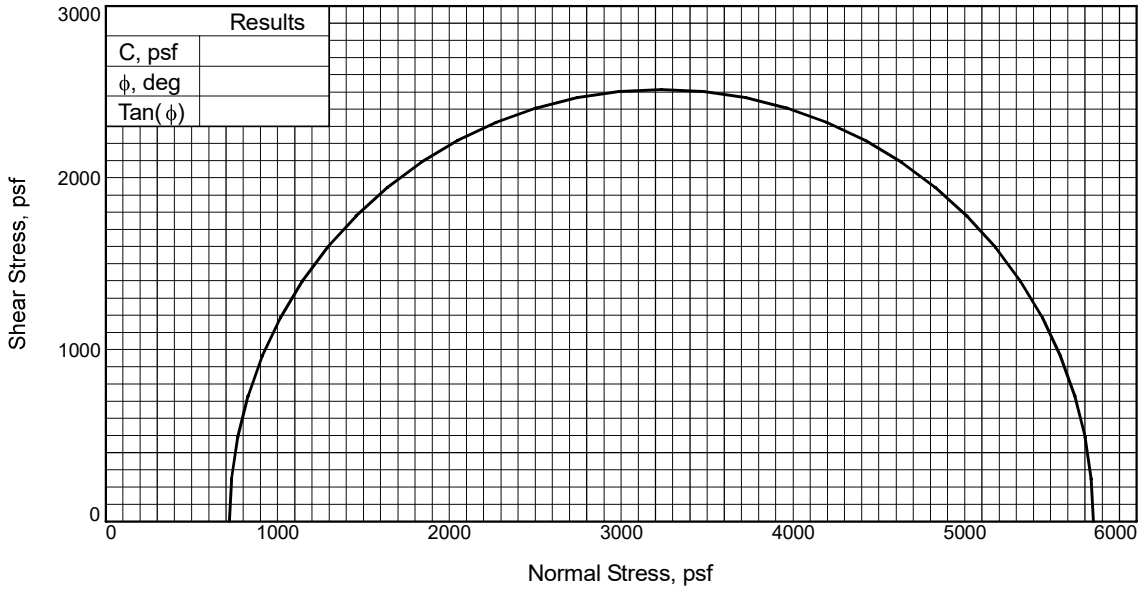

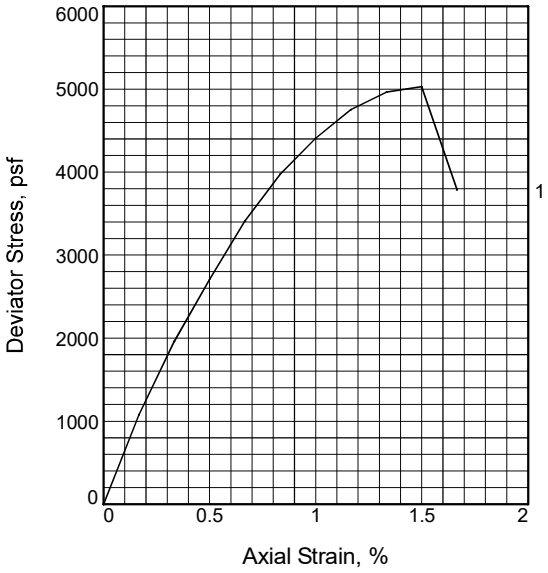

Sample No.		1
Initial	Water Content, %	12.1
	Dry Density, pcf	100.0
	Saturation, %	47.6
	Void Ratio	0.6863
	Diameter, in.	2.39
	Height, in.	6.00
At Test	Water Content, %	12.1
	Dry Density, pcf	100.0
	Saturation, %	47.6
	Void Ratio	0.6863
	Diameter, in.	2.39
	Height, in.	6.00
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		5028
Strain, %		1.5
Ult. Stress, psf		5028
Strain, %		1.5
σ_1 Failure, psf		5748
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Sandy Clay (CL)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-5 Depth: 5.5'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SCW Checked By: SAM

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Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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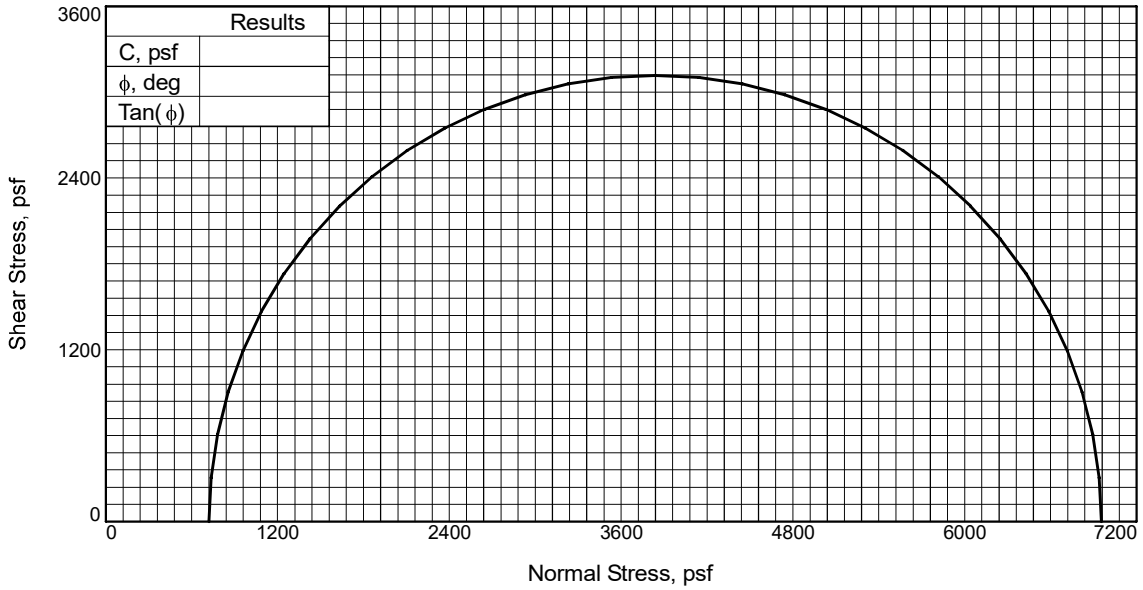

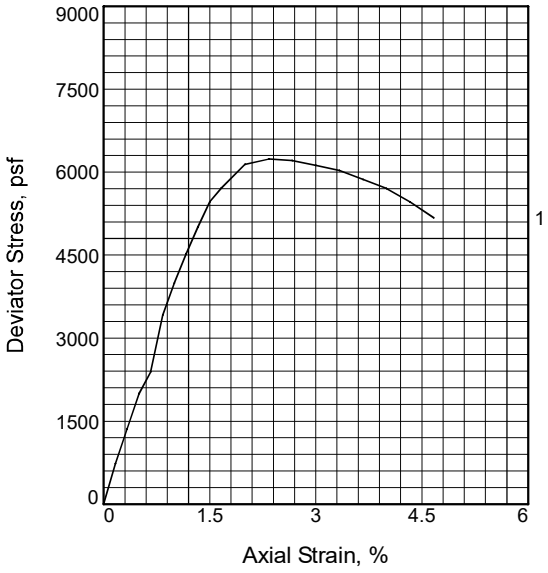

Sample No.		1
Initial	Water Content, %	11.3
	Dry Density, pcf	86.5
	Saturation, %	32.1
	Void Ratio	0.9481
	Diameter, in.	2.40
	Height, in.	6.00
At Test	Water Content, %	11.3
	Dry Density, pcf	86.5
	Saturation, %	32.1
	Void Ratio	0.9481
	Diameter, in.	2.40
	Height, in.	6.00
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		6234
Strain, %		2.3
Ult. Stress, psf		6234
Strain, %		2.3
σ_1 Failure, psf		6954
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Clayey Sand (SC)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-6 Depth: 2.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SAA Checked By: SCW

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Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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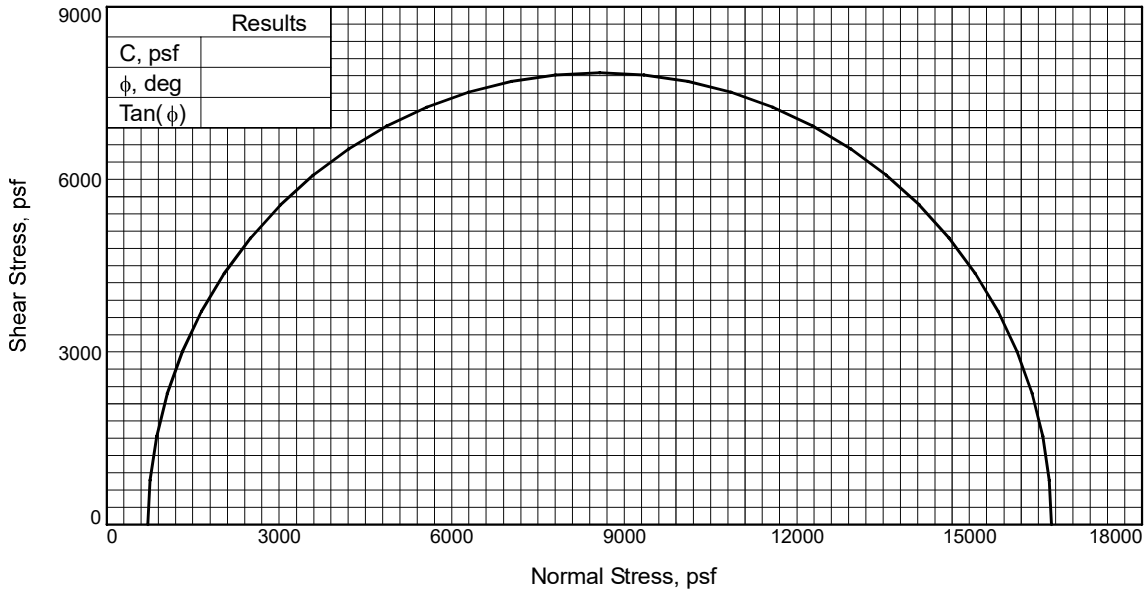

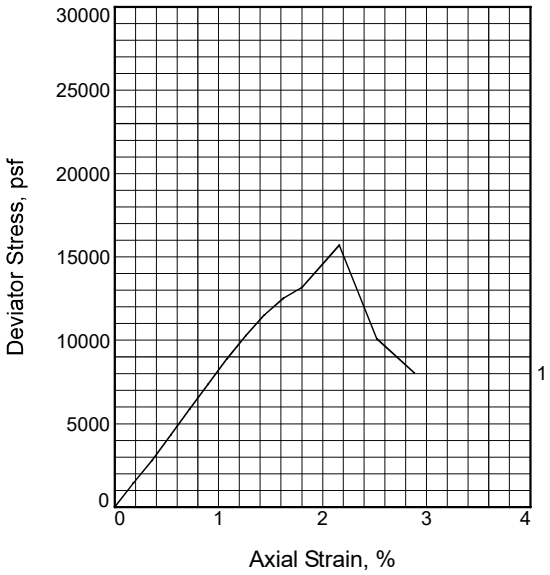

Sample No.		1
Initial	Water Content, %	12.8
	Dry Density, pcf	116.7
	Saturation, %	77.5
	Void Ratio	0.4446
	Diameter, in.	2.39
	Height, in.	5.55
At Test	Water Content, %	12.8
	Dry Density, pcf	116.7
	Saturation, %	77.5
	Void Ratio	0.4446
	Diameter, in.	2.39
	Height, in.	5.55
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		15708
Strain, %		2.2
Ult. Stress, psf		15708
Strain, %		2.2
σ_1 Failure, psf		16428
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Clayey Sand (SC)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-6 Depth: 13.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SAM Checked By: SCW

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Job No: 6498.12.PW.2 Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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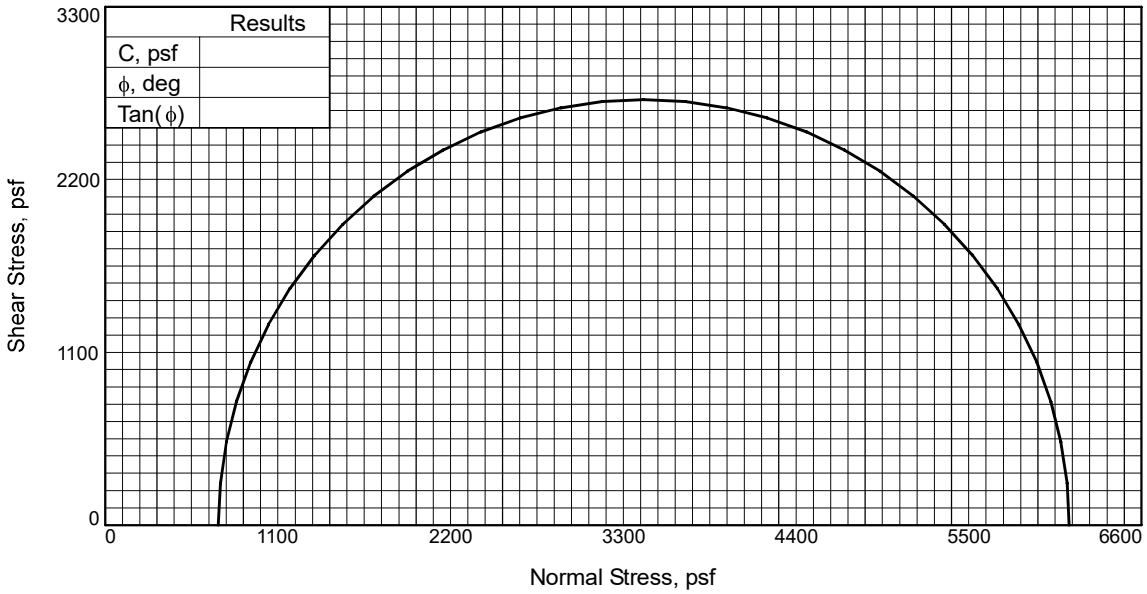

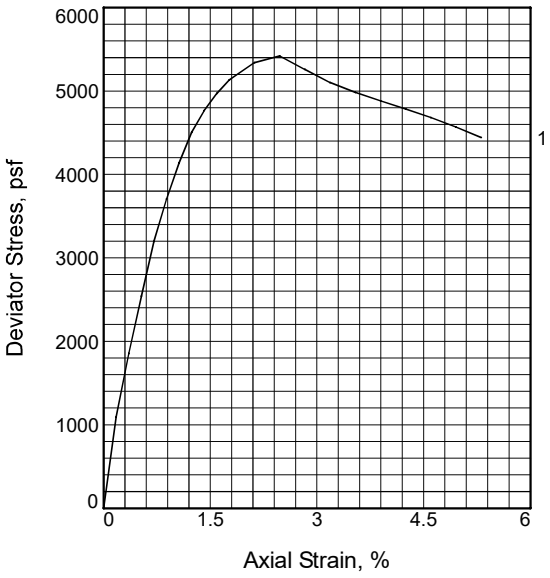

Sample No.		1
Initial	Water Content, %	12.7
	Dry Density, pcf	88.1
	Saturation, %	37.5
	Void Ratio	0.9129
	Diameter, in.	2.42
	Height, in.	5.65
At Test	Water Content, %	12.7
	Dry Density, pcf	88.1
	Saturation, %	37.5
	Void Ratio	0.9129
	Diameter, in.	2.42
	Height, in.	5.65
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		5419
Strain, %		2.5
Ult. Stress, psf		5419
Strain, %		2.5
σ_1 Failure, psf		6139
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Sandy Silt (ML)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-7 Depth: 4.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SCW Checked By: SAM

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Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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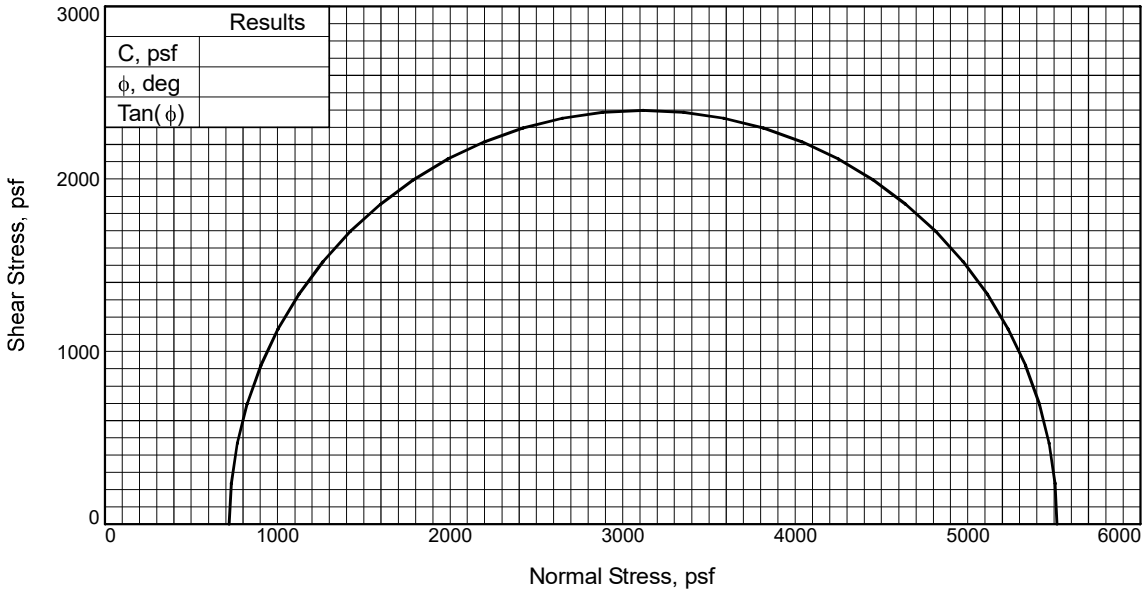

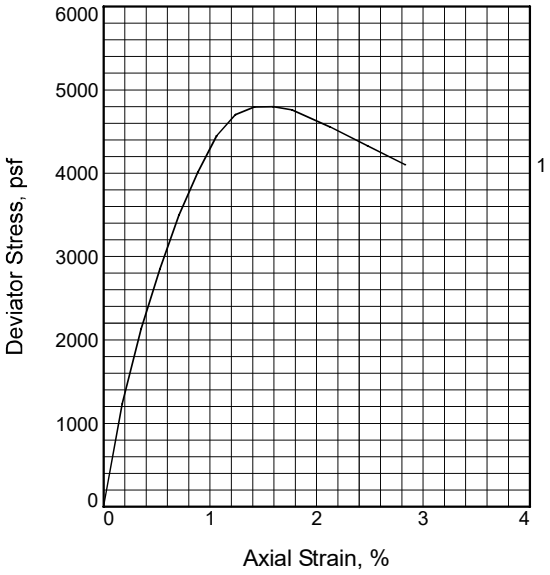

Sample No.		1
Initial	Water Content, %	12.7
	Dry Density, pcf	97.1
	Saturation, %	46.7
	Void Ratio	0.7359
	Diameter, in.	2.41
	Height, in.	5.65
At Test	Water Content, %	12.7
	Dry Density, pcf	97.1
	Saturation, %	46.7
	Void Ratio	0.7359
	Diameter, in.	2.41
	Height, in.	5.65
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		4797
Strain, %		1.6
Ult. Stress, psf		4797
Strain, %		1.6
σ_1 Failure, psf		5517
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Dark Brown Sandy Clay (CL)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-7 Depth: 6.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SCW Checked By: SAM

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Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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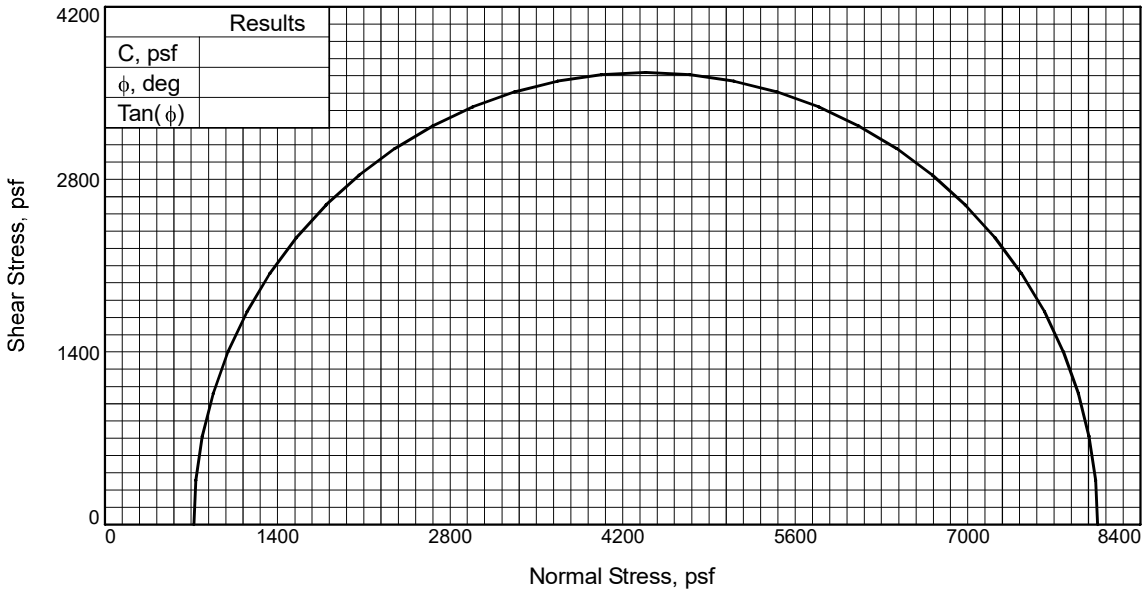

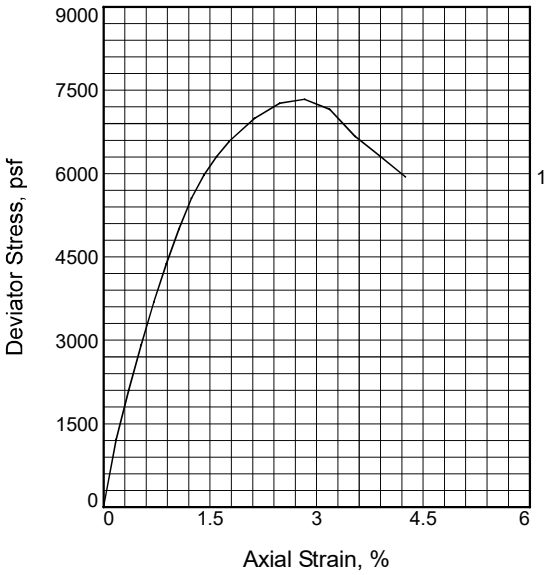

Sample No.		1
Initial	Water Content, %	17.5
	Dry Density, pcf	106.8
	Saturation, %	81.7
	Void Ratio	0.5787
	Diameter, in.	2.42
	Height, in.	5.65
At Test	Water Content, %	17.5
	Dry Density, pcf	106.8
	Saturation, %	81.7
	Void Ratio	0.5787
	Diameter, in.	2.42
	Height, in.	5.65
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		7334
Strain, %		2.8
Ult. Stress, psf		7334
Strain, %		2.8
σ_1 Failure, psf		8054
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Sandy Clay (CL)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-7 Depth: 9.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SCW Checked By: SAM

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Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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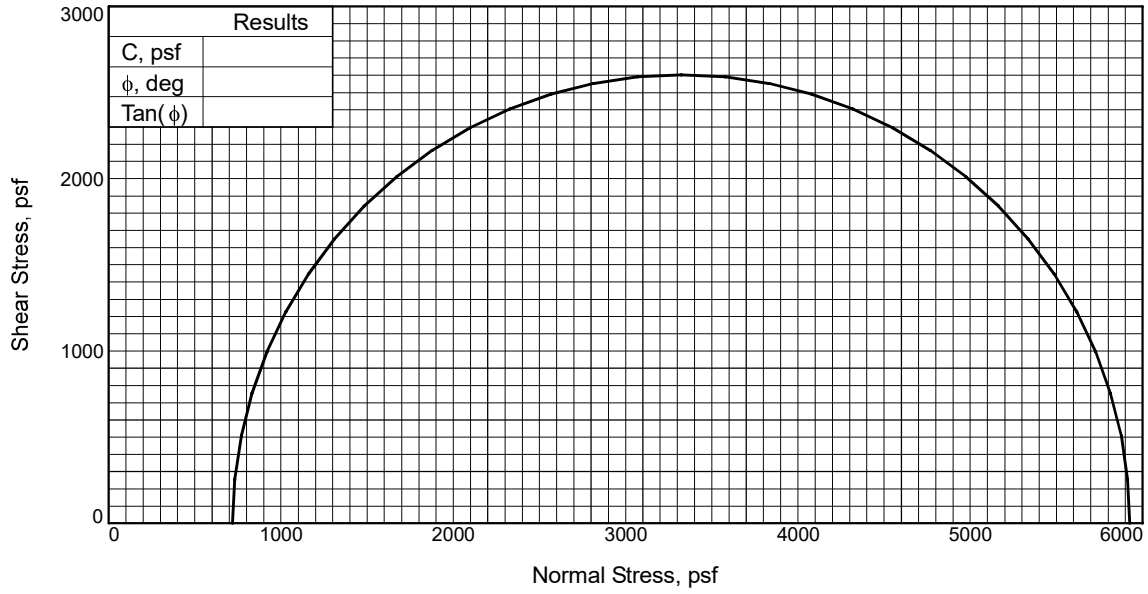

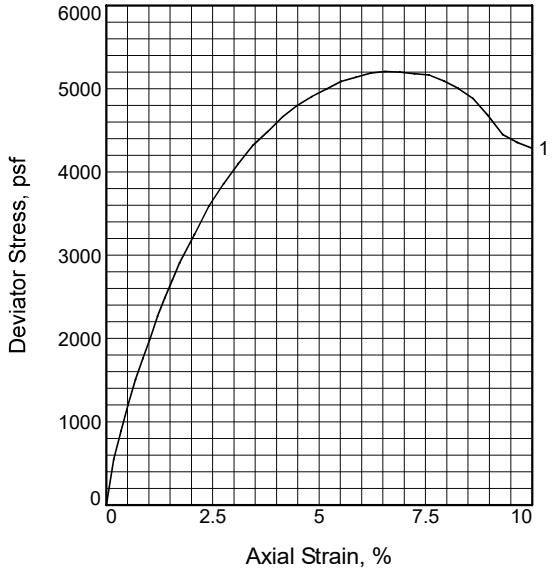

Sample No.		1
Initial	Water Content, %	19.1
	Dry Density, pcf	105.6
	Saturation, %	86.6
	Void Ratio	0.5960
	Diameter, in.	2.42
	Height, in.	5.80
At Test	Water Content, %	19.1
	Dry Density, pcf	105.6
	Saturation, %	86.6
	Void Ratio	0.5960
	Diameter, in.	2.42
	Height, in.	5.80
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		5206
Strain, %		6.6
Ult. Stress, psf		5206
Strain, %		6.6
σ_1 Failure, psf		5926
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Clayey Sand (SC)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-7 Depth: 14.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SAM Checked By: SCW

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Job No: 6498.12.PW.2 Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
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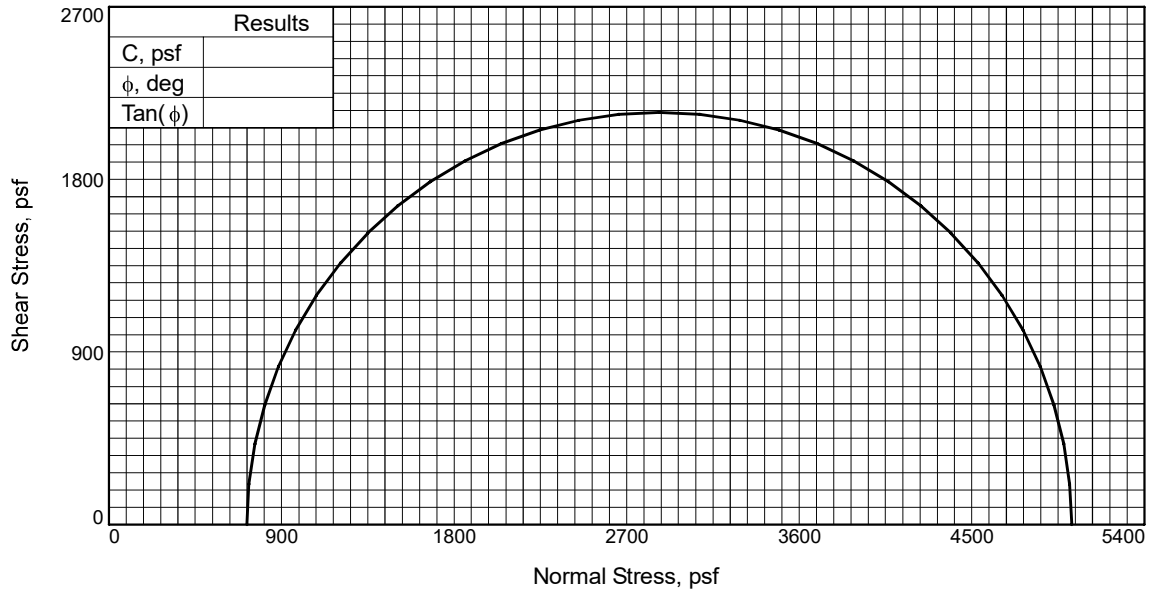
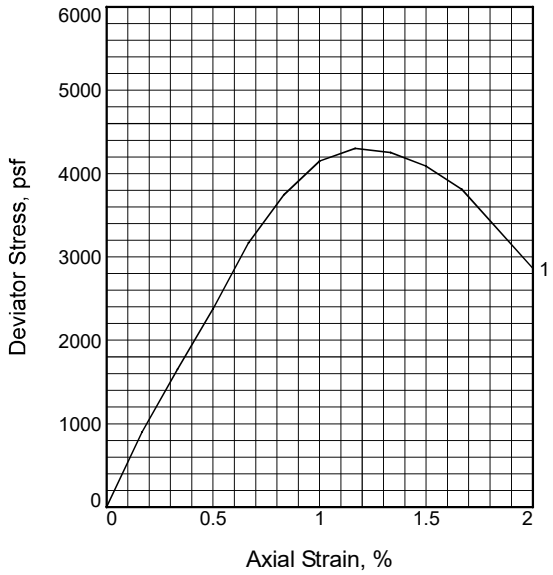




Sample No.		1
Initial	Water Content, %	12.6
	Dry Density, pcf	105.0
	Saturation, %	56.2
	Void Ratio	0.6050
	Diameter, in.	2.43
	Height, in.	6.00
At Test	Water Content, %	12.6
	Dry Density, pcf	105.0
	Saturation, %	56.2
	Void Ratio	0.6050
	Diameter, in.	2.43
	Height, in.	6.00
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		4301
Strain, %		1.2
Ult. Stress, psf		4301
Strain, %		1.2
σ_1 Failure, psf		5021
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Silty Sand (SM)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-8 Depth: 4.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

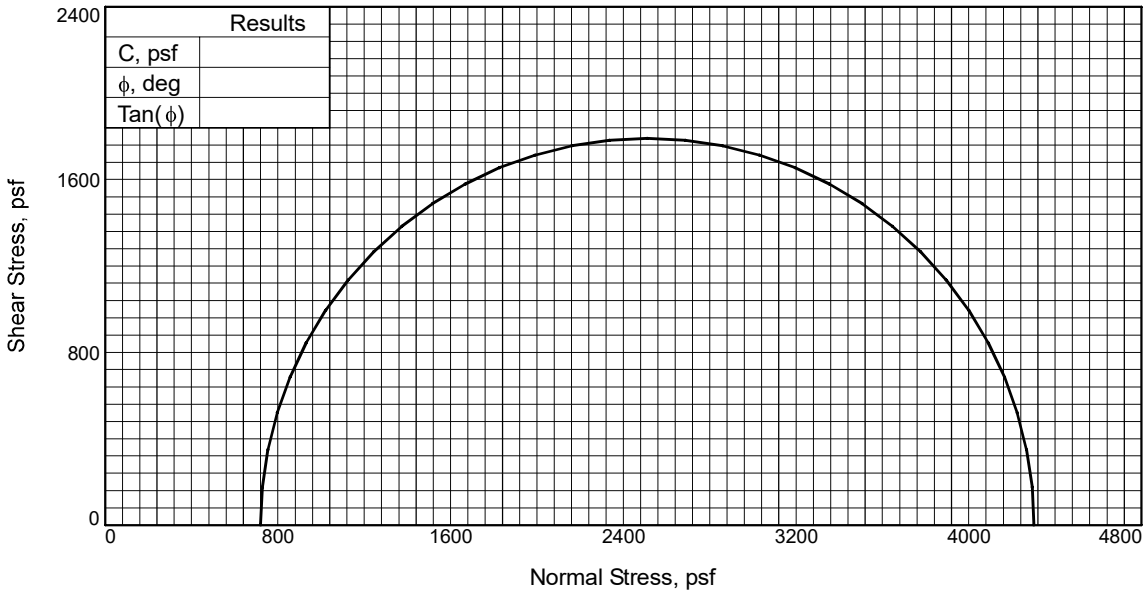
Tested By: SAM Checked By: SCW

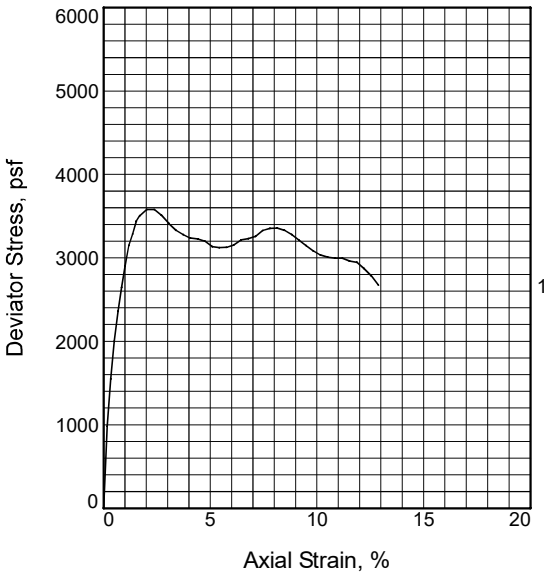
RGH CONSULTANTS

Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
32





Sample No.		1
Initial	Water Content, %	11.6
	Dry Density, pcf	97.8
	Saturation, %	43.2
	Void Ratio	0.7229
	Diameter, in.	2.40
	Height, in.	5.90
At Test	Water Content, %	11.6
	Dry Density, pcf	97.8
	Saturation, %	43.2
	Void Ratio	0.7229
	Diameter, in.	2.40
	Height, in.	5.90
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		3581
Strain, %		2.4
Ult. Stress, psf		3581
Strain, %		2.4
σ_1 Failure, psf		4301
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Silty Sand (SM)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-8 Depth: 6.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

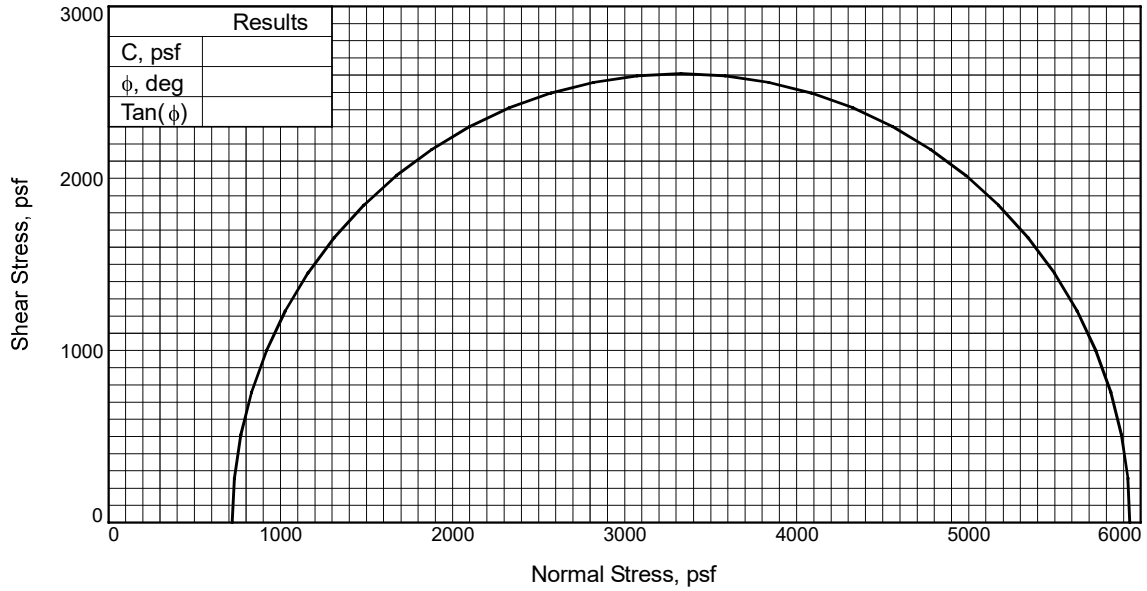
Tested By: SAA Checked By: SCW

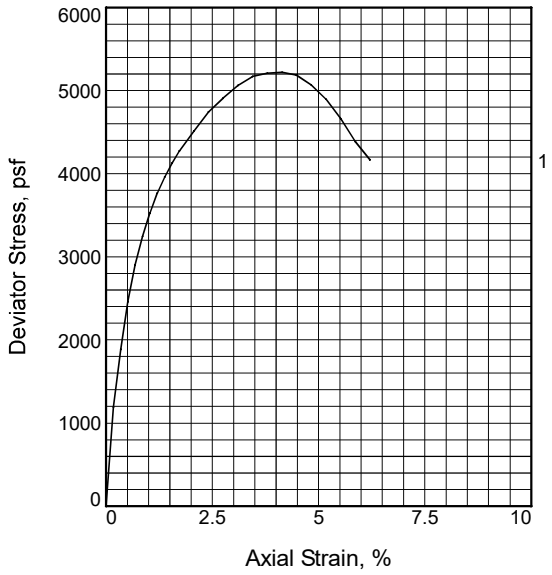
RGH CONSULTANTS

Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
33





Sample No.		1
Initial	Water Content, %	16.7
	Dry Density, pcf	111.8
	Saturation, %	89.0
	Void Ratio	0.5080
	Diameter, in.	2.41
	Height, in.	5.80
At Test	Water Content, %	16.7
	Dry Density, pcf	111.8
	Saturation, %	89.0
	Void Ratio	0.5080
	Diameter, in.	2.41
	Height, in.	5.80
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		5217
Strain, %		4.1
Ult. Stress, psf		5217
Strain, %		4.1
σ_1 Failure, psf		5937
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Sandy Clay (CL)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-8 Depth: 9.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

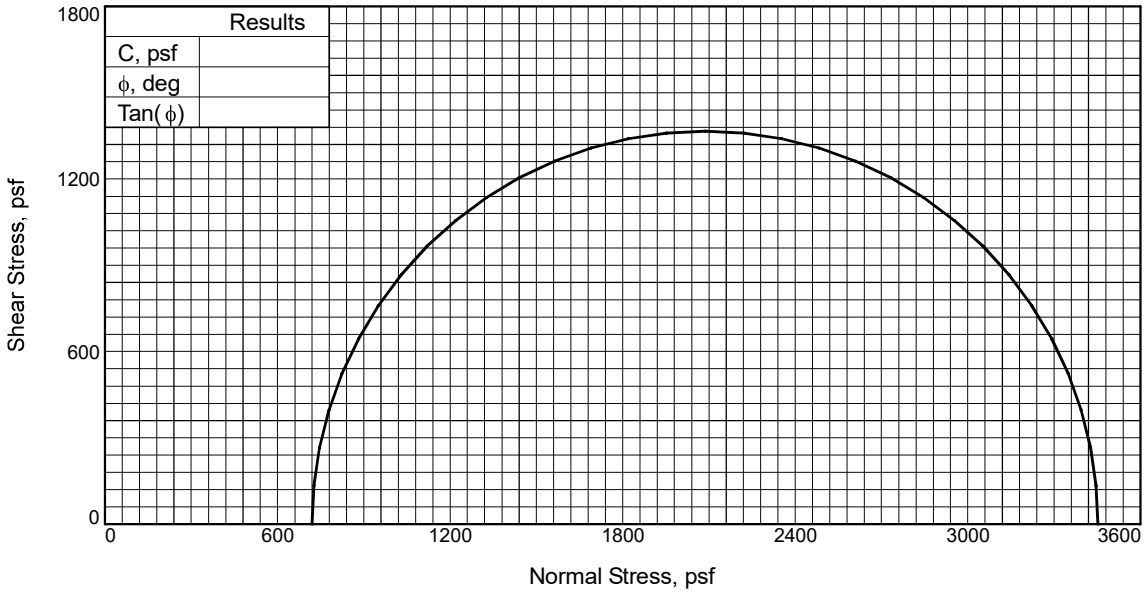
Tested By: SAM Checked By: SCW

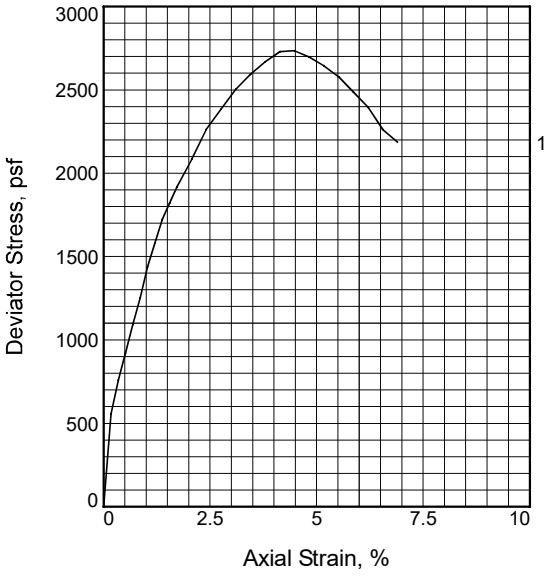
RGH CONSULTANTS

Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
34





Sample No.		1
Initial	Water Content, %	13.8
	Dry Density, pcf	121.0
	Saturation, %	95.0
	Void Ratio	0.3934
	Diameter, in.	2.40
	Height, in.	5.80
At Test	Water Content, %	13.8
	Dry Density, pcf	121.0
	Saturation, %	95.0
	Void Ratio	0.3934
	Diameter, in.	2.40
	Height, in.	5.80
Strain rate, in./min.		0.060
Back Pressure, psi		0.00
Cell Pressure, psi		5.00
Fail. Stress, psf		2733
Strain, %		4.5
Ult. Stress, psf		2733
Strain, %		4.5
σ_1 Failure, psf		3453
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Brown Clayey Sand (SC)

Assumed Specific Gravity= 2.70
Remarks:

Project: Mills Lane Storm Drain Improvements

Source of Sample: SD-8 Depth: 14.0'

Proj. No.: 6948.12.PW.2 Date Sampled: 10/27/20

Tested By: SAA Checked By: SCW

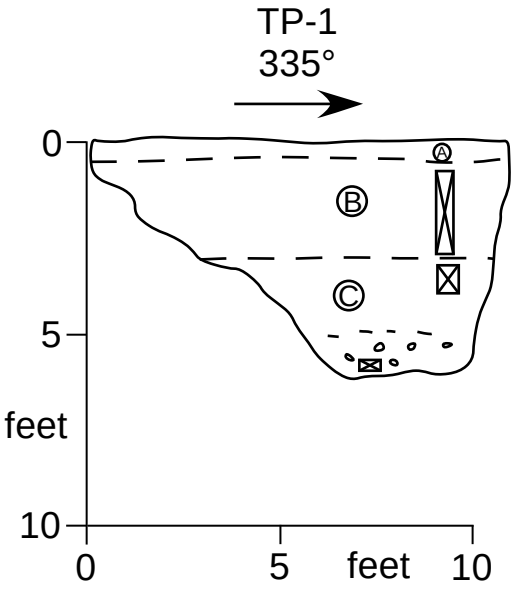
RGH CONSULTANTS

Job No: 6498.12.PW.2 | Date: DEC 2020

TRAXIAL TEST DATA
Mills Lane Storm Drain Improvements
Mills Lane
St. Helena, California

PLATE
35

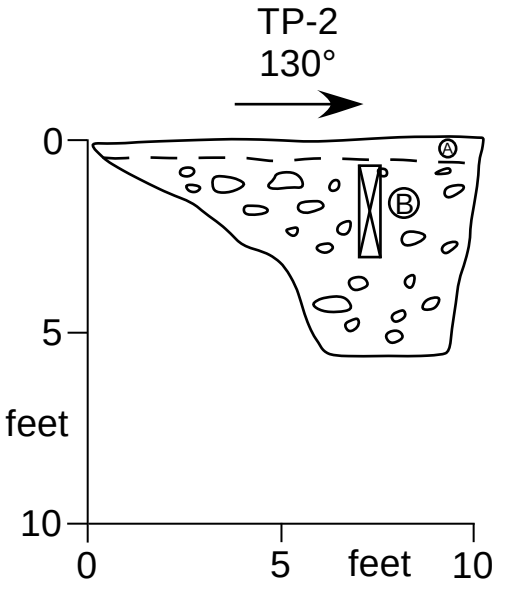
APPENDIX B – PREVIOUS BORING LOG AND TEST PIT DATA



Ⓐ BROWN SANDY CLAY WITH GRAVEL (CL), soft, dry, weak and porous, with rootlets and organics

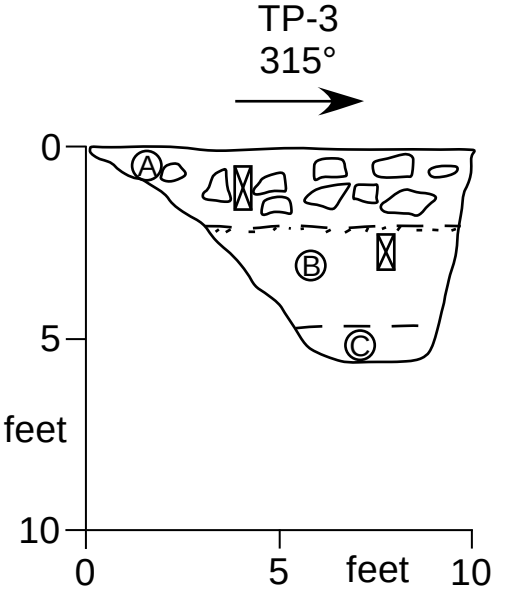
Ⓑ YELLOW BROWN TO BROWN SANDY CLAY (CL), very stiff, moist, very fine sand

Ⓒ YELLOW BROWN CLAY (CL), stiff, moist, porous to about 5', few gravels and less porous from 5'-6', becomes wet at 5'-6'



Ⓐ DARK BROWN SILT (ML), soft, dry to moist weak and porous, with rootlets

Ⓑ BROWN CLAYEY GRAVEL WITH SAND (GC), medium dense, moist, sloughing, cobbles to 8" in diameter, rounded



Ⓐ BROWN CLAYEY SAND WITH GRAVEL (SC), medium dense to dense, dry to moist, cobbles and angular boulders to 12" diameter, with roots, root layer at 2', fines content = 27.5% (Fill)

Ⓑ DARK BROWN SANDY CLAY (CL), hard, dry to moist, with gravel, very fine sand, fines content = 54.7%

Ⓒ BROWN CLAYEY GRAVEL WITH SAND (GC), medium dense, moist, sloughing, cobbles to 8" in diameter, rounded

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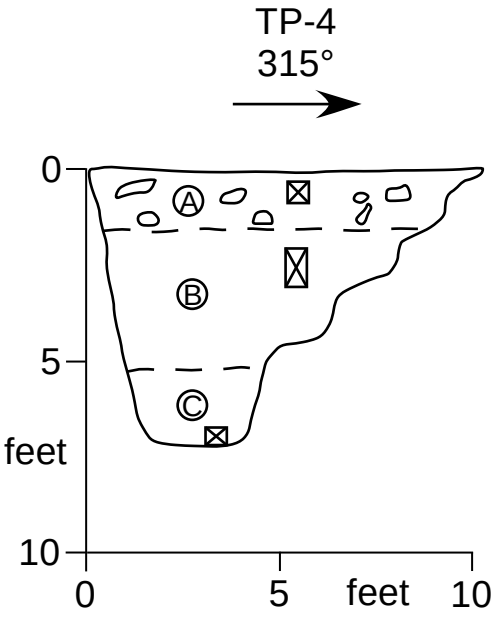
Job No: 7248.01.04.2 | Date: JULY 2018

LOG OF TEST PITS TP-1, TP-2 AND TP-3
Saint Helena Custom Crush
420 La Fata Street
St. Helena, California

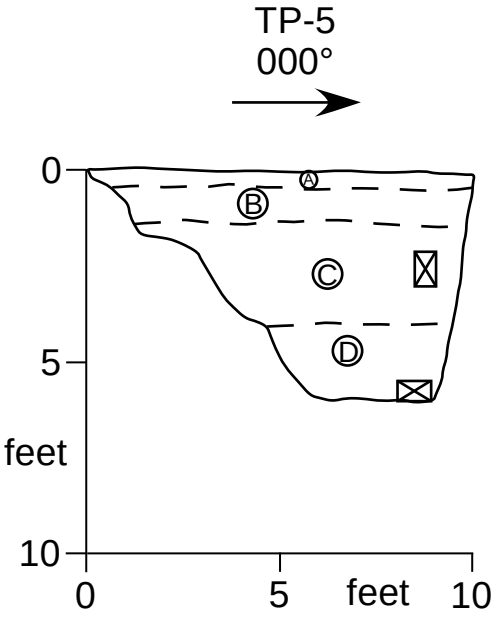
PLATE
3



Ⓐ BROWN CLAYEY SAND WITH GRAVEL (SC), medium dense, dry to moist, with roots, with concrete, rebar, metal scraps (Fill)

Ⓑ DARK BROWN SANDY CLAY (CL), hard, moist, sparse rounded gravel, fines content = 63.9%

Ⓒ BROWN TO YELLOW BROWN CLAY WITH SAND (CL), stiff, moist, with sparse gravel



Ⓐ BROWN CLAYEY SAND WITH GRAVEL (SC), medium dense, dry, weak and porous, with roots, very fine sand (Fill)

Ⓑ BROWN CLAY WITH SAND (CL), hard, dry to moist, with abundant roots

Ⓒ DARK BROWN AND YELLOW BROWN CLAY WITH SAND (CL), hard, dry to moist, some roots, porous

Ⓓ BROWN CLAYEY GRAVEL WITH SAND (GC), medium dense, moist

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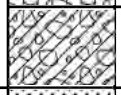
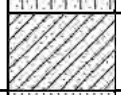
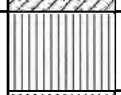
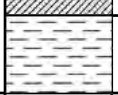
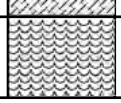
Job No: 7248.01.04.2 | Date: JULY 2018

LOG OF TEST PITS TP-4 AND TP-5
Saint Helena Custom Crush
420 La Fata Street
St. Helena, California

PLATE
4

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVEL (LITTLE OR FINES)		GW	WELL-GRADED GRAVEL, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVEL, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVEL WITH FINES (OVER 12% OF FINES)		GM	WELL-GRADED GRAVEL, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GC	CLAYEY GRAVEL, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SAND, GRAVELLY SAND, LITTLE OR NO FINES
				SP	POORLY-GRADED SAND, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (OVER 12% OF FINES)		SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
				SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS — LIQUID LIMIT LESS THAN 50			ML	INORGANICS SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS — LIQUID LIMIT GREATER THAN 50			MH	ORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS AND OTHER SOILS WITH HIGH ORGANIC-CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

KEY TO TEST DATA

Consol - Consolidation
Gs - Specific Gravity
SA - Sieve Analysis
■ - "Undisturbed" Sample
⊠ - Bulk or Disturbed Sample
◪ - Standard Penetration Test
⊘ - Sample Attempt With No Recovery
◧ - Sample Recovered But Not Retained

Shear Strength, psf		Confining Pressure, psf	
Tx	320	(2600)	- Unconsolidated Undrained Traixial
TxCU	320	(2600)	- Consolidated Undrained Triaxial
DS	2750	(2600)	- Consolidated Drained Direct Shear
UC	2000		- Unconfined Compression
FVS	470		- Field Vane Shear
LVS	700		- Laboratory Vane Shear
SS			- Shrink Swell
EXP			- Expansion
P			- Permeability

Note: All strength tests on 2.8-in. or 2.4-in. diameter sample, unless otherwise indicated.

RGH CONSULTANTS

Job No: 7248.01.04.2 | Date: JULY 2018

SOIL CLASSIFICATION AND KEY TO TEST DATA
Saint Helena Custom Crush
420 La Fata Street
St. Helena, California

PLATE
6

RGH Geotechnical and Environmental Consultants

LOG OF BORING B-1

OTHER LABORATORY TESTS	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS/ FOOT*	DEPTH (ft)	SAMPLES	SYMBOLS	MATERIALS DESCRIPTION
UBC Expansion Index = 30 (low)	91	13.9	10				DARK BROWN SANDY CLAY (CL) medium stiff, moist; porous, disced, w/ gravel (Topsoil)
	104	15.4					
UBC Expansion Index = 45 (low)	111	16.6	10				BROWN SANDY CLAY (CL) medium stiff, wet; w/ gravel (Subsoil)
	107	19.9	22	5			*Becoming stiff to very stiff below 5 feet*
			36	10			BROWN CLAYEY GRAVEL (GC) dense, wet;
							NO FREE GROUNDWATER OBSERVED
				15			

*BLOW COUNTS – Converted to Equivalent Standard Penetration Blow Counts
**ELEVATION – Existing Ground Surface

PROJECT	Mills Lane Commercial Project	DRILLING COMPANY	Pearson Drilling
LOCATION	St. Helena, California	DATE DRILLED	04/20/01
JOB NUMBER	5700.01.00.2	SURFACE ELEVATION**	Feet
LOGGED BY	LAS	TOTAL DEPTH OF HOLE	10.5 Feet
DRILL RIG	6-inch Solid Stem Auger	APPROVED BY	

PLATE 3

RGH Geotechnical and Environmental Consultants

LOG OF BORING B-4

OTHER LABORATORY TESTS	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS/ FOOT*	DEPTH (ft)	SAMPLES	SYMBOLS	MATERIALS DESCRIPTION
							DARK BROWN SANDY CLAY (CL) medium stiff, wet; porous, disced, w/ gravel (Topsoil)
UBC Expansion Index = 48 (low)	103	19.1	9				
							BROWN SANDY CLAY (CL) medium stiff to stiff, wet; w/ gravel (Subsoil)
Strength Test (See Plate 16)	104	22.4	10				
				5			
			25				BROWN CLAYEY GRAVEL (GC) medium dense, wet;
							NO FREE GROUNDWATER OBSERVED
				10			
				15			

*BLOW COUNTS - Converted to Equivalent Standard Penetration Blow Counts

**ELEVATION - Existing Ground Surface

PROJECT	Mills Lane Commercial Project	DRILLING COMPANY	Pearson Drilling
LOCATION	St. Helena, California	DATE DRILLED	04/26/01
JOB NUMBER	5700.01.00.2	SURFACE ELEVATION**	Feet
LOGGED BY	LAS	TOTAL DEPTH OF HOLE	9.5 Feet
DRILL RIG	6-inch Solid Stem Auger	APPROVED BY	

PLATE 6

RGH Geotechnical and Environmental Consultants

LOG OF BORING B-5

OTHER LABORATORY TESTS	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS/ FOOT*	DEPTH (ft)	SAMPLES	SYMBOLS	MATERIALS DESCRIPTION
			9				DARK BROWN SANDY CLAY (CL) medium stiff, moist; porous, disced, w/ gravel (Topsoil)
			12				BROWN CLAYEY GRAVEL (GC) medium dense to dense, wet;
			35	5			*With larger gravels @ ±7-8 feet*
							NO FREE GROUNDWATER OBSERVED
				10			
				15			

*BLOW COUNTS - Converted to Equivalent Standard Penetration Blow Counts
**ELEVATION - Existing Ground Surface

PROJECT	Mills Lane Commercial Project	DRILLING COMPANY	Pearson Drilling
LOCATION	St. Helena, California	DATE DRILLED	04/26/01
JOB NUMBER	5700.01.00.2	SURFACE ELEVATION**	Feet
LOGGED BY	LAS	TOTAL DEPTH OF HOLE	9.5 Feet
DRILL RIG	6-inch Solid Stem Auger	APPROVED BY	

PLATE 7

RGH Geotechnical and Environmental Consultants

LOG OF BORING B-6

OTHER LABORATORY TESTS	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS/ FOOT*	DEPTH (ft)	SAMPLES	SYMBOLS	MATERIALS DESCRIPTION
			8				DARK BROWN SANDY CLAY (CL) medium stiff, moist; porous, disced, w/ gravel (Topsoil)
			8				
				5			
							BROWN SANDY CLAY (CL) very stiff, wet; w/ gravel (Subsoil)
			19				
				10			
							Becomes gravelly below 12 feet
			25				
							NO FREE GROUNDWATER OBSERVED
				15			

*BLOW COUNTS - Converted to Equivalent Standard Penetration Blow Counts
**ELEVATION - Existing Ground Surface

PROJECT	Mills Lane Commercial Project	DRILLING COMPANY	Pearson Drilling
LOCATION	St. Helena, California	DATE DRILLED	04/26/01
JOB NUMBER	5700.01.00.2	SURFACE ELEVATION**	Feet
LOGGED BY	LAS	TOTAL DEPTH OF HOLE	13.5 Feet
DRILL RIG	6-inch Solid Stem Auger	APPROVED BY	

PLATE 8

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS (More Than Half Is Larger Than #200 Sieve)	GRAVELS — More Than Half Coarse Fraction Is larger Than No. 4 Sieve Size	Clean Gravels With Little or No Fines	GW	Well Graded Gravels, Gravel - Sand Mixtures
			GP	Poorly Graded Gravels, Gravel - Sand Mixtures
		Gravels With Over 12% Fines	GM	Silty Gravels, Poorly Graded Gravel - Silt - Silt Mixtures
			GC	Clayey Gravels, Poorly Graded Gravel - Sand - Clay Mixtures
	SANDS — More Than Half Coarse Fraction Is Smaller Than No. 4 Sieve Size	Clean Sands With Little or No Fines	SW	Well Graded Sands, Gravelly Sands
			SP	Poorly Graded Sands, Gravelly Sands
		Sands With Over 12% Fines	SM	Silty Sands, Poorly Graded Sand - Silt Mixtures
			SC	Clayey Sands, Poorly Graded Sand - Clay Mixtures
FINE GRAINED SOILS (More Than Half Is Smaller Than #200 Sieve)	SILTS AND CLAYS — Liquid Limit Less Than 50		ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands, or Clayey Silts with Slight Plasticity
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
			OL	Organic Clays and Organic Silty Clays of Low Plasticity
	SILTS AND CLAYS — Liquid Limit Greater Than 50		MH	Organic Silts, Micaceous or Diatomacious Fine Sandy or Silty Soils, Elastic Silts
			CH	Inorganic Clays of High Plasticity, Fat Clays
			OH	Organic Clays of Medium to High Plasticity, Organic Silts
HIGHLY ORGANIC SOILS			Pt	Peat and Other Highly Organic Soils

UNIFIED SOIL CLASSIFICATION SYSTEM

Consol - Consolidation
LL - Liquid Limit (In %)
PL - Plastic Limit (In %)
PI - Plastic Index
G_s - Specific Gravity
SA - Sieve Analysis
"Undisturbed" Sample
Bulk or Disturbed Sample
Standard Penetration Test
Sample Attempt With No Recovery

Shear Strength, psf
Confining Pressure, psf

Tx	320	(2600)	Unconsolidated Undrained Triaxial
Tx CU	320	(2600)	Consolidated Undrained Triaxial
DS	2750	(2000)	Consolidated Drained Direct Shear
FVS	470		Field Vane Shear
UC	2000		Unconfined Compression
LVS	700		Laboratory Vane Shear

SS - Shrink Swell
EXP - Expansion
P - Permeability

Note: All strength tests on 2.8" or 2.4" diameter sample unless otherwise indicated.

KEY TO TEST DATA

R G H
Geotechnical and Environmental Consultants

Job No: 5700.01.00.2
Appr:
Drwn: kab
Date: Apr. 2001

SOIL CLASSIFICATION CHART AND KEY TO TEST DATA
MILLS LANE COMMERCIAL PROJECT
St. Helena, California

PLATE 14

APPENDIX C - REFERENCES

Dwyer, M.J., Noguchi, N., and O'Rourke, J., 1976, Reconnaissance Photo-Interpretation Map of Landslides in 24 Selected 7.5-Minute Quadrangles in Lake, Napa, Solano, and Sonoma Counties, California: U.S. Geological Survey OFR 76-74, 25 Plates, Scale 1:24,000.

Fox, K.F., Jr., et al., 1973, Preliminary Geology Map of Eastern Sonoma County and Western Napa County, California: U.S. Geological Survey, Miscellaneous Field Studies Map MF-483, Basic Data Contribution 56, Scale 1:62,500.

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RGH, 2017, Geotechnical Engineering Report Update, Mills Lane Lodging Project, Mills Lane, St. Helena, California, Project No. 7008.01.12.2, February 23, 2017.

RGH, 2018, Geotechnical Study Report: Crush Facility and Retention Pond, St. Helena Custom Crush Winery, 420 La Fata Street, St. Helena, California, Project Number: 7248.01.04.2, July 17, 2018.

APPENDIX D - DISTRIBUTION

BKF Engineers (e)
Attention: Becky Dower
200 4th Street, Suite 300
Santa Rosa, CA 95401
bdower@bkf.com

EGC:JJP:aku:brw

s:\project files\6251-6500\6498\6498.12.pw.2 mills lane storm drain improvements (bkf)\6498.12.pw.2 gs report.doc

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from alight industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ-sometimes significantly from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the express purpose of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in-this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely on Your ASFE-Member Geotechnical Engineer For Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE
The Best People on Earth

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IIGER06045.0M

APPENDIX B

Preliminary Stormwater Hydrology Analysis

JOB NO. 20201249

BkF 100+ YEARS
ENGINEERS . SURVEYORS . PLANNERS

PRELIMINARY STORMWATER HYDROLOGY ANALYSIS

FOR

MILLS LANE STORM DRAIN

ST. HELENA, CA

APRIL 2021

PRELIMINARY

Becky Dower, PE
No. C-80868
April 8, 2020

200 Fourth Street, Suite 300, Santa Rosa, CA 95401 | 707.583.8500

BACKGROUND & INTRODUCTION

This analysis has been performed to compare the pre- and post-development hydrologic conditions for the improvements associated with the proposed Mills Lane Storm Drain project along Mills Lane in St. Helena.

PROJECT DESCRIPTION

The proposed *Mills Lane Storm Drain* will consist of approximately 4,800 feet of storm drain pipe along Mills Lane in St. Helena, stretching from Highway 29 to the Napa River. The storm drain system will reroute existing discharge from a roadside ditch, as well as pick up future discharge from the proposed Farmstead development.

EXISTING CONDITIONS

The site in its current condition consists of an asphalt road with primarily vineyards and other undeveloped land on either side. There are a few residencs among the vineyards on the north/west side of the road. There is a drainage ditch along the north/west side of the road that doesn't remain well defined along the entire length of Mills Lane. There are several dirt driveways on both sides of the road that provide access to the adjacent vineyards. The paved road ends approximately 500 feet before the Napa River, where a gravel road continues to the top of the river bank. The site slopes gently to the northeast, towards the Napa River. The adjacent unimproved areas also drain towards the Napa River.

There is an existing subsurface drainage system in Highway 29 that discharges into a roadside drainage ditch along Mills Lane. This existing storm drain system collects runoff from a portion of Highway 29 and the adjacent land to the southwest, opposite Mills Lane.

PROPOSED CONDITIONS

The project does not propose to divert stormwater between watersheds, but redirect much of the overland flow into a subsurface system. In its current condition, stormwater runoff from a portion of Highway 29 and the adjacent land to the southwest is collected via multiple inlets, routed through a subsurface storm drain system, and discharged into a roadside drainage ditch adjacent to Mills Lane. This drainage ditch slopes gently to the northeast, towards the Napa River. In the proposed condition, the stormwater runoff from Highway 29 will instead remain underground until it ultimately discharges into the Napa River. The proposed storm drain system will be located under Mills Lane, and will also receive stormwater runoff from the future Farmstead development, located at 1000 Mills Lane. The drainage ditch is expected to remain in place, though the flow within the ditch is expected to decrease. Increases to the stormwater flow within the existing highway subsurface drainage system are not anticipated with this project.

The project is not anticipated to alter the total existing impervious area of Mills Lane. Therefore, the runoff generated within the project limits is not expected to increase with these improvements.

METHODS OF ANALYSIS - HYDROLOGY

Pre-Construction Hydrology

The proposed storm drain will not collect surface runoff from Mills Lane or the adjacent land, with the exception of the Farmstead development. Therefore, pre-developemnt runoff from these adjacent lands into the ditch is not analyzed in this study.

A drainage report prepared by Caltrans outlines the watershed charateristics and provides the 10-, 25-, and 100-year flows that discharge into the drainage ditch along Mills Lane. According to this report, the contributing watershed is approximately 36 acres and has a composite runoff coefficient of 0.53. The 10- and 100-year discharges into the drainage ditch are stated as 37.30 cubic feet per second (cfs) and 68.35 cfs, respectively.

Post-Construction Hydrology

The proposed storm drain system connects to an existing 30" storm drain pipe at a new drop inlet structure. The new storm drain will consist of 45 feet of 36" pipe, 894 feet of 48" pipe, and 3,867 feet of 60" pipe. All proposed storm drain pipe will be reinforced concrete pipe (RCP).

This project does not propose any work within Highway 29; therefore the post-development flows from the highway is expected to equal the pre-development flows mentioned above.

According to a hydrology analysis prepared by Sherwood Design Engineers, dated April 2017, the peak 10-year post-construction runoff for the future Farmstead development is 11.59 cfs. From the drainage report prepared by Caltrans, the 10- and 100-year discharges into the drainage ditch are related by a factor of 1.83. This factor can be applied to the Farmstead development to approximate the projects 100-year discharge, which equates to approximately 21.20 cfs.

Combining the discharges from Highway 29 and the future Farmstead development yields expected flows of 48.89 cfs for the 10-year storm and 89.55 cfs for the 100-year storm.

The proposed storm drain pipes were modeled using the HydraFlow Express extension for AutCAD Civil 3D 2018, a product by Autodesk, in order to determin their capacities. The proposed section of 36" RCP (n=0.013) is sloped at 2.00% and has a maxmimum capacity of 80 cfs. The proposed section of 36" RCP is sloped at a minimum of 0.50%, which has a corresponding maximum capacity of 105 cfs. The proposed section of 48" RCP is sloped at a minimum of 0.50%, which has a corresponding maximum capcity of 195 cfs.

The future Farmstead development is anticipated to connect to the proposed system at multiple locations via storm drain manholes. To simplify calculations, this report assumes the stormwater generated on the Farmstead site will connect to the proposed system at only one location, where the system expands from a 48" pipe to a 60" pipe. Therefore the Highway 29 discharge alone will be conveyed throught the 36" and 48" sections of storm drain pipe, and the combined Highway 29 and Farmstead discharge will be conveyed through only the 60" sections of pipe. As mentioned above, the proposed 36" RCP has a capacity of 80 cfs; therefore it will carry the highway discharge at rougly 47% capacity, or a flow depth of approximately 1.3 feet. The proposed 60" RCP has a capacity of 195 cfs; therefore it will carry the combined highway and Farmstead discharge at roughly 46% capacity, or a flow depth of approximately 2.5 feet.

A flood profile for the Napa River prepared by the Federal Emergency Management Agency (FEMA) shows the water surface elevations of the Napa River for the 10- and 100-year storms at ±205.5 feet and ±209.3 feet, respectively. The proposed invert elevation of the new storm drain at the Napa River is ±199.00. The

connection point of the future Farmstead project is anticipated to have an invert elevation of ±221.50, well above the flood elevation.

CONCLUSION

Project improvements will not increase the overall impervious area on site, therefore the project is not anticipated to increase stormwater runoff and is not subject to hydromodifcation requirements.

As discussed above, the proposed storm drain system is expected to have adequate capacity to convey the anticipated flows from the 10-year and even 100-year storms.

APPENDIX C

Biological Site Assessment Report

Biological Site Assessment Report

MILLS LANE STORM DRAIN IMPROVEMENTS PROJECT
ST. HELENA, NAPA COUNTY

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EXECUTIVE SUMMARY

This report details the regulatory background, methods, results, and recommendations of a biological site assessment (BSA) for the proposed installation of a storm water drain project along Mills Lane in St. Helena, California. Biologists from WRA, Inc. performed a field survey on December 4, 2020. The Study Area is composed primarily of developed land surrounded by vineyards and coast live oak riparian woodlands above the western bank of the Napa River.

Approximately 0.01 acre of oak woodlands are located within the limits of disturbance and may be impacted by construction of stormwater infrastructure. The remainder of the Study Area is situated in the developed land cover (i.e., paved road).

No special-status plants have the potential to occur within the Study Area.

Three special-status bats and three special-status birds, as well as non-status birds with baseline legal protections, have the potential to occur in the Project Area. In addition, two special-status amphibians, one special-status reptile, and two special-status fishes have a low potential to occur within the Study Area vicinity. Mitigation measures and best management practices have been developed and provided herein to avoid impacts to these resources.

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LIST OF APPENDICES

LIST OF PREPARERS

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LIST OF ABBREVIATIONS & ACRONYMS

BIOS	Biogeographic Information and Observation System
BSA	Biological Site Assessment
CARI	California Aquatic Resources Inventory
CCH	Consortium of California Herbaria
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPPA	California Native Plant Protection Act
CNPS	California Native Plant Society
County	County of Napa
Corps	U.S. Army Corps of Engineers
CRLF	California Red-legged Frog
CSRL	California Soils Resources Lab
CWA	Clean Water Act
EFH	Essential Fish Habitat
ESA	(Federal) Endangered Species Act
FYLF	Foothill Yellow-Legged Frog
LOD	Limits of Disturbance
MBTA	Migratory Bird Treaty Act
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resource Conservation Service
NWI	National Wetland Inventory
NWPL	National Wetland Plant List
OHWM	Ordinary High Water Mark
Rank	California Rare Plant Ranks
RWQCB	Regional Water Quality Control Board
SFEI	San Francisco Estuary Institute
SFP	State Fully Protected Species
SWRCB	State Water Resource Control Board
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WBWG	Western Bat Working Group
WPT	Western Pond Turtle
WRA	WRA, Inc.

1.0 INTRODUCTION

WRA, Inc. (WRA) conducted a biological site assessment (BSA) for a storm drain project located along Mills Lane in the City of St. Helena, Napa County (Assessor's Parcel Numbers [APNs] 009-070-029 and 009-120-060[1]) on December 4, 2020 (Appendix A, Figure 1). The proposed project (Project) involves the construction of a new storm drain along Mills Lane, which is a City street for most of its length, from its intersection with State Highway 29 east to the Napa River. The storm drain will be 36 inches in diameter at the Highway 29 connection, increasing to a 60 inch diameter outfall. The total length of the proposed storm drain is approximately 4,900 feet. The storm drain will discharge to the west bank of the Napa River approximately 600 feet east of the terminus of Mills Lane. For the purpose of discussion in this report, the terms "Study Area" and "Project Area" are defined as follows:

Study Area: The area throughout which the assessment was performed, the location of the proposed storm drain line and outfall and surrounding areas, totaling 13.16 acres.

Project Area: The 1.54-acre Project Area encompasses the area evaluated for potential impacts to sensitive biological resources and includes the proposed storm drain alignment and outfall structure, limit of grading, construction access, and staging areas.

The purpose of this assessment was to determine whether the Study Area supports any sensitive habitats or species and, if applicable, to assess potential impacts to any sensitive natural resources. This report describes results of the site visit, which assessed the Study Area for (1) the presence of sensitive land cover types, (2) the potential for the site to support special-status plant and wildlife species, and (3) the presence of any other sensitive natural resources protected by local, state, or federal laws and regulations. Based on the results of the site assessment, potential impacts to sensitive biological communities and special status species resulting from the proposed project were evaluated in accordance with California Environmental Quality Act (CEQA) guidelines. Accordingly, recommended measures to avoid, minimize, or mitigate for potential impacts are provided in Section 6.0.

Potential habitat for special-status species observed during the site assessment is discussed herein. Specific findings on the presence of special-status species may require that preconstruction surveys or other studies be conducted; recommendations for additional studies are provided, if necessary.

2.0 REGULATORY BACKGROUND

The following sections provide an overview of the regulatory context of the BSA, including applicable laws and regulations, that were applicable to biological resources that may exist on the Study Area.

[1] The majority of the Project is located along Mills Lane, which does not have an APN.

2.1 Federal and State Regulatory Setting

2.1.1 Sensitive Land Cover Types

Land cover types are herein defined as those areas of a particular vegetation type, soil or bedrock formation, aquatic features, and/or other distinct phenomenon. Typically, land cover types have identifiable boundaries that can be delineated based on changes in plant assemblages, soil or rock types, soil surface or near-surface hydroperiod, anthropogenic or natural disturbance, topography, elevation, etc. Many land cover types are not considered sensitive or otherwise protected under the environmental regulations discussed here. However, these land cover types typically provide essential ecological and biological functions for plants and wildlife, including, frequently, special-status species. Those land cover types that are considered or protected under one or more environmental regulations are discussed below.

Waters of the United States: The United States Army Corps of Engineers (Corps) regulates "Waters of the United States" under Section 404 of the Clean Water Act (CWA). Waters of the United States are defined in the Code of Federal Regulations (CFR) as waters susceptible to use in commerce, including interstate waters and wetlands, all other waters (intrastate waterbodies, including wetlands), and their tributaries (33 CFR 328.3). Potential wetland areas, according to the three criteria used to delineate wetlands as defined in the Corps Wetlands Delineation Manual (Environmental Laboratory 1987), are identified by the presence of (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology. Unvegetated waters including lakes, rivers, and streams may also be subject to Section 404 jurisdiction and are characterized by an ordinary high water mark (OHWM) identified based on field indicators such as the lack of vegetation, sorting of sediments, and other indicators of flowing or standing water. Other waters, for example, generally include lakes, rivers, and streams. The placement of fill material into Waters of the United States generally requires a permit from the Corps under Section 404 of the CWA.

Waters of the State: The term "Waters of the State" is defined by the Porter-Cologne Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." The State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCB) protect waters within this broad regulatory scope through many different regulatory programs. Waters of the State in the context of a CEQA Biological Resources evaluation include wetlands and other surface waters protected by the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State*. The SWRCB and RWQCB issue permits for the discharge of fill material into surface waters through the State Water Quality Certification Program, which fulfills requirements of Section 401 of the CWA and the Porter-Cologne Water Quality Control Act. Projects that require a Clean Water Act permit are also required to obtain a Water Quality Certification. If a project does not require a federal permit, but does involve discharge of dredge or fill material into surface waters of the State, the SWRCB and RWQCB may issue a permit in the form of Waste Discharge Requirements.

Streams, Lakes, and Riparian Habitat: Streams and lakes, as habitat for fish and wildlife species, are subject to jurisdiction by CDFW under Sections 1600-1616 of California Fish and Game Code (CFGC). Alterations to or work within or adjacent to streambeds or lakes generally require a 1602 Lake and Streambed Alteration Agreement. The term “stream”, which includes creeks and rivers, is defined in the California Code of Regulations (CCR) as “a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life [including] watercourses having a surface or subsurface flow that supports or has supported riparian vegetation” (14 CCR 1.72). In addition, the term “stream” can include ephemeral streams, dry washes, watercourses with subsurface flows, canals, aqueducts, irrigation ditches, and other means of water conveyance if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife (CDFG 1994). “Riparian” is defined as “on, or pertaining to, the banks of a stream.” Riparian vegetation is defined as “vegetation which occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself” (CDFG 1994). Removal of riparian vegetation also requires a Section 1602 Lake and Streambed Alteration Agreement from CDFW.

Sensitive Natural Communities: Sensitive natural communities not discussed above include habitats that fulfill special functions or have special values. Natural communities considered sensitive are those identified in local or regional plans, policies, regulations, or by the CDFW. CDFW ranks sensitive communities as "threatened" or "very threatened" and keeps records of their occurrences in its California Natural Diversity Database (CNDDB; CDFW 2020). CNDDB vegetation alliances are ranked 1 through 5 based on NatureServe's (2018) methodology, with those alliances ranked globally (G) or statewide (S) as 1 through 3 considered sensitive. Impacts to sensitive natural communities identified in local or regional plans, policies, or regulations or those identified by the CDFW or U.S. Fish and Wildlife Service (USFWS) must be considered and evaluated under CEQA (CCR Title 14, Div. 6, Chap. 3, Appendix G). Specific habitats may also be identified as sensitive in city or county general plans or ordinances.

2.1.2 Special-status Species

Plants: Special-status plants include taxa that have been listed as endangered or threatened, or are formal candidates for such listing, under the federal Endangered Species Act (ESA) and/or California Endangered Species Act (CESA). The California Native Plant Protection Act (CNPPA) lists 64 “rare” or “endangered” and prevents “take”, with few exceptions, of these species. Plant species on the California Native Plant Society (CNPS) Rare and Endangered Plant Inventory (Inventory) with California Rare Plant Ranks (Rank) of 1, 2, and 3 are also considered special-status plant species and must be considered under CEQA. Rank 4 species are typically only afforded protection under CEQA when such species are particularly unique to the locale (e.g., range limit, low abundance/low frequency, limited habitat) or are otherwise considered locally rare. A description of the CNPS Ranks is provided below in Appendices B and C.

Wildlife: As with plants, special-status wildlife includes species/taxa that have been listed or are formal candidates for such under ESA and/or CESA. The federal Bald and Golden Eagle Protection Act provides relatively broad protections to both of North America's eagle species (bald [*Haliaeetus leucocephalus*] and golden eagle [*Aquila chrysaetos*)] that in some regards are similar to those provided by ESA. The CFGC designates some species as Fully Protected (FP), which indicates that take of that species cannot be authorized through a state permit. Additionally, CDFW Species of Special Concern (species that face extirpation in California if current population and habitat trends continue) are given special consideration under CEQA, and are therefore considered special-status species. In addition to regulations for special-status species, most native birds in the United States, including non-status species, have baseline legal protections under the Migratory Bird Treaty Act of 1918 and CFGC, i.e., sections 3503, 3503.5 and 3513. Under these laws/codes, the intentional harm or collection of adult birds as well as the intentional collection or destruction of active nests, eggs, and young is illegal. For bat species, the Western Bat Working Group (WBWG) designates conservation status for species of bats, and those with a high or medium-high priority are typically given special consideration under CEQA.

Critical Habitat, Essential Fish Habitat, and Wildlife Corridors: Critical habitat is a term defined in the ESA as a specific and formally-designated geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. The ESA requires federal agencies to consult with the USFWS to conserve listed species on their lands and to ensure that any activities or projects they fund, authorize, or carry out will not jeopardize the survival of a threatened or endangered species. In consultation for those species with critical habitat, federal agencies must also ensure that their activities or projects do not adversely modify critical habitat to the point that it will no longer aid in the species' recovery. Note that designated critical habitat areas that are currently unoccupied by the species but which are deemed necessary for the species' recovery are also protected by the prohibition against adverse modification.

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) provides for conservation and management of fishery resources in the U.S. This Act establishes a national program intended to prevent overfishing, rebuild overfished stocks, ensure conservation, and facilitate long-term protection through the establishment of Essential Fish Habitat (EFH). EFH consists of aquatic areas that contain habitat essential to the long-term survival and health of fisheries, which may include the water column, certain bottom types, vegetation (e.g. eelgrass (*Zostera* spp.)), or complex structures such as oyster beds. Any federal agency that authorizes, funds, or undertakes action that may adversely affect EFH is required to consult with NMFS.

Movement and migratory corridors for native wildlife (including aquatic corridors) as well as wildlife nursery sites are given special consideration under CEQA.

2.2 City of St. Helena Regulatory Setting

City of St. Helena General Plan Update 2040: The St. Helena General Plan (St. Helena 2019) regulates natural resource use in the City of St. Helena. The General Plan provides policies and implementing actions in four topic areas including Natural Habitat and Biodiversity, Open Space, Water Quality and Conservation, and Healthy Living Environment.

The following General Plan policies relate to the proposed project:

- OS1.1 Preserve and enhance St. Helena's riparian corridors for their value in providing wildlife habitat, biodiversity, natural drainage, and visual amenity.
- OS1.2 Prohibit development, alteration, and/or removal of native vegetation from riparian areas. Disallow invasive species that degrade habitat quality.
- OS1.3 Protect and enhance contiguous corridors of riparian vegetation along the Napa River and its tributaries in order to support regional wildlife movement and enhance aquatic habitat.
- OS1.4 Protect natural habitats that have the potential to support rare, endangered, or special-status wildlife and plant species. Control invasive species that degrade habitat quality.
- OS1.5 Restrict development of hillside areas in order to protect wildlife, vegetation, viewsheds, and open space characteristics.
- OS1.6 Manage invasive species that degrade habitat quality, especially along the Napa River and its tributaries.
- OS3.1 Promote stormwater management techniques that minimize surface water runoff in public and private developments. Utilize low impact development techniques to best manage stormwater through conservation, on-site filtration and water recycling, and ensure compliance with the NPDES permit.
- OS3.2 Reduce stormwater runoff in developed areas to protect water quality in creeks. Incorporate sustainable low impact design features in the design of infrastructure.

City of St. Helena Municipal Code: The City of St. Helena Municipal Code (St. Helena 2020) establishes regulations for new development within the city limits. The Municipal Code calls for a setback of 20 feet between building structures and the top-of-bank of any perennial or intermittent stream. Structures of less than 500 square feet are exempt from this requirement, and the public works director has discretion to approve additional modifications.

3.0 ENVIRONMENTAL SETTING

The approximately 13.2-acre Study Area is linearly set along Mills Lane and a dirt road extending past the eastern terminus of Mills Lane to the upper bank of the Napa River (Appendix A). It is located in western Napa County, approximately 0.5 miles southeast of downtown St. Helena. It is situated within the Napa Valley floor, perpendicular to the Napa River. Detailed descriptions of the local setting are below.

3.1 Topography and Soils

The overall topography of the Study Area generally flat with a slight eastward slope towards the Napa River, ranging from approximately 190 to 240 feet above sea level. According to the *Soil*

Survey of Napa County (USDA 1978), the Study Area is underlain by four soil mapping units. The parent soil series of all the Study Area's mapping units are summarized below.

Bale Series: This series consists of somewhat poorly drained soils on alluvial fans, floodplains, and low terraces at elevations ranging from 20 to 400 feet. These soils are not considered hydric, with low runoff and moderate permeability (CSRL 2020, USDA 1978). Native vegetation consists of oak (*Quercus* spp.) woodlands and willow (*Salix* spp.) scrub. Typical land uses include vineyards, irrigated pasture, and prune orchards (USDA 1978).

Cortina Series: This series consists of loam soils formed from recent stratified alluvium on floodplains and alluvial fans at elevations ranging from 100 to 500 feet. These soils are not considered hydric, and are excessively drained, with rapid permeability (CSRL 2020, USDA 1978). Native vegetation consists of willow scrub and water grasses. Typical land uses include vineyard and prune orchards (USDA 1978).

Pleasanton Series: This series consists of loam soils formed from alluvium derived from sedimentary rock situated on alluvial fans at elevations ranging from 50 to 600 feet. These soils are not considered hydric, and are well-drained with moderately slow permeability (CSRL 2020, USDA 1978). Native and naturalized vegetation include annual grasslands and scattered oaks. Typical land use is dryland and irrigated pasture, orchards, and vineyards (CSRL 2020, USDA 1978).

Yolo Series: This series consists of loam soils formed from recent alluvium on alluvial fans at elevations ranging from sea level to 500 feet. These soils are not considered hydric, and are well drained, with moderate permeability (CSRL 2020, USDA 1978). Typical land uses include vineyards, orchards, and pastures (USDA 1978).

3.2 Climate and Hydrology

The Study Area is located within the valley fog incursion zone of Napa County. The average monthly maximum temperature of Calistoga (Station ID: 041312), approximately 8 miles northwest of the Study Area, is 92.5 degrees Fahrenheit, while the average monthly minimum temperature is 36.2 degrees Fahrenheit. Precipitation falls as rain with an annual average of 37.55 inches. Precipitation-bearing weather systems are predominantly from the west and south with the majority of rainfalls between November and March, with a combined average of 31.52 inches (USDA 2020).

The local watershed is Middle Napa River (HUC 12: 180500020202) and the regional watershed is Napa River (HUC 10: 1805000202). The Study Area is situated in the Napa River – Lower St. Helena Reach Napa County Planning Watershed. There are no blue line streams mapped on the St. Helena or Rutherford 7.5-minute quadrangles within the Study Area, however the Napa River is mapped directly east of the Study Area (USGS 2015). Likewise, the Napa River is mapped in the National Wetlands Inventory (NWI; USFWS 2020a) and the California Aquatic Resources Inventory (CARI; SFEI 2020). The primary hydrologic sources are direct precipitation and consequent surface sheet flow and subsurface flow into channels (streams). Precipitation in the majority of the Study Area infiltrates quickly due to well-drained loam soils. Detailed descriptions of aquatic resources are in Section 5.1 below.

3.3 Current and Historic Land Use

The Study Area encompasses Mills Lane and extends approximately 4,900 feet east of Highway 29 intersection to the Napa River corridor. Regional land uses include rural residential, vineyards, and orchards. The edge of residential neighborhoods of St. Helena are approximately 800 feet northwest of the Study Area.

The land surrounding the Study Area is predominantly agricultural, with orchards and vineyards. There are four rural residences on the north side of Mills Lane. One large agricultural building was under construction on the south side of Mills Lane in the western portion of the Study Area. The site was an active construction zone with associated stockpiles and debris piles. The land on both sides of Mills Lane in the western portion of the Study Area consists of fallow fields that are not actively in agricultural production. The eastern end of the Study Area terminates within the Napa River corridor. Vegetation in this reach of the river consists of riparian woodland with a dense understory. Historically, land uses in the region have primarily been agricultural, with little change apparent on historical aerial imagery since 1948 (Historical Aerials 2020, Google Earth 2020). Detailed plant community descriptions are included in Section 5.1 below, and a list of observed plants is included in Appendix C.

4.0 METHODS

On December 4, 2020, the Project Area was traversed on foot to determine (1) plant communities present within the Project Area, (2) if existing conditions provided suitable habitat for any special status plant or wildlife species, and (3) determine the location and extent of sensitive land cover types including wetlands, streams and riparian areas. Prior to the site visit, WRA biologists reviewed the following literature and performed database searches to assess the potential for sensitive natural communities (e.g., wetlands) and special-status species (e.g., endangered plants):

- *Soil Survey of Napa County, California* (USDA 1978)
- Rutherford and St. Helena 7.5-minute quadrangles (USGS 2015)
- Contemporary aerial photographs (Google Earth 2020)
- Historical aerial photographs (Historical Aerials 2020)
- National Wetlands Inventory (USFWS 2020a)
- California Aquatic Resources Inventory (SFEI 2020)
- California Natural Diversity Database (CNDDB, CDFW 2020a)
- California Native Plant Society Electronic Inventory (CNPS 2020a)
- Consortium of California Herbaria (CCH 2020)
- USFWS List of Federal Endangered and Threatened Species (USFWS 2020b)
- *eBird* Online Database (eBird 2020)
- CDFW Publication, *California Bird Species of Special Concern in California* (Shuford and Gardali 2008)
- CDFW and University of California Press publication *California Amphibian and Reptile Species of Special Concern* (Thomson et al. 2016)
- *Breeding Birds of Napa County, California* (Smith 2003)
- *A Field Guide to Western Reptiles and Amphibians* (Stebbins 2003)
- *A Manual of California Vegetation, 2nd Edition* (Sawyer et al. 2009)
- *A Manual of California Vegetation Online* (CNPS 2020b)

- *Preliminary Descriptions of the Terrestrial Natural Communities* (Holland 1986)
- Napa County Land Cover (NCLC) map (Thorne et al. 2004)
- *California Natural Community List* (CDFW 2018a)

Database searches (i.e., CNDDB, CNPS) focused on the Saint Helena, Rutherford, Chiles Valley, Yountville, Calistoga, and Kenwood USGS 7.5-minute quadrangles for special-status plants and wildlife. Appendix B contains observations of special-status species documented within the vicinity of the Study Area.

Following the remote assessment, a wildlife biologist and botanist with 40-hour Corps wetland delineation and a wildlife biologist traversed the entire Study Area on foot to document: (1) land cover types (e.g., terrestrial communities, aquatic resources), (2) existing conditions and to determine if such provide suitable habitat for any special-status plant or wildlife species, (3) if and what type of aquatic natural communities (e.g., wetlands) are present, and (4) if special-status species are present[2].

All plant species encountered were recorded. Plants were identified using The Jepson Manual: Vascular Plants of California 2nd Edition (Baldwin et al. 2012) and Jepson Flora Project (Jepson eFlora 2020). Names given follow the Jepson eFlora. Likewise, all wildlife species encountered were noted. Frequently, wildlife encounters include indirect observations, including bird song, tracks, or scat; these instances also were recorded.

4.1 Land Cover Types

Land cover types present in the Study Area were classified based on existing plant community descriptions described by *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) or *A Manual of California Vegetation, Online Edition* (CNPS 2020a; CDFW 2020b) where feasible. However, in some cases, it was necessary to identify variants of community types or to describe non-vegetated areas that are not described in the literature. Land cover types were classified as sensitive or non-sensitive as defined by CEQA and other applicable laws and regulations.

4.1.1 Non-sensitive Land Cover Types

Non-sensitive land cover types are those that are not afforded special protection under CEQA, and other state, federal, and local laws, regulations, and ordinances. These land cover types may, however, provide suitable habitat for some special-status plant or wildlife species, and are described in Section 5.1 below.

4.1.2 Sensitive Land Cover Types including Aquatic Resources

Sensitive land cover types are those that may be afforded special consideration under CEQA and other applicable federal, state, and local laws, regulations and ordinances. Applicable laws and ordinances are discussed above in Section 2.0. Special methods used to identify sensitive land cover types in the Study Area are discussed below.

[2] Due to the timing of the assessment, it may or may not constitute protocol-level species surveys; see Section 4.2 if the site assessment would constitute a formal or protocol-level species survey.

Aquatic resources include Waters of the U.S., Waters of the State, and streams, lakes, and riparian habitat as defined in the CWA, Porter-Cologne Act, and CFGC, respectively. The City of St. Helena mandates setbacks for some structures (with size exceptions) from the top-of-bank of streams, and therefore requires mapping of the outward extent of such features.

A formal wetland delineation was conducted concurrent to the biological resources site assessment to evaluate indicators of wetlands such as hydrophytic vegetation (i.e., plant communities dominated by wetland species), evidence of inundation or flowing water, saturated soils and seepage, and topographic depressions/swales. WRA followed the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Corps 2008).

Streams potentially regulated under the CWA and/or the CFGC were delineated using a combination of surveyed topography data, high resolution aerial photographs, and a sub-meter GPS unit. The location of the ordinary high water mark was recorded to determine the extent of potential CWA Section 404/401 jurisdiction. The top-of-bank was delineated to identify the extent of streambeds regulated by CDFW under CFGC Section 1602. Streams with associated woody vegetation were assessed to determine if these areas would be considered riparian habitat by the CDFW following *A Field Guide to Lake and Streambed Alteration Agreements, Section 1600-1607, California Fish and Game Code* (CDFG 1994).

4.2 Special-status Species and Critical Habitat

4.2.1 General Assessment

Potential occurrence of special-status species in the Study Area was evaluated by first determining which special-status species occur in the greater vicinity through a literature and database review. Database searches for known occurrences of special-status species focused on the 7.5-minute USGS quadrangles mentioned above for special-status plants and the entirety of Napa County for special-status wildlife.

During the December 4, 2020 the Study Area was evaluated for the presence of suitable habitat for special-status species. Suitable habitat conditions are based on physical and biological conditions of the site, as well as the professional expertise of the investigating biologists. The potential for each special-status species to occur in the Study Area was then determined according to the following criteria:

- No Potential. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).
- Unlikely. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.
- Moderate Potential. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.
- High Potential. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.

- Present. Species is observed on the site or has been recorded (i.e. CNDDB, other reports) on the site in the recent past.

Methods for the assessments are described below. If a special-status species was observed during the site visit, its presence was recorded and discussed below in Section 5.2.

4.2.2 Special-status Plants

A habitat assessment for special-status plants was performed by traversing the entirety of the Study Area. Habitat elements required or associated with certain species or species groups were searched for and noted. However, this assessment did not constitute a protocol-level survey.

4.2.3 Special-status Wildlife

The special-status wildlife habitat assessment was performed on December 4, 2020. This assessment consisted of traversing the entirety of the Study Area. Habitat elements required or associated with certain species (e.g., northern spotted owl) or species groups (e.g., bats, anadromous fish) were searched for and noted. Such habitat elements include, but are not limited to: plant assemblages and vegetation structure; stream depth, width, hydro-period, slope, and bed-and-bank structure; rock outcrops, caves, cliffs, overhangs, and substrate texture and rock content; history of site alteration and contemporary disturbances; etc.

4.2.4 Critical Habitat, Essential Fish Habitat, and Wildlife Corridors

Prior to the site visit the USFWS Critical Habitat Mapper (USFWS 2020b) and the NMFS Essential Fish Habitat Mapper (NMFS 2020) were queried to determine if critical habitat for any species or EFH, respectively, occurs within the Study Area. To account for potential impacts to wildlife movement/migratory corridors, biologists reviewed maps from the California Essential Connectivity Project (CalTrans 2010), habitat connectivity data available through the CDFW Biogeographic Information and Observation System (BIOS) (CDFW 2020a). Additionally, aerial imagery (Google 2020) for the local area was referenced to assess if local core habitat areas were present within, or connected to the Study Area. This assessment was refined based on observations of on-site physical and/or biological conditions.

5.0 ASSESSMENT RESULTS

5.1 Land Cover Types

WRA observed three land cover types within the Study Area. Descriptions for each land cover type are contained in the following sections and depicted in Appendix A – Figure 3.

5.1.1 Non-sensitive Cover Types

Developed Area, including Agricultural Land and Ruderal (no vegetation alliance). CDFW Rank: None. Within the Study Area, developed portions are composed of paved Mills Lane, unpaved access roads, vineyards and other agricultural land, four residences, landscaping, and other small outbuildings, as well as the construction zone associated with the large building and ruderal vegetation. Vegetation within this land cover type is highly altered, consisting of ornamental tree stands and small, isolated patches of ruderal vegetation consist of disturbance-adapted species.

Non-native grass and forb species observed include slim oat (*Avena barbata*), rescue grass (*Bromus catharticus*), chicory (*Cichorium intybus*), foxtail barley (*Hordeum murinum*), johnsongrass (*Sorghum halepense*), filarees (*Erodium* sp.) and wild radish (*Raphanus sativus*). Ornamental trees include valley oak (*Quercus lobata*), Russian olive (*Elaeagnus angustifolia*), and English walnut (*Juglans regia*). The western portion of the Study Area contains a stormwater ditch that was constructed in an upland area adjacent to Highway 29. The ditch did not contain water during the December 2020 site visit and supported a mix of ruderal forbs and non-native annual grasses.

Developed areas total 12.86 acres in the Study Area. This community is not considered sensitive by City of St. Helena, CDFW, or any other regulatory entity.

5.1.2 Sensitive Land Cover Types including Aquatic Resources

Coast Live Oak Riparian Woodland (*Quercus agrifolia* Woodland Alliance). CDFW Rank: G5 S4: Coast live oak woodlands occur in the outer and inner Coast Ranges, Transverse Ranges, and southern coast from northern Mendocino County south to San Diego County (Sawyer et al. 2009, CNPS 2020b). These woodlands are typically situated on terraces, canyon bottoms, slopes, and flats underlain by deep, well-drained sandy or loam substrates with high organic content (Sawyer et al. 2009). The Study Area contains 0.25 acre of this land cover type in the eastern portion of the Study Area along the steep banks of the Napa River.

The dominant trees are coast live oak (*Quercus agrifolia*) and red willow (*Salix laevigata*), with scattered cover of Fremont's cottonwood (*Populus fremontii*) within the streambed. Predominant understory species include Himalayan blackberry (*Toxicodendron diversilobum*), California grape (*Vitis californica*), and cocklebur (*Xanthium strumarium*).

These woodlands provide habitat for numerous common native plants and wildlife, as well as have the potential to support several special-status species associated with woodlands. Coast live oak riparian woodland may be subject to CDFW jurisdiction under Section 1602 of the CFGC. The California Invasive Plant Council (Cal-IPC) is an organization that lists known invasive plants throughout California and designates each species with a rating of "high," "moderate," or "limited" based on an invasive plant's prevalence and ability to spread (Cal-IPC 2020). One "high," two "moderate," and two "limited" species were identified in the Study Area.

Intermittent Stream. CWA Section 404/401. Rank: None. The eastern portion of the Study Area contains the Napa River and a secondary channel will be avoided by the proposed Project. The nearest aquatic feature is a secondary channel of the Napa River, located approximately 40 feet northwest of the Project Area.

This reach of the Napa contains intermittent flows, which run during the wet season into the dry season, and receive subsurface discharges. The bed-and-banks are a mix of finer sediments, with medium to large cobble. Riparian vegetation is present. The streambed was entirely dry during the December 2020 site visit. In addition, historical imagery suggests this reach of the Napa River has been seasonably dry in several recent years (e.g. 2013, 2014, 2016, 2019) during the late fall and early winter since at least 1993 (Google 2020).

All of the streams are likely jurisdictional under Section 404/401 of the CWA and Section 1602 of the CFGC; therefore, it is considered a sensitive aquatic resource.

5.2 Special-status Species

5.2.1 Special-status Plant Species

Based upon a review of the resource databases listed in Section 4.0, 42 special-status plant species have been documented in the vicinity of the Study Area. During the site assessment, a WRA botanist evaluated habitat characteristics to determine potential suitability for 42 special-status plant species that have been documented in resource databases within the site vicinity. No special-status plants were observed during the site visit and it was determined that none have the potential to occur in the Study Area for one or more of the following reasons:

- Hydrologic conditions (e.g., tidal, riverine) necessary to support the special-status plant species are not present in the Study Area
- Edaphic (soil) conditions (e.g., volcanic tuff, serpentine) necessary to support the special-status plant species are not present in the Study Area
- Topographic conditions (e.g., north-facing slope, montane) necessary to support the special-status plant species are not present in the Study Area
- Unique pH conditions (e.g., alkali scalds, acidic bogs) necessary to support the special-status plant species are not present in the Study Area
- Associated natural communities (e.g., interior chaparral, tidal marsh) necessary to support the special-status plant species are not present in the Study Area
- The Study Area is geographically isolated (e.g. below elevation, coastal environ) from the documented range of the special-status plant species
- Land use history and contemporary management (e.g., absence of mowing or grazing) has degraded the localized habitat necessary to support the special-status plant species

It should be noted that because the site visit was conducted outside of the blooming period for most annual species, it did not constitute a protocol-level rare plant survey. However, the majority of the Study Area consists of developed land and the coast live oak riparian woodland on the eastern edge of the Study Area does not constitute suitable habitat for species identified in the database records search. All special-status plant species documented in the vicinity of the Study Area and considered during the habitat evaluation are discussed further in Appendix B.

5.2.2 Special-status Wildlife Species

A total of 22 special-status wildlife species have been documented in the vicinity of the Study Area (CDFW 2020a). Six of these species have a moderate to high potential to occur in the Study Area. In addition, five species are aquatic or aquatic for a specific portion of their life history and have potential to occur within the Napa River, which the Project will completely avoid. The remaining 13 species are unlikely or have no potential to occur due to one or more of the following reasons:

- Vegetation habitats (e.g., coast redwood forest, coastal prairie) that provide nesting and/or foraging resources necessary support the special-status wildlife species are not present in the Study Area.
- Physical structures and vegetation (e.g., mines, old-growth coniferous trees) necessary to provide nesting, cover, and/or foraging habitat to support the special-status wildlife species are not present in the Study Area.

- Host plants (e.g., dog violet, harlequin lotus) necessary to provide larval and nectar resources for the special-status wildlife species are not present in the Study Area.
- The Study Area is outside (e.g., north of, west of) of the special-status wildlife species documented nesting range.

Pallid bat (*Antrozous pallidus*). CDFW Species of Special Concern, WBWG High Priority. Moderate Potential. Pallid bats are distributed from southern British Columbia and Montana to central Mexico, and east to Texas, Oklahoma, and Kansas. This species occurs in a number of habitats ranging from rocky arid deserts to grasslands, and into higher elevation coniferous forests. Roosts are typically in rock crevices, tree hollows, mines, caves, and a variety of man-made structures, including vacant and occupied buildings. Tree roosting has been documented within snags and basal hollows of conifers, and within bole cavities in oak trees. Pallid bats are primarily insectivorous, feeding on large prey that is usually taken on the ground but sometimes in flight. Prey items include arthropods such as scorpions, ground crickets, and cicadas (WBWG 2018).

Many of the mature trees in the eastern portion of the Study Area within the riparian corridor along the Napa River contained hollows and cavities that provide suitable roosting habitat for this species. In addition, when flowing, the Napa River, approximately 200 feet east of the Project Area, provides a water source for emerging bats. The open agricultural and ruderal fields also likely support insect prey for pallid bat. CNDDB occurrences are recorded within the vicinity of the Study Area (CDFW 2020).

Fringed myotis (*Myotis thysanodes*). WBWG High Priority. Moderate Potential. The fringed myotis ranges through much of western North America from southern British Columbia, Canada, south to Chiapas, Mexico and from Santa Cruz Island in California, east to the Black Hills of South Dakota. This species is found in desert scrubland, grassland, sage-grass steppe, old-growth forest, and subalpine coniferous and mixed deciduous forest. Oak and pinyon-juniper woodlands are most commonly used. The fringed myotis roosts in colonies from 10 to 2,000 individuals, although large colonies are rare. Caves, buildings, underground mines, rock crevices in cliff faces, and bridges are used for maternity and night roosts, while hibernation has only been documented in buildings and underground mines. Tree-roosting has also been documented in Oregon, New Mexico, and California (WBWG 2018).

Many of the mature trees in the eastern portion of the Study Area within the riparian corridor along the Napa River contained cavities and peeling bark that provide suitable roosting habitat for this species. In addition, when flowing, the Napa River, approximately 200 feet east of the Project Area, provides a water source for emerging bats. The open agricultural and ruderal fields also likely support insect prey for fringed myotis. CNDDB occurrences are recorded within the vicinity of the Study Area (CDFW 2020).

Long-eared myotis (Myotis evotis). WBWG Medium Priority. Moderate Potential. The long-eared myotis (bat) is primarily associated with coniferous forest (from sea level to approximately 9,000 feet elevation), but also occurs in semiarid shrublands, sage scrub, chaparral, and agricultural areas. This species roosts under loose tree bark, in tree hollows, caves, mines, crevices in rocky outcrops, in buildings, under bridges and occasionally on the ground. Long-eared myotis primarily consume beetles and moths, gleaning prey from foliage, trees, rocks, and from the ground (WBWG 2018).

Many of the mature trees in the eastern portion of the Study Area within the riparian corridor along the Napa River contained cavities and peeling or loose bark that provide suitable roosting habitat for this species. In addition, when flowing, the Napa River, approximately 200 feet east of the Project Area, provides a water source for emerging bats. The open agricultural and ruderal fields also likely support insect prey for long-eared myotis. CNDDB occurrences are recorded within the vicinity of the Study Area (CDFW 2020).

White-tailed kite (*Elanus leucurus*). CDFW Fully Protected Species. Moderate Potential. White-tailed kite is resident in open to semi-open habitats throughout the lower elevations of California, including grasslands, savannahs, woodlands, agricultural areas, and wetlands. Vegetative structure and prey availability seem to be more important habitat elements than associations with specific plants or vegetative communities (Dunk 1995). Nests are constructed mostly of twigs and placed in trees, often at habitat edges. Nest trees are highly variable in size, structure, and immediate surroundings, ranging from shrubs to trees greater than 150 feet tall (Dunk 1995). This species preys upon a variety of small mammals, as well as other vertebrates and invertebrates.

The Study Area provides suitable year-round habitat for white-tailed kites, including stands of oaks for nesting along Mills Lane and adjacent to Napa River and open fields in close proximity for foraging.

Purple martin (*Progne subis*). CDFW Species of Special Concern. Moderate Potential. The purple martin is an uncommon summer resident in California, breeding in forest and woodlands at low- to mid- elevations throughout much of the state. Nesting occurs primarily in tree cavities; trees selected are usually taller or isolated, with low canopy cover at the nest height, and situated on the upper portions of slopes and/or near bodies of water where large aerial insects (favored prey) are abundant (Shuford and Gardali 2008). Conifers are the most frequently used tree type in northern California. Manmade structures with suitable cavities such as bridges or utility poles are also used.

Several of the large, mature oak and willow trees within the riparian corridor at the eastern edge of the Project Area contained tree cavities suitable for nesting. Several of the taller trees within this stand provided low canopy cover and open air space near the cavities. In addition, when flowing, the Napa River likely supports abundant prey for purple martin. One CNDDB occurrence is recorded east of the Study Area along the Napa River (CDFW 2020).

Swainson's hawk (*Buteo swainsoni*). State Threatened. Moderate Potential. Swainson's hawk is a summer resident and migrant in California's Central Valley and other scattered low-lying areas inland and near the coast. Nests are constructed of sticks and placed in trees located in otherwise largely open areas. Areas typically used for nesting include the edge of narrow bands of riparian vegetation, isolated patches of oak woodland, lone trees, and also planted and natural trees associated with roads, farmyards and sometimes adjacent residential areas. Foraging occurs in open habitats, including grasslands, open woodlands, and agricultural areas. While breeding, adults feed primarily on rodents (and other vertebrates); for the remainder of the year, large insects (e.g., grasshoppers, dragonflies) comprise most of the diet. In many areas, Swainson's hawks have adapted to foraging primarily in and around agricultural plots (particularly alfalfa, wheat and row crops), as prey is both numerous and conspicuous at harvest and/or during flooding or burning (Bechard et al. 2010).

The nesting range of Swainson's hawk is expanding northward into Napa Valley. In addition, a recent documented nesting occurrence is recorded in large oak tree along the Napa River, approximately four miles south of the Study Area (CDFW 2020). The large windbreak trees within and adjacent to the Study Area and the large oak trees within the Napa River riparian corridor provide suitable nesting habitat for this species. In addition, the fallow fields and ruderal vegetation within and adjacent to the western portion of the Study Area represent suitable foraging habitat. However, no suitable foraging habitat was present within the Project Area.

The following species are unlikely to occur but are discussed here further because they are CESA and/or ESA listed or otherwise special-status and documented occurrences exist near the Study Area.

California red-legged frog (*Rana draytonii*). Federal Threatened, CDFW Species of Special Concern. The California red-legged frog (CRLF) is dependent on suitable aquatic, estivation, and upland habitat. During periods of wet weather, starting with the first rainfall in late fall, red-legged frogs disperse away from their estivation sites to seek suitable breeding habitat. Aquatic and breeding habitat is characterized by dense, shrubby, riparian vegetation and deep, still or slow-moving water. Breeding occurs between late November and late April. California red-legged frogs estivate (period of inactivity) during the dry months in small mammal burrows, moist leaf litter, incised stream channels, and large cracks in the bottom of dried ponds.

No suitable breeding habitat is present within or adjacent to the Project Area. In addition, CRLF predators are likely present within this reach of the Napa River. The Napa River riparian corridor provides elements of suitable non-breeding aquatic habitat, however no known breeding ponds occur within 1 mile of the Project Area. The upland areas within the Study Area are heavily managed for agriculture and do not provide suitable upland habitat. In addition, no known breeding habitat is present within 1 mile of the Study Area and the developed areas of St. Helena directly north and west of the Study Area make it unlikely for this species to disperse through the Study Area. In addition, there are no documented occurrences within 7 miles and the nearest records are considered extirpated or possibly extirpated (CDFW 2020).

Foothill yellow-legged frog (*Rana boylii*). State Candidate (Threatened), CDFW Species of Special Concern. The foothill yellow-legged frog (FYLF) historically occurred in coastal and mountain streams from southern Oregon to Los Angeles County, but has declined in many parts of this range. This species is strongly associated with rivers and perennial creeks, and prefers shallow, flowing water with a rocky substrate. FYLF individuals do not typically move overland and are rarely observed far from a source of permanent water (typically less than ten feet). Aquatic breeding sites are in-stream, often near confluences, with eggs typically deposited behind or sometimes under rocks in low-flow areas with cobble and/or gravel (Thomson et al. 2016). Metamorphosis takes at least 15 weeks.

The Napa River adjacent to the Study Area provides a rocky substrate and may be occupied when the stream is flowing; any individuals present would presumably retreat downstream when flow ceases. Breeding within the stream is unlikely given the limited water depth and intermittent nature of the flow. There were no observations of this species during the site visit.

Steelhead - Central California Coast DPS (*Oncorhynchus mykiss irideus*). Federal Threatened. The Central California Coast DPS includes all naturally spawned populations of steelhead (and their progeny) in California streams from the Russian River to Aptos Creek, and the drainages of

San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin. Steelhead typically migrate to marine waters after spending two years in freshwater, though they may stay up to seven. They then reside in marine waters for two or three years prior to returning to their natal stream to spawn as four- or five-year olds. Steelhead adults typically spawn between December and June. In California, females typically spawn two times before they die. Preferred spawning habitat for steelhead is in perennial streams with cool to cold water temperatures, high dissolved oxygen levels and fast flowing water. Abundant riffle areas (shallow areas with gravel or cobble substrate) for spawning and deeper pools with sufficient riparian cover for rearing are necessary for successful breeding.

Steelhead are known to occur in this reach of the Napa River (Napa RCD 2006). In addition, the portion of the Napa River near the Study Area is within critical habitat for steelhead, as designated by NMFS (NMFS 2020). However, the river was completely dry during the site visit, indicating it is not suitable to support breeding or rearing habitat, which requires perennial or near-perennial flow. In addition, historical imagery suggests this reach of the Napa River has been seasonably dry in several years (e.g. 2013, 2014, 2016, 2019) during the late fall and early winter since at least 1993 (Google 2020). This indicates that this portion of the river does not reliably represent suitable breeding or rearing habitat in any given year. However, when flowing typically in the winter and spring, this stretch of the Napa River does represent important migration habitat for steelhead, connecting spawning habitat in upstream headwaters and marine, potential rearing, and estuarine habitat downstream.

Chinook salmon - Central Valley Fall/late fall-run ESU (Oncorhynchus tshawytscha), NMFS Species of Concern, CDFG Species of Special Concern. The Central Valley Fall/late fall-run ESU includes all naturally spawned spring-run populations from the Sacramento San Joaquin River mainstem and its tributaries. Late-fall run Chinook salmon are morphologically similar to spring-run chinook. They are large salmonids, reaching 75-100 cm SL and weighing up to 9-10 kg or more. The great majority of late-fall Chinook salmon appear to spawn in the mainstem of the Sacramento River, which they enter from October through February. Spawning occurs in January, February and March, although it may extend into April in some years. Eggs are laid in large depressions (redds) hollowed out in gravel beds. The embryos hatch following a 3-4 month incubation period and the alevins (sac-fry) remain in the gravel for another 2-3 weeks. Once their yolk sac is absorbed, the fry emerge and begin feeding on aquatic insects. All fry have emerged by early June. The juveniles hold in the river for nearly a year before moving out to sea the following December through March. Once in the ocean, salmon are largely piscivorous and grow rapidly. The specific habitat requirements of late-fall chinook have not been determined, but they are presumably similar to other Chinook salmon runs and fall within the range of the physical and chemical characteristics of the Sacramento River above Red Bluff.

Chinook salmon are known to occur in this reach of the Napa River (Napa RCD 2006). In addition, the portion of the Napa River near the Study Area is within Essential Fish Habitat for this species, as designated by NMFS (NMFS 2020). However, the river was completely dry during the site visit, indicating it is not suitable to support breeding or rearing habitat, which requires perennial or near-perennial flow. In addition, historical imagery suggests this reach of the Napa River has been seasonably dry in several years (e.g. 2013, 2014, 2016, 2019) during the late fall and early winter since at least 1993 (Google 2020). This indicates that this portion of the river does not reliably represent suitable breeding or rearing habitat in any given year. However, when flowing typically in the winter and spring, this stretch of the Napa River could represent important

migration habitat for Chinook salmon, potentially connecting spawning habitat in upstream headwaters and marine, potential rearing, and estuarine habitat downstream.

Western pond turtle (*Actinemys marmorata*), CDFW Species of Special Concern. The western pond turtle (WPT) is the only native freshwater turtle in California. This turtle is uncommon to common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest and Transverse Ranges. WPT inhabits annual and perennial aquatic habitats, such as coastal lagoons, lakes, ponds, marshes, rivers, and streams from sea level to 5,500 feet in elevation. Pond turtles also occupies man-made habitats such as stock ponds, wastewater storage, percolation ponds, canals, and reservoirs. This species requires low-flowing or stagnant freshwater aquatic habitat with suitable basking structures, including rocks, logs, algal mats, mud banks, and sand. Warm, shallow, nutrient-rich waters are ideal as they support prey items, which include aquatic invertebrates and occasionally fish, carrion, and vegetation. Turtles require suitable aquatic habitat for most of the year; however, WPT often occupies creeks, rivers, and coastal lagoons that become seasonally unsuitable. To escape periods of high water flow, high salinity, or prolonged dry conditions, WPT may move upstream and/or take refuge in vegetated, upland habitat for up to four months (Rathbun et al. 2002). Although upland habitat is utilized for refuging and nesting, this species preferentially utilizes aquatic and riparian corridors for movement and dispersal.

WPT nests from late April through July. This species requires open, dry upland habitat with friable soils for nesting and prefer to nest on unshaded slopes within 15 to 330 feet of suitable aquatic habitat (Rathbun et al. 1992). Females venture from water for several hours in the late afternoon or evening during the nesting season to excavate a nest, lay eggs, and bury the eggs to incubate and protect them. Nests are well-concealed, though native mammals are occasionally able to locate and predate upon eggs. Hatchlings generally emerge in late fall but may overwinter in the nest and emerge in early spring of the following year. The Study Area does not represent suitable habitat for WPT since the Napa River was completely dry during the site visit and this flow pattern has been recorded in previous years. Although WPT may move through this portion of the Napa River during periods of sustained flow, WPT is not likely to be present for prolonged periods of time, including for breeding, due to the intermittent presence of water. In addition, the upland habitat adjacent to the Napa River within the Study Area is highly modified and maintained agricultural land, making it not suitable for WPT breeding.

5.2.3 Critical Habitat, Essential Fish Habitat, and Wildlife Corridors

No designated Critical Habitat (USFWS 2020b) or Essential Fish Habitat (NMFS 2020) occurs in the Project Area. However, this reach of the Napa River directly adjacent to the Study Area is critical habitat for steelhead – Central California Coast DPS, as designated by NMFS (NMFS 2020). This reach of the Napa River is also considered Essential Fish Habitat for chinook and coho salmon, which includes large swaths of the Napa River watershed and most tributaries (NMFS 2020). The Napa River is also considered a designated wildlife corridor (Napa County 2005).

6.0 PROJECT ANALYSIS AND RECOMMENDATIONS

6.1 Sensitive Land Cover Types

6.1.1 Coast Live Oak Riparian Woodland

Coast live oak riparian woodland may be considered jurisdictional by CDFW pursuant to Section 1602 of the CFGC.

The Study Area contains 0.25 acre of coast live oak riparian woodland. The Project Area currently contains less than 0.01 acre of oak woodland and the project was intentionally designed to minimize impacts to this sensitive land cover type. The Project will avoid removing mature oak within the coast live oak riparian woodland. However, some trimming may be required. As a result, the following is recommended to protect coast live oak riparian woodlands.

> Recommendation 1: The Project should avoid impacting mature coast live oak trees to the maximum extent feasible. In addition, prior to project initiation, it is recommended that the City obtain a Lake and Streambed Alteration Agreement from CDFW to authorize construction activities within coast live oak riparian woodland habitat.

6.1.2 Aquatic Resources

The Project Area supports riparian habitat that may be regulated by CDFW. The Napa River, which is regulated as a waters of the U.S. and State, is situated outside of the Project Area. However, the Napa River flows adjacent to the eastern Project Area boundary and may be indirectly impacted during construction through accidental release of harmful chemicals or impaired runoff. The following measures are recommended to ensure project compliance with all applicable federal and state regulations.

> Recommendation 2:
>
> The City will may be required to secure regulatory permits to authorize impacts to Waters of the U.S. and Waters of the State prior to construction of the stormwater outfall structure and to comply with all permit conditions. In addition, regulatory agencies may require compensatory mitigation for impacts to jurisdictional habitat features in order to comply with the federal and state “no net loss of wetlands” policy. Impacts to jurisdictional features should not occur until the permits are received from the appropriate regulatory agencies, or correspondence is received from the agencies indicating that a permit is not required. The following requirements are anticipated:
>
> - Submit a jurisdictional delineation to the Corps to request verification of the extent of CWA 404 jurisdiction and a regulatory permit determination. If the Corps determines that the proposed project activities will not impact waters of the U.S., no further actions would be required. If it is determined that a permit is needed, a Pre-Construction Notification (PCN) would need to be submitted. The project proponent will be responsible for complying with all conditions outlined in the applicable Nationwide Permit.

- Apply for a Lake and Streambed Alteration Agreement (LSAA) to authorize outfall work proposed to occur along the bank of Napa River in accordance with Section 1600 of the CFGC. The City will be responsible for conducting all project activities in accordance with the LSAA.

- Submit to RWQCB an application for Clean Water Act Section 401 Water Quality Certification or Waste Discharge Requirements for Projects Involving Discharge of Dredged and/or Fill Material to Waters of the State. The City will be responsible for conducting all project activities in accordance with the permit provisions outlined in the applicable RWQCB permit.

In addition, the following aquatic resource impact avoidance and minimization measures would be implemented as part of the Project:

- Removal of vegetation will be minimized to the extent feasible during outfall installation work. Construction areas temporarily disturbed by excavation and construction activities will be restored immediately to pre-project conditions at minimum. The stream bank surrounding the work area will be stabilized through the installation of a rip-rap and revegetating disturbed areas with appropriate erosion control vegetation.
- Construction activities associated with the storm drain outfall installation and associated BMP activities, which will be performed in order to stabilize the slope surrounding the work area along the bank of Napa River, shall be conducted during the dry season, typically between April 1 and October 15 and should be suspended during unseasonable rainfalls of greater than one-half inch over a 24-hour period. If rainfall is in the forecast, standard erosion control measures (e.g., straw waddles, bales) should be deployed on the Project Area edge paralleling the aquatic feature. This work window may be adjusted based on weather patterns at the time of construction (e.g., late season precipitation could postpone the start date).
- Prior to construction activities, the boundaries of the Napa River including its secondary channel will be plotted on all construction plans and maps, including a minimum buffer of 10 feet or more as determined by a qualified biologist.
- Silt fencing and construction fencing (or flagging to make the silt fencing more visible) shall be installed above the OHWM of the Napa River, and the final location of the installed fencing shall be approved by a qualified biologist prior to initiation of construction activities.
- Encroachment into the sensitive habitat and buffer shall be prohibited by construction personnel, and storage of materials or equipment shall be prohibited in this area.
- Prior to the onset of construction activities, construction personnel shall be briefed on the location of sensitive habitat and other resources that shall be preserved and the importance of avoidance.
- The fencing shall be monitored regularly during construction activities to ensure that the fencing remains intact and functional, and that encroachment has not

occurred into the sensitive habitat or boundary; any repairs to the fence or encroachment correction shall be conducted immediately.

- All fueling and maintenance of vehicles and other equipment and staging areas shall be at least 50 feet (15 meters) from sensitive habitats.
- Appropriate sediment and erosion control best management practices (BMPs) (e.g., use of silt fencing and/or straw waddles around the perimeter of the construction zone) shall be implemented to minimize surface runoff originating from the development and thereby protect water quality of Napa River and its associated habitats. The BMPs shall be implemented during and following project construction, as described in the project's stormwater pollution prevention plan (SWPPP).
- To avoid establishment of invasive, non-native plant species on or adjacent to the project site, the following measures shall be implemented:
    - Vegetation disturbances shall be limited to those areas identified on construction plans and maps as slated for development or construction staging.
    - Native and compatible non-native plant species shall be used for revegetation. The list of plant species included in the seed mix will be pre-approved by CDFW prior to revegetation implementation.
    - The revegetation seed mix will not include invasive non-native plants that threaten wildlands according to the California Invasive Plant Inventory made available by the California Invasive Plant Council (Cal-IPC).
    - Erosion and sediment control materials shall be certified as weed-free.

6.2 Special-status Species

6.2.1 Special-status Plants

No special-status plants have the potential to occur within the Study Area, therefore, no further studies are recommended.

6.2.2 Special-status Wildlife

The Study Area has the potential to support four special-status wildlife species (three bats and three birds), as well as non-status native birds protected under the CFGC (Sections 3503, 3503.5, 3513). The following measures are recommended to avoid or otherwise minimize potential impacts to these species.

Bat Species: Three special-status bats have the potential to occur within the Study Area (pallid bat, fringed myotis, long-tailed myotis). Removal and trimming of trees during the bat maternity season (generally, April through August) could impact bat breeding and potentially result in the take of bats. Because a targeted bat habitat assessment was not conducted as part of this biological assessment, pre-construction surveys for bat habitat and recommendations for tree removal to avoid impacts to bat species are provided below.

> Recommendation 3: WRA recommends that any tree removal be performed from September through March, outside of the general bat maternity season. If tree removal

during this period is not feasible, it is recommended that a bat habitat assessment and survey effort (the latter if needed) be performed by a qualified biologist prior to tree removal to determine if bats are present in the trees. If no suitable roosting habitat for bats is found, then no further study is warranted. If special-status bat species or bat maternity roosts are detected, then roost trees should be avoided until the end of the maternity roosting season. If this avoidance is not feasible, appropriate species- and roost-specific mitigation measures should be developed in consultation with CDFW. Irrespective of time of year, all felled trees should remain on the ground for at least 24 hours prior to chipping, off-site removal, or other processing to allow any bats present within the felled trees to escape.

All Native Bird Species (including non-special-status): In addition to the three special-status bird species discussed above (white-tailed kite, Swainson's hawk, and purple martin), a variety of non-status bird species with baseline protections under the CFGC may use vegetation within the Project Area for nesting. Seasonal work restrictions or pre-construction surveys are recommended to ensure that the implementation of the Proposed Project would not impact any nesting birds.

Recommendation 4: WRA recommends that tree/vegetation removal and initial ground disturbance occur from August 16 to January 31, outside of the general bird nesting season. If tree/vegetation removal during this time is not feasible, a pre-construction nesting bird survey should be performed by a qualified biologist no more than 14 days prior to the initiation of tree removal or ground disturbance is recommended. The survey should cover the Project Area (including tree removal areas) and surrounding areas within 500 feet where access is feasible. If active bird nests are found during the survey, an appropriate no-disturbance buffer should be established by the qualified biologist. Once it is determined that the young have fledged (left the nest) or the nest otherwise becomes inactive (e.g., due to predation), the buffer may be lifted and work may be initiated within the buffer.

Swainson's Hawk: In addition to other special-status and non-special status nesting birds previously discussed, Swainson's hawk have the potential to nest within or adjacent to the Study Area. Although foraging habitat is located nearby the Project, the Project Area does not include any foraging habitat. Due to CESA protections, additional pre-construction surveys are recommended to ensure that the implementation of the Project would not impact any nesting Swainson's hawks.

Recommendation 5: If tree removal occurs during the Swainson's hawk nesting season (between March 1 to September 15), a minimum of two pre-construction Swainson's hawk nest surveys should be performed. Nest surveys should be conducted within a 0.25-mile radius of the Study Area (where accessible) and fall within Survey Periods II and III and be conducted with methodology outlined in the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (CDFG 2000). If a nest is located during pre-construction surveys, the qualified biologist should establish an appropriate no-disturbance buffer. Once it is determined that the young have fledged (left the nest) or the nest otherwise becomes inactive (e.g., due to predation), the buffer may be lifted and work may be initiated within the buffer.

California red-legged frog, Foothill yellow-legged frog, Western pond turtle: When it is inundated and flowing, the main channel of the Napa River (outside of the Project Area) could support CRLF, FYLF, and WPT that are dispersing upstream or downstream from perennial reaches of the Napa River that provide year-round suitable habitat for these species. Because the Napa River draws down completely following the end of the wet season, it does not provide suitable breeding habitat for CRLF or FYLF. However, out of an abundance of caution and to avoid any potential impacts to these species as a result of outfall construction work, the following measures are recommended.

> Recommendation 6: Outfall construction work would be conducted during the dry season when the adjacent stretch of the Napa River is completely dry. In addition, two (2) preconstruction surveys should be performed by a qualified biologist within the Project Area and a surrounding 100-foot buffer from the limit of disturbance no more than 5 days prior to project initiation. The surveys must have remarkably different light angles (e.g., early morning and early afternoon), but can be conducted on the same day. Survey areas (streams) will be systematically walked upstream, zig-zagging between the bank and the thalweg in wide areas, and bank-to-bank in narrow areas. All areas along the streams that could support frogs or WPT will be searched, including rocks, ledges, woody debris, overhanging vegetation, and exposed logs. Surveyors will use binoculars to reduce disturbing frogs and flashlights for searching darkened crevices and shaded areas. Slow-moving and/or still waters will be closely inspected for the presence of tadpoles.
>
> If no CRLF, FYLF, or WPT are detected during the pre-construction survey, additional impact avoidance measures would be warranted. Such measures include: (1) installation of exclusion fencing, (2) presence of qualified biologist[3] during ground disturbance activities, and (3) implementation of a worker education program. Exclusion fencing shall be installed along the inhabited aquatic feature immediately adjacent to the Project Area, extending 100 feet beyond the terminus of the proposed ground disturbance in each direction. The qualified biologist will be present to perform a survey of the Project Area in the morning prior to that day's ground-breaking activities. If a CRLF, FYLF, or WPT is present within the Project Area, individual frogs or WPT shall be allowed to leave the disturbance area of their own accord, as confirmed by the biologist. Alternatively, other measures may be derived and approved in coordination with the CDFW. Finally, the worker education program shall consist of a qualified biologist providing construction personnel with information regarding the identification and ecology of CRLF, FYLF and WPT, the potential for occurrence of the species within work areas, the legal status of the species and ramifications for take, the specific measures being implemented to avoid impacts to CRLF, FYLF, and WPT, and the role of the qualified biologist.

Steelhead and Chinook Salmon: When it is inundated and flowing, the portion of the Napa River within the Study Area has the potential to support steelhead and Chinook salmon dispersing upstream or downstream from spawning or rearing areas in other reaches of the Napa River. However, the proposed outfall structure has been sited to avoid direct impacts to the Napa River

[3] A qualified biologist is an individual who possesses, at a minimum, a bachelor's or advanced degree, from an accredited university, with a major in biology, zoology, wildlife biology, natural resources science, or a closely related scientific discipline, at least two years of field experience in the biology and natural history of local plant, fish, and wildlife resources in the Project Area vicinity, and knowledge of state and federal laws regarding the protection of sensitive and endangered species.

and its secondary channels and all will be construction during the dry season to avoid adverse effects to steelhead and Chinook salmon. The proposed Project would increase the quality of treated water discharged into the Napa River compared to existing discharge. While operation of the Project would not adversely impact the Napa River, construction of may result in excess sedimentation, runoff or accidental release of harmful chemicals. The potential discharge of impaired runoff during construction activities into the Napa River could degrade the quality of this habitat and generate a significant impact to special-status fish and wildlife species that rely on this habitat. Implemented as part of the project, a Stormwater Pollution Prevention Plan (SWPPP) would require water quality BMPs to ensure that water leaving the construction area does not exceed water quality thresholds. These measures would protect water quality in the Napa River by minimizing the risk of hazardous materials spills and preventing runoff of impaired water offsite. The Project will also bury all rip-rap to restore natural contours to the streambank and eliminate surfaces on the outfall structure that may serve as perches or platforms. These design features will serve to discourage steelhead and Chinook predators from using the constructed outfall structure.

6.2.3 Wildlife Movement

As stated in Section 5.2., the Study Area predominantly consists of a paved road surrounded by agricultural land and rural residences. Construction of the storm water outfall will occur within a small portion of the upper stream bank and is not expected to impede wildlife movement within the Napa River corridor. Surrounding oak woodland and riverine habitat will allow for continued localized movement of wildlife. Native resident or migratory fish or wildlife species, established native resident or migratory wildlife corridors, and native wildlife nursery sites would not be significantly affected by the proposed Project.

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Appendix A

Figures

Appendix B

Potential for Special-status Species to Occur in the Study Area

Appendix B: Special-Status Species Table

Species	Status*	Habitat	Potential for Occurrence**
PLANTS			
Amorpha californica var. *napensis* **Napa false indigo**	Rank 1B.2	Shrub. Blooms April through July. Found in openings in broadleafed upland forest/woodland, cismontane woodland, and chaparral. Known elevations range from 45 to 8,465 feet above mean sea level (amsl).	**No Potential.** This perennial shrub would have been identifiable by vegetative characteristics and was not observed during the survey.
Astragalus claranus **Clara Hunt's milk- vetch**	FE, ST, Rank 1B.1	Annual herb. Blooms March through May. Occurs on open grassy hillsides in cismontane woodland, valley and foothill grassland, and chaparral, especially on exposed shoulders in thin, volcanic clay soils moist in spring. Known elevations range from 195 to 10,140 feet amsl.	**No Potential.** Suitable habitat (open grassy hillsides in cismontane woodland) is not present within the Project Area.
Astragalus clevelandii **Cleveland's milk- vetch**	Rank 4.3	Perennial herb. Blooms June through September. Occurs on serpentine seeps in chaparral, cismontane woodland, and riparian forest. Known elevations range from 655 to 4,920 feet amsl.	**No Potential.** Suitable habitat (serpentine seeps) is not present within the Project Area.
Brodiaea leptandra **narrow-anthered brodiaea**	Rank 1B.2	Perennial herb. Blooms May through July. Found on volcanic substrates in broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland. Known elevations range from 95 to 2,000 feet amsl.	**No Potential.** Suitable habitat (volcanic substrates) is not present within the Project Area.
Calamagrostis ophitidis	Rank 4.3	Perennial grass. Blooms April through July. Occurs on	**No Potential.** Suitable habitat (serpentine,

Species	Status*	Habitat	Potential for Occurrence**
serpentine reed grass		serpentine, rocky soils in chaparral (open, often north-facing slopes), lower montane coniferous forest, meadows and seeps, and valley and foothill grassland. Known elevations range from 230 to 3,495 feet amsl.	rocky soils) is not present within the Project Area.
Calochortus uniflorus **pink star-tulip**	Rank 4.2	Perennial bulbiferous herb. Blooms April through June. Found in coastal prairie, coastal scrub, meadows and seeps, and North Coast coniferous forest. Known elevations range from 25 to 6,135 feet amsl.	**No Potential.** Suitable habitat (North Coast coniferous forest) is not present within the Project Area.
Castilleja ambigua var. *ambigua* **johnny-nip**	Rank 4.2	Annual herb (hemiparasitic). Blooms March through August. Occurs in coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grassland, and vernal pool margins. Known elevations range from 0 to 435 feet amsl.	**No Potential.** Suitable habitat (coastal habitats, marshes and swamps, grasslands, and vernal pools) is not present within the Project Area. .
Ceanothus confusus **Rincon Ridge ceanothus**	Rank 1B.1	Shrub. Blooms February through June. Known from volcanic or serpentine soils, dry shrubby slopes in closed-cone coniferous forest, chaparral, and cismontane woodland. Known elevations range from 295 to 4,200 feet amsl.	**No Potential.** Suitable habitat (chaparral on volcanic or serpentine soils) is not present within the Project Area. Further, this shrub species was not observed during the survey.
Ceanothus divergens **Calistoga ceanothus**	Rank 1B.2	Shrub. Blooms February through April. Found on rocky, serpentine or volcanic sites in chaparral and cismontane woodland. Known elevations range from 325 to 4,300 feet amsl.	**No Potential.** Suitable habitat (chaparral or woodland on rocky, serpentine or volcanic sites) is not present within the Project Area.
Ceanothus purpureus	Rank 1B.2	Shrub. Blooms March through	**No Potential.** Suitable habitat (rocky, volcanic

Species	Status*	Habitat	Potential for Occurrence**
holly-leaved ceanothus		May. Grows on rocky, volcanic slopes in chaparral and cismontane woodland. Known elevations range from 130 to 2,560 feet amsl.	slopes) is not present within the Project Area.
Ceanothus sonomensis **Sonoma ceanothus**	Rank 1B.2	Shrub. Blooms February through April. Grows on sandy, serpentine or volcanic, soils in chaparral. Known elevations range from 455 to 2,610 feet amsl.	**No Potential.** Suitable habitat (sandy, serpentine or volcanic, soils in chaparral) is not present within the Project Area.
Centromadia parryi ssp. *parryi* **pappose tarplant**	Rank 1B.2	Annual herb. Blooms May through November. Found in vernally mesic, often alkaline sites in chaparral, coastal prairie, meadows and seeps, coastal salt marsh, and valley and foothill grassland. Known elevations range from 5 to 1,380 feet amsl.	**No Potential.** Suitable habitat (vernally mesic sites) is not present within the Project Area. If present, senescent individuals of this late blooming species would have been observed during the survey; however, this species was not detected.
Clarkia gracilis ssp. *tracyi* **Tracy's clarkia**	Rank 4.2	Annual herb. Blooms April through July. Occurs in chaparral openings, usually on serpentine soils. Known elevations range from 210 to 2,135 feet amsl.	**No Potential.** Suitable habitat (serpentine soils in chaparral openings) is not present within the Project Area.
Collomia diversifolia **serpentine collomia**	Rank 4.3	Annual herb. Blooms May through June. Found on serpentine, rocky or gravelly soils in chaparral and cismontane woodland. Known elevations range from 655 to 4,100 feet amsl.	**No Potential.** Suitable habitat (serpentine, rocky or gravelly soils) is not present within the Project Area.
Cordylanthus tenuis ssp. *brunneus* **serpentine bird's- beak**	Rank 4.3	Annual herb (hemiparasitic). Blooms July through August. Usually occurs on serpentine soils in closed-cone coniferous forest, chaparral, and cismontane woodland. Known elevations	**No Potential.** Suitable habitat (serpentine soils and coniferous forests) is not present within the Project Area.

Species	Status*	Habitat	Potential for Occurrence**
		range from 490 to 3,005 feet amsl.	
Delphinium uliginosum **swamp larkspur**	Rank 4.2	Perennial herb. Blooms May through June. Found on serpentine seeps in chaparral and valley and foothill grassland. Known elevations range from 950 to 2,430 feet amsl.	**No Potential.** Suitable habitat (serpentine seeps) is not present within the Project Area.
Erigeron biolettii **streamside daisy**	Rank 3	Perennial herb. Blooms June through October. Occurs on rocky, mesic sites in broadleafed upland forest, cismontane woodland, and North Coast coniferous forest. Known elevations range from 25 to 3,645 feet amsl.	**No Potential.** Suitable habitat (rocky, mesic sites in forests and woodlands) is not present within the Project Area.
Erigeron greenei **Greene's narrow- leaved daisy**	Rank 1B.2	Perennial herb. Blooms May through September. Occurs on serpentine and volcanic substrates in shrubby vegetation (chaparral). Known elevations range from 260 to 3,300 feet amsl.	**No Potential.** Suitable habitat (serpentine and volcanic substrates) is not present within the Project Area.
Eryngium constancei **Loch Lomond button-celery**	FE, SE, Rank 1B.1	Annual, perennial herb. Blooms April through June. Found in volcanic ash flow vernal pools. Known elevations range from 1,310 to 2,885 feet amsl.	**No Potential.** Suitable habitat (volcanic ash flow vernal pools) is not present within the Project Area, which is outside of its known elevation range.
Harmonia nutans **nodding harmonia**	Rank 4.3	Annual herb. Blooms March through May. Occurs on rocky or gravelly volcanic soils in chaparral and cismontane woodland. Known elevations range from 100 to 3,200 feet amsl.	**No Potential.** Suitable habitat (volcanic soils) is not present within the Project Area.
Hesperolinon bicarpellatum **two-carpellate western**	Rank 1B.2	Annual herb. Blooms May through July. Found on serpentine soils in chaparral. Known elevations range from 195 to 3,300 feet amsl.	**No Potential.** Suitable habitat (serpentine soils) is not present within the Project Area

Species	Status*	Habitat	Potential for Occurrence**
flax			
Hesperolinon sharsmithiae **Sharsmith's western flax**	Rank 1B.2	Annual herb. Blooms May through July. Grows on serpentine substrates in chaparral. Known elevations range from 885 to 1,905 feet amsl.	**No Potential.** Suitable habitat (serpentine substrates) is not present within the Project Area
Iris longipetala **coast iris**	Rank 4.2	Perennial rhizomatous herb. Blooms March through May. Occurs on mesic sites in coastal prairie, lower montane coniferous forest, and meadows and seeps. Known elevations range from 0 to 1,970 feet amsl.	**No Potential.** Suitable habitat (mesic sites in lower montane coniferous forest) is not present within the Project Area.
Lasthenia burkei **Burke's goldfields**	FE, SE, Rank 1B.1	Annual herb. Blooms April through June. Most often found in vernal pools, swales, meadows, and seeps. Known elevations range from 45 to 1,970 feet amsl.	**No Potential.** Suitable habitat (vernal pools and swales) is not present within the Project Area.
Layia septentrionalis **Colusa layia**	Rank 1B.2	Annual herb. Blooms April through May. Often found as scattered colonies on sandy or serpentine soils in in fields and grassy slopes within chaparral, cismontane woodland, and valley and foothill grassland. Known elevations range from 45 to 3,610 feet amsl.	**No Potential.** Suitable habitat (grassy slopes on sandy/serpentine soils within cismontane woodland) is not present within the Project Area.
Leptosiphon jepsonii **Jepson's leptosiphon**	Rank 1B.2	Annual herb. Blooms March through May. Occurs on open to partially shaded grassy slopes and on volcanic soils or the periphery of serpentine substrates in chaparral and cismontane woodland. Known elevations range from 180 to 2,805 feet amsl.	**No Potential.** Suitable habitat (grassy slopes in cismontane woodland) is not present within the Project Area.
Limnanthes vinculans	FE, SE, Rank 1B.1	Annual herb. Blooms April through May. Grows in swales, wet meadows, and marshy areas in	**No Potential.** Suitable habitat (vernal pools and swales, meadows, and marshy areas)

Species	Status*	Habitat	Potential for Occurrence**
Sebastopol meadowfoam		valley oak savanna; on poorly drained soils of clays and sandy loam in meadows and seeps, vernal pools, and valley and foothill grassland. Known elevations range from 45 to 380 feet amsl.	is not present within the Project Area.
Lomatium repostum **Napa lomatium**	Rank 4.3	Perennial herb. Blooms March through June. Grows on serpentine soils in chaparral and cismontane woodland. Known elevations range from 295 to 2,725 feet amsl.	**No Potential.** Suitable habitat (serpentine soils) is not present within the Project Area. Further, this perennial herb would have been identifiable by vegetative characteristics and was not observed during the survey.
Lupinus sericatus **Cobb Mountain lupine**	Rank 1B.2	Perennial herb. Blooms March through June. Found on open wooded slopes in gravelly (sometimes serpentine) soils in stands of knobcone pine-oak woodland, chaparral, cismontane woodland, lower montane coniferous forest, and broadleafed upland forest. Known elevations range from 900 to 1,525 feet amsl.	**No Potential.** Suitable habitat (gravelly soils on open wooded slopes) is not present within the Project Area. Further, this perennial shrub would have been identifiable by vegetative characteristics and was not observed during the survey.
Micropus amphibolus **Mt. Diablo cottonweed**	Rank 3.2	Annual herb. Blooms March through May. Occurs on rocky substrates in broadleafed upland forest, chaparral, cismontane woodland, and valley and foothill grassland. Known elevations range from 155 to 2,710 feet amsl.	**No Potential.** Suitable habitat (rocky substrates in chaparral, forests and woodlands) is not present within the Project Area.
Monardella viridis	Rank 4.3	Perennial rhizomatous herb. Blooms June through September.	**No Potential.** Suitable habitat is not present within the

Species	Status*	Habitat	Potential for Occurrence**
green monardella		Grows in broadleafed upland forest, chaparral, and cismontane woodland. Known elevations range from 165 to 3,315 feet amsl.	Project Area. Further, this perennial herb would have been identifiable by vegetative characteristics and was not observed during the survey.
Navarretia cotulifolia **cotula navarretia**	Rank 4.2	Annual herb. Blooms May through June. Occurs on adobe substrate in chaparral, cismontane woodland, and valley and foothill grassland. Known elevations range from 0 to 6,005 feet amsl.	**No Potential.** Suitable habitat (chaparral and grassland on adobe substrate) is not present within the Project Area.
Navarretia leucocephala ssp. *bakeri* **Baker's navarretia**	Rank 1B.1	Annual herb. Blooms April through July. Occurs on adobe or alkaline soils in vernal pools and swales in cismontane woodland, meadows and seeps, valley and foothill grassland, and lower montane coniferous forest. Known elevations range from 5 to 5,510 feet amsl.	**No Potential.** Suitable habitat (vernal pools/swales, meadows or seeps on adobe or alkaline soils) is not present within the Project Area.
Penstemon newberryi var. *sonomensis* **Sonoma beardtongue**	Rank 1B.3	Perennial herb. Blooms April through August. Found in crevices on rock outcrops and talus slopes in chaparral. Known elevations range from 590 to 4,610 feet amsl.	**No Potential.** Suitable habitat (crevices on rock outcrops and talus slopes in chaparral) is not present within the Project Area. Further, this perennial herb would have been identifiable by vegetative characteristics and was not observed during the survey.
Plagiobothrys strictus **Calistoga popcornflower**	FE, ST, Rank 1B.1	Annual herb. Blooms March through June. Grows in alkaline sites near thermal springs and on margins of vernal pools in heavy, dark, adobe- like clay in meadows and seeps, valley and foothill	**No Potential.** Suitable habitat (alkaline sites and thermal springs on heavy, dark, adobe- like clay soils) is not present within the Project Area.

Species	Status*	Habitat	Potential for Occurrence**
		grassland, and vernal pools. Known elevations range from 295 to 1,510 feet amsl.	
Poa napensis **Napa bluegrass**	FE, SE, Rank 1B.1	Perennial grass. Blooms May through August. Found in meadows and seeps and valley and foothill grassland; prefers moist, alkaline meadows fed by runoff from nearby hot springs. Known elevations range from 325 to 660 feet amsl.	**No Potential.** Suitable habitat (moist, alkaline meadows) is not present within the Project Area.
Ranunculus lobbii **Lobb's aquatic buttercup**	Rank 4.2	Annual herb (aquatic). Blooms February through May. Occurs on mesic sites in cismontane woodland, North Coast coniferous forest, valley and foothill grassland, and vernal pools. Known elevations range from 40 to 2,655 feet amsl.	**No Potential.** Suitable aquatic habitat is not present within the Project Area.
Senecio clevelandii var. *clevelandii* **Cleveland's ragwort**	Rank 4.3	Perennial herb. Blooms June through July. Found on serpentine seeps in chaparral. Known elevations range from 1,195 to 2,955 feet amsl.	**No Potential.** Suitable habitat (serpentine seeps) is not present within the Project Area, which is outside of its known elevation range. Further, this perennial herb would have been identifiable by vegetative characteristics and was not observed during the survey.
Sidalcea hickmanii ssp. *napensis* **Napa checkerbloom**	Rank 1B.1	Perennial herb. Blooms April through June. Found on rhyolitic substrates in chaparral. Known elevations range from 1,360 to 2,005 feet amsl.	**No Potential.** Suitable habitat (rhyolitic substrates) is not present within the Project Area, which is outside of its known elevation range. Further, this perennial herb would have been identifiable by vegetative characteristics

Species	Status*	Habitat	Potential for Occurrence**
			and was not observed during the survey.
Sidalcea oregana ssp. *hydrophila* **marsh checkerbloom**	Rank 1B.2	Perennial herb. Blooms July through August. Occurs in wet soils along streambanks, meadows and seeps, and riparian forest. Known elevations range from 1,310 to 6,660 feet amsl.	**No Potential.** Suitable habitat (wet soils along streambanks and riparian forest) is not present within the Project Area, which is also outside of this species' known elevation range. Further, this perennial species was not observed during the survey. No plants belonging to the *Sidalcea* genus were observed during the survey.
Toxicoscordion fontanum **marsh zigadenus**	Rank 4.2	Perennial bulbiferous herb. Blooms April through July. Grows on vernally mesic, often serpentine sites in chaparral, cismontane woodland, lower montane coniferous forest, meadows and seeps, and marshes and swamps. Known elevations range from 45 to 3,280 feet amsl.	**No Potential.** Suitable habitat (vernally mesic sites in woodlands, forests, and marshes) is not present within the Project Area. Further, this perennial herb would have been identifiable by vegetative characteristics and was not observed during the survey.
Viburnum ellipticum **oval-leaved viburnum**	Rank 2B.3	Shrub. Blooms May through June. Occurs in chaparral, cismontane woodland, and lower montane coniferous forest. Known elevations range from 330 to 4,595 feet amsl.	**No Potential.** Suitable habitat (chaparral and lower montane coniferous forest) is not present within the Project Area. Further, this perennial shrub would have been identifiable by vegetative characteristics and was not observed during the survey.
INVERTEBRATES			
Bombus occidentalis	SC	Once common and widespread; species has declined precipitously	**Unlikely.** Known widespread prior to the 1990's. Low

Species	Status*	Habitat	Potential for Occurrence**
western bumble bee		from central California to southern British Columbia, Canada, perhaps from disease.	potential to occur within the Project Area due to its decline and ongoing threats.
Syncaris pacifica **California freshwater shrimp**	FE, SE	Endemic to Marin, Napa, and Sonoma Counties. Found in low elevation (less than 380 feet), low gradient streams (less than 1 percent) where riparian cover is moderate to heavy, with shallow pools away from the main streamflow. Winters in undercut banks with exposed roots. Summers in leafy branches touching water.	**Unlikely.** Suitable habitat (low gradient streams with moderate riparian cover, shallow pools away from the main streamflow) is present within the Napa River adjacent to the Project Area. However, there is no suitable aquatic habitat located within the Project Area.
FISHES			
Oncorhynchus mykiss irideus **steelhead - central California coast DPS**	FT	From Russian River, south to Soquel Creek and to, but not including, Pajaro River. Sacramento/San Joaquin flowing waters. Also San Francisco and San Pablo Bay basins. Occupies freshwater streams or lakes, using aquatic vegetation, boulders, and wood as protective cover. Spend the majority of the year in estuaries or open ocean and only return to freshwater to spawn.	**Unlikely.** Designated critical habitat is present adjacent to the Project Area in the Napa River; however, the Project will avoid wetted portions of the Napa River.
Oncorhynchus kisutch **Coho salmon - central CA coast ESU**	FE, SE, NMFS	Federal listing includes populations between Punta Gorda and San Lorenzo River. State listing includes populations south of San Francisco Bay only. Occurs inland and in coastal marine waters. Requires beds of loose, silt-free, coarse gravel	**No Potential.** Although the Study Area is located within designated Essential Fish Habitat for this species, coho salmon is considered likely extirpated from the Napa River (Leidy 2006).

Species	Status*	Habitat	Potential for Occurrence**
		for spawning. Also needs cover, cool water and sufficient dissolved oxygen.	
Oncorhynchus tshawytscha **Chinook salmon - central valley fall/late fall-run ESU**	SSC, NMFS	Populations spawning in the Sacramento and San Joaquin Rivers and their tributaries. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for 1 or more years before migrating downstream to the ocean.	**Unlikely.** Suitable habitat (freshwater stream) is present adjacent to the Project Area in the Napa River; however, the Project will avoid wetted portions of the Napa River.
AMPHIBIANS			
Dicamptodon ensatus **California giant salamander**	SSC	Known from wet coastal forests near streams and seeps from Mendocino County, south to Monterey County, and east to Napa County. Aquatic larvae found in cold, clear streams, occasionally in lakes and ponds. Adults known from wet forests under rocks and logs near streams and lakes.	**Unlikely.** No suitable wet coastal forests are present within the Project Area.
Rana boylii **foothill yellow- legged frog**	SSC	Partly-shaded, shallow streams and riffles with a rocky substrate in chaparral, cismontane woodland, coastal scrub, and Klamath/North Coast flowing waters. Need at least some cobble-sized substrate for egg-laying. Need at least 15 weeks to attain metamorphosis.	**Unlikely.** The Napa River outside of the Project Area provides a rocky substrate and may be occupied when the stream is flowing; any individuals present would presumably retreat downstream when flow ceases. Breeding within the stream is unlikely given the limited water depth and intermittent nature of the flow. Project Area, however the Project will avoid the main channel.

Species	Status*	Habitat	Potential for Occurrence**
Rana draytonii **California red- legged frog**	FT, SSC	Occurs in lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11 to 20 weeks of permanent water for larval development. Must have access to estivation habitat.	**Unlikely.** No suitable breeding habitat is present within or adjacent to the Project Area. In addition, CRLF predators are likely present within this reach of the Napa River. The Napa River riparian corridor provides elements of suitable non-breeding aquatic habitat, however no known breeding ponds occur within 1 mile of the Project Area. The upland areas within the Study Area are heavily managed for agriculture and do not provide suitable upland habitat. In addition, no known breeding habitat is present within 1 mile of the Study Area and the developed areas of St. Helena directly north and west of the Study Area make it unlikely for this species to disperse through the Study Area. In addition, there are no documented occurrences within 7 miles and the nearest records are considered extirpated or possibly extirpated (CDFW 2020).
Taricha rivularis **red-bellied newt**	SSC	Inhabits coastal forests from southern Sonoma County northward, with an isolated population in Santa Clara County. Redwood forest provides typical habitat, though other forest types (e.g., hardwood) are also occupied. Adults are terrestrial and fossorial. Breeding occurs in	**Unlikely.** No suitable redwood forests are present within the Project Area. In addition, the nearest documented occurrences is recorded 7 miles west of the Project Area near Mt. Hood (CDFW 2020).

Species	Status*	Habitat	Potential for Occurrence**
		streams, usually with relatively strong flow.	
REPTILES			
Emys marmorata **western pond turtle**	SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams, and irrigation ditches, usually with aquatic vegetation, below 6,000 feet amsl; occur in artificial flowing waters, Klamath/North Coast flowing waters, Klamath/North Coast standing waters, and marshes and swamps. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 kilometer from water for egg-laying.	**Unlikely, Potential within Napa River.** Suitable habitat (streams with aquatic vegetation) is present adjacent to the Project Area within the Napa River. However, the Project will avoid the main channel of the Napa River. No suitable nesting sites are present within the Project Area within 0.5 kilometer of the Napa River.
BIRDS			
Falco peregrinus anatum **American peregrine falcon**	FD, SD, FP	Occurs near wetlands, lakes, rivers, or other water sources. Nests on cliffs, banks, dunes, mounds; also, human-made structures. Nest consists of a scrape, depression, or ledge in an open site.	**Unlikely.** Suitable nesting habitat (cliffs, banks, dunes, and mounds) is not present within the Project Area. However, this species may forage in the vicinity.
Progne subis **purple martin**	SSC	Inhabits broadleaved upland forest, lower montane coniferous forest, woodlands, and low elevation coniferous forest of Douglas-fir, ponderosa pine, and Monterey pine. Nests in old woodpecker cavities mostly, also in human-made structures. Nest often located in tall, isolated tree/snag.	**Moderate.** Suitable habitat (woodlands with woodpecker cavities) is present within the Project Area.
Agelaius tricolor **tricolored blackbird**	ST, SSC	Nearly endemic to California, where it is most numerous in the Central Valley and vicinity.	**Unlikely.** Limited riparian thicket is present within the Project Area, however these

Species	Status*	Habitat	Potential for Occurrence**
		Highly colonial, nesting in dense aggregations over or near freshwater in emergent growth or riparian thickets. Also uses flooded agricultural fields. Abundant insect prey near breeding areas essential.	patches are likely not large enough to support nesting colonies. In addition, the nearest documented occurrence is 8 miles east of the Project Area (CDFW 2020).
Ardea alba **great egret**	none (breeding sites protected by CDFW); CDF sensitive	Year-round resident. Nests colonially or semi-colonially, usually in trees, occasionally on the ground or elevated platforms. Breeding sites usually in close proximity to foraging areas: marshes, lake margins, tidal flats, and rivers. Forages primarily on fishes and other aquatic prey, also smaller terrestrial vertebrates.	**Unlikely.** Large roost trees near foraging areas are not present within the Project Area. In addition, the nearest documented occurrence is 6 miles east of the Project Area on the shores of Lake Hennessey (CDFW 2020). This species may occasionally forage in the Project Area.
Ardea herodias **great blue heron**	none (breeding sites protected by CDFW); CDF sensitive	Year-round resident. Nests colonially or semi-colonially in tall trees and on cliffs, also sequestered terrestrial substrates. Breeding sites usually in close proximity to foraging areas: marshes, lake margins, tidal flats, and rivers. Forages primarily on fishes and other aquatic prey, also smaller terrestrial vertebrates.	**Unlikely.** Large roost trees or cliffs near foraging areas are not present within the Project Area. In addition, the nearest documented occurrence is 6 miles east of the Project Area on the shores of Lake Hennessey (CDFW 2020). This species may occasionally forage in the Project Area
Buteo swainsoni **Swainson's hawk**	ST	Summer resident in California's Central Valley and limited portions of the southern California interior. Nests in tree groves and isolated trees in riparian and agricultural areas, including near buildings. Forages in grasslands and scrub habitats	**Moderate Potential.** Large trees for nesting nearby open fields for foraging habitat is present in the western portion of the Project Area. In addition, the nearest documented nesting site is 4 miles south of the Project Area

Species	Status*	Habitat	Potential for Occurrence**
		as well as agricultural fields, especially alfalfa. Preys on arthropods year-round as well as smaller vertebrates during the breeding season.	in a large oak tree, which are also present onsite (CDFW 2020).
Elanus leucurus **white-tailed kite**	CFP	Year-round resident in coastal and valley lowlands with scattered trees and large shrubs, including grasslands, marshes and agricultural areas. Nests in trees, of which the type and setting are highly variable. Preys on small mammals and other vertebrates.	**Moderate Potential.** Suitable nesting and foraging habitat is present throughout the Project Area.
Haliaeetus leucocephalus **bald eagle**	FD, SE, CFP	Occurs year-round in California, but primarily a winter visitor; breeding population is growing. Nests in large trees in the vicinity of larger lakes, reservoirs and rivers. Wintering habitat somewhat more variable but usually features large concentrations of waterfowl or fish.	**Unlikely.** Large trees suitable for nesting are present within the Project Area, however the Napa River is likely not large enough to support stable foraging. The nearest documented occurrence is from 1988 and is located 5 miles east of the Project Area near Lake Hennessey (CDFW 2020).
MAMMALS			
Antrozous pallidus **pallid bat**	SSC, WBWG High	Occurs in multiple habitats, including deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**Moderate Potential.** Suitable foraging habitat (woodlands and forests) is present within the Project Area. In addition, large trees within the Project Area may provide suitable roosting habitat.
Corynorhinus townsendii	SSC, WBWG High	Found throughout California in a wide variety of habitats. Most	**Unlikely.** Suitable foraging habitat (mesic sites) is

Species	Status*	Habitat	Potential for Occurrence**
Townsend's big- eared bat		common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	present within the Project Area. However, the Project Area does not contain suitable roosting habitat.
Myotis thysanodes **fringed myotis**	SSC, WBWG High	Occurs in a wide variety of habitats, optimally pinyon-juniper, valley foothill hardwood, and hardwood- conifer woodlands. Uses caves, mines, buildings or crevices for maternity colonies and roosts.	**Moderate.** Suitable foraging habitat (riparian woodlands) is present within the Project Area. In addition, the riparian woodlands may provide suitable roosting habitat.
Myotis evotis **long-eared myotis**	WBWG Medium	Occurs in semiarid shrublands, sage, chaparral, and agricultural areas, but is usually associated with coniferous forests from sea level to 9000 feet. Individuals roost under exfoliating tree bark, and in hollow trees, caves, mines, cliff crevices, and rocky outcrops on the ground. They also sometimes roost in buildings and under bridges.	**Moderate.** Suitable roosting and foraging habitat is present within the Project Area.

*** Key to status codes:**

Federal (USFWS)
FE: Federally-listed Endangered
FT: Federally-listed Threatened
FD: Federally-delisted
FC: Candidate federal listing

State
SE: State-listed Endangered

Species	Status*	Habitat	Potential for Occurrence**

ST: State-listed Threatened

SCE: State Candidate Endangered

SSC: State Species of Special Concern

CFP: California Fully Protected Species

Cwl: California Watch List

*California Special Animal (species with no official federal or state status, but are included on the CDFW's Special Animal List due to limited distribution or previous state or federal status).

California Native Plant Society (CNPS)**:**
Rank 1A – Presumed extinct in California;
Rank 1B – Rare, threatened, or endangered in California and elsewhere
Rank 2A: Plants presumed extirpated in California, but more common elsewhere; Rank 2B: Rare, threatened, or endangered in California, but more common elsewhere
Rank 3 – Plants for which more information is needed – A review list
Rank 4 – Plants of limited distribution – A watch list
Additional threat ranks endangerment codes are assigned to each taxon or group as follows:
.1 – Seriously endangered in California (over 80% of occurrences threatened/high degree of immediacy of threat)
.2 – Fairly endangered in California (20-80% occurrences threatened)
.3 – Not very endangered in California (<20% of occurrences threatened or no current threats known)

Western Bat Working Group

WBWG High = Designated as High Priority by the Western Bat Working Group

WBWG Medium = Designated as Medium Priority by the Western Bat Working Group

****Potential for Occurrence Evaluations:**

No Potential. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).

Unlikely. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.

Moderate Potential. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.

Species	Status*	Habitat	Potential for Occurrence**
High Potential. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site. Present. Species was observed on the site or has been recorded (i.e. CNDDB, other reports) on the site recently.			

Appendix C

Species Observed in the Study Area

Appendix C-1. Plant species observed during December 4, 2020 site visit.

Scientific Name	Common Name	Origin	Form	Rarity Status[1]	CAL-IPC Status[2]	Wetland Status[3]
Avena barbata	Slim oat	non-native (invasive)	annual, perennial grass	-	Moderate	-
Bromus catharticus	Rescue grass	non-native	annual, perennial grass	-	-	-
Cichorium intybus	Chicory	non-native	perennial herb	-	-	FACU
Erodium sp.	Filaree	non-native	annual herb	-	-	-
Hordeum murinum	Foxtail barley	non-native (invasive)	annual grass	-	Moderate	FACU
Quercus agrifolia	Coast live oak	native	tree	-	-	-
Raphanus sativus	Wild radish	non-native (invasive)	annual, biennial herb	-	Limited	-
Rubus armeniacus	Himalayan blackberry	non-native (invasive)	shrub	-	High	FAC
Rumex crispus	Curly dock	non-native (invasive)	perennial herb	-	Limited	FAC
Salix laevigata	Red willow	native	tree	-	-	FACW

Scientific Name	Common Name	Origin	Form	Rarity Status[1]	CAL-IPC Status[2]	Wetland Status[3]
Sorghum halepense	Johnsongrass	non-native	perennial grass	-	-	FACU
Vitis californica	California wild grape	native	vine, shrub	-	-	FACU
Xanthium strumarium	Cocklebur	native	annual herb	-	-	FAC

- All species identified using the *Jepson eFlora* [Jepson Flora Project (eds.) 2020]; nomenclature follows *Jepson eFlora* [Jepson Flora Project (eds.) 2020]

*Special-status only within its native range. The Study Area is outside of the native range of this species.

[1]Rarity Status: The CNPS Inventory of Rare and Endangered Plants (CNPS 2020)

FE:	Federal Endangered
FT:	Federal Threatened
SE:	State Endangered
ST:	State Threatened
SR:	State Rare
Rank 1A:	Plants presumed extinct in California
Rank 1B:	Plants rare, threatened, or endangered in California and elsewhere
Rank 2:	Plants rare, threatened, or endangered in California, but more common elsewhere
Rank 3:	Plants about which we need more information – a review list
Rank 4:	Plants of limited distribution – a watch list

[2]Invasive Status: California Invasive Plant Inventory (Cal-IPC 2020)

High:	Severe ecological impacts; high rates of dispersal and establishment; most are widely distributed ecologically.
Moderate:	Substantial and apparent ecological impacts; moderate-high rates of dispersal, establishment dependent on disturbance; limited-moderate distribution ecologically
Limited:	Minor or not well documented ecological impacts; low-moderate rate of invasiveness; limited distribution ecologically
Assessed:	Assessed by Cal-IPC and determined to not be an existing current threat

[3]Wetland Status: National List of Plant Species that Occur in Wetlands, California – Arid West Region (Lichvar et al. 2016)

OBL:	Almost always found in wetlands;
FACW:	Usually found in wetlands
FAC:	Equally found in wetlands and uplands
FACU:	Usually not found in wetlands
UPL:	Almost never found in wetlands
NL:	Not listed, assumed almost never found in wetlands
NI:	No information; not factored during wetland delineation

Appendix C-2. Wildlife species observed in the Study Area on December 4, 2020.

Scientific Name	Common Name
Birds	
Baeolophus inornatus	Oak titmouse
Bombycilla cedrorum	Cedar waxwing
Buteo jamaicensis	Red-tailed hawk
Cathartes aura	Turkey vulture
Charadrius vociferus	Killdeer
Colaptes auratus	Northern flicker
Corvus brachyrhynchos	American crow
Corvus corax	Common raven
Euphagus cyanocephalus	Brewer's blackbird
Junco hyemalis	Dark-eyed junco
Haemorhous mexicanus	House finch
Melanerpes formicivorus	Acorn woodpecker
Mimus polyglottos	Northern mockingbird
Passer domesticus	Song sparrow
Psaltriparus minimus	Bushtit
Sayornis nigricans	Black phoebe
Setophaga coronata	Yellow-rumped warbler
Sialia mexicana	Western bluebird
Spinus psaltria	Lesser goldfinch
Streptopelia decaocto	Eurasian collared-dove
Sturnus vulagaris	European starling
Turdus migratorius	American robin
Zonotrichia leucophrys	White-crowned sparrow

Appendix D

Representative Photographs

Northeast-facing view of Mills Lane near the intersection of Mills Lane and SR-29.

View of the partially-vegetated stormwater ditch north of the Study Area.

East-facing view of the ruderal land south of the Study Area near the intersection of Mills Lane and SR-29.

West-facing view of Mills Lane with cleared agricultural land to the north of the Study Area.

Southeast-facing view of the active construction area south of the Study Area.

West-facing view of Mills Lane with vineyards on each side of the Study Area.

West-facing view of the proposed outfall location in coast live oak riparian woodland.

North-facing view of the coast live oak riparian woodland at the eastern terminus of Mills Lane.

Southeast-facing view of coast live oak riparian woodland at the eastern terminus of Mills Lane.

View of thick vegetated understory near the proposed outfall location.

South-facing view of the main channel of the Napa River approximately 250 feet east of the proposed outfall. No flowing or standing water was present.

South-facing view of the Napa River.

APPENDIX D

Air Quality and Greenhouse Gas Emissions Data

Construction Phase		Excavation and Pipe Laying	Grubbing	Trench Paving
Location(s) of Construction Acitivites		*between Highway 29 and the Napa River*	*Near Napa River*	*Entire length of Mills Lane*
Duration (Days)		*60*	*2*	*2*
Total hours of CalEEMod Construction Equipment in each phase	Aerial Lifts			
	Air Compressor			
	Bore/Drill Rigs			
	Cement and Mortar Mixers			
	Concrete/Industrial Saws			
	Cranes			
	Crawler Tractors			
	Crushing/Proc. Equipment			
	Dumpers/Tenders			
	Excavators	*1*		
	Forklifts			
	Generator Sets			
	Graders			
	Off-Highway Tractors			
	Off-Highway Trucks			
	Pavers			*1*
	Paving Equipment			*1*
	Plate Compactors			
	Pressure Washers			
	Pumps			
	Rollers			
	Rough Terrain Forklifts			
	Rubber Tired Dozers			
	Rubber Tired Loaders			
	Scrapers			
	Signal Boards	*1*		*1*
	Skid Steer Loaders			
	Surfacing Equipment			
	Sweepers/Scrubbers			*1*
	Tractors/Loaders/Backhoes	*1*		
	Trenchers			
	Welders			
	Other construction equipment not listed in CalEEMod (Please input equipment name, horsepower, and load factor)			
Number of Workers on Site		*4*	*4*	*4*
Import Volume, cubic yards				*2,000 cubic yards of pavement*
Export Volumes, cubic yards		*12,000 cy of soil, 2,000 cy of pavement*		
Notes from Project Applicant				

Notes:

Please fill duration, location(s), number of construction workers, and import and export volumes for each phase.

Please provide the total hours of activity for each piece of construction equipment for each phase. If a certain piece is not used, leave blank.

St Helena Storm Drain.v1

Napa County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	1.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.6	**Precipitation Freq (Days)**	64
Climate Zone	4			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Land use selection is arbitrary because it does not affect the construction schedule and equipment list.

Construction Phase - According to the RFI, two construction phases that would involve heavy equipment would be excavation and pipe laying (60 days) and trench paving (2 days). The grubbing phase in between (2 days) does not have heavy equipment

Off-road Equipment - Equipment list based on the RFI. Assume that heavy equipment would operate work the full eight hours a day.

Off-road Equipment - Equipment list based on the RFI. Conservatively assume all equipment would work the full eight hours a day.

Trips and VMT - 14,000 cyds during excavation and pipe laying would be 700 truck trips; 2,000 cyds during trench paving would be 100 truck trips.

Demolition - 14,000 cy of materials would be exported. The equivalent weight that would result in 7,000 truck trips are 7,000 tons.

Grading - 2,000 cubic yards of pavement would be imported.

Construction Off-road Equipment Mitigation - Use Tier 2 + Level III DPF on all equipment except for isgnal boards to mitigate health risk impacts.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstructionPhase	NumDays	10.00	60.00
tblConstructionPhase	NumDays	1.00	2.00
tblLandUse	LotAcreage	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblTripsAndVMT	HaulingTripNumber	692.00	700.00
tblTripsAndVMT	HaulingTripNumber	0.00	100.00
tblTripsAndVMT	WorkerTripNumber	8.00	4.00
tblTripsAndVMT	WorkerTripNumber	10.00	4.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0185	0.2500	0.2084	6.0000e-004	0.0861	7.6500e-003	0.0937	0.0140	7.0900e-003	0.0211	0.0000	55.1152	55.1152	9.0400e-003	0.0000	55.3411
Maximum	**0.0185**	**0.2500**	**0.2084**	**6.0000e-004**	**0.0861**	**7.6500e-003**	**0.0937**	**0.0140**	**7.0900e-003**	**0.0211**	**0.0000**	**55.1152**	**55.1152**	**9.0400e-003**	**0.0000**	**55.3411**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0162	0.3545	0.2314	6.0000e-004	0.0861	2.0000e-003	0.0881	0.0140	1.9800e-003	0.0160	0.0000	55.1152	55.1152	9.0400e-003	0.0000	55.3411
Maximum	**0.0162**	**0.3545**	**0.2314**	**6.0000e-004**	**0.0861**	**2.0000e-003**	**0.0881**	**0.0140**	**1.9800e-003**	**0.0160**	**0.0000**	**55.1152**	**55.1152**	**9.0400e-003**	**0.0000**	**55.3411**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**12.42**	**-41.84**	**-11.05**	**0.00**	**0.00**	**73.86**	**6.03**	**0.00**	**72.07**	**24.22**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	7-5-2021	9-30-2021	0.2541	0.3531
		Highest	0.2541	0.3531

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Excavation and Pipe Laying	Demolition	7/5/2021	9/24/2021	5	60	
2	Trench Paving	Site Preparation	9/29/2021	9/30/2021	5	2	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Excavation and Pipe Laying	Excavators	1	8.00	158	0.38
Excavation and Pipe Laying	Signal Boards	1	8.00	6	0.82
Excavation and Pipe Laying	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Trench Paving	Pavers	1	8.00	130	0.42
Trench Paving	Paving Equipment	1	8.00	132	0.36
Trench Paving	Signal Boards	1	8.00	6	0.82
Trench Paving	Sweepers/Scrubbers	1	8.00	64	0.46

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Excavation and Pipe Laying	3	4.00	0.00	700.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trench Paving	4	4.00	0.00	100.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

3.2 Excavation and Pipe Laying - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0784	0.0000	0.0784	0.0119	0.0000	0.0119	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0142	0.1323	0.1750	2.7000e-004		6.9100e-003	6.9100e-003		6.3900e-003	6.3900e-003	0.0000	23.1443	23.1443	7.1900e-003	0.0000	23.3240
Total	**0.0142**	**0.1323**	**0.1750**	**2.7000e-004**	**0.0784**	**6.9100e-003**	**0.0853**	**0.0119**	**6.3900e-003**	**0.0183**	**0.0000**	**23.1443**	**23.1443**	**7.1900e-003**	**0.0000**	**23.3240**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7400e-003	0.0966	0.0196	2.7000e-004	5.9000e-003	3.1000e-004	6.2100e-003	1.6200e-003	2.9000e-004	1.9200e-003	0.0000	26.3508	26.3508	1.3100e-003	0.0000	26.3836
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.3000e-004	3.0000e-004	3.1500e-003	1.0000e-005	9.5000e-004	1.0000e-005	9.5000e-004	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	0.7907	0.7907	2.0000e-005	0.0000	0.7912
Total	**3.1700e-003**	**0.0969**	**0.0228**	**2.8000e-004**	**6.8500e-003**	**3.2000e-004**	**7.1600e-003**	**1.8700e-003**	**3.0000e-004**	**2.1800e-003**	**0.0000**	**27.1415**	**27.1415**	**1.3300e-003**	**0.0000**	**27.1748**

3.2 Excavation and Pipe Laying - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0784	0.0000	0.0784	0.0119	0.0000	0.0119	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0121	0.2335	0.1968	2.7000e-004		1.5800e-003	1.5800e-003		1.5800e-003	1.5800e-003	0.0000	23.1442	23.1442	7.1900e-003	0.0000	23.3240
Total	**0.0121**	**0.2335**	**0.1968**	**2.7000e-004**	**0.0784**	**1.5800e-003**	**0.0799**	**0.0119**	**1.5800e-003**	**0.0134**	**0.0000**	**23.1442**	**23.1442**	**7.1900e-003**	**0.0000**	**23.3240**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7400e-003	0.0966	0.0196	2.7000e-004	5.9000e-003	3.1000e-004	6.2100e-003	1.6200e-003	2.9000e-004	1.9200e-003	0.0000	26.3508	26.3508	1.3100e-003	0.0000	26.3836
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.3000e-004	3.0000e-004	3.1500e-003	1.0000e-005	9.5000e-004	1.0000e-005	9.5000e-004	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	0.7907	0.7907	2.0000e-005	0.0000	0.7912
Total	**3.1700e-003**	**0.0969**	**0.0228**	**2.8000e-004**	**6.8500e-003**	**3.2000e-004**	**7.1600e-003**	**1.8700e-003**	**3.0000e-004**	**2.1800e-003**	**0.0000**	**27.1415**	**27.1415**	**1.3300e-003**	**0.0000**	**27.1748**

3.3 Trench Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.2000e-004	6.9500e-003	7.7000e-003	1.0000e-005		3.9000e-004	3.9000e-004		3.6000e-004	3.6000e-004	0.0000	1.0387	1.0387	3.3000e-004	0.0000	1.0469
Total	**7.2000e-004**	**6.9500e-003**	**7.7000e-003**	**1.0000e-005**	**0.0000**	**3.9000e-004**	**3.9000e-004**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**1.0387**	**1.0387**	**3.3000e-004**	**0.0000**	**1.0469**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.9000e-004	0.0138	2.8000e-003	4.0000e-005	8.4000e-004	4.0000e-005	8.9000e-004	2.3000e-004	4.0000e-005	2.7000e-004	0.0000	3.7644	3.7644	1.9000e-004	0.0000	3.7691
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	1.0000e-004	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0264	0.0264	0.0000	0.0000	0.0264
Total	**4.0000e-004**	**0.0138**	**2.9000e-003**	**4.0000e-005**	**8.7000e-004**	**4.0000e-005**	**9.2000e-004**	**2.4000e-004**	**4.0000e-005**	**2.8000e-004**	**0.0000**	**3.7908**	**3.7908**	**1.9000e-004**	**0.0000**	**3.7955**

3.3 Trench Paving - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.2000e-004	0.0103	8.8900e-003	1.0000e-005		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	1.0387	1.0387	3.3000e-004	0.0000	1.0469
Total	**5.2000e-004**	**0.0103**	**8.8900e-003**	**1.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**1.0387**	**1.0387**	**3.3000e-004**	**0.0000**	**1.0469**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.9000e-004	0.0138	2.8000e-003	4.0000e-005	8.4000e-004	4.0000e-005	8.9000e-004	2.3000e-004	4.0000e-005	2.7000e-004	0.0000	3.7644	3.7644	1.9000e-004	0.0000	3.7691
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	1.0000e-004	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0264	0.0264	0.0000	0.0000	0.0264
Total	**4.0000e-004**	**0.0138**	**2.9000e-003**	**4.0000e-005**	**8.7000e-004**	**4.0000e-005**	**9.2000e-004**	**2.4000e-004**	**4.0000e-005**	**2.8000e-004**	**0.0000**	**3.7908**	**3.7908**	**1.9000e-004**	**0.0000**	**3.7955**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.586522	0.036345	0.168625	0.112459	0.022729	0.006000	0.017299	0.036828	0.003880	0.001801	0.005497	0.001027	0.000988

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Summary of ISCST3 Model Parameters, Assumptions, and Results for DPM and $PM_{2.5}$ Emissions during Construction

ISCST3 Model Parameters and Assumptions			
Source Type	**Units**	**Value**	**Notes**
Line-Area Source: Off-Road Equipment and On-Road Haul Truck Exhaust for Construction			
Hours/Work Day	hours/day	9	Monday - Friday, 8 AM - 5 PM
DPM Emission Rate	gram/second	0.00346	Assume ALL exhaust PM_{10} would be on Mills Lane for 62 days
Average Trip Length from Vehicle	meters	1494	4900 feet of the project length
Release Height	meters	3.0	BAAQMD, 2012
Length of Side	meters	9.0	ISCST3 Calculator
Initial Vertical Dimension	meters	2.8	SMAQMD, 2015

ISCST3 Model Results				
Location Type	**Emissions Source**	**Pollutant**	**Annual Average Concentration**	**Notes**
Residential Receptor	Umitigated Construction	DPM ($\mu g/m^{3)}$	0.60	Offsite MEIR (Ground level residential receptor)
		$PM_{2.5}$ ($\mu g/m^{3)}$	0.55	Offsite MEIR (Ground level residential receptor)
Residential Receptor	Mitigated Construction	DPM ($\mu g/m^{3)}$	0.16	Offsite MEIR (Ground level residential receptor)
		$PM_{2.5}$ ($\mu g/m^{3)}$	0.14	Offsite MEIR (Ground level residential receptor)

Notes:

DPM = diesel particulate matter

PM_{10} = particulate matter with aerodynamic resistance diameters equal to or less than 10 microns

$PM_{2.5}$ = particulate matter with aerodynamic resistance diameters equal to or less than 2.5 microns

$\mu g/m^3$ = micrograms per cubic meter

Sacramento Metropolitan Air Quality Management District (SMAQMD), 2015. *Guide to Air Quality Assessment in Sacramento County* . June.

Health Risk Assessment for DPM Emissions during Construction

Inhalation Cancer Risk Assessment for DPM	Units	Age Group 3rd Trimester	Notes
DPM Concentration (C)	$\mu g/m^3$	0.597	ISCST3 Annual Average (Unmitigated)
Daily Breathing Rate (DBR)	L/kg-day	361	95th percentile (OEHHA, 2015)
Inhalation absorption factor (A)	unitless	1.0	OEHHA, 2015
Exposure Frequency (EF)	unitless	0.96	350 days/365 days in a year (OEHHA, 2015)
Dose Conversion Factor (CF_D)	$mg\text{-}m^3/\mu g\text{-}L$	0.000001	Conversion of µg to mg and L to m^3
Dose (D)	mg/kg/day	0.000207	$C*DBR*A*EF*CF_D$ (OEHHA, 2015)
Cancer Potency Factor (CPF)	$(mg/kg/day)^{-1}$	1.1	OEHHA, 2015
Age Sensitivity Factor (ASF)	unitless	10	OEHHA, 2015
Annual Exposure Duration (ED)	years	0.237003058	62 workdays converted to month
Averaging Time (AT)	years	70	70 years for residents (OEHHA, 2015)
Fraction of time at home (FAH)	unitless	0.85	OEHHA, 2015
Cancer Risk Conversion Factor (CF)	unitless	1000000	Chances per million (OEHHA, 2015)
Cancer Risk	per million	6.54	D*CPF*ASF*ED/AT*FAH*CF (OEHHA, 2015)
Total Cancer Risk (Unmitigated)	per million	6.5	At Offsite MEIR location
Total Cancer Risk (Mitigated)	per million	1.7	At Offsite MEIR location

Hazard Index for DPM	Units	Value	
Chronic REL	$\mu g/m^3$	5.0	OEHHA, 2015
Unmitigated Chronic Hazard Index	unitless	0.119	At offsite MEIR location
Mitigated Chronic Hazard Index	unitless	0.031	At offsite MEIR location

Notes:

DPM = diesel particulate matter

REL = reference exposure level

$\mu g/m^3$ = micrograms per cubic meter

L/kg-day = liters per kilogram-day

m^3/L = cubic meters per liter

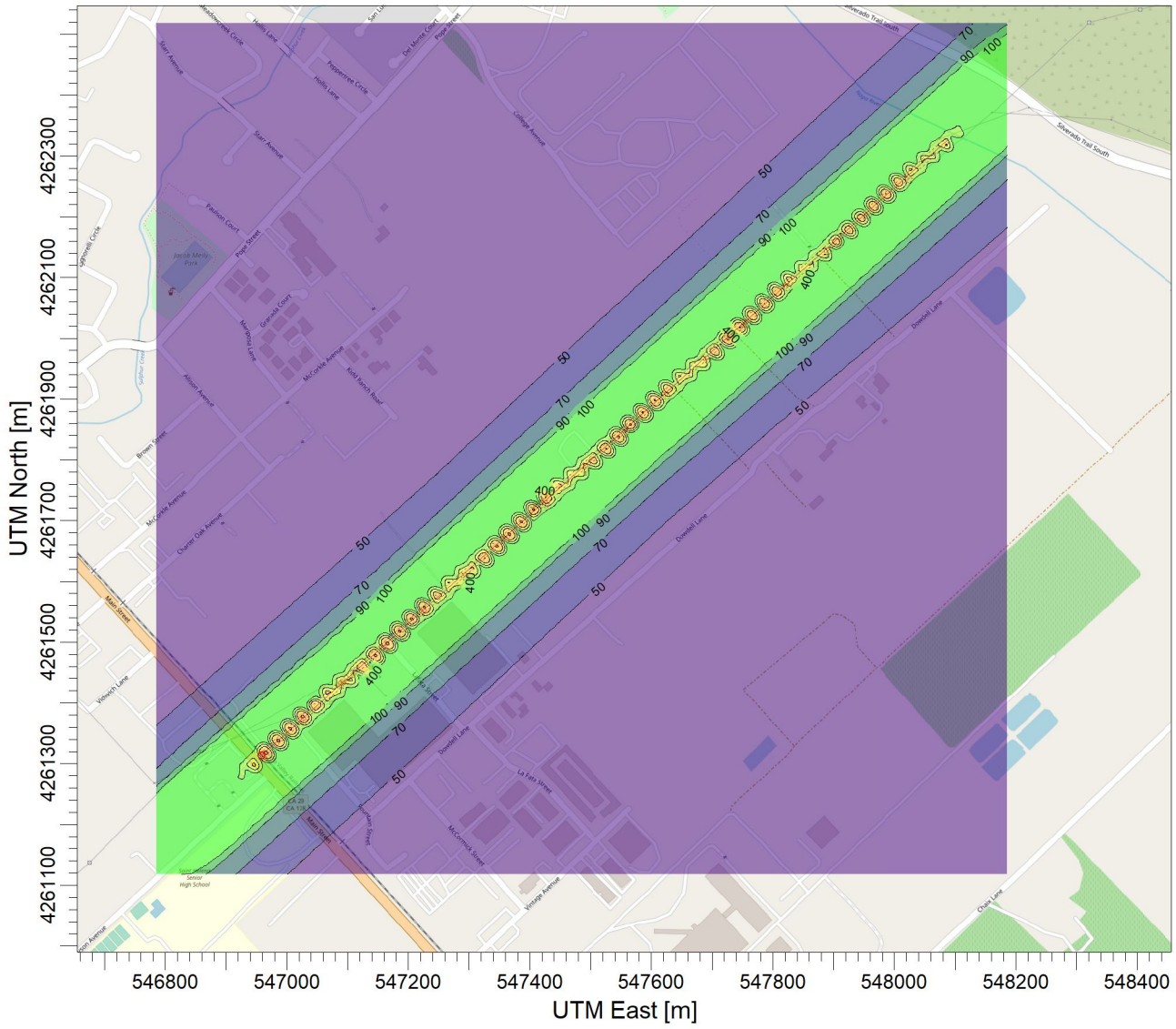
$(mg/kg/day)^{-1}$ = 1/milligrams per kilograms per day

MEIR = maximum exposed individual resident

Office of Environmental Health Hazard Assessment (OEHHA), 2015. *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. February.*

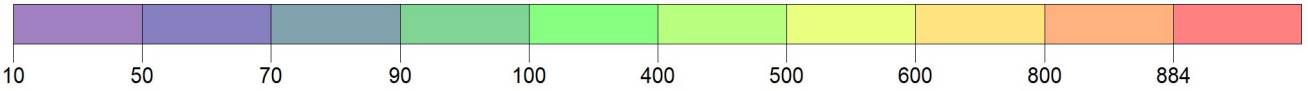
PROJECT TITLE:

St Helena Mills Lane Project
Unit Emissions Concentration Contours



PLOT FILE OF HIGH 1ST HIGH 1-HR VALUES FOR SOURCE GROUP: ALL ug/m^3

Max: 884 [ug/m^3] at (546965.81, 4261318.00)



COMMENTS:	SOURCES: **1**	COMPANY NAME:	
	RECEPTORS: **5041**	MODELER:	
	OUTPUT TYPE: **Concentration**	SCALE: 1:11,328 (0 — 0.4 km)	
	MAX: **884 ug/m^3**	DATE: **5/5/2021**	PROJECT NO.: