APPENDIX D: GEOLOGY AND SOILS TECHNICAL SUPPORT DOCUMENTS

Geotechnical Report

CORNERSTONE EARTH GROUP

TYPE OF SERVICES	Geotechnical and Geologic Hazard Investigation
PROJECT NAME	Guadalupe Quarry Closure, Annexation and Redevelopment
LOCATION	1 Quarry Road Brisbane, California
CLIENT	Orchard Partners, LLC
PROJECT NUMBER	582-5-2
DATE	August 6, 2023

CORNERSTONE EARTH GROUP

Type of Services	**Geotechnical and Geologic Hazard Investigation**
Project Name	**Guadalupe Quarry Closure, Annexation and Redevelopment**
Location	**1 Quarry Road Brisbane, California**
Client	**Orchard Partners, LLC**
Client Address	**3697 Mt. Diablo Boulevard, Suite 200 Lafayette, California**
Project Number	**582-5-2**
Date	**August 6, 2024**

Prepared by **John R. Dye, P.E., G.E.**
Senior Principal Engineer
Geotechnical Project Manager

REGISTERED PROFESSIONAL ENGINEER
JOHN R. DYE
GE2582
GEOTECHNICAL
STATE OF CALIFORNIA

William H. Godwin, P.G., C.E.G.
Engineering Geologist

REGISTERED GEOLOGIST
WILLIAM H. GODWIN
Exp: 9/30/24
No. 2199
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

Matthew J. Schaffer, P.E., G.E.
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. SCHAFFER
GE3143
GEOTECHNICAL
STATE OF CALIFORNIA

TABLE OF CONTENTS

SECTION 1: INTRODUCTION 1
1.1 PROJECT LOCATION AND DESCRIPTION 2
1.1.1 Project Location 2
1.1.2 Project Description 3
1.1.3 Existing Infrastructure 4
1.1.4 Proposed Grading 4
1.1.5 Reclamation Plan Amendment 4
1.2 SCOPE OF SERVICES 4
1.3 PURPOSE AND SCOPE OF THIS REPORT 5
SECTION 2: METHODS OF INVESTIGATION 5
2.1 LITERATURE REVIEW 5
2.2 SITE RECONNAISSANCE 5
2.3 EXPLORATION PROGRAM 5
2.3.1 Current Field Investigation (2021 through 2022) 5
Table 1: Summary of Current Field Exploration 6
Table 1: Summary of Current Field Exploration (Continued) 7
2.3.2 Previous Field Explorations (1987 through 2003) 7
Table 2: Summary of Previous Field Explorations 8
Table 2: Summary of Previous Field Explorations (Continued) 9
2.4 LABORATORY TESTING PROGRAM 9
2.5 ENVIRONMENTAL SERVICES 9
SECTION 3: REGIONAL SETTING 9
3.1 REGIONAL GEOLOGIC SETTING 9
3.2 REGIONAL FAULTING AND SEISMICITY 10
3.2.1 Regional Active Faulting 10
3.2.2 Historical Seismicity 10
Table 3: Approximate Fault Distances 11
Table 4: Historical Earthquakes (M ≥ 6) Within about 100 km of the Project Site 12
3.3 SITE GEOLOGY 12
3.4 SITE GEOLOGIC STRUCTURE 13
SECTION 4: SITE CONDITIONS 13
4.1 GEOMORPHOLOGY AND RECENT HISTORY 13
4.2.1 Quarry Road 14
4.2.2 Quarry Floor 14
4.2.3 Sidecast Fill 15

4.2.4 Rubble Fill 15
4.2.5 Quarry View Berm 15
4.2.6 Tailings Stockpile 15
4.2.7 Seismic Refraction Line and Boring Bedrock Depth Comparisons – Quarry Floor and Rubble Fill Areas 16
4.3 SITE GEOLOGY AND SUBSURFACE CONDITIONS 19
4.3.1 Undocumented Fill (Qaf) 19
4.3.2 Colluvium and Alluvium (Qc / Qal) 19
4.3.3 Franciscan Complex Bedrock (KJsk) 19
4.4 GROUNDWATER 20
Table 5a: Groundwater Data, Current Field Investigation 20
Table 5a: Groundwater Data, Current Field Investigation (Continued) 21
Table 5b: Groundwater Data, Previous Field Investigations 21
Table 6: Monitoring Well EB-12A Measurements 22
SECTION 5: GEOLOGIC HAZARDS 23
5.1 FAULT SURFACE RUPTURE 23
5.2 ESTIMATED GROUND SHAKING 24
5.3 LIQUEFACTION POTENTIAL 24
5.4 LATERAL SPREADING 25
5.5 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING 25
5.6 VARIABLE QUARRY FILLS 25
5.7 LANDSLIDING 26
5.8 QUARRY ACCESS ROAD STABILITY 27
5.9 ROCKFALL HAZARD 27
5.9.1 Rockfall Barriers 28
5.9.2 Debris Catchment Fencing 28
5.10 VARIABLE GROUNDWATER AND POTENTIAL GROUNDWATER LEVEL RISE 28
5.11 TSUNAMI/SEICHE 29
5.12 FLOODING 29
SECTION 6: SLOPE STABILITY 29
6.1 GENERAL 29
6.2 GLOBAL STABILITY ANALYSIS OF EXISTING QUARRY SLOPES 29
Table 7: Recommended Rock Parameters 30
6.3 STABILITY METHOD OF ANALYSIS 31
6.4 SOIL AND BEDROCK PROPERTIES 32
Table 8: Summary of Soil and Bedrock Strength Properties 33
6.5 GROUNDWATER 34

6.6 SURFICIAL LOADS ---------- 34
6.7 STATIC AND SEISMIC STABILITY ANALYSIS ---------- 34
6.7.1 Geogrid and Ground Improvements 35
6.7.2 Stability Analysis for Temporary Cut Slopes 36
SECTION 7: CONCLUSIONS 36
7.1 SUMMARY ---------- 36
7.3 STABILITY OF EXISTING AND NEW FILL SLOPES ---------- 37
7.4 POTENTIAL FOR ROCK FALL HAZARDS AROUND FORMER QUARRY SLOPES --- 38
7.4.1 Rockfall Barriers 39
7.4.2 Debris Catchment Fencing 39
7.5 EXCAVATION OF HARD BEDROCK AREAS ---------- 39
7.6 PRESENCE OF VARIABLE GROUNDWATER DEPTHS ---------- 40
7.7 EROSION OF COHESIONLESS FILL MATERIAL ---------- 40
7.8 PRESENCE OF COBBLES, BOULDERS, AND BURIED RUBBLE ---------- 41
7.9 CUT/FILL AND MATERIAL TRANSITIONS ---------- 41
7.10 PLANS AND SPECIFICATIONS REVIEW ---------- 42
7.11 CONSTRUCTION OBSERVATION AND TESTING ---------- 42
SECTION 8: EARTHWORK 42
8.1 SITE DEMOLITION ---------- 42
8.2 SITE CLEARING AND PREPARATION ---------- 43
8.3 RE-COMPACTION OF EXISTING QUARRY FILLS ---------- 44
8.3.1 Quarry View Berm 44
8.3.2 Main Quarry Facility 44
8.3.3 Recent Quarry Fill 44
8.3.4 Rubble Fill 45
8.3.5 Tailings Stockpile 45
8.3.6 Sidecast Fill 45
8.3.7 Re-Compaction Recommendations 45
8.4 DEEP DYNAMIC COMPACTION ---------- 46
8.4.1 General Approach 46
8.4.2 Performance Testing 47
8.4.3 Performance Criteria for DDC Mitigation 48
Table 9: Summary of DDC Performance Criteria 48
8.5 GROUND IMPROVEMENT USING RIGID INCLUSIONS ---------- 48
8.6 TEMPORARY CUT AND FILL SLOPES ---------- 49
8.7 SUBGRADE PREPARATION ---------- 49
8.8 SUBGRADE STABILIZATION MEASURES ---------- 49

8.8.1 Scarification and Drying 50
8.8.2 Removal and Replacement 50
8.8.3 Chemical Treatment 50
8.9 MATERIAL FOR FILL 50
8.9.1 Re-Use of On-site Soils for Mass Grading 50
8.9.2 Potential Import Sources 50
8.10 COMPACTION REQUIREMENTS FOR CONVENTIONAL FILLS 51
8.10.1 Conventional Mechanical Compaction 52
Table 10: Compaction Requirements 52
Table 10: Compaction Requirements (Continued) 53
8.11 TRENCH BACKFILL 53
8.12 PERMANENT CUT AND FILL SLOPES 53
8.12.1 Keyways and Benches 54
8.12.2 Fill Drainage 54
8.12.3 Plan Review and Construction Monitoring 55
8.13 SITE DRAINAGE 56
8.13.1 Surface Drainage 56
8.13.2 Subsurface Drainage 56
8.14 LOW-IMPACT DEVELOPMENT (LID) IMPROVEMENTS 57
8.14.1 Storm Water Treatment Design Considerations 58
8.15 PERMANENT EROSION CONTROL MEASURES 59
8.16 LANDSCAPE CONSIDERATIONS 60
SECTION 9: 2022 CBC SEISMIC DESIGN CRITERIA 60
9.1 SEISMIC DESIGN CRITERIA 60
9.1.1 Site Location and Provided Data For 2022 CBC Seismic Design 60
9.1.2 Site Classification – Chapter 20 of ASCE 7-16 61
9.1.3 Site Class C Parameters 61
Table 11: CBC Site Categorization and Site Coefficients for Site Class C 61
Table 11: CBC Site Categorization and Site Coefficients for Site Class C (Continued) 62
9.1.4 Site Class D Parameters 62
SECTION 10: FOUNDATIONS 62
10.1 SUMMARY OF RECOMMENDATIONS 62
10.2 SHALLOW FOUNDATIONS – WAREHOUSE AND PARKING GARAGE 62
10.2.1 Conventional Shallow Footings 62
10.2.2 Bearing Capacity and Footing Settlement 63
Table 12: Preliminary Warehouse Structural Loading 63
Table 13: Assumed Parking Garage Structural Loading 63

Table 14: Preliminary Total Static Settlements Due to Foundation Loads Only 64
10.2.3 Lateral Loading 64
10.2.4 Conventional Shallow Footing Construction Considerations 65
10.3 SHALLOW FOUNDATIONS – WATER TANK ----------65
10.3.1 Ring and Spread Footings.....66
10.3.2 Bearing Capacity and Footing Settlement 66
10.3.3 Lateral Loading 66
10.3.4 Oiled Sand Cushion 67
10.3.5 Ring and Spread Footing Foundation Construction Considerations.....67
10.4 DEEP FOUNDATIONS ----------67
10.4.1 Driven Piles 67
10.4.2 Vertical and Lateral Capacity 67
Table 15: LPile Parameters 68
10.4.3 Passive Resistance against Pile Caps/Grade Beams.....68
10.4.4 Pre-Production Test Program and Construction Considerations 68
SECTION 11: CONCRETE SLABS AND PEDESTRIAN PAVEMENTS 68
11.1 OFFICE SLABS-ON-GRADE ----------68
11.2 WAREHOUSE SLABS-ON-GRADE ----------69
11.3 PARKING GARAGE SLABS-ON-GRADE ----------69
11.4 INTERIOR SLABS MOISTURE PROTECTION CONSIDERATIONS ----------70
11.5 EXTERIOR FLATWORK----------71
SECTION 12: VEHICULAR PAVEMENTS.....71
12.1 ASPHALT CONCRETE ----------71
Table 16: Asphalt Concrete Pavement Recommendations, Untreated Subgrade.....72
Table 17: Asphalt Concrete Pavement Recommendations, Chemical-Treated Subgrade72
12.2 PORTLAND CEMENT CONCRETE----------72
Table 18: PCC Pavement Recommendations, Untreated Subgrade 73
Table 19: PCC Pavement Recommendations, Chemical-Treated Subgrade 74
12.3 TRASH ENCLOSURES ----------74
SECTION 13: RETAINING WALLS 74
13.1 STATIC LATERAL EARTH PRESSURES ----------74
Table 20: Recommended Lateral Earth Pressures.....74
13.2 SEISMIC LATERAL EARTH PRESSURES----------75
13.2.1 Below-Grade Warehouse and Parking Garage Walls 75
13.2.2 Site Walls.....75
13.3 WALL DRAINAGE----------75
13.3.1 At-Grade Site Walls.....75

13.3.2 Below-Grade Walls 76
13.4 BACKFILL ----76
13.5 FOUNDATIONS ----77
13.6 MECHANICALLY STABILIZED EARTH WALLS ----77
Table 21: Recommended Soil Parameters – MSE Walls 77
13.7 SOIL NAIL AND ROCK BOLT WALLS ----78
Table 22: Recommended Rock Parameters – Rock Bolt Walls 78
SECTION 14: LIMITATIONS....78
SECTION 15: REFERENCES....79

FIGURE 1: VICINITY MAP
FIGURE 2: EXISTING QUARRY SITE FEATURES
FIGURE 2A: SITE EXPLORATION PLAN
FIGURE 2B: SITE DEVELOPMENT PLAN
FIGURE 2C: QUARRY ROAD DEVELOPMENT PLAN
FIGURE 2D: DEPTH TO BEDROCK MAP
FIGURE 3: REGIONAL GEOLOGIC MAP
FIGURE 4: REGIONAL FAULT AND ACTIVITY MAP
FIGURE 5: SITE GEOLOGIC MAP
FIGURE 6: GEOLOGIC HAZARD MAP
FIGURE 7A: GENERALIZED CROSS SECTIONS 1-6
FIGURE 7B: GENERALIZED CROSS SECTIONS 7-9
FIGURE 7C: GENERALIZED CROSS SECTIONS 10 AND 11
FIGURE 7D: GENERALIZED CROSS SECTIONS 12-15
FIGURE 7E: GENERALIZED CROSS SECTIONS 16-18
FIGURE 8: CONCEPTUAL MITIGATION PLAN
FIGURE 9A: CONCEPTUAL MITIGATION CROSS SECTIONS 1-6
FIGURE 9B: CONCEPTUAL MITIGATION CROSS SECTIONS 7-9
FIGURE 9C: CONCEPTUAL MITIGATION CROSS SECTIONS 10 AND 11
FIGURE 9D: CONCEPTUAL MITIGATION CROSS SECTIONS 12-15
FIGURE 9E: CONCEPTUAL MITIGATION CROSS SECTIONS 16-18
FIGURE 10: GRADING AND MITIGATION DETAILS
FIGURE 11: BEDROCK DESIGNATION FOR TIERED RETAINING WALLS

APPENDIX A: FIELD INVESTIGATION
APPENDIX B: LABORATORY TEST PROGRAM
APPENDIX C: PREVIOUS EXPLORATION LOGS

APPENDIX D: SEISMIC REFRACTION SURVEY
APPENDIX E: GRAPHICAL SLOPE STABILITY ANALYSIS OUTPUT
APPENDIX F: GROUND MOTION HAZARD ANALYSIS

Type of Services	**Geotechnical and Geologic Hazard Investigation**
Project Name	**Guadalupe Quarry Closure, Annexation and Redevelopment**
Location	**1 Quarry Road** **Brisbane, California**

SECTION 1: INTRODUCTION

This geotechnical and geologic hazard investigation report was prepared for the sole use of Orchard Partners, LLC for the Guadalupe Quarry Closure, Annexation and Redevelopment project in Brisbane, California. As you know, we previously prepared a report titled, "Geotechnical Feasibility Evaluation, Crocker Logistics Center, 1 Quarry Road, Brisbane, California," dated February 16, 2022. This geotechnical report supersedes previously reported geotechnical conclusions and project information. The general site location is shown on the Vicinity Map, Figure 1. For our use, we were provided with the following documents:

- Conceptual grading plans and cross sections titled, "Crocker Logistics Center for Orchard Partners, LLC, Brisbane, California," prepared by Kier and Wright, dated July 2023.
- A plan sheet titled, "Exhibit, Park Access and Sidewalk, Brisbane, California," prepared by Kier and Wright, dated May 2022.
- A set of foundation loading schematics titled, "Foundation Loads," prepared by HSA & Associates, Inc., undated.
- A rough grading volume takeoff exhibit titled, "1 Old Quarry Road – Brisbane, DGC Takeoff Exhibit: Rough Grading," prepared by DeSilva Gates Construction (DGC), dated July 16, 2021.
- An undocumented fill excavation exhibit titled, "Brisbane Quarry, Undoc Fill Excavation, prepared by DeSilva Gates Construction, dated October 15, 2021.
- A geotechnical letter titled, "Rock Slope Stability Issues Affecting the Feasibility of the Guadalupe Quarry Conversion Plan, Brisbane, CA," prepared by Jacobs Associates, dated February 7, 2000.

- A geotechnical report titled, “Geotechnical Investigation, One Quarry Road, Residential Development, Brisbane, California,” prepared by Alan Kropp & Associates, Inc., dated November 21, 2000.

- A geotechnical report titled, “Geotechnical Investigations of Selected Key Elements, Brisbane Quarry, One Quarry Road, Brisbane, California,” prepared by Berlogar Geotechnical Consultants, dated May 5, 2003.

- A geotechnical report titled, “Revised Rock Slope Stability Assessment, Guadalupe Valley Quarry, California Mine ID: 91-41-0002, San Mateo County, California,” prepared by Geocon Consultants, Inc., dated June 5, 2018.

- A letter titled, “Geologic and Geotechnical Peer Review, Guadalupe Quarry – Closure, Annexation & Redevelopment, and Crocker Logistics Center, 1 Quarry Road, Brisbane, California,” prepared by Cotton, Shires and Associates, Inc., dated June 13, 2023.

- A letter titled, “Supplemental Geologic and Geotechnical Peer Review, Guadalupe Quarry – Closure, Annexation & Redevelopment, and Crocker Logistics Center, 1 Quarry Road, Brisbane, California,” prepared by Cotton, Shires and Associates, Inc., dated September 27, 2023.

- A letter titled, “Second Supplemental Geologic and Geotechnical Peer Review, Guadalupe Quarry – Closure, Annexation & Redevelopment, and Crocker Logistics Center, 1 Quarry Road, Brisbane, California,” prepared by Cotton, Shires and Associates, Inc., dated November 20, 2023.

- A letter titled, “Third Supplemental Geologic and Geotechnical Peer Review, Guadalupe Quarry – Closure, Annexation & Redevelopment, and Crocker Logistics Center, 1 Quarry Road, Brisbane, California,” prepared by Cotton, Shires and Associates, Inc., dated March 27, 2024.

- A rockfall investigation report titled, “Rockfall Investigation, Report of Findings, Guadalupe Quarry Closure, Annexation and Redevelopment, Brisbane, California, Project No. KGT22-25,” prepared by Kane GeoTech, Inc., dated October 19, 2023, revised January 10, 2024.

- A set of preliminary rockfall mitigation drawings titled, “Guadalupe Valley Quarry Rockfall Mitigation, Rockfall Protection, San Mateo County, California,” Sheets 1 to 11, prepared by Kane GeoTech, Inc., dated January 8, 2024.

1.1 PROJECT LOCATION AND DESCRIPTION

1.1.1 Project Location

The proposed project is within the existing Guadalupe Quarry in unincorporated San Mateo County west of Brisbane, California. The Guadalupe Quarry encompasses approximately

144 acres of hilly land located on the east face of San Bruno Mountain, approximately 1¾ miles west of the San Francisco Bay. The quarry has reportedly been in operation since 1895 and produces virgin construction aggregate and recycled aggregate from previously used building materials. Up to about 600 feet of material has been mined from the southern and western sections of the quarry relative to the current quarry floor. Benches of varying width and height are observed within the excavation walls. In general, the existing quarry and surrounding facilities have been separated into nine primary site features, including old and new quarry slopes, sidecast fill, tailings stockpile, recent quarry fill, rubble fill, main quarry facility, and the quarry view berm. Two existing stormwater detention basins are also present at the site. The approximate locations of these quarry features are presented in Figure 2. Further description of recent site history and site geology are presented in subsequent sections.

1.1.2 Project Description

Based on the conceptual site plans provided and discussions with the design team, the project includes redeveloping the existing quarry for a new warehouse distribution center and parking garage. The warehouse will be two stories. A third floor is currently being considered. We understand the building may have a footprint of up to approximately 11 to 11½ acres. The lower-level finished floor will be about Elevation 327 feet on the south end of the building sloping ½ percent down to about Elevation 320 feet on the north end of the building (datum unspecified). Similarly, the upper-level finished floor elevation will be about Elevation 367 feet sloping about ½ percent down to about Elevation 360 feet. The preliminary grading plans indicate the lower-level will have dock high loading on the western side of the building and the second floor of the warehouse will have dock high loading on the eastern side of the building. A multi-level parking structure is also planned adjacent to the northwest corner of the warehouse building, with an anticipated bottom floor at approximately Elevation 298 feet. The proposed parking structure will be partially below grade on the south side of the garage and is currently anticipated to be structurally independent from the warehouse. Tie-back retaining walls will support the fill on the uphill side of the garage. The warehouse building will be surrounded by drive aisles with dock doors and trailer parking located to the east and west of the building. Two large bioswales are currently planned for the north side of the site between new site access roads.

The project will also include reconstructing Quarry Road and constructing a new access road at the northwest corner of the site. The new access road will connect to South Hill Drive located to the north. Site work will also include construction of retaining walls throughout the site to achieve proposed site grades. Large retaining walls ranging in height from about 10 to 60 feet are planned north of the proposed building. These walls are currently proposed to be Mechanically Stabilized Earth (MSE) walls with block facing and geogrid reinforcing. MSE walls are also planned at the southeastern corner of the site near the existing quarry fill areas. Deep cuts are planned along the western edge of the quarry that will extend into existing bedrock. Walls in this area will be tiered and are currently planned as rock bolt walls with shotcrete facing. Appurtenant utilities, landscaping, water tanks, an electrical substation, and other improvements necessary for site development are also planned.

1.1.3 Existing Infrastructure

As discussed, the project is located within the existing Guadalupe Quarry. The existing infrastructure observed on-site is focused near the northern portion of the site and includes industrial rock crushing and sieving equipment, along with an office building, and industrial structures used primarily as equipment storage areas. A network of storm drains and drainage canals were also observed starting at the southern pond, located at the base of the benched excavation and leading to the run-off pond located near the northern entrance of the project site. Numerous soil and crushed rock stockpiles and berms are located throughout the main quarry area.

1.1.4 Proposed Grading

Grading for the site will involve excavation and compaction of roughly 1.5 to 1.6 million cubic yards of soil and bedrock material (based on quantities calculated by DGC (2021). To achieve the design grades, significant cuts will be made within the western and eastern portions of the development area with significant fills in the northern portion of the site. Cuts and fills will vary significantly, with average cuts and fills ranging from 10 to 50 feet and fills up to about 100 feet thick for the building pad are anticipated. New fill slopes inclined at 3:1 (horizontal:vertical) are planned at the southern and eastern edges of the quarry floor.

1.1.5 Reclamation Plan Amendment

Based on discussions with the project team, the approved reclamation plan provided final grading for development pads consistent with the same future uses proposed by the Guadalupe Quarry Closure, Annexation and Redevelopment Plan. To the degree minor deviations occur in the approved project as a result of the City review process, amending the approved plan is reportedly anticipated once the CEQA process is complete. The amendment would replace the 1994 grading plan with the Guadalupe Quarry Closure, Annexation and Redevelopment grading plans.

Our discussions with the project team indicate the Guadalupe Quarry Closure, Annexation and Redevelopment Plan is a site-specific development plan that does not rely on the 1994 County reclamation plan approval excepting its consistency with the post mining land use. Detailed studies have been completed for the redevelopment of this quarry, as documented in the studies referenced in this report.

1.2 SCOPE OF SERVICES

Our scope of services was presented in our proposals dated March 12, 2001 and October 30, 2021 and consisted of review of available literature, geologic reconnaissance, field and laboratory programs to evaluate physical and engineering properties of the subsurface soils, a shear wave geophysical investigation, aerial mapping and data capture, engineering analysis to prepare recommendations for site work and grading, building foundations, flatwork, retaining walls, and pavements, slope stability analyses, and preparation of this report. Brief descriptions

of our exploration and laboratory programs and previous exploration and laboratory programs are presented below.

1.3 PURPOSE AND SCOPE OF THIS REPORT

The purpose of this report is to provide a geologic and geotechnical investigation report to support the design of the Guadalupe Quarry Closure, Annexation and Development project. This report covers the proposed on-site improvements based on the grading plans received as of February 2023. In this report, we have prepared Geotechnical Mitigation plans based on our understanding of the project grading as of February 2023. The recommendations in this report may be revised in the future based on changes in the plans, application building codes or reclamation plans, or the evaluation of the standard of practice at that time. This report is for the on-site improvements only and does not include recommendations for off-site infrastructure improvements. If required, off-site improvements will be addressed at a future date.

Based on our review of peer review comments provided by Cotton, Shires and Associated dated June 13, 2023, September 27, 2023, November 20, 2023, and March 27, 2024, the findings and recommendations presented in the following sections of this report have been updated to include all of our response to their prior peer review comments.

SECTION 2: METHODS OF INVESTIGATION

2.1 LITERATURE REVIEW

There have been numerous geologic and geotechnical investigations performed at the Guadalupe Quarry. Published geologic and geotechnical reports were researched and reviewed for this investigation and are listed in the references section at the end of this report. In addition, we reviewed available published historic aerial photographs of the site and vicinity. Further discussion of site history is provided in subsequent sections of this report.

2.2 SITE RECONNAISSANCE

Our engineering geologist conducted site reconnaissance's on occasions in 2021. Our senior principal engineer visited the site in May 2023. No substantial changes in the surface landforms were noted during these visits; however, new stockpiles of quarry spoils were noted within the quarry, but these were of limited extent. No evidence of recent slope movements or severe erosion was noted between our site visits.

2.3 EXPLORATION PROGRAM

2.3.1 Current Field Investigation (2021 through 2022)

Field exploration consisted of 42 borings drilled on various dates between April 9, 2021 and May 26, 2022 with truck- and track-mounted, hollow- and solid-stem auger, rotary-wash, wet-rock coring, and sonic drilling equipment. The borings were drilled to depths ranging from about 3¼ to 163 feet. The borings were backfilled with cement grout in accordance with local

requirements; exploration notifications were provided as required by local jurisdictions. A summary of our current field investigation is presented in the table below.

In addition to our borings, JR Associates performed nine seismic refraction lines to further evaluate bedrock velocity and interpreted depths within the quarry. These locations are plotted on the site plans, and the seismic refraction report is presented in Appendix D.

The approximate locations of our exploratory borings and seismic refraction lines are shown on the Site Exploration Plan, Figure 2A. Logs of our borings and details regarding our field investigation are included in Appendix A.

Table 1: Summary of Current Field Exploration

Boring ID	Date Drilled	Depth of Boring (feet)	Top of Boring Elevation[1] (feet)	Depth to Bedrock (feet)	Bedrock Elevation[1] (feet)
EB-1	5/10 & 5/11/2021	156.1	540	-	-
EB-2	4/29/2021	40	460	-	-
EB-3	4/9/2021	33	343	27	316
EB-3A	4/9/2021	25.9	343	25.5	317.5
EB-4	5/11 to 6/1/2021	163	502	147	355
EB-5	5/25 to 6/2/2021	73	446	54.5	391.5
EB-6	4/16/2021	50.2	264	-	-
EB-7	4/27/2021	32.5	314	22.5	291.5
EB-8	5/5/2021	77.8	209	-	-
EB-9	5/17 & 5/18/2021	47.75	357	-	-
EB-10	4/27/2021	45	355	28	327
EB-11	4/26/2021	23.7	289	-	-
EB-12	4/28 & 4/29/2021	84	375	74	301
EB-12A	5/26 & 5/27/2021	85	375	84	291
EB-13	4/16/2021	27.1	277	-	-
EB-13A	4/16/2021	34.5	277	-	-
EB-14	4/26/2021	33	310	23	287
EB-15	4/26/2021	27.5	310	21	289
EB-16	5/17/2021	8.25	312	8	304
EB-16A	5/17/2021	9.1	312	8.5	303.5
EB-16B	6/17/2021	35	312	8.5	303.5
EB-17	5/13 & 5/14/2021	137.5	433	-	-
EB-18	5/18 to 6/17/2021	85	396	-	-
EB-18A	6/3/2021	56	397	-	-
EB-19	5/17/2021	58.75	200	33.75	166.25
EB-20	4/30 to 5/25/2021	113.6	430	-	-
EB-21	3/14 & 3/15/2022	86.5	325	80	245
EB-22	3/15/2022	43	238	33	205
EB-23	3/16/2022	27	188	16	172

[1]Kier & Wright, July 2023, Elevation datum unknown

Table 1 Continues

Table 1: Summary of Current Field Exploration (Continued)

Boring ID	Date Drilled	Depth of Boring (feet)	Top of Boring Elevation[1] (feet)	Depth to Bedrock (feet)	Bedrock Elevation[1] (feet)
EB-24	2/8/2022	3.25	214	-	-
EB-24A	3/16/2022	71.5	214	-	-
EB-25	2/8/2022	11.3	215	-	-
EB-25A	2/8/2022	59.4	215	51.5	163.5
EB-26	2/7/2022	11	178	5.5	172.5
EB-27	2/7/2022	14.3	152	5.5	146.5
EB-28	2/7/2022	19.3	138	1.5	136.5
EB-29	2/7/2022	40	121	-	-
EB-30	2/7/2022	14.2	93	2	91
EB-31	4/12 & 4/13/2022	105	524	97	427
EB-32	4/13 & 4/25/2022	100	565	92	473
EB-33	4/25 & 4/26/2022	40.5	592	38	554
EB-34	5/26/2022	20.3	160	1.5	158.5

[1]Kier & Wright, July 2023, Elevation datum unknown

2.3.2 Previous Field Explorations (1987 through 2003)

We reviewed previous field exploration dating back to 1987 to prepare this report. Peter Kaldveer Associates (PKA) performed five exploratory borings on the southeast side of the site in 1987 to depths ranging from about 17 to 76 feet below historic site grades. In 2000, Terrasearch (TI) performed 20 borings on the northern and east-central sides of the site to depths ranging from about ½ to 43½ feet below historic site grades (i.e. site grades at the time of their exploration). Additionally, in 2000 Jacobs Associates (JA) performed 13 borings to depths ranging from about 24 to 173½ feet below historic site grades on the eastern side of the site and within the southern sidecast fill area. Furthermore, Alan Kropp and Associates (AKA) performed seven exploratory borings in 2000 to depths ranging from about 25¼ to 102 feet below historic site grades within the northern half and southeastern portion of the site. The JA investigation and the AKA investigations were performed approximately concurrently. In 2003, Berlogar Geotechnical Consultants (B) performed four borings to depths ranging from about 66½ to 155 feet below historic site grades within the southeastern portion of the site. A summary of previous field investigations is presented in the table below.

We note that historic grade elevations may not represent current grade elevations due to current and previous quarrying operations. The approximate locations of the previous explorations are shown on the Site Exploration Plan, Figure 2A. Available boring logs and laboratory testing are presented in Appendix C.

Table 2: Summary of Previous Field Explorations

Boring ID	Date Drilled	Depth of Boring (feet)	Top of Boring Elevation[2] (feet)	Current Depth to Bedrock (feet)	Bedrock Elevation[1] (feet)
PKA-1	7/31/1987	28	415	121	387
PKA-2	7/31/1987	17	380	172	363
PKA-3	7/31/1987	65	405	-	-
PKA-4	7/31/1987	76	405	171	329
PKA-5	7/31/1987	45.5	366	177.5	320.5
TI-1	12/17/1999	26.5	197	-	-
TI-2	12/17/1999	1.5	200	-	-
TI-3	12/17/1999	39	205	40	166
TI-4	12/17/1999	28.5	215	30.5	186.5
TI-5	12/20/1999	19	310	48	291
TI-6	12/20/1999	21	312	55	291
TI-7	12/20/1999	18	305	28	287
TI-8	12/20/1999	20	330	23	310
TI-9	12/17/1999	43.5	312	45.5	271.5
TI-10	12/20/1999	22	380	86	358
TI-11	12/20/1999	6	305	3	299
TI-12	12/20/1999	16	245	14	229
TI-13	12/17/1999	0.5	360	28.5	359.5
TI-14	12/17/1999	1	345	1	344
TI-15	12/17/1999	1	345	-7	344
TI-16	12/17/1999	0.5	230	-4.5	229.5
TI-17	12/17/1999	1	220	-1.5	219.5
TI-18	12/17/1999	1	243	0.5	242.5
TI-19	12/20/1999	1	310	0	310
TI-20	12/20/1999	10	320	12	316
JA-1	9/2000	39.5	577	2	575
JA-2	9/2000	24	442	2	440
JA-3	9/2000	64	458	79	401
JA-4	9/2000	103	453	137	362
JA-5	9/2000	41.5	490	32	458
JA-6	9/2000	32	349	166.5	328.5
JA-7	9/2000	40	363	96	342
JA-8	9/2000	58.5	432	65.5	374.5
JA-9	9/2000	148.5	500	154.5	355.5
JA-10	9/2000	173.5	557	169	388
JA-11	9/2000	42.5	567	33.5	533.5
JA-12	9/2000	86.5	568	60	508
JA-13	9/2000	51.5	552	67.5	507.5

[1]Kier & Wright, July 2023, Elevation datum unknown
[2]Elevation reported on boring log, datum unknown

Table 2 Continues

Table 2: Summary of Previous Field Explorations (Continued)

Boring ID	Date Drilled	Depth of Boring (feet)	Top of Boring Elevation[2] (feet)	Current Depth to Bedrock (feet)	Bedrock Elevation[1] (feet)
AKA-1	8/29/2000	51.5	265	16.5	223.5
AKA-2	8/30/2000	69	395	123	332
AKA-3	8/31/2000	102	430	200	335
AKA-4	9/5/2000	25.2	315	43	299
AKA-5	9/5/2000	46.5	320	50	282
AKA-6	9/6/2000	56.5	225	39.5	185.5
AKA-7	9/6/2000	34.2	205	34	178
B-1	3/10/2003	66.5	415	114.75	353.25
B-2	3/13/2003	74	463	86	394
B-3	3/14/2003	107	425	162	323
B-4	3/18/2003	155	497	148.5	348.5

[1]Kier & Wright, July 2023, Elevation datum unknown
[2]Elevation reported on boring log, datum unknown

2.4 LABORATORY TESTING PROGRAM

In addition to visual classification of samples, the laboratory program has focused on obtaining data for evaluation of proposed site development design including slope stability, retaining walls, settlement, and grading recommendations. Testing included moisture contents and dry densities, washed sieve analyses, grain size analyses, triaxial shear strength tests, and a compaction curve.

2.5 ENVIRONMENTAL SERVICES

Environmental services were not requested for this project. We understand Farallon Consulting is providing environmental services at the site. If environmental concerns are determined to be present, the project environmental consultant should review our geotechnical recommendations for compatibility with the environmental concerns.

SECTION 3: REGIONAL SETTING

3.1 REGIONAL GEOLOGIC SETTING

The site is located in California's Coast Ranges geomorphic province, an approximately 500-mile-long series of northwest-trending mountain ranges (2,000 to 6,000 feet elevation) and valleys that generally trend subparallel to the San Andreas Fault. The geomorphology of the Coast Ranges province is controlled predominantly by deformation (faulting, folding, and shearing) associated with subduction of the Farallon Plate beneath the North American Plate and movement between the Pacific and North American Plates along the San Andreas Fault system.

The geology of the Coast Ranges province includes the presence of several terranes, distinct blocks or assemblages of Cretaceous and Jurassic, igneous and sedimentary oceanic rock scraped off the Farallon Plate during subduction and metamorphosed (or not) to varying degrees. These terranes and associated mélange zones are collectively called the Franciscan Complex. The Guadalupe Quarry is located in the San Bruno Mountain terrain (a more distinctive rock body, not fault bounded as defined as terrane), the youngest of the Franciscan terranes the San Francisco area, see Figure 3, Regional Geologic Map. The San Bruno Mountain terrain consists primarily of graywacke sandstone with interbedded shale and is bounded to the southwest and northeast by the Hillside and City College Fault Zones, respectively (Bonillo, 1998, Brabb et al, 1998). Figure 3 and other geologic maps in this report identify this geologic unit with the symbol "JKsk" indicating a higher percentage potassium feldspar than surrounding sandstone and shale units with the more common "JKs" designation. The Hillside and City College Faults are both mapped as pre-Quaternary faults and are, therefore, not considered active (Jennings and Bryant, 2010).

3.2 REGIONAL FAULTING AND SEISMICITY

3.2.1 Regional Active Faulting

The San Andreas Fault Zone, situated about 6.3 kilometers (km) southwest of the project site, is the primary tectonic boundary between the North American Plate and the Pacific Plate, and dominates the tectonics, geology, and physiography of the San Francisco Bay region. Splays from the San Andreas Fault, and other faults, which accommodate irregularities in the movement of the plates past each other, are capable of generating large earthquakes. These active faults, which could cause significant shaking at the project site include the San Andreas, Hayward-Rodgers Creek, San Gregorio, Calaveras, Mount Diablo Thrust, Monte Vista-Shannon, Green Valley, Point Reyes, and West Napa Faults.

Other older and less significant faults shown on regional maps include the City College Fault, the Hillside Fault and the San Bruno Fault. The City College Fault trends northwest and crosses through the Guadalupe Valley and extends towards the Sunset District of San Francisco. Schlocker (1974) describes sheared and shattered Franciscan Complex rocks along the trend of the City College Fault, with abundant slickensides and gouge zones exposed in the shear zone. The City College Fault has not been active in the late Quaternary, nor is seismicity associated with the zone. The San Bruno Fault shown on Bonilla (1965) has since been removed from government maps based on work by the USGS (1997).

3.2.2 Historical Seismicity

The project area is located in a seismically active region that has been subjected to several strong earthquakes during historic time. We reviewed the *2010 Fault Activity Map of California* (Jennings and Bryant, 2010), the Quaternary Fault and Fold Database (USGS and CGS, 2006), and other sources to identify active faults in the site vicinity. Based on our literature review and site reconnaissance, the site is not located on any known "active" fault trace. In addition, the site is not located within a Special Studies Earthquake Fault Zone (formerly referred to as an Alquist-Priolo Special Studies Zone).

While seismologists cannot predict earthquake events, geologists from the U.S. Geological Survey have recently updated (in 2015) earlier estimates from their 2014 Uniform California Earthquake Rupture Forecast (Version 3; UCERF3) publication. The estimated probability of one or more magnitude 6.7 earthquakes (the size of the destructive 1994 Northridge earthquake) expected to occur somewhere in the San Francisco Bay Area has been revised (increased) to 72 percent for the period 2014 to 2043 (Aagaard et al., 2016). The faults in the region with the highest estimated probability of generating damaging earthquakes between 2014 and 2043 are the Hayward (33%), Calaveras (26%), and San Andreas Faults (22%). In this 30-year period, the probability of an earthquake of magnitude 6.7 or larger occurring is 22 percent along the San Andreas Fault and 33 percent for the Hayward Fault.

The faults considered capable of generating significant earthquakes are generally associated with the well-defined areas of crustal movement, which trend northwesterly. The table below presents the State-considered active faults within about 50 kilometers of the site. Other local seismologic features are discussed further in this report.

Table 3: Approximate Fault Distances

Fault Name	Distance	
	(miles)	(kilometers)
San Andreas (1906)	3.9	6.3
San Gregorio	8.0	12.9
Hayward (Total Length)	14.8	23.8
Monte Vista-Shannon	19.3	31.1
Calaveras	24.0	38.7
Concord-Green Valley	27.8	44.7
Rogers Creek	28.0	45.1
Point Reyes	28.1	45.3

A regional fault and activity map is presented as Figure 4, illustrating the relative distances of the site to significant fault zones.

The project site is located approximately 3.9 miles northeast of the active San Andreas fault, which is responsible for several large historic earthquakes in northern California. The largest northern California earthquake was the 1906 San Francisco earthquake (**M**=7.8, according to WGCEP, 2008), in which an estimated 290-mile-long segment of the San Andreas fault ruptured from near Fort Bragg to Hollister. That earthquake was felt from the Oregon border south to Los Angeles, and as far east as Nevada.

Table 4 provides information of the times and locations of 13 events in the greater San Francisco Bay region with reported magnitudes of 6 or greater within 62 miles (100 km) of the project site. Those 13 earthquakes primarily are associated with the right-lateral, strike-slip San Andreas, Hayward, or Calaveras faults (e.g. 1838, 1868, 1906, and 1984).

Table 4: Historical Earthquakes (M ≥ 6) Within about 100 km of the Project Site

Year	Month	Day[1]	Latitude (°N)	Longitude (°W)	Magnitude[2]	Depth (km)	Radial Distance from site (km)
1808	06	21	37.80	122.50	6.0	-	8
1836	06	10	37.80	122.20	6.8	-	123
1838	06		37.60	122.40	7.0	-	54
1858	11	26	37.50	121.90	6.1	-	61
1865	10	08	37.30	121.90	6.5	-	75
1868	10	21	37.70	122.10	6.8	-	31
1889	05	19	38.00	121.90	6.0	-	72
1898	03	31	38.20	122.40	6.3	-	53
1906	04	18	37.70	122.50	8.25	-	9.4
1911	07	11	37.25	121.75	6.6	-	81
1984	04	24	37.320	121.698	6.1	8	81
1989	10	18	37.036	121.883	7.1	19	90
2014	8	24	38.215	122.312	6.0	11	58

1. Date is universal time.
2. Earthquake magnitudes are as reported in the CDMG, USHIS, Berkeley Seismological Laboratory, or NCEDC catalogs. Magnitudes are either local or Richter magnitudes (M_L) and moment magnitudes (**M**). Local magnitudes are determined from the amplitude (in mm) of the maximum wave recorded on a seismogram. Moment magnitude is the magnitude of an earthquake that is proportional to the slip on the fault times the area of the fault surface that slips. **M** is related to the total energy released in the earthquake and can be estimated from seismograms.

3.3 SITE GEOLOGY

The Guadalupe Quarry and San Bruno Mountain are underlain by Cretaceous- to Jurassic-age sandstone and shale of the Franciscan Complex, described by Bonilla (1998) as follows: *"Interbedded sandstone and shale, hard where fresh and intact, soft where weathered or sheared. Commonly medium dark gray where fresh, olive gray to yellowish brown where moderately weathered, and yellowish orange to yellowish gray where highly weathered. Sandstone generally containing more than two percent potassium feldspar."*

An approximate 500-foot-long fault trace, dipping 70 degrees east, is mapped along the west side of the quarry (Bonilla, 1998) as shown on Figure 3. This is also shown on Figure 5, Site Geologic Map.

The geologic conditions we observed at the site during our reconnaissance are consistent with those represented in the reviewed literature. Shear zones were observed trending generally in

north-south and east-west directions, and the fault trace mapped by Bonilla (1998) was observed. We also observed a north-trending near-vertical fault in the southeast portion of the site. This fault was noted on the Geologic Map for the site prepared as part of the Jacobs Associates (2000) report.

The project site is located within the Visitacion Valley Groundwater Basin. Surface water from rainfall will percolate through fractures in the rock mass and will flow into the quarry on a seasonal basis from the area immediately surrounding the project site during the rainy season. Standing water was observed in a large excavation in the center of the quarry and it serves as a collection point. Additional groundwater data is provided in subsequent sections.

3.4 SITE GEOLOGIC STRUCTURE

The geologic structure at the project site is best described in the report by Jacobs Associates (2000) and is summarized with slight modifications below.

Although the rock mass structure exposed by the quarry slopes is quite variable on a local scale, the overall structural pattern exhibits some preferential trends. As shown on the Site Geologic Map, Figure 5, bedding in the New Quarry and the northern portion of the Old Quarry generally strikes to the west and dips to the north at inclinations ranging from about 50 degrees to vertical. In the remaining portion of the Old Quarry the bedding also generally strikes to the west, with dips ranging from about 70 degrees to the north to 20 degrees to the south.

In addition to bedding, jointing in the bedrock results in an overall blocky rock mass structure, with individual blocks typically ranging from about 1 to 10 feet in maximum dimension. The jointing has relatively dispersed (i.e., random) orientations, but with an overall trend of steeply dipping joints that strike subparallel to the bedding and sub-vertical joints that strike toward the north (approximately orthogonal to bedding). These orientations and descriptions are shown graphically by stereonet plots in Geocon (2018) and photographs in Jacobs Associates (2000).

The bedrock is cut by several steeply dipping faults. The faults can be divided into two sets, one striking to the north-northwest (at a low angle to bedding) and the other striking approximately north. Faults exposed in the slopes in the Old Quarry are characterized by bands of clay gouge up to 1 foot in thickness that locally expose hydrothermally mineralization. Conversely in the New Quarry, zones of hydrothermally altered breccia and clay gouge locally exceeds a width of 20 feet delineates a significant northwest trending fault zone. The degree of clay gouge does not reflect recency of faulting; however, the persistence of these faults extends to the scale of the entire quarry.

SECTION 4: SITE CONDITIONS

4.1 GEOMORPHOLOGY AND RECENT HISTORY

The site is located along the northeastern slope of the San Bruno Mountain, where the San Bruno Mountain's ridgeline trends southeast to northwest. The site is surrounded to the east, south, and west by northwestern facing slopes of the San Bruno Mountain. The site is

characterized as a rock quarry that has been actively mined since 1895. Portions of the site have been an active quarry for many years, but a significant amount of the quarrying and off hauling began in the early 1950's. Based on aerial photographs provided online from Historic Aerials (http://www.historicaerials.com) covering the quarry (taken in 1946, 1956, 1968, 1980, 1982, 1987, 1993, 2002, 2005, 2009, 2010, 2012, 2014, 2016, and 2018), the photo's suggest that the quarry operations were focused along the western sections of the site. By 1968, the quarry operations had expanded to the southern and eastern boundaries of the project site. Sometime between 1982 to 1987, the photos suggest that the quarry operators focused their mining and off haul operations in the southeastern section of the site and established new off hauling roads. By the 1993 photo, a series of new rock benches are visible and continue to appear until the 2002 aerial photo. The 2005 photo suggests that mining operations slowed and no new rock benches appear until 2014. After the 2014 photo, the site appears to be largely unchanged.

4.2 SURFACE DESCRIPTION AND TOPOGRAPHY

The approximately 144 acre-site is largely situated along the northeastern facing slope of the San Bruno Mountain. The northern section of the site is located near the toe of the slope and southern section of the project site is located near the San Bruno ridge line. We divided the site into several sections: Quarry Road, the quarry floor (i.e. recent quarry fill and main quarry facility areas), sidecast fill, rubble fill, quarry view berm, and the tailings stockpile.

4.2.1 Quarry Road

The existing Quarry Road acts as the front access point for the quarry. The road intersects South Hill Drive to the east and extends westward about ½ mile to the quarry gates. Quarry Road generally ranges in elevation from about 55 feet to the east up to about 170 feet at the quarry gates. Within the gates, the existing road will be extended along the northern perimeter of the site to provide access to the proposed parking structure and warehouse. Additionally, Quarry Road will be extended northward to join with South Hill Drive to the northwest. Due to the existing terrain, subsurface conditions at the proposed northern Quarry Road extension were unable to be evaluated at the time of our field explorations and should be further investigated. We performed 10 soil borings in the vicinity of the proposed roadway realignment and extension: EB-19, EB-23, EB-25, EB-25A, EB-26, EB-27, EB-28, EB-29, EB-30, and EB-34 to depths of about 11 to 59½ feet below current site grades. Bedrock was encountered in these explorations at about 1½ to 51½ feet below current site grades, corresponding to about Elevation 91 to 211 feet.

4.2.2 Quarry Floor

The quarry floor, which includes both the main quarry facility and recent quarry fill, is currently occupied by the existing quarry offices, the manufacturing area, and internal roads extending south to the southern-most pond. We performed nine soil borings within the vicinity of the quarry floor: EB-6, EB-7, EB-8, EB-11, EB-13, EB-13A, EB-14, EB-24, and EB-24A. Our explorations within the quarry floor were drilled to depths of about 23¾ to 77¾ feet below current site grades. Bedrock was encountered at EB-7 and EB-14 at depths of about 22½ and

23 feet below current site grades, respectively, corresponding to Elevation 291½ and 287 feet, respectively. Practical drilling refusal was encountered in the remaining borings at the terminal depth of the borings, except EB-24A which was terminated at 71½ feet in native soils. Supplemental discussion of bedrock depths estimated in the seismic refraction lines performed compared to borings performed within the quarry floor area is provided in Section 4.2.7 below.

4.2.3 Sidecast Fill

As part of former mining operations, a significant quantity of fill was previously placed in the southern portion of the site between the new and old quarry benches. Site elevations in this area vary greatly and generally range from about 520 to 600 feet. We performed three soil borings within the sidecast fill: EB-31, EB-32, and EB-33. Our explorations within the sidecast fill were drilled to depths of about 40½ to 105 feet below current site grades. Bedrock was encountered in these explorations at depths ranging from about 38 feet at EB-33 to the south to 97 feet at EB-31 to the north. Top of bedrock ranged from about Elevation 554 feet to the south down to about Elevation 427 feet to the north.

4.2.4 Rubble Fill

Debris and recycled concrete and asphalt materials have been placed on the western side of the site over the years. Site elevations in this area varies significantly. We performed seven soil borings within the western debris fill areas: EB-9, EB-10, EB-16, EB-16A, EB-16B, EB-18, and EB-18A. Our explorations within the western debris fill areas were drilled to depths ranging from about 9 to 85 feet below current site grades. Bedrock was encountered in EB-10, EB-16, EB-16A, and EB-16B at depths of about 28, 8, 8½, and 8½ feet, respectively, corresponding to Elevation 327, 304, and 303½ feet. Drilling refusal was encountered in the remaining borings due to obstructions within the fill or borehole collapse. Supplemental discussion of bedrock depths estimated in the seismic refraction lines performed compared to borings performed within the rubble fill area is provided in Section 4.2.7 below.

4.2.5 Quarry View Berm

The existing northern view berm is located parallel to the northern boundary of the quarry property. The berm begins north of EB-8, inclines to about Elevation 240 feet, and then downward towards the northern boundary of the site at approximately 1.5:1 to 2:1 (horizontal:vertical). Due to current dense vegetation and terrain, subsurface conditions in this area were unable to be evaluated at this time, however, based on conversations with quarry staff and judgement, the berm consists of undocumented fill placed during early stages of the quarry development.

4.2.6 Tailings Stockpile

An existing tailings stockpile is located on the south-southeast portion of the site, just below the old quarry slopes. Exposed benches of bedrock are visible along the southeastern site boundary. Beneath the benches, portions of the old quarry area have been backfilled over the years for site access roads and storage of quarry tailings. We performed nine borings in the

vicinity of the tailings stockpile: EB-1, EB-2, EB-3, EB-3A, EB-4, EB-12, EB-12A, EB-15, and EB-20. Boring EB-4, located at approximately Elevation 502 feet was performed on the main mound of quarry tailings. Bedrock at this location was encountered about 147 feet below current site grades, corresponding to Elevation 355 feet. Borings EB-3, EB-3A, EB-12, EB-12A, and EB-15 encountered bedrock at depths ranging from about 25½ to 84 feet below current site grades, corresponding to Elevation 289 to 317½ feet.

4.2.7 Seismic Refraction Line and Boring Bedrock Depth Comparisons – Quarry Floor and Rubble Fill Areas

Below is a summary of the seismic refraction lines and comparisons with bedrock depths in nearby borings within the quarry floor and rubble fill areas of the quarry. It is noted that the bedrock depths reported in the Terrasearch (TI) boring logs (1999-2000) were considered less accurate than the Jacobs Associates or Alan Kropp borings since many of the TI borings did not drive samples into rock when auger refusal was encountered. Therefore, it was not clear whether other obstructions or actual undisturbed rock was encountered.

- Line 1 Spreads 1 and 2: Interpreted bedrock depths along this seismic line/spreads ranged from approximately 12 to 25 feet beneath site grades. The closest borings were EB-7 and EB-14 roughly 70 to 80 feet south of the seismic line, which encountered bedrock at depths of 22½ and 23 feet beneath site grades. The seismic line interpreted bedrock at depths of approximately 19 feet adjacent to these borings. In our opinion, the depths between the two are reasonably comparable.

- Line 1 Spreads 3, 4, and 5: Interpreted bedrock depths along this seismic line/spreads ranged from about 12 to 38 feet beneath site grades. Borings EB-11 and EB-13/EB-13A were performed within about 25 feet of the seismic line. Practical auger refusal was encountered at depths of about 24 feet in EB-11 and 34½ feet in EB-13A. It was unclear if refusal was the top of bedrock or just a cobble at the bottom of boring. The seismic line interpreted bedrock at about 15 feet and 25 feet in the location of EB-11 and EB-13/EB-13A, respectively. Provided the refusal depth of the borings is about the depth of bedrock, it is our opinion the depth difference between the borings and seismic line is reasonable considering potential variables discussed further below and in JR Associates seismic refraction survey report attached in Appendix D.

- Line 2 Spread 16: Interpreted bedrock depths along this seismic line/spread ranged from about 20 to 47 feet beneath site grades. Borings EB-12 and EB-12A were performed within about 25 feet of the seismic line and encountered bedrock at 74 and 84 feet, respectively. The seismic line interpreted bedrock at about 37 feet in the location of these borings. As discussed in JR Associates seismic refraction survey report, the P-wave velocity for the second seismic layer (layer interpreted to be bedrock) in their two-layer seismic model ranged from 8,370 to 16,000 fps except for Line 2 Spread 16 where the velocity measured under this spread was only up to 4,180 fps. JR Associates notes that typical velocities around 5,000 fps indicated saturated soil or fill. As such, the depth to bedrock interpreted by the two-layer seismic model may in fact not be the depth to bedrock and therefore potentially explain the discrepancy between the borings and

seismic lines. The data from Borings EB-12/12A was used to reflect the bedrock depth in Cross Sections 3 and 13.

- Line 2 Spreads 17 and 18: Interpreted bedrock depths along this seismic line/spreads ranged from 0 to about 40 feet beneath site grades. Borings TI-6 and TI-8 were performed about 50 to 60 feet from the seismic line. The estimated bedrock depth at these locations (based on current site grades) is about 55 and 23 feet, respectively. The seismic line interpreted bedrock depths at about 39 and 40 feet adjacent to these borings. Boring TI-20 encountered a bedrock depth of about 4 feet and was performed in close proximity to the seismic line. The seismic line interpreted bedrock depth at about 2 feet in this approximate location. In our opinion, there could be variability in depth to bedrock between TI-6 and TI-8 solely because of the distance between the two and variability of the quarried bedrock depth. In our opinion, the difference in bedrock depth between TI-20 and the seismic line is reasonable considering all the potential variables and the highly weathered bedrock description.

- Line 3 Spreads 6 and 7: Interpreted bedrock depths along this seismic line/spreads ranged from about 17 to 42 feet beneath site grades. Boring EB-10 was performed within 25 feet of the seismic line and encountered bedrock at 28 feet. The seismic line interpreted bedrock depth at about 33 feet at the approximate boring location. In our opinion, the depths between the two are reasonably comparable.

- Line 4 Spread 14: Interpreted bedrock depth along this seismic line/spread ranged from about 24 to 36 feet beneath site grades. Boring EB-10 was performed within about 25 feet of the seismic line and encountered bedrock at 28 feet. The seismic line interpreted bedrock depth at about 35 feet at this location. Boring EB-9 was performed about 60 to 70 feet from the seismic line and encountered practical auger refusal at about 48 feet. It was unclear if refusal was the top of bedrock or just a cobble at the bottom of boring. In our opinion, the depths between EB-10 and the seismic line are reasonably comparable.

- Line 5 Spreads 8, 9, and 10: Interpreted bedrock depth along this seismic line/spreads ranged from about 10 to 36 feet. Borings EB-13/EB-13A and EB-6 were performed about 30 to 40 feet away and 50 feet away, respectively. Practical auger refusal was encountered at depths of about 34½ feet in EB-13A and at 50 feet in EB-6. It was unclear if refusal was the top of bedrock or just a cobble at the bottom of boring. The seismic line interpreted bedrock at depths of about 10 feet and 15 feet adjacent to EB-13A and EB-6, respectively. It is our opinion, the offset between the borings and seismic line is too great to compare depths considering the potential variability in the quarried bedrock depth.

- Line 6 Spread 13: Interpreted bedrock depth along this seismic line/spread ranged from about 18 to 24 feet. Boring EB-22 was performed in close proximity to the seismic line and encountered bedrock at 33 feet. The seismic line interpreted bedrock depth at about 21 feet at this location. In our opinion, the depths between EB-22 and the seismic line are reasonably comparable.

- Line 7 Spread 15: Interpreted bedrock depth along this seismic line/spread ranged from about 11 to 31 feet. Boring TI-11 was performed about 70 to 80 feet from the seismic line with the bedrock depth being about 0 feet. The seismic line interpreted bedrock depth at about 11 feet adjacent to the boring. The offset between the boring and seismic line is greater than 50 feet, therefore, the seismic refraction data was weighted more heavily in this area.

- Line 8 Spread 12: Interpreted bedrock depth along this seismic line/spread ranged from about 21 to 47 feet. Boring EB-6 was performed in close proximity to the seismic line and encountered practical auger refusal at a depth of about 50 feet. It was unclear if refusal was the top of bedrock or just a cobble at the bottom of boring. The seismic line interpreted bedrock depth at about 27 feet at the approximate boring location. We acknowledge there is a greater discrepancy between the boring and seismic line bedrock depth, so the boring data was relied upon in this location. Potential limitations in the interpretation of bedrock depth for the seismic line and potential for quarried bedrock depth change in the approximate location of the boring and seismic line are potential reasons for the discrepancy.

- Line 9 Spread 11: Interpreted bedrock depth along this seismic line/spread ranged from about 10 to 42 feet. Boring AKA-1 was performed within about 25 feet of the seismic line with the current bedrock depth being 16½ feet. The seismic line interpreted bedrock depth at about 12 feet adjacent to the boring. In our opinion, the depths between AKA-1 and the seismic line are reasonably comparable.

The depth to top of bedrock across the quarry floor and rubble fill areas are highly variable. As discussed above, some borings were performed in proximity to the seismic lines while others were offset from the lines. Depths to bedrock in some borings are generally similar to that from the seismic lines while others had larger variations. The variations could be from boring offset, surface elevations, and variations in subsurface bedrock depth across the offsets. Additionally, as noted in JR Associates seismic refraction survey report, “Seismic layers do not always correspond directly to lithologic changes that might be found in borehole or trenching data. The depths to layer 2 given in the appendix are the results of the computer analysis and are given to a tenth of a foot. These are the computed depths to the compressional wave velocity changes and indicate the top of the second seismic layer. A seismic layer is an interface between materials with different P-wave velocities. Factors such as weathering, cementation, induration, and saturation as well as lithologic changes can create changes in seismic velocities. Also, there can be lithologic changes without velocity changes. The depth to bedrock at lines that cross can be different because the average seismic wave velocities for each line is often different. However, our field experience indicates that seismic layers often correspond to major changes in lithology or saturation to within ±20% of the depth to the interface.”

Taking all this into account, we have compiled the data and used our best engineering judgement to evaluate the results and provide depictions of depths to bedrock on the cross sections and figures in this report.

4.3 SITE GEOLOGY AND SUBSURFACE CONDITIONS

The site is blanketed by deep quarry fills (Qaf), colluvium (Qc), and alluvium (Qal) overlying Franciscan Formation bedrock (KJsk). The approximate locations of our exploratory borings and prior explorations are shown on the Site Exploration Plan, Site Development Plan, and Quarry Road Development Plan, Figures 2A to 2C. A more detailed description of these materials is presented below and on the exploration logs in Appendix A.

4.3.1 Undocumented Fill (Qaf)

The development is within an area of previous quarry excavation and quarry waste fills that have remained from previous quarrying activities throughout the decades. Undocumented fills were encountered in our geotechnical borings to depths of up to about 156 feet, at which practical auger refusal was encountered (i.e. fills may be deeper). Undocumented fills generally blanket the previously filled quarry floor, sediment ponds, old quarry pit, new quarry pit, quarry view berm, and the perimeter of the site. The undocumented quarry fills are highly variable and may consist of soft to hard clays, loose to very dense sands and gravels, steel, concrete, rubble, and other materials of variable consistency and density.

4.3.2 Colluvium and Alluvium (Qc / Qal)

Based on our review, colluvium appears to mantle the bedrock surrounding the slopes above the quarry edges. According to the Alan Kropp & Associates geotechnical report published in November 2000, we understand that two ravines previously passed through the central portion of the quarry area. Prior to quarrying, these ravines were likely filled with thin deposits of colluvium and shallow landslide debris. Thicker deposits of colluvium and some fan deposits are present near the mouths of these ravines in the northern portion of the quarry area. Additionally, we encountered deeper alluvial soils at Boring EB-19 near the quarry offices and Boring EB-24A near the view berm. Alluvial soils at Boring EB-19 were encountered to a depth of about 33¼ feet and to the terminal depth of EB-24A at 71½ feet. In general, older alluvial soils mantle the bedrock on the northern third of the quarry (main quarry facility and view berm) and consist of interbedded stiff to very stiff clays and medium dense to dense clayey sands.

4.3.3 Franciscan Complex Bedrock (KJsk)

Franciscan Formation bedrock within the quarry consists primarily of sandstone with interbedded shale. As previously discussed, the bedrock on site exhibits wide variations in strike and dip. In general, shear zones are concentrated in the shale interbeds and along inactive bedrock faults. Bedrock strength and hardness varies with depth, fracturing and weathering. Based on our review of prior subsurface data, interpretation of the exposed bedrock and bedrock encountered in our borings, weathered bedrock that mantles the undisturbed hillside areas flanking the quarry, or bedrock encountered beneath quarry fill and alluvial soil at the northern half of the site has been designated as $KJsk_1$. Less weathered bedrock exposed on old and new quarry slopes and beneath quarry fills on the southern half of the site has been designated as $KJsk_2$. Prior mapping by Jacobs Associates (2000) and later adopted by Geocon (2018), referred to weathered and less weathered Franciscan formation

bedrock materials as KJf_1 and KJf_2, respectively, as shown on Figure 5. For this investigation, we have adopted the KJsk designation as presented by Bonilla (1998).

4.4 GROUNDWATER

We reviewed groundwater data provided in previous geotechnical investigations performed on site. Groundwater was encountered in previous investigations performed by Peter Kaldveer and Associates (PKA) in 1987, Alan Kropp and Associates (AKA) in 2000, and Berlogar and Associates (B) in 2003 at varying depths. The groundwater depths noted in these borings range from 15 to 198 feet below current site grades.

Groundwater was also encountered in several borings performed during our field exploration (EB). Groundwater observed in Borings AKA-2, EB-1, EB-6, and EB-24A were noted as potentially perched in the field. Groundwater observed in Borings EB-11, EB-13, and EB-25 was up to about 2 to 4 feet below current site grades at the end of the boring, immediately prior to backfilling the boring. Groundwater was not observed in Borings EB-2, EB-3, EB-4, EB-5, EB-9, EB-10, EB-12, EB-13A, EB-14, EB-16, EB-16A, EB-16B, EB-18, EB-18A, EB-19, EB-20, EB-21, EB-24, EB-26, EB-27, EB-28, EB-29, EB-30, EB-31, EB-32, EB-33, and EB-34; however, our borings were immediately backfilled when the boring was completed and drilling procedures, including introducing water or drilling fluid during drilling into the hollow stem, precluded us from observing the groundwater depth. Groundwater depths encountered at our various exploration locations and during prior investigations are provided in Table 5a below.

All measurements were taken at the time of drilling and may not represent the stabilized levels that can be higher than the initial levels encountered. As shown in Table 5a, groundwater levels are highly variable across the site. Fluctuations in groundwater levels occur due to many factors including seasonal fluctuation, underground drainage patterns, regional fluctuations, and other factors.

Table 5a: Groundwater Data, Current Field Investigation

Boring ID	Date Drilled	Groundwater Elevation[1] (feet)	Groundwater Depth Below Current Grades (feet)	Depth of Boring
EB-1[23]	5/10/2021	436	104	156.1
EB-6[23]	4/16/2021	236	28	50.2
EB-7	4/27/2021	293	21	32.5
EB-8	5/5/2021	157	52	77.8
EB-11[4]	4/26/2021	274	15	23.7
EB-12A	5/27/2021	297	78	85.0
EB-13[4]	4/16/2021	271	6	27.1

Table 5a Continues

Table 5a: Groundwater Data, Current Field Investigation (Continued)

Boring ID	Date Drilled	Groundwater Elevation[1] (feet)	Groundwater Depth Below Current Grades (feet)	Depth of Boring
EB-15	4/26/2021	287	23	27.5
EB-17	5/14/2021	298	135	137.5
EB-22	3/15/2022	214	24	43
EB-23	3/16/2022	172	16	27
EB-24A[2]	3/16/2022	194	20	71.5
EB-25	2/8/2022	205	10	11.3
EB-25A	2/8/2022	208	7	59.4

[1]Elevation datum unknown
[2]Perched groundwater
[3]No groundwater observed at the end of drilling
[4]Shallow groundwater noted at the end of drilling

Table 5b: Groundwater Data, Previous Field Investigations

Boring ID	Date Drilled	Groundwater Elevation[1] (feet)	Groundwater Depth Below Current Grades (feet)	Depth of Boring
PKA-3	7/31/1987	354	110	65.0
PKA-4	7/31/1987	348	152	76.0
PKA-5	7/31/1987	325	173	45.5
AKA-1	8/29/2000	225	15	51.5
AKA-22	8/30/2000	376	79	69.0
AKA-3	8/31/2000	337	198	102.0
B-1	3/10/2003	385	83	66.5
B-3	3/14/2003	358	127	107.0

[1]Elevation datum unknown
[2]Perched groundwater

We also installed a groundwater monitoring well at the location of Boring EB-12A. Measurements taken at Monitoring Well EB-12A are provided below. As shown in the table, groundwater depths varied between about 73 feet at the time of installation to about 60¾ to 64½ feet after installation.

Table 6: Monitoring Well EB-12A Measurements

Date Measured	Groundwater Depth Below Current Grades (feet)	Static Head (feet)	Groundwater Elevation[1] (feet)
6/2/2021	73.2	11.8	301.8
6/16/2021	64.6	20.4	310.4
7/27/2021	62.7	22.3	312.3
11/30/2021	64.1	20.9	310.9
1/11/2022	60.8	24.2	314.2

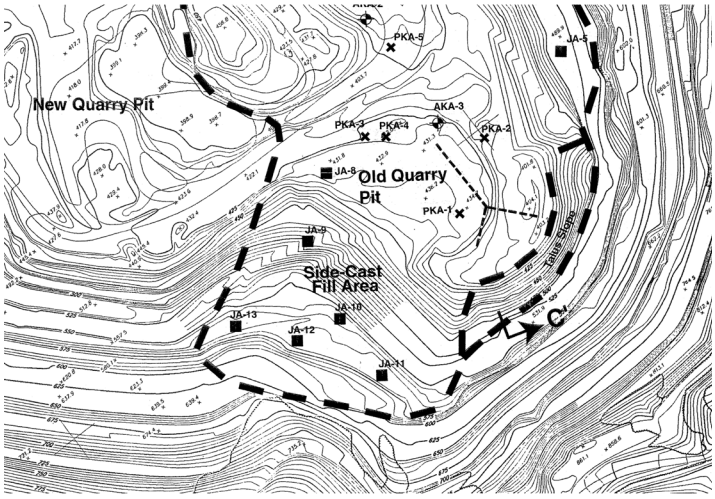
[1]Elevation datum unknown

In addition to groundwater encountered during drilling, groundwater was reportedly observed seeping into the base of the new quarry pit at approximately Elevation 370 feet (datum unknown) by Alan Kropp and Associates. Groundwater seepage areas were previously mapped by Jacobs and Associates on the southwest slope at elevations below about 700 feet. Seepage was also observed by Geocon on the southwest quarry slope below about Elevation 430 feet (datum unknown). We understand quarry personnel previously indicated that some of the seeps became active flows projecting out from the quarry slope during the winter of 2016/2017.

We understand a culvert system was previously installed in the early 1990's and extends from the southern portion of the floor of the old quarry pit to the upper sediment pond. Quarry drains were observed discharging are located along the quarry entrance road.

4.5 EXISTING SUBDRAINAGE AND PIPING SYSTEMS

Alan Kropp & Associates (November 2000) discussed a partial subdrain system that was reportedly installed in the early 1990s under the direction of Jo Crosby & Associates. The subdrain was reportedly intended to flow from the former old quarry pit bottom (near approximately Elevation 400 feet) to the upper sediment pond located near the northeastern part of the quarry floor. The purpose of the subdrain was reportedly in preparation for future development. The subdrain was described in the text of AKA report and the approximate location depicted on their Figure 2 Site Plan (see Y-shaped, thin dashed line below).



The subdrain was described as a 12- to 18-inch diameter perforated CMP pipe surrounded by crushed rock and filter fabric that was covered with compacted fill (fill thickness not known). The subdrain installation was reportedly incomplete and was terminated at roughly Elevation 385 feet and a temporary riser pipe installed for future reference. AKA reported that the riser pipe location had been surveyed in 2000 and that fill in the old quarry area had been placed up to about Elevation 430 feet. Since 2000, roughly 50 to 80 feet of additional mine tailings have been stockpiled over the old subdrain. At this time, we consider the subdrain to be abandoned and non-functional, with no known record of the pipe ever being connected to a free-draining outlet. Our review of the preliminary grading plan and our Conceptual Mitigation Cross Section 15 (Figure 9D) indicates the subdrain could potentially be exposed in future over-excavation for the planned MSE wall near the southeast corner of the development. If encountered, we would recommend the subdrain pipe be connected to the new subdrain system within the planned buttress fill excavation.

Cornerstone is not aware of any additional existing subdrains below the quarry fills; however, we understand there is a culvert pipe that collects surface water from the southern end of the quarry (new quarry pit) and discharges water into an open ditch near the northeast corner of the site near the quarry office. This water reportedly is collected in a storm drain inlet that flows to the storm drain system at South Hill Drive. Abandonment of the old quarry pipe(s), either through complete removal or filling with slurry, will need to be coordinated with the grading contractor to adequately control water.

SECTION 5: GEOLOGIC HAZARDS

5.1 FAULT SURFACE RUPTURE

As discussed above, some significant faults are located within 25 kilometers of the site. We reviewed the *2010 Fault Activity Map of California* (Jennings and Bryant, 2010), the Quaternary Fault and Fold Database (USGS and CGS, 2006), and other sources to identify active faults in

the site vicinity. Based on our literature review and site reconnaissance, the site is not located on any known “active” fault trace. In addition, the site is not contained within a Special Studies Earthquake Fault Zone (formerly referred to as an Alquist-Priolo Special Studies Zone). Therefore, the risk from surface fault rupture is considered to be very low.

5.2 ESTIMATED GROUND SHAKING

Moderate to severe (design-level) earthquakes can cause strong ground shaking, which is the case for most sites within the Bay Area. A peak ground acceleration (PGA_M) was estimated following the ground motion hazard analysis procedure presented in Chapter 16 and 18 and Appendix J of the 2022 California Building Code (CBC) and Chapter 21, Section 21.2 of ASCE 7-16 and Supplement No. 1. For our analysis, we used PGA_M values of 0.92g and 0.94g, corresponding to our Site Class D site specific analysis and the mapped PGA_M for Site Class C, respectively.

5.3 LIQUEFACTION POTENTIAL

Liquefaction is generally associated with loose, saturated and granular soils. Regional hazard maps (CGS) show liquefaction zones north of the site in the Guadalupe Valley beyond the project boundary. The quarry floor is covered by various generations of quarry tailings and stockpiles ranging from clayey sands with gravel to poorly graded gravels and cobbles. The consistency and density of these man-made deposits varies significantly and some of these materials will be susceptible to localized liquefaction at varying depths where perched or static groundwater is presented, generally in the deeper quarry fills. The underlying bedrock beneath the quarry spoils and fills is not susceptible to liquefaction.

A detailed liquefaction analysis was not performed as part of this investigation. However, to mitigate this concern, as discussed in subsequent sections of this report, in-situ densification will be performed on the deepest portions of the quarry fill by excavating down to within 30 feet of the top of bedrock or native soil, then performing deep dynamic compaction (DDC) to densify these materials and mitigate the potential for static and seismically-induced settlement. During the DDC program, a performance testing program will be performed, which will include pre-and post-densification exploration in various “test areas” to confirm that densification has been performed to the desired levels. Areas not achieving acceptable densification will be evaluated on a case-by-case basis to determine the means and methods needed to increase densification until satisfactory results are obtained prior to beginning production DDC work. This may include changing DDC spacing, orientation, number of passes, and/or drop height and weight until satisfactory results can be documented.

Additional information and recommendations are provided in subsequent sections of this report. Provided these recommendations are followed to address the potential for liquefaction to occur, the risk to the planned improvements from liquefaction will be low.

5.4 LATERAL SPREADING

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically, lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. As failure tends to propagate as block failures, it is difficult to analyze and estimate where the first tension crack will form.

The majority of the deep quarry fills are located within the southern half to two-thirds of the site, with some existing fill located along the eastern edge of the site. Deep Dynamic Compaction (DDC) ground improvement will be performed under the entire planned parking garage and warehouse building. Mitigation outside the planned building footprints, such as in roadway or retaining wall areas, will include over-excavation and re-compaction of existing fills using standard mechanical compaction equipment during mass grading. Quarry fills beyond the western edge DDC zone will mostly be over-excavated as part of the planned cuts for parking and roadway areas. In some localized areas, such as the eastern edge of the development area, some existing fill will be left in place due to the medium dense or clayey consistency of the fill and the lack of groundwater. In these areas, liquefaction potential would be considered low and long-term settlement is estimated to occur relatively quickly (immediate or re-compression settlement). Localized ground improvement for planned MSE walls will include installing lateral shear keys using either soil-cement columns or grouted displacement columns. Overall, the potential for lateral spread is considered low once the northern buttress slope is re-constructed and Deep Dynamic Compaction is completed.

5.5 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING

Loose unsaturated sandy soils can settle during strong seismic shaking. The existing quarry spoils and fills across the quarry are variable in consistency and density and potentially susceptible to differential seismic settlement during a significant seismic event. However, site grading and site development construction will mitigate this potential concern; therefore, the potential for unsaturated sand shaking affecting the proposed development will be low.

5.6 VARIABLE QUARRY FILLS

As mentioned, quarry fills and spoils generally blanket the previous quarry floor and site and are highly variable in consistency and density. These fills may be locally susceptible to settlement and differential movement due to static loads from new fills or building foundations. Site grading and site development construction will mitigate this concern by excavation of some of the existing fills and spoils, performing Deep Dynamic Compaction (DDC) ground improvement densification of the fills and spoils remaining in-place, and by proper compaction of engineered fills up to proposed grades. Therefore, the potential for settlement and differential movement of the variable fills affecting the development will be low. Further discussion of variable quarry fills and grading recommendations are presented in the subsequent sections of this report.

5.7 LANDSLIDING

The Guadalupe Valley and project is situated on the northern edge of prominent San Bruno Mountain underlain by bedrock of the Franciscan Complex. This setting would suggest that landsliding and the impacts of high intensity rainfall events are interrelated. The high intensity storms during winter of 1982 caused significant slope instability in the form of debris flows throughout the San Francisco Bay Area. The USGS conducted a study (USGS, 1988) that showed intensity contours of as much as 23 debris flows occurring per square kilometer in the slopes near the project site. There is no record of debris flows entering the Quarry and many of the flows may have extended down the south side of San Bruno Mountain. There is a possibility of a debris flow entering the project site; however, in all likelihood it would be dispersed upon hitting the terraced slopes of the quarry.

The California Geological Survey has recently released a seismic hazard report (CGS, 2021) and accompanying map of the San Francisco South 7.5-minute quadrangle. An excerpt of the seismic hazard map is presented in Geologic Hazard Map, Figure 6, and shows the portions of the property are considered a hazard for seismically-induced landsliding (light blue shading). At the scale of the map, the Guadalupe Quarry is not well presented; however, it can be concluded that the tops of slopes around the quarry and certain interior over-steepened slopes are susceptible to landslides from seismic ground shaking.

Therefore, there is a risk of landsliding at the project site, but the degree and specific type of movement (topple, wedge, debris flow or planar) cannot be determined from that map. Previously mapped landslides on the northeast edge and northwest edges of the site are shown on the Site Geologic Map, Figure 5. The northeastern landslides are east of and outside the development area. The northwestern mapped slide features are subtle, are likely to be relatively shallow features, and do not show recent activity. These mapped northwestern slides will be buttressed by planned site fills and should not impact planned improvements.

Undeveloped hillsides above the rim of the quarry appear to consist of colluvial and residual soils overlying weathered Franciscan formation bedrock. Our review of prior site geotechnical, geologic or rock stability studies did not find discussions of mapping of tension cracks at the upper rim of the quarry, nor did we find tension crack mapping on the geologic maps by Jacobs (2000), AKA (2000), or Geocon (2103, 2017, 2018). Jacobs (2000) described block joints of varying widths and spacing and completed a detailed block failure analysis of typical quarry benches, but Jacobs did not describe quarry rim tension cracks indicative of potential large-scale failure of the old and new quarry slopes.

Our prior site observations did not record tension cracks at the quarry rim. More recently, our drone reconnaissance from 2022 of existing upper old and new quarry slopes did not reveal observable tension cracks or quarry rim movement that would suggest potential large-scale or deep-seated slope instability. Drone observations appeared to support prior observations and conclusions of prior studies of the old and new quarry, indicating localized bench failures that are joint controlled, accumulation of talus and/or large boulders on existing quarry benches ranging from roughly 1 to 3 feet on average, and very localized slope failures higher up on the quarry slopes associated with weaker sheared rock (mapped bedrock faulting).

A discussion of local global slope stability proposed for site slopes is provided in Section 6 below. A discussion of rockfall hazard is discussed in the next section below and in the "Conclusions" section.

5.8 QUARRY ACCESS ROAD STABILITY

The western rim of the quarry is flanked by an old access road that was reportedly cut into the natural slope above the quarry rim. This access road (bench) intersects three natural drainage swales that flow east towards the edge of the access road. The access road has become overgrown with vegetation and localized gullies have formed in the road. Surface water runoff along this bench is generally directed north towards the quarry floor near the debris fill stockpiles.

The western edge of the planned development will include multiple tiered, anchored retaining walls cut into the native bedrock. The upper walls will include concrete lined drainage swales above each wall to capture and direct surface runoff to storm drain inlets. Based on our discussions with the design team, swales and inlets will be designed to handle anticipated surface water runoff.

Any surface water that "breaches" the upper access road bench would likely flow over existing tiered quarry benches and eventually be captured by planned retaining wall improvements. The potential impact to the planned improvements due to localized concentrated runoff from natural slopes will need to be adequately mitigated through appropriate stormwater improvements to be finalized during the construction development phase of the project.

5.9 ROCKFALL HAZARD

As discussed, the Guadalupe Quarry is flanked and underlain by Cretaceous- to Jurassic-age bedrock of the Franciscan Complex. Franciscan Formation bedrock within the quarry consists primarily of sandstone with interbedded shale. The bedrock on site exhibits wide variations in strike and dip. In general, shear zones are concentrated in the shale interbeds and along inactive bedrock faults. Bedrock strength and hardness varies with depth, fracturing and weathering. Prior quarry activities created benched slopes inclined at approximately 1:1 (horizontal:vertical) along the southern, southeastern, and western edges of the valley.

Recent studies and our additional global stability review of the existing quarry slopes (see Section 6 below) indicate existing quarry slope areas are stable against large-scale, deep-seated slope failures under static and pseudo-static conditions. However, slopes above the planned southern and western retaining walls constructed as part of the development, while stable from an overall slope perspective, will present a moderate risk of rockfall due to bench-scale planar-, wedge-, and toppling-type failures. Rock-fall from weathering and release of individual rock blocks will also be an ongoing hazard. It has been determined that rockfall hazard at the site can be adequately mitigated if the quarry slopes and rockfall protection measures are constructed and maintained.

Kane Geotechnical (2024) was retained to provide a rockfall mitigation analysis, report, and preliminary designs for hazard areas. Final rockfall mitigation plans will need to be provided once final grading and site development plans are available. Rockfall mitigation elements will require periodic observation and maintenance to check for debris and clear or remove accumulated rock or soil materials.

The following presents a summary of Kane's planned preliminary mitigation elements:

- Rockfall Barriers above planned retaining walls at south end and west side of site adjacent to Old and New Quarry slopes and along east side of site adjacent to Old Quarry slopes,
- Debris Catchment Fencing above retaining walls along northwestern edge of development area and adjacent to south and southeastern New Quarry slopes above retaining walls.

5.9.1 Rockfall Barriers

Rockfall barriers will consist of approximately 13-foot high, high-strength steel mesh fencing supported by metal posts and wire rope bracing that is anchored into Franciscan Formation bedrock. The mesh is attached loosely to allow energy from debris or falling rocks to be absorbed and dissipated by the fencing.

5.9.2 Debris Catchment Fencing

Debris catchment fencing will consist of approximately 6½-foot high, high strength chain-link fencing supported by metal posts and wire rope bracing that is anchored into Franciscan Formation bedrock. The mesh is attached tightly to the posts and is intended to capture material from shallow soil and rock debris flows.

Once detailed grading, drainage, and retaining wall plans are finalized, a final rock fall mitigation plan should be prepared to depict the planned barriers and fencing. Kane Geotechnical should be retained to review updated grading plans, perform additional reconnaissance as needed, and provide detailed rockfall mitigation plan and report set prior to construction.

5.10 VARIABLE GROUNDWATER AND POTENTIAL GROUNDWATER LEVEL RISE

As mentioned, groundwater was encountered in some of our explorations and previous explorations at the site. Groundwater has previously been observed seeping into the base of the quarry pit and seeps have been observed within some of the quarry slopes. We understand a culvert pipe system was previously installed and assists in controlling the groundwater within the bottom of the quarry. We anticipate groundwater may be present within future site fills near the proposed finished grades for the development. Site grading and installation of a permanent subdrainage system during construction will address this concern and therefore the potential to affect the development will be low. Further recommendations for a permanent subdrainage system are provided in subsequent sections of this report.

5.11 TSUNAMI/SEICHE

A tsunami or seiche originating in the Pacific Ocean would lose much of its energy passing through San Francisco Bay. Based on the mapping of tsunami inundation potential for the San Francisco Bay Area by CGS (conservation.ca.gov/cgs/tsunami/maps), areas most likely to be inundated are marshlands, tidal flats, and former bay margin lands that are now artificially filled, but are still at or below sea level, and are generally within 1½ miles of the shoreline. The site is approximately 1¾ miles inland from the San Francisco Bay shoreline and is at elevations greater than 150 feet above mean sea level. Therefore, the potential for inundation due to tsunami or seiche is considered low.

5.12 FLOODING

Based on our internet search of the Federal Emergency Management Agency (FEMA) flood map public database, the site is located within Zone X, described as an area of minimal flood hazard. We recommend the project civil engineer be retained to confirm this information.

The Department of Water Resources (DWR), Division of Safety of Dams (DSOD) compiled a database of Dam Failure Inundation Hazard Maps (DSOD, 2015). The generalized hazard maps were prepared by dam owners as required by the State Office of Emergency Services; they are intended for planning purposes only. Based on our review of these maps, the site is not located within a dam failure inundation area.

SECTION 6: SLOPE STABILITY

6.1 GENERAL

The planned grading for this project is complex and will include significant cuts and fills to achieve site grades. Large fill slopes and tiered MSE walls will be constructed within the south and southeastern areas of the development. Site grades will be raised significantly to enable construction of the proposed buildings and a multitude of tiered MSE walls, some ranging up to about 60 feet in height will be constructed within the front northern portion of the development. The various slopes and walls will need to maintain static stability as well as seismic stability during a seismic event. Below Section 6.2 outlines our global stability review of the existing quarry slopes. Sections 6.3 through 6.7 outline and discuss our global stability analyses for the various fill slopes and tiered MSE walls proposed for the development.

6.2 GLOBAL STABILITY ANALYSIS OF EXISTING QUARRY SLOPES

Our slope stability analysis included an assessment of the potential for global (“large-scale”) quarry slope failure. Our global analysis was based on current quarry slope configuration, and review of the prior studies by Jacobs, Alan Kropp & Associates, and Geocon. We noted that Jacobs’ study was focused more on localized bench and jointing analysis, in addition to stability of embankment fill slopes. Jacobs’ jointing and bench failure analysis presented bedrock unconfined compressive strengths ranging from about 3 to 14 ksi and back-calculated joint strengths (friction angle) ranging from 16 to 72 degrees, with an average of about 44 degrees.

Overall, Jacobs' stability analysis concluded that the potential for global quarry face instability was remote.

Geocon (2018) presented a similar conclusion using updated rock strength parameters, which included evaluation of mass bedrock strength and considering the lack of observed global instability. Geocon performed analysis using the Jacobs (2020) data and the program RocLab to estimate rock mass properties, including Mohr-Coulomb parameters, based on the Generalized Hoek-Brown failure criterion (Hoek et al., 2002, Hoek and Diedrichs, 2006). Geocon's interpretation of the RocLab results were presented as weathered and less weather sandstone bedrock exposed in the quarry slopes having cohesion values of 14,000 and 26,000 psf and internal friction angles of 30 and 40 degrees, respectively. Our interpretation of the Geocon strength data was that the values were too aggressive, although the general methodology was considered acceptable.

Prior to our stability analysis of new buttresses and tiered-wall configurations as discussed in Sections 6.3 to 6.7 below, we did review the data presented in the CGS SHZR (San Francisco South 7.5-Minute Quadrangle, 2021) for the site vicinity. The Franciscan rocks referenced in this report for Group 1 (KJsk) were presented as having average cohesion at 777 psf and friction angle at 31 degrees. However, use of these values was considered overly conservative and not appropriate because when used as strength parameters in our model, all existing quarry slopes were shown to be grossly unstable under static loading conditions. These values were not considered in our analysis of the quarry slopes, which have remained stable for decades.

Therefore, we performed back-calculation of the existing quarry slope and varied the cohesion and friction parameters of the bedrock until minimum factors of safety of 1.5 and 1.0 were obtained for static and seismic loading conditions (additional discussion of the program utilized and method of analysis is provided in Section 6.3 below). Since the quarry slopes have remained stable for decades, we considered these values as lower bound estimates of rock mass strength. Considering the prior studies by Jacobs and Geocon, their prior laboratory testing and estimates of joint strength, as well as the aggressive strength parameters used by Geocon (2018), we judged reasonably conservative rock mass strength parameters to be as follows:

Table 7: Recommended Rock Parameters

Soil/Rock Material	Total Unit Weight (pcf)	Angle of Internal Friction (phi)	Cohesion (psf)
$KJsk_1$ - Weak (more weathered) Franciscan Complex Bedrock	155	32	5,000
$KJsk_2$ - Hard (less weathered) Franciscan Complex Bedrock	160	40	7,500

Using the above parameters for bedrock mass strength, the factors of safety with respect to global (large-scale) stability of the existing quarry slope were above acceptable levels for the

planned development. Results from our global quarry slope analysis are attached to Appendix E.

With respect to slope instability above the quarry rim, based on our interpretation of prior data, geologic mapping and our reconnaissance, in our opinion, the potential for slope movement above the rim of the quarry would be limited to shallow, localized debris flow failures of colluvial or highly weathered rock that could possibly contribute to rock fall conditions and additional debris on existing quarry benches. In our opinion, localized debris from above the quarry rim would be adequately mitigated by the planned rock fall hazard mitigation.

6.3 STABILITY METHOD OF ANALYSIS

To evaluate the global stability of the proposed development slopes and retaining walls, we performed static and seismic slope stability analysis for Generalized Cross Sections 1, 3, 10, 12, 13, and 16 as shown on Figures 7A, 7C, 7D, and 7E. Sections 1 and 3 were used to analyze the proposed slopes and walls within the tailings stockpile area (southeast corner) of the proposed development. Section 13 was used to analyze the proposed slopes and walls within the sidecast fill area (south side) of the proposed development. Sections 10, 12, and 16 were used to analyze the proposed grading and various proposed walls within the north side of the development.

The stability of a slope is influenced by many factors including but not limited to the geologic structure and composition, inclination, height of slope, groundwater, surcharges, and climatic factors such as rainfall and irrigation. In geotechnical engineering, “stability” is expressed as a ratio of resisting moments and forces divided by driving moments and forces termed the factor of safety (FS). Factors of safety can be calculated for static and seismic conditions. In performing the slope stability analyses, we followed the guidelines set forth by California Geologic Survey in Special Publication 117A (2008).

Computer assisted slope stability analysis was performed using the computer program Slide2 Version 9.018, which uses circular and block modes of failure. The program consisted of inputting slope geometry, the different soil layers or geologic layers, unit weights, groundwater, and strength parameters. For our slope angles, soil and bedrock layers, soil and bedrock properties, and groundwater locations, assumptions were interpreted based on our review of our and previous boring information, seismic refraction lines, laboratory testing, site reconnaissance, grading information provided Kier and Wright, and our experience.

Slide2 uses a “pseudo-static” method of analysis which models the effects of transient or pulsating earthquake loading on a potential slide mass by using an “equivalent” static horizontal acceleration acting on the mass of the potential slide. The ground motion parameter used in a pseudo-static analysis is referred to as the seismic coefficient “k”. CGS (2008) has published recommendations for the selection of the “k” value in a publication titled, “Guidelines for Evaluation and Mitigation of Seismic Hazards in California, Special Publication 117A.” As shown on the Regional Fault and Activity Map, Figure 4, the site is located adjacent to the San Andreas Fault and strong ground shaking can be expected during a seismic event near the site. In accordance with the CGS Guidelines, we have performed our pseudo-static analysis using

simplified design procedures in accordance with Stewart and others (2003) to develop a "screen analysis procedure," based on a pseudo-static approach that accounts for the anticipated seismicity at the site and allows for different levels of acceptable displacements. For this site, we determined a "k" value of 0.23g for our analysis. This was obtained from limiting displacements to a 15 cm threshold and a maximum horizontal acceleration at the site for a soft rock site condition and a 475-year return period (10% probability of exceedance in 50 years) value of 0.54g, which was obtained from the USGS Unified Hazard Tool website (earthquake.usgs.gov/hazards/interactive).

6.4 SOIL AND BEDROCK PROPERTIES

Each of the soil and bedrock materials included in our stability analyses are discussed below. A summary of the soil and bedrock parameters used in our analyses are presented in the table below.

Engineered Fill: The engineered fill is assumed to generally be comprised of the existing quarry fills and tailings across the site. The strength parameters of the engineered fill were based on engineering judgement and the results of remolded consolidated-undrained triaxial compression (TX-CU) shear tests with pore pressure measurements on a bulk sample of existing fill material from Boring EB-4. The bulk was determined to be a representative sample of the soil material that would be cut during grading and used as engineered fill material to grade the site. To establish the shear strength of the material that is anticipated to be used as engineered fill, we had the samples remolded to approximately 92 percent relative compaction at approximately 2 percent above the optimum moisture. The TX-CU sample was tested at three progressively increasing confining stresses to develop total and effective strength envelopes. The TX-CU test results are presented in Appendix B. Based on the results, our experience, and engineering judgement, we used an internal angle of friction (ϕ) of 33 degrees and a cohesion (c) of 150 pounds per square foot (psf) in our analysis for the engineered fill. Due to the sandy and gravely nature of the engineered fill material, we have used the same parameters for both our short-term (seismic) and long-term (static) analysis.

Quarry Fill: The strength parameters for the in-place undocumented quarry fills were determined based on our boring data including "N" values, densities, moistures, triaxial testing, and our engineering judgement based on the highly variable nature of the material. To obtain shear strength data, we performed consolidated-undrained triaxial compression (TX-CU) shear tests with pore pressure measurements on relatively undisturbed samples from Boring EB-1 and EB-4. We also performed various TX-CU testing on remolded samples collected from Borings EB-1 and EB-4 at various depths. These remolded tests were run at various unit weights ranging from 92 to 120 pounds per cubic foot and at a moisture content of about 12 percent to simulate the approximate range of in-place fill materials. Remolding of the samples were performed due to potential disturbance in collecting the generally sandy and gravelly natured material. Some of the TX-CU tests were performed using one sample tested at three progressively increasing confining stresses to develop total and effective strength envelopes. Other TX-CU tests were performed on three samples remolded to the approximate desired unit weight and moisture content and each sample tested at a different confining stress. The TX-CU test results are presented in Appendix B. For our analysis, we used an internal angle of

friction (ϕ) of 33 degrees and a cohesion (c) of zero pounds per square foot for the existing quarry fill. These parameters were used for both the long-term (static) and short-term (seismic) analyses due to the sandy and gravelly nature of the material.

Native Soils: The strength parameters for the native soils were determined based on our boring data including densities, moistures, triaxial testing, and our engineering judgement. To obtain shear strength data, we performed pocket penetrometer tests and unconsolidated-undrained triaxial tests on relatively undisturbed samples from our borings. Test results are presented on the boring logs at the appropriate sample depths and triaxial testing is presented in Appendix B. Based on the results and our engineering judgement, for the native soils we used an internal angle of friction (ϕ) of zero and cohesion (c) of 2,500 psf for the short-term (seismic) analysis and a ϕ = 28° and C = 500 psf for the long-term (static) analysis.

Franciscan Formation Bedrock: The strength parameters for the Franciscan Formation bedrock were determined based on review of the various exploration data, prior back calculation of slope stability for existing quarry slopes performed by Geocon (2018), and our engineering judgement. As mentioned, the quarry is underlain by areas of weaker and stronger bedrock. However, as the underlying bedrock, whether weak or strong, is significantly stronger than the in-place soils or future engineered fills and due to the configuration of the proposed slopes and walls, we have modeled all bedrock, regardless of the location, as weak bedrock in our analysis. For our analysis, we used an internal angle of friction (ϕ) of 32 degrees and a cohesion (c) of 5,000 pounds per square foot for the Franciscan Formation Bedrock for both the long-term (static) and short-term (seismic) analyses.

Table 8: Summary of Soil and Bedrock Strength Properties

			Long-Term (Static) Conditions		Short-Term (Seismic) Conditions	
Material Description	**Total Unit Weight (pcf)**	**Saturated Unit Weight (pcf)**	**Friction Angle (degrees)**	**Cohesion (psf)**	**Friction Angle (degrees)**	**Cohesion (psf)**
Engineered Fill	135	140	150	33	150	33
Quarry Fill	130	134	0	33	0	33
Native Soil	130	135	500	28	2,500	0
Franciscan Bedrock (KJsk)	155	165	5,000	32	5,000	32

6.5 GROUNDWATER

Groundwater was encountered in some of our borings and borings performed by previous consultants as outlined in tables within the “Groundwater” section this report. Where encountered, the groundwater depths within the current and previous explorations where highly variable across the site at depths ranging from about 6 to 173 feet below site grades. Groundwater seepage was also observed in the Franciscan Bedrock during our site reconnaissance visits in the southern “new quarry” area. We anticipate groundwater will be present within the bedrock fractures and perched in locations directly above the bedrock surface. We also anticipate groundwater may be present within future site fills as well as within the existing native soils at the northern end of the site.

The groundwater depth encountered in some explorations is higher than the groundwater depth depicted in our stability analysis. However, groundwater depths depicted in our stability analysis represent the design groundwater depth we feel appropriate based on the current design and future installation of subdrains during project construction as discussed in other sections of this report.

6.6 SURFICIAL LOADS

We modeled anticipated surficial loading from three sources: 1) new warehouse structure as an areal slab load of 1,000 psf over the building footprint and a perimeter wall load of 38 klf; 2) new parking structure as an areal load of 1,000 psf over the building footprint; and 3) new water tank as an areal load of 2,000 psf over the footprint of the water tank. The above pressures were estimated based on the proposed structures. The above wall loading was the preliminary wall loading provided by the structural engineer.

6.7 STATIC AND SEISMIC STABILITY ANALYSIS

Our stability analysis has entailed running multiple analyses up to this point as part of the site grading design process. Through this process, we have provided various feedback and support to the design team regarding slope grades and remedial grading recommendations.

Using the subsurface profile and topography depicted on Cross Sections 1, 3, 10, 12, 13, and 16, we performed a static and seismic slope stability analysis using the computer program Slide2. The analysis was used to evaluate the potential failure of the proposed fill slopes and retaining walls and whether the slopes and walls would yield factors of safety greater than 1.5 under static conditions and greater than 1.0 under seismic conditions, implying that the slopes are relatively stable under static and seismic conditions from a global stability viewpoint. The Bishop Simplified method of analyses and Morgenstern-Price method of analyses were used to evaluate the global stability of the slopes and retaining walls using potential circular type failure surfaces. With these methods, the computer program searched for the circular failure surface corresponding to the lowest factor of safety. Based on our analyses, factors of safety less than 1.5 and 1.0 were obtained for the static and seismic conditions, respectively. Therefore, the following conditions will need to be incorporated into the design and construction of the slopes and walls:

- Any permanent soil slopes will need to be 3:1 (horizontal:vertical) or flatter,
- All fill material will need to be compacted and moisture conditioned in accordance with the “Earthwork” section of this report,
- To achieve global stability of the tiered Mechanically Stabilized Earth (MSE) walls and slopes, geogrid, ground improvement, and buttressing as diagrammed on Mitigation Cross Sections, Figures 9A to 9E, will need to be included.

Provided these conditions are implemented during final design and construction, the planned slopes and the global stability of the tier MSE walls will have factors of safety greater than 1.5 and 1.0 for static and seismic loading conditions, respectively. Copies of the stability output from our models, illustrating the subsurface and surface geometry, geogrid and ground improvement needed, and low factor-of-safety surface, are attached in Appendix E. Stability outputs for Cross Sections 10, 12, and 16 showing all failure surfaces with factors of safety up to roughly 0.2 greater than the lowest factor of safety are also attached in Appendix E. Additional information regarding the geogrid and ground improvement used in our analysis to achieve the acceptable factors of safety are presented in the section below.

6.7.1 Geogrid and Ground Improvements

As discussed above, geogrid and ground improvements are required at various locations to achieve acceptable factors of safety for the proposed MSE walls and slopes. For the geogrid, our analysis included Tencate Miragrid 10XT and 20XT with allowable tensile strengths of 3,806 lbs/ft and 5,493 lbs/ft, respectively. During construction, the slopes will have to include these types of geogrid or approved equivalents.

For the ground improvements at Cross Sections 10, 12, and 16, the composite cohesive strength (ground improvement element plus surrounding soil) within the ground improved zone will need to vary from as low as 15 psi (2,160 psf) up 200 psi (28,800 psf). However, at this time, the ground improvement elements are shown to have a composite cohesive strength of 200 psi in our stability analysis outputs. In our opinion, this represents the upper bound of the required ground improvement strength to achieve. Additionally, the ground improvements shown on slope stability analysis Cross Sections 10 and 16 need to extend to bedrock to achieve acceptable global factors of safety. During construction, the chosen ground improvement element(s) will need to be in contact with the bedrock and will likely need to extend approximately one foot or more into the rock to confirm meeting the required minimum depth. At Cross Section 12, the ground improvements will need to extend to the depth of quarry fills that will remain in-place beneath the engineered fills to achieve acceptable global factors of safety.

Mitigation Plan, Figure 8, and Mitigation Cross Sections, Figures 9A to 9E, show the extent and depth of proposed ground improvement areas and geogrid reinforcing needed for global stability of the proposed MSE walls and slopes. Per initial discussions with the design team, we understand soil-cement columns or grouted displacement with elements spaced at approximately 5 to 6 feet on-center, triangular pattern, in two to three rows along the entire

length of the wall stability mitigation areas will likely be used. Displacement columns typically have a diameter of about 18 inches, while soil-cement columns could range from 24 to 48 inches in diameter.

Supplemental analysis and refinement of recommendations for geogrid and ground improvement will need to be provided during design once final wall design(s), grading, and the ground improvement method has been determined. We will need to work with the ground improvement design build contractor to achieve the minimum composite ground improvement zone strength required at the various locations.

Additional information regarding rigid inclusion ground improvement performance criteria is provided in Section 8.5 of this report.

6.7.2 Stability Analysis for Temporary Cut Slopes

To construct the planned tiered MSE walls within the south and southeastern area of the development, the existing fills will need to be over-excavated to enable placement of geogrid and buttressing as outlined on Mitigation Cross Sections, Figure 9A, and placement of engineered fill within the reinforcement zone of the walls. As such, a cut slope in the existing quarry fills and tailings will be required. Based on our analysis, to enable factors of safety at about 1.1 or greater, the exposed back cuts should be maintained at 1.5:1 (horizontal:vertical) or flatter. During construction, some raveling of these temporary back cuts may still occur, and the temporary slopes should be observed and locally flattened to maintain stable conditions, as needed.

SECTION 7: CONCLUSIONS

7.1 SUMMARY

From a geologic and geotechnical viewpoint, the project is feasible provided the concerns listed below are addressed in the project design. Descriptions of each concern with brief outlines of our recommendations follow the listed concerns.

- Settlement due to loose, undocumented quarry fills
- Stability of existing and new fill slopes
- Potential for rock fall hazards around former quarry slopes
- Excavation of hard bedrock areas
- Presence of variable groundwater depths
- Erosion of relatively cohesionless fill material
- Presence of cobbles, boulders, and buried rubble
- Cut/fill and material transitions

7.2 SETTLEMENT DUE TO LOOSE, UNDOCUMENTED QUARRY FILLS

As discussed, undocumented quarry fills blanket most of the quarry site, including the main quarry facility, recent quarry fill areas, the sidecast fill area, the tailings stockpile, rubble fill area, and the northern view berm area. The density and consistency of these fills vary significantly and are susceptible to long-term seismic and static settlement. The project includes placement of up to 100 feet of new fill across the northern portion of the site. Much of this fill will be excavated from the existing sidecast fill, recent quarry fill, and tailings stockpile areas to raise site grades on the northern half of the development area.

To mitigate the potential for long-term static settlement or seismic settlement, existing quarry fills will need to be densified or re-compacted using mechanical compaction methods. Deeper fills within the planned building areas should be exposed and densified using ground improvement techniques such as Deep Dynamic Compaction (DDC). Prior to fill placement at the north end of the site, the view berm area will need to be over-excavated and recompacted prior to placing new fill or construction of new roadways and retaining walls.

Foundations constructed over deep fills will be subject to some long-term settlement. Even well-compacted fills may experience minor long-term settlements due to secondary strains or hydrocompression. Provided that the fills are placed and compacted in accordance with our recommendations; we estimate that total long-term post-construction fill settlement would be less than ¼ percent of the total fill thickness. Zones of existing fill that are not planned for over-excavation or densification are primarily in parking and roadway areas where existing fill consists of stiff clayey soils or medium dense sands and gravels. Some localized zones of loose sands/gravels may be present in these areas. The potential for fill settlement was estimated to be primarily due to re-compression (immediate) settlement; therefore, post-construction settlement in areas located outside of the planned building areas is estimated to be within tolerable limits for the planned roadway, parking and retaining wall areas.

In our opinion, the potential for settlement of un-compacted existing fills beneath roadway and utility improvements is also considered relatively low. Where localized fill settlement does occur in non-building areas, it is anticipated to occur within a few to several months. Based on our discussions with the project civil engineer, gravity flow utilities will be designed with sufficient gradient to reduce the potential for grade reversal due to post-construction differential settlement.

Recommendations addressing this concern are presented in the “Earthwork” section of the report. A conceptual mitigation plan showing approximate limits of DDC work is presented as Figure 8. Over-excavation and DDC improvement areas designed to mitigate fill settlement are presented graphically in Figures 9A through 9E.

7.3 STABILITY OF EXISTING AND NEW FILL SLOPES

As presented in Section 6, recent slope stability analyses indicated that several constraints were required for the proposed fill slope and retaining wall configurations to achieve acceptable factors of safety for static and seismic loading conditions. These constraints are as follows:

- Existing terraced quarry slopes are considered to have acceptable factors of safety for static and seismic conditions.
- New fill slopes constructed using on-site quarry fills should be inclined no steeper than 3:1 (horizontal:vertical) and have drainage benches at no greater than 50 feet apart, as measured vertically.
- All fill slopes should be constructed with suitable keyways, benches and subsurface drainage. Where new fills will be constructed over existing view berm fills at the north end of the site, the existing undocumented fills should be over-excavated and re-compacted prior to placement of new fills or retaining walls.
- For new Mechanically Stabilized Earth (MSE) walls greater than 20 feet tall, the geogrid reinforcement length and spacing will be governed by global stability requirements and will likely exceed requirements for internal wall stability.
- Localized portions of planned MSE walls will require additional ground improvement at the base of the walls to increase seismic factors of safety to acceptable levels.

The conceptual location of recommended fill buttresses, keyways and fill over-excavations areas to mitigate slope instability is presented on the Conceptual Mitigation Plan, Figure 8. The Conceptual Mitigation Cross Sections 1 through 16, Figures 9A to 9E, present the approximate lateral extent and depth of recommended keyways, benches, buttress, and geogrid reinforcement for the planned slopes and MSE walls. Grading and earthwork recommendations are presented in the “Earthwork” section of this report. Supplemental analysis will be required once more detailed grading plans are finalized and MSE wall design has been initiated.

Grading plans should show conceptual locations of keyways, subdrains, and colluvium and fill removals. Grading and/or retaining wall plan details should include geogrid type, strength, vertical spacing, and length, subdrain details, and keyway and benching details.

7.4 POTENTIAL FOR ROCK FALL HAZARDS AROUND FORMER QUARRY SLOPES

As discussed, the Guadalupe Quarry is flanked and underlain by Cretaceous- to Jurassic-age bedrock of the Franciscan Complex. Franciscan Formation bedrock within the quarry consists primarily of sandstone with interbedded shale. The bedrock on site exhibits wide variations in strike and dip. In general, shear zones are concentrated in the shale interbeds and along inactive bedrock faults. Bedrock strength and hardness varies with depth, fracturing and weathering. Prior quarry activities created benched slopes inclined at approximately 1:1 (horizontal:vertical) along the southern, southeastern, and western edges of the valley.

Recent studies indicate existing quarry slope areas are stable against large-scale, deep-seated slope failures under static and pseudo-static conditions. However, slopes above the planned southern and western retaining walls constructed as part of the development, while stable from an overall slope perspective, will present a moderate risk of rockfall due to bench-scale planar-, wedge-, and toppling-type failures. Rock-fall from weathering and release of individual rock blocks will also be an ongoing hazard. It has been determined that rockfall hazard at the site

can be adequately mitigated if the quarry slopes and rockfall protection measures are constructed and maintained.

Kane Geotechnical (2024) was retained to provide a rockfall mitigation analysis, report, and preliminary designs for hazard areas. The results of their analysis are presented in a separate report with accompanying plans. Final rockfall mitigation plans will need to be provided once final grading and site development plans are available. Rockfall mitigation elements will require periodic observation and maintenance to check for debris and clear or remove accumulated rock or soil materials.

The following presents a summary of Kane's planned preliminary mitigation elements:

- Rockfall Barriers above planned retaining walls at south end and west side of site adjacent to Old and New Quarry slopes and along east side of site adjacent to Old Quarry slopes,
- Debris Catchment Fencing above retaining walls along northwestern edge of development area and adjacent to south and southeastern New Quarry slopes above retaining walls.

7.4.1 Rockfall Barriers

Rockfall barriers will consist of approximately 13-foot high, high-strength steel mesh fencing supported by metal posts and wire rope bracing that is anchored into Franciscan Formation bedrock. The mesh is attached loosely to allow energy from debris or falling rocks to be absorbed and dissipated by the fencing.

7.4.2 Debris Catchment Fencing

Debris catchment fencing will consist of approximately 6½-foot high, high strength chain-link fencing supported by metal posts and wire rope bracing that is anchored into Franciscan Formation bedrock. The mesh is attached tightly to the posts and is intended to capture material from shallow soil and rock debris flows.

Once detailed grading, drainage, and retaining wall plans are finalized, a final rock fall mitigation plan should be prepared to depict the planned barriers and fencing. Kane Geotechnical should be retained to review updated grading plans, perform additional reconnaissance as needed, and provide detailed rockfall mitigation plan and report set prior to construction.

7.5 EXCAVATION OF HARD BEDROCK AREAS

The project will involve deep cuts into relatively hard rock along the west and south ends of the development area. Based on seismic refraction surveys performed by JR Associates, seismic shear wave velocities in the order of 4,000 to 9,200 feet per second were encountered on the site in the Franciscan Formation bedrock. Based on published correlations and our experience with similar sites in Franciscan bedrock, weathered, fractured bedrock should be rippable with

D9 or larger late-model Caterpillar-type tractors or equivalent. However, for less weathered rock exposed within the former quarry terraces, some hydraulic jacking or controlled blasting might be needed to excavate some of the harder areas of bedrock at the. JR Associates' seismic refraction report is presented in Appendix D.

7.6 PRESENCE OF VARIABLE GROUNDWATER DEPTHS

Groundwater was encountered in many of our borings performed within the main quarry facility and stockpile areas at variable depths. We also observed groundwater ponded at the bottom of the deepest quarry areas at the south end of the site. This water level is reportedly controlled by a culvert pipe to keep water levels drawn down in the main quarry areas. Additionally, previous consultants have documented similar springing areas in the northern portion of the site.

The potential impacts of groundwater will typically consist of unwanted seepage near the edges of the development area, settlement of newly compacted engineered fill if groundwater levels are allowed to perch within the new fill areas, difficulty achieving compaction and adverse impacts on slope stability. We anticipate that groundwater will be encountered during mass grading to over-excavated and re-compact the loose quarry fills. As discussed, densification for the deeper quarry fills will be performed using in-situ methods consisting of Deep Dynamic Compaction (DDC). Therefore, the potential impact due to the presence of static or perched groundwater at lower elevations within the quarry fill will likely be low. If perched water is encountered during DDC work, it may be necessary to install temporary subdrains to control groundwater flow. Additionally, as previously mentioned, abandonment of the old quarry pipe(s) (i.e. culvert pipe and subdrain), either through complete removal or filling with slurry, will need to be coordinated with the grading contractor to adequately control water.

To reduce the potential for perched groundwater in the existing and proposed fills, we recommend that a permanent subdrain system be established within the fill after DDC densification has been completed and approved as depicted in Figure 8. The goal of the permanent subdrain system is to allow localized or seasonal changes in groundwater elevation to be maintained at an elevation well below the planned building pad elevation. This would allow water seepage from the existing quarry slopes or terraces to be collected and discharged to free draining outlets at the northern end of the site, such as stormwater detention basins or the new storm drain system.

Subdrains will also be required in new keyed and benched fills and buttresses, behind new retaining walls, and behind tiered rock nail walls around the perimeter of the site to prevent hydrostatic pressures from destabilizing new fill slopes or impacting new retaining walls. Recommendations addressing these concerns are presented in the following sections of this report.

7.7 EROSION OF COHESIONLESS FILL MATERIAL

Evidence of erosion was observed within the main quarry facility and stockpile areas. No significant unprotected watercourses were observed at the site; however, localized drainages

from existing quarry terraces were observed at the south end of the site. The potential for erosion within the main quarry facility and stockpile areas is generally considered high. Franciscan bedrock is considered to have low erosion potential. Cuts made into undisturbed native colluvial or residual soils that overlie Franciscan bedrock will likely have a moderate to high erosion potential. Engineered fill slopes, even when compacted to modern compaction standards, will likely have a moderate to high erosion potential due to the cohesionless nature of the available fill and variable percent of silt and clay fines. To reduce the potential for erosion, we recommend that finished slopes be inclined no steeper than 3:1 for slopes greater than 20 feet high, be constructed with intermediate drainage benches to collect surface water runoff, and finished slopes be covered with short-term erosion protection fabric and hydroseeded to reduce erosion. Areas where concentrated surface runoff on new fill slopes cannot be avoided should be covered with energy dissipation materials or covered with long-term erosion control fabric. Where surface water runoff may be concentrated on existing natural slopes above the rim of the quarry, such as above the southwestern edge of the new quarry slopes, should be evaluated by the civil engineer to add adequate drainage inlets above planned tiered walls or new fill slopes. Additional recommendations are presented in the “Earthwork” section.

7.8 PRESENCE OF COBBLES, BOULDERS, AND BURIED RUBBLE

As mentioned, the quarry fills are highly variable and localized fill areas contain cobbles, boulders, concrete, asphalt, and buried rubble. As previously discussed, much of this debris is stockpiled within the rubble area shown in Figure 2; however, localized debris and rock fragments may be encountered within existing quarry fills. Site grading and over-excavation and re-compaction or densification of quarry fills will address the presence of the items within the fills and therefore the potential impact to the development will be low. In general, over-sized materials encountered during grading will either need to be processed and crushed for re-use or buried in designated rock fill areas. Recommendations addressing this concern are discussed in the “Earthwork” section below.

7.9 CUT/FILL AND MATERIAL TRANSITIONS

The preliminary grading plan indicates that fills up to 100-feet thick are proposed at the northern end of the site. The southern end of the site will require significant cuts into undocumented quarry fills. The lower portions of these fills below planned building pad grades will be densified in place using Deep Dynamic Compaction (DDC) techniques. Localized zones of shallower bedrock beneath the quarry floor may be encountered during pad excavation, therefore, localized zones of bedrock may be exposed near pad grades. If encountered, the rock should be over-excavated to a depth of at least 5 feet below the foundation level and replaced with compacted, engineered fill. Foundations constructed over deep fills will be subject to long-term settlement. Even well-compacted fills may experience minor long-term settlements due to secondary strains or hydrocompression. Provided that the fills are placed and compacted in accordance with our recommendations; we estimate that total long-term post-construction fill settlement would be less than ¼ percent of the total fill thickness. Recommendations addressing this concern are presented in the “Earthwork” section of this report.

7.10 PLANS AND SPECIFICATIONS REVIEW

We recommend that we be retained to review the geotechnical aspects of the project structural, civil, retaining wall, rock fall mitigation, and landscape plans and specifications, allowing sufficient time to provide the design team with any comments prior to issuing the plans for construction.

7.11 CONSTRUCTION OBSERVATION AND TESTING

As site conditions may vary significantly between the small-diameter borings performed during this investigation, we also recommend that a Cornerstone representative be present to provide geotechnical observation and testing during earthwork and foundation construction. This will allow us to form an opinion and prepare a letter at the end of construction regarding contractor compliance with project plans and specifications, and with the recommendations in our report. We will also be allowed to evaluate any conditions differing from those encountered during our investigation and provide supplemental recommendations as necessary. For these reasons, the recommendations in this report are contingent of Cornerstone providing observation and testing during construction. Contractors should provide at least 48-hour notice when scheduling our field personnel.

SECTION 8: EARTHWORK

8.1 SITE DEMOLITION

All existing improvements not to be reused for the planned development, including all foundations, flatwork, pavements, utilities, quarry equipment, water wells, sumps, tunnels, and other improvements should be demolished and removed from the site or pulverized for re-use as fill. Recommendations in this section apply to the removal of these improvements, which are currently present on the site, prior to the start of mass grading or the construction of new improvements for the project.

Cornerstone should be notified prior to the start of demolition and should be present on at least a part-time basis during all backfill and mass grading as a result of demolition. Occasionally, other types of buried structures (wells, cisterns, debris pits, etc.) can be found on sites with prior development. If encountered, Cornerstone should be contacted to address these types of structures on a case-by-case basis.

8.1.1 Demolition of Existing Slabs, Foundations and Pavements

All slabs, foundations, and pavements should be completely removed from within planned building areas. A discussion of recycling existing improvements is provided later in this report.

Special care should be taken during the demolition and removal of existing floor slabs, foundations, utilities and pavements to minimize disturbance of the subgrade. Excessive disturbance of the subgrade, which includes either native or previously placed engineered fill, resulting from demolition activities may require mapping to track the location of disturbed soils.

Existing foundations are typically mat-slabs, shallow footings, or piers/piles. If slab or shallow footings are encountered, they should be completely removed. If drilled piers are encountered, they can likely be removed during over-excavation or cut off at an elevation at least 60 inches below proposed ground improvement elevation, whichever is deeper. The remainder of the drilled pier could remain in place. Foundation elements to remain in place should be surveyed and superimposed on the proposed development plans to determine the potential for conflicts or detrimental impacts to the planned construction. Following review, additional mitigation or planned foundation elements may need to be modified.

8.1.2 Abandonment of Existing Utilities

All utilities should be completely removed from within planned building areas. For any utility line to be considered acceptable to remain within building areas, the utility line must be completely backfilled with grout or sand-cement slurry (sand slurry is not acceptable), the ends outside the building area capped with concrete, and the trench fills either removed and replaced as engineered fill with the trench side slopes flattened to at least 1:1, or the trench fills are determined not to be a risk to the structure. The assessment of the level of risk posed by the particular utility line will determine whether the utility may be abandoned in place or needs to be completely removed. The contractor should assume that all utilities will be removed from within building areas unless provided written confirmation from both the owner and the geotechnical engineer.

Utilities extending beyond the building area may be abandoned in place provided the ends are plugged with concrete, they do not conflict with planned improvements, and that the trench fills do not pose significant risk to the planned surface improvements.

The risk for owners associated with abandoning utilities in place include the potential for future differential settlement of existing trench fills, and/or partial collapse and potential ground loss into utility lines that are not filled with grout.

8.2 SITE CLEARING AND PREPARATION

8.2.1 Site Stripping

The site should be stripped of all surface vegetation, and surface and subsurface improvements to be removed within the proposed development area. Demolition of existing improvements is discussed in the prior paragraphs. A detailed discussion of removal or in-situ densification of existing fills is provided later in this report. Surface vegetation and topsoil should be stripped to a sufficient depth to remove all material greater than 3 percent organic content by weight. Based on our site observations, surficial stripping should extend about 2 to 6 inches below existing grade in vegetated areas. In existing view berm areas at the north end of the site, additional stripping or topsoil removal will likely be required due to the existing dense vegetation and mature trees and root systems.

8.2.2 Tree and Shrub Removal

Trees and shrubs designated for removal should have the root balls and any roots greater than ½-inch diameter removed completely. Mature trees are estimated to have root balls extending to depths of 2 to 4 feet, depending on the tree size. Significant root zones are anticipated to extend to the diameter of the tree canopy. Grade depressions resulting from root ball removal should be cleaned of loose material and backfilled in accordance with the recommendations in the "Compaction" section of this report, unless the trees are located with a planned over-excavation area.

8.3 RE-COMPACTION OF EXISTING QUARRY FILLS

As discussed in the "Conclusions" section, several generations of man-made fill were observed on the site based on our historic aerial photograph review, site reconnaissance, and as encountered in recent and prior explorations. The approximate locations of the various fill areas described in this report are presented in the Existing Quarry Site Features Plan, Figure 2. A brief description of these existing quarry fills is presented below followed by re-compaction recommendations.

8.3.1 Quarry View Berm

The north end of the facility is flanked by a man-made berm and fill slope constructed at the mouth of the original valley. The fill was likely placed on a gentle to moderately steep valley floor and appears to have been constructed to conceal quarry operations from neighboring areas. The crest of the berm is relatively flat and the north-facing slope is inclined at approximately 1.5:1 to 2:1 (horizontal:vertical). Large groves of trees and dense vegetation cover this slope.

8.3.2 Main Quarry Facility

The fills placed within the main quarry facility, which is where most of the quarry processing equipment and offices are located, consist of older fill that has been in place for at least 30 to 40 years. This area is relatively flat, except for various gravel and sand stockpiles currently being used in quarry operations. Fill thickness in this part of the quarry increases from south to north and overlies original alluvial soils since little to no quarrying occurred in this area.

8.3.3 Recent Quarry Fill

The area designated as recent quarry fill generally represents the central portion of the quarry where several decades of fill has been placed, relocated, stockpiled and used as storage for various quarry materials. These fills are generally terraced or stockpiled loosely and have numerous haul roads that are used to access the quarry bottom. Some of these fills cover the original quarry bottom and some appear to have been placed over original native alluvial soil that once made up the original valley floor.

8.3.4 Rubble Fill

The rubble fill at the western edge of the main quarry appears to contain significant concrete debris and large rock boulders and cobbles mixed within a matrix of soil. Due to difficulties drilling through this material, the actual thickness is not known, but is estimated to be on the order of 60 feet thick. Excavation of this fill will likely require additional processing, such as crushing or careful placement as a rock fill in future engineered fill areas.

8.3.5 Tailings Stockpile

The tailings stockpile at the southeast corner of the quarry is a large stockpile of relatively loose to medium dense soil materials that were used to fill the original old quarry bottom, buttress the steep remnant slopes of the old quarry, and as a place to store finer grained soil tailings consisting of clayey/silty sands with lower percentages of gravel. Borings performed in this material indicate the fill depth varies up to roughly 150 to 160 feet thick. Historic aerial images of the stockpile indicate a slope failure occurred at the north end of the stockpile in 2018 that filled a portion of the northeastern stormwater detention basin. The slope appears to have been stabilized by removing a portion of the sloughed fill material and flattening the stockpile slopes between 2018 and 2019.

8.3.6 Sidecast Fill

The sidecast fill appears to be a stockpile of loose to medium dense soil and rock materials that were used to fill the original old quarry bottom at the south end of the quarry and buttress the steep remnant slopes between the old quarry and new quarry terraces. Borings performed in this material indicate the fill depth varies up to roughly 90 to 100 feet thick. Due to the relatively loose to medium dense consistency of this fill, the lower portion of the sidecast fill will need to be over-excavated and reconstructed as a buttress fill as part of future terraced retaining walls planned at the south end of the site.

8.3.7 Re-Compaction Recommendations

As discussed, the planned development area lies within the main quarry facility where loose, uncompacted quarry fills, stockpiles, debris piles, and tailings embankments are present. The thickness of the existing quarry fills varies significantly across the quarry, with as little as 20 feet of fill across the central portion of the quarry, to roughly 90 to 160 feet of fill within the southern Sidecast Fill and southeast Tailings Stockpile. Collectively, although much of this fill has been in place for many years, they are considered undocumented due to lack of mechanical compaction and the significant variability in density, strength, and soil type. The existing fills will be susceptible to both static and seismic settlement due to the weight of new fills, building loads and future strong ground shaking in the region. Therefore, we recommend that these fills be re-compacted or densified using appropriate mechanical compaction methods to improve the strength and density of the fill and to reduce potential future settlement to tolerable levels.

We have discussed several methods of potential re-compaction of existing deep quarry fills with the project team, including over-excavation and re-compaction using conventional earthwork

equipment, as wells as ground improvement methods ranging from Rapid Impact Compaction (RIC), vibro-compaction/replacement, and Deep Dynamic Compaction. Based on our discussions with the design team, we understand that Deep Dynamic Compaction (DDC) is likely the more feasible alternative for the deeper portions of the quarry fill. Team discussions indicate that DDC can be used for deeper fills and traditional mechanical compaction, such as sheepsfoot, rubber-tired and vibratory equipment, can be used for shallower fills and buttress construction. A discussion of the proposed DDC method is presented below.

Provided the existing quarry fills meet the “Material for Fill” requirements below, the quarry fills may be reused when backfilling the excavations. If materials are encountered that do not meet the requirements, such as debris, wood, trash, those materials should be screened out of the remaining material and be removed from the site. Backfill of excavations should be placed in lifts and compacted in accordance with the “Compaction” section below.

8.4 DEEP DYNAMIC COMPACTION

8.4.1 General Approach

Dynamic Dynamic Compaction is a ground improvement technique that densifies soils and fill materials by using a drop weight. The ground is subjected to repeated surface tamping using a heavy steel and concrete weight. Typically, the tamper weighs between 5 and 10 tons, dropping in free fall from heights of up to 30 feet. The tamper is dropped a set number of times on a grid pattern over the site to form a pass. Two or three passes may be required on a site, depending on soil type and condition. The imprints formed at each drop position are infilled with fill material after each pass. Based on discussions with the design team, we understand that in-situ densification can be achieved for fill layers up to 30 feet thick. Therefore, we recommend that existing quarry fills be over-excavated to at least within 30 feet of the bottom of the fill or top of bedrock, depending on the location of the DDC work being performed. The conceptual depths of the planned DDC are presented graphically on the Mitigation Cross Sections (Figures 9A to 9E).

The actual depth of the over-excavation will need to be finalized based on input from the ground improvement contractor and the type of equipment used to complete the work. This will require existing fills to be excavated to expose deeper quarry fills prior to the start of the DDC work. The approximate depth to bedrock is presented in Figure 2D and can be used to estimate the depth of over-excavation required to begin DDC operations. It should be noted that not all fill areas within the planned building area are underlain by bedrock. Portions of the northern end of the building are underlain by fill overlying native alluvial soil above the bedrock. Once detailed grading plans have been finalized, we recommend that we work closely with the ground improvement and grading contractors to review over-excavation depths and the anticipated thickness of fill to be densified using DDC techniques. Since site grades vary significantly across the site, it may be necessary to step the DDC treatment areas from south to north and treat the slopes between steps with subsequent passes to avoid leaving loose zones within the fill.

8.4.2 Performance Testing

Typically, in-situ testing by borehole or static cone penetrometer tests (CPTs), accompanied with measurement of print volume and site surface settlement is performed during or following DDC work. The treatment pattern, energy level, number of passes and phasing of passes must be designed to consider the soil conditions, type of development and required bearing capacity and settlement characteristics.

We anticipate two to three test areas established in quarry fill areas once initial mass grading has excavated and exposed the deeper quarry fill at thicknesses of 30 feet or less. For example, in areas where existing quarry fill is greater than 30 feet thick, the grading contractor will excavate the existing fill to various predetermined elevations to create the test pads. The size of the test pads will depend on the size of the crane and access roads required for mobilization, but we anticipate pads of approximately 100 to 200 feet square as needed. Once the test pads are excavated, pre-DDC exploration and testing will be performed on the existing fill to determine the density and/or stiffness of the fill. Conventional borings will be drilled through the untreated fill in each test area to collect SPT N-value data and retrieve relatively undisturbed soil samples. If soil conditions permit, Cone Penetration Tests (CPTs) will also be performed to provide more detailed data for liquefaction analysis. Where the gravel percentage within the fill exceeds approximately 50 percent, Large Penetration Testing (LPT) will likely be used and correlated back to SPT N-values. An auto-hammer will be used for all SPT or LPT sampling. Excavations will be performed locally within each test pad to collect representative bulk samples for laboratory testing, including dry density and moisture content, gradation, maximum dry density, and nuclear field density tests. This information will be recorded and plotted graphically versus depth for each location and test pad. We anticipate at least five test locations will be required for each test pad; actual test locations will be determined once the initial test pad size is finalized.

Following completion of the planned and approved DDC mitigation for each area, the pads will be re-graded to re-establish the pads to their pre-DDC elevations so that confirmation explorations, including borings and CPTs where applicable, can be performed at consistent elevations. Post-DDC explorations will be performed consistent with the pre-DDC exploration. If possible, CPTs will be performed with the same calibrated cones. Completed DDC test pads will also be re-excavated, and nuclear field density tests will be performed at various locations and depths within each test pad. We anticipate that field density testing may be limited to the upper 10 to 20 feet of the DDC treated fills, depending on benching and OSHA requirements. This data will be recorded and plotted versus depth to provide an additional source of density data. All data will be summarized and reviewed with the design-build ground improvement contractor to confirm production weight, drop height, number of drops, spacing and applied energy. The information will be used to confirm that the quarry fills have been densified to the approved design standards. If one or more of the tests areas do not achieve the desired objectives, the methodology and application rates will be revised until the desired objective is achieved. During full construction, additional post-DDC testing will be performed periodically.

8.4.3 Performance Criteria for DDC Mitigation

For the planned DDC densification in the quarry fill areas, post-DDC testing and analysis should demonstrate that liquefaction-induced settlement will be ½ inch or less for the DDC treated fills. Liquefaction analysis will be based on SPT and CPT based analysis methods. In addition, the existing quarry fill should be densified to one or more of the following criteria:

Table 9: Summary of DDC Performance Criteria

Soil Type	Average SPT N-value[1] (blows per foot)	Relative Compaction[2] (percent)
Clayey/silty sand (SC/SM)	30	95
Clayey sand with gravel (SC)	30	95
Poorly-graded gravel with sand (GP)	50	95
Well-graded gravel with sand (GW)	50	95

[1] SPT N-value based on conversion to $N_{1,60;}$ blows per foot, conversion from LPTs or blows per inch depending on fill gradation.
[2] Based on ASTM D1557

8.5 GROUND IMPROVEMENT USING RIGID INCLUSIONS

The conceptual lateral extent and depth of the recommended ground improvement for global stability mitigation of new terraced retaining wall and slopes at the north end of the project is presented in Figures 9A to 9E. For the global stability mitigation, final performance objectives for rigid inclusions should be based on the stiffness and shear resistance provided by a grouping of ground improvement elements based on an approved area replacement ratio for each strength of material to considered. For example, the strength of a soil-cement column typically ranges from about 100 to 200 psi, which is less than a grouted displacement column, which is typically designed using a grout strength ranging from about 1,000 to 2,000 psi. Our analysis assumed a design objective for the ground improvement area beneath the walls to have lateral shear capacity of at least 200 psi (28,800 psf) based on an area replacement ratio methodology. A soil-cement column mitigation, if considered, would require additional rows of overlapping columns over a wider area to achieve a similar design objective. Assuming grouted displacement columns are selected, once the final layout, spacing, and depth have been determined, confirmation during construction will include strength testing of grout. This will include unconfined compressive strength testing per ASTM standards performed on a daily or weekly basis. Daily observation will be required to confirm the elements are installed in accordance with the approved plans and specifications and would include observing spacing, depth, and grout replacement ratios.

8.6 TEMPORARY CUT AND FILL SLOPES

The contractor is responsible for maintaining all temporary slopes and providing temporary shoring where required. Temporary shoring, bracing, and cuts/fills should be performed in accordance with the strictest government safety standards. On a preliminary basis, most of the main quarry area is filled with loose to medium dense granular quarry tailings and fills consisting of sands and gravels with varying percentages of fines and over-sized cobbles and boulders. Type C soil classification should be assumed for excavations within existing quarry fills, as well as native alluvial or colluvial soils, where present. In areas where shallow bedrock may be present, Type A and B soil classification may be assumed for cuts into bedrock or compacted engineered fill, respectively. A Cornerstone representative should be retained to confirm the preliminary site classification as site grading continues.

Excavations performed during site demolition and fill removal should be sloped at 2:1 (horizontal:vertical) within the upper 5 feet below building subgrade. Excavations extending more than 5 feet below building subgrade and excavations in pavement and flatwork areas should be sloped at a 1:1 inclination unless the OSHA soil classification indicates that slope should not exceed 1.5:1. Cuts into competent bedrock can likely be cut vertically.

8.7 SUBGRADE PREPARATION

After site clearing and demolition is complete, and prior to backfilling any excavations resulting from fill removal, in-situ fill densification or demolition, the excavation subgrade and subgrade within areas to receive additional site fills, slabs-on-grade and/or pavements should be scarified to a depth of 12 inches, moisture conditioned, and compacted in accordance with the “Compaction” section below. The depths of some keyway excavations are shown on our mitigation sections, Figure 9A through 9E. The bottom of keyways excavated into undisturbed rock do not need to be scarified but should be proof rolled to confirm subgrade stability prior to placement of any fill.

8.8 SUBGRADE STABILIZATION MEASURES

Where alluvial soil is exposed at finished subgrade or used as soil fill materials, or other soils with high fines contents such as clays and silty soils, these soils can become unstable due to high moisture content, whether from high in-situ moisture contents or from winter rains. As the moisture content increases over the laboratory optimum, it becomes more likely the materials will be subject to softening and yielding (pumping) from construction loading or become unworkable during placement and compaction.

There are several methods to address potential unstable soil conditions and facilitate fill placement and trench backfill. Some of the methods are briefly discussed below. Implementation of the appropriate stabilization measures should be evaluated on a case-by-case basis according to the project construction goals and the particular site conditions.

8.8.1 Scarification and Drying

The clay subgrade may be scarified to a depth of 12 inches and allowed to dry to near optimum conditions, if sufficient dry weather is anticipated to allow sufficient drying. More than one round of scarification may be needed to break up the soil clods.

8.8.2 Removal and Replacement

As an alternative to scarification, the contractor may choose to over-excavate the unstable soils and replace them with dry on-site or import materials. A Cornerstone representative should be present to provide recommendations regarding the appropriate depth of over-excavation, whether a geosynthethic (stabilization fabric or geogrid) is recommended, and what materials are recommended for backfill.

8.8.3 Chemical Treatment

Where the unstable area exceeds about 5,000 to 10,000 square feet and/or site winterization is desired, chemical treatment with quicklime (CaO), kiln-dust, or cement may be more cost-effective than removal and replacement. Recommended chemical treatment depths will typically range from 12 to 18 inches depending on the magnitude of the instability.

8.9 MATERIAL FOR FILL

8.9.1 Re-Use of On-site Soils for Mass Grading

On-site soils with an organic content less than 3 percent by weight may be reused as general fill. We assume that large boulders or concrete fragments (over 1 to 2 feet in diameter) may be uncovered during the mass grading operations at the site and may be unable to be broken down to smaller pieces with conventional earthwork equipment. The contractor should be prepared to handle oversized rock and/or debris and either crush the rock to an acceptable size for engineered fill or place the rock in a designated rock fill area. These oversized rocks may be used within the larger fills, although they must be spaced relative to each other such that soils with fines must be compacted in suitable lifts around each boulder. Over-sized rocks should be placed within new fills such that they will not interfere with future foundation, utility or retaining wall construction.

General fill should not have lumps, clods or cobble pieces larger than 6 inches in diameter; 85 percent of the fill should be smaller than 2½ inches in diameter. Oversized material (smaller than 12 inches in diameter) may be allowed provided the oversized pieces are not allowed to nest together and the compaction method will allow for loosely placed lifts not exceeding 12 inches.

8.9.2 Potential Import Sources

For planning purposes, imported material for use as general fill should be inorganic with a Plasticity Index (PI) of 15 or less, and not contain recycled asphalt concrete where it will be

used within building areas. Each potential import source should be reviewed on a case-by-case basis. To prevent significant caving during trenching or foundation construction, imported material should have sufficient fines. Samples of potential import sources should be delivered to our office at least 10 days prior to the desired import start date. Information regarding the import source should be provided, such as any site geotechnical reports. If the material is derived from an excavation rather than a stockpile, potholes will likely be required to collect samples from throughout the depth of the planned cut that will be imported. At a minimum, laboratory testing will include PI tests. Material data sheets for select fill materials (Class 2 aggregate base, ¾-inch crushed rock, quarry fines, etc.) listing current laboratory testing data (not older than 6 months from the import date) may be provided for our review without providing a sample. If current data is not available, specification testing will need to be completed prior to approval.

Environmental and soil corrosion characterization should also be considered by the project team prior to acceptance. Suitable environmental laboratory data to the planned import quantity should be provided to the project environmental consultant; additional laboratory testing may be required based on the project environmental consultant's review. The potential import source should also not be more corrosive than the on-site soils, based on pH, saturated resistivity, and soluble sulfate and chloride testing.

8.10 COMPACTION REQUIREMENTS FOR CONVENTIONAL FILLS

Control of fill density and moisture content will be critical to the long-term performance of new fills placed to raise site grades and construct new fill slopes. Fills placed at different depths and with different soil types will have variable strengths and compressibility. Therefore, a variable fill compaction specification is appropriate for this project. New fills placed at the site will be derived from a variety of current fill sources that have properties ranging from fine-grained silts and clays mixed with varying percentages of sand and gravel, to predominantly sandy or gravelly soils with lower percentages of silt or clay fines. The compaction requirements presented below were developed to reduce long-term settlement of existing and new fills to negligible levels. Some elastic or immediate settlement will occur during construction of deep fills due to the self-weight of new fill. We estimate that elastic settlement will occur primarily during mass grading and that post-construction settlement of deeper fills will be within tolerable limits for the planned improvements. Further discussion of fill settlement is presented in the "Foundations" section of the report.

Some fill is expected to have a high percentage of rock or concrete fragments mixed into the soil, which typically increases the density of the fill material. If the maximum dry density used to estimate the relative compaction of the fill is not corrected for the appropriate percent rock, the estimated relative compaction could be artificially high and result in an under compacted fill. Therefore, compaction specifications and requirements in the field should include consistent methodology for making rock corrections of on-site fills.

8.10.1 Conventional Mechanical Compaction

In general, all fills, and subgrade areas where fill, foundations, slabs-on-grade, retaining walls and pavements are planned, should be placed in loose lifts 8 inches thick or less and compacted in accordance with ASTM D1557 (latest version) requirements as shown in the table below. In general, clayey soils should be compacted with sheepsfoot equipment and sandy/gravelly soils with vibratory equipment, although alternative compaction methods may be considered feasible. Open-graded materials such as crushed rock should be placed in lifts no thicker than 18 inches and consolidated in place with vibratory equipment. Each lift of fill and all subgrade should be firm and unyielding under construction equipment loading in addition to meeting the compaction requirements to be approved.

The contractor (with input from a Cornerstone representative) should evaluate the in-situ moisture conditions, as the use of vibratory equipment on soils with high moistures can cause unstable conditions. General recommendations for soil stabilization are provided in the "Subgrade Stabilization Measures" section of this report.

Table 10: Compaction Requirements

Description	Material Description	Minimum Relative[1] Compaction (percent)	Moisture[2] Content (percent)
General Fill (< 10 feet from finished grade)	On-Site Fine-Grained Soil	90	>3
	On-site Granular Soils	93	>2
General Fill (> 10 feet from finished grade)	On-Site Fine-Grained Soil	93	>3
	On-Site Granular Soils	95	>2
Trench Backfill	On-Site Fine-Grained Soil	90	>3
	On-site Granular Soils	90	>1
Trench Backfill (upper 6 inches of subgrade)	On-Site Soils	95	>1
Crushed Rock Fill	¾-inch Clean Crushed Rock	Consolidate In-Place	NA
Non-Expansive Fill	Imported Non-Expansive Fill	90	Optimum
Flatwork Subgrade	On-Site Soils	90	>1
Flatwork Aggregate Base	Class 2 Aggregate Base[3]	90	Optimum
MSE Retaining Walls Reinforced Fill Zone	On-Site Granular Soils[4]	95	>2

Table 10 Continues

Table 10: Compaction Requirements (Continued)

Description	Material Description	Minimum Relative[1] Compaction (percent)	Moisture[2] Content (percent)
Pavement Subgrade	Low Expansion Soils	95	>1
Pavement Aggregate Base	Class 2 Aggregate Base[3]	95	Optimum
Asphalt Concrete	Asphalt Concrete	95 (Marshall)	NA

1 – Relative compaction based on maximum density determined by ASTM D1557 (latest version)
2 – Moisture content based on optimum moisture content determined by ASTM D1557 (latest version)
3 – Class 2 aggregate base shall conform to Caltrans Standard Specifications, latest edition, except that the relative compaction should be determined by ASTM D1557 (latest version)
4 – Granular fill with less than 30 percent passing the No. 200 sieve

8.11 TRENCH BACKFILL

Utility lines constructed within public right-of-way should be trenched, bedded and shaded, and backfilled in accordance with the local or governing jurisdictional requirements. Utility lines in private improvement areas should be constructed in accordance with the following requirements unless superseded by other governing requirements.

All utility lines should be bedded and shaded to at least 6 inches over the top of the lines with crushed rock (⅜-inch-diameter or greater) or well-graded sand and gravel materials conforming to the pipe manufacturer's requirements. Open-graded shading materials should be consolidated in place with vibratory equipment and well-graded materials should be compacted to at least 90 percent relative compaction with vibratory equipment prior to placing subsequent backfill materials.

General backfill over shading materials may consist of on-site native materials provided they meet the requirements in the "Material for Fill" section, and are moisture conditioned and compacted in accordance with the requirements in the "Compaction" section.

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

8.12 PERMANENT CUT AND FILL SLOPES

Due to the variable nature of the quarry fills to be re-used as engineered fill and to improve the long-term stability of new fill slopes, we recommend all fill slopes greater than 20 feet high be

constructed at a maximum inclination of 3:1 (horizontal:vertical). Slopes less than 20 feet high may be constructed at 2.5:1. Cut slopes into the tailings and sidecast fills at the south end of the site will need to be partially over-excavated and rebuilt as an engineered buttress fill. In addition, the north-facing quarry berm will also need to be partially over-excavated and re-constructed as a keyed and benched engineered fill. A mitigation plan showing recommended over-excavation locations are presented on Figure 8; mitigation cross sections are presented on Figures 9A to 9E.

All permanent cut slopes in bedrock should have a maximum inclination of 1.5:1 (horizontal:vertical) unless adverse bedding or shearing is exposed during grading. Our engineering geologist should review all bedrock cut slopes at the time of construction. If adverse conditions are observed, then the slope should be flattened to 2:1; 3:1 or over-excavated and rebuilt as an engineered fill slope. Fill slopes should be overbuilt at least 12 to 18 inches and trimmed back, exposing engineered fill when complete. Refer to the “Erosion Control” section of this report for a discussion regarding protection of slope surfaces.

8.12.1 Keyways and Benches

Fill placed on existing ground inclined at 6:1 or greater should be benched into the existing slope and a keyway constructed at the toe of the fill. Benches should be angled slightly into the slope, be spaced vertically at no greater than 10 feet between benches, and be at least 5 to 10 feet wide. Depending on the thickness of any colluvial/residual soil layer that blankets the bedrock, the benches may need to be widened beyond the minimum width to extend into competent bedrock/soil and allow for the installation of geogrid where applicable. Keyways should also be angled slightly into the slope (minimum 2 percent inclination), extend at least 5 feet into competent soil or bedrock and be at least 20 feet wide. A typical keyway and bench construction detail is depicted in Figure 10. The conceptual location of proposed keyways is depicted on Figure 8. Once more detailed grading plans have been finalized, we should be retained to prepare additional keyway and subdrain plans, as needed.

8.12.2 Fill Drainage

A permanent subsurface drainage system consisting of a series of perforated gravity pipes or drainage strips should be constructed between engineered fill placed against a bedrock or native soil slope and within all keyways. This system is intended to intercept perched water flowing through the bedrock and transmit it to suitable outlet structures and reduce the potential for hydrostatic pressures building up behind the fills and causing slope instability. The drain lines should be placed at the back of the keyways and benches as shown on the Grading and Mitigation Details, Figure 10. Bench drains should be spaced vertically at no greater than 30 feet.

For fill slope and buttress construction, the drainage system should be constructed as shown in Figure 10 and will consist of a minimum 4- to 8-inch-diameter perforated PVC pipe (perforations placed downward). The pipe should consist of SDR 35 or approved equivalent for fill depths less than 30 feet deep and SDR 23.5 pipe for depths greater than 30 feet. Subdrain pipes should be bedded and shaded in Caltrans Class 2 Permeable Material (latest version) or ¾-inch

crushed rock; if crushed rock is used, the rock should be encapsulated in filter fabric (Mirafi 140N or equivalent). The bedding should be at least 2 inches below the pipe. Drainage material should be at least 24 inches in width and 36 inches in height; where seepage is observed in bench cuts, the height of the drainage material should be increased to at least 12 inches above the height of the observed seepage zone. Alternatively, geocomposite strip drains may be used in lieu of drain rock in fills with less than 30 feet of cover, provided the strip drains extend up the back of benches and keyways at least 36 inches or more, as shown in Figure 10. Strips should overlap by at least 6 inches vertically, if necessary and at least 12 inches horizontally. Strip drains may not be used where more than 30 feet of fill (vertical) will be placed over them.

The ground surface beneath the subdrain system, as well as the subdrain pipes should slope towards suitable outlet structures at an inclination of at least 1 percent. Cutoff plugs consisting of compacted clayey soil or cement-sand slurry should be provided where subdrains transition to solid pipe or where they daylight near an outlet point. Suitable outlet structures may consist of connecting the drainage lines to a storm drain system, with a sump if required; if the drain lines will outlet overland at the toe of the slope, an appropriate rock spill pad should be provided; the drain lines should not outlet onto the slope.

Access ports (cleanouts) with terminal risers should be provided at the upslope boundary of each subsurface drain. Segments of solid discharge pipe should have cleanouts with terminal risers at least every 100 feet. In addition, the high end and all 90-degree bends of the subdrain pipe should be connected to a riser that extends to the ground surface. The number of cleanouts can be reduced by installing “sweep” 90-degree bends or pairs of 45-degree bends in succession instead of using tight 90-degree bends. Our representative in the field should review the final discharge location at the time of construction.

8.12.3 Plan Review and Construction Monitoring

We should be retained to review the conceptual grading and sub-drainage plans for each phase of the mass grading of the site and we can provide more specific input regarding the location of keyways and subsurface fill drainage for the final plans. A Cornerstone representative should be on site during keyway and fill slope construction. Field modifications to the planned keyway and benching may be required based on encountered field conditions. In addition, it has been our experience that cut slopes in undocumented fills are prone to localized sloughing even when sloped to conform with OSHA requirements. Localized cuts in existing Franciscan Formation bedrock may be prone to localized sloughing and weak zones along joints or adverse bedding. We recommend that a Cornerstone engineering geologist observe the condition of all cut slopes and evaluate the potential for localized adverse materials or bedding orientation. Recommendations to address any potential stability issues that are identified during grading should be implemented during construction.

We recommend that the project civil engineer or land surveyor be retained to survey in place all keyways, sub-drainage lines, solid pipes, and cleanouts, and create an as-built plan. This plan will be of use for any future maintenance or repair work.

8.13 SITE DRAINAGE

8.13.1 Surface Drainage

Surface runoff should not be allowed to flow over the top of or pond at the top or toe of engineered slopes or retaining walls. Ponding should also not be allowed on or adjacent to building foundations, slabs-on-grade, or pavements. Site slopes for water discharge should conform to applicable building codes. Existing earth swales located at the top of existing tiered quarry slopes should be cleaned during construction to remove loose debris or sediment. Where these drainage swales intersect planned tiered retaining walls on the west side of the project, the walls should be designed with adequate surface water inlets to collect water and safely discharge it to the storm drain system. Surface water runoff from adjacent hillside swales that intersect planned improvements should be collected in inlets designed by the project civil engineer. This should include new tiered retaining walls or new engineered fill slopes that will be constructed adjacent to existing tiered quarry benches or any undisturbed natural slopes that may direct concentrated surface water runoff towards new improvements.

Roof runoff should be directed away from building areas in closed conduits, to approved infiltration facilities, or on to hardscaped surfaces that drain to suitable facilities. Retention, detention or infiltration facilities should be spaced at least 10 feet from buildings, and preferably at least 5 feet from slabs-on-grade or pavements. These facilities are not recommended where stormwater infiltration may affect slopes at lower elevations on or adjacent to the site. However, if slopes are not present at lower elevations that could potentially be affected, and if retention, detention or infiltration facilities are located within these zones, we recommend that these treatment facilities meet the requirements in the Storm Water Treatment Design Considerations section of this report.

Lined v-ditches should be included at the top of slopes and intermediate benches, and at the toe of slopes or behind retaining walls adjacent to planned or existing development. All v-ditches and drain inlets should be sized to accommodate the design storm events for the upslope tributary area. Concrete-lined v-ditches should be reinforced as required and have adequate control and construction joints and should be constructed neat in excavations; backfill around formed ditches should not be allowed.

Upslope sources of water should be evaluated, especially where new fill slopes are planned to daylight near existing quarry slopes, benches, or natural drainages. Additional surface drainage inlets should be considered near the base of quarry or natural slopes where they discharge or direct surface water runoff onto new fill slopes. If upslope irrigation is planned, additional surface and subsurface drainage, or construction of drained buttress fills may be needed to protect site improvements. We should be consulted if this issue will affect the project.

8.13.2 Subsurface Drainage

As discussed in the “Permanent Cut and Fill Slopes” section, subsurface drainage improvements should be installed as part of earthwork for fill construction. These improvements should include positive surface gradients for keyways and benches and the installation of a

subdrain system consisting of perforated pipe and permeable gravel or drain rock. If drain rock is used, the rock and pipe should be entirely wrapped with a permeable geotextile fabric. Subdrains should also be installed at the toe of any proposed cut slopes depending on the actual conditions observed during construction. A detailed subdrain plan should be prepared once grading plans are finalized. The actual location of subdrains should be determined in the field at the time of construction.

To control potential perched groundwater beneath the planned facility, we recommend that a system of perforated subdrains be placed near the base of new fills placed within the building and surrounding facility parking areas. Perforated subdrains should be installed after Deep Dynamic Compaction (DDC) is completed. The recommended conceptual subdrain locations are presented in Figure 8 and should consist of Schedule 40 PVC pipe, perforations placed downward. For preliminary planning, we recommend that peripheral subdrains be at least 6 inches in diameter; primary trunk lines should be at least 8 to 12 inches in diameter. As discussed above, subdrain pipes should be bedded and shaded in Caltrans Class 2 Permeable Material (latest version) or ¾-inch crushed rock; if crushed rock is used, the rock should be encapsulated in filter fabric (Mirafi 140N or equivalent). The bedding should be at least 2 inches below the pipe.

Perforated pipes should be connected to solid discharge pipes that direct water to C3 treatment areas or storm drainage facilities, as determined by the civil engineer. The actual pipe size, location, access ports, and discharge locations should be finalized once detailed grading plans have been prepared and once final foundation and below-grade retaining wall plans have been prepared. The actual location of subdrains should be determined in the field at the time of construction. We recommend that the project civil engineer or land surveyor be retained to survey in place all subdrain lines, solid pipes, and cleanouts, and create an as-built plan. This plan will be of use for any future maintenance or repair work.

8.14 LOW-IMPACT DEVELOPMENT (LID) IMPROVEMENTS

The Municipal Regional Permit (MRP) requires regulated projects to treat 100 percent of the amount of runoff identified in Provision C.3.d from a regulated project's drainage area with low impact development (LID) treatment measures onsite or at a joint stormwater treatment facility. LID treatment measures are defined as rainwater harvesting and use, infiltration, evapotranspiration, or biotreatment. A biotreatment system may only be used if it is infeasible to implement harvesting and use, infiltration, or evapotranspiration at a project site.

Technical infeasibility of infiltration may result from site conditions that restrict the operability of infiltration measures and devices. Various factors affecting the feasibility of infiltration treatment may create an environmental risk, structural stability risk, or physically restrict infiltration. The presence of any of these limiting factors may render infiltration technically infeasible for a proposed project. To aid in determining if infiltration may be feasible at the site, we provide the following site information regarding factors that may aid in determining the feasibility of infiltration facilities at the site.

- The existing quarry fills to be used as fill for the project will vary significantly and likely range from clayey sands to silty sands and gravels. Once compacted as engineered fills, these fill soils will likely be categorized as Hydrologic Soil Group B or C, which could have infiltration rates on the order of 0.2 to 2 inches per hour. Where underlain by bedrock, water may not infiltrate any quicker and designers should assume rates similar to Group D. In our opinion, the on-site quarry fills will have moderate infiltration characteristics that could potentially assist with stormwater infiltration. However, water infiltration into soils near planned slopes or tall retaining may not be feasible due to potential stability concerns. Bedrock areas will likely have low infiltration and significantly limit the infiltration of stormwater.

- We recommend that infiltration testing be performed upon completion of rough grading to better define potential infiltration characteristics of engineered fills.

8.14.1 Storm Water Treatment Design Considerations

If storm water treatment improvements, such as shallow bio-retention swales, basins or pervious pavements, are required as part of the site improvements to satisfy Storm Water Quality (C.3) requirements, we recommend the following items be considered for design and construction.

8.14.1.1 General Bioswale Design Guidelines

- If possible, avoid placing bioswales or basins within 10 feet of the building perimeter or within 5 feet of exterior flatwork or pavements. The planned bio-retention areas at the north end of the site will be located in close proximity to new MSE retaining walls. If bioswales must be constructed within these setbacks, or where they will be located adjacent to MSE walls, the side(s) and bottom of the trench basin area excavation should be lined with 15-mil visqueen to reduce water infiltration into the surrounding soil.
- Bioswales constructed within 3 feet of proposed buildings may be within the foundation zone of influence for perimeter wall loads. Therefore, where bioswales will parallel foundations and will extend below the “foundation plane of influence,” an imaginary 1:1 plane projected down from the bottom edge of the foundation, the foundation will need to be deepened so that the bottom edge of the bioswale filter material is above the foundation plane of influence.

- The bottom of bioswale or detention areas should include a perforated drain placed at a low point, such as a shallow trench or sloped bottom, to reduce water infiltration into the surrounding soils near structural improvements.

8.14.1.2 Bioswale Infiltration Material

- Gradation specifications for bioswale filter material, if required, should be specified on the grading and improvement plans.

- Compaction requirements for bioswale filter material in non-landscaped areas or in pervious pavement areas, if any, should be indicated on the plans and specifications to satisfy the anticipated use of the infiltration area.

- If bioswales are to be vegetated, the landscape architect should select planting materials that do not reduce or inhibit the water infiltration rate, such as covering the bioswale with grass sod containing a clayey soil base.

- Due to the relatively loose consistency and/or high organic content of many bioswale filter materials, long-term settlement of the bioswale medium should be anticipated. To reduce initial volume loss, bioswale filter material should be wetted in 12 inch lifts during placement to pre-consolidate the material. Mechanical compaction should not be allowed, unless specified on the grading and improvement plans, since this could significantly decrease the infiltration rate of the bioswale materials.

- It should be noted that the volume of bioswale filter material may decrease over time depending on the organic content of the material. Additional filter material may need to be added to bioswales after the initial exposure to winter rains and periodically over the life of the bioswale areas, as needed.

8.14.1.3 Bioswale Construction Adjacent to Pavements

If bio-infiltration swales or basins are considered adjacent to proposed parking lots or exterior flatwork, we recommend that mitigative measures be considered in the design and construction of these facilities to reduce potential impacts to flatwork or pavements. Exterior flatwork, concrete curbs, and pavements located directly adjacent to bio-swales may be susceptible to settlement or lateral movement, depending on the configuration of the bioswale and the setback between the improvements and edge of the swale. To reduce the potential for distress to these improvements due to vertical or lateral movement, the following options should be considered by the project civil engineer:

- Improvements should be setback from the vertical edge of a bioswale such that there is at least 1 foot of horizontal distance between the edge of improvements and the top edge of the bioswale excavation for every 1 foot of vertical bioswale depth, or

- Concrete curbs for pavements, or lateral restraint for exterior flatwork, located directly adjacent to a vertical bioswale cut should be designed to resist lateral earth pressures in accordance with the recommendations in the “Retaining Walls” section of this report, or concrete curbs or edge restraint should be adequately keyed into the native soil or engineered to reduce the potential for rotation or lateral movement of the curbs.

8.15 PERMANENT EROSION CONTROL MEASURES

Hillside grading will require periodic maintenance after construction to reduce the potential for erosion and sloughing. At a minimum all slopes should be vegetated by hydroseeding or other landscape ground cover. The establishment of vegetation will help reduce runoff velocities, allow some infiltration and transpiration, trap sediment within runoff, and protect the soil from

raindrop impact. Depending on the exposed material type and the slope inclination, more aggressive erosion control measures may be needed to protect slopes for one or more winter seasons while vegetation is establishing. For slopes with inclinations of 3:1 (horizontal:vertical) or greater, and due to the cohesionless nature of the much of the anticipated fill soils, erosion control should consist of jute netting, straw matting, or erosion control blankets used in combination with hydroseeding.

Both construction and post-construction Storm Water Pollution Prevention Plans (SWPPPs) should be prepared for the project-specific requirements. We recommend that final grading plans be provided for our review.

8.16 LANDSCAPE CONSIDERATIONS

We recommend greatly reducing the amount of surface water infiltrating into the site soils near foundations and exterior slabs-on-grade. This can typically be achieved by:

- Using drip irrigation
- Avoiding open planting within 3 feet of the building perimeter or near the top of existing slopes
- Regulating the amount of water distributed to planter areas by using irrigation timers
- Selecting landscaping that requires little or no watering, especially near foundations.

We recommend that the landscape architect consider these items when developing landscaping plans.

SECTION 9: 2022 CBC SEISMIC DESIGN CRITERIA

9.1 SEISMIC DESIGN CRITERIA

We developed site-specific seismic design parameters in accordance with the 2022 California Building Code (CBC) and ASCE 7-16.

9.1.1 Site Location and Provided Data For 2022 CBC Seismic Design

The project is located at latitude 37.685592° and longitude -122.421489°, which is based on Google Earth (WGS84) coordinates within the Guadalupe Quarry in Brisbane, California. We have assumed that a Seismic Importance Factor (I_e) of 1.00 has been assigned to the structures in accordance with Table 1.5-2 of ASCE 7-16 for structures classified as Risk Category II. The structure periods have not been provided by the project structural engineer.

9.1.2 Site Classification – Chapter 20 of ASCE 7-16

Code-based site classification and ground motion attenuation relationships are based on the time-weighted average shear wave velocity of the top approximately 100 feet (30 meters) of the soil profile (V_{S30}).

As discussed, the subsurface conditions beneath the proposed warehouse and parking garage will vary significantly. The northern half of the warehouse will be underlain by engineered fill and native soils on the order of 100 feet or more. The southern half of the building will be underlain by about 10 to 40 feet of engineered fill underlain by bedrock. The parking garage will be underlain by about 10 to 90 feet of engineered fill and native soils underlain by bedrock. Where the fills and native soils are thicker beneath the buildings, we estimate the average shear wave velocity would be between 600 to 1,200 feet per second for the upper 30 meters beneath the buildings and therefore classified as Soil Classification D. Where the fills and native soils are thinner, we estimate the average shear wave velocity would be between 1,200 to 2,500 feet per second for the upper 30 meters and classified as Soil Classification C. As such, the Soil Classification (Site Class) will vary beneath the proposed buildings between Site Class C and D. ***As the structures will span across differing Site Classes, we recommend the structural design be checked for both conditions and designed accordingly for the worst-case scenario and parameters***.

9.1.3 Site Class C Parameters

Below outlines recommended parameters for structural design for Site Class C conditions. The mapped spectral acceleration parameters S_s and S_1 were calculated using the web-based program ATC Hazards by Locations, located at https://hazards.atcouncil.org/, based on the site coordinates presented below and the site classification. The table below lists the various factors used to determine the seismic coefficients and other parameters for Site Class C conditions.

Table 11: CBC Site Categorization and Site Coefficients for Site Class C

Classification/Coefficient	Design Value
Site Class	C
Site Latitude	37.685592°
Site Longitude	-122.421489°
0.2-second Period Mapped Spectral Acceleration[1], S_S	1.826g
1-second Period Mapped Spectral Acceleration[1], S_1	0.747g
Short-Period Site Coefficient – Fa	1.2
Long-Period Site Coefficient – Fv	1.4

Table 11 Continues

Table 11: CBC Site Categorization and Site Coefficients for Site Class C (Continued)

Classification/Coefficient	Design Value
0.2-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects - S_{MS}	2.192g
1-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects – S_{M1}	1.046g
0.2-second Period, Design Earthquake Spectral Response Acceleration – S_{DS}	1.461g
1-second Period, Design Earthquake Spectral Response Acceleration – S_{D1}	0.698g

9.1.4 Site Class D Parameters

For Site Class D conditions, in accordance with Section 11.4.8 of ASCE 7-16, we performed a ground motion hazard analysis following Chapter 21, Section 21.2 of ASCE 7-16. We evaluated both Probabilistic MCE_R Ground Motions in accordance with Method 1 and Deterministic MCE_R Ground Motions to generate our recommended design response spectrum for Site Class D conditions. The recommended design spectral accelerations and associated periods are provided graphically on Figure 2 in Appendix F. The details of our analysis are presented in Appendix F.

SECTION 10: FOUNDATIONS

10.1 SUMMARY OF RECOMMENDATIONS

In our opinion, the proposed warehouse, parking garage, and water tanks may be supported on shallow foundations provided the settlements are tolerable and the recommendations in the "Earthwork" section and the sections below are followed. Driven deep foundation elements may also be used to support the warehouse walls where additional lateral resistance is required and to transfer foundation loads below adjacent parking garage walls where shallow foundations would surcharge the adjacent below-grade parking garage walls.

10.2 SHALLOW FOUNDATIONS – WAREHOUSE AND PARKING GARAGE

10.2.1 Conventional Shallow Footings

Provided the existing quarry fills, which are considered undocumented and highly variable at this time, are re-compacted using both mechanical compaction methods as well as in-situ Deep Dynamic Compaction (DDC) methods, the warehouse and parking garage may be supported on conventional shallow footings. Conventional shallow footings should bear on engineered fill, be at least 24 inches wide, and extend at least 30 inches below the lowest adjacent grade. Lowest adjacent grade is defined as the deeper of the following: 1) bottom of the adjacent interior slab-on-grade, or 2) finished exterior grade, excluding landscaping topsoil.

10.2.2 Bearing Capacity and Footing Settlement

The structural engineer provided preliminary column and perimeter wall dead plus live loading for the warehouse presented in the below table. Structural loads for the parking garage were not available at the time this report was prepared; therefore, we assumed the typical loading as presented in the below table.

Table 12: Preliminary Warehouse Structural Loading

Foundation Area	Dead Plus Live Load
Roof Column	1,183 kips
Edge Roof Column	1,960 kips
Intermediate Column	1,086 kips
Perimeter Wall	37 to 38 kips per lineal foot

Table 13: Assumed Parking Garage Structural Loading

Foundation Area	Dead Plus Live Load
Exterior Column	600 to 800 kips
Interior Column	1,200 to 1,600 kips

To limit post construction static settlements, we recommend designing footings for maximum allowable dead plus live bearing pressures ranging from 6,000 to 10,000 psf. These pressures are a net value; the weight of the footing may be neglected for the portion of the footing extending below grade. Bearing pressures for dead loads only should not exceed two-thirds the dead plus live load capacity. The dead plus live bearing capacity may be increased by one-third for all loads including wind and seismic.

Based on the above loading and an allowable dead plus live bearing pressure ranging from 6,000 to 10,000 psf, we estimate the total static footing settlement will be as outlined in the below table. We recommend reviewing the estimated settlements with the design team and determining acceptable settlement for the structure prior to finalizing the allowable bearing pressure for the foundations.

Table 14: Preliminary Total Static Settlements Due to Foundation Loads Only

Foundation Area	Estimated Static Total Settlement (inches)		
Allowable Bearing Capacity	**6,000 psf**	**8,000 psf**	**10,000 psf**
Roof Column (Warehouse)	¾ to 1	1 to 1¼	1½ to 1¾
Edge Roof Column (Warehouse)	1¼ to 1½	1½ to 1¾	1¾ to 2
Intermediate Column (Warehouse)	¾ to 1	1 to 1¼	1½ to 1¾
Perimeter Wall (Warehouse)	¾ to 1	1 to 1¼	1 to 1¼
Exterior Column (Parking Garage)	¾ to 1	¾ to 1	1 to 1¼
Interior Column (Parking Garage)	1 to 1¼	1¼ to 1½	1½ to 1¾

The above preliminary total foundation settlement estimates are due to foundation loads only. Settlement due to deep fills including hydro-compression and the potential for differential settlement across portions of the building with varying depths of fill beneath is possible. However, provided the grading recommendations including over-excavation of existing soils and bedrock, DDC ground improvement on existing fills left in-place, and proper compaction of new engineered fills with sufficient moisture is performed as outlined in the “Earthwork” section of this report, we anticipate the degree of post-construction settlement of deep fills and differential settlements across portions of the buildings in addition to those outlined below will be limited to less than ¼ percent of the new fill thickness. This could result in an additional ½ to 2 inches across the warehouse building.

For the warehouse, post-construction differential settlements due to foundation loads only are anticipated to be on the order of ½ to ¾ inch between adjacent interior column foundations and on the order of ¾ to 1 inch between the exterior perimeter wall foundations and the first interior column foundation line. Differential settlements are anticipated to be on the order of ½ inch over a horizontal distance of about 50 feet along the length of the continuous perimeter wall foundations. For the parking garage, post-construction differential settlements due to foundation loads only are anticipated to be on the order of ½ to ¾ inch between adjacent interior column foundations and between the exterior column foundations and the first interior column foundation line.

The above estimated settlements are preliminary. The final building loading and layout should be reviewed and updated settlement estimates provided, as needed.

10.2.3 Lateral Loading

Lateral loads may be resisted by friction between the bottom of footing and the supporting subgrade, and also by passive pressures generated against footing sidewalls. An ultimate frictional resistance of 0.5 applied to the footing dead load, and an ultimate passive pressure based on an equivalent fluid pressure of 500 pcf may be used in design. The structural engineer should apply an appropriate factor of safety to the ultimate values above. Where

footings are adjacent to landscape areas without hardscape, the upper 12 inches of soil should be neglected when determining passive pressure capacity.

10.2.4 Conventional Shallow Footing Construction Considerations

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

Footing excavations should be filled as soon as possible or be kept moist until concrete placement by regular sprinkling to prevent desiccation. A Cornerstone representative should observe all footing excavations prior to placing reinforcing steel and concrete. If there is a significant schedule delay between our initial observation and concrete placement, we may need to re-observe the excavations.

The engineered fills are anticipated to generally range from sandy clays to clayey sands with gravels. However, some of the fills may have fewer fines and be comprised of mostly sand and gravels with lower fines. Where the fills are mostly comprised of sand and gravel with lower fines, footing excavation walls may not stand vertical and may need to be sloped to a minimum 1:1 inclination. Granular material encountered in the footing bottoms will likely be disturbed to a depth of 6 to 8 inches following excavation and will likely need to be compacted to 93 percent relative compaction prior to steel placement. Care should be taken to not disturb the compacted granular material during steel placement. We should re-observe the footing excavations in granular materials after reinforcing steel has been placed and just prior to concrete placement. Footing excavations should also be kept moist by regular sprinkling with water to prevent desiccation and potential raveling of the granular materials. As an alternative, a rat slab can be placed over the granular material after we have observed the footing excavation to protect the granular material prior to steel placement.

10.3 SHALLOW FOUNDATIONS – WATER TANK

The plans provided show construction of a 550k gallon water tank and 280k gallon fire tank within the northern portion of the site. At this time, specific grading for the tank pads has not been shown. On a preliminary basis, provided the water tanks can tolerate the anticipated settlements discussed below, the tanks can be supported on perimeter ring foundations and interior column spread footing foundations. This should be further reviewed once additional grading information at the tank locations is provided.

10.3.1 Ring and Spread Footings

Ring and spread footings should bear entirely on engineered fill, be at least 18 inches wide, and extend at least 24 inches below the lowest adjacent grade. Bottom of footing is based on lowest adjacent grade, defined as the deeper of the following: 1) bottom of the tank subgrade, or 2) finished exterior grade, excluding landscaping topsoil.

10.3.2 Bearing Capacity and Footing Settlement

Structural loading for the water tanks was not available at the time this report was prepared. Based on the tank sizes and anticipated height of water within the tanks estimated from the tank diameters and storage capacity noted on the civil plans, we estimate the tanks will exert an areal pressure of about 2,000 psf on the soil subgrade when filled with water.

To limit post construction static settlements, we recommend designing the ring and spread footings for maximum allowable dead plus live bearing pressures ranging from 6,000 to 10,000 psf. This pressure is a net value; the weight of the footing may be neglected for the portion of the footing extending below grade. The dead plus live bearing capacity may be increased by one-third for all loads including wind and seismic.

Based on the estimated areal pressure and the allowable bearing pressures presented above, we estimate that the total static settlement will be on the order of ¾ to 1½ inches, with post-construction differential settlement on the order of ¾ to 1 inch over a horizontal distance of 30 feet. We recommend we be retained to review the final footing layout and loading and verify the settlement estimates above.

The above preliminary foundation settlement estimates are due to foundation loads only. Settlement due to deep fills and the potential for differential settlement across portions of the tanks with varying depths of fill beneath is possible. However, provided the grading recommendations including over-excavation of existing soils and bedrock, and proper compaction of new engineered fills with sufficient moisture is performed as outlined in the "Earthwork" section of this report, we anticipate the degree of hydro-compression settlement of deep fills and differential settlements across portions of the tanks in addition to those outlined above will be limited. As previously mentioned, we should further review once additional grading information at the tank locations is provided.

10.3.3 Lateral Loading

Lateral loads may be resisted by friction between the bottom of footing and the supporting subgrade, and also by passive pressures generated against footing sidewalls. An ultimate frictional resistance of 0.5 applied to the footing dead load, and an ultimate passive pressure based on an equivalent fluid pressure of 500 pcf may be used in design. The structural engineer should apply an appropriate factor of safety to the ultimate values above. The upper 12 inches of footing embedment should be neglected for passive resistance for exterior footings unless the perimeter of the tank is paved. If grades slope down and away from the tank perimeter foundation, passive resistance should be ignored to a depth until there is a minimum

horizontal distance of 10 feet from the face of footing to the exposed sloping grade. This should be further reviewed once grading information at the tanks is available.

10.3.4 Oiled Sand Cushion

Steel bottomed of the tanks between the ring foundation and any interior column foundations will likely be supported directly on compacted soils. We also anticipate oiled sand cushion will be placed between the subgrade and tank bottom. The oiled sand cushion should be placed and compacted on the subgrade prepared in accordance with the “Earthwork” recommendations of this report. The oiled sand cushion should be compacted to a minimum 95 percent relative compaction and should be designed in accordance with tank manufacture requirements.

10.3.5 Ring and Spread Footing Foundation Construction Considerations

Please refer to the conventional shallow footing construction considerations section in the warehouse and parking garage shallow foundations section above.

10.4 DEEP FOUNDATIONS

10.4.1 Driven Piles

We understand there will be significant lateral loads on the lower-level, below-grade walls along the east side of the warehouse building that will require additional foundation support to resist the lateral forces. Additionally, as the parking garage will be located directly adjacent to the northwest corner of the warehouse and will extend below the lower-level of the warehouse, shallow foundations from the warehouse would surcharge the parking garage below-grade walls. We understand driven steel H-piles are being proposed below the lower-level warehouse foundations along the east side of the warehouse to help resist lateral loads on the below-grade warehouse walls. Additionally, we understand driven steel H-piles are being proposed to transfer warehouse building loads below the adjacent below-grade parking garage walls so not to surcharge the garage walls.

10.4.2 Vertical and Lateral Capacity

At this time, we understand the driven piles would primarily be used as lateral support. If vertical capacity will be used, we should be consulted to provide vertical capacity recommendations based on the desired driven pile support elements and layout of proposed pile locations.

To evaluate the pile lateral capacity including deflections, shear forces, and moments in the piles under loading, the following LPile parameters in the table below could be used to model the underlying materials.

Table 15: LPile Parameters

Material	Soil Type	Effective Unit Weight (pcf)	Friction Angle (degrees)	Undrained Cohesion (psf)	p-y Modulus (K, pci)	Strain Factor, E50
Engineered Fill	Sand, Reese et al.	135	33	N/A	225	N/A

10.4.3 Passive Resistance against Pile Caps/Grade Beams

Passive resistance against pile caps/grade beams poured neat against engineered fill may also be considered; however, as the allowable lateral deflections of piles will be limited, full allowable passive pressures will not be developed. The structural engineer should evaluate appropriate allowable passive pressures that maintain strain compatibility between the piles and pile caps/grade beams if additional passive resistance is required. If desired, we can provide passive resistance values that are strain compatible with the deflection chosen by the structural engineer.

10.4.4 Pre-Production Test Program and Construction Considerations

On a preliminary basis, we recommend at least one lateral pile load test be performed. In addition, if the piles are designed as vertical capacity elements, we recommend that at least one pile has dynamic monitoring during installation prior to the installation of production piles. Piles should be driven with the same pile driving equipment/hammers and settings that will be used to drive all the production piles. The total number of tests should be reviewed, and additional load tests may be required based on the final layout and number of piles to be installed. We may also recommend a pile driving analyzer (PDA) be used during test pile installation. Additional recommendations should be provided once additional pile information and plans are available.

The installation of all test and production piles should be observed on a full-time basis by a Cornerstone representative to confirm that the piles are installed in accordance with our recommendations and project requirements. Contractors should note the piles will extend through variable conditions including engineer fills that contain sands, gravels, and cobbles, and potentially into bedrock materials.

We may recommend additional testing of piles, or additional installations, if any pile installations vary from normal installation practices. Pile contractors should meet all the requirements of the pile specifications for the project. We recommend that pile contractors have at least 3 years of local deep foundation installation experience.

SECTION 11: CONCRETE SLABS AND PEDESTRIAN PAVEMENTS

11.1 OFFICE SLABS-ON-GRADE

Significant fill will be placed and compacted to establish finished pad grade for the proposed warehouse building slab-on-grade. Provided the upper foot of pad subgrade consists of on-site

sandy and gravelly soils with a Plasticity Index (PI) of 15 or less, the proposed office slabs-on-grade within the warehouse can be supported directly on the engineered subgrade soils prepared in accordance with the recommendations in the "Earthwork" section of this report. Office slab-on-grade areas should be at least 4 inches thick. If moisture-sensitive floor coverings are planned, the recommendations in the "Interior Slabs Moisture Protection Considerations" section below may be incorporated in the project design if desired. If significant time elapses between initial subgrade preparation and slab-on-grade construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to near optimum moisture content.

The structural engineer should determine the appropriate slab reinforcement for the loading requirements. For unreinforced concrete slabs, ACI 302.1R recommends limiting control joint spacing to 24 to 36 times the slab thickness in each direction, or a maximum of 18 feet.

11.2 WAREHOUSE SLABS-ON-GRADE

Significant fill will be placed and compacted to establish finished pad grade for the proposed warehouse building slab-on-grade. Provided the upper foot of pad subgrade consists of on-site sandy and gravelly soils with a Plasticity Index (PI) of 15 or less and has an R-value of at least 50, the proposed warehouse slab-on-grade can be supported directly on the engineered subgrade soils prepared in accordance with the recommendations in the "Earthwork" section of this report. The warehouse slabs-on-grade should be at least 6 inches thick, should have a minimum compressive strength of 3,500 psi, and should be designed for the specific warehouse loading (i.e. forklifts, rack loads, etc).

Considering the above subgrade support, warehouse slabs-on-grade can be designed based on a subgrade modulus of 200 pounds per cubic inch (pci). If there are areas within the warehouse that are moisture sensitive, such as equipment and elevator rooms, a vapor barrier may be placed over the upper engineered subgrade soils prior to slab construction. Please refer to the recommendations in the "Interior Slabs Moisture Protection Considerations" section for vapor barrier construction. If significant time elapses between initial subgrade preparation and slab-on-grade construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to near optimum moisture content. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness.

11.3 PARKING GARAGE SLABS-ON-GRADE

Garage slabs-on-grade should be at least 5 inches thick and if constructed with minimal reinforcement intended for shrinkage control only, should have a minimum compressive strength of 3,000 psi. If the slab will have heavier reinforcing because the slab will also serve as a structural diaphragm, the compressive strength may be reduced to 2,500 psi at the structural engineer's discretion. As discussed, significant fill will be placed and compacted to establish finished pad grade for the proposed parking garage slab-on-grade. Provided the upper foot of pad subgrade consists of on-site sandy and gravelly soils with a Plasticity Index (PI) of 15 or less and has an R-value of at least 50, the proposed garage slab-on-grade can be supported

directly on the engineered subgrade soils prepared in accordance with the recommendations in the “Earthwork” section of this report.

If there will be areas within the garage that are moisture sensitive, such as equipment and elevator rooms, the recommendations in the “Interior Slabs Moisture Protection Considerations” section below may be incorporated in the project design if desired. If significant time elapses between initial subgrade preparation and slab-on-grade construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to near optimum moisture content. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness.

11.4 INTERIOR SLABS MOISTURE PROTECTION CONSIDERATIONS

The following general guidelines for concrete slab-on-grade construction where floor coverings are planned are presented for consideration by the developer, design team, and contractor. These guidelines are based on information obtained from a variety of sources, including the American Concrete Institute (ACI) and are intended to reduce the potential for moisture-related problems causing floor covering failures, and may be supplemented as necessary based on project-specific requirements. The application of these guidelines or not will not affect the geotechnical aspects of the slab-on-grade performance.

- Place a minimum 15-mil vapor retarder conforming to ASTM E 1745, Class C requirements or better directly below the concrete slab; the vapor retarder should extend to the slab edges and be sealed at all seams and penetrations in accordance with manufacturer’s recommendations and ASTM E 1643 requirements. A 4-inch-thick capillary break, consisting of crushed rock should be placed below the vapor retarder and consolidated in place with vibratory equipment. The mineral aggregate shall be of such size that the percentage composition by dry weight as determined by laboratory sieves will conform to the following gradation:

Sieve Size	Percentage Passing Sieve
1”	100
¾”	90 – 100
No. 4	0 – 10
No. 200	0 – 5

- The concrete water:cement ratio should be 0.45 or less. Mid-range plasticizers may be used to increase concrete workability and facilitate pumping and placement.

- Water should not be added after initial batching unless the slump is less than specified and/or the resulting water:cement ratio will not exceed 0.45.

- Polishing the concrete surface with metal trowels is not recommended.

- Where floor coverings are planned, all concrete surfaces should be properly cured.

- Water vapor emission levels and concrete pH should be determined in accordance with ASTM F1869-98 and F710-98 requirements and evaluated against the floor covering manufacturer's requirements prior to installation.

11.5 EXTERIOR FLATWORK

Exterior concrete flatwork subject to pedestrian and/or occasional light pick up loading should be at least 4 inches thick and supported directly upon subgrade prepared in accordance with the "Earthwork" recommendations of this report provided the upper foot of subgrade consist of on-site sandy and gravelly soils with a Plasticity Index (PI) of 15 or less. If subgrade consists of on-site clayey soils, the concrete flatwork should be supported on at least 4 inches of Class 2 aggregate base overlying prepared subgrade. Flatwork that will be subject to heavier or frequent vehicular loading should be designed in accordance with the recommendations in the "Vehicular Pavements" section below.

To help reduce the potential for uncontrolled shrinkage cracking, adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness. Flatwork should be isolated from adjacent foundations or retaining walls except where limited sections of structural slabs are included to help span irregularities in retaining wall backfill at the transitions between at-grade and on-structure flatwork.

SECTION 12: VEHICULAR PAVEMENTS

12.1 ASPHALT CONCRETE

The following asphalt concrete pavement recommendations tabulated below are based on Procedure 608 of the Caltrans Highway Design Manual, estimated traffic indices for various pavement-loading conditions, and on a design R-value of 30. The design R-value was chosen based on engineering judgement considering the generally sandy and gravelly soil conditions. However, following grading, if clayey soils are encountered at subgrade within areas of pavements, additional testing and a lower R-value may be required, and additional pavement section recommendations may be needed. Additionally, we have also included an option for chemical-treated (cement) subgrade soils using an estimated design R-value of 50. If it is desired to chemical-treat, we recommend the upper 12 inches of subgrade soil be treated. Additional testing will need to be performed to determine the appropriate lime/cement percentage to be mixed with the subgrade soil.

Table 16: Asphalt Concrete Pavement Recommendations, Untreated Subgrade

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base[1] (inches)	Total Pavement Section Thickness (inches)
5.0	3.0	5.5	8.5
6.0	3.5	7.5	11.0
7.0	4.0	9.5	13.5
8.0	5.0	10.5	15.5
9.0	5.5	13.0	18.5
10.0	6.5	14.0	20.5
11.0	7.0	16.0	23.0

(1) Caltrans Class 2 aggregate base; minimum R-value of 78; subgrade R-value of 30

Table 17: Asphalt Concrete Pavement Recommendations, Chemical-Treated Subgrade

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base[1] (inches)	Total Pavement Section Thickness (inches)
5.0	3.0	4.0	7.0
6.0	3.5	4.0	7.5
7.0	4.0	4.5	8.5
8.0	5.0	5.0	10.0
9.0	5.5	6.5	12.0
10.0	6.5	7.0	13.5
11.0	7.0	8.0	15.0

(1) Caltrans Class 2 aggregate base; minimum R-value of 78; minimum chemical-treated subgrade R-value of 50

Frequently, the full asphalt concrete section is not constructed prior to construction traffic loading. This can result in significant loss of asphalt concrete layer life, rutting, or other pavement failures. To improve the pavement life and reduce the potential for pavement distress through construction, we recommend the full design asphalt concrete section be constructed prior to construction traffic loading. Alternatively, a higher traffic index may be chosen for the areas where construction traffic will use the pavements.

12.2 PORTLAND CEMENT CONCRETE

The exterior Portland Cement Concrete (PCC) pavement recommendations tabulated below are based on methods presented in “Concrete Pavement for Trucking Facilities” by the American Concrete Pavement Association (ACPA, 1995), and the Portland Cement Association (PCA) design manual (PCA, 1984). In our opinion, the truck loading areas where trucks turn, brake, or

stop should be constructed of reinforced Portland Cement Concrete (PCC) pavement. We have provided a few pavement alternatives below as the anticipated number of trucks and number of load repetitions per day on a given location of the pavement has not been provided at this time. An alternative should be chosen that is greater than what is expected for the development. At this time, we have assumed trucks will consist of tractor trailers. When more specific truck loading information is available, additional information can be provided.

Table 18: PCC Pavement Recommendations, Untreated Subgrade

Traffic Category	Minimum PCC Thickness[1] (inches)
Trucks per day per lane = 20	7.0
Trucks per day per lane = 80	7.5
Trucks per day per lane = 400	8.0

(1) Subgrade design R-Value = 30

The PCC thickness recommended above are based on a concrete flexural strength of at least 550 psi, minimum 28-day compressive strength of 4,000 psi, and supporting the PCC on at least 6 inches of Class 2 aggregate base compacted to a minimum relative compaction of 95 percent (ASTM D1557) as recommended in the “Earthwork” section of our report, and laterally restraining the PCC with curbs or concrete shoulders. The aggregate base should be constructed over compacted subgrade prepared in accordance with “Compaction” section of this report. The PCC should have a low water-cement ratio (industry standards), and in no case exceed a water-cement plus pozzolan ratio of 0.53.

Adequate expansion and control joints should be included. Joint spacing should not exceed about 24 times the pavement thickness, in approximately square panels for unreinforced concrete. Joint spacing can be increased somewhat for reinforced concrete where light reinforcing steel is provided to help hold together intermediate cracks that may form in panels. Construction and expansion joints, and dowels, should be designed in accordance with industry standards.

If the subgrade soils are to be chemically treated (cement), we have provided some pavement alternatives below. For chemically treated subgrade, we recommend the upper 12 inches of subgrade soil be treated and the treated subgrade should obtain a minimum R-value of 50. If chemical treatment of the subgrade is performed, the underlying Class 2 aggregate base section may be reduced from 6 inches to 4 inches, provided it is compacted to a minimum relative compaction of 95 percent (ASTM D1557) as recommended in the “Earthwork” section of our report. Additional testing will need to be performed to determine the appropriate lime/cement percentage to be mixed with the subgrade soil to achieve an estimated R-value of 50. The remaining design and construction details should be consistent with the above recommendations for PCC pavements over untreated subgrade.

Table 19: PCC Pavement Recommendations, Chemical-Treated Subgrade

Traffic Category	Minimum PCC Thickness[1] (inches)
Trucks per day per lane = 20	6.5
Trucks per day per lane = 80	7.0
Trucks per day per lane = 400	7.5

(1) Subgrade design R-Value = 50, assuming 12-inch-thick subgrade chemical treatment

12.3 TRASH ENCLOSURES

Pads where trash containers will be stored, and where garbage trucks will park while emptying trash containers, should be constructed on Portland Cement Concrete. We recommend that the trash enclosure pads and stress (landing) pads where garbage trucks will store, pick up, and empty trash be increased to a minimum PCC thickness of 8 inches. The compressive strength, underlayment, and construction details should be consistent with the above recommendations for PCC pavements.

SECTION 13: RETAINING WALLS

13.1 STATIC LATERAL EARTH PRESSURES

The structural design of the proposed below-grade warehouse and parking garage walls and any site retaining wall should include resistance to lateral earth pressures that develop from the soil behind the wall, any undrained water pressure, and surcharge loads acting behind the wall. Provided a drainage system is constructed behind the wall to prevent the build-up of hydrostatic pressures as discussed in the section below, we recommend that the walls be designed for the following pressures:

Table 20: Recommended Lateral Earth Pressures

Sloping Backfill Inclination (horizontal:vertical)	Lateral Earth Pressure*	
	Unrestrained – Cantilever Wall	Restrained – Braced Wall
Level	37 pcf	37 pcf + 8H
3:1	47 pcf	47 pcf + 8H
2½:1	52 pcf	52 pcf + 8H
2:1	57 pcf	57 pcf + 8H
Additional Surcharge Loads	1/3 of vertical loads at top of wall	½ of vertical loads at top of wall

* Lateral earth pressures are based on an equivalent fluid pressure for level backfill conditions
** H is the distance in feet between the bottom of footing and top of retained soil

The below-grade warehouse and parking garage walls should be designed as a restrained wall. If adequate drainage cannot be provided behind walls, an additional equivalent fluid pressure of 40 pcf should be added to the values above for both restrained and unrestrained walls for the portion of the wall that will not have drainage. Damp proofing or waterproofing of the walls may be considered where moisture penetration and/or efflorescence are not desired.

13.2 SEISMIC LATERAL EARTH PRESSURES

13.2.1 Below-Grade Warehouse and Parking Garage Walls

The 2022 California Building Code (CBC) states that lateral pressures from earthquakes should be considered in the design of basements and retaining walls. We checked seismic earth pressures for the proposed restrained below-grade warehouse and parking garage walls in accordance with CBC 1803.5.12 and ASCE 7-16 Section 11.8.3 using the design-level earthquake. The below-grade warehouse and parking garage walls appear range up to on the order of 35 to 40 feet high. Because the walls are greater than 12 feet in height, and peak ground accelerations are greater than 0.40g, we checked the result of the seismic increment when added to the recommended active earth pressure against the recommended fixed-wall earth pressures. Based on our analysis, we recommend the basement/lower level warehouse walls be designed for a seismic increment component, a triangular load with a resultant force of $20H^2$ applied one third of the height up from the base of the wall. This seismic increment can also be expressed as an equivalent fluid pressure equal to 40 pcf.

13.2.2 Site Walls

As mentioned, the 2022 CBC states that lateral pressures from earthquakes should be considered in the design of retaining walls. In our opinion, design of minor walls (i.e. walls 6 feet or less in height) for seismic lateral earth pressures in addition to static earth pressures is not warranted. However, site walls appear to range up to about 60 feet high. We recommend site walls greater than 6 feet in height be designed for a seismic increment component equal to a triangular load with a resultant force of $20H^2$ applied one third of the height up from the base of the wall. This seismic increment can also be expressed as an equivalent fluid pressure equal to 40 pcf.

13.3 WALL DRAINAGE

13.3.1 At-Grade Site Walls

Adequate drainage should be provided by a subdrain system behind all walls taller than 30 inches. This system should consist of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with Class 2 Permeable Material per Caltrans Standard Specifications, latest edition. The permeable backfill should extend at least 12 inches out from the wall and to within 2 feet of outside finished grade. Alternatively, ½-inch to ¾-inch crushed rock may be used in place of the Class 2 Permeable Material provided the crushed rock and pipe are enclosed in filter fabric, such as Mirafi 140N or approved equivalent. The upper 2 feet of wall backfill should consist of

compacted on-site soil. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or equivalent drainage matting can be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill. Horizontal strip drains connecting to the vertical drainage matting may be used in lieu of the perforated pipe and crushed rock section. The vertical drainage panel should be connected to the perforated pipe or horizontal drainage strip at the base of the wall, or to some other closed or through-wall system such as the TotalDrain system from AmerDrain. Sections of horizontal drainage strips should be connected with either the manufacturer's connector pieces or by pulling back the filter fabric, overlapping the panel dimples, and replacing the filter fabric over the connection. At corners, a corner guard, corner connection insert, or a section of crushed rock covered with filter fabric must be used to maintain the drainage path.

Drainage panels should terminate 18 to 24 inches from final exterior grade. The Miradrain panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil.

13.3.2 Below-Grade Walls

Miradrain, AmerDrain or other equivalent drainage matting should be used for wall drainage where below-grade walls are temporarily shored and the shoring will be flush with the back of the permanent walls. The drainage panel should be connected at the base of the wall by a horizontal drainage strip and closed or through-wall system such as the TotalDrain system from AmerDrain.

Sections of horizontal drainage strips should be connected with either the manufacturer's connector pieces or by pulling back the filter fabric, overlapping the panel dimples, and replacing the filter fabric over the connection. At corners, a corner guard, corner connection insert, or a section of crushed rock covered with filter fabric must be used to maintain the drainage path. In addition, where drainage panels will connect from a horizontal application to vertical basement wall drainage panels, the drainage path must be maintained.

Drainage panels should terminate 18 to 24 inches from final exterior grade unless capped by hardscape. The drainage panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil. If the shoring system will be offset behind the back of permanent wall, the drainage systems discussed in the "At-Grade Site Walls" section may also be used.

13.4 BACKFILL

Where surface improvements will be located over the retaining wall backfill, backfill placed behind the walls should be compacted to at least 95 percent relative compaction using light compaction equipment. Where no surface improvements are planned, backfill should be compacted to at least 90 percent. If heavy compaction equipment is used, the walls should be temporarily braced.

As discussed previously, consideration should be given to the transitions from on-grade to on-structure. Providing subslabs or other methods for reducing differential movement of flatwork or pavements across this transition should be included in the project design.

13.5 FOUNDATIONS

Retaining walls may be supported on a continuous spread footing. Foundations for retaining walls associated with the warehouse and parking garage should be designed in accordance with the "Foundations" section of this report. We should be retained to supply supplemental foundation recommendations for conventional site retaining walls as the design of the site continues.

13.6 MECHANICALLY STABILIZED EARTH WALLS

Any mechanically stabilized earth (MSE) walls that will be constructed on site should be designed in accordance with the soil parameters in the table below. Where we have shown the requirement for geogrid reinforcing elements as outlined in the "Slope Stability" section and on mitigation Figures 9A through 9E of this report, and where MSE walls will retain more than about 3 feet of soil, requiring geogrid reinforcing elements, we recommend the use of wall systems with pinned connections between blocks, such as Keystone or Versalok wall systems, not just angled blocks that rely on gravity. All walls should be designed to include permeable granular fill behind the walls with an appropriate subdrain that discharges to a free drain outlet.

Table 21: Recommended Soil Parameters – MSE Walls

Wall Location	Material Type	Friction Angle (degrees)	Cohesion (psf)	Soil Moist Unit Weight (pcf)
Northern Walls	Foundation Soil, Reinforced Fill Zone, and Retained Soil	33	150	135
South and Southeast Walls	Foundation Soil and Retained Soil	30	100	125
South and Southeast Walls	Reinforced Fill Zone	33	150	135

The above assumes that the foundation soil, reinforced fill zone, and retained soils for the northern walls and the reinforced fill zone for the south and southeast walls will consist of on-site clayey sand and gravelly soils compacted as engineered fill. On-site clay soils should not be used as backfill within the reinforcing fill zone.

As an alternative to using the on-site sandy soils, imported select fill may be used as the engineered fill behind the wall. Imported select fill should be non-expansive, consisting predominantly of sand and gravel with less than 20 percent passing the No. 200 sieve. The

manufacturer's recommendations should be followed regarding design and construction. We should be retained to review the design calculations, plans, and details for conformance with project requirements and provide additional recommendations.

13.7 SOIL NAIL AND ROCK BOLT WALLS

Tiered rock bolt walls are being proposed by the design team along the west perimeter of the proposed development. Based on site observations and conditions encountered in our explorations and previous explorations by others, the soil and rock conditions will vary along the length of these walls. The table below outlines recommended soil and rock parameters for design, which have been updated to reflect additional evaluation of rock strength based on back calculation of slope stability for existing quarry slopes. The Bedrock Designation for Tiered Retaining Walls, Figure 12, shows approximate sections of wall where the weak and hard bedrock conditions are anticipated to be encountered.

Table 22: Recommended Rock Parameters – Rock Bolt Walls

Soil/Rock Material	Total Unit Weight (pcf)	Angle of Internal Friction (phi)	Cohesion (psf)	Preliminary Ultimate Bond Stress* (psi)
$KJsk_1$ - Weak (more weathered) Franciscan Complex Bedrock	155	32	5,000	110
$KJsk_2$ - Hard (less weathered) Franciscan Complex Bedrock	160	40	7,500	175

**Based on FHWA correlations for sandstone bedrock and cohesionless soil (Table 7, PTI 1996).*

SECTION 14: LIMITATIONS

This report, an instrument of professional service, has been prepared for the sole use of Orchard Partners, LLC specifically to support the design of the Guadalupe Quarry Closure, Annexation and Redevelopment project in Brisbane, California. The opinions, conclusions, and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in Northern California at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred.

Recommendations in this report are based upon the soil and groundwater conditions encountered during our subsurface exploration. If variations or unsuitable conditions are encountered during construction, Cornerstone must be contacted to provide supplemental recommendations, as needed.

Orchard Partners, LLC may have provided Cornerstone with plans, reports and other documents prepared by others. Orchard Partners, LLC understands that Cornerstone reviewed and relied on the information presented in these documents and cannot be responsible for their accuracy.

Cornerstone prepared this report with the understanding that it is the responsibility of the owner or their representatives to see that the recommendations contained in this report are presented to other members of the design team and incorporated into the project plans and specifications, and that appropriate actions are taken to implement the geotechnical recommendations during construction.

Conclusions and recommendations presented in this report are valid as of the present time for the development as currently planned. Changes in the condition of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Therefore, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes beyond Cornerstone's control. This report should be reviewed by Cornerstone after a period of three (3) years has elapsed from the date of this report. In addition, if the current project design is changed, then Cornerstone must review the proposed changes and provide supplemental recommendations, as needed.

An electronic transmission of this report may also have been issued. While Cornerstone has taken precautions to produce a complete and secure electronic transmission, please check the electronic transmission against the hard copy version for conformity.

Recommendations provided in this report are based on the assumption that Cornerstone will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design, and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, Cornerstone cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of Cornerstone's report by others. Furthermore, Cornerstone will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services.

SECTION 15: REFERENCES

Aagaard, B.T., Blair, J.L., Boatwright, J., Garcia, S.H., Harris, R.A., Michael, A.J., Schwartz, D.P., and DiLeo, J.S., 2016, Earthquake outlook for the San Francisco Bay region 2014–2043 (ver. 1.1, August 2016): U.S. Geological Survey Fact Sheet 2016–3020, 6 p., http://dx.doi.org/10.3133/fs20163020.

Alan Kropp & Associates, Inc. 2000. *Geotechnical Investigation, One Quarry Road, Residential Development, Brisbane, California.* November 21.

ATC Hazards by Location, Hazards by Location, 2022, https://hazards.atcouncil.org/.

American Concrete Pavement Association (ACPA, 2006). *Design of Concrete Pavement for Streets and Roads.*

American Concrete Pavement Association (ACPA, 1995). Concrete Pavement for Trucking Facilities.

ASCE 7-16. American Society of Civil Engineers. (2016). *Minimum Design Loads and Associated Criteria for Buildings and Other Structures.*

Berlogar Geotechnical Consultants, 2003. *Geotechnical Investigations of Selected Key Elements, Brisbane Quarry, One Quarry Road, Brisbane, California*. May 5.

Bonilla, M.G., 1998, Preliminary Geologic Map of the San Francisco South 7.5' Quadrangle and Part of the Hunters Point 7.5' Quadrangle. San Francisco Bay Area, California, USGS Open-File Report 98-354, map scale 1:24,000. Jennings and Bryan 2010.

Bonilla, M.G. 1965, Geologic map of the San Francisco South Quadrangle, California. U.S. Geologic Survey Open-File Map Scale 1:20,000.

Brabb, E.E., Graymer, R.W., and Jones, D.L. 1998 *Geology of the onshore part of San Mateo County, California: a digital database*. Open-File Report OF-98-137. Map Scale 1:62,500.

California Building Code, 2022, Structural Engineering Design Provisions, Vol. 2.

California Department of Conservation Division of Mines and Geology, 1998, Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada, International Conference of Building Officials, February, 1998.

California Division of Mines and Geology (2008), "Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117A, September.

California Geological Survey, 2021. Seismic Hazard Zone Report for the San Francisco South 7.5-Minute Quadrangle, San Mateo County, California. SHZR No. 133.

California Geological Survey, 2021. Earthquake Fault Zones (1982) and Seismic Hazard Zones (2021), San Francisco South 7.5-minute Quadrangle: PDF map of Earthquake Zones of Required Investigation, scale 1:24,000
https://maps.conservation.ca.gov/cgs/informationwarehouse/ Accessed 27th of January 2022.

Federal Emergency Management Administration (FEMA), 2012, FIRM San Mateo County Unincorporated Areas, San Bruno Mountain Park, California, Community Map #06081C0041E.

Geocon Consultants, Inc. 2018. Revised Rock Slope Stability Assessment, Guadalupe Valley Quarry, California Mine ID: 91-41-0002, San Mateo County, California. June 5.

GitHub, *usgs/shakemap-scenarios*, 2020, https://github.com/usgs/shakemap-scenarios/tree/master/rupture_sets/BSSC2014.

Google Earth Pro application, various photos from 1985 to 2022.

Jacobs Associates, 2000, Rock Slope Stability Issues Affecting the Feasibility of the Guadalupe Quarry Conversion Plan, Brisbane, CA. February 7.

Jennings, C.W., and Bryant, W.A., 2010, *Fault Activity Map of California*, California Geological Survey Geologic Data Map No. 6, map scale 1:750,000.

Lew, M. et al, 2010, Seismic Earth Pressures on Deep Building Basements, Proceedings, SEAOC Convention, Indian Wells, CA.

Nationwide Environmental Title Research, Historic Aerials by NETR Online, various photos from 1946 to 2020, http://www.historicaerials.com/.

Portland Cement Association, 1984, Thickness Design for Concrete Highway and Street Pavements: report.

Ritter, J.R., and Dupre, W.R., 1972, Map Showing Areas of Potential Inundation by Tsunamis in the San Francisco Bay Region, California: San Francisco Bay Region Environment and Resources Planning Study, USGS Basic Data Contribution 52, Misc. Field Studies Map MF-480.

Schlocker, J., 1974, Geology of the San Francisco North Quadrangle, California: U.S. Geological Survey Professional Paper 782.

State of California Department of Transportation, Highway Design Manual, 2020.

Terrasearch, Inc. 2000, *Geotechnical Investigation on Proposed Residential Development, Guadalupe Quarry, Brisbane, California.* Prepared for Summerhill Homes, January 17.

USGS and CGS, 2006, *Quaternary Fault and Fold Database for the United States*, http://earthquakes.usgs.gov/regional/qfaults/, accessed in August 2017.

USGS, 1988 Distribution and Concentration of Debris Flows and Other Landslides in San Mateo County California. *in* Ellen, S.D., and Wieczorek, G.F., eds., Landslides, floods, and marine effects of the storm of January 3-5, 1982, in the San Francisco Bay region, California, U.S. Geological Survey Professional Paper 1434, p. 1-5. Plate 8, scale 1:62,500.

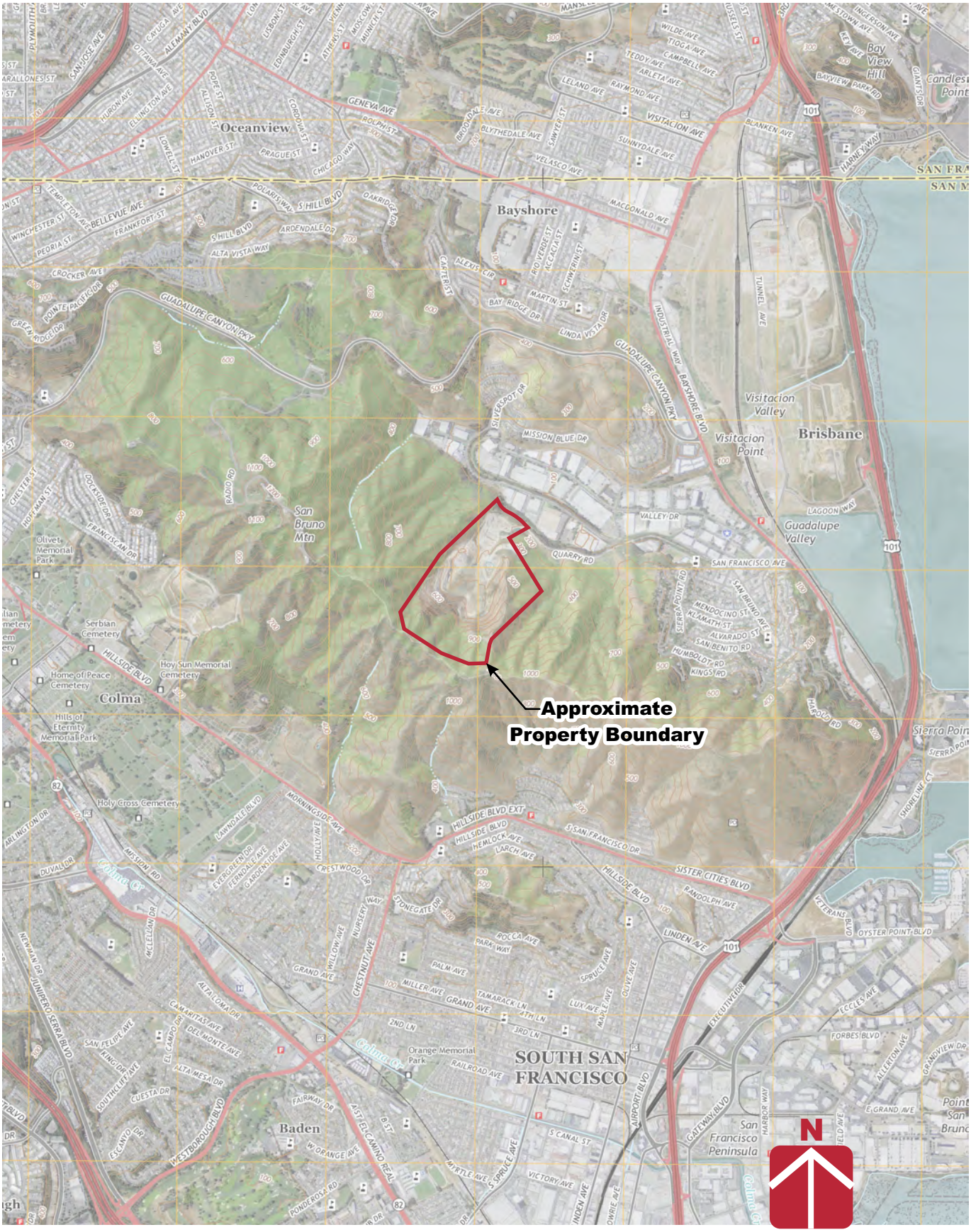
USGS, 1997. Investigation of the San Bruno Fault near the Proposed Extension of the Bay Area Rapid Transit Line from Colma to San Francisco International Airport, San Mateo County, California. USGS Open File Report 97-429.

U.S. Geological Survey, *Unified Hazard Tool*, 2020, https://earthquake.usgs.gov/hazards/interactive/.

U.S. Geological Survey, *Building Seismic Safety Council 2014 Event Set*, ArcGIS Web Application, 2020, https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=14d2f75c7c4f4619936dac0d14e1e468.

U.S. Geological Survey, *USGS Earthquake Hazards Program*, 2020, https://earthquake.usgs.gov/nshmp-haz-ws/apps/spectra-plot.html.

Working Group on California Earthquake Probabilities, 2015, The Third Uniform California Earthquake Rupture Forecast, Version 3 (UCERF), U.S. Geological Survey Open File Report 2013-1165 (CGS Special Report 228). *KMZ files available at:* www.scec.org/ucerf/images/ucerf3_timedep_30yr_probs.kmz.



0 3000 6000

APPROXIMATE SCALE (FEET)

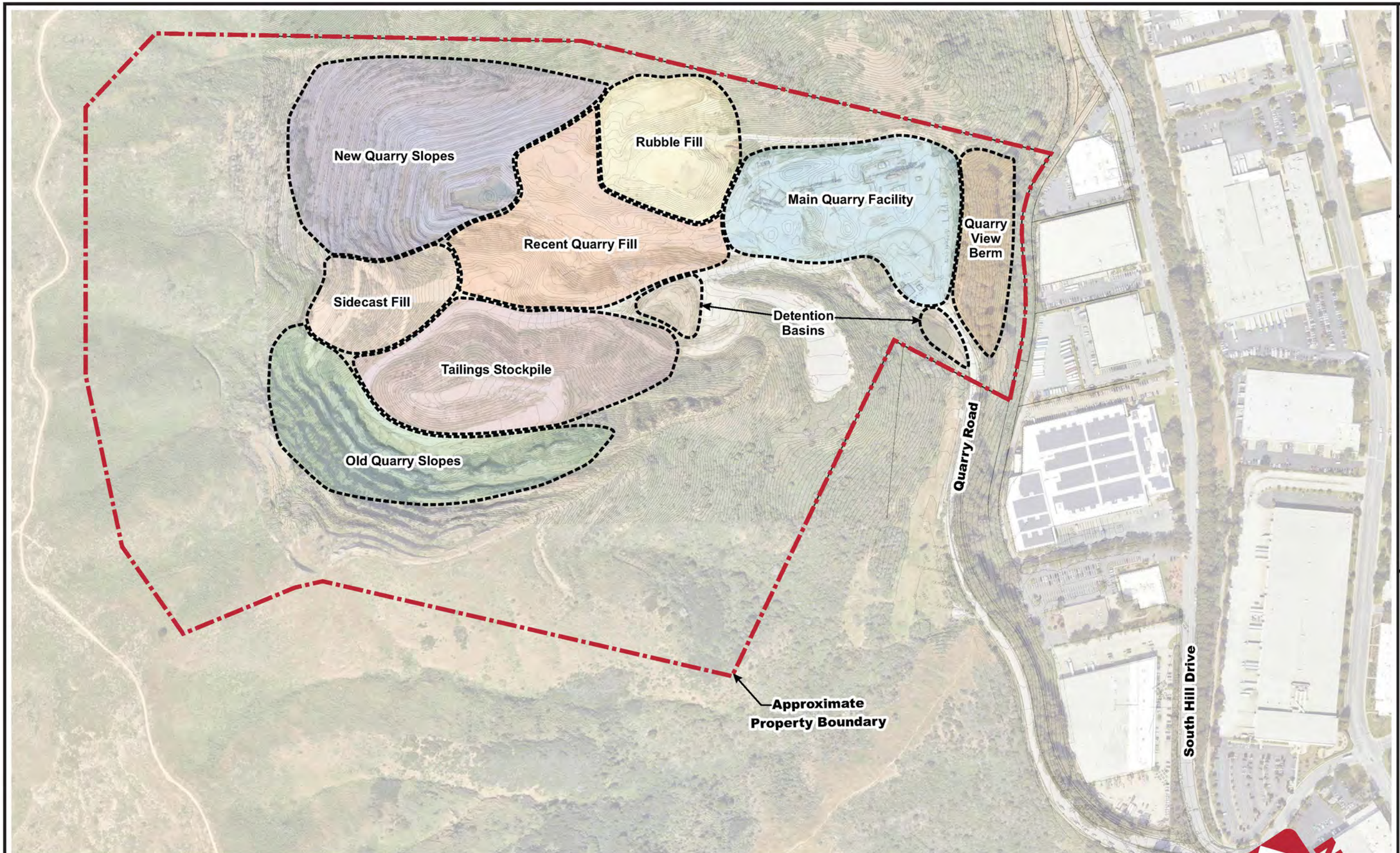
Base: USGS, San Francisco South 7.5'-Minute Quadrangle, California, 2015

CORNERSTONE EARTH GROUP

Vicinity Map

Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

Project Number	582-5-2
Figure Number	Figure 1
Date	July 2023
Drawn By	RRN



Base by Google Earth, dated 04/04/2022
Overlay by Kier + Wright, Existing Topography from Conceptual Grading - RG-1, dated July 2023

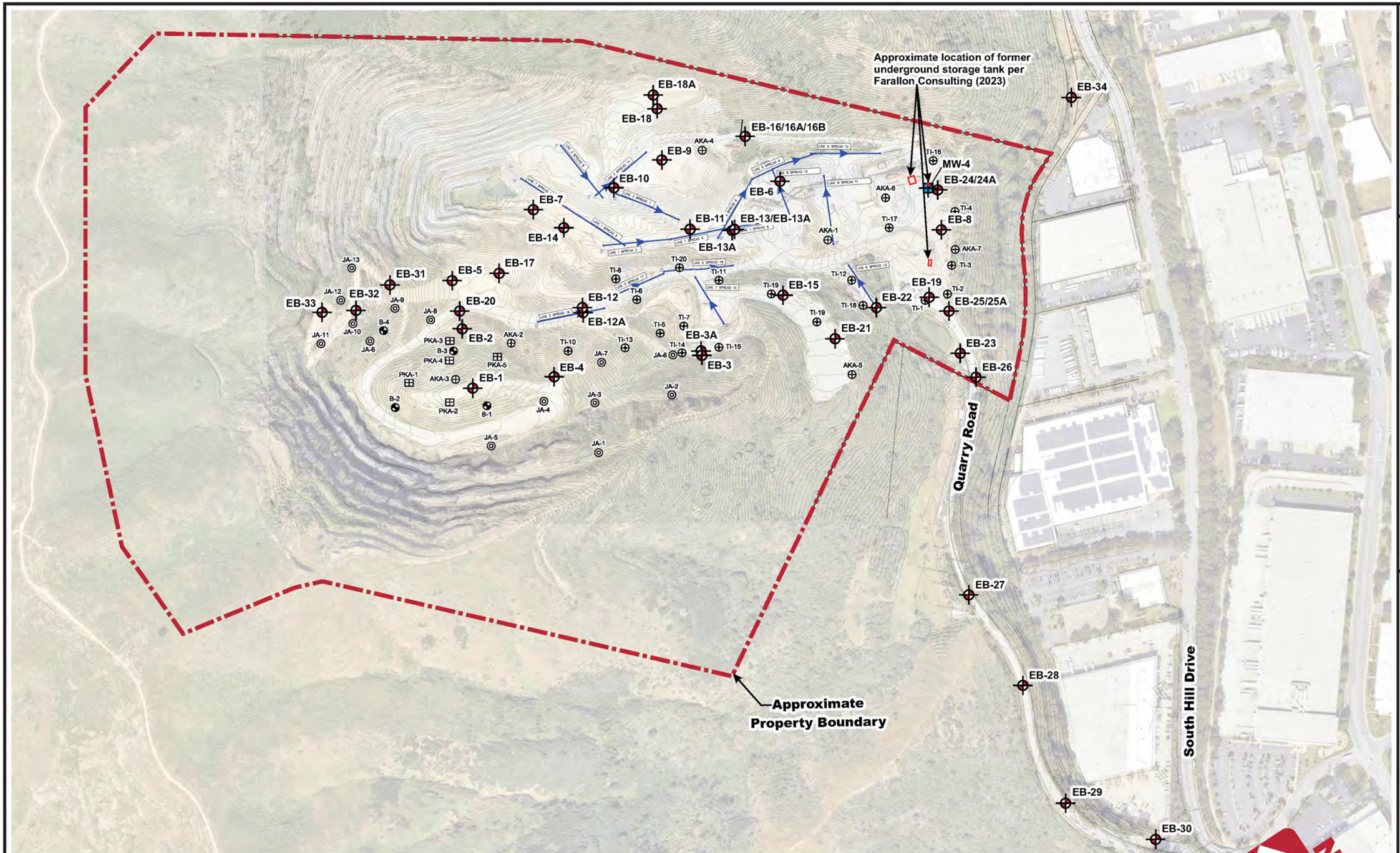
0 350 700
APPROXIMATE SCALE (FEET)

Project Number	582-5-2
Figure Number	Figure 2
Date	July 2023
Drawn By	RRN

Existing Quarry Site Features

Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

CORNERSTONE EARTH GROUP



Legend

- Approximate location of seismic refraction line
- Approximate location of monitoring well (MW) (By others)
- Approximate location of exploratory boring (EB) (Cornerstone, 2021/2022)
- Approximate location of boring (B) (BGC, 3-2003)
- Approximate location of boring (AKA) (Alan Kropp & Associates, 2000)
- Approximate location of boring (JA) (Jacobs Associates, 2000)
- Approximate location of boring (TI) (Terrasearch, 2000)
- Approximate location of boring (PKA) (Peter Kaldveer Associates, 1987)

0 350 700
APPROXIMATE SCALE (FEET)

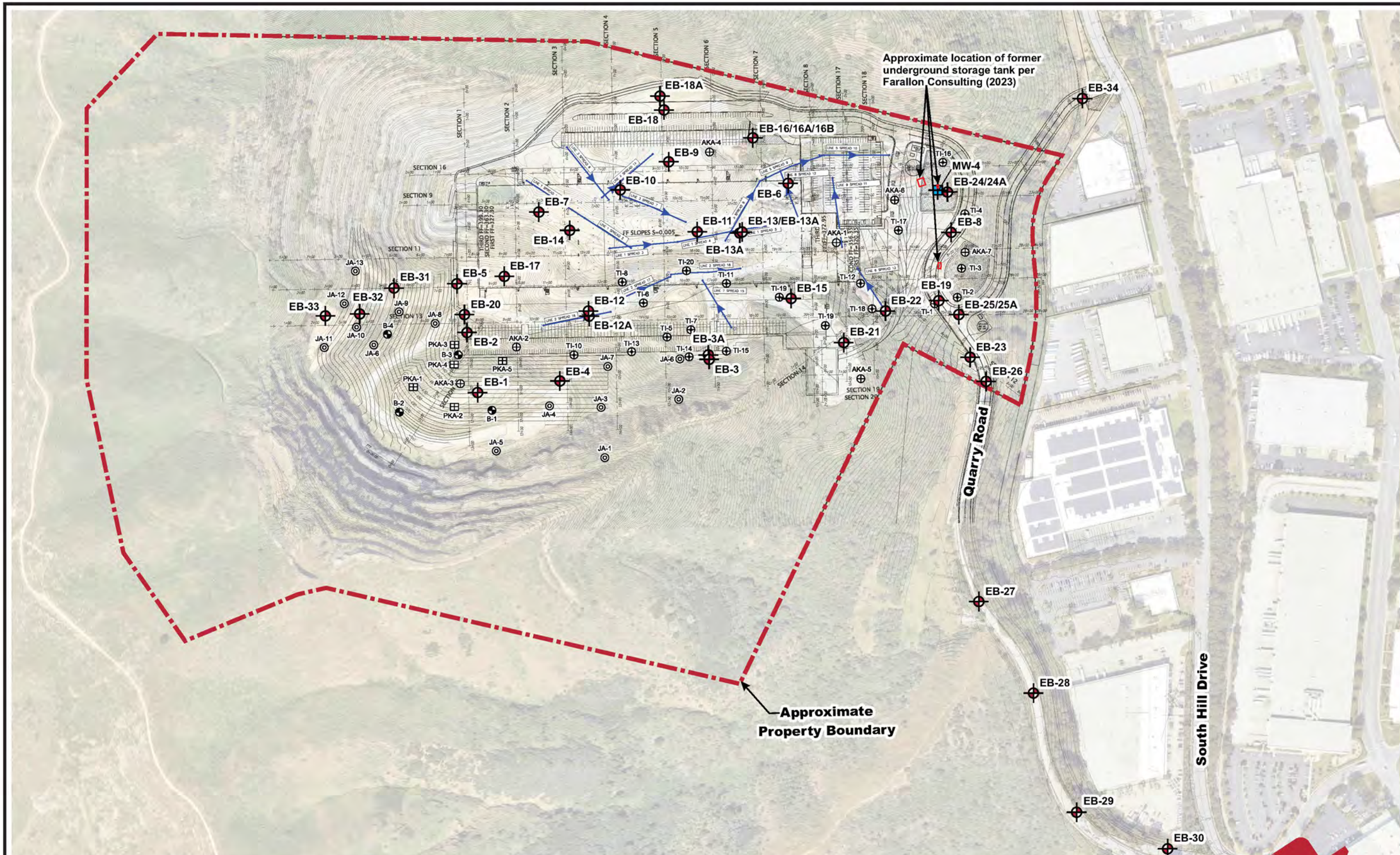
Base by Google Earth, dated 04/04/2022
Overlay by Kier + Wright, Existing Topography from Conceptual Grading - RG-1, dated July 2023

Project Number	582-5-2
Figure Number	Figure 2A
Date	July 2023
Drawn By	RRN

Site Exploration Plan

Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

CORNERSTONE EARTH GROUP



Legend

- Approximate location of seismic refraction line
- Approximate location of monitoring well (MW) (By others)
- Approximate location of exploratory boring (EB) (Cornerstone, 2021/2022)
- B-1 Approximate location of boring (B) (BGC, 3-2003)
- AKA-1 Approximate location of boring (AKA) (Alan Kropp & Associates, 2000)
- JA-1 Approximate location of boring (JA) (Jacobs Associates, 2000)
- TI-2 Approximate location of boring (TI) (Terrasearch, 2000)
- PKA-1 Approximate location of boring (PKA) (Peter Kaldveer Associates, 1987)

0 350 700
APPROXIMATE SCALE (FEET)

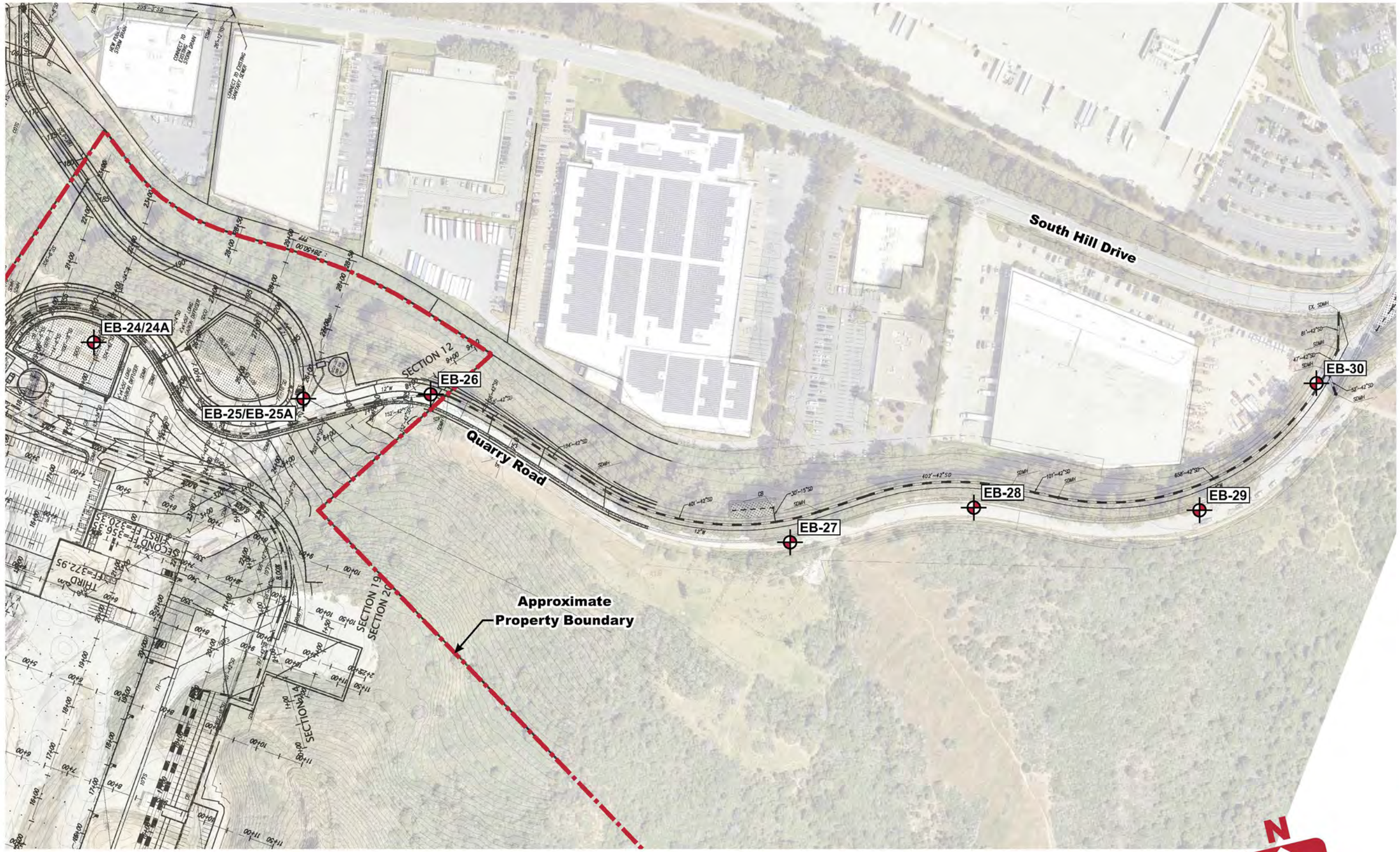
Base by Google Earth, dated 04/04/2022
Overlay by Kier + Wright, Existing Topography from Conceptual Grading - RG-1, dated July 2023

Project Number	582-5-2
Figure Number	Figure 2B
Date	July 2023
Drawn By	RRN

Site Development Plan

Guadalupe Quarry Closure, Annexation and Redevelopment
Brisbane, CA

CORNERSTONE EARTH GROUP



Legend

Approximate location of exploratory boring (EB) (Cornerstone, 2022)

0 200 400

APPROXIMATE SCALE (FEET)

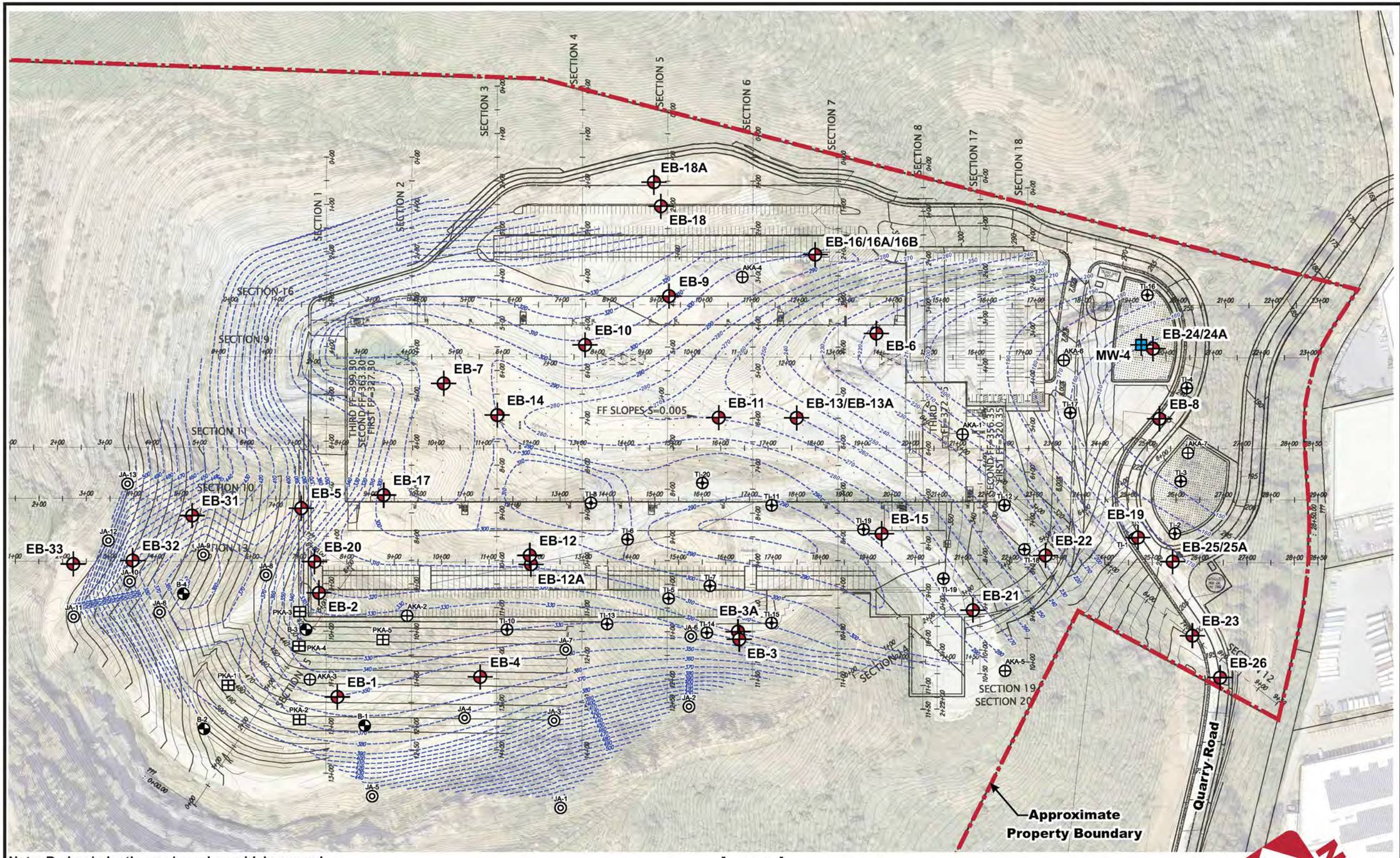
Base by Google Earth, dated 04/04/2022
Overlay by Kier + Wright, Conceptual Grading - RG-1, dated July 2023, and
Kier + Wright, Preliminary Utility Plan - C4.0, dated November 2022

Project Number	582-5-2
Figure Number	Figure 2C
Date	July 2023
Drawn By	RRN

Quarry Road Development Plan

Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

CORNERSTONE EARTH GROUP



Note: Bedrock depths are based on widely spaced exploration and abrupt variations should be anticipated due to historic quarry activities. If more detailed depth to bedrock estimates are required, supplemental exploration should be performed.

Base by Google Earth, dated 04/04/2022
Overlay by Kier + Wright, Conceptual Grading - RG-1, dated July 2023,
Kier + Wright, Bedrock Surface, Sheet 1, dated February 2022

Legend

- 320 — Conceptual top of bedrock elevation contours (feet)
- Approximate location of monitoring well (MW) (By others)
- Approximate location of exploratory boring (EB) (Cornerstone, 2021)
- B-4 — Approximate location of boring (B) (BGC, 3-2003)
- AKA-7 — Approximate location of boring (AKA) (Alan Kropp & Associates, 2000)
- JA-13 — Approximate location of boring (JA) (Jacobs Associates, 2000)
- TI-20 — Approximate location of boring (TI) (Terrasearch, 2000)
- PKA-5 — Approximate location of boring (PKA) (Peter Kaldveer Associates, 1987)

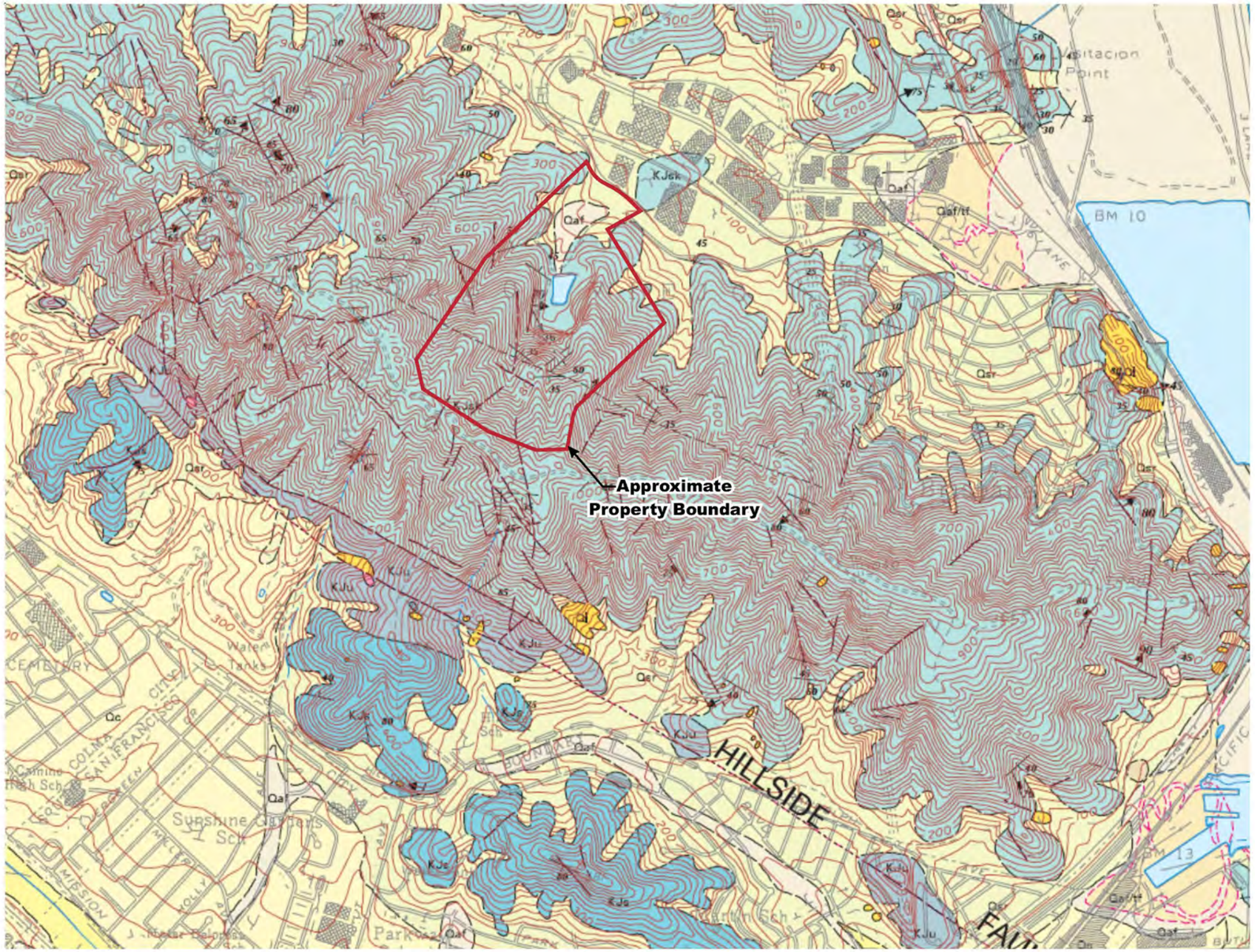
0 200 400
APPROXIMATE SCALE (FEET)

Project Number	582-5-2
Figure Number	Figure 2D
Date	July 2023
Drawn By	RRN

Conceptual Depth to Bedrock Map

Guadalupe Quarry Closure, Annexation and Redevelopment
Brisbane, CA

CORNERSTONE EARTH GROUP



EXPLANATION

GEOLOGIC UNIT DESCRIPTIONS

water

QUATERNARY
Holocene

Qaf Artificial fill
Clay, silt, sand, rock fragments, organic matter, and man-made debris.

Qaf/tf Artificial fill over tidal flat
Clay, silt, sand, rock fragments, organic matter, and man-made debris, placed over tidal flats.

Qafs Artificial fill, Native American shellmound.
Dark silty to sandy soil containing shell fragments and rare intact shells.

Ql Landslide deposits
Composition and structure depend on the geologic formation involved and type of landslide.

Qal Alluvium
Mostly sand and silt but locally contains clay, gravel, or boulders; generally gray to brown.

Pleistocene

Qt Marine terrace deposits
Predominantly friable well sorted fine-grained yellowish-orange to gray sand; includes alluvial gravel and colluvial clay.

Qsr Slope debris and ravine fill
Stony silty to sandy clay; locally silty to clayey sand or gravel; yellowish-orange to medium gray, unstratified or poorly stratified. Where it overlies the Merced or Colma Formation it is commonly a silty to clayey sand, or gravel.

Qc Colma Formation
In northwest and central parts of area, friable well sorted fine to medium sand containing a few beds of sandy silt, clay, and gravel. In southeast part of area, mostly sandy clay and silty sand, yellowish orange to gray.

CRETACEOUS AND JURASSIC
Franciscan Complex and associated rocks

KJs Sandstone and shale
Interbedded sandstone and shale, hard where fresh and intact, soft where weathered or sheared. Commonly medium dark gray where fresh, olive gray to yellowish brown where moderately weathered, and yellowish orange to yellowish gray where highly weathered.

KJsk Sandstone and shale
Sandstone generally containing more than two percent potassium feldspar.

KJc Chert
Hard chert interbedded with firm shale; chert layers generally two or three inches thick, shale layers less than one inch thick; generally grayish red.

KJg Greenstone
Altered volcanic rocks, fine grained, mostly basalt; hard where fresh, but weathered and firm to soft in most exposures; commonly grayish olive to moderate olive gray where moderately weathered, dark yellowish orange to light brown where highly weathered.

KJm Metamorphic rocks
Hard to firm, fine-to coarse-grained schistose, gneissose, or granulose metamorphic rocks; dark gray, dark greenish gray, or dark bluish gray.

sp Serpentine
Hard to soft, generally greenish gray; contains small bodies of grabbro and diabase.

KJu Sheared rocks
Small to large fragments of hard rock in matrix of sheared rock. Matrix generally coherent and firm, but soft in places, especially where weathered. Dark gray where fresh, yellowish brown where weathered. Derived mostly from shale and sandstone of Franciscan Complex and serpentine.

Contact, certain
Contact, approximately located
Contact, concealed
Contact, gradational or inferred
Fault, certain
Fault, approximately located
Fault, concealed
Fault, concealed, queried
Fault, inferred

Anticline, certain
Anticline, approximately located
Syncline, approximately located
Monocline, approximately located

Bedding
Approximate bedding
Horizontal bedding
Vertical bedding
Fault attitude
Foliation
Foreset beds
Joint

N

0 1500 3000
APPROXIMATE SCALE (FEET)

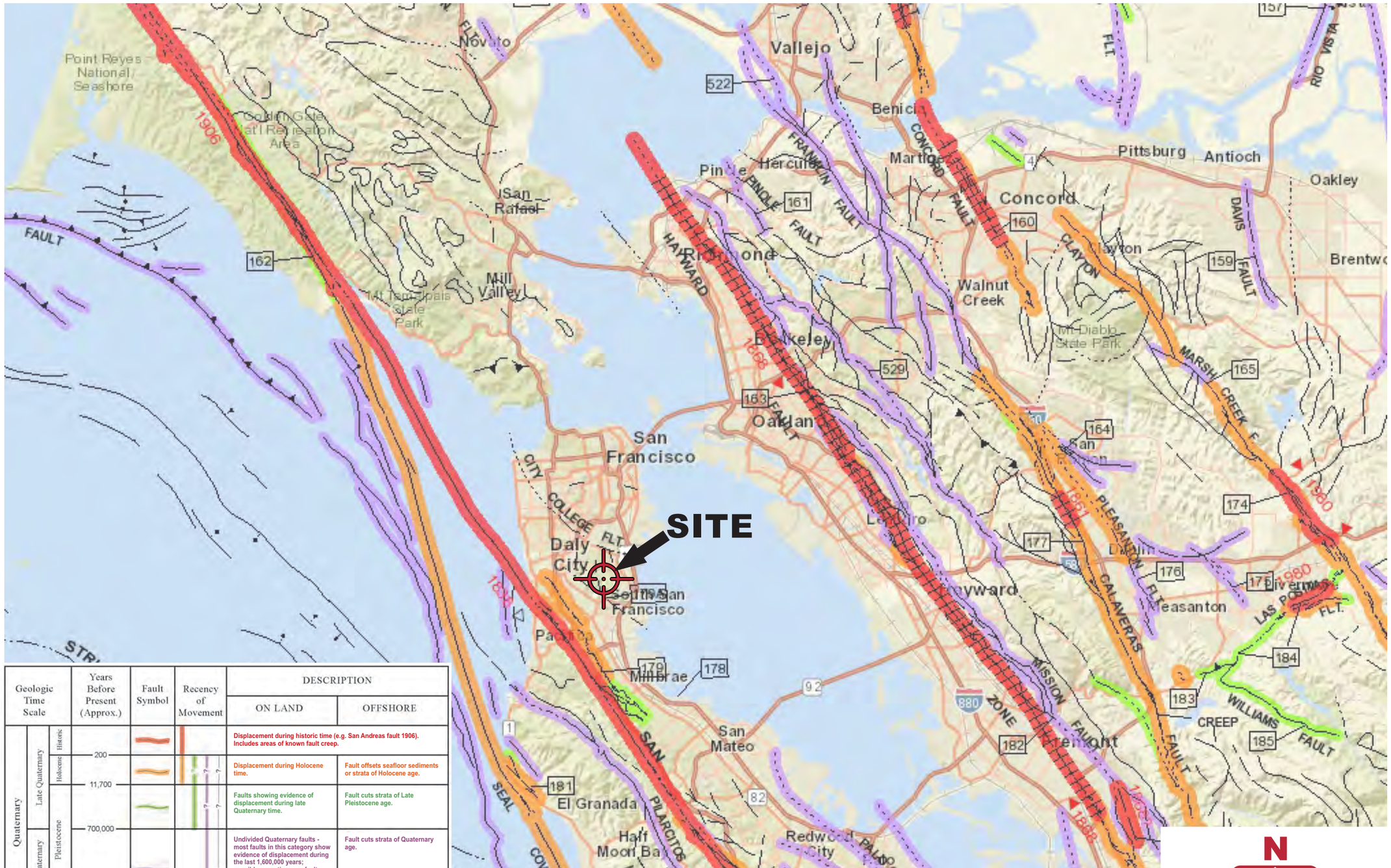
Base: Bonilla, 1998 USGS Open-File Report 98-354

Project Number	582-5-2
Figure Number	Figure 3
Date	July 2023
Drawn By	RRN

Regional Geologic Map

Guadalupe Quarry Closure, Annexation and Redevelopment
Brisbane, CA

CORNERSTONE EARTH GROUP



Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION: ON LAND	DESCRIPTION: OFFSHORE
Quaternary	Late Quaternary	Historic	200			Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
		Holocene	11,700		? ?	Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
		Pleistocene	700,000		? ?	Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
	Early Quaternary		1,600,000'		?	Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Pilo-Pleistocene age.	Fault cuts strata of Quaternary age.
Pre-Quaternary			4.5 billion (Age of Earth)			Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.

Base by California Geological Survey - 2010 Fault Activity Map of California (Jennings and Bryant, 2010)

N

0 5 10

APPROXIMATE SCALE (MILES)

Project Number: 582-5-2

Figure Number: Figure 4

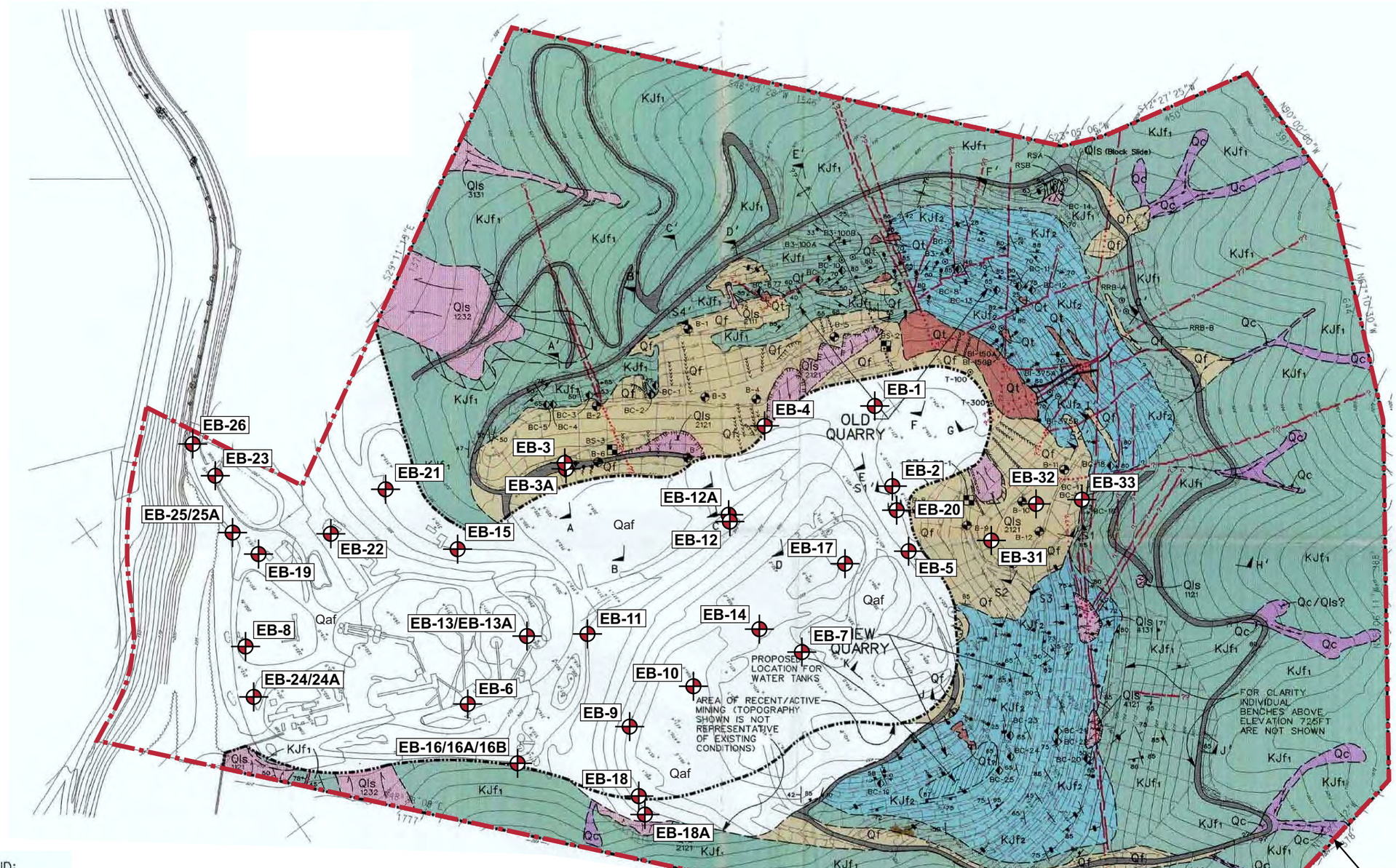
Drawn By: RRN

Date: July 2023

Regional Fault and Activity Map

Guadalupe Quarry Closure, Annexation and Redevelopment
Brisbane, CA

CORNERSTONE EARTH GROUP



LEGEND:

GEOLOGIC UNITS

- Qf - Artificial Fill
- Qaf - Undocumented Quarry Fill
- Qt - Talus
- Qc - Colluvium
- Qls - Landslide Deposit (See Key to Landslide Classification)
- KJf1 - Moderately to highly weathered Franciscan Complex Bedrock
- KJf2 - Slightly to moderately weathered Franciscan Complex Bedrock

Approximate location of exploratory boring (EB) (Cornerstone, 2021/2022) within main quarry area

SYMBOLS

- Study Area Boundary
- Geologic Contact - dashed where approximate dotted where concealed queried where uncertain
- Fault - dashed where approximate dotted where concealed queried where uncertain
- Fill slope (hatchures point downslope)
- Cut slope (hatchures point downslope)
- 70 Strike and dip of bedding
- Strike of vertical bedding
- 45 Strike and dip of jointing
- Strike of vertical jointing
- 60 Strike and dip of fault
- Axis of anticline
- Axis of syncline
- Dike
- Seeps, springs or wet areas
- Normal Scarp (hatchures point toward down-dropped side)
- Seasonal drainage path (approximate)
- Unpaved Access Road
- Closed depression
- Erosion rills
- C — C' Location of geologic cross section
- S2 — S2' Location of seismic refraction profile
- B-4 Location of exploratory boring
- BS-1 Location of bulk soil sample
- T-100 Location of rock sample subjected to unconfined compressive strength test (sample number indicated)
- BC-2 Location of rock slope failure back-calculation

KEY TO LANDSLIDE MAPPING AND CLASSIFICATION

Qls 2231

- Landslide (of mappable extent)
  - Scarp/hatchures indicate source area
  - Arrows indicate general direction of motion
- Predominate failure mechanism: 1 - slump-flow complex; 2 - debris slide; 3 - debris flow; 4 - rotational slide
- State of activity: 1 - active or recently active; 2 - dormant
- Estimated maximum depth of deposit: 1 - less than 5 feet; 2 - 5 to 15 feet; 3 - greater than 15 feet
- Certainty of identification: 1 - definite; 2 - probable; 3 - uncertain

0 300 600

APPROXIMATE SCALE (FEET)

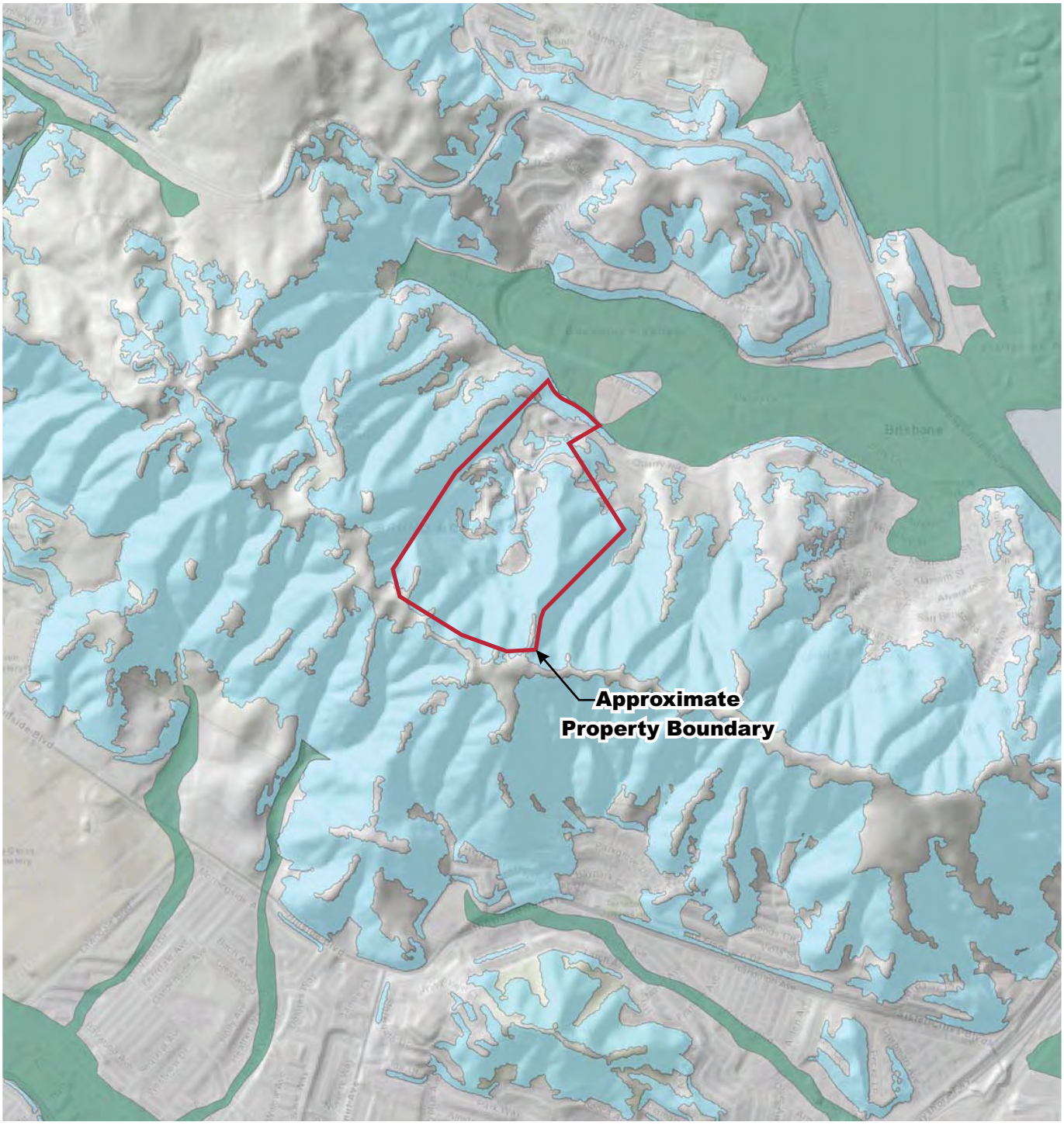
Base by Jacobs Associates (2000) and adopted by (Geocon, 2018)

Project Number	Figure Number	Date	Drawn By
582-5-2	Figure 5	July 2023	RRN

Site Geologic Map

Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

CORNERSTONE EARTH GROUP



Explanation

Liquefaction

Areas where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslides

Areas where previous occurrence on landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

N

0 2000 4000

APPROXIMATE SCALE (FEET)

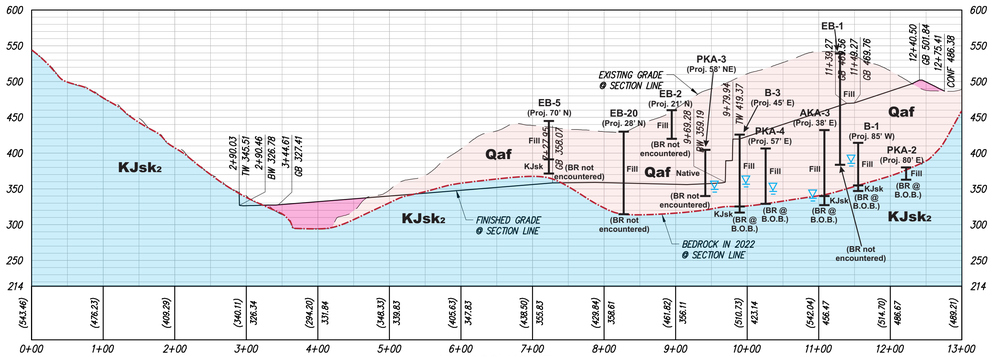
Base: CGS, Earthquake Zones of Required Investigation
San Francisco South 7.5' Minute Quadrangle

CORNERSTONE EARTH GROUP

Geologic Hazard Map

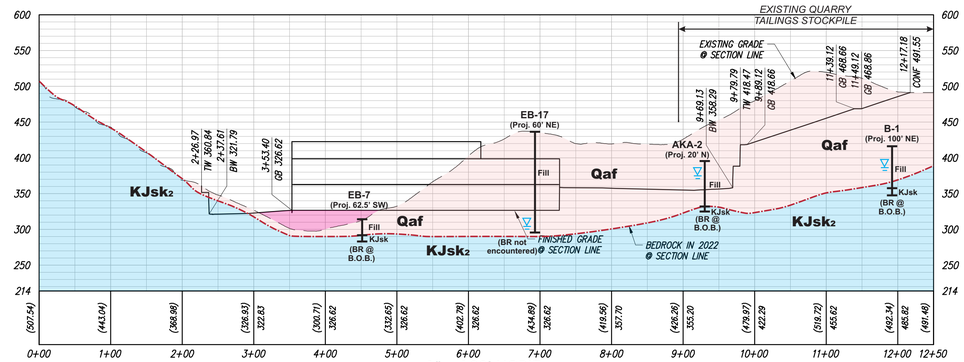
Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

Project Number	582-5-2
Figure Number	Figure 6
Date	July 2023
Drawn By	RRN



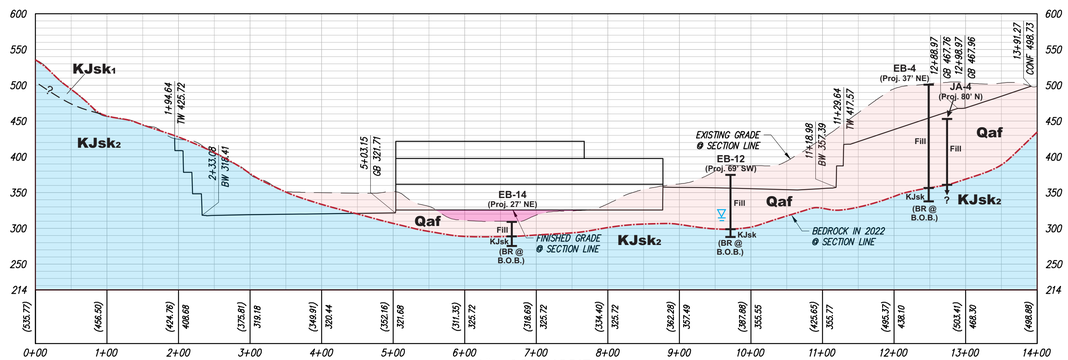
1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 1



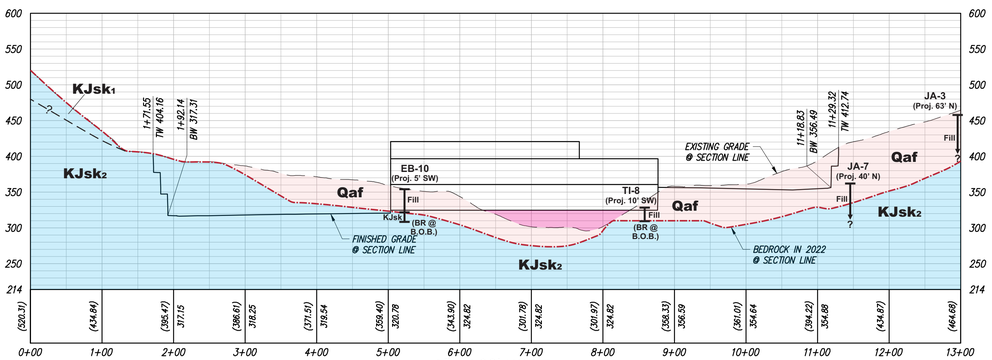
1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 2



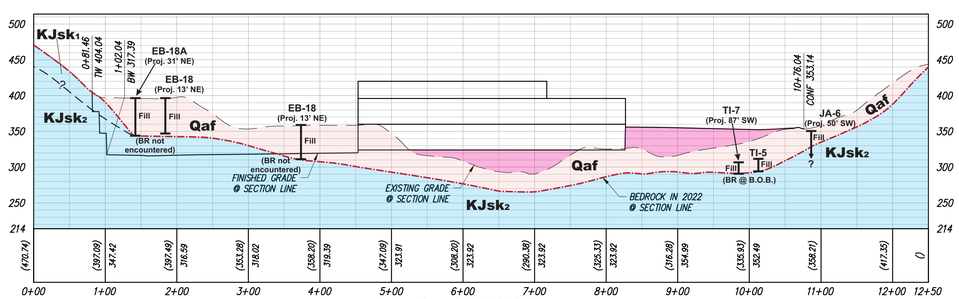
1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 3



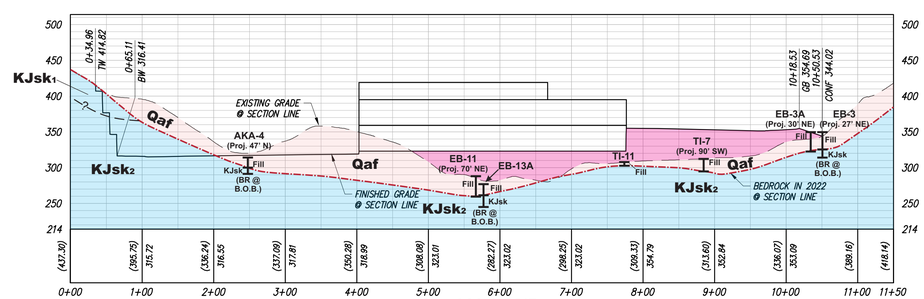
1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 4



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 5



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 6

Explanation

Geologic Units

Qaf	Existing quarry fill
Qal	Alluvial soil
KJsk₁	Moderately to highly weathered Franciscan Complex Bedrock
KJsk₂	Slightly to Moderately weathered Franciscan Complex Bedrock

Symbols

- Geologic Contact (dashed where approximate; queried where uncertain)
- Approximate ground water depth at time of drilling; actual depth may vary
- Existing quarry fills, stockpiles
- Proposed fills
- Bedrock

Notes:
1) The depth to bedrock depicted may vary from actual depths encountered in explorations due to horizontal offset and changes over short distances. Depth to bedrock based on engineering judgment between borings.
2) The subsurface profile is conceptual and is based on limited subsurface data obtained from widely spaced borings. Actual subsurface conditions may vary significantly between borings.
3) See Figure 2B for location of cross section.

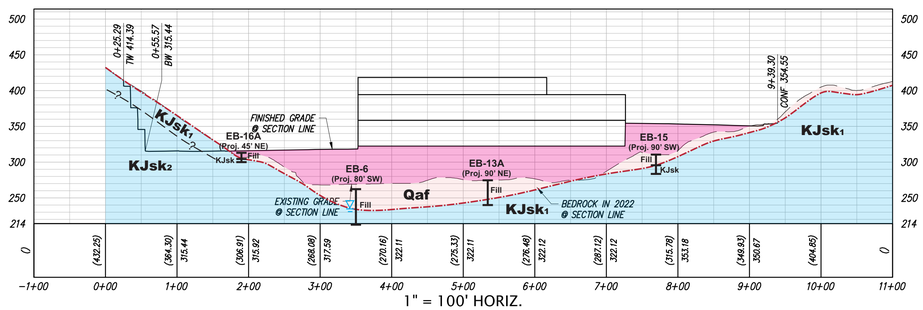
Base by Kier & Wright, Site Sections - RG-2, dated February 2023

Project Number	582-5-2
Figure Number	Figure 7A
Date	July 2023
Drawn By	RRN

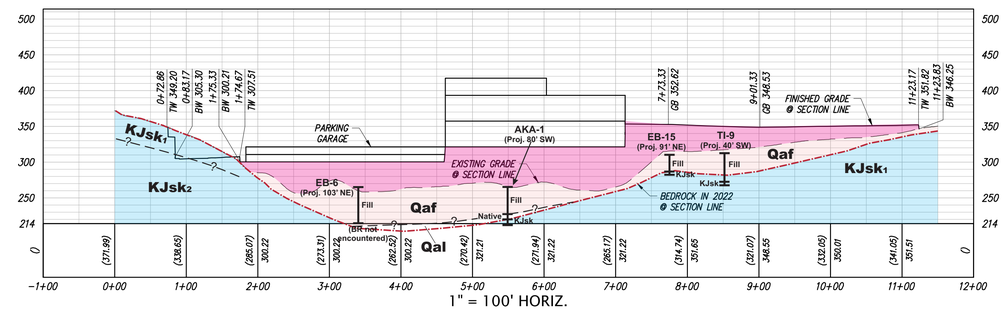
Generalized Cross Sections 1-6

Guadalupe Quarry Closure, Annexation and Redevelopment
Brisbane, CA

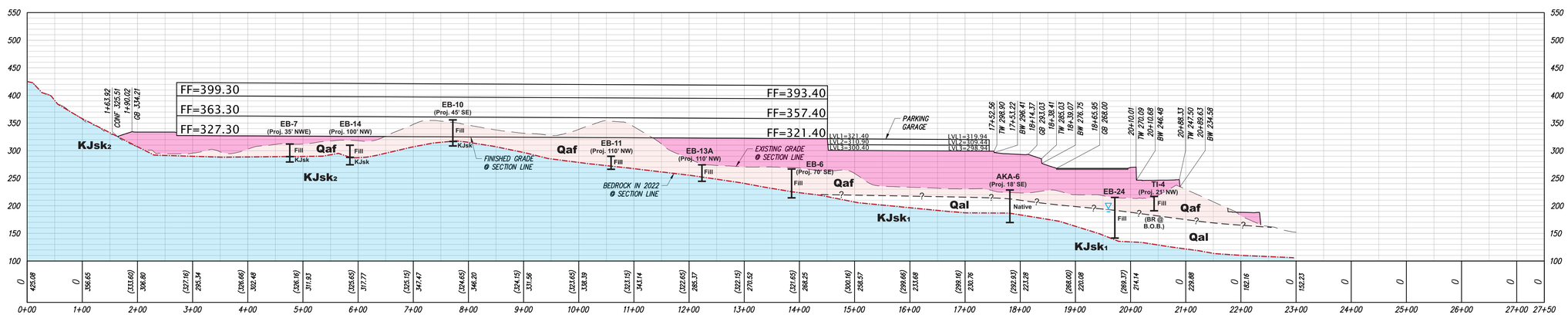
CORNERSTONE EARTH GROUP



SECTION 7



SECTION 8



SECTION 9

Explanation

Geologic Units

Qaf	Existing quarry fill
Qal	Alluvial soil
$KJsk_1$	Moderately to highly weathered Franciscan Complex Bedrock
$KJsk_2$	Slightly to Moderately weathered Franciscan Complex Bedrock

Symbols

- Geologic Contact (dashed where approximate; queried where uncertain)
- Approximate ground water depth at time of drilling; actual depth may vary
- Existing quarry fills, stockpiles
- Proposed fills
- Bedrock

Notes:
1) The depth to bedrock depicted may vary from actual depths encountered in explorations due to horizontal offset and changes over short distances. Depth to bedrock based on engineering judgment between borings.
2) The subsurface profile is conceptual and is based on limited subsurface data obtained from widely spaced borings. Actual subsurface conditions may vary significantly between borings.
3) See Figure 2B for location of cross section.

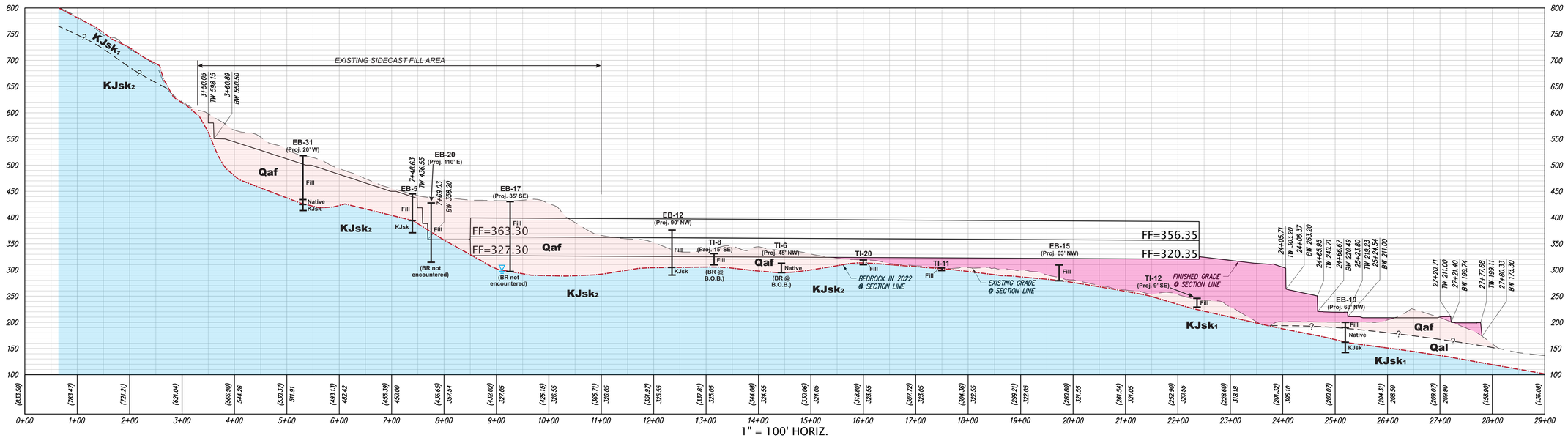
Base by Kier & Wright, Site Sections - RG-3, dated July 2023

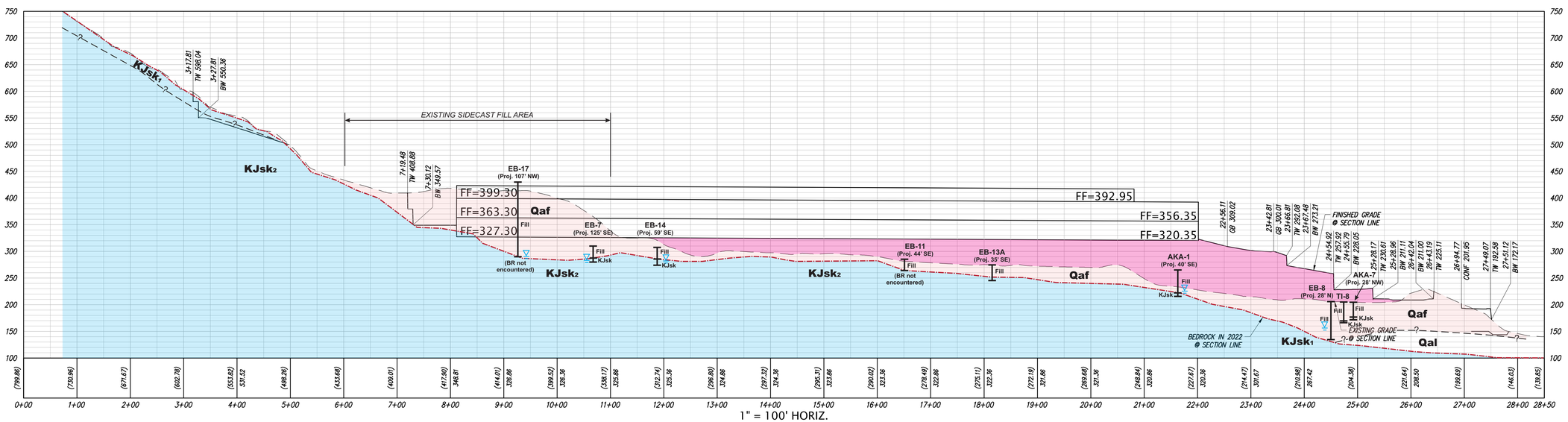
Project Number	582-5-2
Figure Number	Figure 7B
Date	July 2023
Drawn By	RRN

Generalized Cross Sections 7-9

Guadalupe Quarry Closure, Annexation and Redevelopment
Brisbane, CA

CORNERSTONE EARTH GROUP





Explanation

Geologic Units

Qaf	Existing quarry fill
Qal	Alluvial soil
KJsk1	Moderately to highly weathered Franciscan Complex Bedrock
KJsk2	Slightly to Moderately weathered Franciscan Complex Bedrock

Symbols

- Geologic Contact (dashed where approximate; queried where uncertain)
- Approximate ground water depth at time of drilling; actual depth may vary
- Existing quarry fills, stockpiles
- Proposed fills
- Bedrock

Notes:
1) The depth to bedrock depicted may vary from actual depths encountered in explorations due to horizontal offset and changes over short distances. Depth to bedrock based on engineering judgment between borings.
2) The subsurface profile is conceptual and is based on limited subsurface data obtained from widely spaced borings. Actual subsurface conditions may vary significantly between borings.
3) See Figure 2B for location of cross section.

Base by Kier & Wright, Site Sections - RG-4, dated February 2023

Project Number 582-5-2

Figure Number Figure 7C

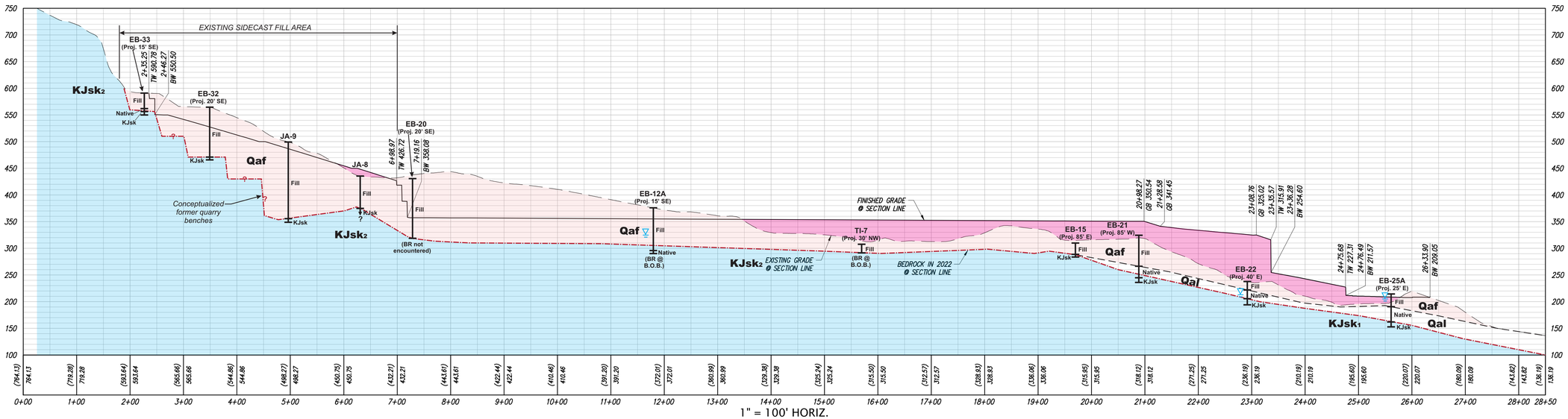
Date July 2023

Drawn By RRN

Generalized Cross Sections 10 & 11

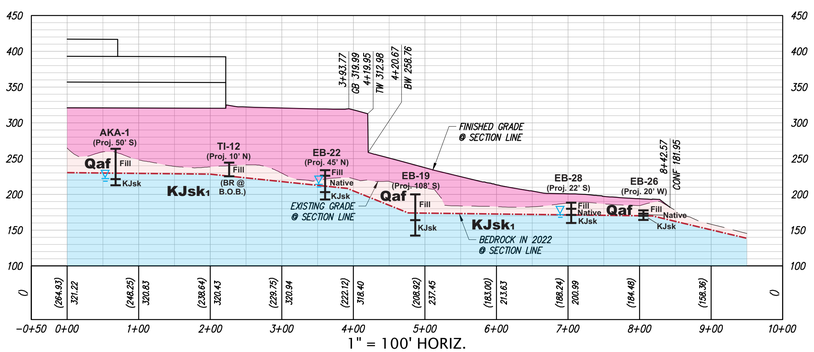
Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

CORNERSTONE EARTH GROUP



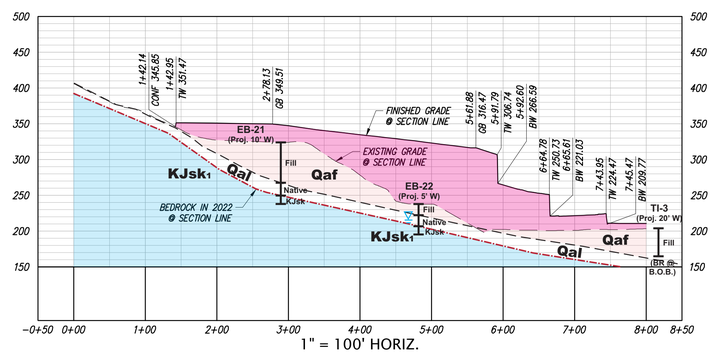
1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 13



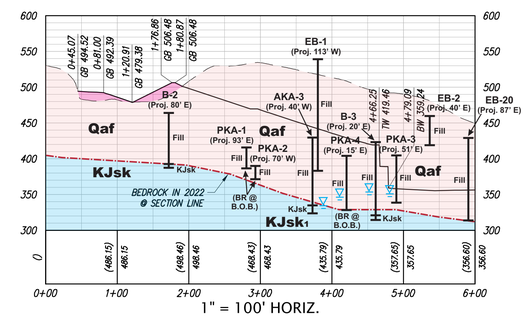
1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 12



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 14



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 15

Explanation

Geologic Units

Qaf	Existing quarry fill
Qal	Alluvial soil
$KJsk_1$	Moderately to highly weathered Franciscan Complex Bedrock
$KJsk_2$	Slightly to Moderately weathered Franciscan Complex Bedrock

Symbols

- Geologic Contact (dashed where approximate; queried where uncertain)
- Approximate ground water depth at time of drilling; actual depth may vary
- Existing quarry fills, stockpiles
- Proposed fills
- Bedrock

Notes:
1) The depth to bedrock depicted may vary from actual depths encountered in explorations due to horizontal offset and changes over short distances. Depth to bedrock based on engineering judgment between borings.
2) The subsurface profile is conceptual and is based on limited subsurface data obtained from widely spaced borings. Actual subsurface conditions may vary significantly between borings.
3) See Figure 2B for location of cross section.

Base by Kier & Wright, Site Sections - RG-5, dated February 2023

Project Number 582-5-2

Figure Number Figure 7D

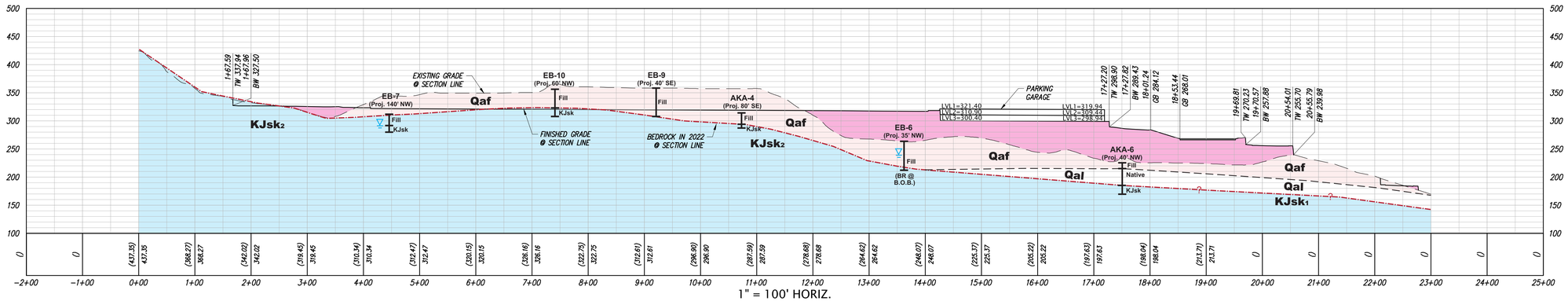
Date July 2023

Drawn By RRN

Generalized Cross Sections 12-15

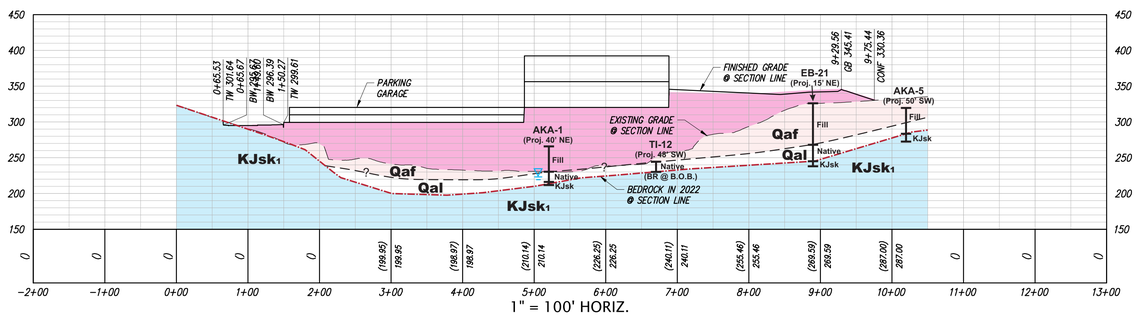
Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

CORNERSTONE EARTH GROUP



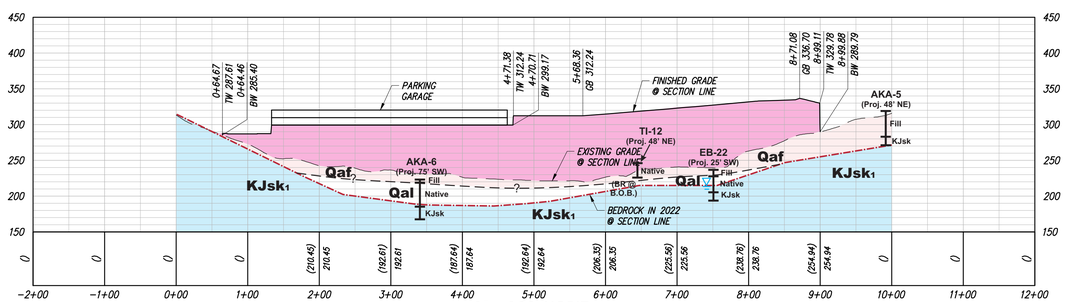
1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 16



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 17



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 18

Explanation

Geologic Units

Qaf	Existing quarry fill
Qal	Alluvial soil
$KJsk_1$	Moderately to highly weathered Franciscan Complex Bedrock
$KJsk_2$	Slightly to Moderately weathered Franciscan Complex Bedrock

Symbols

—?— — —	Geologic Contact (dashed where approximate; queried where uncertain)
▽	Approximate ground water depth at time of drilling; actual depth may vary
	Existing quarry fills, stockpiles
	Proposed fills
	Bedrock

Notes:
1) The depth to bedrock depicted may vary from actual depths encountered in explorations due to horizontal offset and changes over short distances. Depth to bedrock based on engineering judgment between borings.
2) The subsurface profile is conceptual and is based on limited subsurface data obtained from widely spaced borings. Actual subsurface conditions may vary significantly between borings.
3) See Figure 2B for location of cross section.

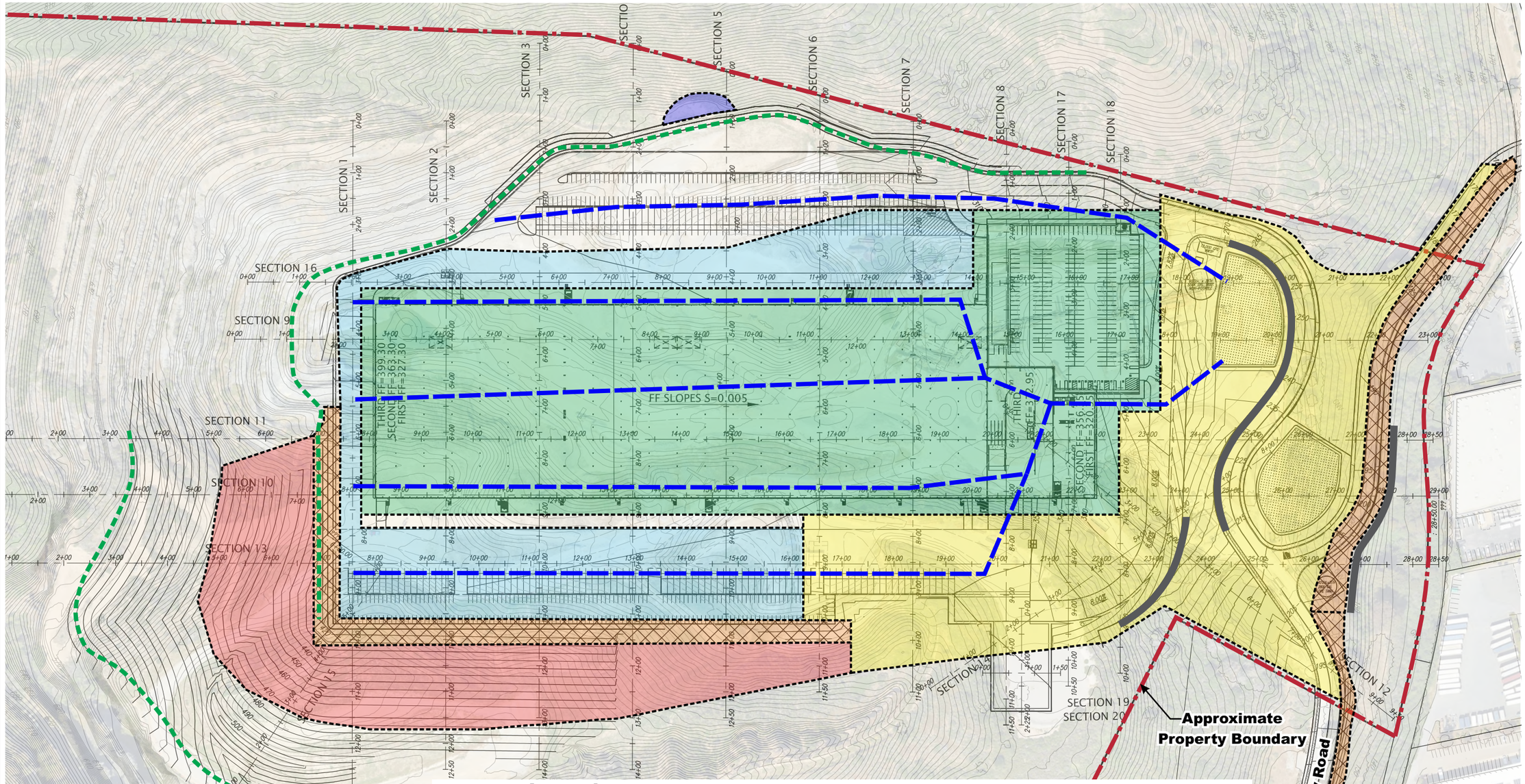
Base by Kier & Wright, Site Sections - RG-6, dated July 2023

Project Number 582-5-2
Figure Number Figure 7E
Date July 2023
Drawn By RRN

Generalized Cross Sections 16-18

Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

CORNERSTONE EARTH GROUP



Legend

- Approximate lateral extent of in-situ densification of undocumented fill using deep dynamic compaction (DDC); maximum 30 foot thick densification depth
- Approximate lateral extent of existing undocumented fill over-excavation prior to new fill placement using conventional earthwork equipment
- Approximate lateral extent of 5 foot deep fill over-excavation below planned finished grades, where present, for parking and truck apron pavement areas
- Approximate lateral extent of primary keyway for buttress fill
- Approximate lateral extent of existing sidecast or tailings fill over-excavation prior to fill placement for new buttress using conventional earthwork equipment
- Approximate lateral extent of old landslide stabilization prior to tiered retaining wall construction
- Approximate lateral extent of ground Improvement for MSE retaining wall global stability mitigation: Grouted Displacement or Soil-Cement Columns extending to approximately 50 to 90 feet below bottom of wall and spaced at approximately 5 ft on center; two to three rows of columns depending on type of ground improvement selected by contractor. Actual depth and spacing to be confirmed once grading plans are finalized. See Figures 9A-9E for approximate limit of global stability ground improvement.
- Approximate lateral extent of perforated subdrain to control perched water levels in planned engineered fills; schedule 40 PVC pipe at least 6 inches in diameter for laterals and 8 to 12 inch diameter for trunk lines. All subdrains to conned to solid PVC discharge pipe to free draining outlet as determined by the civil engineer. Deep subdrains to be constructed after completion of Deep Dynamic Compaction mitigation.
- Approximately lateral extent of conceptual rockfall hazard mitigation consisting of Geobrugg rackfall barriers, rockfall embankments, debris catchment fences, and wire rope slope stabilization mesh per conceptual design by Kane Geotechnical (2022). Refer to Appendix E. Final design to be completed once grading and retaining wall plans have been finalized.

0 200 400
APPROXIMATE SCALE (FEET)

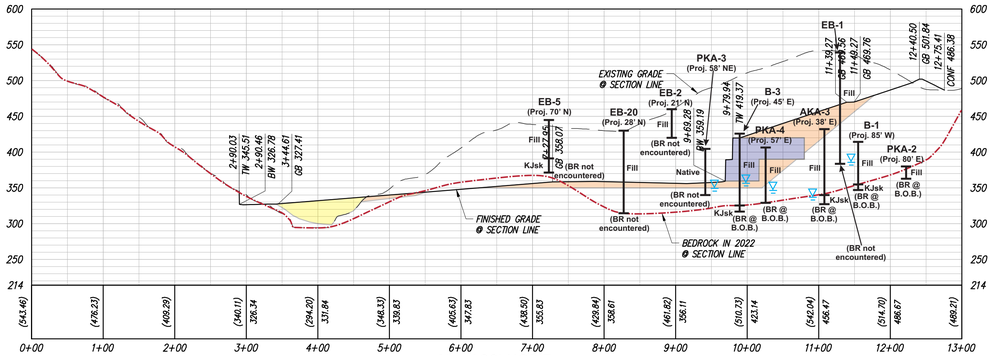
Base by Google Earth, dated 04/04/2022
Overlay by Kier + Wright, Conceptual Grading - RG-1, dated July 2023

Project Number	582-5-2
Figure Number	Figure 8
Date	April 2024
Drawn By	RRN

Proposed Mitigation Plan

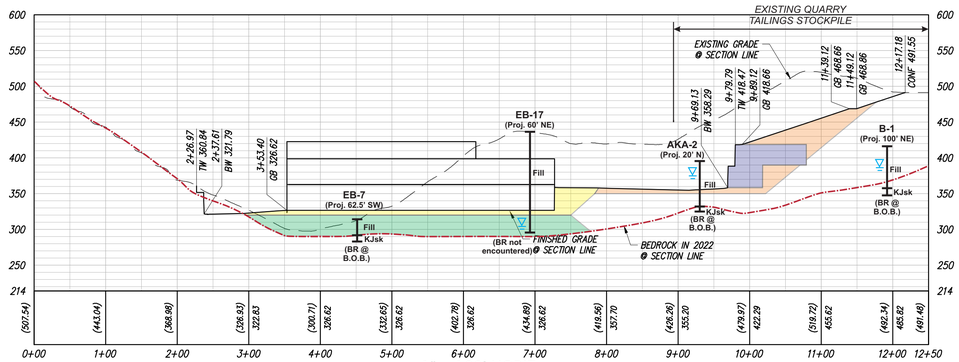
Guadalupe Quarry Closure, Annexation and Redevelopment
Brisbane, CA

CORNERSTONE EARTH GROUP



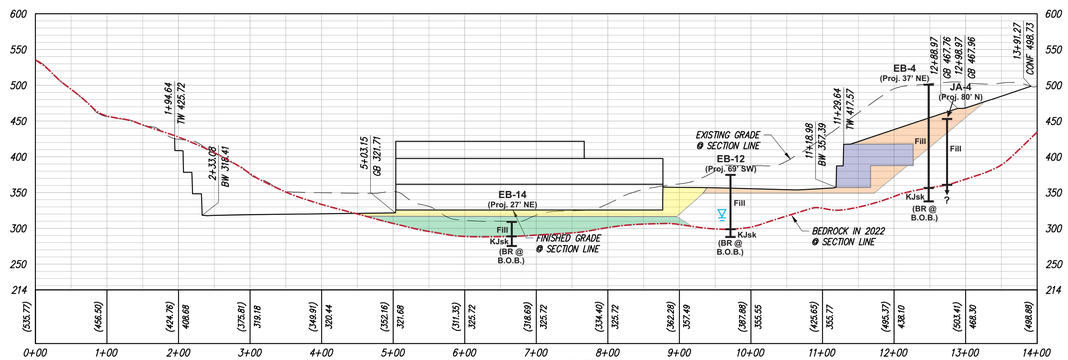
1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 1



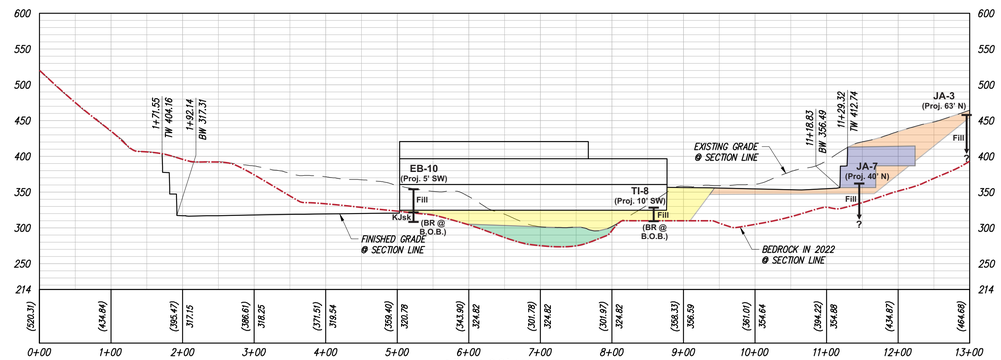
1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 2



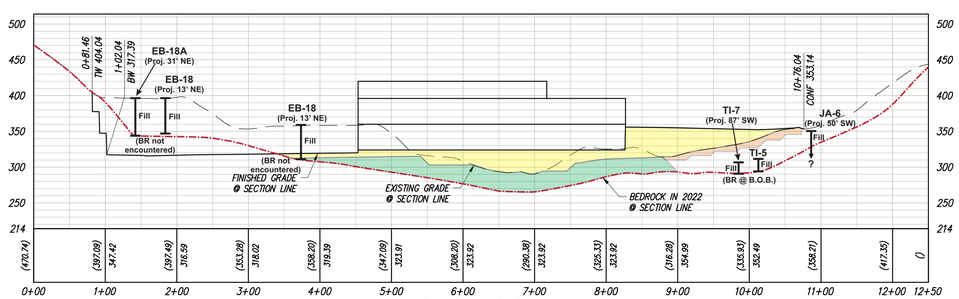
1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 3



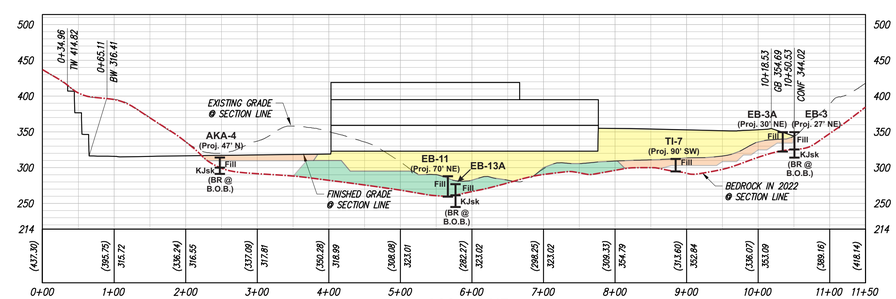
1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 4



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 5



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 6

Geogrid Reinforcing for Global Stability: Miragrid 20XT or approved equivalent at approximately 5 ft vertical spacing; final length and spacing to be confirmed once grading plans are finalized

Approximate lateral extent of engineered fill compacted with conventional grading equipment

Approximate lateral extent of undocumented fill, colluvial soil or bedrock over-excavation and re-compaction

Approximate extent of existing quarry fill to be exposed and densified using deep dynamic compaction (based on 30-foot thick maximum densification depth)

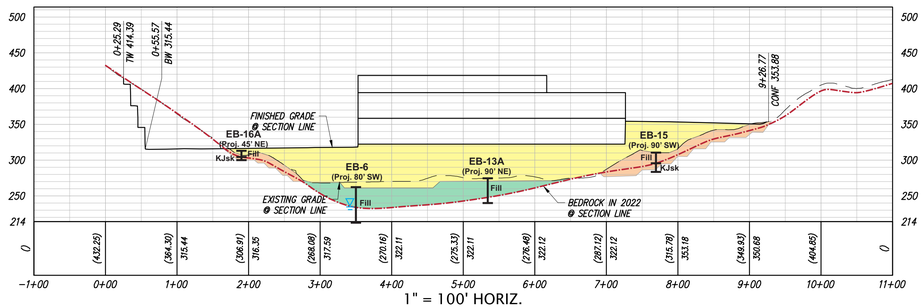
Base by Kier & Wright, Site Sections - RG-2, dated February 2023

Project Number	582-5-2
Figure Number	Figure 9A
Date	April 2024
Drawn By	RRN

Proposed Mitigation Cross Sections 1-6

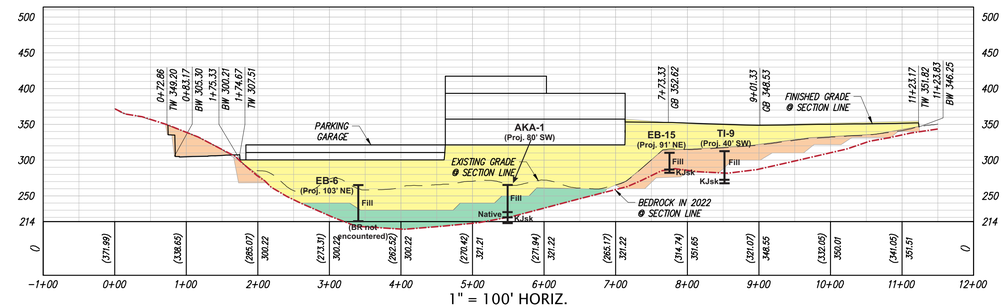
Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

CORNERSTONE EARTH GROUP



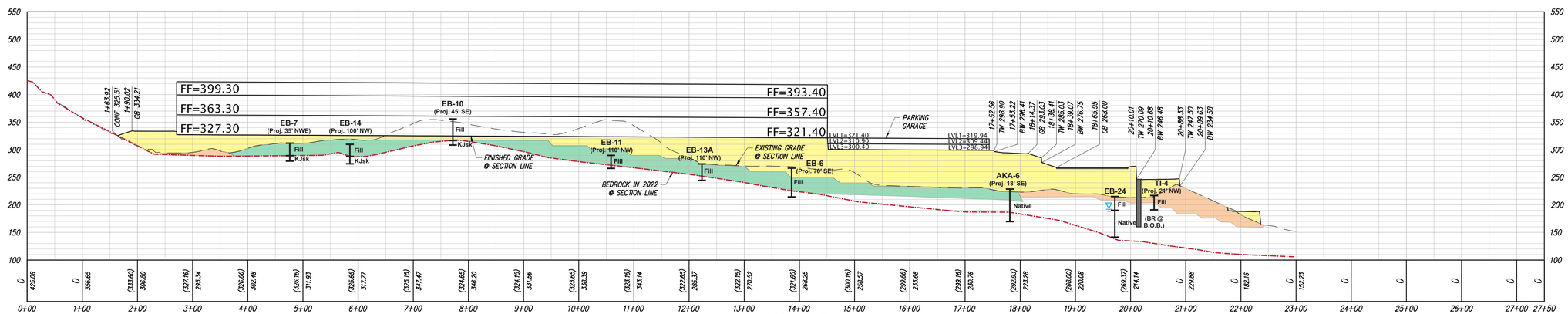
1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 7



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 8



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 9

Ground Improvement for Global Stability: Grouted Displacement or Soil-Cement Columns extending to approximately 50 to 90 feet below bottom of wall and spaced at approximately 5 ft on center; two to three rows of columns depending on type of ground improvement selected by contractor. Actual depth and spacing to be confirmed once grading plans are finalized

Approximate lateral extent of engineered fill compacted with conventional grading equipment

Approximate lateral extent of undocumented fill, colluvial soil or bedrock over-excavation and re-compaction

Approximate extent of existing quarry fill to be exposed and densified using deep dynamic compaction (based on 30-foot thick maximum densification depth)

Base by Kier & Wright, Site Sections - RG-3, dated February 2023

Project Number 582-5-2

Figure Number Figure 9B

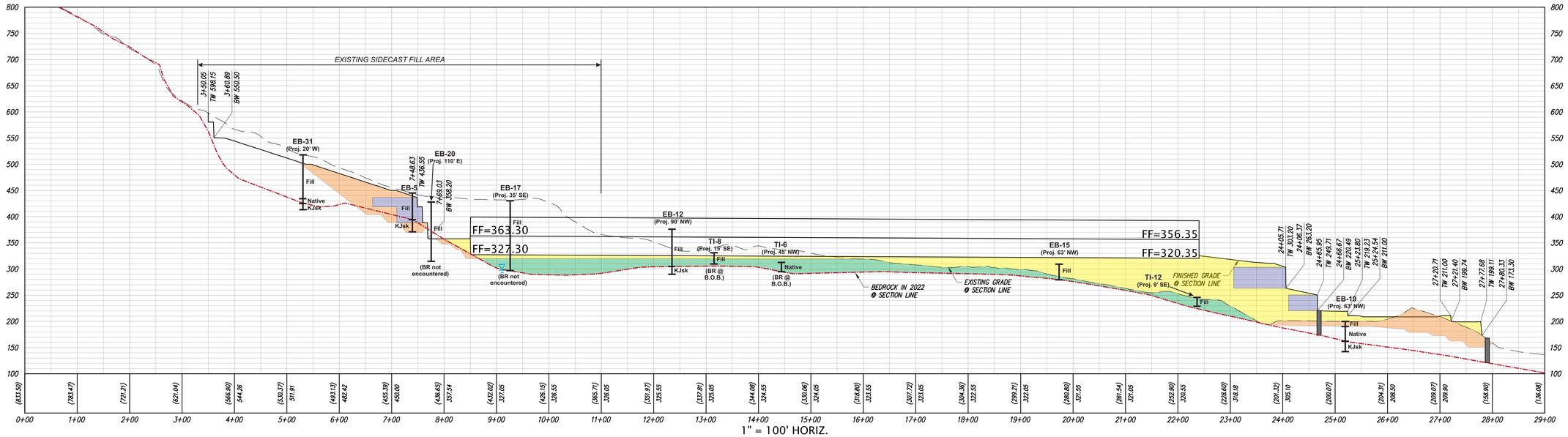
Drawn By RRN

Date April 2024

Proposed Mitigation Cross Sections 7-9

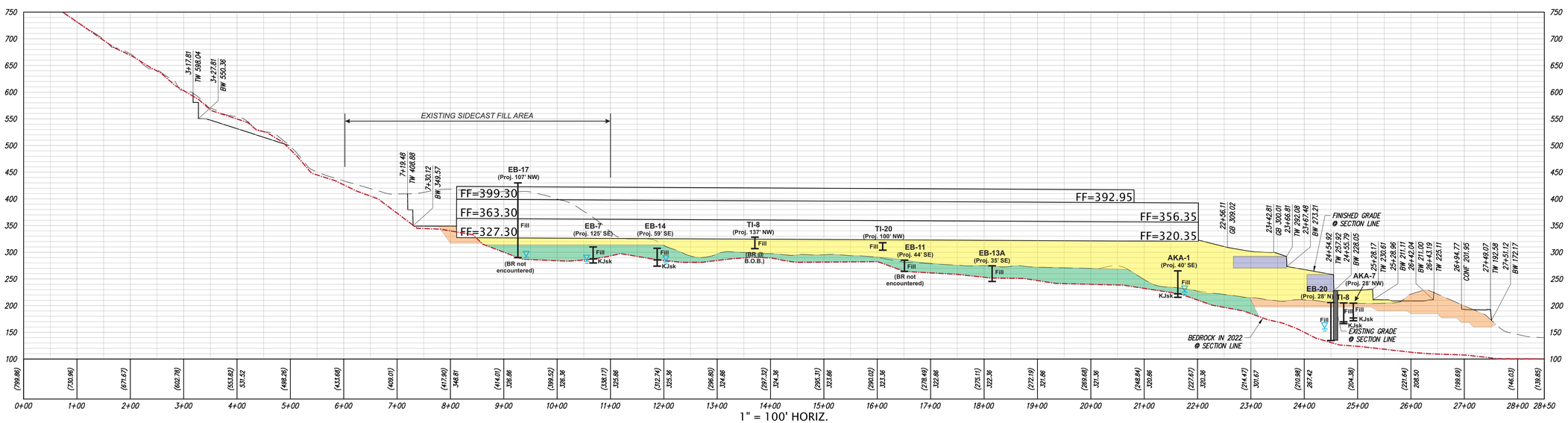
Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

CORNERSTONE EARTH GROUP



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 10



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 11

Geogrid Reinforcing for Global Stability: Miragrid 20XT or approved equivalent 5 ft vertical spacing; final length and spacing to be confirmed once grading plans are finalized

Ground Improvement for Global Stability: Grouted Displacement or Soil-Cement Columns extending to approximately 50 to 90 feet below bottom of wall and spaced at approximately 5 ft on center; two to three rows of columns depending on type of ground improvement selected by contractor. Actual depth and spacing to be confirmed once grading plans are finalized

Approximate lateral extent of engineered fill compacted with conventional grading equipment

Approximate lateral extent of undocumented fill, colluvial soil or bedrock over-excavation and re-compaction

Approximate extent of existing quarry fill to be exposed and densified using deep dynamic compaction (based on 30-foot thick maximum densification depth)

Base by Kier & Wright, Site Sections - RG-4, dated February 2023

Project Number 582-5-2

Figure Number Figure 9C

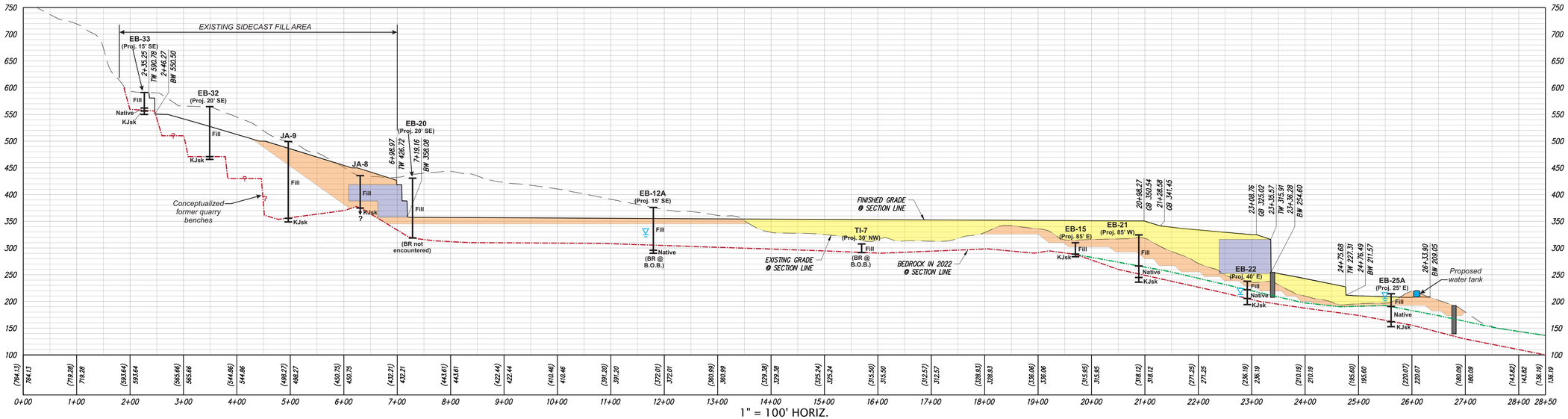
Drawn By RRN

Date April 2024

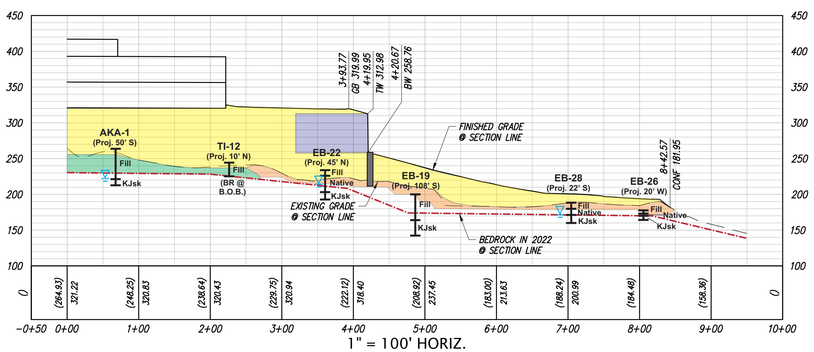
Proposed Mitigation Cross Sections 10 and 11

Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

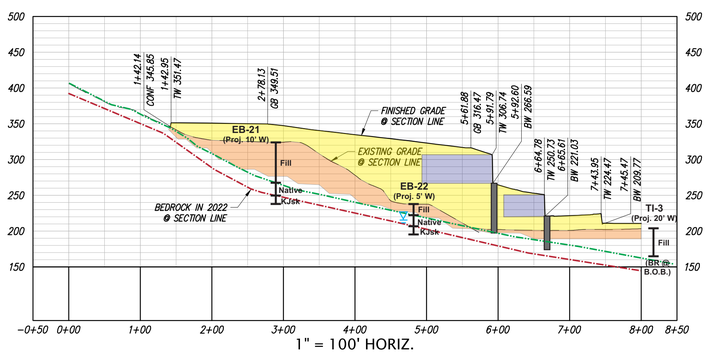
CORNERSTONE EARTH GROUP



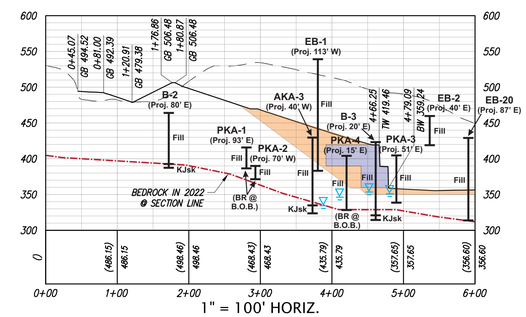
SECTION 13



SECTION 12



SECTION 14



SECTION 15

Geogrid Reinforcing for Global Stability: Miragrid 20XT or approved equivalent 5 ft vertical spacing; final length and spacing to be confirmed once grading plans are finalized

Ground Improvement for Global Stability: Grouted Displacement or Soil-Cement Columns extending to approximately 50 to 90 feet below bottom of wall and spaced at approximately 5 ft on center; two to three rows of columns depending on type of ground improvement selected by contractor. Actual depth and spacing to be confirmed once grading plans are finalized

Approximate lateral extent of engineered fill compacted with conventional grading equipment

Approximate lateral extent of undocumented fill, colluvial soil or bedrock over-excavation and re-compaction

Approximate extent of existing quarry fill to be exposed and densified using deep dynamic compaction (based on 30-foot thick maximum densification depth)

Base by Kier & Wright, Site Sections - RG-5, dated February 2023

Project Number 582-5-2

Figure Number Figure 9D

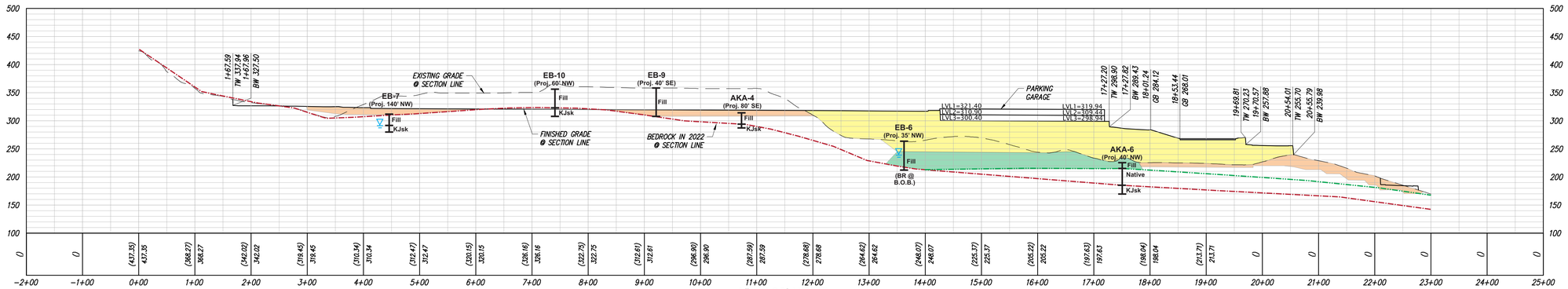
Date April 2024

Drawn By RRN

Proposed Mitigation Cross Sections 12-15

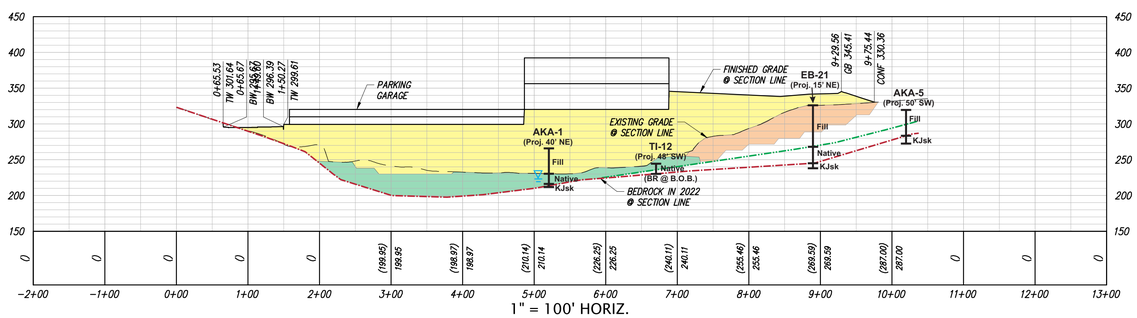
Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

CORNERSTONE EARTH GROUP



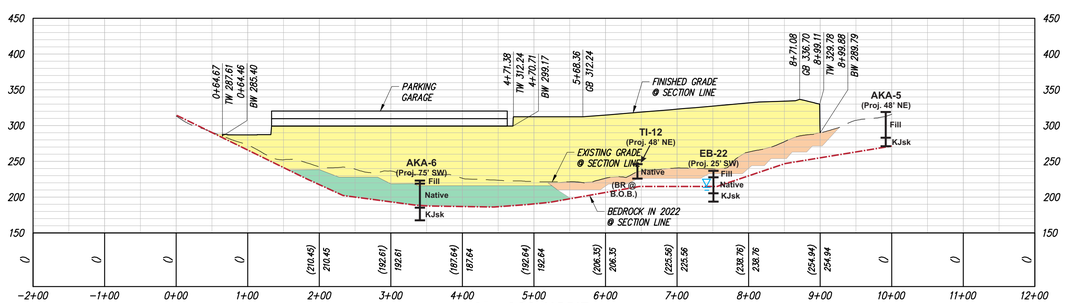
1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 16



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 17



1" = 100' HORIZ.
1" = 100' VERT.
PROFILE

SECTION 18

Approximate lateral extent of engineered fill compacted with conventional grading equipment

Approximate lateral extent of undocumented fill, colluvial soil or bedrock over-excavation and re-compaction

Approximate extent of existing quarry fill to be exposed and densified using deep dynamic compaction (based on 30-foot thick maximum densification depth)

Base by Kier & Wright, Site Sections - RG-6, dated February 2023

Project Number 582-5-2

Figure Number Figure 9E

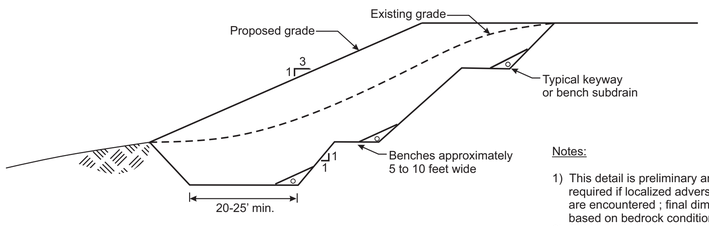
Date April 2024

Drawn By RRN

Proposed Mitigation Cross Sections 16-18

Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

CORNERSTONE EARTH GROUP

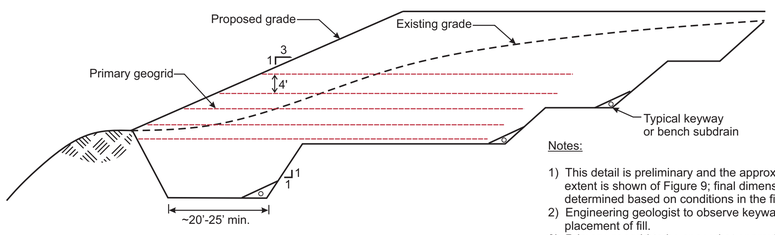


Notes:

1) This detail is preliminary and modifications may be required if localized adverse bedrock or soil conditions are encountered ; final dimensions to be determined based on bedrock conditions in the field.
2) Engineering Geologist to observe cutslope before placement of fill.
3) Place erosion control as specified by civil engineer; see report for details.

Detail 1 - Typical Bench and Keyway Detail

Not to scale

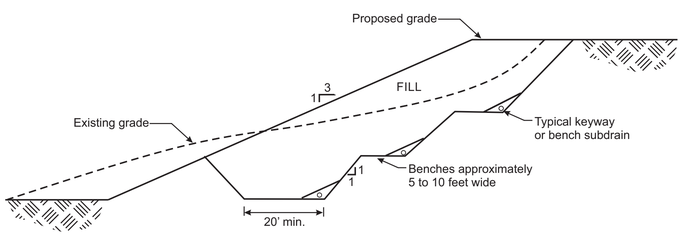


Notes:

1) This detail is preliminary and the approximate lateral extent is shown of Figure 9; final dimensions to be determined based on conditions in the field.
2) Engineering geologist to observe keyway and benching placement of fill.
3) Primary geogrid to be spaced at approximately 4 feet vertically and extend at least 50 to 100 feet into the slope as measured from face of slope. Geogrid to consist of Miragrid 10XT, 20XT and/or approved equivalent.
4) Primary geogrid spacing to range from 4 to 6 feet vertically.

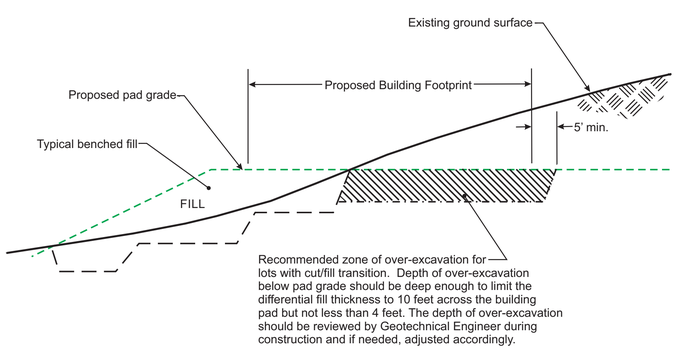
Detail 2 - Conceptual Geogrid Reinforced Fill Slope

Not to scale



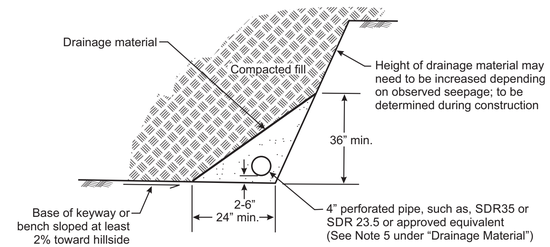
Detail 3 - Conceptual Fill Over Cut Slope

Not to scale



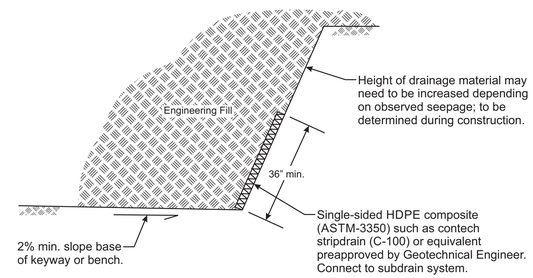
Detail 4 - Conceptual Cut / Fill Transition Over-Excavation

Not to scale



Detail 5 - Typical Bench and Keyway Subdrain

Not to scale



Detail 6 - Keyway and Bench Geocomposite Subdrain

Not to scale

Notes:

1) See mitigation plan and cross sections for locations.
2) Geotechnical engineer to verify location and placement of these subdrains in the field at time of construction.
3) Contractor responsible to install connection of composite to solid discharge lines.
4) Labor and material cost to furnished install geocomposite drain and pipe connections to subdrain system to be included in contractors scope of work.

DRAINAGE MATERIAL

Alternative 1

Class 2 Permeable Material
(Caltrans Standard Specs, latest edition)

Material shall consist of clean, coarse sand and gravel or crushed stone, conforming to the following gradation requirements:

Sieve Size	% Passing Sieve
1"	100
3/4"	90-100
3/8"	40-100
#4	25-40
#8	18-33
#30	5-15
#50	0-7
#200	0-3

Alternative 2

1 /2- to 3/4- inch Clean Crushed Rock or Gravel Wrapped in Filter Fabric

All non-woven filter fabric shall meet the following minimum average roll values unless otherwise specified by Cornerstone Earth Group

Grab Strength (ASTM D-4632):	180 lbs.
Mass Per Unit Area (ASTM D-4751):	5 oz/yd
Apparent Opening Size (ASTM D-4751):	70-100 U.S. std. sieve
Flow Rate (ASTM D-4491):	80 gal/min/ft
Puncture Strength (ASTM D-4833):	80 lbs.

Notes:

1. 1% fall (minimum) along all keyways, benches and subdrain lines.
2. All perforated pipe placed perforations down.
3. All pipe joints shall be glued.
4. All subdrains should be discharged to a free draining outlet approved by the Civil Engineer.
5. Subdrain pipe (perforated or solid connector) should consist of SDR-35 PVC pipe when placed in fills less than 30 feet deep. SDR-23.5 PVC pipe should be used when fill is greater than 30 feet deep.

Project Number 582-5-2

Figure Number Figure 10

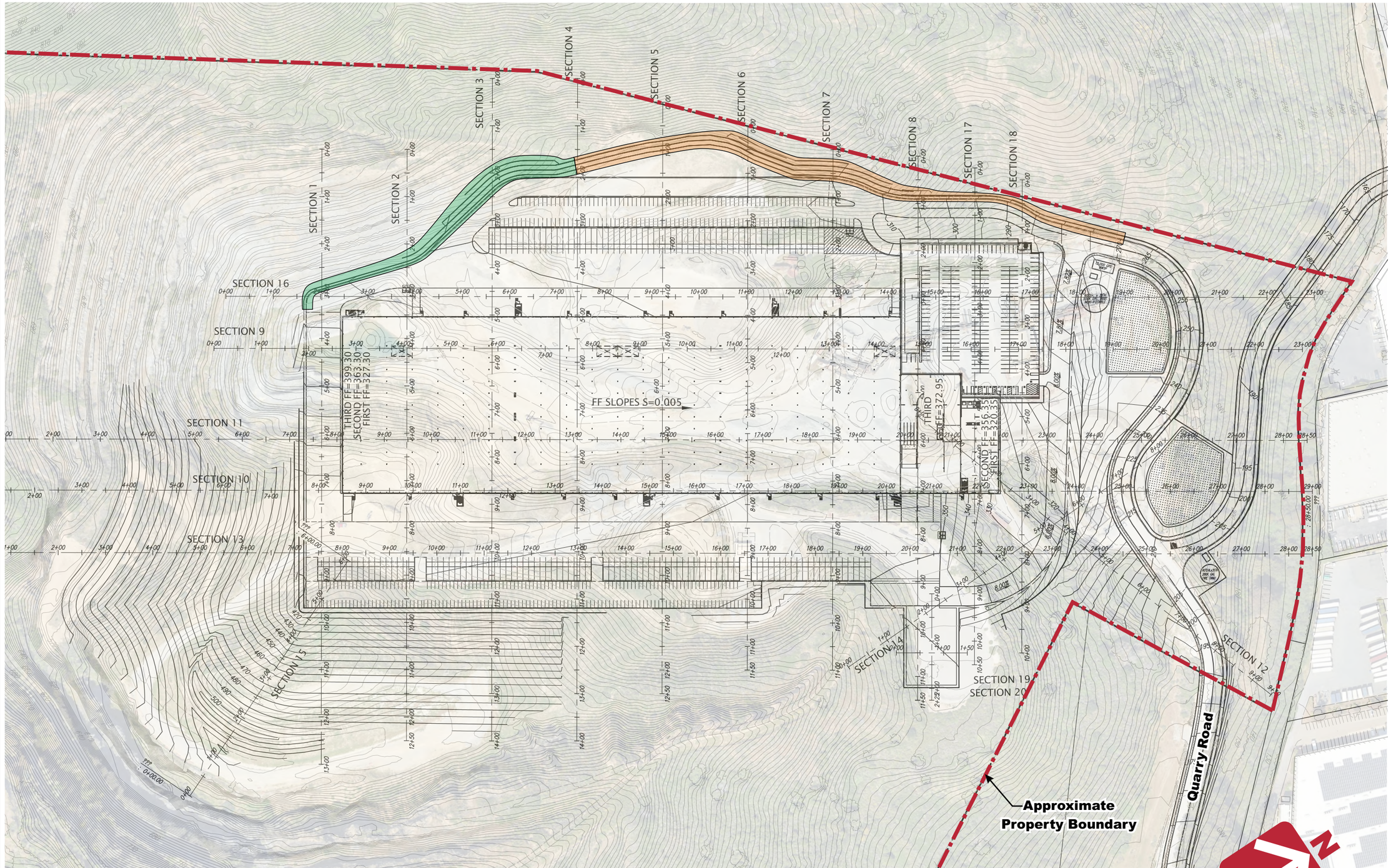
Date July 2023

Drawn By RRN

Grading and Mitigation Details

Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA

CORNERSTONE EARTH GROUP



Legend

Approximate lateral extent of tiered retaining wall using hard rock parameters

Approximate lateral extent of tiered retaining wall using weathered rock parameters

0 200 400

APPROXIMATE SCALE (FEET)

Base by Google Earth, dated 04/04/2022
Overlay by Kier + Wright, Conceptual Grading - RG-1, dated July 2023

Project Number	582-5-2
Figure Number	Figure 11
Date	July 2023
Drawn By	RRN

Bedrock Designation for Tiered Retaining Walls

Guadalupe Quarry Closure, Annexation and Redevelopment
Brisbane, CA

CORNERSTONE EARTH GROUP

APPENDIX A: FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using truck- and track-mounted, hollow- and solid-stem auger, rotary wash, wet-rock coring, and sonic drilling equipment. Forty-two (42) 4- to 8-inch-diameter exploratory borings were drilled on various dates between April 9, 2021 and May 26, 2022 to depths of about 3¼ to 163 feet. The approximate locations of exploratory borings are shown on the Site Exploration Plan, Figure 2A. The soils and rock encountered were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). Boring logs, as well as a key to the classification of the soil and bedrock, are included as part of this appendix.

Boring locations were approximated using existing site boundaries, a hand-held GPS unit, and other site features as references. Boring elevations were based on interpolation of existing grades based on topographic survey provided by Kier & Wright (2023). The locations and elevations of the borings should be considered accurate only to the degree implied by the method used.

Representative soil and bedrock samples (drive, core, and bulk) were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing. The standard penetration resistance blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The 2-inch O.D. split-spoon sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration (ASTM D1586). 2.5-inch I.D. samples were obtained using a Modified California Sampler driven into the soil with the 140-pound hammer previously described. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last 12 inches. Wet rock core samples were collected using a HQ triple tube sampler. The various samplers are denoted at the appropriate depth on the boring logs.

Field tests included an evaluation of the unconfined compressive strength of the soil samples using a pocket penetrometer device. The results of these tests are presented on the individual boring logs at the appropriate sample depths.

Attached boring logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-98)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY
			PI>4 AND PLOTS<"A" LINE	ML	SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY
			PI PLOTS <"A" LINE	MH	ELASTIC SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT

OTHER MATERIAL SYMBOLS

- Poorly-Graded Sand with Clay
- Clayey Sand
- Sandy Silt
- Artificial/Undocumented Fill
- Poorly-Graded Gravelly Sand
- Topsoil
- Well-Graded Gravel with Clay
- Well-Graded Gravel with Silt
- Sand
- Silt
- Well Graded Gravelly Sand
- Gravelly Silt
- Asphalt
- Boulders and Cobble

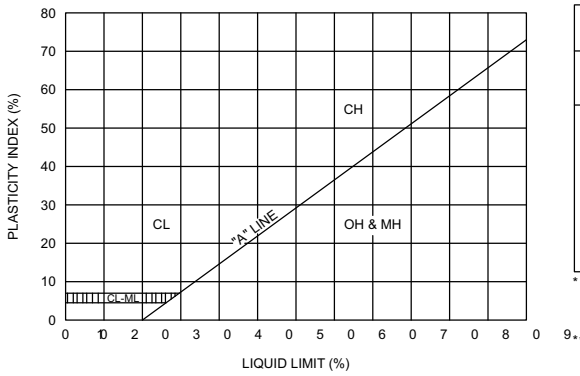
SAMPLER TYPES

- SPT
- Modified California (2.5" I.D.)
- Rock Core
- Shelby Tube
- No Recovery
- Grab Sample

ADDITIONAL TESTS

CA	-	CHEMICAL ANALYSIS (CORROSIVITY)	PI	-	PLASTICITY INDEX
CD	-	CONSOLIDATED DRAINED TRIAXIAL	SW		SWELL TEST
CN	-	CONSOLIDATION	TC	-	CYCLIC TRIAXIAL
CU	-	CONSOLIDATED UNDRAINED TRIAXIAL	TV	-	TORVANE SHEAR
DS	-	DIRECT SHEAR	UC	-	UNCONFINED COMPRESSION
PP	-	POCKET PENETROMETER (TSF)	(1.5)	-	(WITH SHEAR STRENGTH IN KSF)
(3.0)	-	(WITH SHEAR STRENGTH IN KSF)		-	
RV	-	R-VALUE	UU		UNCONSOLIDATED UNDRAINED TRIAXIAL
SA	-	SIEVE ANALYSIS: % PASSING #200 SIEVE		-	
	-	WATER LEVEL			

PLASTICITY CHART



PENETRATION RESISTANCE
(RECORDED AS BLOWS / FOOT)

SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	STRENGTH** (KSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.5
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.5 - 1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

** UNDRAINED SHEAR STRENGTH IN KIPS/SQ. FT. AS DETERMINED BY LABORATORY TESTING OR APPROXIMATED BY THE STANDARD PENETRATION TEST, POCKET PENETROMETER, TORVANE, OR VISUAL OBSERVATION.

CORNERSTONE EARTH GROUP

LEGEND TO SOIL DESCRIPTIONS

Figure Number A-1

HARDNESS

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

STRENGTH

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

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

D. **Deep –** Moderate to complete mineral decomposition: extensive disintegration: deep and thorough discoloration: many fractures, all extensively coated or filled with oxides, carbonates and/or clay or silt.

M. **Moderate –** Slight change or partial decomposition of minerals: little disintegration: cementation little to unaffected. Moderate to occasionally intense discoloration. Moderately coated fractures.

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

F. **Fresh –** Unaffected by weathering agents. No disintegration or discoloration. Fractures usually less numerous than joints.

FRACTURING

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

BEDDING OF SEDIMENTARY ROCKS

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

BORING NUMBER EB-1

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 5/10/21 **DATE COMPLETED** 5/11/21
GROUND ELEVATION 540 FT +/- **BORING DEPTH** 156.1 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.682790° **LONGITUDE** -122.421466°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING 104 ft.
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (1.0 2.0 3.0 4.0)
540.0	0		**Poorly Graded Sand with Silt (SP-SM) [Fill]** medium dense, moist, brown, fine to medium sand	42	MC-1B	109	10			
	5									
534.0			**Clayey Sand with Gravel (SC) [Fill]** medium dense, moist, gray with brown mottles, fine to coarse sand, fine to coarse subangular to subrounded gravel	42	MC-2B	113	16			
	10									
	15									
524.0			**Sandy Lean Clay with Gravel (CL) [Fill]** very stiff, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, some brick fragments							
521.0			**Poorly Graded Sand with Silt (SP-SM) [Fill]** loose, moist, brown, fine sand, some fine to coarse subangular gravel	13	SPT-3C		20			○
520.0	20		**Sandy Lean Clay with Gravel (CL) [Fill]** very stiff, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity							
515.5										
	25									
514.0										

Continued Next Page

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
514.0			**Lean Clay with Sand (CL) [Fill]** very stiff, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, low to moderate plasticity							
511.0			**Clayey Sand with Gravel (SC) [Fill]** medium dense, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel	34	MC-4B		24			○
	30									
	35									
			some concrete fragments	32	MC-5B	115	14			
	40									
	45									
				19	SPT-6B		12			
	50									
485.5	55									
484.0			*Continued Next Page*							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-1

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0, 2.0, 3.0, 4.0)
484.0			**Poorly Graded Sand with Clay and Gravel (SP-SC) [Fill]** very dense, moist, dark gray, fine to coarse sand, fine to coarse subangular to subrounded gravel, abundant AC grindings	50 / 5"	MC-7		4			
	60									
478.0			**Clayey Sand with Gravel (SC) [Fill]** medium dense to dense, moist, gray brown, fine to coarse sand, fine to coarse subangular to subrounded gravel							
	65									
				44	MC-8B	116	14			
	70									
	75									
				64	MC-9B	116	16			
	80									
				44	MC-10B	108	14		38	
	85									
454.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

UNDRAINED SHEAR STRENGTH, ksf: HAND PENETROMETER; TORVANE; UNCONFINED COMPRESSION; UNCONSOLIDATED-UNDRAINED TRIAXIAL (1.0, 2.0, 3.0, 4.0)

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
454.0			**Clayey Sand with Gravel (SC) [Fill]** medium dense to dense, moist, gray brown, fine to coarse sand, fine to coarse subangular to subrounded gravel						
				36	SPT-11		11		
	90								
				44	12A MC 12B	121 / 125	6 / 8		25
	95								
			becomes very dense	72	SPT-13	121	13		
	100								
438.0			**Clayey Sand (SC) [Fill]** dense, moist, gray brown, fine sand, some fine to coarse subangular to subrounded gravel 10% Gravel, 77% Sand, 13% Clay / Silt						
				41	SPT-14B		15		13
	105								
			some wood debris						
431.0			**Sandy Lean Clay with Gravel (CL) [Fill]** very stiff, moist, gray and brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity	38	MC-15B		10		
	110								
427.0			**Clayey Sand with Gravel (SC) [Fill]** dense to very dense, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, some cobbles						
				62	SPT				
	115								
424.0									

Continued Next Page

BORING NUMBER EB-1

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
424.0			**Clayey Sand with Gravel (SC) [Fill]** dense to very dense, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, some cobbles						
				36	SPT-17		12		34
	120								
				50 / 6"	MC				
	125								
			29% Gravel, 41% Sand, 30% Clay / Silt	31	SPT-19		13		30
	130								
				52	SPT-20		15		
	135								
			27% Gravel, 41% Sand, 32% Clay / Silt	70	MC-21B	131	11		32
	140								
				50 / 6"	NR				
	145			50 / 6"	SPT				
394.0									

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-1

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
394.0			**Clayey Sand with Gravel (SC) [Fill]** dense to very dense, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, some cobbles							
				50/6"	SPT					
	150									
				50/4"	MC-24B	130	12			
	155		Sandstone fragments in recovery. *No advancement for 10 minutes, practical auger refusal.*	50/1"	SPT					
383.9			Bottom of Boring at 156.1 feet.							
	160									
	165									
	170									
	175									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-2

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/29/21 **DATE COMPLETED** 4/29/21
GROUND ELEVATION 460 FT +/- **BORING DEPTH** 40 ft.
DRILLING CONTRACTOR Britton Exploration
LATITUDE 37.683099° **LONGITUDE** -122.422068°
DRILLING METHOD CME 55 Track Rig, 6 inch solid stem auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0, 2.0, 3.0, 4.0)
460.0	0		**Silty Sand (SM) [Fill]** loose, moist, brown, fine to medium sand, some fine subrounded gravel	5	MC-1		4			
	5									
453.0			**Silty Sand with Gravel (SM) [Fill]** loose, moist, brown, fine to medium sand, fine subrounded gravel, some brick debris	42	MC-2B	116	7			
	10									
445.0	15		**Silty Gravel with Sand (GM) [Fill]** loose, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand							
			Switched from auger to 4 inch diameter mud rotary at 18.5'	13	MC-3	109	15			
	20									
436.0										
	25									
434.0			*Continued Next Page*							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-2

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
434.0			**Clayey Gravel with Sand (GM)** medium dense, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand						
				19	SPT-4		14		29
	30								
429.0			**Poorly Graded Gravel with Sand (GP) [Fill]** medium dense, moist, gray, fine to coarse subangular gravel, fine to medium sand, some cobbles, possible boulders						
	35								
			No advancement for 10 minutes, practical auger refusal.	40	MC-5	131	9		
420.0	40		Bottom of Boring at 40.0 feet.						
	45								
	50								
	55								

UNDRAINED SHEAR STRENGTH, ksf

○ HAND PENETROMETER

△ TORVANE

● UNCONFINED COMPRESSION

▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL

1.0 2.0 3.0 4.0

BORING NUMBER EB-3

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/9/21 **DATE COMPLETED** 4/9/21
GROUND ELEVATION 343 FT +/- **BORING DEPTH** 33 ft.
DRILLING CONTRACTOR Britton Exploration
LATITUDE 37.684948° **LONGITUDE** -122.420064°
DRILLING METHOD CME 55, 6 inch Solid Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
343.0	0		**Clayey Sand with Gravel (SC) [Fill]** medium dense, moist, brown, fine to medium sand, fine to coarse subangular gravel						
341.5			**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, gray brown, fine to coarse subangular gravel, fine to coarse sand	50 6"	MC-1		6		
				50 5"	SPT-2A		6		
338.0	5		**Sandstone Boulder [FILL]** *Switched from auger to 4 inch diameter rotary wash at 5.5'* *Run #1: 61% recovery*	50 6"	SPT-3		6		
					RC-1				
335.0			**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, brown, fine to coarse subangular to subrounded gravel, fine to coarse sand						
	10		*Run #2: No recovery, sample is washing out in drilling fluid*		RC-2				
	15		*Highly variable drilling to 27' large voids and cobbles with potential boulders* *Run #3: No recovery*		RC-3				
				15	SPT				
	20		*Run #4: 13% recovery*		RC-4				
				18	SPT-4		11		
	25		*Run #5: 61% recovery*						
317.0			*Continued Next Page*						

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-3

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
317.0			*Run #5: 61% recovery*		RC-5					
316.0			**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured							
	30		*Run #6: 90% recovery, RQD = 77%*		RC-6					
310.0			Bottom of Boring at 33.0 feet.							
	35									
	40									
	45									
	50									
	55									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-3A

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/9/21 **DATE COMPLETED** 4/9/21
GROUND ELEVATION 343 FT +/- **BORING DEPTH** 25.9 ft.
DRILLING CONTRACTOR Britton Exploration
LATITUDE 37.684979° **LONGITUDE** -122.420132°
DRILLING METHOD CME 55, 6 inch Solid Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
343.0	0	6 inches aggregate base						
342.5		**Clayey Sand (SC) [Fill]**						
341.5		**Clayey Gravel with Sand (GC) [Fill]** loose to medium dense, moist, fine to coarse subangular gravel, fine sand, some cobbles	34	SPT-1		4		
	5		13	SPT-2		11		
			43	MC-3B		9		
	10	*Highly variable drilling to 25' large voids and cobbles with potential boulders*						
			9	SPT-4B		11		
	15		20	SPT				
			21	SPT-6B		2		
	20							
			43	MC-7B	121	10		
	25		50 5"	SPT-8B		7		
317.5		**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured						
317.1		Bottom of Boring at 25.9 feet.						

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-4

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 5/11/21 **DATE COMPLETED** 6/1/21
GROUND ELEVATION 502 FT +/- **BORING DEPTH** 163 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.683609° **LONGITUDE** -122.420757°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER / TORVANE / UNCONFINED COMPRESSION / UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
502.0	0		**Poorly Graded Sand with Clay (SP-SC) [Fill]** medium dense, moist, gray with brown, fine to medium sand, some thin seams of clay	23	MC-1B	96	14			
	5									
495.0			**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, brown, fine to coarse subangular to subrounded gravel, fine to coarse sand	36	MC-2B	117	7			
	10									
488.0			**Clayey Sand (SC) [Fill]** medium dense, moist, brown, fine to medium sand, some fine subangular gravel							
	15			21	3A MC 3B	115 118	16 15		29	
	20									
	25									
476.0			*Continued Next Page*							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

UNDRAINED SHEAR STRENGTH, ksf: HAND PENETROMETER; TORVANE; UNCONFINED COMPRESSION; UNCONSOLIDATED-UNDRAINED TRIAXIAL (1.0, 2.0, 3.0, 4.0)

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
476.0			**Clayey Sand (SC) [Fill]** medium dense, moist, brown, fine to medium sand, some fine subangular gravel						
			becomes loose to medium dense	13	MC-4B	120	14		
	30								
				27	MC-5B	118	15		37
	35								
			6% Gravel, 77% Sand, 17% Clay / Silt	18	6A MC-6B	107	16		
	40				6B	107	15		17
				22	SPT				
				15	MC-8B	113	17		
	45			20	SPT				
			5% Gravel, 70% Sand, 25% Clay / Silt	54	MC-10B	111	17		25
	50								
450.0			**Clayey Sand with Gravel (SC) [Fill]** dense to very dense, moist, brown with reddish brown mottles, fine to coarse sand, fine to coarse subangular to subrounded gravel						
				68	MC-11B	110	13		32
	55								
446.0									

Continued Next Page

BORING NUMBER EB-4

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0 2.0 3.0 4.0)
446.0			**Clayey Sand with Gravel (SC) [Fill]** dense to very dense, moist, brown with reddish brown mottles, fine to coarse sand, fine to coarse subangular to subrounded gravel							
				72	SPT-12C		10			
	60									
			30% Gravel, 40% Sand, 30% Clay / Silt	50 6"	MC-13B	129	11		30	
	65									
				50 5"	MC-14B	127	9			
432.5										
	70		**Poorly Graded Sand with Clay (SP-SC) [Fill]** very dense, moist, brown, fine to medium sand, some fine subangular gravel							
430.0			**Clayey Sand with Gravel (SC) [Fill]** dense to very dense, moist, brown with reddish brown mottles, fine to coarse sand, fine to coarse subangular to subrounded gravel							
				37	SPT-15		12			
	75									
				36	SPT-16		11			
	80									
				50 6"	MC-17B	125	13		39	
	85									
416.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-4

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

UNDRAINED SHEAR STRENGTH, ksf: ○ HAND PENETROMETER; △ TORVANE; ● UNCONFINED COMPRESSION; ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL (1.0, 2.0, 3.0, 4.0)

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
416.0			**Clayey Sand with Gravel (SC) [Fill]** dense to very dense, moist, brown with reddish brown mottles, fine to coarse sand, fine to coarse subangular to subrounded gravel						
				46	18A MC 18B	121 / 123	11 / 13		
	90								
			22% Gravel, 52% Sand, 27% Clay / Silt	50 / 5"	MC-19	114	11		27
	95								
404.0			**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, brown with gray mottles, fine to coarse subangular to subrounded gravel, fine to coarse sand	47	MC-20B		13		
	100								
400.0			**Clayey Sand (SC) [Fill]** dense, moist, gray with brown mottles, fine to coarse sand, some fine to coarse subangular to subrounded gravel 11% Gravel, 61% Sand, 28% Clay / Silt	49	21A MC 21B	128 / 127	10 / 10		29
	105								
				57	MC-22B	127	10		
	110								
				54	MC-23B	127	10		
	115								
386.0									

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-4

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0 2.0 3.0 4.0)
386.0			**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, brown, fine to coarse subangular to subrounded gravel, fine to coarse sand							
				50/6"	MC-24B	124	9			
	120									
			41% Gravel, 35% Sand, 24% Clay / Silt	50/6"	MC-25B	120	12		24	
	125									
	130									
				78	SPT-26		12			
	135									
	140		*Practical auger refusal at 144.5' on 5/13/2021 with Exploration Geoservices. Returned on 6/1/2021 with Britton Exploration, CME 55 with 4 inch diameter rotary wash.*							
				50/3"	MC					
				50/6"	NR					
	145									
356.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-4

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
356.0			*Run #1: 100% recovery*		RC-1					
355.0			**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured							
	150		*Run #2: 40% recovery, RQD = 0*		RC-2					
	155		*Run #3: 60% recovery, RQD = 28%*		RC-3					
	160		*Run #4: 65% recovery, RQD = 15%*		RC-4					
339.0			Bottom of Boring at 163.0 feet.							
	165									
	170									
	175									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-5

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 5/25/21 **DATE COMPLETED** 6/2/21
GROUND ELEVATION 446 FT +/- **BORING DEPTH** 73 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.683410° **LONGITUDE** -122.422604°
DRILLING METHOD Mobile B-53, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
446.0	0	**Clayey Sand with Gravel (SC) [Fill]**						
445.5		**Sandy Lean Clay with Gravel (CL)** stiff, moist, dark gray with brown mottles, fine sand, fine to coarse subangular to subrounded gravel, moderate plasticity	13	MC-1B	96	18		
442.0	5	**Clayey Gravel with Sand (GC)** medium dense, moist, dark brown with reddish brown mottles, fine to coarse subangular to subrounded gravel, fine to coarse sand	17	MC-2	90	7		
438.5		**Poorly Graded Gravel (GP] [Fill]** medium dense, dry, gray, fine to coarse subangular gravel, some cobbles possible intact boulder	37	MC-3B	117	6		
435.5	10	**Clayey Gravel with Sand (GC) [Fill]** loose, moist, dark brown with reddish brown mottles, fine to coarse subangular to subrounded gravel, fine to coarse sand	10	MC-4A		9		
431.5	15	**Silty Sand with Gravel (SM) [Fill]** loose to medium dense, moist, brown, fine to medium sand, some fine to coarse subangular to subrounded gravel	14	MC-5B	97	18		38
	20		11	SPT-6		16		
420.0	25							

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-5

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0 2.0 3.0 4.0)
420.0			**Silty Sand with Gravel (SM) [Fill]** loose to medium dense, moist, brown, fine to medium sand, some fine to coarse subangular to subrounded gravel							
				13	MC-7B	98	17			
	30									
				11	SPT-8		16			
	35									
				12	SPT-9		14			
	40									
				36	MC-10B	109	16		46	
	45									
399.0			**Clayey Sand with Gravel (GC) [Fill]** medium dense, moist, dark brown with reddish brown mottles, fine to coarse sand, fine to coarse subangular to subrounded gravel	14	SPT-11		17		37	
	50									
394.0			**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, dark brown with reddish brown mottles, fine to coarse subangular to subrounded gravel, fine to coarse sand	50 / 2"	MC-12B	126	11			
391.5	55									
390.0										

Continued Next Page

BORING NUMBER EB-5

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
390.0			**Sandstone [KJsk]** moderately hard, moderately strong, fresh to little weathering, bluish gray, closely fractured *Practical auger refusal at 58' on 5/26/2021 with Exploration Geoservices. Returned on 6/2/2021 with Britton Exploration, CME 55 with 4 inch diameter rotary wash.*	50 1"	SPT					
386.5	60		**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured *Run #1: 61% recovery, RQD = 38%*		RC-1					
	65		*Run #2: 97% recovery, RQD = 97%*		RC-2					
	70		*Run #3: 100% recovery, RQD = 100%*		RC-3					
373.0			Bottom of Boring at 73.0 feet.							
	75									
	80									
	85									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-6

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/16/21 **DATE COMPLETED** 4/16/21
GROUND ELEVATION 264 FT +/- **BORING DEPTH** 50.2 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.686614° **LONGITUDE** -122.421357°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY JLC
AT TIME OF DRILLING 28 ft.
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
264.0	0		**Silty Sand with Gravel (SM) [Fill]** medium dense, moist, gray and brown, fine to coarse sand, fine subangular to angular gravel	42	MC-1B	122	8		22
	5			42	MC-2B	123	11		
256.5			**Poorly Graded Gravel with Sand (GP) [Fill]** loose, moist, gray and brown, fine to coarse subangular gravel, fine to coarse sand	14	MC-3B	110	6		
254.0	10		**Clayey Sand (SC) [Fill]** medium dense, moist, brown, fine to medium sand, some fine subangular gravel	21	SPT-4		13		
	15		becomes dense to very dense	44	SPT-5		13		
				50 / 6"	MC-6	119	14		
	20								
				38	SPT-7		16		41
	25								
238.0									

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-6

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

UNDRAINED SHEAR STRENGTH, ksf: HAND PENETROMETER; TORVANE; UNCONFINED COMPRESSION; UNCONSOLIDATED-UNDRAINED TRIAXIAL (1.0, 2.0, 3.0, 4.0)

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
238.0			**Clayey Sand (SC) [Fill]** medium dense, moist, brown, fine to medium sand, some fine subangular gravel						
	30			45	MC-8A	112	9		
			becomes dense	40	SPT-9		18		18
229.0	35		**Poorly Graded Gravel with Silt and Sand (GP-GM) [Fill]** very dense, moist, gray and brown, fine to coarse sand, fine to coarse subangular to subrounded gravel						
				50 / 6"	SPT-10		9		
	40								
				50 / 6"	SPT-11		15		
	45								
				50 / 6"	SPT-12		11		
				50 / 3"	SPT				
			No advancement for 10 minutes, practical auger refusal. Sandstone fragments in recovery.	50 / 2"	SPT-14		13		
213.8	50		Bottom of Boring at 50.2 feet.						
	55								

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-7

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/27/21 **DATE COMPLETED** 4/27/21
GROUND ELEVATION 314 FT +/- **BORING DEPTH** 32.5 ft.
DRILLING CONTRACTOR Britton Exploration
LATITUDE 37.684381° **LONGITUDE** -122.422816°
DRILLING METHOD CME 55 Track Rig, 6 inch solid stem auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING 21 ft.
NOTES
AT END OF DRILLING 21 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
314.0	0	6 inches aggregate base access road							
313.5		**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand	31	MC-1B	112	12			
			45	MC-2B	124	9			
	5								
308.5		**Sandy Lean Clay with Gravel (CL) [Fill]** hard, moist, brown, fine sand, some fine subangular gravel, moderate plasticity	41	MC-3B	124	11			>4.5
		becomes medium stiff to soft	9	MC-4B	113	12			
	10		4	SPT					
			8	MC-6B	115	13			
	15								
			13	MC-7B	115	13			
			4	SPT					
295.0		**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles							
	20		50 6"	MC-9B	124	14			
291.5		**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured *Switched to 4 inch diameter rotary wash at 22.5'.* *Run #1: 53% recovery, RQD = 17%*	50 3"	SPT					
	25			RC-1					
288.0		*Continued Next Page*							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-7

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
288.0			**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured							
			closely fractured from 28.5 to 32.5'							
	30		*Run #2: 78% recovery, RQD = 33%*		RC-2					
			Well developed fault breccia 31.5 to 32.5'.							
281.5			Bottom of Boring at 32.5 feet.							
	35									
	40									
	45									
	50									
	55									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-8

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 5/5/21 **DATE COMPLETED** 5/5/21
GROUND ELEVATION 209 FT +/- **BORING DEPTH** 77.8 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.687685° **LONGITUDE** -122.419695°
DRILLING METHOD Mobile B-53, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY JLC
AT TIME OF DRILLING 52 ft.
NOTES
AT END OF DRILLING 52 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0, 2.0, 3.0, 4.0)
209.0 / 208.8	0		1 inch aggregate base access road							
			Well Graded Sand with Gravel (SW) [Fill] very dense, moist, gray and brown, fine to coarse sand, fine to coarse sand, fine to coarse subangular to subrounded gravel, some cobbles	50 / 3"	MC-1		5			
				50 / 1"	SPT-2		5			
	5			50 / 3"	SPT-3		6			
				30	SPT-4		8			
	10									
				59	MC-5		7			
	15									
193.0			**Clayey Sand with Gravel (SC) [Fill]** medium dense, moist, brown, fine to coarse sand, fine to coarse subangular to angular gravel							
				27	MC-6B	117	10			
	20									
187.0			**Sandy Lean Clay (CL) [Fill]** stiff, moist, brown and gray mottled, fine sand, some fine subangular gravel, moderate plasticity							
				15	MC-7B	117	18			○
	25									
183.0										

Continued Next Page

BORING NUMBER EB-8

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER / TORVANE / UNCONFINED COMPRESSION / UNCONSOLIDATED-UNDRAINED TRIAXIAL)
183.0		**Sandy Lean Clay (CL) [Fill]** stiff, moist, brown and gray mottled, fine sand, some fine subangular gravel, moderate plasticity							
180.5		**Silty Sand (SM) [Fill]** very dense, moist, brown, fine to coarse sand	50 5"	MC-8B	116	18			
	30								
178.5		**Well Graded Sand (SW) [Fill]** very dense, moist, brown, fine to coarse sand, some fine angular gravel							
175.0		**Sandy Lean Clay (CL) [Fill]** very stiff to hard, moist, light brown with reddish brown and gray mottles, fine sand, moderate plasticity	50 6"	MC-9	123	12			
			50 6"	MC					
	35		65	SPT					
			50 6"	SPT-12		15			>4.5
170.0		**Well Graded Sand with Gravel (SW) [Fill]** medium dense, wet, gray, fine to coarse sand, fine angular gravel							
	40		26	SPT-13		11			
	45	becomes very dense	50 6"	SPT-14		11			
159.0	50	**Well Graded Gravel with Sand (GW) [Fill]** very dense, wet, gray, fine angular gravel, fine to coarse sand	50 6"	SPT-15		12			
155.0		**Silty Sand (SM) [Fill]** dense, moist, gray, fine sand							
	55		32	SPT-16		17			
153.0									

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-8

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
153.0			**Silty Sand (SM) [Fill]** dense, moist, gray, fine sand						
149.0	60		**Poorly Graded Gravel with Silt and Sand (GP-GM) [Fill]** very dense, moist, gray and brown, fine to coarse sand, fine to coarse subangular to subrounded gravel	71	SPT-17		9		
	65			50 / 5"	SPT-18		8		
				50 / 6"	SPT-19		13		
	70			50 / 2"	NR				
	75		*Drill rate = 0.1'/min. at 77-77.5'*						
131.2			*No advancement for 10 minutes, practical auger refusal.* Bottom of Boring at 77.8 feet.	50 / 3"	NR				
	80								
	85								

UNDRAINED SHEAR STRENGTH, ksf

○ HAND PENETROMETER

△ TORVANE

● UNCONFINED COMPRESSION

▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL

1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-9

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 5/17/21 **DATE COMPLETED** 5/18/21
GROUND ELEVATION 357 FT +/- **BORING DEPTH** 47.75 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.685833° **LONGITUDE** -122.422561°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
357.0	0		**Poorly Graded Sand with Silt and Gravel (SP-SM) [Fill]** dense to very dense, moist, dark gray, fine to coarse sand, fine to coarse subangular gravel, abundant AC and concrete fragments	50 6"	MC-1	103	7			
	5			36	SPT-2		5			
	10			66	SPT-3		6			
343.0			**Well Graded Gravel with Silt and Sand (GW-GM) [Fill]** very dense, moist, dark gray, fine to coarse subangular gravel, fine to coarse sand, abundant AC grindings	50 6"	MC-4	105	7			
339.5	15		**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant AC grindings	22	SPT-5		9			
	20			33	MC-6B		8			
	25									
331.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-9

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
331.0										
329.5			**Clayey Gravel with Sand (GC) [Fill]** dense to very dense, moist, brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant cobbles	50 / 5"	SPT-7		4			
	30									
				55	SPT-8		10			
	35									
				54	MC-9B	106	12			
	40									
				50 / 4"	MC-10	116	13			
	45		*Drill rate = 0.1'/min. at 46-47.5'*							
309.3			*No advancement for 10 minutes, practical auger refusal. Sandstone fragments in recovery.*	50 / 1"	SPT					
				50 / 1"	SPT					
			Bottom of Boring at 47.8 feet.							
	50									
	55									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:06 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-10

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/27/21 **DATE COMPLETED** 4/27/21
GROUND ELEVATION 355 FT +/- **BORING DEPTH** 45 ft.
DRILLING CONTRACTOR Britton Exploration
LATITUDE 37.685174° **LONGITUDE** -122.422478°
DRILLING METHOD CME 55 Track Rig, 6 inch solid stem auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
355.0	0		**Well Graded Sand with Clay and Gravel (SW-SC) [Fill]** very dense, moist, gray and dark gray mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, abundant AC and concrete fragments	50 6"	MC-1B	116	6		7
				38	MC-2B	116	6		
	5			21	MC-3B	114	9		
			some rebar encountered	25	SPT-4		8		
				33	MC-5B	130	8		
	10								
344.0			**Clayey Sand (SC) [Fill]** medium dense, moist, gray and reddish brown mottled, fine to coarse sand, some fine to coarse subangular to subrounded gravel						
				29	MC-6B	124	10		
	15								
338.0			**Well Graded Sand with Clay and Gravel (SW-SC) [Fill]** medium dense, moist, gray and dark gray mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel	18	MC-7B	126	9		9
	20								
333.0			**Poorly Graded Gravel with Silt and Sand (GP-GM) [Fill]** very dense, moist, gray and brown, fine to coarse sand, fine to coarse subangular to subrounded gravel	50 4"	MC-8A	113	8		
	25								
329.0			*Continued Next Page*						

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-10

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

UNDRAINED SHEAR STRENGTH, ksf: HAND PENETROMETER; TORVANE; UNCONFINED COMPRESSION; UNCONSOLIDATED-UNDRAINED TRIAXIAL (1.0, 2.0, 3.0, 4.0)

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
329.0									
327.0			**Sandstone [KJsk]** moderately hard, moderately strong, fresh weathering, bluish gray, closely to intensely fractured	50 3"	MC-9A		4		
	30		*Drill rate = 0.3'/min. at 30-33.5'*						
				50 3"	SPT-10		3		
	35		becomes hard, strong *Switched to 4 inch diameter rotary wash at 35'.*	50 1"	SPT				
			Run #1: 35% recovery, RQD = 35%		RC-1				
	40		*Run #2: 57% recovery, RQD = 49%*		RC-2				
310.0	45		Bottom of Boring at 45.0 feet.						
	50								
	55								

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-11

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/26/21 **DATE COMPLETED** 4/26/21
GROUND ELEVATION 289 FT +/- **BORING DEPTH** 23.7 ft.
DRILLING CONTRACTOR Britton Exploration
LATITUDE 37.685594° **LONGITUDE** -122.421483°
DRILLING METHOD CME 55 Track Rig, 6 inch solid stem auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING 15 ft.
NOTES
AT END OF DRILLING 3 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
289.0	0	6 inches of gravel access road						
288.5		**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand	50 6"	MC-1	112	5		
286.5		**Clayey Sand with Gravel (SC) [Fill]** medium dense, moist, gray and dark gray mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel	24	MC-2B	128	9		
	5		50 6"	MC-3B	129	8		
283.0		**Clayey Gravel with Sand (GC) [Fill]** dense to very dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand	50 5"	MC-4		13		
	10		41	SPT-5		11		
			50 1"	SPT-6		15		
	15							
			50 4"	MC-7		12		
			50 3"	SPT-8		10		
	20							
265.3		Sandstone fragments in recovery. *No advancement for 10 minutes, practical auger refusal.*	50 2"	SPT				
	25	Bottom of Boring at 23.7 feet.						

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-12

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/28/21 **DATE COMPLETED** 4/29/21
GROUND ELEVATION 375 FT +/- **BORING DEPTH** 84 ft.
DRILLING CONTRACTOR Britton Exploration
LATITUDE 37.684239° **LONGITUDE** -122.421434°
DRILLING METHOD CME 55 Track Rig, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
375.0	0							
374.8		1 inch asphalt concrete over 4 inches aggregate base						
374.6		**Clayey Gravel with Sand (GC) [Fill]** medium dense to loose, moist, gray and reddish brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand	40	MC-1B	121	8		
			14	MC-2B	121	8		
370.5	5	**Clayey Sand with Gravel (SC) [Fill]** loose, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel	9	MC-3B	110	8		19
			5	SPT				
367.0	10	**Clayey Gravel with Sand (GC) [Fill]** loose to medium dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles	37	MC-5B	105	9		
			16	MC-6B	112	11		
	15		30	SPT-7A		10		
			15	MC-8B	111	10		
	20		9	SPT				
			20	MC-9B	87	9		
	25							
349.0								

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-12

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0, 2.0, 3.0, 4.0)
349.0										
348.0			**Clayey Sand with Gravel (SC) [Fill]** medium dense, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel	50 / 5"	MC-10A		9			
	30			34	MC-11B	114	9		25	
340.5			**Sandy Lean Clay with Gravel (CL) [Fill]** stiff, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity							
	35			13	MC-12B	117	10			○
				50 / 3"	MC-13B	115	8			○
	40									
				50 / 6"	MC					
	45									
				19	MC-15B	124	10			○
	50									
323.0			**Clayey Gravel with Sand (GC) [Fill]** very dense to medium dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles							
				50 / 6"	MC-16B	129	7			
	55									
319.0			*Continued Next Page*							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-12

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
319.0			**Clayey Gravel with Sand (GC) [Fill]** very dense to medium dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles						
				54	MC-17		10		
	60								
				37	MC-18		15		
	65								
				16	SPT-19		9		
	70								
			some organics	50 4"	SPT-20		15		
301.0			**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured *Switched to 4 inch diameter rotary wash at 74'.* *Run #1: 88% recovery, RQD = 71%*		RC-1				
	75								
	80		*Run #2: 100% recovery, RQD = 92%*		RC-2				
291.0			Bottom of Boring at 84.0 feet.						
	85								

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-12A

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 5/26/21 **DATE COMPLETED** 5/27/21
GROUND ELEVATION 375 FT +/- **BORING DEPTH** 85 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.684191° **LONGITUDE** -122.421357°
DRILLING METHOD Mobile B-53, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING 63 ft.
NOTES
AT END OF DRILLING 78 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0 2.0 3.0 4.0)
375.0	0									
374.8			1 inch asphalt concrete over 4 inches aggregate base							
374.6			**Clayey Gravel with Sand (GC) [Fill]** medium dense to loose, moist, gray and reddish brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand	21	MC-1B	123	8			
370.5	5		**Clayey Sand with Gravel (SC) [Fill]** loose, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel							
367.0	10		**Clayey Gravel with Sand (GC) [Fill]** loose to medium dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles	11	SPT-2		11		18	
	15									
	20									
	25									
349.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-12A

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
349.0										
348.0			**Clayey Sand with Gravel (SC) [Fill]** medium dense, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel							
				25	SPT-3B		11			
	30									
	35		tough drilling from 34.5 to 37'							
338.0			**Sandy Lean Clay with Gravel (CL) [Fill]** stiff, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity							
	40									
				58	4A SPT 4B		11 7			
	45									
	50									
323.0			**Clayey Gravel with Sand (GC) [Fill]** very dense to medium dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles							
	55									
319.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-12A

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
319.0			**Clayey Gravel with Sand (GC) [Fill]** very dense to medium dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles							
				59	SPT-5		9			
	60									
	65									
				50 4"	SPT-6A		12		20	
	70									
300.0	75		**Sandy Lean Clay with Gravel (CL) [Fill]** stiff, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity							
	80			34	7A SPT 7B		13 23			
294.0			**Sandy Lean Clay with Gravel (CL)** stiff, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity							
291.0			**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured							
290.0	85			50 2"	MC					

Bottom of Boring at 85.0 feet.

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

Monitoring Well MW-12A

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

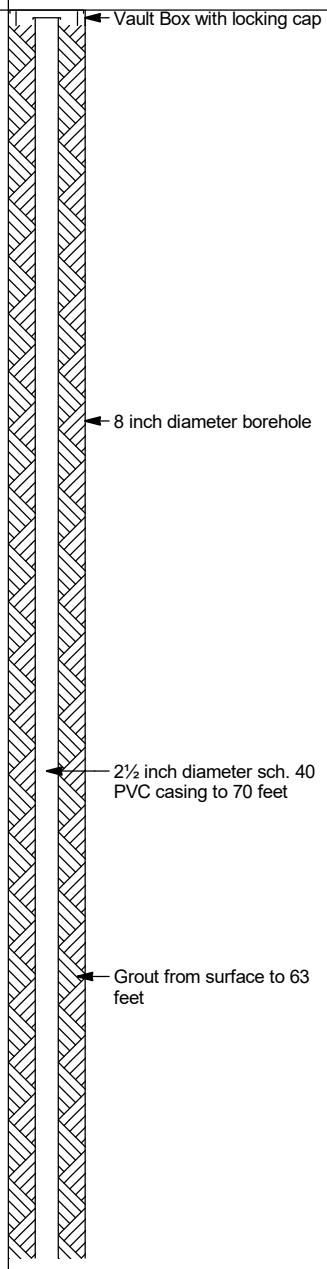
DATE STARTED 5/26/21 **DATE COMPLETED** 5/27/21
GROUND ELEVATION 375 FT +/- **BORING DEPTH** 85 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.684191° **LONGITUDE** -122.421357°
DRILLING METHOD Mobile B-53, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING 63 ft.
NOTES
AT END OF DRILLING 78 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	OVM READING (ppm)
375.0	0	1 inch asphalt concrete over 4 inches aggregate base					
374.8							
374.6		**Clayey Gravel with Sand (GC) [Fill]** medium dense to loose, moist, gray and reddish brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand	21	MC-1B			
370.5	5	**Clayey Sand with Gravel (SC) [Fill]** loose, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel					
367.0	10	**Clayey Gravel with Sand (GC) [Fill]** loose to medium dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles	11	SPT-2			18
	15						
	20						
	25						
348.0		**Clayey Sand with Gravel (SC) [Fill]** medium dense, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel	25	SPT-3B			
	30						
	35	rough drilling from 34.5 to 37'					
338.0		**Sandy Lean Clay with Gravel (CL) [Fill]** stiff, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity					
	40						
334.0							

Continued Next Page

Well Details



CORNERSTONE GI WELL - CORNERSTONE 0812.GDT - 7/27/23 10:53 - P:\DRAFTING\GINT FILES\582-5-2 CROCKER GI WELL.GPJ

Monitoring Well MW-12A

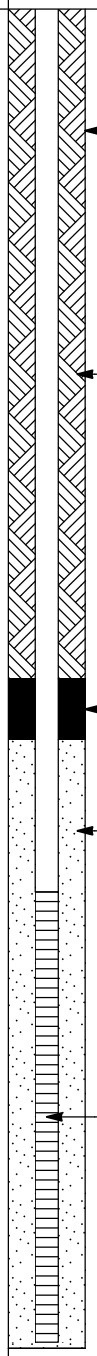
CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	OVM READING (ppm)
334.0		**Sandy Lean Clay with Gravel (CL) [Fill]** stiff, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity					
	45		58	4A SPT 4B			
	50						
323.0		**Clayey Gravel with Sand (GC) [Fill]** very dense to medium dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles					
	55						
	60		59	SPT-5			
	65						
			50 4"	SPT-6A			20
	70						
300.0	75	**Sandy Lean Clay with Gravel (CL) [Fill]** stiff, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity					
	80		34	7A SPT 7B			
294.0		**Sandy Lean Clay with Gravel (CL)** stiff, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity					
291.0							
290.0	85	**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured	50 2"	MC			

Bottom of Boring at 85.0 feet.



CORNERSTONE GI WELL - CORNERSTONE 0812.GDT - 7/27/23 10:53 - P:\DRAFTING\GINT FILES\582-5-2 CROCKER GI WELL.GPJ

BORING NUMBER EB-13

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/16/21 **DATE COMPLETED** 4/16/21
GROUND ELEVATION 277 FT +/- **BORING DEPTH** 27.1 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.685957° **LONGITUDE** -122.421176°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY JLC
AT TIME OF DRILLING 6 ft.
NOTES
AT END OF DRILLING 2 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0 2.0 3.0 4.0)
277.0	0		**Well Graded Gravel with Clay and Sand (GW-GC) [Fill]** very dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles	50/5"	MC-1B	116	13			
271.0	5		**Sandy Lean Clay with Gravel (CL) [Fill]** medium dense, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity	17	SPT-2		16			
	10			25	MC-3B	113	12			
	15			21	MC-4B	108	18			
	20			50/5"	SPT-5		19			
252.5	25		**Poorly Graded Gravel with Clay and Sand (GP-GC) [Fill]** very dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand *No advancement for 10 minutes, practical auger refusal.*	50/1"	NR					
249.9			Bottom of Boring at 27.1 feet.							
	30									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-13A

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/16/21 **DATE COMPLETED** 4/16/21
GROUND ELEVATION 277 FT +/- **BORING DEPTH** 34.5 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.685934° **LONGITUDE** -122.421176°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY JLC
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
277.0	0		**Well Graded Gravel with Clay and Sand (GW-GC) [Fill]** very dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles							
	5									
271.0			**Sandy Lean Clay with Gravel (CL) [Fill]** medium dense, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity							
	10		Straight drilled to 34 feet with no samples taken. Classification is from adjacent EB-13.							
	15									
	20									
252.5	25									
251.0			*Continued Next Page*							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-13A

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0, 2.0, 3.0, 4.0)
251.0			**Poorly Graded Gravel with Clay and Sand (GP-GC) [Fill]** very dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand							
	30									
			Drill rate = 0.3'/min. at 33-34'							
242.5			*Drill rate = 0.1'/min. at 34-34.5'*	50 / 1"	SPT					
	35		Bottom of Boring at 34.5 feet.							
	40									
	45									
	50									
	55									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-14

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/26/21 **DATE COMPLETED** 4/26/21
GROUND ELEVATION 310 FT +/- **BORING DEPTH** 33 ft.
DRILLING CONTRACTOR Britton Exploration
LATITUDE 37.684541° **LONGITUDE** -122.422402°
DRILLING METHOD CME 55 Track Rig, 6 inch solid stem auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
310.0	0	6 inches of gravel access road						
309.5		**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, brown with reddish brown mottles, fine to coarse subangular to subrounded gravel, fine to coarse sand	36	MC-1B	130	9		
307.0		**Sandy Lean Clay with Gravel (CL) [Fill]** medium stiff to stiff, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity	36	MC-2A	111	12		
	5		18	MC-3B		12		
			8	SPT-4		20		
			11	MC-5B	116	16		
	10	*Switched to 4 inch diameter rotary wash at 13'.*						
297.0		**Sandstone [Fill]**	50 3"	SPT				
296.5		**Clayey Gravel with Sand (GC) [Fill]** very dense to medium dense, moist, dark gray, fine to coarse subangular to subrounded gravel, fine to coarse sand *Run #1: 12% recovery*		RC-1				
	15		23	SPT-7		7		
	20	*Run #2: 37% recovery*		RC-2				
287.0		**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured *Run #3: 30% recovery, RQD = 0*						
	25			RC-3				
284.0		*Continued Next Page*						

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-14

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
284.0			**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured *Run #3: 30% recovery, RQD = 0*						
	30		*Run #4: 85% recovery, RQD = 56%*		RC-4					
277.0			Bottom of Boring at 33.0 feet.							
	35									
	40									
	45									
	50									
	55									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-15

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/26/21 **DATE COMPLETED** 4/26/21
GROUND ELEVATION 310 FT +/- **BORING DEPTH** 27.5 ft.
DRILLING CONTRACTOR Britton Exploration
LATITUDE 37.685723° **LONGITUDE** -122.420409°
DRILLING METHOD CME 55 Track Rig, 6 inch solid stem auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING 23 ft.
NOTES
AT END OF DRILLING 23 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

UNDRAINED SHEAR STRENGTH, ksf: HAND PENETROMETER; TORVANE; UNCONFINED COMPRESSION; UNCONSOLIDATED-UNDRAINED TRIAXIAL (1.0, 2.0, 3.0, 4.0)

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
310.0	0	6 inches of gravel access road						
309.5		**Clayey Gravel with Sand (GC) [Fill]** dense, moist, brown and gray mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand	75	MC-1B	144	6		
306.5		**Clayey Sand with Gravel (SC) [Fill]** medium dense to loose, moist, brown and gray mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel	27	MC-2B	122	11		
	5		16	MC-3B		7		
			8	SPT-4		7		
			9	MC-5B	107	8		
	10							
			12	MC-6B	118	14		
	15		7	SPT-7		10		
292.5		**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, brown and dark brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant cobbles	50 5"	MC-8 SPT		12		
	20		50 3"	SPT				
			50 3"					
289.0		**Sandstone [KJsk]** moderately hard, moderately strong, fresh weathering, bluish gray, closely to intensely fractured, with sheared shale *Drill rate = 0.05'/min. at 23.5-24'*	50 6"	MC-11	128	14		
	25							
		becomes hard, strong *Drill rate = 0.2'/min. at 26-27'*	50 6"	SPT-12		12		
282.5		*No advancement for 10 minutes, practical auger refusal.*						

Bottom of Boring at 27.5 feet.

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-16

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 5/17/21 **DATE COMPLETED** 5/17/21
GROUND ELEVATION 312 FT +/- **BORING DEPTH** 8.3 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.686614° **LONGITUDE** -122.422028°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
312.0	0								
311.8			2 inches asphalt concrete over 6 inches aggregate base						
311.3			**Silty Sand with Gravel (SM)** medium dense to dense, moist, fine sand, fine to coarse subangular gravel	32	MC-1B	108	10		
				44	MC-2B	121	10		
	5		becomes very dense	50 / 4"	MC-3B	115	11		
304.0			**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured *No advancement for 10 minutes, practical auger refusal.*	50 / 3"	SPT				
303.7	10		Bottom of Boring at 8.3 feet.						
	15								
	20								
	25								

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-16A

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 5/17/21 **DATE COMPLETED** 5/17/21
GROUND ELEVATION 312 FT +/- **BORING DEPTH** 9.1 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.686614° **LONGITUDE** -122.422028°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0, 2.0, 3.0, 4.0)
312.0	0									
			Straight drill to 8.5 feet.							
	5									
303.5			**Sandstone [KJsk]**	50	SPT-5		18			
302.9			hard, strong, fresh weathering, bluish gray, closely to intensely fractured	6"	SPT					
	10		*No advancement for 10 minutes, practical auger refusal.*	50 1"						
			Bottom of Boring at 9.1 feet.							
	15									
	20									
	25									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-16B

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 6/17/21 **DATE COMPLETED** 6/17/21
GROUND ELEVATION 312 FT +/- **BORING DEPTH** 35 ft.
DRILLING CONTRACTOR Britton Exploration
LATITUDE 37.686614° **LONGITUDE** -122.422028°
DRILLING METHOD CME 55 Track Rig, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0 2.0 3.0 4.0)
312.0	0									
311.8			2 inches asphalt concrete over 6 inches aggregate base							
311.3			**Silty Sand with Gravel (SM)** medium dense to dense, moist, fine sand, fine to coarse subangular gravel							
			Straight drill to 8.5 feet.							
	5		becomes very dense							
			Switched to 4 inch diameter rotary wash at 8.5'.							
303.5			**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured		RC-1					
	10		*Run #1: 100% recovery, RQD = 0*							
			Run #2: 60% recovery, RQD = 17%		RC-2					
	15		*Run #3: 37% recovery, RQD = 0*		RC-3					
294.0			**Shale [KJsk]** hard, strong, fresh weathering, dark brown and gray, closely to intensely fractured							
	20		*Run #4: 22% recovery, RQD = 0*		RC-4					
287.0	25									
286.0			*Continued Next Page*							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-16B

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
286.0			**Sandstone [KJsk]** hard, strong, fresh weathering, bluish gray, closely to intensely fractured *Run #5: No recovery*		RC-5					
	30			50/5"	SPT-5A		18			
			Run #6: 87% recovery, RQD = 53%		RC-6					
277.0	35		Bottom of Boring at 35.0 feet.							
	40									
	45									
	50									
	55									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-17

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 5/13/21 **DATE COMPLETED** 5/14/21
GROUND ELEVATION 433 FT +/- **BORING DEPTH** 137.5 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.683833° **LONGITUDE** -122.422349°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING 125 ft.
NOTES
AT END OF DRILLING 135 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
433.0	0	**Clayey Sand with Gravel (SC) [Fill]** loose, moist, brown, fine sand, fine to coarse subangular gravel	11	MC-1A		14		
			11	MC-2B	110	18		
429.0	5	**Sandy Lean Clay with Gravel (CL) [Fill]** medium stiff, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, some wood chips and brick fragments, low plasticity	26	MC-3B	112	17		
426.0	10	**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, some brick and concrete fragments	40	MC-4B	128	10		
421.0	15	**Poorly Graded Sand with Silt (SP-SM) [Fill]** loose to medium dense, moist, brown, fine to medium sand	12	MC-5B	100	5		
			15	SPT				
	20	some fine subangular gravel	13	SPT-7		8		
			7	SPT-8		9		
	25		27	MC-9B		8		
407.0		*Continued Next Page*						

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-17

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0 2.0 3.0 4.0)
407.0			**Poorly Graded Sand with Silt (SP-SM) [Fill]** loose to medium dense, moist, brown, fine to medium sand							
				19	SPT-10		13			
	30									
402.0			**Poorly Graded Sand with Silt and Gravel (SP-SM) [Fill]** medium dense, moist, brown, fine to medium sand, fine to coarse subangular gravel							
				48	MC-11B		10			
	35									
				22	SPT-12		8			
	40									
				31	MC-13B	110	10			
	45									
386.5			**Sandy Lean Clay with Gravel (CL) [Fill]** stiff, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity							
384.0			**Poorly Graded Sand with Silt (SP-SM) [Fill]** loose, moist, brown, fine to medium sand	17	MC-14C	96	2			○
	50									
				9	SPT-15		2			
	55									
377.0				9	SPT					

Continued Next Page

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

UNDRAINED SHEAR STRENGTH, ksf: HAND PENETROMETER; TORVANE; UNCONFINED COMPRESSION; UNCONSOLIDATED-UNDRAINED TRIAXIAL (1.0, 2.0, 3.0, 4.0)

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
377.0								
376.0		**Poorly Graded Sand with Silt (SP-SM) [Fill]** medium dense, moist, brown, fine to medium sand, some fine to coarse subangular gravel						
			16	SPT-17		4		
	60							
368.5		**Clayey Sand with Gravel (SC) [Fill]** dense, moist, brown, fine to coarse sand, fine to coarse subangular gravel	40	SPT-18B		11		
	65							
367.0		**Clayey Gravel with Sand (GC) [Fill]** very dense to dense, moist, brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles	50 3"	MC				
			50 6"	SPT-20		10		
	70							
			44	SPT-21B		10		
	75							
357.0		**Clayey Sand with Gravel (SC) [Fill]** medium dense, moist, brown, fine to coarse sand, fine to coarse subangular gravel						
			18	SPT-22		10		
	80							
348.0	85							
347.0								

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-17

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0 2.0 3.0 4.0)
347.0			**Clayey Gravel with Sand (GC) [Fill]** dense, moist, bluish gray, fine to coarse subangular gravel, fine to coarse sand, some cobbles							
				35	SPT-23		7			
	90									
	95									
			becomes medium dense	27	MC-24		7			
	100									
328.0	105		**Clayey Gravel with Sand (GC) [Fill]** very dense to dense, moist, bluish gray, fine to coarse subangular gravel, fine to coarse sand, some cobbles							
				64	SPT-25		6			
	110			42	SPT-26B		5			
	115									
317.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-17

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲) 1.0 2.0 3.0 4.0
317.0										
315.0			**Poorly Graded Sand with Silt (SP-SM) [Fill]** loose, moist, bluish gray, fine to medium sand, some fine to coarse subangular gravel							
	120			7	SPT-27					
	125									
	130		becomes medium dense	13	SPT-28		19			
298.0	135		**Poorly Graded Gravel with Clay and Sand (GP-GC) [Fill]** very dense, moist, gray and brown mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand							
295.5			*No advancement for 10 minutes, practical auger refusal.*	50 5"	SPT-29		17			
			Bottom of Boring at 137.5 feet.							
	140									
	145									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-18

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 5/18/21 **DATE COMPLETED** 6/17/21
GROUND ELEVATION 396 FT +/- **BORING DEPTH** 85 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.685921° **LONGITUDE** -122.423006°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
396.0	0	**Poorly Graded Sand with Silt (SP-SM) [Fill]** medium dense, moist, brown, fine to medium sand, some fine to coarse subangular to subrounded gravel						
394.3		**Sandy Lean Clay (CL) [Fill]** stiff, moist, brown, fine to coarse sand, some fine to coarse subangular to subrounded gravel, low plasticity	46	MC-1B	113	11		
391.5	5	**Well Graded Sand with Clay (SW-SC) [Fill]** medium dense, moist, brown, fine to medium sand, some fine to coarse subangular to subrounded gravel	11	SPT-2		9		
386.0	10	**Well Graded Gravel with Silt and Gravel (GW-GM) [Fill]** medium dense, moist, brown, fine to medium sand, some fine to coarse subangular to subrounded gravel, abundant AC fragments	27	SPT-3		4		
	15		50 / 4"	MC-4B	113	6		
	20		22	SPT-5		7		
371.0	25		50 / 6"	SPT-6		10		
370.0								

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-18

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
370.0			**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, dark gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant AC, some concrete fragments	64	SPT-7		10			
	30									
				50 4"	MC-8B	114	10			
	35									
				50 1"	SPT-9		3			
	40									
				50 6"	SPT					
	45		*Practical auger refusal at 48.8' on 5/18/2021 with Exploration Geoservices. Returned on 6/16/2021 with Britton Exploration, CME 55 with 3 inch diameter rotary wash.*							
349.0			**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, dark gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant concrete rubble, some rebar, some brick fragments	50 2"	SPT					
				50 4"	SPT-12		5			
					RC-1					
	50		*Run #1: No recovery*							
			Run #2: 7% recovery, RQD = 0		RC-2					
	55									
340.0			*Continued Next Page*							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-18

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
340.0			**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, dark gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant concrete rubble, some rebar, some brick fragments *Run #1: No recovery* *Run #3: 8% recovery, RQD = 0*		RC-3					
	60			56	SPT					
			Run #4: No recovery.		RC-4					
	65		*Highly variable drilling to 85' large voids, cobbles and boulders*							
			Run #5: No recovery.		RC-5					
	70			37	SPT					
			Run #6: No recovery.		RC-6					
	75									
			Run #7: No recovery.		RC-7					
	80									
			Hole collapsed to 65' and had to abandon boring. *Run #8: No recovery.*		RC-8					
311.0	85		Bottom of Boring at 85.0 feet.							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-18A

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 6/3/21 **DATE COMPLETED** 6/3/21
GROUND ELEVATION 397 FT +/- **BORING DEPTH** 56 ft.
DRILLING CONTRACTOR Britton Exploration
LATITUDE 37.686089° **LONGITUDE** -122.423145°
DRILLING METHOD CME 55 Track Rig, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
397.0	0		**Poorly Graded Sand with Silt and Gravel (SP-SM) [Fill]** dense, moist, brown, fine to medium sand, fine to coarse subangular to subrounded gravel, some AC and concrete fragments	51	MC-1B	104	6		
391.0	5		**Clayey Sand with Gravel (SC) [Fill]** medium dense, moist, dark gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant AC, some brick fragments	14	SPT-2		7		
	10								
	15			32	SPT-3		4		1
	20								
373.0	25		**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, dark gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant AC, some concrete fragments						
370.0			*Continued Next Page*						

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-18A

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

UNDRAINED SHEAR STRENGTH, ksf: ○ HAND PENETROMETER; △ TORVANE; ● UNCONFINED COMPRESSION; ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL (1.0, 2.0, 3.0, 4.0)

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
370.0			**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, dark gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant AC, some concrete fragments						
				60	MC-4		7		
	30								
	35								
				7	SPT-5		7		
	40								
	45								
				51	MC-6B	105	6		
	50								
	55		*Practical auger refusal. Drill plug was lost in bottom of hole and had to abandon boring.*						
341.0			Bottom of Boring at 56.0 feet.						

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-19

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 5/17/21 **DATE COMPLETED** 5/17/21
GROUND ELEVATION 200 FT +/- **BORING DEPTH** 58.75 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.687166° **LONGITUDE** -122.419123°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
200.0	0	6 inches asphalt concrete over 6 inches aggregate base						
199.5								
199.0		**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, dark brown and gray mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant AC, some concrete fragments	50 / 2"	MC				
			50 / 6"	MC-1	126	8		
196.0		**Clayey Sand (SC) [Native]** medium dense, moist, brown, fine to medium sand						
	5		24	MC-2B	115	14		
193.5		**Lean Clay with Sand (CL)** very stiff, moist, brown, fine sand, moderate plasticity						
			20	MC-3B	106	19		
	10							
188.0		**Sandy Lean Clay (CL)** very stiff, moist, brown, fine sand, low to moderate plasticity						
			37	MC-4B	111	17		
	15							
183.0		**Lean Clay with Sand (CL)** very stiff, moist, brown, fine sand, moderate plasticity						
			37	MC-5B	102	22		
	20							
		some fine subangular gravel	54	MC-6B	109	19		
	25							
172.5		*Continued Next Page*						

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-19

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
172.5			**Lean Clay with Sand (CL)** very stiff, moist, brown, fine sand, moderate plasticity	42	MC-7B	111	20		
	30								
169.0			**Poorly Graded Sand with Silt and Gravel (SP-SM)** very dense, moist, brown, fine to medium sand, some fine to coarse subangular to subrounded gravel	50 2"	MC				
166.3			**Sandstone [KJsk]** moderately hard, moderatele strong, little weathering, brown, closely to intensely fractured *Drill rate = 0.23'/min. at 34-43.5'*						
	35								
				50 3"	MC-9	109	8		
	40								
				50 6"	SPT-10		18		
			Drill rate = 0.45'/min. at 44-48.5'						
	45								
				50 3"	SPT-11		6		
	50		*Drill rate = 0.3'/min. at 49-58.5'*						
				50 5"	SPT-12		13		
	55								
141.2				50 3"	SPT-13		6		
			Bottom of Boring at 58.8 feet.						

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-20

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/30/21 **DATE COMPLETED** 5/25/21
GROUND ELEVATION 430 FT +/- **BORING DEPTH** 113.6 ft.
DRILLING CONTRACTOR Britton Exploration
LATITUDE 37.683158° **LONGITUDE** -122.422267°
DRILLING METHOD CME 55 Track Rig, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
430.0	0		**Silty Sand with Gravel (SM) [Fill]** loose, moist, gray and brown mottled, fine sand, some fine subangular to subrounded gravel		GB-1		7		
	5								
424.0			**Clayey Gravel with Sand (GC) [Fill]** loose, moist, brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles		GB-2		8		
				18	MC-3B		9		
	10								
419.0			**Sandy Lean Clay with Gravel (CL) [Fill]** stiff, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, some cobbles, possible boulders, low plasticity Liquid Limit = 27, Plastic Limit = 15		GB-4		15	12	
	15								
				8	NR				
	20								
				20	NR-6		13		
	25								
404.0									

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-20

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
404.0			**Sandy Lean Clay with Gravel (CL) [Fill]** stiff, moist, gray and brown mottled, fine to coarse sand, fine to coarse subangular to subrounded gravel, some cobbles, possible boulders, low plasticity							
				12	MC-7B	120	13			
	30									
397.5			**Clayey Gravel with Sand (GC) [Fill]** loose to medium dense, moist, brown and dark brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant cobbles, some boulders							
				18	MC-8		13			
	35									
				15	MC-9		14			
	40									
			becomes dense	74	MC-10B		4			
			Switched from auger to 4 inch diameter mud rotary at 44'							
			Run #1: 50% recovery.		RC-1					
	45									
			Run #2: 10% recovery.		RC-2					
	50									
			Run #3: No recovery.		RC-3					
	55									
374.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-20

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
374.0			**Clayey Gravel with Sand (GC) [Fill]** loose to medium dense, moist, brown and dark brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant cobbles, some boulders *Run #4: 15% recovery.*		RC-4					
	60		*Run #5: 15% recovery.*		RC-5					
	65		*Run #6: 7% recovery.* *Highly variable drilling to 113.6' large voids, cobbles and boulders*		RC-6					
	70			50 6"	SPT-12		20			
			Run #7: 42% recovery.		RC-7					
	75		*Left hole open at 77.5' on 4/30/2021 with Britton Exploration. Returned on 5/25/2021 with Exploration Geoservices, Mobile B-56 with 8 inch diameter Hollow stem auger.*		RC-8					
				31	SPT-13B		7			
				42	SPT-14B					
	80									
				61	MC-15B					
	85									
344.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-20

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

UNDRAINED SHEAR STRENGTH, ksf: HAND PENETROMETER; TORVANE; UNCONFINED COMPRESSION; UNCONSOLIDATED-UNDRAINED TRIAXIAL (1.0, 2.0, 3.0, 4.0)

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
344.0			**Clayey Gravel with Sand (GC) [Fill]** loose to medium dense, moist, brown and dark brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant cobbles, some boulders						
	90			58	MC-16B	126	4		
335.0	95		**Poorly Graded Gravel with Clay and Sand (GP-GC) [Fill]** very dense, moist, gray, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant cobbles, some sandstone boulders *Drill rate = 0.2'/min. at 95-100'*	50 / 5"	SPT-17A		5		
	100			50 / 6"	MC-18A	81	3		
	105		*Highly variable drilling to 113.6' large voids, cobbles and boulders*	50 / 3"	SPT-19		2		
	110								
316.4			*Drill rate = 0.06'/min. at 113-113.5' No advancement for 10 minutes, practical auger refusal.*	50 / 2"	SPT-20		1		
				50 / 1"	NR				
	115		Bottom of Boring at 113.6 feet.						

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-21

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 3/14/22 **DATE COMPLETED** 3/15/22
GROUND ELEVATION 325 FT +/- **BORING DEPTH** 86.5 ft.
DRILLING CONTRACTOR Geo-Ex Subsurface Exploration
LATITUDE 37.686176° **LONGITUDE** -122.419296°
DRILLING METHOD CME 75, Truck mounted
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0 2.0 3.0 4.0)
325.0	0		**Well Graded Gravel with Clay and Sand (GW-GC) [Fill]** medium dense, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand							
	5			21	MC-1B	97	9			
317.0			**Clayey Sand with Gravel (CL) [Fill]** loose, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel							
	10			10	MC-2B	109	15		24	
312.0			**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand							
	15			12	MC-3A	105	16		31	
	20									
	25			7	SPT-4		12		20	
298.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-21

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

UNDRAINED SHEAR STRENGTH, ksf: ○ HAND PENETROMETER; △ TORVANE; ● UNCONFINED COMPRESSION; ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL (1.0, 2.0, 3.0, 4.0)

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
298.0			**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand						
	30								
	35			15	SPT				
	40								
	45			25	SPT-6		21		15
	50								
	55			26	NR				
266.8									

Continued Next Page

BORING NUMBER EB-21

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
266.8			**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand							
	60									
	65			24	SPT-7		21		33	
257.0			**Lean Clay with Sand (CL)** very stiff, moist, brown, fine to coarse sand, some fine to coarse subangular to subrounded gravel, low plasticity							
	70			17	SPT					○
	75			43	SPT-9		12			○
245.0	80		*Switched to Rock coring at 80'* **Sandstone [KJsk]** moderately hard, moderately strong, little weathering, brown, closely to intensely fractured *Run #1: 100% recovery, RQD = 33%* *Run #2: 60% recovery, RQD = 24%*	50 2"	SPT RC-1 RC-2					
	85									
238.5			Bottom of Boring at 86.5 feet.							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-22

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 3/15/22 **DATE COMPLETED** 3/15/22
GROUND ELEVATION 238 FT +/- **BORING DEPTH** 43 ft.
DRILLING CONTRACTOR Geo-Ex Subsurface Exploration
LATITUDE 37.686701° **LONGITUDE** -122.419336°
DRILLING METHOD CME 75, Truck mounted, 4 inch solid stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING 24 ft.
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
238.0 / 237.9	0	1 inch asphalt concrete over 5 feet aggregate base						
233.0	5	**Well Graded Gravel with Clay and Sand (GW-GC) [Fill]** medium dense, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand	56	MC-1C	125	9		
229.0	10	**Lean Clay with Sand (CL)** very stiff, moist, brown, fine to coarse sand, some fine to coarse subangular to subrounded gravel, low plasticity						
222.5	15	**Sandy Lean Clay with Gravel (CL)** very stiff, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity	27	2A MC	118	13		57
				2B	111	19		
	20							
	25		22	3A MC	114	18		58
212.0								

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-22

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0 2.0 3.0 4.0)
212.0			**Sandy Lean Clay with Gravel (CL)** very stiff, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity		3B	113	18			▲
	30									
205.0			*Switched to Rock coring at 33'*	50 1"	SPT					
	35		**Sandstone [KJsk]** moderately hard, moderately strong, little weathering, brown, closely to intensely fractured *Run #1: 7% recovery*		RC-1					
	40		*Run #2: 68% recovery, RQD = 55%*		RC-2					
195.0			Bottom of Boring at 43.0 feet.							
	45									
	50									
	55									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-23

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 3/16/22 **DATE COMPLETED** 3/16/22
GROUND ELEVATION 188 FT +/- **BORING DEPTH** 27 ft.
DRILLING CONTRACTOR Geo-Ex Subsurface Exploration
LATITUDE 37.6871431° **LONGITUDE** -122.4182497°
DRILLING METHOD CME 75, Truck mounted
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING 16 ft.
NOTES
AT END OF DRILLING 16 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
188.0 / 187.8	0	2 inches Gravel						
		Silty Sand with Gravel (SM) [Fill] medium dense, moist, gray, fine to medium sand, fine subangular gravel						
	5							
182.3		**Clayey Sand with Gravel (SC)** medium dense, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel	25	MC-1A	108	10		
	10		43	2A MC 2B	117 / 119	15 / 15		39
	15		50 / 4"	3A MC 3B	121 / 123	15 / 12		
172.0		**Sandstone [KJsk]** moderately hard, moderately strong, little weathering, brown, closely to intensely fractured						
	20	*Switched to Rock coring at 20'*	50 / 3"	SPT				
		Run #1: 44% recovery, RQD = 18%		RC-1				
	25	*Run #2: 63% recovery, RQD = 6%*		RC-2				
161.0		Bottom of Boring at 27.0 feet.						

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-24

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 3/16/22 **DATE COMPLETED** 3/16/22
GROUND ELEVATION 214 FT +/- **BORING DEPTH** 71.5 ft.
DRILLING CONTRACTOR Geo-Ex Subsurface Exploration
LATITUDE 37.687877° **LONGITUDE** -122.420145°
DRILLING METHOD CME 75, Truck mounted
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING 20 ft.
NOTES
AT END OF DRILLING 30 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
214.0 / 213.8	0	2 inches Gravel						
		Well Graded Sand with Gravel and Silt (SW-SM) [Fill] medium dense, moist, brown, fine to coarse sand, fine subrounded gravel		GB				
	5							
208.3		**Clayey Sand with Gravel (SC) [Fill]** medium dense, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel	29	MC-2B	120	8		21
205.0		**Well Graded Sand with Clay and Gravel (SW-SC) [Fill]** medium dense, moist, brown, fine to coarse sand, fine to coarse subangular gravel						
	10		23	MC-3B	103	7		
	15							
194.0	20	**Lean Clay (CL)** stiff, moist, brown with gray mottles, moderate plasticity	12	SPT-4B		21		
	25							
188.0		*Continued Next Page*						

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-24

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER / TORVANE / UNCONFINED COMPRESSION / UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
188.0			**Lean Clay (CL)** stiff, moist, brown with gray mottles, moderate plasticity							
186.0			**Clayey Sand with Gravel (SC)** very dense, moist, reddish brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, some sandstone cobbles							
	30			50 / 5"	MC-5B	134	9		14	
	35									
176.0			**Sandy Lean Clay with Gravel (CL)** stiff, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity *Swiched from auger to 4 inch diameter rotary wash at 40'*							
	40			29	SPT-6		15			○
	45									
168.0			**Clayey Sand (SC)** medium dense, moist, reddish brown, fine to medium sand, some fine subangular to subrounded gravel							
	50			18	SPT-7		19		36	
	55									
158.0			*Continued Next Page*							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-24

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0, 2.0, 3.0, 4.0)
158.0			**Clayey Sand (SC)** medium dense, moist, reddish brown, fine to medium sand, some fine subangular to subrounded gravel							
	60			26	MC-8		16			
	65									
148.0			**Sandy Lean Clay with Gravel (CL)** very stiff, moist, brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, low plasticity							
	70			25	MC-9		22			○
142.5			Bottom of Boring at 71.5 feet.							
	75									
	80									
	85									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-24A

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 2/8/22 **DATE COMPLETED** 2/8/22
GROUND ELEVATION 214 FT +/- **BORING DEPTH** 3.3 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.687881° **LONGITUDE** -122.420133°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY JLC
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0, 2.0, 3.0, 4.0)
214.0	0		2 inches asphalt concrete over 8 inches aggregate base							
213.8										
213.1			**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, dark brown and gray mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand	50 / 1"	MC-1	110	5			
211.0				50 / 3"	SPT					
210.7			**Clayey Gravel (GC) [Fill]** very dense, moist, brown, fine to coarse subangular to subrounded gravel, some fine sand Practical drilling refusal on cobble at 3.3 feet.							
	5									
	10									
	15									
	20									
	25									

Bottom of Boring at 3.3 feet.

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-25

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 2/8/22 **DATE COMPLETED** 2/8/22
GROUND ELEVATION 215 FT +/- **BORING DEPTH** 11.3 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.687288° **LONGITUDE** -122.418782°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY JLC
AT TIME OF DRILLING 10 ft.
NOTES Terminated boring at 11.3 moved over 8' FOR EB-25A
AT END OF DRILLING 4 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
215.0	0		6 inches aggregate base						
214.5			**Concrete rubble [Fill]**	50/3"	MC				
211.8			**Clayey Sand with Gravel (SC) [Fill]** dense to very dense, moist, dark gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand	37	SPT				
	5			50/5"	MC-3	103	9		
				50/1"	SPT				
205.0	10		**Poorly Graded Gravel (GP) [Fill]** very dense, moist, gray and brown, fine to coarse angular to subangular gravel	50/3"	MC				
203.8			Bottom of Boring at 11.3 feet.						
	15								
	20								
	25								

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-25A

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 2/8/22 **DATE COMPLETED** 2/8/22
GROUND ELEVATION **BORING DEPTH** 59.4 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.687287° **LONGITUDE** -122.418813°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY JLC
AT TIME OF DRILLING 7 ft.
NOTES
AT END OF DRILLING 20 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0 2.0 3.0 4.0)
	0		12 inches aggregate base							
			Clayey Sand with Gravel (SC) [Fill] very dense, moist, dark gray and brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, fine to coarse sand	50 / 2"	SPT-1		6			
	5		**Well Graded Gravel with Sand (GW) [Fill]** very dense, moist, gray, fine to coarse aubangular to subrounded gravel, fine to coarse sand	50 / 5"	SPT					
			Poorly Graded Gravel (GP) [Fill] loose, moist, gray and brown, fine to coarse angular to subangular gravel	4	SPT					
	10		**Sandy Lean Clay (CL) [Fill]** medium stiff, moist, dark brown, fine sand, some fine to coarse subangular to subrounded gravel	15	MC-4B	114	16			
			Sandy Lean Clay (CL) very stiff, moist, light brown, with reddish brown mottles, finne sand, moderate plasticity	18	NR-5		22			
	15									
				66	MC					
	20									
				53	MC-7B	104	21			
	25									

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-25A

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

UNDRAINED SHEAR STRENGTH, ksf: ○ HAND PENETROMETER; △ TORVANE; ● UNCONFINED COMPRESSION; ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL (1.0, 2.0, 3.0, 4.0)

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
			Sandy Lean Clay (CL) very stiff, moist, light brown, with reddish brown mottles, finne sand, moderate plasticity	50 / 6"	MC					
	30									
				44	MC-9B	111	20			○ 3.0
	35									
				50 / 5"	MC					>4.5 ○
	40									
				50 / 6"	SPT-11		23			>4.5 ○
	45									
				50 / 6"	SPT					>4.5 ○
	50		**Sandstone [KJsk]** moderately hard, moderately strong, little weathering, brown, closely to intensely fractured							
				50 / 4"	SPT					
	55									
				50 / 5"	SPT-14		22			
	60		Bottom of Boring at 59.4 feet.							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-26

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 2/7/22 **DATE COMPLETED** 2/7/22
GROUND ELEVATION 178 FT +/- **BORING DEPTH** 11 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.6871797° **LONGITUDE** -122.4178376°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
178.0	0		2 inches asphalt concrete over 4 inches aggregate base						
177.8									
177.5			**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, brown and gray mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand	50 6"	MC-1	117	6		
				50 5"	MC-2	96	9		
174.5			**Lean Clay with Sand (CL)** very stiff, moist, brown, fine sand, moderate plasticity						
	5			50 6"	SPT-3B		13		
172.5			**Sandstone [KJsk]** moderately hard, moderately strong, little weathering, brown, closely to intensely fractured						
				50 6"	MC				
	10			50 6"	MC-5		6		
167.0			Bottom of Boring at 11.0 feet.						
	15								
	20								
	25								

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-27

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 2/7/22 **DATE COMPLETED** 2/7/22
GROUND ELEVATION 152 FT +/- **BORING DEPTH** 14.3 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.685862° **LONGITUDE** -122.415637°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
152.0	0		½ inch asphalt concrete over 4 inches aggregate base						
151.9									
151.6			**Clayey Sand (SC) [Fill]** medium dense, moist, brown with light brown mottles, fine sand	26	MC-1B	102	11		
149.5			**Clayey Sand (SC)** medium dense, moist, brown, fine sand	24	MC-2B	94	7		
	5								
146.5			**Sandstone [KJsk]** moderately hard, moderately strong, little weathering, brown, closely to intensely fractured	58	MC-3C	115	8		
				63	MC				
	10								
137.7			Bottom of Boring at 14.3 feet.	50 / 3"	SPT				
	15								
	20								
	25								

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-28

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 2/7/22 **DATE COMPLETED** 2/7/22
GROUND ELEVATION 138 FT +/- **BORING DEPTH** 19.3 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.685811° **LONGITUDE** -122.414300°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
138.0	0	1 inch asphalt concrete over 4 inches aggregate base						
137.9								
137.6		**Clayey Sand (SC) [Fill]** medium dense, moist, brown, fine to medium sand						
136.5		**Sandstone [KJsk]** moderately hard, moderately strong, little weathering, brown, closely to intensely fractured	50/6"	MC-1A	103	11		
			50/6"	MC-2B	116	13		
	5		42	SPT				
			50/6"	SPT				
	10		50/6"	SPT				
			50/4"	MC-6	111	8		
	15		50/3"	SPT				
118.7		Bottom of Boring at 19.3 feet.						
	20							
	25							

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-29

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 2/7/22 **DATE COMPLETED** 2/7/22
GROUND ELEVATION 121 FT +/- **BORING DEPTH** 40 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.685500° **LONGITUDE** -122.412741°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER / TORVANE / UNCONFINED COMPRESSION / UNCONSOLIDATED-UNDRAINED TRIAXIAL)
121.0	0	1 inch asphalt concrete over 4 inches aggregate base							
120.9									
120.6		**Well Graded Gravel with Sand (GW) [Fill]** dense, moist, bluish gray, fine to coarse subangular gravel, fine to coarse sand	50 5"	MC-1B	120	9		45	
119.0		**Clayey Sand (SC) [Fill]** dense, moist, brown, fine to medium sand	44	SPT					
	5								
115.5		**Lean Clay with Sand (CL)** medium stiff, moist, brown with gray mottles, fine sand, moderate plasticity	16	MC-3C	106	20			○
113.0		**Sandy Lean Clay (CL)** hard, moist, brown with gray mottles, fine sand, moderate plasticity	52	MC					>4.5 ○
	10								
107.0		**Clayey Sand with Gravel (SC)** very dense, moist, brown with light brown mottles, fine to coarse sand, fine to coarse subangular gravel	50 4"	MC-5	104	14			
	15		50 5"	SPT					
102.5		**Clayey Gravel (GC)** very dense, moist, brown, with reddish mottles, fine sand	50 6"	SPT-7		10			
	20								
99.0		**Lean Clay with Sand (CL)** very stiff, moist, brown with gray mottles, fine sand, moderate plasticity	40	SPT					○
	25								
93.5									

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-29

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0, 2.0, 3.0, 4.0)
93.5			**Lean Clay with Sand (CL)** very stiff, moist, brown with gray mottles, fine sand, moderate plasticity							
	30			60	MC-9B		23			
	35			50 / 6"	MC-10B	108	18			
				64	SPT					
81.0	40		Bottom of Boring at 40.0 feet.							
	45									
	50									
	55									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-30

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 2/7/22 **DATE COMPLETED** 2/7/22
GROUND ELEVATION 93 FT +/- **BORING DEPTH** 14.2 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.686042° **LONGITUDE** -122.411711°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
93.0	0	2 inch asphalt concrete over 4 inches aggregate base						
92.8								
92.5		**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, brown and gray mottled, fine to coarse subangular to subrounded gravel, fine to coarse sand	50 6"	MC-1	121	17		
91.0			50 3"	MC-2		9		
89.0		**Sandstone [KJsk]** moderately hard, moderately strong, little weathering, brown, closely to intensely fractured						
	5		50 5"	SPT-3		18		
		Siltstone [KJsk] moderately hard, moderately strong, little weathering, brown, closely to intensely fractured						
	10		50 3"	SPT				
82.0		**Sandstone [KJsk]** moderately hard, moderately strong, little weathering, brown, closely to intensely fractured						
78.8		Bottom of Boring at 14.2 feet.	50 2"	SPT-5		2		
	15							
	20							
	25							

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-31

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/12/22 **DATE COMPLETED** 4/13/22
GROUND ELEVATION 524 FT +/- **BORING DEPTH** 105 ft.
DRILLING CONTRACTOR Geo-Ex Subsurface Exploration
LATITUDE 37.682764° **LONGITUDE** -122.423044°
DRILLING METHOD Geoprobe 8140LS Sonic
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
524.0	0		**Well Graded Gravel with Clay and Sand (GW-GC) [Fill]** very dense, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant cobbles							
	5			50 / 2"	NR					
	10									
	15			50 / 2"	NR					
	20									
	25									
498.0			*Continued Next Page*							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
498.0			**Well Graded Gravel with Clay and Sand (GW-GC) [Fill]** very dense, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, abundant cobbles							
	30									
					GB					
	35									
	40									
					GB					
	45									
	50									
					GB					
	55									
468.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-31

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲; 1.0, 2.0, 3.0, 4.0)
468.0			Sandstone cobbles or boulder encountered		GB					
466.0			**Clayey Gravel with Sand (GC) [Fill]** very dense, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles							
	60				GB					
	65									
	70				GB					
	75		*Stopped drilling on 4/12/2022, resumed drilling on 4/13/2022*							
	80									
	85		*easier drilling*							
438.0			*Continued Next Page*							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-31

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
438.0			**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, bluish gray, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles							
	90				GB					
	95									
427.0			**Sandstone [KJsk]** moderately hard, moderately strong, little weathering, gray, closely to intensely fractured							
	100			50 / 1"	NR					
					GB					
419.0	105		Bottom of Boring at 105.0 feet.							
	110									
	115									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-32

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/13/22 **DATE COMPLETED** 4/25/22
GROUND ELEVATION 565 FT +/- **BORING DEPTH** 100 ft.
DRILLING CONTRACTOR Geo-Ex Subsurface Exploration
LATITUDE 37.682332° **LONGITUDE** -122.423012°
DRILLING METHOD Geoprobe 8140LS Sonic
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
565.0	0		**Clayey Gravel with Sand (GC) [Fill]** loose, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles							
	5				GB					
	10									
	15				GB					
	20			12	SPT					
	25									
539.0			*Continued Next Page*							

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-32

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER ○, TORVANE △, UNCONFINED COMPRESSION ●, UNCONSOLIDATED-UNDRAINED TRIAXIAL ▲) 1.0 2.0 3.0 4.0
539.0			**Clayey Gravel with Sand (GC) [Fill]** loose, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles							
					GB					
	30									
	35									
					GB					
	40			9	SPT					
	45									
					GB					
	50									
	55				GB					
509.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-32

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
509.0			**Clayey Gravel with Sand (GC) [Fill]** loose, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles becomes medium dense							
	60			20	SPT					
	65				GB					
	70									
	75				GB					
	80			24	SPT					
					GB					
	85									
479.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-32

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
479.0			**Clayey Gravel with Sand (GC) [Fill]** loose, moist, gray and brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles							
	90									
473.0			**Sandstone [KJsk]** moderately hard, moderately strong, little weathering, gray, closely fractured		GB					
					GB					
	95				GB					
					GB					
465.0	100		Bottom of Boring at 100.0 feet.							
	105									
	110									
	115									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-33

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 4/25/22 **DATE COMPLETED** 4/26/22
GROUND ELEVATION 592 FT +/- **BORING DEPTH** 40.5 ft.
DRILLING CONTRACTOR Geo-Ex Subsurface Exploration
LATITUDE 37.682039° **LONGITUDE** -122.423240°
DRILLING METHOD Geoprobe 8140LS Sonic
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
592.0	0		**Clayey Gravel with Sand (GC) [Fill]** medium dense to loose, moist, brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles							
	5				GB					
	10				GB					
	15									
	20									
	25									
566.0										

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-33

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry

PROJECT NUMBER 582-5-2

PROJECT LOCATION Brisbane, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (HAND PENETROMETER, TORVANE, UNCONFINED COMPRESSION, UNCONSOLIDATED-UNDRAINED TRIAXIAL) 1.0 2.0 3.0 4.0
566.0			**Clayey Gravel with Sand (GC) [Fill]** medium dense to loose, moist, brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles							
	30				GB					
559.0			**Clayey Gravel with Sand (GC) [Fill]** medium dense, moist, brown, fine to coarse subangular to subrounded gravel, fine to coarse sand, some cobbles		GB					
	35									
554.0			**Sandstone [KJsk]** moderately hard, moderately strong, little weathering, bluish gray, closely fractured		GB GB					
	40				GB					
551.5			Bottom of Boring at 40.5 feet.							
	45									
	50									
	55									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

BORING NUMBER EB-34

CORNERSTONE EARTH GROUP

PROJECT NAME Guadalupe Quarry
PROJECT NUMBER 582-5-2
PROJECT LOCATION Brisbane, CA

DATE STARTED 5/26/22 **DATE COMPLETED** 5/26/22
GROUND ELEVATION 160 FT +/- **BORING DEPTH** 20.3 ft.
DRILLING CONTRACTOR Exploration Geoservices Inc.
LATITUDE 37.689533° **LONGITUDE** -122.420180°
DRILLING METHOD Mobile B-56, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
AT TIME OF DRILLING Not Encountered
NOTES
AT END OF DRILLING Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION
160.0	0	4 inches aggregate base
159.7		**Poorly Graded Sand with Silt (SP-SM)** very dense, moist, light brown with brown mottles, fine sand
158.5		**Sandstone (KJsk)** moderate hard, weak strength, deep weathering, brown with dark brown mottled, fine sand
156.0	5	**Sandy Claystone (KJsk)** moderate hard, weak to friable, deep weathering, brown and light brown mottled, fine sand
142.0	20	**Sandstone (KJsk)** moderate hard, moderately strong, moderate weathering, brown, fine sand
139.7		Bottom of Boring at 20.3 feet.

N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
50 / 4"	MC-1	97	5		8
50 / 6"	MC-2	104	9		
75	SPT-3		11		
50 / 5"	SPT				
33	SPT-5		14		
50 / 3"	SPT				
50 / 3"	SPT-7		4		

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 7/27/23 12:10 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

APPENDIX B: LABORATORY TEST PROGRAM

The laboratory testing program was performed to evaluate the physical and mechanical properties of the soils retrieved from the site to aid in verifying soil classification.

Moisture Content: The natural water content was determined (ASTM D2216) on 294 samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

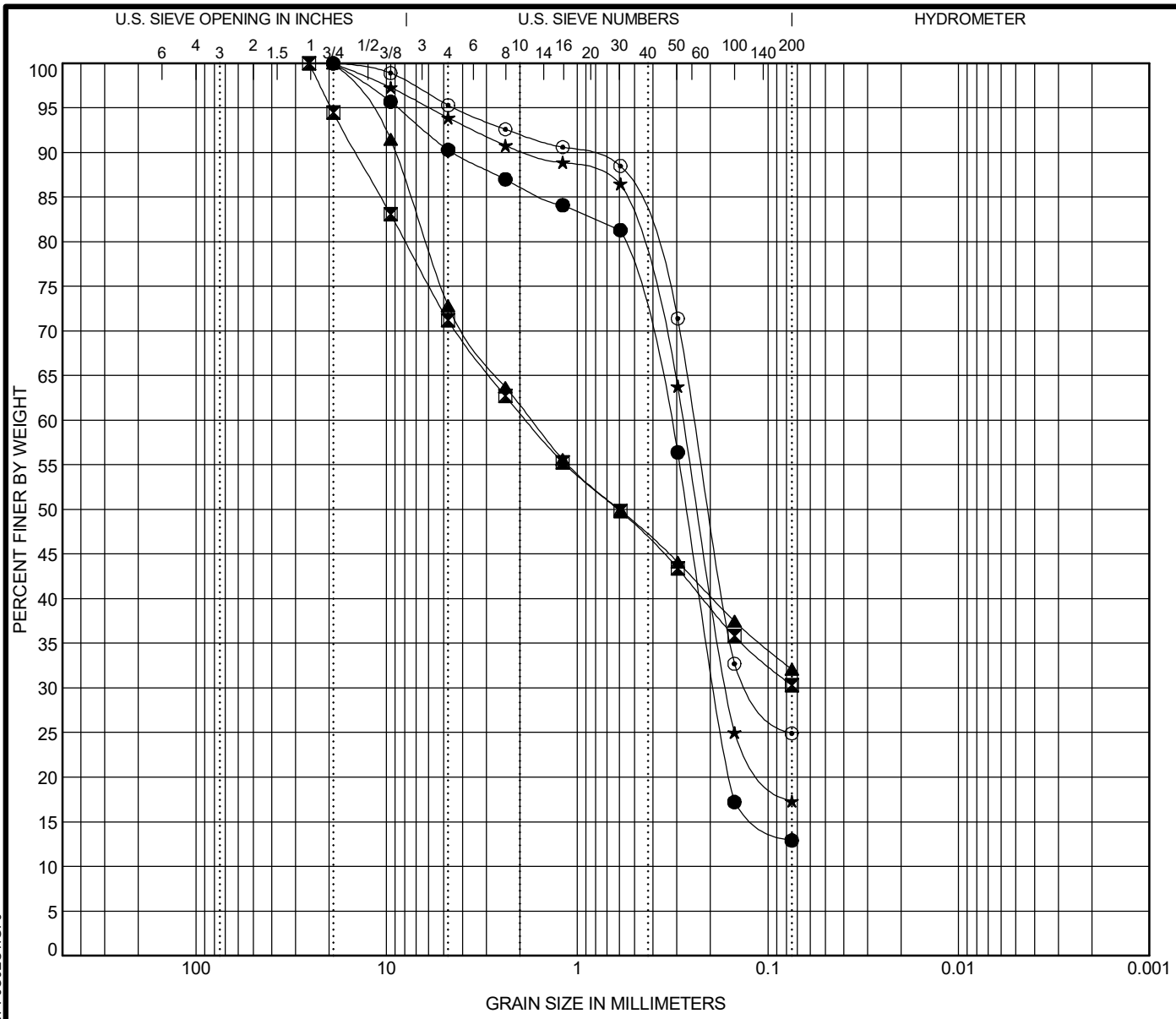
Dry Densities: In place dry density determinations (ASTM D2937) were performed on 142 samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Grain Size Analyses: The particle size distribution (ASTM D422) was determined on nine drive samples and 16 bulk samples of the subsurface soils to aid in the classification of these soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Washed Sieve Analyses: The percent soil fraction passing the No. 200 sieve (ASTM D1140) was determined on 42 samples of the subsurface soils to aid in the classification of these soils. Results of these tests are included as part of this appendix and are shown on the boring logs at the appropriate sample depths.

Undrained-Unconsolidated Triaxial Shear Strength: The undrained shear strength was determined on three relatively undisturbed sample(s) by unconsolidated-undrained triaxial shear strength testing (ASTM D2850). The results of these tests are included as part of this appendix.

Consolidated-Undrained Triaxial Compression with Pore Pressure Measurements: The undrained shear strength was determined on four relatively undisturbed samples and seven remolded samples of the soil material by multi-stage, consolidated undrained triaxial shear strength testing with pore pressure measurements (ASTM D4767). The results of these tests are included as part of this appendix.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**EB-1**	**103.5**	**Clayey Sand with Gravel (SC) [Fill]**					
⊠	**EB-1**	**128.5**	**Clayey Sand with Gravel (SC) [Fill]**					
▲	**EB-1**	**138.5**	**Clayey Sand with Gravel (SC) [Fill]**					
★	**EB-4**	**38.5**	**Clayey Sand with Gravel (SC) [Fill]**					
⊙	**EB-4**	**48.5**	**Clayey Sand with Gravel (SC) [Fill]**					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**EB-1**	**103.5**	**19.05**	**0.328**	**0.187**		**9.7**	**77.4**	**12.9**	
⊠	**EB-1**	**128.5**	**25.4**	**1.849**			**28.8**	**40.9**	**30.3**	
▲	**EB-1**	**138.5**	**19.05**	**1.735**			**27.2**	**40.7**	**32.1**	
★	**EB-4**	**38.5**	**19.05**	**0.278**	**0.164**		**6.1**	**76.6**	**17.3**	
⊙	**EB-4**	**48.5**	**19.05**	**0.243**	**0.118**		**4.7**	**70.4**	**24.9**	

CORNERSTONE EARTH GROUP

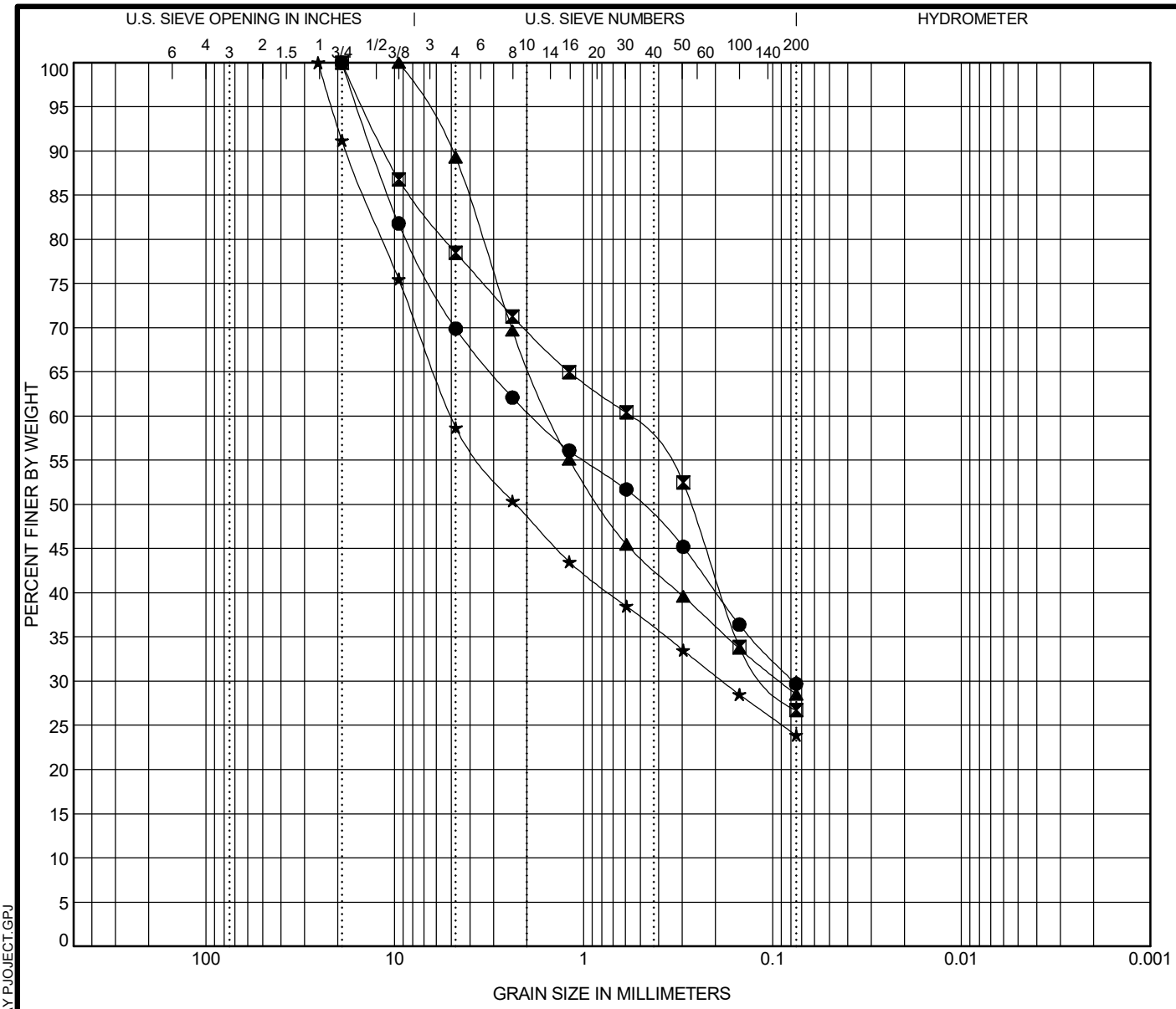
GRAIN SIZE DISTRIBUTION

Project: Bay Project

Location: Brisbane, CA

Number: 582-5-2

US GRAIN SIZE - CORNERSTONE 0812.GDT - 5/24/21 11:26 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**EB-4**	**63.5**	**Clayey Sand with Gravel (SC) [Fill]**					
⊠	**EB-4**	**93.5**	**Clayey Sand with Gravel (SC) [Fill]**					
▲	**EB-4**	**103.5**	**Clayey Sand with Gravel (SC) [Fill]**					
★	**EB-4**	**123.5**	**Clayey Sand with Gravel (SC) [Fill]**					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**EB-4**	**63.5**	**19.05**	**1.868**	**0.077**		**30.1**	**40.2**	**29.7**	
⊠	**EB-4**	**93.5**	**19.05**	**0.574**	**0.103**		**21.5**	**51.8**	**26.7**	
▲	**EB-4**	**103.5**	**9.525**	**1.503**	**0.092**		**10.7**	**60.8**	**28.5**	
★	**EB-4**	**123.5**	**25.4**	**5.013**	**0.184**		**41.3**	**34.8**	**23.9**	

CORNERSTONE EARTH GROUP

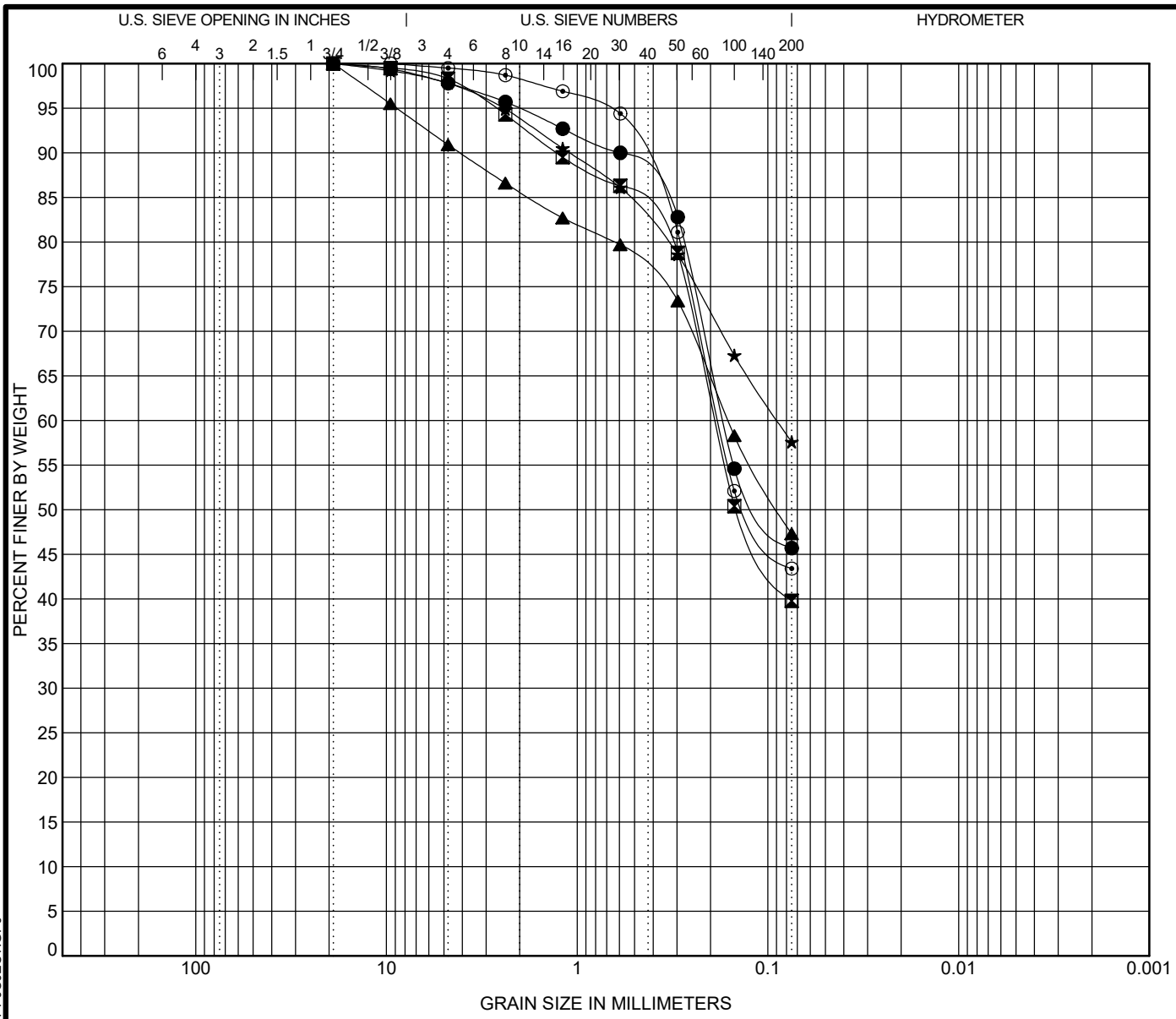
GRAIN SIZE DISTRIBUTION

Project: Bay Project

Location: Brisbane, CA

Number: 582-5-2

US GRAIN SIZE - CORNERSTONE 0812.GDT - 5/24/21 11:26 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**EB-1 (bulks)**	**18.0**	**Clayey Sand (SC) [Fill]**					
⊠	**EB-1 (bulks)**	**80.0**	**Clayey Sand (SC) [Fill]**					
▲	**EB-4 (bulks)**	**15.0**	**Clayey Sand (SC) [Fill]**					
★	**EB-4 (bulks)**	**32.0**	**Sandy Lean Clay (CL) [Fill]**					
⊙	**EB-4 (bulks)**	**40.0**	**Clayey Sand (SC) [Fill]**					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**EB-1 (bulks)**	**18.0**	**19.05**	**0.171**			**2.2**	**52.1**	**45.7**	
⊠	**EB-1 (bulks)**	**80.0**	**19.05**	**0.189**			**1.7**	**58.5**	**39.8**	
▲	**EB-4 (bulks)**	**15.0**	**19.05**	**0.162**			**9.1**	**43.6**	**47.3**	
★	**EB-4 (bulks)**	**32.0**	**19.05**	**0.089**			**2.2**	**40.2**	**57.6**	
⊙	**EB-4 (bulks)**	**40.0**	**9.525**	**0.181**			**0.5**	**56.1**	**43.4**	

CORNERSTONE EARTH GROUP

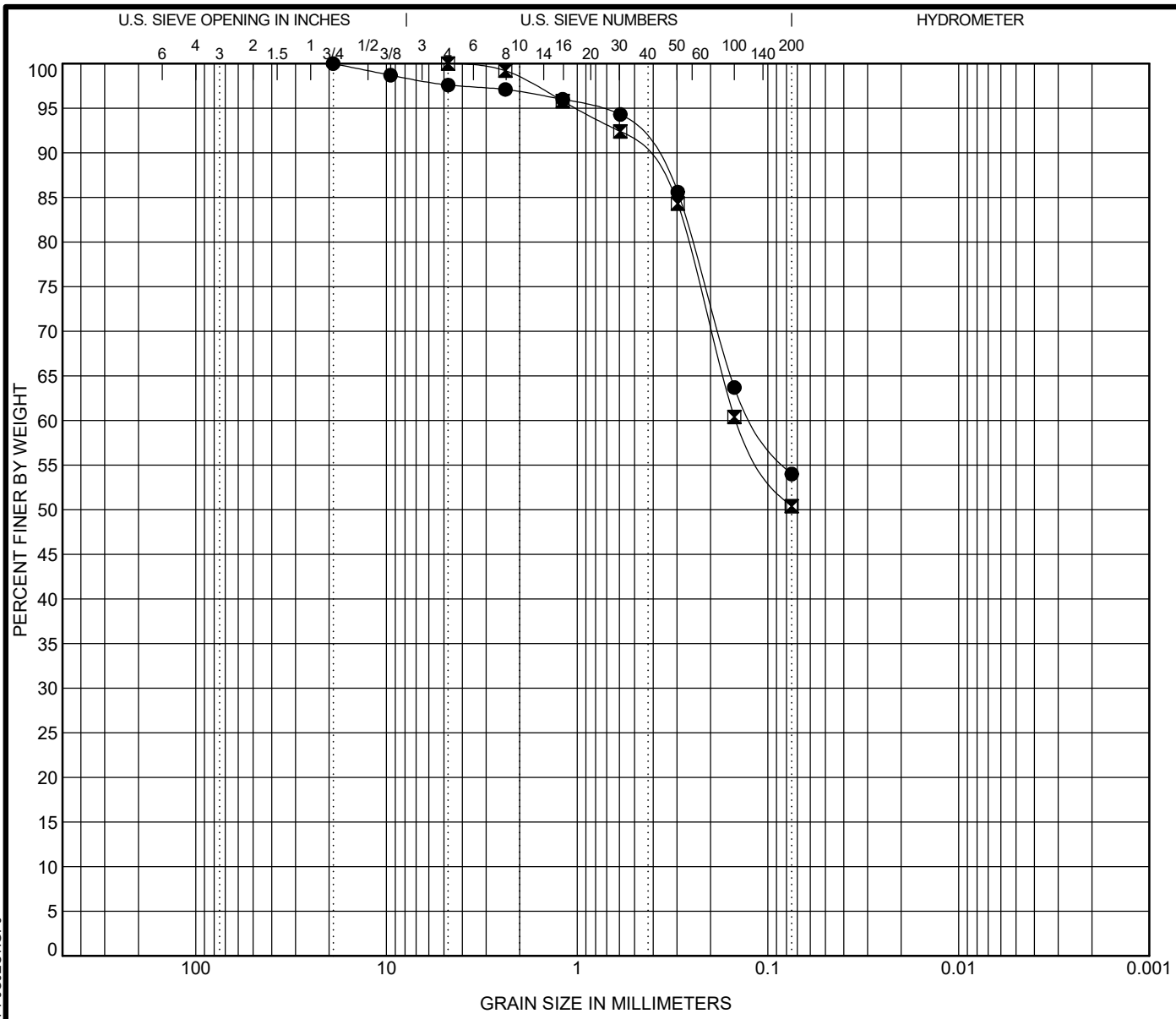
GRAIN SIZE DISTRIBUTION

Project: Bay Project

Location: Brisbane, CA

Number: 582-5-2

US GRAIN SIZE - CORNERSTONE 0812.GDT - 5/26/21 12:34 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**EB-4 (bulks)**	**53.0**	**Sandy Lean Clay (CL) [Fill]**					
⧗	**EB-4 (bulks)**	**90.0**	**Sandy Lean Clay (CL) [Fill]**					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**EB-4 (bulks)**	**53.0**	**19.05**	**0.115**			**2.4**	**43.6**	**54.0**	
⧗	**EB-4 (bulks)**	**90.0**	**4.75**	**0.146**			**0.0**	**49.6**	**50.4**	

CORNERSTONE EARTH GROUP

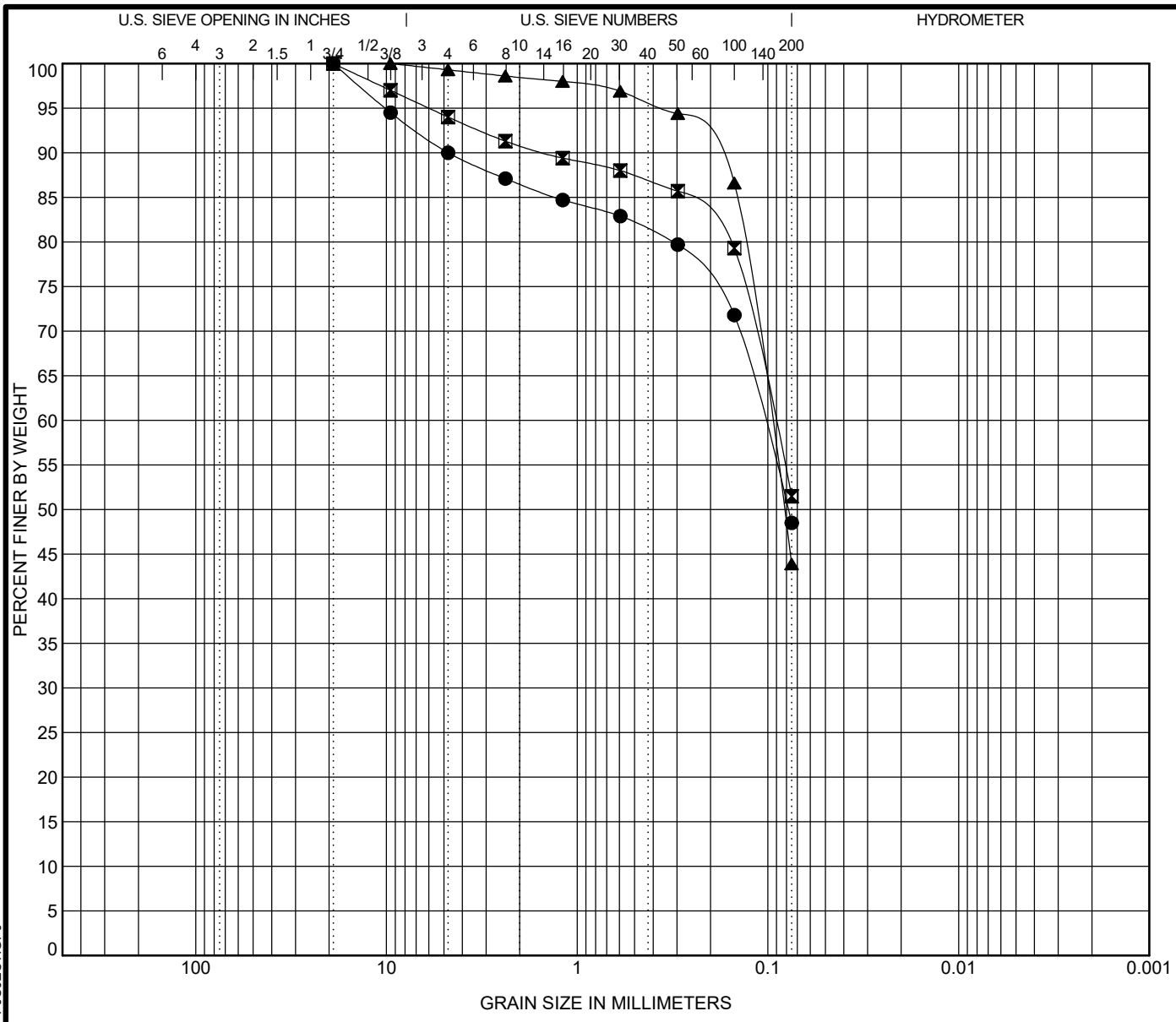
GRAIN SIZE DISTRIBUTION

Project: Bay Project

Location: Brisbane, CA

Number: 582-5-2

US GRAIN SIZE - CORNERSTONE 0812.GDT - 5/26/21 12:34 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**EB-5 (bulks)**	**15.0**	**Clayey Sand (SC)**					
⊠	**EB-5 (bulks)**	**30.0**	**Sandy Lean Clay (CL)**					
▲	**EB-5 (bulks)**	**45.0**	**Clayey Sand (SC)**					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**EB-5 (bulks)**	**15.0**	**19.05**	**0.106**			**10.0**	**41.5**	**48.5**	
⊠	**EB-5 (bulks)**	**30.0**	**19.05**	**0.093**			**6.0**	**42.5**	**51.5**	
▲	**EB-5 (bulks)**	**45.0**	**9.525**	**0.097**			**0.7**	**55.4**	**43.9**	

CORNERSTONE EARTH GROUP

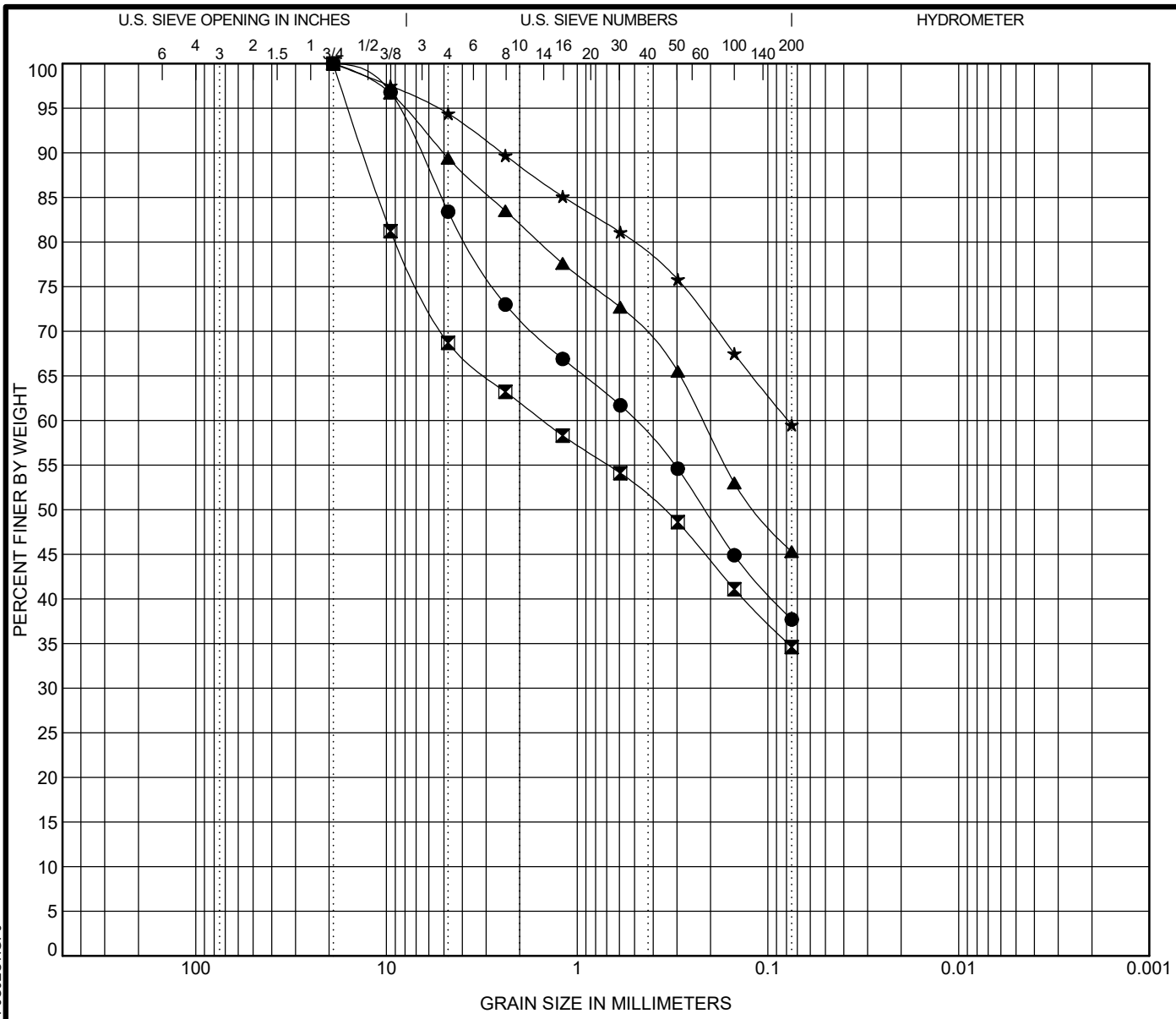
GRAIN SIZE DISTRIBUTION

Project: Bay Project

Location: Brisbane, CA

Number: 582-5-2

US GRAIN SIZE - CORNERSTONE 0812.GDT - 7/6/21 12:48 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**EB-12A (bulks)**	**13.0**	**Clayey Sand with Gravel (SC)**					
⊠	**EB-12A (bulks)**	**25.0**	**Clayey Sand with Gravel (SC)**					
▲	**EB-20 (bulks)**	**31.0**	**Clayey Sand (SC)**					
★	**EB-20 (bulks)**	**88.0**	**Sandy Lean Clay (CL)**					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**EB-12A (bulks)**	**13.0**	**19.05**	**0.503**			**16.6**	**45.7**	**37.7**	
⊠	**EB-12A (bulks)**	**25.0**	**19.05**	**1.514**			**31.3**	**34.1**	**34.6**	
▲	**EB-20 (bulks)**	**31.0**	**19.05**	**0.22**			**10.6**	**44.1**	**45.3**	
★	**EB-20 (bulks)**	**88.0**	**19.05**	**0.078**			**5.6**	**34.9**	**59.5**	

CORNERSTONE EARTH GROUP

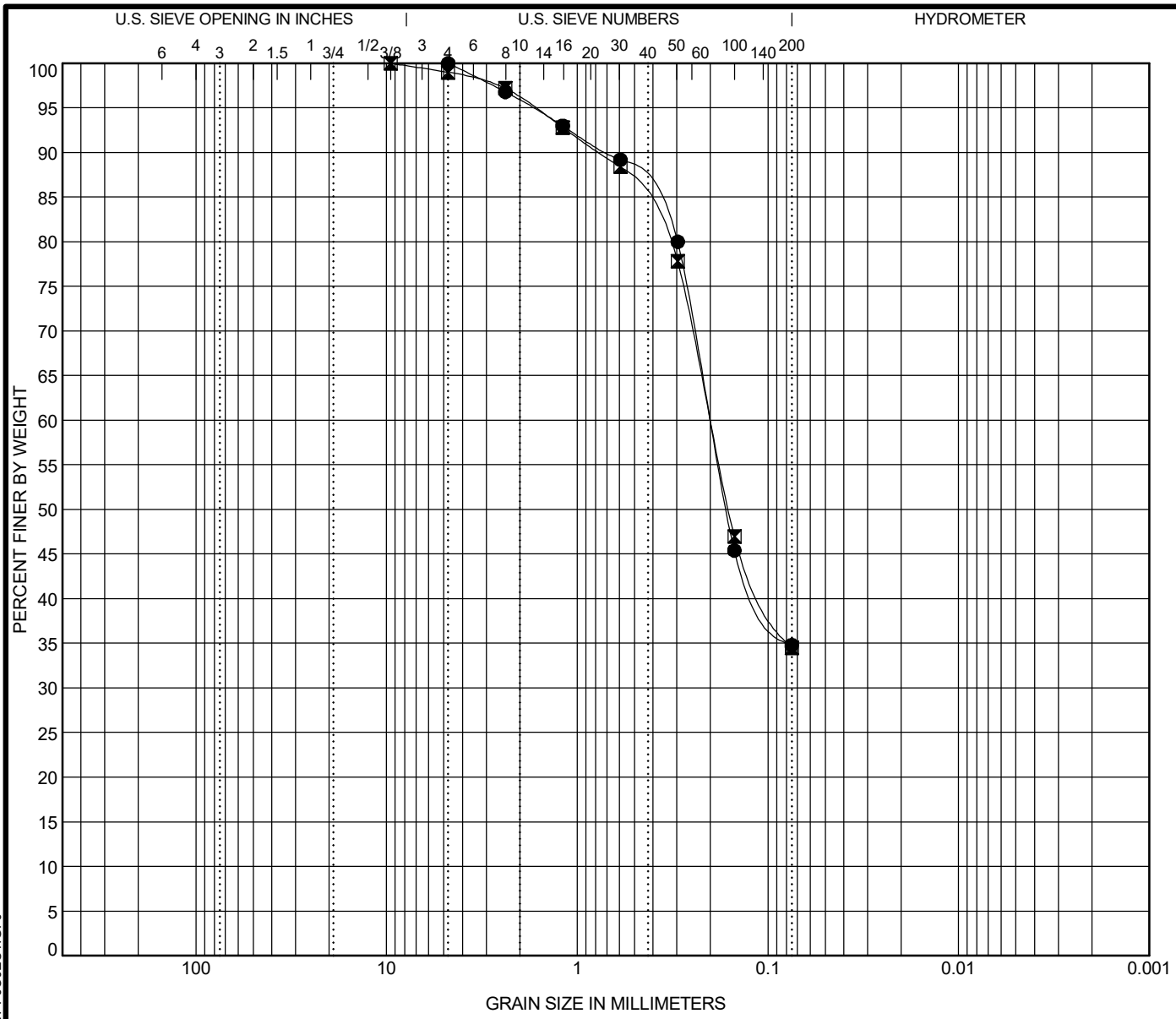
GRAIN SIZE DISTRIBUTION

Project: Bay Project

Location: Brisbane, CA

Number: 582-5-2

US GRAIN SIZE - CORNERSTONE 0812.GDT - 7/6/21 12:48 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**EB-1 (bulks)**	**18.5**	**Clayey Sand (SC) adjusted**					
⊠	**EB-4 (bulks)**	**90.5**	**Clayey Sand (SC) adjusted**					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**EB-1 (bulks)**	**18.5**	**4.75**	**0.2**			**0.0**	**65.2**	**34.8**	
⊠	**EB-4 (bulks)**	**90.5**	**9.525**	**0.2**			**1.0**	**64.5**	**34.5**	

CORNERSTONE EARTH GROUP

GRAIN SIZE DISTRIBUTION

Project: Bay Project

Location: Brisbane, CA

Number: 582-5-2

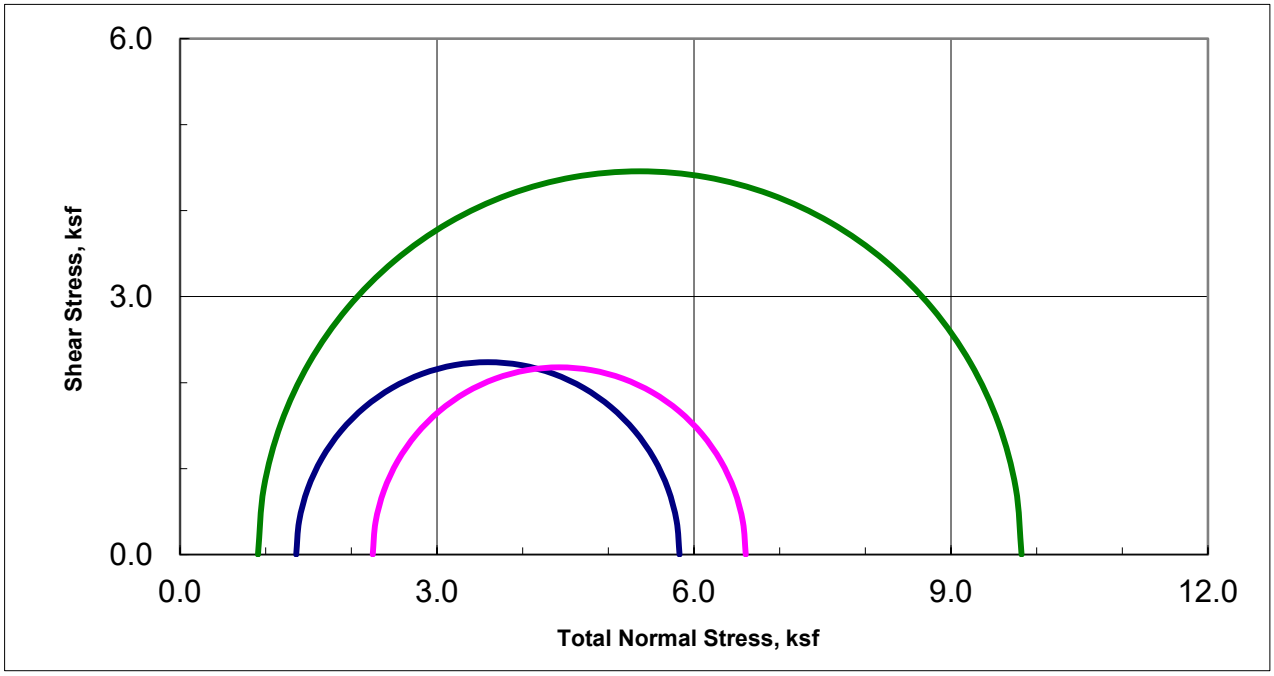
US GRAIN SIZE - CORNERSTONE 0812.GDT - 7/14/21 08:07 - P:\DRAFTING\GINT FILES\582-5-2 BAY PJOJECT.GPJ

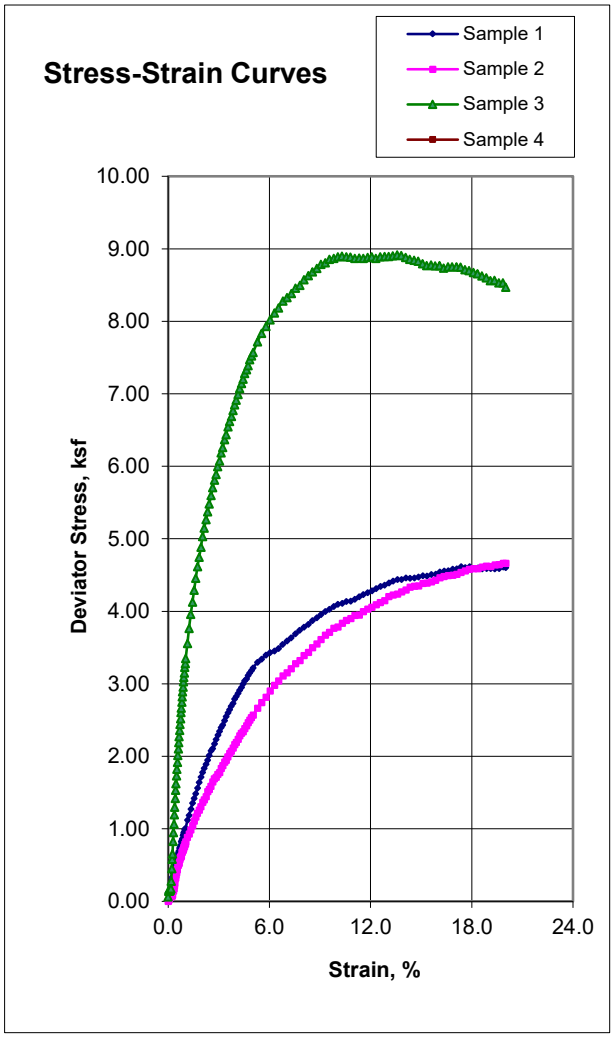
Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

COOPER TESTING LABORATORY

Unconsolidated-Undrained Triaxial Test

ASTM D2850





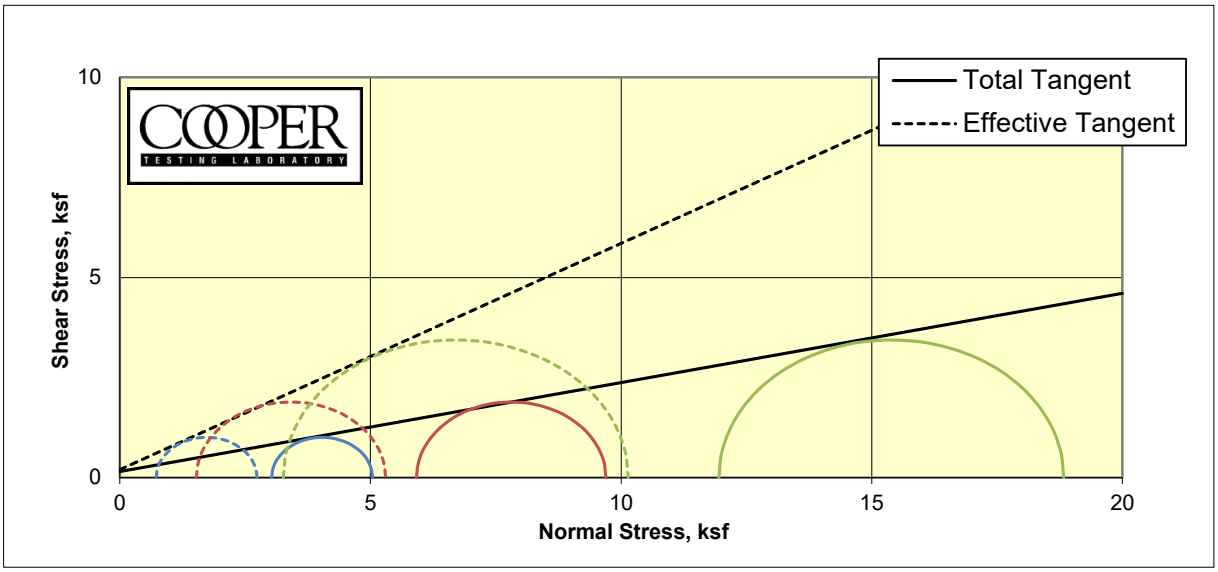
Sample Data	1	2	3	4
Moisture %	19.1	18.0	14.9	
Dry Den,pcf	110.9	113.2	119.1	
Void Ratio	0.520	0.489	0.415	
Saturation %	99.3	99.6	96.6	
Height in	4.99	4.98	5.03	
Diameter in	2.40	2.42	2.40	
Cell psi	9.4	15.6	6.3	
Strain %	15.00	15.00	13.57	
Deviator, ksf	4.475	4.355	8.914	
Rate %/min	1.00	1.00	1.00	
in/min	0.050	0.050	0.050	
Job No.:	640-1495			
Client:	Cornerstone Earth Group			
Project:	582-5-2			
Boring:	EB-22	EB-22	EB-23	
Sample:	2B	3B	2B	
Depth ft:	15.5	26.0	11.0	

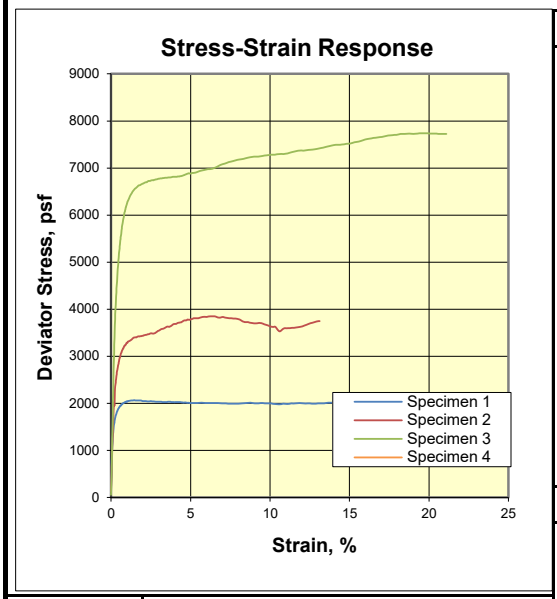
Visual Soil Description	
Sample #	
1	Yellowish Brown Sandy CLAY
2	Yellowish Brown Sandy CLAY w/ Gravel
3	Yellowish Brown Sandy CLAY
4	

Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767



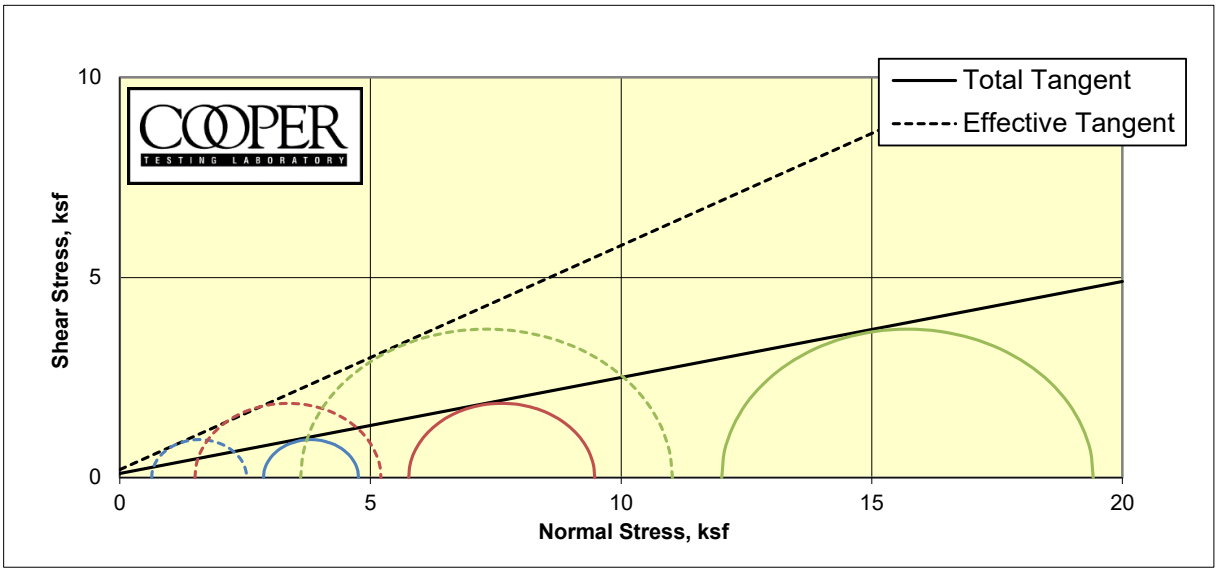


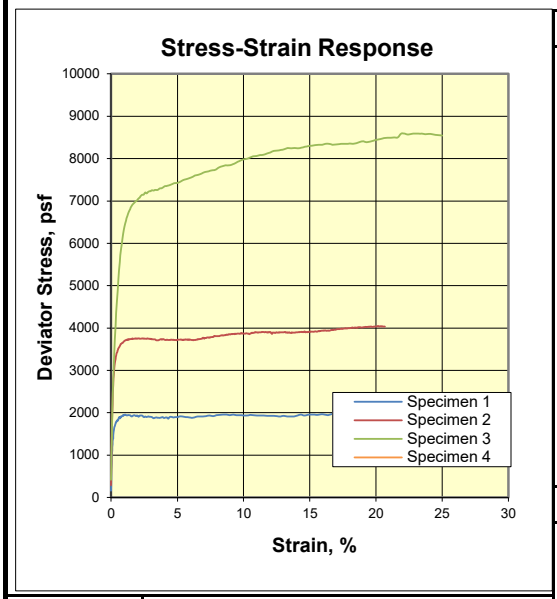
CTL Number:	640-1468		
Client Name:	Cornerstone Earth Group		
Project Name:	Bay Project		
Project Number:	582-5-2		
Date:	7/6/2021	By:	MD/DC
Total C	**0.150**	**ksf**	
Total phi	**12.5**	**degrees**	
Eff. C	**0.200**	**ksf**	
Eff. Phi	**29.5**	**degrees**	©

Remarks: Remolded to 98 pcf @ 12%. Specimen 2 shear was stopped at ~13% due to a loss of confining pressure at that point.

Specimen	**1**	**2**	**3**	**4**
Boring	EB-1	EB-1	EB-1	
Sample				
Depth	80.0	80.0	80.0	
Visual Description	Dark Brown Clayey SAND	Dark Brown Clayey SAND	Dark Brown Clayey SAND	
MC (%)	12.4	12.5	12.5	
Dry Density (pcf)	97.5	97.4	97.4	
Saturation (%)	44.8	45.1	45.1	
Void Ratio	0.761	0.763	0.763	
Diameter (in)	2.38	2.38	2.38	
Height (in)	5.00	5.00	5.00	
	Final			
MC (%)	20.0	18.0	16.0	
Dry Density (pcf)	110.8	114.8	119.2	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.550	0.495	0.440	
Diameter (in)	2.26	2.23	2.20	
Height (in)	4.86	4.81	4.74	
Cell Pressure (psi)	130.8	151.9	193.3	
Back Pressure (psi)	109.8	110.8	110.3	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	2.008	3.776	6.880	
Excess PP (psi)	16.0	30.5	60.3	
Sigma 1 (ksf)	2.736	5.305	10.143	
Sigma 3 (ksf)	0.728	1.529	3.263	
P (ksf)	1.732	3.417	6.703	
Q (ksf)	1.004	1.888	3.440	
Stress Ratio	3.758	3.469	3.109	
Rate (in/min)	0.0004	0.0004	0.0004	

Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767



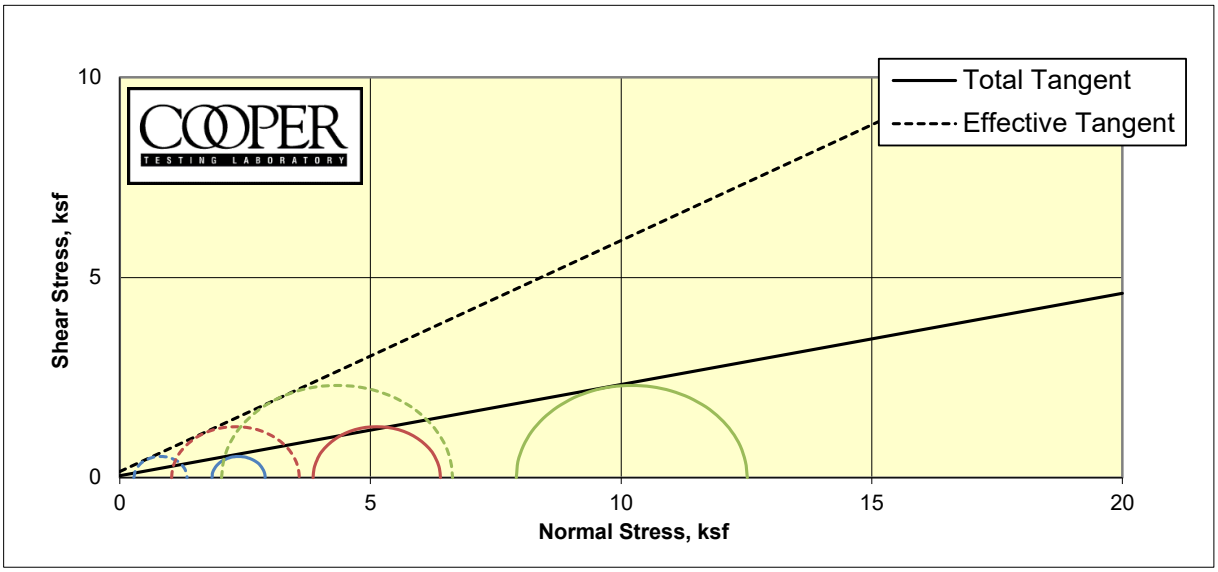


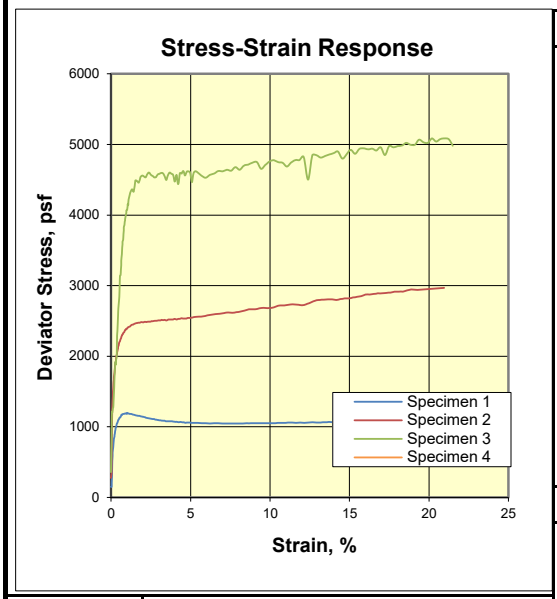
CTL Number:	640-1468		
Client Name:	Cornerstone Earth Group		
Project Name:	Bay Project		
Project Number:	582-5-2		
Date:	7/6/2021	By:	MD/DC
Total C	**0.100**	**ksf**	
Total phi	**13.5**	**degrees**	
Eff. C	**0.200**	**ksf**	
Eff. Phi	**29.2**	**degrees**	©

Remarks: Remolded to 105 pcf @ 12%.

Specimen	**1**	**2**	**3**	**4**
Boring	EB-1	EB-1	EB-1	
Sample				
Depth	80.0	80.0	80.0	
Visual Description	Brown Sandy CLAY/ Clayey SAND	Brown Sandy CLAY/ Clayey SAND	Brown Sandy CLAY/ Clayey SAND	
MC (%)	12.4	12.3	12.3	
Dry Density (pcf)	104.4	104.4	104.5	
Saturation (%)	52.9	52.7	52.6	
Void Ratio	0.645	0.644	0.643	
Diameter (in)	2.38	2.38	2.38	
Height (in)	5.00	5.00	5.00	
	Final			
MC (%)	19.4	18.0	16.0	
Dry Density (pcf)	112.0	114.8	119.2	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.533	0.495	0.440	
Diameter (in)	2.32	2.30	2.27	
Height (in)	4.90	4.86	4.81	
Cell Pressure (psi)	130.7	151.0	192.9	
Back Pressure (psi)	110.8	111.0	109.6	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	1.895	3.712	7.416	
Excess PP (psi)	15.5	29.6	58.3	
Sigma 1 (ksf)	2.531	5.210	11.024	
Sigma 3 (ksf)	0.636	1.498	3.608	
P (ksf)	1.584	3.354	7.316	
Q (ksf)	0.947	1.856	3.708	
Stress Ratio	3.978	3.478	3.055	
Rate (in/min)	0.0004	0.0004	0.0004	

Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767



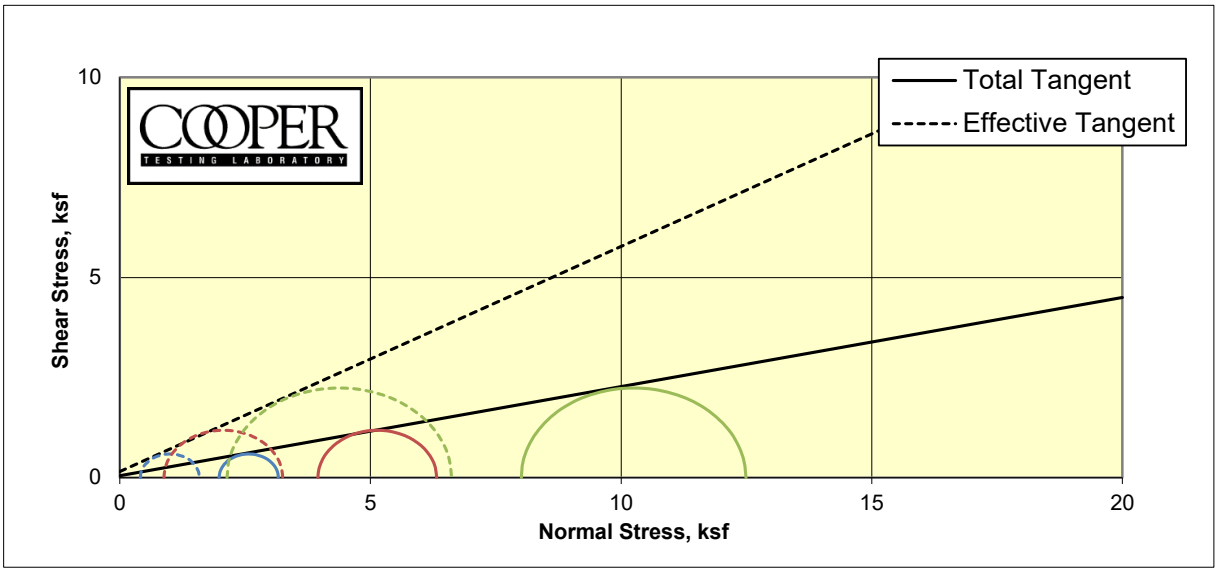


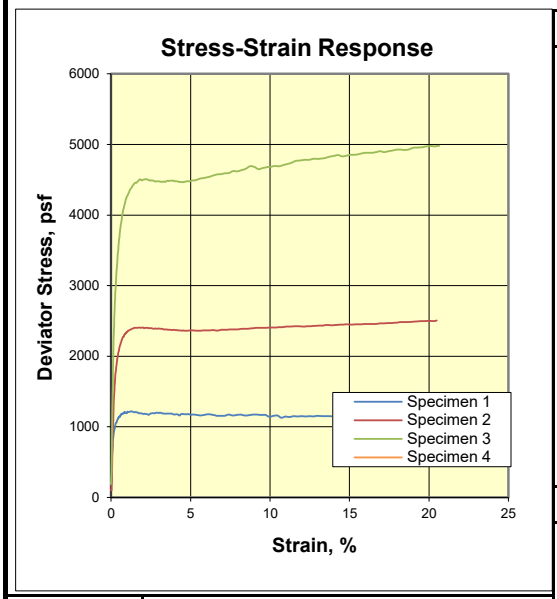
CTL Number:	640-1468		
Client Name:	Cornerstone Earth Group		
Project Name:	Bay Project		
Project Number:	582-5-2		
Date:	7/6/2021	By:	MD/DC
Total C	**0.050**	**ksf**	
Total phi	**12.8**	**degrees**	
Eff. C	**0.150**	**ksf**	
Eff. Phi	**30.0**	**degrees**	©

Remarks: Remolded to 92 pcf @ 12%.

Specimen	**1**	**2**	**3**	**4**
Boring	EB-4	EB-4	EB-4	
Sample				
Depth	40.0	40.0	40.0	
Visual Description	Brown Sandy CLAY	Brown Sandy CLAY	Brown Sandy CLAY	
MC (%)	12.1	12.1	12.4	
Dry Density (pcf)	92.0	92.1	91.9	
Saturation (%)	39.3	39.5	40.0	
Void Ratio	0.832	0.830	0.834	
Diameter (in)	2.38	2.38	2.38	
Height (in)	5.00	5.00	5.00	
	Final			
MC (%)	22.0	19.5	18.0	
Dry Density (pcf)	105.8	110.4	113.4	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.594	0.526	0.486	
Diameter (in)	2.25	2.22	2.21	
Height (in)	4.84	4.77	4.66	
Cell Pressure (psi)	123.7	137.4	165.5	
Back Pressure (psi)	110.9	110.7	110.6	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	1.059	2.545	4.606	
Excess PP (psi)	10.8	19.6	40.8	
Sigma 1 (ksf)	1.343	3.583	6.638	
Sigma 3 (ksf)	0.284	1.038	2.031	
P (ksf)	0.814	2.310	4.335	
Q (ksf)	0.530	1.273	2.303	
Stress Ratio	4.727	3.453	3.268	
Rate (in/min)	0.0004	0.0004	0.0004	

Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767



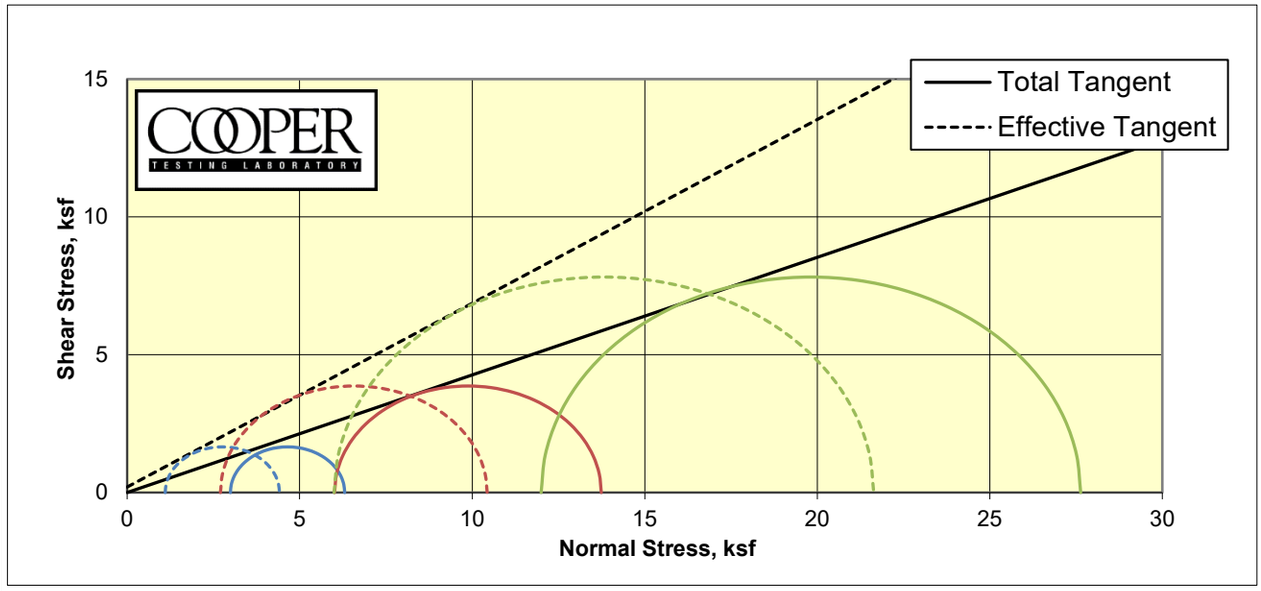


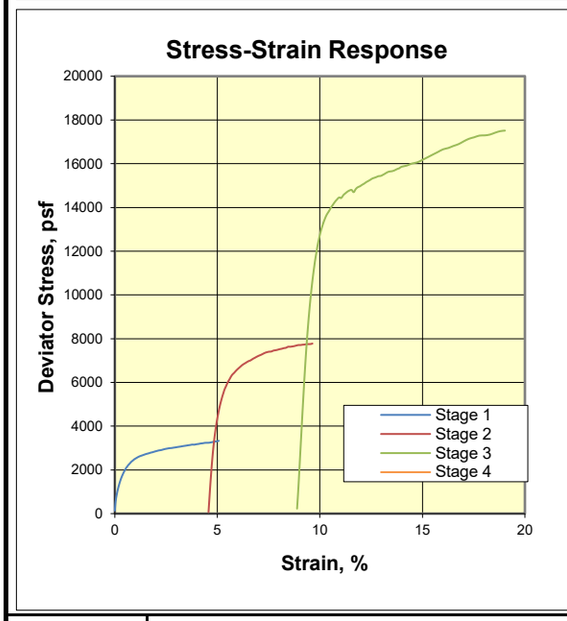
CTL Number:	640-1468		
Client Name:	Cornerstone Earth Group		
Project Name:	Bay Project		
Project Number:	582-5-2		
Date:	7/6/2021	By:	MD/DC
Total C	0.050	ksf	
Total phi	12.5	degrees	
Eff. C	0.150	ksf	
Eff. Phi	29.4	degrees	©

Remarks: Remolded to 100 pcf @ 12%.

Specimen	1	2	3	4
Boring	EB-4	EB-4	EB-4	
Sample				
Depth	40.0	40.0	40.0	
Visual Description	Brown Sandy CLAY	Brown Sandy CLAY	Brown Sandy CLAY	
MC (%)	12.3	12.2	12.2	
Dry Density (pcf)	99.9	100.0	100.0	
Saturation (%)	48.2	48.1	48.2	
Void Ratio	0.687	0.685	0.685	
Diameter (in)	2.38	2.38	2.38	
Height (in)	5.00	5.00	5.00	
	Final			
MC (%)	21.2	19.6	17.6	
Dry Density (pcf)	107.3	110.2	114.2	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.571	0.529	0.475	
Diameter (in)	2.31	2.29	2.28	
Height (in)	4.91	4.88	4.74	
Cell Pressure (psi)	123.7	137.7	165.5	
Back Pressure (psi)	110.0	110.2	109.9	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	1.180	2.367	4.481	
Excess PP (psi)	10.9	21.3	40.8	
Sigma 1 (ksf)	1.589	3.249	6.619	
Sigma 3 (ksf)	0.410	0.883	2.138	
P (ksf)	0.999	2.066	4.378	
Q (ksf)	0.590	1.183	2.240	
Stress Ratio	3.881	3.681	3.096	
Rate (in/min)	0.0004	0.0004	0.0004	

Staged Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767m



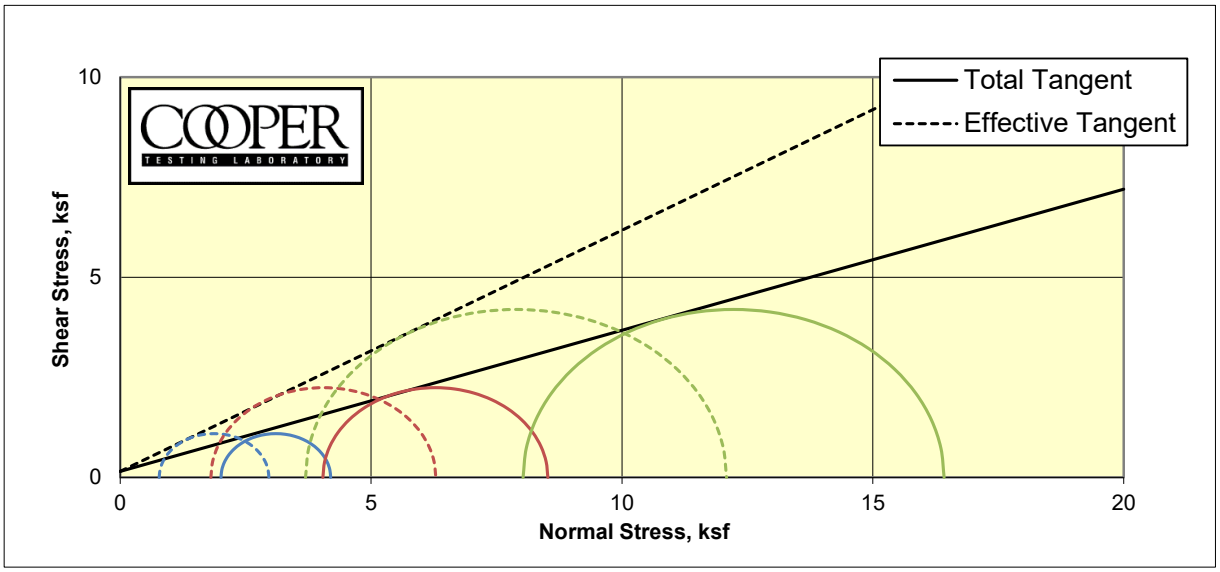


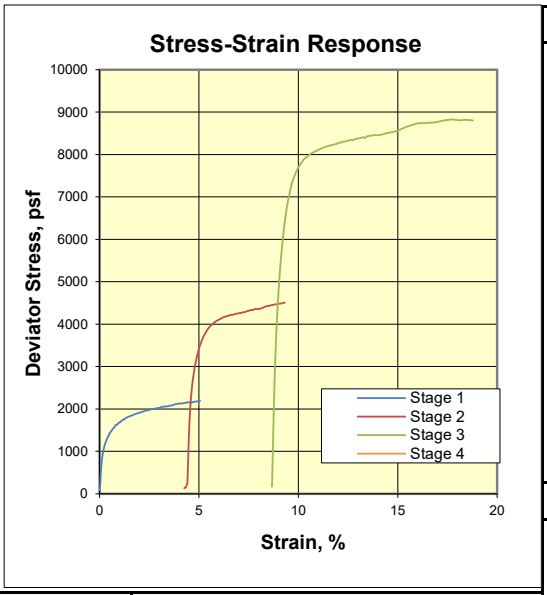
CTL Number:	640-1475		
Client Name:	Cornerstone Earth Group		
Project Name:	Bay Project		
Project Number:	582-5-2		
Date:	7/15/2021	By:	MD/DC
Total C	**0.000**	**ksf**	
Total phi	**23.1**	**degrees**	
Eff. C	**0.200**	**ksf**	
Eff. Phi	**33.7**	**degrees**	©

Remarks: +1/2" Gravel noted after shear.

Stage	**1**	**2**	**3**	**4**
Boring	EB-1			
Sample	12A			
Depth	94.0			
Visual Description	Greenish Gray Clayey GRAVEL w/ Sand			
MC (%)	6.1			
Dry Density (pcf)	121.1			
Saturation (%)	42.0			
Void Ratio	0.391			
Diameter (in)	2.40			
Height (in)	5.01			
	Final			
MC (%)	12.2	11.1	10.1	
Dry Density (pcf)	126.9	129.8	132.4	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.328	0.299	0.273	
Diameter (in)	2.36	2.39	2.42	
Height (in)	4.94	4.72	4.50	
Cell Pressure (psi)	90.7	111.6	153.2	
Back Pressure (psi)	70.0	69.9	69.9	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	3.312	7.731	15.637	
Excess PP (psi)	13.1	23.0	41.7	
Sigma 1 (ksf)	4.415	10.434	21.636	
Sigma 3 (ksf)	1.103	2.704	5.999	
P (ksf)	2.759	6.569	13.818	
Q (ksf)	1.656	3.865	7.819	
Stress Ratio	4.003	3.860	3.607	
Rate (in/min)	0.0005	0.0005	0.0005	

Staged Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767m

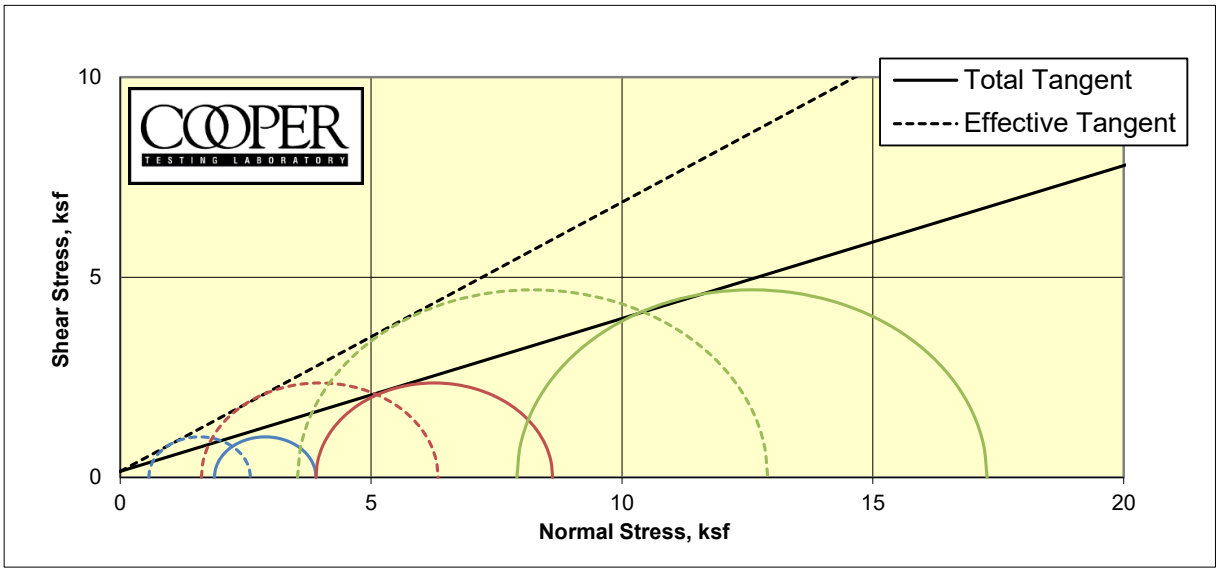


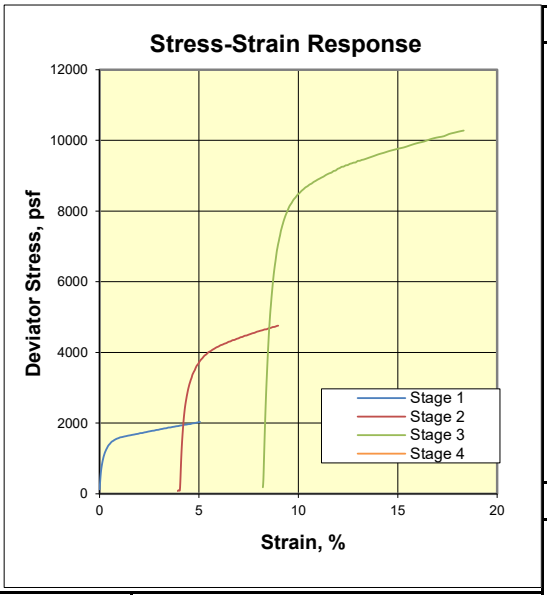


CTL Number:	640-1475		
Client Name:	Cornerstone Earth Group		
Project Name:	Bay Project		
Project Number:	582-5-2		
Date:	7/16/2021	By:	MD/DC
Total C	0.150	ksf	
Total phi	19.4	degrees	
Eff. C	0.150	ksf	
Eff. Phi	31.1	degrees	©

Stage	1	2	3	4
Boring	EB-4			
Sample	3A			
Depth	19.0			
Visual Description	Olive Brown Sandy CLAY w/ Gravel			
MC (%)	15.7			
Dry Density (pcf)	115.4			
Saturation (%)	88.4			
Void Ratio	0.488			
Diameter (in)	2.42			
Height (in)	4.99			
	Final			
MC (%)	16.2	14.9	13.7	
Dry Density (pcf)	118.7	121.7	124.7	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.447	0.410	0.377	
Diameter (in)	2.39	2.42	2.44	
Height (in)	4.94	4.72	4.51	
Cell Pressure (psi)	83.7	97.8	125.5	
Back Pressure (psi)	69.8	69.8	69.8	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	2.186	4.484	8.391	
Excess PP (psi)	8.6	15.5	30.1	
Sigma 1 (ksf)	2.963	6.290	12.084	
Sigma 3 (ksf)	0.777	1.806	3.693	
P (ksf)	1.870	4.048	7.889	
Q (ksf)	1.093	2.242	4.196	
Stress Ratio	3.813	3.482	3.272	
Rate (in/min)	0.0005	0.0005	0.0005	

Staged Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767m

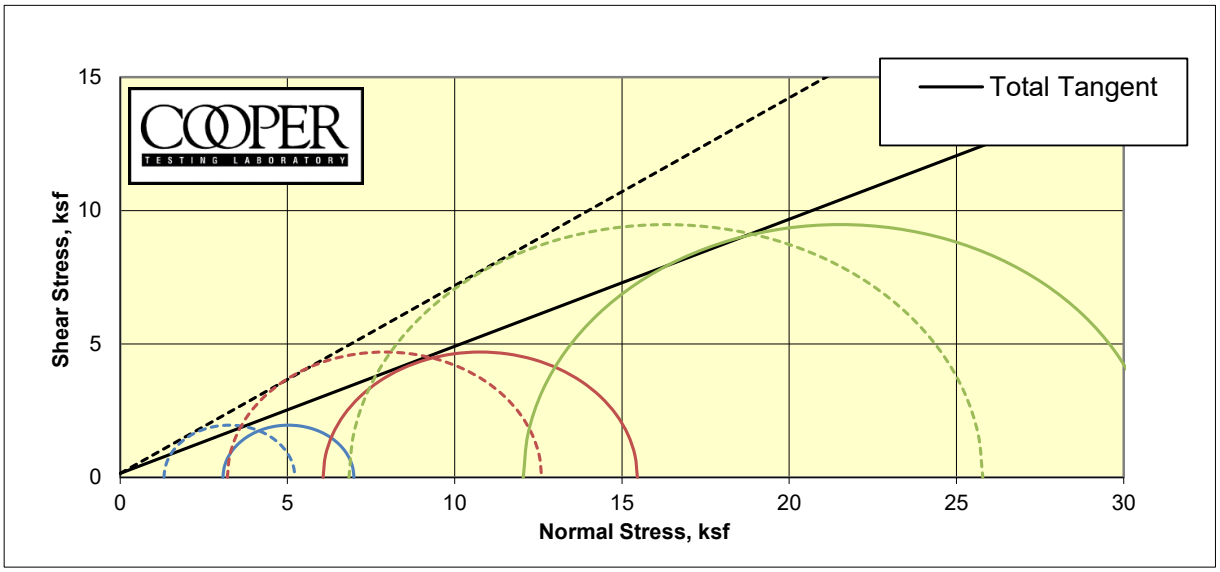


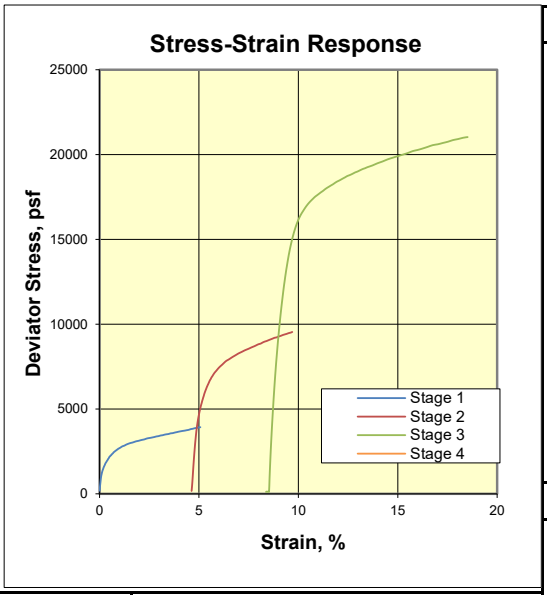


CTL Number:	640-1475		
Client Name:	Cornerstone Earth Group		
Project Name:	Bay Project		
Project Number:	582-5-2		
Date:	7/19/2021	By:	MD/DC
Total C	0.150	ksf	
Total phi	20.9	degrees	
Eff. C	0.150	ksf	
Eff. Phi	33.9	degrees	©

Stage	1	2	3	4
Boring	EB-4			
Sample	6A			
Depth	39.0			
Visual Description	Brown Clayey SAND, trace Gravel			
MC (%)	16.0			
Dry Density (pcf)	106.9			
Saturation (%)	77.1			
Void Ratio	0.548			
Diameter (in)	2.41			
Height (in)	4.98			
	Final			
MC (%)	19.9	18.5	17.3	
Dry Density (pcf)	108.3	110.9	113.4	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.528	0.491	0.458	
Diameter (in)	2.41	2.42	2.45	
Height (in)	4.93	4.74	4.53	
Cell Pressure (psi)	103.9	117.7	145.4	
Back Pressure (psi)	90.9	90.6	90.5	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	2.024	4.718	9.372	
Excess PP (psi)	9.1	15.9	30.4	
Sigma 1 (ksf)	2.593	6.336	12.906	
Sigma 3 (ksf)	0.570	1.618	3.534	
P (ksf)	1.582	3.977	8.220	
Q (ksf)	1.012	2.359	4.686	
Stress Ratio	4.552	3.917	3.652	
Rate (in/min)	0.0005	0.0005	0.0005	

Staged Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767m

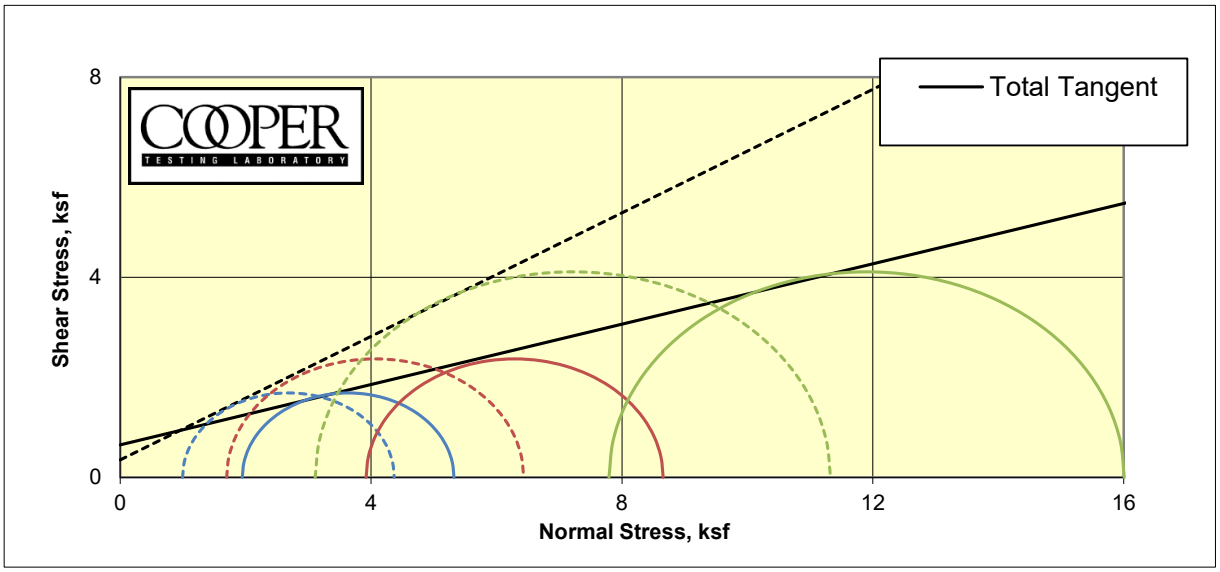


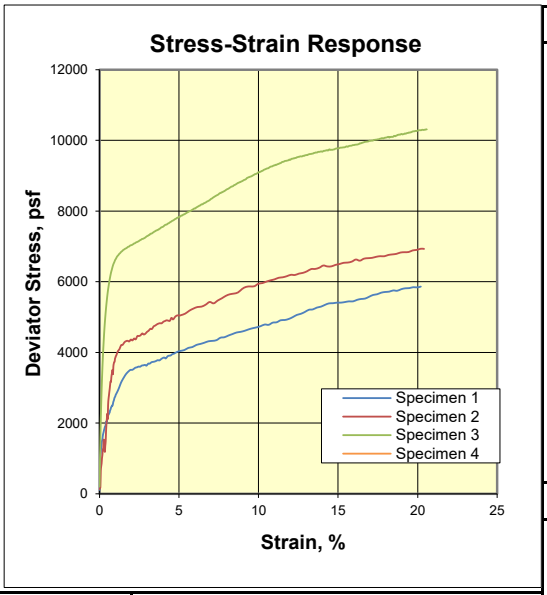


CTL Number:	640-1475		
Client Name:	Cornerstone Earth Group		
Project Name:	Bay Project		
Project Number:	582-5-2		
Date:	7/16/2021	By:	MD/DC
Total C	0.150	ksf	
Total phi	25.5	degrees	
Eff. C	0.150	ksf	
Eff. Phi	35.1	degrees	©

Stage	1	2	3	4
Boring	EB-4			
Sample	21A			
Depth	104.0			
Visual Description	Dark Greenish Gray Clayey SAND w/ Gravel/ Clayey GRAVEL w/ Sand			
MC (%)	10.1			
Dry Density (pcf)	127.8			
Saturation (%)	85.5			
Void Ratio	0.319			
Diameter (in)	2.40			
Height (in)	5.01			
	Final			
MC (%)	11.4	10.5	9.6	
Dry Density (pcf)	131.5	134.1	136.4	
Saturation (%)	108.8	109.7	110.6	
Void Ratio	0.282	0.257	0.235	
Diameter (in)	2.38	2.41	2.44	
Height (in)	4.94	4.71	4.52	
Cell Pressure (psi)	80.6	101.7	144.2	
Back Pressure (psi)	59.3	59.5	60.5	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	3.914	9.396	18.950	
Excess PP (psi)	12.3	19.9	36.2	
Sigma 1 (ksf)	5.221	12.599	25.787	
Sigma 3 (ksf)	1.308	3.203	6.838	
P (ksf)	3.265	7.901	16.313	
Q (ksf)	1.957	4.698	9.475	
Stress Ratio	3.993	3.934	3.771	
Rate (in/min)	0.0005	0.0005	0.0005	

Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767



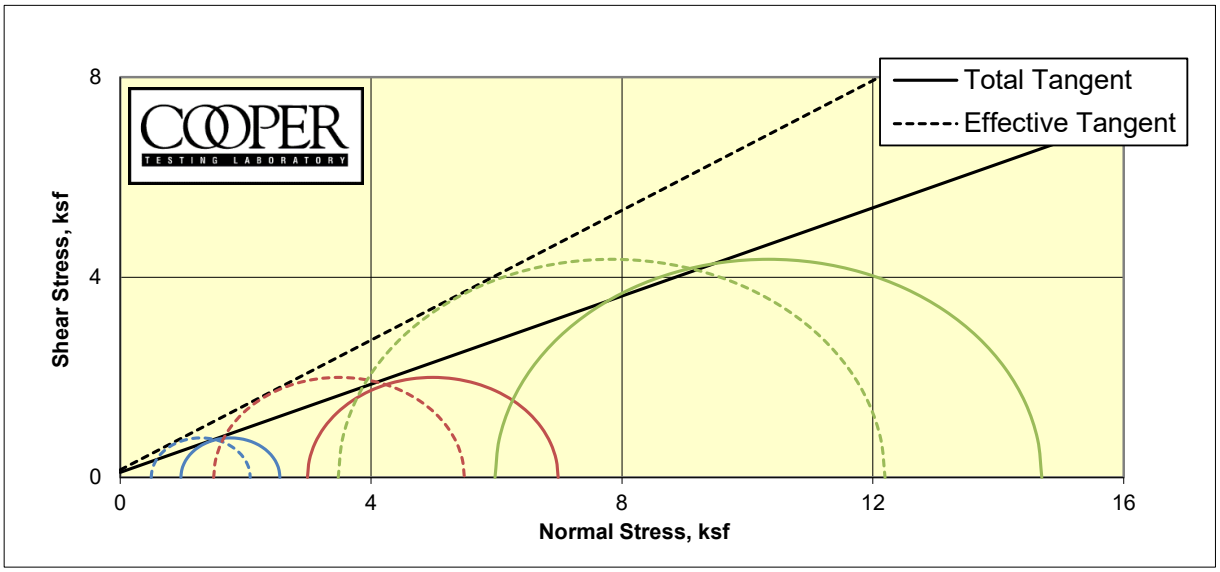


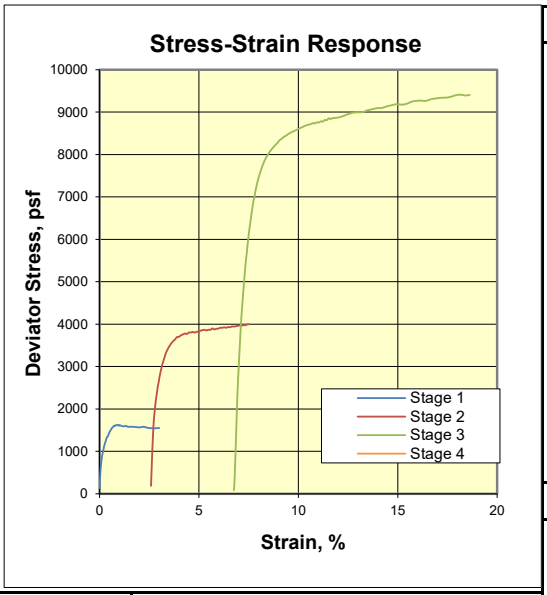
CTL Number:	640-1476		
Client Name:	Cornerstone Earth Group		
Project Name:	Bay Project		
Project Number:	582-5-2		
Date:	8/3/2021	By:	MD/DC
Total C	**0.650**	**ksf**	
Total phi	**16.8**	**degrees**	
Eff. C	**0.350**	**ksf**	
Eff. Phi	**31.7**	**degrees**	©

Remarks: Remolded to 120 pcf @ 12%. Strengths picked at the peak effective stress ratios.

Specimen	**1**	**2**	**3**	**4**
Boring	EB-1	EB-1	EB-1	
Sample				
Depth	18.0	18.0	18.0	
Visual Description	Grayish Brown Clayey SAND	Grayish Brown Clayey SAND	Grayish Brown Clayey SAND	
MC (%)	12.0	12.2	12.2	
Dry Density (pcf)	119.5	119.3	119.1	
Saturation (%)	75.4	76.1	76.2	
Void Ratio	0.437	0.439	0.442	
Diameter (in)	2.38	2.38	2.38	
Height (in)	5.00	5.00	5.00	
	Final			
MC (%)	16.2	15.9	15.3	
Dry Density (pcf)	118.8	119.4	120.8	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.445	0.437	0.421	
Diameter (in)	2.39	2.39	2.39	
Height (in)	4.95	4.92	4.87	
Cell Pressure (psi)	114.1	128.8	155.8	
Back Pressure (psi)	100.6	101.6	101.7	
	Effective Stresses At:			
Strain (%)	1.6	3.4	6.5	
Deviator (ksf)	3.376	4.737	8.217	
Excess PP (psi)	6.6	15.4	32.5	
Sigma 1 (ksf)	4.369	6.434	11.325	
Sigma 3 (ksf)	0.994	1.697	3.108	
P (ksf)	2.681	4.065	7.217	
Q (ksf)	1.688	2.368	4.108	
Stress Ratio	4.397	3.792	3.643	
Rate (in/min)	0.0004	0.0004	0.0004	

Staged Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767m



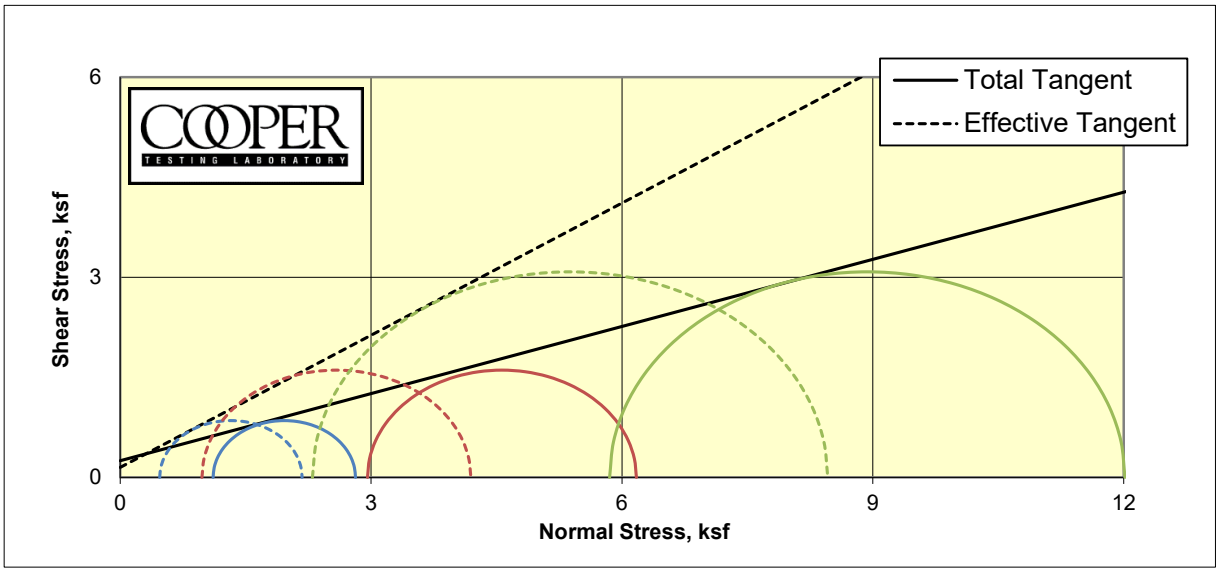


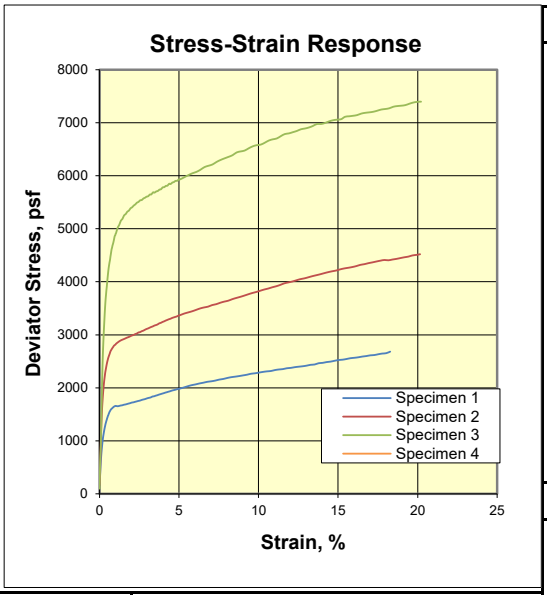
CTL Number:	640-1477		
Client Name:	Cornerstone Earth Group		
Project Name:	Bay Project		
Project Number:	582-5-2		
Date:	8/3/2021	By:	MD/DC
Total C	**0.100**	**ksf**	
Total phi	**23.8**	**degrees**	
Eff. C	**0.150**	**ksf**	
Eff. Phi	**33.0**	**degrees**	©

Remarks: Remolded to 92% of 132.5 @ 10.5 (OPT+2%). Strengths picked at the peak effective stress ratios.

Stage	**1**	**2**	**3**	**4**
Boring	EB-4			
Sample				
Depth	90.0			
Visual Description	Grayish Brown Clayey SAND			
MC (%)	10.8			
Dry Density (pcf)	120.7			
Saturation (%)	70.7			
Void Ratio	0.422			
Diameter (in)	2.39			
Height (in)	5.00			
	Final			
MC (%)	14.9	14.2	13.3	
Dry Density (pcf)	121.9	123.5	125.7	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.408	0.390	0.366	
Diameter (in)	2.38	2.39	2.43	
Height (in)	4.98	4.85	4.64	
Cell Pressure (psi)	106.8	120.8	142.1	
Back Pressure (psi)	100.1	100.1	100.6	
	Effective Stresses At:			
Strain (%)	2.1	5.0	4.2	
Deviator (ksf)	1.578	3.997	8.718	
Excess PP (psi)	3.3	10.4	17.4	
Sigma 1 (ksf)	2.072	5.487	12.194	
Sigma 3 (ksf)	0.494	1.490	3.476	
P (ksf)	1.283	3.488	7.835	
Q (ksf)	0.789	1.999	4.359	
Stress Ratio	4.191	3.683	3.508	
Rate (in/min)	0.0005	0.0005	0.0005	

Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767





CTL Number:	640-1479		
Client Name:	Cornerstone Earth Group		
Project Name:			
Project Number:	582-5-2		
Date:	8/19/2021	By:	MD/DC
Total C	**0.250**	**ksf**	
Total phi	**18.5**	**degrees**	
Eff. C	**0.150**	**ksf**	
Eff. Phi	**33.4**	**degrees**	©

Remarks: Remolded to 120 pcf @ 12.0%. Strengths picked at the peak effective stress ratios.

Specimen	**1**	**2**	**3**	**4**
Boring	EB-1	EB-1	EB-1	
Sample				
Depth	80.0	80.0	80.0	
Visual Description	Brown Sandy CLAY/ Clayey SAND	Brown Sandy CLAY/ Clayey SAND	Brown Sandy CLAY/ Clayey SAND	
MC (%)	12.0	12.0	11.8	
Dry Density (pcf)	119.5	119.5	119.8	
Saturation (%)	72.9	72.9	71.8	
Void Ratio	0.463	0.463	0.459	
Diameter (in)	2.38	2.38	2.38	
Height (in)	5.00	5.00	5.00	
	Final			
MC (%)	16.9	16.0	15.0	
Dry Density (pcf)	118.7	120.7	123.1	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.472	0.448	0.420	
Diameter (in)	2.38	2.37	2.36	
Height (in)	5.00	4.96	4.95	
Cell Pressure (psi)	106.8	120.7	141.2	
Back Pressure (psi)	99.1	100.2	100.6	
	Effective Stresses At:			
Strain (%)	1.8	3.8	6.6	
Deviator (ksf)	1.703	3.216	6.163	
Excess PP (psi)	4.4	13.7	24.7	
Sigma 1 (ksf)	2.175	4.193	8.461	
Sigma 3 (ksf)	0.472	0.977	2.299	
P (ksf)	1.324	2.585	5.380	
Q (ksf)	0.851	1.608	3.081	
Stress Ratio	4.606	4.291	3.681	
Rate (in/min)	0.0004	0.0004	0.0004	

APPENDIX C: PREVIOUS EXPLORATION LOGS

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION ± 415 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER Not Encountered	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
GRAVEL($\frac{1}{4}$-3 inches), some silt.	brown	loose-medium dense	GP	1, 2, 3, 4					
CLAY, sandy(fine-coarse), some gravel(fine)				5, 6, 7					
GRAVEL(fine-coarse), with sand (fine-coarse), some clay Passing #200 Sieve = 18%	grey-brown	dense	GC	8, 9, 10, 11, 12		39			
GRAVEL(fine grained), with sand (fine-coarse), some clay Liquid Limit = 26% Plasticity Index = 9% Passing #200 Sieve =	brown	medium dense	GC	13, 14, 15, 16, 17, 18		13			
CLAY, gravelly(fine-grained), with sand(fine-medium)	brown	stiff	CL GC	19, 20		13			

PETER KALDVEER AND ASSOCIATES, INC.
Geotechnical Consultants

EXPLORATORY BORING LOG

PHASE I STUDY
GUADALUPE QUARRY DEVELOPMENT
San Mateo County, California

PROJECT NO.	DATE	Boring
K800-5	August 1987	No. 1

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION ± 415 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER Not Encountered	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION: DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, gravely(fine) with sand (fine-medium)	brown	stiff	CL GC	21					
(continuation)				22					
				23					
				24					
				25					
				26					
				27					
SANDSTONE	hard		BR	28		50/2"			
Bottom of Boring = 28 Feet (refusal)				29					
				30					
				31					
				32					
				33					
				34					
				35					
				36					
				37					
				38					
				39					
				40					

Notes:
1. The stratification lines represent the approximate boundaries between material types and the transition may be gradual.

PETER KALDVEER AND ASSOCIATES, INC.
Geotechnical Consultants

EXPLORATORY BORING LOG

PHASE I STUDY
GUADALUPE QUARRY DEVELOPMENT
San Mateo County, California

PROJECT NO.	DATE	BORING NO.
K800-5	August 1987	1

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION ± 380 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER Not Encountered	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
GRAVEL (coarse grained), with cobbles 5 to 7 inches	light brown	medium dense	GP	1, 2, 3, 4					
Gravel fine-grained, clayey with sand (fine-coarse) and traces of silt. Passing #200 Sieve = 23%	brown	very dense	GC CL	5, 6, 7, 8		60			
GRAVEL (fine grained), sandy (fine-coarse), some clay. Passing #200 Sieve = 16%	brown	medium dense	CL	9, 10, 11, 12, 13, 14		19			
(Boulder at 13½ Feet)				15, 16		31/5"			
SANDSTONE		hard	BR	17					
Bottom of Boring = 17 Feet (refusal)				18, 19, 20					

Notes:
1. The stratification lines represent the approximate boundaries between material types and the transition may be gradual.

PETER KALDVEER AND ASSOCIATES, INC.
Geotechnical Consultants

EXPLORATORY BORING LOG

PHASE I STUDY
GUADALUPE QUARRY DEVELOPMENT
San Mateo County, California

PROJECT NO.	DATE	BORING NO.
K800-5	August 1987	2

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION ± 405 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER 35½' (See Note 2)	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
CLAY, gravelly (fine grained)	grey blue	soft	CL	1, 2, 3, 4			19		
GRAVEL, (fine coarse), traces of clay Passing #200 Sieve = 9%	grey	medium dense	GC	5, 6, 7, 8, 9		21			
CLAY, some sand (fine coarse), gravelly (fine grained)	brow	stiff	CL	10, 11, 12, 13, 14		7			
GRAVEL, (fine grained), clayey with sand Passing #200 Sieve = 28%	tan orange	very dense	GC	15, 16, 17, 18, 19		70			
CLAY, gravelly (fine grained) with sand	brown	hard	CL GC	20		53			

PETER KALDVEER AND ASSOCIATES, INC.

Geotechnical Consultants

EXPLORATORY BORING LOG

PHASE I STUDY
GUADALUPE QUARRY DEVELOPMENT
San Mateo County, California

PROJECT NO.	DATE	BORING NO.
K800-5	August 1987	3

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION ± 405 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER 35½' (See Note 2)	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION: DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, gravelly (fine grained) with sand (fine coarse)	brown	hard	CL GC	21		53	11		
(continuation)				22					
				23					
				24					
				25					
				26					
				27					
				28					
GRAVEL (fine grained), clayey with sand (fine coarse)	brown grey	very dense	GC	29					
				30					
(Boulder from 30 to 32 feet)				31		79	10		
				32					
				33					
				34					
				35			▽		
				36					
CLAY, gravelly (fine grained) with sand (fine medium)	tan orange	hard	CL GC	37					
				38					
				39					
GRAVEL, fine grained, clayey with sand (fine medium)	tan orange	very dense	GC	40		33			

PETER KALDVEER AND ASSOCIATES, INC.
Geotechnical Consultants

EXPLORATORY BORING LOG

PHASE I STUDY
GUADALUPE QUARRY DEVELOPMENT
San Mateo County, California

PROJECT NO.	DATE	BORING NO.
K800-5	August 1987	3

DRILLING Continuous Flight Auger	SURFACE ELEVATION ± 405 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER 35½' (See Note 2)	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
GRAVEL (fine grained), clayey with sand (fine grained).	tan orange	very dense	GC CL	41		33			
Passing #200 Sieve = 24%				42					
(continuation)				43					
				44					
				45					
				46					
				47					
				48					
				49					
				50					
				51					
				52					
				53					
				54					
				55					
				56					
				57					
				58					
				59					
				60					

Peter Kaldveer and Associates

Geotechnical Consultants

EXPLORATORY BORING LOG

PHASE I STUDY
GUADALUPE QUARRY DEVELOPMENT
San Mateo County, California

PROJECT NO.	DATE	BORING NO
K800-5	August 1987	3

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION ± 405 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER 35½' (See Note2)	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	TIME	DRILL PRESS (PSI)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR								
(continuation)				61, 62		64'	63'		
Clay, sandy(fine grained), some gravel(fine grained)	brown	stiff	CL	63, 64					
Bottom of Boring = 65 Feet				65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80					

Notes:
1. The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.
2. Groundwater level was measured at 35½ feet at time of drilling. After drilling and three days later, the groundwater level was measured at 51 feet.

PETER KALDVEER AND ASSOCIATES, INC.
Geotechnical Consultants

EXPLORATORY BORING LOG

PHASE I STUDY
GUADALUPE QUARRY DEVELOPMENT
San Mateo County, California

PROJECT NO.	DATE	BORING NO.
K800-5	August 1987	3

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION ± 405 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER 57' (See Note 2)	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
GRAVEL, clayey with sand and silt	brown	loose	GW	1					
(Boulder at 2 feet)			GP	2, 3, 4, 5					
CLAY, gravelly fine grained with sand and silt	brown	firm		6, 7, 8, 9, 10, 11, 12, 13					
(grading only some gravel, fine grained)	grey brown			14, 15, 16, 17					
(Boulder from 18 feet to 19 feet)				18, 19, 20					

PETER KALDVEER AND ASSOCIATES, INC.
Geotechnical Consultants

EXPLORATORY BORING LOG

PHASE I STUDY
GUADALUPE QUARRY DEVELOPMENT
San Mateo County, California

PROJECT NO.	DATE	BORING NO.
K800-5	August 1987	4

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION ± 405 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER 57' (See Note 2)	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
CLAY, gravelly fine grained, some sand and silt	grey brown	firm	CL						
(continuation)				21					
				22					
				23					
				24					
				25					
				26					
				27					
				28					
				29					
				30					
				31					
				32					
				33					
				34					
				35					
				36					
				37					
				38					
				39					
				40					

PETER KALDVEER
AND ASSOCIATES, INC.
Geotechnical Consultants

EXPLORATORY BORING LOG

PHASE I STUDY
GUADALUPE QUARRY DEVELOPMENT
San Mateo County, California

PROJECT NO.	DATE	BORING NO.
K800-5	August 1987	4

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION ± 405 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER 57' (See Note2)	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (PSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST	SOIL TYPE						
CLAY, gravelly fine grained, some sand and silt (continuation)	grey brown	firm stiff	CL	41 42 43 44					
GRAVEL (fine grained), clayey, some sand (fine-coarse) Passing #200 Sieve = 23%	grey	dense	GC CL	45 46 47 48 49 50 51 52 53 54		30	14		
		very dense		55 56 57 58 59 60		45	12		

Peter Kaldveer and Associates *Geotechnical Consultants*	EXPLORATORY BORING LOG PHASE I STUDY GUADALUPE QUARRY DEVELOPMENT San Mateo County, California		
	PROJECT NO.	DATE	BORING NO 4
	K800-5	August 1987	

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION ± 405 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER 57' (See Note 2)	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	TIME	DRILL PRESS (PSI)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR								
GRAVEL (fine grained), sandy (fine coarse grained), some clay (continuation)	grey	very dense	GC	61 62 63 64					
GRAVEL, with sand Passing #200 Sieve = 11%	grey	very dense	GW GP	65 66 67 68 69 70 71		20/6"			
(Boulder at 72 feet)				72 73 74 75					
SANDSTONE		hard	BR	76		50/3"			
Bottom of Boring = 76 Feet (refusal) Notes: 1. The stratification lines represent the approximate boundaries between material types and the transition may be gradual. 2. Groundwater level was measured at 57 feet after drilling.				77 78 79 80					

PETER KALDVEER AND ASSOCIATES, INC. *Geotechnical Consultants*	EXPLORATORY BORING LOG PHASE I STUDY GUADALUPE QUARRY DEVELOPMENT San Mateo County, California		
	PROJECT NO. K800-5	DATE August 1987	BORING NO. 4

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION ± 366 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER 41'(See Note 2)	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
GRAVEL(fine grained), sandy fine coarse)	orange brown	medium	GP	1					
				2					
(Boulder from 2 to 3½ feet)				3					
				4					
GRAVEL(fine coarse), clayey, some sand(fine coarse)	mottled orange grey brown	dense	GC CL	5					
Passing #200 Sieve = 33%				6		42			
				7					
				8					
				9					
				10					
		medium dense		11		24	8		
				12					
CLAY, gravelly(fine grained), sandy(fine coarse)	brown	stiff	CL GC	13					
				14					
				15					
				16					
				17					
				18					
				19					
				20		30			

PETER KALDVEER AND ASSOCIATES, INC.

Geotechnical Consultants

EXPLORATORY BORING LOG

PHASE I STUDY
GUADALUPE QUARRY DEVELOPMENT
San Mateo County, California

PROJECT NO.	DATE	BORING NO.
K800-5	August 1987	5

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION ± 366 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER 41' (See Note2)	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
CLAY, gravelly (fine grained), sandy (fine coarse)	brown	stiff	CL GC	21		30	11		
(continuation)				22					
				23					
				24					
				25					
				26					
				27					
				28					
				29					
				30					
(Boulder from 30 to 31½ feet)				31					
				32					
				33					
				34					
			GC CL	35		29	13		
				36					
				37					
				38					
				39					
				40					

PETER KALDVEER AND ASSOCIATES, INC.
Geotechnical Consultants

EXPLORATORY BORING LOG

PHASE I STUDY
GUADALUPE QUARRY DEVELOPMENT
San Mateo County, California

PROJECT NO.	DATE	BORING NO.
K800-5	August 1987	

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION ± 366 Feet	LOGGED BY BK
DEPTH TO GROUNDWATER 41' (See Note 2)	BORING DIAMETER 6 inches	DATE DRILLED 7/31/87

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
CLAY, gravelly (fine grained), sandy (fine coarse)	brown	stiff	CL GC	41			▽		
				42					
				43					
				44					
SANDSTONE		hard	BR	45					
Bottom of Boring = 45½ Feet (refusal)				46					
				47					
Notes: 1. The stratification lines represent the approximate boundaries between material types and the transition may be gradual. 2. Groundwater level was measured at 41 feet at time of drilling and after drilling.				48					
				49					
				50					
				51					
				52					
				53					
				54					
				55					
				56					
				57					
				58					
				59					
				60					

Peter Kaldveer and Associates

Geotechnical Consultants

EXPLORATORY BORING LOG

PHASE I STUDY
GUADALUPE QUARRY DEVELOPMENT
San Mateo County, California

PROJECT NO.	DATE	BORING NO.
K800-5	August 1987	5

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-1
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0	1-1			Dark gray-brown clayey GRAVEL; dense; slightly damp.	GM	41	113.2	15.7		
10	1-2			Orange-brown clayey sandy silt; moist, medium firm.	ML	12	108.8	19.1		
				-- as above						
20	1-3			-- as above		14	102.7	22.6		
				Boring Terminated at 26.5 feet. Auger refusal. NO GROUNDWATER.						
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	6

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-2
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Light gray-brown SAND AND GRAVEL; moist, medium dense (FILL).	GW-SW					
				Boring Terminated at 1.5 feet. AUGER REFUSAL (large boulder or heavy gravels). NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	7

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-3
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium gray brown SAND; moist, medium dense.	SW					
				Medium gray-brown silty SAND; slightly moist, dense.	SM					
				Dark gray silty SAND and GRAVEL; moist, medium dense to dense. slight odor (hydrocarbons).	GW-SW					
10	3-1	X								Diesel 33ppm Motor Oil 130 ppm Oil 1
				--as above, strong petroleum odor.						
	3-2	X								Diesel 380 ppm Motor Oil 1200ppm
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	8

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-3
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
				Boring terminated at 39 feet. Auger refusal (bedrock). NO GROUNDWATER.						
40										
50										
60										
70										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	8

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-4
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium gray brown SAND; moist, medium dense.	SW					
				Dark gray silty SAND and GRAVEL; moist, medium dense to dense. slight odor (hydrocarbons).	GW-SW					
				--as above, strong petroleum odor.						
10										
20										
				Boring terminated at 28.5 feet. Auger refusal (bedrock). NO GROUNDWATER.						
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	9

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-5
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0	5-1			Medium to light gray fine sandy SILT and CLAY; medium firm to firm, damp to moist.	CL-ML	12	103.3	8.8		
10				Dark gray silty CLAY; firm, moist.	CL					
20				Boring Terminated at 19 feet. Auger refusal (bedrock). NO GROUNDWATER.						
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS

TERRASEARCH INC.

6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	10

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-6
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium to light gray fine sandy SILT and CLAY; medium firm to firm, moist.	CL-ML					
				Dark gray silty CLAY; firm, moist.	CL					
10										
20										
				Boring Terminated at 21 feet. Auger refusal (bedrock). NO GROUNDWATER.						
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	11

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-7
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium to light gray fine sandy SILT and CLAY; medium firm to firm, moist.	CL-ML					
10				Dark gray silty CLAY; firm, moist.	CL					
				Boring Terminated at 18 feet. Auger refusal (bedrock). NO GROUNDWATER.						
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	12

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-8
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium to dark brown SAND and GRAVEL; dense, damp.	GW-SW					
				Medium to dark gray brown silty SAND and sandy SILT with occasional gravel; medium firm and dense, moist to damp.	SM					
10										
20				Boring Terminated at 20 feet. Auger Refusal (bedrock). NO GROUNDWATER.						
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	13

LOGGED BY RP	SURFACE ELEVATION -feet	BORING NO. B-9
DRILL RIG rotary wash	BORING DIAMETER 4 7/8" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Gray clayey SAND and GRAVEL; FILL.	GC-SC					
10	9-1					14	117.1	8.1		
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS

TERRASEARCH INC.

6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	14

LOGGED BY RP	SURFACE ELEVATION -feet	BORING NO. B-9
DRILL RIG rotary wash	BORING DIAMETER 4 7/8" -Inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
40				Bedrock (sandstone).	ROCK					
				Boring Terminated at 43.5 feet. NO GROUNDWATER.						
50										
60										
70										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	14

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-10
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium brown silty SAND and GRAVEL; medium dense to dense, moist; occasional layers of clayey SILT.	GM-SM					
10										
20				Boring Terminated at 22 feet. Auger refusal (bedrock). NO GROUNDWATER.						
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8062	1/25/2000	15

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-11
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium brown silty SAND; medium dense, damp.	SM					
				Orange brown silty fine SAND; dense, damp (weathered bedrock).	SW					
	11-1					50+	129.2	8.0		
				Boring Terminated at 6 feet. Auger Refusal (bedrock). NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	16

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-12
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Dark brown sandy SILT; medium firm, slightly moist.	ML					
				Orange brown silty SAND; dense, damp (weathered bedrock).	SW					
	12-1					25		6.2		sample disturbed
10										
				Boring Terminated at 16 feet. Auger Refusal (bedrock) NO GROUNDWATER.						
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/27/2000	17

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-13
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Dark brown sandy GRAVEL; medium dense, slightly moist. (Fill).	GM					
				Boring Terminated at 0.5 feet. Auger Refusal (bedrock). NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	18

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-14
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Dark brown sandy GRAVEL; medium dense, slightly moist. (Fill).	GM					
				Boring Terminated at 1 foot. Auger Refusal (bedrock). NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	19

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-15
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Dark brown sandy GRAVEL; medium dense, slightly moist. (Fill).	GM					
				Boring Terminated at 1 foot. Auger Refusal (bedrock). NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	20

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-16
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Light gray-brown SAND; moist, medium dense (FILL); very hard drilling.	SW					
				Boring Terminated at 0.5 feet. AUGER REFUSAL (bedrock). NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	21

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-17
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Asphalt/concrete.						
				Light gray-brown SAND; very slow drilling (bedrock?).	SW					
				Boring Terminated at 1 foot. AUGER REFUSAL NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	22

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-18
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Asphalt/concrete.						
				Light gray-brown SAND; very slow drilling (bedrock?).	SW					
				Boring Terminated at 1 foot. AUGER REFUSAL NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS

TERRASEARCH INC.

6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	23

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-19
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Light gray brown SAND; slow drilling (bedrock?)	SW					
				Boring Terminated at 1 foot. AUGER REFUSAL NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	24

LOGGED BY RP	SURFACE ELEVATION -feet	BORING NO. B-20
DRILL RIG rotary wash	BORING DIAMETER 4 7/8" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Gray clayey SAND and GRAVEL; damp, dense (FILL).	GM					
				Tannish sandstone (bedrock?) --grayish sandstone.	ROCK					
10				Boring Terminated at 10 feet. NO GROUNDWATER.						
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	25

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-1
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0	1-1			Dark gray-brown clayey GRAVEL; dense; slightly damp.	GM	41	113.2	15.7		
10	1-2			Orange-brown clayey sandy silt; moist, medium firm.	ML	12	108.8	19.1		
				-- as above						
20	1-3			-- as above		14	102.7	22.6		
				Boring Terminated at 26.5 feet. Auger refusal. NO GROUNDWATER.						
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	6

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-2
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Light gray-brown SAND AND GRAVEL; moist, medium dense (FILL).	GW-SW					
				Boring Terminated at 1.5 feet. AUGER REFUSAL (large boulder or heavy gravels). NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	7

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-3
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium gray brown SAND; moist, medium dense.	SW					
				Medium gray-brown silty SAND; slightly moist, dense.	SM					
				Dark gray silty SAND and GRAVEL; moist, medium dense to dense. slight odor (hydrocarbons).	GW-SW					
10	3-1	X								Diesel 33ppm Motor Oil 130 ppm Oil 1
				--as above, strong petroleum odor.						
	3-2	X								Diesel 380 ppm Motor Oil 1200ppm
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	8

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-3
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
				Boring terminated at 39 feet. Auger refusal (bedrock). NO GROUNDWATER.						
40										
50										
60										
70										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	8

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-4
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium gray brown SAND; moist, medium dense.	SW					
				Dark gray silty SAND and GRAVEL; moist, medium dense to dense. slight odor (hydrocarbons).	GW-SW					
				--as above, strong petroleum odor.						
10										
20										
				Boring terminated at 28.5 feet. Auger refusal (bedrock). NO GROUNDWATER.						
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	9

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-5
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0	5-1			Medium to light gray fine sandy SILT and CLAY; medium firm to firm, damp to moist.	CL-ML	12	103.3	8.8		
10				Dark gray silty CLAY; firm, moist.	CL					
20				Boring Terminated at 19 feet. Auger refusal (bedrock). NO GROUNDWATER.						
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS

TERRASEARCH INC.

6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	10

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-6
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium to light gray fine sandy SILT and CLAY; medium firm to firm, moist.	CL-ML					
				Dark gray silty CLAY; firm, moist.	CL					
10										
20										
				Boring Terminated at 21 feet. Auger refusal (bedrock). NO GROUNDWATER.						
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	11

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-7
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium to light gray fine sandy SILT and CLAY; medium firm to firm, moist.	CL-ML					
10				Dark gray silty CLAY; firm, moist.	CL					
				Boring Terminated at 18 feet. Auger refusal (bedrock). NO GROUNDWATER.						
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	12

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-8
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium to dark brown SAND and GRAVEL; dense, damp.	GW-SW					
				Medium to dark gray brown silty SAND and sandy SILT with occasional gravel; medium firm and dense, moist to damp.	SM					
10										
20				Boring Terminated at 20 feet. Auger Refusal (bedrock). NO GROUNDWATER.						
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	13

LOGGED BY RP	SURFACE ELEVATION -feet	BORING NO. B-9
DRILL RIG rotary wash	BORING DIAMETER 4 7/8" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Gray clayey SAND and GRAVEL; FILL.	GC-SC					
10	9-1					14	117.1	8.1		
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS

TERRASEARCH INC.

6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	14

LOGGED BY RP	SURFACE ELEVATION -feet	BORING NO. B-9
DRILL RIG rotary wash	BORING DIAMETER 4 7/8" -Inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
40				Bedrock (sandstone).	ROCK					
				Boring Terminated at 43.5 feet. NO GROUNDWATER.						
50										
60										
70										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	14

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-10
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium brown silty SAND and GRAVEL; medium dense to dense, moist; occasional layers of clayey SILT.	GM-SM					
10										
20				Boring Terminated at 22 feet. Auger refusal (bedrock). NO GROUNDWATER.						
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8062	1/25/2000	15

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-11
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Medium brown silty SAND; medium dense, damp.	SM					
				Orange brown silty fine SAND; dense, damp (weathered bedrock).	SW					
	11-1					50+	129.2	8.0		
				Boring Terminated at 6 feet. Auger Refusal (bedrock). NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	16

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-12
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Dark brown sandy SILT; medium firm, slightly moist.	ML					
				Orange brown silty SAND; dense, damp (weathered bedrock).	SW					
	12-1					25		6.2		sample disturbed
10										
				Boring Terminated at 16 feet. Auger Refusal (bedrock) NO GROUNDWATER.						
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/27/2000	17

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-13
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Dark brown sandy GRAVEL; medium dense, slightly moist. (Fill).	GM					
				Boring Terminated at 0.5 feet. Auger Refusal (bedrock). NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	18

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-14
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Dark brown sandy GRAVEL; medium dense, slightly moist. (Fill).	GM					
				Boring Terminated at 1 foot. Auger Refusal (bedrock). NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	19

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-15
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Dark brown sandy GRAVEL; medium dense, slightly moist. (Fill).	GM					
				Boring Terminated at 1 foot. Auger Refusal (bedrock). NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	20

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-16
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Light gray-brown SAND; moist, medium dense (FILL); very hard drilling.	SW					
				Boring Terminated at 0.5 feet. AUGER REFUSAL (bedrock). NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	21

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-17
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Asphalt/concrete.						
				Light gray-brown SAND; very slow drilling (bedrock?).	SW					
				Boring Terminated at 1 foot. AUGER REFUSAL NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	22

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-18
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Asphalt/concrete.						
				Light gray-brown SAND; very slow drilling (bedrock?).	SW					
				Boring Terminated at 1 foot. AUGER REFUSAL NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS

TERRASEARCH INC.

6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	23

LOGGED BY SLB	SURFACE ELEVATION -feet	BORING NO. B-19
DRILL RIG B3500	BORING DIAMETER 6" -inch	DATE DRILLED 12/20/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Light gray brown SAND; slow drilling (bedrock?)	SW					
				Boring Terminated at 1 foot. AUGER REFUSAL NO GROUNDWATER.						
10										
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	24

LOGGED BY RP	SURFACE ELEVATION -feet	BORING NO. B-20
DRILL RIG rotary wash	BORING DIAMETER 4 7/8" -inch	DATE DRILLED 12/17/99

DEPTH (feet)	SAMPLE NO.	SAMPLE	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION AND CLASSIFICATION	SOIL CLASSIFICATION	CONVERTED SPT BLOW COUNT (BLOWS/FT.)	DRY DENSITY (PCF)	MOISTURE CONTENT (PERCENT)	PERCENT RELATIVE COMPACTION	ADDITIONAL TESTS
0				Gray clayey SAND and GRAVEL; damp, dense (FILL).	GM					
				Tannish sandstone (bedrock?) --grayish sandstone.	ROCK					
10				Boring Terminated at 10 feet. NO GROUNDWATER.						
20										
30										

GEOTECHNICAL ENGINEERS AND GEOLOGISTS
TERRASEARCH INC.
6840 VIA DEL ORO, SUITE 110, SAN JOSE, CALIFORNIA 95119-1348 (408) 362-4920

EXPLORATORY BORING LOG

Guadalupe Quarry

Brisbane, California

PROJECT NO.	DATE	FIGURE
8063	1/25/2000	25

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ± 265 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 8-29-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL (fine-to-coarse-grained), clayey, sandy, silty; (FILL)	Brown to Dark Brown	Loose	GC	1					
				2					
				3					
				4					
				5					
				6					
	Dark Brown to Gray			7					
				8					
				9					
				10					
				11		[11]	7	111	
				12					
				13					
				14					
				15					
				16					
CLAY, silty, gravelly, sandy; (FILL)	Mottled Gray to Black	Firm	CL	17					
				18					
				19					
				20					

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	1 of 3	1

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ± 265 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 8-29-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
CLAY, silty, gravelly, sandy; (FILL)	Mottled Gray to Black	Firm	CL	21	X	[7]			
				22					
				23					
				24					
				25					
				26					
				27					
CLAY, gravelly, sandy, silty; (FILL)	Yellowish Brown to Orange	Very Stiff	CL	28					
				29					
				30					
				31	X	[35]	11	114	
				32					
				33					
				34					
				35					
				36					
(FILL ↑)				37					
CLAY, sandy, silty	Dark Brown	Firm	CL	38					
				39					
				40					

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	2 of 3	1

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ± 265 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 8-29-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
CLAY, sandy, silty	Dark Brown	Firm	CL	41	X	[13]			ATOD
SANDSTONE, completely to severely weathered, fractured, Iron staining	Brown to Gray	Soft Hardness	BR	42					
				43					
				44					
				45	X				
				46		[31]			
				47					
				48					
				49					
				50	X				
				51		[75]			

Bottom of boring at 51 feet and 6 inches

NOTES

1. Groundwater was encountered at approximately 41 feet at the time of drilling, and was at a depth of about 40 feet 1/2 hour after drilling. The boring was grouted following drilling in accordance with San Mateo County requirements (See text for discussion).

2. Stratification lines represent the approximate boundaries between material types, and the transitions may be gradual.

3. Penetration resistance values (blow counts) enclosed in brackets ([ ]) were recorded with a 3.0-inch O.D. Modified California sampler, and are not standard penetration resistance values.

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	3 of 3	1

DRILL RIG: Hollow Stem Auger / Rotary Wash	SURFACE ELEVATION: ± 395 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 8-30-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL (fine-to-coarse-grained), clayey, sandy, silty; (FILL)	Brown to Gray	Medium Dense	GC						
				1					
				2					
				3					
				4					
				5					
				6					
				7					
				8					
				9					
				10		[34]	6	125	
				11					
				12					
				13					
				14					
				15					
				16					
				17					
				18					
				19					Perched groundwater at 19 feet
				20		[50]	7	132	

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	1 of 4	2

DRILL RIG: Hollow Stem Auger / Rotary Wash	SURFACE ELEVATION: ± 395 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 8-30-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL (fine-to-coarse-grained), clayey, sandy, silty; (FILL)	Brown to Gray	Medium Dense	GC	21, 22					
CLAY, gravelly, sandy, silty; (FILL)	Mottled Gray and Brown	Stiff	CL	23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36	X	[32]	9	120	
GRAVEL (fine-to-coarse-grained), clayey, sandy, silty; (FILL)	Brown to Gray	Medium Dense	GC	37, 38, 39, 40					

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	2 of 4	2

DRILL RIG: Hollow Stem Auger / Rotary Wash	SURFACE ELEVATION: ± 395 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 8-30-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL (fine-to-coarse-grained), clayey, sandy, silty; (FILL)	Brown to Gray	Medium Dense	GC						
				41					
				42					
				43					
				44		[72]			-no sample recovery; may have pushed large gravel at tip of sample barrel. (driller said no resistance when retrieving sampler)
				45					
				46					
				47					
				48					
				49					
				50					
				51		21			
				52					
				53					
				54					
				55					
				56					
				57					
				58					
				59					
				60		[46]	10	135	

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	3 of 4	2

DRILL RIG: Hollow Stem Auger / Rotary Wash	SURFACE ELEVATION: ± 395 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 8-30-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL (fine-to-coarse-grained), clayey, sandy, silty; (FILL) (FILL ↑)	Brown to Gray	Medium Dense	GC	61, 62					- no free groundwater was encountered prior to switching to rotary wash
SANDSTONE, very slight weathering	Bluish Gray	Hard to Very Hard	BR	63, 64, 65, 66, 67, 68		100 / 2"			- no recovery - at 63 feet 2 inches switched to rotary wash with NX core barrel.
- 69 feet: thin zones of dark gray shale									

Bottom of boring at 69 feet

NOTES

1. No free groundwater was encountered in the boring at the time of drilling. Perched groundwater was encountered at approximately 19 feet at the time of drilling. The boring was grouted following drilling in accordance with San Mateo County requirements (See text for discussion).

2. Stratification lines represent the approximate boundaries between material types, and the transitions may be gradual.

3. Penetration resistance values (blow counts) enclosed in brackets ([ ]) were recorded with a 3.0-inch O.D. Modified California sampler, and are not standard penetration resistance values.

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	4 of 4	2

DRILL RIG: Hollow Stem Auger / Rotary Wash	SURFACE ELEVATION: ± 430 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 8-31-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
CLAY, gravelly, silty, sandy; (FILL)	Light Brown to Brown	Firm	CL	1					
				2					
				3					
				4					
				5					
				6					
				7					
				8					
				9					
				10					
				11					
				12					
				13					
				14					
				15					
				16					
				17					
	Brown to Dark Brown			18					
				19					
				20					

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	1 of 6	3

DRILL RIG: Hollow Stem Auger / Rotary Wash	SURFACE ELEVATION: ± 430 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 8-31-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
CLAY, gravelly, silty, sandy; (FILL)	Brown to Dark Brown	Firm	CL	21					
				22					
				23					
				24					
				25					
				26					
				27					
				28					
				29					
		Very Stiff		30		[36]			-no recovery
				31					
				32					
				33					
				34					
				35					
GRAVEL, (fine-to-coarse-grained), clayey, sandy, silty; (FILL)	Light Brown to Brown	Dense	GC	36		[72]			-used plastic catcher in sampler (large gravels in sample barrel, up to 2" diameter)
				37					
				38					
	Brown to Gray			39					
				40					

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	2 of 6	3

DRILL RIG: Hollow Stem Auger / Rotary Wash	SURFACE ELEVATION: ± 430 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 8-31-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL, (fine-to-coarse-grained), clayey, sandy, silty; (FILL)	Brown to Gray	Dense	GC						
				41					
				42					
				43					
				44					
				45		[42]	10	116	
				46					
				47					
				48					
				49					
				50					
				51					
				52					
				53					
				54					
				55		[87]			-no sample recovery; may have pushed large gravel at tip of sample barrel. (driller said no resistance when retrieving sampler)
				56					
				57					
				58					
				59					
				60					

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	3 of 6	3

DRILL RIG: Hollow Stem Auger / Rotary Wash	SURFACE ELEVATION: ± 430 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 8-31-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL, (fine-to-coarse-grained), clayey, sandy, silty; (FILL)	Brown to Gray	Dense	GC			[50/5"]	9	109	
				61					
				62					
				63					
				64					
				65					
				66					
				67					
				68					
				69					
				70					
				71					
				72		[51]	7	115	
				73					
				74					
				75					
				76					
				77					
				78					
				79					
				80					

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	4 of 6	3

DRILL RIG: Hollow Stem Auger / Rotary Wash	SURFACE ELEVATION: ± 430 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 8-31-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL, (fine-to-coarse-grained), clayey, sandy, silty; (FILL)	Brown to Gray	Dense	GC						
				81					
				82					
				83					
				84					
				85					
				86		50/5"			
				87					
				88					
				89					
				90					
				91					
				92					
				93					ATOD
				94					
				95		100/2"			
SANDSTONE, very slight weathering, moderately to intensely fractured, with thin interbeds of black shale; with white carbonate veins	Bluish Gray	Hard to Very Hard	BR	96					- at 95 feet 2 inches switched to rotary wash with NX core barrel. Measured groundwater prior to switching to rotary wash.
				97					
				98					
				99					
				100					

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	5 of 6	3

DRILL RIG: Hollow Stem Auger / Rotary Wash	SURFACE ELEVATION: ± 430 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 8-31-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
SANDSTONE, very slight weathering, moderately to intensely fractured, with thin interbeds of black shale; with carbonate veins	Bluish Gray	Hard to Very Hard	BR	101					

Bottom of boring at 102 feet

NOTES

1. Groundwater was encountered at approximately 93 feet at the time of drilling. The boring was grouted following drilling in accordance with San Mateo County requirements (See text for discussion).

2. Stratification lines represent the approximate boundaries between material types, and the transitions may be gradual.

3. Penetration resistance values (blow counts) enclosed in brackets ([ ]) were recorded with a 3.0-inch O.D. Modified California sampler, and are not standard penetration resistance values.

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ± 315feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 9-5-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL, clayey, sandy, silty; (FILL)	Mottled Gray and Brown	Dense	GC	1, 2, 3, 4, 5, 6					
CLAY, gravelly, sandy, silty; (FILL)	Mottled Brown to Reddish Brown with Blue Gray	Stiff	CL	7, 8, 9					
(FILL ↑)	Dark Brown to Black			10	☒	[50] / 6"			
SILT, clayey, sandy, with sandstone fragments	Reddish Brown	Very Stiff	ML	11, 12, 13, 14, 15		50			
SANDSTONE, completely weathered, intensely fractured, with clay seams	Gray to Dark Gray	Soft Hardness	BR	16, 17, 18, 19, 20	☒	50/6" [45]	12	120	

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	1 of 2	4

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ±315 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 9-5-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
SANDSTONE, completely weathered, intensely fractured, with clay seams	Gray to Dark Gray	Soft Hardness	BR	21 22 23 24 25		50/2"			

Bottom of boring at 25 feet and 2 inches

NOTES

1. No groundwater was encountered at the time of drilling, and the boring was grouted following drilling in accordance with San Mateo County requirements. (See text for discussion.)

2. Stratification lines represent the approximate boundaries between material types, and the transitions may be gradual.

3. Penetration resistance values (blow counts) enclosed in brackets ([ ]) were recorded with a 3.0-inch O.D. Modified California sampler, and are not standard penetration resistance values.

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	2 of 2	4

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ± 320 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 9-5-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL (fine-to-coarse-grained), clayey, sandy, silty; (FILL)	Brown to Gray	Loose	GC						
				1					
				2					
				3					
				4					
				5					
				6					
				7					
				8					
				9					
				10					
				11		[11]			
				12					
				13					
				14					
				15					
				16					
				17					
				18					
				19					
				20		[16]	9	11	

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	1 of 3	5

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ± 320 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 9-5-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL (fine-to-coarse-grained), clayey, sandy, silty; (FILL)	Brown to Gray	Loose	GC	21					
				22					
				23					
				24					
				25					
				26					
				27					
				28					
				29					
				30					
				31		[13]	9	103	
				32					
				33					
				34					
				35					
				36					
				37					
(FILL ↑)				38					
SANDSTONE, moderately severe to severely weathered, intensely fractured	Brown to Reddish Brown	Soft Hardness	BR	39					
(continued on next sheet)				40		[69]			

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	2 of 3	5

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ± 320 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 9-5-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
SANDSTONE, moderately severe to severely weathered, intensely fractured	Brown to Reddish Brown	Soft Hardness	BR	41, 42, 43, 44, 45, 46		93			

Bottom of boring at 46 feet and 6 inches

NOTES

1. No groundwater was encountered at the time of drilling, and the boring was grouted following drilling in accordance with San Mateo County requirements. (See text for discussion.)

2. The stratification line represents the approximate boundary between material types, and the transition may be gradual.

3. Penetration resistance values (blow counts) enclosed in brackets ([ ]) were recorded with a 3.0-inch O.D. Modified California sampler, and are not standard penetration resistance values.

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	3 of 3	5

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ± 225 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 9-6-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
ASPHALTIC CONCRETE	Black			1					
GRAVEL (fine-to-coarse-grained), sandy, silty; (FILL)	Dark Brown to Gray	Medium Dense	GC	2, 3					
SILT, sandy, clayey; (FILL) (FILL ↑)	Mottled Olive to Brown	Firm	ML	4, 5, 6, 7	X	[14]	13	103	
CLAY, sandy, silty	Dark Brown to Gray	Firm	CL	8, 9, 10, 11, 12	X	[11]	17	109	- Consolidation (See Appendix B) PI = 6% LL = 21% -200 = 60%
CLAY, sandy, silty	Reddish Brown	Stiff	CL	13, 14, 15, 16, 17	X	[15]	19	109	Luc=2 ksf
SILT, clayey, sandy, with gravels	Reddish Brown	Stiff to Very Stiff	ML	18, 19, 20	X	[40]			

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	1 of 4	6

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ± 225 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 9-6-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
SILT, clayey, sandy, with gravels	Reddish Brown	Stiff	ML	21					
CLAY, sandy, silty, gravelly	Dark Brown to Gray	Stiff	CL	22					
				23					
				24					
				25					
				26					
				27					
				28					
				29					
				30		[19]	19	111	
				31					
				32					
				33					
				34					
				35					
				36					
				37					
				38					
				39					
SANDSTONE, completely weathered (continued on next sheet)	Brown	Soft Hardness	BR	40		[48]			

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	2 of 4	6

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ± 225 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 9-6-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
SANDSTONE, completely weathered	Brown	Soft Hardness	BR						
				41					
				42					
				43					
				44					
				45					
	Reddish Brown to Brown			46					
				47					
				48					
				49					
				50		[50] 5"			
				51					
				52					
				53					
				54					
				55					
				56		69			

Bottom of boring at 56 feet and 6 inches

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	3 of 4	6

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ± 225 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 9-6-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS

NOTES

1. No groundwater was encountered at the time of drilling, and the boring was grouted following drilling in accordance with San Mateo County requirements. (See text for discussion.)

2. Stratification lines represent the approximate boundaries between material types, and the transitions may be gradual.

3. Penetration resistance values (blow counts) enclosed in brackets ([ ]) were recorded with a 3.0-inch O.D. Modified California sampler, and are not standard penetration resistance values.

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	4 of 4	6

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ± 205 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 9-6-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL (fine-to-coarse-grained), clayey, sandy, silty; (FILL)	Brown to Dark Brown	Loose	GC	1, 2, 3, 4, 5, 6					
	Dark Brown to Gray			7, 8, 9, 10, 11	[12]	10	105		
				12, 13, 14, 15, 16					
GRAVEL, clayey, sandy, silty; (FILL)	Gray	Medium Dense	GC	17, 18					
-abundant rock fragments				19, 20	[24]	15	120		PI = 7% LL = 20% -200 = 28%

(continued on next sheet)

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	1 of 2	7

DRILL RIG: Hollow Stem Auger	SURFACE ELEVATION: ± 205 feet	LOGGED BY: DI
DEPTH TO GROUNDWATER: See Notes	BORING DIAMETER: 8 inches	DATE DRILLED: 9-6-00

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	DEPTH (feet)	SAMPLER	BLOWS / FT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	OTHER TESTS
GRAVEL, sandy, silty, clayey; (FILL)	Gray	Medium Dense	GC	21, 22, 23, 24, 25, 26					
(FILL ↑)				27					
SANDSTONE, completely weathered	Brown to Gray	Soft Hardness	BR	28, 29, 30		50/5"			
				31, 32, 33, 34		50/2"			

Bottom of boring at 34 feet and 2 inches

NOTES

1. No groundwater was encountered at the time of drilling, and the boring was grouted following drilling in accordance with San Mateo County requirements. (See text for discussion.)

2. Stratification lines represent the approximate boundaries between material types, and the transitions may be gradual.

3. Penetration resistance values (blow counts) enclosed in brackets ([ ]) were recorded with a 3.0-inch O.D. Modified California sampler, and are not standard penetration resistance values.

ALAN KROPP & ASSOCIATES
Geotechnical Consultants

EXPLORATORY BORING LOG

ONE QUARRY ROAD
Brisbane, California

PROJECT NO.	DATE	SHEET	BORING NO.
2065-1	November 2000	2 of 2	7

Berlogar Geotechnical Consultants (2003)

BORING LOG B-1

JOB NUMBER: 2627.100 **DATE DRILLED:** 3-10-03

JOB NAME: Brisbane Quarry **SURFACE ELEVATION:** 415 feet

DRILL RIG: Rotary Wash **DATUM:** Mean Sea Level

SAMPLER TYPE:	DRIVE WEIGHT - LB	HEIGHT OF FALL - IN
2.5 inch I.D. Split Barrel	140	30
Standard Penetration Test	140	30
Diamond Core		

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
24	8.4	113		SM	SILTY SAND with gravel, light to medium gray-brown, moist, dense, fine to coarse-grained sand, fine gravel (fill)
35	9.4	129	5	SM	SILTY SAND with gravel, gray, moist, dense, fine to coarse-grained sand, fine gravel (fill)
15	11.4	122	10	SC	CLAYEY SAND with gravel, brown-gray, moist, medium dense to dense, some silt (fill)
30	10.4	126	15		below 13 feet, some fine to coarse gravel
16	14.2	111	20	SC	CLAYEY SAND with gravel brown-gray, moist, dense, fine to coarse gravel, fine to coarse-grained sand (fill)

BORING LOG B-1

JOB NUMBER: 2627.100 **SHEET:** 2 **OF:** 4

JOB NAME: Brisbane Quarry **DEPTH:** 20 feet **TO** 40 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
16	14.2	111		SC	CLAYEY SAND, brown-gray, moist, dense, fine to coarse grained sand, trace fine to coarse gravel, occasional cobbles (fill)
			25		
21	-	-			below 27 feet, cobbles and boulders to 29 feet
				GC	CLAYEY GRAVEL with sand, gray, moist, medium dense to dense, fine to coarse gravels, fine to medium-grained sand (fill)
			30		
15	10.3	134			below 31 feet, mottled brown-gray, gray and light gray-brown
					below 33 feet, becomes wet
			35		
22	10.1	115			
				GM	SILTY GRAVEL with sand, gray, moist, dense, fine to coarse gravel, fine to coarse-grained sand (fill)
			40		below 39 feet, possible 8 inch void
22	13.7	109			

BORING LOG B-1

JOB NUMBER: 2627.100 **SHEET:** 3 **OF:** 4

JOB NAME: Brisbane Quarry **DEPTH:** 40 feet **TO** 60 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
22	13.7	109		GM	SILTY GRAVEL with sand, gray, moist, dense, fine to coarse gravel, fine to coarse-grained sand (fill)
				GC	CLAYEY GRAVEL with sand, gray, wet, dense, fine to coarse gravel, fine to coarse-grained sand (fill)
			45		
25	10.4	124			
					at 47.5 feet, 12 inch diameter boulder
			50		
40	7.8	132			
				GM	SILTY GRAVEL with sand, mottled gray and brown-gray, wet, very dense, fine to coarse gravel, medium to coarse-grained sand (fill)
			55		
50	8.6	112			
				CL	SANDY CLAY with gravel, light red-brown, wet to saturated, very stiff to hard, fine to coarse-grained sand, fine to coarse gravel, occasional cobbles and boulders (fill)
100/ 0"	-	-			at 58 feet, 18-24 inch boulder
			60		

BORING LOG B-1

JOB NUMBER: 2627.100 **SHEET:** 4 **OF:** 4

JOB NAME: Brisbane Quarry **DEPTH:** 60 feet **TO** 66.5 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
				CL	SANDY CLAY with gravel, light red-brown, wet to saturated, very stiff to hard, fine to coarse-grained sand, fine to coarse gravel, occasional cobbles and boulders (fill)
			65		SANDSTONE, light gray, moderately weathered, moderately strong to strong, highly fractured 60° fractures, highly weathered zone from 65.5 to 66.5 feet, light gray-brown, limonite stained
			70 75 80		Boring terminated at 66.5 feet. Free water encountered at 33 feet, rose to 30 feet by end of day.

Berlogar Geotechnical Consultants (2003)

BORING LOG B-2

JOB NUMBER: 2627.100 **DATE DRILLED:** 3-13-03

JOB NAME: Brisbane Quarry **SURFACE ELEVATION:** 463 feet

DRILL RIG: Rotary Wash **DATUM:** Mean Sea Level

SAMPLER TYPE:	DRIVE WEIGHT - LB	HEIGHT OF FALL - IN
2.5 inch I.D. Split Barrel	140	30
Diamond Core		

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
18	7.6	111		SC	CLAYEY SAND with gravel, brown-gray, moist, dense, fine to medium-grained sand, fine to coarse gravel, occasional cobbles (fill)
				CL	SANDY CLAY, light orange-brown, moist, stiff, fine to medium-grained sand (fill)
13	14.1	111	5		
					below 8.5 feet, mottled brown-gray
11	14.6	111	10		
					between 13.5 to 14.5 feet, coarse gravel and cobbles
9	14.6	107	15		
11	12.6	123	20		

BORING LOG B-2

JOB NUMBER: 2627.100 **SHEET:** 2 **OF:** 4

JOB NAME: Brisbane Quarry **DEPTH:** 20 feet **TO** 40 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
11	12.6	123		CL	SANDY CLAY, light red-brown, moist, medium stiff, fine to medium-grained sand, some silt, trace fine gravel (fill)
					below 23 feet, mottled light red-brown and medium gray-brown
11	14.0	116	25		
12	13.9	122	30		
					below 31 feet, becomes moist to wet
					below 33.5 feet, becomes gray-brown,dry to moist, stiff
21	12.5	120	35		
					at 38 feet, 100% loss of drilling fluid
				SC	CLAYEY SAND, light gray-brown, moist, medium dense, fine to coarse-grained sand, trace to some fine gravel (fill)
17	10.1	113	40		

BORING LOG B-2

JOB NUMBER: 2627.100 **SHEET:** 3 **OF:** 4

JOB NAME: Brisbane Quarry **DEPTH:** 40 feet **TO** 60 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
17	10.1	113		SC	CLAYEY SAND, mottled medium gray-brown, brown-gray and light red-brown, dry to moist, dense, fine to medium-grained sand, trace fine gravel (fill)
23	21.8	104	45	ML	SANDY SILT, gray-brown, moist, dense, fine to medium- grained sand (fill)
19	9.9	94	50	SM	SILTY SAND, light gray-brown, dry to moist, dense, fine to medium-grained sand (fill)
55	8.5	135	55	GC	CLAYEY GRAVEL with sand, gray, moist to wet, dense, fine to coarse gravel, fine to coarse-grained sand (fill)
50	8.6	137	60		below 58.5 feet, becomes light gray-brown

BORING LOG B-2

JOB NUMBER: 2627.100 **SHEET:** 4 **OF:** 4

JOB NAME: Brisbane Quarry **DEPTH:** 60 feet **TO** 74 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
50	8.6	137		GC	CLAYEY GRAVEL with sand, light gray-brown, moist to wet, fine to coarse gravel, fine to coarse-grained sand, trace silt (fill)
40	8.8	12.8	65		below 67.5 feet, some cobbles and boulders
			70		SANDSTONE, fine-grained, light gray, moderately weathered, strong, moderately fractured
			75		Boring terminated at 74 feet. No free water encounted
			80		

Berlogar Geotechnical Consultants (2003)

BORING LOG B-3

JOB NUMBER: 2627.100 **DATE DRILLED:** 3-14-03

JOB NAME: Brisbane Quarry **SURFACE ELEVATION:** 425 feet

DRILL RIG: Rotary Wash **DATUM:** Mean Sea Level

SAMPLER TYPE:	DRIVE WEIGHT - LB	HEIGHT OF FALL - IN
2.5 inch I.D. Split Barrel	140	30
Diamond Core		

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
60	7.8	110		GC	CLAYEY GRAVEL with sand, light to medium gray-brown, dry to moist, dense, fine to coarse gravel, fine to coarse-grained sand, occasional cobbles (fill)
19	9.9	126	5	CL	SANDY CLAY with gravel, gray-brown, moist to wet, stiff, fine to medium-grained sand (fill)
14	11.9	120	10		occasional cobbles and boulders
15	11.4	125	15	SC	CLAYEY SAND with gravel, gray, moist to wet, medium dense, fine to coarse-grained sand, fine to coarse gravel (fill)
					below 16 feet, gray mottling
21	8.7	118	20	GC	CLAYEY GRAVEL with sand, gray-brown, moist to wet, dense, fine to coarse gravel, fine to coarse-grained sand (fill)

BORING LOG B-3

JOB NUMBER: 2627.100 **SHEET:** 2 **OF:** 6

JOB NAME: Brisbane Quarry **DEPTH:** 20 feet **TO** 40 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
21	8.7	118		GC	CLAYEY GRAVEL with sand, gray-brown, moist to wet, dense, fine to coarse gravel, fine to coarse-grained sand, occasional cobbles and boulders (fill)
32	-	-	25		between 25 to 28 feet, cobbles and coarse gravel
45	10.1	129	30	GC	CLAYEY GRAVEL with sand, blue-gray, wet, dense, fine gravel, fine to medium-grained sand (fill)
39	8.7	128	35		below 34 feet, light orange-brown mottling
36	18.9	110	40	CL	SANDY CLAY with silt, gray-brown, wet, very stiff, fine to medium-grained sand, trace fine gravel (fill)

BORING LOG B-3

JOB NUMBER: 2627.100 **SHEET:** 3 **OF:** 6

JOB NAME: Brisbane Quarry **DEPTH:** 40 feet **TO** 60 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
36	18.9	110		CL	SANDY CLAY with silt, gray-brown, wet, very stiff, fine to medium-grained sand, trace fine gravel (fill)
				CH	SILTY CLAY, dark blue-gray, wet, hard (fill)
63	16.9	111	45		
				SC	CLAYEY SAND with gravel, gray, wet, very dense, fine to medium-grained sand (fill)
50	9.3	129	50		
				GC	CLAYEY GRAVEL with sand, light red-brown, wet, dense, fine to coarse gravel, fine to coarse-grained sand (fill)
100/ 0"	-	-	55		at 55 feet, 12 inch boulder
				GC	CLAYEY GRAVEL with sand, gray, wet, dense, fine to coarse gravel, fine to coarse-grained sand (fill)
	7.3	120	60		

BORING LOG B-3

JOB NUMBER: 2627.100 **SHEET:** 4 **OF:** 6

JOB NAME: Brisbane Quarry **DEPTH:** 60 feet **TO** 80 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
110	7.3	120		GC	CLAYEY GRAVEL, mottled gray and light to medium gray-brown, wet, very dense, fine to coarse gravel, trace fine to medium-grained sand (fill)
63	8.4	132	65		
					from 67 to 73 feet, becomes dense, below 67 feet, becomes wet to saturated
33	8.5	133	70		
80	-	-	75		
60/6"	-	-	80		

BORING LOG B-3

JOB NUMBER: 2627.100 **SHEET:** 5 **OF:** 6

JOB NAME: Brisbane Quarry **DEPTH:** 80 feet **TO** 100 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
60/6"	-	-		GC	CLAYEY GRAVEL, gray, saturated, dense, fine to coarse gravel trace fine to medium-grained sand (fill)
				GC	CLAYEY GRAVEL with sand, light gray-brown, saturated, dense, fine to coarse gravel, fine to coarse-grained sand (fill)
40	11.9	129	85		
47	8.9	122	90	GC	CLAYEY GRAVEL, brown, saturated, very dense, fine to coarse gravel, trace fine to medium-grained sand (fill)
60	9.6	124	95		below 95 feet, mottled light brown and dark gray
				GC	CLAYEY GRAVEL with sand, gray-brown, saturated, very dense, coarse-grained sand (fill)
85/5"	11.6	115	100		

Berlogar Geotechnical Consultants (2003)

BORING LOG B-3

JOB NUMBER: 2627.100 **SHEET:** 6 **OF:** 6

JOB NAME: Brisbane Quarry **DEPTH:** 100 feet **TO** 107 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
85/5"	11.6	115		GC	CLAYEY GRAVEL with sand, gray-brown, saturated, very dense (fill)
			105		SANDSTONE, light gray-brown to gray, moderately weathered, moderately strong, moderately fractured
			110 115 120		Boring terminated at 107 feet. Free water encounted at 67 feet.

Berlogar Geotechnical Consultants (2003)

BORING LOG B-4

JOB NUMBER: 2627.100 **DATE DRILLED:** 3-18-03

JOB NAME: Brisbane Quarry **SURFACE ELEVATION:** 497 feet

DRILL RIG: Rotary Wash **DATUM:** Mean Sea Level

SAMPLER TYPE:	DRIVE WEIGHT - LB	HEIGHT OF FALL - IN
2.5 inch I.D. Split Barrel	140	30
Diamond Core		

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
13	10.0	115		GC	CLAYEY GRAVEL with sand, gray-brown, moist to wet, loose to medium dense, fine to coarse gravel, fine to medium-grained sand (fill)
17	12.6	136	5		below 5 feet, becomes dense
17	11.6	120	10		
18	14.7	81	15	GM	SILTY GRAVEL with sand, gray-brown, moist to wet, medium dense, fine to coarse gravel, fine to coarse-grained sand (fill) possible void from 13.5 to 15 feet
9	12.5	117	20	GC	CLAYEY GRAVEL with sand, gray-brown, wet, loose, fine to coarse gravel, fine to coarse-grained sand (fill)

BORING LOG B-4

JOB NUMBER: 2627.100 **SHEET:** 2 **OF:** 8

JOB NAME: Brisbane Quarry **DEPTH:** 20 feet **TO** 40 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
9	12.5	117		GC	CLAYEY GRAVEL with sand, gray-brown, wet, loose to medium dense, fine to coarse gravel, fine to coarse-grained sand (fill)
13	10.5	128	25		
18	-	-	30		
17	11.8	114	35		
47	14.5	114	40	SC	CLAYEY SAND with gravel, light blue-gray and light orange-brown, wet, dense, fine to coarse-grained sand (fill)

BORING LOG B-4

JOB NUMBER: 2627.100 **SHEET:** 3 **OF:** 8

JOB NAME: Brisbane Quarry **DEPTH:** 40 feet **TO** 60 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
47	14.5	114		SC	CLAYEY SAND with gravel, mottled light blue-gray and light orange-brown, wet, very dense, fine to coarse gravel, fine to coarse-grained sand (fill)
				GC	CLAYEY GRAVEL, brown, wet, dense, fine to coarse gravel, fine to coarse-grained sand (fill)
25	9.4	121	45		
					below 47 feet, increase in coarse gravel and cobbles, dense
51	11.3	80	50		
				GP	GRAVEL with sand, brown, wet, medium dense, fine to coarse-grained sand (fill)
38	7.8	105	55		
				GC	CLAYEY GRAVEL with sand, gray-brown, wet, dense, fine to coarse gravel, fine to coarse-grained sand (fill)
44	-	-	60		

BORING LOG B-4

JOB NUMBER: 2627.100 **SHEET:** 4 **OF:** 8

JOB NAME: Brisbane Quarry **DEPTH:** 60 feet **TO** 80 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
44	-	-		GC	CLAYEY GRAVEL with sand, gray-brown, wet, dense, fine to coarse gravel, fine to coarse-grained sand (fill)
34	13.5	120			
30	12.7	115	65		
				SC	CLAYEY SAND with gravel, light to medium red-brown, wet, medium dense, fine to coarse-grained sand, fine to coarse gravel (fill)
32	11.4	129	70		
				GC	CLAYEY GRAVEL with sand, light to medium gray-brown, moist to wet, medium dense, fine to coarse gravel, fine to coarse-grained sand (fill)
36	11.8	124	75		
28	13.1	114	80		

BORING LOG B-4

JOB NUMBER: 2627.100 **SHEET:** 5 **OF:** 8

JOB NAME: Brisbane Quarry **DEPTH:** 80 feet **TO** 100 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
28	13.1	114		GC	CLAYEY GRAVEL wirh sand, mottled light to medium gray-brown gray and light brown-gray, moist to wet, medium dense, fine to coarse gravel, fine to medium-grained sand (fill)
40	11.7	116	85		
				GP	GRAVEL, gray-brown, wet, medium dense, trace to some coarse-grained sand, trace clay (fill)
36	5.9	116	90		
				GP	GRAVEL, light orange-brown, wet, dense, trace coarse-grained sand, trace clay (fill)
51	7.2	98	95		
					below 99 feet, becomes medium dense
38	4.7	88	100		

BORING LOG B-4

JOB NUMBER: 2627.100 **SHEET:** 6 **OF:** 8

JOB NAME: Brisbane Quarry **DEPTH:** 100 feet **TO** 120 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
38	4.7	88		GP	GRAVEL, light to medium orange-brown, moist to wet, medium dense, trace coarse-grained sand, trace clay (fill)
				GC	CLAYEY GRAVEL with sand, mottled yellow-brown to gray-brown, wet to saturated, very dense, fine to coarse gravel, fine to coarse-grained sand (fill)
53	26.5	96	105		
50	10.6	101	110		below 110 feet, predominantly gray-brown
42	9.9	137	115		below 118 feet, becomes hard
85	10.4	127	120		

BORING LOG B-4

JOB NUMBER: 2627.100 **SHEET:** 7 **OF:** 8

JOB NAME: Brisbane Quarry **DEPTH:** 120 feet **TO** 140 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
85	10.4	127		GC	CLAYEY GRAVEL with sand, mottled yellow-brown to gray-brown, wet, hard, fine to coarse gravel, fine to coarse-grained sand (fill)
					below 124 feet, becomes very dense
51	11.8	121	125		
				GM	SILTY GRAVEL with sand, gray-brown, wet to saturated, med dense, fine to coarse gravel, fine to coarse-grained sand (fill)
33	8.1	130	130		
				GP	GRAVEL, gray-brown, wet to saturated, dense, trace fine-grained sand (fill)
66	6.9	133	135		
				GP	GRAVEL with sand, gray-brown, wet, very dense, fine to coarse-grained sand (fill)
60/6"	8.4	131	140		

BORING LOG B-4

JOB NUMBER: 2627.100 **SHEET:** 8 **OF:** 8

JOB NAME: Brisbane Quarry **DEPTH:** 140 feet **TO** 155 feet

NOTES:

BLOWS PER FT.	MOISTURE CONTENT %	DRY UNIT WEIGHT p.c.f.	DEPTH IN FEET	USCS CLASSI-FICATION	DESCRIPTION
60/6"	8.4	131		GP	GRAVEL with sand, gray-brown, wet, very dense, fine to coarse-grained sand (fill)
					below 143 feet, trace clay and silt
27	9.9	129	145		
					SANDSTONE, light gray, slightly weathered, moderately strong, moderately hard, highly to moderately fractured
			150		
			155		
					Boring terminated at 155 feet. No free water encounted.
			160		

MAJOR DIVISIONS			CLASSIFICATION	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
		GRAVEL WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL - SAND - 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	INORGANIC 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 SILTS

UNIFIED SOIL CLASSIFICATION SYSTEM

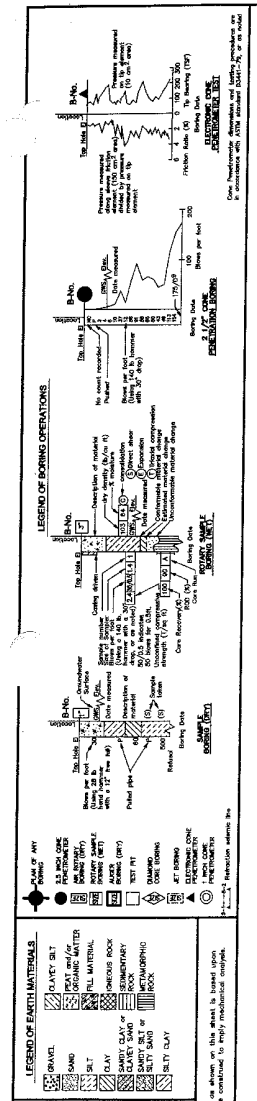
Blows per ft.	Moisture Content (%)	Dry Unit Weight (pcf)	Depth in Feet	USCS Classification	
					Bulk Sample
					2.5" I.D. Split Barrel Sample
					2.8" I.D. Shelby Tube Sample
					No sample recovered
Note: Soils described as dry, moist, and wet are estimated to be dry of optimum, near optimum, and wet of optimum moisture content, respectively. Saturated soils are estimated to be within areas of free groundwater.					Standard Penetration Test interval
					Well defined stratum change
					Gradual stratum change
					Interpreted stratum change
					Apparent ground water level at date noted. Seasonal weather conditions, site topography, etc., may cause changes in water level indicated on logs.

KEY TO BORING LOG SYMBOLS

BY: FF

DATE: 4-23-03

JOB NUMBER: 2627.100



WEATHERING DESCRIPTORS

Descriptors	Diagnostic features: Chemical weathering–Discoloration and/or oxidation: Body of rock	Chemical weathering–Discoloration and/or oxidation: Fracture surfaces †	Mechanical weathering–Grain boundary conditions (disaggregation) primarily for granitics and some coarse-grained sediments	Texture and solutioning: Texture	Texture and solutioning: Solutioning	General characteristic (strength, excavation, etc.) §
Fresh	No discoloration, not oxidized	No discoloration or oxidation	No separation, intact (tight)	No change	No solutioning	Hammer rings when crystalline rocks are struck. Almost always rock excavation except for naturally weak or weakly cemented rocks such as siltstones or shales.
Slightly weathered to fresh*						
Slightly weathered	Discoloration or oxidation is limited to surface of, or short distance from, fractures; some feldspar crystals are dull	Minor to complete discoloration or oxidation of most surfaces	No visible separation, intact (tight)	Preserved	Minor leaching of some soluble minerals may be noted	Hammer rings when crystalline rocks are struck. Body of rock not weakened. With few exceptions, such as siltstones or shales, classified as rock excavation.
Moderately to slightly weathered*						
Moderately weathered	Discoloration or oxidation extends from fractures usually throughout; Fe–Mg minerals are "rusty", feldspar crystals are "cloudy".	All fracture surfaces are discolored or oxidized	Partial separation of boundaries visable	Generally preserved	Soluble minerals may be mostly leached	Hammer does not ring when rock is struck. Body of rock is slightly weakened. Depending on fracturing, usually is rock excavation except in naturally weak rocks such as siltstones or shales.
Intensely to moderately weathered*						
Intensely weathered	Discoloration or oxidation throughout; all feldspars and Fe–Mg minerals are altered to clay to some extent; or chemical alteration produces in situ disaggregation, see grain boundary conditions.	All fracture surfaces are discolored or oxidized, surfaces friable	Partial separation, rock is friable; in semiarid conditions granitics are disaggregated	Texture altered by chemical disintegration (hydration, argillation)	Leaching of soluble minerals may be complete	Dull sound when struck with hammer, usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness such as incipient or hairline fractures, or veinlets. Rock is significantly weakened. Usually common excavation.
Very intensely weathered*						
Decomposed	Discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and Fe–Mg minerals are completely altered to clay.		Complete separation of grain boundaries (disaggregated)	Resembles a soil, partial or complete remnant rock structure may be preserved; leaching of soluble minerals usually complete		Can be granulated by hand. Always common excavation. Resistant minerals such as quartz may be present as "stringers" or "dikes".

NOTE: This chart and its horizontal categories are more readily applied to rocks with feldspars and mafic minerals. Weathering in various sedimentary rocks, particularly limestones and poorly indurated sediments, will not always fit the categories established. This chart and weathering categories may have to be modified for particular site conditions or alterations such as hydrothermal effects; however, the basic framework and similar descriptors are to be used.

* Combination descriptors are permissible where equal distribution of both weathering characteristics are present over significant intervals or where characteristics present are "in between" the diagnostic feature. However, dual descriptors should not be used where significant, identifiable zones can be delineated. When given as a range, only two adjacent terms may be combined (i.e., decomposed to slightly weathered or moderately weathered to fresh) are not acceptable.

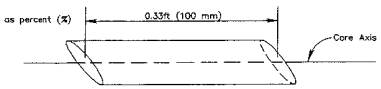
† Does not include directional weathering along shears or faults and their associated features. For example, a shear zone that carried weathering to great depths into a fresh rock mass would not require the rock mass to be classified as weathered.

§ These are generalizations and should not be used as diagnostic features for weathering or excavation classification. These characteristics vary to a large extent based on naturally weak materials or cementation and type of excavation.

ROCK QUALITY DESIGNATION (RQD)

$$RQD = \frac{\text{Sum of length of solid core pieces} \geq 0.33 \text{ ft [4 in.] (100 mm) long}}{\text{Length of the run in feet (mm)}} \times 100$$

Expressed as percent (%)



ROCK HARDNESS/STRENGTH DESCRIPTORS

Descriptor	Criteria
Extremely hard	Core, fragment, or exposure cannot be scratched with knife or sharp pick; can only be chipped with repeated heavy hammer blows.
Very hard	Can be scratched with knife or sharp pick. Core or fragment breaks with repeated heavy hammer blows.
Hard	Can be scratched with knife or sharp pick with difficulty (heavy pressure). Heavy hammer blow required to break specimen.
Moderately hard	Can be scratched with knife or sharp pick with light or moderate pressure. Core or fragment breaks with moderate hammer blow.
Moderately soft	Can be grooved 1/16 inch (2 mm) deep by knife or sharp pick with moderate or heavy pressure. Core or fragment breaks with light hammer blow or heavy manual pressure.
Soft	Can be grooved or gouged easily by knife or sharp pick with light pressure, can be scratched with fingernail. Breaks with light to moderate manual pressure.
Very soft	Can be readily indented, grooved or gouged with fingernail, or carved with a knife. Breaks with light manual pressure.
Any bedrock unit softer than very soft, is to be described using USBR 5000 consistency descriptors.	

NOTE: Although "sharp pick" is included in these definitions, descriptions of ability to be scratched, grooved or gouged by a knife is the preferred criteria.

BEDDING, FOLIATION, OR FLOW TEXTURE DESCRIPTORS

Descriptor	Thickness/spacing
Massive	Greater than 10 ft (3 m)
Very thickly, (bedded, foliated, or banded)	3 to 10 ft (1 to 3 m)
Thickly	1 to 3 ft (300 mm to 1 m)
Moderately	0.3 to 1 ft (100 to 300 mm)
Thinly	0.1 to 0.3 ft (30 to 100 mm)
Very thinly	0.03 [3/8 in] to 0.1 ft (10 to 30 mm)
Laminated (intensely foliated or banded)	Less than 0.03 ft [3/8 in] (<10 mm)

FRACTURE DENSITY

FRACTURE DENSITY – Based on the spacing of all natural fractures in an exposure or core recovery lengths in drill holes; excludes mechanical breaks, shears, and shear zones; however, shear–distributed zones (fracturing outside the shear) are included. Descriptors for fracture density apply to all rock exposures such as tunnel walls, dozer trenches, outcrops, or foundation cut slopes and inverts, as well as boreholes. Descriptive criteria presented below are based on drill hole cores where lengths are measured along the core axis, for other exposures the criteria is distance measured between fractures (size of blocks).

UNFRACTURED: No/observed fractures.

VERY SLIGHTLY FRACTURED: Core recovered mostly in lengths greater than 3 feet (1 m).

SLIGHTLY TO VERY SLIGHTLY FRACTURED

SLIGHTLY FRACTURED: Core recovered mostly in lengths from 1 to 3 feet (300 to 1000 mm) with few scattered lengths less than 1 foot (300 mm) or greater than 3 feet (1000 mm).

MODERATELY TO SLIGHTLY FRACTURED

MODERATELY FRACTURED: Core recovered mostly in 0.33 to 1.0 foot (100 to 300 mm) lengths with most lengths about 0.67 foot (200 mm).

INTENSELY TO MODERATELY FRACTURED

INTENSELY FRACTURED: Lengths average from 0.1 to 0.33 foot (30 to 100 mm) with scattered fragmented intervals. Core recovered mostly in lengths less than 0.33 foot (100 mm).

VERY INTENSELY TO INTENSELY FRACTURED

VERY INTENSELY FRACTURED: Core recovered mostly as chips and fragments with a few scattered short core lengths.

* Combinations of fracture densities (e.g. very intensely to intensely fractured or moderately to slightly fractured) are used where equal distribution of both fracture density characteristics are present over a significant interval or exposure, or where characteristics are "in between" the descriptor definitions.

Source: U.S. Department of Interior, Bureau of Reclamation "Engineering Geology Field Manual".

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

TABER CONSULTANTS
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

JOB No. 2D2/300/174

DESIGN OVERSIGHT

SIGN OFF DATE

DRAWN BY M. D. Robertson

CHECKED BY D. Scott Kieffer

E. A. Hilmer
FIELD INVESTIGATOR

DATE August 2000

PREPARED FOR
JACOBS ASSOCIATES

D.S. Kieffer
PROJECT ENGINEER

BRIDGE NO.

POST MILE

BRISBANE QUARRY
LOG OF TEST BORINGS

11/03/00 2D2300174zb.dwg

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU
EA

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY)

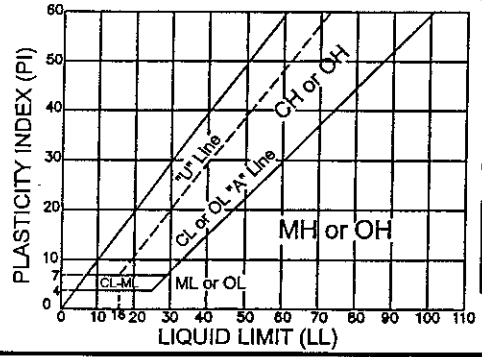
SHEET OF

Taber Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116
(916) 371-1690 Fax (916) 371-7265

UNIFIED SOIL CLASSIFICATION SUMMARY

(ASTM D 2487-93)

Pt	OH	CH	MH	OL	CL	ML	SC	SM	SP	SW	GC	GM	GP	GW
Highly organic soils	Silts and clays Liquid limit 50 or more			Silts and clays Liquid limit less than 50			Sands with fines >12% fines		Clean sands < 5% fines		Gravels with fines > 12% fines		Clean gravels < 5% fines	
							Sands—50% or more of coarse fraction is smaller than No 4. Sieve				Gravels—more than 50% of coarse fraction is larger than No. 4 sieve			
Fine grained soils (50% or more is smaller than No. 200 sieve)							Coarse grained soils (More than 50% is larger than No. 200 sieve)							



LABORATORY CLASSIFICATION CRITERIA

GW and SW – Cu $\geq$ 4 for GW and 6 FOR SW; 1 $\leq$ Cc $\leq$ 3

GP and SP—Clean gravel or sand not meeting requirements for GW and SW.

GM and SM—Atterberg limits of fines below "A" line or P.I. less than 4.

GC and SC—Atterberg limits of fines above "A" line with P.I. greater than 7.

Fines (silt or clay)	Sand			Gravel		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		
Sieve sizes	200	40	10	4	3/4"	3"	10"

Classification of earth materials shown on the test boring logs is based on field inspection and should not be construed to imply laboratory analysis unless so stated.

MATERIAL SYMBOLS

- Gravel
- Sand
- Silt
- Clay
- Sandy clay or clayey sand
- Sandy silt or silty sand
- Silty clay or clayey silt
- Peat and/or organic matter
- Fill material
- Igneous rock
- Sedimentary rock
- Metamorphic rock

CONSISTENCY CLASSIFICATION FOR SOILS

Standard Penetration "N"-Value*	Granular	Cohesive
0–5	Very loose	Very soft
6–10	Loose	Soft
11–20	Semicompact	Stiff
21–35	Compact	Very stiff
36–70	Dense	Hard
> 70	Very dense	Very hard

* According to the Standard Penetration Test (ASTM D 1586)

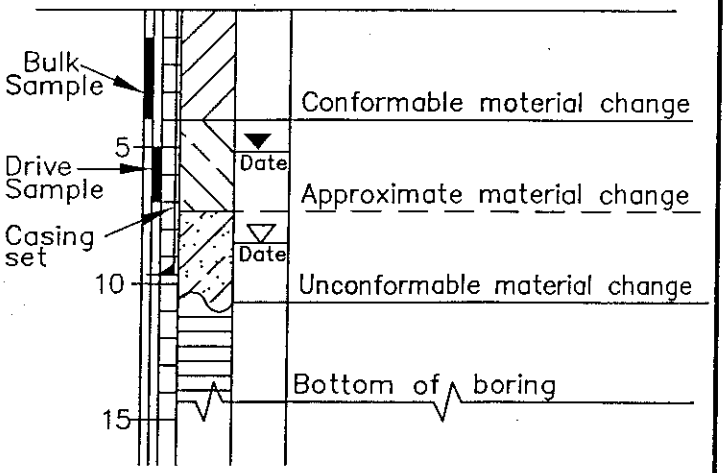
Blow count of 50/0.5 indicates 50 blows for 0.5 feet.

Where standard penetration test has not been performed, consistencies shown (in parenthesis) on logs are estimated.

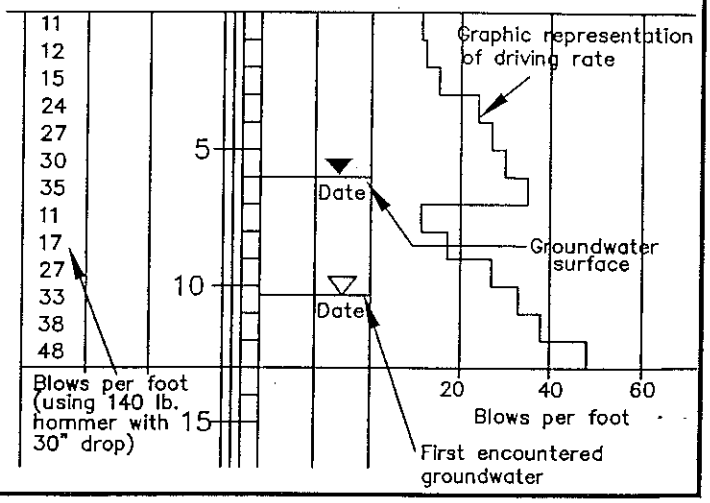
KEY TO "OTHER TESTS" LABORATORY

A – Atterberg Limits
C – Consolidation
CR – Corrosivity
E – Expansion Index
G – Gradation
H – Hydrometer
M – Maximum Dry Density
P – Permeability
R – Resistance Value
S – Direct Shear
SE – Sand Equivalent
SG – Specific Gravity
T – Triaxial Shear

LEGEND OF BORING



LEGEND OF PENETRATION TEST



Jacobs Associates (2000)

Taber
Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix

ELEVATION: 577ft. (approx.)

BORING No. B-1

Depth (in feet)	Blows/Foot (350 ft-lb/blow)	Sample Size (inches)	Sample No.	Description
				Loose brown SILTY GRAVEL, (GM), dry (fill)
				Light brown gray to locally gray SANDSTONE- moderately weathered to highly weathered, moderately hard, with moist SILTY seams and interbeds of very moist dark gray SHALE (Franciscan Complex Bedrock)
10	48 (33)	2.5	1	
20	50/0.3	1.4	2	
30	50/0.1	1.4	3	
40				No free graundwater encountered

Depth scale: 5, 10, 15, 20, 25, 30, 35, 40

Columns: UNCONFINED COMPRESSIVE STRENGTH (tsf) | OTHER TESTS | DRY DENSITY (lbs/cu. ft.) | Moisture (%) | BLOWS/FOOT (350 ft-lb/blow) | SAMPLE SIZE (inches) | SAMPLE No. | DEPTH (in feet) | MATERIAL SYMBOL | UNIFIED SOIL CLASS

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-25-00

Taber Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix

ELEVATION: 442ft. (approx.)

BORING No. B-2

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
										Loose/semicompact brown SILTY GRAVEL (GM), dry/damp (fill)
										Gray SANDSTONE, highly weathered, moderately hard, moderately to intensely fractured (Franciscan Complex Bedrock)
				55	1.4	1	10			
				50/0.1	1.4	2	20			
							25			No free groundwater encountered

5, 15, 30, 35, 40

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-24-00

Jacobs Associates (2000)

Taber Since 1954

Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix

ELEVATION: 458ft. (approx.)

BORING No. B-3

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
										Semicompact brown SILTY fine-medium GRAVEL with occasional COBBLES (GM), moist to locally very moist (fill)
				30 (20)	2.5	1	10			
							15			
										Loose to semicompact dark brown SILTY fine-coarse SAND and SANDY SILT with occasional GRAVEL (SM), moist (fill)
				18 (12)	2.5	2	20			
							25			
		108	12			3U	30			
	G	114	12	10 (7)	2.5	3L				
							35			
							40			--BORING CONTINUES--

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-23-00

Taber
Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix

ELEVATION: 458ft. (approx.)

BORING No. B-3 cont.

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
				11	1.4	4				Loose to semicompact dark brown SILTY fine-coarse SAND and SANDY SILT with occasional GRAVEL (SM), moist (fill)
							45			
							50			
				18	1.4	5				
							55			
										Gray to green SANDSTONE with SHALE (Fronciscan Complex Bedrock)
				120/0.5	1.4	6	60			
							65			No free groundwater encountered.
							70			
							75			
							80			

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES..

LOGGED BY: E.A.H. | DATE: 08-23-00

Jacobs Associates (2000)

Taber Since 1954

Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 54.5ft. depth then 3-inch diamond core

ELEVATION: 453ft. (approx.)

BORING No. B-4

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
	G			15 (10)	2.5	1	5			Loose to semicompact brown SILTY GRAVEL (GM), moist with very moist seams, fine to coorse GRAVEL (fill)
				11	1.4	2	10			
				17 (12)	2.5	3	15			
				10	1.4	4	20			
				17 (12)	2.5	5	25			
				9	1.4	6	30			
				6	1.4	7	35			Dark brown and dark gray SILTY SAND (SM), loose, moist, fine to coarse SAND, occasional GRAVEL (fill)
	G	122 / 119	12 / 10	15 (10)	2.5	8U / 8L	40			--BORING CONTINUES--

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-22&23-00

11/03/00 2D2300174c.dwg 1=1

Taber Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 55.5ft. depth then 3-inch diamond core

ELEVATION: 453ft. (approx.)

BORING No. B-4 cont.

BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	Description
15 (10)	2.5	8				Dork brown and dark gray SILTY SAND (SM), loose, moist, fine to coarse SAND, occasional GRAVEL (fill)
10	1.4	9	45			
87	1.4	10	50			Brown SANDY GRAVEL with SILT (GM)- Compact to locally very dense, moist (fill)
REC=14% RQD=0%	Run	A	55			
REC=21% RQD=0%	Run	B	60			
REC=28% RQD=0%	Run	C	65			
REC=34% RQD=0%	Run	D	70			
REC=18% RQD=0%	Run	E	75			Brown SILTY GRAVEL (GM), (fill)
			80			--BORING CONTINUES--

UNCONFINED COMPRESSIVE STRENGTH (tsf) | OTHER TESTS | DRY DENSITY (lbs/cu. ft.) | Moisture (%)

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-22&23-00

Taber Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 55.5ft. depth then 3-inch diamond core

ELEVATION: 453ft. (approx.)

BORING No. B-4 cont.

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
				REC=26% RQD=0%	Run	F	85			Brown SILTY GRAVEL (GM), (fill)
				REC=10% RQD=0%	Run	G	90			
				REC=92% RQD=24%	Run	H	95			Gray SANDSTONE slightly weathered, hard moderately to intensely fractured, random white cementation veins (some calcitic) with elongated boudins of dark gray SHALE from 98.4ft. to 98.8ft. at 15°-25° dips (Franciscan Complex Bedrock)
				REC=98% RQD=8%	Run	I	100			
				REC=84% RQD=21%	Run	J				
							105			No free groundwater encountered.
							110			
							115			
							120			

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-22&23-00

Jacobs Associates (2000)

Taber Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix

ELEVATION: 490ft. (approx.)

BORING No. B-5

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
										Semicompact brown SILTY GRAVEL (GM), damp with occasional COBBLES and BOULDERS (fill)
							5			
							10			Loose to semicompact brown GRAVELLY SILT (ML) and SILTY GRAVEL (GM) very moist with local wet seams and occasional COBBLES (fill)
				21 (14)	2.5	1				
							15			
		108	12			2U	20			
	G	112	10	14 (10)	2.5	2L				
							25			
				8	1.4	3	30			
										Gray SANDSTONE, slightly weathered (Fronciscan Complex Bedrock)
							35			
							40			
				73	1.4	4				

No free groundwater encountered. Wet seams from 9.0-32.0ft. depth during drilling.

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-24-00

11/03/00 2D2300174h.dwg 1=1

Jacobs Associates (2000)

Taber
Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix

ELEVATION: 349ft. (approx.)

BORING No. B-6

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
	G			10	1.4	1	10			Loose to semicompact brown SILTY GRAVEL (GM), moist, with occasional COBBLES and BOULDERS (fill)
				40/0.3 (27/0.3)	2.5	2	20			Slightly CLAYEY gray SANDSTONE, intensely weathered, decomposed locally from 27.0ft. to 31.0ft. depth to a gray mottled orange hard slightly CLAYEY SILT, moist (Franciscan Complex Bedrock?)
				41	1.4	3	30			
							35			No free groundwater encountered
							40			

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-21-00

11/03/00 2D2300174b.dwg 1=1

Jacobs Associates (2000)

Taber Since 1954

Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 25.0ft. depth then 3-inch diamond core

ELEVATION: 363ft. (approx.)

BORING No. B-7

UNCONFINED COMPRESSIV. STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
				12	1.4	1	5			Brown, blue gray and gray SILTY SAND with GRAVEL (SM) – Semicompact to compact, moist, fine to coarse SAND, with occasional COBBLES and BOULDERS (fill)
				39 (27)	2.5	2	10			
				ref	1.4	3	15			
				20	1.4	4	20			
				NR	1.4	5	25			Gray SANDSTONE, intensely weathered very intensely to intensely fractured with abundant random oriented (light) calcite veins and thin CLAY filled fractures, moderately soft and moderately hard, occasional slickensided surfaces (Franciscan Complex Bedrock)
				REC=48% RQD=0%	Run	A	30			
				REC=76% RQD=30%	Run	B	35			Gray SANDSTONE with minor dark gray SHALE, moderately to slightly weathered, hard, moderately fractured with occasional slickensided surfaces, moderotely hard with local moderately soft green calcite veins, obundant very thin to thin CLAY filled fractures (Franciscan Complex Bedrock)
				REC=94% RQD=68%	Run	C	40			

No free groundwater encountered

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES..

LOGGED BY: E.A.H. | DATE: 08-21-00

Jacobs Associates (2000)

Taber
Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 6-inch auger to 4.0ft. depth then 5.5-inch Concentrix

ELEVATION: 432ft. (approx.)

BORING No. B-8

UNCONFINED COMPRESSIV. STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
										Loose dark brown/dark gray SANDY SILT and SILTY fine-coarse SAND (ML/SM), moist with occasional GRAVELLY zones (fill)
				7 (5)	2.5	1	5, 10			
				8	1.4	2	15, 20			
				21 (14)	2.5	3	25, 30			Semicompact brown GRAVELLY SILT and SILTY GRAVEL (ML/GM), moist with very moist/wet zones (fill)
							35, 40			Dense brown SILTY GRAVEL (GM) with COBBLES and occasional BOULDERS, moist (fill)
										--BORING CONTINUES--

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-25-00

Jacobs Associates (2000)

Taber Since 1954

Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 6-inch auger to 4.0ft. depth then 5.5-inch Concentrix

ELEVATION: 432ft. (approx.)

BORING No. B-8 cont.

Depth (in feet)	Blows/Foot (350 ft-lb/blow)	Sample Size (inches)	Sample No.	Description
	41	1.4	4	Dense brown SILTY GRAVEL (GM) with COBBLES and occasional BOULDERS, moist (fill)
45				
				Semicompact brown SILTY GRAVEL (GM), moist/ very moist (fill)
50	22 (15)	2.5	5	
55				
				Gray SANDSTONE (Franciscan Complex Bedrock?)
60				No free groundwater encountered.
65				
70				
75				
80				

Columns: UNCONFINE COMPRESSI. STRENGTH (tsf) | OTHER TESTS | DRY DENSITY (lbs/cu. ft.) | Moisture (%) | BLOWS/FOOT (350 ft-lb/blow) | SAMPLE SIZE (inches) | SAMPLE No. | DEPTH (in feet) | MATERIAL SYMBOL | UNIFIED SOIL CLASS

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-25-00

Jacobs Associates (2000)

Taber Since 1954

Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 105.8ft. depth then 3-inch diamond core

ELEVATION: 500ft. (approx.)

BORING No. B-9

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
				6	1.4	1	5			Brown CLAYEY GRAVEL with SAND (GC)-loose, moist, with occasional COBBLES and BOULDERS (fill)
				13 (9)	2.5	2	10			
				9	1.4	3	15			
	A,G	113	11	12 (8)	2.5	4	20			
				23	1.4	5	25			Brown SILTY GRAVEL with SAND (GM)-compact to semicompact, moist to very moist. With lenses of GRAVELLY SILT (ML), locally with abundant COBBLES, fine to coarse GRAVEL (fill)
				26 (18)	2.5	6	30			
				14	1.4	7	35			
				31 (21)	2.5	8	40			--BORING CONTINUES--

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 09-5&6-00

11/03/00 2D2300174x.dwg 1=1

Taber Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 105.8ft. depth then 3-inch diamond core

ELEVATION: 500ft. (approx.)

BORING No. B-9 cont.

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
				17	1.4	9	45			Brown SILTY GRAVEL with SAND (GM)-compact to semicompact, moist to very moist. With lenses of GRAVELLY SILT (ML), locally with abundant COBBLES, fine to coarse GRAVEL (fill)
				39 (27)	2.5	10	50			
				18	1.4	11	55			
				32 (22)	2.5	12	60			
				17	1.4	13	65			
	G			25 (17)	2.5	14	70			—Well graded SILTY GRAVEL (GW-GM) at 70ft.
				31	1.4	15	75			
				31 (21)	2.5	16	80			

--BORING CONTINUES--

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 09-5&6-00

Taber
Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 105.8ft. depth then 3-inch diamond core

ELEVATION: 500ft. (approx.)

BORING No. B-9 cont.

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
				29	1.4	17	85			Brown SILTY GRAVEL with SAND (GM)-compact to semicompact, moist to very moist. With lenses of GRAVELLY SILT (ML), locally with abundant COBBLES, fine to coarse GRAVEL (fill)
				26 (18)	2.5	18	90			Brown SILTY SAND with GRAVEL (SM)-semicompact to compact, very moist. Locally with wet seams, CLAY binder, and occasional COBBLES. Fine to coarse SAND (fill)
				23	1.4	19	95			
				35 (24)	2.5	20	100			
				28	1.4	21	105			
				REC=25% RQD=0%	Run	A	110			
				REC=60% RQD=0%	Run	B	115			
				REC=92% RQD=0%	Run	C	120			

--BORING CONTINUES--

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 09-5&6-00

Taber
Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 105.8ft. depth then 3-inch diamond core

ELEVATION: 500ft. (approx.)

BORING No. B-9 cont.

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
				REC=63% RQD=9%	Run	E				Brown SILTY SAND with GRAVEL (SM)-semicompact to compact, very moist. Locally with wet seams, CLAY binder, and occasional COBBLES. Fine to coarse SAND (fill)
				REC=100% RQD=0%	Run	F	125			
				REC=80% RQD=0%	Run	G				
				REC=29% RQD=0%	Run	H				
				REC=38% RQD=0%	Run	I	130			
				REC=100% RQD=0%	Run	J				
				REC=100% RQD=0%	Run	K				
				REC=70% RQD=0%	Run	L				
				REC=61% RQD=0%	Run	M	135			
				REC=46% RQD=0%	Run	N	140			
				REC=50% RQD=0%	Run	O	145			Gray SANDSTONE, moderately hard, moderately weathered, very intensely fractured, slightly open ond partly healed fractures (Franciscan Complex Bedrock)
				REC=100% RQD=23%	Run	P				
							150			No free groundwater encountered
							155			
							160			

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 09-5&6-00

Jacobs Associates (2000)

Taber Since 1954

Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 122.6ft. depth then 3-inch diamond core

ELEVATION: 557ft. (approx.)

BORING No. B-10

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
										Loose and semicompact interlayered brown SILTY fine-coarse GRAVEL (GM) and GRAVELLY SILT (ML), very moist with occasional COBBLES and BOULDERS (fill)
				11 (7)	2.5	1	10			
				8	1.4	2	20			
	G	86	48	9 (6)	2.5	3	30			
				15	1.4	4	40			
										--BORING CONTINUES--

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-29&30-00

11/03/00 2D2300174q.dwg 1=1

Taber Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 122.6ft. depth then 3-inch diamond core

ELEVATION: 557ft. (approx.)

BORING No. B-10 cont.

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
										Loose and semicompact interlayered brown SILTY fine-coarse GRAVEL (GM) and GRAVELLY SILT (ML), very moist with occasional COBBLES and BOULDERS (fill)
				22 (15)	2.5	5	50			
				17	1.4	6	60			
				41 (28)	2.5	7	70			Compact to dense brown SILTY GRAVEL (GM), locally a GRAVELLY SILT (ML), moist (local wet seam at 78.6-79.0ft. depth) (fill)
				16	1.4	8	80			--BORING CONTINUES--

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-29&30-00

Taber Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 122.6ft. depth then 3-inch diamond core

ELEVATION: 557ft. (approx.)

BORING No. B-10 cont.

UNCONFINE COMPRESSI STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
										Compact to dense brown SILTY GRAVEL (GM), locally a GRAVELLY SILT (ML), moist (local wet seam ot 78.6-79.0ft. depth) (fill)
							85			
				30	1.4	9	90			
							95			
	G			39 (27)	2.5	10	100			-Well graded GRAVEL (GM-GW) at 100ft.
							105			
				44	1.4	11	110			
							115			
				23	1.4	12	120			

--BORING CONTINUES--

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-29&30-00

Taber
Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 122.6ft. depth then 3-inch diamond core

ELEVATION: 557ft. (approx.)

BORING No. B-10 cont.

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
										Compact to dense brown SILTY GRAVEL (GM), locally a GRAVELLY SILT (ML), moist (fill)
										Compact/dense brown SILTY GRAVEL (GM) with scattered COBBLES (fill)
							125			
				REC=20% RQD=0%	Run	A	130			
							135			
				REC=25% RQD=0%	Run	B	140			
							145			
				REC=22% RQD=0%	Run	C	150			
							155			
				REC=18% RQD=0%	Run	D	160			
										--BORING CONTINUES--

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-29&30-00

Taber
Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 122.6ft. depth then 3-inch diamond core

ELEVATION: 557ft. (approx.)

BORING No. B-10 cont.

UNCONFINE COMPRESSI. STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
										Compact/dense brown SILTY GRAVEL (GM) with scattered COBBLES (fill)
				REC=46% RQD=0%	Run	E	165			
				REC=20% RQD=0%	Run	F	170			Interlayered gray SANDSTONE and dark gray SHALE, slightly weathered, moderately hard/hard, moderately to very intensely fractured (Franciscan Complex Bedrock)
				REC=60% RQD=0%	Run	G				
							175			No free groundwater encountered
							180			
							185			
							190			
							195			
							200			

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-29&30-00

Jacobs Associates (2000)

Taber Since 1954

Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix

ELEVATION: 567ft. (approx.)

BORING No. B-11

UNCONFINE COMPRESSI. STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
										Brown (locally gray) SANDY GRAVEL with SILT (GM)-semicompact to loose, moist to very moist, fine to coarse GRAVEL with occasional COBBLES and BOULDERS. Occasional layers of GRAVELLY SILT (ML) (fill)
	G	97	24	23 (16)	2.5	1	10			
				12	1.4	2	20			
		109	12			3U	30			
	A,G	109	14	11 (7)	2.5	3L				
				74/0.7	1.4	4	40			Gray SANDSTONE, moderately hard to hard, intensely weathered grading to slightly weathered, locally with CLAY filled fractures and thin veins of dark gray SHALE (Franciscan Complex Bedrock)

No free groundwater encountered

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-28&29-00

11/03/00 2D2300174p.dwg 1=1

Jacobs Associates (2000)

Taber Since 1954

Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 69.0ft. depth then 3-inch diamond core

ELEVATION: 568ft. (approx.)

BORING No. 12

UNCONFINE COMPRESSI STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
				20	1.4	1	5			Gray to brown SILTY GRAVEL with COBBLES (GM)-loose to semicompact, damp to very moist, with occasional BOULDERS (fill)
				14 (10)	2.5	2	10			
				10	1.4	3	15			
	G			20 (14)	2.5	4	20			
				9	1.4	5	25			
				16 (11)	2.5	6	30			
				8	1.4	7	35			
	G	108	9	12 (8)	2.5	8	40			--BORING CONTINUES--

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-28-00

Taber Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 69.0ft. depth then 3-inch diamond core

ELEVATION: 568ft. (approx.)

BORING No. 12 cont.

Depth	Blows/Foot (350 ft-lb/blow)	Sample Size (inches)	Sample No.	Material Symbol	Description
					Gray to brown SILTY GRAVEL with COBBLES (GM)-loose to semicompact, damp to very moist, with occasional BOULDERS (fill)
45	12	1.4	9		
50	26 (18)	2.5	10		
55	9	1.4	11		
60	35/0.3 (24/0.3)	2.5	12		Gray SANDSTONE, moderately hard, very intensely fractured, moderately to intensely weathered, locally decomposed from 70.5 to 73.0ft. depth (Franciscan Complex Bedrock)
65	50/0.1	1.4	13		
70	REC=32% RQD=0%	Run	A		
75	REC=54% RQD=0%	Run	B		Gray SANDSTONE, moderately to intensely fractured, slightly weathered to moderately weathered, hard to moderately hard (Franciscan Complex Bedrock)
80	REC=89% RQD=18%	Run	C		--BORING CONTINUES--

Unconfined Compressive Strength (tsf) | Other Tests | Dry Density (lbs/cu. ft.) | Moisture (%) | Unified Soil Class

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-28-00

Taber
Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 69.0ft. depth then 3-inch diamond core

ELEVATION: 568ft. (approx.)

BORING No. B-12 cont.

UNCONFINE COMPRESSI STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
				REC=32% ROD=0%	Run	D	85			Gray SANDSTONE-hard to moderately hard, slightly to moderately weathered, moderately to intensely fractured (Fronciscan Complex Bedrock)
										No free groundwater encountered to 60.0ft. depth.
							90			
							95			
							100			
							105			
							110			
							115			
							120			

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-28-00

Jacobs Associates (2000)

Taber Since 1954

Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 21.0ft. depth then 3-inch diamond core

ELEVATION: 552ft. (approx.)

BORING No. B-13

UNCONFINE COMPRESSI. STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
										Semicompact brown SILTY GRAVEL (GM) with COBBLES and small BOULDERS with local GRAVELLY SILT (ML) zones, damp to very moist (fill)
				13	1.4	1	10			
		112	10			2U	20			
	G	112	11	21	2.5	2L				
				(14)						
				REC=27% RQD=0%	Run	A	25			
				REC=30% RQD=0%	Run	B	30			
				10	1.4	3	35			
							40			--BORING CONTINUES--

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-31-00

Taber
Since 1954
Taber Consultants
Engineers and Geologists
3911 West Capitol Avenue
West Sacramento, CA 95691-2116

TEST BORING LOG

Job No. 2D2/300/174

TYPE: 5.5-inch Concentrix to 21.0ft. depth then 3-inch diamond core

ELEVATION: 552ft. (approx.)

BORING No. B-13 cont.

UNCONFINED COMPRESSIVE STRENGTH (tsf)	OTHER TESTS	DRY DENSITY (lbs/cu. ft.)	Moisture (%)	BLOWS/FOOT (350 ft-lb/blow)	SAMPLE SIZE (inches)	SAMPLE No.	DEPTH (in feet)	MATERIAL SYMBOL	UNIFIED SOIL CLASS	
				REC=23% RQD=0%	Run	C				Semicompact brown SILTY GRAVEL (GM) with COBBLES and small BOULDERS with local GRAVELLY SILT (ML) zones, damp to very moist (fill)
				17	1.4	4				
				REC=74% RQD=24%	Run	D	45			Brown to gray SANDSTONE with white QUARTZ veins, hard, moderately weathered to slightly weathered, intensely fractured to moderately fractured with open (up to 1/2") fractures with QUARTZ crystals and minor dark gray SHALE at 51.4ft. depth. (Franciscan Complex Bedrock)
				REC=100% RQD=42%	Run	E	50			
										No free groundwater encountered?
							55			
							60			
							65			
							70			
							75			
							80			

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

LOGGED BY: E.A.H. | DATE: 08-31-00

APPENDIX D: SEISMIC REFRACTION SURVEY

JR Associates (2022)

J R ASSOCIATES

Engineering Geophysics
17040 Oak Leaf Drive
Morgan Hill, CA 95037
(408) 293-7390

SEISMIC REFRACTION SURVEY AT THE ORCHARD PARTNERS QUARRY BRISBANE, CALIFORNIA

January 16, 2022

for

Cornerstone Earth Group
1259 Oakmead Parkway
Sunnyvale, CA 94085

by

James Rezowalli, GP-921

PROFESSIONAL GEOPHYSICIST
JAMES REZOWALLI
GP-921
STATE OF CALIFORNIA

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS iii

I INTRODUCTION 4

A. Site Conditions 4

II METHODOLOGY 5

A. Field Procedures 5
B. Instrumentation 5
C. Data Reduction 6

III RESULTS 7

A. Two-Layer Seismic Model 8
B. Multi Layer Tomography Seismic Model 8
C. Limitations 8

IV DRAWINGS

APPENDIX I

LIST OF ILLUSTRATIONS

Drawing 1 Vicinity Map

Drawing 2 Site Map

Drawing 3 Refraction Lines Identification and Direction

Drawing 4 Refraction Line 1 Spreads 1 & 2

Drawing 5 Refraction Line 1 Spreads 3, 4, & 5

Drawing 6 Refraction Line 2 Spread 16

Drawing 7 Refraction Line 2 Spreads 17 & 18

Drawing 8 Refraction Line 3, Spreads 6 & 7

Drawing 9 Refraction Line 4 Spread 14

Drawing 10 Refraction Line 5 Spreads 8, 9 & 10

Drawing 11 Refraction Lines 6 & 7 Spreads 13 & 15

Drawing 12 Refraction Lines 8 & 9 Spreads 11 & 12

I INTRODUCTION

This report presents the results of a seismic refraction investigation performed at the Orchard Brothers Quarry off Quarry Road in Brisbane, California (Drawing 1). The investigation was performed for Cornerstone Earth Group by J R Associates. The purpose of the investigation was to measure bedrock depth and bedrock compressional wave velocities. James Rezowalli, Principal Geophysicist, and Brian Rezowalli, Field Manager, of J R Associates performed the field work in December of 2021.

A. Site Conditions

The site is an active quarry on the side of San Bruno Mountain. At the time of this survey there was an active quarry face on the south side of the property and the quarry's loading and office facilities were in the middle and north side. Over much of the middle of the property the competent bedrock was covered with spoils from the quarry operation. The purpose of this investigation was to help determine the depth to bedrock and the thickness of the spoils.

II METHODOLOGY

A. Field Procedures

We collected seismic refraction data along nine refraction lines (Drawings 2 and 3). The refraction lines were placed on existing quarry fill along the side of the quarry's access roads. The lines contained one or more spreads and varied from 170 feet to 700 feet in length. The length of the lines depended on the available access. The individual spreads making up the lines were typically 250 feet long. Drawing 3 shows the line and spread locations. Each refraction spread had geophones spaced 10 feet apart and three or more shot points. The shot points were at each end and in the middle of each spread. Where space allowed we placed a shot point 125 feet off the end of a spread. A PEG 40 truck-mounted energy source striking an aluminum plate was used to create compressional (P-) waves at the shot point locations. The depth of penetration was approximately 70 to 80 feet below the ground surface.

B. Instrumentation

Litton LRS-1011 14-Hz geophones detected the seismic signals. A cable connected the geophones to a Geometrics Geode 24-channel seismograph which in turn was connected to a personal computer. The Geode filtered, stacked, and recorded the signals. Stacking (adding) signals from multiple shots at the same shot point location improved the signal to noise ratio of the seismograph recordings. Typically eight recordings at each shot point location were stacked. A PC displayed the seismograph recordings in the field for quality control and stored the records for later processing.

C. Data Reduction

Data reduction began by picking the arrival times from the seismograph recordings. An arrival time is the time a P-wave spent traveling from shot point to geophone. The wave could either travel along the ground surface or be refracted from an interface between materials. For a refraction to occur, the materials below the interface must have a greater P-wave velocity than the materials above the interface. The arrival times were entered into a computer program with elevation, location, and layer control information. Cornerstone provided surface elevations at the start and end of each line that were obtained from an existing topographic map. Elevation changes along the line were measured with a hand level. The refraction line locations were not professionally land surveyed. Because the topography may have changed since the topographic map was created the absolute surface elevations are approximate. If a new topographic map is obtained the bedrock elevations can be calculated by subtracting the bedrock depths listed in the Appendix from the new surface elevations.

The data were interpreted using software provided by the seismograph manufacturer, Geometrics, Inc. The seismograph recordings were viewed and the first arrivals from the shot points for each spread and geophone were hand picked. The program then made two seismic layering models to fit the arrival time picks. The first model assumed two layers using constant velocities for each layer. The model represents spoils with a constant seismic velocity over bedrock also with a constant seismic velocity. The second model used a ten-layer topographic inversion that allowed the seismic wave velocities to vary in both the horizontal and vertical directions. This model assumes there is a transition zone between the bottom of the spoils and the top of the bedrock where the P-wave velocity increases with depth. For each model the program calculates a travel time for a seismic wave passing from the shot points to each geophone through the model and compares it to the actual arrival times. The program then adjusts the model until the calculated travel times closely match the actual travel times.

III RESULTS

The results of the computer analysis of the refraction data are presented in Drawings 4 through 12 and are summarized in Table 1. The drawings contain the two-dimensional diagrams profiling the seismic layering and layer velocities calculated for each of the two models for each refraction line. The profiles do not show the first and last 10 feet of the seismic lines. They only show layering starting 10 feet in from the beginning to 10 feet before the end of the refractions lines where the first and last geophones were located. The computed depths to the second seismic layer for the two-layer model are summarized in Table 1 and are listed in the appendix.

Table 1. Summary of Two-Layer Model Results

Line Numbers	Average Depth to Layer 2 (feet)	Max Depth (ft)	Min Depth (ft)	Layer 1 Velocity (fps)	Layer 2 Velocity (fps)
1 Spread 1	20.52	23.8	18.6	2170	13,500
1 Spread 2	16.4	21.3	11.9	2170	13,500
1 Spread 3	23.4	28.4	13.1	3490	9790
1 Spread 4	19.5	24.7	15.5	3490	9790
1 Spread 5	32.7	38.8	24.3	3490	9790
2 Spread 16	34.5	47.1	20.0	2540	4180
2 Spread 17	35.7	46.6	10.1	2230	8780
2 Spread 18	5.2	9.6	0.0	2230	8780
3 Spread 6	27.4	43.7	19.7	2060	16,000
3 Spread 7	27.8	32.4	18.3	2040	12,600
4 Spread 14	32.6	39.2	25.1	2250	11,050
5 Spread 8	14.3	19.5	9.5	2800	8730
5 Spread 9	16.9	20.9	13.5	2800	8730
5 Spread 10	21.8	33.7	10.3	2820	8730
6 Spread 13	20.6	22.8	16.0	1800	8910
7 Spread 15	16.9	28.6	11.2	3700	12,200
8 Spread 15	31.2	47.6	20.8	2580	10,900
9 Spread 15	29.0	42.4	10.4	3400	8370

A. Two-Layer Seismic Model

We found two layers beneath the refraction lines. The layers were distinguished by their compressional (P-) wave velocities. Layer 1 included the ground surface and had a P-wave velocity ranging between 1800 and 3490 feet per second (fps). The P-wave velocities suggest the first seismic layer consisted of partially saturated compressed fill material.

The second seismic layer was distinguished by a P-wave velocity that ranged from 8370 to 16,000 fps. The depth to the top of the second seismic layer ranged from 2 to 53 feet. With the exception of line 2 Spread 16, the P-wave velocities suggest the second seismic layer ranges from fracture and weathered bedrock to competent bedrock. The P-wave velocity measured under Line 2 Spread 16, 4180, suggests either saturated soils or possibly highly weathered and fractured rock. Typically velocities around 5000 fps indicate saturated soil or fill.

B. Multi Layer Tomography Seismic Model

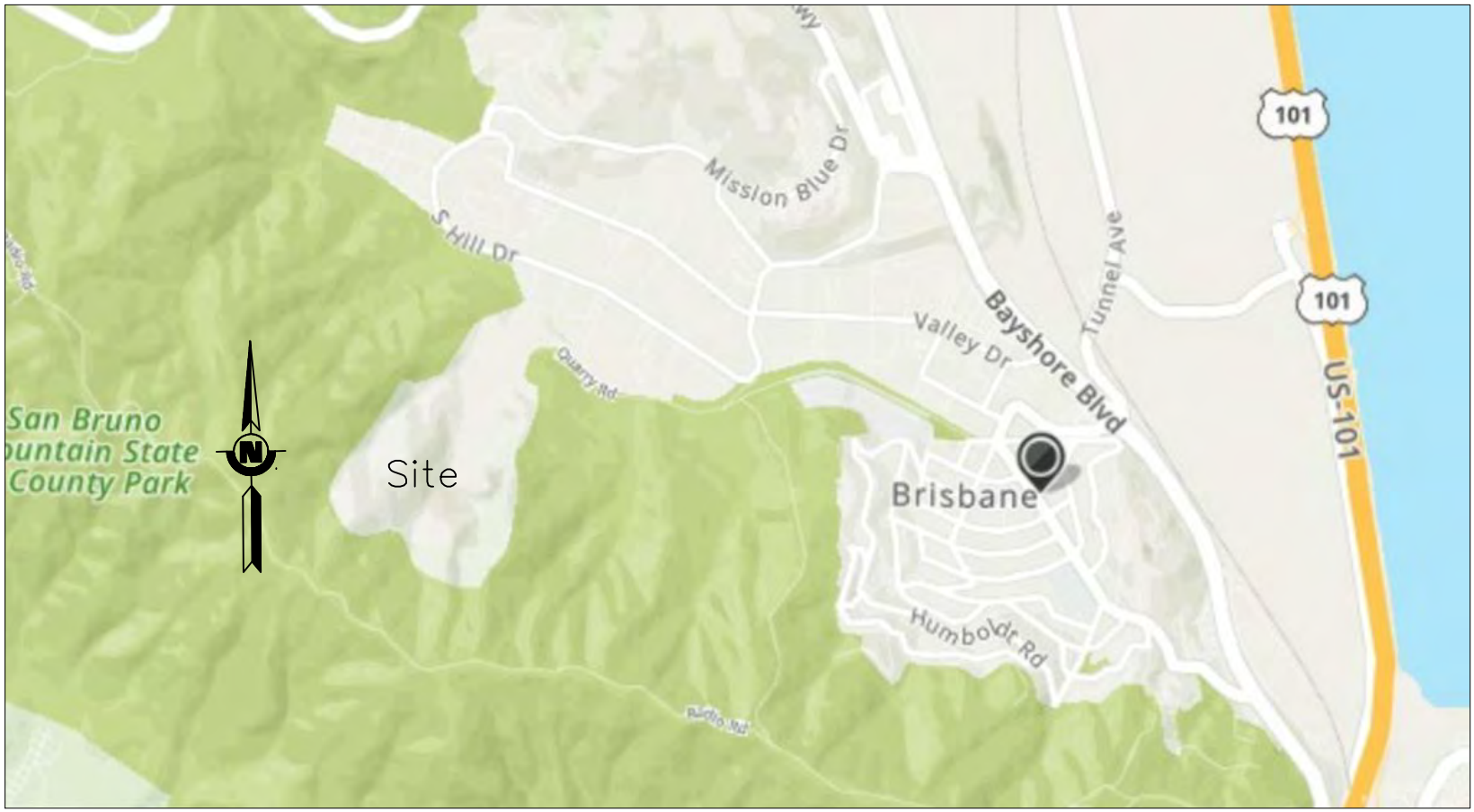
The multi layer tomography seismic model also indicates two seismic layers with a thin transitional zone in between. Typically, P-wave velocities of 6000 feet per second (fps) and higher indicate bedrock, the higher the velocity the more competent the rock. Velocities below 5000 fps usually indicate soils of varying saturation, the lower the velocity the less saturated the soil.

C. Limitations

Seismic layers do not always correspond directly to lithologic changes that might be found in borehole or trenching data. The depths to layer 2 given in the appendix are the results of the

computer analysis and are given to a tenth of a foot. These are the computed depths to the compressional wave velocity changes and indicate the top of the second seismic layer. A seismic layer is an interface between materials with different P-wave velocities. Factors such as weathering, cementation, induration, and saturation as well as lithologic changes can create changes in seismic velocities. Also, there can be lithologic changes without velocity changes. The depth to bedrock at lines that cross can be different because the average seismic wave velocities for each line is often different. However, our field experience indicates that seismic layers often correspond to major changes in lithology or saturation to within ±20% of the depth to the interface.

IV DRAWINGS

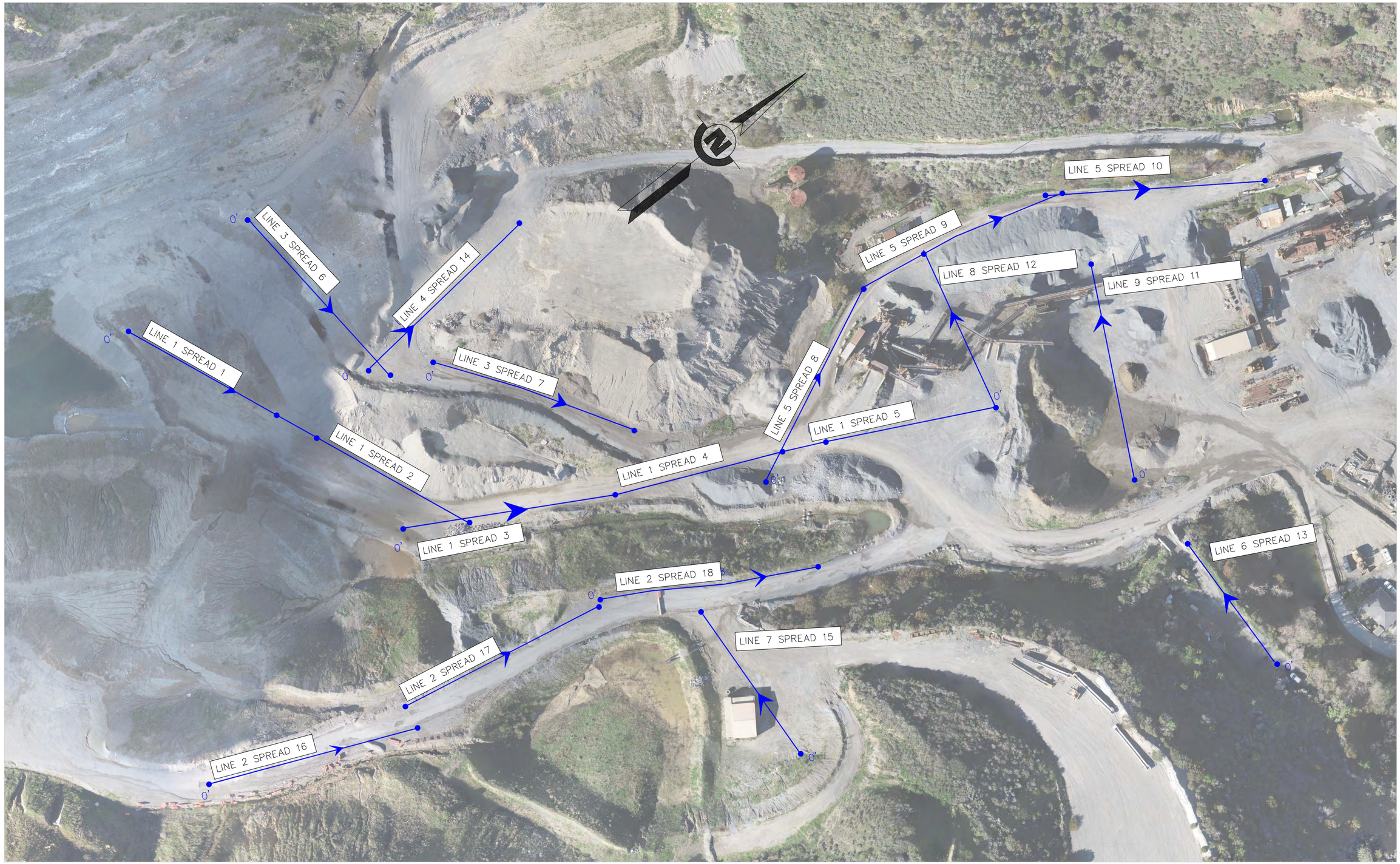


Vicinity Map
Brisbane Quarry
Brisbane, California

SCALE: No Scale			DRAWN BY: J.J.R.
DATE: 12-22-2021	JOB NUMBER:	156-010-21	REVISED:

J R Associates Civil and Environmental Geophysics
17040 Oak Leaf Drive Morgan Hill, CA (408) 293-7390

DRAWING NUMBER: 1 of 1

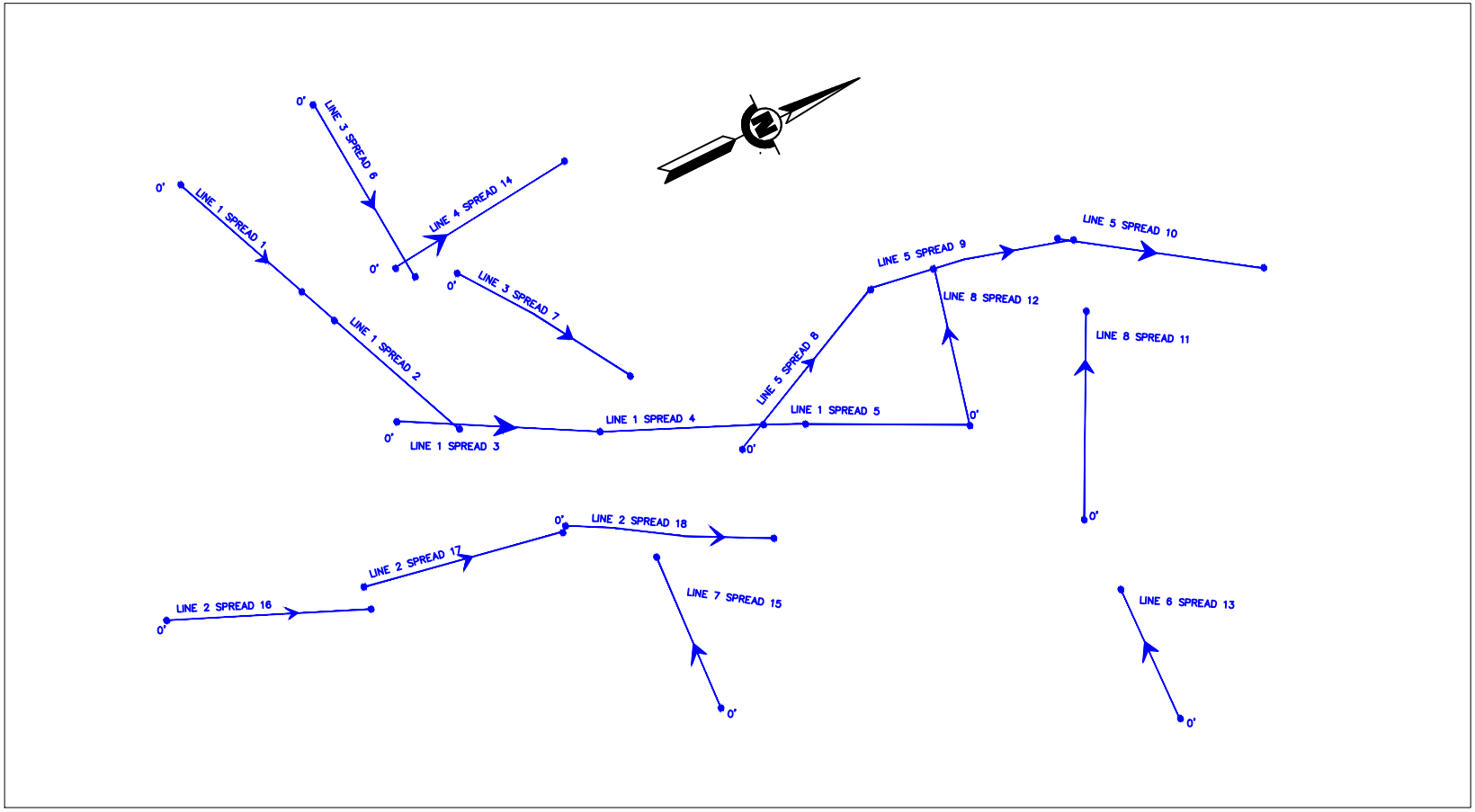


Site Map
Brisbane Quarry
Brisbane, California

SCALE: 1" = 50'		DRAWN BY:	J.J.R.
DATE: 12-22--2021	JOB NUMBER: 156-299-21	REVISED:	

J R Associates Civil and Environmental Geophysics
17040 Oak Leaf Drive, Morgan Hill, CA (408) 293-7390

DRAWING NUMBER: 2 of 2



100 nT Contour Interval

EXPLANATION:

- Seismic Refraction Line
- Spread End Point
- Direction of Shooting
- Start of Line

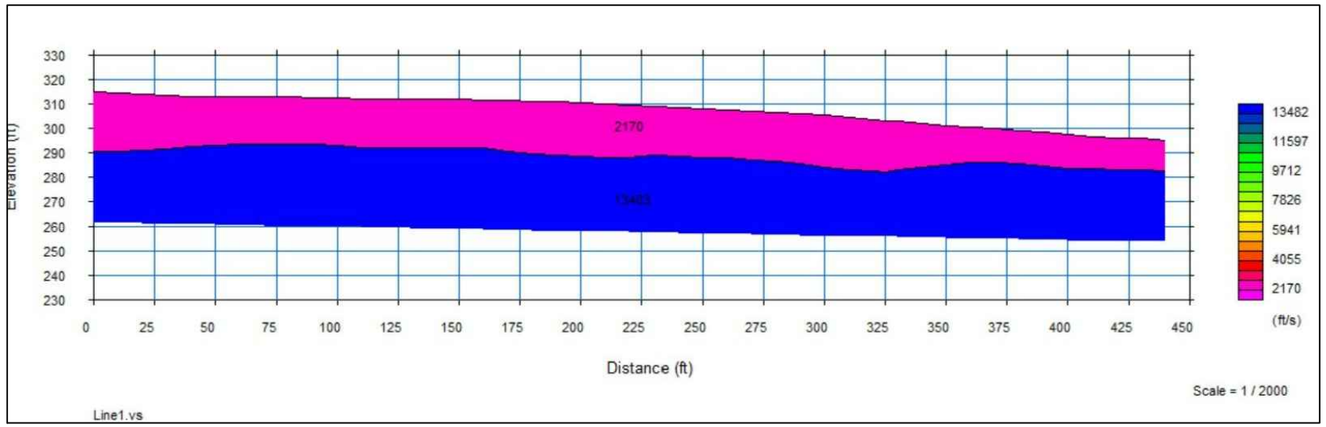
Refraction Line Identifications and Directions
Brisbane Quarry
Brisbane, California

SCALE: No Scale			DRAWN BY: J.J.R.
DATE: 12-22-2021	JOB NUMBER:	156-010-21	REVISED:

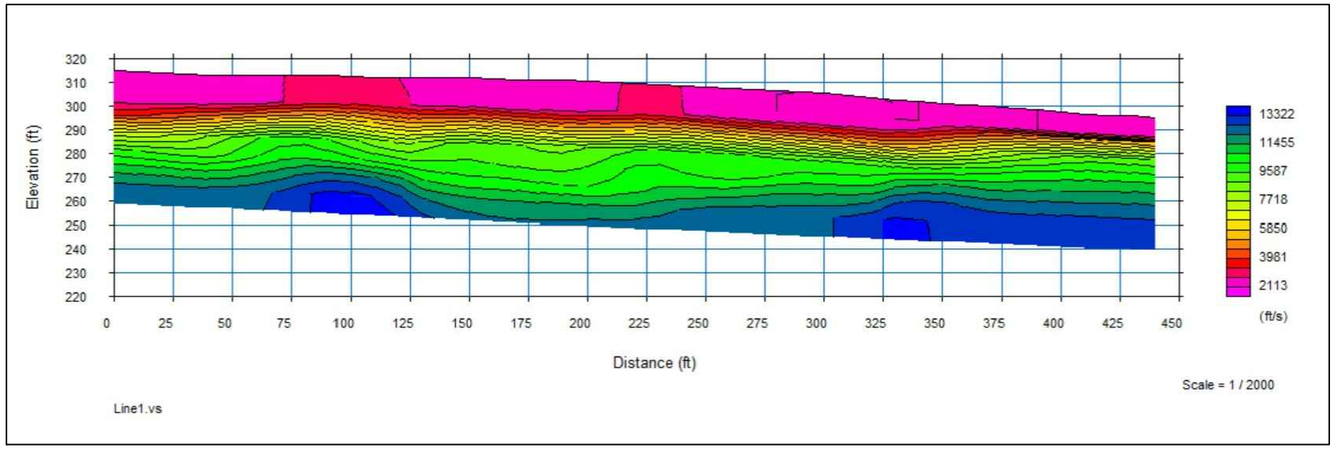
J R Associates Civil and Environmental Geophysics
17040 Oak Leaf Drive Morgan Hill, CA (408) 293-7390

DRAWING NUMBER: 1 of 1

LINE 1 SPREADS 1 & 2 TWO LAYER MODEL



LINE 1 SPREADS 1 & 2 TOMOGRAPHIC MODEL

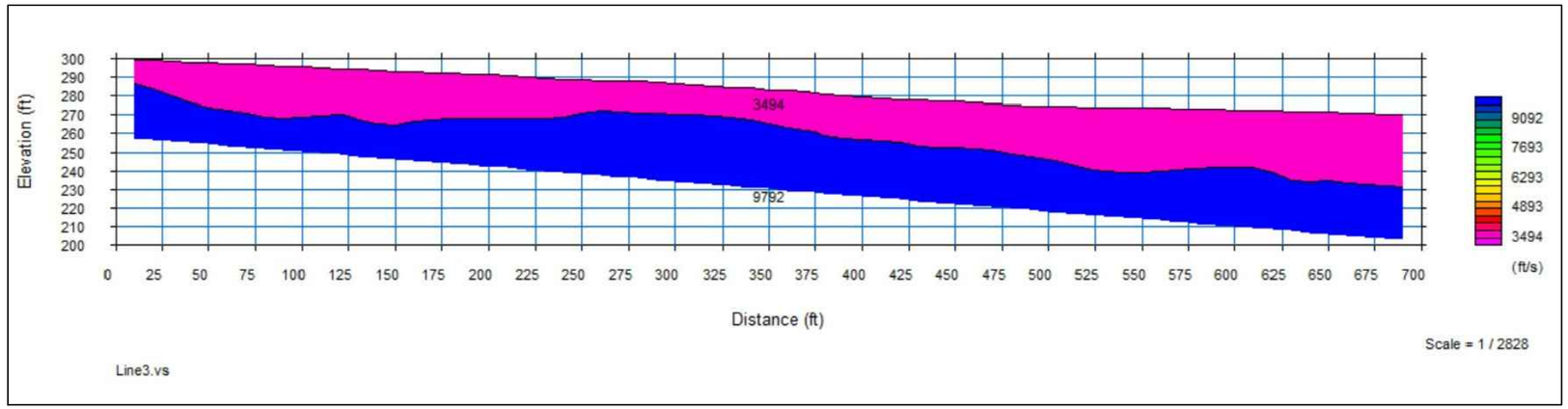


Refraction Line 1 Spreads 1 & 2
Brisbane Quarry
Brisbane, California

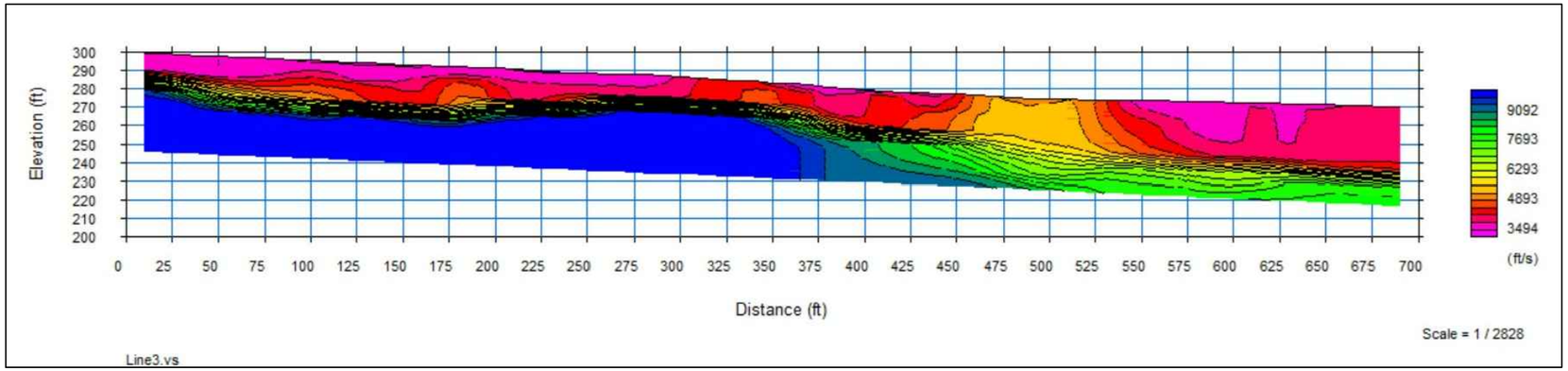
SCALE: See Diagram			DRAWN BY: J.J.R.
DATE: 12-22-2021	JOB NUMBER:	156-010-21	REVISED:

J R Associates Civil and Environmental Geophysics
17040 Oak Leaf Drive Morgan Hill, CA (408) 293-7390

LINE 1 SPREADS 3, 4, & 5 TWO LAYER MODEL



LINE 1 SPREADS 3, 4, & 5 TOMOGRAPHIC MODEL



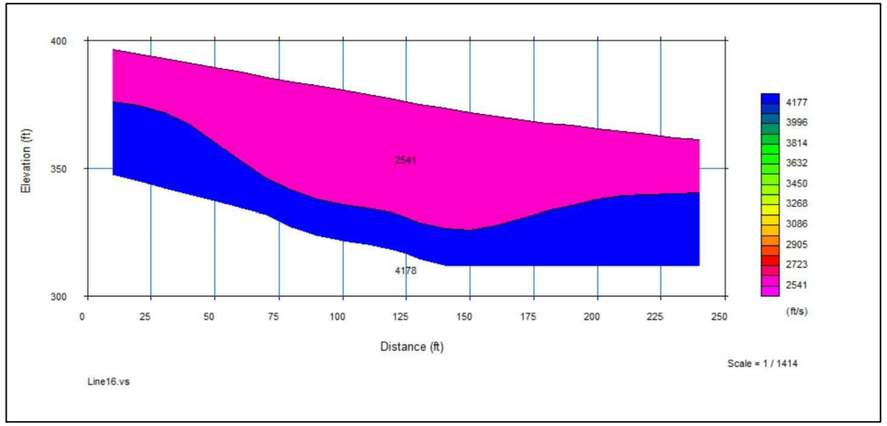
Refraction Line 1 Spreads 3, 4, & 5
Brisbane Quarry
Brisbane, California

SCALE: See Diagram			DRAWN BY: J.J.R.
DATE: 12-22-2021	JOB NUMBER:	156-010-21	REVISED:

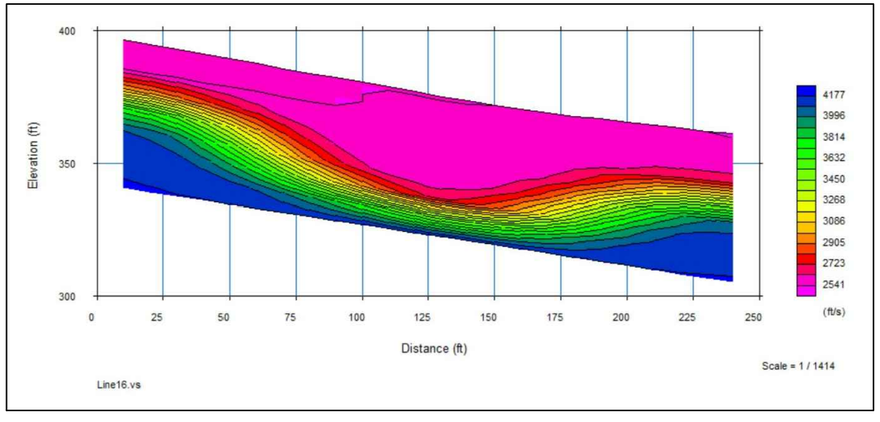
J R Associates Civil and Environmental Geophysics
17040 Oak Leaf Drive Morgan Hill, CA (408) 293-7390

DRAWING NUMBER: 5 of 12

LINE 2 SPREAD 16 TWO LAYER MODEL



LINE 2 SPREAD 16 TOMOGRAPHIC MODEL

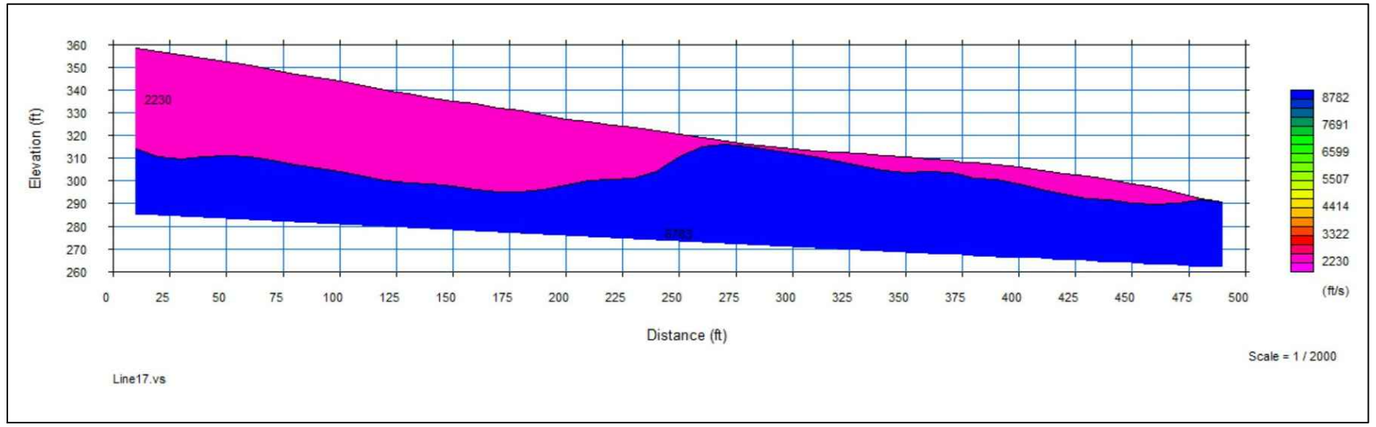


Refraction Line 2 Spread 16
Brisbane Quarry
Brisbane, California

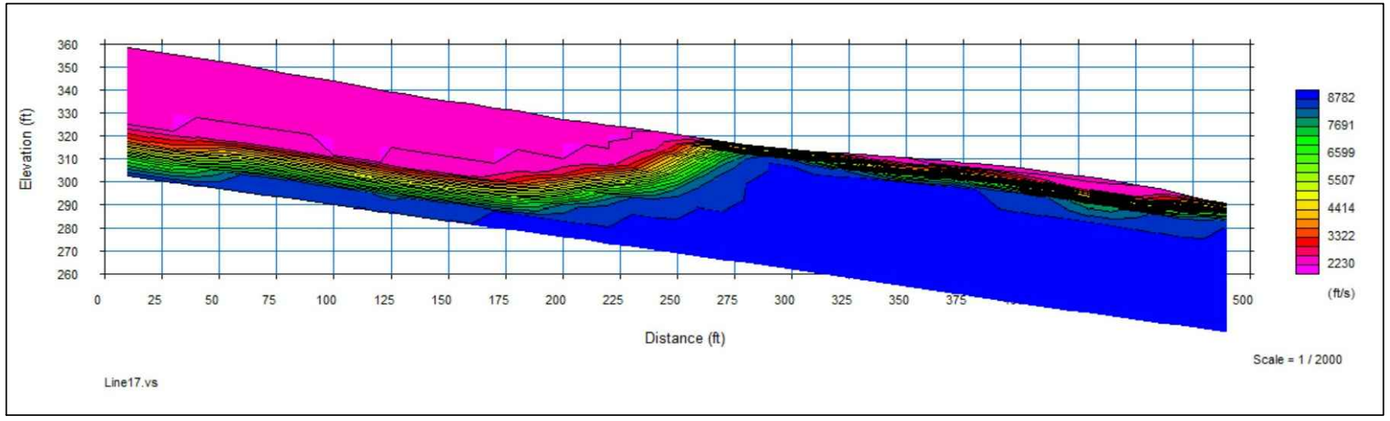
SCALE: See Diagram			DRAWN BY: J.J.R.
DATE: 12-22-2021	JOB NUMBER:	156-010-21	REVISED:

J R Associates Civil and Environmental Geophysics
17040 Oak Leaf Drive Morgan Hill, CA (408) 293-7390

LINE 2 SPREADS 17 & 18 TWO LAYER MODEL



LINE 2 SPREADS 17 & 18 TOMOGRAPHIC MODEL



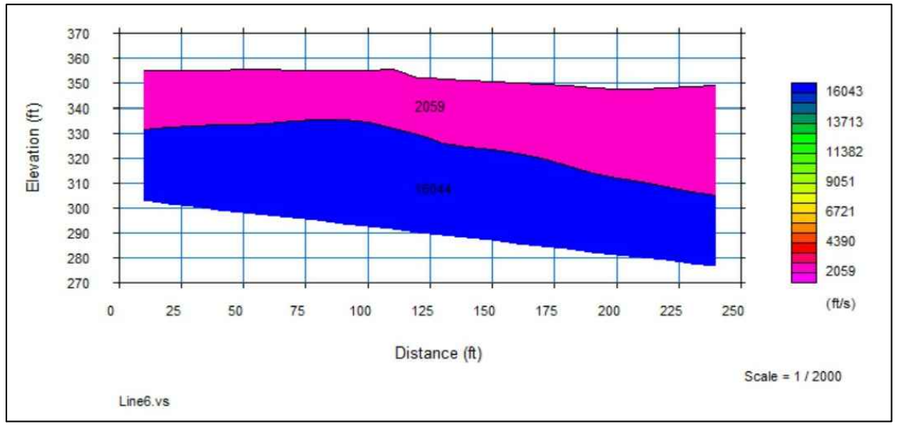
Refraction Line 2 Spreads 17 & 18
Brisbane Quarry
Brisbane, California

SCALE: See Diagram			DRAWN BY: J.J.R.
DATE: 12-22-2021	JOB NUMBER:	156-010-21	REVISED:

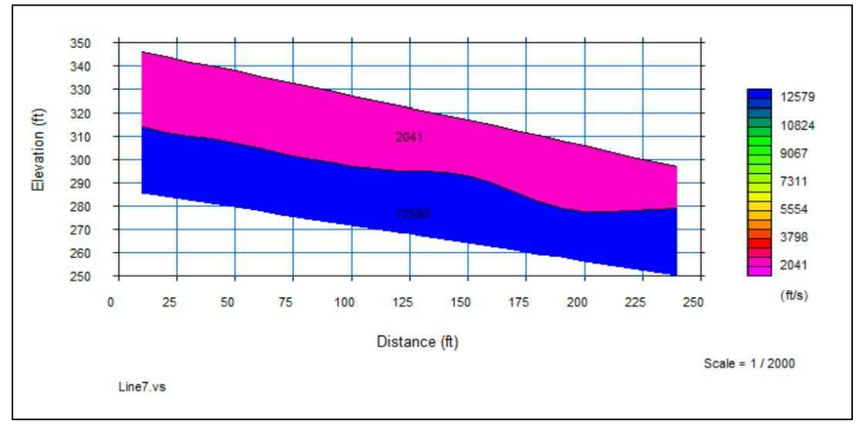
J R Associates Civil and Environmental Geophysics
17040 Oak Leaf Drive Morgan Hill, CA (408) 293-7390

DRAWING NUMBER: 7 of 12

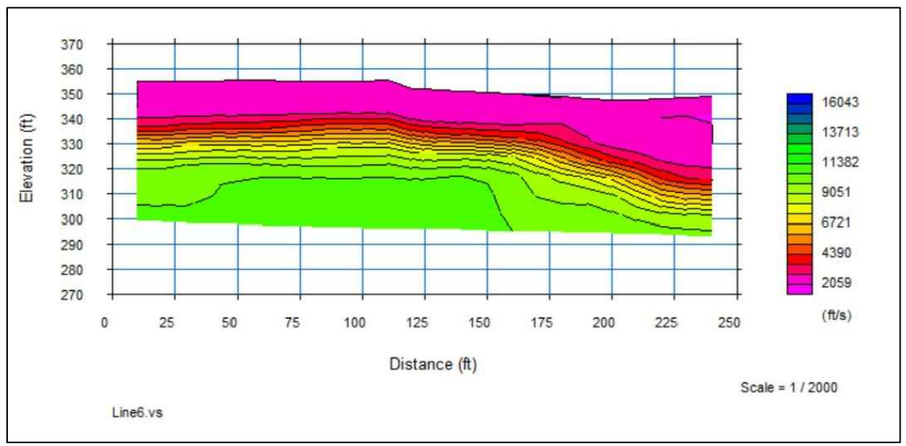
LINE 3 SPREAD 6 TWO LAYER MODEL



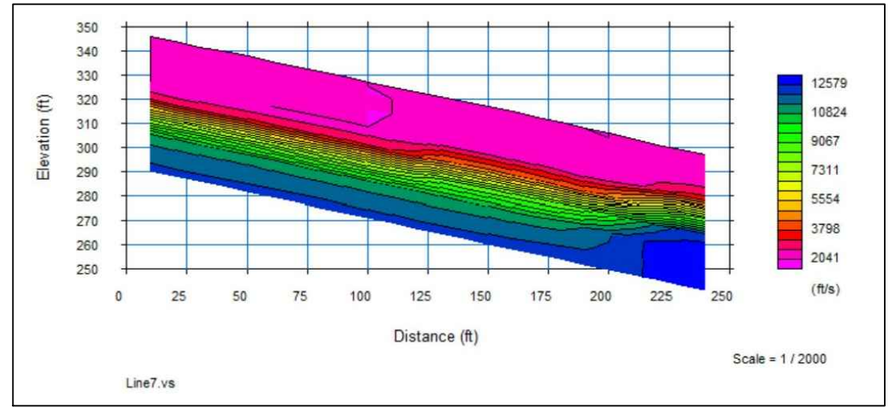
LINE 3 SPREAD 7 TWO LAYER MODEL



LINE 3 SPREAD 6 TOMOGRAPHIC MODEL



LINE 3 SPREAD 7 TOMOGRAPHIC MODEL



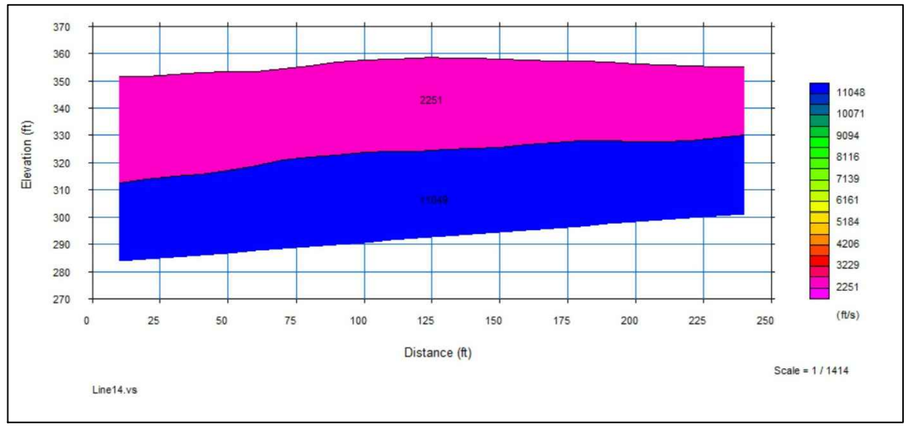
Refraction Line 3 Spreads 6 & 7
Brisbane Quarry
Brisbane, California

SCALE: See Diagram			DRAWN BY: J.J.R.
DATE: 12-22-2021	JOB NUMBER:	156-010-21	REVISED:

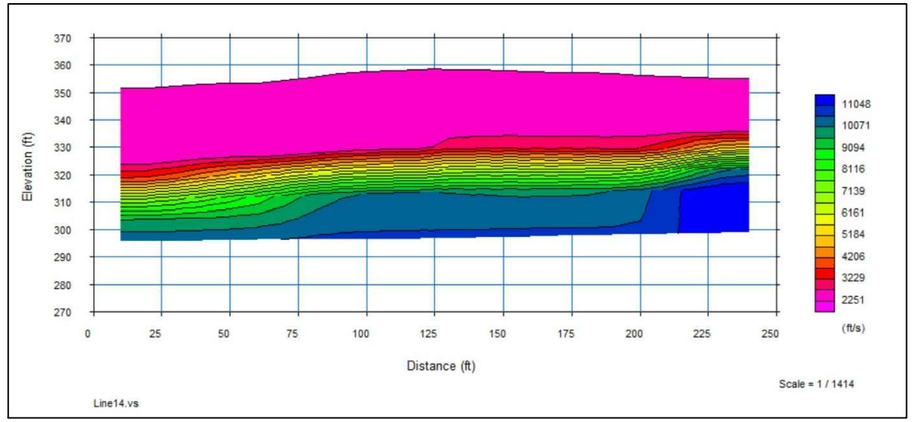
J R Associates Civil and Environmental Geophysics
17040 Oak Leaf Drive Morgan Hill, CA (408) 293-7390

DRAWING NUMBER: 8 of 12

LINE 4 SPREAD 14 TWO LAYER MODEL



LINE 4 SPREAD 14 TOMOGRAPHIC MODEL

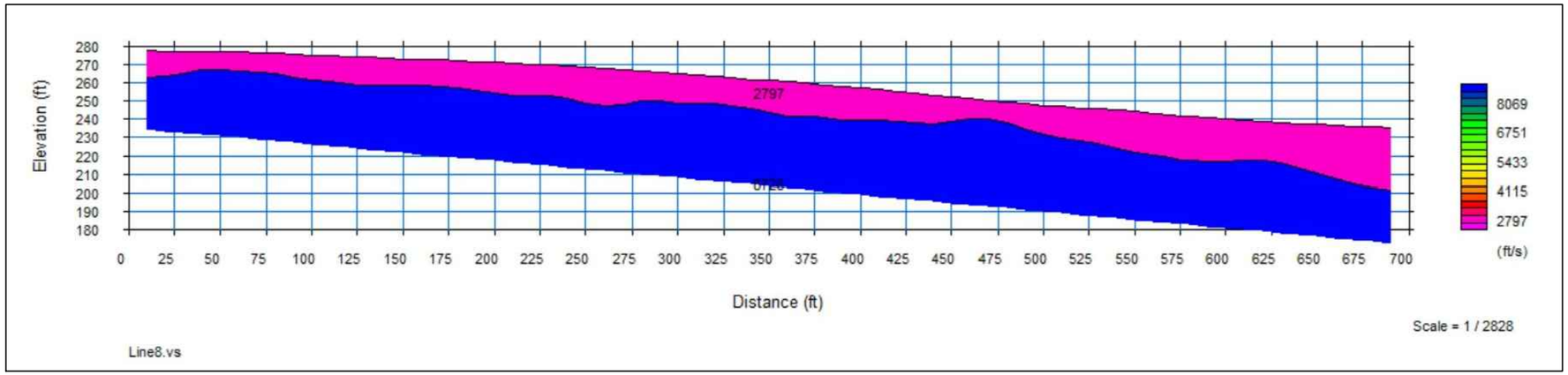


Refraction Line 4 Spread 14
Brisbane Quarry
Brisbane, California

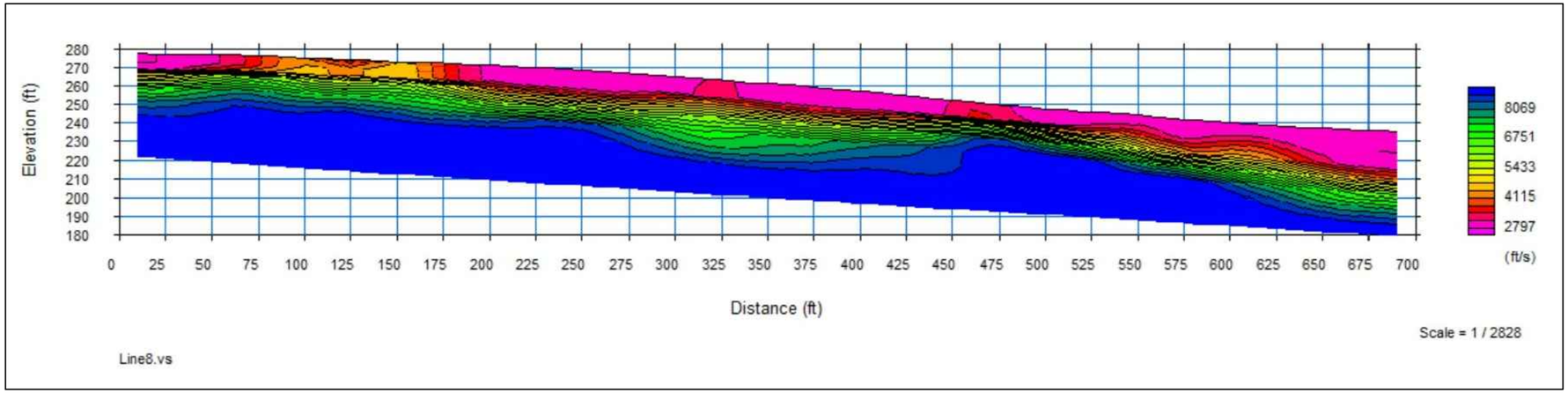
SCALE: See Diagram			DRAWN BY: J.J.R.
DATE: 12-22-2021	JOB NUMBER:	156-010-21	REVISED:

J R Associates Civil and Environmental Geophysics
17040 Oak Leaf Drive Morgan Hill, CA (408) 293-7390

LINE 5 SPREADS 8, 9 & 10 TWO LAYER MODEL



LINE 5 SPREADS 8, 9, & 10 TOMOGRAPHIC MODEL

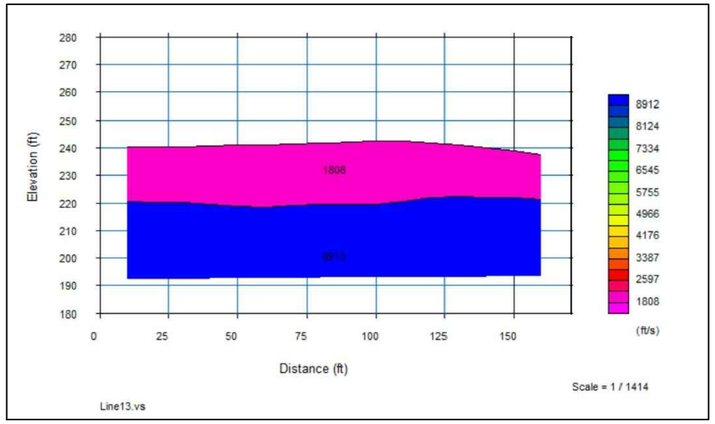


Refraction Line 5 Spreads 8, 9 & 10
Brisbane Quarry
Brisbane, California

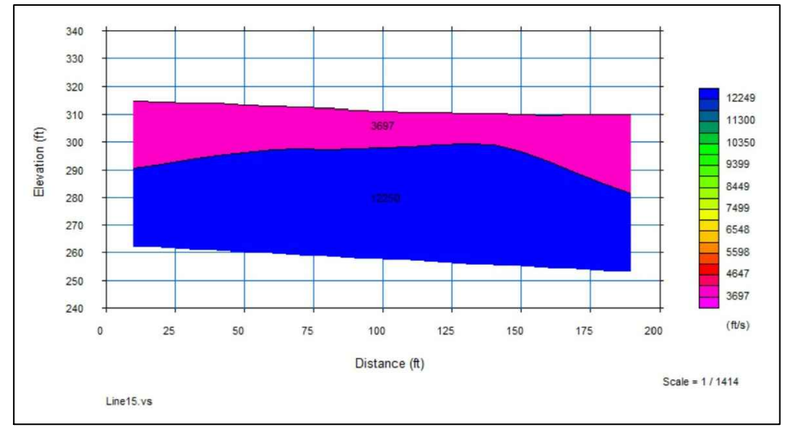
SCALE: See Diagram		DRAWN BY:	J.J.R.
DATE: 12-22-2021	JOB NUMBER: 156-010-21	REVISED:	

J R Associates Civil and Environmental Geophysics
17040 Oak Leaf Drive Morgan Hill, CA (408) 293-7390

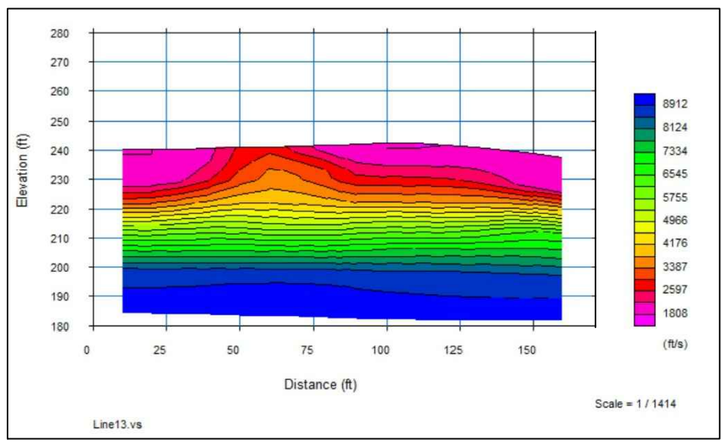
LINE 6 SPREAD 13 TWO LAYER MODEL



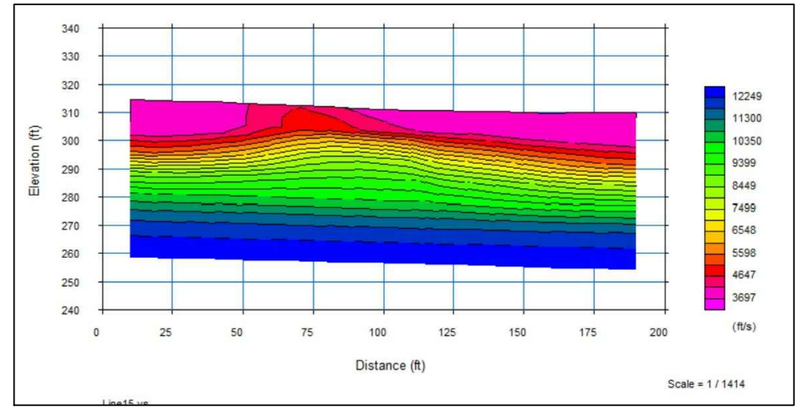
LINE 7 SPREAD 15 TWO LAYER MODEL



LINE 6 SPREAD 13 TOMOGRAPHIC MODEL



LINE 7 SPREAD 15 TOMOGRAPHIC MODEL



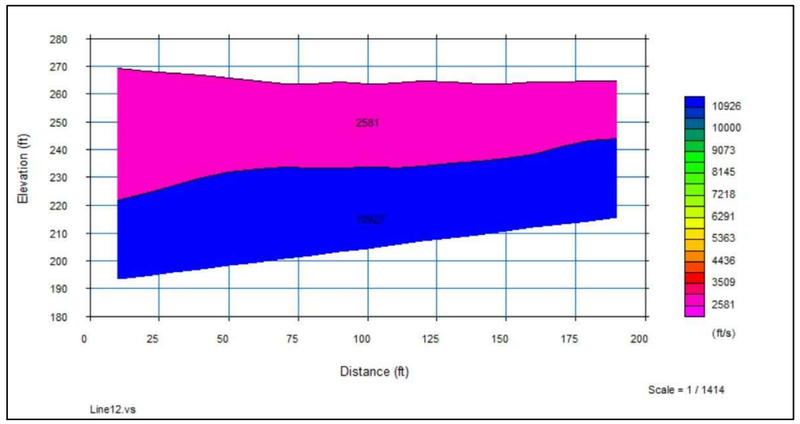
Refraction Lines 6 & 7 Spreads 13 & 15
Brisbane Quarry
Brisbane, California

SCALE: See Diagram			DRAWN BY: J.J.R.
DATE: 12-22-2021	JOB NUMBER:	156-010-21	REVISED:

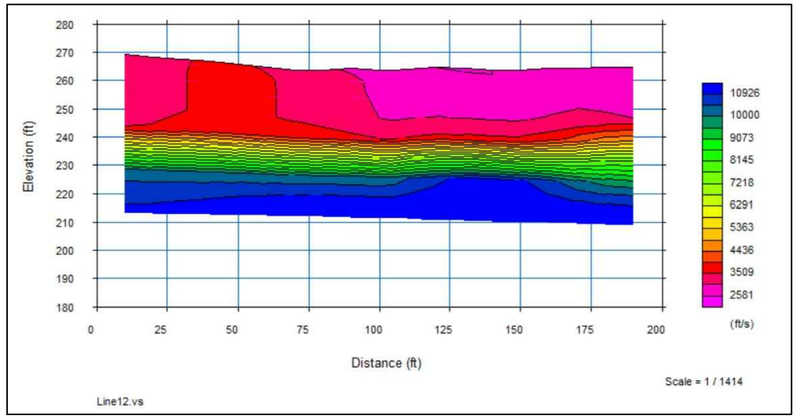
J R Associates Civil and Environmental Geophysics
17040 Oak Leaf Drive Morgan Hill, CA (408) 293-7390

DRAWING NUMBER: 11 of 12

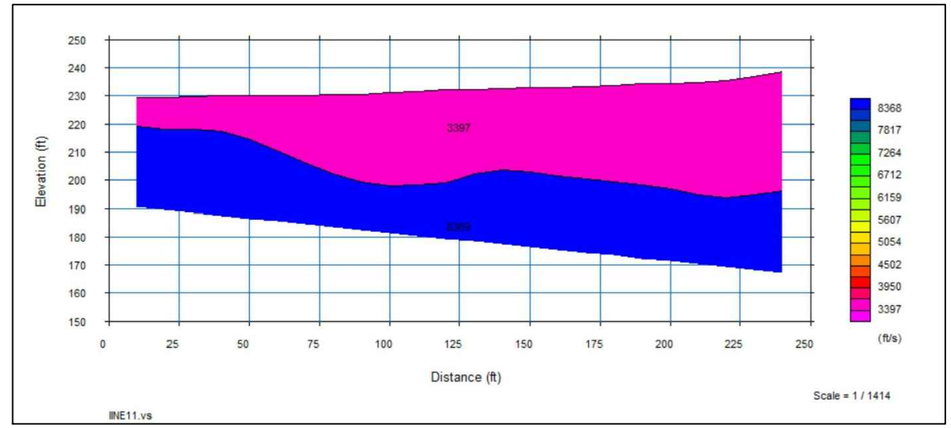
LINE 8 SPREAD 12 TWO LAYER MODEL



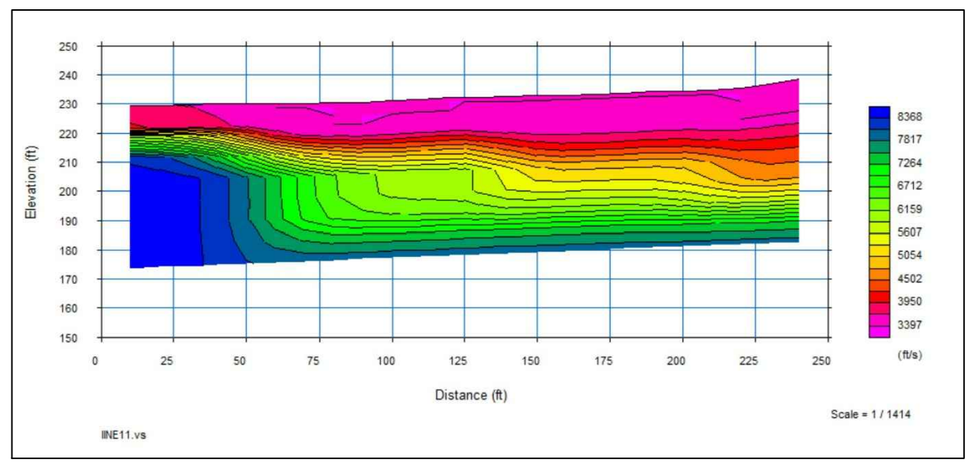
LINE 8 SPREAD 12 TOMOGRAPHIC MODEL



LINE 9 SPREAD 11 TWO LAYER MODEL



LINE 9 SPREAD 11 TOMOGRAPHIC MODEL



Refraction Lines 8 & 9, Spreads 11 & 12
Brisbane Quarry
Brisbane, California

SCALE: See Diagram			DRAWN BY: J.J.R.
DATE: 12-22-2021	JOB NUMBER:	156-010-21	REVISED:

J R Associates Civil and Environmental Geophysics
17040 Oak Leaf Drive Morgan Hill, CA (408) 293-7390

APPENDIX I

Line SR 1 Spreads 1 & 2

Range	Surface/Rock Elevations (ft)	Rock Depth (ft)	Surface/Rock Velocities (ft/sec)	Average Depth (ft)	Max Depth (ft)	Min Depth (ft)
0	315.0		2113			
0	291.2	23.8	13323			
10	314.7		2113			
10	291.1	23.6	13323			
20	314.3		2113			
20	291.5	22.8	13323			
30	313.7		2113			
30	292.3	21.4	13323			
40	313.1		2113			
40	293.1	20.0	13323			
50	312.9		2113			
50	293.7	19.2	13323			
60	312.9		2113			
60	294.0	18.9	13323			
70	313.0		2113			
70	294.2	18.8	13323			
80	313.0		2113			
80	294.1	18.9	13323			
90	312.9		2113			
90	293.9	19.0	13323			
100	312.5		2113			
100	293.5	19.0	13323			
110	312.1		2113			
110	292.7	19.4	13323			
120	312.0		2113			
120	292.3	19.7	13323			
125	312.0		2113			
125	292.3	19.7	13323			
130	312.0		2113			
130	292.4	19.6	13323			
140	312.0		2113			
140	292.7	19.3	13323			
150	312.0		2113			
150	292.7	19.3	13323			
160	311.7		2113			
160	292.3	19.4	13323			
170	311.4		2113			
170	291.1	20.3	13323			
180	311.4		2113			
180	290.0	21.4	13323			
190	311.0		2113			
190	289.6	21.4	13323			
200	310.5		2113			
200	289.2	21.3	13323			
210	310.0		2113			
210	288.8	21.2	13323			
220	309.6		2113			
220	289.0	20.6	13323			
230	308.9		2113			
230	289.7	19.2	13323			
240	308.5		2113			
240	289.9	18.6	13323	Spread 1 Average	Max	Min
250	308.1		2113	20.2	23.8	18.6
250	289.1	19.0	13323			
260	307.7		2113			
260	288.2	19.5	13323			
270	307.3		2113			
270	287.6	19.7	13323			
280	306.8		2113			
280	287.1	19.7	13323			
290	306.2		2113			
290	286.5	19.7	13323			
300	305.5		2113			
300	285.2	20.3	13323			
310	304.5		2113			
310	283.9	20.6	13323			
320	303.7		2113			
320	283.3	20.4	13323			
325	303.2		2113			
325	283.0	20.2	13323			
330	302.8		2113			
330	283.6	19.2	13323			
340	302.0		2113			
340	284.9	17.1	13323			
350	301.4		2113			
350	285.8	15.6	13323			
360	300.7		2113			
360	286.4	14.3	13323			
370	300.0		2113			
370	286.9	13.1	13323			
380	299.2		2113			
380	286.6	12.6	13323			
390	298.5		2113			
390	285.6	12.9	13323			
400	297.5		2113			
400	284.7	12.8	13323			
410	296.8		2113			
410	284.4	12.4	13323			
420	296.2		2113			
420	284.2	12.0	13323			
430	295.9		2113			
430	283.8	12.1	13323			
440	295.4		2113	Spread 2 Average	Max	Min
440	283.5	11.9	13323	16.4	21.3	11.9

Line SR 1 Spreads 3, 4, & 5

Range	Surface/Rock Elevations	Rock Depth (ft)	Surface/Rock Velocities (ft/se	Average Depth (ft)	Max Depth (ft)	Min Depth (ft)
10	299.5		3494			
10	286.4	13.1	9792			
20	299.0		3494			
20	283.8	15.2	9792			
30	298.5		3494			
30	280.2	18.3	9792			
40	298.1		3494			
40	276.5	21.6	9792			
50	297.6		3494			
50	273.9	23.7	9792			
60	297.3		3494			
60	272.4	24.9	9792			
70	297.0		3494			
70	271.0	26.0	9792			
80	296.5		3494			
80	269.0	27.5	9792			
90	296.1		3494			
90	268.4	27.7	9792			
100	295.6		3494			
100	269.0	26.6	9792			
110	295.1		3494			
110	269.3	25.8	9792			
120	294.6		3494			
120	270.1	24.5	9792			
125	294.3		3494			
125	269.6	24.7	9792			
130	294.1		3494			
130	267.3	26.8	9792			
140	293.6		3494			
140	265.3	28.3	9792			
150	293.2		3494			
150	264.8	28.4	9792			
160	292.8		3494			
160	266.6	26.2	9792			
170	292.4		3494			
170	267.8	24.6	9792			
180	292.1		3494			
180	267.9	24.2	9792			
190	291.7		3494			
190	268.2	23.5	9792			
200	291.3		3494			
200	268.4	22.9	9792			
210	290.8		3494			
210	268.2	22.6	9792			
220	290.3		3494			
220	268.0	22.3	9792			
230	289.6		3494			
230	268.1	21.5	9792			
240	289.0		3494			
240	269.1	19.9	9792			
250	288.5		3494	Spread 3 Average	Max Depth (ft)	Min Depth (ft)
250	271.1	17.4	9792	23.4	28.4	13.1
260	288.2		3494			
260	272.1	16.1	9792			
270	288.0		3494			
270	271.8	16.2	9792			
280	287.7		3494			
280	271.2	16.5	9792			
290	287.2		3494			

290	270.9	16.3	9792				
300	286.6		3494				
300	270.7	15.9	9792				
310	285.9		3494				
310	270.1	15.8	9792				
320	285.3		3494				
320	269.8	15.5	9792				
330	284.8		3494				
330	269.1	15.7	9792				
340	284.2		3494				
340	267.3	16.9	9792				
350	283.4		3494				
350	265.3	18.1	9792				
360	282.7		3494				
360	263.6	19.1	9792				
370	282.0		3494				
370	262.1	19.9	9792				
375	281.5		3494				
375	260.9	20.6	9792				
380	281.1		3494				
380	258.9	22.2	9792				
390	280.2		3494				
390	257.5	22.7	9792				
400	279.4		3494				
400	257.0	22.4	9792				
410	278.7		3494				
410	256.1	22.6	9792				
420	278.2		3494				
420	255.2	23.0	9792				
430	277.8		3494				
430	253.6	24.2	9792				
440	277.4		3494				
440	252.7	24.7	9792				
450	277.0		3494	Spread 4 Average	Max Depth (ft)	Min Depth (ft)	
450	252.5	24.5	9792	19.5	24.7	15.5	
460	276.5		3494				
460	252.2	24.3	9792				
470	275.9		3494				
470	250.9	25.0	9792				
480	275.4		3494				
480	249.4	26.0	9792				
490	274.9		3494				
490	247.8	27.1	9792				
500	274.6		3494				
500	246.0	28.6	9792				
510	274.2		3494				
510	243.9	30.3	9792				
520	274.0		3494				
520	241.3	32.7	9792				
530	273.8		3494				
530	240.0	33.8	9792				
540	273.8		3494				
540	239.0	34.8	9792				
550	273.6		3494				
550	238.8	34.8	9792				
560	273.7		3494				
560	239.9	33.8	9792				
570	273.4		3494				
570	241.0	32.4	9792				
575	273.4		3494				
575	241.3	32.1	9792				

580	273.5		3494				
580	241.4	32.1	9792				
590	272.9		3494				
590	241.6	31.3	9792				
600	272.6		3494				
600	241.9	30.7	9792				
610	272.5		3494				
610	241.9	30.6	9792				
620	272.2		3494				
620	239.3	32.9	9792				
630	271.9		3494				
630	234.9	37.0	9792				
640	271.7		3494				
640	234.1	37.6	9792				
650	271.5		3494				
650	234.6	36.9	9792				
660	271.2		3494				
660	233.5	37.7	9792				
670	270.9		3494				
670	232.8	38.1	9792				
680	270.6		3494				
680	232.2	38.4	9792				
690	270.4		3494	Spread 5 Average	Max Depth (ft)	Min Depth (ft)	
690	231.6	38.8	9792	32.7	38.8	24.3	

Line SR 2 Spread 16

Range	Surface/Rock Elevations (ft)	Rock Depth (ft)	Surface/Rock Velocities (ft/sec)	Average Depth (ft)	Max Depth (ft)	Min Depth (ft)
10	396.4		2541			
10	376.0	20.4	4178	34.5	47.1	20.0
20	394.8		2541			
20	374.8	20.0	4178			
30	393.1		2541			
30	371.7	21.4	4178			
40	391.2		2541			
40	367.0	24.2	4178			
50	389.5		2541			
50	360.0	29.5	4178			
60	387.6		2541			
60	352.5	35.1	4178			
70	385.6		2541			
70	346.0	39.6	4178			
80	383.9		2541			
80	341.2	42.7	4178			
90	382.3		2541			
90	337.9	44.4	4178			
100	380.6		2541			
100	335.9	44.7	4178			
110	378.8		2541			
110	334.3	44.5	4178			
120	377.0		2541			
120	332.6	44.4	4178			
125	376.1		2541			
125	330.8	45.3	4178			
130	375.0		2541			
130	328.7	46.3	4178			
140	373.5		2541			
140	326.4	47.1	4178			
150	371.7		2541			
150	325.8	45.9	4178			
160	370.2		2541			
160	327.4	42.8	4178			
170	368.7		2541			
170	330.4	38.3	4178			
180	367.5		2541			
180	333.3	34.2	4178			
190	366.7		2541			
190	335.4	31.3	4178			
200	365.3		2541			
200	337.6	27.7	4178			
210	364.2		2541			
210	339.3	24.9	4178			
220	363.1		2541			
220	339.5	23.6	4178			
230	361.9		2541			
230	339.7	22.2	4178			
240	361.0		2541			
240	340.3	20.7	4178			

Line SR 2 Spreads 17 & 18

Range	Surface/Rock Elevations (ft)	Rock Depth (ft)	Surface/Rock Velocities (ft/sec)	Average Depth (ft)	Max Depth (ft)	Min Depth (ft)
10	358.5		2230			
10	314.2	44.3	8783			
20	357.2		2230			
20	310.6	46.6	8783			
30	355.7		2230			
30	309.7	46.0	8783			
40	354.2		2230			
40	310.7	43.5	8783			
50	352.5		2230			
50	311.3	41.2	8783			
60	350.9		2230			
60	310.6	40.3	8783			
70	349.3		2230			
70	308.9	40.4	8783			
80	347.1		2230			
80	307.1	40.0	8783			
90	345.7		2230			
90	305.7	40.0	8783			
100	343.9		2230			
100	304.3	39.6	8783			
110	341.9		2230			
110	302.1	39.8	8783			
120	340.3		2230			
120	300.2	40.1	8783			
125	339.4		2230			
125	299.7	39.7	8783			
130	338.5		2230			
130	299.2	39.3	8783			
140	336.8		2230			
140	298.7	38.1	8783			
150	335.0		2230			
150	297.6	37.4	8783			
160	333.9		2230			
160	296.2	37.7	8783			
170	332.3		2230			
170	295.3	37.0	8783			
180	331.1		2230			
180	295.3	35.8	8783			
190	329.0		2230			
190	296.3	32.7	8783			
200	327.1		2230			
200	298.3	28.8	8783			
210	326.0		2230			
210	300.0	26.0	8783			
220	324.8		2230			
220	300.5	24.3	8783			
230	323.7		2230			
230	301.1	22.6	8783			
240	322.4		2230			
240	304.4	18.0	8783			
250	320.7		2230	Spread 17 Average	Max Depth (ft)	Min Depth (ft)
250	310.6	10.1	8783	35.7	46.6	10.1
260	319.2		2230			
260	315.2	4.0	8783			
270	317.5		2230			
270	316.2	1.3	8783			
280	316.0		2230			
280	315.1	0.9	8783			
290	315.0		2230			
290	313.6	1.4	8783			
300	314.0		2230			
300	312.2	1.8	8783			
310	313.2		2230			
310	310.7	2.5	8783			
320	312.6		2230			
320	308.4	4.2	8783			
330	312.1		2230			
330	306.5	5.6	8783			
340	311.3		2230			
340	304.7	6.6	8783			
350	310.5		2230			
350	303.5	7.0	8783			
360	309.6		2230			
360	303.9	5.7	8783			

370	309.0		2230				
370	303.8	5.2	8783				
375	308.4		2230				
375	302.5	5.9	8783				
380	307.9		2230				
380	301.3	6.6	8783				
390	307.0		2230				
390	300.5	6.5	8783				
400	306.0		2230				
400	298.8	7.2	8783				
410	304.8		2230				
410	296.3	8.5	8783				
420	303.4		2230				
420	293.9	9.5	8783				
430	301.9		2230				
430	292.3	9.6	8783				
440	300.5		2230				
440	291.5	9.0	8783				
450	298.7		2230				
450	290.4	8.3	8783				
460	296.9		2230				
460	289.7	7.2	8783				
470	294.7		2230				
470	290.3	4.4	8783				
480	292.4		2230				
480	291.4	1.0	8783				
490	290.7		2230	Spread 18 Average	Max Depth (ft)	Min Depth (ft)	
490	290.7	0.0	8783		5.2	9.6	0.0

Line SR 3 Spread 6

Range	Surface/Rock Elevations (ft)	Rock Depth (ft)	Surface/Rock Velocities (ft/sec)	Average Depth (ft)	Max Depth (ft)	Min Depth (ft)
10	355.1		2059			
10	331.6	23.5	16044	27.4	43.7	19.7
20	355.1		2059			
20	332.5	22.6	16044			
30	355.4		2059			
30	333.3	22.1	16044			
40	355.4		2059			
40	333.5	21.9	16044			
50	355.6		2059			
50	333.7	21.9	16044			
60	355.5		2059			
60	334.2	21.3	16044			
70	355.3		2059			
70	334.9	20.4	16044			
80	355.4		2059			
80	335.6	19.8	16044			
90	355.4		2059			
90	335.7	19.7	16044			
100	355.4		2059			
100	334.7	20.7	16044			
110	355.5		2059			
110	332.3	23.2	16044			
120	352.4		2059			
120	329.7	22.7	16044			
125	352.1		2059			
125	327.8	24.3	16044			
130	351.8		2059			
130	325.9	25.9	16044			
140	351.4		2059			
140	324.6	26.8	16044			
150	350.8		2059			
150	323.7	27.1	16044			
160	350.2		2059			
160	322.2	28.0	16044			
170	349.7		2059			
170	319.9	29.8	16044			
180	349.1		2059			
180	317.2	31.9	16044			
190	348.4		2059			
190	314.4	34.0	16044			
200	347.5		2059			
200	312.1	35.4	16044			
210	347.7		2059			
210	310.4	37.3	16044			
220	348.2		2059			
220	308.5	39.7	16044			
230	348.6		2059			
230	306.7	41.9	16044			
240	349.1		2059			
240	305.4	43.7	16044			

Line SR 3 Spread 7

Range	Surface/Rock Elevations (ft)	Rock Depth (ft)	Surface/Rock Velocities (ft/sec)	Average Depth (ft)	Max Depth (ft)	Min Depth (ft)
10	346.2		2041			
10	314.3	31.9	12580	27.8	32.4	18.3
20	344.0		2041			
20	311.6	32.4	12580			
30	341.8		2041			
30	310.1	31.7	12580			
40	339.9		2041			
40	309.0	30.9	12580			
50	337.9		2041			
50	307.2	30.7	12580			
60	335.8		2041			
60	304.8	31.0	12580			
70	333.7		2041			
70	302.5	31.2	12580			
80	331.6		2041			
80	300.6	31.0	12580			
90	329.6		2041			
90	298.8	30.8	12580			
100	327.3		2041			
100	297.1	30.2	12580			
110	325.0		2041			
110	295.9	29.1	12580			
120	322.9		2041			
120	295.2	27.7	12580			
125	321.9		2041			
125	295.0	26.9	12580			
130	320.9		2041			
130	294.9	26.0	12580			
140	318.9		2041			
140	294.5	24.4	12580			
150	316.9		2041			
150	293.0	23.9	12580			
160	314.9		2041			
160	290.0	24.9	12580			
170	312.8		2041			
170	286.0	26.8	12580			
180	310.5		2041			
180	282.1	28.4	12580			
190	308.1		2041			
190	279.0	29.1	12580			
200	305.9		2041			
200	277.6	28.3	12580			
210	303.5		2041			
210	277.7	25.8	12580			
220	301.4		2041			
220	278.3	23.1	12580			
230	299.3		2041			
230	278.7	20.6	12580			
240	297.1		2041			
240	278.8	18.3	12580			

Line SR 4 Spread 14

Range	Surface/Rock Elevations (ft)	Rock Depth (ft)	Surface/Rock Velocities (ft/sec)	Average Depth (ft)	Max Depth (ft)	Min Depth (ft)
10	351.7		2251			
10	312.5	39.2	11049	32.6	39.2	25.1
20	351.6		2251			
20	313.7	37.9	11049			
30	352.5		2251			
30	314.8	37.7	11049			
40	353.2		2251			
40	315.7	37.5	11049			
50	353.3		2251			
50	316.9	36.4	11049			
60	353.4		2251			
60	318.8	34.6	11049			
70	354.3		2251			
70	320.8	33.5	11049			
80	355.5		2251			
80	321.8	33.7	11049			
90	356.9		2251			
90	322.5	34.4	11049			
100	357.7		2251			
100	323.7	34.0	11049			
110	358.2		2251			
110	324.2	34.0	11049			
120	358.4		2251			
120	324.1	34.3	11049			
125	358.6		2251			
125	324.4	34.2	11049			
130	358.5		2251			
130	324.9	33.6	11049			
140	358.3		2251			
140	325.1	33.2	11049			
150	357.9		2251			
150	325.7	32.2	11049			
160	357.6		2251			
160	326.6	31.0	11049			
170	357.4		2251			
170	327.3	30.1	11049			
180	357.3		2251			
180	328.0	29.3	11049			
190	356.9		2251			
190	327.9	29.0	11049			
200	356.3		2251			
200	327.5	28.8	11049			
210	356.0		2251			
210	327.5	28.5	11049			
220	355.6		2251			
220	328.0	27.6	11049			
230	355.2		2251			
230	329.1	26.1	11049			
240	355.1		2251			
240	330.0	25.1	11049			

Line SR 5 Spreads 8, 9, and 10

Range	Surface/Rock Elevations (ft)	Rock Depth (ft)	Surface/Rock Velocities (ft/sec)	Average Depth (ft)	Max Depth (ft)	Min Depth (ft)
10	277.5		2797			
10	263.3	14.2	8728			
20	277.2		2797			
20	263.6	13.6	8728			
30	277.2		2797			
30	265.1	12.1	8728			
40	277.1		2797			
40	266.8	10.3	8728			
50	277.0		2797			
50	267.5	9.5	8728			
60	276.8		2797			
60	266.7	10.1	8728			
70	276.4		2797			
70	265.7	10.7	8728			
80	276.1		2797			
80	264.9	11.2	8728			
90	275.7		2797			
90	263.2	12.5	8728			
100	275.2		2797			
100	261.9	13.3	8728			
110	274.7		2797			
110	260.9	13.8	8728			
120	274.4		2797			
120	259.6	14.8	8728			
125	274.2		2797			
125	258.8	15.4	8728			
130	274.1		2797			
130	258.6	15.5	8728			
140	273.6		2797			
140	258.4	15.2	8728			
150	273.2		2797			
150	258.6	14.6	8728			
160	272.9		2797			
160	258.8	14.1	8728			
170	272.5		2797			
170	258.2	14.3	8728			
180	272.0		2797			
180	257.0	15.0	8728			
190	271.6		2797			
190	255.6	16.0	8728			
200	271.2		2797			
200	254.6	16.6	8728			
210	270.7		2797			
210	253.3	17.4	8728			
220	270.2		2797			
220	252.8	17.4	8728			
230	269.7		2797			
230	253.1	16.6	8728			
240	269.1		2797			
240	251.8	17.3	8728			
250	268.6		2797	Soread 8 Average (ft)	Max Depth (ft)	Min Depth (ft)
250	249.1	19.5	8728	14.3	19.5	9.5
260	268.0		2797			
260	247.1	20.9	8728			
270	267.3		2797			
270	247.9	19.4	8728			
280	266.5		2797			
280	249.8	16.7	8728			
290	265.8		2797			
290	250.0	15.8	8728			
300	265.0		2797			
300	248.7	16.3	8728			
310	264.2		2797			
310	248.4	15.8	8728			
320	263.4		2797			
320	248.8	14.6	8728			
330	262.6		2797			
330	247.7	14.9	8728			
340	261.9		2797			
340	245.6	16.3	8728			
350	261.3		2797			
350	243.5	17.8	8728			
360	260.6		2797			
360	241.9	18.7	8728			
370	259.7		2797			
370	241.5	18.2	8728			
375	259.3		2797			
375	242.0	17.3	8728			
380	258.9		2797			
380	241.2	17.7	8728			
390	258.0		2797			

390	239.7	18.3	8728				
400	257.1		2797				
400	239.5	17.6	8728				
410	256.3		2797				
410	239.6	16.7	8728				
420	255.4		2797				
420	239.2	16.2	8728				
430	254.4		2797				
430	238.3	16.1	8728				
440	253.4		2797				
440	237.7	15.7	8728				
450	252.4		2797	Soread 9 Average (ft)	Max Depth (ft)	Min Depth (ft)	
450	238.9	13.5	8728	16.9	20.9	13.5	
460	251.3		2797				
460	240.2	11.1	8728				
470	250.3		2797				
470	240.0	10.3	8728				
480	249.4		2797				
480	238.1	11.3	8728				
490	248.7		2797				
490	234.7	14.0	8728				
500	247.7		2797				
500	231.8	15.9	8728				
510	247.0		2797				
510	229.8	17.2	8728				
520	246.3		2797				
520	228.4	17.9	8728				
530	245.7		2797				
530	226.7	19.0	8728				
540	245.1		2797				
540	224.1	21.0	8728				
550	244.3		2797				
550	222.0	22.3	8728				
560	243.5		2797				
560	220.5	23.0	8728				
570	242.5		2797				
570	219.1	23.4	8728				
575	242.1		2797				
575	217.8	24.3	8728				
580	242.0		2797				
580	217.3	24.7	8728				
590	241.2		2797				
590	217.2	24.0	8728				
600	240.5		2797				
600	217.1	23.4	8728				
610	239.7		2797				
610	217.6	22.1	8728				
620	239.1		2797				
620	217.6	21.5	8728				
630	238.3		2797				
630	216.0	22.3	8728				
640	237.6		2797				
640	213.3	24.3	8728				
650	237.1		2797				
650	211.0	26.1	8728				
660	236.6		2797				
660	207.9	28.7	8728				
670	236.2		2797				
670	204.7	31.5	8728				
680	235.7		2797				
680	202.7	33.0	8728				
690	235.2		2797	Soread 9 Average (ft)	Max Depth (ft)	Min Depth (ft)	
690	201.5	33.7	8728	21.8	33.7	10.3	

Line SR 6 Spread 13

Range	Surface/Rock Elevations (ft)	Rock Depth (ft)	Surface/Rock Velocities (ft/sec)	Average Depth (ft)	Max Depth (ft)	Min Depth (ft)
10	240.2		1808			
10	220.5	19.7	8913	20.6	22.8	16.0
20	240.2		1808			
20	220.1	20.1	8913			
30	240.5		1808			
30	220.1	20.4	8913			
40	240.7		1808			
40	219.5	21.2	8913			
50	241.0		1808			
50	218.6	22.4	8913			
60	241.1		1808			
60	218.5	22.6	8913			
70	241.4		1808			
70	218.9	22.5	8913			
80	241.7		1808			
80	219.4	22.3	8913			
85	241.9		1808			
85	219.4	22.5	8913			
90	242.1		1808			
90	219.5	22.6	8913			
100	242.3		1808			
100	219.5	22.8	8913			
110	242.3		1808			
110	220.5	21.8	8913			
120	241.8		1808			
120	221.8	20.0	8913			
130	241.0		1808			
130	222.3	18.7	8913			
140	240.0		1808			
140	222.2	17.8	8913			
150	239.0		1808			
150	221.8	17.2	8913			
160	237.4		1808			
160	221.4	16.0	8913			

Line SR 7 Spread 15

Range	Surface/Rock Elevations (ft)	Rock Depth (ft)	Surface/Rock Velocities (ft/sec)	Average Depth (ft)	Max Depth (ft)	Min Depth (ft)
10	314.6		3697			
10	290.8	23.8	12250	16.9	28.6	11.2
20	314.1		3697			
20	291.8	22.3	12250			
30	314.0		3697			
30	293.7	20.3	12250			
40	313.9		3697			
40	295.3	18.6	12250			
50	313.3		3697			
50	296.2	17.1	12250			
60	312.9		3697			
60	297.3	15.6	12250			
70	312.4		3697			
70	297.8	14.6	12250			
80	312.0		3697			
80	297.4	14.6	12250			
90	311.5		3697			
90	297.6	13.9	12250			
100	311.0		3697			
100	298.1	12.9	12250			
110	310.8		3697			
110	298.4	12.4	12250			
115	310.7		3697			
115	298.8	11.9	12250			
120	310.6		3697			
120	299.0	11.6	12250			
130	310.5		3697			
130	299.3	11.2	12250			
140	310.3		3697			
140	298.9	11.4	12250			
150	309.9		3697			
150	296.5	13.4	12250			
160	309.8		3697			
160	292.9	16.9	12250			
170	309.9		3697			
170	288.9	21.0	12250			
180	310.0		3697			
180	284.8	25.2	12250			
190	310.0		3697			
190	281.4	28.6	12250			

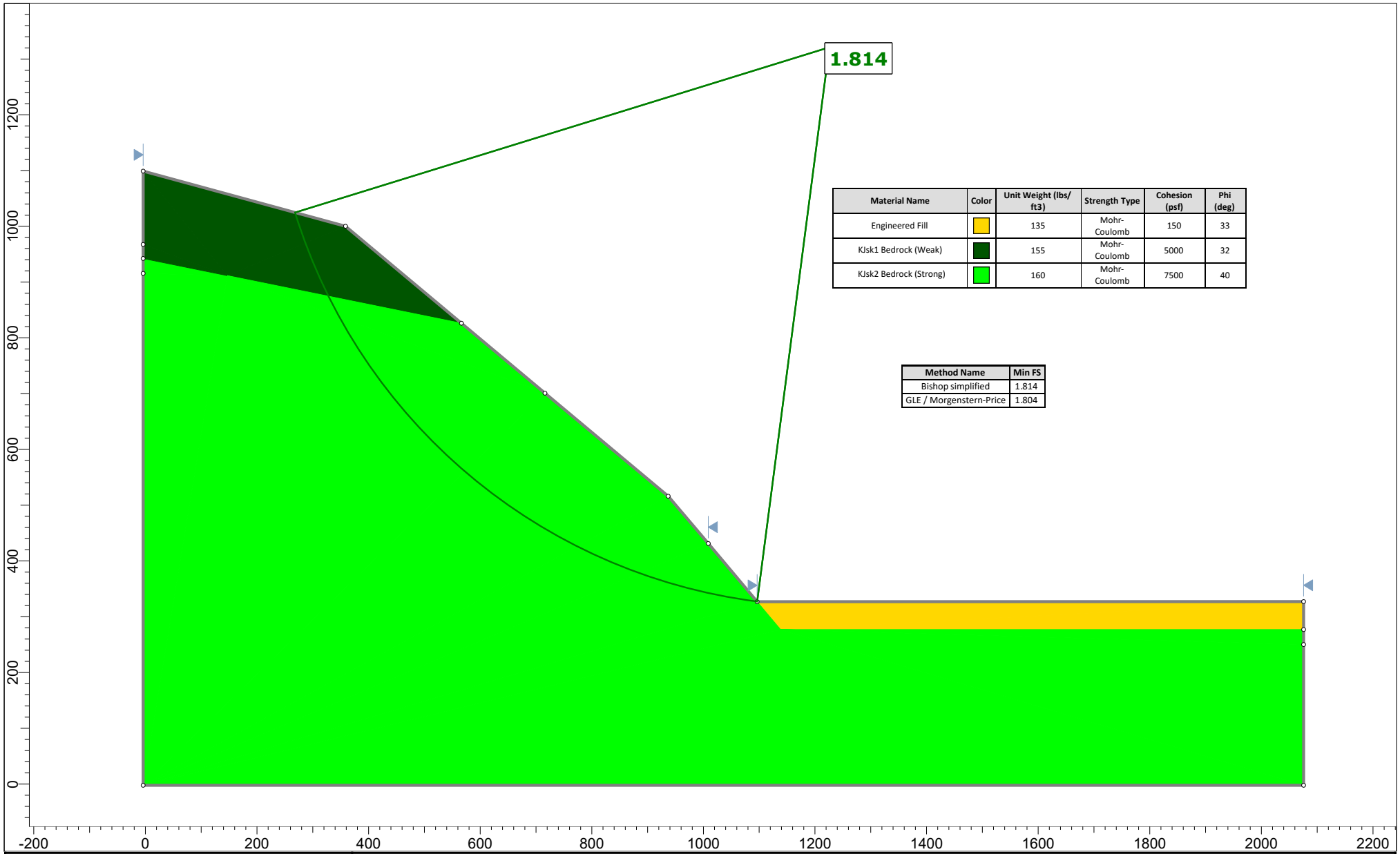
Line SR 8 Spread 12

Range	Surface/Rock Elevations (ft)	Rock Depth (ft)	Surface/Rock Velociti	Average Depth (ft)	Max Depth (ft)	Min Depth (ft)
10	269.2		2581			
10	221.6	47.6	10927	31.2	47.6	20.8
20	268.3		2581			
20	224.3	44.0	10927			
30	267.7		2581			
30	226.9	40.8	10927			
40	267.0		2581			
40	229.6	37.4	10927			
50	266.0		2581			
50	231.8	34.2	10927			
60	264.7		2581			
60	232.9	31.8	10927			
70	263.8		2581			
70	233.5	30.3	10927			
80	263.8		2581			
80	233.5	30.3	10927			
90	264.2		2581			
90	233.4	30.8	10927			
100	263.6		2581			
100	233.8	29.8	10927			
105	263.5		2581			
105	233.7	29.8	10927			
110	264.0		2581			
110	233.4	30.6	10927			
120	264.8		2581			
120	234.0	30.8	10927			
130	264.5		2581			
130	234.9	29.6	10927			
140	263.8		2581			
140	235.9	27.9	10927			
150	263.5		2581			
150	236.9	26.6	10927			
160	264.4		2581			
160	238.4	26.0	10927			
170	264.2		2581			
170	241.2	23.0	10927			
180	264.6		2581			
180	243.2	21.4	10927			
190	264.8		2581			
190	244.0	20.8	10927			

Line SR 9 Spread 11

Range	Surface/Rock Elevations	Rock Depth (ft)	Surface/Rock Velocities (	Average Depth (ft)	Max Depth (ft)	Min Depth (ft)
10	229.6		3397			
10	219.2	10.4	8369	29.0	42.4	10.4
20	229.6		3397			
20	218.3	11.3	8369			
30	229.8		3397			
30	217.9	11.9	8369			
40	230.1		3397			
40	217.3	12.8	8369			
50	230.1		3397			
50	214.4	15.7	8369			
60	230.1		3397			
60	210.2	19.9	8369			
70	230.2		3397			
70	205.9	24.3	8369			
80	230.5		3397			
80	202.2	28.3	8369			
90	230.6		3397			
90	199.4	31.2	8369			
100	231.1		3397			
100	198.0	33.1	8369			
110	231.7		3397			
110	198.2	33.5	8369			
120	232.2		3397			
120	199.3	32.9	8369			
125	232.4		3397			
125	200.5	31.9	8369			
130	232.4		3397			
130	202.3	30.1	8369			
140	232.5		3397			
140	203.6	28.9	8369			
150	232.8		3397			
150	203.1	29.7	8369			
160	233.1		3397			
160	201.6	31.5	8369			
170	233.3		3397			
170	200.3	33.0	8369			
180	233.7		3397			
180	199.4	34.3	8369			
190	234.2		3397			
190	198.5	35.7	8369			
200	234.6		3397			
200	196.7	37.9	8369			
210	234.9		3397			
210	194.6	40.3	8369			
220	235.4		3397			
220	193.8	41.6	8369			
230	236.9		3397			
230	194.6	42.3	8369			
240	238.5		3397			
240	196.1	42.4	8369			

APPENDIX E: GRAPHICAL SLOPE STABILITY ANALYSIS OUTPUT



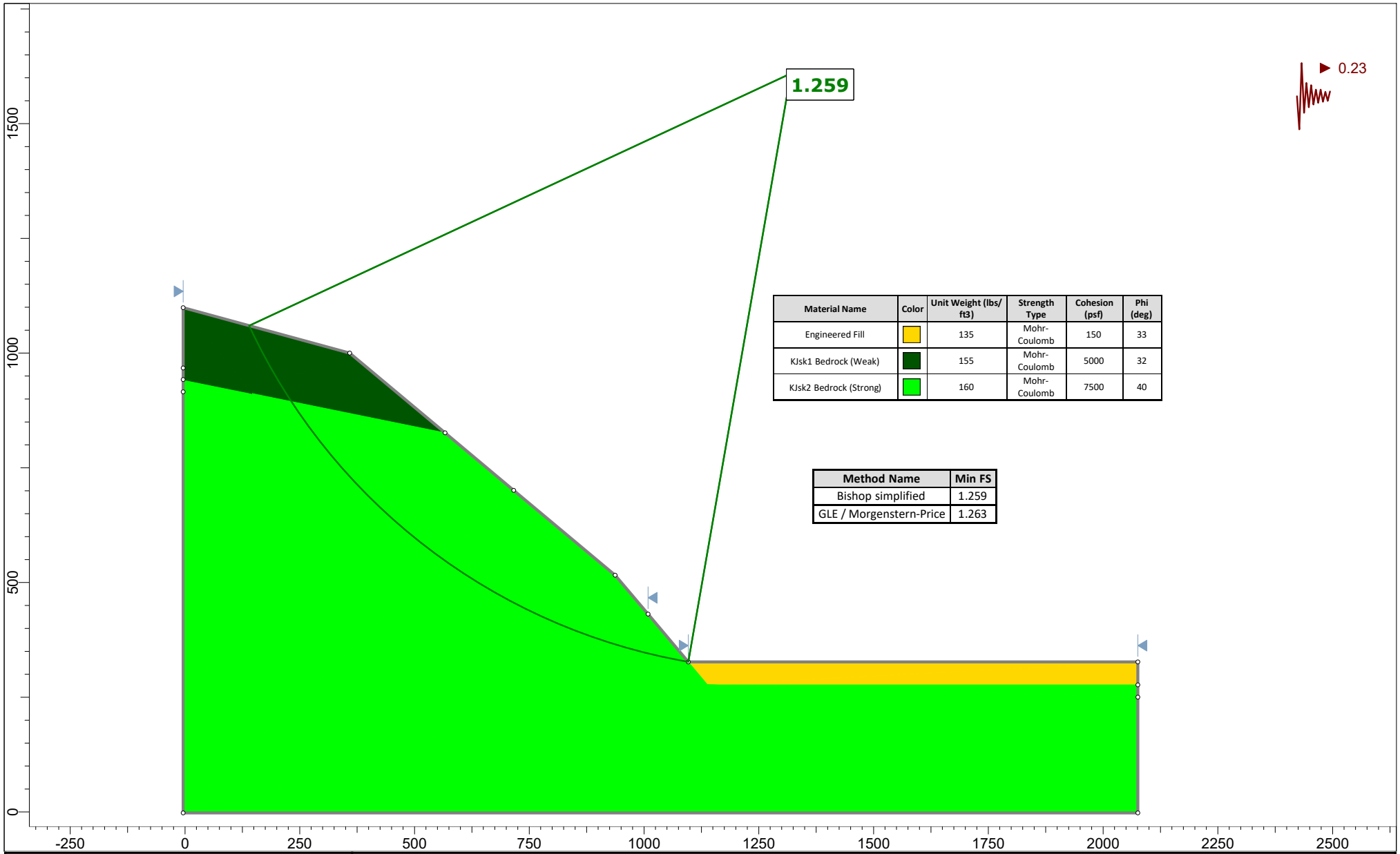
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135	Mohr-Coulomb	150	33
KJsk1 Bedrock (Weak)		155	Mohr-Coulomb	5000	32
KJsk2 Bedrock (Strong)		160	Mohr-Coulomb	7500	40

Method Name	Min FS
Bishop simplified	1.814
GLE / Morgenstern-Price	1.804

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	New Quarry Slope Global Stability Analysis	*Scenario*	Static
Drawn By		*Company*	Cornerstone Earth Group
Date	October 2023	*File Name*	582-5-2 New Quarry Slope_Global Stability Analysis



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135	Mohr-Coulomb	150	33
KJsk1 Bedrock (Weak)		155	Mohr-Coulomb	5000	32
KJsk2 Bedrock (Strong)		160	Mohr-Coulomb	7500	40

Method Name	Min FS
Bishop simplified	1.259
GLE / Morgenstern-Price	1.263

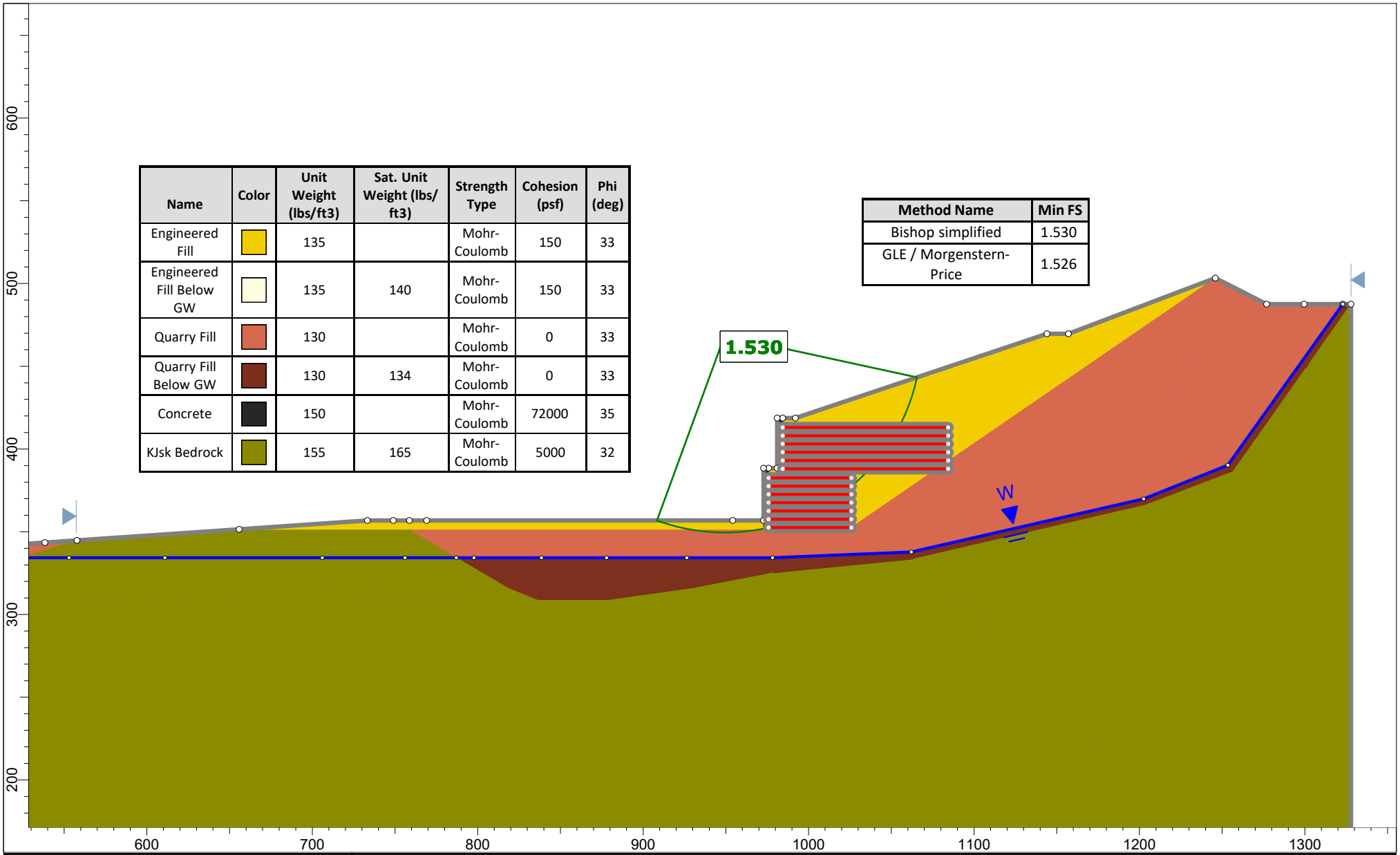
rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	New Quarry Slope Global Stability Analysis	*Scenario*	Seismic
Drawn By		*Company*	Cornerstone Earth Group
Date	October 2023	*File Name*	582-5-2 New Quarry Slope_Global Stability Analysis

Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32

Method Name	Min FS
Bishop simplified	1.530
GLE / Morgenstern-Price	1.526



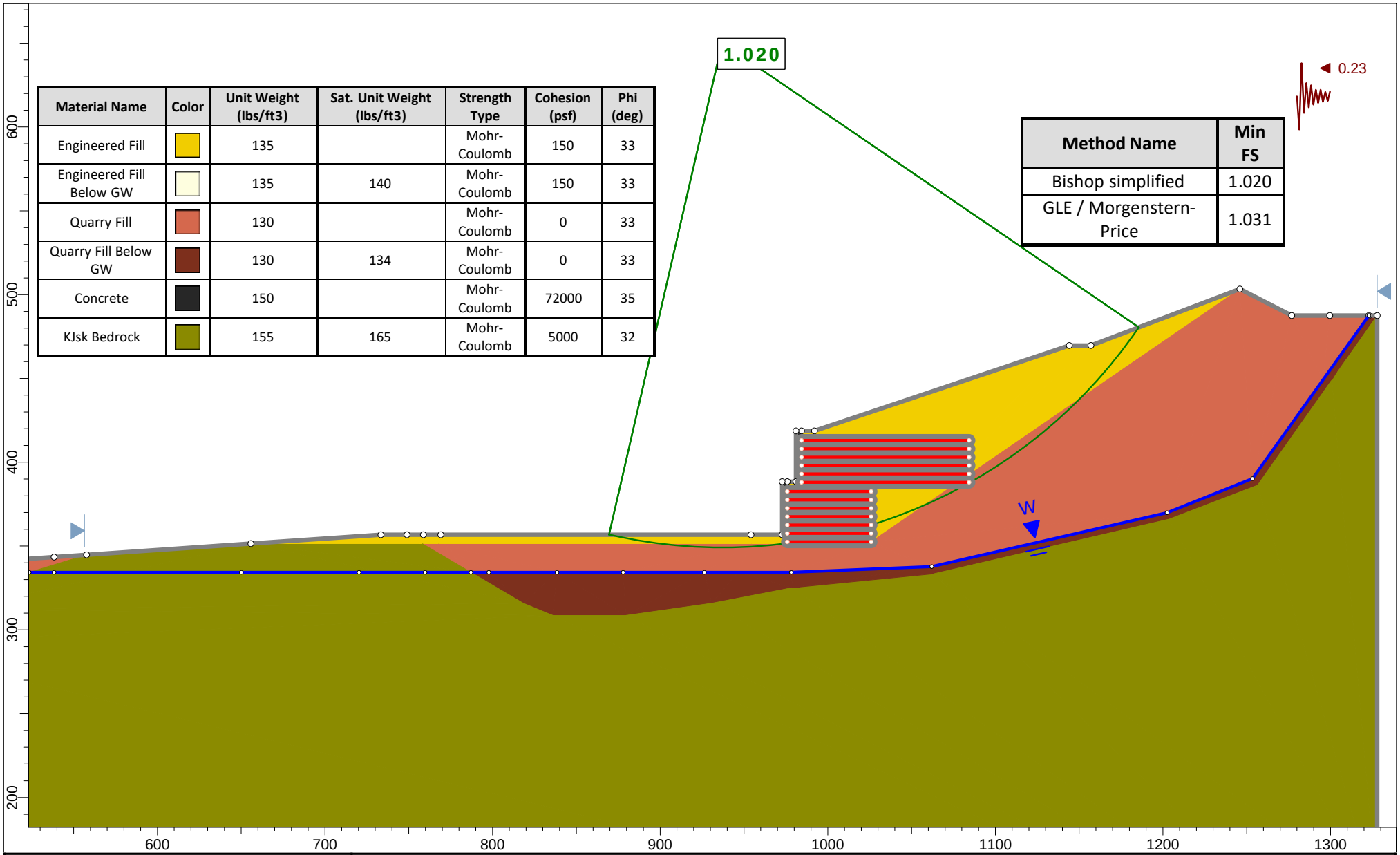
rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 1	Scenario	Static
Drawn By		Company	Cornerstone Earth Group
Date	August 2023	File Name	582-5-2 Slope Stability Analyses _Section 1

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32

Method Name	Min FS
Bishop simplified	1.020
GLE / Morgenstern-Price	1.031



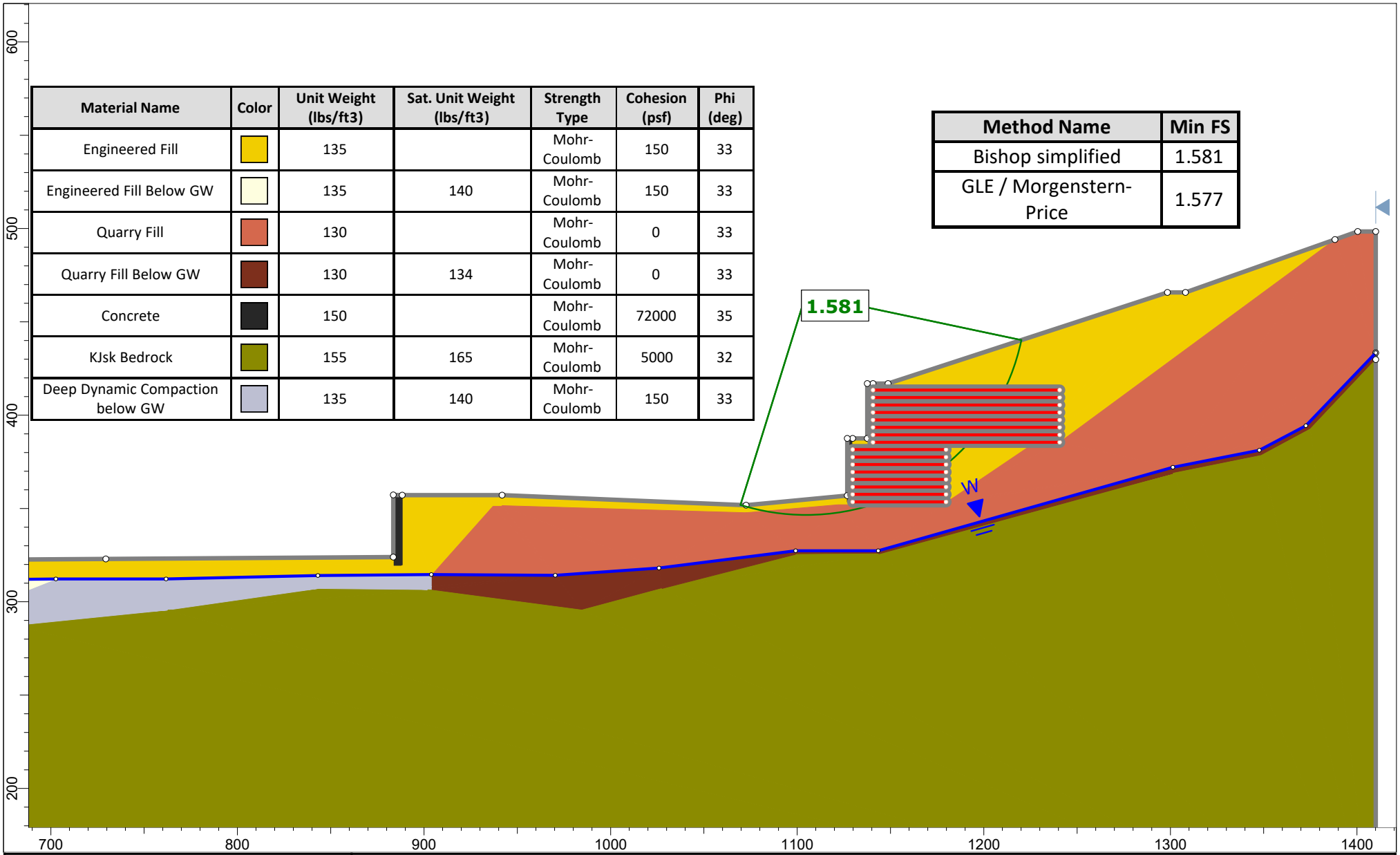
rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 1	Scenario	Seismic
Drawn By		Company	Cornerstone Earth Group
Date	August 2023	File Name	582-5-2 Slope Stability Analyses_Section 1

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Deep Dynamic Compaction below GW		135	140	Mohr-Coulomb	150	33

Method Name	Min FS
Bishop simplified	1.581
GLE / Morgenstern-Price	1.577



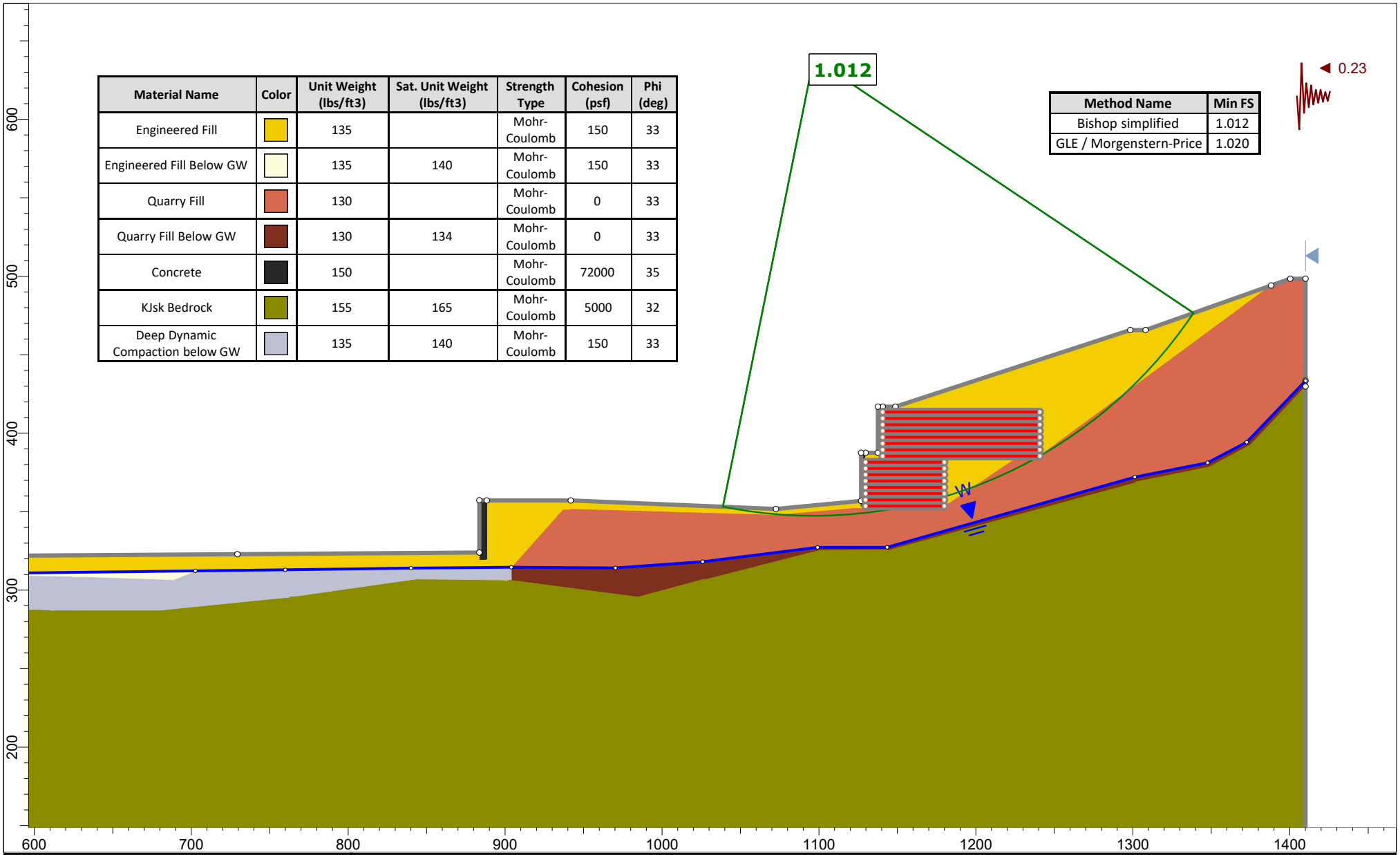
rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 3	Scenario	Static
Drawn By		Company	Cornerstone Earth Group
Date	August 2023	File Name	582-5-2 Slope Stability Analyses _Section 3

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Deep Dynamic Compaction below GW		135	140	Mohr-Coulomb	150	33

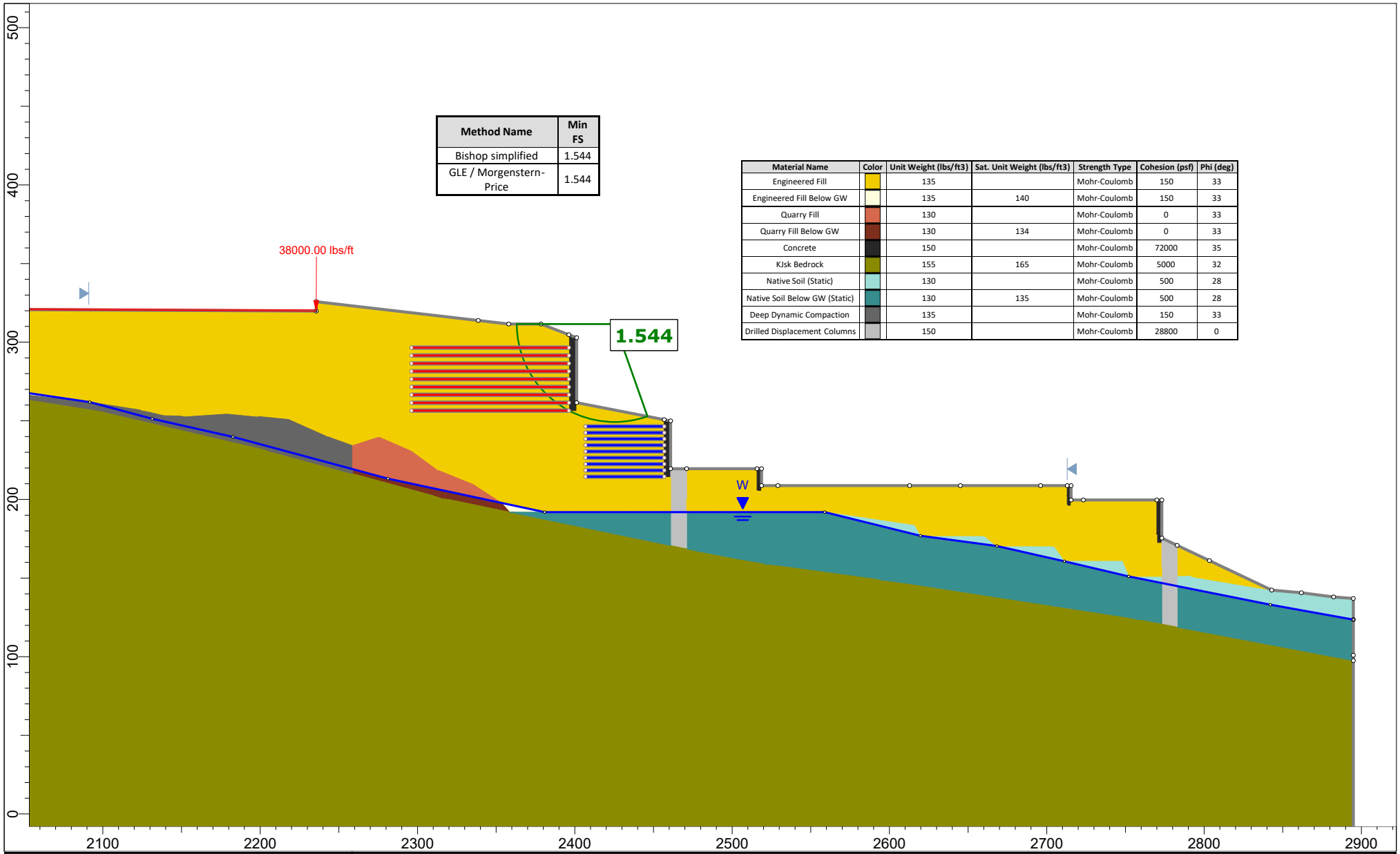
Method Name	Min FS
Bishop simplified	1.012
GLE / Morgenstern-Price	1.020



rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 3	Scenario	Seismic
Drawn By		Company	Cornerstone Earth Group
Date	August 2023	File Name	582-5-2 Slope Stability Analyses _Section 3



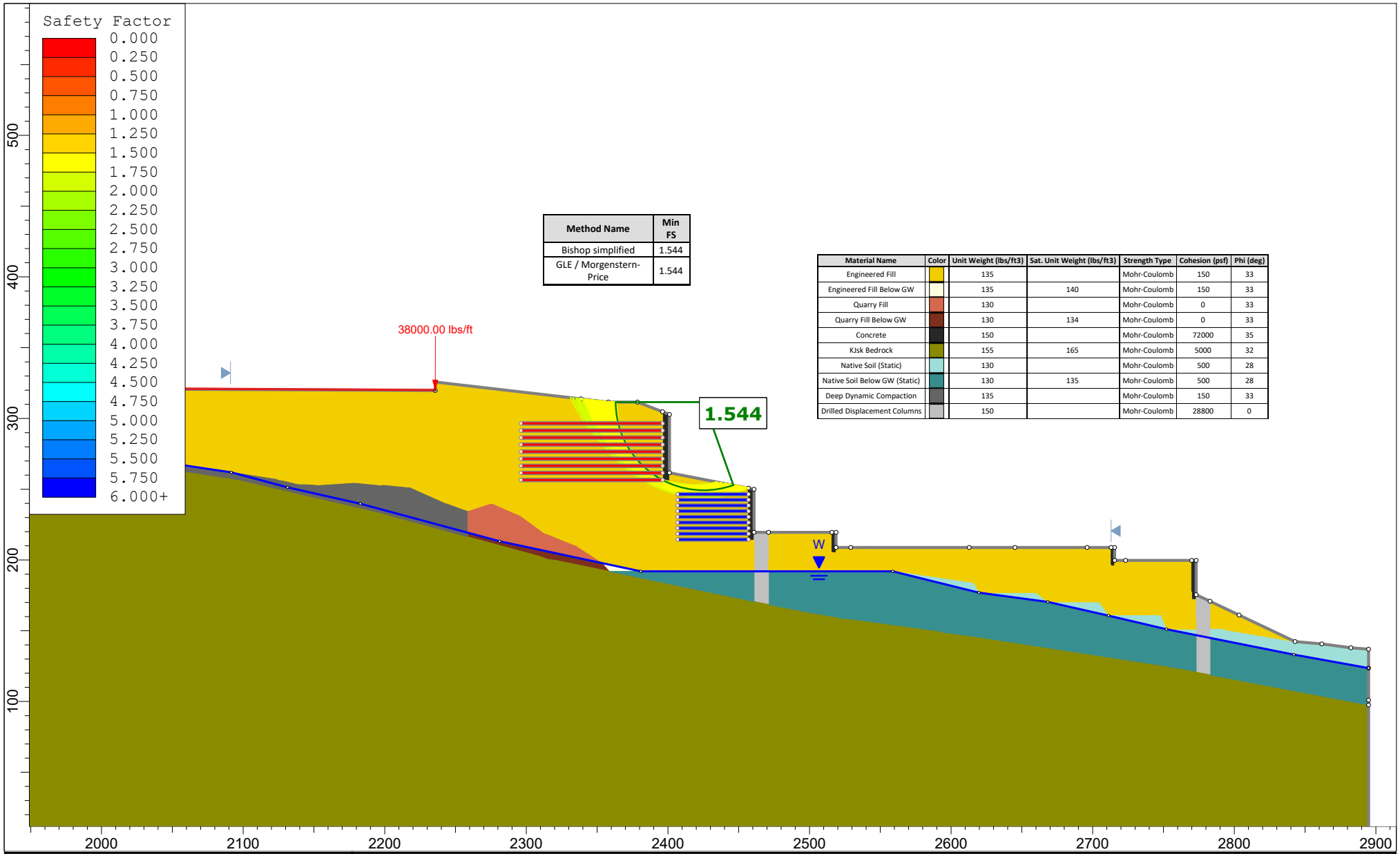
Method Name	Min FS
Bishop simplified	1.544
GLE / Morgenstern-Price	1.544

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Static)		130		Mohr-Coulomb	500	28
Native Soil Below GW (Static)		130	135	Mohr-Coulomb	500	28
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 10	*Scenario*	North-South Walls - Static - Lowest FS
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 10



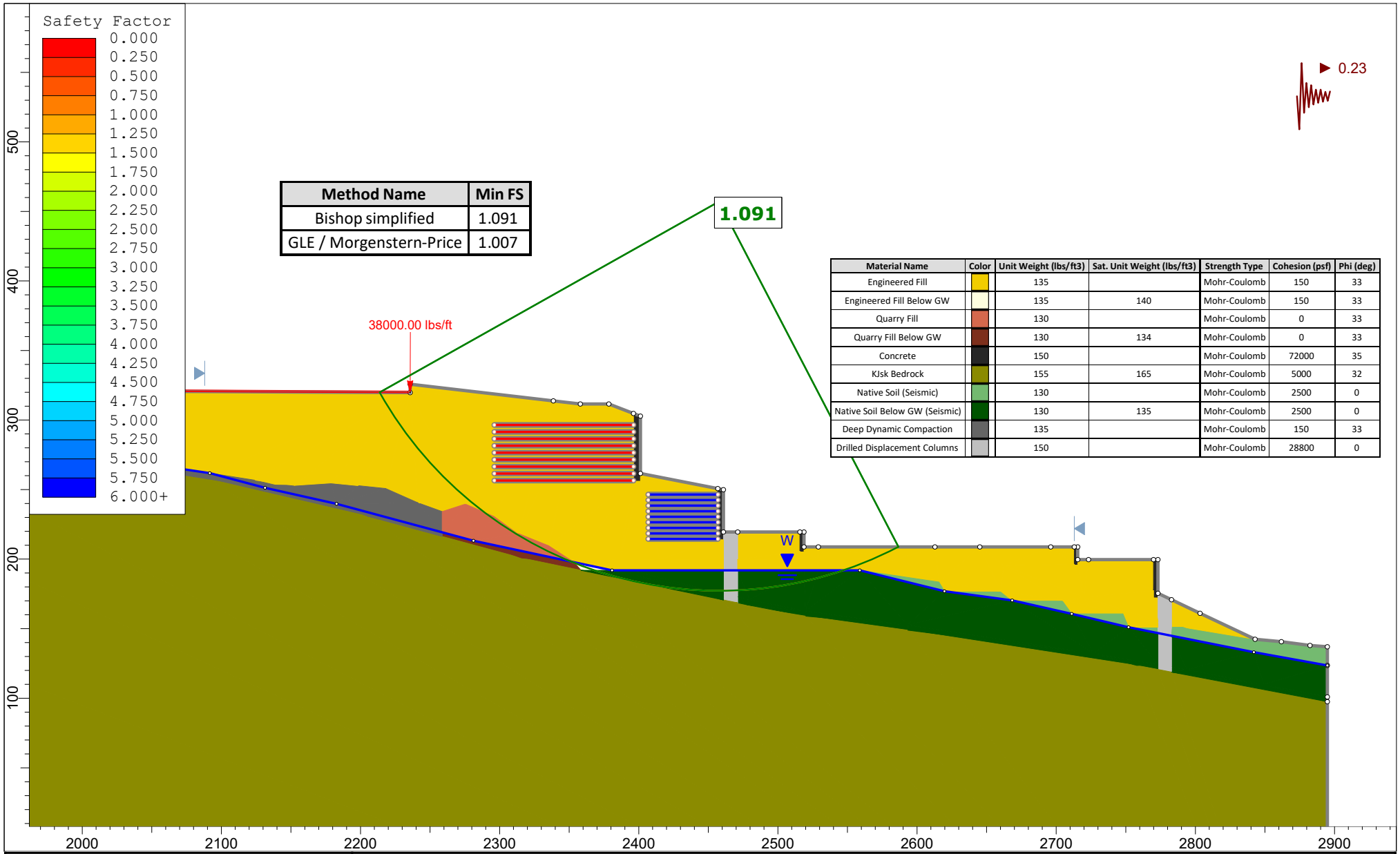
Method Name	Min FS
Bishop simplified	1.544
GLE / Morgenstern-Price	1.544

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Static)		130		Mohr-Coulomb	500	28
Native Soil Below GW (Static)		130	135	Mohr-Coulomb	500	28
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 10	*Scenario*	North-South Walls - Static - FS 1.8 and Below
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 10



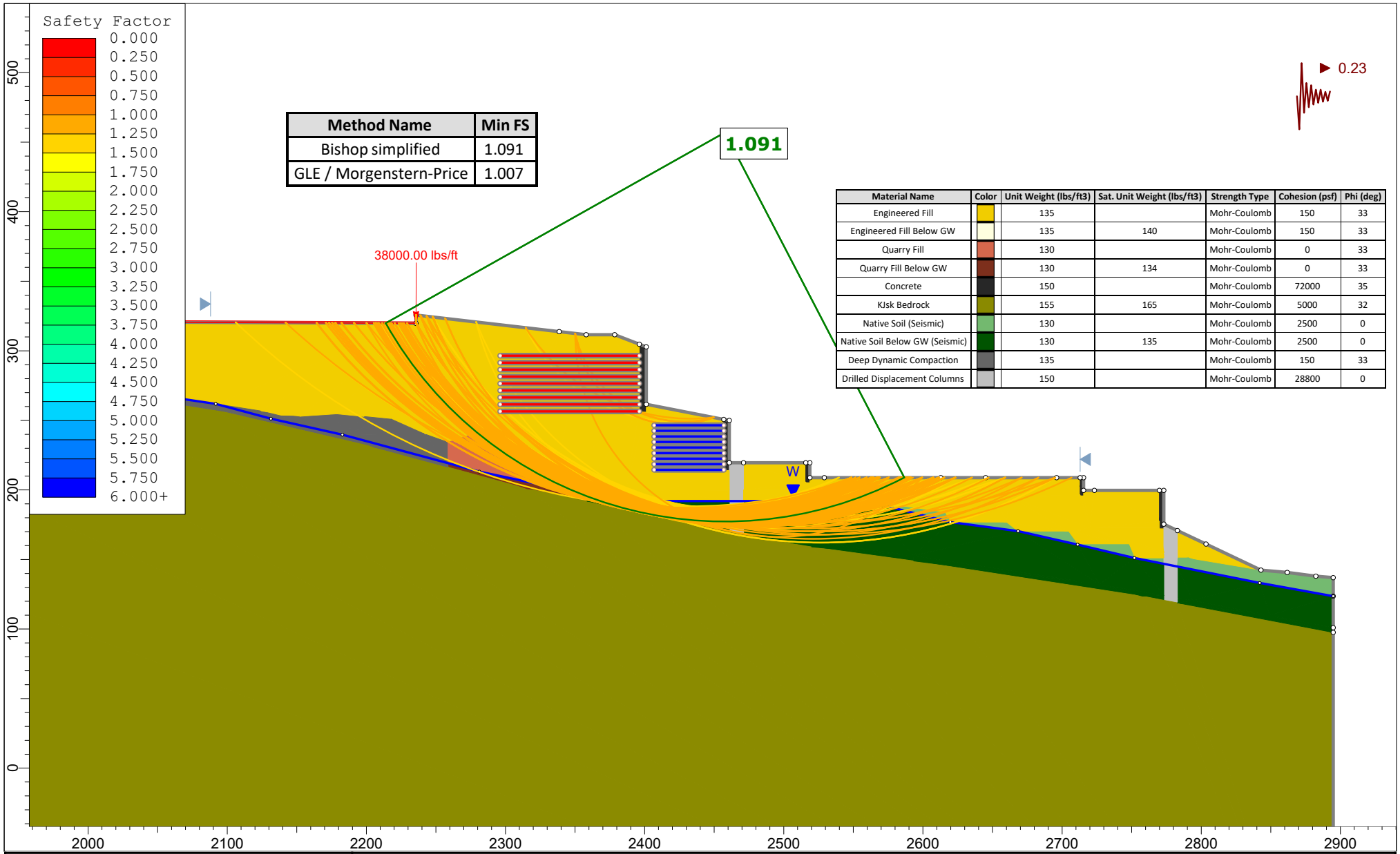
Method Name	Min FS
Bishop simplified	1.091
GLE / Morgenstern-Price	1.007

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Seismic)		130		Mohr-Coulomb	2500	0
Native Soil Below GW (Seismic)		130	135	Mohr-Coulomb	2500	0
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 10	*Scenario*	North-South Walls - Seismic - Lowest FS
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 10



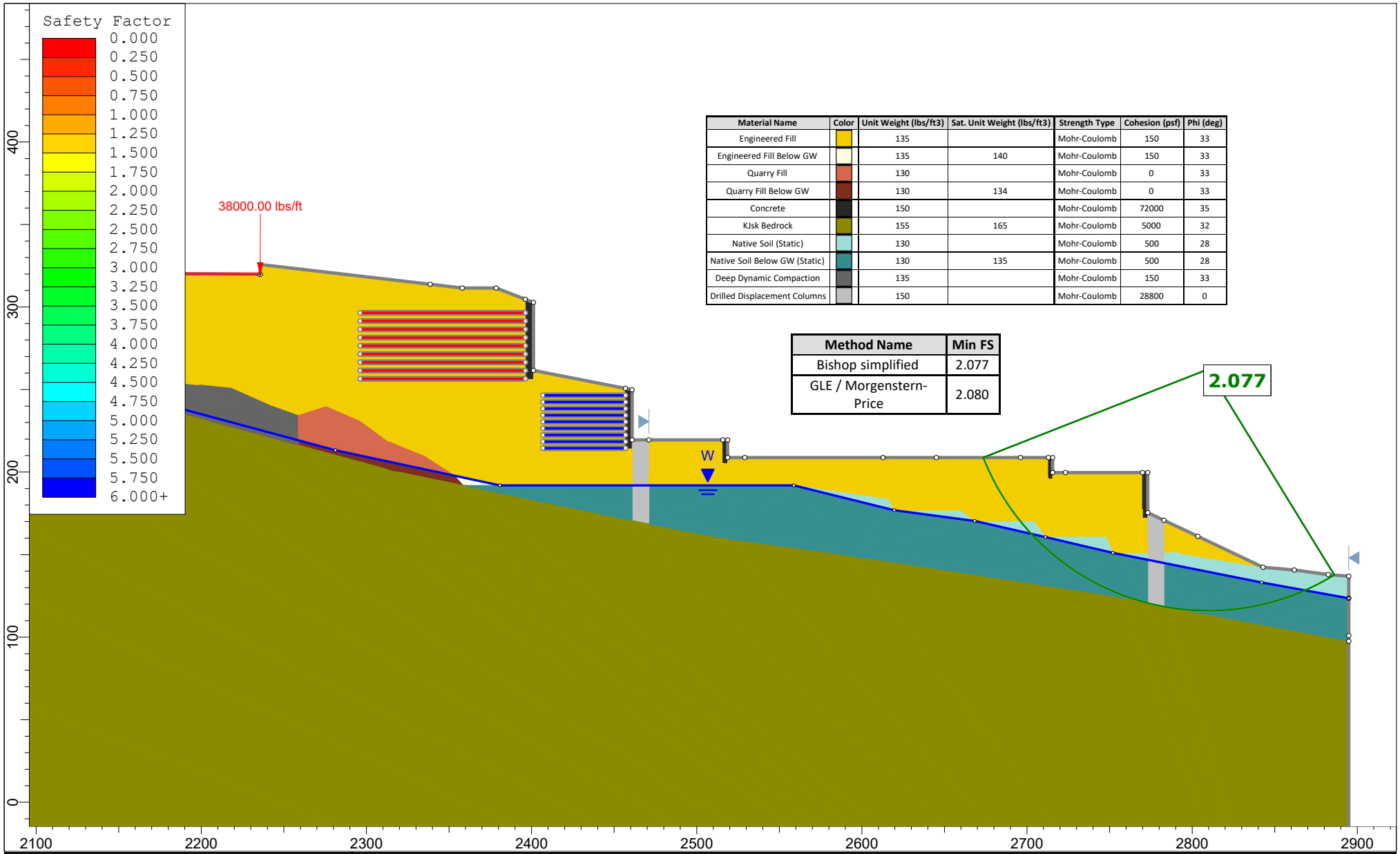
Method Name	Min FS
Bishop simplified	1.091
GLE / Morgenstern-Price	1.007

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Seismic)		130		Mohr-Coulomb	2500	0
Native Soil Below GW (Seismic)		130	135	Mohr-Coulomb	2500	0
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 10	*Scenario*	North-South Walls - Seismic - FS 1.3 and Below
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 10



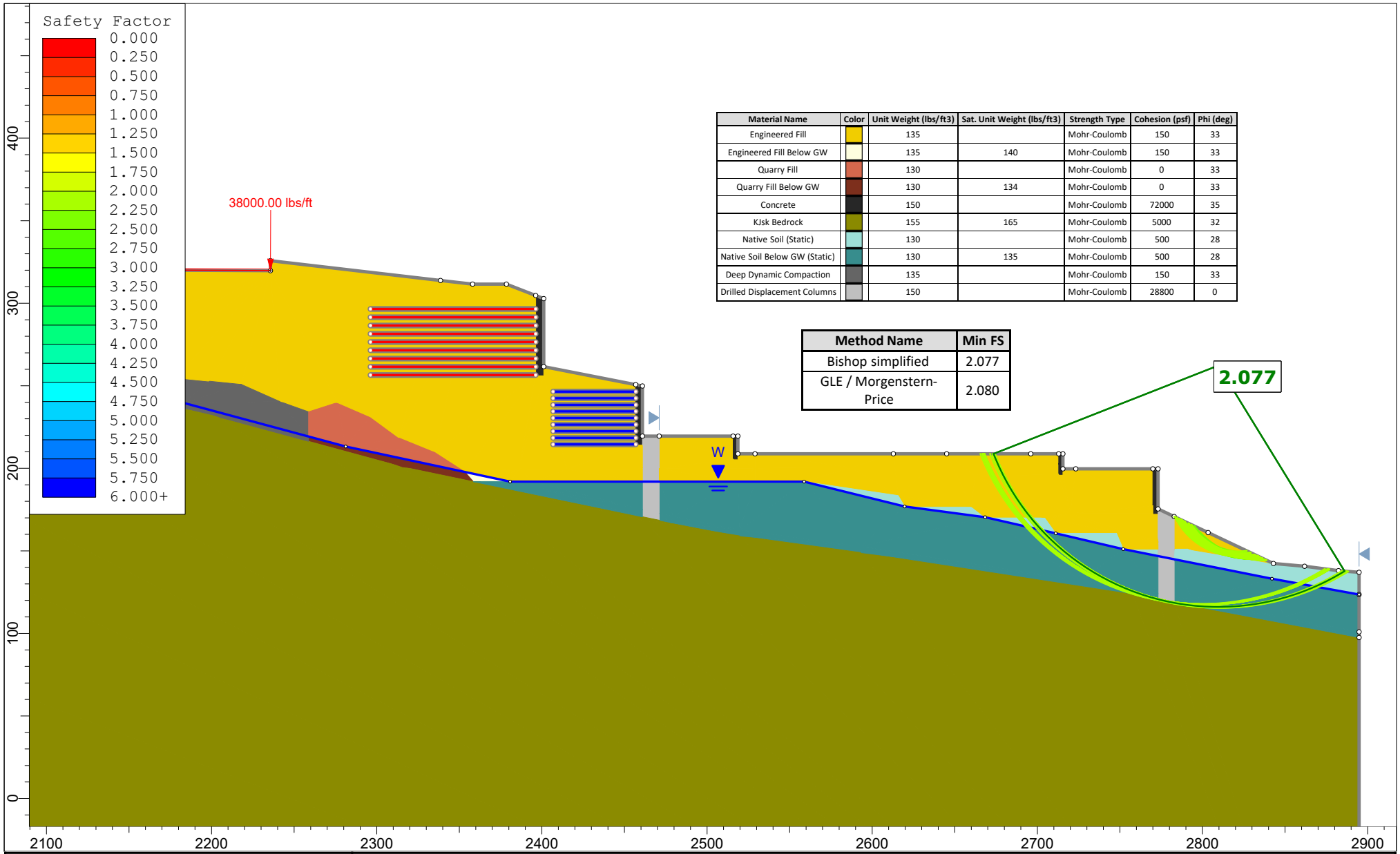
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Static)		130		Mohr-Coulomb	500	28
Native Soil Below GW (Static)		130	135	Mohr-Coulomb	500	28
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0

Method Name	Min FS
Bishop simplified	2.077
GLE / Morgenstern-Price	2.080

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 10	*Scenario*	North-North Walls - Static - Lowest FS
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 10



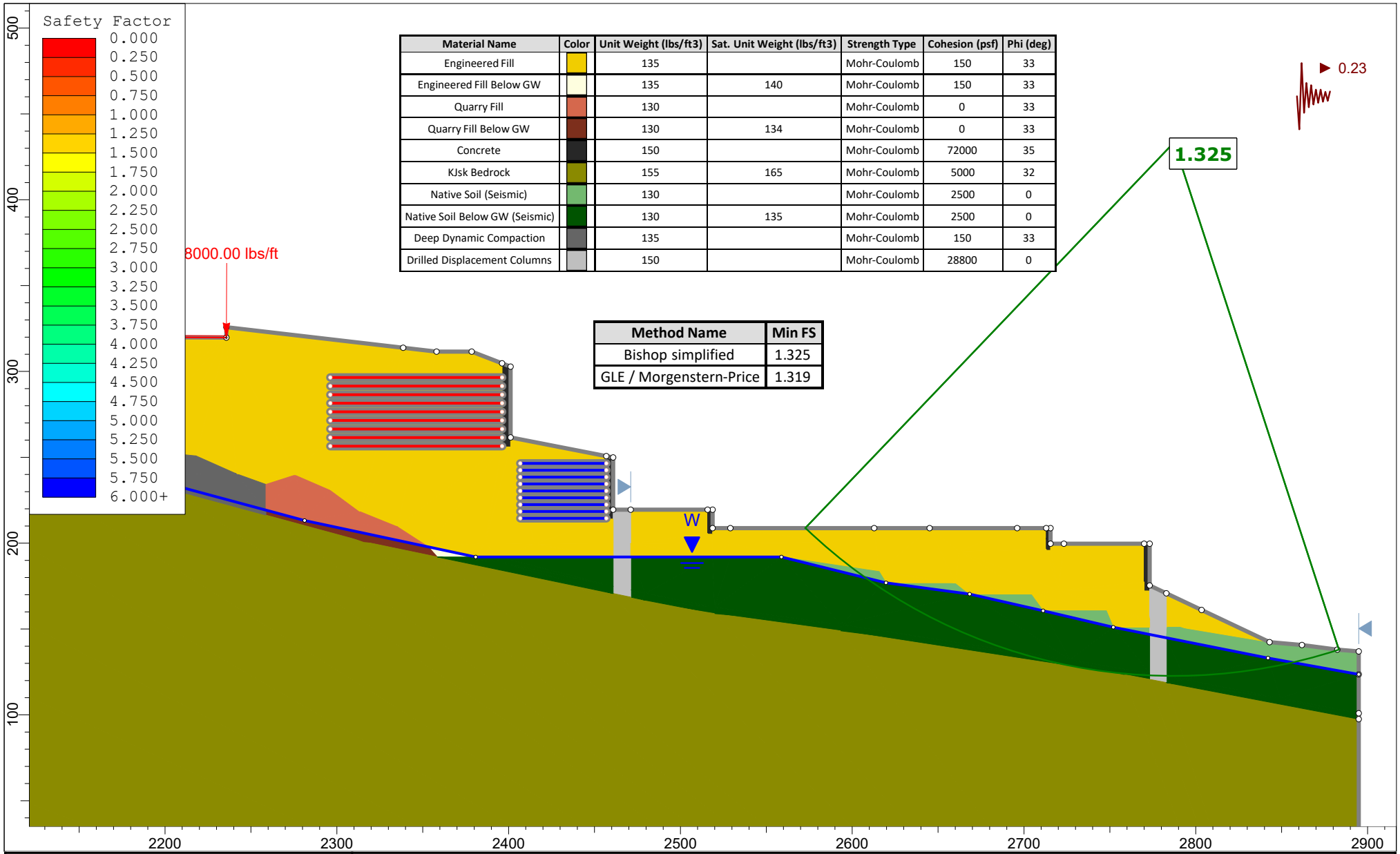
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Static)		130		Mohr-Coulomb	500	28
Native Soil Below GW (Static)		130	135	Mohr-Coulomb	500	28
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0

Method Name	Min FS
Bishop simplified	2.077
GLE / Morgenstern-Price	2.080

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 10	*Scenario*	North-North Walls - Static - FS 2.3 and Below
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 10



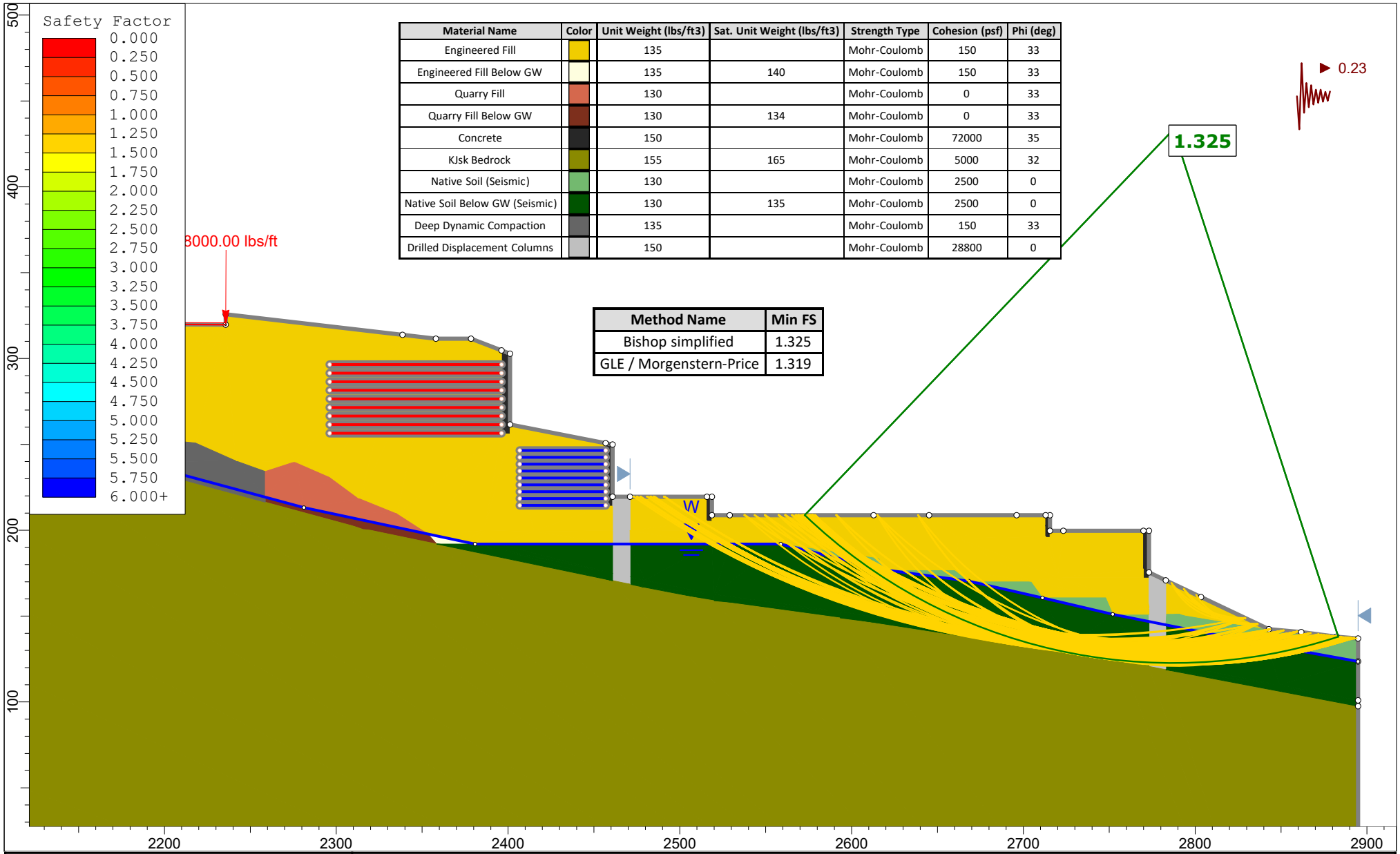
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Seismic)		130		Mohr-Coulomb	2500	0
Native Soil Below GW (Seismic)		130	135	Mohr-Coulomb	2500	0
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0

Method Name	Min FS
Bishop simplified	1.325
GLE / Morgenstern-Price	1.319

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 10	*Scenario*	North-North Walls - Seismic - Lowest FS
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 10



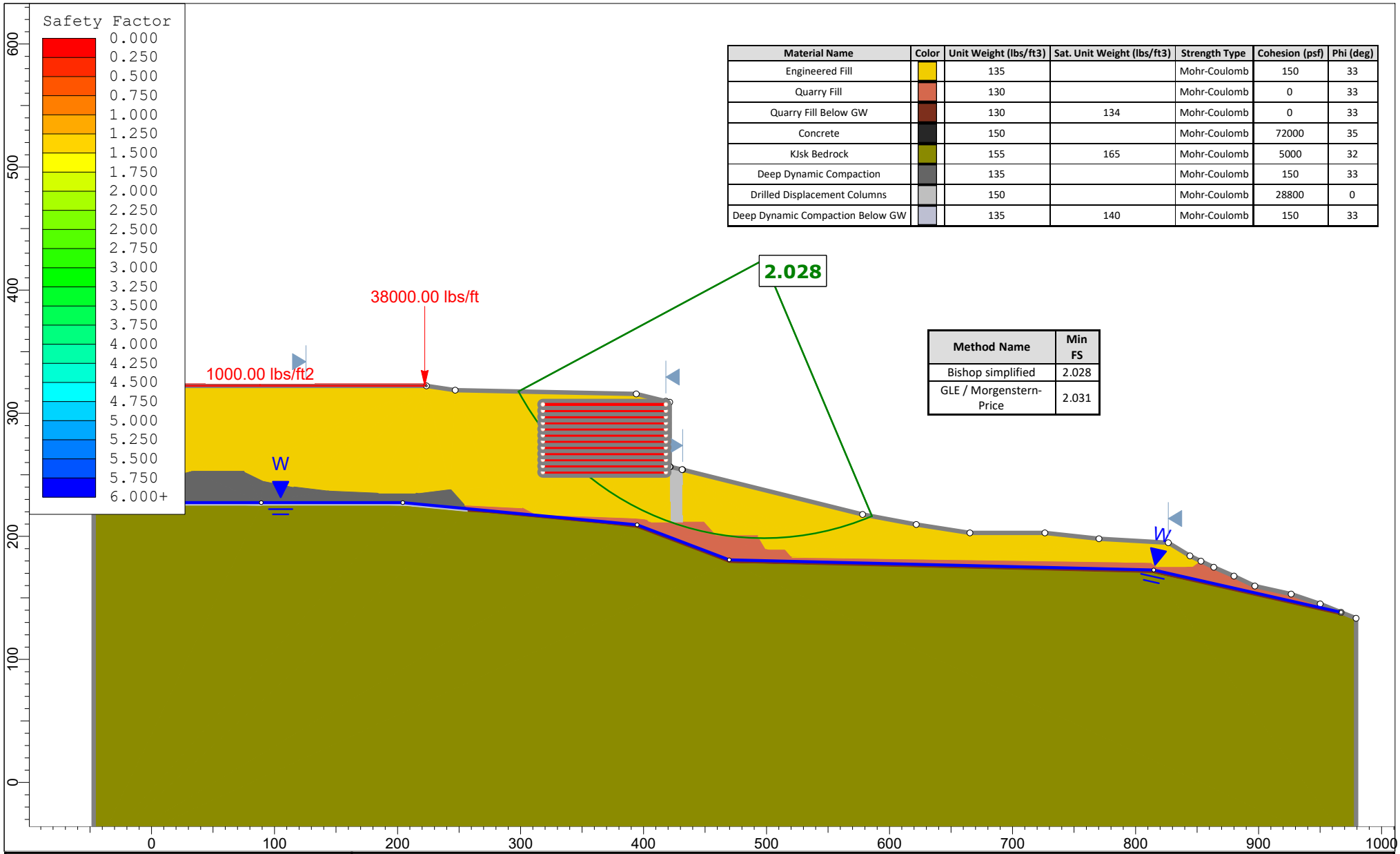
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Seismic)		130		Mohr-Coulomb	2500	0
Native Soil Below GW (Seismic)		130	135	Mohr-Coulomb	2500	0
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0

Method Name	Min FS
Bishop simplified	1.325
GLE / Morgenstern-Price	1.319

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 10	*Scenario*	North-North Walls - Seismic - FS 1.5 and Below
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 10



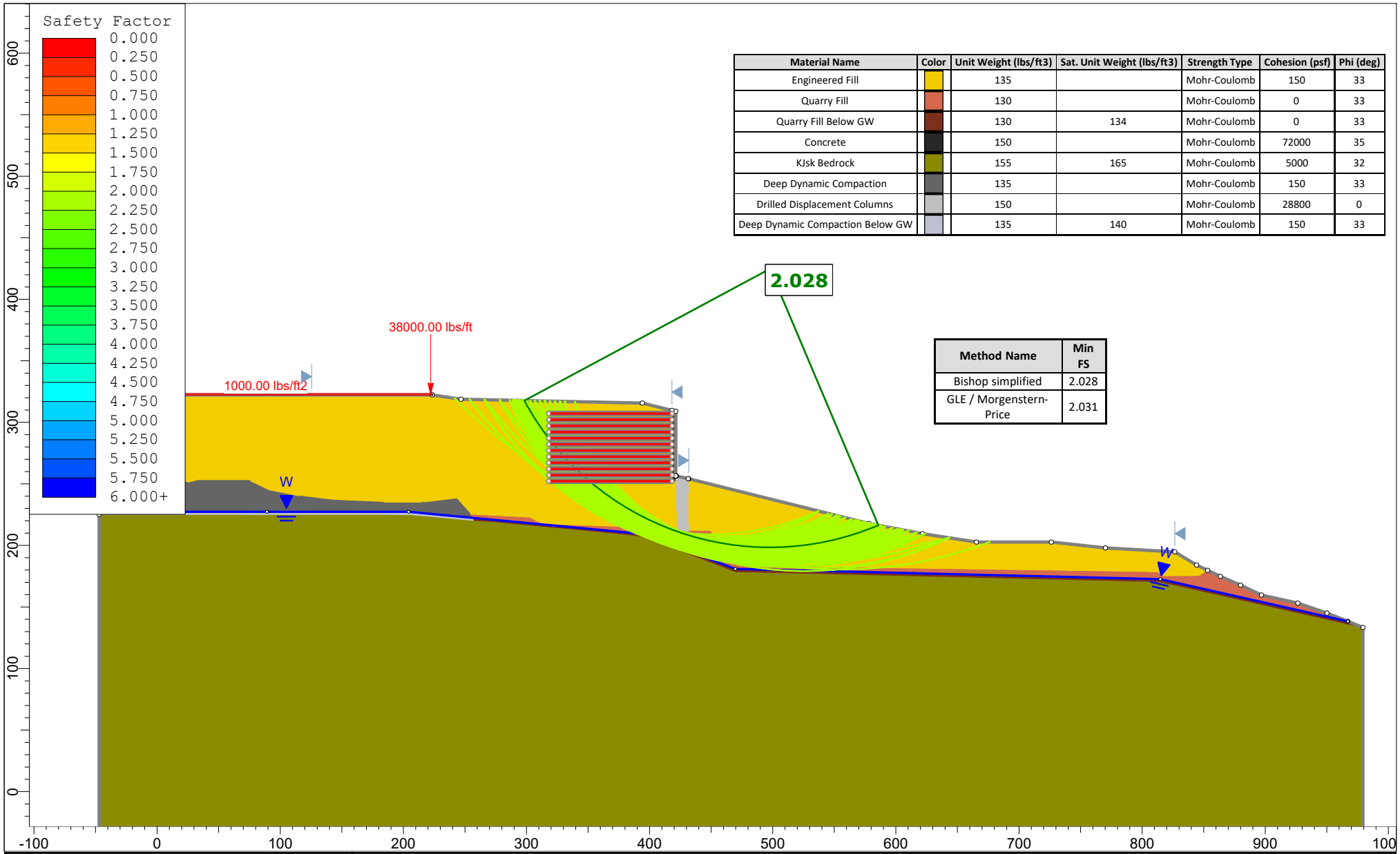
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0
Deep Dynamic Compaction Below GW		135	140	Mohr-Coulomb	150	33

Method Name	Min FS
Bishop simplified	2.028
GLE / Morgenstern-Price	2.031

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 12	*Scenario*	Static - Lowest FS
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 12



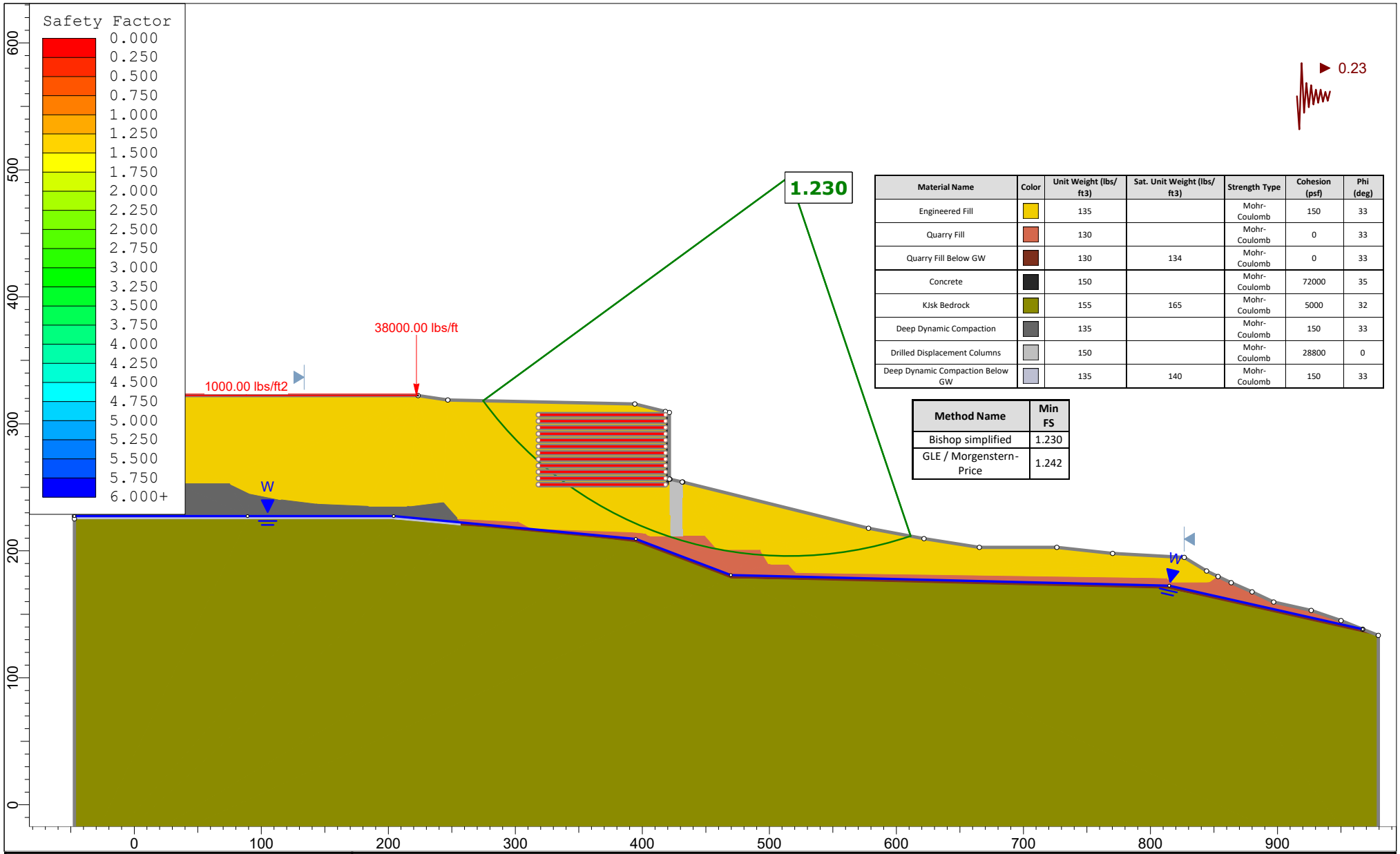
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0
Deep Dynamic Compaction Below GW		135	140	Mohr-Coulomb	150	33

Method Name	Min FS
Bishop simplified	2.028
GLE / Morgenstern-Price	2.031

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 12	*Scenario*	Static - FS 2.2 and Below
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 12



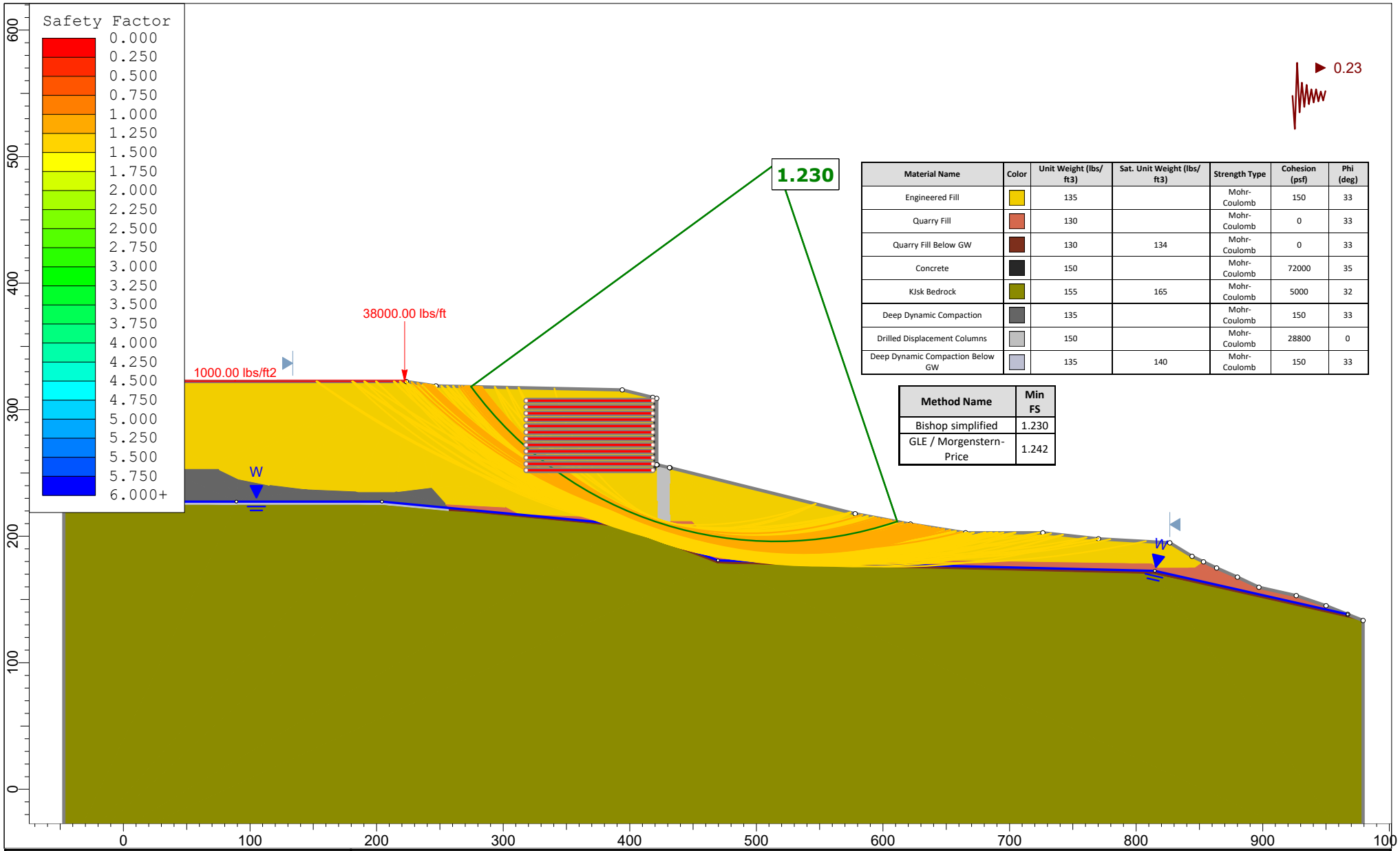
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0
Deep Dynamic Compaction Below GW		135	140	Mohr-Coulomb	150	33

Method Name	Min FS
Bishop simplified	1.230
GLE / Morgenstern-Price	1.242

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 12	*Scenario*	Seismic - Lowest FS
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 12



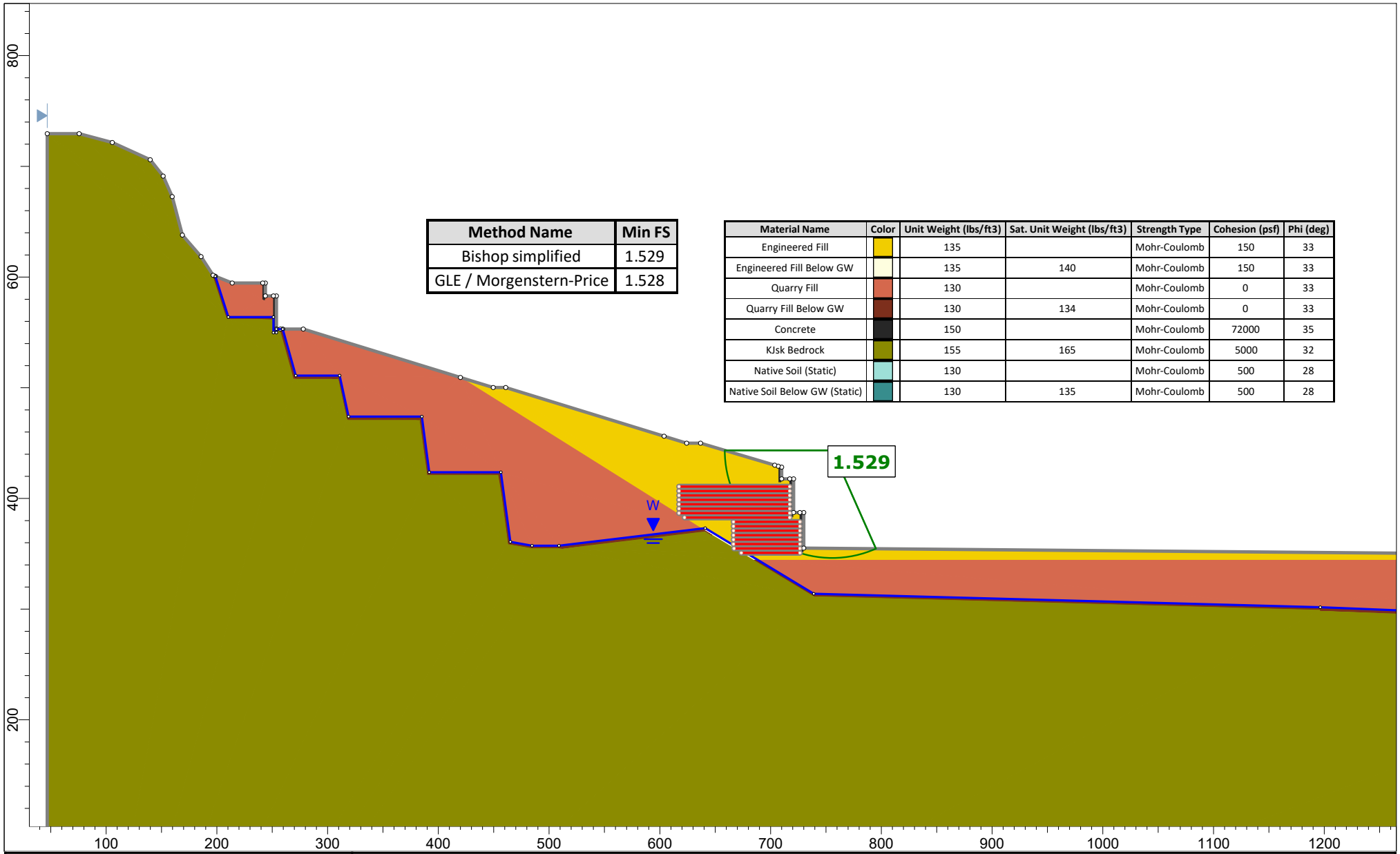
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0
Deep Dynamic Compaction Below GW		135	140	Mohr-Coulomb	150	33

Method Name	Min FS
Bishop simplified	1.230
GLE / Morgenstern-Price	1.242

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 12	*Scenario*	Seismic - FS 1.4 and Below
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 12



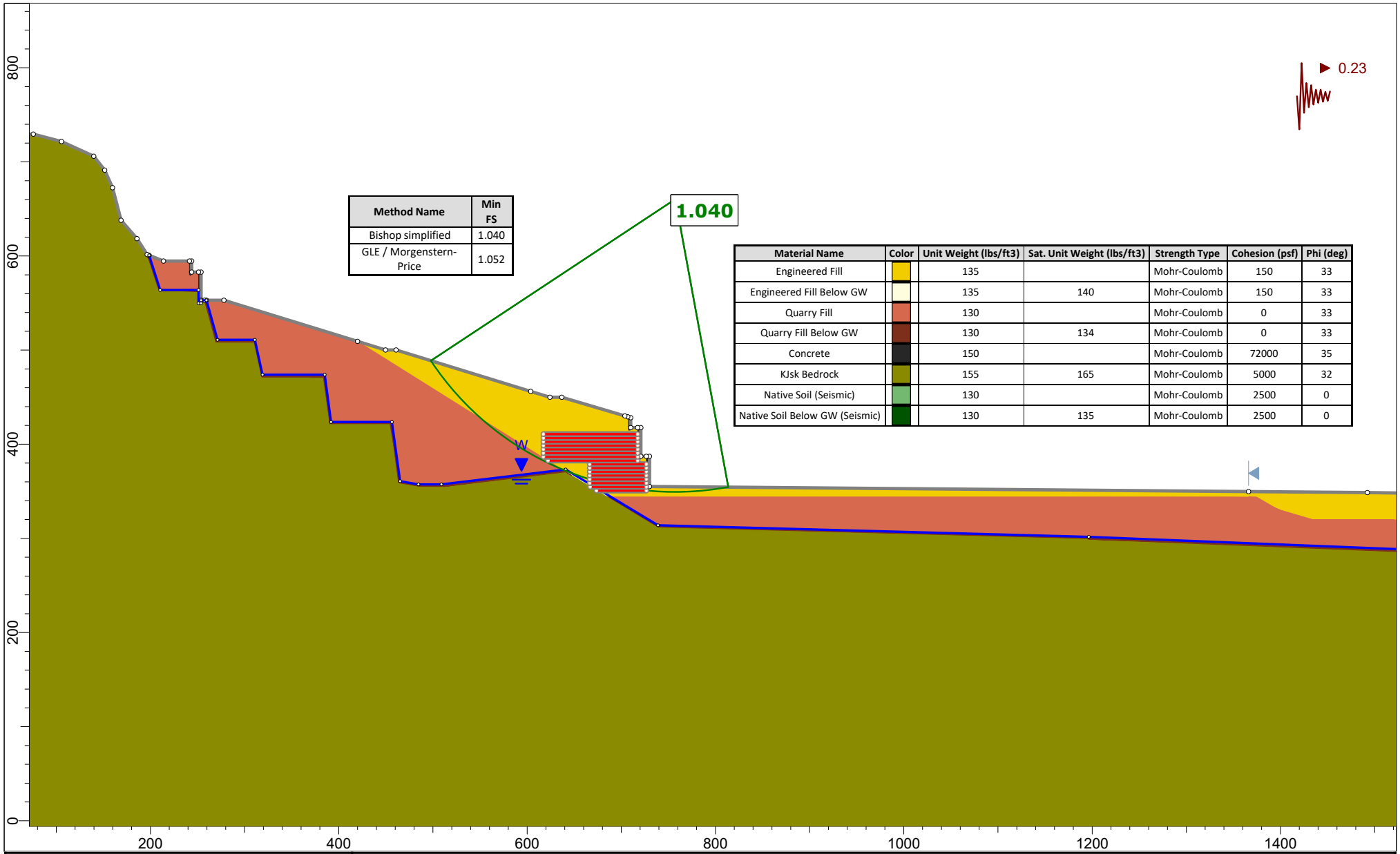
Method Name	Min FS
Bishop simplified	1.529
GLE / Morgenstern-Price	1.528

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Static)		130		Mohr-Coulomb	500	28
Native Soil Below GW (Static)		130	135	Mohr-Coulomb	500	28

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 13	*Scenario*	Static
Drawn By		*Company*	Cornerstone Earth Group
Date	August 2023	*File Name*	582-5-2 Slope Stability Analyses_Section 13



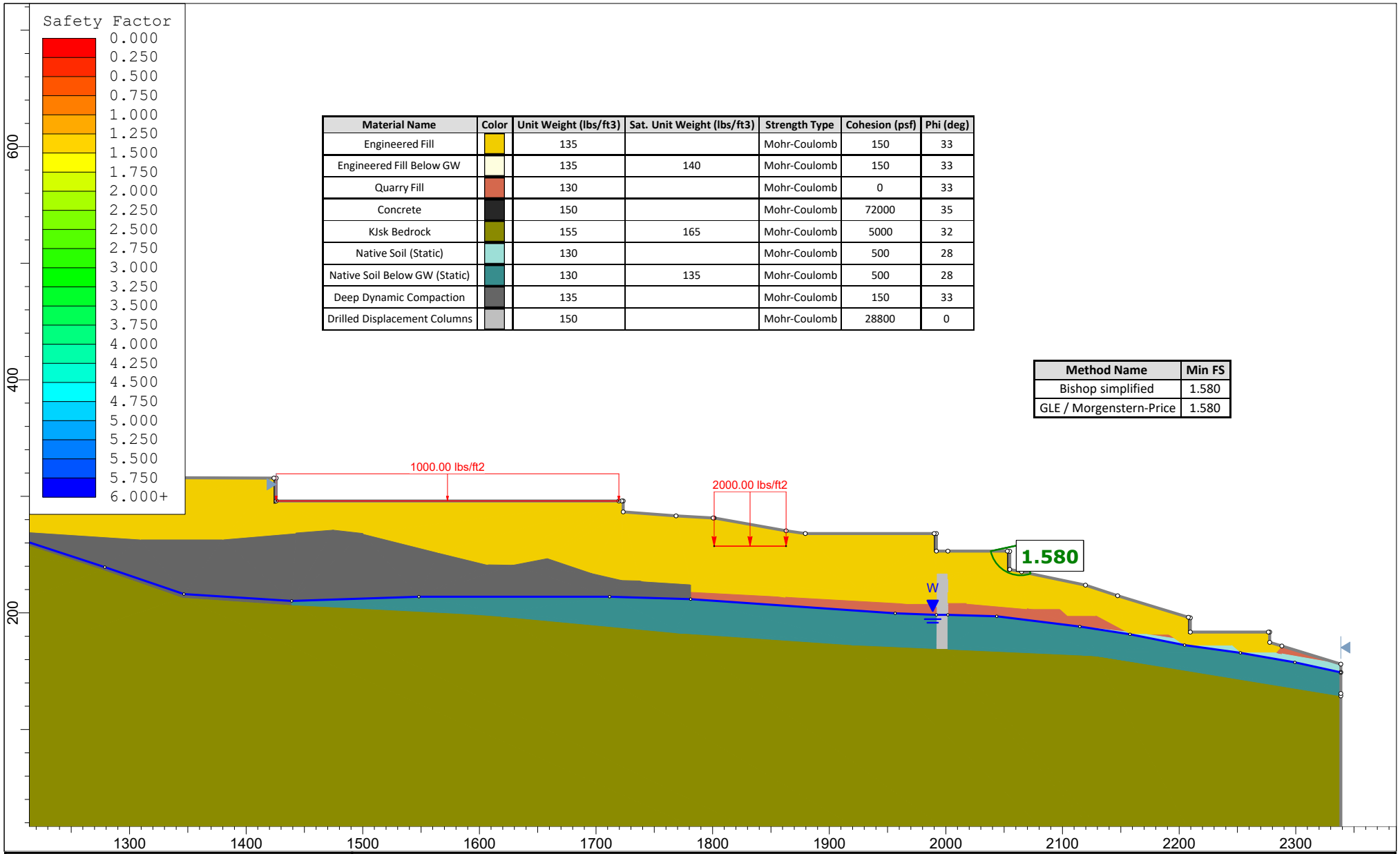
Method Name	Min FS
Bishop simplified	1.040
GLE / Morgenstern-Price	1.052

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Quarry Fill Below GW		130	134	Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Seismic)		130		Mohr-Coulomb	2500	0
Native Soil Below GW (Seismic)		130	135	Mohr-Coulomb	2500	0

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 13	*Scenario*	Seismic
Drawn By		*Company*	Cornerstone Earth Group
Date	August 2023	*File Name*	582-5-2 Slope Stability Analyses_Section 13



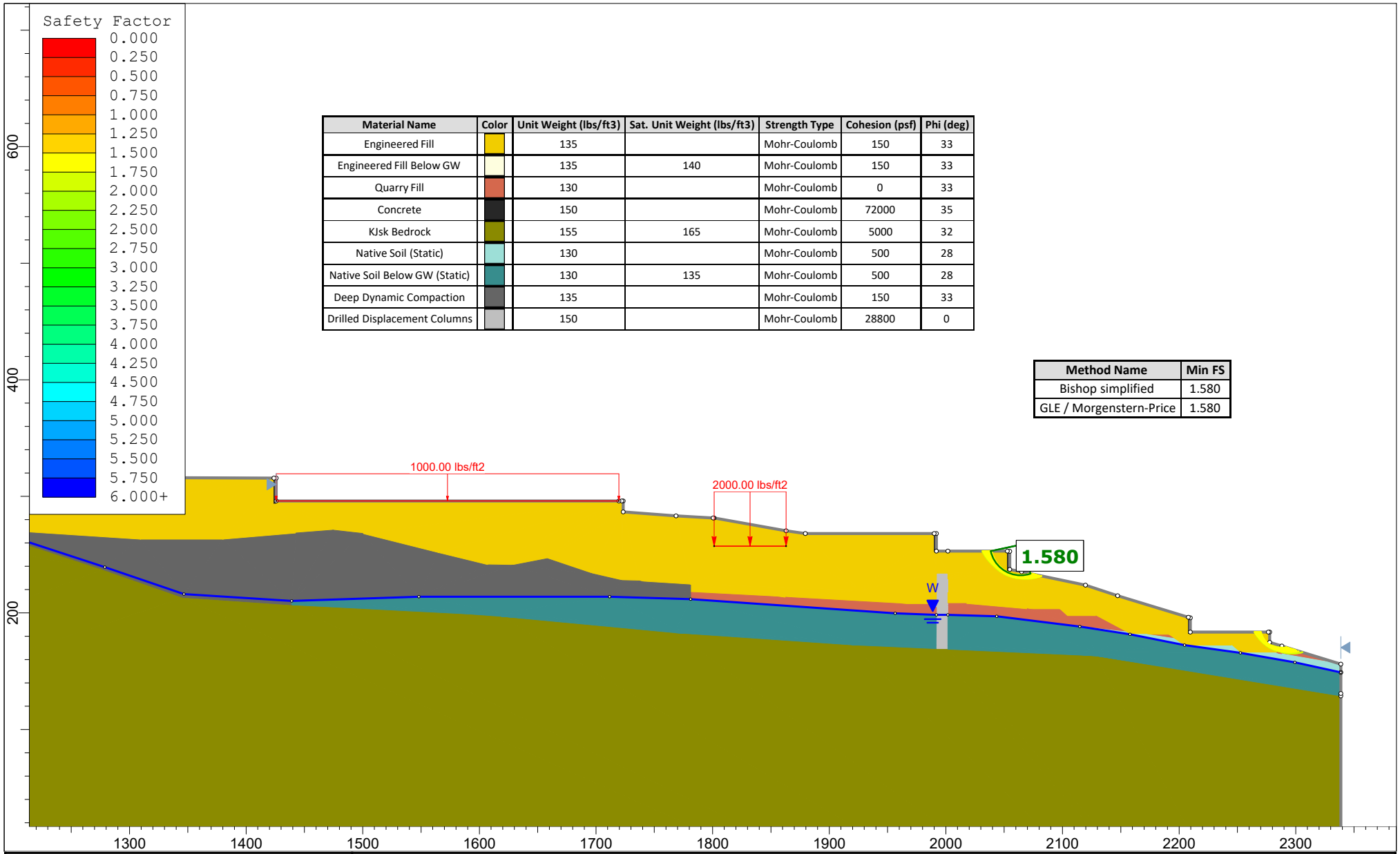
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Static)		130		Mohr-Coulomb	500	28
Native Soil Below GW (Static)		130	135	Mohr-Coulomb	500	28
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0

Method Name	Min FS
Bishop simplified	1.580
GLE / Morgenstern-Price	1.580

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 16	*Scenario*	Static - Lowest FS
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 16



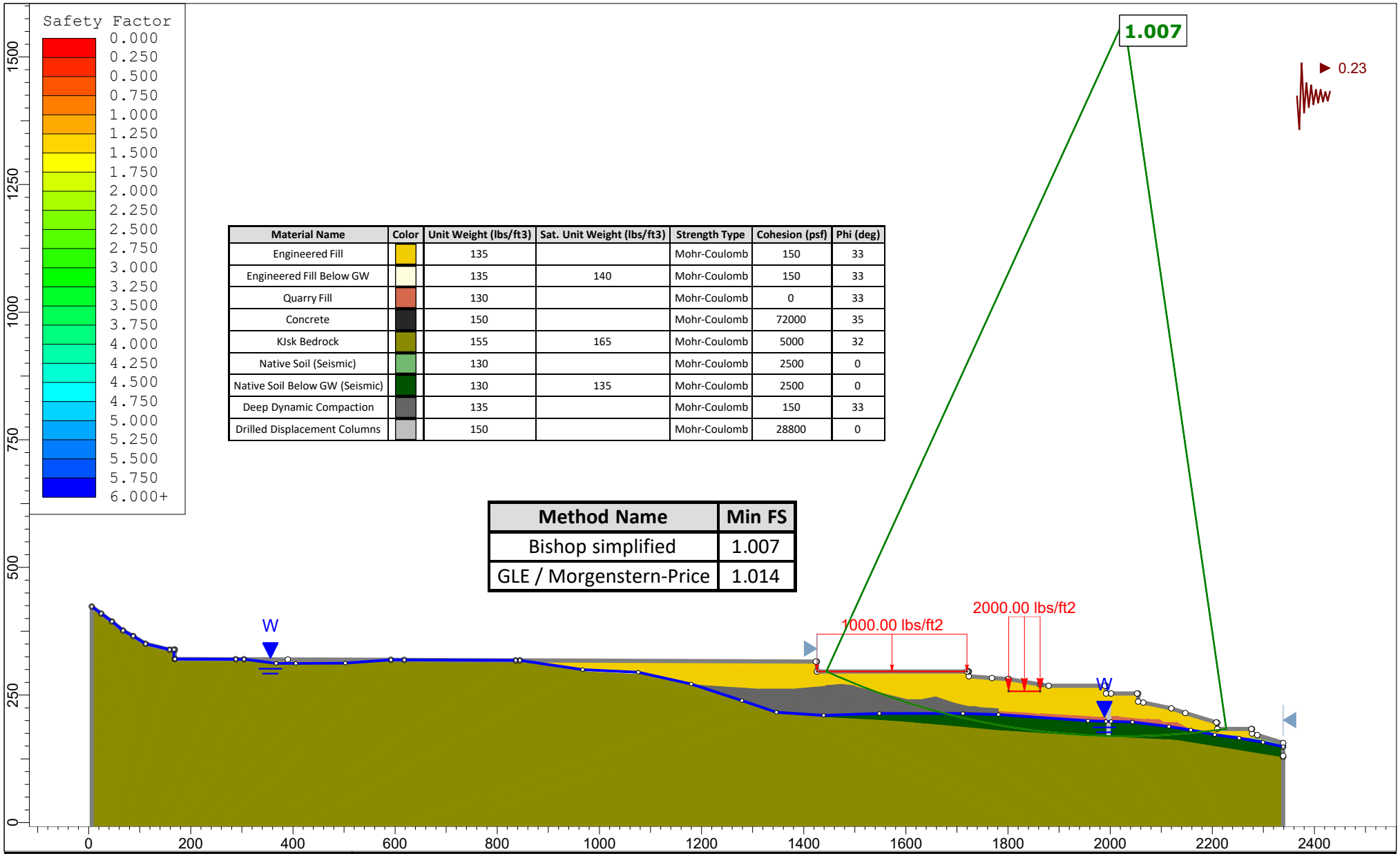
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Static)		130		Mohr-Coulomb	500	28
Native Soil Below GW (Static)		130	135	Mohr-Coulomb	500	28
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0

Method Name	Min FS
Bishop simplified	1.580
GLE / Morgenstern-Price	1.580

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 16	*Scenario*	Static - FS 1.8 and Below
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 16



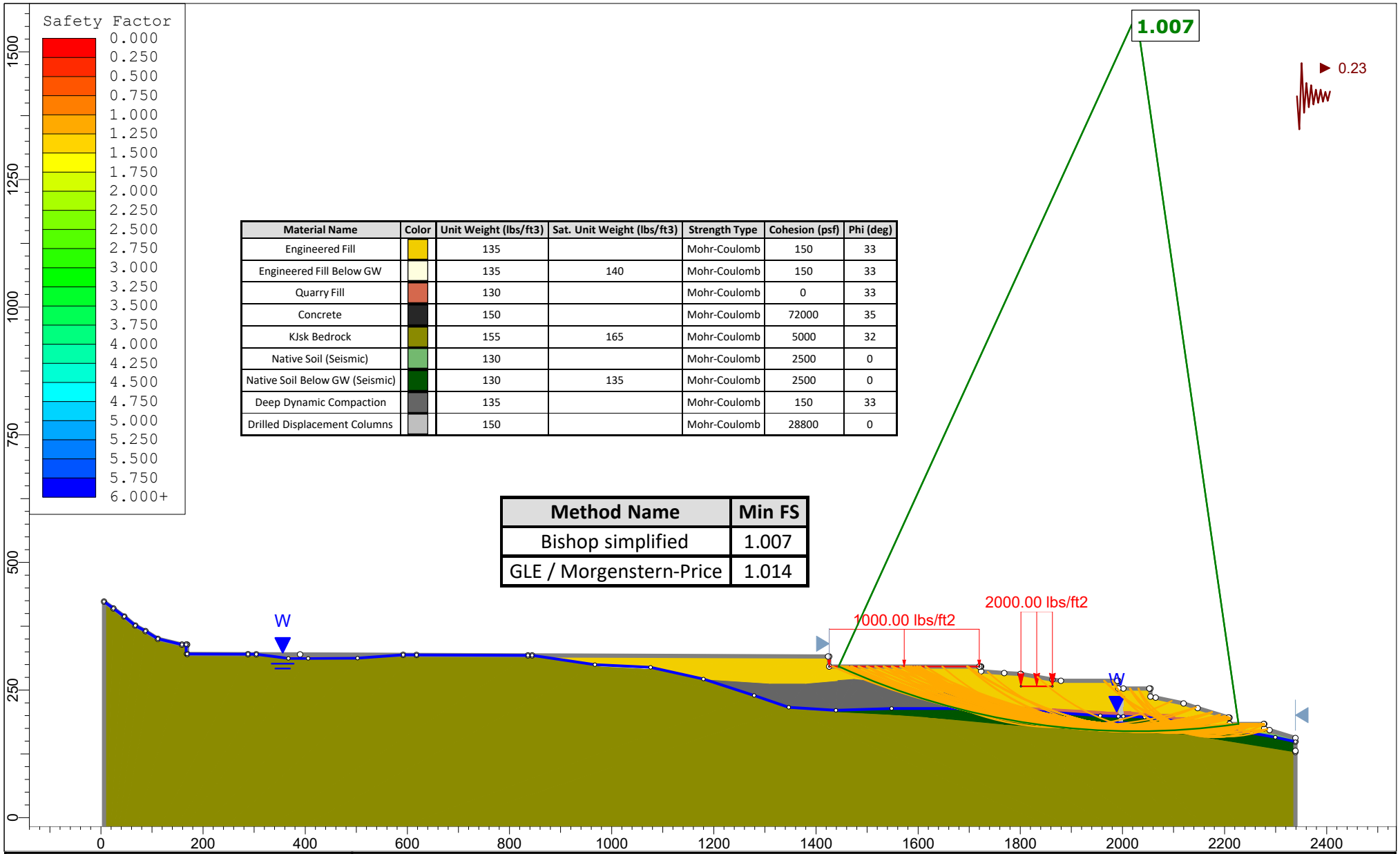
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Seismic)		130		Mohr-Coulomb	2500	0
Native Soil Below GW (Seismic)		130	135	Mohr-Coulomb	2500	0
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0

Method Name	Min FS
Bishop simplified	1.007
GLE / Morgenstern-Price	1.014

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 16	*Scenario*	Seismic - Lowest FS
Drawn By		*Company*	Cornerstone Earth Group
Date	January 2024	*File Name*	582-5-2 Slope Stability Analyses_Section 16



Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Engineered Fill		135		Mohr-Coulomb	150	33
Engineered Fill Below GW		135	140	Mohr-Coulomb	150	33
Quarry Fill		130		Mohr-Coulomb	0	33
Concrete		150		Mohr-Coulomb	72000	35
KJsk Bedrock		155	165	Mohr-Coulomb	5000	32
Native Soil (Seismic)		130		Mohr-Coulomb	2500	0
Native Soil Below GW (Seismic)		130	135	Mohr-Coulomb	2500	0
Deep Dynamic Compaction		135		Mohr-Coulomb	150	33
Drilled Displacement Columns		150		Mohr-Coulomb	28800	0

Method Name	Min FS
Bishop simplified	1.007
GLE / Morgenstern-Price	1.014

rocscience

SLIDEINTERPRET 9.018

Project	Guadalupe Quarry Closure		
Group	Section 16	Scenario	Seismic - FS 1.2 and Below
Drawn By		Company	Cornerstone Earth Group
Date	January 2024	File Name	582-5-2 Slope Stability Analyses_Section 16

APPENDIX F: GROUND MOTION HAZARD ANALYSIS (Detailed Discussion)

The following sections provide a detailed description of our site-specific ground motion hazard analysis and recommended parameters for Site Class D conditions. Our site-specific analysis assumed the engineered fills and native soils that remain in place below the engineered fills would have an average SPT blow count of 25 to 30 with V_{S30} of about 275 m/s (902 ft/s).

Code-Based Seismic Design Parameters

Code-based spectral acceleration parameters were determined based on mapped acceleration response parameters adjusted for the specific site conditions. Mapped Risk-Adjusted Maximum Considered Earthquake (MCE_R) spectral acceleration parameters (S_S and S_1) were determined using the ATC Hazards by Location website (https://hazards.atcouncil.org), see attached to this appendix.

The mapped acceleration parameters were adjusted for local site conditions based on the average soil conditions for the upper 100 feet (30 meters) of the soil profile. Code-based MCE_R spectral response acceleration parameters adjusted for site effects (S_{MS} and S_{M1}) and design spectral response acceleration parameters (S_{DS} and S_{D1}) are presented in Table 1.

In accordance with Section 11.4.8 of ASCE 7-16, structures on Site Class D sites with mapped 1-second period spectral acceleration (S_1) values greater than or equal to 0.2 require a site-specific ground motion hazard analysis be performed in accordance with Section 21.2 of ASCE 7-16. ***Design seismic parameters determined by performing a Ground Motion Hazard Analysis per Section 21.2 of ASCE 7-16 are presented in Table 4. Recommended values in Table 1 should not be used for design unless in the judgement of the structural engineer the exception for Site Class D can be taken in accordance with Section 11.4.8 of ASCE 7-16.*** Values summarized in Table 1 are only used to determine Seismic Design Category and comparison with minimum code requirements for further use in our ground motion hazard analysis (GMHA).

Table 1: 2022 CBC Site Categorization and Site Coefficients

Classification/Coefficient	Design Value
Site Class	D
Site Latitude	37.685592°
Site Longitude	-122.421489°
0.2-second Period Mapped Spectral Acceleration[1], S_S	1.826g
1-second Period Mapped Spectral Acceleration[1], S_1	0.747g
Short-Period Site Coefficient – Fa	1

Table 1 Continues

Table 1: 2022 CBC Site Categorization and Site Coefficients (Continued)

Classification/Coefficient	Design Value
Long-Period Site Coefficient – Fv	null[1]
0.2-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects - S_{MS}	1.826g
1-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects – S_{M1}	null[1]
0.2-second Period, Design Earthquake Spectral Response Acceleration – S_{DS}	1.218g
1-second Period, Design Earthquake Spectral Response Acceleration – S_{D1}	null[1]
Site Amplification Factor at PGA – F_{PGA}	1.1
Site Modified Peak Ground Acceleration – PGA_M	0.865g

(1) See Section 11.4.8 of ASCE 7-16

SITE-SPECIFIC GROUND MOTION HAZARD ANALYSIS

Following Section 11.4.8 of ASCE 7-16, we performed a ground motion hazards analysis (GMHA) in accordance with Chapter 21, Section 21.2 of ASCE 7. We evaluated both Probabilistic MCE_R Ground Motions in accordance with Method 1 and Deterministic MCE_R Ground Motions to generate our recommended design response spectrum for the project.

Our analyses were performed using the USGS interface Unified Hazard Tool (UHT) based on the UCERF 3 Data Set, Building Seismic Safety Council (BSSC) Scenario Catalog 2014 event set (BSSC 2014), and the 2014 National Seismic Hazard Maps – Source Parameters (NSHMP deterministic event set). Additionally, we utilized the USGS program Response Spectra Plotter with combined models (Combined: WUS 2014 (4.1)) and the USGS program Risk-Targeted Ground Motion Calculator.

Our analysis utilized the mean ground motions predicted by four of the Next Generation Attenuation West 2 (NGA-West 2) relationships: Boore-Atkinson (2013), Campbell-Bozorgnia (2013), Chiou-Youngs (2013), and Abrahamson-Silva (2013). Rotation factors (scale factors) were determined as specified in ASCE 7-16 Chapter 21, Section 21.2, to calculate the maximum rotated component of ground motions (ASCE, 2016).

Probabilistic MCE_R

We performed a probabilistic seismic hazard analysis (PSHA) in accordance with ASCE 7-16 Sections 21.2.1 and 21.2.1.2. The probabilistic MCE acceleration response spectrum is defined as the 5 percent damped acceleration response spectrum having a 2 percent probability of exceedance in a 50-year period (2,475-year return period). The probabilistic MCE spectrum was multiplied by Risk Coefficients (C_R) to determine the probabilistic MCE_R. We used Risk Coefficients (C_{RS} and C_{R1}) of 0.897 and 0.883, respectively, based on ASCE 7-16 Section 21.2.1.1 - Method 1 and the ATC website. Risk coefficients for the various periods are presented in Table 2, Column 3.

The resulting probabilistic MCE_R are presented on Figure 1 (red line) attached to this letter. Spectral ordinates are tabulated in Table 2, Column 6.

Deterministic MCE_R

We performed deterministic seismic hazard analyses in accordance with ASCE 7-16 Section 21.2.2 and ASCE 7-16 Supplement No. 1. The deterministic MCE_R acceleration response spectrum is calculated as the largest 84th percentile ground motion in the direction of maximum horizontal response for each period for characteristic earthquakes on all known active faults within the region. The largest deterministic ground motion resulted from a M_w 7.88 earthquake on the San Andreas Fault (SAN+SAP+SAS segments) located at a distance of approximately 6.02 km from the site. For the deterministic spectra we estimated z1.0 and z2.5 parameters of 0.1 km and 1.5 km, respectively, based on our review of geology, anticipated subsurface conditions where Site Class D occurs, and our engineering judgement. For our analysis, we also evaluated the San Gregorio (North) and San Andreas Fault (SAN+SAP+SAS) combined fault segments. The deterministic spectra inputs are attached to this appendix.

In accordance with Supplement No.1 of ASCE 7-16, when the largest spectral response acceleration of the resulting deterministic ground motion response spectrum is less than $1.5F_a$ then the largest 84th percentile rotated response spectrum (Table 2, Column 4) shall be scaled by a single factor such that the maximum response spectral acceleration equals $1.5F_a$. For Site Classes A, B, C and D, F_a is determined using Table 11.4.1 with the value of S_s taken as 1.5; for Site Class E, F_a shall be taken as 1.0. When the largest spectral response acceleration of the probabilistic ground motion response of 21.2.1 is less than $1.2F_a$, the deterministic ground motion response spectrum does not need to be calculated.

As the largest probabilistic spectral response acceleration was determined to be 2.548g, which is greater than $1.2F_a$, where F_a is taken as 1.000 from Table 11.4-1 in ASCE 7-16 Supplement No.1, the 84th percentile rotated response spectrum was calculated as part of the deterministic analyses. The maximum spectral acceleration from the 84th percentile rotated response spectrum was then compared to $1.5F_a$ to determine if a scale factor needed to be applied. The deterministic MCE spectrum is tabulated in Table 2, Column 5.

Site-Specific MCE_R

The site-specific MCE_R is defined by ASCE 7-16 Section 21.2.3 as the lesser of the deterministic and probabilistic MCE_R's at each period. Spectral ordinates for the site-specific MCE_R are tabulated in Table 2, Column 7 and shown graphically on Figure 1 (dashed black line) attached to this appendix.

Table 2: Development of Site-Specific MCE_R Spectrum

Period (seconds)	CBC General Spectrum (g)	Risk Coefficient	Det. 84th Percentile Rotated	Deterministic MCE_R (g)	Probabilistic MCE_R (g)	Site-Specific MCE_R (g)
0.000	0.487	0.897	1.010	1.010	0.927	0.927
0.050	0.665	0.897	1.067	1.067	1.199	1.067
0.100	0.844	0.897	1.531	1.531	1.472	1.472
0.150	1.023	0.897	1.873	1.873	1.718	1.718
0.200	1.201	0.897	2.043	2.043	1.965	1.965
0.205	1.217	0.897	2.056	2.056	1.984	1.984
0.250	1.217	0.896	2.173	2.173	2.157	2.157
0.300	1.217	0.895	2.227	2.227	2.352	2.227
0.400	1.217	0.894	2.289	2.289	2.450	2.289
0.500	1.217	0.892	2.270	2.270	2.548	2.270
0.750	1.217	0.887	1.902	1.902	2.314	1.902
1.000	1.217	0.883	1.585	1.585	2.096	1.585
1.023	1.217	0.883	1.568	1.568	2.079	1.568
2.000	0.623	0.883	0.874	0.874	1.344	0.874
3.000	0.415	0.883	0.627	0.627	0.985	0.627
4.000	0.311	0.883	0.473	0.473	0.755	0.473
5.000	0.249	0.883	0.384	0.384	0.601	0.384

Design Response Spectrum

The Design Response Spectrum (DRS) is defined in ASCE 7-16 Section 21.3 as:

- two-thirds of the site-specific MCE_R, but
- not less than 80% of the general design response spectrum

Spectral accelerations corresponding to two-thirds of the MCE_R are tabulated in Table 3, Column 2. Ordinates corresponding to 80% of the general Site Class D response spectrum are tabulated below in Table 3, Column 3. Ordinates of the site-specific DRS are tabulated in Table 3, Column 4. Development of the site-specific DRS is presented graphically on Figure 2 (dashed black line) attached to this appendix.

Table 3: Development of Site-Specific Design Response Spectrum

Period (seconds)	2/3 Site-Specific MCE_R (g)	80% CBC General Spectrum (g)	Design Response Spectrum (g)
0.000	0.618	0.390	0.618
0.050	0.711	0.532	0.711
0.100	0.981	0.675	0.981
0.150	1.146	0.818	1.146
0.200	1.310	0.961	1.310
0.205	1.323	0.974	1.323
0.250	1.438	0.974	1.438
0.300	1.485	0.974	1.485
0.400	1.526	0.974	1.526
0.500	1.513	0.974	1.513
0.750	1.268	0.974	1.268
1.000	1.056	0.974	1.056
1.023	1.046	0.974	1.046
2.000	0.583	0.498	0.583
3.000	0.418	0.332	0.418
4.000	0.315	0.249	0.315
5.000	0.256	0.199	0.256

DESIGN ACCELERATION PARAMETERS

Design acceleration parameters (S_{DS} and S_{D1}) were determined in accordance with Section 21.4 of ASCE 7-16. S_{DS} is defined as the design spectral acceleration at 90% of the maximum spectral acceleration, S_a, obtained from the site-specific spectrum, at any period within the range from 0.2 to 5 seconds, inclusive. S_{D1} is defined as the maximum value of the product, TS_a, for periods from 1 to 2 seconds for sites with vs,30 > 1,200 ft/s ($v_{s,30}$ > 365.76 m/s) and for periods from 1 to 5 seconds for sites with vs,30 ≤ 1,200 ft/s ($v_{s,30}$ ≤365.76 m/s).

Site-specific MCE_R spectral response acceleration parameters (S_{MS} and S_{M1}) are calculated as:

- 1.5 times the S_{DS} and S_{D1} values, respectively, but
- not less than 80% of the code-based values presented in Table 1.

Recommended design acceleration parameters are summarized in Table 4.

When using the Equivalent Lateral Force Procedure, ASCE 7-16 Section 21.4 allows using the spectral acceleration at any period (T) in lieu of S_{D1}/T in Eq. 12.8-3 and $S_{D1}T_L/T_2$ in Eq. 12.8-4.

The site-specific spectral acceleration at any period may be calculated by interpolation of the spectral ordinates in Table 3, Column 4.

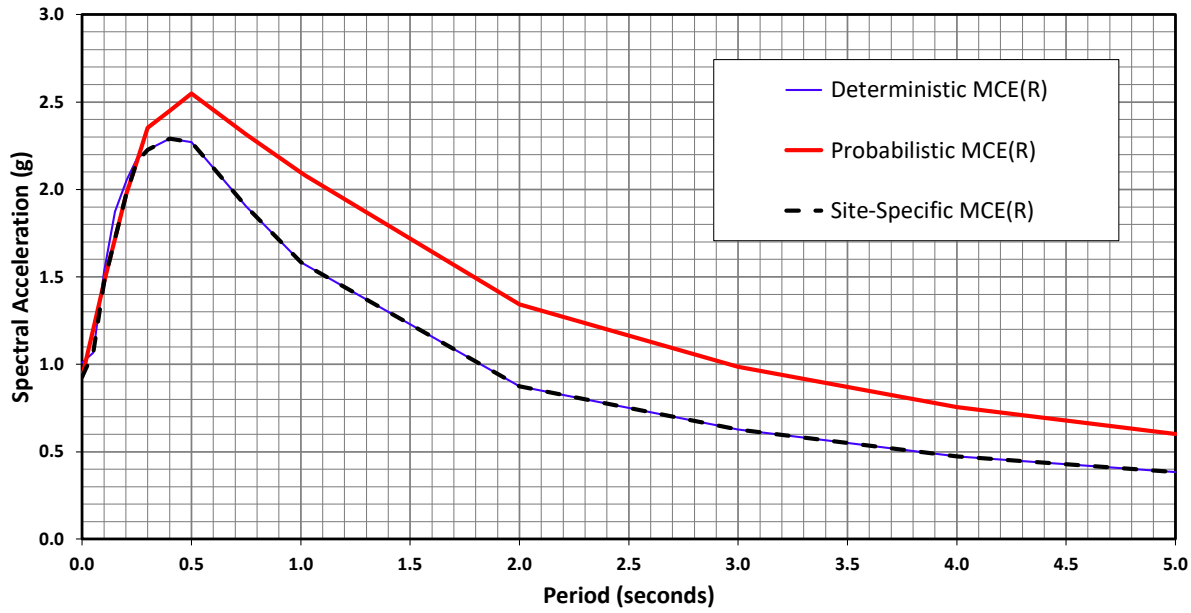
Table 4: Site-Specific Design Acceleration Parameters

Parameter	Value
S_{DS}	1.373
S_{D1}	1.279
S_{MS}	2.060
S_{M1}	1.918

SITE-SPECIFIC MCE_G PEAK GROUND ACCELERATION

We calculated the Site-Specific MCE_G Peak Ground Acceleration (PGA_M) in accordance with ASCE 7-16 Section 21.5. The Site-Specific PGA_M is calculated as the lesser of probabilistic and deterministic geometric mean PGA. The 2% in 50-year probabilistic geometric mean PGA is 0.939g. The deterministic PGA is considered the greater of the largest 84th percentile deterministic geometric mean PGA (0.919g) or one-half of the tabulated F_{PGA} value from ASCE 7-16 Table 11.8.1 with the value of PGA taken as 0.5g. For the site, F_{PGA} is 1.100 and one-half of the F_{PGA} is 0.55g; therefore, the deterministic PGA is 0.919g. Additionally, the Site-Specific PGA_M may not be less than 80% of the mapped PGA_M determined from ASCE 7-16 Equation 11.8-1. The mapped PGA_M for the site is 0.865g; 80% of PGA_M is 0.692g.

Based on the above, the recommended Site-Specific PGA_M for the site is 0.919g.



The Site-Specific Maximum Considered Earthquake (MCE_R) is defined as the lesser of the following at all periods:

- Deterministic MCE_R – maximum 84th percentile deterministic, or
- Probabilistic MCE_R – defined as the 2,475–year ground motion.

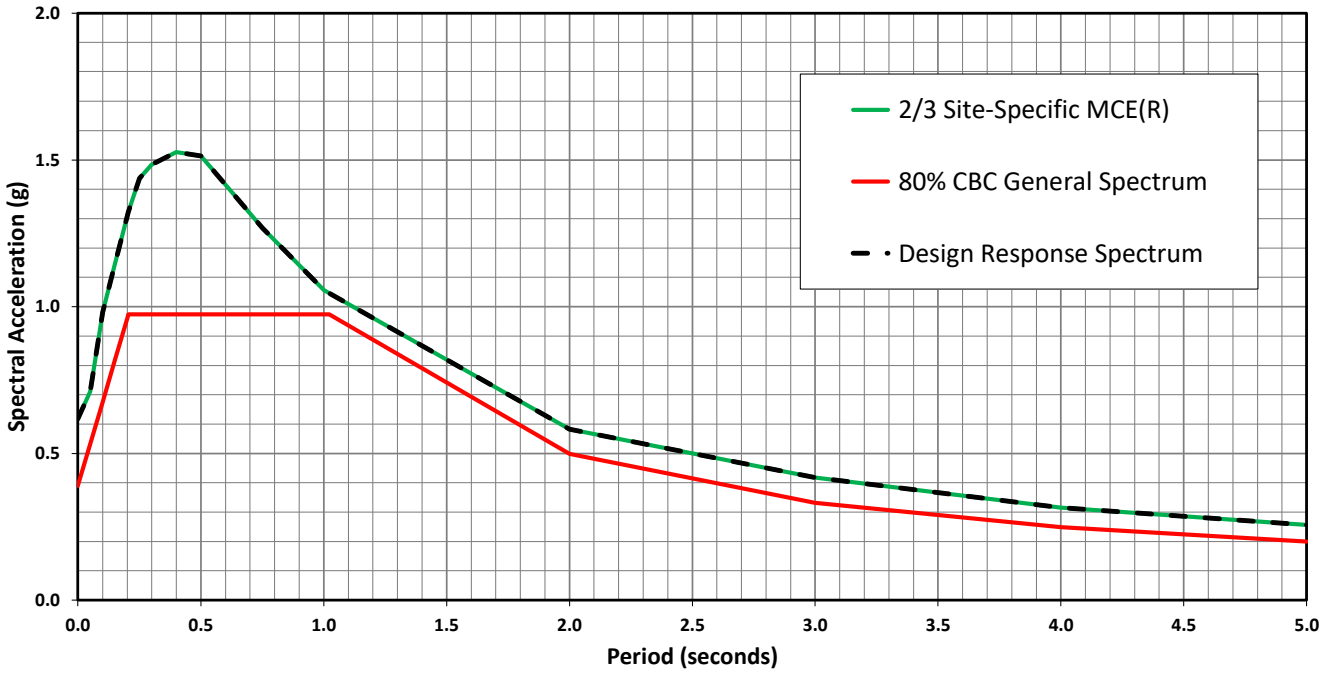
Site-Specific MCE_R	
Period (Seconds)	Spectral Acceleration (g)
0.00	0.927
0.05	1.067
0.10	1.472
0.15	1.718
0.20	1.965
0.21	1.984
0.25	2.157
0.30	2.227
0.40	2.289
0.50	2.270
0.75	1.902
1.00	1.585
1.02	1.568
2.00	0.874
3.00	0.627
4.00	0.473
5.00	0.384

References:

ASCE/SEI 7-16: Minimum Design Loads and Associated Criteria for Buildings and Other Strutures with Supplement No. 1.
2022 California Building Code, Title 24, Part 2, Volume 2

CORNERSTONE EARTH GROUP

MCE_R RESPONSE SPECTRA	FIGURE 1
Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA	PROJECT NO. 582-5-2
	January 11, 2024 / JRD/MJS



The Site-Specific Design Response Spectrum per Section 21.2, 21.3 and 21.4 of ASCE 7-16 is defined as the greater of the following at all periods:

- 2/3 of the Site-Specific MCE_R, or
- 80% of the CBC General Spectrum.

Design Response Spectra	
Period (Seconds)	Spectral Acceleration (g)
0.00	0.618
0.05	0.711
0.10	0.981
0.15	1.146
0.20	1.310
0.21	1.323
0.25	1.438
0.30	1.485
0.40	1.526
0.50	1.513
0.75	1.268
1.00	1.056
1.02	1.046
2.00	0.583
3.00	0.418
4.00	0.315
5.00	0.256

Site Design	Design Values
Site Class (Per Chapter 20 ASCE 7-16)	D
Shear Wave Velocity, V_{S30} (m/sec)	275
Site Latitude (degrees)	37.685592
Site Longitude (degrees)	-122.421489
Risk Category	II
Building Period (sec)	Unknown
Importance Factor, I_e	1
[1]Site Specific PGA_M (g)	0.92

[1] Lower of Deterministic and Probabilistic, but not less than 80% of mapped value of FM x PGA, determined in accordance with Section 21.5 of ASCE 7-16.

Design Acceleration Parameters[1]	
S_{DS}	1.373
S_{D1}	1.279
S_{MS}	2.060
S_{M1}	1.918

References:

ASCE/SEI 7-16: Minimum Design Loads and Associated Criteria for Buildings and Other Strutures with Supplement No. 1.
2022 California Building Code, Title 24, Part 2, Volume 2

CORNERSTONE EARTH GROUP

DESIGN RESPONSE SPECTRA	FIGURE 2	
Guadalupe Quarry Closure, Annexation and Redevelopment Brisbane, CA	PROJECT NO. 582-5-2	
	January 11, 2024	JRD/MJS

Hazards by Location

Search Information

Coordinates:	37.685592, -122.421489
Elevation:	320 ft
Timestamp:	2022-05-04T22:22:19.061Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	II
Site Class:	D

Basic Parameters

Name	Value	Description
S_S	1.826	MCE_R ground motion (period=0.2s)
S_1	0.747	MCE_R ground motion (period=1.0s)
S_{MS}	1.826	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.218	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.897	Coefficient of risk (0.2s)
CR_1	0.883	Coefficient of risk (1.0s)
PGA	0.786	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.865	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	2.188	Probabilistic risk-targeted ground motion (0.2s)
SsUH	2.44	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.826	Factored deterministic acceleration value (0.2s)
S1RT	0.903	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.022	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.747	Factored deterministic acceleration value (1.0s)
PGAd	0.786	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the report.

U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Please also see the new USGS Earthquake Hazard Toolbox for access to the most recent NSHMs for the conterminous U.S. and Hawaii.

Input

Edition

Dynamic: Conterminous U.S. 2014 (u…

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

37.685592

Time Horizon

Return period in years

2475

Longitude

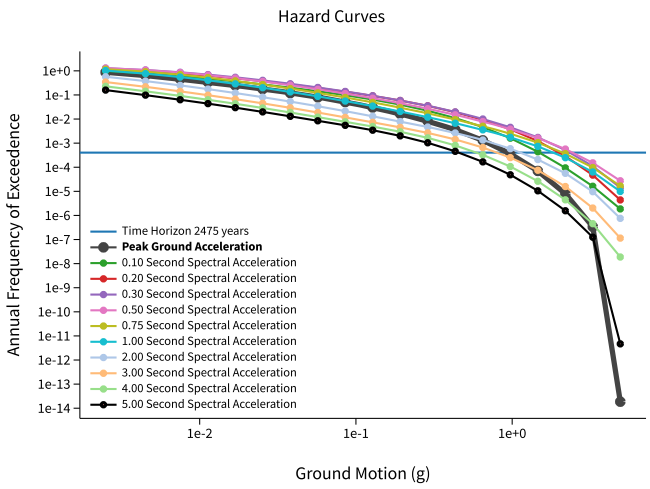
Decimal degrees, negative values for western longitudes

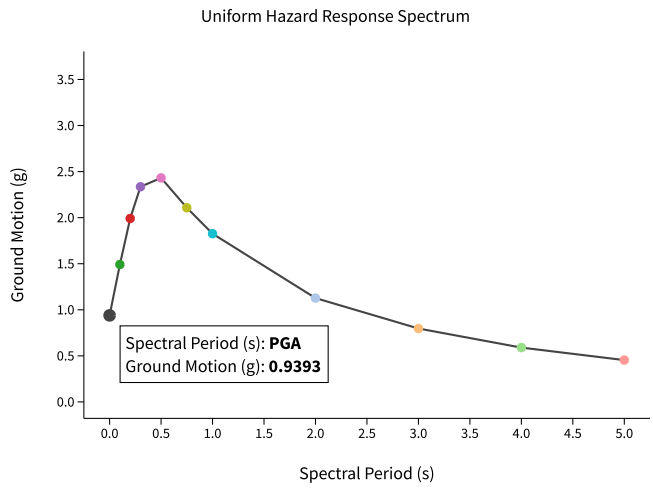
-122.421489

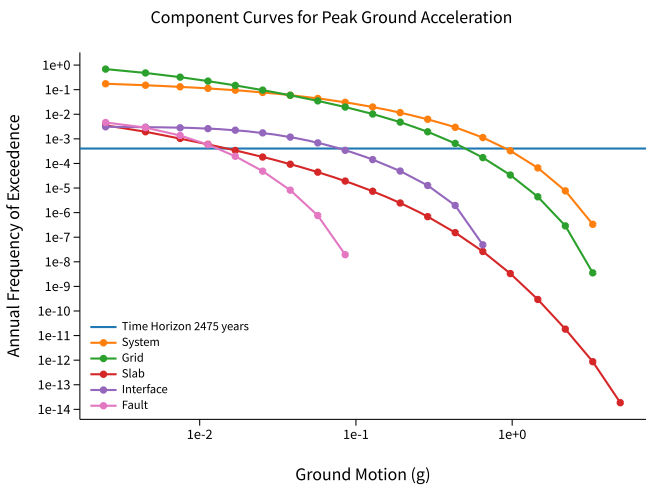
Site Class

259 m/s (Site class D)

Hazard Curve





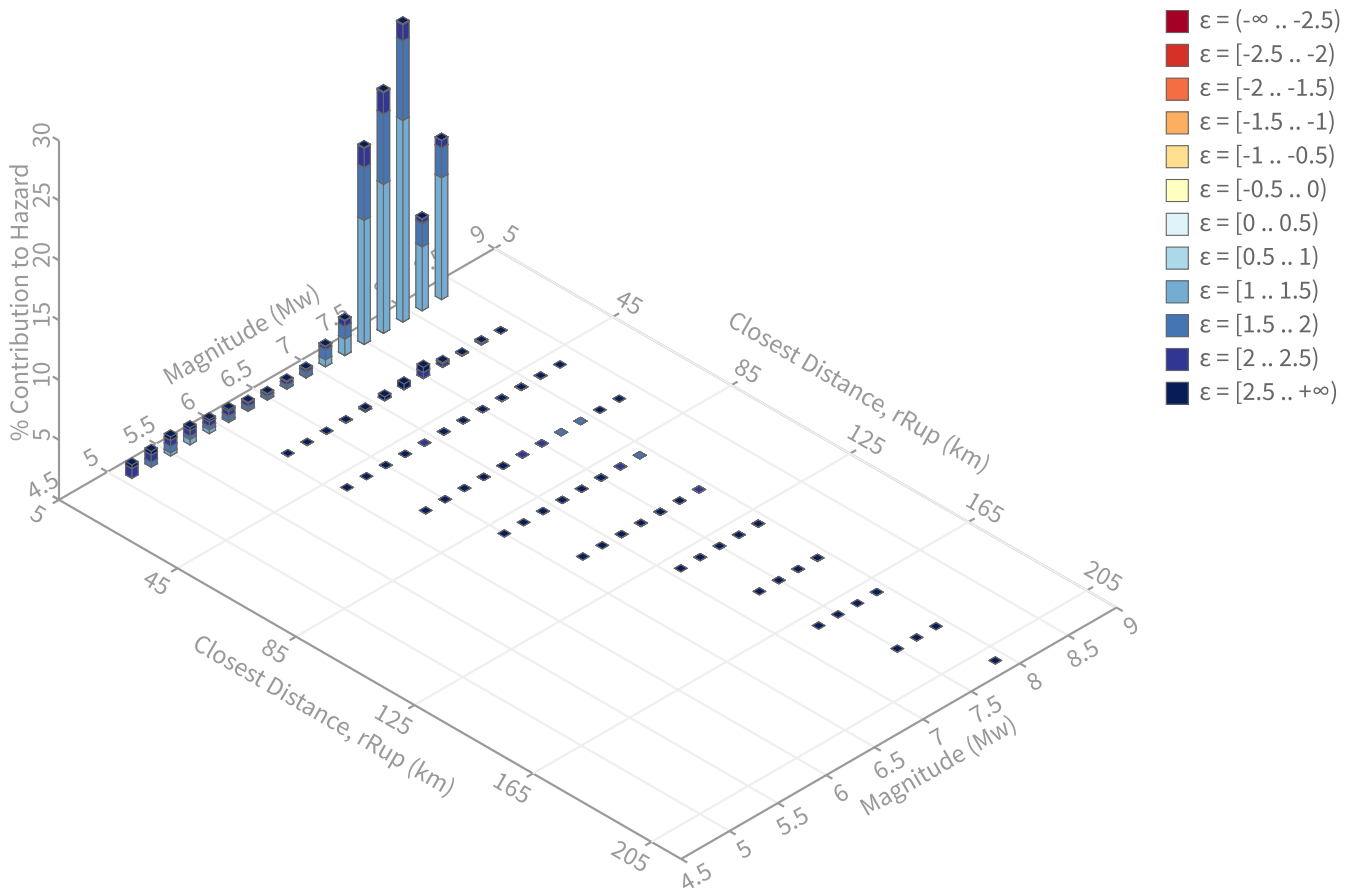


View Raw Data

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 0.93934885 g

Recovered targets

Return period: 3271.7963 yrs
Exceedance rate: 0.0003056425 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.04 %

Mean (over all sources)

m: 7.6
r: 7.49 km
ε_0: 1.53 σ

Mode (largest m-r bin)

m: 7.86
r: 6.78 km
ε_0: 1.41 σ
Contribution: 24.9 %

Mode (largest m-r-ε_0 bin)

m: 7.86
r: 6.05 km
ε_0: 1.25 σ
Contribution: 16.83 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM32	System							45.65
San Andreas (Peninsula) [10]		6.02	7.83	1.38	122.475°W	37.652°N	231.33	37.62
San Gregorio (North) [6]		13.41	7.69	1.93	122.566°W	37.647°N	251.52	3.20
UC33brAvg_FM31	System							45.07
San Andreas (Peninsula) [10]		6.02	7.83	1.38	122.475°W	37.652°N	231.33	37.31
San Gregorio (North) [6]		13.41	7.69	1.93	122.566°W	37.647°N	251.52	3.33
UC33brAvg_FM31 (opt)	Grid							4.64
PointSourceFinite: -122.421, 37.708		5.71	5.58	1.75	122.421°W	37.708°N	0.00	1.10
PointSourceFinite: -122.421, 37.708		5.71	5.58	1.75	122.421°W	37.708°N	0.00	1.10
UC33brAvg_FM32 (opt)	Grid							4.64
PointSourceFinite: -122.421, 37.708		5.71	5.58	1.75	122.421°W	37.708°N	0.00	1.10
PointSourceFinite: -122.421, 37.708		5.71	5.58	1.75	122.421°W	37.708°N	0.00	1.10

```
{
  "name": "Deterministic Response Spectra Results",
  "status": "success",
  "date": "2024-01-09T18:13:39Z",
  "url": "https://earthquake.usgs.gov/spectra?
gmm=COMBINED_WUS_2014_41&Mw=7.88&rake=180&zHyp=6.20&zTop=0&dip=90&width=12.4&rX=6.02&rRup=6.02&rJB=6.
02&vs30=275&z1p0=.1&z2p5=1.5",
  "server": {
    "threads": 1,
    "servlet": "2.348 µs",
    "calc": "0.000 ns",
    "nshmp-haz": {
      "url": "https://github.com/usgs/nshmp-haz",
      "version": "1.3.2"
    },
    "nshmp-haz-ws": {
      "url": "https://github.com/usgs/nshmp-haz-ws",
      "version": "1.2.3--ws"
    }
  },
  "request": {
    "gmms": [
      "COMBINED_WUS_2014_41"
    ],
    "input": {
      "Mw": 7.88,
      "rJB": 6.02,
      "rRup": 6.02,
      "rX": 6.02,
      "dip": 90.0,
      "width": 12.4,
      "zTop": 0.0,
      "zHyp": 6.2,
      "rake": 180.0,
      "vs30": 275.0,
      "vsInf": true,
      "z1p0": 0.1,
      "z2p5": 1.5
    }
  },
  "means": {
    "label": "Means",
    "xLabel": "Period (s)",
    "yLabel": "Median ground motion (g)",
    "data": [
      {
        "constraints": [
          {
            "id": "Mw",
            "min": 3.3,
            "max": 8.5
          },
          {
            "id": "rJB",
            "min": 0.0,
            "max": 300.0
          },
          {
            "id": "rRup",
            "min": 0.0,
            "max": 300.0
          },
          {
            "id": "rX",
```

```
      "min": 0.0,
      "max": 300.0
    },
    {
      "id": "dip",
      "min": 0.0,
      "max": 90.0
    },
    {
      "id": "width",
      "min": 0.0,
      "max": 60.0
    },
    {
      "id": "zTop",
      "min": 0.0,
      "max": 20.0
    },
    {
      "id": "zHyp",
      "min": 0.0,
      "max": 20.0
    },
    {
      "id": "rake",
      "min": -180.0,
      "max": 180.0
    },
    {
      "id": "vs30",
      "min": 150.0,
      "max": 1500.0
    },
    {
      "id": "z2p5",
      "min": 0.0,
      "max": 10.0
    }
  ],
  "supportedImts": [
    "PGA",
    "PGV",
    "SA0P01",
    "SA0P02",
    "SA0P03",
    "SA0P05",
    "SA0P075",
    "SA0P1",
    "SA0P15",
    "SA0P2",
    "SA0P25",
    "SA0P3",
    "SA0P4",
    "SA0P5",
    "SA0P75",
    "SA10P0",
    "SA1P0",
    "SA1P5",
    "SA2P0",
    "SA3P0",
    "SA4P0",
    "SA5P0",
    "SA7P5"
  ],
  "id": "COMBINED_WUS_2014_41",
```

```
        "label": "Combined: WUS 2014 (4.1)",
        "data": {
          "xs": [
            0.001,
            0.01,
            0.02,
            0.03,
            0.05,
            0.075,
            0.1,
            0.15,
            0.2,
            0.25,
            0.3,
            0.4,
            0.5,
            0.75,
            1.0,
            1.5,
            2.0,
            3.0,
            4.0,
            5.0,
            7.5,
            10.0
          ],
          "ys": [
            0.54099,
            0.54314,
            0.54684,
            0.56479,
            0.56159,
            0.66758,
            0.79694,
            0.98909,
            1.08517,
            1.13346,
            1.12738,
            1.09791,
            1.04024,
            0.79423,
            0.62989,
            0.4259,
            0.31792,
            0.21872,
            0.16062,
            0.1257,
            0.06848,
            0.04216
          ]
        }
      }
    ]
  },
  "sigmas": {
    "label": "Sigmas",
    "xLabel": "Period (s)",
    "yLabel": "Standard deviation",
    "data": [
      {
        "constraints": [
          {
            "id": "Mw",
            "min": 3.3,
            "max": 8.5
```

```
      },
      {
        "id": "rJB",
        "min": 0.0,
        "max": 300.0
      },
      {
        "id": "rRup",
        "min": 0.0,
        "max": 300.0
      },
      {
        "id": "rX",
        "min": 0.0,
        "max": 300.0
      },
      {
        "id": "dip",
        "min": 0.0,
        "max": 90.0
      },
      {
        "id": "width",
        "min": 0.0,
        "max": 60.0
      },
      {
        "id": "zTop",
        "min": 0.0,
        "max": 20.0
      },
      {
        "id": "zHyp",
        "min": 0.0,
        "max": 20.0
      },
      {
        "id": "rake",
        "min": -180.0,
        "max": 180.0
      },
      {
        "id": "vs30",
        "min": 150.0,
        "max": 1500.0
      },
      {
        "id": "z2p5",
        "min": 0.0,
        "max": 10.0
      }
    ],
    "supportedImts": [
      "PGA",
      "PGV",
      "SA0P01",
      "SA0P02",
      "SA0P03",
      "SA0P05",
      "SA0P075",
      "SA0P1",
      "SA0P15",
      "SA0P2",
      "SA0P25",
      "SA0P3",
```

```
      "SA0P4",
      "SA0P5",
      "SA0P75",
      "SA10P0",
      "SA1P0",
      "SA1P5",
      "SA2P0",
      "SA3P0",
      "SA4P0",
      "SA5P0",
      "SA7P5"
    ],
    "id": "COMBINED_WUS_2014_41",
    "label": "Combined: WUS 2014 (4.1)",
    "data": {
      "xs": [
        0.001,
        0.01,
        0.02,
        0.03,
        0.05,
        0.075,
        0.1,
        0.15,
        0.2,
        0.25,
        0.3,
        0.4,
        0.5,
        0.75,
        1.0,
        1.5,
        2.0,
        3.0,
        4.0,
        5.0,
        7.5,
        10.0
      ],
      "ys": [
        0.52941,
        0.53005,
        0.53248,
        0.536,
        0.54623,
        0.55799,
        0.55776,
        0.54316,
        0.53727,
        0.5442,
        0.56302,
        0.59497,
        0.61906,
        0.6602,
        0.68361,
        0.70184,
        0.71133,
        0.71738,
        0.70898,
        0.71027,
        0.70657,
        0.69642
      ]
    }
  }
```

```
        ]
    }
  }
```

```
{
  "name": "Deterministic Response Spectra Results",
  "status": "success",
  "date": "2023-12-20T16:47:44Z",
  "url": "https://earthquake.usgs.gov/spectra?
gmm=COMBINED_WUS_2014_41&Mw=7.44&rake=180&zHyp=5.75&zTop=0&dip=90&width=11.51&rX=13.41&rRup=13.41&rJB
=13.41&vs30=275&z1p0=.1&z2p5=1.5",
  "server": {
    "threads": 1,
    "servlet": "1.541 µs",
    "calc": "0.000 ns",
    "nshmp-haz": {
      "url": "https://github.com/usgs/nshmp-haz",
      "version": "1.3.2"
    },
    "nshmp-haz-ws": {
      "url": "https://github.com/usgs/nshmp-haz-ws",
      "version": "1.2.3--ws"
    }
  },
  "request": {
    "gmms": [
      "COMBINED_WUS_2014_41"
    ],
    "input": {
      "Mw": 7.44,
      "rJB": 13.41,
      "rRup": 13.41,
      "rX": 13.41,
      "dip": 90.0,
      "width": 11.51,
      "zTop": 0.0,
      "zHyp": 5.75,
      "rake": 180.0,
      "vs30": 275.0,
      "vsInf": true,
      "z1p0": 0.1,
      "z2p5": 1.5
    }
  },
  "means": {
    "label": "Means",
    "xLabel": "Period (s)",
    "yLabel": "Median ground motion (g)",
    "data": [
      {
        "constraints": [
          {
            "id": "Mw",
            "min": 3.3,
            "max": 8.5
          },
          {
            "id": "rJB",
            "min": 0.0,
            "max": 300.0
          },
          {
            "id": "rRup",
            "min": 0.0,
            "max": 300.0
          },
          {
            "id": "rX",
```

```
      "min": 0.0,
      "max": 300.0
    },
    {
      "id": "dip",
      "min": 0.0,
      "max": 90.0
    },
    {
      "id": "width",
      "min": 0.0,
      "max": 60.0
    },
    {
      "id": "zTop",
      "min": 0.0,
      "max": 20.0
    },
    {
      "id": "zHyp",
      "min": 0.0,
      "max": 20.0
    },
    {
      "id": "rake",
      "min": -180.0,
      "max": 180.0
    },
    {
      "id": "vs30",
      "min": 150.0,
      "max": 1500.0
    },
    {
      "id": "z2p5",
      "min": 0.0,
      "max": 10.0
    }
  ],
  "supportedImts": [
    "PGA",
    "PGV",
    "SA0P01",
    "SA0P02",
    "SA0P03",
    "SA0P05",
    "SA0P075",
    "SA0P1",
    "SA0P15",
    "SA0P2",
    "SA0P25",
    "SA0P3",
    "SA0P4",
    "SA0P5",
    "SA0P75",
    "SA10P0",
    "SA1P0",
    "SA1P5",
    "SA2P0",
    "SA3P0",
    "SA4P0",
    "SA5P0",
    "SA7P5"
  ],
  "id": "COMBINED_WUS_2014_41",
```

```
        "label": "Combined: WUS 2014 (4.1)",
        "data": {
          "xs": [
            0.001,
            0.01,
            0.02,
            0.03,
            0.05,
            0.075,
            0.1,
            0.15,
            0.2,
            0.25,
            0.3,
            0.4,
            0.5,
            0.75,
            1.0,
            1.5,
            2.0,
            3.0,
            4.0,
            5.0,
            7.5,
            10.0
          ],
          "ys": [
            0.33491,
            0.33623,
            0.33745,
            0.34875,
            0.36627,
            0.44224,
            0.53104,
            0.66467,
            0.73311,
            0.75899,
            0.7491,
            0.70471,
            0.64753,
            0.47339,
            0.3602,
            0.23128,
            0.16608,
            0.10662,
            0.07629,
            0.0581,
            0.03143,
            0.01915
          ]
        }
      }
    ]
  },
  "sigmas": {
    "label": "Sigmas",
    "xLabel": "Period (s)",
    "yLabel": "Standard deviation",
    "data": [
      {
        "constraints": [
          {
            "id": "Mw",
            "min": 3.3,
            "max": 8.5
```

```
      },
      {
        "id": "rJB",
        "min": 0.0,
        "max": 300.0
      },
      {
        "id": "rRup",
        "min": 0.0,
        "max": 300.0
      },
      {
        "id": "rX",
        "min": 0.0,
        "max": 300.0
      },
      {
        "id": "dip",
        "min": 0.0,
        "max": 90.0
      },
      {
        "id": "width",
        "min": 0.0,
        "max": 60.0
      },
      {
        "id": "zTop",
        "min": 0.0,
        "max": 20.0
      },
      {
        "id": "zHyp",
        "min": 0.0,
        "max": 20.0
      },
      {
        "id": "rake",
        "min": -180.0,
        "max": 180.0
      },
      {
        "id": "vs30",
        "min": 150.0,
        "max": 1500.0
      },
      {
        "id": "z2p5",
        "min": 0.0,
        "max": 10.0
      }
    ],
    "supportedImts": [
      "PGA",
      "PGV",
      "SA0P01",
      "SA0P02",
      "SA0P03",
      "SA0P05",
      "SA0P075",
      "SA0P1",
      "SA0P15",
      "SA0P2",
      "SA0P25",
      "SA0P3",
```

```
      "SA0P4",
      "SA0P5",
      "SA0P75",
      "SA10P0",
      "SA1P0",
      "SA1P5",
      "SA2P0",
      "SA3P0",
      "SA4P0",
      "SA5P0",
      "SA7P5"
    ],
    "id": "COMBINED_WUS_2014_41",
    "label": "Combined: WUS 2014 (4.1)",
    "data": {
      "xs": [
        0.001,
        0.01,
        0.02,
        0.03,
        0.05,
        0.075,
        0.1,
        0.15,
        0.2,
        0.25,
        0.3,
        0.4,
        0.5,
        0.75,
        1.0,
        1.5,
        2.0,
        3.0,
        4.0,
        5.0,
        7.5,
        10.0
      ],
      "ys": [
        0.5439,
        0.54455,
        0.54727,
        0.55135,
        0.5614,
        0.5725,
        0.57282,
        0.56047,
        0.5561,
        0.56339,
        0.58144,
        0.60945,
        0.63126,
        0.66917,
        0.69039,
        0.70568,
        0.7131,
        0.71794,
        0.70942,
        0.7107,
        0.707,
        0.69685
      ]
    }
  }
```

```
      ]
    }
  }
```

Geometric Mean												
		Deterministic MCE										
		San Andreas SAN + SAP +SAS			San Gregorio (North)			0				
	Mag --->	7.88			7.44							
	Dist (km) --->											
Period											Maximum	Controlling
(seconds)		Sa (g)	std. dev.	84th Percentile	Sa (g)	std. dev.	84th Percentile	Sa (g)	std. dev.	84th Percentile	Sa (g)	Fault
0.000		0.541	0.529	0.919	0.335	0.544	0.577	0.000	0.000	0.000	0.919	San Andreas SAN + SAP +SAS
0.050		0.562	0.546	0.970	0.366	0.561	0.642	0.000	0.000	0.000	0.970	San Andreas SAN + SAP +SAS
0.100		0.797	0.558	1.392	0.531	0.573	0.942	0.000	0.000	0.000	1.392	San Andreas SAN + SAP +SAS
0.150		0.989	0.543	1.703	0.665	0.560	1.164	0.000	0.000	0.000	1.703	San Andreas SAN + SAP +SAS
0.200		1.085	0.537	1.857	0.733	0.556	1.278			0.000	1.857	San Andreas SAN + SAP +SAS
0.205				0.000			0.000	0.000	0.000	0.000		San Andreas SAN + SAP +SAS
0.250		1.133	0.544	1.953	0.759	0.563	1.333	0.000	0.000	0.000	1.953	San Andreas SAN + SAP +SAS
0.300		1.127	0.563	1.980	0.749	0.581	1.340	0.000	0.000	0.000	1.980	San Andreas SAN + SAP +SAS
0.400		1.098	0.595	1.990	0.705	0.609	1.296	0.000	0.000	0.000	1.990	San Andreas SAN + SAP +SAS
0.500		1.040	0.619	1.932	0.648	0.631	1.217	0.000	0.000	0.000	1.932	San Andreas SAN + SAP +SAS
0.750		0.794	0.660	1.537	0.473	0.669	0.924	0.000	0.000	0.000	1.537	San Andreas SAN + SAP +SAS
1.000		0.630	0.660	1.219	0.360	0.669	0.703			0.000	1.219	San Andreas SAN + SAP +SAS
1.023				0.000			0.000	0.000	0.000	0.000		San Andreas SAN + SAP +SAS
2.000		0.318	0.711	0.648	0.166	0.713	0.339	0.000	0.000	0.000	0.648	San Andreas SAN + SAP +SAS
3.000		0.219	0.717	0.448	0.107	0.718	0.219	0.000	0.000	0.000	0.448	San Andreas SAN + SAP +SAS
4.000		0.161	0.709	0.326	0.076	0.709	0.155	0.000	0.000	0.000	0.326	San Andreas SAN + SAP +SAS
5.000		0.126	0.710	0.256	0.058	0.711	0.118	0.000	0.000	0.000	0.256	San Andreas SAN + SAP +SAS