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August 28, 2023 Project No. 07-230525-0

Ms. Rosalind Cox
Madera Unified School District
1205 South Madera Avenue
Madera, CA 93637

Subject: Geotechnical Investigation and Geohazards Study Report
New Kindergarten Classrooms at Lincoln Elementary School
650 Liberty Lane
Madera, CA 93637

Dear Ms. Cox:

In accordance with your request, we have performed a geotechnical investigation and geohazards study for the subject project. This work was performed in accordance with Section 1803*A.6* of the 2022 California Building Code (CBC). The results of our geotechnical investigation and geohazards study are presented in the accompanying report, which includes a description of site conditions and potential geologic hazards, results of our field investigation and laboratory testing, conclusions, and recommendations.

We appreciate this opportunity to be of service to you. If you have any questions regarding this report, please do not hesitate to contact us at your convenience.

Respectfully submitted,

RMA GeoScience, Inc.

Megan J. Stewart, GIT
Staff Geologist

Josue Montes, PE|GE
Principal Geotechnical Engineer
GE 2904

REGISTERED PROFESSIONAL ENGINEER
JOSUE A. MONTES, JR.
No. GE2904
Exp. 12-31-24
GEOTECHNICAL
STATE OF CALIFORNIA

Mark A. Swiatek, PG|CEG
President
EG 1781

PROFESSIONAL GEOLOGIST
MARK A. SWIATEK
No. 1781
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Distribution: Addressee (4 Originals and a pdf copy to *roaslindcox@maderausd.org*)

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GEOTECHNICAL CONSULTANTS

GEOTECHNICAL INVESTIGATION AND GEOHAZARDS STUDY REPORT
NEW KINDERGARTEN CLASSROOMS AT LINCOLN ELEMENTARY SCHOOL
650 LIBERTY LANE
MADERA, CALIFORNIA 93637

for

Madera Unified School District
1205 South Madera Avenue
Madera, California 93637

August 28, 2023

Project No. 07-230524-0

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1.00 INTRODUCTION

1.01 Purpose

A geotechnical investigation and geohazards study has been completed for the New Kindergarten Classrooms at Lincoln Elementary School project in Madera, California. The purpose of the investigation was to summarize geotechnical and geologic conditions at the site, to assess their potential impact on the proposed development, and to develop geotechnical engineering design parameters for the project.

1.02 Scope of the Study

The general scope of this study included the following:

- Review of published and unpublished geologic, seismic, groundwater and geotechnical literature. This included reviewing the following geotechnical reports:
- Examination of aerial photographs and topographic maps.
- Contacting of Underground Service Alert to locate onsite utility lines.
- Logging, sampling, and backfilling of four exploratory borings drilled with a SIMCO 2800 drill rig: one to an approximate depth of 51 feet and two to an approximate depth of 21 feet.
- Laboratory testing of representative soil samples.
- Geotechnical evaluation of the compiled data.
- Preparation of this report presenting our findings and conclusions.

As part of the geohazards study associated with our geotechnical investigation, our scope of services included addressing applicable items in California Geological Survey – Note 48, Checklist for the review of engineering Geology and Seismology Reports for California Public School, Hospitals, and Essential Service Buildings, October 2013.

Our scope of work did not include a preliminary site assessment for the potential of hazardous materials onsite.

1.03 Site Location and Description

The project site lies within the existing Lincoln Elementary School in Madera, California, which was constructed before 1998. The location of the site relative to nearby streets is indicated on Figure 1, Site Vicinity Map. Its geographic position is 36.9605° north latitude and 120.1048° west longitude. The existing ground surface is relatively flat and the elevation above mean sea level at the project site is approximately 252 feet according to the USGS Madera 7.5 Minute Quadrangle (see Figure 2).

Photo taken near the southwest corner of the site, facing northeast. Taken on July 20, 2023.

1.04 Planned Improvements

Based on our review of the information provided, which included a site plan prepared by PBK, we understand the project will consist primarily of the installation/construction of three (3) new modular buildings with an approximate footprint area of 3,550 square feet each. It is anticipated that the new buildings will be wood-framed, with concrete slab-on-grade floors, and shallow reinforced-concrete foundations. Maximum wall and column loads (dead plus live, not including wind or seismic loads) are anticipated to be less than 2.0 kips per foot and 50 kips, respectively. Appurtenant improvements are anticipated to be various underground utilities, new concrete flatwork, and landscaping. No grading plan was available at the time of the preparation of this report.

1.05 Investigation Methods

Our investigation consisted of office research, review of the compiled data, and preparation of this report. It has been performed in a manner consistent with generally accepted engineering and geologic principles and

practices and has incorporated applicable requirements of California Building Code. Definitions of technical terms and symbols used in this report include those of the ASTM International, the California Building Code, and commonly used geologic nomenclature. Technical supporting data are presented in the attached appendices. Appendix A presents a description of the methods and equipment used in performing the field exploration and logs of our subsurface exploration. Appendix B presents a description of our laboratory testing and the test results. Results of our liquefaction and seismic settlement analysis are provided in Appendix C. References are presented in Appendix D.

2.00 FINDINGS

2.01 Geologic Setting

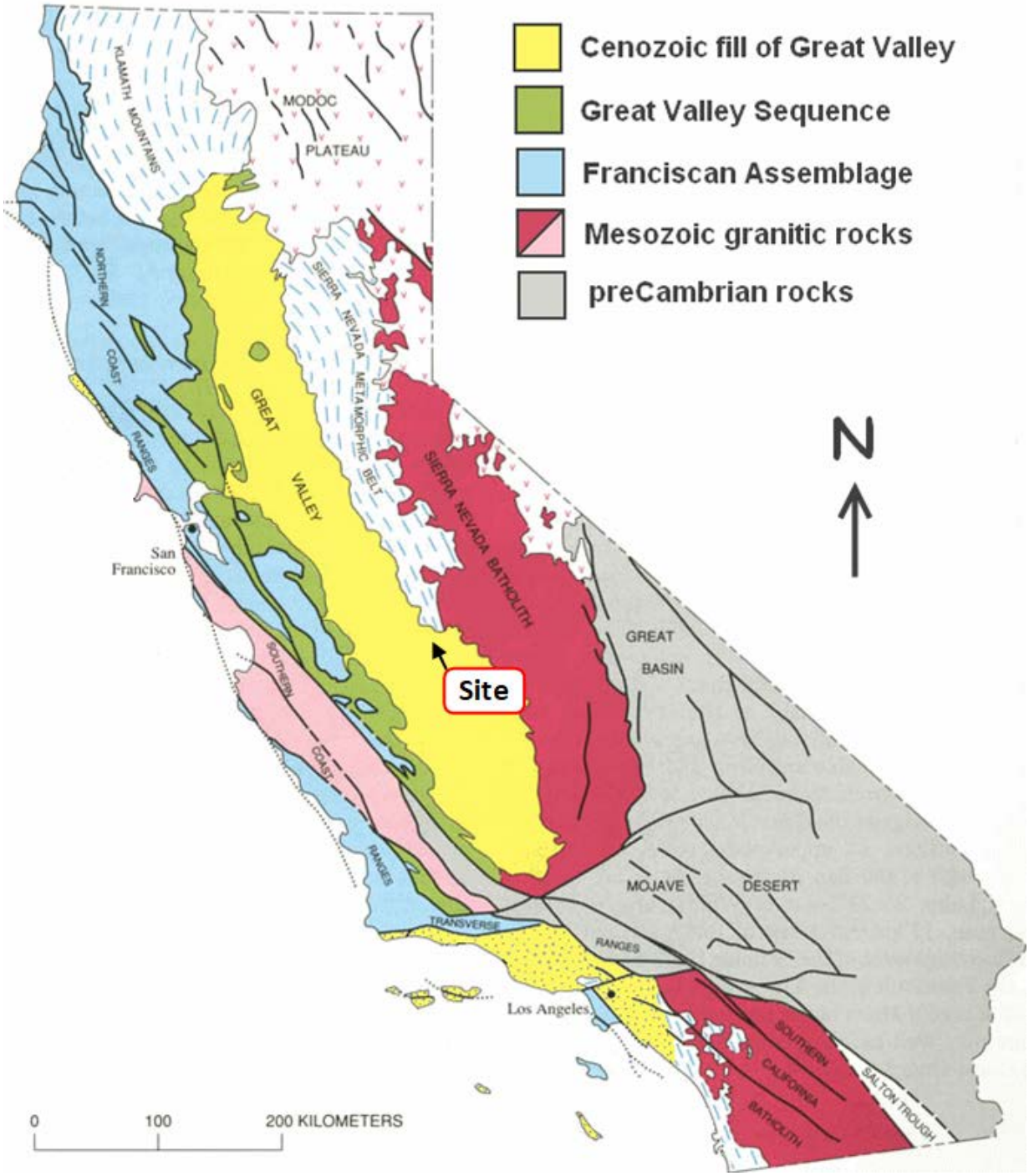
The subject site is located in the south-central San Joaquin Valley, which comprises the southern half of the Great Valley geomorphic province. The valley is a westward-titling trough which forms a broad alluvial fan, approximately 200 miles long and 50 to 70 miles wide, where the eastern flank is broad and gently inclined, as opposed to the western flank which is relatively narrow (Bartow, 1991; Page, 1968). The Central Valley consists of the Great Valley Sequence, overlain by Cenozoic alluvium. Underlying the Great Valley Sequence are the Franciscan Assemblage to the west and the Sierra Nevada batholith to the east (Bailey, Irwin, and Jones, 1964).

The Franciscan Assemblage, made up of deformed and high pressure and low temperature metamorphosed mafic and ultramafic rocks, was formed around the Late Jurassic through the Miocene (160 to about 20 million years ago) by the offscraping of rocks from a subducting plate dipping to the east (Wakabayashi, 1992; Wakabayashi, 2010).

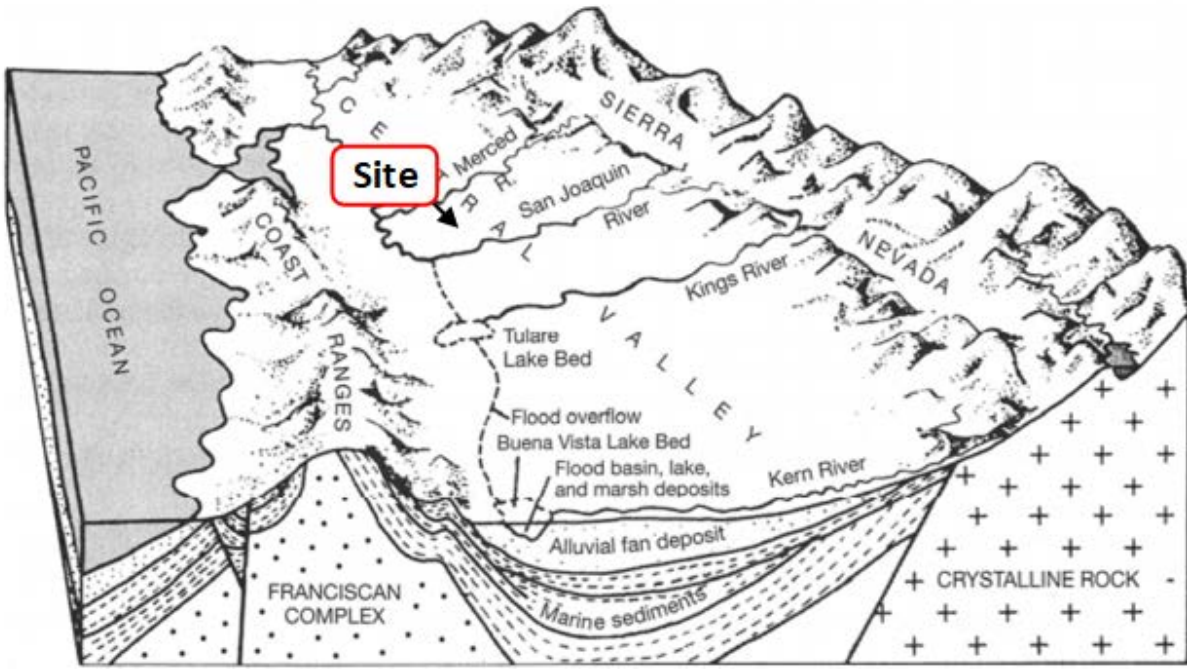
The Sierra Nevada started to form during the Early Jurassic (around 200 million years ago) when the Farallon Plate began subducting under the North American Plate. This subduction resulted in several orogenies, or mountain building events, that created the granitic Sierra Nevada Batholith deep below the surface. During the Miocene (around 10 million years ago), vertical movement along the Sierra Nevada Frontal Fault Zone (part of the Eastern California Shear Zone) began to uplift the Sierra Nevada. This uplift and erosion exposed the batholiths to the surface. From the Pleistocene (commonly known as the most recent Ice Age) to the present, glaciers have been carving out many parts of the Sierras. The current uplift of the Sierra Nevada is 1 - 2mm per year (Hammond, et al. 2012).

The Great Valley Sequence is a 40,000 foot sequence of marine shale, sandstone, and conglomerate beds, deposited in a deep marine environment during the Late Jurassic through the Cretaceous (150 – 65 million years ago). Overlying the Great Valley Sequence is several thousand feet of Cenozoic alluvium, deposited by: streams and rivers draining from the mountains and creating alluvial fans; by lakes that covered parts of the valley floor from time to time; flooding; and marsh environments (Page, 1986). In some places, it is thousands of feet thick, and more than half of this thickness is composed of fine grained fluvial and lacustrine deposits. Holocene deposition consists mainly of episodic deposition of alluvial sediments (Bartow, 1991; Page, 1986). A generalized

geologic map for the State of California is shown below and Figure 3A illustrates the geologic setting within the regional area of the project site. As shown on Figure 3A, the project site is situated on Quaternary deposits of alluvium that are estimated to be several thousand feet deep.



Geologic map showing the locations of Cenozoic alluvium/fill (yellow) overlying the Great Valley Sequence (green), the Franciscan Assemblage (blue), and the Sierra Nevada Batholith (red). Modified from: Irwin (1990).



Geologic block diagram of California. From: Harden (2004). Not to scale.

2.02 Earth Materials

The soils encountered in our test borings consisted primarily of both reworked and native soils. The reworked soil consisted of silty sand which extended from the surface to a depth of approximately 3 feet. The native soil profile consisted of silty sand with varying amounts of clay, sandy silt with varying amounts of clay, silty clay, and poorly graded sand to the maximum depth explored of approximately 51 feet. These layers varied in thickness and appear to be horizontally discontinuous across the project site. The granular soils generally had a relative density of loose to very dense, while the fine-grained soils had a relative consistency of stiff to hard. As indicated above, the soils encountered in the test borings are related to deep alluvial deposits that have been deposited over the past several thousand years.

A Boring Location Map showing the locations of the referenced test borings is presented as Figure 5. The logs of our recent exploratory borings are presented in Appendix A, which provide more detailed information of the soils that were encountered to a depth of approximately 51 feet at the project site.

2.03 Expansive Soils

Our field exploration indicates that the near surface soils at the project site have a very low expansion potential (Expansion Index, EI, of 8). Results of our laboratory tests are presented in Appendix B.

2.04 Surface and Groundwater Conditions

Groundwater was not encountered during our subsurface exploration. No areas of ponding or standing water were observed at the time of our study, and no seepage was observed in the exploratory borings to the maximum depth explored of approximately 51 feet below existing ground surface.

According to recent groundwater data from the SGMA Data Viewer application, the depth to groundwater in the vicinity of the project site is approximately 180 feet as of Fall 2022. Historical data derived from wells (State Well Number 11S17E27C001M, 11S17E28A001M, 11S17E16H001M, 11S17E14M001M, and 11S17E26A001M) located approximately 0.66 miles south-southeast, 0.72 miles south-southwest, 1.07 miles northwest, 1.20 miles northeast, and 1.60 miles southeast, respectively, of the project site indicates the depth to ground water in the vicinity of the project site was approximately 32 feet deep in the 1930's, gradually declined to a depth of approximately 83 feet by the 1960's, and declined further to a depth of approximately 125 feet by the 1990's, with a historical high of 18.8 feet in April 1926.

Since 1925 (the earliest well data available) the depth to groundwater has increased significantly, falling 161 feet in 98 years. Some recovery in the groundwater could occur, especially following a period of wet years. However, in consideration of the demand for groundwater related to domestic and agricultural purposes, it is highly unlikely that the groundwater table will recover much above the levels observed during, or prior to, the 1980's. Thus, although the "historical high" groundwater table is approximately 18.8 feet at the project site, a design "high" groundwater table of 95 feet is recommended for Civil Engineering purposes.

2.05 Faults

The site is not located within the boundaries of an Earthquake Fault Zone for fault-rupture hazard as defined by the Alquist-Priolo Earthquake Fault Zoning Act and no faults are known to pass through the property. The nearest active earthquake fault zones are the Ortigalita Fault Zone, the Nunez Fault, the San Andreas Fault Zone, the Calaveras Fault Zone, and the Quien Sabe Fault located approximately 45.2 miles west-southwest, 53.3 miles south-southwest, 62.2 miles southwest, 64.0 miles west-southwest, and 64.4 miles west, respectively, of the project site. The location of the project site relative to these and other fault zones is illustrated on Figure 4a.

Our research of regional geologic and seismic data did not reveal any known instances of ground failure in the vicinity of the site associated with regional seismic activity. Seismic design parameters relative to the requirements of the 2022 California Building Code (CBC) are presented in Section 3.10.

2.06 Historic Seismicity

According to the California Historical Earthquakes Online Database maintained by the California Geological Survey and the United Stated Geological Survey (USGS) database, there have been no historic earthquakes with a magnitude greater than or equal to 5.5 with an epicenter within 50 miles of the site. Large historic earthquakes in California with an epicenter of less than 100 miles away from the site are summarized in the table below.

Large Historic Earthquakes

Event	Date	Magnitude	Distance from Site (Miles)
NE of San Juan Bautista	June 10, 1836	6.4	77
E of San Juan Bautista	January 18, 1840	6.5	78
SE of San Juan Bautista	July 3, 1841	6.0	78
E of King City	September 2, 1853	6.3	62
W of Coalinga	January 9, 1857	6.1	67
Fort Tejon	January 9, 1857	7.9	88
NE of King City	April 17, 1860	6.0	63
NE of Morgan Hill	February 26, 1864	6.1	84
SW of Tracy	July 15, 1866	6.0	92
NW of Bishop	April 11, 1872	6.8	96
NW of Parkfield	February 2, 1881	6.0	68
SW of Patterson	April 10, 1881	6.3	70
SW of Hollister	March 30, 1883	6.0	78
E of King City	April 12, 1885	6.5	65
SW of Bishop	September 30, 1889	6.0	79
E of Watsonville	April 24, 1890	6.3	83
E of Gilroy	June 20, 1897	6.3	77
W of San Juan Bautista	April 30, 1899	6.0	83
NW of Parkfield	March 3, 1901	6.4	70
SE of Morgan Hill	July 21, 1911	6.5	85
SE of Mammoth Lakes	May 25, 1980	6.1	83
E of Mammoth Lakes	May 25, 1980	6.0	83
SE of Mammoth Lakes	May 25, 1980	6.1	82
SE of Mammoth Lakes	May 27, 1980	6.2	81
NE of Coalinga	May 2, 1983	6.7	52
E of San Jose	April 4, 1984	6.2	90
NW of Bishop	November 23, 1984	6.1	89
N of Bishop	July 21, 1986	6.4	100
Loma Prieta	October 18, 1989	6.9	98
SE of Parkfield	September 28, 2004	6.0	80

2.07 Flooding Potential

According to the Federal Emergency Management Agency (Flood Insurance Rate Map #06039C1155E, effective September 26, 2008), the site is located within an unshaded area of "Zone X", which is an "area determined to be outside the 0.2% annual chance floodplain".

Control of surface runoff originating from within and outside of the site should be included in design of the project.

2.08 Landslides

Since there are no natural or manmade slopes in the vicinity of the project site, landslides are not a hazard at this site.

2.09 Other Geologic Hazards

California Geologic Survey Note 48 (2011) identifies a number of exceptional geologic hazards that can occur at individual sites, but do not occur statewide. Evaluation of these exceptional conditions is referred as a conditional geologic assessment by Note 48. Specific assessment items listed in Note 48 are addressed in the table below.

Conditional Geologic Assessment

Hazard	Assessment	Reference
Methane gas, hydrogen-sulfide gas, tar seeps	Not applicable; site is not located within an oil field identified as a high risk area for hazardous gas accumulations.	See Section 1.03.
Volcanic eruption	Not applicable; site is not located in a known hazard area for volcanic eruptions.	Miller, 1989 (U.S.G.S. Bulletin 1847)
Flooding	The proposed development area is not located within the boundaries of a 100-year or 500-year flood zone.	See Section 2.07.
Tsunami and seiches inundation	Not applicable.	See Section 3.11.
Radon-222 gas	Not applicable; typically a concern in the California Coast Ranges.	See Section 2.01 and CGS Note 48.
Naturally occurring asbestos	Not applicable; site is not located in an area likely to contain naturally occurring asbestos.	Churchill and Hill, 2000 (DMG OFR 2000-19)
Hydrocollapse due to anthropic use of water	Due to the density of the underlying soils, hydrocollapse due to anthropic use of water is unlikely.	See Sections 2.01, 2.02, and Appendix A.

Hazard	Assessment	Reference
Regional land subsidence	The site is not identified in an area of large historic subsidence within the California Central Valley. Control of subsidence will dependent upon proper jurisdictional management of groundwater resources.	Madera County General Plan Background Report, 1995, and Borches and Carpenter, 2014.
Clays and cyclic softening	Soils within the upper 51 feet of the ground surface are primarily granular rather than clays. Expansive properties of near-surface soils have been considered in foundation design.	See Sections 2.03, 3.04, and 3.12.

3.00 CONCLUSIONS AND RECOMMENDATIONS

3.01 General Conclusions

Based on specific data and information contained in this report, our understanding of the project, and our geotechnical engineering experience, it is our professional judgment that the proposed development is geologically and geotechnically feasible. Our review of geological literature and the field exploration performed for this project did not indicate any unusual conditions at the site that would entail special design considerations or construction procedures. Specific geotechnical recommendations and guidelines are presented below to provide information for other members of the design team that can be used to prepare the project plans and specifications for the planned improvements to the administration building.

3.02 General Earthwork and Grading

All grading should be performed in accordance with the recommendations provided below, the project plans and specifications, Appendix J of the 2022 California Building Code and all applicable governmental agency requirements. In the event of conflicts between this report and the other referenced documents, this report shall govern. It should be noted that all references to maximum dry density, optimum moisture content, and relative compaction are based on ASTM D 1557 laboratory test procedures.

3.03 Rippability and Rock Disposal

Exploratory borings that have been done at the project site were advanced without difficulty and no oversize materials were encountered. Accordingly, we expect that all earth materials will be rippable with conventional grading equipment and oversized materials are not expected.

3.04 Earthwork Recommendations

All vegetation, organic rich soils (soils containing more than 2 percent organics by weight), trash, debris, existing pavement sections and underground utilities, should be cleared from the grading area and removed from the site. After the removal of deleterious materials and the stripping of organic-rich soils, the following over-excavation must be done within the area of the planned improvements:

- Within the area of the planned building improvements plus at least 5 feet horizontally beyond the perimeter of these improvements, the subgrade must be over-excavated at least 24 inches below the stripped subgrade surface or 12 inches below the bottom of footings, whichever is lower. The bottom of the over-excavation within each building area must be level and at a uniform depth below the finished pad elevation.
- Outside of the "building pad" area indicated above, no over-excavation should be required unless loose or unstable soils are present that will require some over-excavation prior to the scarification, moisture conditioning, and compaction as recommended below.

Following the over-excavation indicated above, a designated representative for the Project Geotechnical Engineer must review the exposed ground surface and determine if any additional over-excavation is required.

The over-excavated ground surface in all areas determined to be satisfactory for the support of fills must be scarified to a minimum depth of 12 inches. Scarification should continue until the soils are broken down and free from lumps or clods and until the scarified zone is uniform. The moisture content of the scarified zone shall be adjusted to near optimum moisture content. The scarified zone must then be uniformly compacted to at least 90 percent relative compaction within the building pad area and concrete flatwork and to at least 95 percent relative compaction within paved areas that will be subject to vehicular traffic.

Removed and/or over-excavated soils, free of organics and other deleterious material, may be used as engineered fill. Fill material should be placed in nearly horizontal layers, uniformly moisture conditioned to near optimum moisture content, and then compacted in layers that do not exceed approximately 8 inches in thickness. Thicker lifts may be placed if testing indicates the compaction procedures are such that the required compaction is being achieved and the geotechnical consultant approves their use. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to insure uniformity of material in each layer. Engineered fill must be compacted to achieve a relative compaction of at least 90 percent, except for the upper 12 inches of subgrade below asphalt or concrete pavement sections subject to vehicular traffic, which must be compacted to at least 95 percent. Based on our observations of the existing field conditions and lab testing data, a shrinkage factor (decrease in volume of soil upon removal and recompaction) in the range of 5 to 10 percent is considered applicable for this project.

The above recommendations are based on the assumption that soils encountered during field exploration are representative of soils throughout the site. However, there can be unforeseen and unanticipated variations in soils between points of subsurface exploration. Hence, over-excavation depths must be verified, and adjusted if

necessary, at the time of grading. In addition, any contaminated soils within three (3) feet of the finished subgrade surface, must be removed and properly disposed of outside the area the planned improvements.

3.05 Imported Fill Material

If required, imported fill materials that will be placed within building or concrete flatwork areas must be non-hazardous and be obtained from a single, uniform source that meets the following criteria:

Gradation			
Sieve Size		**Percent Passing**	
3-inch		100%	
3/4-inch		90% - 100%	
#4		60% - 100%	
#200		20% - 50%	
Maximum Expansion Index		**Maximum Plasticity Index**	
20		10	
Minimum R-Value (in paved areas)			
50			
Maximum Organic Content			
< 2% by weight			
Corrosivity			
pH	**Minimum Resistivity (ohm-cm)**	**Soluble Sulfates (mg/kg)**	**Soluble Chlorides (mg/kg)**
6.0 to 8.5	> 5,000*	< 1,000	< 200

*unless other requirement established by the Design Engineer

3.06 Temporary Slopes and Shoring

Our geotechnical investigation indicates that excavations less than 4 feet in depth may generally be constructed with vertical sidewalls without shoring or shielding. Temporary excavations in existing alluvial soils that are deeper than 4 feet may be safely made at an inclination of 1:1 or flatter. If vertical sidewalls are required in excavations greater than 4 feet in depth, the use of cantilevered or braced shoring is recommended. The following geotechnical parameters can be used to design a shoring system:

Moist Unit Weight of Soils: 130 pcf
Angle of Internal Friction (ø): 30°
Cohesion: 200 psf

Unless vehicles, equipment, materials, etc., are kept a minimum distance equal to the height of the excavation away from the edge of the excavation, a surcharge load equal to a uniform lateral pressure of 72 psf should be assumed to act on the shoring in addition to the earth pressure calculated using the above geotechnical parameters.

Vehicles, equipment, materials, etc. should be set back a minimum distance of 10 feet from the top edge of sloped or vertical excavations. Surface waters should be diverted away from temporary excavations and prevented from draining over the top of the excavation and down the slope face. During periods of heavy rain, the slope face should be protected with sandbags to prevent drainage over the edge of the slope, and a visqueen liner placed on the slope face to prevent erosion of the slope face.

Periodic observations of the excavations should be made by the geotechnical consultant to verify that the soil conditions have not varied from those anticipated and to monitor the overall condition of the temporary excavations over time. If at any time during construction conditions are encountered which differ from those anticipated, the geotechnical consultant should be contacted and allowed to analyze the field conditions prior to commencing work within the excavation. In any case, Cal/OSHA construction safety orders should be observed during all underground work.

3.07 Fill and Cut Slopes

Due to the low gradient of the property, it appears that construction of cut and fill slopes will not be required. If such slopes are proposed, they should be inclined no steeper than 2 horizontal to 1 vertical. In addition, appropriate landscaping measures should be taken to protect the face of slopes from erosion.

3.08 Utility Trench Backfill

The existing onsite soils will generally not be suitable for use as pipe bedding for buried utilities. All pipes should be bedded in sand or other suitable material as specified by the Project Civil Engineer and/or as specified by the pipe/conduit manufacturer. We recommend the bedding material have a Sand Equivalent (SE) of at least 30 and have less than 8 percent, by weight, passing the #200 Sieve. The geotechnical consultant should review and approve proposed bedding materials prior to use. Bedding materials should be compacted to at least 90% relative compaction (ASTM D1557) by mechanical methods.

The on-site soils are expected to be suitable as trench backfill provided they are screened of organic matter and other deleterious material. Trench backfill must be compacted to at least 90% relative compaction (ASTM D1557) and the upper 12 inches of trench backfill beneath pavement sections should be compacted to at least 95% relative compaction. Trench backfill should be compacted using mechanical methods; no jetting of backfill should be allowed. A minimum trench width of 24 inches or 18 inches plus the diameter of the utility line, whichever is greater, should be provided to permit uniform compaction on both sides of utility line and allow for a technician to perform in-place density tests. If narrower trenches are desired, a sand-cement slurry should be used to backfill the trenches to within 8 inches of the top of trench. The sand-cement slurry should contain at

least 2 sacks of cement per yard of mix and have a 4- to 6-inch slump. In addition, slurry should be consolidated using a suitable vibratory or mechanical method.

All utility trench backfill within street right of ways, utility easements, under or adjacent to sidewalks, driveways, or building pads should be observed and tested by the geotechnical consultant to verify proper compaction. Trenches excavated adjacent to foundations should not extend within the footing influence zone defined as the area within a line projected at a 1:1 drawn from the bottom edge of the footing. Trenches crossing perpendicular to foundations should be excavated and backfilled prior to the construction of the foundations. The excavations should be backfilled in the presence of the geotechnical engineer and tested to verify adequate compaction beneath the proposed footing. Where utility crossings are located within 12 inches of bottoms of footings, conduits should be wrapped with polystyrene foam or other suitable material with a minimum thickness of one inch. Conduits extending through footings shall be "sleeved" as determined by the Project Structural Engineer.

3.09 Faulting

Since the site is not located within the boundaries of an Earthquake Fault Zone and no faults are known to pass through or near the property, surface fault rupture within the site is considered unlikely.

3.10 Seismic Design Parameters

Seismic design parameters have been developed in accordance with Section 1613*A* of the 2022 California Building Code (CBC) using the online SEAOC and OSHPD Seismic Design Maps Calculator (ASCE 7-16 Standard) and a site location based on latitude and longitude. The calculator generates probabilistic and deterministic maximum considered earthquake spectral parameters represented by a 5-percent damped acceleration response spectrum having a 2-percent probability of exceedance in 50 years. The deterministic response accelerations are calculated as 150 percent of the largest median 5-percent damped spectral response acceleration computed on active faults within a region, where the deterministic values govern. The calculator does not, however, produce separate probabilistic and deterministic results. The parameters generated for the subject site are presented below:

2022 California Building Code (CBC) Seismic Parameters

Parameter	Value
Site Location	Latitude = 36.9605 degrees Longitude = -120.1048 degrees
Site Class	Site Class = D* Soil Profile Name = "Stiff Soil"
Risk Category	III
Mapped Spectral Accelerations	S_s (0.2-second period) = 0.609g S_1 (1-second period) = 0.238g
Site Coefficients (Site Class D)	F_a = 1.313 F_V = Null - Section 11.4.8
Maximum Considered Earthquake Spectral Accelerations (Site Class D)	S_{MS} (0.2-second period) = 0.799g S_{M1} (1-second period) = Null - Section 11.4.8
Design Earthquake Spectral Accelerations (Site Class D)	S_{DS} (0.2-second period) = 0.533g S_{D1} (1-second period) = Null - Section 11.4.8

*As defined in Chapter 20 of ASCE 7-16, a Site Class D is applicable to predominantly cohesionless soils with an **average** standard penetration resistance of 15 to 50 within the upper 100 feet. Based on the geologic setting, our 50-foot deep test boring (see Appendix A), and other historical geotechnical data (see Section 1.02), the soil profile at the project site meets these criteria.

As the Site Class is D and the S_1 value is greater than 0.200g, then per ASCE 7-16 Section 11.4.8 a site-specific ground motions procedure is required with several exceptions. We assume that Exception 2 is applicable to this site, and hence the seismic parameters indicated in the table above have been calculated. If Exception 2 does not apply, the structural engineer should contact us so we develop the site-specific seismic parameters.

The above table shows that the mapped spectral response acceleration parameter for a 1-second period (S_1) is less than 0.750g and the spectral response acceleration parameter (S_{DS}) is greater than 0.500g. Therefore, the Seismic Design Category using 2022 CBC Tables 1613.2.5(1) and 1613.2.5(2) is D for all Occupancy Categories (2022 CBC Section 1613.2.5). Consequently, as required for Seismic Design Categories C through F by CBC Section 1803.5.12, slope instability, liquefaction, total and differential settlement, and surface displacement by faulting or seismically lateral spreading or lateral flow have been evaluated.

Peak earthquake ground acceleration adjusted for site class effects (PGA_M) has been calculated in accordance with ASCE 7-16 Section 11.8.3 as follows: $PGA_M = F_{PGA} \times PGA = 1.338 \times 0.262 = 0.351g$.

3.11 Liquefaction and Secondary Earthquake Hazards

Potential secondary seismic hazards that can affect land development projects include liquefaction, tsunamis, seiches, and seismically induced settlement.

Liquefaction

Liquefaction is a phenomenon where earthquake-induced ground vibrations increase the pore pressure in saturated, granular soils until it is equal to the confining, overburden pressure. When this occurs, the soil can completely lose its shear strength and enter a liquefied state. The possibility of liquefaction is dependent upon grain size, relative density, confining pressure, saturation of the soils, and intensity and duration of ground shaking. In order for liquefaction to occur, three criteria must be met: “low density”, coarse-grained (sandy) soils, a groundwater depth of less than about 51 feet, and a potential for seismic shaking from nearby large-magnitude earthquake.

Research has shown that saturated, loose sands with a silt content less than about 25 percent are most susceptible to liquefaction, whereas other soil types are generally considered to have a low susceptibility. According to the California Geologic Survey (CGS) Special Publication SP-117A (2008), "Guidelines for Evaluating and Mitigating Seismic Hazards in California," any materials with a PI > 12 and moisture content < 85% of the liquid limit were considered not subject to liquefaction. Liquefaction susceptibility is related to numerous factors, and the following conditions must exist for liquefaction to occur:

- Sediments must be relatively young in age and must not have developed large amounts of cementation
- Sediments must consist mainly of cohesionless sands and silts
- The sediment must not have a high relative density
- Free groundwater must exist in the sediment; and
- The site must be exposed to seismic events of a magnitude large enough to induce straining of soils particles

The soils in the upper 51 feet at the project site consist primarily of silty sand, sandy silt, silty clay, and poorly graded sand. A liquefaction analysis was performed using the sampler blow count and soil data from the deep boring that was performed at the project site (Boring B-1), using corrected SPT value [$(N_1)_{60}$]. The analysis was performed using LiquefyPro Version 5 (2015 edition) for two groundwater conditions: at a depth of 18.8 feet (historical high groundwater condition as required by CGS) and at a depth of 95 feet (representative of a recommended design "high groundwater condition" based on historical DWR data in the past 30 years). The analysis also took into account that the (PGA_M) is 0.351g and the Modal Magnitude (M_M) for the design level earthquake is 5.5 (based on the PSH Deaggregation tool on the USGS website at https://earthquake.usgs.gov/hazards/interactive/) for a 2-percent probability for exceedance in 50 years (a return period of 2,475 years). A summary of the input data and the results of this liquefaction analysis are provided in Appendix C of this report. Based on this analysis, there appears to be a low risk of liquefaction occurring at the project site during a design level earthquake (Factor-of-Safety against liquefaction is greater than 1.2).

It should be noted that the California Geological Survey has not yet prepared a Seismic Hazard Zone Map of potential liquefaction hazards for the quadrangle in which the site is located. In addition, there are no liquefaction hazard zones identified near the site according to the Madera County General Plan. Because there

are no mapped liquefaction hazard zones near the site, a map depicting such a zone relative to the site has not been prepared.

Tsunamis and Seiches

Tsunamis are sea waves that are generated in response to large-magnitude earthquakes. When these waves reach shorelines, they sometimes produce coastal flooding. Seiches are the oscillation of large bodies of standing water, such as lakes, that can occur in response to ground shaking. Tsunamis and seiches do not pose hazards due to the inland location of the site and lack of nearby bodies of standing water.

Seismically Induced Settlement

Seismically induced settlement occurs most frequently in areas underlain by loose, granular sediments. Damage as a result of seismically induced settlement is most dramatic when differential settlement occurs in areas with large variations in the thickness of underlying sediments. Settlement caused by ground shaking is often non-uniformly distributed, which can result in differential settlement.

A seismic settlement analysis was performed using LiquefyPro Version 5 (2015 edition) in conjunction with the liquefaction analysis that was performed for this project as indicated above. A summary of the input data and the results of the seismic settlement analysis are provided in Appendix C of this report. Based on this analysis, a seismic settlement of less than 1/4 inch is expected to occur at the project site during a design level earthquake.

Seismically Induced Flooding

The City and County of Madera General Plans indicates the site is located within the potential dam inundation area of Hensley Lake/Hidden Dam. However, the chances of this of this dam failing while at full capacity is considered remote. Consequently, seismically induced flooding at the site is unlikely.

Seismically Induced Landslides

There are no cut or fill slopes that currently exist or are planned at the project site; therefore, the potential for seismically induced landslides is nil.

3.12 Foundations

Isolated spread footings and/or continuous wall footings are recommended to support the proposed new building. New footings should be embedded at least 12 inches below the lowest adjacent grade and must be constructed on properly compacted fill as recommended in Section 3.04 of this report. Continuous and isolated spread footings with a minimum width of 12 and 24 inches, respectively, may be designed using an allowable bearing capacity of 3,000 pounds per square foot (psf). An allowable increase of 750 psf per additional 12 inches of embedment, and an allowable increase of 500 psf per additional 12 inches of width, can be used in design, up to a maximum allowable bearing capacity of 5,000 psf. This allowable bearing capacity represents an allowable

net increase in soil pressure over existing soil pressure and may be increased by one-third for short-term wind or seismic loads. The maximum expected settlement of footings is expected to be less than 3/4 inch with a differential settlement of less than 1/4 inch between similarly sized and loaded footings or less than 1/4 inch over a distance of 30 feet for continuous footings. This assumes that the maximum column and wall loads (dead plus live, not including wind or seismic) associated with new building improvements will not exceed 40 kips and 2.0 kips per foot, respectively.

Our lab testing indicates that the upper 5 feet of soils at the site should have a very low expansion potential (Expansion Index ≤ 20). The type and dimensions of concrete, and the size and location of reinforcing steel, used in foundations should be specified by the Project Structural Engineer. As a minimum, reinforcement for continuous footings should include at least one #4 bar located near both the top and bottom of continuous footings.

It will be very important for all footing excavations to be observed by the geotechnical engineer to verify that they have been excavated into the recommended bearing material. Where zones of relatively loose or disturbed soils are present at the bottom of foundation excavations, these soils should be properly compacted to provide a uniform bearing surface that meets the approval of the geotechnical engineer (refer to Section 3.04).

3.13 Lateral Load Resistance and Earth Pressures

Lateral loads may be resisted by soil friction and the passive resistance of the soil. The following parameters are recommended.

- Allowable Passive Earth Pressure = 350 psf (equivalent fluid weight, includes a factor of safety = 2.0)
- Allowable Coefficient of Friction (soil to footing) = 0.35 (includes a factor of safety = 1.5)
- Retaining structures should be designed to resist a lateral active earth pressure of 35 pcf (equivalent fluid weight) for a level, non-expansive granular backfill with drainage provided.

The active earth pressure provided above is only applicable if the retained earth is allowed to strain sufficiently to achieve the active state. The required minimum horizontal strain to achieve the active state is approximately 0.0025H. Retaining structures should be designed to resist an at-rest lateral earth pressure of 55 pcf (equivalent fluid weight) if this horizontal strain cannot be achieved.

The Mononobe-Okabe method is commonly utilized for calculating seismically induced active and passive lateral earth pressures and is based on the limit equilibrium Coulomb theory for static stress conditions. This method entails three fundamental assumptions (e.g., Seed and Whitman, 1970): Wall movement is sufficient to ensure either active or passive conditions, the driving soil wedge inducing the lateral earth pressures is formed by a planar failure surface starting at the heel of the wall and extending to the free surface of the backfill, and the driving soil wedge and the retaining structure act as rigid bodies, and therefore, experiences uniform accelerations throughout the respective bodies (U.S. Army Corps of Engineers, 2003, Engineering and Design - Stability Analysis of Concrete Structures).

- Seismic Lateral Earth Pressure for level backfill = 18 pcf (equivalent fluid weight)

The seismic lateral earth pressure given above is a triangular distribution increasing with depth, and the resultant of this pressure is an increment of force which should be applied to the back of the wall at 1/3 of the wall height from the wall base. The seismic increment of earth pressure should be added to the static active pressure. Even for the at-rest (K_o) condition, the seismic increment of earth pressure should be added to the static active soil pressure, not to the at-rest (SEAOC Seismology Committee 2019). Per CBC Section 1803.5.12 dynamic seismic lateral earth pressures shall be applied to foundation walls and retaining walls supporting more than 6 feet of backfill. Dynamic seismic lateral earth pressures may also be applied to shorter walls at the discretion of the structural engineer.

3.14 Pole Type Foundations

It is anticipated that light poles, signs, or canopies may be supported on pole-type foundations or drilled piers. This type of foundation should be designed in accordance with Section 1807.3 of the 2022 CBC. It is recommended that an allowable lateral soil bearing pressure of 300 psf per foot of embedment be used to develop parameters S1 and S3 rather than one of the values given in Table 1806.2. This value includes a factor of safety of 2 and may be increased as indicated in Section 1806.3.4. In landscape areas, the upper 12 inches of soil should be ignored when calculating the minimum depth of embedment.

An allowable end bearing pressure of 3,000 psf (includes a factor of safety of 3.0) and an allowable average skin friction of 300 psf (includes a factor of safety of 2.0) may be used to support compressive vertical loads applied to pier foundations that are embedded at least 5 feet. The end bearing should be ignored if the drilled pier excavation is not properly cleaned out prior to installing the reinforcing steel and placing concrete. The uplift capacity of drilled piers can be calculated using an allowable skin friction of 190 psf plus the weight of the pier. In landscape areas, the skin friction within the upper 12 inches of embedded length should be ignored for compressive or uplift loads. The total settlement of pier foundations designed in accordance with these recommendations should not exceed one-half inch.

Prior to placing reinforcing steel or concrete, loose or disturbed soils should be removed from drilled pier excavations. A representative of the Geotechnical Engineer should observe the drilling and clean-out associated with the construction of pier foundations in order to assess whether the actual bearing conditions are compatible with the conditions anticipated during the preparation of this report. Therefore, for drilled piers that extend to depths of sandy soils, the contractor should be prepared to take measures to prevent caving or significant sloughing in drilled holes (such as temporary casing) from occurring during the drilling and installation of reinforcing steel and concrete. In any case, reinforcing steel and concrete should be installed in an expeditious manner after each drilled hole is cleaned out. The contractor must take responsibility for staging the installation of drilled piers so that significant amounts of sloughing or caving do not occur prior to installing the reinforcing steel and concrete. The annular space around the pole must be backfilled using approved CLSM (controlled low strength material).

3.15 Interior Slabs on Grade

Concrete floors with a minimum thickness of 4 inches are recommended for interior slabs on grade. Existing on-site soils within 5 feet of the ground surface may be considered to have a very low expansion potential for design purposes (Expansion Index of ≤ 20). However, to reduce the potential for excessive cracks as a result of differential movement, consideration should be given to reinforcing concrete slab-on-grade floors with at least #3 bars spaced 24 inches on-center in both directions. Reinforcement consisting of welded or woven wire mesh should not be used, due to the difficulty of keeping it centered in the slab during the construction process. If heavy concentrated or moving loads are anticipated, slabs should be designed using a modulus of subgrade reaction (k) of 180 pci. The concrete mix, reinforcement of slabs, and the location of construction and control joints should be specified by the Design Engineer.

Special care should be taken on floors slabs to be covered with thin-set tile or other inflexible coverings. These areas should have suitable reinforcement that is placed at the mid-height of the slab, to mitigate drying shrinkage cracks. Alternatively, inflexible flooring may be installed with unbonded fabric or liners to prevent reflection of slab cracks through the flooring.

A moisture vapor retarder/barrier is recommended beneath all slabs-on-grade that will be covered by moisture-sensitive flooring materials such as vinyl, linoleum, wood, carpet, rubber, rubber-backed carpet, tile, impermeable floor coatings, adhesives, or where moisture-sensitive equipment, products, or environments will exist. We recommend that design and construction of the moisture vapor retarder/barrier conform to Section 1805 of the 2022 California Building Code and pertinent sections of American Concrete Institute (ACI) guidance documents 302.1R-04, 302.2R-06 and 360R-10.

The moisture vapor retarder/barrier should consist of a minimum 10 mils thick polyethylene with a maximum perm rating of 0.3 in accordance with ASTM E 1745. Seams in the moisture vapor retarder/barrier should be overlapped no less than 6 inches or in accordance with the manufacturer's recommendations. Joints and penetrations should be sealed with the manufacturer's recommended adhesives, pressure-sensitive tape, or both. The contractor must avoid damaging or puncturing the moisture vapor retarder/barrier and repair any punctures with additional polyethylene properly lapped and sealed.

The moisture vapor retarder/barrier may be placed directly beneath the floor slab with no intermediate granular fill layer. The vapor barrier should be placed directly on a smooth compacted subgrade surface consistent with the recommendations provided in Section 3.02 of this report. This method of construction will provide improved curing of the slab bottom and will eliminate potential problems caused by water being trapped in a granular fill layer. However, concrete slabs poured directly on a moisture vapor retarder/barrier can experience shrinkage cracking and curling due to differential rates of curing through the thickness of the slab. Therefore, for concrete placed directly on the moisture vapor retarder/barrier, we recommend a maximum water to cement ratio of 0.45 and the use of water-reducing admixtures to increase workability and decrease bleeding.

Alternatively, the slabs may be constructed over 2 inches of sand that is placed on the moisture vapor retarder/barrier. Granular fill should consist of clean, fine-graded materials with 100% passing the No. 4 sieve, 10% to 30% passing the No. 100 sieve, and less than 5% passing the No. 200 sieve. The granular layer should be moist but not saturated and uniformly compacted by making at least one pass with a vibratory base compactor or some other mechanical method that is approved by the Project Geotechnical Engineer. If uneven, the surface of the sand should be trimmed to provide the full design thickness of the proposed slab. The granular fill layer should not be left exposed to rain or other sources of water such as wet-grinding, power washing, pipe leaks or other processes, and should be damp but not saturated at the time of concrete placement. Granular fill layers that become saturated should be removed and replaced prior to concrete placement.

3.16 Miscellaneous Concrete Flatwork

Miscellaneous concrete flatwork and walkways may be designed with a minimum thickness of 4 inches. Large slabs (greater than 6 feet in width) should be reinforced with a minimum of #3 rebar placed 24 inches on-center in both directions. The reinforcement must be placed at mid-height in the slab. Control joints should be constructed to create squares or rectangles with a maximum spacing of 12 feet. The Project Civil Engineer should provide design details and specifications for all exterior concrete flatwork include walkways. In addition, walkways should be separated from foundations with a thick expansion joint filler.

The subgrade beneath all miscellaneous concrete flatwork and equipment pads should be constructed in accordance with Section 3.04 of this report. The geotechnical engineer should monitor the moisture conditioning and compaction of the subgrade soils in order to verify compliance with our recommendations.

3.17 Footing Excavations and Concrete Subgrade

All footing excavations should be observed by the geotechnical consultant to verify that they have been excavated into competent soils. The foundation excavations should be observed prior to the placement of forms, reinforcement steel, or concrete. These excavations should be evenly trimmed and level. Prior to concrete placement, any loose or soft soils should be removed. Excavated soils should not be placed within slab or footing areas unless properly compacted (see Section 3.04).

Prior to the placement of the moisture barrier and sand, the subgrade soils underlying the slab should be observed by the geotechnical consultant to verify that all under-slab utility trenches have been properly backfilled and compacted, that no loose or soft soils are present, and that the slab subgrade has been properly compacted to a minimum of 90 percent relative compaction within the upper 12 inches.

Footings may experience an overall loss in bearing capacity or an increased potential to settle where located in close proximity to existing or future utility trenches. Furthermore, stresses imposed by the footings on the utility lines may cause cracking, collapse and/or a loss of serviceability. To reduce this risk, footings should extend below a 1:1 plane projected upward from the closest bottom of a parallel utility trench.

The subgrade below slabs on grade and walkways should be brought to a minimum of 0% and a maximum of 4% above the optimum moisture content for a depth of 6 inches prior to the placement of concrete or a moisture barrier. The geotechnical consultant should perform insitu moisture tests to verify that the appropriate moisture content has been achieve a maximum of 72 hours prior to the placement of concrete or moisture barriers.

3.18 Drainage and Moisture Proofing

Surface drainage should be directed away from the proposed improvements into suitable drainage devices (see Section 1804.4 of the 2022 CBC). Neither excess irrigation nor rainwater should be allowed to collect or pond against building foundations or within low-lying or level areas of the lot. Surface waters should be diverted away from the tops of slopes and prevented from draining over the top of slopes and down the slope face.

Walls and portions thereof that retain soil and enclose interior spaces and floors below grade should be waterproofed and damp-proofed in accordance with Section 1805 of the 2022 CBC.

Retaining structures should be drained to prevent the accumulation of subsurface water behind the walls. Backdrains should be installed behind all retaining walls exceeding 3 feet in height. All backdrains should be outlet to suitable drainage devices. Retaining walls less than 3 feet in height should be provided with backdrains or weep holes. Damp-proofing and/or waterproofing should also be provided on all retaining walls exceeding 3 feet in height.

3.19 Cement Type and Corrosion Potential

A soluble sulfate test was performed on a near-surface soil sample indicated a soluble sulfate content of 36.4 mg/kg (0.00364 percent by weight). Thus, below-grade concrete at the subject site should have a negligible exposure to water-soluble sulfate in the soil. Our recommendations for concrete exposed to sulfate-containing soils are presented in the table below.

Recommendations for Concrete Exposed to Soils Containing Soluble Sulfate

Sulfate Exposure	Water Soluble Sulfate (SO_4) in Soil (% by Weight)	Sulfate (SO_4) in Water (ppm)	Cement Type (ASTM C150)	Maximum Water-Cement Ratio (by Weight)	Minimum Compressive Strength (psi)
Negligible	0.00 - 0.10	0-150	--	--	2,500
Moderate	0.10 - 0.20	150-1,500	II	0.50	4,000
Severe	0.20 - 2.00	1,500-10,000	V	0.45	4,500
Very Severe	Over 2.00	Over 10,000	V plus pozzolan or slag	0.45	4,500

Use of alternate combinations of cementitious materials may be permitted if the combinations meet design recommendations contained in American Concrete Institute guideline ACI 318-11.

Our testing also indicates that there is a low concentration of soluble chloride (24.0 mg/kg) in the onsite soils; therefore, special no protection of reinforcing steel should be required due to soil conditions.

The soils were also tested for soil reactivity (pH) and electrical resistivity (ohm-cm). The test results indicate that the on-site soils have a pH of 8.39 and a minimum electrical resistivity of 4,110 ohm-cm. A neutral or non-corrosive soil has a value ranging from 6.0 to 8.5; thus, the onsite soils can be considered neutral. Generally, soils that could be considered moderately corrosive to ferrous metals have minimum resistivity values of about 3,000 ohm-cm to 10,000 ohm-cm. Soils with resistivity values less than 3,000 ohm-cm can be considered corrosive and soils with resistivity values less than 1,000 ohm-cm can be considered extremely corrosive. In any case, buried metal conduits should have a protective coating in accordance with the manufacturer's specifications. A corrosion specialist should be consulted if more detailed recommendations are required.

3.20 Plan Review

Once formal grading and foundation plans are prepared for the subject project, this office should review the plans from a geotechnical viewpoint, comment on changes from the plan used during preparation of this report and revise the recommendations of this report where necessary.

3.21 Geotechnical Observation and Testing During Grading

The geotechnical engineer should be contacted to provide observation and testing during the following stages of grading:

- During the clearing and grubbing of the site.
- During the demolition of any existing structures, buried utilities or other existing improvements.
- During excavation and over-excavation of existing subgrade.
- During all phases of grading including ground preparation and filling operations.
- When any unusual conditions are encountered during grading.

A grading and compaction report summarizing conditions encountered during grading and the in-place density testing that was performed should be submitted upon completion of the earthwork construction.

3.22 Post-Grading Geotechnical Observation and Testing

After the completion of grading the geotechnical engineer should be contacted to provide additional observation and testing during the following construction activities:

- During trenching and backfilling operations of buried improvements and utilities to verify proper backfill and compaction of the utility trenches.

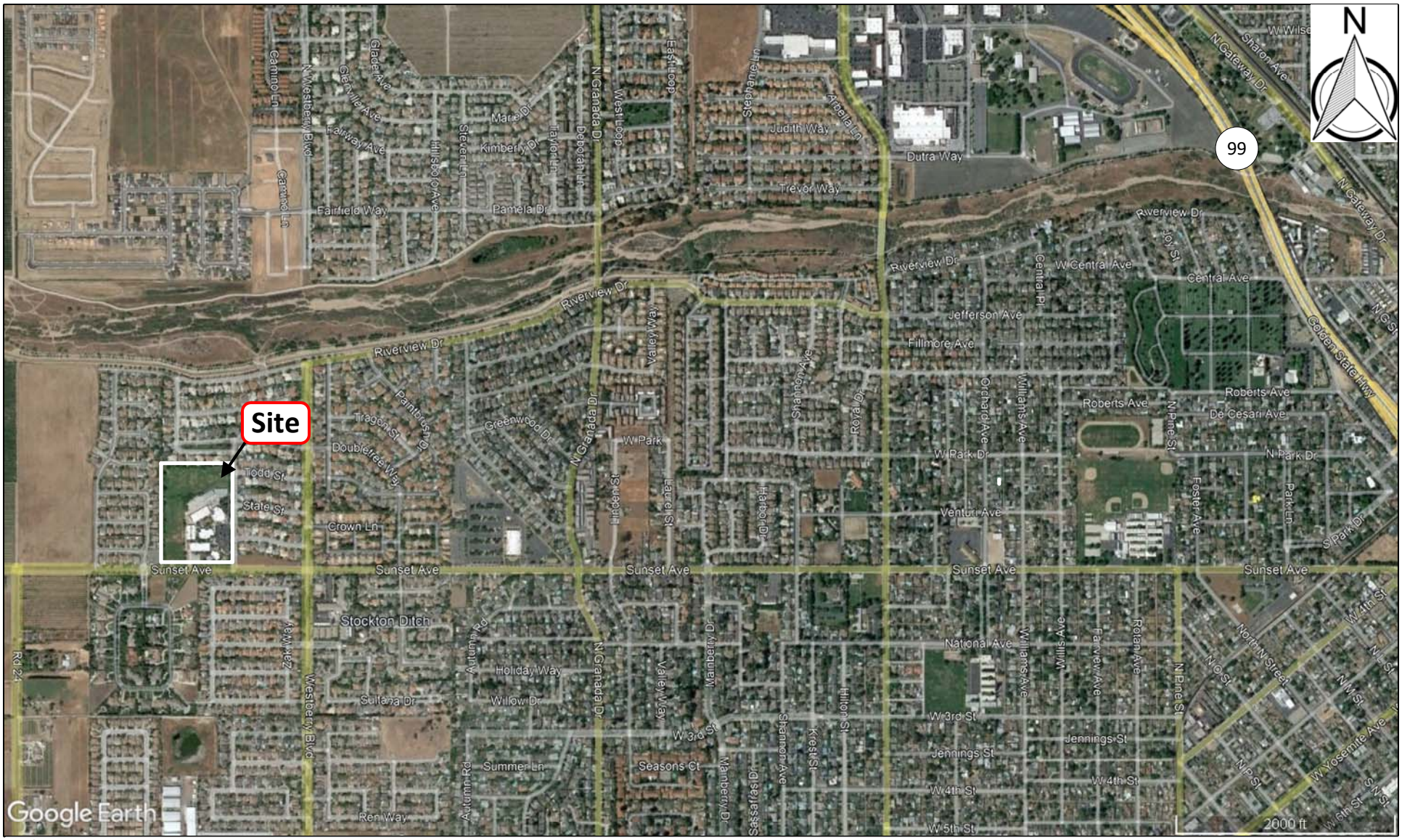
- After excavation and prior to placement of reinforcing steel or concrete within footing excavations to verify that footings are properly founded in competent materials.
- During fine or precise grading involving the placement of any fills underlying driveways, sidewalks, walkways, or other miscellaneous concrete flatwork to verify proper placement, mixing and compaction of fills.
- When any unusual ground or soil conditions are encountered during construction.

4.00 CLOSURE

The findings, conclusions and recommendations in this report were prepared in accordance with generally accepted engineering and geologic principles and practices. No other warranty, either express or implied, is made. This report has been prepared for the Madera Unified School District and other members of the Project Design Team to be used for the design and construction of improvements at the project site. Anyone using this report for any other purpose must draw their own conclusions regarding required construction procedures and subsurface conditions.

RMA GeoScience should be retained during the earthwork and foundation phases of construction to monitor compliance with the design concepts and recommendations and to provide additional recommendations as needed. Should subsurface conditions be encountered during construction that are different from those described in this report, this office should be notified immediately so that our recommendations may be re-evaluated.

FIGURES



Reference: Google Earth Pro, 2023

Scale: 1" ≈ 1,274'

FIGURE 1

SITE VICINITY MAP

New Kindergarten Classrooms at Lincoln Elementary School
650 Liberty Lane
Madera, California 93637
Project #07-230525-0

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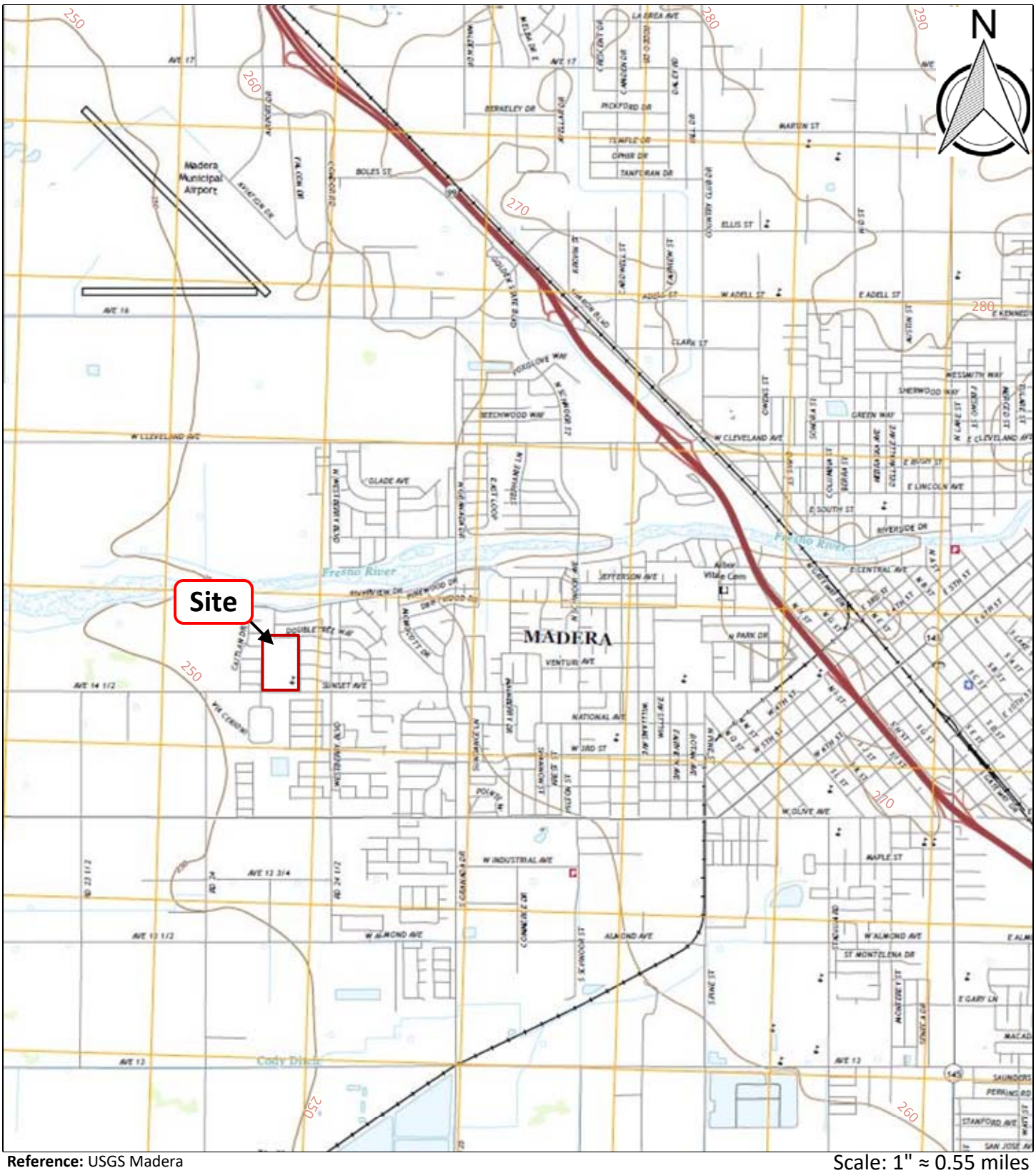

Reference: USGS Madera Quadrangle, California 7.5-Minute Series, 2018

Scale: 1" ≈ 0.55 miles

FIGURE 2

USGS CONTOUR MAP

New Classroom Buildings at Lincoln Elementary School
650 Liberty Lane
Madera, California 93637
Project #07-230525-0

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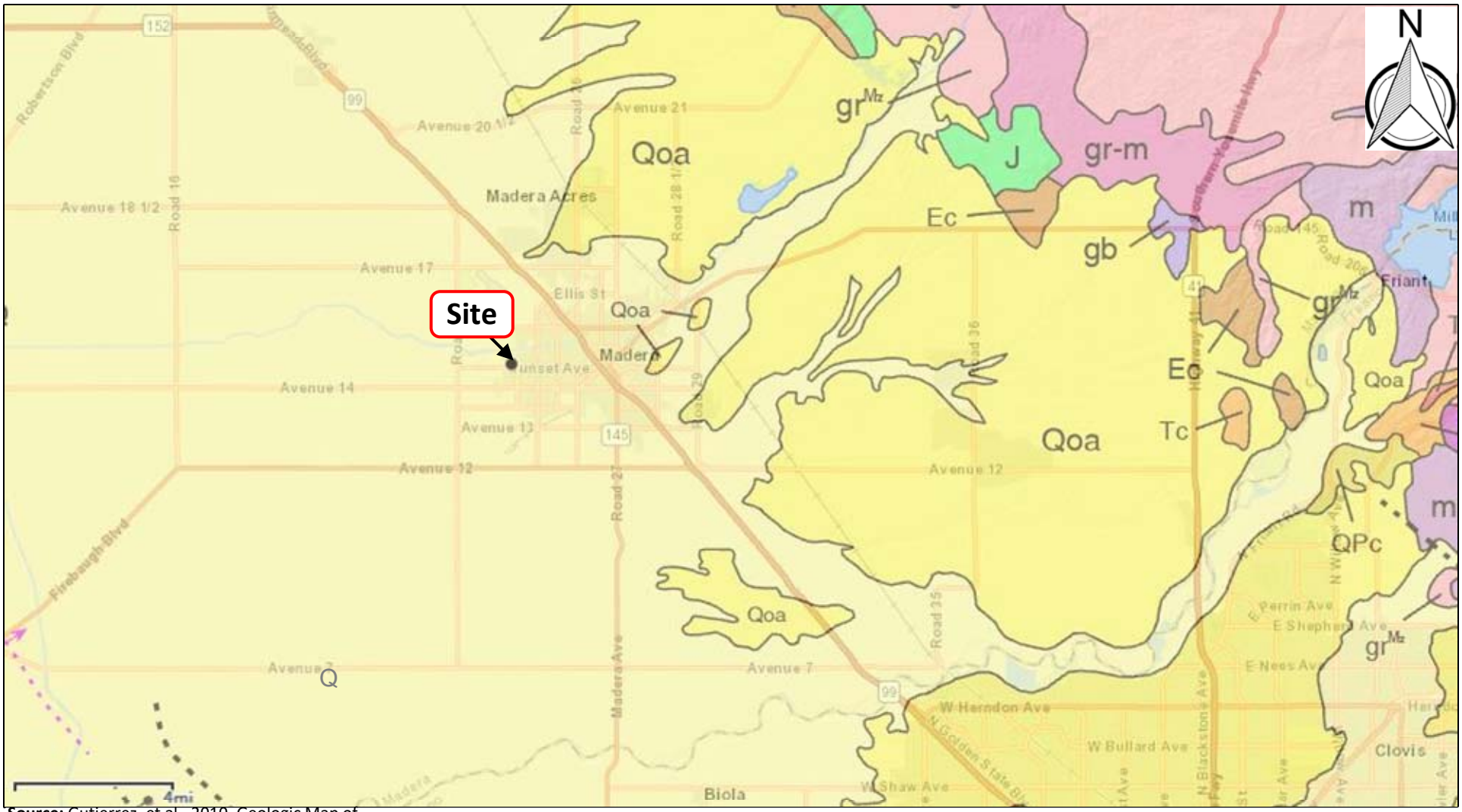

Source: Gutierrez, et al., 2010, Geologic Map of California, California Geologic Survey Map No. 2

FIGURE 3A

REGIONAL GEOLOGIC MAP

New Kindergarten Classrooms at Lincoln Elementary School
650 Liberty Lane
Madera, California 93637
Project #07-230525-0

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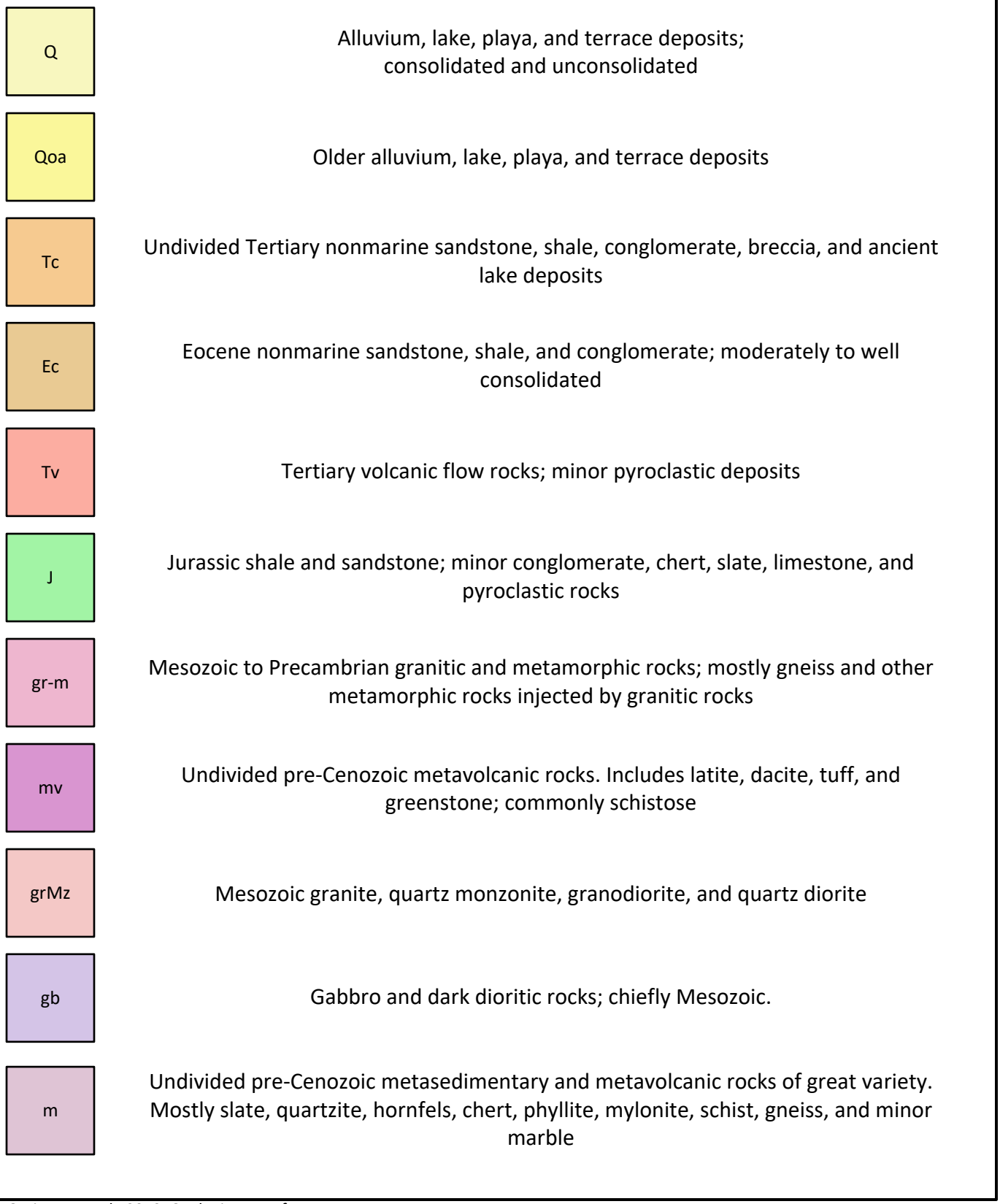

Source: Gutierrez, et al., 2010, Geologic Map of California, California Geologic Survey Map No. 2

FIGURE 3B
LEGEND FOR REGIONAL GEOLOGIC MAP
New Kindergarten Classrooms at Lincoln Elementary School
650 Liberty Lane
Madera, California 93637
Project #07-230525-0

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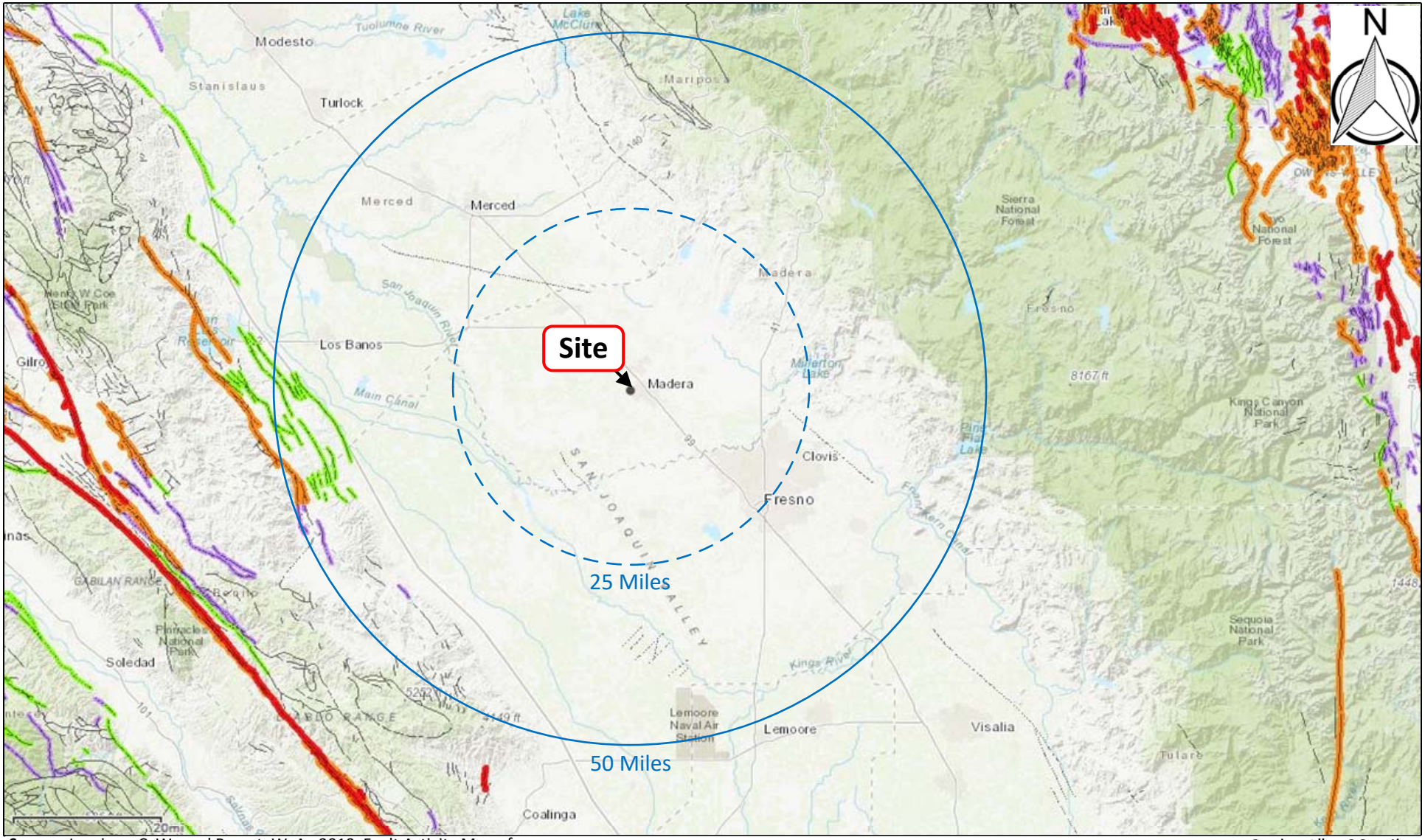

Source: Jennings, C. W., and Bryant, W. A., 2010, Fault Activity Map of California, California Geological Survey, Geologic Data Map No. 6.

Scale: 1" ≈ 20 miles

FIGURE 4A

FAULT ACTIVITY MAP

New Kindergarten Classrooms at Lincoln Elementary School
650 Liberty Lane
Madera, California 93637
Project #07-230525-0

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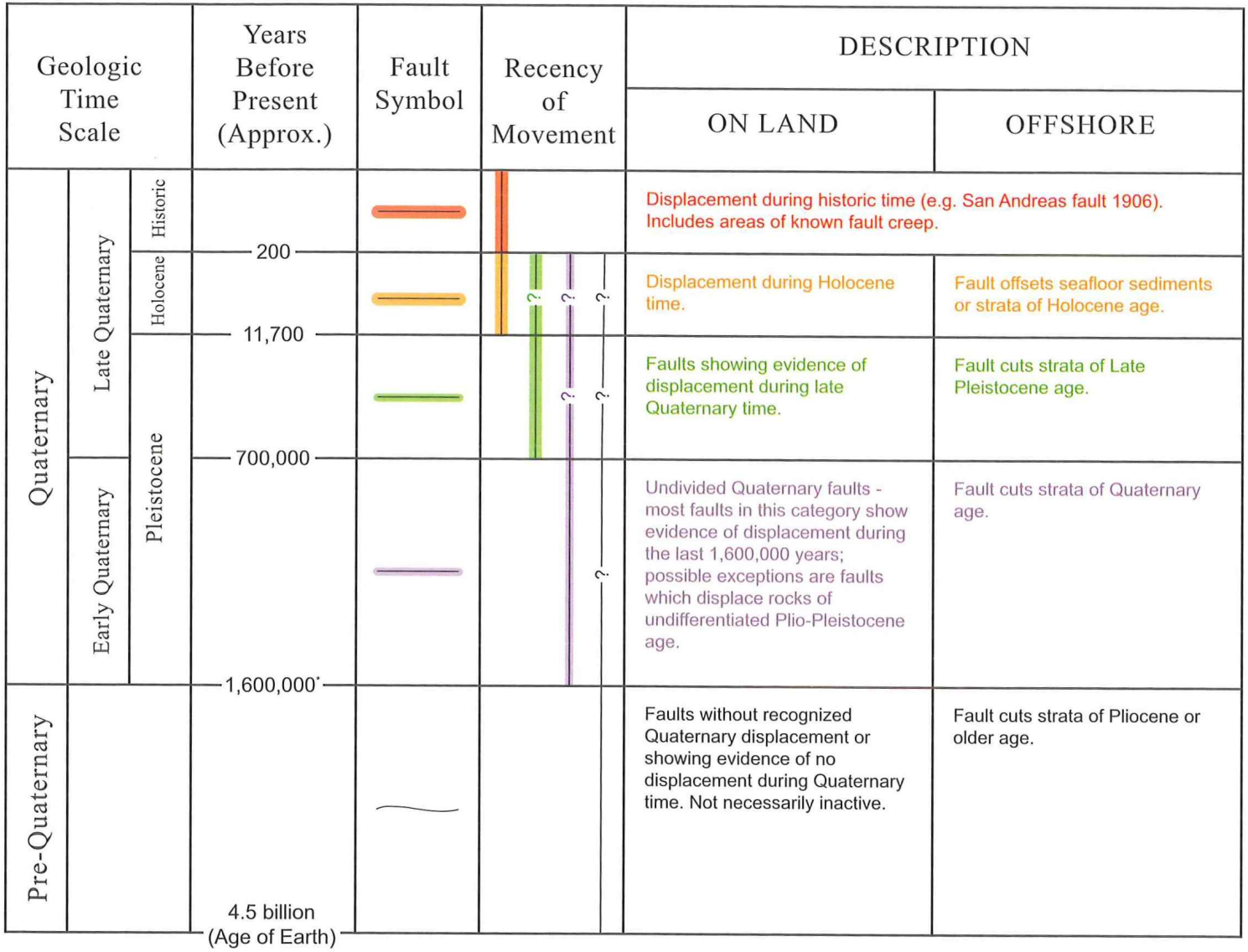

* Quaternary now recognized as extending to 2.6 Ma (Walker and Geissman, 2009). Quaternary faults in this map were established using the previous 1.6 Ma criterion.

Source: Jennings, C. W., and Bryant, W. A., 2010, Fault Activity Map of California, California Geologic Survey, Geologic Data Map No. 6.

FIGURE 4B
Legend for Fault Activity Map
New Kindergarten Classrooms at Lincoln Elementary School
650 Liberty Lane
Madera, California 93637
Project #07-230525-0

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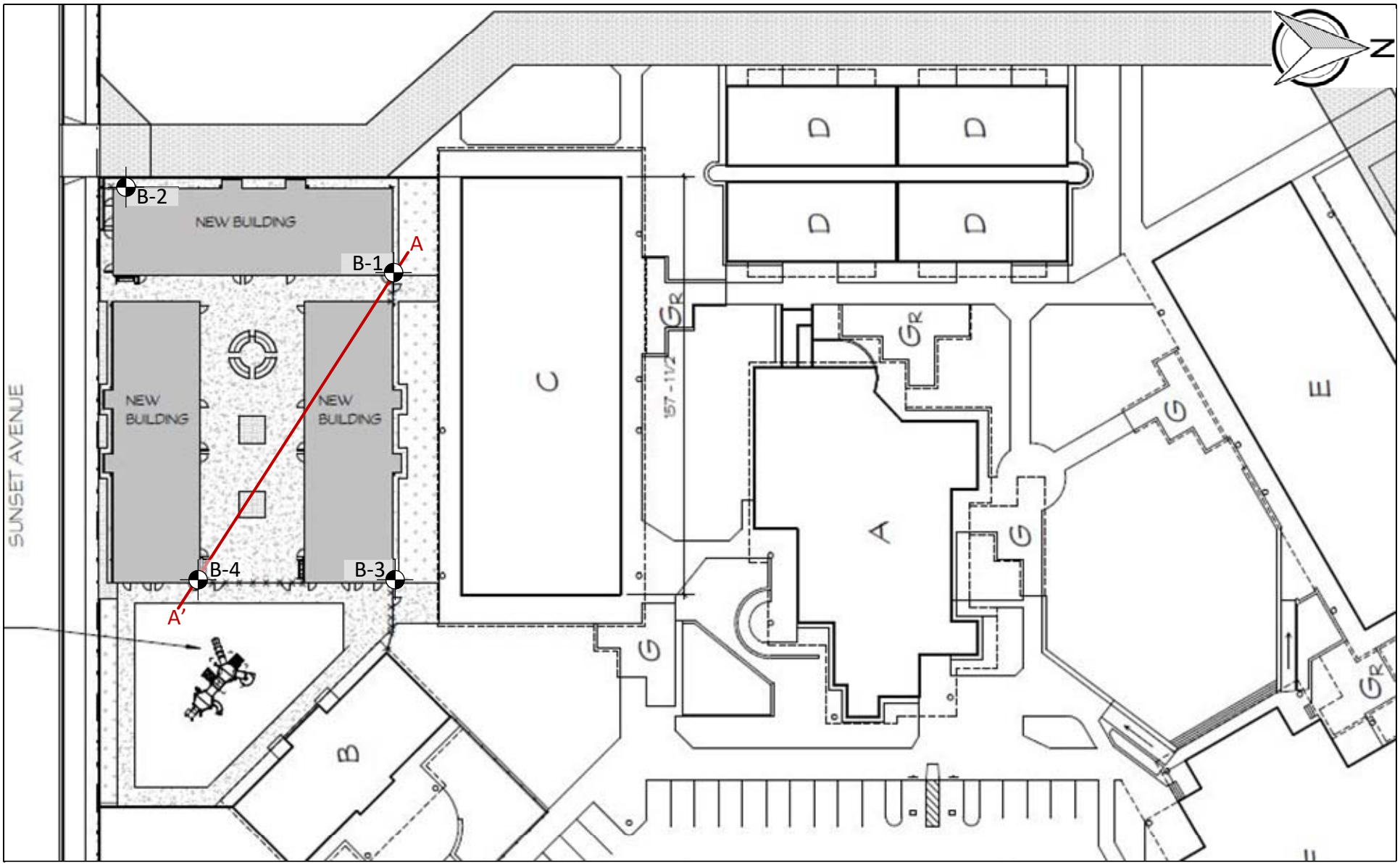

Site Plan prepared by: PBK

Scale: 1" ≈ 59'

FIGURE 5

BORING LOCATION MAP

New Kindergarten Classrooms at Lincoln Elementary School
650 Liberty Lane
Madera, California 93637
Project #07-230525-0

B-2 Approximate Boring Locations

A —— A' Cross Section Line

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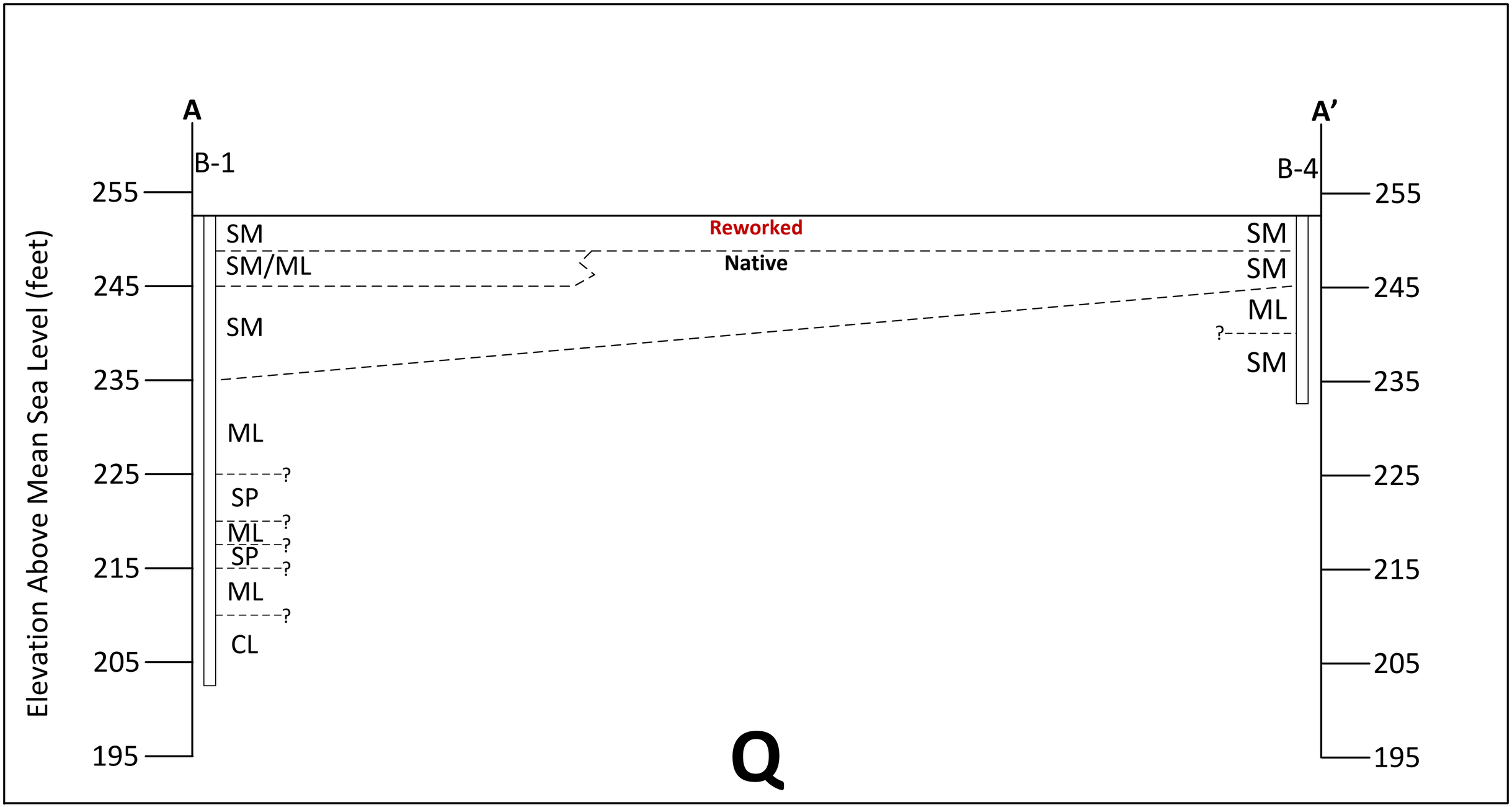

FIGURE 6
CROSS SECTION A TO A'
New Kindergarten Classrooms at Lincoln Elementary School
650 Liberty Lane
Madera, California 93637
Project #07-230525-0

Horizontal Scale: 1" = 11'
Vertical Scale: 1" = 10'

S56E

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APPENDIX A

FIELD INVESTIGATION

APPENDIX A

FIELD INVESTIGATION

A-1.00 FIELD EXPLORATION

A-1.01 Number of Borings

Our subsurface investigation consisted of excavating four test borings to a maximum depth of approximately 51 feet below existing grade. The test borings were excavated with a SIMCO 2800 drill rig equipped with a 4-inch solid stem auger and a 140-pound auto-hammer on July 20, 2023.

A-1.02 Location of Borings

The approximate locations of the borings are shown on Figure 5, Boring Location Map. GPS coordinates indicated on the logs are based on information provided by Google Earth Pro.

A-1.03 Logging Borings

Boring logs were prepared by one of our staff and are included in this appendix. The log contains factual information and interpretation of subsurface conditions between samples. The stratum indicated on the boring logs represents the approximate boundary between earth units and the transition may be gradual. The logs show subsurface conditions at the dates and locations indicated and may not be representative of subsurface conditions at other locations and times.

Identification of the soils encountered during the subsurface exploration was made using the field identification procedure of the Unified Soils Classification System (ASTM D2488). A legend defining the terms used in describing the relative compaction, consistency or firmness of the soil, and moisture level is provided on the following page. Bag, ring, or tube samples of the major earth units were obtained for laboratory inspection and testing.

I. SOIL STRENGTH/DENSITY

BASED ON STANDARD PENETRATION TESTS

Compactness of sand		Consistency of clay	
Penetration Resistance N (blows/ft)	Compactness	Penetration Resistance N (blows/ft)	Consistency
0-4	Very Loose	<2	Very Soft
4-10	Loose	2-4	Soft
10-30	Medium Dense	4-8	Medium Stiff
30-50	Dense	8-15	Stiff
>50	Very Dense	15-30	Very Stiff
		>30	Hard

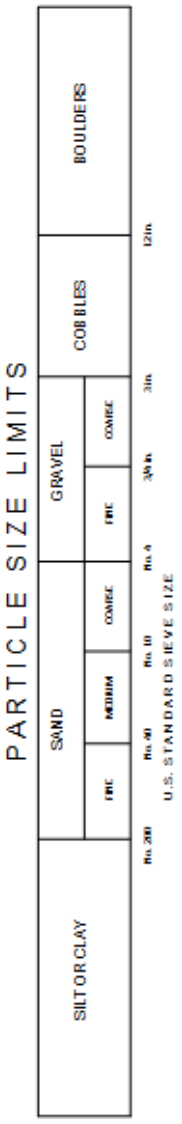
N = Number of blows of 140 lb. weight falling 30 in. to drive 2-in OD sampler 1 ft. (corrected)

BASED ON RELATIVE COMPACTION

Compactness of sand		Consistency of clay	
% Compaction	Compactness	% Compaction	Consistency
<75	Loose	<80	Soft
75-83	Medium Dense	80-85	Medium Stiff
83-90	Dense	85-90	Stiff
>90	Very Dense	>90	Very Stiff

II. SOIL MOISTURE

Moisture of sands		Moisture of clays	
% Moisture	Description	% Moisture	Description
<5%	Dry	<12%	Dry
5-12%	Moist	12-20%	Moist
>12%	Very Moist, wet	>20%	Very Moist, wet



MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size.	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravel, gravel-sand mixtures. little or no fines.
			GP	Poorly graded gravel or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	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 silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

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Exploratory Boring Log

Boring No. B-1
Sheet 1 of 2

Date Drilled:	July 20th, 2023	Drilling Equipment:	SIMCO 2800, Solid Stem Auger
Logged By:	GJV	Borehole Diameter:	4"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.960512°, -120.104788°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
	R	30		10.9	118.3	SM		**REWORKED:** dark brown, fine to medium SILTY SAND with CLAY, moist, dense, with roots and organics
5	R	6				SM/ML		**NATIVE:** brown, fine SILTY SAND/SANDY SILT, moist, loose, minor roots
10	S	50/4"				SM		Light brown, fine to medium SILTY SAND minor CLAY, moist, very dense, partially cemented
15	R	54		10.4	123.7			. . .dense
20	S	21				ML		Brown, fine SANDY SILT with CLAY, moist, very stiff
25	R	25		13.5	120.5			. . .with interlayers of SILTY SAND
30	S	11				SP		Light brown, fine SAND, dry, loose
						ML		Brown, fine SANDY SILT with CLAY, moist, stiff
35	R	32		2.9	108.1	SP		Light gray, fine to coarse SAND with fine to coarse GRAVEL, dry, medium dense
	S					ML		Brown, fine SANDY SILT minor CLAY, moist, very stiff

***Note**
All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
- Groundwater
- End of Boring

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Exploratory Boring Log

Boring No. B-1

Date Drilled:	July 25th, 2023	Drilling Equipment:	SIMCO 2800, Solid Stem Auger
Logged By:	GJV	Borehole Diameter:	4"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.960512°, -120.104788°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
	S	17				ML		. . .with interlayers of SILTY SAND
45	R	37		18.8	116.3	CL		Gray brown to brown, SILTY CLAY with fine SAND, moist, hard
50	S	23						. . .very stiff
55								
60								
65								
70								
75								

This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.

Notes:
1. Boring terminated at approximately 51'
2. No groundwater encountered
3. Boring backfilled with soil cuttings

***Note**

All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
- S - SPT Sample
- Bulk Sample
- T - Modified California Tube Sample
- R - Modified California Ring Sample

Symbols:
- Groundwater
- End of Boring

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Exploratory Boring Log

Boring No. B-2
Sheet 1 of 1

Date Drilled:	July 20th, 2023	Drilling Equipment:	SIMCO 2800, Solid Stem Auger
Logged By:	GJV	Borehole Diameter:	4"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.960260°, -120.104822°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
	R	39	▨	5.9	127.1	SM		**REWORKED:** dark brown, fine to medium SILTY SAND, moist, dense, with roots and organics
5	R	10		3.8	111.0	SM		**NATIVE:** brown, fine to medium SILTY SAND, dry, medium dense
10	R	16		14.6	120.3	ML		Brown to red born, fine SANDY SILT with CLAY, moist, very stiff . . .light brown, fine to medium grained
15	S	27				SM		Brown, fine to medium SILTY SAND, moist, medium dense
20	S	22						. . .fine grained, with interlayers of SANDY SILT
25								
30								
35								

This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.

Notes:
1. Boring terminated at approximately 21'
2. No groundwater encountered
3. Boring backfilled with soil cuttings

***Note**
All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
▨ - Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
▽ - Groundwater
◣ - End of Boring

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Exploratory Boring Log

Boring No. B-3
Sheet 1 of 1

Date Drilled:	July 20th, 2023	Drilling Equipment:	SIMCO 2800, Solid Stem Auger
Logged By:	GJV	Borehole Diameter:	4"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.960493°, -120.104350°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
	R	44	▨	6.5	129.4	SM		**REWORKED:** light brown, fine to medium SILTY SAND trace CLAY, moist, dense
5	R	15		13.3	104.4	SM		**NATIVE:** brown, fine to medium SILTY SAND minor CLAY, very moist, medium dense
10	R	20		11.7	103.0	ML		Light brown, fine SANDY SILT, dry, very stiff
15	S	26				SM		Light brown, fine SILTY SAND, dry, medium dense . . .with interlayers of SANDY SILT
20	S	17						. . .with interlayers of SAND
25								
30								
35								

This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.

Notes:
1. Boring terminated at approximately 21'
2. No groundwater encountered
3. Boring backfilled with soil cuttings

***Note**
All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
▨ - Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
▽ - Groundwater
◣ - End of Boring

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Exploratory Boring Log

Boring No. B-4
Sheet 1 of 1

Date Drilled:	July 20th, 2023	Drilling Equipment:	SIMCO 2800, Solid Stem Auger
Logged By:	GJV	Borehole Diameter:	4"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.960302°, -120.104352°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
	R	50		6.4	127.8	SM		**REWORKED:** brown, fine to medium SILTY SAND trace CLAY, moist, very dense
5	R	11		9.0	103.4	SM		**NATIVE:** brown, fine to medium SILTY SAND, moist, medium dense . . .with interlayers of SANDY SILT
10	S	13				ML		Brown, fine SANDY SILT with CLAY, moist, stiff, minor roots
15	S	32				SM		Brown, fine to medium SILTY SAND, moist, dense . . .with interlayers of SAND with GRAVEL
20	S	31						. . .with interlayers of SANDY SILT
25								
30								
35								

Notes:
1. Boring terminated at approximately 21'
2. No groundwater encountered
3. Boring backfilled with soil cuttings

***Note**
All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
- Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
- Groundwater
- End of Boring

APPENDIX B

LABORATORY TESTS

APPENDIX B

B-1.00 LABORATORY TESTS

B-1.01 Moisture Determination

The moisture content of tube and ring samples obtained from the test borings was determined in accordance with ASTM D2216, the standard method for determining the water content of soil using a drying oven. The mass of material remaining after oven drying is used as the mass of the solid particles. The results of these tests are provided on the boring logs in Appendix A.

B-1.02 Density of Split-Barrel Samples

The densities of ring and tube samples, which were obtained using a split-barrel sampler, were determined in accordance with ASTM D2937. The results of these tests are provided on the boring logs in Appendix A.

B-1.03 Soluble Sulfates and Chlorides

Tests were performed in accordance with California Test Methods 417 and 422 on a near-surface soil sample obtained during the field exploration. These tests were performed by Dellavalle Laboratory, Inc. located in Fresno, California (see Table B1 for results).

B-1.04 Soil Reactivity (pH) and Minimum Electrical Resistivity

One near-surface soil sample was tested for soil reactivity (pH) and minimum electrical resistivity using California Test Method 643 (see Table B1). The pH measurement determines the degree of acidity or alkalinity in the soils. The minimum electrical resistivity is used as an indicator of how corrosive the soil is relative to buried metallic items.

TABLE B1: SUMMARY OF CORROSIVITY TESTS

Sample Location	Soluble Sulfates (mg/kg)	Soluble Chlorides (mg/kg)	pH	Minimum Resistivity (ohm-cm)
B-2 @ 1’ – 3’	36.4	24.0	8.39	4,110

B-1.05 Percent Passing #200 Sieve

Three soil samples were tested in accordance with ASTM D1140 to determine the percent passing the #200 sieve (see Table B2). This represents the amount of silt and clay that is present in the soil.

TABLE B2: PERCENT PASSING #200 SIEVE TEST RESULTS

Sample Location	Dry Weight Before Wash (grams)	Dry Weight After Wash (grams)	Percent Passing #200 Sieve
B-1 @ 35.5’	292.0	274.1	6
B-2 @ 1’ – 3’	286.2	236.3	17
B-4 @ 5.5’	276.7	182.3	34

B-1.06 Atterberg Limits

The liquid limit, plastic limit, and the plasticity index of a near-surface soil sample were determined using the standard test methods of ASTM D4318 (See Figure B1).

B-1.07 Expansion Index

Expansion index testing was performed on a near-surface sample of the on-site soils in accordance with the standard test methods of ASTM D4829. The results of this test are shown on Figure B2.

B-1.08 Direct Shear

One 3-point direct shear test was performed on a representative near-surface sample of soil using the standard test method of ASTM D3080 (consolidated and drained). The shear tests were performed on a direct shear machine of the strain-controlled type. To simulate possible adverse field conditions, the samples were saturated prior to shearing. Three soil specimens were sheared at varying normal loads for the test and the results plotted to establish the angle of the internal friction and cohesion of the tested sample. The results of this test are shown on Figure B3.

B-1.09 One-Dimensional Consolidation Properties

The magnitude and rate of consolidation of soils obtained from test borings, when it is restrained laterally and drained axially while subjected to incrementally applied controlled-stress loading, was determined using the standard test methods of ASTM D2435. The results of these tests are shown on Figure B4.

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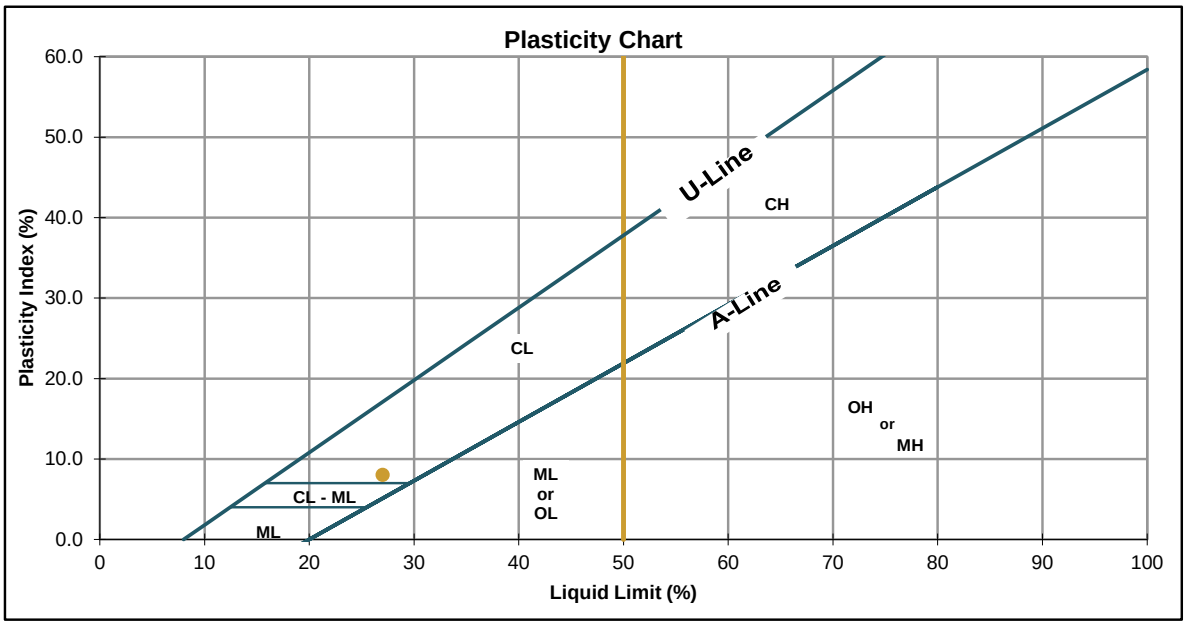
Figure B1
Laboratory Test Form | ASTM D4318
Plasticity Index (PI) of Soils

Project Number:	07-230525-0/02	Lab ID:	23-013436
Project Name:	New Kindergarten Classrooms at Lincoln ES	Date Tested:	7/31/2023
Sampled By:	Gabe V.	Tested By:	Jason M.
Sample Date:	7/20/2023		
Sample Location:	B-1 @ 1ft - 3ft		
Sample Description:	Silty SAND with Clay, fine to medium grained, brown		

Plasticity Index Results

Liquid Limit:	27
Average Plastic Limit :	19
Plasticity Index:	8



Liquid Limit Data

	Trial 1	Trial 2	Trial 3
Wet Weight (gm.)	17.53	19.64	18.74
Dry Weight (gm.)	15.71	17.31	16.56
Tare Weight (gm.)	8.74	8.77	8.64
Number of Blows	33	24	17
Moisture Content (%)	26.1	27.3	27.5

Plastic Limit Data

	Trial 1	Trial 2
Wet Weight (gm.)	30.56	31.32
Dry Weight (gm.)	28.85	29.47
Tare Weight (gm.)	19.84	19.74
Moisture Content (%)	19.0	19.0

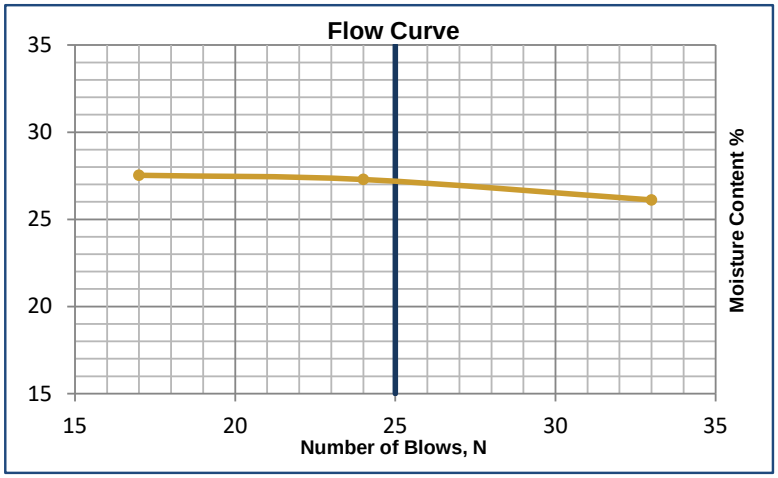


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Figure
Laboratory Test Form | ASTM D4829
Expansion Index of Soils

Project Number:	07-230525-0/02	Lab ID:	23-013451
Project Name:	New Kindergarten Classrooms at Lincoln ES	Date Sampled:	7/20/2023
Sampled By:	Gabe V.	Date Tested:	8/2/2023
Tested By:	Jason M.		
Sample Location:	B-4 @ 1ft - 3ft		
Sample Description:	Silty SAND trace Clay, fine to medium grained, brown		

Expansion Readings

Initial Sample Height (in):	0.0092
Final Sample Height (in):	0.0172
Expansion (in):	**0.0080**
Expansion Index, EI:	8

Classification of Expansive Soil

EI	Potential Expansion
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

Expansion Index Data

Initial Set-Up Data		Final Data	
Sample + Tare Weight (gm):	780.6	Sample + Tare Weight (gm):	815.9
Tare Weight (gm):	365.9	Tare Weight (gm):	365.9
Initial Gauge Reading (in):	0.0092	Final Gauge Reading (in):	0.0172
Moisture Content And Density Data			
Wet Weight + Tare (gm):	100.0	Wet Weight + Tare (gm):	801.6
Dry Weight + Tare (gm):	91.8	Dry Weight + Tare (gm):	755.9
Tare Weight (gm):	0	Tare Weight (gm):	365.9
Moisture Content:	8.9%	Moisture Content:	11.7%
Initial Volume (ft^3):	0.007345	Final Volume (ft^3):	0.007330
Remolded Wet Density (pcf):	124.5	Final Wet Density (pcf):	135.3
Remolded Dry Density (pcf):	114.3	Final Dry Density (pcf):	121.1
Degree of Saturation:	**51**	Assumed Specific Gravity:	2.7

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Figure B4a
Laboratory Test Form | ASTM D2435
Consolidation, No Time Rate

Project Number:	07-230525-0/02	Lab ID:	23-013449
Project Name:	New Kindergarten Classrooms at Lincoln ES	Date Sampled:	7/20/2023
Sampled By:	Gabe V.	Date Tested:	7/21/23 - 8/4/23
Tested By:	Jennifer K.		
Sample Location:	B-3 @ 5.5ft		
Sample Description:	Silty SAND, fine to medium grained, brown		
Sample Preparation:	In-Situ Ring Sample		

Consolidation Test Data

Initial Data		Final Data	
Initial Sample Height (in):	1.0000	Final Sample Height (in):	0.9219
Intial Void Ratio:	0.52	Final Void Ratio:	0.40
Initial Gauge Reading (in):	0.2473	Final Gauge Reading (in):	0.3254

Moisture Content and Density Data

Intial Wet Weight + Tare (gm):	184.60	Final Wet Weight + Tare (gm):	193.70
Intial Dry Weight + Tare (gm):	170.40	Final Dry Weight + Tare (gm):	170.40
Tare Weight (gm):	45.20	Tare Weight (gm):	45.20
Initial Moisture Content:	11.34%	Final Moisture Content:	18.61%
Initial Volume (ft^3):	0.002531	Final Volume (ft^3):	0.002334
Initial Wet Density (pcf):	121.40	Final Wet Density (pcf):	140.28
Initial Dry Density (pcf):	109.04	Final Dry Density (pcf):	118.27
Initial Degree of Saturation:	56.2	Final Degree of Saturation:	118.4

Moisture Condition	Load (psf)	Dial Reading (in)	Sample Height (in)	Axial Strain (%)
In Situ	0	0.2473	1.0000	0.00
	100	0.2475	0.9998	0.02
	250	0.2479	0.9994	0.06
Saturated	250	0.2480	0.9993	0.07
	500	0.2582	0.9891	1.09
	1000	0.2763	0.9710	2.90
	2000	0.2929	0.9544	4.56
	4000	0.3101	0.9372	6.28
	8000	0.3307	0.9166	8.34
	4000	0.3296	0.9177	8.23
	2000	0.3278	0.9195	8.05
	1000	0.3254	0.9219	7.81

(As required by ASTM E-329-18)

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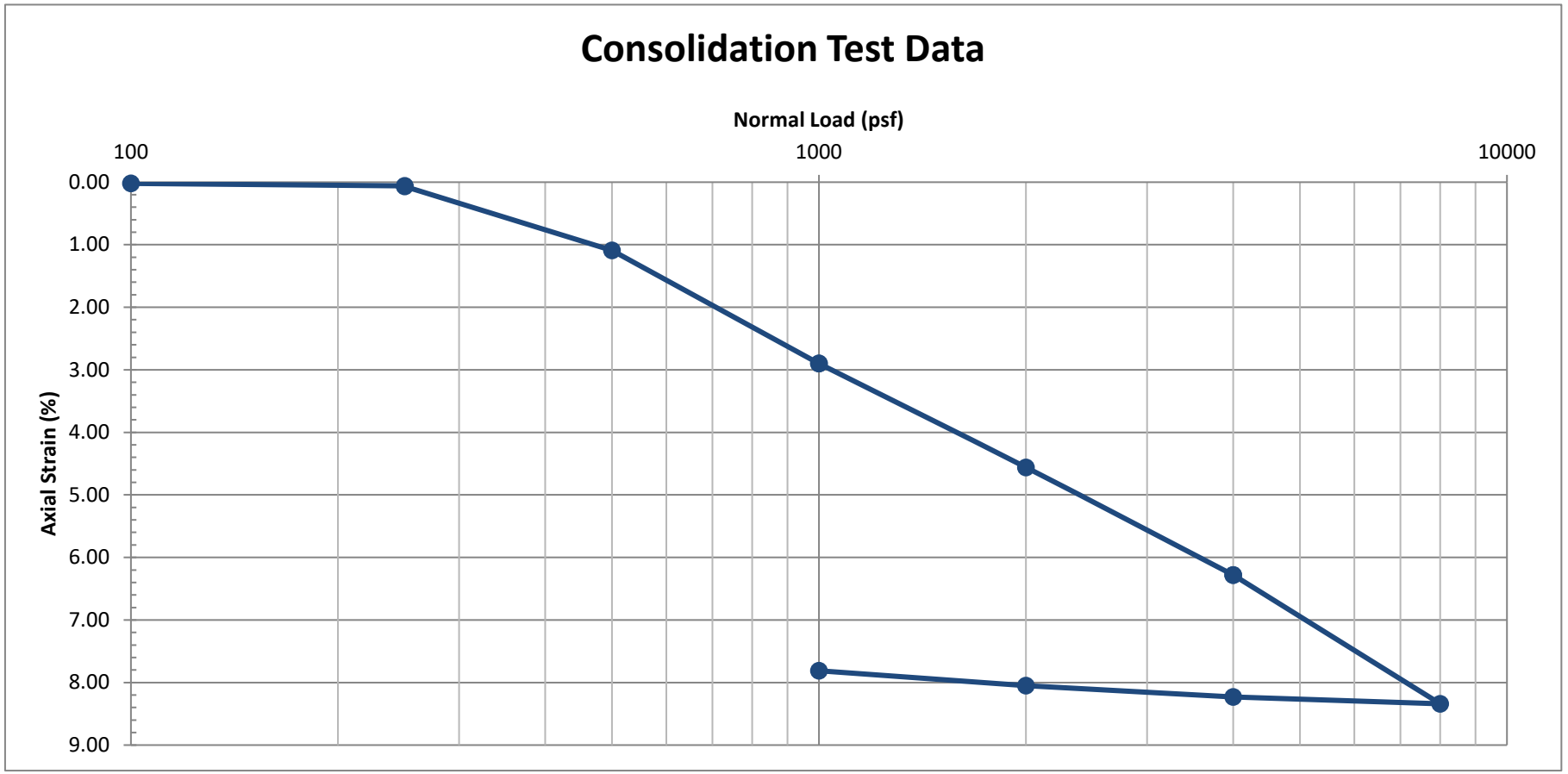
Figure B4b
Laboratory Test Form | ASTM D2435
Consolidation, No Time Rate



Project Number:	07-230525-0/02	**Project Name:**	New Kindergarten Classrooms at Lincoln Elementary School		
Date Tested:	7/21/23 - 8/4/23	**Lab ID:**	23-013449	**Sample Location:**	B-3 @ 5.5ft
Tested By:	Jennifer K.	**Description:**	SM	**Sampled By:**	Gabe V.

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APPENDIX C

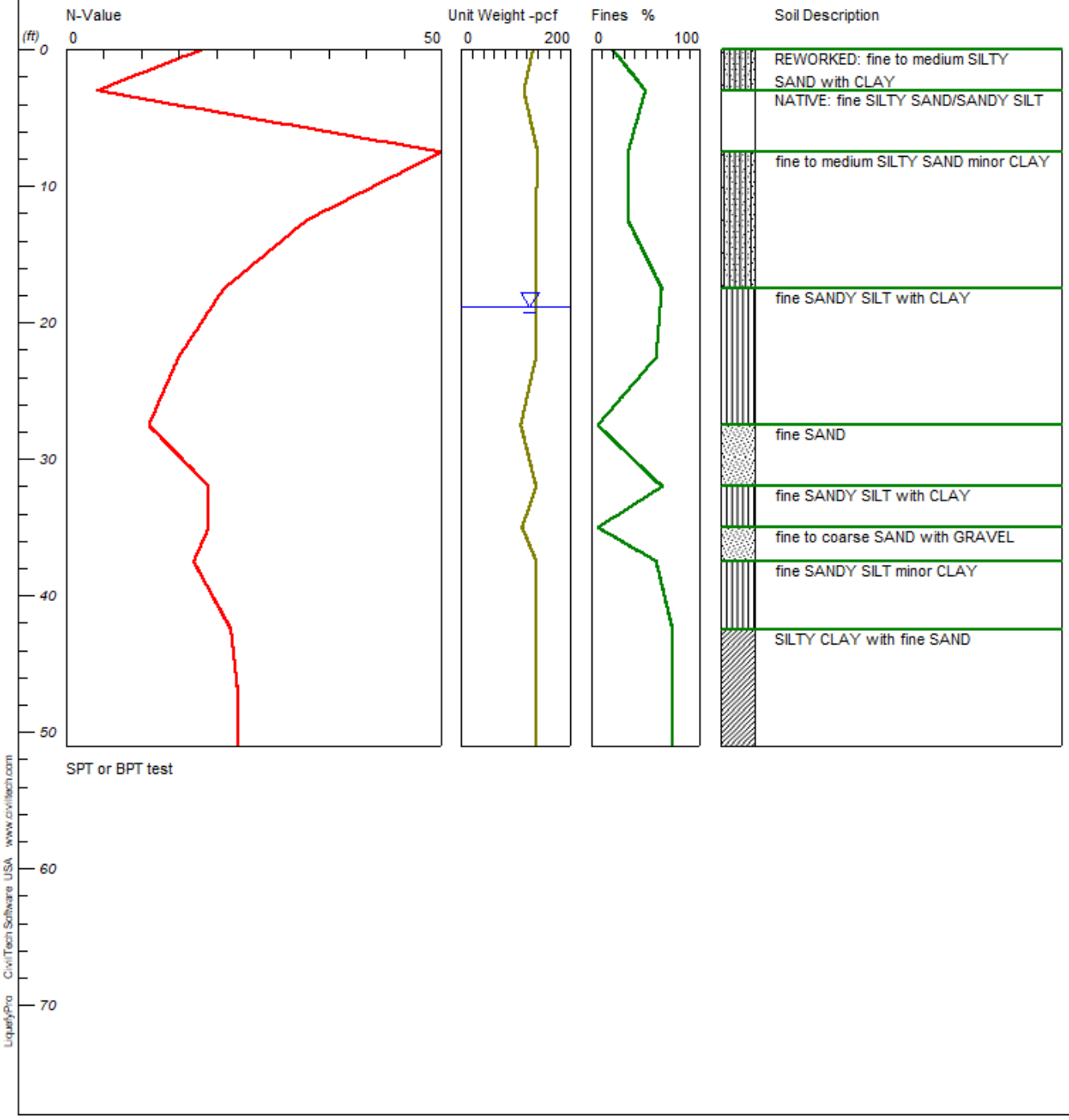
LIQUIFACTION AND SEISMIC SETTLEMENT ANALYSIS
(Figures and Analysis Summary)

LIQUEFACTION ANALYSIS

New Kindergarten Classrooms at Lincoln Elementary Sc

Hole No.=B-1 Water Depth=18.8 ft Surface Elev.=252

Magnitude=5.5
Acceleration=0.351g

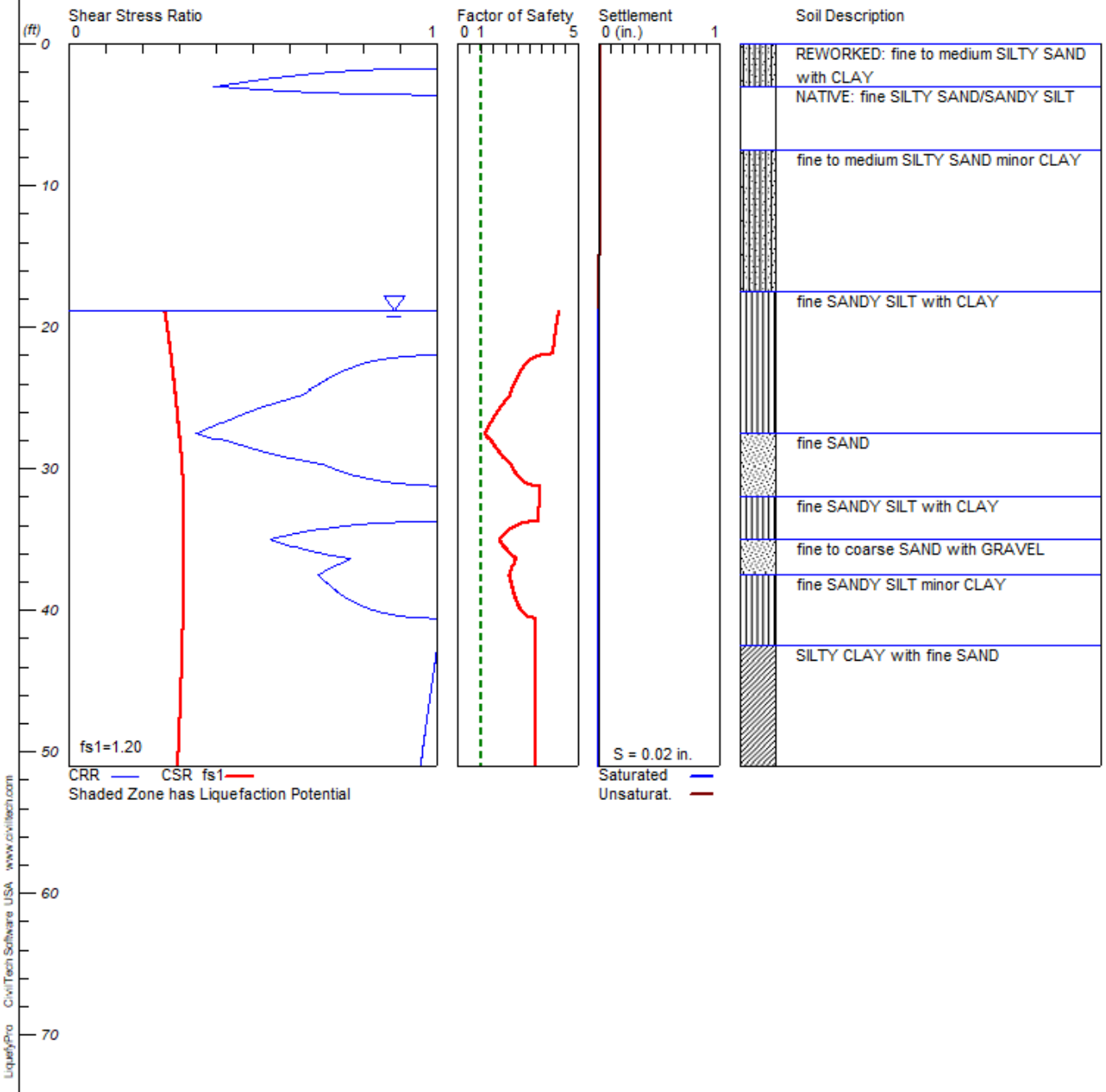


LIQUEFACTION ANALYSIS

New Kindergarten Classrooms at Lincoln Elementary Sc

Hole No.=B-1 Water Depth=18.8 ft Surface Elev.=252

Magnitude=5.5
Acceleration=0.351g

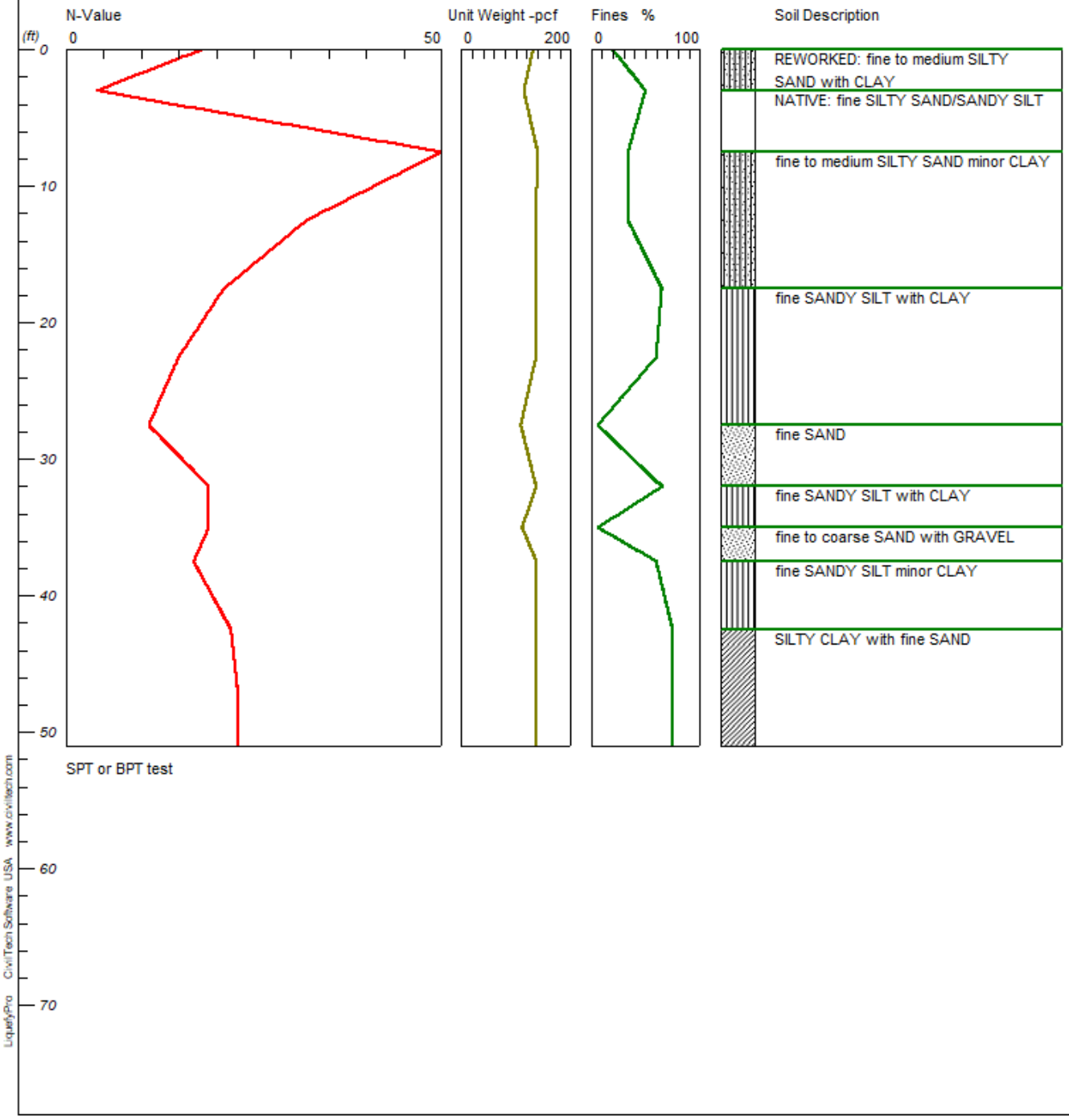


LIQUEFACTION ANALYSIS

New Kindergarten Classrooms at Lincoln Elementary Sc

Hole No.=B-1 Water Depth=95 ft Surface Elev.=252

Magnitude=5.5
Acceleration=0.351g

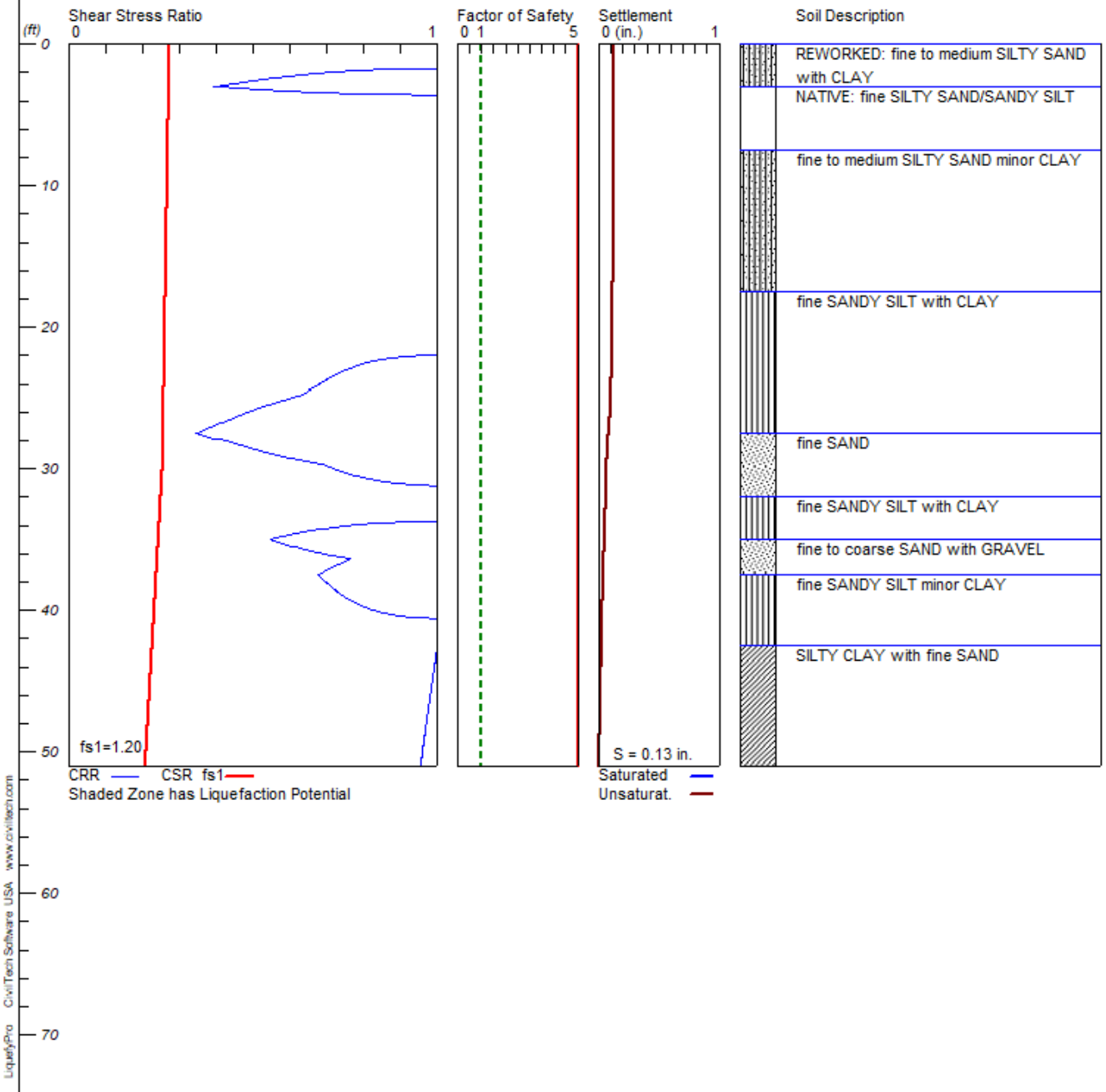


LIQUEFACTION ANALYSIS

New Kindergarten Classrooms at Lincoln Elementary Sc

Hole No.=B-1 Water Depth=95 ft Surface Elev.=252

Magnitude=5.5
Acceleration=0.351g



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LIQUEFACTION ANALYSIS SUMMARY
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Input File Name: C:\Users\Engineering\Desktop\07-230525-0.liq
Title: New Kindergarten Classrooms at Lincoln Elementary Sc
Subtitle: 07-230525-0

Surface Elev.=252
Hole No.=B-1
Depth of Hole= 51.00 ft
Water Table during Earthquake= 18.80 ft
Water Table during In-Situ Testing= 180.00 ft
Max. Acceleration= 0.35 g
Earthquake Magnitude= 5.50

Input Data:
Surface Elev.=252
Hole No.=B-1
Depth of Hole=51.00 ft
Water Table during Earthquake= 18.80 ft
Water Table during In-Situ Testing= 180.00 ft
Max. Acceleration=0.35 g
Earthquake Magnitude=5.50
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.5
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.2
Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth	SPT	gamma	Fines
ft		pcf	%
0.00	18.00	131.20	20.00
3.00	4.00	114.50	50.00

7.50	50.00	140.00	34.00
12.50	32.00	136.60	34.00
17.50	21.00	137.00	65.00
22.50	15.00	136.80	60.00
27.50	11.00	109.00	6.00
32.00	19.00	137.00	65.00
35.00	19.00	111.20	6.00
37.50	17.00	137.50	60.00
42.50	22.00	138.20	75.00
47.50	23.00	138.20	75.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.01 in.
Total Settlement of Saturated and Unsaturated Sands=0.02 in.
Differential Settlement=0.008 to 0.011 in.

Depth	CRRm	CSRfs	F.S.	S_sat.	S_dry	S_all
ft				in.	in.	in.
0.00	1.11	0.27	5.00	0.00	0.01	0.02
0.05	1.11	0.27	5.00	0.00	0.01	0.02
0.10	1.11	0.27	5.00	0.00	0.01	0.02
0.15	1.11	0.27	5.00	0.00	0.01	0.02
0.20	1.11	0.27	5.00	0.00	0.01	0.02
0.25	1.11	0.27	5.00	0.00	0.01	0.02
0.30	1.11	0.27	5.00	0.00	0.01	0.02
0.35	1.11	0.27	5.00	0.00	0.01	0.02
0.40	1.11	0.27	5.00	0.00	0.01	0.02
0.45	1.11	0.27	5.00	0.00	0.01	0.02
0.50	1.11	0.27	5.00	0.00	0.01	0.02
0.55	1.11	0.27	5.00	0.00	0.01	0.02
0.60	1.11	0.27	5.00	0.00	0.01	0.02
0.65	1.11	0.27	5.00	0.00	0.01	0.02
0.70	1.11	0.27	5.00	0.00	0.01	0.02
0.75	1.11	0.27	5.00	0.00	0.01	0.02
0.80	1.11	0.27	5.00	0.00	0.01	0.02
0.85	1.11	0.27	5.00	0.00	0.01	0.02
0.90	1.11	0.27	5.00	0.00	0.01	0.02
0.95	1.11	0.27	5.00	0.00	0.01	0.02
1.00	1.11	0.27	5.00	0.00	0.01	0.02
1.05	1.11	0.27	5.00	0.00	0.01	0.02
1.10	1.11	0.27	5.00	0.00	0.01	0.02
1.15	1.11	0.27	5.00	0.00	0.01	0.02
1.20	1.11	0.27	5.00	0.00	0.01	0.02
1.25	1.11	0.27	5.00	0.00	0.01	0.02
1.30	1.11	0.27	5.00	0.00	0.01	0.02
1.35	1.11	0.27	5.00	0.00	0.01	0.02
1.40	1.11	0.27	5.00	0.00	0.01	0.02
1.45	1.11	0.27	5.00	0.00	0.01	0.02
1.50	1.11	0.27	5.00	0.00	0.01	0.02
1.55	1.11	0.27	5.00	0.00	0.01	0.02
1.60	1.11	0.27	5.00	0.00	0.01	0.02

1.65 1.11 0.27 5.00 0.00 0.01 0.02
1.70 1.11 0.27 5.00 0.00 0.01 0.02
1.75 0.93 0.27 5.00 0.00 0.01 0.02
1.80 0.85 0.27 5.00 0.00 0.01 0.02
1.85 0.80 0.27 5.00 0.00 0.01 0.02
1.90 0.77 0.27 5.00 0.00 0.01 0.02
1.95 0.74 0.27 5.00 0.00 0.01 0.02
2.00 0.71 0.27 5.00 0.00 0.01 0.02
2.05 0.69 0.27 5.00 0.00 0.01 0.02
2.10 0.66 0.27 5.00 0.00 0.01 0.02
2.15 0.64 0.27 5.00 0.00 0.01 0.02
2.20 0.62 0.27 5.00 0.00 0.01 0.02
2.25 0.60 0.27 5.00 0.00 0.01 0.02
2.30 0.59 0.27 5.00 0.00 0.01 0.02
2.35 0.57 0.27 5.00 0.00 0.01 0.02
2.40 0.55 0.27 5.00 0.00 0.01 0.02
2.45 0.54 0.27 5.00 0.00 0.01 0.01
2.50 0.52 0.27 5.00 0.00 0.01 0.01
2.55 0.51 0.27 5.00 0.00 0.01 0.01
2.60 0.50 0.27 5.00 0.00 0.01 0.01
2.65 0.48 0.27 5.00 0.00 0.01 0.01
2.70 0.47 0.27 5.00 0.00 0.01 0.01
2.75 0.45 0.27 5.00 0.00 0.01 0.01
2.80 0.44 0.27 5.00 0.00 0.01 0.01
2.85 0.43 0.27 5.00 0.00 0.01 0.01
2.90 0.42 0.27 5.00 0.00 0.01 0.01
2.95 0.40 0.27 5.00 0.00 0.01 0.01
3.00 0.39 0.27 5.00 0.00 0.01 0.01
3.05 0.42 0.27 5.00 0.00 0.01 0.01
3.10 0.45 0.27 5.00 0.00 0.01 0.01
3.15 0.48 0.27 5.00 0.00 0.01 0.01
3.20 0.51 0.27 5.00 0.00 0.01 0.01
3.25 0.54 0.27 5.00 0.00 0.01 0.01
3.30 0.57 0.27 5.00 0.00 0.01 0.01
3.35 0.61 0.27 5.00 0.00 0.01 0.01
3.40 0.65 0.27 5.00 0.00 0.01 0.01
3.45 0.70 0.27 5.00 0.00 0.01 0.01
3.50 0.76 0.27 5.00 0.00 0.01 0.01
3.55 0.86 0.27 5.00 0.00 0.01 0.01
3.60 1.11 0.27 5.00 0.00 0.01 0.01
3.65 1.11 0.27 5.00 0.00 0.01 0.01
3.70 1.11 0.27 5.00 0.00 0.01 0.01
3.75 1.11 0.27 5.00 0.00 0.01 0.01
3.80 1.11 0.27 5.00 0.00 0.01 0.01
3.85 1.11 0.27 5.00 0.00 0.01 0.01
3.90 1.11 0.27 5.00 0.00 0.01 0.01
3.95 1.11 0.27 5.00 0.00 0.01 0.01
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8.65 1.11 0.27 5.00 0.00 0.01 0.01
8.70 1.11 0.27 5.00 0.00 0.01 0.01
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8.90 1.11 0.27 5.00 0.00 0.01 0.01
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10.45 1.11 0.27 5.00 0.00 0.01 0.01
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10.55 1.11 0.27 5.00 0.00 0.01 0.01
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10.65 1.11 0.27 5.00 0.00 0.01 0.01
10.70 1.11 0.27 5.00 0.00 0.01 0.01
10.75 1.11 0.27 5.00 0.00 0.01 0.01
10.80 1.11 0.27 5.00 0.00 0.01 0.01
10.85 1.11 0.27 5.00 0.00 0.01 0.01
10.90 1.11 0.27 5.00 0.00 0.01 0.01
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11.40 1.11 0.27 5.00 0.00 0.01 0.01
11.45 1.11 0.27 5.00 0.00 0.01 0.01
11.50 1.11 0.27 5.00 0.00 0.01 0.01
11.55 1.11 0.27 5.00 0.00 0.01 0.01
11.60 1.11 0.27 5.00 0.00 0.01 0.01
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11.70 1.11 0.27 5.00 0.00 0.01 0.01
11.75 1.11 0.27 5.00 0.00 0.01 0.01
11.80 1.11 0.27 5.00 0.00 0.01 0.01
11.85 1.11 0.27 5.00 0.00 0.01 0.01
11.90 1.11 0.27 5.00 0.00 0.01 0.01
11.95 1.11 0.27 5.00 0.00 0.01 0.01
12.00 1.11 0.27 5.00 0.00 0.01 0.01
12.05 1.11 0.27 5.00 0.00 0.01 0.01
12.10 1.11 0.27 5.00 0.00 0.01 0.01
12.15 1.11 0.27 5.00 0.00 0.01 0.01
12.20 1.11 0.27 5.00 0.00 0.01 0.01
12.25 1.11 0.27 5.00 0.00 0.01 0.01
12.30 1.11 0.27 5.00 0.00 0.01 0.01
12.35 1.11 0.27 5.00 0.00 0.01 0.01
12.40 1.11 0.27 5.00 0.00 0.01 0.01

12.45	1.11	0.27	5.00	0.00	0.01	0.01
12.50	1.11	0.27	5.00	0.00	0.01	0.01
12.55	1.11	0.27	5.00	0.00	0.01	0.01
12.60	1.11	0.27	5.00	0.00	0.01	0.01
12.65	1.11	0.27	5.00	0.00	0.01	0.01
12.70	1.11	0.27	5.00	0.00	0.01	0.01
12.75	1.11	0.27	5.00	0.00	0.01	0.01
12.80	1.11	0.27	5.00	0.00	0.01	0.01
12.85	1.11	0.27	5.00	0.00	0.01	0.01
12.90	1.11	0.27	5.00	0.00	0.01	0.01
12.95	1.11	0.27	5.00	0.00	0.01	0.01
13.00	1.11	0.27	5.00	0.00	0.01	0.01
13.05	1.11	0.27	5.00	0.00	0.01	0.01
13.10	1.11	0.27	5.00	0.00	0.01	0.01
13.15	1.11	0.27	5.00	0.00	0.01	0.01
13.20	1.11	0.27	5.00	0.00	0.01	0.01
13.25	1.11	0.27	5.00	0.00	0.01	0.01
13.30	1.11	0.27	5.00	0.00	0.01	0.01
13.35	1.11	0.27	5.00	0.00	0.01	0.01
13.40	1.11	0.27	5.00	0.00	0.01	0.01
13.45	1.11	0.27	5.00	0.00	0.01	0.01
13.50	1.11	0.27	5.00	0.00	0.01	0.01
13.55	1.11	0.27	5.00	0.00	0.01	0.01
13.60	1.11	0.27	5.00	0.00	0.01	0.01
13.65	1.11	0.27	5.00	0.00	0.01	0.01
13.70	1.11	0.27	5.00	0.00	0.01	0.01
13.75	1.11	0.27	5.00	0.00	0.00	0.01
13.80	1.11	0.26	5.00	0.00	0.00	0.01
13.85	1.11	0.26	5.00	0.00	0.00	0.01
13.90	1.11	0.26	5.00	0.00	0.00	0.01
13.95	1.11	0.26	5.00	0.00	0.00	0.01
14.00	1.11	0.26	5.00	0.00	0.00	0.01
14.05	1.11	0.26	5.00	0.00	0.00	0.01
14.10	1.11	0.26	5.00	0.00	0.00	0.01
14.15	1.11	0.26	5.00	0.00	0.00	0.01
14.20	1.11	0.26	5.00	0.00	0.00	0.01
14.25	1.11	0.26	5.00	0.00	0.00	0.01
14.30	1.11	0.26	5.00	0.00	0.00	0.01
14.35	1.11	0.26	5.00	0.00	0.00	0.01
14.40	1.11	0.26	5.00	0.00	0.00	0.01
14.45	1.11	0.26	5.00	0.00	0.00	0.01
14.50	1.11	0.26	5.00	0.00	0.00	0.01
14.55	1.11	0.26	5.00	0.00	0.00	0.01
14.60	1.11	0.26	5.00	0.00	0.00	0.01
14.65	1.11	0.26	5.00	0.00	0.00	0.01
14.70	1.11	0.26	5.00	0.00	0.00	0.01
14.75	1.11	0.26	5.00	0.00	0.00	0.01
14.80	1.11	0.26	5.00	0.00	0.00	0.01
14.85	1.11	0.26	5.00	0.00	0.00	0.01
14.90	1.11	0.26	5.00	0.00	0.00	0.01
14.95	1.11	0.26	5.00	0.00	0.00	0.01
15.00	1.11	0.26	5.00	0.00	0.00	0.01
15.05	1.11	0.26	5.00	0.00	0.00	0.01
15.10	1.11	0.26	5.00	0.00	0.00	0.01

15.15	1.11	0.26	5.00	0.00	0.00	0.01
15.20	1.11	0.26	5.00	0.00	0.00	0.01
15.25	1.11	0.26	5.00	0.00	0.00	0.01
15.30	1.11	0.26	5.00	0.00	0.00	0.01
15.35	1.11	0.26	5.00	0.00	0.00	0.01
15.40	1.11	0.26	5.00	0.00	0.00	0.01
15.45	1.11	0.26	5.00	0.00	0.00	0.01
15.50	1.11	0.26	5.00	0.00	0.00	0.01
15.55	1.11	0.26	5.00	0.00	0.00	0.01
15.60	1.11	0.26	5.00	0.00	0.00	0.01
15.65	1.11	0.26	5.00	0.00	0.00	0.01
15.70	1.11	0.26	5.00	0.00	0.00	0.01
15.75	1.11	0.26	5.00	0.00	0.00	0.01
15.80	1.11	0.26	5.00	0.00	0.00	0.01
15.85	1.11	0.26	5.00	0.00	0.00	0.01
15.90	1.11	0.26	5.00	0.00	0.00	0.01
15.95	1.11	0.26	5.00	0.00	0.00	0.01
16.00	1.11	0.26	5.00	0.00	0.00	0.01
16.05	1.11	0.26	5.00	0.00	0.00	0.01
16.10	1.11	0.26	5.00	0.00	0.00	0.00
16.15	1.11	0.26	5.00	0.00	0.00	0.00
16.20	1.11	0.26	5.00	0.00	0.00	0.00
16.25	1.11	0.26	5.00	0.00	0.00	0.00
16.30	1.11	0.26	5.00	0.00	0.00	0.00
16.35	1.11	0.26	5.00	0.00	0.00	0.00
16.40	1.11	0.26	5.00	0.00	0.00	0.00
16.45	1.11	0.26	5.00	0.00	0.00	0.00
16.50	1.11	0.26	5.00	0.00	0.00	0.00
16.55	1.11	0.26	5.00	0.00	0.00	0.00
16.60	1.11	0.26	5.00	0.00	0.00	0.00
16.65	1.11	0.26	5.00	0.00	0.00	0.00
16.70	1.11	0.26	5.00	0.00	0.00	0.00
16.75	1.11	0.26	5.00	0.00	0.00	0.00
16.80	1.11	0.26	5.00	0.00	0.00	0.00
16.85	1.11	0.26	5.00	0.00	0.00	0.00
16.90	1.11	0.26	5.00	0.00	0.00	0.00
16.95	1.11	0.26	5.00	0.00	0.00	0.00
17.00	1.11	0.26	5.00	0.00	0.00	0.00
17.05	1.11	0.26	5.00	0.00	0.00	0.00
17.10	1.11	0.26	5.00	0.00	0.00	0.00
17.15	1.11	0.26	5.00	0.00	0.00	0.00
17.20	1.11	0.26	5.00	0.00	0.00	0.00
17.25	1.11	0.26	5.00	0.00	0.00	0.00
17.30	1.11	0.26	5.00	0.00	0.00	0.00
17.35	1.11	0.26	5.00	0.00	0.00	0.00
17.40	1.11	0.26	5.00	0.00	0.00	0.00
17.45	1.11	0.26	5.00	0.00	0.00	0.00
17.50	1.11	0.26	5.00	0.00	0.00	0.00
17.55	1.11	0.26	5.00	0.00	0.00	0.00
17.60	1.11	0.26	5.00	0.00	0.00	0.00
17.65	1.11	0.26	5.00	0.00	0.00	0.00
17.70	1.11	0.26	5.00	0.00	0.00	0.00
17.75	1.11	0.26	5.00	0.00	0.00	0.00
17.80	1.11	0.26	5.00	0.00	0.00	0.00

17.85	1.11	0.26	5.00	0.00	0.00	0.00
17.90	1.11	0.26	5.00	0.00	0.00	0.00
17.95	1.11	0.26	5.00	0.00	0.00	0.00
18.00	1.11	0.26	5.00	0.00	0.00	0.00
18.05	1.11	0.26	5.00	0.00	0.00	0.00
18.10	1.11	0.26	5.00	0.00	0.00	0.00
18.15	1.11	0.26	5.00	0.00	0.00	0.00
18.20	1.11	0.26	5.00	0.00	0.00	0.00
18.25	1.11	0.26	5.00	0.00	0.00	0.00
18.30	1.11	0.26	5.00	0.00	0.00	0.00
18.35	1.11	0.26	5.00	0.00	0.00	0.00
18.40	1.11	0.26	5.00	0.00	0.00	0.00
18.45	1.11	0.26	5.00	0.00	0.00	0.00
18.50	1.11	0.26	5.00	0.00	0.00	0.00
18.55	1.11	0.26	5.00	0.00	0.00	0.00
18.60	1.11	0.26	5.00	0.00	0.00	0.00
18.65	1.11	0.26	5.00	0.00	0.00	0.00
18.70	1.11	0.26	5.00	0.00	0.00	0.00
18.75	1.11	0.26	5.00	0.00	0.00	0.00
18.80	1.11	0.26	4.22	0.00	0.00	0.00
18.85	1.11	0.26	4.22	0.00	0.00	0.00
18.90	1.11	0.26	4.21	0.00	0.00	0.00
18.95	1.11	0.26	4.21	0.00	0.00	0.00
19.00	1.11	0.26	4.20	0.00	0.00	0.00
19.05	1.11	0.26	4.20	0.00	0.00	0.00
19.10	1.11	0.26	4.20	0.00	0.00	0.00
19.15	1.11	0.26	4.19	0.00	0.00	0.00
19.20	1.11	0.26	4.19	0.00	0.00	0.00
19.25	1.11	0.26	4.18	0.00	0.00	0.00
19.30	1.11	0.26	4.18	0.00	0.00	0.00
19.35	1.11	0.26	4.17	0.00	0.00	0.00
19.40	1.11	0.27	4.17	0.00	0.00	0.00
19.45	1.11	0.27	4.16	0.00	0.00	0.00
19.50	1.11	0.27	4.16	0.00	0.00	0.00
19.55	1.11	0.27	4.16	0.00	0.00	0.00
19.60	1.11	0.27	4.15	0.00	0.00	0.00
19.65	1.11	0.27	4.15	0.00	0.00	0.00
19.70	1.11	0.27	4.14	0.00	0.00	0.00
19.75	1.11	0.27	4.14	0.00	0.00	0.00
19.80	1.11	0.27	4.13	0.00	0.00	0.00
19.85	1.11	0.27	4.13	0.00	0.00	0.00
19.90	1.11	0.27	4.13	0.00	0.00	0.00
19.95	1.11	0.27	4.12	0.00	0.00	0.00
20.00	1.11	0.27	4.12	0.00	0.00	0.00
20.05	1.11	0.27	4.11	0.00	0.00	0.00
20.10	1.11	0.27	4.11	0.00	0.00	0.00
20.15	1.11	0.27	4.10	0.00	0.00	0.00
20.20	1.11	0.27	4.10	0.00	0.00	0.00
20.25	1.11	0.27	4.10	0.00	0.00	0.00
20.30	1.11	0.27	4.09	0.00	0.00	0.00
20.35	1.11	0.27	4.09	0.00	0.00	0.00
20.40	1.11	0.27	4.08	0.00	0.00	0.00
20.45	1.11	0.27	4.08	0.00	0.00	0.00
20.50	1.11	0.27	4.08	0.00	0.00	0.00

20.55	1.11	0.27	4.07	0.00	0.00	0.00
20.60	1.11	0.27	4.07	0.00	0.00	0.00
20.65	1.11	0.27	4.06	0.00	0.00	0.00
20.70	1.11	0.27	4.06	0.00	0.00	0.00
20.75	1.11	0.27	4.06	0.00	0.00	0.00
20.80	1.11	0.27	4.05	0.00	0.00	0.00
20.85	1.11	0.27	4.05	0.00	0.00	0.00
20.90	1.11	0.27	4.05	0.00	0.00	0.00
20.95	1.11	0.27	4.04	0.00	0.00	0.00
21.00	1.11	0.27	4.04	0.00	0.00	0.00
21.05	1.11	0.27	4.03	0.00	0.00	0.00
21.10	1.11	0.27	4.03	0.00	0.00	0.00
21.15	1.11	0.27	4.03	0.00	0.00	0.00
21.20	1.11	0.27	4.02	0.00	0.00	0.00
21.25	1.11	0.28	4.02	0.00	0.00	0.00
21.30	1.11	0.28	4.02	0.00	0.00	0.00
21.35	1.11	0.28	4.01	0.00	0.00	0.00
21.40	1.11	0.28	4.01	0.00	0.00	0.00
21.45	1.11	0.28	4.01	0.00	0.00	0.00
21.50	1.11	0.28	4.00	0.00	0.00	0.00
21.55	1.11	0.28	4.00	0.00	0.00	0.00
21.60	1.11	0.28	3.99	0.00	0.00	0.00
21.65	1.11	0.28	3.99	0.00	0.00	0.00
21.70	1.11	0.28	3.99	0.00	0.00	0.00
21.75	1.11	0.28	3.98	0.00	0.00	0.00
21.80	1.11	0.28	3.98	0.00	0.00	0.00
21.85	1.11	0.28	3.98	0.00	0.00	0.00
21.90	1.07	0.28	3.84	0.00	0.00	0.00
21.95	1.00	0.28	3.60	0.00	0.00	0.00
22.00	0.96	0.28	3.44	0.00	0.00	0.00
22.05	0.93	0.28	3.33	0.00	0.00	0.00
22.10	0.91	0.28	3.25	0.00	0.00	0.00
22.15	0.89	0.28	3.18	0.00	0.00	0.00
22.20	0.87	0.28	3.12	0.00	0.00	0.00
22.25	0.86	0.28	3.07	0.00	0.00	0.00
22.30	0.85	0.28	3.02	0.00	0.00	0.00
22.35	0.84	0.28	2.98	0.00	0.00	0.00
22.40	0.83	0.28	2.94	0.00	0.00	0.00
22.45	0.82	0.28	2.91	0.00	0.00	0.00
22.50	0.81	0.28	2.87	0.00	0.00	0.00
22.55	0.80	0.28	2.85	0.00	0.00	0.00
22.60	0.80	0.28	2.83	0.00	0.00	0.00
22.65	0.79	0.28	2.80	0.00	0.00	0.00
22.70	0.78	0.28	2.78	0.00	0.00	0.00
22.75	0.78	0.28	2.76	0.00	0.00	0.00
22.80	0.77	0.28	2.74	0.00	0.00	0.00
22.85	0.77	0.28	2.72	0.00	0.00	0.00
22.90	0.76	0.28	2.70	0.00	0.00	0.00
22.95	0.76	0.28	2.68	0.00	0.00	0.00
23.00	0.75	0.28	2.66	0.00	0.00	0.00
23.05	0.75	0.28	2.65	0.00	0.00	0.00
23.10	0.75	0.28	2.63	0.00	0.00	0.00
23.15	0.74	0.28	2.61	0.00	0.00	0.00
23.20	0.74	0.28	2.59	0.00	0.00	0.00

23.25	0.73	0.28	2.58	0.00	0.00	0.00
23.30	0.73	0.28	2.56	0.00	0.00	0.00
23.35	0.73	0.28	2.55	0.00	0.00	0.00
23.40	0.72	0.29	2.53	0.00	0.00	0.00
23.45	0.72	0.29	2.51	0.00	0.00	0.00
23.50	0.71	0.29	2.50	0.00	0.00	0.00
23.55	0.71	0.29	2.48	0.00	0.00	0.00
23.60	0.71	0.29	2.47	0.00	0.00	0.00
23.65	0.70	0.29	2.46	0.00	0.00	0.00
23.70	0.70	0.29	2.44	0.00	0.00	0.00
23.75	0.70	0.29	2.43	0.00	0.00	0.00
23.80	0.69	0.29	2.41	0.00	0.00	0.00
23.85	0.69	0.29	2.40	0.00	0.00	0.00
23.90	0.69	0.29	2.39	0.00	0.00	0.00
23.95	0.68	0.29	2.37	0.00	0.00	0.00
24.00	0.68	0.29	2.36	0.00	0.00	0.00
24.05	0.68	0.29	2.35	0.00	0.00	0.00
24.10	0.67	0.29	2.34	0.00	0.00	0.00
24.15	0.67	0.29	2.32	0.00	0.00	0.00
24.20	0.67	0.29	2.31	0.00	0.00	0.00
24.25	0.66	0.29	2.30	0.00	0.00	0.00
24.30	0.66	0.29	2.29	0.00	0.00	0.00
24.35	0.66	0.29	2.28	0.00	0.00	0.00
24.40	0.65	0.29	2.26	0.00	0.00	0.00
24.45	0.66	0.29	2.27	0.00	0.00	0.00
24.50	0.65	0.29	2.25	0.00	0.00	0.00
24.55	0.65	0.29	2.24	0.00	0.00	0.00
24.60	0.65	0.29	2.23	0.00	0.00	0.00
24.65	0.64	0.29	2.22	0.00	0.00	0.00
24.70	0.64	0.29	2.21	0.00	0.00	0.00
24.75	0.64	0.29	2.20	0.00	0.00	0.00
24.80	0.64	0.29	2.18	0.00	0.00	0.00
24.85	0.63	0.29	2.16	0.00	0.00	0.00
24.90	0.62	0.29	2.13	0.00	0.00	0.00
24.95	0.61	0.29	2.11	0.00	0.00	0.00
25.00	0.61	0.29	2.08	0.00	0.00	0.00
25.05	0.60	0.29	2.06	0.00	0.00	0.00
25.10	0.59	0.29	2.03	0.00	0.00	0.00
25.15	0.59	0.29	2.01	0.00	0.00	0.00
25.20	0.58	0.29	1.98	0.00	0.00	0.00
25.25	0.57	0.29	1.96	0.00	0.00	0.00
25.30	0.57	0.29	1.94	0.00	0.00	0.00
25.35	0.56	0.29	1.92	0.00	0.00	0.00
25.40	0.56	0.29	1.89	0.00	0.00	0.00
25.45	0.55	0.29	1.87	0.00	0.00	0.00
25.50	0.54	0.29	1.85	0.00	0.00	0.00
25.55	0.54	0.29	1.83	0.00	0.00	0.00
25.60	0.53	0.29	1.81	0.00	0.00	0.00
25.65	0.53	0.29	1.79	0.00	0.00	0.00
25.70	0.52	0.29	1.77	0.00	0.00	0.00
25.75	0.52	0.29	1.75	0.00	0.00	0.00
25.80	0.51	0.29	1.73	0.00	0.00	0.00
25.85	0.50	0.30	1.71	0.00	0.00	0.00
25.90	0.50	0.30	1.69	0.00	0.00	0.00

25.95	0.49	0.30	1.67	0.00	0.00	0.00
26.00	0.49	0.30	1.65	0.00	0.00	0.00
26.05	0.48	0.30	1.63	0.00	0.00	0.00
26.10	0.48	0.30	1.62	0.00	0.00	0.00
26.15	0.47	0.30	1.60	0.00	0.00	0.00
26.20	0.47	0.30	1.58	0.00	0.00	0.00
26.25	0.46	0.30	1.56	0.00	0.00	0.00
26.30	0.46	0.30	1.54	0.00	0.00	0.00
26.35	0.45	0.30	1.53	0.00	0.00	0.00
26.40	0.45	0.30	1.51	0.00	0.00	0.00
26.45	0.44	0.30	1.49	0.00	0.00	0.00
26.50	0.44	0.30	1.48	0.00	0.00	0.00
26.55	0.43	0.30	1.46	0.00	0.00	0.00
26.60	0.43	0.30	1.44	0.00	0.00	0.00
26.65	0.42	0.30	1.42	0.00	0.00	0.00
26.70	0.42	0.30	1.41	0.00	0.00	0.00
26.75	0.42	0.30	1.39	0.00	0.00	0.00
26.80	0.41	0.30	1.37	0.00	0.00	0.00
26.85	0.41	0.30	1.36	0.00	0.00	0.00
26.90	0.40	0.30	1.34	0.00	0.00	0.00
26.95	0.40	0.30	1.33	0.00	0.00	0.00
27.00	0.39	0.30	1.31	0.00	0.00	0.00
27.05	0.39	0.30	1.29	0.00	0.00	0.00
27.10	0.38	0.30	1.28	0.00	0.00	0.00
27.15	0.38	0.30	1.26	0.00	0.00	0.00
27.20	0.37	0.30	1.24	0.00	0.00	0.00
27.25	0.37	0.30	1.23	0.00	0.00	0.00
27.30	0.36	0.30	1.21	0.00	0.00	0.00
27.35	0.36	0.30	1.20	0.00	0.00	0.00
27.40	0.36	0.30	1.18	0.00	0.00	0.00
27.45	0.35	0.30	1.16	0.00	0.00	0.00
27.50	0.35	0.30	1.15	0.00	0.00	0.00
27.55	0.35	0.30	1.17	0.00	0.00	0.00
27.60	0.36	0.30	1.19	0.00	0.00	0.00
27.65	0.36	0.30	1.21	0.00	0.00	0.00
27.70	0.37	0.30	1.22	0.00	0.00	0.00
27.75	0.38	0.30	1.24	0.00	0.00	0.00
27.80	0.38	0.30	1.26	0.00	0.00	0.00
27.85	0.39	0.30	1.28	0.00	0.00	0.00
27.90	0.41	0.30	1.36	0.00	0.00	0.00
27.95	0.42	0.30	1.38	0.00	0.00	0.00
28.00	0.42	0.30	1.40	0.00	0.00	0.00
28.05	0.43	0.30	1.42	0.00	0.00	0.00
28.10	0.44	0.30	1.44	0.00	0.00	0.00
28.15	0.44	0.30	1.46	0.00	0.00	0.00
28.20	0.45	0.30	1.48	0.00	0.00	0.00
28.25	0.46	0.30	1.50	0.00	0.00	0.00
28.30	0.46	0.30	1.52	0.00	0.00	0.00
28.35	0.47	0.30	1.54	0.00	0.00	0.00
28.40	0.48	0.30	1.56	0.00	0.00	0.00
28.45	0.48	0.30	1.58	0.00	0.00	0.00
28.50	0.49	0.31	1.60	0.00	0.00	0.00
28.55	0.49	0.31	1.62	0.00	0.00	0.00
28.60	0.50	0.31	1.64	0.00	0.00	0.00

28.65	0.51	0.31	1.66	0.00	0.00	0.00
28.70	0.52	0.31	1.69	0.00	0.00	0.00
28.75	0.52	0.31	1.71	0.00	0.00	0.00
28.80	0.53	0.31	1.73	0.00	0.00	0.00
28.85	0.54	0.31	1.75	0.00	0.00	0.00
28.90	0.54	0.31	1.78	0.00	0.00	0.00
28.95	0.55	0.31	1.80	0.00	0.00	0.00
29.00	0.56	0.31	1.82	0.00	0.00	0.00
29.05	0.57	0.31	1.85	0.00	0.00	0.00
29.10	0.58	0.31	1.87	0.00	0.00	0.00
29.15	0.58	0.31	1.90	0.00	0.00	0.00
29.20	0.59	0.31	1.92	0.00	0.00	0.00
29.25	0.60	0.31	1.95	0.00	0.00	0.00
29.30	0.61	0.31	1.98	0.00	0.00	0.00
29.35	0.62	0.31	2.01	0.00	0.00	0.00
29.40	0.63	0.31	2.04	0.00	0.00	0.00
29.45	0.64	0.31	2.07	0.00	0.00	0.00
29.50	0.65	0.31	2.10	0.00	0.00	0.00
29.55	0.66	0.31	2.13	0.00	0.00	0.00
29.60	0.67	0.31	2.16	0.00	0.00	0.00
29.65	0.68	0.31	2.20	0.00	0.00	0.00
29.70	0.69	0.31	2.23	0.00	0.00	0.00
29.75	0.70	0.31	2.25	0.00	0.00	0.00
29.80	0.70	0.31	2.27	0.00	0.00	0.00
29.85	0.71	0.31	2.28	0.00	0.00	0.00
29.90	0.71	0.31	2.30	0.00	0.00	0.00
29.95	0.72	0.31	2.31	0.00	0.00	0.00
30.00	0.72	0.31	2.33	0.00	0.00	0.00
30.05	0.73	0.31	2.34	0.00	0.00	0.00
30.10	0.73	0.31	2.36	0.00	0.00	0.00
30.15	0.74	0.31	2.38	0.00	0.00	0.00
30.20	0.74	0.31	2.39	0.00	0.00	0.00
30.25	0.75	0.31	2.41	0.00	0.00	0.00
30.30	0.75	0.31	2.43	0.00	0.00	0.00
30.35	0.76	0.31	2.45	0.00	0.00	0.00
30.40	0.77	0.31	2.47	0.00	0.00	0.00
30.45	0.77	0.31	2.49	0.00	0.00	0.00
30.50	0.78	0.31	2.51	0.00	0.00	0.00
30.55	0.79	0.31	2.53	0.00	0.00	0.00
30.60	0.79	0.31	2.56	0.00	0.00	0.00
30.65	0.80	0.31	2.58	0.00	0.00	0.00
30.70	0.81	0.31	2.61	0.00	0.00	0.00
30.75	0.82	0.31	2.64	0.00	0.00	0.00
30.80	0.83	0.31	2.67	0.00	0.00	0.00
30.85	0.84	0.31	2.70	0.00	0.00	0.00
30.90	0.85	0.31	2.74	0.00	0.00	0.00
30.95	0.87	0.31	2.78	0.00	0.00	0.00
31.00	0.88	0.31	2.84	0.00	0.00	0.00
31.05	0.90	0.31	2.90	0.00	0.00	0.00
31.10	0.93	0.31	2.97	0.00	0.00	0.00
31.15	0.96	0.31	3.08	0.00	0.00	0.00
31.20	1.00	0.31	3.22	0.00	0.00	0.00
31.25	1.07	0.31	3.44	0.00	0.00	0.00
31.30	1.07	0.31	3.44	0.00	0.00	0.00

31.35	1.07	0.31	3.44	0.00	0.00	0.00
31.40	1.07	0.31	3.43	0.00	0.00	0.00
31.45	1.07	0.31	3.43	0.00	0.00	0.00
31.50	1.07	0.31	3.43	0.00	0.00	0.00
31.55	1.07	0.31	3.43	0.00	0.00	0.00
31.60	1.07	0.31	3.43	0.00	0.00	0.00
31.65	1.07	0.31	3.43	0.00	0.00	0.00
31.70	1.07	0.31	3.43	0.00	0.00	0.00
31.75	1.07	0.31	3.42	0.00	0.00	0.00
31.80	1.07	0.31	3.42	0.00	0.00	0.00
31.85	1.07	0.31	3.42	0.00	0.00	0.00
31.90	1.07	0.31	3.42	0.00	0.00	0.00
31.95	1.07	0.31	3.42	0.00	0.00	0.00
32.00	1.07	0.31	3.42	0.00	0.00	0.00
32.05	1.06	0.31	3.42	0.00	0.00	0.00
32.10	1.06	0.31	3.41	0.00	0.00	0.00
32.15	1.06	0.31	3.41	0.00	0.00	0.00
32.20	1.06	0.31	3.41	0.00	0.00	0.00
32.25	1.06	0.31	3.41	0.00	0.00	0.00
32.30	1.06	0.31	3.41	0.00	0.00	0.00
32.35	1.06	0.31	3.41	0.00	0.00	0.00
32.40	1.06	0.31	3.41	0.00	0.00	0.00
32.45	1.06	0.31	3.41	0.00	0.00	0.00
32.50	1.06	0.31	3.40	0.00	0.00	0.00
32.55	1.06	0.31	3.40	0.00	0.00	0.00
32.60	1.06	0.31	3.40	0.00	0.00	0.00
32.65	1.06	0.31	3.40	0.00	0.00	0.00
32.70	1.06	0.31	3.40	0.00	0.00	0.00
32.75	1.06	0.31	3.40	0.00	0.00	0.00
32.80	1.06	0.31	3.40	0.00	0.00	0.00
32.85	1.06	0.31	3.40	0.00	0.00	0.00
32.90	1.06	0.31	3.39	0.00	0.00	0.00
32.95	1.06	0.31	3.39	0.00	0.00	0.00
33.00	1.06	0.31	3.39	0.00	0.00	0.00
33.05	1.06	0.31	3.39	0.00	0.00	0.00
33.10	1.06	0.31	3.39	0.00	0.00	0.00
33.15	1.06	0.31	3.39	0.00	0.00	0.00
33.20	1.06	0.31	3.39	0.00	0.00	0.00
33.25	1.06	0.31	3.39	0.00	0.00	0.00
33.30	1.06	0.31	3.38	0.00	0.00	0.00
33.35	1.06	0.31	3.38	0.00	0.00	0.00
33.40	1.06	0.31	3.38	0.00	0.00	0.00
33.45	1.06	0.31	3.38	0.00	0.00	0.00
33.50	1.06	0.31	3.38	0.00	0.00	0.00
33.55	1.06	0.31	3.38	0.00	0.00	0.00
33.60	1.06	0.31	3.38	0.00	0.00	0.00
33.65	1.05	0.31	3.38	0.00	0.00	0.00
33.70	1.05	0.31	3.35	0.00	0.00	0.00
33.75	0.92	0.31	2.94	0.00	0.00	0.00
33.80	0.86	0.31	2.76	0.00	0.00	0.00
33.85	0.83	0.31	2.64	0.00	0.00	0.00
33.90	0.80	0.31	2.56	0.00	0.00	0.00
33.95	0.78	0.31	2.49	0.00	0.00	0.00
34.00	0.76	0.31	2.43	0.00	0.00	0.00

34.05	0.74	0.31	2.38	0.00	0.00	0.00
34.10	0.73	0.31	2.33	0.00	0.00	0.00
34.15	0.71	0.31	2.28	0.00	0.00	0.00
34.20	0.70	0.31	2.24	0.00	0.00	0.00
34.25	0.69	0.31	2.20	0.00	0.00	0.00
34.30	0.68	0.31	2.16	0.00	0.00	0.00
34.35	0.66	0.31	2.12	0.00	0.00	0.00
34.40	0.65	0.31	2.09	0.00	0.00	0.00
34.45	0.64	0.31	2.06	0.00	0.00	0.00
34.50	0.63	0.31	2.02	0.00	0.00	0.00
34.55	0.62	0.31	1.99	0.00	0.00	0.00
34.60	0.61	0.31	1.96	0.00	0.00	0.00
34.65	0.60	0.31	1.93	0.00	0.00	0.00
34.70	0.60	0.31	1.90	0.00	0.00	0.00
34.75	0.59	0.31	1.88	0.00	0.00	0.00
34.80	0.58	0.31	1.85	0.00	0.00	0.00
34.85	0.57	0.31	1.82	0.00	0.00	0.00
34.90	0.56	0.31	1.80	0.00	0.00	0.00
34.95	0.55	0.31	1.77	0.00	0.00	0.00
35.00	0.55	0.31	1.75	0.00	0.00	0.00
35.05	0.55	0.31	1.77	0.00	0.00	0.00
35.10	0.56	0.31	1.78	0.00	0.00	0.00
35.15	0.56	0.31	1.80	0.00	0.00	0.00
35.20	0.57	0.31	1.82	0.00	0.00	0.00
35.25	0.58	0.31	1.84	0.00	0.00	0.00
35.30	0.58	0.31	1.86	0.00	0.00	0.00
35.35	0.59	0.31	1.88	0.00	0.00	0.00
35.40	0.60	0.31	1.90	0.00	0.00	0.00
35.45	0.60	0.31	1.92	0.00	0.00	0.00
35.50	0.61	0.31	1.95	0.00	0.00	0.00
35.55	0.62	0.31	1.97	0.00	0.00	0.00
35.60	0.62	0.31	1.99	0.00	0.00	0.00
35.65	0.63	0.31	2.01	0.00	0.00	0.00
35.70	0.64	0.31	2.04	0.00	0.00	0.00
35.75	0.65	0.31	2.06	0.00	0.00	0.00
35.80	0.65	0.31	2.09	0.00	0.00	0.00
35.85	0.66	0.31	2.11	0.00	0.00	0.00
35.90	0.67	0.31	2.14	0.00	0.00	0.00
35.95	0.68	0.31	2.17	0.00	0.00	0.00
36.00	0.69	0.31	2.20	0.00	0.00	0.00
36.05	0.70	0.31	2.23	0.00	0.00	0.00
36.10	0.71	0.31	2.26	0.00	0.00	0.00
36.15	0.72	0.31	2.29	0.00	0.00	0.00
36.20	0.73	0.31	2.33	0.00	0.00	0.00
36.25	0.74	0.31	2.37	0.00	0.00	0.00
36.30	0.76	0.31	2.41	0.00	0.00	0.00
36.35	0.77	0.31	2.45	0.00	0.00	0.00
36.40	0.76	0.31	2.43	0.00	0.00	0.00
36.45	0.76	0.31	2.42	0.00	0.00	0.00
36.50	0.75	0.31	2.40	0.00	0.00	0.00
36.55	0.75	0.31	2.39	0.00	0.00	0.00
36.60	0.74	0.31	2.37	0.00	0.00	0.00
36.65	0.74	0.31	2.36	0.00	0.00	0.00
36.70	0.74	0.31	2.35	0.00	0.00	0.00

36.75	0.73	0.31	2.33	0.00	0.00	0.00
36.80	0.73	0.31	2.32	0.00	0.00	0.00
36.85	0.72	0.31	2.31	0.00	0.00	0.00
36.90	0.72	0.31	2.30	0.00	0.00	0.00
36.95	0.72	0.31	2.28	0.00	0.00	0.00
37.00	0.71	0.31	2.27	0.00	0.00	0.00
37.05	0.71	0.31	2.26	0.00	0.00	0.00
37.10	0.71	0.31	2.25	0.00	0.00	0.00
37.15	0.70	0.31	2.24	0.00	0.00	0.00
37.20	0.70	0.31	2.23	0.00	0.00	0.00
37.25	0.69	0.31	2.22	0.00	0.00	0.00
37.30	0.69	0.31	2.21	0.00	0.00	0.00
37.35	0.69	0.31	2.20	0.00	0.00	0.00
37.40	0.68	0.31	2.19	0.00	0.00	0.00
37.45	0.68	0.31	2.18	0.00	0.00	0.00
37.50	0.68	0.31	2.17	0.00	0.00	0.00
37.55	0.68	0.31	2.17	0.00	0.00	0.00
37.60	0.68	0.31	2.18	0.00	0.00	0.00
37.65	0.68	0.31	2.19	0.00	0.00	0.00
37.70	0.69	0.31	2.19	0.00	0.00	0.00
37.75	0.69	0.31	2.20	0.00	0.00	0.00
37.80	0.69	0.31	2.21	0.00	0.00	0.00
37.85	0.69	0.31	2.21	0.00	0.00	0.00
37.90	0.69	0.31	2.22	0.00	0.00	0.00
37.95	0.70	0.31	2.23	0.00	0.00	0.00
38.00	0.70	0.31	2.23	0.00	0.00	0.00
38.05	0.70	0.31	2.24	0.00	0.00	0.00
38.10	0.70	0.31	2.25	0.00	0.00	0.00
38.15	0.71	0.31	2.25	0.00	0.00	0.00
38.20	0.71	0.31	2.26	0.00	0.00	0.00
38.25	0.71	0.31	2.27	0.00	0.00	0.00
38.30	0.71	0.31	2.28	0.00	0.00	0.00
38.35	0.71	0.31	2.28	0.00	0.00	0.00
38.40	0.72	0.31	2.29	0.00	0.00	0.00
38.45	0.72	0.31	2.30	0.00	0.00	0.00
38.50	0.72	0.31	2.31	0.00	0.00	0.00
38.55	0.72	0.31	2.31	0.00	0.00	0.00
38.60	0.73	0.31	2.32	0.00	0.00	0.00
38.65	0.73	0.31	2.33	0.00	0.00	0.00
38.70	0.73	0.31	2.34	0.00	0.00	0.00
38.75	0.73	0.31	2.35	0.00	0.00	0.00
38.80	0.74	0.31	2.36	0.00	0.00	0.00
38.85	0.74	0.31	2.37	0.00	0.00	0.00
38.90	0.74	0.31	2.37	0.00	0.00	0.00
38.95	0.74	0.31	2.38	0.00	0.00	0.00
39.00	0.75	0.31	2.39	0.00	0.00	0.00
39.05	0.75	0.31	2.40	0.00	0.00	0.00
39.10	0.75	0.31	2.41	0.00	0.00	0.00
39.15	0.76	0.31	2.42	0.00	0.00	0.00
39.20	0.76	0.31	2.43	0.00	0.00	0.00
39.25	0.76	0.31	2.44	0.00	0.00	0.00
39.30	0.77	0.31	2.45	0.00	0.00	0.00
39.35	0.77	0.31	2.46	0.00	0.00	0.00
39.40	0.77	0.31	2.48	0.00	0.00	0.00

39.45	0.78	0.31	2.49	0.00	0.00	0.00
39.50	0.78	0.31	2.50	0.00	0.00	0.00
39.55	0.78	0.31	2.51	0.00	0.00	0.00
39.60	0.79	0.31	2.53	0.00	0.00	0.00
39.65	0.79	0.31	2.54	0.00	0.00	0.00
39.70	0.80	0.31	2.55	0.00	0.00	0.00
39.75	0.80	0.31	2.57	0.00	0.00	0.00
39.80	0.81	0.31	2.59	0.00	0.00	0.00
39.85	0.81	0.31	2.60	0.00	0.00	0.00
39.90	0.82	0.31	2.62	0.00	0.00	0.00
39.95	0.82	0.31	2.64	0.00	0.00	0.00
40.00	0.83	0.31	2.66	0.00	0.00	0.00
40.05	0.84	0.31	2.68	0.00	0.00	0.00
40.10	0.84	0.31	2.71	0.00	0.00	0.00
40.15	0.85	0.31	2.73	0.00	0.00	0.00
40.20	0.86	0.31	2.76	0.00	0.00	0.00
40.25	0.87	0.31	2.79	0.00	0.00	0.00
40.30	0.88	0.31	2.83	0.00	0.00	0.00
40.35	0.89	0.31	2.87	0.00	0.00	0.00
40.40	0.91	0.31	2.91	0.00	0.00	0.00
40.45	0.92	0.31	2.96	0.00	0.00	0.00
40.50	0.94	0.31	3.03	0.00	0.00	0.00
40.55	0.97	0.31	3.10	0.00	0.00	0.00
40.60	0.99	0.31	3.20	0.00	0.00	0.00
40.65	1.01	0.31	3.26	0.00	0.00	0.00
40.70	1.01	0.31	3.26	0.00	0.00	0.00
40.75	1.01	0.31	3.26	0.00	0.00	0.00
40.80	1.01	0.31	3.26	0.00	0.00	0.00
40.85	1.01	0.31	3.26	0.00	0.00	0.00
40.90	1.01	0.31	3.26	0.00	0.00	0.00
40.95	1.01	0.31	3.25	0.00	0.00	0.00
41.00	1.01	0.31	3.25	0.00	0.00	0.00
41.05	1.01	0.31	3.25	0.00	0.00	0.00
41.10	1.01	0.31	3.25	0.00	0.00	0.00
41.15	1.01	0.31	3.25	0.00	0.00	0.00
41.20	1.01	0.31	3.25	0.00	0.00	0.00
41.25	1.01	0.31	3.25	0.00	0.00	0.00
41.30	1.01	0.31	3.25	0.00	0.00	0.00
41.35	1.01	0.31	3.25	0.00	0.00	0.00
41.40	1.01	0.31	3.25	0.00	0.00	0.00
41.45	1.01	0.31	3.25	0.00	0.00	0.00
41.50	1.01	0.31	3.25	0.00	0.00	0.00
41.55	1.01	0.31	3.25	0.00	0.00	0.00
41.60	1.01	0.31	3.25	0.00	0.00	0.00
41.65	1.01	0.31	3.25	0.00	0.00	0.00
41.70	1.01	0.31	3.25	0.00	0.00	0.00
41.75	1.01	0.31	3.25	0.00	0.00	0.00
41.80	1.01	0.31	3.25	0.00	0.00	0.00
41.85	1.01	0.31	3.25	0.00	0.00	0.00
41.90	1.01	0.31	3.25	0.00	0.00	0.00
41.95	1.01	0.31	3.25	0.00	0.00	0.00
42.00	1.01	0.31	3.25	0.00	0.00	0.00
42.05	1.01	0.31	3.25	0.00	0.00	0.00
42.10	1.00	0.31	3.24	0.00	0.00	0.00

42.15	1.00	0.31	3.24	0.00	0.00	0.00
42.20	1.00	0.31	3.24	0.00	0.00	0.00
42.25	1.00	0.31	3.24	0.00	0.00	0.00
42.30	1.00	0.31	3.24	0.00	0.00	0.00
42.35	1.00	0.31	3.24	0.00	0.00	0.00
42.40	1.00	0.31	3.24	0.00	0.00	0.00
42.45	1.00	0.31	3.24	0.00	0.00	0.00
42.50	1.00	0.31	3.24	0.00	0.00	0.00
42.55	1.00	0.31	3.24	0.00	0.00	0.00
42.60	1.00	0.31	3.24	0.00	0.00	0.00
42.65	1.00	0.31	3.24	0.00	0.00	0.00
42.70	1.00	0.31	3.24	0.00	0.00	0.00
42.75	1.00	0.31	3.24	0.00	0.00	0.00
42.80	1.00	0.31	3.24	0.00	0.00	0.00
42.85	1.00	0.31	3.24	0.00	0.00	0.00
42.90	1.00	0.31	3.24	0.00	0.00	0.00
42.95	1.00	0.31	3.24	0.00	0.00	0.00
43.00	1.00	0.31	3.24	0.00	0.00	0.00
43.05	1.00	0.31	3.24	0.00	0.00	0.00
43.10	1.00	0.31	3.24	0.00	0.00	0.00
43.15	1.00	0.31	3.24	0.00	0.00	0.00
43.20	1.00	0.31	3.24	0.00	0.00	0.00
43.25	1.00	0.31	3.24	0.00	0.00	0.00
43.30	1.00	0.31	3.24	0.00	0.00	0.00
43.35	1.00	0.31	3.24	0.00	0.00	0.00
43.40	1.00	0.31	3.24	0.00	0.00	0.00
43.45	1.00	0.31	3.24	0.00	0.00	0.00
43.50	1.00	0.31	3.24	0.00	0.00	0.00
43.55	1.00	0.31	3.23	0.00	0.00	0.00
43.60	1.00	0.31	3.23	0.00	0.00	0.00
43.65	1.00	0.31	3.23	0.00	0.00	0.00
43.70	1.00	0.31	3.23	0.00	0.00	0.00
43.75	1.00	0.31	3.23	0.00	0.00	0.00
43.80	1.00	0.31	3.23	0.00	0.00	0.00
43.85	0.99	0.31	3.23	0.00	0.00	0.00
43.90	0.99	0.31	3.23	0.00	0.00	0.00
43.95	0.99	0.31	3.23	0.00	0.00	0.00
44.00	0.99	0.31	3.23	0.00	0.00	0.00
44.05	0.99	0.31	3.23	0.00	0.00	0.00
44.10	0.99	0.31	3.23	0.00	0.00	0.00
44.15	0.99	0.31	3.23	0.00	0.00	0.00
44.20	0.99	0.31	3.23	0.00	0.00	0.00
44.25	0.99	0.31	3.23	0.00	0.00	0.00
44.30	0.99	0.31	3.23	0.00	0.00	0.00
44.35	0.99	0.31	3.23	0.00	0.00	0.00
44.40	0.99	0.31	3.23	0.00	0.00	0.00
44.45	0.99	0.31	3.23	0.00	0.00	0.00
44.50	0.99	0.31	3.23	0.00	0.00	0.00
44.55	0.99	0.31	3.23	0.00	0.00	0.00
44.60	0.99	0.31	3.23	0.00	0.00	0.00
44.65	0.99	0.31	3.23	0.00	0.00	0.00
44.70	0.99	0.31	3.23	0.00	0.00	0.00
44.75	0.99	0.31	3.23	0.00	0.00	0.00
44.80	0.99	0.31	3.23	0.00	0.00	0.00

44.85	0.99	0.31	3.23	0.00	0.00	0.00
44.90	0.99	0.31	3.23	0.00	0.00	0.00
44.95	0.99	0.31	3.23	0.00	0.00	0.00
45.00	0.99	0.31	3.23	0.00	0.00	0.00
45.05	0.99	0.31	3.23	0.00	0.00	0.00
45.10	0.99	0.31	3.23	0.00	0.00	0.00
45.15	0.99	0.31	3.23	0.00	0.00	0.00
45.20	0.99	0.31	3.23	0.00	0.00	0.00
45.25	0.99	0.31	3.23	0.00	0.00	0.00
45.30	0.99	0.31	3.23	0.00	0.00	0.00
45.35	0.99	0.31	3.23	0.00	0.00	0.00
45.40	0.99	0.31	3.23	0.00	0.00	0.00
45.45	0.99	0.31	3.23	0.00	0.00	0.00
45.50	0.99	0.31	3.23	0.00	0.00	0.00
45.55	0.99	0.31	3.23	0.00	0.00	0.00
45.60	0.98	0.31	3.23	0.00	0.00	0.00
45.65	0.98	0.31	3.23	0.00	0.00	0.00
45.70	0.98	0.31	3.23	0.00	0.00	0.00
45.75	0.98	0.31	3.23	0.00	0.00	0.00
45.80	0.98	0.31	3.22	0.00	0.00	0.00
45.85	0.98	0.31	3.22	0.00	0.00	0.00
45.90	0.98	0.30	3.22	0.00	0.00	0.00
45.95	0.98	0.30	3.22	0.00	0.00	0.00
46.00	0.98	0.30	3.22	0.00	0.00	0.00
46.05	0.98	0.30	3.22	0.00	0.00	0.00
46.10	0.98	0.30	3.22	0.00	0.00	0.00
46.15	0.98	0.30	3.22	0.00	0.00	0.00
46.20	0.98	0.30	3.22	0.00	0.00	0.00
46.25	0.98	0.30	3.22	0.00	0.00	0.00
46.30	0.98	0.30	3.22	0.00	0.00	0.00
46.35	0.98	0.30	3.22	0.00	0.00	0.00
46.40	0.98	0.30	3.22	0.00	0.00	0.00
46.45	0.98	0.30	3.22	0.00	0.00	0.00
46.50	0.98	0.30	3.22	0.00	0.00	0.00
46.55	0.98	0.30	3.22	0.00	0.00	0.00
46.60	0.98	0.30	3.22	0.00	0.00	0.00
46.65	0.98	0.30	3.22	0.00	0.00	0.00
46.70	0.98	0.30	3.22	0.00	0.00	0.00
46.75	0.98	0.30	3.22	0.00	0.00	0.00
46.80	0.98	0.30	3.22	0.00	0.00	0.00
46.85	0.98	0.30	3.22	0.00	0.00	0.00
46.90	0.98	0.30	3.22	0.00	0.00	0.00
46.95	0.98	0.30	3.22	0.00	0.00	0.00
47.00	0.98	0.30	3.22	0.00	0.00	0.00
47.05	0.98	0.30	3.22	0.00	0.00	0.00
47.10	0.98	0.30	3.22	0.00	0.00	0.00
47.15	0.98	0.30	3.22	0.00	0.00	0.00
47.20	0.98	0.30	3.22	0.00	0.00	0.00
47.25	0.98	0.30	3.22	0.00	0.00	0.00
47.30	0.98	0.30	3.22	0.00	0.00	0.00
47.35	0.98	0.30	3.22	0.00	0.00	0.00
47.40	0.98	0.30	3.22	0.00	0.00	0.00
47.45	0.97	0.30	3.22	0.00	0.00	0.00
47.50	0.97	0.30	3.22	0.00	0.00	0.00

47.55	0.97	0.30	3.22	0.00	0.00	0.00
47.60	0.97	0.30	3.22	0.00	0.00	0.00
47.65	0.97	0.30	3.22	0.00	0.00	0.00
47.70	0.97	0.30	3.22	0.00	0.00	0.00
47.75	0.97	0.30	3.22	0.00	0.00	0.00
47.80	0.97	0.30	3.22	0.00	0.00	0.00
47.85	0.97	0.30	3.22	0.00	0.00	0.00
47.90	0.97	0.30	3.22	0.00	0.00	0.00
47.95	0.97	0.30	3.22	0.00	0.00	0.00
48.00	0.97	0.30	3.22	0.00	0.00	0.00
48.05	0.97	0.30	3.22	0.00	0.00	0.00
48.10	0.97	0.30	3.22	0.00	0.00	0.00
48.15	0.97	0.30	3.22	0.00	0.00	0.00
48.20	0.97	0.30	3.22	0.00	0.00	0.00
48.25	0.97	0.30	3.22	0.00	0.00	0.00
48.30	0.97	0.30	3.22	0.00	0.00	0.00
48.35	0.97	0.30	3.22	0.00	0.00	0.00
48.40	0.97	0.30	3.22	0.00	0.00	0.00
48.45	0.97	0.30	3.22	0.00	0.00	0.00
48.50	0.97	0.30	3.22	0.00	0.00	0.00
48.55	0.97	0.30	3.22	0.00	0.00	0.00
48.60	0.97	0.30	3.22	0.00	0.00	0.00
48.65	0.97	0.30	3.22	0.00	0.00	0.00
48.70	0.97	0.30	3.22	0.00	0.00	0.00
48.75	0.97	0.30	3.22	0.00	0.00	0.00
48.80	0.97	0.30	3.22	0.00	0.00	0.00
48.85	0.97	0.30	3.22	0.00	0.00	0.00
48.90	0.97	0.30	3.22	0.00	0.00	0.00
48.95	0.97	0.30	3.22	0.00	0.00	0.00
49.00	0.97	0.30	3.22	0.00	0.00	0.00
49.05	0.97	0.30	3.22	0.00	0.00	0.00
49.10	0.97	0.30	3.22	0.00	0.00	0.00
49.15	0.97	0.30	3.22	0.00	0.00	0.00
49.20	0.97	0.30	3.22	0.00	0.00	0.00
49.25	0.97	0.30	3.22	0.00	0.00	0.00
49.30	0.97	0.30	3.22	0.00	0.00	0.00
49.35	0.96	0.30	3.22	0.00	0.00	0.00
49.40	0.96	0.30	3.22	0.00	0.00	0.00
49.45	0.96	0.30	3.22	0.00	0.00	0.00
49.50	0.96	0.30	3.22	0.00	0.00	0.00
49.55	0.96	0.30	3.22	0.00	0.00	0.00
49.60	0.96	0.30	3.22	0.00	0.00	0.00
49.65	0.96	0.30	3.22	0.00	0.00	0.00
49.70	0.96	0.30	3.22	0.00	0.00	0.00
49.75	0.96	0.30	3.22	0.00	0.00	0.00
49.80	0.96	0.30	3.22	0.00	0.00	0.00
49.85	0.96	0.30	3.22	0.00	0.00	0.00
49.90	0.96	0.30	3.22	0.00	0.00	0.00
49.95	0.96	0.30	3.22	0.00	0.00	0.00
50.00	0.96	0.30	3.22	0.00	0.00	0.00
50.05	0.96	0.30	3.22	0.00	0.00	0.00
50.10	0.96	0.30	3.22	0.00	0.00	0.00
50.15	0.96	0.30	3.22	0.00	0.00	0.00
50.20	0.96	0.30	3.22	0.00	0.00	0.00

50.25	0.96	0.30	3.22	0.00	0.00	0.00
50.30	0.96	0.30	3.22	0.00	0.00	0.00
50.35	0.96	0.30	3.22	0.00	0.00	0.00
50.40	0.96	0.30	3.22	0.00	0.00	0.00
50.45	0.96	0.30	3.22	0.00	0.00	0.00
50.50	0.96	0.30	3.22	0.00	0.00	0.00
50.55	0.96	0.30	3.22	0.00	0.00	0.00
50.60	0.96	0.30	3.22	0.00	0.00	0.00
50.65	0.96	0.30	3.22	0.00	0.00	0.00
50.70	0.96	0.30	3.22	0.00	0.00	0.00
50.75	0.96	0.30	3.22	0.00	0.00	0.00
50.80	0.96	0.30	3.22	0.00	0.00	0.00
50.85	0.96	0.30	3.22	0.00	0.00	0.00
50.90	0.96	0.30	3.22	0.00	0.00	0.00
50.95	0.96	0.30	3.23	0.00	0.00	0.00
51.00	0.96	0.30	3.23	0.00	0.00	0.00

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* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5,CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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1 atm (atmosphere) = 1 tsf (ton/ft2)

CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

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LIQUEFACTION ANALYSIS SUMMARY
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Input File Name: C:\Users\Engineering\Desktop\07-230525-0.liq
Title: New Kindergarten Classrooms at Lincoln Elementary Sc
Subtitle: 07-230525-0

Surface Elev.=252
Hole No.=B-1
Depth of Hole= 51.00 ft
Water Table during Earthquake= 95.00 ft
Water Table during In-Situ Testing= 180.00 ft
Max. Acceleration= 0.35 g
Earthquake Magnitude= 5.50

Input Data:
Surface Elev.=252
Hole No.=B-1
Depth of Hole=51.00 ft
Water Table during Earthquake= 95.00 ft
Water Table during In-Situ Testing= 180.00 ft
Max. Acceleration=0.35 g
Earthquake Magnitude=5.50
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.5
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.2
Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth	SPT	gamma	Fines
ft		pcf	%
0.00	18.00	131.20	20.00
3.00	4.00	114.50	50.00

7.50	50.00	140.00	34.00
12.50	32.00	136.60	34.00
17.50	21.00	137.00	65.00
22.50	15.00	136.80	60.00
27.50	11.00	109.00	6.00
32.00	19.00	137.00	65.00
35.00	19.00	111.20	6.00
37.50	17.00	137.50	60.00
42.50	22.00	138.20	75.00
47.50	23.00	138.20	75.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.13 in.
Total Settlement of Saturated and Unsaturated Sands=0.13 in.
Differential Settlement=0.064 to 0.085 in.

Depth	CRRm	CSRfs		F.S.	S_sat.	S_dry	S_all
ft					in.	in.	in.
0.00	1.11	0.27	5.00	0.00	0.13	0.13	
0.05	1.11	0.27	5.00	0.00	0.13	0.13	
0.10	1.11	0.27	5.00	0.00	0.13	0.13	
0.15	1.11	0.27	5.00	0.00	0.13	0.13	
0.20	1.11	0.27	5.00	0.00	0.13	0.13	
0.25	1.11	0.27	5.00	0.00	0.13	0.13	
0.30	1.11	0.27	5.00	0.00	0.13	0.13	
0.35	1.11	0.27	5.00	0.00	0.13	0.13	
0.40	1.11	0.27	5.00	0.00	0.13	0.13	
0.45	1.11	0.27	5.00	0.00	0.13	0.13	
0.50	1.11	0.27	5.00	0.00	0.13	0.13	
0.55	1.11	0.27	5.00	0.00	0.13	0.13	
0.60	1.11	0.27	5.00	0.00	0.13	0.13	
0.65	1.11	0.27	5.00	0.00	0.13	0.13	
0.70	1.11	0.27	5.00	0.00	0.13	0.13	
0.75	1.11	0.27	5.00	0.00	0.13	0.13	
0.80	1.11	0.27	5.00	0.00	0.13	0.13	
0.85	1.11	0.27	5.00	0.00	0.13	0.13	
0.90	1.11	0.27	5.00	0.00	0.13	0.13	
0.95	1.11	0.27	5.00	0.00	0.13	0.13	
1.00	1.11	0.27	5.00	0.00	0.13	0.13	
1.05	1.11	0.27	5.00	0.00	0.13	0.13	
1.10	1.11	0.27	5.00	0.00	0.13	0.13	
1.15	1.11	0.27	5.00	0.00	0.13	0.13	
1.20	1.11	0.27	5.00	0.00	0.13	0.13	
1.25	1.11	0.27	5.00	0.00	0.13	0.13	
1.30	1.11	0.27	5.00	0.00	0.13	0.13	
1.35	1.11	0.27	5.00	0.00	0.13	0.13	
1.40	1.11	0.27	5.00	0.00	0.13	0.13	
1.45	1.11	0.27	5.00	0.00	0.13	0.13	
1.50	1.11	0.27	5.00	0.00	0.13	0.13	
1.55	1.11	0.27	5.00	0.00	0.13	0.13	
1.60	1.11	0.27	5.00	0.00	0.13	0.13	

1.65 1.11 0.27 5.00 0.00 0.13 0.13
1.70 1.11 0.27 5.00 0.00 0.13 0.13
1.75 0.93 0.27 5.00 0.00 0.13 0.13
1.80 0.85 0.27 5.00 0.00 0.13 0.13
1.85 0.80 0.27 5.00 0.00 0.13 0.13
1.90 0.77 0.27 5.00 0.00 0.13 0.13
1.95 0.74 0.27 5.00 0.00 0.13 0.13
2.00 0.71 0.27 5.00 0.00 0.13 0.13
2.05 0.69 0.27 5.00 0.00 0.13 0.13
2.10 0.66 0.27 5.00 0.00 0.13 0.13
2.15 0.64 0.27 5.00 0.00 0.13 0.13
2.20 0.62 0.27 5.00 0.00 0.13 0.13
2.25 0.60 0.27 5.00 0.00 0.13 0.13
2.30 0.59 0.27 5.00 0.00 0.13 0.13
2.35 0.57 0.27 5.00 0.00 0.13 0.13
2.40 0.55 0.27 5.00 0.00 0.13 0.13
2.45 0.54 0.27 5.00 0.00 0.13 0.13
2.50 0.52 0.27 5.00 0.00 0.13 0.13
2.55 0.51 0.27 5.00 0.00 0.13 0.13
2.60 0.50 0.27 5.00 0.00 0.13 0.13
2.65 0.48 0.27 5.00 0.00 0.13 0.13
2.70 0.47 0.27 5.00 0.00 0.13 0.13
2.75 0.45 0.27 5.00 0.00 0.13 0.13
2.80 0.44 0.27 5.00 0.00 0.13 0.13
2.85 0.43 0.27 5.00 0.00 0.13 0.13
2.90 0.42 0.27 5.00 0.00 0.13 0.13
2.95 0.40 0.27 5.00 0.00 0.13 0.13
3.00 0.39 0.27 5.00 0.00 0.13 0.13
3.05 0.42 0.27 5.00 0.00 0.13 0.13
3.10 0.45 0.27 5.00 0.00 0.13 0.13
3.15 0.48 0.27 5.00 0.00 0.13 0.13
3.20 0.51 0.27 5.00 0.00 0.13 0.13
3.25 0.54 0.27 5.00 0.00 0.13 0.13
3.30 0.57 0.27 5.00 0.00 0.13 0.13
3.35 0.61 0.27 5.00 0.00 0.13 0.13
3.40 0.65 0.27 5.00 0.00 0.13 0.13
3.45 0.70 0.27 5.00 0.00 0.12 0.12
3.50 0.76 0.27 5.00 0.00 0.12 0.12
3.55 0.86 0.27 5.00 0.00 0.12 0.12
3.60 1.11 0.27 5.00 0.00 0.12 0.12
3.65 1.11 0.27 5.00 0.00 0.12 0.12
3.70 1.11 0.27 5.00 0.00 0.12 0.12
3.75 1.11 0.27 5.00 0.00 0.12 0.12
3.80 1.11 0.27 5.00 0.00 0.12 0.12
3.85 1.11 0.27 5.00 0.00 0.12 0.12
3.90 1.11 0.27 5.00 0.00 0.12 0.12
3.95 1.11 0.27 5.00 0.00 0.12 0.12
4.00 1.11 0.27 5.00 0.00 0.12 0.12
4.05 1.11 0.27 5.00 0.00 0.12 0.12
4.10 1.11 0.27 5.00 0.00 0.12 0.12
4.15 1.11 0.27 5.00 0.00 0.12 0.12
4.20 1.11 0.27 5.00 0.00 0.12 0.12
4.25 1.11 0.27 5.00 0.00 0.12 0.12
4.30 1.11 0.27 5.00 0.00 0.12 0.12

4.35 1.11 0.27 5.00 0.00 0.12 0.12
4.40 1.11 0.27 5.00 0.00 0.12 0.12
4.45 1.11 0.27 5.00 0.00 0.12 0.12
4.50 1.11 0.27 5.00 0.00 0.12 0.12
4.55 1.11 0.27 5.00 0.00 0.12 0.12
4.60 1.11 0.27 5.00 0.00 0.12 0.12
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4.75 1.11 0.27 5.00 0.00 0.12 0.12
4.80 1.11 0.27 5.00 0.00 0.12 0.12
4.85 1.11 0.27 5.00 0.00 0.12 0.12
4.90 1.11 0.27 5.00 0.00 0.12 0.12
4.95 1.11 0.27 5.00 0.00 0.12 0.12
5.00 1.11 0.27 5.00 0.00 0.12 0.12
5.05 1.11 0.27 5.00 0.00 0.12 0.12
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5.15 1.11 0.27 5.00 0.00 0.12 0.12
5.20 1.11 0.27 5.00 0.00 0.12 0.12
5.25 1.11 0.27 5.00 0.00 0.12 0.12
5.30 1.11 0.27 5.00 0.00 0.12 0.12
5.35 1.11 0.27 5.00 0.00 0.12 0.12
5.40 1.11 0.27 5.00 0.00 0.12 0.12
5.45 1.11 0.27 5.00 0.00 0.12 0.12
5.50 1.11 0.27 5.00 0.00 0.12 0.12
5.55 1.11 0.27 5.00 0.00 0.12 0.12
5.60 1.11 0.27 5.00 0.00 0.12 0.12
5.65 1.11 0.27 5.00 0.00 0.12 0.12
5.70 1.11 0.27 5.00 0.00 0.12 0.12
5.75 1.11 0.27 5.00 0.00 0.12 0.12
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13.85	1.11	0.26	5.00	0.00	0.12	0.12
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13.95	1.11	0.26	5.00	0.00	0.12	0.12
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14.95	1.11	0.26	5.00	0.00	0.12	0.12
15.00	1.11	0.26	5.00	0.00	0.12	0.12
15.05	1.11	0.26	5.00	0.00	0.12	0.12
15.10	1.11	0.26	5.00	0.00	0.12	0.12

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15.85	1.11	0.26	5.00	0.00	0.12	0.12
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16.75	1.11	0.26	5.00	0.00	0.12	0.12
16.80	1.11	0.26	5.00	0.00	0.12	0.12
16.85	1.11	0.26	5.00	0.00	0.12	0.12
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17.65	1.11	0.26	5.00	0.00	0.12	0.12
17.70	1.11	0.26	5.00	0.00	0.12	0.12
17.75	1.11	0.26	5.00	0.00	0.12	0.12
17.80	1.11	0.26	5.00	0.00	0.12	0.12

17.85	1.11	0.26	5.00	0.00	0.12	0.12
17.90	1.11	0.26	5.00	0.00	0.12	0.12
17.95	1.11	0.26	5.00	0.00	0.12	0.12
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18.05	1.11	0.26	5.00	0.00	0.11	0.11
18.10	1.11	0.26	5.00	0.00	0.11	0.11
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18.70	1.11	0.26	5.00	0.00	0.11	0.11
18.75	1.11	0.26	5.00	0.00	0.11	0.11
18.80	1.11	0.26	5.00	0.00	0.11	0.11
18.85	1.11	0.26	5.00	0.00	0.11	0.11
18.90	1.11	0.26	5.00	0.00	0.11	0.11
18.95	1.11	0.26	5.00	0.00	0.11	0.11
19.00	1.11	0.26	5.00	0.00	0.11	0.11
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19.60	1.11	0.26	5.00	0.00	0.11	0.11
19.65	1.11	0.26	5.00	0.00	0.11	0.11
19.70	1.11	0.26	5.00	0.00	0.11	0.11
19.75	1.11	0.26	5.00	0.00	0.11	0.11
19.80	1.11	0.26	5.00	0.00	0.11	0.11
19.85	1.11	0.26	5.00	0.00	0.11	0.11
19.90	1.11	0.26	5.00	0.00	0.11	0.11
19.95	1.11	0.26	5.00	0.00	0.11	0.11
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20.50	1.11	0.26	5.00	0.00	0.11	0.11

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20.70	1.11	0.26	5.00	0.00	0.11	0.11
20.75	1.11	0.26	5.00	0.00	0.11	0.11
20.80	1.11	0.26	5.00	0.00	0.11	0.11
20.85	1.11	0.26	5.00	0.00	0.11	0.11
20.90	1.11	0.26	5.00	0.00	0.11	0.11
20.95	1.11	0.26	5.00	0.00	0.11	0.11
21.00	1.11	0.26	5.00	0.00	0.11	0.11
21.05	1.11	0.26	5.00	0.00	0.11	0.11
21.10	1.11	0.26	5.00	0.00	0.11	0.11
21.15	1.11	0.26	5.00	0.00	0.11	0.11
21.20	1.11	0.26	5.00	0.00	0.11	0.11
21.25	1.11	0.26	5.00	0.00	0.11	0.11
21.30	1.11	0.26	5.00	0.00	0.11	0.11
21.35	1.11	0.26	5.00	0.00	0.11	0.11
21.40	1.11	0.26	5.00	0.00	0.11	0.11
21.45	1.11	0.26	5.00	0.00	0.11	0.11
21.50	1.11	0.26	5.00	0.00	0.11	0.11
21.55	1.11	0.26	5.00	0.00	0.11	0.11
21.60	1.11	0.26	5.00	0.00	0.11	0.11
21.65	1.11	0.26	5.00	0.00	0.11	0.11
21.70	1.11	0.26	5.00	0.00	0.11	0.11
21.75	1.11	0.26	5.00	0.00	0.11	0.11
21.80	1.11	0.26	5.00	0.00	0.11	0.11
21.85	1.11	0.26	5.00	0.00	0.11	0.11
21.90	1.07	0.26	5.00	0.00	0.11	0.11
21.95	1.00	0.26	5.00	0.00	0.11	0.11
22.00	0.96	0.26	5.00	0.00	0.11	0.11
22.05	0.93	0.26	5.00	0.00	0.11	0.11
22.10	0.91	0.26	5.00	0.00	0.11	0.11
22.15	0.89	0.26	5.00	0.00	0.11	0.11
22.20	0.87	0.26	5.00	0.00	0.11	0.11
22.25	0.86	0.26	5.00	0.00	0.11	0.11
22.30	0.85	0.26	5.00	0.00	0.11	0.11
22.35	0.84	0.26	5.00	0.00	0.11	0.11
22.40	0.83	0.26	5.00	0.00	0.11	0.11
22.45	0.82	0.26	5.00	0.00	0.11	0.11
22.50	0.81	0.26	5.00	0.00	0.11	0.11
22.55	0.80	0.26	5.00	0.00	0.11	0.11
22.60	0.80	0.26	5.00	0.00	0.11	0.11
22.65	0.79	0.26	5.00	0.00	0.11	0.11
22.70	0.78	0.26	5.00	0.00	0.11	0.11
22.75	0.78	0.26	5.00	0.00	0.11	0.11
22.80	0.77	0.26	5.00	0.00	0.11	0.11
22.85	0.77	0.26	5.00	0.00	0.11	0.11
22.90	0.76	0.26	5.00	0.00	0.11	0.11
22.95	0.76	0.26	5.00	0.00	0.11	0.11
23.00	0.75	0.26	5.00	0.00	0.11	0.11
23.05	0.75	0.26	5.00	0.00	0.11	0.11
23.10	0.75	0.26	5.00	0.00	0.11	0.11
23.15	0.74	0.26	5.00	0.00	0.11	0.11
23.20	0.74	0.26	5.00	0.00	0.11	0.11

23.25	0.73	0.26	5.00	0.00	0.10	0.10
23.30	0.73	0.26	5.00	0.00	0.10	0.10
23.35	0.73	0.26	5.00	0.00	0.10	0.10
23.40	0.72	0.26	5.00	0.00	0.10	0.10
23.45	0.72	0.26	5.00	0.00	0.10	0.10
23.50	0.71	0.26	5.00	0.00	0.10	0.10
23.55	0.71	0.26	5.00	0.00	0.10	0.10
23.60	0.71	0.26	5.00	0.00	0.10	0.10
23.65	0.70	0.26	5.00	0.00	0.10	0.10
23.70	0.70	0.26	5.00	0.00	0.10	0.10
23.75	0.70	0.26	5.00	0.00	0.10	0.10
23.80	0.69	0.26	5.00	0.00	0.10	0.10
23.85	0.69	0.26	5.00	0.00	0.10	0.10
23.90	0.69	0.26	5.00	0.00	0.10	0.10
23.95	0.68	0.26	5.00	0.00	0.10	0.10
24.00	0.68	0.26	5.00	0.00	0.10	0.10
24.05	0.68	0.26	5.00	0.00	0.10	0.10
24.10	0.67	0.26	5.00	0.00	0.10	0.10
24.15	0.67	0.26	5.00	0.00	0.10	0.10
24.20	0.67	0.26	5.00	0.00	0.10	0.10
24.25	0.66	0.26	5.00	0.00	0.10	0.10
24.30	0.66	0.26	5.00	0.00	0.10	0.10
24.35	0.66	0.26	5.00	0.00	0.10	0.10
24.40	0.65	0.26	5.00	0.00	0.10	0.10
24.45	0.66	0.26	5.00	0.00	0.10	0.10
24.50	0.65	0.26	5.00	0.00	0.10	0.10
24.55	0.65	0.26	5.00	0.00	0.10	0.10
24.60	0.65	0.26	5.00	0.00	0.10	0.10
24.65	0.64	0.26	5.00	0.00	0.10	0.10
24.70	0.64	0.26	5.00	0.00	0.10	0.10
24.75	0.64	0.26	5.00	0.00	0.10	0.10
24.80	0.64	0.26	5.00	0.00	0.10	0.10
24.85	0.63	0.26	5.00	0.00	0.10	0.10
24.90	0.62	0.26	5.00	0.00	0.10	0.10
24.95	0.61	0.26	5.00	0.00	0.10	0.10
25.00	0.61	0.26	5.00	0.00	0.10	0.10
25.05	0.60	0.26	5.00	0.00	0.10	0.10
25.10	0.59	0.26	5.00	0.00	0.10	0.10
25.15	0.59	0.26	5.00	0.00	0.10	0.10
25.20	0.58	0.26	5.00	0.00	0.10	0.10
25.25	0.57	0.26	5.00	0.00	0.10	0.10
25.30	0.57	0.26	5.00	0.00	0.10	0.10
25.35	0.56	0.26	5.00	0.00	0.10	0.10
25.40	0.56	0.26	5.00	0.00	0.10	0.10
25.45	0.55	0.26	5.00	0.00	0.10	0.10
25.50	0.54	0.26	5.00	0.00	0.10	0.10
25.55	0.54	0.26	5.00	0.00	0.10	0.10
25.60	0.53	0.26	5.00	0.00	0.10	0.10
25.65	0.53	0.26	5.00	0.00	0.10	0.10
25.70	0.52	0.26	5.00	0.00	0.10	0.10
25.75	0.52	0.26	5.00	0.00	0.10	0.10
25.80	0.51	0.26	5.00	0.00	0.09	0.09
25.85	0.50	0.26	5.00	0.00	0.09	0.09
25.90	0.50	0.26	5.00	0.00	0.09	0.09

25.95	0.49	0.26	5.00	0.00	0.09	0.09
26.00	0.49	0.26	5.00	0.00	0.09	0.09
26.05	0.48	0.26	5.00	0.00	0.09	0.09
26.10	0.48	0.26	5.00	0.00	0.09	0.09
26.15	0.47	0.26	5.00	0.00	0.09	0.09
26.20	0.47	0.26	5.00	0.00	0.09	0.09
26.25	0.46	0.26	5.00	0.00	0.09	0.09
26.30	0.46	0.26	5.00	0.00	0.09	0.09
26.35	0.45	0.26	5.00	0.00	0.09	0.09
26.40	0.45	0.26	5.00	0.00	0.09	0.09
26.45	0.44	0.26	5.00	0.00	0.09	0.09
26.50	0.44	0.26	5.00	0.00	0.09	0.09
26.55	0.43	0.26	5.00	0.00	0.09	0.09
26.60	0.43	0.26	5.00	0.00	0.09	0.09
26.65	0.42	0.26	5.00	0.00	0.09	0.09
26.70	0.42	0.26	5.00	0.00	0.09	0.09
26.75	0.42	0.26	5.00	0.00	0.09	0.09
26.80	0.41	0.26	5.00	0.00	0.09	0.09
26.85	0.41	0.26	5.00	0.00	0.09	0.09
26.90	0.40	0.26	5.00	0.00	0.09	0.09
26.95	0.40	0.26	5.00	0.00	0.09	0.09
27.00	0.39	0.26	5.00	0.00	0.09	0.09
27.05	0.39	0.26	5.00	0.00	0.09	0.09
27.10	0.38	0.26	5.00	0.00	0.08	0.08
27.15	0.38	0.26	5.00	0.00	0.08	0.08
27.20	0.37	0.26	5.00	0.00	0.08	0.08
27.25	0.37	0.26	5.00	0.00	0.08	0.08
27.30	0.36	0.26	5.00	0.00	0.08	0.08
27.35	0.36	0.26	5.00	0.00	0.08	0.08
27.40	0.36	0.26	5.00	0.00	0.08	0.08
27.45	0.35	0.26	5.00	0.00	0.08	0.08
27.50	0.35	0.26	5.00	0.00	0.08	0.08
27.55	0.35	0.26	5.00	0.00	0.08	0.08
27.60	0.36	0.26	5.00	0.00	0.08	0.08
27.65	0.36	0.26	5.00	0.00	0.08	0.08
27.70	0.37	0.26	5.00	0.00	0.08	0.08
27.75	0.38	0.26	5.00	0.00	0.08	0.08
27.80	0.38	0.26	5.00	0.00	0.08	0.08
27.85	0.39	0.26	5.00	0.00	0.08	0.08
27.90	0.41	0.26	5.00	0.00	0.08	0.08
27.95	0.42	0.26	5.00	0.00	0.08	0.08
28.00	0.42	0.26	5.00	0.00	0.07	0.07
28.05	0.43	0.26	5.00	0.00	0.07	0.07
28.10	0.44	0.26	5.00	0.00	0.07	0.07
28.15	0.44	0.26	5.00	0.00	0.07	0.07
28.20	0.45	0.26	5.00	0.00	0.07	0.07
28.25	0.46	0.26	5.00	0.00	0.07	0.07
28.30	0.46	0.26	5.00	0.00	0.07	0.07
28.35	0.47	0.26	5.00	0.00	0.07	0.07
28.40	0.48	0.26	5.00	0.00	0.07	0.07
28.45	0.48	0.26	5.00	0.00	0.07	0.07
28.50	0.49	0.26	5.00	0.00	0.07	0.07
28.55	0.49	0.26	5.00	0.00	0.07	0.07
28.60	0.50	0.26	5.00	0.00	0.07	0.07

28.65	0.51	0.26	5.00	0.00	0.07	0.07
28.70	0.52	0.26	5.00	0.00	0.07	0.07
28.75	0.52	0.26	5.00	0.00	0.07	0.07
28.80	0.53	0.26	5.00	0.00	0.07	0.07
28.85	0.54	0.26	5.00	0.00	0.07	0.07
28.90	0.54	0.26	5.00	0.00	0.07	0.07
28.95	0.55	0.26	5.00	0.00	0.07	0.07
29.00	0.56	0.26	5.00	0.00	0.07	0.07
29.05	0.57	0.26	5.00	0.00	0.07	0.07
29.10	0.58	0.26	5.00	0.00	0.07	0.07
29.15	0.58	0.26	5.00	0.00	0.07	0.07
29.20	0.59	0.26	5.00	0.00	0.07	0.07
29.25	0.60	0.26	5.00	0.00	0.07	0.07
29.30	0.61	0.26	5.00	0.00	0.07	0.07
29.35	0.62	0.26	5.00	0.00	0.07	0.07
29.40	0.63	0.26	5.00	0.00	0.07	0.07
29.45	0.64	0.25	5.00	0.00	0.07	0.07
29.50	0.65	0.25	5.00	0.00	0.07	0.07
29.55	0.66	0.25	5.00	0.00	0.07	0.07
29.60	0.67	0.25	5.00	0.00	0.07	0.07
29.65	0.68	0.25	5.00	0.00	0.07	0.07
29.70	0.69	0.25	5.00	0.00	0.06	0.06
29.75	0.70	0.25	5.00	0.00	0.06	0.06
29.80	0.70	0.25	5.00	0.00	0.06	0.06
29.85	0.71	0.25	5.00	0.00	0.06	0.06
29.90	0.71	0.25	5.00	0.00	0.06	0.06
29.95	0.72	0.25	5.00	0.00	0.06	0.06
30.00	0.72	0.25	5.00	0.00	0.06	0.06
30.05	0.73	0.25	5.00	0.00	0.06	0.06
30.10	0.73	0.25	5.00	0.00	0.06	0.06
30.15	0.74	0.25	5.00	0.00	0.06	0.06
30.20	0.74	0.25	5.00	0.00	0.06	0.06
30.25	0.75	0.25	5.00	0.00	0.06	0.06
30.30	0.75	0.25	5.00	0.00	0.06	0.06
30.35	0.76	0.25	5.00	0.00	0.06	0.06
30.40	0.77	0.25	5.00	0.00	0.06	0.06
30.45	0.77	0.25	5.00	0.00	0.06	0.06
30.50	0.78	0.25	5.00	0.00	0.06	0.06
30.55	0.79	0.25	5.00	0.00	0.06	0.06
30.60	0.79	0.25	5.00	0.00	0.06	0.06
30.65	0.80	0.25	5.00	0.00	0.06	0.06
30.70	0.81	0.25	5.00	0.00	0.06	0.06
30.75	0.82	0.25	5.00	0.00	0.06	0.06
30.80	0.83	0.25	5.00	0.00	0.06	0.06
30.85	0.84	0.25	5.00	0.00	0.06	0.06
30.90	0.85	0.25	5.00	0.00	0.06	0.06
30.95	0.87	0.25	5.00	0.00	0.06	0.06
31.00	0.88	0.25	5.00	0.00	0.06	0.06
31.05	0.90	0.25	5.00	0.00	0.06	0.06
31.10	0.93	0.25	5.00	0.00	0.06	0.06
31.15	0.96	0.25	5.00	0.00	0.06	0.06
31.20	1.00	0.25	5.00	0.00	0.06	0.06
31.25	1.07	0.25	5.00	0.00	0.06	0.06
31.30	1.07	0.25	5.00	0.00	0.06	0.06

31.35	1.07	0.25	5.00	0.00	0.06	0.06
31.40	1.07	0.25	5.00	0.00	0.06	0.06
31.45	1.07	0.25	5.00	0.00	0.06	0.06
31.50	1.07	0.25	5.00	0.00	0.06	0.06
31.55	1.07	0.25	5.00	0.00	0.06	0.06
31.60	1.07	0.25	5.00	0.00	0.06	0.06
31.65	1.07	0.25	5.00	0.00	0.06	0.06
31.70	1.07	0.25	5.00	0.00	0.06	0.06
31.75	1.07	0.25	5.00	0.00	0.06	0.06
31.80	1.07	0.25	5.00	0.00	0.06	0.06
31.85	1.07	0.25	5.00	0.00	0.06	0.06
31.90	1.07	0.25	5.00	0.00	0.06	0.06
31.95	1.07	0.25	5.00	0.00	0.06	0.06
32.00	1.07	0.25	5.00	0.00	0.06	0.06
32.05	1.06	0.25	5.00	0.00	0.06	0.06
32.10	1.06	0.25	5.00	0.00	0.06	0.06
32.15	1.06	0.25	5.00	0.00	0.06	0.06
32.20	1.06	0.25	5.00	0.00	0.06	0.06
32.25	1.06	0.25	5.00	0.00	0.06	0.06
32.30	1.06	0.25	5.00	0.00	0.06	0.06
32.35	1.06	0.25	5.00	0.00	0.06	0.06
32.40	1.06	0.25	5.00	0.00	0.06	0.06
32.45	1.06	0.25	5.00	0.00	0.06	0.06
32.50	1.06	0.25	5.00	0.00	0.06	0.06
32.55	1.06	0.25	5.00	0.00	0.06	0.06
32.60	1.06	0.25	5.00	0.00	0.06	0.06
32.65	1.06	0.25	5.00	0.00	0.06	0.06
32.70	1.06	0.25	5.00	0.00	0.06	0.06
32.75	1.06	0.25	5.00	0.00	0.06	0.06
32.80	1.06	0.25	5.00	0.00	0.05	0.05
32.85	1.06	0.25	5.00	0.00	0.05	0.05
32.90	1.06	0.25	5.00	0.00	0.05	0.05
32.95	1.06	0.25	5.00	0.00	0.05	0.05
33.00	1.06	0.25	5.00	0.00	0.05	0.05
33.05	1.06	0.25	5.00	0.00	0.05	0.05
33.10	1.06	0.25	5.00	0.00	0.05	0.05
33.15	1.06	0.25	5.00	0.00	0.05	0.05
33.20	1.06	0.25	5.00	0.00	0.05	0.05
33.25	1.06	0.25	5.00	0.00	0.05	0.05
33.30	1.06	0.25	5.00	0.00	0.05	0.05
33.35	1.06	0.25	5.00	0.00	0.05	0.05
33.40	1.06	0.25	5.00	0.00	0.05	0.05
33.45	1.06	0.25	5.00	0.00	0.05	0.05
33.50	1.06	0.25	5.00	0.00	0.05	0.05
33.55	1.06	0.25	5.00	0.00	0.05	0.05
33.60	1.06	0.25	5.00	0.00	0.05	0.05
33.65	1.05	0.25	5.00	0.00	0.05	0.05
33.70	1.05	0.25	5.00	0.00	0.05	0.05
33.75	0.92	0.25	5.00	0.00	0.05	0.05
33.80	0.86	0.25	5.00	0.00	0.05	0.05
33.85	0.83	0.25	5.00	0.00	0.05	0.05
33.90	0.80	0.25	5.00	0.00	0.05	0.05
33.95	0.78	0.25	5.00	0.00	0.05	0.05
34.00	0.76	0.25	5.00	0.00	0.05	0.05

34.05	0.74	0.25	5.00	0.00	0.05	0.05
34.10	0.73	0.25	5.00	0.00	0.05	0.05
34.15	0.71	0.25	5.00	0.00	0.05	0.05
34.20	0.70	0.25	5.00	0.00	0.05	0.05
34.25	0.69	0.25	5.00	0.00	0.05	0.05
34.30	0.68	0.24	5.00	0.00	0.05	0.05
34.35	0.66	0.24	5.00	0.00	0.05	0.05
34.40	0.65	0.24	5.00	0.00	0.05	0.05
34.45	0.64	0.24	5.00	0.00	0.05	0.05
34.50	0.63	0.24	5.00	0.00	0.05	0.05
34.55	0.62	0.24	5.00	0.00	0.05	0.05
34.60	0.61	0.24	5.00	0.00	0.05	0.05
34.65	0.60	0.24	5.00	0.00	0.05	0.05
34.70	0.60	0.24	5.00	0.00	0.05	0.05
34.75	0.59	0.24	5.00	0.00	0.05	0.05
34.80	0.58	0.24	5.00	0.00	0.05	0.05
34.85	0.57	0.24	5.00	0.00	0.05	0.05
34.90	0.56	0.24	5.00	0.00	0.05	0.05
34.95	0.55	0.24	5.00	0.00	0.05	0.05
35.00	0.55	0.24	5.00	0.00	0.05	0.05
35.05	0.55	0.24	5.00	0.00	0.05	0.05
35.10	0.56	0.24	5.00	0.00	0.05	0.05
35.15	0.56	0.24	5.00	0.00	0.05	0.05
35.20	0.57	0.24	5.00	0.00	0.05	0.05
35.25	0.58	0.24	5.00	0.00	0.05	0.05
35.30	0.58	0.24	5.00	0.00	0.05	0.05
35.35	0.59	0.24	5.00	0.00	0.04	0.04
35.40	0.60	0.24	5.00	0.00	0.04	0.04
35.45	0.60	0.24	5.00	0.00	0.04	0.04
35.50	0.61	0.24	5.00	0.00	0.04	0.04
35.55	0.62	0.24	5.00	0.00	0.04	0.04
35.60	0.62	0.24	5.00	0.00	0.04	0.04
35.65	0.63	0.24	5.00	0.00	0.04	0.04
35.70	0.64	0.24	5.00	0.00	0.04	0.04
35.75	0.65	0.24	5.00	0.00	0.04	0.04
35.80	0.65	0.24	5.00	0.00	0.04	0.04
35.85	0.66	0.24	5.00	0.00	0.04	0.04
35.90	0.67	0.24	5.00	0.00	0.04	0.04
35.95	0.68	0.24	5.00	0.00	0.04	0.04
36.00	0.69	0.24	5.00	0.00	0.04	0.04
36.05	0.70	0.24	5.00	0.00	0.04	0.04
36.10	0.71	0.24	5.00	0.00	0.04	0.04
36.15	0.72	0.24	5.00	0.00	0.04	0.04
36.20	0.73	0.24	5.00	0.00	0.04	0.04
36.25	0.74	0.24	5.00	0.00	0.04	0.04
36.30	0.76	0.24	5.00	0.00	0.04	0.04
36.35	0.77	0.24	5.00	0.00	0.04	0.04
36.40	0.76	0.24	5.00	0.00	0.04	0.04
36.45	0.76	0.24	5.00	0.00	0.04	0.04
36.50	0.75	0.24	5.00	0.00	0.04	0.04
36.55	0.75	0.24	5.00	0.00	0.04	0.04
36.60	0.74	0.24	5.00	0.00	0.04	0.04
36.65	0.74	0.24	5.00	0.00	0.04	0.04
36.70	0.74	0.24	5.00	0.00	0.04	0.04

36.75	0.73	0.24	5.00	0.00	0.04	0.04
36.80	0.73	0.24	5.00	0.00	0.04	0.04
36.85	0.72	0.24	5.00	0.00	0.04	0.04
36.90	0.72	0.24	5.00	0.00	0.04	0.04
36.95	0.72	0.24	5.00	0.00	0.04	0.04
37.00	0.71	0.24	5.00	0.00	0.04	0.04
37.05	0.71	0.24	5.00	0.00	0.04	0.04
37.10	0.71	0.24	5.00	0.00	0.04	0.04
37.15	0.70	0.24	5.00	0.00	0.04	0.04
37.20	0.70	0.24	5.00	0.00	0.04	0.04
37.25	0.69	0.24	5.00	0.00	0.04	0.04
37.30	0.69	0.24	5.00	0.00	0.04	0.04
37.35	0.69	0.24	5.00	0.00	0.04	0.04
37.40	0.68	0.24	5.00	0.00	0.04	0.04
37.45	0.68	0.24	5.00	0.00	0.04	0.04
37.50	0.68	0.24	5.00	0.00	0.04	0.04
37.55	0.68	0.24	5.00	0.00	0.04	0.04
37.60	0.68	0.24	5.00	0.00	0.04	0.04
37.65	0.68	0.24	5.00	0.00	0.04	0.04
37.70	0.69	0.24	5.00	0.00	0.04	0.04
37.75	0.69	0.24	5.00	0.00	0.03	0.03
37.80	0.69	0.24	5.00	0.00	0.03	0.03
37.85	0.69	0.24	5.00	0.00	0.03	0.03
37.90	0.69	0.24	5.00	0.00	0.03	0.03
37.95	0.70	0.24	5.00	0.00	0.03	0.03
38.00	0.70	0.24	5.00	0.00	0.03	0.03
38.05	0.70	0.24	5.00	0.00	0.03	0.03
38.10	0.70	0.24	5.00	0.00	0.03	0.03
38.15	0.71	0.24	5.00	0.00	0.03	0.03
38.20	0.71	0.24	5.00	0.00	0.03	0.03
38.25	0.71	0.24	5.00	0.00	0.03	0.03
38.30	0.71	0.24	5.00	0.00	0.03	0.03
38.35	0.71	0.24	5.00	0.00	0.03	0.03
38.40	0.72	0.24	5.00	0.00	0.03	0.03
38.45	0.72	0.24	5.00	0.00	0.03	0.03
38.50	0.72	0.24	5.00	0.00	0.03	0.03
38.55	0.72	0.24	5.00	0.00	0.03	0.03
38.60	0.73	0.24	5.00	0.00	0.03	0.03
38.65	0.73	0.24	5.00	0.00	0.03	0.03
38.70	0.73	0.24	5.00	0.00	0.03	0.03
38.75	0.73	0.24	5.00	0.00	0.03	0.03
38.80	0.74	0.23	5.00	0.00	0.03	0.03
38.85	0.74	0.23	5.00	0.00	0.03	0.03
38.90	0.74	0.23	5.00	0.00	0.03	0.03
38.95	0.74	0.23	5.00	0.00	0.03	0.03
39.00	0.75	0.23	5.00	0.00	0.03	0.03
39.05	0.75	0.23	5.00	0.00	0.03	0.03
39.10	0.75	0.23	5.00	0.00	0.03	0.03
39.15	0.76	0.23	5.00	0.00	0.03	0.03
39.20	0.76	0.23	5.00	0.00	0.03	0.03
39.25	0.76	0.23	5.00	0.00	0.03	0.03
39.30	0.77	0.23	5.00	0.00	0.03	0.03
39.35	0.77	0.23	5.00	0.00	0.03	0.03
39.40	0.77	0.23	5.00	0.00	0.03	0.03

39.45	0.78	0.23	5.00	0.00	0.03	0.03
39.50	0.78	0.23	5.00	0.00	0.03	0.03
39.55	0.78	0.23	5.00	0.00	0.03	0.03
39.60	0.79	0.23	5.00	0.00	0.03	0.03
39.65	0.79	0.23	5.00	0.00	0.03	0.03
39.70	0.80	0.23	5.00	0.00	0.03	0.03
39.75	0.80	0.23	5.00	0.00	0.03	0.03
39.80	0.81	0.23	5.00	0.00	0.03	0.03
39.85	0.81	0.23	5.00	0.00	0.03	0.03
39.90	0.82	0.23	5.00	0.00	0.03	0.03
39.95	0.82	0.23	5.00	0.00	0.03	0.03
40.00	0.83	0.23	5.00	0.00	0.03	0.03
40.05	0.84	0.23	5.00	0.00	0.03	0.03
40.10	0.84	0.23	5.00	0.00	0.03	0.03
40.15	0.85	0.23	5.00	0.00	0.03	0.03
40.20	0.86	0.23	5.00	0.00	0.03	0.03
40.25	0.87	0.23	5.00	0.00	0.03	0.03
40.30	0.88	0.23	5.00	0.00	0.03	0.03
40.35	0.89	0.23	5.00	0.00	0.03	0.03
40.40	0.91	0.23	5.00	0.00	0.03	0.03
40.45	0.92	0.23	5.00	0.00	0.03	0.03
40.50	0.94	0.23	5.00	0.00	0.03	0.03
40.55	0.97	0.23	5.00	0.00	0.03	0.03
40.60	0.99	0.23	5.00	0.00	0.03	0.03
40.65	1.01	0.23	5.00	0.00	0.03	0.03
40.70	1.01	0.23	5.00	0.00	0.03	0.03
40.75	1.01	0.23	5.00	0.00	0.03	0.03
40.80	1.01	0.23	5.00	0.00	0.03	0.03
40.85	1.01	0.23	5.00	0.00	0.03	0.03
40.90	1.01	0.23	5.00	0.00	0.03	0.03
40.95	1.01	0.23	5.00	0.00	0.03	0.03
41.00	1.01	0.23	5.00	0.00	0.03	0.03
41.05	1.01	0.23	5.00	0.00	0.03	0.03
41.10	1.01	0.23	5.00	0.00	0.03	0.03
41.15	1.01	0.23	5.00	0.00	0.03	0.03
41.20	1.01	0.23	5.00	0.00	0.03	0.03
41.25	1.01	0.23	5.00	0.00	0.02	0.02
41.30	1.01	0.23	5.00	0.00	0.02	0.02
41.35	1.01	0.23	5.00	0.00	0.02	0.02
41.40	1.01	0.23	5.00	0.00	0.02	0.02
41.45	1.01	0.23	5.00	0.00	0.02	0.02
41.50	1.01	0.23	5.00	0.00	0.02	0.02
41.55	1.01	0.23	5.00	0.00	0.02	0.02
41.60	1.01	0.23	5.00	0.00	0.02	0.02
41.65	1.01	0.23	5.00	0.00	0.02	0.02
41.70	1.01	0.23	5.00	0.00	0.02	0.02
41.75	1.01	0.23	5.00	0.00	0.02	0.02
41.80	1.01	0.23	5.00	0.00	0.02	0.02
41.85	1.01	0.23	5.00	0.00	0.02	0.02
41.90	1.01	0.23	5.00	0.00	0.02	0.02
41.95	1.01	0.23	5.00	0.00	0.02	0.02
42.00	1.01	0.23	5.00	0.00	0.02	0.02
42.05	1.01	0.23	5.00	0.00	0.02	0.02
42.10	1.00	0.23	5.00	0.00	0.02	0.02

42.15	1.00	0.23	5.00	0.00	0.02	0.02
42.20	1.00	0.23	5.00	0.00	0.02	0.02
42.25	1.00	0.23	5.00	0.00	0.02	0.02
42.30	1.00	0.23	5.00	0.00	0.02	0.02
42.35	1.00	0.23	5.00	0.00	0.02	0.02
42.40	1.00	0.23	5.00	0.00	0.02	0.02
42.45	1.00	0.23	5.00	0.00	0.02	0.02
42.50	1.00	0.23	5.00	0.00	0.02	0.02
42.55	1.00	0.23	5.00	0.00	0.02	0.02
42.60	1.00	0.23	5.00	0.00	0.02	0.02
42.65	1.00	0.23	5.00	0.00	0.02	0.02
42.70	1.00	0.23	5.00	0.00	0.02	0.02
42.75	1.00	0.23	5.00	0.00	0.02	0.02
42.80	1.00	0.23	5.00	0.00	0.02	0.02
42.85	1.00	0.23	5.00	0.00	0.02	0.02
42.90	1.00	0.23	5.00	0.00	0.02	0.02
42.95	1.00	0.23	5.00	0.00	0.02	0.02
43.00	1.00	0.23	5.00	0.00	0.02	0.02
43.05	1.00	0.23	5.00	0.00	0.02	0.02
43.10	1.00	0.23	5.00	0.00	0.02	0.02
43.15	1.00	0.23	5.00	0.00	0.02	0.02
43.20	1.00	0.23	5.00	0.00	0.02	0.02
43.25	1.00	0.23	5.00	0.00	0.02	0.02
43.30	1.00	0.22	5.00	0.00	0.02	0.02
43.35	1.00	0.22	5.00	0.00	0.02	0.02
43.40	1.00	0.22	5.00	0.00	0.02	0.02
43.45	1.00	0.22	5.00	0.00	0.02	0.02
43.50	1.00	0.22	5.00	0.00	0.02	0.02
43.55	1.00	0.22	5.00	0.00	0.02	0.02
43.60	1.00	0.22	5.00	0.00	0.02	0.02
43.65	1.00	0.22	5.00	0.00	0.02	0.02
43.70	1.00	0.22	5.00	0.00	0.02	0.02
43.75	1.00	0.22	5.00	0.00	0.02	0.02
43.80	1.00	0.22	5.00	0.00	0.02	0.02
43.85	0.99	0.22	5.00	0.00	0.02	0.02
43.90	0.99	0.22	5.00	0.00	0.02	0.02
43.95	0.99	0.22	5.00	0.00	0.02	0.02
44.00	0.99	0.22	5.00	0.00	0.02	0.02
44.05	0.99	0.22	5.00	0.00	0.02	0.02
44.10	0.99	0.22	5.00	0.00	0.02	0.02
44.15	0.99	0.22	5.00	0.00	0.02	0.02
44.20	0.99	0.22	5.00	0.00	0.02	0.02
44.25	0.99	0.22	5.00	0.00	0.02	0.02
44.30	0.99	0.22	5.00	0.00	0.02	0.02
44.35	0.99	0.22	5.00	0.00	0.02	0.02
44.40	0.99	0.22	5.00	0.00	0.02	0.02
44.45	0.99	0.22	5.00	0.00	0.02	0.02
44.50	0.99	0.22	5.00	0.00	0.02	0.02
44.55	0.99	0.22	5.00	0.00	0.02	0.02
44.60	0.99	0.22	5.00	0.00	0.02	0.02
44.65	0.99	0.22	5.00	0.00	0.02	0.02
44.70	0.99	0.22	5.00	0.00	0.02	0.02
44.75	0.99	0.22	5.00	0.00	0.02	0.02
44.80	0.99	0.22	5.00	0.00	0.02	0.02

44.85	0.99	0.22	5.00	0.00	0.02	0.02
44.90	0.99	0.22	5.00	0.00	0.02	0.02
44.95	0.99	0.22	5.00	0.00	0.02	0.02
45.00	0.99	0.22	5.00	0.00	0.02	0.02
45.05	0.99	0.22	5.00	0.00	0.02	0.02
45.10	0.99	0.22	5.00	0.00	0.02	0.02
45.15	0.99	0.22	5.00	0.00	0.02	0.02
45.20	0.99	0.22	5.00	0.00	0.02	0.02
45.25	0.99	0.22	5.00	0.00	0.01	0.01
45.30	0.99	0.22	5.00	0.00	0.01	0.01
45.35	0.99	0.22	5.00	0.00	0.01	0.01
45.40	0.99	0.22	5.00	0.00	0.01	0.01
45.45	0.99	0.22	5.00	0.00	0.01	0.01
45.50	0.99	0.22	5.00	0.00	0.01	0.01
45.55	0.99	0.22	5.00	0.00	0.01	0.01
45.60	0.98	0.22	5.00	0.00	0.01	0.01
45.65	0.98	0.22	5.00	0.00	0.01	0.01
45.70	0.98	0.22	5.00	0.00	0.01	0.01
45.75	0.98	0.22	5.00	0.00	0.01	0.01
45.80	0.98	0.22	5.00	0.00	0.01	0.01
45.85	0.98	0.22	5.00	0.00	0.01	0.01
45.90	0.98	0.22	5.00	0.00	0.01	0.01
45.95	0.98	0.22	5.00	0.00	0.01	0.01
46.00	0.98	0.22	5.00	0.00	0.01	0.01
46.05	0.98	0.22	5.00	0.00	0.01	0.01
46.10	0.98	0.22	5.00	0.00	0.01	0.01
46.15	0.98	0.22	5.00	0.00	0.01	0.01
46.20	0.98	0.22	5.00	0.00	0.01	0.01
46.25	0.98	0.22	5.00	0.00	0.01	0.01
46.30	0.98	0.22	5.00	0.00	0.01	0.01
46.35	0.98	0.22	5.00	0.00	0.01	0.01
46.40	0.98	0.22	5.00	0.00	0.01	0.01
46.45	0.98	0.22	5.00	0.00	0.01	0.01
46.50	0.98	0.22	5.00	0.00	0.01	0.01
46.55	0.98	0.22	5.00	0.00	0.01	0.01
46.60	0.98	0.22	5.00	0.00	0.01	0.01
46.65	0.98	0.22	5.00	0.00	0.01	0.01
46.70	0.98	0.22	5.00	0.00	0.01	0.01
46.75	0.98	0.22	5.00	0.00	0.01	0.01
46.80	0.98	0.22	5.00	0.00	0.01	0.01
46.85	0.98	0.22	5.00	0.00	0.01	0.01
46.90	0.98	0.22	5.00	0.00	0.01	0.01
46.95	0.98	0.22	5.00	0.00	0.01	0.01
47.00	0.98	0.22	5.00	0.00	0.01	0.01
47.05	0.98	0.22	5.00	0.00	0.01	0.01
47.10	0.98	0.22	5.00	0.00	0.01	0.01
47.15	0.98	0.22	5.00	0.00	0.01	0.01
47.20	0.98	0.22	5.00	0.00	0.01	0.01
47.25	0.98	0.22	5.00	0.00	0.01	0.01
47.30	0.98	0.22	5.00	0.00	0.01	0.01
47.35	0.98	0.22	5.00	0.00	0.01	0.01
47.40	0.98	0.22	5.00	0.00	0.01	0.01
47.45	0.97	0.22	5.00	0.00	0.01	0.01
47.50	0.97	0.22	5.00	0.00	0.01	0.01

47.55	0.97	0.22	5.00	0.00	0.01	0.01
47.60	0.97	0.22	5.00	0.00	0.01	0.01
47.65	0.97	0.22	5.00	0.00	0.01	0.01
47.70	0.97	0.22	5.00	0.00	0.01	0.01
47.75	0.97	0.22	5.00	0.00	0.01	0.01
47.80	0.97	0.21	5.00	0.00	0.01	0.01
47.85	0.97	0.21	5.00	0.00	0.01	0.01
47.90	0.97	0.21	5.00	0.00	0.01	0.01
47.95	0.97	0.21	5.00	0.00	0.01	0.01
48.00	0.97	0.21	5.00	0.00	0.01	0.01
48.05	0.97	0.21	5.00	0.00	0.01	0.01
48.10	0.97	0.21	5.00	0.00	0.01	0.01
48.15	0.97	0.21	5.00	0.00	0.01	0.01
48.20	0.97	0.21	5.00	0.00	0.01	0.01
48.25	0.97	0.21	5.00	0.00	0.01	0.01
48.30	0.97	0.21	5.00	0.00	0.01	0.01
48.35	0.97	0.21	5.00	0.00	0.01	0.01
48.40	0.97	0.21	5.00	0.00	0.01	0.01
48.45	0.97	0.21	5.00	0.00	0.01	0.01
48.50	0.97	0.21	5.00	0.00	0.01	0.01
48.55	0.97	0.21	5.00	0.00	0.01	0.01
48.60	0.97	0.21	5.00	0.00	0.01	0.01
48.65	0.97	0.21	5.00	0.00	0.01	0.01
48.70	0.97	0.21	5.00	0.00	0.01	0.01
48.75	0.97	0.21	5.00	0.00	0.01	0.01
48.80	0.97	0.21	5.00	0.00	0.01	0.01
48.85	0.97	0.21	5.00	0.00	0.01	0.01
48.90	0.97	0.21	5.00	0.00	0.01	0.01
48.95	0.97	0.21	5.00	0.00	0.01	0.01
49.00	0.97	0.21	5.00	0.00	0.01	0.01
49.05	0.97	0.21	5.00	0.00	0.01	0.01
49.10	0.97	0.21	5.00	0.00	0.01	0.01
49.15	0.97	0.21	5.00	0.00	0.00	0.00
49.20	0.97	0.21	5.00	0.00	0.00	0.00
49.25	0.97	0.21	5.00	0.00	0.00	0.00
49.30	0.97	0.21	5.00	0.00	0.00	0.00
49.35	0.96	0.21	5.00	0.00	0.00	0.00
49.40	0.96	0.21	5.00	0.00	0.00	0.00
49.45	0.96	0.21	5.00	0.00	0.00	0.00
49.50	0.96	0.21	5.00	0.00	0.00	0.00
49.55	0.96	0.21	5.00	0.00	0.00	0.00
49.60	0.96	0.21	5.00	0.00	0.00	0.00
49.65	0.96	0.21	5.00	0.00	0.00	0.00
49.70	0.96	0.21	5.00	0.00	0.00	0.00
49.75	0.96	0.21	5.00	0.00	0.00	0.00
49.80	0.96	0.21	5.00	0.00	0.00	0.00
49.85	0.96	0.21	5.00	0.00	0.00	0.00
49.90	0.96	0.21	5.00	0.00	0.00	0.00
49.95	0.96	0.21	5.00	0.00	0.00	0.00
50.00	0.96	0.21	5.00	0.00	0.00	0.00
50.05	0.96	0.21	5.00	0.00	0.00	0.00
50.10	0.96	0.21	5.00	0.00	0.00	0.00
50.15	0.96	0.21	5.00	0.00	0.00	0.00
50.20	0.96	0.21	5.00	0.00	0.00	0.00

50.25	0.96	0.21	5.00	0.00	0.00	0.00
50.30	0.96	0.21	5.00	0.00	0.00	0.00
50.35	0.96	0.21	5.00	0.00	0.00	0.00
50.40	0.96	0.21	5.00	0.00	0.00	0.00
50.45	0.96	0.21	5.00	0.00	0.00	0.00
50.50	0.96	0.21	5.00	0.00	0.00	0.00
50.55	0.96	0.21	5.00	0.00	0.00	0.00
50.60	0.96	0.21	5.00	0.00	0.00	0.00
50.65	0.96	0.21	5.00	0.00	0.00	0.00
50.70	0.96	0.21	5.00	0.00	0.00	0.00
50.75	0.96	0.21	5.00	0.00	0.00	0.00
50.80	0.96	0.21	5.00	0.00	0.00	0.00
50.85	0.96	0.21	5.00	0.00	0.00	0.00
50.90	0.96	0.21	5.00	0.00	0.00	0.00
50.95	0.96	0.21	5.00	0.00	0.00	0.00
51.00	0.96	0.21	5.00	0.00	0.00	0.00

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* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5,CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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1 atm (atmosphere) = 1 tsf (ton/ft2)

CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

APPENDIX D

REFERENCES

APPENDIX D

REFERENCES

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