ARAGÓN GEOTECHNICAL, INC.
Consultants in the Earth & Material Sciences

PRELIMINARY GEOTECHNICAL INVESTIGATION
"HARLEY KNOX BOULEVARD AT REDLANDS AVENUE" PROJECT
CITY OF PERRIS, RIVERSIDE COUNTY, CALIFORNIA

FOR
FIRST INDUSTRIAL REALTY TRUST, INC.
898 N. PACIFIC COAST HWY., SUITE 175
EL SEGUNDO, CALIFORNIA 90245

PROJECT NO. 4585-SFI
MARCH 5, 2020

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March 5, 2020
Project No. 4585-SFI

First Industrial Realty Trust, Inc.
898 N. Pacific Coast Highway, Suite 175
El Segundo, California 90245

Attention: Mr. Matt Pioli

Subject: Preliminary Geotechnical Investigation Report
Proposed "Harley Knox Boulevard at Redlands Avenue" Light Industrial Project
City of Perris, Riverside County, California.

Mr. Pioli:

In accordance with our proposal dated December 4, 2019 and your authorization, Aragón Geotechnical Inc. (AGI) has completed preliminary geotechnical and geological assessments for the above-referenced project. The attached report presents in detail the findings, opinions, and recommendations developed as a result of surface inspections, subsurface exploration and field tests, laboratory testing, and quantitative analyses. Our scope included an infiltration feasibility study for stormwater BMPs, but excluded environmental research and materials testing for contaminants in soil, groundwater, or air at the site. Infiltration-related findings have been presented in a separate report for the civil designer's use in formulating a required water quality management plan.

Subsurface site characterization was based on eight exploratory borings arrayed within the proposed construction area. Drilled intervals encountered massive Pleistocene-age alluvial strata comprising sandy silt, silt, clayey silt, clay, and clayey sand as majority classifications within 50 feet of existing grades. A few feet of interpreted younger fine-grained soils blanketed almost all of the site. Localized silty sand alluvium composed the surface near the southwestern project corner. All surficial materials have been loosened by former agricultural tilling, burrowing fauna, and seasonal shrink-swell phenomena. Site soils were classified compressible within 5 to 6 feet of existing grades. AGI did not find evidence for pre-existing fill. Saturated soils were encountered in multiple borings starting at depths of about 18 to 20 feet but appeared to represent only a relatively thin perched-water zone.

Geologic constraints to development will require inclusion of structural measures to mitigate the high likelihood of strong earthquake ground motions at the site. However, risks from other natural hazards including liquefaction, surface fault rupture, settlement or subsidence, landsliding, seiching, induced flooding, and tsunami appear to range from extremely low to zero.

Findings indicate the site should be suitable for a large warehouse-type structure from a geotechnical viewpoint. AGI recommends that compressible shallow-depth alluvium be removed and replaced as compacted engineered fill for adequate support of new fills, structures, and new pavements. Acceptable remedial grading "bottoms" below the building outline should average between 5 and 6 feet below existing surfaces. Few or no deviations from this range are expected. All site soils should be acceptable for reuse in compacted fills. Data indicate as-built fill may have a "medium" expansion potential, however. If the project ultimately requires import soils, we would strongly encourage selection of non-expansive import materials and selective grading operations to place import immediately below industrial floor subgrades to the maximum extent feasible.

It is AGI's preliminary conclusion that properly designed and constructed conventional shallow footings should provide adequate building support. Overexcavation is recommended when or if needed to supply at least 24 inches of engineered fill below all shallow spread and continuous footings. On-and off-site pavement areas should be partly stripped and partly processed-in-place to create recompacted depths of approximately 36 inches. Paved areas in any cuts deeper than two feet should require only soil processing in place.

In addition to foundation design guidelines, including preliminary recommended design values for both vertical and lateral loads, this report presents recommendations for site earthwork, prescriptive code values for use in seismic groundshaking mitigation, concrete mix designs, and construction observation. It is recommended that grading and foundation plan reviews be performed by AGI prior to construction.

Thank you very much for this opportunity to be of service. Please do not hesitate to call our Riverside office if you should have any questions.

Very truly yours,
Aragón Geotechnical Inc.

Mark G. Doerschlag, CEG 1752
Engineering Geologist

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Geotechnical Engineer, G.E. No. 2994

MGD/CFA:mma

Distribution: (4) Addressee

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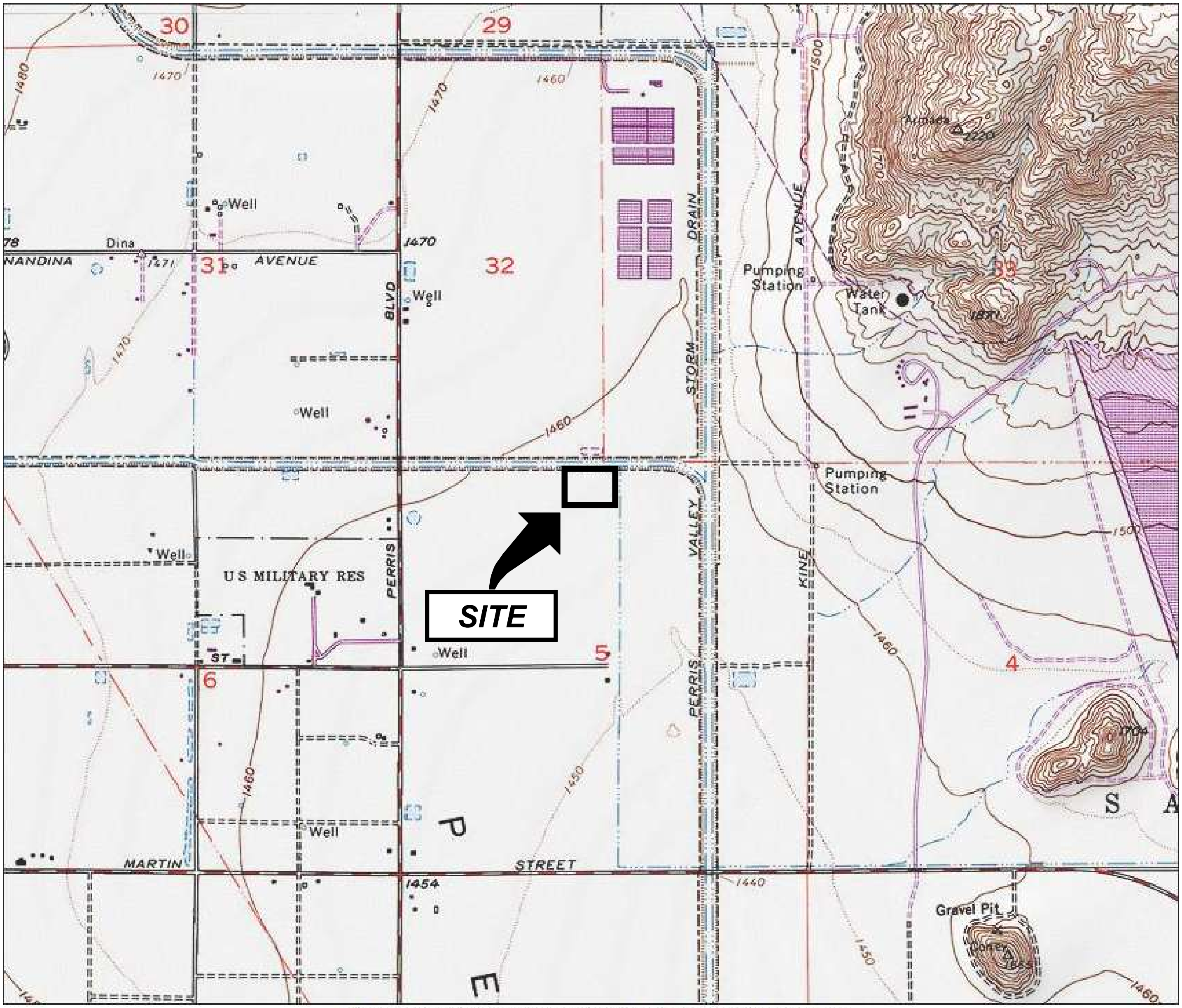
1.0 INTRODUCTION

This report presents the results of preliminary soils engineering and geologic evaluations conducted by Aragón Geotechnical, Inc. (AGI) for a proposed logistics warehouse or light manufacturing facility site situated northwest of the intersection of Harley Knox Boulevard at Redlands Avenue, Perris, California. The rectangular project site comprises 3 contiguous land parcels (APN 302-100-016, 017, and 029) and totals 9.3 gross acres. Map coordinates at the northeast project corner are 33.85886°N x 117.21706°W (this coordinate point was selected for seismological analyses based on closest site-to-source distance). Situs per the Public Lands Survey System places the project in the NW¼ of Section 5, Township 4 South, Range 3 West (San Bernardino Baseline and Meridian). The accompanying Site Location Map, Figure 1, depicts the general location of the project on a 1:24,000-scale topographic quadrangle map. Although out-of-date with respect to the rapid urbanization of the surrounding Perris Valley area, the older map series was selected for better depictions of ground slope and drainage patterns.

The primary objectives of our investigation were to determine the nature and engineering properties of the subsurface materials underlying the project area, in order to assess site suitability for the building and to provide *preliminary* foundation design, grading, and construction recommendations. Accordingly, our scope included reconnaissance of the 3 parcels and surrounding acreage, aerial photo interpretation, geologic literature research, subsurface exploration, recovery of representative soil samples, laboratory soils testing, and geotechnical analyses. Authorized services included field tests germane to water infiltration potential for subterranean storage chambers and shallow water-quality basins. An infiltration feasibility report has been issued by AGI under separate cover for the design civil engineer's use in formulating a required water quality management plan.

Geological assessments focused on risks posed by active earthquake faults, strong ground motion, liquefaction or other secondary seismic hazards, and groundwater. These were evaluated using published resources and site-specific qualitative analyses, plus conclusions drawn from field findings and local case-history experience. However, environmental research, Phase I or Phase II environmental site assessments, monitoring well construction, or contaminant testing of air, soil, or groundwater found in the site were beyond the scope of this geotechnical investigation.



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Reference: U. S. Geological Survey 7½-Minute Series Topographic Map, Perris Quadrangle (1979).

SITE LOCATION MAP	
APN 320-100-0016, 017, & 029, CITY OF PERRIS, RIVERSIDE COUNTY, CA.	

PROJECT NO. 4585-SFI	DATE: 3/5/20	**FIGURE 1**

2.0 PROPOSED CONSTRUCTION

A conceptual site development plan originating from the Irvine firm of RGA Office of Architectural Design was referenced for property information and borehole locality selection. The scaled drawing (Scheme 01) lacked elevation contours but included the planned envelope of an approximately rectangular 201,506-square-foot industrial building with a setback distance of 32 feet from Harley Knox Boulevard. Truck dock doors would be situated on the north side of the structure. Clearance-under-beam dimensions and finish floor elevations have not been specified. Three office areas, potentially with mezzanine levels, are planned in the northeastern, southeastern, and southwestern building corners. Based on regional practices, AGI anticipated that the structural system would feature concrete tilt-up walls with parapet heights of possibly 45 to 60 feet, supported by perimeter shallow foundations. Engineered roof trusses would rest on isolated interior steel columns. Moderate foundation loads would be predicted for walls and columns. Basements or other subterranean construction were not shown on the drawing and would be unlikely. Although a fraction of the site is technically within the City of Moreno Valley, AGI interprets that jurisdiction for development entitlements will be exercised by the City of Perris.

Surrounding the building, concrete paving is expected in truck areas while lighter-duty asphalt sections could be substituted in automobile driveways and stalls. Limited areas for collection, treatment, and disposal of stormwater runoff may exist in landscape strips next to the bordering streets. Formal BMP locations remain unknown, however. Live sewer, water, and gas utilities exist in street rights-of-way next to the property, and would presumably connect with the new building via buried service laterals.

Future grading would probably be a cut-and-fill operation. We suspect that grading could involve soil imports to help balance volumetric shrinkage that will occur during mass grading, and to raise industrial floor elevations above general terrain elevations. Raw cut-and-fill quantities can be expected to increase based on ground preparation measures we can foresee for the building pad. Neither earthen slopes nor retaining walls are shown on conceptual plans, but in our view are unlikely to be needed on the very flat site.

3.0 FIELD INVESTIGATION AND LABORATORY TESTING

Subsurface geotechnical site characterization comprising 8 exploratory soil borings was completed by AGI on January 20, 2020. The individual properties were vacant and had essentially unrestricted access. AGI-selected drill sites were cleared of utility interference issues by notification to the 811 DigAlert service in advance of AGI's work. A targeted well-spaced soil boring array was desired. Soil borings were preferentially sited to evaluate possible "least-favorable" locations identified from aerial photos and other geological resources, while also meeting a goal of spanning the building envelope to gauge the degree of geotechnical site variability. Soil boring locations and depths were not fixed, however, and were modified by AGI's field geologist where appropriate to obtain data concerning: (1) Material classifications, engineering properties including in-place relative densities, and settlement potential in light of local geological interpretations; (2) Presence or absence of groundwater; (3) Continuity of layers or units across the property; and (4) Unit geological origins and a derivation of site "stiffness" for earthquake engineering purposes.

The soil borings were drilled with a truck-mounted hollow-stem auger rig capable of driving and retrieving soil sample barrels. Borehole termination depths ranged from 21.5 to 51.5 feet. None of the borings encountered bedrock or were halted by machine refusal. As expected, all borings encountered deep sediments that were amenable to drive-tube sampling, performed at 2-foot to 5-foot depth increments. At shallow depths where soil bearing capacity and settlement potential would be the main items of concern, relatively undisturbed soil samples were recovered by driving a 3.0-inch-diameter "California modified" split-barrel sampler lined with brass rings. Deeper horizons in most borings included Standard Penetration Tests (SPTs) conducted using an unlined 2.0-inch O.D. split-barrel spoon. All sampler driving was done using rods and a mechanically actuated automatic 140-pound hammer free-falling 30 inches. Bulk samples of auger cuttings representative of shallow native materials found near the eastern end of the proposed building were bagged. All geotechnical samples were brought to AGI's Riverside laboratory for assigned soils testing.

Drill cuttings and each discrete sample were visually/manually examined and classified according to the Unified Soil Classification System, and observations made concerning relative density, constituent grain size, visible macro-porosity, plasticity, and past or present groundwater conditions. Continuous logs of the subsurface conditions encountered were recorded by a senior Engineering Geologist, and the results are presented on the Field Boring Logs in Appendix A. The approximate locations of the borehole explorations are illustrated on the Geotechnical Map (Plate No. 1 foldout), located at the back of this report.

"Undisturbed" samples were tested for unit dry density and water content. One-dimensional consolidation tests were conducted on selected barrel samples in order to evaluate settlement or collapse potential. Collapsible soils undergo rapid, irreversible compression when brought close to saturation while also subjected to loads such as from buildings or fill. The recovered bulk soil samples were evaluated for index and engineering properties such as shear strength, compaction criteria, expansion potential, and corrosivity characteristics. Discussions of the laboratory test standards used and the test results are presented in Appendix B.

4.0 SITE GEOTECHNICAL CONDITIONS

4.1 Previous Site Uses

AGI's scope included limited historical research to ascertain changes to surficial conditions through time, and address known or possible geotechnical impacts to project design or construction. Stereoscopic aerial photographs archived at the Riverside County Flood Control and Water Conservation District headquarters in Riverside, California, were interpreted for evidence of past structures, land use, and for geological assessments of active faulting potential and geomorphic history. Older monoscopic pictures were downloaded from the U.C. Santa Barbara Aerial Collections web application. Finally, the on-line version of the U.S. Geological Survey Historical Map Collection was accessed for digital scans of topographic quadrangle sheets pre-dating the referenced base map used for Figure 1. Reviewed historical sources are listed under "References" at the end of this report.

For decades beginning before 1938 and up until at least the mid-1990's, the site was a single agricultural field used for dry-farmed grain crops and irrigated alfalfa. In the late 1980's or early 1990's, a small house and outbuildings were placed near Redlands Boulevard. One large pine tree shaded the home. There were no confirmed past uses for stock raising, poultry ranching, feedlot, or dairying operations.

Agricultural activity seems to have ceased by around 2005. By then, the site had been partitioned by barbed-wire fences into four smaller fields that may have briefly been used for low-intensity animal keeping. The small house was present until 2013 when only slabs-on-grade were noted on aerial photos. The last few years saw no major on-site changes. Both Redlands Avenue and Harley Knox Boulevard appear to have been completed as improved arterial streets in 2015.

4.2 Surface Conditions

Project limits are defined by 4-lane boulevards to the south and east, a partly developed rural property to the west (the western half of the former master parcel that included the site), and an unlined trapezoidal flood control channel to the north. Chain-link or simple barbed-wire fences demarcate private property boundaries. None of the constituent parcels seem to have experienced major grading or dumping of fill soils. A small raised pad, relict concrete floors, block walls, and one remaining mature ash tree are present on APN 302-100-029. To date, AGI has not seen any evidence for private wells in the parcels. Water mains are present in the neighboring streets. The site has been regularly disced for weed abatement.

The project area features a very low-gradient slope of under a half-percent toward the east-southeast according to Riverside County Flood Control contour maps. Relief within the site is estimated to be under 3 feet. Very soft and disturbed soil surfaces dominate the recently disced lots. It appears that most incident rainfall is absorbed by loosened surface horizons, although excess water runoff can move unimpeded as sheetflow across the individual lots southward toward ultimate interception by improved Harley Knox Boulevard.

4.3 Subsurface Conditions

AGI soil borings penetrated vertically heterogeneous alluvial soil sequences that could be grouped into three general packages:

(1) A surficial zone dominated by sandy silt with some clay (Unified Soil Classification System classification ML), overlying typically cemented clayey silt. Overall package thickness was 9 to 13 feet in exploration borings. The uppermost 3 to 4 feet of site soils have been plowed and thoroughly “churned” by burrowing fauna, resulting in low *in situ* density and sometimes low penetration resistance

for sampling tools. The southwestern corner of the building envelope had 6 feet of a different, slightly porous silty sand. The underlying cemented soils represented hardpans. Soils were frequently shot through with abundant whitish-colored calcium carbonate as interstitial cement, fracture linings, or laminar precipitates. Where weathered near ground surfaces, fine-grained soils exhibited poor cohesion and soft, punky textures judged to be highly compressible. Deeper horizons *not* subject to weathering were cohesive and proven to have low compressibility in laboratory tests. Water contents were high, often registering more than 20% of soil dry weight in laboratory tests. Logged ring sampler penetration resistance within 10 feet of grade ranged from 20 to more than 50 blows per foot.

(2) An intermediate-depth package of coarsening-downward alluvial deposits composed of clay, silt and sandy silt, and silty or clayey sand (USCS CL, ML, SM and SC). Contacts between different soils were indistinct and gradational. Fine-grained layers were typically medium stiff, non-plastic or only slightly plastic at field water content, and non-dilative. Coarse-grained soils were generally medium dense.

(3) A deeper sequence starting at depths of 30 to 35 feet that could be a second coarsening-downward package of clay overlying silty and clayey sand (SM, SC).

Laboratory tests corroborated field interpretations of the predominance of fine-grained soil types, and our judgments of competency of natural deposits. Predicted properties of “engineered fill” were based on tests of a composite sample of near-surface silt and uppermost weathered hardpan from 0 to 4 feet. The sample produced an expansion index of 66 (categorically “medium” expansion potential). The same blend was also characterized by a modest achievable maximum dry density on the order of 110 pounds per cubic foot based on modified Proctor methods.

The hardpan and all deeper sequences were interpreted to be far older than the surficial layer. Pedogenic alteration and calcium carbonate precipitates were present to depths exceeding 10 feet. Consolidation tests showed that clay-bearing fine-grained soil types that have been subjected to weathering and seasonal moisture changes may be prone to collapse when saturated under load, even where not described as porous. Vesicular textures and pinhole voids are reliable indicators for detecting collapsible soils in the Inland area. However, testing also demonstrated that soils deeper than 6 feet, i.e., beyond typical active shrink-swell depths, should have very low compressibility. The contact between surficial sandy silt zones and hardpan soils was usually fairly abrupt and typical of an erosional surface. Section 5.2 (Local Geologic Conditions) and the drill logs in Appendix A contain considerable additional descriptions and interpretations of soil conditions in the project area.

4.4 Groundwater

Slow groundwater inflows were observed in 5 out of 8 exploratory borings. Saturated or near-saturated soils were logged over brief intervals a few feet thick beginning at depths of 18 to 20 feet below existing grades. Below the interpreted perched-water horizons, soils were not distinctly wet and auger cuttings remained solid. The findings were consistent with our knowledge of the Perris area and groundwater data from nearby properties. Shallower soil samples were not mottled with iron oxide staining, a telltale effect of episodic high groundwater. Gray or black soil colors (reduced) were absent to the maximum exploration depth of 51.5 feet.

The project site is within the West San Jacinto groundwater subbasin. According to many years of monitoring well records reviewed through the State CASGEM and GeoTracker websites, groundwater within a radius of about a half-mile from the property has had minimum measured depths of less than 30 feet east of the site, but more than 70 feet to the south. The hydrogeologic regime is complex due to the heterogeneity of the alluvial basin fill, substantial erosional relief of the buried bedrock surfaces under the southern Perris Valley, leakage under the Lake Perris dam, and municipal groundwater pumping. There has also been a historic tendency for groundwater levels to rise across the valley. Rising water levels are attributed to changing land uses in the Perris Plain vicinity, such as the cessation of formerly widespread agricultural pumping and introduction of irrigated suburban tracts.

We think the shallow perched groundwater zones have a proximal origin from two sources: The adjacent earthen flood control channel, and treated wastewater effluent stored in Eastern Municipal Water District ponds located just northeast of the site.

The flood channel was wet at the time of field work. It represents a seasonal line of alluvial basin recharge. We also believe there is unavoidable slow exfiltration from the EMWD reclaimed water ponds. Many of the ponds have existed for decades.

Under current and predicted future conditions, *we judge that groundwater should remain at or below the minimum-detected 18-foot depth*. Shallower unsaturated soils tend to be cemented and/or fine-grained, and will not readily transmit seasonal rainfall as local recharge. Groundwater should not influence building design or construction. Any open excavation or shaft deeper than ~18 feet, however, could encounter saturated ground and water inflows. Future fluctuations in water surface elevations will remain possible, however, due to variations in precipitation, temperature, consumptive uses, or surrounding land use changes which were not present at the time observations were made.

5.0 ENGINEERING GEOLOGIC ANALYSES

5.1 Regional Geologic Setting

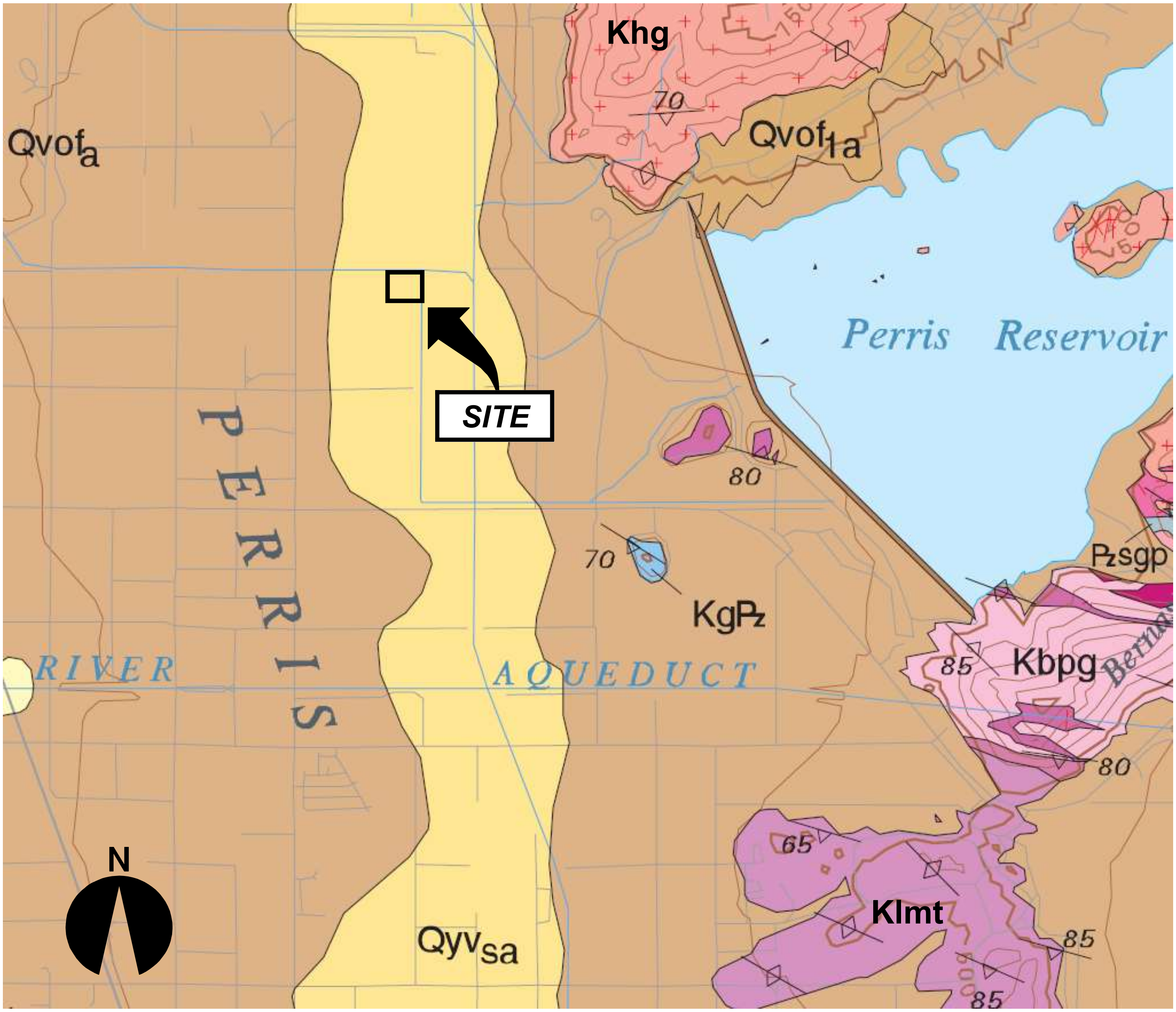
All of western Riverside County lies within the Peninsular Ranges Physiographic Province, one of 11 continental provinces recognized in California. The physiographic provinces are topographic-geologic groupings of convenience based primarily on landforms, characteristic lithologies, and late Cenozoic structural and geomorphic history. The Peninsular Ranges encompass southwestern California west of the Imperial-Coachella Valley trough and south of the escarpments of the San Gabriel and San Bernardino Mountains. Most of the province lies outside of California, where it comprises much of the Baja California Peninsula. The province is characterized by youthful, steeply sloped, northwest-trending elongated ranges and intervening valleys.

Structurally, the Peninsular Ranges province in California is composed of a number of relatively stable, elongated crustal blocks bounded by active faults of the San Andreas transform system. Although some folding, minor faulting, and random seismic activity can be found within the blocks, intense structural deformation and large earthquakes are mostly limited to the block margins. Exceptions are most notable approaching the Los Angeles Basin, where compressive stress gives rise to increasing degrees of vertical offset along the transform faults and a change in deformation style that includes young folds and active thrust ramps. Perris is located in the central portion of the Perris tectonic block, the longest sides of which are bounded by the San Jacinto fault zone to the northeast and the Elsinore and Chino fault systems to the southwest.

The Peninsular Ranges structural blocks are dominated by the presence of intrusive granitic rock types similar to those in the Sierra Nevada, although the province additionally contains a diverse array of metamorphic, sedimentary, and extrusive volcanic rocks. In general, the metamorphic rocks represent the highly altered host rocks for the episodic emplacement of Mesozoic-age granitic masses of varying composition. Parts of the province include thick sequences of younger marine and non-marine clastic sedimentary rocks of Mesozoic and Tertiary age, ranging from claystones to conglomerate. Pre-Quaternary sedimentary rocks are conspicuously absent from most of the Perris Block, however, which is dominated by crystalline basement materials.

5.2 Local Geologic Conditions

Bounded by sometimes bold mountainous terrain to the east and west, the Perris Plain is entirely underlain by massive to crudely bedded alluvium. The alluvium conceals several deep erosional channels carved into granitic basement bedrock that can be considered tributaries to an ancestral San Jacinto River. Morton and Miller (2006) assign an early to middle Pleistocene age for very old alluvium (unit $Qvof_a$, Figure 2) that composes the majority of the topographical valley floor. The map exhibit also delineates a ribbon-like zone of younger Quaternary alluvium that follows the valley axis and supposedly underlies the site. However, exploration data from the Harley Knox project and other nearby study sites show that younger deposits actually tend to be very thin or absent in the depicted areas. AGI interprets surficial silty sand in the southwestern site corner to be representative of younger (but probably still pre-Holocene age) alluvium derived from elevated granitic bedrock terrain west of the Interstate 215 freeway. These deposits probably thicken westward. The regional map is erroneous.



Selected vicinity units:

0 0.5 1.0 mi.

Qyv_{sa} Young sandy axial-valley alluvial deposits (Holocene and late Pleistocene)
$Qvof_{a}$ Very old sandy alluvial-fan deposits (middle to early Pleistocene)

KgPz
Kbpg
Khg
Klmt

Granitic and mixed intrusive/metamorphic basement rocks composed of tonalite, granodiorite, and banded gneiss (Cretaceous and older)

Reference: Modified after Morton and Miller (2006). Scale is approximate.

VICINITY GEOLOGIC MAP		
APN 302-100-016, 017, & 029, CITY OF PERRIS, RIVERSIDE COUNTY, CA.		
PROJECT NO. 4585-SFI	DATE: 3/5/20	**FIGURE 2**

The Perris Plain is considered part of the "Paloma" depositional surface of Woodford et al. (1971), typified by fairly strongly developed illuvial clay and calcic horizons atop the older parent materials. Multiple fining-up sedimentary sequences and older buried soils (paleosols) are known from geotechnical and environmental explorations of the valley. The maximum depth of the $Qvof_a$ unit at the warehouse site is not known with certainty, but probably exceeds 500 feet based on geophysical survey data and some well records (AECOM, 2013). Granitic bedrock rises to the surface only about 3,700 feet northeast of the project site.

5.3 Slope Stability

The almost zero-relief site was found to be free of natural features associated with gross instability of slopes. The property is also distant from mountainous slopes surrounding Perris Valley. We judge landslide risks to be nil.

5.4 Flooding

AGI reviewed Riverside County GIS maps and the official revised (2014) FEMA Flood Insurance Rate Map for the site and vicinity to evaluate flood potential. The Perris Valley Drain and laterals such as the channel passing the site have mostly mitigated former sheet-flood risks in the lowest-elevation parts of the Perris Plain. Per the referenced FEMA susceptibility map, the site area is entirely classified Zone X for minimal flood hazard. "100-year" flood volumes should remain within the adjacent channel.

5.5 Faulting and Regional Seismicity

The project is situated in region of active and potentially active faults, as is all of metropolitan Southern California. Active faults present several potential risks to structures and people. Hazards associated with active faults include strong earthquake ground shaking, soil densification and liquefaction, mass wasting (landsliding), and surface rupture along active fault traces. Generally, the following four factors are the principal determinants of seismic risk at a given location:

- Distance to seismogenically capable faults.
- The maximum or "characteristic" magnitude earthquake for a capable fault.
- Seismic recurrence interval, in turn related to tectonic slip rates.
- Nature of earth materials underlying the site.

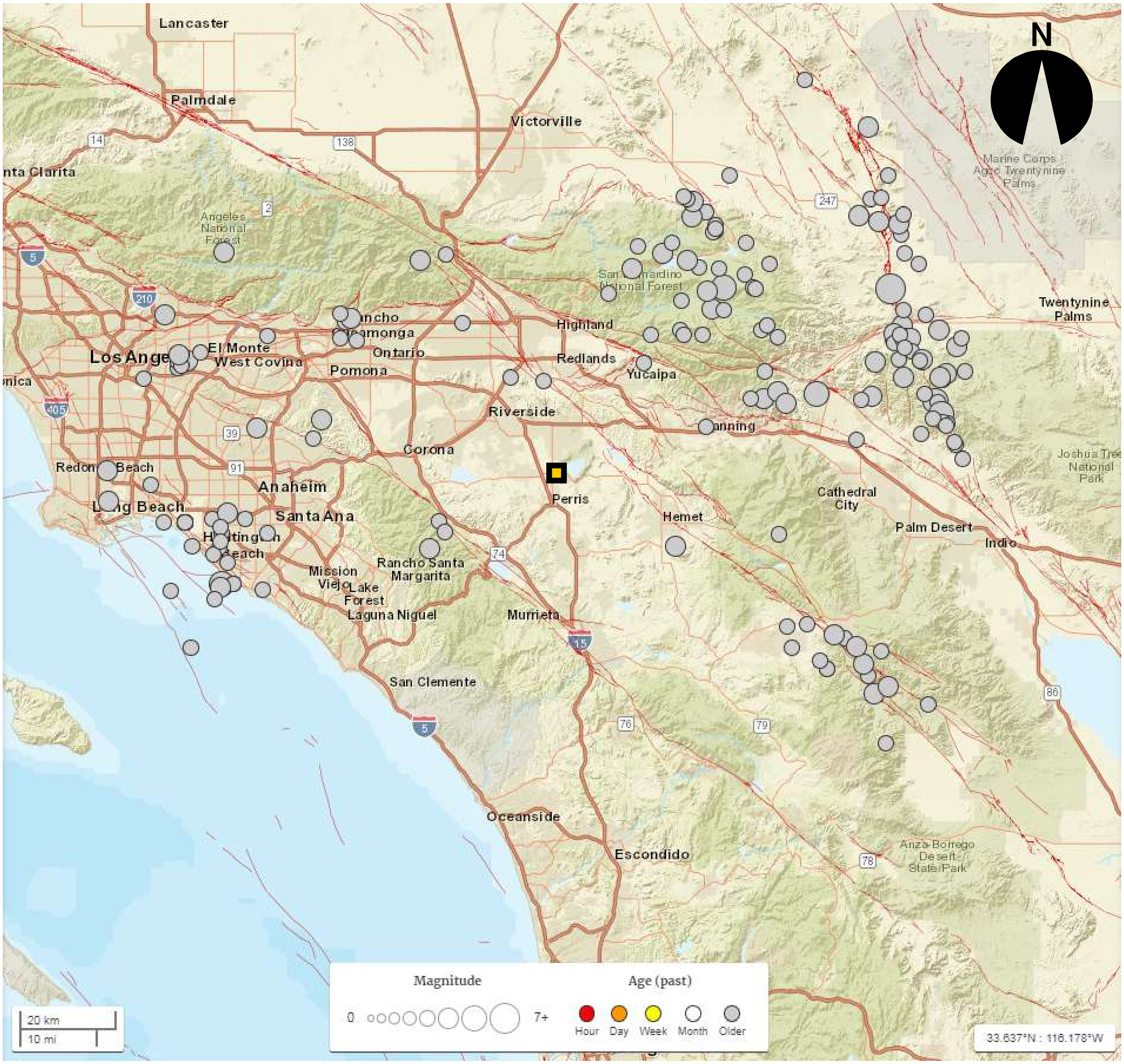
5.5.1 Fault Rupture Potential

Surface rupture presents a primary or direct potential hazard to structures built across an active fault trace. Reviews of official maps delineating State of California Earthquake Fault Zones and Riverside County Fault Hazard Management zones indicated the project site is not located in a zone of required investigation for active faulting. The closest known active regional fault traces are associated with the Casa Loma branch of the San Jacinto fault zone east of Perris Reservoir, about 7.1 miles away at closest approach. Aerial photographic interpretations did not suggest visible lineaments or manifestations of fault topography related to active fault traces on or adjacent to the site. Accordingly, chances for direct surface fault rupture affecting the project are judged to be extremely low.

5.5.2 Strong Motion Potential

All Southern California construction is considered to be at high risk of experiencing strong ground motion during a structure's design life. In addition to the previously mentioned San Jacinto fault zone, the San Andreas Fault can be considered a potentially significant sources of lower-frequency and longer-duration shaking at the project. Other, more-distant regional faults are very unlikely to cause shaking as intense as that caused by rupture of one of the two listed faults. Probabilistic risk models for the Perris-Moreno Valley area fundamentally assign the highest seismic risks from large characteristic seismic events along the San Jacinto fault system. The mode-magnitude event for peak ground acceleration at a 2% in 50-year exceedance risk is a multi-segment M_w8.1 earthquake on the San Jacinto fault (U.S. Geological Survey, 2020b; dynamic conterminous U.S. 2014 model).

The searchable ANSS Comprehensive Earthquake Catalog indicates about 178 events of local magnitude M4.5 or greater have occurred within 100 kilometers of the project since instrumented recordings started in 1932 (Figure 3, next page). Clusters of epicenters are associated with the 1992 Landers and triggered Big Bear Lake events. These and other notable historical earthquakes in southern California over the last 30 years (e.g., Northridge, Hector Mine) were far away. They produced estimated peak ground accelerations well under 0.20g



Reference: U. S. Geological Survey (2019c) real-time earthquake epicenter map. Plotted are 178 epicenters of instrument-recorded events from 1932 to present (3/3/20) of local magnitude M4.5 or greater within a radius of ~62 miles (100 kilometers) of the site. Location accuracy varies. The site is indicated by the gold square. The red lines indicate the approximate surface traces of Quaternary active faults. The selected magnitude corresponds to a threshold intensity value where light damage potential begins. These events are also generally widely felt by persons. Notable Southern California historical events with epicenters just beyond the selected search radius would include the Northridge earthquake [San Fernando Valley], and the Hector Mine event in the Mojave Desert north of Yucca Valley.

AGI	**SIGNIFICANT EVENT EPICENTER EXHIBIT**
	APN 302-100-016, 017, & 029, CITY OF PERRIS, RIVERSIDE COUNTY, CA.
	PROJECT NO. 4585-SFI · DATE: 3/5/20 · **FIGURE 3**

in the City of Perris area. Interestingly, earthquakes larger than the selected M4.5 intensity threshold have been rare along the northern San Jacinto fault and the San Andreas fault, even though both have among the fastest slip rates and shortest mean recurrence intervals among all California faults.

San Jacinto Fault: The San Jacinto fault constitutes a set of *en-échelon* or right- and left-stepping fault segments stretching from near Cajon Pass to the Imperial Valley region. The primary sense of slip along the zone is right-lateral, although many individual fault segments show evidence of at least several thousand feet of vertical displacement. The San Jacinto fault zone has been very active, producing possibly eight historical earthquakes of local magnitude 6.0 or greater. The communities of Hemet and San Jacinto were heavily damaged in 1918 and again in 1923 from events on the San Jacinto Fault. Pre-instrumental interpreted magnitudes for these events were M_L6.8 and M_L6.3, respectively. The historical record suggests each discrete segment *usually* reacts to tectonic stress more or less independently from the others, and to have its own characteristic large earthquake with differing maximum magnitude potential and recurrence interval. Researchers and code development authorities now model the fault with potential for multi-segment rupture, however, with consequent increases in calculated risk to structures.

San Andreas Fault: For most of its over-550-mile length, the San Andreas Fault can be clearly defined as a narrow, discrete zone of predominantly right-lateral shear. The southern terminus is close to the eastern shore of the Salton Sea, where it joins a crustal spreading center marked by the Brawley Seismic Zone. To the northwest, a major interruption of the otherwise relatively simple slip model for the San Andreas fault is centered in the San Gorgonio Pass region. Here, structural complexity resulting from a 15-kilometer left step in the fault zone has created (or reactivated) a myriad of separate faults spanning a zone 5 to 7 kilometers wide (Matti, et al., 1985; Sieh and Yule, 1997; 1998). Continuing research is refining speculation that propagation of ruptures from other portions of the San Andreas Fault might not be impeded through the Pass region. New data suggest the San Bernardino and Coachella Valley segments of the fault may experience concurrent rupture roughly once out of every three to four events. Multi-segment cascade rupture is currently considered in all 2008 and later State of California seismic hazard models (Petersen, 2008; Working Group, 2013), and has been adopted as a scenario event for emergency response training such as the annual ShakeOut drill.

Source characteristics for the two regional active fault zones with the highest contributions to site risks are listed in the following table. Fault data have been summarized from WGCEP (2013) as implemented for the latest California fault model. Magnitudes are based on a probabilistic recurrence interval of 2,475 years for each source, binned to nearest 0.05 magnitude decrement. The reference magnitudes usually reflect cascade ruptures.

Regional Seismic Source Parameters

Fault Name (segment)	Distance from Site (km)	Length (km)	Geologic Slip Rate (mm/yr)	Magnitude @ 2% in 50 Yr. Prob., M_W
San Jacinto (w/ stepovers)	11.4	25	14.0	8.1
San Andreas (Coachella→Mojave South)	29.6	302	10.0 to 32.5	8.25

Version 3 of the Uniform California Earthquake Rupture Forecast (UCERF3) is the updated reference fault source model for the latest-edition California building codes and insurance risk analyses. Utilizing knowledge of tectonic slip rates and last historical or constrained paleoseismic event dates, UCERF3 includes *time-dependent* rupture probabilities for many major California faults. For the San Jacinto fault zone (stepovers combined) between Hemet and Moreno Valley, the model ascribed a 13.8% chance for an earthquake of $M \geq 6.7$ in the next 30 years beginning in 2015 (Field et al., 2015). The conditional probability for an earthquake of magnitude $M_W \geq 6.7$ somewhere along the southern San Andreas Fault was calculated at 57 percent in 30 years. These probabilities will increase each year for successive 30-year windows. Most researchers peg the southern San Andreas as “overdue” for a very large earthquake.

Earthquake shaking hazards are quantified by deterministic calculation (specified source, specified magnitude, and a distance attenuation function), or probabilistic analysis (chance of intensity exceedance considering all sources and all potential magnitudes for a specified exposure period). With certain special exceptions, today's engineering codes and practice generally utilize (time-independent) probabilistic hazard analysis. Prescribed parameter values calculated for the latest 2014 U.S. national hazard model indicate the site has a 10 percent risk in 50 years of peak ground accelerations (PGA) exceeding approximately 0.47g, and 2 percent chance in 50-year exposure period of exceeding .76g (U.S. Geological Survey, 2020b). The reported PGA values were linearly interpolated from 0.01-degree gridded data and include soil correction (NEHRP site class D; local shear wave velocity estimate $V_{s30} \approx 260$ m/sec). Calculated peak or spectral acceleration values should never be construed as representing exact predictions of site response, however. *Actual* shaking intensities from any seismic source may be substantially higher or lower than estimated for a given earthquake event, due to complex and unpredictable effects from variables such as:

- Near-source directivity of horizontal shaking components
- Fault rupture propagation direction, length, and mode (strike-slip, normal, reverse)
- Depth and consistency of unconsolidated sediments or fill
- Topography
- Geologic structure underlying the site
- Seismic wave reflection, refraction, and interference (basin effects)

5.5.3 Liquefaction Hazard

Liquefaction is the transformation of a granular material from a solid state into a semi-fluid state as a consequence of increased pore-water pressure. Certain soil materials subjected to ground vibrations will tend to compact and decrease in volume. If the materials are saturated and drainage is unable to occur, the tendency to decrease in volume will result in an increase in pore-water pressure. Intergranular pressures may build up to a point where they equal the overburden stress and the effective stress becomes zero, whereupon the soil loses strength and may become capable of flowing as a viscous fluid. Liquefaction risks are usually highest in seismic regions where loose sand or soft non-plastic silt occur below groundwater.

Riverside County hazard zone maps place the project in “very high” to “high” liquefaction potential zones. County criteria for these designations would be groundwater less than 30 feet deep and interpreted susceptible soils. Younger alluvium, as identified on Figure 2 for example, would be a flag for the County’s high-hazard zonation. Deep deposits of saturated younger soils were not found in the Harley Knox site, however. Nonetheless, logged relative densities in older sediments based on SPT blow counts and shallow water at 18 feet did not rule out threat from liquefaction based on standardized risk screening criteria.

Calculation or estimation of two variables is required for evaluation of liquefaction potential. These variables are the seismic demand placed on a soil layer, expressed in terms of cyclic stress ratio (CSR), and the capacity of the soil to resist liquefaction, expressed in terms of cyclic resistance ratio (CRR) (Youd and Idriss, 1997). CSR is dependent on the peak horizontal ground acceleration, depth to groundwater, and depth of the soil layer under analysis. CRR is an empirically derived value that discriminates between soils with observed liquefaction effects and those that did not liquefy in actual earthquakes. In most natural soil deposits, CRR increases with increasing depth, increasing geologic age, or increasing clay content. Soils that are not close to or at saturation are normally considered free of liquefaction hazards, but may still have susceptibility and opportunity for related phenomena such as volumetric strain settlement to occur.

SPT-based liquefaction and settlement potential analyses were completed for the alluvial sequences represented by Borings B-3 and B-8, using the PC-hosted software package LiquefyPro (version 4.3, ©CivilTech Software, 2003). The analyses were done in conformance to published guidelines and recommendations of the State of California (California Geological Survey, 2008) and a technical committee of seismological researchers, consultants, and building officials (Martin and Lew, 1999). Current codes require the selection of a site-modified peak ground acceleration PGA_M derived in accordance with ASCE/SEI

Standard 7-16 §11.8.3 for a triggering assessment. For risk screening purposes we considered a reasonable present and future high-water level of 18 feet below the surface. Details of user-selectable parameters, the expected seismic condition assumed by AGI for this investigation, settlement calculations, and program output plots with quantified liquefaction susceptibility and total strain settlements depicted are presented in Appendix C. Profile analyses were run for both mean and modal-magnitude seismic events derived from a deaggregation analysis. This was done as a sensitivity check on input motions.

AGI's greatest concern was liquefaction potential of sandy sediments near perched-water horizons at depths shallower than 35 feet. However, the evaluation results indicate that with corrected SPT $N_{1(60)cs}$ values exceeding 17, these layers are not liquefiable at expected seismic intensities. We conclude that liquefaction risks at the site are insignificant for the assumed construction. The related phenomena of flow slides, lateral spreading, and surface manifestations such as ground fissuring or sand boil are also ruled out as hazards.

5.5.4 Other Secondary Seismic Hazards

Settlement & Subsidence. AGI finds that surface settlements from saturated and dry-sand volumetric changes should be trivial assuming that very shallow soils are treated by remedial grading for structural support. Calculated total surface settlements from the liquefaction model analyses are of very low magnitude (approximately 0.1 inch). Differential settlements over horizontal spans of 30 to 40 feet would be even less. We think the tiny calculated differential settlement potentials are reasonable engineering assumptions for this site. Both the total and differential settlements are far lower than typical allowable maximum deflections for concrete panel-wall construction on continuous foundations. Regional subsidence from fluids withdrawal or tectonic deformation is not a documented hazard in the Perris Valley.

Flooding. AGI categorically rules out tsunami and seiche hazards. The project site is inland and not adjacent to lakes or open reservoirs. Induced flooding risks from municipal water storage tanks are also absent.

Parts of the Perris Valley including the Harley Knox site could be impacted by breaching of the Lake Perris dam. More-distant reservoirs near Hemet (Lake Hemet; Diamond Valley Lake) do not pose inundation hazard, as the site appears to be passively protected by elevation. In July 2005, the State identified potential seismic safety problems with Perris Dam. Deficiencies with the alluvial foundation soils were addressed by several years of construction to stabilize the downstream embankment and mitigate liquefaction potential. Work was completed in 2018. We believe reservoir loss potential is now extremely remote and is below a level of regulatory concern for ordinary construction.

Landslides. Section 5.3 notes that the site is flat and far from steep or boulder-strewn mountain slopes. Earthquake-induced hazards from slope instability or tumbling rocks are judged to be zero.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 General

Based on the results of our field exploration and laboratory tests, engineering analyses, local experience, and judgment, it is our professional opinion that the project site should be suitable from a geotechnical viewpoint for the proposed project. Geological hazards imposed on the warehouse building appear to be limited to strong ground motion due to earthquake. Geotechnical constraints include surficial lower-density natural materials judged susceptible to hydrocollapse and compression under building loads. Deeper alluvium within zones of near-constant soil moisture is demonstrably hard, cemented, and has very low compressibility. Near-surface silts and "B-horizon" very old alluvium are clayey and categorized as expansive, though.

Prescriptive mitigation for the hazard of strong ground motion is nominally provided structural design adherence to local adopted building codes. Section 6.7 contains recommended short- and long-period design spectral accelerations for the project.

Soil excavation and compaction to create dense engineered fill are recommended to mitigate unsuitable surficial alluvial deposits and disturbed horizons that would otherwise be present below shallow structural foundations, pavements, and planned engineered fills. Listed below are the recommended earthwork actions for existing soil conditions impacting site development:

(1) Remedial grading should replace all "younger", typically disturbed sandy silt deposits capping cemented older alluvium, plus all active shrink-swell horizons, as compacted engineered fill beside and below the entire building envelope and all concrete site walls. Based on the exploration logs, expected structural "removal" depths from existing grades should have a fairly uniform range of approximately 5 to 6 feet across the entire property. "Active" horizons will be identifiable by soil type (clayey silt and possibly silty clay), and should be physically distinguishable by peculiar granulated or "exploded" textures, abundant white carbonate, and sometimes visible macro-porosity. There is a fairly abrupt transition from unsuitable materials to competent alluvium. We think this transition should be fairly obvious during mass grading.

(2) Overexcavations should be deepened, if required, so that at least 24 inches of engineered fill is created beneath all future continuous or spread footings. Concrete site walls not attached to the building should also be founded on a minimum of 24 inches of engineered fill. Foundation-zone lateral excavation limits at final bottom elevations should be at least 5.0 feet beyond footing edges. Feathering upward at 3:1 or flatter inclinations is recommended where needed to join with nominal bottom depths for unsuitable soil removals below industrial floors in the rest of the building. Where excavation encroachments into adjacent property are not allowed, as may occur for perimeter site walls, a reduced maximum foundation bearing pressure equal to prescriptive code values for native soil shall be assumed.

(3) At least 24 inches of soil stripping before placement of compacted engineered fill is recommended in all future new pavement areas. The remaining 12 inches may be processed and compacted in place. The intent is to recompact loose, heavily bioturbated, and mechanically tilled soils. Should pavement subgrades be planned more than 24 inches below current surfaces, in-place processing is recommended to create at least 12 inches of engineered soil fill below flexible or rigid pavement structural sections.

We expect that site soil blends will be expansive. Pre-project consultations between AGI and earthwork contractors would be encouraged to formulate plans for initial stockpiling and "round-robin" excavations and fills. Clay content is much lower for soils within 36 inches of current grades, and for silty sand that may be limited in distribution to the southwestern building quadrant. These soils should be preferentially saved for floor subgrades. A goal of planning would be to devise schemes to keep excavated clayey hardpan soils only in the deeper portions of fills, and selectively retain shallower less-expansive materials for use in pad finishing. Alternatively, if import soil is required, proven non-expansive import materials could substitute for local soils when constructing pad subgrades.

6.2 Site Grading

The general guidelines presented below should be included in the project construction specifications to provide a basis for quality control during grading. It is recommended that all compacted fills be placed and compacted under continuous engineering observation and in accordance with the following:

- Demolition and removal of any and all abandoned buried improvements including foundations, slabs, irrigation pipes, tanks, or cables. Any abandoned septic tanks and leach fields should be excavated and removed in their entirety. If domestic water wells are found, they should be properly grouted, sealed, and capped by a C57-licensed drilling contractor in accordance with Riverside County and State DWR regulations. A copy of the well closure report(s) must be submitted to AGI.

- Clearing and disposal of weeds, shrubs, trees, tree roots larger than approximately one inch, and debris should be initiated prior to grading. If necessary in the opinion of the Geotechnical Engineer, the grading contractor must be prepared to supply personnel to pick woody debris or foreign objects from engineered fill during the grading operations.

- Excavation of fill, disturbed or porous native soil, or other unsuitable material as determined at the time of grading by the Geotechnical Engineer shall be performed as discussed in Section 6.1 for support of compacted engineered fill, structures, and improvements. Bottom acceptance will be by geological observation, probing, and density testing in alluvium. Natural soils shall demonstrate in-place dry densities of 85% or greater of the laboratory-determined maximum dry density to be classified competent, and exhibit insignificant macro-porosity. All of the site soils appear to be acceptable for reuse in new engineered compacted fill if free from organic debris and trash. Final determinations of removal depths shall be made by qualified geotechnical professional staff during grading based upon conditions encountered during earthwork activities.

- Observation and acceptance of all stripped areas by the Geotechnical Engineer and/or Engineering Geologist and/or their designated representative shall be done prior to placing fill.

- Shallow scarification of exposed bottoms to depths of 4 to 6 inches (structural envelope), or to planned processing depths (pavement and other engineered fill areas), moisture-conditioning by adding moisture or drying back to above-optimum moisture contents as described below, and recompaction to at least 90 percent of the maximum dry density as determined by the ASTM D1557-12 test standard.

- Fill soils should be uniformly moisture-conditioned by mixing and blending to optimum water content or higher, and placed in lifts having thicknesses commensurate with the type of compaction equipment used, but generally no greater than 6 to 8 inches. Pre-watering of the site is recommended in advance of earthwork (depending upon seasonal conditions) to moisten the upper 24 to 36 inches of material. This will help reduce fugitive dust, and more importantly allow for easier mixing and clod crushing. Care will be needed to avoid overwatering the deeper clayey horizons and creating sticky, muddy, impassable conditions. *Fill water contents below the recommended minimum water content shall constitute a basis for non-acceptance of the fill irrespective of measured relative compaction, and at the discretion of the Geotechnical Engineer may require the fill be reworked to produce uniform water contents at or over the desired 100% of optimum moisture.*

- The contractor should utilize means and methods that result in uniform compaction of engineered fill meeting at least 90 percent of the laboratory maximum dry density determined by the ASTM D1557-12 standard. Sheepsfoot rollers and/or a Rex compactor are recommended for mixing and kneading action that will be needed to distribute water in clayey fill soils and break down cohesive clods. AGI recommends the uppermost 12 inches of pad and pavement subgrade material achieve at least 95 percent relative compaction for all project-site soil classifications except for silty clay (USCS CL). The latter is not anticipated, but would require special recommendations to minimize chances for heave and pavement distress.

- Rocks or other similar irreducible inert particles larger than about 3 inches in diameter should be excluded from engineered structural fills on this site. Based on exploration findings, oversize rocks should be very rare or absent.

- Field observation and testing shall be performed to verify that the recommended compaction and soil water contents are being uniformly achieved. Where compaction of less than 90 percent is indicated (95 percent in identified subgrade zones as previously noted), additional compaction effort, with adjustment of the water content as necessary, should be made until at least minimum-accepted compaction is obtained. Field density tests should be performed at frequencies not less than one test per 2-foot rise in fill elevation and/or per 1,000 cubic yards of fill placed and compacted at this site.

- Import soils, if required, should consist of predominantly granular material with low or negligible expansion potential and be free of deleterious organic matter and large rocks. Import soils with an expansion index of under 20 are preferred and recommended for selective use within 18 inches of final pad elevations if an unbalanced site is part of the design plan. The borrow site and import soils must be reviewed and accepted by the Geotechnical Engineer prior to use. Geotechnical acceptance will only be predicated on meeting certain engineering criteria, and would not address any environmental testing or clearances required by local agencies or by the proposed end use.

- Proper surface drainage should be carefully taken into consideration during site development planning and warehouse construction. Finish surface contours should everywhere result in drainage being directed away from building foundations to swales, area drains, or water quality basins. The use of descending ramps to proposed dock doors should be discouraged; a better approach is an elevated building finish floor and exterior pavement surfaces sloping away from the dock doors. Roof runoff should be directed to LID BMPs at least 15 feet lateral to perimeter building foundations. Landscape beds should not be placed next to structures unless xeriscape and micro-irrigation design practices can be enforced.

- It is recommended that expansion index and soluble sulfate content tests be performed upon completion of rough grading in the building pad. The exact number of tests should be determined by site observations made during grading, but should not be less than one test for every soil type encountered or 5 tests overall, whichever is greater. Atterberg limits testing to help qualify soil activity is recommended in the event expansion indices greater than 20 are calculated.

6.3 Earthwork Volume Adjustments

Removal and recompaction of the unsuitable surficial alluvium will result in material volume loss. The calculation of earth balance factors for the site as a whole is subject to some uncertainty, based on imprecise estimates of shallow soil density from 0 to 2 feet (tilled zone), and the future achieved degrees of compaction. We believe that civil designers should make allowances for at least 12 to 15 percent shrinkage in the building removal areas. Exterior paved areas may shrink closer to 20 percent from 0 to 2 feet. Bottom subsidence from heavy equipment is predicted to be almost undetectable in the deep cemented soils, but on a site-wide average inclusive of paved areas should fall near 0.1 foot in our estimation.

6.4 Slopes

Slopes are not shown on the project conceptual drawing. It is doubtful that permanent manufactured fill slopes will be needed anywhere on the extremely flat site. Any required slopes should conform to the following recommendations:

- Cut and fill slopes should be constructed at maximum slope inclinations of 2:1 (horizontal:vertical).
- The surfaces of all fill slopes should be compacted as generally recommended under Site Grading, and should be free of slough or loose soils in their finished condition. The desired result should be 90 percent relative compaction to the slope face.
- The fill portion of any fill-over-cut slopes should maintain a minimum horizontal thickness of 5 feet or one-half the remaining fill slope height (whichever is greater), and be adequately benched into undisturbed competent materials. Cut slopes in local native surficial alluvium are preliminarily judged feasible without needs for stabilization fills.
- Erosion control measures should be implemented for all slopes as soon as practicable after slope completion, per applicable City ordinances.

6.5 Foundation Design

Although information regarding anticipated foundation loads was not available for this report, the predicted construction type implies moderate imposed soil loads. Foundation plans, once they become available, must be evaluated by this firm for compatibility with the preliminary recommendations presented below.

Conventional shallow continuous or spread footings embedded entirely within compacted engineered fill appear feasible for the light industrial building. Structural loads may be supported on continuous or isolated spread footings at least 18 inches wide. *All* footings including site wall foundations should be bottomed a minimum of 24 inches below the lowest adjacent final grade. The recommended maximum allowable bearing value is limited to 3,000 pounds per square foot (FS $\geq$3.0). Building or site walls that are "zero lot line" alignments shall match code-specified prescriptive maximum bearing of 1,500 pounds per square foot for native soil. Bearing values may be increased by one-third when considering short-duration seismic or wind loads.

Lateral load resistance will be provided by friction/cohesion between the supporting materials and building support elements, and by passive pressure. A cohesion coefficient of 0.4 may be utilized for foundations and slabs constructed atop structural fill derived from fine-grained (USCS ML) blended site materials. A passive earth pressure of 250 pounds per square foot, per foot of depth, may be used for the sides of footings. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

Any <u>exterior</u> isolated building footings should be tied in at least two perpendicular directions by grade beams or tie beams to reduce the potential for lateral drift or differential distortion. The base of the grade beams should enter the adjoining footings at the same depth as the footings (viewed in profile). The grade beam steel should be continuous at the footing connection. Footings should either be continuous across large openings, such as loading dock doors or main entrances, or be tied with a grade beam or tie beam.

Interior columns should be supported on spread footings or integrated footing and grade beam systems. Column loads should not be supported directly by slabs. When designing the interior building footings, the structural engineer should consider utilizing grade beams to control lateral drift of isolated column footings, if the combination of friction and passive earth pressure will not be sufficient to resist lateral forces.

Minimum foundation reinforcement should consist of four No. 5 bars, two near the top and two near the bottom (viewed in cross-section), or as dictated by loading conditions. However, footing and grade beam reinforcement specified by the project structural engineer shall take precedence over the latter guidelines.

Provided that AGI's recommendations for engineered fill depths below footings are incorporated into final design and construction, foundation settlements should be of low magnitude. Much of the anticipated foundation settlement is expected to occur during construction. Maximum consolidation settlements are not expected to exceed a ½-inch and should occur below the heaviest loaded columns. Differential settlement is not expected to exceed approximately ¼ to ½ of an inch between similarly loaded elements in a 30-foot span.

6.6 Floor Slab Design

Concrete slab-on-grade industrial floor construction is assumed. The following recommendations are presented as options for minimum design parameters for the slabs, accounting for soil expansive pressures and measured soil strengths only. The minimum design parameters do not account for concentrated loads (e.g., machinery, pallet racks, etc.) and/or the installation of freezers or heating boxes.

The information and recommendations presented in these sections are not meant to supersede design by the project structural engineer. We have conceptualized options based on an as-built subgrade having a “medium” expansion index of 70 or less and plasticity index of under 10, as AGI anticipates for local silty materials placed during mass grading. Generally, the indicated dimensions or materials may be varied by the structural engineer to produce acceptable performance for heavy or point loads, or to reduce section thicknesses. Final verification of the applicability of these or any modified recommendations must be confirmed by expansion index testing at the conclusion of pad precise grading.

Lightly Loaded Floor Slabs. Commercial/office slabs in areas which will receive relatively light live loads (i.e., less than approximately 125 psf) may be a minimum of 5.0 inches thick if reinforced with No. 3 reinforcing bars at 18 inches on-center in two horizontally perpendicular directions. Reinforcing should be properly supported on chairs or blocks to ensure placement near the vertical midpoint of the slab. "Hooking" of the reinforcement is not considered an acceptable method of positioning the steel. The recommended minimum compressive strength of concrete in this application is 3,000 pounds per square inch (psi).

Transverse and longitudinal control joints are advised to isolate slab cracking due to concrete shrinkage or expansion. If utilized in lieu of added reinforcement or concrete additives, crack control joints should be spaced no more than 12 feet on center and constructed to a minimum depth of T/4, where "T" equals the slab thickness in inches. Construction joints between pours should utilize dowel baskets to control vertical deflections from either interior loads or soil uplift pressures.

Highly Loaded Floor Slabs. The project structural engineer should design slabs in the event of expected high loads (i.e., machinery, forklifts, storage racks, etc.). Designs utilizing the modulus of subgrade reaction (k-value) may be used. A k-value of 100 pounds per square inch per inch may conservatively used for on-site soils. Recommended R-value tests for final pavement section design, and/or plate load tests, may be used to verify the subgrade modulus after completion of grading.

For live loads of up to 250 psf, plain concrete slabs should be at least 6.5 inches thick. The concrete used in slab construction should conform to Class 560-C-3250. Transverse and longitudinal crack control joints (if utilized) should be spaced no more than 12 feet on center and constructed to a minimum depth of T/4, where "T" equals the slab thickness in inches. Construction joints between pours should utilize dowel baskets to control vertical deflections from either interior loads or soil uplift pressures. These suggested design factors can be altered as long as comparable stiffness and strength objectives can be achieved.

Moisture Protection. Ground-floor office portions of the warehouse building slab would be expected to have interior floor finishes (wood, vinyl, carpet) potentially sensitive to subgrade moisture or water vapor. AGI recommends a minimum 6-mil-thick plastic vapor retarder installed per manufacturer and code specifications with all laps/openings sealed. The barrier may be situated atop as-built subgrades if reasonably free of large stones. Optional thicker 10-mil vapor retarders (e.g., StegoWrap®) should be favored due to greater damage resistance and even lower transmissivity. Protected areas should be separated from any areas that are not similarly protected. The separation may be created by a concrete cut-off wall extending at least 24 inches into the subgrade soil.

Subgrade Pre-Saturation. Pre-saturation is recommended for all pad soil and pedestrian walkway subgrades demonstrating post-grading expansion indices exceeding 20. AGI encourages use of import soils meeting “non-expansive” criteria within 18 inches of building flatwork. For as-built expansion indices under 20, AGI would recommend that soil water contents at least approach optimum soil water contents determined from ASTM D1557-12 to a depth of at least 12 inches prior to vapor retarder installation or industrial slab concrete placement. Extremely dry soils can pull water from wet concrete by capillary action and potentially affect hydration of cement pastes. Construction sequencing that helps preserve grading water should be encouraged. Pad subgrade soils with as-built expansion indices in the range of 20 to 50 should be at or over 110 percent of optimum water content to a depth of 12 inches. Expansion indices over 50 should be reviewed by AGI for specific pre-pour conditioning recommendations based on soil classification, plasticity index, and as-built minimum compaction. Subgrade soil water contents should be checked and verified as suitable by AGI technical staff no more than 48 hours prior to concrete placement.

6.7 2019 California Building Code Seismic Criteria

Prescriptive mitigation for the hazard of strong ground motion is nominally provided by structural design adherence to local adopted building codes. The 2019 CBC, based on the 2018 *International Building Code*, maintains a “look-up” code convention for seismic engineering, using as primary inputs the site’s location and the assigned site class. The latter is a measure of shallow-earth elastic resistance determined by borehole tests, depth to bedrock, and/or geophysical methods. The updated 2019 code quantifies seismic risk based on the newer probabilistic 2014 National Seismic Hazard model. Design coefficients are ultimately functions of distance to active faults, fault activity, and measured or correlated mean shear wave velocity within 30 meters (~100 feet) of the ground surface. The tabulated criteria presented on the next page were derived in accordance with the rules of Section 1613 of the 2019 CBC and ASCE/SEI Standard 7-16.

Table 6.7-1
2019 CBC Seismic Design Factors and Coefficients
(Lat. 33.85886, Long. 117.21706)

2019 CBC Section #	Seismic Parameter	Indicated Value or Classification
1613.2.1	Mapped Acceleration MCE_R S_s	1.500g (Note 1)
	Mapped Acceleration MCE_R S_1	0.600g (Note 1)
1613.2.2	Site Class	D (Note 2)
1613.2.3	Site Coefficient F_a	1.0
	Site Coefficient F_v	1.7 (Note 3)
1613.2.3	Adjusted MCE_R Spectral Response S_{MS}	1.500g
	Adjusted MCE_R Spectral Response S_{M1}	1.020g
1613.2.4	Design Spectral Response S_{DS}	1.000g (Note 4)
	Design Spectral Response S_{D1}	0.679g (Note 4)

Notes

(1) Interpolated from 0.01-degree gridded data in the probabilistic 2014 National Seismic Hazard Model (SEAOC, 2020), 2% in 50-year exceedance probability.

(2) Determinate classification, based on minimal site grading, borehole SPT data, depth to bedrock greater than 30 meters, and estimated $V_{s30} \approx 260$ m/sec. Clay horizons are deemed to be outside of criteria for "soft clay" as defined by ASCE 7-16 §20.3.2.

(3) Provided that equivalent lateral force procedures are used to determine seismic resisting elements of the structure, and the seismic response coefficient C_s is determined in accordance with ASCE 7-16 §12.8.1.1.

(4) Defined by 2019 CBC §1613.1 and ASCE/SEI 7-16 §11.4.5. A *site-specific* MCE_R response spectral acceleration at any period shall be taken as the lesser of the probabilistic or deterministic spectral response accelerations, with the latter subject to lower-limit values. The design spectral response accelerations are calculated as ⅔ of the MCE_R value.

Based on ASCE 7-16 and CBC §1613.2.5, a Seismic Design Category of **D** for risk category **I-III** buildings/structures is assigned for buildings sited where $S_{D1} > 0.20g$ and $S_1 < 0.75g$. The option for alternative seismic design category determination based on a structure's fundamental period and CBC Table 1613.2.5(1) alone is allowed. The site-modified zero-period MCE_G ground motion estimate PGA_M is 0.601g. Seismic response coefficients determined by the SEAOC seismic design tool applied to Figures 22-18A and 22-19A of ASCE 7-16 would be:

$C_{RS} = 0.930$ $C_{R1} = 0.907$

It should be understood that the 2019 CBC and most other building codes define minimum criteria needed to produce acceptable life-safety performance. Code-compliant structures can still suffer damage. Project owners should be aware that structures can be designed to further limit earthquake damage, sometimes for modest cost premiums. Ultimately, final selection of design coefficients should be made by the structural consultant based on local guidelines and ordinances, expected structural response, and desired performance objectives.

6.8 Pavements

Depending upon budget, aesthetics, life-cycle costs, and proposed end use, Portland cement concrete (PCC) pavement or a mix of PCC and lighter-duty asphalt surfaces could be specified for the project. Customarily, truck driveways and trailer stalls use PCC pavement. Conventional asphalt surfaces might be elected for employee auto parking and driveways along Redlands Avenue. It is anticipated that the uppermost porous and mechanically tilled topsoils in areas that will support new asphalt or PCC pavements, curbs and gutter, sidewalks, or other flatwork will be removed and recompacted as recommended in Section 6.1.

For an assumed traffic index of 8.0, equivalent maximum single-axle loads of 13,000 pounds, an estimated R-value of at least 15 for on-site soils shallower than 3 feet, and assumed concrete modulus of rupture of 500 psi, the recommended preliminary PCC design section includes 8.5 inches of un-reinforced (plain) concrete over 12 inches of (non-clay) soil compacted to not less than 95 percent relative compaction. Subgrade treatments such as lime or cement soil stabilization should be considered for low-strength clay soil classifications, and would be recommended for heavy-duty pavements resting on clay soils with R-values under 10 or having plasticity indices greater than 10. Concrete used for pavement should have a minimum 28-day compressive strength f_c of 3,500 pounds per square inch. The structural engineer may evaluate alternative sections that include reinforcement or different-strength concrete mixes in the event of a different design traffic index, special conditions including ESALs exceeding 13,000 pounds, or requests for a thinner concrete section.

The following table presents an *example* structural section for automobile parking lot hot-mix asphalt pavements based upon Caltrans design methods, a 20-year pavement lifetime, and an estimated soil R-value. The example section may be useful for development cost estimates. Neighboring streets are fully improved and not expected to require work other than patch paving at utility laterals. The tabulated dimensions are the minimum-recommended structural section for passenger automobile loads. Final recommended section(s) may change and should be based on expected loading, desired pavement lifetime, and recommended R-value tests on soils collected from as-built subgrades.

Table 6.8-1
Preliminary Asphalt Pavement Design

Pavement End Use	Traffic Index	R-Value	A.C. Thickness	Base Thickness
Passenger Auto Parking	5.5	15	4.0"	8.0"

It is recommended that concrete curbs and ribbon gutters be poured neat against compacted soil subgrades in advance of pavement subgrade excavation and base course placement. It is especially critical that drainage pathways from tree wells or nearby landscaped areas not be created by inadvertent construction of curbs atop permeable base course layers.

Generally, subexcavation of pavement areas should not exceed that needed to mitigate compressible surficial soils per the protocol in Section 6.1. Subgrades not classified as clay should be processed and compacted to a minimum of 95 percent of the laboratory maximum dry density determined by ASTM D1557-12 to depths of at least 12 inches. Modified compaction and water content specifications will be required for clay soil (USCS classification CL), whether stabilized or unstabilized. Base course should meet materials specifications for Caltrans Class 2 aggregate base material or better, and should be placed and fully compacted in lifts no greater than 6 inches thick to a minimum dry density of 95 percent of the laboratory maximum dry density per the ASTM D1557-12 standard. Pavement gradients should be designed to allow rapid and unimpaired flows of runoff water, and concrete gutters should be provided at all flow lines.

We think the owner would be best served by avoiding *reclaimed base materials* containing crushed concrete. Reclaimed base from multiple Inland Empire sources is now known to sometimes unintentionally contain aluminum metal fragments subject to chemical hydrolysis, extreme volumetric swelling, and the development of very visible pavement bumps in conventional hot mix asphalt surfacing. Effects on PCC pavements have not been detected to date. To our knowledge, reclaimed materials suppliers have not introduced equipment that can reject the causative metal fragments from the crusher runs. Specification of natural crushed aggregates will minimize this risk if a flexible pavement is planned.

6.9 Retaining Walls

Available plans did not depict retaining walls, and the limited site relief suggests walls may be avoidable except possibly for dock door areas. Preliminary recommended earth pressure values for walls are shown below. AGI assumes that a well-drained, select granular on-site or import material such as locally available decomposed granite sand with a sand equivalent value of 30 or better will be utilized for backfill. Clayey site soils are not recommended for wall backfill. Live loading (e.g., trucks or forklifts) must be added to the stated values. Wall pressures from seismic inertial loads must also be included for tall walls (none expected). Seismic loads may be based on a design peak ground acceleration PGA_M of 0.60g and MCE event magnitude M_w8.1. Other recommended site conditions such as drained, granular backfill soils would be consistent with the assumptions of the widely used Mononobe-Okabe method or similar later variations of rigid plastic methods for finding force magnitudes on the wall. Standard reduction factors for PGA (e.g., 0.5 for M-O method) may thus be implemented.

Table 6.9-1
Preliminary Retaining Wall Fluid Pressure

Inclination of Retained Material	Equivalent Fluid Pressure (psf)	
	Unrestrained	Restrained
Level	37	56

AGI recommends reviews of preliminary wall designs to gauge needs for locality-specific modifications and/or supplemental soil tests before construction. The same recommended maximum foundation bearing value of 3,000 psf for structures may also be assumed for retaining walls and site walls founded atop engineered fill. *Exception:* Perimeter site wall footings should be based on a reduced maximum bearing value of 1,500 psf where overexcavations are laterally constrained by property lines. Vertical backcuts are recommended; soil removal operations could require alternating slot cuts perpendicular to property lines if loose or unstable conditions are found. AGI currently believes that temporary vertical cut faces up to 5 feet high should stand without problems for at least a day.

Granular wall backfill at dock doors should be mechanically compacted to a minimum of 95 percent relative compaction; 90 percent or greater is sufficient where not subject to live loads. Density testing is recommended to verify the adequacy of compaction. Substitution with crushed or pit-run clean rock materials in wall panel backfills is encouraged, but must also be accompanied by mechanical densification with plate compactors, ramming tampers, or concrete vibrators.

Exterior walls retaining more than 3 feet of soil should be provided with a means of drainage to prevent hydrostatic forces. Drainage provisions may be based on the wall height, wall length, and any irrigated land uses next to the improvement. Typical approaches would be a continuous perforated subdrain line embedded in open-graded crushed rock placed at the inside bottom of the wall, or through-the-wall options such as weepholes, or open head joints for CMU structures.

6.10 Temporary Sloped Excavations

Excavations at the site would be expected to encounter massive, non-raveling sequences of silty or clayey alluvium, and/or engineered fill after mass grading. Excavations up to 5 feet in depth in these materials should stand vertically for temporary periods. Trenches open for any extended period of time, trenches placed in disturbed native ground, and all excavations for worker entry greater than 5 feet in depth should be properly sloped or shored. Where sufficient space is available for a sloped excavation, the side slopes should be inclined to no steeper than 1:1 (horizontal to vertical) per current rules for excavation material Type B and an excavation depth of 18 feet or less in unsaturated soil. The exposed earth materials in the excavation side slopes should be observed and verified as suitable by a geotechnical engineer or other qualified person. The exposed slope faces should be kept moist and not allowed to dry out.

Surcharge loads should not be permitted within five feet from the top of excavations, unless the cut or trench is properly shored. Contractors are ultimately responsible for verifying that slope height, slope inclination, excavation depths, and shoring design are in compliance with Cal-OSHA safety regulations (Title 8, Section 1540-1543 et seq.), or successor regulations.

6.11 Trench Backfill

All soil-backfilled utility trenches on this site should be backfilled in lifts and mechanically compacted to at least 90 percent of the laboratory maximum dry density. Utility purveyors may specify a greater degree of compaction in streets (e.g., lateral connections into Redlands Avenue or Harley Knox Boulevard) than this stated minimum. Flooded or jetted backfill is not recommended except for densification of select imported granular bedding materials placed directly around utility lines. The local soils are deemed unsuitable to serve as pipe bedding materials. Density testing is recommended to verify the adequacy of compaction efforts.

6.12 Soil Corrosivity

Chemical analyses were performed to provide a general evaluation of the corrosivity of the native soils and included soluble sulfates, soluble chlorides, pH, and minimum saturated resistivity. Findings indicated the site soils should not be aggressive to concrete, but could be highly corrosive to buried metal. Analytic tests reported soluble sulfate contents were low, quantified at only 0.0064 weight percent in a representative sample from the east end of the building envelope. Minimum saturated resistivity was 2,546 ohm-cm. The test data did not point to chloride enrichment that is a characteristic for the sites's mapped agricultural soil unit (Domino silt loam, saline-alkali). Elevated chloride up to 235 ppm was detected, however, for another industrial project across Harley Knox Boulevard (NorCal Engineering, 2017), and we would caution that severe corrosion potential could exist in older silt and clay deposits toward the east end of the project. A larger set of onsite samples should be analyzed during mass grading. We encourage the owner to engage a qualified corrosion engineer for a more in-depth evaluation of risks to buried ferrous objects and for specification of special corrosion protection features that may be required. Metal fire protection lines should be keyed upon.

The categorically “negligible” sulfate concentrations indicate that normal Type I-II cement should be suitable for concrete mix designs utilized for this project, based on American Concrete Institute (ACI) 318 Table 4.3.1. Type V cement may optionally be used for any site concrete mix, and would be mandatory for measured sulfate concentrations exceeding 0.20 weight percent. It is recommended that all concrete in contact with on-site soil materials be selected, batched, and placed in accordance with the latest California Building Code and ACI technical recommendations.

6.13 Construction Observation

The preliminary foundation recommendations presented in this report are based on the assumption that all foundations will bear entirely within properly compacted engineered fill approved by this office. It is recommended that all engineered fill placement operations be performed under continuous engineering observation and testing by AGI personnel. Engineered fill shall constitute any load-bearing soil placements, irrespective of yardage quantity or depth. Continuous observation is a 2019 CBC requirement for engineered fill. Continuous or periodic fill observation and testing may be suitable for trench backfills depending mostly on trench depth and contractor production. Verification testing of completed soil-subgrade expansion potential, soluble sulfate content, soil plasticity index, and pre-saturation (if required) is recommended at appropriate points in the construction time line. All foundation excavations should be observed prior to placing reinforcing steel to verify that foundations are embedded within satisfactory materials and that excavations are free of loose or disturbed soils and made to the recommended depths.

6.14 Investigation Limitations

The present findings and recommendations are based on the results of the field exploration combined with interpolations of soil and groundwater conditions between a limited number of subsurface excavations. The nature and extent of variations beyond or between the explorations may not become evident until construction. If conditions encountered during construction vary significantly from those indicated by this report, then additional geotechnical tests, analyses, and recommendations could be required from this office. Because this report has also incorporated assumed conditions or characteristics of the proposed structure where specific information was not available, foundation plan reviews by this firm are recommended prior to site grading in order to evaluate the proposed facilities from a geotechnical viewpoint and allow modifications to the preliminary recommendations developed to date.

We recommend that the project engineer incorporate this report and subsequent plan review reports into the overall project specification by title and date references on final drawings. Lastly, a pre-construction meeting with the owner, grading contractor, and civil engineer is strongly encouraged to present, explain, and clarify geotechnical concerns, uncertainties, and recommendations for the site.

7.0 CLOSURE

This report was prepared for the use of First Industrial Realty Trust, Inc. and their designates, in cooperation with this office. All professional services provided in connection with the preceding report were prepared in accordance with generally accepted professional engineering principles and local practice in the fields of soil mechanics, foundation engineering, and engineering geology, as well as the general requirements of Riverside County and the City of Perris in effect at the time of report issuance. We make no other warranty, either expressed or implied. We cannot guarantee acceptance of the final report by regulating authorities without needs for additional services.

AGI enthusiastically welcomes the opportunity to help engineer the owner's planned business improvements in the Inland Empire. If you should have any questions, please contact the undersigned at our Riverside office at (951) 776-0345.

Respectfully submitted,
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Attachments: Appendices A through C
Geotechnical Map, Plate No. 1 (foldout)

Distribution: (4) Addressee

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AERIAL PHOTOGRAPHS

RCFCWCD Aerial Photography Collection, Riverside

Date Flown	Flight Number	Scale	Frame Numbers
5-24-74	1974 County	1:24,000	Nos. 380-381
4-10-80	1980 County	1:19,200	Nos. 399-400
2-4-84	1984 County	1:19,200	Nos. 1148-1149
1-21-90	1990 County	1:19,200	Line 8, Nos. 26-27
1-30-95	1995 County	1:19,200	Line 8, Nos. 24-25
3-11-00	2000 County	1:19,200	Line 8, Nos. 26-27
4-14-05	2005 County	1:19,200	Line 8, Nos. 23-24
3-29-10	2010 County	1:19,200	Line 8, Nos. 23-24

U.C. Santa Barbara Aerial Image Collections

Date Flown	Flight Number	Scale	Frame Numbers
6-7-38	AXM-1938A	1:20,000	Line 35, #70
1-28-62	C-24244	1:24,000	Line 1, #42
5-15-67	AXM-1967	1:20,000	Line 3HH, #59
6-7-80	AMI RIV-80	1:20,000	10535
6-1-94	NAPP 2C	1:40,000	#6865-82

Google Earth Pro Historical Image Archive

Image dates as shown in application:

6/5/02
10/25/03
12/18/03
1/4/04
12/30/04
10/10/05
12/2005

1/3/06
4/27/06
5/24/09
11/15/09
3/9/11
6/17/12
11/6/12
11/12/13
4/27/14

2/9/16
10/21/16
2/19/18
8/13/18
8/24/18
12/2/18

APPENDIX A

A P P E N D I X A

MAP EXPLANATION & SUBSURFACE EXPLORATION LOGS

The Geotechnical Map (Plate No. 1, foldout at the back of this report) was prepared based upon information supplied by the client, or others, along with Aragón Geotechnical's field measurements and observations. Field exploration locations illustrated on the map were derived from taped and paced measurements of distance to existing improvements, and air photo overlays scaled to match the development plan. Locations should be considered approximate. The selected boring locations were deemed sufficient by AGI for characterizing the possible range of subsurface conditions occurring at the site.

The Field Boring Logs on the following pages schematically depict and describe the subsurface (soil and groundwater) conditions encountered at the specific exploration locations on the date that the explorations were performed. Unit descriptions reflect predominant soil types; actual variability may be much greater. Unit boundaries may be approximate or gradational. Text information often incorporates the field investigator's interpretations of geologic history, origin, diagenesis, and unit identifiers such as formation name or time-stratigraphic group. Additionally, soil conditions between recovered samples are based in part on judgment. Therefore, the logs contain both factual and interpretive information. Subsurface conditions may differ between exploration locations and within areas of the site that were not explored. The subsurface conditions may also change at the exploration locations over the passage of time.

The investigation scope and field operations were conducted in general accordance with the procedures recommended by the American Society for Testing and Materials (ASTM) standard D420-98 entitled "Site Characterization for Engineering Design and Construction Purposes" and/or other relevant specifications. Soil samples were preserved and transported to AGI's Riverside laboratory in general accordance with the procedures recommended by ASTM standard D4220 entitled "Standard Practices for Preserving and Transporting Soil Samples". Brief descriptions of the sampling and testing procedures are presented below:

Ring-Lined Barrel Sampling – ASTM D3550-01

In this procedure, a thick-walled barrel sampler constructed to receive thin-wall liners (either a stack of 1-inch-high brass rings or 6-inch stainless steel tubes for environmental testing) is used to collect soil samples for classification and laboratory tests. Samples were collected from selected depths in 6 out of 8 hollow-stem auger borings. The drilling rig was equipped with a 140-pound mechanically actuated automatic driving hammer operated to fall 30 inches, acting on rods. A 12-inch-long sample barrel fitted with 2.50-inch-diameter rings and tubes plus a waste barrel extension was subsequently driven a distance of 18 inches or to practical refusal (considered to be ≥50 blows for 6 inches). The raw blow counts for each 6-inch increment of penetration (or fraction thereof) were recorded and are shown on the Field Boring Logs. An asterisk (*) marks refusal within the initial 6-inch seating interval. The hammer weight of 140 pounds and fall of 30 inches allow rough *correlations to be made (via conversion factors that normally range from 0.60 to 0.65 in Southern California practice) to uncorrected Standard Penetration Test N-values, and thus approximate descriptions of consistency or relative density could be derived. The method provides relatively undisturbed samples that fit directly into laboratory test instruments without additional handling and disturbance.*

Standard Penetration Tests – ASTM D1586-11

In deeper boreholes or the explorations geared to stormwater BMP feasibility, Standard Penetration Tests were performed to recover disturbed samples suitable for classification, and to provide baseline data for liquefaction susceptibility analyses and site class assignment for seismic design. A split-barrel sampler with a 2.0-inch outside diameter is driven by successive blows of a 140-pound hammer with a vertical fall of 30 inches, for a distance of 18 inches at the desired depth. The drill rig used for this investigation was equipped with an automatic trip hammer acting on drilling rods. The total number of blows required to drive the sampler the last 12 inches of the 18-inch sample interval is defined as the Standard Penetration Resistance, or "N-value". Penetration resistance counts for each 6-inch interval and the raw, uncorrected N-value for each test are shown on the Field Boring Logs. Drive efficiencies for automatic hammers are higher than older rope-and-cathead systems, which are disappearing from practice. Where practical refusal was encountered within a 6-inch interval, defined as penetration resistance ≥50 blows per 6 inches, the raw blow count was recorded for the noted fractional interval; an asterisk (*) marks refusal within the initial 6-inch seating interval. The N-value represents an index of the relative density for granular soils or comparative consistency for cohesive soils.

Bulk Sample

A relatively large volume of soil is collected with a shovel or trowel. The sample is transported to the materials laboratory in a sealed plastic bag or bucket.

Classification of Samples

Bulk auger cuttings and discrete soil samples were visually-manually classified based on texture and plasticity, utilizing the procedures outlined in the ASTM D2487-11 standard. The assignment of a group name to each of the collected samples was performed according to the Unified Soil Classification System (ASTM D2488-09). The plasticity reported on field logs refers to soil behavior at field moisture content unless noted otherwise. Site material classifications are reported on the Field Boring Logs.

FIELD LOG OF BORING B - 1

Project:	*LOGISTICS BLDG., APN 302-100-016, 017, and 029*
Location:	*CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

Date(s) Drilled:	**1/20/20**	Logged By:	**M. Doerschlag**
Drilled By:	**2R Drilling**	Total Depth:	**21.5 Ft.**
Rig Make/Model:	**CME 75 Truck**	Hammer Type:	**Automatic trip**
Drilling Method:	**Hollow-Stem Auger**	Hammer Weight/Drop:	**140 Lb./30 In.**
Hole Diameter:	**8 In.**	Surface Elevation:	**± 1459 Ft. AMSL per Earth DEM**

Comments: Located in potential shallow-basin BMP area.

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	GRAPHIC LOG	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
0						ML	Sandy Silt: Brown; stiff; moist; averages about 30% fine to medium-grained sand; massive. Interpreted as strongly bioturbated and with surficial plowed zone. [Younger valley alluvium] Abrupt contact.				
	1455			SPT 8 7 6 N=13		ML	Clayey Silt: Overall light brown; stiff; moist; moderately cemented with abundant diffuse and filamentous carbonate; few fine pores. [Pedogenic B horizon, very old alluvium]				
5				SPT 4 5 7 N=12		ML	← Clayey silt, massive, not visibly porous, non-plastic @ field water content, trace of fine sand.				
10	1450			SPT 4 5 4 N=9		CL	Silty Clay: Light olive brown; medium stiff; moist; not visibly porous. [Very old alluvium]				
				SPT 2 2 2 N=4		CL	← Silty clay, brown and olive brown, abundant soft laminar carbonate, very moist, plastic.				
15	1445					ML	Silt: Yellowish brown; stiff; moist; little to no sand and only trace of clay. [Very old alluvium]				

Continued on next sheet.

FIELD LOG OF BORING B - 1

Project: *LOGISTICS BLDG., APN 302-100-016, 017, and 029*

Location: *CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
15		SPT 2 4 6 N=10	ML	Silt: Yellowish brown; stiff; moist to very moist; little to no sand and only trace of clay; non-plastic; massive; not visibly porous and no pedogenic carbonate; common MnO spots. [Very old alluvium]				
	1440	SPT 2 5 8 N=13	ML	← Silt, massive, some fine sand and non-plastic. Gradational lower contact.				
20		SPT 4 6 6 N=12	SM	Silty Sand: Yellowish brown; medium dense; wet; estimated 40% fines with trace of clay; fine to medium grained; massive. [Very old alluvium]				

Bottom of boring at 21.5 ft.
Perched groundwater encountered at 19.2 ft.
Boring backfilled with compacted soil cuttings.

FIELD LOG OF BORING B - 2

Project: *LOGISTICS BLDG., APN 302-100-016, 017, and 029*

Location: *CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

Date(s) Drilled:	**1/20/20**	Logged By:	**M. Doerschlag**
Drilled By:	**2R Drilling**	Total Depth:	**26.5 Ft.**
Rig Make/Model:	**CME 75 Truck**	Hammer Type:	**Automatic trip**
Drilling Method:	**Hollow-Stem Auger**	Hammer Weight/Drop:	**140 Lb./30 In.**
Hole Diameter:	**8 In.**	Surface Elevation:	**± 1459 Ft. AMSL per Earth DEM**

Comments: Located in potential subterranean chamber-type BMP area; Perris Valley Drain to north.

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: BULK	DRIVE	TYPE, "N" or (Blows/ft.)	GRAPHIC LOG	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
0						ML	Sandy Silt: Brown; soft; moist; averages about 20% fine to medium-grained sand; massive. Interpreted as strongly bioturbated and with surficial plowed zone. [Younger valley alluvium] Abrupt contact.				
	1455					ML	Silt: Overall very light brown; stiff; moist; moderately cemented with abundant diffuse and filamentous carbonate plus some clay in upper two feet; . [Pedogenic B horizon, very old alluvium]				
5				SPT 4 4 5 N=9		ML	← Silt, massive, uncemented but with few fine carbonate clots, not visibly porous, non-plastic, traces of fine sand and clay.				
	1450										
10				SPT 3 2 3 N=5		CL	Silty Clay: Olive brown; medium stiff; very moist; not visibly porous. Has heavy diffuse and laminar carbonate in 10' sample. Hole squeezing noted later in drilling. [Very old alluvium]				
	1445										
15											

Continued on next sheet.

FIELD LOG OF BORING B - 2

Project:	*LOGISTICS BLDG., APN 302-100-016, 017, and 029*
Location:	*CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
15		SPT 2 3 3 N=6	ML	Clayey Silt: Dark yellowish brown; medium stiff; very moist; about 5-10% fine to coarse sand (weathered granules); non-plastic; massive; not visibly porous and no pedogenic carbonate; common MnO spots. [Very old alluvium]				
	1440							
20		SPT 6 11 10 N=21	ML, CL	← Primarily wet sandy silt with some clay, cohesive, well-packed texture containing ~40% fine to coarse weathered-grain sand. Sample features one silty clay layer with heavy laminar carbonate.				
			SM	Silty Sand: Yellowish brown; medium dense; very moist to wet; estimated 40% fines with trace of clay; fine to medium grained; massive; uncemented. [Very old alluvium]				
	1435							
25		SPT 5 8 12 N=20	SM, ML	← Silty sand, fine to medium grained, wet, faintly bedded 2"-8" thick, subordinate sandy silt, low 5% clay.				

Bottom of boring at 26.5 ft.
Perched groundwater encountered at 18.0 ft..
Boring backfilled with compacted soil cuttings.

FIELD LOG OF BORING B - 3

Project: *LOGISTICS BLDG., APN 302-100-016, 017, and 029*

Location: *CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

Date(s) Drilled:	**1/20/20**	Logged By:	**M. Doerschlag**
Drilled By:	**2R Drilling**	Total Depth:	**51.5 Ft.**
Rig Make/Model:	**CME 75 Truck**	Hammer Type:	**Automatic trip**
Drilling Method:	**Hollow-Stem Auger**	Hammer Weight/Drop:	**140 Lb./30 In.**
Hole Diameter:	**8 In.**	Surface Elevation:	**± 1458 Ft. AMSL per Earth DEM**

Comments: Located near NE corner of proposed warehouse.

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: BULK / DRIVE	TYPE, "N" or (Blows/ft.)	GRAPHIC LOG	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
0		BULK			ML	Sandy Silt: Brown; mostly very stiff; moist; averages about 15% fine to coarse-grained sand; massive. Interpreted as strongly bioturbated 0-3 feet and with surficial plowed zone. [Younger valley alluvium]				BULK: MAX, EI, SHEAR, SULFATE, CHLORIDE, pH, RESISTIVITY
	1455	DRIVE	RING 13 20 22 (42)		ML	← Sandy silt, abruptly changing to pale brown at 3', trace of coarse sand.	101.7	13.0		
5		DRIVE	RING 6 8 15 (23)		ML	← Sandy silt with clay, massive, heavy soft carbonate clots, not visibly porous, friable low-cohesion texture.	90.8	26.0		
		DRIVE	RING 10 15 22 (37)		ML	Clayey Silt: Very light brown grading to brown; very stiff to stiff; moist; mostly crumbly and friable with abundant diffuse and filamentous carbonate; not visibly porous. [Pedogenic B horizon, very old alluvium]	94.8	27.0		
	1450	DRIVE	RING 8 10 10 (20)		ML	← Clayey silt , grades brown, continued with diffuse carbonate, not visibly porous.	95.8	25.0		
10		DRIVE	RING 5 7 10 (17)		CL	Silty Clay: Olive brown; medium stiff to stiff; moist; not visibly porous but with heavy diffuse carbonate at 10 feet; slightly plastic; non-dilative. [Very old alluvium]	65.5	54.3		
	1445									
15										

Continued on next sheet.

FIELD LOG OF BORING B - 3

Project: ***LOGISTICS BLDG., APN 302-100-016, 017, and 029***

Location: ***CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.***

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	OTHER TESTS
15		SPT 3 4 9 N=13	ML	Sandy Silt: Yellowish brown; stiff; moist; about 15% fine to medium sand plus minor clay; non-plastic; massive to faintly laminated; not visibly porous. Some pedogenic carbonate at top; common MnO spots. [Very old alluvium]			
	1440						
20		SPT 3 4 5 N=9	CL	← Classifies as sandy lean clay, still yellowish brown, faintly bedded 10"-12" thick, uncemented and no carbonate.			SIEVE, LL/PL
			SM	Silty Sand: Yellowish brown; medium dense; mostly only very moist; estimated 40% low-plasticity fines; fine to medium grained; uncemented. [Very old alluvium]			
	1435						
25		SPT 2 9 8 N=17	SM, ML	← Silty sand, as bove, subjectively only moist (sample inferred to be below perched water zone), bedded ½"-3" thick, low-plasticity fines,			LL/PL
	1430		ML	Clayey Silt: Yellowish brown; very stiff; moist; about 20% fine to medium sand but stays cohesive and massive; non-dilative. Fine carbonate blebs at top of unit. [Very old alluvium]			
30		SPT 7 12 13 N=25					
	1425						
35							

Continued on next sheet.

FIELD LOG OF BORING B - 3

Project: ***LOGISTICS BLDG., APN 302-100-016, 017, and 029***

Location: ***CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.***

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: BULK	DRIVE	TYPE, "N" or (Blows/ft.)	GRAPHIC LOG	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
35			■	SPT 2 3 4 N=7		CH	Silty Clay: Olive; medium stiff; moist; slightly sticky, "rubbery", and plastic with remolding at top; non-dilative. Common fine bits of organics and small MnO spots. [Very old alluvium]				LL/PL
	1420										
40			■	SPT 3 5 8 N=13		CL	← Silty clay, continued cohesive and with fine bits of organics and MnO spots, non-dilative.				LL/PL
	1415					SC	Clayey Sand: Dark yellowish brown; dense, grading to medium dense with depth; moist; well-packed fine to coarse sand with weathered grains; cohesive. Firm drilling. [Very old alluvium]				
45			■	SPT 9 16 25 N=41		SC/CL	← Clayey sand with nearly 50% fines, cohesive, not visibly porous.				
	1410										
50			■	SPT 7 8 12 N=20		SC	← Clayey sand, fine-grained, about 40% fines, uncemented, moist.				

Bottom of boring at 51.5 ft.
Perched groundwater measured at 20.0 ft..
Boring backfilled with compacted soil cuttings.

FIELD LOG OF BORING B - 4

Project: *LOGISTICS BLDG., APN 302-100-016, 017, and 029*

Location: *CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

Date(s) Drilled:	**1/20/20**	Logged By:	**M. Doerschlag**
Drilled By:	**2R Drilling**	Total Depth:	**21.5 Ft.**
Rig Make/Model:	**CME 75 Truck**	Hammer Type:	**Automatic trip**
Drilling Method:	**Hollow-Stem Auger**	Hammer Weight/Drop:	**140 Lb./30 In.**
Hole Diameter:	**8 In.**	Surface Elevation:	**± 1458 Ft. AMSL per Earth DEM**

Comments: Located near SE corner of proposed warehouse.

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
0			ML	Sandy Silt: Brown; medium stiff; moist; averages about 20% fine to medium-grained sand; massive. Interpreted as strongly bioturbated 0-3 feet and with surficial plowed zone. [Younger valley alluvium]				
	1455	RING 12 17 25 (42)			84.4	23.9		
			ML-CL	Clayey Silt: Light brown and brown; very stiff; moist; top is crumbly with abundant diffuse and filamentous carbonate; not visibly porous. [Pedogenic B horizon, very old alluvium]				
5		RING 9 15 21 (36)	ML-CL	← Clayey silt, grades brown, cemented and cohesive, with thick veils and veins of carbonate, not visibly porous.	92.3	18.8		CONSOL
		RING 8 28 29 (57)	ML-CL	← Clayey silt , grades yellowish brown, some soft laminar carbonate, not visibly porous.	88.9	36.0		CONSOL
	1450							
			CL	Silty Clay: Brown; medium stiff; subjectively only moist; not visibly porous but with some diffuse carbonate; slightly plastic; non-dilative. [Very old alluvium]				
10		RING 4 6 7 (13)			72.0	42.4		
	1445							
15								

Continued on next sheet.

FIELD LOG OF BORING B - 4

Sheet 2 of 2

Project:	*LOGISTICS BLDG., APN 302-100-016, 017, and 029*
Location:	*CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	TYPE, "N" or (Blows/ft.)	GRAPHIC LOG	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
15				RING 6 10 13 (23)		ML	Sandy Silt: Yellowish brown; stiff; very moist; about 15% fine-grained sand plus minor clay; non-plastic; massive; not visibly porous. Lacks pedogenic carbonate; common MnO spots. [Very old alluvium]	104.7	22.6		
	1440										
20				RING 6 10 13 (23)		SM	Silty Sand: Yellowish brown; medium dense; very moist to wet (probable seepage zone); about 40-45% low-plasticity fines; fine to medium grained; common soft carbonate clots. [Very old alluvium]	94.4	15.3		

Bottom of boring at 21.5 ft.
No groundwater measured (seepage @ bottom).
Boring backfilled with compacted soil cuttings.

AGI	**FIELD LOG OF BORING B - 5** Sheet 1 of 2
	Project: *LOGISTICS BLDG., APN 302-100-016, 017, and 029*
	Location: *CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

Date(s) Drilled:	**1/20/20**	Logged By:	**M. Doerschlag**
Drilled By:	**2R Drilling**	Total Depth:	**21.5 Ft.**
Rig Make/Model:	**CME 75 Truck**	Hammer Type:	**Automatic trip**
Drilling Method:	**Hollow-Stem Auger**	Hammer Weight/Drop:	**140 Lb./30 In.**
Hole Diameter:	**8 In.**	Surface Elevation:	**± 1458 Ft. AMSL per Earth DEM**

Comments: Located near center of proposed warehouse.

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: BULK / DRIVE / TYPE, "N" or (Blows/ft.)	GRAPHIC LOG	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
0				ML	Sandy Silt: Brown; medium stiff; moist; averages about 20% fine to medium-grained sand; massive. Interpreted as strongly bioturbated and with surficial plowed zone. [Younger valley alluvium]				
	1455	RING 17 30 36 (66)		ML	Clayey Silt: Light brown at top; very stiff to hard; moist. Top of unit sandy (~25%) and carbonate-cemented, lacks macro-porosity. [Pedogenic B horizon, very old alluvium]	Dist.	15.3		
5									
		RING 19 25 27 (52)		ML-CL	← Clayey silt, variegated brown and light brown, very heavy soft carbonate. Sample slightly disturbed.	83.7	34.3		
	1450								
		RING 17 29 45 (74)		ML	Sandy Silt: Yellowish brown; hard, becoming very stiff; moist; about 15% very fine-grained sand plus minor clay; non-plastic; massive; not visibly porous, but with few fine carbonate clots. [Very old alluvium]	105.5	20.7		
10									
					[Clay zone in other bores not detected here]				
	1445								
15									

Continued on next sheet.

FIELD LOG OF BORING B - 5

Project: *LOGISTICS BLDG., APN 302-100-016, 017, and 029*

Location: *CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	TYPE, "N" or (Blows/ft.)	GRAPHIC LOG	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
15				RING 8 13 19 (32)		ML	Sandy Silt: Dark yellowish brown; very stiff; very moist at 15'. Estimated 20% very fine sand and some clay, but non-plastic and with dilatant behavior; not visibly porous. [Very old alluvium]	109.0	20.4		
	1440										
20				RING 4 4 6 (10)		SM	Silty Sand: Yellowish brown; loose; very moist; subequal proportions of sand + low-plasticity fines; fine to medium grained; few coarse soft carbonate clots; not dilative in trial. [Very old alluvium]	97.9	21.4		

Bottom of boring at 21.5 ft.
No groundwater measured.
Boring backfilled with compacted soil cuttings.

FIELD LOG OF BORING B - 6

AGI

Project:	*LOGISTICS BLDG., APN 302-100-016, 017, and 029*
Location:	*CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

Date(s) Drilled:	**1/20/20**	Logged By:	**M. Doerschlag**
Drilled By:	**2R Drilling**	Total Depth:	**21.5 Ft.**
Rig Make/Model:	**CME 75 Truck**	Hammer Type:	**Automatic trip**
Drilling Method:	**Hollow-Stem Auger**	Hammer Weight/Drop:	**140 Lb./30 In.**
Hole Diameter:	**8 In.**	Surface Elevation:	**± 1458 Ft. AMSL per Earth DEM**

Comments: Located at midline axis in western third of proposed warehouse.

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	TYPE, "N" or (Blows/ft.)	GRAPHIC LOG	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
0						ML	Sandy Silt: Brown; medium stiff; moist; averages about 20% fine to medium-grained sand; massive. Interpreted as strongly bioturbated and with surficial plowed zone. [Younger valley alluvium]				
	1455			RING 11 27 26 (53)		ML	Clayey Silt: Very pale brown; stiff; moist; massive; abundant soft carbonate, with slight punky texture. [Pedogenic B horizon, very old alluvium]	105.4	7.5		
5				RING 10 13 12 (25)		CL-ML	← Classifies as silty lean clay, pale yellow, with near-total replacement by soft punky carbonate, crumbly friable texture.	Dist.	37.7		
	1450			RING 16 42 45 (87)		ML	Sandy Silt: Yellowish brown; hard; moist; non-plastic; massive; not visibly porous, but slightly cemented and heavy carbonate to at least 11' depth. [Very old alluvium]	105.7	17.4		
10											
	1445					CL	Silty Clay: Olive brown; medium stiff; moist to very moist; massive; slightly plastic; estimated 15-20% very fine sand. [Very old alluvium]				
15											

Continued on next sheet.

FIELD LOG OF BORING B - 6

Project: ***LOGISTICS BLDG., APN 302-100-016, 017, and 029***

Location: ***CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.***

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	GRAPHIC LOG	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
15				RING 6 9 12 (21)		CL	Silty Clay: Olive brown; medium stiff; moist to very moist; massive; slightly plastic; estimated 15-20% very fine sand. [Very old alluvium]	97.7	30.1		
	1440						Drill rate slows.				
						CL	Sandy Clay: Dark yellowish brown; hard; moist; has up to 40% fine to coarse weathered sand grains; strongly cohesive and non-dilative. Unit may feature very thin SP-SC layers in upper 2 feet. [Very old alluvium]				
20				RING 17 30 40 (70)		CL		124.8	13.2		

Bottom of boring at 21.5 ft.
No groundwater measured.
Boring backfilled with compacted soil cuttings.

FIELD LOG OF BORING B - 7

Project: *LOGISTICS BLDG., APN 302-100-016, 017, and 029*

Location: *CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

Date(s) Drilled:	**1/20/20**	Logged By:	**M. Doerschlag**
Drilled By:	**2R Drilling**	Total Depth:	**21.5 Ft.**
Rig Make/Model:	**CME 75 Truck**	Hammer Type:	**Automatic trip**
Drilling Method:	**Hollow-Stem Auger**	Hammer Weight/Drop:	**140 Lb./30 In.**
Hole Diameter:	**8 In.**	Surface Elevation:	**± 1458 Ft. AMSL per Earth DEM**

Comments: Located near NW corner of proposed warehouse.

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	OTHER TESTS
0			ML	Sandy Silt: Brown; medium stiff; moist; averages about 20% fine to medium-grained sand; massive. Interpreted as strongly bioturbated 0-3 feet and with surficial plowed zone. [Younger valley alluvium]			
	1455	RING 7 10 12 (22)			84.5	15.3	
			ML	Clayey Silt: Light brown; stiff; moist; cohesive and partly cemented with abundant carbonate between small peds; not visibly porous. [Pedogenic B horizon, very old alluvium]			
5		RING 6 13 17 (30)	ML	← Clayey silt, cemented and cohesive, with thick veils and veins of carbonate, not visibly porous.	95.9	18.2	
		RING 5 9 11 (20)	CL-ML	← Silty clay, grades brown, cohesive, continued heavy soft carbonate, not visibly porous.	86.1	31.4	CONSOL
	1450						
			ML	Clayey Silt: Yellowish brown; hard; subjectively only moist; very sandy (~40%+) at top, but decreasing with depth; non-plastic; non-dilative. Below 10' appears to become increasingly clayey and with very firm drilling. [Very old alluvium]			
10		RING 27 50/6"	ML/SM		105.3	13.1	
	1445						
15							

Continued on next sheet.

FIELD LOG OF BORING B - 7

Project: *LOGISTICS BLDG., APN 302-100-016, 017, and 029*

Location: *CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	GRAPHIC LOG	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
15	1440			RING 11 15 20 (35)		ML	Clayey Silt: Dark yellowish brown; very stiff; moist; trace of sand and minor laminar carbonate; uncemented; non-plastic; not visibly porous. [Very old alluvium]	106.4	21.1		
20				RING 8 16 20 (36)		SC, SC-SP	Clayey Sand: Dark yellowish brown; dense; very moist to wet (latter noted in ½"-1" thick coarse-grained SC-SP beds); averages 40% low-plasticity fines; fine to coarse grained; minor diffuse carbonate. [Very old alluvium]	103.1	22.0		

Bottom of boring at 21.5 ft.
No groundwater measured (seepage near bottom).
Boring backfilled with compacted soil cuttings.

FIELD LOG OF BORING B - 8

Project: *LOGISTICS BLDG., APN 302-100-016, 017, and 029*

Location: *CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

Date(s) Drilled:	**1/20/20**	Logged By:	**M. Doerschlag**
Drilled By:	**2R Drilling**	Total Depth:	**41.5 Ft.**
Rig Make/Model:	**CME 75 Truck**	Hammer Type:	**Automatic trip**
Drilling Method:	**Hollow-Stem Auger**	Hammer Weight/Drop:	**140 Lb./30 In.**
Hole Diameter:	**8 In.**	Surface Elevation:	**± 1458 Ft. AMSL per Earth DEM**

Comments: Located near SW corner of proposed warehouse.

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
0			SM	Silty Sand: Brown; loose almost to base; moist; fine to coarse-grained sand; massive; slightly cemented below 2½ feet. [Younger alluvium]				
	1455	RING 6 17 40 (57)	SM	← Silty sand, as above, visibly porous. Weathered granules.	120.0	7.1		
5		RING 25 31 36 (67)	SM	← Silty sand, slightly cemented though no pedogenic carbonate, not visibly porous.	127.7	4.8		CONSOL
		RING 20 50/6"	CL	Silty Clay: Olive brown; hard; moist; cohesive and partly cemented with diffuse carbonate; non-plastic; not visibly porous. [Pedogenic B horizon, very old alluvium]	108.7	17.9		
	1450							
			ML	Clayey Silt: Yellowish brown; hard; subjectively only moist; trace to some fine sand; non-plastic; non-dilative. [Very old alluvium]				
10		RING 30 36 37 (73)	ML		105.8	21.2		
	1445							
15								

Continued on next sheet.

FIELD LOG OF BORING B - 8

Project: *LOGISTICS BLDG., APN 302-100-016, 017, and 029*

Location: *CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS TYPE, "N" or (Blows/ft.)	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
15		SPT 3 5 10 N=15	ML	Clayey Silt: At 15' is strong brown; very stiff; very moist; trace of very fine sand; no carbonate; uncemented; non-plastic; not visibly porous. [Very old alluvium]				
	1440							
20		SPT 8 8 10 N=18	SC	Clayey Sand: Yellowish brown; medium dense; very moist to wet; averages 40% low-plasticity fines; fine to medium grained sand; abundant MnO spots. Indistinctly bedded, and very firm drilling. [Very old alluvium]				
	1435							
25		SPT 6 7 10 N=17	SM	Silty Sand: Similar to overlying strata but silt > clay; yellowosh brown; medium dense; entire unit interpreted as wet; average 40% fines with abundant MnO spots. Weathered, well-packed grains. [Very old alluvium]				
	1430							
30		SPT 6 9 12 N=21	SM	Silty sand, wet.. Sharp contact.				
			CL	Silty Clay: Olive brown; medium stiff; very moist; common diffuse carbonate; plastic. [Very old alluvium]				
	1425							
35								

Continued on next sheet.

FIELD LOG OF BORING B - 8

Sheet 3 of 3

Project: *LOGISTICS BLDG., APN 302-100-016, 017, and 029*

Location: *CITY OF PERRIS, RIVERSIDE COUNTY, CALIF.*

DEPTH (ft.)	ELEVATION (MSL DATUM)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	TYPE, "N" or (Blows/ft.)	GRAPHIC LOG	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (pcf)	WATER CONTENT (%)	WELL COMPLETION	OTHER TESTS
35				SPT 3 5 5 N=10		MH	Silty Clay: Olive brown; medium stiff; very moist; common carbonate clots and filaments. Classifies as plastic silt @ 35' but majority of interval logged as clay. Non-sensitive and notably "tough" samples.				LL/PL
	1420										
40				SPT 4 7 9 N=16		CL	← Silty clay, no carbonate, about 10% fine sand, moderately plastic.				

Bottom of boring at 41.5 ft.
Groundwater measured at 20.0 ft.
Boring backfilled with compacted soil cuttings.

APPENDIX B

A P P E N D I X B

LABORATORY TESTING

Water Content - Dry Density Determinations – ASTM D2216-10

The dry unit weight and field moisture content were determined for each of the recovered barrel samples. The moisture-density information provides a gross indication of soil consistency and can assist in delineating local variations. The information can also be used to correlate soils and define units between individual exploration locations on the project site, as well as with units found on other sites in the general area.

Measured dry densities ranged from approximately 65.5 to 127.7 pounds per cubic foot. Water contents in ring samples ranged from 4.8 to 54.3 percent of dry unit weight. Sample locations and the corresponding test results are illustrated on the Field Boring Logs.

Modified Effort Compaction Tests – ASTM D1557-12

A bulk soil sample was collected from the eastern end of the prospective building envelope, where finer-grained deposits are the predominant shallow materials. The representative future fill material was tested to determine a maximum dry density and optimum water content per the Method A procedure in the noted ASTM standard. The test method uses 25 blows of a 10-pound hammer falling 18 inches on each of 5 soil layers in a 1/30 cubic foot cylinder. Soil samples were prepared at varying moisture contents to create a curve illustrating achieved dry density as a function of water content. The test results are listed below and shown graphically on page B-4.

Maximum Density - Optimum Water Content Determinations

Soil Description	Location	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
Sandy Silt (ML), some clay [Younger valley alluvium]	B - 3 @ 0 - 4 ft.	110.0	17.5

Shear Strength Tests – ASTM D3080-11

Direct shear tests were performed on soils prepared to represent future compacted fill derived from fine-grained native site alluvium. We expect mass grading operations should produce soil masses with roughly equivalent strengths. "Fill" test samples were remolded to approximately 90 percent of the maximum dry density, at optimum water content as determined from a compaction test. All samples were initially saturated, consolidated and drained of excess moisture, and tested in a direct shear machine of the strain control type. Test samples are initially prepared and/or retained within standard one-inch-high brass rings. Samples were tested at increasing normal loads to determine the Mohr-Coulomb shear strength parameters illustrated on page B-5. Peak and ultimate shear strength values are illustrated on the plot.

Expansion Index Test – ASTM D4829-11
One laboratory clay expansion test of typical silty materials expected to be incorporated into structural compacted fill were performed in general accordance with the 1994 Uniform Building Code Standard 18-2 and subsequent modern ASTM adoption. A remolded sample is compacted in two layers in a 4-inch I.D. mold to a total compacted thickness of about 1.0 inch, using a 5.5-pound hammer falling 12 inches at 15 blows per layer. The sample is initially at a saturation between 49 and 51 percent. After remolding, the sample is confined under a normal load of 144 pounds per square foot and allowed to soak for 24 hours. The resulting volume change due to increase in moisture content within the sample is recorded and the Expansion Index (EI) calculated.

Expansion Index Test Results

Soil Description	Location	Expansion Index	Expansion Classification
Sandy Silt (ML), some clay [Younger valley alluvium]	B - 3 @ 0 - 4 ft.	66	Medium

Particle Size (Gradation) Analysis – ASTM D422
Quantitative determination was made of the distribution of coarse-grained particle sizes and fines proportions for one deep sample (Boring B-3 at 20 feet). Gradation analyses help verify preliminary field classifications of total fines content, an important proxy for dynamic settlement potential. Mechanically actuated sieves were utilized for separating the various classes of coarse-grained (sand) particles. Percent passing and percent retained for the sieve analysis are illustrated on the accompanying chart on page B-6.

Consolidation Tests – ASTM D2435M-11
Natural alluvium was checked for collapse susceptibility and overall compressibility within predicted removal intervals and to help verify depths to competent materials. Testing imposes a series of cumulative vertical loads to a small, laterally confined soil sample. The apparatus is designed to accept a one-inch-high brass ring containing an undisturbed or remolded soil sample. During each load increment, vertical compression (consolidation) of the sample is measured and recorded at selected time intervals. Porous stones are placed in contact with both sides of the specimen to permit the ready addition or release of water. Undisturbed samples are initially at field moisture content, and are subsequently inundated to determine soil behavior under saturated conditions. The test results are plotted graphically on pages B-7 through B-10.

Atterberg Limits Determinations – ASTM D4318-10e1

Liquid limit and plastic limit determinations were made on selected samples of clayey alluvium as a check on soil classification and liquefaction susceptibility. The plastic limit constitutes the water content at which a manually remolded cohesive soil will just form a 1/8-inch-diameter thread without crumbling. The liquid limit constitutes the water content at which a soil will just begin to flow if jarred several times. Practically, it is determined by subjecting a grooved remolded soil pat to successive small impacts in a mechanical liquid limit device; the numerical result is the minimum water content at which the groove closes. The plasticity index (liquid limit minus plastic limit) and derived soil classification for the tested samples are indicated below. The test is performed only on the grain size fraction passing a 40-mesh screen.

Logged Soil Description	Location	Plastic Limit	Liquid Limit	Plasticity Index	USCS Symbol (Fines)
Sandy Clay (CL) [Very old alluvium]	Boring B - 3 20 ft.	10	29	19	CL
Silty Sand (SM) [Very old alluvium]	Boring B - 3 25 ft.	20	26	16	CL-ML
Silty Clay (CH) [Very old alluvium]	Boring B - 3 35 ft.	23	58	35	CH
Silty Clay (CL) [Very old alluvium]	Boring B - 3 40 ft.	18	27	9	CL
Silty Clay (MH and CL) [Very old alluvium]	Boring B - 8 35 ft.	32	53	21	MH

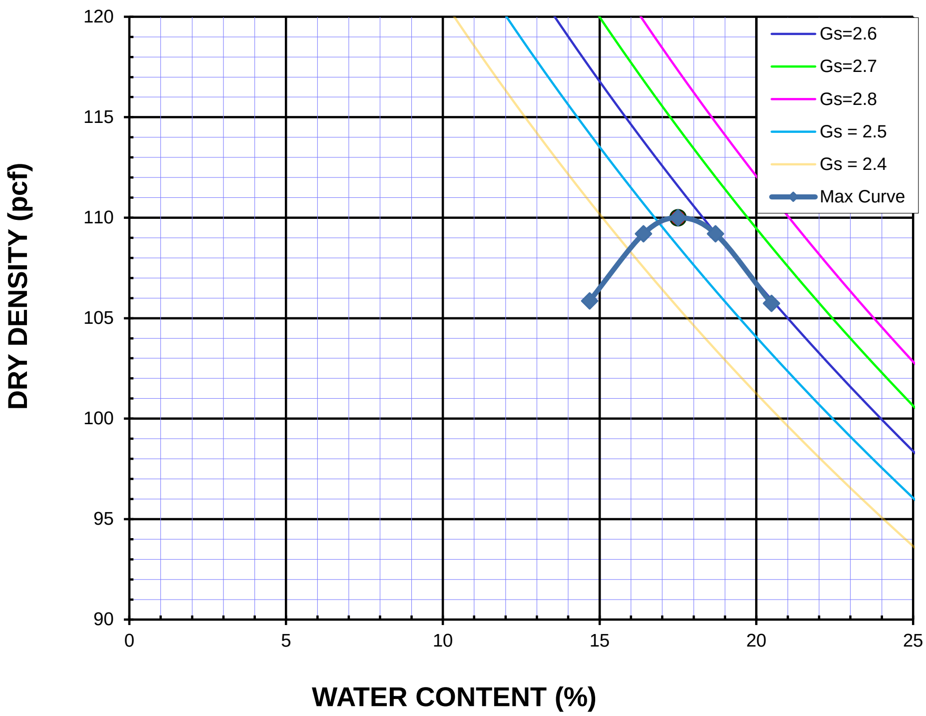
Soil Corrosivity

Fine-grained sediment [Domino silt loam, saline-alkali] representative of future mass-graded fill in future contact with concrete or ferrous metals was tested in the laboratories of Project X Corrosion Engineers, Murrieta, California, to determine the tabulated data on page B-11. The submitted soil sample was tested in general accordance with ASTM and Caltrans Standard Methods listed at the top of the table. Soluble-species quantitative determinations were based on a 1:3 water-to-soil extract.

ARAGÓN GEOTECHNICAL, INC.
16801 Van Buren Blvd.
Riverside, California 92504
(951) 776-0345

Maximum Density Test

Client:	First Industrial Realty Trust, Inc. 898 N. Pacific Coast Highway, Suite 175 El Segundo, CA 90245	**Project Name:**	Harley Knox Perris, California
Project No.:	4585-SFI	**Report Date:**	March 5, 2020
Sampled By:	Mark Doerschlag	**Lab ID No.:**	20-1038
Date of Sampling:	January 20, 2020		
Information provided by Technician	X Performed at Laboratory Performed at Jobsite	X Moist Preparation Dry Preparation	
Tested By:	Cesar Lopez	**Date Tested:**	January 22, 2020
Sample Location:	B-3	**Source:** Native	**Depth/Elev:** 0 - 4 ft
Sample Description:	Sandy Silt with some clay. [Younger Valley Alluvium]		



A	METHOD USED (A,B or C)
#4	SIEVE NUMBER
Mechanical	TYPE OF RAMMER
20.5%	AS REC'D MOISTURE
0.0%	PERCENT RETAINED
-	OVEN DRY (C127)
110.0	**MAXIMUM DENSITY [PCF]**
17.5	**OPTIMUM MOISTURE [%]**
-	**CORRECTED MAXIMUM DENSITY [PCF]**
-	**CORRECTED OPTIMUM MOISTURE [%]**

Remarks: No modifications made to test method, followed exact test procedure.

.

AASHTO/ASTM/CTM Standards Used:	Unless noted, material was sampled in accordance with AASHTO T2/ASTM D75/CTM 125. Sample tested in accordance with ASTM D2216, D1557 & D4718.

ARAGÓN GEOTECHNICAL, INC.
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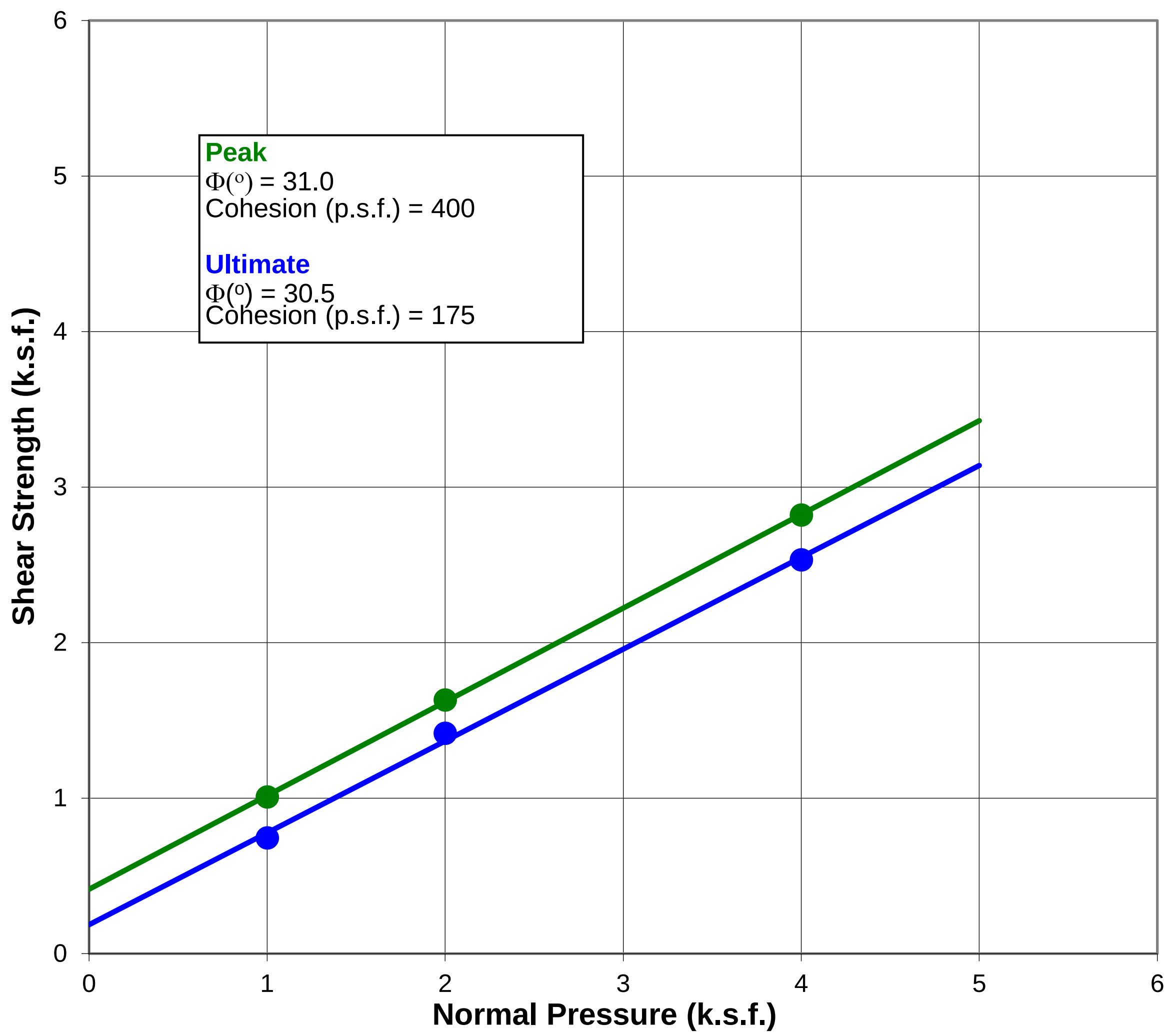
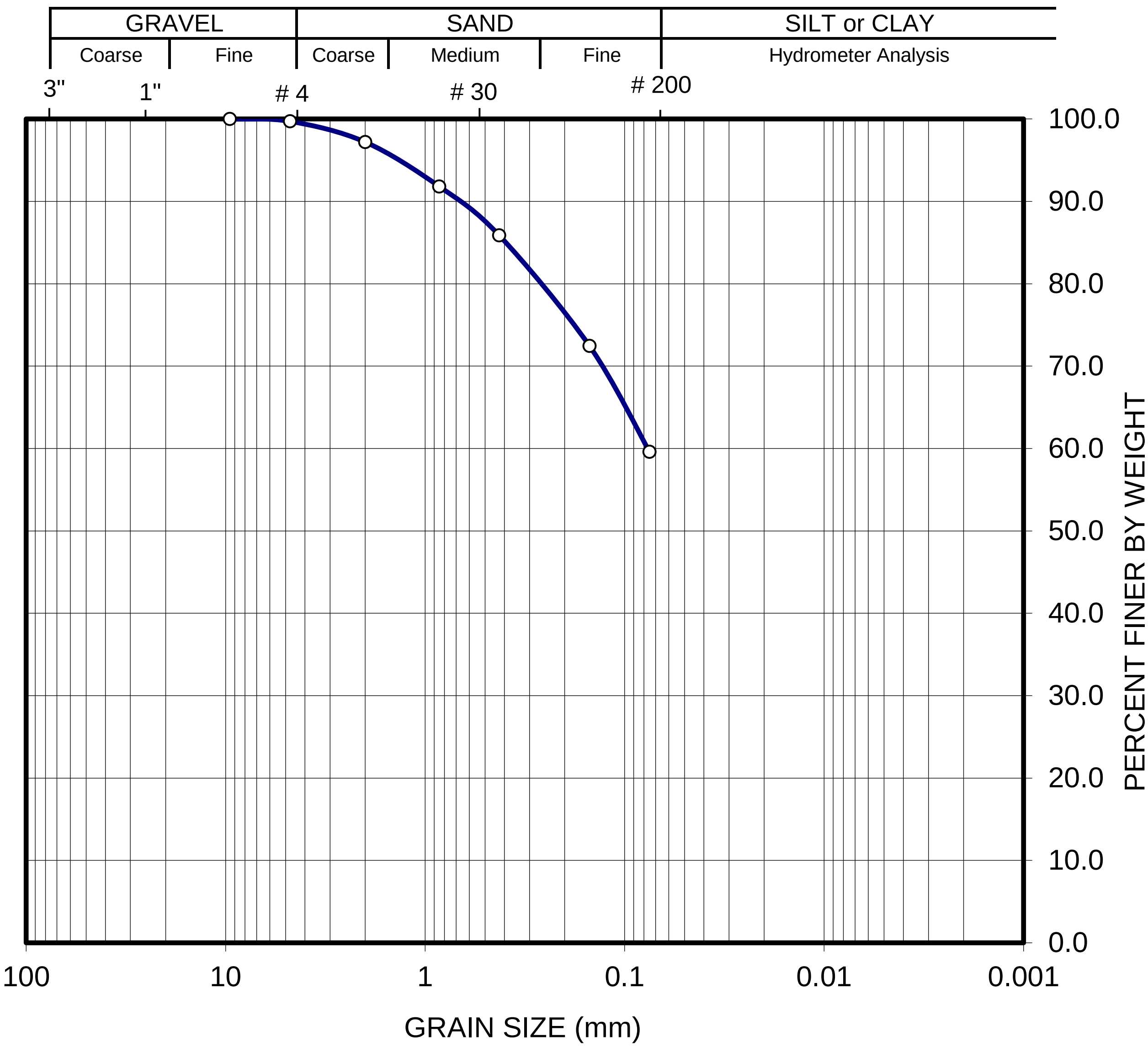
Riverside, California 92504
951-776-0345

Direct Shear Test Diagram

Project Name:	Harley Knox		
Project Number:	4585-SFI	Tested by:	Cesar Lopez
Sample Location:	B-3	Date Tested:	January 27, 2020
Sampled by:	Mark Doerschlag	Depth (ft):	0.0 - 4.0
Date Sampled:	January 20, 2020	Lab I.D. No.:	20-1038
Test Condition:	Remolded, Consolidated, Drained.		
Sample Description:	Sandy silt (ML) with some clay. [Younger Valley alluvium]		





Boring: B-3 at 20'	Sample I.D.: 20-1044	
Gravel (%): 0.3	Sand (%): 40.1	Fines (%): 59.6
Sample Description: Sandy Clay (CL), indistinctly bedded. [Very old alluvium]		

AGI	**GRAIN SIZE DISTRIBUTION CURVE**		
	APN 302-100-016, 017 & 029, PERRIS, CALIFORNIA		
	PROJECT NO. 4585-SFI	DATE: 3/5/2020	**PAGE B-6**

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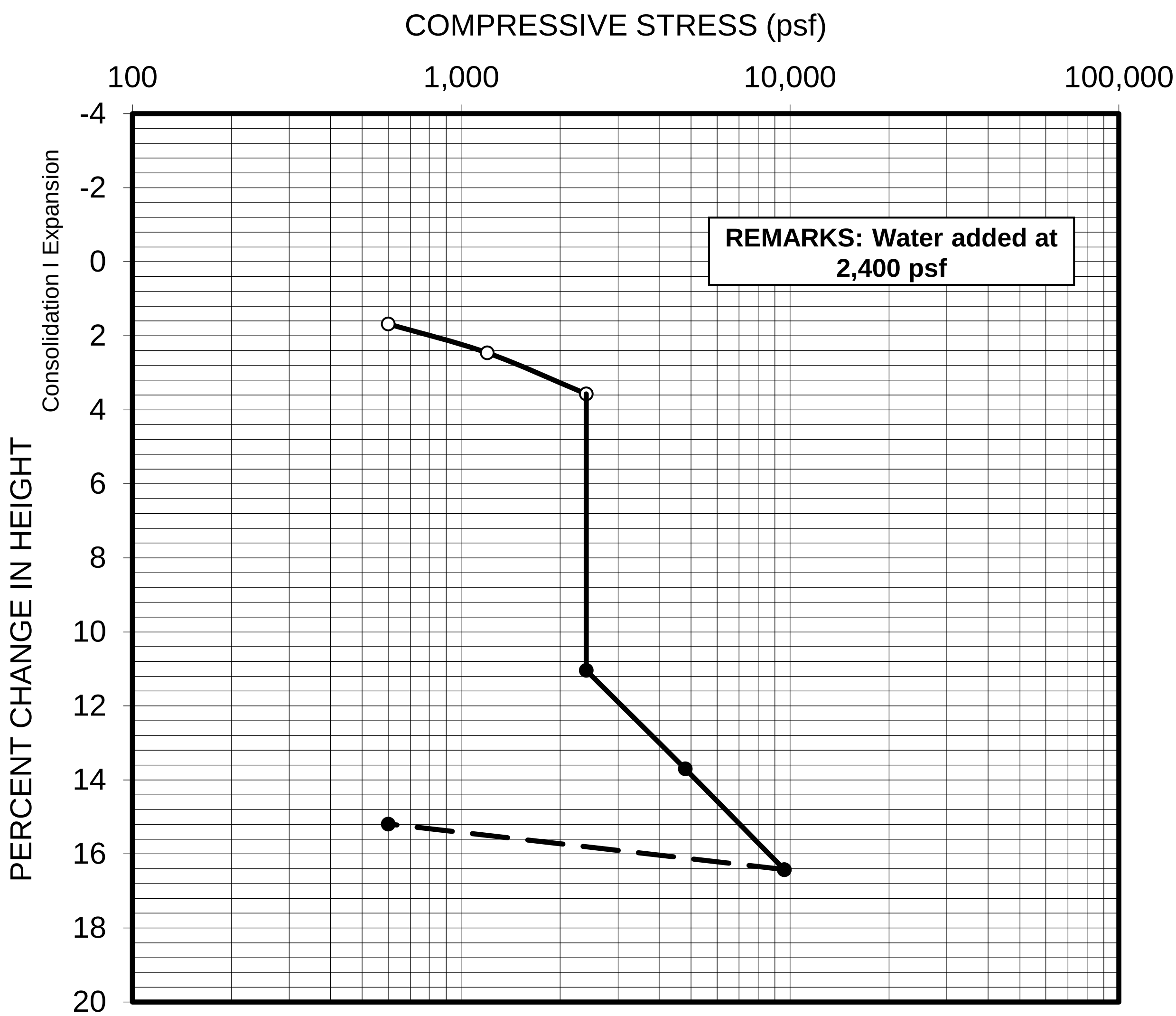
Consolidation Curve

Project Name:	Harley Knox Blvd. at Redlands Ave., Perris, CA		
Project Number:	4585-SFI	Tested by:	Cesar Lopez
Sample Location:	B-4	Date Tested:	January 24, 2020
Sampled by:	Mark Doerschlag	Depth (ft):	4.0
Date Sampled:	January 20, 2020	Moisture %:	18.8
Dry Density (pcf):	92.3	Saturation %:	61.4
Sample Description:	Clayey silt (ML-CL), heavy carbonate, not visibly porous. [Very old alluvium]		



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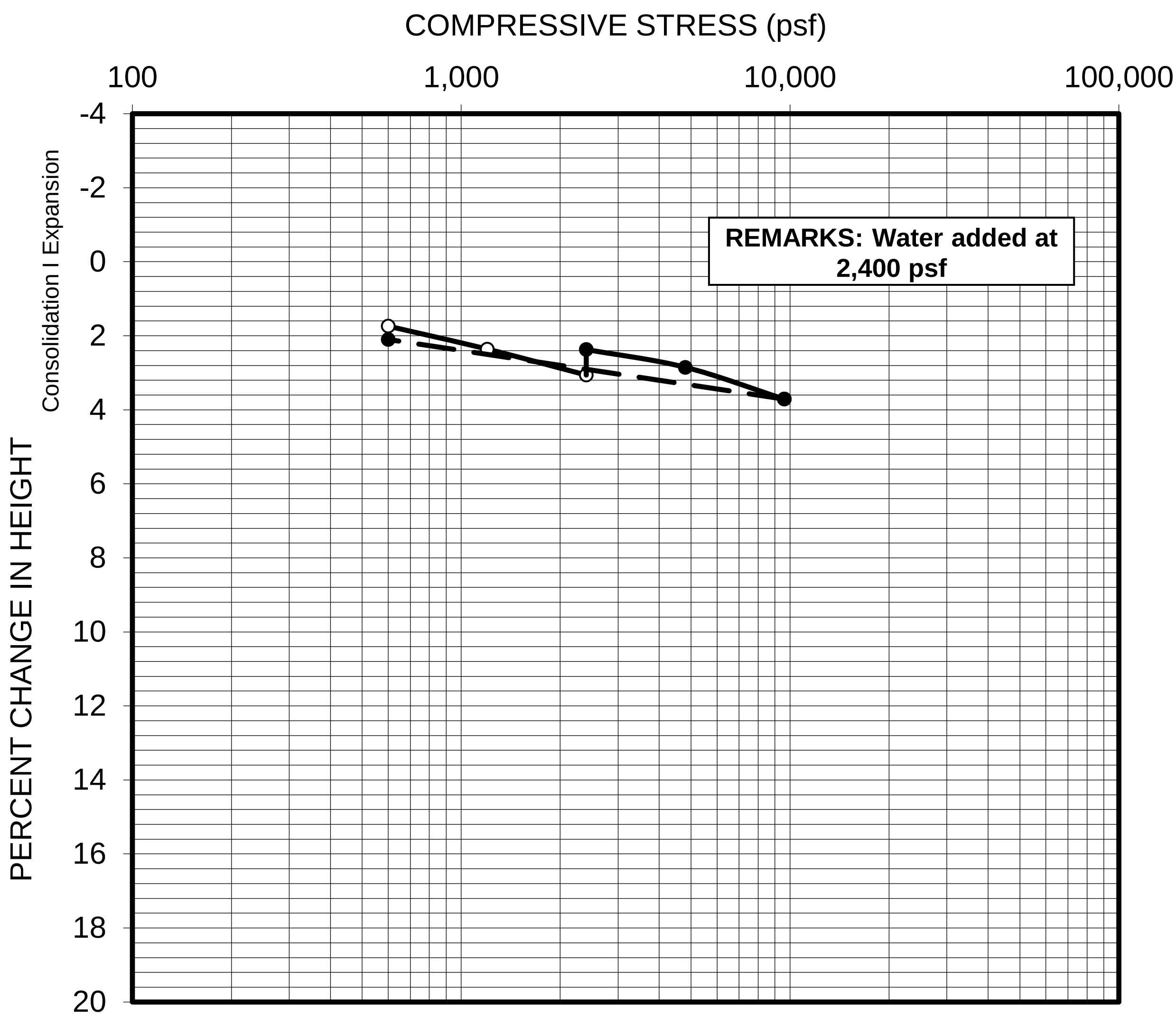
Riverside, California 92504
951-776-0345

Consolidation Curve

Project Name:	Harley Knox Blvd. at Redlands Ave., Perris, CA		
Project Number:	4585-SFI	Tested by:	Cesar Lopez
Sample Location:	B-4	Date Tested:	January 24, 2020
Sampled by:	Mark Doerschlag	Depth (ft):	6.0
Date Sampled:	January 20, 2020	Moisture %:	36.0
Dry Density (pcf):	88.9	Saturation %:	108.5
Sample Description:	Clayey silt (ML-CL), laminar carbonate, not visibly porous. [Very old alluvium]		



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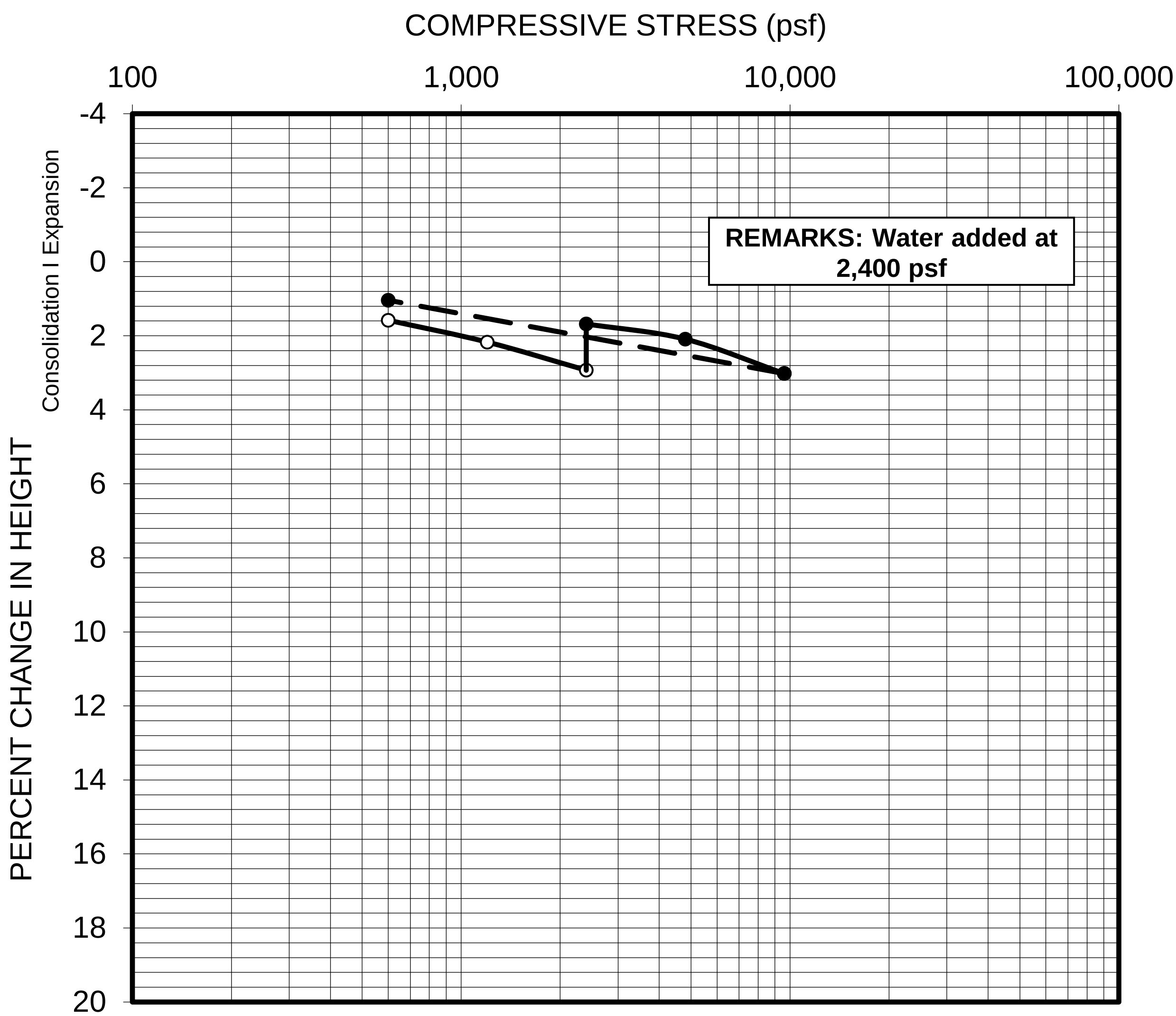
Consolidation Curve

Project Name:	Harley Knox Blvd. at Redlands Ave., Perris, CA		
Project Number:	4585-SFI	Tested by:	Cesar Lopez
Sample Location:	B-7	Date Tested:	January 24, 2020
Sampled by:	Mark Doerschlag	Depth (ft):	6.0
Date Sampled:	January 20, 2020	Moisture %:	31.4
Dry Density (pcf):	86.1	Saturation %:	88.5
Sample Description:	Clayey silt (ML), heavy carbonate, not visibly porous. [Very old alluvium]		



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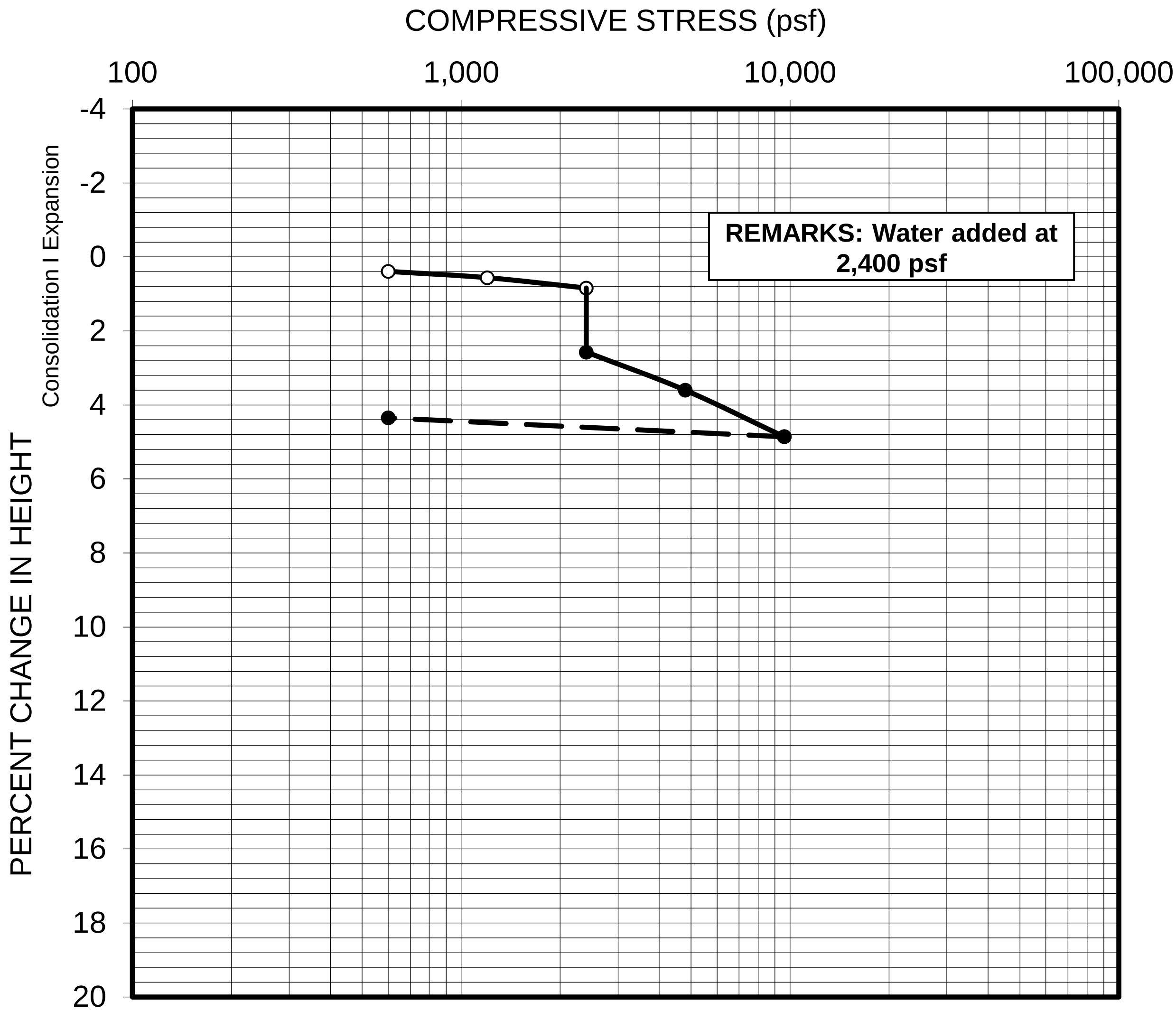
Consolidation Curve

Project Name:	Harley Knox Blvd. at Redlands Ave., Perris, CA		
Project Number:	4585-SFI	Tested by:	Cesar Lopez
Sample Location:	B-8	Date Tested:	January 24, 2020
Sampled by:	Mark Doerschlag	Depth (ft):	4.0
Date Sampled:	January 20, 2020	Moisture %:	4.8
Dry Density (pcf):	127.7	Saturation %:	40.5
Sample Description:	Silty sand (SM), slightly cemented, not visibly porous. [Younger alluvium]		



Soil Analysis Lab Results

Client: Aragon Geotechnical, Inc.
Job Name: First Industrial Harley Knox
Client Job Number: 4585-SFI
Project X Job Number: S200127C
January 31, 2020

	Method	ASTM D4327		ASTM D4327		ASTM G187		ASTM G51
Bore# / Description	**Depth**	**Sulfates** SO_4^{2-}		**Chlorides** Cl^-		**Resistivity**		**pH**
						As Rec'd	**Minimum**	
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ohm-cm)	(Ohm-cm)	
20-1038 B-3	0-4	63.9	0.0064	21.7	0.0022	67,000	2,546	8.6

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract

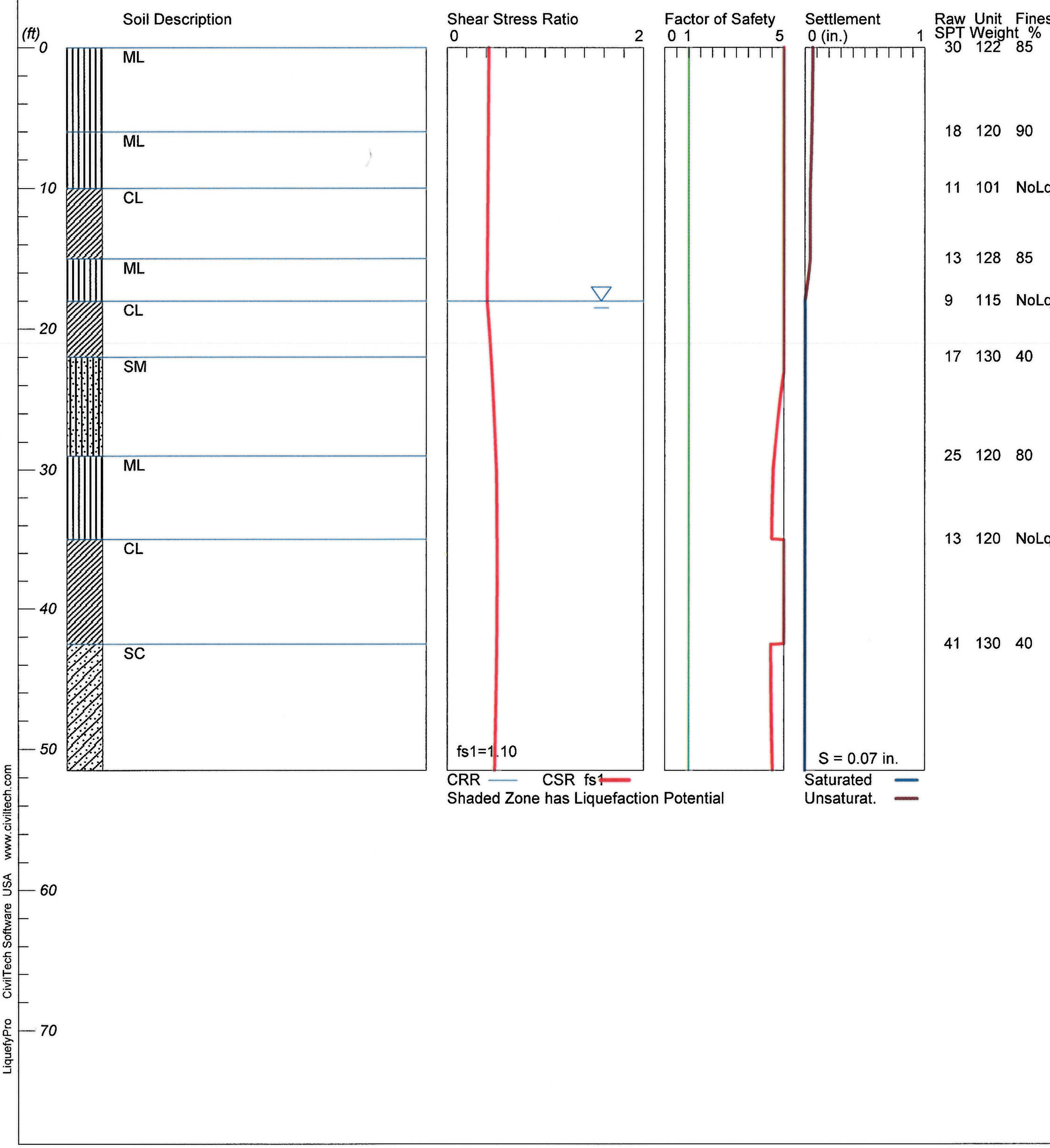
APPENDIX C

LIQUEFACTION ANALYSIS

Logistics Bldg. APN 302-100-016

Hole No.=B-3 Water Depth=18 ft Surface Elev.=1458

Magnitude=7.1
Acceleration=0.60g

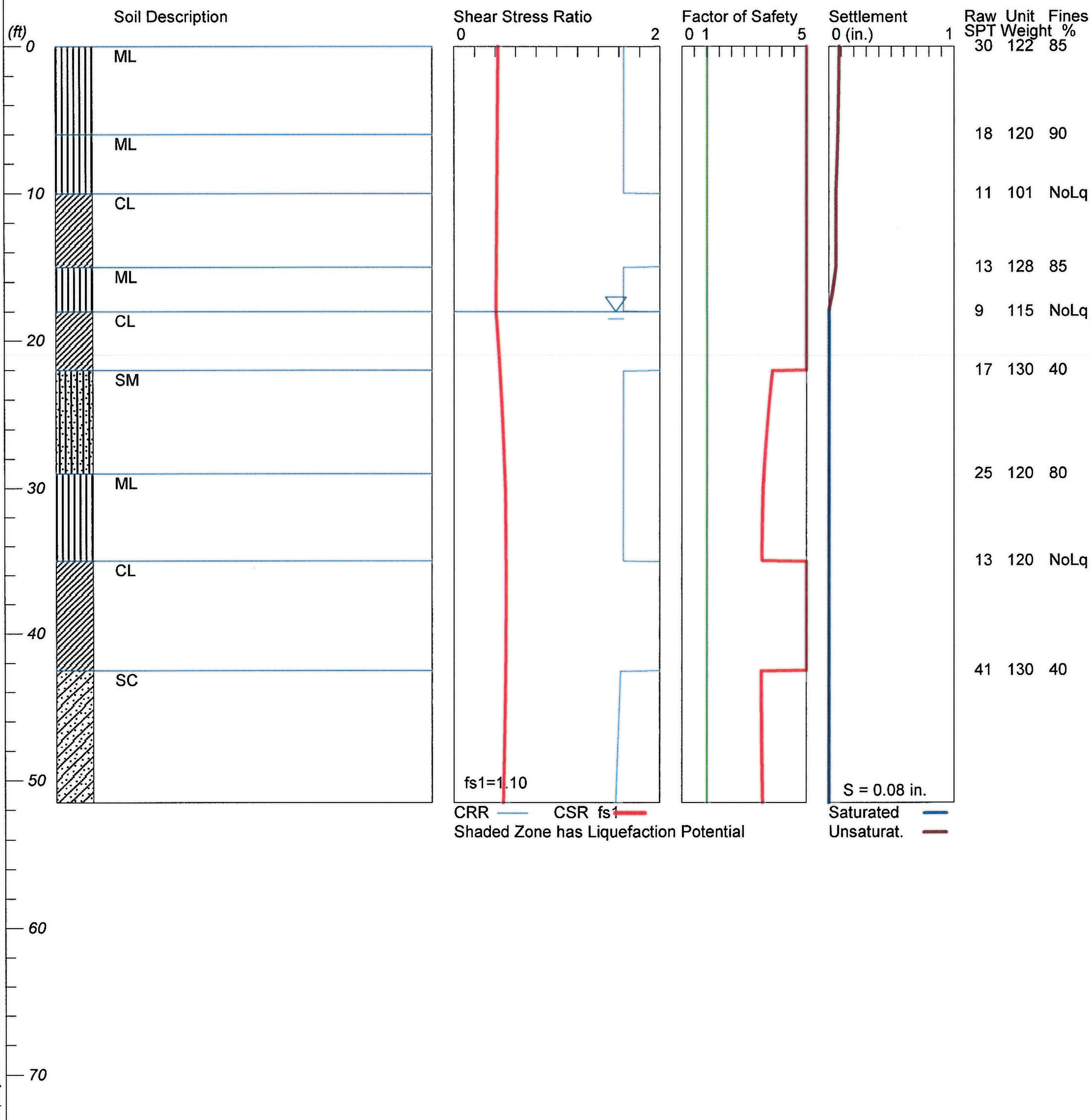


LIQUEFACTION ANALYSIS

Logistics Bldg. APN 302-100-016

Hole No.=B-3 Water Depth=18 ft Surface Elev.=1458

Magnitude=8.1
Acceleration=0.60g

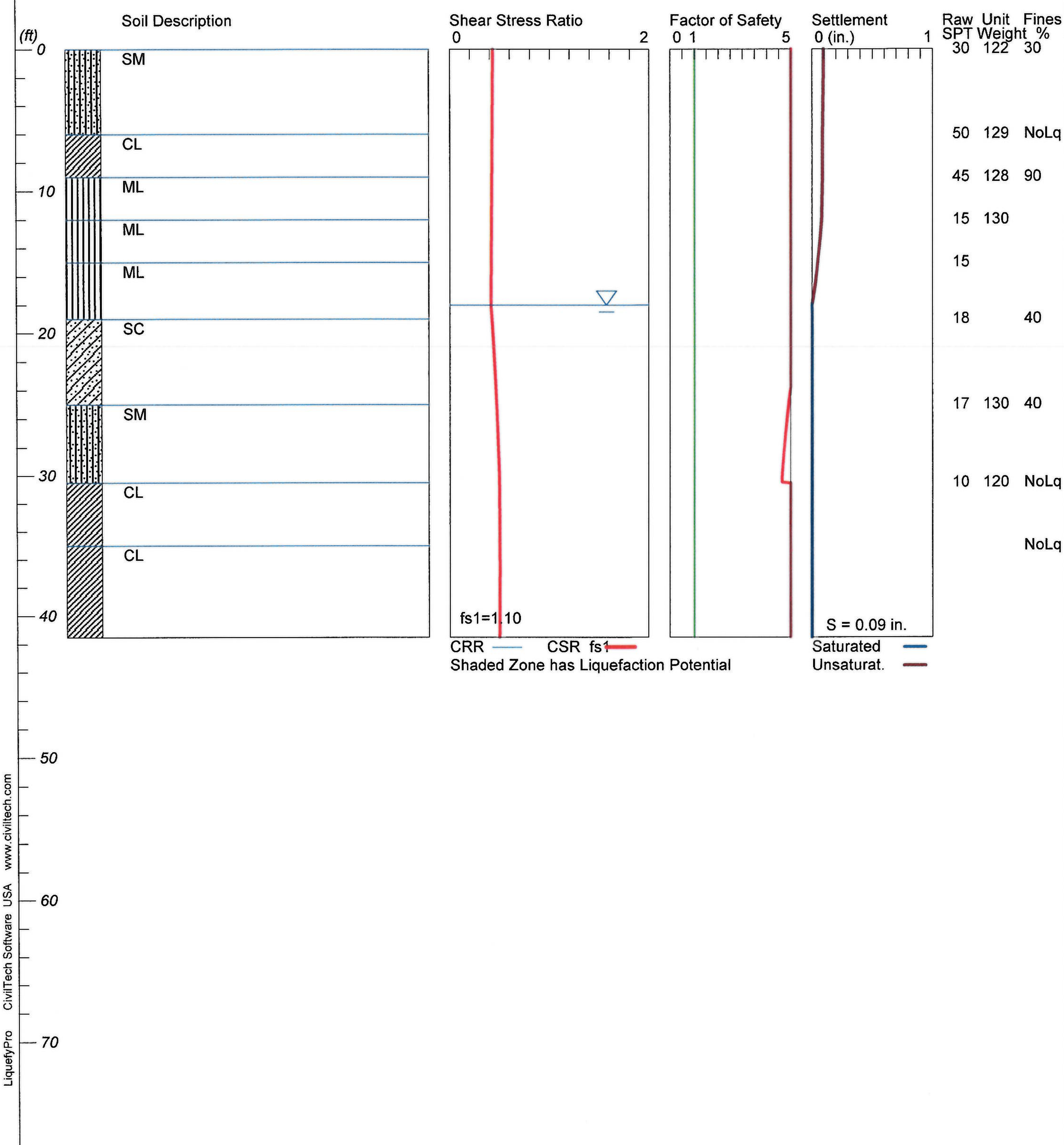


LIQUEFACTION ANALYSIS

Logistics Bldg. APN 302-100-016

Hole No.=B-8 Water Depth=18 ft Surface Elev.=1458

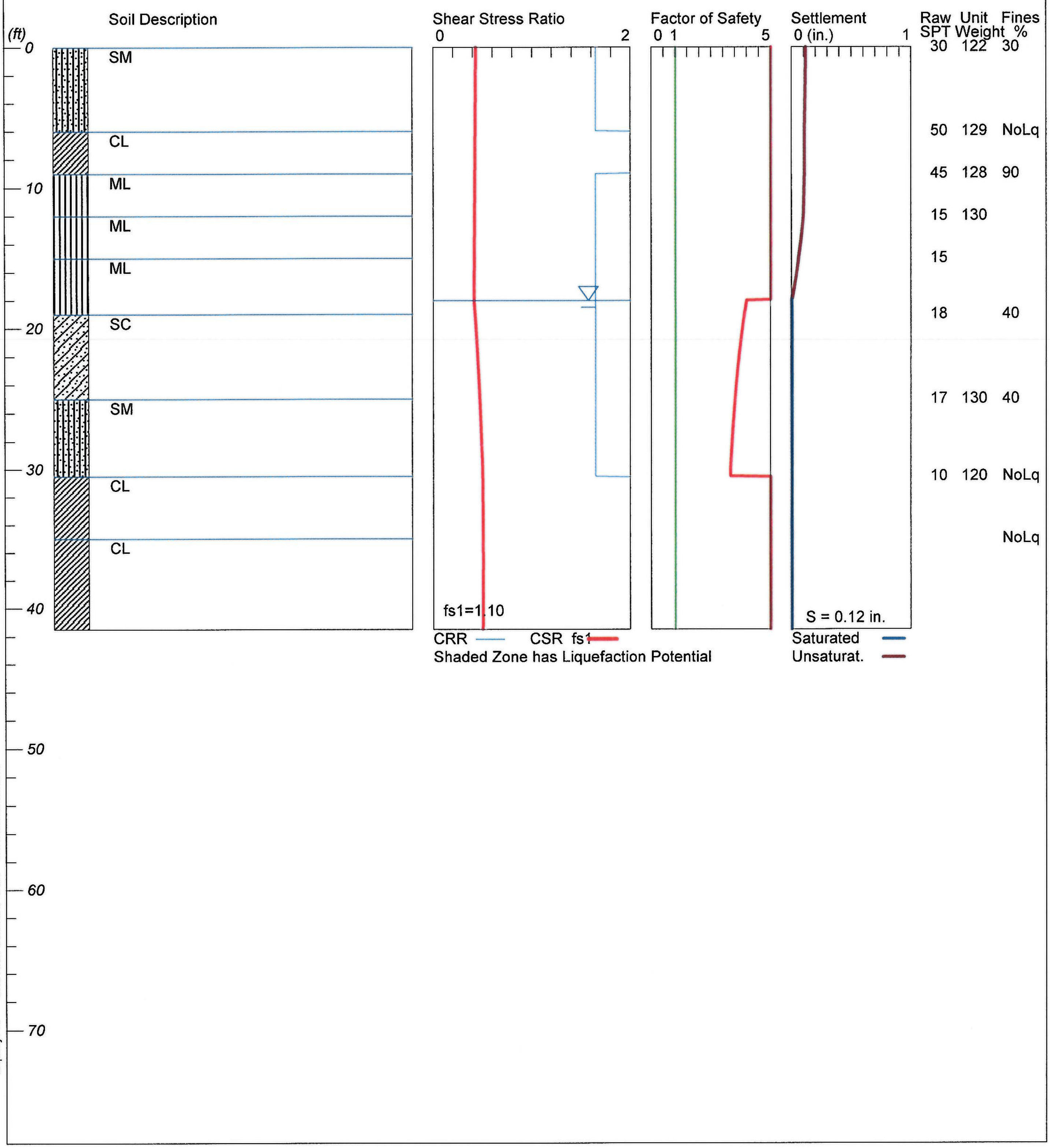
Magnitude=7.1
Acceleration=0.60g



LIQUEFACTION ANALYSIS

Logistics Bldg. APN 302-100-016

Hole No.=B-8 Water Depth=18 ft Surface Elev.=1458 *Magnitude=8.1*
Acceleration=0.60g



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LIQUEFACTION ANALYSIS SUMMARY
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Licensed to , 3/6/2020 3:16:48 PM

Input File Name: \\agi\Projects\Current Projects\First Industrial Realty\First Industrial Realty - Harley Knox (4585-SFI)\Liquefy Pro\B-3.liq
Title: Logistics Bldg. APN 302-100-016
Subtitle: 4585-SFI

Surface Elev.=1458
Hole No.=B-3
Depth of Hole= 51.50 ft
Water Table during Earthquake= 18.00 ft
Water Table during In-Situ Testing= 20.00 ft
Max. Acceleration= 0.6 g
Earthquake Magnitude= 7.10

Input Data:
Surface Elev.=1458
Hole No.=B-3
Depth of Hole=51.50 ft
Water Table during Earthquake= 18.00 ft
Water Table during In-Situ Testing= 20.00 ft
Max. Acceleration=0.6 g
Earthquake Magnitude=7.10
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Idriss/Seed
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.3
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: No
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.00	30.00	122.00	85.00
6.00	18.00	120.00	90.00
10.00	11.00	101.00	NoLiq
15.00	13.00	128.00	85.00
18.00	9.00	115.00	NoLiq
22.00	17.00	130.00	40.00
29.00	25.00	120.00	80.00
35.00	13.00	120.00	NoLiq
42.50	41.00	130.00	40.00

Output Results:
Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.07 in.
Total Settlement of Saturated and Unsaturated Sands=0.07 in.
Differential Settlement=0.033 to 0.044 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.30	0.43	5.00	0.00	0.07	0.07
0.10	2.30	0.43	5.00	0.00	0.07	0.07
0.20	2.30	0.43	5.00	0.00	0.07	0.07
0.30	2.30	0.43	5.00	0.00	0.07	0.07
0.40	2.30	0.43	5.00	0.00	0.07	0.07
0.50	2.30	0.43	5.00	0.00	0.07	0.07

0.60	2.30	0.43	5.00	0.00	0.07	0.07
0.70	2.30	0.43	5.00	0.00	0.07	0.07
0.80	2.30	0.43	5.00	0.00	0.07	0.07
0.90	2.30	0.43	5.00	0.00	0.07	0.07
1.00	2.30	0.43	5.00	0.00	0.07	0.07
1.10	2.30	0.43	5.00	0.00	0.07	0.07
1.20	2.30	0.43	5.00	0.00	0.07	0.07
1.30	2.30	0.43	5.00	0.00	0.07	0.07
1.40	2.30	0.43	5.00	0.00	0.07	0.07
1.50	2.30	0.43	5.00	0.00	0.07	0.07
1.60	2.30	0.43	5.00	0.00	0.07	0.07
1.70	2.30	0.43	5.00	0.00	0.07	0.07
1.80	2.30	0.43	5.00	0.00	0.07	0.07
1.90	2.30	0.43	5.00	0.00	0.07	0.07
2.00	2.30	0.43	5.00	0.00	0.07	0.07
2.10	2.30	0.43	5.00	0.00	0.07	0.07
2.20	2.30	0.43	5.00	0.00	0.07	0.07
2.30	2.30	0.43	5.00	0.00	0.06	0.06
2.40	2.30	0.43	5.00	0.00	0.06	0.06
2.50	2.30	0.43	5.00	0.00	0.06	0.06
2.60	2.30	0.43	5.00	0.00	0.06	0.06
2.70	2.30	0.43	5.00	0.00	0.06	0.06
2.80	2.30	0.43	5.00	0.00	0.06	0.06
2.90	2.30	0.43	5.00	0.00	0.06	0.06
3.00	2.30	0.43	5.00	0.00	0.06	0.06
3.10	2.30	0.43	5.00	0.00	0.06	0.06
3.20	2.30	0.43	5.00	0.00	0.06	0.06
3.30	2.30	0.43	5.00	0.00	0.06	0.06
3.40	2.30	0.43	5.00	0.00	0.06	0.06
3.50	2.30	0.43	5.00	0.00	0.06	0.06
3.60	2.30	0.43	5.00	0.00	0.06	0.06
3.70	2.30	0.43	5.00	0.00	0.06	0.06
3.80	2.30	0.43	5.00	0.00	0.06	0.06
3.90	2.30	0.43	5.00	0.00	0.06	0.06
4.00	2.30	0.42	5.00	0.00	0.06	0.06
4.10	2.30	0.42	5.00	0.00	0.06	0.06
4.20	2.30	0.42	5.00	0.00	0.06	0.06
4.30	2.30	0.42	5.00	0.00	0.06	0.06
4.40	2.30	0.42	5.00	0.00	0.06	0.06
4.50	2.30	0.42	5.00	0.00	0.06	0.06
4.60	2.30	0.42	5.00	0.00	0.06	0.06
4.70	2.30	0.42	5.00	0.00	0.06	0.06
4.80	2.30	0.42	5.00	0.00	0.06	0.06
4.90	2.30	0.42	5.00	0.00	0.06	0.06
5.00	2.30	0.42	5.00	0.00	0.06	0.06
5.10	2.30	0.42	5.00	0.00	0.06	0.06
5.20	2.30	0.42	5.00	0.00	0.06	0.06
5.30	2.30	0.42	5.00	0.00	0.06	0.06
5.40	2.30	0.42	5.00	0.00	0.06	0.06
5.50	2.30	0.42	5.00	0.00	0.06	0.06
5.60	2.30	0.42	5.00	0.00	0.06	0.06
5.70	2.30	0.42	5.00	0.00	0.06	0.06
5.80	2.30	0.42	5.00	0.00	0.06	0.06
5.90	2.30	0.42	5.00	0.00	0.06	0.06
6.00	2.30	0.42	5.00	0.00	0.06	0.06
6.10	2.30	0.42	5.00	0.00	0.06	0.06
6.20	2.30	0.42	5.00	0.00	0.06	0.06
6.30	2.30	0.42	5.00	0.00	0.06	0.06
6.40	2.30	0.42	5.00	0.00	0.06	0.06
6.50	2.30	0.42	5.00	0.00	0.06	0.06
6.60	2.30	0.42	5.00	0.00	0.06	0.06
6.70	2.30	0.42	5.00	0.00	0.06	0.06
6.80	2.30	0.42	5.00	0.00	0.06	0.06
6.90	2.30	0.42	5.00	0.00	0.06	0.06
7.00	2.30	0.42	5.00	0.00	0.06	0.06
7.10	2.30	0.42	5.00	0.00	0.06	0.06
7.20	2.30	0.42	5.00	0.00	0.06	0.06
7.30	2.30	0.42	5.00	0.00	0.06	0.06
7.40	2.30	0.42	5.00	0.00	0.05	0.05
7.50	2.30	0.42	5.00	0.00	0.05	0.05
7.60	2.30	0.42	5.00	0.00	0.05	0.05
7.70	2.30	0.42	5.00	0.00	0.05	0.05
7.80	2.30	0.42	5.00	0.00	0.05	0.05
7.90	2.30	0.42	5.00	0.00	0.05	0.05
8.00	2.30	0.42	5.00	0.00	0.05	0.05
8.10	2.30	0.42	5.00	0.00	0.05	0.05

8.20	2.30	0.42	5.00	0.00	0.05	0.05
8.30	2.30	0.42	5.00	0.00	0.05	0.05
8.40	2.30	0.42	5.00	0.00	0.05	0.05
8.50	2.30	0.42	5.00	0.00	0.05	0.05
8.60	2.30	0.42	5.00	0.00	0.05	0.05
8.70	2.30	0.42	5.00	0.00	0.05	0.05
8.80	2.30	0.42	5.00	0.00	0.05	0.05
8.90	2.30	0.42	5.00	0.00	0.05	0.05
9.00	2.30	0.42	5.00	0.00	0.05	0.05
9.10	2.30	0.42	5.00	0.00	0.05	0.05
9.20	2.30	0.42	5.00	0.00	0.05	0.05
9.30	2.30	0.42	5.00	0.00	0.05	0.05
9.40	2.30	0.42	5.00	0.00	0.05	0.05
9.50	2.30	0.42	5.00	0.00	0.05	0.05
9.60	2.30	0.42	5.00	0.00	0.05	0.05
9.70	2.30	0.42	5.00	0.00	0.05	0.05
9.80	2.30	0.42	5.00	0.00	0.05	0.05
9.90	2.30	0.42	5.00	0.00	0.05	0.05
10.00	2.00	0.42	5.00	0.00	0.05	0.05
10.10	2.00	0.42	5.00	0.00	0.05	0.05
10.20	2.00	0.42	5.00	0.00	0.05	0.05
10.30	2.00	0.42	5.00	0.00	0.05	0.05
10.40	2.00	0.42	5.00	0.00	0.05	0.05
10.50	2.00	0.42	5.00	0.00	0.05	0.05
10.60	2.00	0.42	5.00	0.00	0.05	0.05
10.70	2.00	0.42	5.00	0.00	0.05	0.05
10.80	2.00	0.42	5.00	0.00	0.05	0.05
10.90	2.00	0.42	5.00	0.00	0.05	0.05
11.00	2.00	0.42	5.00	0.00	0.05	0.05
11.10	2.00	0.42	5.00	0.00	0.05	0.05
11.20	2.00	0.42	5.00	0.00	0.05	0.05
11.30	2.00	0.42	5.00	0.00	0.05	0.05
11.40	2.00	0.42	5.00	0.00	0.05	0.05
11.50	2.00	0.42	5.00	0.00	0.05	0.05
11.60	2.00	0.42	5.00	0.00	0.05	0.05
11.70	2.00	0.42	5.00	0.00	0.05	0.05
11.80	2.00	0.42	5.00	0.00	0.05	0.05
11.90	2.00	0.42	5.00	0.00	0.05	0.05
12.00	2.00	0.42	5.00	0.00	0.05	0.05
12.10	2.00	0.42	5.00	0.00	0.05	0.05
12.20	2.00	0.42	5.00	0.00	0.05	0.05
12.30	2.00	0.42	5.00	0.00	0.05	0.05
12.40	2.00	0.42	5.00	0.00	0.05	0.05
12.50	2.00	0.42	5.00	0.00	0.05	0.05
12.60	2.00	0.42	5.00	0.00	0.05	0.05
12.70	2.00	0.42	5.00	0.00	0.05	0.05
12.80	2.00	0.42	5.00	0.00	0.05	0.05
12.90	2.00	0.42	5.00	0.00	0.05	0.05
13.00	2.00	0.42	5.00	0.00	0.05	0.05
13.10	2.00	0.42	5.00	0.00	0.05	0.05
13.20	2.00	0.42	5.00	0.00	0.05	0.05
13.30	2.00	0.42	5.00	0.00	0.05	0.05
13.40	2.00	0.42	5.00	0.00	0.05	0.05
13.50	2.00	0.42	5.00	0.00	0.05	0.05
13.60	2.00	0.42	5.00	0.00	0.05	0.05
13.70	2.00	0.42	5.00	0.00	0.05	0.05
13.80	2.00	0.42	5.00	0.00	0.05	0.05
13.90	2.00	0.42	5.00	0.00	0.05	0.05
14.00	2.00	0.41	5.00	0.00	0.05	0.05
14.10	2.00	0.41	5.00	0.00	0.05	0.05
14.20	2.00	0.41	5.00	0.00	0.05	0.05
14.30	2.00	0.41	5.00	0.00	0.05	0.05
14.40	2.00	0.41	5.00	0.00	0.05	0.05
14.50	2.00	0.41	5.00	0.00	0.05	0.05
14.60	2.00	0.41	5.00	0.00	0.05	0.05
14.70	2.00	0.41	5.00	0.00	0.05	0.05
14.80	2.00	0.41	5.00	0.00	0.05	0.05
14.90	2.00	0.41	5.00	0.00	0.05	0.05
15.00	2.30	0.41	5.00	0.00	0.05	0.05
15.10	2.30	0.41	5.00	0.00	0.04	0.04
15.20	2.30	0.41	5.00	0.00	0.04	0.04
15.30	2.30	0.41	5.00	0.00	0.04	0.04
15.40	2.30	0.41	5.00	0.00	0.04	0.04
15.50	2.30	0.41	5.00	0.00	0.04	0.04
15.60	2.30	0.41	5.00	0.00	0.04	0.04
15.70	2.30	0.41	5.00	0.00	0.04	0.04

15.80	2.30	0.41	5.00	0.00	0.04	0.04
15.90	2.30	0.41	5.00	0.00	0.04	0.04
16.00	2.30	0.41	5.00	0.00	0.03	0.03
16.10	2.30	0.41	5.00	0.00	0.03	0.03
16.20	2.30	0.41	5.00	0.00	0.03	0.03
16.30	2.30	0.41	5.00	0.00	0.03	0.03
16.40	2.30	0.41	5.00	0.00	0.03	0.03
16.50	2.30	0.41	5.00	0.00	0.03	0.03
16.60	2.30	0.41	5.00	0.00	0.03	0.03
16.70	2.30	0.41	5.00	0.00	0.02	0.02
16.80	2.30	0.41	5.00	0.00	0.02	0.02
16.90	2.30	0.41	5.00	0.00	0.02	0.02
17.00	2.30	0.41	5.00	0.00	0.02	0.02
17.10	2.30	0.41	5.00	0.00	0.02	0.02
17.20	2.30	0.41	5.00	0.00	0.02	0.02
17.30	2.30	0.41	5.00	0.00	0.01	0.01
17.40	2.30	0.41	5.00	0.00	0.01	0.01
17.50	2.30	0.41	5.00	0.00	0.01	0.01
17.60	2.30	0.41	5.00	0.00	0.01	0.01
17.70	2.30	0.41	5.00	0.00	0.01	0.01
17.80	2.30	0.41	5.00	0.00	0.00	0.00
17.90	2.30	0.41	5.00	0.00	0.00	0.00
18.00	2.00	0.41	5.00	0.00	0.00	0.00
18.10	2.00	0.41	5.00	0.00	0.00	0.00
18.20	2.00	0.41	5.00	0.00	0.00	0.00
18.30	2.00	0.41	5.00	0.00	0.00	0.00
18.40	2.00	0.42	5.00	0.00	0.00	0.00
18.50	2.00	0.42	5.00	0.00	0.00	0.00
18.60	2.00	0.42	5.00	0.00	0.00	0.00
18.70	2.00	0.42	5.00	0.00	0.00	0.00
18.80	2.00	0.42	5.00	0.00	0.00	0.00
18.90	2.00	0.42	5.00	0.00	0.00	0.00
19.00	2.00	0.42	5.00	0.00	0.00	0.00
19.10	2.00	0.42	5.00	0.00	0.00	0.00
19.20	2.00	0.42	5.00	0.00	0.00	0.00
19.30	2.00	0.43	5.00	0.00	0.00	0.00
19.40	2.00	0.43	5.00	0.00	0.00	0.00
19.50	2.00	0.43	5.00	0.00	0.00	0.00
19.60	2.00	0.43	5.00	0.00	0.00	0.00
19.70	2.00	0.43	5.00	0.00	0.00	0.00
19.80	2.00	0.43	5.00	0.00	0.00	0.00
19.90	2.00	0.43	5.00	0.00	0.00	0.00
20.00	2.00	0.43	5.00	0.00	0.00	0.00
20.10	2.00	0.43	5.00	0.00	0.00	0.00
20.20	2.00	0.43	5.00	0.00	0.00	0.00
20.30	2.00	0.44	5.00	0.00	0.00	0.00
20.40	2.00	0.44	5.00	0.00	0.00	0.00
20.50	2.00	0.44	5.00	0.00	0.00	0.00
20.60	2.00	0.44	5.00	0.00	0.00	0.00
20.70	2.00	0.44	5.00	0.00	0.00	0.00
20.80	2.00	0.44	5.00	0.00	0.00	0.00
20.90	2.00	0.44	5.00	0.00	0.00	0.00
21.00	2.00	0.44	5.00	0.00	0.00	0.00
21.10	2.00	0.44	5.00	0.00	0.00	0.00
21.20	2.00	0.44	5.00	0.00	0.00	0.00
21.30	2.00	0.44	5.00	0.00	0.00	0.00
21.40	2.00	0.45	5.00	0.00	0.00	0.00
21.50	2.00	0.45	5.00	0.00	0.00	0.00
21.60	2.00	0.45	5.00	0.00	0.00	0.00
21.70	2.00	0.45	5.00	0.00	0.00	0.00
21.80	2.00	0.45	5.00	0.00	0.00	0.00
21.90	2.00	0.45	5.00	0.00	0.00	0.00
22.00	2.00	0.45	5.00	0.00	0.00	0.00
22.10	2.30	0.45	5.00	0.00	0.00	0.00
22.20	2.30	0.45	5.00	0.00	0.00	0.00
22.30	2.30	0.45	5.00	0.00	0.00	0.00
22.40	2.30	0.45	5.00	0.00	0.00	0.00
22.50	2.30	0.46	5.00	0.00	0.00	0.00
22.60	2.30	0.46	5.00	0.00	0.00	0.00
22.70	2.30	0.46	5.00	0.00	0.00	0.00
22.80	2.30	0.46	5.00	0.00	0.00	0.00
22.90	2.30	0.46	5.00	0.00	0.00	0.00
23.00	2.30	0.46	5.00	0.00	0.00	0.00
23.10	2.30	0.46	5.00	0.00	0.00	0.00
23.20	2.30	0.46	4.99	0.00	0.00	0.00
23.30	2.30	0.46	4.98	0.00	0.00	0.00

23.40	2.30	0.46	4.97	0.00	0.00	0.00
23.50	2.30	0.46	4.97	0.00	0.00	0.00
23.60	2.30	0.46	4.96	0.00	0.00	0.00
23.70	2.30	0.46	4.95	0.00	0.00	0.00
23.80	2.30	0.47	4.94	0.00	0.00	0.00
23.90	2.30	0.47	4.93	0.00	0.00	0.00
24.00	2.30	0.47	4.93	0.00	0.00	0.00
24.10	2.30	0.47	4.92	0.00	0.00	0.00
24.20	2.30	0.47	4.91	0.00	0.00	0.00
24.30	2.30	0.47	4.90	0.00	0.00	0.00
24.40	2.30	0.47	4.90	0.00	0.00	0.00
24.50	2.30	0.47	4.89	0.00	0.00	0.00
24.60	2.30	0.47	4.88	0.00	0.00	0.00
24.70	2.30	0.47	4.87	0.00	0.00	0.00
24.80	2.30	0.47	4.87	0.00	0.00	0.00
24.90	2.30	0.47	4.86	0.00	0.00	0.00
25.00	2.30	0.47	4.85	0.00	0.00	0.00
25.10	2.30	0.47	4.84	0.00	0.00	0.00
25.20	2.30	0.48	4.84	0.00	0.00	0.00
25.30	2.30	0.48	4.83	0.00	0.00	0.00
25.40	2.30	0.48	4.82	0.00	0.00	0.00
25.50	2.30	0.48	4.82	0.00	0.00	0.00
25.60	2.30	0.48	4.81	0.00	0.00	0.00
25.70	2.30	0.48	4.80	0.00	0.00	0.00
25.80	2.30	0.48	4.80	0.00	0.00	0.00
25.90	2.30	0.48	4.79	0.00	0.00	0.00
26.00	2.30	0.48	4.78	0.00	0.00	0.00
26.10	2.30	0.48	4.78	0.00	0.00	0.00
26.20	2.30	0.48	4.77	0.00	0.00	0.00
26.30	2.30	0.48	4.76	0.00	0.00	0.00
26.40	2.30	0.48	4.76	0.00	0.00	0.00
26.50	2.30	0.48	4.75	0.00	0.00	0.00
26.60	2.30	0.48	4.75	0.00	0.00	0.00
26.70	2.30	0.49	4.74	0.00	0.00	0.00
26.80	2.30	0.49	4.73	0.00	0.00	0.00
26.90	2.30	0.49	4.73	0.00	0.00	0.00
27.00	2.30	0.49	4.72	0.00	0.00	0.00
27.10	2.30	0.49	4.72	0.00	0.00	0.00
27.20	2.30	0.49	4.71	0.00	0.00	0.00
27.30	2.30	0.49	4.70	0.00	0.00	0.00
27.40	2.30	0.49	4.70	0.00	0.00	0.00
27.50	2.30	0.49	4.69	0.00	0.00	0.00
27.60	2.30	0.49	4.69	0.00	0.00	0.00
27.70	2.30	0.49	4.68	0.00	0.00	0.00
27.80	2.30	0.49	4.68	0.00	0.00	0.00
27.90	2.30	0.49	4.67	0.00	0.00	0.00
28.00	2.30	0.49	4.67	0.00	0.00	0.00
28.10	2.30	0.49	4.66	0.00	0.00	0.00
28.20	2.30	0.49	4.65	0.00	0.00	0.00
28.30	2.30	0.49	4.65	0.00	0.00	0.00
28.40	2.30	0.50	4.64	0.00	0.00	0.00
28.50	2.30	0.50	4.64	0.00	0.00	0.00
28.60	2.30	0.50	4.63	0.00	0.00	0.00
28.70	2.30	0.50	4.63	0.00	0.00	0.00
28.80	2.30	0.50	4.62	0.00	0.00	0.00
28.90	2.30	0.50	4.62	0.00	0.00	0.00
29.00	2.30	0.50	4.61	0.00	0.00	0.00
29.10	2.30	0.50	4.61	0.00	0.00	0.00
29.20	2.30	0.50	4.60	0.00	0.00	0.00
29.30	2.30	0.50	4.60	0.00	0.00	0.00
29.40	2.30	0.50	4.59	0.00	0.00	0.00
29.50	2.30	0.50	4.59	0.00	0.00	0.00
29.60	2.30	0.50	4.58	0.00	0.00	0.00
29.70	2.30	0.50	4.58	0.00	0.00	0.00
29.80	2.30	0.50	4.57	0.00	0.00	0.00
29.90	2.30	0.50	4.57	0.00	0.00	0.00
30.00	2.30	0.50	4.56	0.00	0.00	0.00
30.10	2.30	0.50	4.56	0.00	0.00	0.00
30.20	2.30	0.50	4.56	0.00	0.00	0.00
30.30	2.30	0.50	4.56	0.00	0.00	0.00
30.40	2.30	0.50	4.56	0.00	0.00	0.00
30.50	2.30	0.51	4.55	0.00	0.00	0.00
30.60	2.30	0.51	4.55	0.00	0.00	0.00
30.70	2.30	0.51	4.55	0.00	0.00	0.00
30.80	2.30	0.51	4.55	0.00	0.00	0.00
30.90	2.30	0.51	4.55	0.00	0.00	0.00

31.00	2.30	0.51	4.55	0.00	0.00	0.00
31.10	2.30	0.51	4.54	0.00	0.00	0.00
31.20	2.30	0.51	4.54	0.00	0.00	0.00
31.30	2.30	0.51	4.54	0.00	0.00	0.00
31.40	2.30	0.51	4.54	0.00	0.00	0.00
31.50	2.30	0.51	4.54	0.00	0.00	0.00
31.60	2.30	0.51	4.54	0.00	0.00	0.00
31.70	2.30	0.51	4.54	0.00	0.00	0.00
31.80	2.30	0.51	4.53	0.00	0.00	0.00
31.90	2.30	0.51	4.53	0.00	0.00	0.00
32.00	2.30	0.51	4.53	0.00	0.00	0.00
32.10	2.30	0.51	4.53	0.00	0.00	0.00
32.20	2.30	0.51	4.53	0.00	0.00	0.00
32.30	2.30	0.51	4.53	0.00	0.00	0.00
32.40	2.30	0.51	4.53	0.00	0.00	0.00
32.50	2.30	0.51	4.52	0.00	0.00	0.00
32.60	2.30	0.51	4.52	0.00	0.00	0.00
32.70	2.30	0.51	4.52	0.00	0.00	0.00
32.80	2.30	0.51	4.52	0.00	0.00	0.00
32.90	2.30	0.51	4.52	0.00	0.00	0.00
33.00	2.30	0.51	4.52	0.00	0.00	0.00
33.10	2.30	0.51	4.52	0.00	0.00	0.00
33.20	2.30	0.51	4.52	0.00	0.00	0.00
33.30	2.30	0.51	4.52	0.00	0.00	0.00
33.40	2.30	0.51	4.52	0.00	0.00	0.00
33.50	2.30	0.51	4.51	0.00	0.00	0.00
33.60	2.30	0.51	4.51	0.00	0.00	0.00
33.70	2.30	0.51	4.51	0.00	0.00	0.00
33.80	2.30	0.51	4.51	0.00	0.00	0.00
33.90	2.30	0.51	4.51	0.00	0.00	0.00
34.00	2.30	0.51	4.51	0.00	0.00	0.00
34.10	2.30	0.51	4.51	0.00	0.00	0.00
34.20	2.30	0.51	4.51	0.00	0.00	0.00
34.30	2.30	0.51	4.51	0.00	0.00	0.00
34.40	2.30	0.51	4.51	0.00	0.00	0.00
34.50	2.30	0.51	4.51	0.00	0.00	0.00
34.60	2.30	0.51	4.51	0.00	0.00	0.00
34.70	2.30	0.51	4.51	0.00	0.00	0.00
34.80	2.30	0.51	4.51	0.00	0.00	0.00
34.90	2.30	0.51	4.50	0.00	0.00	0.00
35.00	2.31	0.51	4.53	0.00	0.00	0.00
35.10	2.00	0.51	5.00	0.00	0.00	0.00
35.20	2.00	0.51	5.00	0.00	0.00	0.00
35.30	2.00	0.51	5.00	0.00	0.00	0.00
35.40	2.00	0.51	5.00	0.00	0.00	0.00
35.50	2.00	0.51	5.00	0.00	0.00	0.00
35.60	2.00	0.51	5.00	0.00	0.00	0.00
35.70	2.00	0.51	5.00	0.00	0.00	0.00
35.80	2.00	0.51	5.00	0.00	0.00	0.00
35.90	2.00	0.51	5.00	0.00	0.00	0.00
36.00	2.00	0.51	5.00	0.00	0.00	0.00
36.10	2.00	0.51	5.00	0.00	0.00	0.00
36.20	2.00	0.51	5.00	0.00	0.00	0.00
36.30	2.00	0.51	5.00	0.00	0.00	0.00
36.40	2.00	0.51	5.00	0.00	0.00	0.00
36.50	2.00	0.51	5.00	0.00	0.00	0.00
36.60	2.00	0.51	5.00	0.00	0.00	0.00
36.70	2.00	0.51	5.00	0.00	0.00	0.00
36.80	2.00	0.51	5.00	0.00	0.00	0.00
36.90	2.00	0.51	5.00	0.00	0.00	0.00
37.00	2.00	0.51	5.00	0.00	0.00	0.00
37.10	2.00	0.51	5.00	0.00	0.00	0.00
37.20	2.00	0.51	5.00	0.00	0.00	0.00
37.30	2.00	0.51	5.00	0.00	0.00	0.00
37.40	2.00	0.51	5.00	0.00	0.00	0.00
37.50	2.00	0.51	5.00	0.00	0.00	0.00
37.60	2.00	0.51	5.00	0.00	0.00	0.00
37.70	2.00	0.51	5.00	0.00	0.00	0.00
37.80	2.00	0.51	5.00	0.00	0.00	0.00
37.90	2.00	0.51	5.00	0.00	0.00	0.00
38.00	2.00	0.51	5.00	0.00	0.00	0.00
38.10	2.00	0.51	5.00	0.00	0.00	0.00
38.20	2.00	0.51	5.00	0.00	0.00	0.00
38.30	2.00	0.51	5.00	0.00	0.00	0.00
38.40	2.00	0.51	5.00	0.00	0.00	0.00
38.50	2.00	0.51	5.00	0.00	0.00	0.00

38.60	2.00	0.51	5.00	0.00	0.00	0.00
38.70	2.00	0.51	5.00	0.00	0.00	0.00
38.80	2.00	0.51	5.00	0.00	0.00	0.00
38.90	2.00	0.51	5.00	0.00	0.00	0.00
39.00	2.00	0.51	5.00	0.00	0.00	0.00
39.10	2.00	0.51	5.00	0.00	0.00	0.00
39.20	2.00	0.51	5.00	0.00	0.00	0.00
39.30	2.00	0.51	5.00	0.00	0.00	0.00
39.40	2.00	0.51	5.00	0.00	0.00	0.00
39.50	2.00	0.51	5.00	0.00	0.00	0.00
39.60	2.00	0.51	5.00	0.00	0.00	0.00
39.70	2.00	0.51	5.00	0.00	0.00	0.00
39.80	2.00	0.51	5.00	0.00	0.00	0.00
39.90	2.00	0.51	5.00	0.00	0.00	0.00
40.00	2.00	0.51	5.00	0.00	0.00	0.00
40.10	2.00	0.51	5.00	0.00	0.00	0.00
40.20	2.00	0.51	5.00	0.00	0.00	0.00
40.30	2.00	0.51	5.00	0.00	0.00	0.00
40.40	2.00	0.51	5.00	0.00	0.00	0.00
40.50	2.00	0.51	5.00	0.00	0.00	0.00
40.60	2.00	0.51	5.00	0.00	0.00	0.00
40.70	2.00	0.51	5.00	0.00	0.00	0.00
40.80	2.00	0.51	5.00	0.00	0.00	0.00
40.90	2.00	0.51	5.00	0.00	0.00	0.00
41.00	2.00	0.51	5.00	0.00	0.00	0.00
41.10	2.00	0.51	5.00	0.00	0.00	0.00
41.20	2.00	0.51	5.00	0.00	0.00	0.00
41.30	2.00	0.51	5.00	0.00	0.00	0.00
41.40	2.00	0.51	5.00	0.00	0.00	0.00
41.50	2.00	0.51	5.00	0.00	0.00	0.00
41.60	2.00	0.51	5.00	0.00	0.00	0.00
41.70	2.00	0.51	5.00	0.00	0.00	0.00
41.80	2.00	0.51	5.00	0.00	0.00	0.00
41.90	2.00	0.51	5.00	0.00	0.00	0.00
42.00	2.00	0.51	5.00	0.00	0.00	0.00
42.10	2.00	0.51	5.00	0.00	0.00	0.00
42.20	2.00	0.51	5.00	0.00	0.00	0.00
42.30	2.00	0.51	5.00	0.00	0.00	0.00
42.40	2.00	0.51	5.00	0.00	0.00	0.00
42.50	2.00	0.51	5.00	0.00	0.00	0.00
42.60	2.27	0.51	4.46	0.00	0.00	0.00
42.70	2.27	0.51	4.46	0.00	0.00	0.00
42.80	2.26	0.51	4.46	0.00	0.00	0.00
42.90	2.26	0.51	4.46	0.00	0.00	0.00
43.00	2.26	0.51	4.46	0.00	0.00	0.00
43.10	2.26	0.51	4.46	0.00	0.00	0.00
43.20	2.26	0.51	4.46	0.00	0.00	0.00
43.30	2.26	0.51	4.46	0.00	0.00	0.00
43.40	2.26	0.51	4.46	0.00	0.00	0.00
43.50	2.26	0.51	4.47	0.00	0.00	0.00
43.60	2.26	0.51	4.47	0.00	0.00	0.00
43.70	2.26	0.51	4.47	0.00	0.00	0.00
43.80	2.26	0.51	4.47	0.00	0.00	0.00
43.90	2.26	0.51	4.47	0.00	0.00	0.00
44.00	2.26	0.51	4.47	0.00	0.00	0.00
44.10	2.26	0.50	4.47	0.00	0.00	0.00
44.20	2.25	0.50	4.47	0.00	0.00	0.00
44.30	2.25	0.50	4.47	0.00	0.00	0.00
44.40	2.25	0.50	4.47	0.00	0.00	0.00
44.50	2.25	0.50	4.47	0.00	0.00	0.00
44.60	2.25	0.50	4.47	0.00	0.00	0.00
44.70	2.25	0.50	4.47	0.00	0.00	0.00
44.80	2.25	0.50	4.47	0.00	0.00	0.00
44.90	2.25	0.50	4.47	0.00	0.00	0.00
45.00	2.25	0.50	4.47	0.00	0.00	0.00
45.10	2.25	0.50	4.47	0.00	0.00	0.00
45.20	2.25	0.50	4.47	0.00	0.00	0.00
45.30	2.25	0.50	4.47	0.00	0.00	0.00
45.40	2.25	0.50	4.47	0.00	0.00	0.00
45.50	2.25	0.50	4.47	0.00	0.00	0.00
45.60	2.24	0.50	4.47	0.00	0.00	0.00
45.70	2.24	0.50	4.47	0.00	0.00	0.00
45.80	2.24	0.50	4.47	0.00	0.00	0.00
45.90	2.24	0.50	4.47	0.00	0.00	0.00
46.00	2.24	0.50	4.48	0.00	0.00	0.00
46.10	2.24	0.50	4.48	0.00	0.00	0.00

46.20	2.24	0.50	4.48	0.00	0.00	0.00
46.30	2.24	0.50	4.48	0.00	0.00	0.00
46.40	2.24	0.50	4.48	0.00	0.00	0.00
46.50	2.24	0.50	4.48	0.00	0.00	0.00
46.60	2.24	0.50	4.48	0.00	0.00	0.00
46.70	2.24	0.50	4.48	0.00	0.00	0.00
46.80	2.24	0.50	4.48	0.00	0.00	0.00
46.90	2.24	0.50	4.48	0.00	0.00	0.00
47.00	2.23	0.50	4.48	0.00	0.00	0.00
47.10	2.23	0.50	4.48	0.00	0.00	0.00
47.20	2.23	0.50	4.48	0.00	0.00	0.00
47.30	2.23	0.50	4.48	0.00	0.00	0.00
47.40	2.23	0.50	4.49	0.00	0.00	0.00
47.50	2.23	0.50	4.49	0.00	0.00	0.00
47.60	2.23	0.50	4.49	0.00	0.00	0.00
47.70	2.23	0.50	4.49	0.00	0.00	0.00
47.80	2.23	0.50	4.49	0.00	0.00	0.00
47.90	2.23	0.50	4.49	0.00	0.00	0.00
48.00	2.23	0.50	4.49	0.00	0.00	0.00
48.10	2.23	0.50	4.49	0.00	0.00	0.00
48.20	2.23	0.50	4.49	0.00	0.00	0.00
48.30	2.23	0.50	4.49	0.00	0.00	0.00
48.40	2.22	0.49	4.49	0.00	0.00	0.00
48.50	2.22	0.49	4.50	0.00	0.00	0.00
48.60	2.22	0.49	4.50	0.00	0.00	0.00
48.70	2.22	0.49	4.50	0.00	0.00	0.00
48.80	2.22	0.49	4.50	0.00	0.00	0.00
48.90	2.22	0.49	4.50	0.00	0.00	0.00
49.00	2.22	0.49	4.50	0.00	0.00	0.00
49.10	2.22	0.49	4.50	0.00	0.00	0.00
49.20	2.22	0.49	4.50	0.00	0.00	0.00
49.30	2.22	0.49	4.50	0.00	0.00	0.00
49.40	2.22	0.49	4.50	0.00	0.00	0.00
49.50	2.22	0.49	4.51	0.00	0.00	0.00
49.60	2.22	0.49	4.51	0.00	0.00	0.00
49.70	2.22	0.49	4.51	0.00	0.00	0.00
49.80	2.21	0.49	4.51	0.00	0.00	0.00
49.90	2.21	0.49	4.51	0.00	0.00	0.00
50.00	2.21	0.49	4.51	0.00	0.00	0.00
50.10	2.21	0.49	4.51	0.00	0.00	0.00
50.20	2.21	0.49	4.51	0.00	0.00	0.00
50.30	2.21	0.49	4.52	0.00	0.00	0.00
50.40	2.21	0.49	4.52	0.00	0.00	0.00
50.50	2.21	0.49	4.52	0.00	0.00	0.00
50.60	2.21	0.49	4.52	0.00	0.00	0.00
50.70	2.21	0.49	4.52	0.00	0.00	0.00
50.80	2.21	0.49	4.52	0.00	0.00	0.00
50.90	2.21	0.49	4.52	0.00	0.00	0.00
51.00	2.21	0.49	4.52	0.00	0.00	0.00
51.10	2.21	0.49	4.53	0.00	0.00	0.00
51.20	2.21	0.49	4.53	0.00	0.00	0.00
51.30	2.20	0.49	4.53	0.00	0.00	0.00
51.40	2.20	0.49	4.53	0.00	0.00	0.00
51.50	2.20	0.49	4.53	0.00	0.00	0.00

* 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.

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: \\agi\Projects\Current Projects\First Industrial Realty\First Industrial Realty - Harley Knox (4585-SFI)\Liquefy Pro\B-3.liq
Title: Logistics Bldg. APN 302-100-016
Subtitle: 4585-SFI

Surface Elev.=1458
Hole No.=B-3
Depth of Hole= 51.50 ft
Water Table during Earthquake= 18.00 ft
Water Table during In-Situ Testing= 20.00 ft
Max. Acceleration= 0.6 g
Earthquake Magnitude= 8.10

Input Data:

Surface Elev.=1458
Hole No.=B-3
Depth of Hole=51.50 ft
Water Table during Earthquake= 18.00 ft
Water Table during In-Situ Testing= 20.00 ft
Max. Acceleration=0.6 g
Earthquake Magnitude=8.10
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Idriss/Seed
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.3
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: No

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.00	30.00	122.00	85.00
6.00	18.00	120.00	90.00
10.00	11.00	101.00	NoLiq
15.00	13.00	128.00	85.00
18.00	9.00	115.00	NoLiq
22.00	17.00	130.00	40.00
29.00	25.00	120.00	80.00
35.00	13.00	120.00	NoLiq
42.50	41.00	130.00	40.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.08 in.
Total Settlement of Saturated and Unsaturated Sands=0.08 in.
Differential Settlement=0.041 to 0.054 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	1.64	0.43	5.00	0.00	0.08	0.08
0.10	1.64	0.43	5.00	0.00	0.08	0.08
0.20	1.64	0.43	5.00	0.00	0.08	0.08
0.30	1.64	0.43	5.00	0.00	0.08	0.08
0.40	1.64	0.43	5.00	0.00	0.08	0.08
0.50	1.64	0.43	5.00	0.00	0.08	0.08

0.60	1.64	0.43	5.00	0.00	0.08	0.08
0.70	1.64	0.43	5.00	0.00	0.08	0.08
0.80	1.64	0.43	5.00	0.00	0.08	0.08
0.90	1.64	0.43	5.00	0.00	0.08	0.08
1.00	1.64	0.43	5.00	0.00	0.08	0.08
1.10	1.64	0.43	5.00	0.00	0.08	0.08
1.20	1.64	0.43	5.00	0.00	0.08	0.08
1.30	1.64	0.43	5.00	0.00	0.08	0.08
1.40	1.64	0.43	5.00	0.00	0.08	0.08
1.50	1.64	0.43	5.00	0.00	0.08	0.08
1.60	1.64	0.43	5.00	0.00	0.08	0.08
1.70	1.64	0.43	5.00	0.00	0.08	0.08
1.80	1.64	0.43	5.00	0.00	0.08	0.08
1.90	1.64	0.43	5.00	0.00	0.08	0.08
2.00	1.64	0.43	5.00	0.00	0.08	0.08
2.10	1.64	0.43	5.00	0.00	0.08	0.08
2.20	1.64	0.43	5.00	0.00	0.08	0.08
2.30	1.64	0.43	5.00	0.00	0.08	0.08
2.40	1.64	0.43	5.00	0.00	0.08	0.08
2.50	1.64	0.43	5.00	0.00	0.08	0.08
2.60	1.64	0.43	5.00	0.00	0.08	0.08
2.70	1.64	0.43	5.00	0.00	0.08	0.08
2.80	1.64	0.43	5.00	0.00	0.08	0.08
2.90	1.64	0.43	5.00	0.00	0.08	0.08
3.00	1.64	0.43	5.00	0.00	0.08	0.08
3.10	1.64	0.43	5.00	0.00	0.08	0.08
3.20	1.64	0.43	5.00	0.00	0.08	0.08
3.30	1.64	0.43	5.00	0.00	0.08	0.08
3.40	1.64	0.43	5.00	0.00	0.08	0.08
3.50	1.64	0.43	5.00	0.00	0.08	0.08
3.60	1.64	0.43	5.00	0.00	0.08	0.08
3.70	1.64	0.43	5.00	0.00	0.08	0.08
3.80	1.64	0.43	5.00	0.00	0.08	0.08
3.90	1.64	0.43	5.00	0.00	0.08	0.08
4.00	1.64	0.42	5.00	0.00	0.08	0.08
4.10	1.64	0.42	5.00	0.00	0.08	0.08
4.20	1.64	0.42	5.00	0.00	0.08	0.08
4.30	1.64	0.42	5.00	0.00	0.08	0.08
4.40	1.64	0.42	5.00	0.00	0.08	0.08
4.50	1.64	0.42	5.00	0.00	0.08	0.08
4.60	1.64	0.42	5.00	0.00	0.07	0.07
4.70	1.64	0.42	5.00	0.00	0.07	0.07
4.80	1.64	0.42	5.00	0.00	0.07	0.07
4.90	1.64	0.42	5.00	0.00	0.07	0.07
5.00	1.64	0.42	5.00	0.00	0.07	0.07
5.10	1.64	0.42	5.00	0.00	0.07	0.07
5.20	1.64	0.42	5.00	0.00	0.07	0.07
5.30	1.64	0.42	5.00	0.00	0.07	0.07
5.40	1.64	0.42	5.00	0.00	0.07	0.07
5.50	1.64	0.42	5.00	0.00	0.07	0.07
5.60	1.64	0.42	5.00	0.00	0.07	0.07
5.70	1.64	0.42	5.00	0.00	0.07	0.07
5.80	1.64	0.42	5.00	0.00	0.07	0.07
5.90	1.64	0.42	5.00	0.00	0.07	0.07
6.00	1.64	0.42	5.00	0.00	0.07	0.07
6.10	1.64	0.42	5.00	0.00	0.07	0.07
6.20	1.64	0.42	5.00	0.00	0.07	0.07
6.30	1.64	0.42	5.00	0.00	0.07	0.07
6.40	1.64	0.42	5.00	0.00	0.07	0.07
6.50	1.64	0.42	5.00	0.00	0.07	0.07
6.60	1.64	0.42	5.00	0.00	0.07	0.07
6.70	1.64	0.42	5.00	0.00	0.07	0.07
6.80	1.64	0.42	5.00	0.00	0.07	0.07
6.90	1.64	0.42	5.00	0.00	0.07	0.07
7.00	1.64	0.42	5.00	0.00	0.07	0.07
7.10	1.64	0.42	5.00	0.00	0.07	0.07
7.20	1.64	0.42	5.00	0.00	0.07	0.07
7.30	1.64	0.42	5.00	0.00	0.07	0.07
7.40	1.64	0.42	5.00	0.00	0.07	0.07
7.50	1.64	0.42	5.00	0.00	0.07	0.07
7.60	1.64	0.42	5.00	0.00	0.07	0.07
7.70	1.64	0.42	5.00	0.00	0.07	0.07
7.80	1.64	0.42	5.00	0.00	0.07	0.07
7.90	1.64	0.42	5.00	0.00	0.07	0.07
8.00	1.64	0.42	5.00	0.00	0.06	0.06
8.10	1.64	0.42	5.00	0.00	0.06	0.06

8.20	1.64	0.42	5.00	0.00	0.06	0.06
8.30	1.64	0.42	5.00	0.00	0.06	0.06
8.40	1.64	0.42	5.00	0.00	0.06	0.06
8.50	1.64	0.42	5.00	0.00	0.06	0.06
8.60	1.64	0.42	5.00	0.00	0.06	0.06
8.70	1.64	0.42	5.00	0.00	0.06	0.06
8.80	1.64	0.42	5.00	0.00	0.06	0.06
8.90	1.64	0.42	5.00	0.00	0.06	0.06
9.00	1.64	0.42	5.00	0.00	0.06	0.06
9.10	1.64	0.42	5.00	0.00	0.06	0.06
9.20	1.64	0.42	5.00	0.00	0.06	0.06
9.30	1.64	0.42	5.00	0.00	0.06	0.06
9.40	1.64	0.42	5.00	0.00	0.06	0.06
9.50	1.64	0.42	5.00	0.00	0.06	0.06
9.60	1.64	0.42	5.00	0.00	0.06	0.06
9.70	1.64	0.42	5.00	0.00	0.06	0.06
9.80	1.64	0.42	5.00	0.00	0.06	0.06
9.90	1.64	0.42	5.00	0.00	0.06	0.06
10.00	2.00	0.42	5.00	0.00	0.06	0.06
10.10	2.00	0.42	5.00	0.00	0.06	0.06
10.20	2.00	0.42	5.00	0.00	0.06	0.06
10.30	2.00	0.42	5.00	0.00	0.06	0.06
10.40	2.00	0.42	5.00	0.00	0.06	0.06
10.50	2.00	0.42	5.00	0.00	0.06	0.06
10.60	2.00	0.42	5.00	0.00	0.06	0.06
10.70	2.00	0.42	5.00	0.00	0.06	0.06
10.80	2.00	0.42	5.00	0.00	0.06	0.06
10.90	2.00	0.42	5.00	0.00	0.06	0.06
11.00	2.00	0.42	5.00	0.00	0.06	0.06
11.10	2.00	0.42	5.00	0.00	0.06	0.06
11.20	2.00	0.42	5.00	0.00	0.06	0.06
11.30	2.00	0.42	5.00	0.00	0.06	0.06
11.40	2.00	0.42	5.00	0.00	0.06	0.06
11.50	2.00	0.42	5.00	0.00	0.06	0.06
11.60	2.00	0.42	5.00	0.00	0.06	0.06
11.70	2.00	0.42	5.00	0.00	0.06	0.06
11.80	2.00	0.42	5.00	0.00	0.06	0.06
11.90	2.00	0.42	5.00	0.00	0.06	0.06
12.00	2.00	0.42	5.00	0.00	0.06	0.06
12.10	2.00	0.42	5.00	0.00	0.06	0.06
12.20	2.00	0.42	5.00	0.00	0.06	0.06
12.30	2.00	0.42	5.00	0.00	0.06	0.06
12.40	2.00	0.42	5.00	0.00	0.06	0.06
12.50	2.00	0.42	5.00	0.00	0.06	0.06
12.60	2.00	0.42	5.00	0.00	0.06	0.06
12.70	2.00	0.42	5.00	0.00	0.06	0.06
12.80	2.00	0.42	5.00	0.00	0.06	0.06
12.90	2.00	0.42	5.00	0.00	0.06	0.06
13.00	2.00	0.42	5.00	0.00	0.06	0.06
13.10	2.00	0.42	5.00	0.00	0.06	0.06
13.20	2.00	0.42	5.00	0.00	0.06	0.06
13.30	2.00	0.42	5.00	0.00	0.06	0.06
13.40	2.00	0.42	5.00	0.00	0.06	0.06
13.50	2.00	0.42	5.00	0.00	0.06	0.06
13.60	2.00	0.42	5.00	0.00	0.06	0.06
13.70	2.00	0.42	5.00	0.00	0.06	0.06
13.80	2.00	0.42	5.00	0.00	0.06	0.06
13.90	2.00	0.42	5.00	0.00	0.06	0.06
14.00	2.00	0.41	5.00	0.00	0.06	0.06
14.10	2.00	0.41	5.00	0.00	0.06	0.06
14.20	2.00	0.41	5.00	0.00	0.06	0.06
14.30	2.00	0.41	5.00	0.00	0.06	0.06
14.40	2.00	0.41	5.00	0.00	0.06	0.06
14.50	2.00	0.41	5.00	0.00	0.06	0.06
14.60	2.00	0.41	5.00	0.00	0.06	0.06
14.70	2.00	0.41	5.00	0.00	0.06	0.06
14.80	2.00	0.41	5.00	0.00	0.06	0.06
14.90	2.00	0.41	5.00	0.00	0.06	0.06
15.00	1.64	0.41	5.00	0.00	0.06	0.06
15.10	1.64	0.41	5.00	0.00	0.05	0.05
15.20	1.64	0.41	5.00	0.00	0.05	0.05
15.30	1.64	0.41	5.00	0.00	0.05	0.05
15.40	1.64	0.41	5.00	0.00	0.05	0.05
15.50	1.64	0.41	5.00	0.00	0.05	0.05
15.60	1.64	0.41	5.00	0.00	0.05	0.05
15.70	1.64	0.41	5.00	0.00	0.05	0.05

15.80	1.64	0.41	5.00	0.00	0.04	0.04
15.90	1.64	0.41	5.00	0.00	0.04	0.04
16.00	1.64	0.41	5.00	0.00	0.04	0.04
16.10	1.64	0.41	5.00	0.00	0.04	0.04
16.20	1.64	0.41	5.00	0.00	0.04	0.04
16.30	1.64	0.41	5.00	0.00	0.04	0.04
16.40	1.64	0.41	5.00	0.00	0.03	0.03
16.50	1.64	0.41	5.00	0.00	0.03	0.03
16.60	1.64	0.41	5.00	0.00	0.03	0.03
16.70	1.64	0.41	5.00	0.00	0.03	0.03
16.80	1.64	0.41	5.00	0.00	0.03	0.03
16.90	1.64	0.41	5.00	0.00	0.02	0.02
17.00	1.64	0.41	5.00	0.00	0.02	0.02
17.10	1.64	0.41	5.00	0.00	0.02	0.02
17.20	1.64	0.41	5.00	0.00	0.02	0.02
17.30	1.64	0.41	5.00	0.00	0.02	0.02
17.40	1.64	0.41	5.00	0.00	0.01	0.01
17.50	1.64	0.41	5.00	0.00	0.01	0.01
17.60	1.64	0.41	5.00	0.00	0.01	0.01
17.70	1.64	0.41	5.00	0.00	0.01	0.01
17.80	1.64	0.41	5.00	0.00	0.00	0.00
17.90	1.64	0.41	5.00	0.00	0.00	0.00
18.00	2.00	0.41	5.00	0.00	0.00	0.00
18.10	2.00	0.41	5.00	0.00	0.00	0.00
18.20	2.00	0.41	5.00	0.00	0.00	0.00
18.30	2.00	0.41	5.00	0.00	0.00	0.00
18.40	2.00	0.42	5.00	0.00	0.00	0.00
18.50	2.00	0.42	5.00	0.00	0.00	0.00
18.60	2.00	0.42	5.00	0.00	0.00	0.00
18.70	2.00	0.42	5.00	0.00	0.00	0.00
18.80	2.00	0.42	5.00	0.00	0.00	0.00
18.90	2.00	0.42	5.00	0.00	0.00	0.00
19.00	2.00	0.42	5.00	0.00	0.00	0.00
19.10	2.00	0.42	5.00	0.00	0.00	0.00
19.20	2.00	0.42	5.00	0.00	0.00	0.00
19.30	2.00	0.43	5.00	0.00	0.00	0.00
19.40	2.00	0.43	5.00	0.00	0.00	0.00
19.50	2.00	0.43	5.00	0.00	0.00	0.00
19.60	2.00	0.43	5.00	0.00	0.00	0.00
19.70	2.00	0.43	5.00	0.00	0.00	0.00
19.80	2.00	0.43	5.00	0.00	0.00	0.00
19.90	2.00	0.43	5.00	0.00	0.00	0.00
20.00	2.00	0.43	5.00	0.00	0.00	0.00
20.10	2.00	0.43	5.00	0.00	0.00	0.00
20.20	2.00	0.43	5.00	0.00	0.00	0.00
20.30	2.00	0.44	5.00	0.00	0.00	0.00
20.40	2.00	0.44	5.00	0.00	0.00	0.00
20.50	2.00	0.44	5.00	0.00	0.00	0.00
20.60	2.00	0.44	5.00	0.00	0.00	0.00
20.70	2.00	0.44	5.00	0.00	0.00	0.00
20.80	2.00	0.44	5.00	0.00	0.00	0.00
20.90	2.00	0.44	5.00	0.00	0.00	0.00
21.00	2.00	0.44	5.00	0.00	0.00	0.00
21.10	2.00	0.44	5.00	0.00	0.00	0.00
21.20	2.00	0.44	5.00	0.00	0.00	0.00
21.30	2.00	0.44	5.00	0.00	0.00	0.00
21.40	2.00	0.45	5.00	0.00	0.00	0.00
21.50	2.00	0.45	5.00	0.00	0.00	0.00
21.60	2.00	0.45	5.00	0.00	0.00	0.00
21.70	2.00	0.45	5.00	0.00	0.00	0.00
21.80	2.00	0.45	5.00	0.00	0.00	0.00
21.90	2.00	0.45	5.00	0.00	0.00	0.00
22.00	2.00	0.45	5.00	0.00	0.00	0.00
22.10	1.64	0.45	3.63	0.00	0.00	0.00
22.20	1.64	0.45	3.63	0.00	0.00	0.00
22.30	1.64	0.45	3.62	0.00	0.00	0.00
22.40	1.64	0.45	3.61	0.00	0.00	0.00
22.50	1.64	0.46	3.61	0.00	0.00	0.00
22.60	1.64	0.46	3.60	0.00	0.00	0.00
22.70	1.64	0.46	3.59	0.00	0.00	0.00
22.80	1.64	0.46	3.59	0.00	0.00	0.00
22.90	1.64	0.46	3.58	0.00	0.00	0.00
23.00	1.64	0.46	3.57	0.00	0.00	0.00
23.10	1.64	0.46	3.57	0.00	0.00	0.00
23.20	1.64	0.46	3.56	0.00	0.00	0.00
23.30	1.64	0.46	3.56	0.00	0.00	0.00

23.40	1.64	0.46	3.55	0.00	0.00	0.00
23.50	1.64	0.46	3.54	0.00	0.00	0.00
23.60	1.64	0.46	3.54	0.00	0.00	0.00
23.70	1.64	0.46	3.53	0.00	0.00	0.00
23.80	1.64	0.47	3.53	0.00	0.00	0.00
23.90	1.64	0.47	3.52	0.00	0.00	0.00
24.00	1.64	0.47	3.52	0.00	0.00	0.00
24.10	1.64	0.47	3.51	0.00	0.00	0.00
24.20	1.64	0.47	3.50	0.00	0.00	0.00
24.30	1.64	0.47	3.50	0.00	0.00	0.00
24.40	1.64	0.47	3.49	0.00	0.00	0.00
24.50	1.64	0.47	3.49	0.00	0.00	0.00
24.60	1.64	0.47	3.48	0.00	0.00	0.00
24.70	1.64	0.47	3.48	0.00	0.00	0.00
24.80	1.64	0.47	3.47	0.00	0.00	0.00
24.90	1.64	0.47	3.47	0.00	0.00	0.00
25.00	1.64	0.47	3.46	0.00	0.00	0.00
25.10	1.64	0.47	3.46	0.00	0.00	0.00
25.20	1.64	0.48	3.45	0.00	0.00	0.00
25.30	1.64	0.48	3.45	0.00	0.00	0.00
25.40	1.64	0.48	3.44	0.00	0.00	0.00
25.50	1.64	0.48	3.44	0.00	0.00	0.00
25.60	1.64	0.48	3.43	0.00	0.00	0.00
25.70	1.64	0.48	3.43	0.00	0.00	0.00
25.80	1.64	0.48	3.42	0.00	0.00	0.00
25.90	1.64	0.48	3.42	0.00	0.00	0.00
26.00	1.64	0.48	3.41	0.00	0.00	0.00
26.10	1.64	0.48	3.41	0.00	0.00	0.00
26.20	1.64	0.48	3.40	0.00	0.00	0.00
26.30	1.64	0.48	3.40	0.00	0.00	0.00
26.40	1.64	0.48	3.40	0.00	0.00	0.00
26.50	1.64	0.48	3.39	0.00	0.00	0.00
26.60	1.64	0.48	3.39	0.00	0.00	0.00
26.70	1.64	0.49	3.38	0.00	0.00	0.00
26.80	1.64	0.49	3.38	0.00	0.00	0.00
26.90	1.64	0.49	3.37	0.00	0.00	0.00
27.00	1.64	0.49	3.37	0.00	0.00	0.00
27.10	1.64	0.49	3.37	0.00	0.00	0.00
27.20	1.64	0.49	3.36	0.00	0.00	0.00
27.30	1.64	0.49	3.36	0.00	0.00	0.00
27.40	1.64	0.49	3.35	0.00	0.00	0.00
27.50	1.64	0.49	3.35	0.00	0.00	0.00
27.60	1.64	0.49	3.35	0.00	0.00	0.00
27.70	1.64	0.49	3.34	0.00	0.00	0.00
27.80	1.64	0.49	3.34	0.00	0.00	0.00
27.90	1.64	0.49	3.33	0.00	0.00	0.00
28.00	1.64	0.49	3.33	0.00	0.00	0.00
28.10	1.64	0.49	3.33	0.00	0.00	0.00
28.20	1.64	0.49	3.32	0.00	0.00	0.00
28.30	1.64	0.49	3.32	0.00	0.00	0.00
28.40	1.64	0.50	3.31	0.00	0.00	0.00
28.50	1.64	0.50	3.31	0.00	0.00	0.00
28.60	1.64	0.50	3.31	0.00	0.00	0.00
28.70	1.64	0.50	3.30	0.00	0.00	0.00
28.80	1.64	0.50	3.30	0.00	0.00	0.00
28.90	1.64	0.50	3.30	0.00	0.00	0.00
29.00	1.64	0.50	3.29	0.00	0.00	0.00
29.10	1.64	0.50	3.29	0.00	0.00	0.00
29.20	1.64	0.50	3.29	0.00	0.00	0.00
29.30	1.64	0.50	3.28	0.00	0.00	0.00
29.40	1.64	0.50	3.28	0.00	0.00	0.00
29.50	1.64	0.50	3.27	0.00	0.00	0.00
29.60	1.64	0.50	3.27	0.00	0.00	0.00
29.70	1.64	0.50	3.27	0.00	0.00	0.00
29.80	1.64	0.50	3.26	0.00	0.00	0.00
29.90	1.64	0.50	3.26	0.00	0.00	0.00
30.00	1.64	0.50	3.26	0.00	0.00	0.00
30.10	1.64	0.50	3.26	0.00	0.00	0.00
30.20	1.64	0.50	3.25	0.00	0.00	0.00
30.30	1.64	0.50	3.25	0.00	0.00	0.00
30.40	1.64	0.50	3.25	0.00	0.00	0.00
30.50	1.64	0.51	3.25	0.00	0.00	0.00
30.60	1.64	0.51	3.25	0.00	0.00	0.00
30.70	1.64	0.51	3.25	0.00	0.00	0.00
30.80	1.64	0.51	3.25	0.00	0.00	0.00
30.90	1.64	0.51	3.25	0.00	0.00	0.00

31.00	1.64	0.51	3.24	0.00	0.00	0.00
31.10	1.64	0.51	3.24	0.00	0.00	0.00
31.20	1.64	0.51	3.24	0.00	0.00	0.00
31.30	1.64	0.51	3.24	0.00	0.00	0.00
31.40	1.64	0.51	3.24	0.00	0.00	0.00
31.50	1.64	0.51	3.24	0.00	0.00	0.00
31.60	1.64	0.51	3.24	0.00	0.00	0.00
31.70	1.64	0.51	3.24	0.00	0.00	0.00
31.80	1.64	0.51	3.24	0.00	0.00	0.00
31.90	1.64	0.51	3.23	0.00	0.00	0.00
32.00	1.64	0.51	3.23	0.00	0.00	0.00
32.10	1.64	0.51	3.23	0.00	0.00	0.00
32.20	1.64	0.51	3.23	0.00	0.00	0.00
32.30	1.64	0.51	3.23	0.00	0.00	0.00
32.40	1.64	0.51	3.23	0.00	0.00	0.00
32.50	1.64	0.51	3.23	0.00	0.00	0.00
32.60	1.64	0.51	3.23	0.00	0.00	0.00
32.70	1.64	0.51	3.23	0.00	0.00	0.00
32.80	1.64	0.51	3.23	0.00	0.00	0.00
32.90	1.64	0.51	3.23	0.00	0.00	0.00
33.00	1.64	0.51	3.23	0.00	0.00	0.00
33.10	1.64	0.51	3.22	0.00	0.00	0.00
33.20	1.64	0.51	3.22	0.00	0.00	0.00
33.30	1.64	0.51	3.22	0.00	0.00	0.00
33.40	1.64	0.51	3.22	0.00	0.00	0.00
33.50	1.64	0.51	3.22	0.00	0.00	0.00
33.60	1.64	0.51	3.22	0.00	0.00	0.00
33.70	1.64	0.51	3.22	0.00	0.00	0.00
33.80	1.64	0.51	3.22	0.00	0.00	0.00
33.90	1.64	0.51	3.22	0.00	0.00	0.00
34.00	1.64	0.51	3.22	0.00	0.00	0.00
34.10	1.64	0.51	3.22	0.00	0.00	0.00
34.20	1.64	0.51	3.22	0.00	0.00	0.00
34.30	1.64	0.51	3.22	0.00	0.00	0.00
34.40	1.64	0.51	3.22	0.00	0.00	0.00
34.50	1.64	0.51	3.22	0.00	0.00	0.00
34.60	1.64	0.51	3.22	0.00	0.00	0.00
34.70	1.64	0.51	3.22	0.00	0.00	0.00
34.80	1.64	0.51	3.22	0.00	0.00	0.00
34.90	1.64	0.51	3.21	0.00	0.00	0.00
35.00	1.65	0.51	3.23	0.00	0.00	0.00
35.10	2.00	0.51	5.00	0.00	0.00	0.00
35.20	2.00	0.51	5.00	0.00	0.00	0.00
35.30	2.00	0.51	5.00	0.00	0.00	0.00
35.40	2.00	0.51	5.00	0.00	0.00	0.00
35.50	2.00	0.51	5.00	0.00	0.00	0.00
35.60	2.00	0.51	5.00	0.00	0.00	0.00
35.70	2.00	0.51	5.00	0.00	0.00	0.00
35.80	2.00	0.51	5.00	0.00	0.00	0.00
35.90	2.00	0.51	5.00	0.00	0.00	0.00
36.00	2.00	0.51	5.00	0.00	0.00	0.00
36.10	2.00	0.51	5.00	0.00	0.00	0.00
36.20	2.00	0.51	5.00	0.00	0.00	0.00
36.30	2.00	0.51	5.00	0.00	0.00	0.00
36.40	2.00	0.51	5.00	0.00	0.00	0.00
36.50	2.00	0.51	5.00	0.00	0.00	0.00
36.60	2.00	0.51	5.00	0.00	0.00	0.00
36.70	2.00	0.51	5.00	0.00	0.00	0.00
36.80	2.00	0.51	5.00	0.00	0.00	0.00
36.90	2.00	0.51	5.00	0.00	0.00	0.00
37.00	2.00	0.51	5.00	0.00	0.00	0.00
37.10	2.00	0.51	5.00	0.00	0.00	0.00
37.20	2.00	0.51	5.00	0.00	0.00	0.00
37.30	2.00	0.51	5.00	0.00	0.00	0.00
37.40	2.00	0.51	5.00	0.00	0.00	0.00
37.50	2.00	0.51	5.00	0.00	0.00	0.00
37.60	2.00	0.51	5.00	0.00	0.00	0.00
37.70	2.00	0.51	5.00	0.00	0.00	0.00
37.80	2.00	0.51	5.00	0.00	0.00	0.00
37.90	2.00	0.51	5.00	0.00	0.00	0.00
38.00	2.00	0.51	5.00	0.00	0.00	0.00
38.10	2.00	0.51	5.00	0.00	0.00	0.00
38.20	2.00	0.51	5.00	0.00	0.00	0.00
38.30	2.00	0.51	5.00	0.00	0.00	0.00
38.40	2.00	0.51	5.00	0.00	0.00	0.00
38.50	2.00	0.51	5.00	0.00	0.00	0.00

38.60	2.00	0.51	5.00	0.00	0.00	0.00
38.70	2.00	0.51	5.00	0.00	0.00	0.00
38.80	2.00	0.51	5.00	0.00	0.00	0.00
38.90	2.00	0.51	5.00	0.00	0.00	0.00
39.00	2.00	0.51	5.00	0.00	0.00	0.00
39.10	2.00	0.51	5.00	0.00	0.00	0.00
39.20	2.00	0.51	5.00	0.00	0.00	0.00
39.30	2.00	0.51	5.00	0.00	0.00	0.00
39.40	2.00	0.51	5.00	0.00	0.00	0.00
39.50	2.00	0.51	5.00	0.00	0.00	0.00
39.60	2.00	0.51	5.00	0.00	0.00	0.00
39.70	2.00	0.51	5.00	0.00	0.00	0.00
39.80	2.00	0.51	5.00	0.00	0.00	0.00
39.90	2.00	0.51	5.00	0.00	0.00	0.00
40.00	2.00	0.51	5.00	0.00	0.00	0.00
40.10	2.00	0.51	5.00	0.00	0.00	0.00
40.20	2.00	0.51	5.00	0.00	0.00	0.00
40.30	2.00	0.51	5.00	0.00	0.00	0.00
40.40	2.00	0.51	5.00	0.00	0.00	0.00
40.50	2.00	0.51	5.00	0.00	0.00	0.00
40.60	2.00	0.51	5.00	0.00	0.00	0.00
40.70	2.00	0.51	5.00	0.00	0.00	0.00
40.80	2.00	0.51	5.00	0.00	0.00	0.00
40.90	2.00	0.51	5.00	0.00	0.00	0.00
41.00	2.00	0.51	5.00	0.00	0.00	0.00
41.10	2.00	0.51	5.00	0.00	0.00	0.00
41.20	2.00	0.51	5.00	0.00	0.00	0.00
41.30	2.00	0.51	5.00	0.00	0.00	0.00
41.40	2.00	0.51	5.00	0.00	0.00	0.00
41.50	2.00	0.51	5.00	0.00	0.00	0.00
41.60	2.00	0.51	5.00	0.00	0.00	0.00
41.70	2.00	0.51	5.00	0.00	0.00	0.00
41.80	2.00	0.51	5.00	0.00	0.00	0.00
41.90	2.00	0.51	5.00	0.00	0.00	0.00
42.00	2.00	0.51	5.00	0.00	0.00	0.00
42.10	2.00	0.51	5.00	0.00	0.00	0.00
42.20	2.00	0.51	5.00	0.00	0.00	0.00
42.30	2.00	0.51	5.00	0.00	0.00	0.00
42.40	2.00	0.51	5.00	0.00	0.00	0.00
42.50	2.00	0.51	5.00	0.00	0.00	0.00
42.60	1.62	0.51	3.19	0.00	0.00	0.00
42.70	1.62	0.51	3.19	0.00	0.00	0.00
42.80	1.62	0.51	3.19	0.00	0.00	0.00
42.90	1.62	0.51	3.19	0.00	0.00	0.00
43.00	1.62	0.51	3.19	0.00	0.00	0.00
43.10	1.61	0.51	3.19	0.00	0.00	0.00
43.20	1.61	0.51	3.19	0.00	0.00	0.00
43.30	1.61	0.51	3.19	0.00	0.00	0.00
43.40	1.61	0.51	3.19	0.00	0.00	0.00
43.50	1.61	0.51	3.19	0.00	0.00	0.00
43.60	1.61	0.51	3.19	0.00	0.00	0.00
43.70	1.61	0.51	3.19	0.00	0.00	0.00
43.80	1.61	0.51	3.19	0.00	0.00	0.00
43.90	1.61	0.51	3.19	0.00	0.00	0.00
44.00	1.61	0.51	3.19	0.00	0.00	0.00
44.10	1.61	0.50	3.19	0.00	0.00	0.00
44.20	1.61	0.50	3.19	0.00	0.00	0.00
44.30	1.61	0.50	3.19	0.00	0.00	0.00
44.40	1.61	0.50	3.19	0.00	0.00	0.00
44.50	1.61	0.50	3.19	0.00	0.00	0.00
44.60	1.61	0.50	3.19	0.00	0.00	0.00
44.70	1.61	0.50	3.19	0.00	0.00	0.00
44.80	1.61	0.50	3.19	0.00	0.00	0.00
44.90	1.61	0.50	3.19	0.00	0.00	0.00
45.00	1.60	0.50	3.19	0.00	0.00	0.00
45.10	1.60	0.50	3.19	0.00	0.00	0.00
45.20	1.60	0.50	3.19	0.00	0.00	0.00
45.30	1.60	0.50	3.19	0.00	0.00	0.00
45.40	1.60	0.50	3.19	0.00	0.00	0.00
45.50	1.60	0.50	3.19	0.00	0.00	0.00
45.60	1.60	0.50	3.19	0.00	0.00	0.00
45.70	1.60	0.50	3.19	0.00	0.00	0.00
45.80	1.60	0.50	3.19	0.00	0.00	0.00
45.90	1.60	0.50	3.19	0.00	0.00	0.00
46.00	1.60	0.50	3.19	0.00	0.00	0.00
46.10	1.60	0.50	3.19	0.00	0.00	0.00

46.20	1.60	0.50	3.19	0.00	0.00	0.00
46.30	1.60	0.50	3.20	0.00	0.00	0.00
46.40	1.60	0.50	3.20	0.00	0.00	0.00
46.50	1.60	0.50	3.20	0.00	0.00	0.00
46.60	1.60	0.50	3.20	0.00	0.00	0.00
46.70	1.60	0.50	3.20	0.00	0.00	0.00
46.80	1.60	0.50	3.20	0.00	0.00	0.00
46.90	1.60	0.50	3.20	0.00	0.00	0.00
47.00	1.59	0.50	3.20	0.00	0.00	0.00
47.10	1.59	0.50	3.20	0.00	0.00	0.00
47.20	1.59	0.50	3.20	0.00	0.00	0.00
47.30	1.59	0.50	3.20	0.00	0.00	0.00
47.40	1.59	0.50	3.20	0.00	0.00	0.00
47.50	1.59	0.50	3.20	0.00	0.00	0.00
47.60	1.59	0.50	3.20	0.00	0.00	0.00
47.70	1.59	0.50	3.20	0.00	0.00	0.00
47.80	1.59	0.50	3.20	0.00	0.00	0.00
47.90	1.59	0.50	3.20	0.00	0.00	0.00
48.00	1.59	0.50	3.20	0.00	0.00	0.00
48.10	1.59	0.50	3.21	0.00	0.00	0.00
48.20	1.59	0.50	3.21	0.00	0.00	0.00
48.30	1.59	0.50	3.21	0.00	0.00	0.00
48.40	1.59	0.49	3.21	0.00	0.00	0.00
48.50	1.59	0.49	3.21	0.00	0.00	0.00
48.60	1.59	0.49	3.21	0.00	0.00	0.00
48.70	1.59	0.49	3.21	0.00	0.00	0.00
48.80	1.59	0.49	3.21	0.00	0.00	0.00
48.90	1.59	0.49	3.21	0.00	0.00	0.00
49.00	1.58	0.49	3.21	0.00	0.00	0.00
49.10	1.58	0.49	3.21	0.00	0.00	0.00
49.20	1.58	0.49	3.21	0.00	0.00	0.00
49.30	1.58	0.49	3.21	0.00	0.00	0.00
49.40	1.58	0.49	3.21	0.00	0.00	0.00
49.50	1.58	0.49	3.22	0.00	0.00	0.00
49.60	1.58	0.49	3.22	0.00	0.00	0.00
49.70	1.58	0.49	3.22	0.00	0.00	0.00
49.80	1.58	0.49	3.22	0.00	0.00	0.00
49.90	1.58	0.49	3.22	0.00	0.00	0.00
50.00	1.58	0.49	3.22	0.00	0.00	0.00
50.10	1.58	0.49	3.22	0.00	0.00	0.00
50.20	1.58	0.49	3.22	0.00	0.00	0.00
50.30	1.58	0.49	3.22	0.00	0.00	0.00
50.40	1.58	0.49	3.22	0.00	0.00	0.00
50.50	1.58	0.49	3.22	0.00	0.00	0.00
50.60	1.58	0.49	3.23	0.00	0.00	0.00
50.70	1.58	0.49	3.23	0.00	0.00	0.00
50.80	1.58	0.49	3.23	0.00	0.00	0.00
50.90	1.58	0.49	3.23	0.00	0.00	0.00
51.00	1.57	0.49	3.23	0.00	0.00	0.00
51.10	1.57	0.49	3.23	0.00	0.00	0.00
51.20	1.57	0.49	3.23	0.00	0.00	0.00
51.30	1.57	0.49	3.23	0.00	0.00	0.00
51.40	1.57	0.49	3.23	0.00	0.00	0.00
51.50	1.57	0.49	3.23	0.00	0.00	0.00

* 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.

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: \\agi\Projects\Current Projects\First Industrial Realty\First Industrial Realty - Harley Knox (4585-SFI)\Liquefy Pro\B-8.liq
Title: Logistics Bldg. APN 302-100-016
Subtitle: 4585-SFI

Surface Elev.=1458
Hole No.=B-8
Depth of Hole= 41.50 ft
Water Table during Earthquake= 18.00 ft
Water Table during In-Situ Testing= 20.00 ft
Max. Acceleration= 0.6 g
Earthquake Magnitude= 7.10

Input Data:
Surface Elev.=1458
Hole No.=B-8
Depth of Hole=41.50 ft
Water Table during Earthquake= 18.00 ft
Water Table during In-Situ Testing= 20.00 ft
Max. Acceleration=0.6 g
Earthquake Magnitude=7.10
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Idriss/Seed
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: No
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.00	30.00	122.00	30.00
6.00	50.00	129.00	NoLiq
9.00	45.00	128.00	90.00
12.00	15.00	130.00	90.00
15.00	15.00	130.00	90.00
19.00	18.00	130.00	40.00
25.00	17.00	130.00	40.00
30.50	10.00	120.00	NoLiq
35.00	10.00	120.00	NoLiq

Output Results:
Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.09 in.
Total Settlement of Saturated and Unsaturated Sands=0.09 in.
Differential Settlement=0.047 to 0.063 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.30	0.43	5.00	0.00	0.09	0.09
0.10	2.30	0.43	5.00	0.00	0.09	0.09
0.20	2.30	0.43	5.00	0.00	0.09	0.09
0.30	2.30	0.43	5.00	0.00	0.09	0.09
0.40	2.30	0.43	5.00	0.00	0.09	0.09
0.50	2.30	0.43	5.00	0.00	0.09	0.09

0.60	2.30	0.43	5.00	0.00	0.09	0.09
0.70	2.30	0.43	5.00	0.00	0.09	0.09
0.80	2.30	0.43	5.00	0.00	0.09	0.09
0.90	2.30	0.43	5.00	0.00	0.09	0.09
1.00	2.30	0.43	5.00	0.00	0.09	0.09
1.10	2.30	0.43	5.00	0.00	0.09	0.09
1.20	2.30	0.43	5.00	0.00	0.09	0.09
1.30	2.30	0.43	5.00	0.00	0.09	0.09
1.40	2.30	0.43	5.00	0.00	0.09	0.09
1.50	2.30	0.43	5.00	0.00	0.09	0.09
1.60	2.30	0.43	5.00	0.00	0.09	0.09
1.70	2.30	0.43	5.00	0.00	0.09	0.09
1.80	2.30	0.43	5.00	0.00	0.09	0.09
1.90	2.30	0.43	5.00	0.00	0.09	0.09
2.00	2.30	0.43	5.00	0.00	0.09	0.09
2.10	2.30	0.43	5.00	0.00	0.09	0.09
2.20	2.30	0.43	5.00	0.00	0.09	0.09
2.30	2.30	0.43	5.00	0.00	0.09	0.09
2.40	2.30	0.43	5.00	0.00	0.09	0.09
2.50	2.30	0.43	5.00	0.00	0.09	0.09
2.60	2.30	0.43	5.00	0.00	0.09	0.09
2.70	2.30	0.43	5.00	0.00	0.09	0.09
2.80	2.30	0.43	5.00	0.00	0.09	0.09
2.90	2.30	0.43	5.00	0.00	0.09	0.09
3.00	2.30	0.43	5.00	0.00	0.09	0.09
3.10	2.30	0.43	5.00	0.00	0.09	0.09
3.20	2.30	0.43	5.00	0.00	0.09	0.09
3.30	2.30	0.43	5.00	0.00	0.09	0.09
3.40	2.30	0.43	5.00	0.00	0.09	0.09
3.50	2.30	0.43	5.00	0.00	0.09	0.09
3.60	2.30	0.43	5.00	0.00	0.09	0.09
3.70	2.30	0.43	5.00	0.00	0.09	0.09
3.80	2.30	0.43	5.00	0.00	0.09	0.09
3.90	2.30	0.43	5.00	0.00	0.09	0.09
4.00	2.30	0.42	5.00	0.00	0.09	0.09
4.10	2.30	0.42	5.00	0.00	0.09	0.09
4.20	2.30	0.42	5.00	0.00	0.09	0.09
4.30	2.30	0.42	5.00	0.00	0.09	0.09
4.40	2.30	0.42	5.00	0.00	0.09	0.09
4.50	2.30	0.42	5.00	0.00	0.09	0.09
4.60	2.30	0.42	5.00	0.00	0.09	0.09
4.70	2.30	0.42	5.00	0.00	0.09	0.09
4.80	2.30	0.42	5.00	0.00	0.09	0.09
4.90	2.30	0.42	5.00	0.00	0.09	0.09
5.00	2.30	0.42	5.00	0.00	0.09	0.09
5.10	2.30	0.42	5.00	0.00	0.09	0.09
5.20	2.30	0.42	5.00	0.00	0.09	0.09
5.30	2.30	0.42	5.00	0.00	0.09	0.09
5.40	2.30	0.42	5.00	0.00	0.09	0.09
5.50	2.30	0.42	5.00	0.00	0.09	0.09
5.60	2.30	0.42	5.00	0.00	0.09	0.09
5.70	2.30	0.42	5.00	0.00	0.09	0.09
5.80	2.30	0.42	5.00	0.00	0.09	0.09
5.90	2.30	0.42	5.00	0.00	0.09	0.09
6.00	2.00	0.42	5.00	0.00	0.09	0.09
6.10	2.00	0.42	5.00	0.00	0.09	0.09
6.20	2.00	0.42	5.00	0.00	0.09	0.09
6.30	2.00	0.42	5.00	0.00	0.09	0.09
6.40	2.00	0.42	5.00	0.00	0.09	0.09
6.50	2.00	0.42	5.00	0.00	0.09	0.09
6.60	2.00	0.42	5.00	0.00	0.09	0.09
6.70	2.00	0.42	5.00	0.00	0.09	0.09
6.80	2.00	0.42	5.00	0.00	0.09	0.09
6.90	2.00	0.42	5.00	0.00	0.09	0.09
7.00	2.00	0.42	5.00	0.00	0.09	0.09
7.10	2.00	0.42	5.00	0.00	0.09	0.09
7.20	2.00	0.42	5.00	0.00	0.09	0.09
7.30	2.00	0.42	5.00	0.00	0.09	0.09
7.40	2.00	0.42	5.00	0.00	0.09	0.09
7.50	2.00	0.42	5.00	0.00	0.09	0.09
7.60	2.00	0.42	5.00	0.00	0.09	0.09
7.70	2.00	0.42	5.00	0.00	0.09	0.09
7.80	2.00	0.42	5.00	0.00	0.09	0.09
7.90	2.00	0.42	5.00	0.00	0.09	0.09
8.00	2.00	0.42	5.00	0.00	0.09	0.09
8.10	2.00	0.42	5.00	0.00	0.09	0.09

8.20	2.00	0.42	5.00	0.00	0.09	0.09
8.30	2.00	0.42	5.00	0.00	0.09	0.09
8.40	2.00	0.42	5.00	0.00	0.09	0.09
8.50	2.00	0.42	5.00	0.00	0.09	0.09
8.60	2.00	0.42	5.00	0.00	0.09	0.09
8.70	2.00	0.42	5.00	0.00	0.09	0.09
8.80	2.00	0.42	5.00	0.00	0.09	0.09
8.90	2.00	0.42	5.00	0.00	0.09	0.09
9.00	2.30	0.42	5.00	0.00	0.09	0.09
9.10	2.30	0.42	5.00	0.00	0.09	0.09
9.20	2.30	0.42	5.00	0.00	0.09	0.09
9.30	2.30	0.42	5.00	0.00	0.09	0.09
9.40	2.30	0.42	5.00	0.00	0.09	0.09
9.50	2.30	0.42	5.00	0.00	0.09	0.09
9.60	2.30	0.42	5.00	0.00	0.08	0.08
9.70	2.30	0.42	5.00	0.00	0.08	0.08
9.80	2.30	0.42	5.00	0.00	0.08	0.08
9.90	2.30	0.42	5.00	0.00	0.08	0.08
10.00	2.30	0.42	5.00	0.00	0.08	0.08
10.10	2.30	0.42	5.00	0.00	0.08	0.08
10.20	2.30	0.42	5.00	0.00	0.08	0.08
10.30	2.30	0.42	5.00	0.00	0.08	0.08
10.40	2.30	0.42	5.00	0.00	0.08	0.08
10.50	2.30	0.42	5.00	0.00	0.08	0.08
10.60	2.30	0.42	5.00	0.00	0.08	0.08
10.70	2.30	0.42	5.00	0.00	0.08	0.08
10.80	2.30	0.42	5.00	0.00	0.08	0.08
10.90	2.30	0.42	5.00	0.00	0.08	0.08
11.00	2.30	0.42	5.00	0.00	0.08	0.08
11.10	2.30	0.42	5.00	0.00	0.08	0.08
11.20	2.30	0.42	5.00	0.00	0.08	0.08
11.30	2.30	0.42	5.00	0.00	0.08	0.08
11.40	2.30	0.42	5.00	0.00	0.08	0.08
11.50	2.30	0.42	5.00	0.00	0.08	0.08
11.60	2.30	0.42	5.00	0.00	0.08	0.08
11.70	2.30	0.42	5.00	0.00	0.08	0.08
11.80	2.30	0.42	5.00	0.00	0.08	0.08
11.90	2.30	0.42	5.00	0.00	0.08	0.08
12.00	2.30	0.42	5.00	0.00	0.08	0.08
12.10	2.30	0.42	5.00	0.00	0.08	0.08
12.20	2.30	0.42	5.00	0.00	0.08	0.08
12.30	2.30	0.42	5.00	0.00	0.08	0.08
12.40	2.30	0.42	5.00	0.00	0.08	0.08
12.50	2.30	0.42	5.00	0.00	0.08	0.08
12.60	2.30	0.42	5.00	0.00	0.07	0.07
12.70	2.30	0.42	5.00	0.00	0.07	0.07
12.80	2.30	0.42	5.00	0.00	0.07	0.07
12.90	2.30	0.42	5.00	0.00	0.07	0.07
13.00	2.30	0.42	5.00	0.00	0.07	0.07
13.10	2.30	0.42	5.00	0.00	0.07	0.07
13.20	2.30	0.42	5.00	0.00	0.07	0.07
13.30	2.30	0.42	5.00	0.00	0.07	0.07
13.40	2.30	0.42	5.00	0.00	0.07	0.07
13.50	2.30	0.42	5.00	0.00	0.07	0.07
13.60	2.30	0.42	5.00	0.00	0.06	0.06
13.70	2.30	0.42	5.00	0.00	0.06	0.06
13.80	2.30	0.42	5.00	0.00	0.06	0.06
13.90	2.30	0.42	5.00	0.00	0.06	0.06
14.00	2.30	0.41	5.00	0.00	0.06	0.06
14.10	2.30	0.41	5.00	0.00	0.06	0.06
14.20	2.30	0.41	5.00	0.00	0.06	0.06
14.30	2.30	0.41	5.00	0.00	0.06	0.06
14.40	2.30	0.41	5.00	0.00	0.05	0.05
14.50	2.30	0.41	5.00	0.00	0.05	0.05
14.60	2.30	0.41	5.00	0.00	0.05	0.05
14.70	2.30	0.41	5.00	0.00	0.05	0.05
14.80	2.30	0.41	5.00	0.00	0.05	0.05
14.90	2.30	0.41	5.00	0.00	0.05	0.05
15.00	2.30	0.41	5.00	0.00	0.05	0.05
15.10	2.30	0.41	5.00	0.00	0.05	0.05
15.20	2.30	0.41	5.00	0.00	0.04	0.04
15.30	2.30	0.41	5.00	0.00	0.04	0.04
15.40	2.30	0.41	5.00	0.00	0.04	0.04
15.50	2.30	0.41	5.00	0.00	0.04	0.04
15.60	2.30	0.41	5.00	0.00	0.04	0.04
15.70	2.30	0.41	5.00	0.00	0.04	0.04

15.80	2.30	0.41	5.00	0.00	0.04	0.04
15.90	2.30	0.41	5.00	0.00	0.04	0.04
16.00	2.30	0.41	5.00	0.00	0.03	0.03
16.10	2.30	0.41	5.00	0.00	0.03	0.03
16.20	2.30	0.41	5.00	0.00	0.03	0.03
16.30	2.30	0.41	5.00	0.00	0.03	0.03
16.40	2.30	0.41	5.00	0.00	0.03	0.03
16.50	2.30	0.41	5.00	0.00	0.03	0.03
16.60	2.30	0.41	5.00	0.00	0.03	0.03
16.70	2.30	0.41	5.00	0.00	0.02	0.02
16.80	2.30	0.41	5.00	0.00	0.02	0.02
16.90	2.30	0.41	5.00	0.00	0.02	0.02
17.00	2.30	0.41	5.00	0.00	0.02	0.02
17.10	2.30	0.41	5.00	0.00	0.02	0.02
17.20	2.30	0.41	5.00	0.00	0.02	0.02
17.30	2.30	0.41	5.00	0.00	0.01	0.01
17.40	2.30	0.41	5.00	0.00	0.01	0.01
17.50	2.30	0.41	5.00	0.00	0.01	0.01
17.60	2.30	0.41	5.00	0.00	0.01	0.01
17.70	2.30	0.41	5.00	0.00	0.01	0.01
17.80	2.30	0.41	5.00	0.00	0.00	0.00
17.90	2.30	0.41	5.00	0.00	0.00	0.00
18.00	2.30	0.41	5.00	0.00	0.00	0.00
18.10	2.30	0.41	5.00	0.00	0.00	0.00
18.20	2.30	0.41	5.00	0.00	0.00	0.00
18.30	2.30	0.41	5.00	0.00	0.00	0.00
18.40	2.30	0.42	5.00	0.00	0.00	0.00
18.50	2.30	0.42	5.00	0.00	0.00	0.00
18.60	2.30	0.42	5.00	0.00	0.00	0.00
18.70	2.30	0.42	5.00	0.00	0.00	0.00
18.80	2.30	0.42	5.00	0.00	0.00	0.00
18.90	2.30	0.42	5.00	0.00	0.00	0.00
19.00	2.30	0.42	5.00	0.00	0.00	0.00
19.10	2.30	0.42	5.00	0.00	0.00	0.00
19.20	2.30	0.42	5.00	0.00	0.00	0.00
19.30	2.30	0.42	5.00	0.00	0.00	0.00
19.40	2.30	0.42	5.00	0.00	0.00	0.00
19.50	2.30	0.43	5.00	0.00	0.00	0.00
19.60	2.30	0.43	5.00	0.00	0.00	0.00
19.70	2.30	0.43	5.00	0.00	0.00	0.00
19.80	2.30	0.43	5.00	0.00	0.00	0.00
19.90	2.30	0.43	5.00	0.00	0.00	0.00
20.00	2.30	0.43	5.00	0.00	0.00	0.00
20.10	2.30	0.43	5.00	0.00	0.00	0.00
20.20	2.30	0.43	5.00	0.00	0.00	0.00
20.30	2.30	0.43	5.00	0.00	0.00	0.00
20.40	2.30	0.43	5.00	0.00	0.00	0.00
20.50	2.30	0.43	5.00	0.00	0.00	0.00
20.60	2.30	0.44	5.00	0.00	0.00	0.00
20.70	2.30	0.44	5.00	0.00	0.00	0.00
20.80	2.30	0.44	5.00	0.00	0.00	0.00
20.90	2.30	0.44	5.00	0.00	0.00	0.00
21.00	2.30	0.44	5.00	0.00	0.00	0.00
21.10	2.30	0.44	5.00	0.00	0.00	0.00
21.20	2.30	0.44	5.00	0.00	0.00	0.00
21.30	2.30	0.44	5.00	0.00	0.00	0.00
21.40	2.30	0.44	5.00	0.00	0.00	0.00
21.50	2.30	0.44	5.00	0.00	0.00	0.00
21.60	2.30	0.44	5.00	0.00	0.00	0.00
21.70	2.30	0.44	5.00	0.00	0.00	0.00
21.80	2.30	0.45	5.00	0.00	0.00	0.00
21.90	2.30	0.45	5.00	0.00	0.00	0.00
22.00	2.30	0.45	5.00	0.00	0.00	0.00
22.10	2.30	0.45	5.00	0.00	0.00	0.00
22.20	2.30	0.45	5.00	0.00	0.00	0.00
22.30	2.30	0.45	5.00	0.00	0.00	0.00
22.40	2.30	0.45	5.00	0.00	0.00	0.00
22.50	2.30	0.45	5.00	0.00	0.00	0.00
22.60	2.30	0.45	5.00	0.00	0.00	0.00
22.70	2.30	0.45	5.00	0.00	0.00	0.00
22.80	2.30	0.45	5.00	0.00	0.00	0.00
22.90	2.30	0.45	5.00	0.00	0.00	0.00
23.00	2.30	0.45	5.00	0.00	0.00	0.00
23.10	2.30	0.46	5.00	0.00	0.00	0.00
23.20	2.30	0.46	5.00	0.00	0.00	0.00
23.30	2.30	0.46	5.00	0.00	0.00	0.00

23.40	2.30	0.46	5.00	0.00	0.00	0.00
23.50	2.30	0.46	5.00	0.00	0.00	0.00
23.60	2.30	0.46	5.00	0.00	0.00	0.00
23.70	2.30	0.46	5.00	0.00	0.00	0.00
23.80	2.30	0.46	5.00	0.00	0.00	0.00
23.90	2.30	0.46	4.99	0.00	0.00	0.00
24.00	2.30	0.46	4.99	0.00	0.00	0.00
24.10	2.30	0.46	4.98	0.00	0.00	0.00
24.20	2.30	0.46	4.97	0.00	0.00	0.00
24.30	2.30	0.46	4.96	0.00	0.00	0.00
24.40	2.30	0.46	4.96	0.00	0.00	0.00
24.50	2.30	0.46	4.95	0.00	0.00	0.00
24.60	2.30	0.47	4.94	0.00	0.00	0.00
24.70	2.30	0.47	4.94	0.00	0.00	0.00
24.80	2.30	0.47	4.93	0.00	0.00	0.00
24.90	2.30	0.47	4.92	0.00	0.00	0.00
25.00	2.30	0.47	4.92	0.00	0.00	0.00
25.10	2.30	0.47	4.91	0.00	0.00	0.00
25.20	2.30	0.47	4.90	0.00	0.00	0.00
25.30	2.30	0.47	4.90	0.00	0.00	0.00
25.40	2.30	0.47	4.89	0.00	0.00	0.00
25.50	2.30	0.47	4.88	0.00	0.00	0.00
25.60	2.30	0.47	4.88	0.00	0.00	0.00
25.70	2.30	0.47	4.87	0.00	0.00	0.00
25.80	2.30	0.47	4.86	0.00	0.00	0.00
25.90	2.30	0.47	4.86	0.00	0.00	0.00
26.00	2.30	0.47	4.85	0.00	0.00	0.00
26.10	2.30	0.47	4.84	0.00	0.00	0.00
26.20	2.30	0.48	4.84	0.00	0.00	0.00
26.30	2.30	0.48	4.83	0.00	0.00	0.00
26.40	2.30	0.48	4.83	0.00	0.00	0.00
26.50	2.30	0.48	4.82	0.00	0.00	0.00
26.60	2.30	0.48	4.81	0.00	0.00	0.00
26.70	2.30	0.48	4.81	0.00	0.00	0.00
26.80	2.30	0.48	4.80	0.00	0.00	0.00
26.90	2.30	0.48	4.80	0.00	0.00	0.00
27.00	2.30	0.48	4.79	0.00	0.00	0.00
27.10	2.30	0.48	4.79	0.00	0.00	0.00
27.20	2.30	0.48	4.78	0.00	0.00	0.00
27.30	2.30	0.48	4.78	0.00	0.00	0.00
27.40	2.30	0.48	4.77	0.00	0.00	0.00
27.50	2.30	0.48	4.76	0.00	0.00	0.00
27.60	2.30	0.48	4.76	0.00	0.00	0.00
27.70	2.30	0.48	4.75	0.00	0.00	0.00
27.80	2.30	0.48	4.75	0.00	0.00	0.00
27.90	2.30	0.49	4.74	0.00	0.00	0.00
28.00	2.30	0.49	4.74	0.00	0.00	0.00
28.10	2.30	0.49	4.73	0.00	0.00	0.00
28.20	2.30	0.49	4.73	0.00	0.00	0.00
28.30	2.30	0.49	4.72	0.00	0.00	0.00
28.40	2.30	0.49	4.72	0.00	0.00	0.00
28.50	2.30	0.49	4.71	0.00	0.00	0.00
28.60	2.30	0.49	4.71	0.00	0.00	0.00
28.70	2.30	0.49	4.70	0.00	0.00	0.00
28.80	2.30	0.49	4.70	0.00	0.00	0.00
28.90	2.30	0.49	4.69	0.00	0.00	0.00
29.00	2.30	0.49	4.69	0.00	0.00	0.00
29.10	2.30	0.49	4.68	0.00	0.00	0.00
29.20	2.30	0.49	4.68	0.00	0.00	0.00
29.30	2.30	0.49	4.67	0.00	0.00	0.00
29.40	2.30	0.49	4.67	0.00	0.00	0.00
29.50	2.30	0.49	4.66	0.00	0.00	0.00
29.60	2.30	0.49	4.66	0.00	0.00	0.00
29.70	2.30	0.49	4.66	0.00	0.00	0.00
29.80	2.30	0.49	4.65	0.00	0.00	0.00
29.90	2.30	0.50	4.65	0.00	0.00	0.00
30.00	2.30	0.50	4.64	0.00	0.00	0.00
30.10	2.30	0.50	4.64	0.00	0.00	0.00
30.20	2.30	0.50	4.64	0.00	0.00	0.00
30.30	2.30	0.50	4.64	0.00	0.00	0.00
30.40	2.30	0.50	4.64	0.00	0.00	0.00
30.50	2.31	0.50	4.66	0.00	0.00	0.00
30.60	2.00	0.50	5.00	0.00	0.00	0.00
30.70	2.00	0.50	5.00	0.00	0.00	0.00
30.80	2.00	0.50	5.00	0.00	0.00	0.00
30.90	2.00	0.50	5.00	0.00	0.00	0.00

31.00	2.00	0.50	5.00	0.00	0.00	0.00
31.10	2.00	0.50	5.00	0.00	0.00	0.00
31.20	2.00	0.50	5.00	0.00	0.00	0.00
31.30	2.00	0.50	5.00	0.00	0.00	0.00
31.40	2.00	0.50	5.00	0.00	0.00	0.00
31.50	2.00	0.50	5.00	0.00	0.00	0.00
31.60	2.00	0.50	5.00	0.00	0.00	0.00
31.70	2.00	0.50	5.00	0.00	0.00	0.00
31.80	2.00	0.50	5.00	0.00	0.00	0.00
31.90	2.00	0.50	5.00	0.00	0.00	0.00
32.00	2.00	0.50	5.00	0.00	0.00	0.00
32.10	2.00	0.50	5.00	0.00	0.00	0.00
32.20	2.00	0.50	5.00	0.00	0.00	0.00
32.30	2.00	0.50	5.00	0.00	0.00	0.00
32.40	2.00	0.50	5.00	0.00	0.00	0.00
32.50	2.00	0.50	5.00	0.00	0.00	0.00
32.60	2.00	0.50	5.00	0.00	0.00	0.00
32.70	2.00	0.50	5.00	0.00	0.00	0.00
32.80	2.00	0.50	5.00	0.00	0.00	0.00
32.90	2.00	0.50	5.00	0.00	0.00	0.00
33.00	2.00	0.50	5.00	0.00	0.00	0.00
33.10	2.00	0.50	5.00	0.00	0.00	0.00
33.20	2.00	0.50	5.00	0.00	0.00	0.00
33.30	2.00	0.50	5.00	0.00	0.00	0.00
33.40	2.00	0.50	5.00	0.00	0.00	0.00
33.50	2.00	0.50	5.00	0.00	0.00	0.00
33.60	2.00	0.50	5.00	0.00	0.00	0.00
33.70	2.00	0.50	5.00	0.00	0.00	0.00
33.80	2.00	0.50	5.00	0.00	0.00	0.00
33.90	2.00	0.50	5.00	0.00	0.00	0.00
34.00	2.00	0.50	5.00	0.00	0.00	0.00
34.10	2.00	0.50	5.00	0.00	0.00	0.00
34.20	2.00	0.50	5.00	0.00	0.00	0.00
34.30	2.00	0.50	5.00	0.00	0.00	0.00
34.40	2.00	0.50	5.00	0.00	0.00	0.00
34.50	2.00	0.50	5.00	0.00	0.00	0.00
34.60	2.00	0.50	5.00	0.00	0.00	0.00
34.70	2.00	0.50	5.00	0.00	0.00	0.00
34.80	2.00	0.50	5.00	0.00	0.00	0.00
34.90	2.00	0.50	5.00	0.00	0.00	0.00
35.00	2.00	0.50	5.00	0.00	0.00	0.00
35.10	2.00	0.50	5.00	0.00	0.00	0.00
35.20	2.00	0.50	5.00	0.00	0.00	0.00
35.30	2.00	0.50	5.00	0.00	0.00	0.00
35.40	2.00	0.50	5.00	0.00	0.00	0.00
35.50	2.00	0.50	5.00	0.00	0.00	0.00
35.60	2.00	0.50	5.00	0.00	0.00	0.00
35.70	2.00	0.50	5.00	0.00	0.00	0.00
35.80	2.00	0.50	5.00	0.00	0.00	0.00
35.90	2.00	0.50	5.00	0.00	0.00	0.00
36.00	2.00	0.50	5.00	0.00	0.00	0.00
36.10	2.00	0.50	5.00	0.00	0.00	0.00
36.20	2.00	0.50	5.00	0.00	0.00	0.00
36.30	2.00	0.50	5.00	0.00	0.00	0.00
36.40	2.00	0.50	5.00	0.00	0.00	0.00
36.50	2.00	0.50	5.00	0.00	0.00	0.00
36.60	2.00	0.50	5.00	0.00	0.00	0.00
36.70	2.00	0.50	5.00	0.00	0.00	0.00
36.80	2.00	0.50	5.00	0.00	0.00	0.00
36.90	2.00	0.50	5.00	0.00	0.00	0.00
37.00	2.00	0.50	5.00	0.00	0.00	0.00
37.10	2.00	0.50	5.00	0.00	0.00	0.00
37.20	2.00	0.50	5.00	0.00	0.00	0.00
37.30	2.00	0.50	5.00	0.00	0.00	0.00
37.40	2.00	0.50	5.00	0.00	0.00	0.00
37.50	2.00	0.50	5.00	0.00	0.00	0.00
37.60	2.00	0.50	5.00	0.00	0.00	0.00
37.70	2.00	0.50	5.00	0.00	0.00	0.00
37.80	2.00	0.50	5.00	0.00	0.00	0.00
37.90	2.00	0.50	5.00	0.00	0.00	0.00
38.00	2.00	0.50	5.00	0.00	0.00	0.00
38.10	2.00	0.50	5.00	0.00	0.00	0.00
38.20	2.00	0.50	5.00	0.00	0.00	0.00
38.30	2.00	0.50	5.00	0.00	0.00	0.00
38.40	2.00	0.50	5.00	0.00	0.00	0.00
38.50	2.00	0.50	5.00	0.00	0.00	0.00

38.60	2.00	0.50	5.00	0.00	0.00	0.00
38.70	2.00	0.50	5.00	0.00	0.00	0.00
38.80	2.00	0.50	5.00	0.00	0.00	0.00
38.90	2.00	0.50	5.00	0.00	0.00	0.00
39.00	2.00	0.50	5.00	0.00	0.00	0.00
39.10	2.00	0.50	5.00	0.00	0.00	0.00
39.20	2.00	0.50	5.00	0.00	0.00	0.00
39.30	2.00	0.50	5.00	0.00	0.00	0.00
39.40	2.00	0.50	5.00	0.00	0.00	0.00
39.50	2.00	0.50	5.00	0.00	0.00	0.00
39.60	2.00	0.50	5.00	0.00	0.00	0.00
39.70	2.00	0.50	5.00	0.00	0.00	0.00
39.80	2.00	0.50	5.00	0.00	0.00	0.00
39.90	2.00	0.50	5.00	0.00	0.00	0.00
40.00	2.00	0.50	5.00	0.00	0.00	0.00
40.10	2.00	0.50	5.00	0.00	0.00	0.00
40.20	2.00	0.50	5.00	0.00	0.00	0.00
40.30	2.00	0.50	5.00	0.00	0.00	0.00
40.40	2.00	0.50	5.00	0.00	0.00	0.00
40.50	2.00	0.50	5.00	0.00	0.00	0.00
40.60	2.00	0.50	5.00	0.00	0.00	0.00
40.70	2.00	0.50	5.00	0.00	0.00	0.00
40.80	2.00	0.50	5.00	0.00	0.00	0.00
40.90	2.00	0.50	5.00	0.00	0.00	0.00
41.00	2.00	0.50	5.00	0.00	0.00	0.00
41.10	2.00	0.50	5.00	0.00	0.00	0.00
41.20	2.00	0.50	5.00	0.00	0.00	0.00
41.30	2.00	0.50	5.00	0.00	0.00	0.00
41.40	2.00	0.50	5.00	0.00	0.00	0.00
41.50	2.00	0.50	5.00	0.00	0.00	0.00

* 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.

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: \\agi\Projects\Current Projects\First Industrial Realty\First Industrial Realty - Harley Knox (4585-SFI)\Liquefy Pro\B-8.liq
Title: Logistics Bldg. APN 302-100-016
Subtitle: 4585-SFI

Surface Elev.=1458
Hole No.=B-8
Depth of Hole= 41.50 ft
Water Table during Earthquake= 18.00 ft
Water Table during In-Situ Testing= 20.00 ft
Max. Acceleration= 0.6 g
Earthquake Magnitude= 8.10

Input Data:

Surface Elev.=1458
Hole No.=B-8
Depth of Hole=41.50 ft
Water Table during Earthquake= 18.00 ft
Water Table during In-Situ Testing= 20.00 ft
Max. Acceleration=0.6 g
Earthquake Magnitude=8.10
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Idriss/Seed
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: No

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.00	30.00	122.00	30.00
6.00	50.00	129.00	NoLiq
9.00	45.00	128.00	90.00
12.00	15.00	130.00	90.00
15.00	15.00	130.00	90.00
19.00	18.00	130.00	40.00
25.00	17.00	130.00	40.00
30.50	10.00	120.00	NoLiq
35.00	10.00	120.00	NoLiq

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.12 in.
Total Settlement of Saturated and Unsaturated Sands=0.12 in.
Differential Settlement=0.058 to 0.076 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	1.64	0.43	5.00	0.00	0.12	0.12
0.10	1.64	0.43	5.00	0.00	0.12	0.12
0.20	1.64	0.43	5.00	0.00	0.12	0.12
0.30	1.64	0.43	5.00	0.00	0.12	0.12
0.40	1.64	0.43	5.00	0.00	0.12	0.12
0.50	1.64	0.43	5.00	0.00	0.12	0.12

0.60	1.64	0.43	5.00	0.00	0.12	0.12
0.70	1.64	0.43	5.00	0.00	0.12	0.12
0.80	1.64	0.43	5.00	0.00	0.12	0.12
0.90	1.64	0.43	5.00	0.00	0.12	0.12
1.00	1.64	0.43	5.00	0.00	0.12	0.12
1.10	1.64	0.43	5.00	0.00	0.12	0.12
1.20	1.64	0.43	5.00	0.00	0.12	0.12
1.30	1.64	0.43	5.00	0.00	0.12	0.12
1.40	1.64	0.43	5.00	0.00	0.11	0.11
1.50	1.64	0.43	5.00	0.00	0.11	0.11
1.60	1.64	0.43	5.00	0.00	0.11	0.11
1.70	1.64	0.43	5.00	0.00	0.11	0.11
1.80	1.64	0.43	5.00	0.00	0.11	0.11
1.90	1.64	0.43	5.00	0.00	0.11	0.11
2.00	1.64	0.43	5.00	0.00	0.11	0.11
2.10	1.64	0.43	5.00	0.00	0.11	0.11
2.20	1.64	0.43	5.00	0.00	0.11	0.11
2.30	1.64	0.43	5.00	0.00	0.11	0.11
2.40	1.64	0.43	5.00	0.00	0.11	0.11
2.50	1.64	0.43	5.00	0.00	0.11	0.11
2.60	1.64	0.43	5.00	0.00	0.11	0.11
2.70	1.64	0.43	5.00	0.00	0.11	0.11
2.80	1.64	0.43	5.00	0.00	0.11	0.11
2.90	1.64	0.43	5.00	0.00	0.11	0.11
3.00	1.64	0.43	5.00	0.00	0.11	0.11
3.10	1.64	0.43	5.00	0.00	0.11	0.11
3.20	1.64	0.43	5.00	0.00	0.11	0.11
3.30	1.64	0.43	5.00	0.00	0.11	0.11
3.40	1.64	0.43	5.00	0.00	0.11	0.11
3.50	1.64	0.43	5.00	0.00	0.11	0.11
3.60	1.64	0.43	5.00	0.00	0.11	0.11
3.70	1.64	0.43	5.00	0.00	0.11	0.11
3.80	1.64	0.43	5.00	0.00	0.11	0.11
3.90	1.64	0.43	5.00	0.00	0.11	0.11
4.00	1.64	0.42	5.00	0.00	0.11	0.11
4.10	1.64	0.42	5.00	0.00	0.11	0.11
4.20	1.64	0.42	5.00	0.00	0.11	0.11
4.30	1.64	0.42	5.00	0.00	0.11	0.11
4.40	1.64	0.42	5.00	0.00	0.11	0.11
4.50	1.64	0.42	5.00	0.00	0.11	0.11
4.60	1.64	0.42	5.00	0.00	0.11	0.11
4.70	1.64	0.42	5.00	0.00	0.11	0.11
4.80	1.64	0.42	5.00	0.00	0.11	0.11
4.90	1.64	0.42	5.00	0.00	0.11	0.11
5.00	1.64	0.42	5.00	0.00	0.11	0.11
5.10	1.64	0.42	5.00	0.00	0.11	0.11
5.20	1.64	0.42	5.00	0.00	0.11	0.11
5.30	1.64	0.42	5.00	0.00	0.11	0.11
5.40	1.64	0.42	5.00	0.00	0.11	0.11
5.50	1.64	0.42	5.00	0.00	0.11	0.11
5.60	1.64	0.42	5.00	0.00	0.11	0.11
5.70	1.64	0.42	5.00	0.00	0.11	0.11
5.80	1.64	0.42	5.00	0.00	0.11	0.11
5.90	1.64	0.42	5.00	0.00	0.11	0.11
6.00	2.00	0.42	5.00	0.00	0.11	0.11
6.10	2.00	0.42	5.00	0.00	0.11	0.11
6.20	2.00	0.42	5.00	0.00	0.11	0.11
6.30	2.00	0.42	5.00	0.00	0.11	0.11
6.40	2.00	0.42	5.00	0.00	0.11	0.11
6.50	2.00	0.42	5.00	0.00	0.11	0.11
6.60	2.00	0.42	5.00	0.00	0.11	0.11
6.70	2.00	0.42	5.00	0.00	0.11	0.11
6.80	2.00	0.42	5.00	0.00	0.11	0.11
6.90	2.00	0.42	5.00	0.00	0.11	0.11
7.00	2.00	0.42	5.00	0.00	0.11	0.11
7.10	2.00	0.42	5.00	0.00	0.11	0.11
7.20	2.00	0.42	5.00	0.00	0.11	0.11
7.30	2.00	0.42	5.00	0.00	0.11	0.11
7.40	2.00	0.42	5.00	0.00	0.11	0.11
7.50	2.00	0.42	5.00	0.00	0.11	0.11
7.60	2.00	0.42	5.00	0.00	0.11	0.11
7.70	2.00	0.42	5.00	0.00	0.11	0.11
7.80	2.00	0.42	5.00	0.00	0.11	0.11
7.90	2.00	0.42	5.00	0.00	0.11	0.11
8.00	2.00	0.42	5.00	0.00	0.11	0.11
8.10	2.00	0.42	5.00	0.00	0.11	0.11

8.20	2.00	0.42	5.00	0.00	0.11	0.11
8.30	2.00	0.42	5.00	0.00	0.11	0.11
8.40	2.00	0.42	5.00	0.00	0.11	0.11
8.50	2.00	0.42	5.00	0.00	0.11	0.11
8.60	2.00	0.42	5.00	0.00	0.11	0.11
8.70	2.00	0.42	5.00	0.00	0.11	0.11
8.80	2.00	0.42	5.00	0.00	0.11	0.11
8.90	2.00	0.42	5.00	0.00	0.11	0.11
9.00	1.64	0.42	5.00	0.00	0.11	0.11
9.10	1.64	0.42	5.00	0.00	0.11	0.11
9.20	1.64	0.42	5.00	0.00	0.10	0.10
9.30	1.64	0.42	5.00	0.00	0.10	0.10
9.40	1.64	0.42	5.00	0.00	0.10	0.10
9.50	1.64	0.42	5.00	0.00	0.10	0.10
9.60	1.64	0.42	5.00	0.00	0.10	0.10
9.70	1.64	0.42	5.00	0.00	0.10	0.10
9.80	1.64	0.42	5.00	0.00	0.10	0.10
9.90	1.64	0.42	5.00	0.00	0.10	0.10
10.00	1.64	0.42	5.00	0.00	0.10	0.10
10.10	1.64	0.42	5.00	0.00	0.10	0.10
10.20	1.64	0.42	5.00	0.00	0.10	0.10
10.30	1.64	0.42	5.00	0.00	0.10	0.10
10.40	1.64	0.42	5.00	0.00	0.10	0.10
10.50	1.64	0.42	5.00	0.00	0.10	0.10
10.60	1.64	0.42	5.00	0.00	0.10	0.10
10.70	1.64	0.42	5.00	0.00	0.10	0.10
10.80	1.64	0.42	5.00	0.00	0.10	0.10
10.90	1.64	0.42	5.00	0.00	0.10	0.10
11.00	1.64	0.42	5.00	0.00	0.10	0.10
11.10	1.64	0.42	5.00	0.00	0.10	0.10
11.20	1.64	0.42	5.00	0.00	0.10	0.10
11.30	1.64	0.42	5.00	0.00	0.10	0.10
11.40	1.64	0.42	5.00	0.00	0.10	0.10
11.50	1.64	0.42	5.00	0.00	0.10	0.10
11.60	1.64	0.42	5.00	0.00	0.10	0.10
11.70	1.64	0.42	5.00	0.00	0.10	0.10
11.80	1.64	0.42	5.00	0.00	0.10	0.10
11.90	1.64	0.42	5.00	0.00	0.10	0.10
12.00	1.64	0.42	5.00	0.00	0.10	0.10
12.10	1.64	0.42	5.00	0.00	0.10	0.10
12.20	1.64	0.42	5.00	0.00	0.09	0.09
12.30	1.64	0.42	5.00	0.00	0.09	0.09
12.40	1.64	0.42	5.00	0.00	0.09	0.09
12.50	1.64	0.42	5.00	0.00	0.09	0.09
12.60	1.64	0.42	5.00	0.00	0.09	0.09
12.70	1.64	0.42	5.00	0.00	0.09	0.09
12.80	1.64	0.42	5.00	0.00	0.09	0.09
12.90	1.64	0.42	5.00	0.00	0.09	0.09
13.00	1.64	0.42	5.00	0.00	0.09	0.09
13.10	1.64	0.42	5.00	0.00	0.09	0.09
13.20	1.64	0.42	5.00	0.00	0.08	0.08
13.30	1.64	0.42	5.00	0.00	0.08	0.08
13.40	1.64	0.42	5.00	0.00	0.08	0.08
13.50	1.64	0.42	5.00	0.00	0.08	0.08
13.60	1.64	0.42	5.00	0.00	0.08	0.08
13.70	1.64	0.42	5.00	0.00	0.08	0.08
13.80	1.64	0.42	5.00	0.00	0.08	0.08
13.90	1.64	0.42	5.00	0.00	0.07	0.07
14.00	1.64	0.41	5.00	0.00	0.07	0.07
14.10	1.64	0.41	5.00	0.00	0.07	0.07
14.20	1.64	0.41	5.00	0.00	0.07	0.07
14.30	1.64	0.41	5.00	0.00	0.07	0.07
14.40	1.64	0.41	5.00	0.00	0.07	0.07
14.50	1.64	0.41	5.00	0.00	0.07	0.07
14.60	1.64	0.41	5.00	0.00	0.06	0.06
14.70	1.64	0.41	5.00	0.00	0.06	0.06
14.80	1.64	0.41	5.00	0.00	0.06	0.06
14.90	1.64	0.41	5.00	0.00	0.06	0.06
15.00	1.64	0.41	5.00	0.00	0.06	0.06
15.10	1.64	0.41	5.00	0.00	0.06	0.06
15.20	1.64	0.41	5.00	0.00	0.05	0.05
15.30	1.64	0.41	5.00	0.00	0.05	0.05
15.40	1.64	0.41	5.00	0.00	0.05	0.05
15.50	1.64	0.41	5.00	0.00	0.05	0.05
15.60	1.64	0.41	5.00	0.00	0.05	0.05
15.70	1.64	0.41	5.00	0.00	0.05	0.05

15.80	1.64	0.41	5.00	0.00	0.05	0.05
15.90	1.64	0.41	5.00	0.00	0.04	0.04
16.00	1.64	0.41	5.00	0.00	0.04	0.04
16.10	1.64	0.41	5.00	0.00	0.04	0.04
16.20	1.64	0.41	5.00	0.00	0.04	0.04
16.30	1.64	0.41	5.00	0.00	0.04	0.04
16.40	1.64	0.41	5.00	0.00	0.03	0.03
16.50	1.64	0.41	5.00	0.00	0.03	0.03
16.60	1.64	0.41	5.00	0.00	0.03	0.03
16.70	1.64	0.41	5.00	0.00	0.03	0.03
16.80	1.64	0.41	5.00	0.00	0.03	0.03
16.90	1.64	0.41	5.00	0.00	0.03	0.03
17.00	1.64	0.41	5.00	0.00	0.02	0.02
17.10	1.64	0.41	5.00	0.00	0.02	0.02
17.20	1.64	0.41	5.00	0.00	0.02	0.02
17.30	1.64	0.41	5.00	0.00	0.02	0.02
17.40	1.64	0.41	5.00	0.00	0.01	0.01
17.50	1.64	0.41	5.00	0.00	0.01	0.01
17.60	1.64	0.41	5.00	0.00	0.01	0.01
17.70	1.64	0.41	5.00	0.00	0.01	0.01
17.80	1.64	0.41	5.00	0.00	0.00	0.00
17.90	1.64	0.41	5.00	0.00	0.00	0.00
18.00	1.64	0.41	3.99	0.00	0.00	0.00
18.10	1.64	0.41	3.98	0.00	0.00	0.00
18.20	1.64	0.41	3.97	0.00	0.00	0.00
18.30	1.64	0.41	3.97	0.00	0.00	0.00
18.40	1.64	0.42	3.96	0.00	0.00	0.00
18.50	1.64	0.42	3.95	0.00	0.00	0.00
18.60	1.64	0.42	3.94	0.00	0.00	0.00
18.70	1.64	0.42	3.93	0.00	0.00	0.00
18.80	1.64	0.42	3.92	0.00	0.00	0.00
18.90	1.64	0.42	3.91	0.00	0.00	0.00
19.00	1.64	0.42	3.90	0.00	0.00	0.00
19.10	1.64	0.42	3.89	0.00	0.00	0.00
19.20	1.64	0.42	3.88	0.00	0.00	0.00
19.30	1.64	0.42	3.87	0.00	0.00	0.00
19.40	1.64	0.42	3.87	0.00	0.00	0.00
19.50	1.64	0.43	3.86	0.00	0.00	0.00
19.60	1.64	0.43	3.85	0.00	0.00	0.00
19.70	1.64	0.43	3.84	0.00	0.00	0.00
19.80	1.64	0.43	3.83	0.00	0.00	0.00
19.90	1.64	0.43	3.83	0.00	0.00	0.00
20.00	1.64	0.43	3.82	0.00	0.00	0.00
20.10	1.64	0.43	3.81	0.00	0.00	0.00
20.20	1.64	0.43	3.80	0.00	0.00	0.00
20.30	1.64	0.43	3.79	0.00	0.00	0.00
20.40	1.64	0.43	3.79	0.00	0.00	0.00
20.50	1.64	0.43	3.78	0.00	0.00	0.00
20.60	1.64	0.44	3.77	0.00	0.00	0.00
20.70	1.64	0.44	3.76	0.00	0.00	0.00
20.80	1.64	0.44	3.76	0.00	0.00	0.00
20.90	1.64	0.44	3.75	0.00	0.00	0.00
21.00	1.64	0.44	3.74	0.00	0.00	0.00
21.10	1.64	0.44	3.74	0.00	0.00	0.00
21.20	1.64	0.44	3.73	0.00	0.00	0.00
21.30	1.64	0.44	3.72	0.00	0.00	0.00
21.40	1.64	0.44	3.71	0.00	0.00	0.00
21.50	1.64	0.44	3.71	0.00	0.00	0.00
21.60	1.64	0.44	3.70	0.00	0.00	0.00
21.70	1.64	0.44	3.69	0.00	0.00	0.00
21.80	1.64	0.45	3.69	0.00	0.00	0.00
21.90	1.64	0.45	3.68	0.00	0.00	0.00
22.00	1.64	0.45	3.67	0.00	0.00	0.00
22.10	1.64	0.45	3.67	0.00	0.00	0.00
22.20	1.64	0.45	3.66	0.00	0.00	0.00
22.30	1.64	0.45	3.66	0.00	0.00	0.00
22.40	1.64	0.45	3.65	0.00	0.00	0.00
22.50	1.64	0.45	3.64	0.00	0.00	0.00
22.60	1.64	0.45	3.64	0.00	0.00	0.00
22.70	1.64	0.45	3.63	0.00	0.00	0.00
22.80	1.64	0.45	3.63	0.00	0.00	0.00
22.90	1.64	0.45	3.62	0.00	0.00	0.00
23.00	1.64	0.45	3.61	0.00	0.00	0.00
23.10	1.64	0.46	3.61	0.00	0.00	0.00
23.20	1.64	0.46	3.60	0.00	0.00	0.00
23.30	1.64	0.46	3.60	0.00	0.00	0.00

23.40	1.64	0.46	3.59	0.00	0.00	0.00
23.50	1.64	0.46	3.59	0.00	0.00	0.00
23.60	1.64	0.46	3.58	0.00	0.00	0.00
23.70	1.64	0.46	3.57	0.00	0.00	0.00
23.80	1.64	0.46	3.57	0.00	0.00	0.00
23.90	1.64	0.46	3.56	0.00	0.00	0.00
24.00	1.64	0.46	3.56	0.00	0.00	0.00
24.10	1.64	0.46	3.55	0.00	0.00	0.00
24.20	1.64	0.46	3.55	0.00	0.00	0.00
24.30	1.64	0.46	3.54	0.00	0.00	0.00
24.40	1.64	0.46	3.54	0.00	0.00	0.00
24.50	1.64	0.46	3.53	0.00	0.00	0.00
24.60	1.64	0.47	3.53	0.00	0.00	0.00
24.70	1.64	0.47	3.52	0.00	0.00	0.00
24.80	1.64	0.47	3.52	0.00	0.00	0.00
24.90	1.64	0.47	3.51	0.00	0.00	0.00
25.00	1.64	0.47	3.51	0.00	0.00	0.00
25.10	1.64	0.47	3.50	0.00	0.00	0.00
25.20	1.64	0.47	3.50	0.00	0.00	0.00
25.30	1.64	0.47	3.49	0.00	0.00	0.00
25.40	1.64	0.47	3.49	0.00	0.00	0.00
25.50	1.64	0.47	3.48	0.00	0.00	0.00
25.60	1.64	0.47	3.48	0.00	0.00	0.00
25.70	1.64	0.47	3.48	0.00	0.00	0.00
25.80	1.64	0.47	3.47	0.00	0.00	0.00
25.90	1.64	0.47	3.47	0.00	0.00	0.00
26.00	1.64	0.47	3.46	0.00	0.00	0.00
26.10	1.64	0.47	3.46	0.00	0.00	0.00
26.20	1.64	0.48	3.45	0.00	0.00	0.00
26.30	1.64	0.48	3.45	0.00	0.00	0.00
26.40	1.64	0.48	3.44	0.00	0.00	0.00
26.50	1.64	0.48	3.44	0.00	0.00	0.00
26.60	1.64	0.48	3.44	0.00	0.00	0.00
26.70	1.64	0.48	3.43	0.00	0.00	0.00
26.80	1.64	0.48	3.43	0.00	0.00	0.00
26.90	1.64	0.48	3.42	0.00	0.00	0.00
27.00	1.64	0.48	3.42	0.00	0.00	0.00
27.10	1.64	0.48	3.42	0.00	0.00	0.00
27.20	1.64	0.48	3.41	0.00	0.00	0.00
27.30	1.64	0.48	3.41	0.00	0.00	0.00
27.40	1.64	0.48	3.40	0.00	0.00	0.00
27.50	1.64	0.48	3.40	0.00	0.00	0.00
27.60	1.64	0.48	3.40	0.00	0.00	0.00
27.70	1.64	0.48	3.39	0.00	0.00	0.00
27.80	1.64	0.48	3.39	0.00	0.00	0.00
27.90	1.64	0.49	3.38	0.00	0.00	0.00
28.00	1.64	0.49	3.38	0.00	0.00	0.00
28.10	1.64	0.49	3.38	0.00	0.00	0.00
28.20	1.64	0.49	3.37	0.00	0.00	0.00
28.30	1.64	0.49	3.37	0.00	0.00	0.00
28.40	1.64	0.49	3.37	0.00	0.00	0.00
28.50	1.64	0.49	3.36	0.00	0.00	0.00
28.60	1.64	0.49	3.36	0.00	0.00	0.00
28.70	1.64	0.49	3.36	0.00	0.00	0.00
28.80	1.64	0.49	3.35	0.00	0.00	0.00
28.90	1.64	0.49	3.35	0.00	0.00	0.00
29.00	1.64	0.49	3.35	0.00	0.00	0.00
29.10	1.64	0.49	3.34	0.00	0.00	0.00
29.20	1.64	0.49	3.34	0.00	0.00	0.00
29.30	1.64	0.49	3.34	0.00	0.00	0.00
29.40	1.64	0.49	3.33	0.00	0.00	0.00
29.50	1.64	0.49	3.33	0.00	0.00	0.00
29.60	1.64	0.49	3.33	0.00	0.00	0.00
29.70	1.64	0.49	3.32	0.00	0.00	0.00
29.80	1.64	0.49	3.32	0.00	0.00	0.00
29.90	1.64	0.50	3.32	0.00	0.00	0.00
30.00	1.64	0.50	3.31	0.00	0.00	0.00
30.10	1.64	0.50	3.31	0.00	0.00	0.00
30.20	1.64	0.50	3.31	0.00	0.00	0.00
30.30	1.64	0.50	3.31	0.00	0.00	0.00
30.40	1.64	0.50	3.31	0.00	0.00	0.00
30.50	1.65	0.50	3.33	0.00	0.00	0.00
30.60	2.00	0.50	5.00	0.00	0.00	0.00
30.70	2.00	0.50	5.00	0.00	0.00	0.00
30.80	2.00	0.50	5.00	0.00	0.00	0.00
30.90	2.00	0.50	5.00	0.00	0.00	0.00

31.00	2.00	0.50	5.00	0.00	0.00	0.00
31.10	2.00	0.50	5.00	0.00	0.00	0.00
31.20	2.00	0.50	5.00	0.00	0.00	0.00
31.30	2.00	0.50	5.00	0.00	0.00	0.00
31.40	2.00	0.50	5.00	0.00	0.00	0.00
31.50	2.00	0.50	5.00	0.00	0.00	0.00
31.60	2.00	0.50	5.00	0.00	0.00	0.00
31.70	2.00	0.50	5.00	0.00	0.00	0.00
31.80	2.00	0.50	5.00	0.00	0.00	0.00
31.90	2.00	0.50	5.00	0.00	0.00	0.00
32.00	2.00	0.50	5.00	0.00	0.00	0.00
32.10	2.00	0.50	5.00	0.00	0.00	0.00
32.20	2.00	0.50	5.00	0.00	0.00	0.00
32.30	2.00	0.50	5.00	0.00	0.00	0.00
32.40	2.00	0.50	5.00	0.00	0.00	0.00
32.50	2.00	0.50	5.00	0.00	0.00	0.00
32.60	2.00	0.50	5.00	0.00	0.00	0.00
32.70	2.00	0.50	5.00	0.00	0.00	0.00
32.80	2.00	0.50	5.00	0.00	0.00	0.00
32.90	2.00	0.50	5.00	0.00	0.00	0.00
33.00	2.00	0.50	5.00	0.00	0.00	0.00
33.10	2.00	0.50	5.00	0.00	0.00	0.00
33.20	2.00	0.50	5.00	0.00	0.00	0.00
33.30	2.00	0.50	5.00	0.00	0.00	0.00
33.40	2.00	0.50	5.00	0.00	0.00	0.00
33.50	2.00	0.50	5.00	0.00	0.00	0.00
33.60	2.00	0.50	5.00	0.00	0.00	0.00
33.70	2.00	0.50	5.00	0.00	0.00	0.00
33.80	2.00	0.50	5.00	0.00	0.00	0.00
33.90	2.00	0.50	5.00	0.00	0.00	0.00
34.00	2.00	0.50	5.00	0.00	0.00	0.00
34.10	2.00	0.50	5.00	0.00	0.00	0.00
34.20	2.00	0.50	5.00	0.00	0.00	0.00
34.30	2.00	0.50	5.00	0.00	0.00	0.00
34.40	2.00	0.50	5.00	0.00	0.00	0.00
34.50	2.00	0.50	5.00	0.00	0.00	0.00
34.60	2.00	0.50	5.00	0.00	0.00	0.00
34.70	2.00	0.50	5.00	0.00	0.00	0.00
34.80	2.00	0.50	5.00	0.00	0.00	0.00
34.90	2.00	0.50	5.00	0.00	0.00	0.00
35.00	2.00	0.50	5.00	0.00	0.00	0.00
35.10	2.00	0.50	5.00	0.00	0.00	0.00
35.20	2.00	0.50	5.00	0.00	0.00	0.00
35.30	2.00	0.50	5.00	0.00	0.00	0.00
35.40	2.00	0.50	5.00	0.00	0.00	0.00
35.50	2.00	0.50	5.00	0.00	0.00	0.00
35.60	2.00	0.50	5.00	0.00	0.00	0.00
35.70	2.00	0.50	5.00	0.00	0.00	0.00
35.80	2.00	0.50	5.00	0.00	0.00	0.00
35.90	2.00	0.50	5.00	0.00	0.00	0.00
36.00	2.00	0.50	5.00	0.00	0.00	0.00
36.10	2.00	0.50	5.00	0.00	0.00	0.00
36.20	2.00	0.50	5.00	0.00	0.00	0.00
36.30	2.00	0.50	5.00	0.00	0.00	0.00
36.40	2.00	0.50	5.00	0.00	0.00	0.00
36.50	2.00	0.50	5.00	0.00	0.00	0.00
36.60	2.00	0.50	5.00	0.00	0.00	0.00
36.70	2.00	0.50	5.00	0.00	0.00	0.00
36.80	2.00	0.50	5.00	0.00	0.00	0.00
36.90	2.00	0.50	5.00	0.00	0.00	0.00
37.00	2.00	0.50	5.00	0.00	0.00	0.00
37.10	2.00	0.50	5.00	0.00	0.00	0.00
37.20	2.00	0.50	5.00	0.00	0.00	0.00
37.30	2.00	0.50	5.00	0.00	0.00	0.00
37.40	2.00	0.50	5.00	0.00	0.00	0.00
37.50	2.00	0.50	5.00	0.00	0.00	0.00
37.60	2.00	0.50	5.00	0.00	0.00	0.00
37.70	2.00	0.50	5.00	0.00	0.00	0.00
37.80	2.00	0.50	5.00	0.00	0.00	0.00
37.90	2.00	0.50	5.00	0.00	0.00	0.00
38.00	2.00	0.50	5.00	0.00	0.00	0.00
38.10	2.00	0.50	5.00	0.00	0.00	0.00
38.20	2.00	0.50	5.00	0.00	0.00	0.00
38.30	2.00	0.50	5.00	0.00	0.00	0.00
38.40	2.00	0.50	5.00	0.00	0.00	0.00
38.50	2.00	0.50	5.00	0.00	0.00	0.00

38.60	2.00	0.50	5.00	0.00	0.00	0.00
38.70	2.00	0.50	5.00	0.00	0.00	0.00
38.80	2.00	0.50	5.00	0.00	0.00	0.00
38.90	2.00	0.50	5.00	0.00	0.00	0.00
39.00	2.00	0.50	5.00	0.00	0.00	0.00
39.10	2.00	0.50	5.00	0.00	0.00	0.00
39.20	2.00	0.50	5.00	0.00	0.00	0.00
39.30	2.00	0.50	5.00	0.00	0.00	0.00
39.40	2.00	0.50	5.00	0.00	0.00	0.00
39.50	2.00	0.50	5.00	0.00	0.00	0.00
39.60	2.00	0.50	5.00	0.00	0.00	0.00
39.70	2.00	0.50	5.00	0.00	0.00	0.00
39.80	2.00	0.50	5.00	0.00	0.00	0.00
39.90	2.00	0.50	5.00	0.00	0.00	0.00
40.00	2.00	0.50	5.00	0.00	0.00	0.00
40.10	2.00	0.50	5.00	0.00	0.00	0.00
40.20	2.00	0.50	5.00	0.00	0.00	0.00
40.30	2.00	0.50	5.00	0.00	0.00	0.00
40.40	2.00	0.50	5.00	0.00	0.00	0.00
40.50	2.00	0.50	5.00	0.00	0.00	0.00
40.60	2.00	0.50	5.00	0.00	0.00	0.00
40.70	2.00	0.50	5.00	0.00	0.00	0.00
40.80	2.00	0.50	5.00	0.00	0.00	0.00
40.90	2.00	0.50	5.00	0.00	0.00	0.00
41.00	2.00	0.50	5.00	0.00	0.00	0.00
41.10	2.00	0.50	5.00	0.00	0.00	0.00
41.20	2.00	0.50	5.00	0.00	0.00	0.00
41.30	2.00	0.50	5.00	0.00	0.00	0.00
41.40	2.00	0.50	5.00	0.00	0.00	0.00
41.50	2.00	0.50	5.00	0.00	0.00	0.00

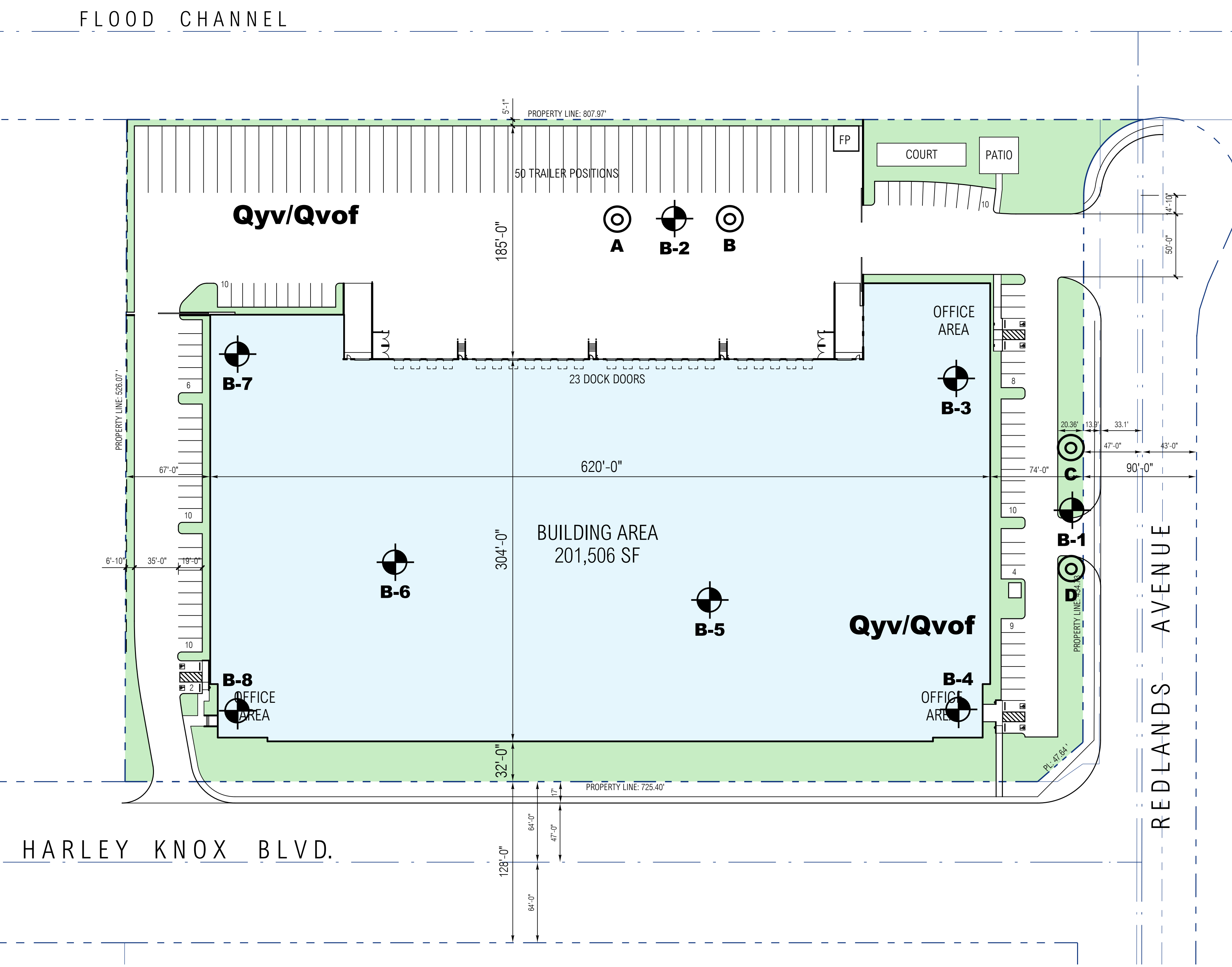
* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

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

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

PROJECT DATA	
SITE AREA:	400,546 SF /
DEVELOPED SITE	9.19 AC
BUILDING AREA:	
INDUSTRIAL	197,506 SF
MEZZANINE	4,000 SF
TOTAL	201,506 SF
LOT COVERAGE (MAX 50.0%)	49.30 %
FAR COVERAGE (MAX 75.0%)	50.30 %
AUTO PARKING REQUIRED:	
HIGH-CUBE WAREHOUSE	
0-20,000 SF (1/1000 SF)	20
20K - 40,000 SF (1/2000 SF)	10
40K + SF (1/5000 SF)	33
TOTAL (10% MAX OFFICE)	63 STALLS
AUTO PARKING PROVIDED	
ACCESSIBLE STALLS	6 STALLS
STANDARD STALLS	71 STALLS
TOTAL PROVIDED	77 STALLS
LANDSCAPE PROVIDED: (12%)	53,993 SF/ 13.47 %



SITE PLAN - SCHEME 01

GEOTECHNICAL LEGEND

- **B-8** Approximate location of exploratory boring
- **D** Approximate location of percolation test
- Qyv/Qvof Surficial younger valley alluvium over very old fan alluvium, weathered surface

0 100 200 400

SCALE: 1"=100'

GEOTECHNICAL MAP		
APN 302-100-016, 017, AND 029, CITY OF PERRIS, CA		
PROJECT NO. 4585-SFI	DATE: 3/5/2020	PLATE NO. 1