HP INSPECTIONS, Inc.
CONSTRUCTION INSPECTION SPECIALISTS

August 5, 2015
Project: IMWA-5

Mr. John Razumich
Imwalle Properties
115 South Market Street, Suite 190
San Jose, California 95113

Subject: Geotechnical Investigation for
Mixed Use Development
645 Horning Street
San Jose, California

Dear Mr. Razumich:

This report presents the results of our geotechnical investigation for the mixed use development proposed for construction on the property located at 645 Horning Street in San Jose, California.

We understand that the buildings will be demolished and replaced with residential buildings within the north portion of the property and with commercial/retail buildings within the south portion of the property. We understand that the buildings will be constructed of wood frame and with concrete slab on grade floors.

You provided us with an electronic copy of site plan that shows the location of the proposed retail building. This drawing was prepared by MI Architects and was used to prepare our site plan (Figure 2) that shows the location of our exploration holes that were made as part of this geotechnical investigation.

SCOPE OF WORK

We performed the following scope of work for the original geotechnical investigation.

1. Reviewed geologic and geotechnical information in our files pertinent to the site and the surrounding area.

2. Explored, sampled and classified subsurface soils by means of five small diameter exploration borings and three electronic cone penetration test probes (CPT). At the end of drilling and testing all exploration holes were backfilled with soil cement grout.

3. Performed laboratory testing on soil samples to measure their pertinent index and engineering properties.

4. Reviewed and analyzed information collected from our literature review, subsurface exploration and laboratory test data.

5. Developed site seismic characteristics in accordance with the California Building Code.

6. Prepared this report presenting our findings, conclusions and geotechnical recommendations.

FINDINGS

Surface Conditions

The site is located along the southwest corner of the intersection of Oakland Road and Highway 101 in San Jose, California and is bound by Highway 101 off ramp to Oakland Road, by Horning Street on the south and 13th Street on the west. The site is nearly level with an average ground elevation of about 65 feet (based on the USGS Topographic Mps).

At the time of our subsurface exploration in July of 2015, the site was occupied primarily by commercial/industrial type buildings (bungalow type) that are occupied by automotive services, welding and landscaping supply. Areas around the existing buildings are covered with paved driveways and parking. We understand that the existing structures will be demolished to make room for the proposed building.

The Highway 101 off-ramp located along the north side of the property is supported by a concrete retaining wall. This retaining wall varies in height between 2 to three feet along the east side to about 10 feet along the west side.

Subsurface Conditions

Subsurface conditions at this site were explored by means of five small diameter exploration holes and three electronic cone penetration test probes that were advance to a depth of between 30 and 50 feet below existing ground surface. Within the depth of our exploration, the site is underlain by sand, silt and clay.

Below the pavement section, the site is generally underlain by an average of about 7 feet of loose silty sand (SM) to sandy silt (ML). This layer of sand/silt has no plasticity and is low potential for expansion. Below this layer of loose sand and silt, the site is underlain bay silty clay (CL) that extends to the maximum depth of our exploration.

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At the time of our subsurface exploration in July of 2015, ground water encountered in all of our exploration holes. The depth from the existing ground surface to the top of the ground water was measured at the end of drilling of each hole and CPT and was found to be at about 24 feet.

The descriptions given above pertain only to the subsurface conditions found at the site at the time of our subsurface exploration in July 2015. Subsurface conditions, particularly ground water levels and the consistency of the near-surface soils, will vary with the seasons.

Detailed descriptions of the materials encountered in the borings are given on the appended boring logs together with the results of some of the laboratory tests performed on selected samples obtained from the drill holes.

Seismic Considerations

This site is located within the seismically active San Francisco Bay region but outside any of the Alquist-Priolo Earthquake Fault Zones. The following faults are closest to the site.

Fault	Distance to Fault		Maximum Moment Magnitude
	Miles	Kilometers	
SAN ANDREAS (1906)	13	21	7.9
HAYWARD (Total Length)	7	12	7.1
HAYWARD (SE Extension)	4.5	7.2	6.4
MONTE VISTA - SHANNON	9	14	6.8
HAYWARD (South)	7	12	6.9
CALAVERAS (No.of Calaveras	7	12	6.8
CALAVERAS (So.of Calaveras	7	12	6.2
SARGENT	16	25	6.8
SAN GREGORIO	27	44	7.3
ZAYANTE-VERGELES	19	31	6.8
GREENVILLE	21	34	6.9
HAYWARD (North)	29	46	6.9

Seismic hazards can be divided into two general categories, hazards due to ground rupture and hazards due to ground shaking. Since no active faults are known to cross this property, the risk of earthquake-induced ground rupture occurring across the project site appears to be remote. Based on historic records and on the known general seismicity of the San Francisco Bay region, we consider it probable that during the next 50 years the site will be shaken by at least one

earthquake of Richter Magnitude 6.5 or greater, and by numerous earthquakes of lesser Magnitude, all having epicentral locations within about 20 miles of the site.

Potential for Liquefaction

Should a major earthquake occur with an epicentral location close to the site, ground shaking at the site will undoubtedly be severe, as it will for other property in the general area. Even under the influence of ground shaking, the soils that underlie the site should not liquefy.

Liquefaction is the process by which saturated, non-cohesive soil (sand and silt) loses shear strength during seismic shaking and behaves like a liquid, rather a solid. The effect on structures and buildings can be devastating, and is a major contributor to seismic failures.

Liquefaction occurs when a saturated sand formation is subject to cyclic shaking. The shaking causes increased pore water pressure which reduces the effective stress, and therefore reduces the shear strength of the sand. Soils most prone to liquefaction are loose sands between layers of lower permeability soil that prevent rapid dissipation of cyclic pore pressures.

The loose grains can support considerable weight, as they are in contact with each other in a statically stable formation. Once strong earthquake shaking begins, the grains are separated by high pore water pressure and are no longer resting on each other. Eventually, the grains will settle into a more compact arrangement. However, this transition is not immediate, and requires excess water to leave the formation. For a short period of time, depending how long it takes for the water to drain from the formation, the grains float in liquid slurry. The excess water is squeezed out which causes the quicksand condition at the surface. If there is a dry soil crust or impermeable cap, the excess water will sometimes come to the surface through cracks in the confining layer, bringing liquefied sand with it, creating sand boils.

Method of Analysis

The potential for liquefaction at this site was evaluated using procedures outlined in the Special Publication 117A “GUIDELINES FOR EVALUATING AND MITIGATING SEISMIC HAZARDS IN CALIFORNIA 2008” by the California Geological Survey.

The potential for liquefaction was analyzed using procedures outlined in the Technical report NCEER-97-0022 “Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils” dated December 31, 1997.

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Ground Water Elevation

Based on the results of our subsurface exploration performed in July of 2014, ground water was encountered at an average depth of about 24 feet below existing ground surface. However, based on the historic ground water data presented in Plate 1.2 of the Seismic Hazard Zone Report 058 published by the Department of Conservation, Division of Mines and Geology dated 2002, historically, ground water was encountered at a depth of about 10 feet below existing ground surface. This higher ground water was used for the analysis of the potential for liquefaction.

Potential for Liquefation

Considering the clayey nature of the soil that underlies the site, it is our opinion that the even under the influence of ground shaking, the soils that underlie the site should not liquefy.

Seismic Design Parameters

The following general site seismic parameters may be used for design in accordance with the California Building Code.

Site Class: **D** (Stiff Soil Profile)

Mapped Acceleration Parameters: $\mathbf{S_s}$ (for short periods) = 1.500g
$\mathbf{S_1}$ (for 1-second period) = 0.600g

Site Coefficient: $\mathbf{F_a}$ (for short periods) = 1.0
$\mathbf{F_v}$ (for 1-second period) = 1.5

Adjusted Maximum Considered EQ Spectral Response Acceleration Parameters:

$$\mathbf{S_{MS}} = \mathbf{F_a} * \mathbf{S_s} = 1.500g$$
$$\mathbf{S_{M1}} = \mathbf{F_v} * \mathbf{S_1} = 0.9000g$$

Design Spectral Response Acceleration Parameters:

$$\mathbf{S_{DS}} = \mathbf{2/3} * \mathbf{S_{MS}} = 1.000g$$
$$\mathbf{S_{D1}} = \mathbf{2/3} * \mathbf{S_{M1}} = 0.600g$$

Seismic Design Category: **D**

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We should point out that the structural seismic design is not intended to eliminate damage to a structure. The goal of the design system is to minimize the loss of human life. It is unlikely that any structure can be designed to withstand the forces of a great earthquake without any damage at all.

CONCLUSIONS AND RECOMMENDATIONS

The most geotechnical concern about this site is the presence of loose silty sand and sandy silt layer that extends to an average depth of about 7 feet below existing ground surface. If left untreated, this layer of sand and silt will compress and settle under the influence of the building loads. To minimize the potential effect of settlement of this layer of sand/silt, we recommend that it should be subexcavated to an average depth of about 5 feet. The excavated soil may then be used to build up the site after moisture conditioning and compaction as recommended in the following section.

The other geotechnical concern about this site is the presence of the highway off-ramp retaining wall along the north side of the property. New buildings that will be constructed close to this retaining wall will impose additional lateral load on this wall. In order to minimize the potential effect of new construction on this retaining wall, we recommend that buildings should be set back a distance equal to 1½ times the height of the wall, otherwise, the building foundations should be embedded so that the bottom of the building foundation is below an imaginary line extending down from the bottom of the building foundation to the bottom of the retaining wall at a gradient of about 1½ : 1 (horizontal to vertical).

This site is suitable for the proposed construction of the new buildings provided that the recommendations presented in this report are followed.

The following recommendations, which are presented as guidelines to be used by project planners and designers, have been prepared assuming HP INSPECTIONS will be commissioned to observe and test during site grading and foundation construction. This additional opportunity to inspect the project site will allow us to compare subsurface conditions exposed during construction with those that were observed during this investigation.

Site Preparation Grading and Compaction

- Existing structures and pavements within areas of the site to be built on or paved should be removed. Utility lines including electric, water, sanitary sewers and storm drains designated for abandonment on the Project Plans, should be dug out and removed. All debris and materials arising from demolition and removal operations should be wasted off-site.

- The surface layer loose sand and silt below areas of the site to be built on or paved should be excavated. The depth and horizontal limits of these excavations should be determined in the field by the Soils Engineer at the time of excavation. For planning purposes, however, it may be assumed that these excavations will extend to an average depth of about 5 feet below existing grade under proposed buildings and about three feet under pavement areas. Soil from these excavations may be stockpiled for subsequent use as structural fill.

- Soil surfaces exposed by excavations of the surface fill soils and at the bottom of the existing basement should be scarified to a depth of 8 inches, conditioned with water (or allowed to dry, as necessary) to produce a soil water content of about 2 percent above the optimum value and then compacted to at least 90 percent relative compaction based on ASTM Test D1557-91.

- Structural fill may then be placed up to design grades in the proposed pavement areas and building areas (if the second alternate described above is selected). Structural fill using on-site inorganic soil, or approved import, should be placed in layers, each not exceeding 8 inches thick (before compaction), conditioned with water (or allowed to dry, as necessary) to produce a soil water content of about 2 percent above the optimum value, and then compacted to at least 90 percent relative compaction based of ASTM Test D1557-91. The upper 8 inches of pavement subgrades should be compacted to at least 95 percent relative compaction based on ASTM Test D1557-91.

- On-site soils proposed for use as structural fill should be inorganic, free from deleterious materials, and should contain no more than 15% by weight of rocks larger than 3 inches (largest dimension) and no rocks larger than 6 inches. The suitability of existing soil for reuse as a structural fill should be determined by a member of our staff at the time of grading. We expect that most of the existing fill soil will be suitable for reuse as structural fill.

- If import is required for use as structural fill, it should be inorganic, should preferably have a low expansion potential and should be free from clods or rocks larger than 4 inches in largest dimension. Prior to delivery to the site, proposed import should be tested in our laboratory to verify its suitability for use as structural fill and, if found to be suitable, further tested to estimate the water content and density at which it should be placed.

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Building Foundations

The proposed buildings may either be supported on conventional shallow foundations bearing on competent in-place native soil or on compacted structural fill placed as described in the Site Preparation, Grading and Compaction section of the geotechnical investigation report.

Continuous, reinforced concrete foundations may be designed to impose pressures on foundation soils up to 2000 pounds per square foot from dead plus normal live loading. Continuous foundations should be at least 15 inches wide and should be embedded at least 18 inches below rough pad grade or adjacent finished grade, whichever is lower.

Interior isolated foundations, such as may support column loads, may be designed to impose pressures on foundation soils up to 3000 pounds per square foot from dead plus normal live loading. Interior foundations should be embedded at least 18 inches below rough pad grade.

Based upon our experience with similar buildings constructed on similar foundation soils, we expect the total long-term static settlement of the building to be approximately 1(±) inch. Using the design values presented above, and assuming a minimum embeddment of both continuous and isolated footings, we would expect the post-construction differential settlement of a relatively uniformly loaded structure to be no more than about 3/4 of the total settlement.

Lateral forces on the proposed building may de resisted by passive pressure acting against the sides of footings and by friction between the soil and the bottom of the footing. An equivalent fluid pressure of 300 pounds per square foot per foot of depth may be used to calculate the ultimate passive resistance to lateral loads. A coefficient of friction of 0.3 may be used to calculate resistance to lateral loads at the base of foundations.

The allowable foundation pressures given previously may be increased by one-third when considering additional short-term wind or seismic loading.

During foundation construction, care should be taken to minimize evaporation of water from foundation and floor subgrades. Scheduling the construction sequence to minimize the time interval between foundation excavation and concrete placement is important. Concrete should be placed only in foundation excavations that have been kept moist, are free from drying cracks and contain no loose or soft soil or debris.

Concrete Slabs-On-Grade

Concrete floor slabs should be constructed on compacted soil subgrades prepared as described in the section on Site Preparation, Grading and Compaction.

To minimize floor dampness, a section of capillary break material at least five inches thick and covered with a membrane vapor barrier should be placed between the floor slab and the compacted soil subgrade. The capillary break should be a free-draining material, such as 3/8" pea gravel or a permeable aggregate complying with CALTRANS Standard Specifications, Section 68, Class 1, Type A or Type B. The material proposed for use as a capillary break should be tested in our laboratory to verify its effectiveness as a capillary break. The membrane vapor barrier should be a high quality membrane such as Moistop (by Fortifiber Corporation) or similar. A protective cushion of sand or capillary break material at least two inches thick should be placed between the membrane vapor barrier and the floor slab.

Exterior concrete slabs may be constructed directly on the water-conditioned and compacted soil subgrade.

Utility Trenches

The attention of contractors, particularly the underground contractor, should be drawn to the requirements of California Code of Regulations, Title 8, Construction Code Section 1540 regarding Safety Orders for "Excavations, Trenches, Earthwork".

For purposes of this section of the report, bedding is defined as material placed in a trench up to 1 foot above a utility pipe and backfill is all material placed in the trench above the bedding.

Unless concrete bedding is required around utility pipes, free-draining sand should be used as bedding. Sand proposed for use in bedding should be tested in our laboratory to verify its suitability and to measure its compaction characteristics. Sand bedding should be compacted by mechanical means to achieve at least 90 percent compaction density based on ASTM Tests D1557-91.

Approved, on-site, inorganic soil, or imported material may be used as utility trench backfill. Proper compaction of trench backfill will be necessary under and adjacent to structural fill, building foundations, concrete slabs and vehicle pavements. In these areas, backfill should be conditioned with water (or allowed to dry) to produce a soil-water content of about 2 percent above the optimum value and placed in horizontal layers not exceeding 6 inches in thickness (before compaction). Each layer should be compacted to 90 percent relative compaction based of ASTM Test D1557-91. The upper 8 inches of pavement subgrades should be compacted to

about 95 percent relative compaction based on ASTM Test D1557-91.

Where any trench crosses the perimeter foundation line of any building, the trench should be completely plugged and sealed with compacted clay soil for a horizontal distance of at least 2 feet on either side of the foundation.

Surface Drainage

Surface drainage gradients should be planned to prevent ponding and to promote drainage of surface water away from building foundations, slabs, edges of pavements and sidewalks, and towards suitable collection and discharge facilities.

Water seepage or the spread of extensive root systems into the soil subgrades of foundations, slabs, or pavements, could cause differential movements and consequent distress in these structural elements. This potential risk should be given due consideration in the design and construction of landscaping.

Follow-up Geotechnical Services

Our recommendations are based on the assumption that HP INSPECTIONS will be commissioned to perform the following services.

1. Review final grading and foundation plans prior to construction.

2. Observe and advise during clearing of the site.

3. Observe, test and advise during grading and placement of structural fill.

4. Test proposed capillary break material that will be used beneath concrete slabs-on-grade and advise on suitability.

5. Observe and advise during foundation and slab construction.

6. Observe, test and advise during utility trench backfilling.

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LIMITATIONS

The recommendations contained in this report are based on certain plans, information and data that have been provided to us. Any change in those plans, information and data will render our recommendations invalid unless we are commissioned to review the change and to make any necessary modifications and/or additions to our recommendations.

Subsurface exploration of any site is necessarily confined to selected locations. Conditions may, and often do, vary between and around such locations. Should conditions different from those encountered in our explorations come to light during project development, additional exploration, testing and analysis may be necessary; changes in project design and construction may also be necessary.

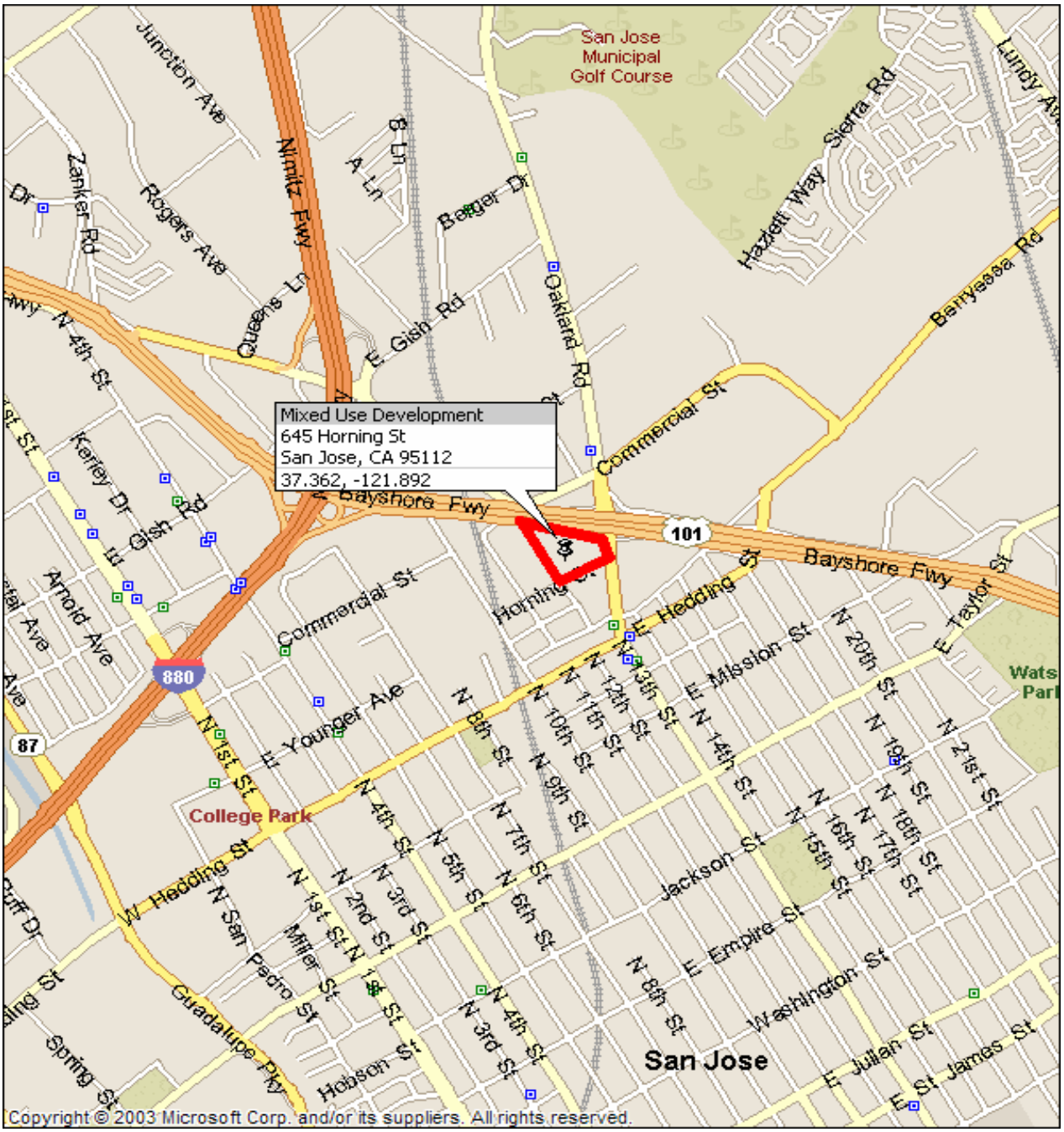
Our recommendations have been made in accordance with the principles and practices generally employed by the geotechnical engineering profession. This is in lieu of all other warranties, express or implied.

All earthwork and associated construction should be observed by our field representative, and tested where necessary, to compare the generalized site conditions assumed in this report with those found at the site at the time of construction, and to verify that construction complies with the intent of our recommendations.

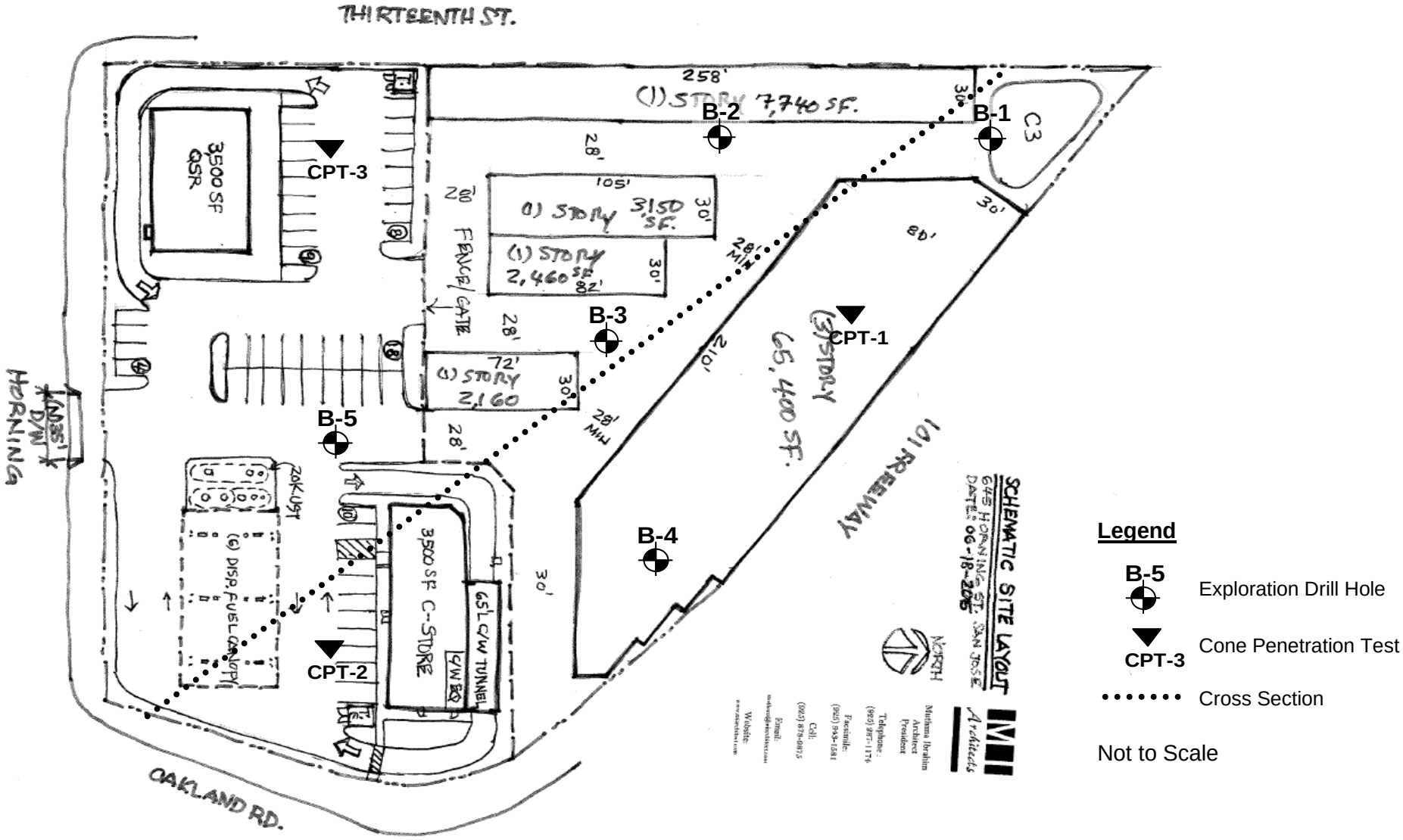
Report prepared by:

HP INSPECTIONS

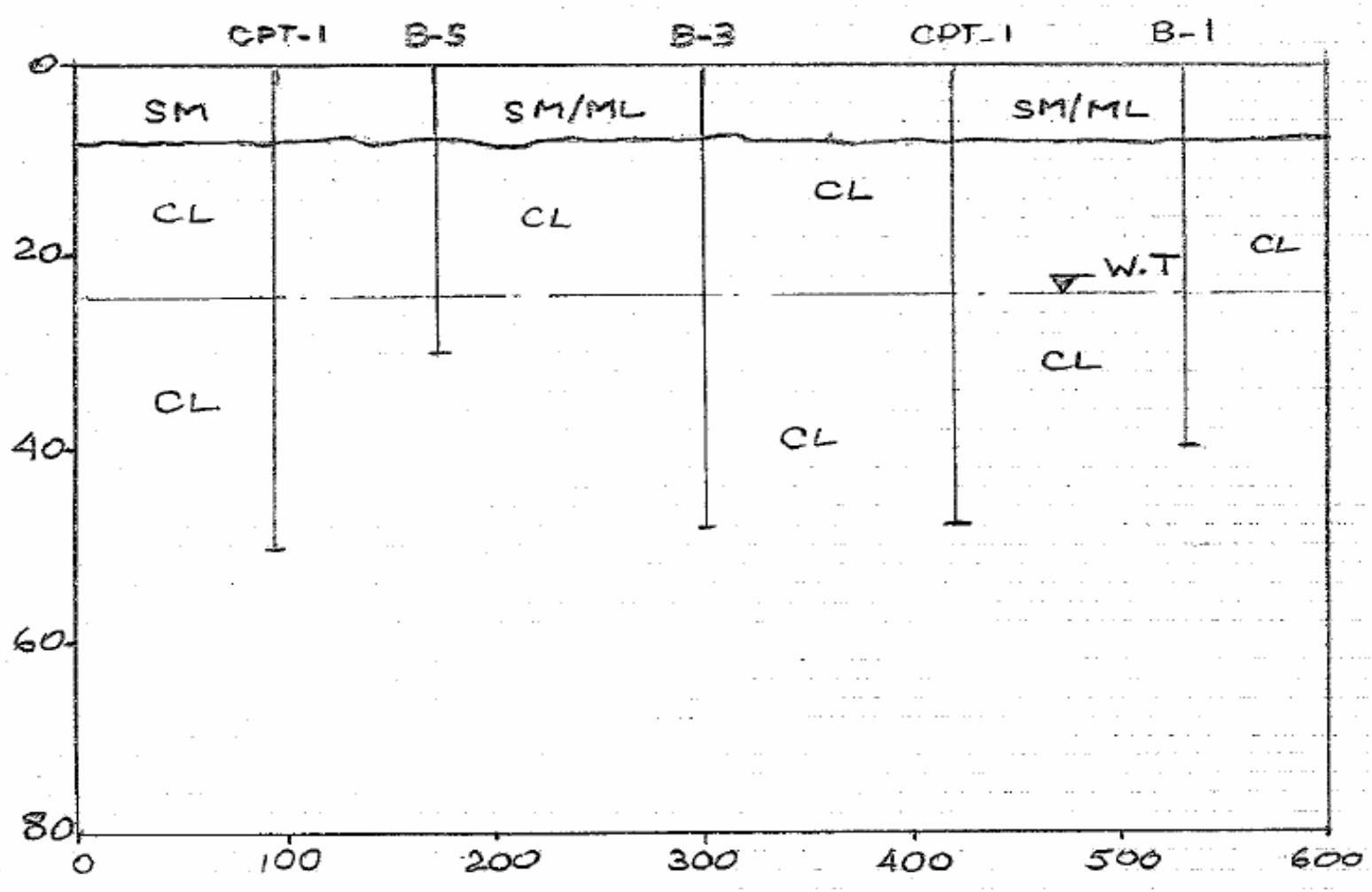
Basil A. Amso
CE 49998



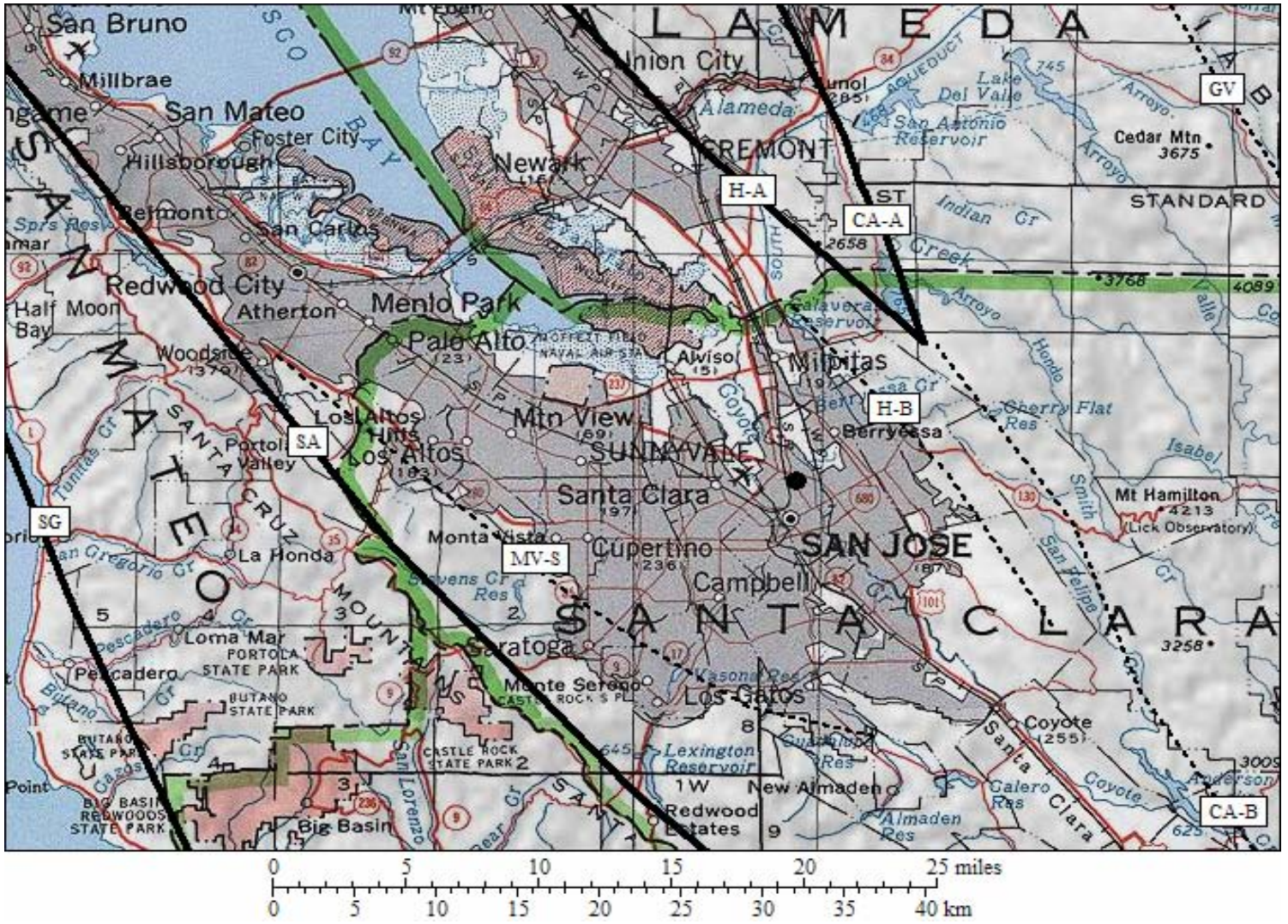
H P INSPECTIONS, Inc.	**VICINITY MAP**	**FIGURE 1**
AUGUST 2015	**MIXED USE DEVELOPMENT 645 HORNING STREET SAN JOSE, CALIFORNIA**	**PROJECT IMWA-5**



HP INSPECTIONS, INC.	**SITE PLAN AND LOCATION OF EXPLORATION BORINGS**	**FIGURE 2**
AUGUST 2015	**MIXED USE DEVELOPMENT 645 HORNING STREET SAN JOSE, CALIFORNIA**	**PROJECT IMWA-5**



H P INSPECTIONS	**CROSS SECTION**	**FIGURE 3**
AUGUST 2015	**MIXED USE DEVELOPMENT 645 HORNING STREET SAN JOSE, CALIFORNIA**	**PROJECT IMWA-5**

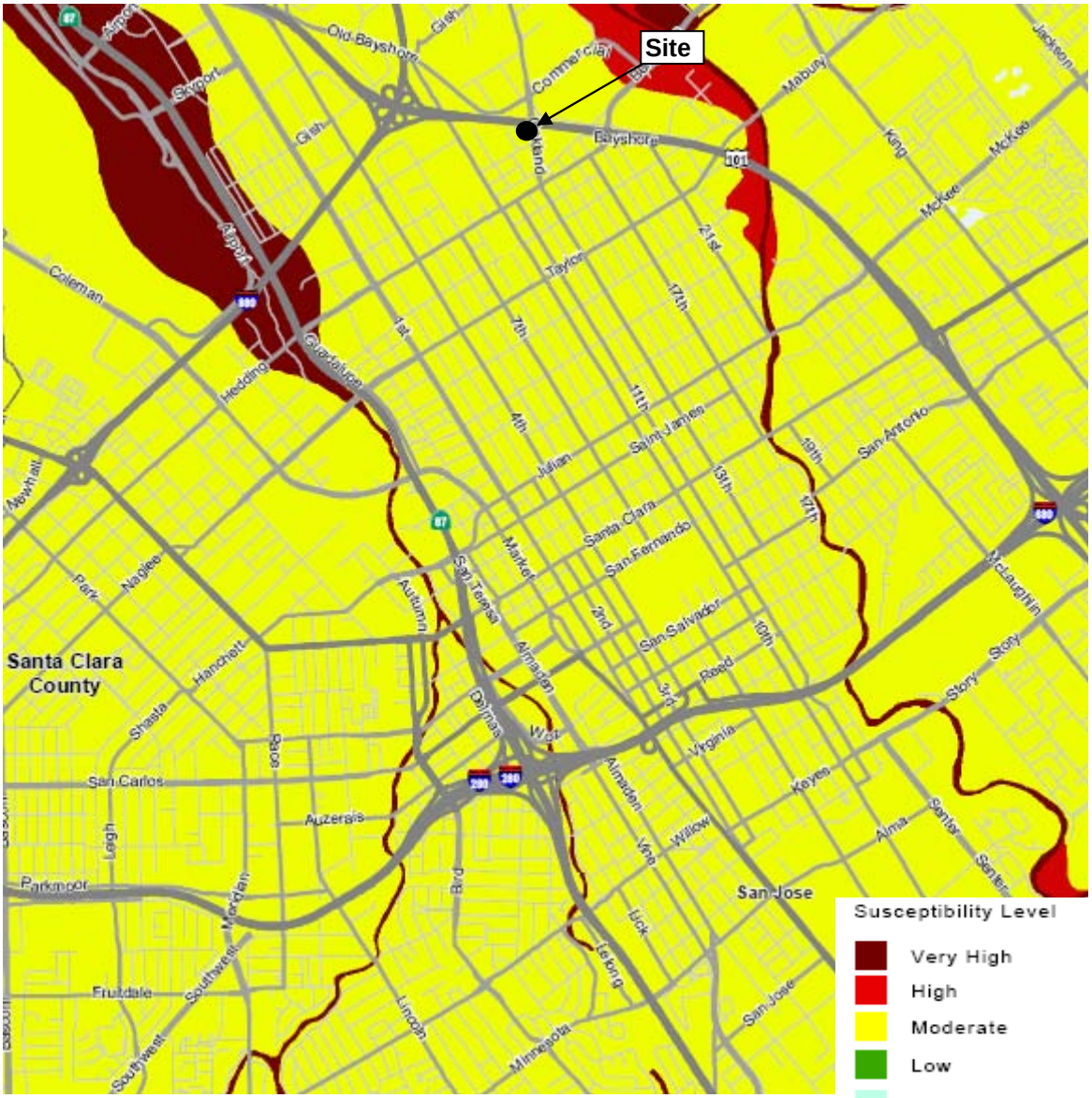


LEGEND

———	Type "A" Faults
HA	Hayward (Total Length)
CA	Calaveras (No. of Resr)
SA	San Andreas
SG	San Gregorio
·····	Type "B" Faults
H-B	Hayward (SE Extension)
GV	Greenville
CA-B	Calaveras (So. of Resr)
MV- S	Monte Vista - Shannon
●	Site Location

This map should not be used to determine whether or not a given property lies on a fault line. Its only purpose is to give the reader of this report a feel of aprox. distances to Types A & B fault.
Faults other than Types A & B are not shown on this map.

HP INSPECTION	**APPROXIMATE LOCATION FAULTS**	**FIGURE 4**
AUGUST 2015	**MIXED USE DEVELOPMENT 645 HORNING STREET SAN JOSE, CALIFORNIA**	**PROJECT IMWA-5**



Source: This map is based on work by William Lettis & Associates, Inc. and USGS. USGS Open-File Report 00-444, Knudsen & others, 2000 and USGS Open-File Report 2006-1037, Witter & others, 2006

H P INSPECTIONS, Inc.	**LIQUEFACTION SUSCEPTIBILITY MAP**	**FIGURE 5**
AUGUST 2015	**MIXED USE DEVELOPMENT 645 HORNING STREET SAN JOSE, CALIFORNIA**	**PROJECT IMWA-5**

DIVISION OF MINES AND GEOLOGY
JAMES F. DAVIS, STATE GEOLOGIST

STATE OF CALIFORNIA-GRAY DAVIS, GOVERNOR
THE RESOURCES AGENCY-MARY D. NICHOLS, SECRETARY
DEPARTMENT OF CONSERVATION-DARRYL W. YOUNG, DIRECTOR

San Jose West Quadrangle Plate 1.2
SEISMIC HAZARD ZONE REPORT 056

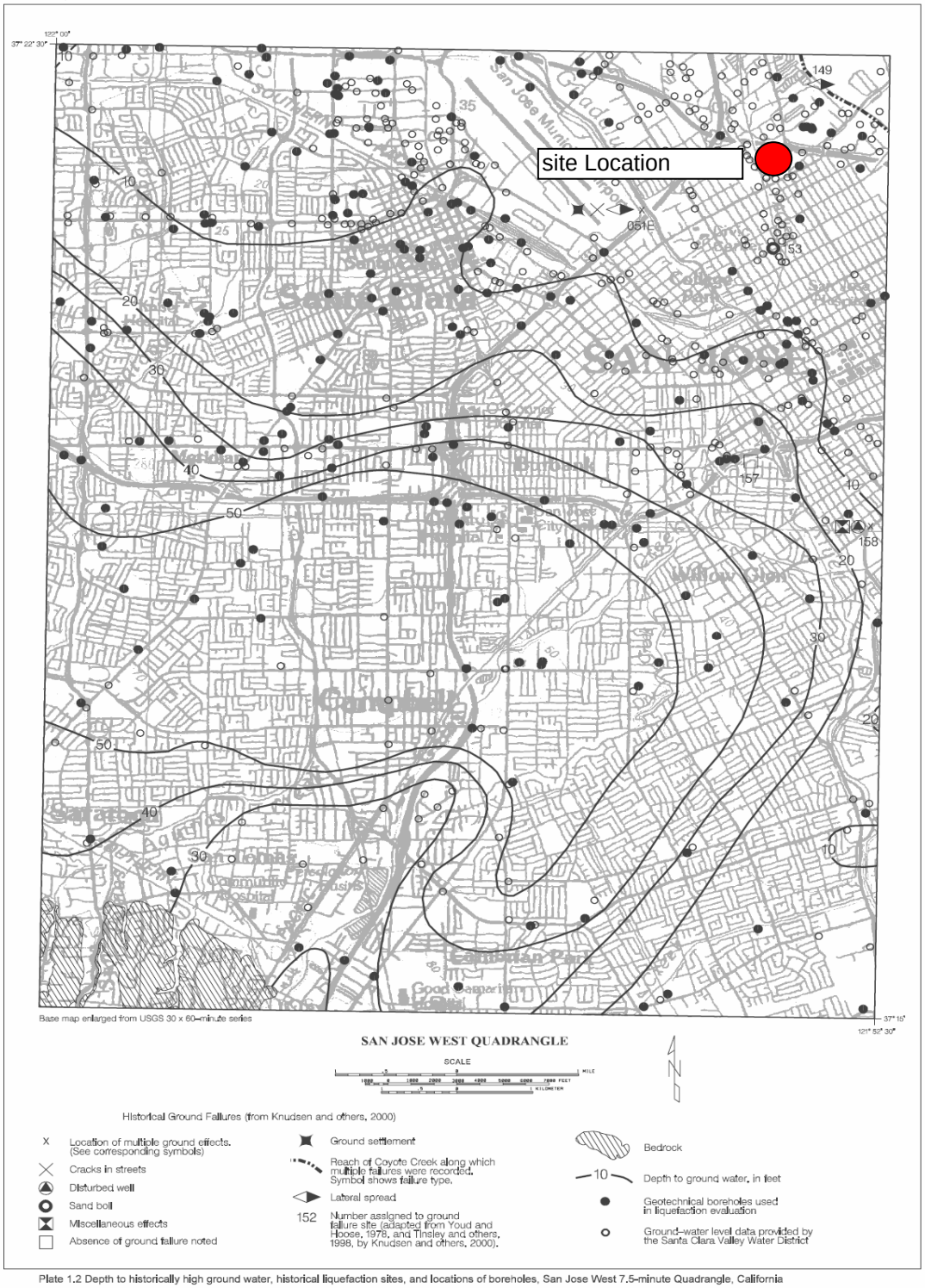


Plate 1.2 Depth to historically high ground water, historical liquefaction sites, and locations of boreholes, San Jose West 7.5-minute Quadrangle, California

H P INSPECTIONS, Inc.	**HISTORIC GROUND WATER TABLE**	**FIGURE 6**
AUGUST 2015	**MIXED USE DEVELOPMENT 645 HORNING STREET SAN JOSE, CALIFORNIA**	**PROJECT IMWA-5**

APPENDIX A

Key to Exploration Logs and Boring Logs

KEY TO EXPLORATORY BORING LOGS
SOIL CLASSIFICATIONS

PRIMARY DIVISIONS			GROUP1 SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS More than half of material is larger than No. 200 sieve size	**GRAVELS** More than half coarse fraction is larger than No.4 sieve	Clean Gravels (less than5% fines*)	**GW**	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravel with fines*	**GM**	Silty gravels, gravel-sand-silt mixtures, non-plastio fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastio fines
	SANDS More than half coarse fraction is smaller than No.4 sieve	Clean Sands (less than 5%fines*)	**SW**	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		Sands with fines*	**SM**	Silty sands, silt-sand mixtures, non-plastio fines
			SC	Clayey sand, sand-clay mixtures, plastio fines
FINE GRAINED SOILS More than half of material is smaller than No. 200 sieve size	**SILTS AND CLAYS** Liquid limit is less than 35		**ML**	Inorganic silts, clayey silts, rock flour, silty very fine sands
			CL	Inorganic clays of low plasticity, gravelly clay of low plasticity
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit is between35 and 50		**MI**	Inorganic silts, clayey silts and silty fine sand with intermediate plasticity
			CI	Inorganic clays, gravely clays, sandy clays and silty clays of intermediate plasticity
			OI	Inorganic clays and silty clays of intermediate plasticity
	SILTS AND CLAYS Liquid limit is greater than 50		**MH**	Inorganic silts, clayey silts, elastic silts, micaceous or diatomaceous silty or fine sandy soil
			CH	Inorganic clays of high plasticity
			OH	Organic clays and silts of high plasticity
HIGHLY ORGANIC SOILS			**Pt**	Peat, meadow mat, highly organic soils

GRAIN SIZES

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENINGS			
200	**40**	**10**	**4**	**¾”**	**3”**	**12”**	
Silts and Clays	Fine	Medium	Coarse	Fine	Coarse	Cobbles	Boulders
	SAND			**GRAVEL**			

RELATIVE DENSITY

SANDS, GRAVELS AND NON-PLASTIC SILTS	BLOWS/FOOT*
VERY LOOSE	0 – 4
LOOSE	4 – 10
MEDIUM DENSE	10 – 30
DENSE	30 – 50
VERY DENSE	OVER 50

CONSISTENCY

CLAYS AND PLASTIC SILTS	UNCONFINED SHEAR STRENGTH (PSF)	BLOWS/FOOT*
VERY SOFT	0 – 250	0 – 2
SOFT	250-500	2 – 4
FIRM	500-1000	4 – 8
STIFF	1000-2000	8 – 16
VERY STIFF	2 000– 4000	16 – 32
HARD	>4000	OVER 32

SYMBOLS

▽	Initial Ground Water Level
▼	Final Ground Water Level
S	Standard Penetration Sampler
M	Modified California Sampler
D	Dames & Moore Sampler

NOTES

*BLOWS per FOOT – Resistance to advance the soil sampler in number of blows of a 140-pound hammer falling 30 inches to drive a split spoon sampler.

Stratification lines on the logs represent the approximate boundary between soil types, and the transition may be gradual.

Modified California Sampler – 2 ½ O.D. (1 7/8 Inch I.D.) sampler

Standard Penetration Sampler – 2 inch O.D. (1 3/8 Inch I.D.) split spoon sampler (ASTM D1586).

Dames & Moore Sampler – 3 inch O.D. (2.5 inch I.D.) sampler

BORING LOG

No. B-1

PROJECT **645 Horning Street, Mixed Use Development** DATE 07/15/2015 LOGGED BY BAA

DRILL RIG Hollow Stem Auger HOLE DIA. 8" SAMPLER X - Modified California, * - S.P.T

GROUND WATER DEPTH INITIAL 22 ft FINAL 23 ft HOLE ELEVATION

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT (%)	WATER CONTENT (%)	PLASTIC LIMIT (%)	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
Silty Sand to Sandy Silt, brown, dry, loose	SM/ ML	1										
		2					Non Plastic					
			x	9				16		86		
		3										
		4										
		5	x	5				28		82		
		6										
		7										
		8										
Silty Clay, brown, dry, stiff	CL	9										
		10	x	11	2.1			21		100	9	5120
		11										
		12										
		13										
		14										
		15	x	14	2.2			18		101	8	4675
slightly sandy		16										
		17										
		18										
		19										
		20	x	15	3			19		101	9	5765

BORING LOG

No. B-1

PROJECT **645 Horning Street, Mixed Use Development** DATE 07/15/2015 LOGGED BY BAA

DRILL RIG Hollow Stem Auger HOLE DIA. 8" SAMPLER X - Modified California, * - S.P.T

GROUND WATER DEPTH INITIAL 22 ft FINAL 23 ft HOLE ELEVATION

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT (%)	WATER CONTENT (%)	PLASTIC LIMIT (%)	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
Silty Clay, brownish gray, damp, stiff	CL	21										
		22										
		23										
		24										
		25	*	16	1.5							
		26										
		27										
very sandy silty clay, thin layer about 6 inches thick		28										
		29										
		30	*	10	2.5							
		31										
		32										
		33										
		34										
		35	*	14	2							
		36										
		37										
		38										
		39										
Bottom of hole at 40 feet		40	*	16	2							

BORING LOG

No. B-2

PROJECT **645 Horning Street, Mixed Use Development** DATE 07/15/2015 LOGGED BY BAA

DRILL RIG Hollow Stem Auger HOLE DIA. 8" SAMPLER X - Modified California, * - S.P.T

GROUND WATER DEPTH INITIAL 22 ft FINAL 22 ft HOLE ELEVATION

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT (%)	WATER CONTENT (%)	PLASTIC LIMIT (%)	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
Pavement over Silty Sand to Sandy Silt, light brown, dry, loose	SM/ ML	1										
		2	x	8				18		84		
		3										
		4										
		5	x	8				23		88		
		6										
		7										
		8										
		9										
Silty Sandy Clay, brown, damp, medium stiff	CL	10	x	9	1.5			22		93	6	1760
		11										
		12										
becomes stiff		13										
		14										
		15	x	13	2.5			19		101	8	3895
		16										
		17										
		18										
		19										
		20	*	12	2.7							

BORING LOG

No. B-2

PROJECT **645 Horning Street, Mixed Use Development** DATE 07/15/2015 LOGGED BY BAA

DRILL RIG Hollow Stem Auger HOLE DIA. 8" SAMPLER X - Modified California, * - S.P.T

GROUND WATER DEPTH INITIAL 22 ft FINAL 22 ft HOLE ELEVATION

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT (%)	WATER CONTENT (%)	PLASTIC LIMIT (%)	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
Silty Clay; grayish brown, damp, stiff	CL	21										
thin lense of very sandy caly at 22 feet		22										
		23										
		24										
		25	*	14	2.5							
		26										
		27										
		28										
		29										
slightly sandy		30	*	12	2							
		31										
		32										
		33										
		34										
		35	*	16	2							
Bottom of hole at 35 feet		36										
		37										
		38										
		39										
		40										

BORING LOG

No. B-3

PROJECT **645 Horning Street, Mixed Use Development** DATE 07/15/2015 LOGGED BY BAA

DRILL RIG Hollow Stem Auger HOLE DIA. 8" SAMPLER X - Modified California, * - S.P.T

GROUND WATER DEPTH INITIAL 22 ft FINAL 25 ft HOLE ELEVATION

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT (%)	WATER CONTENT (%)	PLASTIC LIMIT (%)	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
Pavement over Silty Sand to Sandy Silt, light brown, dry, loose	SM/ ML	1					Non Plastic					
		2	x	6				14		79		
		3										
		4										
		5	x	10				20		97		
		6										
		7										
Silty Clay, brown, damp, medium stiff	CL	8										
		9										
		10	x	12	1.5			23		90	6	1730
		11										
		12										
		13										
		14										
stiff to very stiff		15	x	22	2.5			14		101	8	3510
		16										
		17										
		18										
Silty Clay; dark brownish gray, damp, stiff	CL/ CH	19										
		20	x	24	3.5			16		105	8	4125

BORING LOG

No. B-3

PROJECT **645 Horning Street, Mixed Use Development** DATE 07/15/2015 LOGGED BY BAA

DRILL RIG Hollow Stem Auger HOLE DIA. 8" SAMPLER X - Modified California, * - S.P.T

GROUND WATER DEPTH INITIAL 22 ft FINAL 25 ft HOLE ELEVATION

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT (%)	WATER CONTENT (%)	PLASTIC LIMIT (%)	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
Silty Clay; grayish brown, damp, stiff	CL	21										
		22										
		23										
thin lense of sand, about 6 inches		24										
		25	*	19	1.7							
Silty Clay; gray, moist, stiff	CL	26										
		27										
		28										
		29										
		30	*	8	1.8							
		31										
		32										
		33										
		34										
		35	*	12	1.5							
slightly sandy silty clay		36										
		37										
		38										
		39										
		40	*	16	2							

BORING LOG

No. B-3

PROJECT **645 Horning Street, Mixed Use Development** DATE 07/15/2015 LOGGED BY BAA

DRILL RIG Hollow Stem Auger HOLE DIA. 8" SAMPLER X - Modified California, * - S.P.T

GROUND WATER DEPTH INITIAL 22 ft FINAL 25 ft HOLE ELEVATION

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT (%)	WATER CONTENT (%)	PLASTIC LIMIT (%)	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
Sandy Silty Clay; gray, moist, stiff	CL	41										
		42										
		43										
		44										
		45	*	23	2							
		46										
		47										
		48										
		49										
		50	*	20	2.1							
Bottom of hole at 50 feet		51										
		52										
		53										
		54										
		55										
		56										
		57										
		58										
		59										
		60										

BORING LOG

No. B-4

PROJECT **645 Horning Street, Mixed Use Development** DATE 07/15/2015 LOGGED BY BAA

DRILL RIG Hollow Stem Auger HOLE DIA. 8" SAMPLER X - Modified California, * - S.P.T

GROUND WATER DEPTH INITIAL 24 ft FINAL 25 ft HOLE ELEVATION

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT (%)	WATER CONTENT (%)	PLASTIC LIMIT (%)	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
Pavement over Silty Sand to Sandy Silt, light brown, dry, loose	SM/ ML	1										
		2	x	6				9		96		
		3										
		4										
		5	x	10				18		92		
		6										
		7										
		8										
Sandy Silty Clay; brown, damp, stiff	CL	9										
		10	x	10	2			17		93	10	3170
		11										
		12										
		13										
		14										
		15	x	17	2.2			16		102	9	3165
slightly sandy		16										
		17										
		18										
		19										
		20	x	16	2			16		100	7	4435

BORING LOG

No. B-4

PROJECT **645 Horning Street, Mixed Use Development** DATE 07/15/2015 LOGGED BY BAA

DRILL RIG Hollow Stem Auger HOLE DIA. 8" SAMPLER X - Modified California, * - S.P.T

GROUND WATER DEPTH INITIAL 24 ft FINAL 25 ft HOLE ELEVATION

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT (%)	WATER CONTENT (%)	PLASTIC LIMIT (%)	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
Silty Clay; gray, damp to moist, stiff	CL	21										
		22										
		23										
		24										
		25	*	15	2.5							
		26										
		27										
		28										
		29										
		30	*	18	2							
Silty Clay; brown and gray, moist to wet; stiff		31										
		32										
		33										
		34										
		35	*	18	2.2							
		36										
		37										
		38										
		39										
Bottom of hole at 40 feet		40	*	20	2.5							

BORING LOG

No. B-5

PROJECT **645 Horning Street, Mixed Use Development** DATE 07/15/2015 LOGGED BY BAA

DRILL RIG Hollow Stem Auger HOLE DIA. 8" SAMPLER X - Modified California, * - S.P.T

GROUND WATER DEPTH INITIAL 24 ft FINAL 24 ft HOLE ELEVATION

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT (%)	WATER CONTENT (%)	PLASTIC LIMIT (%)	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
Pavement over Silty Sand to Sandy Silt, light brown, dry, loose	ML/ SM	1					Non Plastic					
		2	x	5				16		82		
		3										
		4										
		5	x	7				20		96		
		6										
		7										
		8										
Silty Clay; brown, damp, stiff	CL	9										
		10	x	11	2.5			23		90	6	2450
		11										
		12										
		13										
		14										
		15	*	13	2.5							
		16										
		17										
		18										
slightly sandy		19										
		20	*	16	2							

BORING LOG

No. B-5

PROJECT **645 Horning Street, Mixed Use Development** DATE 07/15/2015 LOGGED BY BAA

DRILL RIG Hollow Stem Auger HOLE DIA. 8" SAMPLER X - Modified California, * - S.P.T

GROUND WATER DEPTH INITIAL 24 ft FINAL 24 ft HOLE ELEVATION

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT (%)	WATER CONTENT (%)	PLASTIC LIMIT (%)	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
Silty Clay; brown to gray, damp to wet stiff	CL	21										
		22										
		23										
		24										
		25	*	17	2.5							
		26										
		27										
		28										
		29										
		30	*	19	2.5							
Bottom of hole at 30 feet		31										
		32										
		33										
		34										
		35										
		36										
		37										
		38										
		39										
		40										

APPENDIX B

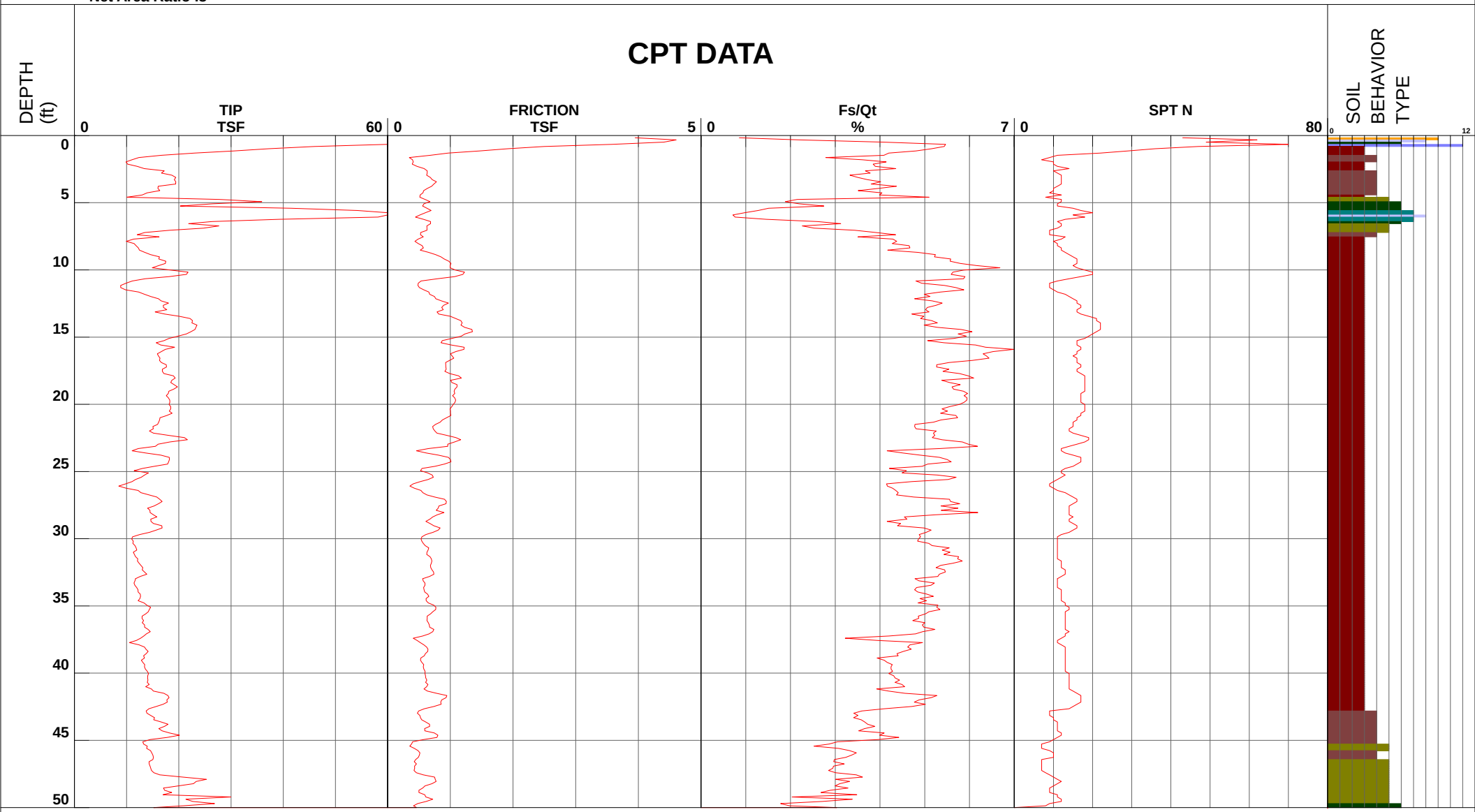
CONE PENETRATION TESTS

HP Inspections Inc

Project	Imwalle Mixed Use	Operator	CB	Filename	SDF(514).cpt
Job Number	IMWA-5	Cone Number	DDG1333	GPS	
Hole Number	CPT-01	Date and Time	7/14/2015 9:30:39 AM	Maximum Depth	50.36 ft
EST GW Depth During Test		25.50 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

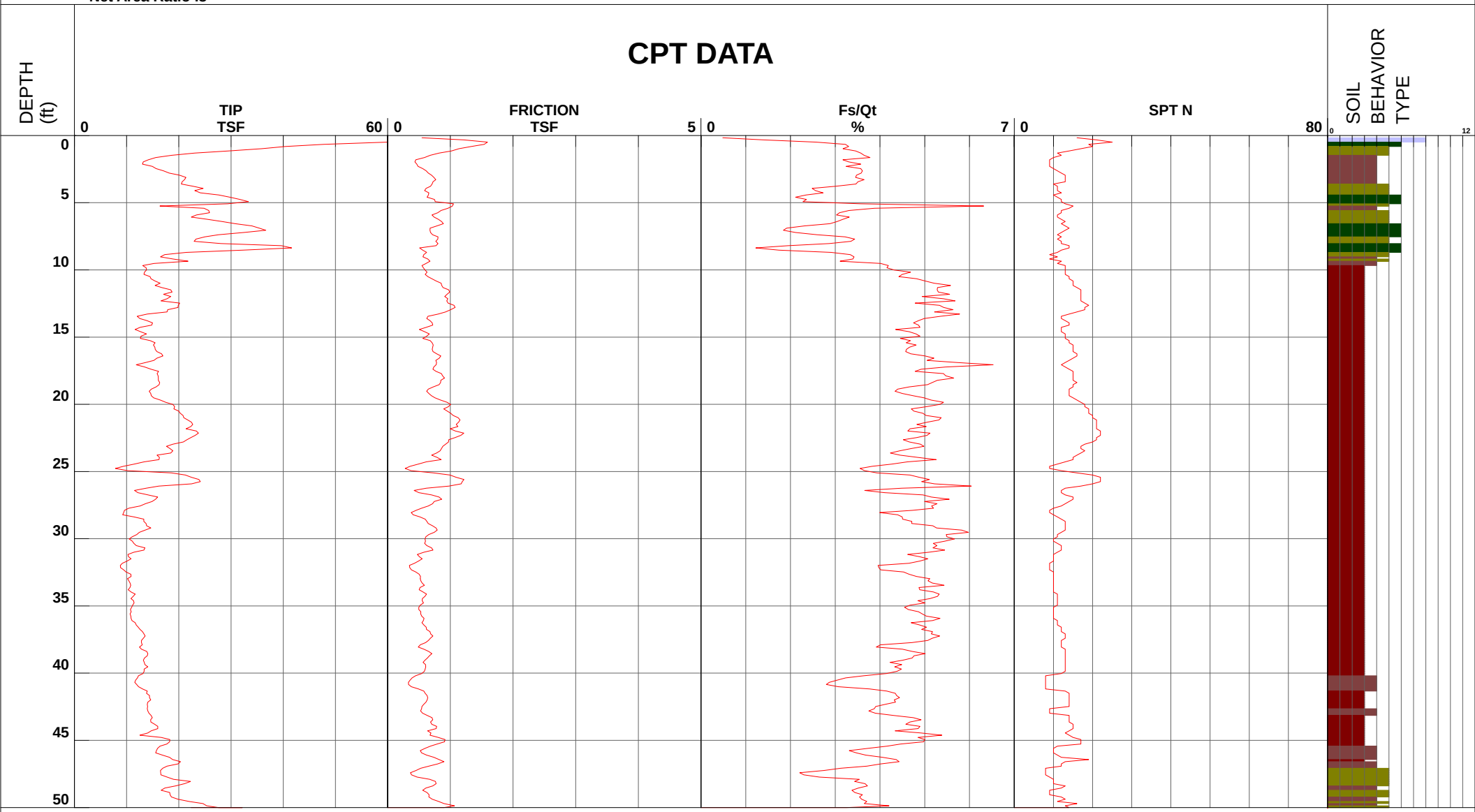
S*Soil behavior type and SPT based on data from UBC-1983

HP Inspections Inc

Project	Imwalle Mixed Use	Operator	CB	Filename	SDF(513).cpt
Job Number	IMWA-5	Cone Number	DDG1333	GPS	
Hole Number	CPT-02	Date and Time	7/14/2015 8:56:39 AM	Maximum Depth	50.52 ft
EST GW Depth During Test		25.50 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

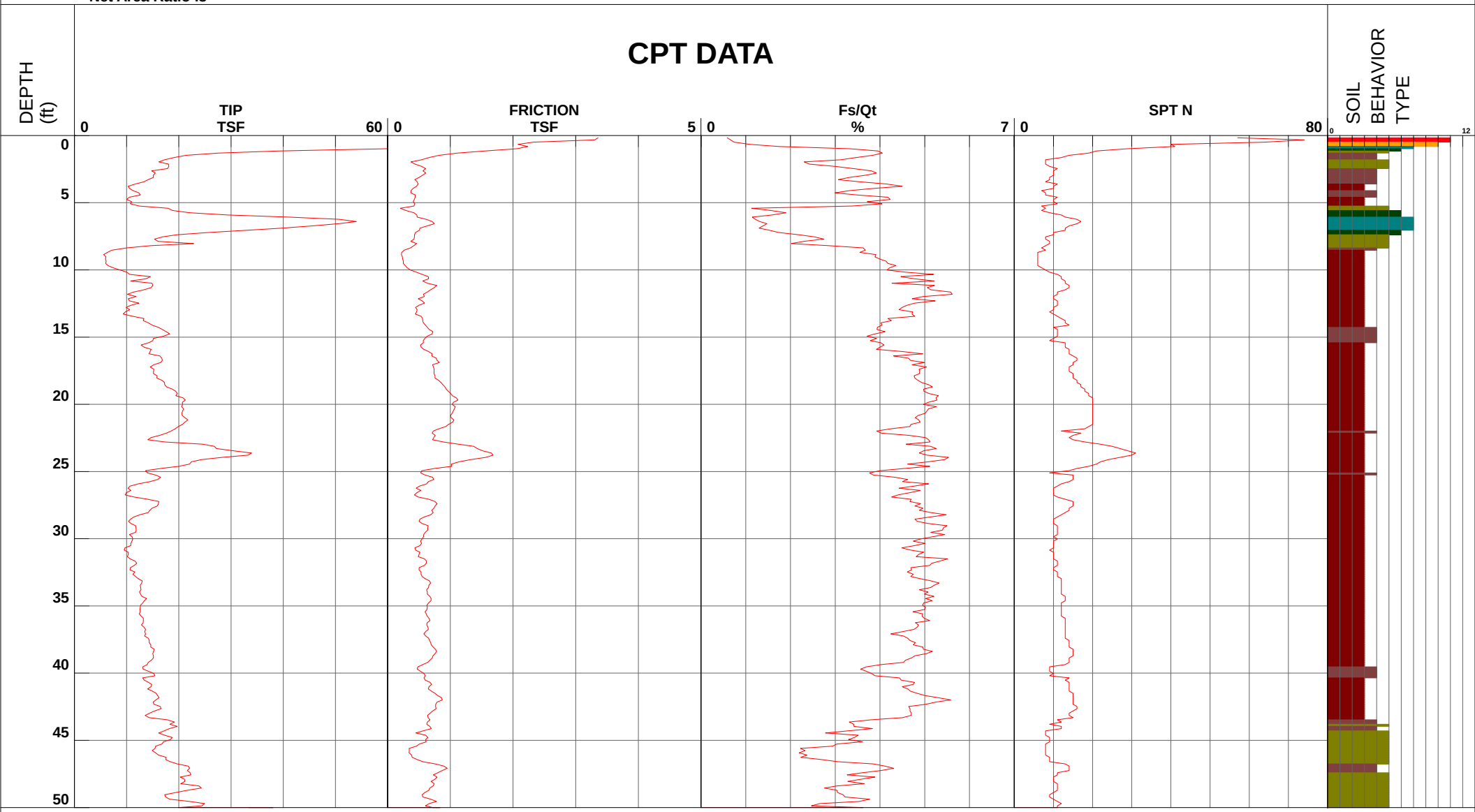
S*Soil behavior type and SPT based on data from UBC-1983

HP Inspections Inc

Project	Imwalle Mixed Use	Operator	CB	Filename	SDF(512).cpt
Job Number	IMWA-5	Cone Number	DDG1333	GPS	
Hole Number	CPT-03	Date and Time	7/14/2015 8:23:55 AM	Maximum Depth	50.52 ft
EST GW Depth During Test		25.50 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 10cm squared

S*Soil behavior type and SPT based on data from UBC-1983

INTERPRETATION OF CONE PENETRATION TESTS
AND
LIQUEFATION ANALYSIS

LIGUEFACTION ANALYSIS

PROJECT NAME: 645 HORNING STREET **CPT-1** **PROJECT NUMBER:** IMWA-5

DEPTH FT.	MEASURED TIP RESIST. TSF	MEASURED FRICTION RESIST. TSF	CORRECTED TIP RESIST. qc1N cs	TOTAL VERTICAL STRESS PSF	EFFECT. VERTICAL STRESS PSF	STRESS REDUCTION COEFF. rd	CYCLIC STRESS RATIO	CYCLIC RESIST. RATIO (clean sand)	SAFETY FACTOR clean sand	SOIL TYPE	Apparent Fine Content %	Estimated Settlement Inches
0.49	108.4	4.4	914.7	41.2	41.2	1.00	0.49	71.3	145.99	Sands: clean sand to silty sand	10.9	
0.98	37.2	1.9	345.4	82.3	82.3	1.00	0.49	3.9	8.02	Sand Mixture: silty sand to sandy silt	21.6	
1.48	16.6	0.7	172.8	124.3	124.3	1.00	0.49	0.6	1.15	Sand Mixture: silty sand to sandy silt	28.9	
1.97	9.9	0.4	171.2	165.5	165.5	1.00	0.49	0.5	1.12	Sand Mixture: silty sand to sandy silt	29.7	
2.46	13.4	0.6	188.3	206.6	206.6	1.00	0.49	0.7	1.44	Sand Mixture: silty sand to sandy silt	28.7	
2.95	18.7	0.6	138.6	247.8	247.8	1.00	0.49	0.3	0.67	Sand Mixture: silty sand to sandy silt	29.1	
3.44	19.4	0.8	151.6	289.0	289.0	1.00	0.49	0.4	0.83	Sand Mixture: silty sand to sandy silt	32.2	
3.94	16.0	0.6	164.4	331.0	331.0	0.99	0.48	0.5	1.02	Sand Mixture: silty sand to sandy silt	29.6	
4.43	13.0	0.5	144.6	372.1	372.1	0.99	0.48	0.4	0.75	Silt Mixture: clayey silt to silty clay	33.8	
4.92	35.9	0.7	126.3	413.3	413.3	0.99	0.48	0.3	0.55	Sand Mixture: silty sand to sandy silt	17.9	
5.41	41.5	0.6	121.9	467.2	467.2	0.99	0.48	0.2	0.51	Sand Mixture: silty sand to sandy silt	15.1	
5.91	72.0	0.5	146.3	524.7	524.7	0.99	0.48	0.4	0.77	Sands: clean sand to silty sand	6.1	
6.40	26.3	0.7	117.3	581.0	581.0	0.99	0.48	0.2	0.48	Sand Mixture: silty sand to sandy silt	27.1	
6.89	24.8	0.6	110.6	637.4	637.4	0.99	0.48	0.2	0.43	Sand Mixture: silty sand to sandy silt	28.2	
7.38	12.0	0.5	121.1	693.7	693.7	0.99	0.48	0.2	0.51	Silt Mixture: clayey silt to silty clay	44.1	
7.87	9.9	0.4	109.7	750.1	750.1	0.99	0.48	0.2	0.42	Silt Mixture: clayey silt to silty clay	49.1	
8.37	12.2	0.6	120.8	807.6	807.6	0.98	0.48	0.2	0.51	Silt Mixture: clayey silt to silty clay	47.3	
8.86	14.5	0.8	135.3	863.9	863.9	0.98	0.48	0.3	0.65	Silt Mixture: clayey silt to silty clay	46.9	
9.35	17.5	1.0	148.4	920.3	920.3	0.98	0.48	0.4	0.80	Silt Mixture: clayey silt to silty clay	45.5	
9.84	14.9	1.0	149.2	976.6	976.6	0.98	0.48	0.4	0.81	Silt Mixture: clayey silt to silty clay	52.7	
10.33	21.4	1.2	157.6	1033.0	1012.4	0.98	0.49	0.4	0.91	Silt Mixture: clayey silt to silty clay	43.2	
10.83	11.0	0.5	108.9	1090.5	1038.7	0.98	0.50	0.2	0.40	Silt Mixture: clayey silt to silty clay	53.8	
11.32	8.8	0.5	106.4	1146.8	1064.4	0.98	0.51	0.2	0.37	Clays: silty clay to clay	62.7	
11.81	13.4	0.7	118.6	1203.2	1090.2	0.98	0.53	0.2	0.45	Silt Mixture: clayey silt to silty clay	51.2	
12.30	16.6	0.9	131.2	1259.5	1116.0	0.98	0.54	0.3	0.54	Silt Mixture: clayey silt to silty clay	47.9	
12.80	17.0	0.9	130.4	1317.0	1142.3	0.98	0.55	0.3	0.52	Silt Mixture: clayey silt to silty clay	47.3	
13.29	17.3	0.8	125.5	1373.4	1168.1	0.98	0.56	0.3	0.47	Silt Mixture: clayey silt to silty clay	46.2	
13.78	22.6	1.2	146.7	1429.7	1193.8	0.98	0.57	0.4	0.66	Silt Mixture: clayey silt to silty clay	43.1	
14.27	23.3	1.2	149.4	1486.1	1219.6	0.97	0.58	0.4	0.67	Silt Mixture: clayey silt to silty clay	43.3	
14.76	21.5	1.2	150.1	1542.4	1245.4	0.97	0.59	0.4	0.67	Silt Mixture: clayey silt to silty clay	46.5	
15.26	17.2	0.9	126.8	1599.9	1271.7	0.97	0.60	0.3	0.45	Silt Mixture: clayey silt to silty clay	48.8	
15.75	19.2	1.2	149.0	1656.3	1297.5	0.97	0.60	0.4	0.64	Silt Mixture: clayey silt to silty clay	51.1	
16.24	15.9	1.0	135.5	1712.6	1323.2	0.97	0.61	0.3	0.51	Clays: silty clay to clay	55.2	
16.73	16.3	1.0	133.6	1769.0	1349.0	0.97	0.62	0.3	0.49	Silt Mixture: clayey silt to silty clay	54.3	
17.22	17.6	0.9	127.9	1825.3	1374.8	0.97	0.63	0.3	0.44	Silt Mixture: clayey silt to silty clay	50.3	
17.72	17.1	1.0	131.8	1882.8	1401.1	0.97	0.63	0.3	0.46	Silt Mixture: clayey silt to silty clay	52.9	
18.21	18.7	1.0	131.0	1939.2	1426.8	0.97	0.64	0.3	0.45	Silt Mixture: clayey silt to silty clay	50.1	
18.70	19.7	1.1	136.4	1995.5	1452.6	0.97	0.65	0.3	0.49	Silt Mixture: clayey silt to silty clay	50.0	
19.19	18.0	1.1	134.4	2051.9	1478.4	0.96	0.65	0.3	0.47	Silt Mixture: clayey silt to silty clay	53.3	
19.69	18.3	1.1	134.4	2109.4	1504.7	0.96	0.66	0.3	0.46	Silt Mixture: clayey silt to silty clay	53.3	
20.18	18.4	1.0	129.8	2166.6	1531.4	0.96	0.66	0.3	0.43	Silt Mixture: clayey silt to silty clay	52.1	
20.67	18.7	1.0	127.4	2225.4	1559.6	0.96	0.67	0.3	0.41	Silt Mixture: clayey silt to silty clay	51.4	
21.16	16.3	0.9	119.7	2284.2	1587.8	0.96	0.67	0.2	0.36	Silt Mixture: clayey silt to silty clay	54.7	
21.65	15.0	0.7	108.9	2343.0	1616.0	0.96	0.68	0.2	0.29	Silt Mixture: clayey silt to silty clay	54.7	

LIGUEFACTION ANALYSIS

PROJECT NAME: 645 HORNING STREET | **CPT-1** | **PROJECT NUMBER:** IMWA-5

DEPTH FT.	MEASURED TIP RESIST. TSF	MEASURED FRICTION RESIST. TSF	CORRECTED TIP RESIST. qc1N cs	TOTAL VERTICAL STRESS PSF	EFFECT. VERTICAL STRESS PSF	STRESS REDUCTION COEFF. rd	CYCLIC STRESS RATIO	CYCLIC RESIST. RATIO (clean sand)	SAFETY FACTOR clean sand	SOIL TYPE	Apparent Fine Content %	Estimated Settlement Inches
22.15	15.1	0.8	113.1	2403.0	1644.8	0.96	0.68	0.2	0.31	Clays: silty clay to clay	56.4	
22.64	21.6	1.2	133.1	2461.8	1673.1	0.96	0.69	0.3	0.44	Silt Mixture: clayey silt to silty clay	49.7	
23.13	15.5	1.0	123.1	2520.6	1701.3	0.96	0.69	0.3	0.37	Clays: silty clay to clay	59.9	
23.62	13.7	0.6	100.2	2579.4	1729.5	0.95	0.69	0.2	0.25	Clays: silty clay to clay	57.2	
24.11	18.2	1.0	123.4	2638.2	1757.7	0.95	0.70	0.3	0.37	Silt Mixture: clayey silt to silty clay	54.6	
24.61	15.3	0.8	108.5	2698.2	1786.5	0.95	0.70	0.2	0.28	Clays: silty clay to clay	56.8	
25.10	14.2	0.6	100.2	2757.0	1814.8	0.95	0.70	0.2	0.25	Clays: silty clay to clay	57.1	
25.59	11.7	0.6	101.2	2815.8	1843.0	0.95	0.71	0.2	0.25	Clays: silty clay to clay	66.4	
26.08	8.5	0.4	78.7	2874.6	1871.2	0.95	0.71	0.1	0.18	Clays: silty clay to clay	70.1	
26.57	12.7	0.6	94.0	2933.4	1899.4	0.94	0.71	0.2	0.22	Clays: silty clay to clay	60.3	
27.07	16.3	0.9	115.2	2993.4	1928.2	0.94	0.71	0.2	0.31	Clays: silty clay to clay	58.9	
27.56	15.3	0.8	109.8	3052.2	1956.5	0.94	0.72	0.2	0.28	Clays: silty clay to clay	60.1	
28.05	14.5	0.9	114.3	3111.0	1984.7	0.94	0.72	0.2	0.30	Clays: silty clay to clay	64.6	
28.54	14.6	0.7	99.7	3169.8	2012.9	0.94	0.72	0.2	0.24	Clays: silty clay to clay	58.8	
29.04	16.8	0.7	102.5	3229.8	2041.7	0.94	0.72	0.2	0.25	Clays: silty clay to clay	54.9	
29.53	14.4	0.7	102.4	3288.6	2069.9	0.93	0.72	0.2	0.25	Clays: silty clay to clay	61.5	
30.02	10.9	0.5	90.0	3347.4	2098.2	0.93	0.72	0.1	0.20	Clays: silty clay to clay	68.5	
30.51	11.6	0.6	94.2	3406.2	2126.4	0.93	0.73	0.2	0.22	Clays: silty clay to clay	68.4	
31.00	11.3	0.6	95.8	3465.0	2154.6	0.93	0.73	0.2	0.22	Clays: silty clay to clay	71.1	
31.50	12.2	0.7	99.7	3525.0	2183.4	0.92	0.73	0.2	0.24	Clays: silty clay to clay	69.9	
31.99	12.7	0.7	98.4	3583.8	2211.6	0.92	0.73	0.2	0.23	Clays: silty clay to clay	67.4	
32.48	13.4	0.7	101.1	3642.6	2239.8	0.92	0.73	0.2	0.24	Clays: silty clay to clay	66.6	
32.97	11.7	0.6	90.0	3701.4	2268.1	0.92	0.73	0.1	0.20	Clays: silty clay to clay	68.1	
33.46	11.6	0.6	92.0	3760.2	2296.3	0.91	0.73	0.2	0.21	Clays: silty clay to clay	70.1	
33.96	12.2	0.6	91.4	3820.2	2325.1	0.91	0.73	0.2	0.21	Clays: silty clay to clay	67.7	
34.45	12.5	0.6	92.5	3879.0	2353.3	0.91	0.73	0.2	0.21	Clays: silty clay to clay	67.4	
34.94	13.9	0.7	99.4	3937.8	2381.5	0.90	0.73	0.2	0.24	Clays: silty clay to clay	66.4	
35.43	14.2	0.7	98.2	3996.6	2409.8	0.90	0.73	0.2	0.23	Clays: silty clay to clay	65.3	
35.93	13.0	0.6	92.6	4056.6	2438.6	0.90	0.73	0.2	0.21	Clays: silty clay to clay	67.2	
36.42	13.5	0.7	94.4	4115.4	2466.8	0.89	0.73	0.2	0.22	Clays: silty clay to clay	66.7	
36.91	14.6	0.7	97.2	4174.2	2495.0	0.89	0.73	0.2	0.23	Clays: silty clay to clay	64.8	
37.40	12.7	0.4	76.5	4233.0	2523.2	0.89	0.73	0.1	0.17	Clays: silty clay to clay	60.7	
37.89	12.4	0.6	88.4	4291.8	2551.5	0.88	0.72	0.1	0.20	Clays: silty clay to clay	68.6	
38.39	14.2	0.6	91.5	4351.8	2580.3	0.88	0.72	0.2	0.21	Clays: silty clay to clay	64.4	
38.88	13.5	0.5	84.3	4410.6	2608.5	0.88	0.72	0.1	0.19	Clays: silty clay to clay	63.3	
39.37	13.6	0.6	87.2	4469.4	2636.7	0.87	0.72	0.1	0.20	Clays: silty clay to clay	65.0	
39.86	14.1	0.6	88.2	4528.2	2664.9	0.87	0.72	0.1	0.20	Clays: silty clay to clay	64.3	
40.35	14.1	0.6	88.6	4587.0	2693.2	0.86	0.72	0.1	0.20	Clays: silty clay to clay	64.6	
40.85	14.4	0.6	90.5	4647.0	2722.0	0.86	0.71	0.1	0.21	Clays: silty clay to clay	64.9	
41.34	15.3	0.6	89.5	4705.8	2750.2	0.85	0.71	0.1	0.21	Clays: silty clay to clay	62.2	
41.83	18.3	0.9	104.8	4764.6	2778.4	0.85	0.71	0.2	0.26	Clays: silty clay to clay	61.7	
42.32	17.1	0.9	100.8	4823.4	2806.6	0.85	0.71	0.2	0.25	Clays: silty clay to clay	63.1	
42.81	13.9	0.5	80.3	4882.2	2834.9	0.84	0.71	0.1	0.18	Clays: silty clay to clay	62.6	
43.31	15.5	0.5	81.4	4942.2	2863.7	0.84	0.70	0.1	0.19	Clays: silty clay to clay	58.9	

LIGUEFACTION ANALYSIS

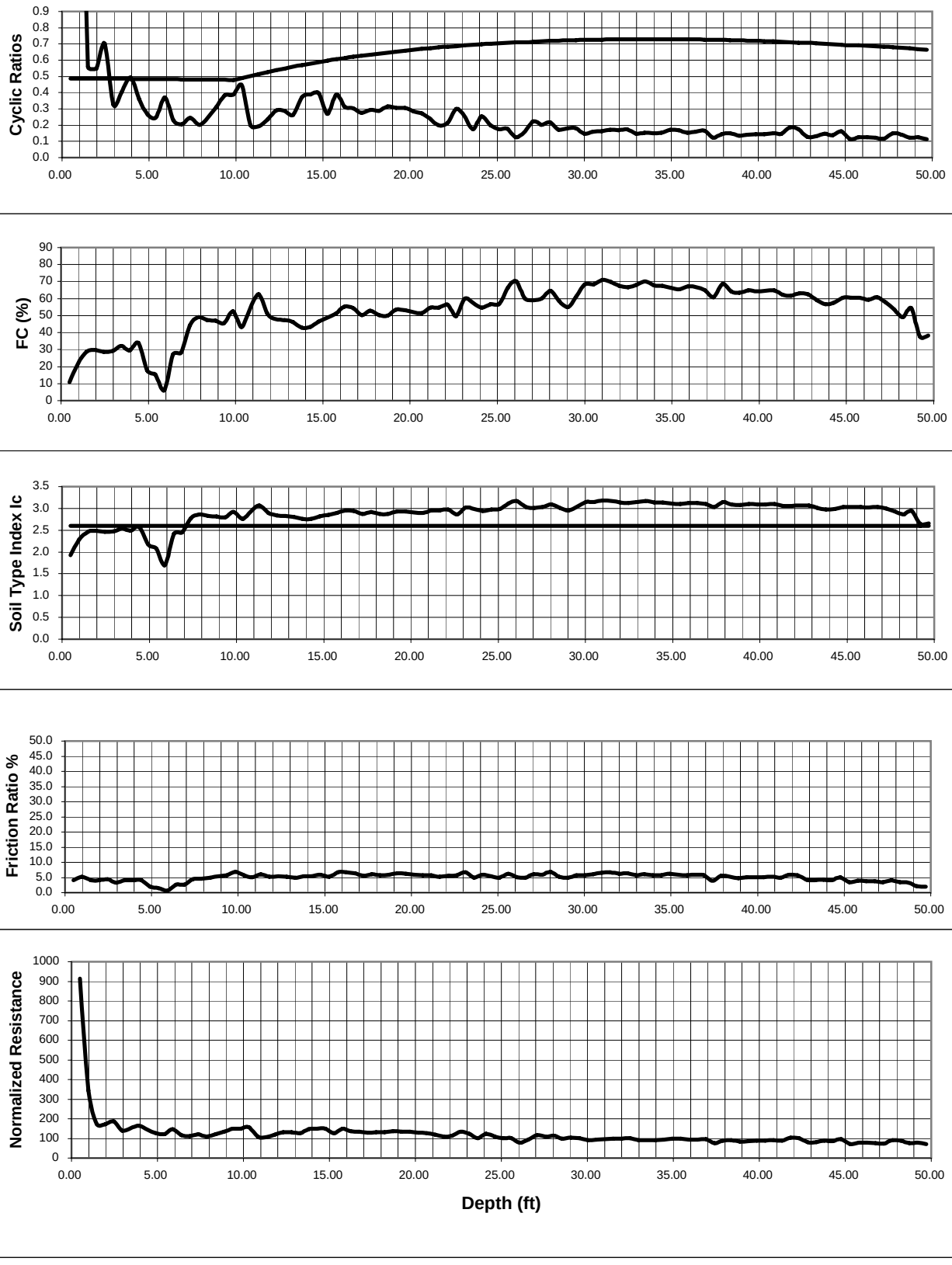
PROJECT NAME: 645 HORNING STREET CPT-1 **PROJECT NUMBER:** IMWA-5

DEPTH FT.	MEASURED TIP RESIST. TSF	MEASURED FRICTION RESIST. TSF	CORRECTED TIP RESIST. qc1N cs	TOTAL VERTICAL STRESS PSF	EFFECT. VERTICAL STRESS PSF	STRESS REDUCTION COEFF. rd	CYCLIC STRESS RATIO	CYCLIC RESIST. RATIO (clean sand)	SAFETY FACTOR clean sand	SOIL TYPE	Apparent Fine Content %	Estimated Settlement Inches
43.80	18.1	0.7	89.3	5001.0	2891.9	0.83	0.70	0.1	0.21	Clays: silty clay to clay	56.7	
44.29	17.0	0.6	84.9	5059.8	2920.1	0.83	0.70	0.1	0.20	Clays: silty clay to clay	57.5	
44.78	18.0	0.8	95.6	5118.6	2948.3	0.82	0.70	0.2	0.23	Clays: silty clay to clay	60.4	
45.28	13.5	0.4	71.4	5178.6	2977.1	0.82	0.69	0.1	0.16	Clays: silty clay to clay	60.5	
45.77	14.8	0.5	78.2	5237.4	3005.4	0.81	0.69	0.1	0.18	Clays: silty clay to clay	60.6	
46.26	15.4	0.5	78.2	5296.2	3033.6	0.81	0.69	0.1	0.18	Clays: silty clay to clay	59.3	
46.75	14.6	0.5	76.2	5355.0	3061.8	0.80	0.68	0.1	0.18	Clays: silty clay to clay	60.7	
47.24	15.1	0.4	73.2	5413.8	3090.0	0.80	0.68	0.1	0.17	Clays: silty clay to clay	57.9	
47.74	21.1	0.7	91.0	5473.8	3118.8	0.79	0.68	0.1	0.22	Silt Mixture: clayey silt to silty clay	53.6	
48.23	23.3	0.7	87.4	5532.6	3147.0	0.79	0.68	0.1	0.21	Silt Mixture: clayey silt to silty clay	49.0	
48.72	17.8	0.5	77.0	5591.4	3175.3	0.78	0.67	0.1	0.18	Silt Mixture: clayey silt to silty clay	54.3	
49.21	30.5	0.6	78.0	5650.2	3203.5	0.78	0.67	0.1	0.19	Silt Mixture: clayey silt to silty clay	37.6	
49.70	27.3	0.5	70.9	5709.0	3231.7	0.77	0.67	0.1	0.17	Silt Mixture: clayey silt to silty clay	38.2	

Potentially Liquefiable Zone

Total Anticipated Settlement **0.00**

LIQUEFACTION ANALYSIS BASED ON NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH FOR 645 HORNING STREET, CPT-1



LIGUEFACTION ANALYSIS

PROJECT NAME: 645 HORNING STREET **CPT-2** **PROJECT NUMBER:** IMWA-5

DEPTH FT.	MEASURED TIP RESIST. TSF	MEASURED FRICTION RESIST. TSF	CORRECTED TIP RESIST. qc1N cs	TOTAL VERTICAL STRESS PSF	EFFECT. VERTICAL STRESS PSF	STRESS REDUCTION COEFF. rd	CYCLIC STRESS RATIO	CYCLIC RESIST. RATIO (clean sand)	SAFETY FACTOR clean sand	SOIL TYPE	Apparent Fine Content %	Estimated Settlement Inches
0.49	61.9	1.6	488.1	41.2	41.2	1.00	0.49	10.9	22.32	Sands: clean sand to silty sand	8.7	
0.98	35.8	1.1	260.9	82.3	82.3	1.00	0.49	1.7	3.55	Sand Mixture: silty sand to sandy silt	16.1	
1.48	18.6	0.7	170.7	124.3	124.3	1.00	0.49	0.5	1.11	Sand Mixture: silty sand to sandy silt	26.0	
1.97	13.2	0.4	129.4	165.5	165.5	1.00	0.49	0.3	0.58	Sand Mixture: silty sand to sandy silt	31.0	
2.46	15.6	0.6	138.8	206.6	206.6	1.00	0.49	0.3	0.68	Sand Mixture: silty sand to sandy silt	31.2	
2.95	20.1	0.7	146.8	247.8	247.8	1.00	0.49	0.4	0.77	Sand Mixture: silty sand to sandy silt	28.7	
3.44	20.6	0.7	144.2	289.0	289.0	1.00	0.49	0.4	0.74	Sand Mixture: silty sand to sandy silt	29.5	
3.94	24.6	0.6	125.8	331.0	331.0	0.99	0.48	0.3	0.55	Sand Mixture: silty sand to sandy silt	23.8	
4.43	27.7	0.7	125.7	372.1	372.1	0.99	0.48	0.3	0.55	Sand Mixture: silty sand to sandy silt	22.5	
4.92	33.3	0.8	132.3	413.3	413.3	0.99	0.48	0.3	0.61	Sand Mixture: silty sand to sandy silt	20.7	
5.41	24.8	1.0	149.2	467.2	467.2	0.99	0.48	0.4	0.80	Sand Mixture: silty sand to sandy silt	31.7	
5.91	23.4	0.7	123.5	524.7	524.7	0.99	0.48	0.3	0.53	Sand Mixture: silty sand to sandy silt	30.0	
6.40	28.3	0.9	131.6	581.0	581.0	0.99	0.48	0.3	0.60	Sand Mixture: silty sand to sandy silt	28.1	
6.89	35.4	0.7	112.9	637.4	637.4	0.99	0.48	0.2	0.44	Sand Mixture: silty sand to sandy silt	20.6	
7.38	27.6	0.7	115.2	693.7	693.7	0.99	0.48	0.2	0.46	Sand Mixture: silty sand to sandy silt	27.6	
7.87	22.9	0.8	120.5	750.1	750.1	0.99	0.48	0.2	0.51	Silt Mixture: clayey silt to silty clay	34.3	
8.37	41.6	0.5	96.7	807.6	807.6	0.98	0.48	0.2	0.34	Sand Mixture: silty sand to sandy silt	16.1	
8.86	17.3	0.6	114.0	863.9	863.9	0.98	0.48	0.2	0.45	Silt Mixture: clayey silt to silty clay	36.6	
9.35	21.7	0.7	118.0	920.3	920.3	0.98	0.48	0.2	0.49	Silt Mixture: clayey silt to silty clay	32.8	
9.84	13.7	0.6	112.6	976.6	976.6	0.98	0.48	0.2	0.44	Silt Mixture: clayey silt to silty clay	45.8	
10.33	13.3	0.6	114.6	1033.0	1012.4	0.98	0.49	0.2	0.45	Silt Mixture: clayey silt to silty clay	48.3	
10.83	15.4	0.8	127.8	1090.5	1038.7	0.98	0.50	0.3	0.55	Silt Mixture: clayey silt to silty clay	47.7	
11.32	16.7	0.9	135.1	1146.8	1064.4	0.98	0.51	0.3	0.60	Silt Mixture: clayey silt to silty clay	47.5	
11.81	17.0	0.9	138.9	1203.2	1090.2	0.98	0.53	0.3	0.63	Silt Mixture: clayey silt to silty clay	48.3	
12.30	16.6	0.9	137.8	1259.5	1116.0	0.98	0.54	0.3	0.60	Silt Mixture: clayey silt to silty clay	49.6	
12.80	19.8	1.1	144.4	1317.0	1142.3	0.98	0.55	0.4	0.66	Silt Mixture: clayey silt to silty clay	45.7	
13.29	13.9	0.8	127.3	1373.4	1168.1	0.98	0.56	0.3	0.49	Silt Mixture: clayey silt to silty clay	54.3	
13.78	13.9	0.7	115.7	1429.7	1193.8	0.98	0.57	0.2	0.39	Silt Mixture: clayey silt to silty clay	51.5	
14.27	12.6	0.6	110.8	1486.1	1219.6	0.97	0.58	0.2	0.36	Silt Mixture: clayey silt to silty clay	54.1	
14.76	13.8	0.7	113.4	1542.4	1245.4	0.97	0.59	0.2	0.37	Silt Mixture: clayey silt to silty clay	52.0	
15.26	14.5	0.7	113.5	1599.9	1271.7	0.97	0.60	0.2	0.36	Silt Mixture: clayey silt to silty clay	50.9	
15.75	15.4	0.7	115.5	1656.3	1297.5	0.97	0.60	0.2	0.37	Silt Mixture: clayey silt to silty clay	49.9	
16.24	16.7	0.8	119.0	1712.6	1323.2	0.97	0.61	0.2	0.39	Silt Mixture: clayey silt to silty clay	48.7	
16.73	15.2	0.8	118.4	1769.0	1349.0	0.97	0.62	0.2	0.38	Silt Mixture: clayey silt to silty clay	52.3	
17.22	13.5	0.7	116.2	1825.3	1374.8	0.97	0.63	0.2	0.36	Clays: silty clay to clay	56.8	
17.72	15.8	0.9	123.3	1882.8	1401.1	0.97	0.63	0.3	0.40	Silt Mixture: clayey silt to silty clay	53.4	
18.21	16.0	0.8	121.8	1939.2	1426.8	0.97	0.64	0.2	0.39	Silt Mixture: clayey silt to silty clay	52.9	
18.70	15.6	0.7	112.6	1995.5	1452.6	0.97	0.65	0.2	0.33	Silt Mixture: clayey silt to silty clay	51.5	
19.19	14.6	0.7	107.2	2051.9	1478.4	0.96	0.65	0.2	0.30	Silt Mixture: clayey silt to silty clay	52.7	
19.69	16.4	0.8	119.6	2109.4	1504.7	0.96	0.66	0.2	0.36	Silt Mixture: clayey silt to silty clay	52.8	
20.18	19.2	1.0	125.6	2166.6	1531.4	0.96	0.66	0.3	0.40	Silt Mixture: clayey silt to silty clay	49.5	
20.67	20.2	1.0	126.6	2225.4	1559.6	0.96	0.67	0.3	0.40	Silt Mixture: clayey silt to silty clay	48.4	
21.16	21.7	1.2	134.6	2284.2	1587.8	0.96	0.67	0.3	0.46	Silt Mixture: clayey silt to silty clay	48.6	
21.65	22.3	1.1	131.5	2343.0	1616.0	0.96	0.68	0.3	0.43	Silt Mixture: clayey silt to silty clay	47.3	

LIGUEFACTION ANALYSIS

PROJECT NAME: 645 HORNING STREET **CPT-2** **PROJECT NUMBER:** IMWA-5

DEPTH FT.	MEASURED TIP RESIST. TSF	MEASURED FRICTION RESIST. TSF	CORRECTED TIP RESIST. qc1N cs	TOTAL VERTICAL STRESS PSF	EFFECT. VERTICAL STRESS PSF	STRESS REDUCTION COEFF. rd	CYCLIC STRESS RATIO	CYCLIC RESIST. RATIO (clean sand)	SAFETY FACTOR clean sand	SOIL TYPE	Apparent Fine Content %	Estimated Settlement Inches
22.15	23.8	1.2	135.5	2403.0	1644.8	0.96	0.68	0.3	0.46	Silt Mixture: clayey silt to silty clay	46.7	
22.64	21.6	1.0	121.4	2461.8	1673.1	0.96	0.69	0.2	0.36	Silt Mixture: clayey silt to silty clay	46.7	
23.13	17.6	0.9	117.0	2520.6	1701.3	0.96	0.69	0.2	0.33	Silt Mixture: clayey silt to silty clay	52.8	
23.62	18.5	0.8	109.3	2579.4	1729.5	0.95	0.69	0.2	0.29	Silt Mixture: clayey silt to silty clay	49.2	
24.11	16.2	0.9	114.9	2638.2	1757.7	0.95	0.70	0.2	0.32	Clays: silty clay to clay	56.2	
24.61	9.4	0.4	79.8	2698.2	1786.5	0.95	0.70	0.1	0.18	Clays: silty clay to clay	64.4	
25.10	18.6	0.7	104.4	2757.0	1814.8	0.95	0.70	0.2	0.26	Silt Mixture: clayey silt to silty clay	48.6	
25.59	23.9	1.2	131.1	2815.8	1843.0	0.95	0.71	0.3	0.41	Silt Mixture: clayey silt to silty clay	48.3	
26.08	16.2	1.0	120.5	2874.6	1871.2	0.95	0.71	0.2	0.34	Clays: silty clay to clay	60.3	
26.57	12.1	0.5	89.5	2933.4	1899.4	0.94	0.71	0.1	0.21	Clays: silty clay to clay	60.2	
27.07	15.5	0.9	112.8	2993.4	1928.2	0.94	0.71	0.2	0.30	Clays: silty clay to clay	60.1	
27.56	12.6	0.6	99.5	3052.2	1956.5	0.94	0.72	0.2	0.24	Clays: silty clay to clay	64.3	
28.05	9.4	0.4	79.3	3111.0	1984.7	0.94	0.72	0.1	0.18	Clays: silty clay to clay	67.7	
28.54	13.3	0.6	95.1	3169.8	2012.9	0.94	0.72	0.2	0.22	Clays: silty clay to clay	60.8	
29.04	13.8	0.7	102.4	3229.8	2041.7	0.94	0.72	0.2	0.25	Clays: silty clay to clay	62.8	
29.53	12.4	0.7	104.1	3288.6	2069.9	0.93	0.72	0.2	0.26	Clays: silty clay to clay	69.0	
30.02	10.5	0.6	94.3	3347.4	2098.2	0.93	0.72	0.2	0.22	Clays: silty clay to clay	73.1	
30.51	11.8	0.6	96.0	3406.2	2126.4	0.93	0.73	0.2	0.22	Clays: silty clay to clay	68.3	
31.00	11.4	0.6	92.6	3465.0	2154.6	0.93	0.73	0.2	0.21	Clays: silty clay to clay	69.0	
31.50	10.8	0.6	90.4	3525.0	2183.4	0.92	0.73	0.1	0.20	Clays: silty clay to clay	70.6	
31.99	8.8	0.3	75.1	3583.8	2211.6	0.92	0.73	0.1	0.16	Clays: silty clay to clay	72.4	
32.48	9.9	0.4	82.6	3642.6	2239.8	0.92	0.73	0.1	0.18	Clays: silty clay to clay	71.7	
32.97	10.2	0.5	87.5	3701.4	2268.1	0.92	0.73	0.1	0.20	Clays: silty clay to clay	73.6	
33.46	10.8	0.6	91.6	3760.2	2296.3	0.91	0.73	0.2	0.21	Clays: silty clay to clay	73.5	
33.96	10.9	0.6	89.9	3820.2	2325.1	0.91	0.73	0.1	0.20	Clays: silty clay to clay	72.6	
34.45	10.8	0.6	88.9	3879.0	2353.3	0.91	0.73	0.1	0.20	Clays: silty clay to clay	72.7	
34.94	11.2	0.5	86.3	3937.8	2381.5	0.90	0.73	0.1	0.19	Clays: silty clay to clay	70.2	
35.43	10.9	0.5	86.7	3996.6	2409.8	0.90	0.73	0.1	0.19	Clays: silty clay to clay	72.0	
35.93	10.9	0.6	89.8	4056.6	2438.6	0.90	0.73	0.1	0.20	Clays: silty clay to clay	74.4	
36.42	11.9	0.6	89.3	4115.4	2466.8	0.89	0.73	0.1	0.20	Clays: silty clay to clay	70.1	
36.91	13.1	0.7	94.8	4174.2	2495.0	0.89	0.73	0.2	0.22	Clays: silty clay to clay	68.7	
37.40	13.2	0.7	94.9	4233.0	2523.2	0.89	0.73	0.2	0.22	Clays: silty clay to clay	68.6	
37.89	13.0	0.5	84.4	4291.8	2551.5	0.88	0.72	0.1	0.19	Clays: silty clay to clay	64.3	
38.39	13.9	0.7	92.6	4351.8	2580.3	0.88	0.72	0.2	0.21	Clays: silty clay to clay	65.8	
38.88	13.5	0.6	91.2	4410.6	2608.5	0.88	0.72	0.2	0.21	Clays: silty clay to clay	67.0	
39.37	13.6	0.6	89.1	4469.4	2636.7	0.87	0.72	0.1	0.20	Clays: silty clay to clay	66.0	
39.86	13.4	0.6	87.6	4528.2	2664.9	0.87	0.72	0.1	0.20	Clays: silty clay to clay	66.0	
40.35	12.2	0.4	74.2	4587.0	2693.2	0.86	0.72	0.1	0.16	Clays: silty clay to clay	63.4	
40.85	12.0	0.3	69.6	4647.0	2722.0	0.86	0.71	0.1	0.16	Clays: silty clay to clay	61.5	
41.34	14.1	0.6	86.4	4705.8	2750.2	0.85	0.71	0.1	0.20	Clays: silty clay to clay	64.4	
41.83	14.5	0.6	89.7	4764.6	2778.4	0.85	0.71	0.1	0.21	Clays: silty clay to clay	64.9	
42.32	14.1	0.6	85.8	4823.4	2806.6	0.85	0.71	0.1	0.20	Clays: silty clay to clay	64.6	
42.81	14.2	0.5	82.3	4882.2	2834.9	0.84	0.71	0.1	0.19	Clays: silty clay to clay	62.8	
43.31	15.1	0.7	92.9	4942.2	2863.7	0.84	0.70	0.2	0.22	Clays: silty clay to clay	65.9	

LIGUEFACTION ANALYSIS

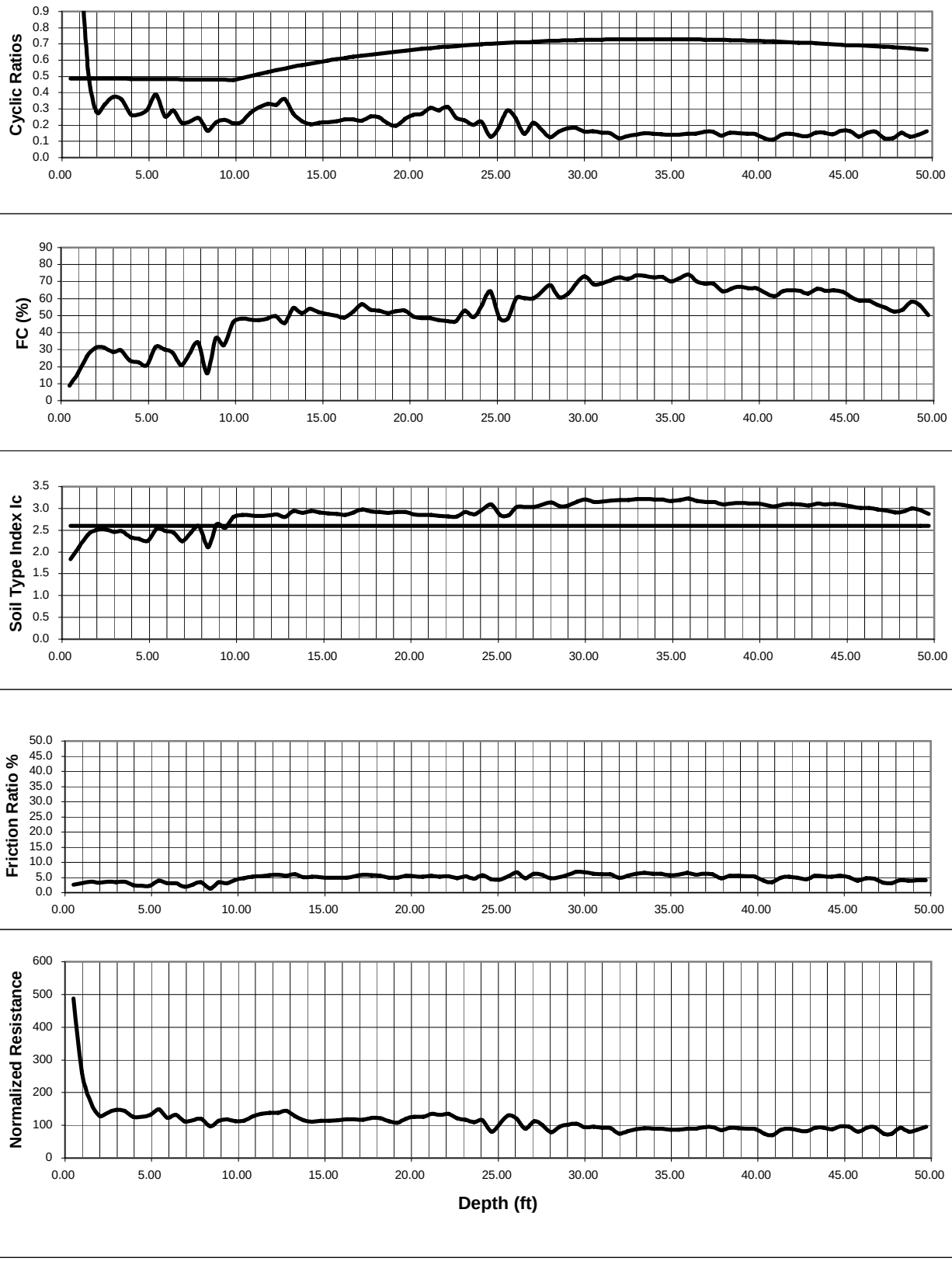
PROJECT NAME: 645 HORNING STREET CPT-2 **PROJECT NUMBER:** IMWA-5

DEPTH FT.	MEASURED TIP RESIST. TSF	MEASURED FRICTION RESIST. TSF	CORRECTED TIP RESIST. qc1N cs	TOTAL VERTICAL STRESS PSF	EFFECT. VERTICAL STRESS PSF	STRESS REDUCTION COEFF. rd	CYCLIC STRESS RATIO	CYCLIC RESIST. RATIO (clean sand)	SAFETY FACTOR clean sand	SOIL TYPE	Apparent Fine Content %	Estimated Settlement Inches
43.80	15.6	0.7	92.3	5001.0	2891.9	0.83	0.70	0.2	0.22	Clays: silty clay to clay	64.5	
44.29	14.9	0.6	88.5	5059.8	2920.1	0.83	0.70	0.1	0.21	Clays: silty clay to clay	64.9	
44.78	16.8	0.8	97.1	5118.6	2948.3	0.82	0.70	0.2	0.24	Clays: silty clay to clay	63.9	
45.28	17.9	0.8	95.6	5178.6	2977.1	0.82	0.69	0.2	0.23	Clays: silty clay to clay	60.8	
45.77	15.9	0.5	80.2	5237.4	3005.4	0.81	0.69	0.1	0.19	Clays: silty clay to clay	58.6	
46.26	18.5	0.7	92.2	5296.2	3033.6	0.81	0.69	0.2	0.22	Clays: silty clay to clay	58.6	
46.75	20.1	0.8	94.6	5355.0	3061.8	0.80	0.68	0.2	0.23	Clays: silty clay to clay	56.5	
47.24	16.7	0.5	74.7	5413.8	3090.0	0.80	0.68	0.1	0.17	Silt Mixture: clayey silt to silty clay	54.7	
47.74	18.1	0.5	75.1	5473.8	3118.8	0.79	0.68	0.1	0.18	Silt Mixture: clayey silt to silty clay	52.3	
48.23	21.5	0.8	92.0	5532.6	3147.0	0.79	0.68	0.2	0.23	Silt Mixture: clayey silt to silty clay	53.6	
48.72	17.1	0.6	81.2	5591.4	3175.3	0.78	0.67	0.1	0.19	Clays: silty clay to clay	58.0	
49.21	19.1	0.7	86.1	5650.2	3203.5	0.78	0.67	0.1	0.21	Clays: silty clay to clay	56.1	
49.70	25.2	0.9	96.3	5709.0	3231.7	0.77	0.67	0.2	0.25	Silt Mixture: clayey silt to silty clay	50.2	

Potentially Liquefiable Zone

Total Anticipated Settlement **0.00**

LIQUEFACTION ANALYSIS BASED ON NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH FOR 645 HORNING STREET, CPT-2



LIGUEFACTION ANALYSIS

PROJECT NAME: 645 HORNING STREET **CPT-3** **PROJECT NUMBER:** IMWA-5

DEPTH FT.	MEASURED TIP RESIST. TSF	MEASURED FRICTION RESIST. TSF	CORRECTED TIP RESIST. qc1N cs	TOTAL VERTICAL STRESS PSF	EFFECT. VERTICAL STRESS PSF	STRESS REDUCTION COEFF. rd	CYCLIC STRESS RATIO	CYCLIC RESIST. RATIO (clean sand)	SAFETY FACTOR clean sand	SOIL TYPE	Apparent Fine Content %	Estimated Settlement Inches
0.49	314.9	2.3	2194.8	41.2	41.2	1.00	0.49	983.3	2014.80	Gravelly sand to dense sand	0.0	
0.98	62.2	2.1	398.3	82.3	82.3	1.00	0.49	6.0	12.21	Sands: clean sand to silty sand	12.9	
1.48	21.4	0.8	188.6	124.3	124.3	1.00	0.49	0.7	1.44	Sand Mixture: silty sand to sandy silt	25.1	
1.97	16.2	0.4	117.0	165.5	165.5	1.00	0.49	0.2	0.47	Sand Mixture: silty sand to sandy silt	23.9	
2.46	17.8	0.6	143.1	206.6	206.6	1.00	0.49	0.4	0.73	Sand Mixture: silty sand to sandy silt	28.9	
2.95	15.1	0.6	133.9	247.8	247.8	1.00	0.49	0.3	0.62	Silt Mixture: clayey silt to silty clay	33.5	
3.44	13.3	0.5	148.6	289.0	289.0	1.00	0.49	0.4	0.79	Sand Mixture: silty sand to sandy silt	29.2	
3.94	10.5	0.4	134.9	331.0	331.0	0.99	0.48	0.3	0.64	Silt Mixture: clayey silt to silty clay	35.2	
4.43	12.6	0.4	132.4	372.1	372.1	0.99	0.48	0.3	0.61	Sand Mixture: silty sand to sandy silt	32.3	
4.92	10.9	0.4	125.3	413.3	413.3	0.99	0.48	0.3	0.54	Silt Mixture: clayey silt to silty clay	36.6	
5.41	17.9	0.2	71.3	467.2	467.2	0.99	0.48	0.1	0.24	Sand Mixture: silty sand to sandy silt	22.1	
5.91	29.3	0.5	99.5	524.7	524.7	0.99	0.48	0.2	0.36	Sand Mixture: silty sand to sandy silt	19.8	
6.40	54.0	0.7	128.9	581.0	581.0	0.99	0.48	0.3	0.58	Sands: clean sand to silty sand	12.6	
6.89	39.7	0.5	102.7	637.4	637.4	0.99	0.48	0.2	0.37	Sand Mixture: silty sand to sandy silt	15.8	
7.38	19.6	0.4	92.2	693.7	693.7	0.99	0.48	0.2	0.32	Sand Mixture: silty sand to sandy silt	30.5	
7.87	16.0	0.4	86.6	750.1	750.1	0.99	0.48	0.1	0.29	Silt Mixture: clayey silt to silty clay	35.1	
8.37	10.0	0.4	98.2	807.6	807.6	0.98	0.48	0.2	0.35	Silt Mixture: clayey silt to silty clay	47.0	
8.86	5.7	0.2	79.1	863.9	863.9	0.98	0.48	0.1	0.26	Clays: silty clay to clay	62.2	
9.35	6.1	0.3	82.1	920.3	920.3	0.98	0.48	0.1	0.27	Clays: silty clay to clay	62.8	
9.84	7.4	0.3	88.2	976.6	976.6	0.98	0.48	0.1	0.30	Clays: silty clay to clay	59.6	
10.33	10.6	0.6	111.8	1033.0	1012.4	0.98	0.49	0.2	0.43	Clays: silty clay to clay	55.8	
10.83	10.7	0.6	112.0	1090.5	1038.7	0.98	0.50	0.2	0.42	Clays: silty clay to clay	55.9	
11.32	14.7	0.7	125.1	1146.8	1064.4	0.98	0.51	0.3	0.51	Silt Mixture: clayey silt to silty clay	49.2	
11.81	10.1	0.6	111.5	1203.2	1090.2	0.98	0.53	0.2	0.40	Clays: silty clay to clay	59.7	
12.30	10.5	0.6	108.8	1259.5	1116.0	0.98	0.54	0.2	0.37	Clays: silty clay to clay	57.7	
12.80	9.9	0.4	98.2	1317.0	1142.3	0.98	0.55	0.2	0.31	Clays: silty clay to clay	56.7	
13.29	9.4	0.4	97.4	1373.4	1168.1	0.98	0.56	0.2	0.30	Clays: silty clay to clay	59.4	
13.78	13.2	0.6	106.0	1429.7	1193.8	0.98	0.57	0.2	0.34	Silt Mixture: clayey silt to silty clay	50.3	
14.27	16.1	0.6	109.8	1486.1	1219.6	0.97	0.58	0.2	0.35	Silt Mixture: clayey silt to silty clay	45.2	
14.76	18.3	0.7	113.9	1542.4	1245.4	0.97	0.59	0.2	0.37	Silt Mixture: clayey silt to silty clay	42.9	
15.26	15.0	0.6	103.7	1599.9	1271.7	0.97	0.60	0.2	0.31	Silt Mixture: clayey silt to silty clay	46.6	
15.75	13.3	0.5	101.3	1656.3	1297.5	0.97	0.60	0.2	0.29	Silt Mixture: clayey silt to silty clay	50.4	
16.24	14.2	0.7	114.9	1712.6	1323.2	0.97	0.61	0.2	0.36	Silt Mixture: clayey silt to silty clay	53.1	
16.73	16.8	0.8	118.9	1769.0	1349.0	0.97	0.62	0.2	0.38	Silt Mixture: clayey silt to silty clay	49.0	
17.22	14.4	0.7	115.3	1825.3	1374.8	0.97	0.63	0.2	0.36	Silt Mixture: clayey silt to silty clay	53.8	
17.72	15.1	0.7	115.0	1882.8	1401.1	0.97	0.63	0.2	0.35	Silt Mixture: clayey silt to silty clay	52.6	
18.21	16.7	0.8	118.8	1939.2	1426.8	0.97	0.64	0.2	0.37	Silt Mixture: clayey silt to silty clay	50.6	
18.70	17.6	0.9	124.8	1995.5	1452.6	0.97	0.65	0.3	0.40	Silt Mixture: clayey silt to silty clay	50.9	
19.19	19.7	1.0	129.1	2051.9	1478.4	0.96	0.65	0.3	0.43	Silt Mixture: clayey silt to silty clay	48.7	
19.69	21.2	1.1	134.9	2109.4	1504.7	0.96	0.66	0.3	0.47	Silt Mixture: clayey silt to silty clay	48.1	
20.18	20.5	1.1	132.0	2166.6	1531.4	0.96	0.66	0.3	0.44	Silt Mixture: clayey silt to silty clay	49.0	
20.67	20.5	1.0	128.2	2225.4	1559.6	0.96	0.67	0.3	0.41	Silt Mixture: clayey silt to silty clay	48.4	
21.16	21.7	1.1	128.4	2284.2	1587.8	0.96	0.67	0.3	0.41	Silt Mixture: clayey silt to silty clay	47.1	
21.65	19.8	0.9	120.7	2343.0	1616.0	0.96	0.68	0.2	0.36	Silt Mixture: clayey silt to silty clay	48.4	

LIGUEFACTION ANALYSIS

PROJECT NAME: 645 HORNING STREET | **CPT-3** | **PROJECT NUMBER:** IMWA-5

DEPTH FT.	MEASURED TIP RESIST. TSF	MEASURED FRICTION RESIST. TSF	CORRECTED TIP RESIST. qc1N cs	TOTAL VERTICAL STRESS PSF	EFFECT. VERTICAL STRESS PSF	STRESS REDUCTION COEFF. rd	CYCLIC STRESS RATIO	CYCLIC RESIST. RATIO (clean sand)	SAFETY FACTOR clean sand	SOIL TYPE	Apparent Fine Content %	Estimated Settlement Inches
22.15	17.6	0.7	106.3	2403.0	1644.8	0.96	0.68	0.2	0.28	Silt Mixture: clayey silt to silty clay	48.6	
22.64	14.0	0.7	108.2	2461.8	1673.1	0.96	0.69	0.2	0.29	Clays: silty clay to clay	58.2	
23.13	26.7	1.4	141.2	2520.6	1701.3	0.96	0.69	0.3	0.50	Silt Mixture: clayey silt to silty clay	45.1	
23.62	33.8	1.7	151.0	2579.4	1729.5	0.95	0.69	0.4	0.58	Silt Mixture: clayey silt to silty clay	40.2	
24.11	24.2	1.3	138.6	2638.2	1757.7	0.95	0.70	0.3	0.47	Silt Mixture: clayey silt to silty clay	48.4	
24.61	20.0	1.0	123.2	2698.2	1786.5	0.95	0.70	0.3	0.36	Silt Mixture: clayey silt to silty clay	51.5	
25.10	13.9	0.5	91.9	2757.0	1814.8	0.95	0.70	0.2	0.22	Silt Mixture: clayey silt to silty clay	54.4	
25.59	15.9	0.7	105.8	2815.8	1843.0	0.95	0.71	0.2	0.27	Clays: silty clay to clay	55.2	
26.08	10.6	0.5	91.0	2874.6	1871.2	0.95	0.71	0.2	0.21	Clays: silty clay to clay	66.5	
26.57	9.9	0.5	87.4	2933.4	1899.4	0.94	0.71	0.1	0.20	Clays: silty clay to clay	68.4	
27.07	14.0	0.7	100.3	2993.4	1928.2	0.94	0.71	0.2	0.24	Clays: silty clay to clay	59.5	
27.56	15.8	0.8	105.7	3052.2	1956.5	0.94	0.72	0.2	0.26	Clays: silty clay to clay	57.1	
28.05	14.1	0.7	103.9	3111.0	1984.7	0.94	0.72	0.2	0.26	Clays: silty clay to clay	61.7	
28.54	10.7	0.5	89.7	3169.8	2012.9	0.94	0.72	0.1	0.20	Clays: silty clay to clay	68.1	
29.04	11.7	0.6	98.4	3229.8	2041.7	0.94	0.72	0.2	0.23	Clays: silty clay to clay	68.7	
29.53	11.6	0.6	95.0	3288.6	2069.9	0.93	0.72	0.2	0.22	Clays: silty clay to clay	67.7	
30.02	11.1	0.5	91.1	3347.4	2098.2	0.93	0.72	0.2	0.21	Clays: silty clay to clay	68.4	
30.51	10.7	0.5	88.4	3406.2	2126.4	0.93	0.73	0.1	0.20	Clays: silty clay to clay	69.1	
31.00	10.3	0.5	88.2	3465.0	2154.6	0.93	0.73	0.1	0.20	Clays: silty clay to clay	71.6	
31.50	10.6	0.6	92.9	3525.0	2183.4	0.92	0.73	0.2	0.21	Clays: silty clay to clay	73.1	
31.99	11.4	0.6	92.4	3583.8	2211.6	0.92	0.73	0.2	0.21	Clays: silty clay to clay	69.5	
32.48	11.6	0.5	88.5	3642.6	2239.8	0.92	0.73	0.1	0.20	Clays: silty clay to clay	67.4	
32.97	12.2	0.6	92.5	3701.4	2268.1	0.92	0.73	0.2	0.21	Clays: silty clay to clay	67.3	
33.46	12.6	0.7	95.9	3760.2	2296.3	0.91	0.73	0.2	0.22	Clays: silty clay to clay	68.0	
33.96	12.5	0.6	94.0	3820.2	2325.1	0.91	0.73	0.2	0.22	Clays: silty clay to clay	68.0	
34.45	13.8	0.7	97.3	3879.0	2353.3	0.91	0.73	0.2	0.23	Clays: silty clay to clay	65.2	
34.94	12.7	0.6	93.0	3937.8	2381.5	0.90	0.73	0.2	0.21	Clays: silty clay to clay	67.7	
35.43	12.6	0.6	90.9	3996.6	2409.8	0.90	0.73	0.1	0.21	Clays: silty clay to clay	67.0	
35.93	13.3	0.7	94.4	4056.6	2438.6	0.90	0.73	0.2	0.22	Clays: silty clay to clay	67.0	
36.42	12.9	0.6	92.0	4115.4	2466.8	0.89	0.73	0.2	0.21	Clays: silty clay to clay	67.6	
36.91	13.5	0.6	90.5	4174.2	2495.0	0.89	0.73	0.1	0.20	Clays: silty clay to clay	65.0	
37.40	14.2	0.7	93.0	4233.0	2523.2	0.89	0.73	0.2	0.21	Clays: silty clay to clay	64.2	
37.89	14.7	0.7	95.0	4291.8	2551.5	0.88	0.72	0.2	0.22	Clays: silty clay to clay	64.0	
38.39	15.3	0.8	99.7	4351.8	2580.3	0.88	0.72	0.2	0.24	Clays: silty clay to clay	65.0	
38.88	15.2	0.7	95.3	4410.6	2608.5	0.88	0.72	0.2	0.22	Clays: silty clay to clay	63.4	
39.37	14.1	0.6	86.1	4469.4	2636.7	0.87	0.72	0.1	0.19	Clays: silty clay to clay	62.8	
39.86	14.4	0.5	83.3	4528.2	2664.9	0.87	0.72	0.1	0.19	Clays: silty clay to clay	60.7	
40.35	13.3	0.6	87.1	4587.0	2693.2	0.86	0.72	0.1	0.20	Clays: silty clay to clay	66.6	
40.85	15.0	0.7	93.9	4647.0	2722.0	0.86	0.71	0.2	0.22	Clays: silty clay to clay	64.7	
41.34	15.2	0.7	93.2	4705.8	2750.2	0.85	0.71	0.2	0.22	Clays: silty clay to clay	64.4	
41.83	16.4	0.9	101.6	4764.6	2778.4	0.85	0.71	0.2	0.25	Clays: silty clay to clay	65.0	
42.32	15.4	0.8	96.6	4823.4	2806.6	0.85	0.71	0.2	0.23	Clays: silty clay to clay	66.0	
42.81	15.6	0.7	93.5	4882.2	2834.9	0.84	0.71	0.2	0.22	Clays: silty clay to clay	64.4	
43.31	14.6	0.6	89.4	4942.2	2863.7	0.84	0.70	0.1	0.21	Clays: silty clay to clay	65.7	

LIGUEFACTION ANALYSIS

PROJECT NAME: 645 HORNING STREET CPT-3 **PROJECT NUMBER:** IMWA-5

DEPTH FT.	MEASURED TIP RESIST. TSF	MEASURED FRICTION RESIST. TSF	CORRECTED TIP RESIST. qc1N cs	TOTAL VERTICAL STRESS PSF	EFFECT. VERTICAL STRESS PSF	STRESS REDUCTION COEFF. rd	CYCLIC STRESS RATIO	CYCLIC RESIST. RATIO (clean sand)	SAFETY FACTOR clean sand	SOIL TYPE	Apparent Fine Content %	Estimated Settlement Inches
43.80	18.6	0.6	86.4	5001.0	2891.9	0.83	0.70	0.1	0.20	Silt Mixture: clayey silt to silty clay	54.3	
44.29	17.5	0.6	82.9	5059.8	2920.1	0.83	0.70	0.1	0.19	Clays: silty clay to clay	55.3	
44.78	19.2	0.6	86.8	5118.6	2948.3	0.82	0.70	0.1	0.20	Silt Mixture: clayey silt to silty clay	53.9	
45.28	17.3	0.5	78.9	5178.6	2977.1	0.82	0.69	0.1	0.18	Silt Mixture: clayey silt to silty clay	54.5	
45.77	15.5	0.3	67.6	5237.4	3005.4	0.81	0.69	0.1	0.16	Silt Mixture: clayey silt to silty clay	53.0	
46.26	18.6	0.4	69.6	5296.2	3033.6	0.81	0.69	0.1	0.16	Silt Mixture: clayey silt to silty clay	48.0	
46.75	20.7	0.8	92.1	5355.0	3061.8	0.80	0.68	0.2	0.22	Silt Mixture: clayey silt to silty clay	54.3	
47.24	22.2	0.9	97.3	5413.8	3090.0	0.80	0.68	0.2	0.24	Silt Mixture: clayey silt to silty clay	54.0	
47.74	20.9	0.8	93.2	5473.8	3118.8	0.79	0.68	0.2	0.23	Clays: silty clay to clay	54.9	
48.23	21.1	0.7	90.5	5532.6	3147.0	0.79	0.68	0.1	0.22	Silt Mixture: clayey silt to silty clay	53.8	
48.72	22.2	0.7	84.8	5591.4	3175.3	0.78	0.67	0.1	0.20	Silt Mixture: clayey silt to silty clay	49.8	
49.21	18.4	0.6	80.7	5650.2	3203.5	0.78	0.67	0.1	0.19	Clays: silty clay to clay	55.2	
49.70	25.5	0.7	83.2	5709.0	3231.7	0.77	0.67	0.1	0.20	Silt Mixture: clayey silt to silty clay	45.0	

Potentially Liquefiable Zone

Total Anticipated Settlement **0.00**

LIQUEFACTION ANALYSIS BASED ON NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH FOR 645 HORNING STREET, CPT-3