SOIL TESTERS

P.O. Box 1195
Lakeside, California
92040
(619) 443-0060

March 21, 2022

Philip Chodur
G8 Development, Inc.
4538 Cass Street
San Diego, California 92138

SUBJECT: File No. 1251H2A-19 and 1251H2A-19
SITE INSPECTION - Response
Proposed Residential Building Site
1065, 1067 & 1069 E Bradley Avenue
El Cajon area, County of San Diego

Dear Mr. Chodur:

Per your email of January 24, 2022, the additional information you requested is as follows:

5. Updated geotechnical report addressing the following review comments.

   a. Provide pavement structural section recommendations.

      A R-Value test was not performed during our site investigation. Testing will be done on the as-graded conditions. Without the R-Value test, an assumed pavement section of 4 inches of asphalt concrete over 8 inches of Class II base should be used.

   b. It appears that laboratory test to determine soil parameters were performed by a third part. Provide the third party graphical plots and results of all test performed including but not limited to, shear strength, gradation, expansive index to verify parameters are as reported in the summary.

      The laboratory testing presented in our report was performed by our own lab and other labs. We do not include the work product in our signed, stamped reports.

   c. Overtly state in the Geotechnical Report regarding chemical testing for PH, sulfate and chloride content, carbonate and sulfide content, and resistivity, whether or not the results of the testing provided negligible results and/or whether or not additional testing is required from a qualified corrosion engineer.

The design engineer should determine whether additional testing from a qualified corrosion engineer is needed.

d. Provide site investigation logs. Include a Geotechnical Map delineating geologic soil types and location of test pits and borings.

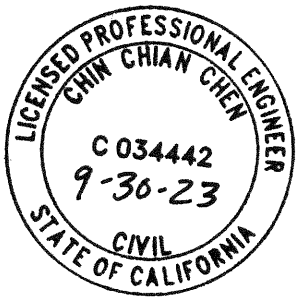
Please see attached updated reports with the logs and maps with the trench locations.

If we can be of any further assistance, please do not hesitate to contact our office. This opportunity to be of service is sincerely appreciated.

Respectfully submitted,

Chin C. Chen, RPE C34442

CCC/mlj



SOIL TESTERS

P.O. Box 119
Lakeside, California
92040
(619) 443-0060

March 28, 2019

Philip Chodur
G8 Development, Inc.
4538 Cass Street
San Diego, California 92138

SUBJECT: File No. 1251H2-19
SITE INSPECTION
Proposed Residential Building Site
1065 E Bradley Avenue
El Cajon area, County of San Diego

Dear Mr. Chodur:

SCOPE

In accordance with your request, a Site Inspection has been performed at the subject site. The purpose of this investigation was to examine existing site conditions and provide engineering recommendations for the 13-15 proposed two-story residential units.

FIELD INSPECTION

In order to accomplish this purpose, a representative of this firm visited the site, reviewed the topography and site conditions and visually and textually classified the surface and near surface soils. Representative samples of the on-site soils were obtained from 5 test explorations approximately 5 to 6 feet in depth and tested for density, shear strength and expansive characteristics.

SITE CONDITIONS

The subject site is located on the south side of E Bradley Avenue. The site is relatively level with an approximate 3 degree inclination from east to west. The property is currently occupied by a single family residence and a metal workshop. The existing structures will be removed to make way for the new development. Other neighboring properties are occupied by residential and commercial structures. Fill materials were not encountered and loose

natives soils were encountered to approximately 1 to 3 feet in depth during course of this inspection.

SOIL CONDITIONS

Soils encountered in the test explorations were topsoils consisting of loose, brown, silty sands to approximately 8 inches in depth. These surface soils were underlain with native soils consisting of firm, red brown, silty sands with a trace of clay to a depth of 3 to 4 feet where medium dense to dense, red brown, silty sands with a trace of clay were encountered to the bottom of the explorations approximately 5 to 6 feet in depth.

The soils we encountered were not considered to be expansive with respect to change in volume with change in moisture content.

CONCLUSIONS AND RECOMMENDATIONS

1. A representative sample of the foundation soil was remolded to 90% of maximum dry density. Based on the following test results, a safe allowable bearing value of at least 2000 pounds per square foot for 12 inch deep footings may be used in designing the foundations and slab for the proposed structures. This value may be increased by one third for wind and/or seismic loading. This value may be increased by 20 percent for each additional foot of depth and or width to a maximum of 3 times the designated value.

Maximum Dry Density	130.1 pcf
Optimum Moisture	10.8%
Angle of internal friction	35°
Cohesion	217 psf
Unit weight	117.7 pcf
Expansion Index	30

2. Lateral resistance to horizontal movement may be provided by the soil passive pressure and friction of concrete to soil. An allowable passive pressure of 250 pounds per square foot per foot of depth may be used. A coefficient of friction of 0.35 is recommended. The soils passive pressure may be increased by 1/3 for wind and seismic loading.

3. The seismic parameters for the site coordinates 33.81884°N, 116.94626°W for assumed Site Class D are as follows:

• S_s = 0.871 g	S_{ms} = 1.003 g	S_{ds} = 0.669 g
• S_1 = 0.337 g	S_{m1} = 0.582 g	S_{d1} = 0.388 g

4. The existing compressible native soils we encountered should not be utilized to support the proposed new structure. They should be recompacted to at least 90 percent of maximum dry density in accordance with the Grading Specifications in this report in order to provide adequate support for the proposed new structures. Anticipated depth of recompaction is 3 to 4 feet. The recompaction should extend at least five feet outside the proposed building footprint. Organic materials and roots must be removed from the soils before replacement.

5. Conventional spread footings founded a minimum of 12 inches below lowest adjacent grade and having a width determined by the allowable soil bearing value as detailed above are recommended for foundation support. Footing widths should be at least 12 inches for continuous footings and 24 inches for square footings due to practical considerations as well as Building Code requirements. These recommendations are based upon the soil type encountered and do not take into consideration the proposed bearing load.

6. Concrete Slab-On-Grade, SOG, should be designed by the project's structural engineer based on anticipated loading conditions. We recommend that conventional reinforced concrete SOG for this project be founded on 4 inches of Class II Virgin Aggregate Base (with approximately 2% +/- over optimum moisture content and 90% compaction, relative to the lab maximum dry density, ASTM D 1557), overlying a 12 inch thick zone of adequately placed and compacted structural fill. We recommend that a moisture barrier be provided by a membrane, visqueen 10 mils in minimum thickness or equivalent, be placed at top of well compacted Class II Aggregate Base, then covered with 2 inches of moist clean sand having a minimum sand equivalent of 30 when tested in accordance with the American Society of Testing and Materials test method `ASTM D1555.

   Floor slabs, as a minimum, should be 5 inches thick with #4 reinforcing steel at 16" on-center each way. Reinforcement should be placed at mid-height of the slab. The final slab thickness and reinforcement should be determined by the structural design engineer. Control joints should be provided in accordance with the recommendations of the structural design engineer.

SITE EROSION CONTROL

During the construction, surface water should be controlled via berms, gravel bags and/or sandbags, silt fence, straw wattles, siltation basins, while maintaining positive surface grades or other methods to avoid damage to the finish work or adjoining properties. All site entrances and exits must have coarse gravel or steel shaker plates to minimize offsite sediment tracking. Best management Practices (BMP's) must be used to protect storm drains and minimize pollution. The contractor should take measures to prevent erosion of graded areas until such time as permanent drainage and erosion control measures have been installed. After completion of grading, all excavated surfaces should exhibit positive drainage and eliminate areas where water might pond.

SITE AND SURFACE DRAINAGE

Drainage at the site should be directed away from foundations, collected and tight lined to appropriate discharge points. Consideration may be given to collecting roof drainage by eave gutters and directing it away from foundations via non-erosive devices. Water, either natural or from irrigation, should not be permitted to pond, saturate the surface soils or flow towards the foundation. Landscaping requiring a heavy irrigation schedule should not be planted adjacent to foundations or paved areas. The type of drainage issues found within the project and materials specified and used should be determined by the Engineer of Record.

GROUNDWATER AND SURFACE WATERS

There was no indication of a near-surface groundwater table within our exploratory trench or perched groundwater. Although groundwater is not expected to be a significant constraint to the proposed development, our experience indicates that near-surface groundwater conditions can develop in areas where no such groundwater conditions previously existed, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation or unusually heavy precipitation. It is anticipated that site development will include appropriate drainage provisions for control and discharge of surface water runoff. The type of drainage issues found within the project and materials specified and used should be determined by the Civil Engineer. The type of plants and soil specified along with proper irrigation used should be determined by the Landscape Architect.

The following grading specifications should be utilized.

RECOMMENDED GRADING SPECIFICATIONS
For
Proposed Residential Building Site
1065 E Bradley Avenue
El Cajon area, County of San Diego

GENERAL: Soil Testers and `Engineer' are synonymous hereinafter and shall be employed to inspect and test earthwork in accordance with these specifications, the accepted plans, and the requirements of any jurisdictive governmental agencies. They are to be allowed adequate access so that the inspections and tests may be performed. The Engineer shall be apprised of schedules and any unforeseen soil conditions.
Substandard conditions or workmanship, inadequate compaction, adverse weather, or deviation from the lines and grades shown on the plans, etc., shall be cause for the engineer to either stop construction until the conditions are corrected or recommend rejection of the work. Refusal to comply with these specifications or the recommendations and/or interpretations of the engineer will be cause for the engineer and/or his representative to immediately terminate his services.

Deviations from the recommendations of the Soil Report, from the plans, or from these Specifications must be approved in writing by the owner and the contractor and endorsed by the engineer.

SOIL TEST METHODS:

Maximum Density & Opt Moisture	-- ASTM D1557-70
Density of Soil In-Place	-- ASTM D1556, D2922 and D3017
Soil Expansion	-- UBC STANDARD 29-2
Shear Strength	-- ASTM D3080-72
Gradation & Grain Size	-- ASTM D1140-71
Capillary Moisture Tension	-- ASTM D2325-68
Organic Content	-- % Weight loss after heating for 24 hours at 300° F and after deducting soil moisture.

LIMITING SOIL CONDITIONS:

Minimum Compaction	90% for `disturbed' soils. (Existing fill, newly placed fill, plowed ground, etc.) 84% for natural, undisturbed soils. 95% for pavement subgrade within 2' of finish grade and pavement base course.

Expansive Soils	Expansion index exceeding 20
Insufficient fines	Less than 40% passing the #4 sieve.
Oversized Particles	Rocks over 10" in diameter.

PREPARATION OF AREAS TO RECEIVE FILL:
Brush, trash, debris and detrimental soils shall be cleared from the areas to receive fill. Detrimental soils shall be removed to firm competent soil. Slopes exceeding 20% should be stepped uphill with benches 10' or greater in width. Scarify area to receive fill to 6" depth and compact.

FILL MATERIAL shall not contain insufficient fines, oversized particles, or excessive organics. On-site disposition of oversized rock or expansive soils is to be at the written direction of the Engineer. Select fill shall be as specified by the engineer. All fills shall be compacted and tested.

SUBDRAINS shall be installed if required by and as directed by and detailed by the engineer and shall be left operable and unobstructed. They shall consist of 3" plastic perforated pipe set in a minimum cover of 4" of filter rock in a `vee' ditch to intercept and drain free ground from the mass fills. Perforated pipe shall be schedule 40, Poly-Vinyl-Chloride or Acrylonitrile Butadienne Styrene plastic. Rock filter material shall conform to the following gradation:

Sieve size:	3/4"	#4	#30	#200
%Passing:	90-100	25-50	5-20	0-7

Subdrains shall be set at a minimum gradient of 0.2% to drain by gravity and shall be tested by dye flushing before acceptance. Drains found inoperable shall be excavated and replaced.

CAPPING EXPANSIVE SOILS: If capping expansive soils with non-expansive soil to mitigate the expansive potential is used, the cap should be compacted, non-expansive, select soil placed for a minimum thickness 3' over the expansive soil and for a minimum distance of 8' beyond the exterior perimeter of the structure. Special precautions should be taken to ensure that the non-expansive soil remains uncontaminated and the minimum thickness and dimensions around the structure are maintained. The expansive soils underlying the cap of non-expansive cap should be pre-saturated to a depth of 3' to obtain a degree saturation exceeding 90% before any construction supported by the compacted cap.

The non-expansive soil comprising the cap should conform to the following:

Minimum Compaction	90 %
Maximum Expansion Index	30
Minimum Angle of Internal Friction	33 Deg
Cohesion Intercept	100 psf

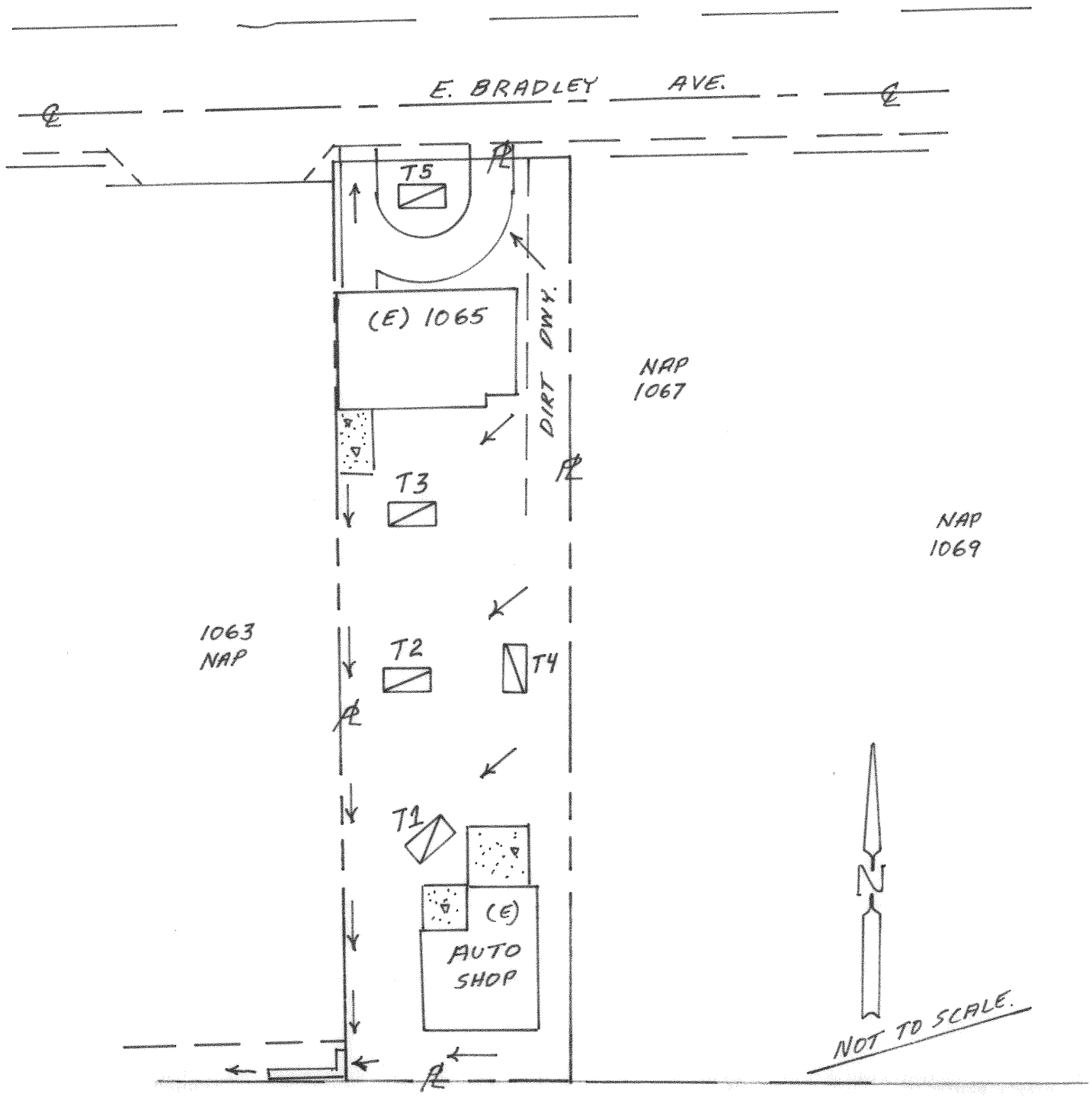
UNFORESEEN CONDITIONS: Soil Testers assume no responsibility for conditions, which differ from those, described in the applicable current reports and documents for this property. Upon termination of the engineer's services for any reason, his fees up to the time of termination become due and payable. If it is necessary for the engineer to issue an unfavorable report concerning the work that he has been hired to test and inspect, the engineer shall not be held liable for any damages that might result from his `unfavorable report'.

If we can be of any further assistance, please do not hesitate to contact our office. This opportunity to be of service is sincerely appreciated.

Respectfully submitted,

Chin C. Chen, RPE C34442

CCC/mlj
cc: (3) submitted



T3 EXPLORATION TRENCH

LOCATION OF EXPLORATION TRENCHES

JOB NO.
1251H2-19
BY
JGR
DATE
3-28-19

SOIL TESTERS

Plate No. II

EXPLORATION NUMBER 1

Date Logged: 03/01/19 Equipment Used: Backhoe
Date Reported: 03/28/19 Groundwater: Encountered

Depth	Unified Classifications	Soil Description	Soil Type
0 to 8"	AF	4 inches of asphalt chips over 4 inches of decomposed granite base	
8" to 5.5'	SM	Red brown, very moist, loose, SILTY SANDS with some clay (Native) Medium dense at 3 feet Dense at 5 feet	
		bottom of excavation – Refusal at 5.5'	

Plate No. III

EXPLORATION NUMBER 2

Date Logged: 03/01/19 Equipment Used: Backhoe
Date Reported: 03/28/19 Groundwater: Encountered

Depth	Unified Classifications	Soil Description	Soil Type
0 to 1'	SM	Dark brown, very moist, very loose, SANDY LOAM	
1 to 5.5'	SM	Red brown, very moist, loose, SILTY SANDS with some clay (Native) Medium dense at 3.5 feet Dense at 5 feet	
		bottom of excavation – Refusal at 5.5'	

Plate No. IV

EXPLORATION NUMBER 3

Date Logged: 03/01/19
Date Reported: 03/28/19
Equipment Used: Backhoe
Groundwater: Encountered

Depth	Unified Classifications	Soil Description	Soil Type
0 to 7"	SM	Dark brown, very moist, very loose, SANDY LOAM	
7 to 5.5'	SM	Red brown, very moist, loose, SILTY SANDS with some clay (Native) Medium dense at 3.5 feet Firm at 4 feet Dense at 5 feet	
		bottom of excavation – Refusal at 5.5'	

Plate No. V

EXPLORATION NUMBER 4

Date Logged: 03/01/19 Equipment Used: Backhoe
Date Reported: 03/28/19 Groundwater: Encountered

Depth	Unified Classifications	Soil Description	Soil Type
0 to 8"	AF	4 inches of asphalt chips over 4 inches of decomposed granite base	
8" to 5.5'	SM	Red brown, very moist, loose, SILTY SANDS with some clay (Native) Medium dense at 3 feet Dense at 4 feet	
		bottom of excavation – Refusal at 5.5'	

Plate No. VI

EXPLORATION NUMBER 5

Date Logged: 03/01/19 Equipment Used: Backhoe
Date Reported: 03/28/19 Groundwater: Encountered

Depth	Unified Classifications	Soil Description	Soil Type
0 to 6"	SM	Dark brown, very moist, very loose, SANDY LOAM	
6 to 6'	SM	Red brown, very moist, loose to firm, SILTY SANDS with some clay (Native) Firm at 4 feet Dense at 5 feet	
		bottom of excavation – Refusal at 6'	

SOIL TESTERS

P.O. Box 1195
Lakeside, California
92040
(619) 443-0060

January 3, 2020

Philip Chodur
G8 Development, Inc.
4538 Cass Street
San Diego, California 92138

SUBJECT: File No. 1251H2A-19
SITE INSPECTION – Addendum I
Proposed Residential Building Site
1067 & 1069 E. Bradley Avenue
El Cajon area, County of San Diego

Dear Mr. Chodur:

In response to your request, the following design values should be used for the proposed retaining walls. Footings for the proposed retaining walls must be founded a minimum of 12 inches into competent native soils or compacted fill soils.

RETAINING WALL DESIGN VALUES

Resistance to horizontal movement may be provided by allowable soil passive pressure and/or coefficient of friction of concrete to soil. The allowable passive pressure may be assumed to be 350 psf at the surface and increasing at the rate of 200 psf per foot of depth. These pressures assume a frictionless vertical element, no surcharge and level adjacent grade. If these assumptions are incorrect, we should be contacted for values that reflect the true conditions. The values are for static conditions and may be increased 1/3 for wind and/or seismic loading. The coefficient of friction of concrete to soil may be safely assumed to be 0.35.

Active pressures for the design of unrestrained, cantilevered, individually supported retaining walls, capable of slight movement away from load may be considered to be equivalent to the pressures developed by a fluid with a density of 35 pcf. This value assumes a vertical, smooth wall and level drained backfill. We should be contacted for new pressures if these assumptions are incorrect. Restrained walls, incapable of movement away from load without damage such as basement walls, should be designed for the additional equivalent fluid of 28 pcf applied triangularly for cohesionless type soils and trapezoidally for cohesive type soils.

The above design values and foundation design assume that the retaining walls are located in soils similar to those we tested during our site inspection. Since some of the soils we observed were clayey, we should inspect the cut to insure that the soils exposed are the same as those tested.

SEISMIC LOADING FOR RETAINING WALLS

The seismic event induced dynamic load should be added to the lateral static pressures on basement, foundation and retaining walls for projects located in seismic design categories D, E or F.

The following is the calculation for the dynamic load, which should be applied in addition to the static loads.

- References: USGS and IBC 2012/2016
- Site Address: 1067 & 1069 E. Bradley Avenue
- Site Soil Classification: Site Class "D"

- S_s = 0.871 g S_{ms} = 1.003 g S_{ds} = 0.669 g
- S_1 = 0.337 g S_{m1} = 0.582 g S_{d1} = 0.388 g

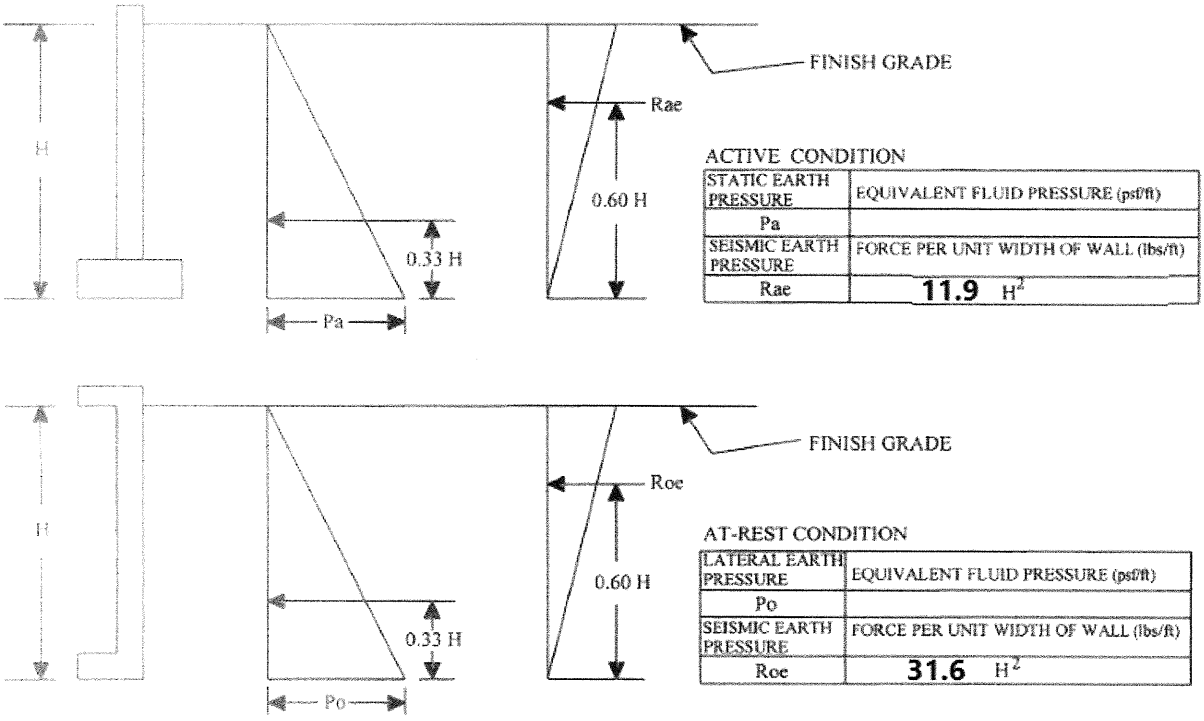
- Kh =Peak Ground Acceleration= S_{ds} *I* 2.5 = 0.669 *I* 2.5 = 0.27
- BackFill Density (Assumed 90% compaction) = 130.1 * (0.90) = 117.1 PCF
- H =The height of the level backfill behind the wall in FT

- Dynamic Load, for Yielding Wall= (.375) (0.27) (117.1 PCF) (H^2) = 11.9 lbs/ft (H^2)

- Dynamic Load, for Non-Yielding Wall= (0.27) (117.1 PCF) (H^2) = 31.6 lbs/ft (H^2)

- The resultant dynamic load acts at a height of 0.6H above the base of the wall. The dynamic load is represented as an inverted triangular pressure distribution. These lateral earth pressures assume the walls are totally drained with no water behind them and assume there is no surcharge applied. If there is any surcharge applied, it should be considered accordingly.

See Figure below:



ACTIVE CONDITION

STATIC EARTH PRESSURE	EQUIVALENT FLUID PRESSURE (psf/ft)
Pa	
SEISMIC EARTH PRESSURE	FORCE PER UNIT WIDTH OF WALL (lbs/ft)
Rae	**11.9** H^2

AT-REST CONDITION

LATERAL EARTH PRESSURE	EQUIVALENT FLUID PRESSURE (psf/ft)
Po	
SEISMIC EARTH PRESSURE	FORCE PER UNIT WIDTH OF WALL (lbs/ft)
Roe	**31.6** H^2

1. ASSUMES NO HYDROSTATIC BUILDUP BEHIND THE RETAINING WALLS.
2. H IS IN FEET.
3. ASSUMES LEVEL GRANULAR BACKFILL COMPACTED TO MINIMUM 90 PERCENT AND WITHIN 2 PERCENT OF OPTIMUM.
4. SURCHARGE LOADS HAVE NOT BEEN INCLUDED.

If you have any questions, please do not hesitate to contact our office.

Respectfully submitted,

Chin C. Chen, RPE C34442
CCC/mlj

SOIL TESTERS

P.O. Box 1195
Lakeside, California
92040
(619) 443-0060

June 27, 2019

Philip Chodur
G8 Development, Inc.
4538 Cass Street
San Diego, California 92138

SUBJECT: File No. 1251H2A-19
SITE INSPECTION
Proposed Residential Building Site
1067 & 1069 E Bradley Avenue
El Cajon area, County of San Diego

Dear Mr. Chodur:

SCOPE

In accordance with your request, a Site Inspection has been performed at the subject site. The purpose of this investigation was to examine existing site conditions and provide engineering recommendations for the 42 proposed two-story residential units.

FIELD INSPECTION

In order to accomplish this purpose, a representative of this firm visited the site, reviewed the topography and site conditions and visually and textually classified the surface and near surface soils. Representative samples of the on-site soils were obtained from 5 test explorations approximately 6.5 to 7 feet in depth and tested for density, shear strength and expansive characteristics.

SITE CONDITIONS

The subject site is located on the south side of E Bradley Avenue. The site is relatively level with an approximate 3 degree inclination from east to west. The property is currently occupied by a single family residence, a large metal warehouse, a barn and several smaller metal buildings. The existing structures will be removed to make way for the new development. Other neighboring properties are occupied by residential and commercial

structures. Fill materials were encountered to a depth of 18 inches in one area and loose natives soils were encountered to approximately 1 foot in depth during course of this inspection.

SOIL CONDITIONS

Soils encountered in the test explorations were topsoils consisting of loose, brown, silty sands to approximately 6 inches in depth. These surface soils were underlain with native soils consisting of firm, red brown, silty sands with a trace of clay to a depth of 3 to 4 feet where medium dense to dense, red brown, silty sands with a trace of clay were encountered to the bottom of the explorations approximately 6.5 to 7 feet in depth. We encountered Fenton fill mixed with ¾ inch rock in the area behind the metal warehouse to a depth of 18 inches.

The soils we encountered were not considered to be expansive with respect to change in volume with change in moisture content.

CONCLUSIONS AND RECOMMENDATIONS

1. A representative sample of the foundation soil was remolded to 90% of maximum dry density. Based on the following test results, a safe allowable bearing value of at least 2000 pounds per square foot for 12 inch deep footings may be used in designing the foundations and slab for the proposed structures. This value may be increased by one third for wind and/or seismic loading. This value may be increased by 20 percent for each additional foot of depth and or width to a maximum of 3 times the designated value.

Maximum Dry Density	130.1 pcf
Optimum Moisture	10.8%
Angle of internal friction	35°
Cohesion	217 psf
Unit weight	117.7 pcf
Expansion Index	30

2. Lateral resistance to horizontal movement may be provided by the soil passive pressure and friction of concrete to soil. An allowable passive pressure of 250 pounds per square foot per foot of depth may be used. A coefficient of friction of 0.35 is recommended. The soils passive pressure may be increased by 1/3 for wind and seismic loading.

3. The seismic parameters for the site coordinates 33.81853°N, 116.94554°W for assumed Site Class D are as follows:

• S_s = 0.871 g	S_{ms} = 1.003 g	S_{ds} = 0.669 g
• S_1 = 0.337 g	S_{m1} = 0.582 g	S_{d1} = 0.388 g

4. The existing compressible native soils and fill soils we encountered should not be utilized to support the proposed new structure. They should be recompacted to at least 90 percent of maximum dry density in accordance with the Grading Specifications in this report in order to provide adequate support for the proposed new structures. Anticipated depth of recompaction is 3 to 4 feet. The recompaction should extend at least five feet outside the proposed building footprint. Organic materials and roots must be removed from the soils before replacement.

5. Conventional spread footings founded a minimum of 12 inches below lowest adjacent grade and having a width determined by the allowable soil bearing value as detailed above are recommended for foundation support. Footing widths should be at least 12 inches for continuous footings and 24 inches for square footings due to practical considerations as well as Building Code requirements. These recommendations are based upon the soil type encountered and do not take into consideration the proposed bearing load.

6. Concrete Slab-On-Grade, SOG, should be designed by the project's structural engineer based on anticipated loading conditions. We recommend that conventional reinforced concrete SOG for this project be founded on 4 inches of Class II Virgin Aggregate Base (with approximately 2% +/- over optimum moisture content and 90% compaction, relative to the lab maximum dry density, ASTM D 1557), overlying a 12 inch thick zone of adequately placed and compacted structural fill. We recommend that a moisture barrier be provided by a membrane, visqueen 10 mils in minimum thickness or equivalent, be placed at top of well compacted Class II Aggregate Base, then covered with 2 inches of moist clean sand having a minimum sand equivalent of 30 when tested in accordance with the American Society of Testing and Materials test method `ASTM D1555.

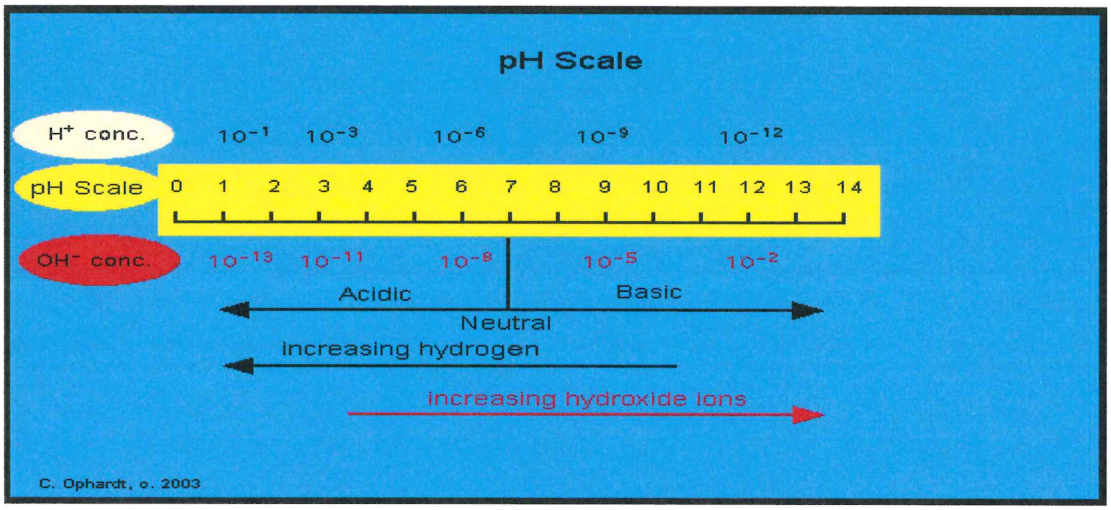
   Floor slabs, as a minimum, should be 5 inches thick with #4 reinforcing steel at 16" on-center each way. Reinforcement should be placed at mid-height of the slab. The final slab thickness and reinforcement should be determined by the structural design engineer. Control joints should be provided in accordance with the recommendations of the structural design engineer.

SITE EROSION CONTROL

During the construction, surface water should be controlled via berms, gravel bags and/or sandbags, silt fence, straw wattles, siltation basins, while maintaining positive surface grades or other methods to avoid damage to the finish work or adjoining properties. All site entrances and exits must have coarse gravel or steel shaker plates to minimize offsite sediment tracking. Best management Practices (BMP's) must be used to protect storm drains and minimize pollution. The contractor should take measures to prevent erosion of graded areas until such time as permanent drainage and erosion control measures have been installed. After completion of grading, all excavated surfaces should exhibit positive drainage and eliminate areas where water might pond.

Chemical Testing

The test is to determine the pH, minimum resistivity, soluble chlorides, and soluble sulfate content of the foundation soil were performed for us by Clarkson Laboratory and Supply Inc,. The test indicates that the soil has a pH range of 7.3, per the California Test Method No. 643.



pH scale, by Virtual Chembook, Elmhurst College, by Charles E. Ophardt, 2003, http://chemistry, Elmhurst.edu/vchembook/images2/184phscale.gif.

From the California Test Method No. 643, indicates the factor that contributes to corrosion includes the presence of soluble salts, soil and water resistivity, and soil and water pH,

along with the presence of oxygen. The following chart will show the soil and the added water amounts indicating the degree of acidity or alkalinity.

WATER ADDED in (mL)	RESISTIVITY (ohm-cm)
Base 15 ml	9,100
5-20 ml	6,600
5-25 ml	5,300
5-30 ml	2,600
5-35 ml	1,800
5-40 ml	1,500
5-45 ml	1,300
5-50 ml	1,400
5-55 ml	1,700

See below table 1, for the classification pertaining to the resistivity of the soil tested.

TABLE 1: SOIL RESISTIVITY CLASSIFICATION

Range in ohm.cm	Class
0-1,000	Very low
1,000-5,000	Low
5,000-10,000	Medium
10,000-25,000	High
25,000-100,000	Very high
100,000-1,000,000	Ultra high
1,000,000-infinity	Super high

The recommendation provided from Clarkson Laboratory and Supply Inc, pertaining to the resistivity of the soil coming into contact with concrete and ferrous metals pipes as follows:

36 years to perforation for a 16 gauge metal culvert.
47 years to perforation for a 14 gauge metal culvert.
65years to perforation for a 12 gauge metal culvert.
83 years to perforation for a 10 gauge metal culvert.
101 years to perforation for a 8 gauge metal culvert.

If the design is going to use direct contact of ferrous metals in the soil then we recommend the project and materials specified and used should be determined by the Civil Engineer with an understanding of cathodic protection for the recommendations.

Sulfate and Chloride Content

A sample of the onsite soil from 2 feet below the surface was tested to assist in an evaluation of the degree of sulfates attack on ordinary (type II) concrete. The test was performed in general accordance with California Test Method No. 417, and yielded a soluble sulfate content of 210 ppm. or 0.021%, with the range of 150 to 1500. The test result indicates a "**Moderate**" degree of sulfate attack, with the cement types: II, MS, IP(MS), IS(MS), P(MS), I(PM) (MS), I(SM)(MS). The Maximum water-cementitious material ratio, by mass: 0.50. The Minimum design compressive strength, MPa (psi): 28 (4000). The type(s) of concrete specified and used should be determined by the Structural Engineer.

The Soluble Chloride Method of testing soils containing Chloride used the California test Method No. 422, and yielded a soluble sulfate content of 11 ppm. or 0.001%.

Carbonate and Sulfide Content

The Carbonate (CO_3) Method of testing soils containing Calcium carbonate used the ASTM Test Method No. D4373. This test is being done due to the location of the site having marine soils looking for cementing agents, are water soluble at pH <7.5, and are soft on the Mohs' scale compared to other soil minerals. The sample yielded **<1 ppm** for Carbonate.

A Saturated Paste Extract Sulfide (S_2) test was made following the ASTM Test Method No. D4658, is a water-soluble test that helps identify the nutrients are soluble in the soil solution, including high sodium or salt and calcium levels. This test is being done due to the location of the site having marine soils which yielded a soluble content of <0.1 ppm.

Moisture Content and Resistivity

"Moisture content is a more important factor in soil corrosivity than any other variable. As water is one of the three components necessary for electrochemical corrosion (the other two being oxygen and metal), corrosion will not occur if the soil is completely dry. Experimental evidence dictates that increased moisture content decreases resistivity of soils, in turn increasing their corrosive potential. Note that when the saturation point of soil is reached, additional moisture has little or no effect on resistivity."

The relationship between the resistivity of the soil, a particular soil class, and the corrosion resistance for galvanized steel is summarized in the following table.

Soil Class	Corrosion Resistance in Galvanized Steel	Electrical Resistivity, W-cm
Sandy	Excellent	6,000 – 10,000
Loams	Good	4,500 – 6,000
Clay	Fair	2,000 – 4,500
Peat/muck	Bad	0 – 2,000

Conversely, the relationship between soil resistivity and corrosion potential in uncoated steel is shown in the table below.

Resistance Classification in Uncoated Steel	Soil Resistivity, W-cm	Corrosion Potential
Low	0 - 2000	Severe
Medium	2000 - 10000	Moderate
High	10000 - 30000	Mild
Very High	>30000	None

Corrosive Soils, Cause, Effects and Mitigation, by Hossein Arbabi, Testing Engineers, Inc., White paper, www.Testing-engineers.com/case1.html.

SITE AND SURFACE DRAINAGE

Drainage at the site should be directed away from foundations, collected and tight lined to appropriate discharge points. Consideration may be given to collecting roof drainage by eave gutters and directing it away from foundations via non-erosive devices. Water, either natural or from irrigation, should not be permitted to pond, saturate the surface soils or flow towards the foundation. Landscaping requiring a heavy irrigation schedule should not be planted adjacent to foundations or paved areas. The type of drainage issues found within the project and materials specified and used should be determined by the Engineer of Record.

GROUNDWATER AND SURFACE WATERS

There was no indication of a near-surface groundwater table within our exploratory trench or perched groundwater. Although groundwater is not expected to be a significant constraint to the proposed development, our experience indicates that near-surface groundwater conditions can develop in areas where no such groundwater conditions previously existed, especially in areas where a substantial increase in surface water

infiltration results from landscape irrigation or unusually heavy precipitation. It is anticipated that site development will include appropriate drainage provisions for control and discharge of surface water runoff. The type of drainage issues found within the project and materials specified and used should be determined by the Civil Engineer. The type of plants and soil specified along with proper irrigation used should be determined by the Landscape Architect.

The following grading specifications should be utilized.

RECOMMENDED GRADING SPECIFICATIONS
For
Proposed Residential Building Site
1067 & 1069 E Bradley Avenue
El Cajon area, County of San Diego

GENERAL: Soil Testers and `Engineer' are synonymous hereinafter and shall be employed to inspect and test earthwork in accordance with these specifications, the accepted plans, and the requirements of any jurisdictive governmental agencies. They are to be allowed adequate access so that the inspections and tests may be performed. The Engineer shall be apprised of schedules and any unforeseen soil conditions.
Substandard conditions or workmanship, inadequate compaction, adverse weather, or deviation from the lines and grades shown on the plans, etc., shall be cause for the engineer to either stop construction until the conditions are corrected or recommend rejection of the work. Refusal to comply with these specifications or the recommendations and/or interpretations of the engineer will be cause for the engineer and/or his representative to immediately terminate his services.

Deviations from the recommendations of the Soil Report, from the plans, or from these Specifications must be approved in writing by the owner and the contractor and endorsed by the engineer.

SOIL TEST METHODS:

Maximum Density & Opt Moisture	-- ASTM D1557-70
Density of Soil In-Place	-- ASTM D1556, D2922 and D3017
Soil Expansion	-- UBC STANDARD 29-2
Shear Strength	-- ASTM D3080-72
Gradation & Grain Size	-- ASTM D1140-71
Capillary Moisture Tension	-- ASTM D2325-68
Organic Content	-- % Weight loss after heating for 24 hours at 300° F and after deducting soil moisture.

LIMITING SOIL CONDITIONS:

Minimum Compaction	90% for `disturbed' soils. (Existing fill, newly placed fill, plowed ground, etc.) 84% for natural, undisturbed soils. 95% for pavement subgrade within 2' of finish grade and pavement base course.
Expansive Soils	Expansion index exceeding 20
Insufficient fines	Less than 40% passing the #4 sieve.
Oversized Particles	Rocks over 10" in diameter.

PREPARATION OF AREAS TO RECEIVE FILL:
Brush, trash, debris and detrimental soils shall be cleared from the areas to receive fill. Detrimental soils shall be removed to firm competent soil. Slopes exceeding 20% should be stepped uphill with benches 10' or greater in width. Scarify area to receive fill to 6" depth and compact.

FILL MATERIAL shall not contain insufficient fines, oversized particles, or excessive organics. On-site disposition of oversized rock or expansive soils is to be at the written direction of the Engineer. Select fill shall be as specified by the engineer. All fills shall be compacted and tested.

SUBDRAINS shall be installed if required by and as directed by and detailed by the engineer and shall be left operable and unobstructed. They shall consist of 3" plastic perforated pipe set in a minimum cover of 4" of filter rock in a `vee' ditch to intercept and drain free ground from the mass fills. Perforated pipe shall be schedule 40, Poly-Vinyl-Chloride or Acrylonitrile Butadienne Styrene plastic. Rock filter material shall conform to the following gradation:

Sieve size:	3/4"	#4	#30	#200
%Passing:	90-100	25-50	5-20	0-7

Subdrains shall be set at a minimum gradient of 0.2% to drain by gravity and shall be tested by dye flushing before acceptance. Drains found inoperable shall be excavated and replaced.

CAPPING EXPANSIVE SOILS: If capping expansive soils with non-expansive soil to mitigate the expansive potential is used, the cap should be compacted, non-expansive, select soil placed for a minimum thickness 3' over the expansive soil and for a minimum distance of 8' beyond the exterior perimeter of the structure. Special precautions should be taken to ensure that the non-expansive soil remains uncontaminated and the minimum thickness and

dimensions around the structure are maintained. The expansive soils underlying the cap of non-expansive cap should be pre-saturated to a depth of 3' to obtain a degree saturation exceeding 90% before any construction supported by the compacted cap.

The non-expansive soil comprising the cap should conform to the following:

Minimum Compaction	90 %
Maximum Expansion Index	30
Minimum Angle of Internal Friction	33 Deg
Cohesion Intercept	100 psf

UNFORESEEN CONDITIONS: Soil Testers assume no responsibility for conditions, which differ from those, described in the applicable current reports and documents for this property. Upon termination of the engineer's services for any reason, his fees up to the time of termination become due and payable. If it is necessary for the engineer to issue an unfavorable report concerning the work that he has been hired to test and inspect, the engineer shall not be held liable for any damages that might result from his `unfavorable report'.

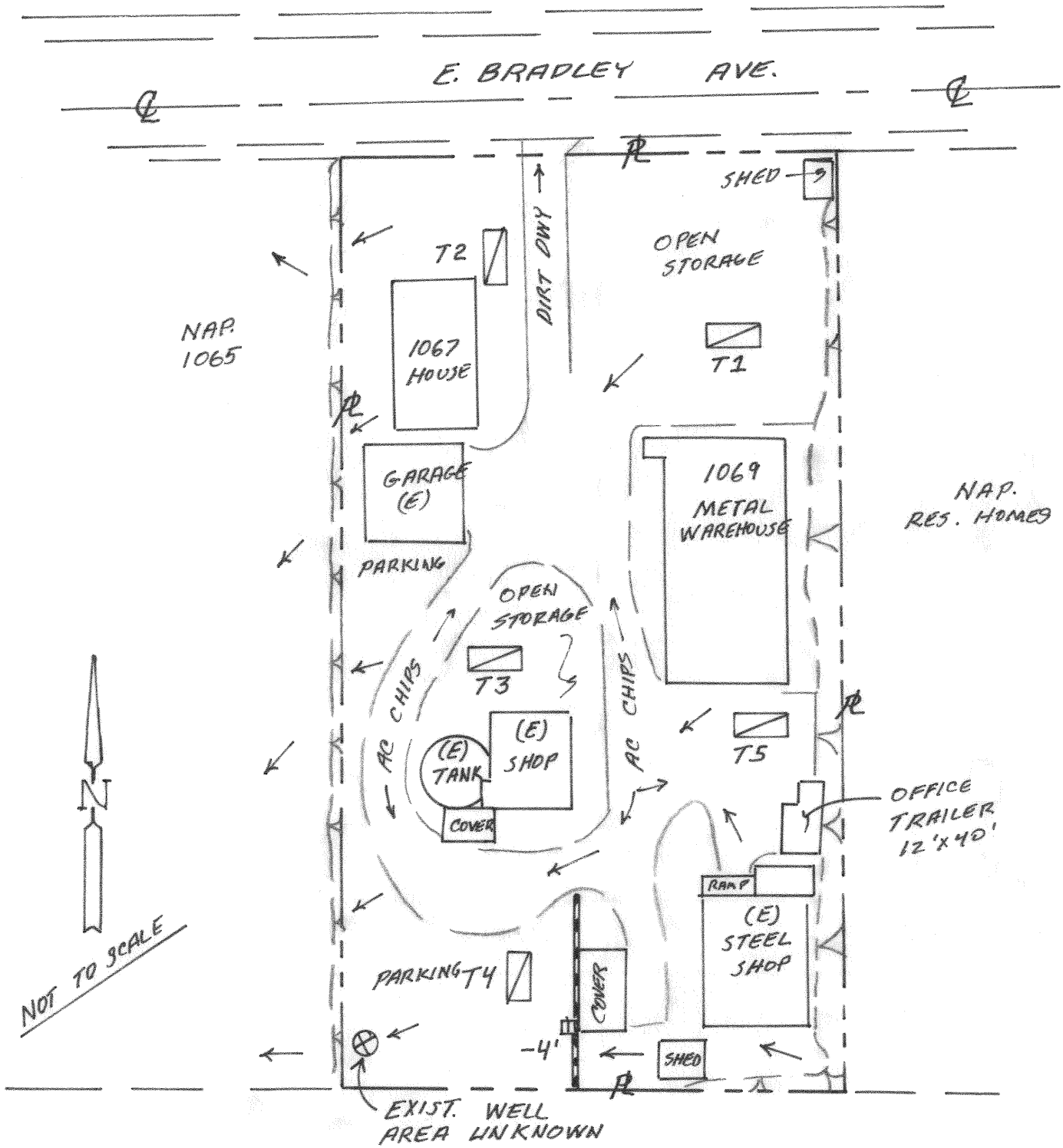
If we can be of any further assistance, please do not hesitate to contact our office. This opportunity to be of service is sincerely appreciated.

Respectfully submitted,

Chin C Chen

Chin C. Chen, RPE C34442

CCC/mlj
cc: (3) submitted



LOCATION OF EXPLORATION TRENCHES

JOB NO.	1251H2A-19
BY	JGR
DATE	6-3-20

SOIL TESTERS
11421 Woodside Ave., Suite C
Santee, California 92071
(619) 562-0500

Plate No. II

EXPLORATION NUMBER 1

Date Logged: 05/23/19 Equipment Used: Backhoe
Date Reported: 06/27/19 Groundwater: Not Encountered

Depth	Unified Classifications	Soil Description	Soil Type
0 to 6"	AF	4 inches of asphalt chips over 4 inches of decomposed granite base	
6" to 12"	SM	Red brown, moist, firm, SILTY SANDS with some clay (Native)	
1 to 7'	SM	Dark red brown, very moist, firm, SILTY SANDS Moist, medium dense to dense at 3 feet Moist, dense at 4 feet Moist, very dense at 5.5 feet	
		bottom of excavation	

Plate No. III

EXPLORATION NUMBER 2

Date Logged: 05/23/19
Date Reported: 06/27/19

Equipment Used: Backhoe
Groundwater: Not Encountered

Depth	Unified Classifications	Soil Description	Soil Type
0 to 6"	SM	Light brown, dry, loose, SILTY SANDS with roots	
6" to 2'	SM	Red brown, moist, loose to firm, SANDY SILTS with roots (Native)	
2 to 6.5'	SM	Red brown, moist, firm to dense, SILTY SANDS Medium dense at 3.5 feet Very dense at 5 feet	
		bottom of excavation – refusal	

Plate No. IV

EXPLORATION NUMBER 3

Date Logged: 05/23/19 Equipment Used: Backhoe
Date Reported: 06/27/19 Groundwater: Not Encountered

Depth	Unified Classifications	Soil Description	Soil Type
0 to 6"	SM	Light brown, dry, loose, SILTY SANDS with roots	
6" to 12"	SM	Red brown, moist, loose, SILTY SANDS with some clay (Native)	
1 to 6.5'	SM	Dark red brown, very moist, firm, SILTY SANDS Moist, medium dense to dense at 3 feet Moist, dense at 4 feet Moist, very dense at 5.5 feet	
		bottom of excavation - refusal	

Plate No. V

EXPLORATION NUMBER 4

Date Logged: 05/23/19 Equipment Used: Backhoe
Date Reported: 06/27/19 Groundwater: Not Encountered

Depth	Unified Classifications	Soil Description	Soil Type
0 to 6"	SM	Light brown, dry, loose, SILTY SANDS with roots	
6" to 12"	SM	Red brown, moist, loose, SILTY SANDS with some clay (Native)	
1 to 6.5'	SM	Dark red brown, very moist, firm, SILTY SANDS Moist, medium dense to dense at 3 feet Moist, dense at 4 feet Moist, very dense at 5.5 feet	
		bottom of excavation - refusal	

Plate No. VI

EXPLORATION NUMBER 5

Date Logged: 05/23/19 Equipment Used: Backhoe
Date Reported: 06/27/19 Groundwater: Not Encountered

Depth	Unified Classifications	Soil Description	Soil Type
0 to 18"	SM	Yellow brown, moist, medium dense, SILTY SANDS with ¾ inch rock (Fenton Fill)	
1.5 to 5.5'	SM	Red brown, very moist, loose to firm, SILTY SANDS with some clay (Native) Firm at 4 feet Dense at 5 feet	
		bottom of excavation	