SOIL TESTERS

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August 15, 2023

Nick Roach
3616 Bonita Glen Terrace
Bonita, California 91902

SUBJECT: File No. 1252D6-23
SITE INSPECTION
Proposed Residential Building Site
0 Euclid Avenue
El Cajon area, County of San Diego

Dear Mr. Roach:

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 proposed single family residence.

If project details vary significantly from those described, Soil Testers should be notified prior to final submittal for revision and possible revision of the recommendations presented herein.

This report is issued with the understanding that it is the responsibility of the owner or the owner's representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

FIELD INSPECTION

To accomplish this purpose, a representative of this firm visited the site, reviewed the topography and site conditions, and visually and texturally classified the surface and near

surface soils. Representative samples of the on-site soils were obtained from 3 test explorations approximately 4 feet in depth and tested for density, shear strength and expansive characteristics.

SITE CONDITIONS

The subject site is a vacant flag lot located on the south side of Euclid Avenue behind the existing residence at 2265 Euclid Avenue. The property is mildly to moderately sloping from south to north. Neighboring properties are occupied by single family residential structures with similar amenities and other vacant lots. Fill materials were not encountered, and loose native soils were encountered to a depth of approximately 8 to 30 inches during this inspection.

SOIL CONDITIONS

Soils encountered in the test explorations 1 and 3 are native soils consisting of loose to firm, dry to slightly moist, brown to light brown, fine to medium, silty sands with a trace of clay approximately 8 to 30 inches in depth underlain by firm to dense, slightly moist, brown to light brown, fine to medium, silty sands with a trace of clay to the bottom of the exploration, approximately 4 feet in depth.

Soils encountered in the test exploration 2 are native soils consisting of loose to firm, dry to slightly moist, brown to light brown, fine to medium, silty sands with a trace of clay approximately 30 inches in depth. These surface soils were underlain by dense to very dense, brown, fine to medium, silty, clayey sands to approximately 36 inches in depth where very dense, brown, fine to medium sandy clays were encountered to approximately 42 inches in depth. Very dense, grey to orange-brown, fine to coarse silty sands with decomposed granite were observed to the bottom of the exploration, approximately 4 feet in depth.

Some of the soils we encountered were considered to be moderately 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	125.3 pcf
Optimum Moisture	12.5%
Angle of internal friction	29°
Cohesion	309 psf
Unit weight	112.3 pcf
Expansion Index	55

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 soil's passive pressure may be increased by 1/3 for wind and seismic loading.

3. The seismic parameters for the site coordinates 32079122°N, 116.90196°W for assumed Site Class D are as follows:

• S_s = 0.745 g	S_{ms} = 0.897 g	S_{ds} = 0.598 g
• S_1 = 0.275 g	S_{m1} = null	S_{d1} = null

4. The existing loose native soils we encountered should not be utilized to support the proposed single family residence. They should be removed and 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 approximately 3 feet for the proposed structure. The recompaction should extend at least five feet outside the proposed building footprints. Organic materials and roots must be removed from the soils before replacement. A representative of this firm should be scheduled during the grading operation for testing and observation including a bottom check prior to placement of any fill.

5. In lieu of grading, footings for the proposed single family residence must extend through any loose, compressible soils a minimum of 12 inches into the competent native soils. Anticipated footing depth is 18 to 42 inches. Footing excavations should be inspected by a representative of this firm prior to placement of forms and reinforcing steel to ensure proper depth has been achieved and that all footings are founded a minimum of 12 inches into firm natural ground. Loose soils and exposed roots should be removed from excavations prior to our inspection. This foundation depth is based upon the soil values only and does not take into consideration the structural requirements. The slab preparation in #8 must be adhered to for proposed slab construction. A representative of this firm should observe and test during the slab preparation, including the bottom check prior to placement of structural fill.

6. The foundation soils are moderately expansive. The following foundation depth is a minimum due to the expansive nature of the soil and must be used to prevent possible damage to the proposed structures from adverse effects of expansive soils. These recommendations for footings and slabs are based upon the soil type only and do not take into consideration the structural requirements. In general, the bottom of footing excavations should be founded in a uniform soil.

   - Use continuous exterior perimeter foundations (including door openings). They should be founded a minimum of 18 inches below lowest adjacent grade.

   - Interior footing depth should exceed 12 inches below top of slab or 12 inches below lowest adjacent grade for raised floor construction.

   - Reinforce continuous concrete foundations as a beam with at least one #5 bar positioned 3 inches above the bottom of footing and one #5 bar positioned at least 2 inch below top of foundation or top of finish floor. Footings deeper than 24 inches should have an additional #5 steel bar for each additional foot of depth. In lieu of one #5 bar, two #4 bars may be used.

7. A representative of this company must inspect the slab preparation and the foundation excavations prior to placement of forms and reinforcing steel to ensure that adequate depth has been achieved.

8. Concrete Slab-On-Grade, SOG for the structures, 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. If the grading option is chosen, the zone of structural fill will be accomplished during the grading process. If deepened footings are proposed, the area under the slab will need to be removed and recompacted with the onsite soils to achieve the 12 inch structural zone. The depth of the slab excavation should be determined by final slab elevation allowing for room for the 4 inches of Class II Base and the 4 inches of sand.

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, between 4 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 D2419.

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 construction, surface water should be controlled via berms, gravel bags and/or sandbags, silt fence, straw wattles, siltation basins, or other methods to avoid damage to the finish work or adjoining properties, while maintaining positive surface grades. 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 or perched groundwater within the depths of our exploration pit. 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 if grading is proposed.

RECOMMENDED GRADING SPECIFICATIONS
For
Proposed Residential Building Site
0 Euclid 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.

A pre-construction meeting or conference with the developer, contractor, civil engineer, soil engineer, and the agency inspector in attendance should be held at the site prior to the beginning of the grading operations. Special soil handling requirements can be discussed at that time.

Grading of the site should commence with the removal of all vegetation and existing improvements from the area to be graded. Deleterious material and debris such as broken asphalt and concrete, underground pipe materials, wires, trash, etc. if encountered, should be exported from the site and should not be mixed with the fill soils.

Abandoned foundations and buried septic tanks or cisterns (if encountered) should be removed and the subsequent depressions and /or trenches should be filled with properly compacted materials as part of the remedial grading.

All fill and backfill soils should be placed in horizontal loose layers approximately 8 inches thick, moisture conditioned to a water content of one to three percent above optimum moisture content, and compacted to at least 90 percent relative compaction, as determined by ASTM Test Method D 1557-00.

The excavation bottom should then be scarified to a depth of approximately 6 to 8 inches, moisture-conditioned to 1 to 3 percent above optimum moisture content, and re-compacted to a minimum relative compaction of 90 percent in accordance with ASTM D 1556-00 or D 6938-17ae1. Excavated sandy or clayey soils should then be uniformly moisture conditioned at above optimum moisture content, placed in 8-inch-thick loose layers and compacted to a relative compaction of at least 90 percent.

Import fill soil, if required, should consist of granular materials with low expansion potential (EI less than 50 or stated by the soil engineer) and should be compacted as indicated herein. Soil Testers should be notified of the import source and should perform laboratory testing of the soil prior to its arrival at the site to determine its suitability as fill material.

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 6" 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:

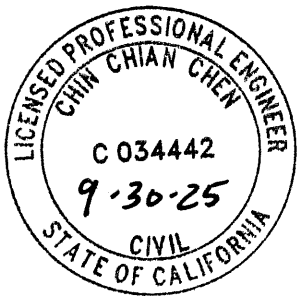
Minimum Compaction	90 %
Maximum Expansion Index	30
Minimum Angle of Internal Friction	33 Deg
Cohesion Intercept	100 psf

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.

Plate I and Detail 1 are part of this report.

Respectfully submitted,



Chin C. Chen, RPE C34442

CCC/mlj

NO SCALE

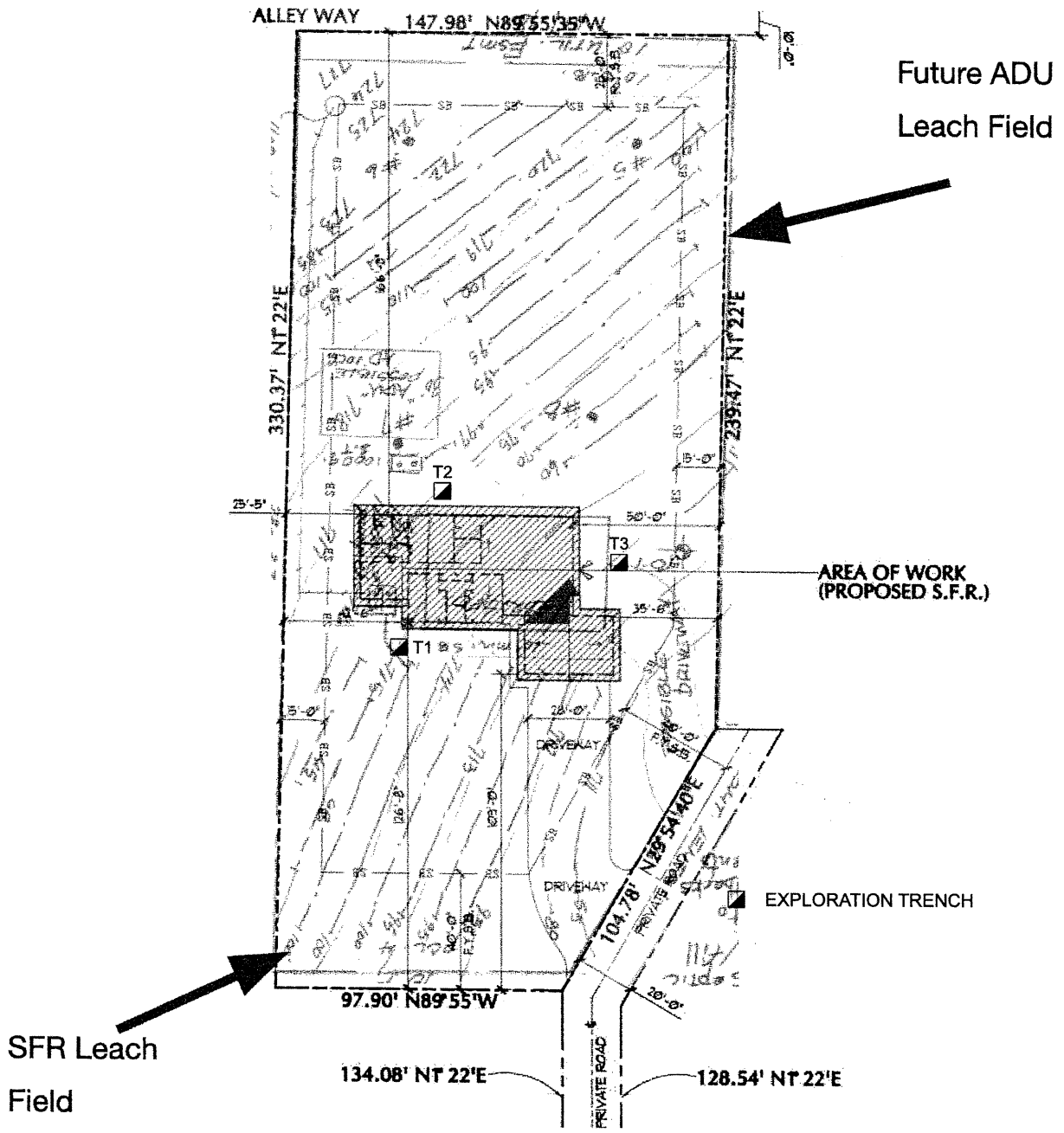
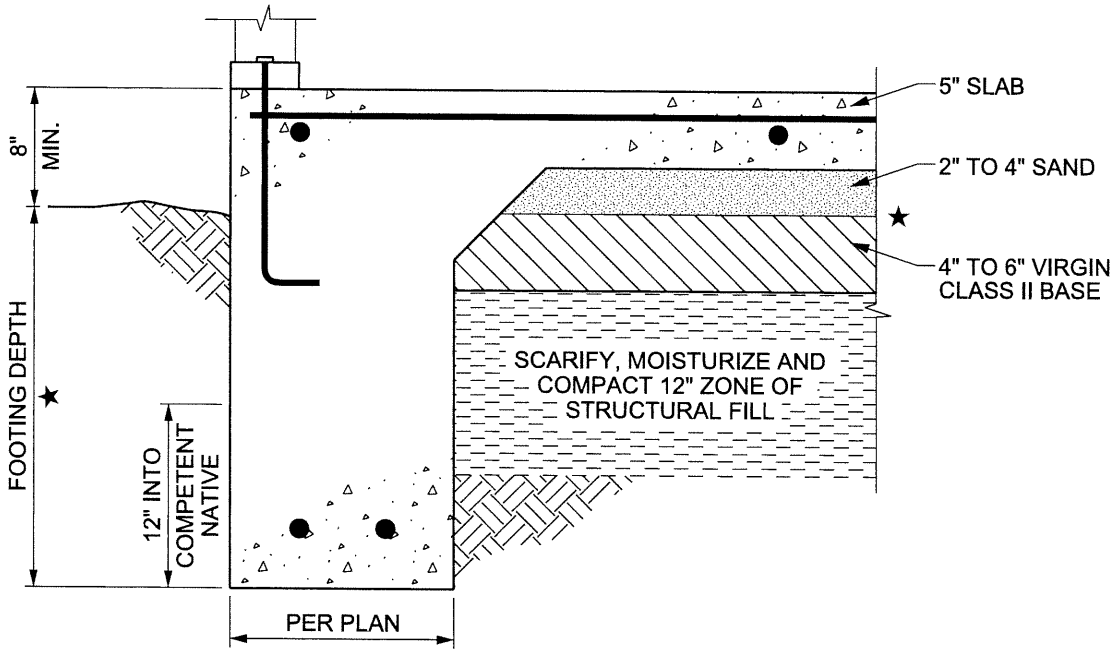


PLATE I

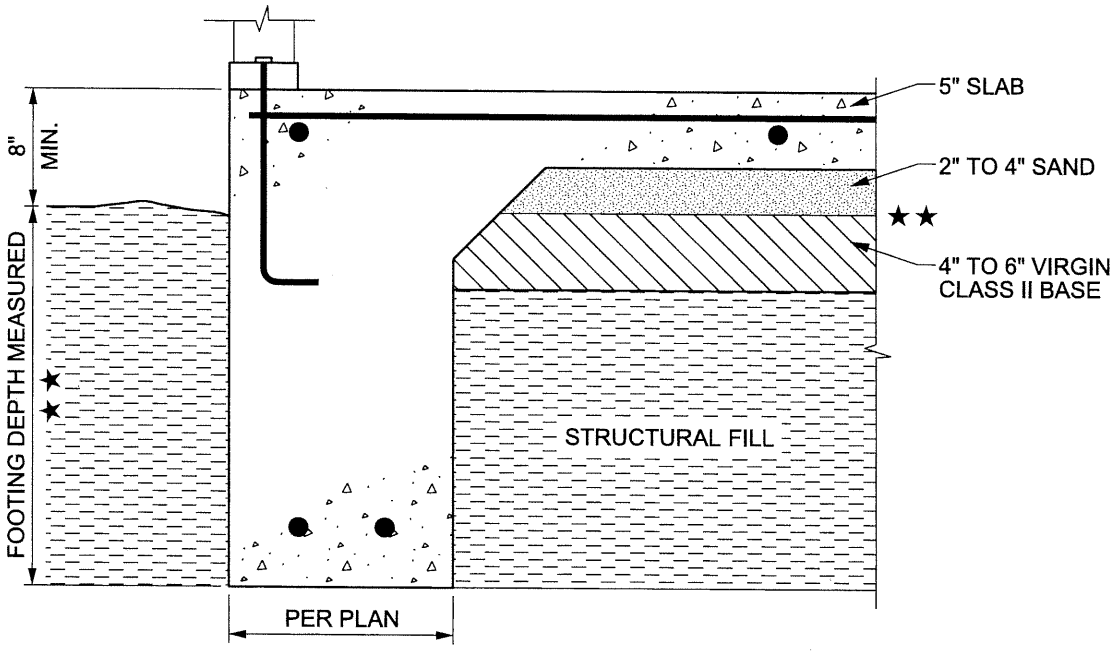
LOCATION OF EXPLORATION TRENCHES	JOB NO.
	1252D5-23
	BY
	JJ
	DATE
	8-15-23

SOIL TESTERS
P.O. BOX 1195 LAKESIDE, CA 92040



NON-GRADED LOT

★ LOWEST ADJACENT GRADE OF STRUCTURAL FILL OR COMPACTED BASE



GRADED LOT

★★ LOWEST ADJACENT GRADE OF OUTSIDE GRADE OR COMPACTED BASE/INSIDE GRADE

NO SCALE

SLAB AND FOOTING DETAILS

DETAIL 1

SOIL TESTERS
P.O. BOX 1195 LAKESIDE, CA 92040