Terracon GeoReport

Geotechnical Engineering Report

Proposed Taco Bell – 43rd Ave and Glendale
4346 West Glendale Avenue
Glendale, Arizona

July 30, 2021
Terracon Project No. CP215032

Prepared for:
Gen2 Arizona Properties, LLC
PO Box 4179
Kingman, Arizona

Prepared by:
Terracon Consultants, Inc.
1050 North Fairway Drive, Suite G-103
Avondale, Arizona

Registered Professional Engineer (Civil)
CERTIFICATE NO.
73259
MATTHEW R.
KLEINHOLZ
Date Signed 7/30/21
ARIZONA, U.S.A.
EXPIRES 6/30/2024

July 30, 2021

Gen2 Arizona Properties, LLC
PO Box 4179
Kingman, Arizona 86402

Attn: Mr. Ron Kutil
Phone: (928) 263-6672
Email: ronkutil@petersonburge.com

Re: Geotechnical Engineering Report
Proposed Taco Bell – 43rd Ave and Glendale
4346 West Glendale Avenue
Glendale, Arizona
Terracon Project No. CP215032

Dear Mr. Kutil:

Terracon Consultants, Inc. (Terracon) has completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PCP215032 dated June 16, 2021. This geotechnical engineering report presents the findings of the subsurface exploration and provides geotechnical engineering recommendations concerning earthwork and the design and construction of foundations, floor slabs and pavements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Registered Professional Engineer (Civil)
CERTIFICATE NO. 73259
MATTHEW R. KLEINHOLZ
Date Signed 7/30/21
ARIZONA, USA
EXPIRES 6/30/2024

Matthew R. Kleinholz, P.E.
Senior Staff Engineer

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Sr. Principal/Sr. Consultant

REPORT TOPICS

Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the ***GeoReport*** logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

REPORT SUMMARY

Topic [1]	Overview Statement [2]
Project Description	We understand the proposed project will consist of redeveloping the site with a new single-story restaurant building and new paved parking and drive areas.
Geotechnical Characterization	Beneath the existing pavement materials, the subsurface soils at the project site consist of medium stiff to stiff clay with variable amounts of sand to depths ranging from 4 to 15 feet. The near-surface soils are underlain by loose to medium dense sand soils with to the full depth of exploration of 20.5 feet. The near surface clay materials exhibit medium plasticity characteristics. Groundwater was not encountered during the field exploration to a maximum boring depth of 20.5 feet.
Earthwork	The upper 10 inches of subgrade soils beneath interior floor slab areas and the aggregate subbase should be scarified, moisture conditioned as necessary, and re-compacted as noted in **Earthwork**. Subgrade soils beneath new pavements should be scarified, moisture conditioned, and compacted to a minimum depth of 12 inches.
Shallow Foundations	Shallow spread footings can be utilized for the proposed project. ■ Maximum allowable bearing pressure = 2,000 psf with a minimum 18-inch embedment depth and maximum continuous footing width of 3.5 feet, and maximum square footing dimension of 5.5 feet. Shallow foundations should be supported on engineered fill as outlined in the **Earthwork** section of the report.
Pavements	Based on the anticipated traffic data outlined in this report and with subgrade prepared as noted in **Earthwork**, the following outlines recommended minimum pavement sections for the proposed project: Asphalt: ■ 3.0” ACC over 4” ABC in Autos/Light Trucks Drives & Parking Areas ■ 3.5” ACC over 6” ABC in Drive-Thru & Truck areas Concrete: ■ 5.0” PCC over 4” ABC in Autos/Light Trucks Drives & Parking Areas ■ 6.0” PCC over 4” ABC in Drive-Thru, Truck Drives & Trash Enclosure Areas
General Comments	This section contains important information about the limitations of this geotechnical engineering report.

1. If the reader is reviewing this report as a pdf, the topics above can be used to access the appropriate section of the report by simply clicking on the topic itself.
2. This summary is for convenience only. It should be used in conjunction with the entire report for design purposes.

Geotechnical Engineering Report

Proposed Taco Bell – 43rd Ave and Glendale
4346 West Glendale Avenue
Glendale, Arizona
Terracon Project No. CP215032
July 30, 2021

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed Taco Bell Restaurant to be located at 4346 West Glendale Avenue in Glendale, Arizona. The approximate location of the project is shown on the attached **Site Location** map. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Demolition considerations
- Excavation considerations
- Foundation design and construction
- Floor slab design and construction
- Seismic site classification per IBC
- Lateral earth pressures
- Pavement design and construction

The geotechnical engineering scope of services for this project included the advancement of 6 test borings to depths of approximately 5½ to 20½ feet below the existing ground surface for subsurface exploration, laboratory testing, geotechnical engineering analysis, and preparation of this report.

A map showing the boring locations is shown on the attached **Exploration Plan**. A log of each boring is included in the **Exploration Results** section of this report. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included in part on the boring logs and as separate graphs in the **Exploration Results** section of this report.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available topographic maps.

Item	Description
Parcel Information	The project is located at 4346 West Glendale Avenue in Glendale, Arizona. See **Site Location** for additional site location information.
Existing Site Conditions	Based on the information provided and our site visit during the field exploration, the site is located within an existing commercial development. The site includes an existing single-story structure and associated asphalt paved parking and drive areas and landscaped areas.
Current Ground Cover	Describe ground cover across the site.
Surrounding improvements	East, West, and North: Other existing commercial properties South: Glendale Avenue
Existing Topography	The site appears to be relatively flat.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and our final understanding of the project conditions is as follows:

Item	Description
Project Description	We understand the proposed project will consist of redeveloping the site with a new single-story restaurant building and new paved parking and drive areas.
Proposed Structure and Building Construction	We anticipate the proposed building will consist of a wood-frame superstructure supported on a reinforced concrete foundation system. We anticipate the floor of the proposed building will be a concrete slab-on-grade. We understand the parking and drive areas will generally consist of asphalt concrete or portland cement concrete pavements.
Finished Grade Elevation	We understand finished floor elevation will be at or slightly above the existing ground surface.
Maximum Loads	■ Columns: 75 kips ■ Walls: 3 kips per linear foot (klf) ■ Slabs: 150 pounds per square foot (psf)
Grading/Slopes	The site is relatively flat and grading operations across the site are anticipated to generally include relatively minor amounts of cuts and fills. Some excavations to remove the existing structure is anticipated as part of the planned building demolition activities.

Item	Description
Below-Grade Structures	None are planned.
Pavements	On-site drives and parking area pavements for automobile and truck traffic are anticipated to consist of asphalt concrete and/or portland cement concrete. Estimated on-site traffic volumes were not provided, and the following are the anticipated design equivalent single axle loads (ESALs) for the on-site pavements: ■ Autos/Light Trucks Drives and Parking Areas: 7,000 ESALs ■ Truck Drives: 27,000 ESALs, and possibly greater depending on site specific truck traffic information ■ The pavement design period is 20 years

GEOTECHNICAL CHARACTERIZATION

Geology

The project area is located in the Basin and Range physiographic province ([1]Cooley, 1967) of the North American Cordillera ([2]Stern, et al, 1979) of the southwestern United States. The southern portion of the Basin and Range province is situated along the southwestern flank of the Colorado Plateau and is bounded by the Sierra Nevada Mountains to the west. Formed during middle and late Tertiary time (100 to 15 million years ago), the Basin and Range province is dominated by fault-controlled topography. The topography consists of mountain ranges and relatively flat alluviated valleys. These mountain ranges and valleys have evolved from generally complex movements and associated erosional and depositional processes. Structurally, the site lies within the Phoenix Basin. Drainage flows to the Gila River during late Tertiary time, coupled with structural activity discussed above, are generally responsible for the present-day topography within the basin.

Typically, the ranges in this area are of small areal extent but protrude significantly above adjacent wide alluviated plains and valleys. The basin rims are formed by the mountain ranges which consist of sedimentary, igneous and metamorphic materials which have been subjected to recurrent faulting and tilting, and in some places volcanic and intrusive events. As a result of erosion, the valleys have experienced partial infilling with sedimentary material which has been deposited as alluvial fans. Occasionally, the valleys may become interlocking as a result of coalescing alluvial fans which are referred to as bajadas.

[1] *Cooley, M.E., 1967,* ***Arizona Highway Geologic Map****, Arizona Geological Society.*
[2] *Stern, C.W., et al, 1979,* ***Geological Evolution of North America****, John Wiley & Sons, Santa Barbara, California.*

Based on review of U.S. Geological Survey (USGS) geological maps, surficial geologic conditions mapped at the site consist of Holocene surficial deposits. These deposits consist of unconsolidated deposits associated with modern fluvial systems. This unit consists primarily of fine-grained, well-sorted sediment on alluvial plains, but also includes gravelly channel, terrace, and alluvial fan deposits on middle and upper piedmonts.

Land Subsidence and Earth Fissures

The site is located within the Western Metropolitan Phoenix area that has experienced historic and documented groundwater decline. The depletion of the groundwater table has resulted in compression of the aquifer material and the phenomenon known as areal subsidence. Earth fissures are fractures or cracks that form in alluvial basins due to substantial groundwater overdrafts that produce local subsidence. Based on a review of the digital map of the Total Land Subsidence in Western Metropolitan Phoenix, Maricopa County, Arizona ([3]ADWR, 2020) prepared by ADWR, total land subsidence in the vicinity of the project site was approximately 0 to 0.4 inches from May 8, 2010 to May 3, 2020.

Earth fissures develop within land subsidence areas where a significant thickness of compressible alluvium overlies shallow irregular bedrock surfaces such as ridges and fault scarps or other subsurface features. Based on a review of available Arizona Geological Survey (AZGS) earth fissure maps, the project site is not within an earth fissure study area and no earth fissures are mapped at, or within ½ mile of the project site.

Subsurface Conditions

Specific conditions encountered at each boring location are indicated on the individual boring logs presented in the **Exploration Results** section of this report. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual. Based on conditions encountered in the borings, subsurface conditions on the project site can be generalized as follows:

Description	Approximate Depth to Bottom of Stratum	Material Description	Consistency / Relative Density
Surface	4 to 10 inches	Existing Asphalt Concrete Existing Aggregate Base Course[1]	---
Stratum 1	4 to 15 feet	Sandy Lean Clay	Medium Stiff to Stiff

[3] *Arizona Department of Water Resources (ADWR), 2020.* **Total Land Subsidence in Western Metropolitan Phoenix, Maricopa County; Based on Radarsat-2 Satellite Interferometric Synthetic Aperture Radar (InSAR) Data; Time Period of Analysis: 10.0 Years 05/08/2010 to 05/03/2020** *Created 5/12/2020 by Arizona Department of Water Resources.*

Description	Approximate Depth to Bottom of Stratum	Material Description	Consistency / Relative Density
Stratum 2	20½ feet	Clayey Sand and Silty Clayey Sand	Loose to Medium Dense

1. Aggregate Base Course was not observed beneath the asphalt concrete pavement at the locations of Borings B-1, B-2, and B-4.

Laboratory tests were conducted on selected soil samples and the test results are presented in the **Exploration Results** section of this report. Test results indicate the near surface clay soils exhibit medium plasticity characteristics. When water was added to a sample of laboratory compacted on-site near surface clay soils, the compacted soils exhibited medium expansive potential when subjected to light loading conditions such as those imposed by lightly loaded floor slabs.

In response to wetting of relatively undisturbed samples while supporting typical foundation pressures, the near surface and near surface soils exhibited low hydro-compaction (collapse) potential at in-situ moisture content and density. These same soils indicate low to moderate compression under typical foundation pressures.

Groundwater Conditions

Groundwater was not observed in any of the test borings at the time of our field exploration, nor when checked upon completion of drilling. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations. Groundwater conditions can change with varying seasonal and weather conditions, and other factors.

Based on information obtained from the Arizona Department of Water Resources – Groundwater Data website (https://gisweb.azwater.gov/waterresourcedata/GWSI.aspx), the depth to regional groundwater was measured in February 2018 to be approximately 194 feet below the ground surface (approximate elevation of 969 feet above mean sea level) at an Arizona Department of Water Resources (ADWR) monitored well site (Local I.D.: A-02-02 09BAD) located approximately 0.5 miles southwest of the site.

CORROSIVITY

The following table lists the results of laboratory soluble sulfate, soluble chloride, electrical resistivity, and pH testing. The values may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Corrosivity Test Results Summary						
Boring	**Sample Depth (feet)**	**Soil Description**	**Soluble Sulfate (ppm)**	**Soluble Chloride (ppm)**	**Electrical Resistivity (Ω-cm)**	**pH**
B – 1	0 – 4	Sandy Lean Clay	30	5	1,241	9.0

Results of soluble sulfate testing indicate that samples of the on-site soils tested classify as S0 according to Table 19.3.1.1 of Section 318 of the American Concrete Institute (ACI) Building Code Requirements for Structural Concrete. Therefore, American Society for Testing and Materials (ASTM) Type I/II portland cement is considered suitable for concrete at the site in contact with similar soluble sulfate concentrations. Concrete should be designed in accordance with the provisions of the ACI Building Code Requirements for Structural Concrete, Section 318, Chapter 19.

These values should be used to help determine potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction. Refer to Summary of Laboratory Results contained in **Exploration Results** for the complete results of the corrosivity testing performed on the site soils in conjunction with this geotechnical exploration. The corrosion information presented is specific to the samples tested.

If the actual soils that will be in contact with the structures at the site are different than those tested, then additional corrosion testing should be performed. Terracon is not a corrosion engineer, and our scope of work was limited to performing corrosion laboratory tests on selected samples, presenting these results, and providing a brief comparison of the results to selected criteria. A qualified corrosion engineer should be consulted if corrosion of underground utilities and structures is a concern.

SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our professional opinion that the **Seismic Site Classification is D**. Subsurface explorations at this site were extended to a maximum depth of 20½ feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

GEOTECHNICAL OVERVIEW

The site appears suitable for the proposed construction based upon geotechnical conditions encountered in the test borings and provided our geotechnical engineering recommendations contained in this report are properly implemented in the design and construction.

- The near surface soils exhibited consistencies of medium stiff to stiff range. These soils will provide relatively poor support for shallow foundations in their current condition. To improve the support characteristics of the on-site soils, the proposed shallow spread footings that will support the proposed building should be founded on engineered fill as outlined in the **Earthwork** section of this report. Properly processed and moisture-conditioned on-site soils are considered suitable for use as engineered fill beneath foundations.

- The interior floor slab should be supported on scarified and re-compacted on-site soils as outlined in the **Earthwork** section of this report.

- Samples of near-surface clay soils obtained from the field exploration exhibited elevated in-situ moisture contents of up to 18%, likely as a result of reduced evapo-transpiration processes from the soils because of the presence of the overlying pavements. The elevated in-situ moisture contents could create unstable and difficult construction conditions. Stabilization of the high moisture content soils may be necessary to facilitate construction. The **Earthwork** section of this report provides some options for mitigation of the high in-situ moisture content subgrade soils.

- The proposed monument sign can be supported on a drilled shaft foundation. Geotechnical engineering design parameters for drilled shaft foundations are outlined in in the **Drilled Shaft Foundations** section of this report.

- Asphalt concrete and rigid pavement systems are suitable for this site. The **Pavements** section addresses the design of the pavement systems.

- All grades must provide effective drainage away from the building during and after construction. Water permitted to pond next to the building can result in greater soil movements than those discussed in this report. These greater movements can result in unacceptable differential floor slab movements, cracked slabs and walls, and roof leaks. Estimated movements described in this report are based on effective drainage for the life of the structure and cannot be relied upon if effective drainage is not maintained.

- Exposed ground should be sloped at a minimum 5 percent away from the building for at least 10 feet beyond the perimeter of the building. After building construction and landscaping, we recommend verifying final grades to document that effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted as necessary, as part of the structure's maintenance program.

Geotechnical engineering recommendations for foundation systems, floor slabs, and other earth connected phases of the project are outlined below. The recommendations contained in this report are based upon the results of field and laboratory testing (included in the **Exploration Results** section), engineering analyses, and our current understanding of the proposed project.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

The following recommendations include clearing site preparation, demolition, excavation, subgrade preparation and placement of engineered fills on the project. The recommendations presented for design and construction of earth supported elements including foundations, slabs and pavements are contingent upon following the recommendations outlined in this section.

Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project.

Site Preparation

Strip and remove the existing structure, foundations, pavements, and other deleterious materials from proposed construction areas. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction. The site should be initially graded to create a relatively level surface to receive fill, and to provide for a relatively uniform thickness of fill beneath the proposed building structure.

We understand that the existing structure and all existing pavement will be razed to accommodate the proposed new construction. Demolition of the existing building should include complete removal of all foundation systems within the proposed construction area. This should include removal of any loose backfill found adjacent to existing foundations. All materials derived from the demolition of existing structures and pavements should be removed from the site, and not be allowed for use in any on-site fills. Existing pavements should be removed from areas that will receive fill.

Although evidence of underground facilities such as septic tanks, cesspools, basements, and utilities was not observed during the site reconnaissance, such features could be encountered during construction. If unexpected fills or underground facilities are encountered, such features should be removed, and the excavation thoroughly cleaned prior to backfill placement and/or construction.

Although existing fill was not encountered in the test borings, unobserved fills may be present below the existing building pad. Any existing fills encountered during demolition of the existing structure and foundation elements should be removed in their entirety and replaced as engineered fill. Any soils disturbed as a result of the building demolition should also be removed and replaced as engineered fill.

Excavation

It is anticipated that shallow excavations to typical foundations depths for the proposed construction can be accomplished with conventional earthmoving equipment.

The subgrade soils exhibited elevated (above optimum) in-situ moisture contents which could result in some amount of instability during construction. The stability of the subgrade may be further compromised by increasing moisture content or by precipitation, repetitive construction traffic or other factors. In the event the subgrade soils exhibit instability during construction, some form of stabilization will be required. At a minimum, the subgrade soils may require some processing to reduce their moisture content by scarifying or removing them and allowing them to aerate and dry prior to compaction. Over-excavation of wet zones and replacement with granular materials may be necessary. Alternatively, the use of biaxial geogrid may be considered to stabilize the soils and to reduce the amount of overexcavation that may otherwise be required. Use of lime, fly ash, kiln dust or cement could also be considered as a stabilization technique. Laboratory evaluation is recommended to determine the effect of chemical stabilization on subgrade soils prior to construction.

The individual contractor(s) is responsible for designing and constructing stable, temporary excavations as required to maintain stability of both the excavation sides and bottoms. Excavations should be sloped or shored in the interest of safety following local and federal regulations, including current OSHA excavation and trench safety standards.
Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

Subgrade Preparation

We recommend the proposed building foundations be supported on shallow spread footings bearing on engineered (compacted) fill. Engineered fill should extend below proposed shallow spread footings to the depths indicated in the following table:

Building/ Structure	Depth of Engineered Fill Below Footings	Lateral Extent of Engineered Fill Beyond the Edges of Footings
Column and Wall Footings	A minimum of 1.5 feet below foundation level or 3 feet below the existing ground surface, whichever is greater	A minimum of 3 feet horizontally beyond the edges of footings

If the building envelope is over-excavated, then the over-excavation should extend laterally a minimum of 5 feet beyond the outside face of the exterior walls or any exterior columns or adjacent sidewalks. The exposed bottom of foundation over-excavated areas, once properly cleared and benched where necessary, should be scarified to a minimum depth of 8 inches, moisture conditioned, and compacted. Alternatively, these exposed areas can be proof-rolled provided compaction is met to a minimum depth of 8 inches. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction. Exposed surfaces in proposed foundation areas should be observed and approved by Terracon prior to placement of engineered fill or other improvements. All foundation excavations should be observed and approved by Terracon prior to placement of reinforcing steel.

The interior floor slab and recommended aggregate subbase course should be supported on a minimum of 10 inches of scarified and recompacted on-site materials.

Subgrade soils and fill materials beneath exterior slabs and pavements should be scarified, moisture conditioned and compacted to a minimum depth of 12 inches. The moisture content and compaction of subgrade soils should be maintained until slab or pavement construction.

Fill Material Types

All fill materials should be inorganic soils free of vegetation and fragments larger than 4 inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

Clean native soils or approved imported materials may be used as fill material for the following:

Fill Type [1]	USCS Classification	Acceptable Location for Placement
On-Site Soils	CL	The on-site native soils are considered suitable for use as engineered fill at all locations and elevations.
Imported Material	Varies	All locations and elevations

1. Controlled, compacted fill should consist of approved materials that are free of organic matter, debris, and oversized materials. A sample of each material type should be submitted to the geotechnical engineer for evaluation.

If required, imported soils for use as engineered fill material within proposed building and structure areas should conform to low volume change materials as indicated in the following specifications:

Gradation	**Percent Finer by Weight (ASTM C136)**
4"	100
No. 4 Sieve	50-100
No. 200 Sieve	15 (min) to 45 (max)

- Liquid Limit .... 30 (max)
- Plasticity Index .... 15 (max)
- Maximum expansive potential (%)* 1.5

*Measured on a sample compacted to approximately 95 percent of the ASTM D698 maximum dry density at about 2 percent below optimum water content. The sample is confined under a 100 psf surcharge and submerged/inundated.

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed 10 inches loose thickness. Aggregate base course should conform to the Maricopa Association of Governments (MAG) specifications.

Fill Compaction Requirements

Engineered fill should meet the following compaction and moisture requirements:

Material Type and Location	Per the Standard Proctor Test (ASTM D698)[1]		
	Minimum Compaction Requirement (%)	Range of Moisture Contents for Compaction (referenced from optimum moisture content)	
		Minimum	Maximum
On-site clay soils:			
Beneath footings	95	-2%	+2%
Beneath pavements	95	Optimum	+2%
Beneath interior floor slabs and the aggregate subbase	95	Optimum	+2%
Imported fill soils:			
Beneath footings	95	-2%	+2%
Beneath floor slabs	95	-2%	+2%
Beneath pavements	95	-2%	+2%
Aggregate base (beneath concrete slabs)	95	-2%	+3%

Material Type and Location	Per the Standard Proctor Test (ASTM D698)[1]		
	Minimum Compaction Requirement (%)	Range of Moisture Contents for Compaction (referenced from optimum moisture content)	
		Minimum	Maximum
Aggregate base (beneath pavements)	100	-2%	+3%
Miscellaneous backfill (outside of building and pavement areas)	95	-2%	+3%

1. The moisture content and compaction should be measured for each lift of engineered fill during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.

Utility Trench Backfill

Utility trenches are a common source of water infiltration and migration. Utility trenches penetrating beneath the building should be effectively sealed to restrict water intrusion and flow through the trenches, which could migrate below the buildings. The trench should provide an effective trench plug that extends at least 5 feet from the face of the building exterior. The plug material should consist of cementitious flowable fill or low permeability clay. The trench plug material should be placed to surround the utility line. If used, the clay trench plug material should be placed and compacted to comply with the water content and compaction recommendations for engineered fill stated previously in this report.

Grading and Drainage

Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of slabs and pavements. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over, or adjacent to, construction areas should be removed. If the subgrade desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted, prior to floor slab construction.

All finished grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the development. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. Planters and other surface features which could retain water in areas adjacent to the building or pavements should be sealed or eliminated.

In areas where sidewalks or paving do not immediately adjoin a structure, we recommend that protective slopes be provided with a minimum grade of approximately 5 percent for at least 10 feet from perimeter walls. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. Where paving or flatwork abuts the structure a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Downspouts, roof drains or scuppers should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving. Sprinkler systems should not be installed within 10 feet of foundation walls. Landscaped irrigation adjacent to the foundation systems should be minimized or eliminated.

After building construction and landscaping, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted as necessary as part of the structure's maintenance program.

Exterior Slab Design and Construction

Compacted subgrade consisting of the existing on-site soils will expand with increasing moisture content; therefore, exterior concrete slabs may heave, resulting in cracking or vertical offsets. The potential for damage would be greatest where exterior slabs are constructed adjacent to the building or other structural elements. To reduce the potential for damage caused by movement, we recommend the following:

- exterior slabs should be supported directly on subgrade fill;
- strict moisture-density control during placement of subgrade fills;
- placement of effective control joints on relatively close centers and isolation joints between slabs and other structural elements;
- provision for adequate drainage in areas adjoining the slabs;
- use of designs which allow vertical movement between the exterior slabs and adjoining structural elements.

Construction Observation and Testing

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of vegetation and topsoil (if applicable), proofrolling, and mitigation of areas delineated by the proofroll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least 1 test for every 1,000 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. One density and water content test should be performed for every 100 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

Design Parameters – Compressive Loads

Design Item	Description/Recommendations
Maximum Net Allowable Bearing Pressure [1,2]	2,000 psf
Minimum Embedment Depth Below finished grade [3]	18 inches
Bearing Material	Spread footings should be supported on engineered fill soil as described in **Earthwork**.
Minimum footing dimensions	Spread Footings: 24 inches Continuous Wall Footings: 18 inches
Maximum footing dimensions	Spread Footings: 54 inches Continuous Wall Footings: 42 inches
Estimated total settlement [2]	1 inch or less
Estimated differential settlement [2,4]	¾ of the total settlement

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied. The allowable bearing pressure may be increased by ⅓ when considering the alternative load combinations of Section 1605.3.2 of the *2012 International Building Code*, however, it should not be increased when loads are determined by the basic allowable stress design load combinations of Section 1605.3.1.
2. Values provided are for maximum loads noted in **Project Description**.

Design Item	Description/Recommendations

3. Finished grade is defined as the lowest adjacent grade within 5 feet of the foundation for perimeter (or exterior) footings and finished floor level for interior footings.
4. Differential settlements are as measured over a span of 40 feet.

Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed. If unsuitable bearing soils or fills are encountered at the base of the planned footing excavation, the excavation should be extended deeper to native soils, and the footings could bear directly on these soils at the lower level or on lean concrete or engineered fill backfill placed in the excavations.

DRILLED SHAFT FOUNDATIONS

Drilled Shaft Axial Loading

Straight sided drilled shaft foundations drilled into natural soils are considered suitable for support of the proposed sign. Drilled shaft foundations should have a minimum diameter of 12 inches, and a minimum embedment depth of 8 feet. The recommended parameters for the analysis of axial capacity of shafts are summarized in the table below. Axial tension (uplift) capacity can be developed from skin friction while the axial compressive capacity can rely on both skin friction and end bearing. Settlement of the drilled shaft foundations designed on the basis of the following table are anticipated to be less than one (1) inch.

Parameters for Analysis of Axial Capacity		
Layer (feet)	**Allowable Skin Friction, psf**	**Allowable End Bearing Pressure, psf**
0-5	---	--
5-8	135	--
8-15	320	5,250

Note: The upper 5 feet of drilled shafts should be ignored when calculating the axial capacity.

Drilled shafts should be considered to work in group action if the horizontal spacing is less than six shaft diameters. A minimum practical horizontal spacing between shafts of at least three diameters should be maintained, and adjacent shafts should bear at the same elevation. The capacity of individual shafts must be reduced when considering the effects of group action. Capacity reduction is a function of shaft spacing and the number of shafts within a group. If group action analyses are necessary, capacity reduction factors can be developed for the analyses.

Drilled Shaft Lateral Loading

Recommended geotechnical parameters for lateral load analysis of the drilled shaft foundations have been developed for use in the computer program L-PILE 2018 that utilizes P-y curve analyses, and they are presented in the following table:

Soil Type	Depth to Bottom of Layer (ft)	Soil Type (P-y) Curve Model	Total Unit Weight (pcf)	Cohesion (psf)	Friction Angle (φ)	Modulus (k) or Strain Factor (e_{50})
Stratum 1	7	Stiff Clay w/o Free Water (Reese)	110	750	---	Allow L-Pile Program to choose appropriate values based on the listed engineering properties
Stratum 2	14	Stiff Clay w/o Free Water (Reese)	110	1,750	---	
Stratum 3	15	Sand (Reese)	105	---	30	

Lateral load design parameters are valid for maximum soil strain of five percent acting over a distance of one shaft diameter.

Drilled Shaft Construction Considerations

Drilling of foundations to design depths should be possible with conventional drilling equipment using single flight power augers.

Sloughing material could be encountered during drilled shaft excavation, requiring the use of temporary casing. If casing is used for drilled shaft construction, it should be withdrawn in a slow continuous manner maintaining a sufficient head of concrete to prevent the creation of voids in shaft concrete. Drilled shaft concrete should have a relatively high fluidity when placed in cased shaft holes or through a tremie. Concrete with a slump in the range of 6 to 8 inches is recommended. Drilled shaft concrete should be placed upon completion of drilling and cleaning. Free-fall concrete placement in drilled shaft excavations will only be acceptable if provisions are taken to avoid striking the concrete on the sides of the hole or reinforcing steel. The use of a bottom-dump hopper, or an elephant's trunk discharging near the bottom of the hole where concrete segregation will be minimized, is recommended.

Shaft bearing surfaces should be cleaned prior to concrete placement. A representative of Terracon should inspect the bearing surface and shaft configuration. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

LATERAL EARTH PRESSURES

Design Parameters

The lateral earth pressure recommendations herein are applicable to the design of footings and rigid retaining walls subject to slight rotation, such as cantilever, or gravity type concrete walls.

Earth Pressure Design Case[1]	Design Recommendation[2,4]
Active Case (Ka)	45 psf/ft
Passive Case (Kp)	345 psf/ft
At-Rest Case (Ko)	65 psf/ft
Coefficient of Base Friction	0.30[3]

1. For active earth pressure, wall must rotate about base, with top lateral movements 0.002 H to 0.004 H, where H is wall height. For passive earth pressure, wall must move horizontally to mobilize resistance.
2. The design values are based on utilizing on-site soils as backfill placed and compacted as outlined in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors.
3. The coefficient of base sliding should be reduced to 0.25 when used in conjunction with passive pressure.
4. The lateral earth pressures herein do not include any factor of safety, they assume drained conditions, and they are not applicable for submerged soils/hydrostatic loading. Additional recommendations may be necessary if such conditions are to be included in the design.

FLOOR SLABS

Floor slabs should be designed based on the following geotechnical recommendations:

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.

Floor Slab Design Parameters

Item	Description
Interior floor system	Slab-on-grade concrete.
Subbase	A minimum of 4 inches of compacted aggregate base course materials
Floor Slab Support	The interior floor slab and recommended aggregate subbase course should be placed on a minimum of 10-inches of scarified and recompacted on-site soils as outlined in the **Earthwork** section of this report.
Estimated Modulus of Subgrade Reaction [1]	125 pounds per square inch per inch (psi/in) for point loads

1. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table.

Additional floor slab design and construction recommendations are as follows:

- Positive separations and/or isolation joints should be provided between slabs and all foundations, columns, or utility lines to allow independent movement.
- Control joints should be provided in slabs to control the location and extent of cracking.
- Other design and construction considerations, as outlined in the ACI Design Manual, Section 302.1R are recommended.
- Some differential movement of a slab-on-grade floor system is possible should the subgrade soils become elevated in moisture content. Such movements are anticipated to be within general tolerance (i.e., less than 1 inch) for normal slab-on-grade construction. To reduce potential slab movements, the subgrade soils should be prepared as outlined in the **Earthwork** section of this report.
- The use of a vapor retarder or barrier should be considered beneath concrete slabs on grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer and slab contractor should refer to ACI 302 and ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder/barrier.

Floor Slab Construction Considerations

Finished subgrade within and for at least 10 feet beyond the floor slab should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and engineered fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should approve the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

PAVEMENTS

General Pavement Comments

Pavement designs are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

Pavement Design Parameters

The design of flexible pavements for the project was based on the procedures of the National Asphalt Pavement Association (NAPA). These design procedures are specific to low-volume (low traffic) pavements such as those that will be constructed at this site. Portland Cement Concrete (PCC) pavement thicknesses are based on the American Concrete Institute (ACI) design recommendations.

The design of the recommended pavement sections was based on the following NAPA and ACI criteria:

- NAPA Traffic Class I (ACI Category A) for automobile drives and parking areas includes a maximum of 7,000 Equivalent Single 18-kip Axle Loads (ESAL's) over the design life of the pavement;
- NAPA Traffic Class II (ACI Category B) for the drive-thru and new main drives and light truck drives areas includes a maximum of 27,000 ESAL's over the design life of the pavement;
- A soil characterization of "poor" based on the sandy lean clay subgrade soils encountered at the site and expected at pavement subgrade elevation;
- A Modulus of Subgrade Reaction, *k*, of 125 pci based on the soil classification and relatively soft subgrade soils;

- A concrete modulus of rupture of 550 psi based on a concrete compressive strength of 4,000 psi; and,
- A pavement design life of 20 years.

Pavement Section Thicknesses

Pavement sections based upon a more detailed pavement design could be provided if specific traffic loading, frequencies, and desired pavement design life are provided. As a minimum, we suggest the following typical pavement sections be considered:

Traffic Area	Alternative	Recommended Pavement Section Thickness (inches)			
		Asphalt Concrete Surface	Portland Cement Concrete	Aggregate Base Course	Total
Automobile Drives & Parking Areas	Flexible	3.0	---	4.0	7.0
	Rigid	---	5.0	4.0	9.0
Drive-Thru, Main Drives & Light Truck Drives	Flexible	3.5	---	6.0	9.5
	Rigid	---	6.0	4.0	10.0
Trash Enclosure	Rigid	--	6.0	4.0	10.0

Design and Construction Considerations

Materials and construction of pavements for the project should be in accordance with the requirements and specifications of the Maricopa Association of Governments ([4]MAG, 2020). Base course or pavement materials should not be placed when the surface is wet. Surface drainage should be provided away from the edge of paved areas to minimize lateral moisture transmission into the subgrade.

All concrete for rigid pavements should have a minimum 28-day compressive strength of 4,000 psi (i.e. MAG AA or equivalent) and be placed with a maximum slump of 4 inches. Although not required for structural support, a minimum 4-inch thick base course layer is recommended beneath concrete pavements to help reduce the potential for slab curl, shrinkage cracking, and subgrade "pumping" through joints. Proper joint spacing will also be required to prevent excessive

[4] *Maricopa Association of Governments, 2020,* ***Uniform Standard Specifications and Details for Public Works Construction****, Arizona.*

slab curling and shrinkage cracking. All joints should be sealed to prevent entry of foreign material and dowelled where necessary for load transfer.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to paved areas should slope down from the edges at a minimum of 2%; and

- The subgrade and pavement surface should have a minimum of 2% slope to promote proper surface drainage.

Pavement Maintenance

Future performance of pavements constructed on the soils at this site will be dependent upon several factors, including:

- maintaining stable moisture content of the subgrade soils; and,
- providing for a planned program of preventative maintenance.

Preventative maintenance should be planned and provided for through an on-going pavement management program to enhance future pavement performance. Preventative maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment.

Preventative maintenance consists of both localized maintenance (e.g. crack sealing and patching) and global maintenance (e.g. surface sealing). Preventative maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client.

Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others.

If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

A total of 6 borings were drilled at the project site on July 9, 2021. The approximate boring locations at the project site are shown on the **Exploration Plan**, and the location and depth of the borings are summarized in the following table:

Number of Borings	Boring ID Nos.	Boring Depth (feet)	Planned Location
4	B-1 through B-4	15 to 15½	Proposed Building Footprint
1	B-5	20½	Proposed Monument Sign Area
1	P-1 and P-2	5	Proposed Pavement/Dumpster Areas

Boring Layout and Elevations: Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±15 feet) and elevations were obtained from Google Earth Pro. If more precise boring layout and elevations are desired, we recommend the borings be surveyed.

Subsurface Exploration Procedures: The borings were advanced with a truck-mounted drill rig utilizing 8-inch outside diameter hollow-stem augers. At selected intervals, samples of the subsurface materials were taken at each boring location by driving split-spoon (SPT) or ring-lined barrel samplers in general accordance with ASTM Standards. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon is driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. A 3-inch O.D. split-barrel sampling spoon with 2.5-inch I.D. ring lined sampler was also used for sampling in the upper ten feet in the soil borings. Ring-lined, split-barrel sampling procedures are similar to standard split spoon sampling procedure; however, blow counts are typically recorded for 6-inch intervals for a total of 12 inches of penetration.

Bulk samples of subsurface materials were obtained from all the borings. Groundwater was not encountered during the field exploration. For safety purposes, the borings were backfilled with auger cuttings mixed with cement and the pavement was patched with asphalt cold patch after their completion.

Our exploration team prepared field boring logs as part of the drilling operations. The sampling depths, penetration distances, and other sampling information were recorded on the field boring logs. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a geotechnical engineer. Final boring logs were prepared from the field logs. The final boring logs represent the geotechnical engineer's interpretation of the field logs and include modifications based on observations and the results of testing of the samples in our laboratory.

Laboratory Testing

Samples retrieved during the field exploration were taken to the laboratory for further observation by the project geotechnical engineer and were classified in accordance with the Unified Soil Classification System (USCS) as shown in the **Exploration Results** section of this report. At that time, the field descriptions were confirmed or modified as necessary and an applicable laboratory testing program was formulated to determine the engineering properties of the subsurface materials.

Laboratory tests were conducted on selected soil samples and the test results are presented in the **Exploration Results** section of this report. These results were used for the geotechnical engineering analyses, and the development of foundation, floor slabs, and pavement recommendations. Laboratory tests were performed in general accordance with the applicable ASTM, local, or other accepted standards.

Selected soil samples obtained from the site were tested for the following engineering properties:

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil by Mass
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D422 Standard Test Method for Particle-Size Analysis of Soils
- ASTM D2435/D2435M Standard Test Methods for One-Dimensional Consolidation Properties of Soils Using Incremental Loading
- ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
- ARIZ 236e Arizona Department of Transportation (ADOT) Determining pH and minimum resistivity of Soils and Aggregate (An Arizona Method)
- ARIZ 733b Arizona Department of Transportation (ADOT) Sulfate in Soils (An Arizona Method)
- ARIZ 736b Arizona Department of Transportation (ADOT) Chloride in Soils (An Arizona Method)

The laboratory testing program often included examination of soil samples by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

SITE LOCATION AND EXPLORATION PLANS

Contents:

Note: All attachments are one page unless noted above.

SITE LOCATION

Proposed Taco Bell – 43rd Ave and Glendale ■ Glendale, Arizona
July 30, 2021 ■ Terracon Project No. CP215032

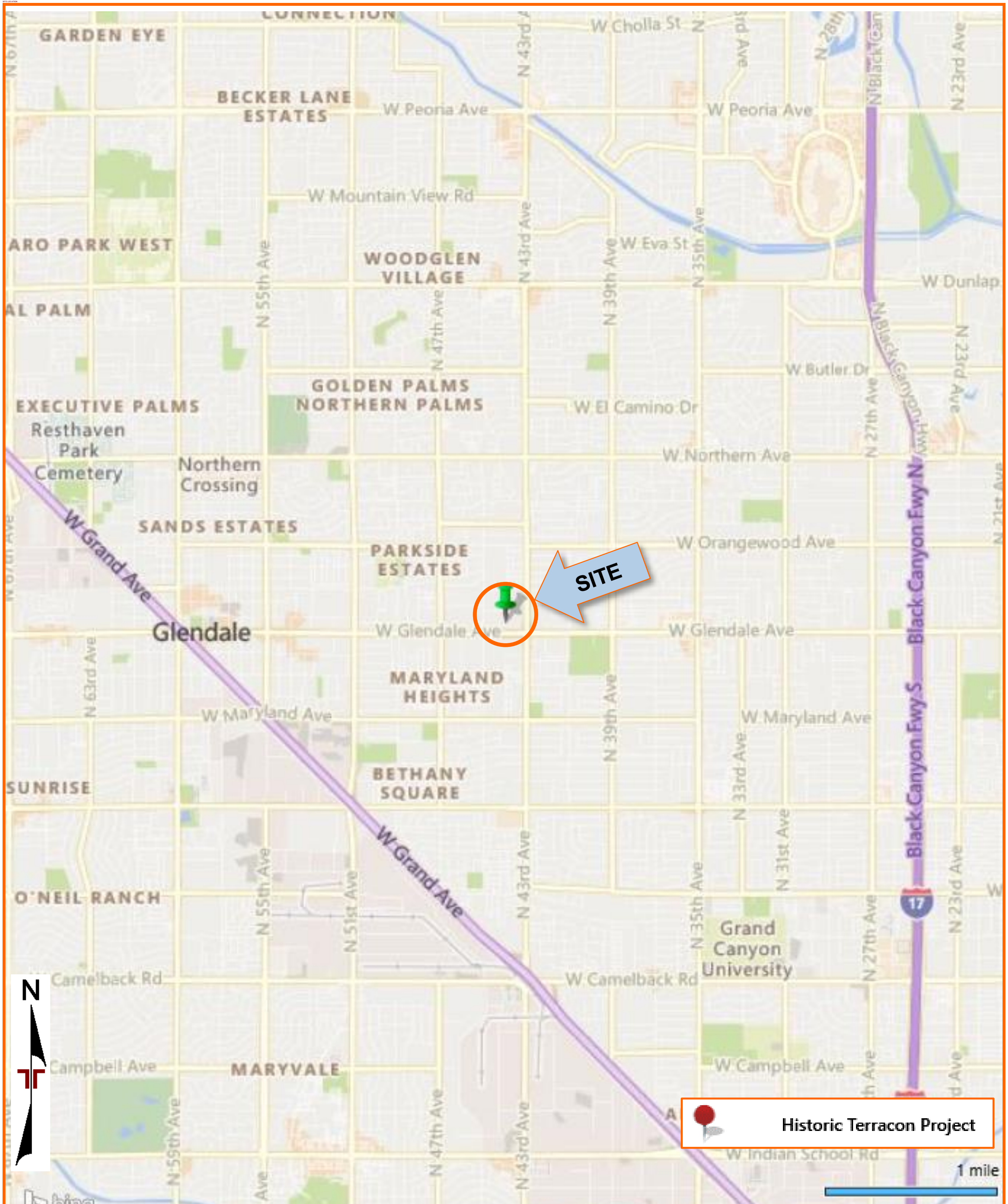


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN

Proposed Taco Bell – 43rd Ave and Glendale ■ Glendale, Arizona

July 30, 2021 ■ Terracon Project No. CP215032

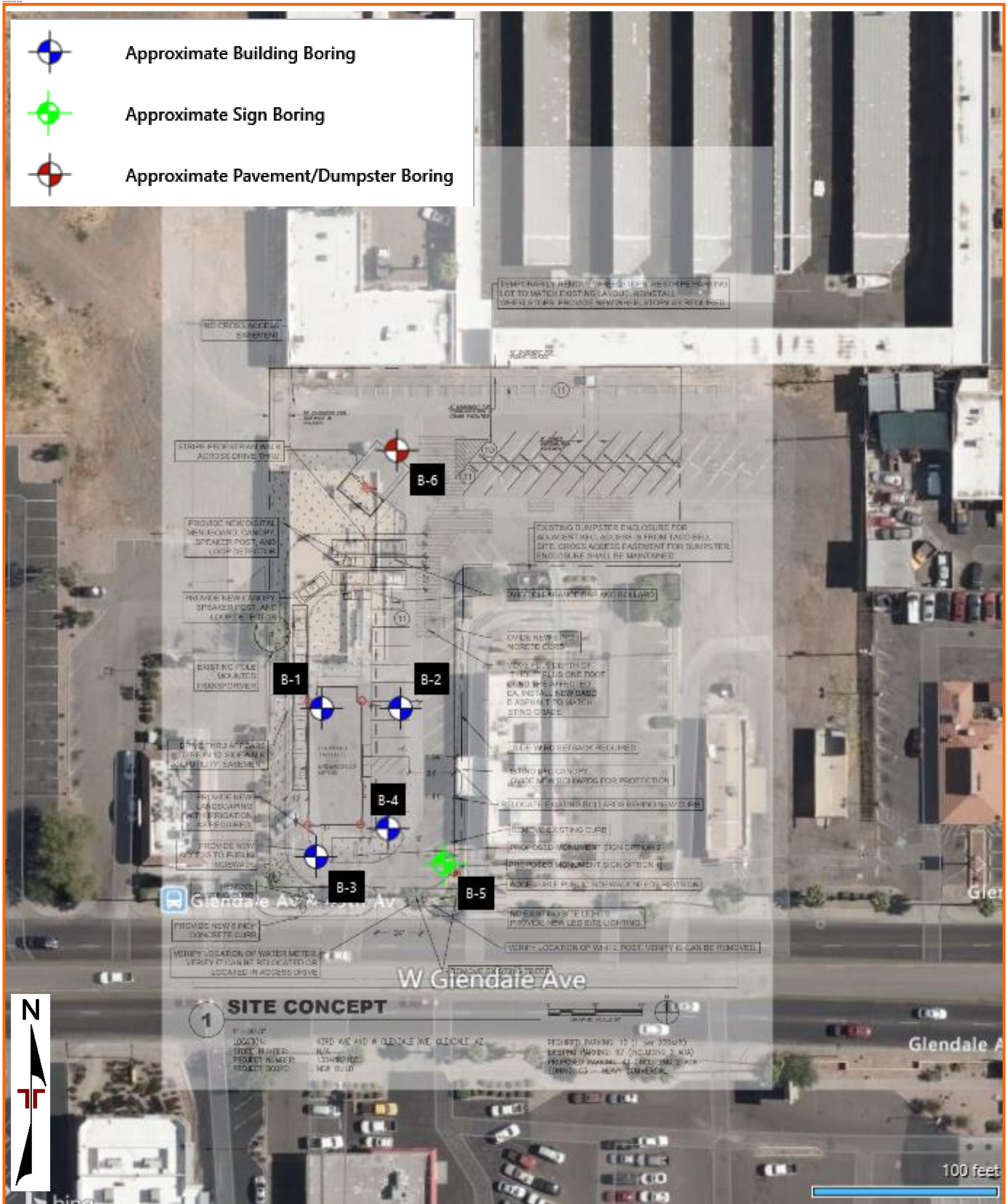


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION RESULTS

Contents:

Note: All attachments are one page unless noted above.

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

Proposed Taco Bell- 43rd and Glendale ■ Glendale, Arizona

Terracon Project No. CP215032

Terracon GeoReport

SAMPLING	WATER LEVEL	FIELD TESTS
Auger Cuttings Ring Sampler Standard Penetration Test	**Water Initially Encountered** **Water Level After a Specified Period of Time** **Water Level After a Specified Period of Time** **Cave In Encountered** Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	**N** Standard Penetration Test Resistance (Blows/Ft.) **(HP)** Hand Penetrometer **(T)** Torvane **(DCP)** Dynamic Cone Penetrometer **UC** Unconfined Compressive Strength **(PID)** Photo-Ionization Detector **(OVA)** Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 0.25	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	0.25 to 0.50	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium Stiff	0.50 to 1.00	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	1.00 to 2.00	8 - 15	10 - 18
Very Dense	> 50	> 99	Very Stiff	2.00 to 4.00	15 - 30	19 - 42
			Hard	> 4.00	> 30	> 42

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification: Group Symbol	Soil Classification: Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu ≥ 4 and 1 ≤ Cc ≤ 3 [E]	GW	Well-graded gravel [F]
			Cu < 4 and/or [Cc<1 or Cc>3.0] [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu ≥ 6 and 1 ≤ Cc ≤ 3 [E]	SW	Well-graded sand [I]
			Cu < 6 and/or [Cc<1 or Cc>3.0] [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G, H, I]
			Fines classify as CL or CH	SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A"	CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay [K, L, M, N]
					Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line	CH	Fat clay [K, L, M]
			PI plots below "A" line	MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay [K, L, M, P]
					Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

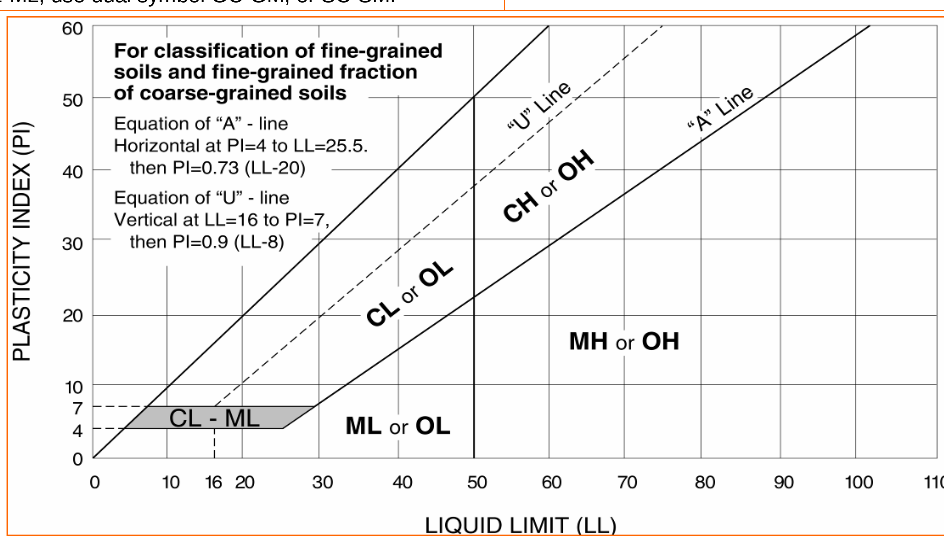
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



BORING LOG NO. B-1

PROJECT: Proposed Taco Bell- 43rd and Glendale

CLIENT: Gen2 Arizona Properties LLC
Kingman, Arizona

SITE: 4346 West Glendale Avenue
Glendale, Arizona

LOCATION See Exploration Plan

Latitude: 33.5389° Longitude: -112.1535°

Approximate Surface Elev.: 1164 (Ft.) +/-

DEPTH	Description	ELEVATION (Ft.)
0.3	**ASPHALT CONCRETE**, approximately 4 inches thick, no aggregate base course observed	1163.5+/-
9.0	**SANDY LEAN CLAY (CL)**, trace gravel, fine to medium sand, medium plasticity, brown, medium stiff	1155+/-
15.5	**SILTY CLAYEY SAND (SC-SM)**, trace gravel, fine to coarse sand, low plasticity, light brown, medium dense; stratified with clayey sand	1148.5+/-

Boring Terminated at 15.5 Feet

DEPTH (Ft.)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0-4 (bulk sample)				28-17-11	65
2-3	3-3	18.1	96		
4-5	3-4	15.5	95		
9-10	6-13	17.8	101		
14-15.5	3-3-3 N=6				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with Auger Cuttings and Grout. Surface Capped with Asphalt

Elevations Obtained with Google Earth Pro

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1050 N Fairway Dr Ste G103
Avondale, AZ

Boring Started: 07-09-2021	Boring Completed: 07-09-2021
Drill Rig: CME 75	Driller: Integrity Drilling
Project No.: CP215032	

BORING LOG NO. B-2

PROJECT: Proposed Taco Bell- 43rd and Glendale

**CLIENT: Gen2 Arizona Properties LLC
Kingman, Arizona**

**SITE: 4346 West Glendale Avenue
Glendale, Arizona**

LOCATION See Exploration Plan

Latitude: 33.5389° Longitude: -112.1534°

Approximate Surface Elev.: 1164 (Ft.) +/-

DEPTH	MATERIAL DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.4	**ASPHALT CONCRETE**, approximately 5 inches thick, no aggregate base course observed	1163.5+/-								
	SANDY LEAN CLAY (CL), trace gravel, fine to medium sand, medium plasticity, brown, soft to medium stiff					2-3	17.5	92		
	medium stiff		5			3-4	14.0	97		
9.0		1155+/-								
	CLAYEY SAND (SC), trace gravel, fine to coarse sand, medium plasticity, light brown, medium dense, weak cementation		10			6-13	16.7	97		
	loose					3-4-4 N=8				
15.5		1148.5+/-	15							

Boring Terminated at 15.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with Auger Cuttings and Grout. Surface Capped with Asphalt

Elevations Obtained with Google Earth Pro

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1050 N Fairway Dr Ste G103
Avondale, AZ

Boring Started: 07-09-2021	Boring Completed: 07-09-2021
Drill Rig: CME 75	Driller: Integrity Drilling
Project No.: CP215032	

BORING LOG NO. B-3

PROJECT: Proposed Taco Bell- 43rd and Glendale

CLIENT: Gen2 Arizona Properties LLC Kingman, Arizona

SITE: 4346 West Glendale Avenue Glendale, Arizona

LOCATION See Exploration Plan

Latitude: 33.5386° Longitude: -112.1535°

Approximate Surface Elev.: 1164 (Ft.) +/-

DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.3	**ASPHALT CONCRETE**, approximately 3 inches thick	1163.5+/-								
0.6	**AGGREGATE BASE COURSE**, approximately 4 inches thick	1163.5+/-								
	SANDY LEAN CLAY (CL), trace gravel, fine to coarse sand, medium plasticity, brown, stiff									
	no sample recovery					5-6				
			5			5-8	11.3	76		
	very stiff		10			12-20	13.3	94		
15.0	weak cementation, stratified with clayey sand	1149+/-	15			9-10	10.4	114		

Boring Terminated at 15 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with Auger Cuttings and Grout. Surface Capped with Asphalt

Elevations Obtained with Google Earth Pro

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1050 N Fairway Dr Ste G103
Avondale, AZ

Boring Started: 07-09-2021	Boring Completed: 07-09-2021
Drill Rig: CME 75	Driller: Integrity Drilling
Project No.: CP215032	

BORING LOG NO. B-4

PROJECT: Proposed Taco Bell- 43rd and Glendale

CLIENT: Gen2 Arizona Properties LLC
Kingman, Arizona

SITE: 4346 West Glendale Avenue
Glendale, Arizona

LOCATION See Exploration Plan

Latitude: 33.5387° Longitude: -112.1534°

Approximate Surface Elev.: 1164 (Ft.) +/-

DEPTH	Description	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.4	**ASPHALT CONCRETE**, approximately 4 inches thick, no aggregate base course observed	1163.5+/-								
	SANDY LEAN CLAY (CL), trace gravel, fine to coarse sand, medium plasticity, brown, medium stiff					2-4	16.1	98	30-18-12	65
4.0		1160+/-								
	CLAYEY SAND (SC), trace gravel, fine to coarse sand, low plasticity, brown, loose		5			3-5	13.0	93		
9.0		1155+/-								
	SILTY CLAYEY SAND (SC-SM), trace gravel, fine to coarse sand, low plasticity, light brown, medium dense		10			6-12	17.5	94		
	medium plasticity, brown, loose, stratified with clayey sand		15			4-4-4 N=8				
15.5		1148.5+/-								
	Boring Terminated at 15.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with Auger Cuttings and Grout. Surface Capped with Asphalt

Elevations Obtained with Google Earth Pro

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1050 N Fairway Dr Ste G103
Avondale, AZ

Boring Started: 07-09-2021	Boring Completed: 07-09-2021
Drill Rig: CME 75	Driller: Integrity Drilling
Project No.: CP215032	

BORING LOG NO. B-5

PROJECT: Proposed Taco Bell- 43rd and Glendale

CLIENT: Gen2 Arizona Properties LLC
Kingman, Arizona

SITE: 4346 West Glendale Avenue
Glendale, Arizona

LOCATION See Exploration Plan

Latitude: 33.5386° Longitude: -112.1533°

Approximate Surface Elev.: 1164 (Ft.) +/-

GRAPHIC LOG	DEPTH	MATERIAL DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	0.3	**ASPHALT CONCRETE**, approximately 3 inches thick	1164+/-								
	0.7	**AGGREGATE BASE COURSE**, approximately 5 inches thick	1163.5+/-								
		SANDY LEAN CLAY (CL), trace gravel, fine to medium sand, medium plasticity, light brown, medium stiff					4-4	16.6	90		
				5			3-5	10.9	89		
		fine to coarse sand, low plasticity, stiff		10			6-11	12.0	99		
	14.0		1150+/-								
		CLAYEY SAND (SC), trace gravel, fine to coarse sand, low to medium plasticity, brown, loose		15			4-5-5 N=10				
		medium dense		20			6-9-13 N=22				
	20.5	***Boring Terminated at 20.5 Feet***	1143.5+/-								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with Auger Cuttings and Grout. Surface Capped with Asphalt

Elevations Obtained with Google Earth Pro

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1050 N Fairway Dr Ste G103
Avondale, AZ

Boring Started: 07-09-2021	Boring Completed: 07-09-2021
Drill Rig: CME 75	Driller: Integrity Drilling
Project No.: CP215032	

BORING LOG NO. B-6

PROJECT: Proposed Taco Bell- 43rd and Glendale

CLIENT: Gen2 Arizona Properties LLC
Kingman, Arizona

SITE: 4346 West Glendale Avenue
Glendale, Arizona

LOCATION See Exploration Plan

Latitude: 33.5393° Longitude: -112.1533°

Approximate Surface Elev.: 1164 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.3	1163.5+/-	**ASPHALT CONCRETE**, approximately 4 inches thick								
0.8	1163+/-	**AGGREGATE BASE COURSE**, approximately 6 inches thick								
		SANDY LEAN CLAY (CL), trace gravel, fine to medium sand, medium plasticity, brown, medium stiff				2-3	16.8	103	30-17-13	62
5.5	1158.5+/-		5			2-3-4 N=7				

Boring Terminated at 5.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow Stem Auger

Abandonment Method:
Boring backfilled with Auger Cuttings and Grout. Surface Capped with Asphalt

Elevations Obtained with Google Earth Pro

Notes:

WATER LEVEL OBSERVATIONS

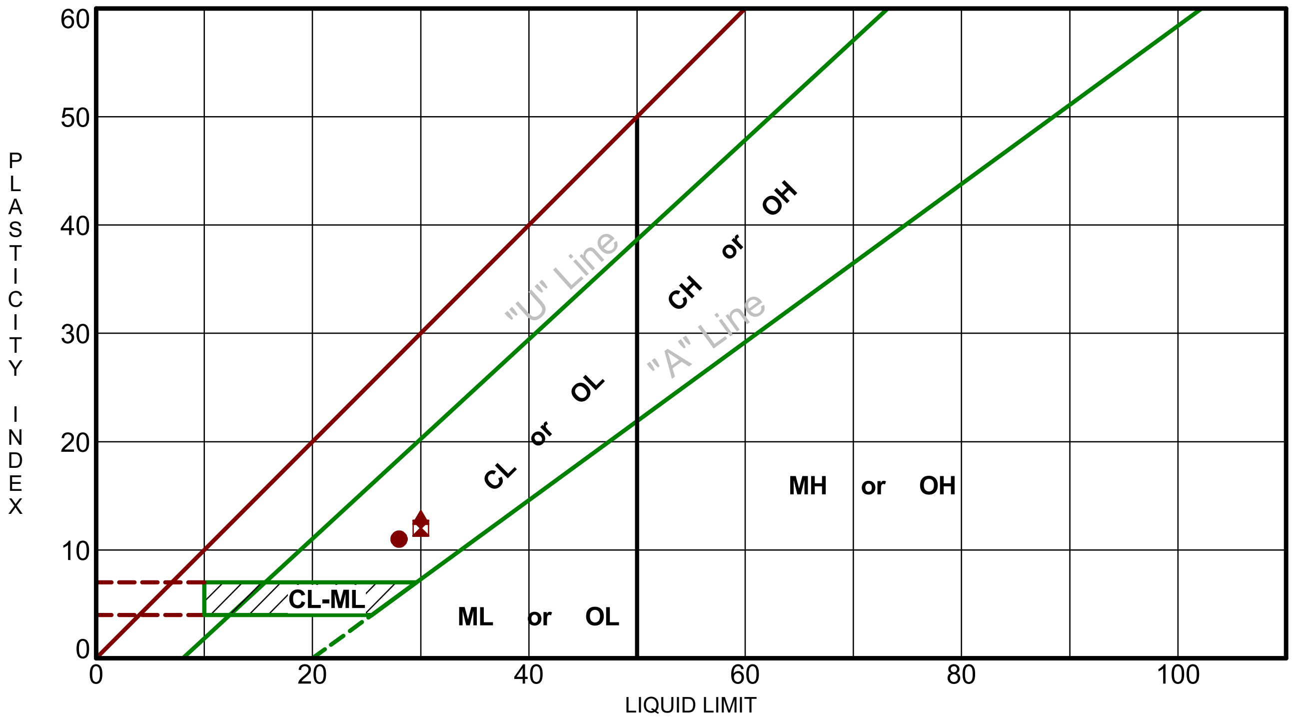
Groundwater not encountered

Terracon
1050 N Fairway Dr Ste G103
Avondale, AZ

Boring Started: 07-09-2021	Boring Completed: 07-09-2021
Drill Rig: CME 75	Driller: Integrity Drilling
Project No.: CP215032	

ATTERBERG LIMITS RESULTS

ASTM D4318



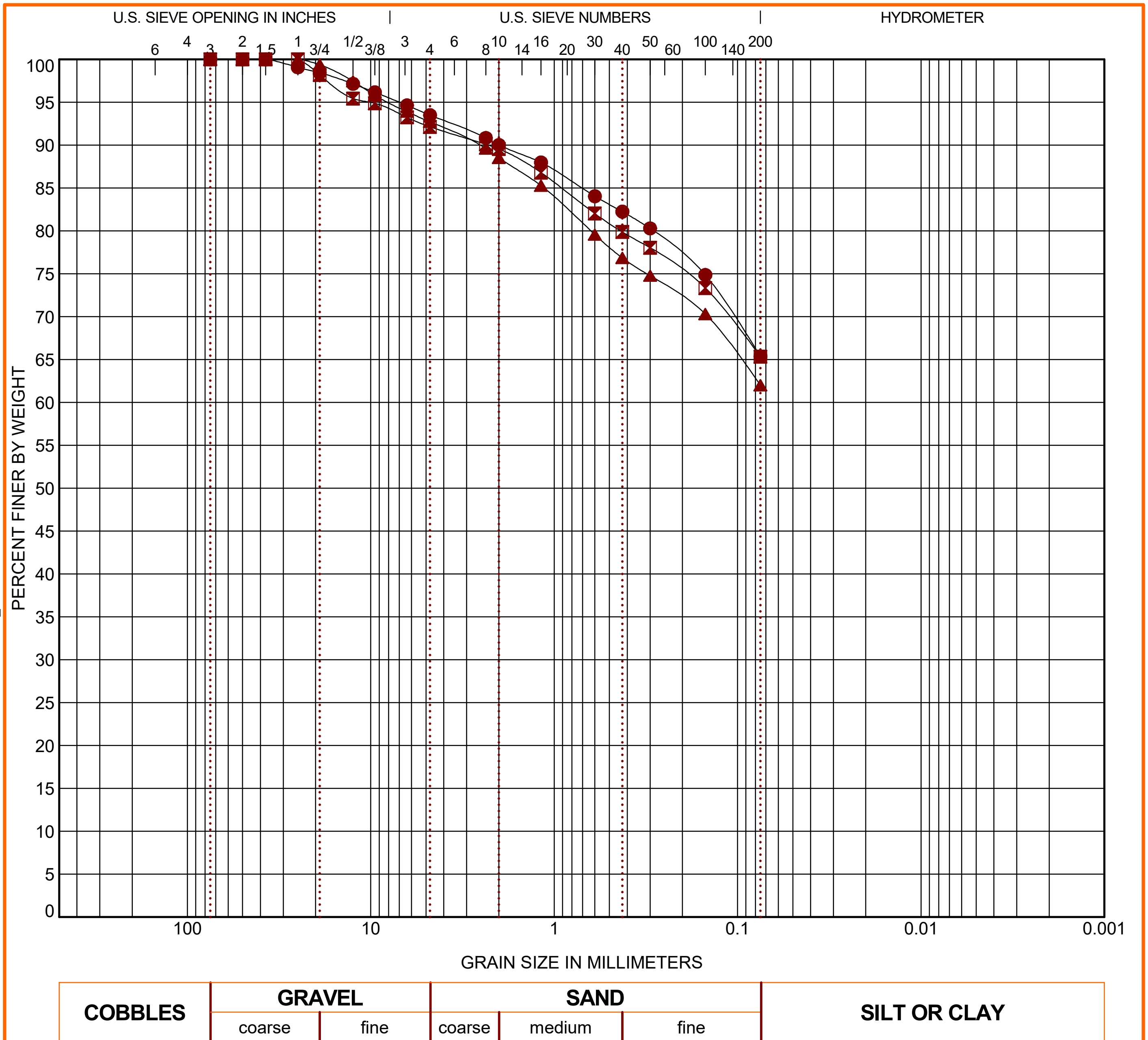
	Boring ID	Depth	LL	PL	PI	Fines	USCS	Description
●	B-1	0 - 4	28	17	11	65.4	CL	SANDY LEAN CLAY
⊠	B-4	0 - 4	30	18	12	65.3	CL	SANDY LEAN CLAY
▲	B-6	0 - 5	30	17	13	62.0	CL	SANDY LEAN CLAY

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS CP215032 PROPOSED TACO BEL.GPJ TERRACON_DATATEMPLATE.GDT 7/23/21

PROJECT: Proposed Taco Bell- 43rd and Glendale	Terracon 1050 N Fairway Dr Ste G103 Avondale, AZ	PROJECT NUMBER: CP215032
SITE: 4346 West Glendale Avenue Glendale, Arizona		CLIENT: Gen2 Arizona Properties LLC Kingman, Arizona

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-1	0 - 4	SANDY LEAN CLAY (CL)		28	17	11		
⊠	B-4	0 - 4	SANDY LEAN CLAY (CL)		30	18	12		
▲	B-6	0 - 5	SANDY LEAN CLAY (CL)		30	17	13		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-1	0 - 4	75				0.0	6.5	28.1		65.4	
⊠	B-4	0 - 4	75				0.0	7.9	26.8		65.3	
▲	B-6	0 - 5	75				0.0	7.3	30.7		62.0	

PROJECT: Proposed Taco Bell- 43rd and Glendale

SITE: 4346 West Glendale Avenue Glendale, Arizona

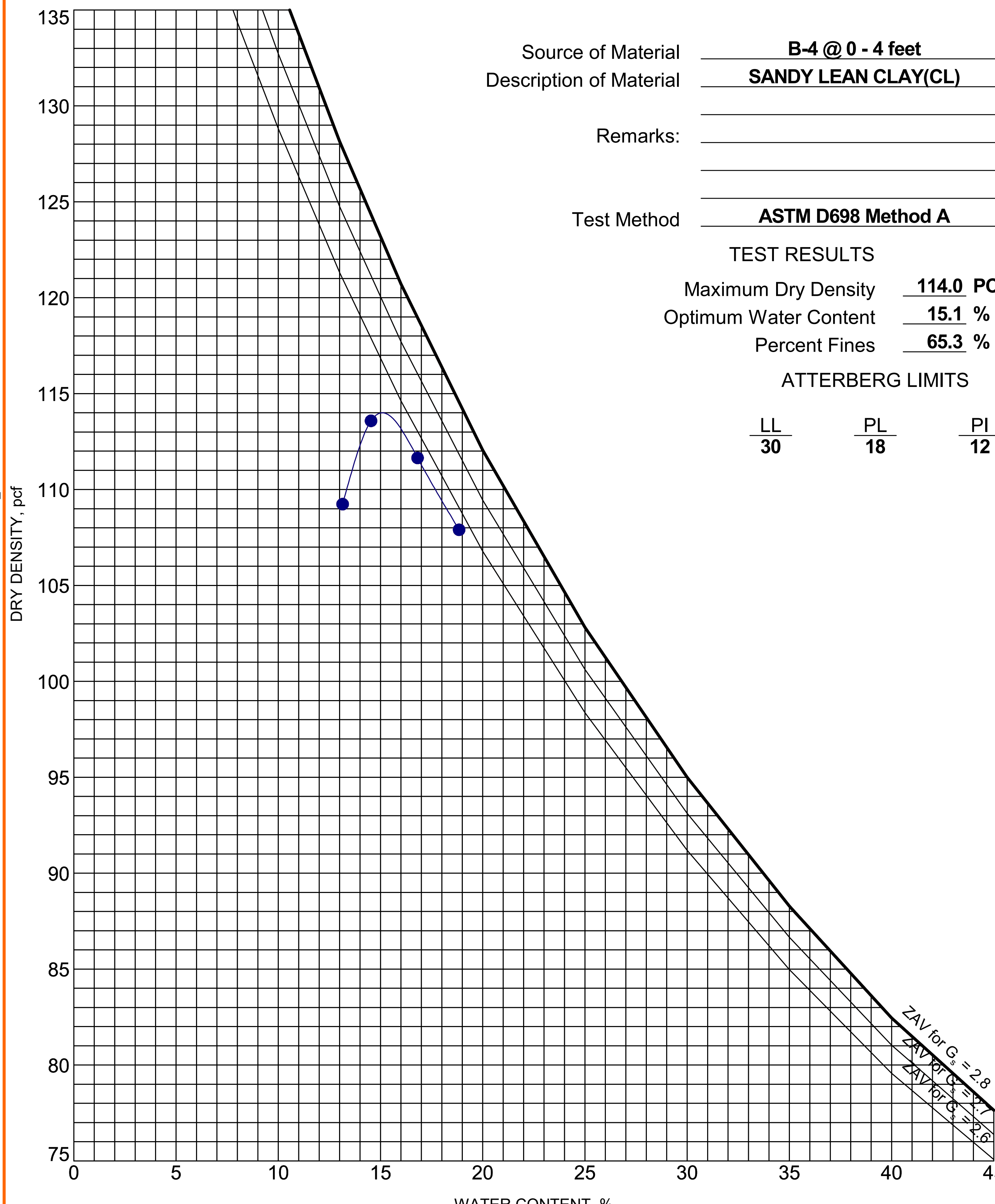
Terracon
1050 N Fairway Dr Ste G103
Avondale, AZ

PROJECT NUMBER: CP215032

CLIENT: Gen2 Arizona Properties LLC Kingman, Arizona

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**B-4 @ 0 - 4 feet**
Description of Material	**SANDY LEAN CLAY(CL)**
Remarks:	
Test Method	**ASTM D698 Method A**

TEST RESULTS

Maximum Dry Density	**114.0**	**PCF**
Optimum Water Content	**15.1**	**%**
Percent Fines	**65.3**	**%**

ATTERBERG LIMITS

LL	PL	PI
30	**18**	**12**

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 CP215032 PROPOSED TACO BEL.GPJ TERRACON_DATATEMPLATE.GDT 7/23/21

PROJECT: Proposed Taco Bell- 43rd and Glendale

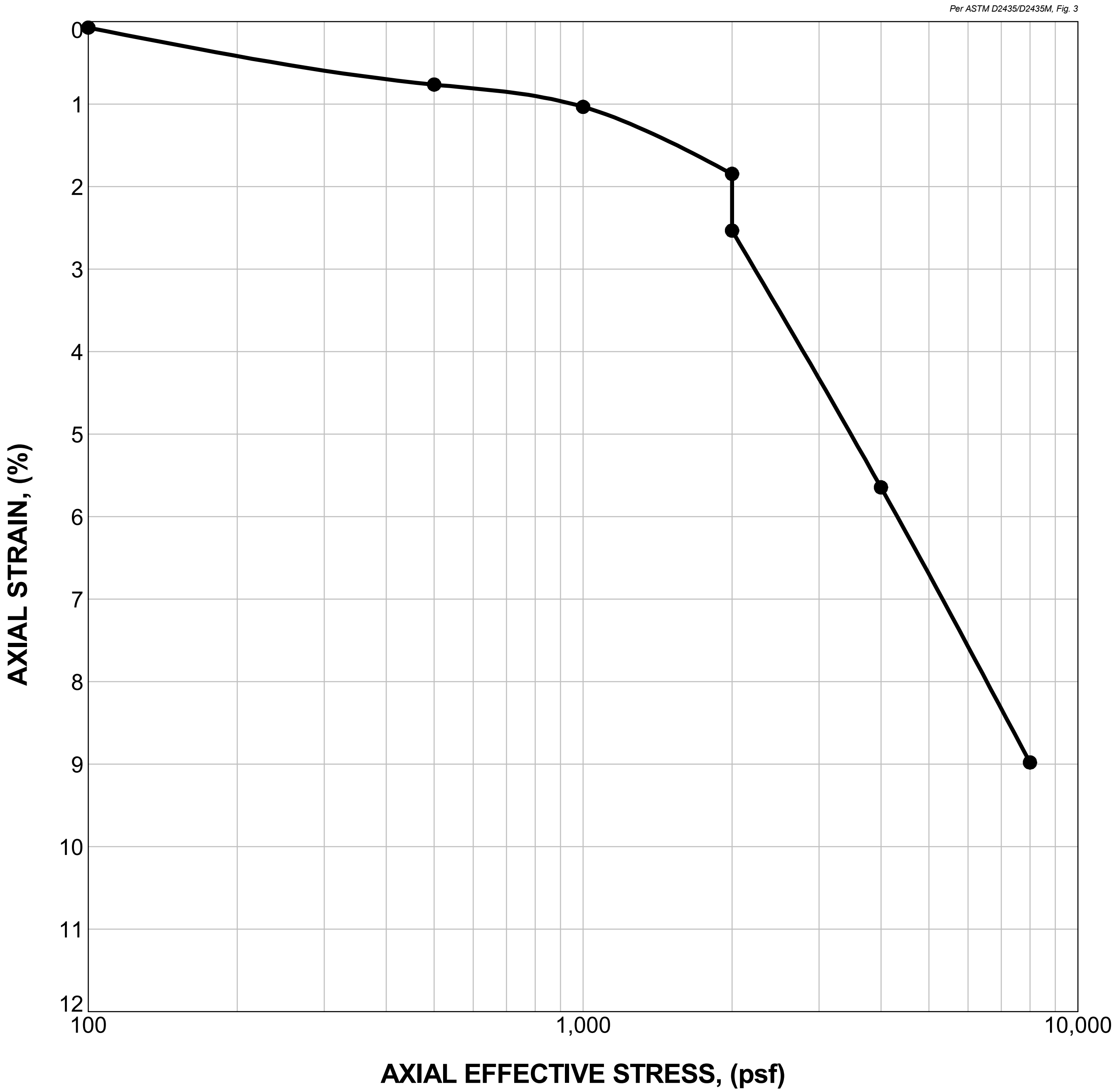
SITE: 4346 West Glendale Avenue Glendale, Arizona

Terracon
1050 N Fairway Dr Ste G103
Avondale, AZ

PROJECT NUMBER: CP215032

CLIENT: Gen2 Arizona Properties LLC Kingman, Arizona

CONSOLIDATION TEST (D2435)



Natural		Initial Dry Density (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c (% / log stress)	C_r (% / log stress)	Initial Void Ratio
Saturation	Moisture									
	16.9 %	98.4								

MATERIAL DESCRIPTION	USCS	AASHTO
Sandy Lean Clay	CL	

NOTES: Water added at 2,000 psf

Borehole: B-2 Depth: 2 ft

PROJECT: Proposed Taco Bell- 43rd and Glendale

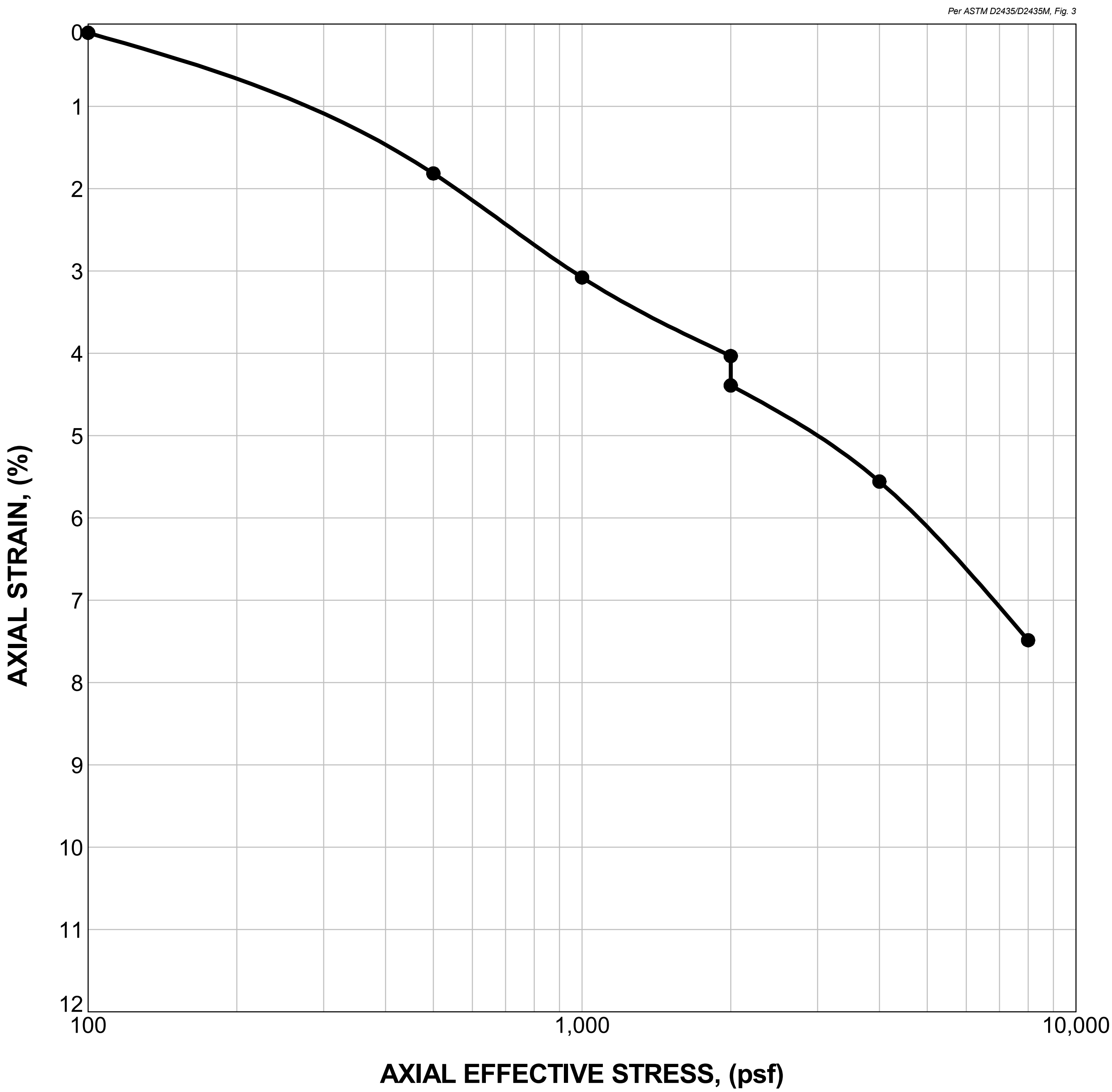
SITE: 4346 West Glendale Avenue
Glendale, Arizona

Terracon
1050 N Fairway Dr Ste G103
Avondale, AZ

PROJECT NUMBER: CP215032

CLIENT: Gen2 Arizona Properties LLC
Kingman, Arizona

CONSOLIDATION TEST (D2435)



Natural		Initial Dry Density (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c (% / log stress)	C_r (% / log stress)	Initial Void Ratio
Saturation	Moisture									
	18.2 %	97.0								

MATERIAL DESCRIPTION	USCS	AASHTO
Sandy Lean Clay	CL	

NOTES: Water added at 2, 000 psf

Borehole: B-4 Depth: 2 ft

PROJECT: Proposed Taco Bell- 43rd and Glendale

SITE: 4346 West Glendale Avenue Glendale, Arizona

Terracon
1050 N Fairway Dr Ste G103
Avondale, AZ

PROJECT NUMBER: CP215032

CLIENT: Gen2 Arizona Properties LLC Kingman, Arizona

SUMMARY OF LABORATORY RESULTS

Borehole No.	Depth (ft.)	USCS Soil Class.	In-Situ Properties		Classification				Expansion Testing					Corrosivity				Remarks
			Dry Density (pcf)	Water Content (%)	Passing #200 Sieve (%)	Atterberg Limits			Dry Density (pcf)	Water Content (%)	Surcharge (psf)	Expansion (%)	Expansion Index EI_{50}	pH	Resistivity (ohm-cm)	Sulfates (ppm)	Chlorides (ppm)	
						LL	PL	PI										
B-1	0.0 - 4.0	CL			65	28	17	11						9.0	1241	30	5	
B-1	2.0 - 3.0	CL	96	18														1, 2
B-1	4.0 - 5.0	CL	95	15														1, 2
B-1	9.0 - 10.0	SC-SM	101	18														1, 2
B-2	2.0 - 3.0	CL	92	17														1, 2
B-2	4.0 - 5.0	CL	97	14														1, 2
B-2	9.0 - 10.0	SC	97	17														1, 2
B-3	4.0 - 5.0	CL	76	11														1, 2
B-3	9.0 - 10.0	CL	94	13														1, 2
B-3	14.0 - 15.0	CL	114	10														1, 2
B-4	0.0 - 4.0	CL			65	30	18	12	108	13.1	100	2.8						
B-4	2.0 - 3.0	CL	98	16														1, 2
B-4	4.0 - 5.0	SC	93	13														1, 2
B-4	9.0 - 10.0	SC-SM	94	17														1, 2
B-5	2.0 - 3.0	CL	90	17														1, 2
B-5	4.0 - 5.0	CL	89	11														1, 2
B-5	9.0 - 10.0	CL	99	12														1, 2
B-6	0.0 - 5.0	CL			62	30	17	13										
B-6	1.0 - 2.0	CL	103	17														1, 2

REMARKS
1. Dry Density and/or moisture determined from one or more rings of a multi-ring sample.
2. Visual Classification.
3. Submerged to approximate saturation.
4. Expansion Index in accordance with ASTM D4829-95.
5. Air-Dried Sample

PROJECT: Proposed Taco Bell- 43rd and Glendale

SITE: 4346 West Glendale Avenue
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