GEOTECHNICAL EXPLORATION REPORT
SMH TINY HOMES AND RV PARK
SECTION 27 TOWNSHIP 27 NORTH,
RANGE 26 EAST
GANADO, ARIZONA

Prepared for:
Fourth World Design Group LLC
P.O. Box 171
Higley, Arizona 85236

atek
ENGINEERING CONSULTANTS

Prepared by:
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Registered Professional Engineer (Civil)
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Date Signed 12/9/25
ARIZONA, U.S.A.

ATEK Project # 250353

December 9, 2025

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Jeff Yazzie, Project Manager
Fourth World Design Group LLC
P.O. Box 171
Higley, Arizona 85236

Regarding: Geotechnical Exploration Report

Project: SMH Tiny Homes and RV Park
Section 27 Township 27 North, Range 26 East
Ganado, Arizona

Dear Mr. Yazzie:

ATEK Engineering Consultants, LLC is pleased to present the attached Geotechnical Exploration Report for the SMH Tiny Homes and RV Park located in Ganado, Arizona within the Navajo Nation. The purpose of our study was to explore and evaluate the subsurface conditions at the proposed site to develop geotechnical engineering recommendations for project design and construction.

Based on our findings, the site is considered suitable for the proposed construction, provided geotechnical recommendations presented in the attached report are followed. Specific recommendations regarding the geotechnical aspects of the project design and construction are presented in the attached report. The recommendations contained within this report are dependent on the provisions provided in the Limitations and Recommended Additional Services sections of this report.

We appreciate the opportunity of providing our services for this project. If you have questions regarding this report or if we may be of further assistance, please contact the undersigned.

Sincerely,
ATEK Engineering Consultants, LLC

Registered Professional Engineer (Civil) CERTIFICATE NO. 71358 ANTONIO LOPEZ ESQUEDA DATE SIGNED 12/9/25 ARIZONA U.S.A.

Registered Professional Engineer (Civil) CERTIFICATE NO. 39511 ARMANDO ORTEGA Date Signed 12/9/25 ARIZONA, U.S.A.

Antonio Lopez, P.E.
Geotechnical Group Manager

Armando Ortega, P.E.
Principal Geotechnical Engineer

Distribution: (1) Addresses (Electronic Copy)

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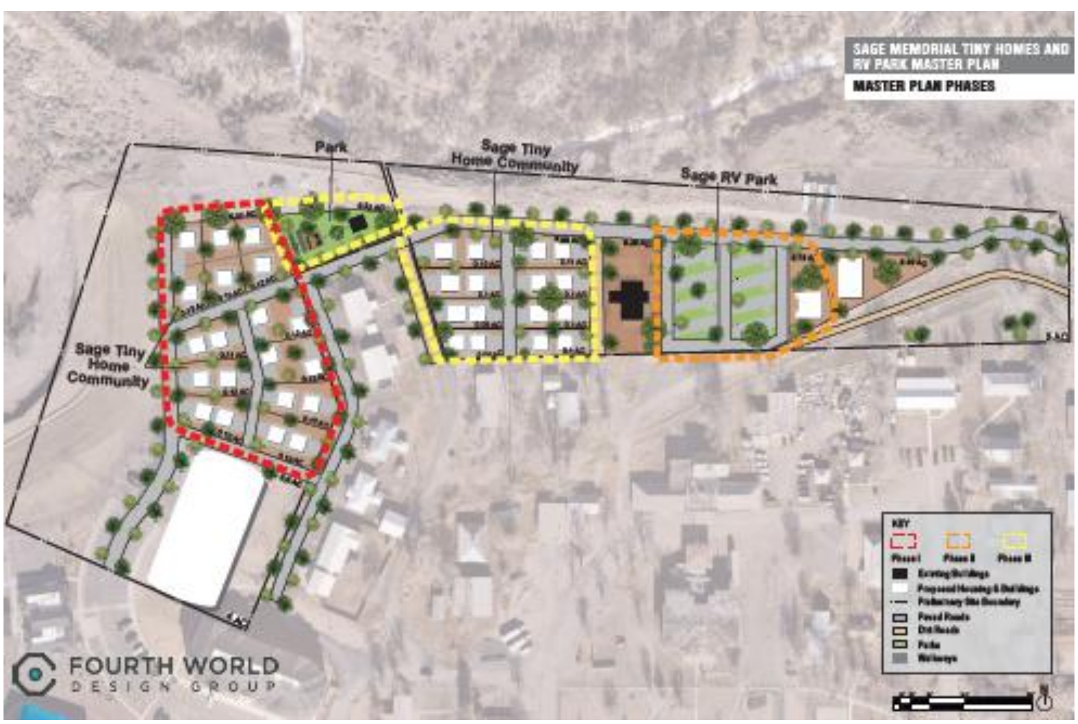
1. INTRODUCTION

This report presents the results of our geotechnical exploration for the Sage Memorial Hospital (SMH) Tiny Homes and RV Park located in Ganado, Arizona within the Navajo Nation. A Site Location Map is presented in **Appendix A** of this report. The following sections of this report describe our understanding of the project and our scope of services.

1.1. Project Description

The project involves developing two tracts located north of Sage Memorial Hospital in Ganado, Arizona within Apache County. Tract One covers approximately 4.0 acres and Tract Two covers approximately 5.0 acres. Planned improvements include the construction of the Western Sage Tiny Home Community (Phase I), the Sage Recreational Vehicle (RV) park (Phase II), and the Eastern Sage Tiny Home Community (Phase III). ATEK understands the improvements will be constructed in phases.



Document provided by Fourth World Design Group.

1.2. Purpose

The purpose of this geotechnical study was to evaluate the general surface and subsurface conditions at the site, and to present recommendations related to geotechnical aspects of design and construction of the proposed project.

1.3. Scope of Services

Our study included a site reconnaissance, subsurface exploration, soil sampling, field and laboratory testing, engineering analyses, and preparation of this report. This report presents geotechnical recommendations for design and construction of proposed structures. The recommendations contained in this report are subject to the limitations presented herein. Attention is directed to the "Limitations" section of this report.

2. FIELD EXPLORATION

2.1. General

Prior to the start of drilling, the AZ 811 and the Navajo Tribal Utility Authority were contacted to locate existing utilities at the boring locations. The field exploration was performed on November 11, 2025. Four soil borings were drilled to a depth of fifteen (15) feet below existing grade. The soil test borings were drilled using a truck mounted B-57 power drill rig equipped with 7 and ¼-inch outside diameter hollow stem augers. The borings were located in the field at the approximate locations shown on the Sample Location Plan included in **Appendix B** of this report. Upon completion of the borings, the boreholes were backfilled with excavated materials.

2.2. Soil Test Borings

Disturbed and relatively undisturbed samples were taken at the direction of the field engineer during drilling operations. Relatively undisturbed samples of the subsurface materials were obtained using a California sampler with a 2.5-inch inside diameter and a 3.0-inch outside diameter. Disturbed samples were obtained using a Standard Penetration/Split Spoon Sampler (SPT) with a 1.5-inch inside diameter and 2.0-inch outside diameter. The California and the SPT samplers were driven 12 and 18 inches, respectively, using a 140-pound hammer falling 30 inches, and blow counts for successive 6-inch penetration intervals were recorded. After the sampler was withdrawn from the borehole, the samples were removed, sealed to minimize moisture loss, and submitted to the laboratory.

Soil classifications made in the field from auger cuttings and samples were re-evaluated in the laboratory after further examination and testing. The soils were classified in accordance with the Unified Soil Classification System presented in **Appendix C**.

Sample classifications, blow counts recorded during sampling, and other related information, were recorded on the soil boring logs. The boring logs are presented in **Appendix C**. The information presented on the logs are a combination of factual and interpretive information. Lines delineating subsurface strata and group symbols are based on field observations made at the time of the field study. Actual subsurface lines delineating subsurface strata may be gradual and vary.

3. LABORATORY TESTING

Selected soil samples from the borings were tested in the laboratory for classification purposes and to evaluate their engineering properties. The laboratory tests included:

- Gradation;
- Atterberg limits;
- Moisture content;
- Undisturbed Unit Weight;
- One-dimensional consolidation;
- Expansion index;
- Swell potential of soil;

- pH tests;
- Resistivity tests;
- Sulfate content;
- And chloride content.

A brief description of each test performed on the soil samples and the results are presented in **Appendix D** of this report.

4. GENERAL SITE CONDITIONS

4.1. Surface Conditions

The project area is located northeast of Sage Memorial Hospital in Ganado, Arizona, within the Navajo Nation. Tract (1) one is situated in a vacant, undeveloped area. Light desiccated vegetation was observed throughout the tract. A chain-link fence was observed along the northern boundary, residential buildings border the tract to the south and east, and empty lots lie to the west and north.

Tract (2) two contains several abandoned residential structures. Light desiccated vegetation was also present across the tract. A chain-link fence runs along the northern portion of this tract. Overhead power lines and utility poles are located along the eastern side, extend through the center of the tract, and reconnect along the northern boundary, following the fence line. Manholes for sewer utilities were identified in the eastern portion of the site, generally aligned with the existing earthen roads. Uncontrolled Fill material was also encountered at the eastern portion of the site within boring designated as B-3. Chunks of asphaltic concrete pavement were encountered on all samples of at boring designated as B-3. Indicating the presence of uncontrolled fill. Residential buildings were observed to the south and west of Tract 2, while vacant lots were present to the north and east. Topography was relatively flat across the sites.

4.2. Subsurface Conditions

As indicated by the exploratory borings, in general the surface soils consist of cohesionless and cohesive soil. The cohesionless soils were Silty Sand (SM) and the cohesive soils consisted of Sandy Lean Clay (CL) with low plasticity. These soils were found to have a relative density of medium dense and a relative consistency of very stiff. The underlying subsurface soils consist of cohesionless soils and cohesive soils. The cohesionless soils consisted of nonelastic Silty Sand (SM). The cohesive soils consisted of Sandy Lean Clay (CL) and Clayey Sand (SC) with low to medium plasticity. These soils were found to have a relative consistency of stiff to very stiff and a relative density of medium dense. Asphaltic concrete debris was encountered from the surface to fifteen feet below at boring location designated as B-3 and at 2.5-feet at boring designated as B-4. For additional information see Boring Logs presented in **Appendix C**.

4.3. Groundwater Conditions

Groundwater was not encountered within the soil test borings and it is anticipated that groundwater will not be a factor in design or construction of the planned improvements. It should be noted that soil moisture conditions within the area may vary depending on rainfall and/or runoff conditions not apparent at the time of our field study.

4.4. Geologic Hazards

4.4.1. Liquefaction Potential

Based on the site soils and groundwater conditions encountered at the project site during this study, the preliminary potential for soil liquefaction is considered to be negligible.

4.4.2. Collapsible Soils

Collapsible soils are soils with the potential for a decrease in volume with an increase in external load or moisture content. These soils are typically found in areas of alluvial deposits with semi-arid to arid climates. Based on the information collected during our field study and subsequent laboratory testing, we anticipate collapse-susceptible soils will be encountered during construction. Based on ASTM D 5333, a calculated collapse potential, I_C, of the tested undisturbed ring samples collected during our field study resulted in range of 0.87 to 7.26 percent indicating a slight to moderately severe collapse potential.

4.5. Seismic Considerations

The project site is located in north-eastern Arizona which is an area of low seismic activity. The following values were developed using the Seismic Design Maps by Structural Engineers Association by Location, the ASCE 7-16 Reference and are based on knowledge of local geologic conditions, and subsurface soils encountered during our study. A 100-foot soil test boring was not advanced during our field study. The geographic coordinates listed below were used in developing the seismic design factors.

Central Latitude……………………………………………………35.714450˚
Central Longitude……………………………………………-109.544881˚

Seismic Design Factors	Value
Site Class	D
F_a, Site Coefficient	1.6
F_v, Site Coefficient	2.4
S_s, Mapped Spectral Acceleration at 0.2-second Period	0.159 g
S_1, Mapped Spectral Acceleration at 1.0-second Period	0.049 g
S_{MS}, Spectral Acceleration at 0.2-second Period Adjusted for Site Class	0.254 g
S_{M1}, Spectral Acceleration at 1.0-second Period Adjusted for Site Class	0.116 g
S_{DS}, Design Spectral Response Acceleration at 0.2-second Period	0.170 g
S_{D1}, Design Spectral Response Acceleration at 1.0-second Period	0.078 g

4.6. Earth Fissures and Land Subsidence

There are no documented earthen fissures near the project site (Earth Fissure Map of Arizona by Arizona Geological Survey, accessed December 2025). Additionally, the site is in an area without a measured land subsidence (Land Subsidence Areas in Arizona, accessed December 2025 by Arizona Department of Water Resources).

5. ENGINEERING ANALYSES AND RECOMMENDATIONS

5.1. Earthwork

All existing structural remnants, fill, pavement, topsoil, vegetation and organic soils should be removed from below structural areas. The following sections present earthwork recommendations based on our understanding of the project, the findings of our field exploration, results of the laboratory tests and engineering analysis. Based on the finding of our field exploration, laboratory test results and engineering analysis, it is our opinion that the proposed construction can be supported on a spread footing system as presented in the following sections.

5.1.1. Frost Depth

This project is in an area with an anticipated frost depth of 18 inches based on Table R301.2(1) Climate and Geographic Design for Apache County, Arizona. To protect against frost heave, the use of fine-grained soils should be avoided in and around structural areas. The potential for snowpack adjacent to the structural areas may allow significant moisture to increase into fills around the outer edge of foundations therefore the exterior should be graded for positive drainage away from the structural areas. Also, to reduce the potential for moisture migration through earthwork operations, refer to section 5.5 of this report.

5.1.2. Frost Considerations

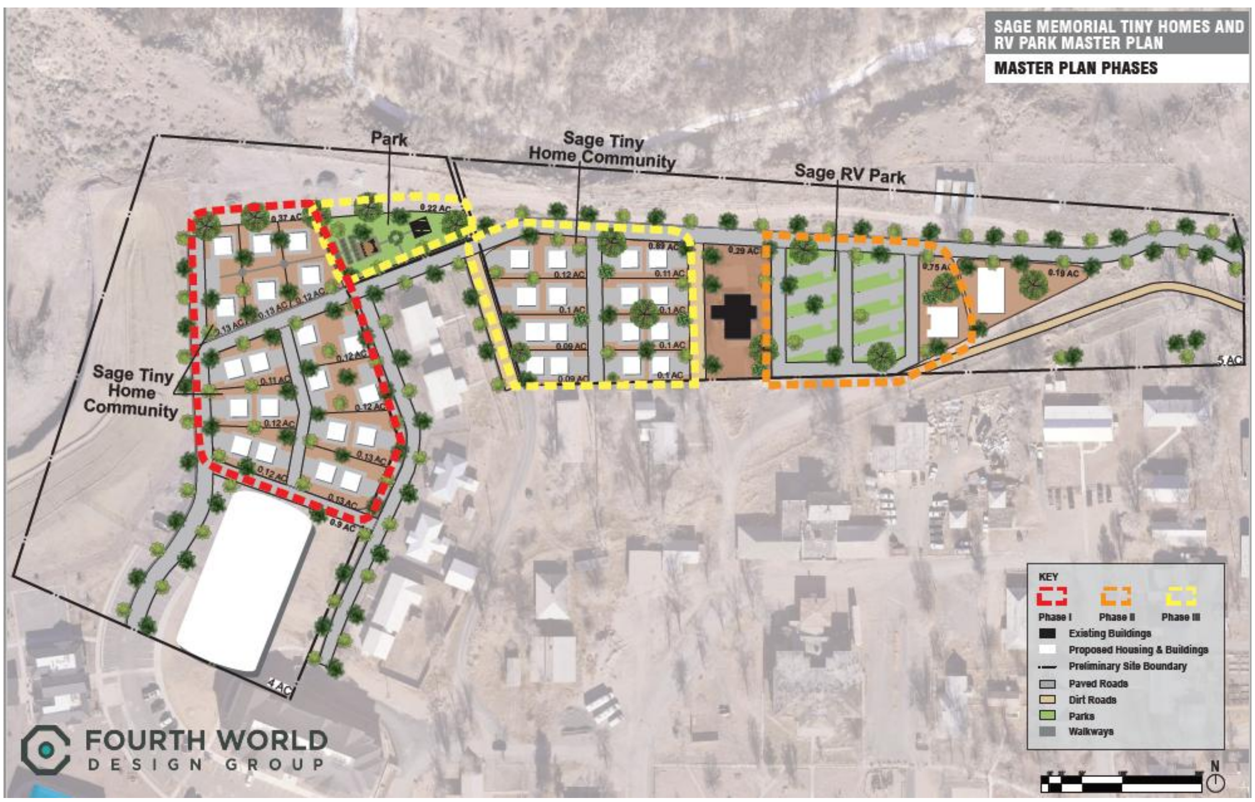
The site soils are frost susceptible, and small amounts of water can affect the performance of the relatively lightly loaded slab-on-grade and concrete flatwork. Exterior slabs and flatwork should be anticipated to heave during winter months. If frost action needs to be eliminated in critical areas, we recommend the use of non-frost susceptible engineered fill per Section 5.1.8. Placement of non-frost susceptible material in large areas may not be feasible; however, the following recommendations are provided to help reduce potential frost heave:

- Provide surface drainage away from structures and flatwork and toward the site storm drainage system;
- Install drain tiles around the perimeter of the building, stoops, below exterior slabs and pavements, and connect them to the storm drainage system;
- Grade clayey subgrades such that groundwater, potentially perched, in overlying more permeable subgrades, such as sand or aggregate base, drain toward the site drainage system;
- Place non-frost susceptible fill as backfill beneath slabs and flatwork that are critical to the project;

- Place a 3 horizontal to 1 vertical (3H:1V) transition zone between non-frost susceptible soils and other soils.

5.1.3. Phase I and Phase III Recommendations

The earthwork recommendations are divided into the three different phases to account for the presence of uncontrolled fill. The planned improvements for Phase I and III include the construction of the Western Sage Tiny Home Community (Red) and the Eastern Sage Tiny Home Community (Yellow).



The recommendations presented below are based on the soils encountered during our field exploration. Please note that uncontrolled fill was encountered on the eastern portion of this project, specifically, in the area of the proposed RV Park. The bearing soils under spread footings and structural slabs should be inspected by the Geotechnical Engineer to disclose the presence of uncontrolled fill. If uncontrolled fill material is encountered, the earthwork recommendations should be followed as Section 5.1.4.

5.1.3.1. Spread Footings – Phase I and III

The existing surface soils should be removed to a minimum depth of two (2) feet below bottom of proposed spread footing elevation or below the existing surface elevation, whichever is deeper. The excavation of the site soils should be within the entire footprint of the structure and extend laterally for a minimum distance of three (3) feet beyond the perimeter of structure. The exposed subsurface soils should be scarified to a depth of eight (8) inches: moisture conditioned to within two (2) percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. The excavated material should then be moisture conditioned to within two (2) percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density and used as engineered fill to bring the site to finished pad elevation. Optimum moisture content and maximum dry density should be determined by American Society for Testing and Materials (ASTM) D 698.

5.1.3.2. Structural Slab with Thickened Edge

The existing surface soils should be removed to a minimum depth of two (2) feet below bottom of the thickened edge elevation, or below the existing surface elevation, whichever is deeper. The exposed native soils should be scarified to a depth of 8-inches: moisture conditioned to within two (2) percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. The excavated material should then be moisture conditioned to within two (2) percent of optimum moisture content and compacted to a minimum of ninety-five (95) percent of maximum dry density and used as engineered fill to bring site to grade. Optimum moisture content and maximum dry density should be determined by ASTM D 698.

5.1.3.3. Sidewalks and Exterior Slabs

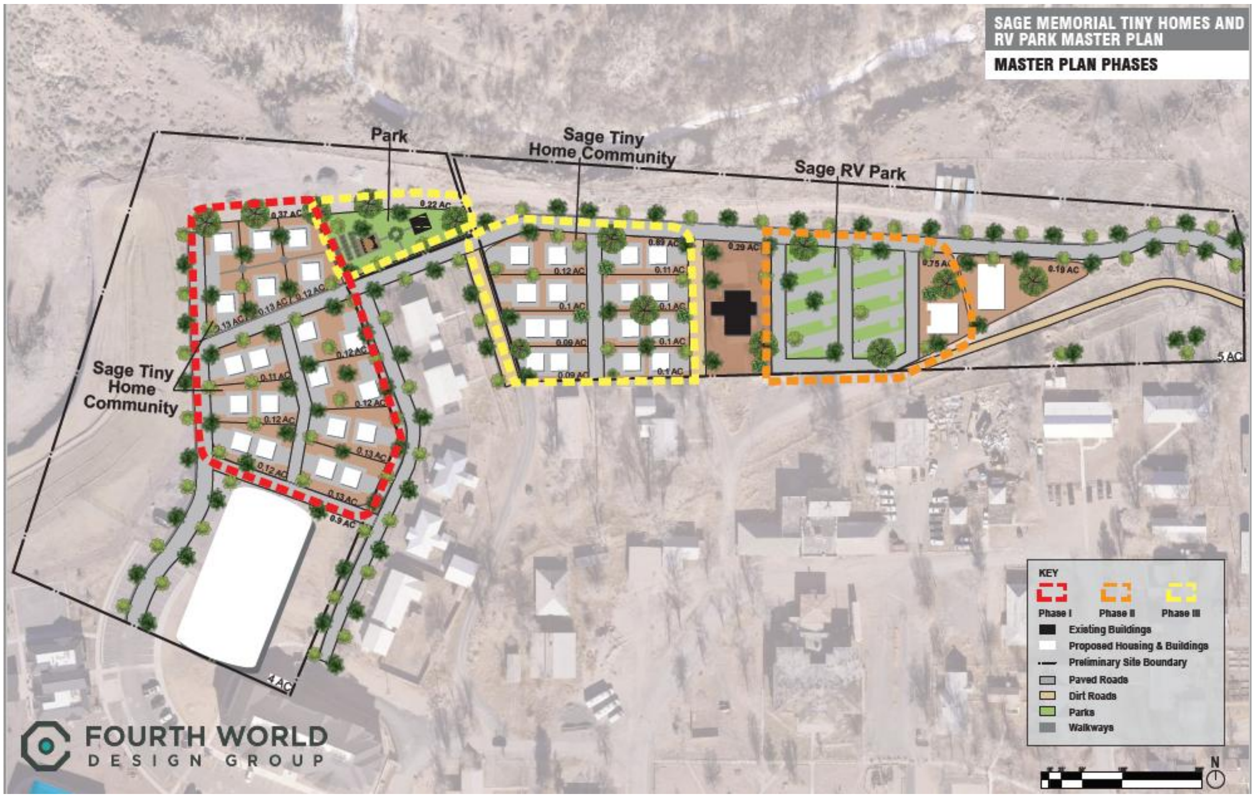
The existing soils are susceptible to frost heave. To reduce the potential for frost heave we recommend an 18-inch layer of low frost susceptible import soils, meeting the recommendations in section 5.1.8 of this report, be placed below the sidewalks and exterior slab areas. Prior to placing the low frost susceptible import soils, the exposed soils should be rolled firm. The low frost susceptible import soils should be moisture conditioned to within two (2) percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. Optimum moisture content and maximum dry density should be determined by ASTM Test Method D 698.

5.1.3.4. Pavement Site Preparation and Grading

The existing soils are susceptible to frost heave. To reduce the potential for frost heave we recommend an 18-inch layer of low frost susceptible import soils, meeting the recommendations in section 5.1.8 of this report, be placed below the pavement areas. Prior to placing the low frost susceptible import soils, the exposed soils should be rolled firm. The low frost susceptible import soils should be moisture conditioned to within two (2) percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. Optimum moisture content and maximum dry density should be determined by ASTM Test Method D 698.

5.1.4. Phase II Recommendations

The earthwork recommendations are divided into the three different phases to account for the presence of uncontrolled fill. The planned improvements for Phase II include the Sage Recreational Vehicle (RV) Park (Orange), and the two building to the east.



Uncontrolled fill material was encountered at a depth of approximately 15 feet on the eastern portion of the project. The general location of the fill is within Phase II. The proposed improvements include the Sage RV Park and two housing buildings to the east.

5.1.4.1. Earthwork Recommendations

Uncontrolled fill was encountered on the easter portion of the site. Risks associated with uncontrolled fill included immediate settlement under load, long term consolidation, and collapse settlement. To reduce these risks, uncontrolled fill within the areas of the new RV Park and housing building east of the RV park should be removed to at least five (5) below existing elevation. The exposed soils should be rolled with a vibratory roller for at least five (5) passes or until the measured settlement is less than 0.25-inch. The excavated material should then be moisture conditioned to within two (2) percent of optimum moisture content and compacted to a minimum of ninety-five (95) percent of maximum dry density and used as engineered fill to bring site to grade. Optimum moisture content and maximum dry density should be determined by ASTM D 698.

Eighteen (18) inches of low frost susceptible import soils should be placed below Non-structural slabs and pavements areas. The low frost susceptible import soils should be moisture conditioned to within two (2) percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. Optimum moisture content and maximum dry density should be determined by ASTM Test Method D 698.

5.1.5. Aggregate Base Course

The aggregate base used in support of Portland cement concrete and asphaltic concrete pavements should conform to the local governing agency and/or Maricopa Association of Governments (MAG) Section 702 Specifications. The plasticity index of the fraction of material passing the No. 40 sieve should not exceed five when tested in accordance with ASTM Test Method D 4318. Coarse aggregate should have a percent of wear, when subjected to the Los Angeles abrasion test (ASTM Test Method C 131), of no greater than 40 when exposed to a maximum of 500 revolutions.

A minimum of four (4) inch layer of clean, granular material should be placed beneath concrete slabs to serve as a leveling base, and to aid in concrete curing. The material should conform to the gradation requirements set by the local governing agency and/or MAG section 702 specifications for Aggregate Base Course (ABC). The use of moisture barriers beneath the floor slabs may be helpful, but is not a geotechnical requirement; however, the architect or the slab designer should evaluate their need.

All aggregate base material should be placed in lifts not greater than eight (8) inches and compacted to a minimum of 95 percent of maximum dry density below Portland cement concrete and one hundred percent of maximum dry density below asphaltic concrete pavements as determined by ASTM Test Method D 698 or as specified by local specification. The moisture content during compaction should be maintained within two percent of optimum moisture content.

5.1.6. Engineered Fill

Engineered fill may consist of native soils and/or imported soils. Pea gravel and poorly-graded materials should not be used as engineered fill unless approved by the geotechnical engineer. All engineered fills should be compacted as noted in section 5.

1. Native soils with low expansive potentials could be used as fill material for the following:
    - general site grading
    - foundation backfill
    - foundation areas

2. Imported soils (if required) should conform to the following:

Gradation	**Percent finer by weight (ASTM C136)**
3"	100
No. 4 Sieve	50-100
No. 200 Sieve	50 (max)
Liquid Limit	30 (max)
Plasticity Index	15 (max)

Expansion Index

Maximum Expansion Index	20

Corrosion Potential	**(PPM)**
Sulfate Content (ARIZ 733)	1,000(max)

Chloride Content (ARIZ 736)..500(max)

3. Imported soils (low-frost susceptible) should conform to the following:

Within Frost Depth, top 18 inches: (Below Sidewalks and Pavement Areas)

Gradation	**Percent finer by weight (ASTM C136)**
3"	100
No. 4 Sieve	25-60
No. 200 Sieve	15 (max)

Expansion Index

Maximum Expansion Index 20

Corrosion Potential	**(PPM)**
Sulfate Content (ARIZ 733)	1,000(max)
Chloride Content (ARIZ 736)	500(max)

4. Aggregate base should conform to MAG and/or local governing specifications.

5. Frozen soils should not be used as fill or backfill.

6. The following are intended to guide in establishing adequate support for the conventional foundation elements:
   - Any natural washes, depressions or new excavations which are to be filled, should be widened as necessary to accommodate compaction equipment and provide a level base for placing fill.
   - Any engineered fill (backfill) materials placed beneath the foundations should meet the requirements for Engineered Fill Materials.
   - All footing excavations should be relatively level and free of loose or disturbed material and inspected by a qualified representative of the Geotechnical Engineer.

7. All fill soils to be used beneath the foundations; slabs and pavements should be approved by the Geotechnical Engineer. Fill should be placed in eight (8) inch loose lifts, moisture conditioned to within two (2) percent of optimum moisture content and compacted to a minimum of 95 percent of maximum dry density. Fill materials placed at depth greater than five (5) feet should be compacted to 100 percent of maximum dry density to finished grade elevation. Optimum moisture content and maximum dry density should be determined by ASTM Test Method D 698.

5.2. Excavation

The field sampling and exploration was performed using a truck-mounted drill rig with 7 and ¼-inch outside diameter hollow stem augers. We present the following general comments regarding ease of excavation with the understanding that they are opinions based on the test borings. The project consultant and contractor should become familiar with this report including boring logs to evaluate potential hard dig conditions. **Please note that excavation characteristics are best evaluated by performing test excavations with the size and type of equipment the contractor plans on using at the site, which was not conducted as part of this study.**

It is anticipated that shallow excavations in the site soils can most likely be accomplished by conventional earth moving equipment in good operating condition. Due to the presence of subsurface cementation, deep excavations may require specialized excavating equipment. Sloughing and caving of near surface soils should be considered during grading operations. Please refer to Section 4 and the boring logs presented in **Appendix** C of this report for more information.

5.2.1. Trench Backfill

Materials

Pipe zone backfill (i.e., material beneath and in the immediate vicinity of the pipe) should consist of soil with a maximum particle size less than one inch. Trench zone backfill (i.e., material placed between the pipe zone backfill and finished subgrade) may consist of soil that meets the requirements for structural fill provided above.

If import material is used for pipe or trench zone backfill, we recommend it consist of fine-grained sand. In general, poorly graded coarse-grained sand and gravel should not be used for pipe or trench zone backfill due to the potential for site soil migration into the relatively large void spaces present in this type of material and water seepage along trenches backfilled with coarse-grained sand and/or gravel.

Recommendations provided above for pipe zone backfill are minimum requirements only. More stringent material specifications may be required to fulfill local codes and/or bedding requirements for specific types of pipes. We recommend the project Civil Engineer develop these material specifications based on planned pipe types, bedding conditions, and other factors beyond the scope of this study.

Compaction Criteria

Backfill of trenches should utilize site soils with particle diameter less than 3-inches, in order to aid compaction and reduce potential differential settlement problems. Backfilling of utility trenches should be in 12-inch maximum loose lifts, and compacted to a minimum of 90 percent and 95 percent of ASTM D-698 (standard Proctor), in non-structural areas and structural areas, respectively. Please note that the local governing agency specifications may surpass these trench backfill requirements. Jetting, flooding, or puddling of cohesive backfill soils should not be utilized under any circumstances.

Care must be used during compaction of backfill against stem walls. Hand operated equipment and thin backfill lifts are suggested to reduce the buildup of additional excessive wall pressure due to compaction method. To reduce the potential for a subsurface wall blowout, heavy construction equipment should not be operated in close proximity to the below ground structures or earth retaining structures.

5.2.2. Temporary Excavations

General

All excavations must comply with applicable local, state, and federal safety regulations including the current Occupational Safety and Health Administration (OSHA) Excavation and Trench Safety Standards. Generally, Construction site safety is solely the responsibility of the Contractor, who shall also be responsible for the means, methods, and sequencing of construction operations. We are providing the information below strictly as a service to our client. **Under no circumstances should the information be interpreted that ATEK is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.**

Excavations and Slopes

The Contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, and/or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations). Such regulations are strictly enforced; and, if not followed, could result in substantial penalties to the Owner, Contractor, and/or earthwork subcontractor and/or utility subcontractors.

Near-surface soils encountered during our field study consisted predominantly of Silty Sands. In our opinion, these soils would be considered a Type C soil when applying OSHA regulations. For this soils type OSHA recommends a maximum slope inclination of 1½(h):1(v) or flatter for excavations 20 feet or less in depth. Steeper cut slopes may be utilized for excavations less than five (5) feet deep depending on the strength, moisture content, and homogeneity of the soils as observed in the field. Flatter slopes and/or trench shields may be required if loose, cohesionless soils and/or water are encountered along the slope face.

Construction Considerations

Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within one-third the slope height from the top of any excavation. Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning may be required to provide structural stability and to protect personnel working within the excavation. Shoring, bracing, or underpinning required for the project (if any) should be designed by a professional engineer registered in the State of Arizona.

During wet weather, earthen berms or other methods should be used to prevent runoff water from entering all excavations. All runoff water should be collected and disposed of outside the construction limits.

5.3. Structures

The anticipated frost depth for the project area is 18-inches below existing site grade. Therefore, concrete slabs and post-tensioned slab-on-ground foundations should have turn downs which extend below the anticipated frost depth.

5.3.1. Shallow Spread Footings

Shallow spread footings bearing on engineered fill can be used to support the structures as recommended (See section 5.1). Recommended footing depths and allowable bearing pressures are presented below.

Allowable Bearing Pressure for Shallow Foundations

Footing Depth Below Finished Grade (ft.)*	Allowable Bearing Pressure (psf)
1.5	1,500
2.0	2,000

***Note**: Footing depth is defined as the depth below the lowest adjacent finished grade elevation within 5-feet of the edge of the footing.

A one-third increase may be applied to the design bearing pressures when considering short duration loads, such as wind and seismic.

Continuous footings and isolated column footings should have a minimum width of 16-inches and 24 inches respectively. The minimum widths are recommended for ease of construction, and to provide a margin of safety against a local or punching shear failure of the foundation soils. All footings should be reinforced to reduce potential distress caused by differential foundation movement.

All the footing excavations should be observed by the Geotechnical Engineer prior to placement of reinforcing steel and/or concrete. If subsurface conditions are encountered that are different than indicated by the borings, revised recommendations may be required.

Settlement of footings designed as recommended above are estimated not to exceed 1-inch. Differential settlements over, a horizontal distance of 50 feet between similarly loaded footings, are expected to be less than ½-inch and ¾-inch for wall and column footings, respectively. Significant moisture increases above those recommended for compaction could result in additional movements. In order to minimize the sensitivity of the structure to differential settlements, footings should be reinforced to allow for a degree of load redistribution should a localized zone of supporting soils become saturated.

5.3.1.1. Structural Slab

For design of structural slabs on grade, a modulus of subgrade reaction, ks, of 150 pci is recommended for slabs bearing on competent soils prepared as recommended above. This modulus of subgrade reaction is based on soils encountered during our field exploration, recommendations for subgrade soils preparation stated within the above referenced report, our experience with similar subgrade conditions and estimates obtained from ACI design charts.

Additionally, it is recommended that a thicken edge be constructed on the slab to minimize the potential for edge damage.

5.3.2. Resistance to Lateral Loads

Proposed walls/structures that will retain soil must be designed to withstand lateral soil pressures. Cantilevered retaining walls, or unrestrained walls subject to lateral earth pressures, should be designed for an equivalent fluid pressure (EFP) of 38 Pounds per Cubic Foot (PCF). Restrained walls should be designed to withstand a residual or long-term at-rest (Ko) earth pressure condition of 58 PCF.

A passive EFP of 300 PCF may be used for shallow spread footings. A coefficient of friction of 0.36 is recommended for computing lateral resistance between the base of footing and soil in analyzing lateral loads. Vehicular surcharge loads and/or hydrostatic pressure will increase the recommended EFP.

Only cohesionless, free-draining granular materials should be used as backfill, adjacent to earth-retaining structures. We recommend that backfill directly behind the walls be compacted with light, hand-held compactors. Heavy compactors and grading equipment should not be allowed to operate within 3 feet of the walls during backfilling, to avoid developing excessive temporary or long-term lateral soil pressures. Positive gravity drainage of the backfill should be provided.

5.3.2.1. Wall Drainage

The above-recommended values do not include lateral pressures due to hydrostatic forces. Therefore, wall backfill should be free draining and provisions should be made to collect and dispose of excess water that may accumulate behind earth retaining structures. In cases where site soils become saturated an equivalent fluid pressure of 90 PCF should be used.

Wall drainage should be collected by continuous perforated drainpipes, filter fabric, and gravel connected to weep holes. The drainpipe must run parallel to the wall. We recommend drain rock consist of durable stone having 100 percent passing the 1-inch sieve and zero percent passing the No. 4 sieve. Synthetic filter fabric should have an equivalent opening size (EOS), U.S. Standard Sieve, of between 40 and 70, a permeability of at least 0.02 centimeters per second and minimum puncture strength of 50 pounds.

5.3.2.2. Backfill Placement

All backfill should be placed and compacted in accordance with recommendations provided above for engineered fill. Care must be used during compaction of backfill against the below ground tanks walls. Hand operated equipment and thin backfill lifts are suggested to reduce the buildup of additional excessive wall pressure due to compaction method. To reduce the potential for a subsurface wall blowout, heavy construction equipment should not be operated next to the walls.

5.4. Moisture Protection

Soil support values reduce with an increase of moisture content. Therefore, positive drainage is essential to the successful performance of any structure. Good surface and subsurface drainage should be established during and after construction to prevent the soils below or adjacent to the structural areas and utility trenches from becoming wet.

Infiltration of water into utility or foundation excavations must be prevented during construction. The drainage design must route all storm and sprinkler water away from the structural areas in a positive manner. All water should be diverted away from areas where it could penetrate the ground surface near the structural areas. Watering of plants should be avoided adjacent to the buildings. Desert-type landscaping is advisable near the structural areas. Plants, which require more water, should be located and drained away from the structural areas.

5.5. Corrosion Potential

5.5.1. Corrosion (Concrete)

Selected samples of the near-surface soils encountered at the site were subjected to chemical analysis for the purpose of corrosion assessment. The samples were tested for soluble sulfates, and soluble chlorides. The samples were tested in general accordance with Arizona Test Methods 733, and 736 for soluble sulfates, and soluble chlorides, respectively. The test results are provided in **Appendix C**.

Based on provisions of American Concrete Institute (ACI) 318 Section 4.3, Table 4.3.1, Requirements for Concrete Exposed to Sulfate-Containing Solutions a sulfate concentration below 0.10 percent by weight (1,000 ppm) is negligible. Based on the laboratory results, sulfate contents of the site soils tested indicate a negligible corrosion potential to concrete.

Based on the laboratory result of the sample collected for this project, chloride contents of the site soils tested indicate negligible corrosion potential.

5.6. Pavement Areas

The on-site soils should be suitable as pavement subgrade soils provided all unsuitable debris, rubble, oversized cobbles, etc. are removed. A flexible and/or rigid pavement is recommended for the pavement areas. The recommended pavement sections are based on the assumption that the subgrade soils are prepared in accordance with section 5.1 of this report.

The flexible pavement section should consist of Central Plant Mix Asphaltic Concrete Pavement (AC) on compacted Aggregate Base Course (ABC) as recommended in the table below. Flexible pavement should be placed in accordance with MAG Section 321 and local municipality standards.

PAVEMENT AREA	ASPHALT SURFACE THICKNESS (IN)	AGGREGATE BASE COURSE THICKNESS (IN)
Parking Areas (On-Site)	3.0	4.0

Our calculations for design of the pavements section is based upon our classification of the subsurface soils, the calculated traffic in 18 kips equivalent single axle loads, the site preparation and grading recommendations provided above. A design life of 20 years was used in design.

Areas subject to sustained, heavy concentrated loads, such as dumpster areas should be paved with Portland Cement Concrete (PCC). A pavement section of 6 inches of PCC on 4 inches of aggregate base course is recommended in these areas. We should be contacted for additional recommendations if there will be any areas subjected to volumes of traffic heavier than those assumed for this report.

6. CLOSURE

6.1. Limitations

Our professional services have been performed using that degree and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers practicing in this or similar localities. No warranty is expressed or implied.

The recommendations contained in this report are based on our field exploration, laboratory test results, and our understanding of the proposed construction. The subsurface data used in the preparation of this report was obtained from the test borings excavated during the field subsurface exploration. It is anticipated that some variations in the soil conditions will exist on-site. The nature and extent of variations may not be evident until construction occurs. If any conditions are encountered at this site that are different from those described in this report, we should be immediately notified so that we may make any necessary revisions to the recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, our firm should also be notified.

It is the Client's responsibility to see that all parties to the project including the designer, contractor, subcontractor, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk.

This report is for the exclusive purpose of providing Geotechnical Engineering and/or testing information and recommendations. The scope of services for this project does not include, either specifically or by implication, any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken. This report has also not addressed the site geology and the possible presence of geologic hazards.

This report may be used only by the Client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on and off-site), or other factors may change over time, and additional work may be required with the passage of time. Any party, other than the Client, who wishes to use this report, shall notify ATEK of such intended use. Based on the intended use of this report, ATEK may require that additional work be performed and that an updated report be issued.

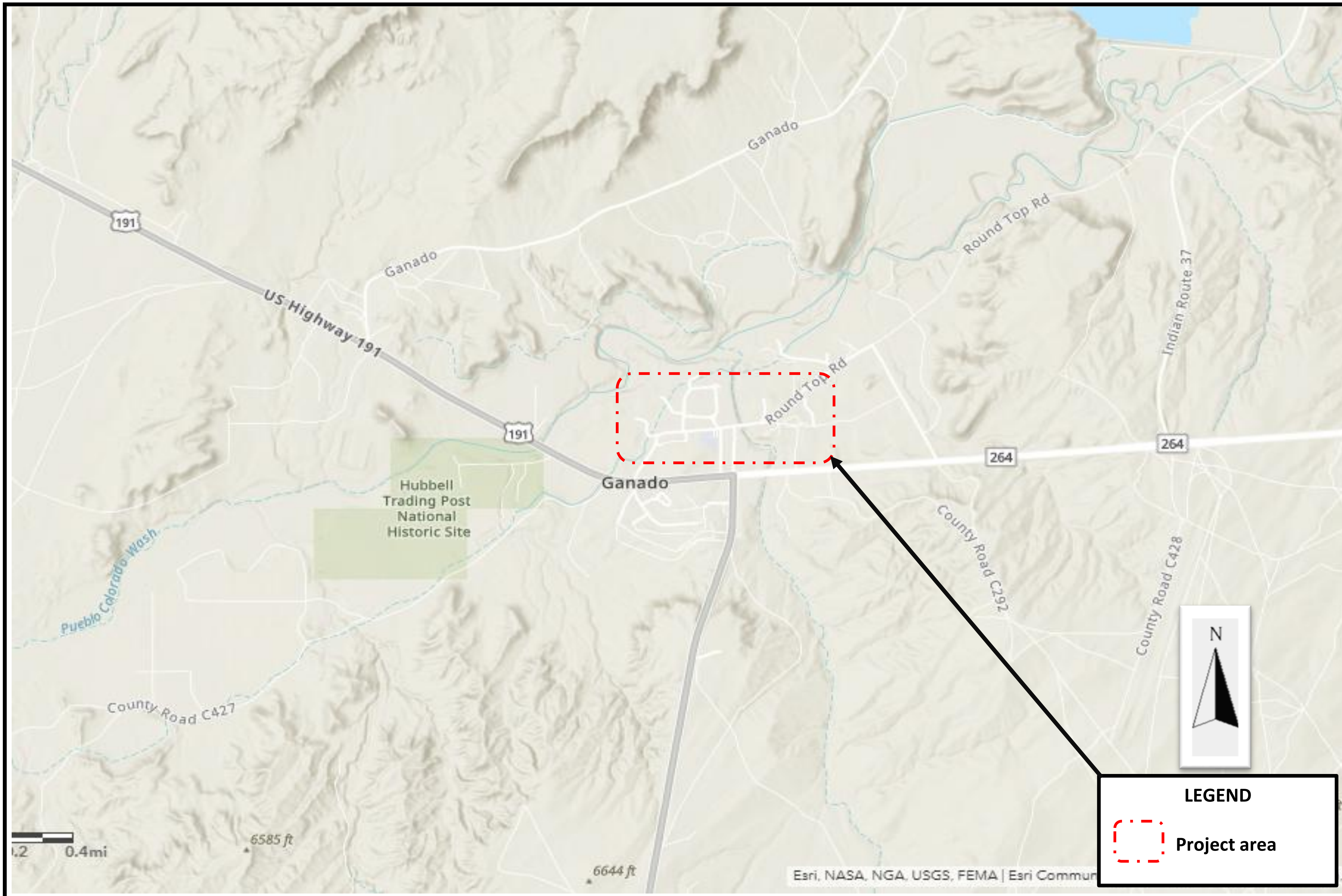
6.2. Recommended Additional Services

The recommendations provided in this report are based on the assumption that an adequate program of tests and observations will be performed during the construction. These tests and observations should be performed by the Geotechnical Engineer's representative and should include, but not limited to the following:

- Observe and document that any existing surficial vegetation and other deleterious materials have been removed from the site as required in site preparation section.
- Approve any material used as import to document that it meets the requirements outlined above before placement.
- Monitor the backfill procedures.
- Perform field density tests, as needed, to verify compaction compliance. The representative should monitor the progress of compaction and filling operations.
- Keep records of on-site activities and progress.

Observation of footing excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present. Construction testing, including field and laboratory evaluation of fill and backfill materials, concrete and steel should be performed to determine whether applicable project requirements have been met.

APPENDIX A
Site Location Map



Project #:	250353	**Site Location Map - Sheet 1 of 1**
Date:	11/25/2025	SMH Tiny Homes and RV Park
Drawn by:	M Mendoza	Ganado, Arizona

Basemap provided by ArcGIS

atek ENGINEERING CONSULTANTS
111 South Weber Drive, Suite 1
Chandler, AZ 85226

APPENDIX B
Sample Location Plan

Basemap provided by Google Earth	Project #: 250353	**Boring Location Plan - Sheet 1 of 1**	atek ENGINEERING CONSULTANTS
	Date: 11/25/2025	SMH Tiny Homes and RV Park	111 South Weber Drive, Suite 1
	Drawn by: M Mendoza	Ganado, Arizona	Chandler, AZ 85226

APPENDIX C
FIELD STUDY AND BORING LOGS

APPENDIX C
FIELD STUDY

BORINGS

The subsurface conditions at the site were explored on November 11, 2025, by drilling soil borings using a truck mounted CME drill rig with 7 and a ¼-inch outside diameter hollow stem auger. The locations of soil test borings performed for this study are shown in **Appendix B** of this report.

The locations of borings were located by visual sighting and pacing from existing site features and, therefore, should be considered approximate. Actual boring locations may vary from those indicated in **Appendix B**.

Our field engineer maintained a log of the excavations; visually classified soils encountered according to the Unified Soil Classification System (USCS) (see USCS Table); and obtained samples of the subsurface materials.

SAMPLING PROCEDURES

Soil samples obtained from the borings were packaged and sealed in the field to reduce moisture loss and disturbance, and returned to our laboratory for further testing. After borings were completed, they were backfilled with the excavated soils.

LIST OF ATTACHMENTS

The following plates are attached and complete this appendix.

Unified Soil Classification System – C1
Log Key – C2
Charts and Definitions – C3
Terminology Used to Describe Soils – C4
Logs of Soil Borings

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			USCS SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LESS THAN 5% PASSING NO. 200 SIEVE	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH OVER 12% PASSING NO. 200 SIEVE	GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH LESS THAN 5% PASSING NO. 200 SIEVE	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% PASSING NO. 200 SIEVE	SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)		ML	INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid limit greater than 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

Note: Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing No. 200 sieve require dual USCS symbols. (See KEY A-3 if provided)

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Drafted By: AM

Date: November, 2025

Project Number: 250353

UNIFIED SOIL CLASSIFICATION SYSTEM

SMH Tiny Homes and RV Park
Fourth World Design Group LLC
Ganado, Arizona

KEY

C-1

LOG SYMBOLS

BULK / GRAB SAMPLE

MODIFIED CALIFORNIA SAMPLER
(2.5 inch inside diameter)

GRAB SAMPLE

STANDARD PENETRATION
SPLIT SPOON SAMPLER
(2.0-inch O.D. X 1.5-inch I.D.)

SHELBY TUBE
(3 inch outside diameter)

NON-STANDARD PENETRATION
SPLIT SPOON SAMPLER
(1.5-inch O.D. X 0.9-inch I.D.)

BDBGM SIZE CORE BARREL
(1.65-inch I.D.)

BW44 SIZE CORE BARREL
(1.75-inch I.D.)

HQ-3 SIZE CORE BARREL
(2.4-inch I.D.)

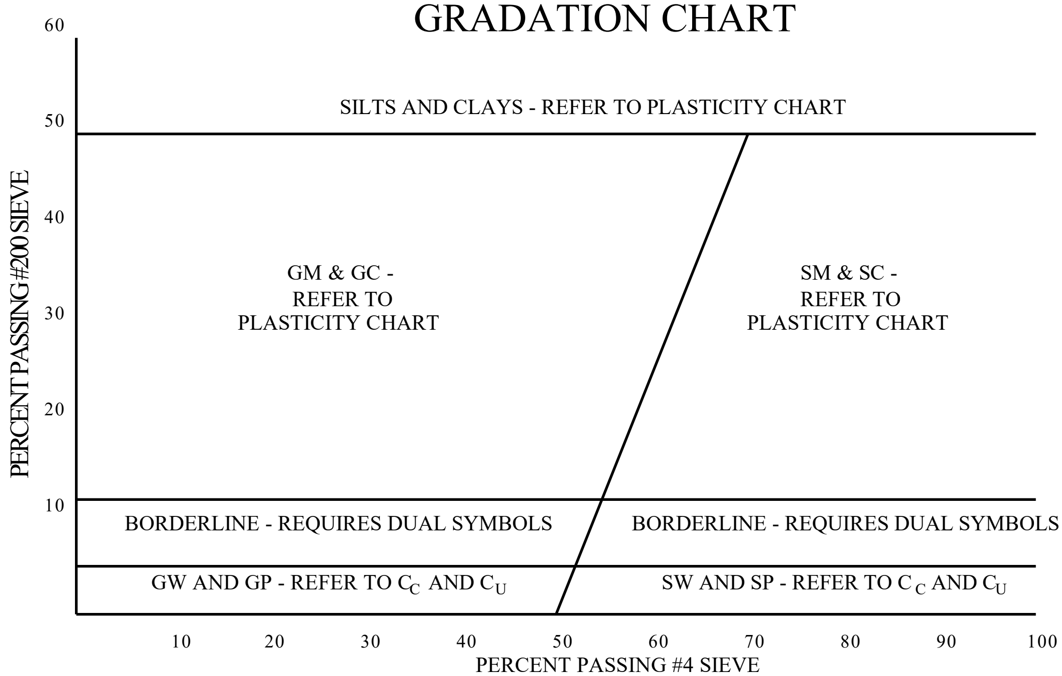
WATER LEVEL
(level after completion)

WATER LEVEL
(level where first encountered)

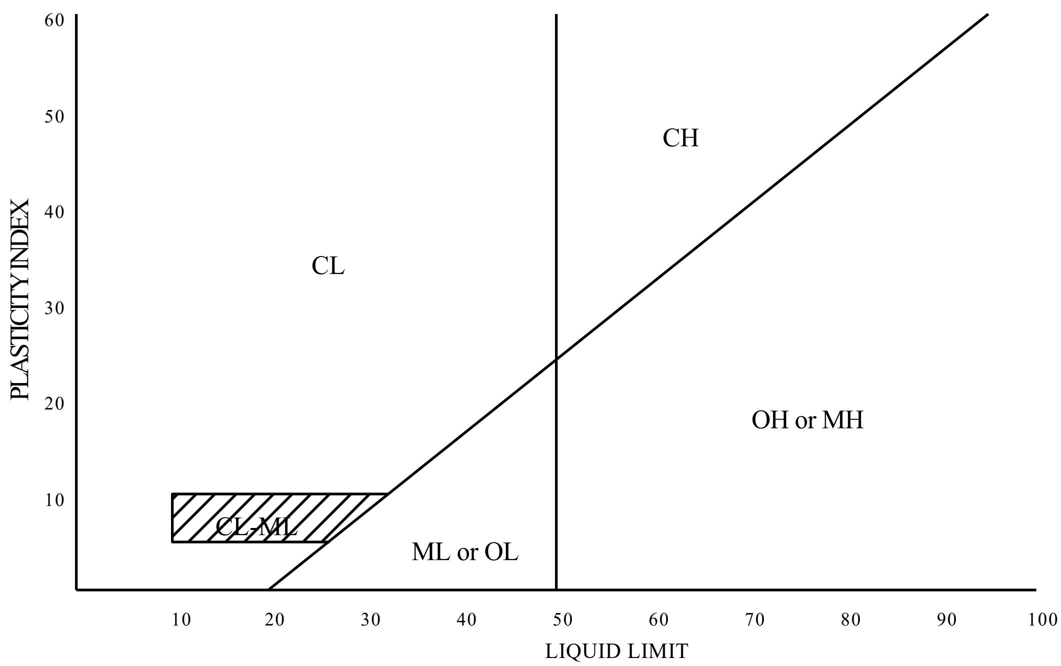
GENERAL NOTES

1. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.
2. No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
3. Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
4. In general, the Unified Soil Classification designations presented on the logs were based on visual classification in the field, modified where appropriate by visual classifications in the office, and/or laboratory gradation and index testing.
5. NA = Not Analyzed

GRADATION CHART



PLASTICITY CHART



Plasticity of Fines (FHWA NHI-06-088)

Plasticity Index	Plasticity Adjective
0	Nonplastic
1-10	Low plasticity
>10-20	Medium Plasticity
>20-40	High Plasticity
>40	Very plastic

Definitions of Soil Particles

Soil Fraction	Particle Size Range
Boulders	Greater than 300mm (12in.)
Cobbles	300mm to 75mm (12in. to 3in.)
Coarse Gravel	75mm to 19mm (3in. to 3/4in.)
Fine Gravel	19mm (3/4in.) to No. 4 Sieve
Coarse Sand	No. 4 sieve to No. 10 sieve
Medium Sand	No. 10 sieve to No. 40 sieve
Fine Sand	No. 40 sieve to No. 200 sieve
Fines	Less than No. 200 sieve

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Drafted By: AM

Date: November, 2025

Project Number: 250353

CHARTS & DEFINITIONS

SMH Tiny Homes and RV Park
Fourth World Design Group LLC
Ganado, Arizona

KEY

C-3

TERMINOLOGY USED ON THE BORING LOGS TO DESCRIBE THE FIRMNESS, DENSITY, OR CONSISTENCY OF SOILS

The standard penetration resistance (N) in blows per foot is obtained by the ASTM D1586 procedure using 2" O.D., 1.5" I.D. samplers.

1. Terms for description of partially saturated and/or cemented soils including clays, cemented granular materials, silts and silty and clayey granular soils.

N	Relative Firmness
0-4	Very soft
5-8	Soft
9-15	Moderately firm
16-30	Firm
31-50	Very firm
51+	Hard

2. Terms for description of coarse grain soils. (FHWA NHI-06-088)

N	Relative Density
0-4	Very loose
5-10	Loose
11-30	Medium dense
31-50	Dense
51+	Very dense

3. Terms for description of fine grain soils. (FHWA NHI-06-088)

N	Relative Consistency
0-2	Very soft
3-4	Soft
5-8	Medium stiff
9-15	Stiff
16-30	Very stiff
31+	Hard

Project Name: SMH Tiny Homes and RV Park	Client: Fourth World Design Group, LLC	
Borehole Location: See Location Plan		Sheet 1 of 1
Borehole Number: B-1	Driller: RCS Drilling	Logger: Marilyn Mendoza
Drilling Equipment: B-57 / Borehole Diameter (in.): 7.25 HSA	Date Started: 11/11/2025	Date Finished: 11/11/2025

Elevation (ft)

Notes:

DEPTH (ft)	DRILL OPERATION	SAMPLE	STANDARD PENETRATION TEST SPT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT LL	PLASTICITY INDEX PI	-200 (%)	USCS CLASSIFICATION	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	REMARKS
				2.7	91.7		NP	17	SM		SILTY SAND (SM), 4% fine graded gravel, 79% fine to coarse grained sand, 17% fines, nonplastic, reddish brown, slightly moist, no to weak cementation, strong reaction to HCl		
			6-5								Medium dense		
5			5-7-7								No cementation, weak reaction to HCl		
10			6-7-7										
15			5-6-7								Strong reaction to HCl	16.5	

Bottom of auger@ 15.0 feet bgs.
Bottom of sampler @ 16.5 feet bgs.
No groundwater encountered.

Sampler Types: Split Spoon; Shelby; Bulk Sample; Grab Sample; Penetrometer; Vane Shear; California

Operation Types: Hand Auger; ODEX; Auger Hollow Stem; Bullnose; Core Barrel; Excavated Pit

WATER LEVEL OBSERVATIONS

While Drilling	N/A ft	Upon Completion of Drilling		N/A ft
Time After Drilling	N/A	N/A	N/A	N/A
Depth To Water (ft)	N/A	N/A	N/A	N/A

Remarks: Not Encountered

ATEK Project Number: 250353	atek ENGINEERING CONSULTANTS	LOG OF EXPLORATORY BORING B-1	Fig. 1

Revised 10-14-11 (MAT)

Project Name: SMH Tiny Homes and RV Park	Client: Fourth World Design Group, LLC
Borehole Location: See Location Plan	Sheet 1 of 1
Borehole Number: B-2	Driller: RCS Drilling; Logger: Marilyn Mendoza
Drilling Equipment: B-57; Borehole Diameter (in.): 7.25 HSA	Date Started: 11/11/2025; Date Finished: 11/11/2025

Elevation (ft)

Notes:

DEPTH (ft)	DRILL OPERATION	SAMPLE	STANDARD PENETRATION TEST SPT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT LL	PLASTICITY INDEX PI	-200 (%)	USCS CLASSIFICATION	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	REMARKS
0	Auger								CL		SANDY LEAN CLAY (CL), low plasticity, dark reddish brown, slightly moist, no cementation, strong reaction to HCl		
		California	14-12	2.5	100.8	19	5				Very stiff		In-Situ Swell Potential = 0.0%
5		Split Spoon	6-9-9										
10		Split Spoon	8-11-13								Reddish brown, weak reaction to HCl Dark brown, moderate cementation		
15		Split Spoon	8-9-10						SM		SILTY SAND (SM), medium dense, reddish brown, slightly moist, no cementation, weak reaction to HCl	15	
												16.5	

Bottom of auger@ 15.0 feet bgs.
Bottom of sampler @ 16.5 feet bgs.
No groundwater encountered.

Sampler Types: Split Spoon; Penetrometer; Shelby; Vane Shear; Bulk Sample; California; Grab Sample

Operation Types: Auger Hollow Stem; Hand Auger; Bullnose; ODEX; Core Barrel; Excavated Pit

WATER LEVEL OBSERVATIONS

While Drilling N/A ft; Upon Completion of Drilling N/A ft

Time After Drilling	N/A	N/A	N/A	N/A
Depth To Water (ft)	N/A	N/A	N/A	N/A

Remarks: Not Encountered

ATEK Project Number: 250353

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LOG OF EXPLORATORY BORING B-2

Fig. 2

Revised 10-14-11 (MAT)

250353 DRAFT LOGS.GPJ ` 11-25-25 ` G Lopez Romo ` ATEK BORING (W/REMARKS-SH#-SAME FIG#) `

Project Name: SMH Tiny Homes and RV Park	Client: Fourth World Design Group, LLC	
Borehole Location: See Location Plan		Sheet 1 of 1
Borehole Number: B-3	Driller: RCS Drilling	Logger: Marilyn Mendoza
Drilling Equipment: B-57 / Borehole Diameter (in.): 7.25 HSA	Date Started: 11/11/2025	Date Finished: 11/11/2025

Elevation (ft)

Notes:

DEPTH (ft)	DRILL OPERATION	SAMPLE	STANDARD PENETRATION TEST SPT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT LL	PLASTICITY INDEX PI	-200 (%)	USCS CLASSIFICATION	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	REMARKS
				2.7			NP	15	SM		SILTY SAND (SM), 1% fine graded gravel, 84% fine to coarse grained sand, 15% fines, no plasticity, dark reddish brown, slightly moist, no cementation, weak reaction to HCl Chunks of Asphaltic Concrete encountered		
			2-10	2.4	99.1						Medium dense		
5			4-5-7										
10			10-8-8						SC		CLAYEY SAND (SC), medium dense, low to medium plasticity, dark reddish brown, slightly moist, weak to moderate cementation, strong reaction to HCl Chunks of Asphaltic Concrete encountered	10	
									SM		SILTY SAND (SM), medium dense, no plasticity, dark reddish brown, slightly moist, weak cementation, strong reaction Chunks of Asphaltic concrete encountered	14	
15			5-5-9									16.5	

Bottom of auger@ 15.0 feet bgs.
Bottom of sampler @ 16.5 feet bgs.
No groundwater encountered.

Sampler Types: Split Spoon; Shelby; Bulk Sample; Grab Sample; Penetrometer; Vane Shear; California

Operation Types: Hand Auger; ODEX; Auger Hollow Stem; Bullnose; Core Barrel; Excavated Pit

WATER LEVEL OBSERVATIONS

While Drilling: N/A ft		Upon Completion of Drilling		N/A ft
Time After Drilling	N/A	N/A	N/A	N/A
Depth To Water (ft)	N/A	N/A	N/A	N/A

Remarks: Not Encountered

ATEK Project Number: 250353

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LOG OF EXPLORATORY BORING B-3

Fig. 3

Project Name: SMH Tiny Homes and RV Park		Client: Fourth World Design Group, LLC	
Borehole Location: See Location Plan			Sheet 1 of 1
Borehole Number: B-4		Driller: RCS Drilling	Logger: Marilyn Mendoza
Drilling Equipment: B-57	Borehole Diameter (in.): 7.25 HSA	Date Started: 11/11/2025	Date Finished: 11/11/2025

Elevation (ft)

Notes:

DEPTH (ft)	DRILL OPERATION	SAMPLE	STANDARD PENETRATION TEST SPT	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT LL	PLASTICITY INDEX PI	-200 (%)	USCS CLASSIFICATION	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft)	REMARKS
	Auger Hollow Stem								SM		SILTY SAND (SM), 88% fine to coarse grained sand, 12% fines, no plasticity, dark reddish brown, slightly moist, no cementation, weak reaction to HCl		
											Chunks of Asphaltic Concrete encountered		
		California	8-10				NP	12			Medium dense		
5		Split Spoon	5-5-5								No reaction to HCl		
10		Split Spoon	4-6-8						CL		SANDY LEAN CLAY (CL), stiff, medium plasticity, dark reddish brown, slightly moist, no cementation, strong reaction to HCl	10	
15		Split Spoon	6-6-5						SM		SILTY SAND (SM), medium dense, no plasticity, pink, slightly moist, no cementation, weak reaction to HCl	15	
												16.5	

Bottom of auger@ 15.0 feet bgs.
Bottom of sampler @ 16.5 feet bgs.
No groundwater encountered.

Sampler Types: Split Spoon; Penetrometer; Shelby; Vane Shear; Bulk Sample; California; Grab Sample

Operation Types: Auger Hollow Stem; Hand Auger; Bullnose; ODEX; Core Barrel; Excavated Pit

WATER LEVEL OBSERVATIONS

While Drilling	N/A ft	Upon Completion of Drilling		N/A ft
Time After Drilling	N/A	N/A	N/A	N/A
Depth To Water (ft)	N/A	N/A	N/A	N/A

Remarks: Not Encountered

ATEK Project Number: 250353

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LOG OF EXPLORATORY BORING B-4

Fig. 4

APPENDIX D
Laboratory Test

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APPENDIX D
LABORATORY TESTING

LABORATORY TESTS

Laboratory tests were performed on selected samples to aid in soil classification and to evaluate physical properties of the soils, which may affect the Geotechnical aspects of project design and construction. A description of the laboratory testing program is presented below.

Sieve Analysis

Sieve analyses were performed to evaluate the gradation characteristics of the material and to aid in soil classification. Tests were performed in general accordance with ASTM Test Method C 136 and D 2487.

Atterberg Limits

Atterberg Limits tests were performed to aid in soil classification and to evaluate the plasticity characteristics of the material. Tests were performed in general accordance with ASTM Test Method D 4318.

Moisture Content

Moisture content tests were performed to evaluate moisture-conditioning requirements during site preparation and earthwork grading. Moisture content was evaluated in general accordance with ASTM Test Method D 2216.

One-Dimensional Consolidation

A one-dimensional consolidation test was performed on a ring samples to evaluate consolidation potential of the site soil. Test procedure was in general accordance with ASTM Test Method D 2435.

Undisturbed Ring Density

Undisturbed ring density tests were performed on ring samples to evaluate the in-situ density and moisture content of the site soils. Test procedures were in general accordance with ASTM Test Method D 2937.

Sulfate Content

Sulfate content tests were performed to evaluate the corrosion potential of the on-site soils. Tests were performed in general accordance with ARIZ 733.

Chloride Content

Chloride content tests were performed to evaluate the corrosion potential of the on-site soils. Tests were performed in general accordance with ARIZ 736.

ENGINEERING CONSULTANTS

PROJECT:	SMH Tiny Homes and RV Park	**PROJECT:**	250353
LOCATION:	Ganado, Arizona	**WORK ORDER:**	2500392
SAMPLE DATE:	11/11/2025	**REVIEWED BY:**	A Lopez, PE

MOISTURE CONTENT OF SOIL -- ASTM D 2216

		MOISTURE		
LAB #	**SAMPLE SOURCE**	**WET WEIGHT (g)**	**DRY WEIGHT (g)**	**MOISTURE CONTENT**
1	Bulk, B-1 @ 0.0'-5.0'	515.5	501.7	2.8%
10	Bulk, B-3 @ 0.0'-5.0'	539.0	524.8	2.7%

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ENGINEERING CONSULTANTS

PROJECT:	SMH Tiny Homes and RV Park	**PROJECT:**	250353
LOCATION:	Ganado, Arizona	**WORK ORDER:**	2500392
SAMPLE DATE:	11/11/2025	**REVIEWED BY:**	A Lopez, PE

DENSITY OF SOIL IN PLACE BY THE DRIVE-CYLINDER METHOD -- ASTM D 2937

		MOISTURE						
LAB #	**SAMPLE SOURCE**	**WET WEIGHT (g)**	**DRY WEIGHT (g)**	**MOISTURE CONTENT**	**# OF RINGS**	**WET WEIGHT + RINGS (g)**	**WEIGHT OF RINGS (g)**	**DRY DENSITY (pcf)**
2	B-1 @ 2.5'-3.5'	113.7	110.7	2.7%	1	158.6	44.9	91.7
6	B-2 @ 2.5'-3.5'	124.8	121.7	2.5%	1	169.8	45.0	100.8
11	B-3 @ 2.5'-3.5'	122.6	119.7	2.4%	1	167.5	44.9	99.1

ENGINEERING CONSULTANTS

PROJECT: SMH Tiny Homes and RV Park
LOCATION: Ganado, Arizona
DATE SAMPLED: 11/11/2025

PROJECT NO: 250353
WORK ORDER NO: 2500392
REVIEWED BY: A Lopez, PE

MECHANICAL SIEVE ANALYSIS
GROUP SYMBOL, USCS (ASTM D-2487)

SIEVE SIZES

					COBBLES		GRAVEL									SAND								Silt or	
							Coarse					Fine				Coarse		Medium			Fine			Clay	
Location & Depth	**USCS**	**LL**	**PL**	**PI**	**6"**	**4"**	**3"**	**2"**	**1 1/2"**	**1 1/4"**	**1"**	**3/4"**	**1/2"**	**3/8"**	**1/4"**	**#4**	**#8**	**#10**	**#16**	**#30**	**#40**	**#50**	**#100**	**#200**	**Lab #**
PERCENT PASSING BY WEIGHT																									
Bulk, B-1 @ 0.0'-5.0'	SM	NV	NP	NP	100	100	100	100	100	100	100	100	98	98	97	96	94	94	93	86	80	70	39	17	1
Bulk, B-3 @ 0.0'-5.0'	SM	NV	NP	NP	100	100	100	100	100	100	100	100	100	99	99	99	99	98	98	95	88	77	62	15	10
Ring, B-4 @ 2.5'-3.5'	SM	NV	NP	NP	100	100	100	100	100	100	100	100	100	100	100	100	99	99	98	86	75	62	60	12	15

This is a summarized report of the referenced procedures and does not include all reporting requirements. Additional data can be provided at client's request.

ENGINEERING CONSULTANTS

PROJECT:	SMH Tiny Homes and RV Park	**PROJECT NO:**	250353
LOCATION:	Ganado, Arizona	**WORK ORDER NO:**	2500392
DATE SAMPLED:	11/11/2025	**REVIEWED BY:**	A Lopez, PE

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS
(ASTM D-4318, DRY PREP)

Lab #	**Location & Depth**	**LL**	**PL**	**PI**
6	Ring, B-2 @ 2.5'-3.5'	19	14	5

ENGINEERING CONSULTANTS

Project:	SMH Tiny Homes and RV Park	**Project Number:**	250353
Location:	Ganado, Arizona	**Work Order Number:**	2500392
Client:	Fourth World Deisng Group, LLC	**Lab Number:**	See Below
Material:	Native	**Date Sampled:**	11/11/25
Sample Source:	See Below		

Swell Potential of Soil ASTM D4546

Sample Number	Sample Source	Swell (%)	In-Situ Moisture (%)
6	Ring, B-2 @ 2.5'-3.5'	0.0	2.5

ENGINEERING CONSULTANTS

Project:	SMH Tiny Homes and RV Park	**Project Number:**	250353
Project Location:	Ganado, Arizona	**Work Order Number:**	2500392
Material:	Native	**Lab Number:**	See Below
Sample Source:	See Below	**Date Sampled:**	11/11/25
Sample Prep:	50% +/-2	**Load:**	144 psf

Expansion Index of Soils (ASTM D 4829)

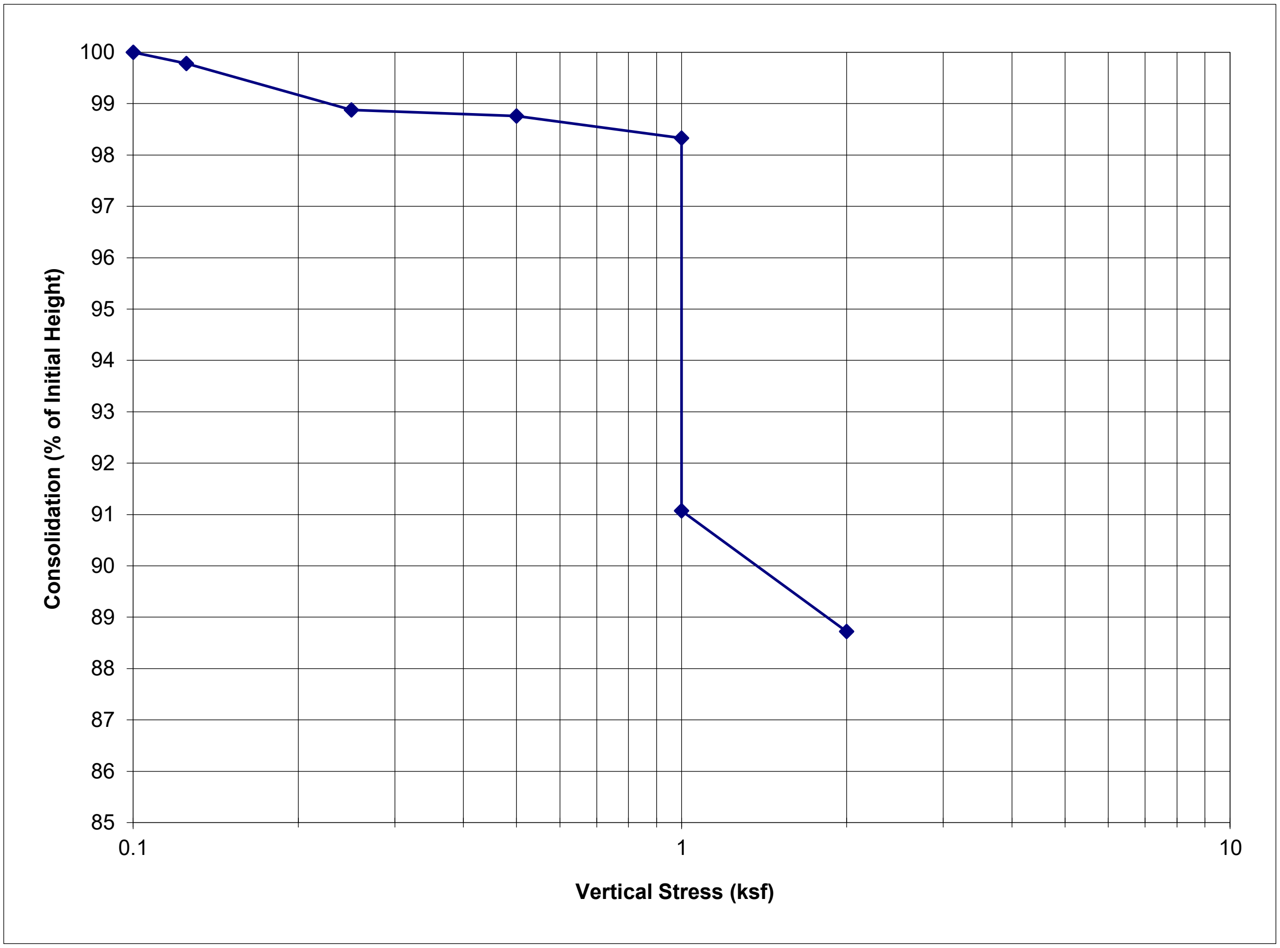
		Moisture Content							Expansion Index	
Lab Number	Sample Description	Dry Weight	Wet Weight	% Water	Wet Mass of Specimen (g)	Dry Density (pcf)	Saturation	Final Reading (in)	Measured	Expansion Index
1	Bulk Sample B-1 @ 0.0'-5.0'	380.3	410.7	8.0%	410.7	114.7	48%	0.0046	4.6	4

ENGINEERING CONSULTANTS

Project:	SMH Tiny Homes and RV Park	**Project Number:**	250353
Project Location:	Ganado, Arizona	**Work Order Number:**	2500392
Client:	Fourth Tiny Homes and RV Park	**Lab Number:**	2
Material:	Native	**Date Sampled:**	11/11/25
Sample Source:	Ring Sample B-1 @ 2.5'-3.5'		
Sample Prep:	In-Situ		

One-Dimensional Consolidation Properties of Soils (ASTM D2435)

Initial Volume (cu.in)	4.60	Final Volume (cu.in)	4.09
Initial Moisture Content	2.7%	Final Moisture Content	21.7%
Initial Dry Density(pcf)	91.6	Final Dry Density(pcf)	103.2
Initial Degree of Saturation	9%	Final Degree of Saturation	95%
Initial Void Ratio	0.81	Final Void Ratio	0.60
Estimated Specific Gravity	2.65	Saturated at	1 ksf
		Hydro Collapse Potential	7.26%

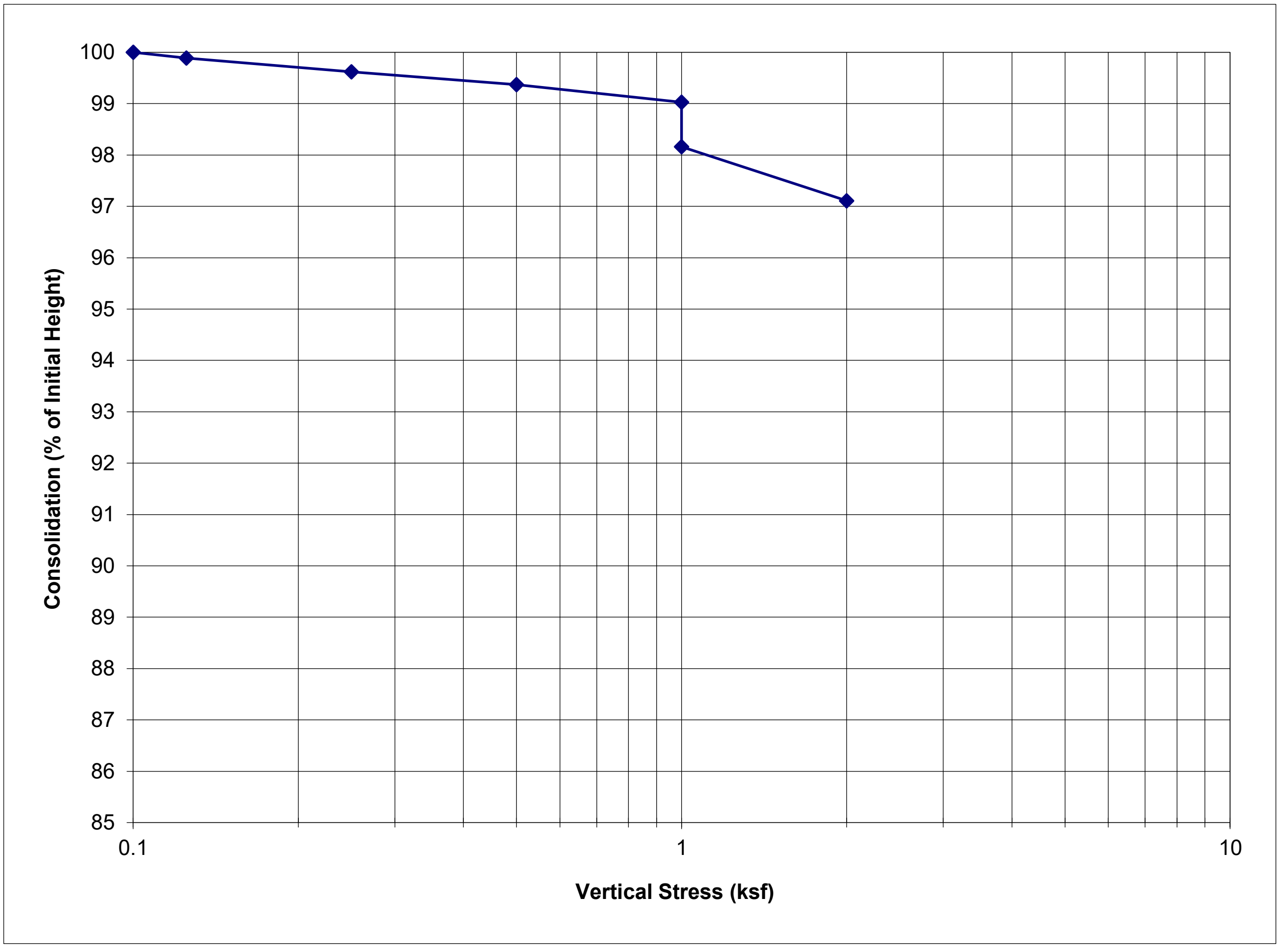


ENGINEERING CONSULTANTS

Project:	SMH Tiny Homes and RV Park	**Project Number:**	250353
Project Location:	Ganado, Arizona	**Work Order Number:**	2500392
Client:	Fourth Tiny Homes and RV Park	**Lab Number:**	11
Material:	Native	**Date Sampled:**	11/11/25
Sample Source:	Ring Sample B-3 @ 2.5'-3.5'		
Sample Prep:	In-Situ		

One-Dimensional Consolidation Properties of Soils (ASTM D2435)

Initial Volume (cu.in)	4.60	Final Volume (cu.in)	4.47
Initial Moisture Content	2.4%	Final Moisture Content	22.9%
Initial Dry Density(pcf)	99.0	Final Dry Density(pcf)	101.9
Initial Degree of Saturation	10%	Final Degree of Saturation	98%
Initial Void Ratio	0.67	Final Void Ratio	0.62
Estimated Specific Gravity	2.65	Saturated at	1 ksf
		Hydro Collapse Potential	0.87%



MOTZZ LABORATORY, INC.

Report: 958729
Reported: 11/20/2025
Received: 11/18/2025
PO: 2500392

Laboratory Analysis Report

Atek Engineering Consultants
Antonio Lopez
111 South Weber Dr Suite 1
Chandler, AZ 85226

Project: 250353

Lab Number	Sample ID
958729-1	1) Bulk, B-1 (0-5')

Test Parameter

Test	*Method*	*Result*	*Units*
Chloride	ARIZ 736b	25	ppm
Sulfate	ARIZ 733b	53	ppm

Lab Number	Sample ID
958729-2	10) Bulk, B-3 (0-5')

Test Parameter

Test	*Method*	*Result*	*Units*
Chloride	ARIZ 736b	11	ppm
Sulfate	ARIZ 733b	35	ppm