Project No. T3021-22-02
REVISED July 1, 2025

Albert A. Webb Associates, Inc.
3788 McCray Street
Riverside California 92506

Attention: Mr. Dilesh Sheth, PE

Subject: GEOTECHNICAL PAVEMENT INVESTIGATION
AVENUE 50 WIDENING
MADISON STREET TO BOTELLA PLACE
CITY OF INDIO PROJECT ST2204
INDIO, CALIFORNIA

Mr. Sheth:

In accordance with the *Single-Project Subconsultant Agreement*, dated March 30, 2023, between Albert A. Webb Associates (Webb) and Geocon West, Inc. (Geocon), we have performed a geotechnical investigation for the proposed City of Indio Project ST2204, located in the City of Indio, California. The approximate project location is shown on the *Vicinity Map*, Figure 1. This revised report supersedes the revised report, dated September 5, 2023.

BACKGROUND AND PURPOSE

The project alignment addressed with this report is approximately 8,100 linear feet of Avenue 50, between Madison Street and Botella Place within the City of Indio. Proposed improvements to Avenue 50 include widening the street to four traffic lanes, with a bike lane, pedestrian improvements, center turn lane, central median, and installation of dry wells for storm water infiltration. Where roadway widening improvements are proposed, the existing roadway width varies between approximately 30 and 55 feet, with an ultimate proposed roadway width varying between 71 and 78 feet and may require retaining walls at some locations. In addition, the project is expected to include pavement reconstruction and/or rehabilitation and curb, gutter, sidewalk, landscape, and underground utility improvements within the project limits. The approximate project alignment is shown on the *Site Plan*, Figure 2.

The purpose of our services was to evaluate the existing pavement structural section, document the existing roadway and subgrade soil conditions, and provide geotechnical recommendations. Geotechnical recommendations include those for construction of proposed interim reconstruction/rehabilitation of existing pavements and ultimate roadway widening improvements, and the construction of associated improvements within the project limits.

SCOPE OF SERVICES

Our work included:

- Performing a site reconnaissance to observe existing site conditions, pavement distress, and mark the core and percolation test locations.
- Notifying subscribing utility companies via Underground Service Alert (USA) to delineate utilities in vicinity of our exploration locations.
- Obtaining an encroachment permit from the City of Indio.
- Providing necessary traffic control measures during fieldwork.
- Coring through existing pavements at sixteen locations (Cores C-1 through C-16) and drilling twelve percolation borings (Borings P-1 through P-12) within the project limits, utilizing a truck mounted drill rig equipped with 8-inch diameter hollow-stem augers.
- Measuring the existing pavement section material thicknesses at each core location.
- Obtaining subgrade soil samples from the core locations.
- Backfilling the core locations with cuttings, clean sand, and capping with cold-patch asphalt concrete. Cores were rig tamped upon completion of installing the cap.
- Performing percolation tests at twelve locations, specified by the City of Indio, per the Riverside County Flood Control and Water Conservation District LID BMP, Appendix A (Handbook).
- Performing laboratory tests on select samples of subgrade soils, which included in-situ moisture and density, grain size distribution, direct shear testing, sulfate screening, optimum moisture and maximum dry density, and soil resistance value (R-value) testing.
- Analyzing the field and laboratory testing data.
- Preparing this report, which presents our findings, conclusions, and recommendations, as it would pertain to design and construction of the proposed improvements.

EXISTING PAVEMENT AND SUBGRADE SOIL CONDITIONS

Existing Pavement Sections

Table 1 summarizes the existing pavement section material thicknesses encountered at our core locations. Approximate core locations are shown on the *Site Map*, Figure 2. Pavement section thicknesses may vary between the core locations.

TABLE 1
EXISTING PAVEMENT STRUCTURAL SECTIONS

Core ID	Approximate Location[1]	HMA[2] (inches)	AB[3] (inches)
C-1	Avenue 50, westbound direction, Sta. 71+50	7.5	6
C-2	Avenue 50, eastbound direction, Sta. 71+50	5	6
C-3	Avenue 50, westbound direction, Sta. 79+50	5.5	8
C-4	Avenue 50, eastbound direction, Sta. 79+50	4.5	7
C-5	Avenue 50, westbound direction, Sta. 88+25	5	6
C-6	Avenue 50, eastbound direction, Sta. 88+25	4.5	6
C-7	Avenue 50, westbound direction, Sta. 95+00	5	6
C-8	Avenue 50, eastbound direction, Sta. 95+00	3.5	5
C-9	Avenue 50, westbound direction, Sta. 103+40	6	6
C-10	Avenue 50, eastbound direction, Sta. 103+40	4.5	5
C-11	Avenue 50, westbound direction, Sta. 111+40	5.5	6
C-12	Avenue 50, eastbound direction, Sta. 111+40	5	5
C-13	Avenue 50, westbound direction, Sta. 130+00	7	5
C-14	Avenue 50, eastbound direction, Sta. 130+00	5	5
C-15	Avenue 50, westbound direction, Sta. 138+00	5.5	6
C-16	Avenue 50, eastbound direction, Sta. 138+00	4	5

Notes:
1. Approximate locations shown on the *Site Map*, Figure 2
2. HMA = Hot Mix Asphalt
3. AB = Aggregate Base

Existing Pavement Conditions

In general, low to high severity distress in the forms of alligator cracking, block cracking, longitudinal cracking, transverse cracking, patching, spalling, and raveling was observed along Avenue 50, within the project limits. Rutting was observed in some areas indicating failure within the aggregate base section and/or subgrade. Lower distress was observed within approximately 540 feet of Madison Street within the westbound, eastbound, and middle-turn lanes. Between approximately 540 feet of Madison Street and Monroe Street, higher distress was observed between the westbound, eastbound, and middle-turn lanes. Between Monroe Street and Botella Place, lower distress was observed within the westbound lanes, with higher distress observed within the eastbound lane and middle-turn lane.

Soil Conditions

Subgrade soils consist of artificial fill overlying alluvial soils in each of our core locations to the maximum depth explored of approximately 5 feet (10 feet in percolation areas). The alluvium generally consists of interbedded poorly graded sands with silt lenses that are vaguely laminated with occasional oxidation staining. The undocumented fill generally consists of poorly graded sands and silty sands. Subgrade soils have a relative compaction of 80 to 90 percent of maximum dry density per ASTM D1557 based on driven sample dry densities.

The soil conditions described here are generalized. The core and percolation boring logs, found in *Appendix A* (A-1 through A-25), detail soil type, color, moisture, consistency, and classification of the soil encountered at specific locations and elevations.

PERCOLATION TESTING

Percolation testing was conducted in accordance with the procedures in the *Riverside County Flood Control and Water Conservation District LID BMP, Appendix A* (Handbook), at the locations provided by the city. The percolation test locations are depicted on the *Site Map* (see Figure 2).

Twelve percolation test borings were excavated to a depth of 10 feet below the existing ground surface using an 8-inch diameter hollow-stem auger drilling rig, at locations requested by Webb. The geologic conditions at the percolation test locations consist of undocumented artificial fill overlying alluvium. Approximately two inches of gravel was placed at the bottom of each test hole and a perforated pipe was placed atop the gravel to keep the test hole open. Gravel was placed around the bottom of the test hole to support the test pipe. The test locations were pre-saturated prior to testing. Infiltration test results are included in *Appendix A* (A-29 through A-40). Results of the converted percolation test rates to infiltration test rates are presented in Table 2 below.

TABLE 2
INFILTRATION TEST RATES

Parameter	P-1	P-2	P-3	P-4
Depth (inches)	120	120	120	120
Test Type	Sandy	Sandy	Sandy	Sandy
Change in head over time: ΔH (inches)	17.5	14.4	20.4	37.1
Average head: Havg (in)	27.1	26.3	29.3	18.5
Time Interval (minutes): Δt (minutes)	10	10	10	10
Radius of test hole: r (inches)	4	4	4	4
Tested Infiltration Rate: It (inches/hour)	7.2	6.1	7.8	21.7

Parameter	P-5	P-6	P-7	P-8
Depth (inches)	120	120	120	120
Test Type	Sandy	Sandy	Sandy	Sandy
Change in head over time: ΔH (inches)	20.0	25.4	38.9	21.0
Average head: Havg (in)	13.0	14.5	19.4	11.0
Time Interval (minutes): Δt (minutes)	10	10	10	10
Radius of test hole: r (inches)	4	4	4	4
Tested Infiltration Rate: It (inches/hour)	16.0	18.5	21.8	19.4

Parameter	P-9	P-10	P-11	P-12
Depth (inches)	120	120	120	120
Test Type	Sandy	Sandy	Sandy	Sandy
Change in head over time: ΔH (inches)	30.6	23.3	19.4	16.9
Average head: Havg (in)	15.3	11.9	10.6	31.1
Time Interval (minutes): Δt (minutes)	10	10	10	10
Radius of test hole: r (inches)	4	4	4	4
Tested Infiltration Rate: It (inches/hour)	21.2	20.1	18.6	6.1

The results of the infiltration testing indicate that infiltration rates at the locations tested range from 6.1 to 21.8 inches per hour. These rates are the calculated infiltration rates from the tested percolation rates. The *Handbook* requires a factor of safety of 3 be applied to the values above based on the test method used.

The *in-situ* field percolation tests performed provide short-term infiltration rates, which apply mainly to the initiation of the infiltration process due to the short time of the test (hours instead of days) and the amount of water used. Where appropriate, the short-term infiltration rates are converted to long-term infiltration rates using reduction factors depending upon the degree of infiltrate quality, maintenance access and frequency, site variability, subsurface stratigraphy variation, and other factors. The small-scale percolation testing cannot model the complexity of the effect of interbedded layers of different soil composition, and our test results should be considered only as index values of infiltration rates.

GROUNDWATER

We did not encounter static groundwater during our investigation. According to the California Department of Water Resources *Water Data* Library online GIS system, historic shallow groundwater depths are recorded between 66 and 125 feet below the ground surface in proximity to the site (Wells 06S07E02D002S, 336805N1162350W001, 336784N1162360W001). It is not uncommon for seepage conditions to develop where none previously existed. Groundwater and seepage are dependent on seasonal precipitation, irrigation, land use, among other factors, and varies as a result. Proper surface drainage will be important to future performance of the project.

LABORATORY TEST RESULTS

We performed laboratory R-Value testing on the soil below the pavement section to evaluate pavement support characteristics along the project alignment. R-Value test results are summarized in Table 3.

TABLE 3
SUMMARY OF R-VALUE TEST RESULTS

Sample Number	Sample Location	Sample Description	R-Value
C-3	Avenue 50, westbound	Silty SAND (SM)	70
C-6	Avenue 50, eastbound	Silty SAND (SM)	71
C-10	Avenue 50, eastbound	Silty SAND (SM)	66
C-11	Avenue 50, westbound	Poorly graded SAND with silt (SP-SM)	59
C-14	Avenue 50, eastbound	Poorly graded SAND with silt (SP-SM)	69

CONCLUSIONS AND RECOMMENDATIONS

It is our opinion that soil or geologic conditions were not encountered during the investigation that would preclude the construction of the proposed improvements, provided the recommendations presented herein are followed and implemented during construction.

Where new or reconstructed pavements are proposed, the upper 12 inches of the exposed subgrade should be remedially graded and processed to 95 percent relative compaction at 0 to 2 percent above optimum moisture content in accordance ASTM D1557.

Conventional Pavements – New Construction and Reconstruction

New pavements should be constructed to meet the current minimum structural section thicknesses found in the City of Indio *Standard Drawing No. 171*. Based on the roadway classifications provided in the *Avenue 50 Conceptual Plan*, prepared by Webb and dated April 22, 2020, Avenue 50 should be designed for a Traffic Index (TI) of 9.0, which correlates with a roadway classification of an Arterial with the City of Indio. However, the City of Indio indicated Geocon should utilize the Street Classification of Secondary roadway which equates to a traffic index of 7.5. Geocon should be contacted for additional recommendations if alternative TI's apply.

The following preliminary pavement sections in Table 4 are recommended along Avenue 50, between Madison Street and Botella Place, where new asphalt concrete pavements are planned. Pavement thicknesses were evaluated following procedures outlined in the referenced Caltrans *Highway Design Manual*. A maximum R-value of 50 was used in our preliminary pavement section calculations, where R-values exceed 50. Final pavement sections should be evaluated based on R-value testing of the soils encountered at the pavement subgrade during construction. R-value testing on local silt material is expected to exhibit substantially lower R-value test results than those listed below. Should silt be encountered in the subgrade, Geocon should be notified to provide revised recommendations.

TABLE 4
PRELIMINARY CONVENTONAL PAVEMENT DESIGN SECTIONS

Roadway Classification	Traffic Index (TI)	Subgrade R-Value	Asphalt Concrete (inches)	Aggregate Base (inches)
Sta. 63+00 to Sta. 144+50				
Secondary	7.5	50*	5.0	8.0

*An R-value of 50 is the maximum value allowed in the procedures to calculate flexible pavements provided in the Caltrans *Highway Design Manual*.

In general, based on our preliminary evaluation of conventional pavement sections, the existing roadway sections do contain the recommended asphalt concrete and aggregate base thicknesses with a few exceptions that have slightly less aggregate base or asphalt concrete than the recommended section thicknesses presented in Table 4 (as measured at our core locations). In considering the addition of asphalt concrete to achieve the recommended structural section, a general rule is that 1 additional inch of asphalt is equivalent to 2 inches of aggregate base.

Asphalt concrete should conform to Section 203-6 of the Greenbook. Class 2 Aggregate Base materials should conform to Section 26-1.02A of the "*Standard Specifications of the State of California, Department of Transportation*" (Caltrans). If used, Crushed Aggregate Base (CAB) should conform to Sections 200-2.2 of the Greenbook.

A rigid Portland cement concrete (PCC) pavement section should be placed in roadway aprons and cross gutters. We calculated the rigid pavement section in general conformance with the procedure recommended by the American Concrete Institute report, ACI 330-21, *Commercial Concrete Parking Lots and Site Paving Design and Construction – Guide.* Table 5 provides the traffic categories and design parameters used for the calculations for 20-year design life.

TABLE 5
TRAFFIC CATEGORIES

Traffic Category	Description	Reliability (%)	Slabs Cracked at End of Design Life (%)
A	Car Parking Areas and Access Lanes	60	15
B	Entrance and Truck Service Lanes	60	15
C	School or City Buses (Excluding Large Articulated Buses)	75	15
D	Heavy Duty Trucks (Gross Weight of 80 Kips)	75	15
E	Garbage or Fire Truck Lane	75	15

We used the parameters presented in Table 6 to calculate the pavement design sections. We should be contacted to provide updated design sections, if necessary.

TABLE 6
RIGID PAVEMENT DESIGN PARAMETERS

Design Parameter	Design Value
Modulus of subgrade reaction, k	50 pci
Modulus of rupture for concrete, M_R	500 psi
Concrete Compressive Strength	3,000 psi
Concrete Modulus of Elasticity, E	3,150,000

Based on the criteria presented herein, the PCC pavement sections should have a minimum thickness as presented in Table 7.

TABLE 7
RIGID VEHICULAR PAVEMENT RECOMMENDATIONS

Traffic Category	Trucks Per Day	Portland Cement Concrete, T (Inches)
A = Car Parking Areas and Access Lanes	10	6
B = Entrance and Truck Service Lanes	10	6½
	50	7
	100	7
C = School or City Buses	50	10
	100	10½
D = Heavy Duty Trucks	50	7½
	100	8½
E = Garbage or Fire Truck Lanes	5	7½
	10	7½

The PCC vehicular pavement should be placed over subgrade soil that is compacted to a dry density of at least 95 percent of the laboratory maximum dry density (ASTM D1557) near to slightly above optimum moisture content.

Adequate joint spacing should be incorporated into the design and construction of the rigid pavement in accordance with Table 8.

TABLE 8
MAXIMUM JOINT SPACING

Pavement Thickness, T (Inches)	Maximum Joint Spacing (Feet)
4<T<5	10
5≤T<6	12.5
6≤T	15

The rigid pavement should also be designed and constructed incorporating the parameters presented in Table 9.

TABLE 9
ADDITIONAL RIGID PAVEMENT RECOMMENDATIONS

Subject	Value
Thickened Edge	1.2 Times Slab Thickness Adjacent to Structures
	1.5 Times Slab Thickness Adjacent to Soil
	Minimum Increase of 2 Inches
	4 Feet Wide
Crack Control Joint Depth	Early Entry Sawn = T/6 to T/5, 1.25 Inch Minimum
	Conventional (Tooled or Conventional Sawing) = T/4 to T/3
Crack Control Joint Width	¼-Inch for Sealed Joints and Per Sealer Manufacturer's Recommendations
	$^{1}/_{16}$- to $^{1}/_{4}$-Inch is Common for Unsealed Joints

Reinforcing steel will not be necessary within the concrete for geotechnical purposes with the possible exception of dowels at construction joints as discussed herein.

To control the location and spread of concrete shrinkage cracks, crack-control joints (weakened plane joints) should be included in the design of the concrete pavement slab. Crack-control joints should be sealed with an appropriate sealant to prevent the migration of water through the control joint to the subgrade materials. The depth of the crack-control joints should be in accordance with the referenced ACI guide.

To provide load transfer between adjacent pavement slab sections, a butt-type construction joint should be constructed. The butt-type joint should be thickened by at least 20 percent at the edge and taper back at least 4 feet from the face of the slab.

Concrete curb/gutter should be placed on soil subgrade compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Cross-gutters that receive vehicular traffic should be placed on subgrade soil compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Base materials should not be placed below the curb/gutter, or cross-gutters so water is not able to migrate from the adjacent parkways to the pavement sections.

Rehabilitation and Reconstruction of Existing Pavements

We understand that existing pavements along westbound Avenue 50, within the project limits, may be rehabilitated or reconstructed. In general, low to high severity distress in the forms of alligator cracking, block cracking, longitudinal cracking, transverse cracking, patching, spalling, and raveling was observed along Avenue 50, within the project limits. Rutting was observed in some areas indicating failure within the aggregate base section and/or subgrade. Lower distress was observed within approximately 540 feet of Madison Street within the westbound, eastbound, and middle-turn lanes. Between approximately 540 feet of Madison Street and Monroe Street, higher distress was observed between the westbound, eastbound, and middle-turn lanes. Between Monroe Street and Botella Place, lower distress was observed within the westbound lanes, with higher distress observed within the eastbound lane and middle-turn lane.

Several alternative methods of pavement treatment are presented herein this section to address the cracking along Avenue 50, within the project limits. The alternative methods are categorized as pavement rehabilitation and pavement reconstruction. Pavement rehabilitation provides a new wearing surface and extends the pavement life. Surface treatments can be performed, but will not address deeper distress, requiring more frequent future maintenance. Deeper methods of rehabilitation can replace more of the pavement, lowering the chance for propagation of existing pavement cracks. Reconstruction is typically performed using recycling techniques, processing part or all of the existing pavement structural section into a new pavement structural layer below a wearing course. The amount of extended life for the pavement will depend on the method chosen for rehabilitation or reconstruction.

Based on the severity of pavement distress along Avenue 50, within the project limits, we opine that a combination of rehabilitation and reconstruction methods should be performed. Pavement rehabilitation, consisting of a mill and overlay, should be considered where lower distress exists, such as within the eastbound, westbound, and middle-turn lanes that are within approximately 540 feet of Madison Street, and the westbound lanes between Monroe Street and Botella Place. Where higher distress exists, such as within the westbound, eastbound, and middle-turn lanes between approximately 540 feet of Madison Street and Monroe Street, and within the eastbound and middle-turn lanes that are between Monroe Street and Botella Place, pavement reconstruction, consisting of cold-in-place recycling, should be considered, with the addition of a thickened wearing course to satisfy the design TI of 7.5, as the asphalt concrete and/or aggregate base sections underlying these existing pavements appear to not meet the minimum required section thicknesses provided in Table 4 (as measured at our core locations). Where a thickened overlay cannot be achieved to meet the design TI, or where rutting exists, consideration should be given to the full-depth reclamation reconstruction method.

<u>Mill and Overlay (Rehabilitation)</u>

In general, prior to placing the overlay, heavily distressed HMA areas should be excavated to at least 6 inches and backfilled with full-depth HMA to match the existing adjacent section. Dig-out repairs should extend at least 1 foot laterally beyond the observed surface failure that prompted the dig-out, or to the lip of curb/gutter, where applicable. The full-depth HMA plugs should be compacted using appropriate compaction equipment.

Milling may increase the performance of an HMA overlay by removing oxidized, brittle pavement. The depth of milling should be selected such that the final milled surface is not located near or slightly above an existing HMA-lift boundary. After milling and prior to placing the HMA overlay, cracks wider than ¼-inch should be routed and cleaned to increase adhesion between the sealant and the pavement surface and be filled with an approved crack sealant. Crack sealant should be placed to within ¼-inch of the pavement surface. Additionally, the use of a Petromat (or equivalent product) can provide an added barrier to moisture intrusion between the existing asphalt concrete pavement and the new overlay.

The “reflective cracking criteria” states that the minimum overlay thickness is one-half of the existing HMA thickness. On average, the existing HMA section is approximately 5 inches; therefore, we recommend a minimum overlay thickness of 3 inches which should provide a service life of approximately 3 to 5 years if properly constructed.

Using a paving interlayer (fabric, mat, grid, or composite grid) between the milled pavement surface and the overlay can delay the initial arrival of reflective cracking extending to the pavement surface and potentially further delay the ongoing development of the cracking after it has appeared on the pavement surface. The delay in reflective cracking generally depends on the thickness of the overlay and the type of interlayer used. In general, reflective cracking in an un-reinforced HMA overlay will appear on the new pavement surface in a period of years approximately equivalent to the overlay thickness in inches (1 inch per year). The service life of a rehabilitated pavement structure after applying an overlay and the rate at which reflective cracking develops is also a function of other factors such as environmental and weather conditions, drainage conditions, traffic loading, pavement structural section adequacy, subgrade and base conditions, workmanship, and others. Table 10 provides pavement interlayer options with associated potential delay in the development of reflective cracking appearing at the pavement surface with respect to a minimum overlay thickness of 3 inches.

TABLE 10
OVERLAY INTERLAYER ALTERNATIVES
3" HMA OVERLAY

Interlayer Type	Approximate Service Life[5]	Potential Overlay Service Life Increase[6]
None	2 years	0%
Paving Fabric[1]	3 years	50%
Paving Mat[2]	5 years	150%
Paving Grid[3]	5½ years	175%
Paving Composite Grid[4]	6 years	200%

Notes:

1. Meets Caltrans' Criteria for Paving Fabric *
2. Meets Caltrans' Criteria for Paving Mat *
3. Meets Caltrans' Criteria for Paving Grid (Class P1 or P2 or Equal) *
4. Meets Caltrans' Criteria for Paving Composite Grid (Class P1 or P2 or Equal) *
5. Service life is defined as the time to reflective cracking appearing at the pavement surface.
6. Potential service life increase estimated based on PRI *Study of Interlayer Effectiveness using APA Crack Testing* (TenCate Geosynthetics) and previous project experience.

*For Caltrans pavement interlayer specifications, refer to Section 12.4 of *MTAG Volume 1 Flexible Pavement Preservation 2nd Edition, Chapter 12 – Interlayers,* January 27, 2009.

If a paving interlayer (paving fabric, mat, or grid) is used, we recommend that finish-milling (fine - ¼ inch or less) or micro-milling (3 millimeters) be performed in lieu of conventional (standard or coarse) milling. If the teeth spacing used for milling is too wide (typically greater than ¼ inch), it will likely require additional emulsion and labor to have the paving interlayer properly adhere to the milled pavement surface. Alternatively, a leveling course of HMA may be placed over the milled surface prior to placing the paving interlayer. If a paving composite grid is used, an HMA leveling course (typically 1-inch thick) will likely be needed to provide a sufficient bond for the material. All paving interlayers and required tack coats (asphalt emulsion) should be installed in accordance with the manufacturer's recommendations.

The asphalt concrete overlay material can be reinforced with the use of high-strength aromatic polyamide fibers (Aramid). By adding a product, such as ACE-XP or AQU-XP Polymer Fibers (or equivalent), to the asphalt concrete, the physical strength and performance of the mix can be improved through an increased bearing capacity and resistance to cracking and rutting. The use of Aramid fibers should be incorporated into the asphalt concrete overlay material through consultation and direction from the manufacturer.

Cold-In-Place Recycling (Partial Reconstruction)

Existing pavements can be partially reconstructed using Cold-In-Place Recycling (CIR), where asphalt concrete is at least 3 inches thick. If this method is selected, a specialty contractor with experience in pavement rehabilitation should be selected to reconstruct the roadways. The CIR process will rehabilitate the pavement section to the previous pavement design but will not address deficiencies in the overall pavement structural section.

The CIR process reconstructs the existing asphalt concrete by milling the existing asphalt concrete pavement, mixing the materials, replacing them as the pavement base course. The milled CIR material is blended with emulsion or foamed asphalt and replaced. The CIR process is completed with an overlay of new asphalt concrete as a wearing surface. The CIR process saves project costs by reducing the amount of import and export from the site resulting from the removal of the existing pavement structural section and grading of the new subgrade.

The CIR process includes milling of the existing pavement surface. These materials can be recycled or can be stockpiled for use in the pavement surface course, depending on the contractor’s methods. The bottom of the milled surface should be processed as part of the CIR, mixed with emulsion or foamed asphalt and replaced as a new asphalt concrete base layer. The processed CIR materials should be a minimum of 3 inches in thickness. The CIR material should be capped with at least 2 inches of new asphalt concrete as a wearing surface. A specialty contractor should review the proposed CIR thicknesses and provide a mix design for the CIR process. Geocon should be allowed to review their mix design and rehabilitation plan and provide additional recommendations as needed.

As the CIR process pulverizes the materials in place, the subgrade will not be exposed during the pavement reconstruction process. A representative of Geocon should be onsite during the processing and compacting of the CIR section to observe the contractor’s operations and look for loose or yielding subgrade conditions. Additional recommendations for improving the subgrade soils can be made based on the conditions encountered.

Full Depth Reclamation (Reconstruction)

The pavement along Avenue 50 can be reconstructed to meet current design criteria using Full Depth Reclamation (FDR). If this method is selected, a specialty contractor with experience in pavement rehabilitation should be selected to reconstruct the roadways.

The FDR process resets the pavement to a new condition by milling the existing asphalt concrete pavement and aggregate base, mixing them, and replacing them as a new pavement base layer. The milled material is blended with stabilizing additives such as asphalt or cement to provide additional binding. The FDR process is completed with an overlay of new asphalt concrete as a wearing surface. The FDR process saves project costs by reducing the amount of import and export from the site resulting from the removal of the existing pavement structural section and grading of the exposed subgrade.

The thickness of the FDR process and the overlay should be based on the thickness of the existing pavement section, the subgrade materials, and the design TI. We have evaluated the pavement structural section using asphalt concrete over FDR. The gravel factor of 1.4 for the cement treated soils was determined utilizing the equation in Section 663 of the Caltrans *Highway Design Manual*. The FDR should be constructed so that the final mixture exhibits a compressive strength of 500 pounds per square inch (psi). Prior to the FDR, the contractor should prepare a mix design to evaluate the necessary additives.

The processed materials should be placed to the minimum thickness in Table 11 and capped with asphalt concrete. We have included recommended pavement sections for a Traffic Index of 7.5 for Avenue 50, within the project limits, as indicated by the City of Indio. If an alternate TI is appropriate for the pavement, Geocon should be contacted for additional recommendations.

TABLE 11
PRELIMINARY FULL DEPTH RECLAMATION RECOMMENDATIONS

Roadway Classification	Traffic Index (TI)	Subgrade R-Value	Asphalt Concrete Wearing Section (inches)	FDR Section (inches)
Sta. 63+00 to Sta. 144+50				
Secondary	7.5	50*	3.0	6.0

*An R-value of 50 is the maximum value allowed in the procedures to calculate flexible pavements provided in the Caltrans *Highway Design Manual*.

The specialty contractor should prepare a mix design for the FDR material. Geocon should be allowed to review their mix design and rehabilitation plan and provide additional recommendations as needed.

Secondary rolling should be performed after FDR and before paving with HMA to microcrack the treated mixture. The microcracking should consist of two to four passes of a heavy steel-wheel vibratory roller. Geocon should be onsite to observe the microcracking.

As the FDR process pulverizes the materials in place, the subgrade will not be exposed during the pavement reconstruction process. A representative of Geocon should be onsite during the processing and compacting of the FDR section to observe the contractor's operations and look for loose or yielding subgrade conditions. Additional recommendations for improving the subgrade soils can be made based on the conditions encountered.

Conventional Retaining Walls

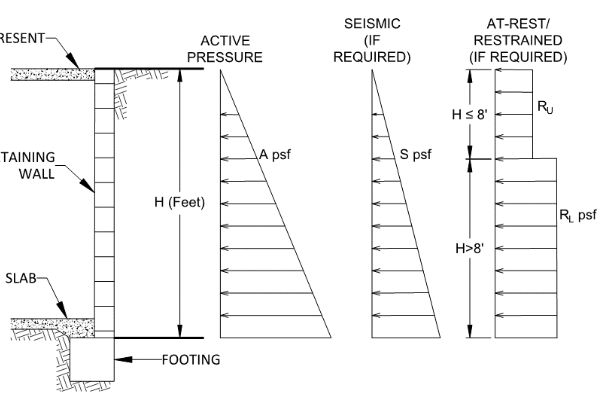
Retaining walls should be designed using the values presented in Table 12. Soil with an Expansion Index (EI) of greater than 50 should not be used as backfill material behind retaining walls. Retaining wall foundations should be supported upon a minimum of 3 feet of newly placed engineered fill compacted to at least 90 percent relative compaction and moisture conditioned at 0 to 2 percent above optimum moisture content in accordance with ASTM D1557.

TABLE 12
RETAINING WALL DESIGN RECOMMENDATIONS

Parameter	Value
Active Soil Pressure, A (Fluid Density, Level Backfill)	35 pcf
Active Soil Pressure, A (Fluid Density, 2:1 Sloping Backfill)	50 pcf
Seismic Pressure, S	15H psf
At-Rest/Restrained Walls Additional Uniform Pressure (0 to 8 Feet High)	7H psf
At-Rest/Restrained Walls Additional Uniform Pressure (8+ Feet High)	13H psf
Expected Expansion Index for the Subject Property	EI≤50

*H = height of the retaining portion of the wall

The project retaining walls should be designed as shown in the Retaining Wall Loading Diagram.



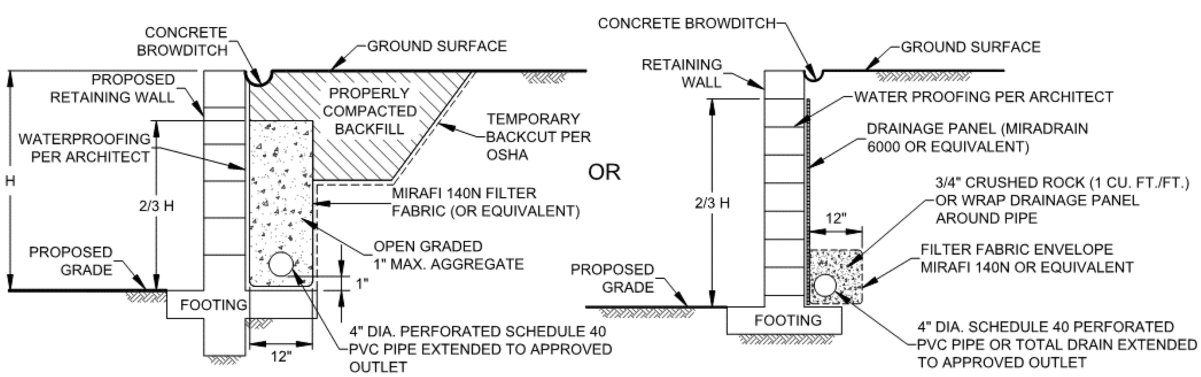
Retaining Wall Loading Diagram

Unrestrained walls are those that are allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall) at the top of the wall. Where walls are restrained from movement at the top (at-rest condition), an additional uniform pressure should be applied to the wall. For retaining walls subject to vehicular loads within a horizontal distance equal to two-thirds the wall height, a surcharge equivalent to 2 feet of fill soil should be added to the upper 10 feet of the retaining wall.

The structural engineer should determine the Seismic Design Category for the project in accordance with Section 1613.3.5 of the 2022 CBC or Section 11.6 of ASCE 7-16. For structures assigned to Seismic Design Category of D, E, or F, retaining walls that support more than 6 feet of backfill should be designed with seismic lateral pressure in accordance with Section 1803.5.12 of the 2022 CBC. The seismic load is dependent on the retained height where H is the height of the wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall.

Retaining walls should be designed to ensure stability against overturning sliding, and excessive foundation pressure. Where a keyway is extended below the wall base with the intent to engage passive pressure and enhance sliding stability, it is not necessary to consider active pressure on the keyway.

Drainage openings through the base of the wall (weep holes) should not be used where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall. The recommendations herein assume a properly compacted granular (EI of 50 or less) free-draining backfill material with no hydrostatic forces or imposed surcharge load. The retaining wall should be properly drained as shown in the Typical Retaining Wall Drainage Detail. If conditions different than those described are expected, or if specific drainage details are desired, Geocon should be contacted for additional recommendations.



Typical Retaining Wall Drainage Detail

The retaining walls may be designed using either the active and restrained (at-rest) loading condition or the active and seismic loading condition as suggested by the structural engineer. Typically, it appears the design of the restrained condition for retaining wall loading may be adequate for the seismic design of the retaining walls. However, the active earth pressure combined with the seismic design load should be reviewed and also considered in the design of the retaining walls.

In general, wall foundations should be designed in accordance with Table 13. The proximity of the foundation to the top of a slope steeper than 3:1 could impact the allowable soil bearing pressure. Therefore, retaining wall foundations should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.

TABLE 13
SUMMARY OF RETAINING WALL FOUNDATION RECOMMENDATIONS

Parameter	Value
Minimum Retaining Wall Foundation Width	12 inches
Minimum Retaining Wall Foundation Depth	12 Inches
Minimum Steel Reinforcement	Per Structural Engineer
Allowable Bearing Capacity	2,000 psf
Bearing Capacity Increase	500 psf per Foot of Depth
	250 psf per Foot of Width
Maximum Allowable Bearing Capacity	3,000 psf
Estimated Total Settlement	1 Inch
Estimated Differential Settlement	½ Inch in 40 Feet

The recommendations presented herein are generally applicable to the design of rigid concrete or masonry retaining walls.

Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfill, and loads acting on the wall. The retaining walls and improvements above the retaining walls should be designed to incorporate an appropriate amount of lateral deflection as determined by the structural engineer.

Soil contemplated for use as retaining wall backfill, including import materials, should be identified in the field prior to backfill. At that time, Geocon should obtain samples for laboratory testing to evaluate its suitability. Modified lateral earth pressures may be necessary if the backfill soil does not meet the required expansion index or shear strength. City or regional standard wall designs, if used, are based on a specific active lateral earth pressure and/or soil friction angle. In this regard, on-site soil to be used as backfill may or may not meet the values for standard wall designs. Geocon should be consulted to assess the suitability of the on-site soil for use as wall backfill if standard wall designs will be used.

Lateral Loading

Table 14 should be used to help design the proposed structures and improvements to resist lateral loads for the design of footings or shear keys. The allowable passive pressure assumes a horizontal surface extending at least 5 feet, or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material in areas not protected by floor slabs or pavement should not be included in design for passive resistance.

TABLE 14
SUMMARY OF LATERAL LOAD DESIGN RECOMMENDATIONS

Parameter	Value
Passive Pressure Fluid Density	260 pcf
Coefficient of Friction (Concrete and Soil)	0.40

*Per manufacturer's recommendations.

The passive and frictional resistant loads can be combined for design purposes. The lateral passive pressures may be increased by one-third when considering transient loads due to wind or seismic forces.

Corrosivity (Water-Soluble Sulfate Content)

We performed laboratory testing on a representative sample of site material to evaluate the percentage of water-soluble sulfate content. Appendix B presents results of the laboratory water-soluble sulfate content tests. The test results indicate the on-site materials at the locations tested possess "S0" sulfate exposure to concrete structures as defined by 2022 CBC Section 1904 and ACI 318-19 Chapter 19. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

TABLE 15
REQUIREMENTS FOR CONCRETE EXPOSED TO SULFATE-CONTAINING SOLUTIONS

Exposure Class		Water-Soluble Sulfate (SO_4) Percent by Weight	Cement Type (ASTM C 150)	Maximum Water to Cement Ratio by Weight[1]	Minimum Compressive Strength (psi)
S0		**SO_4<0.10**	**No Type Restriction**	**n/a**	**2,500**
S1		$0.10 \leq SO_4 < 0.20$	II	0.50	4,000
S2		$0.20 \leq SO_4 \leq 2.00$	V	0.45	4,500
S3	Option 1	SO_4>2.00	V+Pozzolan or Slag	0.45	4,500
	Option 2		V	0.40	5,000

[1] Maximum water to cement ratio limits do not apply to lightweight concrete

Utility Trench Backfill

Utility trenches should be properly backfilled in accordance with the requirements of the City of Indio and the latest edition of the *Standard Specifications for Public Works Construction* (Greenbook). Pipes should be bedded with well graded crushed rock or clean sands (Sand Equivalent greater than 30) to a depth of at least 1 foot over the pipe. <u>The use of well graded crushed rock is only acceptable if used in conjunction with filter fabric to prevent the gravel from having direct contact with soil.</u> The remainder of the trench backfill may be derived from onsite soil or approved import soil, compacted as necessary, until the required compaction is obtained. The use of 2-sack slurry and controlled low strength material (CLSM) are also acceptable as backfill. However, consideration should be given to the possibility of differential settlement where the slurry ends and earthen backfill begins. These transitions should be minimized, and additional stabilization should be considered at these transitions

Trench excavation bottoms should be observed and approved in writing by a representative of Geocon, prior to placing bedding materials, fill, gravel, or concrete.

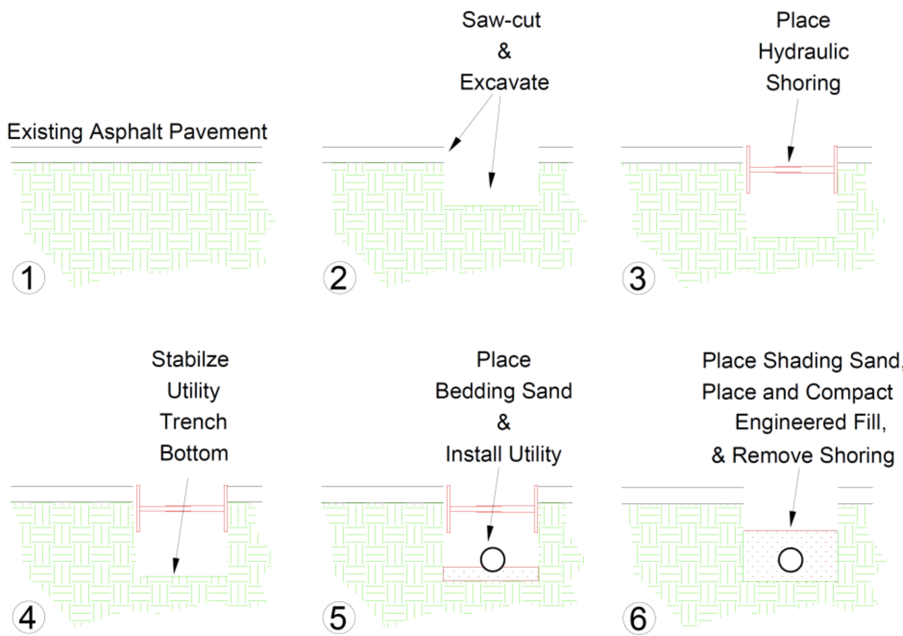
Utility trench backfill should be placed in layers no thicker than will allow for adequate bonding and compaction. Utility backfill should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density and moisture conditioned at 0 to 2 percent above optimum moisture content as determined by ASTM D1557. Backfill at the finish subgrade elevation of new pavements should be compacted to at least 95 percent of the maximum dry density. Backfill materials placed below the recommended moisture content may require additional moisture conditioning prior to placing additional fill.
Recommendations for *Temporary Excavations* and *Shoring* are provided in the following section.

Temporary Excavations and Shoring

The recommendations included herein are provided for stable excavations. It is the responsibility of the contractor and their competent person to ensure all excavations, temporary slopes and trenches are properly constructed and maintained in accordance with applicable OSHA guidelines in order to maintain safety and the stability of the excavations and adjacent improvements. These excavations should not be allowed to become saturated or to dry out. Surcharge loads should not be permitted to a distance equal to the height of the excavation from the top of the excavation. The top of the excavation should be a minimum of 15 feet from the edge of existing improvements. Excavations steeper than those recommended or closer than 15 feet from an existing surface improvement should be shored in accordance with applicable OSHA codes and regulations.

The stability of the excavations is dependent on the design and construction of the shoring system and site conditions. Therefore, Geocon cannot be responsible for site safety and the stability of the proposed excavations.

To protect existing improvements, hydraulic trench shoring may be implemented. The excavation may be conducted adjacent to existing improvements but should not extend below the surcharge area of the existing improvement until the shoring is installed. The surcharge area may be defined by a 1:1 project down and away from the bottom of an existing improvement. Once shoring is installed, the excavation can be completed and the utilities can be installed. See illustration below.



Concrete Flatwork

Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations herein assuming the subgrade materials possess an Expansion Index of 50 or less. Subgrade soils should be compacted to 90 percent of the maximum dry density at a moisture content of 0 to 2 percent above optimum as determined by ASTM D1557. Slab panels should be a minimum of 4 inches thick and when in excess of 8 feet square should be reinforced with 6x6 W2.9/W2.9 (6x6 6/6) welded wire mesh to reduce the potential for cracking. In addition, concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the earthwork section prior to concrete placement. Subgrade soil should be properly compacted and the moisture content of subgrade soil should be verified prior to placing concrete. Base materials will not be required below concrete improvements.

Even with the incorporation of the recommendations of this report, the exterior concrete flatwork has a potential to experience some uplift due to expansive soil beneath grade or differential settlement. The steel reinforcement should overlap continuously in flatwork to reduce the potential for vertical offsets within flatwork.

The recommendations presented herein are intended to reduce the potential for cracking of exterior slabs as a result of differential movement. However, even with the incorporation of the recommendations presented herein, concrete slabs will still crack. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints and proper concrete placement and curing. Crack control joints should be spaced at intervals no greater than 12 feet. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

Drainage and Moisture Protection

Adequate drainage is imperative to reduce the potential for premature pavement deterioration, differential soil movement, soil expansion, erosion, subsurface seepage, and to maintain the integrity of exposed trench sidewalls and bottoms during construction. Care should be taken to ensure surface drainage is directed toward appropriate drainage facilities.

To reduce the potential for water from landscaped/irrigated/unpaved areas migrating under pavement into the base section, consideration should be given to using full-depth curbs or similar cut-off features in areas where pavement abuts irrigated landscaping or unpaved areas. The full-depth curbs should be at least 4 inches wide and extend at least 6 inches or more into the soil subgrade beneath the base section. In addition, drop-inlets with weep-holes at the approximate base-subgrade interface may be used to encourage accumulated water to drain from beneath the pavement.

Under no circumstances should water be allowed to pond within trenches. Surface drainage should be directed away from the top of open excavations through the use of best management practices utilized by the contractor. The contractor should utilize dewatering measures to mitigate ponding water within trenches, as needed.

The conclusions and recommendations presented in this limited pavement evaluation are based on our observations, limited investigation (coring), and our geotechnical experience. Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices used in the site area at this time. No warranty is provided, express or implied.

Please contact us if you have any questions regarding this report or if we may be of further service.

Respectfully Submitted,

GEOCON WEST, INC.

Luke C. Weidman
GIT 891

Andrew T. Shoashekan
PE 93940

Lisa A. Battiato
CEG 2316

LCW:ATS:LAB:hd

Attachments: LIMITATIONS AND UNIFORMITY OF CONDITIONS
LIST OF REFERENCES

MAPS AND ILLUSTRATIONS
Figure 1, Vicinity Map
Figure 2, Site Map

APPENDIX A
FIELD EXPLORATION
Figures A-1 through A-16, Logs of Cores
Figures A-17 through A-28, Logs of Borings
Figures A-29 through A-40, Percolation Test Data

APPENDIX B
LABORATORY TESTING
Figures B-1 through B-3, Compaction Characteristics Using Modified Effort Test Results
Figure B-4, Soluble Sulfate Test Results
Figures B-5 through B-16, Grain Size Distribution
Figures B-17, Direct Shear Test Results

LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report pertain only to the sites investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon West, Inc. should be notified so that supplemental recommendations can be given. An evaluation of liquefaction potential, and an evaluation or identification of the potential presence of hazardous materials, was not part of the scope of services provided by Geocon West, Inc.

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

The findings of this report are valid as of the date of this report. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

REFERENCES

1. Albert A. Webb, 2020, *Avenue 50 Conceptual Plan*, 7-Sheets, dated April 22.

2. American Concrete Institute (ACI), 2019, *Building Code Requirements for Structural Concrete*, ACI 318-19, Report by ACI Committee 318.

3. American Concrete Institute, 2008, Report 330-21, ACI 330-21 *Commercial Concrete Parking Lots and Site Paving Design and Construction – Guide*, undated.

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5. California Department of Transportation, 2018, *Standard Specifications.*

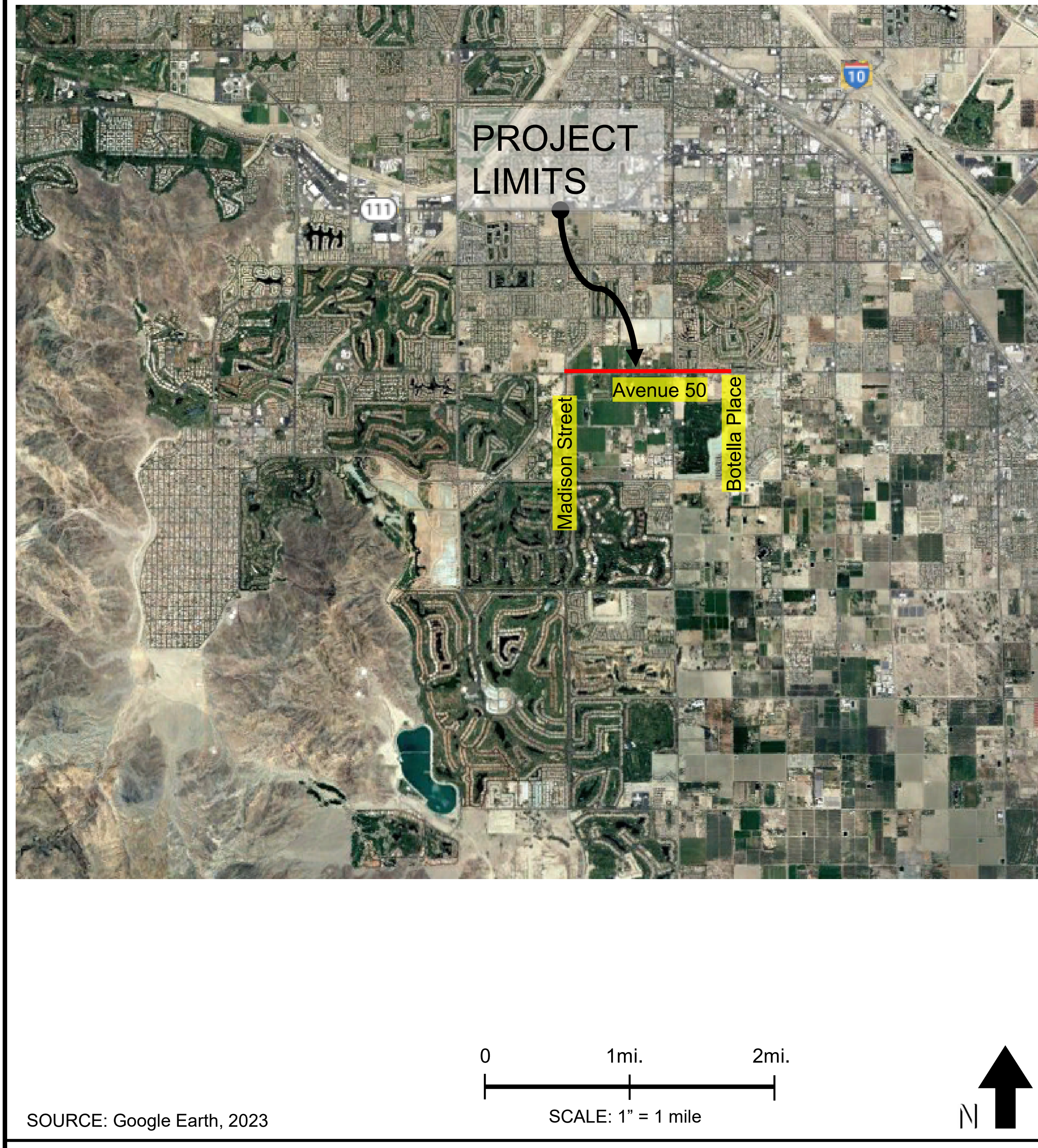
6. California Department of Water Resources, *Water Data Library*, wdl.water.ca.gov/waterlibrary, accessed July 2023.

7. Dibblee, T.W. and Minch, J.A., 2008, *Geologic Map of the Palm Desert and Coachella 15-Minute Quadrangles, Riverside County, California,* DF-373, Scale: 1" = 62,500.

8. Google, Inc., *Google Earth Pro*, accessed June 2023.

9. Indio, 2016, *Street Structural Section Design Requirements*, Standard Plan No. 171, dated May 18.

10. Public Works Standards, Inc., 2022, *"Greenbook" Standard Specifications for Public Works Construction*, Published by BNI Building News.



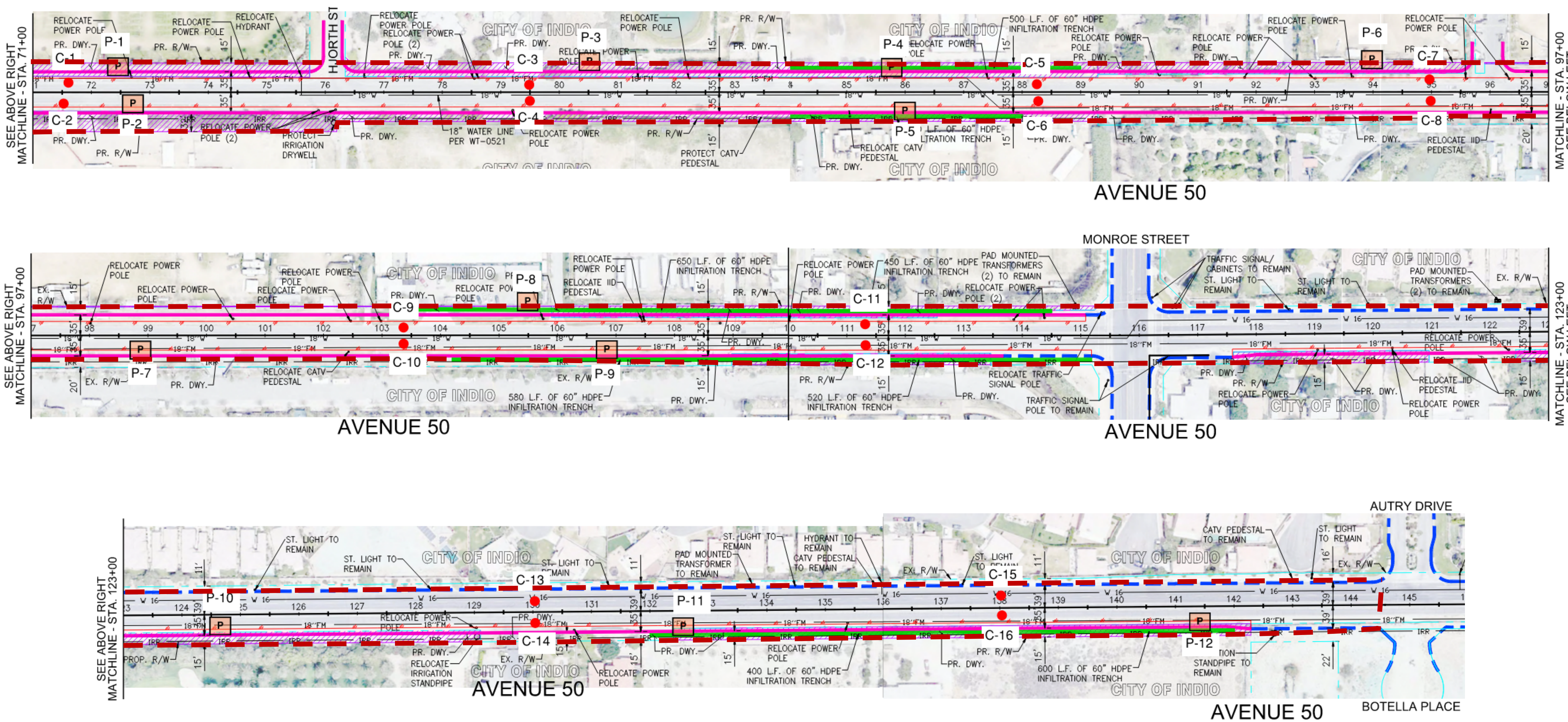
SOURCE: Google Earth, 2023

VICINITY MAP

GEOCON
WEST, INC.
GEOTECHNICAL ENVIRONMENTAL MATERIALS
78-075 MAIN STREET, SUITE G-203, LA QUINTA, CA 92253
PHONE 760-565-2002 FAX 951-304-2392

AVENUE 50 WIDENING
MADISON STREET TO BOTELLA PLACE
CITY OF INDIO PROJECT ST2204
INDIO, CALIFORNIA

LCW			SEPT 2023	PROJECT NO. T3021-22-02	FIG. 1



GEOCON LEGEND

Locations are approximate

C-16 ……. BORING LOCATION

P-12 P ……. PERCOLATION TEST LOCATION

……. PROJECT LIMITS

1" = 100'

100 0 100 200 300

N

Source: Albert A. Webb, *Avenue 50 Conceptual Plan*, dated April 22, 2020.

GEOCON WEST, INC.
GEOTECHNICAL ENVIRONMENTAL MATERIALS
78-075 MAIN STREET, SUITE G-203, LA QUINTA, CA 92253
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SITE MAP

AVENUE 50 WIDENING
MADISON STREET TO BOTELLA PLACE
CITY OF INDIO PROJECT ST2204
INDIO, CALIFORNIA

LCW			SEPT 2023	PROJECT NO. T3021-22-02	FIG. 2

APPENDIX A

APPENDIX A

EXPLORATORY EXCAVATIONS

Our subsurface investigation was conducted on June 1, 2023, by performing sixteen locations (Cores C-1 through C-16) and drilling twelve percolation borings (Borings P-1 through P-12) along Avenue 50, between Madison Street and Botella Place. Borings were backfilled with soil cuttings and were capped with asphalt concrete cold-patch; patched asphalt concrete was rig-tamped. The approximate location of the exploratory borings are depicted on the *Site Map*, Figure 2.

We collected bulk and relatively undisturbed samples from the borings by driving a 3-inch O. D., California Modified Sampler into the “undisturbed” soil mass with blows from a 140-pound hammer auto-hammer falling 30 inches. The California Modified Sampler was equipped with 1-inch high by 2$^{3}/_{8}$-inch inside diameter brass sampler rings to facilitate removal and testing. Relatively undisturbed samples and bulk samples of disturbed soils were transported to our laboratory for testing. The type of sample is noted on the boring logs.

The samplers were driven 18 inches into the bottom of the excavations. Blow counts are recorded for every 6 inches the sampler is driven. The penetration resistances shown on the boring logs are shown in terms of blows per foot. The values indicated on the boring logs are the sum of the last 12 inches of the sampler if driven 18 inches. If the sampler was not driven for 18 inches, an approximate value is calculated in term of blows per foot or the final 6-inch interval is reported. These values are not to be taken as N-values, as adjustment factors have not been applied.

The soil conditions encountered in the borings were visually examined, classified, and logged in general accordance with the Unified Soil Classification System (USCS). Figures A-1 through A-28 present the logs of our exploratory cores and percolation borings, which depict the soil and geologic conditions encountered and the depth at which samples were obtained. Infiltration test results are included in A-29 through A-40.

PROJECT NO. T3021-22-02

CORE C-1

ELEV. (MSL.) **17** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 7.5" AC, 6" Base			
	C-1@SG			SM	**UNDOCUMENTED FILL (afu)** Silty SAND, medium dense, slightly moist, grayish brown; fine to medium sand, 80% relative compaction	29		
2								
	C-1@3'				- Becomes loose, dark grayish brown	14	89.6	9.0
4								

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/1/2023

Figure A-1,
Log of Core C-1, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

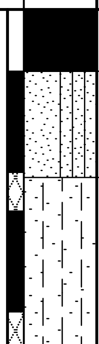
NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T3021-22-02

CORE C-2

ELEV. (MSL.) **14** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**



DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 5" AC, 6" Base			
2	C-2@0-5 C-2@SG			SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, olive grayish brown; fine to medium sand	17		
4	C-2@3'			SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Silty SAND, loose, moist, dark grayish brown; fine to medium sand; micaceous; laminated, 82% relative compaction	12	91.7	7.4

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/2/2023

**Figure A-2,
Log of Core C-2, Page 1 of 1**

BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

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GEOCON

CORE C-3

ELEV. (MSL.) **14** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 5.5" AC, 8" Base			
	C-3@0-5 C-3@SG			SM	**UNDOCUMENTED FILL (afu)** Silty SAND, medium dense, slightly moist, brown; fine to medium sand, 87% relative compaction	27		
2								
	C-3@3'					16	98.5	1.7
4					- Becomes loose, grayish brown			

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/1/2023

Figure A-3,
Log of Core C-3, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T3021-22-02

CORE C-4

ELEV. (MSL.) **12** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 4.5" AC, 7" Base			
2	C-4@SG			SM	**UNDOCUMENTED FILL (afu)** Silty SAND, medium dense, slightly moist, brown; fine to medium sand; little coarse sand	32		
4	C-4@3'			SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Silty SAND, medium dense, slightly moist to moist, dark grayish brown; fine to medium sand; trace coarse sand; vague laminations; oxidation staining, 79% relative compaction	14	88.6	5.5
					Total Depth = 5' Groundwater not encountered Penetration resistance for 140-lb hammer falling 30 inches by auto hammer Backfilled with cuttings and capped with cold patch 6/8/2023			

Figure A-4,
Log of Core C-4, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T3021-22-02

CORE C-5

ELEV. (MSL.) **12** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 5" AC, 6" Base			
	C-5@SG			SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand	31		
2								
	C-5@3'			SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Silty SAND, medium dense, slightly moist to moist, dark grayish brown; fine to medium sand; trace coarse sand; vague laminations; oxidation staining	31		
4								

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/1/2023

Figure A-5,
Log of Core C-5, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

CORE C-6

ELEV. (MSL.) **11** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 4.5" AC, 6" Base			
	C-6@0-5 C-6@SG			SM	**UNDOCUMENTED FILL (afu)** Silty SAND, medium dense, slightly moist, grayish brown; fine to medium sand	32	109.9	3.0
2								
	C-6@3'				- Some mica	18		
4								

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/9/2023

Figure A-6,
Log of Core C-6, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CORE C-7

ELEV. (MSL.) **9** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 5" AC, 6" Base			
2	C-7@0-5 C-7@SG			SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand	48	108.3	4.7
4	C-7@3'			SP-SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Poorly graded SAND with silt, medium dense, slightly moist to moist, dark grayish brown; fine to medium sand; trace coarse sand; vague laminations; oxidation staining	19		

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/1/2023

Figure A-7,
Log of Core C-7, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CORE C-8

ELEV. (MSL.) **8** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 3.5" AC, 5" Base			
	C-8@SG			SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand	49	117.5	2.9
2								
	C-8@3'				- Some mica; dark staining	18		
4								

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/9/2023

Figure A-8,
Log of Core C-8, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T3021-22-02

CORE C-9

ELEV. (MSL.) **2** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 6" AC, 6" Base			
	C-9@SG			SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, light brown; fine to medium sand	35	102.6	4.0
2								
	C-9@3'					26		
4								

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/1/2023

Figure A-9,
Log of Core C-9, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T3021-22-02

CORE C-10

ELEV. (MSL.) **1** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 4.5" AC, 5" Base			
	C-10@0-5 C-10@SG			SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand	34	103.2	4.7
2								
	C-10@3'			SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Silty SAND, medium dense, slightly moist, grayish brown; fine to medium sand; micaceous	29		
4								

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/9/2023

Figure A-10,
Log of Core C-10, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T3021-22-02

CORE C-11

ELEV. (MSL.) **0** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 5.5" AC, 6" Base			
2	C-11@0-5 C-11@SG			SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, loose, slightly moist, grayish brown; fine to medium sand	14	103.2	4.9
4	C-11@3'			SP-SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Poorly graded SAND with silt, medium dense, moist, dark grayish brown; fine to medium sand; some mica; roots; oxidation staining	37		

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/1/2023

Figure A-11,
Log of Core C-11, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... DISTURBED OR BAG SAMPLE
- ... STANDARD PENETRATION TEST
- ... CHUNK SAMPLE
- ... DRIVE SAMPLE (UNDISTURBED)
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T3021-22-02

CORE C-12

ELEV. (MSL.) **0** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 5" AC, 6" Base			
	C-12@SG			SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, dark grayish brown; fine to medium sand	21	98.4	9.2
2				SP-SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Poorly graded SAND with silt, medium dense, slightly moist, dark grayish brown; fine to medium sand; vaguely laminated; oxidation staining			
	C-12@3'					25	103.8	10.6
4				ML	SILT with sand, stiff, moist to wet, dark brown; fine to medium sand			

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/9/2023

Figure A-12,
Log of Core C-12, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T3021-22-02

CORE C-13

ELEV. (MSL.) **-3** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 7" AC, 5" Base			
	C-13@SG			SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, dark grayish brown; fine to medium sand	29	106.5	5.3
2								
	C-13@3'				- Becomes micaceous	29	103.7	3.3
4								

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/1/2023

Figure A-13,
Log of Core C-13, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T3021-22-02

CORE C-14

ELEV. (MSL.) **-3** DATE COMPLETED **6/1/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				AC	**ASPHALT CONCRETE** 5" AC, 5" Base			
	C-14@0-5 C-14@SG			SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, loose, slightly moist, grayish brown; fine to medium sand	12	100.0	4.1
2								
	C-14@3'			SP-SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Poorly graded SAND with silt, medium dense, slightly moist, dark grayish brown; fine to medium sand; micaceous; vaguely laminated	19	97.6	10.3
4								

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/9/2023

Figure A-14,
Log of Core C-14, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T3021-22-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	CORE C-15 ELEV. (MSL.) -7 DATE COMPLETED 6/1/23 EQUIPMENT CME 75 BY: Weidman	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				AC	**ASPHALT CONCRETE** 5.5" AC, 6" Base			
2	C-15@0-5 C-15@SG			SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand	44	102.3	3.6
4	C-15@3'				- Becomes medium dense; micaceous	36	106.6	4.1
					Total Depth = 5' Groundwater not encountered Penetration resistance for 140-lb hammer falling 30 inches by auto hammer Backfilled with cuttings and capped with cold patch 6/1/2023			

Figure A-15,
Log of Core C-15, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T3021-22-02

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	CORE C-16 ELEV. (MSL.) -7 DATE COMPLETED 6/1/23 EQUIPMENT CME 75 BY: Weidman	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				AC	**ASPHALT CONCRETE** 4" AC, 5" Base			
	C-16@SG			SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand	25	108.2	2.6
2								
	C-16@3'			SP-SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Poorly graded SAND with silt, medium dense, slightly moist, dark grayish brown; fine to medium sand; micaceous; vaguely laminated - Lens of silt, dark grayish brown	22	105.7	5.8
4								

Total Depth = 5'
Groundwater not encountered
Penetration resistance for 140-lb hammer falling 30 inches by auto hammer
Backfilled with cuttings and capped with cold patch 6/9/2023

Figure A-16,
Log of Core C-16, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T3021-22-02

BORING P-1

ELEV. (MSL.) 17 DATE COMPLETED 6/2/23

EQUIPMENT CME 75 BY: Weidman

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand			
2								
4								
6				SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Silty SAND, medium dense, moist, grayish brown; fine to medium sand			
8								
	P-1@9-10'							
10					Total Depth = 10' Groundwater not encountered Drilled and percolation test set 6/2/23 Performed percolation test and backfilled with cuttings 6/13/23			

Figure A-17,
Log of Boring P-1, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T3021-22-02

BORING P-2

ELEV. (MSL.) **14** DATE COMPLETED **6/5/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand			
2 – 4					- Trace gravel			
6 – 8				ML	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** SILT with sand,stiff, moist, dark grayish brown; fine to medium sand			
9 – 10	P-2@9-10'							
10					Total Depth = 10' Groundwater not encountered Drilled and percolation test set 6/5/23 Performed percolation test and backfilled with cuttings 6/13/23			

Figure A-18,
Log of Boring P-2, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING P-3

ELEV. (MSL.) **14** DATE COMPLETED **6/2/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, dry, grayish brown; fine to medium sand			
2								
4					- Brief gravel			
6								
				SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Silty SAND, medium dense, moist, dark grayish brown; fine sand			
8								
	P-3@9-10'							
10					Total Depth = 10' Groundwater not encountered Drilled and percolation test set 6/2/23 Performed percolation test and backfilled with cuttings 6/13/23			

Figure A-19,
Log of Boring P-3, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

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PROJECT NO. T3021-22-02

BORING P-4

ELEV. (MSL.) 13 DATE COMPLETED 6/5/23

EQUIPMENT CME 75 BY: Weidman

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand			
2								
4								
6				SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Silty SAND, medium dense, moist, dark grayish brown; fine to medium sand			
8								
	P-4@9-10'							
10					Total Depth = 10' Groundwater not encountered Drilled and percolation test set 6/5/23 Performed percolation test and backfilled with cuttings 6/12/23			

Figure A-20,
Log of Boring P-4, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING P-5

ELEV. (MSL.) **12** DATE COMPLETED **6/5/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand			
2								
4								
5				SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Silty SAND, medium dense, moist, dark grayish brown; fine to medium sand			
6								
8								
9	P-5@9-10'							
10					Total Depth = 10' Groundwater not encountered Drilled and percolation test set 6/5/23 Performed percolation test and backfilled with cuttings 6/12/23			

Figure A-21,
Log of Boring P-5, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

BORING P-6

ELEV. (MSL.) 10 DATE COMPLETED 6/2/23

EQUIPMENT CME 75 BY: Weidman

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand			
2								
4								
				SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Silty SAND, medium dense, slightly moist, dark grayish brown; fine to medium sand			
6								
8								
	P-6@9-10'							
10								

Total Depth = 10'
Groundwater not encountered
Drilled and percolation test set 6/2/23
Performed percolation test and backfilled with cuttings 6/14/23

Figure A-22,
Log of Boring P-6, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T3021-22-02

BORING P-7

ELEV. (MSL.) 5 DATE COMPLETED 6/5/23

EQUIPMENT CME 75 BY: Weidman

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, moist, dark grayish brown; fine to medium sand			
2								
4								
				SP-SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Poorly graded SAND with silt, medium dense, moist, dark grayish brown; fine to medium sand			
6								
8								
	P-7@9-10'							
10					Total Depth = 10' Groundwater not encountered Drilled and percolation test set 6/5/23 Performed percolation test and backfilled with cuttings 6/14/23			

Figure A-23,
Log of Boring P-7, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS
- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING P-8

ELEV. (MSL.) 2 DATE COMPLETED 6/2/23

EQUIPMENT CME 75 BY: Weidman

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to coarse sand			
5				SP-SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Poorly graded SAND with silt, medium dense, slightly moist, dark grayish brown; fine to medium sand			
9	P-8@9-10'							
10					Total Depth = 10' Groundwater not encountered Drilled and percolation test set 6/2/23 Performed percolation test and backfilled with cuttings 6/14/23			

Figure A-24,
Log of Boring P-8, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

BORING P-9

ELEV. (MSL.) 3 DATE COMPLETED 6/5/23

EQUIPMENT CME 75 BY: Weidman

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand			
2								
4								
5				SP-SM	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Poorly graded SAND with silt, medium dense, slightly moist, dark grayish brown; fine to medium sand			
6								
8								
9	P-9@9-10'							
10					Total Depth = 10' Groundwater not encountered Drilled and percolation test set 6/5/23 Performed percolation test and backfilled with cuttings 6/14/23			

Figure A-25,
Log of Boring P-9, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T3021-22-02

BORING P-10

ELEV. (MSL.) **-1** DATE COMPLETED **6/5/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand			
2								
					- Trace gravel			
4								
6				SP	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Poorly graded SAND, medium dense, slightly moist, dark grayish brown; fine to medium sand			
8								
	P-10@9-10							
10					Total Depth = 10' Groundwater not encountered Drilled and percolation test set 6/5/23 Performed percolation test and backfilled with cuttings 6/12/23			

Figure A-26,
Log of Boring P-10, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T3021-22-02

BORING P-11

ELEV. (MSL.) -4 DATE COMPLETED 6/5/23

EQUIPMENT CME 75 BY: Weidman

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand			
5				SP	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Poorly graded SAND, medium dense, moist, dark grayish brown; fine to medium sand			
9	P-11@9-10							
10					Total Depth = 10' Groundwater not encountered Drilled and percolation test set 6/5/23 Performed percolation test and backfilled with cuttings 6/14/23			

Figure A-27,
Log of Boring P-11, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T3021-22-02

BORING P-12

ELEV. (MSL.) **-8** DATE COMPLETED **6/5/23**

EQUIPMENT **CME 75** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SP-SM	**UNDOCUMENTED FILL (afu)** Poorly graded SAND with silt, medium dense, slightly moist, grayish brown; fine to medium sand			
2								
4								
6				SP	**ALLUVIAL SAND AND CLAY OF VALLEY AREAS (Qa)** Poorly graded SAND, medium dense, moist, dark grayish brown; fine to medium sand			
8								
	P-12@9-10							
10					Total Depth = 10' Groundwater not encountered Drilled and percolation test set 6/5/23 Performed percolation test and backfilled with cuttings 6/14/23			

Figure A-28,
Log of Boring P-12, Page 1 of 1

BORING LOGS.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PERCOLATION TEST REPORT

Project Name:	Ave 50 Madison to Botella	**Project No.:**	T3021-22-02
Test Hole No.:	P-1	**Date Excavated:**	6/2/2023
Length of Test Pipe:	120.0 inches	**Soil Classification:**	SM
Height of Pipe above Ground:	0.0 inches	**Presoak Date:**	6/12/2023
Depth of Test Hole:	120.0 inches	**Perc Test Date:**	6/13/2023
Check for Sandy Soil Criteria Tested by:	RF	**Percolation Tested by:**	RF

Water level measured from BOTTOM of hole

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	7:00 AM 7:25 AM	25	25	18.0	0.0	18.0	1.4
2	7:25 AM 7:50 AM	25	50	20.4	0.0	20.4	1.2

Soil Criteria: Sandy

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	7:50 AM 8:00 AM	10	10	21.4	1.3	20.0	0.5
2	8:00 AM 8:10 AM	10	20	27.6	3.7	23.9	0.4
3	8:10 AM 8:20 AM	10	30	32.2	6.1	26.0	0.4
4	8:20 AM 8:30 AM	10	40	29.9	7.8	22.1	0.5
5	8:30 AM 8:40 AM	10	50	30.2	15.6	14.6	0.7
6	8:40 AM 8:50 AM	10	60	35.9	18.4	17.5	0.6

Infiltration Rate (in/hr):	7.2
Radius of test hole (in):	4
Average Head (in):	27.1

Figure A-29

PERCOLATION TEST REPORT

Project Name:	Ave 50 Madison to Botella	**Project No.:**	T3021-22-02
Test Hole No.:	P-2	**Date Excavated:**	6/2/2023
Length of Test Pipe:	120.0 inches	**Soil Classification:**	SM
Height of Pipe above Ground:	0.0 inches	**Presoak Date:**	6/12/2023
Depth of Test Hole:	120.0 inches	**Perc Test Date:**	6/13/2023
Check for Sandy Soil Criteria Tested by:	RF	**Percolation Tested by:**	RF

Water level measured from BOTTOM of hole

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	7:05 AM 7:30 AM	25	25	16.8	0.0	16.8	1.5
2	7:30 AM 7:55 AM	25	50	20.4	0.0	20.4	1.2

Soil Criteria: Sandy

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:05 AM 9:15 AM	10	10	21.8	7.4	14.4	0.7
2	9:15 AM 9:25 AM	10	20	27.5	9.6	17.9	0.6
3	9:25 AM 9:35 AM	10	30	29.5	13.3	16.2	0.6
4	9:35 AM 9:45 AM	10	40	30.0	16.7	13.3	0.8
5	9:45 AM 9:55 AM	10	50	31.8	18.4	13.4	0.7
6	9:55 AM 10:05 AM	10	60	33.5	19.1	14.4	0.7

Infiltration Rate (in/hr):	6.1
Radius of test hole (in):	4
Average Head (in):	26.3

Figure A-30

PERCOLATION TEST REPORT

Project Name:	Ave 50 Madison to Botella	**Project No.:**	T3021-22-02
Test Hole No.:	P-3	**Date Excavated:**	6/2/2023
Length of Test Pipe:	120.0 inches	**Soil Classification:**	SM
Height of Pipe above Ground:	0.0 inches	**Presoak Date:**	6/12/2023
Depth of Test Hole:	120.0 inches	**Perc Test Date:**	6/13/2023
Check for Sandy Soil Criteria Tested by:	RF	**Percolation Tested by:**	RF

Water level measured from BOTTOM of hole

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:00 AM 9:25 AM	25	25	21.6	0.0	21.6	1.2
2	9:25 AM 9:50 AM	25	50	24.0	0.0	24.0	1.0

Soil Criteria: Sandy

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:50 AM 10:00 AM	10	10	25.1	0.4	24.7	0.4
2	10:00 AM 10:10 AM	10	20	34.3	0.4	34.0	0.3
3	10:10 AM 10:20 AM	10	30	35.3	6.7	28.6	0.4
4	10:20 AM 10:30 AM	10	40	37.1	8.9	28.2	0.4
5	10:30 AM 10:40 AM	10	50	37.9	14.8	23.2	0.4
6	10:40 AM 10:50 AM	10	60	39.5	19.1	20.4	0.5

Infiltration Rate (in/hr):	7.8
Radius of test hole (in):	4
Average Head (in):	29.3

Figure A-31

PERCOLATION TEST REPORT

Project Name:	Ave 50 Madison to Botella	**Project No.:**	T3021-22-02
Test Hole No.:	P-4	**Date Excavated:**	6/2/2023
Length of Test Pipe:	120.0 inches	**Soil Classification:**	SM
Height of Pipe above Ground:	0.0 inches	**Presoak Date:**	6/11/2023
Depth of Test Hole:	120.0 inches	**Perc Test Date:**	6/12/2023
Check for Sandy Soil Criteria Tested by:	RF	**Percolation Tested by:**	RF

Water level measured from BOTTOM of hole

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:05 AM 9:30 AM	25	25	15.6	0.0	15.6	1.6
2	9:30 AM 9:55 AM	25	50	19.2	0.0	19.2	1.3

Soil Criteria: Sandy

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:55 AM 10:05 AM	10	10	23.4	0.0	23.4	0.4
2	10:05 AM 10:15 AM	10	20	31.7	0.1	31.6	0.3
3	10:15 AM 10:25 AM	10	30	33.4	0.6	32.8	0.3
4	10:25 AM 10:35 AM	10	40	36.0	1.1	34.9	0.3
5	10:35 AM 10:45 AM	10	50	32.2	0.0	32.2	0.3
6	10:45 AM 10:55 AM	10	60	37.1	0.0	37.1	0.3

Infiltration Rate (in/hr):	21.7
Radius of test hole (in):	4
Average Head (in):	18.5

Figure A-32

PERCOLATION TEST REPORT							
Project Name:		Ave 50 Madison to Botella			**Project No.:**		T3021-22-02
Test Hole No.:		P-5			**Date Excavated:**		6/2/2023
Length of Test Pipe:			120.0	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			0.0	inches	**Presoak Date:**		6/11/2023
Depth of Test Hole:			120.0	inches	**Perc Test Date:**		6/12/2023
Check for Sandy Soil Criteria Tested by:				RF	**Percolation Tested by:**		RF
Water level measured from BOTTOM of hole							
Sandy Soil Criteria Test							
Trial No.	**Time**	**Time Interval (min)**	**Total Elapsed Time (min)**	**Initial Water Level (in)**	**Final Water Level (in)**	**Δ in Water Level (in)**	**Percolation Rate (min/inch)**
1	11:00 AM 11:25 AM	25	25	13.2	0.0	13.2	1.9
2	11:25 AM 11:50 AM	25	50	15.6	0.0	15.6	1.6
		Soil Criteria: Sandy					
		Percolation Test					
Reading No.	**Time**	**Time Interval (min)**	**Total Elapsed Time (min)**	**Initial Water Head (in)**	**Final Water Head (in)**	**Δ in Water Level (in)**	**Percolation Rate (min/inch)**
1	11:50 AM 12:00 PM	10	10	16.7	1.1	15.6	0.6
2	12:00 PM 12:10 PM	10	20	20.3	0.1	20.2	0.5
3	12:10 PM 12:20 PM	10	30	21.6	0.0	21.6	0.5
4	12:20 PM 12:30 PM	10	40	22.7	0.0	22.7	0.4
5	12:30 PM 12:40 PM	10	50	22.8	0.8	22.0	0.5
6	12:40 PM 12:50 PM	10	60	23.0	3.0	20.0	0.5
Infiltration Rate (in/hr):			16.0				
Radius of test hole (in):			4				**Figure A-33**
Average Head (in):			13.0				

PERCOLATION TEST REPORT

Project Name:	Ave 50 Madison to Botella	**Project No.:**	T3021-22-02
Test Hole No.:	P-6	**Date Excavated:**	6/5/2023
Length of Test Pipe:	120.0 inches	**Soil Classification:**	SM
Height of Pipe above Ground:	0.0 inches	**Presoak Date:**	6/13/2023
Depth of Test Hole:	120.0 inches	**Perc Test Date:**	6/14/2023
Check for Sandy Soil Criteria Tested by:	RF	**Percolation Tested by:**	RF

Water level measured from BOTTOM of hole

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	11:05 AM 11:30 AM	25	25	12.0	0.0	12.0	2.1
2	11:30 AM 11:55 AM	25	50	13.2	0.0	13.2	1.9

Soil Criteria: Sandy

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	11:55 AM 12:05 PM	10	10	17.5	0.0	17.5	0.6
2	12:05 PM 12:15 PM	10	20	16.7	0.2	16.4	0.6
3	12:15 PM 12:25 PM	10	30	25.0	1.7	23.3	0.4
4	12:25 PM 12:35 PM	10	40	25.8	1.6	24.2	0.4
5	12:35 PM 12:45 PM	10	50	25.3	2.2	23.2	0.4
6	12:45 PM 12:55 PM	10	60	27.2	1.8	25.4	0.4

Infiltration Rate (in/hr):	18.5
Radius of test hole (in):	4
Average Head (in):	14.5

Figure A-34

PERCOLATION TEST REPORT

Project Name:	Ave 50 Madison to Botella	**Project No.:**	T3021-22-02
Test Hole No.:	P-7	**Date Excavated:**	6/5/2023
Length of Test Pipe:	120.0 inches	**Soil Classification:**	SP-SM
Height of Pipe above Ground:	0.0 inches	**Presoak Date:**	6/13/2023
Depth of Test Hole:	120.0 inches	**Perc Test Date:**	6/14/2023
Check for Sandy Soil Criteria Tested by:	RF	**Percolation Tested by:**	RF

Water level measured from BOTTOM of hole

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	1:00 PM 1:25 PM	25	25	24.0	0.0	24.0	1.0
2	1:25 PM 1:50 PM	25	50	24.0	0.0	24.0	1.0

Soil Criteria: Sandy

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	1:55 PM 2:05 PM	10	10	28.9	0.0	28.9	0.3
2	2:05 PM 2:15 PM	10	20	33.8	0.1	33.7	0.3
3	2:15 PM 2:25 PM	10	30	36.4	0.0	36.4	0.3
4	2:25 PM 2:35 PM	10	40	34.2	0.0	34.2	0.3
5	2:35 PM 2:45 PM	10	50	29.4	0.0	29.4	0.3
6	2:45 PM 2:55 PM	10	60	38.9	0.0	38.9	0.3

Infiltration Rate (in/hr):	21.8
Radius of test hole (in):	4
Average Head (in):	19.4

Figure A-35

PERCOLATION TEST REPORT

Project Name:	Ave 50 Madison to Botella	**Project No.:**	T3021-22-02
Test Hole No.:	P-8	**Date Excavated:**	6/5/2023
Length of Test Pipe:	120.0 inches	**Soil Classification:**	SP-SM
Height of Pipe above Ground:	0.0 inches	**Presoak Date:**	6/13/2023
Depth of Test Hole:	120.0 inches	**Perc Test Date:**	6/14/2023
Check for Sandy Soil Criteria Tested by:	RF	**Percolation Tested by:**	RF

Water level measured from BOTTOM of hole

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	1:00 PM 1:25 PM	25	25	12.0	0.0	12.0	2.1
2	1:25 PM 1:50 PM	25	50	12.0	0.0	12.0	2.1

Soil Criteria: Sandy

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	1:55 PM 2:05 PM	10	10	13.4	0.4	13.1	0.8
2	2:05 PM 2:15 PM	10	20	18.7	1.3	17.4	0.6
3	2:15 PM 2:25 PM	10	30	19.7	1.7	18.0	0.6
4	2:25 PM 2:35 PM	10	40	21.1	0.0	21.1	0.5
5	2:35 PM 2:45 PM	10	50	22.6	0.6	22.0	0.5
6	2:45 PM 2:55 PM	10	60	21.5	0.5	21.0	0.5

Infiltration Rate (in/hr):	19.4
Radius of test hole (in):	4
Average Head (in):	11.0

Figure A-36

PERCOLATION TEST REPORT

Project Name:	Ave 50 Madison to Botella	**Project No.:**	T3021-22-02
Test Hole No.:	P-9	**Date Excavated:**	6/5/2023
Length of Test Pipe:	120.0 inches	**Soil Classification:**	SP-SM
Height of Pipe above Ground:	0.0 inches	**Presoak Date:**	6/13/2023
Depth of Test Hole:	120.0 inches	**Perc Test Date:**	6/14/2023
Check for Sandy Soil Criteria Tested by:	RF	**Percolation Tested by:**	RF

Water level measured from BOTTOM of hole

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	7:00 AM 7:25 AM	25	25	12.0	0.0	12.0	2.1
2	7:25 AM 7:50 AM	25	50	12.0	0.0	12.0	2.1

Soil Criteria: Sandy

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	7:50 AM 8:00 AM	10	10	15.0	0.1	14.9	0.7
2	8:00 AM 8:10 AM	10	20	25.0	0.2	24.7	0.4
3	8:10 AM 8:20 AM	10	30	24.6	0.1	24.5	0.4
4	8:20 AM 8:30 AM	10	40	26.8	0.0	26.8	0.4
5	8:30 AM 8:40 AM	10	50	28.7	0.8	27.8	0.4
6	8:40 AM 8:50 AM	10	60	30.6	0.0	30.6	0.3

Infiltration Rate (in/hr):	21.2
Radius of test hole (in):	4
Average Head (in):	15.3

Figure A-37

PERCOLATION TEST REPORT

Project Name:	Ave 50 Madison to Botella	**Project No.:**	T3021-22-02
Test Hole No.:	P-10	**Date Excavated:**	6/2/2023
Length of Test Pipe:	120.0 inches	**Soil Classification:**	SP
Height of Pipe above Ground:	0.0 inches	**Presoak Date:**	6/11/2023
Depth of Test Hole:	120.0 inches	**Perc Test Date:**	6/12/2023
Check for Sandy Soil Criteria Tested by:	RF	**Percolation Tested by:**	RF

Water level measured from BOTTOM of hole

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	7:05 AM 7:30 AM	25	25	12.0	0.0	12.0	2.1
2	7:30 AM 7:55 AM	25	50	13.2	0.0	13.2	1.9

Soil Criteria: Sandy

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	7:55 AM 8:05 AM	10	10	17.2	0.0	17.2	0.6
2	8:05 AM 8:15 AM	10	20	22.8	1.1	21.7	0.5
3	8:15 AM 8:25 AM	10	30	25.2	0.0	25.2	0.4
4	8:25 AM 8:35 AM	10	40	23.5	0.0	23.5	0.4
5	8:35 AM 8:45 AM	10	50	27.1	0.0	27.1	0.4
6	8:45 AM 8:55 AM	10	60	23.5	0.2	23.3	0.4

Infiltration Rate (in/hr):	20.1
Radius of test hole (in):	4
Average Head (in):	11.9

Figure A-38

PERCOLATION TEST REPORT

Project Name:	Ave 50 Madison to Botella	**Project No.:**	T3021-22-02
Test Hole No.:	P-11	**Date Excavated:**	6/5/2023
Length of Test Pipe:	120.0 inches	**Soil Classification:**	SP
Height of Pipe above Ground:	0.0 inches	**Presoak Date:**	6/13/2023
Depth of Test Hole:	120.0 inches	**Perc Test Date:**	6/14/2023
Check for Sandy Soil Criteria Tested by:	RF	**Percolation Tested by:**	RF

Water level measured from BOTTOM of hole

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:00 AM 9:25 AM	25	25	12.0	0.0	12.0	2.1
2	9:25 AM 9:50 AM	25	50	13.2	0.0	13.2	1.9

Soil Criteria: Sandy

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:50 AM 10:00 AM	10	10	15.0	0.5	14.5	0.7
2	10:00 AM 10:10 AM	10	20	19.3	0.4	19.0	0.5
3	10:10 AM 10:20 AM	10	30	32.4	0.6	31.8	0.3
4	10:20 AM 10:30 AM	10	40	34.7	1.0	33.7	0.3
5	10:30 AM 10:40 AM	10	50	21.4	0.6	20.8	0.5
6	10:40 AM 10:50 AM	10	60	20.3	0.8	19.4	0.5

Infiltration Rate (in/hr):	18.6
Radius of test hole (in):	4
Average Head (in):	10.6

Figure A-39

PERCOLATION TEST REPORT

Project Name:	Ave 50 Madison to Botella	**Project No.:**	T3021-22-02
Test Hole No.:	P-12	**Date Excavated:**	6/5/2023
Length of Test Pipe:	120.0 inches	**Soil Classification:**	SP
Height of Pipe above Ground:	0.0 inches	**Presoak Date:**	6/13/2023
Depth of Test Hole:	120.0 inches	**Perc Test Date:**	6/14/2023
Check for Sandy Soil Criteria Tested by:	RF	**Percolation Tested by:**	RF

Water level measured from BOTTOM of hole

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:05 AM 9:30 AM	25	25	12.0	0.0	12.0	2.1
2	9:30 AM 9:55 AM	25	50	13.2	0.0	13.2	1.9

Soil Criteria: Sandy

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (in)	Percolation Rate (min/inch)
1	9:55 AM 10:05 AM	10	10	25.1	0.2	24.8	0.4
2	10:05 AM 10:15 AM	10	20	33.1	2.5	30.6	0.3
3	10:15 AM 10:25 AM	10	30	34.2	10.3	23.9	0.4
4	10:25 AM 10:35 AM	10	40	35.8	16.7	19.1	0.5
5	10:35 AM 10:45 AM	10	50	37.8	20.0	17.8	0.6
6	10:45 AM 10:55 AM	10	60	39.6	22.7	16.9	0.6

Infiltration Rate (in/hr):	6.1
Radius of test hole (in):	4
Average Head (in):	31.1

Figure A-40

APPENDIX B

APPENDIX B

LABORATORY TESTING

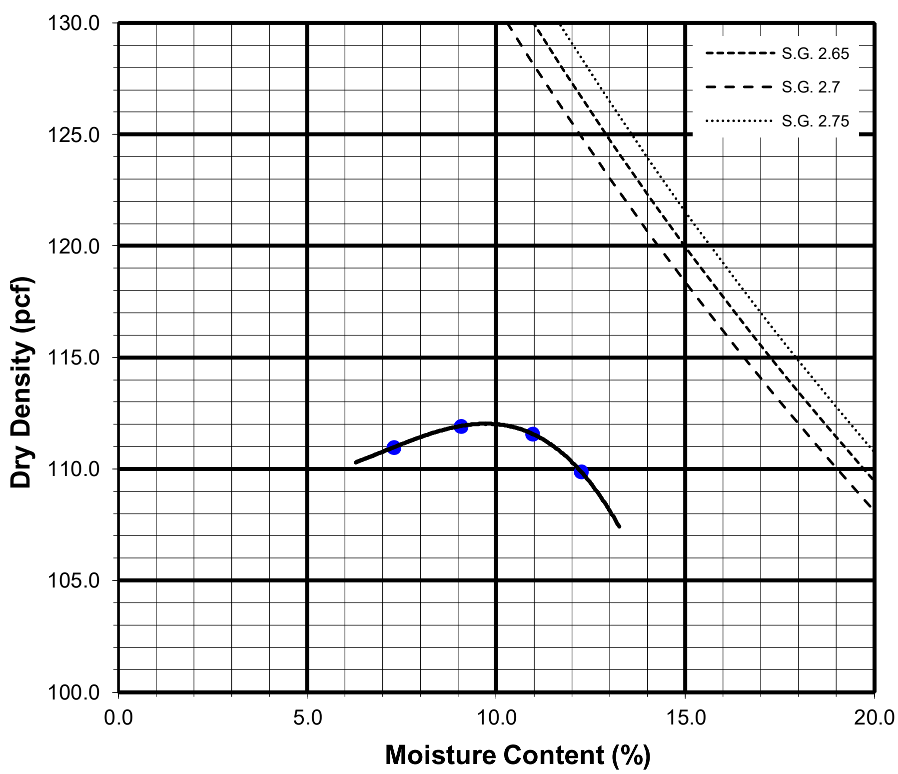
We performed laboratory tests in accordance with current generally accepted test methods of ASTM International (ASTM) or other suggested procedures. We analyzed selected soil samples for maximum density and optimum moisture content, grain size distribution, in-situ direct shear, soil resistance value (R-value), sulfate screening, and in-situ moisture and density. The results of our laboratory testing program are presented on Figures B-1 through B-17. The in-place dry density and moisture content of the samples tested are presented on the boring logs in *Appendix A*. R-value test results are presented in Table 3.

Sample No:

C-2@0-5	Silty SAND (SM), grayish brown

TEST NO.		1	2	3	4	5	6
Wt. Compacted Soil + Mold	(g)	6062	6108	6134	6127		
Weight of Mold	(g)	4264	4264	4264	4264		
Net Weight of Soil	(g)	1798	1844	1870	1863		
Wet Weight of Soil + Cont.	(g)	874.1	706.0	724.1	745.5		
Dry Weight of Soil + Cont.	(g)	844.2	668.9	678.1	691.7		
Weight of Container	(g)	433.3	259.3	258.2	252.4		
Moisture Content	(%)	7.3	9.1	11.0	12.2		
Wet Density	(pcf)	119.0	122.1	123.8	123.3		
Dry Density	(pcf)	111.0	111.9	111.6	109.9		

Maximum Dry Density (pcf)	**112.5**	**Optimum Moisture Content (%)**	**10.0**



Preparation Method: B

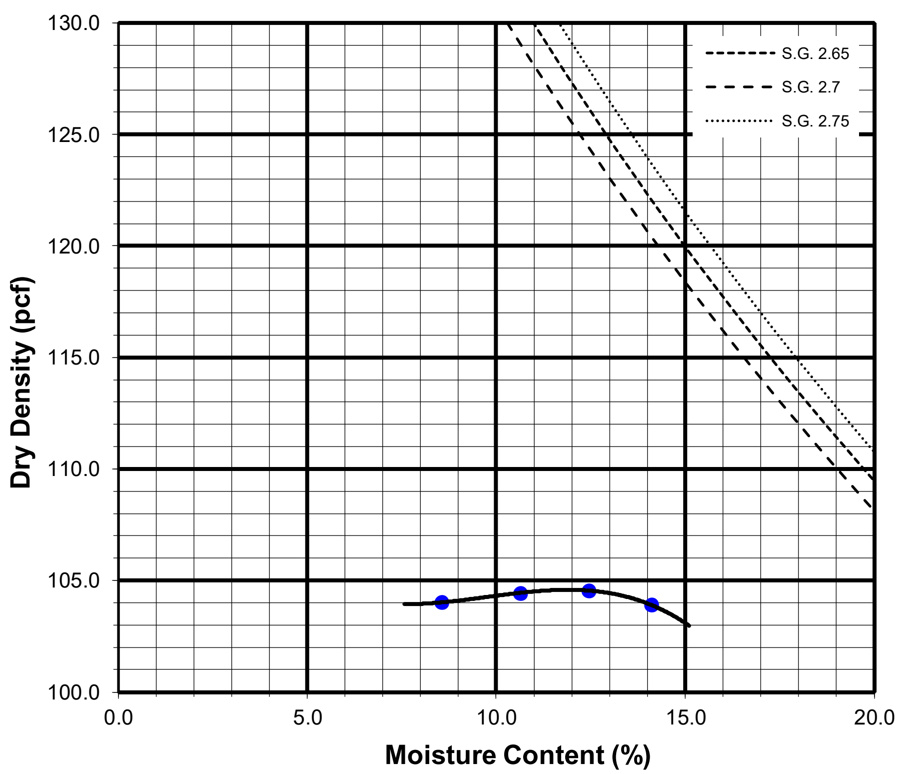
GEOCON	**COMPACTION CHARACTERISTICS USING MODIFIED EFFORT TEST RESULTS** ASTM D-1557	Project No.: T3021-22-02 AVENUE 50 WIDENING MADISON STREET TO BOTELLA PLACE INDIO, CALIFORNIA
	Checked by:	Jul 23 Figure B1

Sample No:

C-7@0-5	Poorly Graded SAND with Silt (SP-SM), grayish brown

TEST NO.		1	2	3	4	5	6
Wt. Compacted Soil + Mold	(g)	5970	6009	6040	6055		
Weight of Mold	(g)	4264	4264	4264	4264		
Net Weight of Soil	(g)	1706	1745	1776	1791		
Wet Weight of Soil + Cont.	(g)	737.8	773.8	760.0	756.6		
Dry Weight of Soil + Cont.	(g)	700.0	724.0	704.5	695.0		
Weight of Container	(g)	258.5	255.5	258.6	258.1		
Moisture Content	(%)	8.6	10.6	12.4	14.1		
Wet Density	(pcf)	112.9	115.5	117.6	118.6		
Dry Density	(pcf)	104.0	104.4	104.5	103.9		

Maximum Dry Density (pcf)	**105.0**	**Optimum Moisture Content (%)**	**11.5**



Preparation Method: B

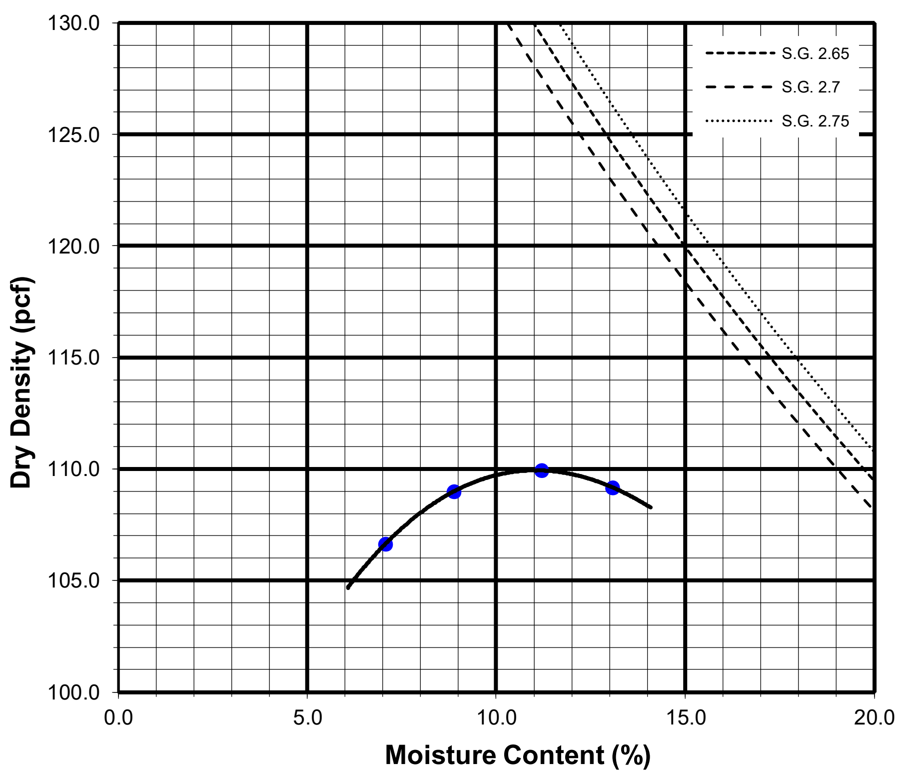
GEOCON	**COMPACTION CHARACTERISTICS USING MODIFIED EFFORT TEST RESULTS** ASTM D-1557	Project No.: T3021-22-02 AVENUE 50 WIDENING MADISON STREET TO BOTELLA PLACE INDIO, CALIFORNIA
	Checked by:	Jul 23 Figure B2

Sample No:

C-15@0-5	Poorly Graded SAND with Silt (SP-SM), grayish brown

TEST NO.		1	2	3	4	5	6
Wt. Compacted Soil + Mold	(g)	6110	6129	5989	6056		
Weight of Mold	(g)	4264	4264	4264	4264		
Net Weight of Soil	(g)	1846	1865	1725	1792		
Wet Weight of Soil + Cont.	(g)	718.6	937.2	742.0	833.8		
Dry Weight of Soil + Cont.	(g)	672.3	878.8	710.0	787.0		
Weight of Container	(g)	258.7	432.2	257.3	259.2		
Moisture Content	(%)	11.2	13.1	7.1	8.9		
Wet Density	(pcf)	122.2	123.5	114.2	118.6		
Dry Density	(pcf)	109.9	109.2	106.6	109.0		

Maximum Dry Density (pcf)	**110.0**	**Optimum Moisture Content (%)**	**10.0**



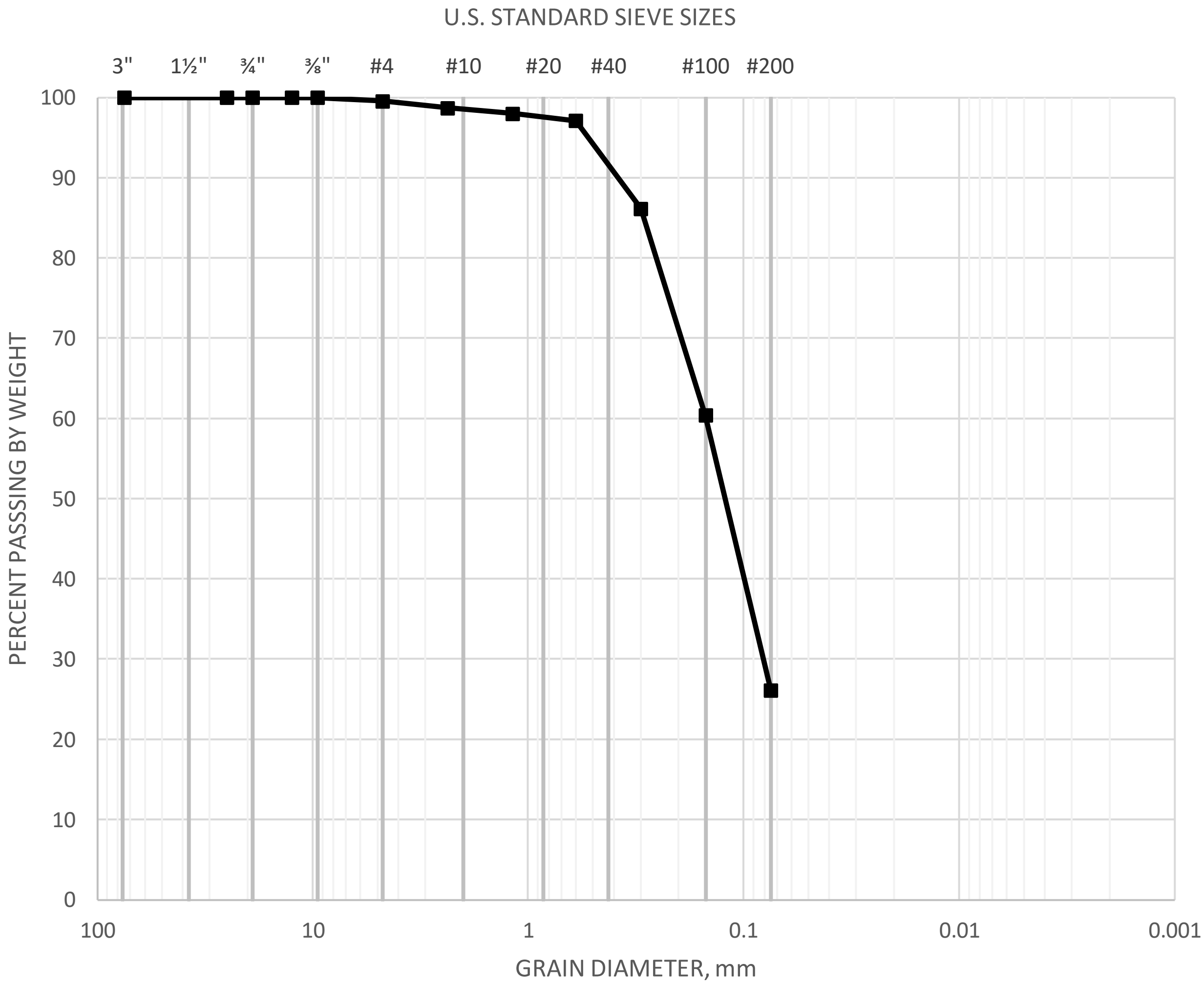
Preparation Method: B

GEOCON	**COMPACTION CHARACTERISTICS USING MODIFIED EFFORT TEST RESULTS** ASTM D-1557	Project No.: T3021-22-02 AVENUE 50 WIDENING MADISON STREET TO BOTELLA PLACE INDIO, CALIFORNIA
	Checked by:	Jul 23 Figure B3

SUMMARY OF LABORATORY WATER SOLUBLE SULFATE TEST RESULTS
AASHTO T290 ASTM C1580

Sample No.	Water Soluble Sulfate ($\% SO_4$)	Sulfate Exposure
C-2@0-5	0.009	S0
C-7@0-5	0.000	S0
C-15@0-5	0.000	S0

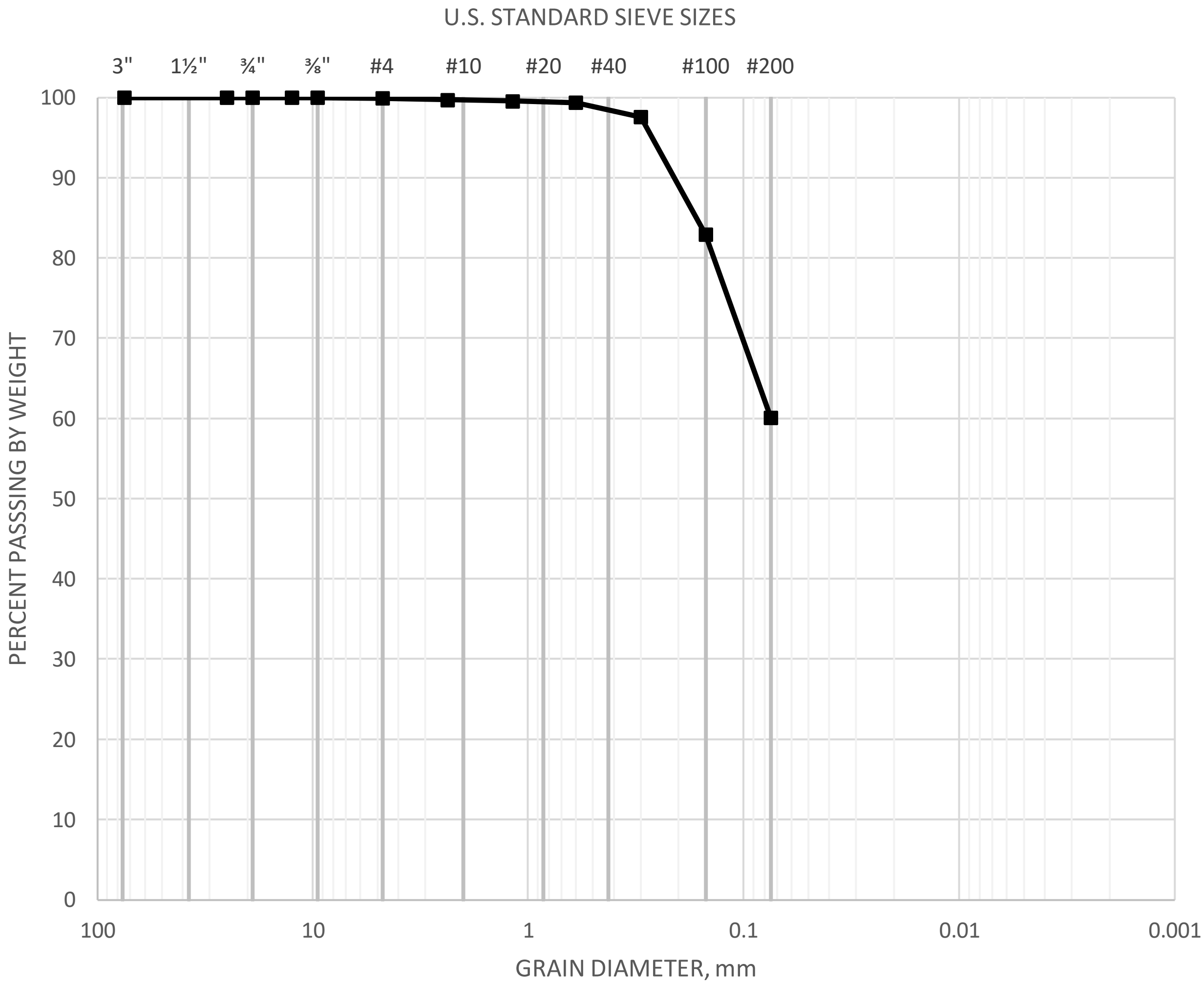
GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-1@9-10	Silty SAND (SM), grayish brown	0.16	0.08	0.075

GEOCON	**GRAIN SIZE DISTRIBUTION** ASTM D 6913	Project No.: T3021-22-02
		AVENUE 50 WIDENING MADISON STREET TO BOTELLA PLACE INDIO, CALIFORNIA
	Checked by:	July 2023 Figure B5

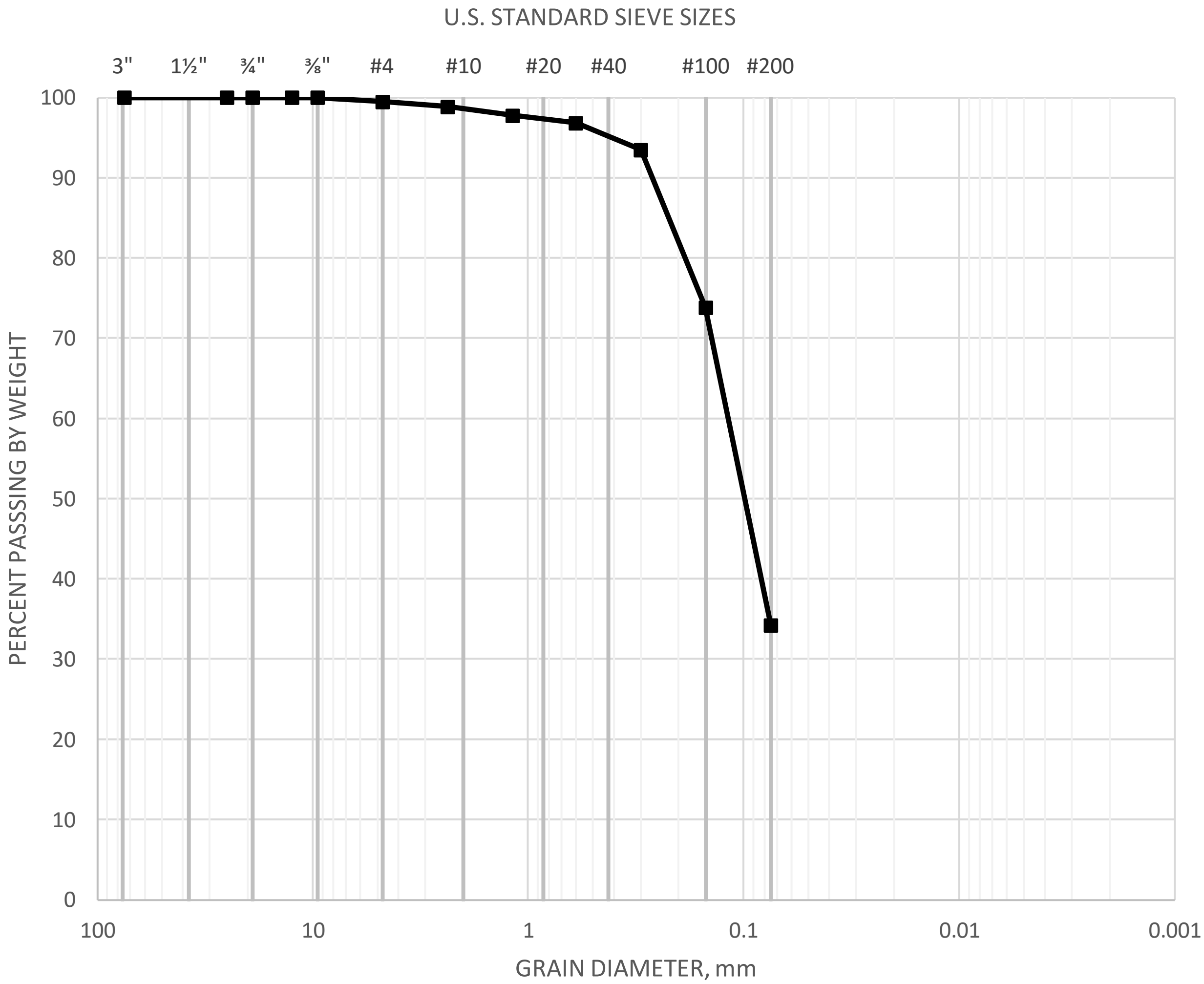
GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-2@9-10	SILT with Sand (ML)s, dark grayish brown	0.075	0.075	0.075

GEOCON	**GRAIN SIZE DISTRIBUTION** ASTM D 6913	Project No.: T3021-22-02
		AVENUE 50 WIDENING MADISON STREET TO BOTELLA PLACE INDIO, CALIFORNIA
	Checked by:	July 2023 Figure B6

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-3@9-10	Silty SAND (SM), dark grayish brown	0.12	0.075	0.075

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D 6913

Checked by:

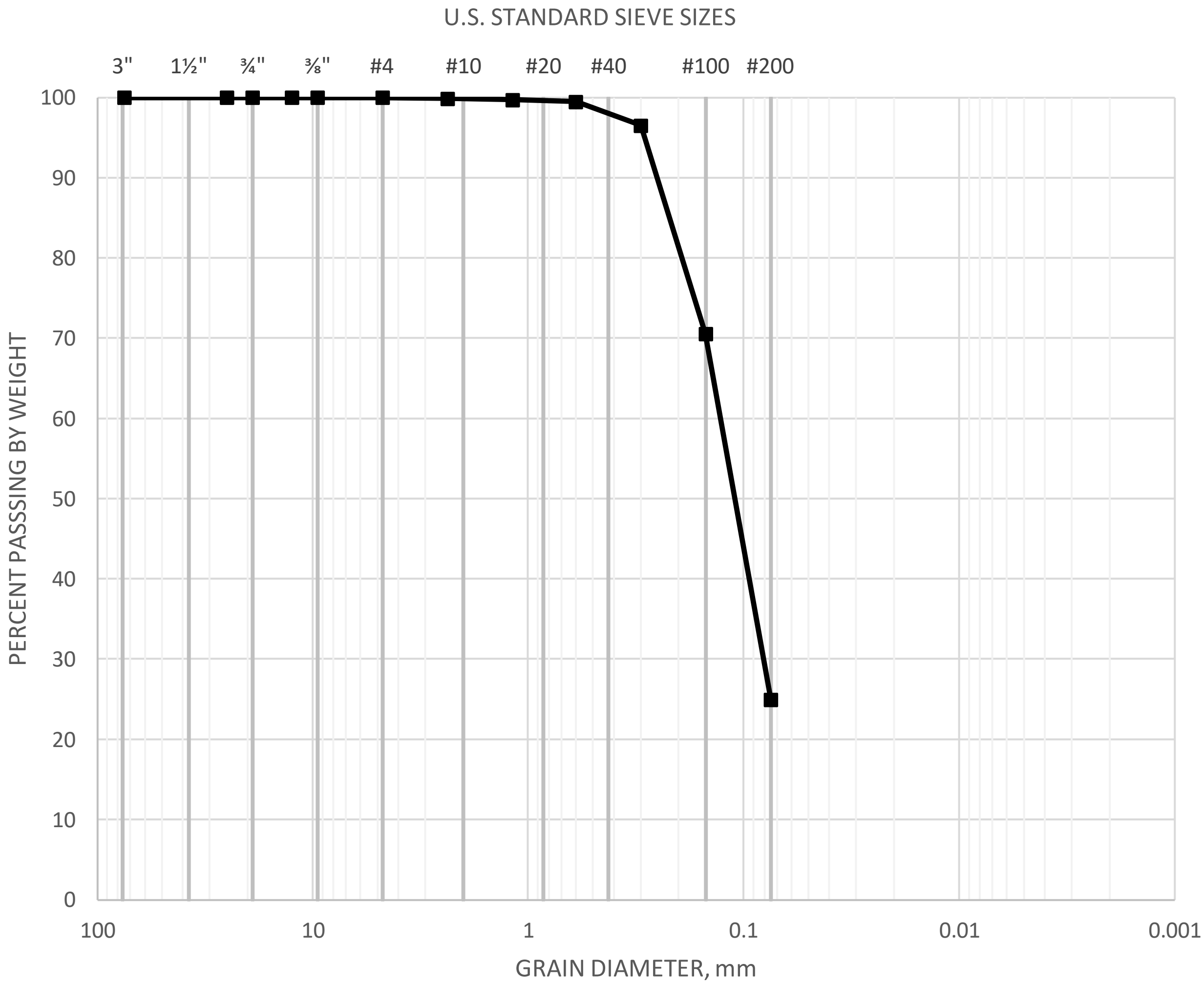
Project No.: T3021-22-02

AVENUE 50 WIDENING
MADISON STREET TO BOTELLA PLACE
INDIO, CALIFORNIA

July 2023

Figure B7

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-4@9-10	Silty SAND (SM), dark grayish brown	0.13	0.08	0.075

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D 6913

Checked by:

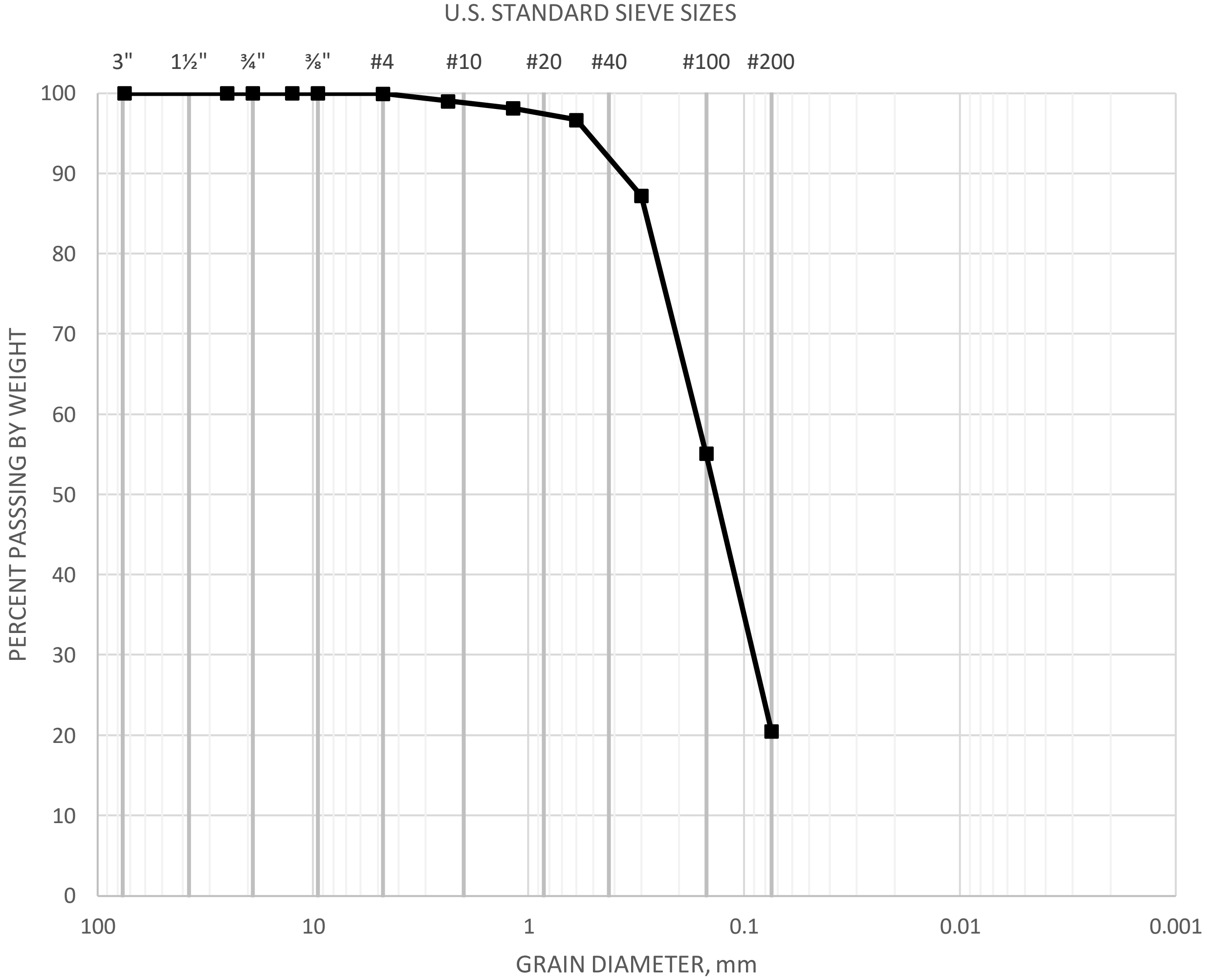
Project No.: T3021-22-02

AVENUE 50 WIDENING
MADISON STREET TO BOTELLA PLACE
INDIO, CALIFORNIA

July 2023

Figure B8

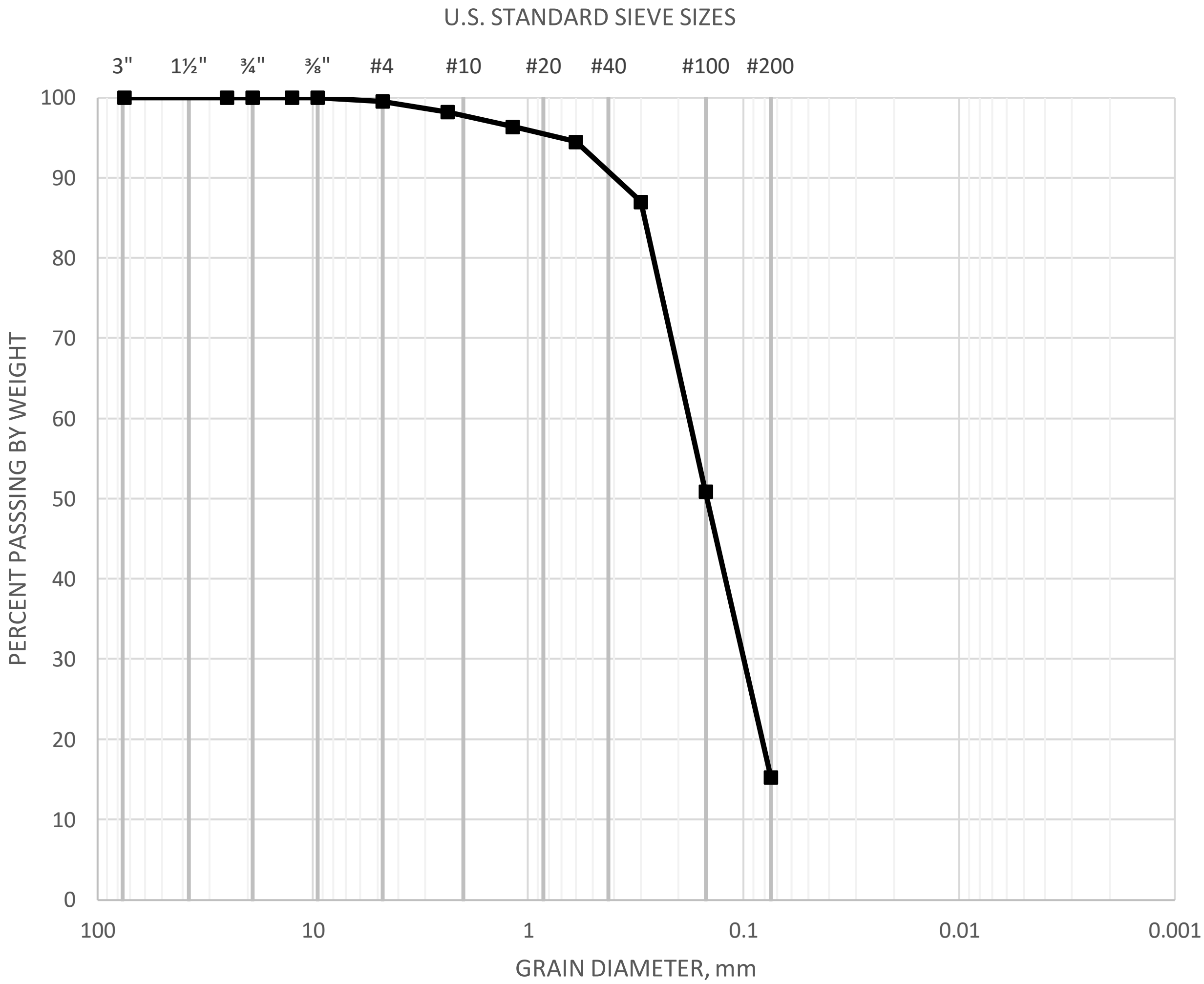
GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-5@9-10	Silty SAND (SM), dark grayish brown	0.17	0.09	0.075

GEOCON	**GRAIN SIZE DISTRIBUTION** ASTM D 6913	Project No.: T3021-22-02
		AVENUE 50 WIDENING MADISON STREET TO BOTELLA PLACE INDIO, CALIFORNIA
	Checked by:	July 2023 Figure B9

GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



SAMPLE	CLASSIFICATION	D60	D30	D10
P-6@9-10	Silty SAND (SM), dark grayish brown	0.18	0.1	0.075

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D 6913

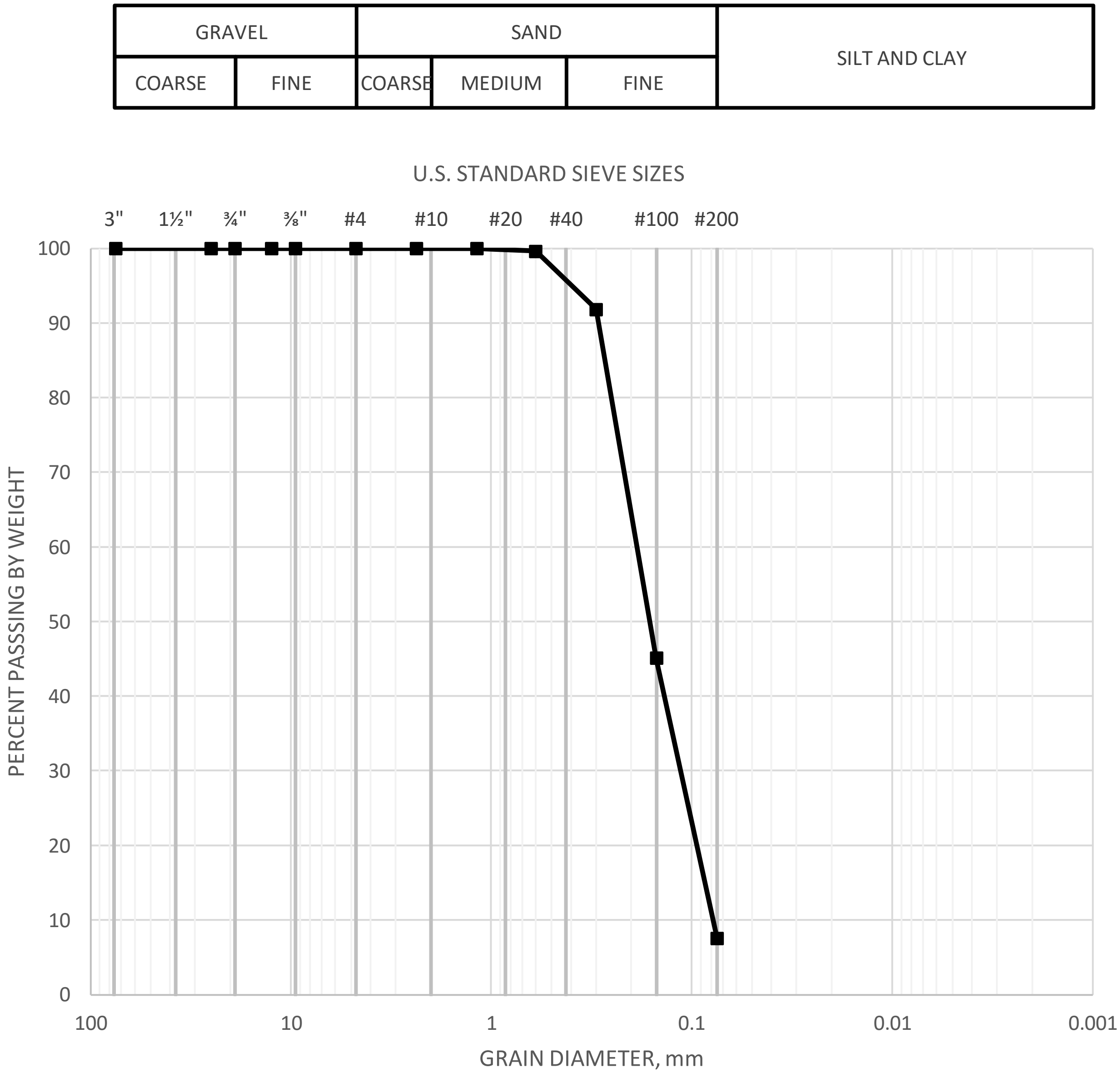
Checked by:

Project No.: T3021-22-02

AVENUE 50 WIDENING
MADISON STREET TO BOTELLA PLACE
INDIO, CALIFORNIA

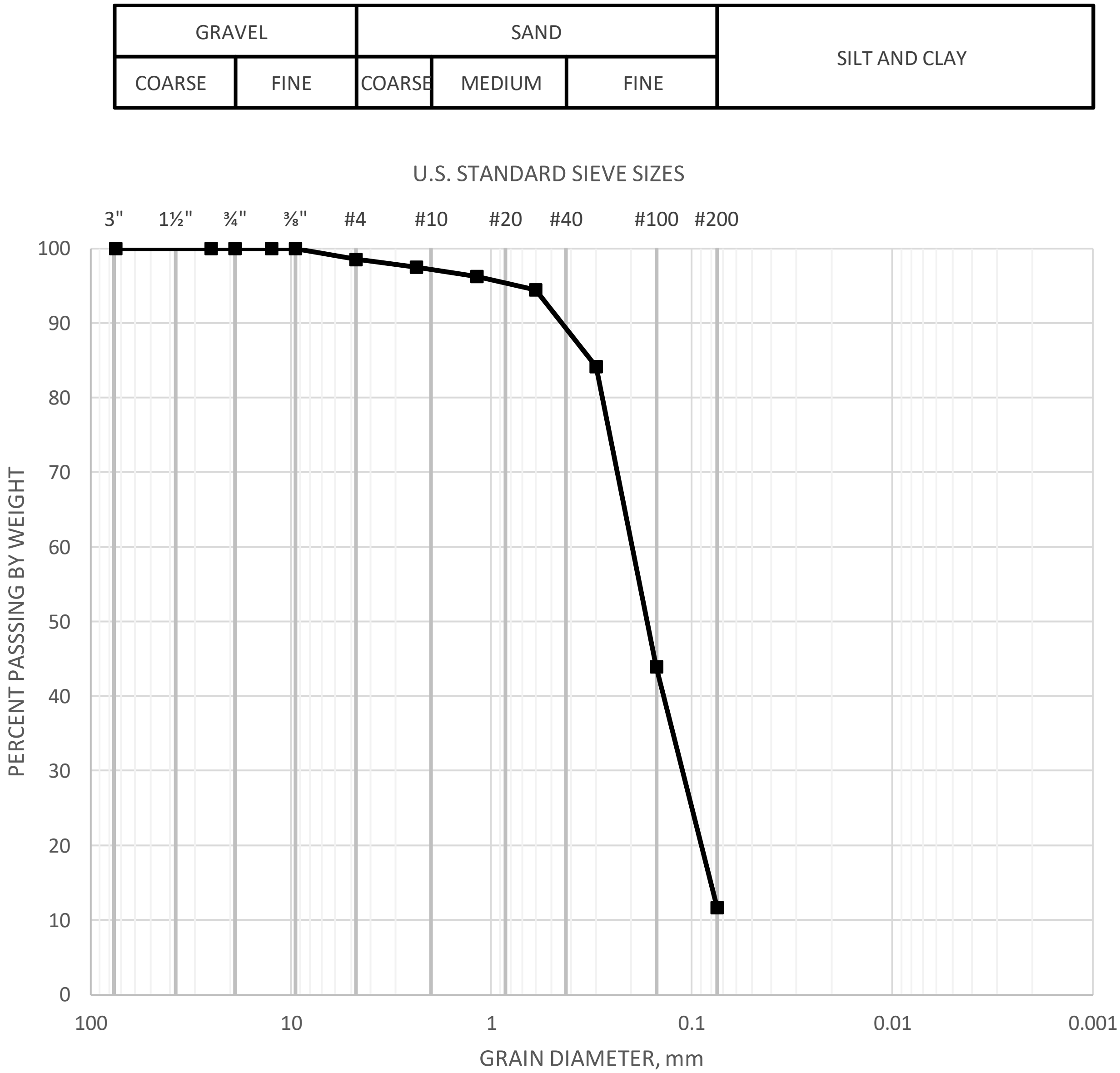
July 2023

Figure B10



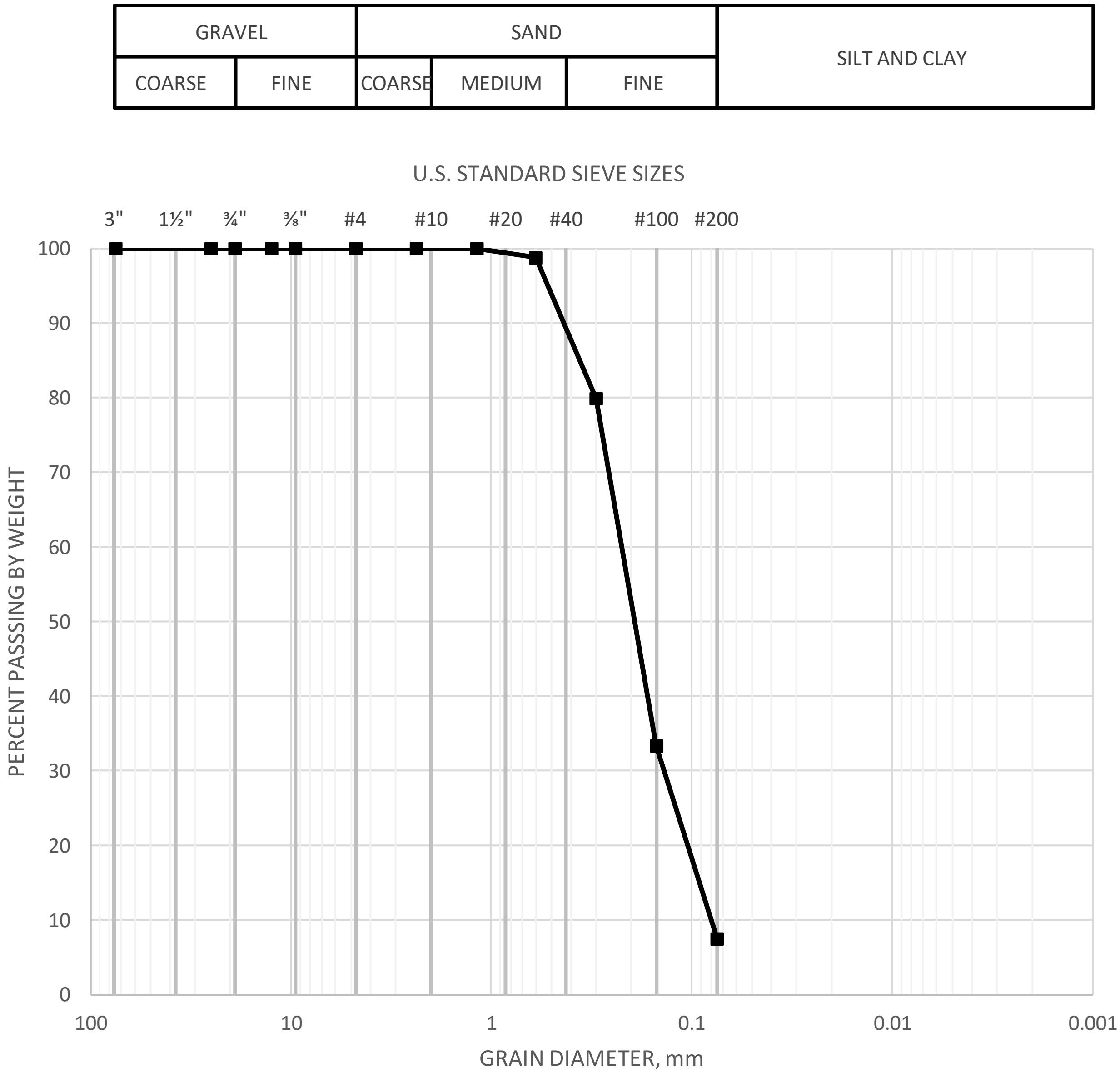
SAMPLE	CLASSIFICATION	D60	D30	D10
P-7@9-10	Poorly graded SAND with silt (SP-SM), dark grayish brown	0.19	0.12	0.079

GEOCON	**GRAIN SIZE DISTRIBUTION** ASTM D 6913	Project No.: T3021-22-02
		AVENUE 50 WIDENING MADISON STREET TO BOTELLA PLACE INDIO, CALIFORNIA
	Checked by:	July 2023 Figure B11



SAMPLE	CLASSIFICATION	D60	D30	D10
P-8@9-10	Poorly graded SAND with silt (SP-SM), dark grayish brown	0.19	0.12	0.075

GEOCON	**GRAIN SIZE DISTRIBUTION** ASTM D 6913	Project No.: T3021-22-02
		AVENUE 50 WIDENING MADISON STREET TO BOTELLA PLACE INDIO, CALIFORNIA
	Checked by:	July 2023 — Figure B12



SAMPLE	CLASSIFICATION	D60	D30	D10
P-9@9-10	Poorly graded SAND with silt (SP-SM), dark grayish brown	0.22	0.15	0.08

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D 6913

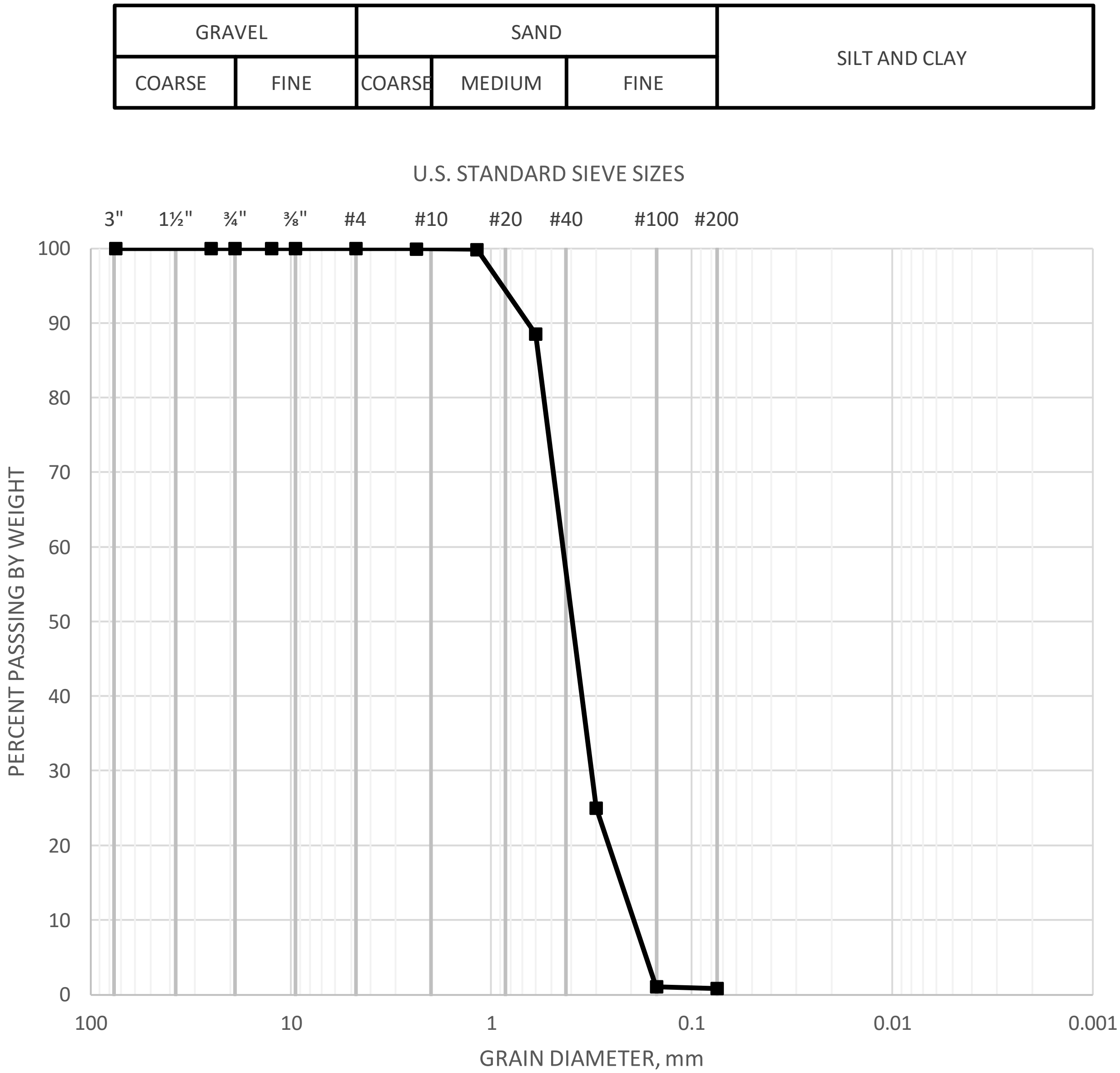
Checked by:

Project No.: T3021-22-02

AVENUE 50 WIDENING
MADISON STREET TO BOTELLA PLACE
INDIO, CALIFORNIA

July 2023

Figure B13



SAMPLE	CLASSIFICATION	D60	D30	D10
P-10@9-10	Poorly graded SAND (SP), dark grayish brown	0.43	0.32	0.22

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D 6913

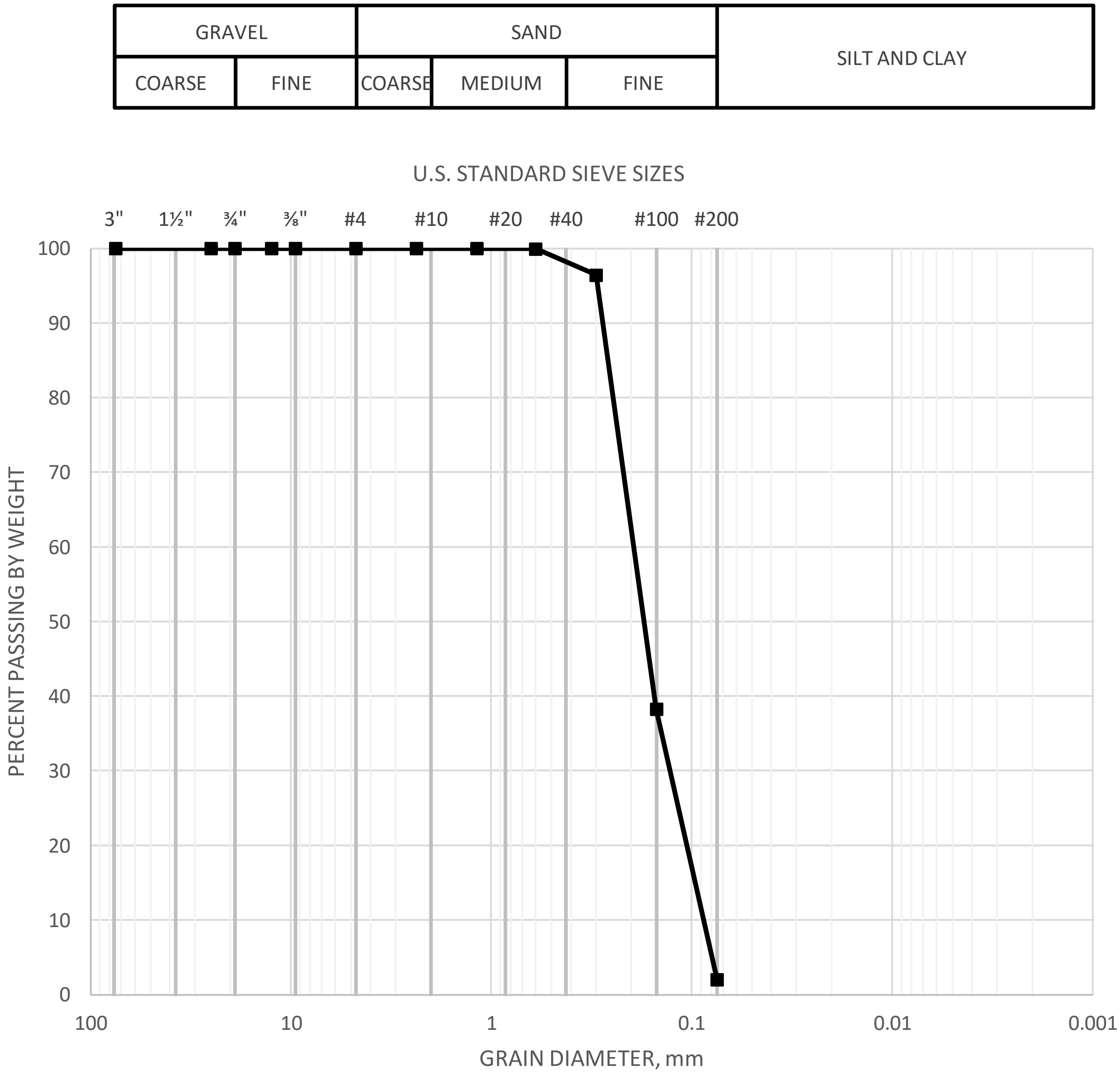
Checked by:

Project No.: T3021-22-02

AVENUE 50 WIDENING
MADISON STREET TO BOTELLA PLACE
INDIO, CALIFORNIA

July 2023

Figure B14



SAMPLE	CLASSIFICATION	D60	D30	D10
P-11@9-10	Poorly Graded SAND (SP), dark grayish brown	0.19	0.14	0.09

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D 6913

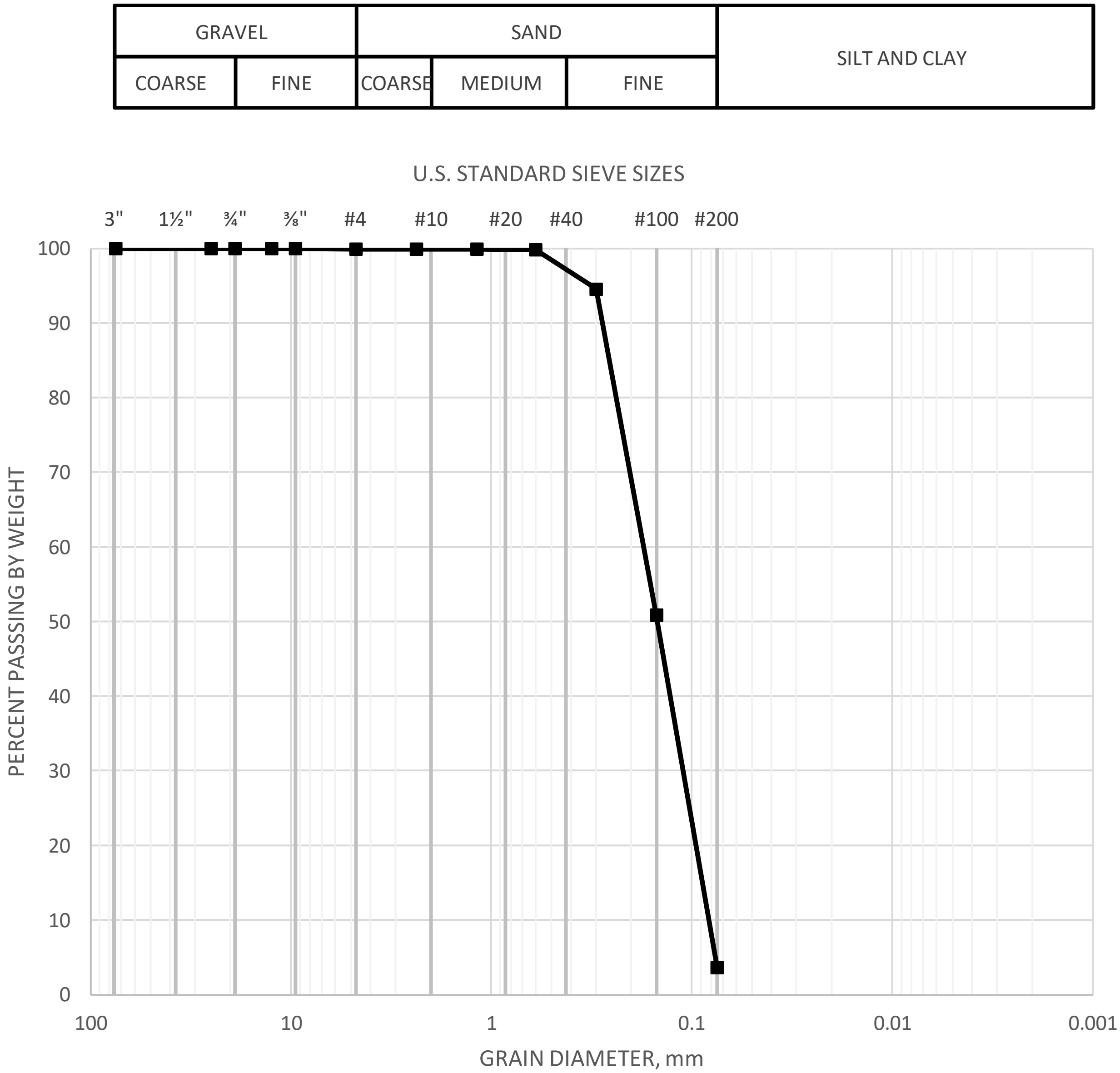
Checked by:

Project No.: T3021-22-02

AVENUE 50 WIDENING
MADISON STREET TO BOTELLA PLACE
INDIO, CALIFORNIA

July 2023

Figure B15



SAMPLE	CLASSIFICATION	D60	D30	D10
P-12@9-10	Poorly Graded SAND (SP), dark grayish brown	0.18	0.11	0.08

GEOCON

GRAIN SIZE DISTRIBUTION

ASTM D 6913

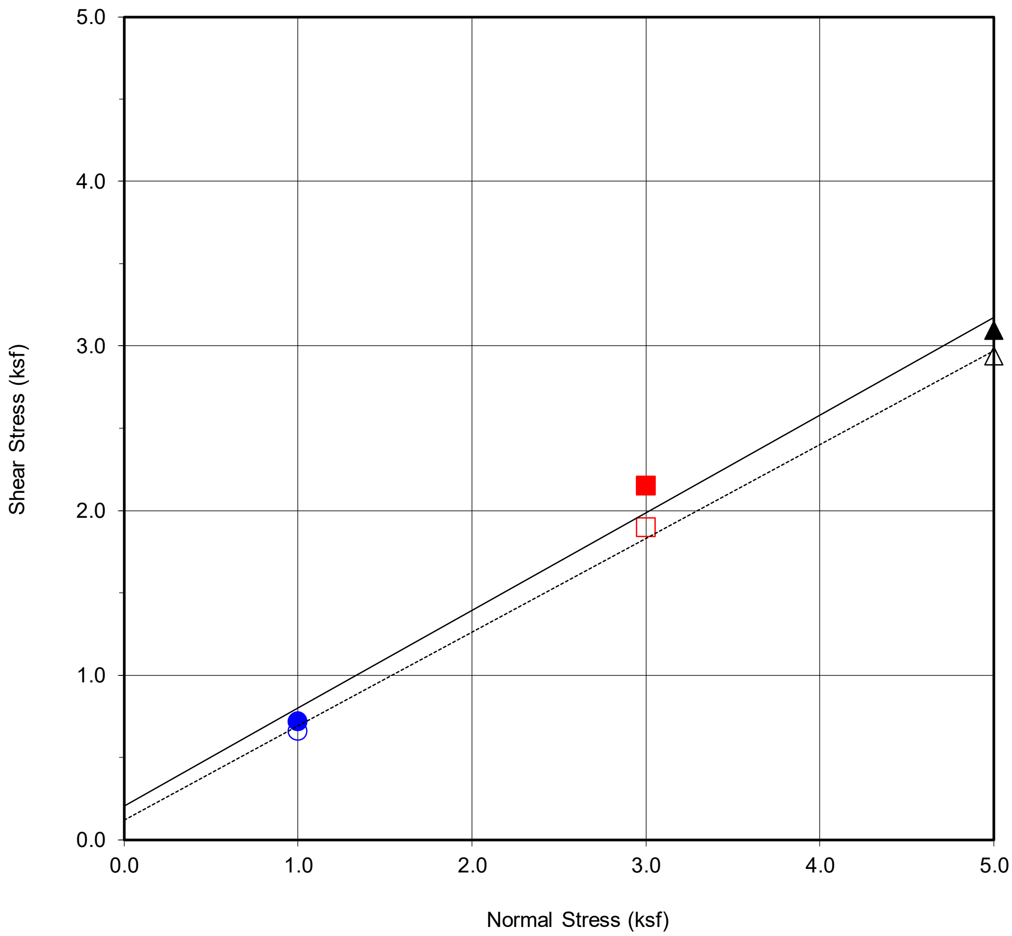
Checked by:

Project No.: T3021-22-02

AVENUE 50 WIDENING
MADISON STREET TO BOTELLA PLACE
INDIO, CALIFORNIA

July 2023

Figure B16



Boring No.	**N/A**
Sample No.	**C-12@3**
Depth (ft)	**3**
Sample Type:	Ring

Soil Identification:		
orly graded SAND with silt (SP-SM), dark grayish bro		
Strength Parameters		
	C (psf)	ϕ (^{o})
Peak	206	31
Ultimate	122	30

Normal Stress (kip/ft²)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.72	■ 2.15	▲ 3.10
Shear Stress @ End of Test (ksf)	○ 0.66	□ 1.90	△ 2.94
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	10.5	14.6	13.4
Initial Dry Density (pcf)	95.4	98.9	97.8
Initial Degree of Saturation (%)	37.0	56.0	50.0
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	30.2	29.2	31.7

GEOCON

DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

Checked by:

Project No.: T3021-22-02

AVENUE 50 WIDENING
MADISON STREET TO BOTELLA PLACE
INDIO, CALIFORNIA

July 2023

Figure B17