ADVANCED GEOTECHNICAL SOLUTIONS, INC.
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18032 Lemon Drive, Suite 367
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March 23, 2022
P/W 2202-09
Report No. 2202-09-B-3

Attention: **Mr. Michael Masterson**

Subject: **Infiltration Feasibility Level Study, Proposed Industrial Development, APNs 3064-401-03, -04, -05, West Side of Highway 395, Hesperia, California**

References: Appendix A

Gentlemen:

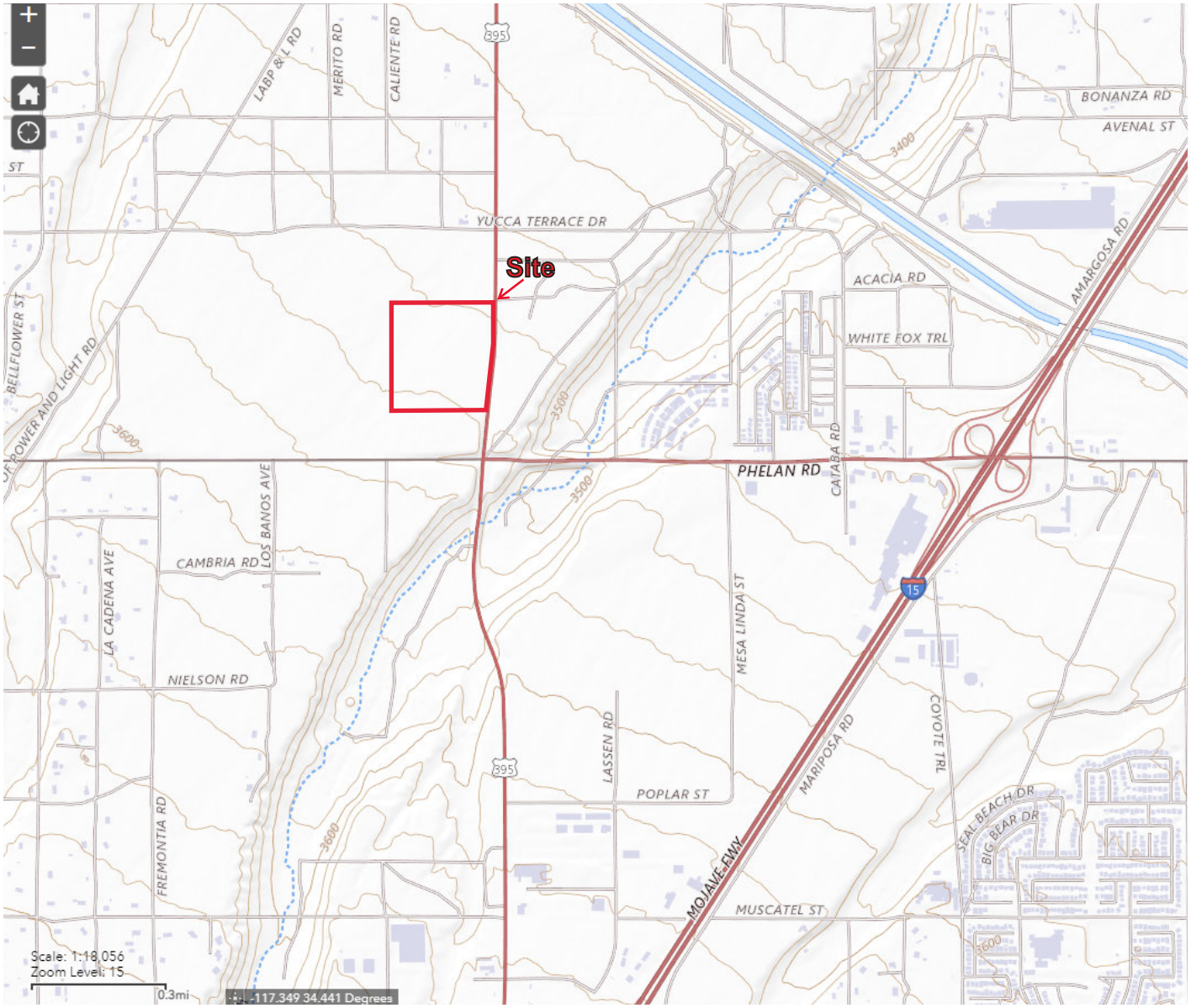
In accordance with your request, Advanced Geotechnical Solutions, Inc. (AGS) has prepared this infiltration feasibility study for the proposed 29-acre industrial development located on three contiguous parcels west of Highway 395 in Hesperia, California. This report is intended to meet the preliminary infiltration testing requirements of the City of Hesperia. AGS has evaluated the feasibility for storm water infiltration in accordance with the Mojave River Watershed Technical Guidance Document for Water Quality Management Plans (2016 Edition). Supporting data are presented in Appendix A.

1.0 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The ~29 acre site is located west of Highway 395 and north of Phelan Road / Main Street in Hesperia, California (Figure 1, Site Location Map). The site encompasses three contiguous parcels- APNs 3064-401-03, 3064-401-04, and 3064-401-05 with a total area of 29.37 acres. The site is currently vacant. Based on our review of historical aerial imagery, the site appears to have been mostly undeveloped except for some dirt roads and the unpaved Caliente Road crossing from the northeastern corner to the southwestern corner.

The site slopes and drains gently to the northeast. Based on the Site Development Plan prepared by Alliance Land Planning dated February 23, 2022, approximate site elevations range between 3,562 feet above mean sea level (msl) on the southwestern corner to 3,537 ft. msl on the northeastern corner of the site.

According to the site development plan, the project consists of a 655,520 square foot warehouse with loading docks to the east and west, offices and mezzanine areas. Associated improvements including a retaining wall along the southern boundary, driveways, parking areas, landscape areas, a storm water detention basin on the northern boundary, a public road on the western boundary and utility installations. Cuts up to 7 feet in depth and fills to about 10 feet are anticipated.



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SCALE: 1 in. = 2000 ft.

SITE LOCATION MAP
29-ACRE PROPERTY
HESPERIA, CALIFORNIA

FIGURE 1

SOURCE MAP(S): USGS The National Map

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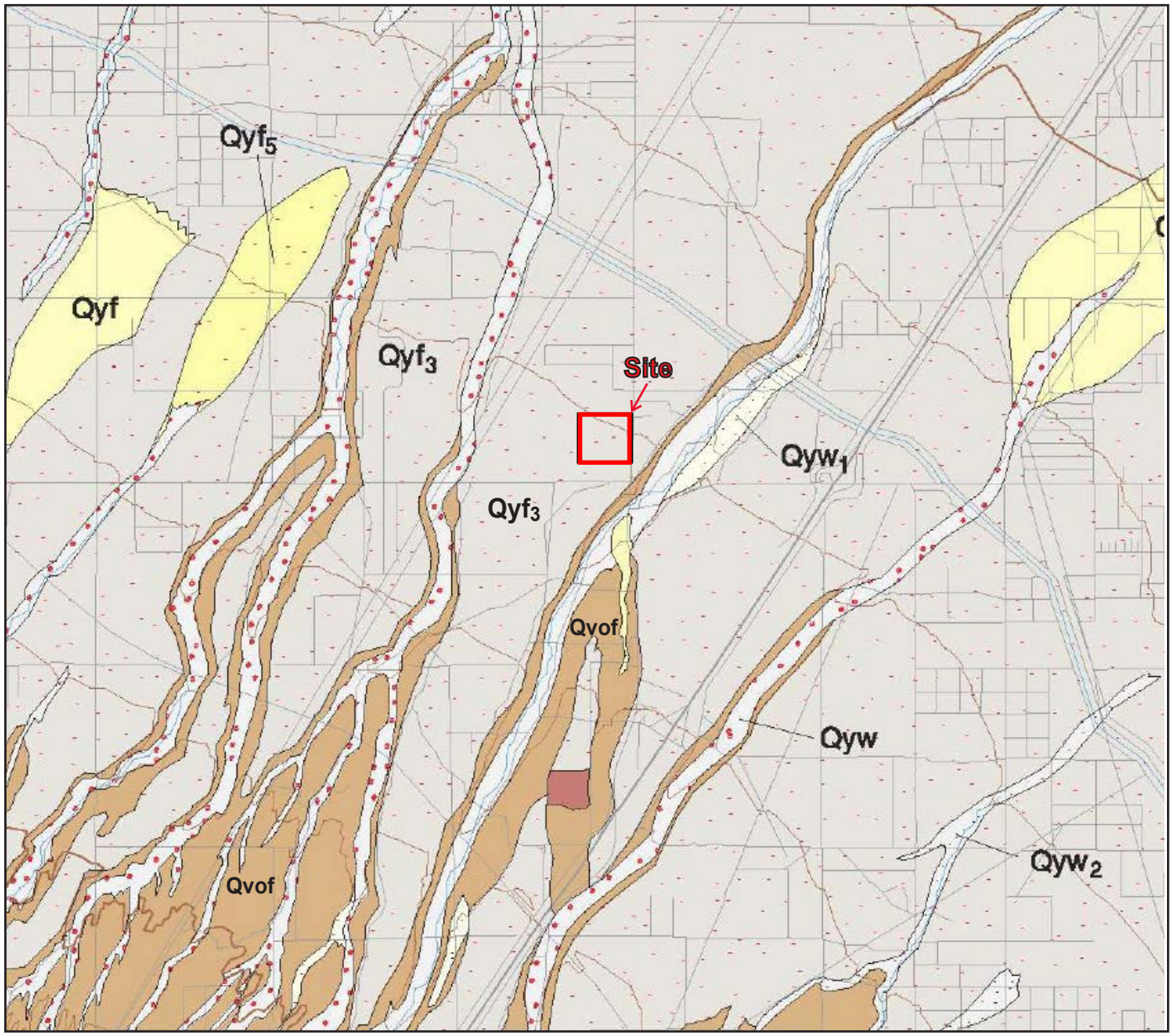
2.0 FIELD INVESTIGATION

On February 21, 2022, AGS performed subsurface exploration at the site which consisted of advancing five hollow-stem auger borings (B-1 through B-5) and four percolation test borings (P-1 through P-4) with a truck-mounted drill rig to approximate depths of 5 and 51.5 feet below existing ground surface (bgs). On March 3, 2022, AGS drilled an additional percolation test borings (P-5) with a hand auger to an approximate depth 6.5 feet bgs and excavated seven trenches (T-1 through T-7) to approximate depths ranging between 4 and 10 feet bgs with a JD 410J backhoe (22,000 lb). All borings and trenches were logged and sampled by our geologist or engineer. Logs of the borings and trenches are presented in Appendix A. The approximate trench locations are shown on Plate 1, Exploration Location Map. Percolation testing was performed on March 4, 2022, in an effort to evaluate the feasibility of storm water infiltration on the site and provide preliminary design infiltration rates in general conformance with Appendix C of the Mojave River Watershed Technical Guidance Document for Water Quality Management Plans (2016).

3.0 GEOLOGY

The site is not within a mapped liquefaction potential zone by the County of Riverside nor within a mapped fault zone. Regional geologic maps show that the site is underlain by alluvial fan deposits (Figure 2, Regional Geologic Map). Based on our site reconnaissance, subsurface excavations, and review of the referenced geologic maps, the site is mantled by topsoil and alluvium underlain by old alluvial-fan deposits. A brief description of the earth materials encountered onsite is presented below, and more detailed descriptions of these materials are provided in the subsurface logs included in Appendix A.

The majority of the site is mantled by topsoil consisting as light yellow brown to light brown, dry to slightly moist, fine- to coarse-grained, silty sand with some roots that is in a loose condition. The topsoil was observed to be 0.3 to 1 foot thick. The topsoil is underlain by alluvium consisting of light brown to yellow brown, dark brown and black, dry to slightly moist, loose to medium dense, porous, fine- to coarse-grained, silty sand with trace gravel and some roots. The alluvium extended to variable depths ranging between 1.7 and 3.3 feet. Older alluvium underlie the younger alluvium onsite. The differentiation is based upon the density changes observed. This unit consists of light brown, orange brown and red brown, slightly moist to moist, medium dense to very dense, fine- to coarse-grained, silty sand and sand with silt; which is slightly indurated and cemented, and contains gravel and cobbles. The older alluvium extended to the maximum depth of exploration of 51.5 feet. A discontinuous fine to coarse-grained sand layer was encountered at depths of around 5.5 to 7 feet below the ground along the northerly side of the site where the proposed basin is planned. This layer was encountered within P-5, T-1, and T-3 but was not encountered in T-2.



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SCALE: 1 in. = 4000 ft.

REGIONAL GEOLOGIC MAP
29-ACRE PROPERTY
HESPERIA, CALIFORNIA

Qyf_3	Young Alluvial Fan Deposits, Unit 3 (Middle Holocene)
Qvof	Very Old Alluvial Fan Deposits (Middle to Early Pleistocene)

FIGURE 2

SOURCE MAP(S): Morton and Miller, 2006, Digital Geologic Map of the San Bernardino and Santa Ana 30' by 60' Quadrangles

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4.0 TEST PROCEDURE

Percolation testing per the Orange County standards (TGD Appendix VII, 2011) was performed within the test borings as referenced in Appendix C of the Mojave River Watershed Technical Guidance Document for Water Quality Management Plans (2016).

The test holes were cleaned of loose debris then successively filled with more than 5 gallons of clean, potable water and allowed to pre-soak. The same day the test holes were cleaned of sediment and the bottom was lined with approximately 2 inches of washed gravel prior to infiltration testing.

A series of falling head percolation tests were performed. The test holes were filled with clean, potable water to approximately 1 to 2 feet above the infiltration surface and allowed to infiltrate. The water level was allowed to drop for a 30-minute period and then measured to calculate the drop rate in inches per hour. Reading were taken at 1-minute intervals in percolation test hole P-5 due to the high rates observed. The test hole was then refilled with water as necessary and the test procedure was repeated over the course of several hours until a stabilized percolation rate was recorded. The stabilized percolation rate was then converted to an infiltration rate based on the "Porchet Method" utilizing the following equation:

$$I_t = \frac{\Delta H\, \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\, 60\, r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Logs of the field testing and graphical representations of the test data presented as infiltration versus time interval are included in Appendix A.

5.0 TEST RESULTS AND PRELIMINARY DESIGN VALUES

The results of our testing are summarized in Table 1 below.

TABLE 1
SUMMARY OF INFILTRATION TEST RESULTS

Test Hole No.	Depth of Test Hole	Approximate Test Elevation	Description (USCS)	Tested Infiltration Rate (in./hr.)
P-1	5.9 feet	3534 ft msl	Silty Sand (SM)	0.55
P-2	4.9 feet	3535 ft msl	Silty Sand (SM)	0.52
P-3	4.0 feet	3537 ft msl	Silty Sand (SM)	1.02
P-4	3.9 feet	3541 ft msl	Silty Sand (SM)	1.27
P-5	6.4 feet	3539 ft msl	Sand with Silt (SP-SM)	15

Infiltration BMPs have the potential to fail over time when not adequately designed or maintained. The infiltration rate will decline between maintenance cycles as the BMP surface becomes occluded and particulates accumulate in the infiltrative layer. The methodology for estimating an appropriate infiltration factor of safety is provided in Appendix C of the TGD.

The measured infiltration rate calculated for the purpose of infiltration infeasibility screening shall be based on a factor of safety of 2.0 applied to the rates obtained from the infiltration test results. No adjustments from this value are permitted. Soils would be considered potentially feasible for infiltration if the measured infiltration rate obtained from field testing is greater than 0.3 inches per hour. Measured rates shall account for uncertainty and bias in measurement methods by applying a factor of safety of 2.0 to testing results. Table 2 below summarizes the preliminary design infiltration rates for the subject test holes utilizing a factor of safety of 2.0.

The field measured infiltration rate is divided by the infiltration safety factor to obtain the design infiltration rate. The design safety factor varies between 2 and 9. A safety factor less than 2.0 must use 2.0, while a safety factor greater than 9 can be used at the discretion of the design engineer. The factor of safety to be used when determining the design infiltration rates should be determined once detailed information on the proposed BMPs are available.

TABLE 2
PRELIMINARY DESIGN INFILTRATION RATES

Test Hole No.	Tested Infiltration Rate (in. /hr.)	Factor of Safety	Measured Infiltration Rate (in. /hr.)
P-1	0.55	2.0	0.28
P-2	0.52	2.0	0.26
P-3	1.02	2.0	0.51
P-4	1.27	2.0	0.64
P-5	15	2.0	7.5

6.0 DESIGN CONSIDERATIONS

6.1. Groundwater

Groundwater was not encountered during our subsurface exploration. Nearby groundwater wells indicate groundwater depths are several hundred feet below the surface. Localized perched groundwater may develop at a later date, most likely at or near fill/bedrock contacts, due to fluctuations in precipitation, irrigation practices, or factors not evident at the time of our field explorations..

6.2. Soil Characteristics and Anticipated Flow Paths

Based on our subsurface exploration and infiltration testing performed at the site, the underlying soils will allow for vertical infiltration with preliminary measured infiltration rates on the order 0.26 to 15 inches per hour, with the higher rates obtained within the underlying sand lens. This lens was capped by less permeable materials near the surface. Some of the underlying soils below this sand lens are less permeable.

Within the sand lens, storm water is anticipated to have very high vertical flow down to less permeable layers, at which point variable lateral flow is anticipated along the contact of dissimilar permeability.

6.3. Geotechnical Hazards

The introduction of water into hydro-collapsible soils may cause differential settlement and potential distress to improvements. Infiltration may saturate the near surface soils, which can potentially cause hydro-collapse prone soils to settle. The soils encountered onsite may be potentially hydro-collapsible. Setbacks from buildings and offsite improvements (minimum 25 feet) should mitigate the potential for settlement to occur below the proposed structures. It is possible that additional settlement of non-structural improvements may occur near infiltration devices. The owner should be aware of the potential need for additional long term maintenance for improvements constructed adjacent to the infiltration BMPs. Additional mitigation may include deeper removals below the improvements or construction of cut-off walls to mitigate the potential for lateral movement of water below the proposed improvements.

The introduction of water into expansive soils can cause heaving and potential distress to improvements, including flatwork, foundations, walls, etc., founded on the expansive soils or bedrock. The upper onsite soils are not considered expansive; therefore ,the infiltration of water is not expected to cause heaving.

The site is not located near nearby slopes. As such, the infiltration of water is not expected to cause slope instability.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Infiltration rates are generally greater than 0.3 inches per hour and infiltration type BMPs are considered feasible subject to the constraints described herein. If infiltration type BMPs are proposed, the infiltration layer can be placed within the sandier layer to yield higher infiltration rates. Additional exploration may be needed to further evaluate the limits and depths of the sandier soil layers.

This report is based on the project as described and the information obtained from the percolation borings at the locations indicated on the plan. The findings are based on the review of the field data combined with an interpolation and extrapolation of conditions between and beyond the exploratory excavations. The results reflect an interpretation of the direct evidence obtained. Services performed by AGS have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other representation, either expressed or implied, and no warranty or guarantee is included or intended.

The data, opinions, and recommendations of this report are applicable to the specific design of this project as discussed in this report. They have no applicability to any other project or to any other location, and any and all subsequent users accept any and all liability resulting from any use or reuse of the data, opinions, and recommendations without the prior written consent of AGS.

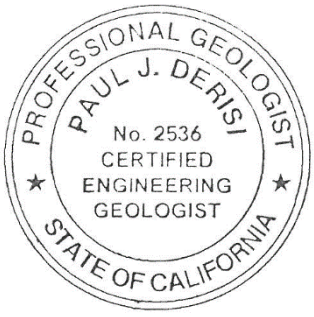
The infiltration rates presented in this report are based on limited testing performed as part of a preliminary screening for feasibility purposes. Dependent upon the final location, depth, and type of proposed BMP, additional testing may be warranted.

Advanced Geotechnical Solutions, Inc. appreciates the opportunity to provide you with geotechnical consulting services and professional opinions. If you have any questions, please contact the undersigned at (619) 867-0487.

Respectfully Submitted,
Advanced Geotechnical Solutions, Inc.

JOHN J. DONOVAN
RCE 65051, RGE 2790, Reg. Exp. 6-30-21

PAUL J. DERISI
CEG 2536, Reg. Exp. 5-31-21



Distribution: (1) Addressee

Attachments: References
Figure 1 - Site Location Map
Figure 2- Regional Geologic Map
Plate 1 - Exploration Location Plan
Appendix A – Field Date- Percolation Test Results and Boring and Test Pit Logs

REFERENCES

Advanced Geotechnical Solutions, Inc., 2022, "EIR Level Geotechnical Study, Proposed Industrial Development, APNs 3064-401-03, -04, -05, West Side of Highway 395, Hesperia, California," Report No. 2202-09-B-2, March 22, 2022.

California Building Standards Commission, 2019, California Building Code, Title 24, Part 2, Volumes 1 and 2.

County of San Bernardino, 2016, *Mojave River Watershed Technical Guidance Document for Water Quality Management Plans*, April 4, 2016.

Morton, D. M., and Miller, F. K., 2006, *Geologic Map of the San Bernardino and Santa Ana 30' x 60' Quadrangles, California*, with digital preparation by Cossette, Pamela M., and Bovard, Kelly R.: United States Geological Survey (USGS) Open-File Report 2006-1217.

Orange County Public Works. (2013). *Exhibit 7.III, Technical Guidance Document (TGD) for the Preparation of Conceptual/ Preliminary and/or Project Water Quality Management Plans (WQMPs)*, December 20, 2013.

State of California Water Boards, May 16, 2019, *http://geotracker.waterboards.ca.gov/*

APPENDIX A

FIELD DATA- PERCOLATION TEST RESULTS AND BORING AND TEST PIT LOGS

PERCOLATION TEST DATA SHEET

Project: Hesperia 29-Acre Business | Project No.: 2202-09 | Date: 3/4/2022

Test Hole No.: P-1 | Tested By: SD | Water Temp.:

Depth of Test Hole: 71 inches | USCS: SM | Air Temp.: 48

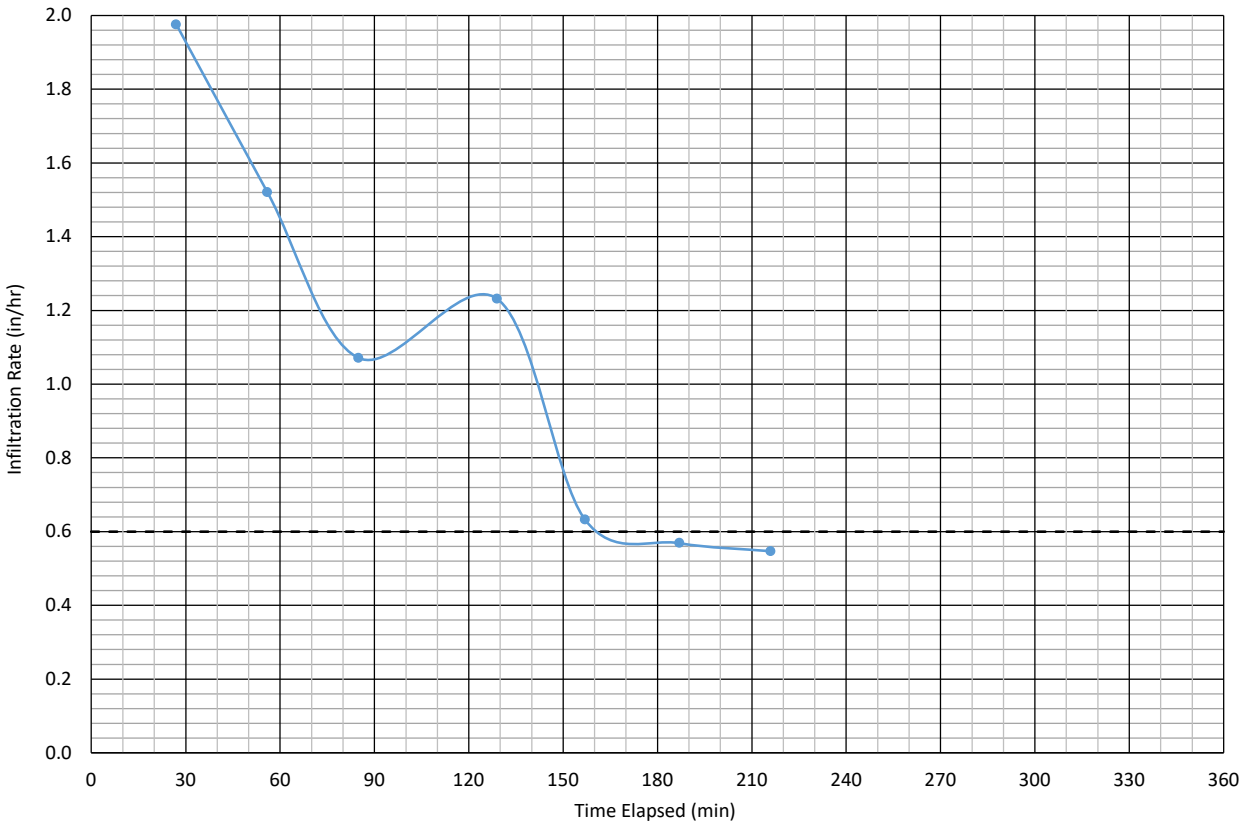
Test Hole Dimensions (Inches)

Length: 71 | Diameter: 8

Infiltration Test

Trial No.	Start Time (hr and min)	Stop Time (hr and min)	Time Interval (min.)	Piezometric Surface (inches)			Average Water Column	Perc Rate (in./hr.)	Infiltration Rate* (in./hr.)
				Start Depth	End Depth	Depth Change			
1	12:42	13:09	27	25 8/16	15 8/16	10	20.50	22.22	1.98
2	13:11	13:40	29	27	18	9	22.50	18.62	1.52
3	13:41	14:10	29	28	21 2/16	6 14/16	24.56	14.22	1.07
4	14:11	14:55	44	26 8/16	16	10 8/16	21.25	14.32	1.23
5	14:58	15:26	28	28	23 14/16	4 2/16	25.94	8.84	0.63
6	15:28	15:58	30	28 2/16	24 2/16	4	26.13	8.00	0.57
7	16:00	16:29	29	29 4/16	25 6/16	3 14/16	27.31	8.02	0.55

*Calculated via Porchet Method



PERCOLATION TEST DATA SHEET

Project: Hesperia 29-Acre Business | Project No.: 2202-09 | Date: 3/4/2022

Test Hole No.: P-2 | Tested By: SD | Water Temp.:

Depth of Test Hole: 59 inches | USCS: SM | Air Temp.: 48

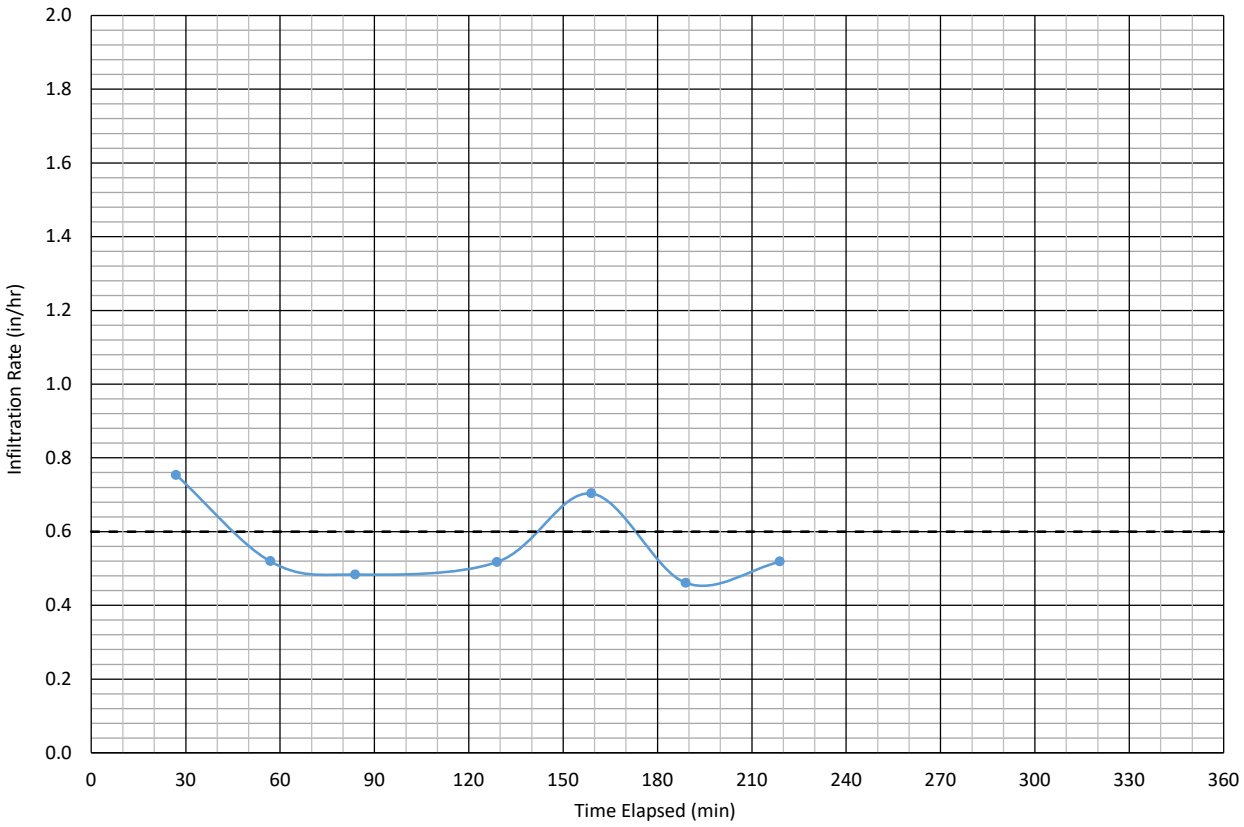
Test Hole Dimensions (Inches)

Length: 59 | Diameter: 8

Infiltration Test

Trial No.	Start Time (hr and min)	Stop Time (hr and min)	Time Interval (min.)	Piezometric Surface (inches)			Average Water Column	Perc Rate (in./hr.)	Infiltration Rate* (in./hr.)
				Start Depth	End Depth	Depth Change			
1	12:39	13:06	27	18	14 14/16	3 2/16	16.44	6.94	0.75
2	13:07	13:37	30	18 8/16	16	2 8/16	17.25	5.00	0.52
3	13:39	14:06	27	18	15 15/16	2 1/16	16.97	4.58	0.48
4	14:07	14:52	45	18 8/16	14 14/16	3 10/16	16.69	4.83	0.52
5	14:53	15:23	30	18 14/16	15 8/16	3 6/16	17.19	6.75	0.70
6	15:25	15:55	30	16 15/16	14 14/16	2 1/16	15.91	4.12	0.46
7	15:56	16:26	30	17 8/16	15 2/16	2 6/16	16.31	4.75	0.52

*Calculated via Porchet Method



PERCOLATION TEST DATA SHEET

Project: Hesperia 29-Acre Business | Project No.: 2202-09 | Date: 3/4/2022

Test Hole No.: P-3 | Tested By: SD | Water Temp.:

Depth of Test Hole: 48 inches | USCS: SM | Air Temp.: 48

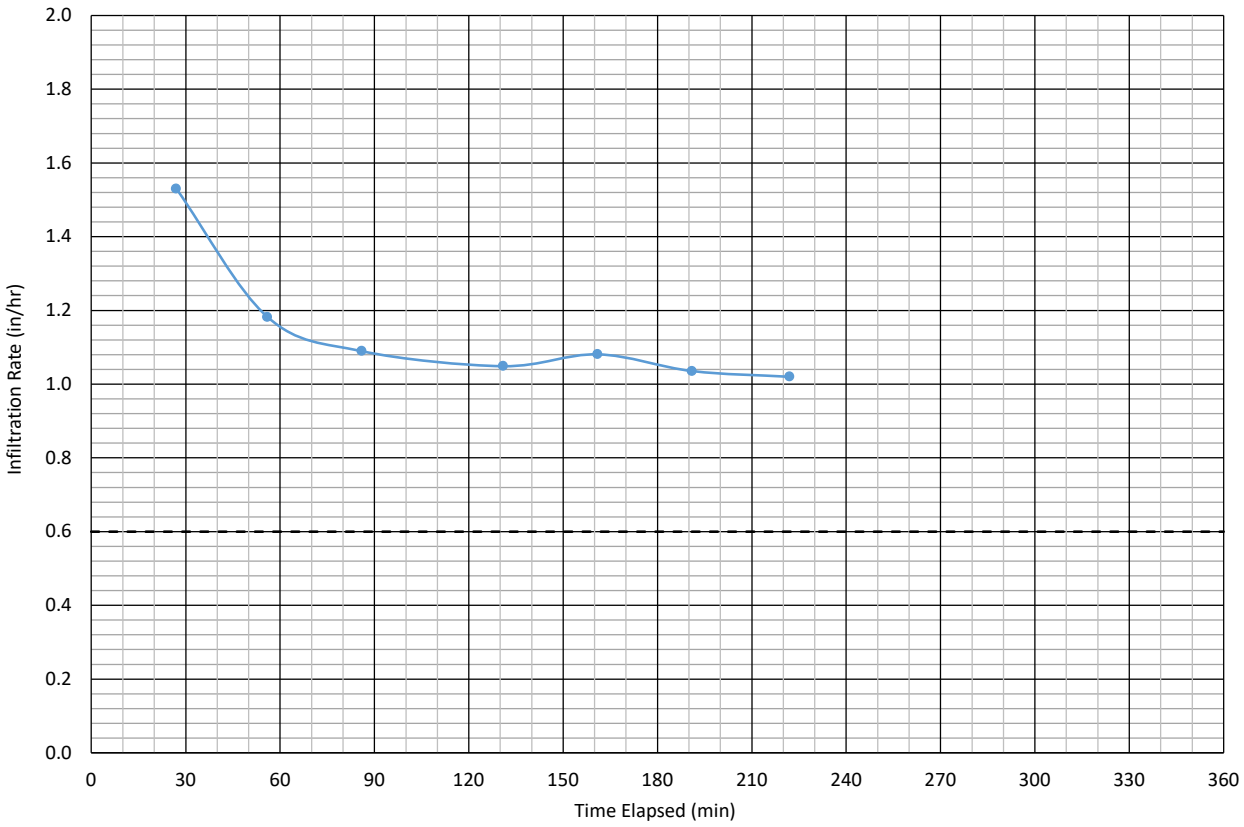
Test Hole Dimensions (Inches)

Length: 48 | Diameter: 8

Infiltration Test

Trial No.	Start Time (hr and min)	Stop Time (hr and min)	Time Interval (min.)	Piezometric Surface (inches)			Average Water Column	Perc Rate (in./hr.)	Infiltration Rate* (in./hr.)
				Start Depth	End Depth	Depth Change			
1	12:36	13:03	27	16 15/16	11 6/16	5 9/16	14.16	12.36	1.53
2	13:03	13:32	29	16	11 8/16	4 8/16	13.75	9.31	1.18
3	13:33	14:03	30	16 4/16	11 14/16	4 6/16	14.06	8.75	1.09
4	14:04	14:49	45	15 14/16	10	5 14/16	12.94	7.83	1.05
5	14:50	15:20	30	16 6/16	12	4 6/16	14.19	8.75	1.08
6	15:21	15:51	30	16	11 14/16	4 2/16	13.94	8.25	1.04
7	15:53	16:24	31	16 4/16	12	4 4/16	14.13	8.23	1.02

*Calculated via Porchet Method



PERCOLATION TEST DATA SHEET

Project: Hesperia 29-Acre Business | Project No.: 2202-09 | Date: 3/4/2022

Test Hole No.: P-4 | Tested By: SD | Water Temp.:

Depth of Test Hole: 46.5 inches | USCS: SM | Air Temp.: 48

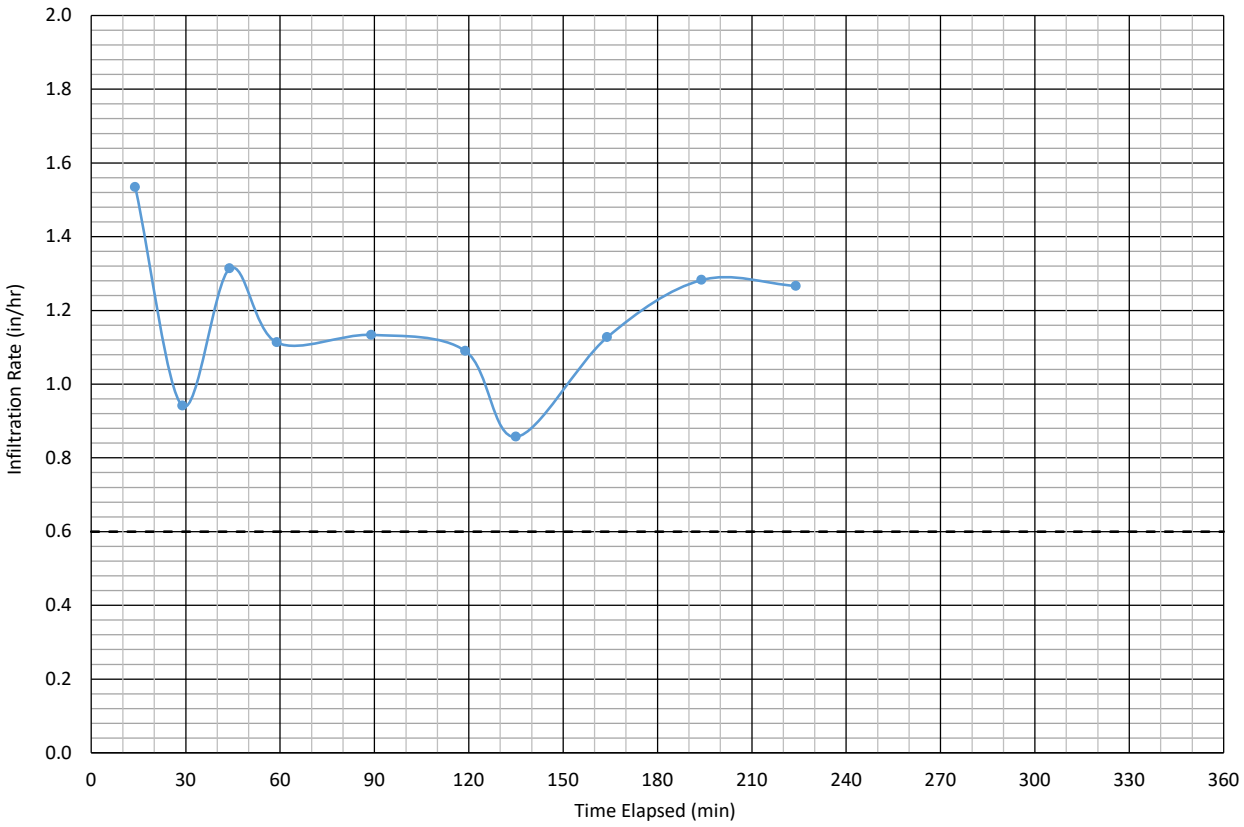
Test Hole Dimensions (Inches)

Length: 46.5 | Diameter: 8

Infiltration Test

Trial No.	Start Time (hr and min)	Stop Time (hr and min)	Time Interval (min.)	Piezometric Surface (inches)			Average Water Column	Perc Rate (in./hr.)	Infiltration Rate* (in./hr.)
				Start Depth	End Depth	Depth Change			
1	12:31	12:45	14	15 8/16	12 10/16	2 14/16	14.06	12.32	1.53
2	12:45	13:00	15	12 10/16	11	1 10/16	11.81	6.50	0.94
3	13:00	13:15	15	16 2/16	13 6/16	2 12/16	14.75	11.00	1.31
4	13:15	13:30	15	13 6/16	11 6/16	2	12.38	8.00	1.11
5	13:30	14:00	30	15 10/16	11 4/16	4 6/16	13.44	8.75	1.13
6	14:00	14:30	30	16 4/16	11 14/16	4 6/16	14.06	8.75	1.09
7	14:30	14:46	16	11 14/16	10 6/16	1 8/16	11.13	5.62	0.86
8	14:47	15:16	29	16 4/16	11 14/16	4 6/16	14.06	9.05	1.13
9	15:18	15:48	30	17	11 12/16	5 4/16	14.38	10.50	1.28
10	15:50	16:20	30	16 12/16	11 10/16	5 2/16	14.19	10.25	1.27

*Calculated via Porchet Method



PERCOLATION TEST DATA SHEET

Project: Hesperia 29-Acre Business | Project No.: 2202-09 | Date: 3/4/2022

Test Hole No.: P-5 | Tested By: SD | Water Temp.:

Depth of Test Hole: 77 inches | USCS: SP-SM | Air Temp.: 48

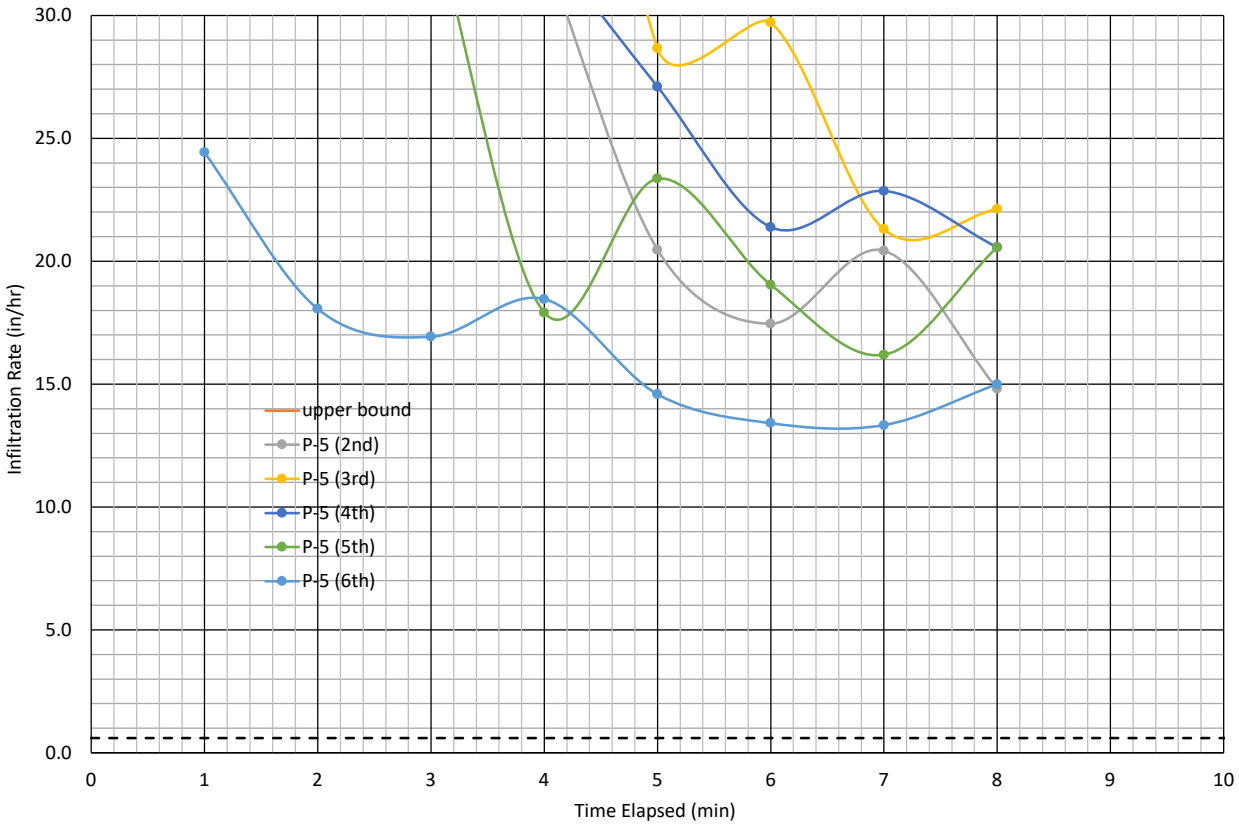
Test Hole Dimensions (Inches)

Length: 77 | Diameter: 8

Infiltration Test

Trial No.	Start Time (hr and min)	Stop Time (hr and min)	Time Interval (min.)	Piezometric Surface (inches)			Average Water Column	Perc Rate (in./hr.)	Infiltration Rate* (in./hr.)
				Start Depth	End Depth	Depth Change			
6			1	21	16 12/16	4 4/16	18.88	255.00	24.43
			1	16 12/16	14 2/16	2 10/16	15.44	157.50	18.06
			1	14 2/16	12	2 2/16	13.06	127.50	16.93
			1	12	10	2	11.00	120.00	18.46
			1	10	8 10/16	1 6/16	9.31	82.50	14.59
			1	8 10/16	7 8/16	1 2/16	8.06	67.50	13.42
			1	7 8/16	6 8/16	1	7.00	60.00	13.33
			1	6 8/16	5 8/16	1	6.00	60.00	15.00

*Calculated via Porchet Method



BORING NUMBER B-1

ADVANCED GEOTECHNICAL SOLUTIONS, INC.

CLIENT Landstar Companies
PROJECT NAME Industrial Development
PROJECT NUMBER 2202-09
PROJECT LOCATION APN 3064-401-03, 04, 05, W. of Hwy 395, Hesperia
DATE STARTED 2/21/22 **COMPLETED** 2/21/22
GROUND ELEVATION 3554 ft **HOLE SIZE** 8
DRILLING CONTRACTOR 2R-Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY FE **CHECKED BY** AB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	SATURATION (%)	OTHER TESTS	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		SC	**Older Alluvium (Qoal):** Clayey SAND, yellowish brown, slightly moist, dense, fine- to coarse-grained; some gravel.	BU					RV				
5				MC	17-21-27 (48)	125	4.1	33	Consol				
10		SM	@ 10 ft. Silty SAND, yellowish brown, moist, dense, fine-grained; some clay.	MC	18-20-31 (51)	113	7.5	43					
15			@ 15 ft. brown with iron oxide staining, very dense, fine- to coarse-grained; some fine gravel.	MC	19-38-46 (84)	130	5.7	55					
20			@ 20 ft. with sub-rounded gravel.	MC	18-33-48 (81)	122	1.8	13					
25				MC	12-22-38 (60)	127	3.9	34					

(Continued Next Page)

AGS
ADVANCED GEOTECHNICAL SOLUTIONS, INC.

CLIENT Landstar Companies **PROJECT NAME** Industrial Development

PROJECT NUMBER 2202-09 **PROJECT LOCATION** APN 3064-401-03, 04, 05, W. of Hwy 395, Hesperia

DEPTH (ft)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	SATURATION (%)	OTHER TESTS	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
30		SM	**Older Alluvium (Qoal):** (continued) Silty SAND, yellowish brown, moist, dense, fine-grained; some clay; with gravel.										
		SP-SM	@ 30 ft. interbedded Silty SAND and gravelly SAND, fine-to coarse-grained, yellowish brown, dry, dense.	SPT	11-14-15 (29)								
35		SP	@ 35 ft. SAND, fine-to coarse-grained, light gray, dry, friable.	MC	13-37-48 (85)	114	2.3	13					
40		SP-SM	@ 40 ft. interbedded Silty SAND and SAND, fine-to coarse-grained, yellowish brown, dry, dense.	SPT	11-11-18 (29)								
45		ML	@ 46 ft. SILT, brown, wet, stiff; some clay.	MC	13-15-35 (50)	124	9.0	73					
50		SP	@ 50 ft. Gravelly SAND, brown, very dense, fine- to coarse-grained; some silt, metamorphic and granitic clasts to 1/2-inch size.	MC	18-34-40 (74)	117	2.4	15					

Total Depth= 51.5 ft.
No water. No caving

BORING NUMBER B-2

ADVANCED GEOTECHNICAL SOLUTIONS, INC.

CLIENT Landstar Companies
PROJECT NAME Industrial Development
PROJECT NUMBER 2202-09
PROJECT LOCATION APN 3064-401-03, 04, 05, W. of Hwy 395, Hesperia
DATE STARTED 2/21/22 **COMPLETED** 2/21/22
GROUND ELEVATION 3553 ft **HOLE SIZE** 8
DRILLING CONTRACTOR 2R-Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY FE **CHECKED BY** AB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	SATURATION (%)	OTHER TESTS	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		SM	**Older Alluvium (Qoal):** Silty SAND, yellowish brown, slightly moist, dense, fine- to coarse-grained.	BU					EI Max DSR Chem				
				MC	8-16-17 (33)	124	2.0	16					
5													
				MC	16-22-27 (49)	123	4.7	36					
10													
15			@ 15 ft. some metamorphic clasts to 1/2-inch size (quartzite).	MC	16-22-25 (47)	126	8.1	69					
20		SP	@ 20 ft. SAND, fine-to coarse-grained, light yellowish brown to light reddish brown, dry.	MC	12-19-27 (46)	121	3.1	22					
25				MC	12-15-29 (44)	115	3.1	18					
			Total Depth= 26.5 ft. No water. No caving										

BORING NUMBER B-3

ADVANCED GEOTECHNICAL SOLUTIONS, INC.

CLIENT Landstar Companies
PROJECT NAME Industrial Development
PROJECT NUMBER 2202-09
PROJECT LOCATION APN 3064-401-03, 04, 05, W. of Hwy 395, Hesperia
DATE STARTED 2/21/22 **COMPLETED** 2/21/22
GROUND ELEVATION 3553 ft **HOLE SIZE** 8
DRILLING CONTRACTOR 2R-Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY FE **CHECKED BY** AB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	SATURATION (%)	OTHER TESTS	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		SM	**Older Alluvium (Qoal):** Silty SAND, yellowish brown, slightly moist, medium dense, fine- to coarse-grained.										
5				MC	5-7-8 (15)	118	1.8	12					
10			@ 10 ft. medium- to coarse-grained, light yellowish brown, dry.	MC	24-41-50 (91)	129	2.5	24					
15			@ 15 ft. Silty SAND, yellowish brown, slightly moist, dense, fine-grained; abundant subrounded gravel to 1/2-inch size.	MC	35-50/5"	132	4.1	42					
20		SP	@ 20 ft. Gravelly SAND, yellowish to reddish brown, very dense, fine- to coarse-grained; metamorphic clasts to 1/2-inch size.	MC	32-39-50 (89)	121	1.9	14					
			Total Depth= 21.5 ft. No water. No caving										

BORING NUMBER B-4

AGS
ADVANCED GEOTECHNICAL SOLUTIONS, INC.

CLIENT Landstar Companies
PROJECT NAME Industrial Development
PROJECT NUMBER 2202-09
PROJECT LOCATION APN 3064-401-03, 04, 05, W. of Hwy 395, Hesperia
DATE STARTED 2/21/22 **COMPLETED** 2/21/22
GROUND ELEVATION 3554 ft **HOLE SIZE** 8
DRILLING CONTRACTOR 2R-Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY FE **CHECKED BY** AB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	SATURATION (%)	OTHER TESTS	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		SM	**Older Alluvium (Qoal):** Silty SAND, yellowish brown, dry, medium dense, fine- to medium-grained.	MC	6-9-11 (20)	117	1.9	12					
5		SP	@ 7 ft. SAND, light red, slightly moist, dense, fine-grained to coarse-grained; some subrounded gravel to 3/4-inch size.	MC	6-10-14 (24)	111	2.8	15	Consol				
10													
15				MC	27-36-50 (86)	130	5.4	53					
20			@ 20 ft. Gravelly SAND, light red, dry, very dense, fine- to coarse-grained; some gravel to 3/4-inch size.	MC	16-27-48 (75)	119	3.0	20					

Total Depth= 21.5 ft.
No water. No caving

BORING NUMBER B-5

ADVANCED GEOTECHNICAL SOLUTIONS, INC.

CLIENT Landstar Companies
PROJECT NAME Industrial Development
PROJECT NUMBER 2202-09
PROJECT LOCATION APN 3064-401-03, 04, 05, W. of Hwy 395, Hesperia
DATE STARTED 2/21/22 **COMPLETED** 2/21/22
GROUND ELEVATION 3545 ft **HOLE SIZE** 8
DRILLING CONTRACTOR 2R-Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY FE **CHECKED BY** AB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	SATURATION (%)	OTHER TESTS	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		SM	**Older Alluvium (Qoal):** Silty SAND, yellowish brown, dry, medium dense, fine- to medium-grained.										
5				MC	24-50/5"	115	2.7	16					
			@ 7 ft. less silt; with coarse gravel.	BU									
10				MC	27-39-43 (82)	121	2.7	19	Consol				
15		SC	@ 15 ft. Clayey SAND, light yellowish brown, dry, dense, fine- to medium-grained; some gravel to 3/4-inch size.	MC	29-50/5"	134	5.2	58					
20		SP	@ 20 ft. SAND, light gray, dry, dense, fine- to coarse-grained; friable.	SPT	5-12-17 (29)								

Total Depth= 21.5 ft.
No water. No caving

BORING NUMBER P-1

ADVANCED GEOTECHNICAL SOLUTIONS, INC.

CLIENT Landstar Companies
PROJECT NAME Industrial Development
PROJECT NUMBER 2202-09
PROJECT LOCATION APN 3064-401-03, 04, 05, W. of Hwy 395, Hesperia
DATE STARTED 2/21/22 **COMPLETED** 3/4/22
GROUND ELEVATION 3540 ft **HOLE SIZE** 8
DRILLING CONTRACTOR 2R-Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY FE **CHECKED BY** AB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	SATURATION (%)	OTHER TESTS	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		SM	Silty SAND, fine- to coarse-grained, yellowish brown, slightly moist, loose; with subrounded gravel to 3/4-inch size.										
5			@ 2 ft. light yellowish brown, slightly moist.										
			Total Depth= 6 ft. No water. No caving										

BORING NUMBER P-2

ADVANCED GEOTECHNICAL SOLUTIONS, INC.

CLIENT Landstar Companies
PROJECT NAME Industrial Development
PROJECT NUMBER 2202-09
PROJECT LOCATION APN 3064-401-03, 04, 05, W. of Hwy 395, Hesperia
DATE STARTED 2/21/22 **COMPLETED** 3/4/22
GROUND ELEVATION 3540 ft **HOLE SIZE** 8
DRILLING CONTRACTOR 2R-Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY FE **CHECKED BY** AB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	SATURATION (%)	OTHER TESTS	ATTERBERG LIMITS			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		SM	Silty SAND, fine- to coarse-grained, yellowish brown, slightly moist, loose; with subrounded gravel to 3/4-inch size.										
5			Total Depth= 5 ft. No water. No caving										

BORING NUMBER P-3

AGS
ADVANCED GEOTECHNICAL SOLUTIONS, INC.

CLIENT Landstar Companies
PROJECT NAME Industrial Development
PROJECT NUMBER 2202-09
PROJECT LOCATION APN 3064-401-03, 04, 05, W. of Hwy 395, Hesperia
DATE STARTED 2/21/22 **COMPLETED** 3/4/22
GROUND ELEVATION 3541 ft **HOLE SIZE** 8
DRILLING CONTRACTOR 2R-Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY FE **CHECKED BY** AB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	SATURATION (%)	OTHER TESTS	ATTERBERG LIMITS			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		SM	Silty SAND, fine- to coarse-grained, yellowish brown.										
			Total Depth= 4 ft. No water. No caving										

BORING NUMBER P-4

ADVANCED GEOTECHNICAL SOLUTIONS, INC.

CLIENT Landstar Companies
PROJECT NAME Industrial Development
PROJECT NUMBER 2202-09
PROJECT LOCATION APN 3064-401-03, 04, 05, W. of Hwy 395, Hesperia
DATE STARTED 2/21/22 **COMPLETED** 3/4/22
GROUND ELEVATION 3545 ft **HOLE SIZE** 8
DRILLING CONTRACTOR 2R-Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING ---
LOGGED BY FE **CHECKED BY** AB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	SATURATION (%)	OTHER TESTS	ATTERBERG LIMITS			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		SM	Silty SAND, fine to coarse-grained, light brown, dry.										
			Total Depth= 4 ft. No water. No caving										

BORING NUMBER P-5

ADVANCED GEOTECHNICAL SOLUTIONS, INC.

CLIENT Landstar Companies
PROJECT NAME Industrial Development
PROJECT NUMBER 2202-09
PROJECT LOCATION APN 3064-401-03, 04, 05, W. of Hwy 395, Hesperia
DATE STARTED 3/4/22 **COMPLETED** 3/4/22
GROUND ELEVATION 3545 ft **HOLE SIZE** 8
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY SD **CHECKED BY** AB
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	SATURATION (%)	OTHER TESTS	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		SM	Silty SAND, fine to coarse-grained, light brown, dry.										
5		SP	SAND with silt, fine to coarse-grained, light brown.										
			Total Depth= 7 ft. No water. No caving										

Date Excavated: 2/21/2022, 3/4/2022
Logged by: SD
Equipment: JD 410J Backhoe

LOG OF TEST PITS

Excavation No.	Depth (ft.)	USCS	Description
T-1	0.0 – 0.5	SM	**Topsoil** SILTY SAND, fine- to coarse-grained, light brown, with roots, dry, loose, numerous rodent holes.
	0.5 – 3.3	SM	**Alluvium (Qal)?** SILTY SAND, fine- to coarse-grained, trace gravel, light brown, dry, loose, porous.
	3.3 – 10.0	SM	**Older Alluvium (Qoal)?** SILTY SAND, fine- to coarse-grained, trace gravel, light brown, medium dense, rodent hole at 3.8 feet in depth.
			@ 5 ft., coarser grained, slightly moist, medium dense.
		SP-SM	@ 5.5 ft., SAND with Silt, trace cobbles.
			@ 9 ft., more cobbles, medium dense to dense.
			TOTAL DEPTH 10 FT. NO WATER, SOME CAVING BELOW 6 FT.

Excavation No.	Depth (ft.)	USCS	Description
T-2	0.0 – 0.3	SM	**Topsoil** SILTY SAND, fine- to medium-grained, light yellow brown, some roots, dry, loose.
	0.3 – 1.7	SM	**Alluvium (Qal)?** SILTY SAND, fine-grained, yellow brown, slightly moist, loose.
	1.7 – 8.5	SM	**Older Alluvium (Qoal)?** SILTY SAND, fine- to coarse-grained, light brown, dry, medium dense. @ 4.5 ft., dense. @ 5.5 ft., fine-grained, slightly indurated, very dense. TOTAL DEPTH 8.5 FT. NO WATER, NO CAVING

Excavation No.	Depth (ft.)	USCS	Description
T-3	0.0 – 0.7	SM	**Topsoil** SILTY SAND, fine- to medium-grained, light yellow brown, some roots, dry, loose.
	0.7 – 2.8	SM	**Alluvium (Qal)?** SILTY SAND, fine-grained, light yellow brown, slightly moist.
	2.8 – 6.0	SM	**Older Alluvium (Qoal)?** SILTY SAND, fine- to coarse-grained, less silt, yellow brown, medium dense.
	6.0 – 10.0	SP-SM	@ 6 ft., SAND with Silt, fine to coarse-grained, with gravel, light yellow brown, dense. @ 8 ft., dense to very dense. TOTAL DEPTH 10 FT. NO WATER, NO CAVING

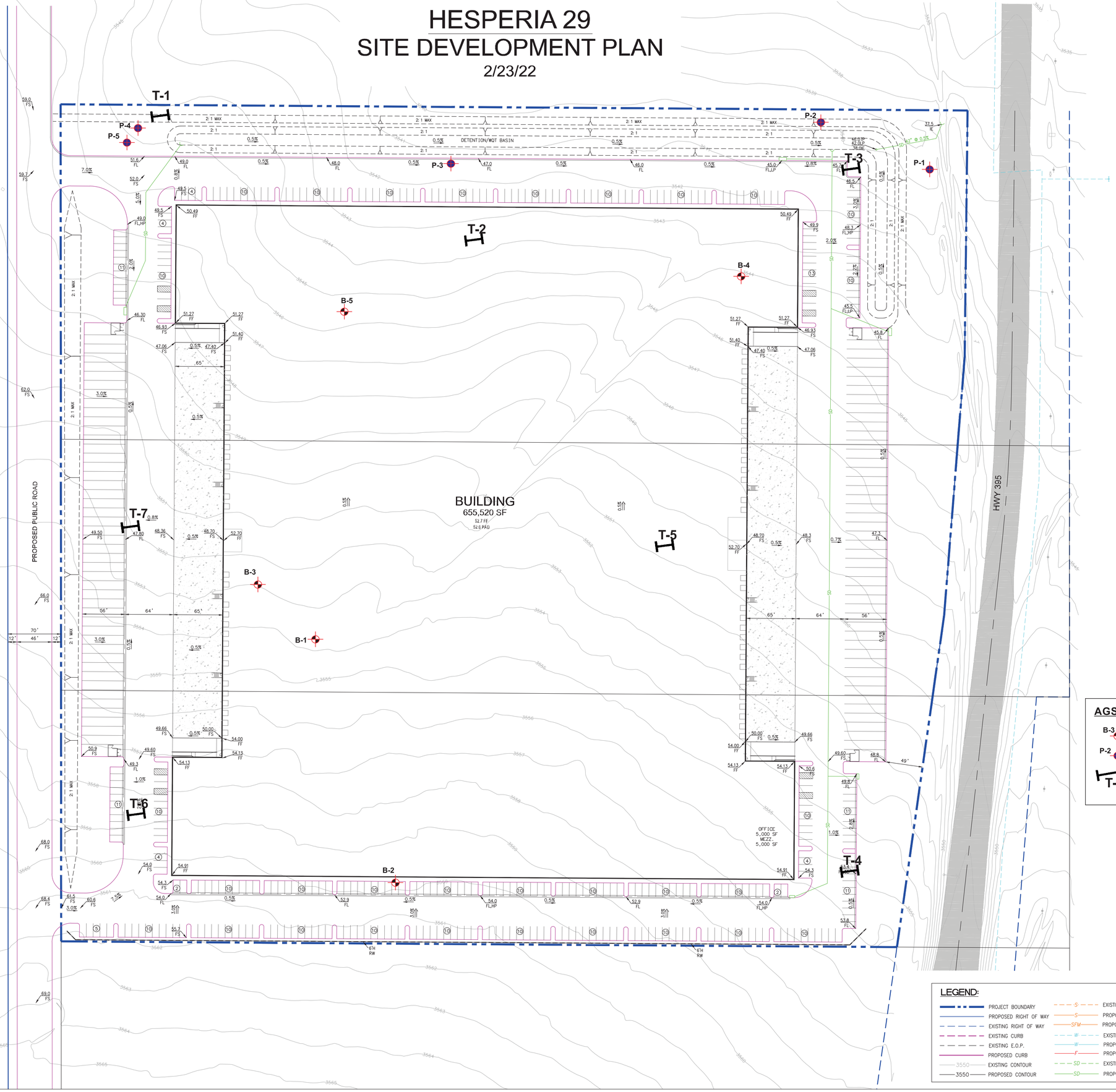
Excavation No.	Depth (ft.)	USCS	Description
T-4	0.0 – 1.0	SM	**Topsoil** SILTY SAND, fine- to coarse-grained, yellow brown, some roots, slightly moist, loose.
	1.0 – 3.0	SM	**Alluvium (Qal)?** SILTY SAND, fine- to coarse-grained, yellow brown, dry to slightly moist, loose, roots down to 30 inches in depth.
	3.0 – 5.0	SM	**Older Alluvium (Qoal)?** SILTY SAND, fine- to coarse-grained, less silt, light yellow brown, medium dense.
	5.0 – 6.0	SP-SM	@ 5 ft., SAND with Silt, fine to coarse-grained, some gravel, orange brown, slightly moist, medium dense.
	6.0 – 8.0	SM	@ 6 ft., SILTY SAND, fine to coarse-grained, orange brown, slightly indurated, dense, more difficult to excavate. TOTAL DEPTH 8 FT. NO WATER, NO CAVING

Excavation No.	Depth (ft.)	USCS	Description
T-5	0.0 – 2.0	SM	**Alluvium (Qal)** SILTY SAND, fine- to medium-grained, yellow brown, slightly moist, loose, some roots.
	2.0 – 4.0	SM	**Older Alluvium (Qoal)?** SILTY SAND, fine- to coarse-grained, some gravel, less silt, yellow brown, dry, medium dense.
	4.0 – 5.0	SM	@ 4 ft., fine to coarse-grained, with gravel, medium dense to dense.
	5.0 – 10.5	SP-SM	@ 5 ft., SAND with silt, fine to coarse-grained, some gravel, orange brown, slightly moist, slightly indurated, dense. TOTAL DEPTH 10.5 FT. NO WATER, NO CAVING

Excavation No.	Depth (ft.)	USCS	Description
T-6	0.0 – 2.0	SM	**Alluvium (Qal)** SILTY SAND, fine- to medium-grained, yellow brown, slightly moist, loose to medium dense.
	2.0 – 2.5	SM	**Older Alluvium (Qoal)?** SILTY SAND, fine- to coarse-grained, trace gravel, less silt, lightly moist, light brown, dry, medium dense.
	2.5 – 7.5	SM	@ 2.5 ft., fine to coarse-grained, with gravel, light brown, dry, dense. @ 4 ft., slightly indurated, dense, harder to excavate. TOTAL DEPTH 7.5 FT. NO WATER, NO CAVING

Excavation No.	Depth (ft.)	USCS	Description
T-7	0.0 – 2.7	SM	**Alluvium (Qal)** SILTY SAND, fine -grained, yellow brown, dry to slightly moist, loose, some roots down to 2 feet in depth.
	2.7 – 4.0	SM	**Older Alluvium (Qoal)?** SILTY SAND, fine- to coarse-grained, some gravel, yellow brown, dry, medium dense to dense.
	4.0 – 7.5	SP-SM	@ 4 ft., SAND with silt, fine to coarse-grained, with gravel, red brown, moist, slightly indurated, dense.
	7.5 – 10.0	SP	@ 7.5 ft., SAND, fine to coarse-grained, with gravel and cobbles, red brown, dense.
	10.0 – 12.0	SP-SM	@ 10 ft., SAND with silt, fine to coarse-grained, slightly indurated, dense, harder to excavate. @ 11 ft., light grey brown, slightly cemented. TOTAL DEPTH 12 FT. NO WATER, SLIGHT CAVING 7.5 to 10 FEET

HESPERIA 29
SITE DEVELOPMENT PLAN
2/23/22



AGS LEGEND:

B-3	Approximate location of hollow stem auger borings (AGS, 2022)
P-2	Approximate location of percolation (AGS, 2022)
T-6	Approximate location of test pit (AGS, 2022)

PLATE 1
Exploration Location Plan

AGS
ADVANCED GEOTECHNICAL SOLUTIONS, INC.

Project:	Report:	Date:
P/W 2202-09	2202-09-B-2	Mar. 2022

LEGEND:

PROJECT BOUNDARY	EXISTING SEWER
PROPOSED RIGHT OF WAY	PROPOSED SEWER
EXISTING RIGHT OF WAY	PROPOSED SEWER FORCE MAIN
EXISTING CURB	EXISTING WATER
EXISTING E.O.P.	PROPOSED WATER
PROPOSED CURB	PROPOSED FIRE WATER
EXISTING CONTOUR	EXISTING STORM DRAIN
PROPOSED CONTOUR	PROPOSED STORM DRAIN

SCALE: 1"=50'

NOTE: ADD 3500 TO ALL PROPOSED ELEVATIONS SHOWN.

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