REPORT OF GEOTECHNICAL ENGINEERING EXPLORATION

WESTGATE AT CRANE ROADWAY
CRANE, INDIANA
23-0446-01G

PREPARED FOR:

AMERICAN STRUCTUREPOINT, INC.
9025 RIVER ROAD, SUITE 200
INDIANAPOLIS, INDIANA 46240

Patriot Engineering and Environmental, Inc.
6150 East 75th Street
Indianapolis, Indiana 46250

August 11, 2023

PATRIOT
ENGINEERING AND ENVIRONMENTAL, INC.

August 11, 2023

Mr. Nicholas Murphy
American Structurepoint, Inc.
9025 River Road, Suite 200
Indianapolis, Indiana 46240

Re: Report of Geotechnical Engineering Exploration
Westgate at Crane Roadway
Crane, Indiana (Daviess County)
Patriot Project No. 23-0446-01G

Dear Nicholas:

Attached is the report of our subsurface exploration for the above referenced project. This exploration was completed in general accordance with our Proposal No. P22-2445-01G dated December 7th, 2023. This report includes detailed and graphic logs of seven (7) soil borings drilled at the proposed project site. Also included in the report are the results of laboratory tests performed on samples obtained from the site, and geotechnical recommendations pertinent to the planned reconstruction.

The purpose of this exploration is to determine the general near surface and subsurface conditions within the project area and to develop the geotechnical engineering recommendations necessary for the design and construction of the proposed roadway alignment. This was achieved by drilling soil borings, and by conducting laboratory tests on soil samples taken from the borings. This report contains the results of our findings, an engineering interpretation of these results with respect to the available project information, and recommendations to aid in the design and construction of the proposed roadway.

PROJECT INFORMATION

The project will include the construction of a new roadway alignment to be named Capt. W.J. Nelson Drive as part of the Westgate Development in Crane, Indiana. We understand that the project will include the construction of approximately 2,200 feet of new roadway from the intersection with Innovation Drive to the intersection with County Road 1400 East. We also understand that the roadway alignment has shifted approximately 200 to 300 feet north of the locations of soil borings RB-4, RB-5, and RB-6.

LABORATORY TESTING

Representative samples recovered in the borings were selected for testing in the laboratory to evaluate their physical properties and engineering characteristics. Laboratory analysis included:

- Natural Moisture Content Analysis (AASHTO T265)
- Grain Size Distribution Analysis (AASHTO T88)
- Atterberg Limits Analysis (AASHTO T89 and T90)
- pH Determination Analysis (AASHTO T289)

- Sulfate Determination (ITM 510)
- Unconfined Compressive Strength (AASHTO T208)
- Standard Proctor (AASHTO T99)
- Resilient Modulus (AASHTO T307)

The results of the laboratory tests are summarized in "*Subsurface Conditions*", as well as in Appendix "C". Soil descriptions on the boring logs are in accordance with the AASHTO system and the Indiana Department of Transportation (INDOT) Standard Specifications (ISS) textural classification, e.g., Clay Loam (A-6).

SUBSURFACE CONDITIONS

Our interpretation of the subsurface conditions is based upon seven (7) soil borings drilled at the approximate locations shown on the Boring Location Map (Figure No. 2) in Appendix "A".

The following discussion is general; for more specific information, please refer to the boring logs presented in Appendix "C". It should be noted that the dashed stratification lines shown on the soil boring logs indicate approximate transitions between soil types. In-situ stratification changes could occur gradually or at different depths.

All depths discussed below refer to depths below the existing ground surface. Our soil boring locations were not surveyed. Therefore, existing ground surface elevations are based on data from Google Earth.

Soil borings RB-1 and RB-2 were drilled in an area covered by 2 to 9 inches of crushed stone.

The remaining soil borings were performed in areas covered with topsoil, a surficial layer of material that is a blend of silts, sands, and clays, with varying amounts of organic matter. The topsoil layer was approximately 7 to 8 inches thick in the borings.

In general, the alignment is underlain by brown to gray, soft to medium stiff Silty Loam (A-4) or Silty Clay Loam (A-6). The natural moisture content of this material ranges from 17 to 23 percent (%). Standard Penetration Test N-values (blow counts) in this material varied from 4 to 9 blows per foot (bpf). The pH of these soils varied from 4.9 to 6.5. The sulfate content of these soils varied from non-detectable (ND) to 73 parts per million (ppm).

Brown to gray, very loose to medium dense, Sandy Loam (A-2-6) or Sand (A-1-b) was encountered in six (6) of the seven (7) soil borings at depths between 3.5 to 13.5 feet below the existing ground surface. Standard Penetration Test N-values (blow counts) in this material varied from 2 to 29 blows per foot (bpf). The pH of these soils varied from 6.6 to 7.7. The sulfate content of these soils varied from 20 to 40 parts per million (ppm).

Brown and gray, very soft to very stiff, Clay (A-7-6) was encountered in four (4) of the seven (7) soil borings at depths between 3.5 to 13.5 feet below the existing ground surface. The natural moisture content of this material ranges from 17 to 23 percent (%). Standard Penetration Test N-values (blow counts) in this material varied from 2 to 17 blows per foot (bpf). The pH of this soil was 5.7. The sulfate content of this soil was 53 parts per million (ppm).

Standard Proctor (moisture-density relationship) tests were performed on bulk samples from soil borings RB-1, RB-4, and RB-7 of the near surface (upper 5 feet) soil. The results of the Standard Proctor (moisture-density relationship) test can be found in Table No. 1 below as well as in Appendix "C".

TABLE NO. 1:
SUMMARY OF STANDARD PROCTOR (MOISTURE-DENSITY RELATIONSHIP) TEST

BORING LOCATION	SOIL TYPE	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)
RB-1	Silty Loam (A-4)	117.2	13.1
RB-4	Silty Loam (A-4)	115.4	13.2
RB-7	Silty Loam (A-4)	110.7	15.7

In conjunction with the Standard Proctor (moisture-density relationship) testing, resilient modulus (M_R) testing was completed on Shelby tube samples from soil boring RB-2, RB-3, and RB-6. The results of the resilient modulus test can be found in Table No. 2 below. The mean resilient modulus values were obtained at a confining pressure of about 2 psi and a deviator stress of 6 psi, at the natural moisture content. Refer to Appendix "C" for laboratory test results.

TABLE NO. 2: SUMMARY OF RESILIENT MODULUS TESTS

BORING LOCATION	SOIL TYPE	SAMPLE TYPE	MEAN RESILIENT MODULUS (PSI)	MOISTURE CONTENT (%)
RB-2	Silty Clay Loam (A-6)	Shelby Tube	4,757	18.6
RB-3	Silty Clay Loam (A-6)	Shelby Tube	5,615	22.7
RB-6	Silty Loam (A-4)	Shelby Tube	3,849	19.6

GROUNDWATER CONDITIONS

The term groundwater pertains to any water that percolates through the soil found on site. This includes any overland flow that permeates through a given depth of soil, perched water, and water that occurs below the "water table", a zone that remains saturated and water-bearing year-round.

Groundwater was encountered in the soil borings during drilling at depths between 13 to 15 feet below the existing round surface. Groundwater was not encountered after the borings were completed.

It should be recognized that fluctuations in the groundwater level should be expected over time due to variations in rainfall and other environmental or physical factors. The true static groundwater level can only be determined through observations made in cased holes over a long period of time, the installation of which was beyond the scope of this exploration.

DESIGN RECOMMENDATIONS

We understand that the project will include the construction of about 2,200 feet of roadway alignment. The shallow subgrade soils along the alignment consist of soft to medium stiff Silty Loam A-4 which if properly prepared (chemical modification) is suitable for the support of the new pavement section. We recommend using subgrade treatment Type IBC (cement) which consists of chemical modification with cement of 14 inches of subgrade.

Based on the conditions referenced above along with the proposed reconstruction, the following parameters (if the pavement is placed on the existing subgrade soils in "cut" or "at grade" areas) can be used for pavement design evaluations for the referenced alignment (presented in Table No. 3). The subgrade treatment provided below assume proper subgrade preparation in accordance with Section 207, "Subgrade", of the INDOT Standard Specifications.

Table No. 3: Summary of Soil Parameters for Pavement Design

Predominant Soil Type	Silty Loam (A-4)
Resilient Modulus (M_R) of Natural Subgrade (psi)	3,800
Resilient Modulus (M_R) of Prepared Subgrade (psi)	8,000
Percent Passing #200 (%)	75.2
Percent Silt (%)	60.6
Percent Clay (%)	14.6
Liquid Limit (LL)	25
Plastic Limit (PL)	18
Plasticity Index (PI)	7
Depth to Water Table (ft)	13
Average Natural Density of Natural Subgrade (pcf)	120
Average Percent Moisture of Natural Subgrade (%)	21
Organic Content (%)	N/A
Marl Content (%)	N/A
Sulfate Content (ppm)	4
Filter Fabric Required for Under-drains if installed	Type 1A
Subgrade Treatment	Type IBC (Cement)

Subgrade treatment Type IBC shall consist of chemical modification with cement of 14 inches of subgrade.

CONSTRUCTION CONSIDERATIONS

Chemical stabilization is used to increase the soil strength (the Mr value) of the subgrade as well as reducing the plasticity of the soil (reduced liquid limit and plasticity indexes). Because of the additional strength gain, stabilizing in-situ soils can be advantageous and a cost effective alternative to undercutting and replacing due to the higher Mr values that can typically be achieved

versus non-modified soils. Higher Mr values may result in an overall decrease of the pavement section (including subbase thickness) due to the increase in subgrade strength.

Prior to the application of the chemical, a number of representative samples of soils should be obtained from the final graded subgrade soils to determine the chemical reactivity and percentage (%) needed for modification of the soils (usually 5 to 8 percent (%)). The sampling and testing should follow the guidelines established in the "Design Procedures for Soil Modification or Stabilization" created by the Geotechnical Engineering Division of INDOT. A specialty contractor experienced in chemical modification should apply and determine the rate at which the chemical is mixed into the existing soils. A *Patriot* representative should monitor the mixing and compaction processes.

GROUNDWATER CONSIDERATIONS

Groundwater was observed during our field activities at 13 to 15 feet below the existing ground surface; which is expected to be below the anticipated pavement excavation depths.

Groundwater inflow into shallow excavations **above** the groundwater table is expected to be adequately controlled by conventional methods such as gravity drainage and/or pumping from sumps.

We appreciated the opportunity to perform this geotechnical engineering exploration and are looking forward to working with you during the reconstruction of the pavement areas. If you have any questions regarding this report or if we may be of any additional assistance, please do not hesitate to contact our office.

Respectfully submitted,
Patriot Engineering and Environmental, Inc.

Ben Lauletta, P.E.
Project Engineer

William D. Dubois, P.E.
Senior Principal Engineer

Appendix A:	County Location Map (Figure No. 1) Site Vicinity Map (Figure No. 2) Boring Location Maps (Figure No. 3) Boring Log Key Boring Logs
Appendix B:	Boring Location Summary Tables Groundwater Summary Tables
Appendix C:	Summary of Classification Test Data Particle Size Distribution Test Reports Atterberg Limits Test Reports Summary of Special Tests Standard Proctor Tests Resilient Modulus Tests Qu Tests
Appendix D:	General Qualifications Standard Clause for Unanticipated Subsurface Conditions

APPENDIX A

County Location Map
(Figure No. 1)

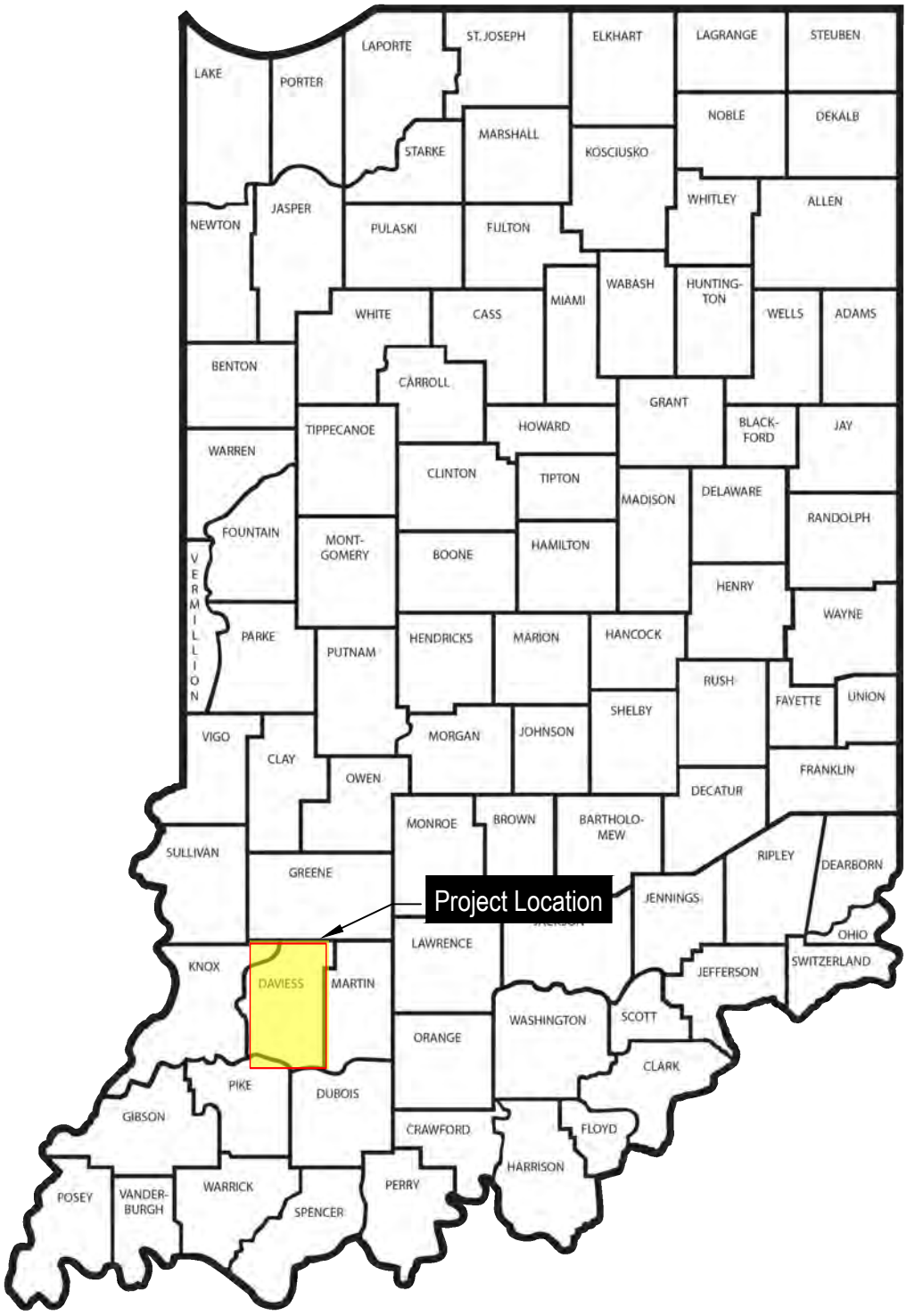
Alignment Vicinity Map
(Figure No. 2)

Soil Boring Location Map
(Figure No. 3)

Boring Log Key

Boring Logs

State of Indiana



Patriot Engineering & Environmental, Inc.

Project: Westgate at Crane Roadway	
	Drawn By: L. Lidy
Project Number: 23-0446-01G	Approved: B. Lauletta
Date: July 10, 2023	DWG: 23-0446-01G_geo

Figure 1

County Location Map

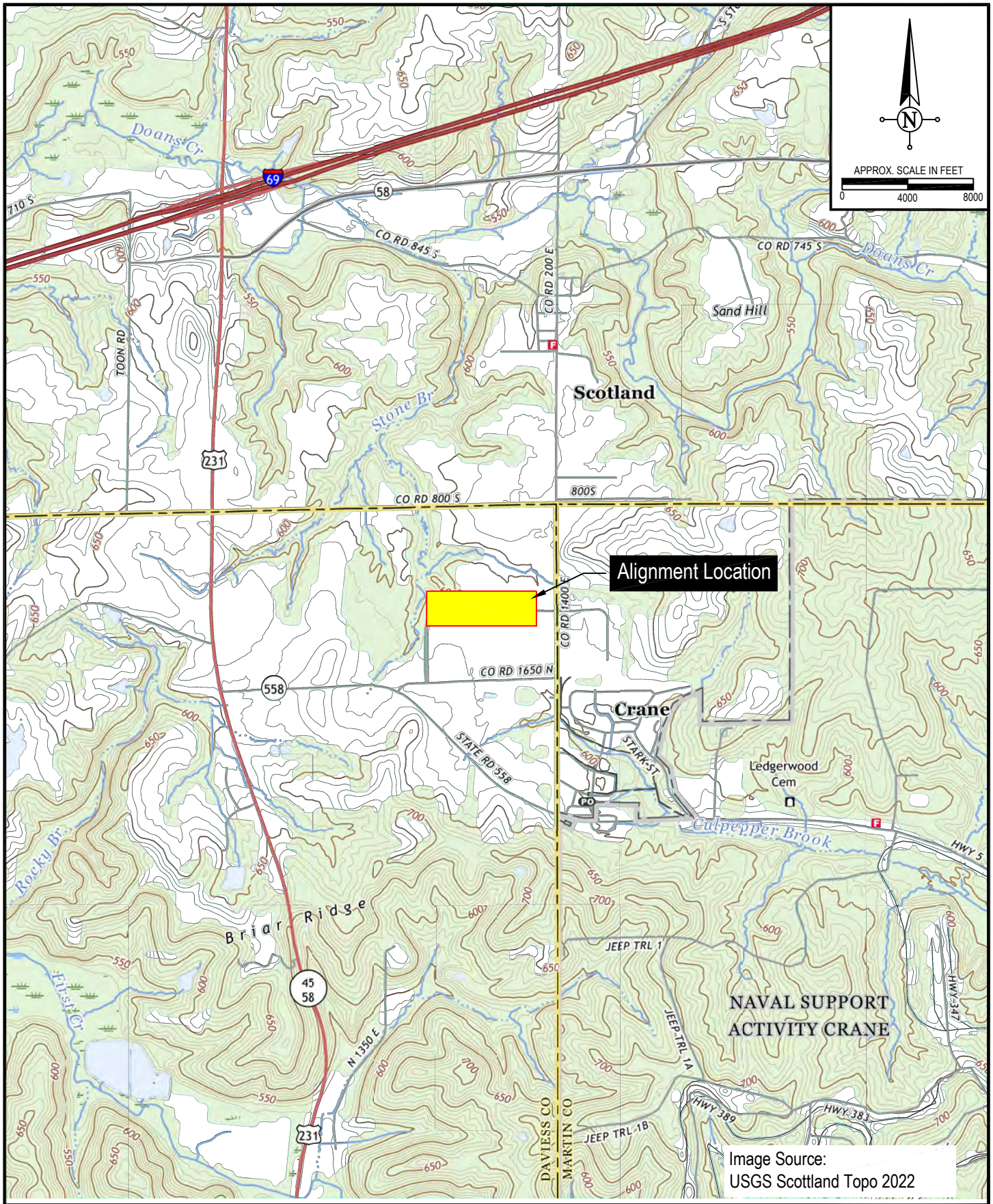


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Figure 2

Alignment Vicinity Map

Patriot Engineering & Environmental, Inc.

LEGEND

- PATRIOT Road Core/Boring
- PATRIOT Sounding
- RB-1 Core/Boring ID

NOTES:

1. Boring locations were staked by PATRIOT. All locations are shown as approximate.
2. All locations were determined in the field with references to existing landmarks.
3. Image Source: Bing Maps
4. Scale as shown.

Project: Westgate at Crane Roadway

	Drawn By: L. Lidy
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Figure 3

Core/Boring Location Map

PATRIOT ENGINEERING and Environmental, Inc.
Engineering Value for Project Success
Consulting Environmental, Geotechnical and Materials Engineers

BORING LOG KEY

AASHTO
FIELD CLASSIFICATION SYSTEM
FOR SOIL EXPLORATION

NON COHESIVE SOILS
(Silt, Sand, Gravel and Combinations)

Density

Very Loose	5 blows/ft. or less
Loose	6 to 10 blows/ft.
Medium Dense	11 to 30 blows/ft.
Dense	31 to 50 blows/ft.
Very Dense	51 blows/ft. or more

Grain Size Terminology

Soil Fraction	Particle Size	US Standard Sieve Size
Boulders	Larger than 75mm	Larger than 75mm
Gravel:	2.00mm to 75mm	#10 to 75mm
Sand: Coarse	0.42mm to 2.00mm	#40 to #10
Fine	0.075mm to 0.42mm	#200 to #40
Silt	0.002mm to 0.075mm	Smaller than #200
Clay	Smaller than 0.002mm	Smaller than #200
Colloids	Smaller than 0.001mm	Smaller than #200

RELATIVE PROPORTIONS FOR SOILS

Descriptive Term	Percent
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

COHESIVE SOILS
(Clay, Silt and Combinations)

Consistency		Field Identification	Unconfined Compressive Strength (tons/sq. ft.)
Very soft	3 blows/ft. or less	Thumb will penetrate soil more than 1 inch	Less than 0.25
Soft	4 to 5 blows/ft.	Thumb will penetrate soil about 1 inch	0.25 - 0.5
Medium Stiff	6 to 10 blows/ft.	Thumb will penetrate soil about ½ inch	0.5 - 1.0
Stiff	11 to 15 blows/ft.	Thumb will indent soil about ¼ inch	1.0 - 2.0
Very Stiff	16 to 30 blows/ft.	Readily indented by thumbnail	2.0 - 4.0
Hard	31 blows/ft. or more	Indented with difficulty by thumbnail	Over 4.0

Classification on logs are made by visual inspection.

Standard Penetration Test - Driving a 2.0" O.D., $1^{3/8}$" I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30.0 inches. It is customary for **Patriot** to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6.0 inches of penetration on the drill log (Example - 6/8/9). The standard penetration test results can be obtained by adding the last two figures (i.e. 8 + 9 = 17 blows/ft.).

Strata Changes - In the column "Soil Descriptions" on the drill log the horizontal lines represent strata changes. A solid line (————) represents an actually observed change, a dashed line (- - - - - -) represents an estimated change.

Groundwater observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc., may cause changes in the water levels indicated on the logs.

Groundwater symbols: ▽-observed groundwater elevation, encountered during drilling;  -observed groundwater elevation upon completion of boring; ▼ -observed groundwater elevation, 24 hours after completion of boring.

PATRIOT ENGINEERING and Environmental Inc.

BORING LOG

BORING NO.: **RB-001**
SHEET 1 OF 1
LATITUDE : 38.900275
LONGITUDE : -86.911851
DATUM :
DATE STARTED : 05-05-23
DATE COMPLETED : 05-05-23

ROUTE # : Capt. W.J. Nelson Drive
COUNTY : Daviess
PROJECT TYPE: Roadway
LOCATION : Crane, Indiana
DES NO. :
PROJECT NO.: 23-0446-01G

ELEVATION : 593.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : HSA
RIG TYPE : Skid
LOCATION :

HAMMER : Auto
DRILLER/INSP : K. Warner
TEMPERATURE : 63 °F
WEATHER : Sunny

GROUNDWATER: ▽ Encountered at 15.0 ft ▼ At completion Dry ▼ NA After 24 hours ▨ Caved in at 10.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6"	% RECOVERY	MOISTURE CONTENT	UNCONF. COMP., ksf	ATTERBERG LIMITS LL	PL	PI	REMARKS
592.3		**Crushed Stone (9") Visual**. 0.8									
	2.5	**Gravel (Crushed Stone)**, Gray, Slightly Moist, Medium Dense.	SS 1	11 10 7	89						
589.5		3.5									
	5.0	**Silty Loam**, **A-4**, Gray, Moist, Medium Stiff, Test Number 209.	SS 2	3 3 4	22	21.6					
587.0		6.0									
	7.5		SS 3	2 3 3	100	20.1					
	10.0	**Silty Clay Loam**, **A-6**, Brown And Gray, Moist, Medium Stiff, Test Number 205.	SS 4	2 3 3	33	17.9					10.0, Borehole Backfilled Per The Aquifer Protection Guidelines
	12.5										
579.5		13.5									
578.0 ▽	15.0	**Clay**, **A-7-6**, Brown And Gray, Moist, Very Soft, Test Number 210. 15.0	SS 5	1 1 1	89	19.6					
		Bottom of Boring at 15.0 ft									
	17.5										
	20.0										

PATRIOT ENGINEERING and Environmental Inc.

BORING LOG

BORING NO.: **RB-002**
SHEET 1 OF 1
LATITUDE : 38.900299
LONGITUDE : -86.910626
DATUM :
DATE STARTED : 05-05-23
DATE COMPLETED : 05-05-23

ROUTE # : Capt. W.J. Nelson Drive COUNTY : Daviess
PROJECT TYPE: Roadway
LOCATION : Crane, Indiana
DES NO. : PROJECT NO.: 23-0446-01G

ELEVATION : 599.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : HSA
RIG TYPE : Skid
LOCATION :

HAMMER : Auto
DRILLER/INSP : K. Warner
TEMPERATURE : 68 °F
WEATHER : Sunny

GROUNDWATER: ▽ Encountered at 13.5 ft ▼ At completion Dry ▼ NA After 24 hours ▨ Caved in at 8.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6"	% RECOVERY	MOISTURE CONTENT	UNCONF. COMP., ksf	ATTERBERG LIMITS LL	PL	PI	REMARKS
598.8		**Crushed Stone (2") Visual**. 0.2									
	2.5	**Silty Clay Loam**, **A-6**, Brown And Gray, Moist, Medium Stiff, Test Number 205.	SS 1	2 3 3	89	17.0					1.0, Sample No. St-1: Shelby Tube Pushed From 1.0 To 3.0 Feet. Wet Unit Weight = 126.2 Pcf
595.5		3.5									
	5.0	**Silty Loam**, **A-4**, Brown And Gray, Moist, Medium Stiff, Test Number 209.	SS 2	3 2 6	33	21.1					
593.0		6.0									
	7.5		SS 3	7 7 3	33						
	10.0	**Sand and Gravel (Visual)**, Brown, Slightly Moist, Loose.	SS 4	4 2 6	0						8.0, Borehole Backfilled Per The Aquifer Protection Guidelines 8.5, Sample No. 4: Two Attempts Were Made To Obtain A Splitspoon Sample
	12.5										
585.5 ▽		13.5									
584.0	15.0	**Sand**, **A-1-b**, Orange-Brown, Saturated, Very Loose, Test Number 208. 15.0	SS 5	1 2 3	67						
		Bottom of Boring at 15.0 ft									
	17.5										
	20.0										

PATRIOT ENGINEERING and Environmental Inc.

BORING LOG

BORING NO.: **RB-003**
SHEET 1 OF 1
LATITUDE : 38.900280
LONGITUDE : -86.909372
DATUM :
DATE STARTED : 05-05-23
DATE COMPLETED : 05-05-23

ROUTE # : Capt. W.J. Nelson Drive COUNTY : Daviess
PROJECT TYPE: Roadway
LOCATION : Crane, Indiana
DES NO. : PROJECT NO.: 23-0446-01G

ELEVATION : 603.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : HSA
RIG TYPE : Skid
LOCATION :
:

HAMMER : Auto
DRILLER/INSP : K. Warner
TEMPERATURE : 70 °F
WEATHER : Sunny

GROUNDWATER: ▽ Encountered at 13.0 ft ▼ At completion Dry ▼ NA After 24 hours ▨ Caved in at 10.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6"	% RECOVERY	MOISTURE CONTENT	UNCONF. COMP., ksf	ATTERBERG LIMITS LL	PL	PI	REMARKS
602.4		**Topsoil (7") Visual**. 0.6									
	2.5	**Silty Clay Loam**, **A-6**, Brown And Gray, Moist, Medium Stiff, Test Number 206.	SS 1	3 4 5	100	19.3					1.0, Sample No. St-1: Shelby Tube Pushed From 1.0 To 3.0 Feet. Wet Unit Weight = 120.3 Pcf
599.5		3.5									
	5.0		SS 2	4 6 8	78	11.8					
	7.5		SS 3	4 7 10	100	16.4					
		Sandy Loam, **A-2-6**, Brown And Gray, Slightly Moist, Medium Dense, Test Number 207.	SS 4	2 5 8	67	16.5					
	10.0 ▨										10.0, Borehole Backfilled Per The Aquifer Protection Guidelines
	12.5										
		▽									
589.5		13.5									
		Sand, **A-1-b**, Orange-Brown, Saturated, Very Loose, Test Number 208.	SS 5	1 2 2	100						
588.0	15.0	15.0									
		Bottom of Boring at 15.0 ft									
	17.5										
	20.0										

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BORING LOG

BORING NO.: **RB-004**
SHEET 1 OF 1
LATITUDE : 38.899875
LONGITUDE : -86.908236
DATUM :
DATE STARTED : 05-05-23
DATE COMPLETED : 05-05-23

ROUTE # : Capt. W.J. Nelson Drive COUNTY : Daviess
PROJECT TYPE: Roadway
LOCATION : Crane, Indiana
DES NO. : PROJECT NO.: 23-0446-01G

ELEVATION : 607.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : HSA
RIG TYPE : Skid
LOCATION :

HAMMER : Auto
DRILLER/INSP : K. Warner
TEMPERATURE : 74 °F
WEATHER : Sunny

GROUNDWATER: ▽ Encountered at 13.0 ft ▼ At completion Dry ▼ NA After 24 hours ▨ Caved in at 11.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6"	% RECOVERY	MOISTURE CONTENT	UNCONF. COMP., ksf	ATTERBERG LIMITS LL	PL	PI	REMARKS
606.3		**Topsoil (8") Visual**. 0.7									
	2.5	**Silty Loam**, **A-4**, Brown And Gray, Moist, Medium Stiff, Test Number 209.	SS 1	2 3 3	100	21.1					
	5.0		SS 2	1 3 3	100	20.3					
601.0		6.0									
	7.5		SS 3	6 11 12	100	16.0					
	10.0	**Sandy Loam**, **A-2-6(1)**, Brown And Gray, Slightly Moist, Medium Dense, Test Number 207.	SS 4	4 6 7	100	17.2		32	14	18	
	12.5										11.0, Borehole Backfilled Per The Aquifer Protection Guidelines
593.5		13.5									
592.0	15.0	**Sand**, **A-1-b**, Brown To Gray, Saturated, Loose, Test Number 208. 15.0	SS 5	1 2 3	100						
		Bottom of Boring at 15.0 ft									
	17.5										
	20.0										

PATRIOT ENGINEERING and Environmental Inc.

BORING LOG

BORING NO.: **RB-005**
SHEET 1 OF 1
LATITUDE : 38.899662
LONGITUDE : -86.907036
DATUM :
DATE STARTED : 05-05-23
DATE COMPLETED : 05-05-23

ROUTE # : Capt. W.J. Nelson Drive COUNTY : Daviess
PROJECT TYPE: Roadway
LOCATION : Crane, Indiana
DES NO. : PROJECT NO.: 23-0446-01G

ELEVATION : 607.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : HSA
RIG TYPE : Skid
LOCATION :

HAMMER : Auto
DRILLER/INSP : K. Warner
TEMPERATURE : 75 °F
WEATHER : Sunny

GROUNDWATER: Encountered at 13.0 ft At completion Dry NA After 24 hours Caved in at 10.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6"	% RECOVERY	MOISTURE CONTENT	UNCONF. COMP., ksf	ATTERBERG LIMITS LL	PL	PI	REMARKS
606.3		**Topsoil (8") Visual**. 0.7									
	2.5	**Silty Loam**, **A-4**, Brown And Gray, Moist, Soft, Test Number 209.	SS 1	1 2 2	100	23.1	0.95				1.0, Sample No. St-1: Shelby Tube Pushed From 1.0 To 3.0 Feet. Wet Unit Weight = 120.0 Pcf
603.5		3.5									
	5.0	**Clay**, **A-7-6**, Brown And Gray, Moist, Stiff, Test Number 210.	SS 2	1 4 8	100	19.6					
601.0		6.0									
	7.5		SS 3	5 7 8	100	19.2					
	10.0	**Sandy Loam**, **A-2-6**, Brown And Gray, Moist, Stiff, Test Number 207.	SS 4	2 5 6	100	19.0					10.0, Borehole Backfilled Per The Aquifer Protection Guidelines
	12.5										
593.5		13.5									
592.0	15.0	**Sand**, **A-1-b**, Brown, Saturated, Loose, Test Number 208. 15.0	SS 5	1 2 3	100						13.5, Sample No. 5: Non-Plastic
		Bottom of Boring at 15.0 ft									
	17.5										
	20.0										

PATRIOT ENGINEERING and Environmental Inc.

BORING LOG

BORING NO.: **RB-006**
SHEET 1 OF 1
LATITUDE : 38.899662
LONGITUDE : -86.905792
DATUM :
DATE STARTED : 05-05-23
DATE COMPLETED : 05-05-23

ROUTE # : Capt. W.J. Nelson Drive COUNTY : Daviess
PROJECT TYPE: Roadway
LOCATION : Crane, Indiana
DES NO. : PROJECT NO.: 23-0446-01G

ELEVATION : 607.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : HSA
RIG TYPE : Skid
LOCATION :
:

HAMMER : Auto
DRILLER/INSP : K. Warner
TEMPERATURE : 77 °F
WEATHER : Sunny

GROUNDWATER: ▽ Encountered at 13.0 ft ▼ At completion Dry ▼ NA After 24 hours ▨ Caved in at 11.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6"	% RECOVERY	MOISTURE CONTENT	UNCONF. COMP., ksf	ATTERBERG LIMITS LL	PL	PI	REMARKS
606.3		**Topsoil (8") Visual**. 0.7									
	2.5	**Silty Loam**, **A-4**, Brown And Gray, Moist, Medium Stiff, Test Number 209.	SS 1	1 3 3	89	20.0					1.0, Sample No. St-1: Shelby Tube Pushed From 1.0 To 3.0 Feet. Wet Unit Weight = 121.1 Pcf
603.5		3.5									
	5.0	**Clay**, **A-7-6**, Brown And Gray, Moist, Very Stiff, Test Number 210.	SS 2	5 7 10	100	18.0					
601.0		6.0									
	7.5		SS 3	4 6 10	100	16.0					
	10.0	**Sandy Loam**, **A-2-6**, Brown And Gray, Moist, Very Stiff, Test Number 207.	SS 4	3 6 13	100	18.4					
											11.0, Borehole Backfilled Per The Aquifer Protection Guidelines
	12.5										
593.5		13.5									
592.0	15.0	**Sand**, **A-1-b**, Brown, Saturated, Very Loose, Test Number 208. 15.0	SS 5	1 1 1	100						
		Bottom of Boring at 15.0 ft									
	17.5										
	20.0										

PATRIOT ENGINEERING and Environmental Inc.

BORING LOG

BORING NO.: **RB-007**
SHEET 1 OF 1
LATITUDE : 38.899624
LONGITUDE : -86.904562
DATUM :
DATE STARTED : 05-05-23
DATE COMPLETED : 05-05-23

ROUTE # : Capt. W.J. Nelson Drive COUNTY : Daviess
PROJECT TYPE: Roadway
LOCATION : Crane, Indiana
DES NO. : PROJECT NO.: 23-0446-01G

ELEVATION : 608.0
STATION :
OFFSET :
LINE :
DEPTH : 15.0 ft

BORING METHOD : HSA
RIG TYPE : Skid
LOCATION :
:

HAMMER : Auto
DRILLER/INSP : K. Warner
TEMPERATURE : 77 °F
WEATHER : Sunny

GROUNDWATER: ▽ Encountered at 13.0 ft ▼ At completion Dry ▼ NA After 24 hours ▨ Caved in at 10.0 ft

STRATUM ELEVATION	SAMPLE DEPTH	SOIL/MATERIAL DESCRIPTION	SAMPLE NUMBER	SPT per 6"	% RECOVERY	MOISTURE CONTENT	UNCONF. COMP., ksf	ATTERBERG LIMITS LL	PL	PI	REMARKS
607.3		**Topsoil (8") Visual**. 0.7									
	2.5	**Silty Loam**, **A-4**, Brown And Gray, Moist, Soft, Test Number 209.	SS 1	1 2 2	89	23.2					
604.5		3.5									
	5.0	**Clay**, **A-7-6(17)**, Brown And Gray, Moist, Medium Stiff, Test Number 210.	SS 2	1 3 4	100	22.8					
	7.5		SS 3	1 3 5	100	17.1		52	19	33	
599.5		8.5									
	10.0	**Sandy Loam**, **A-2-6**, Brown And Gray, Moist, Medium Stiff, Test Number 207.	SS 4	1 3 7	89	16.3					10.0, Borehole Backfilled Per The Aquifer Protection Guidelines
	12.5	▽									
594.5		13.5									
593.0	15.0	**Sand**, **A-1-b**, Brown, Saturated, Very Loose, Test Number 208. 15.0	SS 5	1 1 1	89						
		Bottom of Boring at 15.0 ft									
	17.5										
	20.0										

APPENDIX B

Boring Location Summary Tables

Groundwater Summary Tables

BORING LOCATION SUMMARY TABLE

Geotechnical Engineering Exploration
Westgate at Crane Roadway
Crane, Indiana (Daviess County)
Patriot Project No.: 23-0446-01G

BORING NUMBER	LATITUDE	LONGITUDE
RB-1	38.900275°	-86.911851°
RB-2	38.900299°	-86.910626°
RB-3	38.900280°	-86.909372°
RB-4	38.899875°	-86.908236°
RB-5	38.899662°	-86.907036°
RB-6	38.899662°	-86.905792°
RB-7	38.899624°	-86.904562°

GROUNDWATER SUMMARY TABLE

Geotechnical Engineering Exploration
Westgate at Crane Roadway
Crane, Indiana (Daviess County)
Patriot Project No.: 23-0446-01G

BORING NUMBER	GROUNDWATER DURING DRILLING	GROUNDWATER UPON COMPLETION
	DEPTH (FEET)	DEPTH (FEET)
RB-1	15.0	DRY
RB-2	13.5	DRY
RB-3	13.0	DRY
RB-4	13.0	DRY
RB-5	13.0	DRY
RB-6	13.0	DRY
RB-7	13.0	DRY

APPENDIX C

Summary of Classification Test Data

Particle Size Distribution Test Reports

Atterberg Limits Test Reports

Summary of Special Tests

Standard Proctor Test Report

Resilient Modulus Test Report

Unconfined Compressive Strength Test Report

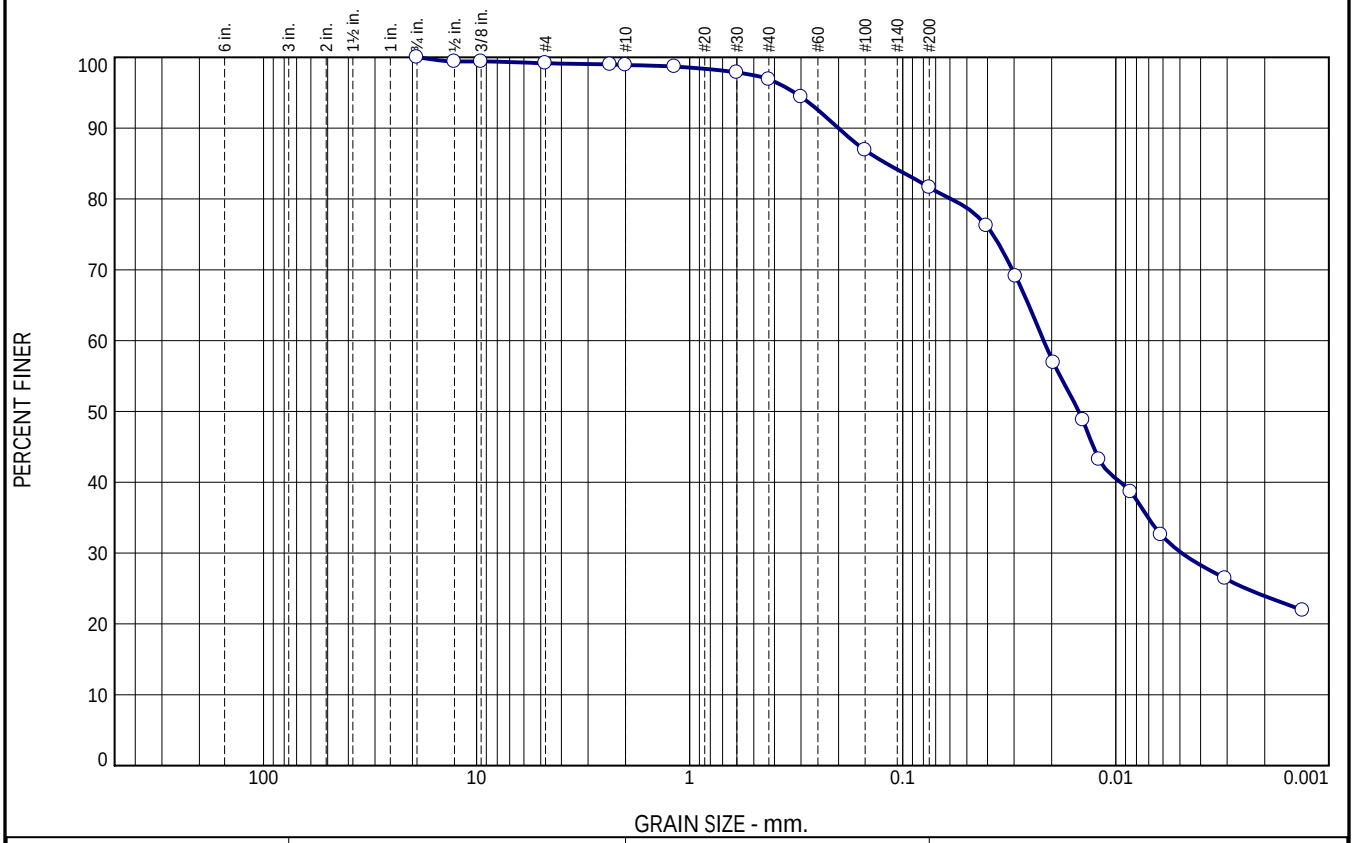
PATRIOT ENGINEERING and Environmental, Inc.
Engineering Value for Project Success
Consulting Environmental, Geotechnical and Materials Engineers

SUMMARY OF CLASSIFICATION TESTS DATA

Project Name: Westgate at Crane Roadway
INDOT Designation Number:
Structure No.:
County: Daviess
District:
Patriot Proj. No.: 23-0446-01G
Client: American Structurepoint, Inc.
Client Address:

Test Number	Boring Number	Sample Number	Sample Depth (Feet)	Classification		% Passing			% Gravel	% Sand	% Silt	% Clay	% Colloids	Sulfates (ppm)	pH	LL	PL	PI
				Textural	AASHTO	#10	#40	#200										
205	RB-002	ST-1	1.0-3.0	SILTY CLAY LOAM	A-6(12)	98.9	96.9	81.6	1.1	17.3	57.7	23.9	20.5	73	6.5	33	17	16
206	RB-003	ST-1	1.0-3.0	SILTY CLAY LOAM	A-6(13)	99.9	96.8	79.8	0.1	20.1	53.1	26.7	24.0	27	4.8	36	19	17
207	RB-004	SS-4	8.5-10.0	SANDY LOAM	A-2-6(1)	98.2	71.8	28.3	1.8	69.9	10.3	18.0	16.5	40	6.6	32	14	18
208	RB-005	SS-5	13.5-15.0	SAND	A-1-b	92.1	35.9	5.2	7.9	86.9	5.2		5.0	20	7.7	NP		
209	RB-006	ST-1	1.0-3.0	SILTY LOAM	A-4(3)	99.6	93.5	75.2	0.4	24.4	60.6	14.6	11.5	ND	4.9	25	18	7
210	RB-007	SS-3	6.0-7.5	CLAY	A-7-6(17)	95.9	79.8	59.8	4.1	36.1	27.9	31.9	30.0	53	5.7	52	19	33

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	1.1	2.0	15.3	57.7	23.9

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	99.4		
3/8"	99.4		
#4	99.2		
#8	99.0		
#10	98.9		
#16	98.7		
#30	97.9		
#40	96.9		
#50	94.4		
#100	86.9		
#200	81.6		
0.0404 mm.	76.2		
0.0295 mm.	69.1		
0.0196 mm.	56.9		
0.0143 mm.	48.8		
0.0120 mm.	43.2		
0.0085 mm.	38.6		
0.0061 mm.	32.6		
0.0031 mm.	26.4		
0.0013 mm.	21.9		

* (no specification provided)

Soil Description

Brown and gray SILTY CLAY LOAM

Atterberg Limits

PL= 17 LL= 33 PI= 16

Coefficients

D_{90}= 0.2003 D_{85}= 0.1192 D_{60}= 0.0218
D_{50}= 0.0149 D_{30}= 0.0049 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(12)

Remarks

Test Number 205
Specific Gravity - 2.620
pH - 6.5

Source of Sample: RB-002 Depth: 1.0-3.0 feet
Sample Number: ST-1

Date: 05/16/2023

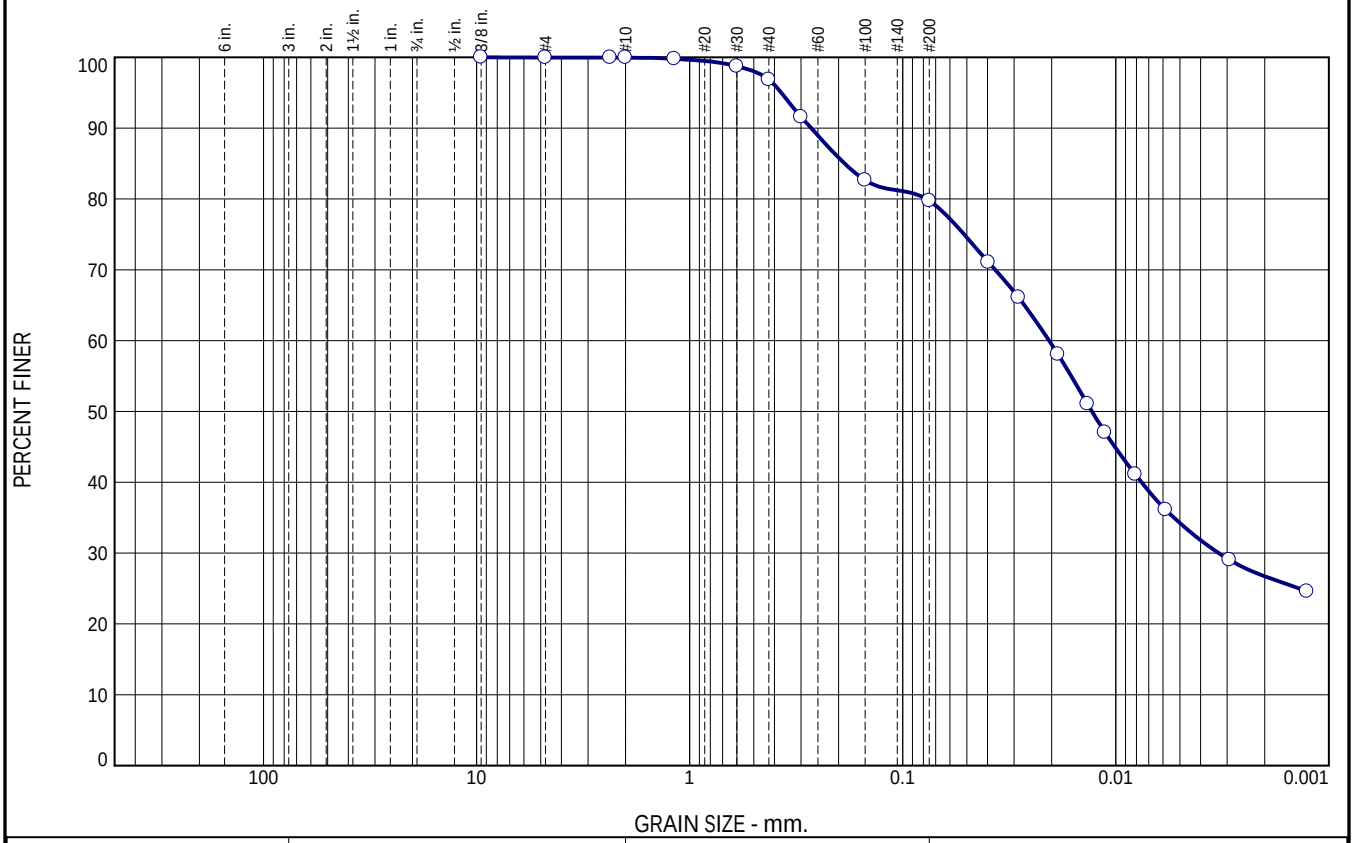
PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.
Indianapolis, Indiana

Client: American Structurepoint, Inc.
Project: Westgate at Crane Development

Project No: 23-0446-01G

Tested By: D. Bush / E. Bergel Checked By: S. Lauletta

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	0.1	3.1	17.0	53.1	26.7

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	100.0		
#8	100.0		
#10	99.9		
#16	99.8		
#30	98.7		
#40	96.8		
#50	91.6		
#100	82.6		
#200	79.8		
0.0396 mm.	71.0		
0.0286 mm.	66.1		
0.0187 mm.	58.0		
0.0136 mm.	51.0		
0.0112 mm.	47.0		
0.0081 mm.	41.1		
0.0058 mm.	36.1		
0.0029 mm.	29.0		
0.0013 mm.	24.6		

* (no specification provided)

Soil Description

Brown and gray SILTY CLAY LOAM

Atterberg Limits

PL= 19 LL= 36 PI= 17

Coefficients

D_{90}= 0.2688 D_{85}= 0.1874 D_{60}= 0.0206
D_{50}= 0.0129 D_{30}= 0.0033 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(13)

Remarks

Test Number 206
Specific Gravity - 2.752
pH - 4.8

Source of Sample: RB-003 Depth: 1.0-3.0 feet
Sample Number: ST-1

Date: 05/16/2023

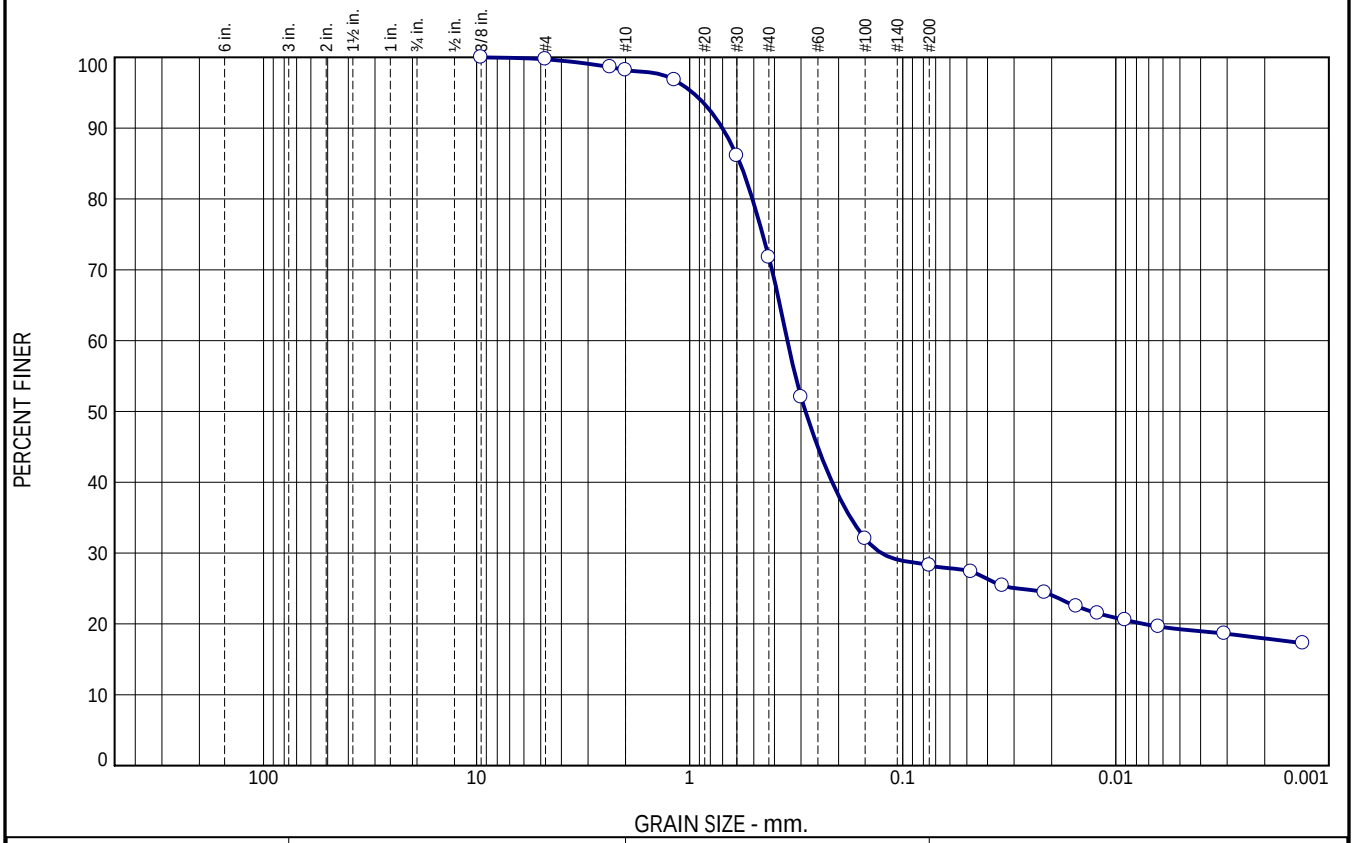
PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.
Indianapolis, Indiana

Client: American Structurepoint, Inc.
Project: Westgate at Crane Development

Project No: 23-0446-01G

Tested By: D. Bush / E. Bergel Checked By: S. Lauletta

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	1.8	26.4	43.5	10.3	18.0

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	99.7		
#8	98.6		
#10	98.2		
#16	96.8		
#30	86.1		
#40	71.8		
#50	52.0		
#100	32.0		
#200	28.3		
0.0478 mm.	27.4		
0.0340 mm.	25.4		
0.0216 mm.	24.4		
0.0153 mm.	22.5		
0.0122 mm.	21.5		
0.0090 mm.	20.6		
0.0063 mm.	19.6		
0.0031 mm.	18.6		
0.0013 mm.	17.3		

* (no specification provided)

Soil Description

Brown SANDY LOAM

Atterberg Limits

PL= 14 LL= 32 PI= 18

Coefficients

D_{90}= 0.7016 D_{85}= 0.5787 D_{60}= 0.3478
D_{50}= 0.2858 D_{30}= 0.1259 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-6(1)

Remarks

Test Number 207
pH - 6.6

Source of Sample: RB-004 Depth: 8.5-10.0 feet
Sample Number: SS-4

Date: 05/26/2023

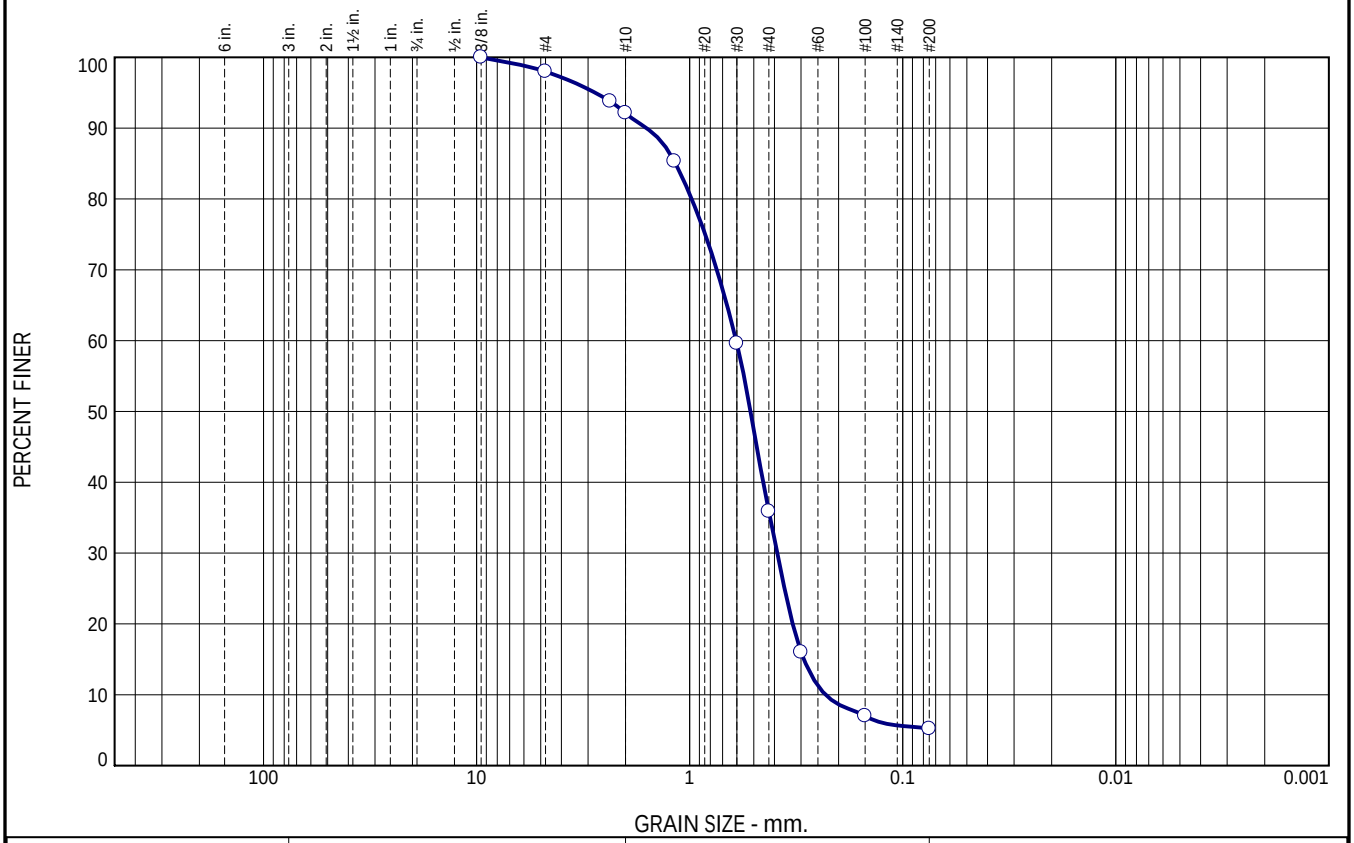
PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.
Indianapolis, Indiana

Client: American Structurepoint, Inc.
Project: Westgate at Crane Development

Project No: 23-0446-01G

Tested By: E. Bergel Checked By: S. Lauletta

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	7.9	56.2	30.7	5.2	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	98.0		
#8	93.8		
#10	92.1		
#16	85.3		
#30	59.6		
#40	35.9		
#50	16.0		
#100	7.0		
#200	5.2		

* (no specification provided)

Soil Description

Brown Sand

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 1.5946 D_{85}= 1.1654 D_{60}= 0.6046
D_{50}= 0.5179 D_{30}= 0.3880 D_{15}= 0.2911
D_{10}= 0.2305 C_u= 2.62 C_c= 1.08

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Test Number 208
pH - 7.7

Source of Sample: RB-005 Depth: 13.5-15.0 feet
Sample Number: SS-5

Date: 05/31/2023

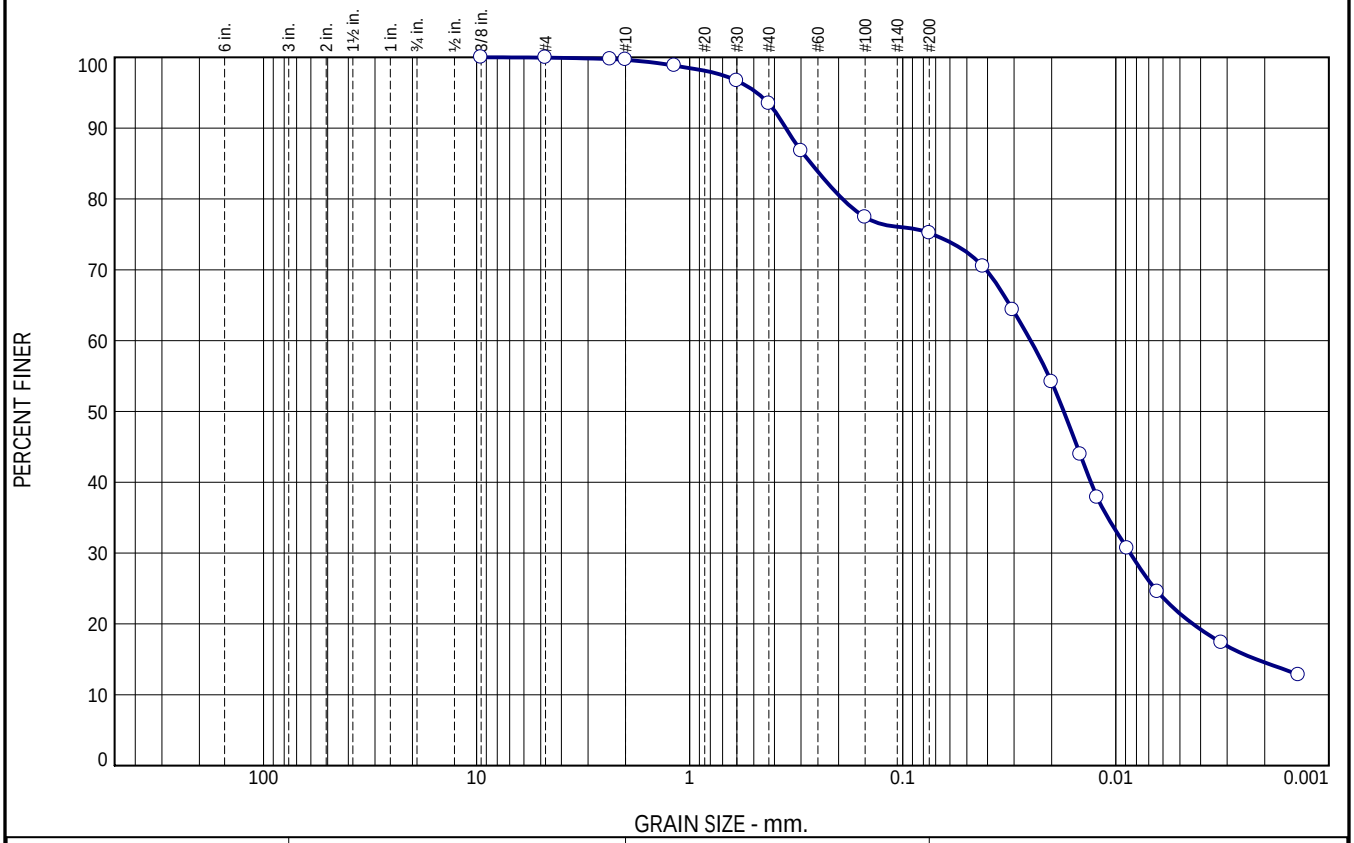
PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.
Indianapolis, Indiana

Client: American Structurepoint, Inc.
Project: Westgate at Crane Development

Project No: 23-0446-01G

Tested By: D. Bush Checked By: S. Lauletta

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	0.4	6.1	18.3	60.6	14.6

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	100.0		
#8	99.7		
#10	99.6		
#16	98.8		
#30	96.7		
#40	93.5		
#50	86.8		
#100	77.4		
#200	75.2		
0.0420 mm.	70.5		
0.0305 mm.	64.3		
0.0200 mm.	54.1		
0.0147 mm.	43.9		
0.0122 mm.	37.8		
0.0088 mm.	30.7		
0.0064 mm.	24.5		
0.0032 mm.	17.3		
0.0014 mm.	12.8		

* (no specification provided)

Soil Description

Brown and gray SILTY LOAM

Atterberg Limits

PL= 18 LL= 25 PI= 7

Coefficients

D_{90}= 0.3533 D_{85}= 0.2687 D_{60}= 0.0251
D_{50}= 0.0175 D_{30}= 0.0086 D_{15}= 0.0022
D_{10}= C_u= C_c=

Classification

USCS= CL-ML AASHTO= A-4(3)

Remarks

Test Number 209
Specific Gravity - 2.581
pH - 4.9

Source of Sample: RB-006 Depth: 1.0-3.0 feet
Sample Number: ST-1

Date: 05/16/2023

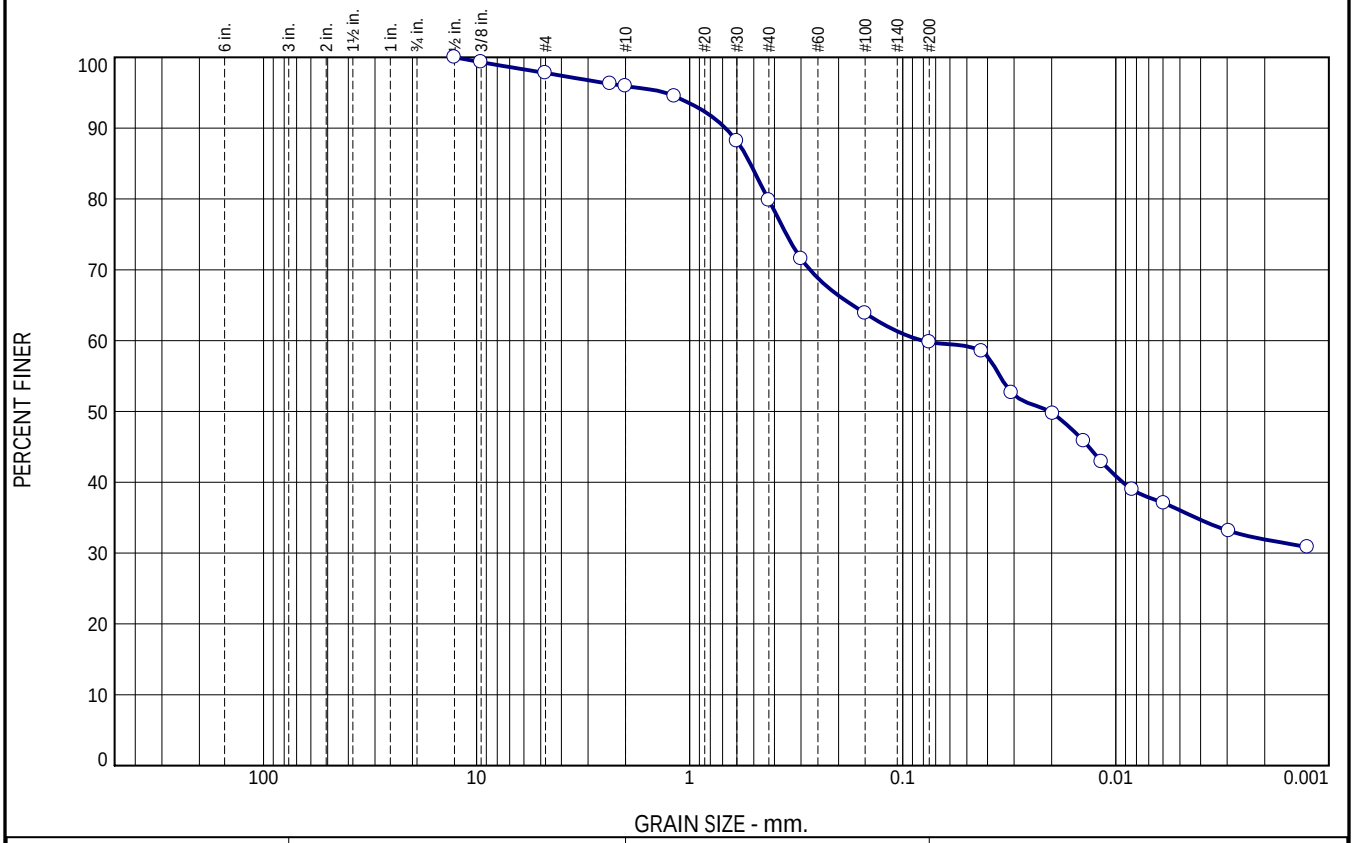
PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.
Indianapolis, Indiana

Client: American Structurepoint, Inc.
Project: Westgate at Crane Development

Project No: 23-0446-01G

Tested By: D. Bush / E. Bergel Checked By: S. Lauletta

Particle Size Distribution Report



% +3"	% Gravel	% Sand		% Fines	
		Coarse	Fine	Silt	Clay
0.0	4.1	16.1	20.0	27.9	31.9

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	99.3		
#4	97.8		
#8	96.3		
#10	95.9		
#16	94.5		
#30	88.2		
#40	79.8		
#50	71.6		
#100	63.9		
#200	59.8		
0.0426 mm.	58.5		
0.0308 mm.	52.6		
0.0197 mm.	49.7		
0.0141 mm.	45.8		
0.0117 mm.	42.9		
0.0084 mm.	39.0		
0.0059 mm.	37.0		
0.0029 mm.	33.1		
0.0013 mm.	30.8		

* (no specification provided)

Soil Description

Brown and gray CLAY

Atterberg Limits

PL= 19 LL= 52 PI= 33

Coefficients

D_{90}= 0.6791 D_{85}= 0.5188 D_{60}= 0.0805
D_{50}= 0.0205 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(17)

Remarks

Test Number 210
pH - 5.7

Source of Sample: RB-007 Depth: 6.0-7.5 feet
Sample Number: SS-3

Date: 05/26/2023

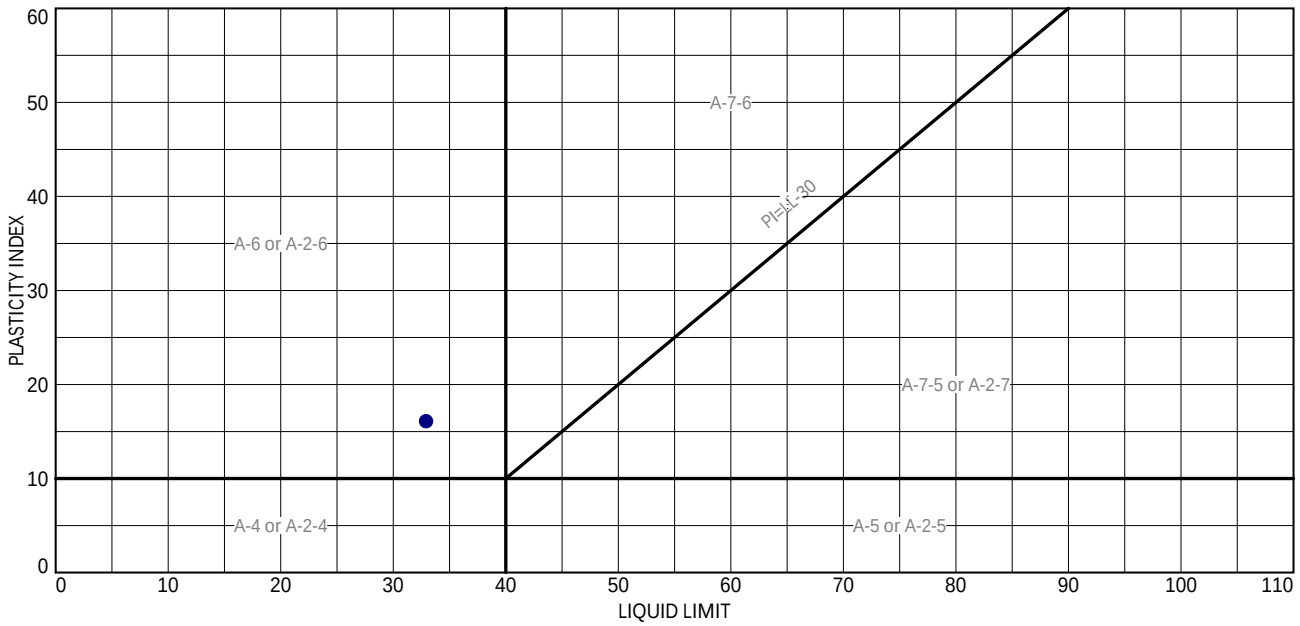
PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.
Indianapolis, Indiana

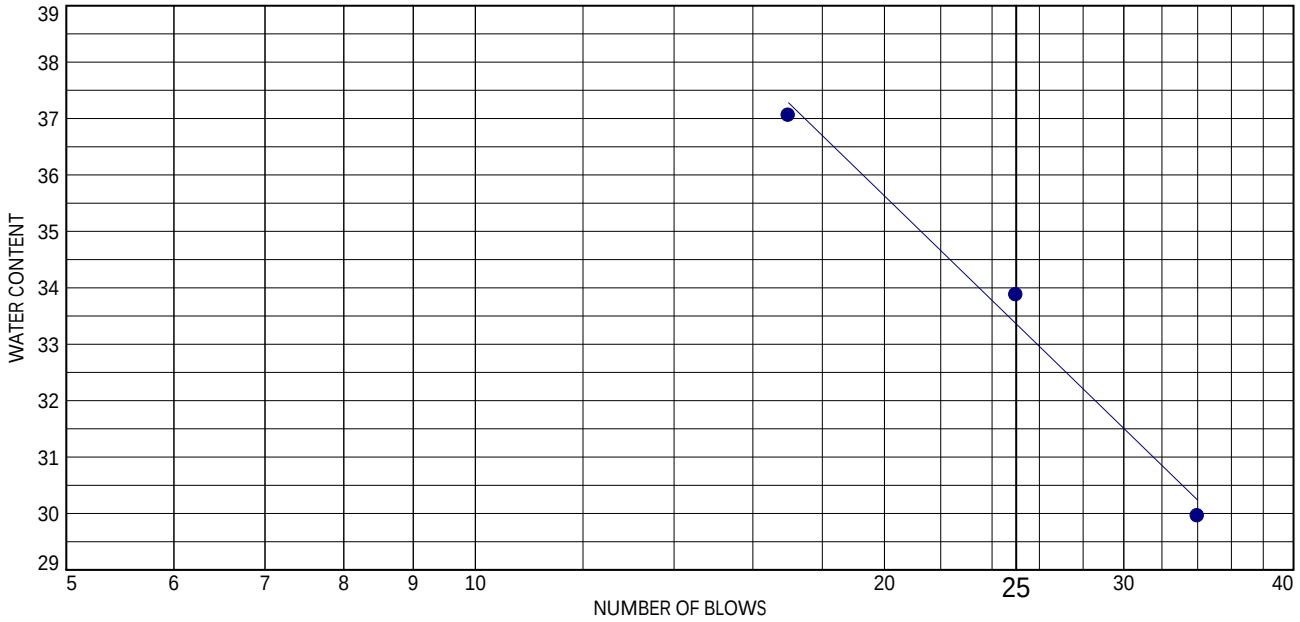
Client: American Structurepoint, Inc.
Project: Westgate at Crane Development

Project No: 23-0446-01G

Tested By: D. Bush / E. Bergel Checked By: S. Lauletta

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	AASHTO
●	Brown and gray SILTY CLAY LOAM	33	17	16	96.9	81.6	A-6(12)

Project No. 23-0446-01G Client: American Structurepoint, Inc.

Project: Westgate at Crane Development

Source of Sample: RB-002 Depth: 1.0-3.0 feet
Sample Number: ST-1

PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.

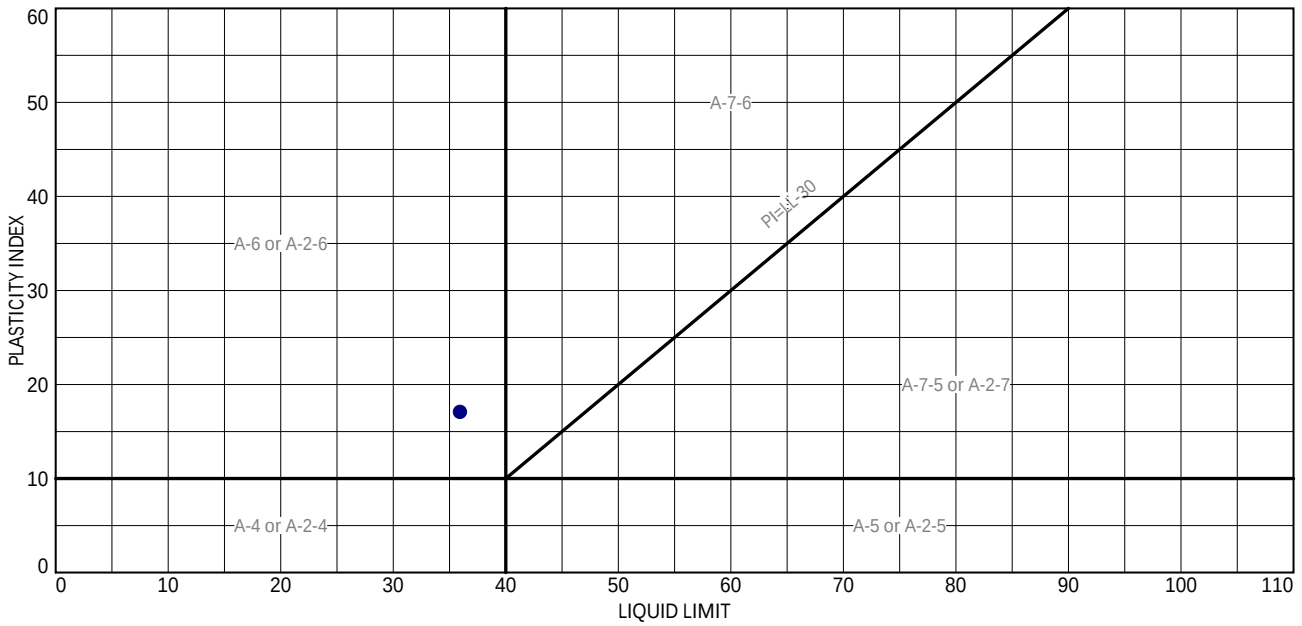
Indianapolis, Indiana

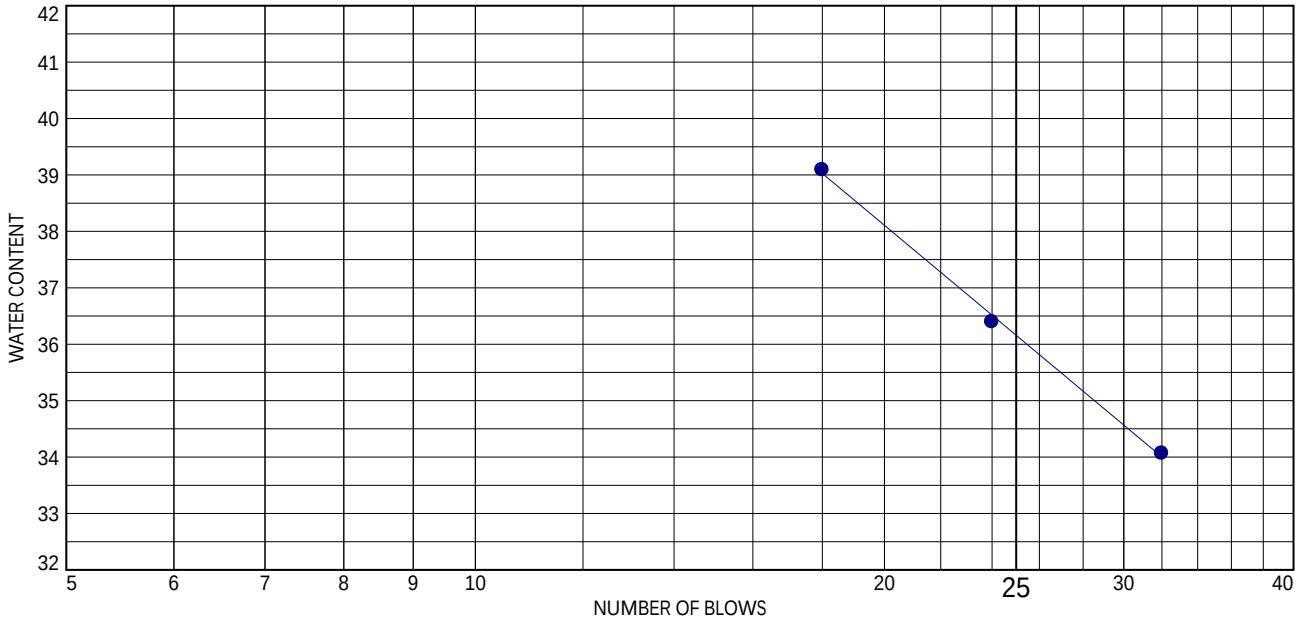
Remarks:

● Test Number 205
Specific Gravity - 2.620
pH - 6.5

Tested By: E. Bergel Checked By: S. Lauletta

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	AASHTO
●	Brown and gray SILTY CLAY LOAM	36	19	17	96.8	79.8	A-6(13)

Project No. 23-0446-01G Client: American Structurepoint, Inc.

Project: Westgate at Crane Development

Source of Sample: RB-003 Depth: 1.0-3.0 feet
Sample Number: ST-1

PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.

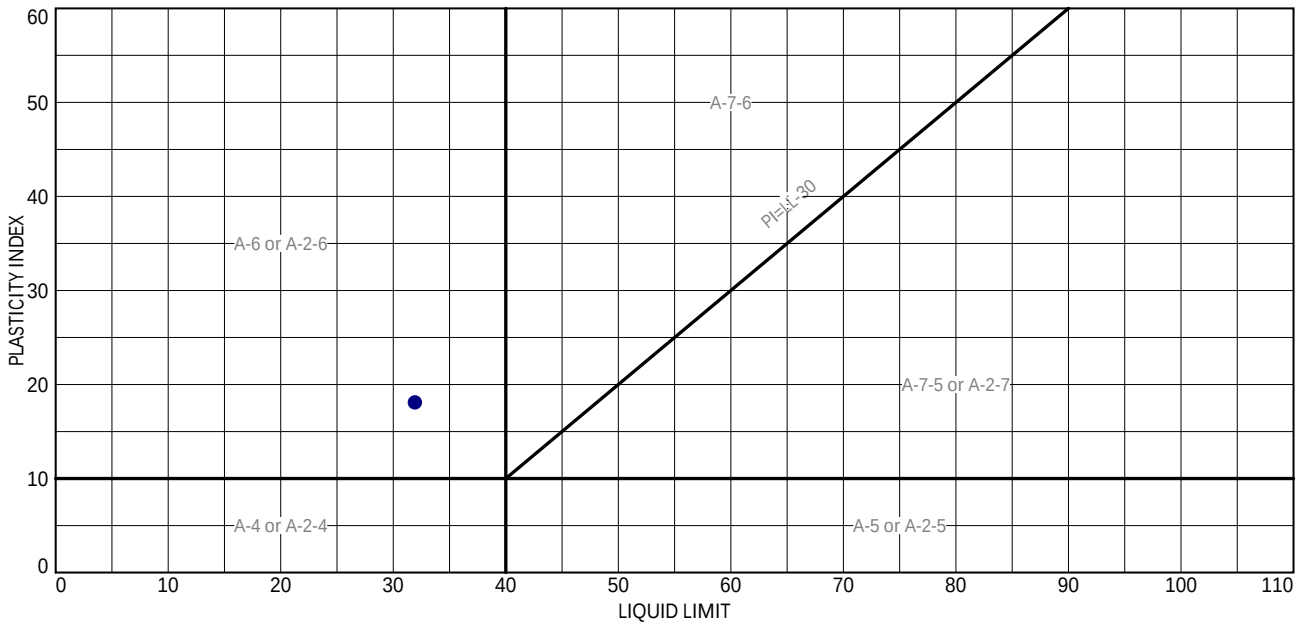
Indianapolis, Indiana

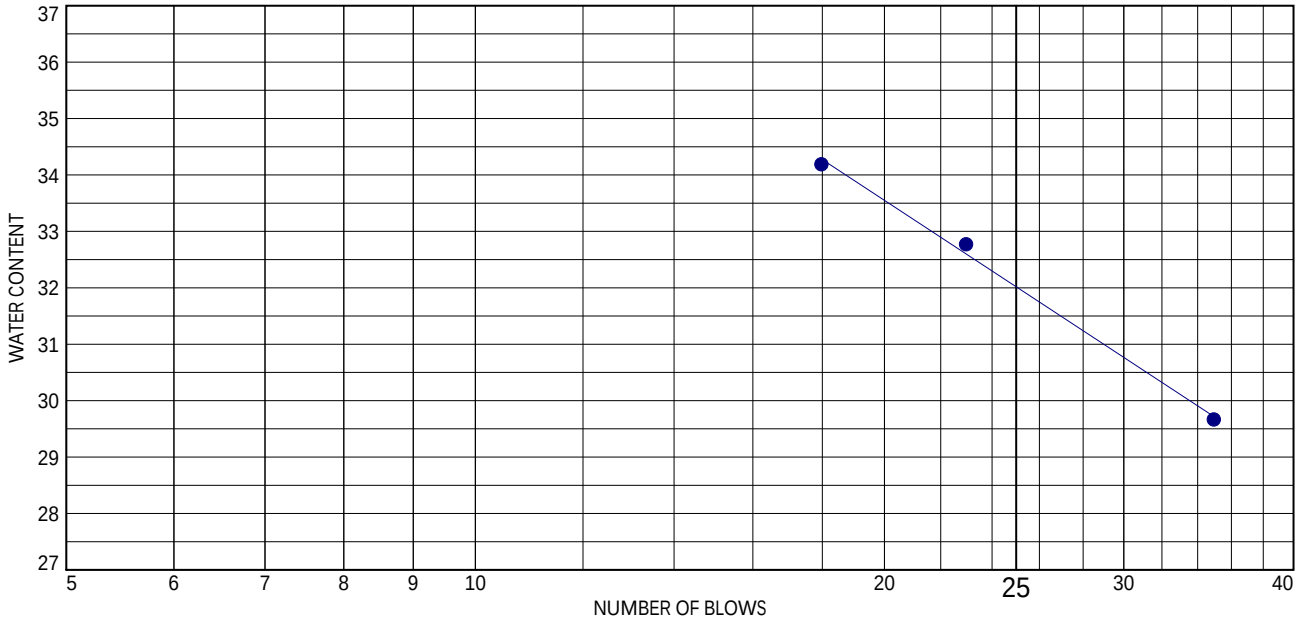
Remarks:

● Test Number 206
Specific Gravity - 2.752
pH - 4.8

Tested By: E. Bergel Checked By: S. Lauletta

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	AASHTO
●	Brown SANDY LOAM	32	14	18	71.8	28.3	A-2-6(1)

Project No. 23-0446-01G Client: American Structurepoint, Inc.

Project: Westgate at Crane Development

Source of Sample: RB-004 Depth: 8.5-10.0 feet
Sample Number: SS-4

PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.

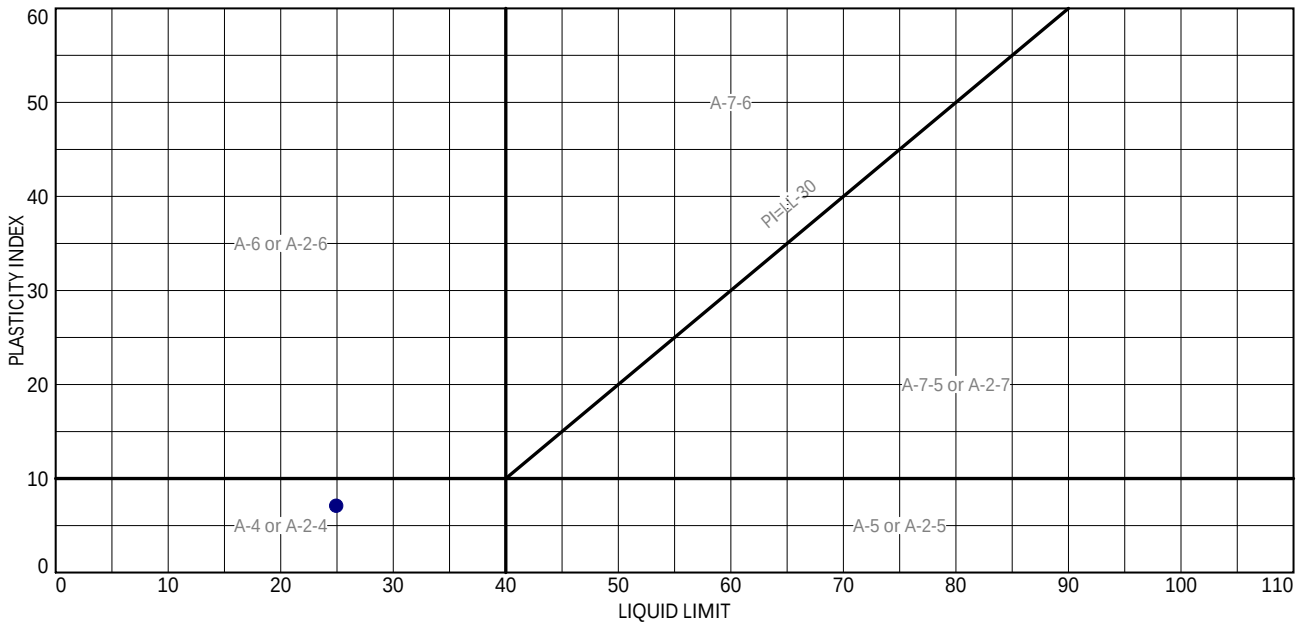
Indianapolis, Indiana

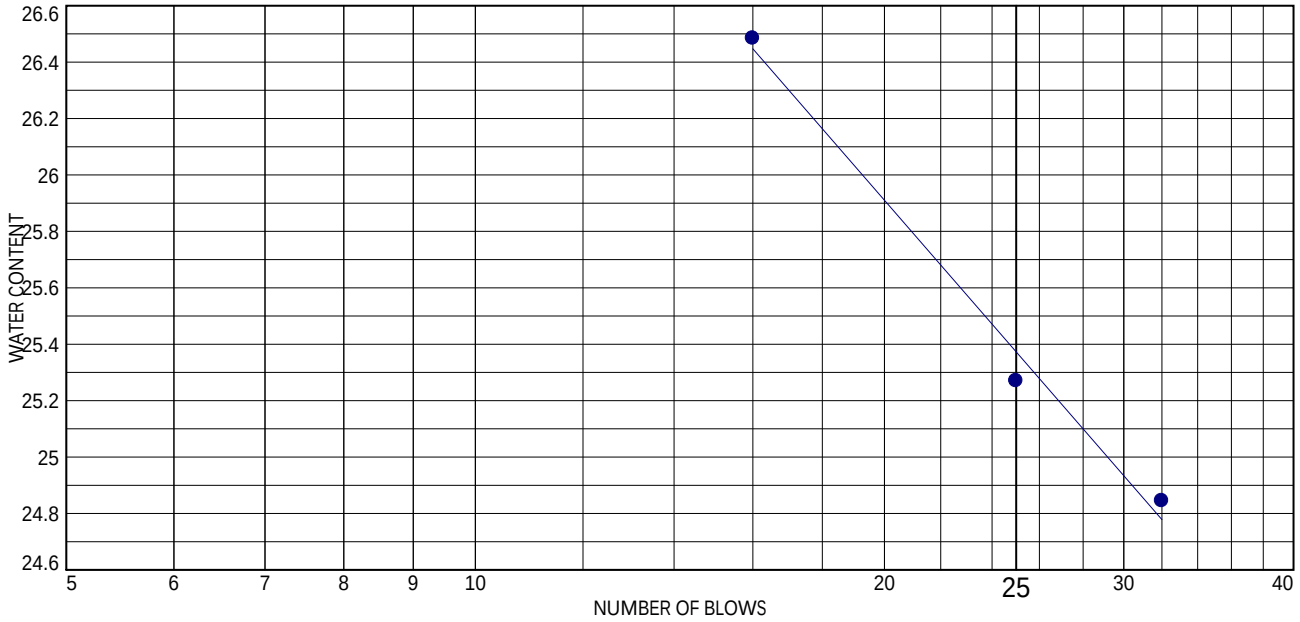
Remarks:

● Test Number 207
pH - 6.6

Tested By: E. Bergel Checked By: S. Lauletta

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	AASHTO
●	Brown and gray SILTY LOAM	25	18	7	93.5	75.2	A-4(3)

Project No. 23-0446-01G Client: American Structurepoint, Inc.

Project: Westgate at Crane Development

Source of Sample: RB-006 Depth: 1.0-3.0 feet
Sample Number: ST-1

PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.

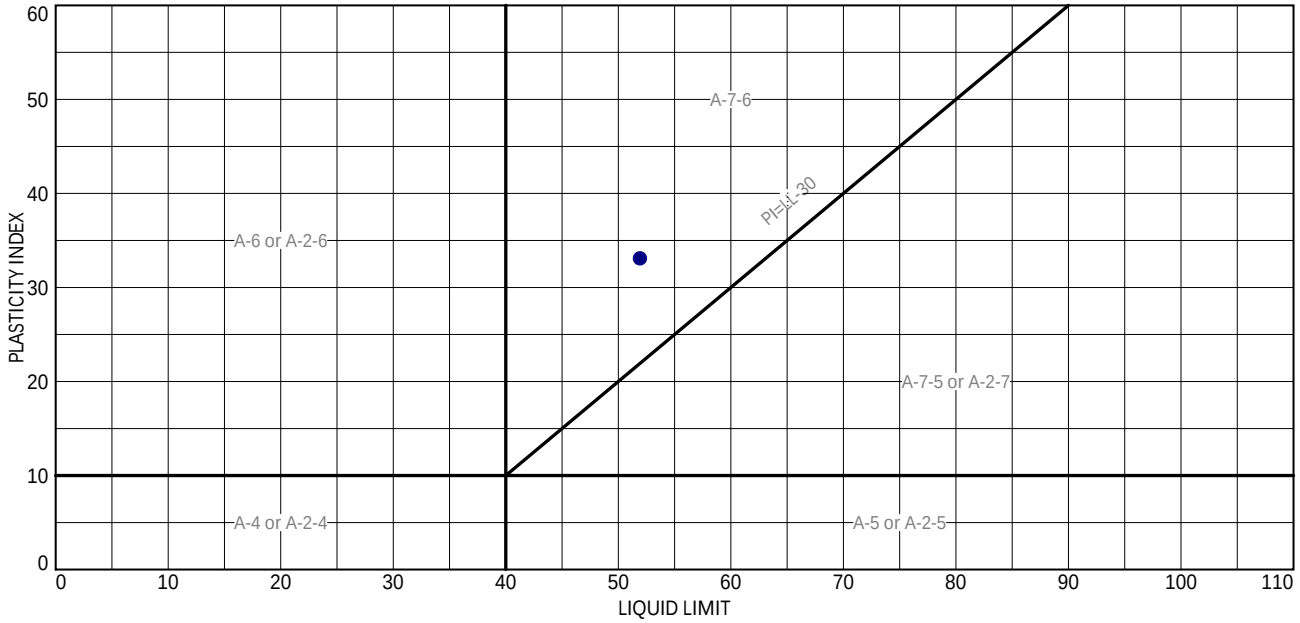
Indianapolis, Indiana

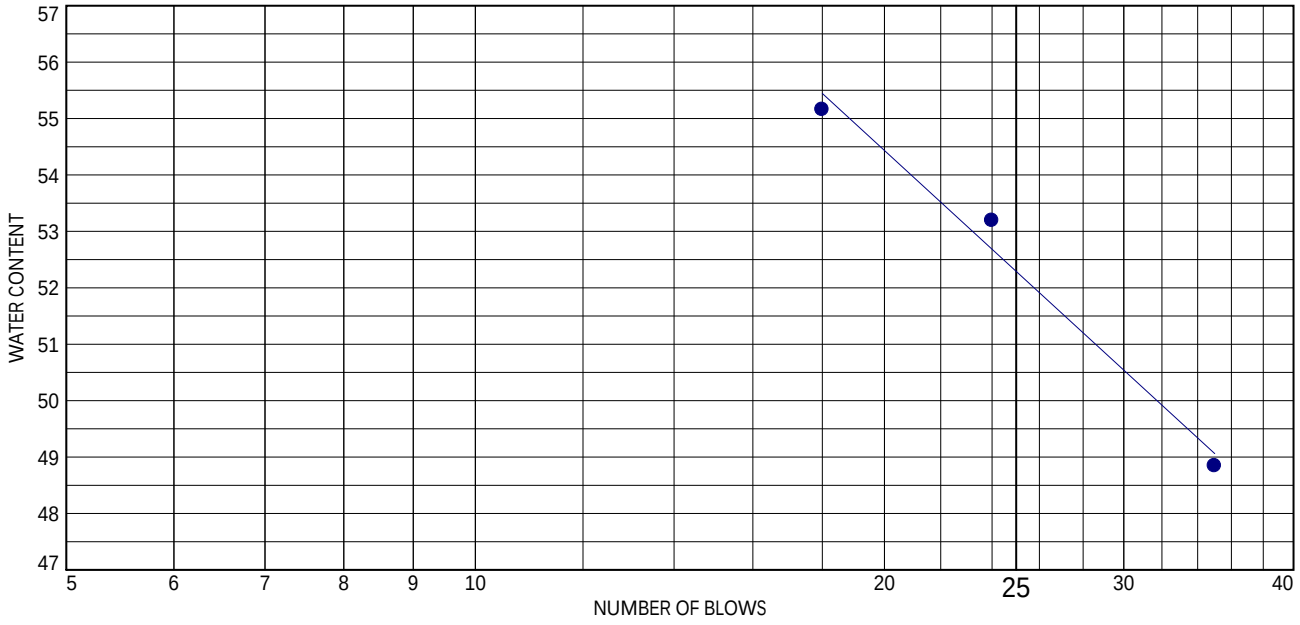
Remarks:

● Test Number 209
Specific Gravity - 2.581
pH - 4.9

Tested By: E. Bergel Checked By: S. Lauletta

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	AASHTO
●	Brown and gray CLAY	52	19	33	79.8	59.8	A-7-6(17)

Project No. 23-0446-01G Client: American Structurepoint, Inc.

Project: Westgate at Crane Development

Source of Sample: RB-007 Depth: 6.0-7.5 feet
Sample Number: SS-3

PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.

Indianapolis, Indiana

Remarks:
● Test Number 210
pH - 5.7

Tested By: E. Bergel Checked By: S. Lauletta

PATRIOT ENGINEERING
and Environmental, Inc.
Indianapolis, Indiana 46250

SUMMARY OF SPECIAL TESTS

Project Name: Westgate at Crane Roadway **INDOT Designation Number:**
Structure No.: **County:** Daviess **District:**
Patriot Proj. No.: 23-0446-01G **Client:** American Structurepoint, Inc. **Client Address:**

Boring Number	Sample Number	Depth (Feet)		% Moisture Content	pH	% Organic Content	% Calcium Carbonate	Unit Weight (pcf)		Unconfined Compressive Strength (Soil/Rock) Qu (ksf)
		Start	End					Wet	Dry	
RB-001	SS-1	1.0	2.5							
	SS-2	3.5	5.0	21.6						
	SS-3	6.0	7.5	20.1						
	SS-4	8.5	10.0	17.9						
	SS-5	13.5	15.0	19.6						
	Bulk	0.8	5.0	17.6						
RB-002	SS-1	1.0	2.5	17.0						
	SS-2	3.5	5.0	21.1						
	SS-3	6.0	7.5							
	SS-4	8.5	10.0							
	SS-5	13.5	15.0							
RB-003	SS-1	1.0	2.5	19.3						
	SS-2	3.5	5.0	11.8						
	SS-3	6.0	7.5	16.4						
	SS-4	8.5	10.0	16.5						
	SS-5	13.5	15.0							
RB-004	SS-1	1.0	2.5	21.1						
	SS-2	3.5	5.0	20.3						
	SS-3	6.0	7.5	16						
	SS-4	8.5	10.0	17.2	6.6					
	SS-5	13.5	15.0							
	Bulk	0.7	5.0	23.0						
RB-005	SS-1	1.0	2.5	23.1						
	SS-2	3.5	5.0	19.6						
	SS-3	6.0	7.5	19.2						
	SS-4	8.5	10.0	19.0						
	SS-5	13.5	15.0							

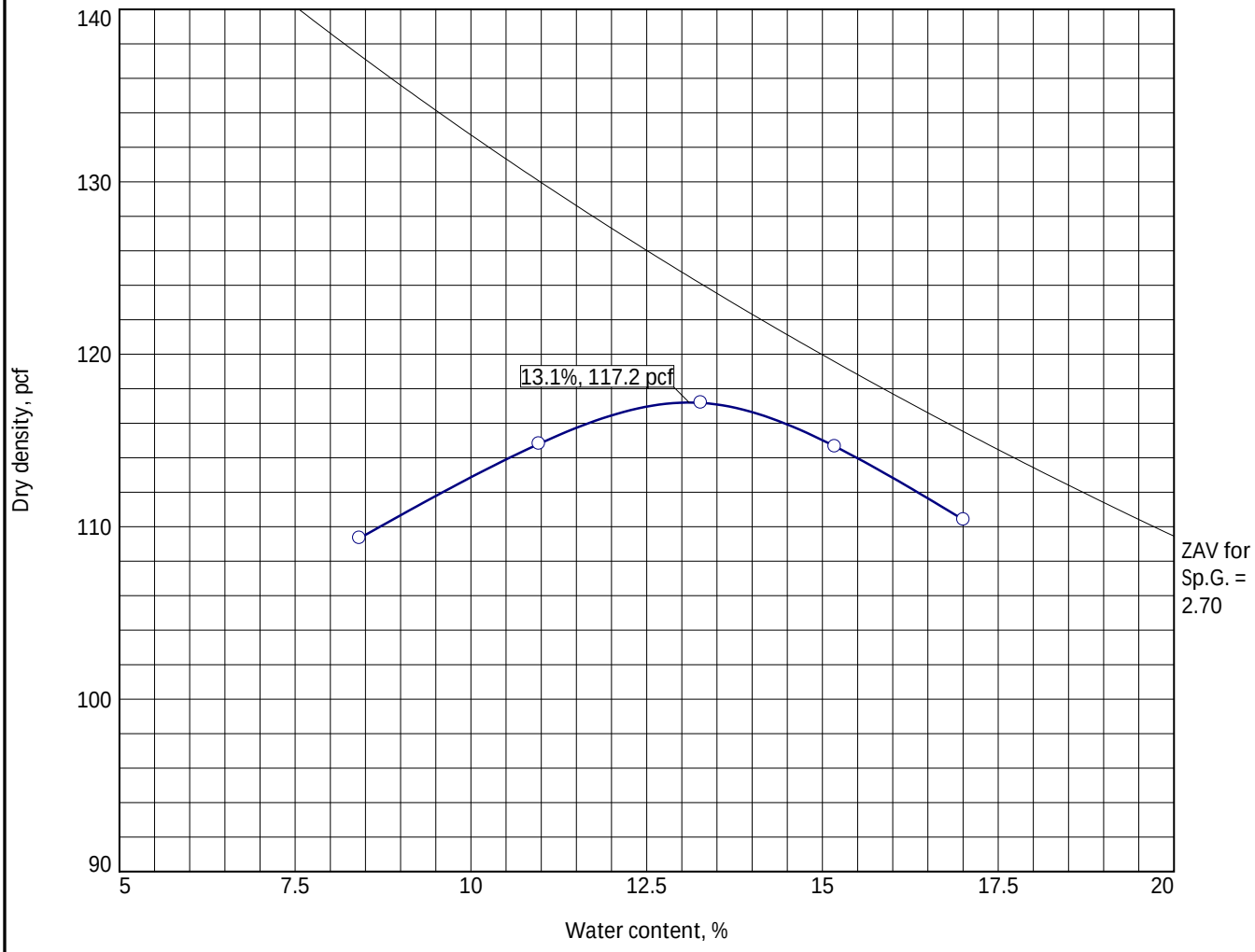
PATRIOT ENGINEERING
and Environmental, Inc.
Indianapolis, Indiana 46250

SUMMARY OF SPECIAL TESTS

Project Name: Westgate at Crane Roadway **INDOT Designation Number:**
Structure No.: **County:** Daviess **District:**
Patriot Proj. No.: 23-0446-01G **Client:** American Structurepoint, Inc. **Client Address:**

Boring Number	Sample Number	Depth (Feet)		% Moisture Content	pH	% Organic Content	% Calcium Carbonate	Unit Weight (pcf)		Unconfined Compressive Strength (Soil/Rock) Qu (ksf)
		Start	End					Wet	Dry	
RB-006	SS-1	1.0	2.5	20.0						
	SS-2	3.5	5.0	18.0						
	SS-3	6.0	7.5	16.0						
	SS-4	8.5	10.0	18.4						
	SS-5	13.5	15.0		7.7					
RB-007	SS-1	1.0	2.5	23.2						
	SS-2	3.5	5.0	22.8						
	SS-3	6.0	7.5	17.1	5.7					
	SS-4	8.5	10.0	16.3						
	SS-5	13.5	15.0							
	Bulk	0.7	5.0	21.1						0

LABORATORY MOISTURE-DENSITY TEST REPORT



Test specification: AASHTO T 99-21 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
0.8-5.0 feet	CL-ML	A-4	17.6	2.7			0.4	

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 117.2 pcf Optimum moisture = 13.1 %	Gray SILTY LOAM

Project No. 23-0446-01G Client: American Structurepoint, Inc.

Project: Westgate at Crane Development

Date: 06/07/2023

○ Source of Sample: RB-001 Sample Number: Bulk

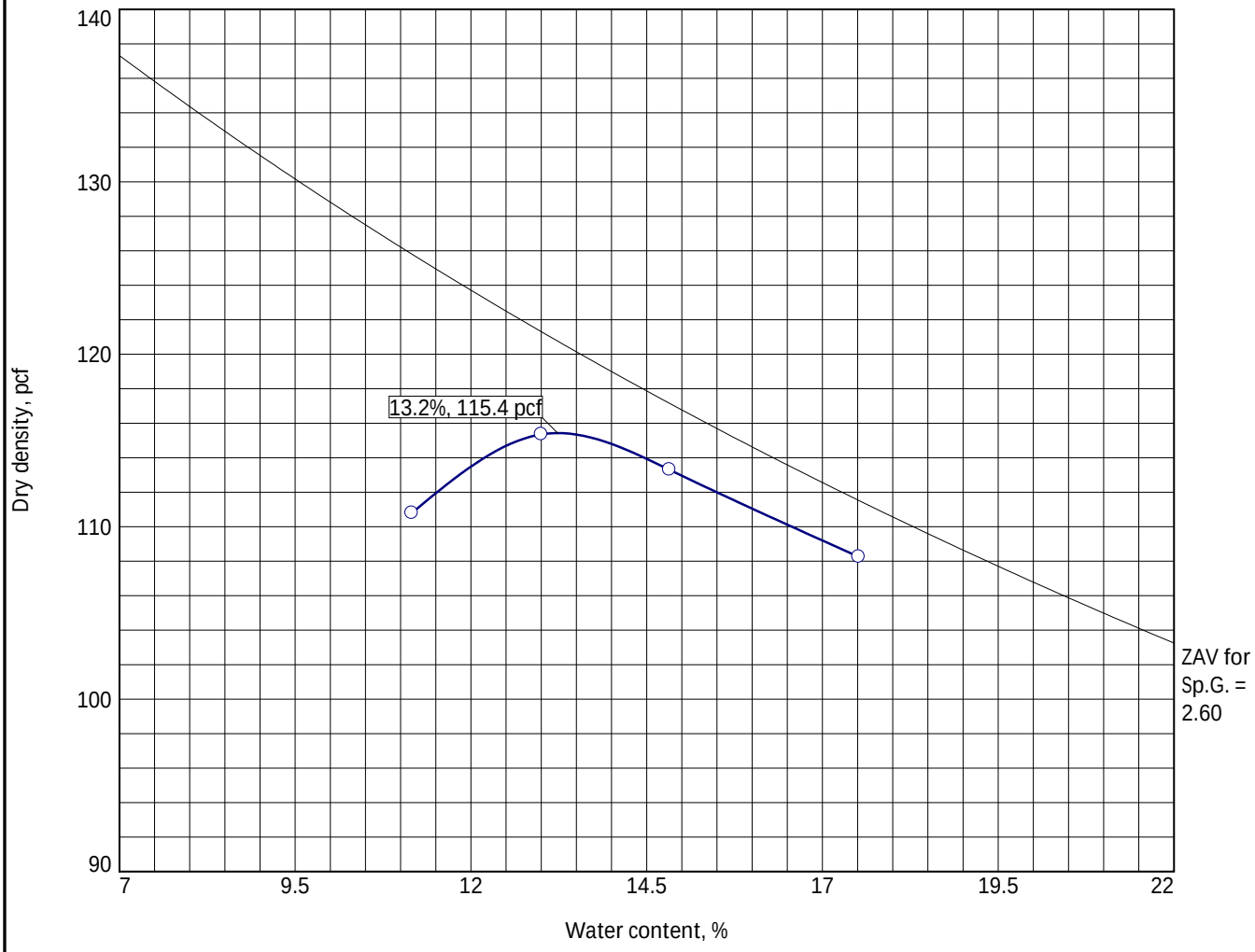
PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.

Indianapolis, Indiana

Remarks:

Tested By: S. Lauletta Checked By: B. Lauletta

LABORATORY MOISTURE-DENSITY TEST REPORT



Test specification: AASHTO T 99-21 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
0.7-5.0 feet	CL-ML	A-4	23.0	2.6			0.5	

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 115.4 pcf Optimum moisture = 13.2 %	Brown and gray SILTY LOAM

Project No. 23-0446-01G Client: American Structurepoint, Inc.

Project: Westgate at Crane Development

Date: 05/24/2023

○ Source of Sample: RB-004 Sample Number: Bulk

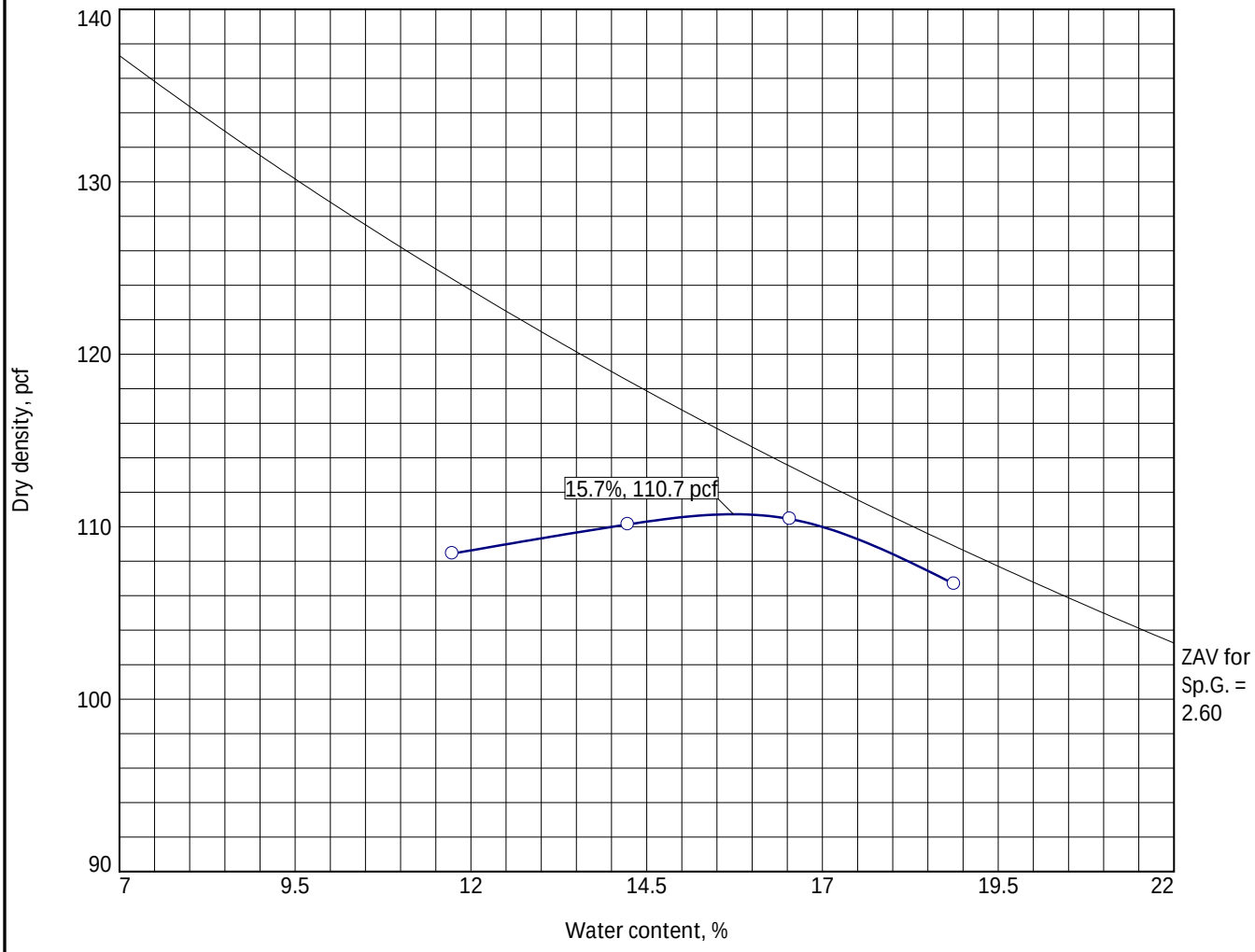
PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.

Indianapolis, Indiana

Remarks:

Tested By: S. Lauletta Checked By: B. Lauletta

LABORATORY MOISTURE-DENSITY TEST REPORT



Test specification: AASHTO T 99-21 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
0.7-5.0 feet	CL-ML	A-4	21.1	2.6			0.3	

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 110.7 pcf Optimum moisture = 15.7 %	Brown and gray SILTY LOAM

Project No. 23-0446-01G Client: American Structurepoint, Inc.

Project: Westgate at Crane Development

Date: 05/24/2023

○ Source of Sample: RB-007 Sample Number: Bulk

PATRIOT ENGINEERING AND ENVIRONMENTAL, INC.

Indianapolis, Indiana

Remarks:

Tested By: S. Lauletta Checked By: B. Lauletta

Client:	Patriot Engineering	Test Date:	05/18/23
Project Name:	Westgate at Crane Development	Tested By:	trm
Project Location:	Crane, IN	Checked By:	anm
GTX #:	317240		
Boring ID:	RB-002		
Sample ID:	ST-1		
Depth, ft:	1-3		
Soil Description:	Moist, yellowish brown clay		
Sample Preparation:	core		
Material Type:	Type 2		
Test No.:	RM-3		
Test Comments:	Sample trimmed and put into the triaxial cell at as-received density and moisture content. Length to Diameter Ratio = 2.12		

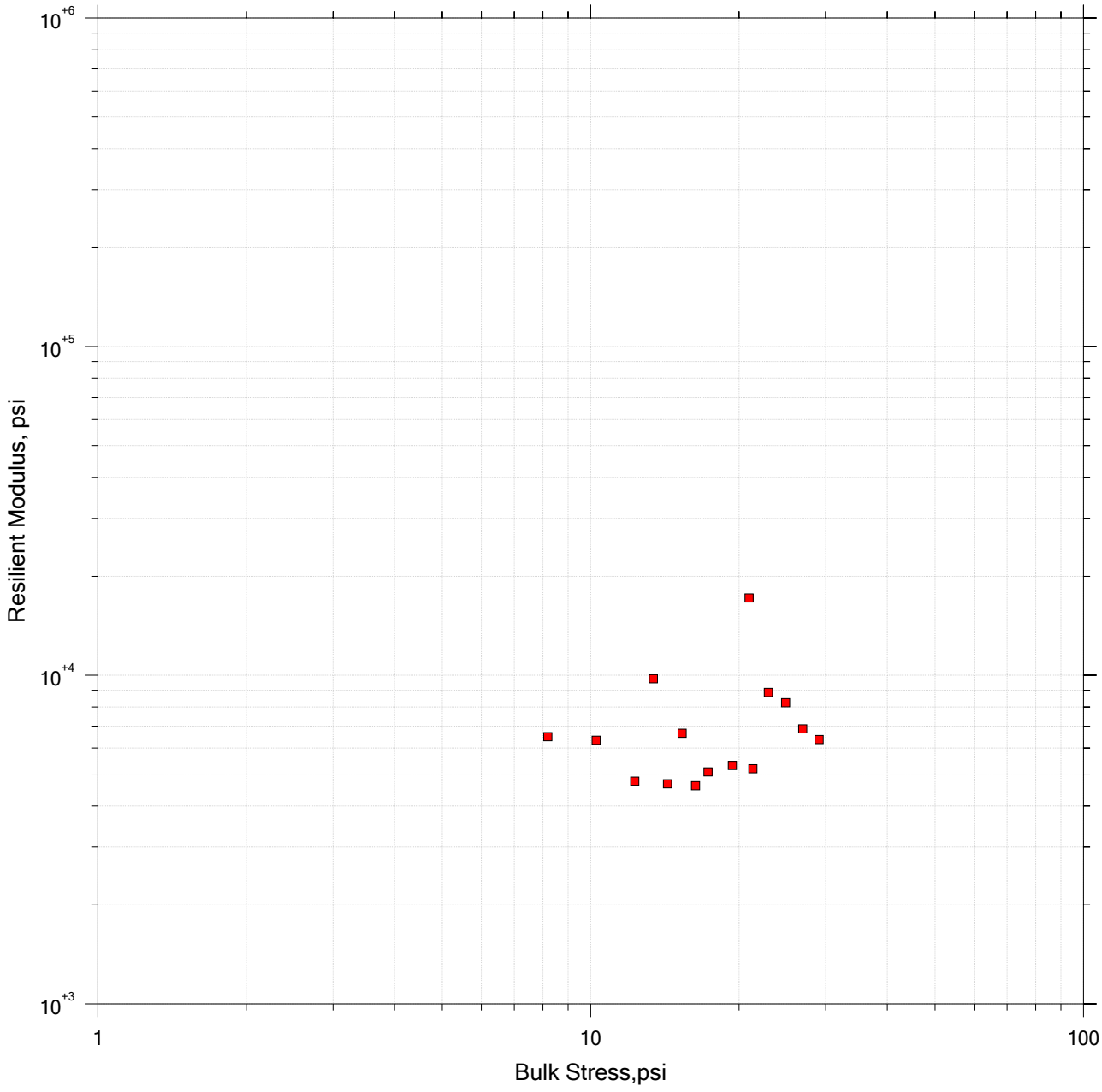
Resilient Modulus of Soil by AASHTO T 307

Test Information:		
	Preconditioning-Greater than 5% perm. strain? (Y=yes or N=no)	N
	Testing-greater than 5% perm. Strain? (Y=yes or N=no)	N
	Testing-Number of Load Sequences Completed (0-15)	15
Specimen Information:		
	Diameter @ top of specimen (in.)	2.88
	Diameter @ middle of specimen (in.)	2.88
	Diameter @ bottom of specimen (in.)	2.88
	Average Diameter of specimen (in.)	2.88
	Membrane Thickness {1} (in.)	0.01
	Membrane Thickness {2} (in.)	0
	Net Diameter (in.)	2.87
	Height of Specimen, Cap and Base, (in.)	8.38
	Height Cap and Base, (in.)	2.30
	Initial Length of Specimen, Lo, (in.)	6.08
	Initial Area Cross Section of Specimen, Ao, (in^2)	6.47
	Initial Volume of Specimen, (Ao)(Lo), (in^3)	39.3
	Soil Specimen Weight	---
	Initial Weight of Container and Wet Soil, (grams)	---
	Final Weight of Container and Wet Soil, (grams)	---
	Weight of Wet Soil Used (grams)	1313
Soil Properties:		
	In Situ Moisture Content(Nuclear), %	N/A
	In Situ Wet Density (Nuclear), (pcf)	N/A
	Specific Gravity	---
	Liquid Limit	---
	Plastic Limit	---
	Plasticity Index	---
Test Specimen Properties:		
	Initial Moisture Content (from trimmings), %	18.6
	Moisture Content after Resilient Modulus Testing, %	18.9
	Initial Dry Density r_d, pcf	107.2
	Permanent Strain, %	0.9
	Quick Shear Test	N/A
	Stress-Strain Plot Attached (Y=yes, N=no)	N
	Triaxial Shear Maximum Strength (Max Load/X-Section Area), psi	N/A
	Did Specimen Fail During Triaxial Shear? (Y=yes, N=no)	N/A

RM TEST

Summary Data

$Mr = 3564.6 * B^{0.218}$ r = 0.22479

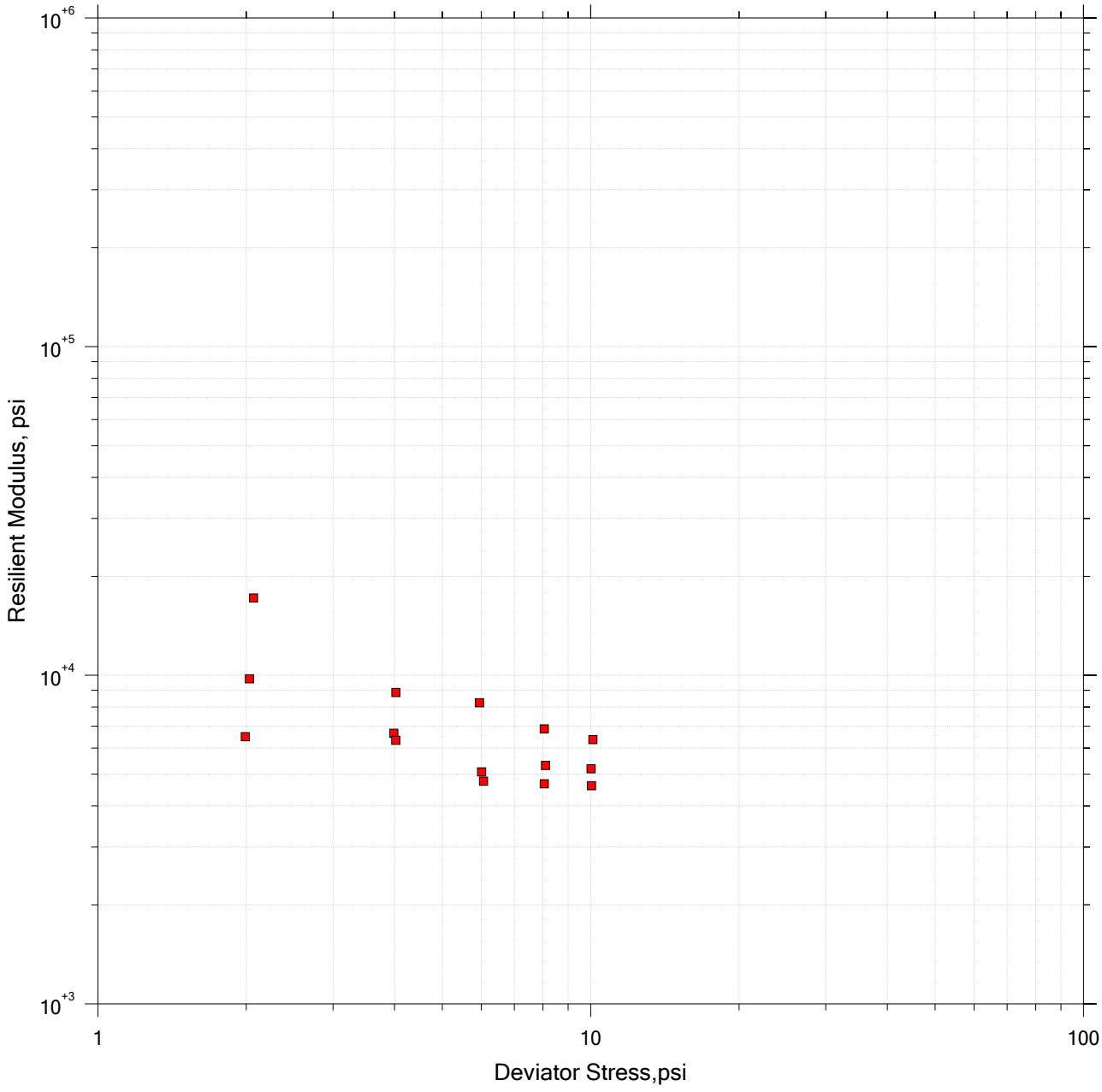


GeoTesting EXPRESS	Project Name: Westgate at Crane	Location: Crane, IN	Project Number: GTX-317240
	Boring Number: RB-002	Tester: md	Checker: anm
	Sample Number: ST-1	Test Date: 05/18/23	Depth: 1-3'
	Test Number: RM-3	Preparation: core	Elevation: ---
	Description: Moist, yellowish brown clay		
	Remarks: CYC-01		

RM TEST

Summary Data

$Mr = 13249 * Sd^{-0.418}$ r = -0.69491

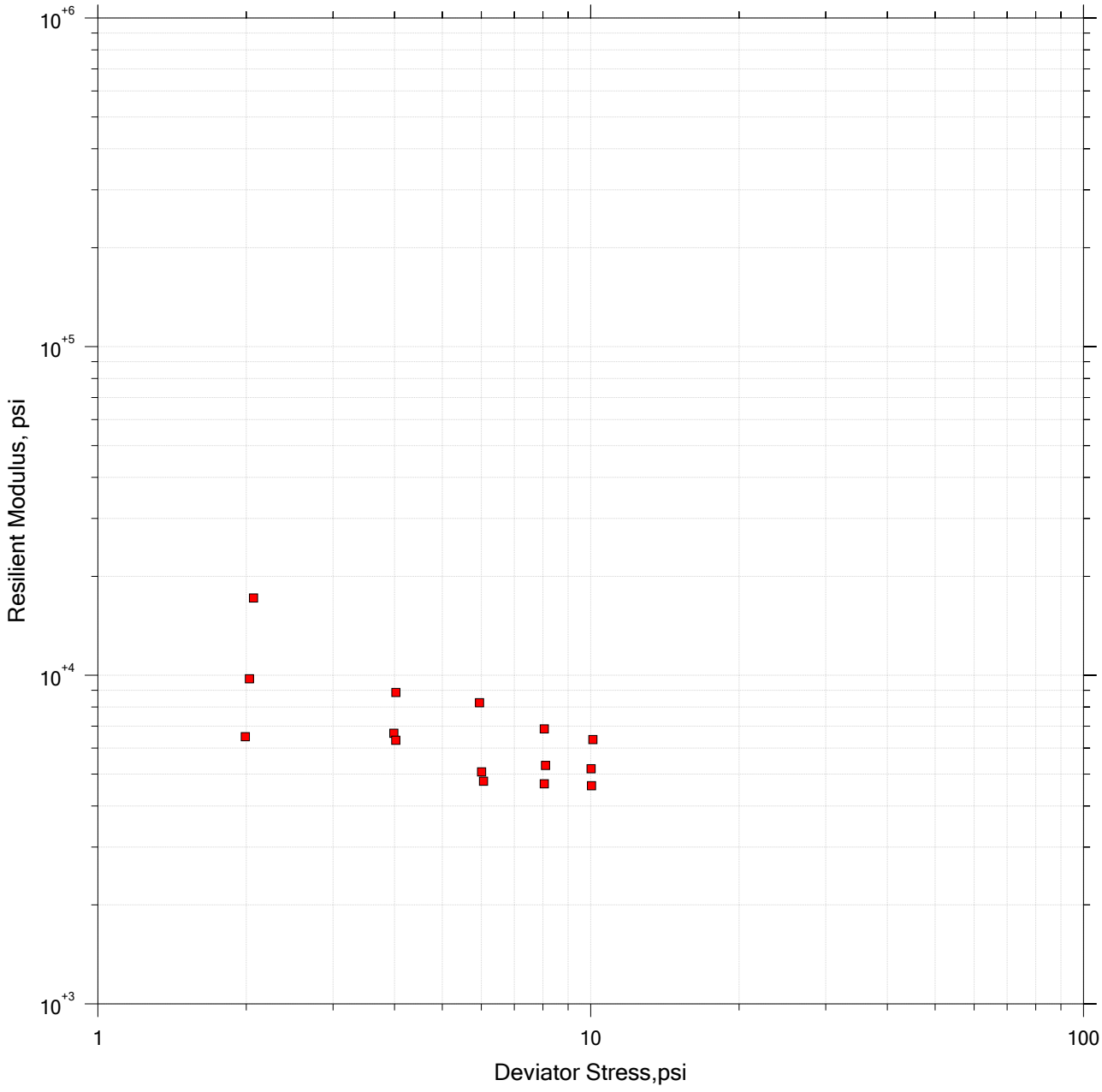


GeoTesting EXPRESS	Project Name: Westgate at Crane	Location: Crane, IN	Project Number: GTX-317240
	Boring Number: RB-002	Tester: md	Checker: anm
	Sample Number: ST-1	Test Date: 05/18/23	Depth: 1-3'
	Test Number: RM-3	Preparation: core	Elevation: ---
	Description: Moist, yellowish brown clay		
	Remarks: CYC-01		

RM TEST

Summary Data

$Mr = 207.04 * Pa * (B/Pa)^{0.737} * (Sd/Pa)^{-0.645}$ r = 0.95705



GeoTesting EXPRESS	Project Name: Westgate at Crane	Location: Crane, IN	Project Number: GTX-317240
	Boring Number: RB-002	Tester: md	Checker: anm
	Sample Number: ST-1	Test Date: 05/18/23	Depth: 1-3'
	Test Number: RM-3	Preparation: core	Elevation: ---
	Description: Moist, yellowish brown clay		
	Remarks: CYC-01		

RM TEST

Summary Data

Confining Stress S3 psi	Nom. Max. Deviator Stress psi	Mean Deviator Stress psi	Std. Dev. Deviator Stress psi	Mean Bulk Stress psi	Mean Resilient Strain %	Std. Dev. Resilient Strain %	Mean Resilient Modulus psi	Std. Dev. Resilient Modulus psi
6.296	2.000	2.069	0.0104	20.96	0.01	0.00	17171.	417.02
6.303	4.000	4.025	0.0244	22.94	0.04	0.00	8862.9	39.692
6.303	6.000	5.950	0.0300	24.86	0.07	0.00	8246.9	25.155
6.296	8.000	8.052	0.0262	26.94	0.11	0.00	6864.5	10.433
6.328	10.00	10.10	0.0217	29.09	0.14	0.00	6367.5	5.4961
3.793	2.000	2.030	0.0252	13.41	0.02	0.00	9750.2	138.07
3.782	4.000	3.986	0.0071	15.33	0.05	0.00	6658.3	42.084
3.767	6.000	6.006	0.0088	17.31	0.11	0.00	5081.2	18.984
3.764	8.000	8.098	0.0283	19.39	0.14	0.00	5311.9	25.166
3.774	10.00	10.02	0.0284	21.34	0.17	0.00	5194.0	11.058
2.064	2.000	1.991	0.0190	8.184	0.03	0.00	6498.9	60.667
2.079	4.000	4.022	0.0110	10.26	0.06	0.00	6337.7	28.631
2.076	6.000	6.060	0.0166	12.29	0.12	0.00	4757.5	32.011
2.090	8.000	8.051	0.0116	14.32	0.16	0.00	4674.3	25.005
2.095	10.00	10.04	0.0163	16.32	0.20	0.00	4611.7	10.838

Project Name: Westgate at Crane	Location: Crane, IN	Project Number: GTX-317240
Boring Number: RB-002	Tester: md	Checker: anm
Sample Number: ST-1	Test Date: 05/18/23	Depth: 1-3'
Test Number: RM-3	Preparation: core	Elevation: ---
Description: Moist, yellowish brown clay		
Remarks: CYC-01		

Client:	Patriot Engineering	Test Date:	05/18/23
Project Name:	Westgate at Crane Development	Tested By:	trm
Project Location:	Crane, IN	Checked By:	anm
GTX #:	317240		
Boring ID:	RB-003		
Sample ID:	ST-1		
Depth, ft:	1-3		
Soil Description:	Moist, gray and yellowish brown clay		
Sample Preparation:	core		
Material Type:	Type 2		
Test No.:	RM-1		
Test Comments:	Sample trimmed and put into the triaxial cell at as-received density and moisture content. Length to Diameter Ratio = 2.02		

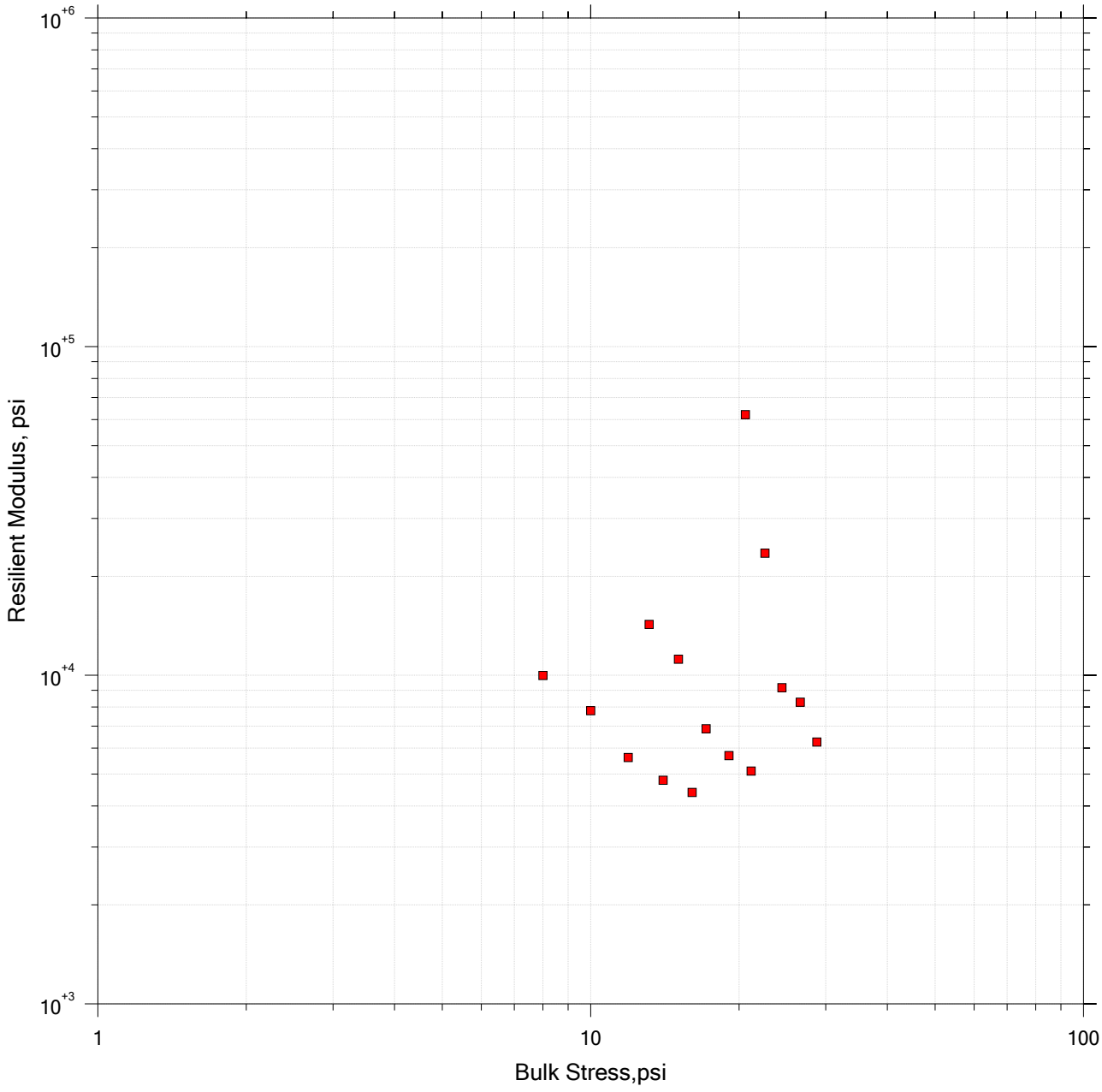
Resilient Modulus of Soil by AASHTO T 307

Test Information:		
	Preconditioning-Greater than 5% perm. strain? (Y=yes or N=no)	N
	Testing-greater than 5% perm. Strain? (Y=yes or N=no)	N
	Testing-Number of Load Sequences Completed (0-15)	15
Specimen Information:		
	Diameter @ top of specimen (in.)	2.88
	Diameter @ middle of specimen (in.)	2.88
	Diameter @ bottom of specimen (in.)	2.88
	Average Diameter of specimen (in.)	2.88
	Membrane Thickness {1} (in.)	0.01
	Membrane Thickness {2} (in.)	0
	Net Diameter (in.)	2.87
	Height of Specimen, Cap and Base, (in.)	8.10
	Height Cap and Base, (in.)	2.30
	Initial Length of Specimen, Lo, (in.)	5.80
	Initial Area Cross Section of Specimen, Ao, (in^2)	6.47
	Initial Volume of Specimen, (Ao)(Lo), (in^3)	37.5
	Soil Specimen Weight	---
	Initial Weight of Container and Wet Soil, (grams)	---
	Final Weight of Container and Wet Soil, (grams)	---
	Weight of Wet Soil Used (grams)	1194
Soil Properties:		
	In Situ Moisture Content(Nuclear), %	N/A
	In Situ Wet Density (Nuclear), (pcf)	N/A
	Specific Gravity	---
	Liquid Limit	---
	Plastic Limit	---
	Plasticity Index	---
Test Specimen Properties:		
	Initial Moisture Content (from trimmings), %	22.7
	Moisture Content after Resilient Modulus Testing, %	23.3
	Initial Dry Density r_d, pcf	98.8
	Permanent Strain, %	0.4
	Quick Shear Test	N/A
	Stress-Strain Plot Attached (Y=yes, N=no)	N
	Triaxial Shear Maximum Strength (Max Load/X-Section Area), psi	N/A
	Did Specimen Fail During Triaxial Shear? (Y=yes, N=no)	N/A

RM TEST

Summary Data

$Mr = 4761 * B^{0.225}$ r = 0.11835

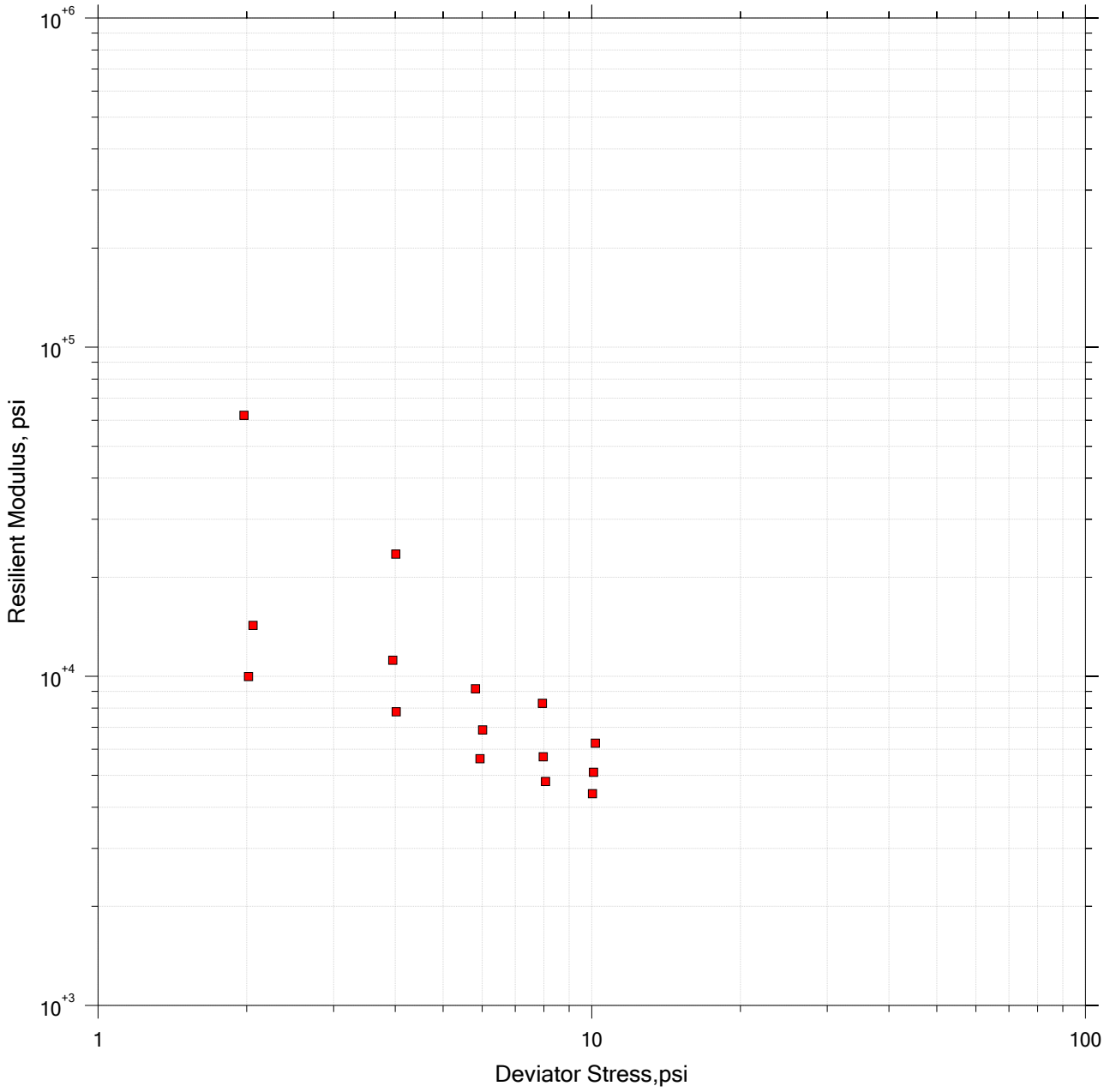


GeoTesting EXPRESS	Project Name: Westgate at Crane	Location: Crane, IN	Project Number: GTX-317240
	Boring Number: RB-003	Tester: md	Checker: anm
	Sample Number: ST-1	Test Date: 05/18/23	Depth: 1-3'
	Test Number: RM-1	Preparation: intact	Elevation: ---
	Description: Moist, gray and yellowish brown clay		
	Remarks: CYC-01		

RM TEST

Summary Data

$Mr = 40008 * Sd^{-0.904}$ r = -0.76059

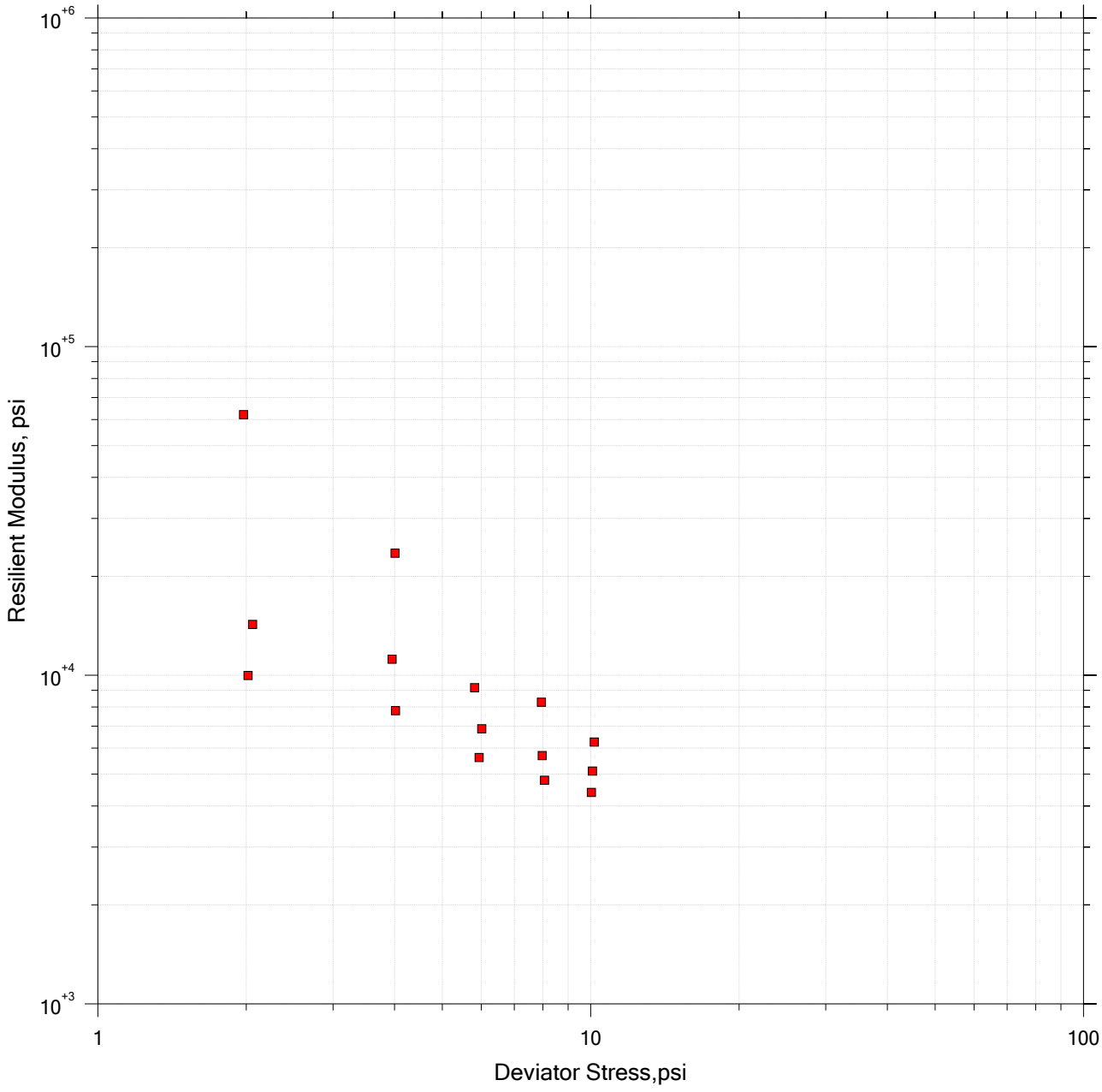


GeoTesting EXPRESS	Project Name: Westgate at Crane	Location: Crane, IN	Project Number: GTX-317240
	Boring Number: RB-003	Tester: md	Checker: anm
	Sample Number: ST-1	Test Date: 05/18/23	Depth: 1-3'
	Test Number: RM-1	Preparation: intact	Elevation: ---
	Description: Moist, gray and yellowish brown clay		
	Remarks: CYC-01		

RM TEST

Summary Data

$Mr = 137.38 * Pa * (B/Pa)^{1.22} * (Sd/Pa)^{-1.28}$ r = 0.94545



GeoTesting EXPRESS	Project Name: Westgate at Crane	Location: Crane, IN	Project Number: GTX-317240
	Boring Number: RB-003	Tester: md	Checker: anm
	Sample Number: ST-1	Test Date: 05/18/23	Depth: 1-3'
	Test Number: RM-1	Preparation: intact	Elevation: ---
	Description: Moist, gray and yellowish brown clay		
	Remarks: CYC-01		

RM TEST

Summary Data

Confining Stress S3 psi	Nom. Max. Deviator Stress psi	Mean Deviator Stress psi	Std. Dev. Deviator Stress psi	Mean Bulk Stress psi	Mean Resilient Strain %	Std. Dev. Resilient Strain %	Mean Resilient Modulus psi	Std. Dev. Resilient Modulus psi
6.208	2.000	1.975	0.0100	20.60	0.00	0.00	62066.	6071.8
6.189	4.000	4.010	0.0574	22.58	0.02	0.00	23507.	536.39
6.211	6.000	5.813	0.0218	24.45	0.06	0.00	9164.2	99.026
6.228	8.000	7.944	0.0142	26.63	0.09	0.00	8277.1	52.668
6.202	10.00	10.17	0.0299	28.77	0.15	0.00	6263.4	29.164
3.694	2.000	2.060	0.0059	13.14	0.01	0.00	14278.	1004.2
3.705	4.000	3.954	0.0226	15.07	0.03	0.00	11188.	113.49
3.712	6.000	6.010	0.0071	17.15	0.08	0.00	6871.7	11.408
3.703	8.000	7.975	0.0132	19.09	0.13	0.00	5693.6	60.106
3.692	10.00	10.08	0.0209	21.16	0.18	0.00	5106.1	7.9735
1.994	2.000	2.017	0.0139	8.000	0.02	0.00	9979.7	115.26
1.995	4.000	4.016	0.0273	9.999	0.05	0.00	7797.9	107.34
1.992	6.000	5.939	0.0217	11.91	0.10	0.00	5615.3	41.672
1.990	8.000	8.059	0.0063	14.03	0.15	0.00	4789.3	13.101
2.013	10.00	10.03	0.0116	16.07	0.21	0.00	4398.5	12.792

Project Name: Westgate at Crane	Location: Crane, IN	Project Number: GTX-317240
Boring Number: RB-003	Tester: md	Checker: anm
Sample Number: ST-1	Test Date: 05/18/23	Depth: 1-3'
Test Number: RM-1	Preparation: intact	Elevation: ---
Description: Moist, gray and yellowish brown clay		
Remarks: CYC-01		

Client:	Patriot Engineering	Test Date:	05/18/23
Project Name:	Westgate at Crane Development	Tested By:	trm
Project Location:	Crane, IN	Checked By:	anm
GTX #:	317240		
Boring ID:	RB-006		
Sample ID:	ST-1		
Depth, ft:	1-3		
Soil Description:	Moist, gray and brown clay		
Sample Preparation:	core		
Material Type:	Type 2		
Test No.:	RM-2		
Test Comments:	Sample trimmed and put into the triaxial cell at as-received density and moisture content. Length to Diameter Ratio = 2.09		

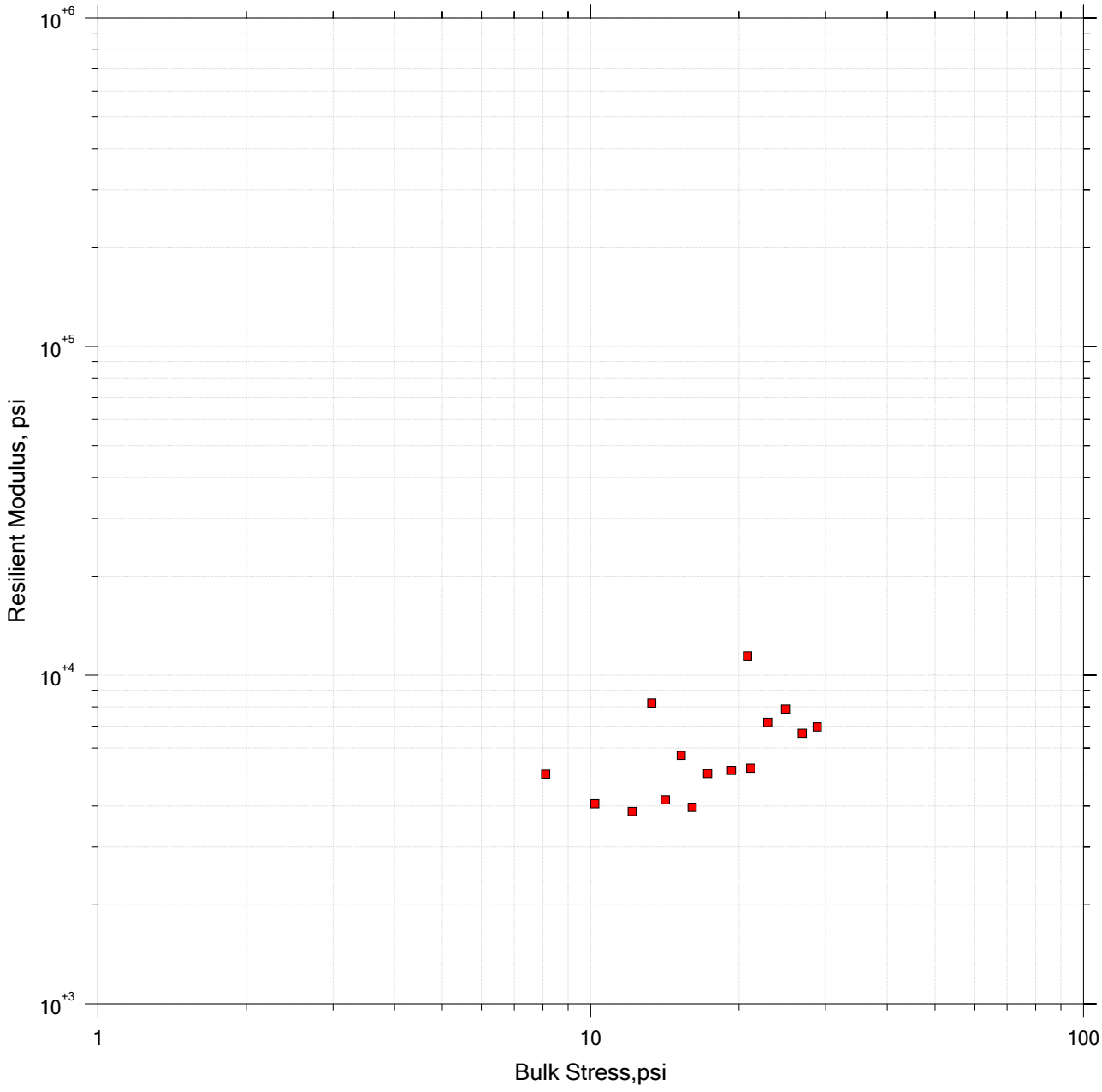
Resilient Modulus of Soil by AASHTO T 307

Test Information:		
	Preconditioning-Greater than 5% perm. strain? (Y=yes or N=no)	N
	Testing-greater than 5% perm. Strain? (Y=yes or N=no)	N
	Testing-Number of Load Sequences Completed (0-15)	15
Specimen Information:		
	Diameter @ top of specimen (in.)	2.81
	Diameter @ middle of specimen (in.)	2.81
	Diameter @ bottom of specimen (in.)	2.81
	Average Diameter of specimen (in.)	2.81
	Membrane Thickness {1} (in.)	0.01
	Membrane Thickness {2} (in.)	0
	Net Diameter (in.)	2.80
	Height of Specimen, Cap and Base, (in.)	8.15
	Height Cap and Base, (in.)	2.30
	Initial Length of Specimen, Lo, (in.)	5.85
	Initial Area Cross Section of Specimen, Ao, (in^2)	6.16
	Initial Volume of Specimen, (Ao)(Lo), (in^3)	36.0
	Soil Specimen Weight	---
	Initial Weight of Container and Wet Soil, (grams)	---
	Final Weight of Container and Wet Soil, (grams)	---
	Weight of Wet Soil Used (grams)	1154
Soil Properties:		
	In Situ Moisture Content(Nuclear), %	N/A
	In Situ Wet Density (Nuclear), (pcf)	N/A
	Specific Gravity	---
	Liquid Limit	---
	Plastic Limit	---
	Plasticity Index	---
Test Specimen Properties:		
	Initial Moisture Content (from trimmings), %	19.6
	Moisture Content after Resilient Modulus Testing, %	18.7
	Initial Dry Density r_d, pcf	102.0
	Permanent Strain, %	0.5
	Quick Shear Test	N/A
	Stress-Strain Plot Attached (Y=yes, N=no)	N
	Triaxial Shear Maximum Strength (Max Load/X-Section Area), psi	N/A
	Did Specimen Fail During Triaxial Shear? (Y=yes, N=no)	N/A

RM TEST

Summary Data

$Mr = 1536.7 * B^{0.465}$ r = 0.53711

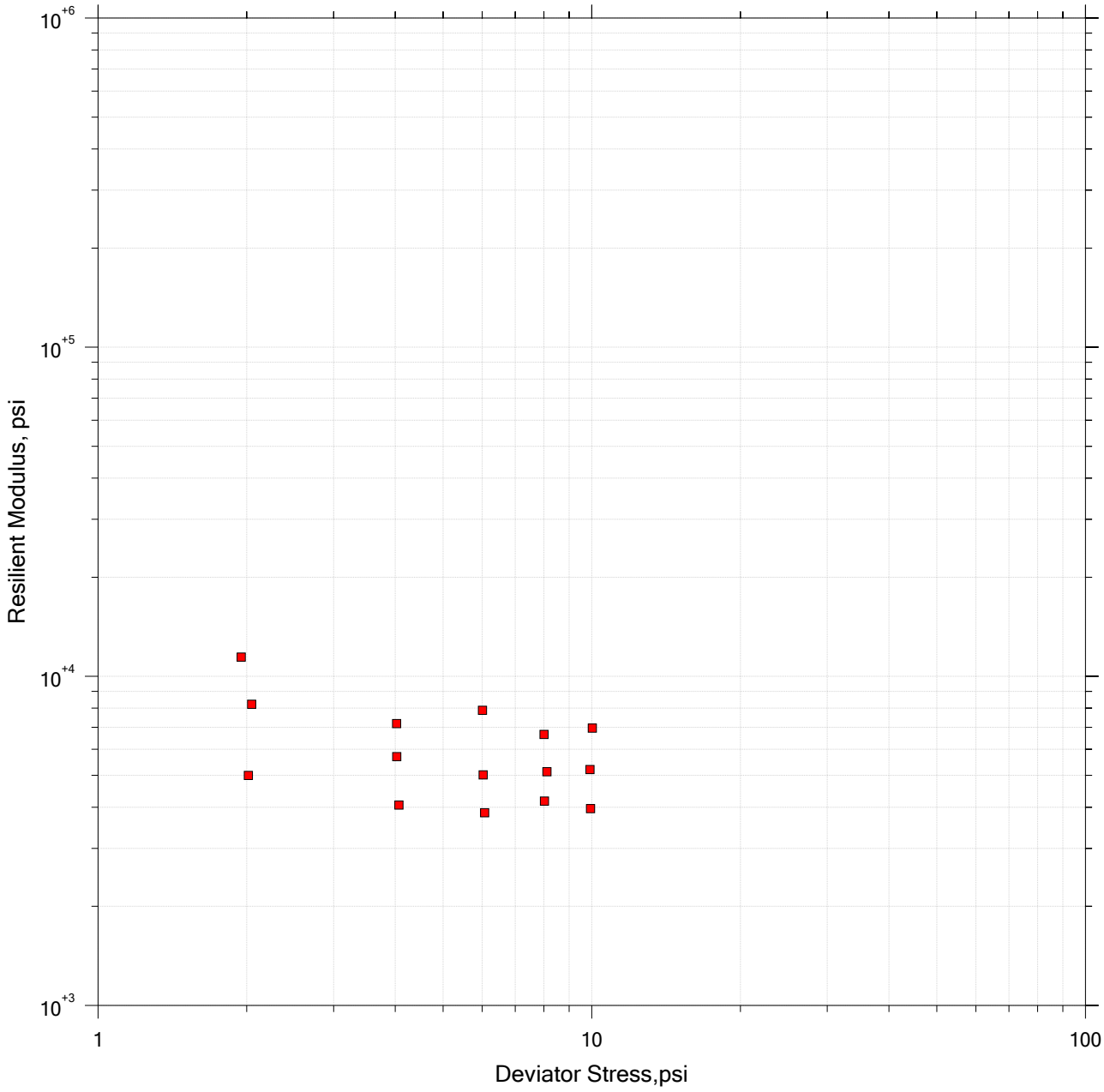


GeoTesting EXPRESS	Project Name: Westgate at Crane	Location: Crane, IN	Project Number: GTX-317240
	Boring Number: RB-006	Tester: md	Checker: anm
	Sample Number: ST-1	Test Date: 05/18/23	Depth: 1-3'
	Test Number: RM-2	Preparation: core	Elevation: ---
	Description: Moist, gray and brown clay		
	Remarks: CYC-01		

RM TEST

Summary Data

$Mr = 8624.7 * Sd^{-0.246}$ r = -0.45803

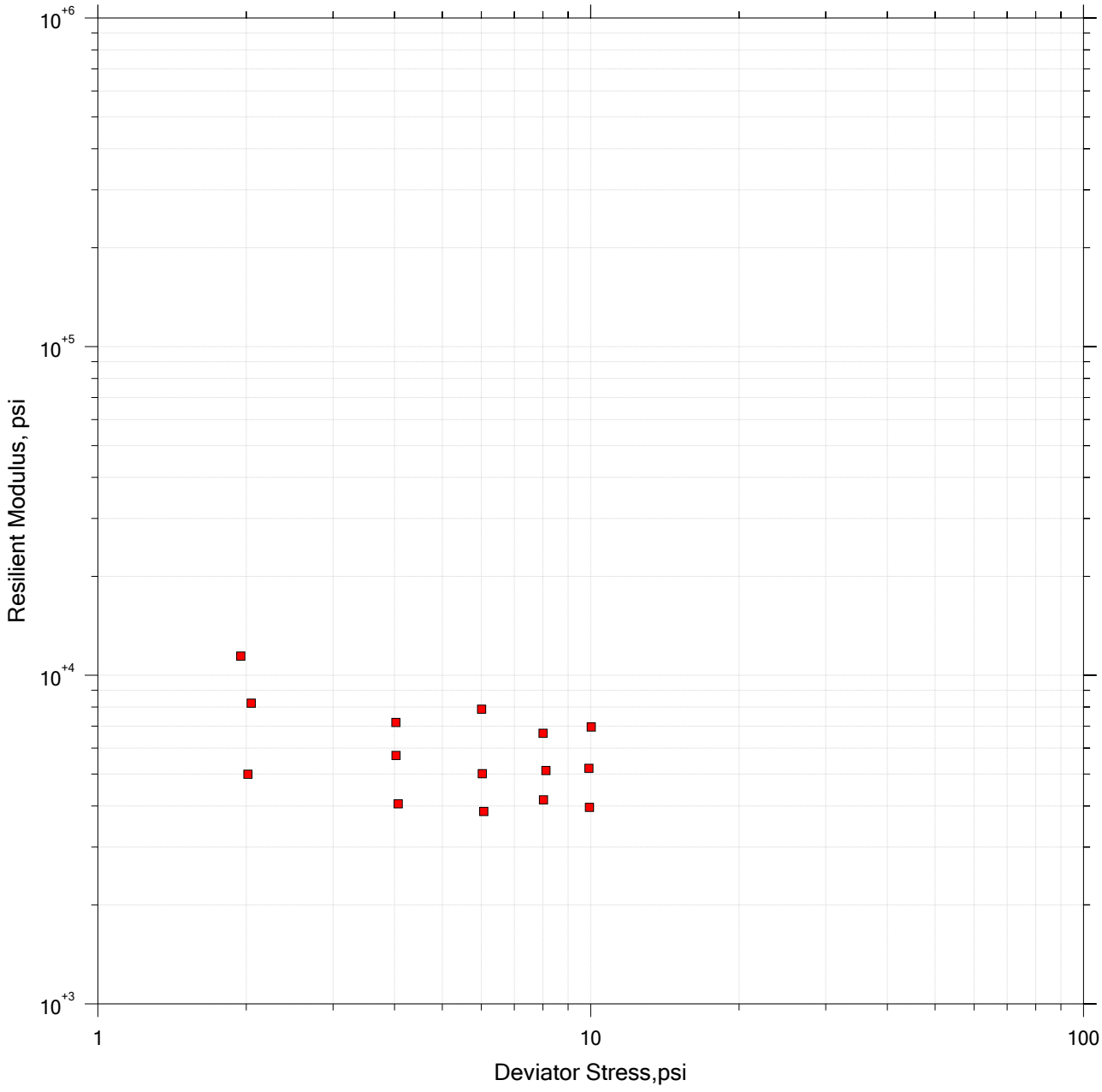


GeoTesting EXPRESS	Project Name: Westgate at Crane	Location: Crane, IN	Project Number: GTX-317240
	Boring Number: RB-006	Tester: md	Checker: anm
	Sample Number: ST-1	Test Date: 05/18/23	Depth: 1-3'
	Test Number: RM-2	Preparation: core	Elevation: ---
	Description: Moist, gray and brown clay		
	Remarks: CYC-01		

RM TEST

Summary Data

$Mr = 205.21 * Pa * (B/Pa)^{0.853} * (Sd/Pa)^{-0.501}$ r = 0.97806



GeoTesting EXPRESS	Project Name: Westgate at Crane	Location: Crane, IN	Project Number: GTX-317240
	Boring Number: RB-006	Tester: md	Checker: anm
	Sample Number: ST-1	Test Date: 05/18/23	Depth: 1-3'
	Test Number: RM-2	Preparation: core	Elevation: ---
	Description: Moist, gray and brown clay		
	Remarks: CYC-01		

RM TEST

Summary Data

Confining Stress S3 psi	Nom. Max. Deviator Stress psi	Mean Deviator Stress psi	Std. Dev. Deviator Stress psi	Mean Bulk Stress psi	Mean Resilient Strain %	Std. Dev. Resilient Strain %	Mean Resilient Modulus psi	Std. Dev. Resilient Modulus psi
6.285	2.000	1.950	0.0114	20.81	0.02	0.00	11437.	352.94
6.279	4.000	4.025	0.0199	22.86	0.05	0.00	7178.6	37.680
6.283	6.000	6.006	0.0219	24.86	0.07	0.00	7882.7	28.109
6.291	8.000	8.006	0.0379	26.88	0.11	0.00	6657.4	10.214
6.266	10.00	10.03	0.0320	28.83	0.13	0.00	6956.0	40.185
3.750	2.000	2.047	0.0231	13.30	0.02	0.00	8218.4	140.34
3.745	4.000	4.028	0.0250	15.26	0.06	0.00	5698.8	37.090
3.748	6.000	6.024	0.0071	17.27	0.11	0.00	5014.0	19.157
3.728	8.000	8.114	0.0253	19.30	0.14	0.00	5125.6	24.455
3.735	10.00	9.916	0.0224	21.12	0.17	0.00	5207.4	8.8255
2.028	2.000	2.016	0.0217	8.100	0.04	0.00	4996.5	45.862
2.041	4.000	4.068	0.0122	10.19	0.09	0.00	4062.9	14.068
2.024	6.000	6.068	0.0252	12.14	0.14	0.00	3849.0	23.595
2.051	8.000	8.021	0.0173	14.17	0.17	0.00	4175.7	11.427
2.041	10.00	9.941	0.0307	16.06	0.23	0.00	3963.3	12.105

GeoTesting EXPRESS	Project Name: Westgate at Crane	Location: Crane, IN	Project Number: GTX-317240
	Boring Number: RB-006	Tester: md	Checker: anm
	Sample Number: ST-1	Test Date: 05/18/23	Depth: 1-3'
	Test Number: RM-2	Preparation: core	Elevation: ---
	Description: Moist, gray and brown clay		
	Remarks: CYC-01		

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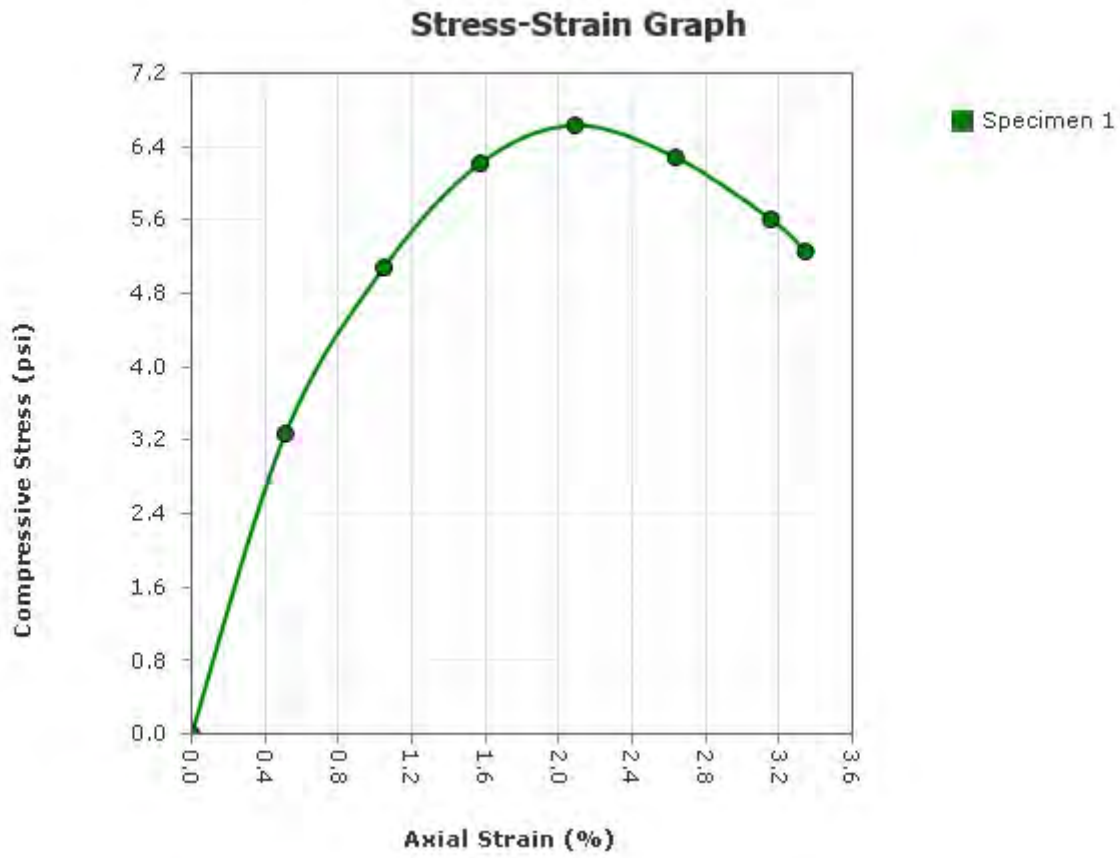
AASHTO ACCREDITATION PROGRAM

Unconfined Compression Test

ASTM D2166



Project:	Westgate at Crane Development
Project Number:	23-0446-01G
Received Date:	5/10/2023
Sampling Date:	5/5/2023
Sample Number:	ST-1
Sample Depth:	1.0-3.0 ft
Boring Number:	RB-005
Location:	
Client Name:	American Structurepoint, Inc.
Remarks:	

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AASHTO ACCREDITATION PROGRAM

Unconfined Compression Test

ASTM D2166

	Specimen Number							
Before Test	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Moisture Content (%):	18.9							
Wet Density (pcf)	120.4							
Dry Density (pcf)	101.3							
Saturation (%):	78.2							
Void Ratio:	0.646							
Height (in)	5.7158							
Diameter (in)	2.8485							
Strain Limit @ 15% (in)	0.9							
Height To Diameter Ratio:	2.01							
Test Data	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Failure Angle (°):								
Strain Rate (in/min)	0.06							
Strain Rate (%/min):	1.05							
Unconfined Compressive Strength (psi)	6.6							
Undrained Shear Strength (psi)	3.3							
Strain at Failure (%):	2.1							

Specific Gravity:	2.67	Plastic Limit:	Liquid Limit:
Type:	Shelby Tube	Soil Classification:	A-4

Project:	Westgate at Crane Development
Project Number:	23-0446-01G
Sampling Date:	5/5/2023
Sample Number:	ST-1
Sample Depth:	1.0-3.0 ft
Boring Number:	RB-005
Location:	
Client Name:	American Structurepoint, Inc.
Remarks:	

Specimen 1 Failure Sketch	Specimen 2 Failure Sketch	Specimen 3 Failure Sketch	Specimen 4 Failure Sketch	Specimen 5 Failure Sketch	Specimen 6 Failure Sketch	Specimen 7 Failure Sketch	Specimen 8 Failure Sketch
							

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AASHTO ACCREDITATION PROGRAM

Unconfined Compression Test

ASTM D2166 LIMS Code: [TO COME FROM LIMS]

Specimen 1

Other Associated Tests:

Sampling Method:	Intact	Material Moisture:	Trimmings	Source Moisture:	Before Shear
Molding Date:	7/12/2023	Test Date:	7/12/2023		
Large Particle:	NO	Sensitivity:	0		
Technician:	E. Bergel	Test Time:	7/12/2023		

Specimen Description: Brown and gray, SILTY LOAM

Test Remarks:

Unconfined Compression Test - Specimen 1

ASTM D2166 LIMS Specimen Code: [TO COME FROM LIMS]

Index	Elapsed Time (hh:mm:ss)	Load (Lbf)	Displacement (in)	Corrected Load (Lbf)	Corrected Displacement (in)	Axial Strain (%)	Cross Sectional Area (in^2)	Stress (psi)	Compressive Stress (psi)
0	00:00:00	1.020281	0.0003	0.0	0.0000	0.0	0.000	0.0	0.0
1	00:00:30	21.96432	0.0295	20.9	0.0292	0.5	6.405	3.3	3.3
2	00:01:00	33.82047	0.0602	32.8	0.0599	1.0	6.440	5.1	5.1
3	00:01:30	41.23545	0.0901	40.2	0.0898	1.6	6.474	6.3	6.2
4	00:02:00	44.22016	0.1197	43.2	0.1193	2.1	6.509	6.8	6.6
5	00:02:30	42.20896	0.1510	41.2	0.1507	2.6	6.545	6.5	6.3
6	00:03:00	37.95272	0.1807	36.9	0.1804	3.2	6.580	5.8	5.6
7	00:03:11	35.68482	0.1915	34.7	0.1911	3.3	6.593	5.4	5.3

APPENDIX D

General Qualifications

Standard Clause for Unanticipated Subsurface Conditions

GENERAL QUALIFICATIONS

of Patriot Engineering's Geotechnical Engineering Investigation

This report has been prepared at the request of our client for his use on this project. Our professional services have been performed, findings obtained, and recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied.

The scope of our services did not include any environmental assessment or investigation for the presence or absence of wetlands, hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report or on the test borings logs regarding vegetation types, odors or staining of soils, or other unusual conditions observed are strictly for the information of our client and the owner.

This report may not contain sufficient information for purposes of other parties or other uses. This company is not responsible for the independent conclusions, opinions or recommendations made by others based on the field and laboratory data presented in this report. Should there be any significant differences in structural arrangement, loading or location of the structure, our analysis should be reviewed.

The recommendations provided herein were developed from the information obtained in the test borings, which depict subsurface conditions only at specific locations. The analysis, conclusions, and recommendations contained in our report are based on site conditions as they existed at the time of our exploration. Subsurface conditions at other locations may differ from those occurring at the specific drill sites. The nature and extent of variations between borings may not become evident until the time of construction. If, after performing on-site observations during construction and noting the characteristics of any variation, substantially different subsurface conditions from those encountered during our explorations are observed or appear to be present beneath excavations, we must be advised promptly so that we can review these conditions and reconsider our recommendations where necessary.

If there is a substantial lapse of time between the submission of our report and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or adjacent to the site, we urge that our report be reviewed to determine the applicability of the conclusions and recommendations considering the changed conditions and time lapse.

We urge that Patriot be retained to review those portions of the plans and specifications that pertain to earthwork and foundations to determine whether they are consistent with our recommendations. In addition, we are available to observe construction, particularly the compaction of structural backfill and preparation of the foundations, and such other field observations as may be necessary.

In order to fairly consider changed or unexpected conditions that might arise during construction, we recommend the following verbiage (Standard Clause for Unanticipated Subsurface Conditions) be included in the project contract.

STANDARD CLAUSE FOR UNANTICIPATED SUBSURFACE CONDITIONS

"The owner has had a subsurface exploration performed by a soils consultant, the results of which are contained in the consultant's report. The consultant's report presents his conclusions on the subsurface conditions based on his interpretation of the data obtained in the exploration. The contractor acknowledges that he has reviewed the consultant's report and any addenda thereto, and that his bid for earthwork operations is based on the subsurface conditions as described in that report. It is recognized that a subsurface exploration may not disclose all conditions as they actually exist and further, conditions may change, particularly groundwater conditions, between the time of a subsurface exploration and the time of earthwork operations. In recognition of these facts, this clause is entered in the contract to provide a means of equitable additional compensation for the contractor if adverse unanticipated conditions are encountered and to provide a means of rebate to the owner if the conditions are more favorable than anticipated.

At any time during construction operations that the contractor encounters conditions that are different than those anticipated by the soils consultant's report, he shall immediately (within 24 hours) bring this fact to the owner's attention. If the owner's representative on the construction site observes subsurface conditions which are different than those anticipated by the consultant's report, he shall immediately (within 24 hours) bring this fact to the contractor's attention. Once a fact of unanticipated conditions has been brought to the attention of either the owner or the contractor, and the consultant has concurred, immediate negotiations will be undertaken between the owner and the contractor to arrive at a change in contract price for additional work or reduction in work because of the unanticipated conditions. The contract agrees that the following unit prices would apply for additional or reduced work under the contract. For changed conditions for which unit prices are not provided, the additional work shall be paid for on a time and materials basis."

Another example of a changed conditions clause can be found in paper No. 4035 by Robert F. Borg, published in ASCE Construction Division Journal, No. CO2, September 1964, page 37.