



Original Date: June 22, 2020
Re-Issue Date: April 20, 2021

Directional Project Support (DPS)
33311 Lois Lane, Suite A
Magnolia, Texas 77354

Reference: **Geotechnical Exploratory Borings
"Shoen Road" (S3-0360)
Chester County, Pennsylvania
PSI Project No.: 04911930**

As requested, Professional Service Industries, Inc. (PSI), an Intertek company, performed exploratory test borings at the above referenced site. Our services were performed under PSI Proposal No. 0491-214504, dated June 19, 2017 signed by Mr. William M. Gardner, President of Directional Project Support, on June 20, 2017. This letter report presents the results of the two (2) test borings performed at the approximate locations and depths provided by DPS.

Work Task

PSI's services included hiring a geotechnical drilling subcontractor (Allied Well Drilling, Inc.) to drill the requested exploratory test borings designated as 360A and 360B generally located in the eastbound lane of Shoen within a reported geophysical anomaly area(s). PSI's services also included providing a field logger to visually classify the soil. The soil samples were returned to PSI's office/laboratory in Harrisburg, Pennsylvania. The approximate site location and boring locations are depicted in Figures 1 and 2 at the end of this report.

Area Geology

Based on the PA Geological Survey's OFGA 16-01.0 "Bedrock Geologic Map of Part of the Chester Valley Area, Chester, Delaware, Montgomery, and Philadelphia Counties, Pennsylvania" (W.E. Kochanov, 2016), the site is underlain by Harpers Formation (Ch) which is indicated to consist of phyllite interlaminated in part with micaceous and argillaceous quartzite. Nearby mapped formations include Chickies Formation (Cch) approximately 200 feet north (quartzite) and Ledger Formation (Cl) approximately 200 feet south (dolostone). The OFGA 16-01.0 geology map has been included in Figure 3 at the end of this report. The Ledger Formation mapped nearby south of the project site is known for Karst topography (i.e. sinkholes, ground subsidence, irregular depth to



bedrock) and the OFR 93-01 "Sinkholes and Karst-Related Features of Chester County, Pennsylvania" (W.E. Kochanov, 1993) has been included as Figure 4.

Subsurface Exploration

On June 9, 2020 at both test boring locations (360A and 360B), the roadway surface was removed, hydro-vac cleared, and hole fitted with a 4-in PVC pipe with annulus spaced filled with flowable fill. On June 10, 2020, the borings were drilled with a Geoprobe 7822DT track-mounted drill rig.

The borings were advanced through soil with casing and rollerbit. Standard Penetration Tests (SPT) utilizing a 24-inch length split-spoon sampler (2-in O.D.) were typically performed continuously until the respective boring termination depths.

PSI's field logger visually classified the soil samples recovered from the test borings. The results of the visual classifications, the SPT blow counts, soil sample recoveries are presented in the boring logs attached to this report. The strata shown on the logs represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The strata represent the approximate boundaries between subsurface materials, where the actual transition may be gradual.

Should there be any questions regarding this exploratory boring data report, please contact our office at (717) 230-8622.

Respectfully submitted,
PROFESSIONAL SERVICE INDUSTRIES, INC.

Raghu Peddishree, P.E.
Project Manager



Paul H. McMichael, P.E.
Principal Consultant/Project Manager

Attachments: Figure 1 – Site Vicinity Map
Figure 2 – Boring Location Plan
Figure 3 – Site Geology Map
Figure 4 – Karst Map
Boring Logs/General Notes

FIGURE 1: SITE VICINITY MAP

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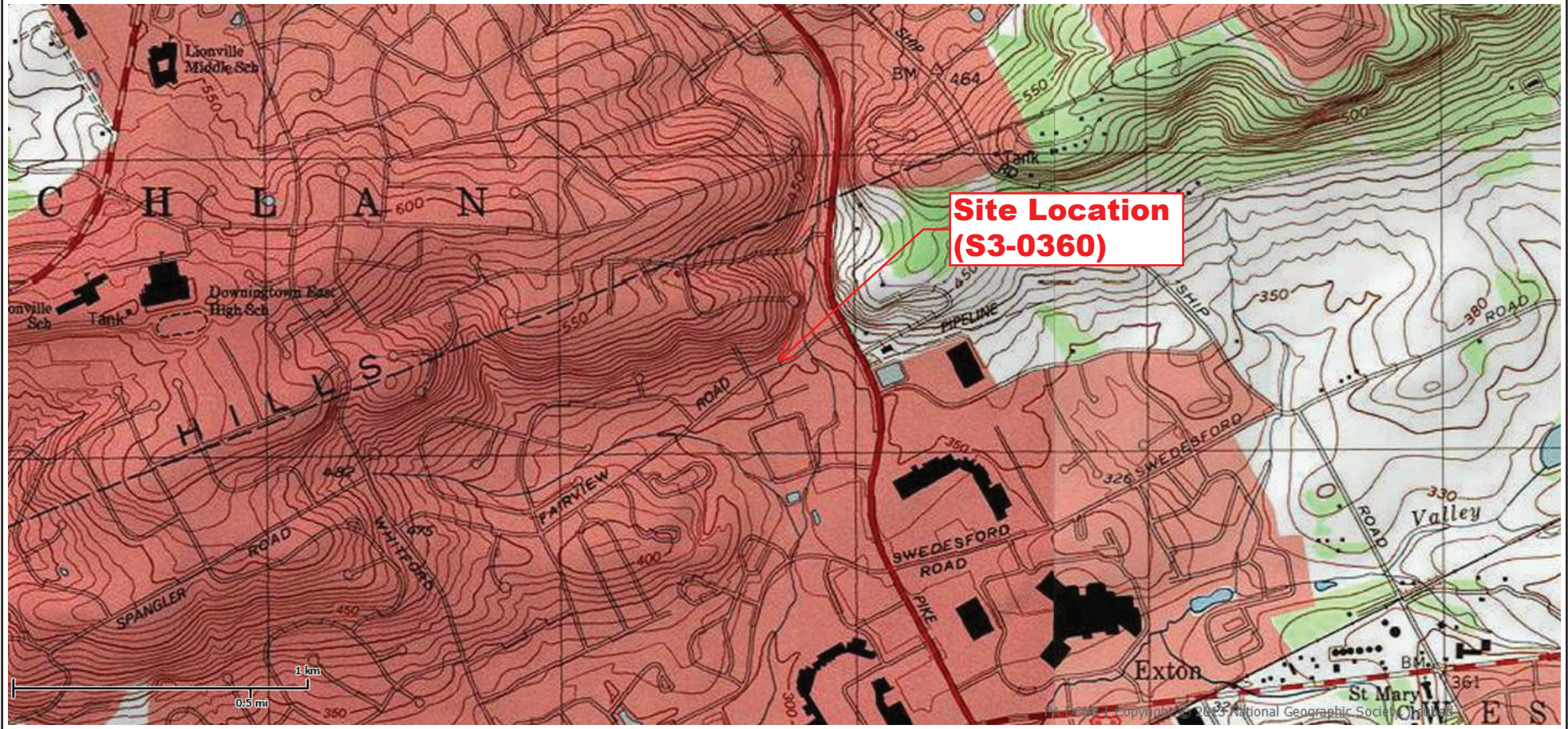


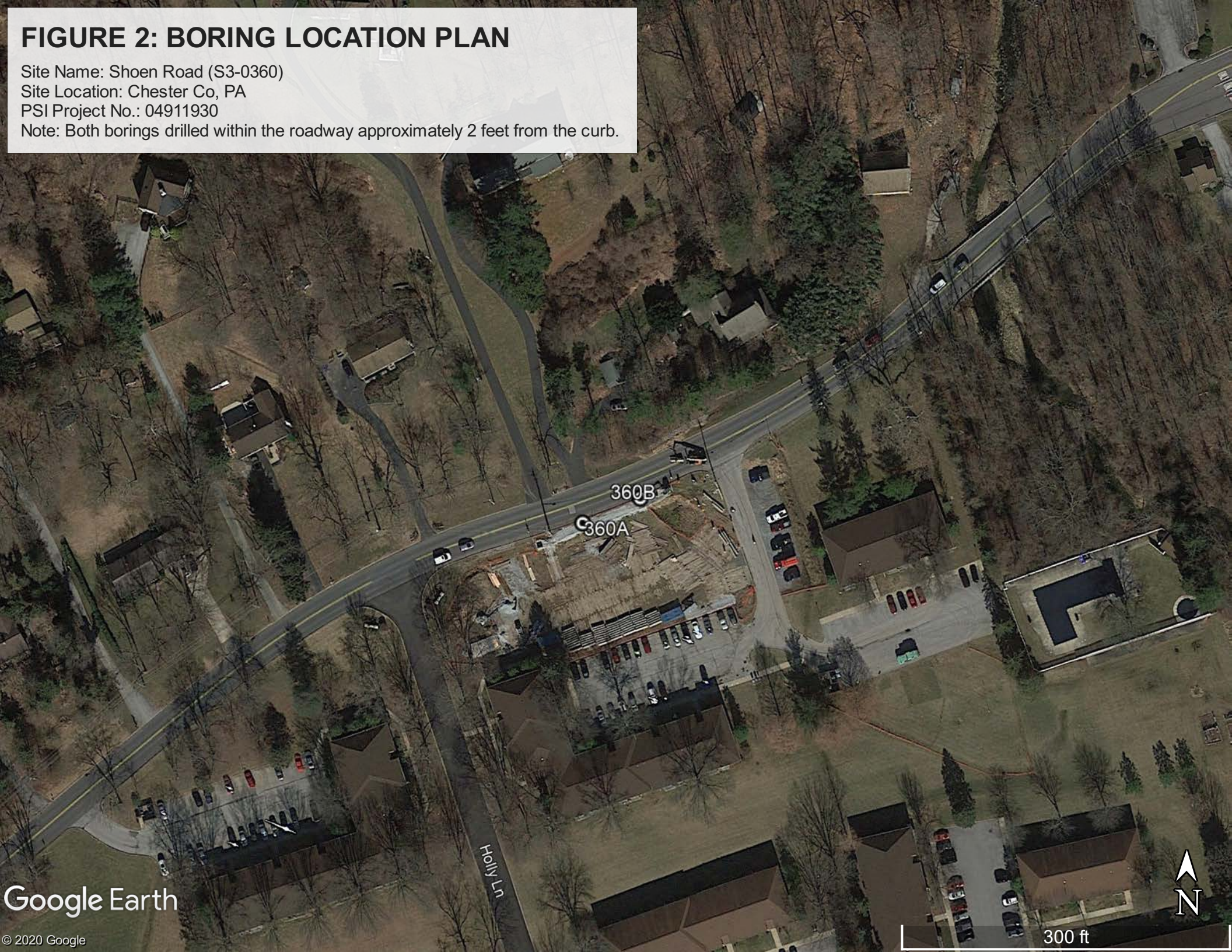
FIGURE 2: BORING LOCATION PLAN

Site Name: Shoen Road (S3-0360)

Site Location: Chester Co, PA

PSI Project No.: 04911930

Note: Both borings drilled within the roadway approximately 2 feet from the curb.



**SINKHOLES AND KARST-RELATED FEATURES
OF CHESTER COUNTY, PENNSYLVANIA**

by **W.E.Kochanov**

1993

OPEN FILE REPORT: 9301

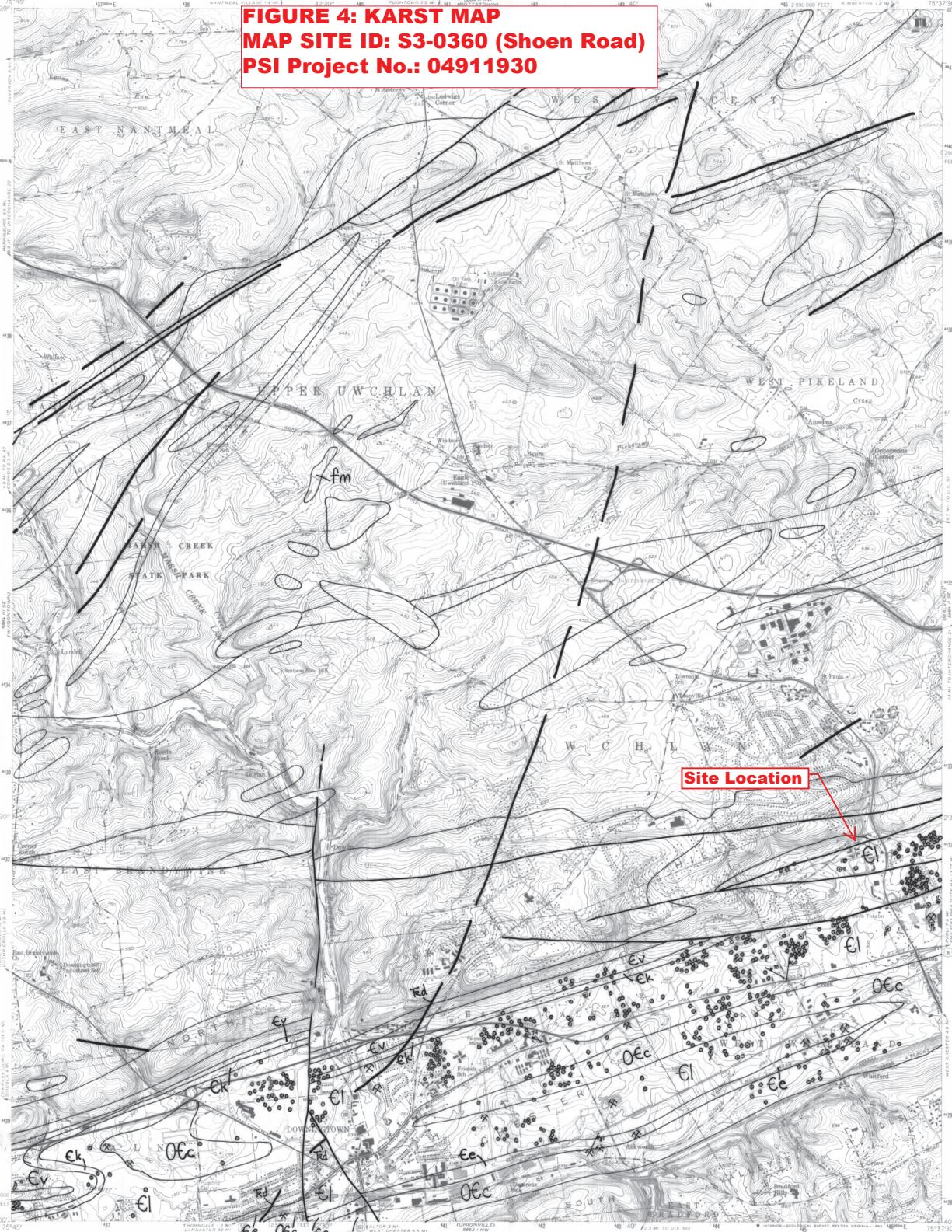
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

DOWNTOWN QUADRANGLE
PENNSYLVANIA—CHESTER CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
0746

**FIGURE 4: KARST MAP
MAP SITE ID: S3-0360 (Shoen Road)
PSI Project No.: 04911930**

SYMBOL	FORMATION
	DIABASE Dk

SYMBOL	FORMATION
	Leithsville Ls
	Allegheny Al
	West Pireland Wp
	Upper Uwchlan Uw
	Lower Uwchlan Lw
	Conestoga Co
	Seneca S
	Onondaga O
	Hamilton Group H



SYMBOLS	
	INDIVIDUAL SINKHOLE OR SINKHOLE GROUP
	CLOSED, SEMI-CLOSED, OR LINEAR DEPRESSIONS
	SURFACE MINE, QUARRY, OR PIT
	CAVE ENTRANCE
	BEDDING ORIENTATION STRIKE AND DIP
	BEDDING ORIENTATION STRIKE AND 90° DIP
	OVERTURNED BED STRIKE AND DIP
	JOINT ORIENTATION STRIKE AND DIP
	JOINT ORIENTATION STRIKE AND 90° DIP
	FAULT CONTACT
	FORMATION CONTACT
	DIABASE DIKE

Mapped, edited, and published by the Geological Survey
Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1991. Field checked 1996

Projections: 10,000-foot grid ticks based on Pennsylvania coordinate system, south zone. 1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue 1927 North American Datum

To place on the predicted North American Datum 1983 move the projection lines 6 meters south and 30 meters west as shown by dashed corner ticks

There may be private inholdings within the boundaries of the National or State reservations shown on this map

Revisions shown in purple and woodland compiled from aerial photographs taken 1961 and other sources. This information not field checked. Map edited 1983

UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24,000

CONTOUR INTERVAL 10-FOET
NATIONAL GEODESIC VERTICAL DATUM OF 1929

ROAD CLASSIFICATION
Heavy-duty Medium-duty Light-duty Unimproved dirt
Interstate Route U.S. Route State Route

0746
DOWNTOWN, PA.
40075-A6-TF-024
1996
PHOTOGRAPHED 1983
DMA 5664 D SW-SERIES 1951

Geology from:
Bascom & Stose (1938)
PAGS Compilation, MAP G1

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY
DENVER, COLORADO 80224 OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

The information presented here has not been reviewed for formal publication.
**Bureau of Topographic and Geologic Survey
P.O. Box 8453, Harrisburg, PA 17105-8453**

DATE STARTED: 6/10/20 **DRILL COMPANY:** Allied Well Drilling, Inc.
DATE COMPLETED: 6/10/20 **DRILLER:** G. Brugger **LOGGED BY:** P. McMichael
COMPLETION DEPTH: 31.0 ft **DRILL RIG:** GeoProbe 7822DT
BENCHMARK: N/A **DRILLING METHOD:** Casing&Rollerbit
ELEVATION: 362.3 ft **SAMPLING METHOD:** 2-in SS
LATITUDE: 40.039069° **HAMMER TYPE:** Automatic
LONGITUDE: -75.63621° **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** R. Peddishree

BORING 360A

Water While Drilling Not Enc.

BORING LOCATION:
 See Boring Location Plan

REMARKS: Boring coordinates/surface elevations provide by DPS; Boring offset ~2 ft north from survey nail marked immediately in front of concrete curb for rig access.

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0						06-09-20: Saw-cut Roadway Surface ~8" Asphalt; Hydro-Vac Cleared to 3.5 ft below road surface (rock exposed at bottom); Fitted with 4-in Dia. PVC pipe with annulus space filled with flowable fill.					
360						Borehole advanced to 5 ft with casing/rollerbit. ~4.5 ft. Broke through boulder (~1/2-foot thick) into soil.					
5				S-1	19	RESIDUUM- Very Soft to Medium Stiff, Brown, SILT/Lean CLAY with Sand, trace Gravel (no reaction to 10%HCl), moist	ML/CL	1-1-1-2 N=2			
355				S-2	24			2-2-4-6 N=6			
10				S-3	1	Very Low Recovery - Piece of Gravel w/Sand (no reaction to 10%HCL)		7-9-12-16 N=21			
350				S-4	18	RESIDUUM- Stiff, Brown SILT with Sand, trace Gravel (quartzite), moist	ML	4-5-6-10 N=11			
15				S-5	15	RESIDUUM- Stiff to Very Stiff, Brown Sandy SILT, trace Gravel, moist	ML	4-6-7-9 N=13			
345				S-6	12			7-7-9-12 N=16			
20				S-7	15	RESIDUUM- Medium Dense, Brown, Silty SAND, moist	SM	8-13-10-8 N=23			
340				S-8	12	~18.5 ft. 2-in of white clay recovered.		6-5-5-7 N=10			
25				S-9	16	RESIDUUM- Stiff, White, Lean CLAY, trace Sand, moist/dry	CL	4-5-6-4 N=10			
				S-10	12			9-8-7-7 N=15			

Continued Next Page



Professional Service Industries, Inc.
 1707 S. Cameron Street, Suite B
 Harrisburg, PA 17104
 Telephone: (717) 230-8622

PROJECT NO.: 04911930
PROJECT: Energy Transfer (DPS)
LOCATION: "Shoen Road" (S3-0360)
 Chester Co., PA

DATE STARTED: 6/10/20 **DRILL COMPANY:** Allied Well Drilling, Inc.
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BENCHMARK: N/A **DRILLING METHOD:** Casing&Rollerbit
ELEVATION: 362.3 ft **SAMPLING METHOD:** 2-in SS
LATITUDE: 40.039069° **HAMMER TYPE:** Automatic
LONGITUDE: -75.63621° **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** R. Peddishree

BORING 360A

Water While Drilling Not Enc.

BORING LOCATION:
 See Boring Location Plan

REMARKS: Boring coordinates/surface elevations provide by DPS; Boring offset ~2 ft north from survey nail marked immediately in front of concrete curb for rig access.

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
25				S-11	18	RESIDUUM - Stiff, White, Lean CLAY, trace Sand, moist/dry White w/ Yellow-Red Layers	CL	3-4-5-6 N=9		X Moisture PL LL STRENGTH, tsf ▲ Qu * Qp	
335			S-12	9	4-5-6-7 N=11						
30			S-13	12	4-5-5-6 N=10						
						Test Boring Terminated @ 31					






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DATE COMPLETED: 6/10/20 **DRILLER:** G. Brugger **LOGGED BY:** P. McMichael
COMPLETION DEPTH: 30.0 ft **DRILL RIG:** GeoProbe 7822DT
BENCHMARK: N/A **DRILLING METHOD:** Casing&Rollerbit
ELEVATION: 360.0 ft **SAMPLING METHOD:** 2-in SS
LATITUDE: 40.039127° **HAMMER TYPE:** Automatic
LONGITUDE: -75.63602° **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** R. Peddishree

BORING 360B

Water  At Start of Drilling 5 feet



BORING LOCATION:
 See Boring Location Plan

REMARKS: Boring coordinates/surface elevations provide by DPS.

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0						06-09-20: Saw-cut Roadway Surface ~7.5" Asphalt; Hydro-Vac Cleared to 7 ft below road surface; Fitted with 4-in Dia. PVC pipe with annulus space filled with flowable fill. 06-10-20: Water in PVC Pipe (5 ft below pavement grade)					
355	5										
				S-1	10	RESIDUUM - Stiff, Brown, Sandy SILT, trace Gravel, moist/wet	ML	6-5 N=11			
				S-2	10	Brown w/Gray		W-3-6-7 N=9			
350	10			S-3	14	RESIDUUM - Soft to Medium Stiff, Brown SILT with Sand, moist/wet	ML	6-2-2-5 N=4			
				S-4	12			4-4-2-3 N=6			
345	15			S-5	12	RESIDUUM Top 7": Soft, Dark Gray Lean CLAY, moist Middle 1": Yellow Sand/Gravel Bottom 4" Yellow/White Lean Clay	CL	2-13-8-7 N=21			
				S-6	18	RESIDUUM - Stiff to Very Stiff, Yellow/White, Lean CLAY, trace Sand, moist/dry		4-4-6-5 N=10			
				S-7	18	S7: Yellow/White with thin Red Layer		3-4-8-11 N=12			
340	20			S-8	15		CL	5-6-8-8 N=14			
				S-9	15			6-6-7-7 N=13			
335	25										

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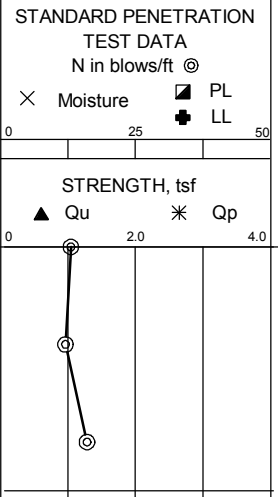
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BORING 360B

Water  At Start of Drilling 5 feet



BORING LOCATION:
 See Boring Location Plan

REMARKS: Boring coordinates/surface elevations provide by DPS.

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
25				S-10	18	RESIDUUM - Stiff to Very Stiff, Yellow/White, Lean CLAY, trace Sand, moist/dry	CL	5-5-8-8 N=13			
			S-11	12	3-6-6-7 N=12						
			S-12	12	9-8-8-7 N=16						
330	30					Test Boring Terminated @ 30					



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GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.	☒ SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
HSA: Hollow Stem Auger - typically 3 1/4" or 4 1/4" I.D. openings, except where noted.	■ ST: Shelby Tube - 3" O.D., except where noted.
M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry	▮ RC: Rock Core
R.C.: Diamond Bit Core Sampler	⬇ TC: Texas Cone
H.A.: Hand Auger	☞ BS: Bulk Sample
P.A.: Power Auger - Handheld motorized auger	☑ PM: Pressuremeter
	CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

- N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
- N₆₀: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
- Q_u: Unconfined compressive strength, TSF
- Q_p: Pocket penetrometer value, unconfined compressive strength, TSF
- w%: Moisture/water content, %
- LL: Liquid Limit, %
- PL: Plastic Limit, %
- PI: Plasticity Index = (LL-PL), %
- DD: Dry unit weight, pcf
- ▼, ▼, ▼ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS

<u>Relative Density</u>	<u>N - Blows/foot</u>
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

ANGULARITY OF COARSE-GRAINED PARTICLES

<u>Description</u>	<u>Criteria</u>
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

<u>Component</u>	<u>Size Range</u>
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to ¾ in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.005 mm to 0.075 mm
Clay:	<0.005 mm

PARTICLE SHAPE

<u>Description</u>	<u>Criteria</u>
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

<u>Descriptive Term</u>	<u>% Dry Weight</u>
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%

GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

<u>Q_u - TSF</u>	<u>N - Blows/foot</u>	<u>Consistency</u>
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

<u>Description</u>	<u>Criteria</u>
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

<u>Descriptive Term</u>	<u>% Dry Weight</u>
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

<u>Description</u>	<u>Criteria</u>	<u>Description</u>	<u>Criteria</u>
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick	Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick	Lensed:	Inclusion of small pockets of different soils
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing	Layer:	Inclusion greater than 3 inches thick (75 mm)
Slickensided:	Fracture planes appear polished or glossy, sometimes striated	Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
		Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

<u>Q_u - TSF</u>	<u>Consistency</u>
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

<u>Description</u>	<u>Criteria</u>
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

<u>Voids</u>	<u>Void Diameter</u>
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

(Typically Sedimentary Rock)

<u>Component</u>	<u>Size Range</u>
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

<u>Rock Mass Description</u>	<u>RQD Value</u>
Excellent	90 - 100
Good	75 - 90
Fair	50 - 75
Poor	25 - 50
Very Poor	Less than 25

Degree of Brokenness

<u>Characteristic</u>	<u>Description</u>
Less than 1 inch	Very Broken
1 inch to 3 inches	Broken
3 inches to 6 inches	Slightly Broken
Greater than 6 inches	Massive

Brokenness: A general rock description referring to any breaks or separations in the rock. Includes bedding planes and fractures.

DEGREE OF WEATHERING

Slightly Weathered: Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.

Weathered: Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.

Highly Weathered: Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS	
			GRAPH	LETTER		
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS (LITTLE OR NO FINES)	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES	
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES	
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES	
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	(APPRECIABLE AMOUNT OF FINES)			GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
		SAND AND SANDY SOILS (LITTLE OR NO FINES)	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
						SP
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES			SM	SILTY SANDS, SAND - SILT MIXTURES
			(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
		FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50			ML
					CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50				MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS	
				CH	INORGANIC CLAYS OF HIGH PLASTICITY	
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
	HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

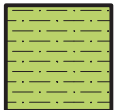
Graphic Symbols for Materials and Rock Deposits



CONCRETE
Portland Cement Concrete



BITUMINOUS CONCRETE



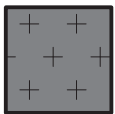
CLAYSTONE



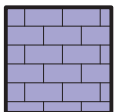
COAL
Coal, Anthracite Coal



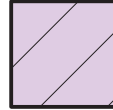
CONGLOMERATE/BRECCIA
Conglomerate, Breccia



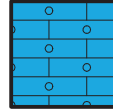
IGNEOUS ROCK
Anorthosite, Basalt, Metabasalt, Diabase (Gabbro), Gabbro, Granite/Granodionite, Homfels, Pegmatite, Rhyolite/Metarhyolite



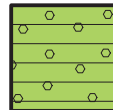
LIMESTONE
Limestone, Dolomite



METAMORPHIC ROCK
Amphibolite, Gneiss, Marble, Phyllite, Quartzite, Schist, Serpentinite, Slate



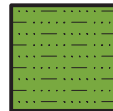
CHERT



SANDSTONE
Sandstone, Orthoquartzite (Sandstone)



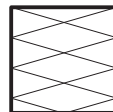
SHALE



SILTSTONE



NO RECOVERY



VOID