URBAN ENGINEERS, INC.

SUBSURFACE EXPLORATION REPORT

PROPOSED BUILDING ADDITION
AMBULATORY SURGERY CENTER REDESIGN

VETERANS AFFAIRS MEDICAL CENTER
135 EAST 38TH STREET
ERIE, PENNSYLVANIA

Prepared for:

IKM Incorporated
Pittsburgh, Pennsylvania

September 2012

Urban Project No. 2012620205.000

URBAN ENGINEERS, INC.
Formulating Excellence®
ISO 9001:2008 Certified | Founded 1960 | Employee Owned
1319 Sassafras Street
Erie, PA 16501-1720
(814) 453-5702 Fax (814) 453-2020
www.urbanengineers.com

September 12, 2012

IKM Incorporated
One PPG Place
Pittsburgh, Pennsylvania 15222

Attn: John C. Schrott
President

Re: Subsurface Exploration Report
Proposed Building Addition
Ambulatory Surgery Center Redesign
Veterans Affairs Medical Center, Erie, Pennsylvania
Urban Project No. 2012620205.000

Gentlemen:

We are pleased to submit herewith our final subsurface exploration report covering field and laboratory services together with our evaluation of subsurface conditions and recommendations for the captioned project. A preliminary evaluation report was submitted by email on September 4, 2012.

We wish to thank you for the opportunity of assisting you in this project, and for your cooperation during the course of this exploration. In the event of questions, additional services or information on any of the above, please do not hesitate to contact our office.

Very truly yours,

URBAN ENGINEERS, INC.

David G. Machmer, P.E.
Geotechnical Engineering Practice Leader

DGM:

TABLE OF CONTENTS

I. INTRODUCTION

This report presents the results of a subsurface exploration performed for the proposed ambulatory surgery center building addition to be constructed at the Erie Veterans Affairs Medical Center, located at 135 East 38th Street, in Erie, Pennsylvania (see Dwg. 1, appended). The objective of the exploration was to evaluate the subsurface conditions at the site as they relate to construction of the proposed building addition. Specifically, the scope of services was as follows:

1. Review site history,
2. Layout and drill test borings,
3. Coordinate the drilling operations and perform part-time drilling observation,
4. Conduct laboratory testing on selected subsurface samples to determine their engineering properties, and
5. Perform engineering analysis and evaluation, and prepare a written report to include recommendations from the geotechnical engineering viewpoint for the design and construction of the foundations for the proposed building addition.

These services have been performed in accordance with Urban's proposal dated August 13, 2012, and your signed authorization dated August 16, 2012.

II. PROPOSED BUILDING ADDITION

The proposed building addition will be about 156 ft. x 80 ft. in plan, as shown on Dwg. 2, appended. The two-story addition will house operating rooms, a recovery area, a reception area, and offices in the upper level, and mechanical and unfinished space in the lower level. Column loads from the steel frame structure are expected not to exceed 400 kips. The upper floor of the addition will be set to match the second floor of the existing building, at Elev. 864.05 (assumed

project datum), and the lower floor will be set to match the first floor of the existing building, at about Elev. 850.45. No construction is planned beneath the lower level.

III. FIELD AND LABORATORY INVESTIGATION

Five (5) test borings were performed by R. Rindfuss Drilling, L.P., Waterford, Pennsylvania, on August 12, 22, and 23, 2012. A track-mounted, diesel-powered drilling rig was used, and split-barrel sampling, penetration tests, and rock coring were performed in accordance with ASTM and other standard procedures. The borings were located in the field and ground surface elevations were obtained by Sandford Engineering, PC, Erie, Pennsylvania. The drilling was coordinated and observed by Urban's drilling technician. The test boring locations are shown on Dwg. 2, and the results are presented on the boring logs included in the appendix.

All recovered subsurface samples were visually inspected in Urban's laboratory and the descriptions are presented on the boring logs. The testing of selected subsurface soil samples was also performed in our laboratory, and included the determination of moisture content, gradation, Atterberg Limits, and classification. The results are included in the appendix and discussed in the following sections.

IV. SITE CONDITIONS

Geologically, the site lies in the "Central Lowland" physiographic province of Pennsylvania. The area was glaciated, and is covered with silty and sandy Ashtabula Moraine soils deposited during the Pleistocene Era. The underlying bedrock is Girard Shale belonging to the Upper Devonian Period of the Paleozoic Era.

The existing hospital building was constructed about 40 years ago, and in the area adjacent to the proposed addition, the building is a 7-story structure with a basement. As

indicated by record drawings revised February 1951, the existing structure is supported on shale bedrock by means of spread footings placed at elevations between 824 and 827. The addition area is currently occupied by a single-story security building, air-conditioning units and transformers on concrete pad foundations, trees, grass, and sidewalks. The ground surface is generally sloping down to the existing building with a relief of about 8 ft. in the proposed addition area. Two retaining walls, upward to 5 ft. tall, are also located in the addition area. Several buried utilities, including electric and sewer, are located in the addition area. Between 2 in. and 5 in. thick topsoil was found at the ground surface in the borings. The subsurface materials encountered below the topsoil are presented graphically on the subsurface profiles on Dwgs. 3, 4, and 5 appended, and are discussed in the following paragraphs.

A 3 ft. to 13 ft. thick layer of fill and possible fill, consisting of brown silt and gravel, little to some sand, trace organics, concrete, and slag, was found at the ground surface in the test borings. The fill is likely associated with site work performed during construction of the existing building. Testing performed on some of the cleaner fill indicates a "moderate" to "high" moisture content, and "slight" plasticity. The fill and possible fill classify as ML and GM in accordance with the Unified Soil Classification System. As indicated by the standard penetration test blow counts, the fill and possible fill is in generally "medium stiff" to "stiff" and "loose" to "medium dense" condition.

An 18.0 ft. to 32.5 ft. thick layer of virgin brown and gray clayey silt and sand, trace to little gravel, was found underlying the fill at depths of 3 ft. to 13 ft. The moisture content varies from "low" to "high," and the plasticity of the fines ranges from "low" to "non-plastic." The classifications are ML, SM, and CL-ML, and the consistency and relative density vary from "medium stiff" to "hard," and "loose" to "very dense," respectively.

Gray shale bedrock in "highly decomposed" to "partially decomposed" condition was encountered at depths of 26.0 ft. to 35.5 ft. below the ground surface, corresponding to Elevations between about 825 and 828. High resistances to drilling and sampling were experienced, and refusals were met after penetrating short distances into shale. Five (5) feet of rock coring was performed in Borings B-2, B-3, and B-4, with core recoveries of 30% to 100%, and Rock Quality Designations (RQDs) of 0%. The borings were terminated in the shale bedrock.

Water level observations were made at the time of drilling and the following day, and are noted on the logs and profiles. Stabilized readings taken the day after drilling indicate depths of 12.2 ft. to 19.7 ft., corresponding to Elevations 839.8 and 841.3. Higher short term readings were noted in Borings C-2, C-3, and C-4, and Boring B-1 was dry at completion of drilling. The higher short term readings may be influenced by water introduced in the hole during rock coring. These observations do not reflect periodic or seasonal variations in the groundwater levels.

V. ANALYSIS AND RECOMMENDATIONS

The existing structure has a basement level present beneath the proposed new lower level, and is supported on bedrock. New foundations in this area will need to be placed at elevations no higher than the existing basement level so no new loads are imposed on the basement wall. Spread footings, if used for the support of the proposed addition in this area, will require upward to 26 ft. of excavation adjacent to the existing building and relatively expensive shoring and bracing may be needed. To minimize possible differential settlement between the new addition and the existing building supported on bedrock, the new addition should be supported on bedrock. Based on the foregoing, we recommend that the proposed addition be supported on the underlying bedrock by means of caissons. The lower level floor slab may be placed on grade

and should be provided with a minimum 1 ft. thick pad of compacted select fill beneath. Details about the compacted select fill are provided in the following paragraphs. A modulus of subgrade reaction of 100 pci may be used for design of the floor slab placed on grade. The lower floor slab supported on grade should be structurally independent of the caisson supported building structure. A frost depth of 4 ft. may be used. Based on the test boring results, we estimate that the site has a "Seismic Site Classification" of "D" (reference 2009 International Building Code).

Straight-shaft caissons with minimum diameters of 24 in. and supported on "relatively sound" shale bedrock as described in the following paragraphs, are recommended for support of the proposed structure. Caissons extending to "relatively sound" bedrock may be designed for a net allowable end bearing pressure of 30 ksf. Based on our experience, we expect the thickness of the "decomposed" and "weathered" bedrock zone, present above the "relatively sound" bedrock zone, may vary from about 2 ft. to 10 ft., and for design purposes, the top of "relatively sound" bedrock may be expected to vary from about Elevation 828 to 820. A modulus of elasticity of 800 ksi may be assumed for the "relatively sound" shale bedrock. Side friction in the overburden soils should be neglected. The settlements of the caisson supported foundations will be negligible.

To obtain higher load capacity, caissons with sockets extending into "relatively sound" shale bedrock may be utilized. Sockets with vertical walls should be used and bells are not recommended. The sockets are constructed by extending the shafts at a constant diameter to a minimum depth of 3 ft. into "relatively sound" shale. It should be pointed out that the socket diameter is normally about 2 in. smaller than the shaft diameter due to the construction equipment. A net allowable end bearing pressure of 40 ksf may be used for the caissons with sockets extending a minimum 3 ft. into "relatively sound" bedrock. Shaft resistance will be developed by adhesion (friction) within the "relatively sound" bedrock, and may be added to the

caisson capacity for down and uplift loads using 3.0 ksf allowable side friction applied to the socket surface area in the "relatively sound" shale bedrock.

The caissons will have to be carried to " relatively sound" bedrock, which will be characterized by earth-auger refusal under the maximum thrust of a caisson drilling rig capable of providing 20,000 ft.-lb. of continuous torque and 30,000 lb. continuous down force. The construction of the sockets, utilizing a carbide rock bit, will commence at this elevation. As mentioned earlier, the thickness of the "decomposed" and "weathered" bedrock zone may vary from about 2 ft. to 10 ft., therefore, proper inspection and identification of bearing material during construction is imperative. Casings may be required to install the caissons through the "looser" fill and soil in order to prevent the sides from caving-in and to control ground water. The concrete should be placed within 2 hours of the completion of drilling, and the bottoms must be cleaned of all loose material and water immediately prior to placing concrete.

The lower level of the addition will extend upward to 12 ft. below the adjacent grades. The below grade walls will be subjected to earth pressures from backfill behind, and from ground loads above and behind, and will have to be designed to withstand these pressures. The following parameters may be used in computation of lateral earth pressures.

Unit Weight of Backfill, γ	= 135 pcf
Coefficient of Active Earth Pressures, K_a	= 0.33
Coefficient of Earth Pressures at Rest, K_0	= 0.5
Coefficient of Passive Earth Pressures, K_p	= 3.0
Friction Factor between Soil and Concrete, tan δ	= 0.30

The sides of the excavation will have to be laid back properly in accordance with OSHA regulations to maintain safe conditions during construction. An OSHA Soil Classification of "C" may be used for the onsite materials. Excavations that extend below the foundation level of the

adjacent existing building must be provided with lateral support or underpinning prior to excavation to maintain the integrity of the existing building and foundations.

Proper drainage should be maintained during construction so that storm water is removed quickly from the site. In contact with water and the movement of construction machinery, the siltier on-site materials may lose their strength and become soft. In the event of this occurrence, the softened soil will have to be over-excavated to 'firm' soil. Stabilized ground water was found at depths of about 8 ft. beneath the proposed lower floor level. Except during construction of the caissons, ground water is not expected to be encountered during construction of the building. Nonetheless, we recommend perimeter underdrains be provided around the exterior of the below grade foundations to help collect and transport away any ground water that reaches the building area, and the below grade walls should be moisture proofed to help maintain dry conditions in the lower level.

Existing fill material excavated from the site should not be used for backfilling in the proposed building area. Any filling or backfilling should be performed with select granular off-site borrow material, free of deleterious matter and conforming to the following specifications.

Gradation Requirements

Particle/Sieve Size	Percent Passing By Weight
3"	100
3/8"	35 - 95
No. 4	25 - 90
No. 10	15 - 80
No. 40	10 - 45
No. 200	3 - 15
Liquid Limit, 25, max.	Plasticity Index, 7, max.

Material conforming to these specifications is available in the region as run-of-bank gravel, and is generally suitable without processing. The filling must be in nearly horizontal layers not

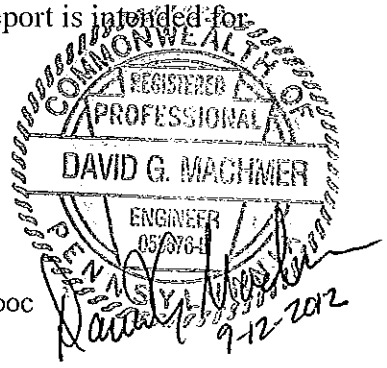
exceeding a loose thickness of 9 inches, and each layer must be compacted to a minimum 95% compaction as determined by ASTM D698 (Standard Proctor) method of compaction test. The in-place density of the compacted fill must be tested, and the ASTM D6938 (nuclear density gauge) method of in-place density measurement can be used. We recommend that representative testing be performed at minimum rates of 1 in-place density test on every 30 cu.yds. of engineered fill placed, and no fewer than 2 tests per lift.

VI. GENERAL

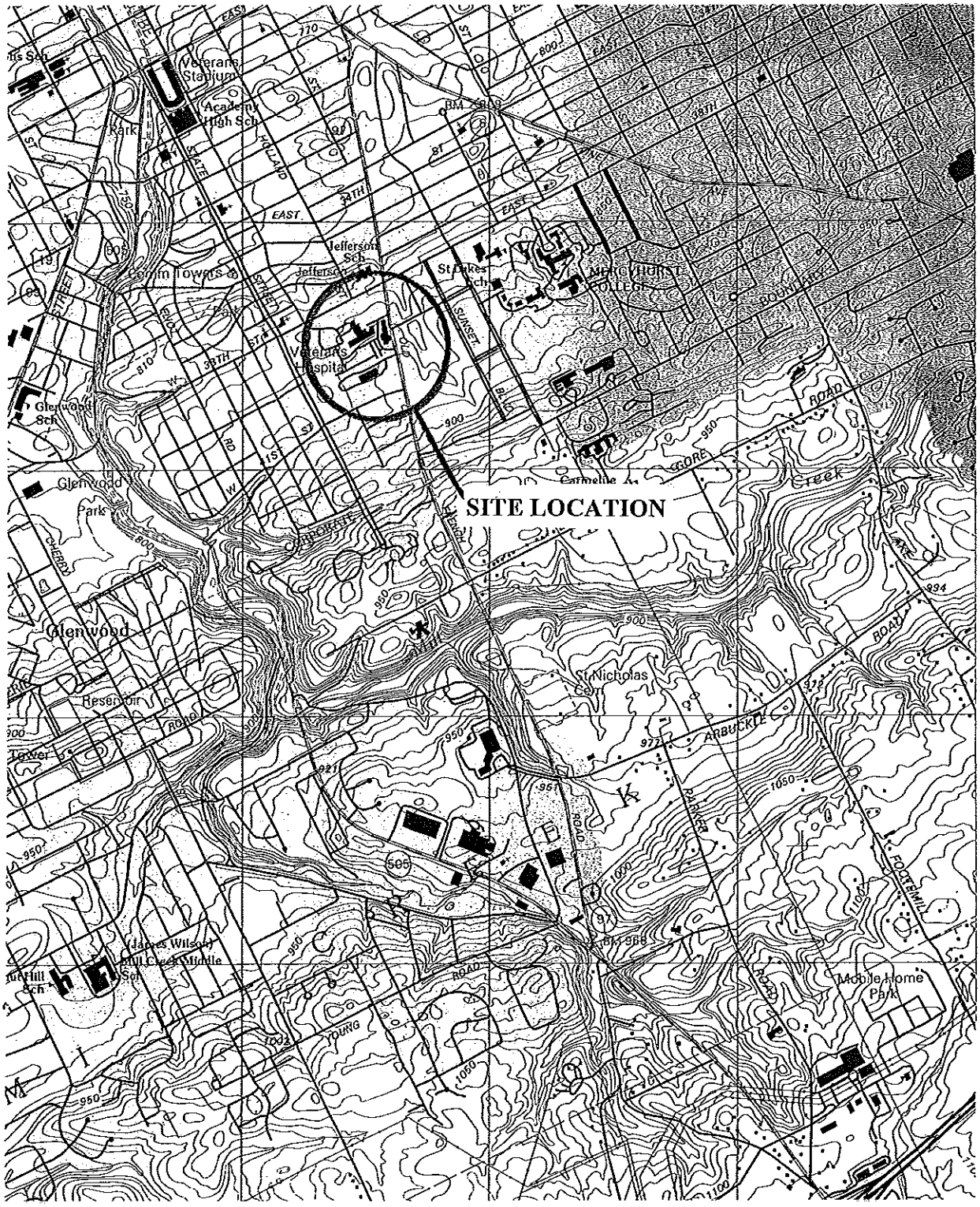
The integrity of the existing adjacent building must be maintained at all times. The site work, foundation subgrades, and caisson installation, must be observed and tested by the soils engineers' representative. Observation of the caisson installation and identification of bearing material during construction by the geotechnical engineers' representative, with a minimum 5 years experience, is imperative. The recommendations and conclusions contained in this report are based on the information revealed in the course of our study and exploration. Any changes in the proposed construction or location must be brought to our attention. Unexpected conditions may be encountered during construction, because the site is a filled area, and any deviation may necessitate re-evaluation of our recommendations and changes may have to be considered. The report has been prepared based on the structural properties of the subsurface materials and does not address environmental aspects. Furthermore, we cannot be responsible for any conclusions drawn from the data included in this report other than those specifically stated. The report has not been prepared to be used directly as construction specifications. This report is intended for use with regards to the specific project discussed herein.

URBAN ENGINEERS, INC.

September 12, 2012



APPENDIX

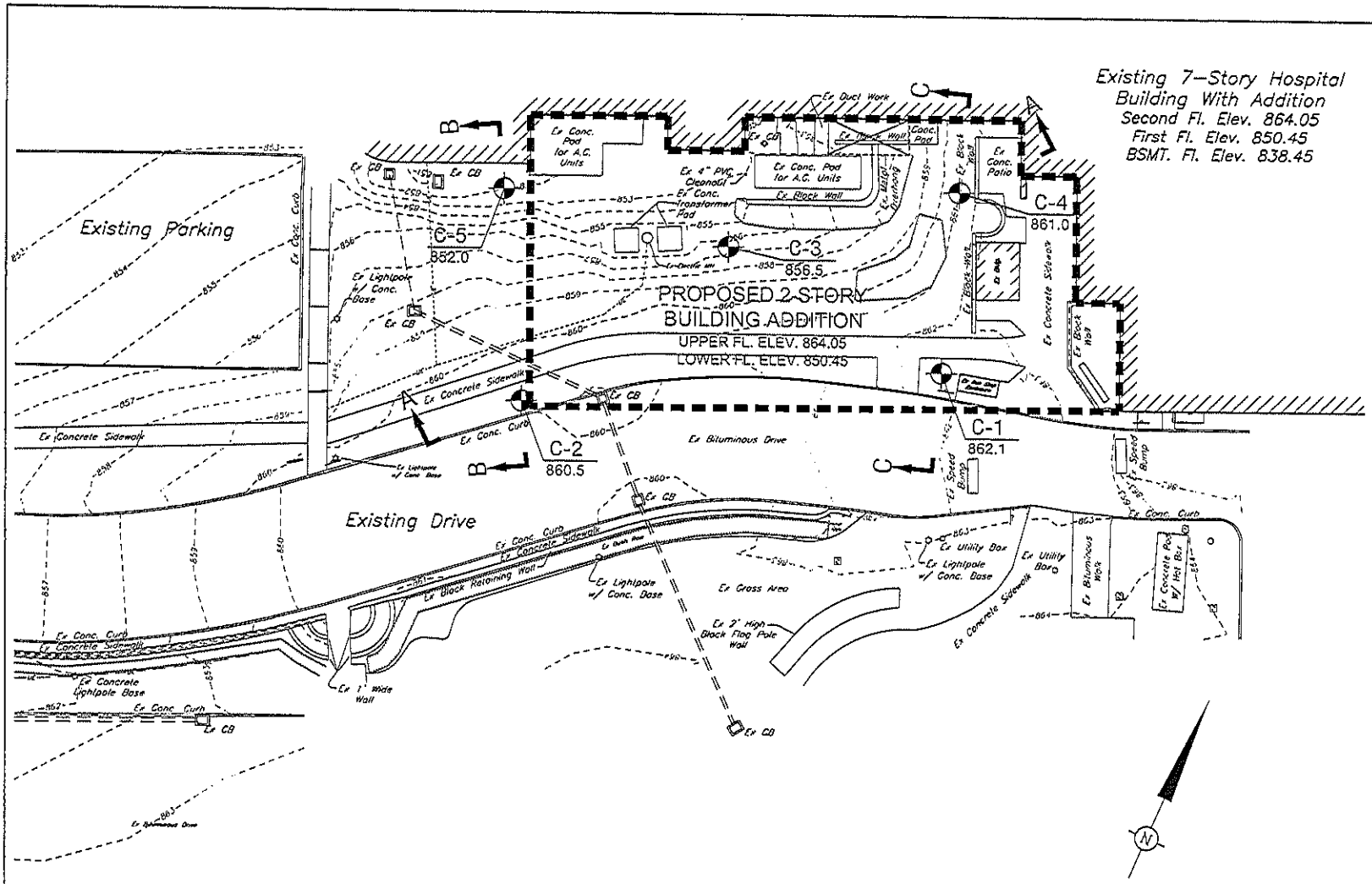


USGS QUADRANGLE REFERENCED:
ERIE SOUTH, PA.

SCALE: 1" = 2000'

SITE LOCATION MAP	DRAWN BY: J.R.T.	UEI NO. 2012620205.000	URBAN ENGINEERS, INC. 1319 Sassafras Street Erie, Pennsylvania 16501 (814) 453-5702
	CHECKED BY: D.G.M., A.R.K.	CAD NAME: 2012620205000	
	DATE: SEPT., 2012	DWG. NO. 1	

PROPOSED BUILDING ADDITION
AMBULATORY SURGERY CENTER REDESIGN
VETERANS AFFAIRS MEDICAL CENTER
ERIE, PENNSYLVANIA



LEGEND AND NOTES:

1. C-1 / 862.1 — INDICATES TEST BORING LOCATION, IDENTIFYING NUMBER AND GROUND SURFACE ELEVATION.
2. THIS DRAWING IS BASED ON AN EXISTING CONDITIONS PLAN PREPARED BY SANFORD ENGINEERING, PC, ERIE, PA, ENTITLED "AUGUST 2012 EXISTING CONDITIONS PLAN FOR VETERANS AFFAIRS MEDICAL CENTER", DATED 08/31/12, RECEIVED SEPT. 5, 2012 IN ELECTRONIC FORMAT, FILE NAMES "v a - amb sp - prelim.dwg" AND "v a - amb prelim_8-31-12".
3. TEST BORINGS WERE PERFORMED BY R. RINDFUSS DRILLING, L.P., WATERFORD, PA.
4. TEST BORINGS LOCATED IN THE FIELD AND GROUND SURFACE ELEVATIONS OBTAINED BY SANFORD.
5. ELEVATIONS ARE REFERENCED TO THE EXISTING CONDITIONS PLAN REFERENCED ABOVE (ASSUMED PROJECT DATUM).

SCALE:

30' 0' 30'

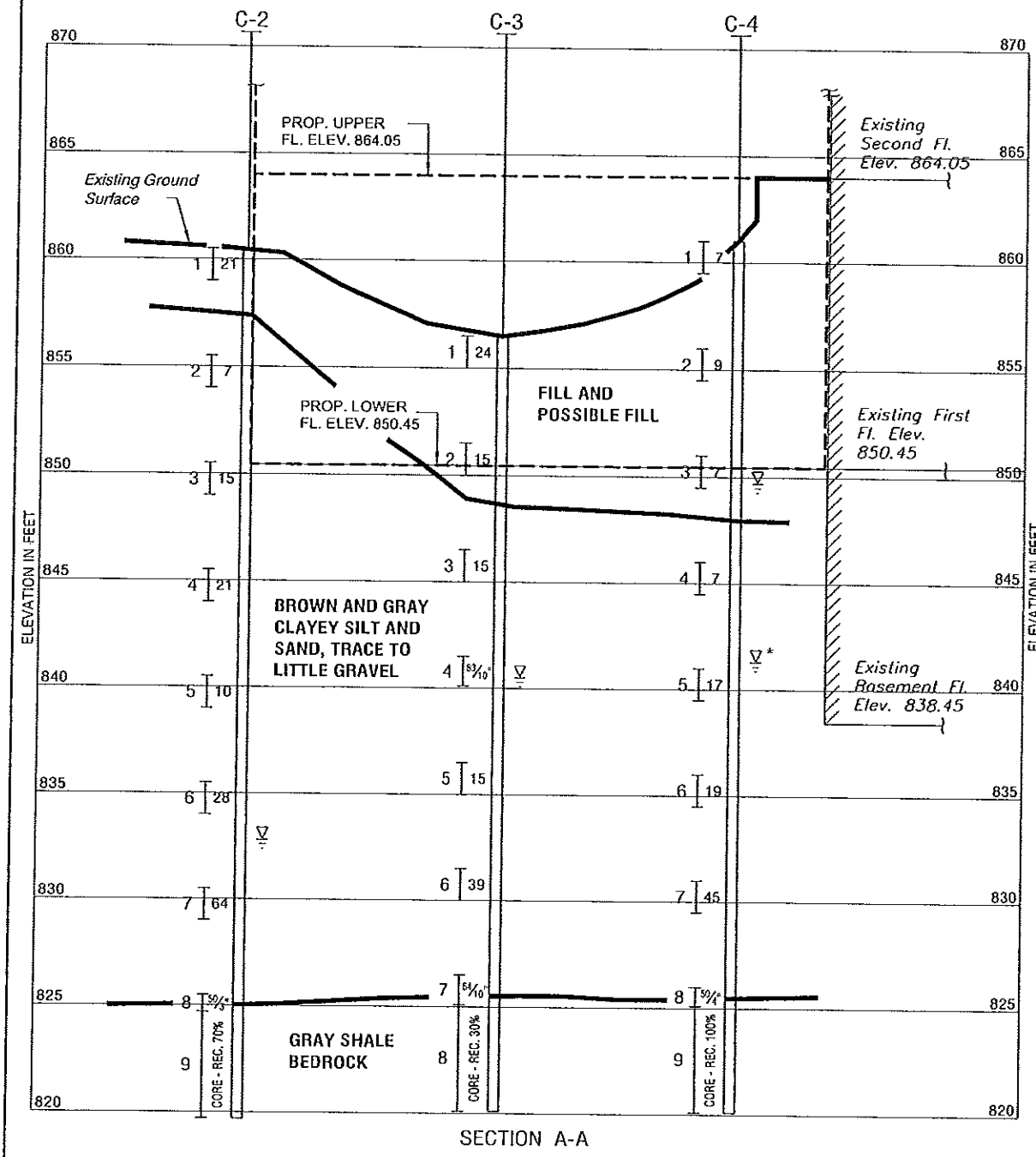
DATE	BY	REVISION

TEST BORING LOCATION PLAN

DRAWN BY: J.R.T.	UEI NO. 2012620205.000
CHECKED BY: D.G.M., A.R.K.	CAD NAME: 2012620205000
DATE: SEPT., 2012	DWG. NO. 2

URBAN ENGINEERS, INC.
1319 Sassafras Street
Erie, Pennsylvania 16501
(814) 453-5702

PROPOSED BUILDING ADDITION
AMBULATORY SURGERY CENTER REDESIGN
VETERANS AFFAIRS MEDICAL CENTER
ERIE, PENNSYLVANIA



SECTION A-A

SCALE:

HORZ. 0' 30'

VERT. 0' 5'

NOTES:

1. THESE PROFILES HAVE BEEN DRAWN FOR THE PURPOSE OF ANALYSIS ONLY. THEY ARE BASED ON THE DATA OBTAINED FROM THE BORINGS AND DO NOT REPRESENT ACTUAL SUBSURFACE CONDITIONS. THE DEPTHS AND THICKNESSES OF THE STRATA INDICATED WERE OBTAINED BY INTERPOLATING IN THE AREAS OF THE TEST BORINGS. IT IS POSSIBLE THAT THE CONDITIONS AROUND THE BORINGS MAY VARY FROM THOSE INDICATED.

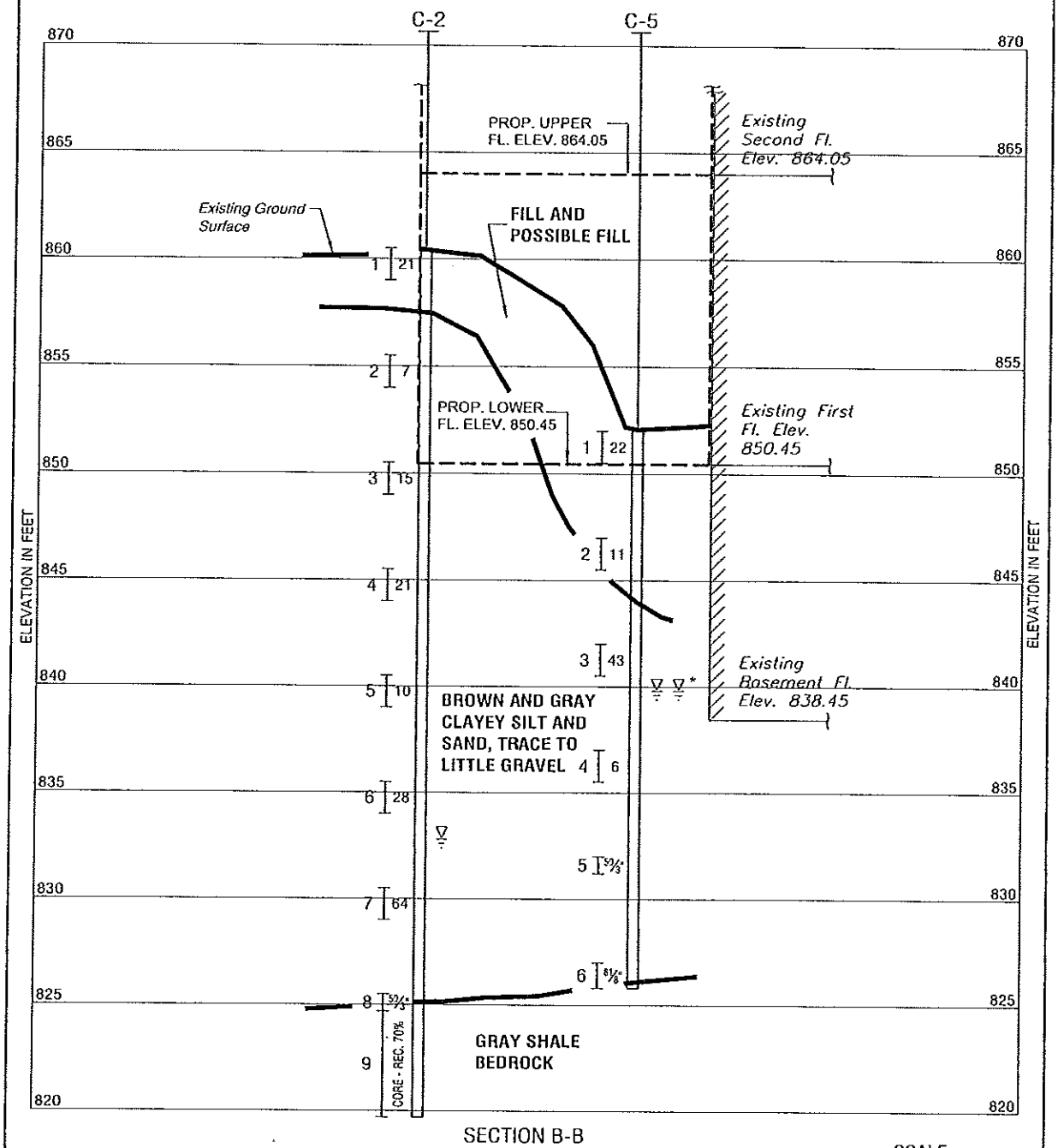
2. FILL AND POSSIBLE FILL - BROWN SILT AND GRAVEL, TRACE TO SOME SAND, TRACE ORGANICS, CONCRETE, AND SLAG

LEGEND

A
B I N

- A - BORING DESIGNATION
- B - SAMPLE NUMBER
- I - SAMPLE LENGTH AND LOCATION WITH DEPTH
- N - STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT
- STRATA CHANGES NOTED ON LOG
- ▽ - GROUND WATER LEVEL OBSERVED IN BORING
- ▽* - 18 HR TO 24 HR GROUND WATER LEVEL OBSERVED IN BORING

SUBSURFACE PROFILES	DRAWN BY: J.R.T.	UEI NO. 2012620205.000	URBAN ENGINEERS, INC. 1319 Sassafras Street Erie, Pennsylvania 16501 (814) 453-5702	PROPOSED BUILDING ADDITION AMBULATORY SURGERY CENTER REDESIGN VETERANS AFFAIRS MEDICAL CENTER ERIE, PENNSYLVANIA
	CHECKED BY: D.G.M., A.R.K.	CAD NAME: 2012620205000		
	DATE: SEPT., 2012	DWG. NO. 3		



SECTION B-B

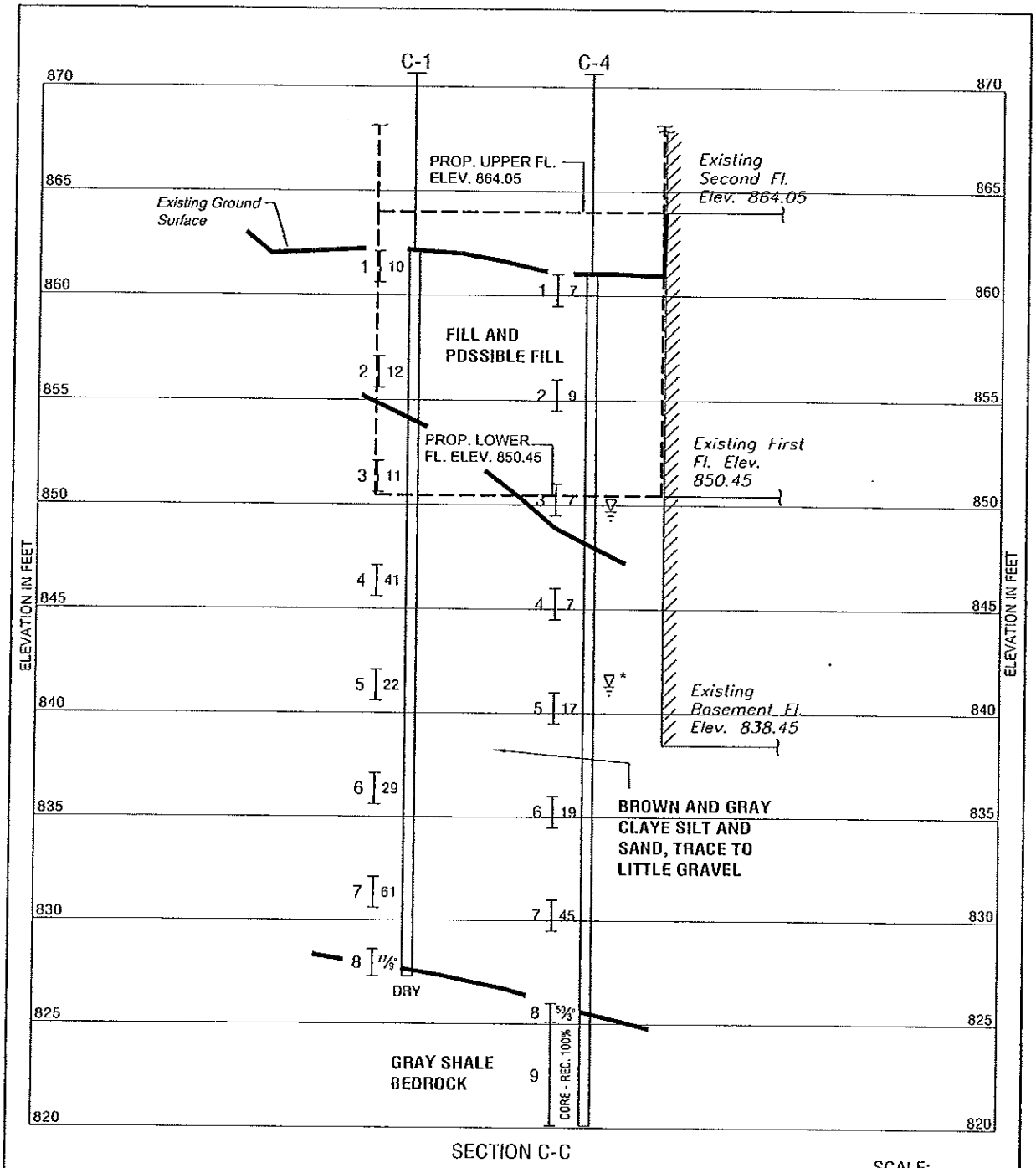
SCALE:

HORZ. 0' 30'

VERT. 0' 5'

NOTE: SEE DWG No. 3 FOR LEGEND AND NOTES

SUBSURFACE PROFILES	DRAWN BY: J.R.T.	UEI NO. 2012620205.000	URBAN ENGINEERS, INC. 1319 Sassafras Street Erie, Pennsylvania 16501 (814) 453-5702	PROPOSED BUILDING ADDITION AMBULATORY SURGERY CENTER REDESIGN VETERANS AFFAIRS MEDICAL CENTER ERIE, PENNSYLVANIA
	CHECKED BY: D.G.M., A.R.K.	CAD NAME: 2012620205000		
	DATE: SEPT., 2012	DWG. NO. 4		



SECTION C-C

SCALE:

HORZ. 0' 30'

VERT. 0' 5'

NOTE: SEE DWG No. 3 FOR LEGEND AND NOTES

SUBSURFACE PROFILES	DRAWN BY: J.R.T.	UEI NO. 20126202O5.000	URBAN ENGINEERS, INC. 1319 Sassafras Street Erie, Pennsylvania 16501 (814) 453-5702	PROPOSED BUILDING ADDITION AMBULATORY SURGERY CENTER REDESIGN VETERANS AFFAIRS MEDICAL CENTER ERIE, PENNSYLVANIA
	CHECKED BY: D.G.M., A.R.K.	CAD NAME: 20126202O5000		
	DATE: SEPT., 2012	DWG. NO. 5		

RECORD OF SUBSURFACE EXPLORATION

Project: VAMC Southwest Ambulatory Surgery Addition
Drilling Contractor: R. Rindfuss Drilling, L.P.
WaterFord, Pennsylvania
Driller: Joe and Don
Drilling Equipment: Track-mounted CME-45; 3.25" ID Hollow Stem Augers;
Standard Split-spoon Sampler

Boring Number: C-1
Ground Surface Elevation: 862.1
Date Started: 8-23-2012
Date Finished: 8-23-2012

Depth (ft.)	Sample No.	Type	Depth (ft.)	Blow Counts	Soil Descriptions	Remarks
0	1	SS	0.0 - 1.5	3 - 5 - 5	2 in. Topsoil 0.2' Brown silt, little sand and gravel, trace organics - Fill	
5	2	SS	5.0 - 6.5	3 - 6 - 6	Brown clayey silt, little sand, trace gravel, roots and organics - Fill 8.0'	
10	3	SS	10.0 - 11.5	4 - 4 - 7	Light brown clayey silt, little sand, trace gravel	
15	4	SS	15.0 - 16.5	17 - 20 - 21	Brown sand, silt, and rock fragments into Gray silt, little sand and gravel	
20	5	SS	20.0 - 21.5	13 - 11 - 11	Ditto into Gray sand and silt, little gravel	
25	6	SS	25.0 - 26.5	7 - 14 - 15	Gray clayey silt, little sand, trace gravel	
30	7	SS	30.0 - 31.5	21 - 27 - 34	Ditto	
35	8	SS	33.5 - 34.7	14 - 27 - 50/3"	34.0' Gray clayey silt, some shale fragments - Highly decomposed shale bedrock	End of Boring at 34.7 ft.

Notes:
SS = Split Spoon Sample (ASTM D 1586)
ST = Shelby Tube Sample (ASTM D 1587)
RC = Rock Core Sample (ASTM D 2113)
Blow Counts for 6 in., based on 140 lb. hammer with 30 in. drop
WOH = Weight of Hammer

Ground Water Data:
Dry at completion

URBAN ENGINEERS, INC.
1319 Sassafras Street
Erie, PA 16501

Proposed Building Addition
Ambulatory Surgery Center Redesign
Veterans Affairs Medical Center
Erie, Pennsylvania

Boring: C-1
Date: Aug. 2012

RECORD OF SUBSURFACE EXPLORATION

Project: VAMC Southwest Ambulatory Surgery Addition
Drilling Contractor: R. Rindfuss Drilling, L.P.
WaterFord, Pennsylvania
Driller: Joe and Don
Drilling Equipment: Track-mounted CME-45; 3.25" ID Hollow Stem Augers;
Standard Split-spoon Sampler; Diamond Bit Core Barrel

Boring Number: C-2
Ground Surface Elevation: 860.5
Date Started: 8-21-2012
Date Finished: 8-21-2012
Page: 1 of 2

Depth (ft.)	Sample No.	Sample Type	Sample Depth (ft.)	Blow Counts	Soil Descriptions	Remarks
0	1	SS	0.0 - 1.5	6 - 9 - 12	2 in. Topsoil 0.2' Light brown silt, some sand, trace organics - Fill 3.0'	
5	2	SS	5.0 - 6.5	3 - 4 - 3	Brown and gray silt and sand, trace gravel	
10	3	SS	10.0 - 11.5	4 - 7 - 8	Brown clayey silt, little sand, trace gravel	
15	4	SS	15.0 - 16.5	5 - 9 - 12	Brown sand, some silt, trace gravel	
20	5	SS	20.0 - 21.5	4 - 5 - 5	Brown clayey silt, some sand, trace gravel	
25	6	SS	25.0 - 26.5	9 - 12 - 16	Gray clayey silt, little sand, trace gravel	
30	7	SS	30.0 - 31.5	16 - 27 - 37	Ditto	
35						

Notes:
SS = Split Spoon Sample (ASTM D 1586)
ST = Shelby Tube Sample (ASTM D 1587)
RC = Rock Core Sample (ASTM D 2113)
Blow Counts for 6 in., based on 140 lb. hammer with 30 in. drop
WOH = Weight of Hammer

Ground Water Data:
27.7 ft. at completion

URBAN ENGINEERS, INC.
1319 Sassafras Street
Erie, PA 16501

Proposed Building Addition
Ambulatory Surgery Center Redesign
Veterans Affairs Medical Center
Erie, Pennsylvania

Boring: C-2
Date: Aug. 2012

RECORD OF SUBSURFACE EXPLORATION

Project: VAMC Southwest Ambulatory Surgery Addition
Drilling Contractor: R. Rindfuss Drilling, L.P.
WaterFord, Pennsylvania
Driller: Joe and Don
Drilling Equipment: Track-mounted CME-45; 3.25" ID Hollow Stem Augers;
Standard Split-spoon Sampler; Diamond Bit Core Barrel

Boring Number: C-2
Ground Surface Elevation: 860.5
Date Started: 8-21-2012
Date Finished: 8-21-2012

Depth (ft.)	Sample No.	Sample Type	Sample Depth (ft.)	Blow Counts	Soil Descriptions	Remarks
35	8	SS	35.0 - 35.8	45 - 50/3"	35.5'	
					Gray decomposed shale bedrock	
	9	RC	35.8 - 40.8	Rec. = 70%; RQD = 0%	Gray shale bedrock	
40						
					End of Boring at 40.8 ft.	
45						
50						
55						
60						
65						
70						

Notes:
SS = Split Spoon Sample (ASTM D 1586)
ST = Shelby Tube Sample (ASTM D 1587)
RC = Rock Core Sample (ASTM D 2113)
Blow Counts for 6 in., based on 140 lb. hammer with 30 in. drop
WOH = Weight of Hammer

Ground Water Data:
See Page 1

RECORD OF SUBSURFACE EXPLORATION

Project: VAMC Southwest Ambulatory Surgery Addition
Drilling Contractor: R. Rindfuss Drilling, L.P.
WaterFord, Pennsylvania
Driller: Joe and Don
Drilling Equipment: Track-mounted CME-45; 3.25" ID Hollow Stem Augers;
Standard Split-spoon Sampler; Diamond Bit Core Barrel

Boring Number: C-3
Ground Surface Elevation: 856.5
Date Started: 8-21-2012
Date Finished: 8-21-2012

Depth (ft.)	Sample No.	Sample Type	Sample Depth (ft.)	Blow Counts	Soil Descriptions	Remarks
0	1	SS	0.0 - 1.5	4 - 10 - 14	2 in. Topsoil 0.2' Brown silt, some sand and gravel, trace concrete fragments - Fill	
5	2	SS	5.0 - 6.5	7 - 8 - 7	Brown silt, some sand, little gravel, trace slag - Fill 8.0'	
10	3	SS	10.0 - 11.5	6 - 7 - 8	Brown sand, some silt, trace gravel	
15	4	SS	15.0 - 16.3	7 - 33 - 50/4"	Brown and gray sand and silt, some black shale fragments	
20	5	SS	20.0 - 21.5	5 - 7 - 8	Brownish gray clayey silt, little sand and shale fragments	
25	6	SS	25.0 - 26.5	15 - 17 - 22	Gray silt, little sand and gravel	
30	7	SS	30.0 - 31.5	8 - 14 - 50/4"	31.0' Gray partially decomposed shale bedrock	
35	8	SS	31.3 - 36.3	Rec. = 30%; RQD = 0%	Gray shale bedrock	

Notes:
SS = Split Spoon Sample (ASTM D 1586)
ST = Shelby Tube Sample (ASTM D 1587)
RC = Rock Core Sample (ASTM D 2113)
Blow Counts for 6 in., based on 140 lb. hammer with 30 in. drop
WOH = Weight of Hammer

Ground Water Data:
15.2 ft. at completion
16.0 ft. at 18 hours

RECORD OF SUBSURFACE EXPLORATION

Project: VAMC Southwest Ambulatory Surgery Addition
Drilling Contractor: R. Rindfuss Drilling, L.P.
WaterFord, Pennsylvania
Driller: Joe and Don
Drilling Equipment: Track-mounted CME-45; 3.25" ID Hollow Stem Augers;
Standard Split-spoon Sampler; Diamond Bit Core Barrel

Boring Number: C-3
Ground Surface Elevation: 856.5
Date Started: 8-21-2012
Date Finished: 8-21-2012
Page: 2 of 2

Depth (ft.)	Sample No.	Sample Type	Sample Depth (ft.)	Blow Counts	Soil Descriptions	Remarks
35						
					End of Boring at 36.3 ft.	
40						
45						
50						
55						
60						
65						
70						

Notes:
SS = Split Spoon Sample (ASTM D 1586)
ST = Shelby Tube Sample (ASTM D 1587)
RC = Rock Core Sample (ASTM D 2113)
Blow Counts for 6 in., based on 140 lb. hammer with 30 in. drop
WOH = Weight of Hammer

Ground Water Data:
See Page 1

RECORD OF SUBSURFACE EXPLORATION

Project: VAMC Southwest Ambulatory Surgery Addition
Drilling Contractor: R. Rindfuss Drilling, L.P.
WaterFord, Pennsylvania
Driller: Joe and Don
Drilling Equipment: Track-mounted CME-45; 3.25" ID Hollow Stem Augers;
Standard Split-spoon Sampler; Diamond Bit Core Barrel

Boring Number: C-4
Ground Surface Elevation: 861.0
Date Started: 8-22-2012
Date Finished: 8-22-2012
Page: 1 of 2

Depth (ft.)	Sample No.	Type	Depth (ft.)	Blow Counts	Soil Descriptions	Remarks
0	1	SS	0.0 - 1.5	3 - 3 - 4	5 in. Topsoil	
					0.4'	
5	2	SS	5.0 - 6.5	2 - 4 - 5	Brown silt, little sand, trace gravel - Possible fill	
10	3	SS	10.0 - 11.5	12 - 3 - 4	Brown clayey silt, some sand and rock fragments - Possible fill	Low recovery
					13.0'	
15	4	SS	15.0 - 16.5	2 - 2 - 5	Brown into gray silt and sand, little gravel	
20	5	SS	20.0 - 21.5	5 - 8 - 9	Gray silt, some sand, little gravel	
25	6	SS	25.0 - 26.5	4 - 10 - 9	Ditto	
30	7	SS	30.0 - 31.5	12 - 24 - 21	Gray silt and sand, little gravel	
35						

Notes:
SS = Split Spoon Sample (ASTM D 1586)
ST = Shelby Tube Sample (ASTM D 1587)
RC = Rock Core Sample (ASTM D 2113)
Blow Counts for 6 in., based on 140 lb. hammer with 30 in. drop
WOH = Weight of Hammer

Ground Water Data:
11.3 ft. at completion
19.7 ft. at 24 hours

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Erie, PA 16501

Proposed Building Addition
Ambulatory Surgery Center Redesign
Veterans Affairs Medical Center
Erie, Pennsylvania

Boring: C-4
Date: Aug. 2012

RECORD OF SUBSURFACE EXPLORATION

Project: VAMC Southwest Ambulatory Surgery Addition
Drilling Contractor: R. Rindfuss Drilling, L.P.
WaterFord, Pennsylvania
Driller: Joe and Don
Drilling Equipment: Track-mounted CME-45; 3.25" ID Hollow Stem Augers;
Standard Split-spoon Sampler; Diamond Bit Core Barrel

Boring Number: C-4
Ground Surface Elevation: 861.0
Date Started: 8-22-2012
Date Finished: 8-22-2012

Depth (ft.)	Sample No.	Sample Type	Sample Depth (ft.)	Blow Counts	Soil Descriptions	Remarks
35	8	SS	35.0 - 35.8	31 - 50/4"	Gray decomposed shale bedrock	
	9	SS	35.8 - 40.8	Rec. = 100%; RQD= 0%	Gray shale bedrock	
40					End of Boring at 40.8 ft.	
45						
50						
55						
60						
65						
70						

Notes:
SS = Split Spoon Sample (ASTM D 1586)
ST = Shelby Tube Sample (ASTM D 1587)
RC = Rock Core Sample (ASTM D 2113)
Blow Counts for 6 in., based on 140 lb. hammer with 30 in. drop
WOH = Weight of Hammer

Ground Water Data:
See Page 1

RECORD OF SUBSURFACE EXPLORATION

Project: VAMC Southwest Ambulatory Surgery Addition
Drilling Contractor: R. Rindfuss Drilling, L.P.
WaterFord, Pennsylvania
Driller: Joe and Don
Drilling Equipment: Track-mounted CME-45; 3.25" ID Hollow Stem Augers;
Standard Split-spoon Sampler

Boring Number: C-5
Ground Surface Elevation: 852.0
Date Started: 8-22-2012
Date Finished: 8-22-2012

Depth (ft.)	Sample No.	Type	Depth (ft.)	Blow Counts	Soil Descriptions	Remarks
0	1	SS	0.0 - 1.5	4 - 11 - 11	4 in. Topsoil 0.3' Brown silt, sand, and gravel - Fill	
5	2	SS	5.0 - 6.5	4 - 5 - 6	Brown sand and gravel, little silt - Possible fill 8.0'	
10	3	SS	10.0 - 11.5	5 - 17 - 26	Brown sand, silt, and gravel	
15	4	SS	15.0 - 16.5	1 - 2 - 4	Gray clayey silt and sand, little gravel	
20	5	SS	20.0 - 20.7	51 - 50/3"	Gray sand and gravel, some silt	
25	6	SS	25.0 - 26.2	11 - 31 - 50/2"	26.0' Gray decomposed shale bedrock End of Boring at 26.2 ft.	
30						
35						

Notes:
SS = Split Spoon Sample (ASTM D 1586)
ST = Shelby Tube Sample (ASTM D 1587)
RC = Rock Core Sample (ASTM D 2113)
Blow Counts for 6 in., based on 140 lb. hammer with 30 in. drop
WOH = Weight of Hammer

Ground Water Data:
12.2 ft. at completion
12.2 ft. at 24 hours

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Proposed Building Addition
Ambulatory Surgery Center Redesign
Veterans Affairs Medical Center
Erie, Pennsylvania

Boring: C-5
Date: Aug. 2012

SUMMARY OF LABORATORY TEST DATA

SAMPLE IDENTIFICATION				SOIL GROUP (UNIFIED SYSTEM, ASTM D2487)	GRAIN SIZE DISTRIBUTION (ASTM D 422)			MOISTURE CONTENT (%)	PLASTICITY (ASTM D 4318)				COMPACTION (ASTM D 698)	
TEST BORING NUMBER	SAMPLE NUMBER	DEPTH (FEET)	ELEVATION (FEET)		GRAVEL (%)	SAND (%)	SILT,CLAY & COLLOIDS (%)		LIQUID LIMIT - W_L (%)	PLASTIC LIMIT - W_P (%)	PLASTICITY INDEX - I_P (%)	LIQUIDITY INDEX - I_L (%)	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)
C-1														
	2	5.0-6.5	855.6	ML	3	27	70	23.4	24	21	3			
	3	10.0-11.5	850.6					19.0						
	5	20.0-21.5	840.6					9.4						
	6	25.0-26.5	835.6	CL-ML	4	28	68	14.0	21	16	5			
C-2														
	2	5.0-6.5	854.0					18.4						
	3	10.0-11.5	849.0	ML	9	28	63	18.0	23	21	2			
	5	20.0-21.5	839.0	SM	4	47	49	18.8	21	19	2			
	6	25.0-26.5	834.0					11.6						
	7	30.0-31.5	829.0					10.4						
C-3														
	2	5.0-6.5	850.0					10.6						
	3	10.0-11.5	845.0	SM	13	56	32	11.8			NP			
	5	20.0-21.5	835.0					12.4						
	6	25.0-26.5	830.0	ML	7	31	63	13.5	21	20	1			
C-4														
	2	5.0-6.5	854.5	ML	7	39	54	12.3	21	19	2			
	3	10.0-11.5	849.5					12.2						
	4	15.0-16.5	844.5					13.8						
	5	20.0-21.5	839.5					10.8						
	6	25.0-26.5	834.5					13.3						
	7	30.0-31.5	829.5	ML	9	35	55	11.3	16	15	1			
C-5														
	1	0.0-1.5	850.5	GM	52	33	15	7.5	26	25	1			
	2	5.0-6.5	845.5					9.6						
	3	10.0-11.5	840.5					8.4						
	4	15.0-16.5	835.5	SM	12	54	33	14.2			NP			
	5	20.0-20.7	831.3					10.4						

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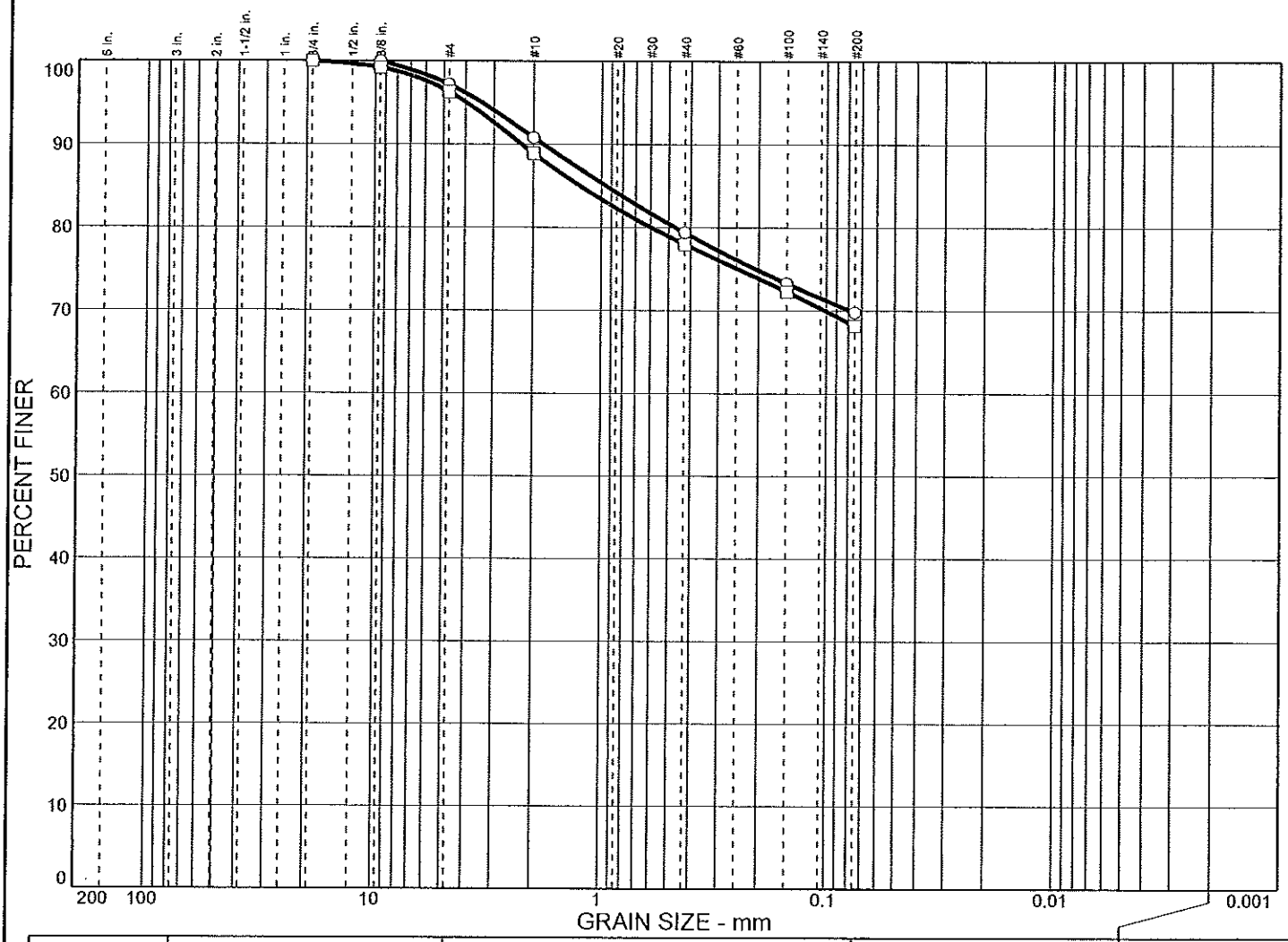
NP=Non-Plastic
Table No. T-1

Date: August 202

Grain Size Distribution Test Report



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	2.8	27.4	69.8	
□	0.0	3.7	28.1	68.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	24	21	0.950							
□	21	16	1.24							

MATERIAL DESCRIPTION	USCS	AASHTO
○ Brown Clayey Silt, some sand, trace gravel, roots, and organics - Fill	ML	
□ Gray Clayey Silt, some sand, trace gravel	CL-ML	

Project No. 2012620205.000 **Client:** IKM Incorporated

Project: Proposed Building Addition

Ambulatory Surgery Center Redesign

○ **Source:** C-1 **Sample No.:** 2 **Elev./Depth:** 5.0-6.5

□ **Source:** C-1 **Sample No.:** 6 **Elev./Depth:** 25.0-26.5

Remarks:

○

□

Grain Size Distribution Test Report

URBAN ENGINEERS

Figure No. 1

Grain Size Distribution Test Report

	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	9.1	28.2	62.7	
□	0.0	4.3	46.5	49.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	23	21	1.97							
□	21	19	1.86	0.220	0.0813					

	MATERIAL DESCRIPTION	USCS	AASHTO
○	Brown Clayey Silt, some sand, trace gravel	ML	
□	Brown Clayey Silt and Sand, trace gravel	SM	

Project No. 2012620205.000 **Client:** IKM Incorporated

Project: Proposed Building Addition

Ambulatory Surgery Center Redesign

○ **Source:** C-2 **Sample No.:** 3 **Elev./Depth:** 10.0-11.5

□ **Source:** C-2 **Sample No.:** 5 **Elev./Depth:** 20.0-21.5

Remarks:

○

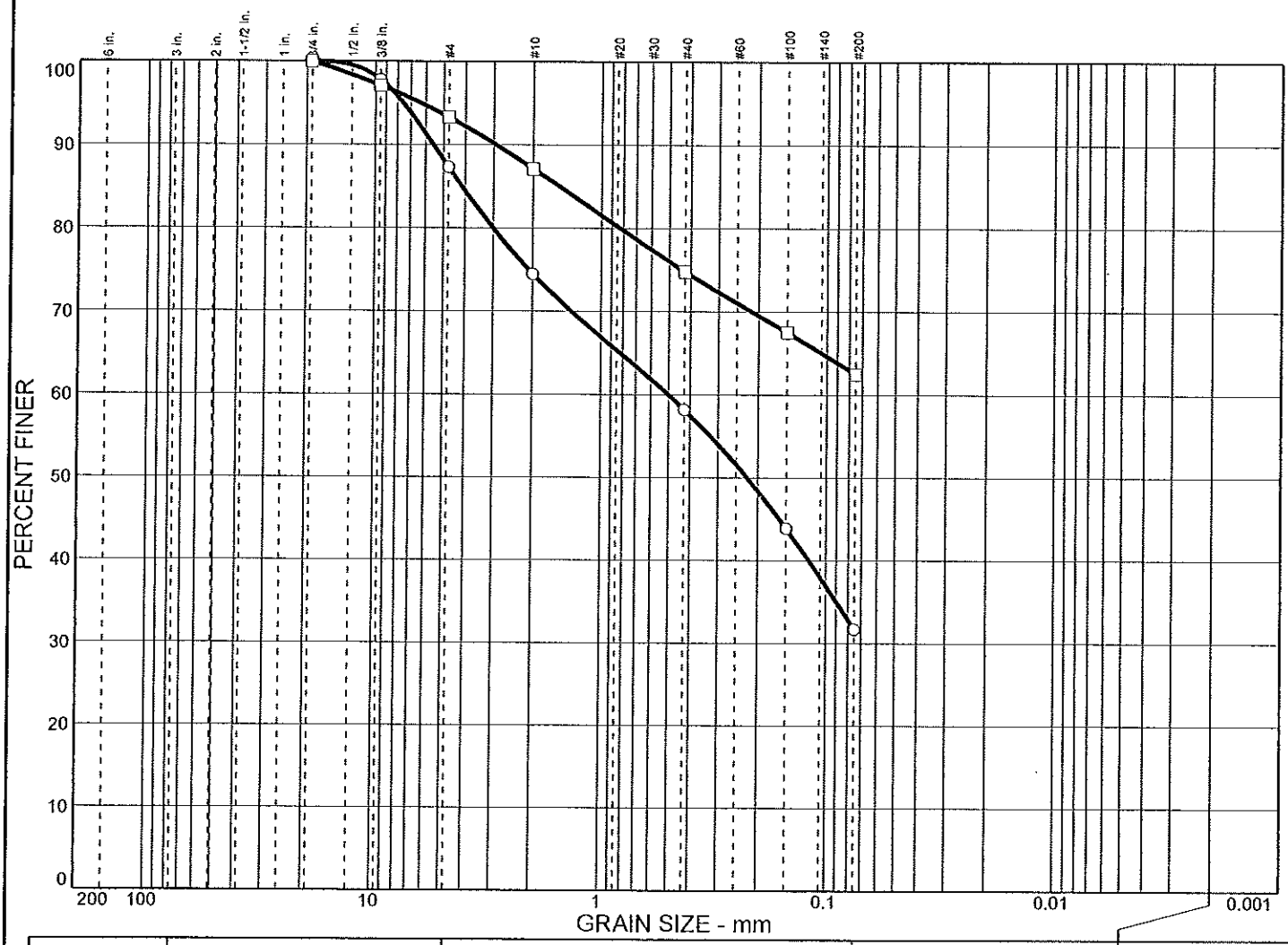
□

Grain Size Distribution Test Report

URBAN ENGINEERS

Figure No. 2

Grain Size Distribution Test Report



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	12.7	55.6	31.7	
□	0.0	6.7	30.8	62.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			4.14	0.501	0.223					
□	21	20	1.53							

	MATERIAL DESCRIPTION	USCS	AASHTO
○	Brown Sand, some silt, trace gravel	SM	
□	Gray Clayey Silt, some sand, trace gravel	ML	

Project No. 2012620205.000 **Client:** IKM Incorporated

Project: Proposed Building Addition

Ambulatory Surgery Center Redesign

○ **Source:** C-3 **Sample No.:** 3 **Elev./Depth:** 10.0-11.5

□ **Source:** C-3 **Sample No.:** 6 **Elev./Depth:** 25.0-26.5

Remarks:

○

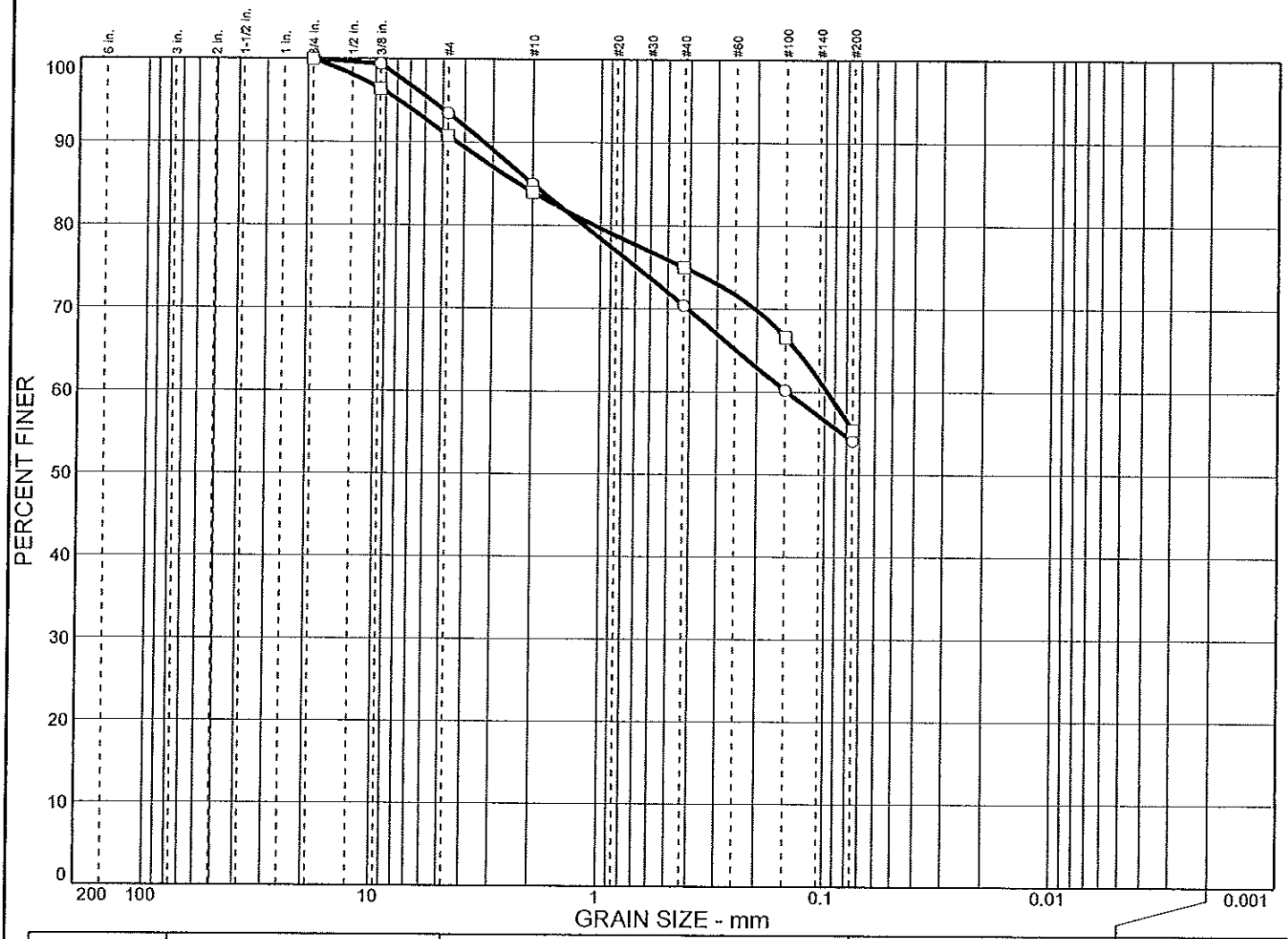
□

Grain Size Distribution Test Report

URBAN ENGINEERS

Figure No. 3

Grain Size Distribution Test Report



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	6.5	39.4	54.1	
□	0.0	9.2	35.4	55.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	21	19	2.00	0.147						
□	16	15	2.30	0.0975						

MATERIAL DESCRIPTION	USCS	AASHTO
○ Brown Clayey Silt and Sand, trace gravel	ML	
□ Gray Clayey Silt and sand, trace gravel	ML	

Project No. 2012620205.000 **Client:** IKM Incorporated

Project: Proposed Building Addition

Ambulatory Surgery Center Redesign

○ **Source:** C-4 **Sample No.:** 2 **Elev./Depth:** 5.0-6.5

□ **Source:** C-4 **Sample No.:** 7 **Elev./Depth:** 30.0-31.5

Remarks:

○

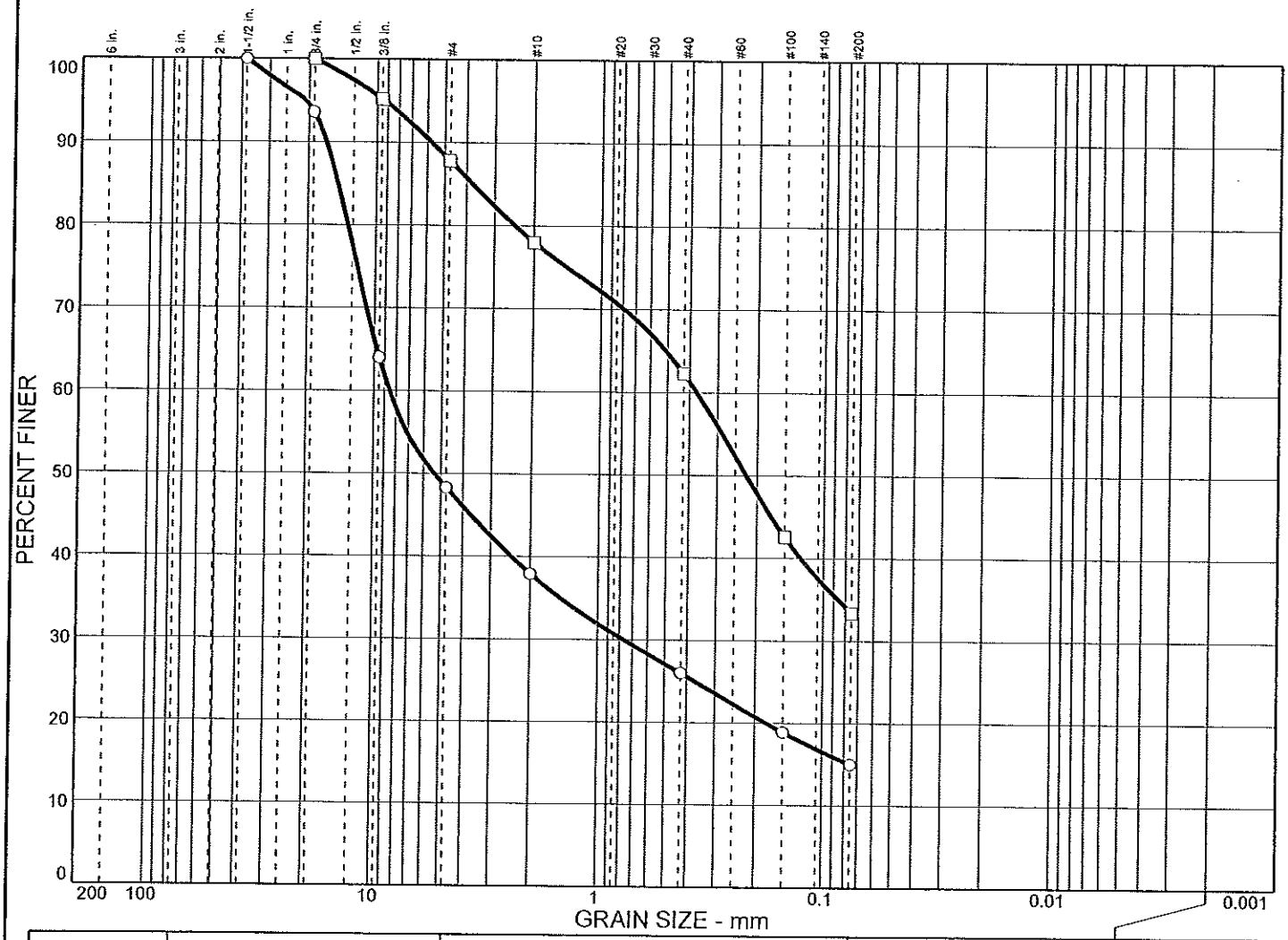
□

Grain Size Distribution Test Report

URBAN ENGINEERS

Figure No. 4

Grain Size Distribution Test Report



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	51.7	33.3	15.0	
□	0.0	12.2	54.4	33.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	26	25	14.8	8.54	5.38	0.767	0.0750			
□			3.76	0.372	0.223					

MATERIAL DESCRIPTION	USCS	AASHTO
○ Brown Gravel, some sand, little clayey Silt - Fill	GM	
□ Gray Sand, some silt, little gravel	SM	

Project No. 2012620205.000 **Client:** IKM Incorporated

Project: Proposed Building Addition

Ambulatory Surgery Center Redesign

○ **Source:** C-5 **Sample No.:** 1 **Elev./Depth:** 0.0-1.5

□ **Source:** C-5 **Sample No.:** 4 **Elev./Depth:** 15.0-16.5

Remarks:

○

□

Grain Size Distribution Test Report

URBAN ENGINEERS

Figure No. 5

SOIL CLASSIFICATION CHART

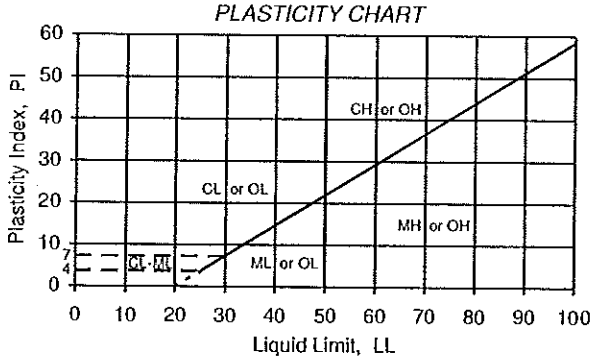
UNIFIED SOIL CLASSIFICATION SYSTEM

Reference: ASTM D 2487

MAJOR DIVISIONS			*LETTER SYMBOL*	*TYPICAL NAMES*
COARSE GRAINED SOILS More than 50% of Material Larger than No. 200 Sieve	GRAVEL AND GRAVELLY SOILS More than 50% of coarse material retained on No. 4 Sieve	CLEAN GRAVELS Little or No Fines	GW	Well graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels and gravel-sand-silt mixtures, little or no fines
			GC	Clayey gravels and gravel-sand-clay mixtures
	SAND AND SANDY SOILS More than 50% of coarse material passing No. 4 Sieve	CLEAN SANDS Little or No Fines	SW	Well graded sands and gravelly sands, little or no fines
			SP	Poorly graded sands and gravelly sands, little or no fines
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures
			SC	Clayey sand, sand-clay mixtures
FINE GRAINED SOILS More than 50% of Material Smaller than No. 200 Sieve	NON-PLASTIC TO MEDIUM PLASTIC SILTS AND CLAYS Liquid Limit less than 50		ML	Inorganic silts, clayey silts, or rock flour, or sandy and/or gravelly silts, which are non-plastic to medium plastic
			CL	Inorganic clays, lean clays, silty clays, or sandy and/or gravelly clays, which are non-plastic to medium plastic
			OL	Organic silts and organic silty clays, which are non-plastic to medium plastic
	HIGHLY PLASTIC TO VERY HIGHLY PLASTIC SILTS AND CLAYS Liquid Limit greater than 50		MH	Inorganic silts or micaceous sands or silts, with high to very high plasticity
			CH	Inorganic clays or fat clays, with high to very high plasticity
			OH	Organic clays, with high to very high plasticity
HIGHLY ORGANIC SOILS			PT	Peat, humus, swamp soils, muck, and other highly organic soils

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATION

PLASTICITY CHART



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SOIL DESCRIPTION CHART

BASED ON THE SIMPLIFIED BURMISTER'S SYSTEM

OVERALL DESCRIPTIVE TERMS

SOIL COMPONENT	*DESCRIPTIVE TERM*	*RANGE OF PROPORTIONS*
Principal Component	-	Largest Proportion
Minor Components	AND	35% to Largest Proportion
	SOME	20% to 35%
	LITTLE	10% to 20%
	TRACE	1% to 10%

FINE GRAINED SOIL DESCRIPTIVE TERMS

COMPONENT	*DESCRIPTION*	*PLASTICITY INDEX*
SILT	Non-Plastic	0
CLAYEY SILT	Slight Plasticity	1 to 5
SILT & CLAY	Low Plasticity	5 to 10
CLAY & SILT	Medium Plasticity	10 to 20
SILTY CLAY	High Plasticity	20 to 40
CLAY	Very High Plasticity	> 40

Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE THE GEOPROFESSIONAL BUSINESS ASSOCIATION

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IIGER09105.0MRP