GESTRA Engineering, Inc.
1626 W. Fond du Lac Avenue
Milwaukee, WI 53205
414-933-7444

April 22, 2011

Paul Vraney
Project Manager, WisDOT

Subject: Additional Subsurface Information
Project ID 1133-03-02
STH 29 and USH 41 Interchange
Early Fill / Early Structures Contract
Brown County

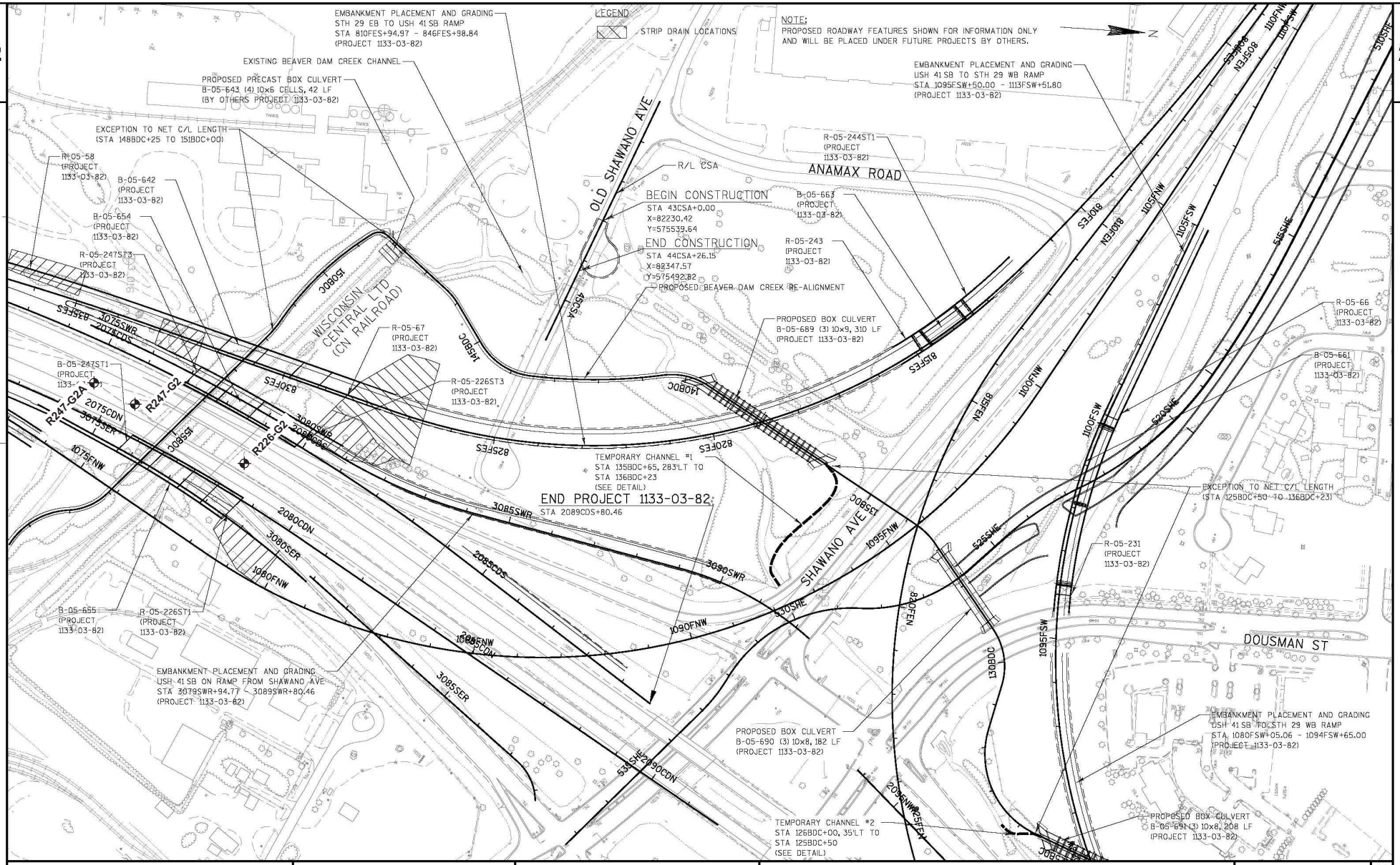
Mr. Vraney,

At the request of WisDOT we are providing additional soils information obtained by GESTRA near structures within the early fill / early structures contract.

This additional information was obtained for site evaluation at Unit 2 retaining walls for R-05-226 and R-05-247. While these structures are not part of the early fill / early structures contract the subsurface information may be of use. For full discussion of conditions and soil parameters used in our analysis see the individual reports.

Sincerely,
GESTRA Engineering, Inc.

Doug Bath, P.E.



PROJECT NO: 1133-03-82/84	HWY: USH 41	COUNTY: BROWN	PROJECT OVERVIEW	SHEET	E

FILE NAME : c:\justin\es-ef\020202_po.dgn PLOT DATE : 3/8/2011 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:200

SOIL BORING LOG

Gestra Engineering Inc.
1626 W. Fond du Lac Avenue
Milwaukee, WI 53205
Phone: 414-933-7444, Fax: 414-933-7844

PROJECT NAME	USH-41 Amendment (R-05-226)
DATE DRILLING STARTED	3/30/2011
DATE DRILLING ENDED	3/30/2011
PROJECT LOCATION	Brown County, Wisconsin
BORING NUMBER	R-226-G2
PROJECT NUMBER	10162-10
DRILLING RIG	Diedrich D50
DRILLING METHOD	3¼" HSA
SURFACE ELEVATION	ft
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: R. Johnson
FIELD LOG	Jeff B.
LAB LOG / QC	N. Saha
NORTHING	
EASTING	

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						FILL, silty sand, trace clay pockets, brown, moist								
SS - 1	15	3/5/5	10											
SS - 2	14	3/4/5	9	5										
SS - 3	14	3/4/5	9											
SS - 4	16	2/3/4	7	10										
						FILL, silty sand, brown to light brown, moist								
SS - 5	15	2/2/4	6											
						FILL, sandy silt, brown, very moist								
SS - 6	16	6/13/13	26	15										
SPT - 6	16	5/10/11	21											Sample 6A: Not able to collect Shelby tube sample due to granular soil. Additional SPT sample was collected from 16'-17.5'.
SS - 7	17	5/9/9	18	20										
SS - 8	17	4/7/4	11	25		Wet condition observed at 24' LEAN CLAY, trace sand and silt lenses, reddish brown, moist, stiff to very stiff	CL			1.50			19.0	
SH - 9	24			30						3.50			23.6	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 24 ft.		CAVE DEPTH AT COMPLETION: 8 ft.	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: N/A ft.		CAVE DEPTH AFTER HOURS: N/A ft., 0 hrs.	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: N/A ft.			

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

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SOIL BORING LOG

PROJECT NAME: USH-41 Amendment (R-05-226)	DATE DRILLING STARTED: 3/30/2011	BORING NUMBER: R-226-G2	
PROJECT LOCATION: Brown County, Wisconsin	DATE DRILLING ENDED: 3/30/2011	PROJECT NUMBER: 10162-10	
		DRILLING RIG: Diedrich D50	

BORING DRILLED BY: FIRM: GESTRA, CREW CHIEF: R. Johnson	FIELD LOG: Jeff B.	NORTHING	DRILLING METHOD: 3¼" HSA
	LAB LOG / QC: N. Saha	EASTING	SURFACE ELEVATION: ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						LEAN CLAY, trace sand and silt lenses, reddish brown, moist, stiff to very stiff	CL							
						LEAN CLAY, trace sand, reddish brown, very moist, medium stiff to stiff								
SS - 10	18	3/3/3	6	35						0.75			29.3	
							CL							
SH - 11	24			40						0.75			15.9	
						SILTY CLAY, trace gravel, gray, moist, very stiff to hard								
SS - 12	15	5/9/11	20	45						3.75			19.1	
							CL-ML							
SS - 13	18	14/12/15	27	50						4.50			13.9	
						LEAN CLAY, brownish gray, moist, medium stiff to stiff								
SS - 14	18	6/6/5	11	55						0.75			28.4	
							CL							
						Color changed to gray at 58.5'								
SS - 15	18	2/4/4	8	60						1.00			17.7	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 24 ft.		CAVE DEPTH AT COMPLETION: 8 ft.	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: N/A ft.		CAVE DEPTH AFTER HOURS: N/A ft., 0 hrs.	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: N/A ft.			

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

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DATE DRILLING STARTED	3/30/2011
BORING NUMBER	**R-226-G2**
PROJECT NUMBER	10162-10
PROJECT LOCATION	Brown County, Wisconsin
DATE DRILLING ENDED	3/30/2011
DRILLING RIG	Diedrich D50
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: R. Johnson
FIELD LOG	Jeff B.
LAB LOG / QC	N. Saha
NORTHING	
EASTING	
DRILLING METHOD	3¼" HSA
SURFACE ELEVATION	ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						LEAN CLAY, brownish gray, moist, medium stiff to stiff								
SH - 16	24			65						1.25			20.6	
							CL							
SS - 17	18	3/4/5	9	70		gray with reddish brown color observed in sample SS-18				0.75			23.6	
SS - 18	18	3/4/6	10	75						1.00			20.0	
						End of boring at 75'								
				80										
				85										
				90										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 24 ft.		CAVE DEPTH AT COMPLETION: 8 ft.	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: N/A ft.		CAVE DEPTH AFTER HOURS: N/A ft., 0 hrs.	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: N/A ft.			

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

SOIL BORING LOG

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PROJECT NAME	USH-41 Amendment (R-05-247)
DATE DRILLING STARTED	3/29/2011
DATE DRILLING ENDED	3/29/2011
PROJECT LOCATION	Brown County, Wisconsin
BORING NUMBER	**R-247-G2**
PROJECT NUMBER	10162-10
DRILLING RIG	Diedrich D50
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: R. Johnson
FIELD LOG	B. Sargent
LAB LOG / QC	N. Saha
NORTHING	574515
EASTING	82728
DRILLING METHOD	3¼" HSA
SURFACE ELEVATION	638.2 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						FILL, sand and gravel, wet								Offset: 50' south and 0' east from the staked location. Staked elevation was 636.74 feet. The reported elevation was adjusted by field technician for offset.
SS - 1	12	6/8/9	17	5	633.2	FILL, silty sand, trace clay pockets, dark brown and gray mixed, very moist to wet								
						Wet at 8'								
SS - 2	14	4/5/9	14	10	628.2	FILL, lean clay, with sand, trace gravel, gray, brown and dark brown mixed, very moist				1.50-2.50				
SS - 3	14	10/23/20	43	15	623.2	FILL, sand, fine to medium grained, trace clay pockets, brown, moist								
SS - 4	12	10/22/30	52	20	618.2	Trace gravel and roots in sample SS-4								
SS - 5	15	13/19/27	46	25	613.2	Trace angular gravel in sample SS-5								
				30	608.2	Auger refusal on a concrete structure and end of boring at 28.5'								

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 8 ft.		CAVE DEPTH AT COMPLETION: N/A ft.	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: N/A ft.		CAVE DEPTH AFTER HOURS: N/A ft., 0 hrs.	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: N/A ft.			

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

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PROJECT NAME	USH-41 Amendment (R-05-247)
DATE DRILLING STARTED	4/4/2011
DATE DRILLING ENDED	4/4/2011
PROJECT LOCATION	Brown County, Wisconsin
BORING NUMBER	**R-247-G2A**
PROJECT NUMBER	10162-10
DRILLING RIG	Diedrich D50
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: R. Johnson
FIELD LOG	J. Bruesewitz
LAB LOG / QC	N. Saha
NORTHING	574455
EASTING	82728
DRILLING METHOD	3¼" HSA
SURFACE ELEVATION	637.5 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						FILL, silty sand, trace gravel, dark brown and gray mixed, moist, with roots								Offset: 110' south from the staked location. Staked elevation was 636.47 feet. The reported elevation was adjusted by field technician for offset.
SS - 1	1	8/6/4	10	5	632.5									
						FILL, lean clay, trace sand and gravel, gray and brown mixed, moist								
SS - 2	9	4/8/10	18	10	627.5					2.50			18.2	
						FILL, silty sand, trace clay pockets, brown and reddish brown mixed, moist								
SS - 3	14	12/18/21	39	15	622.5								11.3	
SS - 4	16	10/14/13	27	20	617.5									Gravel= 1.7%, Sand= 84.2% and P200= 14.1%
SS - 5	16	11/14/17	31	25	612.5									
SS - 6	18	12/12/16	28	30	607.5									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: N/A ft.		CAVE DEPTH AT COMPLETION: 6 ft.	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: N/A ft.		CAVE DEPTH AFTER HOURS: N/A ft., 0 hrs.	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: N/A ft.			

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FIELD LOG	J. Bruesewitz
LAB LOG / QC	N. Saha
NORTHING	574455
EASTING	82728
DRILLING METHOD	3¼" HSA
SURFACE ELEVATION	637.5 ft

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						FILL, silty sand, trace clay pockets, brown and reddish brown mixed, moist								
SS - 7	18	4/6/6	12	35	602.5	LEAN CLAY, reddish brown, moist, stiff to very stiff	CL			3.25	36	19	23.2	
SH - 8	24			40	597.5					1.75				
						LEAN CLAY, with silt lenses, gray with reddish brown layers, moist, very stiff to hard								
SS - 9	16	6/11/14	25	45	592.5		CL			3.00			22.3	
SS - 10	18	11/12/14	26	50	587.5					4.5+			18.7	
						LEAN CLAY, trace silt lenses, brown, moist, very stiff								
SS - 11	18	7/8/9	17	55	582.5		CL			2.75-3.00			28.8	
SS - 12	18	4/7/9	16	60	577.5					2.00			19.7	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: N/A ft.		CAVE DEPTH AT COMPLETION: 6 ft.	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: N/A ft.		CAVE DEPTH AFTER HOURS: N/A ft., 0 hrs.	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: N/A ft.			

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PROJECT NAME	USH-41 Amendment (R-05-247)
DATE DRILLING STARTED	4/4/2011
DATE DRILLING ENDED	4/4/2011
PROJECT LOCATION	Brown County, Wisconsin
BORING NUMBER	**R-247-G2A**
PROJECT NUMBER	10162-10
DRILLING RIG	Diedrich D50
DRILLING METHOD	3¼" HSA
SURFACE ELEVATION	637.5 ft
BORING DRILLED BY	FIRM: GESTRA CREW CHIEF: R. Johnson
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LAB LOG / QC	N. Saha
NORTHING	574455
EASTING	82728

Number and Type	Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation	Soil Description and Geological Origin for Each Major Unit	USCS Classification	Graphic	Well Diagram	Unconfined Comp. Strength (Q_u or Q_p) (tsf)	Liquid Limit	Plasticity Index	Moisture Content (%)	Comments
						LEAN CLAY, trace silt lenses, brown, moist, very stiff	CL							
						LEAN CLAY, gray, moist, medium stiff to stiff	CL							
SH - 13	24			65	572.5					1.00-1.50				
SS - 14	18	3/5/5	10	70	567.5					0.75-1.00			22.7	
						End of boring at 70'								
				75	562.5									
				80	557.5									
				85	552.5									
				90	547.5									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: N/A ft.		CAVE DEPTH AT COMPLETION: 6 ft.	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: N/A ft.		CAVE DEPTH AFTER HOURS: N/A ft., 0 hrs.	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: N/A ft.			

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

GESTRA Engineering, Inc
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Consolidated Undrained Triaxial Compression Test Report

Project Name:	USH-41	Client:	HNTB
Project Location:	Brown Co., WI	Report Date:	4/22/2011
Project Number:	10043-10	Test Method :	ASTM D4767
Boring Number:	R-247-G2	Tester Name:	ESJ
Sample Number:	SH-8	Test Period	4/13/2011 to 4/20/2011
Depth of Sample:	38'-40'	Sampling Date:	
Sample Description:	Sandy Lean CLAY, with gravel,brown, moist	Specific Gravity:	2.68(assumed)

Summary Table of Test Result

Sample I.D.	Confining Stress (psi)	Strain at failure (%)	Pore Pressure (psi)	Effective Confining Stress (psi)	Deviator stress (psi)	FinalB value
1	135.0	9.4	115.0	20.0	32.2	> 0.95
2	145.0	9.5	115.0	30.0	48.2	> 0.95
3	155.0	10.7	115.0	40.0	48.3	> 0.95

measured at strain rate of 0.075 %/min

Shear Strength Parameter
at maximum shear stress

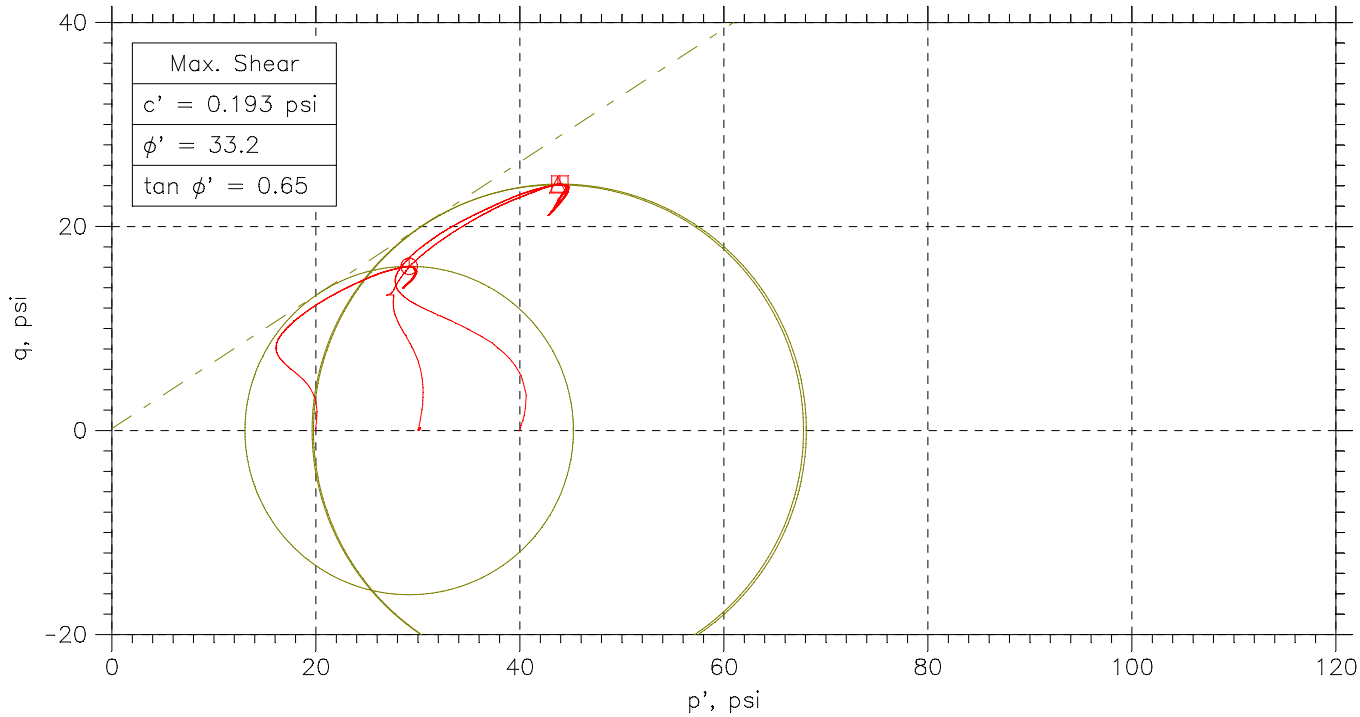
Soil Internal Friction Angle : 33.2 degree (effective)
Soil Cohesion : 0.2 psi (effective)

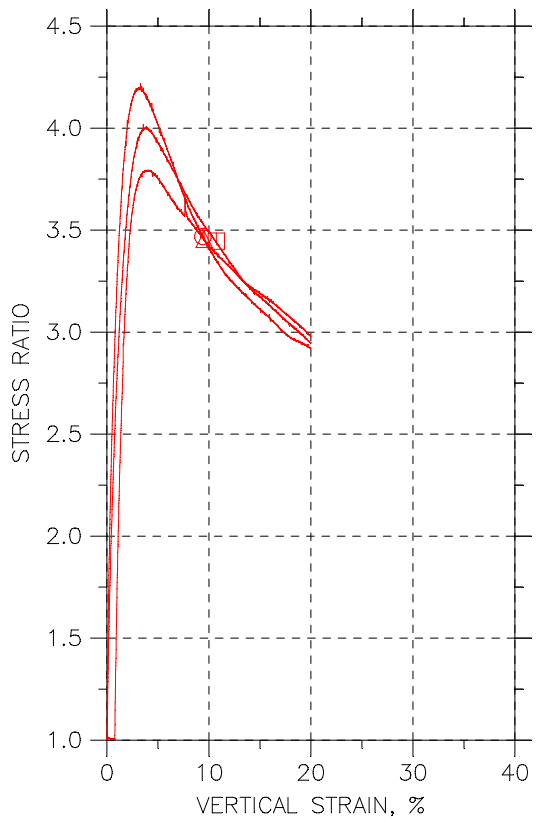
Soil Internal Friction Angle : 17.8 degree (total)
Soil Cohesion : 6.0 psi (total)

Special Note:

Checked by Sangho Lee on Apr. 22th 2011

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		○	△	□	
Sample No.		SH-8	SH-8	SH-8	
Test No.		1	2	3	
Depth					
Initial	Diameter, in	2.86	2.86	2.861	
	Height, in	5.65	5.65	5.652	
	Water Content, %	14.2	14.1	13.2	
	Dry Density, pcf	121.9	122.	122.7	
	Saturation, %	102.2	101.9	97.6	
	Void Ratio	0.372	0.372	0.364	
Before Shear	Water Content, %	13.3	13.4	12.0	
	Dry Density, pcf	123.4	123.	126.6	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.356	0.36	0.321	
	Back Press., psi	115.	115.	115.	
Ver. Eff. Cons. Stress, psi		20.02	30.	40.01	
Shear Strength, psi		16.1	24.09	24.16	
Strain at Failure, %		9.41	9.54	10.7	
Strain Rate, %/min		0.075	0.075	0.075	
B-Value		0.98	0.96	0.96	
Estimated Specific Gravity		2.68	2.68	2.68	
Liquid Limit		---	---	---	
Plastic Limit		---	---	---	

GESTRA

Project: USH-41

Location: Brown Co.,WI

Project No.: 10043-10

Boring No.: R247-G2

Sample Type: Shelby Tube

Description: SANDY LEAN CLAY, with gravel, reddish brown, moist

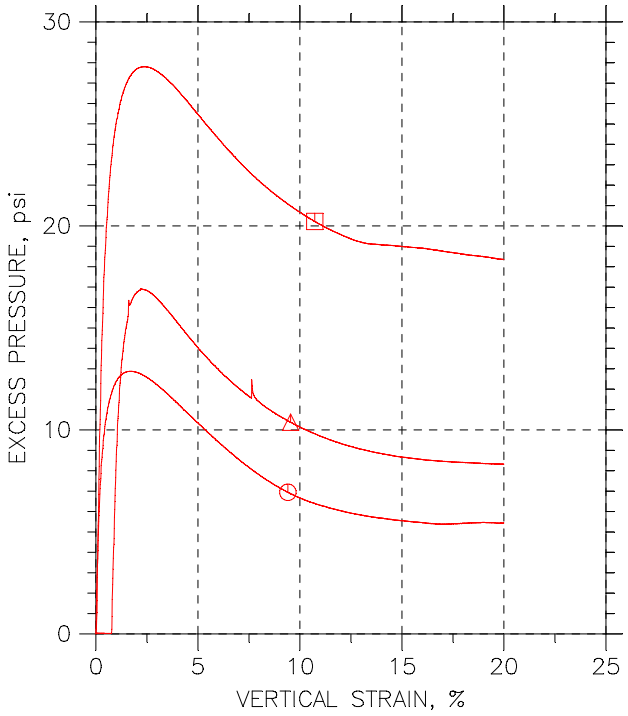
Remarks: ***Validity of calibration data verified on Nov.2.2010

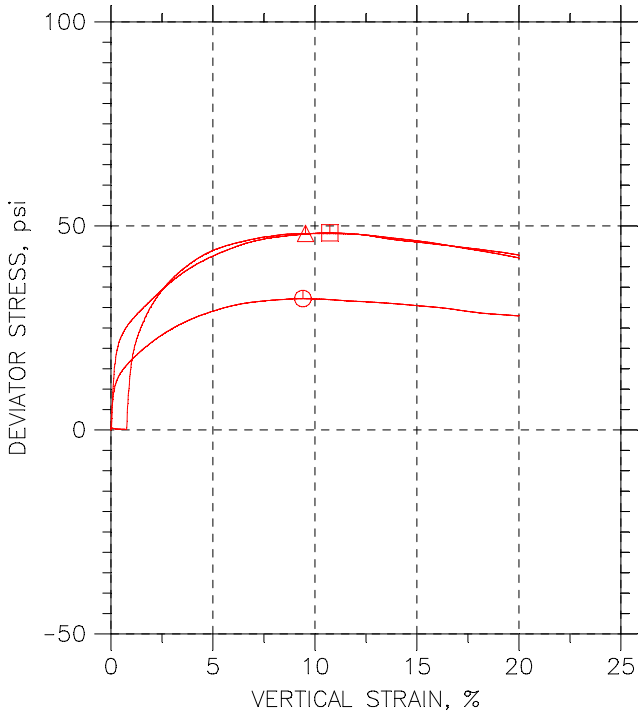
Phase calculations based on start and end of test.

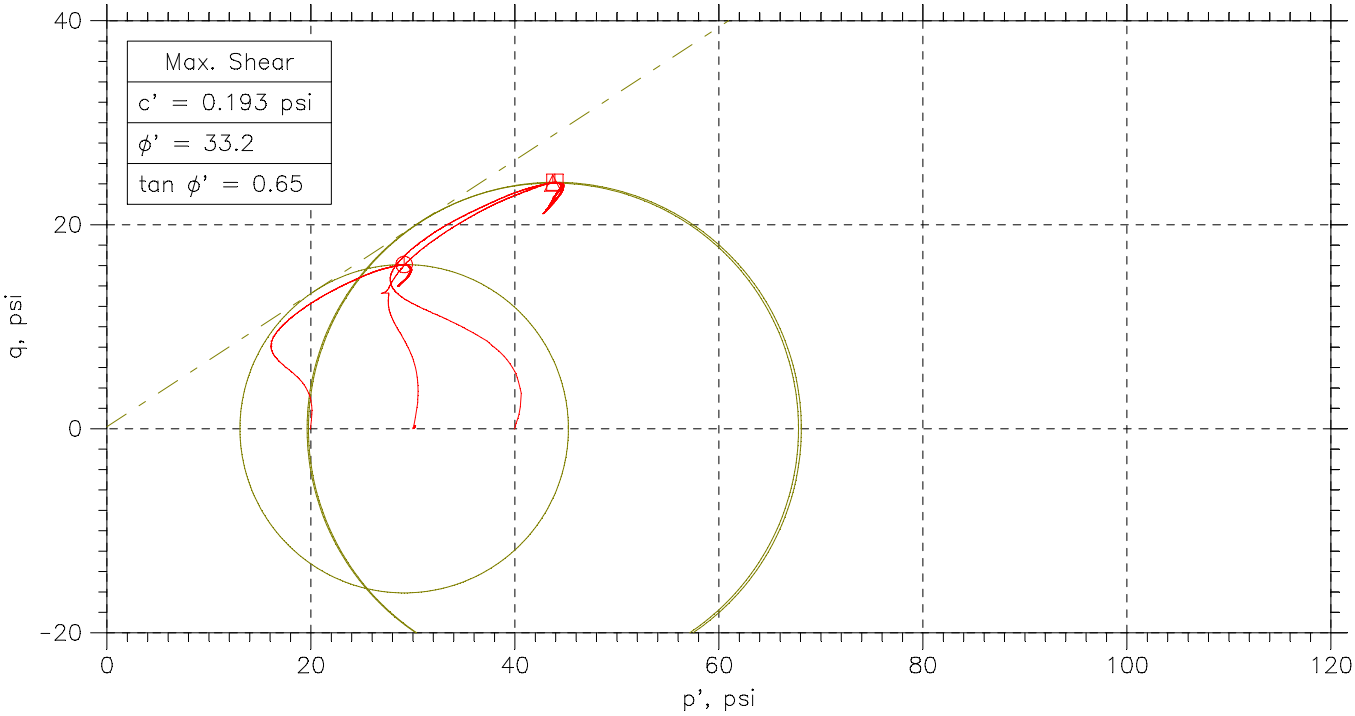
* Saturation is set to 100% for phase calculations

Fri, 22-APR-2011 11:14:40

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







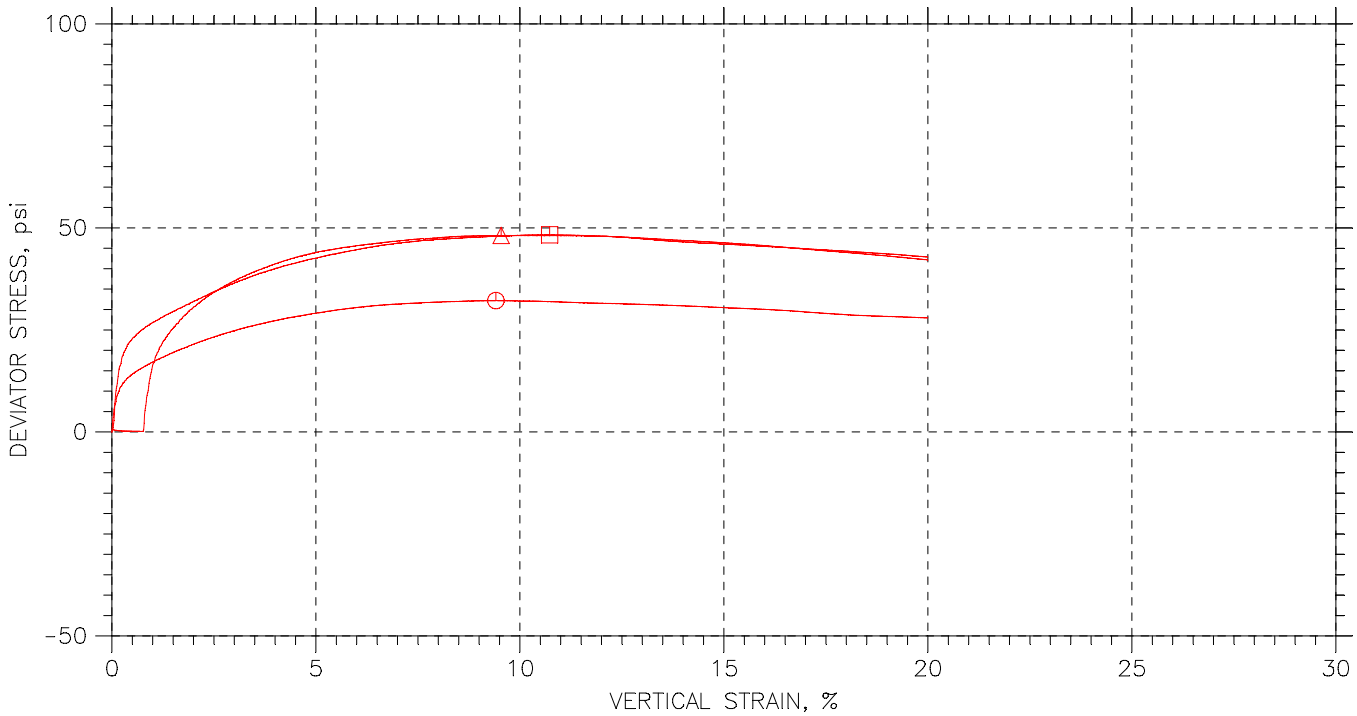
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	SH-8	1		ESJ	4/13/2011	SHL		R247-G2, SH-8 (20 psi).dat
△	SH-8	2		ESJ	4/13/2011	SHL		R247-G2, SH-8 (30 psi).dat
⊡	SH-8	3		ESJ	4/19/2011	SHL		R247-G2, SH-8 (40 psi).dat

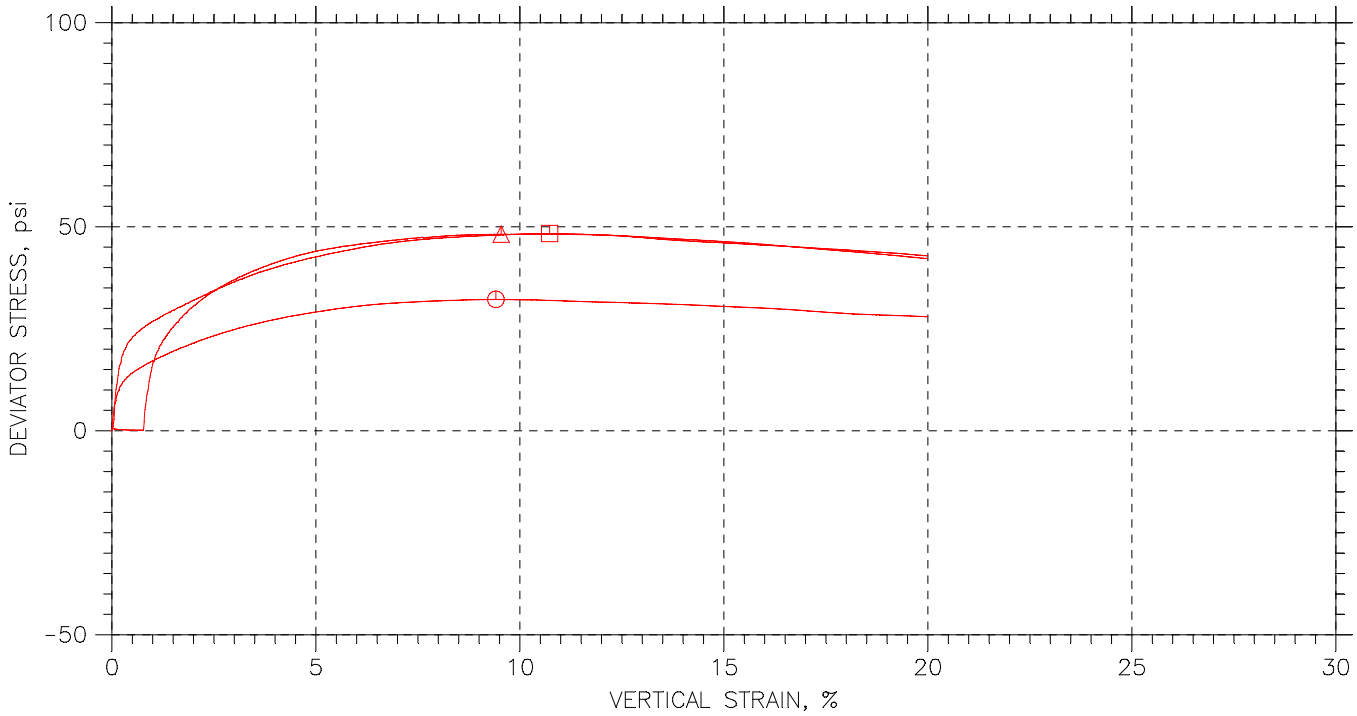
GESTRA

Project: USH-41	Location: Brown Co.,WI	Project No.: 10043-10
Boring No.: R247-G2	Sample Type: Shelby Tube	
Description: SANDY LEAN CLAY, with gravel, reddish brown, moist		
Remarks: ***Validity of calibration data verified on Nov.2.2010		

Fri, 22-APR-2011 11:14:40

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





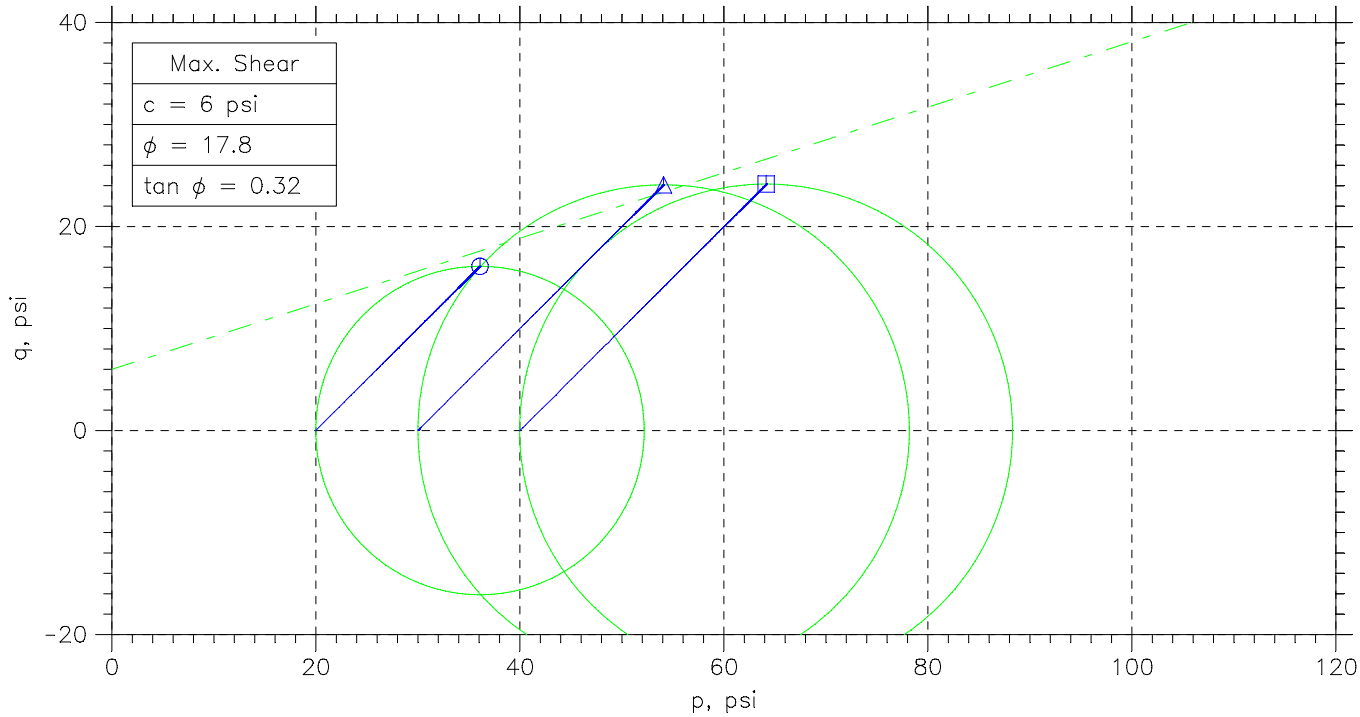
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
◷	SH-8	1		ESJ	4/13/2011	SHL		R247-G2, SH-8 (20 psi).dat
△	SH-8	2		ESJ	4/13/2011	SHL		R247-G2, SH-8 (30 psi).dat
◳	SH-8	3		ESJ	4/19/2011	SHL		R247-G2, SH-8 (40 psi).dat

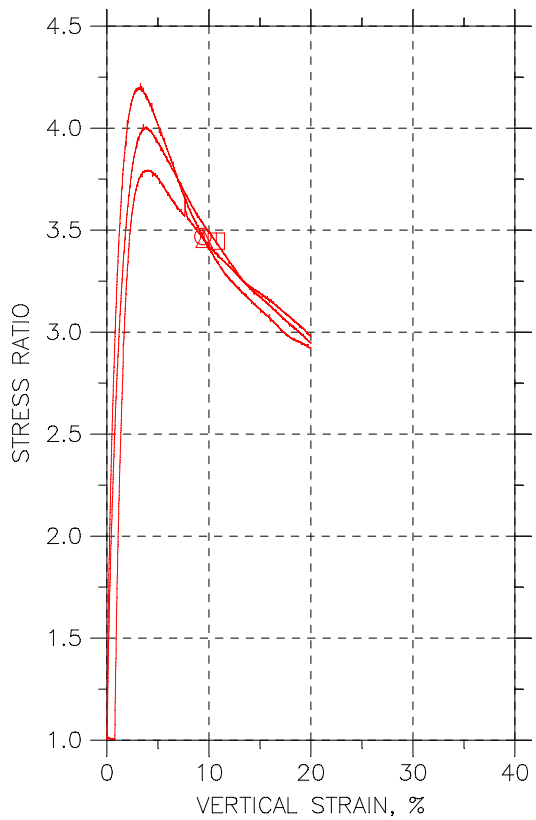
GESTRA

Project: USH-41	Location: Brown Co.,WI	Project No.: 10043-10
Boring No.: R247-G2	Sample Type: Shelby Tube	
Description: SANDY LEAN CLAY, with gravel, reddish brown, moist		
Remarks: ***Validity of calibration data verified on Nov.2.2010		

Fri, 22-APR-2011 11:14:41

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		◷	△	◻	
Sample No.		SH-8	SH-8	SH-8	
Test No.		1	2	3	
Depth					
Initial	Diameter, in	2.86	2.86	2.861	
	Height, in	5.65	5.65	5.652	
	Water Content, %	14.2	14.1	13.2	
	Dry Density, pcf	121.9	122.	122.7	
	Saturation, %	102.2	101.9	97.6	
	Void Ratio	0.372	0.372	0.364	
Before Shear	Water Content, %	13.3	13.4	12.0	
	Dry Density, pcf	123.4	123.	126.6	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.356	0.36	0.321	
	Back Press., psi	115.	115.	115.	
Ver. Eff. Cons. Stress, psi		20.02	30.	40.01	
Shear Strength, psi		16.1	24.09	24.16	
Strain at Failure, %		9.41	9.54	10.7	
Strain Rate, %/min		0.075	0.075	0.075	
B-Value		0.98	0.96	0.96	
Estimated Specific Gravity		2.68	2.68	2.68	
Liquid Limit		---	---	---	
Plastic Limit		---	---	---	

GESTRA

Project: USH-41
Location: Brown Co.,WI
Project No.: 10043-10
Boring No.: R247-G2
Sample Type: Shelby Tube

Description: SANDY LEAN CLAY, with gravel, reddish brown, moist

Remarks: ***Validity of calibration data verified on Nov.2.2010

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations

Fri, 22-APR-2011 11:18:08