FROEHLING & ROBERTSON, INC.

Preliminary Geotechnical Subsurface Data Report
Richland County Emergency Bridge Package 4
S-69 Congress Road over Jumping Run Creek
Richland County, South Carolina
F&R Project No. 65T-0191

Prepared for:

South Carolina Department of Transportation
Design-Build Section
955 Park Street
Columbia, SC 29201

November 11, 2015

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FROEHLING & ROBERTSON, INC.
Engineering • Environmental • Geotechnical

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November 11, 2015

Mr. Trapp Harris, PE
South Carolina Department of Transportation
Design-Build Section
955 Park Street
Columbia, South Carolina 29201

Reference: Preliminary Geotechnical Subsurface Data Report
Richland County Emergency Bridge Package 4
SC 69 Congress Road over Jumping Run Creek
Richland County, South Carolina
F&R Project No. 65T-0191

Dear Mr. Harris:

The purpose of this geotechnical subsurface data report is to present the results of the subsurface investigation program undertaken by Froehling & Robertson, Inc. (F&R) in connection with the Richland County Emergency Bridge Package at State Route S-69 Congress Road over Jumping Run Creek in Richland County, South Carolina. Our services were performed in general accordance with your work order request emailed to F&R on October 16, 2015, and as authorized by your office per our On-Call Contract with SCDOT. The attached report presents our understanding of the project, reviews our investigation procedures, describes existing site and general subsurface conditions, and presents the results of our soil laboratory tests.

We have enjoyed working with you on this project. Please contact us if you have any questions regarding this report or if we may be of further service.

Sincerely,
FROEHLING & ROBERTSON, INC.

Gary R. Taylor, PE
Senior Geotechnical Engineer
Registered SC No. 27330

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 27330 GARY R TAYLOR

Benedictus K. Azumah, PE
Geotechnical Engineer
Registered VA No. 052166

SOUTH CAROLINA FROEHLING & ROBERTSON, INC. No. C00056 CERTIFICATE OF AUTHORIZATION

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APPENDICES

1.0 PURPOSE & SCOPE OF SERVICES

The purpose of this Geotechnical Investigation was to explore the subsurface conditions at the site and perform soil laboratory tests on selected soil samples obtained from the investigation. F&R's scope of services included the following:

- Completion of two soil test borings to a depth of approximately 100 feet below the existing ground surface and as close as possible to each previous bridge abutment location.
- Preparation of typed SCDOT Soil Boring Logs;
- Performing soil laboratory tests including natural moisture contents, Atterberg Limits and Wash No. 200 Gradation tests;
- Preparation of this geotechnical subsurface data report by professional engineers.

This report was prepared in general accordance with the 2010 SCDOT Geotechnical Design Manual (GDM), Version 1.1.

Our scope of services did not include identification and evaluation of appropriate foundation systems for the proposed bridge, design capacities and other environmental aspects of the project site.

2.0 PROJECT INFORMATION

2.1 Site Description

The project site is on Congress Road (State Route S-69) located about 250 ft north from the intersection with Old Leesburg Road in Richland County, South Carolina. Cedar Creek flows in an east-west direction and crosses below the road at the site. The area around the creek and the road is generally wooded. Project surroundings are shown on the attached Figure No. 1 - Site Vicinity Map, Included in Appendix I.

2.2 Project Description

Recent flooding in the region has caused extensive erosion around the bridge and resulted in a complete loss of the bridge. Emergency replacement of the roadway and bridge is planned. For this purpose, the geotechnical subsurface investigation and laboratory testing is required by SCDOT and will form part of a preliminary investigation of the site.

3.0 SUBSURFACE INVESTIGATION

3.1 Subsurface Investigation Program

The subsurface investigation program consisted of two soil test borings (STB). The borings, designated as B-01 and B-02 were advanced to a termination depth of 100 ft below the existing ground surface on the approaches adjacent to the previous location of the bridge. Approximate boring locations are identified on Figure No. 2 - Boring Location Plan, included in Appendix I. Photographs of Borings B-01 and B-02 being drilled are also included in Appendix I as Figure No. 3 and No. 4, respectively.

3.2 Location Control

The STB locations were staked in the field by personnel from our office following instructions from your office. The borings were drilled in the centerline of the existing alignment a few feet from the remaining edge of the bridge approach closest to the creek. The ground surface elevation at the borings locations were not provided to us at the time of this writing. GPS coordinates of Borings B-01 (Latitude 33.999907 / Longitude -80.742296) and B-02 (Latitude 34.000115 / Longitude -80.742316) were obtained with a portable hand-held GPS and are recorded on the soil boring logs included in Appendix II of this report.

3.3 Subsurface Investigation Procedure

Subsurface investigation was performed on October 19, 2015 using an ATV-mounted CME/550X and truck-mounted CME/55 drill rigs. The drill rigs used for this project were equipped with an automatic hammer and the drilling method used was the wash rotary boring. The energy ratio of this ATV-mounted hammer reported to us indicates 86% and that for the truck-mounted hammer indicates 74%. SPT tests at boring locations were performed continuously from the existing ground surface to a depth of 10 feet. Thereafter, boreholes were advanced and SPT performed at approximate 5-foot intervals to their termination depths. The Standard Penetration Test (SPT) was performed at the boring locations in general accordance with ASTM D1586.

Soil samples were obtained with a long split-spoon sampler with each SPT being driven with a 140-lb automatic hammer falling 30 inches. The number of blows required to drive the sampler each 6-inch increment of penetration was recorded and are shown on the boring logs. The first six-inch increment is used to seat the sampler with the sum of the second and third penetration increments being termed the SPT value, “N”. A representative portion of each disturbed split-spoon sample was collected with each SPT, placed in a glass jar, and returned to our laboratory for review and testing.

The recovered split-spoon samples were visually classified by F&R engineers in general accordance with the ASTM D2488. The boring logs provided in Appendix II show the subsurface conditions encountered on the dates and at the approximate locations indicated.

By the nature of the work performed, the drilling activities result in disturbances to the site. The completed boreholes performed were backfilled upon completion. The borehole backfill may subside at some time following our work. F&R assumes no responsibility for borehole subsidence after completion of the field investigation and departing the site.

3.4 Groundwater

Groundwater was encountered in Borings B-01 and B-02 at depths of approximately 18.5 and 13.5 feet, respectively. The depth at which groundwater was encountered in each individual boring is indicated on the attached soil boring logs in Appendix II.

The groundwater levels at the boring locations were determined based on our observation of free water in the split-spoon soil samples following removal of the sampler. Upon completion of drilling, the boreholes were backfilled for safety, hence the absence of 24-hour water level readings on the boring logs.

The groundwater levels on the soil boring logs indicate our estimate of the hydrostatic water table at the time of our investigation. The final design should anticipate the fluctuation of the hydrostatic water table depending on variations in precipitation, surface runoff, evaporation, creek levels and similar factors.

4.0 LABORATORY TESTING

Laboratory testing consisted of Atterberg Limits Tests, No. 200 Sieve Cut grain size analyses (Wash #200), and Natural Moisture Content tests performed on specific soil samples. The specific tests performed on the selected samples are listed in Table No. 1 below.

Table No. 1: Soil Laboratory Tests Performed on Selected Soil Samples

Boring	Sample Number	Depth (ft)	Atterberg Limits	Percent Fines Wash # 200	Natural Moisture Content
B-01	SS-4	6.5-8.5	X	X	X
B-01	SS-7	18.5-20.0	X	X	X
B-01	SS-9	28.5-30.0		X	X
B-01	SS-10	33.5-35.0		X	X
B-01	SS-12	43.5-45.0		X	X
B-01	SS-14	53.5-55.0	X	X	X
B-01	SS-16	63.5-65.0		X	X
B-01	SS-18	73.5-75.0		X	X
B-01	SS-20	83.5-85.0		X	X
B-01	SS-21	88.5-90.0		X	X
B-02	SS-5	8.0-10.0		X	X
B-02	SS-6	13.5-15.0	X	X	X
B-02	SS-8	23.5-25.0		X	X
B-02	SS-10	33.5-35.0	X	X	X
B-02	SS-12	43.5-45.0		X	X
B-02	SS-14	53.5-55.0	X	X	X
B-02	SS-15	58.5-60.0		X	X
B-02	SS-17	68.5-70.0	X	X	X
B-02	SS-20	83.5-85.0		X	X

The laboratory testing results are presented in Appendix III and the laboratory test data sheets are presented in Appendix IV.

F&R greatly appreciates the opportunity to work with you on this project. If there are any questions concerning this report or if any additional information is required, please do not hesitate to contact us.

6.0 LIMITATIONS

This report has been prepared for the exclusive use of South Carolina Department of Transportation or their agent, for specific application to the referenced site in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. Our investigation is based on site location information furnished to us; and generally accepted geotechnical engineering practice. The subsurface investigation logs included herein, do not reflect variations in subsurface conditions which could exist intermediate of the boring locations or in unexplored areas of the site. Should such variations become apparent during construction, it will be necessary to perform additional subsurface exploration based upon on-site observations of the conditions.

APPENDIX I

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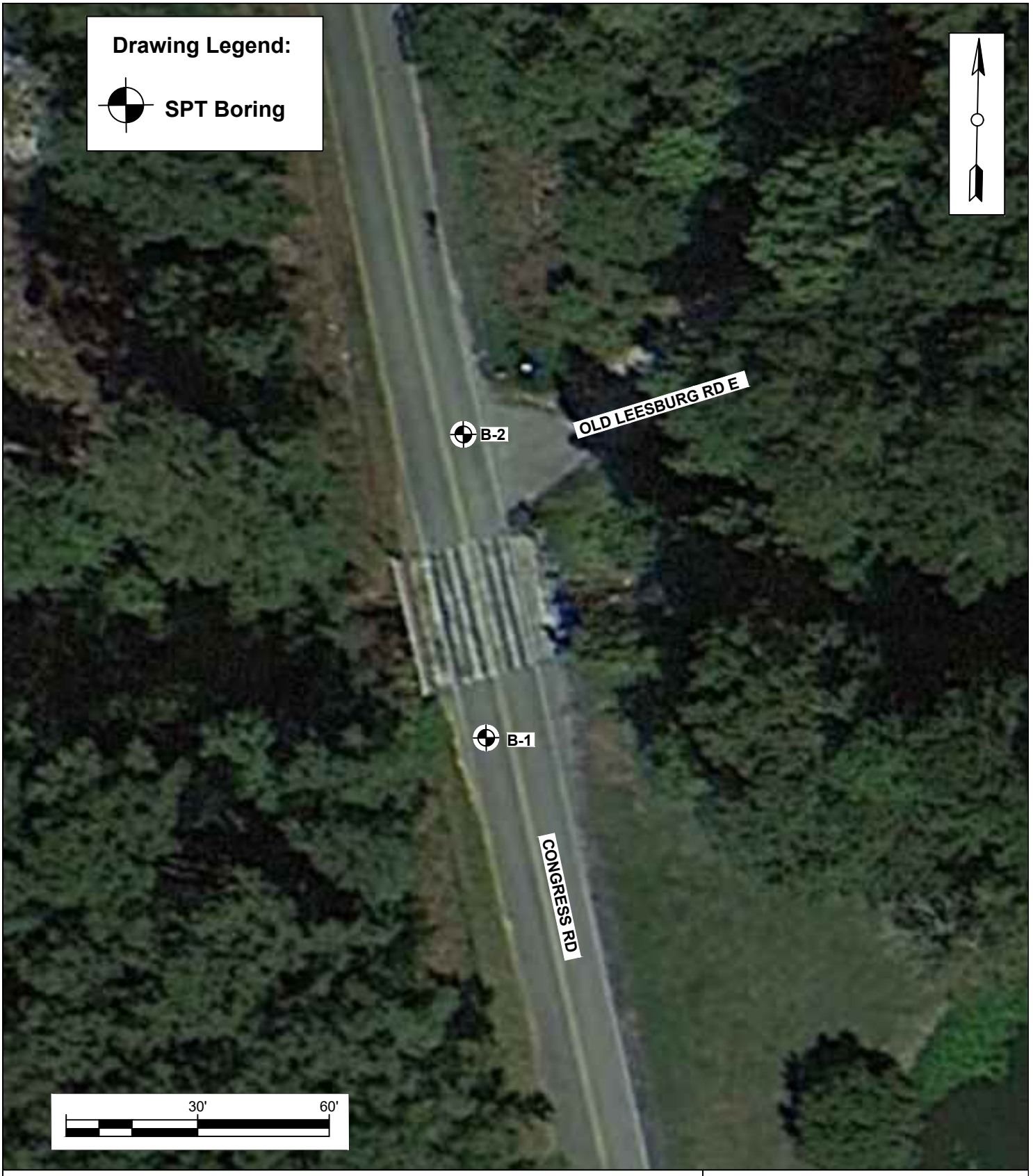
DATE: 11/3/2015

CLIENT: SCDOT

PROJECT NO.: 65T-0191

Site Vicinity Map
Emergency Bridge Package 4 - Congress Road
Richmond County, South Carolina

Figure No. 1



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DATE: 11/3/2015

CLIENT: SCDOT

PROJECT NO.: 65T-0191

Boring Location Map
Emergency Bridge Package 4 - Congress Road
Richmond County, South Carolina

Figure No. 2

Figure No. 3A - Photograph of Boring B-01

Figure No. 3B - Photograph of Boring B-02

APPENDIX II

KEY TO SOIL CLASSIFICATION

Correlation of Penetration Resistance with Relative Density and Consistency

Sands and Gravels		Silts and Clays	
No. of Blows, N	Relative Density	No. of Blows, N	Consistency
0 - 4	Very loose	0 - 2	Very soft
5 - 10	Loose	3 - 4	Soft
11 - 30	Medium dense	5 - 8	Firm
31 - 50	Dense	9 - 15	Stiff
Over 50	Very dense	16 - 30	Very stiff
		31 - 50	Hard
		Over 50	Very hard

Particle Size Identification

(Unified Classification System)

Boulders:	Diameter exceeds 12-in. (300-mm)
Cobbles:	3-in. (75-mm) to 12-in. (300-mm) diameter
Gravel:	**Coarse** - ¾-in. (19-mm) to 3 in. (75-mm) diameter **Fine** - No. 4 (4.75-mm) sieve to ¾-in. (19-mm) diameter
Sand:	**Coarse** – No. 10 (2.0-mm) to No. 4 (4.76 mm) sieve **Medium** – No. 40 (0.425-mm) to No. 10 (2.0-mm) sieve **Fine** - No. 200 (0.075-mm) to No. 40 (0.425-mm) sieve
Silt and Clay:	Less than No. 200 (0.075-mm) sieve

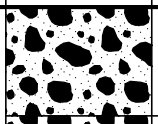
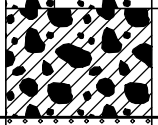
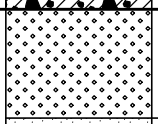
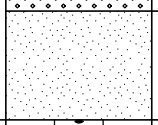
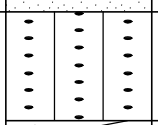
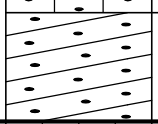
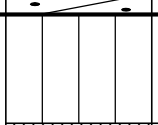
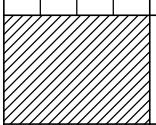
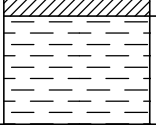
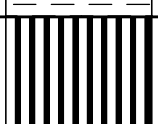
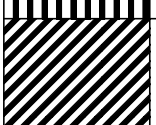
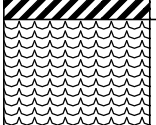
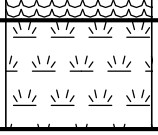
Modifiers

The modifiers provide our estimate of the amount of silt, clay or sand size particles in the soil sample.

Approximate Content	Modifiers
≤ 5%:	Trace
5 to 10%:	Few
15 to 25%:	Little
30 to 45%:	Some
50 to 100%	Mostly

Field Moisture Description	
Dry	Absence of moisture, dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

SOIL CLASSIFICATION CHART

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 MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		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 (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				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	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SCDOT Soil Test Boring Log

File No.:	65T-0191	**Project No. (PIN):**		**County:**	Richland	**Eng./Geo.:**	SCI
Site Description:	Emergency Bridge Package 4 - Congress Rd over Jumping Run Creek					**Route:**	SC 69
Boring No.:	B-01	**Boring Location:**		**Offset:**		**Alignment:**	Existing
Elev.:	ft	**Latitude:**	-80.742296	**Longitude:**	33.999907	**Date Started:**	10/19/15
Total Depth:	100 ft	**Soil Depth:**	100 ft	**Core Depth:**	0 ft	**Date Completed:**	10/19/2015
Bore Hole Diameter (in):		**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-55X	**Drill Method:**	Rotary Wash	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** 18.5 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0								
	0.5	Asphalt Pavement 6"		0.5					
		FILL, medium dense, tannish brown, fine to medium, moist, **POORLY GRADED SAND (SP-SM/A-1-b)** Munsel=10YR 7/3		2.5	1/SS	11	9	10	19
		Reddish Yellow and Brown Munsel=7.5YR 6/8 & 4/3		4.5	2/SS	4	4	6	10
	6.5			6.5	3/SS	3	6	4	10
		ALLUVIUM, very loose, grayish brown, fine to medium, moist, **CLAYEY SAND (SC/A-6)** Munsel=10YR 5/2 SS-4: NMC=20.6%, %200=37.1, LL=38, PL=20, PI=18		8.5	4/SS	1	1	1	2
					5/SS	1/12	1/12		1
				13.5	6/SS	1	1	1	2
	17.5	Very soft, dark gray, wet, **SILTY SAND (SM/A-2-6)** Munsel=7.5YR 4/1 SS-7: NMC=36.9%, %200=30.7, LL=40, PL=28, PI=12		18.5	7/SS	WOH/18			0
		Stiff		23.5	8/SS	1	1	11	12
	27.5	**COASTAL PLAIN**, very hard, pinkish gray, moist, **FAT CLAY with SAND (CH/A-7-6)** Munsel=7.5YR 7/2 SS-9: NMC=21.9%, %200=76.9		28.5	9/SS	12	33	41	74
	32.5	Very stiff, very pale brown, fine to medium, moist, **SILTY SAND (SM/A-2-4)** Munsel=10YR 7/3 SS-10: NMC=30.4%, %200=21.9 SS-12: NMC=28.6%, %200=15.9		33.5	10/SS	8	8	9	17
		Medium dense, wet		38.5	11/SS	7	8	9	17

SPT N VALUE

PL MC LL

FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT CONGRESS ROAD.GPJ SC_DOT.GDT 11/11/15

SCDOT Soil Test Boring Log

File No.:	65T-0191	**Project No. (PIN):**		**County:**	Richland	**Eng./Geo.:**	SCI
Site Description:	Emergency Bridge Package 4 - Congress Rd over Jumping Run Creek					**Route:**	SC 69
Boring No.:	B-01	**Boring Location:**		**Offset:**		**Alignment:**	Existing
Elev.:	ft	**Latitude:**	-80.742296	**Longitude:**	33.999907	**Date Started:**	10/19/15
Total Depth:	100 ft	**Soil Depth:**	100 ft	**Core Depth:**	0 ft	**Date Completed:**	10/19/2015
Bore Hole Diameter (in):		**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-55X	**Drill Method:**	Rotary Wash	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** 18.5 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	● SPT N VALUE ● PL MC LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
		Pink Munsel=2.5YR 8/3		43.5	12/SS	6	10	13	23	
	47.5	Very stiff, pinkish gray, moist, **FAT CLAY (CH/A-7-6)** Munsel=7.5YR 7/2		48.5	13/SS	4	5	8	13	
	52.5	Very stiff, pinkish gray, fine to medium, moist, **SILTY SAND (SM/A-1-b)** Munsel=7.5YR 7/2 SS-14: NMC=27.9, %200=22.2, Non-Plastic		53.5	14/SS	2	8	13	21	
	57.5	Very stiff, grayish brown, moist, **CLAYEY SAND (SC/A-2-7)** Munsel=10YR 5/2 SS-16: NMC=27.9%, %200=35.3		58.5	15/SS	7	8	9	17	
		Hard		63.5	16/SS	4	15	14	29	
				68.5	17/SS	1	5	28	33	
	72.5	Very dense, very pale brown, moist, fine to medium, **SILTY SAND (SM/A-1-b)** Munsel=10YR 7/3 SS-18: NMC=27.0%, %200=15.0 SS-20: NMC=20.5%, %200=13.7 SS-21: NMC=27.9%, %200=12.0		73.5	18/SS	20	28	30	58	
				78.5	19/SS	16	16	18	34	

LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	65T-0191	**Project No. (PIN):**		**County:**	Richland	**Eng./Geo.:**	SCI
Site Description:	Emergency Bridge Package 4 - Congress Rd over Jumping Run Creek					**Route:**	SC 69
Boring No.:	B-01	**Boring Location:**		**Offset:**		**Alignment:**	Existing
Elev.:	ft	**Latitude:**	-80.742296	**Longitude:**	33.999907	**Date Started:**	10/19/15
Total Depth:	100 ft	**Soil Depth:**	100 ft	**Core Depth:**	0 ft	**Date Completed:**	10/19/2015
Bore Hole Diameter (in):		**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-55X	**Drill Method:**	Rotary Wash	**Hammer Type:**	Automatic	**Energy Ratio:**	86%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** 18.5 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
		Dense							
				83.5					
		Very dense, pinkish gray Munsel=7.5YR 7/2			20/SS	12	18	21	39
				88.5					
					21/SS	7	15	16	31
	92.5								
		Medium dense, reddish brown, fine to coarse, moist, **SILTY SAND (SM/A-2-4)**, contains rock fragments Munsel=5YR 5/4		93.5	22/SS	7	7	8	15
	97.5								
		Very stiff, pinkish gray, moist, **FAT CLAY (CH/A-7-6)**		98.5					
	100.0	Munsel=7.5YR 7/2			23/SS	4	7	8	15

● SPT N VALUE ●

PL ⨯ MC ○ LL ⨯

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT CONGRESS ROAD.GPJ SC_DOT.GDT 11/11/15

SCDOT Soil Test Boring Log

File No.:	65T-0191	**Project No. (PIN):**		**County:**	Richland	**Eng./Geo.:**	SCI
Site Description:	Emergency Bridge Package 4 - Congress Rd over Jumping Run Creek					**Route:**	SC 69
Boring No.:	B-02	**Boring Location:**		**Offset:**		**Alignment:**	Existing
Elev.:	ft	**Latitude:**	-80.742316	**Longitude:**	34.00115	**Date Started:**	10/19/15
Total Depth:	100 ft	**Soil Depth:**	100 ft	**Core Depth:**	0 ft	**Date Completed:**	10/19/2015
Bore Hole Diameter (in):		**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-55	**Drill Method:**	Rotary Wash	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** 13.5 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
	0.0								
	0.5	Asphalt Pavement 6"		0.0	1/SS	10	6	9	15
	2.0	**FILL**, medium dense, very pale brown, fine to medium, moist, **CLAYEY SAND (SC/A-2-6)** Munsel=10YR 7/3		2.0	2/SS	6	10	11	21
				4.0	3/SS	10	8	8	16
	6.0	Medium dense, very pale brown, fine to medium, moist, **POORLY GRADED SAND with SILT (SP-SM/A-3)**		6.0	4/SS	1	2	2	4
	8.0	Munsel=10YR 7/3		8.0	5/SS	2	3	3	6
		ALLUVIUM, loose, gray, fine to medium, moist, **CLAYEY SAND (SC/A-2-6)** Munsel=5YR 6/1							
	12.5	Loose, gray, fine to medium, wet, **SILTY SAND (SM/A-2-4)** Munsel=5YR 6/2 SS-5: NMC=14.1%, %200=23.8		13.5	6/SS	2	5	11	16
		COASTAL PLAIN, very stiff, brownish gray, moist, **ELASTIC SILT (MH/A-7-5)** Munsel=10YR 6/2 SS-6: NMC=30.07%, %200=97.3, LL=61, PL=32, PI=29 Hard		18.5	7/SS	7	11	15	26
	23.5	Very hard, gray and pinkish gray, moist, **SANDY ELASTIC SILT (MH/A-7-5)** Munsel=5YR 6/1 & 6/2 SS-8: NMC=22.7%, %200=58.8		23.5	8/SS	14	23	43	66
	27.5	Medium dense, fine to medium, moist, very pale brown and pink, **SILTY SAND (SM/A-1-b)** Munsel=10YR 7/3 & 5YR 7/3 SS-10: NMC=23.9%, %200=13.7, Non-Plastic SS-12: NMC=18.1%, %200=12.9 Dense		28.5	9/SS	7	7	13	20
				33.5	10/SS	7	10	15	25
				38.5	11/SS	9	11	17	28

SPT N VALUE

PL MC LL

FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	65T-0191	**Project No. (PIN):**		**County:**	Richland	**Eng./Geo.:**	SCI
Site Description:	Emergency Bridge Package 4 - Congress Rd over Jumping Run Creek					**Route:**	SC 69
Boring No.:	B-02	**Boring Location:**		**Offset:**		**Alignment:**	Existing
Elev.:	ft	**Latitude:**	-80.742316	**Longitude:**	34.00115	**Date Started:**	10/19/15
Total Depth:	100 ft	**Soil Depth:**	100 ft	**Core Depth:**	0 ft	**Date Completed:**	10/19/2015
Bore Hole Diameter (in):		**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-55	**Drill Method:**	Rotary Wash	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** 13.5 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	SPT N VALUE / PL MC LL / FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
				43.5	12/SS	12	16	17	33	
	47.5	Very dense, dark brown, fine to medium, moist, **CLAYEY SAND (SC/A-2-6)** Munsel=7.5YR 3/2		48.5	13/SS	16	22	23	45	
	52.5	Hard, pinkish gray, moist, **SANDY SILT (MH/A-6)** Munsel=7.5YR 7/2 SS-14: NMC=24.6%, %200=67.0, LL=37, PL=25, PI=12		53.5	14/SS	5	11	17	28	
	57.5	Dense, very pale brown and pink, fine to medium, **SILTY SAND (SM/A-1-b)** Munsel=10YR 7/3 & 5YR 7/3 SS-15: NMC=20.9%, %200=14.1		58.5	15/SS	10	14	18	32	
	62.5	Hard, gray, moist, **FAT CLAY (CH/A-7-6)** Munsel=5YR 6/1		63.5	16/SS	8	9	16	25	
	67.5	Very dense, yellowish brown, fine to medium, **POORLY GRADED SAND with SILT (SP-SM/A-1-b)** Munsel=10YR 5/6 SS-17: NMC=25.5%, %200=10.8, Non-Plastic		68.5	17/SS	20	31	42	73	
				73.5	18/SS	23	45	50/5	95	
		Pinkish gray		78.5	19/SS	21	35	36	71	

LEGEND

Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Soil Test Boring Log

File No.:	65T-0191	**Project No. (PIN):**		**County:**	Richland	**Eng./Geo.:**	SCI
Site Description:	Emergency Bridge Package 4 - Congress Rd over Jumping Run Creek					**Route:**	SC 69
Boring No.:	B-02	**Boring Location:**		**Offset:**		**Alignment:**	Existing
Elev.:	ft	**Latitude:**	-80.742316	**Longitude:**	34.00115	**Date Started:**	10/19/15
Total Depth:	100 ft	**Soil Depth:**	100 ft	**Core Depth:**	0 ft	**Date Completed:**	10/19/2015
Bore Hole Diameter (in):		**Sampler Configuration**		**Liner Required:**	Y (N)	**Liner Used:**	Y (N)
Drill Machine:	CME-55	**Drill Method:**	Rotary Wash	**Hammer Type:**	Automatic	**Energy Ratio:**	74%
Core Size:		**Driller:**	SCI	**Groundwater:**	**TOB** 13.5 ft	**24HR**	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value
		Munsel=7.5YR 7/2							
	82.5	Dense, yellowish brown, fine, **CLAYEY SAND (SC/A-2-6)** Munsel=10YR 5/8 SS-20: NMC=28.9%, %200=26.6		83.5	20/SS	11	13	22	35
	87.5	Very hard, gray, **FAT CLAY (CH/A-7-6)** Munsel=5YR 6/2		88.5	21/SS	18	35	50	85
				93.5	22/SS	33	46	50/4	96
				98.5	23/SS	22	34	50	84
	100.0								

● SPT N VALUE ●

PL MC LL

▲ FINES CONTENT (%)

0 10 20 30 40 50 60 70 80 90

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
ST - Shelby Tube	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT CONGRESS ROAD.GPJ SC_DOT.GDT 11/11/15

APPENDIX III

FROEHLING & ROBERTSON, INC.

LABORATORY TEST SUMMARY SHEET

F&R Project No: 65T-0191
Client: South Carolina Department of Transportation
Project: S-69 Congress Road over Jumping Run Creek
SCDOT Proj ID
City/State: Richland County, SC

Boring/Sample No.	Depth (ft)	LL	PL	PI	USCS/AASHTO Classification	Water Content (%)	Percent Passing No. 200 Sieve
B-01/SS-4	6.5-8.5	38	20	18	SC/A-6	20.6	37.1
B-01/SS-7	18.5-20.0	40	28	12	SM/A-2-6	36.9	30.7
B-01/SS-9	28.5-30.0				CH/A-7-6	21.9	76.9
B-01/SS-10	33.5-35.0				SM/A-2-4	30.4	21.9
B-01/SS-12	43.5-45.0				SM/A-2-4	28.6	15.9
B-01/SS-14	53.5-55.0	NP	NP	NP	SM/A-1-b	27.9	22.2
B-01/SS-16	63.5-65.0				SC/A-2-7	27.9	35.3
B-01/SS-18	73.5-75.0				SM/A-1-b	27.0	15.0
B-01/SS-20	83.5-85.0				SM/A-1-b	20.5	13.7
B-01/SS-21	88.5-90.0				SM/A-1-b	27.9	12.0
B-02/SS-5	8.0-10.0				SM/A-2-4	14.1	23.8
B-02/SS-6	13.5-15.0	61	32	29	MH/A-7-5	30.7	97.3
B-02/SS-8	23.5-25.0				MH/A-7-5	22.7	58.8
B-02/SS-10	33.5-35.0	NP	NP	NP	SM/A-1-b	23.9	13.7
B-02/SS-12	43.5-45.0				SM/A-1-b	18.1	12.9
B-02/SS-14	53.5-55.0	37	25	12	MH/A-6	24.6	67.0
B-02/SS-15	58.5-60.0				SM/A-1-b	20.9	14.1
B-02/SS-17	68.5-70.0	NP	NP	NP	SP-SM/A-1-b	25.5	10.8
B-02/SS-20	83.5-85.0				SC/A-2-6	28.9	26.6

NP: non-plastic

Date: 11/11/15

APPENDIX IV

CONGRESS RD

MOISTURE CONTENT (%)

	#1	#2	#3	#4	#5	#6	#7
Sample I.D	B-1 6.5-8		B-1 18.5-20		B-1 28.5-30		B-1 33.5-35
Wet Soil + Tare	295.89		444.84		389.83		458.11
Dry Soils + Tare	270.44		365.10		346.12		385.76
Tare # & Weight	S-7 147.14		S3 149.17		L 146.18		S21 147.70
Weight of Water	25.45		79.74		43.71		72.35
Weight of Dry Soils	123.3		215.93		199.94		238.06
Moisture Content	0.206		0.369		0.219		0.304

	#8	#9	#10	#11	#12	#13	#14
Sample I.D.	B-1 43.5-45		B-1 53.5-55		B-1 63.5-65		B-1 73.5-75.0
Wet Soil + Tare	436.65		443.58		484.52		477.92
Dry Soils + Tare	372.84		379.45		411.10		407.91
Tare # & Weight	G 149.47		J 149.47		S8 148.06		S9 148.58
Weight of Water	63.81		64.13		73.42		70.01
Weight of Dry Soils	223.37		229.98		263.04		259.33
Moisture Content	0.286		0.279		0.279		0.270

	#15	#16	#17	#18	#19	#20	#21
Sample I.D.	B-1 83.5-85		B-1 88.5-90				
Wet Soil + Tare	520.50		523.84				
Dry Soils + Tare	466.64		441.49				
Tare # & Weight	AE 204.26		B 146.04				
Weight of Water	53.86		82.35				
Weight of Dry Soils	262.38		295.45				
Moisture Content	0.205		0.279				

	#22	#23	#24	#25	#26	#27	#28
Sample I.D.							
Wet Soil + Tare							
Dry Soils + Tare							
Tare # & Weight							
Weight of Water							
Weight of Dry Soils							
Moisture Content							

SP-1 E

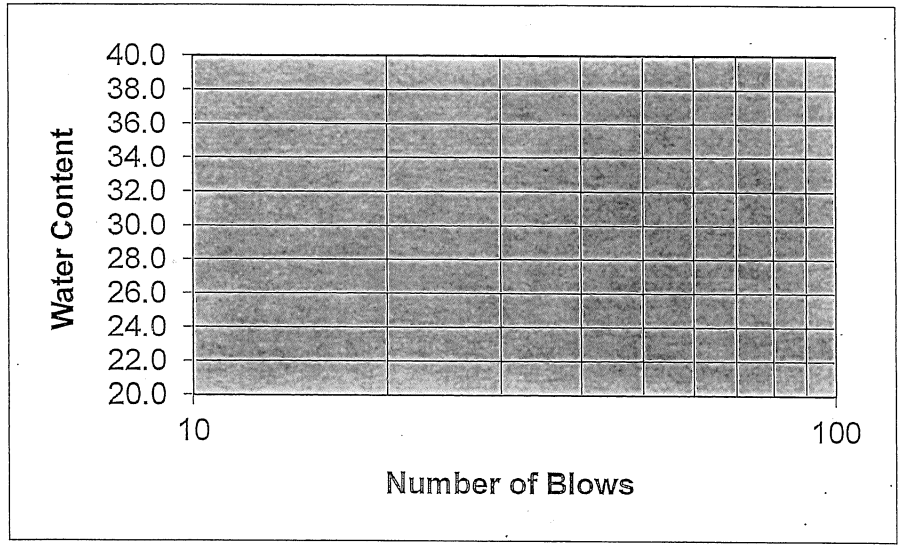
Froehling & Robertson, Inc.
Laboratory Sample Analyses

Client: SCDOT
Project: CONGRESS RD.
F&R Project No.:
Item Code/Use:

Material
Sample No: 4
Location: B-1 6.5-8
Source:

Date Received: 10/29/15
Date Processed:

Liquid Limit				
Tare No.	7A	D1	51	
Cup & Wet Soil	37.08	36.34	37.11	
Cup & Dry Soil	33.42	32.65	33.12	
Moisture Loss	3.66	3.69	3.99	
Cup Weight	23.24	22.97	23.02	
Dry Soil	10.18	9.68	10.10	
Blows	34	23	17	
Moisture %	0.360	0.381	0.395	
Plastic Limit				
Tare No.	M4	60		
Cup & Wet Soil	30.01	29.67		
Cup & Dry Soil	28.88	28.59		
Moisture Loss	1.13	1.08		
Cup Weight	23.30	23.11		
Dry Soil	5.58	5.48		
Moisture %	0.203	0.197		



Laboratory Technician:
Reviewed By:
Program Administrator

LL =
PL =
PI =
USCS =

$$LL = 38.1\left(\frac{23}{25}\right)^{0.121} = 38$$

PL = 20

PI = 18

XX B

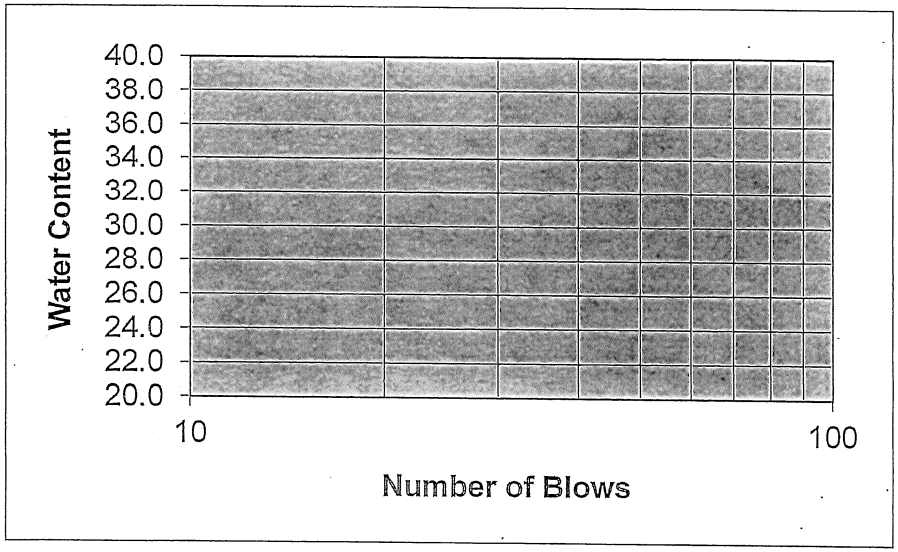
Froehling & Robertson, Inc.
Laboratory Sample Analyses

Client: SCDOT
Project: CONGRESS RD
F&R Project No.:
Item Code/Use:

Material
Sample No: 7
Location: B-1 18.5-20
Source:

Date Received: 10/29/15
Date Processed:

Liquid Limit				
Tare No.	12	8	D11	
Cup & Wet Soil	37.25	37.39	36.69	
Cup & Dry Soil	33.18	33.24	32.62	
Moisture Loss	4.07	4.15	4.07	
Cup Weight	23.04	23.08	22.93	
Dry Soil	10.14	10.16	9.69	
Blows	30	21	15	
Moisture %	0.401	0.408	0.420	
Plastic Limit				
Tare No.	M2	D10		
Cup & Wet Soil	29.47	29.66		
Cup & Dry Soil	28.11	28.26		
Moisture Loss	1.36	1.40		
Cup Weight	23.26	23.10		
Dry Soil	4.85	5.16		
Moisture %	0.280	0.271		



Laboratory Technician:
Reviewed By:
Program Administrator

LL =
PL =
PI =
USCS =

$$LL = 40.8\left(\frac{21}{25}\right)^{0.121} = 40$$

PL = 28

PI = 12

SP3 A

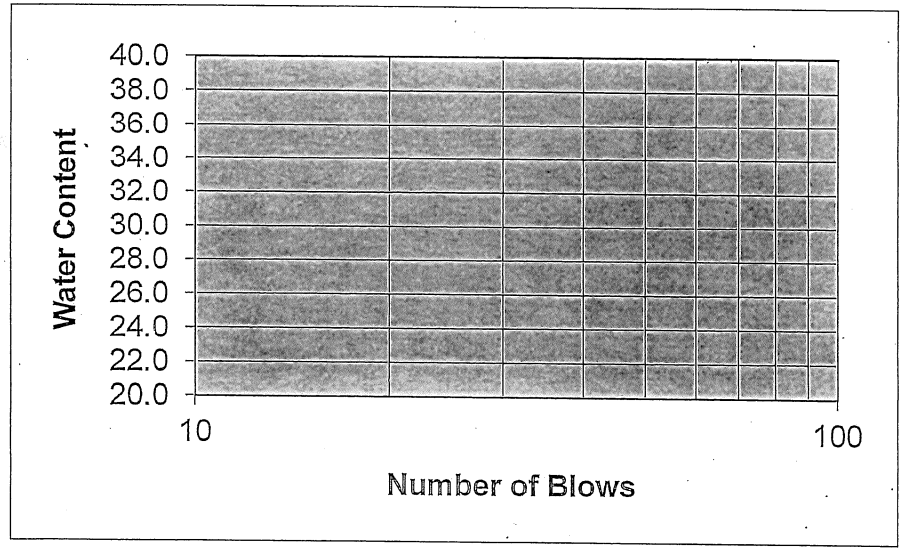
Froehling & Robertson, Inc.
Laboratory Sample Analyses

Client: SCDOT
Project: CONGRESS RD.
F&R Project No.:
Item Code/Use:

Material
Sample No: MW 1A
Location: B-1 53.5-55
Source:

Date Received: 10/29/15
Date Processed:

Liquid Limit				
Tare No.				
Cup & Wet Soil				
Cup & Dry Soil				
Moisture Loss	NON-PLASTIC			
Cup Weight				
Dry Soil				
Blows				
Moisture %				
Plastic Limit				
Tare No.				
Cup & Wet Soil				
Cup & Dry Soil				
Moisture Loss				
Cup Weight				
Dry Soil				
Moisture %				



Laboratory Technician:
Reviewed By:
Program Administrator

LL =
PL =
PI =
USCS =

WASH 200 (C 117)

CLIENT _____ B-1 TECHNICIAN _____

PROJECT CONGRESS 6.5-B TEST DATE _____

RECORD NO. _____

SOIL CLASSIFICATION _____

TARE # N2 TARE WEIGHT 319.98

A Tare and Dry Soil		443.62
B Dry Soil	(A-Tare)	123.64
C Tare and Dry Soil After Wash		397.71
D Dry Soil After Wash	(C-Tare)	77.73
E Material Lost	(B-D)	45.91

Percent Passing #200 (B-D)/B x 100= 37.1%

WASH 200 (C 117)

CLIENT _____ B-1 TECHNICIAN _____

PROJECT CONGRESS TEST DATE _____

RECORD NO. _____ 18.5-20

SOIL CLASSIFICATION _____

TARE # KC TARE WEIGHT 374.65

A Tare and Dry Soil		590.70
B Dry Soil	(A-Tare)	216.05
C Tare and Dry Soil After Wash		524.27
D Dry Soil After Wash	(C-Tare)	149.62
E Material Lost	(B-D)	66.43

Percent Passing #200 (B-D)/B x 100= 30.7%

WASH 200 (C 117)

CLIENT _____ B-1 TECHNICIAN _____

PROJECT CONGRESS 28.5-30 TEST DATE _____

RECORD NO. _____

SOIL CLASSIFICATION _____

TARE # B TARE WEIGHT 397.87

A Tare and Dry Soil		598.30
B Dry Soil	(A-Tare)	200.43
C Tare and Dry Soil After Wash		444.10
D Dry Soil After Wash	(C-Tare)	46.23
E Material Lost	(B-D)	154.2

Percent Passing #200 (B-D)/B x 100= 76.9%

WASH 200 (C 117)

CLIENT _____ TECHNICIAN _____

PROJECT CONGRESS B-1 33.5-35 TEST DATE _____

RECORD NO. _____

SOIL CLASSIFICATION _____

TARE # N1 TARE WEIGHT 327.20

A Tare and Dry Soil		565.75
B Dry Soil	(A-Tare)	238.55
C Tare and Dry Soil After Wash		513.40
D Dry Soil After Wash	(C-Tare)	186.20
E Material Lost	(B-D)	52.35

Percent Passing #200 (B-D)/B x 100= 21.9%

WASH 200 (C 117)

CLIENT _____ TECHNICIAN _____

PROJECT CONGRESS B-1 43.5-45 TEST DATE _____

RECORD NO. _____

SOIL CLASSIFICATION _____

TARE # 8A TARE WEIGHT 337.73

A Tare and Dry Soil		561.52
B Dry Soil	(A-Tare)	223.79
C Tare and Dry Soil After Wash		526.01
D Dry Soil After Wash	(C-Tare)	188.28
E Material Lost	(B-D)	35.51

Percent Passing #200 (B-D)/B x 100= 15.9%

WASH 200 (C 117)

CLIENT _____ B-1

PROJECT CONGRESS 53.5-55

RECORD NO. _____

TECHNICIAN _____

TEST DATE _____

SOIL CLASSIFICATION _____

TARE # C TARE WEIGHT 394.23

A Tare and Dry Soil		624.78
B Dry Soil	(A-Tare)	230.55
C Tare and Dry Soil After Wash		573.50
D Dry Soil After Wash	(C-Tare)	179.27
E Material Lost	(B-D)	51.28

Percent Passing #200 (B-D)/B x 100= 22.2%

WASH 200 (C 117)

CLIENT _____ B-1

PROJECT CONGRESS

RECORD NO. _____ 63.5-65

TECHNICIAN _____

TEST DATE _____

SOIL CLASSIFICATION _____

TARE # A

TARE WEIGHT 388.46

A Tare and Dry Soil		652.16
B Dry Soil	(A-Tare)	263.70
C Tare and Dry Soil After Wash		559.15
D Dry Soil After Wash	(C-Tare)	170.69
E Material Lost	(B-D)	93.01

Percent Passing #200 (B-D)/B x 100= 35.3%

WASH 200 (C 117)

CLIENT _____ B-1 TECHNICIAN _____

PROJECT CONGRESS 73.5-75 TEST DATE _____

RECORD NO. _____

SOIL CLASSIFICATION _____

TARE # XD TARE WEIGHT 306.21

A Tare and Dry Soil		565.87
B Dry Soil	(A-Tare)	259.66
C Tare and Dry Soil After Wash		527.05
D Dry Soil After Wash	(C-Tare)	220.84
E Material Lost	(B-D)	38.82

Percent Passing #200 (B-D)/B x 100= 15.0%

WASH 200 (C 117)

CLIENT _____ B-1

PROJECT CONGRESS 83.5-85

RECORD NO. _____

TECHNICIAN _____

TEST DATE _____

SOIL CLASSIFICATION _____

TARE # R

TARE WEIGHT 442.44

A Tare and Dry Soil		705.08
B Dry Soil	(A-Tare)	262.64
C Tare and Dry Soil After Wash		669.11
D Dry Soil After Wash	(C-Tare)	226.67
E Material Lost	(B-D)	35.97

Percent Passing #200 (B-D)/B x 100= 13.7 %

WASH 200 (C 117)

CLIENT _____ B-1 TECHNICIAN _____

PROJECT CONGRESS TEST DATE _____

RECORD NO. _____ 88.5-90

SOIL CLASSIFICATION _____

TARE # 1.18 TARE WEIGHT 536.29

A Tare and Dry Soil		832.11
B Dry Soil	(A-Tare)	295.82
C Tare and Dry Soil After Wash		796.48
D Dry Soil After Wash	(C-Tare)	260.19
E Material Lost	(B-D)	35.63

Percent Passing #200 (B-D)/B x 100= 12.0%

CONGRESS RD.

MOISTURE CONTENT (%)

	#1	#2	#3 *	#4	#5	#6	#7 *
Sample I.D	B-2 8-10		B-2 13.5-15		B-2 23.5-25		B-2 33.5-35
Wet Soil + Tare	436.36		349.44		403.20		377.75
Dry Soils + Tare	400.76		302.19		355.79		344.34
Tare # & Weight	S123 147.58		S10 148.36		SG 146.54		AD 204.37
Weight of Water	35.60		47.25		47.41		33.41
Weight of Dry Soils	253.18		153.83		209.25		139.97
Moisture Content	0.141		0.307		0.227		0.239

	#8	#9	#10 *	#11	#12	#13	#14 *
Sample I.D.	B-2 43.5-45		B-2 53.5-55		B-2 58.5-60		B-2 68.5-70
Wet Soil + Tare	423.53		403.89		424.13		440.47
Dry Soils + Tare	380.99		361.49		376.66		411.16
Tare # & Weight	K 145.37		12 189.30		S-51 149.53		P5 296.28
Weight of Water	42.54		42.40		47.47		29.31
Weight of Dry Soils	235.62		172.19		227.13		114.88
Moisture Content	0.181		0.246		0.209		0.255

	#15	#16	#17	#18	#19	#20	#21
Sample I.D.	B-2 83.5-85						
Wet Soil + Tare	591.53						
Dry Soils + Tare	526.33						
Tare # & Weight	P4 300.89						
Weight of Water	65.20						
Weight of Dry Soils	225.44						
Moisture Content	0.289						

	#22	#23	#24	#25	#26	#27	#28
Sample I.D.							
Wet Soil + Tare							
Dry Soils + Tare							
Tare # & Weight							
Weight of Water							
Weight of Dry Soils							
Moisture Content							

SB2 C

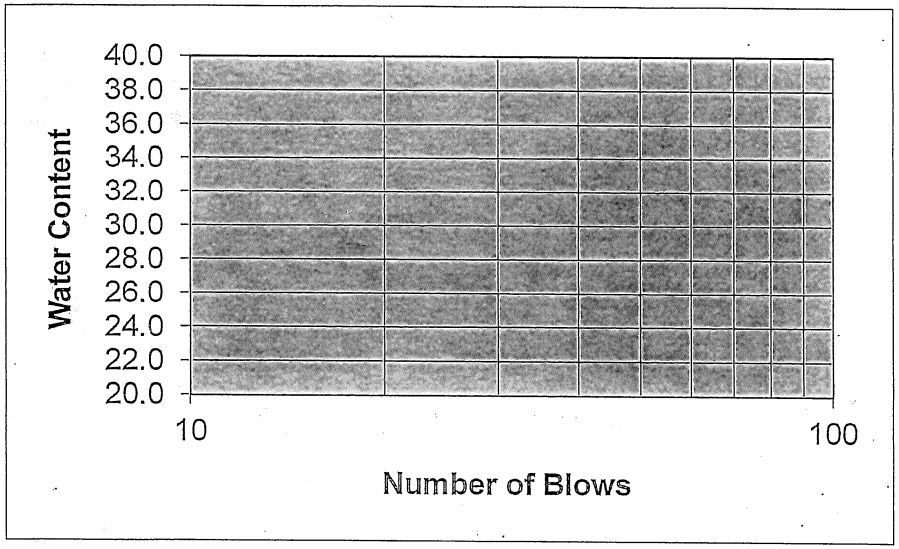
Froehling & Robertson, Inc.
Laboratory Sample Analyses

Client: SCDOT
Project: CONGRESS RD.
F&R Project No.:
Item Code/Use:

Material
Sample No: 6
Location: B-2 13.5-15
Source:

Date Received: 10/29/15
Date Processed:

Liquid Limit				
Tare No.	82	D5	44	
Cup & Wet Soil	36.20	35.90	35.23	
Cup & Dry Soil	31.45	31.16	30.38	
Moisture Loss	4.75	4.74	4.85	
Cup Weight	23.25	23.26	22.80	
Dry Soil	8.20	7.90	7.58	
Blows	35	27	19	
Moisture %	0.579	0.600	0.640	
Plastic Limit				
Tare No.	A4	D6		
Cup & Wet Soil	29.13	29.12		
Cup & Dry Soil	27.70	27.62		
Moisture Loss	1.43	1.50		
Cup Weight	23.07	22.99		
Dry Soil	4.63	4.63		
Moisture %	0.309	0.324		



Laboratory Technician:
Reviewed By:
Program Administrator

LL =
PL =
PI =
USCS =

$$LL = 60\left(\frac{27}{25}\right)^{0.121} = 61$$

PL = 32

PI = 29

T-1 F

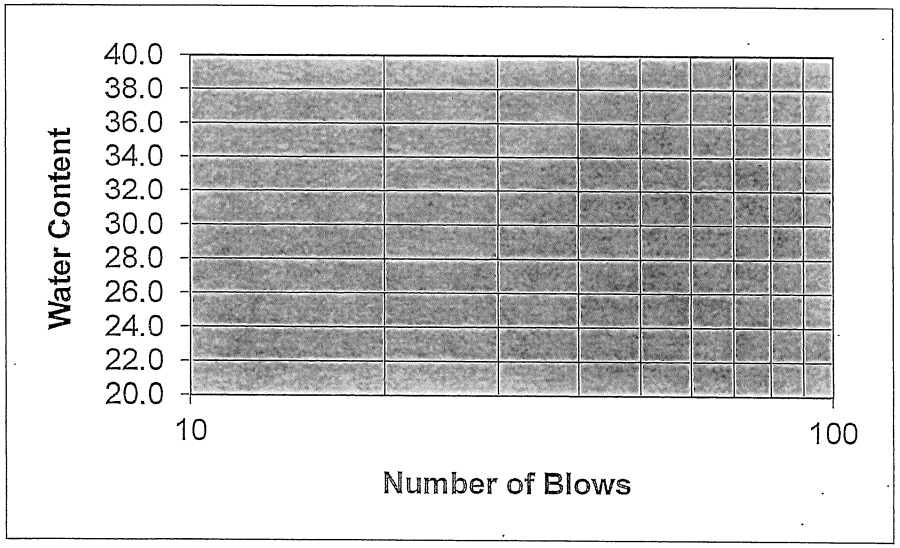
Froehling & Robertson, Inc.
Laboratory Sample Analyses

Client: SCDOT
Project: CONGRESS RD.
F&R Project No.:
Item Code/Use:

Material
Sample No: 10
Location: B-2 33.5-35
Source:

Date Received: 10/29/15
Date Processed:

Liquid Limit				
Tare No.				
Cup & Wet Soil				
Cup & Dry Soil				
Moisture Loss	NON-PLASTIC			
Cup Weight				
Dry Soil				
Blows				
Moisture %				
Plastic Limit				
Tare No.				
Cup & Wet Soil				
Cup & Dry Soil				
Moisture Loss				
Cup Weight				
Dry Soil				
Moisture %				



Laboratory Technician:
Reviewed By:
Program Administrator

LL =
PL =
PI =
USCS =

SP5

D

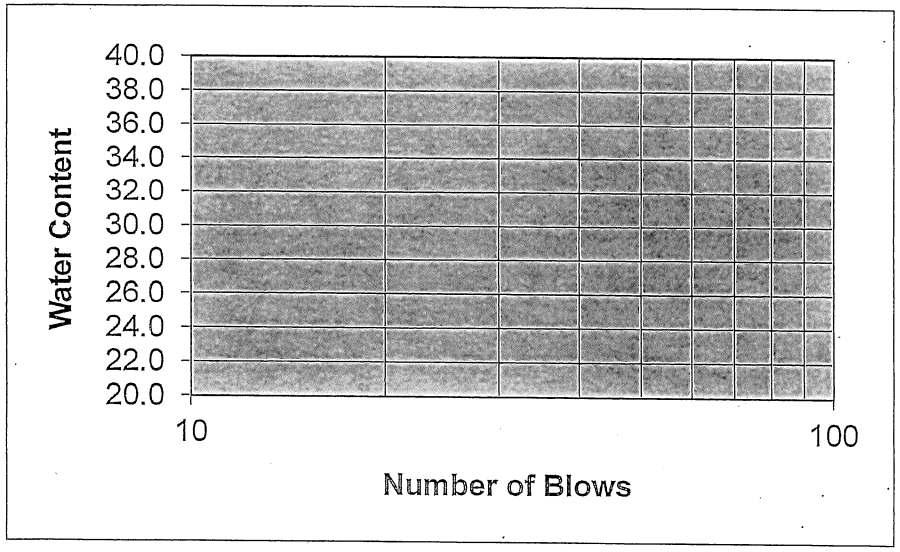
Froehling & Robertson, Inc.
Laboratory Sample Analyses

Client: SCDOT
Project: CONGRESS RD
F&R Project No.:
Item Code/Use:

Material
Sample No: 14
Location: B-2 53.5-55
Source:

Date Received: 10/29/15
Date Processed:

Liquid Limit				
Tare No.	85	M1	42	
Cup & Wet Soil	37.02	36.95	37.18	
Cup & Dry Soil	33.56	33.21	33.17	
Moisture Loss	3.46	3.74	4.01	
Cup Weight	23.13	23.04	22.93	
Dry Soil	10.43	10.17	10.24	
Blows	35	27	18	
Moisture %	0.332	0.368	0.392	
Plastic Limit				
Tare No.	108	M3		
Cup & Wet Soil	29.34	29.92		
Cup & Dry Soil	28.10	28.56		
Moisture Loss	1.24	1.36		
Cup Weight	23.14	23.09		
Dry Soil	4.96	5.47		
Moisture %	0.250	0.249		



Laboratory Technician:
Reviewed By:
Program Administrator

LL =
PL =
PI =
USCS =

$$LL = 36.8\left(\frac{27}{25}\right)^{0.121} = 37$$

PL = 25

PI = 12

SP4 G

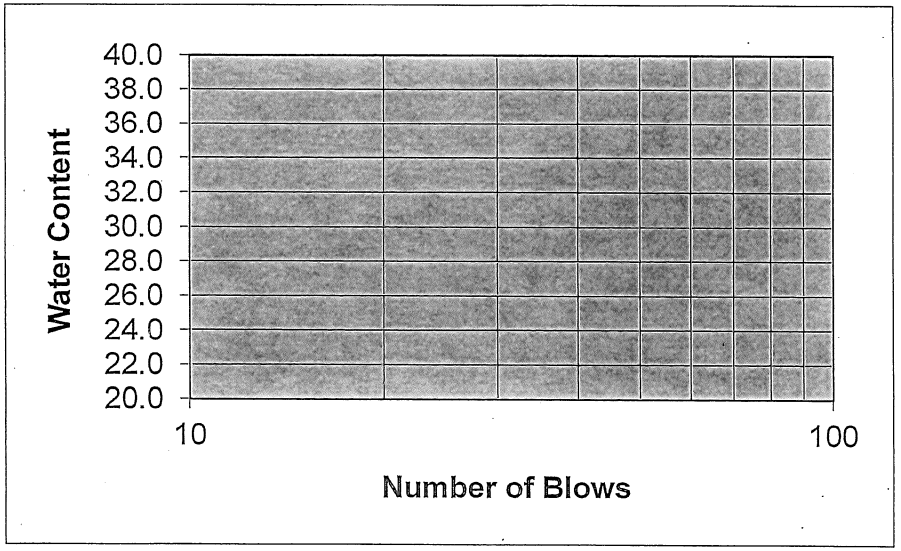
Froehling & Robertson, Inc.
Laboratory Sample Analyses

Client: SCDOT
Project: CONGRESS RD.
F&R Project No.:
Item Code/Use:

Material
Sample No: 17
Location: B-2 68.5-70
Source:

Date Received: 10/29/15
Date Processed:

Liquid Limit				
Tare No.				
Cup & Wet Soil				
Cup & Dry Soil	NON PLASTIC			
Moisture Loss				
Cup Weight				
Dry Soil				
Blows				
Moisture %				
Plastic Limit				
Tare No.				
Cup & Wet Soil				
Cup & Dry Soil				
Moisture Loss				
Cup Weight				
Dry Soil				
Moisture %				



Laboratory Technician:
Reviewed By:
Program Administrator

LL =
PL =
PI =
USCS =

WASH 200 (C 117)

CLIENT _____ B-2 TECHNICIAN _____

PROJECT CONGRESS RD 8-10 TEST DATE _____

RECORD NO. _____

SOIL CLASSIFICATION _____

TARE # D3 TARE WEIGHT 250.09

A Tare and Dry Soil		503.51
B Dry Soil	(A-Tare)	253.42
C Tare and Dry Soil After Wash		443.10
D Dry Soil After Wash	(C-Tare)	193.01
E Material Lost	(B-D)	60.41

Percent Passing #200 (B-D)/B x 100= 23.8%

WASH 200 (C 117)

CLIENT _____ B-2

PROJECT CONGRESS 13.5-15

RECORD NO. _____

TECHNICIAN _____

TEST DATE _____

SOIL CLASSIFICATION _____

TARE # ACC TARE WEIGHT 255.15

A Tare and Dry Soil		409.46
B Dry Soil	(A-Tare)	154.31
C Tare and Dry Soil After Wash		259.36
D Dry Soil After Wash	(C-Tare)	4.21
E Material Lost	(B-D)	150.10

Percent Passing #200 (B-D)/B x 100= 97.3%

WASH 200 (C 117)

CLIENT _____ B-2 TECHNICIAN _____

PROJECT CONGRESS 23.5-25 TEST DATE _____

RECORD NO. _____

SOIL CLASSIFICATION _____

TARE # E TARE WEIGHT 248.06

A Tare and Dry Soil		457.81
B Dry Soil	(A-Tare)	209.75
C Tare and Dry Soil After Wash		334.40
D Dry Soil After Wash	(C-Tare)	86.34
E Material Lost	(B-D)	123.41

Percent Passing #200 (B-D)/B x 100= 58.8 %

WASH 200 (C 117)

CLIENT _____ B-2 TECHNICIAN _____

PROJECT CONGRESS 33.5-35 TEST DATE _____

RECORD NO. _____

SOIL CLASSIFICATION _____

TARE # AB-4 TARE WEIGHT 172.81

A Tare and Dry Soil		313.00
B Dry Soil	(A-Tare)	140.19
C Tare and Dry Soil After Wash		293.76
D Dry Soil After Wash	(C-Tare)	120.95
E Material Lost	(B-D)	19.24

Percent Passing #200 (B-D)/B x 100= 13.7%

WASH 200 (C 117)

CLIENT _____ B-2 TECHNICIAN _____

PROJECT CONGRESS 43.5-45 TEST DATE _____

RECORD NO. _____

SOIL CLASSIFICATION _____

TARE # AA TARE WEIGHT 247.73

A Tare and Dry Soil		483.65
B Dry Soil	(A-Tare)	235.92
C Tare and Dry Soil After Wash		453.21
D Dry Soil After Wash	(C-Tare)	205.48
E Material Lost	(B-D)	30.44

Percent Passing #200 (B-D)/B x 100= 12.9%

WASH 200 (C 117)

CLIENT _____ B-2 TECHNICIAN _____

PROJECT CONGRESS 53.5-55 TEST DATE _____

RECORD NO. _____

SOIL CLASSIFICATION _____

TARE # A3 TARE WEIGHT 249.94

A Tare and Dry Soil		422.54
B Dry Soil	(A-Tare)	172.60
C Tare and Dry Soil After Wash		306.95
D Dry Soil After Wash	(C-Tare)	57.01
E Material Lost	(B-D)	115.59

Percent Passing #200 (B-D)/B x 100= 67.0%

WASH 200 (C 117)

CLIENT _____ B-2 TECHNICIAN _____

PROJECT CONGRESS 58.5-60 TEST DATE _____

RECORD NO. _____

SOIL CLASSIFICATION _____

TARE # N4 TARE WEIGHT 330.53

A Tare and Dry Soil		557.99
B Dry Soil	(A-Tare)	227.46
C Tare and Dry Soil After Wash		525.95
D Dry Soil After Wash	(C-Tare)	195.42
E Material Lost	(B-D)	32.04

Percent Passing #200 (B-D)/B x 100= 14.1%

WASH 200 (C 117)

CLIENT _____ B-2 TECHNICIAN _____

PROJECT CONGRESS 68.5-70 TEST DATE _____

RECORD NO. _____

SOIL CLASSIFICATION _____

TARE # 176 TARE WEIGHT 178.21

A Tare and Dry Soil		293.21
B Dry Soil	(A-Tare)	115.0
C Tare and Dry Soil After Wash		280.74
D Dry Soil After Wash	(C-Tare)	102.53
E Material Lost	(B-D)	12.47

Percent Passing #200 (B-D)/B x 100= 10.8%

WASH 200 (C 117)

CLIENT _____ B-2

PROJECT CONGRESS 83.5-85

RECORD NO. _____

TECHNICIAN _____

TEST DATE _____

SOIL CLASSIFICATION _____

TARE # D

TARE WEIGHT 304.24

A Tare and Dry Soil		529.96
B Dry Soil	(A-Tare)	225.72
C Tare and Dry Soil After Wash		469.85
D Dry Soil After Wash	(C-Tare)	165.61
E Material Lost	(B-D)	60.11

Percent Passing #200 (B-D)/B x 100= 26.6%