

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>50</u>	Immediate Water Depth <u>32.2 (08/31/11)</u>	Start Date <u>08/31/2011</u>	Hole Type <u>core</u>
Surface Elevation <u>463.6'</u>	Static Water Depth <u>NA</u>	End Date <u>08/31/2011</u>	Rig Number <u>1050 ATV</u>
Total Depth <u>168.0'</u>	Driller <u>Danny Jessie</u>	Latitude(83) <u>38.335918</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>167+84.96 86.0' Lt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.635784</u>	

Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT							Boring advanced with 4.25" augers, NQ System utilized to sample bedrock, Drilling Mud was not added to boring @ 1
		<u>Overburden: overburden.</u>							

Top of Rock = 128.0' Base Weathered Rock = 128.0'RDZ = 128.0'
 Elevation = 335.6' Elevation = 335.6' Elevation = 335.6'

Louisville Limestone
 Laurel Dolomite

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Surface Elevation <u>463.6'</u>	Static Water Depth <u>NA</u>	End Date <u>08/31/2011</u>	Rig_Number <u>1050 ATV</u>
Total Depth <u>168.0'</u>	Driller <u>Danny Jessie</u>	Latitude(83) <u>38.335918</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>167+84.96 86.0' Lt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.635784</u>	

Lithology			Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth	Description	Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
DRAFT									
55									55
60									60
65									65
70									70
75		<u>Overburden: overburden.</u>							75
80									80
85									85
90									90
95									95
100									100

Top of Rock = 128.0' Base Weathered Rock = 128.0' RDZ = 128.0'
 Elevation = 335.6' Elevation = 335.6' Elevation = 335.6'

Louisville Limestone
 Laurel Dolomite

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Hole Number <u>50</u> Surface Elevation <u>463.6'</u> Total Depth <u>168.0'</u> Location <u>167+84.96 86.0' Lt.</u>		Immediate Water Depth <u>32.2 (08/31/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/31/2011</u> End Date <u>08/31/2011</u> Latitude(83) <u>38.335918</u> Longitude(83) <u>-85.635784</u>		Hole Type <u>core</u> Rig Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
105		<p style="font-size: 2em; color: red; font-weight: bold;">DRAFT</p> <p><u>Overburden:</u> <i>overburden.</i></p> <p>(Begin Core)</p>							105	
110										110
115										115
120										120
125										125
335.6	128.0									
130		<p><u>Limestone & Shale:</u> <i>Limestone (70%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (30%), gray, silty.</i></p>		20 / 20	10.0	10.0	100		130	
135									135	
140					61 / 58	10.0	10.0	100	138.0 soft zone @ 139.1-139.7	140
145									145	
150				57 / 50	10.0	10.0	100	148.0 RCS-1 @ 142.8-143.6	150	
Top of Rock = 128.0' Base Weathered Rock = 128.0'RDZ = 128.0' Elevation = 335.6' Elevation = 335.6' Elevation = 335.6'									Louisville Limestone Laurel Dolomite	

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Hole Number <u>50</u> Surface Elevation <u>463.6'</u> Total Depth <u>168.0'</u> Location <u>167+84.96 86.0' Lt.</u>		Immediate Water Depth <u>32.2 (08/31/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/31/2011</u> End Date <u>08/31/2011</u> Latitude(83) <u>38.335918</u> Longitude(83) <u>-85.635784</u>			Hole Type <u>core</u> Rig Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>		
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
155		<p style="text-align: center; color: red; font-size: 2em;">DRAFT</p> <p>Limestone & Shale: Limestone (70%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (30%), gray, silty.</p>		57 / 50	10.0	10.0	100		<p>fossiliferous @ 150.3-150.6 vertical fracture @ 151-151.6</p>
160				96 / 96	10.0	10.0	100		<p>RCS-2 @ 166.7-167.7</p>
165									
295.6	168.0								
170		(Bottom of Hole 168.0')							
175									
180									
185									
190									
195									
200									
Top of Rock = 128.0' Base Weathered Rock = 128.0' RDZ = 128.0' Elevation = 335.6' Elevation = 335.6' Elevation = 335.6'									Louisville Limestone Laurel Dolomite

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Hole Number <u>51</u> Surface Elevation <u>465.4'</u> Total Depth <u>158.7'</u> Location <u>167+84.96 6.0' Lt.</u>		Immediate Water Depth <u>31.2 (09/05/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>09/01/2011</u> End Date <u>09/05/2011</u> Latitude(83) <u>38.336011</u> Longitude(83) <u>-85.635526</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT <u>Overburden: Clay, brown, moist, some sand.</u>		1	2.0-4.0	2.0		ST	Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3
				2	5.0-7.0	2.0		ST	
5									
10	455.4								
		<u>Overburden: Sand, light brown, moist, fine grained.</u>		3	10.0-12.0	2.0		ST	
15	450.4								
		<u>Overburden: Sand, brown, moist, fine grained, very loose to dense, some silt, some gravel.</u>		1	15.0-16.5	1.2	3-3-1	SPT	
20									
				2	20.0-21.5	0.6	1-2-1	SPT	
25									
				3	25.0-26.5	0.6	2-3-3	SPT	
30									
				4	30.0-31.5	0.6	3-3-2	SPT	
35									
			5	35.0-36.5	0.1	1-2-1	SPT	Drilling mud added to the boring at a depth of 35.0 ft below the ground surface @ 35	
40									
			6	40.0-41.5	0.1	0-0-0	SPT		
45									
				7	45.0-46.5	1.0	1-2-4	SPT	
50									
Top of Rock = 128.7' Base Weathered Rock = 128.7' RDZ = 128.7' Elevation = 336.7' Elevation = 336.7' Elevation = 336.7'					Louisville Limestone Laurel Dolomite				

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Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
55	410.4	55.0	<u>Overburden: Sand, brown, moist, fine grained, very loose to dense, some silt, some gravel.</u>	8	50.0-51.5	1.5	0-1-3	SPT	55
		DRAFT		9	55.0-56.5	1.2	5-4-9	SPT	60
60				10	60.0-61.5	1.5	6-7-12	SPT	60
65				11	65.0-66.5	1.5	8-8-13	SPT	65
70				12	70.0-71.5	1.5	8-13-24	SPT	70
75				13	75.0-76.5	1.5	14-17-22	SPT	75
80			<u>Overburden: Sand, brown to gray, wet, fine to medium grained, medium dense to dense, poorly graded, some gravel.</u>	14	80.0-81.5	1.2	8-9-12	SPT	80
85				15	85.0-86.5	1.5	6-10-17	SPT	85
90				16	90.0-91.5	1.5	15-13-15	SPT	90
95				17	95.0-96.5	1.5	9-10-10	SPT	95
100									100
Top of Rock = 128.7' Base Weathered Rock = 128.7' RDZ = 128.7' Elevation = 336.7' Elevation = 336.7' Elevation = 336.7'			Louisville Limestone Laurel Dolomite						

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Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		<p style="text-align: center; color: red; font-size: 2em;">DRAFT</p> <p><u>Overburden</u>: Sand, brown to gray, wet, fine to medium grained, medium dense to dense, poorly graded, some gravel.</p>		18	100.0-100.3	0.3	50/0.30'	SPT		
					19	105.0-106.5	0.8	24-13-12	SPT	
					20	110.0-111.5	1.5	50-35-34/0.50'	SPT	
					21	115.0-116.5	1.5	21-24-25	SPT	
					22	120.0-121.5	1.5	8-7-8	SPT	
					23	125.0-126.5	1.5	32-45-50/0.50'	SPT	
336.7	128.7			(Begin Core)						
			<p><u>Limestone & Shale</u>: Limestone (70%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (30%), gray, silty.</p>		36 / 36	10.0	8.1	81		Vertical Fracture @ 129.3-129.7
					52 / 52	10.0	8.6	86		
					68 /	10.0	10.0	100		
									RCS-1 @ 145.4-146.2	
130									138.7	
135									148.7	
140										
145										
150										
Top of Rock = 128.7' Elevation = 336.7'		Base Weathered Rock = 128.7' RDZ = 128.7' Elevation = 336.7'						Louisville Limestone Laurel Dolomite		

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Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
155	306.7	158.7		68 68 / 68	10.0	10.0	100		RCS-2 @ 153.9-154.8	
160			DRAFT (Bottom of Hole 158.7')							160
165									165	
170									170	
175									175	
180									180	
185									185	
190									190	
195									195	
200									200	
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Surface Elevation <u>465.5'</u>		Static Water Depth <u>NA</u>		End Date <u>09/07/2011</u>			Rig Number <u>1050 ATV</u>		
Total Depth <u>159.3'</u>		Driller <u>Danny Jessie</u>		Latitude(83) <u>38.336060</u>			<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>		
Location <u>167+84.96 6.0' Rt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.635503</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT							Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3
			<u>Overburden: overburden.</u>						Drilling mud added to the boring at a depth of 40.0 ft below the ground surface @ 40
Top of Rock = 128.6' Base Weathered Rock = 131.2' RDZ = 131.2'		Elevation = 336.9' Elevation = 334.3' Elevation = 334.3'		Louisville Limestone Laurel Dolomite					

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Elevation	Depth	Description	Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
DRAFT									
		<u>Overburden:</u> <i>overburden.</i>							

Top of Rock = 128.6'	Base Weathered Rock = 131.2'	RDZ = 131.2'	
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Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
DRAFT									
105									105
110									110
115		<u>Overburden: overburden.</u>							115
120									120
125									125
336.9	128.6		(Begin Core)						
130									130
135				12 / 12	9.4	8.5	90		135
140		<u>Limestone & Shale: Limestone (60%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (40%), gray, silty.</u>							138.0
145				42 / 35	10.0	10.0	100		145
150				46 / 46	11.3	11.3	100		148.0
									RCS-1 @ 146.1-146.7

Top of Rock = 128.6' Base Weathered Rock = 131.2' RDZ = 131.2'
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 Laurel Dolomite

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Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
155		Limestone & Shale: <i>Limestone (60%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (40%), gray, silty.</i>		46 / 46	11.3	11.3	100		RCS-2 @ 153.2-154.2
306.2	159.3								159.3
160		DRAFT							160
		(Bottom of Hole 159.3')							
165									165
170									170
175									175
180									180
185									185
190									190
195									195
200									200
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Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>53</u>	Immediate Water Depth <u>51.2 (09/07/11)</u>	Start Date <u>09/07/2011</u>	Hole Type <u>core and sample</u>
Surface Elevation <u>463.2'</u>	Static Water Depth <u>NA</u>	End Date <u>09/07/2011</u>	Rig_Number <u>1050 ATV</u>
Total Depth <u>167.9'</u>	Driller <u>Danny Jessie</u>	Latitude(83) <u>38.336206</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>167+84.96 74.0' Rt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.635386</u>	

Lithology	Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth	Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT						Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3 Boring moved 5.0' RT to drill off of driveway @ 9
		<u>Overburden:</u> Clay, brown, moist, some sand.	1	2.0-4.0	2.0		ST	
			2	5.0-7.0	1.5		ST	
5								
10	453.2							
		<u>Overburden:</u> Sand, brown, moist, fine to medium grained, some clay.	3	10.0-12.0	1.5		ST	
15	448.2							
			1	15.0-16.5	1.1	2-4-2	SPT	
20			2	20.0-21.5	0.5	4-6-7	SPT	
25			3	25.0-26.5	0.5	3-4-3	SPT	
		<u>Overburden:</u> Sand, brown, moist, fine grain, very loose to dense, some silt, some gravel.	4	30.0-31.5	0.7	0-1-0	SPT	
30			5	35.0-36.5	0.6	0-1-0	SPT	
35			6	40.0-41.5	1.0	6-8-10	SPT	
40			7	45.0-46.5	1.0	9-24-21	SPT	
45								
50	413.2							

Top of Rock = 127.2' Base Weathered Rock = 127.2' RDZ = 127.2'
 Elevation = 336.0' Elevation = 336.0' Elevation = 336.0'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>						
Hole Number <u>53</u> Surface Elevation <u>463.2'</u> Total Depth <u>167.9'</u> Location <u>167+84.96 74.0' Rt.</u>		Immediate Water Depth <u>51.2 (09/07/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>09/07/2011</u> End Date <u>09/07/2011</u> Latitude(83) <u>38.336206</u> Longitude(83) <u>-85.635386</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks		
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)			
		<p style="color: red; font-size: 2em; text-align: center;">DRAFT</p> <p><u>Overburden:</u> Sand, brown to gray, wet, fine to medium grained, medium dense to dense, poorly graded, some gravel.</p>		8	50.0-51.5	1.5	8-13-15	SPT	Drilling mud added to the boring at a depth of 55.0 ft below the ground surface @ 55		
55										55	
					9	55.0-56.5	1.5	13-19-21		SPT	
60											60
					10	60.0-61.5	1.5	7-10-11		SPT	
65											65
		<p><u>Overburden:</u> Silt, light brown, wet, fine grained, hard, some sand.</p>									
70	393.2		70.0		12	70.0-71.5	0.5	14-22-33	SPT	70	
75	388.2	75.0							75		
		<p><u>Overburden:</u> Sand, brown to gray, wet, fine to medium grained, medium dense to very dense, poorly graded, some gravel.</p>									
					13	75.0-76.5	1.2	6-10-21	SPT		
80										80	
					14	80.0-81.5	1.5	10-9-13	SPT		
85										85	
					15	85.0-86.5	1.5	10-15-21	SPT		
90					16	90.0-91.5	1.5	13-14-22	SPT	90	
95									95		
				17	95.0-96.5	1.5	14-21-30	SPT			
100	363.2	100.0							100		
Top of Rock = 127.2' Base Weathered Rock = 127.2' RDZ = 127.2' Elevation = 336.0' Elevation = 336.0' Elevation = 336.0'			Louisville Limestone Laurel Dolomite								

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>53</u> Surface Elevation <u>463.2'</u> Total Depth <u>167.9'</u> Location <u>167+84.96 74.0' Rt.</u>		Immediate Water Depth <u>51.2 (09/07/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>09/07/2011</u> End Date <u>09/07/2011</u> Latitude(83) <u>38.336206</u> Longitude(83) <u>-85.635386</u>		Hole Type <u>core and sample</u> Rig Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
105358.2	105.0	Overburden: Clay, gray, wet, fine grained, stiff, some sand.		18	100.0-101.5	0.5	10-3-8	SPT	105	
110			DRAFT		19	105.0-106.5	1.1	12-30-42	SPT	110
115		Overburden: Sand, brown to gray, wet, fine to medium grained, medium dense to very dense, poorly graded, some gravel.			20	110.0-111.5	1.5	9-12-19	SPT	115
120					21	115.0-116.5	0.6	13-11-16	SPT	120
125					22	120.0-121.5	1.5	21-17-20	SPT	125
336.0	127.2	(Begin Core)			23	125.0-126.5	1.5	43-36-32/0.50'	SPT	125
130		Limestone & Shale: Limestone (60%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (40%), gray, silty.		15 / 15	11.3				130	
135									135	
140					34 / 28	10.0				140
145									145	
150				24 /	10.0				150	
Top of Rock = 127.2' Base Weathered Rock = 127.2' RDZ = 127.2' Elevation = 336.0' Elevation = 336.0' Elevation = 336.0'		Louisville Limestone Laurel Dolomite								

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>53</u>	Immediate Water Depth <u>51.2 (09/07/11)</u>	Start Date <u>09/07/2011</u>	Hole Type <u>core and sample</u>
Surface Elevation <u>463.2'</u>	Static Water Depth <u>NA</u>	End Date <u>09/07/2011</u>	Rig Number <u>1050 ATV</u>
Total Depth <u>167.9'</u>	Driller <u>Danny Jessie</u>	Latitude(83) <u>38.336206</u>	<u>GQ-1211</u>
Location <u>167+84.96 74.0' Rt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.635386</u>	<u>Jeffersonville, New Albany, and Charlestown</u>

Lithology			Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth	Description	Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
155		<div style="font-size: 2em; color: red; font-weight: bold; margin-bottom: 10px;">DRAFT</div> <p>Limestone & Shale: Limestone (60%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (40%), gray, silty.</p>		20					fossiliferous @ 150.6-150.9
160				24 / 20	10.0				158.5
165				32 / 32	9.4				
295.3	167.9								RCS-2 @ 167-167.6
170		(Bottom of Hole 167.9')							
175									
180									
185									
190									
195									
200									

Top of Rock = 127.2' Base Weathered Rock = 127.2' RDZ = 127.2'
 Elevation = 336.0' Elevation = 336.0' Elevation = 336.0'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>54</u>	Immediate Water Depth <u>17.8 (09/13/11)</u>	Start Date <u>09/12/2011</u>	Hole Type <u>core and sample</u>
Surface Elevation <u>430.5'</u>	Static Water Depth <u>NA</u>	End Date <u>09/13/2011</u>	Rig Number <u>1050 ATV</u>
Total Depth <u>140.7'</u>	Driller <u>Danny Jessie</u>	Latitude(83) <u>38.336373</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>170+09.96 86.0' Lt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.636315</u>	

Lithology	Elevation	Depth	Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
				Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
			DRAFT							
			<u>Overburden</u> : Sand, brown, moist, fine to medium grained, very loose to medium dense, some clay, some gravel.		ST-1	2.0-4.0	2.0		ST	Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3 Boring was staked on slope, dozer work was needed to clear a path to stake, elevation change of 2.0' due to dozer cut @ 6 Drilling mud added to the boring at a depth of 20.0 ft below the ground surface @ 20
					SPT-1	4.0-5.5	1.5	9-13-12	SPT	
					SPT-2	10.0-11.5	0.9	6-2-2	SPT	
					SPT-3	15.0-16.5	0.8	1-1-1	SPT	
					SPT-4	20.0-21.5	0.7	4-6-7	SPT	
					SPT-5	25.0-26.5	1.5	4-9-14	SPT	
					SPT-6	30.0-31.5	0.6	6-5-8	SPT	
					SPT-7	35.0-36.5	0.7	9-8-7	SPT	
			<u>Overburden</u> : Sand, brown to gray, wet, fine to medium grained, medium dense to dense, poorly graded, some gravel.							
					SPT-8	40.0-41.5	1.5	8-11-17	SPT	
					SPT-9	45.0-46.5	1.5	10-12-17	SPT	

Top of Rock = 100.0'	Base Weathered Rock = 100.8'	RDZ = 100.8'	
Elevation = 330.5'	Elevation = 329.7'	Elevation = 329.7'	Louisville Limestone Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>					
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>54</u>		Immediate Water Depth <u>17.8 (09/13/11)</u>			Start Date <u>09/12/2011</u>			Hole Type <u>core and sample</u>		
Surface Elevation <u>430.5'</u>		Static Water Depth <u>NA</u>			End Date <u>09/13/2011</u>			Rig Number <u>1050 ATV</u>		
Total Depth <u>140.7'</u>		Driller <u>Danny Jessie</u>			Latitude(83) <u>38.336373</u>			<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>		
Location <u>170+09.96 86.0' Lt.</u>		Geologist <u>James Adams</u>			Longitude(83) <u>-85.636315</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		<div style="font-size: 2em; color: red; font-weight: bold; margin-bottom: 20px;">DRAFT</div> <p><u>Overburden:</u> Sand, brown to gray, wet, fine to medium grained, medium dense to dense, poorly graded, some gravel.</p>		SPT-10	50.0-51.5	1.5	9-18-15	SPT		
					SPT-11	55.0-56.5	1.5	16-18-18	SPT	
					SPT-12	60.0-61.5	1.5	10-8-13	SPT	
					SPT-13	65.0-66.5	1.5	17-8-13	SPT	
					SPT-14	70.0-71.5	1.5	18-30-31	SPT	
					SPT-15	75.0-76.5	1.0	15-18-27	SPT	
					SPT-16	80.0-81.5	1.2	13-15-15	SPT	
					SPT-17	85.0-86.5	1.5	12-13-13	SPT	
					SPT-18	90.0-91.5	1.5	17-8-8	SPT	
					SPT-19	95.0-96.5	1.5	10-8-20	SPT	
100330.5	100.0		(Begin Core)						100	
Top of Rock = 100.0'		Base Weathered Rock = 100.8'		RDZ = 100.8'		Louisville Limestone				
Elevation = 330.5'		Elevation = 329.7'		Elevation = 329.7'		Laurel Dolomite				

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>54</u> Surface Elevation <u>430.5'</u> Total Depth <u>140.7'</u> Location <u>170+09.96 86.0' Lt.</u>		Immediate Water Depth <u>17.8 (09/13/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>09/12/2011</u> End Date <u>09/13/2011</u> Latitude(83) <u>38.336373</u> Longitude(83) <u>-85.636315</u>		Hole Type <u>core and sample</u> Rig Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Overburden		Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth	Description		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	
105		<p style="text-align: center; color: red; font-size: 24px;">DRAFT</p> <p>Limestone & Shale: Limestone (60%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (40%), gray, silty.</p>		0 / 0	7.5	7.0	93		107.5
110				37 / 32	5.9	5.9	100		113.4
115				45 / 38	10.0	10.0	100		123.4
120				43 / 43	10.0	10.0	100		133.4
125				68 / 68	7.3	7.3	100		140.7
130									RCS-1 @ 123.4-124.1
135									RCS-2 @ 133.4-133.2
140	289.8	140.7							
145		(Bottom of Hole 140.7')							
150									

Top of Rock = 100.0' Base Weathered Rock = 100.8' RDZ = 100.8'
 Elevation = 330.5' Elevation = 329.7' Elevation = 329.7'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>55</u>		Immediate Water Depth <u>NA</u>		Start Date <u>09/12/2011</u>		Hole Type <u>core</u>			
Surface Elevation <u>438.3'</u>		Static Water Depth <u>NA</u>		End Date <u>09/12/2011</u>		Rig Number <u>1050 ATV</u>			
Total Depth <u>136.2'</u>		Driller <u>Danny Jessie</u>		Latitude(83) <u>38.336521</u>		<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Location <u>170+17.96 6.0' Lt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.636110</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
DRAFT									<p>Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3 Boring was staked on slope, dozer work was needed to clear a path to stake, boring moved ahead station 8.0' from stake to provide working area, elevation change of 3.0' due to dozer cut @ 6</p> <p style="text-align: center;"><u>Overburden: overburden.</u></p> <p>Drilling mud added to the boring at a depth of 30.0 ft below the ground surface @ 30</p>
5									5
10									10
15									15
20									20
25									25
30									30
35									35
40									40
45									45
50									50
Top of Rock = 105.2' Base Weathered Rock = 105.2' RDZ = 105.2'		Elevation = 333.1' Elevation = 333.1'		Elevation = 333.1'		Louisville Limestone Laurel Dolomite			

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>55</u>	Immediate Water Depth <u>NA</u>	Start Date <u>09/12/2011</u>	Hole Type <u>core</u>
Surface Elevation <u>438.3'</u>	Static Water Depth <u>NA</u>	End Date <u>09/12/2011</u>	Rig_Number <u>1050 ATV</u>
Total Depth <u>136.2'</u>	Driller <u>Danny Jessie</u>	Latitude(83) <u>38.336521</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>170+17.96 6.0' Lt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.636110</u>	

Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
DRAFT									
55									55
60									60
65									65
70									70
75		<u>Overburden: overburden.</u>							75
80									80
85									85
90									90
95									95
100									100

Top of Rock = 105.2' Base Weathered Rock = 105.2' RDZ = 105.2'
 Elevation = 333.1' Elevation = 333.1' Elevation = 333.1'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>						
Hole Number <u>55</u> Surface Elevation <u>438.3'</u> Total Depth <u>136.2'</u> Location <u>170+17.96 6.0' Lt.</u>		Immediate Water Depth <u>NA</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>09/12/2011</u> End Date <u>09/12/2011</u> Latitude(83) <u>38.336521</u> Longitude(83) <u>-85.636110</u>		Hole Type <u>core</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks		
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)			
		<u>Overburden: overburden.</u>									
105333.1	105.2	(Begin Core)							105		
		DRAFT <u>Limestone & Shale: Limestone (70%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (30%), gray, silty.</u>			38 / 38	7.8	7.4	95	110		
110											113.0
115							30 / 25	5.0	5.0	100	Soft Zone @ 115 114.6-115.2
120											Soft Zone @ 118.0 116.9-117.1
125							39 / 31	10.0	10.0	100	RCS-1 @ 121.4-122.1
130								fossiliferous @ 128.0 125.8-126.2			
135	302.1	136.2			59 / 59	8.2	8.2	100	RCS-2 @ 136.2 134.9-135.8		
140			(Bottom of Hole 136.2')						140		
145									145		
150									150		
Top of Rock = 105.2' Base Weathered Rock = 105.2' RDZ = 105.2' Elevation = 333.1' Elevation = 333.1' Elevation = 333.1'									Louisville Limestone Laurel Dolomite		

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>						
Hole Number <u>56</u> Surface Elevation <u>439.1'</u> Total Depth <u>136.7'</u> Location <u>170+17.96 6.0' Rt.</u>		Immediate Water Depth <u>26.0 (09/09/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>09/08/2011</u> End Date <u>09/08/2011</u> Latitude(83) <u>38.336544</u> Longitude(83) <u>-85.636079</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks		
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)			
		DRAFT <u>Overburden:</u> Sand, brown, moist, fine to medium grain, loose to medium dense, some clay, some gravel.		1	2.0-4.0	1.5		ST	Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3 Boring was staked on slope, dozer work was needed to clear a path to stake, boring moved ahead station 8.0' from stake to provide working area, elevation change of 3.3' due to dozer cut @ 6		
				2	5.0-7.0	1.0		ST			
				1	7.0-8.5	1.0	7-6-6	SPT			
				2	10.0-11.5	1.0	12-8-1	SPT			
				3	15.0-16.5	0.5	3-2-5	SPT			
20	419.1		20.0								
			<u>Overburden:</u> Sand, light brown, moist, fine grained, loose, some silt, some gravel.		4	20.0-21.5	1.0	4-2-2		SPT	
25	414.1			25.0							
			<u>Overburden:</u> Sand, brown to gray, wet, fine to medium grained, loose to very dense, poorly graded, some gravel.		5	25.0-26.5	1.2	4-5-5		SPT	Drilling mud added to the boring at a depth of 30.0 ft below the ground surface @ 30
					6	30.0-31.5	1.5	7-5-7		SPT	
				7	35.0-36.5	1.5	13-10-10	SPT			
				8	40.0-41.5	1.5	10-6-8	SPT			
				9	45.0-46.5	1.5	10-9-10	SPT			
40											
45											
50											
Top of Rock = 106.2' Base Weathered Rock = 106.2' RDZ = 106.2' Elevation = 332.9' Elevation = 332.9' Elevation = 332.9'			Louisville Limestone Laurel Dolomite								

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>				Project Type: <u>Structure State Bridge</u>					
Item Number: <u>5-731.00</u>						Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>56</u>		Immediate Water Depth <u>26.0 (09/09/11)</u>		Start Date <u>09/08/2011</u>		Hole Type <u>core and sample</u>					
Surface Elevation <u>439.1'</u>		Static Water Depth <u>NA</u>		End Date <u>09/08/2011</u>		Rig Number <u>1050 ATV</u>					
Total Depth <u>136.7'</u>		Driller <u>Danny Jessie</u>		Latitude(83) <u>38.336544</u>		<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>					
Location <u>170+17.96 6.0' Rt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.636079</u>							
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks		
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)			
		<p style="font-size: 2em; color: red; margin: 0;">DRAFT</p> <p style="font-size: 0.8em; margin-top: 20px;"><u>Overburden:</u> Sand, brown to gray, wet, fine to medium grained, loose to very dense, poorly graded, some gravel.</p>		10	50.0-51.5	1.5	11-9-10	SPT			
55				11	55.0-56.5	1.5	17-10-10	SPT		55	
60				12	60.0-61.5	1.5	28-27-24	SPT		60	
65				13	65.0-66.5	1.5	6-7-11	SPT		65	
70				14	70.0-71.5	1.5	15-13-8	SPT		70	
75				15	75.0-76.5	1.5	14-18-22	SPT		75	
80				16	80.0-81.5	1.2	9-10-11	SPT		80	
85				17	85.0-86.5	1.5	17-18-22	SPT		85	
90				18	90.0-91.5	1.0	8-11-12	SPT		90	
95				19	95.0-96.5	1.5	17-8-5	SPT		95	
100										100	
Top of Rock = 106.2'				Base Weathered Rock = 106.2'		RDZ = 106.2'		Louisville Limestone Laurel Dolomite			
Elevation = 332.9'				Elevation = 332.9'		Elevation = 332.9'					

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>56</u> Surface Elevation <u>439.1'</u> Total Depth <u>136.7'</u> Location <u>170+17.96 6.0' Rt.</u>		Immediate Water Depth <u>26.0 (09/09/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>09/08/2011</u> End Date <u>09/08/2011</u> Latitude(83) <u>38.336544</u> Longitude(83) <u>-85.636079</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		<u>Overburden: Sand, brown to gray, wet, fine to medium grained, loose to very dense, poorly graded, some gravel.</u>		20	100.0-101.5	1.5	26-23-28	SPT	
105	332.9		(Begin Core)	21	105.0-106.2	1.2	28-32-50/0.20'	SPT	
110		DRAFT <u>Limestone & Shale: Limestone (60%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (40%), gray, silty.</u>		40 / 40	7.3	7.3	100		
115				50 / 47	5.0	5.0	100		113.5 RCS-1 @ 115.8-116.6 soft zone @ 118.5-116.6-116.8
120				50 / 46	10.0	10.0	100		118.5 fossiliferous @ 127-127.3
125				64 / 64	8.2	8.2	100		128.5 RCS-2 @ 129.6-130.3
130									128.5
135	302.4								136.7
140		(Bottom of Hole 136.7')							
145									
150									
Top of Rock = 106.2' Base Weathered Rock = 106.2' RDZ = 106.2' Elevation = 332.9' Elevation = 332.9' Elevation = 332.9'									Louisville Limestone Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>57</u>	Immediate Water Depth <u>43.2 (09/08/11)</u>	Start Date <u>09/08/2011</u>	Hole Type <u>core</u>
Surface Elevation <u>443.9'</u>	Static Water Depth <u>NA</u>	End Date <u>09/08/2011</u>	Rig Number <u>1050 ATV</u>
Total Depth <u>152.0'</u>	Driller <u>Danny Jessie</u>	Latitude(83) <u>38.336661</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>170+18.46 69.0' Rt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.635917</u>	

Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT							<p>Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3 Boring was drilled on slope, dozer work was needed to clear a path to stake, boring offset 8.5' from stake to provide working area, elevation change 3.0' due to dozer cut @ 6</p>
		<u>Overburden: overburden.</u>							<p>Drilling mud added to the boring at a depth of 45.0 ft below the ground</p>

Top of Rock = 111.3' Base Weathered Rock = 112.1' RDZ = 112.1'
 Elevation = 332.6' Elevation = 331.8' Elevation = 331.8'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>57</u>	Immediate Water Depth <u>43.2 (09/08/11)</u>	Start Date <u>09/08/2011</u>	Hole Type <u>core</u>
Surface Elevation <u>443.9'</u>	Static Water Depth <u>NA</u>	End Date <u>09/08/2011</u>	Rig Number <u>1050 ATV</u>
Total Depth <u>152.0'</u>	Driller <u>Danny Jessie</u>	Latitude(83) <u>38.336661</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>170+18.46 69.0' Rt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.635917</u>	

Lithology	Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth	Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
								surface @ 45
DRAFT								
		<u>Overburden: overburden.</u>						

Top of Rock = 111.3'	Base Weathered Rock = 112.1'	RDZ = 112.1'	
Elevation = 332.6'	Elevation = 331.8'	Elevation = 331.8'	Louisville Limestone Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>57</u>	Immediate Water Depth <u>43.2 (09/08/11)</u>	Start Date <u>09/08/2011</u>	Hole Type <u>core</u>
Surface Elevation <u>443.9'</u>	Static Water Depth <u>NA</u>	End Date <u>09/08/2011</u>	Rig Number <u>1050 ATV</u>
Total Depth <u>152.0'</u>	Driller <u>Danny Jessie</u>	Latitude(83) <u>38.336661</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>170+18.46 69.0' Rt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.635917</u>	

Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		<u>Overburden: overburden.</u>							
105									105
110	332.6		(Begin Core)						110
115		DRAFT		16 / 16	5.7	5.2	91		115
									117.0
120				40 / 35	10.0	10.0	100		120
125									125
									127.0
130		<u>Limestone & Shale: Limestone (60%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (40%), gray, silty.</u>		64 / 58	10.0	10.0	100		130
135									135
									137.0
140				88 / 85	10.0	10.0	100		140
145									145
									147.0
150				84 / 84	5.0	5.0	100		150

Top of Rock = 111.3' Base Weathered Rock = 112.1' RDZ = 112.1'
 Elevation = 332.6' Elevation = 331.8' Elevation = 331.8'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>57</u>	Immediate Water Depth <u>43.2 (09/08/11)</u>	Start Date <u>09/08/2011</u>	Hole Type <u>core</u>
Surface Elevation <u>443.9'</u>	Static Water Depth <u>NA</u>	End Date <u>09/08/2011</u>	Rig Number <u>1050 ATV</u>
Total Depth <u>152.0'</u>	Driller <u>Danny Jessie</u>	Latitude(83) <u>38.336661</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>170+18.46 69.0' Rt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.635917</u>	

Lithology	Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth	Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
291.9	152.0		84 / 84	5.0	5.0	100		152.0
155	<div style="color: red; font-size: 2em; font-weight: bold; margin-bottom: 10px;">DRAFT</div> (Bottom of Hole 152.0')							155
160								160
165								165
170								170
175								175
180								180
185								185
190								190
195								195
200								200

Top of Rock = 111.3' Base Weathered Rock = 112.1' RDZ = 112.1'
 Elevation = 332.6' Elevation = 331.8' Elevation = 331.8'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>				Project Type: <u>Structure State Bridge</u>			
Item Number: <u>5-731.00</u>						Project Manager: <u>Mark Litkenhus</u>			
Hole Number <u>58</u>		Immediate Water Depth <u>15.3 (08/29/11)</u>		Start Date <u>08/26/2011</u>		Hole Type <u>core</u>			
Surface Elevation <u>429.0'</u>		Static Water Depth <u>NA</u>		End Date <u>08/29/2011</u>		Rig Number <u>1050 ATV</u>			
Total Depth <u>136.0'</u>		Driller <u>Danny Jessie</u>		Latitude(83) <u>38.336929</u>		<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Location <u>172+84.96 86.0' Lt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.636964</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT							<p>Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3</p> <p>Drilling mud added to the boring at a depth of 20.0 ft below the ground surface @ 20</p>
			<u>Overburden: overburden.</u>						

Top of Rock = 96.0' Base Weathered Rock = 97.2' RDZ = 97.2'
 Elevation = 333.0' Elevation = 331.8' Elevation = 331.8'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>58</u>	Immediate Water Depth <u>15.3 (08/29/11)</u>	Start Date <u>08/26/2011</u>	Hole Type <u>core</u>
Surface Elevation <u>429.0'</u>	Static Water Depth <u>NA</u>	End Date <u>08/29/2011</u>	Rig Number <u>1050 ATV</u>
Total Depth <u>136.0'</u>	Driller <u>Danny Jessie</u>	Latitude(83) <u>38.336929</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>172+84.96 86.0' Lt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.636964</u>	

Lithology	Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth	Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
DRAFT								
		<u>Overburden: overburden.</u>						
		(Begin Core)						
		<u>Limestone & Shale: Limestone (60%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings. Shale (40%), gray, silty.</u>	20 / 20	2.0	1.9	95		weathered @ 96-97.2
			20 / 18	10.0	10.0	100		98.0

Top of Rock = 96.0' Base Weathered Rock = 97.2' RDZ = 97.2'
 Elevation = 333.0' Elevation = 331.8' Elevation = 331.8'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>58</u> Surface Elevation <u>429.0'</u> Total Depth <u>136.0'</u> Location <u>172+84.96 86.0' Lt.</u>		Immediate Water Depth <u>15.3 (08/29/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/26/2011</u> End Date <u>08/29/2011</u> Latitude(83) <u>38.336929</u> Longitude(83) <u>-85.636964</u>		Hole Type <u>core</u> Rig Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
105		<p style="text-align: center; color: red; font-size: 2em;">DRAFT</p> <p><u>Limestone & Shale: Limestone (60%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings. Shale (40%), gray, silty.</u></p>		20 / 18	10.0	10.0	100		105 Soft Zone @ 106.1-106.2
110				42 / 34	10.0	10.0	100		110 RCS-1 @ 112-112.8
115				75 / 70	10.0	9.7	97		115 118.0
120				86 / 86	8.0	8.0	100		120 128.0 RCS-2 @ 128.6-129.6
125									125
130									130
135	293.0	136.0							135 136.0
140		(Bottom of Hole 136.0')							140
145									145
150									150
Top of Rock = 96.0' Elevation = 333.0'		Base Weathered Rock = 97.2' RDZ = 97.2' Elevation = 331.8'						Louisville Limestone Laurel Dolomite	

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>						
Hole Number <u>59</u> Surface Elevation <u>428.3'</u> Total Depth <u>125.7'</u> Location <u>172+84.96 6.0' Lt.</u>		Immediate Water Depth <u>15.2 (08/29/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/29/2011</u> End Date <u>08/30/2011</u> Latitude(83) <u>38.337077</u> Longitude(83) <u>-85.636758</u>		Hole Type <u>core and sample</u> Rig Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>					
Lithology		Overburden		Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks		
Elevation	Depth	Description		Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)			
427.3	1.0	<u>Overburden: Topsoil.</u>							<p>Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3</p>		
		<p style="font-size: 2em; color: red; font-weight: bold;">DRAFT</p> <p><u>Overburden: Clay, brown, moist, some sand.</u></p>		1	2.0-4.0	2.0		ST			
				2	5.0-7.0	2.0		ST			
				3	10.0-12.0	2.0		ST			
				4	15.0-17.0	0.5		ST			
411.3	17.0			<p><u>Overburden: Clay, brown, moist, very soft to stiff, some sand.</u></p>		1	17.0-18.5	0.6		0-0-0	SPT
						2	20.0-21.5	0.8		2-4-6	SPT
						3	25.0-26.5	0.8		2-5-9	SPT
				<p><u>Overburden: Sand, brown and gray, wet, fine to medium grained, very loose to dense, some clay.</u></p>		4	30.0-31.5	1.0		5-9-11	SPT
						5	35.0-36.5	1.5		7-11-12	SPT
						6	40.0-41.5	1.5	6-8-10	SPT	
		7	45.0-46.5			1.5	7-5-7	SPT			

Top of Rock = 95.6' Base Weathered Rock = 96.6' RDZ = 96.6'
 Elevation = 332.7' Elevation = 331.7' Elevation = 331.7'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>				Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>			
Hole Number <u>59</u> Surface Elevation <u>428.3'</u> Total Depth <u>125.7'</u> Location <u>172+84.96 6.0' Lt.</u>		Immediate Water Depth <u>15.2 (08/29/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/29/2011</u> End Date <u>08/30/2011</u> Latitude(83) <u>38.337077</u> Longitude(83) <u>-85.636758</u>		Hole Type <u>core and sample</u> Rig Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		<p style="text-align: center; color: red; font-size: 2em;">DRAFT</p> <p><u>Limestone & Shale</u>: Limestone (60%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (40%), gray, silty.</p>		24 / 22	10.0	10.0	100		<p>highly fractured soft zone @ 103.5-104.5</p> <p>highly fractured soft zone @ 106.1-106.9</p> <p>RCS-1 @ 107.4-108.2</p>
105				29 / 29	10.0	9.2	92		<p>fossiliferous @ 115.9-116.2</p> <p>fossiliferous @ 117-117.3</p>
110				57 / 57	7.5	7.5	100		<p>RCS-2 @ 121.1-122</p>
115									
120									
125	302.6	125.7							125.7
130		(Bottom of Hole 125.7')							130
135									135
140									140
145									145
150									150
Top of Rock = 95.6' Elevation = 332.7'		Base Weathered Rock = 96.6' Elevation = 331.7'		RDZ = 96.6' Elevation = 331.7'		Louisville Limestone Laurel Dolomite			

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>60</u>		Immediate Water Depth <u>16.4 (08/30/11)</u>		Start Date <u>08/30/2011</u>		Hole Type <u>core</u>			
Surface Elevation <u>427.9'</u>		Static Water Depth <u>NA</u>		End Date <u>08/30/2011</u>		Rig Number <u>1050 ATV</u>			
Total Depth <u>125.6'</u>		Driller <u>Danny Jessie</u>		Latitude(83) <u>38.337100</u>		<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Location <u>172+84.96 6.0' Rt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.636728</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT							<p>Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3</p> <p>Drilling mud added to the boring at a depth of 17.0 ft below the ground surface @ 17</p>
			<u>Overburden: overburden.</u>						
Top of Rock = 95.2' Elevation = 332.7'		Base Weathered Rock = 96.2' Elevation = 331.7'		RDZ = 96.2' Elevation = 331.7'		Louisville Limestone Laurel Dolomite			

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>60</u> Surface Elevation <u>427.9'</u> Total Depth <u>125.6'</u> Location <u>172+84.96 6.0' Rt.</u>		Immediate Water Depth <u>16.4 (08/30/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/30/2011</u> End Date <u>08/30/2011</u> Latitude(83) <u>38.337100</u> Longitude(83) <u>-85.636728</u>		Hole Type <u>core</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT							
		<u>Overburden</u> : overburden.							
		(Begin Core)							
		<u>Limestone & Shale</u> : Limestone (70%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (30%), gray, silty.		29 / 29	2.8	2.6	93		98.0
				10 / 10	10.0	9.1	91		
Top of Rock = 95.2' Elevation = 332.7'	Base Weathered Rock = 96.2' Elevation = 331.7'	RDZ = 96.2' Elevation = 331.7'		Louisville Limestone Laurel Dolomite					

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>60</u> Surface Elevation <u>427.9'</u> Total Depth <u>125.6'</u> Location <u>172+84.96 6.0' Rt.</u>		Immediate Water Depth <u>16.4 (08/30/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/30/2011</u> End Date <u>08/30/2011</u> Latitude(83) <u>38.337100</u> Longitude(83) <u>-85.636728</u>		Hole Type <u>core</u> Rig Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		<p style="text-align: center; color: red; font-size: 2em;">DRAFT</p> <p><u>Limestone & Shale</u>: Limestone (70%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings, fossiliferous. Shale (30%), gray, silty.</p>		10 / 10	10.0	9.1	91		
				50 / 45	10.0	10.0	100		108.0 RCS-1 @ 108.1-109.1
				83 / 83	7.6	7.6	100		fossiliferous @ 116-116.7 118.0 RCS-2 @ 123.1-124.1
105									105
110									110
115									115
120									120
125	302.3	125.6							125
130		(Bottom of Hole 125.6')							130
135									135
140									140
145									145
150									150
Top of Rock = 95.2' Base Weathered Rock = 96.2' RDZ = 96.2' Elevation = 332.7' Elevation = 331.7' Elevation = 331.7'									Louisville Limestone Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>61</u> Surface Elevation <u>427.9'</u> Total Depth <u>137.0'</u> Location <u>172+84.96 69.0' Rt.</u>		Immediate Water Depth <u>18.3 (08/30/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/30/2011</u> End Date <u>08/31/2011</u> Latitude(83) <u>38.337217</u> Longitude(83) <u>-85.636566</u>		Hole Type <u>core and sample</u> Rig Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology	Description		Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth	Rock Core		Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
426.9	1.0	<u>Overburden: topsoil.</u>							Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3
		DRAFT <u>Overburden: Clay, brown, moist, sandy.</u>		1	2.0-4.0	2.0		ST	
				2	5.0-7.0	2.0			
				3	10.0-12.0	2.0		ST	
412.9	15.0	<u>Overburden: Sand, brown, wet, fine to medium grained, very loose, clayey.</u>		4	15.0-17.0	0.5		ST	Drilling mud added to the boring at a depth of 20.0 ft below the ground surface @ 20
				1	20.0-21.5	0.7	0-0-1	SPT	
				2	25.0-26.5	0.8	4-5-7	SPT	
				3	30.0-31.5	0.7	7-10-12	SPT	
		<u>Overburden: Sand, brown to gray, wet, fine to medium grained, medium dense, poorly graded, some gravel.</u>		4	35.0-36.5	1.3	5-6-7	SPT	
				5	40.0-41.5	1.5	4-5-8	SPT	
382.9	45.0	<u>Overburden: Sand, brown, wet, fine grained, loose to medium dense.</u>		6	45.0-46.5	1.5	5-10-8	SPT	

Top of Rock = 96.5' Base Weathered Rock = 96.5' RDZ = 96.5'
 Elevation = 331.4' Elevation = 331.4' Elevation = 331.4'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>61</u> Surface Elevation <u>427.9'</u> Total Depth <u>137.0'</u> Location <u>172+84.96 69.0' Rt.</u>		Immediate Water Depth <u>18.3 (08/30/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/30/2011</u> End Date <u>08/31/2011</u> Latitude(83) <u>38.337217</u> Longitude(83) <u>-85.636566</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		<p style="font-size: 2em; color: red; margin: 0;">DRAFT</p> <p><u>Overburden:</u> Sand, brown, wet, fine grained, loose to medium dense.</p> <p><u>Overburden:</u> Clay, gray, wet, medium stiff to very stiff.</p> <p><u>Overburden:</u> Sand, brown to gray, wet, fine to medium grained, medium dense to dense, poorly graded, some gravel.</p> <p>(Begin Core)</p> <p><u>Limestone & Shale:</u> Limestone (60%), gray, coarse grained, hard, thin to medium bedded, shale streaks, stringers and partings. Shale (40%), gray, silty.</p>		7	50.0-51.5	1.5	3-5-10	SPT		
					8	55.0-56.5	1.5	3-10-12	SPT	
					9	60.0-61.5	1.5	12-9-17	SPT	
					10	65.0-66.5	1.5	10-7-4	SPT	
					11	70.0-71.5	0.6	4-2-4	SPT	
					12	75.0-76.5	1.5	10-11-17	SPT	
					13	80.0-81.5	0.8	4-8-12	SPT	
					14	85.0-86.5	0.9	3-5-10	SPT	
				15	90.0-91.5	1.5	0-8-10	SPT		
				16	95.0-96.1	1.0	26-31-50/0.10'	SPT		
				64 / 64	7.5	7.5	100			
Top of Rock = 96.5' Elevation = 331.4'		Base Weathered Rock = 96.5' Elevation = 331.4'		RDZ = 96.5' Elevation = 331.4'		Louisville Limestone Laurel Dolomite				

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>							
Hole Number <u>62</u> Surface Elevation <u>431.9'</u> Total Depth <u>139.8'</u> Location <u>175+59.96 86.0' Lt.</u>		Immediate Water Depth <u>17.5 (08/23/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/19/2011</u> End Date <u>08/22/2011</u> Latitude(83) <u>38.337485</u> Longitude(83) <u>-85.637613</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>						
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks			
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)				
430.9	1.0	<u>Overburden: Topsoil.</u>							Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3			
		DRAFT			1	2.0-4.0	2.0			ST		
						2	5.0-7.0	2.0				ST
						3	10.0-12.0	2.0				ST
						4	15.0-17.0	2.0				ST
						5	20.0-22.0	2.0				ST
						1	25.0-26.5	0.8		4-12-18		SPT
						2	30.0-31.5	1.0		3-2-1		SPT
						3	35.0-36.5	1.5		0-0-0		SPT
						4	40.0-41.5	1.5		7-11-17		SPT
						5	45.0-46.5	1.5	8-9-15		SPT	
411.9	20.0	<u>Overburden: Clay, brown, moist, sandy.</u>							Drilling mud added to the boring at a depth of 20.0 ft below the ground surface @ 20			
		<u>Overburden: Sand, brown, moist, fine to medium grained, very loose to medium dense, some gravel, some clay.</u>										
396.9	35.0				<u>Overburden: Sand, brown to gray, wet, fine to medium grained, very loose to very dense, poorly graded, some gravel.</u>							
		<u>Overburden: Sand, brown to gray, wet, fine to medium grained, very loose to very dense, poorly graded, some gravel.</u>										
Top of Rock = 99.0' Elevation = 332.9'		Base Weathered Rock = 99.0' Elevation = 332.9'		RDZ = 99.0' Elevation = 332.9'		Louisville Limestone Laurel Dolomite						

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>62</u> Surface Elevation <u>431.9'</u> Total Depth <u>139.8'</u> Location <u>175+59.96 86.0' Lt.</u>		Immediate Water Depth <u>17.5 (08/23/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/19/2011</u> End Date <u>08/22/2011</u> Latitude(83) <u>38.337485</u> Longitude(83) <u>-85.637613</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		DRAFT <u>Overburden: Sand, brown to gray, wet, fine to medium grained, very loose to very dense, poorly graded, some gravel.</u>		6	50.0-51.5	1.5	8-14-15	SPT		
					7	55.0-56.5	1.5	4-8-11	SPT	
					8	60.0-61.5	1.5	6-8-10	SPT	
					9	65.0-66.5	1.5	13-18-15	SPT	
		<u>Overburden: Sand, brown, wet, fine grained, medium dense to dense, some silt, some gravel.</u>		11	75.0-76.5	1.5	10-9-6	SPT		
					12	80.0-81.5	1.5	10-12-22	SPT	
				13	85.0-86.5	1.5	12-15-13	SPT		
				14	90.0-91.5	0.8	7-7-8	SPT		
		<u>Overburden: Sand, brown to gray, wet, fine to medium grained, medium dense, some gravel.</u> (Begin Core)		15	95.0-96.5	1.0	3-6-10	SPT		
100					9.0	9.0	100		100	
Top of Rock = 99.0' Elevation = 332.9'		Base Weathered Rock = 99.0' Elevation = 332.9'		RDZ = 99.0' Elevation = 332.9'		Louisville Limestone Laurel Dolomite				

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>62</u>	Immediate Water Depth <u>17.5 (08/23/11)</u>	Start Date <u>08/19/2011</u>	Hole Type <u>core and sample</u>
Surface Elevation <u>431.9'</u>	Static Water Depth <u>NA</u>	End Date <u>08/22/2011</u>	Rig_Number <u>1050 ATV</u>
Total Depth <u>139.8'</u>	Driller <u>Danny Jessie</u>	Latitude(83) <u>38.337485</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>175+59.96 86.0' Lt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.637613</u>	

Lithology		Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth	Description	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		DRAFT							
105			59 / 53	9.0	9.0	100		105	
								108.0	
110			61 / 58	10.0	10.0	100		110	
								RCS-1 @ 112-112.7	
115								115	
								118.0	
120		Limestone & Shale: <i>Limestone (60%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings. Shale (40%), gray, silty.</i>	87 / 87	10.0	10.0	100		120	
125								125	
									128.0
130				68 / 63	11.8	11.8	100		130
								RCS-2 @ 126.4-127.2	
135								135	
140	292.1							139.8	
								140	
145		(Bottom of Hole 139.8')						145	
150								150	

Top of Rock = 99.0' Base Weathered Rock = 99.0' RDZ = 99.0'
 Elevation = 332.9' Elevation = 332.9' Elevation = 332.9'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>63</u>		Immediate Water Depth <u>19.3 (08/22/11)</u>		Start Date <u>08/22/2011</u>		Hole Type <u>core</u>			
Surface Elevation <u>432.2'</u>		Static Water Depth <u>NA</u>		End Date <u>08/23/2011</u>		Rig Number <u>1050 ATV</u>			
Total Depth <u>129.1'</u>		Driller <u>Danny Jessie</u>		Latitude(83) <u>38.337633</u>		<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Location <u>175+59.96 6.0' Lt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.637407</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
DRAFT									
		<u>Overburden: Overburden.</u>							
333.6	98.6	(Begin Core)							
100				55 /	9.4	9.0	96		100
Top of Rock = 98.6'		Base Weathered Rock = 99.6'		RDZ = 99.6'		Louisville Limestone Laurel Dolomite			
Elevation = 333.6'		Elevation = 332.6'		Elevation = 332.6'					

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>63</u> Surface Elevation <u>432.2'</u> Total Depth <u>129.1'</u> Location <u>175+59.96 6.0' Lt.</u>		Immediate Water Depth <u>19.3 (08/22/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/22/2011</u> End Date <u>08/23/2011</u> Latitude(83) <u>38.337633</u> Longitude(83) <u>-85.637407</u>		Hole Type <u>core</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT <u>Limestone & Shale: Limestone (70%), gray, medium grained, hard, thin to medium bedded, shale streaks, stringers and partings. Shale (30%), gray, silty.</u>		52					
105				55 / 52	9.4	9.0	96		105
110				40 / 38	10.0	10.0	100		108.0 RCS-1 @ 111-111.7
115				70 / 70	11.1	11.1	100		118.0 RCS-2 @ 122.1-123
120									120
125									125
303.1	129.1								129.1
130		(Bottom of Hole 129.1')							130
135									135
140									140
145									145
150									150
Top of Rock = 98.6' Elevation = 333.6'		Base Weathered Rock = 99.6' Elevation = 332.6'		RDZ = 99.6' Elevation = 332.6'		Louisville Limestone Laurel Dolomite			

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>64</u> Surface Elevation <u>432.3'</u> Total Depth <u>128.5'</u> Location <u>175+59.96 6.0' Rt.</u>		Immediate Water Depth <u>19.6 (08/24/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/23/2011</u> End Date <u>08/24/2011</u> Latitude(83) <u>38.337656</u> Longitude(83) <u>-85.637376</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
431.3	1.0	<u>Overburden: Topsoil.</u>							Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3	
		DRAFT		1	2.0-4.0	2.0		ST		
				2	5.0-7.0	2.0		ST		
				3	10.0-12.0	2.0		ST		
			<u>Overburden: Clay, brown, moist, sandy.</u>		4	15.0-17.0	2.0			ST
412.3	20.0				1	20.0-21.5	1.5	0-1-0		SPT
407.3	25.0		<u>Overburden: Sand, brown, wet, medium to fine grained, very loose, some clay.</u>		2	25.0-26.5	1.5	3-3-4		SPT
402.3	30.0		<u>Overburden: Sand, brown, wet, fine to medium grained, loose, some gravel.</u>		3	30.0-31.5	0.5	0-0-0		SPT
					4	35.0-36.5	1.5	3-6-7		SPT
			<u>Overburden: Sand, brown to gray, wet, fine to medium grained, very loose to very dense, poorly graded, some gravel.</u>		5	40.0-41.5	1.5	0-2-3		SPT
					6	45.0-46.5	1.5	8-12-15	SPT	
Top of Rock = 98.5' Elevation = 333.8'		Base Weathered Rock = 101.2' RDZ = 101.2' Elevation = 331.1'		Louisville Limestone Laurel Dolomite						

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>64</u> Surface Elevation <u>432.3'</u> Total Depth <u>128.5'</u> Location <u>175+59.96 6.0' Rt.</u>		Immediate Water Depth <u>19.6 (08/24/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/23/2011</u> End Date <u>08/24/2011</u> Latitude(83) <u>38.337656</u> Longitude(83) <u>-85.637376</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
105		DRAFT <u>Limestone & Shale: Limestone (60%), gray, medium grained, hard, thin to medium bedded, shale streaks, stringers and partings. Shale (40%), gray, silty.</u>		20					highly fractured zone @ 100.2-101.2	
				26 / 20	10.0	9.1	91		108.5	Clay seams and shale partings @ 110.3-112.8
110				56 / 45	10.0	10.0	100		118.5	RCS-1 @ 116.7-117.5
115				78 / 76	10.0	10.0	100			vuggy zone @ 121.7-122.5 RCS-2 @ 124.9-125.7
120										
125										
303.8	128.5									
130		(Bottom of Hole 128.5')								
135										
140										
145										
150										
Top of Rock = 98.5' Elevation = 333.8'		Base Weathered Rock = 101.2' Elevation = 331.1'		RDZ = 101.2' Elevation = 331.1'		Louisville Limestone Laurel Dolomite				

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>65</u>		Immediate Water Depth <u>19.8 (08/25/11)</u>		Start Date <u>08/24/2011</u>		Hole Type <u>core</u>			
Surface Elevation <u>437.7'</u>		Static Water Depth <u>NA</u>		End Date <u>08/25/2011</u>		Rig Number <u>1050 ATV</u>			
Total Depth <u>145.6'</u>		Driller <u>Danny Jessie</u>		Latitude(83) <u>38.337773</u>		<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Location <u>175+59.96 69.0' Rt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.637215</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT							<p>Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3</p> <p>Drilling mud added to the boring at a depth of 20.0 ft below the ground surface @ 20</p>
		<u>Overburden: Overburden.</u>							
Top of Rock = 104.6' Base Weathered Rock = 104.9' RDZ = 104.9'		Elevation = 333.1' Elevation = 332.8' Elevation = 332.8'						Louisville Limestone Laurel Dolomite	

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>65</u>		Immediate Water Depth <u>19.8 (08/25/11)</u>		Start Date <u>08/24/2011</u>			Hole Type <u>core</u>		
Surface Elevation <u>437.7'</u>		Static Water Depth <u>NA</u>		End Date <u>08/25/2011</u>			Rig_Number <u>1050 ATV</u>		
Total Depth <u>145.6'</u>		Driller <u>Danny Jessie</u>		Latitude(83) <u>38.337773</u>			<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>		
Location <u>175+59.96 69.0' Rt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.637215</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
DRAFT									
<u>Overburden: Overburden.</u>									
55									55
60									60
65									65
70									70
75									75
80									80
85									85
90									90
95									95
100									100
Top of Rock = 104.6'		Base Weathered Rock = 104.9'		RDZ = 104.9'		Louisville Limestone Laurel Dolomite			
Elevation = 333.1'		Elevation = 332.8'		Elevation = 332.8'					

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>				Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>						Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>65</u>		Immediate Water Depth <u>19.8 (08/25/11)</u>		Start Date <u>08/24/2011</u>		Hole Type <u>core</u>				
Surface Elevation <u>437.7'</u>		Static Water Depth <u>NA</u>		End Date <u>08/25/2011</u>		Rig Number <u>1050 ATV</u>				
Total Depth <u>145.6'</u>		Driller <u>Danny Jessie</u>		Latitude(83) <u>38.337773</u>		<u>GQ-1211</u>				
Location <u>175+59.96 69.0' Rt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.637215</u>		<u>Jeffersonville, New Albany, and Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		<u>Overburden: Overburden.</u>								
333.1	104.6	(Begin Core)								
		DRAFT		0 / 0	3.4	3.2	94		108.0 soft zone @ 108-108.2	
				36 / 19	10.0	10.0	100		115.6 soft zone @ 115.6-116.4	
				65 / 63	10.0	10.0	100		119.2-120 RCS-1 @ 119.2-120	
			<u>Limestone & Shale: Limestone (70%), gray, medium grained, hard, thin to medium bedded, shale streaks, stringers and partings. Shale (30%), gray, silty.</u>		85 / 81	10.0	10.0	100		139.3-140.1 RCS-2 @ 139.3-140.1
					89 / 89	7.6	7.6	100		
292.1	145.6									
		(Bottom of Hole 145.6')								
Top of Rock = 104.6' Base Weathered Rock = 104.9' RDZ = 104.9'		Elevation = 333.1' Elevation = 332.8' Elevation = 332.8'		Louisville Limestone Laurel Dolomite						

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>66</u> Surface Elevation <u>434.3'</u> Total Depth <u>141.0'</u> Location <u>177+84.96 86.0' Lt.</u>		Immediate Water Depth <u>18.1 (08/23/11)</u> Static Water Depth <u>NA</u> Driller <u>Mark Martin</u> Geologist <u>James Adams</u>		Start Date <u>08/22/2011</u> End Date <u>08/23/2011</u> Latitude(83) <u>38.337940</u> Longitude(83) <u>-85.638143</u>		Hole Type <u>core and sample</u> Rig_Number <u>750 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
433.3	1.0	DRAFT	<u>Overburden: Topsoil.</u>						Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3
			<u>Overburden: Clay, brown, moist, sandy.</u>	1	2.0-4.0	2.0		ST	
			2	5.0-7.0	2.0		ST		
			3	10.0-12.0	2.0		ST		
			4	15.0-17.0	2.0		ST		
			1	20.0-21.5	1.5	1-0-1	SPT	Drilling mud added to the boring at a depth of 20.0 ft below the ground surface @ 20	
		<u>Overburden: Sand, brown, wet, fine to medium grained, very loose to loose, some clay.</u>	2	25.0-26.5	1.5	3-5-5	SPT		
			3	30.0-31.5	0.5	5-5-2	SPT		
			4	35.0-36.5	1.2	2-4-6	SPT		
			5	40.0-41.5	1.0	7-8-9	SPT		
		<u>Overburden: Sand, brown to gray, wet, fine to medium grained, medium dense to very dense, poorly graded, some gravel.</u>	6	45.0-46.5	1.1	4-5-8	SPT		
Top of Rock = 101.0' Base Weathered Rock = 101.2' RDZ = 101.2' Elevation = 333.3' Elevation = 333.1' Elevation = 333.1'		Louisville Limestone Laurel Dolomite							

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>66</u> Surface Elevation <u>434.3'</u> Total Depth <u>141.0'</u> Location <u>177+84.96 86.0' Lt.</u>		Immediate Water Depth <u>18.1 (08/23/11)</u> Static Water Depth <u>NA</u> Driller <u>Mark Martin</u> Geologist <u>James Adams</u>		Start Date <u>08/22/2011</u> End Date <u>08/23/2011</u> Latitude(83) <u>38.337940</u> Longitude(83) <u>-85.638143</u>		Hole Type <u>core and sample</u> Rig Number <u>750 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		<p style="font-size: 2em; color: red; margin: 0;">DRAFT</p> <p style="margin: 10px 0;"><u>Overburden: Sand, brown to gray, wet, fine to medium grained, medium dense to very dense, poorly graded, some gravel.</u></p>		7	50.0-51.5	1.0	5-5-6	SPT		
					8	55.0-56.5	1.3	10-20-20	SPT	
					9	60.0-61.5	1.1	5-7-9	SPT	
					10	65.0-66.5	1.5	5-10-10	SPT	
					11	70.0-70.7	0.0	30-50/0.20'	SPT	
					12	75.0-76.5	1.3	15-20-25	SPT	
					13	80.0-81.5	1.3	10-18-21	SPT	
					14	85.0-86.5	1.5	10-14-16	SPT	
				15	90.0-91.5	1.1	5-7-8	SPT		
				16	95.0-96.5	1.0	12-15-16	SPT		
Top of Rock = 101.0' Base Weathered Rock = 101.2'RDZ = 101.2' Elevation = 333.3' Elevation = 333.1' Elevation = 333.1'		Louisville Limestone Laurel Dolomite								

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>66</u> Surface Elevation <u>434.3'</u> Total Depth <u>141.0'</u> Location <u>177+84.96 86.0' Lt.</u>		Immediate Water Depth <u>18.1 (08/23/11)</u> Static Water Depth <u>NA</u> Driller <u>Mark Martin</u> Geologist <u>James Adams</u>		Start Date <u>08/22/2011</u> End Date <u>08/23/2011</u> Latitude(83) <u>38.337940</u> Longitude(83) <u>-85.638143</u>		Hole Type <u>core and sample</u> Rig_Number <u>750 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
333.3	101.0	(Begin Core)		17	100.0-100.5	0.5	50/0.50'	SPT	
105		DRAFT <u>Limestone & Shale: Limestone (60%), gray, medium grained, hard, thin to medium bedded, shale streaks, stringers and partings. Shale (40%), gray, silty.</u>		15 / 15	6.0	5.5	92		105
110				32 / 28	10.0	9.8	98		110
115									RCS-1 @ 113.8-114.6
120				72 / 65	10.0	10.0	100		120
125									125
130				42 / 31	10.0	10.0	100		130
135									RCS-2 @ 134.3-135.2
140	293.3	141.0		68 / 59	4.0	4.0	100		140
145		(Bottom of Hole 141.0')							145
150									150
Top of Rock = 101.0' Base Weathered Rock = 101.2' RDZ = 101.2' Elevation = 333.3' Elevation = 333.1' Elevation = 333.1'									Louisville Limestone Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>67</u>		Immediate Water Depth <u>19.3 (08/25/11)</u>		Start Date <u>08/24/2011</u>			Hole Type <u>core</u>		
Surface Elevation <u>438.8'</u>		Static Water Depth <u>NA</u>		End Date <u>08/25/2011</u>			Rig_Number <u>750 ATV</u>		
Total Depth <u>134.5'</u>		Driller <u>Mark Martin</u>		Latitude(83) <u>38.338088</u>			<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>		
Location <u>177+84.96 31.0' Lt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.637938</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
DRAFT									
55									55
60									60
65									65
70									70
75			<u>Overburden: Overburden.</u>						75
80									80
85									85
90									90
95									95
100									100
Top of Rock = 104.5'		Base Weathered Rock = 105.0'		RDZ = 105.0'			Louisville Limestone Laurel Dolomite		
Elevation = 334.3'		Elevation = 333.8'		Elevation = 333.8'					

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>67</u> Surface Elevation <u>438.8'</u> Total Depth <u>134.5'</u> Location <u>177+84.96 31.0' Lt.</u>		Immediate Water Depth <u>19.3 (08/25/11)</u> Static Water Depth <u>NA</u> Driller <u>Mark Martin</u> Geologist <u>James Adams</u>		Start Date <u>08/24/2011</u> End Date <u>08/25/2011</u> Latitude(83) <u>38.338088</u> Longitude(83) <u>-85.637938</u>			Hole Type <u>core</u> Rig Number <u>750 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>		
Lithology	Description		Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		<u>Overburden: Overburden.</u>							
334.3	104.5	(Begin Core)							
		DRAFT <u>Limestone & Shale: Limestone (60%), gray, medium grained, hard, thin to medium bedded, fossiliferous, shale streaks, stringers and partings. Shale (40%), gray, silty.</u>		18 / 18	7.2	7.2	100		fractured zone @ 104.5-107 RCS-1 @ 109.3-110.1
				42 / 38	10.0	9.9	99		soft zone @ 116.1-116.4
				60 / 57	5.0	5.0	100		fossiliferous @ 126.7-127.8 RCS-2 @ 128.5-129.2
				49 / 49	7.8	7.8	100		
304.3	134.5								
		(Bottom of Hole 134.5')							

Top of Rock = 104.5' Base Weathered Rock = 105.0' RDZ = 105.0'
 Elevation = 334.3' Elevation = 333.8' Elevation = 333.8'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>70</u> Surface Elevation <u>437.6'</u> Total Depth <u>138.0'</u> Location <u>180+00.96 86.0' Lt.</u>		Immediate Water Depth <u>21.0 (08/18/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/17/2011</u> End Date <u>08/18/2011</u> Latitude(83) <u>38.338376</u> Longitude(83) <u>-85.638653</u>		Hole Type <u>core and sample</u> Rig Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
436.6	1.0	<u>Overburden: Topsoil.</u>							Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3	
		<h1 style="color: red;">DRAFT</h1> <p><u>Overburden: Clay, brown, moist, sandy.</u></p>		1	2.0-4.0	2.0		ST		
					2	5.0-7.0	2.0			ST
					3	10.0-12.0	2.0			ST
										Drilling mud added to the boring at a depth of 25.0 ft below the ground surface @ 25
		<u>Overburden: Sand, brown, wet, medium to fine grained, very loose, some clay.</u>		4	15.0-17.0	0.5		ST		
				1	17.0-18.5	1.5	0-1-1	SPT		
				2	20.0-21.5	1.5	0-1-0	SPT		
										<u>Overburden: Sand, brown to gray, wet, fine to medium grained, medium dense to very dense, poorly graded, some gravel.</u>
				3	25.0-26.5	1.5	1-1-0	SPT		
				4	30.0-31.5	1.0	18-22-28	SPT		
				5	35.0-36.5	1.5	5-8-12	SPT		
				6	40.0-41.5	1.5	5-11-18	SPT		
				7	45.0-46.5	1.5	6-8-13	SPT		

Top of Rock = 103.3' Base Weathered Rock = 103.3' RDZ = 103.3'
 Elevation = 334.3' Elevation = 334.3' Elevation = 334.3'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>70</u> Surface Elevation <u>437.6'</u> Total Depth <u>138.0'</u> Location <u>180+00.96 86.0' Lt.</u>		Immediate Water Depth <u>21.0 (08/18/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/17/2011</u> End Date <u>08/18/2011</u> Latitude(83) <u>38.338376</u> Longitude(83) <u>-85.638653</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		<p style="font-size: 2em; color: red; margin: 0;">DRAFT</p> <p style="margin: 10px 0;"><u>Overburden: Sand, brown to gray, wet, fine to medium grained, medium dense to very dense, poorly graded, some gravel.</u></p>		8	50.0-51.5	1.5	5-9-12	SPT		
					9	55.0-56.5	1.5	7-10-14	SPT	
					10	60.0-61.5	0.5	5-4-12	SPT	
					11	65.0-66.5	1.5	6-10-18	SPT	
					12	70.0-71.5	1.5	4-8-10	SPT	
					13	75.0-76.5	1.1	4-5-9	SPT	
					14	80.0-81.5	0.9	14-19-34	SPT	
					15	85.0-86.5	1.2	7-6-7	SPT	
					16	90.0-91.5	1.5	6-11-14	SPT	
				17	95.0-96.5	1.5	12-14-15	SPT		
Top of Rock = 103.3' Base Weathered Rock = 103.3' RDZ = 103.3' Elevation = 334.3' Elevation = 334.3' Elevation = 334.3'		Louisville Limestone Laurel Dolomite								

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>70</u> Surface Elevation <u>437.6'</u> Total Depth <u>138.0'</u> Location <u>180+00.96 86.0' Lt.</u>		Immediate Water Depth <u>21.0 (08/18/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/17/2011</u> End Date <u>08/18/2011</u> Latitude(83) <u>38.338376</u> Longitude(83) <u>-85.638653</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology	Description		Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
334.3	103.3	<u>Overburden: Sand, brown to gray, wet, fine to medium grained, medium dense to very dense, poorly graded, some gravel.</u>	(Begin Core)	18	100.0-101.5	1.5	7-14-14	SPT		
105		DRAFT		8 / 8	4.7	4.3	91		105	
110									110	
115					18 / 18	10.0	9.8	98		115
120			<u>Limestone & Shale: Limestone (60%), gray, fine grained, hard, thin to medium bedded, shale streaks, stringers and partings. Shale (40%), gray, silty.</u>		21 / 21	10.0	9.0	90		120
125									125	
130									130	
135				47 / 47	10.0	10.0	100		135	
299.6	138.0								138.0	
140		(Bottom of Hole 138.0')							140	
145									145	
150									150	

Top of Rock = 103.3' Base Weathered Rock = 103.3' RDZ = 103.3'
 Elevation = 334.3' Elevation = 334.3' Elevation = 334.3'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>71</u>		Immediate Water Depth <u>18.0 (08/18/11)</u>		Start Date <u>08/18/2011</u>		Hole Type <u>core</u>			
Surface Elevation <u>439.2'</u>		Static Water Depth <u>NA</u>		End Date <u>08/18/2011</u>		Rig Number <u>750 ATV</u>			
Total Depth <u>137.1'</u>		Driller <u>Muriell Wethington</u>		Latitude(83) <u>38.338525</u>		<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Location <u>180+00.96 24.0' Lt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.638448</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT							<p>Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3 boring moved an additional 18.0' left of centerline to avoid toe of embankment, approximate elevation change of 5.0' @ 6</p> <p>Drilling mud added to the boring at a depth of 20.0 ft below the ground surface @ 20</p>
		<u>Overburden: Overburden.</u>							

Top of Rock = 107.1' Base Weathered Rock = 107.6' RDZ = 107.6'
 Elevation = 332.1' Elevation = 331.6' Elevation = 331.6'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>71</u>	Immediate Water Depth <u>18.0 (08/18/11)</u>	Start Date <u>08/18/2011</u>	Hole Type <u>core</u>
Surface Elevation <u>439.2'</u>	Static Water Depth <u>NA</u>	End Date <u>08/18/2011</u>	Rig_Number <u>750 ATV</u>
Total Depth <u>137.1'</u>	Driller <u>Muriell Wethington</u>	Latitude(83) <u>38.338525</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>180+00.96 24.0' Lt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.638448</u>	

Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
DRAFT									
55									55
60									60
65									65
70									70
75		<u>Overburden: Overburden.</u>							75
80									80
85									85
90									90
95									95
100									100

Top of Rock = 107.1' Base Weathered Rock = 107.6' RDZ = 107.6'
 Elevation = 332.1' Elevation = 331.6' Elevation = 331.6'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>71</u> Surface Elevation <u>439.2'</u> Total Depth <u>137.1'</u> Location <u>180+00.96 24.0' Lt.</u>		Immediate Water Depth <u>18.0 (08/18/11)</u> Static Water Depth <u>NA</u> Driller <u>Muriell Wethington</u> Geologist <u>James Adams</u>		Start Date <u>08/18/2011</u> End Date <u>08/18/2011</u> Latitude(83) <u>38.338525</u> Longitude(83) <u>-85.638448</u>		Hole Type <u>core</u> Rig_Number <u>750 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
105	332.1	107.1	<u>Overburden: Overburden.</u> (Begin Core)						
110			DRAFT	55 / 48	9.7	9.0	93		weathered zone @ 107.1-107.6
115									116.8
120				48 / 37	10.0	10.0	100		
125			<u>Limestone & Shale: Limestone (70%), gray, fine grained, hard, thin bedded, shale streaks, stringers and partings. Shale (30%), gray, silty.</u>						RCS-1 @ 124.6-125.5
130									126.8
135				66 / 66	10.3	10.3	100		RCS-2 @ 128.6-129.3 vuggy @ 129.8-130.4
140	302.1	137.1							soft zone @ 136-136.1
145			(Bottom of Hole 137.1')						
150									
Top of Rock = 107.1' Base Weathered Rock = 107.6' RDZ = 107.6' Elevation = 332.1' Elevation = 331.6' Elevation = 331.6'									Louisville Limestone Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>74</u>	Immediate Water Depth <u>12.9 (08/17/11)</u>	Start Date <u>08/16/2011</u>	Hole Type <u>core</u>
Surface Elevation <u>432.7'</u>	Static Water Depth <u>NA</u>	End Date <u>08/17/2011</u>	Rig Number <u>750 ATV</u>
Total Depth <u>138.2'</u>	Driller <u>Muriell Wethington</u>	Latitude(83) <u>38.338922</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>182+70.96 90.0' Lt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.639290</u>	

Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
5		DRAFT							Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3 Boring was originally drilled with 3.25" auger, Boring was re-drilled an additional 4.0' LT of original boring with 4.25" due to the previous augers drilling an off-centered boring @ 6 Drilling mud added to the boring at a depth of 15.0 ft below the ground surface, @ 15
10									
15									
20									
25			<u>Overburden: overburden.</u>						
30									
35									
40									
45									
50									

Top of Rock = 98.2' Base Weathered Rock = 99.2' RDZ = 99.2'
 Elevation = 334.5' Elevation = 333.5' Elevation = 333.5'

Louisville Limestone
 Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>74</u>	Immediate Water Depth <u>12.9 (08/17/11)</u>	Start Date <u>08/16/2011</u>	Hole Type <u>core</u>
Surface Elevation <u>432.7'</u>	Static Water Depth <u>NA</u>	End Date <u>08/17/2011</u>	Rig Number <u>750 ATV</u>
Total Depth <u>138.2'</u>	Driller <u>Muriell Wethington</u>	Latitude(83) <u>38.338922</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>182+70.96 90.0' Lt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.639290</u>	

Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT							
55									55
60									60
65									65
70									70
75		<u>Overburden: overburden.</u>							75
80									80
85									85
90									90
95									95
334.5	98.2		(Begin Core)						
100				39 / 29	8.0	8.0	100		100

Top of Rock = 98.2' Base Weathered Rock = 99.2' RDZ = 99.2'
 Elevation = 334.5' Elevation = 333.5' Elevation = 333.5'

Louisville Limestone
 Laurel Dolomite

weathered @
98.2-99.2

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>74</u> Surface Elevation <u>432.7'</u> Total Depth <u>138.2'</u> Location <u>182+70.96 90.0' Lt.</u>		Immediate Water Depth <u>12.9 (08/17/11)</u> Static Water Depth <u>NA</u> Driller <u>Muriell Wethington</u> Geologist <u>James Adams</u>		Start Date <u>08/16/2011</u> End Date <u>08/17/2011</u> Latitude(83) <u>38.338922</u> Longitude(83) <u>-85.639290</u>			Hole Type <u>core</u> Rig_Number <u>750 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		<p style="text-align: center; color: red; font-size: 2em;">DRAFT</p> <p>Limestone & Shale: Limestone (70%), gray, fine grained, hard, thin bedded, shale streaks, stringers and partings. Shale (30%), dark gray, silty.</p>		39 / 29	8.0	8.0	100		soft zone @ 99-99.2	
105										106.2
110					57 / 57	10.0	10.0	100		soft zone @ 111.4-111.7
115										116.2 RCS-1 @ 116.1-116.8
120					43 / 37	10.0	10.0	100		soft zone @ 119.1-119.4
125									126.2	
130				77 / 75	10.0	10.0	100		RCS-2 @ 131.2-132.1	
135									136.2	
294.5	138.2			29 / 29	2.0	2.0	100		138.2	
140		(Bottom of Hole 138.2')							140	
145									145	
150									150	
Top of Rock = 98.2' Elevation = 334.5'		Base Weathered Rock = 99.2' Elevation = 333.5'		RDZ = 99.2' Elevation = 333.5'		Louisville Limestone Laurel Dolomite				

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>75</u> Surface Elevation <u>433.3'</u> Total Depth <u>128.0'</u> Location <u>182+70.96 6.0' Lt.</u>		Immediate Water Depth <u>13.2 (08/16/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/16/2011</u> End Date <u>08/16/2011</u> Latitude(83) <u>38.339071</u> Longitude(83) <u>-85.639085</u>			Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>		
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
432.3	1.0	<u>Overburden: Topsoil.</u>							Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3
		DRAFT		1	2.0-4.0	2.0		ST	
				2	5.0-7.0	1.5			
		<u>Overburden: Clay, brown, moist, some sand.</u>							
		3	10.0-12.0	2.0				ST	
15	15.0	<u>Overburden: Sand, brown, wet, fine to medium grained, very loose, some clay.</u>		1	15.0-16.5	1.5	1-0-0	SPT	
20	20.0			2	20.0-21.5	1.2	2-1-1	SPT	
25		<u>Overburden: Sand, gray, wet, fine to medium grained, very loose to medium dense, some clay.</u>		3	25.0-26.5	0.8	3-4-14	SPT	
30	30.0			4	30.0-31.5	0.6	7-19-18	SPT	
35				5	35.0-36.5	0.8	4-6-7	SPT	
40		<u>Overburden: Sand, brown to gray, wet, fine to medium grained, medium dense to very dense, poorly graded, some gravel.</u>		6	40.0-41.5	1.5	5-8-9	SPT	
45				7	45.0-46.5	1.3	50-50-50/0.50'	SPT	
50									
Top of Rock = 98.0' Elevation = 335.3'		Base Weathered Rock = 98.2' RDZ = 98.2' Elevation = 335.1'						Louisville Limestone Laurel Dolomite	

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>				Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>75</u> Surface Elevation <u>433.3'</u> Total Depth <u>128.0'</u> Location <u>182+70.96 6.0' Lt.</u>		Immediate Water Depth <u>13.2 (08/16/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/16/2011</u> End Date <u>08/16/2011</u> Latitude(83) <u>38.339071</u> Longitude(83) <u>-85.639085</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		<p style="font-size: 2em; color: red; margin: 0;">DRAFT</p> <p style="margin: 10px 0;"><u>Overburden: Sand, brown to gray, wet, fine to medium grained, medium dense to very dense, poorly graded, some gravel.</u></p> <p style="text-align: right; margin: 0;">(Begin Core)</p>		8	50.0-51.5	1.5	9-15-18	SPT		
					9	55.0-56.5	1.5	3-9-13	SPT	
					10	60.0-61.5	1.5	9-15-16	SPT	
					11	65.0-66.5	1.1	3-6-11	SPT	
					12	70.0-71.5	1.5	6-9-12	SPT	
					13	75.0-76.5	1.2	8-13-13	SPT	
					14	80.0-81.5	1.3	9-7-11	SPT	
					15	85.0-86.5	1.5	7-8-10	SPT	
					16	90.0-91.5	1.1	8-11-14	SPT	
				17	95.0-96.5	1.2	7-8-12	SPT		
335.3	98.0									
				0 / 0	10.0	10.0	100			
Top of Rock = 98.0' Base Weathered Rock = 98.2' RDZ = 98.2' Elevation = 335.3' Elevation = 335.1' Elevation = 335.1'									Louisville Limestone Laurel Dolomite	

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>75</u> Surface Elevation <u>433.3'</u> Total Depth <u>128.0'</u> Location <u>182+70.96 6.0' Lt.</u>		Immediate Water Depth <u>13.2 (08/16/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/16/2011</u> End Date <u>08/16/2011</u> Latitude(83) <u>38.339071</u> Longitude(83) <u>-85.639085</u>		Hole Type <u>core and sample</u> Rig Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
105		<p style="text-align: center; color: red; font-size: 2em;">DRAFT</p> <p><u>Limestone & Shale</u>: Limestone (60%), gray, fine grained, hard, thin bedded, shale streaks, stringers and partings. Shale (40%), dark gray, silty.</p>		0 / 0	10.0	10.0	100		105
110				0 / 0	10.0	10.0	100		108.0 100% water loss throughout 3 runs @ 108
115									118.0
120									
125				17 / 17	10.0	10.0	100		125
305.3	128.0								128.0 RCS-1 @ 125.6-126.5 RCS-2 @ 127.1-127.8
130		(Bottom of Hole 128.0')							130
135									135
140									140
145									145
150									150
Top of Rock = 98.0' Elevation = 335.3'		Base Weathered Rock = 98.2' Elevation = 335.1'		RDZ = 98.2' Elevation = 335.1'		Louisville Limestone Laurel Dolomite			

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>76</u>		Immediate Water Depth <u>12.4 (08/15/11)</u>		Start Date <u>08/15/2011</u>		Hole Type <u>core</u>			
Surface Elevation <u>433.2'</u>		Static Water Depth <u>NA</u>		End Date <u>08/15/2011</u>		Rig Number <u>1050 ATV</u>			
Total Depth <u>128.1'</u>		Driller <u>Danny Jessie</u>		Latitude(83) <u>38.339093</u>		<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Location <u>182+70.96 6.0' Rt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.639054</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT							<p>Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3</p> <p>Drilling mud added to the boring at a depth of 15.0 ft below the ground surface @ 15</p>
			<u>Overburden: overburden.</u>						
Top of Rock = 98.1' Elevation = 335.1'		Base Weathered Rock = 98.5' Elevation = 334.7'		RDZ = 98.5' Elevation = 334.7'		Louisville Limestone Laurel Dolomite			

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>76</u>		Immediate Water Depth <u>12.4 (08/15/11)</u>		Start Date <u>08/15/2011</u>		Hole Type <u>core</u>			
Surface Elevation <u>433.2'</u>		Static Water Depth <u>NA</u>		End Date <u>08/15/2011</u>		Rig Number <u>1050 ATV</u>			
Total Depth <u>128.1'</u>		Driller <u>Danny Jessie</u>		Latitude(83) <u>38.339093</u>		<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Location <u>182+70.96 6.0' Rt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.639054</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
DRAFT									
		<u>Overburden: overburden.</u>							
335.1	98.1	(Begin Core)		30 / 22	10.0	8.7	87		
100									100
Top of Rock = 98.1' Elevation = 335.1'		Base Weathered Rock = 98.5' RDZ = 98.5' Elevation = 334.7'						Louisville Limestone Laurel Dolomite	

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>76</u> Surface Elevation <u>433.2'</u> Total Depth <u>128.1'</u> Location <u>182+70.96 6.0' Rt.</u>		Immediate Water Depth <u>12.4 (08/15/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/15/2011</u> End Date <u>08/15/2011</u> Latitude(83) <u>38.339093</u> Longitude(83) <u>-85.639054</u>		Hole Type <u>core</u> Rig Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
105		<p style="text-align: center; color: red; font-size: 2em;">DRAFT</p> <p><u>Limestone & Shale</u>: Limestone (60%), gray, fine grained, hard, thin bedded, shale streaks, stringers and partings. Shale (40%), dark gray, silty.</p>		30 / 22	10.0	8.7	87		void, 100% water loss @ 105-105.8
110				28 / 28	10.0	10.0	100		RCS-1 @ 117.4-118.1
115				45 / 38	10.0	10.0	100		RCS-2 @ 121.5-122.3
120									
125									
305.1	128.1								
130		(Bottom of Hole 128.1')							
135									
140									
145									
150									
Top of Rock = 98.1' Elevation = 335.1'		Base Weathered Rock = 98.5' Elevation = 334.7'		RDZ = 98.5' Elevation = 334.7'		Louisville Limestone Laurel Dolomite			

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>77</u>		Immediate Water Depth <u>16.6 (08/17/11)</u>		Start Date <u>08/17/2011</u>		Hole Type <u>core and sample</u>			
Surface Elevation <u>434.0'</u>		Static Water Depth <u>NA</u>		End Date <u>08/17/2001</u>		Rig Number <u>1050 ATV</u>			
Total Depth <u>138.6'</u>		Driller <u>Danny Jessie</u>		Latitude(83) <u>38.339210</u>		<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Location <u>182+70.96 69.0' Rt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.638892</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
433.0	1.0	<u>Overburden: Topsoil.</u>							Boring advanced with 4.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3
		DRAFT		1	2.0-4.0	2.0		ST	
				2	5.0-7.0	1.8			
		<u>Overburden: Clay, brown, moist, some sand.</u>							Drilling mud added to the boring at a depth of 20.0 ft below the ground surface @ 20
422.0	12.0			3	10.0-12.0	0.0		ST	
		<u>Overburden: Clay, brown, wet, very soft, some sand.</u>		1	12.0-13.5	1.5	0-0-0	SPT	
				2	15.0-16.5	1.5	0-1-0	SPT	
				3	20.0-21.5	1.5	0-1-0	SPT	
		<u>Overburden: Clay, gray, wet, soft, some sand.</u>		4	25.0-26.5	1.5	1-1-1	SPT	
		<u>Overburden: Sand, brown to gray, wet, fine to medium grained, medium dense, poorly graded, some gravel.</u>		5	30.0-31.5	0.4	3-10-14	SPT	
		<u>Overburden: Clay, gray, wet, very stiff, some sand.</u>		6	35.0-36.5	0.8	9-10-15	SPT	
		<u>Overburden: Sand, brown to gray, wet, fine to medium grained, medium dense, poorly graded, some gravel.</u>		7	40.0-41.5	1.0	8-15-15	SPT	
						8	45.0-46.5	0.5	6-13-16
Top of Rock = 98.2' Elevation = 335.8'		Base Weathered Rock = 98.5' RDZ = 98.5' Elevation = 335.5'							Louisville Limestone Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>77</u> Surface Elevation <u>434.0'</u> Total Depth <u>138.6'</u> Location <u>182+70.96 69.0' Rt.</u>		Immediate Water Depth <u>16.6 (08/17/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/17/2011</u> End Date <u>08/17/2001</u> Latitude(83) <u>38.339210</u> Longitude(83) <u>-85.638892</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		DRAFT		9	50.0-51.5	0.9	5-9-10	SPT		
					10	55.0-56.5	0.5	6-8-10	SPT	
					11	60.0-61.5	1.3	4-7-7	SPT	
					12	65.0-66.5	1.1	4-7-11	SPT	
					13	70.0-71.5	1.5	7-10-16	SPT	
					14	75.0-76.5	1.4	7-9-13	SPT	
					15	80.0-81.5	1.2	10-9-13	SPT	
					16	85.0-86.5	1.2	6-5-10	SPT	
					17	90.0-91.5	1.5	6-11-17	SPT	
				18	95.0-96.5	1.5	5-6-9	SPT		
335.8	98.2		(Begin Core)							
				9 / 4	10.4	10.0	96		weathered zone @	
Top of Rock = 98.2' Elevation = 335.8'		Base Weathered Rock = 98.5' Elevation = 335.5'		RDZ = 98.5' Elevation = 335.5'		Louisville Limestone Laurel Dolomite				

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>						
Hole Number <u>77</u> Surface Elevation <u>434.0'</u> Total Depth <u>138.6'</u> Location <u>182+70.96 69.0' Rt.</u>		Immediate Water Depth <u>16.6 (08/17/11)</u> Static Water Depth <u>NA</u> Driller <u>Danny Jessie</u> Geologist <u>James Adams</u>		Start Date <u>08/17/2011</u> End Date <u>08/17/2001</u> Latitude(83) <u>38.339210</u> Longitude(83) <u>-85.638892</u>		Hole Type <u>core and sample</u> Rig_Number <u>1050 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks		
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)			
105		<p style="text-align: center; color: red; font-size: 2em;">DRAFT</p> <p><u>Limestone & Shale</u>: Limestone (60%), gray, fine grained, hard, thin bedded, shale streaks, stringers and partings. Shale (40%), dark gray, silty.</p>		9 / 4	10.4	10.0	96		98.2-98.5 98.5 water loss @ 100		
110									108.6	RCS-1 @ 110.1-110.8	
115					31 / 28	10.0	10.0	100			
120										118.6	void @ 119.2-120.2
125											
130											
135											
295.4	138.6									128.6	RCS-2 @ 130-130.7
140										138.6	
145		(Bottom of Hole 138.6')									
150											
Top of Rock = 98.2' Elevation = 335.8'		Base Weathered Rock = 98.5' Elevation = 335.5'		RDZ = 98.5' Elevation = 335.5'		Louisville Limestone Laurel Dolomite					

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>						
Hole Number <u>78</u> Surface Elevation <u>429.1'</u> Total Depth <u>136.0'</u> Location <u>184+86.96 86.0' Lt.</u>		Immediate Water Depth <u>13.2 (08/15/11)</u> Static Water Depth <u>NA</u> Driller <u>Muriell Wethington</u> Geologist <u>James Adams</u>		Start Date <u>08/12/2011</u> End Date <u>08/15/2011</u> Latitude(83) <u>38.339359</u> Longitude(83) <u>-85.639800</u>		Hole Type <u>core and sample</u> Rig_Number <u>750 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks		
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)			
428.1	1.0	<u>Overburden: Topsoil.</u>							Boring advanced with 3.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3		
		DRAFT		1	2.0-4.0	2.0		ST			
				2	5.0-7.0	1.8		ST			
				3	10.0-12.0	2.0		ST			
			<u>Overburden: Clay, brown, moist, some sand.</u>		4	15.0-17.0	1.8			ST	
20 409.1	20.0				1	20.0-21.5	1.5	2-1-2		SPT	Drilling mud added to the boring at a depth of 20.0 ft below the ground surface @ 20
25 404.1	25.0		<u>Overburden: Clay, brown, wet, soft, some sand.</u>		2	25.0-26.5	0.8	5-7-9		SPT	
30 399.1	30.0		<u>Overburden: Clay, gray, wet, very stiff, some sand.</u>		3	30.0-31.5	0.8	6-9-14		SPT	
35 394.1	35.0		<u>Overburden: Sand, brown, wet, fine to medium grained, medium dense, poorly graded, some gravel.</u>		4	35.0-36.5	1.5	5-6-8		SPT	
40					5	40.0-41.5	1.2	9-10-11		SPT	
45			<u>Overburden: Sand, brown to gray, fine to medium grained, medium dense to dense, poorly graded, some gravel.</u>		6	45.0-46.5	0.2	7-10-17	SPT		
50									50		
Top of Rock = 95.0' Elevation = 334.1'		Base Weathered Rock = 95.0' Elevation = 334.1'		RDZ = 95.0' Elevation = 334.1'		Louisville Limestone Laurel Dolomite					

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>				Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>78</u> Surface Elevation <u>429.1'</u> Total Depth <u>136.0'</u> Location <u>184+86.96 86.0' Lt.</u>		Immediate Water Depth <u>13.2 (08/15/11)</u> Static Water Depth <u>NA</u> Driller <u>Muriell Wethington</u> Geologist <u>James Adams</u>		Start Date <u>08/12/2011</u> End Date <u>08/15/2011</u> Latitude(83) <u>38.339359</u> Longitude(83) <u>-85.639800</u>		Hole Type <u>core and sample</u> Rig_Number <u>750 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		DRAFT		7	50.0-51.5	1.5	6-10-12	SPT		
					8	55.0-56.5	1.0	3-7-13	SPT	
					9	60.0-61.5	1.5	4-6-10	SPT	
					10	65.0-66.5	0.0	11-14-11	SPT	
					11	70.0-71.5	1.5	9-21-22	SPT	
					12	75.0-76.5	1.2	4-5-7	SPT	
					13	80.0-81.5	1.2	4-6-13	SPT	
					14	85.0-86.5	1.2	5-7-9	SPT	
				15	90.0-91.5	1.5	7-9-14	SPT		
95	334.1		(Begin Core)							
		Limestone & Shale: Limestone (70%), gray, fine grained, hard, thin bedded, fossiliferous shale streaks, stringers and partings. Shale (30%), dark gray, silty.		43 / 18	2.8	2.8	100		97.8 45 degree fracture @ 96-96.2 Vertical Fracture @ 100	
					73 / 52	10.0	10.0	100		
100										
Top of Rock = 95.0' Elevation = 334.1'		Base Weathered Rock = 95.0' RDZ = 95.0' Elevation = 334.1'		Louisville Limestone Laurel Dolomite						

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>78</u> Surface Elevation <u>429.1'</u> Total Depth <u>136.0'</u> Location <u>184+86.96 86.0' Lt.</u>		Immediate Water Depth <u>13.2 (08/15/11)</u> Static Water Depth <u>NA</u> Driller <u>Muriell Wethington</u> Geologist <u>James Adams</u>		Start Date <u>08/12/2011</u> End Date <u>08/15/2011</u> Latitude(83) <u>38.339359</u> Longitude(83) <u>-85.639800</u>		Hole Type <u>core and sample</u> Rig_Number <u>750 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		<p style="text-align: center; color: red; font-size: 2em; font-weight: bold;">DRAFT</p> <p><u>Limestone & Shale: Limestone (70%), gray, fine grained, hard, thin bedded, fossiliferous shale streaks, stringers and partings. Shale (30%), dark gray, silty.</u></p>		73 / 52	10.0	10.0	100		97.2-97.4 RCS-1 @ 98.7-99.6	
105										107.8
110					52 / 52	10.0	10.0	100		vertical fracture @ 115.4-115.7 fossiliferous @ 117.3-117.8
115										117.8
120				85 / 78	10.0	10.0	100		RCS-2 @ 124.7-125.9	
125									127.8	
130				94 / 94	8.2	8.2	100			
135	293.1	136.0							136.0	
140		(Bottom of Hole 136.0')								
145										
150										
Top of Rock = 95.0' Base Weathered Rock = 95.0' RDZ = 95.0' Elevation = 334.1' Elevation = 334.1' Elevation = 334.1'									Louisville Limestone Laurel Dolomite	

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>79</u> Surface Elevation <u>430.2'</u> Total Depth <u>126.1'</u> Location <u>184+86.96 6.0' Lt.</u>		Immediate Water Depth <u>12.8 (08/11/11)</u> Static Water Depth <u>NA</u> Driller <u>Muriell Wethington</u> Geologist <u>James Adams</u>		Start Date <u>08/10/2011</u> End Date <u>08/11/2011</u> Latitude(83) <u>38.339507</u> Longitude(83) <u>-85.639594</u>		Hole Type <u>core and sample</u> Rig Number <u>750 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
429.2	1.0	<u>Overburden: Topsoil.</u>							Boring advanced with 3.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3	
		<u>Overburden: Clay, brown, moist, some sand.</u>		1	2.0-4.0	2.0		ST		
					2	5.0-7.0	1.6			ST
420.2	10.0	DRAFT <u>Overburden: Sand, brown, wet, fine to medium grained, very loose to medium dense, poorly graded, some clay.</u>		3	10.0-12.0	1.0		ST	Drilling mud added to the boring at a depth of 15.0 ft below the ground surface @ 15	
					1	15.0-16.5	1.5	3-2-3		SPT
					2	20.0-21.5	0.8	0-1-2		SPT
					3	25.0-26.5	1.5	2-5-12		SPT
					4	30.0-31.5	0.8	12-12-13		SPT
					5	35.0-36.5	0.8	5-6-6		SPT
					6	40.0-41.5	1.5	7-7-11		SPT
399.5	30.7	<u>Overburden: Sand, brown to dark gray, wet, fine to medium grained, medium dense to very dense, poorly graded, some gravel.</u>								
					7	45.0-46.5	1.5	10-12-19	SPT	
Top of Rock = 95.5' Elevation = 334.7'		Base Weathered Rock = 95.7' RDZ = 95.7' Elevation = 334.5'		Louisville Limestone Laurel Dolomite						

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>	<u>Jefferson - LSIORB East End Approach</u>	Project Type: <u>Structure State Bridge</u>
Item Number: <u>5-731.00</u>		Project Manager: <u>Mark Litkenhus</u>

Hole Number <u>79</u>	Immediate Water Depth <u>12.8 (08/11/11)</u>	Start Date <u>08/10/2011</u>	Hole Type <u>core and sample</u>
Surface Elevation <u>430.2'</u>	Static Water Depth <u>NA</u>	End Date <u>08/11/2011</u>	Rig Number <u>750 ATV</u>
Total Depth <u>126.1'</u>	Driller <u>Muriell Wethington</u>	Latitude(83) <u>38.339507</u>	<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>
Location <u>184+86.96 6.0' Lt.</u>	Geologist <u>James Adams</u>	Longitude(83) <u>-85.639594</u>	

Lithology	Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth	Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
			8	50.0-51.5	1.5	12-20-20	SPT	
			9	55.0-56.5	1.5	5-6-10	SPT	
			10	60.0-61.5	1.0	12-16-18	SPT	
			11	65.0-66.5	1.5	7-7-10	SPT	
			12	70.0-71.5	1.5	8-8-10	SPT	
			13	75.0-76.5	1.2	23-17-15	SPT	
			14	80.0-81.5	1.3	4-5-8	SPT	
			15	85.0-86.5	1.4	4-6-7	SPT	
			16	90.0-91.5	1.1	8-8-8	SPT	
95	334.7	95.5	(Begin Core)					
			17	95.0-95.5	0.3	50/0.50'	SPT	
			88 / 42	2.6	2.6	100		98.1 weathered @ 95.5-95.7 vertical fracture @ 97.3-97.5
			63 / 39	10.0	10.0	100		

DRAFT

Overburden: Sand, brown to dark gray, wet, fine to medium grained, medium dense to very dense, poorly graded, some gravel.

Limestone & Shale: Limestone (70%), gray, fine grained, hard, thin bedded, fossiliferous shale streaks, stringers and partings. Shale (30%), gray, silty.

Top of Rock = 95.5' Elevation = 334.7' Base Weathered Rock = 95.7' Elevation = 334.5' RDZ = 95.7' Elevation = 334.5'

Louisville Limestone
Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>79</u> Surface Elevation <u>430.2'</u> Total Depth <u>126.1'</u> Location <u>184+86.96 6.0' Lt.</u>		Immediate Water Depth <u>12.8 (08/11/11)</u> Static Water Depth <u>NA</u> Driller <u>Muriell Wethington</u> Geologist <u>James Adams</u>		Start Date <u>08/10/2011</u> End Date <u>08/11/2011</u> Latitude(83) <u>38.339507</u> Longitude(83) <u>-85.639594</u>		Hole Type <u>core and sample</u> Rig Number <u>750 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
105		<p style="text-align: center; color: red; font-size: 2em;">DRAFT</p> <p><u>Limestone & Shale</u>: Limestone (70%), gray, fine grained, hard, thin bedded, fossiliferous shale streaks, stringers and partings. Shale (30%), gray, silty.</p>		63 / 39	10.0	10.0	100		RCS-1 @ 100.8-101.8
110				60 / 52	10.0	10.0	100		108.1
115				61 / 65	8.0	8.0	100		fossiliferous @ 117-118.3 100% water loss @ 117.01 RCS-2 @ 122.5-123.3
120									118.1
125	304.1	126.1							120
130		(Bottom of Hole 126.1')							126.1
135									130
140									135
145									140
150									145
									150
Top of Rock = 95.5' Base Weathered Rock = 95.7' RDZ = 95.7' Elevation = 334.7' Elevation = 334.5' Elevation = 334.5'									Louisville Limestone Laurel Dolomite

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>80</u>		Immediate Water Depth <u>14.0 (08/10/11)</u>		Start Date <u>08/10/2011</u>			Hole Type <u>core</u>		
Surface Elevation <u>430.2'</u>		Static Water Depth <u>NA</u>		End Date <u>08/10/2011</u>			Rig Number <u>750 ATV</u>		
Total Depth <u>125.9'</u>		Driller <u>Muriell Wethington</u>		Latitude(83) <u>38.339530</u>			<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>		
Location <u>184+86.96 6.0' Rt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.639564</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT							<p>Boring advanced with 3.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3</p> <p>Drilling mud added to the boring at a depth of 15.0 ft below the ground surface @ 15</p>
			<u>Overburden: overburden.</u>						
5									5
10									10
15									15
20									20
25									25
30									30
35									35
40									40
45									45
50									50
Top of Rock = 96.5' Elevation = 333.7'		Base Weathered Rock = 96.7' Elevation = 333.5'		RDZ = 96.7' Elevation = 333.5'			Louisville Limestone Laurel Dolomite		

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>80</u>		Immediate Water Depth <u>14.0 (08/10/11)</u>		Start Date <u>08/10/2011</u>		Hole Type <u>core</u>			
Surface Elevation <u>430.2'</u>		Static Water Depth <u>NA</u>		End Date <u>08/10/2011</u>		Rig Number <u>750 ATV</u>			
Total Depth <u>125.9'</u>		Driller <u>Muriell Wethington</u>		Latitude(83) <u>38.339530</u>		<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Location <u>184+86.96 6.0' Rt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.639564</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
DRAFT									
55									55
60									60
65									65
70									70
75		<u>Overburden: overburden.</u>							75
80									80
85									85
90									90
95									95
333.7	96.5		(Begin Core)						
		<u>Limestone & Shale: Limestone (60%), gray, fine grained, hard, thin bedded, shale streaks, stringers and partings. Shale (40%), gray, silty.</u>		87 / 73	9.4	9.4	100		
100									100
Top of Rock = 96.5'		Base Weathered Rock = 96.7'		RDZ = 96.7'		Louisville Limestone Laurel Dolomite			
Elevation = 333.7'		Elevation = 333.5'		Elevation = 333.5'					

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>80</u> Surface Elevation <u>430.2'</u> Total Depth <u>125.9'</u> Location <u>184+86.96 6.0' Rt.</u>		Immediate Water Depth <u>14.0 (08/10/11)</u> Static Water Depth <u>NA</u> Driller <u>Muriell Wethington</u> Geologist <u>James Adams</u>		Start Date <u>08/10/2011</u> End Date <u>08/10/2011</u> Latitude(83) <u>38.339530</u> Longitude(83) <u>-85.639564</u>		Hole Type <u>core</u> Rig_Number <u>750 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
		<p style="text-align: center; color: red; font-size: 2em;">DRAFT</p> <p><u>Limestone & Shale: Limestone (60%), gray, fine grained, hard, thin bedded, shale streaks, stringers and partings. Shale (40%), gray, silty.</u></p>		87 / 73	9.4	9.4	100		RCS-1 @ 101.2-102.2	
105									105.9	105
110					79 / 64	10.0	9.6	96		110
115									115.9	115
120										120
125	304.3	125.9		82 / 76	10.0	10.0	100		RCS-2 @ 122.1-123.1	125
									125.9	
130		(Bottom of Hole 125.9')								130
135										135
140										140
145										145
150										150
Top of Rock = 96.5' Elevation = 333.7'		Base Weathered Rock = 96.7' Elevation = 333.5'		RDZ = 96.7' Elevation = 333.5'		Louisville Limestone Laurel Dolomite				

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>				
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>				
Hole Number <u>81</u>		Immediate Water Depth <u>12.3 (08/09/11)</u>		Start Date <u>08/08/2011</u>		Hole Type <u>core</u>			
Surface Elevation <u>431.5'</u>		Static Water Depth <u>NA</u>		End Date <u>08/08/2011</u>		Rig Number <u>750 ATV</u>			
Total Depth <u>138.5'</u>		Driller <u>Muriell Wethington</u>		Latitude(83) <u>38.339647</u>		<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Location <u>184+86.96 69.0' Rt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.639402</u>					
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)	
		DRAFT							<p>Boring advanced with 3.25" augers @ 1 NQ coring system utilized to sample bedrock @ 3</p> <p>Drilling mud added to the boring at a depth of 15.0 ft below the ground surface @ 15</p>
		<u>Overburden:</u> <i>Overburdened.</i>							
5									5
10									10
15									15
20									20
25									25
30									30
35									35
40									40
45									45
50									50
Top of Rock = 98.0' Elevation = 333.5'		Base Weathered Rock = 99.0' Elevation = 332.5'		RDZ = 99.0' Elevation = 332.5'		Louisville Limestone Laurel Dolomite			

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u>					
Item Number: <u>5-731.00</u>					Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>81</u>		Immediate Water Depth <u>12.3 (08/09/11)</u>		Start Date <u>08/08/2011</u>			Hole Type <u>core</u>			
Surface Elevation <u>431.5'</u>		Static Water Depth <u>NA</u>		End Date <u>08/08/2011</u>			Rig Number <u>750 ATV</u>			
Total Depth <u>138.5'</u>		Driller <u>Muriell Wethington</u>		Latitude(83) <u>38.339647</u>			<u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>			
Location <u>184+86.96 69.0' Rt.</u>		Geologist <u>James Adams</u>		Longitude(83) <u>-85.639402</u>						
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
DRAFT										
		<u>Overburden: Overburded.</u>								
333.5	98.0		(Begin Core)							
100				58 / 47	7.4	7.4	100		Vertical Fracture @ 100	
Top of Rock = 98.0' Elevation = 333.5'		Base Weathered Rock = 99.0' RDZ = 99.0' Elevation = 332.5'		RDZ = 99.0' Elevation = 332.5'			Louisville Limestone Laurel Dolomite			

GEOLOGIST'S SUBSURFACE LOG

Project ID: <u>UNKNOWN</u> Item Number: <u>5-731.00</u>		<u>Jefferson - LSIORB East End Approach</u>			Project Type: <u>Structure State Bridge</u> Project Manager: <u>Mark Litkenhus</u>					
Hole Number <u>81</u> Surface Elevation <u>431.5'</u> Total Depth <u>138.5'</u> Location <u>184+86.96 69.0' Rt.</u>		Immediate Water Depth <u>12.3 (08/09/11)</u> Static Water Depth <u>NA</u> Driller <u>Muriell Wethington</u> Geologist <u>James Adams</u>		Start Date <u>08/08/2011</u> End Date <u>08/08/2011</u> Latitude(83) <u>38.339647</u> Longitude(83) <u>-85.639402</u>		Hole Type <u>core</u> Rig_Number <u>750 ATV</u> <u>GQ-1211</u> <u>Jeffersonville, New Albany, and</u> <u>Charlestown</u>				
Lithology		Description	Overburden	Sample No.	Depth (ft)	Rec. (ft)	SPT Blows	Sample Type	Remarks	
Elevation	Depth		Rock Core	Std/Ky RQD	Run (ft)	Rec (ft)	Rec (%)	SDI (JS)		
105		<p style="text-align: center; color: red; font-size: 2em;">DRAFT</p> <p><u>Limestone & Shale</u>: Limestone (60%), gray, fine grained, hard, thin bedded, shale streaks, stringers and partings. Shale (40%), gray, silty.</p>		58 / 47	7.4	7.4	100		98-98.3 105.4	
110				11 / 11	10.0	2.8	28		rock not recovered, ground up by core barrel @ 108.1-115.4	
115					73 / 64	5.0	5.0	100		RCS-1 @ 116.8-117.5 115.4
120					100 / 90	5.0	5.0	100		120.4
125					92 / 84	10.0	10.0	100		RCS-2 @ 128.1-129 125.4
130					0 / 0	3.1	1.6	52		rock not recovered, ground up by core barrel @ 137-138.5 135.4
135									138.5	
140		(Bottom of Hole 138.5')							140	
145									145	
150									150	
Top of Rock = 98.0' Elevation = 333.5'		Base Weathered Rock = 99.0' Elevation = 332.5'		RDZ = 99.0' Elevation = 332.5'		Louisville Limestone Laurel Dolomite				