Ellis & Associates inc.
Environmental ■ Geotechnical ■ Materials Testing
Integrated Engineering Services

November 23, 2011

Mr. Tim Keefe, E.I.
1650 N. Kepler Road
Mail Station 519
Deland, Florida 32724

Reference: Asphalt Pavement Coring and Evaluation Services
FPN: 428862-1
SR 407
From SR 528 to SR 405
Section# 70006
Brevard County, Florida
Contract No. C-8K13
TWO 57.07 (Phase 32)
E & A Project: 0149-0255

Dear Tim:

As requested, Ellis & Associates, Inc. (E&A) has completed the asphalt pavement coring along the alignment of the subject project. The project limits included northbound and southbound lanes between MP 0.000 and MP 6.797. A total of 47 of the original 54 cores were obtained from the project limits, 7 cores (4, 5, 6, 7, 11, 12 & 13) were removed from the coring plan due to traffic safety issues from SR 528 to SR 407.

The attached Pavement Evaluation and Condition Data (PECD) sheet shows the approximate locations of cores. Individual core data, including location of core, core depth, base type, cross slope and crack description was recorded on the PECD sheet. Representative roadway photographs and individual core photographs are also included.

Thank you again for allowing E&A the opportunity to provide this service. If you should have any questions and/or comments regarding this letter, please contact us at (904) 880-0960. We look forward to working with you again in the future.

Respectfully submitted,
ELLIS & ASSOCIATES, INC.

Adam P. Knisely
Project Manager

Joseph M. Champion, P.E.
Director, CMT & Inspection
Licensed, Florida No. 69135

JOSEPH M. CHAMPION * LICENSE No 69135 * STATE OF FLORIDA * PROFESSIONAL ENGINEER

State of Florida Department of Transportation
PAVEMENT EVALUATION AND CONDITION DATA SHEET

Project No.: 428862-1	**Cored By:** Ellis & Associates	**Date:** 11/10/2011	**Page No.:** 1 of 4
County: Brevard	**Highway Sect. No:** 70006	**From:** SR 528	**To:** SR 405
Road No.: SR 407	**Begin M.P.** 0.000	**End M.P.:** 6.797	**Length:** 6.797

Core No.	MP	Distance from left edge of lane (ft)	Lane	Wheel Path	Pavement Layer (in.)							Base		Crack				Pavt Cond.	Rut Depth (in)	Cross Slope (%)	Comments
					FC-5	SP 12.5	Type S	ABC			Core Length (in)	Type	Thick-ness (in)	Depth (in)	Type	Class	Extent				
1	0.125	1.5	OL	-	0.8	1.3	0.8	4.1	-	-	7.0	ABC	4.1	-	-	-	-	F	[redacted]		
2	0.125	7.4	L1	-	1.1	1.0	2.0	-	-	-	4.1	LR	9.4	0.1	BR	I	L	F			Air Voids in Type S course Hairline crack
3	0.125	2.3	IL	-	1.3	1.2	1.3	4.1	-	-	7.9	ABC	4.1	-	-	-	-	F			Air Voids in Type S course
4	0.125	3.7	IR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			Removed from coring plan. Traffic Safety issues from SR 528 to SR 407
5	0.125	3.5	R1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			Removed from coring plan. Traffic Safety issues from SR 528 to SR 407
6	0.125	1.5	OR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			Removed from coring plan. Traffic Safety issues from SR 528 to SR 407
7	0.240	10.0	R1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			Removed from coring plan. Traffic Safety issues from SR 528 to SR 407
8	0.650	1.5	OL	-	0.6	1.4	-	2.5	-	-	4.5	ABC	2.5	-	-	-	-	F			
9	0.650	14.0	L1	-	0.5	1.0	2.3	-	-	-	3.8	LR	9.2	B	BR	III	L	F			Split Core
9A	0.650	14.0	L1	-	0.5	1.0	3.8	-	-	-	5.3	S/S	X	B	BR	III	L	F			Split Core
10	0.650	2.4	IL	-	2.0	1.5	-	4.9	-	-	8.4	ABC	4.9	-	-	-	-	F			
11	0.650	1.8	IR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			Removed from coring plan. Traffic Safety issues from SR 528 to SR 407
12	0.650	3.0	R1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			Removed from coring plan. Traffic Safety issues from SR 528 to SR 407
13	0.650	1.9	OR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			Removed from coring plan. Traffic Safety issues from SR 528 to SR 407
14	1.125	9.8	R1	X	0.7	1.3	3.7	-	-	-	5.7	LR	9.8	2.0	BR	III	M	P			
15	1.125	1.5	OR	-	0.6	3.0	-	4.4	-	-	8.0	ABC	4.4	-	-	-	-	F			

Remarks: Crack Types: L=Longitudinal, T=Transverse, A=Alligator, Bl=Block, Br=Branch, C=Combination

SS = Stabilized Subgrade, LR = Limerock, SBRM = Sand Bituminous Road Mix, ABC = Asphalt Base Course

Crack Extent: L=Light, M=Moderate, S=Severe Pavement Condition: G=Good, F=Fair, P=Poor

Note:

State of Florida Department of Transportation
PAVEMENT EVALUATION AND CONDITION DATA SHEET

Project No.: 428862-1	**Cored By:** Ellis & Associates	**Date:** 11/10/2011	**Page No.:** 2 of 4
County: Brevard	**Highway Sect. No:** 70006	**From:** SR 528	**To:** SR 405
Road No.: SR 407	**Begin M.P.** 0.000	**End M.P.:** 6.797	**Length:** 6.797

Core No.	MP	Distance from left edge of lane (ft)	Lane	Wheel Path	Pavement Layer (in.)							Base		Crack				Pavt Cond.	Rut Depth (in)	Cross Slope (%)	Comments
					FC-5	SP 12.5	Type S	ABC			Core Length (in)	Type	Thick-ness (in)	Depth (in)	Type	Class	Extent				
16	1.750	2.0	OL	-	0.7	1.8	4.4	-	-	-	6.9	LR	10.8	-	-	-	-	F			
17	1.750	2.6	L1	X	0.9	2.0	3.1	-	-	-	6.0	LR	11.1	1.4	BR	III	S	P			
18	2.125	9.3	R1	X	0.5	1.5	3.4	-	-	-	5.4	LR	9.8	1.9	BR	I	S	P			
19	2.125	1.5	OR	-	0.4	1.4	1.0	4.5	-	-	7.3	ABC	4.5	-	-	-	-	F			
20	2.381	1.0	OL	-	-	1.2	-	3.2	-	-	4.4	ABC	3.2	-	-	-	-	F			Thin Asphalt Area
21	2.381	9.5	L1	X	0.5	1.0	0.7	-	-	-	2.2	LR	9.3	B	BR	I	S	P			Thin Asphalt Area
22	2.381	8.8	R1	X	0.5	1.0	1.3	-	-	-	2.8	LR	10.3	B	A	III	S	P			Thin Asphalt Area
23	2.381	1.8	OR	-	-	1.2	-	3.6	-	-	4.8	ABC	3.6	-	-	-	-	F			Thin Asphalt Area
24	2.750	2.5	OL	-	1.0	1.8	-	4.6	-	-	7.4	ABC	4.6	0.1	BR	II	S	P			Air Voids is Type S course Hairline crack
25	2.750	3.0	L1	X	0.7	1.7	3.8	-	-	-	6.2	LR	7.8	1.4	BR	III	S	P			Air Voids is Type S course
26	3.164	8.0	L1	X	1.0	1.4	-	-	-	-	2.4	PCC	X	-	-	-	-	F			
27	3.145	8.0	R1	X	0.7	0.9	-	-	-	-	1.6	PCC	X	-	-	-	-	F			
28	3.525	1.8	OL	-	0.7	1.9	-	4.7	-	-	7.3	ABC	4.7	-	-	-	-	F			Air Voids is Type S course
29	3.525	1.5	L1	-	0.5	2.0	2.8	-	-	-	5.3	LR	9.2	1.5	BR	I	S	P			Air Voids is Type S course
30	3.525	7.5	R1	-	0.8	2.9	1.5	-	-	-	5.2	LR	9.8	-	-	-	-	F			
31	3.525	2.0	OR	-	0.7	2.8	-	4.5	-	-	8.0	ABC	4.5	-	-	-	-	F			

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Core No.	MP	Distance from left edge of lane (ft)	Lane	Wheel Path	Pavement Layer (in.)							Base		Crack				Pavt Cond.	Rut Depth (in)	Cross Slope (%)	Comments
					FC-5	SP 12.5	Type S	ABC			Core Length (in)	Type	Thick-ness (in)	Depth (in)	Type	Class	Extent				
32	3.910	1.8	OL	-	0.6	1.4	-	4.0	-	-	6.0	ABC	4.0	-	-	-	-	F			Delamination between Type S courses
33	3.910	3.3	L2	X	0.7	1.5	1.7	-	-	-	3.9	LR	11.1	0.1	BR	I	L	F			Delamination between Type S courses Air Voids is Type S course, Hairline crack
34	3.910	8.8	L1	X	0.7	1.7	1.5	-	-	-	3.9	LR	9.3	-	-	-	-	F			
35	3.910	2.1	R1	X	0.6	1.9	1.3	-	-	-	3.8	LR	9.7	0.6	BR	I	L	F			Air Voids in Type S course
36	3.910	2.0	OR	-	1.0	1.2	-	4.4	-	-	6.6	ABC	4.4	-	-	-	-	F			Air Voids in Type S course
37	4.323	8.8	R1	X	1.0	1.4	-	-	-	-	2.4	PCC	X	-	-	-	-	F			Approach Slab
38	4.323	9.0	R2	X	0.8	1.7	0.7	-	-	-	3.2	PCC	X	-	-	-	-	F			Approach Slab
39	4.375	3.0	L2	-	0.7	1.0	-	-	-	-	1.7	PCC	X	-	-	-	-	F			Approach Slab
40	4.375	8.5	L1	X	1.0	0.9	-	-	-	-	1.9	PCC	X	-	-	-	-	F			Approach Slab
41	4.750	1.9	OL	-	0.6	1.2	1.7	-	-	-	3.5	LR	4.5	-	-	-	-	F			
42	4.750	8.5	L1	X	1.0	1.0	3.3	-	-	-	4.3	LR	10.7	1.1	BR	II	M	P			
43	4.750	10.0	R1	X	0.8	1.7	1.4	-	-	-	3.9	LR	8.4		BR	II	S	P			
44	4.750	1.2	OR	-	0.9	0.9	-	5.0	-	-	6.8	ABC	5.0	0.1	BR	II	S	P			Hairline crack
45	5.475	1.5	OL	-	0.7	1.7	1.6	-	-	-	4.0	LR	8.5	-	-	-	-	F			
46	5.475	2.0	L1	X	0.8	1.7	3.0	-	-	-	5.5	LR	10.0	2.7	L	III	S	P			Air Voids in Type S course
47	5.475	6.8	GORE	-	1.1	1.2	3.2	-	-	-	5.5	LR	11.5	2.0	BR	III	M	P			Air Voids in Type S course

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Core No.	MP	Distance from left edge of lane (ft)	Lane	Wheel Path	Pavement Layer (in.)							Base		Crack				Pavt Cond.	Rut Depth (in)	Cross Slope (%)	Comments
					FC-5	SP 12.5	Type S	ABC			Core Length (in)	Type	Thick-ness (in)	Depth (in)	Type	Class	Extent				
48	5.475	2.0	R1	X	0.5	2.0	2.5	-	-	-	5.0	LR	12.0	1.3	BR	I	S	P	[redacted]		
49	5.475	8.5	RRTL	X	0.8	1.7	3.5	-	-	-	6.0	LR	7.0	1.5	BR	III	S	P			To Shepard Drive Air Voids in Type S course
50	5.475	1.7	OR	-	1.0	2.0	2.3	-	-	-	5.3	LR	6.7	-	-	-	-	F			
51	6.310	1.5	OL	-	0.7	2.3	1.5	-	-	-	4.5	LR	4.5	1.1	BR	I	S	P			Air Voids in Type S course
52	6.310	7.1	L1	-	0.9	1.6	2.4	-	-	-	4.9	LR	11.1	2.1	BR	III	S	P			Air Voids in Type S course
53	6.310	8.5	R1	X	0.8	2.2	2.8	-	-	-	5.8	LR	10.7	0.9	BR	I	S	P			Air Voids in Type S course
54	6.310	1.8	OR	-	0.8	2.0	3.2	-	-	-	6.0	LR	3.5	-	-	-	-	F			Air Voids in Type S course

Remarks: Crack Types: L=Longitudinal, T=Transverse, A=Alligator, Bl=Block, Br=Branch, C=Combination

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Note:

Supplemental Data to PECD

(Cross-Slope Data Collected at Each Locations Cored)

Core #	MP	Lane	Cross-Slope 0 to 6 feet	Cross-Slope 6 to 12 feet
1	0.125	OL	4.1	
2	0.125	L1	3.7	3.6
3	0.125	IL	-2.1	
4	0.125	IR		
5	0.125	R1		
6	0.125	OR		
7	0.240	R1		
8	0.650	OL	10.2	
9	0.650	L1	9.2	9.3
10	0.650	IL	0.6	
11	0.650	IR		
12	0.650	R1		
13	0.650	OR		
14	1.125	R1	2.4	2.2
15	1.125	OR	6.5	
16	1.750	OL	6.5	
17	1.750	L1	0.6	0.0
18	2.125	R1	2.6	2.4
19	2.125	OR	8.4	

Core #	MP	Lane	Cross-Slope 0 to 6 feet	Cross-Slope 6 to 12 feet
20	2.381	OL	6.2	
21	2.381	L1	-1.4	-1.2
22	2.381	R1	1.2	1.1
23	2.381	OR	3.9	
24	2.750	OL	5.9	
25	2.750	L1	-1.0	0.5
26	3.164	L1	-2.6	-2.0
27	3.145	R1	1.3	1.5
28	3.525	OL	6.4	
29	3.525	L1	-1.2	-0.6
30	3.525	R1	1.9	2.0
31	3.525	OR	7.0	
32	3.910	OL	5.1	
33	3.910	L2	-1.2	0.4
34	3.910	L1	-1.6	-1.4
35	3.910	R1	2.2	3.1
36	3.910	OR	6.7	
37	4.323	R1	2.3	2.5
38	4.323	R2	2.5	2.5

Supplemental Data to PECD

(Cross-Slope Data Collected at Each Locations Cored)

Core #	MP	Lane	Cross-Slope 0 to 6 feet	Cross-Slope 6 to 12 feet
39	4.375	L2	-2.3	
40	4.375	L1	-1.8	-2.2
41	4.750	OL	5.1	
42	4.750	L1	-3.3	-2.1
43	4.750	R1	2.6	2.6
44	4.750	OR	5.5	
45	5.475	OL	6.2	
46	5.475	L1	-1.3	-0.4
47	5.475	GORE	2.0	2.2
48	5.475	R1	2.7	2.7
49	5.475	RRTL	2.8	2.6
50	5.475	OR	7.7	
51	6.310	OL	3.3	
52	6.310	L1	-1.5	-1.5
53	6.310	R1	1.9	1.9
54	6.310	OR	8.5	

Core #	MP	Lane	Cross-Slope 0 to 6 feet	Cross-Slope 6 to 12 feet

Supplemental Data to PECD

(GPS Coordinates for Each Locations Cored)

Core #	MP	GPS Coordinates
1	0.125	28° 27.185, 80° 52.601
2	0.125	28° 27.183, 80° 52.604
3	0.125	28° 27.181, 80° 52.606
4	0.125	28° 27.132, 80° 52.664
5	0.125	28° 27.132, 80° 52.664
6	0.125	28° 27.132, 80° 52.664
7	0.240	28° 27.122, 80° 52.513
8	0.650	28° 27.326, 80° 52.225
9	0.650	28° 27.324, 80° 52.227
10	0.650	28° 27.319, 80° 52.226
11	0.650	28° 27.322, 80° 52.205
12	0.650	28° 27.322, 80° 52.205
13	0.650	28° 27.322, 80° 52.205
14	1.125	28° 27.660, 80° 51.975
15	1.125	28° 27.665, 80° 51.976
16	1.750	28° 28.123, 80° 51.669
17	1.750	28° 28.123, 80° 51.669
18	2.125	28° 28.386, 80° 51.483
19	2.125	28° 28.386, 80° 51.483

Core #	MP	GPS Coordinates
20	2.381	28° 28.579, 80° 51.358
21	2.381	28° 28.575, 80° 51.360
22	2.381	28° 28.576, 80° 51.353
23	2.381	28° 28.576, 80° 51.353
24	2.750	28° 28.845, 80° 51.176
25	2.750	28° 28.845, 80° 51.176
26	3.164	28° 29.212, 80° 50.916
27	3.145	28° 29.198, 80° 50.931
28	3.525	28° 29.479, 80° 50.745
29	3.525	28° 29.476, 80° 50.744
30	3.525	28° 29.471, 80° 50.744
31	3.525	28° 29.476, 80° 50.740
32	3.910	28° 29.760, 80° 50.558
33	3.910	28° 29.755, 80° 50.558
34	3.910	28° 29.753, 80° 50.558
35	3.910	28° 29.756, 80° 50.554
36	3.910	28° 29.755, 80° 50.551
37	4.323	28° 30.077, 80° 50.334
38	4.323	28° 30.075, 80° 50.331

Supplemental Data to PECD

(GPS Coordinates for Each Locations Cored)

Core #	MP	GPS Coordinates
39	4.375	28° 30.119, 80° 50.311
40	4.375	28° 30.119, 80° 50.311
41	4.750	28° 30.438, 80° 50.094
42	4.750	28° 30.440, 80° 50.092
43	4.750	28° 30.434, 80° 50.090
44	4.750	28° 30.435, 80° 50.087
45	5.475	28° 30.964, 80° 49.734
46	5.475	28° 30.966, 80° 49.731
47	5.475	28° 30.962, 80° 49.730
48	5.475	28° 30.961, 80° 49.729
49	5.475	28° 30.960, 80° 49.726
50	5.475	28° 30.962, 80° 49.723
51	6.310	28° 31.572, 80° 49.317
52	6.310	28° 31.568, 80° 49.318
53	6.310	28° 31.567, 80° 49.314
54	6.310	28° 31.569, 80° 49.312

Core #	MP	GPS Coordinates