Agenda Item #: 3-C-4

PALM BEACH COUNTY
BOARD OF COUNTY COMMISSIONERS

AGENDA ITEM SUMMARY

Meeting Date: January 24,2012	**[X] Consent**	**[ ]**	**Regular**
	[ ] Workshop	**[ ]**	**Public Hearing**

Department:

Submitted By: **Engineering and Public Works**
Submitted For: **Construction Coordination Division**

I. EXECUTIVE BRIEF

Motion and Title: Staff recommends motion to approve: Change Order No. 10 in the amount of $181,496.79 to the construction contract (Resolution No. R2010-0022) with J.W. Cheatham, LLC , for the 45th Street from Jog Road to east of Haverhill Road and Jog Road south of 45th Street to north of 45th Street (Project).

SUMMARY: Approval of Change Order No. 10 will compensate for costs and delays associated with the bridge superstructure concrete overrun. Change Order No. 10 is being brought to the Board of County Commissioners because the dollar amount exceeds the maximum amount allowed by the Contract Review Committee as referenced in PPM-CWF-50. Errors and omissions against the consultant, Metric Engineering, will be considered at the end of the Project.

District's 6 & 7 (MRE)

Background and Justification: Change Order No. 10 is required to compensate J.W. Cheatham, LLC, the contractor, for additional superstructure concrete used to construct the Project's bridge deck resulting from a discrepancy in the actual concrete calculations used to determine its design thickness.

Attachments:
1. Location Map
2. Change Order No. 10
3. Change Order No. 10 Attachment A
4. Change Order No. 10 Attachment B
5. Change Order No. 10 Attachment C
6. Change Order History
7. Schedule 1

Recommended By: _____ 11/22/11
Division Director **Date**

Approved By: _____ 1/4/12
County Engineer **Date**

II. FISCAL IMPACT ANALYSIS

A. Five Year Summary of Fiscal Impact:

Fiscal Years	2012	2013	2014	2015	2016
Capital Expenditures	$181,497	-0-	-0-	-0-	-0-
Operating Costs	-0-	-0-	-0-	-0-	-0-
External Revenues	-0-	-0-	-0-	-0-	-0-
Program Income (County)	-0-	-0-	-0-	-0-	-0-
In-Kind Match (County)	-0-	-0-	-0-	-0-	-0-
NET FISCAL IMPACT	$181,497	-0-	-0-	-0-	-0-
# ADDITIONAL FTE POSITIONS (Cumulative)					

Is Item Included in Current Budget? Yes X No

Budget Account No:
Fund 3503 Dept 361 Unit 1328 Object 6551

Recommended Sources of Funds/Summary of Fiscal Impact:
Road Impact Fee Fund - Zone 3
Jog Rd/S. of 45th Street to N. of 45th Street

Change Order #10 $181,496.79

C. Departmental Fiscal Review: Alicia Vandamme

III. REVIEW COMMENTS

A. OFMB Fiscal and/or Contract Dev. and Control Comments:

1/6/2012
OFMB SD 1/5/12 OA 1/5/12

12/10/12
Contract Dev. and Control

B. Approved as to Form and Legal Sufficiency:

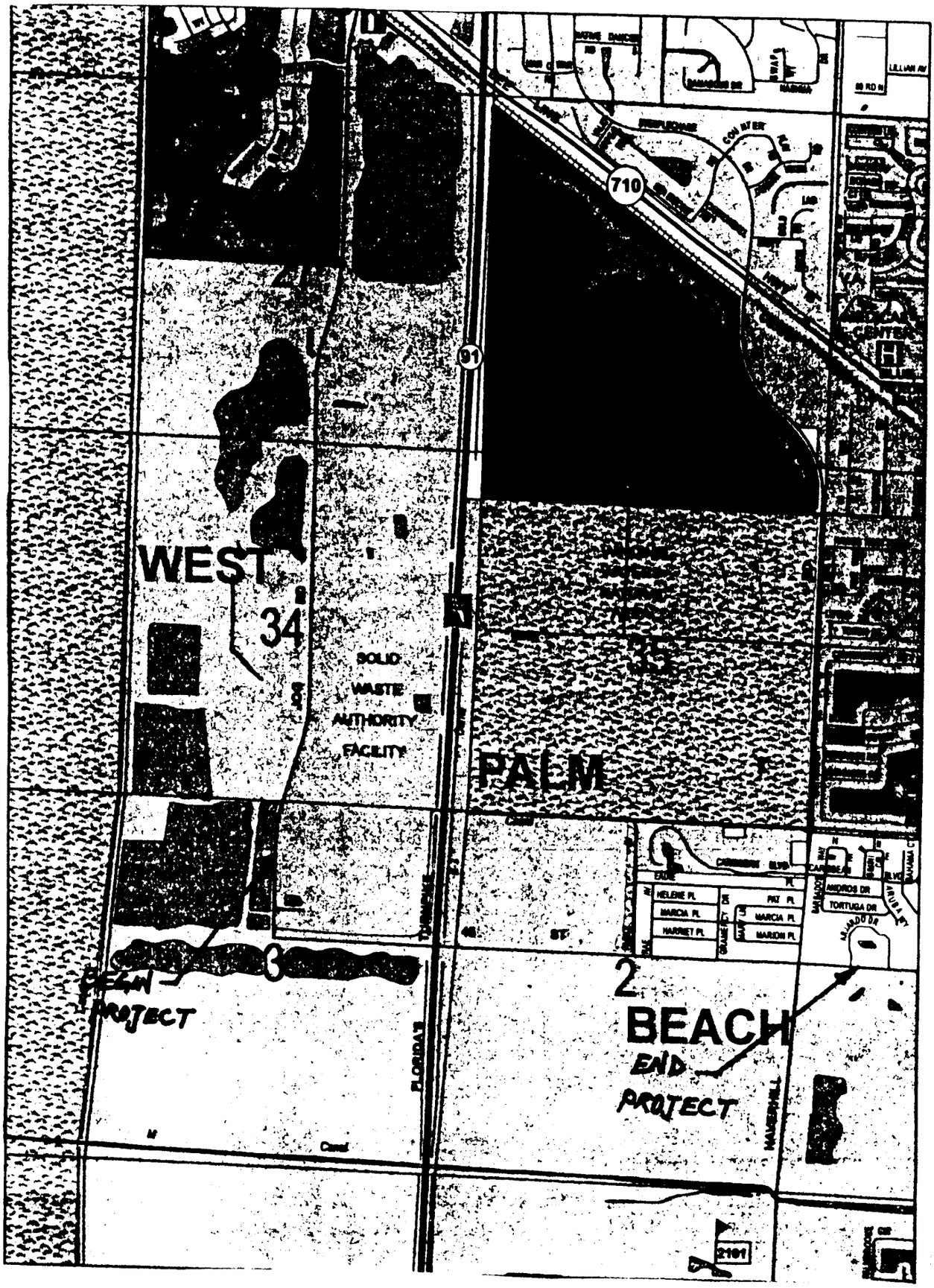
12/10/12
Assistant County Attorney

C. Other Department Review:

Department Director

This summary is not to be used as a basis for payment.

PROJECT LOCATION
45TH STREET FROM JOG ROAD TO E. OF HAVERHILL ROAD. & JOG ROAD FROM S. OF 45TH STREET TO N. OF 45TH STREET
PROJECT # 2003512 & 1998506B



LOCATION SKETCH

CHANGE ORDER

ORIGINAL

Attachment 2

___ Owner Initiated
___ Differing Site Conditions
___ Zoning/Code/Ordinance Changes
X Errors/Omissions/In Design
___ Quantity Overruns/Underruns
___ Request By Another Agency/Outside Party
___ A. Reimbursable ___ B. Non-Reimbursable
___ Other:

PROJECT: (Name)	**45th Street/Jog Road to E. of Haverhill Road & Jog Road S. of 45th Street to N. of 45th Street**	CHANGE ORDER NO:	10 (Ten)
		COUNTY PROJECT NO:	2003512/1998506B
TO:		CONTRACT DATE:	01/12/10
(Contractor)	J.W. Cheatham, LLC	RESOLUTION NO:	R2010-0022
		DISTRICT NO.:	6 & 7

You are directed to make the following changes in this Contract:

Construct bridge deck to plan elevations using additional concrete – 490.82 cy @ $293.0244	$	143,822.26
Allowable mark-up of 10%		14,382.23
30 days additional M.O.T. @ $776.41 per day		23,292.30
TOTAL	**$**	**181,496.79**

The original Contract Sum was.	$14,646,240.35
Net change by previous Change Orders.	$ 1,370,496.81
The Contract Sum prior to this Change Order was	$16,016,737.16
The Contract Sum will be increased by this Change Order	$ 181,496.79
The new Contract Sum including this Change Order will be	$16,198,233.95
The Contract Time will be unchanged by	(0) Days
The Date of Completion as of the date of this Change Order therefore is . . .	July 31, 2012

EXECUTION OF THIS CHANGE ORDER ACKNOWLEDGES FINAL SETTLEMENT OF, AND RELEASES ALL CLAIMS FOR, COSTS AND TIME ASSOCIATED, DIRECTLY OR INDIRECTLY, WITH THE ABOVE-STATED MODIFICATION(S). INCLUDING ALL CLAIMS FOR CUMULATIVE DELAYS OR DISRUPTIONS RESULTING FROM, CAUSED BY, OR INCIDENT TO, SUCH MODIFICATION(S), AND INCLUDING ANY CLAIM THAT THE ABOVE-STATED MODIFICATION(S) CONSTITUTES, IN WHOLE OR PART, A CARDINAL CHANGE TO THE CONTRACT.

_____	J.W. Cheatham, LLC	P.B.Co. Board of County Commissioners
ENGINEER (If Applicable)	CONTRACTOR	OWNER
_____	7396 Westport Place	P.O. Box 21229
Address	Address	Address
_____	West Palm Beach, FL 33413	West Palm Beach, FL 33416-1229
BY_____	BY Thomas P. Uhrig	BY_____
DATE_____	DATE 11/17/11	DATE_____

ATTEST: Sharon R. Bock, Clerk & Comptroller

Approved as to Form and Legal Sufficiency:

_____ _____

(Deputy Clerk) Date

(County Attorney

Attachment A

SUPERSTRUCTURE CONCRETE QUANTITIES PER DECK POUR											
Deck Slab (1)							Haunch Volume (CY) (2)	SIP Forms (3)	Build-Up Over End Diaphragms (4)	Total Estimated Volume per Pour (CY)	Ticketed Concrete Pour (CY)
Span ID	Pour ID	Length (ft)	Width (ft)	Depth (in)	Total Volume (CF)	Total Deck Volume (CY)					
4	1	96.0	53.96	9.352	4,037.42	149.53	55.09	5.07	0.31	210.00	210
4	2	96.0	48.62	10.828	4,211.81	155.99	39.32	4.35	0.34	200.00	200
3,4	3	108.0	53.96	9.490	4,608.81	170.70	62.93	5.71	0.66	240.00	240
3,4	4	108.0	48.62	11.059	4,839.28	179.23	40.16	4.89	0.72	225.00	225
3	5	48.0	53.96	9.500	2,050.56	75.95	25.69	2.54	0.36	104.54	
3	6	48.0	48.62	9.500	1,847.62	68.43	18.84	2.17	0.38	89.83	
2	7	50.0	53.96	9.500	2,136.00	79.11	26.77	2.64	0.36	108.88	
2	8	50.0	48.62	9.500	1,924.60	71.28	19.63	2.26	0.38	93.56	
2,1	9	110.0	53.96	9.500	4,699.19	174.04	88.33	5.81	0.75	268.93	
2,1	10	110.0	48.62	9.500	4,234.12	156.82	43.19	4.98	0.79	205.78	
1	11	103.8	53.96	9.500	4,432.19	164.16	57.49	5.48	0.37	227.49	
1	12	103.8	48.62	9.500	3,993.55	147.91	45.50	4.70	0.40	198.50	
Total						**1,593.15**	**522.93**	**50.60**	**5.83**	**2,172.52**	**875.00**

Attachment A

Beam Haunch (2)									
Span ID	Pour ID		No. of Beams	Average Length (ft)	Flange Width (ft)	Average Build-Up (in)	Total Volume of Concrete Build-Up (CF)	Total Volume of Concrete Build-Up (CY/FT)	Total Cy
3,4			1	96	4		0.00	0.0000	**0.00**
3,4	1		8	96	4	5.81	15.49	0.5738	**55.09**
3,4	2		6	96	4	5.53	11.06	0.4096	**39.32**
3,4			1	108	4		0.00	0.0000	**0.00**
3,4	3		8	108	4	5.90	15.73	0.5827	**62.93**
3,4	4		6	108	4	5.02	10.04	0.3719	**40.16**
3			1	48	4		0.00	0.0000	**0.00**
3	5		8	48	4	5.42	14.45	0.5353	**25.69**
3	6		6	48	4	5.3	10.60	0.3926	**18.84**
2			1	50	4		0.00	0.0000	**0.00**
2	7		8	50	4	5.42	14.45	0.5353	**26.77**
2	8		6	50	4	5.30	10.60	0.3926	**19.63**
2,1			1	110	4		0.00	0.0000	**0.00**
2,1	9		8	110	6	5.42	21.68	0.8030	**88.33**
2,1	10		6	110	4	5.30	10.60	0.3926	**43.19**
2,1			1	103.75	4		0.00	0.0000	**0.00**
2,1	11		8	103.75	4	5.61	14.96	0.5541	**57.49**
2,1	12		6	103.75	4	5.92	11.84	0.4385	**45.50**

Attachment A

Beam Haunch (2)							
Span ID	Pour ID	Beam ID	Beam Length (ft)	Haunch Width (ft)	Total Calculated Haunch Volume to top of support angle per Survey Calculation (See Page __) (cf)	Calculated Average Haunch Depth to top of support Angle along Beam (in)	Average Haunch Depth to top of Support Angle for Beams within the same Pour (in)
4	1	A	124.708	4	156.19	3.76	3.81
		B	124.802	4	152.44	3.66	
		C	124.885	4	162.43	3.90	
		D	124.979	4	178.47	4.28	
		E	125.073	4	147.5	3.54	
		F	125.167	4	159.89	3.83	
		G	125.260	4	159.98	3.83	
		H	125.354	4	152.68	3.65	
	2	I	125.458	4	152.49	3.65	3.53
		J	125.563	4	150.65	3.60	
		K	125.667	4	138.16	3.30	
		L	125.771	4	125.92	3.00	
		M	125.875	4	145.7	3.47	
		N	125.979	4	173.71	4.14	
3	3	A	124.333	4	156.38	3.77	3.90
		B	124.469	4	174.94	4.22	
		C	124.604	4	155.58	3.75	
		D	124.750	4	162.54	3.91	
		E	124.896	4	163.34	3.92	
		F	125.042	4	175.49	4.21	
		G	125.188	4	167.13	4.01	
		H	125.313	4	142.02	3.40	
	4	I	125.469	4	103.31	2.47	3.02
		J	125.625	4	146.72	3.50	
		K	125.792	4	142.82	3.41	
		L	125.948	4	104.26	2.48	
		M	126.115	4	149.09	3.55	
		N	126.292	4	114.02	2.71	
2	5	A	128.667	4	137.48	3.21	3.42
		B	128.771	4	146.06	3.40	
		C	128.875	4	133.39	3.11	
		D	128.969	4	139.76	3.25	
		E	129.052	4	153.7	3.57	
		F	129.135	4	145.03	3.37	
		G	129.208	4	169.79	3.94	
		H	129.323	4	151.97	3.53	
	6	I	129.385	4	152.19	3.53	3.32
		J	129.438	4	133.68	3.10	
		K	129.490	4	148.79	3.45	
		L	129.531	4	150.43	3.48	
		M	129.573	4	128.75	2.98	
		N	129.604	4	145.4	3.37	
2	7	A	128.667	4	137.48	3.21	3.42
		B	128.771	4	146.06	3.40	
		C	128.875	4	133.39	3.11	
		D	128.969	4	139.76	3.25	
		E	129.052	4	153.7	3.57	
		F	129.135	4	145.03	3.37	
		G	129.208	4	169.79	3.94	
		H	129.323	4	151.97	3.53	
	8	I	129.385	4	152.19	3.53	3.32
		J	129.438	4	133.68	3.10	
		K	129.490	4	148.79	3.45	
		L	129.531	4	150.43	3.48	
		M	129.573	4	128.75	2.98	
		N	129.604	4	145.4	3.37	
2	9	A	128.667	4	137.48	3.21	3.42
		B	128.771	4	146.06	3.40	
		C	128.875	4	133.39	3.11	
		D	128.969	4	139.76	3.25	
		E	129.052	4	153.7	3.57	
		F	129.135	4	145.03	3.37	
		G	129.208	4	169.79	3.94	
		H	129.323	4	151.97	3.53	
	10	I	129.385	4	152.19	3.53	3.32
		J	129.438	4	133.68	3.10	
		K	129.490	4	148.79	3.45	
		L	129.531	4	150.43	3.48	
		M	129.573	4	128.75	2.98	
		N	129.604	4	145.4	3.37	
1	11	A	133.052	4	172.77	3.90	3.61
		B	133.063	4	149.23	3.36	
		C	133.063	4	152.17	3.43	
		D	133.063	4	147.21	3.32	
		E	133.063	4	156.3	3.52	
		F	133.063	4	167.04	3.77	
		G	133.063	4	163.22	3.68	
		H	133.073	4	171.95	3.88	
	12	I	133.073	4	181.96	4.10	3.92
		J	133.073	4	161.28	3.64	
		K	133.073	4	160.54	3.62	
		L	133.073	4	173.94	3.92	
		M	133.083	4	175.18	3.95	
		N	133.083	4	189.56	4.27	

Attachment A

SIP Forms (3)							
Predominant Span ID	Pour ID	SIP Form Area				Volume of Formwork Concrete per Square Foot (CY/sf)	Total volume Concrete within Formwork
		Average Width (ft)	Average Length (ft)	No. of Form Runs	Total Form Area within Pour		
4	1	3.3665	96	7	2262.3	0.0022416	5.071
	2	3.3665	96	6	1939.1	0.0022416	4.347
3	3	3.3665	108	7	2545.1	0.0022416	5.705
	4	3.3665	108	6	2181.5	0.0022416	4.890
2	5	3.3665	48	7	1131.1	0.0022416	2.536
	6	3.3665	48	6	969.6	0.0022416	2.173
	7	3.3665	50	7	1178.3	0.0022416	2.641
	8	3.3665	50	6	1010.0	0.0022416	2.264
	9	3.3665	110	7	2592.2	0.0022416	5.811
	10	3.3665	110	6	2221.9	0.0022416	4.981
1	11	3.3665	103.75	7	2444.9	0.0022416	5.481
	12	3.3665	103.75	6	2095.6	0.0022416	4.698
					22,572		**50.597**

Pour Quantities

Attachment A

Add'l Over End Diaphragms (4)					
Predominant Span ID	Pour ID	Width (ft)	Length (ft)	Depth (ft)	Volume (CY)
4	1	0.83	25.27	0.396	0.31
	2	0.83	27.60	0.396	0.34
3	3	1.67	27.21	0.396	0.66
	4	1.67	29.35	0.396	0.72
2	5	0.83	29.74	0.396	0.36
	6	0.83	31.63	0.396	0.38
	7	0.83	29.74	0.396	0.36
	8	0.83	31.63	0.396	0.38
	9	1.67	30.72	0.396	0.75
	10	1.67	32.52	0.396	0.79
1	11	0.83	30.72	0.396	0.37
	12	0.83	32.52	0.396	0.40
Total					**5.83**

Attachment A

6 of 7

Check Pedestal Elevations															
Bent ID	Span	Girder ID	Deck Elevation at CL Brg	Deck Thickness (in)	Theoretical Buildup				Beam Height (in)	Bearing Pad Thickness (in) (*)	Recalculated Pedestal Elevation @ CL Bearing	Pedestal Elevation @ CL Bearing Shown on Plan	Difference (in)	Pedestal Elevation @ CL Bearing Per Contractor Survey	Difference (in)
					B Dim	C Dim	D Dim	Average Buildup							
5	4	A	45.040	8.5	4.5	1.375	4.5	2.938	72	3.5625	**37.660**	37.660	-0.003	37.67	0.120
		B	45.265	8.5	4.75	1.625	4.75	3.188	72	3.5625	**37.863**	37.864	-0.006	37.86	-0.048
		C	45.489	8.5	4.75	1.625	4.75	3.188	72	3.5625	**38.088**	38.088	0.001	38.10	0.144
		D	45.714	8.5	4.75	1.75	4.75	3.250	72	3.5625	**38.313**	38.313	-0.003	38.29	-0.276
		E	45.941	8.5	4.75	1.75	4.75	3.250	72	3.5625	**38.540**	38.538	0.027	38.55	0.144
		F	46.163	8.5	4.75	1.75	4.75	3.250	72	3.5625	**38.762**	38.762	-0.001	38.74	-0.264
		G	46.390	8.5	4.75	1.75	4.75	3.250	72	3.5625	**38.989**	38.987	0.028	38.99	0.036
		H	46.488	8.5	4.75	1.00	4.75	2.875	72	3.5625	**39.087**	39.171	-1.003	39.15	-0.252
		I	46.420	8.5	4.75	1.25	4.75	3.000	72	3.5625	**39.019**	39.018	0.006	39.01	-0.096
		J	46.351	8.5	4.75	1.25	4.75	3.000	72	3.5625	**38.950**	38.950	-0.005	38.95	0.000
		K	46.282	8.5	4.75	1.25	4.75	3.000	72	3.5625	**38.881**	38.880	0.006	38.87	-0.120
		L	46.212	8.5	4.75	1.375	4.75	3.063	72	3.5625	**38.811**	38.811	0.005	38.80	-0.132
		M	46.143	8.5	4.75	1.375	4.75	3.063	72	3.5625	**38.742**	38.742	0.001	38.72	-0.264
		N	46.074	8.5	4.5	1.125	4.5	2.813	72	3.5625	**38.694**	38.639	0.054	38.64	0.012
4	4	A	47.950	8.5	4.5	1.375	4.5	2.938	72	3.5625	**40.670**	40.570	0.001	40.60	0.360
		B	48.149	8.5	4.75	1.625	4.75	3.188	72	3.5625	**40.748**	40.748	0.000	40.81	0.744
		C	48.347	8.5	4.75	1.625	4.75	3.188	72	3.5625	**40.946**	40.946	0.001	40.99	0.528
		D	48.545	8.5	4.75	1.75	4.75	3.250	72	3.5625	**41.143**	41.143	0.006	**40.18**	**-11.556**
		E	48.741	8.5	4.75	1.75	4.75	3.250	72	3.5625	**41.340**	41.340	0.001	41.39	0.600
		F	48.937	8.5	4.75	1.75	4.75	3.250	72	3.5625	**41.536**	41.536	0.000	41.58	0.528
		G	49.132	8.5	4.75	1.75	4.75	3.250	72	3.5625	**41.731**	41.731	0.000	41.78	0.588
		H	49.286	8.5	4.75	1.00	4.75	2.875	72	3.5625	**41.885**	41.886	-0.009	41.93	0.528
		I	49.102	8.5	4.75	1.25	4.75	3.000	72	3.5625	**41.701**	41.701	0.005	41.74	0.468
		J	49.002	8.5	4.75	1.25	4.75	3.000	72	3.5625	**41.600**	41.600	0.006	41.64	0.480
		K	48.900	8.5	4.75	1.25	4.75	3.000	72	3.5625	**41.499**	41.499	-0.005	41.54	0.492
		L	48.797	8.5	4.75	1.375	4.75	3.063	72	3.5625	**41.396**	41.396	-0.003	41.45	0.648
		M	48.693	8.5	4.75	1.375	4.75	3.063	72	3.5625	**41.292**	41.292	-0.001	41.32	0.336
		N	48.588	8.5	4.5	1.125	4.5	2.813	72	3.5625	**41.208**	41.208	-0.003	41.24	0.384
4	3	A	47.992	8.5	4.5	1.375	4.5	2.938	72	3.5625	**40.611**	40.611	0.000	40.60	-0.138
		B	48.190	8.5	4.75	1.625	4.75	3.188	72	3.5625	**40.789**	40.789	-0.001	40.81	0.255
		C	48.387	8.5	4.75	1.625	4.75	3.188	72	3.5625	**40.986**	40.986	-0.002	40.99	0.045
		D	48.584	8.5	4.75	1.75	4.75	3.250	72	3.5625	**41.183**	41.183	-0.002	**40.18**	**-12.033**
		E	48.780	8.5	4.75	1.75	4.75	3.250	72	3.5625	**41.378**	41.379	-0.001	41.39	0.138
		F	48.975	8.5	4.75	1.75	4.75	3.250	72	3.5625	**41.574**	41.574	-0.001	41.58	0.076
		G	49.169	8.5	4.75	1.75	4.75	3.250	72	3.5625	**41.768**	41.768	-0.001	41.78	0.146
		H	49.322	8.5	4.75	1.00	4.75	2.875	72	3.5625	**41.921**	41.922	-0.001	41.93	0.102
		I	49.138	8.5	4.75	1.25	4.75	3.000	72	3.5625	**41.737**	41.737	0.001	41.74	0.042
		J	49.036	8.5	4.75	1.25	4.75	3.000	72	3.5625	**41.635**	41.635	0.001	41.64	0.063
		K	48.933	8.5	4.75	1.25	4.75	3.000	72	3.5625	**41.532**	41.532	0.000	41.54	0.095
		L	48.829	8.5	4.75	1.375	4.75	3.063	72	3.5625	**41.428**	41.428	0.000	41.45	0.261
		M	48.724	8.5	4.75	1.375	4.75	3.063	72	3.5625	**41.323**	41.323	0.001	41.32	-0.041
		N	48.619	8.5	4.5	1.125	4.5	2.813	72	3.5625	**41.238**	41.238	0.000	41.24	0.020

(*) Includes provisions for 1" beveled bearing plate. Since sloped pedestals were provided in lieu of beveled brg plates, seat elevations are approximately 1" lower than the calculated maximum requirement.

Attachment A

SUPERSTRUCTURE CONCRETE QUANTITY SUMMARY TABLE			
Component	**Original Contract Quantity (CY)**	**Revised Quantity Per As-built Conditions (CY)**	**Estimated Overrun in Quantity based on As-built Condition (CY)**
Deck	1388.00	1,593.15	205.15
Diaphragm	194.79	194.79	0.00
Median	65.79	65.79	0.00
Beam Build-Up	273.58	522.93	249.35
Add'l over Piers	Not Considered	5.83	5.83
SIP Form	Not Applicable	Not Applicable	Not Applicable
TOTAL	**1922.2**	**2382.5**	**460.3**

METRIC ENGINEERING

May 16, 2011

Palm Beach County
2300 N. Jog Road, 3rd Floor
West Palm Beach, FL 33411
Attn: Mark Tomlinson

Re: 45th Street Bridge over Florida Turnpike (Bridge No. 934166)
Palm Beach County Project No. 2003512
Superstructure Concrete Quantity Overrun & As-built Deck Thickness

Dear Mr. Tomlinson,

In response to your concerns regarding the estimated overrun in superstructure concrete quantity and increase in as-built deck thickness that has been constructed to date for the referenced bridge, we have conducted an analysis in an attempt to determine possible reasons for the unexpected additional concrete. Our analysis is comprised of the following five parts:

1) Evaluation of estimated concrete quantities based on plan dimensions.
2) Evaluation of estimated concrete quantities based on as-built data.
3) Evaluation of the structural adequacy of the as-built structure with the apparent increase in concrete dead load.
4) Evaluate possible reasons for the increase in as-built deck thickness.
5) Summary and Recommendations.

Part 1: Evaluation of estimated concrete quantities based on plan dimensions.

Our review and back check of the original estimated plan quantity for superstructure concrete revealed no calculation errors. The quantity was based on a deck thickness of 8.5" and average beam build-up (haunch) thickness based on theoretical beam camber calculations. The average build-up was calculated to be 2.81", 2.75", 3.63" & 3.19" for the beams within spans 1 thru 4 respectively. The breakdown for superstructure concrete quantity based on plan dimensions is as follows:

8.5" deck:	1,388 CY
Concrete Build-Up over the Beams:	273.58 CY
Concrete Median:	65.79 CY
Intermediate and End Diaphragms:	194.79 CY
Total Superstructure Concrete:	1922.2 CY

Part 2: Evaluation of estimated concrete quantities based on as-built data.

Based on the contractors as-built survey elevations along each beam, the contractor calculated the required build-up in order to set the SIP forms to achieve an 8.5" thick deck and targeted deck elevations. We reviewed and had no objections to the contractor's methodology for setting the forms.

It is important to note that the actual beam camber was approximately one half the theoretical predicted value resulting in nearly double the haunch volume over the entire bridge. Based on the as-built camber, the estimated volume for the beam haunches over the entire bridge is approximately 522 CY.

With the assumption that the ticketed concrete volume for each pour was the actual installed volume, we estimate an average deck thickness per pour by taking out the known quantities for the volume of beam build-up, volume of build-up over the end diaphragms and additional volume within the bottom flutes of the pans. The average deck thickness for each pour is estimated to be 9.352", 10.828", 9.490" and 11.059" for pours 1 thru 4 respectively *(Refer Attachment A, page 1 of 7)*. The overall weighted average deck thickness is therefore estimated to be approximately 10.5". This estimation correlates with the concrete cover measurements to the top steel that range from 2.5" to 5.0", which indicate deck thickness ranging from 8.5" to 11.0".

Part 3: Evaluation of structural adequacy with the apparent increase in concrete dead load

The bridge design is based on an 8.5" thick deck and 3" average build-up. We have re-analyzed the bridge with the calculated average haunch and deck thickness of 5.7" and 10.5" respectively. Our results show that the ultimate strength of the bridge has not been reduced. We find that the increase in composite beam height results in additional strength that offsets the additional dead load of increased build-up over the beams and increased deck thickness. From a bridge serviceability (cracking) point of view, the bridge capacity has been reduced but exceeds the minimum design requirements. We therefore find the as-built portion of the bridge to have a satisfactory load rating.

Part 4: Evaluate possible reasons for the increase in as-built deck thickness

Deck thickness is a function of the top screed strike elevation less the top of SIP form elevation. Haunch thickness is a function of the remainder of concrete that falls between the bottom of the deck and top of the beam. Once the beams are set and surveyed, the actual haunch is determined and forms are set accordingly. Based on the as-built survey to date, we have confirmed that the pedestals were constructed as per plan (+/- 1") *(Refer to Attachment A, page 6 of 7)*, the anticipated haunch at the bearings are as per plan and the actual beam camber is nearly half the calculated theoretical camber. The difference in camber accounts for the increase in haunch thickness but does not correlate with the increase in deck thickness. By spot checking the SIP form angles in the field, we were able to confirm that the change in elevation between the north side and south side of the

flanges are consistent with the 2% cross slope, however; we were not able to confirm whether or not the angles were set to the contractor's calculated distances from the top of the flange. It is important to keep in mind that the deck elevations within spans 3 and 4 are established with the following parameters:

a) Variations along a vertical curve.
b) Variations along a horizontal curve.
c) Variations in beam lengths. Due to the horizontal curve and non-parallel piers, the beams are not exactly parallel (splade).
d) The cross slope falls along the radial of the horizontal curve.

Since the forms are set at approximately 10ft intervals and at different locations along each beam, it would be impossible for the bottom of the pans to follow the exact theoretical shape of the slab. Therefore, we can anticipate a variation in deck thickness based on these geometric variables alone, however; we can neither confirm nor deny that this is the sole reason for the increase in deck thickness. We have confirmed that the deck and bearing elevations identified on the plans are correct and that there are some variations in the as-built deck elevations that can be attributed to either overbuild or lack of dead load deflection. Therefore, we believe the increase in deck thickness is due to one of the following five possible reasons:

1. Bridge geometry is complex and prohibits the construction of a uniform deck thickness with the traditional construction methods utilized to cast the deck.
2. The discrepancy in actual camber vs theoretical camber. Larger camber values require lower pedestal elevations resulting in increased beam build-up thickness.
3. Complex vertical and horizontal geometry may not allow for the SIP forms to be installed at the exact calculated elevation throughout the deck.
4. Complex vertical and horizontal geometry may not allow for the bidwell screed machine to be set properly.
5. Combination of all of the above.

Part 5: Summary and Recommendations

In summary, the additional concrete will not adversely affect the design life or structural capacity of the bridge, however; an estimated overrun in concrete quantity of 460 CY is anticipated if the remainder of the bridge is constructed in a similar fashion *(Refer to Attachment A, page 7 of 7)*.

As discussed in the meeting held on May 12, 2011, possible solutions to alleviate the overrun in quantity are to a) reduce deck thickness within spans 1 & 2 by providing styrofoam below the bottom mat of steel accordingly or b) reduce the deck thickness within spans 1 and 2 by lowering the PGL elevations by approximately 1 inch. Since the reinforcement is already in place, option "a" is not constructible. The second option (option "b") in our opinion is risky and not recommended. We believe that since the

remainder of the bridge is geometrically less complex, (ie. not within the horizontal curve and estimated deck thickness are anticipated to be between 9 & 9.5 inches according to a survey performed by the contractor), it would be prudent to continue to construct the deck as planned.

In addition, the issue of excessive concrete cover was discussed at the referenced meeting. In particular the question was raised as to whether or not the deck will have a greater tendency to crack under service load due to the proximity of reinforcement in relation to the deck top surface (ie. excessive concrete cover). Based on our investigation of research on this topic, too much concrete cover will increase the chances for the deck surface to crack. We therefore, took another look at the calculated service stresses in the top steel and determined that a maximum concrete cover of 3-1/2" should be maintained throughout the remaining deck sections to be poured. As discussed in the meeting, clear concrete cover to the top mat of steel may be adjusted using concrete shims referred to as "Hog Apples".

Should you have any further questions or concerns regarding this matter, please do not hesitate to contact us.

Sincerely,

Douglas Ruggiano, P.E.
Project Manager

Attachment 5
"C"

J.W. CHEATHAM LLC

Road Building & Earthmoving Contractors

August 26, 2011

Palm Beach County
Construction Coordination Division
P.O. Box 21229
West Palm Beach, FL 33416

Attn: Mr. Ellis Ross, Director

Re: 45th Street Over Florida's Turnpike
Project Number: 2003512, Bridge No.: 934166

Dear Mr. Ross:

I respectfully submit the following change order request for 490.82 CY of additional superstructure concrete required to construct the above referenced bridge.

Superstructure Concrete per Murphy Constr. Cost Breakdown	$	143,822.26
J.W. Cheatham, LLC's Markup (10%)	$	14,382.23
Extended MOT (30 Days @ $776.41/Day)	$	23,292.30
	$	181,496.79

Enclosed is Murphy Construction Company's cost breakdown for your review. Please contact me should you have any questions.

Sincerely,
J.W. Cheatham, LLC

Thomas P. Uhrig
Vice President

7396 Westport Place West Palm Beach, FL 33413 Phone: (561) 471-4100 Fax: (561) 471-8348

CHANGE ORDER HISTORY

PALM BEACH COUNTY PROJECT 45th Street/Jog Road to E. of Haverhill Road & Jog Road S. of 45th Street to N. of 45th Street; Project No.'s 2003512/1998506B

C.O. #	DATE APPROVED	COUNTY ENGINEER		C.R. COMMITTEE		TOTAL DEPT. & C.R. APPROVALS		BOARD OF CO. COMM.	
		AMOUNT	TIME	AMOUNT	TIME	AMOUNT	TIME	AMOUNT	TIME
1	7/22/2010	5,967.00	0						
2	7/22/2010	6,140.00	0						
3	8/12/2010	0.00	0						
4	9/14/2010							719,750.00	0
5	12/21/2010							1,070,477.80	180
6	1/13/2011	29,571.20	0						
7	2/23/2011			80,841.80	0				
8	4/5/2011							137,866.70	0
9	Pending	39,548.31	0						
	TOTAL	81,226.51	0	80,841.80	0	162,068.31	0		
	CUMULATIVE TOTAL	81,226.51	0	80,841.80	0	162,068.31	0		
	As of PPM CW-F-050 Dated June 1, 2011	SINGLE AMT. $50,000.00 MAX. AMT. $250,000.00 or 5% of contract	MAX. TIME 30 DAYS	SINGLE AMT. $100,000.00 MAX. AMT. $250,000.00 or 5% of contract	MAX. TIME 90 DAYS	MAXIMUM CUMULATIVE CO. ENG. & C.R. COMM. $250,000.00 or 5% of contract	MAX. CUM. CO.ENG.&C.R 120 DAYS		

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Attachment 6

SCHEDULE 1

LIST OF PROPOSED SBE-M/WBE SUBCONTRACTORS

PROJECT NAME: 45th Street / Jog Road PROJECT NO. 2003512/1998506B

NAME OF PRIME BIDDER: J.W. Cheatham, LLC

ADDRESS: 7396 Westport Place, WPB, FL 33413

CONTACT PERSON: Tom Uhrig PHONE NO: 561-471-4100 FAX NO: 561-471-8348

BID DATE: 11/17/11 DEPARTMENT: Estimating

PLEASE IDENTIFY ALL APPLICABLE CATEGORIES OF SUBCONTRACTORS

Name, Address and Phone Number	(Check one or both Catagories) Minority Business	Small Business	Dollar Amount Small	Black	Hispanic	Women	Other (Please Specify)
1. NONE	☐	☐	$_____	$_____	$_____	$_____	$_____
2.	☐	☐	$_____	$_____	$_____	$_____	$_____
3.	☐	☐	$_____	$_____	$_____	$_____	$_____
4.	☐	☐	$_____	$_____	$_____	$_____	$_____
5.	☐	☐	$_____	$_____	$_____	$_____	$_____
(Please use additional sheets if necessary)		Total	$_____	$_____	$_____	$_____	$_____

Total ~~Bid~~ CO Price $ 181496.79 Total Value of SBE Participation $ 0

NOTE:
1. **The amounts listed on this form must be supported by the Subcontractors prices included on Schedule 2 in order to be counted toward goal attainment.**
2. **Firms may be certified by Palm Beach County as an SBE and/or M/WBE. If firms are certified as both an SBE and M/WBE, please indicate the dollar amount under the appropriate category.**
3. **M/WBE information is being collected for tracking purposes only.**

Attachment 7