



Illinois Department of Transportation

2300 South Dirksen Parkway / Springfield, Illinois / 62764

April 16, 2013

SUBJECT: FAU 187 (Washington Street)
Project M-TE-00D1(888)
Section 05-00121-07-WR
Lake County
Contract No. 63765
Item 176
April 26, 2013 Letting
Addendum (A)

NOTICE TO PROSPECTIVE BIDDERS:

Due to clarify information necessary to revise the following:

- 1. Replaced the Schedule of Prices.**
- 2. Revised Index to the Special Provisions.**
- 3. Revised pages 4, 12, 87, 95 - 153 of the Special Provisions.**
- 4. Added page 10A to the Special Provisions.**
- 5. Deleted pages 154 & 400 of the Special Provisions.**
- 6. Revised sheets 2 – 7, 11, 21 – 24, 26, 61, 75 – 87, 91 – 101, 106 – 111, 114, 121 – 137, 151, 168 – 216.**

Prime contractors must utilize the enclosed material when preparing their bid and must include any Schedule of Prices changes in their bidding proposal.

Bidders using computer-generated bids are cautioned to reflect any and all Schedule of Prices changes, if involved, into their computer programs.

Very truly yours,

John Baranzelli, P.E.
Acting Engineer of Design and Environment

A handwritten signature in cursive script, reading "Ted B. Walschleger P.E.", with a small "P.E." to the right.

By: Ted B. Walschleger, P.E.
Engineer of Project Management

STATE JOB # - C-91-029-07
 PPS NBR -

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 SCHEDULE OF PRICES
 CONTRACT NUMBER - 63765

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COUNTY NAME	CODE	DIST	SECTION NUMBER	PROJECT NUMBER	ROUTE
LAKE	097	01	05-00121-07-WR	M-TE-00D1/888/000	FAU 187

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	CTS
				DOLLARS	CENTS		
A2000616	T-ACER PLAT	EACH	2.000	X	=		
A2002916	T-CELTIS OCCID	EACH	1.000	X	=		
A2005016	T-GYMNOCCLA DIO	EACH	3.000	X	=		
A2006716	T-QUERCUS MACR	EACH	5.000	X	=		
A2007116	T-QUERCUS RUBRA	EACH	5.000	X	=		
XX001249	ORNAMENTAL FENCE	FOOT	512.000	X	=		
XX001877	SUMP PUMP LINE CONN	EACH	5.000	X	=		
XX003536	CONN EX W MN NP	EACH	22.000	X	=		
XX003668	PRECONSTRUCT VID TAP	L SUM	1.000	X	=		
XX004913	REMOV FOC FR CONDUIT	FOOT	1,412.000	X	=		
XX005855	WATERMAIN CASING PIPE	FOOT	659.000	X	=		
XX005931	TRAF SIGL P 16FT SPL	EACH	3.000	X	=		
XX005937	LED INT IL S-NAME SGN	EACH	4.000	X	=		
XX005940	REMOTE CONTR VIDEO SY	EACH	1.000	X	=		
XX006655	LYR II DATA LINK SWITCH	EACH	2.000	X	=		

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ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	CTS
				DOLLARS	CENTS		
XX006658	FLOCCULATION LOGS	EACH	200.000			=	
XX006659	FLOCCULATION POWDER	POUND	25.000			=	
XX006660	WETLAND PLANTS	EACH	40.000			=	
XX006698	TREE PROTECT & PRESER	EACH	90.000			=	
XX007776	REM & ABAND VALVE BOX	EACH	48.000			=	
XX008132	REL REM-CON VID SYS	EACH	1.000			=	
XX008246	FIB OPT CBL C 24 SM	FOOT	2,542.000			=	
XX008253	VIDEO ENCODER	EACH	1.000			=	
XX008288	SED COL CHAM SYS TEMP	EACH	1.000			=	
XX008392	OUTDR RTD NTRWK CABLE	FOOT	110.000			=	
XX008678	RELOC EXIST ENCODER	EACH	1.000			=	
XX0324878	ADJ SAN SEW SERV LINE	EACH	5.000			=	
XX0325318	LT WT CELL CONC FILL	CU YD	57.000			=	
XX0325462	MEDIA CONVERTER	EACH	1.000			=	
XX0326885	VIDEO DETECT SYS	EACH	1.000			=	

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ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	CTS
				DOLLARS	CENTS		
X0327211	RELOCATE SWITCH	EACH	1.000				
X0327566	ROADSIDE DETECTOR	EACH	1.000				
X0426200	DEWATERING	L SUM	1.000				
X2130010	EXPLOR TRENCH SPL	FOOT	200.000				
X2500910	SEEDING CL 1 MOD	ACRE	0.250				
X2510635	HD EROS CONT BLANK SP	SQ YD	100.000				
X2800302	TEMP DITCH CHECKS SPL	FOOT	84.000				
X4021000	TEMP ACCESS- PRIV ENT	EACH	53.000				
X4022000	TEMP ACCESS- COM ENT	EACH	26.000				
X4023000	TEMP ACCESS- ROAD	EACH	25.000				
X5610004	D I WTR MN FITTINGS	POUND	24,327.000				
X5610651	ABAN EX WM FILL CLSM	FOOT	4,518.000				
X5620116	WATER SER CONN (SHRT)	EACH	16.000				
X5620118	WATER SER CONN (LONG)	EACH	23.000				
X5630006	CUT & CAP EX 6 WM	EACH	7.000				

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				DOLLARS	CENTS		
X5630008	CUT & CAP EX 8 WM	EACH	7.000				
X5630012	CUT & CAP EX 12 WM	EACH	2.000				
X6013600	PIPE UNDERDRAIN 4 MOD	FOOT	11,251.000				
X6030310	FR & LIDS ADJUST SPL	EACH	4.000				
X6640550	CH LK FENCE 4 SPL	FOOT	923.000				
X6700405	ENGR FLD OFF A MOD	CAL MO	15.000				
X7010216	TRAF CONT & PROT SPL	L SUM	1.000				
X7800100	PT PVT MK- RAISED MED	SQ FT	81.000				
X8570215	FAC IN EXIST CAB	EACH	1.000				
X8570226	FAC T4 CAB SPL	EACH	1.000				
X8620200	UNINTER POWER SUP SPL	EACH	1.000				
X8730250	ELCBL C 20 3C TW SH	FOOT	533.000				
X8730571	EC C COAXIAL	FOOT	165.000				
X8730800	ELCBL C VIDEO 20 4C	FOOT	165.000				
X8770125	S C MAA&P 28 SPL	EACH	1.000				

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ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	CTS
				DOLLARS	CENTS		
X8770137	S C MA&P 38 SPL	EACH	1.000				
X8770141	S C MA&P 48 SPL	EACH	1.000				
X8772930	STL COMB MA&P 40 SPL	EACH	1.000				
Z0010600	CLEAN DRAINAGE SYSTEM	FOOT	300.000				
Z0013302	SEGMENT CONC BLK WALL	SQ FT	3,420.000				
Z0013798	CONSTRUCTION LAYOUT	L SUM	1.000				
Z0018500	DRAINAGE STR CLEANED	EACH	5.000				
Z0019400	DRY RUB ST/BR CON T W	CU YD	1.000				
Z0019600	DUST CONTROL WATERING	UNIT	10.000				
Z0022800	FENCE REMOVAL	FOOT	1,139.000				
Z0030850	TEMP INFO SIGNING	SQ FT	210.000				
Z0033046	RE-OPTIMIZE SIG SYS 2	EACH	3.000				
Z0046304	P UNDR FOR STRUCT 4	FOOT	625.000				
Z0056604	STORM SEW WM REQ 8	FOOT	6.000				
Z0056608	STORM SEW WM REQ 12	FOOT	1,552.000				

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ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	CTS
				DOLLARS	CENTS		
Z0056610	STORM SEW WM REQ 15	FOOT	857.000				
Z0056612	STORM SEW WM REQ 18	FOOT	147.000				
Z0056616	STORM SEW WM REQ 24	FOOT	71.000				
Z0056620	STORM SEW WM REQ 30	FOOT	80.000				
Z0056622	STORM SEW WM REQ 36	FOOT	84.000				
Z0070200	SURVEY MONUMENTS	EACH	21.000				
Z0073510	TEMP TR SIGNAL TIMING	EACH	5.000				
Z0076600	TRAINEES	HOUR	1,000.000	0.80		800.00	
Z0076604	TRAINEES TPG	HOUR	1,000.000	10.00		10,000.00	
20100110	TREE REMOV 6-15	UNIT	524.000				
20100210	TREE REMOV OVER 15	UNIT	262.000				
20101000	TEMPORARY FENCE	FOOT	12,132.000				
20101200	TREE ROOT PRUNING	EACH	25.000				
20101300	TREE PRUN 1-10	EACH	25.000				
20101350	TREE PRUN OVER 10	EACH	25.000				

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ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	CTS
				DOLLARS	CENTS		
20200100	EARTH EXCAVATION	CU YD	19,462.000	=			
20201200	REM & DISP UNS MATL	CU YD	5,559.000	=			
20400800	FURNISHED EXCAVATION	CU YD	4,763.000	=			
20800150	TRENCH BACKFILL	CU YD	5,092.000	=			
21001000	GEOTECH FAB F/GR STAB	SQ YD	37,470.000	=			
21101615	TOPSOIL F & P 4	SQ YD	16,080.000	=			
25000400	NITROGEN FERT NUTR	POUND	45.000	=			
25000600	POTASSIUM FERT NUTR	POUND	45.000	=			
25100115	MULCH METHOD 2	ACRE	3.500	=			
25100630	EROSION CONTR BLANKET	SQ YD	16,080.000	=			
25200100	SODDING	SQ YD	15,743.000	=			
25200200	SUPPLE WATERING	UNIT	20.000	=			
28000200	EARTH EXC - EROS CONT	CU YD	50.000	=			
28000250	TEMP EROS CONTR SEED	POUND	336.000	=			
28000305	TEMP DITCH CHECKS	FOOT	84.000	=			

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ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	CTS
				DOLLARS	CENTS		
28000400	PERIMETER EROS BAR	FOOT	4,394.000	X	=		
28000500	INLET & PIPE PROTECT	EACH	3.000	X	=		
28000510	INLET FILTERS	EACH	131.000	X	=		
28100203	STONE RIPRAP CL A2	TON	67.000	X	=		
28100207	STONE RIPRAP CL A4	TON	54.000	X	=		
28200200	FILTER FABRIC	SQ YD	12.000	X	=		
30300001	AGG SUBGRADE IMPROVE	CU YD	944.000	X	=		
30300112	AGG SUBGRADE IMPR 12	SQ YD	35,194.000	X	=		
35100110	AGG BASE CSE A	CU YD	1,825.000	X	=		
40201000	AGGREGATE-TEMP ACCESS	TON	284.000	X	=		
40600100	BIT MATLS PR CT	GALLON	20,048.000	X	=		
40600300	AGG PR CT	TON	36.000	X	=		
40600400	MIX CR JTS FLANGEWYS	TON	1.000	X	=		
40600895	CONSTRUC TEST STRIP	EACH	1.000	X	=		
40600982	HMA SURF REM BUTT JT	SQ YD	63.000	X	=		

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ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	CTS
				DOLLARS	CENTS		
40600990	TEMPORARY RAMP	SQ YD	462.000				
40603085	HMA BC IL-19.0 N70	TON	13,998.000				
40603335	HMA SC "D" N50	TON	431.000				
40603340	HMA SC "D" N70	TON	4,388.000				
42001300	PROTECTIVE COAT	SQ YD	9,131.000				
42300200	PCC DRIVEWAY PAVT 6	SQ YD	171.000				
42400200	PC CONC SIDEWALK 5	SQ FT	53,922.000				
42400800	DETECTABLE WARNINGS	SQ FT	1,170.000				
44000100	PAVEMENT REM	SQ YD	22,646.000				
44000158	HMA SURF REM 2 1/4	SQ YD	5,594.000				
44000200	DRIVE PAVEMENT REM	SQ YD	5,831.000				
44000500	COMB CURB GUTTER REM	FOOT	2,892.000				
44000600	SIDEWALK REM	SQ FT	9,575.000				
44003100	MEDIAN REMOVAL	SQ FT	1,764.000				
44004250	PAVED SHLD REMOVAL	SQ YD	197.000				

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ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	CTS
				DOLLARS	CENTS		
44201735	CL D PATCH T4 7	SQ YD	119.000				
44201777	CL D PATCH T2 11	SQ YD	6.000				
44201781	CL D PATCH T3 11	SQ YD	50.000				
44300200	STRIP REF CR CON TR	FOOT	2,568.000				
48100500	AGGREGATE SHLDS A 6	SQ YD	136.000				
50300225	CONC STRUCT	CU YD	16.400				
50800105	REINFORCEMENT BARS	POUND	1,380.000				
50800205	REINF BARS, EPOXY CTD	POUND	560.000				
54213450	END SECTIONS 15	EACH	1.000				
54213459	END SECTIONS 24	EACH	1.000				
54213657	PRC FLAR END SEC 12	EACH	2.000				
550A0050	STORM SEW CL A 1 12	FOOT	2,965.000				
550A0070	STORM SEW CL A 1 15	FOOT	613.000				
550A0090	STORM SEW CL A 1 18	FOOT	125.000				
550A0120	STORM SEW CL A 1 24	FOOT	180.000				

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ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	CTS
				DOLLARS	CENTS		
550A0140	STORM SEW CL A 1 30	FOOT	65.000				
550A0160	STORM SEW CL A 1 36	FOOT	345.000				
550B0070	STORM SEW CL B 1 15	FOOT	266.000				
55100100	STORM SEWER REM 4	FOOT	30.000				
55100200	STORM SEWER REM 6	FOOT	182.000				
55100300	STORM SEWER REM 8	FOOT	77.000				
55100400	STORM SEWER REM 10	FOOT	242.000				
55100500	STORM SEWER REM 12	FOOT	2,143.000				
55100700	STORM SEWER REM 15	FOOT	109.000				
55100900	STORM SEWER REM 18	FOOT	36.000				
55101200	STORM SEWER REM 24	FOOT	67.000				
55101400	STORM SEWER REM 30	FOOT	341.000				
56103000	D I WATER MAIN 6	FOOT	295.000				
56103100	D I WATER MAIN 8	FOOT	3,729.000				
56103300	D I WATER MAIN 12	FOOT	826.000				

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ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	CTS
				DOLLARS	CENTS		
56105000	WATER VALVES 8	EACH	22.000				
56105200	WATER VALVES 12	EACH	2.000				
56106400	ADJ WATER MAIN 8	FOOT	50.000				
56106600	ADJ WATER MAIN 12	FOOT	50.000				
56400100	FIRE HYDNTS TO BE MVD	EACH	3.000				
56400300	FIRE HYDNTS TO BE ADJ	EACH	1.000				
56400500	FIRE HYDNTS TO BE REM	EACH	11.000				
56400820	FIRE HYD W/AUX V & VB	EACH	13.000				
60200805	CB TA 4 DIA T8G	EACH	9.000				
60201110	CB TA 4 DIA T11V F&G	EACH	63.000				
60201305	CB TA 4 DIA T15F&L	EACH	1.000				
60201340	CB TA 4 DIA T24F&G	EACH	1.000				
60204505	CB TA 5 DIA T8G	EACH	3.000				
60204825	CB TA 5 DIA T11V F&G	EACH	4.000				
60205040	CB TA 5 DIA T24F&G	EACH	1.000				

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				DOLLARS	CENTS		
60207605	CB TC T8G	EACH	3.000 X			=	
60218400	MAN TA 4 DIA T1F CL	EACH	19.000 X			=	
60221100	MAN TA 5 DIA T1F CL	EACH	4.000 X			=	
60221700	MAN TA 5 DIA T8G	EACH	1.000 X			=	
60236200	INLETS TA T8G	EACH	5.000 X			=	
60236825	INLETS TA T11V F&G	EACH	34.000 X			=	
60237470	INLETS TA T24F&G	EACH	2.000 X			=	
60248700	VV TA 4 DIA T1F CL	EACH	22.000 X			=	
60248900	VV TA 5 DIA T1F CL	EACH	2.000 X			=	
60250200	CB ADJUST	EACH	2.000 X			=	
60252800	CB RECONST	EACH	5.000 X			=	
60255500	MAN ADJUST	EACH	36.000 X			=	
60257900	MAN RECONST	EACH	8.000 X			=	
60260100	INLETS ADJUST	EACH	3.000 X			=	
60262700	INLETS RECONST	EACH	5.000 X			=	

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				DOLLARS	CENTS		
60265700	VV ADJUST	EACH	9.000				
60266600	VALVE BOX ADJ	EACH	3.000				
60402210	GRATES T8	EACH	2.000				
60404950	FR & GRATES T24	EACH	2.000				
60406000	FR & LIDS T1 OL	EACH	3.000				
60406100	FR & LIDS T1 CL	EACH	47.000				
60500040	REMOV MANHOLES	EACH	2.000				
60500050	REMOV CATCH BAS	EACH	16.000				
60500060	REMOV INLETS	EACH	15.000				
60500405	FILL VALVE VLTS	EACH	9.000				
60600605	CONC CURB TB	FOOT	827.000				
60603800	COMB CC&G TB6.12	FOOT	10,974.000				
60605000	COMB CC&G TB6.24	FOOT	816.000				
60618300	CONC MEDIAN SURF 4	SQ FT	270.000				
66400705	CH LK GATE 4X4 SINGL	EACH	1.000				

* Reversed 4/16/13

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				DOLLARS	CENTS		
66405700	CH LK GATES 4X10 DBL	EACH	1.000				
66900205	SPL WASTE DISPOSAL	CU YD	2,331.000				
66900450	SPL WASTE PLNS/REPORT	L SUM	1.000				
66900530	SOIL DISPOSAL ANALY	EACH	2.000				
67100100	MOBILIZATION	L SUM	1.000				
70106800	CHANGEABLE MESSAGE SN	CAL MO	16.000				
70300100	SHORT TERM PAVT MKING	FOOT	1,704.000				
70300210	TEMP PVT MK LTR & SYM	SQ FT	1,574.000				
70300220	TEMP PVT MK LINE 4	FOOT	12,309.000				
70300240	TEMP PVT MK LINE 6	FOOT	1,159.000				
70300250	TEMP PVT MK LINE 8	FOOT	8,368.000				
70300260	TEMP PVT MK LINE 12	FOOT	1,330.000				
70300280	TEMP PVT MK LINE 24	FOOT	130.000				
70300520	PAVT MARK TAPE T3 4	FOOT	200.000				
70301000	WORK ZONE PAVT MK REM	SQ FT	200.000				

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				DOLLARS	CENTS		
72400100	REMOV SIN PAN ASSY TA	EACH	2.000				
78000100	THPL PVT MK LTR & SYM	SQ FT	1,574.000				
78000200	THPL PVT MK LINE 4	FOOT	12,309.000				
78000400	THPL PVT MK LINE 6	FOOT	1,159.000				
78000500	THPL PVT MK LINE 8	FOOT	8,368.000				
78000600	THPL PVT MK LINE 12	FOOT	1,330.000				
78000650	THPL PVT MK LINE 24	FOOT	130.000				
78100100	RAISED REFL PAVT MKR	EACH	67.000				
78300100	PAVT MARKING REMOVAL	SQ FT	200.000				
78300200	RAISED REF PVT MK REM	EACH	67.000				
80500020	SERV INSTALL POLE MT	EACH	1.000				
81028200	UNDRGRD C GALVS 2	FOOT	5,906.000				
81028210	UNDRGRD C GALVS 2 1/2	FOOT	48.000				
81028230	UNDRGRD C GALVS 3 1/2	FOOT	36.000				
81028240	UNDRGRD C GALVS 4	FOOT	531.000				

* Revised 4/16/13

FAU 187
05-00121-07-WR
LAKE

ILLINOIS DEPARTMENT OF TRANSPORTATION
SCHEDULE OF PRICES
CONTRACT NUMBER - 63765

ECMS002 DTGECM03 ECMR003 PAGE 17
RUN DATE - 04/15/13
RUN TIME - 183106
*

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	CTS
				DOLLARS	CENTS		
81400100	HANDHOLE	EACH	12.000				
81400300	DBL HANDHOLE	EACH	3.000				
85000200	MAIN EX TR SIG INSTAL	EACH	2.000				
87300925	ELCBL C TRACER 14 1C	FOOT	2,496.000				
87301215	ELCBL C SIGNAL 14 2C	FOOT	2,694.000				
87301225	ELCBL C SIGNAL 14 3C	FOOT	2,563.000				
87301245	ELCBL C SIGNAL 14 5C	FOOT	1,675.000				
87301255	ELCBL C SIGNAL 14 7C	FOOT	2,835.000				
87301805	ELCBL C SERV 6 2C	FOOT	69.000				
87301900	ELCBL C EGRDC 6 1C	FOOT	861.000				
87800100	CONC FDN TY A	FOOT	12.000				
87800150	CONC FDN TY C	FOOT	4.000				
87800415	CONC FDN TY E 36D	FOOT	60.000				
87900200	DRILL EX HANDHOLE	EACH	2.000				
88030020	SH LED 1F 3S MAM	EACH	5.000				

* Revised 4/16/13

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SCHEDULE OF PRICES
CONTRACT NUMBER - 63765

ECMS002 DTGECM03 ECMR003 PAGE 18
RUN DATE - 04/15/13
RUN TIME - 183106
*

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	CTS
				DOLLARS	CENTS		
88030050	SH LED 1F 3S BM	EACH	1.000	X	=		
88030070	SH LED 1F 4S BM	EACH	2.000	X	=		
88030080	SH LED 1F 4S MAM	EACH	2.000	X	=		
88030100	SH LED 1F 5S BM	EACH	2.000	X	=		
88030110	SH LED 1F 5S MAM	EACH	4.000	X	=		
88030240	SH LED 2F 1-3 1-5 BM	EACH	1.000	X	=		
88030250	SH LED 2F 1-4 1-5 BM	EACH	1.000	X	=		
88102717	PED SH LED 1F BM CDT	EACH	3.000	X	=		
88102747	PED SH LED 2F BM CDT	EACH	2.000	X	=		
88102757	PED SH LED 3F BM CDT	EACH	1.000	X	=		
88200210	TS BACKPLATE LOU ALUM	EACH	11.000	X	=		
88700200	LIGHT DETECTOR	EACH	3.000	X	=		
88700300	LIGHT DETECTOR AMP	EACH	1.000	X	=		
88800100	PED PUSH-BUTTON	EACH	10.000	X	=		
89000100	TEMP TR SIG INSTALL	EACH	1.000	X	=		

* Revisesed 4/16/13

FAU 187
05-00121-07-WR
LAKE

ILLINOIS DEPARTMENT OF TRANSPORTATION
SCHEDULE OF PRICES
CONTRACT NUMBER - 63765

ECMS002 DTGECM03 ECMR003 PAGE 19
RUN DATE - 04/15/13
RUN TIME - 183106
*

ITEM NUMBER	PAY ITEM DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE		TOTAL PRICE	
				DOLLARS	CENTS	DOLLARS	CTS
89502300	REM ELCBL FR CON	FOOT	1,303.000			=	
89502375	REMOV EX TS EQUIP	EACH	1.000			=	
89502380	REMOV EX HANDHOLE	EACH	11.000			=	
89502382	REMOV EX DBL HANDHOLE	EACH	1.000			=	
89502385	REMOV EX CONC FDN	EACH	9.000			=	
TOTAL \$							

NOTE:

1. EACH PAY ITEM SHOULD HAVE A UNIT PRICE AND A TOTAL PRICE.
2. THE UNIT PRICE SHALL GOVERN IF NO TOTAL PRICE IS SHOWN OR IF THERE IS A DISCREPANCY BETWEEN THE PRODUCT OF THE UNIT PRICE MULTIPLIED BY THE QUANTITY.
3. IF A UNIT PRICE IS OMITTED, THE TOTAL PRICE WILL BE DIVIDED BY THE QUANTITY IN ORDER TO ESTABLISH A UNIT PRICE.
4. A BID MAY BE DECLARED UNACCEPTABLE IF NEITHER A UNIT PRICE NOR A TOTAL PRICE IS SHOWN.

* Revised 4/16/13

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Lake County Division of Transportation Traffic Signal Special Provisions

Environmental Survey Request Forms
Borrow/Waste/Use Areas (BDE 2289)

Revised 4/16/13

File Name	Pg.		Special Provision Title	Effective	Revised
80218			Preventive Maintenance – Bituminous Surface Treatment	Jan. 1, 2009	April 1, 2012
80219			Preventive Maintenance – Cape Seal	Jan. 1, 2009	April 1, 2012
80220			Preventive Maintenance – Micro-Surfacing	Jan. 1, 2009	April 1, 2012
80221			Preventive Maintenance – Slurry Seal	Jan. 1, 2009	April 1, 2012
80281	366	X	Quality Control/Quality Assurance of Concrete Mixtures	Jan. 1, 2012	Jan. 1, 2013
34261			Railroad Protective Liability Insurance	Dec. 1, 1986	Jan. 1, 2006
80157			Railroad Protective Liability Insurance (5 and 10)	Jan. 1, 2006	
80306			Reclaimed Asphalt Pavement (RAP) and Reclaimed Asphalt Shingles (RAS)	Nov. 1, 2012	Jan. 1, 2013
* 80283	382	X	Removal and Disposal of Regulated Substances	Jan. 1, 2012	Nov. 2, 2012
* 80319	386	X	Removal and Disposal of Surplus Materials	Nov. 2, 2012	
80224			Restoring Bridge Approach Pavements Using High-Density Foam	Jan. 1, 2009	Jan. 1, 2012
80271			Safety Edge	April 1, 2011	
80307			Seeding	Nov. 1, 2012	
80127			Steel Cost Adjustment	April 2, 2004	April 1, 2009
80255			Stone Matrix Asphalt	Jan. 1, 2010	Jan. 1, 2012
80143	387	X	Subcontractor Mobilization Payments	April 2, 2005	April 1, 2011
80317			Surface Testing of Hot-Mix Asphalt Overlays (NOTE: This special provision was previously named "Surface Testing of Pavements".)	Jan. 1, 2013	
80308			Synthetic Fibers in Concrete Gutter, Curb, Median and Paved Ditch	Nov. 1, 2012	
80286	388	X	Temporary Erosion and Sediment Control	Jan. 1, 2012	
80225			Temporary Raised Pavement Marker	Jan. 1, 2009	
80256			Temporary Water Filled Barrier	Jan. 1, 2010	Jan. 1, 2013
80301			Tracking the Use of Pesticides	Aug. 1, 2012	
80273	389	X	Traffic Control Deficiency Deduction	Aug. 1, 2011	
20338	390	X	Training Special Provisions	Oct. 15, 1975	
* 80318			Traversable Pipe Grate	Jan. 1, 2013	April 1, 2013
80270			Utility Coordination and Conflicts	April 1, 2011	Jan. 1, 2012
80288	393	X	Warm Mix Asphalt	Jan. 1, 2012	Nov. 1, 2012
80302	399	X	Weekly DBE Trucking Reports	June 2, 2012	
80289			Wet Reflective Thermoplastic Pavement Marking	Jan. 1, 2012	
80071	400	X	Working Days	Jan. 1, 2002	

The following special provisions are either in the 2013 Standard Specifications, the 2013 Recurring Special Provisions, or the special provisions Portland Cement Concrete, QC/QA of Concrete Mixtures, or Placing and Consolidating Concrete:

File Name	Special Provision Title	New Location	Effective	Revised
80275	Agreement to Plan Quantity	Article 202.07	Jan. 1, 2012	
80291	Calcium Chloride Accelerator for Class PP-2 Concrete	Recurring CS #28	April 1, 2012	
80237	Construction Air Quality – Diesel Vehicle Emissions Control	Articles 105.03 and 107.41	April 1, 2009	Jan. 2, 2012
80239	Construction Air Quality – Idling Restrictions	Articles 105.03 and 107.41	April 1, 2009	
80177	Digital Terrain Modeling for Earthwork Calculations	Recurring CS #32	April 1, 2007	
80272	Drainage and Inlet Protection Under Traffic	Articles 603.02 and 603.07	April 1, 2011	Jan. 1, 2012
80228	Flagger at Side Roads and Entrances	Articles 701.13 and 701.20	April 1, 2009	
80109	Impact Attenuators	Section 643	Nov. 1, 2003	Jan. 1, 2012
80110	Impact Attenuators, Temporary	Section 706	Nov. 1, 2003	Jan. 1, 2012
80203	Metal Hardware Cast into Concrete	Articles 503.02, 504.02, and 1006.13	April 1, 2008	Jan. 1, 2012
80290	Payrolls and Payroll Records	Recurring CS #5	Jan. 2, 2012	
80299	Portland Cement Concrete Inlay or Overlay	Recurring CS #29	April 1, 2012	
80280	Portland Cement Concrete Sidewalk	Article 424.07	Jan. 1, 2012	

Revised 4/16/13

Hubs: The Contractor shall furnish, at their expense, hubs for use by the Engineer according to the following:

1. Shall be 1 3/8" x 7/8" x 18" (actual dimension).
2. Shall be furnished in securely banded (on each end) bundles of 25 pieces.
3. The material shall be kiln dried Douglas fir, oak or maple and surfaced on the 2 larger sides and without splits, pitch pockets, wane, knots or decayed wood.
4. The tapered end on each hub shall be pencil point tapered.

Lath: The Contractor shall furnish, at their expense, lath for use by the Engineer according to the following:

1. Shall be 1 1/8" x 1/2" x 48" (actual dimension).
2. Shall be furnished in securely banded (on each end) bundles of 50 pieces.
3. The material shall be kiln dried Douglas fir, oak or maple and surfaced on the 2 larger sides and without splits, pitch pockets, wane, knots or decayed wood.
4. The tapered end may be saw-cut tapered or pencil tapered.

The cost of this work shall be considered as included in the cost of MOBILIZATION, and no additional compensation will be allowed.

PUBLIC CONVENIENCE AND SAFETY

The Contractor shall limit public inconveniences safety conflicts according to Article 107.09 of the "Standard Specifications" and the following:

Keeping Roads Open to Traffic: All roads shall remain open to traffic with the exception of Washington Street. The Contractor may close one (through traffic) lane because of construction only between the hours of 9:00 AM and 3:00 PM. The Contractor shall maintain one-way traffic during these restricted hours on two lane highways with the use of signs and flaggers as shown on the Traffic Control Standard. On multi-lane highways the Contractor shall maintain at least one (through traffic) lane in each direction with the use of signs, barricades, and arrow boards as shown on the Traffic Control Standards. All lanes of traffic will be maintained between 3:00 PM and 9:00 AM and when no construction activities are being carried out.

The restricted lane closure time may be adjusted by the Resident Engineer. The Contractor shall provide a start and end time and a procedure plan 48 hours prior to the lane(s) to be closed. The Resident Engineer will notify the Contractor 24 hours in advance with the decision.

If the Contractor fails to provide notification or disregards the decision by the Resident Engineer the Traffic Control Deficiency Charge will be applied as stated in the Special Provisions for Traffic Control and Protection.

COMPLETION DATE PLUS WORKING DAYS

It is the intent of the County that this project be constructed in an orderly and timely manner. Toward this end, the Contractor shall take special note of the provisions of Article 105.06, Article 108.01 paragraph 2, and Article 108.02 of the "Standard Specifications" which shall be adhered to.

The Contractor shall coordinate all work between their forces and subcontractors to enable completion within the allotted completion date.

Revise Article 108.05 (b) of the "Standard Specifications" as follows:

When a completion date plus working days is specified, the Contractor shall complete all major items of work to safely open all roadways to traffic by 11:59 PM on, **November 15th, 2013** except as specified herein. This includes but is not limited to drainage and utilities, curb and gutter, sidewalks, and the roadway through binder course with paved entrances and side roads.

The Contractor will be allowed to complete remaining work, cleanup and punchlist items within **20** working days after the completion date. Temporary lane closures for this work may be allowed at the discretion of the Engineer.

It is the intent of the County that this project be fully constructed in 2013. The Contractor shall provide the necessary effort to complete this project in 2013. It will be possible to carry over working days from 2013 to 2014 in order to satisfactorily complete the remaining items of work.

Article 108.09 shall apply to both the completion date and the number of working days.

Added 9/16/13

CHAIN LINK FENCE, 4' (SPECIAL)

Description: This work shall consist of furnishing and installing a new fence at the locations shown on the plans and/or designated by the Engineer.

General: Chain Link fences shall be constructed according to Section 664 of the "Standard Specifications" except that it shall be coated with black vinyl and include the top rail.

Method of Measurement: This work will be measured for payment in feet, along the top of the new installed fence, from center to center of end posts.

Basis of Payment: This work will be paid for at the contract unit price per foot for CHAIN LINK FENCE, 4' (SPECIAL), which shall include the cost of the top rail. The unit price shall include all equipment, materials and labor required to furnish and erect the fence.

CONNECTION TO EXISTING WATER MAINS (NON PRESSURE)

Description. This work shall consist of the connection of new water main and fire hydrant leads to existing water main. It shall be performed in accordance with applicable portions of Section 41 of the Water and Sewer Specifications with the following clarifications.

Materials. Water main and fittings shall conform to the special provisions for Ductile Iron Water Main and Ductile Iron Water Main Fittings. The work includes a material allowance of 15 linear feet of ductile iron pipe (of the necessary diameter) and 500 pounds of fittings. Trench backfill shall meet the requirements for CA-6 listed in Article 1004.01.

Construction Requirements. New water main shall be connected to existing water main after the new main has passed hydrostatic testing and disinfection. Connections shall be accomplished by the use of mechanical joint fittings and lengths of pipe to make the most direct vertical and horizontal adjustments necessary to complete the connection. This may include cut-ins to the existing main or connections to existing valves or fittings. This work will require water to be shut off, which shall be coordinated with the Village's maintenance personnel. The new main shall be disinfected in accordance with Article 561.03(h) of the Ductile Iron Water Main special provision.

Basis of Payment. This work will be measured and paid for at the contract unit price per each for CONNECTION TO EXISTING WATER MAINS (NON PRESSURE) which price shall include all labor, equipment, ductile iron pipe water main (up to 15 linear feet), water main fittings (up to 500 pounds), polyethylene wrapping, disinfection, testing, backfill and thrust blocking required to make the connection. If the quantity allowance for ductile iron water main and/or water main fittings are exceeded, quantities in excess of the allowance will be paid for under the items for DUCTILE IRON WATER MAIN and DUCTILE IRON WATER MAIN FITTINGS.

STATUS OF UTILITIES TO BE ADJUSTED

Effective: January 30, 1987

Revised: January 24, 2013

Utilities companies involved in this project have provided the following estimated durations:

Name of Utility	Type	Location	Estimated Duration of Time for the Completion of Relocation or Adjustments
ComEd Ms. Terri Bleck Manager, Public Relocation Group - Northeast Region 1500 Franklin Blvd. Libertyville, IL 60048 PH: (847) 816-5239 FAX: (847) 816-5348 terri.bleck@ComEd.com	Electric	Along Washington Street	Plans are under review by the utility. Schedule to be addressed by each utility at precon or joint meeting. Work is currently scheduled to be complete by June 2013.
Comcast Mr. Robert Schulter Manager 688 Industrial Drive Elmhurst, IL 60126 PH: (630) 600-6347 FAX: (630) 600-6390 bob_schulter@cable. comcast.com	Cable TV	Along Washington Street	Plans are under review by the utility. Schedule to be addressed by each utility at precon or joint meeting. Work is currently scheduled to be complete by June 2013.
AT&T Legal Mandate Engineering Mr. Hector Garcia 1000 Commerce Drive, Floor 2 Oak Brook, IL 60523 PH: (630) 573-5703 FAX: (630) 573-5567 hg2929@att.com	Telephone	Along Washington Street	AT&T is in process of designing duct relocation where in conflict. Work is currently scheduled to be complete by June 2013.
Nicor Gas Ms. Constance Lane Utility Consultant P.O. BOX 190 Aurora, IL 60507-0190 PH: (630) 388-3830 FAX: (630) 983-4028 clane@nicor.com	Gas	Along Washington Street	Plans are under review by the utility. Schedule to be addressed by each utility at precon or joint meeting. Work is currently scheduled to be complete by June 2013.

Revised 4/16/13

LAKE COUNTY DIVISION OF TRANSPORTATION
TRAFFIC SIGNAL SPECIAL PROVISIONS

Effective: January 1, 2013

All work and equipment performed and installed under this Contract shall be governed by and shall comply with:

SPECIFICATION	ADOPTED/DATED
The State of Illinois "Standard Specifications for Road and Bridge Construction" referred to as "Standard Specifications"	Latest Edition
The State of Illinois "Manual on Uniform Traffic Control Devices for Streets and Highways," referred to as "MUTCD"	Latest Edition
The National Electrical Code referred to as "NEC"	Latest Edition
The National Electrical Manufacturers Association (All publications for traffic control items) referred to as "NEMA"	Latest Edition
The International Municipal Signal Association ("Official Wire & Cable Specifications Manual,") referred to as "IMSA"	Latest Edition
The Institute of Transportation Engineers Technical Report No. 1, (A Standard for Adjustable Face Vehicular Traffic Control Heads) referred to as "ITE"	Latest Edition
AASHTO "Standard Specifications" Structural Supports for Highway Signs, Luminaires, and Traffic Signals	Latest Edition
Supplemental Specifications and Recurring Special Provisions	Latest Edition

The following Traffic Signal Special Provisions supplement the above specifications, manuals, and codes. In case of conflict with any part or parts of said documents, these Special Provisions shall take precedence and shall govern.

The following terms and acronyms are used:

IDOT
 District 1
 LCDOT

Illinois Department of Transportation
 IDOT District 1
 The Lake County Division of Transportation

*Revised 4/16/13
 Page 95 through 154*

Engineer

The Resident Engineer

Traffic Engineer

The County Traffic Engineer – LCDOT

The intent of these Special Provisions is to prescribe the materials and construction methods commonly used in traffic signal installations. All material furnished shall be new. The locations and the details of all installations shall be indicated on the plans or as directed by the Engineer.

The work performed under this contract shall consist of furnishing and installing all traffic signal work as specified on the plans and as specified herein in a manner acceptable and approved by the Engineer.

SUBMITTALS.

Revise Article 801.05 of the Standard Specifications to read:

General requirements include:

- a. All material approval requests shall be submitted at the preconstruction meeting.
- b. Product data and shop drawings shall be assembled by pay item. Only the top sheet of each pay item submittal will be stamped by the LCDOT Traffic Department with the review status, except shop drawings for mast arm pole assemblies will be stamped with the review status on each sheet.
- c. Four complete copies of the manufacturer's descriptive literatures and technical data for the traffic signal materials. If the literature contains more than one item, the Contractor shall indicate which item or items will be furnished.
- d. Seven complete copies of the shop drawings for the mast arm assemblies and poles, and the combination mast arm assemblies and poles showing, in detail, the fabrication thereof and the certified mill analyses of the materials used in the fabrication, anchor rods, and reinforcing materials.
- e. Partial or incomplete submittals will be returned without review.
- f. Certain non-standard mast arm poles and structures will require additional review from IDOT's Bureau of Bridges and Structures. Examples include special mast arms and non-standard length mast arm pole assemblies. The contractor shall account for the additional review time in their schedule.
- g. The contract number or permit number, project location/limits and corresponding pay code number must be on each sheet of correspondence, catalog cuts and mast arm poles and assemblies drawings.
- h. Where certifications and/or warranties are specified, the information submitted for approval shall include certifications and warranties. Certifications involving inspections, and/or tests of material shall be complete with all test data, dates, and times.
- i. After the Engineer reviews the submittals for conformance with the design concept of the project, the Engineer will stamp the drawings indicating their status as 'APPROVED', 'APPROVED AS CORRECTED', 'NOT APPROVED', or 'RESUBMIT'. Since the

Engineer's review is for conformance with the design concept only, it is the Contractor's responsibility to coordinate the various items into a working system as specified. The Contractor shall not be relieved from responsibility for errors or omissions in the shop, working, layout drawings, or other documents by the Engineer's approval thereof. The Contractor must still be in full compliance with contract and specification requirements.

- j. All submitted items reviewed and marked 'APPROVED AS CORRECTED', 'NOT APPROVED', or 'RESUBMIT' are to be resubmitted in their entirety, unless otherwise indicated within the submittal comments., with a disposition of previous comments to verify contract compliance at no additional cost to the contract.
- k. Exceptions to and deviations from the requirements of the Contract Documents will not be allowed. It is the Contractor's responsibility to note any deviations from Contract requirements at the time of submittal and to make any requests for deviations in writing to the Engineer. In general, substitutions will not be acceptable. Requests for substitutions must demonstrate that the proposed substitution is superior to the material or equipment required by the Contract Documents. No exceptions, deviations or substitutions will be permitted without the approval of the Engineer.

MARKING PROPOSED LOCATIONS

Revise "Marking Proposed Locations for Highway Lighting System" of Article 801.09 to read "Marking Proposed Locations for Highway Lighting System and Traffic Signals."

INSPECTION OF ELECTRICAL SYSTEMS

Add the following to Article 801.10 of the "Standard Specifications":

All cabinets, including temporary traffic signal cabinets, shall be assembled by an approved equipment supplier in IDOT District 1. LCDOT reserves the right to request that any controller and cabinet be tested at an IDOT District 1 approved equipment supplier's facility prior to field installation. Such testing will be at no extra cost to the contract. All permanent or temporary "railroad interconnected" controllers and cabinets, shall be new, built, tested and approved by the controller equipment vendor, in the vendor's IDOT District 1 approved facility, prior to field installation. The vendor shall provide the technical equipment and assistance as required by the Engineer to fully test this equipment.

MAINTENANCE AND RESPONSIBILITY

Revise Article 801.11 of the "Standard Specifications" to read:

- a. Existing traffic signal installations and/or any electrical facilities at locations included in this contract may be altered or reconstructed totally or partially as part of the work on this contract. The Contractor is hereby advised that all traffic control equipment presently installed at these locations may be the property of the State of Illinois, Department of Transportation, Division of Highways, County, Private Developer, or the Municipality in which it is located. Once the Contractor has begun any work on any portion of the project, all traffic signals within the limits of this contract or those which have the pay item MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION, TEMPORARY TRAFFIC SIGNAL INSTALLATION, and/or MAINTENANCE OF EXISTING FLASHING BEACON INSTALLATION, shall become the full responsibility of the Contractor. The Contractor shall supply the Engineer and the County's Traffic Signal Maintenance Contractor two 24-hour emergency contact names and telephone

numbers. The Contractor shall provide sufficient qualified personnel to respond to all notifications of malfunctions on a round-the-clock basis (24 hours a day, 7 days a week). The Contractor is required to keep a time and date log of all maintenance items, including the time of the initial report, the response time, and the time of final permanent repair. The Contractor shall provide this information to the Engineer, upon request.

- b. When the project has a pay item for MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION, TEMPORARY TRAFFIC SIGNAL INSTALLATION, and/or MAINTENANCE OF EXISTING FLASHING BEACON INSTALLATION, the Contractor must notify the Traffic Engineer at **(847) 377-7000** of their intent to begin any physical construction work on the project or any portion thereof. This notification must be a minimum of seven (7) working days prior to the start of construction to allow sufficient time for an inspection of the existing traffic signal installation(s) and the transfer of maintenance to the Contractor. If work is started prior to the inspection, maintenance of the traffic signal installation(s) will be immediately transferred to the Contractor without an inspection. The Contractor shall then become responsible for repairing or replacing all equipment that is not operating properly or is damaged at no cost to the owner of the traffic signal. Final repairs to or the replacement of damaged equipment must meet the approval of the Engineer at the time of final inspection or the traffic signal installation will not be accepted.
- c. Contracts that don't include traffic signal installations or modifications, but do include pay items for milling or pavement patching which may result in the destruction of traffic signal loops, do not require maintenance transfer. These contracts do require a notification of intent to work and an inspection. A minimum of seven (7) working days prior to the loop removal, the Contractor shall notify the Traffic Engineer at **(847) 377-7000**, at which time arrangements will be made to adjust the traffic controller timing to compensate for the absence of detection.
- d. The Contractor is advised that the existing and/or temporary traffic signal installation must remain in operation during all construction stages, except for the most unavoidable down time. Any plan to shutdown the traffic signal installation for a period exceeding fifteen (15) minutes must receive prior approval from the Engineer. Approval to shutdown the traffic signal installation will only be granted during the hours of 9:00 A.M. to 3:00 P.M. on weekdays. Shutdowns will not be allowed during inclement weather, weekends or holiday periods.
- e. The Contractor shall be fully responsible for the safe and efficient operation of the traffic signals. Any inquiry, complaint or request by the Division, the County's Traffic Signal Maintenance Contractor or the public, shall be investigated and repairs started. The Contractor shall restore service and complete permanent repairs in accordance with the following Repair Timetable. Failure to provide this service will result in liquidated damages of \$500 per day per occurrence. The Traffic Engineer reserves the right to assign any work not completed within this timeframe to the County's Traffic Signal Maintenance Contractor. All costs associated to repair this uncompleted work shall be the responsibility of the Contractor. Failure to pay these costs to the Traffic Signal Maintenance Contractor within one month after the incident will result in additional liquidated damages of \$500 per month per occurrence. Unpaid bills will be deducted from the cost of the Contract. The County's Traffic Signal Maintenance Contractor may inspect any signalizing device on the Division's highway system at any time without notification.

Immediately after performing any work related to a signal maintenance item (troubleshooting, temporary repair, permanent repair, etc.) the Contractor shall contact the Lake County PASSAGE Transportation Management Center (TMC) at (847) 377-7000.

Unless specifically stated to the contrary, all items shall be repaired within the time frame described in the Repair Timetable. The times listed are noncumulative. Any repairs not specifically covered in the Repair Timetable, or described elsewhere, shall be completed within a time frame matching the most similar line item in the Repair Timetable.

REPAIR TIMETABLE
(non cumulative)

<u>ITEM</u>	<u>RESPONSE</u> <u>TIME</u>	<u>SERVICE</u> <u>RESTORATION</u>	<u>PERMANENT</u> <u>REPAIRS</u>
KNOCKDOWNS/FAILURE/DAMAGE:			
Cabinet	1 hr	24hrs	2 wks
Controller (Local or Master)	1 hr	24hrs	2 wks
Detector Loop	1 hr	n.a.	3 wks
Loop Detector/Amplifier	1 hr	4 hrs	2 wks
MVP Sensor	1 hr	4 hrs	2 wks
PTZ Camera	2 hrs	48 hrs	2 wks
Detector Interface Card/Mini Hub	1 hr	4 hrs	2 wks
Modem	2 hrs	NWD	2 wks
Load Switch	1 hr	2 hrs	2 hrs
Signal Head/Lenses	1 hr	2 hrs	NWD
Pole/Mast Arm	1 hr	2 hrs	ENG
Cabling/Conduit	1 hr	4 hrs	ENG
Interconnect/Communication	1 hr	NWD	ENG
Graffiti/Advertising	NWD	NWD	NWD
Telemetry, Electrical	1 hr	2 hrs	NWD
Ethernet Switches/Video Encoders	1 hr	48 hrs	2 wks
Highway Advisory Radio (HAR)	1 hr	48 hrs	2 wks
Indicators/switches/LEDs/displays	NWD	n.a.	2 wks
Outages not covered elsewhere	1 hr	2 hrs	NWD
Filter/Cleanliness/fans/thermostat	NWD	NWD	n.a.
Misalignment (conflicting)	1 hr	2 hrs	NWD
Misalignment (non-conflicting)	2 hrs	4 hrs	NWD
COMPLAINTS/CALLS/ALARMS:			
Timing/Phasing/Programming	1 hr	2 hrs	ENG
Coordination Alarm/Cycle Fail	NWD	ENG	ENG
Controller Alarm/Status Change	1 hr	NWD	1 wk
Detector Alarm/Status change	NWD	NWD	ENG
CMU Flash/Local Flash	1 hr	2 hrs	1 wk
Door Open/Maint. Req.	2 hrs	4 hrs	NWD

LEGEND: hr=hour, hrs=hours, NWD=next working day, wk=week, wks=weeks, ENG=acceptable to Engineer, days=calendar days, n.a.=not applicable

LIQUIDATED DAMAGES FOR UNTIMELY WORK

A primary concern of LCDOT is to maintain a safe and efficient roadway for the public. Therefore, the Contractor shall proceed with the traffic signal work as soon as conditions and project staging permit. If in the opinion of the Engineer construction conditions are suitable for traffic signal work, and the Contractor has not yet begun the traffic signal work, the Engineer shall notify the Contractor to proceed. The Contractor shall begin the traffic signal work within seven (7) calendar days after notification to proceed. The Contractor shall continue to prosecute the traffic signal work until completion, or until he can no longer proceed due to conditions beyond his control. The Contractor shall notify the Engineer of any conditions impeding and/or delaying his prosecution of the work. Failure by the Contractor to proceed with the traffic signal work as specified herein shall result in liquidated damages of **\$500.00** per calendar day per occurrence.

DAMAGE TO TRAFFIC SIGNAL SYSTEM

Revise Article 801.12(b) of the "Standard Specifications" to read:

Any damaged equipment or equipment not operating properly from any cause whatsoever shall be repaired and/or replaced with new equipment meeting current traffic signal specifications and provided by the Contractor at no additional cost to the Contract and/or owner of the traffic signal system, to the satisfaction of the Engineer. Final repairs or replacement of damaged equipment must meet the approval of the Engineer prior to or at the time of final inspection; otherwise the traffic signal installation will not be accepted. Cable splices outside the controller cabinet shall not be allowed.

Automatic Traffic Enforcement equipment, such as Red Light Enforcement cameras, detectors, and peripheral equipment, damaged or not operating properly from any cause whatsoever, shall be the responsibility of the municipality or the Automatic Traffic Enforcement company per Permit agreement.

TRAFFIC SIGNAL INSPECTION (TURN-ON)

Revise Article 801.15(b) of the "Standard Specifications" to read:

It is LCDOT's intent to have all electric work completed and the equipment field-tested by the vendor, prior to LCDOT's "turn-on" field inspection. The Contractor must have all traffic signal work completed and the electrical service installation connected by the utility company prior to requesting an inspection and "turn-on" of the traffic signal installation. In the event the Traffic Engineer determines that the work is not complete and that the inspection will require more than two (2) hours to complete, the inspection shall be canceled and the Contractor will be required to reschedule at another date.

The Contractor may request a "turn-on" and inspection of the completed traffic signal installation at each separate location. This request must be made to the Traffic Engineer at **(847) 377-7000** a minimum of seven (7) working days prior to the time of the requested inspection. LCDOT will not grant a field inspection until the Contractor provides notification that the equipment has been field tested, and the intersection is operating according to contract requirements.

Signal indications being tested shall match the lane configurations and markings at the intersection. If any conflicting signal indications are visible to motorist or pedestrians while testing, Contractor shall be responsible to provide police officer(s) to direct traffic. In addition, the Contractor shall provide a representative from the control equipment vendor's office to

attend the traffic signal inspection for both permanent and temporary traffic signal "turn-ons". Upon demonstration that the signals are operating properly and that all work has been completed in accordance with the contract and to the satisfaction of the Traffic Engineer, the Traffic Engineer will then allow the signals to be placed in continuous operation. The Agency that is responsible for the maintenance of each traffic signal installation will reassume the traffic signal maintenance upon acceptance by the Traffic Engineer.

The Lake County Division of Transportation requires the following from the Contractor at Traffic Signal "turn-ons":

1. One (1) set of as-built signal plans.
2. One (1) letter from the electrical contractor certifying that all material and equipment provided and installed as part of the project is in accordance with the approved catalog cuts and shop drawings.
3. A knowledgeable representative of the controller equipment supplier shall be present at the traffic signal "turn-on". The representative shall be knowledgeable concerning the cabinet design and the controller functions.
4. One (1) CD or electronic version of the cabinet box prints.
5. One (1) copy of the operation and service manuals for the signal controller and the associated control equipment.
6. Five (5) copies (11" x 17") of the cabinet wiring diagrams.
7. Five (5) copies of the traffic signal installation cable log.
8. All manufacturer and contractor warranties and guarantees required by Article 801.14.

Acceptance of the traffic signal equipment by LCDOT shall be based on the inspection results at the traffic signal "turn-on". If approved, the traffic signal acceptance shall be given verbally at the "turn-on" inspection, followed by written correspondence from the Traffic Engineer. The Contractor shall be responsible for all traffic signal equipment and associated maintenance thereof until LCDOT acceptance is granted. Any "punch list" work remaining after the installation is accepted shall be completed within thirty (30) calendar days of the acceptance date. If this work is not completed within thirty days, LCDOT reserves the right to have the work completed by others at the Contractor's expense. This cost will be in addition to Liquidated Damages for Untimely Work.

The Contractor shall furnish all equipment and/or parts to keep the traffic signal installation operating.

All cost of work and materials required to comply with the above requirements shall be included in the pay item bid prices, under which the subject materials and signal equipment are paid, and no additional compensation will be allowed. Materials and signal equipment not complying with

the above requirements will be subject to removal and disposal at the Contractor's expense.

LOCATING UNDERGROUND FACILITIES

Revise Section 803 of the "Standard Specifications" to read:

Contractor requests for equipment locates will be granted only once prior to the start of the contract. Additional requests shall be at the expense of the Contractor. The location of underground traffic facilities does not relieve the Contractor of their responsibility to repair any item(s) damaged during the construction, at his/her own expense.

Locate requests should be directed to LCDOT's Traffic Signal Maintenance Contractor or to the LCDOT Traffic Engineering Department at (847) 377-7000.

The exact location of all utilities shall be field verified by the Contractor before the installation of any components of the traffic signal system. For locations of utilities call J.U.L.I.E. at **1-800-892-0123**. For the locations of some utilities, other Agencies or Municipalities may need to be contacted.

MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION

Revise Section 850 of the "Standard Specifications" to read:

The Contractor shall not be required to pay the energy charges for the operation of the existing traffic signal installation. Full maintenance responsibility shall start as soon as the Contractor begins any physical work on the Contract or any portion thereof.

The Contractor shall have electricians on staff with IMSA Level II certification to provide signal maintenance.

This item shall include maintenance of all traffic signal equipment at the intersection, including cameras, emergency vehicle pre-emption equipment, master controllers, telephone service installations, communication equipment, communication cables and conduits to adjacent intersections.

The maintenance shall be according to Article 850 of the "Standard Specifications", and the following contained herein.

The Contractor shall check all controllers every two (2) weeks, which will include visually inspecting all timing intervals, relays, detectors, and pre-emption equipment to ensure that they are functioning properly. This item includes, as routine maintenance, all portions of the emergency vehicle pre-emption system. The Contractor shall maintain in stock at all times a sufficient amount of materials and equipment to provide effective temporary and permanent repairs.

The Contractor shall provide immediate corrective action when any part or parts of the system fail to function properly. Two (2) far side heads facing each approach shall be considered the minimum acceptable signal operation pending permanent repairs. When repairs at a signalized intersection require that the controller be disconnected, and power is available, the Contractor shall place the traffic signal installation on flashing operation. The signals shall flash RED for all directions unless a different indication has been specified by the Engineer. The Contractor shall be required to place at least 1 STOP sign (R1-1-36) at each approach of the intersection as a

temporary means of regulating traffic. At approaches where a yellow flashing indication is necessary, as directed by the Engineer, STOP signs will not be required. The Contractor shall furnish and equip all their signal maintenance vehicles with a sufficient number of STOP signs as specified herein. The Contractor shall maintain a sufficient number of spare STOP signs in stock at all times to replace those which may be damaged or stolen.

The Contractor shall provide the Engineer with a 24-hour telephone number for traffic signal maintenance. The Contractor, or his representative, shall be available on a 24-hour basis to respond to emergency calls by the Traffic Engineer or other parties.

Traffic signal equipment which is lost or not returned to the County for any reason shall be replaced with new equipment meeting the requirements of these Specifications.

The Contractor shall respond to all emergency calls from the County or others within one hour after notification and provide immediate corrective action. When equipment has been damaged or becomes faulty beyond repair, the Contractor shall replace it with new and identical equipment. The cost of furnishing and installing the replaced equipment shall be borne by the Contractor at no additional charge to the County. The Contractor may institute action to recover damages from a responsible third party. If at any time the Contractor fails to perform all work as specified herein to keep the traffic signal installation in proper operating condition or if the Engineer cannot contact the Contractor's designated personnel, the Engineer shall have the County's Traffic Signal Maintenance Contractor perform the maintenance work required. The County's Traffic Signal Maintenance Contractor shall bill the Contractor for the total cost of the work. The Contractor shall pay this bill within thirty (30) days of the date of receipt of the invoice or the cost of such work will be deducted from the amount due the Contractor. The Contractor shall allow the County's Traffic Signal Maintenance Contractor to make reviews of the existing traffic signal installation that has been transferred to the Contractor for maintenance.

The Engineer may require the Contractor to transfer maintenance of a signal back to the County's Traffic Signal Maintenance Contractor (or other electrical contractor) for a short time. This may become necessary due to other signal projects in the area, or if the County needs to perform work at the signal. Any costs incurred by the Contractor for maintenance transfer inspections of this type shall be included in cost of pay item MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION.

Any proposed activity in the vicinity of a highway-rail grade crossing must adhere to the guidelines set forth in the current edition of the Manual on Uniform Traffic Control Devices (MUTCD) regarding work in temporary traffic control zones in the vicinity of highway-rail grade crossings which states that lane restrictions, flagging, or other operations shall not create conditions where vehicles can be queued across the railroad tracks. If the queuing of vehicles across the tracks cannot be avoided, a uniformed law enforcement officer or flagger shall be provided at the crossing to prevent vehicles from stopping on the tracks, even if automatic warning devices are in place.

Basis of Payment. This work shall be paid for at the contract unit price each for MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION.

TEMPORARY TRAFFIC SIGNAL INSTALLATION

Add the following to Section 890 of the "Standard Specifications":

Only an approved equipment vendor will be allowed to assemble the temporary traffic signal cabinet. Also, an approved equipment vendor shall assemble and test a temporary railroad traffic signal cabinet. (Refer to the "Inspection of Electrical Systems" specification) A representative of the approved control equipment vendor shall be present at the temporary traffic signal turn-on inspection.

Only controllers compatible with "Centracs" software (NTCIP) or "Aries" software, currently in use by LCDOT, will be approved for use at temporary signal locations. Controller software compatibility requirements are based upon the controller's location in the communication system, and shall be as shown on the plans. All controllers used for temporary traffic signals shall be fully-actuated NEMA microprocessor based with RS232 data entry ports compatible with existing monitoring software, installed in NEMA TS-1 or TS-2 cabinets with 8 phase back panels, capable of supplying 255 seconds of cycle length and individual phase length settings up to 99 seconds. On projects with one lane open and two way traffic flow, such as bridge deck repairs, the temporary bridge signal controller shall be capable of providing an adjustable all red clearance setting of up to 30 seconds in length. All controllers used for temporary traffic signals shall meet or exceed the requirements of Section 857 of the "Standard Specifications" with regards to internal time base coordination and preemption.

All temporary traffic signal cabinets shall have a closed bottom made of aluminum alloy. The bottom shall be sealed along the entire perimeter of the cabinet base to ensure a water, dust and insect-proof seal. The bottom shall provide a minimum of two (2) 4-inch diameter holes to run the electric cables through. The 4-inch diameter holes shall have a bushing installed to protect the electric cables and shall be sealed after the electric cables are installed.

The stand which supports the temporary traffic signal cabinet shall be constructed of lumber and plywood that has been pressure-treated to protect against rot, mold, and insects.

Grounding shall be provided for the temporary traffic signal cabinet meeting or exceeding the applicable portions of the National Electrical Code, Section 806 of the "Standard Specifications" and the "Grounding of Traffic Signal Systems" section of these special provisions.

All traffic signal head sections shall be twelve (12) inches. Traffic signal sections shall be LED with expandable view, unless otherwise approved by the Engineer. The temporary traffic signal heads shall be placed as indicated on the temporary traffic signal plan or as directed by the Traffic Engineer. The Contractor shall furnish enough cable slack to relocate heads to any position on the span wire or at locations illustrated on the plans for construction staging. The temporary traffic signal shall remain in operation during all signal head relocations. Each temporary traffic signal head shall have its own cable from the controller cabinet to the signal head.

All temporary traffic signal installations shall have vehicular detection installed as shown on the plans or as directed by the Engineer. Pedestrian push buttons shall be provided for all pedestrian signal heads/phases as shown on the plans or as directed by the Engineer. All approaches shall have vehicular detection provided by vehicle detection system as shown on the plans or as directed by the Engineer. The Contractor shall install, wire, and adjust the alignment of the video vehicle detection system in accordance to the manufacturer's recommendations and requirements. The Contractor shall be responsible for adjusting the

alignment of the video vehicle detection system for all construction staging changes and for maintaining proper alignment throughout the project. A representative of the approved control equipment vendor shall be present and assist the contractor in setting up and maintaining the video vehicle detection system. An in-cabinet video monitor shall be provided with all video vehicle detection systems and shall be included in the item Temporary Traffic Signal Installation. When called for in the plans, the UPS cabinet shall be mounted to the temporary traffic signal cabinet and meet the requirements of UNINTERRUPTABLE POWER SUPPLY of these Special Provisions.

For temporary traffic signal installations within closed loop system(s), the controller shall be compatible with the existing traffic signal system master controller. The existing system interconnect is to be maintained as part of the Temporary Traffic Signal Installation specified on the plan. The interconnect shall be installed into the temporary controller cabinet as per the notes or details on the plans. Refer to the INTERRUPTION OF COMMUNICATION requirements described earlier. All labor and equipment required to install and maintain the existing interconnect shall be included in the cost of the item TEMPORARY TRAFFIC SIGNAL INSTALLATION.

All emergency vehicle priority equipment (light detectors, light detector amplifiers, confirmation beacons, etc.) as shown on the temporary traffic signal plans shall be provided by the Contractor. It shall be the Contractor's responsibility to contact the municipality or fire district to verify the brand of emergency vehicle priority equipment to be installed prior to the contract bidding. The equipment must be completely compatible with all components of signal equipment currently in use by the County. All light operated systems shall operate at a uniform rate of 14.035 hz \pm 0.002, or as otherwise required by the Engineer. All labor and material required to install and maintain the Emergency Vehicle Priority system shall be included in the cost of the item TEMPORARY TRAFFIC SIGNAL INSTALLATION.

When directed by the Engineer, this item shall also include operational items such as: controller database changes, timing changes, activation/deactivation of phases, relocation of signal heads, relocation / reconfiguration of detectors (microwave and/or video), and bagging / unbagging signal heads. On temporary traffic signal installations with detector loops, coilable non-metallic conduit shall be used for detector loop raceways from the saw-cut to 10 feet up the wood pole, unless otherwise shown on the plans. Coilable non-metallic conduit shall meet the requirements of NEC Article 343 and meet the requirements of COILABLE NON-METALLIC CONDUIT of the Special Provisions.

All existing street name and intersection regulatory signs shall be removed from existing poles and relocated to the temporary signal span wire. If new mast arm assemblies and posts are specified for the permanent signals, the signs shall be relocated to the new equipment at no extra cost.

The Contractor shall not be required to pay the energy charges for the operation of the existing traffic signal installation. If the installation replaces an existing signal, the Contractor shall not be required to pay the energy charges for the operation of the temporary traffic signal. The Contractor shall pay the energy charges for all other temporary traffic signal installations.

The Contractor shall furnish all control equipment for the temporary traffic signals(s) unless otherwise stated in the plans. On projects with multiple temporary traffic signal installations, all

controllers shall be of the same manufacturer and model number with current software installed. Maintenance shall meet the requirements of the "Standard Specifications" and the "Maintenance of Existing Traffic Signal Installation" section of these special provisions. Maintenance of temporary signals and of the existing signals shall be included in the cost of this item. When temporary traffic signals are to be installed at locations where existing signals are presently operating, the Contractor shall be fully responsible for the maintenance of the existing signal installation as soon as he begins any physical work on any portion of the project. Maintenance responsibility of the existing signals shall be incidental to the item TEMPORARY TRAFFIC SIGNAL INSTALLATION. In addition, a minimum of seven (7) days prior to assuming maintenance of the existing traffic signal installation(s) under this contract, the Contractor shall contact the Traffic Engineer **(847) 377-7000** to request an inspection of the installation(s).

Temporary Traffic Signals for bridge projects shall follow the State Standards, "Standard Specifications", LCDOT Traffic Signal Special Provisions, and any plans for Bridge Temporary Traffic Signals included in the plans. The installation shall meet the above requirements for TEMPORARY TRAFFIC SIGNAL INSTALLATION. In addition, all electric cable shall be aerially suspended, at a minimum height of 18 feet, on temporary wood poles (Class 5 or better) of 45 feet minimum height. The signal heads shall be span-wire-mounted or bracket-mounted to the wood pole or as directed by the Engineer. The Controller cabinet shall be mounted to the wood pole or as directed by the Engineer. All approaches for temporary traffic signals for bridge projects shall have microwave vehicle sensors or video vehicle detection, as shown on the plans or as approved by the Engineer.

Basis of Payment: This work shall be paid for at the contract unit price each for TEMPORARY TRAFFIC SIGNAL INSTALLATION which shall include all costs for the installation, vehicular detection system, UPS, modification, maintenance, operational items, complete removal of the temporary traffic signal, and all material required to complete the work.

REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT

Add the following to Article 895.05 of the "Standard Specifications":

The traffic signal equipment, which is to be removed and will become the property of the Contractor, shall be disposed of by the Contractor outside the right-of-way at his/her own expense.

The Contractor shall safely store and arrange for delivery of all equipment that will remain the property of LCDOT. The Contractor shall deliver, unload and stack the equipment at the owner's facility, as directed by the Engineer, within 30 days of removing it from the traffic signal installation. The Contractor shall provide three (3) copies of a list of equipment that is to remain the property of LCDOT including model and serial numbers where applicable. The Contractor shall also provide a copy of the contract plan or special provisions showing the quantities and type of equipment to be delivered. Controllers and peripheral equipment from the same location shall be boxed together (equipment from different locations may not be mixed) and all boxes and controller cabinets shall be clearly marked or labeled with the location from which they were removed. The Contractor shall be responsible for the condition of the traffic signal equipment from the time of removal until the acceptance of a receipt written by the owner indicating that the items have been returned in good condition.

Traffic signal equipment which is lost or not returned to the County for any reason shall be replaced with new equipment meeting the requirements of these Specifications.

RESTORATION OF WORK AREA

Add to Section 801 of the "Standard Specifications":

Restoration of the traffic signal work area shall be included in the related pay item such as foundation, conduit, handhole, trench and backfill, etc. and no extra compensation shall be allowed. All roadway surfaces such as shoulders, medians, sidewalks, pavement, etc. shall be restored to match the previously existing conditions. All damage to mowed lawns shall be replaced with an approved sod, and all damage to unmowed fields shall be seeded, in accordance with Section 250 and 252 of the "Standard Specifications" respectively.

CABINET NEATNESS

The Contractor shall assure that all wiring and peripheral equipment in any new traffic signal cabinet is in a neat and orderly fashion that is acceptable to the Engineer. This applies to controller cabinets, master cabinets, railroad cabinets, communication cabinets, electrical service cabinets, or any other new cabinet called for in the project plans.

All conduit entrances into the cabinet shall be sealed with a pliable waterproof material. Electrical cables inside the cabinet shall be neatly trained along the base and back of the cabinet. Each conductor shall be connected individually to the proper terminal, and the spare conductors shall be bound into a neat bundle. All cables, including those for signals, vehicle detection, pushbuttons, emergency vehicle preemption, video transmission, and communication shall be neatly arranged and bundled within the cabinet to the satisfaction of the Engineer. Each cable shall be marked with an identification number which corresponds to the number and description on the cabinet cable log.

In the case of an existing cabinet that is being modernized or modified, the new cables being installed shall be trained, bundled and labeled to the satisfaction of the Engineer. When working inside an existing cabinet, the Contractor shall minimize disturbance to existing cables and cabinet wiring. Any existing cables and cabinet wiring disturbed by the Contractor shall be re-trained, bundled, and/or labeled to the satisfaction of the Engineer.

The County shall not accept maintenance of the traffic signal installations until the requirements of this specification are satisfied.

VENDOR REPRESENTATION

Under this provision, the Engineer reserves the right to request the equipment vendor be present at the activation of new traffic equipment. Equipment covered under this provision includes signal heads, cabinets, controllers, amplifiers, preemption, video detection/monitoring, communication/transmission, fiber-optic/telemetry, radio, microwave, infrared, illuminated signs, streetlights, push buttons, lighted crosswalks, uninterruptable power supplies, and any other new equipment being installed and activated.

This provision is in addition to the requirement contained herein that the Contractor provide a representative from the control equipment vendor to attend the traffic signal inspection for both permanent and temporary traffic signal "turn-ons".

Any costs associated with equipment vendor representation shall not be paid for separately, but shall be included in the cost of the associated traffic equipment being activated. Any unforeseen costs incurred by the Contractor to provide this representation shall not be the

responsibility of the County.

INTERRUPTION OF COMMUNICATION

The interruption of communication with County equipment shall be kept to an absolute minimum. This includes communication such as controller telemetry, video transmission, camera control signals, Highway Advisory Radio, wireless interconnect, telephone (POTS/ISDN/DSL), high speed Internet, or any other County communication equipment. This provision applies to cable types including copper, multimode fiber optic, singlemode fiber optic, telephone cables, Internet cables, or any other cable used by the County to monitor and maintain its various signal and ITS equipment.

The contractor shall plan ahead, and shall stage his construction work accordingly, so that he can interrupt communication, and then restore communication, with as little down time as possible. For example, when a section of existing interconnect is being relocated, the new handholes and conduits should be installed prior to disconnecting the interconnect cable. The interconnect cable can then be disconnected, pulled out of the existing conduit, pulled through the new conduit, and re-connected. In addition, when an existing fiber optic cable is to be re-used, the contractor shall be prepared to immediately replace any fiber splices and/or terminations that become damaged.

Prior to disconnecting any LCDOT communication link, the contractor shall contact the Traffic Engineer for approval of his planned construction method.

ELECTRIC SERVICE INSTALLATION

Revise Section 805 of the "Standard Specifications" to read:

Description. This work shall consist of all materials and labor required to install, modify, or extend the electric service installation. All installations shall meet the requirements of the details in the "IDOT District 1 Standard Traffic Signal Design Details" and applicable portions of the Specifications.

General. The electric service installation shall be the electric service disconnecting means and it shall be identified as suitable for use as service equipment.

The electric utility contact information is noted on the plans and represents the current information at the time of contract preparation. The Contractor must request in writing for service and/or service modification within 10 days of contract award and must follow-up with the electric utility to assure all necessary documents and payment are received by the utility. The Contractor shall forward copies of all correspondence between the contractor and utility company to the Engineer of Traffic.

Materials.

- a. **General.** The completed control panel shall be constructed in accordance with UL Std. 508, Industrial Control Panel, and carry the UL label. Wire terminations shall be UL listed.
- b. **Enclosures.** All electrical service enclosures shall be UL 50, single door design, fabricated from Type 5052 H-32 aluminum or stainless steel. All seams shall be continuous welded and ground smooth, and the cabinet shall be sized to

adequately house all required components with extra space for arrangement and termination of wiring. Enclosures shall meet the following additional requirements:

1. Pole Mounted Cabinet. The cabinet shall be NEMA Type 4X. Stainless steel screws and clamps shall secure the cover and assure a watertight seal. The cover shall be removable by pulling the continuous stainless steel hinge pin. The cabinet shall have an oil-resistant gasket and a lock kit shall be provided with an internal O-ring in the locking mechanism assuring a watertight and dust-tight seal. A minimum size of 14-inches high, 9-inches wide and 8-inches deep is required. The cabinet shall be channel mounted to a wooden utility pole using assemblies recommended by the manufacturer.
 2. Ground Mounted Cabinet. The cabinet shall be NEMA Type 3R with back panel. The cabinet frame and door shall be 0.125-inch thick, the top 0.250-inch thick, and the bottom 0.500-inch thick. The door and door opening shall be double flanged. The door shall be approximately 80% of the front surface, with a full-length tamperproof stainless steel .075-inch thick hinge bolted to the cabinet with stainless steel carriage bolts and nylock nuts. The locking mechanism shall be slam-latch type with a keyhole cover. A minimum size of 40-inches high, 16-inches wide, and 15-inches deep is required. The cabinet shall be mounted upon a square Type A concrete foundation as indicated on the plans. The foundation is paid for separately.
- c. Surge Protector. Overvoltage protection, with LED indicator, shall be provided for the 120-volt load circuit by the means MOV and thermal fusing technology. The response time shall be <5n seconds and operate within a range of -40C to +85C. The surge protector shall be UL 1449 Listed.
 - d. Circuit Breakers. Circuit breakers shall be standard UL listed molded case, thermal-magnetic bolt-on type, with trip-free indicating handles. 120-volt circuit breakers shall have an interrupting rating of not less than 65,000 rms symmetrical amperes. Unless otherwise indicated, the main disconnect circuit breaker for the traffic signal controller shall be rated 60 amperes, 120 V and the auxiliary circuit breakers shall be rated 10 amperes, 120 V.
 - e. Fuses, Fuseholders and Power Indicating Light. Fuses shall be small-dimensional cylindrical fuses of the dual element time-delay type. The fuses shall be rated for 600 V AC and shall have a UL listed interrupting rating of not less than 10,000 rms symmetrical amperes at rated voltage. The power indicating light shall be LED type with a green colored lens and shall be energized when electric utility power is present.
 - f. Ground and Neutral Bus Bars. A single copper ground and neutral bus bar, mounted on the equipment panel shall be provided. Ground and neutral conductors shall be separated on the bus bar. Compression lugs, plus 2 spare lugs, shall be sized to accommodate the cables with the heads of the connector screws painted green for ground connections and white for neutral connections.

- g. Utility Services Connection. The Contractor shall notify the Utility Company marketing representative a minimum of 30 working days prior to the anticipated date of hook-up. This 30-day advance notification will begin only after the Utility Company marketing representative has received service charge payments from the Contractor. Prior to contacting the Utility Company for service connection, the service installation controller cabinet and cable must be installed for inspection by the Utility Company.
- h. Ground Rod. Ground rods shall be copper-clad steel, a minimum of 10-feet in length, and 3/4-inch in diameter. Ground rod resistance measurements to ground shall be 25 ohms or less. If necessary additional rods shall be installed to meet resistance requirements at no additional cost to the contract.

Installation

- a. General. The Contractor shall confirm the orientation of the traffic service installation and its door side with the Engineer, prior to installation. All conduit entrances into the service installation shall be sealed with a pliable waterproof material.
- b. Pole Mounted. Brackets designed for pole mounting shall be used. All mounting hardware shall be stainless steel. Mounting height shall be as noted on the plans or as directed by the Engineer.
- c. Ground Mounted. The service installation shall be mounted plumb and level on the foundation and fastened to the anchor bolts with hot-dipped galvanized or stainless steel nuts and washers. The space between the bottom of the enclosure and the top of the foundation shall be caulked at the base with silicone.

The service installation shall be paid for at the contract unit price each for SERVICE INSTALLATION of the type specified which shall be payment in full for furnishing and installing the service installation complete. The type A foundation which includes the ground rod shall be paid for separately. SERVICE INSTALLATION, POLE MOUNTED shall include the 3/4-inch grounding conduit, ground rod, and pole mount assembly. Any changes by the utility companies shall be approved by the Engineer and paid for as an addition to the contract according to Article 109.05 of the "Standard Specifications".

GROUNDING OF TRAFFIC SIGNAL SYSTEMS

Revise Section 806 of the "Standard Specifications" to read:

General. All traffic signal systems, equipment and appurtenances shall be properly grounded in strict conformance with the NEC. See "IDOT District One Standard Traffic Signal Design Details" for additional information.

The grounding electrode system shall include a ground rod installed in all foundations, and the service installation. An additional ground rod will be required at locations where measured resistance to ground exceeds 25 ohms. Ground rods are included in the associated pay items and will not be paid for separately. Testing shall be according to Article 801.13.

- a) The grounded conductor (neutral conductor) shall be white color-coded. This conductor shall be bonded to the equipment-grounding conductor only at the Electric Service Installation. All power cables shall include one neutral conductor of the same size.

- b) The equipment-grounding conductor shall be green color-coded. The following is in addition to Article 1087.01 of the "Standard Specifications".
- 1) Equipment-grounding conductors shall be XLP insulated No. 6, unless otherwise noted on the plans, and bonded to the grounded conductor (neutral conductor) only at the electric service Installation. The Earth shall not be used as the equipment-grounding conductor, and no splices shall be allowed in the cable between ground rods. The equipment-grounding conductor is paid for separately.
 - 2) Equipment-grounding conductors shall be bonded, using a UL listed grounding connector, to all traffic signal mast arm poles, traffic signal posts, pedestrian posts, pull boxes, handhole frames and covers and other metallic enclosures throughout the traffic signal wiring system, except where noted herein. A UL listed electrical joint compound shall be applied to all conductors' terminations, connector threads and contact points.
 - 3) All metallic and non-metallic raceways containing traffic signal circuit runs shall have a continuous equipment-grounding conductor, with the following exceptions: Raceways containing only detector loop lead-in circuits, circuits under 50 volts and/or fiber optic cable will not be required to include an equipment-grounding conductor.
- c) The grounding electrode conductor shall be similar to the equipment-grounding conductor in color coding (green) and size. The grounding electrode conductor is used to connect the ground rod to the equipment-grounding conductor and is bonded to ground rods via exothermic welding, UL listed pressure connectors, UL listed clamps or other UL approved listed means.

GROUNDING EXISTING HANDHOLE FRAME AND COVER

This work shall consist of all materials and labor required to bond the equipment-grounding conductor to the existing handhole frame and handhole cover. All installations shall meet the requirements of the details in the "IDOT District One Standard Traffic Signal Design Details" and applicable portions of the Specifications.

The equipment-grounding conductor shall be bonded to the handhole frame and to the handhole cover. Two (2) ½-inch diameter x 1 ¼-inch long hex-head stainless steel bolts, spaced 1.75-inches apart center-to-center shall be fully welded to the frame and to the cover to accommodate a heavy duty Listed grounding compression terminal (Burdny type YGHA or approved equal). The grounding compression terminal shall be secured to the bolts with stainless steel split-lock washers and nylon-insert locknuts.

Welding preparation for the stainless steel bolt hex-head to the frame and to the cover shall include thoroughly cleaning the contact and weldment area of all rust, dirt and contaminates. The Contractor shall assure a solid strong weld. The welds shall be smooth and thoroughly cleaned of flux and spatter. The grounding installation shall not affect the proper seating of the cover when closed.

Mechanical connections to the frame and cover may be approved in lieu of the listed welding procedures. The contractor shall submit a detailed plan indicating the proposed connectors and installation procedures for review and approval by the Engineer prior to the start of any work on this item.

The grounding cable shall be paid for separately.

Basis of Payment: This work shall be paid for at the contract unit price each for GROUNDING EXISTING HANDHOLE FRAME AND COVER, which shall be payment in full for grounding one handhole complete, regardless of the type of handhole or its location.

UNDERGROUND CONDUIT

The conduit shall meet the requirements of Section 810 of the "Standard Specifications", except for the following:

Delete Article 810.01 of the "Standard Specifications" and add the following:

Description. This item shall consist of furnishing and installing galvanized steel conduit, fittings and accessories in the ground, either pushed, trenched, plowed, or directionally bored, with fittings complete as specified herein and as shown on the Contract drawings.

Add the following to Article 810.04 of the "Standard Specifications":

Pavement, driveways, and curbs shall not be removed to install electrical conduits. All buried conduits shall be placed at a minimum depth of 30 inches, except under railroad tracks, where the minimum depth shall meet the written requirements of the railroad company. All conduit couplings shall be threaded. Conduits terminating in junction and pull boxes shall be terminated with galvanized steel bushings.

When empty conduit is installed for future traffic signal interconnects(s), the Contractor shall provide a pull line within the conduit.

Revise Article 810.07 of the "Standard Specifications" to read:

Basis of Payment: This work will be paid for at the contract unit price per foot for UNDERGROUND CONDUIT of the type and size specified, which price shall be payment in full for furnishing and installing the conduit either pushed, trenched, plowed, or directionally bored with fittings, complete. Trenching, backfilling and area restoration are included in the cost of this item.

CONCRETE FOUNDATIONS

Add the following to Article 878.03 of the "Standard Specifications":

All anchor bolts shall be according to Article 1006.09, except all anchor bolts shall be hot dipped galvanized the full length of the anchor bolt including the hook.

Concrete Foundations, Type A for Traffic Signal Posts shall provide anchor bolts with the bolt pattern specified within the "IDOT District 1 Standards Traffic Signal Design Details". All Type A foundations shall be a minimum depth of forty-eight (48) inches.

Concrete Foundations, Type C (Special) for Traffic Signal Cabinets with Uninterruptable Power Supply (UPS / Battery Back-Up) cabinet installations shall be constructed a minimum of forty-eight (48) inches long by thirty-one (31) inches wide, and shall have a minimum depth of forty-

eight (48) inches. An integral concrete pad foundation for the UPS cabinet shall be constructed a minimum of thirty-one (31) inches long by twenty (20) inches wide by ten (10) inches deep. The UPS cabinet pad foundation shall be integral to the side of the signal cabinet foundation, and shall be constructed on the same side as the signal cabinet power panel. An L-Shaped concrete apron shall be constructed along the entire front of the signal cabinet foundation, the entire side of the UPS cabinet foundation, and the entire front of the UPS cabinet foundation. This concrete apron shall be a minimum of thirty-six (36) inches wide by four (4) inches deep. Anchor bolts shall be provided and spaced according to the cabinet manufacturer's specifications.

Concrete Foundations, Type D for Traffic Signal Cabinets shall be constructed a minimum of forty-eight (48) inches long by thirty-one (31) inches wide, and shall have a minimum depth of forty-eight (48) inches. The concrete apron at the signal cabinet shall be constructed a minimum of thirty-six (36) inches wide by forty-eight (48) inches long by four (4) inches deep. Anchor bolts shall be provided and spaced according to the cabinet manufacturer's specifications.

Concrete Foundations, Type E for Mast Arm and Combination Mast Arm Poles shall be 15 ft. minimum depth and in accordance with the latest edition of IDOT standard 878001.

The Resident Engineer shall approve the foundation excavation prior to placing any concrete.

HANDHOLES

Add the following to Section 814 of the "Standard Specifications":

All handholes shall be cast-in-place concrete, with a minimum inside dimension of 21-1/2 inches. Frames and lid openings shall match this dimension. The minimum wall thickness for heavy-duty hand holes shall be 12 inches. The handhole cover shall be labeled "Traffic Signals" with legible raised letters.

All conduits shall enter the handhole at a minimum depth of thirty (30) inches. However, the depth of conduit from detector loops located less than five (5) feet from the handhole may be less than thirty (30) inches.

All cable hooks shall be hot-dipped galvanized in accordance with AASHTO Specification M111. Hooks shall be a minimum of 3/8-inch diameter and extend into the handhole at least 6 inches. Hooks shall be placed a minimum of 12 inches below the lid, or lower if additional space is required. All cable hooks shall be secured with a retaining nut tightened against the handhole concrete.

COILABLE NON-METALLIC CONDUIT

Description. This work shall consist of furnishing and installing empty coilable non-metallic conduit (CNC) for detector loop raceways.

General. The CNC installation shall be in accordance with Sections 810 and 811 of the Standard Specifications except for the following:

Add the following to Article 810.03 of the Standard Specifications:

CNC meeting the requirements of NEC Article 353 shall be used for detector loop raceways to the handholes.

Add the following to Article 811.03 of the Standard Specifications:

On temporary traffic signal installations with detector loops, CNC meeting the requirements of NEC Article 353 shall be used for detector loop raceways from the saw-cut to 10 feet (3m) up the wood pole, unless otherwise shown on the plans

Basis of Payment. All installations of CNC shall be included in the cost of the contract and not paid for separately.

DETECTOR LOOP

Revise Section 886 of the "Standard Specifications" to read:

A minimum of seven (7) working days prior to the Contractor cutting loops, the Engineer shall mark the location of the proposed loops and contact the Traffic Engineer **(847) 377-7000** to inspect and approve the layout. When preformed detector loops are installed, the Contractor shall have them inspected and approved prior to the placement of the concrete surface, using the same notification process as above.

Loop detectors shall be installed according to the requirements of the "IDOT District 1 Standard Traffic Signal Design Details". Saw-cuts (homeruns on preformed detector loops) from the loop to the edge of pavement shall be made perpendicular to the edge of pavement in order to minimize the length of the saw cut (homerun), unless otherwise directed by the Engineer or as shown on the plans. Polyethylene unit duct shall be used for detector loop raceways to the handholes. Coilable non-metallic conduit shall meet the requirements of NEC Article 343. All coilable non-metallic conduit used for traffic signal loop detector runs shall be included in cost of the detector loop.

The detector loop cable insulation shall be labeled with the cable specifications. Each detector loop lead-in wire shall be labeled in the handhole using a Panduit 250W175C waterproof tag or approved equal. The tag will be secured to each wire with nylon ties.

The resistance to ground for new detector loops shall be a minimum of 500 megaohms under any conditions of weather or moisture. Inductance shall be more than 50 microhenries and less than 700 microhenries. Quality readings shall be more than 5. All new or replacement lead-in cables shall be connected to the loop interface panel using appropriate crimp-on, spade type connectors. Detector loop measurements shall include the saw cut and the length of the loop lead-in to the edge of pavement. The lead-in wire, including all necessary connections for proper operations, from the edge of pavement to the handhole, shall be included in the cost of the detector loop. Coilable non-metallic conduit, trench and backfill, and drilling of pavement or handholes shall be incidental to detector loop quantities.

The location of each dive hole shall be marked on the face of the curb, the edge of pavement or the handhole, with a saw cut 1/4 inch deep by 4 inches long.

- (a) Type I: Each detector loop, which is to be installed in new asphalt pavement, must be placed in the pavement below the surface course. Each detector loop, which is to be

installed in an existing asphalt or concrete pavement, shall be located to miss existing pavement cracks, if possible. Loop sealant used to seal new loops shall consist of a two-component thixotropic, chemically-cured polyurethane. The sealant will be Chemque Q-Seal 295, Perol Elastic Cement A/C Grade or an approved equal. The sealant shall be installed 1/8 inch below the pavement surface. Excess sealant, which accumulates on the surface, shall be removed immediately. Loop sealant used to reseal existing loops shall be composed of an asphalt-based compound. The sealant will be Doseal 230 or an approved equal.

- (b) Preformed. This work shall consist of furnishing and installing a rubberized heat resistant preformed traffic signal loop in accordance with the "Standard Specifications", except for the following:

Preformed detector loops shall be installed in new pavement constructed of portland cement concrete and shall be placed in the substrate. Loop lead-ins shall be protected to the satisfaction of the Engineer.

Handholes shall be placed next to the shoulder or back of curb when preformed detector loops enter the handhole.

Preformed detector loops shall be factory assembled. Homeruns and interconnects shall be pre-wired and shall be an integral part of the loop assembly. The loop configurations and homerun lengths shall be assembled for the specific application. The loop and homerun shall be constructed using 1 1/16-inch outside diameter (minimum), 3/8-inch inside diameter (minimum) Class A oil resistant synthetic cord-reinforced hydraulic hose with 250 psi internal pressure rating. Hose for the loop and homerun assembly shall be one continuous piece. No joints or splices shall be allowed in the hose except where necessary to connect homeruns or interconnects to the loops. This will provide maximum wire protection and loop system strength. Hose tee connections shall be heavy-duty high temperature synthetic rubber. The tee shall be of proper size to attach directly to the hose, minimizing glue joints. The tee shall have the same flexible properties as the hose to insure that the whole assembly can conform to pavement movement and shifting without cracking or breaking. The wire used shall be #16 THWN stranded copper. The number of turns in the loop shall be application specific. Homerun wire pairs shall be twisted a minimum of four turns per foot. No wire splices will be allowed in the preformed loop assembly. The loop and homeruns shall be filled and sealed with a flexible sealant to insure complete moisture blockage and further protect the wire.

To minimize the length of time that a signal operates without vehicle detection, detector loops for active traffic signal installations shall be installed in a timely manner as follows:

If in the opinion of the Engineer construction conditions are suitable for loop installation(s), the Engineer shall notify the Contractor to proceed. The detector loops shall be installed and fully operational within fourteen (14) calendar days following notification to proceed by the Engineer. This 14-day period shall be in effect throughout the entire year, including the off season, regardless of the Contractor's working day status. Failure by the Contractor to complete the loop installation(s) within the specified timeframe shall result in liquidated damages in the amount of **\$500.00** per calendar day, per occurrence.

This work shall be paid for at the contract unit price per foot for DETECTOR LOOP, TYPE I or PREFORMED DETECTOR LOOP as specified in the plans, which price shall be payment in full for furnishing and installing the detector loop and all related connections for proper operation.

ELECTRIC CABLE

Delete "or stranded, and No. 12 or" from the last sentence of Article 1076.04 (a) of the "Standard Specifications".

Add the following to the Article 1076.04(d) of the Standard Specifications:

Service cable may be single or multiple conductor cable.

The electric service cable shall have an XLP jacket. All other cable jackets shall be polyvinyl chloride, meeting the requirements of IMSA 19-1 or IMSA 20-1. The jacket color for signal cable shall be black. The jacket color for lead-in and communications cable shall be gray. All cabling between the signal cabinet and the signal heads shall be solid copper, not multi-stranded. Heat shrink splices shall be used according to the IDOT District 1 "Standard Traffic Signal Design Details".

GROUNDING CABLE

The cable shall meet the requirements of Section 817 of the "Standard Specifications", except for the following:

Add to Article 817.02 of the "Standard Specifications":

Unless otherwise noted on the Plans, the system grounding cable shall be one conductor, #6 gauge copper, with an XLP jacket.

The traffic signal grounding conductor (system grounding cable) shall be bonded, using a Listed grounding connector (Burndy type KC/K2C, as applicable, or approved equal), to all new and existing traffic signal mast arm poles and traffic/pedestrian signal posts, including push button posts. The grounding conductor shall be bonded to all new and existing pull boxes, handhole frames and covers and other metallic enclosures throughout the traffic signal wiring system and noted herein and detailed on the plans. Bonding to existing handhole frames and covers shall be paid for separately.

Add the following to Article 817.05 of the "Standard Specifications":

Basis of Payment. Payment shall be at the Contract unit price, per foot, for ELECTRIC CABLE IN CONDUIT, EQUIPMENT GROUNDING CONDUCTOR, NO. 6 1C, which price includes all associated labor and material including grounding clamps, splicing, exothermic welds/other UL Listed connectors and hardware.

RAILROAD INTERCONNECT CABLE

The cable shall meet the requirements of Section 873 of the "Standard Specifications", except for the following:

Add the following to Article 873.02 of the "Standard Specifications":

The cable shall be three conductor standard #14 copper cable in a clear polyester binder, shielded with #36 AWG tinned copper braid with 85% coverage, and insulated with .016 inch polyethylene (black, blue, red). The jacket shall be black 0.045 PVC or polyethylene.

Revise Article 873.06 of the "Standard Specifications" to read:

Basis of Payment. This work shall be paid for at the contract unit price per foot for ELECTRIC CABLE IN CONDUIT, RAILROAD, NO. 14 3C, which price shall be payment in full for furnishing, installing, and making all electrical connections in the traffic signal controller cabinet. Connections in the railroad controller cabinet shall be performed by railroad personnel.

ELECTRIC CABLE IN CONDUIT, COAXIAL

This work shall consist of furnishing and installing a Belden 1694A RG-6/U Type Digital Coaxial Cable or approved equal. The cable shall be a 75-ohm coaxial cable with 18 AWG solid bare copper conductor, tinned copper braided shield (95% min), and black polyvinyl chloride jacket. The nominal outside diameter shall be 0.274 inches. Amphenol 31-71032 (or equivalent) BNC plug connectors shall be used at both the PTZ camera and traffic signal cabinet ends of the cable. An Amphenol CLT-2 crimping tool is required for the termination. No splices shall be allowed in the cable between the PTZ camera and the traffic signal cabinet.

Basis of payment. This work will be paid for at the contract unit price per foot for ELECTRIC CABLE IN CONDUIT, COAXIAL, which price shall be payment in full for furnishing the material, making all electrical connections and installing the cable complete, measured as specified herein.

EMERGENCY VEHICLE PRIORITY SYSTEM LINE SENSOR CABLE, NO. 20 3/C

This work shall consist of furnishing and installing lead-in cable for light detectors installed at existing and/or proposed traffic signal installations as part of an emergency vehicle priority system. The work includes installation of the lead-in cables in existing and/or new conduit. The electric cable shall be shielded and have (3) stranded conductors colored blue, orange, and yellow with a stranded tinned copper drain wire. The cable shall meet the requirements of the manufacturer of the Emergency Vehicle Priority System Equipment.

Basis of Payment. This work will be paid for at the contract unit price per foot for EMERGENCY VEHICLE PRIORITY SYSTEM LINE SENSOR CABLE, NO. 20 3/C, which price shall be payment in full for furnishing, installing and making all electrical connections necessary for proper operations.

ELECTRICAL CABLE IN CONDUIT, VIDEO NO 20 4 C

This work shall consist of furnishing and installing a Belden 5402 FE Cable or approved equal. No splices shall be allowed in the cable between the PTZ camera and the traffic signal cabinet.

Basis of payment. This work will be paid for at the contract unit price per foot for ELECTRIC CABLE IN CONDUIT, VIDEO NO. 20 4 C, which price shall be payment in full for furnishing the material, making all electrical connections and installing the cable complete, measured as specified herein.

OUTDOOR RATED NETWORK CABLE

This work shall consist of furnishing and installing a network cable from the traffic signal cabinet to the associated field device shown on the plans.

The outdoor rated network cable shall be a black Category 5e cable, meeting the TIA/EIA 568-B.2 telecommunication standards. The cable shall be composed of 24 AWG solid bare copper conductors, twisted pairs, polyolefin insulation, inner LLPE jacket, overall shield (100% coverage), 24 AWG stranded TC drain wire, industrial grade sunlight- and oil-resistant LLPE jacket. The cable shall be capable of performing from -40 °C to 70 °C.

Each end of the cable shall be terminated with an RJ-45 connector installed according to the TIA/EIA 568B standard. The drain wire at each end shall be terminated with a ring lug and attached to a suitable ground point.

The cable shall be Belden 7937A or approved equivalent.

The work shall be performed according to the applicable portions of Section 873 of the "Standard Specifications", and details as shown on the plans.

Basis of payment. This work will be paid for at the contract unit price per foot for OUTDOOR RATED NETWORK CABLE. The unit price shall include furnishing and installing the cable, and making all connections necessary for proper operation. Furnishing and installing the RJ-45 connectors, ring terminals and grounding the OUTDOOR RATED NETWORK CABLE shall be included in the cost of this pay item.

TRAFFIC-ACTUATED CONTROLLER

Add the following to Section 857 of the "Standard Specifications":

The controller shall be the latest model available that is compatible with "Centracs" software or "Aries" software, currently in use by LCDOT, and shall be NEMA TS2 Type 1 compatible, unless specified otherwise on the plans. Controller software compatibility requirements are based upon the controller's location in the communication system, and shall be as shown on the plans. The controller shall have the latest version of NTCIP software installed, and be equipped with an Ethernet port and a removable data key to save the controller database. Only controllers supplied by approved IDOT District 1 closed-loop equipment manufacturers will be allowed. The traffic signal controller shall provide features to inhibit simultaneous display of circular yellow and yellow arrow indications.

CONTROLLER CABINET AND PERIPHERAL EQUIPMENT

Add the following to Article 1074.03 of the "Standard Specifications":

Cabinets shall be designed for NEMA TS2 Type 1 operation. All cabinets shall be pre-wired for a minimum of eight (8) phases of vehicular, four (4) phases of pedestrian, and four (4) phases of overlap operation. Individual load switches shall be provided for each vehicle, pedestrian and right turn overlap phase.

- Cabinets – Controller cabinets shall have a footprint of approximately 44 inches wide by 26 inches deep. Type IV cabinets shall be 65 inches high, and shall provide a third shelf for mounting additional equipment. Type V cabinets shall be 77 inches high. Cabinets shall be fabricated of 1/8" thick unpainted aluminum alloy 5052-H32. The surface shall be smooth, free of marks and scratches. All external hardware shall be stainless steel.

- Cabinet Doors – Provide front and rear doors of NEMA type 3R construction with cellular neoprene gasket that is rain tight. Door hinges shall be continuous 14-gauge stainless steel and shall be secured with ¼-20 stainless steel carriage bolts. Standard equipment shall include a three-point locking system that secures the door at the top, bottom and center. A corbin lock with two keys shall also be furnished. The door shall be equipped with a two-position doorstop, one at 90° and one at 120°.
- Controller Harness – Provide a TS2 Type 2 “A” harness in addition to the TS2 Type 1 harness.
- Surge Protection – Atlantic Scientific ZoneIT Model 91391 base station, Model 91375 ZoneIT pluggable module (50kA rating) with LED status indicators, or approved equivalent.
- BIU – Containment screw required.
- Switch Guards – All switches shall be guarded.
- Back Panel – The back panel wiring shall be securely covered with a piece of plexiglass, minimum thickness 1/8-inch.
- Heating – One (1) 200-watt, thermostatically-controlled, Hoffman electric heater, or approved equivalent.
- Lighting – Four (4) LED light assemblies shall be included along the top and sides of the cabinet. The LED panels shall be controlled by a wall switch. Relume Traffic Control Box LED panels and power supply, or approved equivalent.
- Plan & Wiring Diagrams – 12” x 16” moisture sealed container attached to door.
- The cabinet shall be equipped with a pull-out drawer/shelf assembly. A 1 ½ inch deep drawer shall be provided in the cabinet, mounted directly beneath the controller support shelf. The drawer shall have a hinged top cover and shall be capable of accommodating one (1) complete set of cabinet prints and manuals. This drawer shall support 50 lbs. in weight when fully extended. The drawer shall open and close smoothly. Drawer dimensions shall make maximum use of available depth offered by the controller shelf and be a minimum of 24 inches wide.
- Detector Racks – Full-size rack fully wired to support one BIU, sixteen channels of vehicle detection, and four channels of EVP.
- Field Wiring Labels – All field wiring shall be labeled.
- Field Wiring Termination – Approved channel lugs required.
- Power Supply – Provide a nonconductive shield.
- Circuit Breaker – The signal circuit breaker shall be sized for the proposed load, but shall not be rated less than thirty (30) amps.
- Police Door – Provide wiring and termination for plug-in manual phase advance switch.
- Railroad Pre-Emption Test Switch – Eaton 8830K13 SHA 1250 or approved equivalent.
- MMU – 16 Channel, LCD display, IP addressable (Ethernet) Malfunction Management Unit. The MMU shall be connected to the Ethernet switch with a CAT 5e cable, and configured for proper communication.
- Door Alarm – The front and rear doors shall be equipped with switches wired to the traffic signal controller alarm 1 input for logging and reporting of a door open condition.

FULL-ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL

This item shall comply with Sections 857 and 863 of the “Standard Specifications” for Road and Bridge Construction, and shall also comply with the following requirements:

The controller shall meet the requirements for NEMA-TS2 standards for a Type 1 Cabinet. The

controller shall be the latest model available that is compatible with "Centracs" software or "Aries" software, currently in use by LCDOT. Controller software compatibility requirements are based upon the controller's location in the communication system, and shall be as shown on the plans. The controller shall have the latest version of NTCIP software installed, and be equipped with an Ethernet port and a removable data key to save the controller database.

The cabinet shall be NEMA TS2 Type 1 design, meeting the requirements of CONTROLLER CABINET AND PERIPHERAL EQUIPMENT.

Basis of payment. This item will be paid for at the contract unit price each for FULL-ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL which price shall be payment in full for furnishing and installing the cabinet and controller, complete with necessary connections and equipment for proper operation, at a location designated by the Engineer.

TRAFFIC ACTUATED CONTROLLER & CABINET INTERCONNECTED WITH RAILROADS

Add the following to Articles 1073.01 (c) (2) and 1074.03 (a) (5) (e) of the Standard Specifications:

Controllers and cabinets shall be new and NEMA TS2 Type 1 design.

A method of monitoring and/or providing redundancy to the railroad preemptor input to the controller shall be included as a component of the Railroad, Full Actuated Controller and Cabinet installation and be verified by the traffic signal equipment supplier prior to installation. The cabinet shall be NEMA TS2 Type 1 design, meeting the requirements of CONTROLLER CABINET AND PERIPHERAL EQUIPMENT and FULL ACTUATED CONTROLLER, IN TYPE IV CABINET, (SPECIAL).

Railroad interconnected controllers and cabinets shall be assembled only by an approved traffic signal equipment supplier. All railroad interconnected (including temporary railroad interconnect) controllers and cabinets shall be new, built, tested and approved by the controller equipment vendor, in the vendor's IDOT District 1 facility, prior to field installation. The vendor shall provide the technical equipment and assistance as required by the Engineer to fully test this equipment.

MASTER CONTROLLER

Revise Articles 860.02 and 860.03 of the "Standard Specifications" to read:

The Master Controller shall be the latest model available that is compatible with "Aries" software, currently in use by LCDOT. The minimum baud rate for fiber optic interconnected signal systems shall be 9600 bps.

This item shall also include the installation of an outdoor network interface for termination of the telephone service and a US Robotics 56k modem. The outdoor network interface shall be mounted to the inside of the cabinet in a location suitable to provide access for termination of the telephone service. The outdoor network interface shall be equipped with a standard Three-Electrode Heavy Duty Gas Tube Surge Arrestor.

INTERSECTION MONITOR

This item shall consist of furnishing and installing an Intersection Monitor at a new or existing

traffic signal controller. This item is necessary at isolated (non-interconnected) traffic signals in order to monitor the intersection and controller operations. The Intersection Monitor shall be either an internal module installed in the controller, or an external data key, and shall be the latest model available. The Intersection Monitor shall be fully compatible with "Aries" traffic signal management software, currently in use by LCDOT.

This item shall also include the installation of an outdoor network interface for termination of the telephone service and a US Robotics 56k modem. The outdoor network interface shall be mounted to the inside of the cabinet in a location suitable to provide access for termination of the telephone service. The outdoor network interface shall be equipped with a standard Three-Electrode Heavy Duty Gas Tube Surge Arrestor.

Basis of payment. This item will be paid for at the contract unit price each for INTERSECTION MONITOR, which price shall be payment in full for furnishing and installing the Intersection Monitor (module or data key) complete with all necessary connections and equipment for proper operations.

INDUCTIVE LOOP DETECTOR.

Add the following to Article 1079.01 of the Standard Specifications:

Contracts requiring new cabinets shall provide for rack mounted detector amplifier cards. Detector amplifiers shall provide LCD displays with loop frequency, inductance, and change of inductance readings.

UNINTERRUPTABLE POWER SUPPLY, SPECIAL

This specification sets forth the minimum requirements for an uninterruptable power system (UPS) with battery back-up, for a traffic signal. The system is comprised of the UPS or Inverter unit, bypass switch, batteries, cabinet, and related wiring harnesses.

Revise Article 1074.04(a) (1) of the Standard Specifications to read:

The UPS shall be line interactive or double conversion and provide voltage regulation and power conditioning when utilizing utility power.

The UPS shall be sized appropriately for the intersection's normal traffic signal operating connected load, plus 20 percent (20%). The total connected traffic signal load shall not exceed the published ratings for the UPS. The UPS shall provide a minimum of six (6) hours of normal operation run-time for signalized intersections with LED type signal head optics at 77 °F (25 °C) (minimum 700 W/1000VA active output capacity, with 90 percent minimum inverter efficiency).

Revise Article 1074.04(a) (10) of the Standard Specifications to read:

The UPS shall be compatible with the County's approved traffic controller assemblies utilizing NEMA TS 1 or NEMA TS 2 controllers and cabinet components for full time operation.

Revise Article 1074.04(a) (17) of the Standard Specifications to read:

When the intersection is in battery backup mode, the UPS shall bypass all internal cabinet lights, ventilation fans, cabinet heaters, service receptacles, any lighted street name signs, any automated enforcement equipment and any other devices directed by the Engineer.

Revise Article 1074.04(b) (2)b of the Standard Specifications to read:

Batteries, inverter/charger and power transfer relay shall be housed in a separate NEMA Type 3R cabinet. The cabinet shall be Aluminum alloy, 5052-H32, 0.125-inch thick and have a natural mill finish.

Revise Article 1074.04(b) (2)c of the Standard Specifications to read:

No more than three batteries shall be mounted on individual shelves for a cabinet housing six batteries and no more than four batteries per shelf for a cabinet housing eight batteries.

Add the following to Article 1074.04(b) (2)e of the Standard Specifications:

The door shall be equipped with a two-position doorstop, one at 90° and one at 120°.

Revise Article 1074.04(b) (2)g of the Standard Specifications to read:

The door shall open to the entire cabinet and have a neoprene gasket, an Aluminum continuous piano hinge with stainless steel pin, and a three point locking system. The cabinet shall be provided with a main door lock which shall operate with a traffic industry conventional No. 2 key. Provisions for padlocking the door shall be provided.

Add the following to Article 1074.04(b) (2) of the Standard Specifications:

j. The battery cabinet shall have provisions for an external generator connection.

Add the following to Article 1074.04(c) of the Standard Specifications:

- (8) The UPS shall include a tip or kill switch installed in the battery cabinet, which shall completely disconnect power from the UPS when the switch is manually activated.
- (9) The UPS shall incorporate a flanged electric generator inlet for charging the batteries and operating the UPS. The generator connector provided shall be a NEMA L5-15P or NEMA L5-30P locking plug. The connector shall be rated for a minimum of 15/125VAC.
- (10) A power adapter cord shall be provided which converts the supplied NEMA locking connector to a NEMA 5-15P plug. The power adapter cord shall be rated for a minimum of 15A/125VAC and shall be a minimum of 12 inches in length.
- (11) Access to the generator inlet shall be from a secured weatherproof lift cover plate or behind a locked battery cabinet police panel.

Battery System.

Revise Article 1074.04(d) (3) of the Standard Specifications to read:

All batteries supplied in the UPS shall be either gel cell or AGM type, deep cycle, completely sealed, prismatic lead calcium based, silver alloy, valve regulated lead acid (VRLA) requiring no maintenance. All batteries in a UPS installation shall be the same type; mixing of gel cell and AGM types within a UPS installation is not permitted.

Revise Article 1074.04(d) (4) of the Standard Specifications to read:

Batteries shall be certified by the manufacturer to operate over a temperature range of -13 to 160 °F (-25 to + 71 °C) for gel cell batteries and -40 to 140 °F (-40 to + 60 °C) for AGM type batteries.

Add the following to Article 1074.04(d) of the Standard Specifications:

- (9) The UPS shall consist of an even number of batteries that are capable of maintaining normal operation of the signalized intersection for a minimum of six hours. Calculations shall be provided showing the number of batteries of the type supplied that are needed to satisfy this requirement. A minimum of four batteries shall be provided.

Add the following to the Article 1074.04 of the Standard Specifications:

- (e) Warranty. The warranty for an uninterruptable power supply (UPS) shall cover a minimum of two years from date the equipment is placed in operation; however, the batteries of the UPS shall be warranted for full replacement for a minimum of five years from the date the traffic signal and UPS are placed into service.

Basis of payment. This item shall be paid for at the contract unit price, each, for furnishing and installing the UNINTERRUPTABLE POWER SUPPLY, SPECIAL. The price shall include the UPS/Inverter unit, Bypass Switch, Batteries, Cabinet, wiring harnesses, power adapter cord, and all associated equipment and materials necessary for proper operation.

EMERGENCY VEHICLE PRIORITY SYSTEM

Revise Section 887 of the "Standard Specifications" to read:

If not marked in the Contract plans, it shall be the Contractor's responsibility to contact the municipality or fire district to verify the brand of emergency vehicle preemption equipment to be installed prior to the contract bidding. The equipment must be of the latest type manufactured and must be completely compatible with all components of signal equipment currently in use by the County.

All new installations shall be equipped with confirmation beacons as shown on the IDOT District 1 "Standard Traffic Signal Design Details". The confirmation beacon shall consist of a PAR 38 white LED flood lamp (90 watt equivalent, approved by the Engineer) for each direction of traffic. The lamp shall have an adjustable mount with a weatherproof enclosure for cable splicing. All hardware shall be cast aluminum or stainless steel. Holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires. In order to maintain uniformity between communities, the confirmation beacons shall indicate when the control equipment receives the preemption signal. The preemption movement shall be signalized by a flashing indication at the rate specified by Section 4L.01 of "MUTCD". The stopped preempted movements shall be signalized by a continuous indication.

All light operated systems shall operate at a uniform rate of 14.035 hz ± 0.002 hz, or as otherwise required by the Traffic Engineer, and provide compatible operation with other light systems currently being operated in the County.

This item shall include any required modifications to an existing traffic signal controller as a result of the addition of the EMERGENCY VEHICLE PRIORITY SYSTEM.

Basis of Payment. The work shall be paid for at the contract unit price each for furnishing and installing LIGHT DETECTOR and LIGHT DETECTOR AMPLIFIER. Furnishing and installing the confirmation beacon shall be included in the cost of the Light Detector. Any required modifications to the traffic signal controller shall be included in the cost of the LIGHT DETECTOR AMPLIFIER. The light detector amplifier shall be paid for on a basis of (1) one each per intersection controller and shall provide operation for all movements required in the pre-emption phase sequence.

STEEL MAST ARM ASSEMBLY AND POLE
STEEL COMBINATION MAST ARM ASSEMBLY AND POLE

Add the following to Article 1077.03 of the "Standard Specifications":

Traffic signal mast arms shall be one-piece construction, unless otherwise approved by the Engineer. All mast arms, mast arm poles, luminaire arms, cast iron bases, and any exposed steel hardware shall be hot-dipped galvanized.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

Luminaire arms shall be steel, and of the length shown on the plans. Luminaire arms over fifteen (15) feet in length shall be tapered, monotube style, with AASHTO 2001 wrap-around, gusset style connection.

Luminaires shall be "cobra head" style, with a minimum mounting height of forty-five (45) feet, and shall be paid for separately.

Stainless steel mesh screening shall be stainless steel banded to the anchor bolts, with a minimum 2-inch lap, to enclose the void between the top of the foundation and the base plate. The mesh screening shall have ¼-inch maximum opening and a minimum wire diameter of AWG NO. 16.

The base of the mast arm pole shall be protected by a bolt-on galvanized metal shroud or an approved equal. The shroud shall be of sufficient strength to deter pedestrian and vehicular damage. The shroud shall be constructed and designed to allow air to circulate throughout the mast arm but not allow infestation of insects or other animals, and such that it is not hazardous to probing fingers and feet. All mounting hardware shall be stainless steel.

STEEL MAST ARM ASSEMBLY AND POLE (SPECIAL)
STEEL COMBINATION MAST ARM ASSEMBLY AND POLE (SPECIAL)

Add the following to Article 1077.03 of the "Standard Specifications":

Base covers for mast arm poles shall be cast aluminum. All mast arms, mast arm poles, luminaire arms, and any exposed steel hardware shall be hot-dipped galvanized, and then powder-coated black by the supplier/manufacturer, as described below or an approved

alternative finishing method. Cast aluminum base covers shall be powder-coated black by the supplier/manufacturer, as described below or an approved alternative finishing method.

All galvanized and aluminum exterior surfaces shall be coated with chip resistive epoxy resin primer applied via electrostatic spray equipment. The primer is to be applied at a minimum dry film thickness (DFT) of 3.0 mils with a minimum DFT of 6.0 mils applied to the lower 8 feet of the pole. The primer coat must be energy absorptive, and capable of achieving a rating of 10A under testing per ASTM (American Society for Testing and Materials) Procedure D3170, Standard Test Method for Chipping Resistance of Coatings. The primed surfaces shall then be coated with a black semi-gloss TGIC Super Durable Polyester topcoat to a minimum dry film thickness of 3.0 mils. The topcoat must meet the requirements of AAMA (American Architectural Manufacturer's Association) 2604 for color and gloss retention properties.

The manufacturer shall warranty the finish of all components for a period of at least 5 years from the date of shipment. The contractor shall provide a copy of the warranty to the Engineer, upon request.

All chips, scrapes, scratches, etc. in the paint shall be touched-up by the Contractor according to the manufacturer's recommendations, with matching paint supplied by the manufacturer.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

Stainless steel mesh screening shall be stainless steel banded to the anchor bolts, with a minimum 2-inch lap, to enclose the void between the top of the foundation and the base plate. The mesh screening shall have ¼-inch maximum opening and a minimum wire diameter of AWG NO. 16.

All base covers shall fit tightly around the poles, with little or no gap at the top of the base cover. Two-piece base covers shall fit together tightly, with little or no gap between the two pieces. All base covers shall fit securely on top of the foundation, and shall not easily move or wobble. All base covers shall have an access hand hole, with a removable cover, and a minimum opening size of 200 square inches.

Pedestrian pushbutton stations shall be mounted to mast arm base covers according to the following: The top and bottom of the station shall be secured by drilling, tapping, and installing a 3/8-inch stainless steel threaded bolt, lock washer, and hex nut. Do not use self-tapping screws. Spacers made of 3/4-inch aluminum conduit shall be installed behind the pushbutton station, to level and plumb the station.

Luminaire arms shall be steel, and of the length shown on the plans. Luminaire arms over fifteen (15) feet in length shall be tapered, monotube style, with AASHTO 2001 wrap-around, gusset style connection.

Luminaires shall be installed at a minimum mounting height of forty-five (45) feet, and shall be paid for separately.

All (Special) steel mast arm assemblies and poles (including combination mast arm assemblies) shall be manufactured and/or supplied by Sternberg Vintage Lighting, Union Metal, Valmont, or

approved equal, according to the following:

- Round, tapered, 16-sharp fluted pole.
- Round, tapered, smooth, standard-curved, flange-connected, traffic signal mast arm

The two-piece mast arm base cover shall be cast aluminum, and shall be manufactured and/or supplied by the same company as the mast arm assembly and pole. Manufacturer designations for the two-piece mast arm base cover to be used with (SPECIAL) MAST ARM ASSEMBLIES include the following:

- Hamilton 6401SS (Sternberg)
- Lake County AC1 base cover (Valmont)

LUMINAIRE

Add the following to Article 1067.01(e) of the "Standard Specifications":

The luminaire housing shall be cobra head style.

Revise Article 1067.01(i) of the "Standard Specifications" to read:

The luminaire shall be painted black or powder-coated black to match the finish of STEEL COMBINATION MAST ARM ASSEMBLY AND POLE (SPECIAL).

TRAFFIC SIGNAL POST

Add the following to Article 1077.01 (d) of the "Standard Specifications":

Steel posts and cast iron bases shall be hot-dipped galvanized.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

TRAFFIC SIGNAL POST (SPECIAL)

Add the following to Article 1077.01 of the "Standard Specifications":

All Traffic Signal Posts (Special) shall be sixteen (16) feet in height, extruded aluminum, unless otherwise specified on the plans. All bases for Traffic Signal Post (Special) shall be cast aluminum.

All Traffic Signal Posts (Special) and associated bases shall be assembled and powder-coated black at the factory. The powder-coated finish and warranty shall meet the requirements of STEEL MAST ARM ASSEMBLY AND POLE (SPECIAL). All exposed steel hardware shall be hot-dipped galvanized, and then powder-coated black.

All chips, scrapes, scratches, etc. in the paint shall be touched-up by the Contractor according to the manufacturer's recommendations, with matching paint supplied by the manufacturer.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

Pedestrian pushbutton stations shall be mounted to signal posts according to the following: The top and bottom of the station shall be secured by drilling, tapping, and installing a 3/8-inch stainless steel threaded bolt. Self-tapping screws are not allowed. Anti-seize lubricating compound shall be applied to all pushbutton and pushbutton station hardware. Spacers made of 3/4-inch aluminum conduit shall be installed behind the pushbutton station, to level and plumb the station.

All Traffic Signal Posts (Special) and associated bases shall be manufactured and/or supplied by Beacon, Sternberg Vintage Lighting, Union Metal, Valmont, or approved equal, according to the following:

- Round, straight (non-tapered), five (5)-inch diameter, 12-flat fluted post.
- A ball center cap for the top of the post, instead of a tenon.
- The base section of the post shall be approximately forty-three (43) inches tall.

Manufacturer designations for TRAFFIC SIGNAL POST (SPECIAL) include the following:

- MainStreet Series (100SJ) base (Beacon)
- Hamilton Series (5400D) base (Sternberg)

PEDESTRIAN PUSH-BUTTON

Replace Article 1074.02 of the "Standard Specifications" with the following:

Pedestrian Push-button assembly shall be ADA compliant, 3-inch round style, highly vandal resistant, non-moving, pressure activated, with a solid-state Piezo switch actuator that cannot be stuck in an "on" or constant call position. A latching red LED and audible tone shall be provided to confirm an actuation. The housing, or bezel, of the assembly shall be solid aluminum and powder coated yellow. The button shall be stainless steel or nickel-plated aluminum.

Pedestrian Push-button assembly shall be a Campbell Company 4 EVR CL with Enlightened Interface Module (ENIM), a Polara BullDog BDL3-Y with Latching Push Button Control Unit (LPBCU), or approved equivalent.

The pedestrian station shall be a Campbell Company 912H Station, Polara PBF9X12 or approved equivalent.

The station shall be installed with a 9-inch by 12-inch retro-reflective sign, according to the following: Where pedestrian signal heads are used, pedestrian signs shall provide the "Push Button for" legend, with the Walking Man symbol and arrow (R10-3). Where no pedestrian signal heads are used, pedestrian signs shall provide the "Push Button for Green Light" legend with arrow (R10-4 with arrow), or as specified on the plans.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

Anti-seize lubricating compound shall be applied to all pushbutton and pushbutton station hardware.

Refer to STEEL MAST ARM ASSEMBLY AND POLE (SPECIAL), STEEL COMBINATION MAST ARM ASSEMBLY AND POLE (SPECIAL), and/or TRAFFIC SIGNAL POST (SPECIAL)

for additional installation requirements.

ILLUMINATED SIGN, LIGHT EMITTING DIODE

Delete last sentence of Article 1084.01(a) and add "Mounting hardware shall be black polycarbonate or galvanized steel and similar to mounting Signal Head hardware and bracket specified herein and shall provide tool free access to the interior."

Revise the second paragraph of Article 1084.01(a) of the Standard Specifications to read:

The exterior surface of the housing shall be acid-etched and shop painted with one coat of zinc-chromate primer and two coats of exterior enamel. The housing shall be the same color (yellow or black) to match the existing or proposed signal heads. The painting shall be according to Section 851.

Add the following to Article 1084.01 (b) of the Standard Specifications:

The message shall be formed by rows of LEDs. The sign face shall be 24 inches by 24 inches .

Add the following to Article 1084.01 of the Standard Specifications:

- (e) The light emitting diode (LED) blank out signs shall be manufactured by National Sign & Signal Company, or an approved equal and consist of a weatherproof housing and door, LEDs and transformers.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

Basis of payment. This work shall be paid for at the unit price each for ILLUMINATED SIGN, LIGHT EMITTING DIODE.

LED INTERNALLY ILLUMINATED STREET NAME SIGN

This work shall consist of furnishing a street name sign which is internally illuminated with light emitting diodes, and installing the sign on a traffic signal mast arm or span wire.

(a) Description.

The LEDs shall be white in color and utilize InGaN or UV thermally efficient technology. The LED Light Engines shall be designed to fit inside a standard fluorescent illuminated street sign housing in lieu of fluorescent lamps and ballasts. The LED internally-illuminated street name sign shall display the designated street name clearly and legibly in the daylight hours without being energized and at night when energized. The sign assembly shall consist of a four-, six-, or eight-foot aluminum housing. White translucent 3M DG³ reflective sheeting sign faces with the street name applied in 3M/Scotchlite Series 1177 or current 3M equivalent transparent green shall be installed in hinged doors on the side of the sign for easy access to perform general cleaning and maintenance operations. Illumination shall occur with LED Light Engine as specified.

(b) Environmental Requirements.

The LED lamp shall be rated for use in the ambient operating temperature range of -40 to +50°C (-40 to +122°F) for storage in the ambient temperature range of -40 to +75°C (-40 to +167°F).

(c) General Construction.

1. The LED Light Engine shall be a single, self-contained device, for installation in an existing street sign housing. The power supply must be designed to fit and mounted on the inside wall at one end of the street sign housing. The LED Light Engine shall be mounted within the inner top portion of the housing and no components of the light source shall sit between the sign faces.
2. The assembly and manufacturing processes of the LED Light Engine shall be designed to ensure that all LED and electronic components are adequately supported to withstand mechanical shocks and vibrations in compliance with the specifications of the ANSI, C136.31-2001 standards.

(d) Mechanical Construction.

1. The sign shall be constructed using a weatherproof, aluminum housing consisting of an extruded aluminum top with a minimum thickness of .140" x 10 3/4" deep (including the drip edge). The extruded aluminum bottom is .094" thick x 5 7/8" deep. The ends of the housing shall be cast aluminum with a minimum thickness of .250". A six-foot sign shall be 72 5/8" long and 22 5/16" tall and not weigh more than 77 pounds. An eight-foot sign shall be 96 5/8" long and 22 5/16" tall and not weigh more than 92 pounds. All corners are continuous TIG (Tungsten Inert Gas) welded to provide a weatherproof seal around the entire housing.
2. The door shall be constructed of extruded aluminum. Two corners are continuous TIG welded with the other two screwed together to make one side of the door removable for installation of the sign face. The door is fastened to the housing on the bottom by a full length, .040" x 1 1/8" open stainless steel hinge. The door shall be held secure onto a 1" wide by 5/32" thick neoprene gasket by three (six total for two-way sign) quarter-turn fasteners to form a watertight seal between the door and the housing.
3. The sign face shall be constructed of .125" white translucent polycarbonate. The letters shall be 8" upper case and 6" lower case. The sign face legend background shall consist of 3M/Scotchlite Series 4090T or current equivalent 3M translucent DG³ white VIP (Visual Impact Performance) diamond grade sheeting (ATSM Type 9) and 3M/Scotchlite Series 1177 or current 3M equivalent transparent green acrylic EC (electronic cut-able) film applied to the front of the sign face. The legend shall be framed by a white polycarbonate border. A logo symbol and/or name of the community may be included with approval of the Engineer.
4. All surfaces of the sign shall be etched and primed in accordance to industry standards before receiving appropriate color coats of industrial enamel. The sign frame shall be painted black with a durable powder coated process.
5. All fasteners and hardware shall be corrosion resistant stainless steel. No tools are required for routine maintenance.
6. All wiring shall be secured by insulated wire compression nuts.
7. A wire entrance junction box shall be supplied with the sign assembly. The box may be supplied mounted to the exterior or interior of the sign and provide a weather tight seal.

8. Each sign shall be activated by a photocell mounted/installed on the side of the sign frame.
9. Brackets and Mounting: LED internally-illuminated street name signs will be factory drilled to accommodate mast arm two-point support assembly mounting brackets.

(e) Electrical.

1. Photocell shall be rated 105-305V, turn on at 1.5 fcs. with a 3-5 second delay. A manufacturer's warranty of six (6) years shall be provided. Power consumption shall be no greater than 1 watt at 120V.
2. The LED Light Engine shall operate from a 60 +/- 3 cycle AC line power over a voltage range of 80 to 135 Vac rms. Fluctuations in line voltage over the range of 80 to 135 Vac shall not affect luminous intensity by more than +/- 10%.
3. Total harmonic distortion induced into the AC power line by the LED Light Engine, operated at a nominal operating voltage, and at a temperature of +25°C (+77°F), shall not exceed 20%.
4. The LED Light Engine shall cycled ON and OFF with a photocell as shown on the detail sheet and shall not exceed the following maximum power values:

4-Foot Sign	60 W
6-Foot Sign	90 W
8-Foot Sign	120 W

The signs shall not be energized when traffic signals are powered by an alternate energy source such as a generator or uninterruptable power source (UPS). The signs shall be connected to the generator or UPS bypass circuitry.

(f) Photometric Requirements.

1. The entire surface of the sign panel shall be evenly illuminated. The average maintained luminous intensity measured across the letters, operating under the conditions defined in Environmental Requirements and Wattage Sections shall be of a minimum value of 100 cd/m².
2. The manufacturer shall make available independent laboratory test results to verify compliance to Voltage Range and Luminous Intensity Distribution Sections.
3. Twelve (12) 1.25 watt LED units shall be mounted on 1-inch x 22-inch metal cone printed circuit boards (MCPCB). The viewing angle shall be 120 degrees. LED shall have a color temperature of 5200k nominal, CRI of 80 with a life expectancy of 75,000 hrs.

(g) Quality Assurance.

The LED Light Engine shall be manufactured in accordance with a vendor quality assurance (QA) program. The production QA shall include statistically controlled routine tests to ensure minimum performance levels of the LED Light Engine build to meet this specification. QA process and test result documentations shall be kept on file for a minimum period of seven (7) years. The LED Light Engine that does not satisfy the production QA testing

performance requirements shall not be labeled, advertised, or sold as conforming to these specifications. Each LED Light Engine shall be identified by a manufacturer's serial number for warranty purposes. LED Light Engines shall be replaced or repaired if they fail to function as intended due to workmanship or material defects within the first sixty (60) months from the date of acceptance. LED Light Engines that exhibit luminous intensities less than the minimum value specified in Photometric Section within the first thirty-six (36) months from the date of acceptance shall be replaced or repaired.

The sign shall be mounted on the mast arm three feet to the right of the furthest right signal head, as viewed by the approaching traffic.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

The Manufacturer/Vendor shall supply shop drawings of the fixtures, sign, sign message and mounting hardware for approval. All hardware used to install the sign shall be in accordance with the manufacturer's recommendations.

Basis of Payment. This work will be paid for at the contract unit price each for furnishing and installing LED INTERNALLY ILLUMINATED STREET NAME SIGN, of the size specified, complete in place, including photocell and all related hardware, wiring, and connections required for proper operations. The #14 2/C cable from the signal cabinet to the sign shall be paid for separately.

MAST ARM SIGN PANELS

Add the following to Article 720.02 of the Standard Specifications:

Signs attached to poles or posts (such as mast arm signs) shall have mounting brackets and sign channels which are equal to and completely interchangeable with those used by LCDOT. All aluminum signs shall have a white reflectorized legend and border on a green reflectorized background, DG³ type sheeting. The sign face shall not have any holes. 3M Scotch Joining Systems bonding tape or an approved equal shall be used in place of screws or rivets. The Signfix Aluminum Channel Framing System is currently recommended, but other brands of mounting hardware or bonding tape may be acceptable based upon LCDOT approval.

SIGNAL HEADS

Add the following to Section 1078 of the Standard Specifications to read:

All vehicle signal and pedestrian signal heads shall provide 12-inch displays, with glossy black polycarbonate housings, with the following exception: At locations where existing yellow polycarbonate heads will remain, all new signal heads shall be yellow to match the existing ones. Connecting hardware and mounting brackets shall be polycarbonate, the same color as the heads, or galvanized. A corrosive resistant anti-seize lubricant shall be applied to all metallic mounting bracket joints, and shall be visible to the inspector at the signal turn-on. Where required, incandescent bulbs shall be manufactured by Duratest, Sylvania or an approved equal.

SIGNAL HEAD, LED

This work shall consist of furnishing and installing a traffic signal head with light emitting diodes (LED) of the type specified in the plans, in accordance with Sections 880 and 1078 of the Standard Specifications for Road and Bridge Construction, and the following.

The lens of the LED signal module shall be tinted with a wavelength-matched color to reduce sun phantom effect and enhance on/off contrast. The tinting shall be uniform across the lens face, and shall not affect chromaticity. The lens shall be smooth, with the same uniform appearance as incandescent lenses.

Each individual LED signal module shall be clearly marked with the manufacturer's name, model number, date of manufacture, nominal operating voltage, and power consumption in watts.

The LED signal module shall have a one-piece neoprene gasket.

The LEDs arrow indication shall be a solid display with a minimum of three (3) outlining rows of LEDs and at least one (1) fill row of LEDs.

All LED signal modules shall be warranted for 5 years from the date of traffic signal turn-on against failures due to manufacturing, workmanship, or material defects including modules which exhibit luminous intensities less than the minimum values specified by the Institute for Transportation Engineers (ITE) LED purchase specification, "Vehicle Traffic Control Signal Heads: LED Circular Signal Supplement". Any modules that do not meet these warranty requirements shall be replaced or repaired at no expense to the County. The manufacturer's written warranty for the LED signal modules shall be included in the product submittal to the County.

PEDESTRIAN SIGNAL HEAD, LED
PEDESTRIAN SIGNAL HEAD, LED, COUNTDOWN

This work shall consist of furnishing and installing a pedestrian countdown signal head, with light emitting diodes (LED) of the type specified in the plans, in accordance with Section 881 and Article 1078.02 of the Standard Specifications for Road and Bridge Construction, and the following.

Pedestrian Countdown Signal Heads shall not be used at signalized intersections where traffic signals and railroad warning devices are interconnected.

The nominal message-bearing surface of pedestrian signal heads shall be 12 in. x 12 in.

Pedestrian Countdown Signal Heads shall consist of two (2) 12-inch by 12-inch modules aligned vertically. The top module of the unit shall be overlapping full "HAND" and full "MAN" symbols. The bottom module of the unit shall be a two digit numerical countdown display ("00" to "99"). The counter shall begin countdown at the beginning of the pedestrian clearance interval as the pictogram of the hand starts flashing. The counter shall execute a countdown of the time, in seconds, of the pedestrian clearance interval synchronized with the controller and ending at (0) at the expiration of the pedestrian clearance interval. The counter shall be blank at all other times.

The visor for each signal shall be the tunnel visor.

The signal module shall have a one-piece neoprene gasket.

The signal module identification labels and warranty shall be according to the SIGNAL HEAD,

LED section of these specifications.

SIGNAL HEAD, LED, RETROFIT

This work shall consist of furnishing and installing vehicle or pedestrian LED signal modules in an existing signal head, of the type and mounting specified in the plans, according to the following.

All vehicle and pedestrian LED Retrofit signal modules shall fully comply with the SIGNAL HEAD, LED; PEDESTRIAN SIGNAL HEAD, LED; and PEDESTRIAN SIGNAL HEAD, LED, COUNTDOWN sections of these specifications.

Basis of Payment. This item shall be paid for at the contract unit price each for SIGNAL HEAD, LED, of the type and mounting specified, RETROFIT or PEDESTRIAN SIGNAL HEAD, LED, RETROFIT; or PEDESTRIAN SIGNAL HEAD, LED, COUNTDOWN, RETROFIT, which price shall be payment in full for furnishing the equipment described above including LED(s) modules, all mounting hardware, and installing them in satisfactory operating condition.

TRAFFIC SIGNAL BACKPLATE

Delete the second sentence of the fourth paragraph of Article 1078.03 of the Standard Specifications.

Add the following to the fourth paragraph of Article 1078.03 of the Standard Specifications:

When retro reflective sheeting is specified, it shall be Type ZZ sheeting according to Article 1091.03 and applied in preferred orientation for the maximum angularity according to the manufacturer's recommendations. The retro reflective sheeting shall be installed under a controlled environment at the manufacturer/supplier before shipment to the contractor. The aluminum backplate shall be prepared and cleaned, following recommendations of the retro reflective sheeting manufacturer.

VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION)

This specification sets forth the minimum requirements for a system that monitors vehicles on a roadway via processing of video images and provides detector outputs to a traffic signal controller. This work shall consist of furnishing and installing video cameras, all cables, video processors, controller interface unit, and remote communication module to operate a video vehicle detection system at one signalized intersection.

The video detection system, (complete intersection) shall be one of the following or approved equal:

- Autoscope Encore, Terra TIP, Terra TAP
- Iteris RZ-4 WDR, Vantage Edge 2, Vantage TS2-IM, Edge Connect
- Autoscope AIS-IV, Terra RackVision,

All the cables from the detection cameras to the traffic signal cabinet and within the traffic signal cabinet itself shall be included in the cost of this item.

The video detection system, (complete intersection) shall also include a LCD monitor in the traffic signal cabinet with BNC connector for video input.

The video detection camera shall be installed on top of the luminaire arm. However, occasionally overhead utility wires obstruct the camera's field of view and prevent proper detector placement. When this occurs, the camera shall be installed on a J-hook below the luminaire arm, instead of the normal mounting bracket. The cost of the J-hook shall be included in the cost of this item.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

Surge protection and grounding shall be provided to protect the video detection cameras and components located in the traffic signal cabinet.

In order for the Traffic Engineer to manipulate detection zones and view the video signal over a high-speed connection, the VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) must be connected to either the LCDOT Gigabit Ethernet network or a VIDEO TRANSMISSION SYSTEM.

If the VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) is being connected to the Gigabit Ethernet network, the remote communications module shall communicate over 10/100 Base T Ethernet to a LAYER II (DATA LINK) SWITCH and/or a LAYER III (NETWORK) SWITCH. The Layer II and Layer III switches shall be installed according to the plans, and shall be paid for separately.

Basis of Payment. This item will be paid for at the contract unit price each for VIDEO DETECTION SYSTEM, (COMPLETE INTERSECTION) which price shall be payment in full for furnishing all associated equipment, cables and hardware required, installing the system at one signalized intersection, and placing the system in operation to the satisfaction of the Engineer.

REMOTE-CONTROLLED VIDEO SYSTEM

This pay item shall include providing and installing a remote-controlled video system at a location designated by the Engineer. The remote-controlled video system shall be a PELCO Spectra IV SE Series Discreet Dome System or approved equal. This pay item shall include a color camera (minimum 35x optical zoom), dome assembly, all mounting hardware, connectors, cables, and related equipment necessary to complete the installation in accordance with the manufacturer's specifications.

The PTZ control, power, and coax cables from the traffic signal cabinet shall be paid for separately.

The camera shall be installed as shown on the plans, either on the luminaire arm near the luminaire, or on the combination mast arm assembly pole, angled toward the center of the intersection. When installed on the pole, the camera shall be mounted with a 14-inch pendant arm with integral transformer / power supply (Pelco IWM24-GY or approved equal). When installed on the luminaire arm, the camera shall be installed with a 30-degree tilt-adjustable bracket, and the external power supply (Pelco WCS1-4 or approved equal) shall be installed on the pole. Cameras and external power supplies shall be installed with stainless steel straps.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

The contractor shall contact the Traffic Engineer prior to installing the Pelco camera and associated wiring, to receive final approval on the camera location.

In order for the Traffic Engineer to control the camera remotely and view the video signal over a high-speed connection, the REMOTE-CONTROLLED VIDEO SYSTEM must be connected to either the LCDOT Gigabit Ethernet network or a VIDEO TRANSMISSION SYSTEM.

If the REMOTE-CONTROLLED VIDEO SYSTEM is being connected to the Gigabit Ethernet network, then a LAYER II (DATA LINK) SWITCH and/or a LAYER III (NETWORK) SWITCH will be required. Layer II and Layer III switches shall be installed according to the plans, and shall be paid for separately.

If the REMOTE-CONTROLLED VIDEO SYSTEM is being connected to a new or existing VIDEO TRANSMISSION SYSTEM, then fiber-optic video/data transmitters and receivers may be required. Fiber-optic video/data transmitters and receivers are necessary whenever the REMOTE-CONTROLLED VIDEO SYSTEM and the VIDEO TRANSMISSION SYSTEM are installed at separate signalized intersections. When required, fiber-optic video/data transmitters and receivers shall be installed according to the plans, and shall be included in the cost of this item. The VIDEO TRANSMISSION SYSTEM shall be paid for separately.

Basis of Payment. This item will be paid for at the contract unit price each for REMOTE-CONTROLLED VIDEO SYSTEM, which price shall be payment in full for furnishing all associated equipment required, installing the system complete and in place, and placing the system in operation to the satisfaction of the Engineer.

CAMERA MOUNTING ASSEMBLY

This work shall consist of modifying an existing traffic signal mast arm pole to accommodate an extension pole suitable for mounting a CCTV Camera. The pole extension shall be a 20-foot long, 4-inch diameter, Schedule 80 galvanized steel pipe and fastened to the existing mast arm pole with adjustable, galvanized steel clamps as indicated in the plans. The galvanized clamps shall fit securely around the tapered mast arm and shall be modified as required to maintain a true vertical alignment of the camera mounting assembly pole. The exposed wires shall be trained into a drip loop and protected with black plastic spiral cable wrap.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

Basis of payment. This work shall be paid for at the contract unit price each for CAMERA MOUNTING ASSEMBLY, which shall include all necessary mounting hardware, labor, and incidentals necessary to securely fasten the assembly to an existing pole and placing the camera in operation to the satisfaction of the Engineer. The camera, cables, connectors, and related equipment shall be paid for separately as part of REMOTE-CONTROLLED VIDEO SYSTEM.

VIDEO TRANSMISSION SYSTEM

This specification sets forth the minimum requirements for a video transmission system that

allows a user to transmit video output from multiple cameras to a remote location, via video transmitter(s) and a high-speed communication link.

The high-speed communication link will be either an ISDN phone line or DSL connection as indicated on the plans.

The VIDEO TRANSMISSION SYSTEM may be installed in either the intersection traffic signal cabinet or in the VIDEO COMMUNICATIONS CABINET. The Cabinet shall be paid for separately.

The VIDEO TRANSMISSION SYSTEM may include the relocation of existing video transmitter(s), ISDN modems, Cisco router, and/or high-speed Internet modem(s) to a new traffic signal cabinet. The relocation of such existing equipment to a new traffic signal cabinet shall be performed as directed by the Engineer and included in the cost of the VIDEO TRANSMISSION SYSTEM. Any item damaged during removal, storage, or reinstallation shall be repaired or replaced in kind to the satisfaction of the Engineer at the Contractor's expense.

System Components:

The system shall consist of video transmitter(s) (ADPRO Fast Tx or approved equal) or a high-speed Internet modem(s), a Cisco Router, and related connection cables.

High-Speed Internet Modem:

The high-speed Internet modem shall be provided by the County or the Internet Service Provider.

The Cisco Router shall be procured from Delcan, the County's Passage engineering consultant. Delcan shall program this equipment for the appropriate location in the County's communication network.

Basis of payment. This item will be paid for at the contract unit price each for VIDEO TRANSMISSION SYSTEM, which price shall be payment in full for furnishing and/or relocating all associated equipment required, installing the system complete and in place, and placing the system in operation to the satisfaction of the Engineer

COMMUNICATIONS CABINET

This specification sets forth the minimum requirements for a communications cabinet to be installed at the location(s) shown in the plans.

The Communications Cabinet shall be a Model 332 (Type 170) Controller Cabinet, with heat exchanger, or approved equal. The heat exchanger shall be thermostatically controlled to maintain the temperature between 32°F and 122°F within the enclosure. The cabinet shall be constructed of 0.125"-thickness, alloy-5052 sheet aluminum. The surface shall have a smooth, natural aluminum mill finish. The cabinet shall measure 24" wide x 30" deep x 55" high.

The communications cabinet shall have front and rear doors of NEMA type 3R construction with cellular neoprene gasket that is rain tight. Door hinges shall be continuous 14-gauge stainless steel and shall be secured with ¼-20 stainless steel carriage bolts. Standard equipment shall include a three-point locking system that secures the door at the top, bottom and center. A corbin lock with two keys shall also be furnished. The front and rear doors shall be equipped

with a two-position doorstop, one at 90° and one at 120°. Door locking rods are ¼" x ¾" aluminum turned edgeways with 1" nylon rollers. Door handles shall be cast aluminum.

The front and rear doors shall be equipped with alarm switches wired to an I/O module. The I/O module shall be connected to the Layer III network switch to transmit door open and closed alarms to the TMC. The I/O device shall be a Moxa E2210, Advantech ADAM-6050, or approved equal meeting the following requirements:

- 10/100BaseT LAN connection
- Supports Modbus/TCP over a TCP/IP network
- Minimum of 8 digital dry-contact inputs (logic level 0 = short to GND, logic level 1 = open)
- -10C to +60C Power: 24VDC nominal
- Mounting: DIN rail

The communications cabinet shall be base mounted and equipped with inside flanges and anchoring holes in the front and back of the cabinet for anchoring to a base.

The communications cabinet shall be equipped with a 19" Electronic Industries Association (EIA) rack using 1.75" hole spacing for the purpose of mounting rack-mountable cabinet equipment. The cabinet shall include a fiber optic connector housing, Corning Cable Systems CCH-04U, or approved equal, and a splice housing, Corning Cable Systems CSH-03U, or approved equal, mounted on the 19" rack.

The communications cabinet shall also be equipped with a 15A rackmount power distribution unit and a pull-out drawer/ shelf assembly.

The heat exchanger handles the air inside the communication cabinet, as necessary, to maintain the equipment within the desired temperature range. Therefore, the cabinet shall be fully enclosed, with no louvers in any doors or side panels. No fans or thermostats shall be installed in the communication cabinet.

A power panel shall be included with the cabinet and shall include the following:

- 50-amp circuit breaker. This circuit breaker shall supply power to all devices in the cabinet.
- The main breaker shall be thermal magnetic type, U.L. listed for HACR service, with a minimum of 20,000 amp interrupting capacity.
- Two 15-amp load breakers with minimum 10,000 amp interrupting capacity.
- Two 20-amp load breakers with minimum 10,000 amp interrupting capacity.
- Atlantic Scientific ZoneIT Model 91391 base station, Model 91375 ZoneIT pluggable module (50kA rating) surge arrester, with LED status indicators, or approved equivalent.
- A 15-position neutral bus bar capable of connecting three #12 wires per position.
- A 7-position ground bus bar capable of connecting three #12 wires per position.
- A NEMA type 5-15R GFI convenience outlet.

The heat exchanger shall be mounted on the side of the communications cabinet and conform to the following specifications.

- Maximum dimensions of 47 inches high x 15 inches wide x 11 inches deep
- The unit shall provide closed-loop system cooling and heating. (Heater option shall be included with the unit.)

- Unit shall be fully gasketed and maintain the NEMA 3R enclosure rating
- Shall utilize a high efficiency, convoluted, refrigerant-free, aluminum heat transfer element
- Shall operate under maximum enclosure temperature of 150°F and maximum ambient temperature of 131°F
- The unit shall dissipate a minimum of 54 Watts per °F
- Shall operate on 115 VAC, 60 Hz
- The heat exchanger shall be hard-wired to the communications cabinet power supply.
- Unit shall be UL listed

Basis of payment. This item will be paid for at the contract unit price each for COMMUNICATIONS CABINET, which price shall be payment in full for furnishing all associated equipment and labor, and installing the cabinet as shown on the plans and to the satisfaction of the Engineer. The Layer III switch, fiber optic splices and terminations, the video transmission system, if applicable, and the concrete foundation for the cabinet shall be paid for separately.

LAYER II (DATA LINK) SWITCH

This specification sets forth the minimum requirements for a layer II Ethernet switch that will transmit data from one traffic signal cabinet to another traffic signal cabinet containing a layer II switch or a layer III (Network) switch. The layer II switch shall be a Cisco Catalyst 2955 Series Intelligent Ethernet Switch, or approved equal.

The Layer II (Data Link) Switch shall be procured from Delcan, the County's Passage engineering consultant. Delcan shall program this equipment for the appropriate location in the County's communication network.

The layer II switch and its power supply shall be mounted to either a standard DIN rail or an equipment mounting channel in the cabinet. The power supply shall be hard-wired to the cabinet power, not plugged into one of the traffic signal cabinet power outlets.

Basis of Payment. This item will be paid for at the contract unit price each for LAYER II (DATA LINK) SWITCH, which price shall be payment in full for furnishing and installing the switch, and all necessary connectors, cables, fiber optic jumpers, hardware, software, other peripheral equipment, and placing it in operation to the satisfaction of the Engineer. The VIDEO ENCODER, MEDIA CONVERTERS, and TERMINAL SERVERS shall be paid for separately.

LAYER III (NETWORK) SWITCH

This specification sets forth the minimum requirements for a layer III switch that will transmit video data from one traffic signal cabinet to another traffic signal cabinet or to another location having a layer III switch. The layer III switch shall be a Cisco Catalyst 3560 Series Intelligent Ethernet Switch, or approved equal.

The Layer III (Network) Switch shall be procured from Delcan, the County's Passage engineering consultant. Delcan shall program this equipment for the appropriate location in the County's communication network.

The layer III switch shall be mounted to the 19-inch equipment rack inside the cabinet. The layer III switch shall be plugged into the 15A power distribution unit inside the cabinet.

Basis of Payment. This item will be paid for at the contract unit price each for LAYER III (NETWORK) SWITCH, which price shall be payment in full for furnishing and installing the

switch, and all necessary connectors, cables, fiber optic jumpers, hardware, software, other peripheral equipment, and placing it in operation to the satisfaction of the Engineer. The VIDEO ENCODER, LAYER III FIBER OPTIC TRANSCEIVER MODULES, MEDIA CONVERTERS, and TERMINAL SERVERS shall be paid for separately.

FIBER OPTIC TRANSCEIVER MODULE, SFP TYPE, LONG DISTANCE

This specification sets forth the minimum requirements for a fiber optic transceiver module that plugs into a Cisco layer III gigabit ethernet switch. The module shall be a small form pluggable (SFP), long distance, single mode transceiver, Cisco GLC-LH-SM, or approved equivalent. The transceiver shall be installed in the Cisco layer III switch at the location shown on the plans.

Basis of payment. This item will be paid for at the contract unit price each for FIBER OPTIC TRANSCEIVER MODULE, SFP TYPE, LONG DISTANCE, which price shall be payment in full for furnishing and installing the module, and all necessary connectors, cables, hardware, software, other peripheral equipment, and placing it in operation to the satisfaction of the Engineer.

FIBER OPTIC TRANSCEIVER MODULE, SFP TYPE, EXTRA LONG DISTANCE

This specification sets forth the minimum requirements for a fiber optic transceiver module that plugs into a Cisco layer III gigabit ethernet switch. The module shall be a small form pluggable (SFP), extra-long distance, single mode transceiver, Cisco GLC-ZX-SM, or approved equivalent. The transceiver shall be installed in the Cisco layer III switch at the location shown on the plans.

Basis of payment. This item will be paid for at the contract unit price each for FIBER OPTIC TRANSCEIVER MODULE, SFP TYPE, EXTRA LONG DISTANCE, which price shall be payment in full for furnishing and installing the module, and all necessary connectors, cables, hardware, software, other peripheral equipment, and placing it in operation to the satisfaction of the Engineer.

FIBER OPTIC TRANSCEIVER MODULE, GBIC TYPE, LONG DISTANCE

This specification sets forth the minimum requirements for a fiber optic transceiver module that plugs into a Cisco layer III gigabit ethernet switch. The module shall be a Gigabit Interface Converter (GBIC) type, long distance, single mode transceiver, Cisco WS-G5486, or approved equivalent. The transceiver shall be installed in the Cisco layer III switch at the location shown on the plans. This type of transceiver module is intended for use with earlier models of Cisco layer III switches.

Basis of payment. This item will be paid for at the contract unit price each for FIBER OPTIC TRANSCEIVER MODULE, GBIC TYPE, LONG DISTANCE, which price shall be payment in full for furnishing and installing the module, and all necessary connectors, cables, hardware, software, other peripheral equipment, and placing it in operation to the satisfaction of the Engineer.

FIBER OPTIC TRANSCEIVER MODULE, GBIC TYPE, EXTRA LONG DISTANCE

This specification sets forth the minimum requirements for a fiber optic transceiver module that plugs into a Cisco layer III gigabit Ethernet switch. The module shall be a Gigabit Interface Converter (GBIC) type, extra long distance, single mode transceiver, Cisco WS-G5487, or approved equivalent. The transceiver shall be installed in the Cisco layer III switch at the location shown on the plans. This type of transceiver module is intended for use with earlier models of Cisco layer III switches.

Basis of payment. This item will be paid for at the contract unit price each for FIBER OPTIC TRANSCEIVER MODULE, GBIC TYPE, EXTRA LONG DISTANCE, which price shall be payment in full for furnishing and installing the module, and all necessary connectors, cables, hardware, software, other peripheral equipment, and placing it in operation to the satisfaction of the Engineer.

VIDEO ENCODER

This specification sets forth the minimum requirements for a video encoder that will transmit video data from one traffic signal cabinet to another traffic signal cabinet or to another location having a layer three switch.

The video encoder shall be an Optelecom Model C-50e MPEG-4 video encoder/decoder, or an Optelecom Model C-54e E-MC 4-channel MPEG-4 encoder, as shown on the plans, or approved equivalent. Other video encoder/decoders submitted for approval must be compatible with the Lake County Passage Advanced Traffic Management System (ATMS) software and VideoLAN VLC Media Player Release 0.8.6D or later.

The VIDEO ENCODER shall be procured from Delcan, the County's Passage engineering consultant. Delcan shall program this equipment for the appropriate location in the County's communication network.

The video encoder shall be mounted on a 16 gauge (min.) aluminum plate, and the plate shall be mounted to the cabinet side rails.

The power supply shall be mounted to either a standard DIN rail or an equipment mounting channel in the cabinet. The power supply shall be hard-wired to the cabinet power, not plugged into one of the traffic signal cabinet power outlets.

Basis of payment. This item will be paid for at the contract unit price each for VIDEO ENCODER, which price shall be payment in full for furnishing and installing the encoder, and all necessary connectors, cables, hardware, software, other peripheral equipment, and placing it in operation to the satisfaction of the Engineer.

MEDIA CONVERTER

This specification sets forth the minimum requirements for an unmanaged Ethernet switch that performs copper-to-fiber media conversion at 10/100Mbps speeds.

The media converter shall be a Ruggedcom RMC40 Series, (Model RMC40-HI-C200) four-port, unmanaged Ethernet switch, or approved equivalent. The power supply shall be the HI voltage type (85-264VAC) and ports 3 and 4 shall be for single-mode fiber with SC connectors.

The media converter shall be mounted to either a standard DIN rail or an equipment mounting channel in the cabinet. The power supply shall be hard-wired to the traffic signal cabinet power, not plugged into one of the traffic signal cabinet power outlets. When the media converter is mounted within a communications cabinet, the power supply shall be connected to the power distribution center.

Basis of payment. This item will be paid for at the contract unit price each for MEDIA CONVERTER, which price shall be payment in full for furnishing and installing the media

converter, and all necessary connectors, cables, fiber optic jumpers, hardware, software, other peripheral equipment, and placing it in operation to the satisfaction of the Engineer.

TERMINAL SERVER

This specification sets forth the minimum requirements for a terminal server that will transmit signal controller data from one or more traffic signal controllers onto the Lake County PASSAGE Gigabit Ethernet network.

The terminal server shall be a Digi PortServer TS Hcc 4 four-port serial-to-Ethernet device, or approved equivalent, installed at the location shown on the plans. The terminal server shall be properly configured for its location within the Lake County PASSAGE Network, and for proper communication with the signal equipment being connected to it.

Basis of payment. This item will be paid for at the contract unit price each for TERMINAL SERVER, which price shall be payment in full for furnishing, installing, and configuring the terminal server, and all necessary connectors, cables, hardware, software, other peripheral equipment, and placing it in operation to the satisfaction of the Engineer.

FIBER OPTIC CABLE

Add the following to Section 871 and Section 1076.02 of the "Standard Specifications":

This work shall consist of furnishing and installing Fiber Optical cable in conduit with all accessories and connectors. The cable shall be of the type, size, and the number of fibers specified with twelve fibers per buffer tube.

The distribution enclosure shall be a Corning Model WIC-04P Wall-Mountable Interconnect Center, or approved equivalent, capable of accommodating the required number of fibers. The distribution enclosure shall be included in the cost of the fiber optic cable, including connections to any existing cables.

All fibers being terminated shall be connected to the distribution enclosure and labeled at the connector and also at the enclosure bulkhead. The label shall include the direction and also the fiber number (e.g. S1, S2, N11, N12).

All splices and terminations on the installed fiber optic cable shall be included in the cost of the fiber optic cable. The splicing of the installed fiber optic cable to any existing fiber optic cable shall be included in the cost of this pay item.

All terminations and splices required only on existing fiber optic cable shall be paid for separately in accordance with the pay item TERMINATE FIBER IN CABINET or SPLICE FIBER IN CABINET.

The quality of the fiber optic cable, including all splices and terminations, shall be verified by testing and documentation in accordance with Article 801.13(d) of the "Standard Specifications", to the satisfaction of the Engineer.

Multimode: The contractor shall coordinate with the equipment vendor, and shall terminate as many multimode fibers as are necessary to establish proper communications with signal controllers and/or video transmission equipment. In addition, the contractor shall terminate four

unused multimode fibers and attach them to the distribution enclosure. All multimode terminations shall be ST compatible connectors with ceramic ferrules.

Singlemode: The contractor shall splice and/or terminate the number of singlemode fibers shown on the project plans, if any. Singlemode fiber terminations shall utilize pre-fabricated, factory-terminated pigtailed fusion spliced to bare fibers. The pre-fabricated pigtailed shall have all of their fibers color coded to match the singlemode fibers in the fiber optic cable. All fusion splices shall be secured on Corning splice trays, Models M67-068, M67-110, or approved equivalent, capable of accommodating the required number of fusion splices. All single-mode connectors shall be SC compatible, with ceramic ferrules.

A minimum of 13 feet of slack cable shall be provided for the controller cabinet. The controller cabinet slack cable shall be stored as directed by the Engineer.

Fiber Optic cable may be gel filled or have an approved water blocking tape.

Basis of Payment. The work shall be paid for at the contract unit price per foot for FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125, 24 FIBER (12 MULTIMODE AND 12 SINGLEMODE), (FIBER OPTIC CABLE IN CONDUIT, 24 SINGLEMODE) or as specified in plans for the cable in place, including distribution enclosure(s), all connectors, pigtailed, splice trays, connector bulkheads, testing and documentation, and the required number of fiber splices and terminations described in the plans. Additional fiber terminations and/or splices required by the Engineer, (not included in this item), shall be paid for as TERMINATE FIBER IN CABINET and/or SPLICE FIBER IN CABINET.

TERMINATE FIBER IN CABINET

This work shall consist of terminating existing or new fibers in field cabinets or buildings as indicated on the plans or as directed by the Engineer.

All multi-mode connectors shall be ST compatible, with ceramic ferrules. Singlemode fiber terminations shall utilize pre-fabricated, factory-terminated (SC compatible) pigtailed fusion spliced to bare fibers. . The pre-fabricated pigtailed shall have all of their fibers color coded to match the singlemode fibers in the fiber optic cable. All fusion splices shall be secured on Corning splice trays, Models M67-068, M67-110, or approved equivalent, capable of accommodating the required number of fusion splices. Splice trays and connector bulkheads shall be included in the cost of TERMINATE FIBER IN CABINET, and shall not be paid for separately. Connector bulkheads shall be the proper type for the fiber enclosure at the location, and shall be properly secured to the enclosure.

The quality of all fiber splices shall be verified by testing and documentation in accordance with Article 801.13(d) of the "Standard Specifications", to the satisfaction of the Engineer.

Basis of payment. This work shall be paid for at the contract unit price each for each fiber terminated in a field cabinet or inside a building as TERMINATE FIBER IN CABINET, which will be payment in full for terminating each required multimode or singlemode fiber, including all connectors, pigtailed, splice trays, bulkheads, testing and documentation. The splicing of pigtailed for singlemode fibers is included in the cost of TERMINATE FIBER IN CABINET, and shall not be paid for separately. This pay item shall not be used to pay for fiber terminations and/or splices completed to meet the requirements of FIBER OPTIC CABLE IN CONDUIT.

SPLICE FIBER IN CABINET

This work shall consist of fusion splicing singlemode fibers in a field cabinet or inside a building as indicated on the plans and as directed by the Engineer. Splices shall be secured in fiber optic splice trays within fiber optic distribution enclosures. The splice trays shall be Corning Models M67-068, M67-110, or approved equivalent, capable of accommodating the required number of fusion splices. Splice trays shall be included in the cost of SPLICE FIBER IN CABINET and shall not be paid for separately.

The quality of all fiber splices shall be verified by testing and documentation in accordance with Article 801.13(d) of the "Standard Specifications", to the satisfaction of the Engineer.

All optical fibers shall be spliced to provide continuous runs. Splices shall only be allowed in equipment cabinets except where otherwise shown on the Plans.

All splices shall be made using a fusion splicer that automatically positions the fibers using a system of light injection and detection. The Contractor shall provide all equipment and consumable supplies.

Basis of payment. This work shall be paid for at the contract unit price each for SPLICE FIBER IN CABINET, which will be payment in full for all fusion splicing, fiber optic splice trays, testing and documentation, at a cabinet or building location shown on the plans and as directed by the Engineer. This pay item shall not be used to pay for fiber terminations and/or splices completed to meet the requirements of FIBER OPTIC CABLE IN CONDUIT.

FIBER OPTIC TRACER CABLE

The cable shall meet the requirements of Section 817 of the "Standard Specifications", except for the following:

In order to trace the fiber optic cable after installation, an XLP black insulated copper cable No. 14 shall be pulled in the same conduit as the fiber optic cable. The tracer cable shall be continuous, and extend a minimum of 3 feet into the controller cabinet. The tracer cable shall be clearly marked and identified. In order to minimize the number of splices required, the tracer cable shall incorporate maximum lengths of cable supplied by the manufacturer. Splicing of the tracer cable will be allowed at the handholes only. The tracer cable splice shall use a Western Union splice soldered with resin core flux. All exposed surfaces of the solder shall be smooth. Splices shall be soldered using a soldering iron. Blowtorches or other devices which oxidize copper cable shall not be allowed for soldering operations. The splice shall be covered with underwater grade WCSMW 30/100 heat shrink tube, minimum length four (4) inches and with a minimum one (1) inch coverage over the XLP insulation.

Basis of payment. The tracer cable shall be paid for separately as ELECTRIC CABLE IN CONDUIT, TRACER, NO. 14 1C per foot, which price shall include all associated labor and material for installation.

WIRELESS TRANSMISSION SYSTEM SHORT RANGE

This work shall consist of the installation of a new node on the Lake County PASSAGE wireless network. This item includes the directional antenna and power injector, associated cables / wiring, and all mounting hardware.

The WIRELESS TRANSMISSION SYSTEM SHORT RANGE includes:

- One (1) Proxim TsunamiMP.11 5054-R Subscriber unit with Integrated 23dBi Antenna

- (Model 5054-SUR-US) or approved equivalent.
- Two (2) Proxim Model 76394 surge suppressors, or approved equivalent.
- Power wiring from the radio power injector to the circuit breaker.
- All mounting hardware.

All components of this item shall be installed as shown on the plans. The radio transceiver and antenna shall be installed as high as possible on the mast arm assembly pole. The antenna shall be directed / aimed at another antenna on the County's wireless system, (e.g. aimed at a sector antenna on a water tower), as shown on the plans and as directed by the Engineer. The power injector shall be installed inside the traffic signal cabinet.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

The WIRELESS TRANSMISSION SYSTEM SHORT RANGE electronics shall be procured from Delcan, the County's Passage engineering consultant. Delcan shall program this equipment for the appropriate location in the County's communication network.

Basis of payment. This item will be paid for at the contract unit price each for WIRELESS TRANSMISSION SYSTEM SHORT RANGE, which price shall be payment in full for furnishing and installing the power injector, antenna, and all associated connectors, cables, hardware, and other peripheral equipment, and placing it in operation to the satisfaction of the Engineer. The Outdoor Rated Network Cable from the antenna to the traffic signal cabinet shall be paid for separately.

WIRELESS TRANSMISSION SYSTEM LONG RANGE

This work shall consist of the installation of a new node on the Lake County PASSAGE wireless network. This item includes the directional antenna and power injector, associated cables / wiring, and all mounting hardware.

The WIRELESS TRANSMISSION SYSTEM LONG RANGE includes:

- One (1) Proxim TsunamiMP.11 5054-R-LR Subscriber unit for extended range with Integrated 23dBi Antenna (Model 5054-SUR-LR-US) or approved equivalent.
- Two (2) Proxim Model 76394 surge suppressors, or approved equivalent.
- Power wiring from the radio power injector to the circuit breaker.
- All mounting hardware.

All components of this item shall be installed as shown on the plans. The radio transceiver and antenna shall be installed as high as possible on the mast arm assembly pole. The antenna shall be directed / aimed at another antenna on the County's wireless system, (e.g. aimed at a sector antenna on a water tower), as shown on the plans and as directed by the Engineer. The power injector shall be installed inside the traffic signal cabinet.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

The WIRELESS TRANSMISSION SYSTEM LONG RANGE electronics shall be procured from Delcan, the County's Passage engineering consultant. Delcan shall program this equipment for the appropriate location in the County's communication network.

Basis of payment. This item will be paid for at the contract unit price each for WIRELESS TRANSMISSION SYSTEM LONG RANGE, which price shall be payment in full for furnishing and installing the power injector, antenna, and all associated connectors, cables, hardware, and other peripheral equipment, and placing it in operation to the satisfaction of the Engineer. The Outdoor Rated Network Cable from the antenna to the traffic signal cabinet shall be paid for separately.

WIRELESS TRANSMISSION SYSTEM EXTRA LONG RANGE

This work shall consist of the installation of a new node on the Lake County PASSAGE wireless network. This item includes the radio, directional antenna and power injector, associated cables / wiring, and all mounting hardware.

The WIRELESS TRANSMISSION SYSTEM EXTRA LONG RANGE includes:

- One (1) Proxim TsunamiMP.11 (Model 5054-SUA-LR-US) Subscriber unit for extended range with type N connector
- One (1) RadioWaves 28dBi Antenna (Model FP2-5-28) or approved equivalent.
- One (1) low loss RF coaxial cable, 3 foot, N to N
- Two (2) Proxim Model 76394 surge suppressors, or approved equivalent.
- Power wiring from the radio power injector to the circuit breaker.
- All mounting hardware.

All components of this item shall be installed as shown on the plans. The radio transceiver and antenna shall be installed as high as possible on the mast arm assembly pole. The antenna shall be directed / aimed at another antenna on the County's wireless system, (e.g. aimed at a sector antenna on a water tower), as shown on the plans and as directed by the Engineer. The power injector shall be installed inside the traffic signal cabinet.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

The WIRELESS TRANSMISSION SYSTEM EXTRA LONG RANGE electronics shall be procured from Delcan, the County's Passage engineering consultant. Delcan shall program this equipment for the appropriate location in the County's communication network.

Basis of payment. This item will be paid for at the contract unit price each for WIRELESS TRANSMISSION SYSTEM EXTRA LONG RANGE, which price shall be payment in full for furnishing and installing the power injector, antenna, and all associated connectors, cables, hardware, and other peripheral equipment, and placing it in operation to the satisfaction of the Engineer. The Outdoor Rated Network Cable from the radio to the traffic signal cabinet shall be paid for separately.

WIRELESS TRANSMISSION SYSTEM POINT TO POINT

This work shall consist of the installation of a new node on the Lake County PASSAGE wireless network. This item includes the directional antenna and power injector, associated cables / wiring, and all mounting hardware.

The WIRELESS TRANSMISSION SYSTEM POINT TO POINT includes:

- One (1) Proxim Tsunami Quick Bridge unit with Integrated 23dBi Antenna (Model QB-8150-LINK-US) or approved equivalent.

- Two (2) Proxim Model 76394 surge suppressors, or approved equivalent.
- Power wiring from the radio power injector to the circuit breaker.
- All mounting hardware.

All components of this item shall be installed as shown on the plans. The radio transceiver and antenna shall be installed as high as possible on the mast arm assembly pole. The antenna shall be directed / aimed at another antenna on the County's wireless system, (e.g. aimed at corresponding antenna at other intersection), as shown on the plans and as directed by the Engineer. The power injector shall be installed inside the traffic signal cabinet.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

The WIRELESS TRANSMISSION SYSTEM POINT TO POINT electronics shall be procured from Delcan, the County's Passage engineering consultant. Delcan shall program this equipment for the appropriate location in the County's communication network.

Basis of payment. This item will be paid for at the contract unit price each for WIRELESS TRANSMISSION SYSTEM POINT TO POINT, which price shall be payment in full for furnishing and installing the power injector, antenna, and all associated connectors, cables, hardware, and other peripheral equipment, and placing it in operation to the satisfaction of the Engineer. The Outdoor Rated Network Cable from the antenna to the traffic signal cabinet shall be paid for separately.

WIRELESS TRANSMISSION SYSTEM BACKHAUL

This work shall consist of the installation of a new node on the Lake County PASSAGE wireless network. This item includes the directional antenna and power injector, associated cables / wiring, and all mounting hardware.

The WIRELESS TRANSMISSION SYSTEM BACKHAUL includes:

- One (1) Proxim Tsunami licensed backhaul radio (Model **GX-800**) or approved equivalent.
- One (1) 2 foot dish antenna or other as specified on plans
- Two (2) Proxim Model 76394 surge suppressors, or approved equivalent.
- Power wiring from the radio power injector to the circuit breaker.
- All mounting hardware.

All components of this item shall be installed as shown on the plans. The radio transceiver and antenna shall be installed as high as possible on the mast arm assembly pole or tower as shown on plans. The antenna shall be directed / aimed at another antenna on the County's wireless system, (e.g. aimed at corresponding antenna at other intersection / tower), as shown on the plans and as directed by the Engineer. The power injector shall be installed inside the traffic signal / grade level cabinet.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

The WIRELESS TRANSMISSION SYSTEM BACKHAUL electronics shall be procured from Delcan, the County's Passage engineering consultant. Delcan shall program this equipment for the appropriate location in the County's communication network.

Basis of payment. This item will be paid for at the contract unit price each for WIRELESS TRANSMISSION SYSTEM BACKHAUL, which price shall be payment in full for furnishing and installing the power injector, antenna, and all associated connectors, cables, hardware, and other peripheral equipment, and placing it in operation to the satisfaction of the Engineer. The Outdoor Rated Network Cable from the antenna to the traffic signal cabinet shall be paid for separately.

WIRELESS TRANSMISSION SYSTEM BASE STATION

This work shall consist of the installation of a new node on the Lake County PASSAGE wireless network. This item includes the directional antenna and power injector, associated cables / wiring, and all mounting hardware.

The WIRELESS TRANSMISSION SYSTEM BASE STATION includes:

- One (1) Proxim Tsunami base station long range unit (Model 5054-BSU-R-LR) or approved equivalent.
- One (1) 60 degree sector antenna or other as shown on the plans.
- Two (2) Proxim Model 76394 surge suppressors, or approved equivalent.
- Power wiring from the radio power injector to the circuit breaker.
- All mounting hardware and poles.

All components of this item shall be installed as shown on the plans. The radio transceiver and antenna shall be installed on a new mounting pole or other as shown on the plans. The antenna shall be directed / aimed according to the azimuth settings listed in the plans and as directed by the Engineer. The power injector shall be installed inside the cabinet.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

The WIRELESS TRANSMISSION SYSTEM BASE STATION electronics shall be procured from Delcan, the County's Passage engineering consultant. Delcan shall program this equipment for the appropriate location in the County's communication network.

Basis of payment. This item will be paid for at the contract unit price each for WIRELESS TRANSMISSION SYSTEM BASE STATION, which price shall be payment in full for furnishing and installing the power injector, antenna, and all associated connectors, cables, hardware, and other peripheral equipment, and placing it in operation to the satisfaction of the Engineer. The Outdoor Rated Network Cable from the antenna to the cabinet shall be paid for separately.

RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION)

This work shall consist of the removal, storage, and relocation of an existing video detection system (complete intersection) from one traffic signal installation (temporary or permanent) to another traffic signal installation (temporary or permanent). This item shall also include the relocation of the remote-controlled video system according to the plans.

The video detection system (complete intersection) shall be removed and relocated as shown in the plans. Any damage sustained to the video detection system during removal, storage, transport, and/or reinstallation operations shall be repaired or replaced in kind to the satisfaction of the Engineer at the Contractor's expense.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

Basis of payment. This item will be paid for at the contract unit price each for RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION), which price shall be payment in full for disconnecting the existing video detection system, remote-controlled video system, packaging/storing it, transporting it, and relocating it to the new location complete and operating to the satisfaction of the Engineer.

RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM

This work shall consist of the removal, storage, and relocation of an existing remote-controlled video system from one traffic signal installation (temporary or permanent) to another traffic signal installation (temporary or permanent). This pay item shall be used when only the remote-controlled video system is being relocated. This pay item shall not be used when the remote-controlled video system is being relocated as part of RELOCATE EXISTING VIDEO DETECTION SYSTEM (COMPLETE INTERSECTION).

The remote-controlled video system shall be removed and relocated as shown in the plans. Any damage sustained to the remote-controlled video system during removal, storage, transport, and/or reinstallation operations shall be repaired or replaced in kind to the satisfaction of the Engineer at the Contractor's expense.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

Basis of payment. This item will be paid for at the contract unit price each for RELOCATE EXISTING REMOTE-CONTROLLED VIDEO SYSTEM, which price shall be payment in full for disconnecting the existing remote-controlled video system, packaging/storing it, transporting it, and relocating it to the new location complete and operating to the satisfaction of the Engineer.

RELOCATE EXISTING SWITCH

This work shall consist of the removal, storage, and relocation of an existing layer two or layer three switch from one traffic signal installation to another traffic signal installation.

The switch shall be removed and relocated as shown in the plans. Any damage sustained to the switch during removal, storage, transport, and/or reinstallation operations shall be repaired or replaced in kind to the satisfaction of the Engineer at the Contractor's expense.

Basis of payment. This item will be paid for at the contract unit price each for RELOCATE EXISTING SWITCH, which price shall be payment in full for disconnecting the existing switch, packaging/storing it, transporting it, and relocating it to the new location complete and operating to the satisfaction of the Engineer. This item shall also include the relocation and reinstallation of the switch power supply, and all fiber optic jumper cables necessary for proper operation.

TEMPORARY TRAFFIC SIGNAL TIMING

This work shall consist of developing and maintaining appropriate traffic signal timings for the specified intersection for the entirety of the construction project beginning with any changes to the existing traffic patterns including lane shifts or lane reductions. This shall include the period

prior to the turn-on of any temporary traffic signal installation. This item can also be utilized to make temporary timing adjustments to existing traffic signals required by detours or other temporary conditions.

All timings and adjustments necessary for this work shall be performed by an approved Consultant who has previous experience in optimizing Closed Loop Traffic signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 705-4424 for a listing of approved Consultants.

The following tasks are associated with TEMPORARY TRAFFIC SIGNAL TIMINGS.

- (a) Consultant shall attend temporary traffic signal inspection (turn-on) and/or detour meeting and conduct on-site implementation of the traffic signal timings. Make fine-tuning adjustments to the timings in the field to alleviate observed adverse operating conditions and to enhance operations.
- (b) Consultant shall provide monthly observation of traffic signal operations in the field.
- (c) Consultant shall provide on-site consultation and adjust timings as necessary for construction stage changes, temporary traffic signal phase changes, and any other conditions affecting timing and phasing, including lane closures, detours, and other construction activities.
- (d) Consultant shall make timing adjustments and prepare comment responses as directed by the Area Traffic Signal Operations Engineer.

Basis of Payment. The work shall be paid for at the contract unit price each for TEMPORARY TRAFFIC SIGNAL TIMING, which price shall be payment in full for performing all work described herein per intersection. When the temporary traffic signal installation is turned on, traffic control is installed, or the detour is implemented, 50 percent of the bid price will be paid. The remaining 50 percent of the bid price will be paid following the removal of the temporary traffic signal installation, traffic control and/or detour.

RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM

Description. This work shall consist of re-optimizing a closed loop traffic signal system according to the following Levels of work.

LEVEL I applies when improvements are made to an existing signalized intersection within an existing closed loop traffic signal system. The purpose of this work is to integrate the improvements to the subject intersection into the signal system while minimizing the impacts to the existing system operation. This type of work would be commonly associated with the addition of signal phases, pedestrian phases, or improvements that do not affect the capacity at an intersection.

LEVEL II applies when improvements are made to an existing signalized intersection within an existing closed loop traffic signal system and detailed analysis of the intersection operation is desired by the engineer, or when a new signalized or existing signalized intersection is being added to an existing system, but optimization of the entire system is not required. The purpose of this work is to optimize the subject intersection, while integrating it into the existing signal system with limited impact to the system operations. This item also includes an evaluation of the overall system operation, including the traffic responsive program.

For the purposes of re-optimization work, an intersection shall include all traffic movements

operated by the subject controller and cabinet.

After the signal improvements are completed, the signal shall be re-optimized as specified by an approved Consultant who has previous experience in optimizing Closed Loop Traffic Signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 377-7000 for a listing of approved Consultants. Traffic signal system optimization work, including fine-tuning adjustments of the optimized system, shall follow the requirements stated in the most recent IDOT District 1 SCAT Guidelines, except as note herein.

All work shall be based upon the LCDOT Countywide Synchro model. The Consultant shall contact the LCDOT at 847-377-7000 to acquire the required portion of the countywide model to be updated for the particular project. Upon completion of the project, the Consultant shall provide the LCDOT with the revised and updated files for inclusion into the Countywide Synchro Model.

The Consultant shall confer with the Traffic Signal Engineer prior to optimizing the system to determine if any extraordinary conditions exist that would affect traffic flows in the vicinity of the system, in which case, the Consultant may be instructed to wait until the conditions return to normal or to follow specific instructions regarding the optimization.

(a) LEVEL I Re-Optimization

1. The following tasks are associated with LEVEL I Re-Optimization.
 - a. Appropriate signal timings shall be developed for the subject intersection and existing timings shall be utilized for the rest of the intersections in the system.
 - b. Proposed signal timing plan for the new or modified intersection(s) shall be forwarded to the County for review prior to implementation.
 - c. Consultant shall conduct on-site implementation of the timings at the turn-on and make fine-tuning adjustments to the timings of the subject intersection in the field to alleviate observed adverse operating conditions and to enhance operations.
 - d. All patterns associated with Transit Signal Priority and Incident Response Plans are to be reviewed and adjusted as required.
2. The following deliverables shall be provided for LEVEL I Re-Optimization.
 - a. Consultant shall furnish to the County a cover letter describing the extent of the re-optimization work performed.

(b) LEVEL II Re-Optimization

1. In addition to the requirements described in the LEVEL I Re-Optimization above, the following tasks are associated with LEVEL II Re-Optimization.
 - a. Traffic counts shall be taken at the subject intersection after the traffic signals are approved for operation by the Area Traffic Signal Operations Engineer. Manual turning movement counts shall be conducted from 6:30 a.m. to 9:30 a.m., 11:00 a.m. to 1:00 p.m., and 3:30 p.m. to 6:30 p.m. on a typical weekday from midday Monday to midday Friday. The turning movement counts shall identify cars, and single-unit, multi-unit heavy vehicles, and transit buses.
 - b. Traffic responsive program operation shall be evaluated to verify proper pattern

- selection and lack of oscillation and a report of the operation shall be provided to IDOT.
- c. All patterns associated with Transit Signal Priority and Incident Response Plans are to be reviewed and adjusted as required.
2. The following deliverables shall be provided for LEVEL II Re-Optimization.
- a. Consultant shall furnish to the County one (1) copy of a technical memorandum for the optimized system. The technical memorandum shall include the following elements:
 1. Brief description of the project
 2. Printed copies of the analysis output from Synchro (or other appropriate approved optimization software file)
 3. Printed copies of the traffic counts conducted at the subject intersection
 - b. Consultant shall furnish to the County two (2) CDs for the optimized system. The CDs shall include the following elements:
 1. Electronic copy of the technical memorandum in PDF format
 2. Revised Synchro files (or other appropriate, approved optimization software file) including the new signal and the rest of the signals in the closed loop system or as identified by the Engineer
 3. Traffic counts conducted at the subject intersection
 4. The CD case shall include a clearly readable label displaying the same information securely affixed to the side and front.

Basis of Payment. This work shall be paid for at the contract unit price each for RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM – LEVEL I or RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM – LEVEL II, which price shall be payment in full for performing all work described herein per intersection. Following completion of the timings and submittal of specified deliverables, 100 percent of the bid price will be paid. Each intersection will be paid for separately.

OPTIMIZE TRAFFIC SIGNAL SYSTEM

Description. This work shall consist of optimizing a closed loop traffic signal system.

OPTIMIZE TRAFFIC SIGNAL SYSTEM applies when a new or existing closed loop traffic signal system is to be optimized and a formal Signal Coordination and Timing (SCAT) Report is to be prepared. The purpose of this work is to improve system performance by optimizing traffic signal timings, developing a time of day program and a traffic responsive program.

After the signal improvements are completed, the signal system shall be optimized as specified by an approved Consultant who has previous experience in optimizing Closed Loop Traffic Signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 377-7000 for a listing of approved Consultants. Traffic signal system optimization work, including fine-tuning adjustments of the optimized system, shall follow the requirements stated in the most recent IDOT District 1 SCAT Guidelines, except as note herein.

All work shall be based upon the LCDOT Countywide Synchro model. The Consultant shall contact the LCDOT at 847-377-7000 to acquire the required portion of the countywide model to be updated for the particular project. Upon completion of the project, the Consultant shall

provide the LCDOT with the revised and updated files for inclusion into the Countywide Synchro Model.

The Consultant shall confer with the Traffic Signal Engineer prior to optimizing the system to determine if any extraordinary conditions exist that would affect traffic flows in the vicinity of the system, in which case, the Consultant may be instructed to wait until the conditions return to normal or to follow specific instructions regarding the optimization.

(a) The following tasks are associated with OPTIMIZE TRAFFIC SIGNAL SYSTEM.

1. Appropriate signal timings and offsets shall be developed for each intersection and appropriate cycle lengths shall be developed for the closed loop signal system or as identified by Engineer.
2. All patterns associated with Transit Signal Priority and Incident Response Plans are to be developed as required.
3. Traffic counts shall be taken at all intersections after the permanent traffic signals are approved for operation by the Area Traffic Signal Operations Engineer. Manual turning movement counts shall be conducted from 6:30 a.m. to 9:30 a.m., 11:00 a.m. to 1:00 p.m., and 3:30 p.m. to 6:30 p.m. on a typical weekday from midday Monday to midday Friday. The turning movement counts shall identify cars, and single-unit and multi-unit heavy vehicles.
4. A traffic responsive program shall be developed, which considers both volume and occupancy. A time-of-day program shall be developed for used as a back-up system.
5. Proposed signal timing plan for the new or modified intersection shall be forwarded to the County for review prior to implementation.
6. Consultant shall conduct on-site implementation of the timings and make fine-tuning adjustments to the timings in the field to alleviate observed adverse operating conditions and to enhance operations.
7. Speed and delay studies shall be conducted during each of the count periods along the system corridor in the field before and after implementation of the proposed timing plans for comparative evaluations. These studies should utilize specialized electronic timing and measuring devices.

(b) The following deliverables shall be provided for OPTIMIZE TRAFFIC SIGNAL SYSTEM.

1. Consultant shall furnish to the County one (1) copy of a SCAT Report for the optimized system. The SCAT Report shall include the following elements:

Cover Page in color showing a System Map
Figures <ol style="list-style-type: none"> 1. System overview map – showing system number, system schematic map with numbered system detectors, oversaturated movements, master location, system phone number, cycle lengths, and date of completion. 2. General location map in color – showing signal system location in the metropolitan area. 3. Detail system location map in color – showing cross street names and local controller addresses. 4. Controller sequence – showing controller phase sequence diagrams.
Table of Contents
Tab 1: Final Report <ol style="list-style-type: none"> 1. Project Overview 2. System and Location Description (Project specific) 3. Methodology 4. Data Collection 5. Data Analysis and Timing Plan Development 6. Implementation <ol style="list-style-type: none"> a. Traffic Responsive Programming (Table of TRP vs. TOD Operation) 7. Evaluation <ol style="list-style-type: none"> a. Speed and Delay runs
Tab 2. Turning Movement Counts <ol style="list-style-type: none"> 1. Turning Movement Counts (Showing turning movement counts in the intersection diagram for each period, including truck percentage)
Tab 3. Synchro Analysis <ol style="list-style-type: none"> 1. AM: Time-Space diagram in color, followed by intersection Synchro report (Timing report) summarizing the implemented timings. 2. Midday: same as AM 3. PM: same as AM
Tab 4: Speed, Delay Studies <ol style="list-style-type: none"> 1. Summary of before and after runs results in two (2) tables showing travel time and delay time. 2. Plot of the before and after runs diagram for each direction and time period.
Tab 5: Environmental Report <ol style="list-style-type: none"> 1. Environmental impact report including gas consumption, NO2, HCCO, improvements.
Tab 6: Electronic Files <ol style="list-style-type: none"> 1. Two (2) CDs for the optimized system. The CDs shall include the following elements: <ol style="list-style-type: none"> a. Electronic copy of the SCAT Report in PDF format b. Copies of the Synchro files for the optimized system c. Traffic counts for the optimized system d. New or updated intersection graphic display files for each of the system intersections and the system graphic display file including system detector locations and addresses.

Basis of Payment. The work shall be paid for at the contract unit each for OPTIMIZE TRAFFIC SIGNAL SYSTEM, which price shall be payment in full for performing all work described herein for the entire traffic signal system. Following the completion of traffic counts, 25 percent of the bid price will be paid. Following the completion of the Synchro analysis, 25 percent of the bid price will be paid. Following the setup and fine tuning of the timings, the speed-delay study, and the TRP programming, 25 percent of the bid price will be paid. The remaining 25 percent will be paid when the system is working to the satisfaction of the engineer and the report and CD have been submitted.

FULL-ACTUATED CONTROLLER AND CABINET (SPECIAL)

Effective: January 1, 2002

Revised: January 1, 2007

This work shall consist of furnishing and installing a(n) "Econolite" brand traffic actuated solid state digital controller in the controller cabinet of the type specified, meeting the requirements of the current District One Traffic Signal Special Provisions including conflict monitor, load switches and flasher relays, with all necessary connections for proper operation.

Basis of Payment. This work will be paid for at the contract unit price each for FULL-ACTUATED CONTROLLER AND TYPE IV CABINET (SPECIAL) or FULL-ACTUATED CONTROLLER AND TYPE V CABINET (SPECIAL).

WORKING DAYS (BDE)

Effective: January 1, 2002

The Contractor shall complete the work within **110** working days.

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