



Andy Beshear
GOVERNOR

TRANSPORTATION CABINET

200 Mero Street
Frankfort, Kentucky 40601

Jim Gray
SECRETARY

February 10, 2026

CALL NO. 104
CONTRACT ID NO. 261503
ADDENDUM # 1

Subject: Warren County, STP 7434 (023)
Letting February 19, 2026

- (1) Revised - Proposal Bid Items - Pages 116-121A of 121
- (2) Added - Planning Notes - Pages 1-35 of 35
- (3) Revised - Plan Sheet U0A

Proposal revisions are available at <http://transportation.ky.gov/Construction-Procurement/>.

If you have any questions, please contact us at 502-564-3500.

Sincerely,

A handwritten signature in black ink that reads "Rachel Mills".

Rachel Mills, P.E.
Director
Division of Construction Procurement

RM:mr
Enclosures

PROPOSAL BID ITEMS

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Section: 0001 - PAVING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0010	00003		CRUSHED STONE BASE	7,680.00	TON		\$	
0020	00020		TRAFFIC BOUND BASE	16.00	TON		\$	
0030	00078		CRUSHED AGGREGATE SIZE NO 2	10,250.00	TON		\$	
0040	00190		LEVELING & WEDGING PG64-22	1,502.00	TON		\$	
0050	00214		CL3 ASPH BASE 1.00D PG64-22	8,556.00	TON		\$	
0060	02602		FABRIC-GEOTEXTILE CLASS 1	14,855.00	SQYD		\$	
0070	02608		FABRIC-GEOTEXTILE CLASS 4A	14,855.00	SQYD		\$	
0080	22906ES403		CL3 ASPH SURF 0.38A PG64-22	2,992.00	TON		\$	
0090	24970EC		ASPHALT MATERIAL FOR TACK NON-TRACKING	21.00	TON		\$	
0100	26248EC		ELECTRONIC DELIVERY MGMT SYSTEM - AGG	1.00	LS		\$	

Section: 0002 - ROADWAY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0110	00078		CRUSHED AGGREGATE SIZE NO 2	3,867.00	TON		\$	
0120	01000		PERFORATED PIPE-4 IN	768.00	LF		\$	
0130	01010		NON-PERFORATED PIPE-4 IN	36.00	LF		\$	
0140	01028		PERF PIPE HEADWALL TY 3-4 IN	3.00	EACH		\$	
0150	01740		CORED HOLE DRAINAGE BOX CON-4 IN	57.00	EACH		\$	
0160	01810		STANDARD CURB AND GUTTER	6,763.00	LF		\$	
0170	01875		STANDARD HEADER CURB	399.00	LF		\$	
0180	01885		LIP HEADER CURB	197.00	LF		\$	
0190	01923		STANDARD BARRIER MEDIAN TYPE 5	1,117.00	SQYD		\$	
0200	02014		BARRICADE-TYPE III	8.00	EACH		\$	
0210	02091		REMOVE PAVEMENT	470.00	SQYD		\$	
0220	02101		CEM CONC ENT PAVEMENT-8 IN	2,904.00	SQYD		\$	
0230	02159		TEMP DITCH	2,640.00	LF		\$	
0240	02160		CLEAN TEMP DITCH	1,320.00	LF		\$	
0250	02200		ROADWAY EXCAVATION	14,504.00	CUYD		\$	
0260	02223		GRANULAR EMBANKMENT	81.00	CUYD		\$	
0270	02242		WATER	200.00	MGAL		\$	
0280	02429		RIGHT-OF-WAY MONUMENT TYPE 1	60.00	EACH		\$	
0290	02430		RIGHT-OF-WAY MONUMENT TYPE 1A	4.00	EACH		\$	
0300	02432		WITNESS POST	10.00	EACH		\$	
0310	02469		CLEAN SINKHOLE	3.00	EACH		\$	
0320	02483		CHANNEL LINING CLASS II	91.00	TON		\$	
0330	02484		CHANNEL LINING CLASS III	49.00	TON		\$	
0340	02545		CLEARING AND GRUBBING APPROXIMATELY 12 ACRES	1.00	LS		\$	
0350	02562		TEMPORARY SIGNS	814.00	SQFT		\$	
0360	02603		FABRIC-GEOTEXTILE CLASS 2	2,964.00	SQYD		\$	
0370	02607		FABRIC-GEOTEXTILE CLASS 2 FOR PIPE	11,637.00	SQYD		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0380	02650		MAINTAIN & CONTROL TRAFFIC	1.00	LS		\$	
0390	02671		PORTABLE CHANGEABLE MESSAGE SIGN	3.00	EACH		\$	
0400	02676		MOBILIZATION FOR MILL & TEXT	1.00	LS		\$	
0410	02677		ASPHALT PAVE MILLING & TEXTURING	645.00	TON		\$	
0420	02690		SAFELoading	26.00	CUYD		\$	
0430	02701		TEMP SILT FENCE	2,640.00	LF		\$	
0440	02703		SILT TRAP TYPE A	12.00	EACH		\$	
0450	02704		SILT TRAP TYPE B	12.00	EACH		\$	
0460	02705		SILT TRAP TYPE C	12.00	EACH		\$	
0470	02706		CLEAN SILT TRAP TYPE A	12.00	EACH		\$	
0480	02707		CLEAN SILT TRAP TYPE B	12.00	EACH		\$	
0490	02708		CLEAN SILT TRAP TYPE C	12.00	EACH		\$	
0500	02720		SIDEWALK-4 IN CONCRETE	5,734.00	SQYD		\$	
0510	02726		STAKING	1.00	LS		\$	
0520	05952		TEMP MULCH	36,586.00	SQYD		\$	
0530	05953		TEMP SEEDING AND PROTECTION	27,439.00	SQYD		\$	
0540	05963		INITIAL FERTILIZER	1.40	TON		\$	
0550	05964		MAINTENANCE FERTILIZER	2.30	TON		\$	
0560	05985		SEEDING AND PROTECTION	3,702.00	SQYD		\$	
0570	05990		SODDING	38,940.00	SQYD		\$	
0580	05992		AGRICULTURAL LIMESTONE	2.00	TON		\$	
0590	06406		SBM ALUM SHEET SIGNS .080 IN	71.00	SQFT		\$	
0600	06407		SBM ALUM SHEET SIGNS .125 IN	225.00	SQFT		\$	
0610	06410		STEEL POST TYPE 1	488.00	LF		\$	
0620	06510		PAVE STRIPING-TEMP PAINT-4 IN	52,159.00	LF		\$	
0630	06542		PAVE STRIPING-THERMO-6 IN W	13,502.00	LF		\$	
0640	06543		PAVE STRIPING-THERMO-6 IN Y	11,384.00	LF		\$	
0650	06547		PAVE STRIPING-THERMO-12 IN Y	50.00	LF		\$	
0660	06565		PAVE MARKING-THERMO X-WALK-6 IN	1,228.00	LF		\$	
0670	06566		PAVE MARKING-THERMO X-WALK-12 IN	1,145.00	LF		\$	
0680	06568		PAVE MARKING-THERMO STOP BAR-24IN	323.00	LF		\$	
0690	06569		PAVE MARKING-THERMO CROSS-HATCH	2,965.00	SQFT		\$	
0700	06574		PAVE MARKING-THERMO CURV ARROW	35.00	EACH		\$	
0710	06576		PAVE MARKING-THERMO ONLY	1.00	EACH		\$	
0720	06610		INLAID PAVEMENT MARKER-MW	159.00	EACH		\$	
0730	06611		INLAID PAVEMENT MARKER-MY	22.00	EACH		\$	
0740	06612		INLAID PAVEMENT MARKER-BY	166.00	EACH		\$	
0750	10020NS		FUEL ADJUSTMENT	31,166.00	DOLL		\$	
0760	10030NS		ASPHALT ADJUSTMENT	51,102.00	DOLL		\$	
0770	20000ES724		TREE	12.00	EACH		\$	
0780	20099ES842		PAVE MARK TEMP PAINT STOP BAR	323.00	LF		\$	
0790	20194ED		REMOVE & RESET TRAFFIC SIGN	3.00	EACH		\$	
0800	20208NC		PAVE MARK-PAINT ARROWS	33.00	EACH		\$	
0810	20430ED		SAW CUT	271.00	LF		\$	
0820	21289ED		LONGITUDINAL EDGE KEY	9,930.00	LF		\$	
0830	21373ND		REMOVE SIGN	3.00	EACH		\$	
0840	23139EN		STRIPING REMOVAL	12,290.00	LF		\$	
0850	23158ES505		DETECTABLE WARNINGS	919.00	SQFT		\$	
0860	24631EC		BARCODE SIGN INVENTORY	42.00	EACH		\$	
0870	24880EC		REMOVE PAVEMENT MARKER	308.00	EACH		\$	

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Section: 0003 - DRAINAGE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0880	00440		ENTRANCE PIPE-15 IN	206.00	LF		\$	
0890	00441		ENTRANCE PIPE-18 IN	247.00	LF		\$	
0900	00443		ENTRANCE PIPE-24 IN	131.00	LF		\$	
0910	00462		CULVERT PIPE-18 IN	59.00	LF		\$	
0920	00464		CULVERT PIPE-24 IN	50.00	LF		\$	
0930	00521		STORM SEWER PIPE-15 IN	5,404.00	LF		\$	
0940	00522		STORM SEWER PIPE-18 IN	436.00	LF		\$	
0950	00524		STORM SEWER PIPE-24 IN	797.00	LF		\$	
0960	00528		STORM SEWER PIPE-36 IN	46.00	LF		\$	
0970	01202		PIPE CULVERT HEADWALL-15 IN	1.00	EACH		\$	
0980	01204		PIPE CULVERT HEADWALL-18 IN	5.00	EACH		\$	
0990	01208		PIPE CULVERT HEADWALL-24 IN	6.00	EACH		\$	
1000	01212		PIPE CULVERT HEADWALL-36 IN	1.00	EACH		\$	
1010	01432		SLOPED BOX OUTLET TYPE 1-15 IN	1.00	EACH		\$	
1020	01456		CURB BOX INLET TYPE A	48.00	EACH		\$	
1030	01496		DROP BOX INLET TYPE 3	3.00	EACH		\$	
1040	01559		DROP BOX INLET TYPE 13G	5.00	EACH		\$	
1050	01568		DROP BOX INLET TYPE 13S	1.00	EACH		\$	
1060	01577		DROP BOX INLET TYPE 14	2.00	EACH		\$	
1070	01581		DROP BOX INLET TYPE 16G	2.00	EACH		\$	
1080	01756		MANHOLE TYPE A	1.00	EACH		\$	
1090	01767		MANHOLE TYPE C	1.00	EACH		\$	
1100	01771		FRAME AND LID TY 1	1.00	EACH		\$	
1110	08100		CONCRETE-CLASS A	4.31	CUYD		\$	
1120	21799EN		BORE AND JACK PIPE-24 IN	102.00	LF		\$	
1130	23126EN		BORE AND JACK PIPE-18 IN	47.00	LF		\$	
1140	24814EC		PIPELINE INSPECTION	3,692.00	LF		\$	

Section: 0004 - SEWER

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1150	02690		SAFELoading	34.60	CUYD		\$	
1160	15155		S CAP EXISTING MAIN CUT AND CAP 10" SEWER (REVISED 2-10-26)	2.00	EACH		\$	
1170	15155		S CAP EXISTING MAIN CUT AND CAP 15" SEWER (REVISED 2-10-26)	2.00	EACH		\$	
1180	15155		S CAP EXISTING MAIN CUT AND CAP 24" SEWER (REVISED 2-10-26)	1.00	EACH		\$	
1190	15155		S CAP EXISTING MAIN CUT AND CAP 4" SEWER (REVISED 2-10-26)	1.00	EACH		\$	
1200	15155		S CAP EXISTING MAIN CUT AND CAP 6" SEWER (REVISED 2-10-26)	2.00	EACH		\$	
1210	15155		S CAP EXISTING MAIN CUT AND CAP 8" SEWER (REVISED 2-10-26)	2.00	EACH		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1220	14003		W CAP EXISTING MAIN CUT, CAP AND BLOCK EXISTING FORCE MAIN	3.00	EACH		\$	
1230	15022		S ENCASEMENT STEEL OPEN CUT RANGE 3 12" STEEL CASING PIPE OPEN CUT W/ CASING SPACERS (RANGE 3) (REVISED 2-10-26)	25.00	LF		\$	
1240	14089		W TAPPING SLEEVE AND VALVE SIZE 1 SOLID SLEEVE	4.00	EACH		\$	
1250	15016		S ENCASEMENT STEEL BORED RANGE 3 12" STEEL CASING PIPE BORED & JACKED W/ CASING SPACERS (RANGE 3)	67.00	LF		\$	
1260	15017		S ENCASEMENT STEEL BORED RANGE 4 18" STEEL CASING PIPE BORED & JACKED W/ CASING SPACERS (RANGE 4)	55.00	LF		\$	
1270	15018		S ENCASEMENT STEEL BORED RANGE 5 24" STEEL CASING PIPE BORED & JACKED W/ CASING SPACERS (RANGE 5)	260.00	LF		\$	
1280	15060		S FORCE MAIN PVC 06 INCH	132.00	LF		\$	
1290	15063		S FORCE MAIN PVC 12 INCH (REVISED 2-10-26)	426.00	LF		\$	
1300	15074		S FORCE MAIN TIE-IN 06 INCH	1.00	EACH		\$	
1310	15077		S FORCE MAIN TIE-IN 12 INCH 12" FORCE MAIN TIE-IN (REVISED 2-10-26)	1.00	EACH		\$	
1320	15087		S LATERAL LONG SIDE 04 INCH SANITARY SEWER RECONNECT LONG SIDE	2.00	EACH		\$	
1330	15089		S LATERAL SHORT SIDE 04 INCH SANITARY SEWER RECONNECT SHORT SIDE	5.00	EACH		\$	
1340	15092		S MANHOLE 4' DIAMETER PRECAST MANHOLE (0'-6' DEEP)	21.00	EACH		\$	
1350	15093		S MANHOLE ABANDON/REMOVE	14.00	EACH		\$	
1360	15094		S MANHOLE ADJUST TO GRADE	2.00	EACH		\$	
1370	15099		S MANHOLE TAP EXISTING	3.00	EACH		\$	
1380	15112		S PIPE PVC 08 INCH	239.00	LF		\$	
1390	15113		S PIPE PVC 10 INCH	62.00	LF		\$	
1400	15114		S PIPE PVC 12 INCH	283.00	LF		\$	
1410	15117		S PIPE PVC 24 INCH	952.00	LF		\$	
1420	15118		S PIPE SPECIAL 15" PVC SANITARY SEWER	542.00	LF		\$	

Section: 0005 - SIGNALIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1430	04780		FUSED CONNECTOR KIT	18.00	EACH		\$	
1440	04820		TRENCHING AND BACKFILLING	295.00	LF		\$	
1450	04845		CABLE-NO. 14/7C	3,067.00	LF		\$	
1460	04885		MESSENGER-10800 LB	200.00	LF		\$	
1470	04886		MESSENGER-15400 LB	970.00	LF		\$	
1480	04932		INSTALL STEEL STRAIN POLE	12.00	EACH		\$	
1490	04953		TEMP RELOCATION OF SIGNAL HEAD	34.00	EACH		\$	
1500	06472		INSTALL SPAN MOUNTED SIGN	3.00	EACH		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1510	20093NS835		INSTALL PEDESTRIAN HEAD-LED	8.00	EACH		\$	
1520	20188NS835		INSTALL LED SIGNAL-3 SECTION	11.00	EACH		\$	
1530	20266ES835		INSTALL LED SIGNAL- 4 SECTION	7.00	EACH		\$	
1540	20457NS835		INSTALL PED DETECTOR-AUDIBLE	8.00	EACH		\$	
1550	23068NN		REMOVE & REINSTALL COORDINATING UNIT	2.00	EACH		\$	
1560	23157EN		TRAFFIC SIGNAL POLE BASE	45.00	CUYD		\$	
1570	23222EC		INSTALL SIGNAL PEDESTAL	6.00	EACH		\$	
1580	24528ED		TETHER WIRE	1,170.00	LF		\$	
1590	24900EC		PVC CONDUIT-1 1/4 IN-SCHEDULE 80	135.00	LF		\$	
1600	24901EC		PVC CONDUIT-2 IN-SCHEDULE 80	160.00	LF		\$	
1610	24908EC		INSTALL SIGNAL CONTROLLER-TY ATC	2.00	EACH		\$	
1620	24955ED		REMOVE SIGNAL EQUIPMENT	4.00	EACH		\$	
1630	26119EC		INSTALL RADAR PRESENCE DETECTOR TYPE A	6.00	EACH		\$	
1640	26246EC		INSTALL SOLAR SCHOOL FLASHER ASSEMBLY	2.00	EACH		\$	

Section: 0006 - WATERLINE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1650	14003		W CAP EXISTING MAIN CUT , CAP AND BLOCK ABANDONED WATER MAIN (REVISED 2-10-26)	22.00	EACH		\$	
1660	02690		SAFELOADING	66.00	CUYD		\$	
1670	02735		SURF RESTORATION DRIVEWAY/ENTRANCE RESTORATION	418.00	SQYD		\$	
1680	14014		W ENCASMENT STEEL OPEN CUT RANGE 3 12" STEEL CASING PIPE OPEN CUT W/ CASING SPACERS (RANGE 3) (REVISED 2-10-26)	20.00	LF		\$	
1690	14009		W ENCASMENT STEEL BORED RANGE 4 16" STEEL CASING PIPE BORED & JACKED W/ CASING SPACERS (RANGE 4)	72.00	LF		\$	
1700	14015		W ENCASMENT STEEL OPEN CUT RANGE 4 16" STEEL CASING PIPE OPEN CUT W/ CASING SPACERS (RANGE 4) (REVISED 2-10-26)	28.00	LF		\$	
1710	14011		W ENCASMENT STEEL BORED RANGE 6 30" STEEL CASING PIPE BORED & JACKED W/ CASING SPACERS (RANGE 6)	80.00	LF		\$	
1720	14017		W ENCASMENT STEEL OPEN CUT RANGE 6 30" STEEL CASING PIPE OPEN CUT W/ CASING SPACERS (RANGE 6) (REVISED 2-10-26)	30.00	LF		\$	
1730	14016		W ENCASMENT STEEL OPEN CUT RANGE 5 20" STEEL CASING PIPE OPEN CUT (RANGE 5) (REVISED 2-10-26)	40.00	LF		\$	
1740	14016		W ENCASMENT STEEL OPEN CUT RANGE 5 24" STEEL CASING PIPE OPEN CUT W/ CASING SPACERS (RANGE 5) (REVISED 2-10-26)	235.00	LF		\$	
1750	14019		W FIRE HYDRANT ASSEMBLY 6" FIRE HYDRANT ASSEMBLY W/ GATE VALVE (REVISED 2-10-26)	6.00	EACH		\$	

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1760	14021		W FIRE HYDRANT REMOVE REMOVE EXISTING FIRE HYDRANT ASSEMBLY	9.00	EACH		\$	
1770	14030		W METER RELOCATE	27.00	EACH		\$	
1780	14055		W PIPE DUCTILE IRON SPECIAL 1" DI WATER MAIN (REVISED 2-10-26)	51.00	LF		\$	
1790	14033		W PIPE DUCTILE IRON 02 INCH 2" DI WATER MAIN (REVISED 2-10-26)	14.00	LF		\$	
1800	14036		W PIPE DUCTILE IRON 06 INCH	14.00	LF		\$	
1810	14037		W PIPE DUCTILE IRON 08 INCH	290.00	LF		\$	
1820	14039		W PIPE DUCTILE IRON 12 INCH	4,371.00	LF		\$	
1830	14039		W PIPE DUCTILE IRON 12 INCH WITH NITRILE GASKET	416.00	LF		\$	
1840	14040		W PIPE DUCTILE IRON 16 INCH	324.00	LF		\$	
1850	14080		W SERV PE/PLST LONG SIDE 3/4 IN 3/4" SERVICE RECONNECTION - LONG SIDE	7.00	EACH		\$	
1860	14085		W SERV PE/PLST SHORT SIDE 3/4 IN 3/4" SERVICE RECONNECTION - SHORT SIDE	21.00	EACH		\$	
1870	14177		W VALVE BOX REMOVE (REVISED 2-10-26)	2.00	EACH		\$	
1880	14089		W TAPPING SLEEVE AND VALVE SIZE 1 CONNECT TO EXISTING SYSTEM VIA 1" COMPRESSION COUPLING AND CORP STOP	1.00	EACH		\$	
1890	14089		W TAPPING SLEEVE AND VALVE SIZE 1 CONNECT TO EXISTING SYSTEM VIA 2" TAPPING SLEEVE, 2" VALVE & VALVE BOX (SIZE 1)	2.00	EACH		\$	
1900	14089		W TAPPING SLEEVE AND VALVE SIZE 1 CONNECT TO EXISTING SYSTEM VIA 8" SOLID SLEEVE	2.00	EACH		\$	
1910	14090		W TAPPING SLEEVE AND VALVE SIZE 2 CONN TO EXIST SYSTEM VIA 12" TAPPING SLEEVE, 12" VALVE & VALVE BOX (SIZE 2)	5.00	EACH		\$	
1920	14090		W TAPPING SLEEVE AND VALVE SIZE 2 CONN TO EXIST SYSTEM VIA 16" TAPPING SLEEVE, 16" VALVE & VALVE BOX (SIZE 2)	1.00	EACH		\$	
1930	14089		W TAPPING SLEEVE AND VALVE SIZE 1 CONN TO EXSTNG SYS VIA 6" TAPPING SLEEVE 2" VALVE & VALVE BOX (SZ 1) (R 2-10-26)	1.00	EACH		\$	
1940	14108		W VALVE 12 INCH 12" GATE VALVE & BOX (REVISED 2-10-26)	17.00	EACH		\$	
1950	14109		W VALVE 16 INCH 16" GATE VALVE & BOX (REVISED 2-10-26)	5.00	EACH		\$	
1960	14105		W VALVE 06 INCH 6" GATE VALVE & BOX	1.00	EACH		\$	
1970	14106		W VALVE 08 INCH 8" GATE VALVE & BOX (REVISED 2-10-26)	1.00	EACH		\$	

Section: 0007 - PLANNING (ADDED 2-10-26)

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1971	04793		CONDUIT-1 1/4 IN (ADDED 2-10-26)	40.00	LF		\$	

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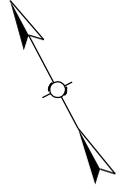
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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1972	04795		CONDUIT-2 IN (ADDED 2-10-26)	15.00	LF		\$	
1973	04820		TRENCHING AND BACKFILLING (ADDED 2-10-26)	50.00	LF		\$	
1974	04829		PIEZOELECTRIC SENSOR (ADDED 2-10-26)	4.00	EACH		\$	
1975	04830		LOOP WIRE (ADDED 2-10-26)	2,100.00	LF		\$	
1976	04895		LOOP SAW SLOT AND FILL (ADDED 2-10-26)	400.00	LF		\$	
1977	04960		REMOVE AND REPLACE SIDEWALK (ADDED 2-10-26)	2.00	SQYD		\$	
1978	20360ES818		WOOD POST (ADDED 2-10-26)	2.00	EACH		\$	
1979	20391NS835		ELECTRICAL JUNCTION BOX TYPE A (ADDED 2-10-26)	1.00	EACH		\$	
1981	20359NN		GALVANIZED STEEL CABINET (ADDED 2-10-26)	1.00	EACH		\$	

Section: 0008 - DEMOBILIZATION &/OR MOBILIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1980	02568		MOBILIZATION	1.00	LS		\$	
1990	02569		DEMOBILIZATION	1.00	LS		\$	

WARREN CO. US 31W ~m.p. 11.11
~LAT/LONG N 36.96918, W 86.46322
COUNT STATION B43
STA 142+50



SITE LOCATION IS APPROXIMATE AND WILL BE DETERMINED IN THE FIELD AND APPROVED BY DIVISION OF PLANNING PERSONNEL PRIOR TO ANY CONSTRUCTION.

ALL LOOPS SHALL BE 6'X6' SQUARE AND SHALL BE INSTALLED 16' FROM LEADING EDGE TO LEADING EDGE AS SHOWN. PIEZOELECTRIC SENSORS (PIEZOS) SHALL BE INSTALLED 5' FROM THE EDGE OF LOOPS WITH THE EDGE OF EACH PIEZO FLUSH WITH THE EDGE OF THE CORRESPONDING DRIVING LANE. LOOPS AND PIEZOS SHALL BE INSTALLED SPLICE-FREE TO THE CABINET AND A MINIMUM OF 2' OF WIRE FOR EACH SENSOR SHALL BE COILED INSIDE EACH JUNCTION BOX AND CABINET. ALL LOOPS AND PIEZOS SHALL BE LABELED IN ALL JUNCTION BOXES AND CABINET. DIVISION OF PLANNING PERSONNEL WILL CONNECT THE LOOPS AND PIEZOS INSIDE THE CABINET.

INSTALL ONE (1) 1/4" CONDUIT FROM EACH SAW SLOT TO NEAREST JUNCTION BOX.

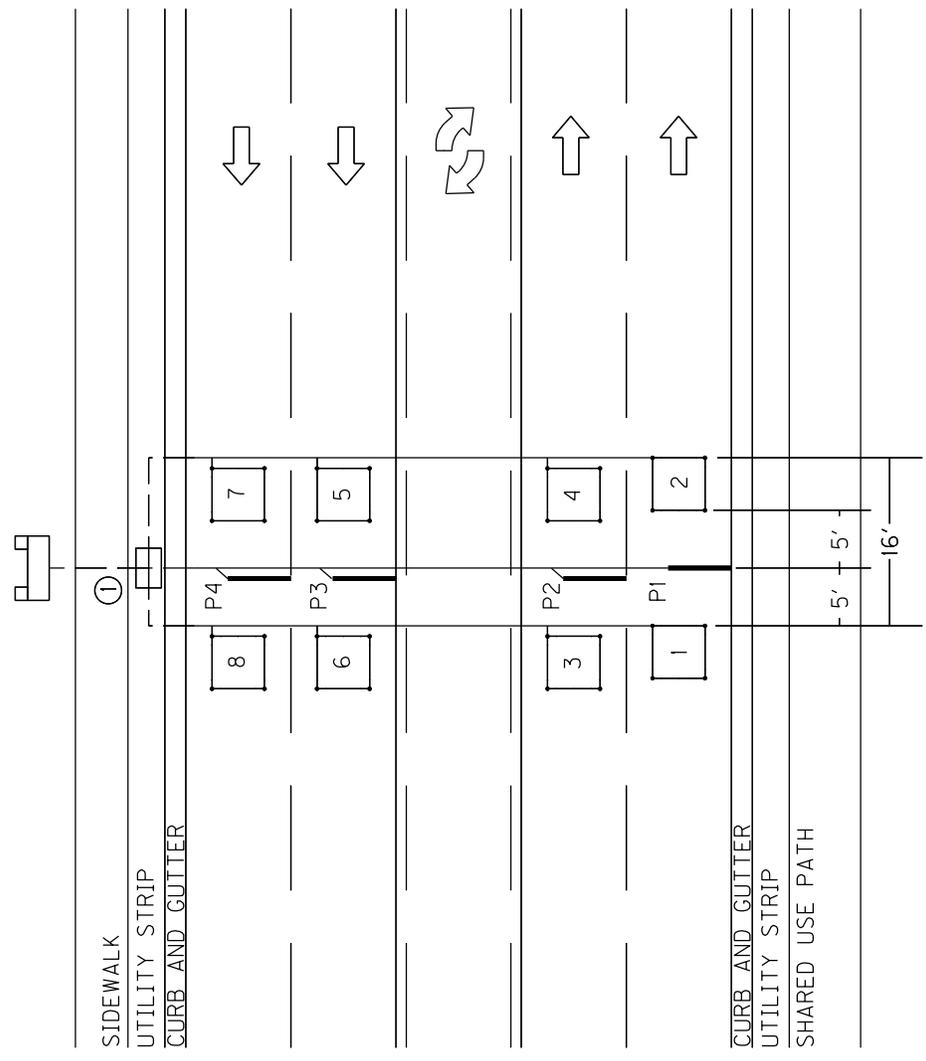
INSTALL ONE (1) TYPE A JUNCTION BOX (JB A1)

INSTALL ONE (1) 20"X20"X8" CABINET MOUNTED TO TWO (2) WOOD POSTS.

REMOVE AND REPLACE ONE (1) SECTION OF SIDEWALK TO INSTALL CONDUIT FROM JUNCTION BOX TO CABINET.

CODED NOTE:

- ① INSTALL ONE (1) 2' CONDUIT.



Permanent Traffic Data Acquisition Station
 Estimate Of Quantities

Revised February 2025

**PERMANENT TRAFFIC DATA ACQUISITION STATIONS
 ESTIMATE OF QUANTITIES**

Bid Item Code	Description	Unit	Quantity
4793	CONDUIT 1 ¼ INCH	LIN FT	40
4795	CONDUIT 2 INCH	LIN FT	15
4811	ELECTRICAL JUNCTION BOX TYPE B	EACH	
4820	TRENCHING AND BACKFILLING	LIN FT	50
4821	OPEN CUT ROADWAY	LIN FT	
4829	PIEZOELECTRIC SENSOR	EACH	4
4830	LOOP WIRE	LIN FT	2100
4833	WIRE – NO. 8	LIN FT	
4834	WIRE – NO. 6	LIN FT	
4850	CABLE NO. 14/1 PAIR	LIN FT	
4871	POLE – 35’ WOODEN	EACH	
4895	LOOP SAW SLOT AND FILL	LIN FT	400
4899	ELECTRICAL SERVICE	EACH	
4960	REMOVE AND REPLACE SIDEWALK	SQYD	2
20213EC	INSTALL PAD MOUNT ENCLOSURE	EACH	
20359NN	GALVANIZED STEEL CABINET	EACH	1
20360ES818	WOOD POST	EACH	2
20391NS835	ELECTRICAL JUNCTION BOX TYPE A	EACH	1
20392NS835	ELECTRICAL JUNCTION BOX TYPE C	EACH	
20468EC	ELECTRICAL JUNCTION BOX 10x8x4	EACH	
21543EN	BORE AND JACK CONDUIT – 2 INCH	LIN FT	
23206EC	INSTALL CONTROLLER CABINET	EACH	
24963ED	LOOP TEST	EACH	

MATERIAL, INSTALLATION, AND BID ITEM NOTES FOR PERMANENT TRAFFIC DATA ACQUISITION STATIONS

1. DESCRIPTION

Except as specified in these notes, all work shall consist of furnishing and installing all materials necessary for permanent data acquisition station equipment installation(s) and shall be performed in accordance with the current editions of:

- The Contract
- Division of Planning Standard Detail Sheets
- Kentucky Transportation Cabinet, Department of Highways, *Standard Specifications for Road and Bridge Construction*
- Kentucky Transportation Cabinet, Department of Highways, Standard Drawings
- National Fire Protection Association (NFPA) 70: *National Electrical Code*
- Institute of Electrical and Electronic Engineers (IEEE), *National Electrical Safety Code*
- Federal Highway Administration, *Manual on Uniform Traffic Control Devices*
- American Association of State Highway and Transportation Officials (AASHTO), *Roadside Design Guide*.
- Standards of the utility company serving the installation, if applicable

The permanent traffic data acquisition station layout(s) indicate the extent and general arrangement of the proposed installation and are for general guidance. Any omission or commission shown or implied shall not be cause for deviation from the intent of the plans and specifications. Information shown on the plans and in this proposal and the types and quantities of work listed are not to be taken as an accurate or complete evaluation of the material and conditions to be encountered during construction. The bidder must draw his own conclusion as to the conditions encountered. The Department of Highways (Department) does not give any guarantee as to the accuracy of the data and no claim will be considered for additional compensation if the conditions encountered are not in accordance with the information shown. If any modifications of the plans or specifications are considered necessary by the Contractor, details of such modifications and the reasons, therefore, shall be submitted in writing to the Engineer for written approval prior to beginning such modified work.

The Contractor shall contact all utility companies and the district utility agent prior to beginning construction to insure proper clearance and shielding from existing and proposed utilities. The Contractor shall use all possible care in excavating on this project so as not to disturb any existing utilities whether shown on the plans or not shown on the plans. Any utilities disturbed or damaged by the Contractor during construction shall be replaced or repaired to original condition by the Contractor at no cost to the department. If necessary, to avoid existing utilities, the Contractor shall hand dig areas where poles or conduit cross utilities.

Material, Installation, and Bid Item Notes for
Permanent Traffic Data Acquisition Stations

Revised February 2025

The Contractor shall be responsible for all damage to public and/or private property resulting from his work.

The Contractor shall inspect the project site prior to submitting a bid and shall be thoroughly familiarized with existing conditions. Submission of a bid will be considered an affirmation of this inspection having been completed. The Department will not honor any claims resulting from site conditions.

2. MATERIALS

All proposed materials shall be approved prior to being utilized. The Contractor shall submit for material approval an electronic file of descriptive literature, drawings and any requested design data for the proposed materials. After approval, no substitutions of any approved materials may be made without the written approval of the Engineer.

Materials requiring sampling shall be made available a sufficient time in advance of their use to allow for necessary testing.

2.1. Anchoring

2.1.1. Anchor and Anchor Rod

Anchor, except rock anchor, shall be expanding type, with a minimum area of 135 square inches.

Anchor rod shall be galvanized steel, double-eye, have a minimum diameter of 5/8 inches, and a minimum length of 84 inches. Minimum holding capacity shall be 15,400 lbs.

Rock anchor shall be galvanized steel, triple-eye, expanding type, with a minimum diameter of 3/4 inch, a minimum 53 inches long, and a minimum tensile strength of 23,000 lb.

2.1.2. Guy Wire and Guy Guard

Guy wire shall be Class A, Zinc-coated, 3/8 inch diameter, high strength grade steel (minimum 10,800 lb.) and galvanized per ASTM A475. Guy guard shall be 8' long, fully-rounded, yellow, and able to be securely attached to the guy wire.

2.1.3. Strandwise for Guy Wire

Strandwise for guy wire shall be 3/8 inch and rated to hold a minimum of 90% of the rated breaking strength (RBS) of the strand used.

2.2. Asphalt

Asphalt shall be a minimum CL2 Asph Surf 0.38B PG64-22 and conform to the *Standard Specifications for Road and Bridge Construction*.

2.3. Backer Rod

Backer rod shall be 1/2 inch diameter, closed cell polyethylene foam and shall meet or exceed the following physical properties:

- Density (average): 2.0 lbs/cu.ft. (minimum): ASTM D 1622 test method
- Tensile Strength: 50 PSI (minimum): ASTM D 1623 test method
- Compression Recovery: 90% (minimum): ASTM D 5249 test method
- Water Absorption: 0.03 gm/cc (maximum): ASTM C 1016 test method

2.4. Cabinets

2.4.1. Galvanized Steel Cabinet

Galvanized Steel Cabinet shall be constructed of 16 or 14 gauge galvanized steel and shall meet or exceed the industry standards set forth by UL 50 and NEMA 3R. The finish shall be an ANSI 61 gray polyester powder finish inside and out over the galvanized steel. Cabinet shall have minimum inside dimensions of 20 inches high by 20 inches wide by 8 inches deep.

The cabinet shall be equipped with the following:

- Drip shield top
- Seam-free sides, front, and back, to provide protection in outdoor installations against rain, sleet, and snow
- Hinged cover with 16 gauge galvanized steel continuous stainless steel pin.
- Cover fastened with captive plated steel screws, knob or latch
- Hasp and staple for padlocking
- No gaskets or knockouts
- Back panel for terminal block installation
- Post mounting hardware
- Terminal Blocks

2.4.2. Anchor Bolt for Pad Mounted Cabinet

Anchor bolt for pad mounted cabinet shall be galvanized steel with minimum dimensions of 3/8 inch by 6 inches.

2.5. Concrete

Concrete shall be Class A and conform to the *Standard Specifications for Road and Bridge Construction*.

2.6. Conduit and Conduit Fittings

Conduit and conduit fittings shall be rigid steel unless otherwise specified.

Conduit shall be zinc galvanized inside and out and conform to the NEC, UL Standard 6, and ANSI C-80.1.

Rigid Steel Conduit Fittings shall be galvanized inside and out and conform to the NEC, UL Standard 514B, and ANSI C-80.4. Intermediate Metal Conduit (IMC) will not be approved as an acceptable alternative to rigid steel conduit.

2.7. Conduit sealant

Conduit sealant shall be weather-, mold-, and mildew-resistant and chemically resistant to gasoline, oil, dilute acids and bases. Conduit sealant shall be closed cell type and shall meet or exceed the following properties:

- Cure Time 20 minutes max.
- Density 64.4 kg/m³; 6 lbs/ft³
- Compressive Strength (ASTM 1691) 13.8 MPa; 330 or 300 psi

- Tensile Strength (ASTM 1623) 15.9 MPa; 270 or 250 psi
- Flexural Strength (ASTM D790) 14.5 MPa; 460 or 450 psi
- Service Temperature -20 to 200 F

2.8. Electrical Service Meter Base

Electrical service meter base shall meet or exceed all requirements of the National Electrical Code and the local utility providing the electrical service.

2.9. Electrical Service Disconnect

Electrical service disconnect shall meet or exceed all requirements of the National Electrical Code and the local utility providing the electrical service.

2.10. Flashing Arrow

Flashing Arrow shall conform to the *Standard Specifications for Road and Bridge Construction*.

2.11. Ground Fault Circuit Interrupter (GFCI) Receptacle

Ground Fault Circuit Interrupter Receptacle shall be 2-pole, 3-wire, 20 Amp, 125 Volt, 60 Hz, NEMA 5-20R configuration and meet or exceed the following standards and certifications:

- NEMA WD-1 and WD-6
- UL 498 and 943
- NOM 057
- ANSI C-73

This item shall include a UL listed, 4 inch x4 inch x 2¹/₈ inch box with ¾ inch side and end knockouts and a 1½ inches deep, single-receptacle cover to house the GFCI receptacle. Box and cover shall be hot rolled, galvanized steel with a minimum thickness of 0.62 inches.

2.12. Grounding

2.12.1. Ground Rod

Ground Rod shall be composite shaft consisting of a pure copper exterior (5 mil minimum) that has been inseparably molten welded to a steel core. Ground Rod shall have a minimum diameter of 5/8 inch, a minimum length of 8 feet and shall be manufactured for the sole purpose of providing electrical grounding.

2.12.2. Ground Rod Clamp

Ground rod shall be equipped with a one piece cast copper or bronze body with a non-ferrous hexagonal head set screw and designed to accommodate a 10 AWG solid through 2 AWG stranded grounding conductor.

2.13. Grout

2.13.1. Grout for Inductive Loop Installation

Grout for inductive loop installation shall be non-shrink, shall meet the requirements of the *Standard Specifications for Road and Bridge Construction*,

and shall be included on the KYTC Division of Materials, *List of Approved Materials*.

2.13.2. Grout for Piezoelectric Sensor Installation

Grout for piezoelectric sensor installation shall be per the piezoelectric sensor manufacturer's recommendation. Grout shall be suitable for installation in both asphalt and Portland cement pavements. Grout shall have a short curing time (tack free in ten minutes; open to traffic in forty minutes; and fully cured within sixty minutes) to prevent unnecessary lane closure time and should be of sufficient consistency to prevent running when applied on road surfaces with a drainage cross slope. Particulate matter within the grout shall not separate or settle and the grout shall not shrink during the curing process.

2.14. Hardware

Except where specified otherwise, all hardware such as nuts, bolts, washers, threaded ends of fastening devices, etc. with a diameter less than 5/8 inch shall be passivated stainless steel, alloy type 316 or type 304. Stainless steel hardware shall meet ASTM F593 and F594 for corrosion resistance. All other nuts and bolts shall meet ASTM A307 and shall be galvanized.

2.14.1. Conduit Strap

Conduit strap shall be double-hole, stainless steel, and sized to support specified conduit. Conduit strap shall attach to wood pole or post with two 2 ¼ inch wood screws.

2.14.2. Mounting Strap for Pole Mount Cabinet

Mounting strap for pole mount cabinet shall be ¾ inch x 0.03 inch stainless steel; equipped with clips or buckles to securely hold strap.

2.14.3. Metal Framing Channel and Fittings

Metal framing channel shall be 1 5/8 inches wide galvanized steel that conforms to ASTM A1011 and ASTM A653. One side of the channel shall have a continuous slot with in-turned edges to accommodate toothed fittings.

Fittings shall be punch pressed from steel plates and conform to ASTM A575 and the physical requirements of ASTM A1011.

2.15. Junction Box

2.15.1. Junction Box Type A, B, or C

Junction Box Type A, B, or C shall meet or exceed ANSI/SCTE 77-2007, Tier 15. Box shall have an open bottom. A removable, non-slip cover marked "PLANNING" shall be equipped with a lifting slot and attached with a minimum of two 3/8 inch stainless steel hex bolts and washers. Type A Box shall have nominal inside dimensions of 13 inches wide by 24 inches long by 18 inches deep. Type B Box shall have nominal inside dimensions of 11 inches wide by 18 inches long by 12

inches deep. Type C Box shall have nominal inside dimensions of 24 inches wide by 36 inches long by 30 inches deep.

2.15.2. Aggregate for Junction Box Type A, B, or C

Aggregate for junction box type A, B, or C shall be gradation size no. 57 and conform to the *Standard Specifications for Road and Bridge Construction*.

2.15.3. Junction Box 10x8x4

Junction Box Type 10x8x4 shall be constructed of a UV-stabilized, nonmetallic material or non-rusting metal and be weatherproof in accordance with NEMA 4X. Box shall be equipped with an overhanging door with a continuous durable weatherproof gasket between the body and door. Door shall be hinged with screws, hinge(s) and pin(s) and shall be equipped with a padlockable latch on the side opposite the hinge(s). Junction Box 10x8x4 shall have minimum inside dimensions of 10 inches high by 8 inches wide by 4 inches deep.

2.16. Maintain and Control Traffic

Materials for the bid item Maintain and Control Traffic shall conform to the *Standard Specifications for Road and Bridge Construction*, and the KYTC Department of Highways *Standard Drawings*.

2.17. Piezoelectric Sensor

Piezoelectric sensor (piezo) shall provide a consistent level voltage output signal when a vehicle axle passes over it, shall have a shielded transmission cable attached, and shall meet the following requirements:

- Dimensions: such that sensor will fit in a ¾ inch wide by 1 inch deep saw cut. Total length shall be 6 feet unless specified otherwise.
- Output uniformity: ± 7% (maximum)
- Typical output level range: 250mV (minimum) from a wheel load of 400 lbs.
- Working temperature range: -40° to 160° F.
- Sensor life: 30 million Equivalent Single Axle Loadings (minimum)

Shielded transmission cable shall be coaxial and shall meet the following requirements:

- RG 58C/U with a high density polyethylene outer jacket rated for direct burial
- Length shall be a minimum of 100 feet. Installations may exceed 100 feet so the piezo shall be supplied with a lead-in of appropriate length so that the cable can be installed splice-free from the piezo to the cabinet.
- Soldered, water resistant connection to the sensor.

One installation bracket for every 6 inches of sensor length shall also be supplied. Piezo shall be a RoadTrax BL Class I or approved equal.

2.18. Saw Slot Sealant

Saw Slot Sealant shall be non-shrink, non-stringing, moisture cure, polyurethane

encapsulant suitable for use in both asphalt and concrete pavements. It shall provide a void-free encapsulation for detector loop cables and adequate compressive yield strength and flexibility to withstand heavy vehicular traffic and normal pavement movement.

The cured encapsulant shall meet or exceed the following:

- Hardness (Indentation): 35-65 Shore A, ASTM D2240
- Tensile Strength: 150 psi minimum, ASTM D412
- Elongation: 125% minimum 2 inch/minute pull, ASTM D412
- Tack-free Drying Time: 24 hours maximum, ASTM C679
- Complete Drying Time: 30 hours maximum, KM 64-447
- Chemical Interactions (seven day cure at room temperature, 24-hour immersion, KM 64-446):
 - Motor Oil: No effect
 - Deicing Chemicals: No effect
 - Gasoline: Slight swell
 - Hydraulic Brake Fluid: No effect
 - Calcium Chloride (5%): No effect

2.19. Seeding and Protection

Material for Seeding and Protection shall be Seed Mixture Type I and conform to the *Standard Specifications for Road and Bridge Construction*.

2.20. Signs

Materials for signs shall conform to the *Standard Specifications for Road and Bridge Construction*.

2.21. Splicing Materials

2.21.1. Electrical Tape

Electrical tape shall be a premium grade, UL-listed, all-weather, vinyl-insulating tape with a minimum thickness of 7 mil. Tape shall be flame retardant and resistant to abrasion, moisture, alkalis, acids, corrosion, and weather (including ultraviolet exposure).

2.21.2. Splice Kit

Splice kit shall be inline resin-type and rated for a minimum of 600V. Resin shall be electrical insulating-type and shall provide complete moisture and insulation resistance.

2.22. Steel Reinforcing Bar

Steel reinforcing bar shall be #5 and shall conform to the *Standard Specifications for Road and Bridge Construction*.

2.23. Terminal Block

Terminal block shall be rated for a minimum of 300 V and have a minimum of six

terminal pairs with 9/16-inch nominal spacing (center to center) for connecting loop and piezoelectric sensor wires to cable assemblies. Terminal block shall have screw type terminal strips to accommodate wire with spade-tongue ends.

2.24. Warning Tape

Warning tape shall be acid and alkali resistant formulated for direct burial. Tape shall be a minimum of 3 inches wide by 4.0 mils (nominal) thick, and shall be permanently imprinted with a minimum 1 inch black legend on a red background warning of an electric line. Tape shall meet or exceed the following industry specifications:

- American Gas Association (AGA) 72-D-56
- American Petroleum Institute (API) RP 1109
- American Public Works Association (APWA) Uniform Color Code
- Department of Transportation (DOT) Office of Pipeline Safety USAS B31.8
- Federal Gas Safety Regulations S 192-321 (e)
- General Services Administration (GSA) Public Buildings Service Guide: PBS 4-1501, Amendment 2
- National Transportation Safety Board (NTSB) PSS 73-1
- Occupational Safety and Health Administration (OSHA) 1926.956 (c) (1)

2.25. Wire and Cable

All cable and wire shall be plainly marked in accordance with the National Electrical Code (NEC).

2.25.1. Loop Wire

Loop wire shall be 14 AWG, stranded, copper, single conductor, and shall conform to the International Municipal Signal Association (IMSA) Specification No. 51-7.

2.25.2. Cable No. 14/1 Pair

Cable No. 14/1 pair loop lead-in cable shall be 14 AWG, stranded, copper paired, electrically shielded conductors, and shall conform to IMSA 19-2.

2.25.3. Grounding conductor

Grounding conductor and bonding jumper shall be solid or stranded, 4 AWG bare copper.

2.25.4. Service Entrance Conductor

Service entrance conductor shall be stranded, copper, Type USE-2, sized as required to comply with the NEC.

2.25.5. Terminal for electrical wire or cable

Terminal for electrical wires or cables shall be insulated, solderless, spade tongue terminals of correct wire and stud size. Terminal for electrical wires or cables shall be incidental to the wire or cable (including piezoelectric sensor transmission cable) to be connected to terminal strips.

2.26. Wood Post

Wood post shall be Southern Pine pretreated to conform to the American Wood Preservers' Association (AWPA) C-14 or UC4B and shall have minimum dimensions of 4 inches by 4 inches by 8 feet long (for Galvanized Steel Cabinet) or 4 feet long (for Junction Box 10x8x4), sawed on all four sides with both ends square.

2.27. Wooden Pole

Wooden pole shall be a Class IV wood pole of the length specified and shall conform to the *Standard Specifications for Road and Bridge Construction* except the pole shall be treated in accordance with AWPA P9 Type A.

3. CONSTRUCTION METHODS

The plans indicate the extent and general arrangement of the installation and are for guidance. When the Contractor deems any modifications to the plans or specifications necessary, details of such changes and the reasons shall be submitted in writing to the engineer for written approval prior to beginning the modified work.

After the project has been let and awarded, the Division of Construction shall notify the Division of Planning of the scheduled date for a Pre-Construction meeting so that prior arrangements can be made to attend. This will allow the Division of Planning an opportunity to address any concerns and answer any questions that the Contractor may have before beginning the work.

The Division of Planning Equipment Management Team (502-564-7183) shall be notified a minimum of seven days before any work pertaining to these specifications begins to allow their personnel the option to be present during installation.

Unless otherwise specified, installed materials shall be new.

Construction involving the installation of loops or piezoelectric sensors shall not be performed when the temperature of the pavement is less than 38°F.

A final inspection will be performed by a member of the Central Office Division of Planning equipment staff after the installation is complete to verify that the installation is in compliance with the plans and specifications.

Any required corrective work shall be performed per the *Standard Specifications for Road and Bridge Construction*.

3.1. Anchoring

Furnish: Anchor, anchor rod, guy wire, strand vise, guy guard.

Anchor shall be installed in relatively dry and solid soil. Rock anchor shall be installed in solid rock. Excavate the hole at a 45° to 60° angle in line with the guy (hole size shall be slightly larger than the expanded anchor – see manufacturer’s recommendation). Attach rod to anchor, install assembly into hole, and expand anchor. Backfill and tamp entire disturbed area. The effectiveness of the anchor is dependent upon the thoroughness of backfill tamping. Attach guy to strand vise on pole and anchor rod and tighten to required tension. Install guy guard on guy.

3.2. Bore and Jack Pipe – 2”

Furnish: Steel Encasement Pipe, 2”

Bore and jack pipe – 2” shall conform to the Section 706 of the *Standard Specifications for Road and Bridge Construction*.

3.3. Cleanup and Restoration

Furnish: Seed Mix Type 1 (as required); fertilizer (as required); agricultural limestone (as required); mulch or hydromulch (as required); tackifier (as required).

The Contractor shall be responsible for repairing any damage to public and/or private property resulting from his work. Upon completion of the work, restore all disturbed highway features in like kind design and materials. This shall include filling any ruts and leveling ground appropriately. Contractor shall dispose of all waste and debris off the project. Sow all disturbed earthen areas with Seed Mix Type 1 per Section 212 of the *Standard Specifications for Road and Bridge Construction*. All materials and labor necessary for cleanup and restoration shall be considered incidental to other bid items.

3.4. Conduit

Furnish: Conduit; conduit fittings; bushings (grounding where required); LB condulets (as required); weatherheads (as required); conduit straps; hardware; conduit sealant.

Conduit that may be subject to regular pressure from traffic shall be laid to a minimum depth of 24 inches below grade. Conduit that will not be subject to regular pressure from traffic shall be laid to a minimum depth of 18 inches below grade.

Conduit ends shall be reamed to remove burrs and sharp edges. Cuts shall be square and true so that the ends will butt together for the full circumference of the conduit. Tighten couplings until the ends of the conduit are brought together. Do not leave exposed threads. Damaged portions of the galvanized surfaces and untreated threads resulting from field cuts shall be painted with an Engineer-approved, rust inhibitive paint. Conduit bends shall have a radius of no less than 12 times the nominal diameter of the conduit, unless otherwise shown on the plans.

Contractor shall install a bushing (grounding bushing where required) on both ends of all conduits. Cap spare conduits on both ends with caps or conduit sealant.

Conduit openings in junction boxes and cabinets shall be waterproofed with a flexible, removable conduit sealant, working it around the wires, and extending it a minimum 1 inch into the end of the conduit.

After the conduit has been installed and prior to backfilling, the conduit installation shall be inspected and approved by the Engineer.

3.5. Electrical Service

Furnish: Meter base, service disconnect, wire, GFCI AC duplex receptacle with box and cover; conduit, conduit fittings, bushings (grounding where required); LB condulets (as required); weatherhead; conduit straps; hardware; conduit sealant; ground rod with clamp; grounding conductor.

Prior to any construction, the Contractor shall initiate a work order with the local power

company for the installation of electrical service to the site. A representative from the Division of Planning and the local power company shall be consulted prior to choosing an exact location for the pole. The Contractor shall clear the right-of-way for the electrical service drop.

Contractor shall obtain electrical inspections, memberships, meter base, service disconnect and any other requirements by the utility serving the installation and pay all fees as required.

Install meter-base and disconnect panel with a 30-ampere, fused, circuit breaker inside. Install a manufactured weatherproof hub connector to connect the conduit to the top of the meter base and service disconnect.

Install a rigid $\frac{3}{4}$ inch conduit with three 8 AWG service conductors from the cabinet, through the service disconnect to the meter base and a $1\frac{1}{4}$ " conduit with three 8 AWG service conductors from the meter base to a weatherhead two feet from the top of the electrical service pole. Install conduit straps 30 inches on center and provide a drip loop where the wire enters the weatherhead. Splice electric drop with service entrance conductors at the top of the pole.

The limit of conduit incidental to "Install Electrical Service" for a pad mounted cabinet is 24 inches beyond face of service pole.

Install a 120-volt, 20-amp GFCI AC duplex receptacle with box and cover in the automatic data recorder (ADR) cabinet.

Install a ground rod with clamp. Install a grounding conductor wire from the meter base, through the disconnect panel, to the ground rod clamp. Install grounding conductor in $1\frac{3}{4}$ " conduit from service disconnect to ground rod.

After completing the installation and before the electrical service is connected, obtain a certificate of compliance from the Kentucky Department of Housing, Buildings and Construction, Electrical Inspection Division.

3.6. Flashing Arrow

Furnish: Arrow Panel

Construction of Flashing Arrow shall conform to the *Standard Specifications for Road and Bridge Construction*.

3.7. Galvanized Steel Cabinet

Furnish: Cabinet; wood posts; concrete; conduit fittings; metal framing channel; pipe clamp; terminal block(s); spade tongue wire terminals; wire labels; hardware.

Where right-of-way allows, locate the cabinet such that it is outside the clear zone in accordance with the *Roadside Design Guide*. Install Cabinet such that the door of the

cabinet faces the roadway.

Excavate as required and install wood posts to a depth of 36 inches and place concrete around posts as shown on the standard detail sheets. Install metal framing channel with pipe clamp between posts.

Install Cabinet on wood posts 38 inches above the finished grade as shown on the standard detail sheets. Install a unistrut between posts when two posts are specified.

Install the required number of terminal blocks on the cabinet back plate. Install a spade tongue terminal on each loop and piezo sensor wire entering the cabinet and connect wires to terminal block(s). Wiring shall be neat and orderly. Label all wires and cables inside cabinet.

Install conduit from ground to cabinet and attach to pipe clamp. Install locknuts to attach conduit to cabinet and install a conduit bushing as shown on the standard detail sheets.

3.8. Grounding

Furnish: Ground rod with clamp; grounding conductor.

At sites with electrical or solar service, all conduits, poles, and cabinets shall be bonded to ground rods and the electrical system ground to form a complete grounded system.

Install such that top of ground rod is a minimum of 3 inches below finished grade.

Grounding systems shall have a maximum 25 ohms resistance to ground. If the resistance to ground is greater than 25 ohms, two or more ground rods connected in parallel shall be installed. Adjacent ground rods shall be separated by a minimum of 6 feet.

3.9. Install Pad Mount Enclosure

Furnish: Concrete; anchor bolts with washers and nuts; conduit; conduit fittings; conduit grounding bushings; ground rod with clamp; grounding conductor; conduit sealant; wooden stakes (where required); wire labels; hardware.

The Contractor shall be responsible for securing the enclosure from the Central Office Division of Planning Warehouse in Frankfort and transporting it to the installation site.

Where right-of-way allows, locate the enclosure such that it is outside the clear zone in accordance with the *Roadside Design Guide*.

Excavate as required, and place concrete to construct the enclosure foundation as specified on the standard detail sheets. Install enclosure on the concrete base such that the door(s) of the enclosure opens away from traffic (hinges away from traffic). Install anchor bolts, washers, and nuts to secure the enclosure to the foundation.

Install ground rod with clamp and install one $\frac{3}{4}$ inch rigid conduit from enclosure base to

ground rod. Install a grounding conductor from ground rod to enclosure base and bond to each conduit bushing in the base.

Install one 3/4 inch rigid steel conduit for electrical service from the base of the enclosure to 24 inches beyond the concrete base. Make all field wiring connections to the electrical service, as applicable.

If electrical service is not provided as a bid item in the contract, plug conduit on both ends with a cap, conduit sealant, or electrical tape. Mark the location of the buried conduit end with a wooden stake labeled "3/4 in. conduit."

Install specified rigid steel conduit(s) into the base of the enclosure for sensor wire entry. Install one spare 2-inch conduit from the enclosure base to 2 feet beyond the concrete base. Plug spare conduit on both ends with a cap, conduit sealant or electrical tape.

The limit of all conduits incidental to "Install Pad Mount Enclosure" is 24 inches beyond the edge of the concrete base.

Wiring in enclosure shall be neat and orderly. Label all wires and cables inside enclosure. KYTC personnel will furnish and install terminal blocks and connect sensors to terminal blocks.

3.10. Install Controller Cabinet

Furnish: Mounting brackets; mounting straps; conduit; LB condulets; conduit fittings; conduit grounding bushings; ground rod with clamp; grounding conductor; cable staples; conduit sealant; wooden stakes (where required); wire labels; hardware.

The Contractor shall be responsible for securing the cabinet from the Central Office Division of Planning Warehouse in Frankfort and transporting it to the installation site. Any existing holes in the cabinet not to be reused shall be covered or plugged to meet NEC requirements.

Install mounting brackets and secure cabinet to pole with mounting straps.

Install a ground rod with clamp. Install grounding conductor in 1-3/4" conduit form cabinet to ground rod.

Install one 3/4 inch rigid steel conduit with two lb. condulets from cabinet to electrical service disconnect box. Make all field wiring connections to the electrical service, as applicable.

If electrical service is not provided as a bid item in the contract, plug conduit on both ends with cap, plumbers putty, conduit sealant, or electrical tape. Mark the location of the buried conduit end with a wooden stake labeled "3/4 in. conduit".

Install specified rigid steel conduit(s) and type LB condulet(s) into the bottom of the

cabinet for sensor wire entry. The limit of conduits incidental to “Install Controller Cabinet” is 24 inches beyond the face of the pole.

Wiring in cabinet shall be neat and orderly. Label all wires and cables inside cabinet. KYTC personnel will furnish and install terminal blocks and connect sensors to terminal blocks.

3.11. Junction Box Type 10x8x4

Furnish: Junction box; wood post; conduit fittings; wire labels; hardware.

Where right-of-way allows, locate the junction box such that it is outside the clear zone in accordance with the Roadside Design Guide.

Excavate as required and install wood post(s) to a depth of 18 inches. Install junction box on wood post such that the bottom of the box is 18 inches above the finished grade as shown on the standard detail sheets. Box shall be installed with four (4) 2½ inch wood screws and washers.

Install locknuts to attach conduit to junction box and install a conduit bushing as shown on the standard detail sheets.

Wiring inside box shall be neat and orderly. Label all wires and cables inside box.

3.12. Junction Box Type A, B, or C

Furnish: Junction box, No. 57 aggregate; grounding conductor

Excavate as required and place approximately 12 inches of No. 57 aggregate beneath the proposed junction box to allow for drainage. Install specified junction box type A, B, or C near the edge of pavement, flush with finished grade per the detail sheets. Where required, orient the box so that the dimensions comply with the National Electrical Code. Stub conduits with grounding bushings into junction box at its base to accommodate wires and connect grounding conductor to all grounding bushings. Backfill to existing grade, and restore disturbed area to the satisfaction of the Engineer.

Wiring inside box shall be neat and orderly. Label all wires and cables inside box.

3.13. Loops - Proposed

Furnish: Wire; saw slot sealant; backer rod; grout; conduit sealant.

The plans and notes specify the approximate location for loop installations. Prior to sawing slots or drilling cores, the Contractor shall meet with a representative of the Division of Planning to verify the precise layout locations on site. Avoid expansion joints and pavement sections where potholes, cracks, or other roadway flaws exist.

Upon completion of this meeting, the Contractor shall measure out and mark the proposed loop locations with spray paint or chalk such that the saw slots will be parallel

and perpendicular to the direction of traffic. Marked lines shall be straight and exact to the locations determined and sized as shown on the plans. Unless indicated otherwise, loops shall be 6 feet by 6 feet square and loops in the same lane shall be spaced 16 feet from leading edge to leading edge.

On resurfacing, rehabilitation, and new construction projects that include new asphalt pavement, the Contractor shall install loops prior to laying the final surface course. On projects with milling and texturing, the Contractor may install the loops prior to or after the milling operation; however, if installed prior to milling, the Contractor shall be responsible for ensuring that the loops are installed at a depth such that the milling operation will not disturb the newly installed loops. The Contractor shall correct damage caused by the milling operations to newly installed loops prior to placement of the final surface course at no additional cost to the Cabinet.

For projects that include the installation of new asphalt and piezoelectric sensors, the Contractor shall mark or otherwise reference all loops installed prior to the final surface course such that the loops can be accurately located when the piezoelectric sensors are installed after placement of the final surface course.

For projects that do not have asphalt surfacing, the Contractor shall install the loops in the surface of the pavement.

The Prime Contractor shall coordinate the installation of loops with the electrical sub-Contractor and the Engineer to ensure correct operation of the completed installation.

The following is a typical step by step procedure for the installation of a loop.

- Carefully mark the slot to be cut, perpendicular to the flow of traffic and centered in the lane.
- Make each saw-cut 3/8-inch wide and at a depth such that the top of the backer rod is a minimum of 2 inches below the surface of rigid (PCC/Concrete) pavement or 4 inches below the surface of asphalt pavement.
- Drill a 1½ inch core hole at each corner and use a chisel to smooth corners to prevent sharp bends in the wire.
- Clean ALL foreign and loose matter out of the slots and drilled cores and within 1 foot on all sides of the slots using a high-pressure washer.
- Completely dry the slots and drilled cores and within 1 foot on all sides of the slots using oil-free forced air, torpedo heaters, electric heaters, or natural evaporation, depending on weather conditions. Be very careful not to burn the asphalt if heat is used.
- Measure 9-12 inches from the edge of the paved surface (shoulder break or face of curb) and drill a 1½ inch hole on a 45° angle to the conduit adjacent to the roadway.
- Closely inspect all cuts, cores, and slots for jagged edges or protrusions prior to the placement of the wire. All jagged edges and protrusions shall be ground or re-cut and cleaned again.

- Place the loop wire splice-free from the termination point (cabinet or junction box) to the loop, continue around the loop for four turns, and return to the termination point.
- Push the wire into the saw slot with a blunt object such as a wooden stick. Make sure that the loop wire is pushed fully to the bottom of the saw slot.
- Install conduit sealant to a minimum of 1" deep into the cored 1½ inch hole.
- Apply loop sealant from the bottom up and fully encapsulate the loop wires in the saw slot. The wire should not be able to move when the sealant has set.
- Cover the encapsulated loop wire with a continuous layer of backer rod along the entire loop and home run saw slots such that no voids are present between the loop sealant and backer rod.
- Finish filling the saw cut with non-shrinkable grout per manufacturer's instructions. Alleviate all air pockets and refill low spaces. There shall be no concave portion to the grout in the saw slot. Any excess grout shall be cleaned from the roadway to alleviate tracking.
- Clean up the site and dispose of all waste off the project.
- Ensure that the grout has completely cured prior to subjecting the loop to traffic. Curing time varies with temperature and humidity.

Exceptions to installing loop wire splice-free to the junction box or cabinet may be considered on a case-by-case basis and must be pre-approved by the Engineer. If splices are allowed, they shall be located in a junction box and shall conform to the construction note for Splicing.

If loop lead-in cable (Cable No. 14/1 Pair) is specified, cable shall be installed splice free to the cabinet ensuring that extra cable is left in each junction box or cabinet. All wires and cables shall be labeled in each junction box and cabinet.

Loop inductance readings shall be between 100 and 300 microhenries. The difference of the loop inductance between two loops in the same lane shall be ± 20 microhenries. Inductance loop conductors shall test free of shorts and grounds. Upon completion of the project, all loops must pass an insulation resistance test of a minimum of 100 million ohms to ground when tested with a 500 Volt direct current potential in a reasonably dry atmosphere between conductors and ground.

3.14. Loop Test

When noted on a data collection station layout sheet that there are existing inductive loops within the limits of the project, notify the Engineer in writing, a minimum of 14 calendar days prior to beginning milling operations. After milling and prior to placing asphalt inlay, conduct an operating test on the existing inductance loops at the control cabinet in the presence of the Engineer to determine if the inductance loop conductors have an insulating resistance of a minimum of 100 megohms when tested with a 500-volt direct current potential in a reasonably dry atmosphere between conductors and ground. The Department may also conduct its own tests with its own equipment.

If the tests indicate the loop resistances are above the specified limit and the Engineer determines the system is operable, proceed with the asphalt inlay. If the test indicates the loop resistance is not within the specified limits or if the Engineer determines the system is otherwise not operable, prior to placing the asphalt inlay install and test new loop detectors according to the station layout, notes, and Detail Drawings.

The Engineer will contact and maintain liaison with the District Planning Engineer and the Division of Planning in order to coordinate any necessary work.

3.15. Maintain and Control Traffic

Furnish (all as required): Drums, traffic cones, barricades used for channelization purposes, delineators, and object markers.

Maintain and Control Traffic shall conform to the plans, the Standard Specifications for Road and Bridge Construction, and the KYTC Department of Highways Standard Drawings.

3.16. Open Cut Roadway

Furnish: Concrete, reinforcing bars.

Excavate trench by sawing and chipping away roadway to dimensions as indicated on the detail sheets. After placing conduit, install concrete and steel reinforcing bars per the *Standard Specifications for Road and Bridge Construction*. Restore any disturbed sidewalk to its original condition.

3.17. Piezoelectric Sensor

Furnish: Piezoelectric sensor and cable; sensor support brackets; saw slot sealant; backer rod; grout; conduit sealant.

The plans and notes specify the approximate location for piezoelectric sensor (piezo) installations. Prior to sawing slots or drilling cores, the Contractor shall meet with a representative of the Division of Planning to verify the final layout on site. Avoid expansion joints and pavement sections where potholes, cracks, or other roadway flaws exist. Roadway ruts at the proposed piezo location shall not be in excess of ½ inch under a 4-foot straight edge.

Install the piezo perpendicular to traffic in the final surface course of the pavement. Locate the sensor in the lane as shown on the site layout drawing. Eleven-foot length sensors shall be centered in the lane.

The following is a typical step by step procedure for the installation of a piezo. Refer specifically to the manufacturer's instructions provided with the sensor prior to installation.

- Carefully mark the slot to be cut, perpendicular to the flow of traffic and properly positioned in the lane.

- It is strongly recommended that a 3/4 inch wide diamond blade be used for cutting the slot, or that blades be ganged together to provide a single 3/4 inch wide cut. The slot shall be wet cut to minimize damage to the pavement.
- Cut a slot 3/4 inch wide ($\pm 1/16$ inch) by 1 inch minimum deep. The slot should be a minimum of 2 inches longer than the sensor (including the lead attachment). Drop the saw blade an extra 1/2 inch down on both ends of the sensor. The lead out of the passive cable should be centered on the slot.
- Cut the slot for the passive cable 1/4 inch wide and at a depth so that the top of the backer rod is a minimum of 2 inches below the road surface.
- Clean ALL foreign and loose matter out of the slot and within 1 foot on all sides of the slot using a high-pressure washer.
- Completely dry the slot and within 1 foot on all sides of the slot using oil-free forced air, torpedo heaters, electric heaters, or natural evaporation, depending on weather conditions. Be very careful not to burn the asphalt if heat is used.
- Measure 9-12 inches from the edge of the paved surface (shoulder break or face of curb) and drill a 1 1/2 inch hole on a 45° angle to the conduit adjacent to the roadway.
- Place strips of 2-4-inch-wide tape strips on the pavement along the lengths of both sides of the sensor slot, 1/8 inch away from the slot.
- Wear clean, protective latex (or equivalent) gloves at all times when handling sensors. Visually inspect sensor to ensure it is straight. Check lead attachment and passive cable for cuts, gaps, cracks and/or bare wire. Verify that the correct sensor type and length is being installed by checking the data sheet. Verify there is sufficient cable to reach the cabinet. Piezo lead-in cable shall not be spliced.
- Test the sensor for capacitance, dissipation factor and resistance, according to the directions enclosed with the sensor. Capacitance and dissipation should be within $\pm 20\%$ of the piezo data sheet. Resistance (using the 20M setting) should be infinite. Record the sensor serial number and the test results and label “pre-installation.” This information should be stored in the counter cabinet and/or returned to Department Planning personnel.
- Lay the sensor next to the slot and ensure that it is straight and flat.
- Clean the sensor with steel wool or an emery pad and wipe with alcohol and a clean, lint-free cloth.
- Place the installation bracket clips every 6 inches along the length of the sensor.
- Bend the tip of the sensor downward at a 30° angle. Bend the lead attachment end down at a 15° angle and then 15° back up until level (forming a lazy Z).
- Place the sensor in the slot, with the brass element 3/8 inch below the road surface along the entire length. The tip of the sensor should be a minimum of 2 inches from the end of the slot and should not touch the bottom of the slot. The top of the plastic installation bracket clips should be 1/8 inch below the surface of the road. The lead attachment should not touch the bottom or sides of the slot. Ensure the sensor ends are pushed down per the manufacturer’s instructions.
- Visually inspect the length of the sensor to ensure it is at uniform depth along its length and it is level (not twisted, canted or bent).

- On the passive cable end, block the end of the slot approximately 3-5 inches beyond the end of the lead attachment area creating an adequate “dam” so that the sensor grout does not flow out.
- Use one bucket of sensor grout per piezo installation. Overfill the slot with sensor grout and allow to cure for a minimum of 10 minutes before continuing with the installation. Ensure that sensor grout fills around and beneath the sensor completely and that there is not a trough on top.
- Remove the tape along the sides of the saw slot when the adhesive starts to cure.
- Carefully remove the dam from the end of the sensor.
- Route the lead-in cable through the saw slot
- Install conduit sealant to a minimum of 1” deep into the cored 1½ inch hole.
- Cover the lead-in cable with encapsulant, backer rod, and grout.
- If necessary, after the grout has hardened, grind with an angle grinder until the profile is a 1/16-inch mound. There shall be no concave portion to the mound.
- Clean up the site and dispose of all waste off the project.
- Ensure that the sensor grout has completely cured prior to subjecting the sensor to traffic. Curing time will vary with temperature and humidity.

Upon installation, test the sensor for capacitance, dissipation factor and resistance, according to the directions enclosed with the sensor. Capacitance and dissipation should be within $\pm 20\%$ of the piezo data sheet. Resistance (using the 20M setting) should be infinite. Perform a functional test of the piezo with an oscilloscope to ensure that the sensor is generating a proper response to the passage of vehicles.

Record the sensor serial number and the test results and label “post-installation.” This information should be stored in the counter cabinet and/or returned to Department Planning personnel.

3.18. Pole – Wooden

Furnish: Pole; anchoring equipment (as required); hardware (as required).

Excavate and install wood pole to a minimum depth of one-sixth the total pole height. Place backfill material in hole and compact until flush with existing grade. Install guy wire, guy guard, anchor, anchor rod, and strand vise, if necessary. Anchor shall be a minimum of one-third the pole height from the face of the pole. Provide temporary erosion control, seeding, protection and restoration of disturbed areas to the satisfaction of the Engineer.

3.19. Removal of Existing Equipment

The Contractor shall remove existing materials (including but not limited to: poles, anchors, cabinets, junction boxes, conduit and wire) not to be reused. Contractor shall dispose of all removed materials off the project. All materials and labor necessary for the removal of existing equipment shall be considered incidental to other bid items.

3.20. Signs

Furnish: Signs; sign standards; hardware.

Construction of signs shall conform to the *Standard Specifications for Road and Bridge Construction*.

3.21. Splicing

Furnish: Splice kit; solder.

These notes describe the splicing process (if permitted) and are not intended to grant permission to splice. Permission to splice shall be determined by the Division of Planning and the locations shall be shown on the layout sheet. If splicing is needed but not shown on the layout sheet, the Contractor shall receive prior written approval from the Division of Planning.

All splices shall conform to the provisions of the NEC.

Splices for loop and loop lead-in wire shall be twisted and soldered. Abrade the outer jacket of both wires to promote good adhesion and prevent capillary leak paths. Seal the splice with an electrical sealing resin. Spliced loop conductors shall test free of shorts and unauthorized grounds and shall have an insulating resistance of at least 100 megohms when tested with a 500-volt direct current potential in a reasonably dry atmosphere between conductors and ground.

For piezos, the same type coax cable, supplied by the manufacturer, shall be used to splice to the sensor's lead-in cable. Cables shall be soldered. Abrade the outer jacket of both cables to promote good adhesion and prevent capillary leak paths. Seal the splice with an electrical sealing resin. Spliced piezo cables shall be tested and have a minimum resistance of 20 megohms, a maximum dissipation factor of 0.03, a capacitance within the manufacturer's recommended range based upon the length of additional cable. A functional test of the piezo shall be performed to ensure that the sensor is generating a proper response to the passage of vehicles.

3.22. Trenching and Backfilling

Furnish: Warning tape; seed mix type I; cereal rye or German foxtail-millet; mulch; concrete (as required); asphalt (as required).

Excavate trench and provide required cover as shown on the standard detail sheets. After placing conduit, backfill material shall be placed and compacted in lifts of 9 inches or less. Install warning tape as shown on the detail sheet. Provide temporary erosion control, seeding, protection and restoration of disturbed areas to the satisfaction of the Engineer.

3.23. Wiring

Furnish: Wire; wire labels; spade tongue wire terminals (as required).

Installation of all wiring shall conform to the NEC. Permanent identification numbers

shall be affixed to all wires in all junction boxes and cabinets (see Layout(s) for loop and piezo numbers).

Additional lengths of each loop and piezo sensor wire shall be neatly coiled in all cabinets and junction boxes as follows:

Enclosure Type	Additional length of each wire
Galvanized Steel Cabinet	2' - 3'
Pad Mount Cabinet (332)	6' - 8'
Pole Mount Cabinet (336)	3' - 4'
Junction Box Type 10x8x4	2' - 3'
Junction Box Type A, B, or C	2' - 3'

3.24. Wood Post

Furnish: Wood post; concrete (as required); seed mix type I; cereal rye or German foxtail-millet; mulch.

Excavate hole to specified depth and place concrete, if required. Install post, backfill to existing grade, and tamp backfill. Provide temporary erosion control, seeding, protection and restoration of disturbed areas to the satisfaction of the Engineer.

3.25. Remove and Replace Sidewalk

Furnish: Lumber, stakes, nails or screws, and concrete.

Remove existing sidewalk to install rigid conduit from edge of roadway to nearest junction box or cabinet. Form, pour and finish concrete in place of old existing sidewalk making sure to replace the expansion joints in their respective locations. Concrete shall conform to the *Kentucky Standard Specifications for Road and Bridge Construction* for sidewalks.

4. BID ITEM NOTES AND METHOD OF MEASUREMENT FOR PAYMENT

Only the bid items listed will be measured for payment. All other items required to complete the vehicle detection installation shall be incidental to other items of work. Payment at the contract unit price shall be full compensation for all materials, labor, equipment and incidentals to furnish and install these items.

4.1. Bore and Jack Pipe – 2”

Bore and jack pipe – 2” shall be furnished, installed, and measured for payment per the *Standard Specifications for Road and Bridge Construction*.

4.2. Conduit

Conduit shall include furnishing and installing specified conduit in accordance with the specifications. This item shall include conduit fittings, bodies, boxes, weatherheads, expansion joints, couplings, caps, conduit sealant, electrical tape, clamps, bonding straps and any other necessary hardware. Conduit will be measured in linear feet.

4.3. Electrical Service

Electrical Service shall include furnishing and installing all necessary materials and payment of all fees toward the complete installation of an electrical service which has passed all required inspections. Incidental to this item shall be furnishing and installing:

- Meter-base per utility company’s specifications
- Service disconnect panel per utility company’s specifications
- Meter base and service disconnect entrance hubs, waterproof
- Service entrance conductors
- Rigid steel conduit
- Rigid steel conduit fittings
- Conduit straps
- Weatherhead
- Duplex GFCI receptacle, 120-volt, 20-amp
- Ground rod with clamp
- Grounding conductor

Also incidental to this item shall be any necessary clearing of right of way for the electrical service drop.

Electrical service will be measured in individual units each.

4.4. Flashing Arrow

Flashing Arrow shall be furnished, installed, and measured for payment per the *Standard Specifications for Road and Bridge Construction*.

4.5. Galvanized Steel Cabinet

Galvanized Steel Cabinet shall include furnishing and installing galvanized steel cabinet on post as specified. Incidental to this item shall be furnishing and installing grounding hardware, and any necessary post/pole mounting hardware. Also incidental to this item shall be furnishing and installing the required number of terminal blocks and connection of all

sensors to the terminal blocks. Galvanized Steel Cabinet will be measured in individual units each.

4.6. Install Pad Mount Enclosure

Install Pad Mount Enclosure shall include installing a Department-furnished enclosure as specified on the detail sheets.

This item shall include obtaining the enclosure from KYTC and transporting it to the installation site and furnishing and installing the following:

- Concrete foundation (including any excavation necessary)
- Anchor bolts, lock washers, and nuts
- Conduit
- Conduit fittings (including grounding bushings)
- Weatherhead
- Terminal Strip(s)
- Ground rod with clamp
- Grounding conductor

Install Pad Mount Enclosure will be measured in individual units each.

4.7. Install Controller Cabinet

Install Controller Cabinet shall include installing a Department-furnished cabinet as specified on the detail sheets.

This item shall include obtaining the cabinet from KYTC and transporting it to the installation site and furnishing and installing the following:

- Conduit
- Conduit Fittings
- Terminal Strip(s)
- Ground rod with clamp
- Grounding conductor

Install Controller Cabinet will be measured in individual units each.

4.8. Junction Box Type 10" x 8" x 4"

Junction Box Type 10"x8"x4" shall include furnishing and installing specified junction box in accordance with the specifications. This item shall include connectors, splice sleeves, conduit fittings, mounting materials and any other items required to complete the installation. Incidental to this item shall be furnishing and installing specified post (wood, channel, metal, etc.) as required for the installation. Junction Box Type 10"x8"x4" will be measured in individual units each.

4.9. Junction Box Type A, B, or C

Junction Box Type A, B, or C shall include furnishing and installing specified junction box in accordance with the specifications. This item shall include excavation, furnishing and installing #57 aggregate, backfilling around the box, and restoration of disturbed areas to the satisfaction of the Engineer. Incidental to this item shall be furnishing and installing a

grounding conductor bonding all conduit grounding bushings in the box. Junction Box Type A, B, or C will be measured in individual units each.

4.10. Loop Saw Slot and Fill

Loop Saw Slot and Fill shall include sawing and cleaning saw slots and furnishing and installing conduit sealant, loop sealant, backer rod, grout, or other specified material. Loop Saw Slot and Fill will be measured in linear feet of sawed slot.

4.11. Maintain and Control Traffic

Maintain and Control Traffic shall be measured for payment per the *Standard Specifications for Road and Bridge Construction*.

4.12. Open Cut Roadway

Open Cut Roadway shall include excavating trench (sawing and chipping roadway) to dimensions as indicated on the detail sheets and furnishing and placing concrete, steel reinforcing bars, and asphalt. This item also includes restoring any disturbed sidewalk to its original condition. Open Cut Roadway will be measured in linear feet.

4.13. Piezoelectric Sensor

Piezoelectric sensor (piezo) shall include sawing and cleaning saw slots and furnishing and installing piezo in accordance with the specifications. This item shall include furnishing and installing lead-in wire, conduit sealant, encapsulation material, backer rod, grout, testing, and accessories. Piezo will be measured in individual units each.

4.14. Pole – 35' Wooden

Pole – 35' Wooden shall include excavation, furnishing and installing specified wood pole, backfilling and restoring disturbed areas to the satisfaction of the Engineer. Incidental to this item shall be furnishing and installing guy wire, anchor and anchor rod, strand vise, and guy guard, if specified.

Pole – 35' Wooden will be measured in individual units each.

4.15. Signs

Signs shall be furnished, installed, and measured for payment per the *Standard Specifications for Road and Bridge Construction*.

4.16. Trenching and Backfilling

Trenching and Backfilling shall include excavation, warning tape, backfilling, temporary erosion control, seeding, protection and restoration of disturbed areas to original condition. This item shall include concrete, asphalt or approved replacement material for sidewalks, curbs, roadways, etc. (if required). Trenching and backfilling will be measured in linear feet.

4.17. Wire or Cable

Wire or cable shall include furnishing and installing specified wire or cable within saw slot, conduit, junction box, cabinet, or overhead as indicated on the detail sheets. Incidental to this item shall be the labeling of all wires and cables in each junction box, cabinet and splice

box, and furnishing and installing other hardware required for installing cable. Wire or Cable will be measured in linear feet.

4.18. Wood Post

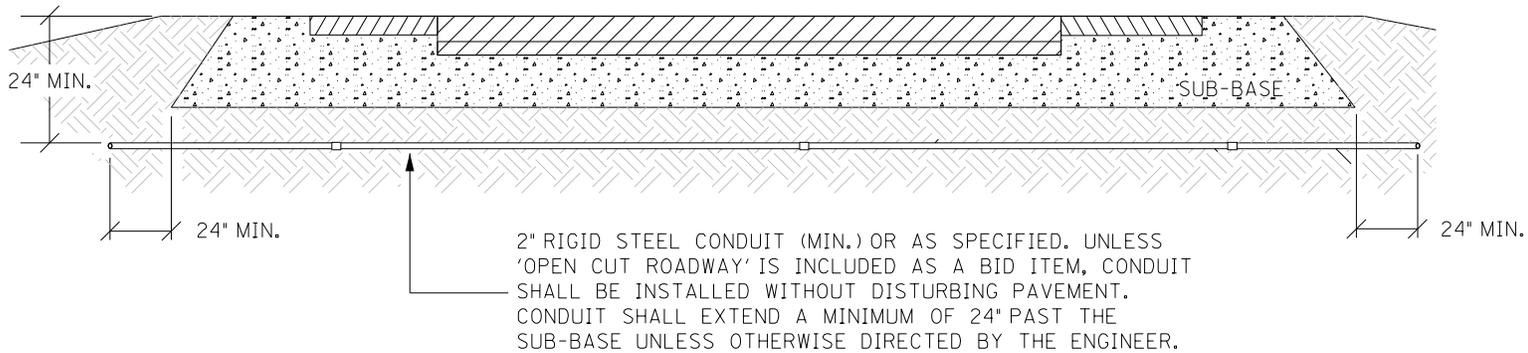
Wood Post shall include furnishing and installing wood post as specified. This item shall include excavation, furnishing and placing concrete (if required), backfilling around the post, and restoration of disturbed areas to the satisfaction of the engineer. Wood Post will be measured in individual units each.

4.19. Remove and Replace Sidewalk

Remove and Replace Sidewalk shall include removing existing sidewalk to install conduit and/or junction box (if required) and replacing old existing sidewalk with new sidewalk after installation of required items. This item includes removing old sidewalk and disposing of off the project and forming, pouring and finishing the new sidewalk after installation of required items.

4.20. Loop Test

Loop Test includes conducting an operating test on the existing inductance loops at the control cabinet in the presence of the Engineer to determine if the inductance loop conductors have an insulating resistance of a minimum of 100 megohms when tested with a 500-volt direct current potential in a reasonably dry atmosphere between conductors and ground.

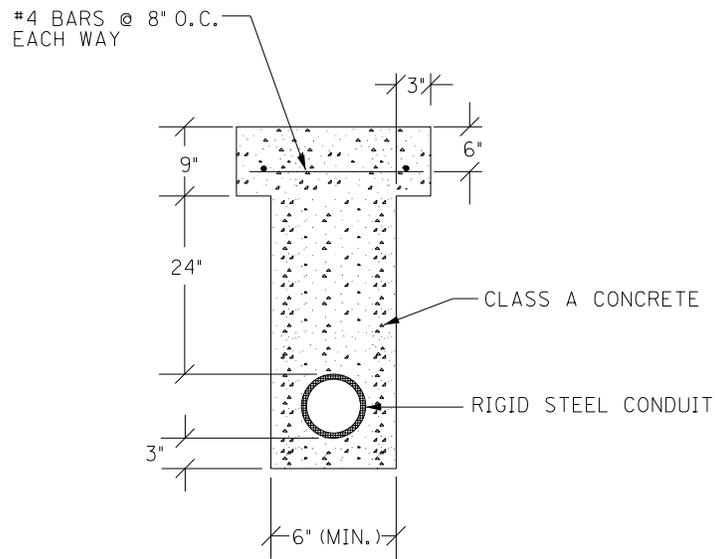
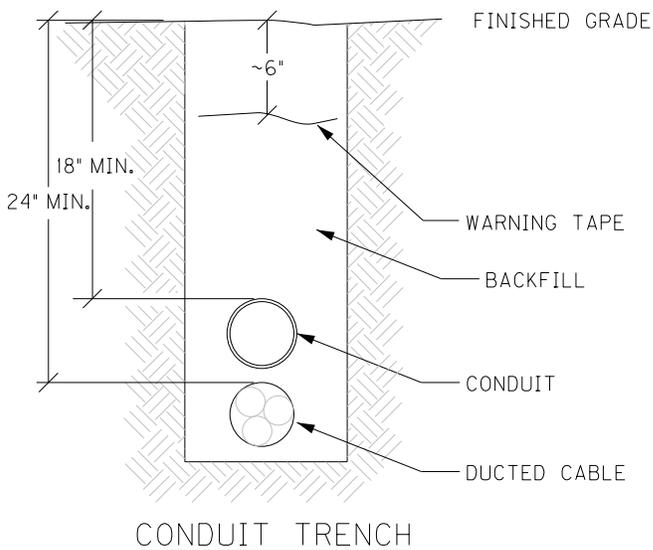


CONDUIT UNDER PAVEMENT

TOTAL TRENCH WIDTH SHALL BE 3" (NOM.) WIDER THAN THE SUM OF THE OUTSIDE DIAMETER(S) OF THE CONDUIT(S) INSTALLED. CONDUIT(S) SHALL BE CENTERED IN TRENCH.

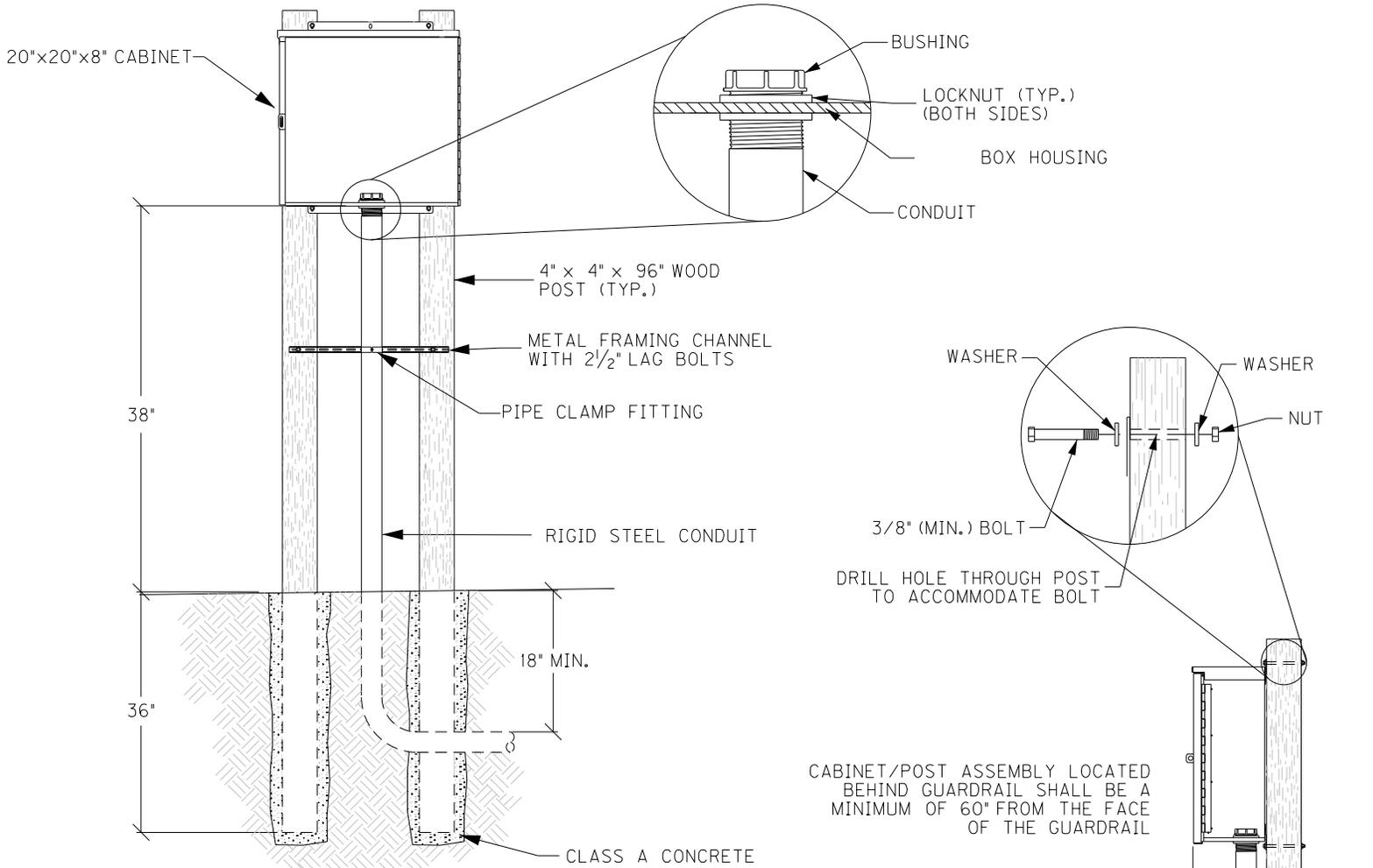
CONTRACTOR SHALL PLACE BACKFILL IN LIFTS (9" MAX.) COMPACT BACKFILL, AND RESTORE DISTURBED AREA TO THE SATISFACTION OF THE ENGINEER

CONTRACTOR SHALL INSTALL UNDERGROUND UTILITY WARNING TAPE ABOVE CONDUIT AS SHOWN.

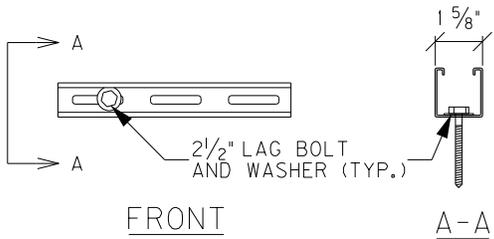


OPEN CUT PAVEMENT DETAIL

CONDUIT INSTALLATION



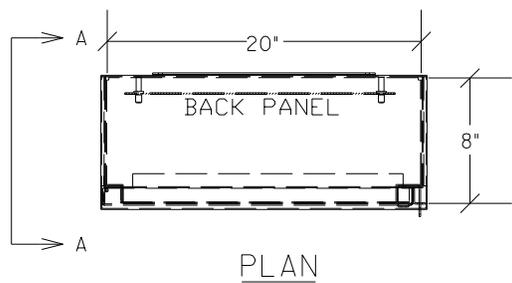
FRONT VIEW



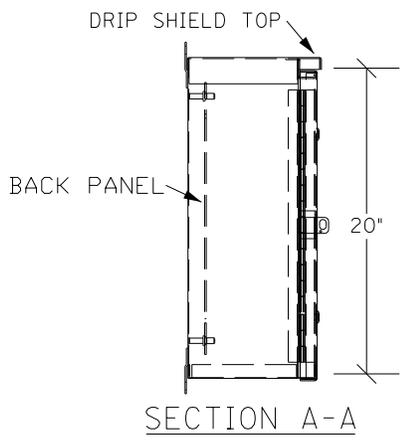
METAL FRAMING CHANNEL

GALVANIZED STEEL CABINET
DOUBLE POST ASSEMBLY

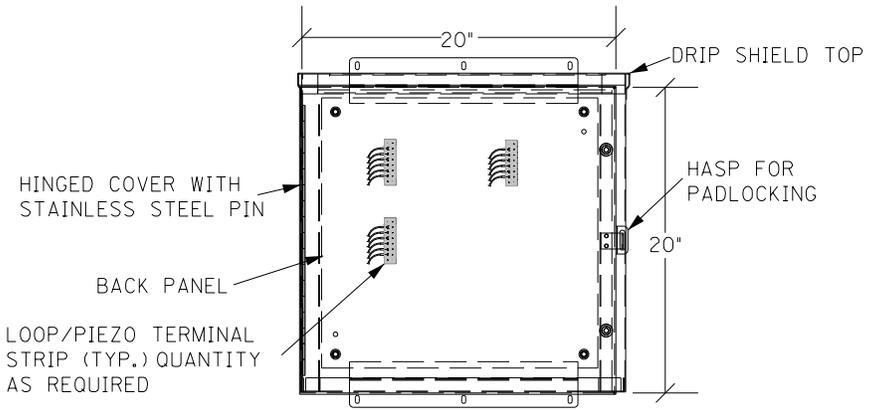
RIGHT VIEW



PLAN

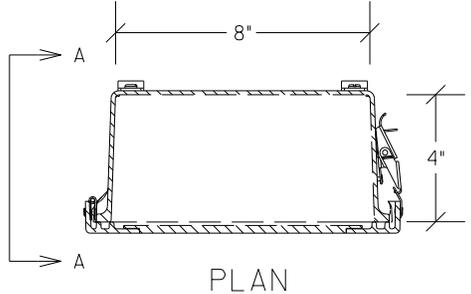


SECTION A-A

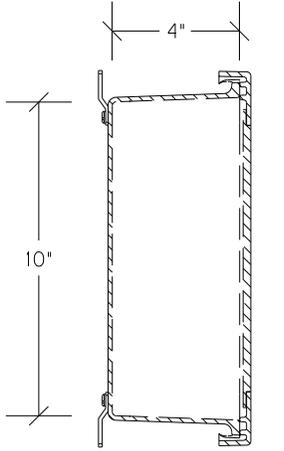


ELEVATION

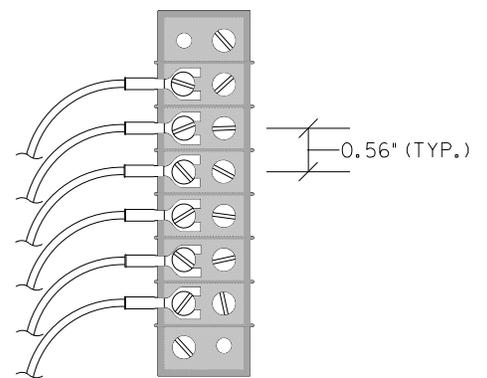
GALVANIZED STEEL CABINET



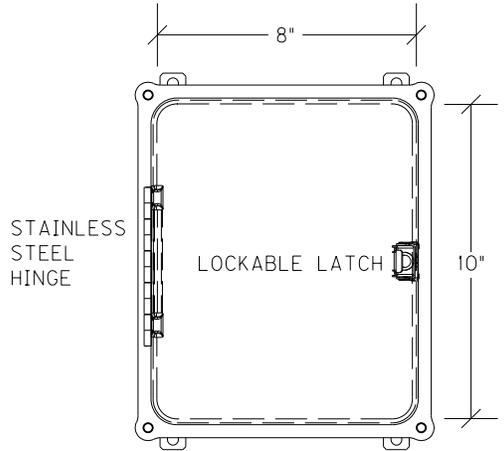
PLAN



SECTION A-A

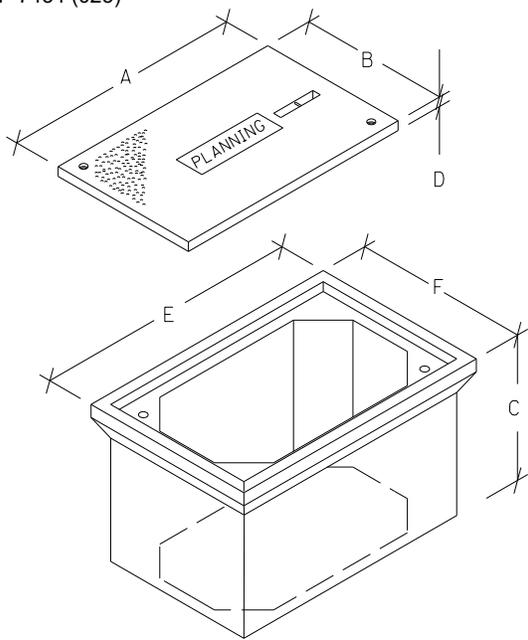


TERMINAL STRIP (TYP.)



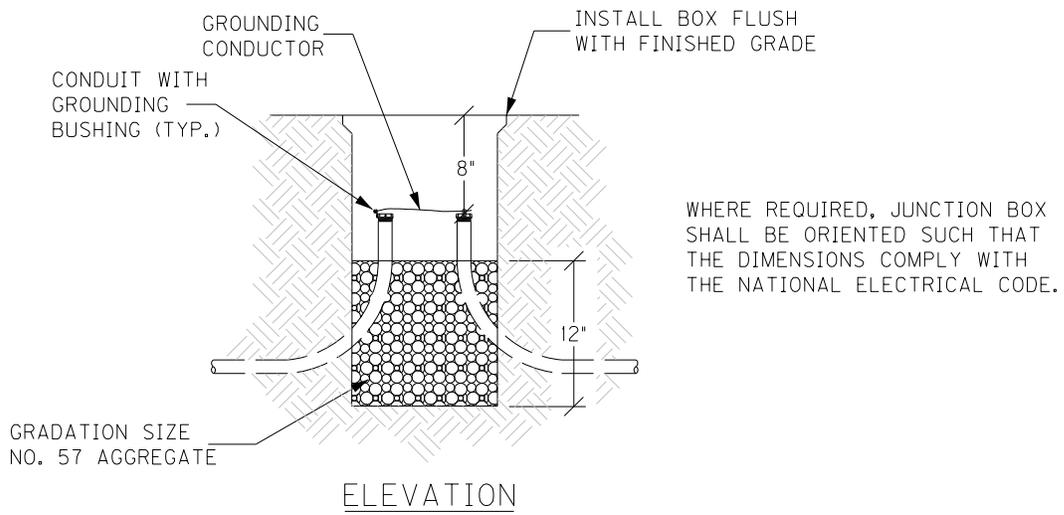
ELEVATION

JUNCTION BOX 10"X8"X4"

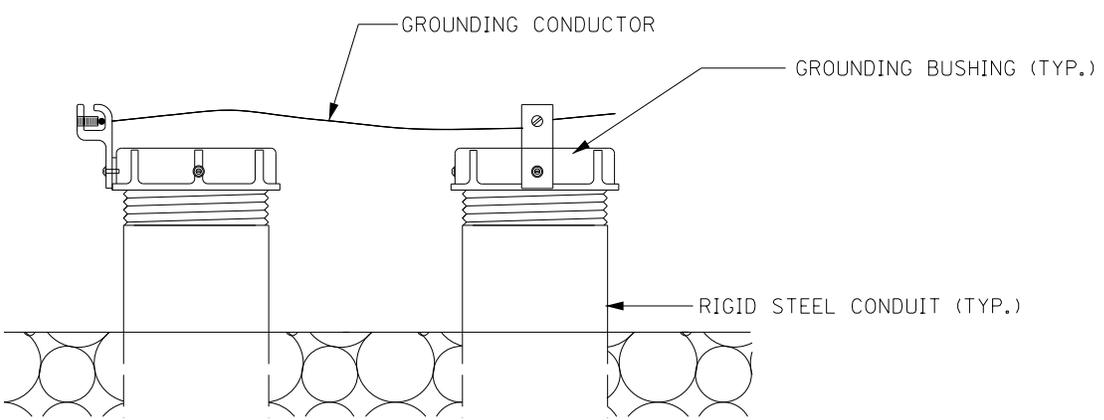


JUNCTION BOX DIMENSIONS (NOMINAL)						
	A	B	C	D*	E	F
TYPE A	23"	14"	18"	2"	25"	16"
TYPE B	18"	11"	12"	1¾"	20"	13"
TYPE C	36"	24"	30"	3"	38"	26"

* MINIMUM
STACKABLE BOXES ARE PERMITTED



ELEVATION

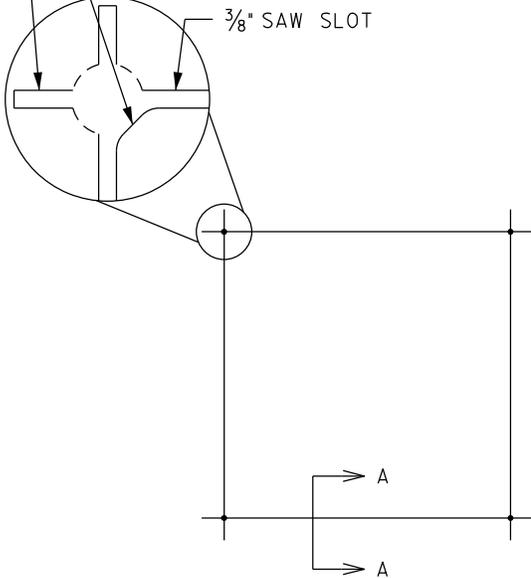


GROUNDING DETAIL

JUNCTION BOX - TYPE A, TYPE B, TYPE C

WARREN COUNTY
STP 7434 (023)

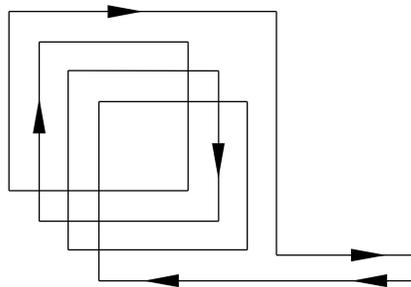
EXTEND CUT BEYOND CORNER
TO ACHIEVE FULL DEPTH
CORE DRILL 1 1/2" HOLE AND/OR
CHISEL CORNER TO SLOT DEPTH
TO ELIMINATE SHARP EDGES



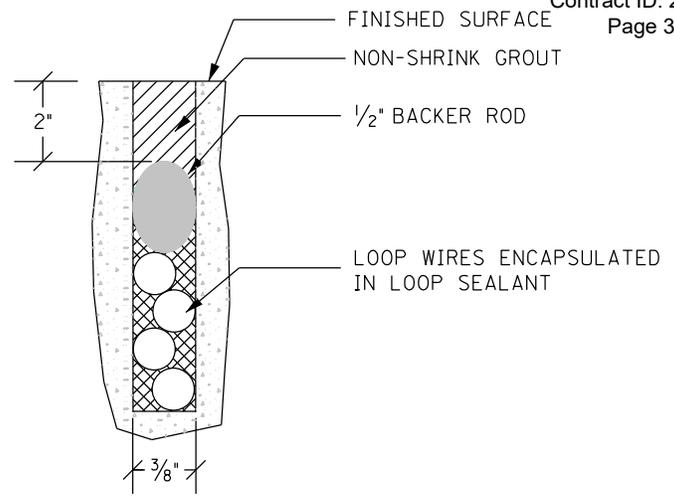
SAW CUT PLAN

UNLESS SPECIFIED OTHERWISE, ALL LOOPS SHALL BE 6' x 6' SQUARE, CENTERED IN EACH LANE, WITH FOUR (4) TURNS OF 14 AWG LOOP WIRE.

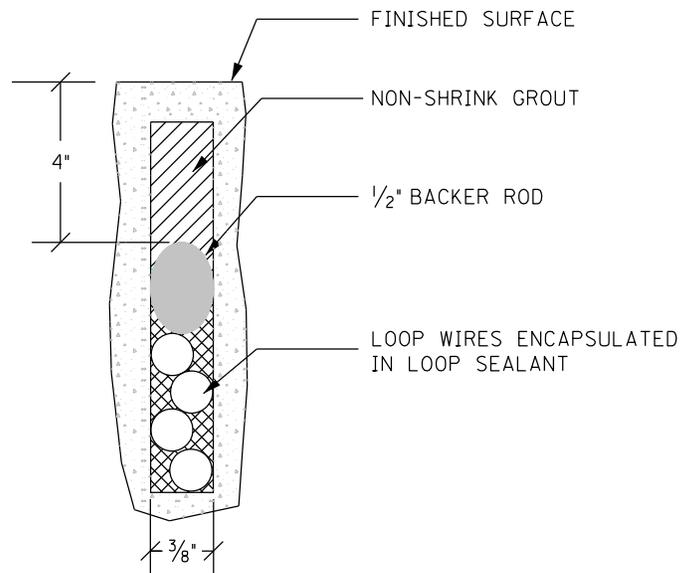
ADJACENT SAW SLOTS SHALL BE A MINIMUM OF 12" APART.



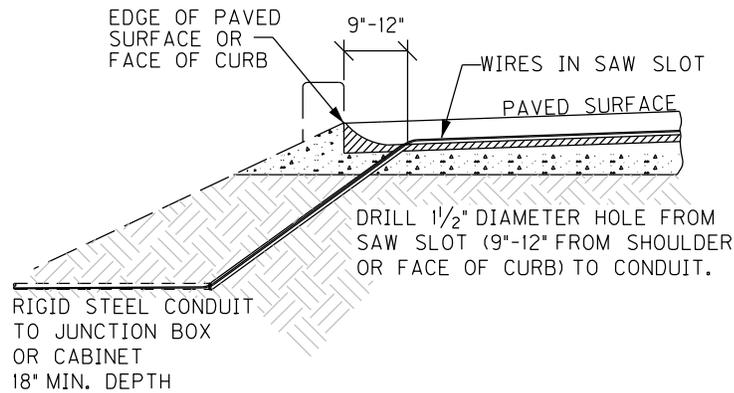
WIRING PLAN



SECTION A-A (CONCRETE)

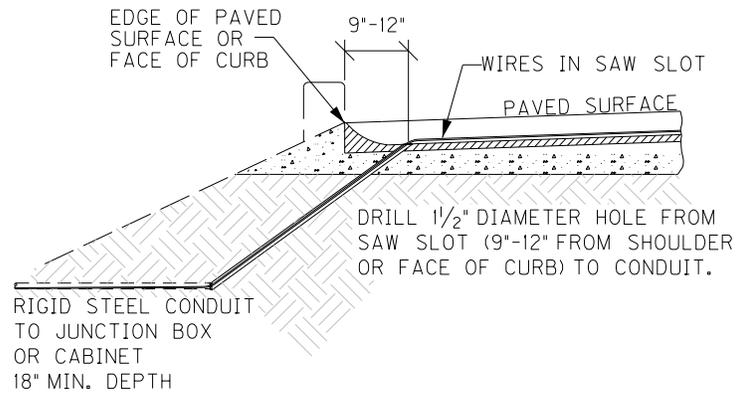
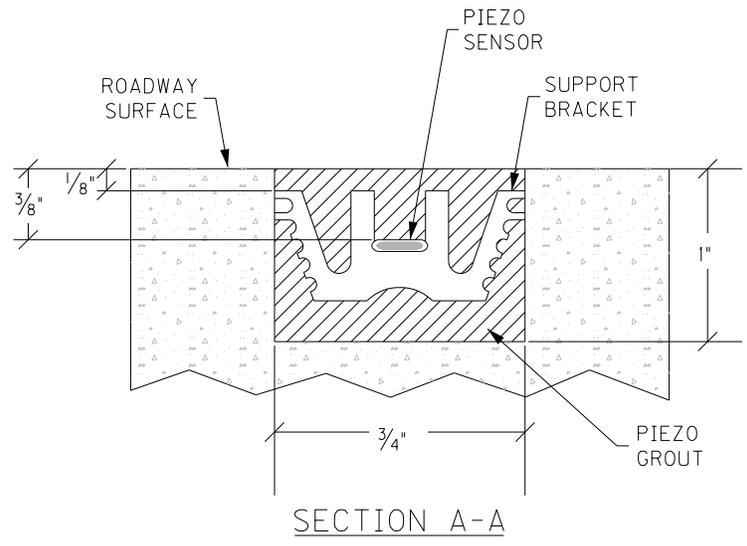
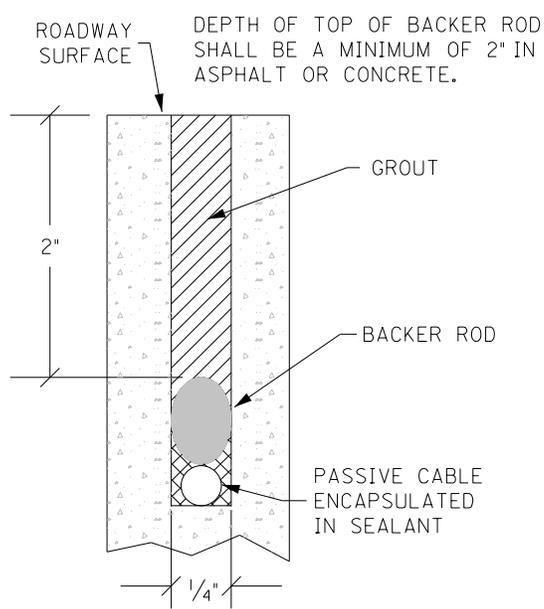
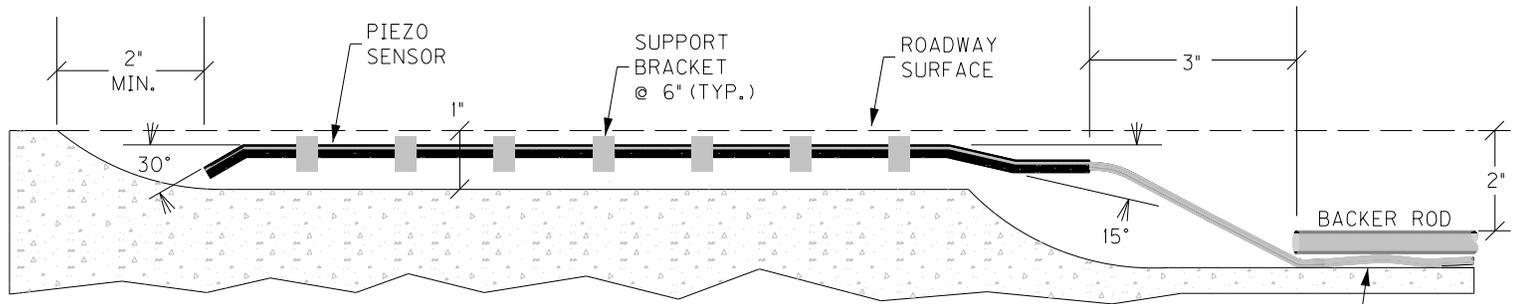
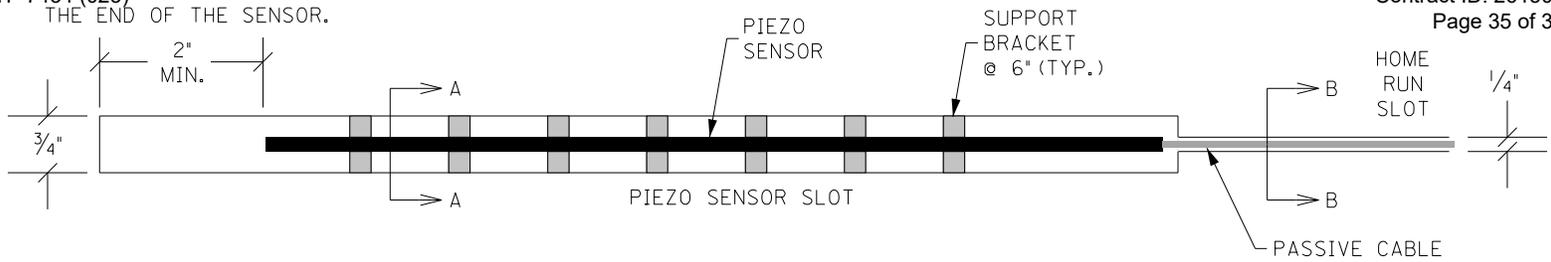


SECTION A-A (ASPHALT)



SAW SLOT EDGE OF PAVEMENT TRANSITION

INDUCTIVE LOOP DETECTOR



PIEZOELECTRIC SENSOR INSTALLATION

PREPARED BY _____ DATE _____
CHECKED BY _____ DATE _____
APPROVED BY _____ DATE _____

USER: \$\$\$USER\$\$\$
DATE: \$\$\$DATE\$\$\$
FILE NAME: \$\$\$design\$flte\$Specification\$\$\$
E-SHEET NAME: _____

NOTES:
1. FITTINGS SHALL BE INCIDENTAL TO PIPE

KYTC Item No.	Description	Unit	Drawings Sheet Numbers									Total Units		
			U1	U2	U3	U4	U5	U6	U7	U8	U9			
14040	Water 16" DI Water Main	LF		23	301									324
14039	12" DI Water Main	LF	412	290	368	609	618	584	597	618	275			4,371
14037	12" DI Water Main with Nitrile Gasket	LF		345	71									416
14036	8" DI Water Main	LF		80	54	156	6							290
14035	8" DI Water Main	LF				6								14
14033	2" DI Water Main	LF				14								14
14055	1" DI Water Main	LF								51				51
14016	20" Steel Casing Pipe Open Cut (Range 5)	LF						20	20					40
14017	30" Steel Casing Pipe Bored & Jacked w/ Casing Spacers (Range 6)	LF			80									80
14017	30" Steel Casing Pipe Bored & Jacked w/ Casing Spacers (Range 6)	LF			30									30
14018	16" Steel Casing Pipe Bored & Jacked w/ Casing Spacers (Range 4)	LF				72								72
14014	12" Steel Casing Pipe Open Cut w/ Casing Spacers (Range 3)	LF								20				20
14015	16" Steel Casing Pipe Open Cut w/ Casing Spacers (Range 4)	LF												28
14016	24" Steel Casing Pipe Open Cut w/ Casing Spacers (Range 5)	LF	55	85	85	30								235
14003	Entr. Separat. Block Assembled Water Main	EA	2	4	2	1	4	1	1	6	2			22
14019	6" Fire Hydrant Assembly w/ Gate Valve	EA	1	1	1									6
14021	Remove Existing Fire Hydrant Assembly	EA	1	1	1	1	1	1	1	1	1			9
14090	Connect to Existing System via 16" Tapping Sleeve, 16" Valve & Valve Box (Size 2)	EA	1	1	1					1	1			5
14089	Connect to Existing System via 12" Tapping Sleeve, 12" Valve & Valve Box (Size 2)	EA								1				1
14089	Connect to Existing System via 6" Tapping Sleeve, 2" Valve & Valve Box (Size 1)	EA												2
14089	Connect to Existing System via 2" Tapping Sleeve, 2" Valve & Valve Box (Size 1)	EA				2								2
14089	Connect to Existing System via 1" Compression Coupling and Corp Stop	EA								1				1
14089	Connect to Existing System via 8" Solid Sleeve	EA				1								2
14109	16" Gate Valve & Box	EA	2	2	3									5
14108	12" Gate Valve & Box	EA	2	2		2	2	2	2	3	4			17
14106	8" Gate Valve & Box	EA				1								1
14105	6" Gate Valve & Box	EA									1			1
14030	Ductile Iron Fittings (Fittings incidental to pipe)	TONS												2.36
14080	Relocate Existing Water Meter	EA	1	3	2	1	2	5	4	5	4			27
14080	3/4" Service Reconnection - Long Side	EA			2		1	2	1	1				7
14085	3/4" Service Reconnection - Short Side	EA	1	3		2	1	3	3	4	4			21
14177	Driveway/Entrance Restoration	LF			56	24	40	74	85	129	30			418
14177	Structure Removal (i.e. Valve Boxes)	EA	2											2
2690	Safeload Existing Water Main Under Roadway	CUYD	6.92	3.344	19.33	19.94	14.28			2.384				66
15117	Sanitary 24" PVC Sanitary Sewer	LF							241	610	101			952
15118	15" PVC Sanitary Sewer	LF					215	327						542
15114	12" PVC Sanitary Sewer	LF	141	142										283
15113	10" PVC Sanitary Sewer	LF									62			62
15112	8" PVC Sanitary Sewer	LF				201				38				239
15063	12" PVC Force Main	LF	359						67					426
15060	6" PVC Force Main	LF								132				132
15018	24" Steel Casing Pipe Bored & Jacked w/ Casing Spacers (Range 5)	LF	100				80	80						260
15017	18" Steel Casing Pipe Bored & Jacked w/ Casing Spacers (Range 4)	LF									55			55
15016	12" Steel Casing Pipe Bored & Jacked w/ Casing Spacers (Range 3)	LF								67				67
15022	12" Steel Casing Pipe Open Cut w/ Casing Spacers (Range 3)	LF								25				25
15092	4" Diameter Pre-bored Manhole (6'-6" Deep)	EA	1	2		5	4	2	4	3	21			21
15094	Adjust Manhole to Grade	EA	1	1	1									2
15093	Remove/Abandon Existing Manhole	EA	1	1						2	2			14
15099	Connect to Existing Manhole	EA				1	1	2	2	5	2			3
14089	Solid Sleeve	EA	2								2			4
15155	Cut, Cap and Block Existing Force Main	EA	1								2			3
15087	Fittings (Incidental to pipe)	TONS	0.26											0.26
15086	Sanitary Sewer Reconnect Long Side	EA												2
15155	Sanitary Sewer Reconnect Short Side	EA	1	2		2	1	1			1			5
15155	Cut and Cap 24" Sewer	EA												1
15155	Cut and Cap 15" Sewer	EA							1					2
15155	Cut and Cap 10" Sewer	EA												2
15155	Cut and Cap 8" Sewer	EA												2
15155	Cut and Cap 6" Sewer	EA												2
15077	Cut and Cap 4" Sewer	EA									1			1
15074	12" Force Main Tie-In	EA	1											1
2690	Safeload Existing Sewer Under Roadway	CUYD	6.629	2.035			2.82			21.22	1.89			34.6