

**Cuyahoga County
Department of Public Works
Cuyahoga County Engineer's
Sample Traffic Control Notes**

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CUY-T01

ITEM 630 - SIGNS ERECTED, FLAT SHEET (11/21/2013)

CUY-D500 SIGNS ERECTED UNDER THIS ITEM WILL BE SUPPLIED AND INSTALLED BY THE CUYAHOGA COUNTY DEPARTMENT OF PUBLIC WORKS. THE CONTRACTOR MUST GIVE FOUR WEEKS ADVANCE NOTICE TO THE CUYAHOGA COUNTY SIGN SHOP, 4000 BROOKPARK ROAD, CLEVELAND, OHIO 44134 (216-741-3019), PRIOR TO THE DESIRED INSTALLATION OF THE SIGNS.

Designer Note: Include this note when CUY-D500 signs are to be installed by the county. The CUY-D500 sign is to be installed on all county roads and state routes 500 feet in advance of the centerline of the intersection of all county roads or state routes. The 30" x 24" sign is used on single lane approaches only, while the 36" x 30" sign is used when there are two or more lanes on the approach. The county supplies and installs these signs as indicated in the note.

CUY-T02

ITEM 630 - SIGN ERECTED, FLAT SHEET (Municipally Supplied) (01/04/1999)

THE SIGNS LISTED BELOW, TO BE ERECTED UNDER THIS ITEM, WILL BE SUPPLIED BY THE (CITY) (VILLAGE) OF _____ TWO WEEKS ADVANCE NOTICE MUST BE GIVEN TO THE (CITY) (VILLAGE) _____ DEPARTMENT, _____, OHIO ____ (216-__-____), PRIOR TO PICKUP OF THE SIGNS BY THE CONTRACTOR, AT THE ABOVE ADDRESS.

Designer Note: Include this paragraph with CUY-T01 when municipally supplied signs (such as snow emergency route or late night parking restriction signs) are to be installed by the contractor. Include the address and telephone number of the municipal agency which will supply the signs, and specify which signs will be furnished.

CUY-T03

ITEM 630 - SIGN, STREET NAME, AS PER PLAN (04/25/2005)

SIGNS SUPPLIED UNDER THIS ITEM SHALL MEET THE REQUIREMENTS OF 630, EXCEPT THAT THE BACKGROUND COLOR OF THE SIGN SHALL BE _____. THE LEGEND SHALL BE ____ INCH HIGH LETTERS ON A ____ INCH HIGH EXTRUDED PLATE WITH STIFFENED EDGES.

Designer Note: Use this note when oversize street name signs (larger than 4 inch letters on an 8 inch plate) are desired by the municipality, and/or when the background color differs from the Green color specified in the OMUTCD.

CUY-T04

ITEM 630 - SIGN, STREET NAME, AS PER PLAN (04/25/2005)

SIGNS SUPPLIED UNDER THIS ITEM SHALL MEET THE REQUIREMENTS OF 630, EXCEPT THAT THE LEGEND SHALL BE ____ INCH HIGH LETTERS ON A ____ INCH HIGH EXTRUDED PLATE WITH STIFFENED EDGES.

Designer Note: Use this note when oversize street name signs (larger than 4 inch letters on an 8 inch plate) are desired by the municipality, and when the background color is the Green color specified in the OMUTCD.

CUY-T05

ITEM 630 - SIGN, DOUBLE FACED STREET NAME, AS PER PLAN (11/08/2013)

SIGNS SUPPLIED UNDER THIS ITEM SHALL MEET THE REQUIREMENTS OF 630, WITH THE FOLLOWING EXCEPTIONS:

- THE BACKGROUND COLOR OF THE SIGN SHALL BE BLUE.
- TYPE G SHEETING SHALL BE USED FOR THE BACKGROUND AND LEGEND.
- THE LEGEND SHALL BE 7 INCH HIGH UPPERCASE LETTERS USING THE UNIVERSE 65 FONT.
- THE BACKING MATERIAL SHALL BE A 10 INCH HIGH FLAT SHEET PLATE.
- THE SIGN SHALL BE INSTALLED USING FULL LENGTH EDGE STIFFENERS ALONG THE TOP AND BOTTOM.

THERE SHALL BE NO BORDER.

PAYMENT FOR ITEM 630 - SIGN, DOUBLE FACED STREET NAME, AS PER PLAN, WILL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH, COMPLETE AND IN PLACE, AND SHALL INCLUDE MOUNTING HARDWARE.

Designer Note: Use this note for Street Name signs in the City of Cleveland, or where any other municipality has special requirements such as those listed.

CUY-T06

ITEM 630 - SIGN, FLAT SHEET, TYPE G, AS PER PLAN (01/04/1999)

OVERHEAD MOUNTED STREET NAME SIGNS SUPPLIED UNDER THIS ITEM SHALL MEET THE REQUIREMENTS OF 630, WITH THE FOLLOWING EXCEPTIONS:

THE BACKGROUND COLOR OF THE SIGN SHALL BE BLUE.

TYPE G SHEETING SHALL BE USED FOR THE BACKGROUND, BORDER, AND LEGEND.

THE LEGEND SHALL BE FORMED FROM UPPER AND LOWER CASE LETTERS USING THE UNIVERSE 65 FONT, 12 INCHES HIGH FOR ONE LINE MESSAGES, AND 7 INCHES HIGH FOR TWO LINE MESSAGES.

THE BACKING MATERIAL SHALL BE A FLAT SHEET PLATE 20 INCHES HIGH FOR ONE LINE MESSAGES AND 24 INCHES HIGH FOR TWO LINE MESSAGES.

THE BORDER SHALL BE 1/4 INCH WIDE, INSET 1/2 INCH FROM THE EDGE OF THE PLATE.

PAYMENT FOR ITEM 630 - SIGN, FLAT SHEET, TYPE G, AS PER PLAN, WILL BE MADE AT THE CONTRACT UNIT PRICE BID PER SQUARE FOOT, COMPLETE AND IN PLACE.

Designer Note: Use this note for Mast Arm Mounted Street Name signs in the City of Cleveland. Modify as appropriate for other municipalities (Cleveland uses the plate sizes, fonts and border dimensions listed - others should use standard highway fonts, plate sizes and borders).

CUY-T07

ITEM 630 - SIGN, FLAT SHEET, TYPE G OR TYPE H (11/08/2013)

ALL SIGNS SHALL BE SUPPLIED AND ERECTED BY THE CONTRACTOR. SIGN SHEETING SHALL BE TYPE G EXCEPT FOR ALL STOP (R1-1), YIELD (R1-2), DO NOT ENTER (R5-1) AND WRONG WAY (R5-1a) SIGNS WHICH SHALL BE TYPE H SHEETING. STORE SIGNS AND POSTS AS DIRECTED BY THE ENGINEER FOR PICK UP BY COUNTY.

CUY-T08

ITEM 630 - SIGN HANGER ASSEMBLY, MAST ARM, AS PER PLAN (05/28/2010)

FLAT SHEET SIGNS SHALL BE RIGIDLY ATTACHED TO TRAFFIC SIGNAL MAST ARMS WITH THE SIGN CENTERED VERTICALLY WITH THE ARM, USING THE SIGN BRACKET DETAIL ON STANDARD CONSTRUCTION DRAWING TC-16.21, OR ANOTHER METHOD OF RIGID ATTACHMENT AS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL ENSURE THAT THE SIGN FACE IS MOUNTED PERPENDICULAR (90 DEGREES) TO THE DIRECTION OF TRAFFIC.

PAYMENT FOR "ITEM 630 - SIGN HANGER ASSEMBLY, MAST ARM, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND ALL PARTS NECESSARY TO ATTACH ONE SIGN.

Designer Note: This note is used to specify rigid mounting of flat sheet signs on Traffic Signal Mast Arms, using the same mounting hardware as is used on Type TC-16.21 Sign Supports.

CUY-T09

ITEM 630 - SIGN HANGER ASSEMBLY, MAST ARM, AS PER PLAN A (05/28/2010)

ALL FLAT SHEET SIGNS, EXCEPT STREET NAME SIGNS, SHALL BE RIGIDLY ATTACHED TO TRAFFIC SIGNAL MAST ARMS WITH THE SIGN CENTERED VERTICALLY WITH THE ARM, USING THE SIGN BRACKET DETAIL ON STANDARD CONSTRUCTION DRAWING TC-16.21, OR ANOTHER METHOD OF RIGID ATTACHMENT AS APPROVED BY THE ENGINEER. SIGNS SHALL BE MOUNTED WHERE SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER. SIGNS SHALL BE MOUNTED LEVEL AND NOT SLOPED ALONG THE MAST ARM. THE CONTRACTOR SHALL ENSURE THAT THE SIGN FACE IS MOUNTED PERPENDICULAR (90 DEGREES) TO THE DIRECTION OF TRAFFIC. EXISTING REGULATORY SIGNS SHALL NOT BE REMOVED UNTIL THE NEW SIGNS ARE ERECTED. ANY SIGNS MOUNTED ON POLES TO BE REMOVED SHALL BE TEMPORARILY RELOCATED UNTIL THE NEW SIGNS ARE INSTALLED.

PAYMENT FOR "ITEM 630 - SIGN HANGER ASSEMBLY, MAST ARM, AS PER PLAN A" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND ALL PARTS NECESSARY TO ATTACH ONE SIGN.

Designer Note: This note is used, for projects in the City of Cleveland, to specify rigid mounting of flat sheet signs, other than Street Name Signs, on Traffic Signal Mast Arms.

CUY-T10

ITEM 630 - SIGN HANGER ASSEMBLY, MAST ARM, AS PER PLAN B (01/04/1999)

STREET NAME SIGNS SHALL BE RIGIDLY ATTACHED TO TRAFFIC SIGNAL MAST ARMS, WITH THE SIGN CENTERED VERTICALLY WITH THE ARM, USING CONTINUOUS SLOTTED SIGN SUPPORT SECTIONS, UNIVERSAL CHANNEL CLAMPS, AND BANDING, AS SPECIFIED BELOW.

SIGNS SHALL BE MOUNTED WHERE SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER. SIGNS SHALL BE MOUNTED LEVEL AND NOT SLOPED ALONG THE MAST ARM. THE CONTRACTOR SHALL INSURE THAT THE SIGN FACE IS MOUNTED PERPENDICULAR (90 DEGREES) TO THE DIRECTION OF TRAFFIC. EXISTING STREET NAME SIGNS SHALL NOT BE REMOVED UNTIL THE NEW SIGNS ARE ERECTED. ANY STREET NAME SIGNS MOUNTED ON POLES TO BE REMOVED SHALL BE TEMPORARILY RELOCATED UNTIL THE NEW SIGNS ARE INSTALLED.

CONTINUOUS SLOTTED SIGN SUPPORT SECTIONS

THERE SHALL BE FOUR (4) SLOTTED SIGN SUPPORT SECTIONS USED, MOUNTED VERTICALLY, FOR EACH STREET NAME SIGN. SECTIONS SHALL BE FABRICATED FROM ALLOT 6061-T6 ALUMINUM, IN STANDARD 16 FOOT LENGTHS. THE CONFIGURATION OF THE SECTIONS SHALL BE:

THE WIDTH OF THE BASE SHALL BE 1.41" OVERALL. THE WALL THICKNESS OF THE BASE SHALL BE 0.098". THE VERTICAL WALLS SHALL EXTEND UPWARDS 0.689', AT WHICH POINT THEY SHALL EXTEND INWARD AT A 45° ANGLE. THE WALL THICKNESS FOR THE VERTICAL WALLS SHALL BE 0.083". A "U" SHAPED CHANNEL, 0.771" IN WIDTH OVERALL, SHALL EXTEND VERTICALLY 0.470" FROM THE BOTTOM OF THE "U" TO FORM A CONTINUOUS INVERTED "T" SLOT. THE BOTTOM OF THE "T" SHALL HAVE A WALL THICKNESS OF 0.079". VERTICAL WALL THICKNESS SHALL BE 0.110". THE OPENING IN THE INVERTED "T" SHALL BE 0.335" WIDE. THE INVERTED "T" SHALL HAVE AN ANGLE OF 45° TO CREATE A TRACK IN WHICH THE BOLTS WILL NOT ROTATE.

THERE SHALL BE ONE GROOVE, 0.015" DEEP BY 90° IN THE CENTER OF THE BASE.

THIS SECTION SHALL BE FABRICATED SO AS TO ACCOMMODATE POSITIONABLE STAINLESS STEEL FITTINGS AND CLAMPS, PROVIDING COMPLETE FREEDOM OF ALIGNMENT WITHIN THE 0.335" SLOT TO CREATE AN INTEGRATED SUPPORT SYSTEM.

UNIVERSAL CHANNEL CLAMPS

THERE SHALL BE ONE (1) CLAMP USED FOR EACH CHANNEL SECTION. THIS DEVICE SHALL BE FABRICATED FROM STAINLESS STEEL TYPE 304. EACH UNIVERSAL CHANNEL CLAMP SHALL BE 2.75" LONG, 1.1875" HIGH AND 1.125" DEEP AT EITHER END. THE "SADDLE" SHALL BE FORMED FROM 16 GAUGE STAINLESS STEEL TYPE 304 FORMED BY TAPERING UNIFORMLY TOWARD THE CENTER OF THE LARGER SIDE TO A DEPTH OF 0.50", FORMING A MODIFIED "V".

LOCKED WITHIN THE "SADDLE" SHALL BE A PORTION OF THE UNIT REFERRED TO AS THE "INSERT PLATE", WHICH SHALL BE FABRICATED FROM 14 GAUGE STAINLESS STEEL TYPE 304, AND SHALL FORM A SHALLOW "U". THE LEGS OF THE "U" SHALL BE 1.0" HIGH AND 1.0625" WIDE WITH AN APERTURE DESIGNED TO PERMIT PASSAGE OF 0.1875" VERTICALLY ON THE 1.0" SADDLE DIMENSION AND SHALL BE IN FROM THE EDGE CLOSEST TO THE "V" OF THE SADDLE. THE BASE OF THE "U" SHALL BE 0.5" WIDE AND 2.50" LONG WHERE IT IS PREDESIGNED TO SLIDE IN A POSITIONABLE MANNER INTO THE 0.335" CONTINUOUS SLOTTED SIGN SUPPORT SECTION.

BANDING:

THE BANDING SHALL BE TYPE AISI 1201 STAINLESS STEEL. THE THICKNESS OF THE BANDING SHALL BE 0.030". THE WIDTH OF THE BANDING SHALL BE 0.750".

ATTACHMENT OF STREET NAME SIGNS

STREET NAME SIGNS SHALL BE ATTACHED TO THE CHANNEL SECTIONS USING POP RIVETS.

PAYMENT:

PAYMENT FOR "ITEM 630 - SIGN HANGER ASSEMBLY, MAST ARM, AS PER PLAN B" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND ALL PARTS NECESSARY TO ATTACH ONE SIGN.

Designer Note: This note is used, for projects in the City of Cleveland, to specify rigid mounting of Street Name Signs, on Traffic Signal Mast Arms.

CUY-T11

WING MOUNTED DOUBLE FACED STREET NAME SIGN BRACKETS (01/04/1999)

WHEN DOUBLE FACED STREET NAME SIGNS ARE TO BE INSTALLED BY WING MOUNTING THE SIGNS TO STRAIN POLES, MAST ARM POLES, OR WOOD POLES, THE MOUNTING BRACKET SHALL BE ONE OF THE FOLLOWING, OR AN APPROVED EQUAL:

#8 WING BRACKET

DECKER SUPPLY CO, INC.
P.O. BOX 8008
MADISON, WI 53708
(800-274-5495)

GX-3 CANTILEVERED WING BRACKET

SUPERIOR PRECISION DESIGN, INC.
3 SPIELMAN ROAD
FAIRFIELD, NJ 07004
(800-377-4160)

VS-1C CANTILEVER BRACKET

VULCAN SIGNS
P.O. BOX 850
FOLEY, AL 36536
(800-633-6845)

THE BRACKET SHALL BE SUITABLE FOR MOUNTING EXTRUDED DOUBLE FACED STREET NAME SIGNS WITH THICKENED EDGES.

THE COST OF THE MOUNTING BRACKET, INCLUDING LABOR, MATERIAL, AND EQUIPMENT NECESSARY TO INSTALL THE SIGN AND BRACKET, SHALL BE INCLUDED IN THE CONTRACT PRICE PAID FOR THE SIGN. NO SEPARATE PAYMENT WILL BE MADE.

Designer Note: This note is used to specify wing mounting brackets for attaching double faced street name signs to strain poles, mast arm poles, or wood poles. The cost of the brackets and any other mounting fittings and hardware is included in the cost of the double faced sign, per 630.14.

CUY-T12

ITEM 630 - SIGN SUPPORT ASSEMBLY, POLE MOUNTED (09/29/2003)

WHEN UTILITY POLES ARE IN CLOSE PROXIMITY TO THE PROPOSED LOCATION OF GROUND MOUNTED SIGNS, MISCELLANEOUS FLAT SHEET SIGNS SHALL BE ATTACHED TO EXISTING OR NEW UTILITY POLES, IN LIEU OF SINGLE GROUND MOUNTED POST SUPPORTS, USING SIGN SUPPORT ASSEMBLY, POLE MOUNTED, AS SHOWN ON STANDARD CONSTRUCTION DRAWING TC-41.40. FOR THIS PURPOSE, A CONTINGENCY QUANTITY OF _____ EACH OF THIS ITEM HAS BEEN CARRIED TO THE GENERAL SUMMARY FOR USE AS DIRECTED BY THE ENGINEER. WHEN ANY SIGNS ARE TO BE INSTALLED ON UTILITY POLES, AS SHOWN ON THE PLANS, OR UNDER THE DIRECTION OF THE ENGINEER, THE CONTRACTOR SHALL NOTIFY THE POLE OWNER(S) THAT SIGNS ARE BEING ATTACHED TO THEIR POLES UNDER THE PROVISIONS OF ORC 5515.04.

Designer Note: This note is used to provide for mounting flat sheet signs on utility, strain, or mast arm poles, in lieu of on ground mounted supports, when they are in close proximity to the plan location, in order to reduce the number of posts required.

CUY-T13

POWER SUPPLY FOR TRAFFIC SIGNALS (04/25/2005)

ELECTRIC POWER SHALL BE OBTAINED FROM (CEI, FIRST ENERGY) (CLEVELAND PUBLIC POWER) AT THE LOCATION(S) INDICATED ON THE PLANS. POWER SUPPLIED SHALL BE 120 VOLTS.

THE CONTRACTOR WILL BE RESPONSIBLE FOR REQUESTING AND SCHEDULING ANY INSPECTIONS THE POWER COMPANY MAY REQUIRE FOR THE POWER SERVICE HOOK UP. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE POWER COMPANY FOR THE ELECTRICAL SERVICE CONNECTION. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR SPLICE POWER CABLE INTO THE POWER COMPANY'S CIRCUITS. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS AND THE PAYING OF ALL FEES. THE CONTRACTOR SHALL PAY ALL POWER CHARGES UNTIL THE SIGNALS ARE ACCEPTED BY THE MAINTAINING AGENCY.

Designer Note: County version of ODOT's TEM Note (442-2 and 442-14). Edit as appropriate to indicate the Utility Company and Voltage desired.

CUY-T14

POWER SUPPLY FOR SIGN LIGHTING (04/25/2005)

ELECTRIC POWER SHALL BE OBTAINED FROM (CEI, FIRST ENERGY) (CLEVELAND PUBLIC POWER) AT THE LOCATION(S) INDICATED ON THE PLANS. POWER SUPPLIED SHALL BE 120 VOLTS.

THE CONTRACTOR WILL BE RESPONSIBLE FOR REQUESTING AND SCHEDULING ANY INSPECTIONS THE POWER COMPANY MAY REQUIRE FOR THE POWER SERVICE HOOK UP. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE POWER COMPANY FOR THE ELECTRICAL SERVICE CONNECTION. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR SPLICE POWER CABLE INTO THE POWER COMPANY'S CIRCUITS. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS AND THE PAYING OF ALL FEES. THE CONTRACTOR SHALL PAY ALL POWER CHARGES UNTIL THE SIGN LIGHTING IS ACCEPTED BY THE MAINTAINING AGENCY.

Designer Note: County version of ODOT's TEM Note (242-2 and 442-14). Edit as appropriate to indicate the Utility Company and Voltage desired.

CUY-T15

POWER SUPPLY FOR TRAFFIC SIGNALS AND SIGN LIGHTING (04/25/2005)

ELECTRIC POWER SHALL BE OBTAINED FROM (CEI, FIRST ENERGY) (CLEVELAND PUBLIC POWER) AT THE LOCATION(S) INDICATED ON THE PLANS. POWER SUPPLIED SHALL BE 120 VOLTS.

THE CONTRACTOR WILL BE RESPONSIBLE FOR REQUESTING AND SCHEDULING ANY INSPECTIONS THE POWER COMPANY MAY REQUIRE FOR THE POWER SERVICE HOOK UP. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE POWER COMPANY FOR THE ELECTRICAL SERVICE CONNECTION. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR SPLICE POWER CABLE INTO THE POWER COMPANY'S CIRCUITS. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS AND THE PAYING OF ALL FEES. THE CONTRACTOR SHALL PAY ALL POWER CHARGES UNTIL THE SIGNALS AND/OR SIGN LIGHTING ARE ACCEPTED BY THE MAINTAINING AGENCY.

Designer Note: County version of ODOT's TEM Notes (242-2, 442-2 and 442-14). Edit as appropriate to indicate the Utility Company and Voltage desired.

CUY-T16

SIGNAL SUPPORTS, STRAIN POLES, SPAN WIRE SIGN SUPPORTS, AND/OR OVERHEAD SIGN SUPPORTS (11/08/2013)

DUE TO THE POSSIBILITY OF CONFLICT WITH EXISTING OR PROPOSED UNDERGROUND OBSTRUCTIONS (INCLUDING THE POSSIBILITY OF UNRECORDED OBSTRUCTIONS) WHICH COULD AFFECT THE LOCATION OF THE FOUNDATIONS FOR THESE ITEMS, AND CONSEQUENTLY, THE DESIGN OF THE VARIOUS SUPPORTS, AND/OR ARMS, THE CONTRACTOR SHALL NOT PLACE FINAL ORDERS FOR THESE ITEMS UNTIL THE FOUNDATIONS HAVE BEEN INSTALLED, AND HE/SHE HAS RECEIVED, FROM THE ENGINEER, WRITTEN NOTICE TO PROCEED WITH THE ORDERS FOR THESE ITEMS.

IF ANY FOUNDATION LOCATIONS MUST BE ADJUSTED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER, WHO WILL DETERMINE THE REVISED LOCATIONS AND IF ANY SUPPORT DESIGN CHANGES ARE NECESSARY, IN CONSULTATION WITH THE MAINTAINING AGENCY. THE CONTRACTOR WILL NOT BE RESPONSIBLE FOR DETERMINING THE REVISED DESIGN. THE ENGINEER WILL SUBSEQUENTLY INFORM THE CONTRACTOR OF ANY CHANGES NECESSARY, AND AUTHORIZE HIM/HER TO ORDER THE SUPPORTS.

THE CONTRACTOR SHALL, WHEN DEVELOPING HIS/HER PROGRESS SCHEDULE, AND THOSE OF HIS/HER SUBCONTRACTORS, ENSURE THAT THE FOUNDATIONS ARE INSTALLED AT THE EARLIEST TIME AS IS FEASIBLE AND PRACTICAL, AND SHALL INCLUDE SUFFICIENT TIME IN THE PROGRESS SCHEDULE FOR THE ORDERING, MANUFACTURING, DELIVERY, AND INSTALLATION OF THESE ITEMS AFTER THE FOUNDATIONS ARE IN PLACE.

NO PAYMENTS FOR DELIVERED MATERIALS FOR THESE ITEMS WILL BE MADE UNTIL THE FOUNDATIONS ARE IN PLACE, AND IF CHANGES IN THE DESIGN OF THESE ITEMS ARE REQUIRED, NO PAYMENTS WILL BE MADE FOR ITEMS MANUFACTURED TO THE ORIGINAL DESIGNS.

Designer Note: This note should be added when there is a chance that underground obstructions may require the relocation of any traffic signal supports, strain poles, or overhead sign supports, which could involve changes in the design of the poles or mast arms.

Include Note CUY-T17 in the plans when this note is used.

CUY-T17

ITEM 630 – SIGNING, MISC.: FOUNDATION TEST HOLE

ITEM 632 - SIGNALIZATION, MISC.: FOUNDATION TEST HOLE (11/08/2013)

IF UNDERGROUND OBSTRUCTIONS ARE ENCOUNTERED THAT PRECLUDE THE USE OF THE STANDARD OR ALTERNATE FOUNDATION DESIGNS, THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH COMPLETE INFORMATION REGARDING THE OBSTRUCTION, INCLUDING TYPE (I.E. UTILITY), SIZE, DEPTH, AND LATERAL CLEARANCES TO THE SIDES OF THE FOUNDATION EXCAVATION. THE FOUNDATION HOLE SHALL BE COVERED WITH A STEEL PLATE UNTIL THE ENGINEER DETERMINES IF A NEW FOUNDATION LOCATION WILL BE REQUIRED. IF DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL BACKFILL AND COMPACT THE HOLE AND SHALL RESTORE THE SURFACE TO THE SATISFACTION OF THE ENGINEER.”

THE CONTRACTOR SHALL BE COMPENSATED FOR EACH FOUNDATION HOLE THAT MUST BE ABANDONED. PAYMENT FOR ALL LABOR, MATERIALS, EQUIPMENT, TOOLS, AND OTHER INCIDENTALS, INCLUDING BACKFILL, COMPACTING, AND SURFACE RESTORATION, SHALL BE AT THE CONTRACT UNIT PRICE BID FOR "ITEM 630 - SIGNING, MISC.: FOUNDATION TEST HOLE" OR FOR "ITEM 632 - SIGNALIZATION, MISC.: FOUNDATION TEST HOLE" FOR THE NUMBER EXCAVATED AND BACKFILLED. THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN CARRIED TO THE GENERAL SUMMARY AS CONTINGENCY QUANTITIES FOR USE AS DESCRIBED HEREIN:

<u>ITEM</u>	<u>TOTAL</u>	<u>UNIT</u>	<u>DESCRIPTION</u>
630	_____	EACH	SIGNING, MISC.: FOUNDATION TEST HOLE
632	_____	EACH	SIGNALIZATION, MISC.: FOUNDATION TEST HOLE

Designer Note: This note should be added when there is a chance that underground obstructions may require the relocation of any traffic signal supports, strain poles, pedestals, or overhead sign supports, which could involve changes in the location or design of the foundations. Include Note CUY-T16 in the plans when this note is used.

CUY-T18

ITEM 630 - OVERHEAD SIGN SUPPORT, BY TYPE, AS PER PLAN,

ITEM 632 - SIGNAL SUPPORT, BY TYPE, AS PER PLAN

ITEM 632 - STRAIN POLE, BY TYPE, AS PER PLAN

ITEM 632 - PEDESTAL, BY TYPE, AS PER PLAN (01/04/1999)

ALL SIGN SUPPORTS, SIGNAL SUPPORTS, STRAIN POLES, MAST ARMS, AND PEDESTALS ARE TO BE DELIVERED WITH ALL GALVANIZED EXTERIOR SURFACES COATED WITH A URETHANE OR TRIGLYCIDYL-ISOCYANURATE (TGIC) POLYESTER POWDER TO A MINIMUM FILM THICKNESS OF 2.0 MILS (0.002 INCH). THE POWDER SHALL BE DARK BRONZE (ORION BROWN), COLOR A-52355. PRIOR TO APPLICATION, THE SURFACES TO BE POWDER COATED SHALL BE MECHANICALLY ETCHED BY BRUSH BLASTING (REF. SSPC-SP7) AND THE ZINC COATED SUBSTRATE PREHEATED TO 450 DEGREES FAHRENHEIT (450°F) FOR A MINIMUM OF ONE HOUR IN A GAS FIRED CONVECTION OVEN. THE COATING SHALL BE ELECTROSTATICALLY APPLIED AND CURED IN A GAS FIRED CONVECTION OVEN BY HEATING THE ZINC COATED SUBSTRATE TO A MINIMUM OF 350 DEGREES FAHRENHEIT (350°F), AND A MAXIMUM OF 400 DEGREES FAHRENHEIT (400°F). THE THERMOSETTING POWDER RESIN SHALL PROVIDE BOTH INTERCOAT AND SUBSTRATE FUSION ADHESION THAT MEETS CLASSIFICATION 5A OR 5B OF ASTM D-3359.

Designer Note: This note is used, for projects in the City of Cleveland, to specify the color, material, and painting technique to be used for all Overhead Sign Supports, Strain Poles, Signal Supports, and Pedestals.

CUY-T19

EXISTING PARKING METERS (01/04/1999)

EXISTING PARKING METERS LOCATED WITHIN THE WORK LIMITS, WHICH ARE IN CONFLICT WITH CONSTRUCTION, MAINTENANCE OF TRAFFIC, OR THE FINAL TRAFFIC CONTROL PLANS, ARE TO BE REMOVED OR COVERED BY CITY FORCES. FOR THOSE METERS TO BE REMOVED, AFTER THE CITY REMOVES THE METER HEAD, THE CONTRACTOR SHALL REMOVE THE POST AND ANY FOUNDATION. WRITTEN ADVANCE NOTICE MUST BE GIVEN TO THE FOLLOWING AGENCIES, AT LEAST ONE WEEK PRIOR TO THE TIME THE METER MUST BE REMOVED. THE CONTRACTOR SHALL IN NO CASE REMOVE ANY PARKING METER OR POST UNTIL THE CITY HAS REMOVED THE METER HEAD.

CITY OF _____
_____ DEPARTMENT
_____, OHIO _____
(____) ____-____

REMOVAL OF PARKING METER POSTS SHALL BE CONSIDERED INCIDENTAL TO THE VARIOUS OTHER ITEMS OF WORK. NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK.

Designer Note: Use this note when existing parking meters must be removed or covered. Only municipal forces should handle parking meters, due to the fiscal responsibility inherent in their maintenance.

CUY-T20

**ITEM 632 - VEHICULAR SIGNAL HEAD, (COLOR), (ALUMINUM OR POLYCARBONATE),
-SECTION -INCH LENS -WAY (WITH BACKPLATE), AS PER PLAN (11/08/13)**

IN ADDITION TO THE REQUIREMENTS OF CMS 632 AND 732, THE FOLLOWING REQUIREMENTS SHALL ALSO APPLY:

SIGNAL SECTIONS: *(IF POLYCARBONATE SIGNAL HEADS ARE TO BE REQUIRED, INCLUDE ITEMS 1 THRU 3)*

1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.
2. PIPE, SPACERS AND FITTINGS CONSTRUCTED OF POLYCARBONATE PLASTIC MAY BE USED IN LIEU OF GALVANIZED STEEL OR ALUMINUM.
3. [#. GLASS LENSES SHALL BE USED FOR ANY LENSES NOT USING AN LED LAMP.]

MOUNTING HARDWARE: *(SELECT ITEMS AS NEEDED)*

[#. ALL SIGNAL HEADS SHALL BE RIGIDLY MOUNTED TO THE MAST ARM WITH THE (COLOR) LENS LOCATED IN FRONT OF THE MAST ARM.]

[#. ALL UPPER SIGNAL SUPPORT HARDWARE AND PIPING UP TO AND INCLUDING THE WIRE INLET FITTING SHALL BE FERROUS METAL FOR SIGNAL DISPLAYS OF TWO OR MORE SECTIONS.]

[#. THE ENTRANCE FITTING SHALL BE OF THE TRI-STUD DESIGN WITH SERRATED RINGS IN ORDER TO ACHIEVE POSITIVE LOCKING.]

THE COUNTY WILL MEASURE “VEHICULAR SIGNAL HEAD, (COLOR), (ALUMINUM OR POLYCARBONATE), -SECTION -INCH LENS -WAY (WITH BACKPLATE), AS PER PLAN” BY THE NUMBER OF COMPLETE UNITS FURNISHED AND INSTALLED, AND WILL INCLUDE ALL SUPPORT AND MOUNTING HARDWARE, DISCONNECT HANGERS, CLOSURE CAPS, DIMMERS, AND LAMPS AS SPECIFIED.

Designer Note: ODOT TEM 442-17 modified for County use.

Since maintaining agencies will use different combinations of LED/incandescent lamp and aluminum/polycarbonate signal sections, this note will allow the designer to choose the various options that will provide the maintaining agency with features that they prefer. Items that are enclosed in brackets [] should be carefully considered and retained or deleted based on maintaining agency preferences. Care should be taken not to include duplicate requirements for the same item. Some designer notes are in italics.

CUY-T21

**ITEM 632 - PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE D2, AS PER PLAN
(11/08/2013)**

IN ADDITION TO THE REQUIREMENTS OF CMS 632 AND 732, THE FOLLOWING REQUIREMENTS SHALL ALSO APPLY:

(IF POLYCARBONATE SIGNAL HEADS ARE TO BE REQUIRED, INCLUDE THE FOLLOWING ITEMS)

- [1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.]
- [2. PIPE, SPACERS AND FITTINGS CONSTRUCTED OF POLYCARBONATE PLASTIC MAY BE USED IN LIEU OF GALVANIZED STEEL OR ALUMINUM.]
- [3. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.]

THE COUNTY WILL MEASURE “PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE D2, AS PER PLAN” BY THE NUMBER OF COMPLETE UNITS FURNISHED AND INSTALLED, AND WILL INCLUDE ALL SUPPORT AND MOUNTING HARDWARE, CLOSURE CAPS, AND LAMPS AS SPECIFIED.

Designer Note: ODOT TEM 442-18 modified for County use and for Type D2 Pedestrian Signal Head.

Since maintaining agencies will use different combinations of LED/incandescent lamp and aluminum/polycarbonate signal sections, this note will allow the designer to choose the various options that will provide the maintaining agency with features that they prefer. Items that are enclosed in brackets [] should be carefully considered and retained or deleted based on maintaining agency preferences. Care should be taken not to include duplicate requirements for the same item. Some designer notes are in italics.

CUY-T22

ITEM 632 - PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE A2, AS PER PLAN (11/08/2013)

IN ADDITION TO THE REQUIREMENTS OF CMS 632 AND 732, THE FOLLOWING REQUIREMENTS SHALL ALSO APPLY:

(IF POLYCARBONATE SIGNAL HEADS ARE TO BE REQUIRED, INCLUDE THE FOLLOWING ITEMS)

[1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.]

[2. PIPE, SPACERS AND FITTINGS CONSTRUCTED OF POLYCARBONATE PLASTIC MAY BE USED IN LIEU OF GALVANIZED STEEL OR ALUMINUM.]

[3. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.]

THE COUNTY WILL MEASURE "PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE A2, AS PER PLAN" BY THE NUMBER OF COMPLETE UNITS FURNISHED AND INSTALLED, AND WILL INCLUDE ALL SUPPORT AND MOUNTING HARDWARE, CLOSURE CAPS, AND LAMPS AS SPECIFIED.

Designer Note: ODOT TEM 442-18 modified for County use.

Since maintaining agencies will use different combinations of LED/incandescent lamp and aluminum/polycarbonate signal sections, this note will allow the designer to choose the various options that will provide the maintaining agency with features that they prefer. Items that are enclosed in brackets [] should be carefully considered and retained or deleted based on maintaining agency preferences. Care should be taken not to include duplicate requirements for the same item. Some designer notes are in italics.

CUY-T23

MAINTENANCE OF TRAFFIC SIGNAL INSTALLATIONS (11/08/2013)

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TRAFFIC SIGNAL INSTALLATIONS WITHIN THE PROJECT UNDER THE FOLLOWING CONDITIONS:

- A) EXISTING SIGNAL INSTALLATIONS WHICH THE PLANS REQUIRE THE CONTRACTOR TO ADJUST, MODIFY, ADD ONTO, OR REMOVE, OR WHICH THE CONTRACTOR ACTUALLY ADJUSTS, MODIFIES OR OTHERWISE DISTURBS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ENTIRE INSTALLATION (AT AN INTERSECTION) FROM THE TIME HIS/HER OPERATIONS FIRST DISTURB THE INSTALLATION UNTIL THE INSTALLATION HAS BEEN SUBSEQUENTLY REMOVED, MODIFIED, OR RESTORED TO ITS ORIGINAL CONDITION, AND THE WORK HAS BEEN ACCEPTED.
- B) NEW OR REUSED SIGNAL INSTALLATIONS OR DEVICES, INSTALLED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF THESE FROM THE TIME OF INSTALLATION UNTIL THE WORK IS ACCEPTED.

THE CONTRACTOR SHALL CORRECT AS QUICKLY AS POSSIBLE ALL OUTAGES OR MALFUNCTIONS. HE/SHE SHALL PROVIDE THE MAINTAINING AGENCY AND THE ENGINEER SUCH ADDRESSES AND PHONE NUMBERS WHERE HIS/HER MAINTENANCE FORCES CAN BE CONTACTED. THE CONTRACTOR SHALL PROVIDE ONE OR MORE PERSONS TO RECEIVE ALL CALLS AND DISPATCH THE NECESSARY MAINTENANCE FORCES TO CORRECT OUTAGES OR MALFUNCTIONS. SUCH A PERSON OR PERSONS MAY BE USED TO PERFORM OTHER DUTIES AS LONG AS PROMPT ATTENTION IS GIVEN TO THESE CALLS, AND A PERSON IS READILY AVAILABLE CONTINUOUSLY 24 HOURS PER DAY, 7 DAYS PER WEEK. ALL LAMP OUTAGES, CABLE OUTAGES, ELECTRICAL FAILURES, EQUIPMENT MALFUNCTIONS AND MISALIGNED SIGNAL HEADS SHALL BE CORRECTED TO THE SATISFACTION OF THE ENGINEER, WITH THE SIGNAL BACK IN SERVICE, WITHIN FOUR (4) HOURS AFTER THE CONTRACTOR HAS BEEN NOTIFIED OF THE OUTAGE OR MALFUNCTION.

IN THE EVENT NEW SIGNALS ARE DAMAGED PRIOR TO ACCEPTANCE, ALL DAMAGED EQUIPMENT, EXCEPT POLES AND CONTROL EQUIPMENT, SHALL BE REPLACED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER WITH THE SIGNAL BACK IN SERVICE, WITHIN EIGHT (8) HOURS AFTER THE CONTRACTOR HAS BEEN NOTIFIED OF THE DAMAGE. THE CONTRACTOR SHALL ARRANGE FOR FULL TRAFFIC CONTROL UNTIL THE SIGNAL IS BACK IN OPERATION.

IF POLES AND/OR CONTROL EQUIPMENT ARE DAMAGED AND MUST BE REPLACED, THE CONTRACTOR SHALL MAKE TEMPORARY REPAIRS AS NECESSARY TO BRING THE SIGNAL BACK INTO FULL OPERATION WITHIN THE ALLOWED EIGHT (8) HOUR PERIOD, AND SHALL MAKE PERMANENT REPAIRS OR REPLACEMENTS AS SOON THEREAFTER AS POSSIBLE.

NONE OF THE ABOVE SHALL BE CONSTRUED AS COLLECTIVE OR CONSECUTIVE OUTAGE TIME PERIODS AT ANY ONE LOCATION. THAT IS, WHERE MORE THAN ONE OUTAGE OR MALFUNCTION OCCURS CONCURRENTLY AT ANY ONE LOCATION, THEN THE ALLOTTED TIME LIMIT SHALL BE FOR THE WORST SINGLE OUTAGE OR MALFUNCTION.

WHERE OUTAGES OR MALFUNCTIONS ARE THE DIRECT RESULT OF A VEHICLE ACCIDENT, THE RESPONSE OF THE CONTRACTOR SHALL BE AS OUTLINED ABOVE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COLLECTION OF ANY COMPENSATION FOR THIS WORK FROM THOSE PARTIES RESPONSIBLE FOR THE DAMAGE.

WHERE THE CONTRACTOR HAS FAILED TO OR CANNOT RESPOND TO AN OUTAGE OR SIGNAL EQUIPMENT MALFUNCTION AT THOSE LOCATIONS WITHIN HIS/HER RESPONSIBILITY, WITHIN THE PERIODS SPECIFIED ABOVE,

THE ENGINEER MAY INVOKE THE PROVISIONS OF SECTION 105.15, AND ANY SUBSEQUENT BILLINGS TO THE STATE, COUNTY, OR MUNICIPALITY FOR POLICE SERVICES AND/OR MAINTENANCE SERVICES BY MUNICIPAL FORCES OR OUTSIDE CONTRACTORS HIRED BY THE STATE, COUNTY, OR MUNICIPALITY, SHALL BE DEDUCTED FROM MONIES DUE OR TO BECOME DUE TO THE CONTRACTOR IN ACCORDANCE WITH THE PROVISIONS OF SECTION 105.15.

THE CONTRACTOR SHALL PROVIDE THE MAINTENANCE SERVICE ENTIRELY WITH HIS/HER FORCES OR HE/SHE MAY CHOOSE TO ENTER INTO A COOPERATIVE UNDERSTANDING WITH THE LOCAL MAINTAINING AGENCY TO PROVIDE THE MAINTENANCE. THE CONTRACTOR SHALL INFORM THE ENGINEER IN WRITING OF THE MAINTENANCE METHOD SELECTED, AND SHALL PROVIDE A COPY OF THE AGREEMENT WITH THE MUNICIPALITY IN THIS REGARD.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY TRAFFIC SIGNAL COMPONENTS REQUIRED TO BE HANDLED DURING THE RELOCATION OF POLES AND REVISIONS TO THE SIGNAL SYSTEM.

WHEN A TRAFFIC SIGNAL MUST BE TAKEN OUT OF SERVICE BY THE CONTRACTOR, DUE TO CONSTRUCTION PROCEDURES, THIS OUTAGE SHALL NOT EXCEED 3 HOURS AND SHALL NOT INCLUDE THE HOURS OF 6:00 TO 9:00 AM, 12:00 TO 1:00 PM, AND/OR 4:00 TO 7:00 PM.

THE FOLLOWING INTERSECTIONS, WHEN THE SIGNAL IS OUT OF SERVICE DUE TO CONSTRUCTION PROCEDURES, OR DUE TO AN OUTAGE OR EQUIPMENT MALFUNCTION AS DESCRIBED ABOVE, SHALL BE PROTECTED BY THE CONTRACTOR BY THE INSTALLATION OF TEMPORARY "STOP" SIGNS:

THE FOLLOWING INTERSECTIONS, WHEN THE SIGNAL IS OUT OF SERVICE DUE TO CONSTRUCTION PROCEDURES, OR DUE TO AN OUTAGE OR EQUIPMENT MALFUNCTION AS DESCRIBED ABOVE, SHALL BE PROTECTED BY OFF DUTY (CITY) (VILLAGE) OF _____ POLICE OFFICERS, HIRED BY THE CONTRACTOR:

ANY VEHICULAR TRAFFIC SIGNAL HEAD, EITHER NEW OR EXISTING, WHICH WILL BE OUT OF OPERATION, SHALL BE COVERED IN THE MANNER DESCRIBED IN 632.25.

THE CONTRACTOR SHALL MAINTAIN COMPLETE RECORDS OF MALFUNCTIONS, INCLUDING:

1. TIME OF NOTIFICATION OF MALFUNCTION;
2. TIME OF WORK CREWS' ARRIVAL TO CORRECT THE MALFUNCTION;
3. ACTIONS TAKEN TO CORRECT THE MALFUNCTION, INCLUDING A LIST OF PARTS REPAIRED OR REPLACED;
4. A DIAGNOSIS OF THE REASON FOR THE MALFUNCTION AND PROBABILITY OF RECURRENCE; AND
5. TIME OF COMPLETION OF THE REPAIR AND TIME OF SYSTEM RESTORATION TO FULL SERVICE.

A COPY OF THESE RECORDS SHALL BE PROVIDED TO THE ENGINEER WITHIN THREE (3) WORKING DAYS FOLLOWING COMPLETION OF EACH REPAIR.

ALL COSTS RESULTING FROM THE ABOVE REQUIREMENTS SHALL BE CONSIDERED TO BE INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 614 - MAINTAINING TRAFFIC.

Designer Note: The hours when signals may not be out of service may be adjusted as necessary.

CUY-T24

ITEM 632 - REMOVAL OF TRAFFIC SIGNAL INSTALLATION (11/08/2013)

TRAFFIC SIGNAL INSTALLATIONS, INCLUDING SIGNAL HEADS, CABLE, MESSENGER WIRE, STRAIN POLES, MAST ARMS, CABINET, CONTROLLER, DOWN GUYS AND OTHER INCIDENTAL ITEMS REQUIRED BY THE ENGINEER, SHALL BE REMOVED IN ACCORDANCE WITH 632.26 AND AS INDICATED ON THE PLANS. REMOVED ITEMS SHALL BE STORED ON THE PROJECT FOR SALVAGE BY THE (CITY) (VILLAGE) OF _____, IN ACCORDANCE WITH THE LISTING GIVEN HEREIN. ANY ITEMS NOT DESIGNATED FOR SALVAGE, AND/OR ANY ITEMS NOT SALVAGED BY THE MUNICIPALITY BY THE COMPLETION DATE SHALL, WHEN DIRECTED BY THE ENGINEER IN WRITING, BE REMOVED AND DISPOSED OF BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.

THE FOLLOWING ITEMS SHALL BE STORED FOR SALVAGE:

THE FOLLOWING ITEMS SHALL BE DISPOSED OF BY THE CONTRACTOR:

Designer Note: County version of ODOT's TEM Note (442-4).

A list of items to be stored and/or disposed of must be included.

CUY-T25

ITEM 632 - LOOP DETECTOR UNIT, BY TYPE, AS PER PLAN (05/28/2010)

IN ADDITION TO THE REQUIREMENTS OF 632 AND 732.07, OR 732.08, LOOP DETECTOR UNITS SHALL HAVE THE FOLLOWING REQUIREMENTS OR FEATURES:

THE OUTPUT DEVICE SHALL BE A RELAY, AND ALL CONTACTS SHALL BE IN THE WIRING HARNESS.

THE UNIT SHALL BE SELF TUNING.

THE UNIT'S ELECTRICAL CONNECTION PLUGS OR WIRING HARNESS SHALL ALLOW READY REPLACEMENT WITH A SINGLE CHANNEL AMPLIFIER AS DESCRIBED IN 732.07.

EACH UNIT SHALL BE LABELED TO CORRESPOND TO ITS PHASE AND DIRECTION.

DELAY INHIBIT SHALL BE CONNECTED ON ALL DETECTOR HARNESSES FOR THEIR RESPECTIVE PHASE GREENS.

Designer Note: ODOT'S TEM Note (442-6). Also use CUY-T27 with this note.

CUY-T26

ITEM 632 - LOOP DETECTOR UNIT, BY TYPE, AS PER PLAN (05/28/2010)

IN ADDITION TO THE REQUIREMENTS OF 632 AND 732.07 OR 732.08, LOOP DETECTOR UNITS SHALL HAVE THE FOLLOWING REQUIREMENTS OR FEATURES:

THE OUTPUT DEVICE SHALL BE A RELAY, AND ALL CONTACTS SHALL BE IN THE WIRING HARNESS.

THE UNIT SHALL BE SELF TUNING.

THE UNIT'S ELECTRICAL CONNECTION PLUGS OR WIRING HARNESS SHALL ALLOW READY REPLACEMENT WITH A SINGLE CHANNEL AMPLIFIER AS DESCRIBED IN 732.07.

EACH UNIT SHALL BE LABELED TO CORRESPOND TO ITS PHASE AND DIRECTION.

DELAY INHIBIT SHALL BE CONNECTED ON ALL DETECTOR HARNESSES FOR THEIR RESPECTIVE PHASE GREENS.

THE LOOP DETECTOR UNITS FOR NON-SYSTEM LOOPS SHALL HAVE TWO (2) OUTPUTS. ONE OUTPUT SHALL OPERATE IN THE PRESENCE MODE AND THE OTHER IN THE PULSE MODE, IN ORDER TO ENABLE ACCURATE COUNTING OF VEHICLES ENTERING THE LOOP EVEN WHEN PRECEDING VEHICLES REMAIN PRESENT OVER THE LOOP. THE PULSE OUTPUT SHALL BE WIRED TO THE SYSTEM COUNTING INPUT. THE PRESENCE OUTPUT SHALL BE WIRED TO THE CONTROLLER DETECTOR INPUT AND TO THE SYSTEM GRAPHICS DETECTOR INPUT.

EACH AMPLIFIER SHALL BE NUMBERED TO CORRESPOND TO THE LOOP NUMBERS SHOWN ON THE PLAN.

Designer Note: ODOT's TEM Note (442-6) modified for use with closed loop systems. Also use CUY-T27 with this note.

CUY-T27

ITEM 632 – DETECTOR LOOP, AS PER PLAN (11/08/2013)

ALL STOP LINE INDUCTANCE DETECTOR LOOPS SHOWN IN THE PLANS SHALL BE THE POWERHEAD CONFIGURATION SHOWN ON TC-82.10. THE WIDTH SHALL BE AS SPECIFIED ON TC-82.10 AND THE LENGTH SHALL BE AS CURRENTLY CALLED FOR IN THE PLANS. THE STOP LINE DETECTOR LOOPS SHALL NOT BE WIRED TO ANY OTHER LOOPS AND SHALL HAVE ITS OWN DETECTOR CHANNEL. THE LOCATION OF THESE LOOPS SHALL BE SUCH THAT THE POWERHEAD IS LOCATED AT THE STOP LINE, NOT PAST IT. SIGN R10-22 AND PAVEMENT MARKING FIGURE 9C-7 FROM PAGE 923 IN SECTION 9C.05 OF THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES SHALL BE INSTALLED TO DENOTE THE POWERHEAD LOCATION.

ALL DILEMMA ZONE INDUCTANCE DETECTOR LOOPS CALLED FOR IN THE PLANS SHALL BE THE ANGULAR DESIGN DETECTION (ADD) LOOP AS SHOWN ON TC-82.10. DIMENSIONS SHALL BE AS SPECIFIED ON TC-82.10.

SYSTEM LOOPS SHALL BE AS DEPICTED IN THE PLANS.

ALL STOP LINE DETECTION SHALL BE TESTED FOR A BICYCLE TARGET AND ALL DILEMMA ZONES SHALL BE TESTED FOR A MOTORCYCLE TARGET.

INSTALLATION IN CONCRETE PAVEMENT:

LOOP DETECTORS INSTALLED IN CONCRETE PAVEMENT SHALL BE PRE FORMED HEAVY DUTY RUBBER LOOP DETECTORS. THE PRE FORMED LOOPS INSTALLED IN CONCRETE SHALL HAVE AN ADDITIONAL TURN OF WIRE OVER STANDARD LOOPS. THE LOOPS ARE TO BE TYE-WRAPPED TO THE REBAR OR DRAPED UNDER THE MESH. LOOPS SHOULD BE SECURED AT EVERY POINT THAT IT CROSSES REBAR OR EVERY FOOT MAXIMUM. LOOPS SHOULD NOT BE COVERED BY MORE THAN 8" OF CONCRETE. THE LOOPS SHALL BE CONSTRUCTED USING 3/8" SYNTHETIC CORD REINFORCED HYDRAULIC HOSE WITH A 250 PSI INTERNAL PRESSURE RATING.

INSTALLATION IN ASPHALT PAVEMENT:

VEHICLE LOOP DETECTORS SHALL BE INSTALLED IN THE INTERMEDIATE COURSE BEFORE THE SURFACE COURSE OF THE OVERLAY IS PAVED.

THE INSTALLATION OF POURED EPOXY INSULATED SPLICES BETWEEN THE LOOP DETECTOR WIRES AND THE LOOP DETECTOR LEAD IN CABLE SHALL BE CONSIDERED AS INCIDENTAL TO THIS ITEM OF WORK. NO SEPARATE PAYMENT FOR THESE SPLICES WILL BE MADE. NO PAYMENT SHALL BE MADE FOR ANY LOOP NOT INSTALLED ACCORDING TO SPECIFICATIONS.

Designer Note: Add this note to all projects involving loop detectors (unless CUY-T65 is used instead). If requested, video detection may be used in lieu of any inductance loop installation. Replace the second last paragraph with "VEHICLE LOOP DETECTORS SHALL BE INSTALLED IN THE SURFACE COURSE AT THE END OF CONSTRUCTION" if requested by the municipality.

CUY-T28

ITEM 632 - PHONE DROP (05/12/1999)

THIS ITEM OF WORK SHALL CONSIST OF SUPPLYING A TELEPHONE DROP TO THE TRAFFIC SIGNAL CONTROLLER AT THE INTERSECTION(S) SHOWN IN THE PLANS, INCLUDING ANY REQUIRED CONDUIT, CONDUIT RISER, TRENCH, SHIELDED 2/C CABLE, LIGHTNING ARRESTOR AND TERMINAL CONNECTIONS IN THE CABINET NECESSARY TO CONNECT TELEPHONE SERVICE TO A MODEM. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAKE ARRANGEMENTS WITH THE LOCAL TELEPHONE COMPANY TO HAVE A TELEPHONE SERVICE DROP INSTALLED AT THE LOCATION(S) SHOWN IN THE PLANS. PAYMENT FOR ITEM 632 - PHONE DROP WILL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH, COMPLETE AND IN PLACE. THE CONTRACTOR SHALL ASSUME ALL BILLING RESPONSIBILITIES FOR THE PHONE DROP UNTIL COMPLETION OF THE 10 DAY PERFORMANCE TEST.

Designer Note: This note is to be used for specifying Phone Drops for Closed Loop Signal Systems.

CUY-T29

ITEM 632 - INTERCONNECT CABLE, 6 PAIR, NO. 19 AWG, SOLID, REA (PE-39), AS PER PLAN (09/29/2003)

SPLICES SHALL OCCUR ONLY AT THE TERMINAL END OF THE HARDWARE INTERCONNECT PANEL. NO OTHER SPLICES SHALL BE PERMITTED.

PAYMENT FOR ALL LABOR, MATERIAL, TOOLS, EQUIPMENT AND OTHER INCIDENTALS SHALL BE INCLUDED IN THE UNIT PRICE BID PER FOOT INSTALLED FOR ITEM 632 - INTERCONNECT CABLE, 6 PAIR, NO. 19 AWG, SOLID, REA (PE-39), AS PER PLAN.

Designer Note: Use this note when interconnecting traffic signal controllers in closed loop traffic signal systems, using cables installed in conduit.

CUY-T30

ITEM 632 - INTERCONNECT CABLE, INTEGRAL MESSENGER WIRE TYPE, 6 PAIR, NO. 19 AWG, SOLID, REA (PE-38), AS PER PLAN (09/29/2003)

SPLICES SHALL OCCUR ONLY AT THE TERMINAL END OF THE HARDWARE INTERCONNECT PANEL. NO OTHER SPLICES SHALL BE PERMITTED.

THE CABLE SHALL BE INSTALLED WITH APPROXIMATELY ONE TWIST FOR EACH 15 FEET OF SPAN LENGTH.

WHERE INTERCONNECT CABLE IS TO BE PLACED IN POLES, CONDUIT, CONDUIT RISERS, OR CONTROLLERS AS SHOWN ON THE PLAN, THE CONTRACTOR SHALL CAREFULLY REMOVE THE MESSENGER WIRE AND JACKET WEB FROM THE CABLE WITHOUT DAMAGING THE INSULATION OR SHEATHING OF THE CABLE, USING A TOOL SPECIFICALLY DESIGNED AND SIZED FOR THAT PURPOSE. REROUTING OF THE INTERCONNECT CABLE FROM THAT SHOWN IN THE PLANS WILL NOT BE PERMITTED WITHOUT THE APPROVAL OF THE ENGINEER.

PRUNING OF TREES IN ACCORDANCE WITH STANDARD CONSTRUCTION DRAWING LA-1.1, IN ORDER TO PREVENT CONTACT WITH THE INTERCONNECT CABLE SHALL BE INCIDENTAL TO AND INCLUDED IN THE COST OF THE CABLE.

PAYMENT FOR ALL LABOR, MATERIAL, TOOLS, EQUIPMENT AND OTHER INCIDENTALS SHALL BE INCLUDED IN THE UNIT PRICE BID PER FOOT INSTALLED FOR ITEM 632 - INTERCONNECT CABLE, INTEGRAL MESSENGER WIRE TYPE, 6 PAIR, NO. 19 AWG, SOLID, REA (PE-38), AS PER PLAN.

Designer Note: Use this note when interconnecting traffic signal controllers in closed loop traffic signal systems, using cables installed overhead. Verify with the local utilities that there is sufficient room on the utility poles to attach the cable. Otherwise use cable installed in conduit, and note CUY-T29.

If both overhead and underground sections are to be used between adjacent controllers, use this note, and this item for the entire cable run between the controllers, in order to avoid the necessity for splices.

CUY-T31

UNDERDRAINS FOR PULL BOXES (11/08/2013)

UNDERDRAINS FOR PULL BOXES SHALL BE USED AS DIRECTED BY THE ENGINEER AND SHALL BE PROVIDED WHEN THE LENGTH REQUIRED FOR A SATISFACTORY OUTLET DOES NOT EXCEED APPROXIMATELY 40 FEET. AN ESTIMATED QUANTITY OF _____ FEET OF ITEM 611 - 4" CONDUIT, TYPE E IS INCLUDED IN THE GENERAL SUMMARY FOR THIS PURPOSE.

Designer Note: This note is normally used for all projects involving traffic signal or street lighting pullboxes, to provide drainage from the pullboxes. Provide sufficient quantity to connect each pullbox to the nearest manhole, catch basin, or other outlet.

CUY-T32

ITEM 625 - PULL BOX, MISC.: 15-1/2" x 25", AS PER PLAN

ITEM 625 - PULL BOX, MISC.: 19-1/4" x 32-1/4", AS PER PLAN

ITEM 625 - PULL BOX, MISC.: 28" x 37-5/8", AS PER PLAN (11/08/2013)

SIZE:

15-1/2" X 25"

1. THE EXTERIOR DIMENSIONS AT THE TOP SHALL BE 15-1/2" X 25" (NOMINAL).
2. THE BOX SHALL BE 18" DEEP (NOMINAL) PG STYLE AND SHALL BE STACKABLE WITH STAINLESS STEEL HEX HEAD BOLTS AND WASHERS FOR COVER.
3. THE INSIDE DIMENSIONS AT THE BOTTOM SHALL BE 11-3/4" X 21-1/4" (MINIMUM).
4. THE BOX (WITHOUT COVER) SHALL WEIGH APPROXIMATELY 72 LBS.
5. THE COVER SHALL BE 13-3/4" X 23-1/4" X 2" GASKETED HEAVY DUTY WITH 2 BOLTS AND SHALL WEIGH APPROXIMATELY 49 LBS.

19-1/4" X 32-1/4"

1. THE EXTERIOR DIMENSIONS AT THE TOP SHALL BE 19-1/4" X 32-1/4" (NOMINAL).
2. THE BOX SHALL BE 24" DEEP (NOMINAL) PG STYLE AND SHALL BE STACKABLE WITH STAINLESS STEEL HEX HEAD BOLTS AND WASHERS FOR COVER.
3. THE INSIDE DIMENSIONS AT THE BOTTOM SHALL BE 15-1/2" X 28-1/2" (MINIMUM).
4. THE BOX (WITHOUT COVER) SHALL WEIGH APPROXIMATELY 122 LBS.
5. THE COVER SHALL BE 17-1/2" X 30-1/2" X 2" GASKETED HEAVY DUTY WITH 2 BOLTS AND SHALL WEIGH APPROXIMATELY 83 LBS.

28" X 37-5/8"

1. THE EXTERIOR DIMENSIONS AT THE TOP SHALL BE 28" X 37-5/8" (NOMINAL).
2. THE BOX SHALL BE 24" DEEP (NOMINAL) PG STYLE AND SHALL BE STACKABLE WITH STAINLESS STEEL HEX HEAD BOLTS AND WASHERS FOR COVER.
3. THE INSIDE DIMENSIONS AT THE BOTTOM SHALL BE 22-1/4" X 33-7/8" (MINIMUM).
4. THE BOX (WITHOUT COVER) SHALL WEIGH APPROXIMATELY 180 LBS.

5. THE COVER SHALL BE 24" X 35-5/8" X 3" GASKETED HEAVY DUTY WITH 2 BOLTS AND SHALL WEIGH APPROXIMATELY 115 LBS.

LOAD CAPACITY:

THE BOX AND COVER SHALL BE CAPABLE OF SUPPORTING A LOAD OF 20,000 LBS, ON A 10" X 10" AREA, TESTED IN ACCORDANCE WITH WESTERN UNDERGROUND COMMITTEE GUIDE 3.6. THE COVER DEFLECTION SHALL NOT EXCEED 1/2" AT DESIGN LOAD. THE COVER AND BOX SHALL SHOW NO SIGNS OF DAMAGE AFTER TEN (10) CYCLES AT DESIGN LOAD.

MATERIAL AND CONSTRUCTION:

THE BOX SHALL BE CONSTRUCTED OF FIBERGLASS REINFORCED POLYMER (FRP) WITH ISOPHTHALIT POLYESTER USING THE SPRAY-UP AND ROLL CONSTRUCTION METHOD. THE MATERIAL SHALL HAVE STABILIZERS TO RESIST ULTRAVIOLET (UV) DEGRADATION IN ACCORDANCE WITH ASTM D-790 AND ASTM D-11501-71, SECTION 6, PROCEDURE B. THE TOP RING OF THE BOX SHALL BE MADE OF POLYMER CONCRETE USING A POLYESTER BINDER WITH AGGREGATE FILLERS AND CHOPPED FIBERGLASS WITH A MINIMUM TENSILE STRENGTH OF 1900 PSI. THE RING SHALL HAVE THE SAME UV RESISTANCE AS THE FRP MATERIAL. THE THREADED INSERTS FOR THE COVER BOLTS SHALL BE STAINLESS STEEL.

THE COVER SHALL BE MADE WITH A THICK MOLDING COMPOUND (TMC) USING THE COMPRESSION MOLDING METHOD. THE TMC SHALL CONSIST OF A MINIMUM OF TEN PERCENT (10%) FIBERGLASS IN A CALCIUM CARBONATE AND POLYESTER RESIN MATRIX. THE COVER SHALL BE MARKED WITH THE WORD "TRAFFIC" IN 2" LETTERS, EMBOSSED INTO THE TMC, AND SHALL HAVE A NON-SKID SURFACE AND THE SAME UV RESISTANCE AS THE FRP MATERIAL.

THE COVER SHALL BE SECURED TO THE BOX USING TWO HEX HEAD STAINLESS STEEL BOLTS AND WASHERS WHICH SHALL ATTACH TO THREADED INSERTS IN THE BODY OF THE BOX.

CONDUIT OPENINGS:

OPENINGS IN THE SIDE OF THE PULL BOX, WHICH ARE REQUIRED TO INSERT CONDUIT (INTO THE PULL BOX) SHALL BE DRILLED OR SAWN IN THE FIELD, ONCE THESE LOCATIONS HAVE BEEN DETERMINED. THE OPENINGS SHALL NOT EXCEED THE OUTSIDE DIAMETER OF THE CONDUIT BY MORE THAN FIVE PERCENT (5%). ALL OPENINGS IN THE SIDE OF THE PULL BOX SHALL BE THOROUGHLY GROUTED WITH CEMENT MORTAR AFTER PLACING THE CONDUIT.

NOTE:

THE EXACT LOCATIONS OF PULL BOXES ARE TO BE STAKED AND CHECKED BY THE ENGINEER PRIOR TO PLACEMENT TO VERIFY CLEARANCE OF UNDERGROUND FACILITIES AND ANY ABOVE GROUND OBSTRUCTIONS. IF THERE ARE ANY CONFLICTS, THEY ARE TO BE ADJUSTED AS DIRECTED BY THE ENGINEER. PAYMENT FOR THIS IS INCIDENTAL TO ALL 625 ITEMS.

PAYMENT:

PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE BID AND SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND OTHER INCIDENTALS NECESSARY FOR THE ACTUALLY COMPLETED AND ACCEPTED QUANTITIES OF:

ITEM 625 - PULL BOX, MISC.: 15-1/2" X 25", AS PER PLAN	EACH
ITEM 625 - PULL BOX, MISC.: 19-1/4" X 32-1/4", AS PER PLAN	EACH
ITEM 625 - PULL BOX, MISC.: 28" X 37-5/8", AS PER PLAN	EACH

Designer Note: This note is normally used for all projects involving traffic signal or street lighting pullboxes being installed in urban areas, particularly in sidewalks, or where requested by municipal authorities. It provides a smaller, lighter pullbox, with a non-skid top, in lieu of the standard precast pullboxes normally used in rural locations.

CUY-T33

ITEM 632 - STRAIN POLE, TYPE TC-81.10, AS PER PLAN (11/08/2013)

STRAIN POLES SHALL COMPLY WITH 732.12, EXCEPT THAT THE POLES SHALL BE SINGLE SECTION TRUE CONTINUOUS TAPERED TUBES AS SHOWN ON STANDARD CONSTRUCTION DRAWING TC-81.10. THE USE OF STRAIGHT PIPE SECTIONS WITH A TAPER EFFECT ACCOMPLISHED BY THE USE OF REDUCERS WILL NOT BE PERMITTED.

PEDESTRIAN SIGNAL HEAD BRACKET ARMS SHALL BE ATTACHED TO THE POLES BY UTILIZING ONE AND ONE HALF INCH (1-1/2") BLIND HALF COUPLINGS WELDED INTO THE POLE PRIOR TO GALVANIZING. FIELD INSTALLATION OF WIRING HOLES FOR PEDESTRIAN SIGNALS WILL NOT BE PERMITTED.

PAYMENT FOR "ITEM 632 - STRAIN POLE, TYPE TC-81.10, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH.

Designer Note: This note is used to restrict the use of sectional straight tube Traffic Signal Strain Poles.

CUY-T34

ITEM 632 - SIGNAL SUPPORT, TYPE TC-81.21, AS PER PLAN (05/28/2010)

SIGNAL POLES AND MAST ARMS SHALL COMPLY WITH 732.11, EXCEPT THAT THE POLES SHALL BE SINGLE SECTION TRUE CONTINUOUS TAPERED TUBES, AND MAST ARMS SHALL BE ONE OR TWO SECTION TRUE CONTINUOUS TAPERED TUBES, AS SHOWN ON STANDARD CONSTRUCTION DRAWING TC-81.21. THE USE OF STRAIGHT SECTIONS WITH A TAPER EFFECT ACCOMPLISHED BY THE USE OF REDUCERS WILL NOT BE PERMITTED.

PEDESTRIAN SIGNAL HEAD BRACKET ARMS SHALL BE ATTACHED TO THE POLES BY UTILIZING ONE AND ONE HALF INCH (1-1/2") BLIND HALF COUPLINGS WELDED INTO THE POLE PRIOR TO GALVANIZING. FIELD INSTALLATION OF WIRING HOLES FOR PEDESTRIAN SIGNALS WILL NOT BE PERMITTED.

PAYMENT FOR "ITEM 632 - SIGNAL SUPPORT, TYPE TC-81.21, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH.

Designer Note: This note is used to restrict the use of sectional straight tube Traffic Signal Poles and Mast Arms.

CUY-T35

ITEM 632 - DETECTOR LOOP, AS PER PLAN (01/04/1999)

THE INSTALLATION OF POURED EPOXY INSULATED SPLICES BETWEEN THE LOOP DETECTOR WIRES AND THE EXISTING LOOP DETECTOR LEAD IN CABLE SHALL BE CONSIDERED AS INCIDENTAL TO THIS ITEM OF WORK. NO SEPARATE PAYMENT FOR THESE SPLICES WILL BE MADE.

Designer Note: This note should be used for all projects involving existing actuated traffic signals or closed loop systems, where new loop detectors are being installed in the pavement, and are to be connected to existing loop detector lead-in cables. Normally, the cost of the splice between the detector and lead-in cables is included in the cost of the lead-in cable. This note includes that work in the cost of installation of the detector.

CUY-T36

ITEM 632 - SIGNALIZATION, MISC.: MICROWAVE DETECTOR UNIT (01/04/1999)

MICROWAVE DETECTORS SHALL BE SPECIFICALLY DESIGNED AND CONSTRUCTED FOR PRESENCE DETECTION OF VEHICLES IN AN OUTDOOR ENVIRONMENT. THE DETECTION UNIT SHALL BE CAPABLE OF EITHER SIDE MOUNTING ON TRAFFIC SIGNAL POLES OR PEDESTALS OR OVERHEAD MOUNTING ON MAST ARMS. THE DETECTION UNITS SHALL HAVE AN ADJUSTABLE DETECTION PATTERN AND SHALL BE CAPABLE OF CONTINUOUS PRESENCE DETECTION. EACH DETECTOR UNIT SHALL BE FURNISHED COMPLETE WITH ALL REQUIRED MOUNTING HARDWARE, CABLE CONNECTORS, RELAYS, AND WIRING HARNESSES NECESSARY FOR A COMPLETE AND FUNCTIONING INSTALLATION WITH THE TRAFFIC CONTROLLER USED TO OPERATE THE TRAFFIC SIGNALS.

DETECTORS INSTALLED ON MAST ARMS SHALL BE ATTACHED TO THE ARM USING STAINLESS STEEL BANDS AND POLE HUB CLAMPS. THE DETECTOR LEAD IN CABLE MAY UTILIZE THE WIRE OUTLET HOLE OF THE NEAREST VEHICULAR SIGNAL, OR A WIRE OUTLET HOLE PROVIDED EXPRESSLY FOR THE DETECTOR.

DETECTORS MOUNTED ON POLES OR PEDESTALS SHALL BE ATTACHED TO THE POLE OR PEDESTAL AT THE HEIGHT SPECIFIED ON THE PLANS, USING STAINLESS STEEL BANDS AND POLE HUB CLAMPS. THE DETECTOR LEAD IN CABLE SHALL UTILIZE A WIRE OUTLET PROVIDED EXPRESSLY FOR THE DETECTOR THROUGH THE POLE HUB CLAMP.

DETECTORS SHALL BE AIMED BY THE CONTRACTOR FOR MAXIMUM PRESENCE COVERAGE OF THE REQUIRED LANE(S) AND MINIMUM SPILLOVER INTO ADJACENT UN-DETECTED LANES, TO THE SATISFACTION OF THE ENGINEER.

PAYMENT:

PAYMENT FOR "ITEM 632 - SIGNALIZATION, MISC.: MICROWAVE DETECTOR UNIT" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, MOUNTING BRACKETS, TOOLS, EQUIPMENT, TESTING, CERTIFICATIONS, AND OTHER INCIDENTALS NECESSARY TO FURNISH THE DETECTOR, COMPLETE IN PLACE, INCLUDING ALL CONNECTIONS MADE AND WIRING COMPLETE, TESTED, AND ACCEPTED.

Designer Note: This note should be used for all projects involving the installation of microwave traffic signal detectors.

CUY-T37

NEW TRAFFIC PATTERN AHEAD SIGNS (11/08/2013)

CONCURRENT WITH THE ACTUATION OF ANY NEW SIGNAL OPERATION WHICH ALTERS THE SEQUENCE OF THE SIGNAL DISPLAYS FROM THE EXISTING SEQUENCE, THE CONTRACTOR SHALL FURNISH AND INSTALL W23-2 SIGNS (36" X 36") ON

THE TRAFFIC SIGNAL MAST ARMS, WHERE INDICATED ON THE PLANS, APPROXIMATELY THREE (3) FEET FROM THE POLE. THE SIGNS SHALL BE DISPLAYED FOR A MINIMUM OF THIRTY (30) DAYS, BUT NOT TO EXCEED FORTY-FIVE (45) DAYS. AFTER THAT TIME, THE CONTRACTOR SHALL REMOVE THE W23-2 SIGNS, WHICH SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

THE COST OF ALL LABOR, MATERIALS, MOUNTING BRACKETS, TOOLS, EQUIPMENT AND OTHER INCIDENTALS NECESSARY TO ERECT AND REMOVE THE SIGNS SHALL BE INCIDENTAL TO THE LUMP SUM COST OF ITEM 614 MAINTAINING TRAFFIC. NO SEPARATE PAYMENT WILL BE MADE.

Designer Note: This note should be added when the project includes a change in the phasing (sequence) of any traffic signals, to alert motorists of the changed operation.

CUY-T38

SCHEDULING OF DETECTOR LOOP INSTALLATION AND INSTALLATION OF PAVEMENT MARKINGS (11/08/2013)

THE CONTRACTOR SHALL SCHEDULE HIS/HER WORK, AND THAT OF HIS/HER SUBCONTRACTORS, TO ENSURE THAT DETECTOR LOOP INSTALLATION (INCLUDING PAVEMENT CUTTING, THE INSTALLATION OF LOOP DETECTOR WIRES, AND SEALING OF THE LOOP DETECTOR SLOTS) IS COMPLETED PRIOR TO THE INSTALLATION OF THE VARIOUS PAVEMENT MARKINGS TO BE INSTALLED IN THE SAME LOCATIONS (SUCH AS STOP LINES, CROSSWALK LINES, WORDS ON PAVEMENT, AND LANE ARROWS). HE/SHE SHALL FURTHER ENSURE THAT THESE PAVEMENT MARKINGS ARE INSTALLED AS SOON AS PRACTICABLE AFTER THE SURFACE IS INSTALLED AND THE ROAD IS READY TO OPEN TO TRAFFIC.

Designer Note: Include this note in projects involving installation of loop detectors, to assure that the installations of the detector and pavement markings are done in a timely manner, and so that the installation of the detectors, and the sealing of the slots cut for the loops does not damage the pavement markings.

CUY-T39

TEMPORARY SIGNAL TIMING FOR NEW TRAFFIC SIGNALS (01/04/1999)

AS EACH NEW TRAFFIC SIGNAL INSTALLATION IS ENERGIZED, THE CONTRACTOR SHALL ESTABLISH AND MAINTAIN INTERNAL "TIME BASED COORDINATION" BETWEEN ALL OF THE NEW CONTROLLERS UNTIL THE INTERCONNECT CABLE IS IN PLACE AND THE CONTROLLER(S) IS BROUGHT "ON LINE" WITH THE SYSTEM MASTER CONTROLLER.

EACH INDIVIDUAL CONTROLLER SHALL OPERATE IN ACCORDANCE WITH THE COORDINATION TIMING CHART (CYCLE LENGTH, PHASE SPLITS, AND OFFSETS) SHOWN ON THE INTERSECTION PLAN SHEET FOR THE SPECIFIC INTERSECTION CONTROLLER. THE CONTROLLER SHALL OPERATE IN A TIME OF DAY MODE.

THE TIME BETWEEN ACTIVATING A NEW SIGNAL AND THE INSTALLATION AND OPERATION OF THE SIGNAL LOOP DETECTORS SHALL BE KEPT TO A MINIMUM.

THE COST OF THIS WORK SHALL BE CONSIDERED TO BE INCIDENTAL TO THE COST OF THE CONTROLLER PAY ITEM. NO ADDITIONAL COMPENSATION SHALL BE MADE TO THE CONTRACTOR TO PERFORM THIS WORK.

Designer Note: Include this note in projects involving installation of new interconnected and/or closed loop traffic signal systems, to provide adequate traffic signal timing until the entire system is activated.

CUY-T40

SYSTEM TIMING AND ANALYSIS (06/06/2000)

A) GENERAL DESCRIPTION

THE PURPOSE OF THIS WORK IS TO FURNISH ALL MATERIALS, LABOR, TOOLS, AND EQUIPMENT NECESSARY TO PLACE INTO FULL OPERATION A TRAFFIC RESPONSIVE, CLOSED LOOP TRAFFIC SIGNAL COORDINATION SYSTEM.

THIS WORK SHALL CONSIST OF PREPARING SIGNAL TIMING AND TRAFFIC PROGRESSION PROGRAMS, LOADING THE PROGRAMS INTO THE SIGNAL SYSTEM, EVALUATING THE PERFORMANCE OF THE SYSTEM AND REFINING THE PROGRAMS AS NECESSARY TO OPTIMIZE TRAFFIC FLOW AND OPERATION.

THE WORK SHALL INCLUDE TRAFFIC DATA COLLECTION AND EVALUATION, TRAFFIC SIGNAL PROGRESSION AND TIMING ANALYSES, DEVELOPMENT OF TRAFFIC ADJUSTED PATTERN SELECTION PARAMETERS, PERFORMING THE SYSTEM EVALUATION AND REFINEMENT OF THE SYSTEM OPERATION AND PREPARING AND SUBMITTING A SUMMARY REPORT FOR REVIEW AND APPROVAL BY THE ENGINEER.

WHERE A PROJECT CONTAINS INDIVIDUAL "SUB-SYSTEMS" THAT ARE CONNECTED TO THE CENTRAL OFFICE MONITOR (VIA INDIVIDUAL PHONE DROPS), ALL WORK AS OUTLINED IN THIS NOTE SHALL BE PERFORMED FOR EACH SUB-SYSTEM, AND THE COST SHALL BE CONSIDERED INCIDENTAL TO EACH MASTER CONTROLLER FOR THAT

SUB-SYSTEM. IF REQUIRED, SIGNAL "SUB-SYSTEMS" SHALL BE ANALYZED TOGETHER AND TRAFFIC PROGRESSION PROGRAMS SHALL BE COORDINATED TO OPTIMIZE THE OVERALL TRAFFIC FLOW BETWEEN THE VARIOUS SUB-SYSTEMS.

IT IS THE INTENT OF THIS ITEM OF WORK TO OPTIMIZE ONLY CYCLE LENGTHS, PHASE SPLITS, PERMISSIVES AND OFFSETS AND NOT TO CHANGE THE ACTUAL PHASING (AS DEPICTED IN THE PHASE DIAGRAM) THAT IS PROVIDED IN THE PLAN.

AS PART OF THIS ITEM OF WORK, TRAFFIC COUNTS AND TURNING MOVEMENT COUNTS SHALL BE REQUIRED AT EACH INTERSECTION FOR THE FOUR (4) TIME PERIODS LISTED UNDER PART D - "SYSTEM TRAVEL STUDIES". THIS INFORMATION SHALL BE INCLUDED IN THE REPORT.

B) SYSTEMS ENGINEER OR TECHNICIAN

THE WORK SHALL BE PERFORMED BY A PERSON EXPERIENCED IN TRAFFIC ENGINEERING OR TRAFFIC ENGINEERING TECHNOLOGY. THE SYSTEMS ENGINEER OR TECHNICIAN SHALL HAVE A MINIMUM OF FIVE (5) YEARS EXPERIENCE IN TRAFFIC ENGINEERING OR TRAFFIC ENGINEERING TECHNOLOGY (SPECIFICALLY RELATED TO THIS ITEM OF WORK) AND SHALL BE KNOWLEDGEABLE WITH THE DESIGN AND OPERATION OF "CLOSED LOOP" TRAFFIC CONTROL AND SURVEILLANCE SYSTEMS. THE SYSTEMS ENGINEER OR TECHNICIAN SHALL BE FAMILIAR WITH THE TYPE OF "CLOSED LOOP" SYSTEM INSTALLED AS PART OF THIS PROJECT, AND SHALL HAVE PREVIOUSLY SET-UP AND FINE-TUNED A MINIMUM OF FIVE (5) SYSTEMS OF THIS TYPE.

THREE (3) COPIES OF A RESUME DOCUMENTING THE FOLLOWING SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL:

THE SYSTEMS ENGINEER OR TECHNICIAN'S EDUCATION INCLUDING TRAINING IN TRAFFIC ENGINEERING OR TRAFFIC ENGINEERING TECHNOLOGY AND COMPLEX SIGNAL SYSTEM DESIGN.

THE SYSTEMS ENGINEER OR TECHNICIAN'S FAMILIARITY WITH THE "CLOSED LOOP" TYPE SYSTEM TO BE USED ON THIS PROJECT AND EXPERIENCE IN SETTING UP AND FINE TUNING A SYSTEM OF THIS TYPE. A LISTING OF OTHER CLOSED LOOP SYSTEMS THAT THE SYSTEM ENGINEER OR TECHNICIAN HAS PROGRAMMED INTO THE TRAFFIC RESPONSIVE MODE SHALL BE PROVIDED TO THE ENGINEER FOR DOCUMENTATION PURPOSES.

A BRIEF DESCRIPTION OF PROPOSED METHODOLOGY OF DATA COLLECTION AND ANALYSIS, OF SYSTEM PARAMETER USAGE IN SYSTEM EVALUATION, OF FREQUENCY AND MEASUREMENTS OF TRAVEL TIME AND DELAY, AND COMPARING ACTUAL VERSUS SYSTEM MEASUREMENTS OF THE DELAY AND LEVEL OF SERVICE.

THE SYSTEMS ENGINEER OR TECHNICIAN, UNDER AUTHORITY OF THE GENERAL CONTRACTOR, SHALL BE RESPONSIBLE FOR THE OPERATION OF THE SYSTEM, FROM THE START OF THE () DAY PERFORMANCE GUARANTEE PERIOD (AS NOTED IN THE "GUARANTEE" PLAN NOTE SHOWN ON SHEET ___) UNTIL COMPLETION AND ACCEPTANCE OF THE FINAL SUMMARY REPORT BY THE ENGINEER. THE SYSTEMS ENGINEER OR TECHNICIAN SHALL PROVIDE A TWENTY FOUR (24) HOUR EMERGENCY PHONE NUMBER AND SHALL RESPOND TO SYSTEM RELATED PROBLEMS AS DEEMED NECESSARY BY THE ENGINEER TWENTY FOUR (24) HOURS PER DAY, SEVEN DAYS PER WEEK. THE ENGINEER RESERVES THE RIGHT TO REQUEST A SYSTEMS ANALYSIS THROUGHOUT THE ENTIRE DURATION OF THE () DAY GUARANTEE PERIOD, SHOULD NEW OR CONTINUING PROBLEMS OCCUR WITH THE OPERATION OF THE TRAFFIC RESPONSIVE SYSTEM.

THE ENGINEER RESERVES THE RIGHT TO REQUEST THAT THE CONTRACTOR PROVIDE A NEW SYSTEMS ENGINEER OR TECHNICIAN SHOULD THE CURRENT SYSTEMS ENGINEER OR TECHNICIAN FAIL TO PERFORM THE REQUIRED DUTIES IN A TIMELY AND PROFESSIONAL MANNER OR FAIL TO HAVE A FIRM UNDERSTANDING OF THE OPERATION AND PROGRAMMING OF THE CLOSED LOOP SYSTEM CONSTRUCTED UNDER THIS CONTRACT.

THE SYSTEMS ENGINEER OR TECHNICIAN MAY DELEGATE NON-TECHNICAL TASKS (i.e. TRAVEL TIME RUNS, INTERSECTION TRAFFIC COUNTS, ETC....) TO PERSONNEL UNDER HIS/HER DIRECT SUPERVISION, PROVIDED THAT APPROVAL IS RECEIVED BY THE ENGINEER PRIOR TO COMMENCING THIS WORK. THE SYSTEMS ENGINEER OR TECHNICIAN SHALL SUBMIT TO THE ENGINEER IN WRITING A LIST OF THOSE TASKS WHICH ARE TO BE PERFORMED BY OTHER PERSONNEL. THE ENGINEER RESERVES THE RIGHT TO DENY PART OF OR ALL OF THE REQUEST FOR WORK TO BE PERFORMED BY PERSONNEL OTHER THAN THE SYSTEMS ENGINEER OR TECHNICIAN.

C) TRAFFIC PROGRAMS

SIGNAL PROGRESSION AND TIMING PROGRAMS SHALL BE DEVELOPED BY THE SYSTEMS ENGINEER OR TECHNICIAN FROM COUNT AND OCCUPANCY DATA OBTAINED FROM THE LOCAL INTERSECTION AND SYSTEM LOOP DETECTORS, SUPPLEMENTED BY FIELD COUNTS AND MEASUREMENTS AS REQUIRED. THE SIGNAL PROGRESSION PROGRAMS TO BE DEVELOPED SHALL BE AS FOLLOWS:

THREE (3) INBOUND PREFERENTIAL	(A.M. PEAK PERIOD)
THREE (3) OUTBOUND PREFERENTIAL	(P.M. PEAK PERIOD)
THREE (3) AVERAGE	(OFF PEAK PERIODS)

NOTE: THE THREE AVERAGE PROGRAMS SHOULD UTILIZE VARYING CYCLE LENGTHS BASED ON TRAFFIC VOLUME DENSITY AND OCCUPANCY TO MINIMIZE OVERALL INTERSECTION APPROACH DELAY TIME.

TWO (2) SPECIAL PROGRAMS FOR EITHER HIGH CONGESTION OR QUEUE BACKUP.

A MINIMUM OF THREE (3) TIMING PLANS FOR A BACK UP TIME BASE COORDINATED SYSTEM SHALL BE DEVELOPED AND PROGRAMMED INTO THE SYSTEM, TO REPLACE OR SUPPLEMENT THE TIMING PLANS SHOWN IN THE PLANS.

DEFINE SYSTEM PARAMETERS WHICH WILL ENABLE THE SYSTEM TO AUTOMATICALLY TRANSFER INTO A "FREE OPERATION" MODE DURING LIGHT TRAFFIC VOLUME PERIODS AND TO AUTOMATICALLY TRANSFER INTO A COMPUTER SELECTED COORDINATED MODE DURING HEAVY TRAFFIC VOLUME PERIODS.

THE FOLLOWING MINIMUM SYSTEM PARAMETERS SHALL BE ESTABLISHED:

VOLUME, OCCUPANCY AND DIRECTIONALITY THRESHOLDS
TRANSITION SMOOTHING FACTORS
SYSTEM DETECTOR ASSIGNMENT
SYSTEM DETECTOR WEIGHTING

THE SYSTEMS ENGINEER OR TECHNICIAN MAY USE THE SOFTWARE PROVIDED WITH THE CENTRAL OFFICE MONITOR TO HELP ASSIST IN HIS/HER ANALYSIS OF THE OPERATION OF THE CLOSED LOOP SYSTEM.

D) SYSTEM TRAVEL TIME STUDIES

THE SYSTEMS ENGINEER OR TECHNICIAN SHALL CONDUCT A SERIES OF TRAVEL TIME STUDIES FOR EACH SYSTEM OR SUB-SYSTEM ARTERY CONSTRUCTED AS PART OF THE PROJECT, TO MEASURE THE TIME IT TAKES TO TRAVEL FROM THE BEGINNING OF EACH SYSTEM OR SUB-SYSTEM TO THE END OF THAT SYSTEM OR SUB-SYSTEM, IN EACH DIRECTION. THE TRAVEL TIME STUDY PARAMETERS SHOULD BE BASED ON THE POSTED SPEED LIMIT; HOWEVER, DURING PEAK PERIODS IT MAY NOT BE POSSIBLE TO OBTAIN THE POSTED SPEED LIMIT DUE TO LARGER TRAFFIC VOLUMES.

EACH SET OF TRAVEL TIME STUDIES SHALL INCLUDE A MINIMUM OF FIVE (5) RUNS THROUGH THE SYSTEM PER DIRECTION. TRAVEL TIME STUDIES SHALL BE CONDUCTED DURING "IDEAL" WEATHER CONDITIONS (I.E. NO SNOW, RAIN, OR FOG, ETC.).

THE FOUR (4) SEPARATE SETS OF TRAVEL TIME STUDIES SHALL INCLUDE THE FOLLOWING:

1. THE FIRST SET OF TRAVEL TIME STUDIES SHALL BE CONDUCTED BETWEEN THE HOURS OF 7:00 A.M. AND 9:00 A.M. ON WEEKDAYS.
2. THE SECOND SET OF TRAVEL TIME STUDIES SHALL BE CONDUCTED BETWEEN THE HOURS OF 11:30 A.M. AND 1:00 P.M. WEEKDAYS.
3. THE THIRD SET OF TRAVEL TIME STUDIES SHALL BE CONDUCTED BETWEEN THE HOURS OF 4:00 P.M. AND 6:00 P.M. WEEKDAYS.
4. THE FOURTH SET OF TRAVEL TIME STUDIES SHALL BE CONDUCTED DURING ANY OF THE FOLLOWING NON-PEAK HOUR PERIODS:
 - a. 9:00 A.M. TO 11:00 A.M. MONDAY THROUGH SATURDAY
 - b. 1:00 P.M. TO 4:00 P.M. MONDAY THROUGH SATURDAY
 - c. 7:00 P.M. TO 10:00 P.M. MONDAY THROUGH SATURDAY
 - d. 7:00 A.M. TO 10:00 P.M. SUNDAY

A WRITTEN REPORT SHALL BE PROVIDED DOCUMENTING, AT A MINIMUM, THE DATE OF THE TRAVEL TIME STUDY, DAY OF THE WEEK, TIME OF DAY, TOTAL TIME OF TRAVEL AND TOTAL TIME THE VEHICLE WAS STOPPED FOR EACH TRIP.

THE SYSTEMS ENGINEER OR TECHNICIAN SHALL CONDUCT EACH SET OF THE TRAVEL TIME STUDIES LISTED ABOVE FOR EACH OF THE FOLLOWING FIELD CONDITIONS:

- I. PRIOR TO THE BEGINNING OF CONSTRUCTION, WITH THE EXISTING SIGNAL SYSTEM IN OPERATION (NO LANE CLOSURES SHALL BE IN EFFECT DURING THIS ANALYSIS).
- II. PRIOR TO IMPLEMENTING THE TRAFFIC RESPONSIVE MODE, WHILE THE NEW TRAFFIC SIGNAL SYSTEM IS OPERATING UNDER THE "TIME OF DAY" MODE (AS SHOWN IN THE PLANS).
- III. AFTER THE SYSTEM(S) IS PLACED IN THE TRAFFIC RESPONSIVE MODE.
- IV. AFTER THE SYSTEM OPERATION MEETING AND FINAL SYSTEM ADJUSTMENTS ARE MADE.

THE REPORTS PROVIDED FROM EACH OF THE FOUR FIELD CONDITIONS FOR WHICH SYSTEM TRAVEL TIME STUDIES ARE PREPARED SHALL BE USED AS ONE MEANS OF MEASURING THE EFFICIENCY OF THE NEW SYSTEM.

E) DRAFT SYSTEM SUMMARY REPORT

A DRAFT SYSTEM SUMMARY REPORT SHALL BE PREPARED AFTER TRAVEL TIME STUDIES FOR THE FIRST THREE FIELD CONDITIONS ARE PERFORMED (ITEMS I, II, AND III OUTLINED IN PART D) AND TWO (2) COPIES EACH SHALL BE SUBMITTED TO THE ENGINEER AND THE MAINTAINING AGENCY(S) OF THE SIGNAL SYSTEM FOR THE EVALUATION, AND REVIEW OF THE SYSTEM PROGRAMMING, OPERATION AND EFFICIENCY.

THE REPORT SHALL SUMMARIZE THE SIGNAL PROGRESSION AND TIMING PROGRAMS THAT WERE ENTERED INTO THE SYSTEM. THE REPORT SHALL ALSO INCLUDE A COPY OF THE SYSTEMS LOG AFTER OPERATING IN THE TRAFFIC RESPONSIVE MODE TO VERIFY THE NUMBER OF PROGRAMS USED THROUGHOUT THE DAY AS WELL AS THE FREQUENCY OF PROGRAM CHANGES. A MINIMUM OF AT LEAST FOUR DAYS OF SYSTEMS LOGS SHALL BE PROVIDED AND THREE OF THE FOUR LOGS SHALL BE LIMITED TO THE WEEKDAYS OF MONDAY THROUGH FRIDAY; THE FOURTH LOG SHALL BE ON A SUNDAY. COPIES OF ALL DATA AND ANALYSIS CALCULATIONS FOR THE SYSTEM TIMING SHALL BE INCLUDED IN THE REPORT. THE DRAFT SYSTEM SUMMARY REPORT SHALL INCLUDE AN EVALUATION OF THE SYSTEM OPERATION, EFFICIENCY AND PERFORMANCE, AND COPIES OF ALL TRAVEL TIME STUDY DATA.

F) SYSTEM OPERATION MEETING AND FINAL SYSTEM SUMMARY REPORT

AFTER THE DRAFT SYSTEM SUMMARY REPORT HAS BEEN SUBMITTED, THE ENGINEER WILL SCHEDULE A MEETING WHICH WILL INCLUDE THE SYSTEMS ENGINEER OR TECHNICIAN, THE CONTRACTOR, THE ENGINEER, AND REPRESENTATIVE(S) FROM THE MAINTAINING AGENCY(S), TO DISCUSS THE OPERATION OF THE TRAFFIC RESPONSIVE "CLOSED LOOP" SIGNAL SYSTEM. THIS MEETING WILL OCCUR WITHIN FOUR (4) WEEKS AFTER THE DRAFT SYSTEM SUMMARY REPORT HAS BEEN SUBMITTED TO THE ENGINEER AND MAINTAINING AGENCY(S).

THE PURPOSE OF THIS MEETING IS TO DISCUSS THE OPERATION OF THE TRAFFIC RESPONSIVE CLOSED LOOP SIGNAL SYSTEM CONSTRUCTED AND PROGRAMMED UNDER THIS PROJECT, AND TO RECEIVE COMMENTS AND RECOMMENDATIONS FROM THE ENGINEER AND/OR THE MAINTAINING AGENCY(S) REGARDING POTENTIAL MODIFICATIONS TO THE OPERATION OF THE SYSTEM. THE SYSTEMS ENGINEER OR TECHNICIAN WILL ANSWER QUESTIONS REGARDING THE SYSTEM SUMMARY REPORT AS WELL AS THE OPERATION OF THE CLOSED LOOP SYSTEM.

FINAL ADJUSTMENTS TO THE SYSTEM SHALL BE MADE AS DIRECTED BY THE ENGINEER TO ADDRESS ANY CONCERNS WHICH ARE DISCUSSED AT THIS MEETING. THE FINAL TRAVEL TIME STUDY SHALL BE PERFORMED PRIOR TO SUBMITTING THE FINAL REPORT. ONE (1) COPY OF A FINAL SYSTEM SUMMARY REPORT SHALL BE SUBMITTED TO THE ENGINEER AND ONE (1) ADDITIONAL COPY SHALL BE SUBMITTED FOR EACH MAINTAINING AGENCY FOR REVIEW AND APPROVAL. THE FINAL REPORT SHALL INCLUDE ANY REVISIONS TO THE DRAFT REPORT THAT ARE REQUIRED AS A RESULT OF THE SYSTEM OPERATION MEETING.

G) PAYMENT

THE COST OF THIS WORK, INCLUDING ALL LABOR, MATERIALS, EQUIPMENT, TOOLS, AND OTHER INCIDENTALS NECESSARY TO PERFORM THE WORK AS OUTLINED ABOVE SHALL BE INCLUDED IN AND SHALL BE CONSIDERED INCIDENTAL TO THE UNIT PRICE BID EACH FOR ITEM 633 - CONTROLLER, MASTER, TRAFFIC RESPONSIVE, AS PER PLAN.

Designer Note: Include this in the note for Item 633 - Controller, Master, Traffic Responsive, As Per Plan.

References to pre-construction travel time studies may be omitted if the project includes substantial changes to the roadway geometrics (i.e. roadway widening, reconfiguring of pavement markings, etc...) that would taint the results which would indicate the level of improvement over preexisting conditions.

This Note is reproduced on Cuyahoga County Drawing TS-1C, which should be included on the Title Sheet or included as a Plan Insert Sheet with the General Notes

CUY-T41

**ITEM 633 - CONTROLLER, ACTUATED, _____ PHASE,
SOLID STATE DIGITAL MICROPROCESSOR, AS PER PLAN (11/08/2013)**

THE CONTRACTOR SHALL FURNISH AND INSTALL AN ACTUATED _____ PHASE DIGITAL MICROPROCESSOR CONTROLLER AND BASE MOUNTED CABINET AND ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE CONTROLLER FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS.

THE CONTROLLER TYPE AND MODEL AND ALL ACCESSORIES TO BE SUPPLIED SHALL BE IN PRODUCTION AND SHALL BE IN ACCORDANCE WITH THE FEDERAL HIGHWAY ADMINISTRATION (FHWA) TRAFFIC CONTROL HANDBOOK SPECIFICATION FHWA HOP-06-006, DATED OCTOBER 2005 FOR THE TYPE 170 TRAFFIC SIGNAL CONTROLLER SYSTEM, WITH DUAL ACIA INPUTS.

SOFTWARE:

THE CONTROLLER SHALL BE EQUIPPED WITH THE MOST RECENT REVISION OF THE W4IKS, MODEL 170 FULLY ACTUATED PROGRAM SOFTWARE, AS MANUFACTURED BY WAPITI MICROSYSTEMS CORPORATION, 16771 WEST ELLENDALE ROAD, DALLAS, OREGON 97338, THE 233 MODEL 170 TRAFFIC SIGNAL CONTROLLER PROGRAM SOFTWARE, AS MANUFACTURED BY BI-TRAN SYSTEMS, INC., SACRAMENTO CALIFORNIA, OR AN APPROVED EQUAL.

THE CONTRACTOR SHALL INCLUDE WITH HIS/HER BID A STATEMENT IDENTIFYING THE SOFTWARE HE/SHE PROPOSES TO FURNISH FOR THIS ITEM. THE SOFTWARE SHALL BE FROM THE SAME MANUFACTURER AS THE SOFTWARE FOR THE MASTER CONTROLLER.

SYSTEM MEMORY MODULE:

THE CONTROLLER SHALL BE EQUIPPED WITH A SYSTEM MEMORY MODULE WHICH SHALL CONFORM WITH THE FOLLOWING SPECIFICATIONS:

- 1) THE MODULE SHALL COMPLY WITH THE DETAILS AND CONNECTIONS SHOWN ON THE PLANS FOR THE MODEL 170 TRAFFIC CONTROL PROM MODULE OF THE FHWA SPECIFICATIONS, AND SHALL OPERATE AND BE COMPATIBLE WITH THE CONTROLLER.
- 2) ALL ELECTRICAL CONNECTIONS IN AND OUT OF THE MODULE SHALL BE THROUGH A PRINTED CIRCUIT CONNECTOR HAVING TWO (2) ROWS OF 36 INDEPENDENT BIFURCATED CONTACTS ON 0.100 INCH CENTERS.
- 3) THE MODULE SHALL BE DESIGNED SO THAT PERSONS INSERTING OR REMOVING THE ASSEMBLY SHALL NOT BE REQUIRED TO INSERT HANDS OR FINGERS WITHIN THE MICROPROCESSOR UNIT HOUSING OF THIS ASSEMBLY. A HANDLE OR GRIPPING DEVICE PROTRUDING NO MORE THAN 1-1/4 INCHES FROM THE FRONT PANEL SHALL BE ATTACHED TO THE FRONT OF THE ASSEMBLY. THE FRONT PANEL SHALL BE CONNECTED TO GROUND.
- 4) THERE SHALL BE PROVIDED POSITIVE METHODS TO PREVENT THIS MODULE FROM BEING INSERTED UPSIDE DOWN IN THE PROM SLOT WITH THE FRONT PANEL OF THE CONTROLLER CLOSED.
- 5) ALL INPUTS AND OUTPUTS SHALL BE TRI-STATE BUFFERED, ENABLING THEM TO DRIVE A LOAD CONSISTING OF 10 TTL GATES AT 200 PICO FARADS. WHEN THIS MODULE IS NOT BEING ADDRESSED, THE DATA INPUTS AND OUTPUTS SHALL BE DISABLED INTO A HIGH IMPEDANCE STATE, AND THE DATA I/O LINES SHALL NOT SOURCE OR SINK MORE THAN 100 MICROAMPERES. ALL ADDRESS INPUTS SHALL NOT LOAD THE BUS BY MORE THAN ONE TTL GATE LOAD AT 100 PICO FARADS. THE PROPAGATION DELAY TIME SHALL BE LESS THAN 30 NANOSECONDS.
- 6) THE MEMORY MODULE SHALL HAVE THREE (3) SOCKETS TO ACCOMMODATE 8K-32K MEMORY DEVICES. MEMORY MAPS SHALL BE USER SELECTABLE BY JUMPER WIRES. JUMPER POSITIONS FOR TWO SOCKETS SHALL BE PROVIDED TO CONVERT THE SOCKETS FROM AN EPROM SOCKET TO A SRAM SOCKET OR VICE VERSA. JUMPERS FOR THESE SOCKETS SHALL BE PROVIDED TO CONVERT THE SOCKET FROM A NON-STANDBY POWER SOCKET TO A STANDBY POWER SOCKET OR VICE VERSA.
- 7) A POWER SUPPLY SHALL BE PROVIDED ON-BOARD THE MODULE CONSISTING OF A DC REGULATION CIRCUIT, STANDBY POWER AND ALL NECESSARY SUPPORT CIRCUITRY.
- 8) A DC REGULATORY DEVICE WITH ITS CIRCUITRY SHALL BE PROVIDED TO REDUCE THE +12 VDC TO +5 VDC FOR MODULE USE. THE REGULATOR SHALL HAVE A MINIMUM EFFICIENCY OF 75% AND PROVIDE +5 +/- 0.25 VDC FROM NO LOAD TO FULL LOAD WITH A MAXIMUM OF 2% RIPPLE.
- 9) A STANDBY LITHIUM BATTERY SOURCE SHALL BE PROVIDED TO HOLDUP VOLATILE RAM DEVICES DURING A MODEL 170 CONTROLLER UNIT POWER FAILURE. A CIRCUIT SHALL BE PROVIDED TO SENSE THE +5 VDC 170 POWER LINE AND WRITE PROTECT THE RAM DEVICES WHEN THE LINE FALLS BELOW +4.55 +/- 0.05 VDC. THE STANDBY POWER SHALL BE A REPLACEABLE LITHIUM CELL AND SHALL HAVE A SWITCH TO DISCONNECT IT WHILE THE MODULE IS NOT BEING USED. ALL THE DEVICES CONNECTED TO THE STANDBY POWER SHALL NOT EXCEED A MAXIMUM POWER DRAIN EQUIVALENT TO 100 MICROAMPERES AT 3.7 VDC FROM THE STANDBY CELL.
- 10) ALL MEMORY ON THE MODULE SHALL BE NONVOLATILE, ALL ADDRESSABLE DEVICES SHALL BE FULLY DECODED.
- 11) EACH MODULE SHALL BE SUPPLIED WITH ONE 62256 STATIC RAM CHIP AND ONE 27256 EPROM (12.5 V PROGRAM) CONFIGURED AS FOLLOWS:

STATIC RAM CHIP	0000-7FFF
EPROM	8000-FFFF

THE MODULE SHALL NOT READ OR WRITE TO ADDRESSES 0000-0FFF AND 6000-6FFF.

THE VMA/PHASE 2 (E) CLOCK SIGNAL SHALL NOT BE USED IN A MEMORY DEVICE READ OPERATION.
- 12) THE FRONT PANEL SHALL BE LABELED "SYSTEM MEMORY".

CONFLICT MONITOR:

A CONFLICT MONITOR, SERIES 210 OR EQUAL, SHALL BE PROVIDED WITH THE CONTROLLER. THE CONFLICT MONITOR SHALL BE CAPABLE OF EIGHT (8) PHASE OPERATION, AND SHALL MONITOR GREENS, YELLOWS, WALKS, AND ABSENCE OF REDS.

PRIOR TO ACCEPTANCE, THE CONTRACTOR SHALL CERTIFY IN WRITING THAT THE CONTROLLER HAS BEEN TESTED BY AN AUTOMATIC CONFLICT MONITOR TESTER, AND THAT NO CONFLICTS EXIST IN THE PROPER OPERATION OF THE CONTROLLER.

CONTROLLER CABINET:

THE CONTROLLER CABINET SHALL BE MODEL 332 OR MODEL 336 TYPE.

THE CABINET SHALL MEET OR EXCEED THE LATEST FHWA AND CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS) SPECIFICATION REQUIREMENTS, AND SHALL HAVE THE FOLLOWING FEATURES:

- 1) THE FOLLOWING SWITCHES SHALL BE MOUNTED ON THE SWITCH PANEL IN THE CABINET:
RUN / STOP TIME
CONTROLLER SHUTDOWN
DETECTOR TEST
- 2) FLUORESCENT FRONT AND BACK LIGHTS, WITH DOOR ACTIVATED ON / OFF SWITCHES.
- 3) SLIDE OUT SHELF / DRAWER STORAGE UNIT.
- 4) LOWER INPUT TERMINATION PANEL.
- 5) LOOP TERMINATION SIDE PANEL.
- 6) CORBIN LOCKS.
- 7) LIGHTNING PROTECTION:
POWER DISTRIBUTION ASSEMBLY: SHA 1210 OR EQUAL
LOOP INPUTS: SRA-6-LCB OR EQUAL
- 8) COMMUNICATION CABLE INTERFACE: PC-642 OR EQUAL

CABINET FOUNDATION, RISER AND WORK PAD:

THE FOUNDATION DIMENSIONS ON STANDARD CONSTRUCTION DRAWING TC-83.20 SHALL BE REVISED TO THE FOLLOWING:

WIDTH = 30"
DEPTH = 40"

A RISER WITH A MINIMUM HEIGHT OF 8" SHALL BE INSTALLED AT THE BASE CONTROLLER CABINET IN ACCORDANCE WITH 733.04, PART B.

A 30" x 30" x 4" WORK PAD SHALL BE LOCATED IN FRONT OF BOTH DOORS TO THE CABINET UNLESS OTHERWISE IN PAVED AREAS.

ALL OTHER DIMENSIONS AND PROVISIONS OF STANDARD CONSTRUCTION DRAWING TC-83.20 SHALL APPLY. PAYMENT FOR THE FOUNDATION CONCRETE AND WORK PAD(S) SHALL BE UNDER THEIR RESPECTIVE PAY ITEMS.

PAYMENT:

PAYMENT FOR "ITEM 633 - CONTROLLER, ACTUATED, __ PHASE, SOLID STATE DIGITAL MICROPROCESSOR, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TESTING, CERTIFICATIONS, AND OTHER INCIDENTALS NECESSARY TO FURNISH THE CONTROLLER, COMPLETE IN PLACE, INCLUDING ALL CONNECTIONS MADE AND WIRING COMPLETE, TESTED, AND ACCEPTED.

Designer Note: This note is to be used for specifying Type 170 Local Controllers.

CUY-T42

ITEM 633 - CONTROLLER, MASTER, TRAFFIC RESPONSIVE, AS PER PLAN (11/08/2013)

THE CONTRACTOR SHALL FURNISH AND INSTALL A SOLID STATE DIGITAL MICROPROCESSOR MASTER CONTROLLER AND ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE CONTROLLER FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS.

THE CONTROLLER TYPE AND MODEL AND ALL ACCESSORIES TO BE SUPPLIED SHALL BE IN PRODUCTION AND SHALL BE IN ACCORDANCE WITH THE FEDERAL HIGHWAY ADMINISTRATION (FHWA) TRAFFIC CONTROL HANDBOOK SPECIFICATION FHWA HOP-06-006, DATED OCTOBER 2005 FOR THE TYPE 170 TRAFFIC SIGNAL CONTROLLER SYSTEM.

THE CONTROLLER SHALL BE MICROCOMPUTER MODEL 170 WITH DUAL ACIA INPUTS.

SOFTWARE:

THE CONTROLLER SHALL BE EQUIPPED WITH THE MOST RECENT REVISION OF THE W70SM, 170 ON STREET MASTER PROGRAM SOFTWARE, AS MANUFACTURED BY WAPITI MICROSYSTEMS CORPORATION, 16771 WEST ELLENDALE ROAD, DALLAS, OREGON 97338, THE 210 ON STREET MASTER PROGRAM SOFTWARE, AS MANUFACTURED BY BI-TRAN SYSTEMS, INC., SACRAMENTO CALIFORNIA, OR AN APPROVED EQUAL.

THE CONTRACTOR SHALL INCLUDE WITH HIS/HER BID A STATEMENT IDENTIFYING THE SOFTWARE HE/SHE PROPOSES TO FURNISH FOR THIS ITEM. THE SOFTWARE SHALL BE FROM THE SAME MANUFACTURER AS THE SOFTWARE FOR THE LOCAL CONTROLLERS.

SYSTEM MEMORY MODULE:

THE CONTROLLER SHALL BE EQUIPPED WITH A SYSTEM MEMORY MODULE WHICH SHALL CONFORM WITH THE FOLLOWING SPECIFICATIONS:

- 1) THE MODULE SHALL COMPLY WITH THE DETAILS AND CONNECTIONS SHOWN ON THE PLANS FOR THE MODEL 170 TRAFFIC CONTROL PROM MODULE OF THE FHWA SPECIFICATIONS, AND SHALL OPERATE AND BE COMPATIBLE WITH THE CONTROLLER.
- 2) ALL ELECTRICAL CONNECTIONS IN AND OUT OF THE MODULE SHALL BE THROUGH A PRINTED CIRCUIT CONNECTOR HAVING TWO (2) ROWS OF 36 INDEPENDENT BIFURCATED CONTACTS ON 0.100 INCH CENTERS.
- 3) THE MODULE SHALL BE DESIGNED SO THAT PERSONS INSERTING OR REMOVING THE ASSEMBLY SHALL NOT BE REQUIRED TO INSERT HANDS OR FINGERS WITHIN THE MICROPROCESSOR UNIT HOUSING OF THIS ASSEMBLY. A HANDLE OR GRIPPING DEVICE PROTRUDING NO MORE THAN 1-1/4 INCHES FROM THE FRONT PANEL SHALL BE ATTACHED TO THE FRONT OF THE ASSEMBLY. THE FRONT PANEL SHALL BE CONNECTED TO GROUND.
- 4) THERE SHALL BE PROVIDED POSITIVE METHODS TO PREVENT THIS MODULE FROM BEING INSERTED UPSIDE DOWN IN THE PROM SLOT WITH THE FRONT PANEL OF THE CONTROLLER CLOSED.
- 5) ALL INPUTS AND OUTPUTS SHALL BE TRI-STATE BUFFERED, ENABLING THEM TO DRIVE A LOAD CONSISTING OF 10 TTL GATES AT 200 PICO FARADS. WHEN THIS MODULE IS NOT BEING ADDRESSED, THE DATA INPUTS AND OUTPUTS SHALL BE DISABLED INTO A HIGH IMPEDANCE STATE, AND THE DATA I/O LINES SHALL NOT SOURCE OR SINK MORE THAN 100 MICROAMPERES. ALL ADDRESS INPUTS SHALL NOT LOAD THE BUS BY MORE THAN ONE TTL GATE LOAD AT 100 PICO FARADS. THE PROPAGATION DELAY TIME SHALL BE LESS THAN 30 NANoseconds.
- 6) THE MEMORY MODULE SHALL HAVE THREE (3) SOCKETS TO ACCOMMODATE 8K-32K MEMORY DEVICES. MEMORY MAPS SHALL BE USER SELECTABLE BY JUMPER WIRES. JUMPER POSITIONS FOR TWO SOCKETS SHALL BE PROVIDED TO CONVERT THE SOCKETS FROM AN EPROM SOCKET TO A SRAM SOCKET OR VICE VERSA. JUMPERS FOR THESE SOCKETS SHALL BE PROVIDED TO CONVERT THE SOCKET FROM A NON-STANDBY POWER SOCKET TO A STANDBY POWER SOCKET OR VICE VERSA.
- 7) A POWER SUPPLY SHALL BE PROVIDED ON-BOARD THE MODULE CONSISTING OF A DC REGULATION CIRCUIT, STANDBY POWER AND ALL NECESSARY SUPPORT CIRCUITRY.
- 8) A DC REGULATORY DEVICE WITH ITS CIRCUITRY SHALL BE PROVIDED TO REDUCE THE +12 VDC TO +5 VDC FOR MODULE USE. THE REGULATOR SHALL HAVE A MINIMUM EFFICIENCY OF 75% AND PROVIDE +5 ± 0.25 VDC FROM NO LOAD TO FULL LOAD WITH A MAXIMUM OF 2% RIPPLE.
- 9) A STANDBY LITHIUM BATTERY SOURCE SHALL BE PROVIDED TO HOLDUP VOLATILE RAM DEVICES DURING A MODEL 170 CONTROLLER UNIT POWER FAILURE. A CIRCUIT SHALL BE PROVIDED TO SENSE THE +5 VDC 170 POWER LINE AND WRITE PROTECT THE RAM DEVICES WHEN THE LINE FALLS BELOW +4.55 ± 0.05 VDC. THE STANDBY POWER SHALL BE A REPLACEABLE LITHIUM CELL AND SHALL HAVE A SWITCH TO DISCONNECT IT WHILE THE MODULE IS NOT BEING USED. ALL THE DEVICES CONNECTED TO THE STANDBY POWER SHALL NOT EXCEED A MAXIMUM POWER DRAIN EQUIVALENT TO 100 MICROAMPERES AT 3.7 VDC FROM THE STANDBY CELL.
- 10) ALL MEMORY ON THE MODULE SHALL BE NONVOLATILE, ALL ADDRESSABLE DEVICES SHALL BE FULLY DECODED.
- 11) EACH MODULE SHALL BE SUPPLIED WITH ONE 62256 STATIC RAM CHIP AND ONE 27256 EPROM (12.5 V PROGRAM) CONFIGURED AS FOLLOWS:

62256 STATIC RAM CHIP	0000-7FFF
27256 EPROM	8000-FFFF

THE MODULE SHALL NOT READ OR WRITE TO ADDRESSES 0000-0FFF AND 6000-6FFF.

THE VMA/PHASE 2 (E) CLOCK SIGNAL SHALL NOT BE USED IN A MEMORY DEVICE READ OPERATION.
- 12) THE FRONT PANEL SHALL BE LABELED "SYSTEM MEMORY".

CONTROLLER CABINET:

THE SYSTEM MASTER IS TO BE INSTALLED IN THE SAME CABINET AS A LOCAL CONTROLLER AT THE LOCATION SHOWN ON THE PLANS. THE CABINET SPECIFIED FOR THE LOCAL CONTROLLER SHALL BE REPLACED WITH A TYPE _____ CABINET, WHICH SHALL MEET OR EXCEED THE LATEST FHWA AND CALTRANS SPECIFICATION REQUIREMENTS. THE COST OF THE LARGER CABINET ABOVE AND BEYOND THE COST OF THE STANDARD CABINET SHALL BE INCLUDED IN THE COST OF THE SYSTEM MASTER.

PAYMENT:

PAYMENT FOR "ITEM 633 - CONTROLLER, MASTER, TRAFFIC RESPONSIVE, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TESTING, CERTIFICATIONS, AND OTHER INCIDENTALS NECESSARY TO FURNISH THE CONTROLLER, COMPLETE IN PLACE, INCLUDING ALL CONNECTIONS MADE AND WIRING COMPLETE, TESTED, AND ACCEPTED.

Designer Note: This note is to be used for specifying Type 170 On Street Master Controllers.

CUY-T43

ALTERNATE BID ITEMS:

ITEM 633 - CONTROLLER, ACTUATED, 8 PHASE, SOLID STATE DIGITAL MICROPROCESSOR, AS PER PLAN

ITEM 633 - CONTROLLER, MASTER, TRAFFIC RESPONSIVE, AS PER PLAN (07/01/1999)

THESE ITEMS SHALL MEET ALL SPECIFICATIONS OF THE GENERIC BID ITEMS LISTED ABOVE, WITH THE FOLLOWING EXCEPTIONS:

SOFTWARE:

THE LOCAL CONTROLLERS SHALL BE EQUIPPED WITH THE MOST RECENT REVISION OF THE W4IKS, MODEL 170 FULLY ACTUATED PROGRAM SOFTWARE, AND THE MASTER CONTROLLER SHALL BE EQUIPPED WITH THE MOST RECENT REVISION OF THE W70SM, 170 ON STREET MASTER PROGRAM SOFTWARE, AS MANUFACTURED BY WAPITI MICROSYSTEMS CORPORATION, 16771 WEST ELLENDALE ROAD, DALLAS, OREGON 97338.

CUY-T44

ITEM 633 - CONTROLLER, ACTUATED, 8 PHASE, SOLID STATE DIGITAL MICROPROCESSOR, AS PER PLAN (04/25/2005)

THE CONTRACTOR SHALL FURNISH AND INSTALL AN ACTUATED 8 PHASE DIGITAL MICROPROCESSOR CONTROLLER AND (BASE) (POLE) MOUNTED CABINET AND ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE CONTROLLER FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS.

THE CONTROLLER SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE CURRENT EDITION OF NEMA STANDARD TS-1, AND SHALL BE DELIVERED PREWIRED, EQUIPPED WITH AN INTERNAL TIME BASED COORDINATOR AND TELEMETRY UNIT.

THE CONTROLLER SHALL BE COMPLETELY COMPATIBLE WITH THE (CITY OF _____) (VILLAGE OF _____) CLOSED LOOP SYSTEM, AND SHALL INCLUDE ALL COMMUNICATION AND INTERFACE EQUIPMENT NECESSARY TO TRANSMIT AND RECEIVE ALL REQUIRED PATTERN AND COMMAND DATA BETWEEN THE CENTRAL OFFICE COMPUTER, THE SYSTEM MASTER, AND THE LOCAL CONTROLLER.

OVERLAP PROGRAMMING:

THE CONTROLLER SHALL BE EQUIPPED WITH AN INTERCHANGEABLE PLUG-IN PRINTED CIRCUIT BOARD OVERLAP PROGRAMMING ASSEMBLY, AS DESCRIBED IN TS-1, PART 14, OR SHALL OTHERWISE HAVE OVERLAP PROGRAMMING CAPABILITY.

CONFLICT MONITOR:

A CONFLICT MONITOR SHALL BE PROVIDED WITH THE CONTROLLER. THE CONFLICT MONITOR SHALL HAVE EXTENDED MONITORING IN ACCORDANCE WITH 733.03, PART A2c.

PRIOR TO ACCEPTANCE, THE CONTRACTOR SHALL CERTIFY IN WRITING THAT THE CONTROLLER HAS BEEN TESTED BY AN AUTOMATIC CONFLICT MONITOR TESTER, AND THAT NO CONFLICTS EXIST IN THE PROPER OPERATION OF THE CONTROLLER.

CONTROLLER CABINET:

THE CONTROLLER CABINET SHALL HAVE THE FOLLOWING FEATURES:

- 1) THE FOLLOWING SWITCHES SHALL BE MOUNTED ON THE SWITCH PANEL IN THE CABINET:
 - A) RUN / STOP TIME
 - B) CONTROLLER SHUTDOWN
 - C) DETECTOR TEST
 - D) FLASH CONTROL

- 2) THE LOAD SWITCHES SHALL PROVIDE INPUT AND OUTPUT INDICATIONS.
- 3) CORBIN LOCKS
- 4) LIGHTNING PROTECTION
- 5) A POLICE DOOR PANEL, EQUIPPED WITH THE FOLLOWING SWITCHES:
 - A. SIGNAL SHUTDOWN
 - B. FLASH CONTROL
 - C. AUTOMATIC/MANUAL TRANSFER
 - D. MANUAL PUSH BUTTON AND TEN FOOT (10') EXTENSION CORD
- 6) FOUR (4) ADDITIONAL LOOP DETECTOR WIRING HARNESES FOR FUTURE USE.
- 7) AN INCANDESCENT LAMP IN A GOOSENECK FIXTURE WITH MANUAL ON/OFF SWITCH.
- 8) BACK PANEL SHALL BE A 16 POSITION CONTINUOUS BACK PANEL.
- 9) ONE SPARE 2" CONDUIT TO THE CLOSEST PULLBOX. (PAYMENT FOR THE UNDERGROUND 2" CONDUIT SHALL BE INCIDENTAL TO ITEM 625 – CONDUIT, 2", 725.04.)
- 10) INSTALL ONE SEPARATE 2" CONDUIT FOR POWER AND ONE SEPARATE 2" CONDUIT FOR INTERCONNECT CABLE FROM CONTROLLER FOUNDATION TO SOURCE OF POWER SERVICE. (PAYMENT FOR THE UNDERGROUND 2" CONDUIT SHALL BE INCIDENTAL TO ITEM 625 – CONDUIT, 2", 725.04.)

RESTRICTIONS:

THE CONTROLLER AND SOFTWARE SHALL BE LIMITED TO THE FOLLOWING MANUFACTURER(S) AND MODEL(S) (AND SHALL BE MANUFACTURED BY THE SAME COMPANY AS THE SYSTEM MASTER):

PEEK CORPORATION 2906 CORPORATE WAY PALMETTO, FLORIDA 34221 (800) 245-7660 "C L MATS" CLOSED LOOP SYSTEM	AUTOMATIC SIGNAL/EAGLE SIGNAL 8004 CAMERON ROAD AUSTIN TEXAS 78753 (512) 837-8300 "MARC" CLOSED LOOP SYSTEM
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ECONOLITE CORPORATION
3360 EAST LA PALMA AVENUE
ANAHEIM, CA 92806
714-630-3700
MODEL ASC2S-2100
"ARIES" CLOSED LOOP SYSTEM

PAYMENT:

PAYMENT FOR "ITEM 633 - CONTROLLER, ACTUATED, 8 PHASE, SOLID STATE DIGITAL MICROPROCESSOR, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TESTING, CERTIFICATIONS, AND OTHER INCIDENTALS NECESSARY TO FURNISH THE CONTROLLER, COMPLETE IN PLACE, INCLUDING ALL CONNECTIONS MADE AND WIRING COMPLETE, TESTED, AND ACCEPTED.

Designer Note: This note is to be used for specifying NEMA Type 1 Local Controllers.

The restriction shown is for the City of Cleveland ONLY.

CUY-T45

**ITEM 633 - CONTROLLER, ACTUATED, 8 PHASE,
SOLID STATE DIGITAL MICROPROCESSOR, AS PER PLAN (11/08/2013)**

THE CONTRACTOR SHALL FURNISH AND INSTALL AN ACTUATED 8 PHASE DIGITAL MICROPROCESSOR CONTROLLER AND (BASE) (POLE) MOUNTED CABINET AND ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE CONTROLLER FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS.

THE CONTROLLER AND CABINET SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE CURRENT EDITION OF NEMA STANDARD TS-2, FOR TYPE 1 AND TYPE 2 CONTROLLERS, AND SECTIONS 633 AND 733 OF THE CONSTRUCTION AND MATERIALS SPECIFICATIONS, AND SHALL BE DELIVERED PREWIRED, EQUIPPED WITH AN INTERNAL TIME BASED COORDINATOR AND TELEMETRY UNIT.

THE CONTROLLER SHALL BE COMPLETELY COMPATIBLE WITH THE (CITY OF _____) (VILLAGE OF _____) CLOSED LOOP SYSTEM, AND SHALL INCLUDE ALL COMMUNICATION AND INTERFACE EQUIPMENT NECESSARY TO TRANSMIT AND

RECEIVE ALL REQUIRED PATTERN AND COMMAND DATA BETWEEN THE CENTRAL OFFICE COMPUTER, THE SYSTEM MASTER, AND THE LOCAL CONTROLLER.

THE CONTROLLER AND CABINET SHALL HAVE THE FOLLOWING FEATURES:

- 1) THE FOLLOWING SWITCHES SHALL BE MOUNTED ON THE SWITCH PANEL IN THE CABINET:
 - A) RUN / STOP TIME
 - B) CONTROLLER TIMER POWER
 - C) COORDINATION/FREE
 - D) DETECTOR TEST
 - E) FLASH CONTROL
- 2) THE FOLLOWING SWITCHES SHALL BE ACCESSIBLE VIA A POLICE PANEL DOOR
 - A) SIGNAL SHUTDOWN
 - B) FLASH CONTROL
 - C) MANUAL PUSHBUTTON AND TEN FOOT (10') EXTENSION CORD
 - D) AUTOMATIC/MANUAL TRANSFER
- 3) A SERVICE LAMP WITH DOOR ACTIVATED ON/OFF SWITCH.
- 4) THE LOAD SWITCHES SHALL PROVIDE INPUT AND OUTPUT INDICATIONS.
- 5) THE CABINET EXTERIOR SHALL BE ALUMINUM COLORED AND THE INTERIOR SHALL BE WHITE.
- 6) A BROADBAND CELLULAR MODEM COMPLETELY WIRED TO REPORT CABINET FAILURES, DETECTOR FAILURES, AND TRAFFIC COUNTS AT ALL LOCATIONS SHOWN IN THE PLANS WHERE THERE IS A COMMUNICATION CONNECTION FROM THE ANTENNA TO THE MODEM.
- 7) AN INCANDESCENT LAMP IN A GOOSENECK FIXTURE WITH MANUAL ON/OFF SWITCH.
- 8) BACK PANEL SHALL BE A 16 POSITION CONTINUOUS BACK PANEL.
- 9) ONE SPARE 2" CONDUIT TO THE CLOSEST PULLBOX. (PAYMENT FOR THE UNDERGROUND 2" CONDUIT SHALL BE INCIDENTAL TO ITEM 625 – CONDUIT, 2", 725.04.)
- 10) INSTALL ONE SEPARATE 2" CONDUIT FOR POWER AND ONE SEPARATE 2" CONDUIT FOR INTERCONNECT CABLE FROM CONTROLLER FOUNDATION TO SOURCE OF POWER SERVICE. (PAYMENT FOR THE UNDERGROUND 2" CONDUIT SHALL BE INCIDENTAL TO ITEM 625 – CONDUIT, 2", 725.04.)
- 11) LIGHTNING PROTECTION

THE CONTRACTOR SHALL FURNISH A CABINET PLAN SHOWING COMPONENT PLACEMENT, FOR APPROVAL BY THE ENGINEER AND MAINTAINING AGENCY.

PRIOR TO ACCEPTANCE, THE CONTRACTOR SHALL CERTIFY IN WRITING THAT THE MALFUNCTION MANAGEMENT UNIT HAS BEEN TESTED BY AN AUTOMATIC MONITOR TESTER, AND THAT NO CONFLICTS EXIST IN THE PROPER OPERATION OF THE CONTROLLER.

PAYMENT FOR "ITEM 633 - CONTROLLER, ACTUATED, 8 PHASE, SOLID STATE DIGITAL MICROPROCESSOR, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TESTING, CERTIFICATIONS, AND OTHER INCIDENTALS NECESSARY TO FURNISH THE CONTROLLER, COMPLETE IN PLACE, INCLUDING ALL CONNECTIONS MADE AND WIRING COMPLETE, TESTED, AND ACCEPTED.

Designer Note: This note is to be used for specifying NEMA TS-2, Type 1 or Type 2 Local Controllers. Note that some features listed in this note should be included at the discretion of the maintaining agency (i.e. Police Panel Door).

CUY-T46

ITEM 633 - CONTROLLER, MASTER, TRAFFIC RESPONSIVE, AS PER PLAN (11/08/2013)

THE CONTRACTOR SHALL FURNISH AND INSTALL A SOLID STATE DIGITAL MICROPROCESSOR TYPE TRAFFIC RESPONSIVE MASTER CONTROLLER WITH MENU DRIVEN PROMPTS AND ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE CONTROLLER FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS.

THE CONTROLLER SHALL MEET OR EXCEED ALL REQUIREMENTS OF THE CURRENT EDITION OF NEMA STANDARD TS-1, AND SHALL BE DELIVERED PREWIRED, EQUIPPED WITH AN INTERNAL TIME BASED COORDINATOR AND TELEMETRY UNIT.

THE CONTROLLER SHALL BE COMPLETELY COMPATIBLE WITH THE (CITY OF _____) (VILLAGE OF _____) CLOSED LOOP SYSTEM, AND SHALL INCLUDE ALL COMMUNICATION AND INTERFACE EQUIPMENT, INCLUDING A BROADBAND

CELLULAR MODEM, NECESSARY TO TRANSMIT AND RECEIVE ALL REQUIRED PATTERN AND COMMAND DATA BETWEEN THE CENTRAL OFFICE COMPUTER, THE SYSTEM MASTER, AND THE LOCAL CONTROLLER(S).

CONTROLLER CABINET:

THE SYSTEM MASTER IS TO BE INSTALLED IN THE SAME CABINET AS THE LOCAL CONTROLLER AT THE INTERSECTION(S) SHOWN IN THE PLANS. THE CABINET SPECIFIED FOR THE LOCAL CONTROLLER SHALL BE REPLACED WITH A LARGER CABINET, AS REQUIRED TO HOUSE THE SYSTEM MASTER CONTROLLER. THE COST OF THE LARGER CABINET ABOVE AND BEYOND THE COST OF THE STANDARD CABINET SHALL BE INCLUDED IN THE COST OF THE SYSTEM MASTER.

RESTRICTIONS:

THE CONTROLLER AND SOFTWARE SHALL BE LIMITED TO THE FOLLOWING MANUFACTURER(S) AND MODEL(S) (AND SHALL BE MANUFACTURED BY THE SAME COMPANY AS THE LOCAL CONTROLLERS):

PEEK CORPORATION 2906 CORPORATE WAY PALMETTO, FLORIDA 34221 (800) 245-7660 "C L MATS" CLOSED LOOP SYSTEM	AUTOMATIC SIGNAL/EAGLE SIGNAL 8004 CAMERON ROAD AUSTIN TEXAS 78753 (512) 837-8300 "MARC" CLOSED LOOP SYSTEM
ECONOLITE CORPORATION 3360 EAST LA PALMA AVENUE ANAHEIM, CA 92806 714-630-3700 "ARIES" CLOSED LOOP SYSTEM	INTELIGHT INCORPORATED 3450 SOUTH BROADMONT DRIVE TUCSON, ARIZONA 85713 (520) 795-8808 "X-1" CLOSED LOOP SYSTEM

FEATURES:

THE MASTER CONTROLLER SHALL HAVE THE FOLLOWING MINIMUM FEATURES:

1. IT SHALL GENERATE SYSTEM PATTERN COMMANDS TO LOCAL INTERSECTION CONTROLLERS WITHIN ITS CONTROL AREA IN RESPONSE TO PREVAILING TRAFFIC CONDITIONS AS INDICATED BY SAMPLING SENSORS STRATEGICALLY PLACED IN THE CONTROL AREA. THE MASTER SHALL ALSO ALLOW PRE-PROGRAMMED TIME OF DAY SELECTION OF PATTERNS.
2. IT SHALL MONITOR THE OPERATION OF THE LOCAL INTERSECTION CONTROLLERS AND SHALL INITIATE FAILURE REPORTS IF MALFUNCTIONS ARE DETECTED. THE MASTER SHALL GENERATE SYSTEM OPERATION STATUS REPORTS FOR PRINTING AT THE CENTRAL OFFICE MONITOR.
3. IT SHALL BE CAPABLE OF OPERATING IN ANY OF THE FOLLOWING MODES:
 - A. TRAFFIC RESPONSIVE - WHEREBY PATTERN SELECTION IS BASED ON DYNAMIC TRAFFIC CONDITIONS AS MEASURED BY SYSTEM SENSORS LOCATED IN THE CONTROL AREA.
 - B. TIME OF DAY / DAY OF WEEK - WHEREBY PATTERN SELECTION IS BASED ON A PRE-PROGRAMMED BASIS, WITH AUTOMATIC ADJUSTMENTS FOR SEASONAL CHANGES.
 - C. MANUAL OVERRIDE - WHEREBY PATTERN SELECTION IS BASED ON OPERATOR COMMAND AT THE CENTRAL OFFICE MONITOR OR TRAFFIC RESPONSIVE MASTER CONTROLLER SITE.

CAPACITIES:

THE MASTER CONTROLLER SHALL HAVE THE FOLLOWING MINIMUM CAPACITIES:

1. TOTAL INTERSECTION CONTROLLERS: 30
2. SYSTEM SENSOR DETECTOR UNITS: 48
3. THERE SHALL BE A MINIMUM OF THIRTY (30) SELECTABLE PATTERNS AVAILABLE, PLUS FOUR (4) SPECIAL PATTERNS. IN ADDITION, THE MASTER SHALL BE CAPABLE OF DIRECTING THE SYSTEM, OR INDIVIDUAL LOCAL CONTROLLERS INTO FREE (NON-COORDINATED) OPERATION. EACH PATTERN SHALL CONSIST OF A COMBINATION OF CYCLE LENGTH, SPLIT, AND OFFSET VALUES FOR EACH INTERSECTION IN THE CONTROL AREA. PATTERN SELECTION SHALL BE FROM THE FOLLOWING MINIMUM PARAMETER RANGES:
 - A. CYCLE LENGTHS: 6
 - B. OFFSETS: 5
 - C. SPLITS: 16

FUNCTIONAL REQUIREMENTS:

THE MASTER CONTROLLER SHALL HAVE THE FOLLOWING FUNCTIONAL REQUIREMENTS:

1. PATTERN SELECTION DURING NORMAL TRAFFIC RESPONSIVE OPERATION SHALL BE BASED ON THE FOLLOWING QUANTITATIVE TRAFFIC FLOW PARAMETERS:
 - A. VOLUME LEVEL OF ARTERIAL TRAFFIC FLOW

- B. DIRECTIONALITY OF ARTERIAL TRAFFIC FLOW
2. RATIO OF ARTERIAL TRAFFIC FLOW TO NON- ARTERIAL TRAFFIC FLOW PATTERN SELECTION DURING SPECIAL TRAFFIC RESPONSIVE OPERATION SHALL BE BASED ON THE FOLLOWING QUANTITATIVE PARAMETERS:
 - A. NORMAL RESPONSIVE OPERATION OVERRIDE BY DETECTION OF HIGH OCCUPANCY ON SELECTED SYSTEM SENSORS.
 - B. NORMAL RESPONSIVE OPERATION OVERRIDE BY DETECTION OF QUEUE LENGTH OR DURATION ON SELECTED SYSTEM SENSORS.
 3. PREFERENTIAL TRANSFER OF PATTERNS SHALL BE ACCOMPLISHED BY PROGRAMMABLE THRESHOLD VALUES. PROGRAMMABLE THRESHOLD VALUES SHALL ALSO BE PROVIDED FOR SPECIAL PATTERNS.
 4. SYSTEM SENSOR FUNCTIONS:
 - A. VOLUME, OCCUPANCY, AND QUEUE LENGTH DATA FROM THE SYSTEM SENSORS SHALL FORM THE BASIS FOR ALL RESPONSIVE PATTERNS INITIATED BY THE MASTER CONTROLLER.
 - B. THE MASTER CONTROLLER SHALL BE CAPABLE OF SELECTIVE WEIGHTING OF THE DATA FROM EACH SYSTEM SENSOR.
 - C. SYSTEM SENSOR DATA SHALL BE AVERAGED ON A MOVING BASIS, UTILIZING A USER PROGRAMMABLE TIME FACTOR.
 - D. EACH SYSTEM SENSOR SHALL BE MONITORED FOR CONSTANT CALL, ABSENCE OF CALL, AND ERRATIC OUTPUT. THERE SHALL BE AN OPTION TO ELIMINATE THE MONITORING OF ABSENCE OF CALLS DURING LIGHT TRAFFIC PERIODS ON A TIME OF DAY BASIS. SENSORS WHICH FAIL ANY OF THE MONITORING TESTS SHALL BE AUTOMATICALLY DELETED FROM THE VOLUME, OCCUPANCY AND QUEUE LENGTH CALCULATIONS. UPON RESUMPTION OF SATISFACTORY OPERATION, SENSORS SHALL AUTOMATICALLY RESUME INPUT TO VOLUME, OCCUPANCY, AND QUEUE LENGTH CALCULATIONS. A USER PRESCRIBED MINIMUM NUMBER OF DESIGNATED SENSORS SHALL BE REQUIRED TO MAINTAIN TRAFFIC RESPONSIVE OPERATION. THE MINIMUM NUMBER OF OPERATIONAL SENSORS SHALL BE PROGRAMMABLE FOR EACH COMPUTATIONAL CHANNEL. IF FEWER THAN THE PRESCRIBED NUMBER OF SYSTEM SENSORS ARE OPERATIONAL, THEN THE MASTER SHALL REVERT TO THE TIME OF DAY - DAY OF WEEK MODE.
 - E. EACH COMPUTATIONAL CHANNEL SHALL BE ASSIGNED UP TO TWELVE (12) DIFFERENT SYSTEM SENSORS.
 5. IT SHALL BE POSSIBLE TO SELECT ANY SYSTEM PARAMETER FROM THE MASTER ON A PRE-PROGRAMMED TIME OF DAY - DAY OF WEEK BASIS. THERE SHALL BE A TIME OF DAY OVERRIDE OF TRAFFIC RESPONSIVE OPERATION. TIME OF DAY OPERATION SHALL USE A 99 YEAR CALENDAR-CLOCK WITH THE CAPABILITY OF AUTOMATIC CHANGE FOR DAYLIGHT SAVINGS TIME.
 6. MEANS SHALL BE PROVIDED TO ALLOW INTER-MASTER LINKING IN ORDER TO AFFORD COORDINATION BETWEEN CONTIGUOUS SYSTEM CONTROL AREAS. THIS SHALL INCLUDE SYNCHRONIZATION OF MASTER REFERENCE CLOCKS.
 7. PATTERN CHANGES FOR EACH LOCAL CONTROLLER IN THE SYSTEM SHALL BE IMPLEMENTED SMOOTHLY AND IN THE SHORTEST TIME FRAME POSSIBLE WITHOUT VIOLATING MINIMUM INTERVAL VALUES.
 8. THE MASTER CONTROLLER SHALL STORE AND FORMAT MONITORED FUNCTION DATA FOR EITHER IMMEDIATE OUTPUT TO THE CENTRAL OFFICE MONITOR OR FOR FUTURE OUTPUT FOR A MINIMUM OF FORTY-EIGHT (48) HOURS. AS A MINIMUM, THE FOLLOWING REPORTS SHALL BE INCLUDED:
 - A. AN ACTIVITY LOG WHICH INCLUDED TIME, INTERSECTION AND ACTIVITY TYPE FOR ALL MONITORED INTERSECTION FAILURE CONDITIONS.
 - B. A SYSTEM SENSOR FAILURE LOG WHICH INCLUDES TIME, SENSOR LOCATION AND TYPE OF FAILURE.
 - C. A PATTERN CHANGE LOG WHICH INCLUDES THE OPERATING PATTERN AND THE TIME OF CHANGE WHILE IN TRAFFIC RESPONSIVE MODE. A SYSTEM STATUS REPORT WHICH SHOWS THE CURRENT OPERATING MODE AND PATTERN FOR ALL LOCAL INTERSECTION CONTROLLERS ON LINE.
 - D. A SYSTEM SENSOR DATA REPORT WHICH INCLUDES VOLUME, OCCUPANCY, AND AVERAGE SPEED FOR ALL SYSTEM SENSORS.

PAYMENT:

PAYMENT FOR "ITEM 633 - CONTROLLER, MASTER, TRAFFIC RESPONSIVE, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TESTING, CERTIFICATIONS, AND OTHER INCIDENTALS NECESSARY TO FURNISH THE CONTROLLER, COMPLETE IN PLACE, INCLUDING ALL CONNECTIONS MADE AND WIRING COMPLETE, TESTED, AND ACCEPTED.

Designer Note: This note is to be used for specifying NEMA Type 1 or Type 2 on Street Master Controllers. The restriction shown is for the City of Cleveland ONLY.

CUY-T47

TRAFFIC CONTROL SYSTEM GUARANTEE (09/29/2003)

THE CONTRACTOR SHALL GUARANTEE THAT THE TRAFFIC CONTROL SYSTEM INSTALLED AS A PART OF THIS CONTRACT SHALL OPERATE SATISFACTORILY FOR A PERIOD OF _____ DAYS FOLLOWING COMPLETION OF THE TEN (10) DAY PERFORMANCE TEST. IN THE EVENT OF UNSATISFACTORY OPERATION, THE CONTRACTOR SHALL CORRECT FAULTY INSTALLATIONS, MAKE REPAIRS, AND REPLACE DEFECTIVE PARTS WITH NEW PARTS OF EQUAL OR BETTER QUALITY. EQUIPMENT, MATERIAL, AND LABOR COSTS INCURRED IN CORRECTING AN UNSATISFACTORY OPERATION SHALL BE BORNE BY THE CONTRACTOR.

THE GUARANTEE SHALL COVER THE FOLLOWING ITEMS OF THE TRAFFIC CONTROL SYSTEM:

CONTROLLERS, CABINETS AND ASSOCIATED EQUIPMENT,
DETECTOR UNITS,
INTERCONNECTION ITEMS,
MASTER CONTROL EQUIPMENT, AND
CENTRAL OFFICE EQUIPMENT.

CUSTOMARY MANUFACTURER'S GUARANTEES FOR THE FOREGOING ITEMS AND ALL OTHER TRAFFIC CONTROL EQUIPMENT SHALL BE TURNED OVER TO THE MAINTAINING AGENCY FOLLOWING ACCEPTANCE OF THE EQUIPMENT.

THE COST OF GUARANTEEING THE TRAFFIC CONTROL SYSTEM SHALL BE INCIDENTAL TO AND INCLUDED IN THE CONTRACT UNIT PRICE BID FOR THE VARIOUS ITEMS MAKING UP THE SYSTEM.

Designer Note: County version of ODOT's TEM Note (442-15)

For projects not requiring a detailed guarantee, the requirements of 633 will apply. On traffic control projects, projects where the cost for traffic control is more than one third (1/3) of the total cost, or projects with closed loop capability included in the traffic control system, this note may be included.

The period of guarantee should be adjusted in relation to equipment complexity, i.e. 90 days for simple equipment to a maximum of 180 days for computerized control of many intersections.

When the note is included, notice of the fact must be communicated in the Transmittal of Final Plans to the County, so that the County may make provision in the proposal for the extended completion date.

CUY-T48

TRENCHING UNDER EXISTING SIDEWALKS (01/04/1999)

WHERE CONDUIT FOR NEW TRAFFIC SIGNALS OR TRAFFIC SIGNAL INTERCONNECTION IS TO BE INSTALLED IN TRENCHES UNDER EXISTING SIDEWALK, DRIVE APRONS OR CURB RAMPS, THE EXISTING SIDEWALK AND/OR CURB RAMPS SHALL BE REMOVED UNDER ITEM 202 – WALK REMOVED, AND NEW SIDEWALK, DRIVE APRONS AND CURB RAMPS SHALL BE INSTALLED UNDER THE APPROPRIATE PAVING ITEMS. SIDEWALK SHALL BE REMOVED AND INSTALLED IN WHOLE SLABS. PAYMENT FOR THE TRENCHING NECESSARY TO INSTALL THE CONDUIT WILL BE PAID UNDER ITEM 625 – TRENCH, RATHER THAN ITEM 625 – TRENCH IN PAVED AREAS, TYPE A. THE COST OF REMOVAL AND RESTORATION OF THE PAVEMENT WILL BE CONSIDERED INCIDENTAL TO THE RESPECTIVE REMOVAL AND PAVING ITEMS. NO ADDITIONAL COMPENSATION SHALL BE MADE TO THE CONTRACTOR UNDER ITEM 625 TO PERFORM THIS WORK.

Designer Note: Use this note when all conduit to be installed under sidewalks or drive aprons is to be installed in Trench, and payment for the pavement removal and replacement is to be covered under removal and paving items.

This note is designed to avoid paying twice for the removal and replacement of the sidewalk by eliminating payment under both Item 625 - Trench in Paved Areas, Type A and Items 202 - Walk Removal and 608 - Sidewalk.

CUY-T49

ITEM 631 – REMOVAL, MISC.: SCHOOL SPEED LIMIT SIGN ASSEMBLY (11/08/2013)

THIS ITEM OF WORK INCLUDES THE REMOVAL OF A SCHOOL SPEED LIMIT SIGN ASSEMBLY WHICH IS MOUNTED ON A (PEDESTAL) (WOOD POLE) (STRAIN POLE) (SPAN WIRE SUPPORT). THIS ITEM SHALL INCLUDE THE REMOVAL OF THE SIGN ASSEMBLY, PULL BOXES, SIGNAL CABLE, CONDUIT RISERS, TIMER AND TIMER ENCLOSURE, MESSENGER WIRE AND ACCESSORIES, POWER SERVICE, ETC.

AT LOCATIONS WHERE THE ASSEMBLY IS MOUNTED ON ITS OWN SUPPORT, THIS ITEM SHALL INCLUDE THE REMOVAL OF THE SUPPORT AND FOUNDATION TO ONE FOOT BELOW FINISHED GRADE. BACKFILLING, RESTORATION OF SURFACES AND DISPOSAL OF SURPLUS MATERIAL SHALL BE IN ACCORDANCE WITH SECTION 202.02 OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS, AND/OR AS DIRECTED BY THE ENGINEER.

ALL MATERIALS, EQUIPMENT AND LABOR NECESSARY TO PERFORM THE WORK AS OUTLINED ABOVE SHALL BE INCLUDED IN THE UNIT PRICE BID "EACH" FOR ITEM 631 – REMOVAL, MISC.: SCHOOL SPEED LIMIT SIGN ASSEMBLY.

Designer Note: Use this note for the complete removal and disposal of school speed limit sign assemblies.

CUY-T50

ITEM 625 - PLASTIC CAUTION TAPE, AS PER PLAN (11/08/2013)

THE LOCATION OF CONDUIT IN TRENCH SHALL BE MARKED BY THE USE OF A CONTINUOUS IDENTIFYING TAPE BURIED IN THAT TRENCH ABOVE THE CONDUIT LINE. IN ADDITION TO THE REQUIREMENTS OF 625.20 AND 725.22, THE TAPE SHALL BE RED WITH THE WORDS "ELECTRIC LINE BURIED BELOW" PRINTED IN BLACK LETTERS ON ONE SIDE ONLY.

THE CONTRACTOR SHALL BURY THE TAPE IN THE TRENCH WITH ONE STRIP PLACED APPROXIMATELY DOWN THE CENTER LINE AND 6" TO 10" BELOW THE FINAL GRADE. THE TAPE SHALL BE "TERRA TAPE", "ALLEN SYSTEM'S", OR AN EQUAL AS APPROVED BY THE ENGINEER IN ADVANCE.

PAYMENT FOR ITEM 625 – PLASTIC CAUTION TAPE, AS PER PLAN WILL BE MADE AT THE CONTRACT UNIT PRICE BID PER FOOT, COMPLETE AND IN PLACE. THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY FOR USE AS DESCRIBED HEREIN.

<u>ITEM</u>	<u>TOTAL</u>	<u>UNIT</u>	<u>DESCRIPTION</u>
625	_____	FT.	PLASTIC CAUTION TAPE, AS PER PLAN

Designer Note: This note and item should be used with all traffic signal installations. The quantity of tape included in this note should equal the quantity of conduit installed in trenches calculated elsewhere in the plans.

CUY-T51

ITEM 625 – GROUND ROD, AS PER PLAN (09/29/2008)

IN ADDITION TO THE REQUIREMENTS OF 625.16, THIS ITEM SHALL CONSIST OF FURNISHING AND RUNNING OF A SEVEN (7) STRAND, NO 4, AWG COPPER WIRE FROM THE TOP OF THE GROUND ROD, AND ATTACHING IT TO THE NEUTRAL BAR IN THE CABINET.

PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH.

Designer Note: This note and item should be used when requested by the maintaining agency.

CUY-T52

POLE FOUNDATION ELEVATIONS (09/29/2003)

ELEVATIONS SHOWN IN THE PLANS FOR POLE FOUNDATIONS ARE FOR COMPUTATIONAL PURPOSES ONLY. THE ACTUAL ELEVATION OF THE FOUNDATION SHALL BE IN ACCORDANCE WITH TC-21.20 PROVIDED THE EXISTING SLOPE IS LESS THAN 6: 1.

AT LOCATIONS WHERE THE EXISTING SLOPE IS 6:1 OR GREATER, THE BURIED DEPTH OF FOUNDATION, AS SHOWN IN STANDARD DRAWING TC-21.20 SHALL APPLY TO THE LOW SIDE OF THE SLOPE. THE TOP OF THE FOUNDATION SHALL BE SET 2 INCHES (50 MILLIMETERS) ABOVE THE EXISTING SURFACE ON THE HIGH SIDE OF THE SLOPE. THE ADDITIONAL DEPTH OF FOUNDATION NECESSARY TO MEET THESE REQUIREMENTS SHALL BE ADDED TO THE FORMED TOP.

Designer Note: County version of ODOT's TEM Note (442-12).
This note shall be used when strain pole, sign support, or signal support foundations are located in slopes of 6:1 or greater.

CUY-T53

ITEM 632 - COMBINATION SIGNAL SUPPORT, TYPE TC-81.21 AND SIGN SUPPORT, TYPE TC- _____ (WITH LIGHT POLE EXTENSION) (05/28/2010)

THIS SUPPORT SHALL CONSIST OF A TC- _____ POLE WITH A TC-81.21 SIGNAL SUPPORT ARM AND A TC- _____ SIGN SUPPORT ARM, (WITH LIGHT POLE EXTENSION). ALL SIGNAL SUPPORT ITEMS REQUIRED BY 632 AND ALL SIGN SUPPORT

ITEMS REQUIRED BY 630 SHALL BE INCLUDED AS PART OF THIS SUPPORT. THE DESIGN OF THE POLE, AND THE DESIGN AND LENGTH OF THE SIGN SUPPORT ARM AND SIGNAL SUPPORT ARM SHALL BE AS DETAILED IN THE PLANS.

PAYMENT WILL BE AT THE CONTRACT UNIT PRICE AND WILL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT AND OTHER INCIDENTALS NECESSARY FOR EACH SUPPORT FURNISHED, IN PLACE, COMPLETE AND ACCEPTED.

Designer Note: County version of ODOT's TEM Note (442-10).

This note shall be used when combination traffic signal support poles and sign supports are desired. The blanks shall be filled in with appropriate standard construction drawing numbers. The pole designs and arm designs and lengths shall be detailed in a table in the plans. Delete references to Light Pole Extensions if none are to be provided.

CUY-T54

ITEM 632 - COMBINATION STRAIN POLE, TYPE TC-81.10 AND SIGN SUPPORT, TYPE TC- (WITH LIGHT POLE EXTENSION) (09/29/2003)

THIS SUPPORT SHALL CONSIST OF A TC- _____ POLE WITH A TC- _____ SIGN SUPPORT ARM, (WITH LIGHT POLE EXTENSION). ALL SIGNAL SUPPORT ITEMS REQUIRED BY 632 AND ALL SIGN SUPPORT ITEMS REQUIRED BY 630 SHALL BE INCLUDED AS PART OF THIS SUPPORT. THE DESIGN OF THE POLE, AND THE DESIGN AND LENGTH OF THE SIGN SUPPORT ARM SHALL BE AS DETAILED IN THE PLANS.

PAYMENT WILL BE AT THE CONTRACT UNIT PRICE AND WILL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT AND OTHER INCIDENTALS NECESSARY FOR EACH SUPPORT FURNISHED, IN PLACE, COMPLETE AND ACCEPTED.

Designer Note: County version of ODOT's TEM Note (442-11).

This note shall be used when combination strain poles and sign supports are desired. The blanks shall be filled in with appropriate standard construction drawing numbers. The pole designs and arm designs and lengths shall be detailed in a table in the plans. Delete references to Light Pole Extensions if none are to be provided.

CUY-T55

ITEM 630 – SIGN, FLAT SHEET, TYPE H, AS PER PLAN (11/08/2013)

SIGNS SUPPLIED UNDER THIS ITEM SHALL MEET THE REQUIREMENTS OF 630, 730.12, AND 730.192 AND THE BACKGROUND COLOR OF THE SIGN SHALL BE FLUORESCENT YELLOW GREEN, WITH THE FOLLOWING COLOR SPECIFICATION LIMITS:

1		2		3		4	
X	Y	X	Y	X	Y	X	Y
0.387	0.610	0.460	0.540	0.421	0.486	0.368	0.539

THE MINIMUM LUMINANCE FACTOR (Y%) SHALL BE 50. THE MINIMUM FLUORESCENCE LUMINANCE FACTOR (Y_F%) SHALL BE 20.

THE PHOTOMETRIC REQUIREMENTS SHALL BE AS FOLLOWS:

OBSERVATION ANGLE (DEGREES)	ENTRANCE ANGLE (DEGREES)	MINIMUM COEFFICIENT OF RETROREFLECTION
0.2	-4	275
0.2	+30	180
0.5	-4	225
0.5	+30	70

THE MINIMUM COEFFICIENT OF RETROREFLECTIVITY AFTER ARTIFICIAL WEATHERING FOR 500 HOURS SHALL BE 50% OF THE ABOVE VALUES.

PAYMENT FOR ITEM 630 - SIGN, FLAT SHEET, TYPE H, AS PER PLAN, WILL BE MADE AT THE CONTRACT UNIT PRICE BID PER SQUARE FOOT, COMPLETE AND IN PLACE.

Designer Note: Use this note for Specifying Signs using Fluorescent Yellow Green sheeting per 630.04 or when the municipality has decided to use this color.

The following signs can be specified using this color:

R1-6, S1-1, S3-1, S3-2, S3-H3, S4-3P, S5-H1, R1-6b, R1-9, S4-5, S4-5a, W11-1, W11-2, W11-9, W11-15, W11-15a, W15-1 and W15-H2.

Supplemental signs, such as the following, when used with one of the signs listed above:

W3-1, W13-1P, W16-1P, W16-2P, W16-2aP, W16-3P, W16-3aP, W16-5P, W16-6P, W16-7P and W16-9P.

When specifying any signs in this color, all signs in the area of the types listed above, plus the Yellow portions of School Speed Limit Signs and School Speed Limit Sign Assemblies should use this color.

For School Speed Limit Sign Assemblies (S5-H1) also include note CUY-T56 in the plans.

For flat sheet School Speed Limit Signs (S5-H1), also include note CUY-T57 in the plans.

CUY-T56

ITEM 631 - SCHOOL SPEED LIMIT SIGN ASSEMBLY, AS PER PLAN (11/08/2013)

THE S4-3P (SCHOOL) PORTION OF THIS SIGN SHALL BE FABRICATED WITH A BLACK LEGEND ON TYPE H FLUORESCENT YELLOW GREEN SHEETING, AS DESCRIBED IN THE "ITEM 630- SIGN, FLAT SHEET, TYPE H, AS PER PLAN" NOTE ELSEWHERE IN THESE PLANS. THE BALANCE OF THE SIGN SHALL BE FABRICATED UTILIZING TYPE G OR TYPE H SHEETING IF MOUNTED OVERHEAD OR IF PEDESTAL MOUNTED.

ALL MATERIALS, EQUIPMENT AND LABOR NECESSARY TO INSTALL ONE ASSEMBLY SHALL BE INCLUDED IN THE UNIT PRICE BID PER EACH FOR ITEM 631 - SCHOOL SPEED LIMIT SIGN ASSEMBLY, AS PER PLAN.

Designer Note: Use this note when note CUY-T55 is included in the plans, and School Speed Limit Assemblies (S5-H1) are being installed.

CUY-T57

ITEM 630 – SIGN, FLAT SHEET, AS PER PLAN (11/08/2013)

THE S4-3P (SCHOOL) PORTION OF THE SIGNS SPECIFIED UNDER THIS ITEM SHALL BE FABRICATED WITH A BLACK LEGEND ON TYPE H FLUORESCENT YELLOW GREEN SHEETING, AS DESCRIBED IN THE "ITEM 630- SIGN, FLAT SHEET, TYPE H, AS PER PLAN" NOTE ELSEWHERE IN THESE PLANS. THE BALANCE OF THE SIGN SHALL BE FABRICATED UTILIZING TYPE G OR TYPE H SHEETING IF MOUNTED OVERHEAD OR IF GROUND MOUNTED.

PAYMENT FOR ITEM 630 - SIGN, FLAT SHEET, AS PER PLAN, WILL BE MADE AT THE CONTRACT UNIT PRICE BID PER SQUARE FOOT, COMPLETE AND IN PLACE.

Designer Note: Use this note when note CUY-T55 is included in the plans, and flat sheet School Speed Limit signs (S5-H1) are being installed.

CUY-T58

LAYOUT OF PAVEMENT MARKINGS (11/08/2013)

ALTHOUGH PERMANENT PAVEMENT MARKINGS ARE TO BE INSTALLED AT THE END OF CONSTRUCTION, PAVEMENT MARKING PLAN SHEETS HAVE NOT BEEN INCLUDED IN THE CONTRACT PLANS. IN LIEU OF A PAVEMENT MARKING PLAN, THE CONTRACTOR SHALL, PRIOR TO THE START OF CONSTRUCTION, PREPARE AN INVENTORY AND LOG OF ALL EXISTING PAVEMENT MARKINGS, INCLUDING LANE WIDTHS, NO PASSING ZONES, AND CHANNELIZATIONS, FOR USE IN RESTORING THE MARKINGS AT THE END OF CONSTRUCTION. HE/SHE SHALL DELIVER TWO (2) COPIES OF THE INVENTORY AND LOG TO THE ENGINEER BEFORE BEGINNING ANY PAVEMENT REMOVALS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAYOUT OF THE VARIOUS FINAL PAVEMENT MARKINGS, INCLUDING LOCATION OF NO PASSING ZONES, CENTER LINES, LANE LINES, AND EDGE LINES ON THE FINAL SURFACE COURSE, IN ACCORDANCE WITH SECTION 641.06.

UNLESS DIRECTED OTHERWISE BY THE ENGINEER, THE FINAL PAVEMENT MARKINGS SHALL BE RESTORED IN THEIR ORIGINAL PATTERNS AND LOCATIONS. NOTE THAT THE CONSTRUCTION OF ADA COMPLIANT CURB RAMPS MAY NECESSITATE ADJUSTMENT OF THE CROSSWALK AND/OR STOP BAR LOCATIONS, ALL AS DIRECTED BY THE ENGINEER.

THE COST OF LOGGING AND PREMARKING SHALL BE INCLUDED IN THE PRICE BID FOR THE VARIOUS PAVEMENT MARKING ITEMS. NO SEPARATE PAYMENT WILL BE MADE.

Designer Note: Use this note on resurfacing projects when pavement marking plan sheets are NOT included in the construction plans.

CUY-T59

INSTALLATION OF PERMANENT PAVEMENT MARKINGS (ITEMS 646/644) (11/08/2013)

THE CONTRACTOR MAY REDUCE THE NUMBER OF THROUGH TRAFFIC LANES BY 50%, AS DIRECTED BY THE ENGINEER, IN ORDER TO REMOVE PAVEMENT MARKINGS OR WORK ZONE PAVEMENT MARKINGS, AND INSTALL PERMANENT PAVEMENT MARKINGS. HE/SHE SHALL LIMIT THE AFOREMENTIONED CLOSURE TO BETWEEN THE HOURS OF ____A.M. AND ____P.M. UNLESS OTHERWISE APPROVED BY THE ENGINEER.

THE FINAL EPOXY PAVEMENT MARKINGS (ITEM 646) SHALL BE INSTALLED PER 646.04 AND 646.05. IF THE FINAL EPOXY PAVEMENT MARKINGS CANNOT BE INSTALLED WITHIN TWO (2) WORKING DAYS AFTER THE FINAL ASPHALT CONCRETE SURFACE COURSE IS COMPLETE (OR IF THE EPOXY PAVEMENT MARKINGS ARE BEING APPLIED TO A CONCRETE PAVEMENT SURFACE), THE CONTRACTOR SHALL INSTALL CLASS III WORK ZONE PAVEMENT MARKINGS (FULL PATTERN, LOW RATE), PER 614.11.F.3, AS AN INTERIM PAVEMENT MARKING, AS DIRECTED BY THE ENGINEER. THE FINAL EPOXY PAVEMENT MARKINGS MUST BE INSTALLED WITHIN 30 DAYS OF INSTALLING ANY REQUIRED CLASS III WORK ZONE PAVEMENT MARKINGS.

THE FINAL THERMOPLASTIC PAVEMENT MARKINGS (ITEM 644) SHALL BE PLACED WITHIN TWO (2) WORKING DAYS AFTER THE FINAL SURFACE COURSE IS COMPLETE. IF THE FINAL THERMOPLASTIC PAVEMENT MARKINGS CANNOT BE INSTALLED WITHIN TWO (2) WORKING DAYS AFTER THE FINAL ASPHALT CONCRETE SURFACE COURSE IS COMPLETE, THE CONTRACTOR SHALL INSTALL CLASS III WORK ZONE PAVEMENT MARKINGS (FULL PATTERN, LOW RATE), PER 614.11.F.3, AS AN INTERIM PAVEMENT MARKING, AS DIRECTED BY THE ENGINEER. THE FINAL THERMOPLASTIC PAVEMENT MARKINGS MUST BE INSTALLED WITHIN 30 DAYS AFTER THE FINAL SURFACE COURSE IS COMPLETE.

THE FOLLOWING QUANTITIES ARE INCLUDED IN THE GENERAL SUMMARY, AS ESTIMATES OF THE TYPE AND QUANTITY OF THE VARIOUS PAVEMENT MARKINGS TO BE INSTALLED UNDER ITEMS 646 AND 644:

(ASPHALT / CONCRETE SURFACE)

(ITEM 646 / ITEM 646) – EDGE LINE, 4”	_____	MILE
(ITEM 646 / ITEM 646) – LANE LINE, 4”	_____	MILE
(ITEM 646 / ITEM 646) – CENTER LINE	_____	MILE
(ITEM 644 / ITEM 646) – CHANNELIZING LINE, 8”	_____	FT.
(ITEM 644 / ITEM 646) – STOP LINE	_____	FT.
(ITEM 644 / ITEM 646) – CROSSWALK LINE	_____	FT.
(ITEM 644 / ITEM 646) – TRANSVERSE / DIAGONAL LINE	_____	FT.
(ITEM 644 / ITEM 646) – LANE ARROW	_____	EACH
(ITEM 644 / ITEM 646) – WORD ON PAVEMENT, 72”	_____	EACH

PAYMENT SHALL BE BASED ON THE MEASUREMENTS OF THE FINAL QUANTITIES INSTALLED. ANY INTERIM CLASS III WORK ZONE PAVEMENT MARKINGS REQUIRED WILL BE INCLUDED IN THE UNIT PRICE BID OF THE PERTINENT 646 OR 644 ITEMS.

Designer Note: Use this note to specify limitations for Item 646 / Item 644 Pavement Marking operations and, if necessary, to generate Item 646 / Item 644 Pavement Marking quantities when pavement marking plan/quantity calculation sheets are not included in the construction plans. Eliminate the estimated quantities paragraph when pavement marking quantities are calculated/tabulated elsewhere in the plans. This note represents the County standard of applying Item 646 Epoxy Pavement Marking for concrete surfaces & the “long line” markings on asphalt pavement surfaces and applying Item 644 Thermoplastic Pavement Marking for the “short line” markings on asphalt pavement surfaces. Edit note to reflect the proposed pavement surface and corresponding pavement markings being used.

Use the first paragraph of this note with discretion if the contractor must limit his/her pavement marking operations to specific hours. Normally the hours permitted would be 9:00 A.M. to 3:00 P.M., but on some streets these hours would not be advantageous. This paragraph is not to be used on two lane facilities.

INSTALLATION OF PERMANENT PAVEMENT MARKINGS (ITEM 642) (11/08/2013)

THE CONTRACTOR MAY REDUCE THE NUMBER OF THROUGH TRAFFIC LANES BY 50%, AS DIRECTED BY THE ENGINEER, IN ORDER TO REMOVE PAVEMENT MARKINGS OR WORK ZONE PAVEMENT MARKINGS, AND INSTALL PERMANENT PAVEMENT MARKINGS. HE/SHE SHALL LIMIT THE AFOREMENTIONED CLOSURE TO BETWEEN THE HOURS OF ____A.M. AND ____P.M. UNLESS OTHERWISE APPROVED BY THE ENGINEER.

THE FINAL TRAFFIC PAINT PAVEMENT MARKINGS (ITEM 642) SHALL BE PLACED WITHIN TWO (2) WORKING DAYS AFTER THE FINAL SURFACE COURSE IS COMPLETE.

IF THE FINAL TRAFFIC PAINT PAVEMENT MARKINGS CANNOT BE INSTALLED WITHIN TWO (2) WORKING DAYS AFTER THE FINAL ASPHALT CONCRETE SURFACE COURSE IS COMPLETE (OR AFTER A CONCRETE PAVEMENT SURFACE HAS BEEN OPENED TO TRAFFIC), THE CONTRACTOR SHALL INSTALL CLASS III WORK ZONE PAVEMENT MARKINGS (FULL PATTERN, LOW RATE), PER 614.11.F.3, AS AN INTERIM PAVEMENT MARKING, AS DIRECTED BY THE ENGINEER. THE FINAL TRAFFIC PAINT PAVEMENT MARKINGS MUST BE INSTALLED WITHIN 30 DAYS AFTER INSTALLING ANY REQUIRED CLASS III WORK ZONE PAVEMENT MARKINGS.

THE FOLLOWING QUANTITIES ARE INCLUDED IN THE GENERAL SUMMARY, AS ESTIMATES OF THE TYPE AND QUANTITY OF THE VARIOUS PAVEMENT MARKINGS TO BE INSTALLED UNDER ITEM 642:

ITEM 642 – EDGE LINE, 4”, TYPE 1	_____	MILE
ITEM 642 – LANE LINE, 4”, TYPE 1	_____	MILE
ITEM 642 – CENTER LINE, TYPE 1	_____	MILE
ITEM 642 – CHANNELIZING LINE, 8”, TYPE 1	_____	FT.
ITEM 642 – STOP LINE, TYPE 1	_____	FT.
ITEM 642 – CROSSWALK LINE, TYPE 1	_____	FT.
ITEM 642 – TRANSVERSE / DIAGONAL LINE, TYPE 1	_____	FT.
ITEM 642 – LANE ARROW, TYPE 1	_____	EACH
ITEM 642 – WORD ON PAVEMENT, 72”, TYPE 1	_____	EACH

PAYMENT SHALL BE BASED ON THE MEASUREMENTS OF THE FINAL QUANTITIES INSTALLED. ANY INTERIM CLASS III WORK ZONE PAVEMENT MARKINGS REQUIRED WILL BE INCLUDED IN THE UNIT PRICE BID OF THE PERTINENT 642 ITEMS.

Designer Note: Use this note to specify limitations for Item 642 Pavement Marking operations and, if necessary, to generate Item 642 Pavement Marking quantities when pavement marking plan/quantity calculation sheets are not included in the construction plans. Eliminate the estimated quantities paragraph when pavement marking quantities are calculated/tabulated elsewhere in the plans. Item 642 Pavement Marking is used when/if so requested by the maintaining municipality(ies).

Use the first paragraph of this note with discretion if the contractor must limit his/her pavement marking operations to specific hours. Normally the hours permitted would be 9:00 A.M. to 3:00 P.M., but on some streets these hours would not be advantageous. This paragraph is not to be used on two lane facilities.

INSTALLATION OF PERMANENT PAVEMENT MARKINGS (ITEM 643) (11/08/2013)

THE CONTRACTOR MAY REDUCE THE NUMBER OF THROUGH TRAFFIC LANES BY 50%, AS DIRECTED BY THE ENGINEER, IN ORDER TO REMOVE PAVEMENT MARKINGS OR WORK ZONE PAVEMENT MARKINGS, AND INSTALL PERMANENT PAVEMENT MARKINGS. HE/SHE SHALL LIMIT THE AFOREMENTIONED CLOSURE TO BETWEEN THE HOURS OF ____A.M. AND ____P.M. UNLESS OTHERWISE APPROVED BY THE ENGINEER.

THE FINAL POLYESTER PAVEMENT MARKINGS (ITEM 643) SHALL BE INSTALLED PER 643.04.

IF THE FINAL POLYESTER PAVEMENT MARKINGS CANNOT BE INSTALLED WITHIN TWO (2) WORKING DAYS AFTER A CONCRETE PAVEMENT SURFACE HAS BEEN OPENED TO TRAFFIC (OR AFTER COMPLETION OF A FINAL ASPHALT CONCRETE SURFACE COURSE), THE CONTRACTOR SHALL INSTALL CLASS III WORK ZONE PAVEMENT MARKINGS (FULL PATTERN, LOW RATE), PER 614.11.F.3, AS AN INTERIM PAVEMENT MARKING, AS DIRECTED BY THE ENGINEER. THE FINAL POLYESTER PAVEMENT MARKINGS MUST BE INSTALLED WITHIN 30 DAYS OF INSTALLING ANY REQUIRED CLASS III WORK ZONE PAVEMENT MARKINGS.

THE FOLLOWING QUANTITIES ARE INCLUDED IN THE GENERAL SUMMARY, AS ESTIMATES OF THE TYPE AND QUANTITY OF THE VARIOUS PAVEMENT MARKINGS TO BE INSTALLED UNDER ITEM 643:

ITEM 643 – EDGE LINE, 4”, TYPE 1	_____	MILE
ITEM 643 – LANE LINE, 4”, TYPE 1	_____	MILE
ITEM 643 – CENTER LINE, TYPE 1	_____	MILE
ITEM 643 – CHANNELIZING LINE, 8”, TYPE 1	_____	FT.
ITEM 643 – STOP LINE, TYPE 1	_____	FT.

ITEM 643 – CROSSWALK LINE, TYPE 1	_____	FT.
ITEM 643 – TRANSVERSE / DIAGONAL LINE, TYPE 1	_____	FT.
ITEM 643 – LANE ARROW, TYPE 1	_____	EACH
ITEM 643 – WORD ON PAVEMENT, 72”, TYPE 1	_____	EACH

PAYMENT SHALL BE BASED ON THE MEASUREMENTS OF THE FINAL QUANTITIES INSTALLED. ANY INTERIM CLASS III WORK ZONE PAVEMENT MARKINGS REQUIRED WILL BE INCLUDED IN THE UNIT PRICE BID OF THE PERTINENT 643 ITEMS.

Designer Note: Use this note to specify limitations for Item 643 Pavement Marking operations and, if necessary, to generate Item 643 Pavement Marking quantities when pavement marking plan/quantity calculation sheets are not included in the construction plans. Eliminate the estimated quantities paragraph when pavement marking quantities are calculated/tabulated elsewhere in the plans. Item 643 Pavement Marking is used when/if so requested by the maintaining municipality(ies).

Use the first paragraph of this note with discretion if the contractor must limit his/her pavement marking operations to specific hours. Normally the hours permitted would be 9:00 A.M. to 3:00 P.M., but on some streets these hours would not be advantageous. This paragraph is not to be used on two lane facilities.

CUY-T62

INSTALLATION OF PERMANENT PAVEMENT MARKINGS (ITEM 645) (11/08/2013)

THE CONTRACTOR MAY REDUCE THE NUMBER OF THROUGH TRAFFIC LANES BY 50%, AS DIRECTED BY THE ENGINEER, IN ORDER TO REMOVE PAVEMENT MARKINGS OR WORK ZONE PAVEMENT MARKINGS, AND INSTALL PERMANENT PAVEMENT MARKINGS. HE/SHE SHALL LIMIT THE AFOREMENTIONED CLOSURE TO BETWEEN THE HOURS OF _____A.M. AND _____P.M. UNLESS OTHERWISE APPROVED BY THE ENGINEER.

THE FINAL PREFORMED PAVEMENT MARKINGS (ITEM 645) SHALL BE IMMEDIATELY ROLLED INTO THE HOT SURFACE AFTER THE FINAL SURFACE COURSE IS PLACED. TO ACCOMPLISH PROPER (IMMEDIATE) INSTALLATION, THE CONTRACTOR SHALL ENSURE THAT ALL REQUIRED 645 MATERIALS, EQUIPMENT AND QUALIFIED WORKFORCE ARE AVAILABLE ON SITE PRIOR TO COMMENCING WITH THE ASPHALT SURFACE COURSE PLACEMENT.

IF THE FINAL PREFORMED PAVEMENT MARKINGS CANNOT BE INSTALLED WITHIN TWO (2) WORKING DAYS AFTER A CONCRETE PAVEMENT SURFACE HAS BEEN OPENED TO TRAFFIC, THE CONTRACTOR SHALL INSTALL CLASS III WORK ZONE PAVEMENT MARKINGS (FULL PATTERN, LOW RATE), PER 614.11.F.3, AS AN INTERIM PAVEMENT MARKING, AS DIRECTED BY THE ENGINEER. THE FINAL PREFORMED PAVEMENT MARKINGS MUST BE INSTALLED WITHIN 30 DAYS AFTER INSTALLING ANY REQUIRED CLASS III WORK ZONE PAVEMENT MARKINGS.

THE FOLLOWING QUANTITIES ARE INCLUDED IN THE GENERAL SUMMARY, AS ESTIMATES OF THE TYPE AND QUANTITY OF THE VARIOUS PAVEMENT MARKINGS TO BE INSTALLED UNDER ITEM 645:

ITEM 645 – EDGE LINE, 4”, TYPE A3, AS PER PLAN	_____	MILE
ITEM 645 – LANE LINE, 4”, TYPE A3, AS PER PLAN	_____	MILE
ITEM 645 – CENTER LINE, TYPE A3, AS PER PLAN	_____	MILE
ITEM 645 – CHANNELIZING LINE, 8”, TYPE A3, AS PER PLAN	_____	FT.
ITEM 645 – STOP LINE, TYPE A3, AS PER PLAN	_____	FT.
ITEM 645 – CROSSWALK LINE, TYPE A3, AS PER PLAN	_____	FT.
ITEM 645 – TRANSVERSE / DIAGONAL LINE, TYPE A3, AS PER PLAN	_____	FT.
ITEM 645 – LANE ARROW, TYPE A3, AS PER PLAN	_____	EACH
ITEM 645 – WORD ON PAVEMENT, 72”, TYPE A3, AS PER PLAN	_____	EACH

PAYMENT SHALL BE BASED ON THE MEASUREMENTS OF THE FINAL QUANTITIES INSTALLED. ANY INTERIM CLASS III WORK ZONE PAVEMENT MARKINGS REQUIRED WILL BE INCLUDED IN THE UNIT PRICE BID OF THE PERTINENT 645 ITEMS.

Designer Note: Use this note to specify limitations for Item 645 Pavement Marking operations and, if necessary, to generate Item 645 Pavement Marking quantities when pavement marking plan/quantity calculation sheets are not included in the construction plans. Eliminate the estimated quantities paragraph when pavement marking quantities are calculated/tabulated elsewhere in the plans. Item 645 Pavement Marking is used when/if so requested by the maintaining municipality(ies), but should not be used across a change in pavement cross slope (crowns, etc.) or across separate pavement pours/installations.

Use the first paragraph of this note with discretion if the contractor must limit his/her pavement marking operations to specific hours. Normally the hours permitted would be 9:00 A.M. to 3:00 P.M., but on some streets these hours would not be advantageous. This paragraph is not to be used on two lane facilities.

CUY-T63

INSTALLATION OF PERMANENT PAVEMENT MARKINGS (ITEMS 648/647) (11/08/2013)

THE CONTRACTOR MAY REDUCE THE NUMBER OF THROUGH TRAFFIC LANES BY 50%, AS DIRECTED BY THE ENGINEER, IN ORDER TO REMOVE PAVEMENT MARKINGS OR WORK ZONE PAVEMENT MARKINGS, AND INSTALL PERMANENT PAVEMENT MARKINGS. HE/SHE SHALL LIMIT THE AFOREMENTIONED CLOSURE TO BETWEEN THE HOURS OF ____A.M. AND ____P.M. UNLESS OTHERWISE APPROVED BY THE ENGINEER.

THE FINAL SPRAY THERMOPLASTIC PAVEMENT MARKINGS (ITEM 648) SHALL BE INSTALLED PER 648.04 AND 648.05. THE FINAL HEAT-FUSED PREFORMED THERMOPLASTIC PAVEMENT MARKINGS (ITEM 647) SHALL BE INSTALLED PER 647.04.

IF THE FINAL SPRAY THERMOPLASTIC AND/OR THE FINAL HEAT-FUSED PREFORMED THERMOPLASTIC PAVEMENT MARKINGS CANNOT BE INSTALLED WITHIN TWO (2) WORKING DAYS AFTER THE FINAL ASPHALT CONCRETE SURFACE COURSE IS COMPLETE (OR AFTER A CONCRETE PAVEMENT SURFACE HAS BEEN OPENED TO TRAFFIC), THE CONTRACTOR SHALL INSTALL CLASS III WORK ZONE PAVEMENT MARKINGS (FULL PATTERN, LOW RATE), PER 614.11.F.3, AS AN INTERIM PAVEMENT MARKING, AS DIRECTED BY THE ENGINEER. THE FINAL SPRAY THERMOPLASTIC AND/OR THE FINAL HEAT-FUSED PREFORMED THERMOPLASTIC PAVEMENT MARKINGS MUST BE INSTALLED WITHIN 30 DAYS OF INSTALLING ANY REQUIRED CLASS III WORK ZONE PAVEMENT MARKINGS.

THE FOLLOWING QUANTITIES ARE INCLUDED IN THE GENERAL SUMMARY, AS ESTIMATES OF THE TYPE AND QUANTITY OF THE VARIOUS PAVEMENT MARKINGS TO BE INSTALLED UNDER ITEMS 648 AND 647:

ITEM 648 – EDGE LINE, 4”	_____	MILE
ITEM 648 – LANE LINE, 4”	_____	MILE
ITEM 648 – CENTER LINE	_____	MILE
ITEM 647 – CHANNELIZING LINE, 8”	_____	FT.
ITEM 647 – STOP LINE	_____	FT.
ITEM 647 – CROSSWALK LINE	_____	FT.
ITEM 647 – TRANSVERSE / DIAGONAL LINE	_____	FT.
ITEM 647 – LANE ARROW	_____	EACH
ITEM 647 – WORD ON PAVEMENT, 72”	_____	EACH

PAYMENT SHALL BE BASED ON THE MEASUREMENTS OF THE FINAL QUANTITIES INSTALLED. ANY INTERIM CLASS III WORK ZONE PAVEMENT MARKINGS REQUIRED WILL BE INCLUDED IN THE UNIT PRICE BID OF THE PERTINENT 648 OR 647 ITEMS.

Designer Note: Use this note to specify limitations for Item 648 / Item 647 Pavement Marking operations and, if necessary, to generate Item 648 / Item 647 Pavement Marking quantities when pavement marking plan/quantity calculation sheets are not included in the construction plans. Eliminate the estimated quantities paragraph when pavement marking quantities are calculated/tabulated elsewhere in the plans. Item 648 and Item 647 Pavement Markings are used when/if so requested by the maintaining municipality(ies).

Use the first paragraph of this note with discretion if the contractor must limit his/her pavement marking operations to specific hours. Normally the hours permitted would be 9:00 A.M. to 3:00 P.M., but on some streets these hours would not be advantageous. This paragraph is not to be used on two lane facilities.

CUY-T64

REPLACEMENT OF LOOP DETECTORS (09/29/2003)

THE CONTRACTOR SHALL, AT LEAST 5 WORKING DAYS PRIOR TO THE INSTALLATION OF THE ASPHALT CONCRETE SURFACE COURSE, NOTIFY THE MUNICIPALITY, TO PERMIT THEM TO INSTALL TRAFFIC SIGNAL LOOP DETECTORS IN THE BASE COURSE, AND SHALL COORDINATE WORK WITH ANY CONTRACTORS HIRED BY THE MUNICIPALITY TO PERFORM THIS WORK IN ACCORDANCE WITH SECTION 105.08.

Designer Note: Use this note when installation of loop detectors is to be performed by the municipality.

CUY-T65

ITEM 632 – DETECTOR LOOP, AS PER PLAN (11/08/2013)

ALTHOUGH REPLACEMENT TRAFFIC SIGNAL DETECTOR LOOPS ARE TO BE INSTALLED AT THE END OF CONSTRUCTION, A PLAN SHOWING THE SIZE AND LOCATION OF THE VARIOUS LOOPS HAS NOT BEEN INCLUDED IN THE CONTRACT PLANS. IN LIEU OF A TRAFFIC SIGNAL PLAN, THE CONTRACTOR SHALL, PRIOR TO THE START OF CONSTRUCTION, PREPARE AN INVENTORY AND LOG OF ANY AND ALL EXISTING VISIBLE DETECTOR LOOPS, FOR USE IN RESTORING THEM AT THE END OF CONSTRUCTION. HE/SHE SHALL DELIVER TWO COPIES OF THE INVENTORY AND LOG TO THE ENGINEER BEFORE BEGINNING ANY PAVEMENT REMOVALS.

ANY EXISTING LOOP DETECTORS THAT ARE NOT VISIBLE PRIOR TO CONSTRUCTION (BUT ARE DISTURBED DURING THE PAVEMENT PLANING / REMOVAL OPERATIONS), SHALL BE ADDED TO THE INITIAL INVENTORY AND LOG FOR INSTALLATION INTO THE INTERMEDIATE COURSE.

THE ENGINEER WILL COORDINATE THE INSTALLATION OF THE DETECTOR LOOPS WITH THE CITY/VILLAGE OF _____, _____ DEPARTMENT (____) _____ - _____.

REPLACE ALL EXISTING STOP LINE INDUCTANCE DETECTOR LOOPS PER THE POWERHEAD CONFIGURATION SHOWN ON TC-82.10. THE WIDTH SHALL BE AS SPECIFIED ON TC-82.10 AND THE LENGTH SHALL BE AS INDICATED BELOW. THE STOP LINE DETECTOR LOOPS SHALL NOT BE WIRED TO ANY OTHER LOOPS AND SHALL HAVE ITS OWN DETECTOR CHANNEL. THE LOCATION OF THESE LOOPS SHALL BE SUCH THAT THE POWERHEAD IS LOCATED AT THE STOP LINE, NOT PAST IT. SIGN R10-22 AND PAVEMENT MARKING FIGURE 9C-7 FROM PAGE 9C-10 IN SECTION 9C.05 OF THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES SHALL BE INSTALLED TO DENOTE THE POWERHEAD LOCATION. PAYMENT FOR THESE ITEMS SHALL BE INCIDENTAL TO THE COST OF THE DETECTOR LOOP.

SYSTEM LOOP DIMENSIONS SHALL BE 6' X 6', CENTERED IN THE LANE AND THE ANGULAR DESIGN (ADD) LOOP AS SHOWN ON TC-82.10.

ALL STOP LINE DETECTION SHALL BE TESTED FOR A BICYCLE TARGET AND ALL DILEMMA ZONES SHALL BE TESTED FOR A MOTORCYCLE TARGET.

CENTER EACH LOOP IN THE LANE.

THE LENGTH OF EACH STOP LINE POWERHEAD LOOP SHALL BE 35 FEET.

THE INSTALLATION OF POURED EPOXY INSULATED SPLICES BETWEEN THE LOOP DETECTOR WIRES AND THE EXISTING LOOP DETECTOR LEAD IN CABLE SHALL BE CONSIDERED AS INCIDENTAL TO THIS ITEM OF WORK. NO SEPARATE PAYMENT FOR THESE SPLICES WILL BE MADE.

THE FOLLOWING ESTIMATED QUANTITY IS CARRIED TO THE GENERAL SUMMARY AS A CONTINGENCY QUANTITY WHICH IS INCLUDED FOR USE ONLY AND IN AMOUNTS AS DIRECTED BY THE ENGINEER. THE PROVISIONS OF SECTION 104.02 WILL APPLY TO THIS ITEM. THE AMOUNT OF THIS ITEM AND THE LOCATIONS WHERE USED SHALL BE RECORDED AS USED, AND PAYMENT WILL BE BASED ON FINAL MEASUREMENTS.

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>UNIT</u>
632	DETECTOR LOOP, AS PER PLAN	_____	EACH

Designer Note: Use this note on resurfacing projects when detailed traffic control plans are not included in the construction plans. If requested, video detection may be used in lieu of any inductance loop installation.