

**ITEM 632. PULL BOX, MISC.: (13"x24"), (17"x30")**

SIZE: BOX - 13" X 24" X 26" DEEP (NOMINAL).  
 SIZE: BOX - 17" X 30" X 26" DEEP (NOMINAL).

COVER AND BOX SHALL HAVE A MINIMUM VERTICAL TEST LOAD OF 10,000 LBS. OVER A 10" X 10" AREA PER ASTM C-857 AND SO BE IDENTIFIED ON THE SURFACE, ALL IN ACCORDANCE WITH THE WESTERN UNDERGROUND COMMITTEE - GUIDE 3.6 (W.U.C. 3.6). THE BOX MUST ALSO MEET THE STRUCTURAL REQUIREMENTS FOR LATERAL (SIDE) LOADING AS DEFINED IN W.U.C. GUIDE 3.6. THE PULL BOX SHALL BE SUITABLE FOR INSTALLATION AND USE THROUGH A TEMPERATURE RANGE OF -40° C TO +90° C.

THE PULL BOX COVER AND RING SHALL BE MADE OF HIGH DENSITY POLYMER CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 20,000 P.S.I. THE BODY OF THE BOX SHALL BE MADE OF FIBERGLASS REINFORCED POLYESTER (FRP). HIGH DENSITY POLYETHYLENE (HDPE), STRUCTURAL FOAM, OR STRUCTURAL THERMOPLASTIC SHALL NOT BE ACCEPTABLE.

THE COVER SHALL BE FASTENED TO THE BOX WITH TWO STAINLESS STEEL HEX HEAD BOLTS. THE BOX SHALL HAVE A "SELF-LOCATING" OR "FLOATING" THREADED INSERT MADE OF STAINLESS STEEL AND SHALL BE REPLACEABLE. COVER SURFACE SHALL BE SKID RESISTANT AND SHALL HAVE A MINIMUM COEFFICIENT OF FRICTION OF 0.50.

IDENTIFICATION "TRAFFIC" SHALL BE PERMANENTLY MOLDED ON THE TOP SURFACE OF THE PULL BOX COVER.

THE BOX SHALL BE WIDER AT THE BASE FOR STABILITY AND TAPERED INWARDS TOWARD THE TOP. THE BOX SHALL BE PROVIDED WITH A BOTTOM FLANGE AT LEAST 1-1/4" WIDE TO PREVENT SETTLING IN FIRM SOIL WHEN SUBJECTED TO SPECIFIED LOADS. TOP REGION OF THE BOX SHALL BE CONFIGURED TO PROVIDE "KEYING IN" TO LOCK THE BOX IN CONCRETE WHEN INSTALLED IN SIDEWALKS.

IF IT IS NECESSARY TO MAKE CONDUIT ENTRY HOLES IN THE FIELD, IT SHALL BE DONE WITH A WOOD HOLE CUTTING SAW.

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.

PULL BOXES ARE TO BE PROVIDED A 4" DRAIN TO THE NEAREST STORM INLET, UNDER DRAIN OR OTHER SUITABLE OUTLET FROM THE PULL BOX. TWENTY (20) FEET OF 4" PVC CONDUIT SHALL BE USED AND BE INCLUDED IN THE PRICE OF THE PULL BOX. ADDITIONAL 4" CONDUIT IN THE AMOUNT OF 200 L.F. HAS BEEN INCLUDED IN THE BID PROPOSAL FOR USE AS DIRECTED BY THE ENGINEER. FAILURE TO INSTALL DRAIN CONDUIT SHALL RESULT IN A PENALTY EQUAL TO THE PRICE BID FOR THE AFFECTED PULL BOXES. PAYMENT FOR PULL BOX ITEMS SHALL NOT BE MADE UNTIL PULL BOXES, INCLUDING UNDER DRAIN, HAVE BEEN COMPLETELY INSTALLED.

**ITEM 632. LOOP DETECTOR UNITS, DELAY AND EXTENSION TYPE, AS PER PLAN**

- A) EACH AMPLIFIER SHALL BE NUMBERED AND LABELED TO CORRESPOND TO ITS LOOP NUMBER, DIRECTION/LANE (I.E., WBLR, WBLR, WBLT, ...) AND PHASE. THE LOOP NUMBERS AND PHASE ARE SHOWN ON THE INTERSECTION SIGNAL PLANS.
- B) THE AMPLIFIER SHALL BE AUTOMATICALLY SELF TUNING, RELAY TYPE AND ALL CONTACTS SHALL BE INCLUDED IN THE WIRING HARNESS.
- C) THE UNIT'S ELECTRICAL CONNECTION PLUGS OR WIRING HARNESS SHALL ALLOW READY REPLACEMENTS WITH SIGNAL CHANNEL AMPLIFIERS AS DESCRIBED IN SECTION 732.07.
- D) EACH AMPLIFIER SHALL HAVE SYSTEM LOOP OUTPUT FEATURES FOR BOTH VOLUME AND OCCUPANCY. THE COUNT OUTPUT SHALL BE WIRED SO THAT COUNTS CAN BE OBTAINED THROUGH A LAPTOP MICROCOMPUTER OR A TELEPHONE MODEM DIALED UP BY A PERSONAL COMPUTER.

**ITEM 632 DETECTOR LOOP, AS PER PLAN**

THE SIGNAL CONTRACTOR SHALL CONTACT THE CITY OF MENTOR ENGINEERING DEPARTMENT BEFORE INSTALLATION OF VEHICLE DETECTION LOOPS FOR ASSISTANCE IN LOCATION MARKING. THE CITY OF MENTOR CONTACT PERSON FOR LOOP INSTALLATION IS:

MR. PAUL CIUPA  
 ASSISTANT TO THE CITY ENGINEER - TRAFFIC  
 (440) 255-1100

INSTALLATION IN CONCRETE PAVEMENT:

LOOP DETECTORS INSTALLED IN CONCRETE PAVEMENT SHALL BE PRE FORMED HEAVY DUTY RUBBER LOOP DETECTORS (MANUFACTURED BY DETECH). 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 6" OF CONCRETE. THE LOOPS SHALL BE CONSTRUCTED USING 3/8" SYNTHETIC CORD REINFORCED HYDRAULIC HOSE WITH A 250 PSI INTERNAL PRESSURE RATING. NO PAYMENT SHALL BE MADE FOR ANY LOOP NOT INSTALLED ACCORDING TO SPECIFICATIONS.

INSTALLATION IN ASPHALT PAVEMENT:

VEHICLE LOOP DETECTORS SHALL BE INSTALLED IN LEVELING COURSE (WHENEVER APPLICABLE) BEFORE FINAL OVERLAY.

**ITEM 632. VEHICULAR SIGNAL HEAD, 12" LENS, POLYCARBONATE, AS PER PLAN**

SECTION 732.01 OF THE SPECIFICATIONS IS MODIFIED FOR THIS PROJECT AS FOLLOWS:

- A) SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.
- B) GLASS LENSES SHALL BE USED.
- C) PROPER EXTERIOR COLORS SHALL BE OBTAINED BY THE USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.
- D) SIGNAL HEADS SHALL BE RIGIDLY MOUNTED ON THE MAST ARMS WITH THE RED LENS CENTERED ON THE CENTERLINE OF THE MAST ARM.
- E) THE CITY SHALL FIELD LOCATE ALL SIGNAL HEADS FOR THE CONTRACTOR. THE CONTRACTOR SHALL FIELD DRILL ALL HOLES INTO MAST ARM FOR VEHICLE SIGNAL WIRING AFTER THE ENGINEER HAS LOCATED THE SIGNALS. NO PRE-DRILLED VEHICLE SIGNAL WIRING HOLES WILL BE ALLOWED.

**PEDESTRIAN PUSHBUTTON**

PEDESTRIAN PUSHBUTTONS SHALL BE CAST ALUMINUM WITH ADA ("MUSHROOM CAPPED") PUSHBUTTON, PEDESTRIAN SYMBOL AND INDICATOR LIGHT. THE ENGINEER WILL FIELD LOCATE THE PEDESTRIAN PUSHBUTTON FOR THE CONTRACTOR. ALL HOLES FOR PEDESTRIAN PUSHBUTTONS SHALL BE FIELD DRILLED AFTER BEING LOCATED BY THE ENGINEER.

**ITEM 632. PEDESTRIAN SIGNAL HEAD, TYPE D2, AS PER PLAN**

SECTION 732.05 OF THE SPECIFICATIONS IS MODIFIED FOR THIS PROJECT AS FOLLOWS:

- A) PEDESTRIAN SIGNAL HOUSINGS MAY BE CONSTRUCTED OF POLYCARBONATE PLASTIC AND SHALL MEET I.T.E. SPECIFICATIONS.
- B) VISORS SHALL BE CONSTRUCTED OF POLYCARBONATE PLASTIC AND MEET I.T.E. SPECIFICATIONS.
- C) PLASTIC LENSES SHALL BE USED.
- D) PIPE, SPACERS AND FITTINGS CONSTRUCTED OF POLYCARBONATE PLASTIC MAY BE USED IN LIEU OF GALVANIZED STEEL OR ALUMINUM.
- E) SIGNALS SHALL BE ATTACHED TO POLES AS SHOWN ON TC-85.10. THE PEDESTRIAN SIGNAL HEAD BRACKET ARMS SHALL BE ATTACHED TO THE POLES BY UTILIZING 1 1/2" BLIND HALF COUPLINGS WELDED TO THE POLE.
- F) SIGNALS SHALL DISPLAY THE UPRaised PALM AND WALKING PERSON SYMBOLS.
- G) PROPER EXTERIOR COLORS FOR POLYCARBONATE PLASTIC SIGNAL HOUSING SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.

**ITEM 633. CONTROLLER, ACTUATED, 8 PHASE, SOLID STATE DIGITAL MICROPROCESSOR, MODEL PFEK 3000, AS PER PLAN**

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING AN ACTUATED, SOLID STATE DIGITAL MICROPROCESSOR TYPE CONTROLLER WITH SECONDARY CONTROLLER, MENU DRIVEN PROMPTS, INTERNAL TBC, TELEMETRY UNIT AND ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE CONTROLLER COMPLETELY FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS AND COMPATIBLE WITH THE CITY CLOSED LOOP SYSTEM.

THE CONTROLLER AND CABINET SHALL CONFORM TO ODOT SPECIFICATION 633 AND SHALL HAVE THE FOLLOWING FEATURES:

- A) THE LOAD SWITCHES SHALL PROVIDE INPUT AND OUTPUT INDICATIONS.
- B) THE CONFLICT MONITOR (MANUFACTURED BY EDI) SHALL BE CAPABLE OF 12 CHANNEL OPERATION AS PER PLAN AND SHALL HAVE EXTENDED MONITORING, LCD DISPLAY, FAULT/EVENT STORAGE AND REPORTING.
- C) THE FOLLOWING SWITCHES SHALL BE ACCESSIBLE VIA THE POLICE PANEL DOOR:
  - 1) SIGNAL SHUTDOWN
  - 2) FLASH CONTROL
  - 3) MANUAL CONTROL JACK ACTIVATING MANUAL CONTROL WITH SEPARATE MANUAL PUSHBUTTON CORD
- D) THE FOLLOWING SWITCHES SHALL BE MOUNTED ON THE SWITCH PANEL IN THE CABINET:
  - 1) RUN-STOP NORMAL
  - 2) CONTROLLER SHUTDOWN
  - 3) DETECTOR TEST
  - 4) FLASH CONTROL
- E) A FLUORESCENT SERVICE LAMP WITH DOOR ACTIVATED ON/OFF SWITCH.
- F) THE CABINET EXTERIOR SHALL BE ALUMINUM COLORED AND THE INTERIOR SHALL BE WHITE.
- G) THE CONTRACTOR SHALL FURNISH FOR APPROVAL A CABINET PLAN SHOWING COMPONENT PLACEMENT.
- H) THE SUPPLIER SHALL CONTACT THE CITY OF MENTOR FOR SYSTEM DETECTOR HOOK UP AND GRAPHICS DETECTOR HOOK UP.
- I) BACK PANEL SHALL BE ONE CONTINUOUS PANEL CONTAINING 16 LOAD BAYS.
- J) ONE SPARE 2" CONDUIT TO THE CLOSEST PULLBOX.
- K) INDICATOR LIGHT PANEL WITH LOAD SWITCH.

L) PROVIDE FACTORY INSTALLED CONFIRMATION LIGHT ISOLATION PANEL AND HARNESS, AS PER DETAIL DRAWNGS.

M) INSTALL ONE SEPARATE 2" CONDUIT FOR POWER AND ONE SEPARATE 2" CONDUIT FOR INTERCONNECT CABLE FROM CONTROLLER FOUNDATION TO SOURCE OF POWER SERVICE.

**MAINTENANCE OF TRAFFIC SIGNAL/ FLASHER INSTALLATIONS**

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

- A) NEW 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.
- B) EXISTING SIGNAL INSTALLATIONS OR DEVICES, INSTALLED OR MODIFIED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF THESE FROM THE TIME OF INITIAL INSTALLATION OR MODIFICATION UNTIL THE WORK IS ACCEPTED.

THE CONTRACTOR SHALL CORRECT AS QUICKLY AS POSSIBLE ALL OUTAGES OR MALFUNCTIONS. HE SHALL PROVIDE THE CITY AND THE ENGINEER SUCH ADDRESSES AND PHONE NUMBERS WHERE HIS 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. 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 A DAY, 7 DAYS A 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 TO SERVICE WITHIN FOUR (4) HOURS AFTER THE CONTRACTOR HAS BEEN NOTIFIED OF THE OUTAGE.

IN THE EVENT NEW SIGNALS ARE DAMAGED PRIOR TO ACCEPTANCE, ALL DAMAGED EQUIPMENT SHALL BE REPLACED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER. THE SIGNAL SHALL BE BACK IN SERVICE WITHIN EIGHT (8) HOURS AFTER THE CONTRACTOR'S NOTIFICATION OF THE OUTAGE OR MALFUNCTION.

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 8-HOUR PERIOD, AND SHALL MAKE PERMANENT REPAIRS OR REPLACEMENT 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 OCCURS AT ANY ONE LOCATION, THEN THE ALLOTTED TIME LIMIT SHALL BE FOR THE WORST SINGLE OUTAGE.

WHERE OUTAGES 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 THESE LOCATIONS WITHIN HIS RESPONSIBILITY, WITHIN PERIODS AS OUTLINED ABOVE, THE ENGINEER MAY INVOKE THE PROVISIONS OF SECTION 105.15 AND ANY SUBSEQUENT BILLINGS TO THE STATE OR THE CITY OF MENTOR FOR POLICE SERVICE AND MAINTENANCE SERVICES BY CITY FORCES SHALL BE DEDUCTED FROM MONEYS DUE OR TO BECOME DUE THE CONTRACTOR IN ACCORDANCE WITH PROVISIONS OF SECTION 105.15.

THE CONTRACTOR SHALL PROVIDE THE MAINTENANCE SERVICE ENTIRELY WITH HIS FORCES OR HE 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.

ANY VEHICULAR TRAFFIC SIGNAL HEAD, EITHER NEW OR EXISTING, WHICH WILL BE OUT OF OPERATION SHALL BE COVERED IN THE MANNER DESCRIBED IN SECTION 632.24.

THIS ITEM SHALL BE CONSIDERED A SUBSIDIARY WORK ITEM AND THE COST SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE FOR THE VARIOUS ITEMS MAKING UP THE SIGNAL SYSTEM.

**GUARANTEE**

THE CONTRACTOR SHALL GUARANTEE THAT THE TRAFFIC CONTROL SYSTEM INSTALLED AS PART OF THIS CONTRACT SHALL OPERATE SATISFACTORILY FOR THE PERIOD AS COVERED BY THE MAINTENANCE BOND FOLLOWING COMPLETION OF THE 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 ALL THE ITEMS MAKING UP THE TRAFFIC CONTROL SYSTEM: THE CONTROLLER, CABINET, DETECTOR AMPLIFIERS AND CONFLICT MONITOR.

CUSTOMARY MANUFACTURERS' GUARANTEES FOR THE FOREGOING ITEMS SHALL BE TURNED OVER TO THE CITY OF MENTOR ENGINEER FOLLOWING ACCEPTANCE OF THE EQUIPMENT. THE FULL MANUFACTURERS' GUARANTEES (MINIMUM 12 MONTHS) SHALL GO INTO EFFECT ON THE DATE OF ACCEPTANCE BY THE CITY OF MENTOR.

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

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REV. NO.	DESCRIPTION	DATE	BY	CHK'D.

**STATE ROUTE 84  
 INTERIM WIDENING & RESURFACING  
 IMPROVEMENTS**  
 CITY OF MENTOR, LAKE COUNTY, OHIO

DATE:	JULY, 2000.
DRAWN BY:	A.E.P.
CHECKED BY:	A.E.P.
APPROVED BY:	I.M.H.
F.B. No. _____ PG. _____	

**TRAFFIC CONTROL  
 GENERAL NOTES**

SCALE	
HOR.	1" = 20'
VERT.	---
CONTRACT No.	
00123	
SHEET No.	OF
63	74