

City of Avon Traffic Signal Note

JANUARY 31, 2018

GENERAL

THE FOLLOWING NOTES ARE AVAILABLE IN A WORD DOCUMENT FORMAT FOR MODIFICATIONS RELATED TO SPECIFIC PROJECTS. ALL MODIFICATIONS MUST BE IDENTIFIED BY THE TRAFFIC SIGNAL SYSTEM DESIGNER AND THEN APPROVED BY THE CITY OF AVON PRIOR TO INCLUSION ON PLAN OR SPECIFICATION DOCUMENTS.

TYPICAL TRAFFIC SIGNAL NOTES HAVE BEEN CONSOLIDATED HERE FOR CONVENIENCE IN PREPARING TRAFFIC SIGNAL CONSTRUCTION PLANS FOR THE CITY OF AVON. WHEN A PLAN NOTE REVISES THE MATERIAL OR CONTRACTOR REQUIREMENTS FROM WHAT IS SPECIFIED IN THE ODOT CONSTRUCTION & MATERIALS SPECIFICATIONS (C&MS), BOTH THE NOTE AND THE BID ITEM WILL BE DESIGNATED "AS PER PLAN". THESE NOTES MAY BE MODIFIED TO FURTHER DEFINE CONDITIONS OF A PARTICULAR PROJECT BUT SUCH MODIFICATION MUST BE PRE-APPROVED BY THE CITY OF AVON.

THESE PLAN NOTES HAVE BEEN DEVELOPED FOR THE USE OF BOTH DESIGN CONSULTANTS HIRED BY THE CITY OF AVON TO PERFORM TRAFFIC SIGNAL DESIGN AS WELL AS DEVELOPER TEAMS WHO ARE INSTALLING TRAFFIC SIGNALS AS PART OF THEIR SITE PLANS. IT IS UNDERSTOOD THAT THE INSTALLATION OF TRAFFIC SIGNALS AS PART OF AN OVERALL SITE DEVELOPMENT MAY NOT INCLUDE AN ITEMIZED BID, HOWEVER, THESE PLAN NOTES AND REFERENCED DOCUMENTS SHALL GOVERN THE CONSTRUCTION AND MATERIAL SPECIFICATIONS REQUIRED FOR TRAFFIC SIGNAL INSTALLATION. NO EXCEPTIONS TO THESE SPECIFICATIONS ARE ALLOWABLE BY A DEVELOPER, UNLESS APPROVED BY THE CITY OF AVON.

T-0010 SCOPE
LABOR, SUPPLIES, EQUIPMENT AND MATERIALS SHALL BE FURNISHED TO PERFORM ALL OPERATIONS NECESSARY FOR THE ACCEPTABLE INSTALLATION OF THE TRAFFIC CONTROL DEVICES, IN STRICT ACCORDANCE WITH THESE PLANS, NOTES AND SPECIFICATIONS. THESE NOTES, SCHEDULES AND DRAWINGS ARE INTENDED TO PROVIDE FOR ALL MATERIAL AND LABOR REQUIRED TO FURNISH AND INSTALL A COMPLETE TRAFFIC CONTROL SYSTEM. ANY PERTINENT CITY OF AVON SIGNAL AND CONSTRUCTION PERMITS SHALL BE ACQUIRED AND SUBMITTED. THE COSTS INCURRED WITH THE PERMIT APPLICATIONS SHALL BE BORNE BY THE CONTRACTOR. ALL REQUIREMENTS FROM THE CITY OF AVON STANDARDS FOR ENGINEERING CONSTRUCTION SHALL BE ACQUIRED AND OBSERVED. DOCUMENTS SHALL BE OBTAINED FROM THE CITY ENGINEER'S OFFICE.

DESIGNER NOTE: NOTE T-0010 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS.

T-0020 DEFINITIONS AND TERMS
WHEREVER THERE APPEARS IN THE STANDARD SPECIFICATIONS (ODOT ITEMIZED CMS) SUPPLEMENTAL SPECIFICATIONS OR PROPOSAL NOTES, THE TERM "THE STATE", "DIRECTOR OF TRANSPORTATION", "DEPARTMENT", "DISTRICT CONSTRUCTION ENGINEER (DCE)", "ENGINEER", OR ANY OTHER TERM DESIGNATING ANY REPRESENTATIVE OR EMPLOYEE OF THE STATE OR ITS DEPARTMENT OF TRANSPORTATION, SUCH TERM SHALL, FOR THE PURPOSE OF THIS CONTRACT, BE CONSIDERED AND TAKEN AS MEANING AND DESIGNATING THE EMPLOYEE OF THE CITY OF AVON WHOSE DUTY OR FUNCTION IT IS TO DEAL WITH THE SUBJECT MATTER IN CONNECTION WITH SUCH TERMS IS USED AND SPECIFICALLY:

THE STATE SHALL MEAN THE CITY OF AVON.
DEPARTMENT SHALL MEAN THE CITY OF AVON.
DIRECTOR SHALL MEAN THE CITY OF AVON CITY ENGINEER, HIS DEPUTIES OR ANY ENGINEER DESIGNATED AS THE CITY ENGINEER'S REPRESENTATIVE.
DISTRICT CONSTRUCTION ENGINEER SHALL MEAN THE DULY AUTHORIZED AGENT OR REPRESENTATIVE ENGINEER OF THE CITY OF AVON, ACTING WITHIN THE SCOPE OF HIS/HER AUTHORITY FOR THE PURPOSES OF CONSTRUCTION ENGINEERING AND ADMINISTRATION OF THE CONTRACT.
LABORATORY SHALL MEAN THE LABORATORY APPROVED BY THE CITY OF AVON.

DESIGNER NOTE: NOTE T-0020 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS.

T-0030 SPECIFICATIONS
THE STANDARD SPECIFICATIONS OF THE CITY OF AVON AND THE OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATION, JANUARY 1, 2019 EDITION SHALL GOVERN THIS PROJECT. THIS SHALL INCLUDE ANY CHANGES OR SUPPLEMENTAL SPECIFICATIONS. SHOULD A CONFLICT ARISE BETWEEN THESE OR OTHER PROJECT SPECIFICATIONS, THE CITY OF AVON STANDARDS SHALL TAKE PRECEDENCE.

DESIGNER NOTE: NOTE T-0030 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS.

T-0040 LOCAL LAWS, ORDINANCES, AND REGULATIONS
IN ACCORDANCE WITH SECTION 107.01 OF THE GENERAL PROVISIONS, THE CONTRACTOR SHALL STAY FULLY INFORMED OF ALL LOCAL LAWS, ORDINANCES, REGULATIONS, ORDERS, AND DECREES THAT AFFECT THE WORK. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBSERVE AND COMPLY WITH ALL SUCH LAWS, ORDINANCES, REGULATIONS, ORDERS, AND DECREES AT NO ADDITIONAL COST TO THE PROJECT/CITY.

DESIGNER NOTE: NOTE T-0040 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS.

T-0050 UNDERGROUND AND OVERHEAD UTILITIES
LISTED BELOW ARE ALL UTILITIES LOCATED WITHIN THE PROJECT CONSTRUCTION LIMITS TOGETHER WITH THEIR RESPECTIVE OWNERS:

(LIST ALL SANITARY, TELEPHONE, ELECTRIC, GAS, WATER, CABLE TV, ETC.)	(NAME OF OWNER, STREET OR P.O. BOX, CITY, STATE, ZIP CODE, AND EMERGENCY TELEPHONE NUMBER.)
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THE LOCATION OF THE UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE AS OBTAINED FROM THE OWNERS AS REQUIRED BY SECTION 153.64 O.R.C. THE LOCATION OF ALL UNDERGROUND UTILITIES WITHIN THE WORK LIMITS SHALL BE VERIFIED BY THE CONTRACTOR. OVERHEAD UTILITY COMPANIES SHALL BE NOTIFIED AT LEAST TWO WORKING DAYS BEFORE INSTALLING SIGNAL POLES OR SUPPORTS. SPECIAL CARE SHALL BE TAKEN WHEN SETTING POLES OR SUPPORTS DUE TO CLOSE PROXIMITY OF OVERHEAD UTILITIES. COSTS FOR UTILITY VERIFICATION AND NOTIFICATION SHALL BE BORNE BY THE CONTRACTOR AND SHALL BE INCIDENTAL TO THE COST THE PROJECT.

DESIGNER NOTE: NOTE T-0050 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS.

T-0060 MOBILIZATION
THE COST FOR MOBILIZATION INCLUDING FIELD OFFICE, ETC CONSIDERED INCIDENTAL TO, AND INCLUDED IN THE INDIVIDUAL ITEMS OF WORK. NO SEPARATE PAYMENT FOR MOBILIZATION WILL BE MADE.

DESIGNER NOTE: NOTE T-0060 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION

PROJECTS WHERE THERE ARE FEWER THAN TEN (10) SIGNALIZED INTERSECTIONS WITHIN THE PROJECT. FOR PROJECTS WITH TEN (10) OR MORE SIGNALIZED INTERSECTIONS, SEPARATE BID ITEMS SHALL BE PROVIDED FOR MOBILIZATION AND CONSTRUCTION LAYOUT STAKES AND THIS NOTE WILL NOT BE USED.

T-0070 CONSTRUCTION LAYOUT STAKES AND SURVEYING
AN OHIO LICENSED PROFESSIONAL SURVEYOR SHALL BE PROVIDED BY THE CONTRACTOR TO MARK AND LAYOUT THE PLAN LOCATION OF TRAFFIC SIGNAL SUPPORTS AND ALL OTHER STATIONED SIGNAL ITEMS USING THE STATIONS AND OFFSETS PROVIDED IN THESE PLANS. THE SURVEYOR, PROVIDED BY THE CONTRACTOR, SHALL SET THE PROPER POLE AND CABINET FOUNDATION ELEVATIONS. THE CITY OF AVON SHALL APPROVE THE POLE FOUNDATION LOCATIONS AND ELEVATIONS PRIOR TO THE INSTALLATION OF ANY ITEM. THE COSTS FOR THIS SERVICE SHALL BEMADE INCIDENTAL TO THE COST OF THIS PROJECT.

DESIGNER NOTE: NOTE T-0070 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS.

T-0080 MAINTENANCE OF TRAFFIC SIGNAL/ FLASHER INSTALLATION
THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TRAFFIC SIGNAL/FLASHER INSTALLATIONS WITHIN THE PROJECT UNDER THE FOLLOWING CONDITIONS:

- EXISTING SIGNAL/FLASHER INSTALLATIONS WHICH 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 OPERATIONS FIRST DISTURB THE INSTALLATION UNTIL THE INSTALLATION HAS BEEN SUBSEQUENTLY REMOVED OR MODIFIED AND THE WORK IS ACCEPTED.
- NEW OR REUSED SIGNAL/FLASHER 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 SHALL PROVIDE THE CITY OF AVON 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 CITY OF AVON WITH THE SIGNAL BACK TO SERVICE WITHIN FOUR HOURS AFTER THE CONTRACTOR HAS BEEN NOTIFIED OF THE OUTAGE.

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 CITY OF AVON WITH THE SIGNAL BACK IN SERVICE WITHIN 8 HOURS AFTER THE CONTRACTOR'S NOTIFICATION OF THE OUTAGE. 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 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 SPECIFIED ABOVE, THE CITY OF AVON MAY INVOKE THE PROVISIONS OF SECTION 105.15 OF THE ODOT CONSTRUCTION & MATERIALS SPECIFICATIONS AND ANY SUBSEQUENT BILLINGS TO THE CITY OF AVON FOR POLICE SERVICES AND MAINTENANCE SERVICES BY CITY FORCES SHALL BE DEDUCTED FROM MONIES DUE OR TO BECOME DUE TO THE CONTRACTOR.

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 CITY OF AVON, IN WRITING, OF THE MAINTENANCE METHOD SELECTED.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES 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 TO 9 AM, 12 TO 1 PM AND/OR 4 TO 7 PM. ANY SIGNALIZED INTERSECTION, WHERE THE SIGNAL IS OUT OF SERVICE DUE TO CONSTRUCTION PROCEDURES, OR DUE TO AN OUTAGE OR MALFUNCTION OR EQUIPMENT AS DESCRIBED ABOVE, SHALL BE PROTECTED, BY THE CONTRACTOR, BY OFF-DUTY CITY OF AVON POLICE, 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:

- TIME OF NOTIFICATION OF MALFUNCTION;
- TIME OF WORK CREW'S ARRIVAL TO CORRECT THE MALFUNCTION;
- ACTIONS TAKEN TO CORRECT THE MALFUNCTION, INCLUDING A LIST OF PARTS REPAIRED OR REPLACED;
- A DIAGNOSIS OF REASON FOR THE MALFUNCTION AND PROBABILITY OF RECURRENCE;
- TIME OF COMPLETION OF THE REPAIR AND SYSTEM RESTORED TO FULL SERVICE.

A COPY OF THESE RECORDS SHALL BE PROVIDED TO THE CITY OF AVON 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 BID FOR ITEM 614, MAINTAINING TRAFFIC.

DESIGNER NOTE: NOTE T-0080 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS.

CITY OF AVON CONSTRUCTION STANDARDS AND SPECIFICATIONS		
TRAFFIC SIGNAL NOTES	ADOPTION ORDINANCE	DATE
STANDARD CONSTRUCTION DRAWING	61-24	5/29/24
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TC-1

T-0090	<u>POWER SUPPLY FOR TRAFFIC SIGNALS</u> ELECTRIC POWER SHALL BE OBTAINED FROM FIRST ENERGY COMPANY AT THE THE LOCATION INDICATED ON THE PLANS. POWER SUPPLIED SHALL BE 115 VOLTS.
<u>DESIGNER NOTE:</u>	NOTE T-0090 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE TRAFFIC SIGNAL(S) REQUIRE NEW POWER SERVICE. TENTATIVE POWER SERVICE LOCATIONS SHALL BE SPECIFIED AS NEEDED ON THE PLANS EITHER ON THE SIGNAL SUPPORT OR AT SEPARATE SERVICE POLES. THIS NOTE IS AN ADAPTATION OF ODOT'S NOTE 442-2 FROM THEIR "TRAFFIC ENGINEERING MANUAL."
T-0100	<u>SIGNAL ACTIVATION</u> PRIOR TO ACTIVATING THE NEW TRAFFIC SIGNAL TO STOP-AND-GO MODE AND/OR REMOVING THE EXISTING TRAFFIC SIGNAL FROM SERVICE, ALL ITEMS IN THE PROPOSED SIGNAL PLAN SHALL BE FULLY COMPLETED, (I.E., VEHICLE DETECTION, PEDESTRIAN SIGNAL HEADS, ETC). IF THERE ARE CONSTRUCTABILITY ISSUES (I.E., ROADWAY WIDENING, ETC.) THAT PREVENT THE SIGNAL FROM BEING COMPLETED PRIOR TO ACTIVATION, IT SHALL BE BROUGHT TO THE ATTENTION OF THE CITY OF AVON. THE CITY WILL THEN REVIEW, APPROVE OR REJECT PROPOSALS TO ACTIVATE THE TRAFFIC SIGNAL PRIOR TO COMPLETION. THE CONTRACTOR SHALL NOTIFY THE CITY OF AVON AT LEAST 10 WORKI DAYS PRIOR TO SCHEDULING THE FINAL INSPECTION OF THE SIGNAL INSTALLATION. FINAL INSPECTION IS NOT CONSIDERED COMPLETE UNTIL DESIGNATED DISTRICT TRAFFIC PERSONNEL INSPECT THE TRAFFIC SIGNAL AND ISSUE WRITTEN APPROVAL. IF ISSUES ARE FOUND DURING THE FINAL INSPECTION THAT EFFECT THE SAFETY OF THE TRAVELING PUBLIC AND/OR THE EFFICIENCY OF THE INTERSECTION, THE SIGNAL SHALL NOT BE ACTIVATED ON THE PROPOSED DATE. ANY PUNCH LIST ITEMS THAT ARE FOUND SHALL BE CORRECTED AND REINSPECTED BY DISTRICT TRAFFIC PERSONNEL PRIOR TO FINAL ACCEPTANCE. THE CITY OF AVON SHALL ONLY ASSUME DAY TO DAY MAINTENANCE OF THE TRAFFIC SIGNAL AFTER FINAL WRITTEN ACCEPTANCE HAS BEEN ISSUED.
<u>DESIGNER NOTE:</u>	NOTE T-0100 SHALL BE USED FOR ALL NEW CITY OF AVON TRAFFIC SIGNAL INSTALLATIONS.
T-0110	<u>REMOVAL OF TRAFFIC SIGNAL INSTALLATION</u> TRAFFIC SIGNAL INSTALLATIONS, INCLUDING SIGNAL HEADS, CABLE, MESSENGER WIRE, STRAIN POLES, CABINET, CONTROLLER, ETC., SHALL BE REMOVED IN ACCORDANCE WITH C&MS 632.26 AND AS INDICATED ON THE PLANS. REMOVED ITEMS SHALL BE REUSED AS PART OF A NEW INSTALLATION ON THE PROJECT OR STORED ON THE PROJECT FOR SALVAGE BY THE CITY OF AVONIN ACCORDANCE WITH THE LISTING GIVEN HEREIN. (ITEMS TO BE REUSED) (ITEMS TO BE STORED) REMOVED ITEMS SHALL BE DELIVERED TO THE CITY OF AVON WHOSE ADDRESS IS LISTED BELOW: CITY OF AVON, ATTN: SERVICE DIRECTOR (440-937-5766) 35400 SCHNEIDER COURT AVON, OHIO 44011 IN THE EVENT THE ITEMS STORED ON THE PROJECT FOR SALVAGE BY THE CITY OF AVON ARE NOT REMOVED, THE CONTRACTOR SHALL, WHEN DIRECTED BY THE CITY OF AVON IN WRITING, REMOVE AND DISPOSE OF THE ITEMS AT NO ADDITIONAL COST TO THE PROJECT.
<u>DESIGNER NOTE:</u>	NOTE T-0110 SHALL BE INCLUDED ON PROJECTS WHERE EXISTING TRAFFIC SIGNAL INSTALLATIONS ARE BEING MOVED. A LISTING OF ITEMS TO BE REUSED AND/OR STORED MUST BE INCLUDED. PULL BOXES TO BE REMOVED SHALL ITEMIZED SEPARATELY AND PAID FOR UNDER ITEM 625 "PULL BOX REMOVED".
T-0120	<u>INTERCONNECT CABLE, MISC.: (BY SIZE), WITH SUPPORT MESSENGER, AS PER PLAN</u> THE CONTRACTOR WILL BE PERMITTED TO USE EITHER OF TWO TYPES OF INTERCONNECT CABLE CONSTRUCTION AND INSTALLATION UNDER THIS ITEM AS FOLLOWS: 1. INTEGRAL MESSENGER TYPE INTERCONNECT CABLE MEETING THE REQUIREMENTS OF C&MS 732.19. UNDER THIS METHOD ANY SECTIONS OF CABLE SHOWN IN THE PLANS TO BE CONTAINED IN CONTROLLERS, CABINETS, POLES, CONDUITS OR SUPPORTED ON MESSENGER WIRE INSTALLED FOR OTHER PURPOSES SHALL HAVE THE SUPPORTING MESSENGER AND JACKET WEB NEATLY REMOVED BY THE USE OF A TOOL SPECIFICALLY DESIGNED AND SIZED FOR THIS PURPOSE. DEVIATIONS FROM THE CABLE ROUTING SHOWN IN THE PLAN, FOR THE SOLE PURPOSE OF REDUCING THE AMOUNT OF MESSENGER TO BE REMOVED, WILL NOT BE PERMITTED. THE CABLE SHALL BE INSTALLED WITH APPROXIMATELY ONE TWIST FOR EACH 15 FEET OF SPAN LENGTH.
	2. SEPARATE INTERCONNECT CABLE MEETING THE REQUIREMENT C&MS732.19 PLUS A 1/4 INCH MESSENGER WIRE AND LASHING MEETING THE REQUIREMENTS OF C&MS 732.18. UNDER THIS METHOD THE CONTRACTOR WILL INSTALL A SEPARATE 1/4 INCH MESSENGER TO SUPPORT THE SPANS OF INTERCONNECT CABLES IN ALL LOCATIONS WHERE THE PLANS SHOW INTERCONNECT CABLE WHICH IS NOT OTHERWISE SUPPORTED BY A SIGNAL MESSENGER WIRE OR OTHER SUITABLE SUPPORT. UTILIZATION OF EXISTING MESSENGER WIRE, NOT PROVIDED BY THE PROJECT OR DESIGNATED THEREIN AS AVAILABLE FOR USE, IS PROHIBITED. DEVIATION FROM THE CABLE ROUTING SHOWN IN THE PLANS, FOR THE PURPOSE OF REDUCING THE NEED FOR SEPARATE MESSENGER WIRE, WILL NOT BE PERMITTED. IN EITHER CASE THE NUMBER OF SPLICE LOCATIONS SHALL BE KEPT TO A MINIMUM. MEASUREMENT WILL BE BASED UPON THE NUMBER OF FEET OF C&MS ITEM 632, "INTERCONNECT CABLE, MISC.: (BY SIZE), WITH SUPPORT MESSENGER, AS PER PLAN" IN PLACE IN ACCORDANCE WITH THE METHOD DESCRIBED IN C&MS 632.29 AND NO SEPARATE PAYMENT WILL BE PROVIDED FOR ANY SEPARATE MESSENGER WIRE USED TO SUPPORT INTERCONNECT CABLES.
<u>DESIGNER NOTE:</u>	NOTE T-0120 MAY BE USED ON PROJECTS WITH OVERHEAD INTERCONNECT CABLE, IF ACCEPTABLE TO THE CITY OF AVON.
T-0130	<u>DETECTION MAINTENANCE</u> IF VEHICLE DETECTION BECOMES UNEXPECTEDLY DISABLED, REQUIRE MODIFICATION, OR IS SCHEDULED TO BE TEMPORARILY REMOVED DURING THE CONSTRUCTION PROJECT, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CITY OF AVON. IF THE LOSS OF VEHICLE DETECTION IS KNOWN PRIOR TO THE START OF CONSTRUCTION, IT SHALL BE DISCUSSED AT THE PRECONSTRUCTION MEETING. AT SUCH TIME, THE CITY OF AVON SHALL ADVISE THE CONTRACTOR ON THE APPROPRIATE ACTION TO RECTIFY ANY LOSS OF VEHICLE DETECTION. THIS MAY INCLUDE PLACING THE TRAFFIC SIGNAL ON MINIMUM OR MAXIMUM RECALL, MODIFYING THE MINIMUM GREEN TIMES, AND REMOVING THE MALFUNCTIONING DETECTION FROM SERVICE. WHERE NONINTRUSIVE DETECTION (I.E. VIDEO, RADAR) ALREADY EXISTS, THE CONTRACTOR SHALL INSURE THAT DETECTION IS OPERATING AND MAINTAINED BY RECONFIGURING THE DETECTION UNITS ACCORDINGLY DURING ALL CONSTRUCTION PHASES. THIS IS TO AVOID THE SIGNAL FROM MAXING OUT THE EFFECTED SIGNAL PHASE AND CREATING UNNECESSARY DELAYS. LOCATIONS WHERE NON-INTRUSIVE DETECTION IS PROPOSED AND THE EXISTING VEHICLE DETECTION IS TO BE ABANDON, THE NON-INTRUSIVE VEHICLE DETECTION SHALL BE INSTALLED, CONFIGURED AND MADE FULLY FUNCTIONAL PRIOR TO THE EXISTING DETECTION BEING DISABLED. THE CONTRACTOR SHALL CONTINUE TO MAINTAIN AND MODIFY THE DETECTION UNTIL FINAL ACCEPTANCE OF THE TRAFFIC SIGNAL. THIS IS TO ENSURE VEHICLE DETECTION REMAINS FULLY FUNCTIONAL THROUGHOUT CONSTRUCTION.
<u>DESIGNER NOTE:</u>	NOTE T-0130 SHALL BE USED ON ALL PROJECTS WHERE A POTENTIAL CONFLICT EXISTS THAT WILL AFFECT VEHICLE DETECTION.
T-0140	<u>WORK INSPECTION</u> THE CONTRACTOR SHALL PROVIDE THE CITY OF AVON WITH 72 HOURS NOTICE OF ANY SIGNAL WORK TO BEPERFORMED AT THE INTERSECTION SITE(S) SO THAT INSPECTION SERVICES CAN BE SUPPLIED.
<u>DESIGNER NOTE:</u>	NOTE T-0140 SHOULD BE USED ON ALL PROJECTS WHERE SIGNAL MODIFICATIONS OCCUR OR NEW SIGNALS ARE CONSTRUCTED.
T-0150	<u>GROUNDING AND BONDING</u> THE REQUIREMENTS OF THE ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS) AND THE HL AND TC SERIES OF STANDARD CONSTRUCTION DRAWINGS ARE MODIFIED AS FOLLOWS: 1. ALL METALLIC PARTS CONTAINING ELECTRICAL CONDUCTORS SHALL BE PERMANENTLY JOINED TO FORM AN EFFECTIVE GROUND FAULT CURRENT PATH BACK TO THE GROUNDED CONDUCTOR IN THE POWER SERVICE DISCONNECT SWITCH. A. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR IN METALLIC CONDUITS (725.04) IN ADDITION TO THE CONDUCTORS SPECIFIED AND BOND THE CONDUIT TO THIS GROUNDING CONDUCTOR B. WHEN AN EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED IN PLASTIC CONDUIT (725.05), THE INSTALLATION SHALL INCLUDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IN ADDITION TO THE CONDUCTORS SPECIFIED. C. METALLIC CONDUIT CARRYING THE LOOP WIRES FROM IN THE PAVEMENT TO THE PULL BOX SPLICE LOCATION WILL ONLY BE BONDED AT THE PULL BOX END, AND WILL NOT CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR. D. IF MULTIPLE CONDUIT RUNS BEGIN AND END AT THE SAME POINTS, ONLY ONE EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED.
	E. IF AN EQUIPMENT GROUNDING CONDUCTOR IS NEEDED IN CONDUIT BETWEEN SIGNALIZED INTERSECTIONS FOR UNDERGROUND INTERCONNECT CABLE, THE GROUNDING SYSTEM FOR EACH SIGNALIZED INTERSECTION WILL BE SEPARATED ABOUT MIDWAY BETWEEN THE INTERSECTIONS. F. THE MESSENGER WIRE AT SIGNALIZED INTERSECTIONS WILL BE USED AS THE CONDUCTIVE PATH FROM CORNER TO CORNER IF CONDUIT IS NOT PROVIDED UNDER THE ROADWAY. WHEN CONDUIT CONNECTS THE CORNERS OF AN INTERSECTION, AN EQUIPMENT GROUNDING CONDUCTOR SHALL BE USED IN THE CONDUIT. G. TRAFFIC SIGNAL COMPONENTS AND THE ENTIRE SYSTEM SHALL BE TESTED AS REQUIRED BY THE ODOT CONSTRUCTION AND MATERIALS SPECIFICATIONS (C&MS). GROUND RODS SHALL BE TESTED FOR SATISFACTORY LOW RESISTANCE TO GROUND. A CIRCUIT TEST SHALL BE PERFORMED ON ALL CONDUCTORS TO MAKE SURE THERE ARE NO SHORTS, CROSSES, AND HIGH RESISTANCE SPLICES OR OTHER IMPROPER CONNECTIONS. A CABLE INSULATION OR MEG-OHM TEST SHALL BE PERFORMED ON ALL CONDUCTORS TO VERIFY THE INTEGRITY OF THE INSULATION COVERING.
	2. CONDUITS A. THE 725.04 CONDUIT SHALL HAVE GROUNDING BUSHINGS INSTALLED AT ALL TERMINATION POINTS. THE BUSHING MATERIAL SHALL BE COMPATIBLE WITH GALVANIZED STEEL CONDUIT AND THE GROUNDING LUG MATERIAL SHALL BE COMPATIBLE FOR USE WITH COPPER WIRE. THREADED OR COMPRESSION TYPE BUSHINGS MAY BE USED. B. THE 725.05 CONDUIT SHALL HAVE THE INSIDE AND OUTSIDE DIAMETERS OF THE CONDUIT DE-BURRED AT ALL TERMINATION POINTS. C. BOTH ENDS OF METALLIC CONDUIT SHALL BE BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR. D. METALLIC CONDUIT MAY BE BONDED TO METALLIC BOXES THROUGH THE USE OF CONDUIT FITTINGS, UL APPROVED FOR THIS TYPE OF CONNECTION, WITH THE BOX BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR. E. DISSIMILAR METALS SHALL NOT BE USED TOGETHER IN ORDER TO AVOID OXIDATION.
	3. WIRE FOR GROUNDING AND BONDING A. USE INSULATED, COPPER WIRE FOR THE EQUIPMENT GROUNDING CONDUCTOR. BONDING JUMPERS IN BOXES AND ENCLOSURES MAY BE BARE OR INSULATED COPPER WIRE. WIRE SIZE SHALL BE AS FOLLOWS: i. USE 4 AWG BETWEEN THE POWER SERVICE AND SUPPORTS, POLES, PEDESTALS, CONTROLLER OR FLASHER CABINETS. ii. USE A MINIMUM 8 AWG BETWEEN LOOP DETECTOR PULL BOXES AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.I. ABOVE. iii. USE A MINIMUM 8 AWG BETWEEN THE "PREPARE TO STOP WHEN FLASHING" INSTALLATION (INCLUDING SUPPORT) AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.I. ABOVE. iv. THE INSULATION SHALL BE GREEN OR GREEN WITH YELLOW STRIPE(S). FOR 4 AWG OR LARGER, INSULATION MAY ALSO BE BLACK WITH GREEN TAPE/LABELS INSTALLED AT ALL ACCESS POINTS. B. IN A HIGHWAY LIGHTING SYSTEM, THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE THE SAME WIRE SIZE AS THE DUCT CABLE OR DISTRIBUTION CABLE CIRCUIT CONDUCTORS, WITH THE MINIMUM CONDUCTOR SIZE OF 4 AWG. BONDING JUMPERS WILL BE MINIMUM SIZE 4 AWG. C. IF A NEW CONDUIT CONTAINS CABLING, INSTALL A FLAT WOVEN POLYESTER PULLING TAPE, RATED FOR 600 POUNDS MINIMUM, IN THE CONDUIT. IF THE CONDUIT IS TO REMAIN EMPTY, INSTALL AN HDPE INSULATED COPPER TRACER WIRE, 12 AWG MINIMUM, IN THE CONDUIT. ALLOW FOR 10 FEET OF SLACK IN EACH ADJACENT PULL BOX.

CITY OF AVON CONSTRUCTION STANDARDS AND SPECIFICATIONS		
TRAFFIC SIGNAL NOTES	ADOPTION ORDINANCE	DATE
STANDARD CONSTRUCTION DRAWING	61-24	5/29/24
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4. GROUND ROD

- A. A ¾” SCHEDULE 40, PVC CONDUIT WILL BE USED IN FOUNDATIONS AND CONCRETE WALLS FOR THE GROUNDING CONDUCTOR (GROUND WIRE) RACEWAY TO THE GROUND ROD. SHOULD METALLIC CONDUIT BE USED, BOTH ENDS OF THE CONDUIT SHALL BE BONDED TO THE GROUNDING CONDUCTOR.
- B. THE TYPICAL GROUNDING CONDUCTOR (GROUND WIRE) SHALL BE 4 AWG INSULATED, COPPER.

5. THE GREEN CONDUCTOR IN SIGNAL CABLES (CONDUCTOR #4) SHALL NOT BE USED TO SUPPLY POWER TO A SIGNAL INDICATION. IT WILL BE CONNECTED TO THE SIGNAL BODY AS AN EQUIPMENT GROUND IN ALUMINUM HEADS AND IT WILL BE UNUSED IN PLASTIC HEADS. UNUSED CONDUCTORS SHALL BEGROUNDED IN THE CABINET. TYPICAL USE OF CONDUCTORS IS AS FOLLOWS:

COND. NO.	COLOR	VEHICLE SIGNAL	PEDESTRIAN SIGNAL
1	BLACK	GREEN BALL	#1 WALK
2	WHITE	AC NEUTRAL	AC NEUTRAL
3	RED	RED BALL	#1 DW/FDW
4	GREEN	EQUIP. GROUND	EQUIP. GROUND
5	ORANGE	YELLOW BALL	#2DW/FDW
6	BLUE	GREEN ARROW	#2 WALK
7	WHITE/BLACK	YELLOW ARROW	NOT USED

6. POWER SERVICE AND DISCONNECT SWITCH

- A. AT THE POWER SERVICE LOCATION, THE GROUNDING CONDUCTOR (GROUND WIRE) FROM THE DISCONNECT SWITCH NEUTRAL (AC-) BAR TO THE GROUND ROD SHALL BE A CONTINUOUS, UN-SPLICED CONDUCTOR. IF SPLICED, IT SHALL BE AN EXOTHERMIC WELD BUTT SPICE.
- B. THE SERVICE NEUTRAL (AC-) SHALL ONLY BE CONNECTED TO GROUND AT THE PRIMARY POWER SERVICE DISCONNECT SWITCH.
- i. NEMA CONTROLLER CABINETS: IF A POWER SERVICE DISCONNECT SWITCH IS LOCATED BEFORE THE CONTROLLER CABINET, THE NEUTRAL (AC-)AND THE GROUNDING BARS IN THE CONTROLLER CABINET SHALL NOT BE CONNECTED TOGETHER AS SHOWN IN NEMA TS-2, FIGURE 5-4.
- ii. IF SECONDARY DISCONNECT SWITCHES ARE CONNECTED AFTER THE PRIMARY DISCONNECT SWITCH, THE NEUTRAL (AC-) SHALL ONLY BE GROUNDED AT THE PRIMARY SWITCH. EQUIPMENT GROUNDING CONDUCTORS SHALL BE BROUGHT TO THE PRIMARY SWITCH BUT SHALL BE GROUNDED AT BOTH SECONDARY AND PRIMARY SWITCHES.

7. PAYMENT – ALL MATERIALS AND WORK REQUIRED TO COMPLETE THE EFFECTIVE GROUND FAULT CURRENT PATH SYSTEM ARE INCIDENTAL TO THE CONDUCTORS INSTALLED BY CONTRACT.

DESIGNER NOTE: NOTE T-0150 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS. IT IS AN ADAPTATION OF ODOT’S NOTE 442-32 FROM THEIR “TRAFFIC ENGINEERING MANUAL” AND CONTAINS SPECIFIC ADDITIONAL REQUIREMENTS FOR THE CITY OF AVON.

T-0160 GUARANTEE
THE CONTRACTOR SHALL GUARANTEE THAT THE TRAFFIC CONTROL SYSTEM INSTALLED AS PART OF THIS CONTRACT SHALL OPERATE SATISFACTORILY FOR A PERIOD OF 180 DAYS 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 THE FOLLOWING ITEMS OF THE TRAFFIC CONTROL SYSTEM: CONTROLLERS AND ASSOCIATED EQUIPMENT, DETECTOR UNITS, INTERCONNECTION ITEMS AND MASTER CONTROL EQUIPMENT.

CUSTOMARY MANUFACTURER’S GUARANTEES FOR THE FOREGOING ITEMS SHALL BE TURNED OVER TO THE CITY OF AVON FOLLOWING ACCEPTANCE OF THE EQUIPMENT.

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

DESIGNER NOTE: NOTE T-0160 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS. IT IS AN ADAPTATION OF ODOT’S NOTE 442-15 FROM THEIR “TRAFFIC ENGINEERING MANUAL.” PARAGRAPH 3 SHALL BE MODIFIED TO LIST THE ACTUAL EQUIPMENT USED FOR THE SPECIFIC PROJECT. THE LIST INCLUDED IN THIS NOTE PROVIDES AN EXAMPLE OF THE TYPES OF EQUIPMENT REQUIRING THE GUARANTEE AND IS NOT ALL INCLUSIVE.

T-0170

PERSONNEL REQUIREMENTS
IN ADDITION TO THE REQUIREMENTS OF THE ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS), SECTION 108.05, A FULL-TIME SUPERVISOR SHALL BE ASSIGNED FOR THIS PROJECT TO ENSURE ADHERENCE TO THE PLAN REQUIREMENTS AND SPECIFICATIONS AS INTERPRETED AND INSTRUCTED BY THE CITY OF AVON. THE SUPERVISOR SHALL NOT BE CHANGED FOR THIS PROJECT WITHOUT PRIOR WRITTEN NOTICE TO THE CITY OF AVON.

ALL CONTROLLER WORK, AS DEFINED BELOW IN ITEMS 1 THROUGH 4 SHALL BE PERFORMED BY, OR UNDER THE SUPERVISION OF AN IMSA LEVEL TWO CERTIFIED TECHNICIAN:

- BACK PANEL WIRING TERMINATIONS
- PROGRAMMING
- TURN-ON
- TROUBLESHOOTING

A FOREMAN, WHO IS, OR WORKS UNDER THE SUPERVISION OF, AN IMSA LEVEL ONE CERTIFIED TECHNICIAN, SHALL BE ASSIGNED TO EACH CREW PERFORMING WORK ON THIS PROJECT. THE FOREMAN SHALL BE PRESENT AT ALL TIMES WHEN WORK IS BEING PERFORMED BY THE CREW. PRIOR VERBAL OR WRITTEN NOTICE SHALL BE PROVIDED TO THE CITY OF AVON BEFORE REPLACING A CREW FOREMAN.

THE WORK, AS DEFINED BELOW IN ITEMS 1 THROUGH 7, SHALL BE PERFORMED BY, OR UNDER THE SUPERVISION OF AN IMSA LEVEL TWO CERTIFIED TECHNICIAN:

- CABLE SPLICES
- SIGNAL HEAD INSTALLATIONS
- CABLE AND WIRE INSTALLATIONS
- POWER SERVICE INSTALLATIONS
- GROUND ROD TESTING
- CABLE INSTALLATION TESTING
- FIELD WIRE TERMINATIONS

THE IMSA CERTIFICATION PAPERS FOR ALL SIGNAL TECHNICIANS, FOREMAN AND CRAFTS-PERSONS WORKING ON THE PROJECT SHALL BE PRESENTED TO THE CITY OF AVON PRIOR TO COMMENCEMENT OF WORK.

SUFFICIENT WORK FORCES OF PERSONNEL, QUALIFIED IN THE OPINION OF THE CITY OF AVON TO PERFORM THE WORK REQUIRED UNDER THIS CONTRACT, SHALL BE PROVIDED.

EACH FOREMAN OR FOREMAN’S WORK TRUCK SHALL BE EQUIPPED WITH A CELLULAR TELEPHONE. THE CELLULAR TELEPHONE NUMBER FOR EACH FOREMAN SHALL BE PROVIDED TO THE CITY OF AVON.

DESIGNER NOTE: NOTE T-0170 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS.

T-0180

UNDER DRAINS FOR PULL BOXES
REFERENCE ODOT TRAFFIC STANDARD CONSTRUCTION DRAWING HL-30.11 FOR DETAILS ABOUT DRAINING PULL BOXES. UNDER DRAINS FOR PULL BOXES SHALL BE USED AS DIRECTED BY THE CITY OF AVON AND SHALL BE PROVIDED WHERE THE LENGTH REQUIRED FOR A SATISFACTORY OUTLET DOES NOT EXCEED 20 FEET. THE FOLLOWING ESTIMATED QUANTITY IS CARRIED TO THE GENERAL SUMMARY FOR THIS PURPOSE:

ITEM 611 – 4” CONDUIT, TYPE E, _____FT.

DESIGNER NOTE: NOTE T-0180 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHENEVER PULL BOXES ARE REQUIRED FOR THE PROJECT AND THE AREA IS PRONE TO A HIGH-WATER TABLE. IT IS AN ADAPTATION OF ODOT’S NOTE 442-33 FROM THEIR “TRAFFIC ENGINEERING MANUAL.”

T-0190

TRENCHING UNDER EXISTING SIDEWALKS
WHERE CONDUIT FOR NEW TRAFFIC SIGNALS OR TRAFFIC SIGNAL INTERCONNECTION IS TO BE INSTALLED IN TRENCHES UNDER EXISTING SIDEWALK, DRIVE APRONS OR CURB RAMPS AND THE EXISTING CONCRETE SURFACE WILL BE DISTURBED, THE REMOVAL WILL BE AS DIRECTED BY THE CITY OF AVON AND WILL EXTEND TO THE NEAREST TOOLED CONCRETE JOINT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRENCHING, SAW CUTTING, CONCRETE REMOVAL AND RESTORATION REQUIRED TO INSTALL THE PROPOSED CONDUIT AND RESTORE THE SURFACE TO ACCEPTABLE CONDITIONS, AS DETERMINED BY THE CITY OF AVON.

DESIGNER NOTE: NOTE T-0190 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHENEVER CONDUIT IS INSTALLED UNDER SIDEWALKS.

T-0200

RESTORATION OF DISTURBED AREAS

ALL DISTURBED LANDSCAPE AREAS, PAVEMENT SURFACES, SIDEWALKS AND DRIVEWAYS SHALL BE RESTORED TO CONDITION EQUAL TO OR BETTER THAN THAT WHICH EXISTED PRIOR TO THE START OF WORK. RESTORATION SHALL BE PERFORMED WITH MATERIALS IDENTICAL TO THE EXISTING SURFACE, INCLUDING, BUT NOT LIMITED TO, ASPHALT AND CONCRETE PAVEMENT, ASPHALT, CONCRETE AND BRICK SIDEWALK, INTEGRAL CURB AND SPECIAL SURFACES (SUCH AS COLORED OR TEXTURED) AS ENCOUNTERED. CONCRETE SIDEWALKS OR DRIVEWAYS SHALL NOT BE PATCHED. SIDEWALKS AND DRIVEWAYS SHALL BE REPLACED IN ENTIRE ORIGINAL SLAB SECTIONS.

RESTORATION WORK SHALL BE PERFORMED IN ACCORDANCE WITH PERTINENT SPECIFICATION ITEMS AS DIRECTED BY THE CITY OF AVON. THE CITY OF AVON WILL CONSIDER ALL RESTORATION WORK, INCLUDING MATERIALS, EQUIPMENT, LABOR, INCIDENTALS, AND DISPOSAL OF ALL SURPLUS MATERIALS, INCIDENTAL TO THE VARIOUS ITEMS OF UNDERGROUND WORK. NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK.

DESIGNER NOTE: NOTE T-0200 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHENEVER UNDERGROUND CONSTRUCTION IS REQUIRED FOR FOUNDATIONS, CONDUIT, PULL BOXES, ETC.

T-0210

ITEM 625 CONDUIT, BY SIZE, 725.051, AS PER PLAN
ITEM 625 CONDUIT, JACKED OR DRILLED, 725.051, BY SIZE, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF ITEM 625 AND 725.051, CONDUITS SHALL HAVE THE FOLLOWING FEATURES AND REQUIREMENTS:

CONDUITS SHALL HAVE A SINGLE CONDUCTOR TRACER WIRE INSTALLED WITHIN THE CONDUIT FOR USE IN ACCURATELY LOCATING UNDERGROUND CABLES. THE TRACER WIRE SHALL BE MANUFACTURED USING SOLID, SOFT DRAWN, BARE COPPER WITH A HIGH-DENSITY POLYETHYLENE INSULATION. THE WIRE SHALL BE 12 AWG OR LARGER. THE TRACER WIRE SHALL BE INSTALLED SO THAT ELECTRICAL CONTINUITY IS MAINTAINED THROUGHOUT THE CONDUIT SYSTEM USING AS FEW CONNECTIONS AS POSSIBLE.

PAYMENT FOR "ITEM 625 CONDUIT, BY SIZE, 725.051, AS PER PLAN" AND "ITEM 625 CONDUIT, JACKED OR DRILLED, 725.051, BY SIZE, AS PER PLAN"SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER LINEAL FOOT AND SHALL INCLUDE TRACER WIRE, CONNECTIONS AND ALL LABOR, EQUIPMENT AND MATERIALS.

DESIGNER NOTE: NOTE T-0210 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE CONDUIT INSTALLATION IS REQUIRED.

T-0220

ITEM 625 LUMINAIRE, CONVENTIONAL, SOLID-STATE (LED), AS PER PLAN
IN ADDITION TO THE REQUIREMENTS OF ITEM 625 LUMINAIRES SHALL HAVE THE FOLLOWING REQUIREMENTS OR FEATURES:

LUMINAIRES SHALL BE SOLID-STATE (LED) RATED AT 120/277 VAC WITH A NOMINAL WATTAGE OF 83 WATTS. THE INITIAL FIXTURE LIGHT OUTPUT SHALL BE 10,900 LUMENS. THE LUMINAIRE SHALL HAVE A TYPE III DISTRIBUTION AND HOUSED IN A DIE CAST ALUMINUM HOUSING. THE LENS SHALL BE GLASS. THE LIGHT SHALL HAVE A COOL WHITE COLOR TEMPERATURE. A SHORTING CAP SHALL BE PROVIDED WITH EACH FIXTURE AND EACH LUMINAIRE SHALL BE WIRED TO THE POWER SERVICE PEDESTAL WHERE ONE PHOTOCCELL WILL BE PROVIDED TO POWER ALL LUMINAIRES TOGETHER.

THE LUMINAIRES SHALL BE A MODEL STREETSENSE AS MANUFACTURED BY DIALIGHT.

PAYMENT FOR "ITEM 625 LUMINAIRE, CONVENTIONAL, SOLID-STATE (LED), AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID FOR EACH AND SHALL INCLUDE ALL LABOR, EQUIPMENT AND MATERIALS.

DESIGNER NOTE: NOTE T-0220 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE LUMINAIRE INSTALLATION IS REQUIRED.

CITY OF AVON CONSTRUCTION STANDARDS AND SPECIFICATIONS		
TRAFFIC SIGNAL NOTES	ADOPTION ORDINANCE	DATE
STANDARD CONSTRUCTION DRAWING	61-24	5/29/24
		SHEET 3 OF 8

T-0230 ITEM 625 – GROUND ROD, AS PER PLAN
IN ADDITION TO THE REQUIREMENTS OF 625.16, A SEVEN (7) STRAND, NO. 4 AWG COPPER WIRE SHALL BE FURNISHED AND INSTALLED FROM THE TOP OF THE GROUND ROD AND ATTACHED TO THE NEUTRAL BAR IN THE CONTROLLER CABINET.

DESIGNER NOTE: NOTE T-0230 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE A NEW TRAFFIC SIGNAL CONTROLLER AND/OR FOUNDATION INSTALLATIONS ARE REQUIRED.

T-0240 ITEM 631 INTERNALLY ILLUMINATED FIXED MESSAGE SIGN, BY SIZE, 1 FACE, LED EDGE LIT TYPE, AS PER PLAN
FURNISH AND INSTALL SIGNS WHICH ARE CAPABLE OF DISPLAYING ONE CLEARLY LEGIBLE MESSAGE AT A TIME IN ONE DIRECTION.

PROVIDE SIGNS WHICH DISPLAY THE PARTICULAR LEGEND, AND WITH A NOMINAL FACE SIZE SHOWN IN THE PLANS. FURNISH EACH SIGN IN AN ALUMINUM HOUSING WHICH IS RIGIDLY MOUNTED PERPENDICULAR (90 DEGREES) TO THE DIRECTION OF TRAFFIC IT FACES.

PROVIDE SIGNS WHICH OPERATE ON A 120-VAC POWER SOURCE. THE LIGHT SOURCE FOR THE SIGN SHALL BE LEDS (LIGHT EMITTING DIODES). LEDS SHALL BE MOUNTED ALONG BOTH THE TOP AND BOTTOM EDGES OF THE SIGN. THE LEDS SHALL EVENLY ILLUMINATE A LIGHT PANEL THAT IS THE SAME DIMENSIONS OF THE SIGN FACE. THE LEDS SHALL BE RATED TO OPERATE AT NO LESS THAN 70% OF THEIR INITIAL BRIGHTNESS FOR 60,000 HOURS. A MAXIMUM OF FOUR LEDS PER SQUARE FOOT SHALL BE USED.

PROVIDE SIGNS WITH A BLUE BACKGROUND, WHITE BORDER AND WHITE LEGEND FORMED FROM UPPER AND LOWER CASE MUTCD, HIGHWAY GOTHIC, SERIES C LETTERS, 12-INCH INITIAL UPPERCASE AND 9 INCH FOLLOWING LOWER CASE. PROVIDE A CITY OF AVON LOGO TO BE LOCATED TO THE LEFT OF THE STREET NAME LETTERING. THE CITY SHALL PROVIDE ART WORK FOR THE LOGO.

PROVIDE SIGNS WITH ATSM TYPE IX RETRO-REFLECTIVE SHEETING (BOTH SIGN LEGEND AND BACKGROUND).

THE SIGNS SHALL BE MANUFACTURED BY TEMPLE EDGE LIT, DECATUR, ALABAMA.

THE SIGNS SHALL BE MOUNTED TO MAST ARMS USING PELCO AS-3009 RACKETS. STAINLESS STEEL BANDING SHALL NOT BE USED.

PAYMENT FOR "ITEM 631 – INTERNALLY ILLUMINATED FIXED MESSAGE SIGN, BY SIZE, 1 FACE, LED EDGE LIT TYPE, AS PER PLAN" WILL BE MADE AT THE CONTRACT UNIT PRICE BID FOR EACH, IN PLACE, ALL CONNECTIONS MADE AND WIRING COMPLETED, TESTED AND ACCEPTED.

DESIGNER NOTE: NOTE T-0240 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE STREET NAME SIGN INSTALLATION ON SIGNAL SUPPORTS IS REQUIRED.

T-0250 ITEM 632 – VEHICULAR SIGNAL HEAD, (LED), (BY TYPE), AS PER PLAN
IN ADDITION TO THE REQUIREMENTS OF THE ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS) 632 AND 732, THE FOLLOWING REQUIREMENTS SHALL APPLY:

1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF BLACK POLYCARBONATE PLASTIC WITH VISORS AS SPECIFIED AND MEET ITE SPECIFICATIONS.
2. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.
3. THE ENTRANCE FITTING SHALL BE OF THE TRI-STUD DESIGN WITH SERRATED RINGS IN ORDER TO ACHIEVE POSITIVE LOCKING.
4. ALL SIGNAL HEADS SHALL BE RIGIDLY MOUNTED TO THE MAST ARM WITH THE RED LENS LOCATED IN FRONT OF THE MAST ARM.
5. ALUMINUM BACK-PLATES SHALL BE IN ACCORDANCE WITH THE ODOT C&MS AND INCLUDE A FLUORESCENT YELLOW REFLECTIVE BORDER.
6. THE LIGHT EMITTING DIODE (LED) SIGNAL LAMP UNITS SHALL MEET THE REQUIREMENTS OF THE ODOT C&MS 732.04-C. THE CONTRACTOR SHALL PROVIDE THE CITY OF AVON, IN WRITING, WITH THE LED MANUFACTURER NAME, SERIAL NUMBER, PART NUMBER, DESCRIPTION OF LAMP, AND DATE OF MANUFACTURE FOR ALL LED UNITS THAT ARE TO BE USED IN THE SIGNAL HEAD PRIOR TO INSTALLATION, FOR ACCEPTANCE AND WARRANTY PURPOSES.
7. SIGNAL HEADS SHALL HAVE A MINIMUM WALL THICKNESS OF 0.117 INCHES.
8. SIGNAL HEADS SHALL INCLUDE CUTAWAY TYPE VISORS UNLESS OTHERWISE SPECIFIED IN THE PLANS.
9. APPLY A BEAD OF SILICONE TO THE SIGNAL HEAD, WASHER, AND ENTRANCE ADAPTER SERRATIONS TO PREVENT WATER INTRUSION. ALSO, FILL THE SPACE BETWEEN CONCENTRIC SERRATION RINGS ON THE TOP OF THE SIGNAL HEAD TO COMPLETELY EXCLUDE WATER FROM THE SPACE BETWEEN THE CONCENTRIC RINGS.
10. BALANCE ADJUSTERS SHALL NOT BE USED ON ONE-WAY HEADS OR TETHERED HEADS.

PAYMENT FOR "ITEM 632 VEHICULAR SIGNAL HEAD, (LED), (BY TYPE), AS PER PLAN" SHALL BE MADE FOR COMPLETE SIGNAL HEAD FURNISHED AND INSTALLED, INCLUDING ALL LABOR, EQUIPMENT, MATERIALS, AND NEW ATTACHMENT HARDWARE.

DESIGNER NOTE: NOTE T-0250 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHENEVER VEHICULAR SIGNAL HEADS ARE REQUIRED FOR THE PROJECT. IT IS AN ADAPTATION OF ODOT'S NOTE 442-13 FROM THEIR "TRAFFIC ENGINEERING MANUAL."

T-0260 ITEM 632 – PEDESTRIAN SIGNAL HEAD (LED), TYPE D2, COUNTDOWN, AS PER PLAN
IN ADDITION TO THE REQUIREMENTS OF THE ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS) 632 AND 732, THE FOLLOWING REQUIREMENTS SHALL APPLY:

1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF BLACK, POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.
2. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.
3. PIPE, SPACERS AND FITTINGS CONSTRUCTED OF POLYCARBONATE PLASTIC MAY BE USED IN LIEU OF GALVANIZED STEEL OR ALUMINUM.
4. THE PEDESTRIAN SIGNAL HEAD SHALL BE OF THE LED COUNTDOWN TYPE.
5. NEW ATTACHMENT HARDWARE AND FITTINGS SHALL BE USED. PEDESTRIAN SIGNAL HOUSINGS SHALL NOT BE Banded TO STEEL POLES. THE OPTIONAL 2-PIECE HINGED BRACKET WITH STAINLESS STEEL FASTENERS, AS PER ODOT STANDARD CONSTRUCTION DRAWING TC-85.10, SHALL BE USED.
6. THE LIGHT EMITTING DIODE (LED) SIGNAL LAMP UNITS SHALL MEET THE REQUIREMENTS OF THE ODOT C&MS 732.04-C. THE CONTRACTOR SHALL PROVIDE THE CITY OF AVON, IN WRITING, WITH THE LED MANUFACTURER NAME, SERIAL NUMBER, PART NUMBER, DESCRIPTION OF LAMP, AND DATE OF MANUFACTURE FOR ALL LED UNITS THAT ARE TO BE USED IN THE SIGNAL HEAD PRIOR TO INSTALLATION, FOR ACCEPTANCE AND WARRANTY PURPOSES.

PAYMENT FOR "ITEM 632 PEDESTRIAN SIGNAL HEAD (LED), TYPE D2, COUNTDOWN, AS PER PLAN" SHALL BE MADE FOR THE NUMBER OF COMPLETE SIGNAL HEADS FURNISHED AND INSTALLED, INCLUDING ALL LABOR, EQUIPMENT, MATERIALS AND NEW ATTACHMENT HARDWARE.

DESIGNER NOTE: NOTE T-0260 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHENEVER PEDESTRIAN SIGNAL HEADS ARE REQUIRED FOR THE PROJECT. IT IS AN ADAPTATION OF ODOT'S NOTE 442-18 FROM THEIR "TRAFFIC ENGINEERING MANUAL" AND CONTAINS SPECIFIC ADDITIONAL REQUIREMENTS FOR THE CITY OF AVON.

T-0270 ITEM 632 – COVERING OF VEHICULAR SIGNAL HEAD, AS PER PLAN
COVER VEHICULAR SIGNAL HEADS IF ERRECTED AT INTERSECTIONS WHERE TRAFFIC IS MAINTAINED BEFORE ENERGIZING THE SIGNALS. USE A STURDY OPAQUE COVERING MATERIAL SPECIFICALLY MADE FOR USE WITH TRAFFIC SIGNALS, AND ENSURE THAT THE COLOR OF THE COVER IS DIFFERENT THAN THE SIGNAL HEAD, TAN OR BEIGE, SO THAT IT IS CLEAR TO DRIVERS THE HEADS ARE COVERED, NOT DARK. USE A METHOD OF COVERING TO COVER ATTACHMENT AND MATERIALS, INCLUDING BACKPLATES, AS APPROVED BY THE CITY OF AVON. COVERS SHALL BE FREE OF TEXT, PICTURES, OR ANY TYPE OF ADVERTISING. MAINTAIN COVERS AND REMOVE THEM WHEN DIRECTED BY THE CITY OF AVON.

PAYMENT FOR "ITEM 632 COVERING OF VEHICULAR SIGNAL HEAD, AS PER PLAN" SHALL BE MADE FOR THE NUMBER OF COMPLETE COVERINGS FURNISHED AND INSTALLED, INCLUDING ALL LABOR, EQUIPMENT, AND MATERIALS.

DESIGNER NOTE: NOTE T-0270 SHALL BE USED ON ALL CITY OF AVON NEW TRAFFIC SIGNAL CONSTRUCTION PROJECTS AND ANY PROJECT THAT REQUIRE THE COVERING OF VEHICULAR SIGNAL HEADS. IT IS AN ADAPTATION OF ODOT'S NOTE 442-14 FROM THEIR "TRAFFIC ENGINEERING MANUAL."

T-0280 ITEM 632 – POWER SERVICE, AS PER PLAN
POWER SERVICE SHALL BE AS PER THE ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS) 632.24 AND STANDARD CONSTRUCTION DRAWING TC-83.10. POWER SERVICE SHALL ALSO INCLUDE THE FOLLOWING:

1. DISCONNECT SWITCH ENCLOSURES SHALL BE A COMMERCIAL PEDESTAL TYPE SWITCHED LOAD CENTER USING NEMA TYPE 3R CONSTRUCTION. IT SHALL BE A MILBANK MODEL CP3B51119A220CSSP1 OR PRE-APPROVED EQUAL AND SHALL INCLUDE A PADLOCK EQUAL TO WILSON BOHANNON 660, WITH LOCK BODY AND SHACKLE OF BRONZE OR BRASS AND KEYING SHALL BE TO THE STATE MASTER. THE PEDESTAL SHALL INCLUDE A PAD MOUNT BASE TO MOUNT TO A CONCRETE FOUNDATION. THE CABINET SHALL BE UNPAINTED NATURAL ALUMINUM.
2. THE MILBANK PEDESTAL SHALL INCLUDE A MOUNTING BASE, MODEL CP-16PDMNT-CALT PDSTL MNTNG BS. THE MOUNTING BASE SHALL BE INSTALLED FLUSH INTO THE CONCRETE FOUNDATION.

3. THE POWER SERVICE SHALL INCLUDE A RINGLESS SOCKET WITH LEVER BYPASS. THE METER BASE SHALL BE 100 AMP MINIMUM AND INCLUDE A LEVER OPERATED JAW RELEASE, A BYPASS SWITCH RATED FOR 100% CONTINUOUS DUTY. THE METER SOCKET JAWS MUST BE TIN PLATED COPPER AND SPRING SUPPORTED. THE METER BASE SOCKET SHALL HAVE A PLASTIC PROTECTOR TO BE REMOVED BY THE POWER COMPANY ONCE THE METER IS INSTALLED.

4. THE PEDESTAL SHALL HAVE SEPARATE CIRCUITS TO CONTROL THE TRAFFIC SIGNAL, THE LIGHTED STREET NAME SIGNS, THE LIGHTING LUMINAIRES AND EACH DUPLEX RECEPTACLE ON THE MAST ARM SUPPORTS. THE DUPLEX OUTLETS SHALL BE PROTECTED BY A SEPARATE GFI BREAKER. THE STREET NAME SIGNS AND THE LIGHTING LUMINAIRES SHALL BE CONTROLLED BY PHOTO CELLS MOUNTED IN THE ENCLOSURE WITH A WINDOW AND SHIELD. THE PEDESTAL SHALL BE MOUNTED ON THE CONTROLLER PAD SO THAT THE PHOTOCELL WINDOW IS FACING NORTH. A CONCRETE WORKING PAD, SIZED THE SAME AS THE PEDESTAL FOUNDATION, SHALL BE PLACED IN FRONT OF THE PEDESTAL FOR MAINTENANCE ACCESS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR REQUESTING AND SCHEDULING ANY INSPECTIONS THE POWER COMPANY MAY REQUIRE FOR THE POWER SERVICE HOOKUP. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE POWER COMPANY FOR ELECTRICAL SERVICE CONNECTION. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR SPLICE POWER CABLES INTO THE POWER COMPANY'S CIRCUITS. THE VOLTAGE SUPPLIED SHALL BE NOMINALLY 115 VOLTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS AND PAYING OF ALL FEES RELATING TO THE POWER SERVICE CONNECTION. THE CONTRACTOR SHALL PAY ALL POWER CHARGES UNTIL THE SIGNAL IS ACCEPTED BY THE MAINTAINING AGENCY.

IN ADDITION TO THE REQUIREMENTS OF THIS NOTE, PAYMENT WILL INCLUDE ALL NECESSARY LABOR, MISCELLANEOUS HARDWARE AND EQUIPMENT REQUIRED TO PROVIDE FOR THIS ITEM OF WORK IN ACCORDANCE WITH C&MS SPECIFICATION 632. PAYMENT WILL BE AT THE CONTRACT UNIT PRICE PER EACH.

DESIGNER NOTE: NOTE T-0280 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE A NEW POWER SERVICE IS REQUIRED.

T-0290 ITEM 632 PEDESTRIAN PUSHBUTTON, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF 632 AND 732.06, PEDESTRIAN PUSHBUTTONS SHALL BE PROVIDED WITH THE FOLLOWING FEATURES:

1. PUSHBUTTONS SHALL BE MADE BY "CAMPBELL COMPANY", PART NUMBER PN: 502-0001, MODEL: DCC 4 EVR -E- RND 4H -YELLOW ADA/TS2 COMPLIANT MOMENTARY SIGNAL.
2. PUSHBUTTONS SHALL BE FURNISHED THAT ARE RATED AS WATERPROOF AND WHICH INCORPORATE A SOLID NEOPRENE RUBBER GASKET TO SEAL ITSELF AGAINST MOISTURE.
3. PUSHBUTTONS SHALL BE FURNISHED THAT ARE PRESSURE ACTIVATED AND WHICH INCORPORATE A PIEZO-DRIVEN SOLID-STATE SWITCH, TWO TONE ACTIVATION BEEP AND LED INDICATOR THAT MOMENTARILY FLASHES.
4. THE PUSHBUTTON HOUSING SHALL BE SEALED TO THE SIGNAL SUPPORT, PEDESTAL OR POLE WITH A HIGH-QUALITY SILICONE SEALANT.
5. THE PUSHBUTTON SHALL BE WIRED WITH A 2-CONDUCTOR LOOP LEAD-IN WIRE TO THE TRAFFIC SIGNAL CONTROLLER. THE SHIELD OF THE CABLE SHALL BE GROUNDED AT THE CONTROLLER END AND INSULATED AT THE PUSHBUTTON END.

PAYMENT FOR "ITEM 632 PEDESTRIAN PUSHBUTTON, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID FOR EACH IN PLACE, COMPLETELY INSTALLED AT THE LOCATIONS SHOWN IN THE PLANS, WIRED, TESTED AND ACCEPTED.

DESIGNER NOTE: NOTE T-0290 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE A NEW PEDESTRIAN PUSHBUTTON IS REQUIRED.

CITY OF AVON CONSTRUCTION STANDARDS AND SPECIFICATIONS		
TRAFFIC SIGNAL NOTES	ADOPTION ORDINANCE	DATE
STANDARD CONSTRUCTION DRAWING	61-24	5/29/24
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T-0300

ITEM 632 SIGNAL SUPPORT BY TYPE, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF 632 AND 732, SIGNAL SUPPORTS SHALL BE PROVIDED WITH THE FOLLOWING FEATURES:

1. A 20-AMP ELECTRICAL DUPLEX OUTLETS WITH A WEATHERPROOF COVER SHALL BE SUPPLIED AND INSTALLED 13 FEET FROM THE TOP OF FOUNDATION ON THE BACKSIDE OF THE SIGNAL SUPPORT.

PEDESTRIAN SIGNAL HEADS SHALL BE ATTACHED TO THE POLES UTILIZING THE OPTIONAL 2-PIECE HINGED BRACKET (CLAM SHELL) AS SHOWN ON ODOT STANDARD CONSTRUCTION DRAWING TC-85.10. BOLT THE HINGED BRACKET TO THE POLE USING STAINLESS STEEL SCREWS. STAINLESS STEEL BANDING SHALL NOT BE USED.

DUE TO THE POSSIBILITY OF CONFLICTS WITH EXISTING OR PROPOSED UNDERGROUND AND OVERHEAD 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, DO NOT PLACE FINAL ORDERS FOR THESE ITEMS UNTIL THE FOUNDATIONS HAVE BEEN INSTALLED AND WRITTEN NOTICE TO PROCEED WITH THE ORDERS FOR THESE ITEMS HAS BEEN RECEIVED FROM THE CITY OF AVON.

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

WHEN DEVELOPING THE PROGRESS SCHEDULE, AND THOSE OF THE SUB-CONTRACTORS, ENSURE THAT THE FOUNDATIONS ARE INSTALLED AT THE EARLIEST TIME AS FEASIBLE AND PRACTICAL, AND INCLUDE SUFFICIENT TIME IN THE PROGRESS SCHEDULE FOR THE ORDERING, MANUFACTURE, DELIVERY, AND INSTALLATION OF THESE ITEMS AFTER THE FOUNDATIONS ARE IN PLACE.

PAYMENTS WILL NOT MADE FOR DELIVERED MATERIALS FOR THESE ITEMS 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.

PAYMENT FOR ACCEPTED QUANTITIES OF "ITEM 632 SIGNAL SUPPORT BY TYPE, AS PER PLAN" WILL BE MADE AT THE CONTRACT UNIT PRICE BID FOR EACH SIGNAL SUPPORT FURNISHED AND INSTALLED.

DESIGNER NOTE: NOTE T-0300 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS FOR WHERE A NEW SIGNAL SUPPORT IS REQUIRED.

T-0310

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

IN ADDITION TO PROVISIONS OF THE ODOT C&MS, FURNISH AND INSTALL SIGNAL POLES AS SPECIFIED IN THE PLANS.

THE SIGNAL SUPPORT DESIGNER SHALL PROVIDE DRAWINGS OF A SIGNAL SUPPORT WITH STRUCTURAL ASPECTS OF THE DESIGN AND MATERIALS IN COMPLIANCE WITH THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS. THE SIGNAL SUPPORT SHALL BE ASTM A595 GRADE A OR APPROVED EQUAL WITH A MINIMUM YIELD STRENGTH OF 50 KSI. THE FOLLOWING DESIGN PARAMETERS SHALL BE USED:

1. BASIC WING SPEED = 90 MPH
2. DESIGN LIFE = 25 YEARS
3. FATIGUE CATEGORY = III
4. GALLOPING: NO
5. TRUCK INDUCED GUST: NO

SUBMIT, TO THE CITY OF AVON PRIOR TO INCORPORATION: TWO COPIES OF THE SIGNAL SUPPORT DRAWINGS AND SHOP DRAWINGS, WHICH IDENTIFY AND DESCRIBE EACH MANUFACTURED SIGNAL SUPPORT AND SIGNAL SUPPORT ITEM WHICH IS BEING INCORPORATED INTO THE CONSTRUCTION. THE SIGNAL SUPPORT DRAWINGS AND SHOP DRAWINGS SHALL BE REVIEWED, SEALED, STAMPED, AND DATED BY TWO OHIO REGISTERED PROFESSIONAL ENGINEERS.

PAYMENT FOR ITEM 632 "SIGNAL SUPPORT, BY TYPE, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE PER EACH COMPLETE AND IN PLACE, AND SHALL INCLUDE ALL SIGNAL SUPPORT DESIGN, LABOR, MATERIALS, AND EQUIPMENT NECESSARY TO COMPLETE THE WORK.

DESIGNER NOTE: NOTE T-0310 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS FOR WHERE NEW NON-STANDARD SIGNAL SUPPORTS ARE INCLUDED IN THE PLANS.

T-0320

ITEM 632 SIGNAL SUPPORT FOUNDATION

PRIOR TO ORDERING THE SIGNAL SUPPORTS, THE CONTRACTOR SHALL CONTACT OUPS TO HAVE ALL THE UTILITIES LOCATED IN THE FIELD THEN MEET WITH THE CITY OF AVON TO LOCATE THE PROPOSED SUPPORT LOCATIONS TO INSURE THERE ARE NO CONFLICTS WITH UTILITIES. IF THERE ARE ISSUES, THE CONTRACTOR SHALL PROVIDE GUIDANCE AS TO THE RELOCATION OF THE SUPPORT POLES FOR THE CITY OF AVON TO APPROVE.

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: NOTE T-0320 SHOULD BE USED WHEN ANY NEW SIGNAL SUPPORTS ARE TO BE INSTALLED.

T-0330

ITEM 632 SIGNAL SUPPORT, MECHANICAL DAMPER FOR TC-81.21 MAST ARM (GREATER THAN 59' IN LENGTH), AS PER PLAN

THIS ITEM SHALL CONSIST OF THE CONTRACTOR INSTALLING A TUNED MECHANICAL STOCKBRIDGE OR MASS-SPRING TYPE DAMPER ON A TC-81.21 MAST ARM SIGNAL SUPPORT TO REDUCE THE POSSIBILITY OF HARMONIC VIBRATIONS CAUSED BY WIND LOADS. A MECHANICAL DAMPER SHALL BE APPLIED TO ALL MAST ARMS OVER 59 FEET IN LENGTH. THE INSTALLED DAMPER SHALL BE CAPABLE OF REDUCING THE LOADED MAXIMUM VERTICAL MOVEMENT AT THE TIP OF THE ARM TO 8 INCHES MEASURED FROM THE HIGHEST TO THE LOWEST POINT OF DEFLECTION AT WIND SPEEDS OF 5-20 MPH.

ALL ATTACHMENT HARDWARE CONNECTIONS SHALL BE STAINLESS STEEL. STOCKBRIDGE-TYPE DAMPERS SHALL HAVE A STAINLESS STEEL SAFETY CHAIN ANCHORED TO THE MAST ARM TO PREVENT WEIGHTS FROM FALLING SHOULD THEY BECOME SEPARATED FROM THE REST OF THE ASSEMBLY. THE DAMPER SHALL BE ATTACHED TO THE ARM WITHIN 8 FEET OF MAST ARM TIP. INSTALLATION SHALL BE PER THE MANUFACTURER'S GUIDELINES. STATIC DAMPERS SUCH AS HORIZONTAL FLAT SIGN MOUNTINGS SHALL NOT BE USED. ACCEPTABLE DEVICES INCLUDE THE FOLLOWING OR APPROVED EQUAL:

1. UNION METAL ALCOA DAMPER DEVICE - DWG. NO. 2G-1817-C1
2. VALMONT STRUCTURES ALCOA DEVICE - DWG. NO. OH104242P1
3. VALMONT STRUCTURES MITIGATOR - MODEL TR1
4. FLORIDA DOT SPRING-MASS DAMPER - DRAWING INDEX NO. 17749
5. PATHMASTER DAMPER ASSEMBLY - DWG. U2G-1817-C
6. HUBBELL 607 SERIES DAMPER - MILLERBERND WG. NO. HUBBELL-6072014

PAYMENT FOR ITEM 632 "SIGNAL SUPPORT, MECHANICAL DAMPER FOR TC-81.21 MAST ARM (GREATER THAN 59 FEET IN LENGTH), AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE PER EACH COMPLETE AND IN PLACE, AND SHALL INCLUDE ALL LABOR, MATERIALS, AND EQUIPMENT NECESSARY TO COMPLETE THE WORK.

DESIGNER NOTE: T-0330 IS REQUIRED ON ALL PROJECTS INSTALLING TRAFFIC SCD TC-81.21 MAST ARMS GREATER THAN 59 FEET IN LENGTH.

T-0340

ITEM 632 - SIGNALIZATION, MISC.: UNLASH AND RELASH MESSENGER WIRE

THE CONTRACTOR SHALL REMOVE EXISTING MESSENGER WIRE LASHING RODS AND REINSTALL THEM AS NECESSARY FOR THE INSTALLATION OF ANY NEW CABLES ON THE EXISTING INTERSECTION SIGNAL SPANS. THE CABLES SHALL ENTER THE EXISTING STRAIN POLE THROUGH THE POLE CABLE ENTRANCE FITTING AND USE THE EXISTING CONDUIT SYSTEM TO GET TO THE CONTROLLER CABINET. THE NEW CABLES SHALL BE SUPPORTED BY A NEW CABLE SUPPORT ASSEMBLY AT THE TOP OF THE STRAIN POLE.

THE NEW SIGNAL CABLES SHALL BE BID BY SEPARATE BID ITEMS.

PAYMENT FOR ITEM 632 "SIGNALIZATION MISC.: UNLASH AND RELASH MESSENGER WIRE" SHALL BE MADE AT THE CONTRACT UNIT PRICE PER FOOT AND SHALL INCLUDE ALL LABOR, MATERIALS, CABLE SUPPORT ASSEMBLIES AND EQUIPMENT TO INSTALL NEW CABLES ON EXISTING SIGNAL SPAN WIRE INSTALLATIONS.

DESIGNER NOTE: T-0340 IS INTENDED FOR USE ON PROJECTS WHERE UNLASHING AND RELASHING THE MESSENGER WIRE IS REQUIRED IN THE PLANS. TYPICAL USE WOULD BE FOR A TRAFFIC SIGNAL RETROFIT, WHERE A NEW SIGNAL HEAD AND ASSOCIATED CABLES ARE TO BE ADDED TO THE EXISTING SPAN.

T-0350

ITEM 632 - SIGNALIZATION, MISC.: FOUNDATION TEST HOLE

IF UNDERGROUND OBSTRUCTIONS ARE ENCOUNTERED THAT PRECLUDE THE USE OF THE STANDARD OR ALTERNATE FOUNDATION DESIGNS, THE CONTRACTOR SHALL PROVIDE THE CITY OF AVON 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 CITY OF AVON DETERMINES IF A NEW FOUNDATION LOCATION WILL BE REQUIRED.

IF DIRECTED BY THE CITY OF AVON, THE CONTRACTOR SHALL BACKFILL AND COMPACT THE HOLE AND SHALL RESTORE THE SURFACE TO THE SATISFACTION OF THE CITY OF AVON.

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 EACH ITEM 632 -SIGNALIZATION, MISC.: FOUNDATION TEST HOLE FOR THE NUMBER EXCAVATED AND BACKFILLED.

NOTE T-0350 SHOULD BE USED WHEN ANY NEW SIGNAL SUPPORTS OR PEDESTALS ARE TO BE INSTALLED.

ITEM 633 - CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET TYPE TS2, AS PER PLAN

THIS ITEM SHALL BE IN ACCORDANCE WITH ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS) 633 IN ADDITION TO THE FOLLOWING. THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING AN ACTUATED, SOLID STATE DIGITAL MICROPROCESSOR TYPE CONTROLLER WITH MENU DRIVEN PROMPTS, INTERNAL TBC, ETHERNET TELEMETRY PORT AND ALL OTHER ACCESSORIES THAT ARE REQUIRED TO MAKE THE CONTROLLER COMPLETELY FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS.

THE CONTROLLER ASSEMBLY SHALL INCLUDE A NEMA TS2 TYPE A2 CONTROLLER UNIT, NEMA TS2, TYPE 2, CONFIGURATION 4 (16 POSITION) TERMINALS AND FACILITIES AND A NEMA TS2, TYPE 16, MALFUNCTION MANAGEMENT UNIT COMPLETE IN A NEMA TS2 CABINET ASSEMBLY. THE CONTROLLER UNIT SHALL BE MANUFACTURED BY ECONOLITE CONTROL PRODUCTS OF ANAHEIM, CALIFORNIA, MODEL COBALT WITH OPTIONAL 3.3V DATA KEY (8MB) AND GRAPHICAL TOUCH SCREEN.

IN ADDITION TO THE REQUIREMENTS OF 633, CONTROLLER UNITS SHALL BE PROVIDED WITH THE FOLLOWING FEATURES:

- LOAD SWITCHES AND FLASH TRANSFER RELAYS SHALL BE MANUFACTURED BY EDI AND SUPPLIED IN SUFFICIENT QUANTITY TO PERFORM THE OPERATION AS SHOWN IN THE PLANS. THE LOAD SWITCHES PROVIDE INDICATORS ON THE INPUTS OF EACH CIRCUIT.
- THE CONTROLLER UNIT SHALL BE 16-PHASE FULLY ACTUATED AND SHALL MEET ALL REQUIREMENTS FOR A NEMA TS2, TYPE 2 INCLUDING SDLC (PORT 1), 25 PIN SERIAL PORT (PORT 2), AND 9 PIN CONSOLE SERIAL PORTS. THE CONTROLLER SHALL ALSO INCLUDE A 10/100BASET ETHERNET PORT AND DATA-KEY TO MAINTAIN BACK-UP TIMING. MANUFACTURE SPECIFIC "D" CONNECTORS SHALL BE INCLUDED.
- THE NEMA TS2, TYPE 16, MALFUNCTION MANAGEMENT UNIT (MMU) SHALL BE MANUFACTURED BY EDI AND PROVIDED WITH AN LCD DISPLAY AND AN IP ADDRESSABLE ETHERNET PORT. THE CABINET SHALL BE WIRED FOR APPROACH MONITORING. AN SDLC CABLE ASSEMBLY SHALL BE PROVIDED TO CONNECT PORT 1 OF THE CONTROLLER TO AN 8-PORT HUB AND FROM THE 8-PORT HUB TO PORT 1 OF THE MMU. THIS WILL ENABLE THE ADVANCED ERROR CHECKING, EVENT REPORTING AND LOGGING FEATURES AS DEFINED BY NEMA. THE MMU SHALL PASS ALL TESTS AS PERFORMED BY AN AUTOMATIC MONITOR TESTER. TEST RESULTS SHALL BE PRINTED AND SUPPLIED WITH EACH CABINET.
- THE FOLLOWING SWITCHES SHALL BE ACCESSIBLE VIA THE POLICE PANEL:
 - SIGNAL ON/OFF
 - FLASH CONTROL
 - AUTOMATIC/MANUAL TRANSFER
 - MANUAL PUSHBUTTON AND 10' COILED HAND CORD
- THE FOLLOWING SWITCHES SHALL BE MOUNTED ON A TECHNICIAN'S SWITCH PANEL ON THE INSIDE OF THE MAIN CABINET DOOR:
 - STOP TIME ON/OFF
 - FLASH CONTROL
 - TIMER POWER ON/OFF
 - DETECTOR TEST, MOMENTARY PUSHBUTTON
- THE MAINTENANCE PANEL AND POLICE PANEL SHALL BE INSTALLED IN THE CABINET AS A COMPLETE AND INDEPENDENT ASSEMBLY. A SINGLE MULTI-PIN CONNECTOR ASSEMBLY SHALL BE USED TO INTERFACE TO THE MAIN BACK-PANEL. DIRECT WIRING FROM THE BACK-PANEL TO THE MAINTENANCE/POLICE PANEL WILL NOT BE ALLOWED. THE MAINTENANCE/POLICE PANEL ASSEMBLY SHALL BE EASILY REPLACED WITHOUT HAVING TO DISTURB ANY OTHER WIRING IN THE CABINET. THE MAINTENANCE PANEL SHALL BE HINGED WITH A STAINLESS-STEEL HINGE TO THE POLICE PANEL TO ALLOW EASY ACCESS TO THE WIRING WITHIN THE ASSEMBLY.

CITY OF AVON CONSTRUCTION STANDARDS AND SPECIFICATIONS		
TRAFFIC SIGNAL NOTES	ADOPTION ORDINANCE	DATE
STANDARD CONSTRUCTION DRAWING	61-24	5/29/24
		SHEET 5 OF 8

7. A LED CABINET LAMP KIT WITH DOOR ACTIVATED PUSHBUTTON SHALL BE PROVIDED AND SHALL CONSIST OF TWO (2) LED LIGHT SOURCES, THE FIRST MOUNTED TO THE FAN PANEL TO ILLUMINATE THE ENTIRE CABINET, THE SECOND MOUNTED UNDERNEATH THE BOTTOM SHELF TO ILLUMINATE THE ENTIRE LOAD BAY AREA. EACH LIGHT SOURCE SHALL BE A MINIMUM OF 30" IN LENGTH AND BE LOW PROFILE SO NOT TO INTERFERE WITH THE REMOVAL OR MAINTENANCE OF ANY CABINET EQUIPMENT.
8. THE CABINET SHALL BE ALUMINUM, WITH A NATURAL SATIN FINISH, MEASURING 55"H X 60"W X 26"D AND SHALL COMPLY WITH THE REQUIREMENTS OF 733.03. THE INTERIOR SHALL BE PAINTED WHITE IN COLOR. THE CABINET SHALL BE DOUBLE DOOR AND COMPARTMENTALIZED SO THAT THE CONTROLLER CAN BE HOUSED IN ONE COMPARTMENT AND A UPS IN THE OTHER. THE CABINET SHALL HAVE A MINIMUM OF THREE SHELVES IN THE CONTROLLER COMPARTMENT.
9. THE CONTRACTOR SHALL FURNISH, FOR APPROVAL, A CABINET PLAN SHOWING COMPONENT LAYOUT.
10. THE MAIN POWER SURGE PROTECTOR SHALL BE PLUG-IN TYPE, INCLUDE A FAILURE INDICATOR AND A SET OF DRY CONTACTS TO INDICATE THE UNIT HAS FAILED. THE UNIT SHALL BE AN EDCO MODEL SHA-1250 INCLUDING BASE. THE FAIL CONTACTS OF THE SURGE PROTECTOR SHALL BE WIRED TO AN ALARM INPUT FOR REPORTING A FAILED DEVICE TO A CENTRAL COMPUTER.
11. THE FOLLOWING LIST OF FEATURES SHALL BE INCORPORATED INTO THE CABINET AND TERMINALS FACILITY:
- A. THE FIELD TERMINALS FOR SIGNAL HOOK-UP SHALL BE MOUNTED TO A PANEL AND ANGLED AT 45 DEGREES FOR EASE OF INSTALLATION AND MAINTENANCE. NO WIRES, LUGGED OR OTHERWISE, SHALL BE PERMITTED ON THE SIGNAL HOOK-UP SIDE OF THE FIELD TERMINAL BLOCKS, EXCEPT THE PANEL SHALL BE WIRED FROM THE FACTORY SUCH THAT THE PHASING CAN BE REWIRED AT TRAFFIC PHASING, OVERLAPS OR PEDESTRIAN SIGNALS USING JUMPERS FROM THE FRONT OF THE PANEL WITHOUT THE REMOVAL OF THE BACKBOARD AND WITHOUT A NEED FOR SOLDERING. ALL UNUSED WIRES IN THE MMU AND CONTROLLER WILL BE WIRED TO THE CONNECTOR AND BUNDLED FOR FUTURE USE IN THE PANEL.
- B. WIRE CONNECTIONS TO THE BACK-PANEL SHALL BE MADE WITH CRIMP TERMINALS AND THREADED FASTENERS. SOLDER CONNECTIONS MAY BE USED ON THE BACKSIDE OF A PANEL THAT UTILIZES FEED-THRU STYLE TERMINAL BLOCKS. PRINTED CIRCUIT BOARDS SHALL NOT BE USED ON ANY PART OF THE MAIN BACK-PANEL ASSEMBLY.
- C. ALL WIRES FASTENED TO THE LOAD SWITCH, FLASHER AND FLASH TRANSFER RELAY SOCKETS SHALL BE SOLDERED IN PLACE. A GOOD MECHANICAL CONNECTION MUST BE MADE PRIOR TO SOLDERING.
- D. THE BACK-PANEL SHALL BE PROVIDED WITH A UNITIZED SELF-LEVELING/SELF-ADJUSTING HINGED MOUNTING MECHANISM TO ALLOW EASY ACCESS TO ALL WIRING ON THE REAR OF THE PANEL. THE BACK-PANEL SHALL SLIDE ONTO THE HINGE SUPPORT BRACKETS AND BE SECURED IN THE CABINET WITH STAINLESS STEEL MOUNTING HARDWARE SECURELY FASTENED AT NO MORE THAN TWO (2) POINTS. COMPLETE REMOVAL AND REPLACEMENT OF THE MAIN BACK-PANEL ASSEMBLY SHALL BE ACCOMPLISHED WITH THE USE OF SIMPLE HAND TOOLS.
- E. THE BACK-PANEL SHALL BE DESIGNED SUCH THAT IT CAN BE EASILY REMOVED AND REPLACED WITHIN THE CABINET. CONNECTORS SHALL BE USED TO CONNECT ALL SIDE PANELS TO THE BACK-PANEL INCLUDING THE DETECTOR PANEL, MAINTENANCE/POLICE PANEL. CABINET FAN PLATE AND ANY AUXILIARY PANEL. THE MAIN BACK-PANEL ASSEMBLY SHALL BE EASILY REMOVED AND REPLACED WITHOUT REMOVING OR RE-WIRING ANY OF THE SIDEWALL MOUNTED PANELS.
- F. ALL WIRING OF HARNESSSES AND INTER-PANEL WIRING, INCLUDING WIRING TO THE POLICE PANEL SHALL BE PROTECTED WITH A NYLON MESH OR "SNAKE SKIN". ANY EXPOSED WIRES, OR THE USE OF CABLE TIES TO HOLD THE WIRE BUNDLES TOGETHER SHALL NOT BE ALLOWED.
- G. ALL BACK-PANEL TERMINALS AND COMPONENTS SHALL HAVE SILK-SCREENED TERMINAL/CKET FUNCTION IDENTIFICATION LABELS SUCH AS "AC COM", "PHASE 3 GREEN", ETC. SILK-SCREENED TERMINAL REFERENCE NUMBERS SHALL ALSO BE PROVIDED. LOAD SWITCH FIELD TERMINALS SHALL BE LABELED WITH THE LOAD SWITCH NUMBER, COLOR AND TERMINAL REFERENCE NUMBER.
- H. ALL SWITCHES SHALL BE IDENTIFIED WITH PERMANENT TYPE LABELS. THE USE OF PLASTIC MARKING TAPE OR "CROY" TYPE TAPE IS NOT ACCEPTABLE.
- I. ALL MAIN POWER PANEL DEVICES SHALL BE MOUNTED TO THE LOWER RIGHT PORTION OF THE MAIN PANEL, INCLUDING ALL CIRCUIT BREAKERS, LINE FILTERS AND LOAD RELAYS. AS AN ALTERNATE, A SEPARATE POWER PANEL MOUNTED TO THE RIGHT-SIDE WALL OF THE CABINET WILL BE PERMITTED.
- J. FIELD TERMINATIONS FOR LOOPS AND PEDESTRIAN PUSHBUTTONS SHALL BE ON THE LEFT SIDE WALL. THE TERMINAL BLOCK FOR THESE ITEMS SHALL BE MOUNTED VERTICALLY. TERMINATING OF FIELD WIRES OVER TOP OF OTHER TERMINAL BLOCKS SHALL NOT BE ALLOWED.
- K. ALL EQUIPMENT HARNESSSES SHALL BE ATTACHED TO THE UNDERSIDE OF THE SHELVES WITH APPROPRIATE CABLE TIE MOUNTING BLOCKS. FOR EASE OF MAINTENANCE, ALL HARNESSSES SHALL BE OF SUFFICIENT LENGTH TO PLACE THE EQUIPMENT ON TOP OF THE CABINET AND BE OPERATIONAL.

- L. A COLOR-CODED WIRING SYSTEM SHALL BE USED THROUGHOUT THE WIRING OF THE CABINET. THE WIRING COLOR-CODE SHALL BE AS FOLLOWS:
- I. CONTROLLER UNIT – BLUE, 22 GAUGE
- II. MMU – VIOLET, 22 GAUGE
- III. RED LOAD SWITCH OUTPUT – RED, 16 GAUGE
- IV. YELLOW LOAD SWITCH OUTPUT – YELLOW, 16 GAUGE
- V. GREEN LOAD SWITCH OUTPUT – BROWN, 16 GAUGE
- VI. AC LINE POWER – BLACK, VARIES*
- VII. AC NEUTRAL – WHITE, VARIES*
- VIII. EARTH GROUND – GREEN, VARIES*
- IX. LOGIC GROUND – GRAY, 22 GAUGE
- X. FLASH PROGRAMMING – ORANGE, 16 GAUGE
- *SIZED APPROPRIATELY TO HANDLE THE VARYING CURRENT REQUIREMENTS.
12. EACH CABINET SHALL BE EQUIPPED WITH TWO (2) 16-CHANNEL DETECTOR RACKS INCLUDING BUS INTERFACE UNITS AND TERMINATION PANELS.
- A. THE TERMINATION PANEL SHALL BE PROVIDED WITH PROVISIONS AND FULLY WIRED FOR A MINIMUM OF EIGHT (8) LOOP DETECTORS INCLUDING CONNECTORS AND LOOP TERMINATION BLOCKS.
- B. TERMINATION POINTS SHALL BE PROVIDED FOR EIGHT (8) PEDESTRIAN PUSHBUTTONS.
- C. PROVISIONS FOR INTERFACING SYSTEM DETECTORS AND ADDITIONAL DETECTOR INPUTS SHALL BE INCLUDED ON THE PANEL.
13. ALL LOOP DETECTOR RACK POSITIONS SHALL BE TAGGED WITH A WHITE PLASTIC TAG, AND SHALL IDENTIFY WITH PERMANENT MARKER, THE LOOP NUMBER, DIRECTION OF TRAVEL AND DESIGNATE THE LANE FOR WHICH THE LOOP IS PLACED. IT SHALL ALSO INCLUDE ANY NOMENCLATURE AS SHOWN ON THE DRAWINGS USED FOR IDENTIFICATION OF THE HARNESS.
14. A SYSTEMS INTERFACE PANEL SHALL BE PROVIDED AND CONVENIENTLY MOUNTED. TERMINAL BLOCKS SHALL BE FEED-THRU TYPE AND MOUNTED VERTICALLY. ALL SYSTEMS FUNCTIONS OF THE CONTROLLER SHALL BE TERMINATED ON A SINGLE PANEL. AT A MINIMUM, THE SYSTEMS PANELS SHALL INCLUDE TERMINATION POINTS FOR 16 ADDITIONAL DETECTOR INPUTS, 6 PREEMPT INPUTS, 6 PREEMPT OUTPUTS AND 4 SPECIAL FUNCTION OUTPUTS. THE SYSTEMS INTERFACE PANEL SHALL CONNECT TO THE MAIN BACK-PANEL ASSEMBLY AND THE DETECTOR PANEL WITH THE USE OF MULTI-PIN CONNECTORS. DIRECT WIRING FROM THE MAIN BACK-PANEL TO THE SYSTEMS INTERFACE PANEL WILL NOT BE ALLOWED.
15. THE CABINET SHALL CONTAIN A PULL-OUT DOCUMENT DRAWER WITH " HOLD-CLOSED AND B"LOCK-OPEN" FEATURE. THE DOCUMENT DRAWER SHALL MEASURE 22"W X 12"D X 2.5"H. THE DOCUMENT DRAWER SHALL INCLUDE A NON-SKID SURFACE DESIGNED TO SUPPORT THE WEIGHT OF A TYPICAL LAPTOP COMPUTER AND SHALL BE MOUNTED BELOW THE TIMER SHELF.
16. THE CABINET SHALL BE FULLY WIRED TO ACCOMMODATE THE PREEMPTION EQUIPMENT AND PERFORM THE PREEMPTION SEQUENCES AS SPECIFIED IN THESE PLANS.
17. THE CABINET ASSEMBLY SHALL BE FULLY TESTED, WITH ALL COMPONENTS INSTALLED, AT THE FACTORY PRIOR TO SHIPMENT. THE CONTROLLER, MONITOR AND DETECTORS SHALL BE FULLY PROGRAMMED PER THE PLANS AND SPECIFICATIONS, BY A TRAINED FACTORY REPRESENTATIVE. THE COMPLETE AND FULLY PROGRAMMED CABINET ASSEMBLY SHALL BE FACTORY TESTED FOR A MINIMUM OF 24 HOURS, PRIOR TO SHIPMENT. THE SUPPLIER SHALL CERTIFY IN WRITING THAT THE TESTS HAVE BEEN SUCCESSFULLY PERFORMED PRIOR TO INSTALLATION IN HE FIELD. ALL TESTING SHALL BE SUPERVISED BY A LICENSED PROFESSIONAL ENGINEER.
18. THE HEIGHT OF THE CONTROLLER SHOULD BE AROUND 6 FEET TO THE TOP OF THE CABINET SO THE FIELD TECHNICIAN CAN WORK COMFORTABLY ON IT. THE CONTROLLER CABINET SHALL NOT SITDIRECTLY ON THE FOUNDATION, IT MUST HAVE A 12" RISER. THE CABINET DOOR SHALL BE POSITIONED TO FACE AWAY FROM TRAFFIC, AND SHALL NOT FACE TOWARDS THE PATH OF SNOW REMOVAL. A CONCRETE PAD SHALL BE IN FRONT OF THE CABINET.
19. INCLUDE ALL MANUALS AND SOFTWARE FOR ALL COMPONENTS IN THE CABINET.
20. ALL USED PARTS AND SPARE STOCK SHALL BE RETURNED TO THE CITY OF AVON.

THE CONTRACTOR SHALL PROVIDE TRAINING FOR UP TO FIVE (5) PEOPLE IN THE OPERATION, MAINTENANCE AND TROUBLESHOOTING OF THE CONTROLLER AND CABINET. IT SHALL CONSIST OF HANDS-ON INSTRUCTION FOR A MINIMUM OF EIGHT (8) HOURS. ALL TRAINING SHALL BE HELD IN A LOCATION AS SPECIFIED BY THE CITY AND CONDUCTED BY SOMEONE WHO HAS PERFORMED THE TRAINING WITHIN THE LAST YEAR AND DOES IT ON A REGULAR BASIS. THE COST OF TRAINING, INCLUDING COURSE MATERIAL,TRAVEL, SUBSISTENCE AND RELATED COSTS SHALL BE ENTIRELY BORNE BY THE CONTRACTOR AND SHALL BE INCIDENTAL TO THE COST OF THE PREEMPT EQUIPMENT.

PAYMENT FOR "ITEM 633 – CONTROLLER UNIT, TYPE TS2/A2 WITH CABINET TYPE TS2, AS PER PLAN" SHALL BE MADE AT THE CONTRACT PRICE BID. 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:

NOTE T-0360 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS FOR WHERE A NEW CONTROLLER UNIT IS REQUIRED. THE CITY MAY ELECT TO DELETE THE TRAINING REQUIREMENT ONCE THEY ARE CONFIDENT IN TROUBLESHOOTING AND MAINTENANCE OF THE CONTROLLER.

T-0370

ITEM 633 – CABINET FOUNDATION, AS PER PLAN
ITEM 633 – CONTROLLER WORK PAD, AS PER PLAN
THE SIZE OF THE CABINET FOUNDATION AND THE CONTROLLER WORK PAD SHALL BE INCREASED TO ACCOMMODATE THE PROPOSED CONTROLLER CABINET WITH UNINTERRUPTIBLE POWER SUPPLY AND PEDESTAL MOUNTED POWER SERVICE FROM THOSE SHOWN ON ODOT STANDARD CONSTRUCTION DRAWING TC-83.20. THE CABINET FOUNDATION SHALL BE 90" W X 36" D X 36" H AND THE CONTROLLER WORK PAD SHALL BE 90" X 30". THE CONTRACTOR SHALL PROVIDE A SCHEMATIC OF THE FOUNDATION AND CONTROLLER WORK PAD TO THE CITY OF AVON FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTING. ALL OTHER DETAILS SHALL BE AS SHOWN ON TC-83.20.

DESIGNER NOTE:

NOTE T-0370 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS FOR WHERE A NEW CONTROLLER UNIT IS REQUIRED.

T-0380

ITEM 633 UNINTERRUPTIBLE POWER SUPPLY (UPS), AS PER PLAN
THIS WORK IS FOR THE FURNISHING AND INSTALLATION OF AN UNINTERRUPTIBLE POWER SYSTEM (UPS) WITH AUTOMATIC GENERATOR/VEHICLE INVERTER DISCONNECT. IN ADDITION TO THE REQUIREMENTS OF 633 AND 633.18, PROVIDE AN UNINTERRUPTIBLE POWER SUPPLY WITH THE FOLLOWING FEATURES:

1. THE UPS SHALL BE A CLARY CORPORATION SP1250LX SERIES OR APPROVED.
2. THE UPS SHALL BE A DIGITAL, TRUE, ON-LINE, DOUBLE CONVERSION, POWER CONDITIONER AND UNINTERRUPTIBLE POWER SYSTEM (UPS) WITH BATTERY BACKUP CAPABILITY. THE UPS INVERTER SHALL BE IN OPERATION AT ALL TIMES SUPPLYING CLEAN REGULATED POWER (BOTH VOLTAGE AND FREQUENCY) TO ALL LOADS, AT ALL TIMES. THE UPS, BATTERIES AND POWER INTERFACE MODULE SHALL BE CERTIFIED BY AN INDEPENDENT LABORATORY TO OPERATE FROM -40°F TO +165°F. THE COMPLETE SYSTEM, INCLUDING BATTERIES, SHALL HAVE A TWO-YEAR FACTORY WARRANTY.
3. THE UPS UNIT SHALL USE DIGITAL TECHNOLOGY (IRON CORE TRANSFORMERS WILL NOT BE ACCEPTED) TO CONTINUOUSLY CREATE AND CONTROL PURE SINE WAVE OUTPUT POWER. THE UPS SHALL ISOLATE THE CONNECTED EQUIPMENT AGAINST SPIKES, SAGS AND LINE NOISE BY CONVERTING THE UTILITY AC TO DC AND THEN REGENERATE CLEAN AC AT A NOMINAL 120 VOLTS WITH A FREQUENCY OF 60HZ. WHEN OPERATING ON BATTERY POWER, THE UPS SHALL MAINTAIN +/- .0005% FREQUENCY STABILITY TO PREVENT TIME DRIFT PROBLEMS WITH THE TRAFFIC CONTROLLER’S INTERNAL TBC CLOCK. THE BATTERY CHARGING SYSTEM SHALL BE A SEPARATE, DISTINCT, 3 STAGE DESIGN INCORPORATING A PULSE CHARGE CAPABILITY. THE DOUBLE CONVERSION OPERATION OF THE UPS SHALL WORK NORMALLY EVEN WITH BATTERIES DISCONNECTED OR CHARGING. THE SYSTEM SHALL SUPPORT A MAXIMUM 865-WATT LOAD FOR APPROX. 1.8 HOURS AT AMBIENT TEMPERATURE. THE UPS SYSTEM SHALL, IN THE ABSENCE OF AC, BE ABLE TO BE COLD STARTED USING ONLY BATTERY POWER. THE UPS SHALL INCORPORATE ALARM OUTPUTS THAT CAN BE USED FOR REMOTE MONITORING AS WELL AS OUTPUTS THAT CAN BE USED FOR OPERATING THE INTERSECTION IN A COMBINATION OF FULL OPERATION AND FLASH.
4. THE BATTERY SET SHALL BE CERTIFIED TO MEET OR EXCEED THE SAFETY REQUIREMENTS OF MIL-SPEC #MIL-B-8565J. THE BATTERY SET SHALL BE COMPRISED OF EXTREME TEMPERATURE, DEEP CYCLE, AGM/VRLA (ABSORBED GLASS MAT/VALVE REGULATED LEAD ACID) BATTERIES. ALL TERMINALS SHALL HAVE ANDERSON POWER POLE CONNECTORS WITH WIRE LEADS WELDED TO THE BATTERY TERMINALS THUS ELIMINATING THE NEED TO PERIODICALLY RE-TIGHTEN MECHANICAL CONNECTIONS. ALL BATTERY TERMINALS SHALL BE PERMANENTLY SEALED AGAINST CORROSION BY THE BATTERY MANUFACTURER. BOLT ON BATTERY CABLES AND EXPOSED BATTERY TERMINALS WILL NOT BE ACCEPTED. BATTERIES SHALL BE 51AH AND NOT TO EXCEED 25LBS EACH. ALL BATTERIES SHALL BE PLACED ON THERMOSTATICALLY CONTROLLED BATTERY HEATER MATS IN THE ENCLOSURE.

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5. 'A POWER INTERFACE MODULE (PIM) SHALL BE PROVIDE WHICH CONTAINS A TERMINAL STRIP FOR INPUT AND OUTPUT POWER CONNECTIONS IN ADDITION TO NEUTRAL AND GROUND CONNECTIONS. THIS MODULE SHALL HAVE AN INTERFACE THAT WILL ALLOW AN EXTERNAL GENERATOR OR VEHICLE INVERTER TO BE PLUGGED INTO THE SYSTEM. THE UPS SHALL SUPPLY FULLY REGENERATED CLEAN AND CONDITIONED POWER FROM THE GENERATOR/INVERTER POWER SOURCE (WITHOUT SWITCHING TO BATTERIES) IN ADDITION TO MAINTAINING THE 3 STAGE, BATTERY CHARGING SYSTEM. AC INDICATION SHALL BE PROVIDED ON THE OUTSIDE OF CABINET. ONE FOR LINE VOLTAGE (GREEN), AND ONE FOR UPS VOLTAGE (RED).
6. THE UPS MANUFACTURER SHALL BE ISO9001:2008 CERTIFIED AND ALL MANUFACTURING PROCESSES SHALL BE DONE IN THE UNITED STATES AND FULLY COMPLY WITH THE "MADE IN USA" STANDARD. THE UPS SHALL BE FIELD PROVEN WITH A MINIMUM OF THREE YEARS OF USE FOR TRAFFIC SIGNAL APPLICATIONS WITHIN THE UNITED STATES.
7. THE UPS SHALL ALSO INCLUDE A 10/100BASET ETHERNET PORT.

POLE ATTACHMENT HARDWARE WILL BE INCLUDED FOR POLE-MOUNTED CABINETS, AND A CABINET RISER (8 INCH MINIMUM) AND ANCHOR BOLTS WILL BE PROVIDED FOR BASE-MOUNTED CABINETS. BEFORE PERFORMING THE WORK, THE CONTRACTOR AND THE CITY OF AVON WILL PERFORM A SITE INSPECTION TO ESTABLISH THE LOCATION OF THE UPS CABINET AND FOUNDATION.

THE UPS CABINET SHALL INCLUDE A GENERATOR POWER PANEL WITH A HEAVY DUTY POWER RELAY VERSUS THE LINE VOLTAGE GENERATOR SWITCH. THE GENERATOR INLET SHALL BE A RECESSED PANEL WITH A DOOR THAT IS FLUSH WITH THE EXTERNAL SIDE OF THE UPS CABINET. IT SHALL INCLUDE A RECESSED PLUG, AUTOMATIC TRANSFER SWITCH AND A DOOR THAT SECURELY CLOSES OVER THE POWER CORD.

THE UPS OUTPUT NOTIFICATIONS FOR ON BATTERY, BATTERY 2-HOUR TIMER, AND LOW BATTERY SHALL BE WIRED INTO THE TRAFFIC SIGNAL CABINET BACK PANEL TO PROVIDE SPECIAL STATUS ALARMS FOR EACH OUTPUT INTO THE SIGNAL CONTROLLER.

THIS ITEM SHALL INCLUDE A RED LED STATUS INDICATOR LAMP TO ALLOW MAINTENANCE PERSONNEL AND LAW ENFORCEMENT TO QUICKLY ASSESS WHETHER A TRAFFIC SIGNAL CABINET IS BEING POWERED BY A UPS. THE LED HOUSING SHALL BE NEMA 4X, IP65 OR IP66, RATED FOR OUTDOOR USE AND BE TAMPER/SHATTER RESISTANT. IT SHALL BE A DOMED ENCLOSURE CONTAINING A RED LENS WITH LED THAT IS VISIBLE FROM 100 FOOT MINIMUM. THE ENCLOSURE AND LED MODULE SHOULD BE PLACED AND CENTERED ON THE TOP SURFACE OF THE UPS CABINET AND SEALED FROM WATER INTRUSION. IT SHOULD BE WIRED USING MINIMUM 20GA STRANDED, INSULATED HOOKUP WIRE TO THE STATUS RELAY OUTPUTS OF THE UPS. THE WIRES SHALL BE TERMINATED BY LUGS AT THE DISPLAY END AND PERMANENTLY LABELED "BACKUP POWER STATUS DISPLAY," WITH THE WIRE POLARITY INDICATED. THE RED LED SHALL ONLY ILLUMINATE TO INDICATE THE CABINET IS OPERATING UNDER UPS BACKUP POWER (THE "BACKUP" OPERATING CONDITION). THIS ITEM INCLUDES PROGRAMMING THE UPS STATUS RELAY OUTPUTS TO PRODUCE THE LAMP STATUS DISPLAYS. THESE STATUS DISPLAYS WILL BE SOLID 100% DUTY CYCLE (NOT FLASHING) DISPLAYS. THE OPERATING VOLTAGE OF THE LED LAMP SHALL BE 120V AC UNLESS OTHERWISE INDICATED.

PAYMENT FOR "ITEM 633 UNINTERRUPTIBLE POWER SUPPLY (UPS), AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID FOR EACH IN PLACE, COMPLETELY INSTALLED AT THE LOCATIONS SHOWN IN THE PLANS, INCLUDING EXTRA CABINET SPACE, CABINET FOUNDATION AND WORK PAD.

DESIGNER NOTE: NOTE T-0380 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE A NEW CONTROLLER UNIT IS REQUIRED.

T-0390 ITEM 633 – PREEMPTION, AS PER PLAN
THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING PREEMPTION EQUIPMENT IN THE LOCATIONS AND LOCAL CONTROLLERS AS SHOWN IN THE PLANS. THE PREEMPTION SHALL CONFORM TO ODOT SPECIFICATION 633 AND SHALL UTILIZE COMMUNICATIONS TO IDENTIFY THE PRESENCE OF AN EMERGENCY PRIORITY VEHICLE. IT SHALL CAUSE THE TRAFFIC SIGNAL CONTROLLER TO SELECT A PRE-PROGRAMMED PREEMPTION PLAN THAT WILL DISPLAY AND HOLD THE DESIRED SIGNAL PHASE FOR THE DIRECTION OF THE EMERGENCY VEHICLE.

THE PREEMPTION SYSTEM SHALL BE MODEL SONEM 2000 AS MANUFACTURED BY TRAFFIC SYSTEMS, LLC, SCOTTSDALE, ARIZONA

THE COMMUNICATIONS MEDIUM SHALL EMPLOY SIREN ACTIVATED DETECTION TECHNIQUES TO DETERMINE AND LOG THE PRESENCE OF THE EMERGENCY VEHICLE. THE SYSTEM SHALL DETECT THE PRESENCE OF THE VEHICLE THROUGH A SIREN LOCATED ON THE EMERGENCY VEHICLE. THE SYSTEM SHALL ACTIVATE THE PREEMPTION SEQUENCE BY APPLYING A SIGNAL TO ONE OF THE CONTROLLER'S PREEMPT DISCRETE INPUTS. THE SYSTEM SHALL BE COMPLETELY COMPATIBLE WITH THE NEMA SPECIFIED CONTROLLER.

THE EQUIPMENT SHALL BE RACK-MOUNTED, BE EASILY REMOVABLE AND REPLACEABLE WITHIN THE CABINET WITHOUT THE USE OF HARNESSSES OR PLUG-IN STYLE CONNECTORS. THE EQUIPMENT SHALL BE SUPPLIED COMPLETELY WIRED IN THE CONTROLLER CABINET AND TESTED.

THE SYSTEM SHALL BE CAPABLE OF PREEMPTING AND RECEIVING PRIORITY FOR EACH APPROACH TO THE INTERSECTION. IT SHALL BE POSSIBLE TO DETECT THE EMERGENCY VEHICLE UP TO 1200 FEET FROM THE INTERSECTION. THE SUPPLIER SHALL CERTIFY IN WRITING THAT NO FALSE DETECTION CAN OCCUR.

EACH INTERSECTION SHOWN IN THE PLANS SHALL BE SUPPLIED WITH THE FOLLOWING COMPONENTS, EACH BID SEPARATELY:

1. PREEMPTION RECEIVING UNIT
2. PREEMPT DETECTOR CABLE
3. PREEMPT PHASE SELECTOR ASSEMBLY AND INTERFACE WIRING PANEL
4. PREEMPT CONFIRMATION LIGHT

THE EQUIPMENT SHALL BE RACK-MOUNTED, BE EASILY REMOVABLE AND REPLACEABLE WITHIN THE CABINET WITHOUT THE USE OF HARNESSSES OR PLUG-IN STYLE CONNECTORS. THE EQUIPMENT SHALL BE SUPPLIED COMPLETELY WIRED IN THE CONTROLLER CABINET AND TESTED.

THE SYSTEM SHALL BE CAPABLE OF PREEMPTING AND RECEIVING PRIORITY FOR EACH APPROACH TO THE INTERSECTION. IT SHALL BE POSSIBLE TO DETECT THE EMERGENCY VEHICLE UP TO 1200 FEET FROM THE INTERSECTION. THE SUPPLIER SHALL CERTIFY IN WRITING THAT NO FALSE DETECTION CAN OCCUR.

EACH INTERSECTION SHOWN IN THE PLANS SHALL BE SUPPLIED WITH THE FOLLOWING COMPONENTS, EACH BID SEPARATE

THE PREEMPTION RECEIVING UNITS SHALL CONSIST OF FURNISHING AND INSTALLING A LIGHTWEIGHT, WEATHERPROOF AND DIRECTIONAL ASSEMBLY. EACH RECEIVING UNIT SHALL BE 360 DEGREE ADJUSTABLE. THE RECEIVING UNIT SHALL BE CAPABLE OF SENDING THE PROPER ELECTRICAL SIGNAL TO THE TRAFFIC SIGNAL CONTROLLER VIA THE PREEMPTION DETECTOR HOME RUN CABLE. DETECTORS SHALL BE SUPPLIED WITH BRACKET ARM MOUNTING HARDWARE. THE DETECTORS WILL FACE OUTBOUND (TO MINIMIZE FALSE CALLS FROM TURNING EMERGENCY VEHICLES) MOUNTED AS TO POINT DOWN THE CENTER OF ROADWAY. AT TEE INTERSECTIONS, THE LOCATION OF THE DETECTORS MAY BE MOUNTED INBOUND.

THE CONTRACTOR SHALL THOROUGHLY TEST THE INSTALLED SYSTEM. AS A MINIMUM, THE CONTRACTOR SHALL VERIFY THAT ALL CONNECTIONS ARE PROPERLY MADE TO THE CONTROLLER CABINETS. THE CONTRACTOR SHALL CHECK THAT THE RANGE SETTING IS PROPER FOR EACH APPROACH. THE CONTRACTOR SHALL DETERMINE THAT ALL PHASE SELECTORS ARE SELECTING THE PROPER PHASE AND TIMING ACCURATELY. THE CONTRACTOR SHALL VERIFY THAT ALL VEHICLE EMITTERS ARE BEING PROPERLY DETECTED.

ALL CABLES, CONNECTORS, TERMINALS, AND INTERFACE RACKS TO PROVIDE A COMPLETE PRIORITY CONTROL SYSTEM SHALL BE INCIDENTAL TO THIS ITEM. PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH "ITEM 633 – PREEMPTION, AS PER PLAN", IN PLACE AND FULLY OPERATIONAL AS SHOWN IN THE PLANS, EXCEPT FOR THOSE ITEMS BID SEPARATELY.

DESIGNER NOTE: NOTE T-0390 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE A NEW CONTROLLER UNIT IS REQUIRED OR IF AN EXISTING EMERGENCY VEHICLE PREEMPT SYSTEM IS BEING REPLACED.

T-0400 ITEM 633 – PREEMPT CONFIRMATION LIGHT, LED, AS PER PLAN
THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING PREEMPT CONFIRMATION LIGHT INCLUDING HARDWARE AND ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE PREEMPT CONFIRMATION LIGHT COMPLETELY FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS.

A CONFIRMATION LIGHT SHALL BE SUPPLIED FOR EACH INTERSECTION TO INDICATE THAT THE EMERGENCY VEHICLE HAS ACHIEVED CONTROL OF THE TRAFFIC SIGNAL.

THE CONFIRMATION LIGHT SHALL BE A VAPOR TIGHT, ALUMINUM LIGHTING FIXTURE WITH A BAKED-ON EPOXY FINISH, BLUE LED CLUSTER LIGHT OUTPUT, AND STAINLESS-STEEL MOUNTING HARDWARE TO ATTACH TO THE TRAFFIC SIGNAL MAST ARM. THE CONFIRMATION LIGHT SHALL BE POWERED BY A LOAD SWITCH IN THE TRAFFIC SIGNAL CONTROLLER CABINET DEDICATED TO FOR THAT PURPOSE. SIGNAL CABLE CONFORMING TO 732.19 SHALL BE USED FOR CONFIRMATION LIGHTS. A MINIMUM OF 4-CONDUCTOR CABLE SHALL BE USED WITH THE GREEN WIRE SERVING AS THE SAFETY GROUND CONDUCTOR.

THE CONTROLLER SHALL BE PROGRAMMED TO FLASH THE CONFIRMATION LIGHT IN THE DIRECTION OF THE EMERGENCY VEHICLE. ALL OTHER CONFIRMATION LIGHTS SHALL BE STEADY ON.

THE CONFIRMATION LIGHT SHALL BE A MODEL 7100 SERIES MANUFACTURED BY TOMAR ELECTRONICS, GILBERT, ARIZONA OR PRE-APPROVED EQUAL.

PAYMENT FOR "ITEM 633 – PREEMPT CONFIRMATION LIGHT, LED, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH LIGHT IN PLACE, COMPLETELY INSTALLED IN THE LOCATION SHOWN IN THE PLANS, WIRED, TESTED AND ACCEPTED. LOAD SWITCH, CONTROLLER WIRING AND CONTROLLER PROGRAMMING SHALL BE CONSIDERED INCIDENTAL AND INCLUDED IN THE COST OF THE PREEMPT CONFIRMATION LIGHT.

DESIGNER NOTE: NOTE T-0400 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE A NEW CONTROLLER UNIT IS REQUIRED OR IF AN EXISTING EMERGENCY VEHICLE PREEMPT SYSTEM IS BEING REPLACED.

T-0410 ITEM 633 – PREEMPTION RECEIVING UNIT, AS PER PLAN
RECEIVING UNITS SHALL CONSIST OF LIGHT WEIGHT, WEATHERPROOF AND DIRECTIONAL ASSEMBLY. EACH RECEIVING UNIT SHALL BE 360 DEGREE ADJUSTABLE. THE RECEIVING UNIT SHALL BE CAPABLE OF SENDING THE PROPER ELECTRICAL SIGNAL TO THE TRAFFIC SIGNAL CONTROLLER VIA THE PREEMPTION DETECTOR CABLE. RECEIVING UNITS SHALL BE SUPPLIED WITH MAST ARM MOUNTING HARDWARE AS SHOWN IN THE PLANS.

INSTALL THE DETECTORS AT THE LOCATIONS RECOMMENDED BY THE PREEMPT DETECTOR SUPPLIER. FOR MAST ARM MOUNTED LOCATIONS, MOUNT THE PREEMPT DETECTORS BY FIELD DRILLING A WIRE ENTRANCE HOLE IN THE MAST ARM. PROVIDE AND INSTALL A RUBBER GROMMET FOR THE WIRE ENTRANCE HOLE.

FURNISH PREEMPTION RECEIVING UNITS WITH 60-MONTH WARRANTIES OR FOR THE MANUFACTURER'S STANDARD WARRANTY WHICHEVER IS GREATER. ENSURE THE WARRANTY PERIOD BEGINS ON THE DATE OF SHIPMENT TO THE PROJECT. ENSURE THAT EACH UNIT HAS A PERMANENT LABEL OR STAMP INDICATING THE DATE OF SHIPMENT.

FURNISH SONEM MODEL PREEMPTION RECEIVING UNITS, AS MANUFACTURED BY TRAFFIC SYSTEMS, LLC, SCOTTSDALE, ARIZONA.

PAYMENT FOR ACCEPTED QUANTITIES OF "ITEM 633 – PREEMPTION RECEIVING UNIT, AS PER PLAN" SHALL BE AT THE CONTRACT UNIT PRICE FOR EACH RECEIVING UNIT IN PLACE, COMPLETELY INSTALLED AT THE LOCATIONS SHOWN IN THE PLANS, WIRED, TESTED AND ACCEPTED. FIELD DRILLING OF THE MAST ARM FOR THE WIRE ENTRANCE HOLE AND GROMMET SHALL BE CONSIDERED INCIDENTAL TO AND INCLUDED IN THE COST OF THE RECEIVING UNIT.

DESIGNER NOTE: NOTE T-0410 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE A NEW CONTROLLER UNIT IS REQUIRED OR IF AN EXISTING EMERGENCY VEHICLE PREEMPT SYSTEM IS BEING REPLACED.

T-0420 ITEM 633 – PREEMPT PHASE SELECTOR, AS PER PLAN
THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING PREEMPT PHASE SELECTORS, INCLUDING WIRING INTERFACE PANELS IN THE LOCAL CONTROLLER CABINET, AND ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE PREEMPT PHASE SELECTORS COMPLETELY FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS. THIS ITEM SHALL INCLUDE THE EXTRA CABINET SPACE NECESSARY TO BE LOCATED IN THE LOCAL CONTROLLER CABINETS WHERE INDICATED IN THE PLANS.

THE PHASE SELECTORS SHALL CONSIST OF A MODULE OR MODULES THAT WILL PROVIDE THE NECESSARY INPUTS TO THE CONTROLLER. PHASE SELECTORS SHALL BE SUPPLIED WITH SUFFICIENT QUANTITIES OF CHANNELS TO PROVIDE PREEMPTION FOR ALL APPROACHES TO THE INTERSECTION SEPARATELY. POWER SHALL BE OBTAINED FROM THE PHASE SELECTOR OR PHASE SELECTOR POWER SUPPLY AND NOT FROM THE LOCAL CONTROLLER TIMER.

THE PHASE SELECTORS SHALL HAVE FRONT PANEL INDICATORS FOR ACTIVE PREEMPT CHANNEL STATUS. IT SHALL HAVE TEST SWITCHES TO ACTIVATE ALL PREEMPT CHANNELS.

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FURNISH PREEMPT PHASE SELECTORS WITH 60–MONTH WARRANTIES OR FOR THE MANUFACTURER’S STANDARD WARRANTY WHICHEVER IS GREATER. ENSURE THE WARRANTY PERIOD BEGINS ON THE DATE OF SHIPMENT TO THE PROJECT. ENSURE THAT EACH UNIT HAS A PERMANENT LABEL OR STAMP INDICATING THE DATE OF SHIPMENT.

FURNISH SONEM MODEL PREEMPT PHASE SELECTORS, AS MANUFACTURED BY TRAFFIC SYSTEMS, LLC, SCOTTSDALE, ARIZONA.

PAYMENT FOR "ITEM 633 – PREEMPT PHASE SELECTOR, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH PHASE SELECTOR IN PLACE, COMPLETELY INSTALLED IN THE LOCAL CONTROLLER SHOWN IN THE PLANS, WIRED, TESTED AND ACCEPTED.

DESIGNER NOTE: NOTE T–0420 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE A NEW CONTROLLER UNIT IS REQUIRED OR IF AN EXISTING EMERGENCY VEHICLE PREEMPT SYSTEM IS BEING REPLACED.

T–0430 ITEM 633 – PREEMPT DETECTOR CABLE, AS PER PLAN
THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING PREEMPT DETECTOR HOME RUN CABLE IN THE LOCATIONS SHOWN IN THE PLANS. IT SHALL CONNECT THE PREEMPT RECEIVING UNITS TO THE PHASE SELECTORS IN THE LOCAL CONTROLLER CABINET.

PREEMPT DETECTOR CABLE SHALL CONFORM TO ODOT SPECIFICATION 632. ONLY ONE EXTERNAL SPLICE SHALL BE PERMITTED BETWEEN PREEMPTION RECEIVER UNIT AND THE CONTROLLER CABINET. THIS SPLICE SHALL MEET THE REQUIREMENTS OF THE ODOT CONSTRUCTION AND MATERIALS SPECIFICATIONS (C&MS) 632.23 USING A WATERPROOF EPOXY SPLICE KIT. THE CABLE SHALL BE APPROVED FOR BOTH OVERHEAD AND UNDERGROUND USE. THE JACKET SHALL WITHSTAND EXPOSURE TO SUNLIGHT AND ATMOSPHERIC TEMPERATURES AND STRESSES REASONABLY EXPECTED IN NORMAL INSTALLATIONS.

PAYMENT FOR QUANTITIES OF "ITEM 633 – PREEMPT DETECTOR CABLE, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER FOOT FOR THE CABLE FURNISHED, IN PLACE, ALL CONNECTIONS MADE AND WIRING COMPLETED, TESTED AND ACCEPTED.

DESIGNER NOTE: NOTE T–0430 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE A NEW CONTROLLER UNIT IS REQUIRED OR IF AN EXISTING EMERGENCY VEHICLE PREEMPT SYSTEM IS BEING REPLACED.

T–0440 ITEM 809 – ITS DEVICE, MISC.: UNIVERSAL TRAFFIC MANAGEMENT RADAR VEHICLE DETECTION SYSTEM
THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING A UNIVERSAL TRAFFIC MANAGEMENT RADAR VEHICLE DETECTION SYSTEM CAPABLE OF INTERSECTION ADVANCE DETECTION AND STOP BAR PRESENCE DETECTION UTILIZING ABOVE GROUND DIGITAL RADAR DETECTION TECHNIQUES. THE UNIVERSAL TRAFFIC MANAGEMENT RADAR VEHICLE DETECTION SYSTEM SHALL BE A MODEL ACCUSCAN 600C, AS MANUFACTURED BY ECONOLITE CORPORATION ANAHEIM, CALIFORNIA.

THE SYSTEM SHALL BE NON–INTRUSIVE AND SHALL DETECT VEHICLES UP TO 8 LANES WIDE AT THE STOP BAR AND SIMULTANEOUSLY DETECT VEHICLES UP TO 160 METERS (500 FEET) FROM THE SENSOR. THE SYSTEM SHALL DETECT INDIVIDUAL VEHICLE PRESENCE, SPEED, WRONG WAY, QUEUE LENGTH AS WELL AS USER DEFINED CUSTOM APPLICATIONS. THE SYSTEM SHALL TRACK AND CLASSIFY UP TO 256 OBJECTS SIMULTANEOUSLY (OBJECTS INCLUDE TRUCKS, VEHICLES, BICYCLES AND PEDESTRIANS) WITHIN THE RANGE OF THE SENSOR. ONE OR MORE SENSORS AS REQUIRED TO ACHIEVE THE DETECTION OBJECTIVE AS SHOWN IN THE PLANS SHALL BE PROVIDED PER APPROACH, COVERING MULTIPLE LANES WHERE STOP BAR AND ADVANCE DETECTION IS REQUIRED. THE DETECTION SYSTEM SHALL INCLUDE THE FOLLOWING FEATURES AND CAPABILITIES:

THE RADAR SENSING UNIT (600C) SHALL OPERATE IN THE 24.0 TO 24.5 GHZ (K–BAND) AND SHALL PROVIDE ACCURATE PRESENCE–DETECTION OF STOPPED, MOVING OR A CLUSTER OF VEHICLES. THE SENSOR SHALL BE MOUNTED IN A FORWARD–FIRE POSITION, LOOKING AT EITHER APPROACHING OR DEPARTING TRAFFIC AND SHALL ONLY DETECT VEHICLES IN ONE DIRECTION OF TRAVEL BY LANE. IT SHALL MAINTAIN ACCURATE PERFORMANCE IN ALL WEATHER CONDITIONS INCLUDING RAIN, FREEZING, RAIN, SNOW, WIND, DUST, FOG, CHANGES IN TEMPERATURE, OR CHANGES IN LIGHTING AND SHALL BE TESTED TO MEET NEMA TS2 ENVIRONMENTAL STANDARDS.

THE SYSTEM SHALL TRACK ALL VEHICLES BY LANE AS THEY APPROACH THE SENSOR.

THE SYSTEM SHALL INCLUDE A SIMPLE SETUP ROUTINE TO CONFIGURE AND CALIBRATE THE SENSOR FOR PROPER OPERATION DURING INSTALLATION. THE SENSOR SHALL BE CAPABLE OF BEING PROGRAMMED AND UPDATED FROM A LAPTOP COMPUTER OR OTHER PORTABLE PROGRAMMING DEVICE. SOFTWARE SHALL BE PROVIDED. THE SOFTWARE SHALL SUPPORT TCP/IP CONNECTIVITY, UNIT CONFIGURATION, BACK–UP AND RESTORE AND VIRTUAL SENSOR CONNECTIONS. THE GRAPHICAL USER INTERFACE SHALL OPERATE ON A WINDOWS PLATFORM.

THE SENSOR SHALL BE MOUNTED DIRECTLY TO A POLE OR MAST ARM AS RECOMMENDED BY THE MANUFACTURER. CABLE SHALL BE PROVIDED AS REQUIRED AND RECOMMENDED BY THE MANUFACTURER.

SURGE PROTECTION DEVICES AS RECOMMENDED BY THE MANUFACTURER SHALL BE INCLUDED BOTH AT THE POLE WHERE THE SENSOR IS LOCATED TO PROTECT THE SENSOR AND IN THE TRAFFIC CABINET TO PROTECT THE CABINET ELECTRONICS.

POWER SHALL BE PROVIDED FROM THE TRAFFIC CABINET. THE SENSOR SHALL CONSUME LESS THAN 10 WATTS AND OPERATE FROM A DC INPUT BETWEEN 12VDC AND 28VDC. COMPLETE AND AUTOMATIC RECOVERY FROM A POWER FAILURE SHALL BE WITHIN 15 SECONDS AFTER RESUMPTION OF NORMAL POWER.

THE TRAFFIC MANAGEMENT INTERFACE BOARD (TMIB2) SHALL CONNECT UP TO FOUR (4) 600C RADAR SENSORS IN A SINGLE RACK MOUNT PLUG–IN ASSEMBLY. THE ASSEMBLY SHALL CONTAIN ALL SURGE AND OVER–VOLTAGE PROTECTION CIRCUITRY FOR FOUR (4) LONG CABLE RUNS. THE TMIB2 SHALL PROVIDE FULL NEMA TS2 SDLC INTERFACE TO THE TRAFFIC CONTROLLER AND PROVIDE UP TO 64 PROGRAMMABLE DETECTION ZONES. A SINGLE FIELD TERMINATION PANEL SHALL BE PROVIDED THAT INTERFACES UP TO FOUR (4) 600C SENSORS TO THE TMIB2 VIA INDUSTRY STANDARD PLUG–IN CAT6 CABLES. THE FIELD TERMINATION PANEL SHALL CONTAIN A SEPARATE AND ISOLATED POWER SUPPLY TO PROVIDE THE APPROPRIATE POWER TO EACH 600C SENSOR.

ALL MAJOR RADAR SYSTEM COMPONENTS, INCLUDING THE 600C SENSOR, TMIB2 INTERFACE AND SYSTEM SOFTWARE SHALL BE FROM THE SAME MANUFACTURER.

THE MANUFACTURER’S REPRESENTATIVE SHALL PROVIDE A SIX (6) HOUR TRAINING COURSE ON THE SETUP, OPERATION AND MAINTENANCE OF THE SYSTEM.

THE DETECTOR SHALL BE LOCATED AND MOUNTED IN ACCORDANCE WITH MANUFACTURE SPECIFICATIONS AND/OR RECOMMENDATIONS.

PAYMENT FOR "ITEM 809 – ITS DEVICE, MISC.: UNIVERSAL TRAFFIC MANAGEMENT RADAR VEHICLE DETECTION SYSTEM" SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED PROGRAMMING, CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONNECTIONS TESTED AND ACCEPTED.

DESIGNER NOTE: NOTE T–0440 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE RADAR DETECTION IS REQUIRED.

T–0450 ITEM 804 FIBER OPTIC CABLE MEDIA CONVERTER, ETHERNET, AS PER PLAN
IN ADDITION TO THE REQUIREMENTS OF THE ODOT SUPPLEMENTAL SPECIFICATION 804, THE FIBER OPTIC MEDIA CONVERTER SHALL BE AN ENVIRONMENTALLY HARDENED, MANAGED ETHERNET SWITCH MANUFACTURED BY COMNET, MODEL CNGE3FE7MS3. IT SHALL HAVE SEVEN (7) 10/100 BASE–TX AND THREE (3) 100/1000 FX COMBO PORTS.

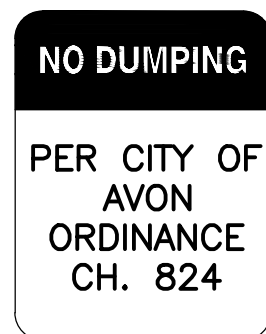
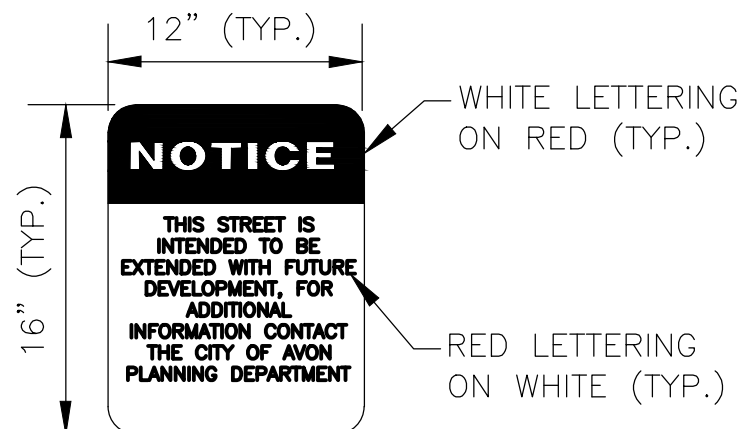
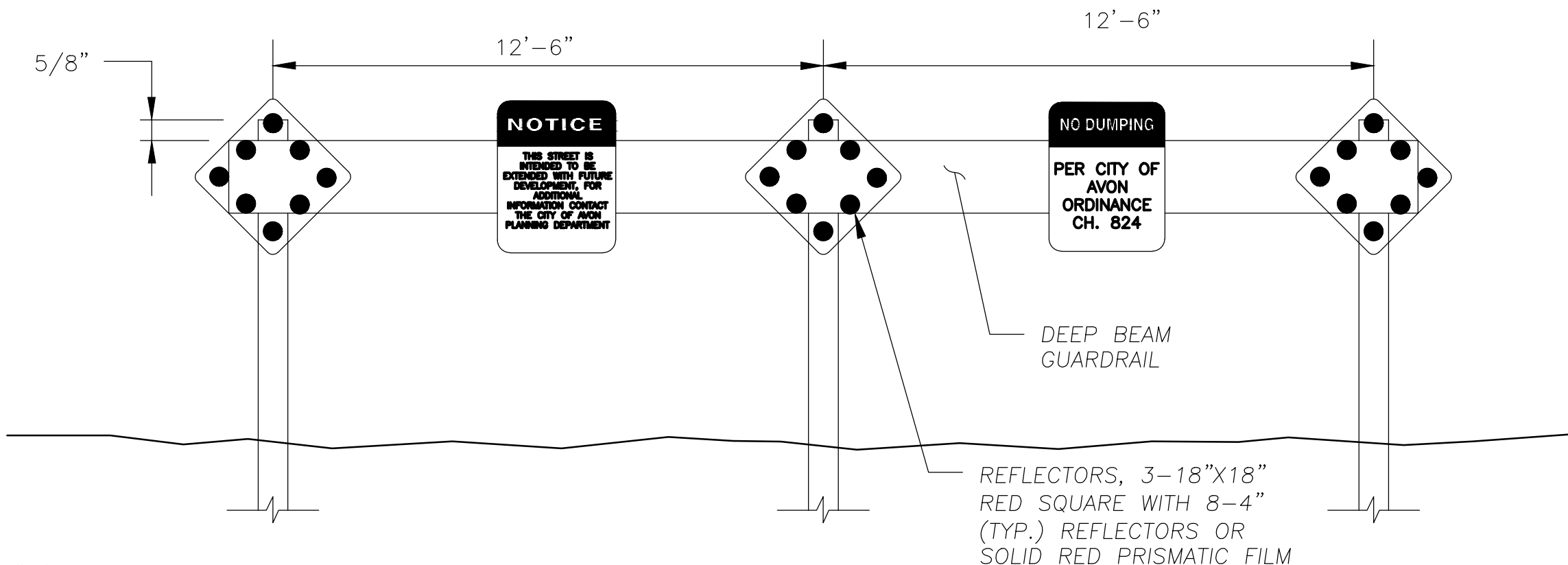
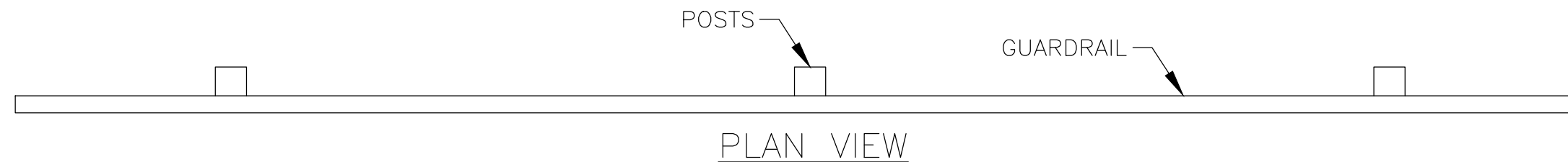
THE ETHERNET SWITCH SHALL BE USED TO CONNECT THE CONTROLLER, MMU, UPS AND OTHER PERIPHERALS TO A FIBER OPTIC INTERCONNECT SYSTEM. SUFFICIENT CAT5/6 CABLES SHALL BE FURNISHED AND INSTALLED TO MAKE THE CONNECTIONS.

PAYMENT FOR "ITEM 804 – FIBER OPTIC CABLE MEDIA CONVERTER, ETHERNET, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED PROGRAMMING, MOUNTING BRACKETS, CABLES, CONNECTIONS TESTED AND ACCEPTED.

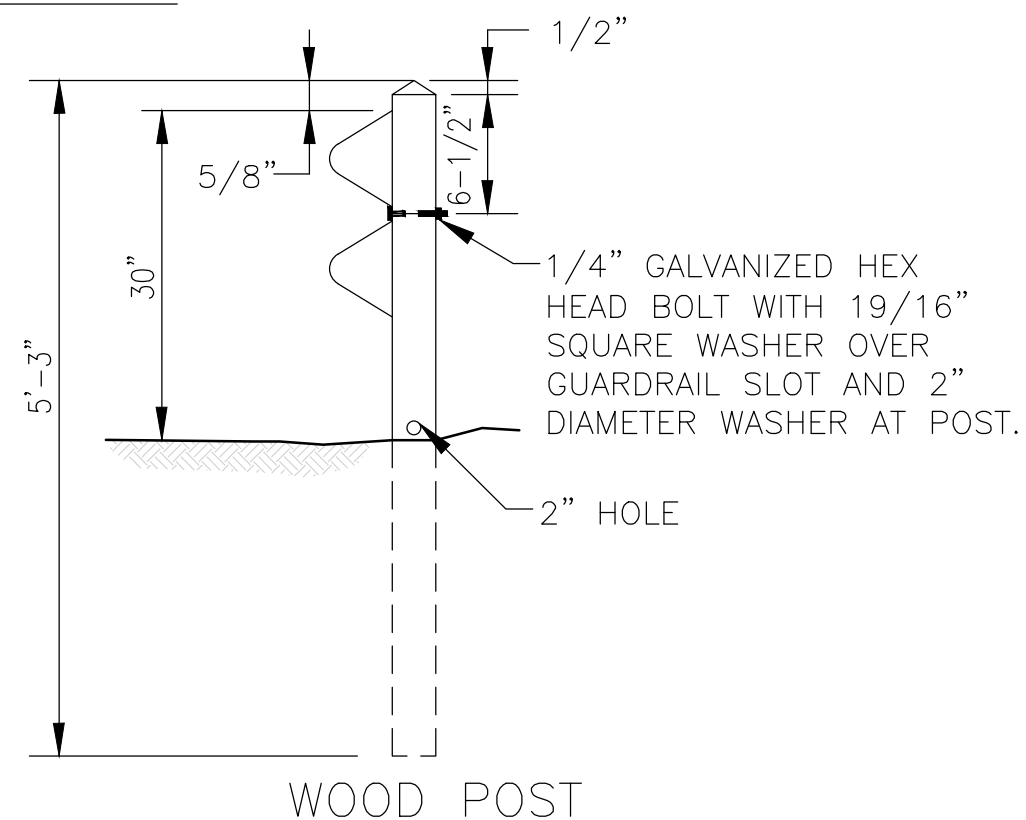
DESIGNER NOTE: NOTE T–0450 SHALL BE USED ON ALL CITY OF AVON TRAFFIC SIGNAL CONSTRUCTION PROJECTS WHERE FIBER OPTIC INTERCONNECT IS UTILIZED.

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