

FIBER OPTIC GENERAL NOTES

GENERAL NOTES:

- 1. THESE PLANS REFLECT CONDITIONS KNOWN DURING PLAN DEVELOPMENT. IN THE EVENT ACTUAL SITE PHYSICAL CONDITIONS PREVENT THE APPLICATION OR THE PROGRESSION OF ANY WORK SPECIFIED IN THESE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY AND PRIOR TO ANY FURTHER WORK ACTIVITY.
- 2. IN ORDER TO MINIMIZE IMPACT TO LANDSCAPING MATERIAL, THE CONTRACTOR SHALL EXERCISE CAUTION THROUGH LANDSCAPING LIMITS DURING ALL PHASES OF CONSTRUCTION ACTIVITY. ANY LANDSCAPE MATERIAL DAMAGED DURING THE CONSTRUCTION PROCESS SHALL BE REPLACED IN KIND AT THE CONTRACTORS EXPENSE.
- 3. CONTRACTOR SHALL COORDINATE HIS ACTIVITIES WITH ALL OTHER CONTRACTORS OPERATING WITHIN THE PROJECT AREA.
- 4. THE CONTRACTOR SHALL EXERCISE ALL APPROPRIATE SAFETY MEASURES WHEN WORKING IN OR AROUND AREAS OF OVERHEAD ELECTRICAL/TRANSMISSION LINES OR UNDERGROUND UTILITIES. HAND DIGGING SHALL BE USED AROUND ALL KNOWN AND LOCATED UTILITIES.
- 5. FLORIDA STATUTE 556 REQUIRES CONTRACTORS TO CALL SUNSHINE STATE ONE-CALL OF FLORIDA, INC., AT 1-800-432-4770, NO LESS THAN 2 OR MORE THAN 5 BUSINESS DAYS BEFORE BEGINNING ANY EXCAVATION OR DEMOLITION. NOT ALL UTILITY AGENCIES/OWNERS ARE MEMBERS OF SUNSHINE STATE ONE-CALL OF FLORIDA, INC.
- 6. THE WORK CORRIDOR SHALL BE RESTORED TO PRE-WORK CONDITIONS.
- 7. CONTRACTOR SHALL MAKE SURE THAT ALL NECESSARY PROTECTIVE MEASURES ARE TAKEN TO SAFEGUARD EXISTING UTILITIES DURING FIBER AND DUCT INSTALLATIONS.
- 8. ALL APPLICABLE PROVISIONS OF EXISTING UTILITY EASEMENTS WILL BE ADHERED TO BY THE CONTRACTOR.
- 9. THE CONTRACTOR SHALL AVOID AND/OR PROTECT ALL TREES AND ROOTS BY HAND DIGGING AS NECESSARY. ANY TREES, SHRUBS OR VEGETATION DAMAGED BY THE CONTRACTOR SHALL BE REPLACED IN KIND AT NO COST TO THE AUTHORITY.

CONDUIT:

- 1. THE BACKBONE FIBER OPTIC CONDUIT NETWORK SHALL BE MAINTAINED AT A CONSTANT HORIZONTAL AND VERTICAL LOCATION AS SHOWN IN THE ROADWAY CROSS SECTIONS OF THE ROADWAY PLANS, DRAINAGE PLANS, STRUCTURE PLANS AND OTHER PLAN COMPONENTS OF THIS PROJECT.
- 2. RAISED MARKERS INDICATING FIBER OPTIC CABLE BURIED BELOW SHALL BE INSTALLED AT EACH PULL BOX ALONG THE FIBER ROUTE AND AT ANY TURNS IN THE CONDUIT RUN.
- 3. CONDUIT RUN SHALL NOT EXCEED 270° OF BENDS OR PER MANUFACTURER RECOMMENDATIONS BETWEEN MANHOLES OR JUNCTION BOXES.
- 4. THE HDPE CONDUIT ENTERING A PROPOSED FIBER OPTIC PULLBOX SHALL NOT EXCEED 45 DEGREE ENTRY ANGLE OR PER MANUFACTURER RECOMMENDATIONS.
- 5. CONTRACTOR SHALL INSTALL MAXIMUM LAYING LENGTHS OF HDPE CONDUIT ELIMINATING CONNECTIONS OR JOINTS IN BETWEEN CONDUIT RUNS. ENGINEER'S PRIOR APPROVAL IS REQUIRED FOR ANY CONNECTIONS JOINED WITH EITHER ELECTROFUSION COUPLING OR USING ANY OTHER MANUFACTURER'S RECOMMENDATIONS.
- 6. ALL EMPTY FIBER OPTIC CONDUITS SHALL BE CAPPED AND FURNISHED WITH A PULL STRING FOR FUTURE USE. EACH CONDUIT SHALL BE PROOFED BY MANUALLY DRAGGING OR PUSHING A RIGID MANDREL AT LEAST 90% OF THE INNER DIAMETER OF THE CONDUIT. IF OBSTRUCTION IS FOUND RECORD LENGTH OF PULL TO ALLOW PROBLEM TO BE LOCATED, DUG UP, AND REPLACED. FURNISH A BORING PATH REPORT TO CITY WITHIN 7 DAYS OF COMPLETION OF EACH ±1200' BORE PATH.
- 7. MINIMUM REQUIRED CONDUIT BURY DEPTHS SHALL BE MAINTAINED WHERE CONFLICTS OCCUR WITH DRAINAGE OR OTHER UTILITIES PER THESE PLANS.
- 8. IN ACCORDANCE WITH N.E.C. IDENTIFY ALL CIRCUITS AND EQUIPMENT WITH "LAMICOID TAGS".
- 9. THE TONE WIRE FOR THE FIBER OPTIC CONDUIT RUNS SHALL BE CONNECTED TO THE GROUNDING SYSTEM IN THE FIBER OPTIC PULL BOX AND 5 FEET OF TONE WIRE SHALL BE COILED IN THE FIBER OPTIC PULL BOX. THE TONE WIRE FOR THE BACKBONE FON CONDUIT SHALL BE SPLICED CONTINUOUS IN THE PULL BOX. TONE WIRE SHALL BE PRE-INSTALLED IN ONE OF THE 4-1.25" HDPE CONDUITS.

CONDUIT (CONT.):

- 10. ALL NEW UNDERGROUND CONDUIT SHALL BE PROPERLY SEALED AT BOTH ENDS WITH APPROVED DUCT PLUGS TO PREVENT THE ENTRY OF DUST, DIRT OR MOISTURE.
- 11. ALL CONDUIT TRENCHES SHALL BE BACKFILLED COMPLETELY TO PROVIDE SAFE CROSSING BY THE END OF EACH WORKING DAY OR WHENEVER THE WORK ZONE BECOMES INACTIVE. THE CONTRACTOR SHALL NOT OPEN ANY AREA THAT CANNOT BE BACKFILLED IN THE SAME DAY/NIGHT OPERATION.
- 12. IT SHOULD BE NOTED THAT NO TEST BORINGS WERE MADE WHERE CONDUIT RUNS ARE TO BE INSTALLED BY JACKING OR TRENCHING. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE JOB SITE CONDITIONS BEFORE SUBMITTING BID PROPOSALS. THE CONTRACTOR SHALL HAND DIG THE FIRST 4' TO VERIFY POSSIBLE UTILITY CONFLICT.
- 13. DUCT RUNS SHALL BE 4 - 1.25" HDPE SDR-13.5 CONDUITS OR GREATER CONDUIT FOR BACKBONE TRUNK CABLE. TONE WIRE TO BE PRE-INSTALLED IN ONE OF THE FOUR HDPE CONDUITS. HDPE CONDUIT SHALL COMPLY WITH HSTM F2160.
- 14. TERMINATIONS INTO SERVICE LOCATIONS SHALL BE 1.5" SCH 40 PVC.
- 15. SEE AERIAL CROSSING PLANS AND DETAIL FOR ALL BRIDGE AND CANAL CROSSING REQUIREMENTS.
- 16. ALL FOUR-1.25" HDPE CONDUIT SHALL BE SHALL BE SMOOTH OUTSIDE, HAVE A RATING OF SDR-13.5 OR THICKER, RIBBED INSIDE, AND PRELUBED. ALL PVC CONDUIT RATED SCHEDULE 40 OR THICKER.

PULL BOX:

- 2. EACH FIBER OPTIC PULL BOX SHALL INCLUDE A MINIMUM OF 20 LINEAR FEET OF GROUNDING ELECTRODE AND SHALL MEET A MEASURED REISISTANCE OF 25 OHMS OR LESS. IF 25 OHMS OR LESS IS NOT OBTAINED WITH THE INITIAL 20 LINEAR FEET OF GROUNDING ELECTRODE, THEN ADDITIONAL GROUNDING ELECTRODE OR A GROUNDING ARRAY SHALL BE INSTALLED UNTIL MEASURED RESISTANCE OF 25 OHMS OR LESS IS ACHIEVED.
- 3. ALL FIBER OPTIC PULL BOXES SHALL HAVE "CITY OF CAPE CORAL FIBER OPTIC" STAMPED ON THE COVER.
- 4. ALL FIBER OPTIC MARKERS SHALL HAVE "THE CITY OF CAPE CORAL" MARKED ON THEM.
- 5. APPROXIMATE LOCATIONS OF PULL BOXES ARE SHOWN IN THE PLANS, THE NUMBER OF PULL BOXES REQUIRED IN THE CONTRACT MAY VARY. CONTRACTORS SHALL SUBMIT A FIBER OPTIC MASTER PLAN SHOWING PROPOSED LOCATIONS OF PULL BOXES FOR ENGINEERS' APPROVAL.

FIBER OPTIC CABLE (BY OTHERS):

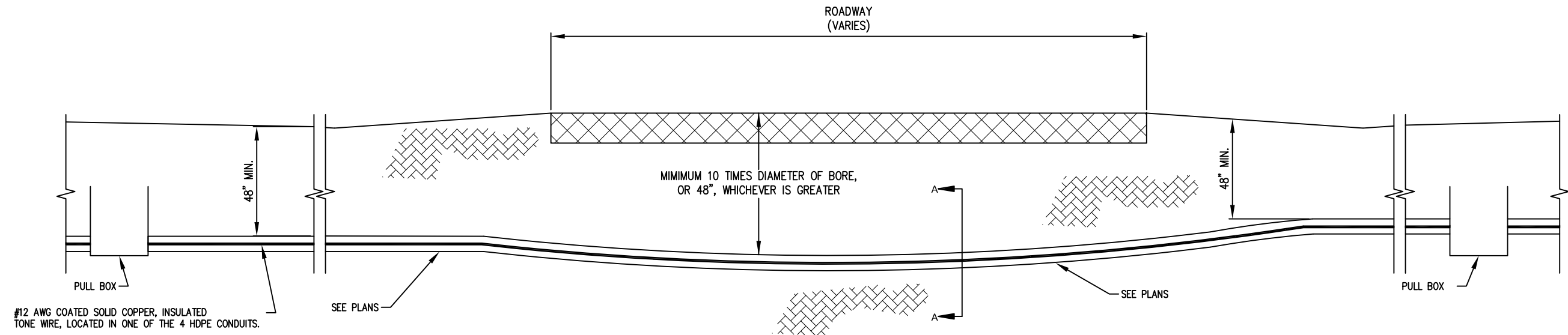
- 1. THE FIBER OPTIC CABLE INSTALLATION TECHNIQUES AND PROCEDURES SHALL BE AS SPECIFIED BY THE CABLE MANUFACTURER AND SHALL BE SUCH THAT THE OPTICAL AND MECHANICAL CHARACTERISTICS OF THE CABLES ARE NOT DEGRADED AT THE TIME OF INSTALLATION. THE CENTRAL STRENGTH MEMBER AND ARAMID YARN SHALL BE ATTACHED DIRECTLY TO THE PULLING EYE DURING CABLE PULLING. "BASKET GRIP" OR "CHINESE FINGER" TYPE ATTACHMENTS TO THE CABLE OUTER TENSILE RATING SHALL BE USED ON ALL PULLS.
- 2. ALL FIBER OPTIC CABLE INSTALLATION PROCEDURES SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY STANDARDS.
- 3. CONTRACTOR SHALL COORDINATE WITH CITY OF CAPE CORAL REPRESENTATIVE PRIOR TO DISCONNECTING ANY FIBERS AND ALL FIBER SPLICING.
- 4. UNDER NO CIRCUMSTANCES SHALL ENERGIZED CABLE BE PLACED IN THE SAME CONDUIT OR PULL BOX AS FIBER OPTIC CABLE.
- 5. FIBER RUNS SHALL BE 4-96 STRAND SINGLE MODE. FINAL RUNS TO THE LIFT STATIONS, WEIRS, PUMP STATIONS, ETC., SHALL BE 6 STRAND SINGLE MODE FROM SPLICE CABLE TO FINAL TERMINATION AT FIBER PATCH PANEL.
- 17. PROVIDE 30' SPARE FIBER IN ALL PULL BOXES AND SPLICE BOXES.

FO-401

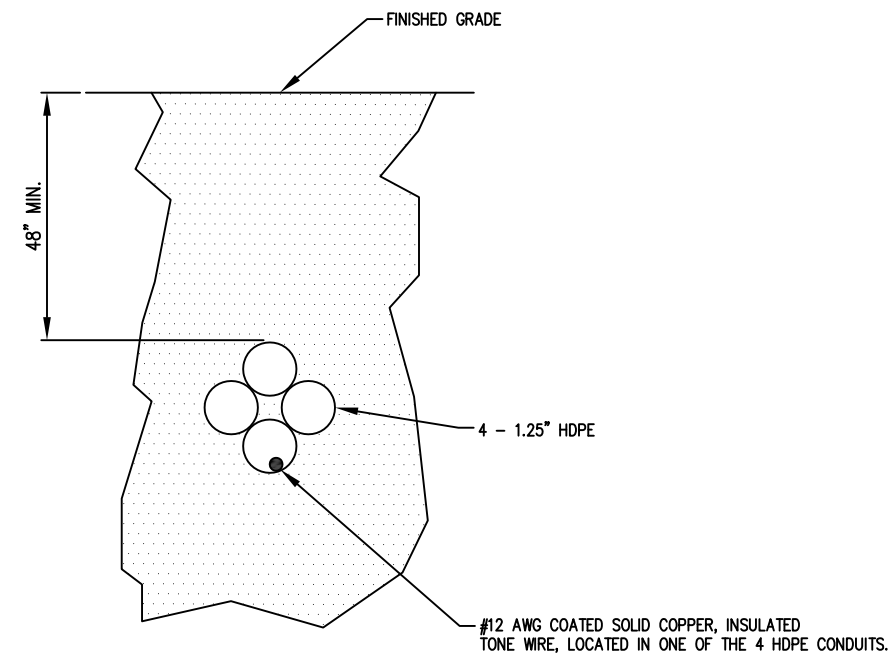
FIBER OPTICS - GENERAL NOTES

NOT TO SCALE

REVISION DATE	 <div>CITY OF CAPE CORAL UTILITIES DEPARTMENT P.O. BOX 150027 CAPE CORAL, FLORIDA 33915-0027</div>	DETAIL NAME	DETAIL NO.
07-21-2017		FIBER OPTICS - GENERAL NOTES	FO-401
ADOPTION DATE			
08-01-2017			



TYPICAL DIRECTIONAL BORE DETAIL FOR FIBER OPTIC CONDUIT



SECTION A-A

NOTES:

1. TYPICAL DETAIL SHOWN HERE FOR DIRECTION BORE WITH A ROADWAY CROSSING.
2. UTILITY IN THE PATH OF THE BORE SHALL BE LOCATED AND THE DEPTH OF THE BORE CROSSING SHALL BE DELINEATED TO CROSS UNDER OR OVER UTILITY WITH 12" MINIMUM SEPARATION.
3. ALL ENDS OF BORE SHALL BE SEALED WITH GROUT.

FO-402 **FIBER OPTIC CONDUIT DIRECTIONAL BORE**
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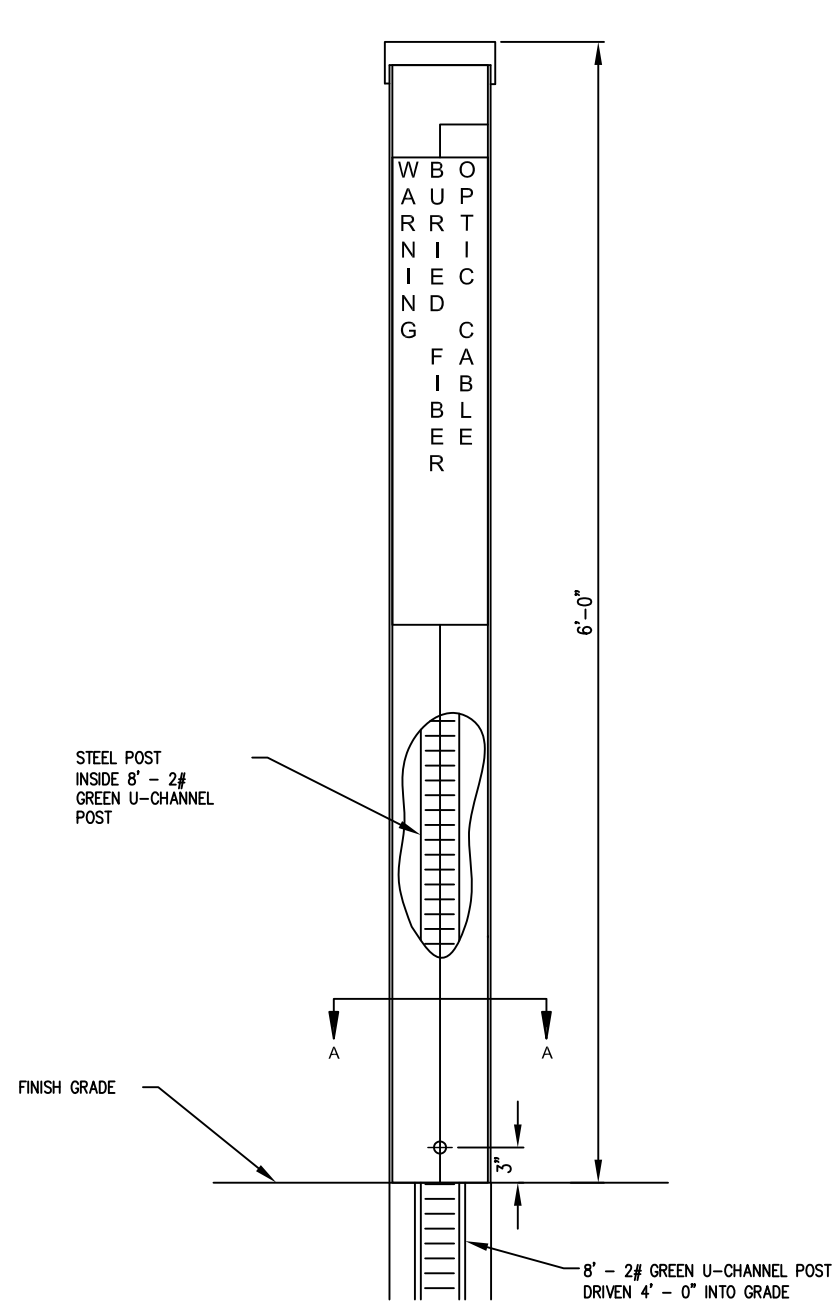
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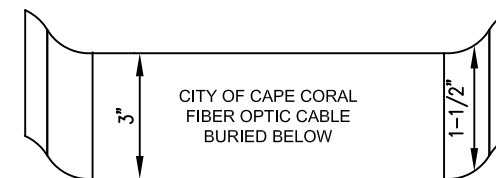
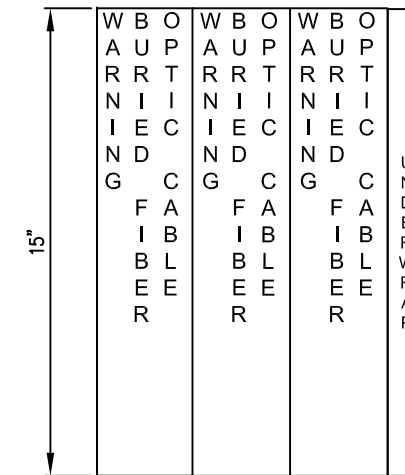
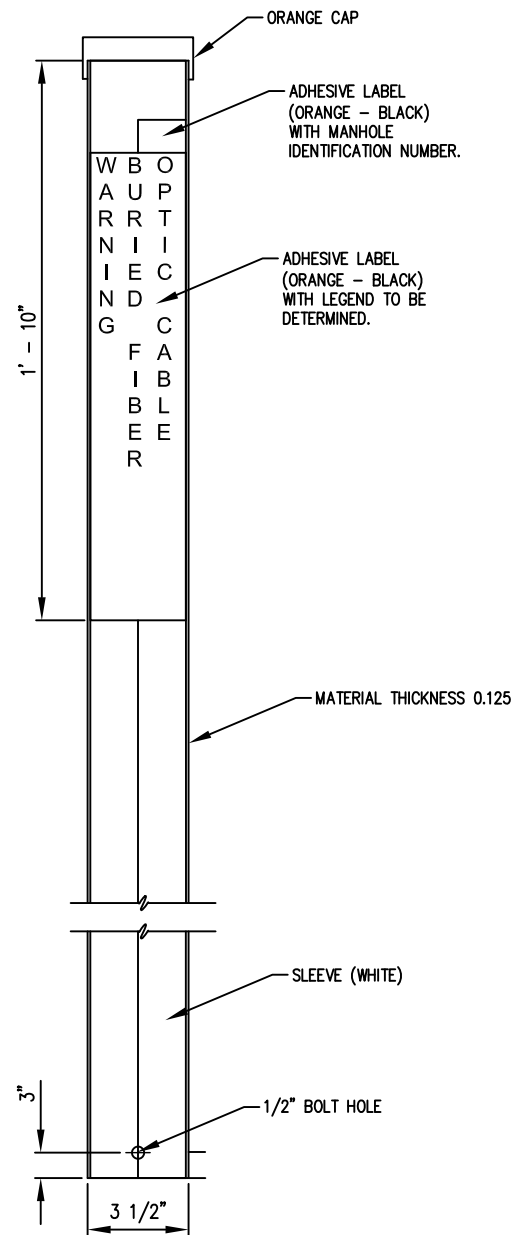
DETAIL NAME
FIBER OPTIC CONDUIT
DIRECTIONAL BORE

DETAIL NO.
FO-402



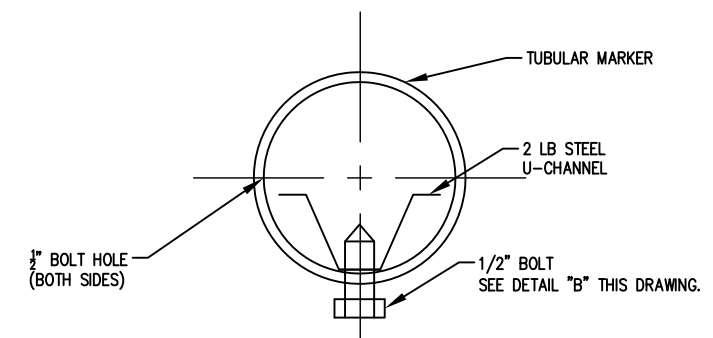
NOTES:

1. 8' - 2#/FT. GREEN STEEL U-CHANNEL POST VULCAN UTILITY SIGNS & PRODUCTS PN 0550145 OR CITY OF CAPE CORAL APPROVED EQUAL.
2. 72" H-41-RF TUBULAR ROUTE MARKER VULCAN UTILITY SIGNS & PRODUCTS PN 0300876 OR CITY OF CAPE CORAL APPROVED EQUAL.
3. ROUTE MARKER WRAP DECAL, BLACK TEXT ON ORANGE BACKGROUND, VULCAN UTILITY SIGNS & PRODUCTS PN 0900466 OR CITY OF CAPE CORAL APPROVED EQUAL.
4. RAISED MARKERS INDICATING FIBER OPTIC CABLE BURIED BELOW SHALL BE INSTALLED AT EACH PULL BOX ALONG THE FIBER ROUTE AND AT ANY TURNS IN THE CONDUIT RUN. MARKER SPACING SHALL NOT EXCEED 500FT AND AT LOCATIONS AS INDICATED IN THE SPECIFICATIONS.

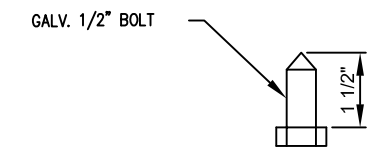


NOTES:

1. ORANGE TAPE WITH BLACK LETTERS
2. TAPE TO READ: "CITY OF CAPE CORAL FIBER OPTIC CABLE BURIED BELOW"




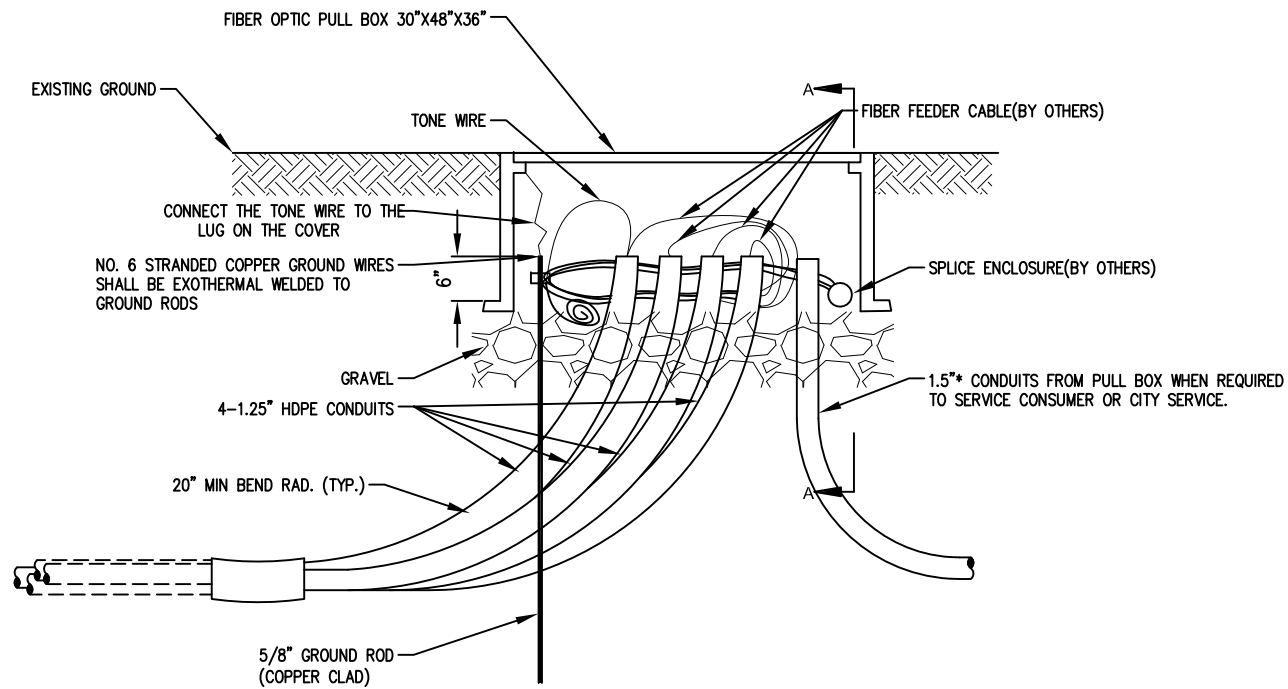
SECTION A-A



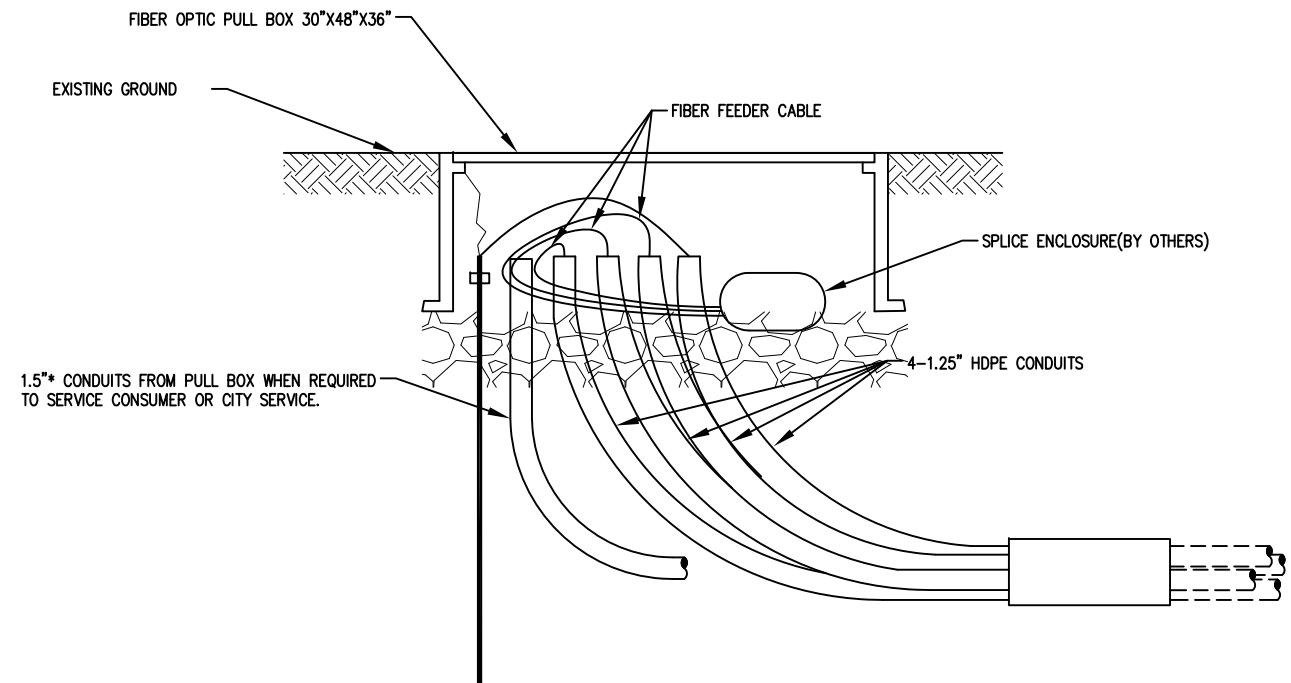
DETAIL B

FO-403 FIBER OPTIC UTILITY MARKER
NOT TO SCALE

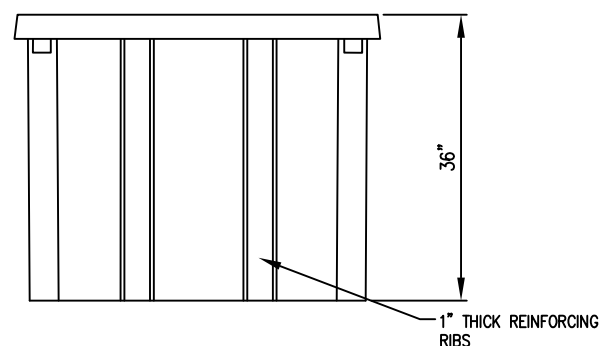
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ADOPTION DATE 08-01-2017		FIBER OPTIC UTILITY MARKER	FO-403



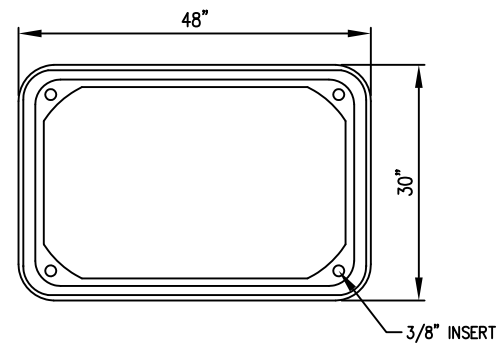
FIBER OPTIC PULL BOX DETAIL



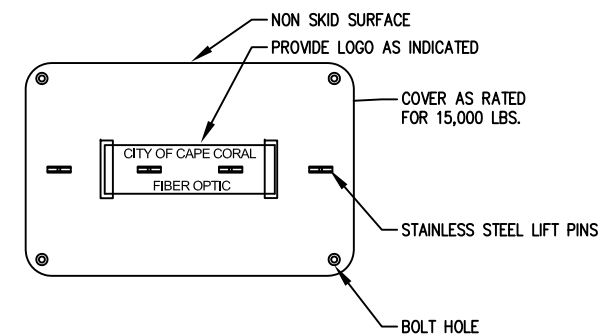
SECTION A-A



SIDE VIEW



TOP VIEW



COVER DETAIL

NOTES:

1. CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE EXISTING CONDUIT OR F.O.N. CABLE AND TONE WIRE. ANY DAMAGE SHALL BE REPLACED IN KIND AT THE CONTRACTORS EXPENSE.
2. PROVIDE 36" X 48" H-20 RATED BOX.
3. SPLICE THE TONE WIRE WITHIN BOX USING EXOTHERMAL WELDS AND 5 FEET OF TONE WIRE SHALL BE COILED IN THE PULL BOX.
4. MAINTAIN MIN FIBER OPTIC CABLE BEND RADIUS AS PER MANUFACTURER SPECIFICATION.
5. PULL BOXES INSTALLED IN SIDEWALK SHALL COMPLY WITH ADA STANDARDS.
6. PULL BOXES PARTIALLY INSTALLED IN SIDEWALK SHALL INCLUDE A CONCRETE COLLAR.

FO-404 FIBER OPTIC PULL BOX
NOT TO SCALE

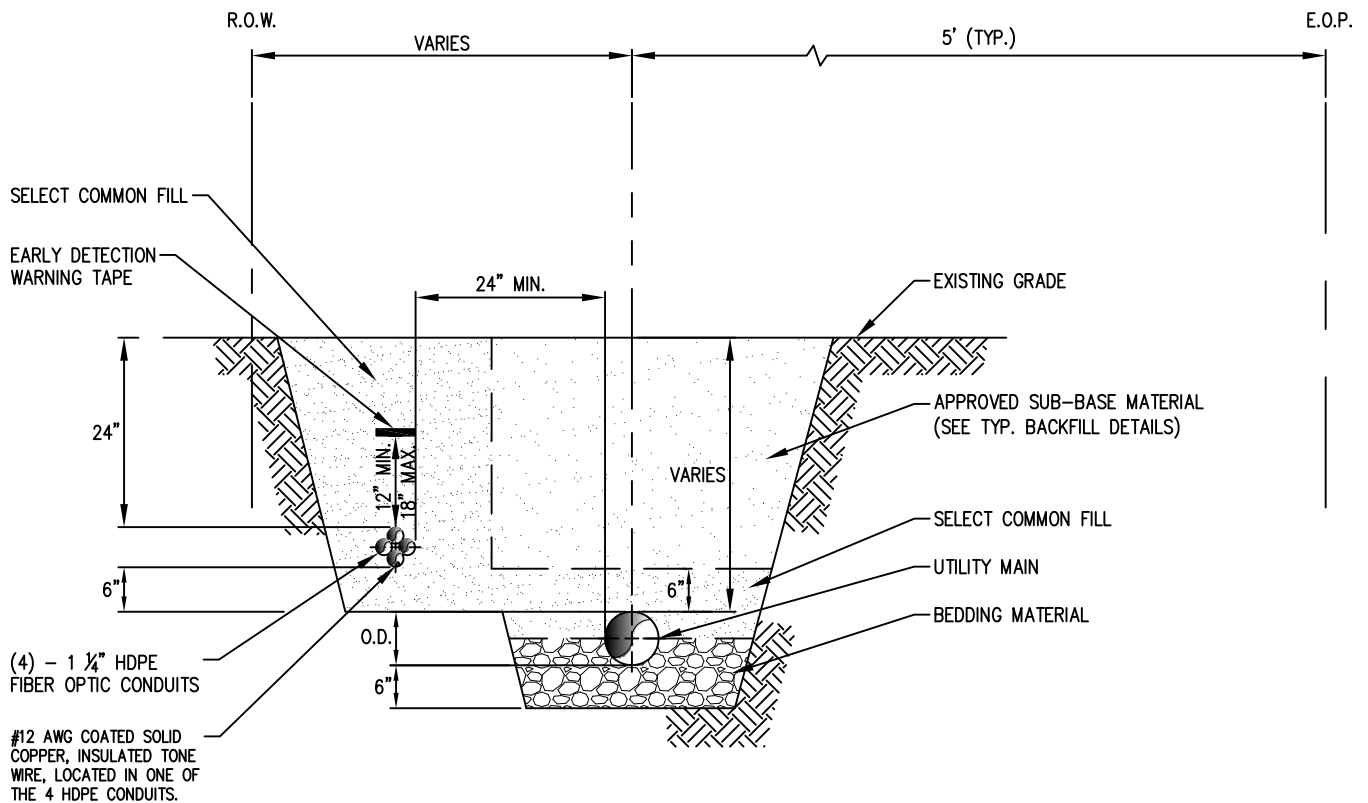
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DETAIL NAME
FIBER OPTIC PULL BOX

DETAIL NO.
FO-404



NOTES:

1. BEDDING MATERIALS SHALL BE FDOT #57 OR #89 STONE.
2. APPROVED SUB-BASE MATERIAL SHALL BE COMPACTED TO MATCH CRITERIA PROVIDED IN BACKFILL DETAILS FOR PAVED AND UNPAVED LOCATIONS RESPECTIVELY.

FO-405 **TYPICAL SECTION FIBER OPTIC CONDUIT SEPARATION FROM UTILITY MAIN**
NOT TO SCALE

FO-05

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DETAIL NAME
TYPICAL SECTION FIBER OPTIC CONDUIT SEPARATION FROM UTILITY MAIN

DETAIL NO.
FO-405