

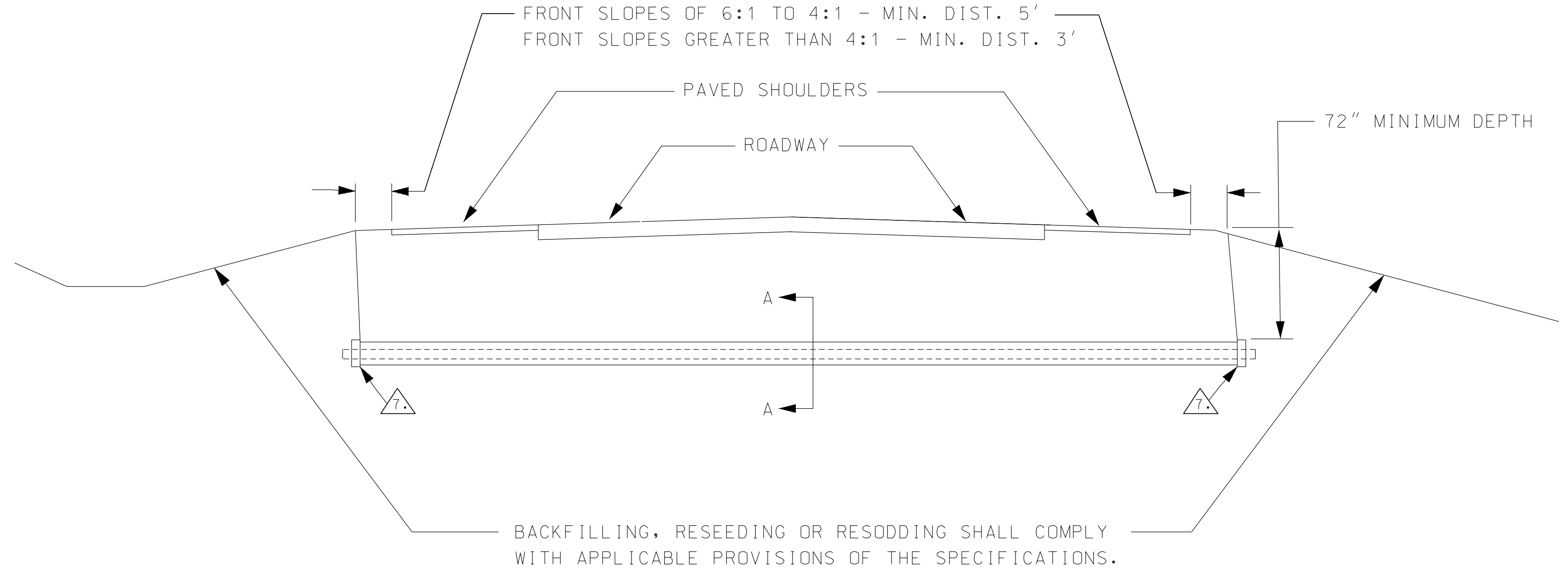
REFERENCE PROJECT NO	FISCAL YEAR	SHEET NO

NOTES:

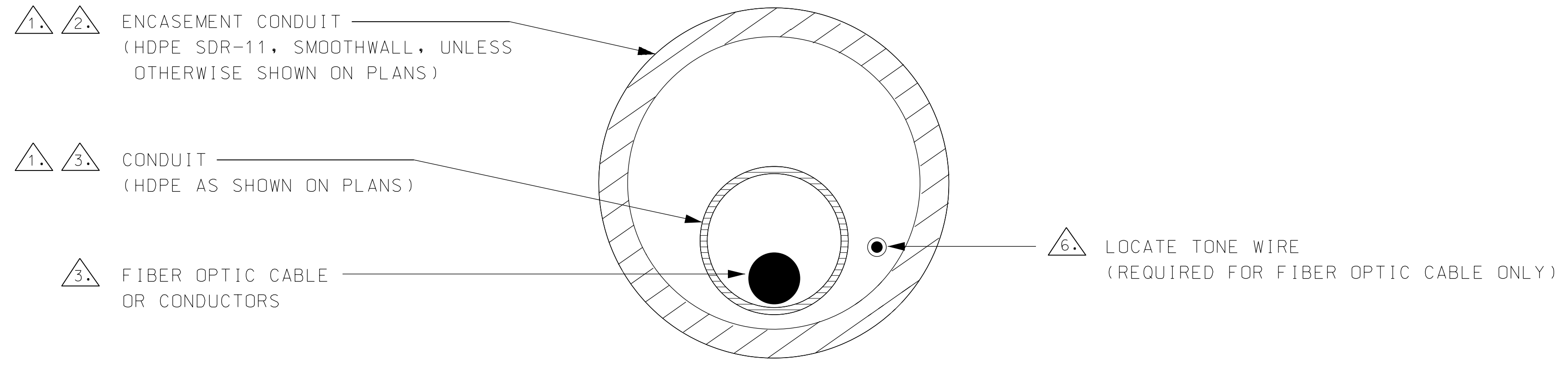
1. REFER TO SECTION 756 OF THE CURRENT ALABAMA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS. ALL CONDUIT INSIDE ENCASEMENT SHALL BE PAID FOR UNDER PAY ITEM 756.
2. NUMBER OF LINES AND SIZE OF ENCASEMENT AS SHOWN ON PLANS.
3. NUMBER AND SIZE OF CONDUITS, FIBER OPTIC CABLES, AND CONDUCTORS AS SHOWN ON PLANS.
4. ENCASEMENT UNDER RAILROAD TRACKS SHALL CONFORM TO THE REQUIREMENTS OF THAT RAILROAD.
5. UPHEAVAL IN ROADWAY SHALL NOT BE ALLOWED. DISTURBANCE OF ROADWAY PAVEMENT CAUSED BY UPHEAVAL SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE. REPAIRS SHALL BE TO THE SATISFACTION OF THE ENGINEER.
6. LOCATE TONE WIRE SHALL BE INSTALLED IN THE ENCASEMENT IN ACCORDANCE WITH ITEM 729.03(j)4 "INSTALLATION OF LOCATE TONE WIRE".
7. ALL ENDS OF ENCASEMENT SHALL BE SEALED WITH NON-SHRINK GROUT OR FOAM SEALANT.
8. UTILITY IN THE PATH OF THE BORE CROSSING SHALL BE DELINEATED TO CROSS UNDER OR OVER UTILITY WITH A 12 INCH MINIMUM SEPERATION.

ABBREVIATIONS:

MIN. - MINIMUM
 DIST. - DISTANCE
 HDPE - HIGH DENSITY POLYETHYLENE



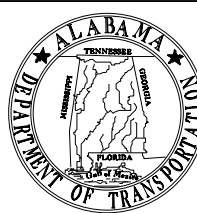
TYPE 5 INSTALLATION FOR FIBER OPTIC CABLE AND CONDUCTORS



SECTION A - A

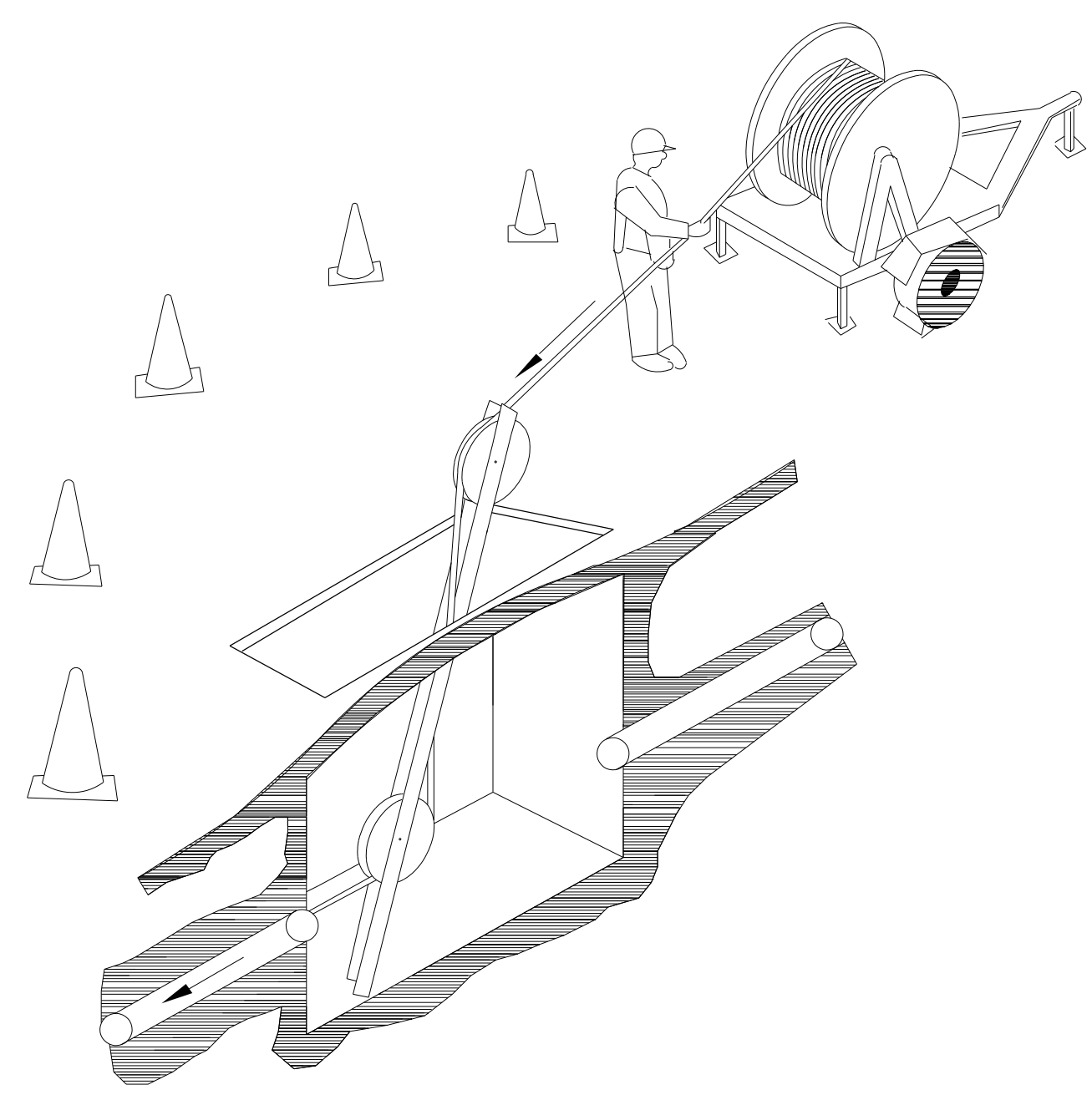
--SPECIFICATIONS--
 CURRENT ALABAMA DEPARTMENT OF TRANSPORTATION

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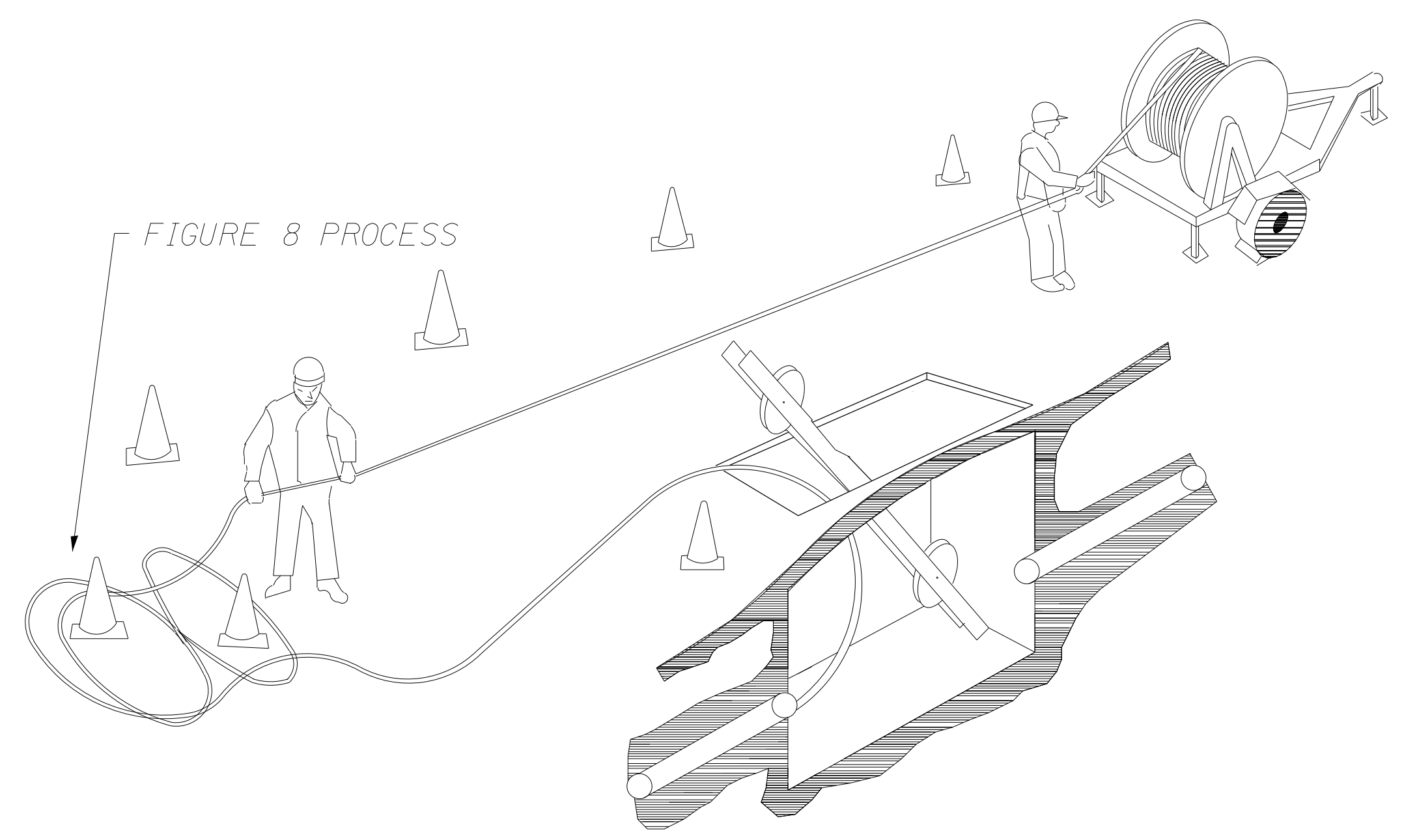
<p>REVISIONS</p> <p>10-4-2018 UPDATES DUE TO GENERAL APP/SPECIFICATIONS.</p> <p>9-10-2019 UPDATES DUE TO GENERAL APP/SPECIFICATIONS.</p>	 <p>ALABAMA DEPARTMENT OF TRANSPORTATION 1409 COLISEUM BOULEVARD MONTGOMERY, AL 36130-3050</p> <p>DESIGN BUREAU SPECIAL DRAWING</p> <p>TYPE 5 INSTALLATION FOR FIBER OPTIC CABLE AND CONDUCTORS</p>
<p>DRAWN BY: _____</p> <p>DATE DRAWN: _____</p>	
<p>SPECIAL DRAWING NO. I.T.S. - 729 - 001</p>	
<p>INDEX NO. 72901</p>	

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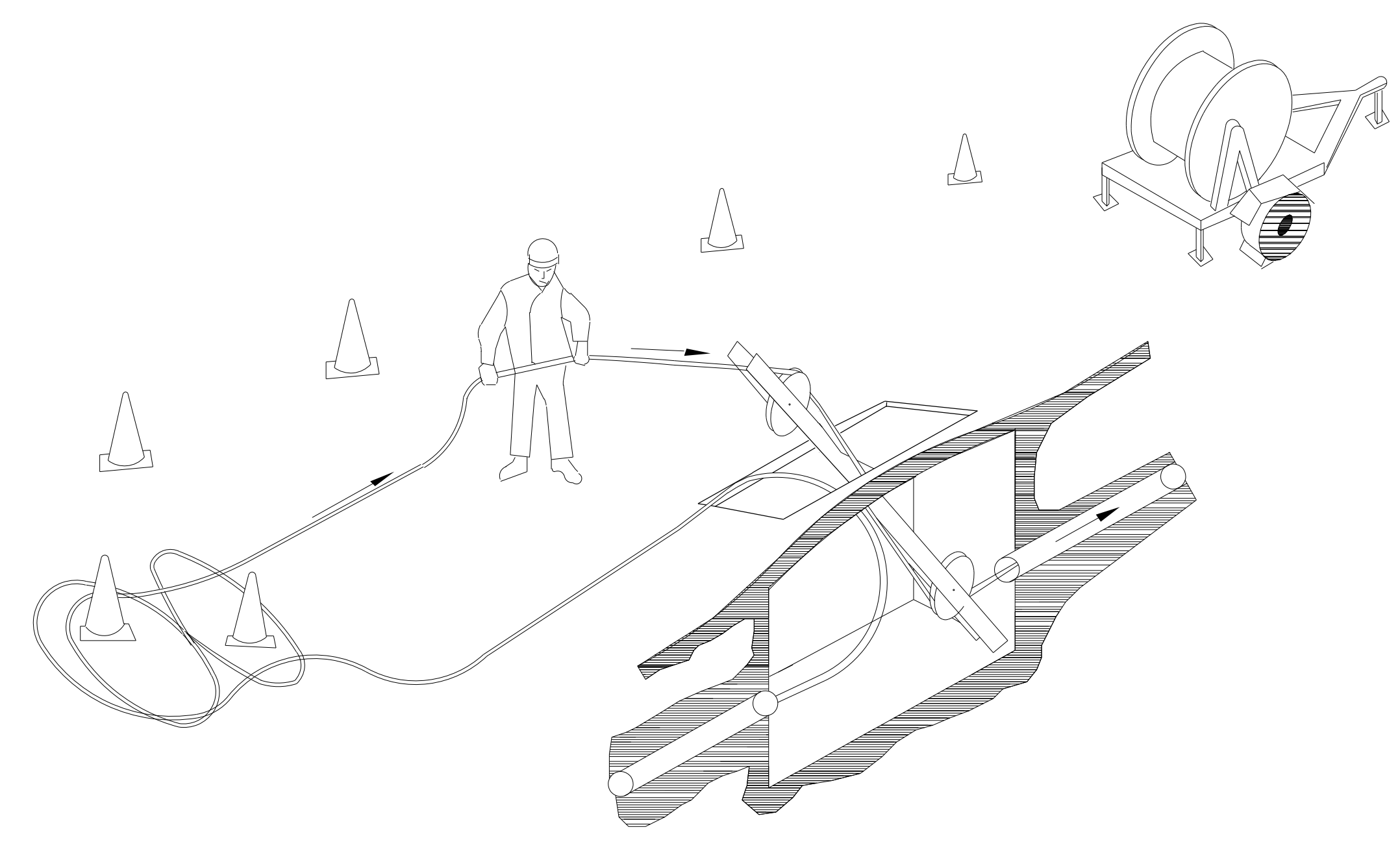
First Step of Center-pull Operation



Second Step of Unreeling Cable



Completion of Center-pull Operation



1. THE PULLING, BENDING AND CRUSHING OF FIBER OPTIC CABLE MAY CAUSE DAMAGE ALTERING THE CABLE'S CHARACTERISTICS TO THE EXTENT THAT THE CABLE SECTION SHOULD BE REPLACED. TO ENSURE ALL SPECIFICATIONS ARE MET, CONSULT THE SPECIFIC CABLE SPECIFICATION SHEET FOR THE CABLE BEING INSTALLED.
2. ALL CABLES UP TO 0.9 INCHES NOMINAL CABLE DIAMETER CAN BE INSTALLED USING A 20 INCH DIAMETER WHEEL. TABLE 1 PROVIDES COMPLETE MINIMUM BEND RADIUS INFORMATION.
3. A PULLING GRIP IS NECESSARY TO SECURE THE PULLING TO THE STRENGTH MEMBERS OF THE CABLE. PULLING GRIPS FOR RAW CABLE ENDS ARE AVAILABLE FACTORY INSTALLED, OR CAN BE EASILY FIELD INSTALLED.
4. THE USE OF A SWIVEL IS REQUIRED TO PREVENT THE PULL LINE FROM IMPARTING A TWIST TO THE CABLE AS IT IS PULLED THROUGH THE CONDUIT. A "BREAK-AWAY" SWIVEL SHALL BE REQUIRED WHEN PULLING MACHINERY IS BEING USED. SWIVEL SHALL BE SET AT A MAX. OF 600 LBS.

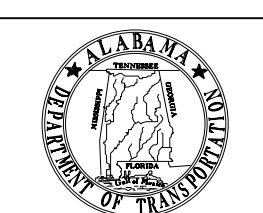
5. IT IS RECOMMENDED THAT MECHANICAL PULLING EQUIPMENT BE UTILIZED ON ALL PULLS UP TO 2,000 FEET. ALL PULLS IN EXCESS OF 2000 FEET SHALL BE REQUIRED TO BE BLOWN. HAND PULLS SHALL ONLY BE ALLOWED WHEN TOTAL LENGTH OF PULL IS A MAXIMUM LENGTH OF 550 FEET.
6. THE FOLLOWING BEND RADIUS SHALL BE MAINTAINED AT ALL TIMES:

TABLE 1

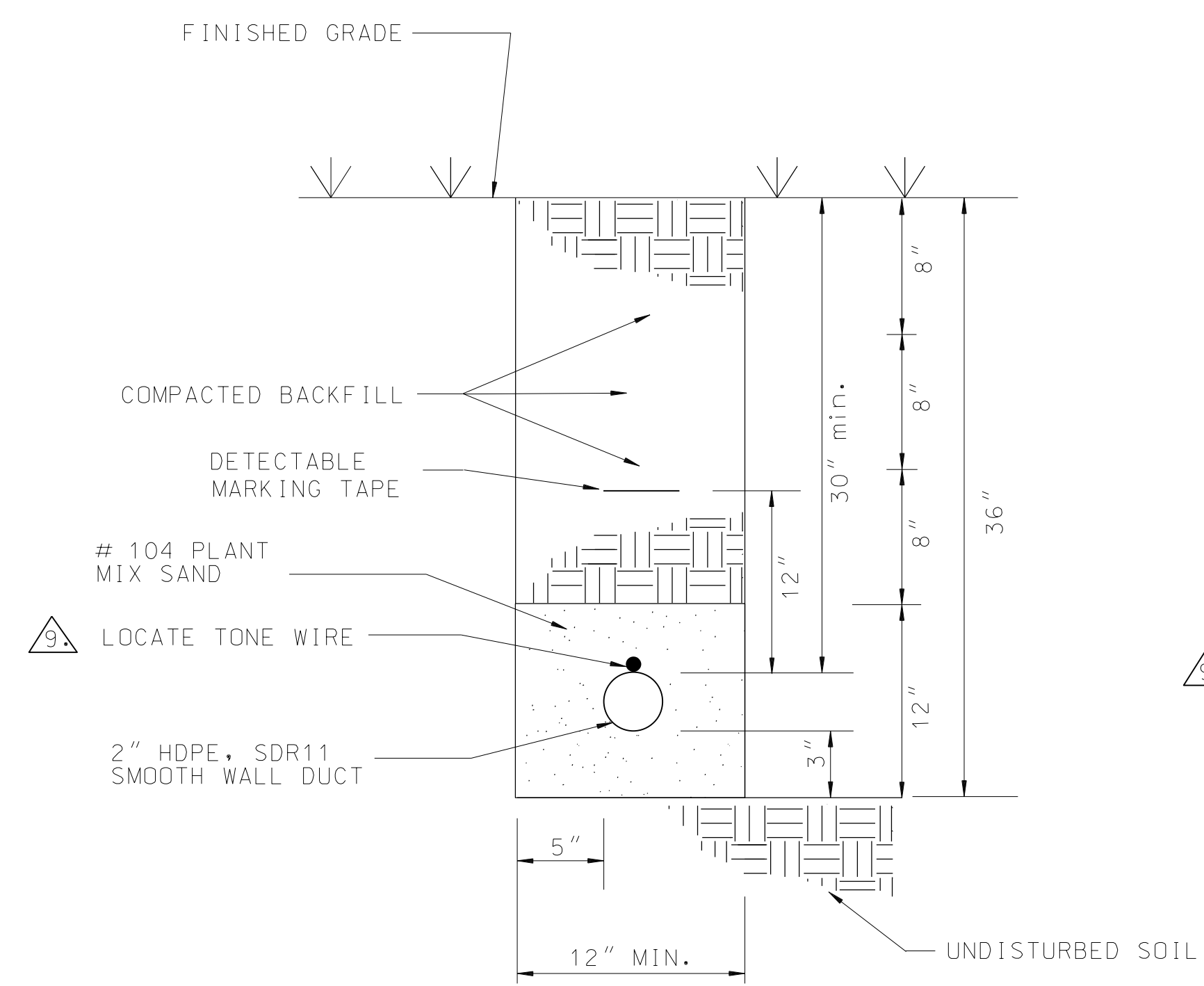
NOMINAL CABLE DIAMETER inches	MINIMUM BEND RADIUS (NO TENSION) INSTALLED inches	MINIMUM BEND RADIUS (UNDER TENSION) inches
1/4 - 3/8	4.0	6.0
4/10 - 6/10	6.0	9.0
5/8 - 8/10	8.0	10.0
13/16 - 9/10	9.0	10.0
15/16 - 1.0	10.0	12.0

--SPECIFICATIONS--
CURRENT ALABAMA DEPARTMENT OF TRANSPORTATION

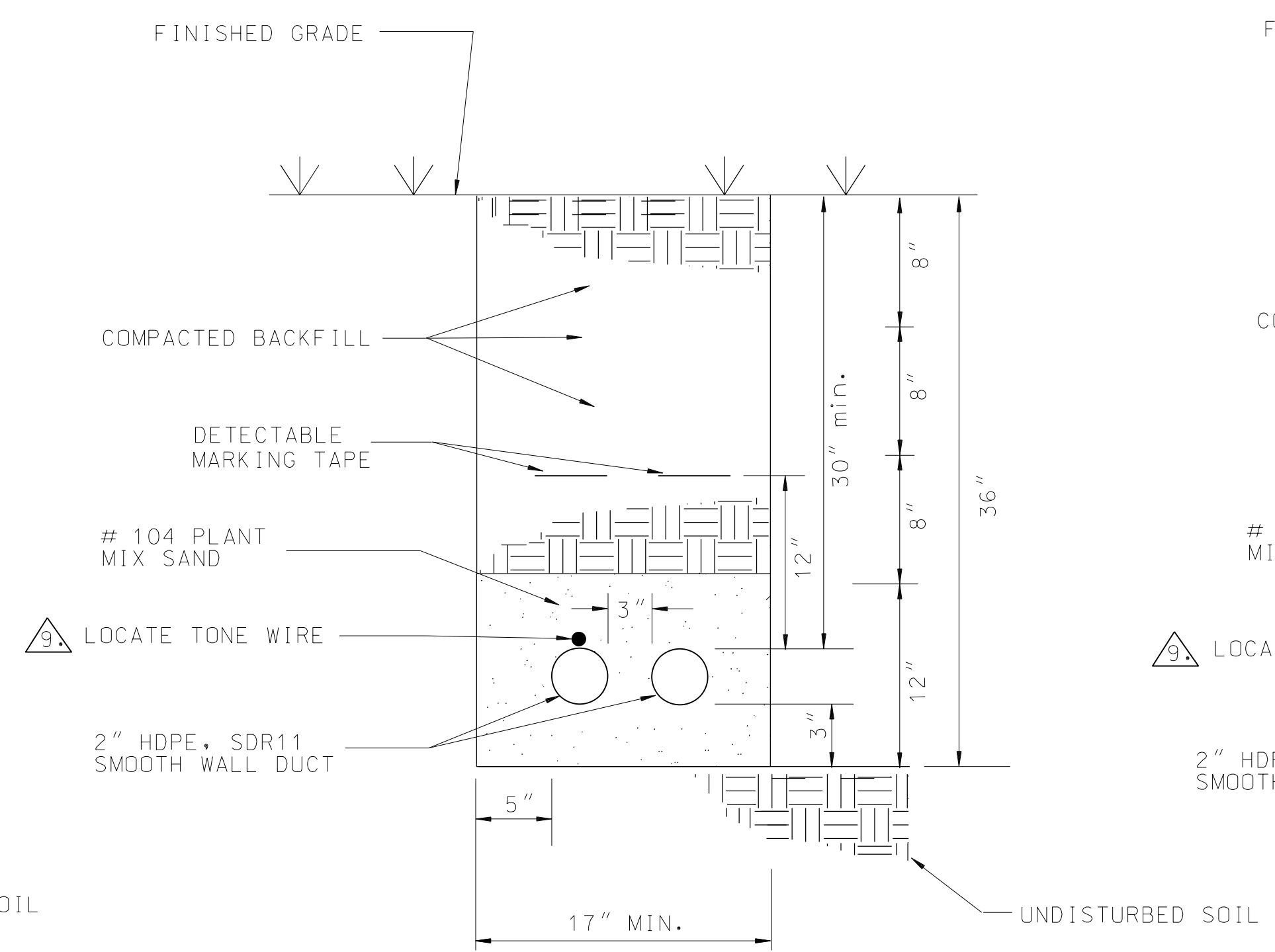
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<p>REVISIONS</p> <p>10-4-2018 UPDATES DUE TO GENERAL APP/SPECIFICATIONS.</p>	 <p>ALABAMA DEPARTMENT OF TRANSPORTATION 1409 COLISEUM BOULEVARD MONTGOMERY, AL 36130-3050</p> <p>DESIGN BUREAU SPECIAL DRAWING</p> <p>FIBER OPTIC CABLE PULLING OPERATION</p>	<p>SPECIAL DRAWING NO.</p> <p>I.T.S. - 729 - 002</p>	<p>INDEX NO.</p> <p>72904</p>
<p>DRAWN BY: _____</p> <p>DATE DRAWN: _____</p>			

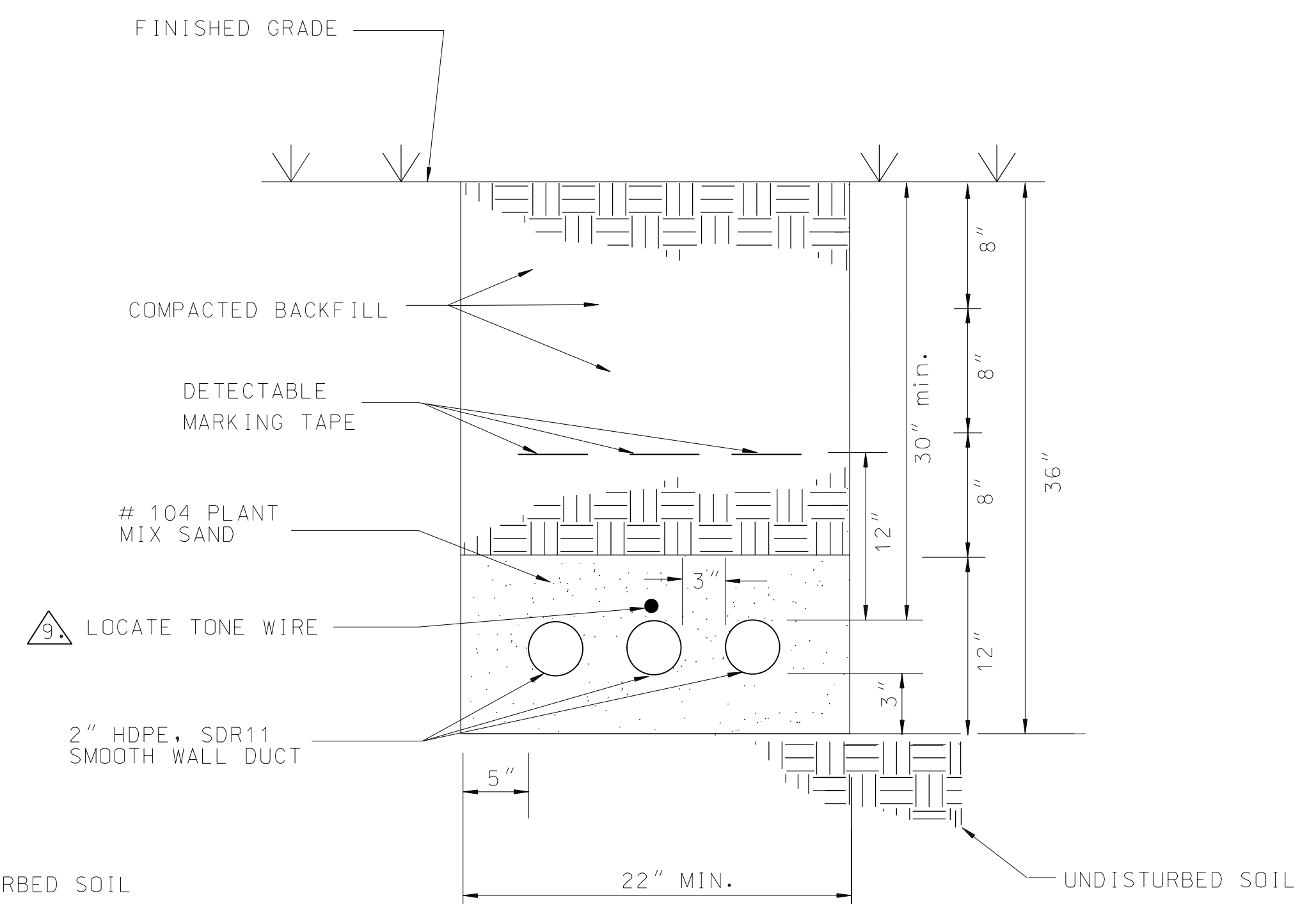
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1 LINE TYPE 1 INSTALLATION



2 LINES TYPE 1 INSTALLATION



3 LINES TYPE 1 INSTALLATION

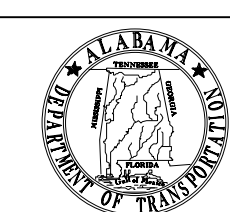
GENERAL NOTES:

1. BOTTOM OF TRENCH SHALL BE CLEAN, SMOOTH, AND FREE OF ROCKS AND DEBRIS. A THREE INCH (3") LAYER OF SAND SHALL BE PLACED IN THE BOTTOM OF THE TRENCH PRIOR TO PLACING HDPE DUCT, AS SHOWN ON THE PLANS.
2. THE CONTRACTOR SHALL INFORM THE PROJECT MANAGER AFTER TRENCH HAS BEEN EXCAVATED AND PRIOR TO PLACING THE BOTTOM LAYER OF SAND IN BOTTOM OF TRENCH. THE PROJECT MANAGER SHALL VISUALLY INSPECT ALL TRENCHES TO INSURE TRENCH BOTTOMS ARE FREE OF ROCKS AND DEBRIS PRIOR TO PLACING THE FIRST LAYER OF BEDDING SAND.
3. HDPE DUCT SHALL BE ANCHORED ON ONE END AND PULLED AT THE OTHER END WITH A FORCE OF 1520 POUNDS. HDPE SHALL BE PLACED STRAIGHT, AS POSSIBLE, IN THE TRENCH WITH NO BENDS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE AND BORNE THE COST FOR REPLACING DUCT AND CABLE DAMAGED AS A RESULT OF IMPROPER BACKFILLING.

5. SURFACE SHALL BE RESTORED TO AS NEAR ORIGINAL CONDITIONS, TO THE SATISFACTION OF THE ENGINEER. THE CONTRACTOR SHALL USE SEEDING MIX AS PER ALDOT STANDARD SPECIFICATIONS.
 6. HDPE SHALL BE SEALED WITH DUCT SEALER ONCE CABLE IS INSTALLED.
 7. NO. 104 PLANT MIX SAND SHOULD HAVE A GRADATION OF 100% PASSING A 3/8" AND 0-12% PASSING A NO. 200. THE TOTAL DELETERIOUS SUBSTANCES 3.0% MAXIMUM (SHALE, COAL, CLAY LUMPS, LOAM). IT SHALL CONSIST OF HARD TOUGH GRAIN, FREE FROM INJURIOUS AMOUNTS OF CLAY, LOAM, OR OTHER DELETERIOUS SUBSTANCES.
 8. ALL CONDUCTIVE CABLES SHALL BE BURIED A MINIMUM OF 12 INCHES FROM FIBER OPTIC CABLES.
9. LOCATE TONE WIRE SHALL BE INSTALLED AS SHOWN OR AS ALLOWED IN ACCORDANCE WITH ITEM 729.03(j)4 "INSTALLATION OF LOCATE TONE WIRE".

--SPECIFICATIONS--
CURRENT ALABAMA DEPARTMENT OF TRANSPORTATION

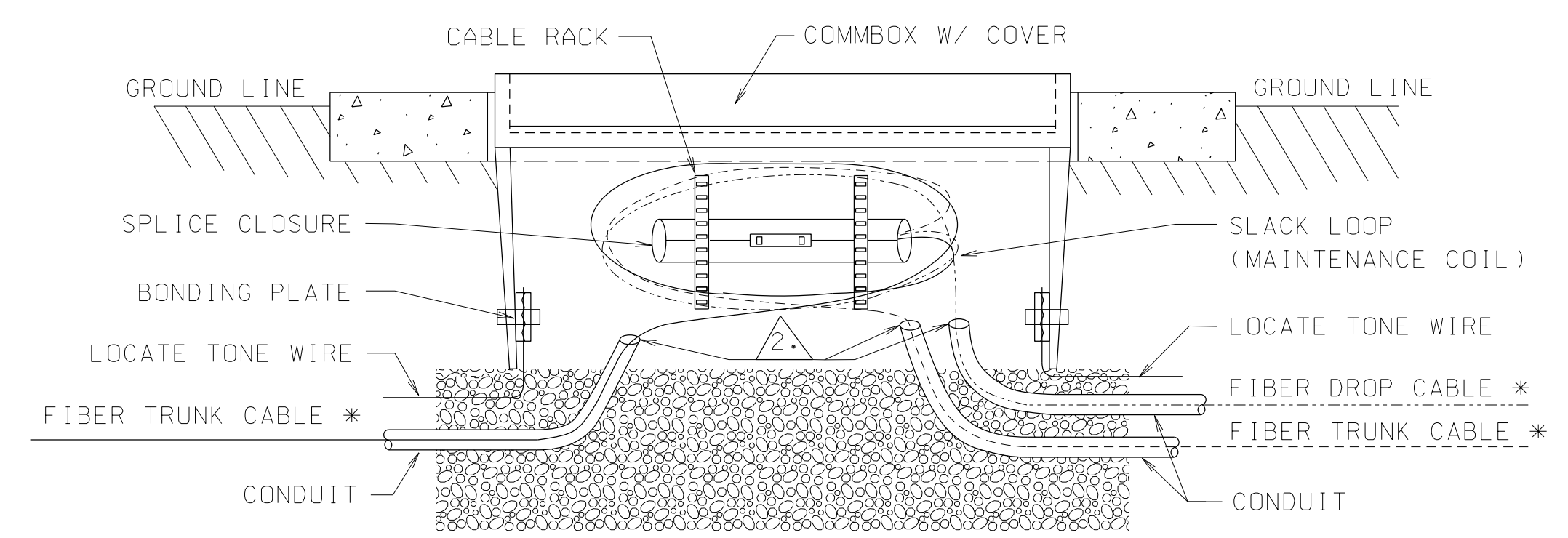
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<p>REVISIONS</p> <p>9-10-2019 UPDATES DUE TO GENERAL APP/SPECIFICATIONS.</p>	 <p>ALABAMA DEPARTMENT OF TRANSPORTATION 1409 COLISEUM BOULEVARD MONTGOMERY, AL 36130-3050</p>	<p>DESIGN BUREAU SPECIAL DRAWING</p> <p>OPEN TRENCH CONSTRUCTION FOR FIBER OPTIC CABLE</p>
<p>DRAWN BY: _____</p> <p>DATE DRAWN: _____</p>		

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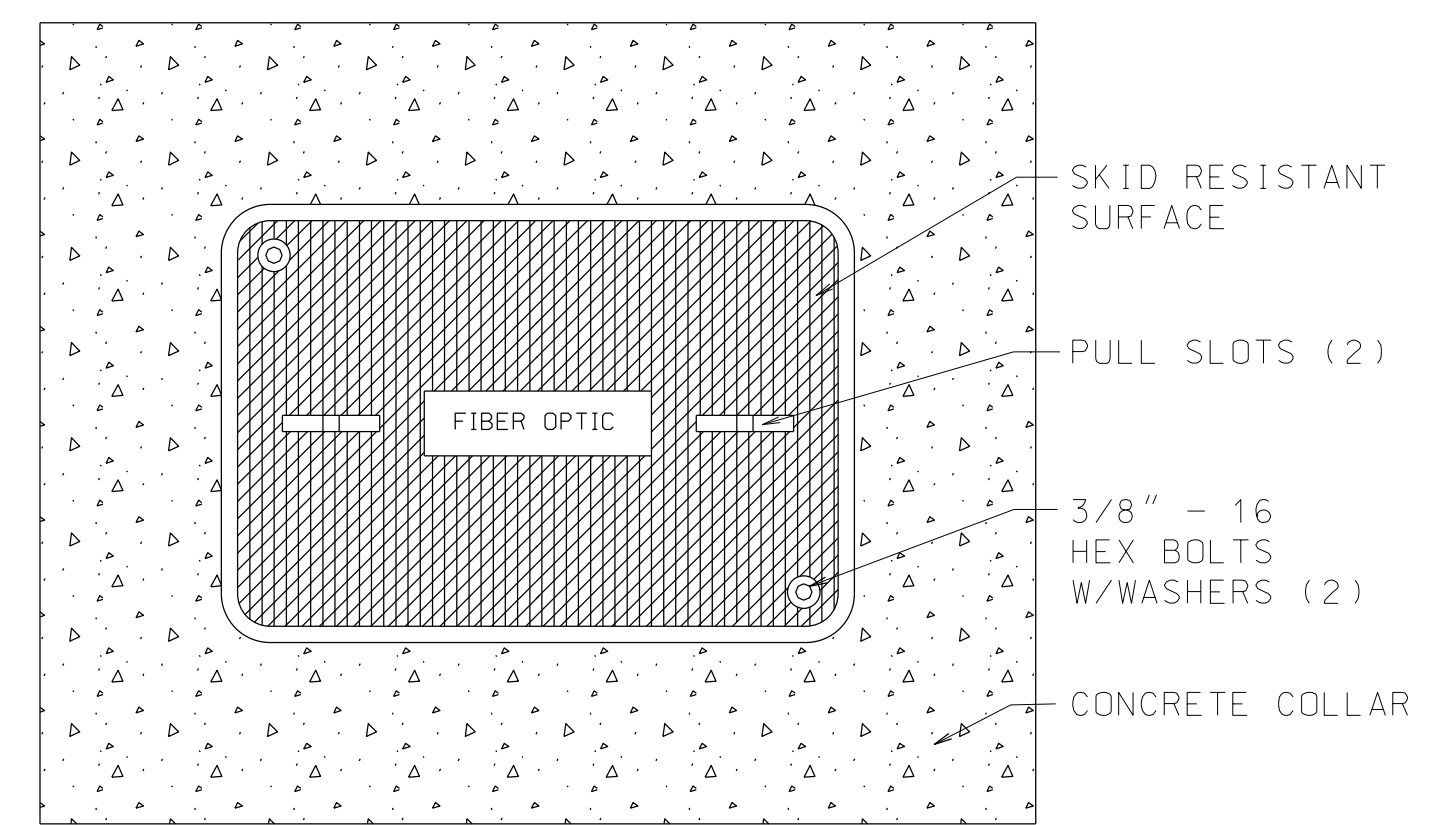
DETAIL: CABLE RACK INSTALLATION

- NOTES:
1. COMMBOX SHALL BE DEFINED TO INCLUDE (1) HEAVY DUTY COVER, (1) OPEN BOTTOMED BOX, AND (1) CABLE RACK. THE COMMBOX SHALL FIT TOGETHER SO THAT THE COVER FITS ON TOP OF THE OPEN BOTTOMED BOX. THE CABLE RACK SHALL BE INSTALLED BY MANUFACTURER PRIOR TO DELIVERY OF COMMBOX.
 2. ALL CONDUIT SHALL BE TURNED UP THROUGH GRAVEL BASE, SO THAT IT EXTENDS THREE (3) INCHES ABOVE THE BOTTOM OF THE BOX. ALL ENDS OF THE CONDUIT WITHIN COMMBOX SHALL BE SEALED USING WATER-BLOCKING POLYURETHANE MATERIAL. THE RADIUS OF THE CONDUIT TURNS SHALL NOT EXCEED THE BENDING RADIUS OF THE FIBER OPTIC CABLE.
 3. IF REQUIRED AND UPON APPROVAL OF THE ENGINEER, HOLES DRILLED IN COMMBOX WALLS MUST NOT BE MORE THAN 1/4 INCH LARGER THAN CONDUIT DIAMETER TO BE INSTALLED. THESE COMMBOX WALL ENTRIES SHALL BE SEALED IN ACCORDANCE WITH THE SPECIFICATIONS.
 4. CABLE RACK SHALL BE CENTERED ON ONE WALL OF COMMBOX AND A MINIMUM OF 6 INCHES FROM THE TOP.
 5. ALL SLACK LOOP SHALL BE LOOSELY STRAPPED TO THE CABLE RACK USING A NON-METALLIC MATERIAL.

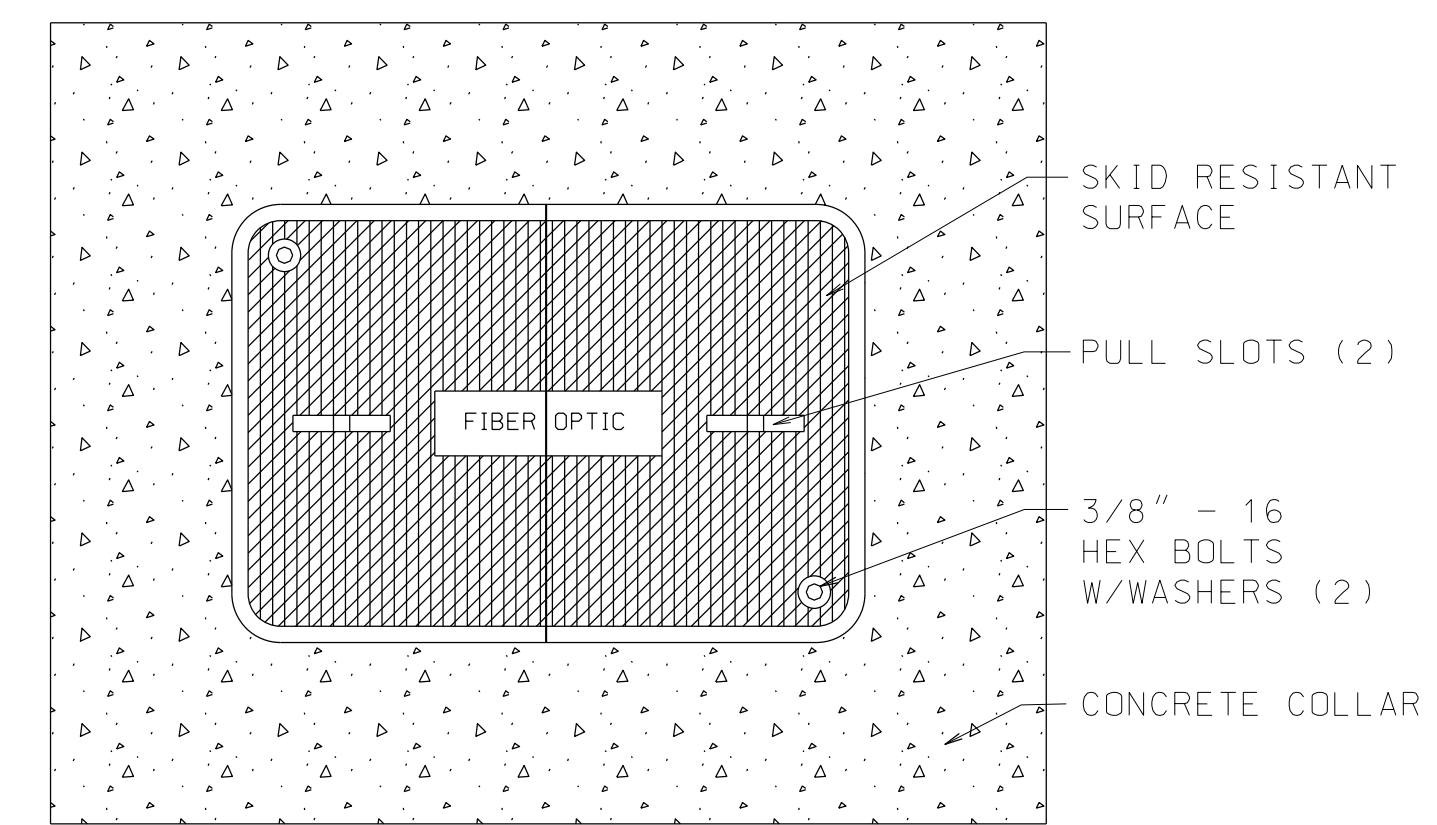


* NOTE: FIBER TRUNK AND DROP CABLE(S) AS REQUIRED ON PLAN LAYOUT

COMMBOX TYPE F1



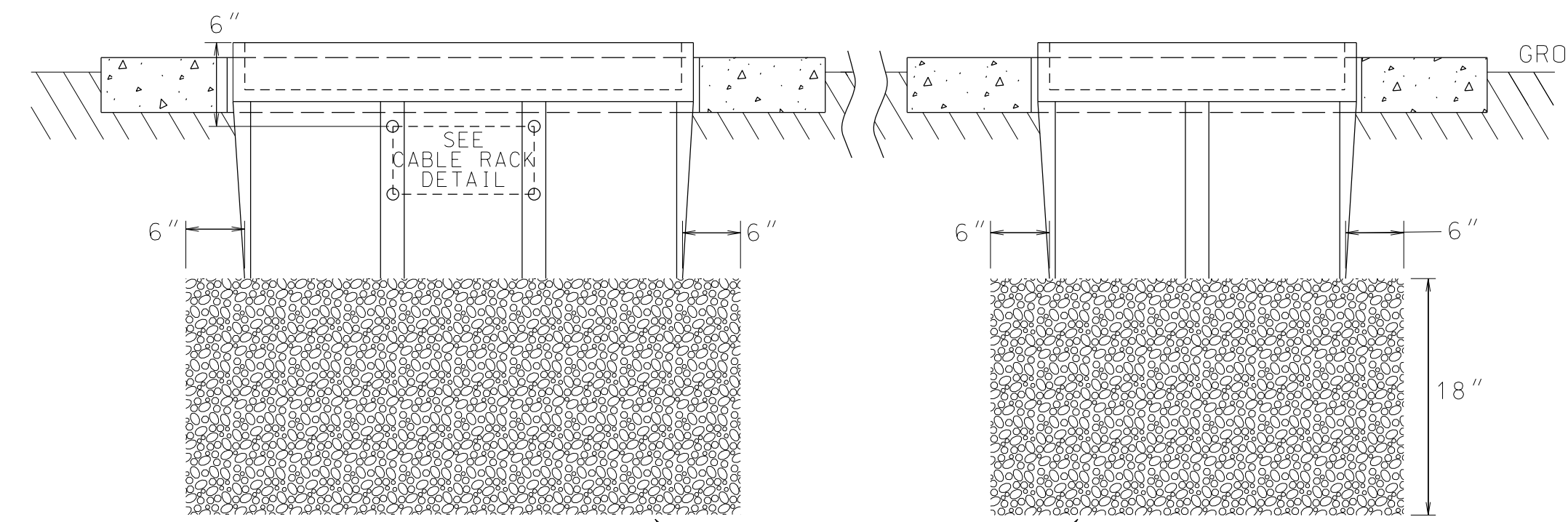
COMMBOX TYPE F2



FOUR STEP PROCEDURE FOR INSTALLING COMMBOX:

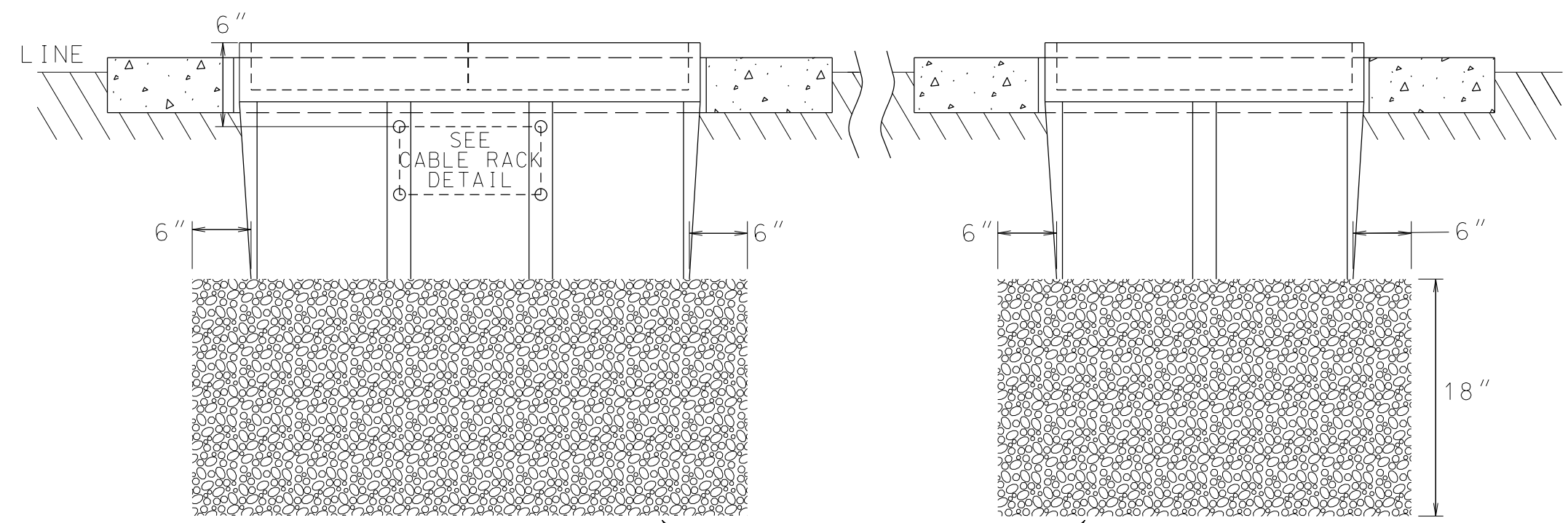
1. PREPARE THE EXCAVATION A MINIMUM OF 18 INCHES DEEPER THAN THE DEPTH OF THE COMMBOX, UNLESS SHOWN OTHERWISE ON THE PLANS. ADD A MINIMUM 18 INCHES OF CRUSHED AGGREGATE FOR DRAINAGE AS REQUIRED TO BRING THE TOP OF THE BOX TO FINISHED GRADE LEVEL.
2. PLACE COMMBOX IN HOLE AND TOP OF THE COMMBOX FLUSH WITH THE SURROUNDING GRADE OR SET AT THE PLANNED FINISHED GRADE.
3. WHILE COMMBOX COVER IS IN PLACE, FILL AND COMPACT SOIL SURROUNDING THE COMMBOX TO GRADE LEVEL.
4. INSTALL CONCRETE COLLAR AROUND THE FINAL LOCATED COMMBOX IN ACCORDANCE WITH THE SPECIFICATIONS.

NOTE:
IF GRADE LEVEL IS RAISED LATER, THE COMMBOX CAN BE PULLED UP AND BRICKED AT THE BOTTOM WITH ONE BRICK PER SIDE (FOUR). THE CAVITY PRODUCED BY THIS RAISING SHALL BE ELIMINATED BY THE ADDITION OF CRUSHED AGGREGATE.



COMMBOX TYPE F1 (NOMINAL: 24" X 36" X 30")

- 1 - HEAVY DUTY COVER (1 PIECE)
- 1 - OPEN BOTTOMED BOX
- 1 - CABLE RACK



COMMBOX TYPE F2 (NOMINAL: 30" X 48" X 36")

- 1 - HEAVY DUTY COVER (2 PIECES)
- 1 - OPEN BOTTOMED BOX
- 1 - CABLE RACK

--SPECIFICATIONS--
CURRENT ALABAMA DEPARTMENT OF TRANSPORTATION

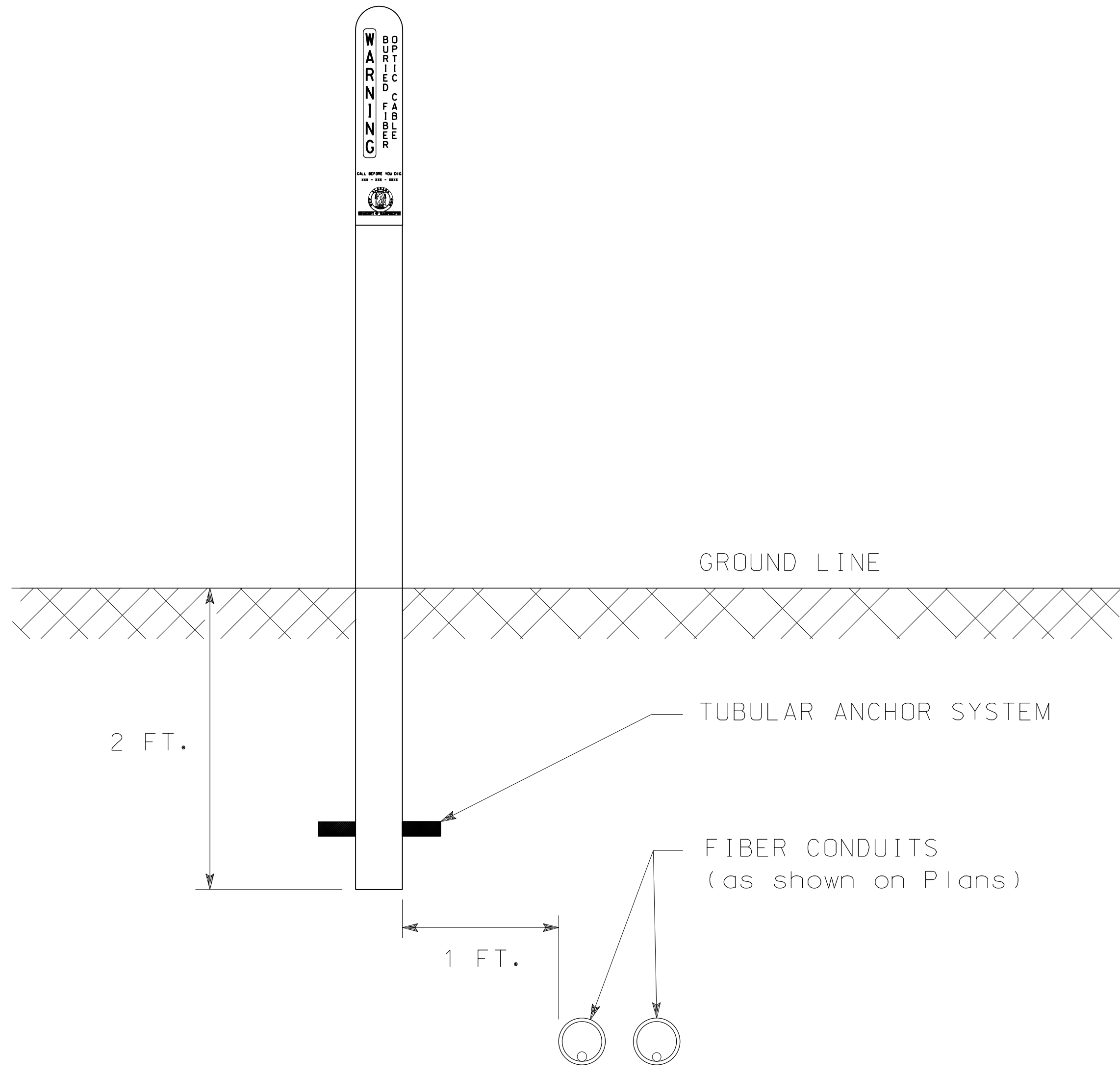
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<p>DRAWN BY: _____</p> <p>DATE DRAWN: _____</p>	<p align="center">SPECIAL DRAWING NO.</p> <p align="center">I.T.S. - 729 - 005</p> <p align="right">INDEX NO. 72913</p>

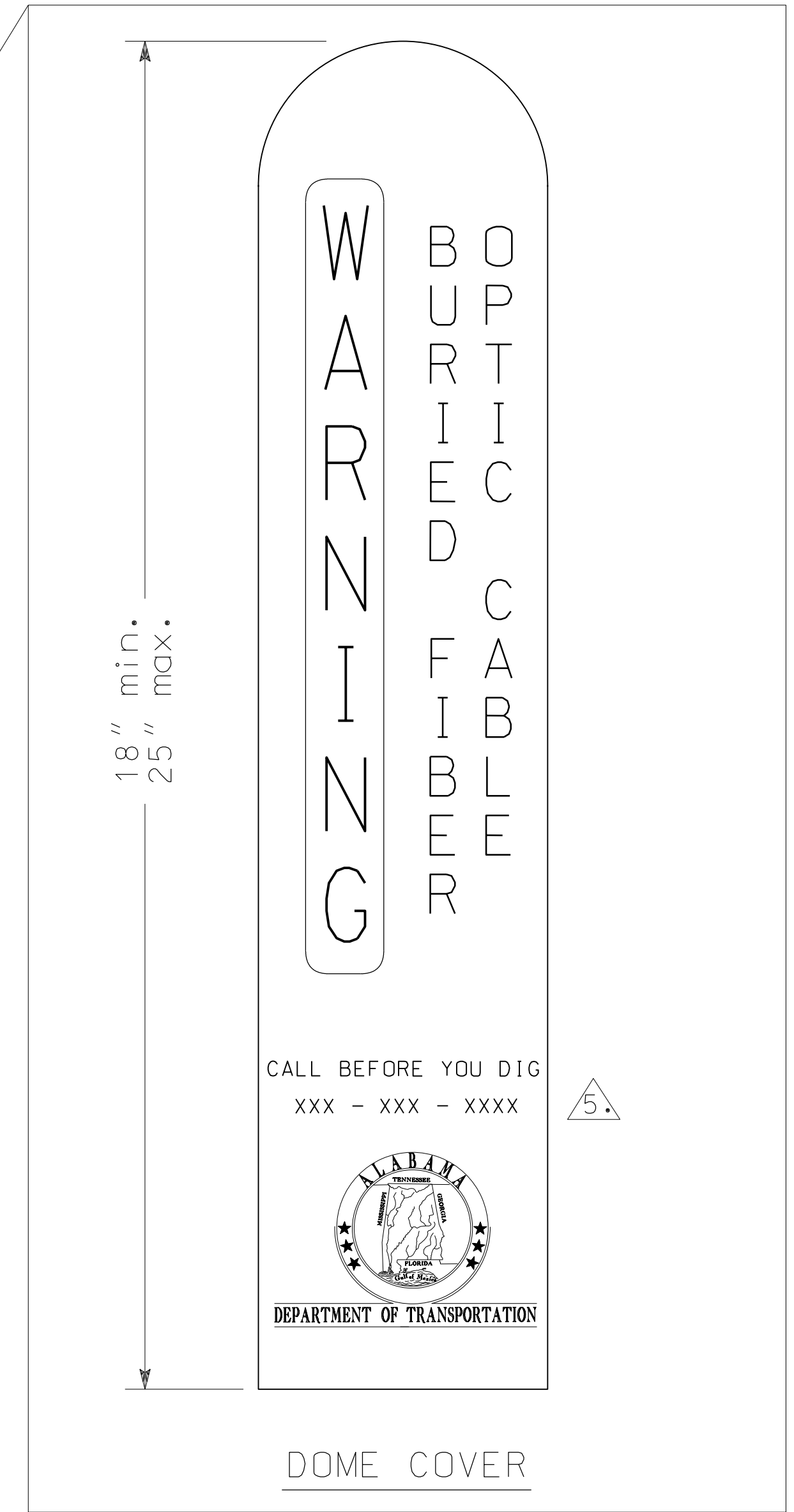
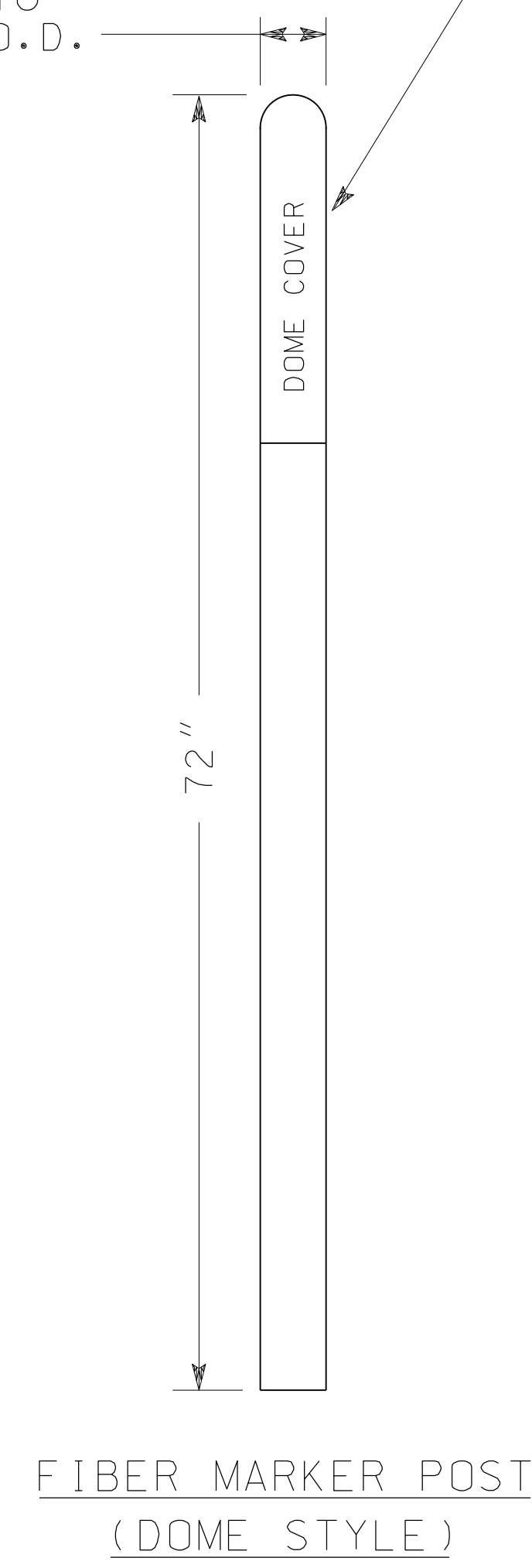
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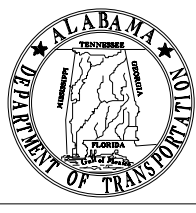
NOTES:

- FIBER MARKER POST SHALL BE INSTALLED AT EACH COMMBX REGARDLESS OF FIBER MARKER POST SPACINGS.
- FIBER MARKER POST SHALL BE SPACED AT MAXIMUM OF 500 FEET INTERVALS ALONG ROUTE OF UNDERGRADE INSTALLED FIBER OPTIC CABLE.
- FIBER MARKER POST SHALL BE INSTALLED AT EACH POINT WHERE A 45 DEGREE OR GREATER CHANGE IN FIBER OPTIC CABLE DIRECTION OCCURS.
- FIBER MARKER POST SHALL NOT OBSTRUCT ACCESS FOR PEDESTRIANS, CYCLISTS OR VEHICLES.
- PHONE NUMBER FOR DOME COVER GRAPHICS SHALL BE PROVIDED BY THE REGION TSM&D ENGINEER. IMPRINTED PHONE NUMBER IS TO BE FOR THE ALDOT REGION OR AREA UTILITY LOCATING CONTACT WHERE FIBER MARKER POST IS TO BE INSTALLED.



3.0" min. to
3.75" max. O.D.



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REVISIONS 10-4-2018 UPDATES DUE TO GENERAL APP/SPECIFICATIONS. 9-12-2019 UPDATES DUE TO GENERAL APP/SPECIFICATIONS.	 ALABAMA DEPARTMENT OF TRANSPORTATION 1409 COLISEUM BOULEVARD MONTGOMERY, AL 36130-3050	DESIGN BUREAU SPECIAL DRAWING MARKER POST FOR FIBER OPTIC CABLE
DRAWN BY: _____ DATE DRAWN: _____	SPECIAL DRAWING NO. I.T.S. - 729 - 006	INDEX NO. 72916

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