

Benjamin Drainage District

Design Standards & Standard Drawings

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STANDARD DRAWINGS DISCLAIMER:

THE DRAWINGS PROVIDED IN THESE STANDARDS ARE ONLY INTENDED TO SHOW THE TYPE OF FACILITY(IES) THAT WILL BE ACCEPTABLE TO THE BDD. THESE ARE NOT INTENDED TO BE USED DIRECTLY IN THE DESIGN OF FACILITIES AS EACH ENCROACHMENT/CROSSING HAS ITS OWN UNIQUE CIRCUMSTANCE, DIMENSIONS, DESIGN CRITERIA, ETC. IT IS THE RESPONSIBILITY OF THE APPLICANT'S DESIGN ENGINEER, WHO WILL STAMP THE DRAWING, TO ENSURE THAT EACH CROSSING IS DESIGNED PROPERLY.

BY USING ANY DETAILS IN THESE DRAWINGS, YOU ACKNOWLEDGE THAT YOU HAVE VERIFIED THE STANDARD DRAWING DETAIL IS ADEQUATE FOR INCORPORATING INTO YOUR DESIGN. FRANSON CIVIL ENGINEERS WILL NOT BE HELD LIABLE FOR ANY USE OF THESE DRAWINGS.

Benjamin Drainage District

2837 W 7300 S
Benjamin, UT 84660

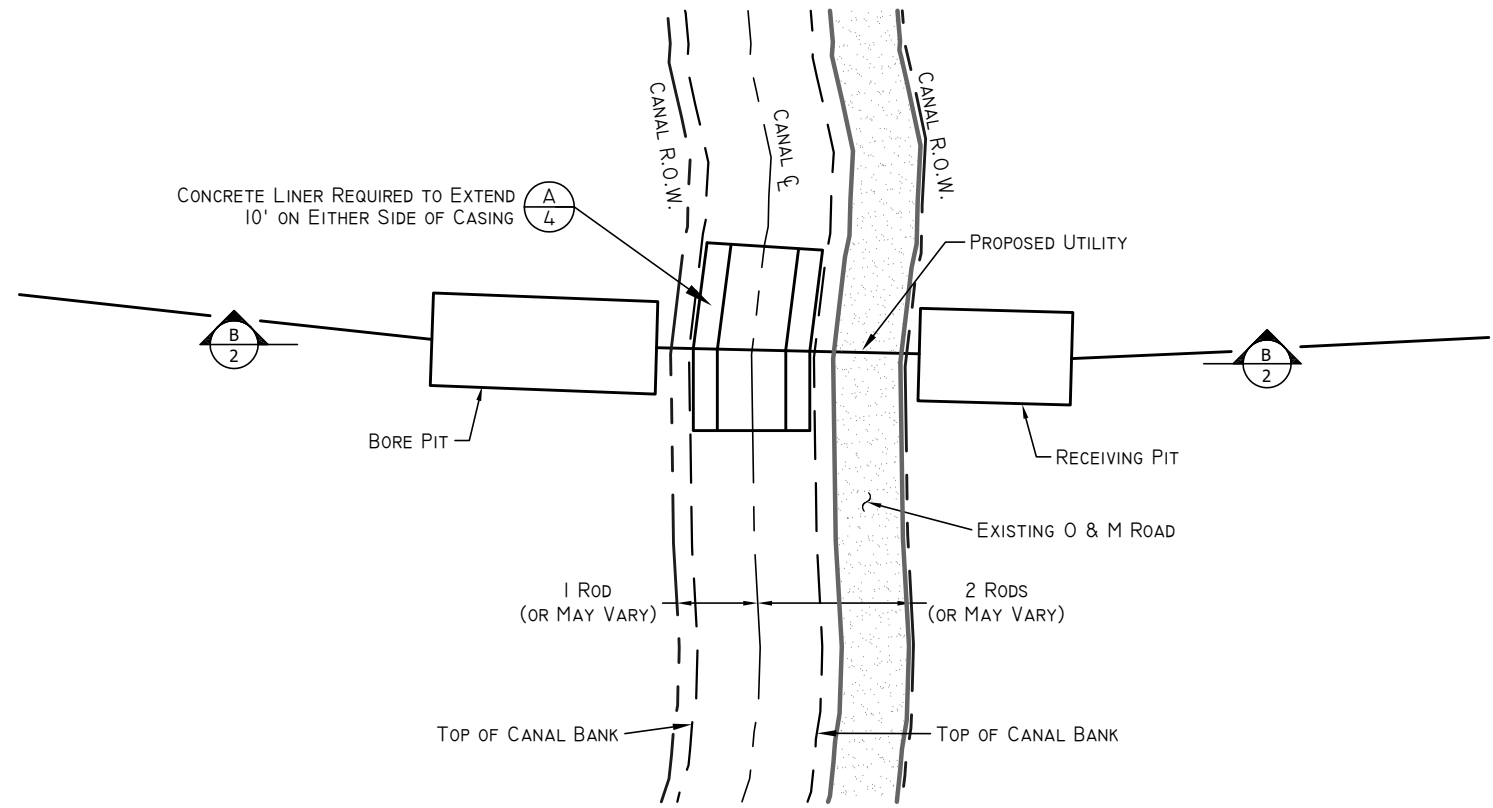
DESIGNER:	ENGINEER	CHECKED:	CHECKED	PROJECT LEADER:
DRAFTSMAN:	DRAWN BY	REVIEWED:	REVIEWED	DATE
NO.	DATE	NO.	DATE	DESCRIPTION

BENJAMIN DRAINAGE DISTRICT
STANDARD DRAWINGS
COVER SHEET

01_SDs_Cover Sheet.dwg
032080 BENJAMIN DD Reviews 2022 Standard Drawings
LAYOUT: Cover

JOB NO.
22080

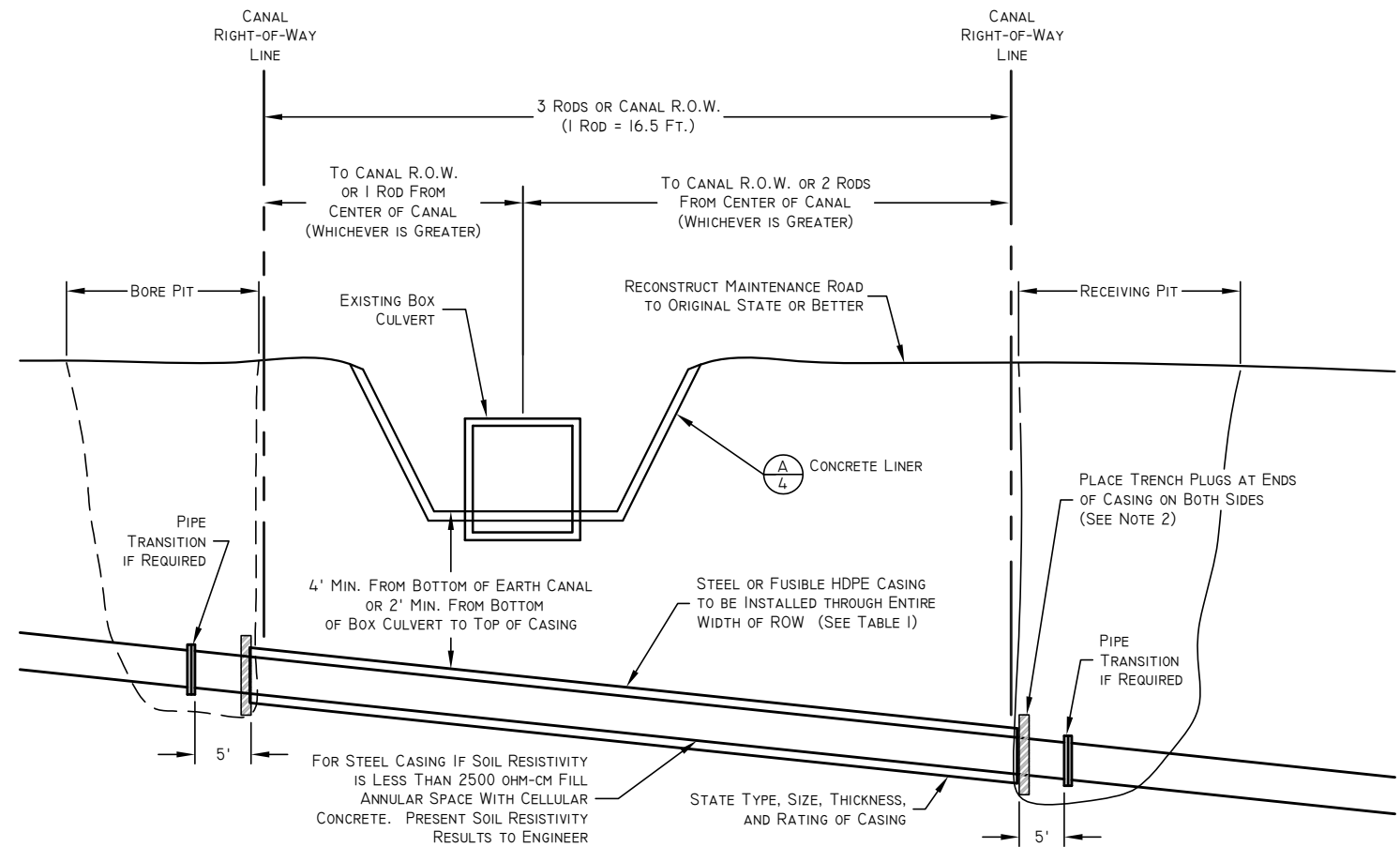
SHEET
1 OF **8**



A BORING UNDER CANAL PLAN VIEW
NTS

NOTES:

1. BORE PIT COMPACTION TO BE 92% MODIFIED PROCTOR DENSITY.
2. TRENCH PLUGS ARE TO BE PLACED IN LOCATIONS SHOWN ON BOTH SIDES FOR WIDTH OF TRENCH AND 12 INCHES ABOVE AND BELOW CASING PIPES AND A MINIMUM THICKNESS OF 24 INCHES. PLUGS SHALL BE A 10% BENTONITE AND 90% CLAY MIXTURE, OR SHALL BE A FLOWABLE FILL CONCRETE.
3. STORMWATER RUNOFF ENTERS THE CANAL DURING STORM EVENTS OR AT OTHER UNEXPECTED TIMES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT THE WORK SITE.
4. WATERLINE PIPE INSIDE OF CASING SHALL HAVE RESTRAINING JOINTS.
5. THRUST BLOCKS ARE REQUIRED ON ALL BENDS AND TEES FOR DIP, PVC, OR PIP WATERLINES.
6. CASING MUST BE A MINIMUM OF 2 FEET BELOW THE BOTTOM OF THE EXISTING CANAL BOX CULVERT OR 4 FEET BELOW EARTHEN CANAL BOTTOM.
7. BORE PITS MUST BE COMPLETELY PLACED OUTSIDE OF THE CANAL RIGHT-OF-WAY. CANAL RIGHT-OF-WAY IS GENERALLY 1-ROD ON THE UPHILL SIDE AND 2-RODS ON THE DOWNHILL SIDE FROM THE CENTER OF THE CANAL. R.O.W. DIMENSIONS MAY BE GREATER IN SOME AREAS.
8. CARRIER PIPE SHALL HAVE ADEQUATE CASING SPACERS.



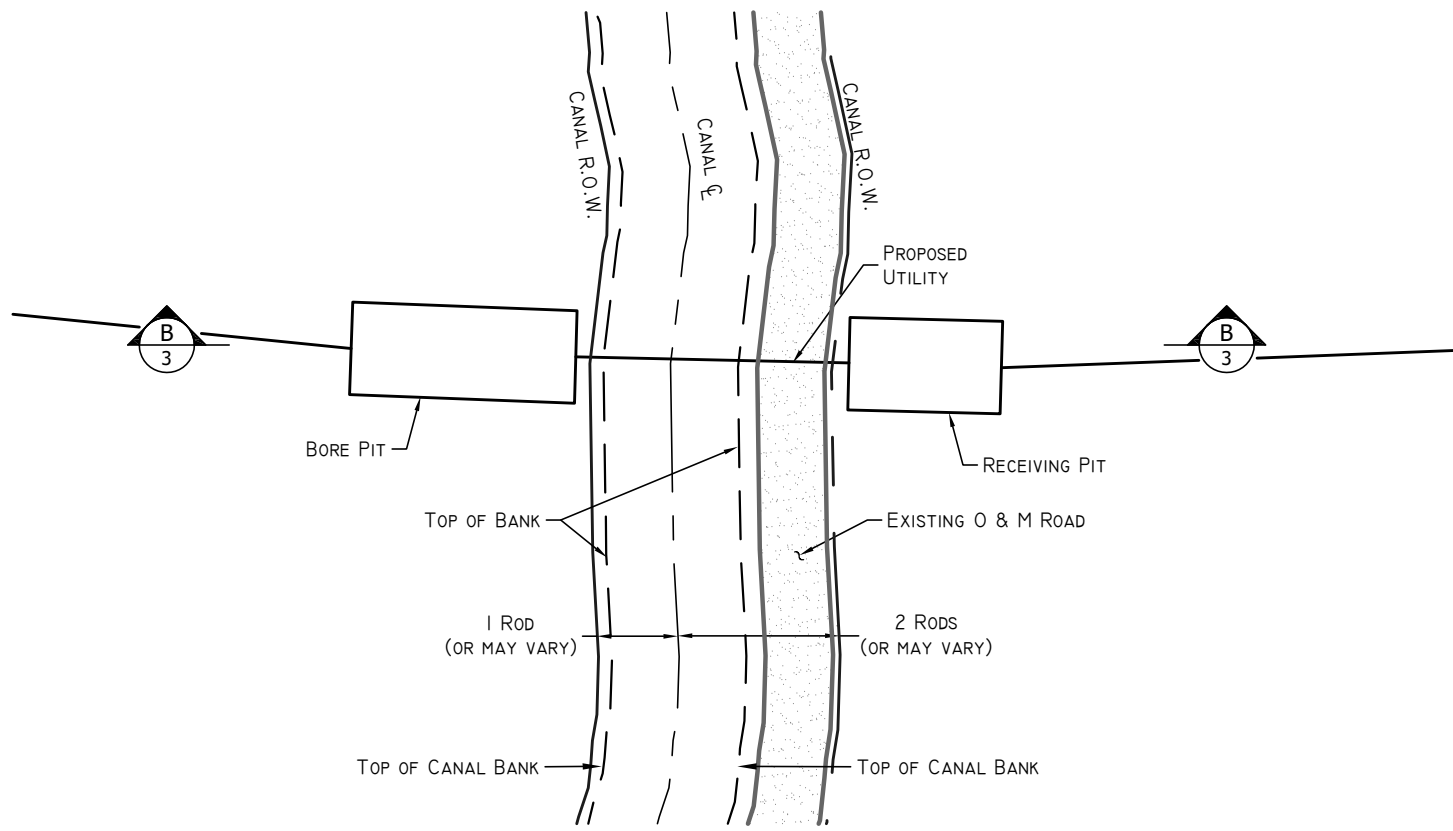
B BORE CASING CROSS SECTION
NTS

TABLE I
STEEL CASING THICKNESS

DIAMETER (INCHES)	MINIMUM WALL THICKNESS (INCHES)
12"	0.188"
14" - 16"	0.312"
18"	0.312"
20" - 22"	0.375"
24" - 26"	0.438"
28" - 32"	0.500"
34" - 36"	0.562"
38" - 42"	0.562"

PROJECT LEADER	PROJECT LEADER	CHECKED	CHECKED	ENGINEER	DRAFTSMAN	DATE	NO.	DATE	DESCRIPTION
SEPTEMBER 7, 2023 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									

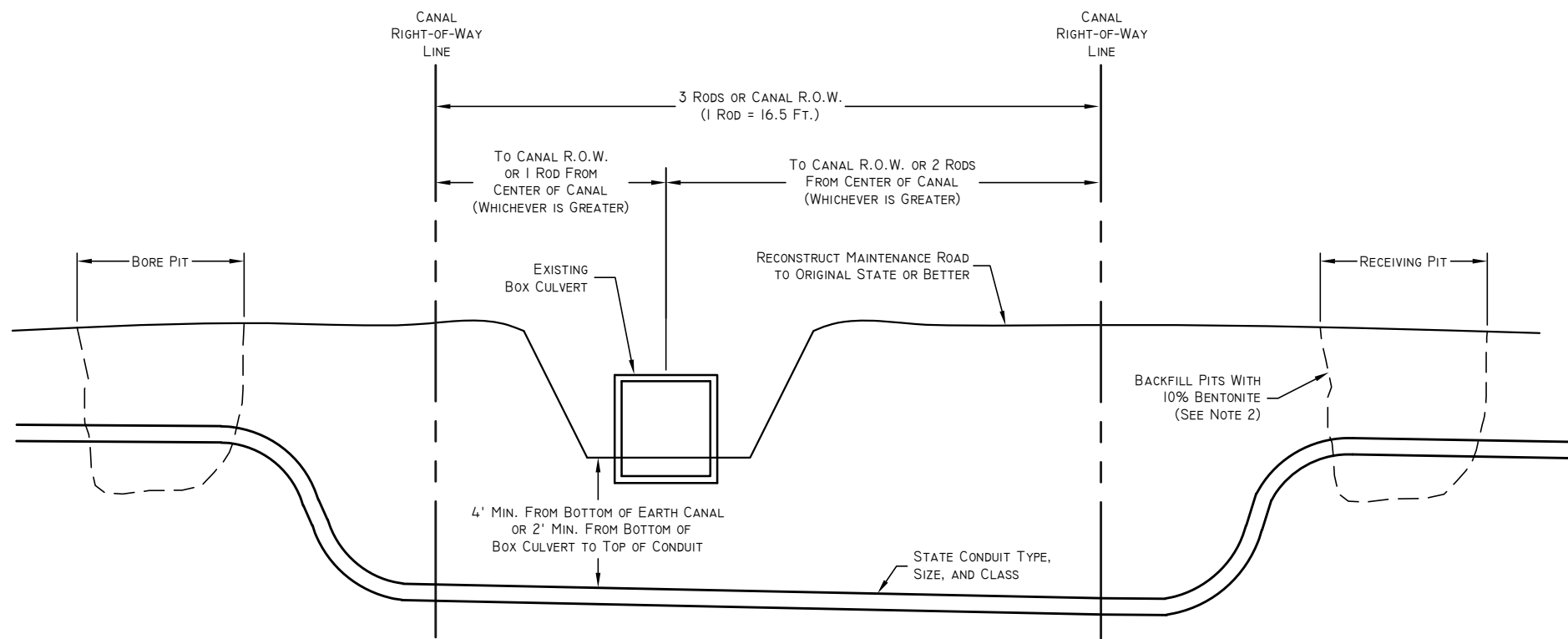
BENJAMIN DRAINAGE DISTRICT
STANDARD DRAWINGS
CANAL BORING DETAILS
02-ULDC Boring Details.dwg
03-22080 BENJAMIN DD Reviews 2022 Standard Drawings
LAYOUT: Boring Details



A DIRECTIONAL DRILL UNDER CANAL
NTS

NOTES:

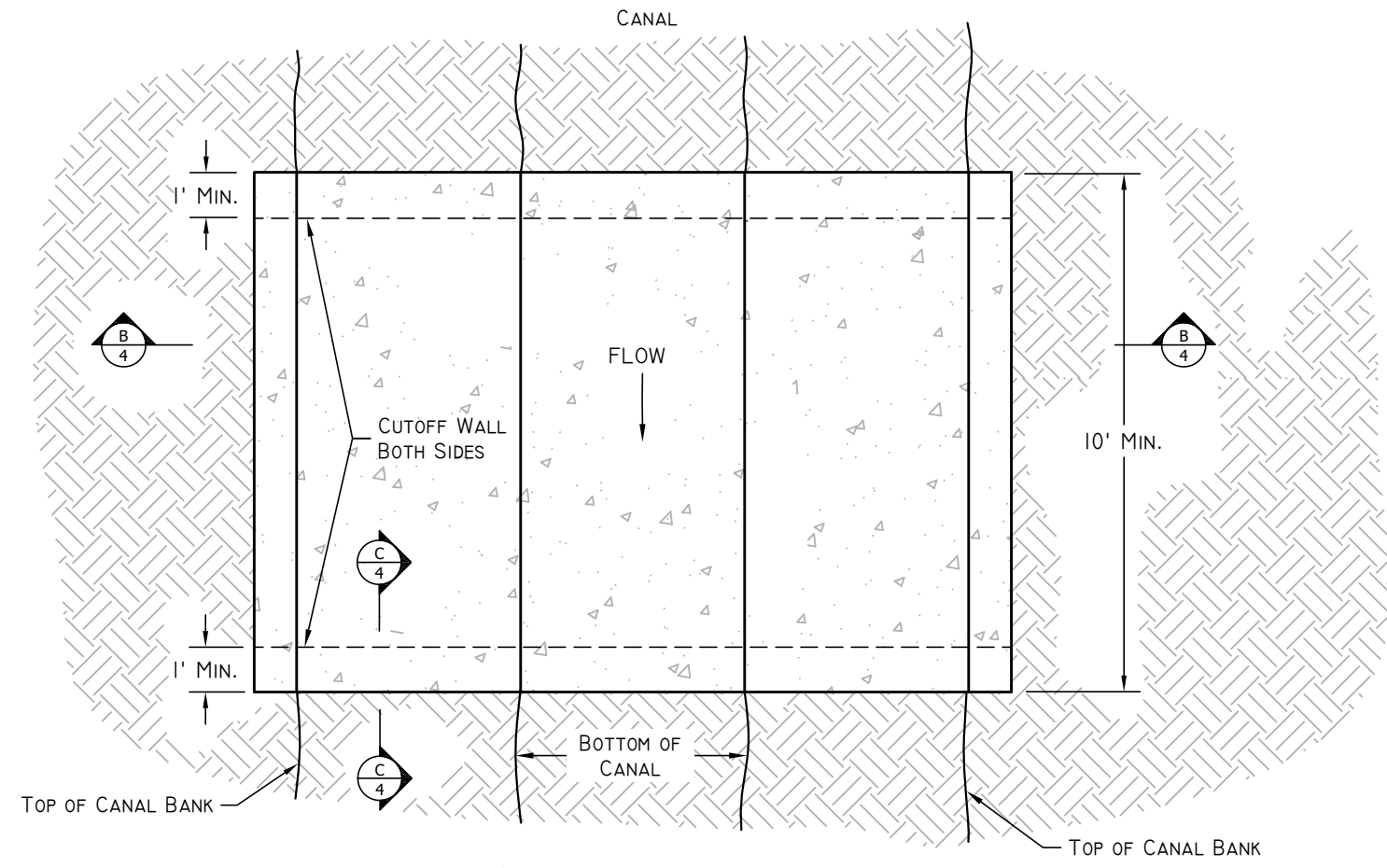
- BORE PIT COMPACTION TO BE 92% MODIFIED PROCTOR DENSITY.
- FILL BORE PITS WITH A MIXTURE OF NATIVE MATERIAL AND 10% BENTONITE POWDER TO CREATE A SEAL THAT WILL PREVENT WATER FROM FOLLOWING THE NEW CONDUIT.
- STORMWATER RUNOFF ENTERS THE CANAL DURING STORM EVENTS OR AT OTHER UNEXPECTED TIMES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT THE WORK SITE.
- CONDUIT MUST BE A MINIMUM OF 2 FEET BELOW THE BOTTOM OF THE EXISTING CANAL BOX CULVERT OR 4 FEET BELOW EARTHEN CANAL BOTTOM.
- BORE PITS MUST BE COMPLETELY PLACED OUTSIDE OF THE CANAL RIGHT-OF-WAY. CANAL RIGHT-OF-WAY IS GENERALLY 1 ROD ON THE UPHILL SIDE AND 2 RODS ON THE DOWNHILL SIDE FROM THE CENTER OF THE CANAL. ROW DIMENSIONS MAY BE GREATER IN SOME AREAS.



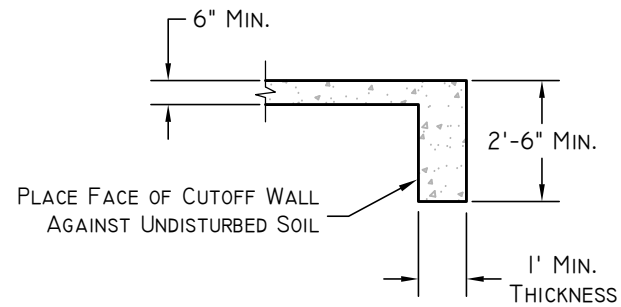
B DIRECTIONAL DRILL CROSS SECTION
NTS

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DESIGNER:	ENGINEER:	CHECKED:	CHECKED:	PROJECT LEADER:	PROJECT LEADER:
DRAFTSMAN:	DRAWN BY:	REVIEWED:	REVIEWED:	SEPTEMBER 7, 2023	SEPTEMBER 7, 2023

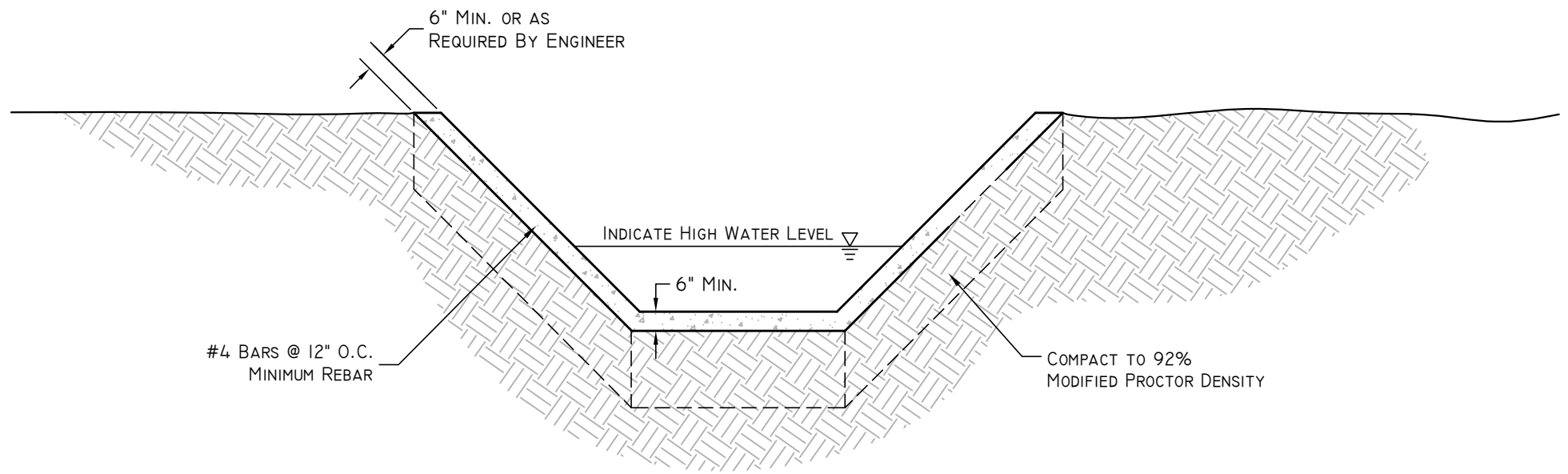


A CONCRETE LINER PLAN
 NTS



NOTE:
 ENGINEER TO DETERMINE REBAR SIZE
 AND SPACING IN CUTOFF WALL.

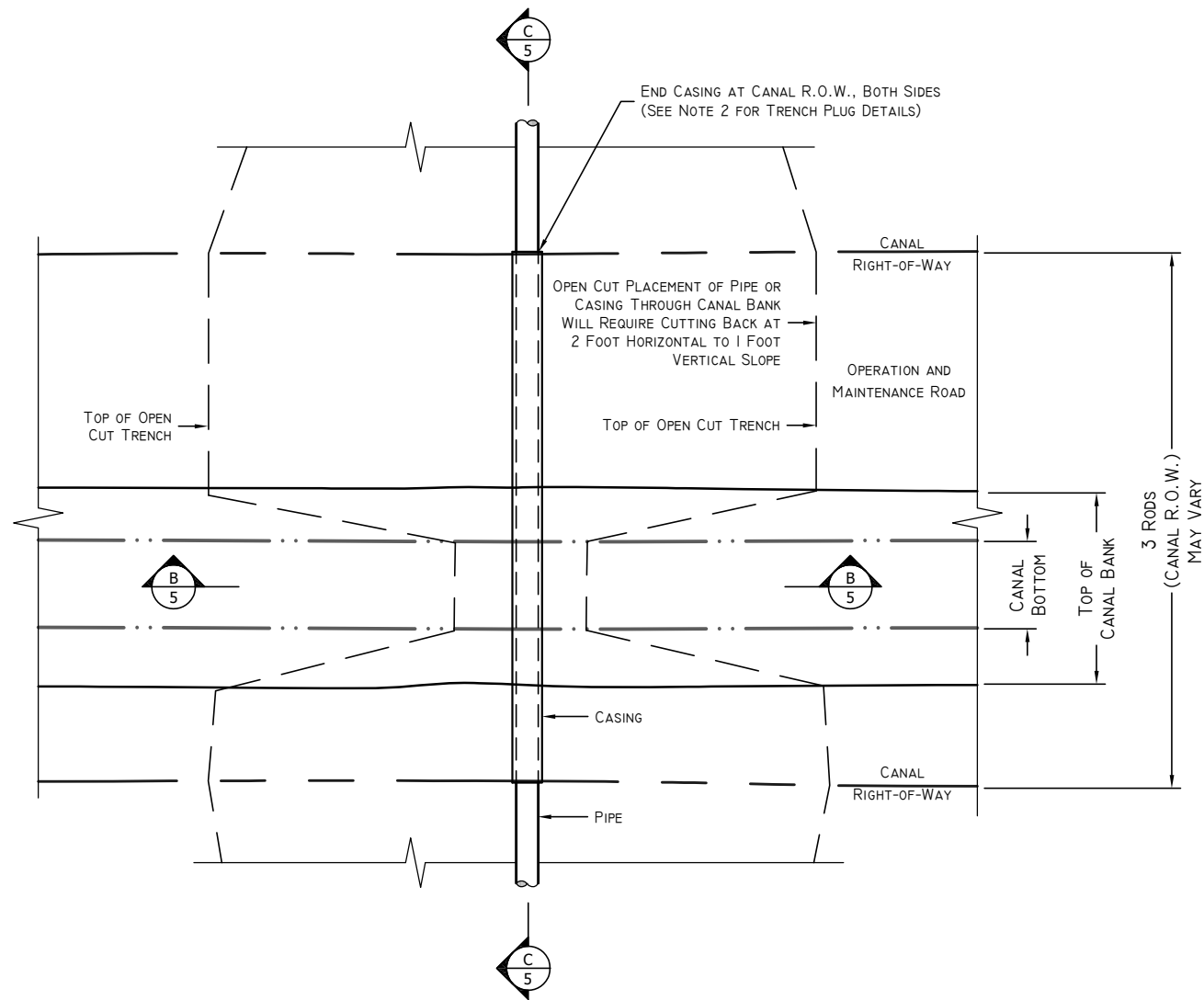
C CUTOFF WALL CROSS SECTION
 NTS



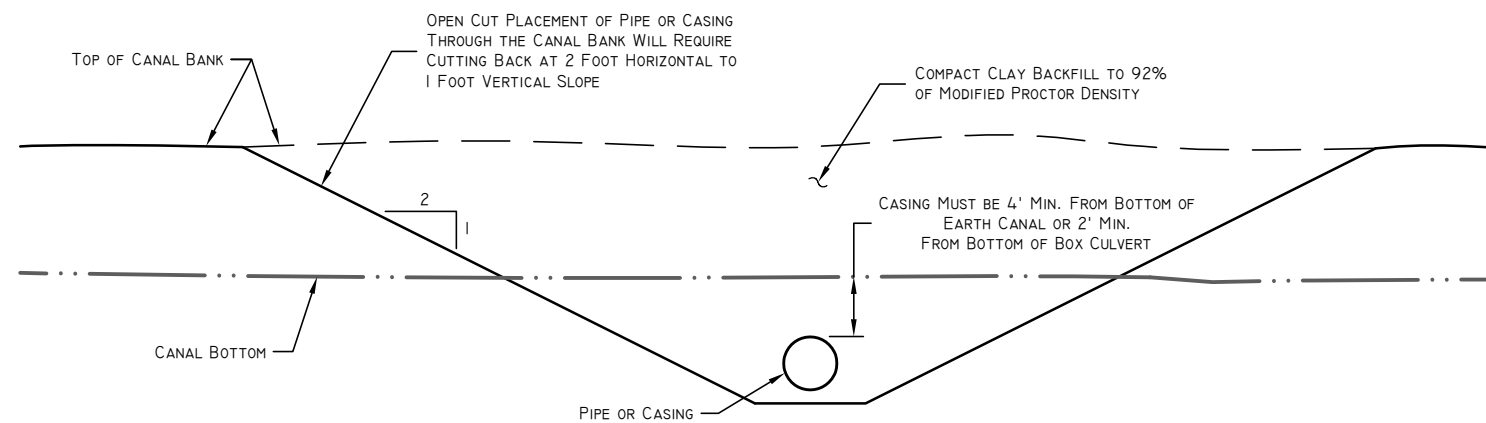
B CONCRETE LINER CROSS SECTION
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NO.	DATE	DESCRIPTION

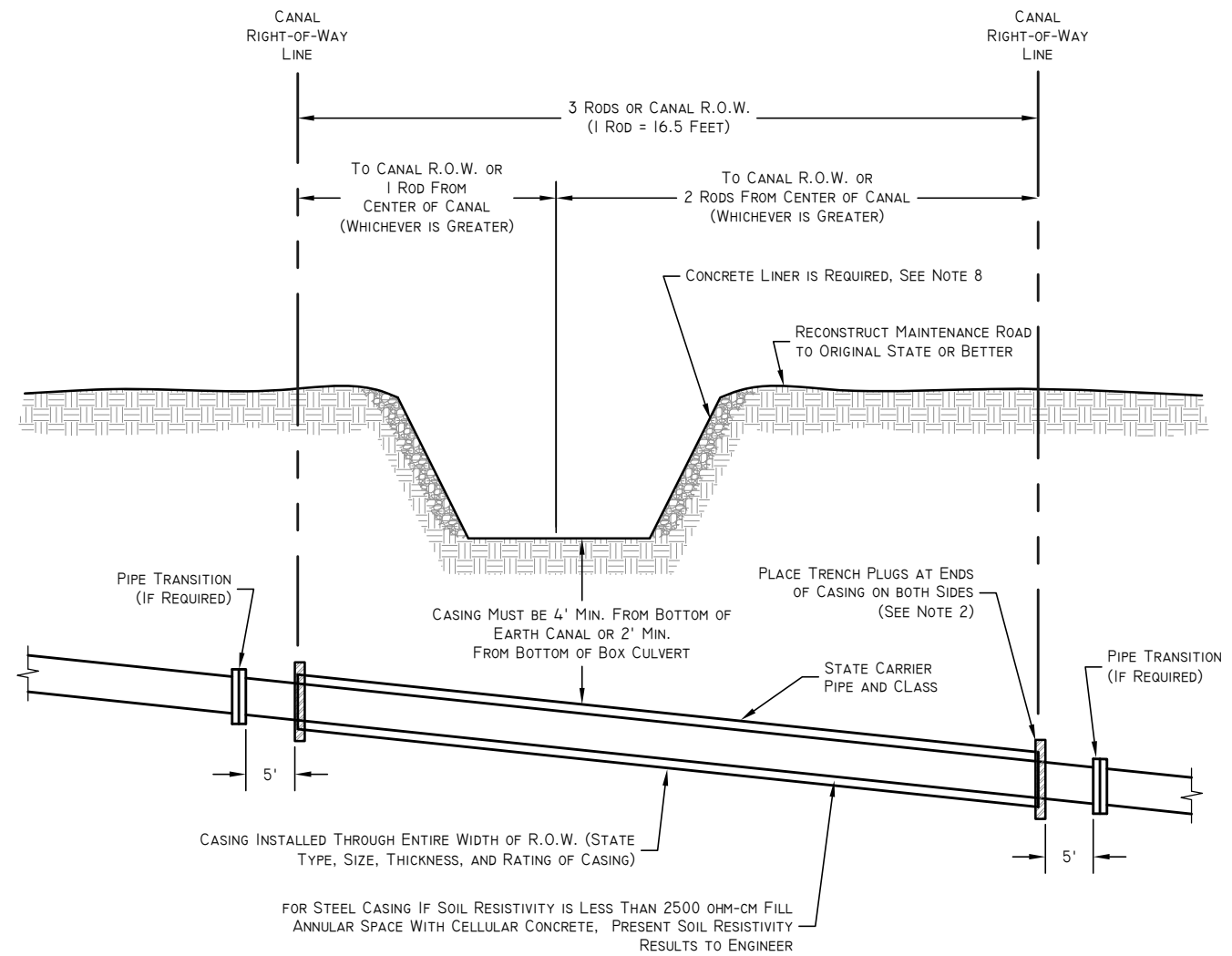
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DRAFTSMAN:	DRAWN BY:	REVIEWED:	REVIEWED:	SEPTEMBER 7, 2023



A OPEN CUT PLAN VIEW
NTS



B OPEN CUT CANAL CROSSING CROSS SECTION
NTS



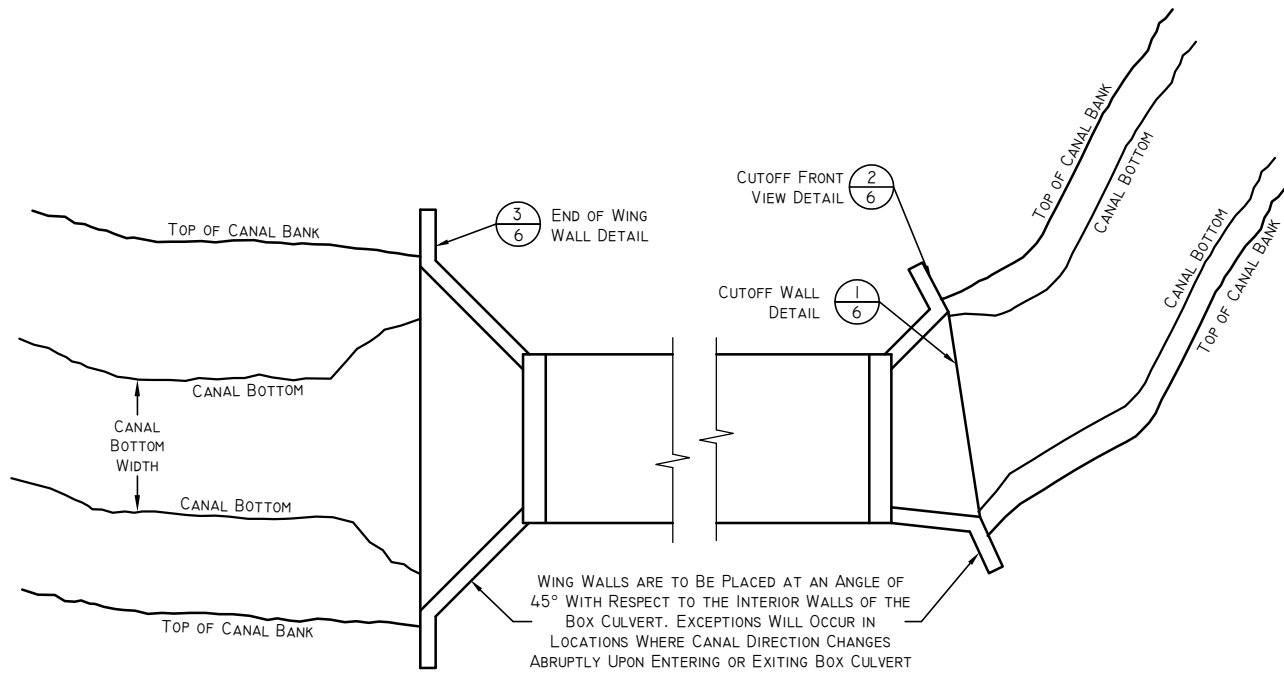
C OPEN CUT CANAL CROSSING PROFILE
NTS

NOTES:

- REMOVAL AND REPLACEMENT OF CANAL FLOOR AND BANKS WILL REQUIRE TESTING AND PROCTORS BY A LICENSED SOILS LAB. COMPACTION TO BE 92% MODIFIED PROCTOR DENSITY.
- TRENCH PLUGS ARE TO BE PLACED IN LOCATIONS SHOWN ON BOTH SIDES FOR WIDTH OF TRENCH AND 12 INCHES ABOVE AND BELOW CASING PIPES AND A MINIMUM THICKNESS OF 24 INCHES. PLUGS SHALL BE A 10% BENTONITE AND 90% CLAY MIXTURE, OR SHALL BE A FLOWABLE FILL CONCRETE.
- STORM WATER RUNOFF ENTERS THE CANAL DURING STORM EVENTS OR AT OTHER UNEXPECTED TIMES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT THE WORK SITE.
- WATERLINE PIPE INSIDE OF CASING SHALL HAVE RESTRAINING JOINTS.
- THRUST BLOCKS ARE REQUIRED ON ALL BENDS AND TEES FOR DIP, PVC, OR PIP WATERLINES.
- CANSING MUST BE 4' MIN. FROM BOTTOM OF EARTH CANAL OR 2' MIN. FROM BOTTOM OF BOX CULVERT.
- CANAL RIGHT-OF-WAY IS GENERALLY 1-ROD ON THE UPHILL SIDE AND 2-RODS ON THE DOWNHILL SIDE FROM THE CENTER OF THE CANAL. R.O.W. DIMENSIONS MAY BE GREATER IN SOME AREAS.
- CONCRETE LINER IS TO BE INSTALLED IN THE CANAL EXTENDING 5 FEET PAST THE EXTENTS OF CANAL DISTURBANCE SEE DETAIL. **A/4**
- CARRIER PIPE SHALL HAVE ADEQUATE CASING SPACERS.

TABLE I
STEEL CASING THICKNESS

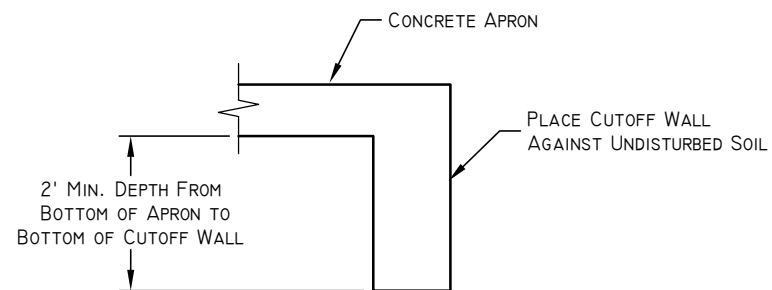
DIAMETER (INCHES)	MINIMUM WALL THICKNESS (INCHES)
12"	0.188"
14" - 16"	0.312"
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38" - 42"	0.562"



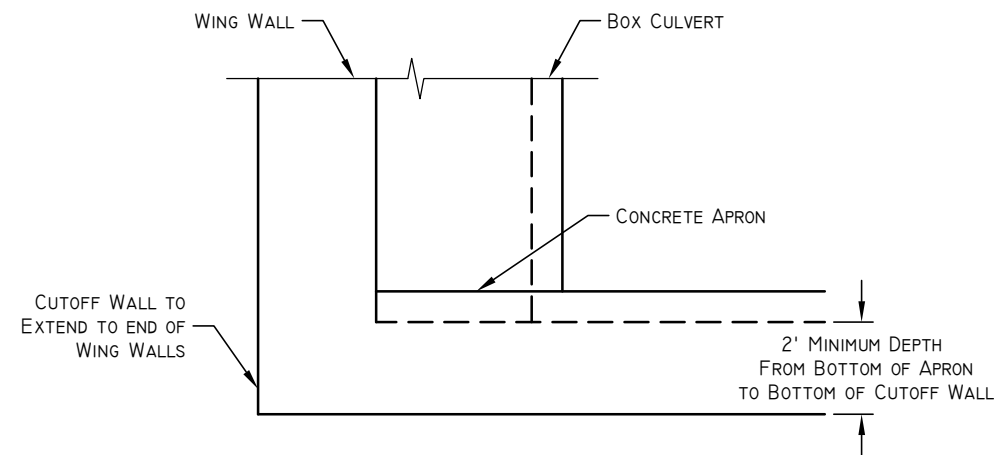
A PLAN VIEW OF BOX CULVERT
NTS

NOTES:

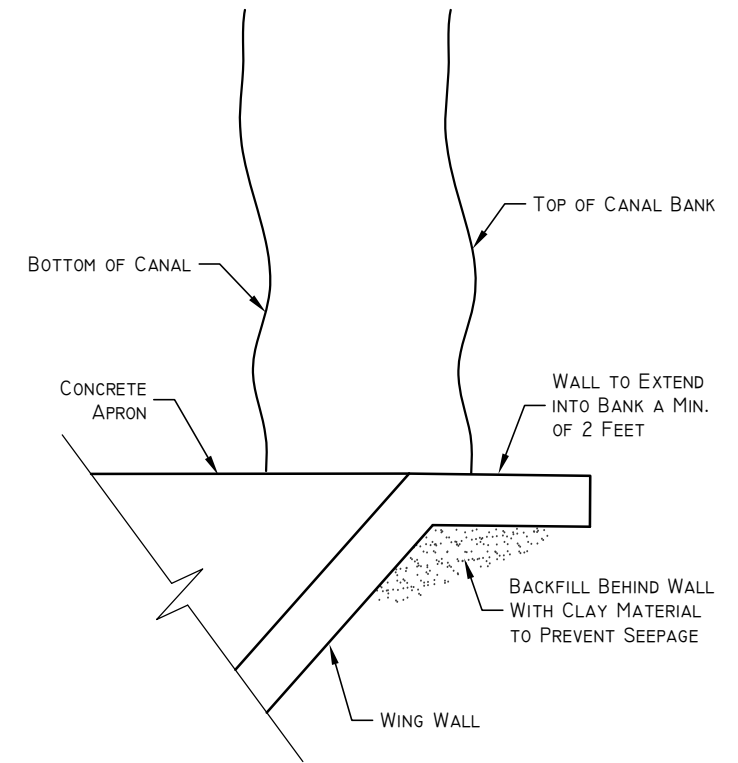
1. BOX CULVERTS TO HAVE A MINIMUM HEIGHT OF 6 FEET.
2. WIDTH OF BOX CULVERT IS TO MATCH EXISTING CHANNEL BOTTOM.
3. NO RIPRAP ALLOWED IN THE CANAL.
4. ACCESS TO CANAL OPERATION AND MAINTENANCE ROAD SHALL BE INSTALLED WITH CURB CUTS AT DRIVE APPROACHES AND THICKENED CONCRETE AT SIDEWALKS.
5. CUTOFF WALLS AND APRONS BETWEEN WING WALLS ARE REQUIRED.
6. END OF WING WALL SHALL NOT INTERFERE WITH OPERATION AND MAINTENANCE ROAD.
7. 6 FOOT CHAIN LINK FENCE OR 4 FOOT PARAPET WALL IS REQUIRED ON ALL BOX CULVERTS THAT CARRY PEDESTRIAN TRAFFIC. EXCEPTIONS MAY OCCUR WHERE LOCAL ORDINANCES NOTE OTHERWISE AND UPON APPROVAL BY CANAL COMPANY.
8. DRAWINGS SUBMITTED FOR REVIEW ARE TO SHOW PLAN AND PROFILE VIEWS, NOTE SLOPE, INCLUDE DETAIL INDICATING REBAR SIZE AND SPACING, AND STATE TRAFFIC LOADING.
9. CASINGS MUST HAVE A MINIMUM OF 2 FEET BETWEEN TOP OF CASING AND BOTTOM OF BOX CULVERT.
10. ALL CONCRETE USED IN CONSTRUCTION SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI. THE CONCRETE MIX SHALL INCLUDE BETWEEN 5% AND 7% AIR ENTRAINMENT.



1 CUTOFF WALL DETAIL
NTS



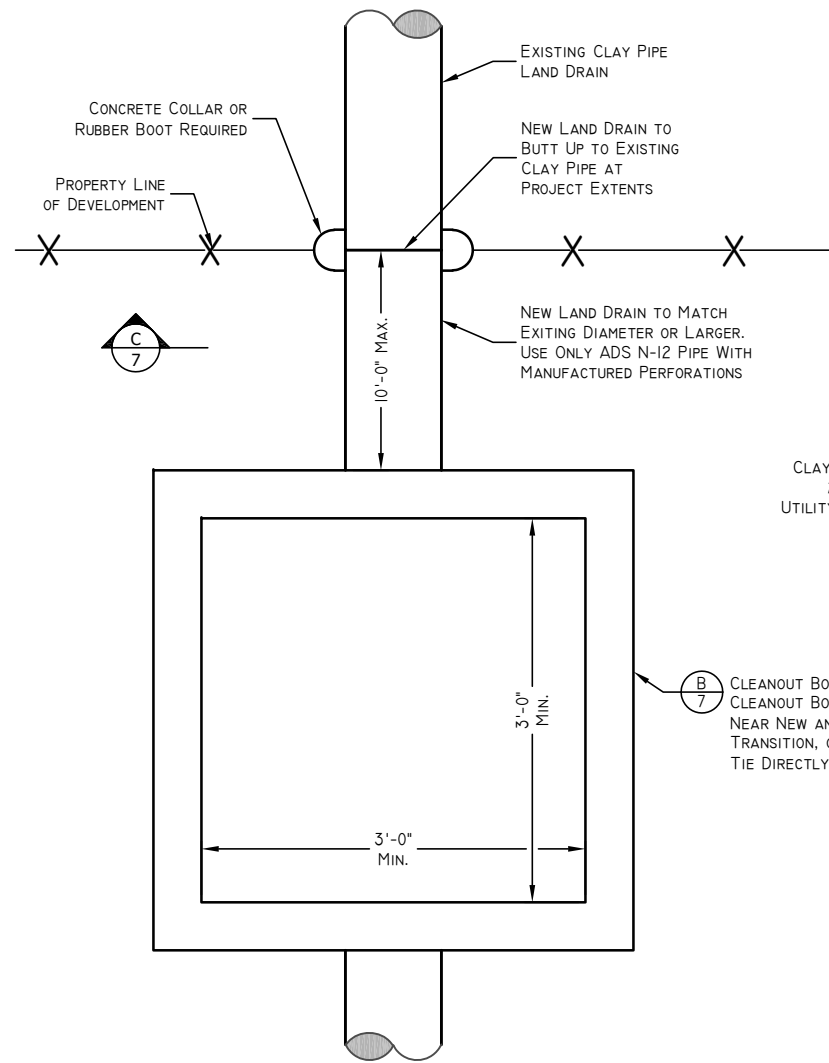
2 CUTOFF FRONT VIEW DETAIL
NTS



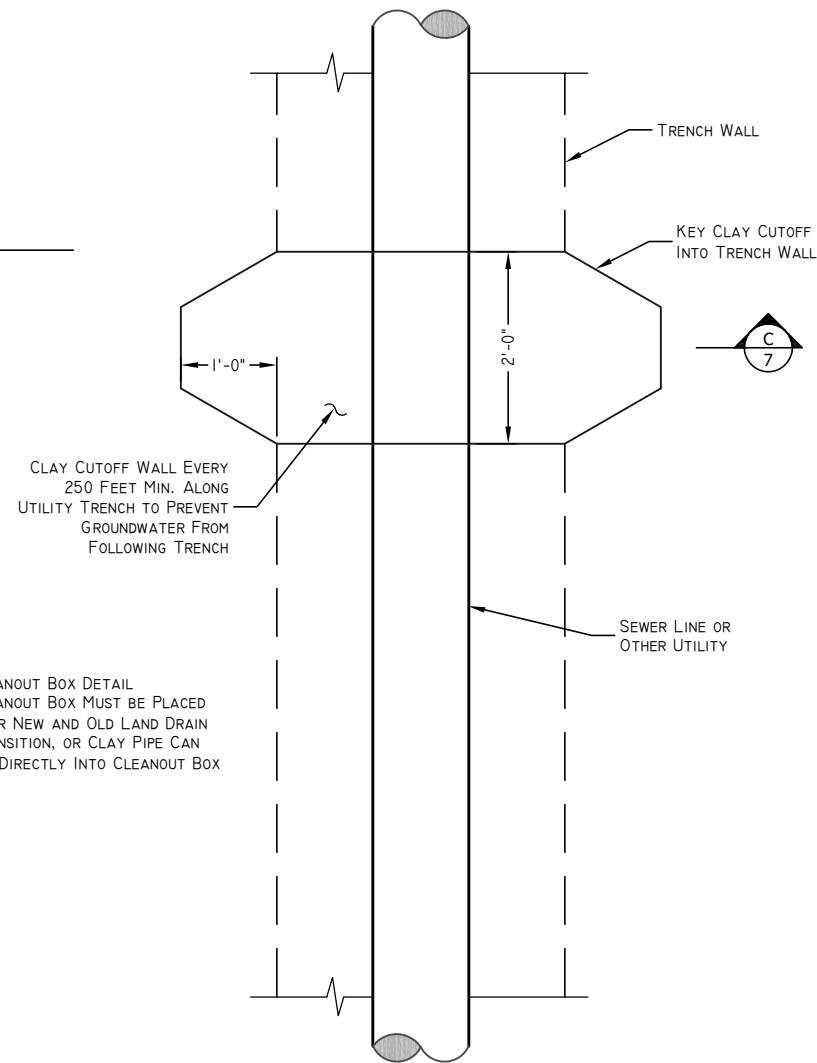
3 END OF WING WALL DETAIL
NTS

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SEPTEMBER 7, 2023		
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DRAFTSMAN	DATE	DATE

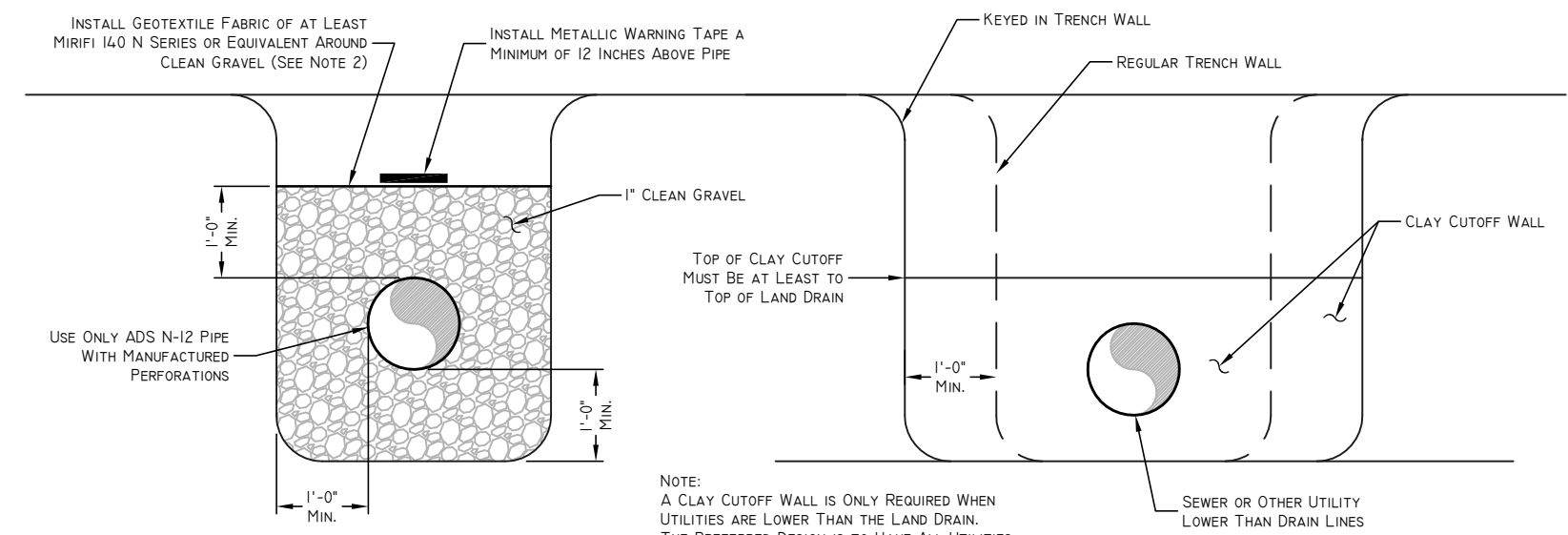
BENJAMIN DRAINAGE DISTRICT	
STANDARD DRAWINGS	
BOX CULVERT DETAILS	
06-ULJDC Box Culvert Details.dwg	
03-22080 BENJAMIN DD Revisions 2022 Standard Drawings	
JOB NO.	LAYOUT: Details
22080	



A LAND DRAIN DETAIL
NOT TO SCALE

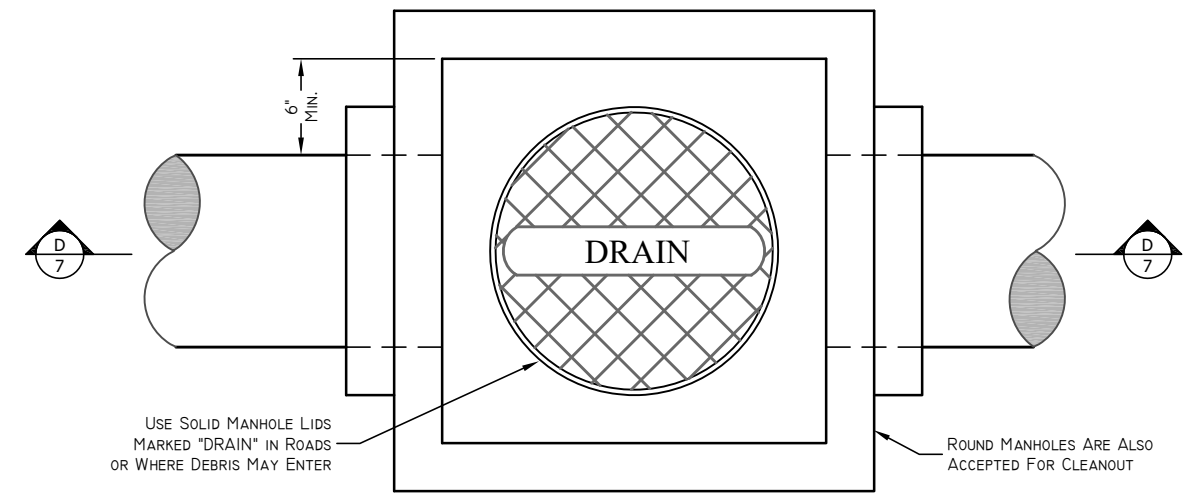


B CLEANOUT BOX DETAIL
CLEANOUT BOX MUST BE PLACED NEAR NEW AND OLD LAND DRAIN TRANSITION, OR CLAY PIPE CAN TIE DIRECTLY INTO CLEANOUT BOX



C LAND DRAIN SECTION
NOT TO SCALE

NOTE:
A CLAY CUTOFF WALL IS ONLY REQUIRED WHEN UTILITIES ARE LOWER THAN THE LAND DRAIN. THE PREFERRED DESIGN IS TO HAVE ALL UTILITIES ABOVE LAND DRAINS.

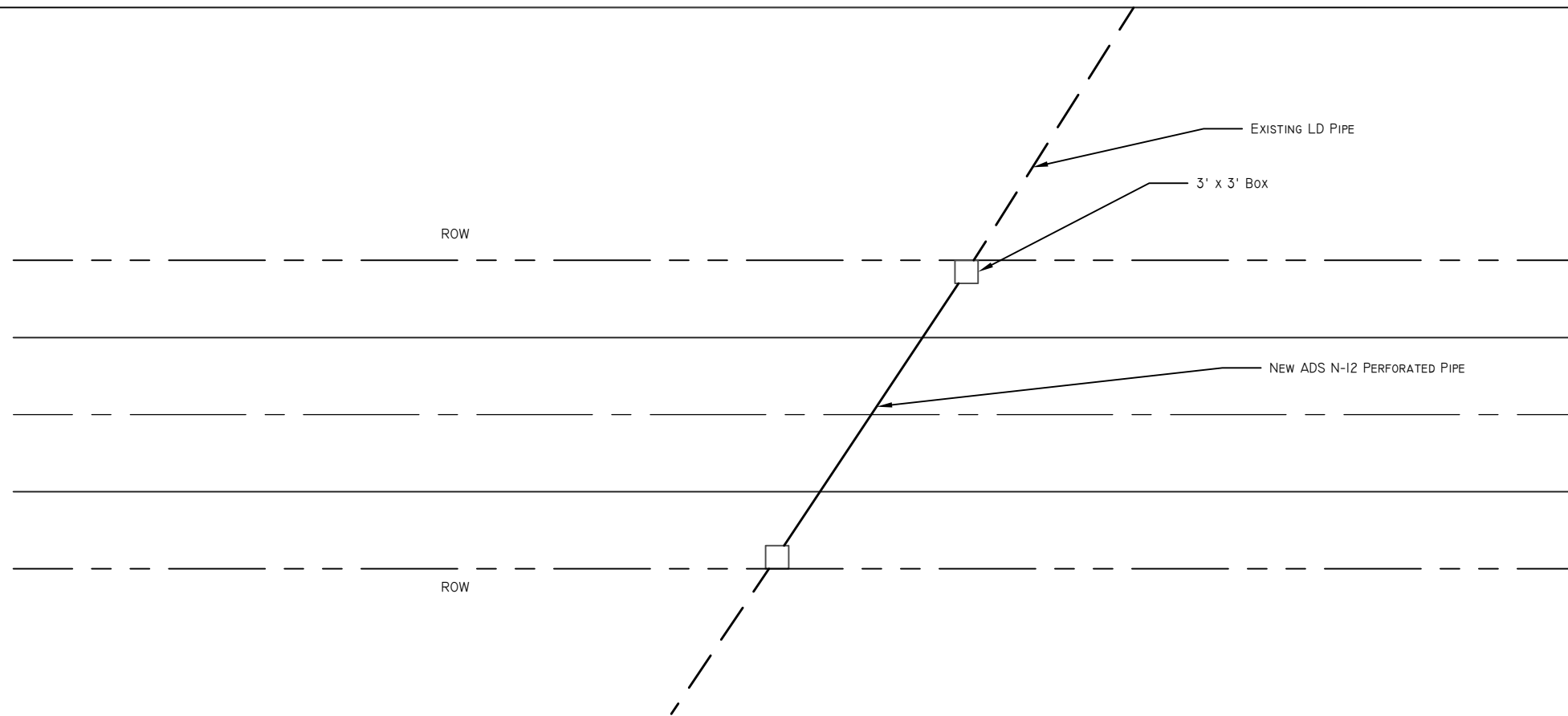


D CLEANOUT BOX SECTION
NOT TO SCALE

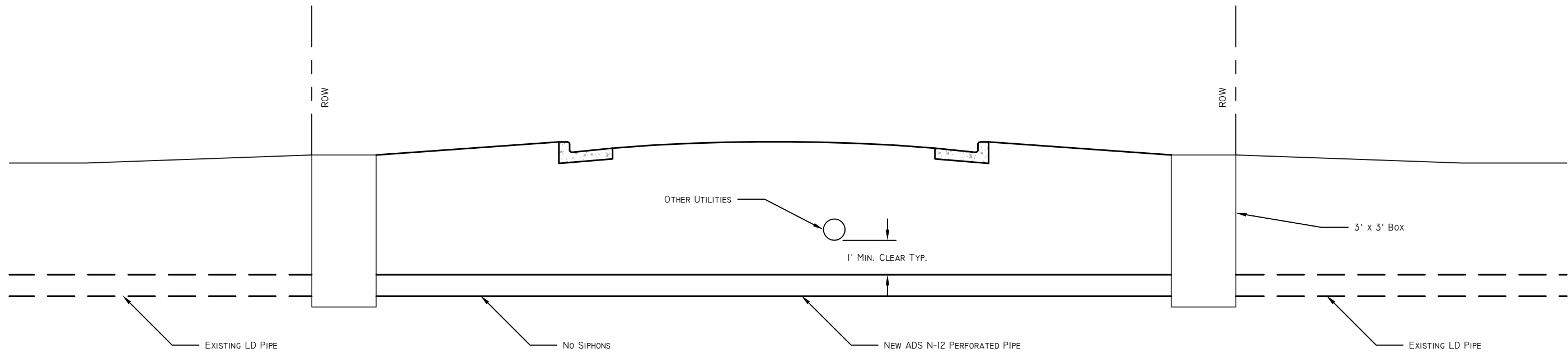
NOTES:

1. LAND DRAINS TO BE 8 INCHES MINIMUM OR DIAMETER TO MATCH EXISTING DRAIN.
2. IN AREAS WITH CLAY SOILS, BDD TO PERFORM A TEST WITH GEOTEXTILE FABRIC TO DETERMINE IF IT CAN BE LEFT OFF OF BOTTOM AND SIDES OF GRAVEL ENVELOPE.
3. ALL BACKFILL MATERIALS TO BE COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY.
4. KNOCKOUT BOXES ARE NOT ALLOWED.

DESIGNER:	DRAFTSMAN:	ENGINEER:	CHECKED:	PROJECT LEADER:
				SEPTEMBER 7, 2023
DATE:	NO.	DESCRIPTION:	REVISIONS:	PRINT DATE:



A ROAD CONSTRUCTION CROSSING EXISTING DRAIN PLAN VIEW
NOT TO SCALE



B ROAD CONSTRUCTION CROSSING EXISTING DRAIN PROFILE VIEW
NOT TO SCALE

Benjamin Drainage District

2837 W 7300 S
Benjamin, UT 84660

DESIGNER:	ENGINEER:	CHECKED:	CHECKED:	PROJECT LEADER:
DRAFTSMAN:	DRAWN BY:	REVIEWED:	REVIEWED:	PRINT DATE:
				SEPTEMBER 7, 2023
NO.	DATE	INTS.	REVISIONS	
			DESCRIPTION	

BENJAMIN DRAINAGE DISTRICT
STANDARD DRAWINGS
ROAD CROSSING DETAILS
08_Road Crossing Details.dwg
03/2080 BENJAMIN DD Reviews 2023 Standard Drawings
JOB NO. 22080
LAYOUT: Directional Drilling