

Benjamin Drainage District

Design Standards & Standard Drawings

Sheet Index

- | | |
|---|---|
| 1 | COVER SHEET |
| 2 | BDD NOTES |
| 3 | DRAIN LINE AND TYPICAL CLEANOUT BOX |
| 4 | ROADWAY CROSSING DETAILS |
| 5 | CANAL BORING DETAILS |
| 6 | DIRECTIONAL DRILLING AND MICROTRENCHING DETAILS |
| 7 | CONCRETE LINER |
| 8 | OPEN CUT DETAILS |
| 9 | BOX CULVERT DETAILS |

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 FACILITIES ARE 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 | | | | | | | | | | BENJAMIN Drainage District | | | | | | | | | |
| STANDARD DRAWINGS | | | | | | | | | | | | | | | | | | | |
| COVER SHEET | | | | | | | | | | | | | | | | | | | |
| JOB NO. | | 01_SDs_Cover Sheet.dwg O\22080 BENJAMIN DD Reviews 2022\Standard Drawings | | | | | | | | | | | | | | | | | |
| 22080 | | LAYOUT: Cover | | | | | | | | | | | | | | | | | |
| SHEET | | | | | | | | | | | | | | | | | | | |
| OF 9 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |

BENJAMIN DRAINAGE DISTRICT (BDD) NOTES

NOTES TO BE ADDED TO THE DRAWING SET UNDER HEADING LABELED “BENJAMIN DRAINAGE DISTRICT (BDD) NOTES”

- ☐ CONTRACTOR MUST NOTIFY FRANSON CIVIL ENGINEERS (FRANSON CIVIL) AT LEAST 24 HOURS BEFORE CONSTRUCTION ON BDD FACILITIES. CALL KYLE DEVANEY, P.E., WITH FRANSON CIVIL ENGINEERS AT 801-756-0309. FAILURE TO DO SO MAY RESULT IN A \$10,000 FINE.
- ☐ BDD CONTACT DURING CONSTRUCTION: ANTHONY CANTO, CHAIRMAN, 801-655-3234.
- ☐ ALL CONSTRUCTION AFFECTING BDD FACILITIES AND WITHIN THE BDD RIGHT-OF-WAY MUST BE DONE TO BDD STANDARDS.
- ☐ ALL BACKFILL MATERIALS SHALL BE COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY.
- ☐ IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT THE WORK SITE. ANY DAMAGE TO THE CANAL CORRIDOR CAUSED BY CONSTRUCTION ACTIVITIES WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND APPLICANT.
- ☐ APPLICANT IS REQUIRED TO PERFORM COMPACTION TESTING AT THE APPLICANT’S COST. IF REQUESTED, COMPACTION TEST RESULTS SHALL BE SUBMITTED TO FRANSON CIVIL ENGINEERS. ALL FAILED MATERIAL SHALL BE REMOVED AND COMPACTED TO SPECIFICATIONS. TESTING MUST BE PERFORMED BY A LICENSED SOILS LAB.
- ☐ 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.
- ☐ APPLY WATERSTOP RX, SWELLSTOP, OR BDD ENGINEER-APPROVED EQUIVALENT TO ALL CONCRETE COLD JOINTS.
- ☐ PVC WATER STOP, OR EQUIVALENT, IS REQUIRED IN ALL JOINTS OF CAST-IN-PLACE CONCRETE TO PREVENT SEEPAGE BETWEEN THE SURFACES.
- ☐ FENCES DISTURBED DURING CONSTRUCTION ACTIVITIES MUST BE REPLACED AND RETURNED TO PRE-CONSTRUCTION CONDITIONS, OR BETTER.
- ☐ NEITHER BDD NOR FRANSON CIVIL CAN VERIFY THE LOCATIONS OF UNDERGROUND FACILITIES. BLUE STAKES SHOULD ALWAYS BE CALLED BEFORE DIGGING (1-800-662-4111).

UNDERGROUND DRAIN LINES

- ☐ CONTRACTOR MUST DOCUMENT ALL NEW PIPES BY VIDEO CAMERA AFTER INSTALLATION AND BACKFILL. ANY PROBLEMS WITH JOINTS, LEVELS, SLOPES, ETC. DISCOVERED BY THE VIDEO TECHNICIANS MUST BE REPAIRED. A DIGITAL COPY OF THE VIDEO MUST BE SUBMITTED TO FRANSON CIVIL ENGINEERS.
- ☐ PRIOR TO BACKFILLING OF PIPES, THE CONTRACTOR MUST NOTIFY KYLE DEVANEY OF FRANSON CIVIL ENGINEERS SO A GPS SURVEY OF THE LOCATION AND ELEVATION OF THE INSTALLED PIPELINES CAN BE PERFORMED.
- ☐ PIPES CROSSING PERPENDICULARLY OVER OR UNDER THE DRAIN PIPE SHALL HAVE A MINIMUM ONE-FOOT VERTICAL CLEARANCE.
- ☐ PIPES OR OTHER UTILITIES RUNNING PARALLEL TO THE DRAIN PIPE IN A SHARED EASEMENT SHALL BE PLACED A MINIMUM OF 5 FEET HORIZONTALLY DISTANCED FROM THE DRAIN PIPE.
- ☐ PIPES ENTERING OR EXITING A CLEANOUT BOX OR MANHOLE SHOULD BE SEALED AND GROUTED.
- ☐ PIPES ENTERING A CLEANOUT BOX OR MANHOLE MUST BE SECURED IN PLACE WITH A CONCRETE COLLAR.
- ☐ CLAY CUTOFFS ARE REQUIRED EVERY 250 FEET ON SEWER AND OTHER LINES THAT ARE DEEPER THAN DRAIN LINES TO PREVENT WATER FROM FOLLOWING THE PIPE TRENCH. CLAY CUTOFFS MUST BE 2 FEET LONG, KEYED INTO THE TRENCH WALLS 1 FOOT, SURROUNDING THE PIPE, AND AS HIGH AS THE DRAIN LINES.

DRAIN LINE CLEANOUT BOXES AND MANHOLES

- ☐ KNOCK OUT BOXES AND MANHOLES ARE NOT ALLOWED. ALL BOXES AND MANHOLES SHALL BE PRE-CAST WITH CORED OPENINGS FOR THE PIPES OR SHALL BE CAST-IN-PLACE.
- ☐ PIPES ENTERING BOXES AND MANHOLES SHOULD BE CONCRETED ON THE OUTSIDE AND GROUTED ON THE INSIDE.
- ☐ LAND DRAIN BOXES AND MANHOLES SHALL NOT BE BURIED, THEY SHALL EXTEND TO THE SURFACE OF THE FINAL GRADE. ANY EXISTING BOXES AND MANHOLES THAT WILL NOT EXTEND TO THE FINAL GRADE SURFACE SHALL BE EXTENDED TO MATCH THE FINAL GRADE.

STORMWATER AND DETENTION BASINS

- ☐ ORIFICE PLATE MUST BE GALVANIZED STEEL OR ALUMINUM.
- ☐ CANAL FLOOR AND EMBANKMENT MATERIAL REMOVED FOR EXCAVATION SHALL BE REPLACED WITH 12-INCH MINIMUM THICKNESS OF 10⁻⁶ CM/SEC PERMEABILITY CLAY MATERIAL, COMPACTED TO 95% STANDARD PROCTOR DENSITY IN 6-INCH MAXIMUM LIFTS.
- ☐ CANAL EMBANKMENT SHALL BE SHAPED TO MATCH THE EXISTING CANAL PRISM.

DIRECTIONAL DRILLING AND MICROTRENCHING

- ☐ WORK CANNOT INTERFERE WITH DELIVERY OF WATER. INSTALLATION ACTIVITIES CAN TAKE PLACE AT ANY TIME PROVIDED WFIC’S ACCESS TO OPERATION, MAINTENANCE, AND REPLACEMENT OF IRRIGATION FACILITIES IS NOT IMPACTED.
- ☐ BORE PITS MUST BE LOCATED OUTSIDE OF CANAL CORRIDOR.
- ☐ 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.
- ☐ BORE PIT COMPACTION SHALL BE 95% STANDARD PROCTOR DENSITY.

BORING

- ☐ BORE PITS MUST BE PLACED COMPLETELY OUTSIDE THE CANAL RIGHT-OF-WAY.
- ☐ 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.
- ☐ BORE PIT COMPACTION SHALL BE A MINIMUM OF 95% STANDARD PROCTOR DENSITY.
- ☐ TRENCH PLUGS ARE TO BE PLACED AT EACH END OF THE CASING.
- ☐ TRENCH PLUGS ARE TO EXTEND THE WIDTH OF TRENCH, 12 INCHES ABOVE AND BELOW CASING PIPES, AND WITH A THICKNESS OF 24 INCHES.
- ☐ TRENCH PLUGS SHALL BE A 10% BENTONITE AND 90% CLAY MIXTURE. AT LEAST 40% OF THE BACKFILL MATERIAL MUST PASS A NO. 200 U.S. STANDARD SIEVE PRIOR TO ADDING BENTONITE POWDER. THE BACKFILL MATERIAL SHALL THEN BE AMENDED BY ADDING AND THOROUGHLY MIXING COMMERCIAL BENTONITE POWDER WITH THE BACKFILL MATERIAL AT A RATIO OF ONE-PART BENTONITE TO NINE PARTS BACKFILL MATERIAL. IMPERMEABLE FLOWABLE FILL IS AN ACCEPTABLE ALTERNATIVE.
- ☐ CONTRACTOR TO NOTIFY KYLE DEVANEY, P.E., OF FRANSON CIVIL ENGINEERS WHEN TRENCH PLUGS ARE INSTALLED. VERIFICATION OF TRENCH PLUG COMPLETION MUST BE PERFORMED BY FRANSON CIVIL ENGINEERS BEFORE BACKFILLING. KYLE CAN BE REACHED AT 801-756-0309.
- ☐ WATER LINE PIPE INSIDE THE CASING SHALL HAVE RESTRAINING JOINTS.
- ☐ THRUST BLOCKS ARE REQUIRED ON ALL BENDS FOR DIP, PVC, OR PIP WATER LINES.

BOX AND PIPE CULVERTS

- ☐ CHANNEL FLOOR AND EMBANKMENT MATERIAL REMOVED FOR EXCAVATION (BETWEEN APRON AND UNDISTURBED CANAL) SHALL BE REPLACED WITH A 12-INCH MINIMUM THICKNESS OF 10⁻⁶ CM/SEC PERMEABILITY CLAY MATERIAL IN 6-INCH MAXIMUM LIFTS.
- ☐ COMPACTION AROUND THE BOX CULVERTS TO MEET MANUFACTURER REQUIREMENTS OR A MINIMUM OF 95% STANDARD PROCTOR DENSITY.
- ☐ CHANNEL EMBANKMENT SHALL BE SHAPED TO MATCH THE EXISTING CHANNEL PRISM.
- ☐ OPEN-CUT TRENCHES FOR THE CUTOFF WALLS SHALL BE CUT AT A MINIMUM OF 2 HORIZONTAL TO 1 VERTICAL SO THAT BACKFILL CAN BE PROPERLY COMPACTED.
- ☐ IF EXTENDING AN EXISTING BOX CULVERT, WATERSTOP RX, SWELLSTOP, OR AN APPROVED EQUIVALENT, SHALL BE PLACED BETWEEN THE OLD CULVERT AND THE NEW CULVERT TO PREVENT SEEPAGE. MASTIC IS NOT ACCEPTABLE.
- ☐ CONDUITS SHOWN ON THESE DRAWINGS DO NOT GIVE PERMISSION FOR THE CONDUIT TO BE OCCUPIED BY AN ENTITY OTHER THAN THE ORIGINAL APPLICANT. EACH ENTITY CROSSING THE CANAL MUST APPLY FOR, AND RECEIVE, AN ENCROACHMENT AGREEMENT FROM SIDG.

EASEMENTS

ADD THE FOLLOWING NOTES TO THE PLAT MAP

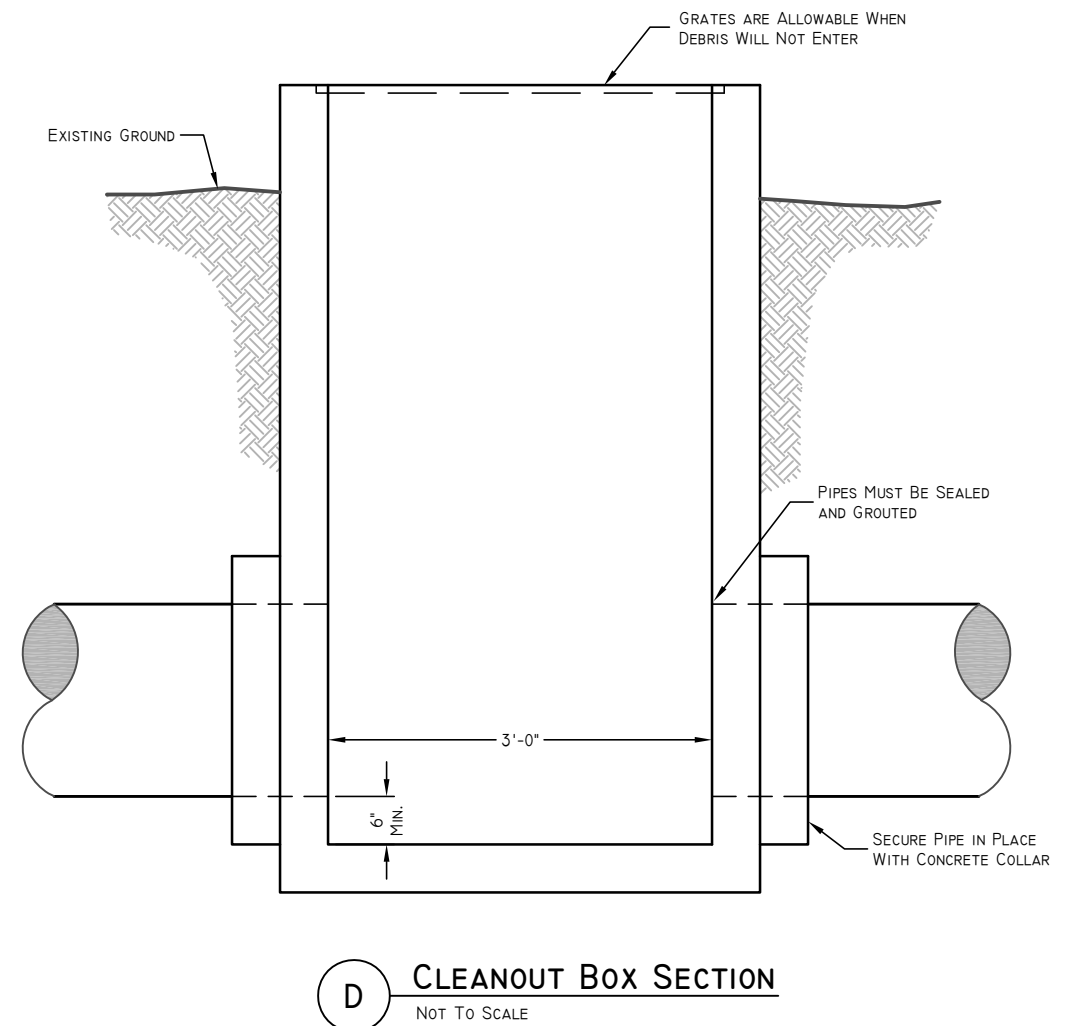
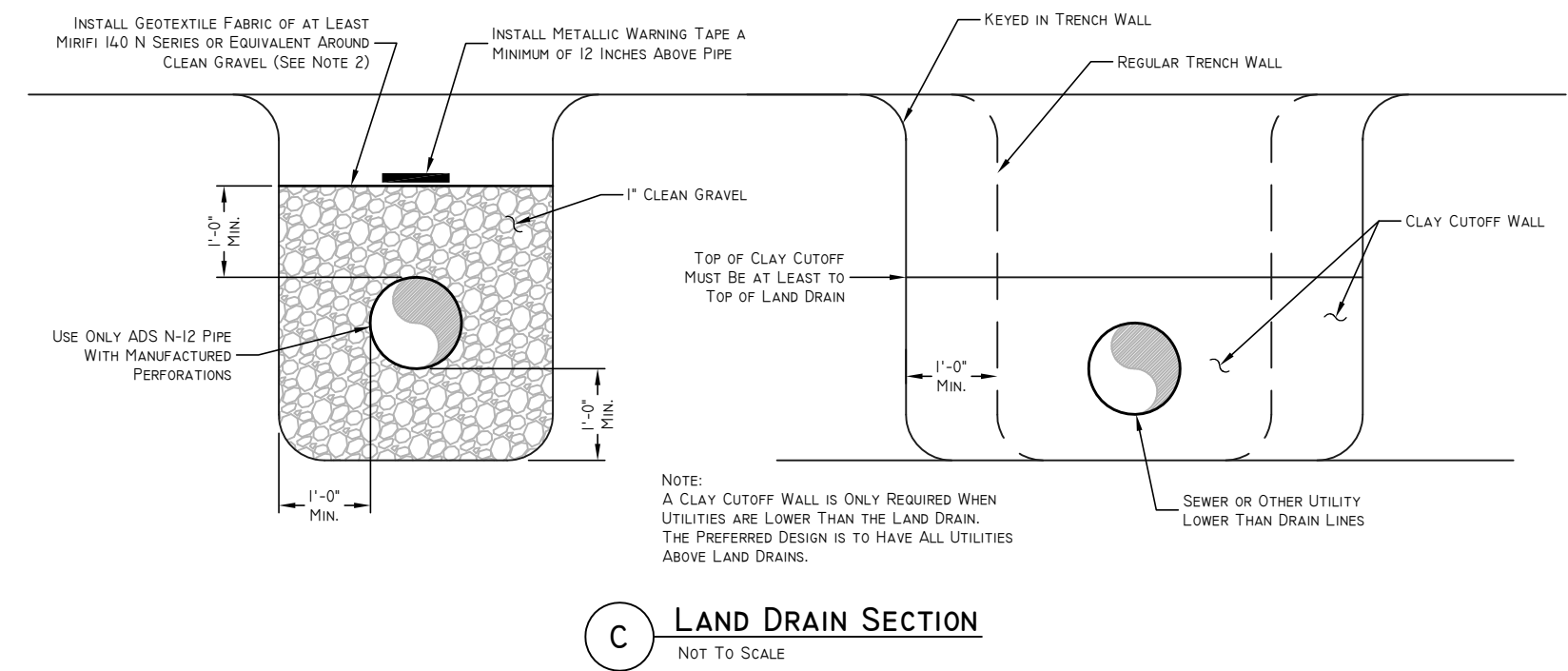
- ☐ NO TREES, SHRUBS, TELEPHONE BOXES, OR POWER BOXES ARE ALLOWED IN BENJAMIN DRAINAGE DISTRICT EASEMENTS.
- ☐ FENCES DISTURBED DURING CONSTRUCTION ACTIVITIES MUST BE REPLACED AND RETURNED TO PRE-CONSTRUCTION CONDITION, OR BETTER.
- ☐ LAND DRAIN BOXES MAY NOT BE FENCED IN YARDS. DIRECT ACCESS (NOT THROUGH FENCES) MUST BE PROVIDED TO BENJAMIN DRAINAGE DISTRICT FROM CITY STREETS.

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 FACILITIES ARE DESIGNED PROPERLY.

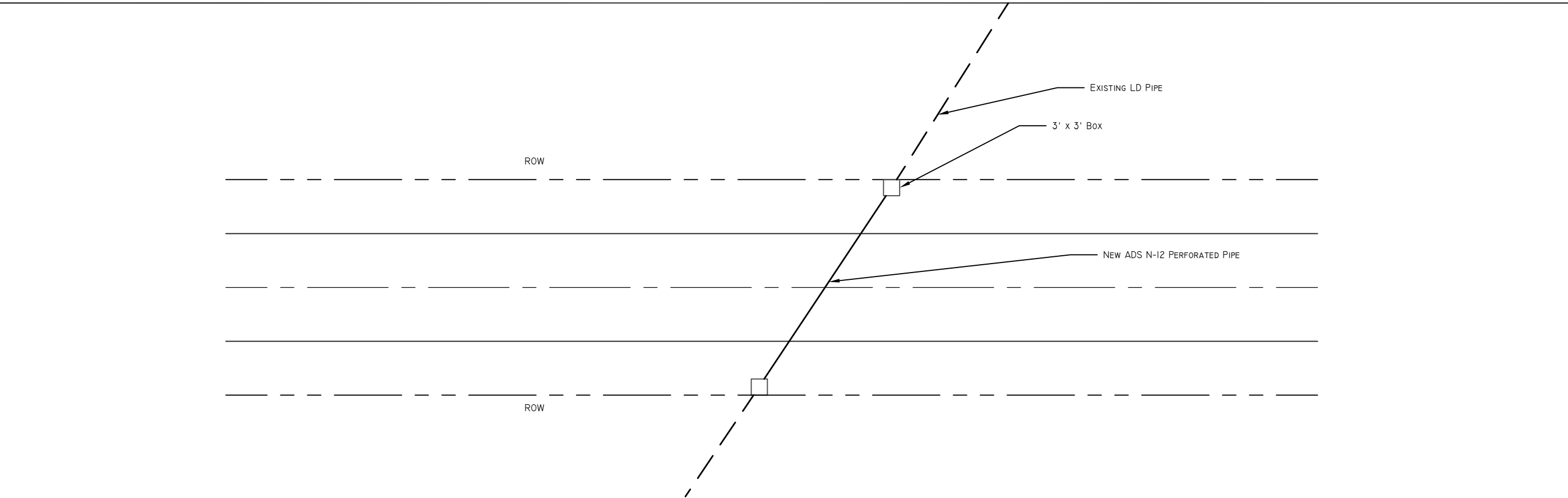
BY USING ANY DETAILS IN THESE DRAWINGS, YOU ACKNOWLEDGE THAT YOU HAVE VERIFIED THE STANDARD DRAWING DETAIL IS ADEQUATE FOR INCORPORATING INTO YOUR DESIGN. FRANSON CIVIL ENGINEERS WILL NOT BE HELD LIABLE FOR ANY USE OF THESE DRAWINGS.

| | | | | | | | | | | | |
|---|------------|----------|------------|----------------|----------------|--|--------------------------|--|--|-------------------------------------|--|
| Benjamin Drainage District | | | | | | | | | | 2837 W 7300 S Benjamin, UT 84660 | |
| | | | | | | | | | | | |
| BENJAMIN DRAINAGE DISTRICT STANDARD DRAWINGS BDD NOTES | DESIGNER: | ENGINEER | CHECKED: | PROJECT LEADER | PROJECT LEADER | | REVISIONS DESCRIPTION | | | | |
| | | | | | PROJECT LEADER | | | | | | |
| | DRAFTSMAN: | DRAWN BY | PRINT DATE | | March 27, 2025 | | | | | | |
| | | | | | | | | | | | |
| | NO. | DATE | INTS. | | | | | | | | |
| 02_General Notes.dwg 03-22080 BENJAMIN DD Reviews 2023 Standard Drawings | | | | | | | | | | JOB NO. 22080 | |
| LAYOUT: Cover | | | | | | | | | | | |
| SHEET 2 OF 9 | | | | | | | | | | | |

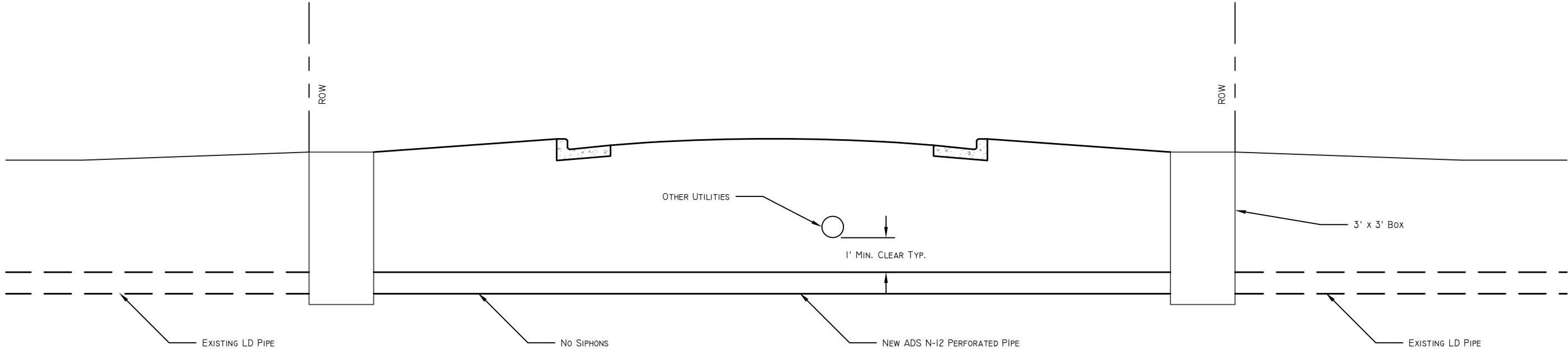


- NOTES:**
1. LAND DRAINS TO BE 8 INCHES MINIMUM OR DIAMETER TO MATCH EXISTING DRAIN.
 2. SUBMIT SOILS REPORT:
 - 2.1. IF NATIVE SOIL MATERIAL IS LESS THAN 20% FINES, A GEOTEXTILE FABRIC OR MIRAFI 140 OR EQUIVALENT SHOULD BE WRAPPED AROUND THE 1" CLEAN CRUSHED GRAVEL.
 - 2.2. IF 20% OR MORE FINES, THE GEOTEXTILE FABRIC ONLY NEEDS TO COVER THE TOP OF THE BACKFILLED 1" CLEAN CRUSHED GRAVEL ACROSS THE ENTIRE WIDTH OF TRENCH.
 3. ALL BACKFILL MATERIALS TO BE COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR DENSITY.
 4. KNOCKOUT BOXES ARE NOT ALLOWED.

[illegible]

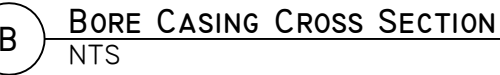
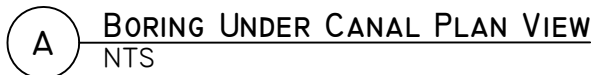


A ROAD CONSTRUCTION CROSSING EXISTING DRAIN PLAN VIEW
NOT TO SCALE

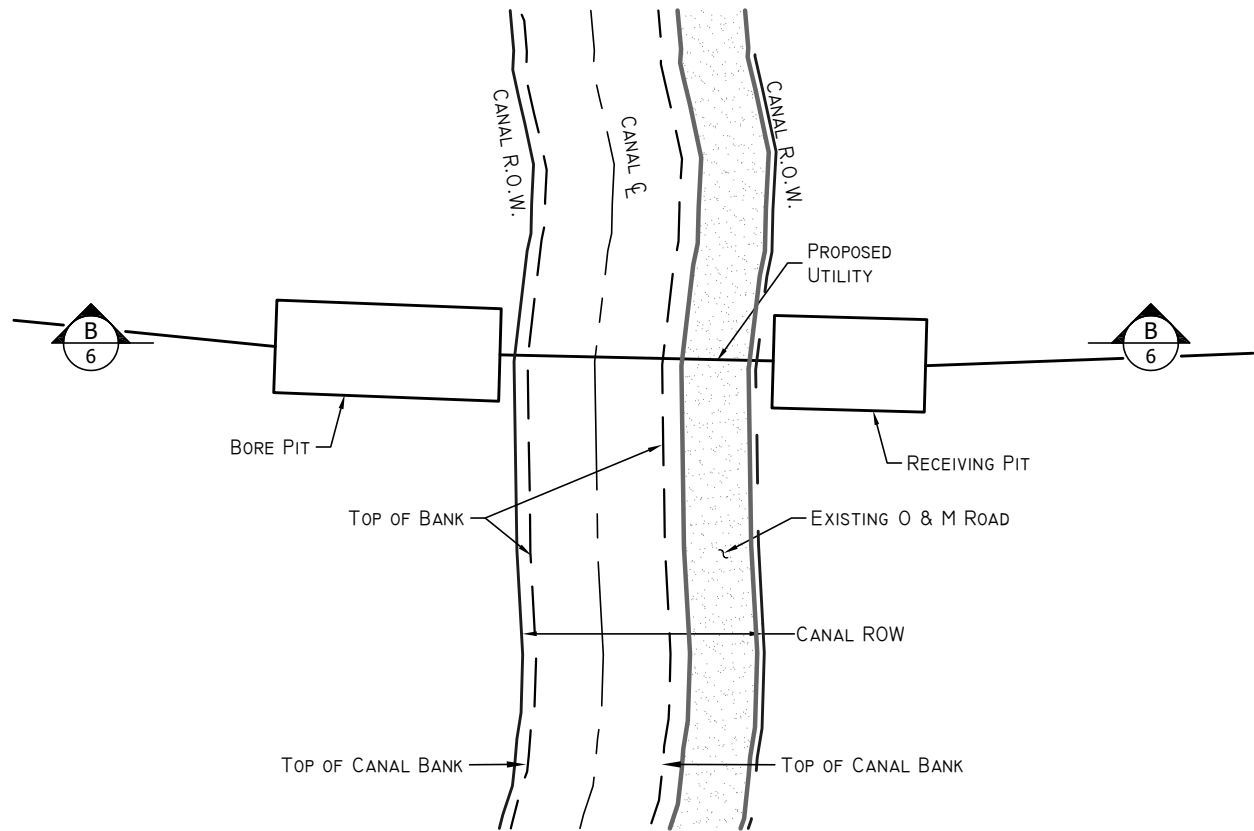


B ROAD CONSTRUCTION CROSSING EXISTING DRAIN PROFILE VIEW
NOT TO SCALE

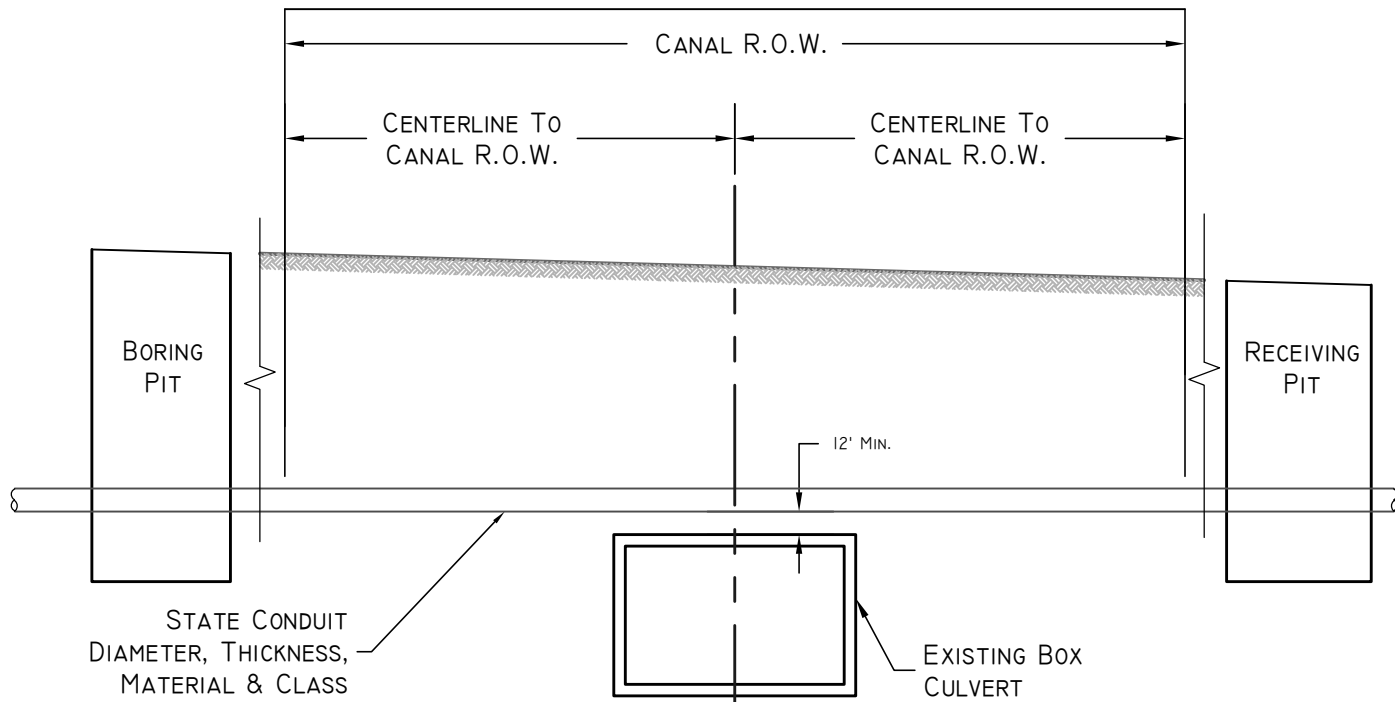
| | | | | | | | |
|--|--|-------------------------------------|-----------|-----------|-----------|-----------------|-----------------|
| Benjamin Drainage District | | 2837 W 7300 S Benjamin, UT 84660 | | | | | |
| | | | | | | | |
| BENJAMIN DRAINAGE DISTRICT STANDARD DRAWINGS ROAD CROSSING DETAILS | | DESIGNER: | ENGINEER: | CHECKED: | CHECKED: | PROJECT LEADER: | PROJECT LEADER: |
| | | DRAFTSMAN: | DRAWN BY: | REVIEWED: | REVIEWED: | PRINT DATE: | PRINT DATE: |
| 04_Road Crossing Details.dwg 03/2080 BENJAMIN DD Reviews 2023 Standard Drawings LAYOUT: Directional Drilling | | NO. | | DATE | | DESCRIPTION | |
| | | | | | | | |
| JOB NO. 22080 | | DATE | | DATE | | DATE | |
| | | | | | | | |
| SHEET | | 4 | | OF | | 9 | |



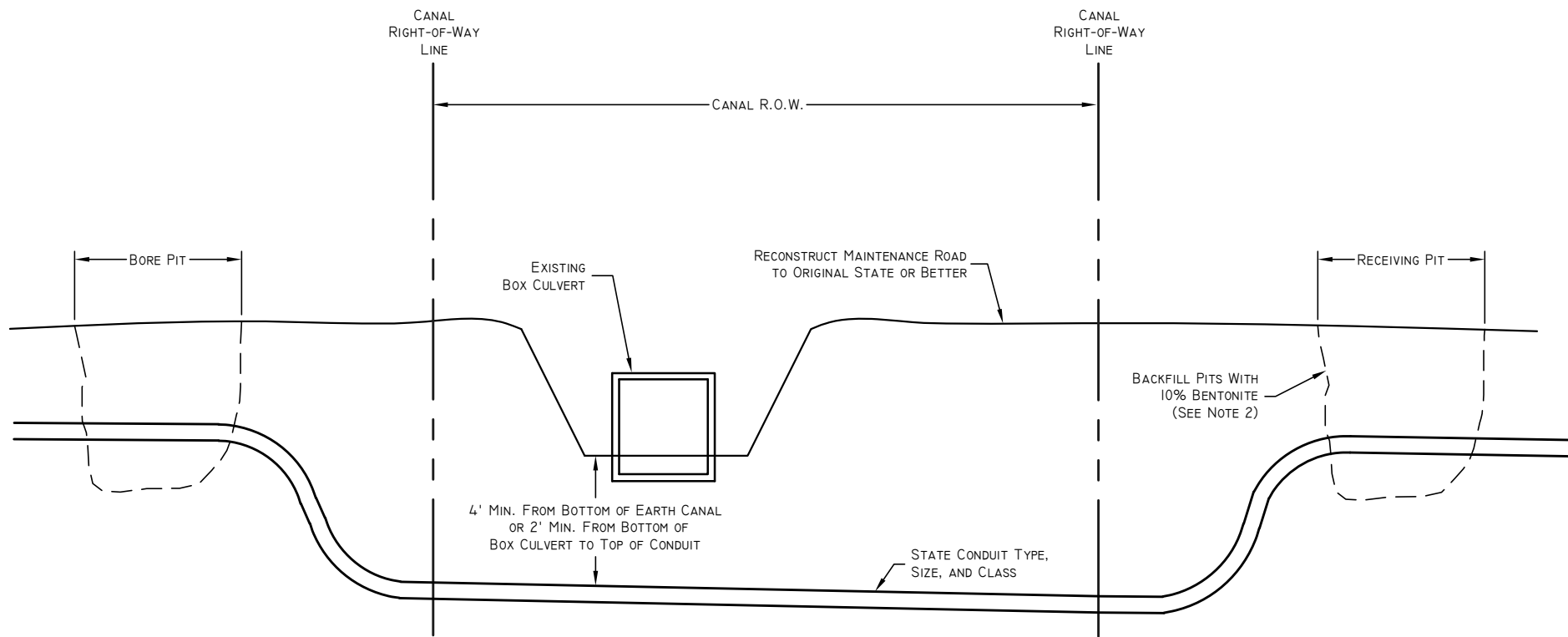
| DIAMETER (INCHES) | MINIMUM WALL THICKNESS (INCHES) |
|----------------------|---------------------------------------|
| 12" | 0.188" |
| 14" - 16" | 0.312" |
| 18" | 0.312" |
| 20" - 22" | 0.375" |
| 24" - 26" | 0.438" |
| 28" - 32" | 0.500" |
| 34" - 36" | 0.562" |
| 38" - 42" | 0.562" |



A DIRECTIONAL DRILL OR MICROTRENCH PLAN
NTS



B DIRECTIONAL DRILL OR MICROTRENCH ABOVE CANAL CROSS SECTION
NTS

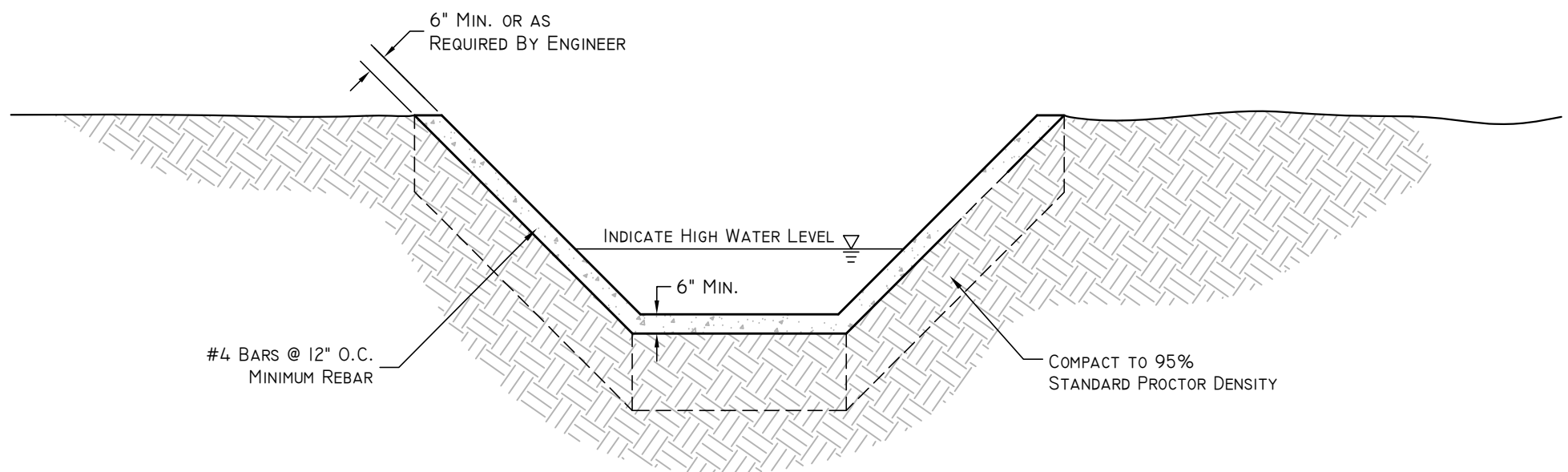
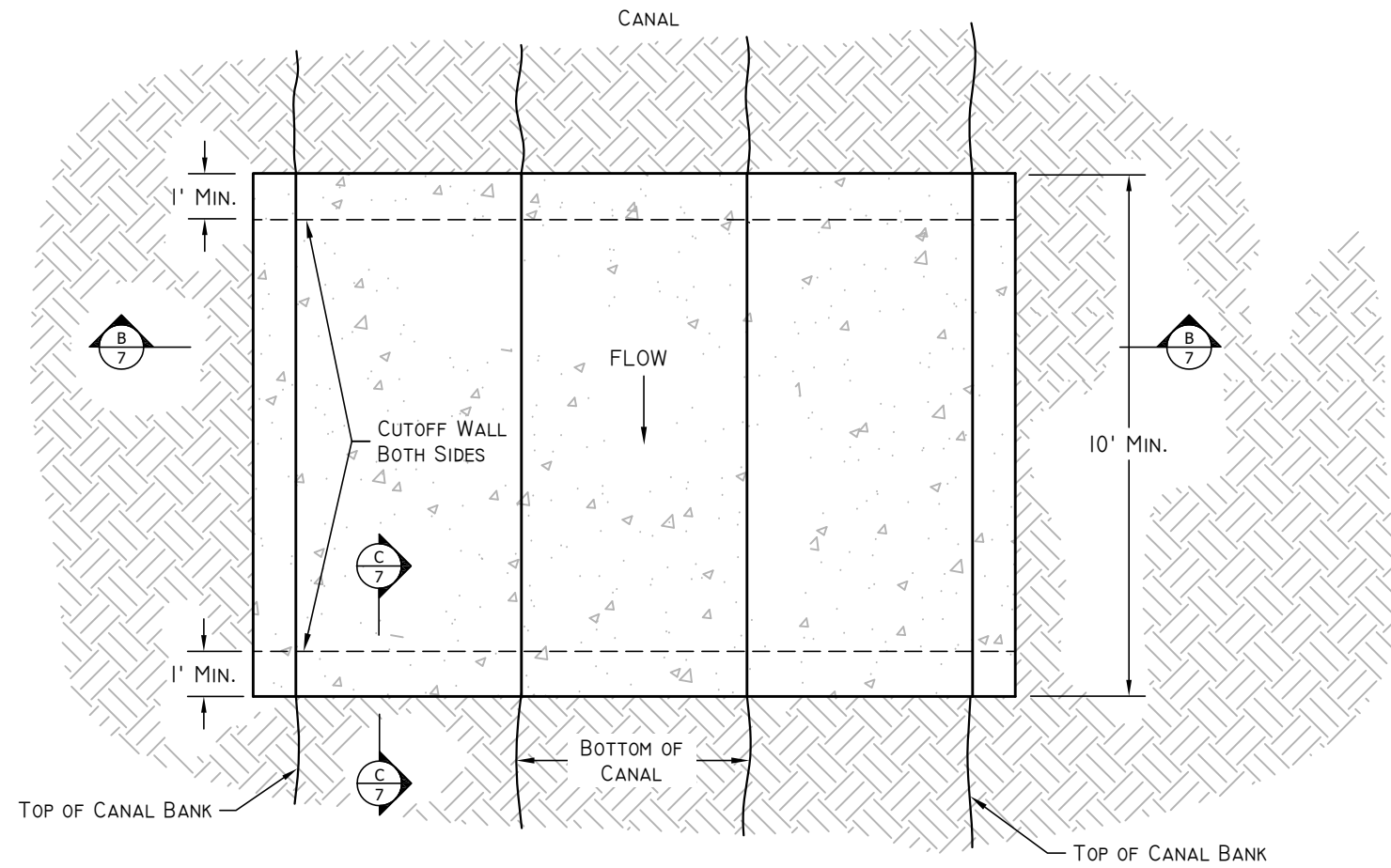
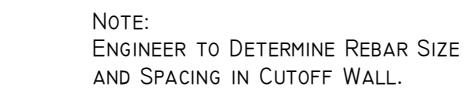


B DIRECTIONAL DRILL UNDER CANAL CROSS SECTION
NTS

NOTES:

1. BORE PIT COMPACTION TO BE 95% STANDARD PROCTOR DENSITY.
2. 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.
3. CONDUIT MUST BE A MINIMUM OF 2 FEET BELOW THE BOTTOM OF THE EXISTING CANAL BOX CULVERT OR 4 FEET BELOW EARTHEN CANAL BOTTOM.
4. BORE PITS MUST BE COMPLETELY PLACED OUTSIDE OF THE CANAL RIGHT-OF-WAY.

| | | | | | | | |
|--|--|--|--|--|--|--|--|
| Benjamin Drainage District | | | | 2837 W 7300 S Benjamin, UT 84660 | | | |
| STANDARD DRAWINGS | | | | 06-ULDC Directional Drilling.dwg 03/2080 BENJAMIN DD Reviews 2022 Standard Drawings | | | |
| DIRECTIONAL DRILLING AND MICROTRENCHING DETAILS | | | | JOB NO. 22080 SHEET 6 OF 9 | | | |
| DESIGNER: ENGINEER: DRAFTSMAN: DRAWN BY: CHECKED: REVIEWED: PROJECT LEADER: PROJECT DATE: MARCH 27, 2025 | | | | NO. DATE DESCRIPTION | | | |
| BENJAMIN DRAINAGE DISTRICT | | | | LAYOUT: Details | | | |

[illegible]




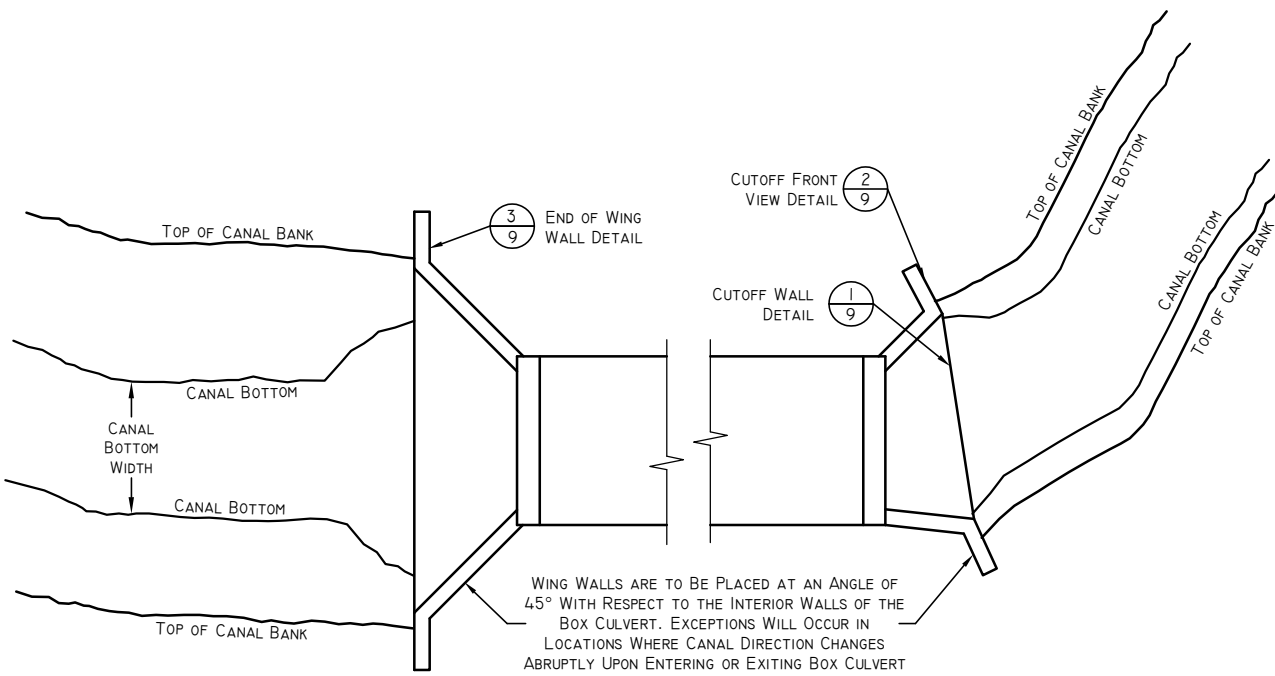
1. REMOVAL AND REPLACEMENT OF CANAL FLOOR AND BANKS WILL REQUIRE TESTING AND PROCTORS BY A LICENSED SOILS LAB. COMPACTION TO BE 95% STANDARD PROCTOR DENSITY.
2. TRENCH PLUGS ARE TO BE PLACED IN LOCATIONS SHOWN ON BOTH SIDES FOR WIDTH OF TRENCH AND 12 INCHES ABOVE AND BELOW CASING PIPES AND A MINIMUM THICKNESS OF 24 INCHES. PLUGS SHALL BE A 10% BENTONITE AND 90% CLAY MIXTURE, OR SHALL BE A FLOWABLE FILL CONCRETE.
3. 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.
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 4' MIN. FROM BOTTOM OF EARTH CANAL OR 2' MIN. FROM BOTTOM OF BOX CULVERT.
7. CONCRETE LINER IS TO BE INSTALLED IN THE CANAL EXTENDING 5 FEET PAST THE EXTENTS OF CANAL DISTURBANCE SEE DETAIL. 
8. CARRIER PIPE SHALL HAVE ADEQUATE CASING SPACERS.

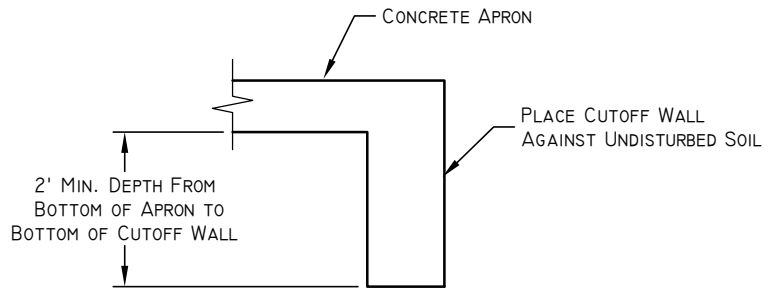
TABLE I
STEEL CASING THICKNESS

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

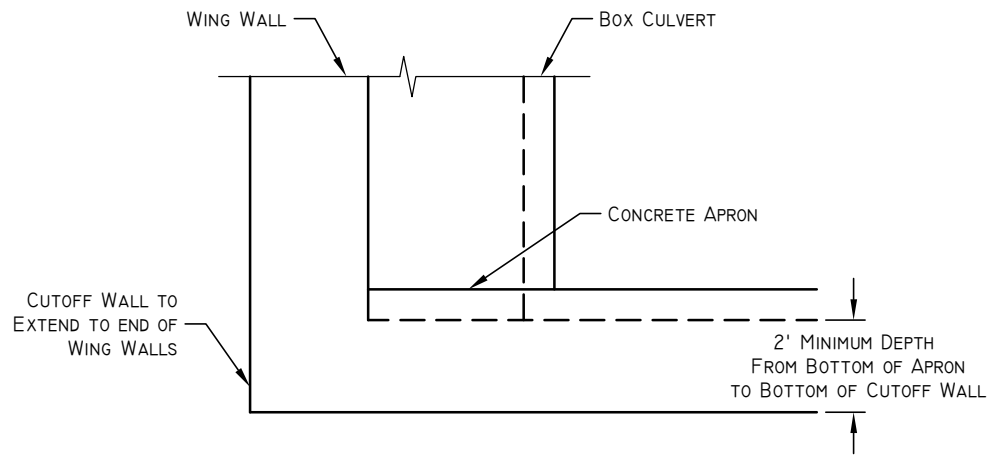


A PLAN VIEW OF BOX CULVERT
NTS

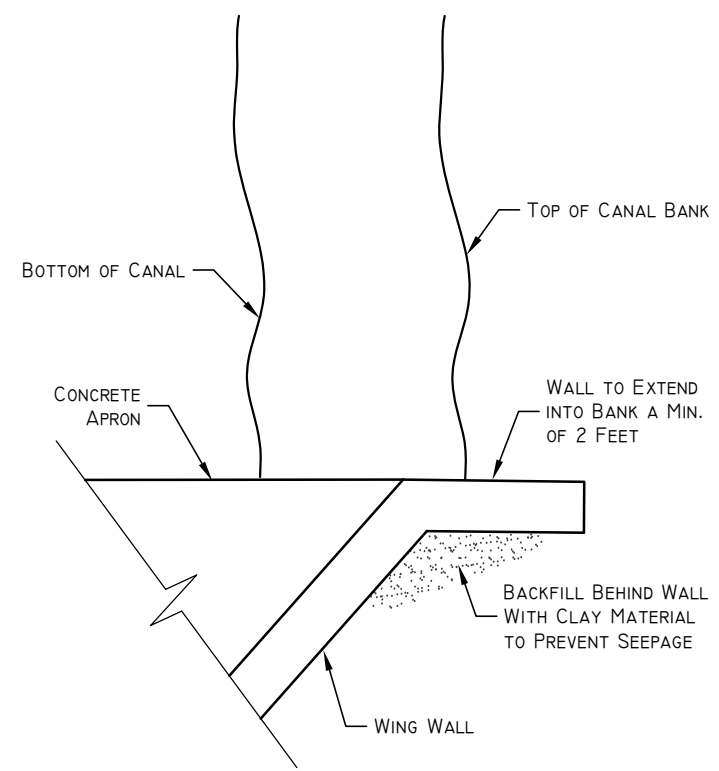
- NOTES:**
- 1. BOX CULVERTS TO HAVE A MINIMUM HEIGHT OF 6 FEET.
 - 2. WIDTH OF BOX CULVERT IS TO MATCH EXISTING CHANNEL BOTTOM.
 - 3. NO RIPRAP ALLOWED IN THE CANAL.
 - 4. ACCESS TO CANAL OPERATION AND MAINTENANCE ROAD SHALL BE INSTALLED WITH CURB CUTS AT DRIVE APPROACHES AND THICKENED CONCRETE AT SIDEWALKS.
 - 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

| | | | |
|--|--|--|--|
| Benjamin Drainage District | | 2837 W 7300 S Benjamin, UT 84660 | |
| | | | |
| PROJECT LEADER | | PROJECT LEADER | |
| March 27, 2025 | | March 27, 2025 | |
| PROJECT LEADER | | PROJECT LEADER | |
| FRONT DATE | | FRONT DATE | |
| CHECKED | | CHECKED | |
| REVIEWED | | REVIEWED | |
| REVISIONS | | REVISIONS | |
| DESCRIPTION | | DESCRIPTION | |
| NO. | | NO. | |
| DATE | | DATE | |
| ENGINEER | | ENGINEER | |
| DRAWN BY | | DRAWN BY | |
| DRAFTSMAN | | DRAFTSMAN | |
| NO. | | NO. | |
| DATE | | DATE | |
| BENJAMIN DRAINAGE DISTRICT | | BENJAMIN DRAINAGE DISTRICT | |
| STANDARD DRAWINGS | | STANDARD DRAWINGS | |
| BOX CULVERT DETAILS | | BOX CULVERT DETAILS | |
| 09-ULDC Box Culvert Details.dwg | | 09-ULDC Box Culvert Details.dwg | |
| 03/2080 BENJAMIN DD Reviews 2022 Standard Drawings | | 03/2080 BENJAMIN DD Reviews 2022 Standard Drawings | |
| LAYOUT: Details | | LAYOUT: Details | |
| JOB NO. | | JOB NO. | |
| 22080 | | 22080 | |
| SHEET | | SHEET | |
| 9 | | 9 | |
| OF | | OF | |