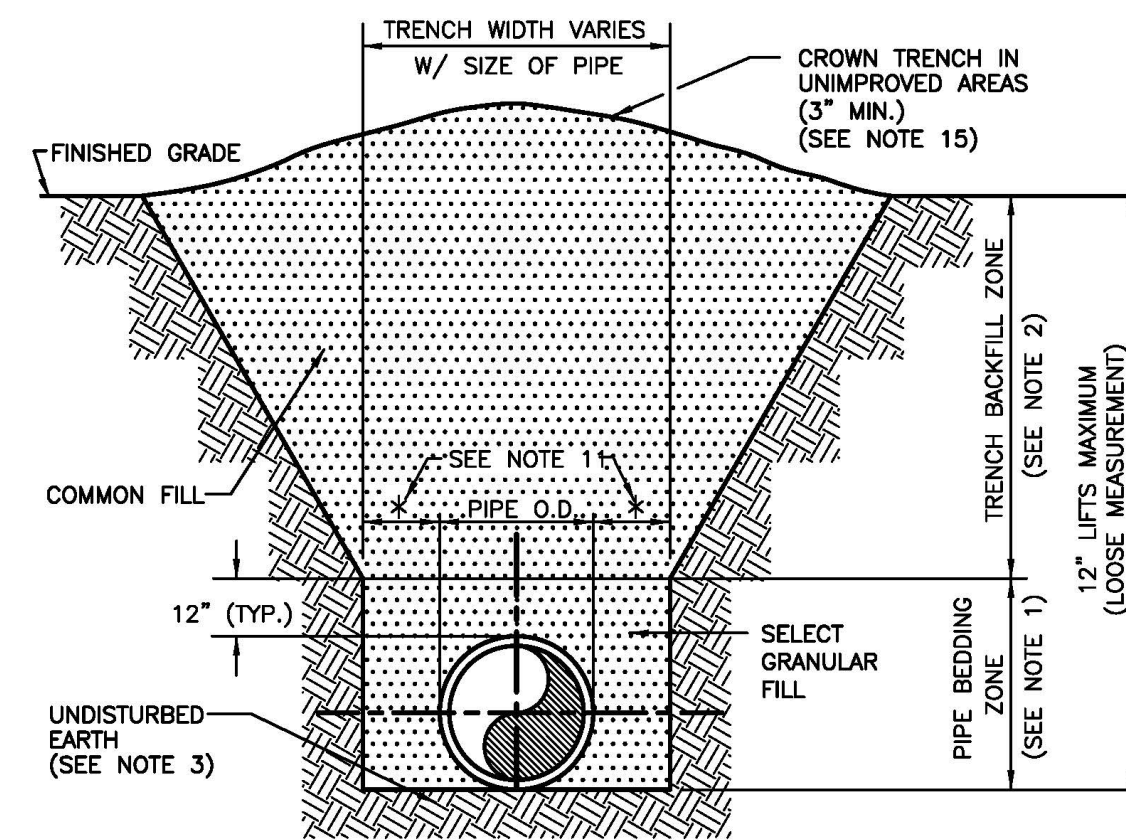


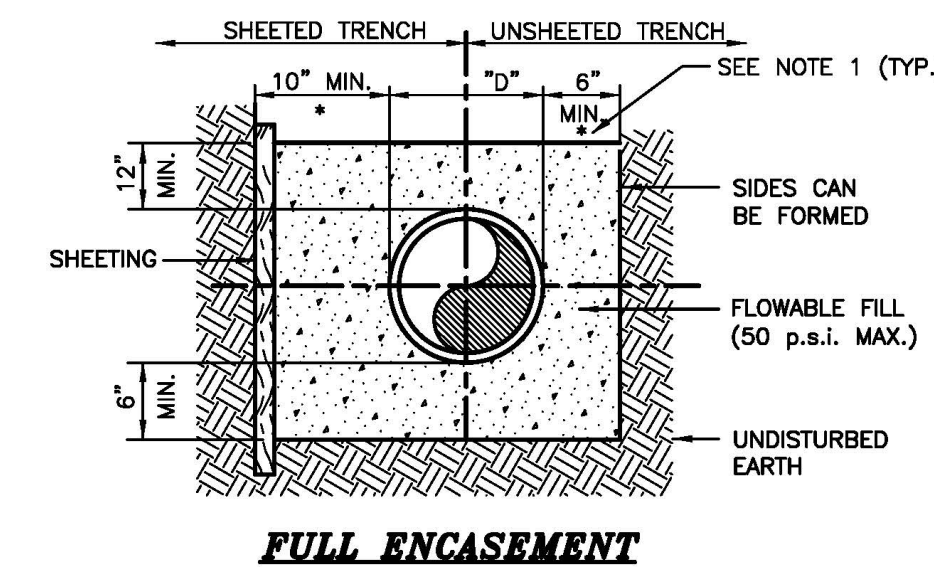
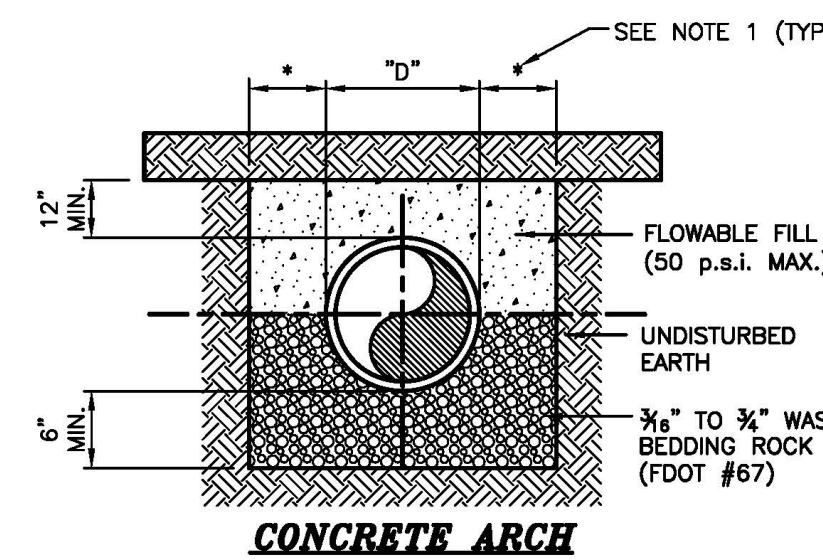
- NOTES:**
1. PIPE BEDDING: SELECT BEDDING ROCK TAMPED IN PLACE.
  2. GRADE AND SHAPE PIPE BED TO EVENLY SUPPORT PIPE AT THE PROPER LINE AND GRADE, WITH FULL CONTACT UNDER THE BOTTOM OF THE PIPE.
  3. INSTALL PIPE AND SYSTEM COMPONENTS.
  4. PLACE BEDDING SIMULTANEOUSLY ON BOTH SIDES OF THE PIPE. CORRECT ANY PIPE DISPLACEMENTS BEFORE PROCEEDING.
  5. IN THE PIPE BEDDING ZONE, PLACE BEDDING IN LIFTS NOT GREATER THAN 6" THICKNESS TO 12" MINIMUM ABOVE THE TOP OF THE PIPE.
  6. IN THE TRENCH BACKFILL ZONE, PLACE COMMON FILL IN LIFTS NOT GREATER THAN 12" THICKNESS AND COMPACT TO 98% OF MAXIMUM DENSITY PER AASHTO T-180 TO THE BOTTOM OF THE SUBGRADE OR THE TOP OF TRENCH IN UNIMPROVED AREAS.
  7. USE TYPE A BEDDING TO BE DETERMINED IN THE FIELD AS DIRECTED BY THE CITY OF MIRAMAR.
  8. IF REQUIRED IN THE CONTRACT DOCUMENTS OR IF APPROVED BY THE CITY OR ITS REPRESENTATIVE, FLOWABLE MORTAR OR CONTROLLED LOW STRENGTH MATERIAL MAY BE USED IN LIEU OF OTHER BEDDING MATERIAL TYPES.
  9. SECURE PIPE AGAINST DISPLACEMENT OR FLOTATION BEFORE PLACING FLOWABLE MORTAR OR CONCRETE ENCASEMENT.
  10. CONCRETE ENCASEMENT: INSTALL WHERE SHOWN IN THE PLANS.
  11. (\*): 18" MAXIMUM FOR PIPE DIAMETER LESS THAN 24", AND 24" MAXIMUM FOR PIPE DIAMETER 24" AND LARGER.
  12. WATER SHALL NOT BE PERMITTED IN THE TRENCH DURING CONSTRUCTION. UNLESS OTHERWISE APPROVED BY THE CITY.
  13. ALL PIPE TO BE INSTALLED WITH BELL FACING UPSTREAM TO THE DIRECTION OF THE FLOW.
  14. REFER TO SECTION 2.18-E OF THE MANUAL FOR SHEETING AND BRACING IN EXCAVATIONS.
  15. GRAVITY SEWERS SHALL UTILIZE TYPE A BEDDING. BEDDING DEPTH SHALL BE 4" MINIMUM FOR PIPE DIAMETER LESS THAN 15" AND 6" MINIMUM FOR PIPE DIAMETER 15" AND LARGER.
  16. DEPTH FOR REMOVAL OF UNSUITABLE MATERIAL SHALL GOVERN DEPTH OF BEDDING ROCK BELOW THE PIPE. CITY OF MIRAMAR SHALL DETERMINE IN THE FIELD REQUIRED REMOVAL OF UNSUITABLE MATERIAL TO REACH SUITABLE FOUNDATION.
  17. UNSUITABLE MATERIAL INCLUDES ORGANIC MATERIAL, BEDROCK, LIMESTONE FILL, BOULDERS, ETC.

**TYPE A BEDDING AND TRENCHING DETAIL**



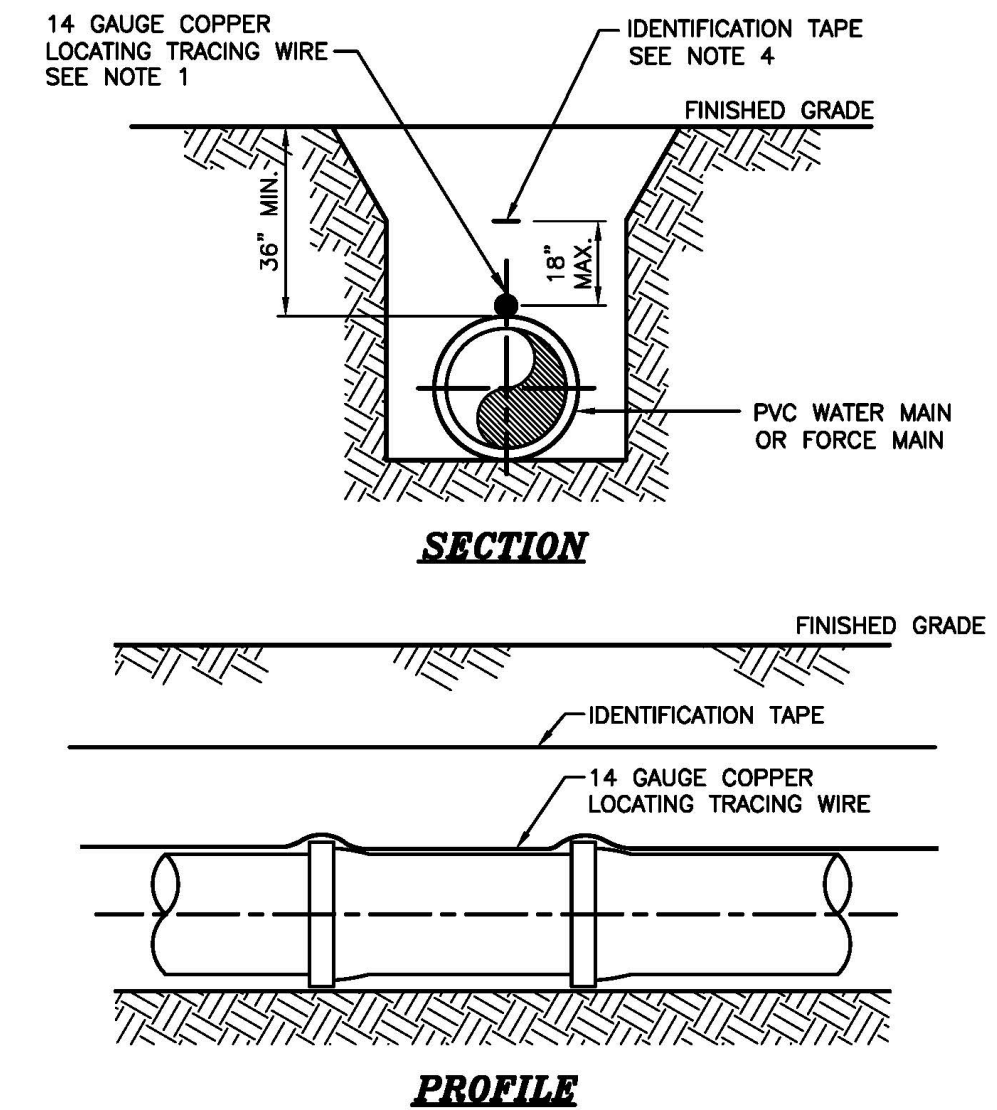
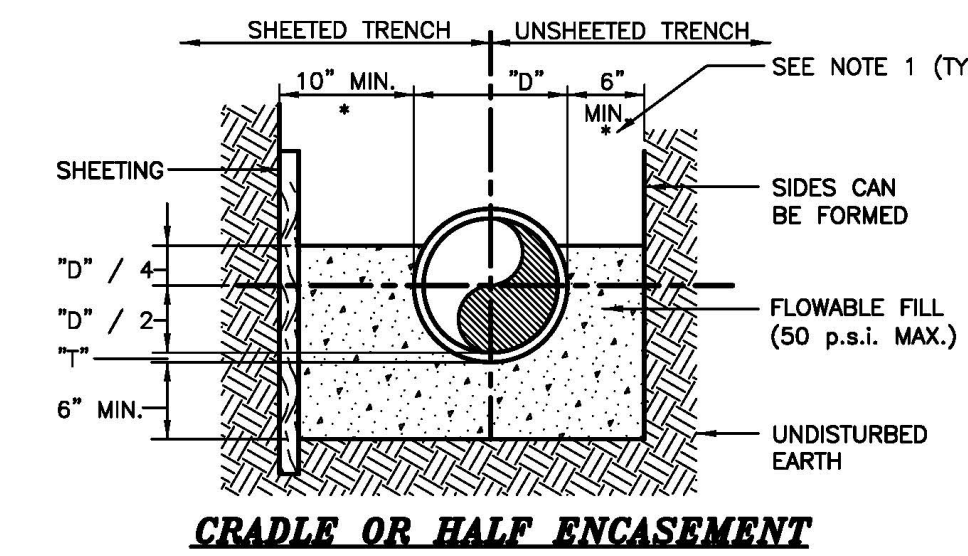
- NOTES:**
1. PIPE BEDDING: SELECT GRANULAR FILL COMPACTED TO 98% OF THE MAXIMUM DENSITY AS PER AASHTO T-180.
  2. TRENCH BACKFILL: COMMON FILL IN 12" MAX. LIFTS COMPACTED TO 98% OF THE MAXIMUM DENSITY AS PER AASHTO T-180.
  3. PIPE BEDDING UTILIZING SELECT COMMON FILL OR BEDDING ROCK IN ACCORDANCE WITH TYPE "A" BEDDING AND TRENCHING DETAIL MAY BE REQUIRED AS DIRECTED BY THE CITY OF MIRAMAR.
  4. GRADE AND SHAPE PIPE BED TO EVENLY SUPPORT PIPE AT THE PROPER LINE AND GRADE, WITH FULL CONTACT UNDER THE BOTTOM OF THE PIPE.
  5. INSTALL PIPE AND SYSTEM COMPONENTS.
  6. PLACE BEDDING SIMULTANEOUSLY ON BOTH SIDES OF THE PIPE. CORRECT ANY PIPE DISPLACEMENTS BEFORE PROCEEDING.
  7. IN THE TRENCH BACKFILL ZONE, PLACE BEDDING IN LIFTS NOT GREATER THAN 12" THICKNESS AND COMPACT TO 98% OF MAXIMUM DENSITY PER AASHTO T-180 TO THE BOTTOM OF THE SUBGRADE OR THE TOP OF TRENCH IN UNIMPROVED AREAS.
  8. IF REQUIRED IN THE CONTRACT DOCUMENTS OR IF APPROVED BY THE CITY OR ITS REPRESENTATIVE, FLOWABLE MORTAR OR CONTROLLED LOW STRENGTH MATERIAL MAY BE USED IN LIEU OF OTHER BEDDING MATERIAL TYPES.
  9. SECURE PIPE AGAINST DISPLACEMENT OR FLOTATION BEFORE PLACING FLOWABLE MORTAR OR CONCRETE ENCASEMENT.
  10. CONCRETE ENCASEMENT: INSTALL WHERE SHOWN IN THE PLANS.
  11. (\*): 18" MAXIMUM FOR PIPE DIAMETER LESS THAN 24", AND 24" MAXIMUM FOR PIPE DIAMETER 24" AND LARGER.
  12. WATER SHALL NOT BE PERMITTED IN THE TRENCH DURING CONSTRUCTION. UNLESS OTHERWISE APPROVED BY THE CITY.
  13. ALL PIPE TO BE INSTALLED WITH BELL FACING UPSTREAM TO THE DIRECTION OF THE FLOW.
  14. REFER TO SECTION 2.18-E OF THE MANUAL FOR SHEETING AND BRACING IN EXCAVATIONS.
  15. FINAL RESTORATION IN IMPROVED AREAS SHALL BE IN COMPLIANCE WITH THE CITY OF MIRAMAR. SURFACE RESTORATION WITHIN CITY OR COUNTY RIGHT-OF-WAY SHALL COMPLY WITH THE APPLICABLE REGULATIONS.

**TYPE B BEDDING AND TRENCHING DETAIL**



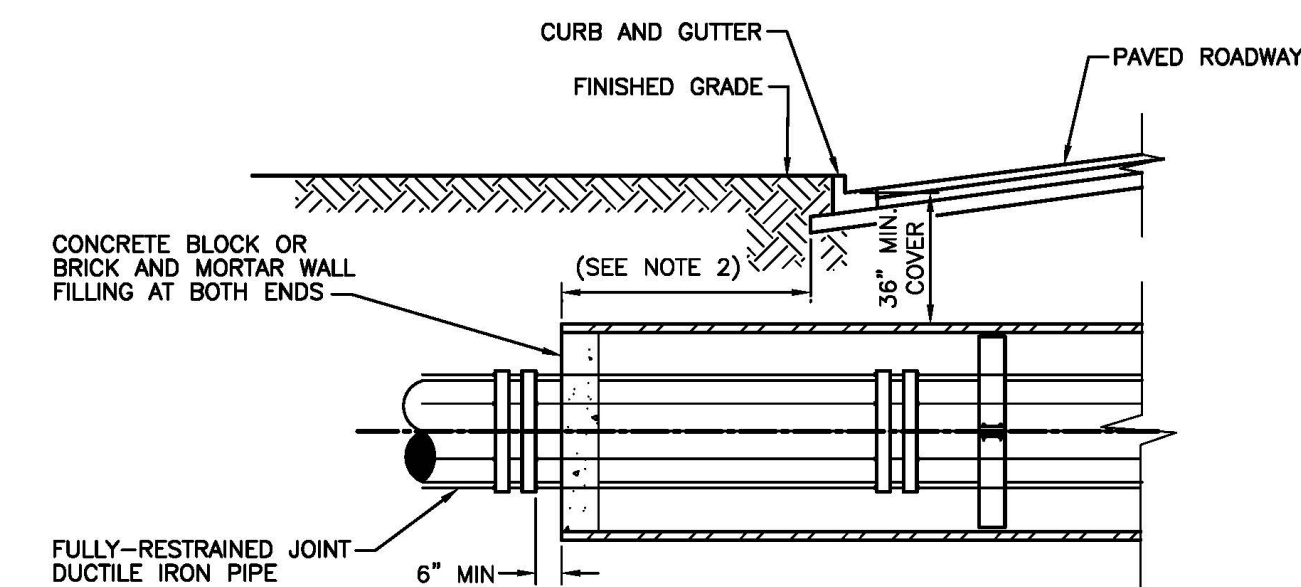
- NOTES:**
1. (\*): 15" MAX. FOR PIPE DIAMETER LESS THAN 24", AND 24" MAX. FOR PIPE DIAMETER 24" AND OVER.
  2. "D" REFERS TO THE DIAMETER OF THE PIPE.
  3. "T" REFERS TO THE THICKNESS OF THE PIPE.
  4. USE OF CONCRETE ARCH HALF ENCASEMENT OR FULL ENCASEMENT TO BE DETERMINED IN THE FIELD AS DIRECTED BY THE CITY OF MIRAMAR.

**CONCRETE ARCH AND ENCASEMENT DETAILS**

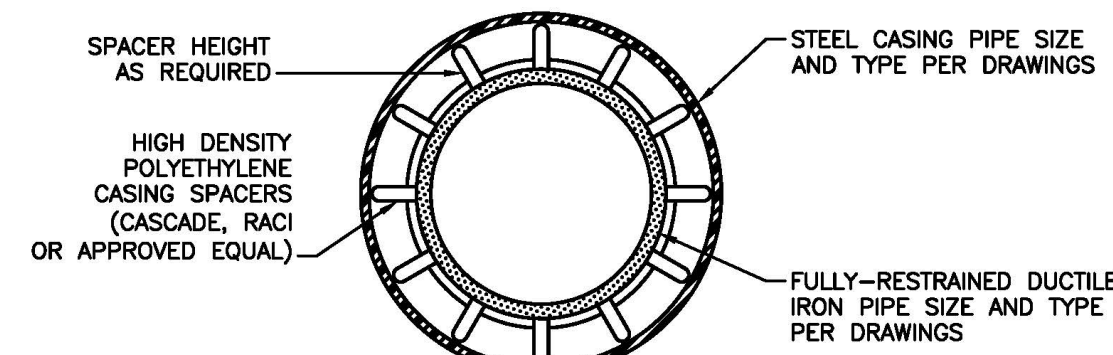


- NOTES:**
1. PVC PIPE SHALL REQUIRE INSULATED METALLIC LOCATING TRACING WIRE (14 GAUGE COPPER) CAPABLE OF DETECTION BY A CABLE LOCATOR AND SHALL BE BURIED DIRECTLY ON TOP OF THE PIPE AT CENTERLINE.
  2. LOCATING WIRE SHALL TERMINATE AT THE TOP OF EACH VALVE BOX AND BE CAPABLE OF EXTENDING 12" ABOVE TOP OF BOX IN SUCH A MANNER SO AS NOT TO INTERFERE WITH VALVE OPERATION.
  3. USE PLASTIC CLIPS AS NECESSARY TO HOLD WIRE DIRECTLY ON THE TOP OF THE PIPE.
  4. DETECTABLE IDENTIFICATION TAPE SHALL BE INSTALLED DIRECTLY OVER CENTERLINE OF ALL PIPE AT 18-INCHES ABOVE THE TOP OF THE PIPE. SEE "ENGINEERING STANDARDS," SECTIONS 4.03-P, 6.03-N AND 8.03-I FOR FURTHER DETAILS.

**PVC PIPE LOCATING WIRE AND IDENTIFICATION TAPE DETAIL**



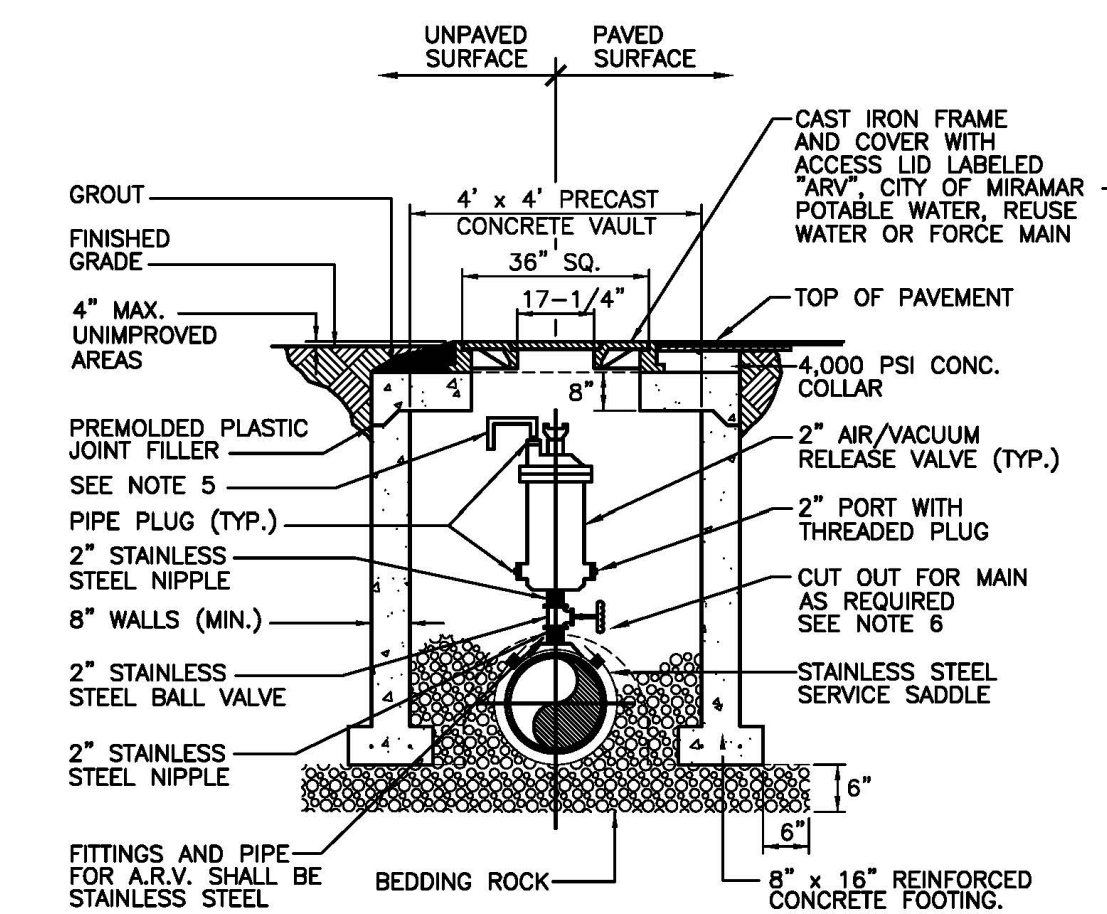
**CASING SPACING DETAIL**



**CASING SPACERS - END VIEW**

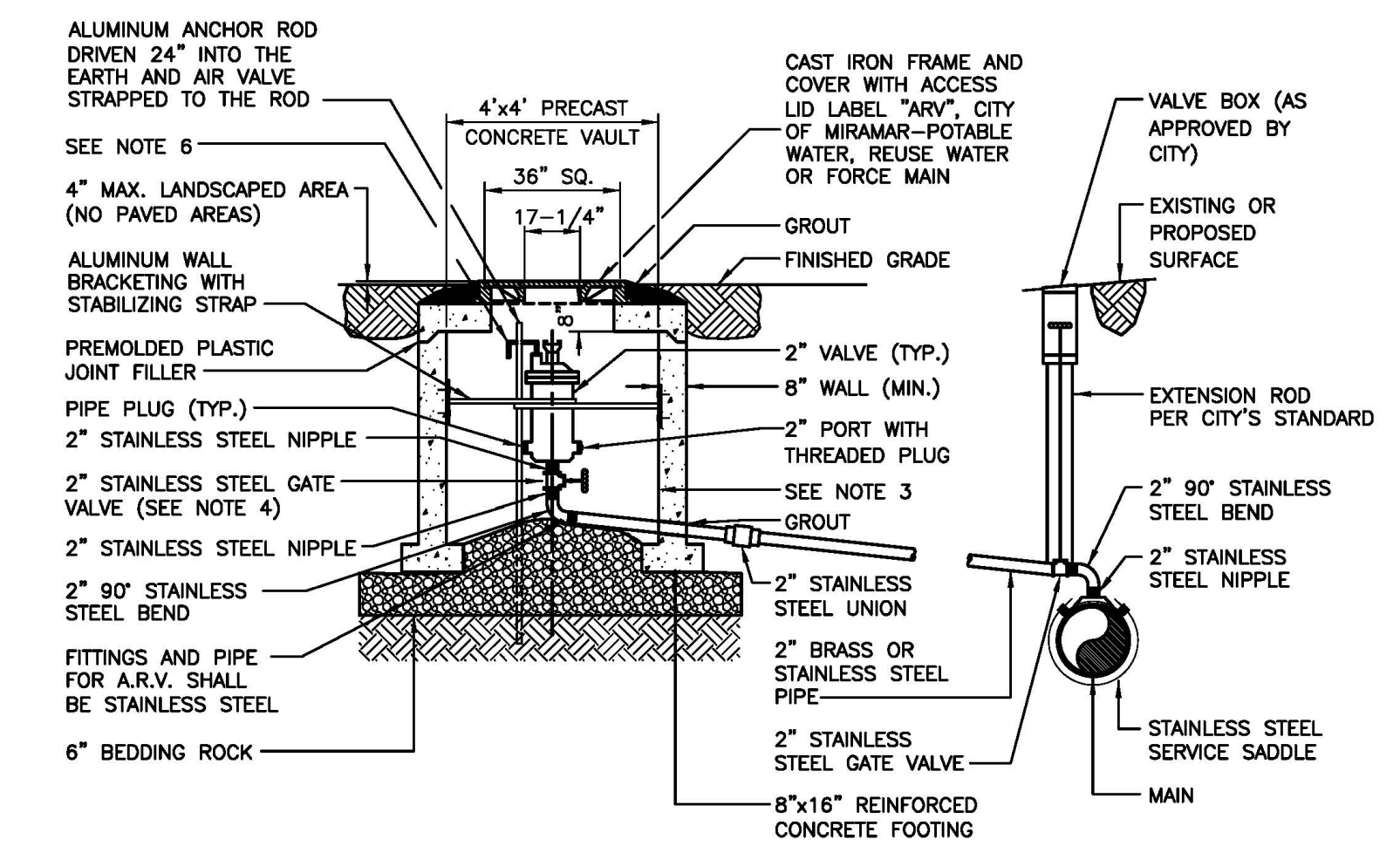
- NOTES:**
1. WHEN CONSTRUCTION IS WITHIN FDOT JURISDICTION, ADDITIONAL REQUIREMENTS OF THE UTILITY ACCOMMODATION MANUAL SHALL BE MET.
  2. CASING SHALL BE OF SUFFICIENT LENGTH TO EXTEND UNDER ALL PAVEMENTS AND IN NO CASE SHALL THE END OF THE CASING BE CLOSER THAN EIGHT (8) FEET FROM THE PAVEMENT EDGE INCLUDING PAVED SHOULDERS PLUS ADDITIONAL LENGTH AS NECESSARY TO EXTEND TO THE EXCAVATED SLOPES OF THE JACKING AND RECEIVING PITS.
  3. CONTRACTOR SHALL MAINTAIN A MINIMUM OF A 2:1 SLOPE (ANY STEEPER AND PIT MUST BE SHEETED AND SHORED) BEGINNING EIGHT (8) FEET FROM EDGE OF PAVEMENT.
  4. CASING SPACERS SHALL BE USED TO INSTALL CARRIER PIPE INSIDE THE ENCASEMENT/CASING PIPE AND TO PROVIDE SUPPORT AROUND THE PERIPHERY OF THE PIPE SHOULD THE PIPE TWIST AS IT IS PUSHED THROUGH THE CASING.
  5. THE MAXIMUM SPAN SHOULD BE 6 1/2 FEET TO PREVENT SAGGING OF THE CARRIER PIPE. THE SPAN BETWEEN SPACERS SHOULD RESULT IN CONSERVATIVE LONG TERM SAFETY FACTOR PROVIDED TOTAL LOAD PER SPACER DOES NOT EXCEED THE MAXIMUM LOAD FOR PIPE FULL OF LIQUID PER SPACER LISTED IN THE LITERATURE. SPACERS SHALL HAVE MINIMUM HEIGHT THAT CLEARS THE PIPE BELL OR AS OTHERWISE INDICATED ON DRAWINGS. SPACER SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
  6. RESTRAINED JOINTS NOT SHOWN FOR CLARITY.
  7. IF THE CASING SPACER MANUFACTURER'S RECOMMENDED CASING SPACING IS MORE STRINGENT THAN THE SPACING SHOWN ABOVE, THEN THE MANUFACTURER'S RECOMMENDED SPACING SHALL BE USED.
  8. THE ENDS OF THE CASING SHALL BE SEALED USING CONCRETE BLOCK OR BRICK AND MORTAR WALL FILLING OR PWM MODEL 1 WA WRAP AROUND END SEAL MADE OF 1/4" THICKNESS RUBBER AND STAINLESS STEEL BANDS OR DESIGN ENGINEER APPROVED EQUAL.

**BORING AND JACKING DETAIL**



- NOTES:**
1. ABOVE DETAIL IS BASED ON 2" COMBINATION AIR/VACUUM RELEASE VALVE, CHANGE PIPE AND FITTINGS ACCORDINGLY FOR OTHER VALVE SIZES AND TYPES. VALVE SIZES TO BE DETERMINED BY THE ENGINEER AND APPROVED BY THE CITY PRIOR TO INSTALLATION.
  2. THE BOTTOM OF THE PRECAST VAULT SHALL BE PLACED AT THE SAME ELEVATION AS THE BOTTOM OF THE PIPE.
  3. ARV VAULT WALLS TO BE COATED INSIDE AND OUTSIDE WITH 16 MIL. THICK APPROVED ASPHALTIC COATING.
  4. LIFT HOLES ARE TO BE SEALED WITH MORTAR INSIDE AND OUTSIDE AFTER INSTALLATION. ALL OPENINGS SHALL BE SEALED WITH WATERPROOF, EXPANDING GROUT.
  5. WASTEWATER VALVES TO BE EQUIPPED WITH THREADED VENT PIPE THAT DIRECTS VENT DOWNWARD.
  6. VAULT SHALL NOT REST ON PIPE. ALLOW 9" MIN. SEPARATION.
  7. WHEN USED ON A FORCE MAIN ALL FITTINGS SHALL BE STAINLESS STEEL.

**AIR RELEASE VALVE DETAIL**



- NOTES:**
1. ABOVE DETAIL IS BASED ON 2" COMBINATION AIR/VACUUM RELEASE VALVE, CHANGE PIPE AND FITTINGS ACCORDINGLY FOR OTHER VALVE SIZES AND TYPES. VALVE SIZES TO BE DETERMINED BY THE ENGINEER AND APPROVED BY THE CITY PRIOR TO INSTALLATION.
  2. THE MINIMUM DIMENSION FROM TOP OF PIPE TO FINISHED GRADE SHALL BE 4.0 FEET.
  3. ARV VAULT WALLS TO BE COATED INSIDE AND OUTSIDE WITH 16 MIL. THICK APPROVED COATING.
  4. VALVE SHALL BE SUPPORTED TO VAULT WALL.
  5. LIFT HOLES ARE TO BE SEALED WITH MORTAR INSIDE AND OUTSIDE AFTER INSTALLATION. ALL OPENINGS SHALL BE SEALED WITH WATERPROOF, EXPANDING GROUT.
  6. VALVES TO BE EQUIPPED WITH THREADED VENT PIPE THAT DIRECTS VENT DOWNWARD.

**OFFSET AIR RELEASE VALVE DETAIL**

BY	
REVISIONS	
NO.	DATE

UTILITIES

CITY OF MIRAMAR  
DEPARTMENT OF  
CONSTRUCTION & FACILITIES MANAGEMENT  
ENGINEERING STANDARDS



SCALE:  
N.T.S.

SHEET NO.  
1 OF 11