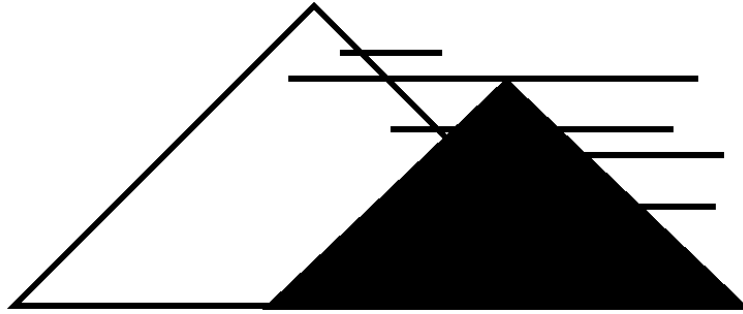




BADGER MOUNTAIN IRRIGATION DISTRICT

DESIGN AND CONSTRUCTION SPECIFICATIONS FOR RESIDENTIAL IRRIGATION DELIVERY SYSTEMS

REVISED: 7/2026

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GENERAL CONDITIONS

Prior to submitting a plat for approval by the Badger Mountain Irrigation District (BMID), otherwise known as the District, the developer shall be responsible for the design of the irrigation system in accordance with the current BMID Standards and Specifications for Residential Irrigation Water Delivery Systems. Domestic water systems shall be in accordance with the City of Richland Design Guidelines, Standard Special Provisions, and Standard Details unless modified herein.

Pre-application Meeting:

A pre-application meeting is required for proposed development projects involving any of the following:

1. New housing developments within the BMID service area boundaries;
2. New commercial buildings or developments within the BMID service area boundaries;
3. And any project with the BMID service boundaries that may touch, alter, modify or BMID facilities and appurtenances or be performed within any BMID easement, either domestic or irrigation.

The purpose of the pre-application meeting is to acquaint BMID staff with the intent of the proposed project, to provide guidance to applicants in preparing irrigation or water engineering plans, and to familiarize applicants with BMID standards, details, and system expectations. The developer shall complete the New Project Application Form and pay the applicable fee(s) prior to scheduling an appointment with BMID.

BMID will contract the Developer to schedule a pre-application meeting once the application form has been submitted and funds have been deposited.

Fees:

A non-refundable intake fee is required prior to scheduling the pre-application meeting. This fee covers the cost of one pre-application meeting, a preliminary document intake and review, and preparation of the Developer Intake Quotation Letter. It also includes an initial determination of whether the submittal is complete and consistent with District standards.

The Developer Intake Quotation Letter provides an estimate of the future funds required to review the proposed project. Review fees are estimated based on factors such as the size of the proposed development, the presence of future development phases, the completeness and clarity of submitted plans, and the applicant's responsiveness to review comments and plan revisions. Please note that review fees are estimates only. Submission of incomplete materials, design changes, or unknown or unforeseen infrastructure issues may result in additional review fees. Review fees are separate from, and in addition to, the non-refundable intake fee.

Preliminary Plans:

Prior to beginning the system design, the engineer shall contact BMID to determine the nearest water delivery point.

Preliminary plans and the Distribution System Design Report are to be submitted to BMID for review. After changes or revisions are made to the plans, if any, a revised set shall be submitted to the BMID. Upon BMID approval of the final revised plans, construction may proceed.

At the Owner's expense the design engineer or his representative shall make periodic observations of the construction to verify the construction is in conformance with the approved design plans and specifications.

Furthermore, prior to plat approval, the licensed design engineer shall furnish a record of construction drawings set showing the as-constructed improvements bearing his stamp and including a statement based on the periodic observation by him or his representative, the construction was in conformance with his design.

Construction Plan-set Approval:

At such time engineering plans are complete and are to be submitted for the first round of reviews at the local jurisdictional level (City of Richland, City of Kennewick, or Benton County), BMID shall also require a full-size paper set and PDF of said plans for their review. The BMID Director shall have 30 calendar days to review and provide comment. Failure to provide this set of plans may result in final plat denial.

Certification:

Prior to plat approval, a Professional Engineer licensed in the state of Washington shall be required to provide a written inspection report to BMID certifying that said irrigation system has been designed so that it is in conformance with District standards and will deliver the required system capacity as stated herein. As an alternative to the installation of the facilities prior to platting and upon written approval from the BMID Board of Directors, the responsible landowner may post a bond in the amount equal to the estimated installation costs as determined by the District Manager to guarantee the installation of said facilities.

Requirements for As-built Survey:

All irrigation appurtenances installed or modified with the construction shall be surveyed by or under the employ of a Washington State Licensed Land Surveyor, and shall include, but not be limited to the following:

Irrigation valves, risers, blow-offs, & meters • Fire Hydrants & valves • PRV Vaults & Manholes
• Monuments (Location & Elevations)

- One (1) Electronic CSV file in the following format: comma-delimited coordinate file (CSV) of all points in the following format: Point Number, Northing, Easting, Elevation, and Descriptor. Provide a copy of your company survey descriptor code sheet.
- One (1) electronic copy (AutoCAD or Civil3d format) which includes all the surveyed data. The electronic record drawings shall contain the entire project in a single base drawing and include all sheet files.
- One (1) PDF copy of the final record drawing.
- One (1) paper copy (22"x34") of the raw survey data signed and sealed from the licensed surveyor shall be provided.

Datum

- The as-built survey shall utilize NAD83/2011 State Plane coordinates for Horizontal Datum and NAVD 88 for Vertical Datum.

In the event that a proposed system is to extend service to a parcel or parcels of land that are not part of a short plat, the property owner (s) shall be responsible for costs associated with the design, installation, and certification of proper size lines and equipment in accordance with the above-stated requirements for platted properties. (See Resolutions 86-7, 86-8).

System Capacity:

The BMID system is a pressurized system that was designed to provide “on-demand” irrigation water to all residential customers. While each service riser to an individual property is not currently metered, there is a per-acre allotment based on the BMID water permit as issued by the Washington State Dept. of Ecology.

Accordingly, delivery valves to each lot are sized to produce flows to approximate the water allotment of 3.5 acre-feet per irrigable acre per irrigation season. This translates to 6.2 GPM/Acre.

For delivery systems having lots with a variety of size ranges, the total system capacity shall be the sum of system capacities calculated for each group of lots within each size range.

Existing Facilities:

Facilities in place at the time of platting or annexing to the District which will deliver uninterrupted flow equal to the system capacity as stated above, need not be replaced. However, the system will have to meet BMID standards and approvals. In addition, the facility shall have an anticipated remaining useful life of 20 years (minimum).

Additional Requirements:

1. The Developer shall execute a written agreement with BMID warranting all work and associated materials for a period of one (1) year following final acceptance. Upon expiration of the one-year warranty period, the system shall be formally turned over to BMID for operation and maintenance. Any repairs or corrective work required during the one-year warranty period, as well as all costs associated with system turnover, shall be performed at the Contractor’s sole expense. All assessments must be paid current before approval of the plat.
2. When working in a multi-jurisdictional area, design shall follow the standard of the agency with the highest standard. This is not to include flow rates, minimum and maximum system pressures, or water rights, where BMID standards will be used at all times.

Indemnification:

Statement below to be included on all Construction Plans submitted to BMID:

The BMID, Board of Directors, Officers, Agents, and Employees shall not be liable for, and shall be held harmless from and indemnified for all damages, injuries, and claims arising from or related to any design and engineering specification and standards herein or approval given hereunder. This holds harmless and indemnification provision applies to claims of negligence and any other theory of liability.

Final Approval:

Statement below to be included on all Final Plats for District Signature of Approval:

THE PROPERTY DESCRIBED HEREIN IS LOCATED WHOLLY OR IN PART WITHIN THE BOUNDARIES OF THE BADGER MOUNTAIN IRRIGATION DISTRICT ("DISTRICT"). SAID PROPERTY IS CLASSIFIED AS IRRIGABLE LAND AND IS ENTITLED TO IRRIGATION WATER UNDER THE EXISTING OPERATING RULES AND REGULATIONS OF THE DISTRICT. THE DISTRICT HEREBY CERTIFIES THAT THE IRRIGATION EASEMENTS AND RIGHT-OF-WAYS SHOWN ON THE PLAT ARE ADEQUATE TO SERVE ALL LOTS AND/OR CERTAIN TRACTS LOCATED WITHIN THE PLAT, SATISFY THE REQUIREMENTS OF RCW 58.17.310, AND THAT THE IRRIGATION ASSESSMENTS HAVE FULLY BEEN PAID THROUGH THE YEAR 20__.

A COPY OF THE FINAL AS-BUILT ENGINEERING PLANS HAVE BEEN DELIVERED TO THE DISTRICT OFFICE AND HAVE BEEN REVIEWED BY THE DISTRICT MANAGER, AND THOSE COMPLETED AS-BUILT DRAWINGS AND IRRIGATION FACILITIES: ____ ARE APPROVED; OR ____ WILL NOT BE REQUIRED.

THE DEVELOPER AND SUBSEQUENT LOT OWNERS ("OWNER") ACKNOWLEDGES THE USE AND THE EXISTENCE OF IRRIGATION WATER AND DELIVERY SYSTEMS MUST COMPLY WITH ALL DISTRICT RULES AND REGULATIONS AND MAY CAUSE DAMAGE OR BE A HAZARD TO PROPERTY AND PERSONS. THE OWNER ASSUMES ALL RISK ASSOCIATED WITH THE USE AND DELIVERY OF IRRIGATION WATER AND HOLDS THE DISTRICT HARMLESS AND WAVES ON BEHALF OF THEMSELVES AND THEIR SUCCESSORS IN INTEREST ANY CLAIMS FOR DAMAGES OF ANY KIND AGAINST THE DISTRICT WHICH MAY BE CAUSED BY THE CONSTRUCTION, OPERATION, OR MAINTENANCE OF THE IRRIGATION FACILITIES; OR FROM THE DELIVERY, LEAKAGE, OR SEEPAGE OF WATER.

MANAGER – BADGER MOUNTAIN IRRIGATION DISTRICT

RESIDENTIAL STANDARD SPECIFICATIONS
IRRIGATION WATER DELIVER SYSTEMS
BADGER MOUNTAIN IRRIGATION DISTRICT

A. PUMP:

1. Pump Type and Duty
 - a. Duty point identified by BMID or their engineering representative.
 - i. Shutoff head shall be a minimum of 25% above the duty point head.
 - ii. BEP flow shall be to the left of the duty point flow for wider range of flows with optimum efficiencies at reduced pump speeds.
 - b. Pump Configuration:
 - i. End suction centrifugal pump: close coupled for vertical mounting: Grundfos LC Series, Pentair B Series, Integrity Pumps, or approved equal.
 - ii. Inline centrifugal pump: Grundfos VL Series, or approved equal.
 - c. Tolerance grade: 1U or 1B
2. Motor
 - a. Volts/Phase/Hertz: 460/3/60hz, unless otherwise specified.
 - b. Horsepower: as required for pump duty point
 - c. NEMA Design: B
 - d. Enclosure type: WPII or better outdoor protection
3. Accessories
 - a. Coating: factory recommendation for external weather conditions (sun, snow, sleet, rain, wind, etc.)
 - b. Sized and equipped with a variable frequency drive (see electrical section).
4. Submit pump specification and data describing all pump parts, fittings, components, and VFD pump curves for approval prior to purchase order or installation.
5. Maximum Noise Level
 - a. All noise generated from the pump station, including, but not limited to, pumps, electrical equipment, and HVAC equipment, shall comply with Washington Administrative Code 173-60.

B. PIPE:

1. Mainlines, Sub Mains, and Laterals
 - a. Pipes shall be polyvinyl Chloride (PVC).
 - b. Minimum pipe diameter shall be two inches.
 - c. Pipe two-inch diameter shall be solvent welded with a minimum Schedule 40 pressure rating.

- d. Pipe larger than two-inch diameter shall have ring gasket joints and in accordance with AWWA C900/C905.
 - e. Restrained joint PVC pipe.
 - f. Pipe shall be purple in color.
- 2. Service lines
 - a. Pipe shall be in accordance with AWWA C901-20 PE 4710 (CTS) DR 9 (200 PSI).
 - b. Pipe shall be purple in color or striped.

C. FITTINGS:

- 1. General
 - a. Mainlines, Sub Mains, and Laterals
 - i. All solvent-welded PVC fittings shall be Schedule 40 and meet or exceed the pressure rating of the pipe.
 - ii. Threaded PVC fittings shall be steel-banded reinforced Schedule 80.
 - iii. Fittings larger than three-inch diameter shall be ductile iron and must meet current AWWA requirements. PVC fittings may be substituted where applicable and with prior approval from BMID.
 - iv. All ductile iron fittings shall be wrapped in 8 mil polyethylene pipe protection wrap
 - v. All ductile iron fittings require one anode installed in accordance with standard detail BMID-08.
 - b. Services
 - i. Proper poly compression fittings with stiffener inserts must be used with service lines.
 - ii. Double-strap bolt-on saddles equal to Romac 202S shall be used for all customer services. U-bolt style service saddles are not permitted.
 - iii. Service saddles must be located a minimum distance of 24-inches from the bell or spigot end of a pipe or from a fitting.
 - iv. Pressure rating:
 - 1. Minimum working pressure: 150 psi
 - 2. Minimum test pressure: 200 psi
- 2. Pressurized Screen Filter
 - a. General
 - i. Inline filter on the intake or discharge side of pump.
 - ii. Minimum capacity: Sized for maximum design flow of pump station.
 - iii. Manufacturer: Clemons FSD, Irrigation Specialists, or approval equal. Submit for approval.

- b. Body
 - i. Filter body: Minimum 12-gauge steel
 - ii. Exterior coating: Polyurethane (UV resistant) topcoat over epoxy base
 - iii. Interior lining shall be epoxy coated.
 - c. Configuration
 - i. Horizontal Inlet: Flanged
 - ii. Bottom Outlet: Flanged
 - iii. End Cover: Bolted or hinged for screen removal and cleaning.
 - d. Screen
 - i. Material: Stainless steel screen.
 - ii. Diameter: Minimum 0.032" perforated holes.
 - iii. Screen should be removable and cleanable.
 - e. Accessories
 - i. Pressure gauges or test ports up.
 - ii. Drain port.
 - iii. Air valve mount.
 - iv. All threaded fittings shall be as described in section C.7 of this document.
 - 3. Strainer
 - a. Manufacturer: Cla-Val X43H, or equal.
 - b. Large flow area H-Style design, allowing service without fitting removal.
 - c. Sized for peak hour demand
 - 4. Transition Coupling
 - a. Manufacturer: Romac RC400, RC501, or equal.
 - b. Coatings:
 - i. Steel with fusion epoxy, or
 - ii. Ductile iron with shop coat wrapped in 8 mil polyethylene pipe protection wrap.
 - c. Add anode tab to fitting (STL and DI) per standard detail BMID-08 for fittings 12" and larger.
 - d. Properly size and install thrust restraint per standard detail BMID-03 or engineer approval.
 - e. Steel pipe coating repair in accordance with BMID technical specifications.
 - 5. Hose Bibb Connection
 - a. Dielectric Union: Watts or equal
 - b. Pipe Nipples: Sch 40 brass or galvanized steel as indicated.
 - c. Gate Valve (MIPxFHT): Nibco or approved equal.
 - 6. Pressure Gauge
 - a. Grade: 2A Analog
 - b. Liquid-filled 2.5" minimum dial.
 - c. Scale range: 0 to 150 psi.

- d. Mount: stem
- e. Manufacturers: Marsh, 3D Instruments, or approved equal.
- 7. Threaded Connections to Piping
 - a. All threaded connections to steel piping shall be made with a threadolet or half coupling. Welded nipples are not permitted.
 - b. Welded connections to cast or ductile fittings are not permitted.
 - c. Threadolets shall be Bonney Forge or approved equal.
- 8. Pipe Support
 - a. Comply with ANSI/ASME B31.3.
 - b. Adjustable galvanized or stainless steel supports for exposed piping.
 - c. Pipe supports placed to prevent sagging, deflection, stresses, and movement.
 - d. Manufacturer: Standon Adjustable Model S92 Pipe Support, or approved equal.
- 9. Ferrous Metal Coating
 - a. General
 - i. This section covers coatings for new ferrous metals. Do not coat stainless steel materials unless specified otherwise.
 - ii. Metals which are located below the top of the exterior wall within a water bearing structure or are located within a vault or manhole shall be considered as under immersion services conditions.
 - iii. Submit detailed repair schedule for District review upon request (no later than 3 working days in advance).
 - b. Materials
 - i. Coating: Liquid-epoxy lining and coating shall be per AWWA C210 to a minimum thickness of 16 mils, measured in accordance with SSPC-PA 2.
 - ii. Lining and coating repair shall be per AWWA C210 and manufacturer's recommendations.
 - iii. Coal tar epoxy is not permitted.
 - c. Execution
 - i. SSPC-SP10 near white blast cleaning, or per preparation methods described in the applicable AWWA product standard.
 - ii. All linings and coatings must be shop applied.
 - iii. Shop lining and coating shall be continuous to the ends of the pipe or back of the flange, except where field welding is indicated.
 - iv. Repair any linings or coatings where damage has removed 20-percent or more of the lining or coating thickness. Lining and coating repair shall be per AWWA C210 and manufacturer's recommendation.
- 10. Steel Pipe Coating Repair
 - a. General
 - i. This section covers field repairs for exposed steel on pipe resulting from cutting, welding, or coating damage.

- b. Materials
 - i. Coating: Trenton Wax-Tape® #1 Non-Firming Anticorrosion Wrap for below grade use, or equal.
- c. Execution
 - i. Strictly follow manufacturer's written instructions.
 - ii. Clean exposed steel surfaces to remove all rust, scale, and contaminants.
 - iii. Apply and press on thin film of Wax-Tape® Primer.
 - iv. Apply Wax-Tap #1 wrap using 1" overlap.
 - v. On irregular surfaces allow slack so it can mold into conformity, but press and form wrap so there are no air pockets or voids.
 - vi. Apply Trenton outerwrap.

D. VALVES:

- 1. Butterfly Valves
 - a. General:
 - i. Manufacturer: M&H 4500, Dezurik BAW, Mueller LineSeal III, Pratt Groundhog, or approved equal.
 - ii. All valves must meet or exceed AWWA C504
 - b. Configuration:
 - i. Body: carbon steel or ductile iron.
 - ii. Flanged or wafer type per application.
 - iii. Operates left, traveling nut operator.
 - iv. Operator on side, except where specified.
 - v. Full epoxy coating, internal and external.
 - vi. Minimum working pressure: 250 psi
 - vii. Leak-tight pressure: 250 psi (manufacturer tested and verified).
 - viii. Withstand 300 ft-lb torque without damage.
- 2. Gate Valves:
 - a. Valves are to be used as isolation valves.
 - b. Valves shall have a minimum working pressure of 250 psi.
 - c. Valves three inches or smaller shall have threaded connections, bronze body, non-rising stems, and come equipped with a hand wheel, unless noted otherwise.
 - d. Valves four inches and larger shall have flanged connections with cast iron bodies and come equipped with a 2" square operating nut.
 - e. All valves must meet or exceed current AWWA C509 or C515 standards.
 - f. All valves shall have a non-rising stem.
 - g. The wedge shall be fully encapsulated with vulcanized SBR rubber or EPDM
 - h. All valves should be suitable for underground service.
 - i.

3. Service Valves:
 - a. All distribution valves within each residential delivery valve box shall be of domestic manufacture.
 - b. Service value is to be Ford BA41-444W-NL CTS inlet x FIP OUTLET or equal.
 - c. Size range is from ¾" to 1".
4. Check Valves
 - a. Meets AWWA C518 Requirements
 - b. Valve shall allow flow in one direction only.
 - c. Optional: Non-slam closure required to prevent water hammer where directed by BMID or their engineering representative.
 - d. Manufacturers: Val-Matic Dual Disc Wafer Check Valve, or approved equal.
5. Ball Valves
 - a. Size range is from 1" and greater.
 - b. Valves shall have threaded connections and come equipped with a handle.
 - c. Valve to be "full port" style.
6. Type must be of quality manufacture.
7. Air/Vacuum Relief Valves
 - a. Air/Vacuum Relief Valves to be installed at all high points along the pipeline and as directed by BMID or their engineering representative.
 - b. Manufacturer: APCO 143C, Val-Matic 200C series, or approved equal.
 - c. Provide air valve's body and cover fabricated from cast iron. Provide internal parts, including float, seat, needle, linkage, level pins, retaining rings and screws fabricated from either stainless steel or bronze.
 - d. 3-inch diameter and larger valves with a high-capacity air vent function (typical for air/vacuum and combination air valves) shall include a throttling device specifically for the air vent function to prevent slamming. The throttling device shall not restrict any vacuum or air release function the valve may also have. APCO CSV surge check, Val-Matic CSS surge suppression, or approved equal.
 - e. Size
 - i. 2" minimum
 - ii. Sized by BMID according to pipe size, slope, pressure, and designed for continuous operation.
 - f. Include isolation valve and fittings for service.
8. Blow-Off Valve Assemblies:
 - a. Blow-off assemblies shall be installed at the end of all pipelines.
 - b. Manufacturer: Eclipse No. 85 Ground hydrant or approved equal. Hydrant to include a 3" body, 2.5" NST outlet.
 - c. Gate valves shall conform to section D.2 of this document.
 - d. Valve boxes shall conform to section E of this document.

- e. Minimum depth of top of riser to be no less than 6" to grade, and maximum depth no more than 10" to grade.
- 9. Drain Valve Assemblies:
 - a. Pipe and fittings must conform to section A and section B.
 - b. The drain valve shall be of 1" Ford Compression (CTS) x FIP or equal.
 - c. Drains shall have drain rock installed to depth of valve and an additional 12" below valve.
 - d. Drain rock shall be WSDOT 9-03.12(5)

E. VALVE BOXES:

- 1. All underground valves shall be protected and made accessible with the installation of valve boxes.
- 2. Valve boxes for isolation valves within paved public street right of way shall be installed for all buried valves. Valve boxes shall be cast-iron, two-piece slip-type standard design with a base corresponding to the total size of the valve. Top of valve box to be installed flush with the surface of pavement, refer to standard detail BMID-07.
- 3. Isolation valve boxes located within unpaved areas of public street right of way shall be provided with a six-inch-thick concrete collar, twenty-four inches square. Lid to be flush with finished grade.
- 4. Isolation and/or Drain Valve Boxes outside of public street right of way may be constructed of PVC pipe, provided that the pipe is 6" diameter sewer pipe and cap. Cap elevation shall be six inches above existing grade.
- 5. Residential distribution valve boxes shall be located at the street side portion of the property served and shall be within six feet of respective property corners. These boxes shall be "Carson 910" round valve boxes (or equal), or rectangular and jumbo size depending on application and approval from district. Valve box assemblies shall include: base unit, risers, and purple lid. The top of the valve box shall be installed flush with finished grade. The valve box shall be as shown in standard detail BMID-02, Type B Service.

F. THRUST BLOCKING:

- 1. Thrust block are required at tees, bends, and dead ends for pipe larger than 2" diameter. Concrete for thrust blocks shall have a minimum compressive strength of 4,000 PSI at 28 days. Concrete thrust blocks are to be poured against undisturbed earth. Any pipe or fitting shall be wrapped in protective plastic wrap prior to pouring of thrusting. For thrust block and bearing area details refer to standard detail BMID-03.

G. DETECTABLE MARKING TAPE & TRACER WIRE:

1. Tape shall be installed two (2) feet over the buried piping.
2. Tape shall be clearly marked "Caution Buried Water Line" and be purple in color.
3. Tracer Wire shall be installed securely on all main, sub, and service lines, and shall be accessible in all distribution valve boxes. The wire shall be type UF#8 AWG single strand sprinkler and irrigation control cable or approved equal. The insulation on the wire shall be purple in color. The wire shall be continuous throughout the project, with 6" minimum overlap and brass split-bolt connectors. 8"-10" Tails shall be installed in every valve box. The District shall perform a continuity test to ensure continuity between all tracer-wire.

H. PIPE INSTALLATION:

1. All PVC pipe shall be assembled and installed in accordance with the pipe manufacturer's recommendations. Thrust blocks shall be placed at locations as described in section E.1 of this document, as shown in standard detail BMID-03.
2. Thrust Blocks shall be placed so that accessibility to the pipe and fittings is not impaired.
3. Pipe installed outside of street right of way shall have a minimum of thirty (30) inches of cover. Maximum of (60) inches of cover. Utilities encountered in the pipe zone shall be crossed below.
4. Pipe Base and Pipe Zone Backfill: Materials for pipe installed outside the street right of way shall include the full width of the trench from (4) inches below the bottom of the pipe to six (6) inches above the top of the pipe. Backfill material may be excavated native material containing no rock, organic matter, or materials larger than ½ inches. Where the volume of quality native excavated materials is inadequate, WSDOT Gravel Backfill for Drains or Crushed Surfacing Base Course will be used for pipe base and pipe zone backfill. The backfill material shall be placed and compacted sufficiently to 95% MDD in accordance with ASTM D1557.
5. Pipe Base and Pipe Zone Backfill materials for pipe installed inside street right of way shall, as a minimum, conform to section 4 above. In addition, backfill methods and materials shall be in accordance with the requirements of the entity in whose right-of-way the pipe is being installed. All work within public road right-of-way shall meet these specifications.

I. HYDROSTATIC PRESSURE TESTING:

1. All water mains and appurtenances in sections of convenient length under a hydrostatic pressure equal to 50 psi in excess of that under which they will operate or in no case shall the test pressure be less than 200 psi. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished and operated by the Contractor.
2. The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place, and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking and remove it after testing.
3. The mains shall be filled with water and allowed to stand under pressure for a sufficient length of time to allow the escape of air and allow the lining of the pipe to absorb water. BMID will furnish the water necessary to fill the pipelines for testing at a time of day when sufficient quantities of water are available for normal system operation. (Exception: Contractor shall provide water for testing during that portion of the year that irrigation water is not available)
4. The test shall be accomplished by pumping the main up to the required pressure, stopping the pump for 15 minutes, and then pumping the main up to the test pressure again. During the test, the section being tested shall be observed to detect any visible leakage. The quantity of water required to restore the pressure shall be accurately determined by pumping through a positive displacement water meter. The District shall approve the meter.
5. The quantity of water lost from the main shall not exceed the number of gallons as determined by the formula, per WSDOT Section 7-09.3(23) for Road, Bridge, and Municipal Construction:

$$L = \frac{SD\sqrt{P}}{266,400}$$

L = Allowable leakage, gallons/hour

D = Nominal diameter of pipe in inches

P = Average test pressure during leakage test (psi)

S = Gross length of pipe tested, feet

6. There shall not be an appreciable or abrupt loss in pressure during the 15-minute test period. Any visible leakage detected shall be corrected by the Contractor regardless of the allowable leakage specified above. Should the test section fail to meet the pressure test successfully as specified, the Contractor shall, at no expense to BMID, locate and repair the defects and then retest the pipeline.
7. Sections to be tested shall normally be limited to 1,500 feet. Laying of pipe shall not be continued more than an additional 1000 feet until the first section has been tested successfully.

8. Prior to calling out BMID to witness the pressure test. The Contractor shall have all equipment set up completely ready for operation and shall have successfully performed the test to ensure that the pipe is in satisfactory condition. Give 24hrs advance notice of the test.

J. ELECTRICAL

1. Variable Frequency Drive (VFD)
 - a. Provide VFD sized for the motor shown on plans.
 - b. 4–20 mA input and EtherNet/IP communication.
 - c. VFD shall support adjustable voltage/frequency (0–460V / 0–60Hz) and allow for full-speed motor control.
 - d. NEMA 3R or better enclosure for outdoor use. All wetted or exposed electronic parts shall be coated/protected for long life.
 - e. Controls for soft start/stop and internal PID pressure setpoint control, integrated disconnect, HIM (Human Interface Module), and door-mounted HOA switch.
 - f. Use Active Front End (AFE) design for motors ≥ 250 HP to meet IEEE 519 harmonic limits.
 - g. Include auto fault reset, flying start, and adjustable accel/decel ramping.
 - h. External fault for high-pressure switch input.
 - i. Manufacturer: Rockwell Powerflex, or approved equal.
2. Flow Meter
 - a. Manufacturer: Endress+Hauser 0x DN full-bore or equal.
 - b. Rated for 150 psi at minimum.
 - c. Rated for ambient temperatures range between 0- and 110-degrees Fahrenheit.
 - d. Sized and installed per manufacturer recommendations with accurate flow range 25% beyond expected design flow range.
 - e. Meters installed inside a vault or hotbox.
 - f. Equipped with upstream basket strainer that does not impact flow turbulence.
 - g. Equipped with indicator-totalizer device and digital readout head with electronic output. Totalizer shall read in units of hundreds of gallons. Transmitter shall display flow rate in gallons per minute, totalized gallons, and an empty pipe indicator.
 - h. Transmitter shall provide a RJ45 Ethernet/IP connection to the instrumentation system with an isolated ground.
 - i. Meter, electronics, and transmitter shall be RFI shielded to prevent adjacent interferences.
 - j. Electronics shall be NEMA 4X rated and 24VDC powered, unless otherwise noted on plans.
3. Programmable Logic Controller (PLC) System

- a. Provide a complete 24VDC PLC system with all terminal blocks, DIN rail, wire duct, circuit breakers, fusing, and grounding.
 - b. Provide 24V DC Power supply 5 amp minimum
 - c. Provide Circuit breakers for PLC Power, Flowmeter Power, VFD I/O, Ethernet Switch, and two (2) spare circuit breakers
 - d. Provide industrial unmanaged ethernet switch, 24VDC, 70 degree Celsius, 5 port gigabit minimum, Allen-Bradley Stratix 2100, 1783-USP5TGK or equal.
 - e. Provide shielded Cat5E ethernet Cabling to all ethernet devices.
 - f. Provide 6" spare DIN rail spacing for owner provided communication equipment.
 - g. PLC Manufacturer: Allen-Bradley Micro 820 with 24VDC inputs with Relay Outputs, 2080-L20E-20QWB or equal.
 - h. All programming of PLC system will be provided by others.
4. Pressure Transducers
- a. Stainless steel sensor with ¼" or ½" NPT male thread.
 - b. Suitable for irrigation water.
 - c. Solid state 4-20 mA output wired directly to the VFD.
 - d. Accuracy: Total error band $\leq 0.1\%$ of full scale (0–100°C range).
 - e. Include integrated digital display with pushbuttons for zero/span adjustment and local configuration (no handheld device required).
 - f. Manufacturer: Endress+Hauser Cerabar PMP51b, Siemens Sitrans P320, or approved equal.
5. Pressure Switch
- a. Stem mounted, separate from pressure gauge or transducer.
 - b. ¼-inch or ½-inch NPT bottom fitting
 - c. All wetted parts shall be brass or stainless steel; no aluminum allowed.
 - d. NEMA 4 enclosure.
 - e. Suitable for irrigation water
 - f. Pressure range: 0 to 300 psi.
 - g. Setpoints are field-adjustable.

K. ADDITIONAL REQUIREMENTS:

1. Piping shall be located with the point of delivery into the system located in the subdivision, short plat, lot, tract, parcel, or site at the point nearest the BMID designated delivery point for that area and at a site suitable for future extension onto adjacent properties. Where the acreage being divided has an existing and adequate on-site delivery point, the piping shall begin at that point. Where the site delivery point is a BMID Line, the connection to that line shall be made by BMID crews for a fee equal to the cost of labor and materials required to make the connection, or under the direct supervision of BMID personnel.

2. Isolation valves shall be installed on all sub mains at or near the inlet to the new system. Valve type shall be as described in section C.
3. Drawings detailing pipe, isolation and drain valve locations, distribution valve boxes, pipe sizes and depths are to be provided to BMID. Drawings shall be provided on a reproducible copy.
4. Testing/Inspection: The contractor will contact the BMID 48 hours before inspection. Trenches shall be left open for inspection by BMID personnel. Following inspection, the trench shall be partially backfilled leaving the pipe joints accessible for examination during the pressure test. Sufficient backfill shall be placed over the pipe barrel between the joints to prevent movement. Before testing all dirt and foreign material shall be flushed from the system and all air vented from any high points. The completed system shall be hydrostatically tested. The pressure shall be maintained until the BMID representative has determined that the system is specification compliant.
5. Air relief valves shall be installed at any high point on each sub-main or lateral. Additional Air Relief Valves may be required if there are sufficient grade changes (high spots) to warrant them.
6. Drain valves shall be installed along the pipeline if there are significant low spots along the pipe route that would not enable the individual distribution valve boxes to drain.
7. Delivery piping shall be installed within the BMID irrigation easements.
8. Pressure Reducing Valves to be installed per BMID Standard as where needed to maintain proper operational pressures. All PRV stations will need to be fenced or secured from public access with a concrete pad poured around the PRV large enough for access to all sides of the PRV inside the fence.

IRRIGATION NOTES TO BE ADDED TO ALL CONSTRUCTION PRINTS

1. NO WORK SHALL BE DONE WITHIN BMID EASEMENTS OR RIGHT OF WAYS WITHOUT PERMISSION FROM BMID.
2. ALL MATERIALS AND WORKMANSHIP SHALL BE IN CONFORMANCE WITH THE LATEST REVISION OF BADGER MOUNTAIN IRRIGATION DISTRICT STANDARD SPECIFICATIONS.
3. CDF OR CONCRETE IS NEEDED WHEN THERE IS LESS THAN 12-INCHES OF CLEARANCE BETWEEN MAINS.
4. IRRIGATION MAINS SHALL BE INSTALLED WITH A MINIMUM OF 30-INCHES OF COVER AND A MAXIMUM OF 60 INCHES.
5. ALL PIPELINES SHALL BE C900/DR 18 (235 PSI) PVC. PVC PIPELINES SHALL BE PURPLE IN COLOR. SERVICES SHALL BE PURPLE-STRIPED

POLYETHYLENE PIPE SIZED PER BMID GUIDELINES WITH A CURB-STOP AND BOX.

6. 8 GA PURPLE LOCATE WIRES SHALL BE INSTALLED OVER THE MAINS AND SERVICE LINES.
7. IRRIGATION SERVICES SHALL BE TYPE B RISER, INSTALLED A MINIMUM OF 5-FEET AWAY FROM DOMESTIC WATER SERVICES AND SEWER SERVICES.
8. IRRIGATION VALVE BOXES OR LIDS WITHIN THE ROADWAY OR PUBLIC RIGHT OF WAY NEED TO BE PER CITY OF RICHLAND SPEC: "RICH 931" CAST IRON LID AND SHALL HAVE "IRR" CAST INTO THE TOP.
9. ALL FITTINGS SHALL BE CEMENT LINED, MECHANICAL JOINT OR MECHANICAL JOINT X FLANGE, DUCTILE IRON, RUBBER GASKET FOLLOWER GLANDS AND BOLTS AWWA C-110 APPROPRIATE GASKET TRANSITION COUPLERS OR C-153 AND C-111; SLEEVES AS NEEDED. NO PVC FITTINGS ALLOWED. FITTINGS SHALL BE RESTRAINED WITH AN ADEQUATE NUMBER OF RESTRAINED JOINTS ON EACH SIDE OR THRUST-BLOCKED FOR 200 PSI PER COK STD DWG 4-6.
10. CONTRACTOR SHALL SUPPLY WATER FOR PRESSURE TESTING EQUIPMENT TO TEST AT EQUAL TO 150 PSI IN EXCESS OF OPERATING PRESSURE, OR IN NO CASE SHALL THE TEST PRESSURE BE LESS THAN 200 PSI.

Badger Mountain Irrigation District
Design Criteria for Irrigation Systems
Serving Residential Development
Summer 2026

The intent of these design criteria is to ensure that the systems meet short duration peak flow rates for safe and reliable operation. The criteria are not an assurance of the stated flow rates. In fact, the District's water right is for only approximately half the rates stated.

For Lots less than 1 acre:

1. Pipelines to be sized at a flow rate of 30 gpm for the most distant lot from the source and an additional 3 gpm per lot thereafter

or

6.0 gpm per acre, based on gross acreage, whichever is greater.
2. Size pipelines using nominal diameters at 5 feet per second maximum velocity.
2. Use 4" minimum nominal diameter.
3. Use class 235 C900 PVC (DR18) pipe.
4. Minimum delivery pressure shall be 40 PSI at the high point of the lot. Increase pipe diameter to achieve this minimum. If the minimum cannot be achieved in this manner, the District may require the developer to install booster pumps.
5. Maximum delivery pressure shall be 100 PSI at the lowest point of the lot. Pressures exceeding this shall be served by a pressure reducing valve.

For Lots from 1 to 5 acres:

1. Pipelines to be sized at a flow rate of 80 gpm for the most distant lot from the source and an additional 30 gpm per lot thereafter

or

8.0 gpm per acre, based on gross acreage, whichever is greater.
2. Size pipelines using nominal diameters at 5 feet per second maximum velocity.
2. Use 4" minimum nominal diameter.
3. Use class 235 C900 PVC (DR18) pipe.
4. Minimum delivery pressure shall be 60PSI at the high point of the lot. Increase pipe diameter to achieve this minimum. If the minimum cannot be achieved in this manner, the District may require the developer to install booster pumps.
5. Maximum delivery pressure shall be 100 PSI at the lowest point of the lot. Pressures exceeding this shall be served by a pressure reducing valve.

BADGER MOUNTAIN IRRIGATION DISTRICT

STANDARD DETAILS

ADOPTED FEBRUARY 2026

DRAWING INDEX			
SHEET TITLE	DWG NO.	SHEET TITLE	DWG NO.
COVER	BMID-00	BLOW-OFF ASSEMBLY	BMID-09
GENERAL NOTES	BMID-01	COMBINATION AIR & VACUUM VALVE ASSEMBLY (ARV)	BMID-10
TYPE B RISER	BMID-02	PRESSURE REDUCING VALVE (PRV)	BMID-11
THRUST BLOCK	BMID-03	SINGLE PUMP BPS SITE PLANS	BMID-12
MECHANICAL RESTRAINT	BMID-04	SINGLE PUMP BPS TYPICAL PROFILE	BMID-13
RESIDENTIAL VALVE SIZING	BMID-05	SINGLE PUMP BPS WITH BYPASS PROFILE	BMID-14
TRENCHING AND BEDDING	BMID-06	BOOSTER PUMP STATION END CONFIGURATION PROFILES	BMID-15
VALVE AND TRACER WIRE INSTALLATION	BMID-07	PUMP AND ELECTRICAL SHELTER	BMID-16
ANODE INSTALLATION	BMID-08	BOOSTER PUMP STATION DETAILS	BMID-17

CONTACT INFORMATION		CALL 48 HOURS BEFORE YOU DIG ONE CALL 1-800-342-1585
BUSINESS OFFICE	BADGER MOUNTAIN IRRIGATION 87525 E. REATA RD KENNEWICK, WA 99338 PHONE: (509) 628-0777	
		REPORT ALL SPILLS DEPT. OF ECOLOGY: 1-800-258-5990 1-800-424-8802

ABBREVIATIONS					
AC	ASBESTOS CEMENT	ELEV	ELEVATION	OD	OUTSIDE DIAMETER
APPROX.	APPROXIMATELY	EQPT	EQUIPMENT	PE	PLAIN END
BMID	BADGER MOUNTAIN IRRIGATION DISTRICT	EW	EACH WAY	PEP	POLYETHYLENE PIPE
BPS	BOOSTER PUMP STATION	EX	EXISTING	PJ	PACK JOINT
BW	BUTT WELD	FIP	FEMALE IRON PIPE	PROP	PROPOSED
CLR	CLEAR	FG	FINISHED GRADE	PVC	POLYVINYL CHLORIDE
CONC	CONCRETE	FL, FLG	FLANGE	RSGV	RESILIENT SEATED GATE VALVE
CSBC	CRUSHED SURFACING BASE COURSE	HMA	HOT MIXED ASPHALT	SCH	SCHEDULE
CSTC	CRUSHED SURFACING TOP COURSE	IE	INVERT ELEVATION	SPEC	SPECIFICATIONS
CTS	COPPER TUBE SIZE	IRRG	IRRIGATION	SST	STAINLESS STEEL
DI	DUCTILE IRON	JT	JOINT	STD	STANDARD
DIP	DUCTILE IRON PIPE	LF	LINEAR FEET	STL	STEEL
DIAM	DIAMETER	MAX	MAXIMUM	TEMP	TEMPORARY
DR	DIMENSION RATIO	MDD	MAXIMUM DRY DENSITY	THR	THREADED
DTL	DETAIL	MIN	MINIMUM	TYP	TYPICAL
DWG	DRAWING	MIP	MALE IRON PIPE	UV	ULTRAVIOLET
EG	EXISTING GROUND	NO	NUMBER		
ELEC	ELECTRICAL	OC	ON CENTER		

STANDARD DETAIL			 BADGER MOUNTAIN IRRIGATION DISTRICT
COVER			
FILE: BMID-D-00-COV.DWG	REVISED: 1/13/2026	DWG NO. BMID-00	

GENERAL INFORMATION

1. NO WORK SHALL BE DONE WITHIN BMID EASEMENTS OR RIGHTS OF WAYS WITHOUT PERMISSION FROM BMID.
2. ALL MATERIALS AND WORKMANSHIP SHALL BE IN CONFORMANCE WITH THE LATEST REVISION OF BADGER MOUNTAIN IRRIGATION DISTRICT CONSTRUCTION SPECIFICATIONS.
3. CDF OR CONCRETE IS NEEDED WHEN THERE IS LESS THAN 12-INCHES OF CLEARANCE BETWEEN MAINS.
4. IRRIGATION MAINS SHALL BE INSTALLED WITH A MINIMUM OF 30-INCHES OF COVER AND A MAXIMUM OF 60-INCHES.
5. IRRIGATION MAINS SHALL BE C900/DR 18 (235 PSI) PVC. PVC PIPELINES SHALL BE PURPLE IN COLOR.
6. SERVICES SHALL BE PURPLE-STRIPED DR 9 CTS POLYETHYLENE PIPE SIZED PER BMID GUIDELINES WITH A CURB-STOP AND BOX.
7. ALL PACK JOINT (PJ) FITTINGS SHALL INCLUDE A METAL INSERT STIFFENER
8. 8 GA PURPLE LOCATE WIRES SHALL BE INSTALLED OVER THE MAINS AND SERVICE LINES.
9. IRRIGATION SERVICES SHALL BE TYPE B RISER, INSTALLED A MINIMUM OF 5- FEET AWAY FROM DOMESTIC WATER SERVICES AND SEWER SERVICES.
10. IRRIGATION VALVE BOXES OR LIDS WITHIN THE ROADWAY OR PUBLIC RIGHT OF WAY NEED TO BE PER CITY OF RICHLAND SPEC: "RICH 931" CAST IRON LID AND SHALL HAVE "IRR" CAST INTO THE TOP.
11. ALL FITTINGS SHALL BE CEMENT LINED, MECHANICAL JOINT OR MECHANICAL JOINT X FLANGE, DUCTILE IRON, RUBBER GASKET FOLLOWER GLANDS AND BOLTS AWWA C-110 APPROPRIATE GASKET TRANSITION COUPLES OR C-153 AND C-111; SLEEVES AS NEEDED. NO PVC FITTINGS ALLOWED. FITTINGS SHALL BE RESTRAINED WITH ADEQUATE NUMBER OF RESTRAINED JOINTS ON EACH SIDE OR THRUST-BLOCKED PER STD DWG NO. BMID-04.
12. CONTRACTOR SHALL SUPPLY WATER FOR PRESSURE TESTING EQUIPMENT TO TEST AT EQUAL TO 50 PSI IN EXCESS OF OPERATING PRESSURE, OR IN NO CASE SHALL THE TEST PRESSURE BE LESS THAN 200 PSI.

STANDARD DETAIL

GENERAL NOTES

FILE: BMID-D-01-GEN.DWG

REVISED: 7/13/2026

DWG NO. BMID-01

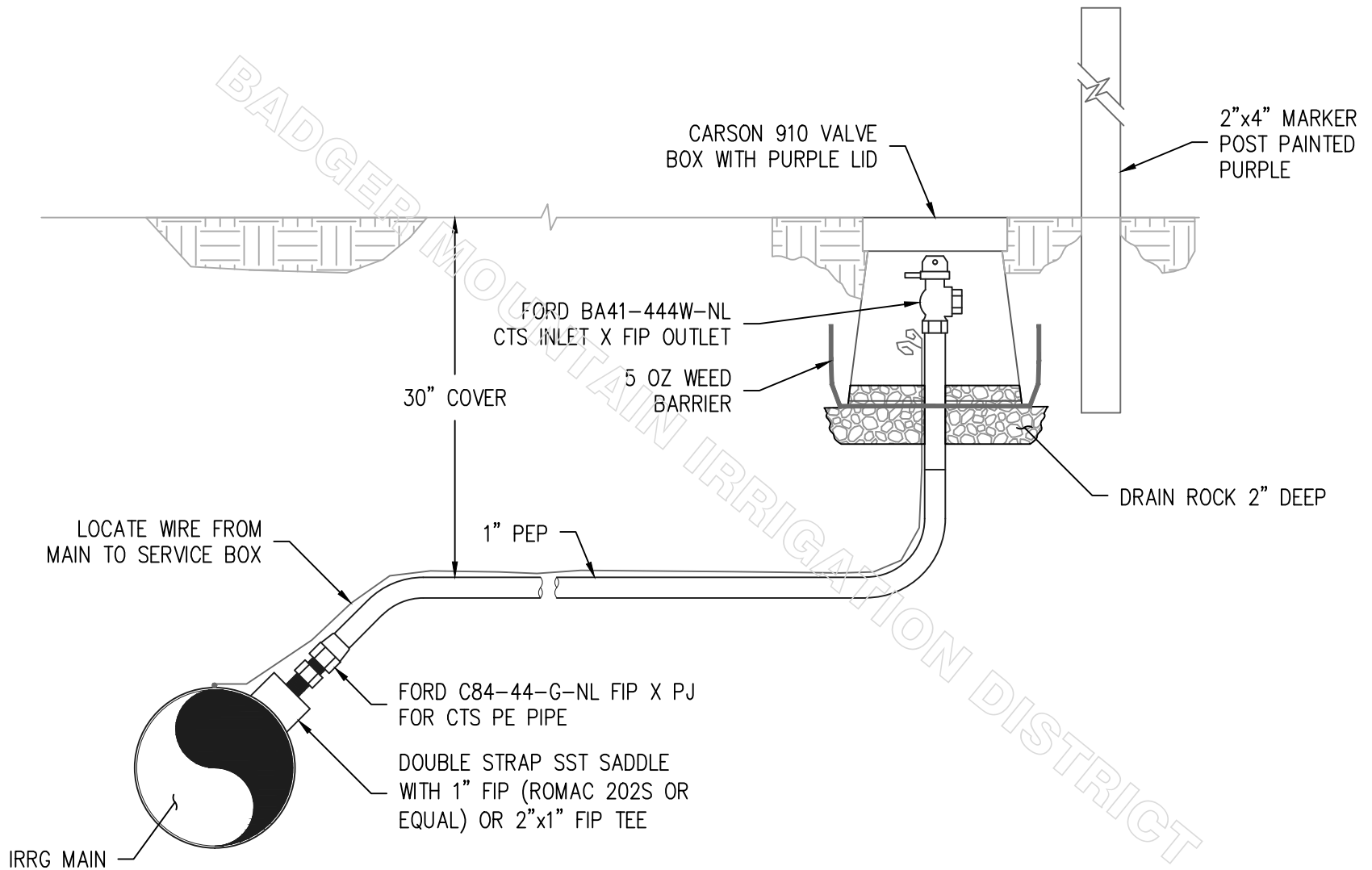


**BADGER MOUNTAIN
IRRIGATION DISTRICT**

STANDARD DETAIL
TYPE B RISER
(LESS THAN 1 ACRE)

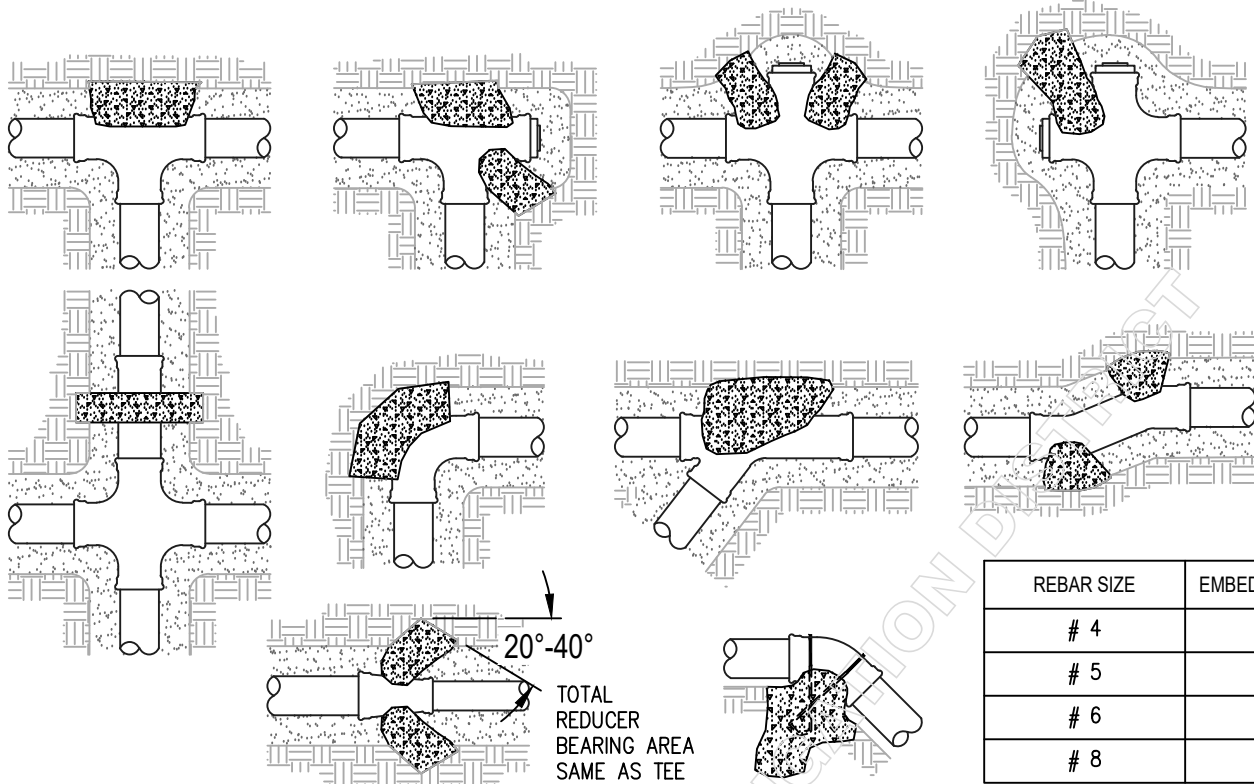


BADGER MOUNTAIN
IRRIGATION DISTRICT



NOTE:

1. ALL CONSTRUCTION AND MATERIALS SHALL MEET BMID CONSTRUCTION SPECIFICATIONS AND BE APPROVED BY BMID.



PIPE SIZE (IN)	HORIZONTAL THRUST BLOCKS MIN. BEARING AREA (SQUARE FEET)				VERTICAL THRUST BLOCKS MIN. VOLUME (CUBIC YARDS)			
	TEES, WYES, & DEAD ENDS	90° BEND	45° BEND	11 1/4° & 22 1/2° BEND	45° VERTICAL BEND		11 1/4° & 22 1/2° VERTICAL BEND	
					MIN. VOL	SIZE	MIN. VOL	SIZE
4 OR LESS	1.9	2.7	1.4	0.7	0.4	# 4	0.7	# 4
6	4.2	6.0	3.2	1.7	0.8	# 4	1.5	# 4
8	7.5	10.7	5.8	2.9	1.4	# 4	2.6	# 4
10	11.8	16.7	9.0	4.6	2.2	# 4	4.1	# 4
12	17.0	24.0	13.0	6.6	3.2	# 4	5.9	# 4
14	23.1	32.7	17.7	9.0	4.4	# 4	8.1	# 4
16	30.2	42.7	23.1	11.8	5.7	# 5	10.5	# 4
18	38.2	54.0	29.2	14.9	7.2	# 5	13.3	# 4
20	47.1	66.6	36.1	18.4	8.9	# 6	16.5	# 4
24	67.9	96.0	51.9	26.5	12.8	# 8	23.7	# 5

NOTES:

1. CONCRETE THRUST BLOCKING SHALL BE POURED AGAINST UNDISTURBED EARTH AND SHALL BE CLASS 5 CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS. NO PRESSURE MAY BE APPLIED TO THE CAST-IN-PLACE THRUST BLOCK UNTIL TEST RESULTS INDICATE MINIMUM 28-DAY CONCRETE COMPRESSIVE STRENGTH HAS BEEN ACHIEVED.
2. VERTICAL THRUST BLOCKS SHALL USE (2) REBAR HOOPED OVER FITTING AND EMBEDDED INTO THE CONCRETE. REBAR STRENGTH SHALL BE MIN. 36,000 KSI.
3. MAINTAIN 18" MIN. GROUND COVER OVER TOP OF CONCRETE THRUST BLOCK.
4. KEEP CONCRETE CLEAR OF JOINT AND ACCESSORIES.
5. PLACE AN 8 MIL OR TWO LAYERS OF 4 MIL POLYETHYLENE SHEETING BETWEEN THE FITTING AND THE THRUST BLOCK.
6. BEARING LOAD IS CALCULATED AT 2,000 LB. PER SQ. FT AND 200 PSI TEST PRESSURE.

STANDARD DETAIL

THRUST BLOCK



**BADGER MOUNTAIN
IRRIGATION DISTRICT**

RESTRAINED PIPE LENGTH (FEET)

TEE BRANCH AND LENGTH EACH SIDE OF BEND

PIPE DIAMETER		TYPE OF FITTINGS											
		TEE BRANCH		90° BEND		45° BEND		22 ½° BEND		11 ¼° BEND		DEAD END VALVE OR PLUG, AND BLOWOFFS	
STATIC TEST PRESSURE (PSI)		150	200	150	200	150	200	150	200	150	200	150	200
6 INCH	PVC	51	73	27	36	12	15	6	8	3	4	66	87
	DI	38	55	24	32	10	13	5	7	3	4	49	65
8 INCH	PVC	70	98	35	46	15	19	7	10	4	5	85	113
	DI	53	74	31	41	13	17	6	8	3	4	64	85
12 INCH	PVC	105	145	48	64	20	27	10	13	5	7	120	160
	DI	79	109	43	57	18	24	9	12	5	6	90	120
16 INCH	DI	104	142	54	72	23	30	11	15	6	8	THRUST BLOCK	THRUST BLOCK
20 INCH	DI	128	174	64	86	27	36	13	17	7	9		
24 INCH	DI	151	205	74	99	31	41	15	20	8	10		
30 INCH	DI	183	248	88	117	37	49	18	24	9	12		
36 INCH	DI	213	288	100	133	42	55	20	27	10	14		

CALCULATIONS ARE BASED ON INSTALLATION IN POORLY GRADED SANDS, GRAVEL, AND GRAVEL-SAND MIXTURES (GM & SM), TYPE 3 TRENCH – PIPE BEDDED IN SELECT NATIVE, OR IMPORTED EARTH BEDDING, TO A DEPTH OF 6-INCHES OVER THE PIPE (STD DWG. NO. BMID-06, A MINIMUM 3 FEET OF COMPACTED PIPE BURY AT THE TIME OF PRESSURE TEST, A SAFETY FACTOR OF 1.5 : 1 TO ALLOW FOR SITE CONDITION VARIABLES, AND A DISTANCE BETWEEN TEE JOINTS OF 10 FEET.

NOTES:

1. THE RESTRAINED PIPE LENGTH APPLIES TO CONDITIONS WHERE A CONCRETE THRUST BLOCK IS NOT USED.
2. IF POLYETHYLENE WRAPPED DIP IS SPECIFIED, INDEPENDENT CALCULATIONS ARE REQUIRED. DO NOT USE THE ABOVE TABLE, WHICH IS FOR STANDARD DIP ONLY.
3. EVERY JOINT WITHIN THE DESIGNATED RESTRAINT LENGTH MUST BE RESTRAINED. IF THE REQUIRED RESTRAINT LENGTH IS SHORTER THAN A SINGLE SECTION OF PIPE BEING USED, ONLY THE FITTING CONNECTION REQUIRES RESTRAINT. IF THE RESTRAINT LENGTH GIVEN IN THE TABLE IS THE REQUIRED LENGTH ON EACH SIDE OF THE BEND OR ON THE TEE BRANCH, AS APPLICABLE.
4. THRUST BLOCKS ARE REQUIRED FOR ALL CONNECTIONS TO AC PIPE AND WHEN AN AC PIPE CONNECTION IS LOCATED ANYWHERE WITHIN THE DESIGNATED RESTRAINT LENGTH.
5. THRUST BLOCKS ARE REQUIRED IF THE DESIGNATED RESTRAINT LENGTH CANNOT BE OBTAINED. SPECIAL ATTENTION NEEDS TO BE GIVEN TO DEAD END STUBS AND BLOWOFF INSTALLATIONS. IF THE LENGTH OF THE FEEDER PIPE, FROM THE MAIN LINE TEE TO THE END CAP, OR BLOWOFF, IS LESS THAN THE DESIGNATED DEAD END RESTRAINT LENGTH, THRUST BLOCKS ARE REQUIRED AT BOTH THE TEE AND AT THE END CAP, OR BLOWOFF. WHEN THE SPECIFIED CONDITIONS ALLOW THE USE OF MECHANICAL RESTRAINTS, THE RESTRAINT LENGTH REQUIREMENTS FOR BOTH THE TEE AND THE END CAP, OR BLOWOFF MUST BE MET.
6. APPROVED METHODS OF RESTRAINED PIPE SHALL BE:
 - 6.1. FOR PVC PIPE, SERIES 2000PV MEGALUG RESTRAINTS FOR FITTINGS AND EAGLE LOC900 FOR PIPE JOINTS, OR APPROVED EQUALS.
 - 6.2. FOR DIP, SERIES 1100 MEGALUG RESTRAINTS AND FIELD LOK 350 GASKETS, OR APPROVED EQUALS.

STANDARD DETAIL

MECHANICAL RESTRAINT



**BADGER MOUNTAIN
IRRIGATION DISTRICT**

RESIDENTIAL VALVE SIZING

<u>ACRES</u>	<u>VALVE SIZE</u>
1.0 – 1.5	1"
1.5 – 2.5	1 $\frac{3}{4}$ "
2.5 – 3.5	1 $\frac{1}{2}$ "
OVER 3.5	2"

BADGER MOUNTAIN IRRIGATION DISTRICT

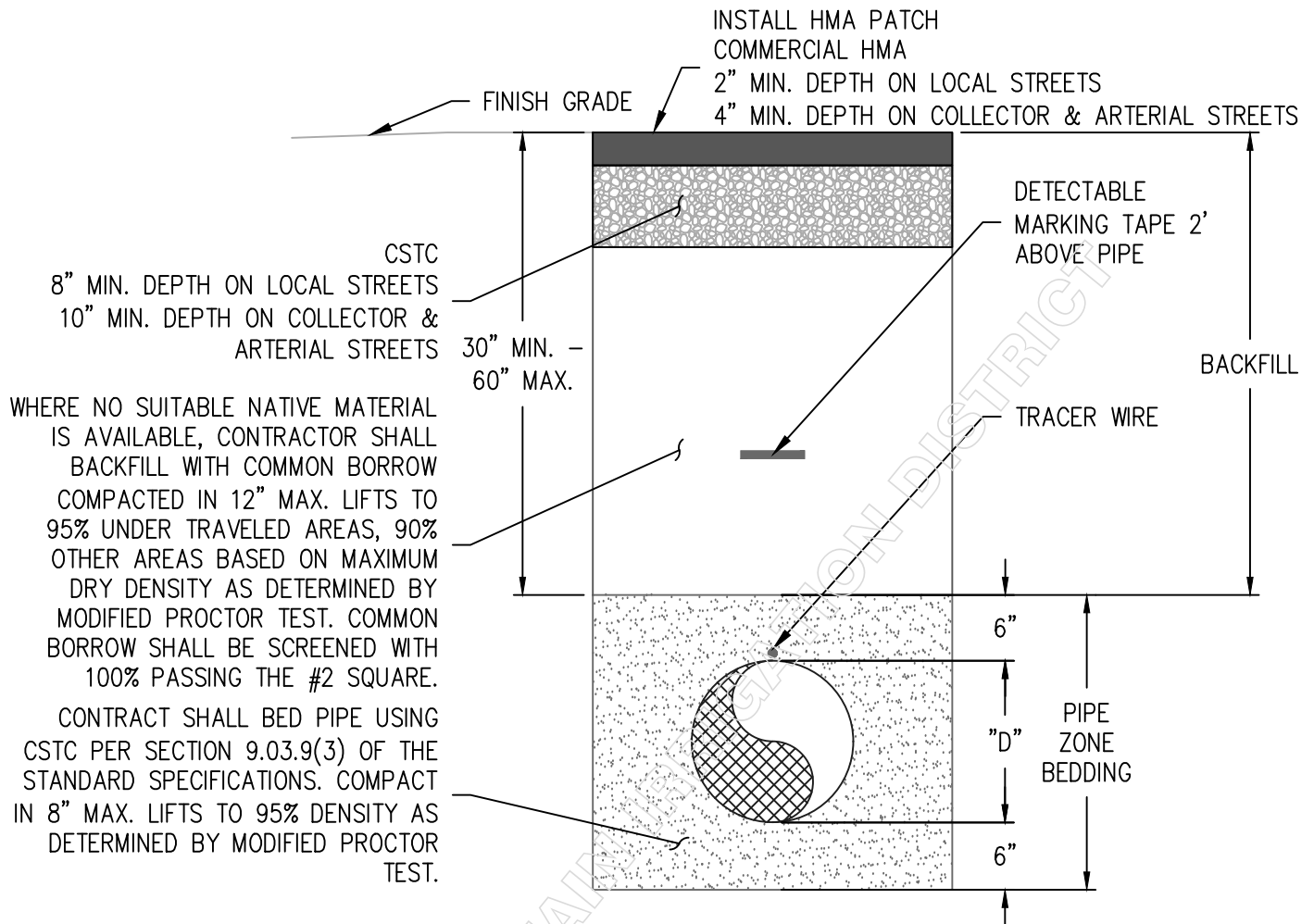
STANDARD DETAIL

RESIDENTIAL VALVE SIZING

FILE: BMID-D-05-VALVE.DWG | REVISED: 1/13/2026 | DWG NO. BMID-05



**BADGER MOUNTAIN
IRRIGATION DISTRICT**



NOTES:

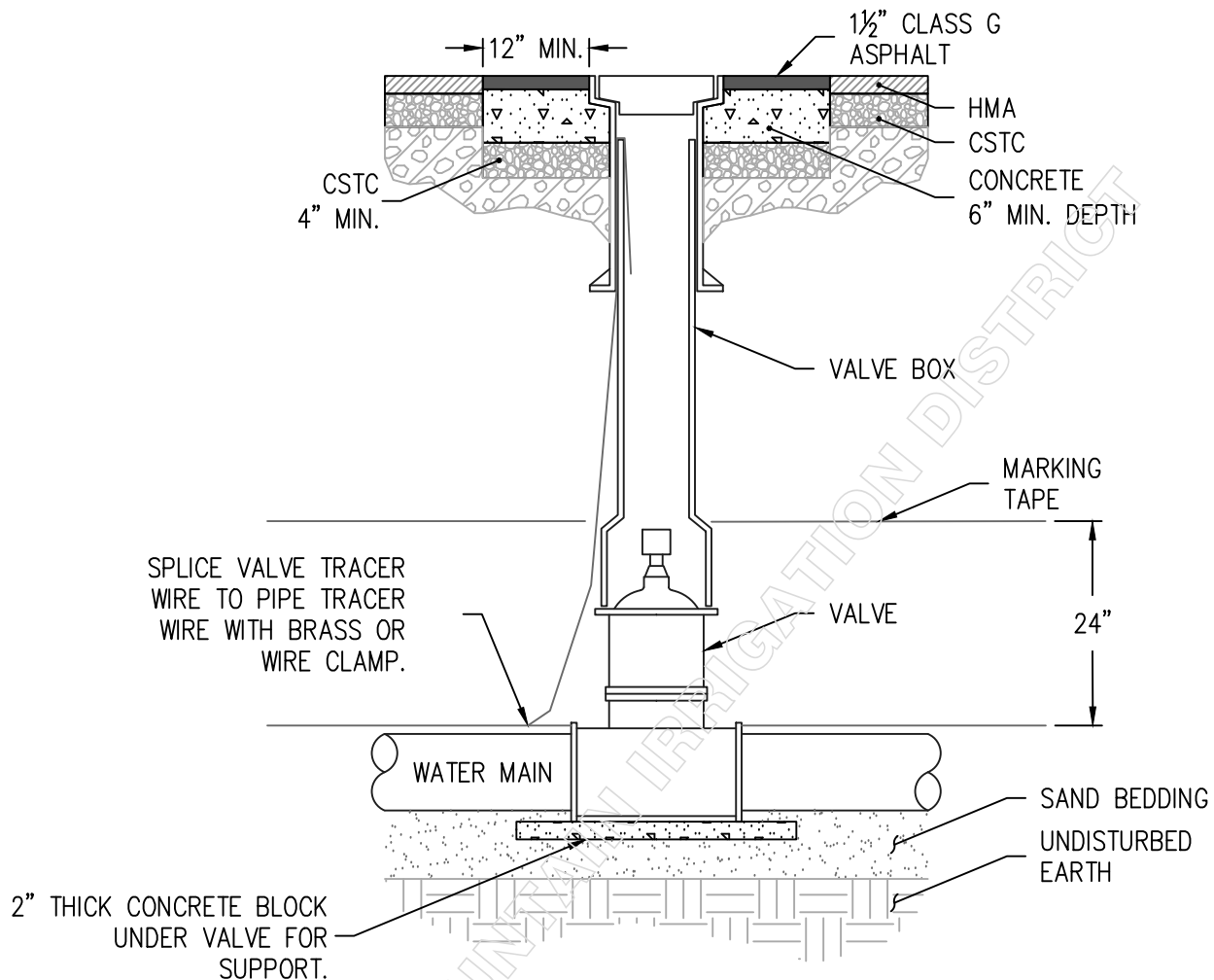
1. TRACER WIRE SHALL BE UF #8 AWG AND TAPED AT 10-FOOT INTERVALS TO THE TOP OF ALL IRRIGATION AND DOMESTIC PRESSURE MAINS.
2. BEDDING MATERIAL SHALL BE PLACED UNDER ALL PIPE PRIOR TO PLACING PIPE.
3. TRENCHES MAY BE BACKFILLED WITH CONTROLLED DENSITY FILL.
4. ALL CONSTRUCTION AND MATERIALS SHALL MEET BMID CONSTRUCTION SPECIFICATIONS AND BE APPROVED BY BMID.
5. MINIMUM TRENCH WIDTH FOR MAINS IS PIPE SIZE PLUS 18 INCHES. ALL TRENCHES SHALL MEET WAC CHAPTER 296-155 FOR CONSTRUCTION WORK.

STANDARD DETAIL

TRENCHING AND BEDDING



**BADGER MOUNTAIN
IRRIGATION DISTRICT**



NOTES:

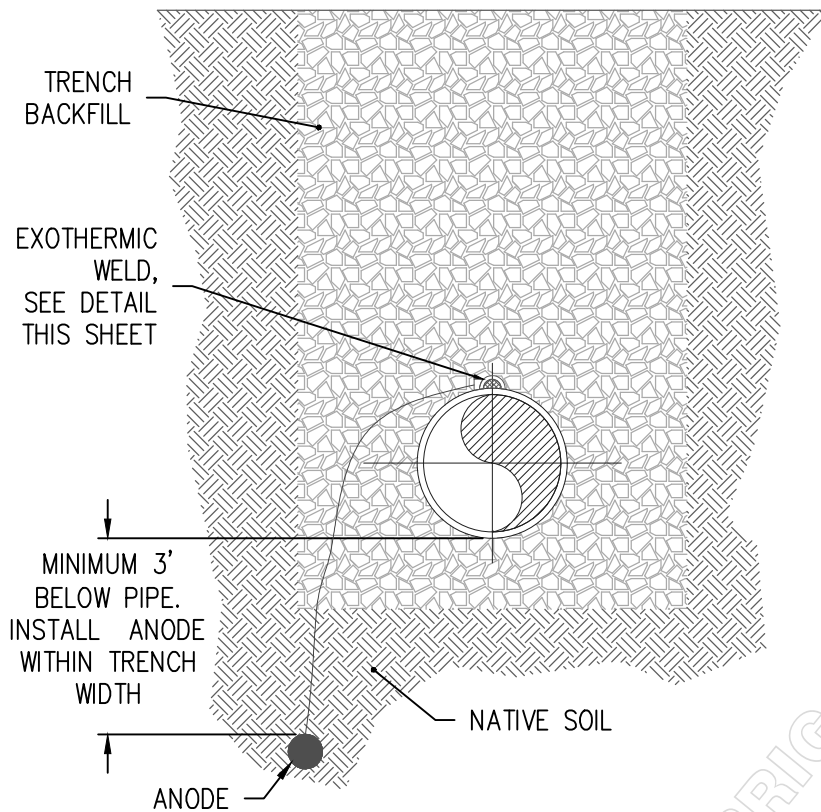
1. TRACER WIRE SHALL BE TAPED AT 10-FOOT INTERVALS TO THE TOP OF ALL NON-METALLIC MAINS AND ON WATER SERVICE LINES UP TO WATER METER TILE.
2. VALVE BOX AND LID SHALL BE SET 1/4 INCH BELOW FINISH GRADE IN ASPHALT AREAS. SET VALVE BOX TO GRADE IN UNPAVED AREAS AND CENTER IN A CONCRETE PAD SLOPED IN DIRECTION OF TRAVEL WITH A MINIMUM DEPTH OF 6 INCHES AND A MINIMUM WIDTH OF 1 FOOT AROUND OUTSIDE OF VALVE BOX.
3. VALVE OPERATING NUT MORE THAN 48 INCHES BELOW GRADE SHALL HAVE AN APPROVED EXTENSION INSTALLED TO BRING TOP OF OPERATING NUT TO 24 INCHES TO 36 INCHES BELOW FINISH GRADE.
4. ALL CONSTRUCTION AND MATERIALS SHALL MEET BMID CONSTRUCTION SPECIFICATIONS AND BE APPROVED BY BMID.

STANDARD DETAIL

**VALVE AND TRACER WIRE
INSTALLATION**



**BADGER MOUNTAIN
IRRIGATION DISTRICT**



GALVANIC ANODE INSTALLATION AND SCHEDULE

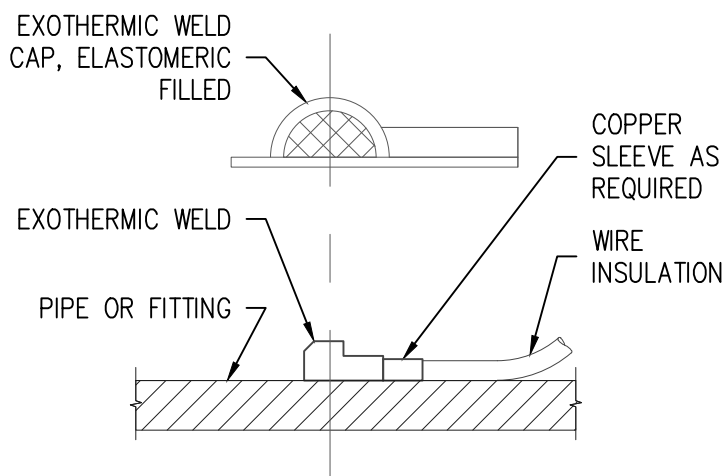
NOTES:

1. LOCATE ANODES A MAX OF 3 FEET HORIZONTALLY FROM CENTERLINE OF PIPE.
2. PLACE ANODE IN CLEAN NATIVE BACKFILL AND COMPACT TO 12" ABOVE ANODE.
3. ANODES MAY BE PLACED UPRIGHT OR HORIZONTALLY, HORIZONTAL ORIENTATION SHOWN.
4. ANODE WIRE SHALL BE EXOTHERMIC WELDED DIRECTLY TO PIPE AT JOINT OR INCORPORATED INTO THE JOINT BOND WITH A SPLIT-BOLT CONNECTION.
5. WATER SOAK ANODE PRIOR TO BURIAL.
6. ANODES SHALL BE PRE-PACKAGED, HIGH POTENTIAL MAGNESIUM, NOMINAL 32 LBS. BARE METAL WEIGHT, 20-INCH NOMINAL LENGTH.

<u>LOCATION</u>	<u>NUMBER OF ANODES</u>
STL TURNOUTS	2
ARV ASSEMBLIES	1
DI/STL FITTINGS	1

NOTES:

1. APPLY WELD CAP DIRECTLY TO PIPE, NOT TO PIPE WRAP. USE PRIMER AS REQUIRED BY THE MANUFACTURER.
2. COMPLETELY ENCLOSE WIRE WITHIN WELD CAP.
3. REPAIR ANY DAMAGED COATING NOT COVERED BY WELD CAP.



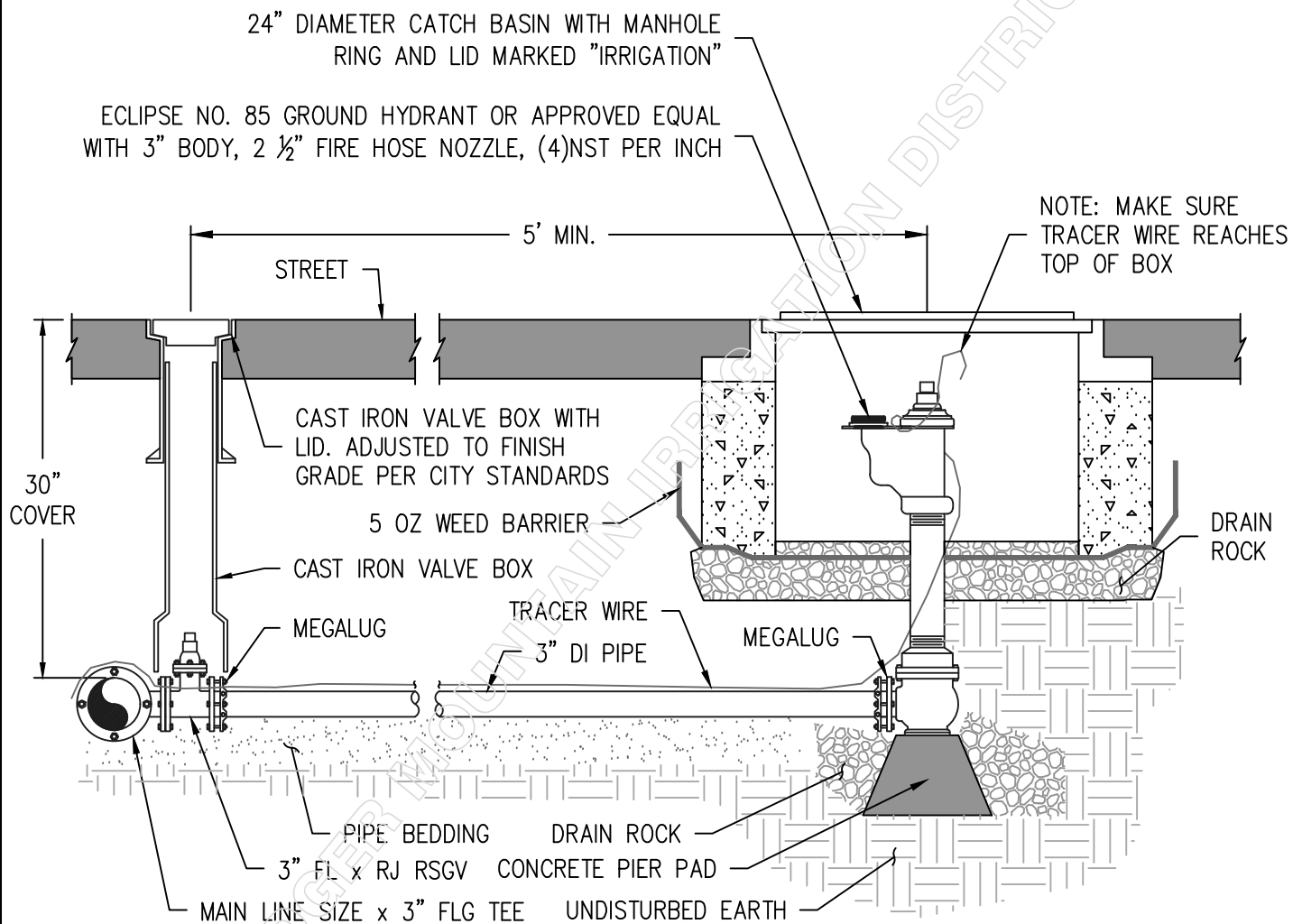
EXOTHERMIC WELD DI & STEEL PIPE

STANDARD DETAIL

ANODE INSTALLATION



**BADGER MOUNTAIN
IRRIGATION DISTRICT**



NOTES:

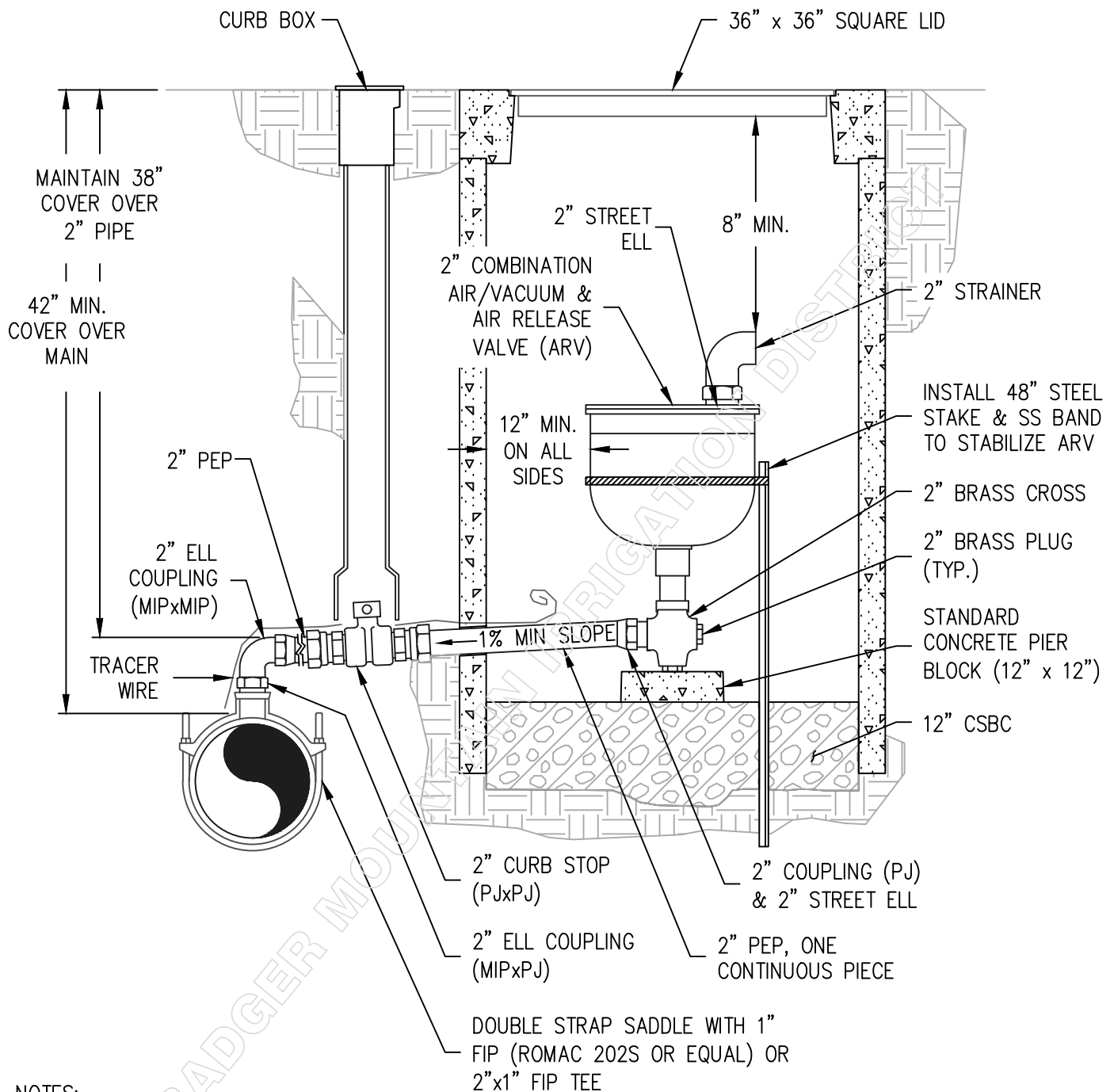
1. ALL CONSTRUCTION AND MATERIALS SHALL MEET BMID CONSTRUCTION SPECIFICATIONS AND BE APPROVED BY BMID.
2. DRAIN ROCK SHALL BE WSDOT 9-03.12(5).

STANDARD DETAIL

BLOW-OFF ASSEMBLY



**BADGER MOUNTAIN
IRRIGATION DISTRICT**



NOTES:

1. ALL CONSTRUCTION AND MATERIALS SHALL MEET BMID CONSTRUCTION SPECIFICATIONS AND BE APPROVED BY BMID.
2. GROUT ALL PENETRATIONS.
3. CURB STOP VALVE & COUPLINGS SHALL BE FORD OR MUELLER BRAND.
4. SADDLE SHALL BE ROMAC 202S STAINLESS STEEL OR EQUAL.
5. PE PIPE TO BE 200 PSI, CTS.
6. BLOW OFF STRAINER SHALL BE 2" MALE THREADED STRAINER WITH SCREENING.
7. ALL FITTINGS SHALL BE BRASS OR BRONZE.

STANDARD DETAIL

**AIR AND VACUUM COMBINATION
ASSEMBLY (AV)**

FILE: BMID-D-10-ARV.DWG

REVISED: 7/16/2026

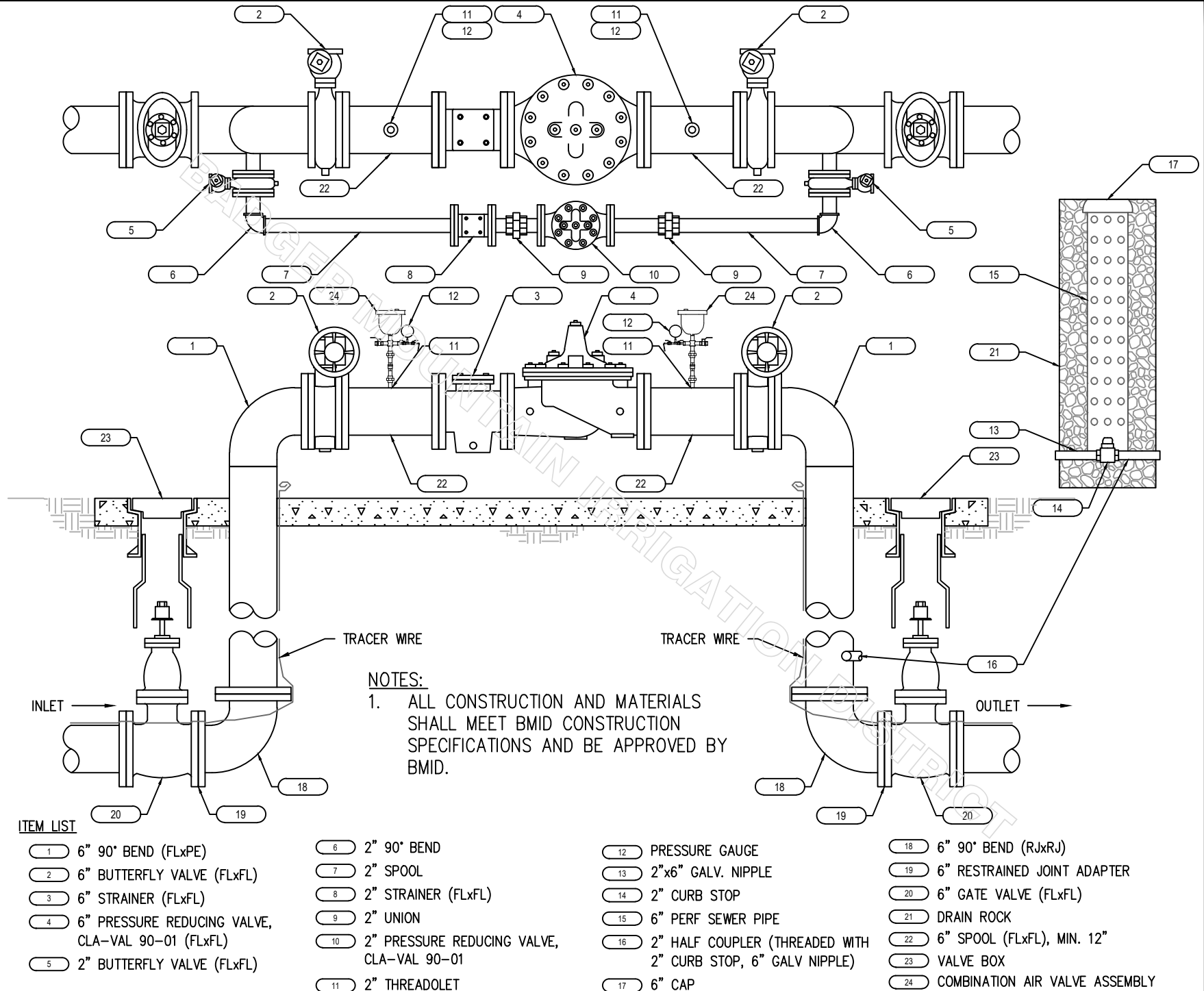
DWG NO. BMID-10



**BADGER MOUNTAIN
IRRIGATION DISTRICT**

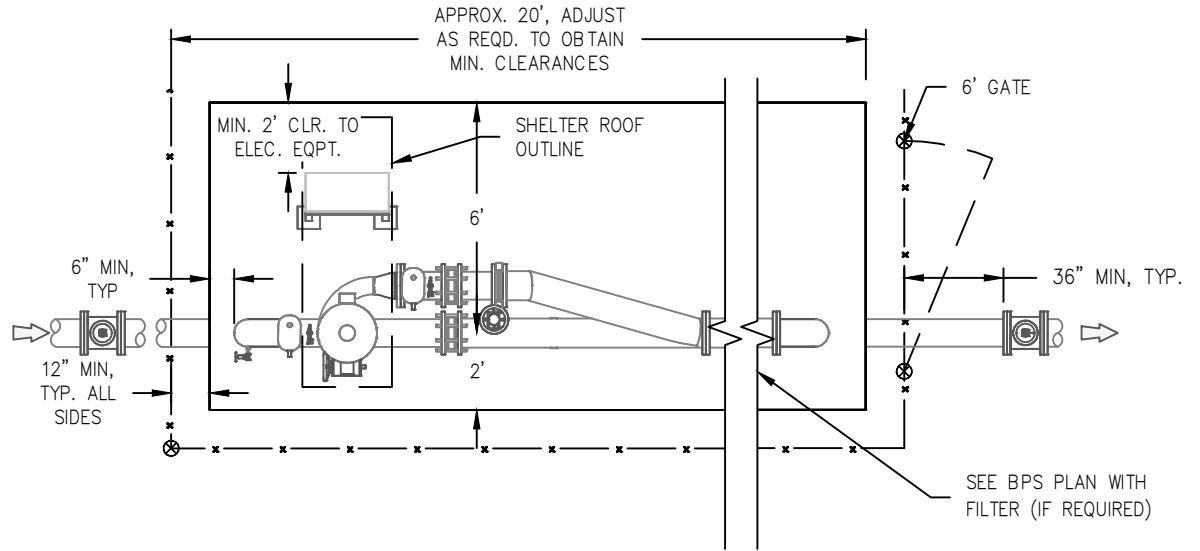
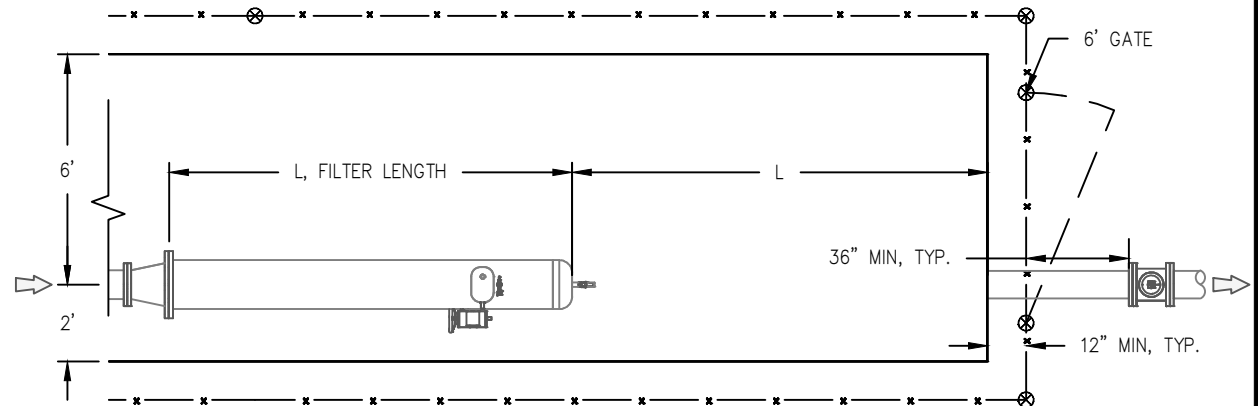
PRESSURE REDUCING VALVE (PRV)

STANDARD DETAIL

BADGER MOUNTAIN
IRRIGATION DISTRICT

SINGLE PUMP BPS SITE PLANS**STANDARD DETAIL****GENERAL NOTES:**

1. LOCATE BPS AT A LOCATION WITHIN BMD EASEMENT AS DIRECTED BY BMD. MAINTAIN APPLICABLE CITY/COUNTY BUILDING SETBACKS.
2. DIAMETER OF PIPE AND FITTINGS TO BE DETERMINED BY BMD OR THEIR ENGINEERING REPRESENTATIVE.
3. USE SCH 40 WELDED STEEL PIPE AND FITTINGS, UNLESS OTHERWISE NOTED.
4. PIPE COATING SHALL BE POLYURETHANE (UV RESISTANT) TOP COAT OVER EPOXY BASE. LINING SHALL BE EPOXY COATING.
5. INSTALL 7' TALL CHAIN-LINK FENCE AND GATE WITH PADLOCK HARDWARE (PADLOCK PROVIDED BY BMD).
6. ALL CONSTRUCTION AND MATERIALS SHALL MEET BMD CONSTRUCTION SPECIFICATIONS AND BE APPROVED BY BMD. SEE DTL BMD-01 FOR ADDITIONAL INFORMATION.
7. THRUST RESTRAINT FOR CONNECTIONS MUST BE VERIFIED BY BMD OR THEIR ENGINEERING REPRESENTATIVE, CONSTRUCTED PER DTL BMD-03, DTL BMD-04, OR PROVIDED BY OTHERS.
8. ISOLATION GATE VALVES AND VALVE BOX NOT SHOWN FOR CLARITY THIS SHEET. INSTALL PER DTL BMD-07.
9. ELECTRICAL EQUIPMENT AND SHELTER NOT SHOWN FOR CLARITY.
10. BMD OR THEIR ENGINEERING REPRESENTATIVE TO DETERMINE APPROPRIATE BPS CONFIGURATION AND LAYOUT.
11. SEE DTL BMD-13 FOR BPS WITHOUT BYPASS PROFILE.
12. SEE DTL BMD-14 FOR BPS WITH BYPASS PROFILE.
13. SEE DTL BMD-15 FOR BPS END CONFIGURATION PROFILE.
14. SEE DTL BMD-16 FOR BPS ELECTRICAL EQUIPMENT AND SHELTER.
15. SEE DTL BMD-17 FOR BOOSTER PUMP STATION DETAILS.
16. ALL NOISE GENERATED FROM THE PUMP STATION, INCLUDING, BUT NOT LIMITED TO, PUMPS, ELECTRICAL EQUIPMENT, AND HVAC EQUIPMENT, SHALL COMPLY WITH WASHINGTON ADMINISTRATIVE CODE 173-60.

**TYPICAL BPS PLAN****BPS PLAN WITH FILTER**

**BADGER MOUNTAIN
IRRIGATION DISTRICT**

SINGLE PUMP BPS TYPICAL PROFILE



BADGER MOUNTAIN IRRIGATION DISTRICT

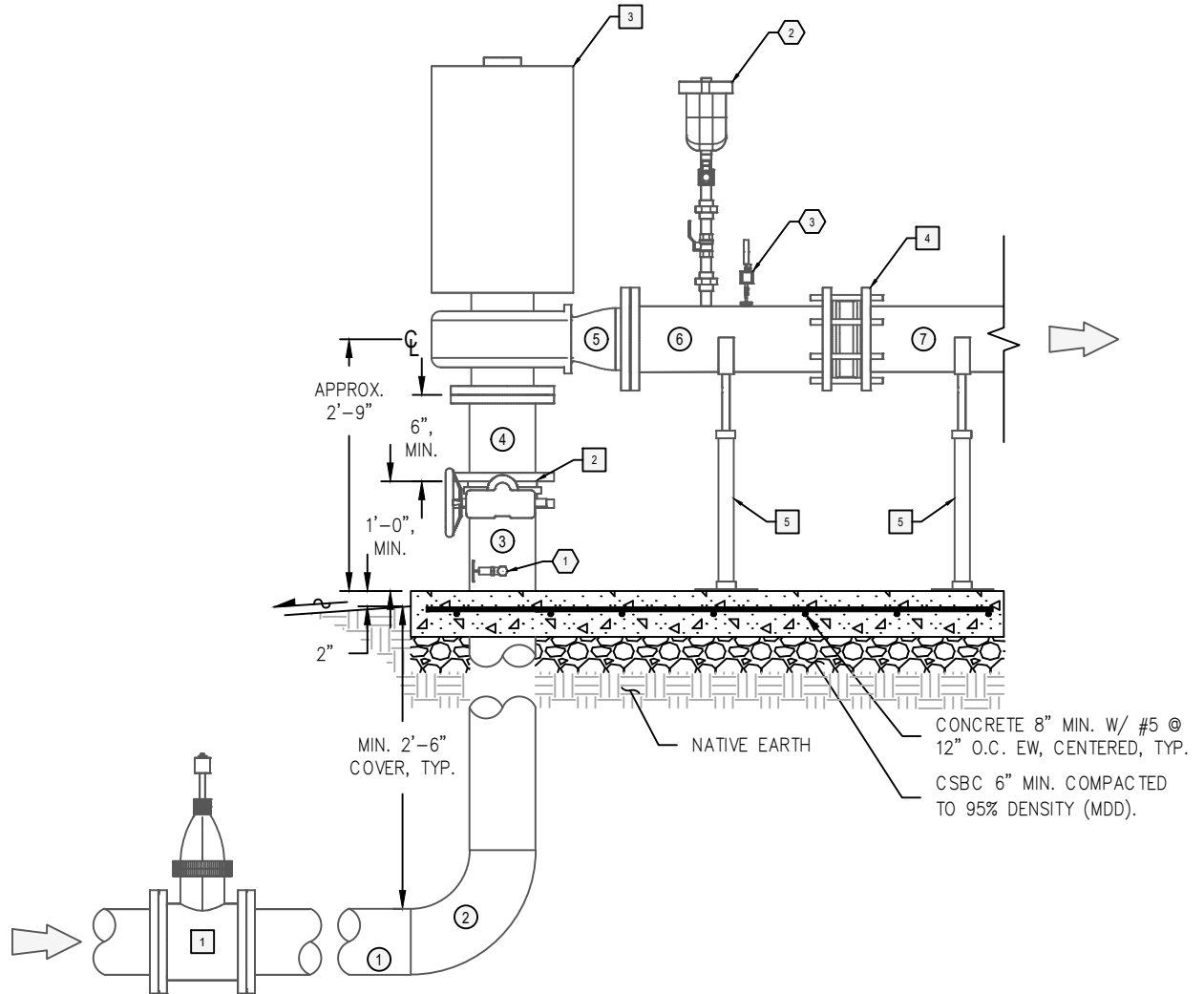
STANDARD DETAIL

- ① STL SPOOL (BWxFL), EXTEND MIN. 3' BEYOND SITE FENCE.
- ② STL 90° BEND (BWxBW)
- ③ STL SPOOL (BWxFL), LTF
- ④ STL REDUCER OR SPOOL (FLxFL), LTF
- ⑤ STL REDUCER (FLxFL), AS NECESSARY
- ⑥ STL SPOOL (FLxFL), 2'-0"
- ⑦ STL SPOOL (FLxFL), 5X PIPE DIA.

1	ISOLATION GATE VALVE (FLxFL)
2	WAFER BUTTERFLY VALVE W/ H. WHEEL
3	PUMP AND MOTOR
4	WAFER DOUBLE DISC CHECK VALVE
5	PIPE SUPPORT, TYP. OF 2.

1	3/4" HOSE PORT
2	2" COMBINATION AIR VALVE ASSEMBLY
3	PRESSURE GAUGE, TRANSMITTER, AND SWITCH ASSEMBLY

1. ELECTRICAL EQUIPMENT AND SHELTER NOT SHOWN FOR CLARITY.
2. ALL CONSTRUCTION AND MATERIALS SHALL MEET BMID CONSTRUCTION SPECIFICATIONS AND BE APPROVED BY BMID.
3. DIAMETER OF PIPE AND FITTINGS DETERMINED BY BMID OR THEIR ENGINEERING REPRESENTATIVE.
4. THRUST RESTRAINT FOR ALL OFF-DETAIL CONNECTIONS MUST BE VERIFIED AND PROVIDED BY OTHERS.
5. INSTALL ISOLATION GATE VALVES AND VALVE BOX PER DTL BMID-07.
6. SEE DTL BMID-12 FOR BPS SITE PLANS.
11. SEE DTL BMID-14 FOR BPS WITH BYPASS PROFILE.
12. SEE DTL BMID-15 FOR BPS END CONFIGURATION PROFILE.
13. SEE DTL BMID-16 FOR BPS ELECTRICAL EQUIPMENT AND SHELTER.
14. SEE DTL BMID-17 FOR BOOSTER PUMP STATION DETAILS.
15. ALL THREADED CONNECTIONS TO STEEL PIPING SHALL BE MADE WITH A THREADOLET OR HALF COUPLING. WELDED NIPPLES ARE NOT PERMITTED.
16. WELDED CONNECTIONS TO CAST OR DUCTILE FITTINGS ARE NOT PERMITTED.



SINGLE PUMP BPS WITH BYPASS PROFILE

STANDARD DETAIL

PIPE AND FITTING LIST

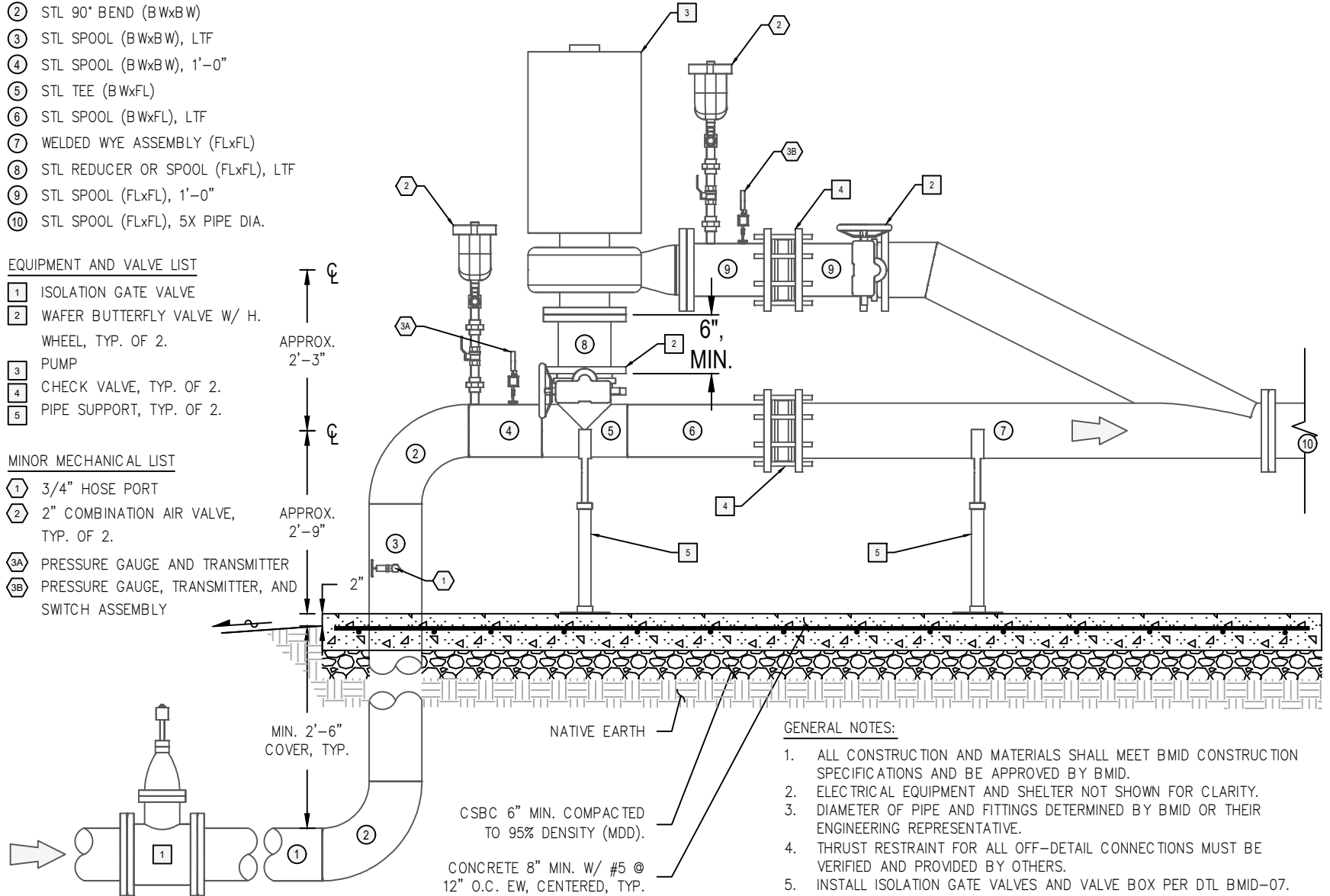
- ① STL SPOOL (BWxFL), EXTEND MIN. 3' BEYOND SITE FENCE
- ② STL 90° BEND (BWxBW)
- ③ STL SPOOL (BWxBW), LTF
- ④ STL SPOOL (BWxBW), 1'-0"
- ⑤ STL TEE (BWxFL)
- ⑥ STL SPOOL (BWxFL), LTF
- ⑦ WELDED WYE ASSEMBLY (FLxFL)
- ⑧ STL REDUCER OR SPOOL (FLxFL), LTF
- ⑨ STL SPOOL (FLxFL), 1'-0"
- ⑩ STL SPOOL (FLxFL), 5X PIPE DIA.

EQUIPMENT AND VALVE LIST

- 1 ISOLATION GATE VALVE
- 2 WAFER BUTTERFLY VALVE W/ H. WHEEL, TYP. OF 2.
- 3 PUMP
- 4 CHECK VALVE, TYP. OF 2.
- 5 PIPE SUPPORT, TYP. OF 2.

MINOR MECHANICAL LIST

- ① 3/4" HOSE PORT
- ② 2" COMBINATION AIR VALVE, TYP. OF 2.
- ③A PRESSURE GAUGE AND TRANSMITTER
- ③B PRESSURE GAUGE, TRANSMITTER, AND SWITCH ASSEMBLY



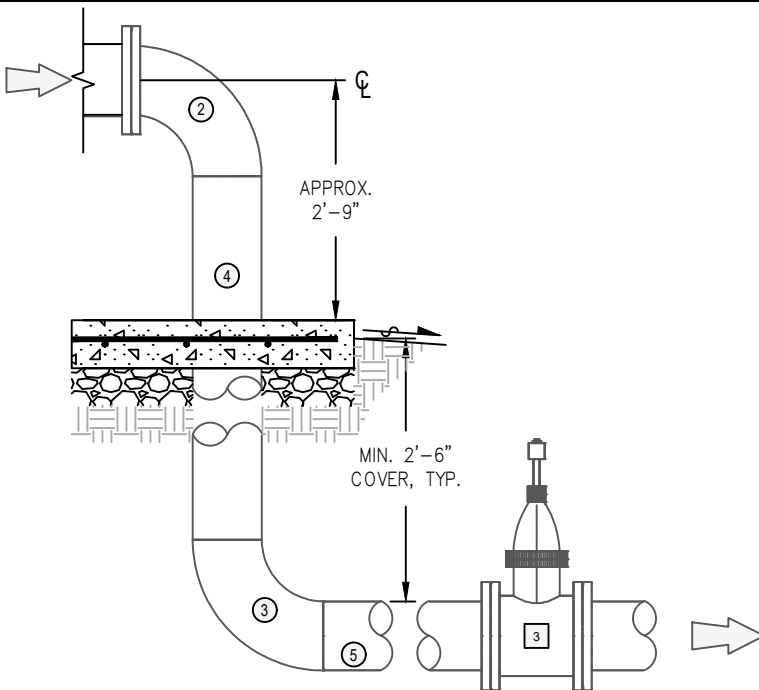
GENERAL NOTES:

1. ALL CONSTRUCTION AND MATERIALS SHALL MEET BMD CONSTRUCTION SPECIFICATIONS AND BE APPROVED BY BMD.
2. ELECTRICAL EQUIPMENT AND SHELTER NOT SHOWN FOR CLARITY.
3. DIAMETER OF PIPE AND FITTINGS DETERMINED BY BMD OR THEIR ENGINEERING REPRESENTATIVE.
4. THRUST RESTRAINT FOR ALL OFF-DETAIL CONNECTIONS MUST BE VERIFIED AND PROVIDED BY OTHERS.
5. INSTALL ISOLATION GATE VALVES AND VALVE BOX PER DTL BMD-07.
6. SEE DTL BMD-12 FOR BOOSTER PUMP STATION SITE PLANS.
11. SEE DTL BMD-13 FOR BPS WITHOUT BYPASS PROFILE.
12. SEE DTL BMD-15 FOR BPS END CONFIGURATION PROFILE.
13. SEE DTL BMD-16 FOR BPS ELECTRICAL EQUIPMENT AND SHELTER.
14. SEE DTL BMD-17 FOR BOOSTER PUMP STATION DETAILS.

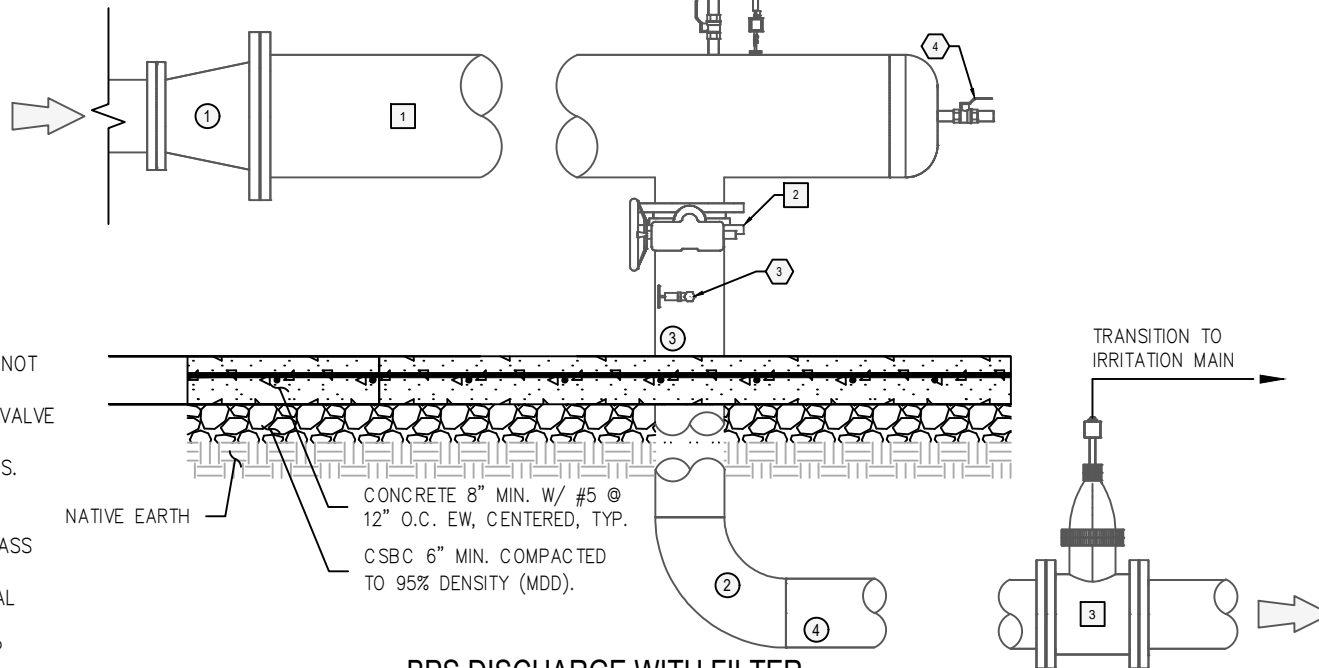


BADGER MOUNTAIN IRRIGATION DISTRICT

STANDARD DETAIL

BOOSTER PUMP STATION END
CONFIGURATION PROFILESBADGER MOUNTAIN
IRRIGATION DISTRICT

TYPICAL BPS DISCHARGE



BPS DISCHARGE WITH FILTER

PIPE AND FITTING LIST

- ① STL CONCENTRIC REDUCER (FLxFL),
SIZE AS NECESSARY
- ② STL 90° BEND (FLxBW)
- ③ STL 90° BEND (BWxBW)
- ④ STL SPOOL (BWxBW), LTF
- ⑤ STL SPOOL (BWxFL), EXTEND MIN. 3'
BEYOND SITE FENCE.

EQUIPMENT AND VALVE LIST

- ① FILTER/STRAINER
- ② BUTTERFLY VALVE W/ H. WHEEL.
- ③ ISOLATION GATE VALVE (FLxFL)

MINOR MECHANICAL LIST

- ① 2" COMBINATION AIR VALVE, TYP. OF 2.
- ② PRESSURE GAUGE AND TRANSMITTER
ASSEMBLY
- ③ GARDEN HOSE PORT WITH BALL VALVE
- ④ 2" BLOW OFF/DRAIN WITH BALL VALVE

GENERAL NOTES:

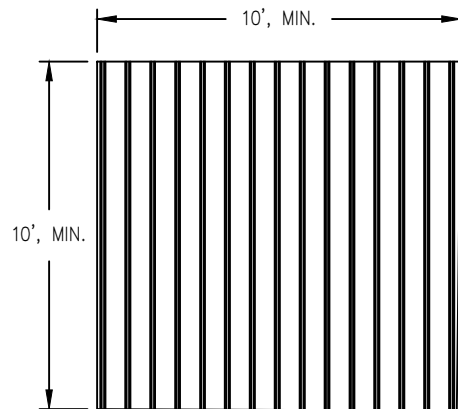
- 1. DIAMETER OF PIPE AND FITTINGS
DETERMINED BY BMD OR THEIR
ENGINEERING REPRESENTATIVE.
- 2. ELECTRICAL EQUIPMENT AND SHELTER NOT
SHOWN FOR CLARITY.
- 3. INSTALL ISOLATION GATE VALVES AND VALVE
BOX PER DTL BMD-07.
- 4. SEE DTL BMD-12 FOR BPS SITE PLANS.
- 11. SEE DTL BMD-13 FOR BPS WITHOUT
BYPASS PROFILE.
- 12. SEE DTL BMD-14 FOR BPS WITH BYPASS
PROFILE.
- 13. SEE DTL BMD-16 FOR BPS ELECTRICAL
EQUIPMENT AND SHELTER.
- 14. SEE DTL BMD-17 FOR BOOSTER PUMP
STATION DETAILS.

PUMP AND ELECTRICAL SHELTER

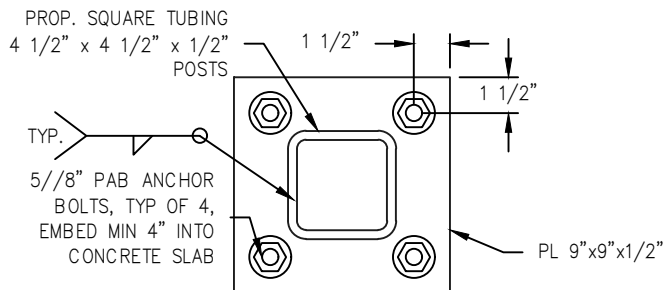


BADGER MOUNTAIN IRRIGATION DISTRICT

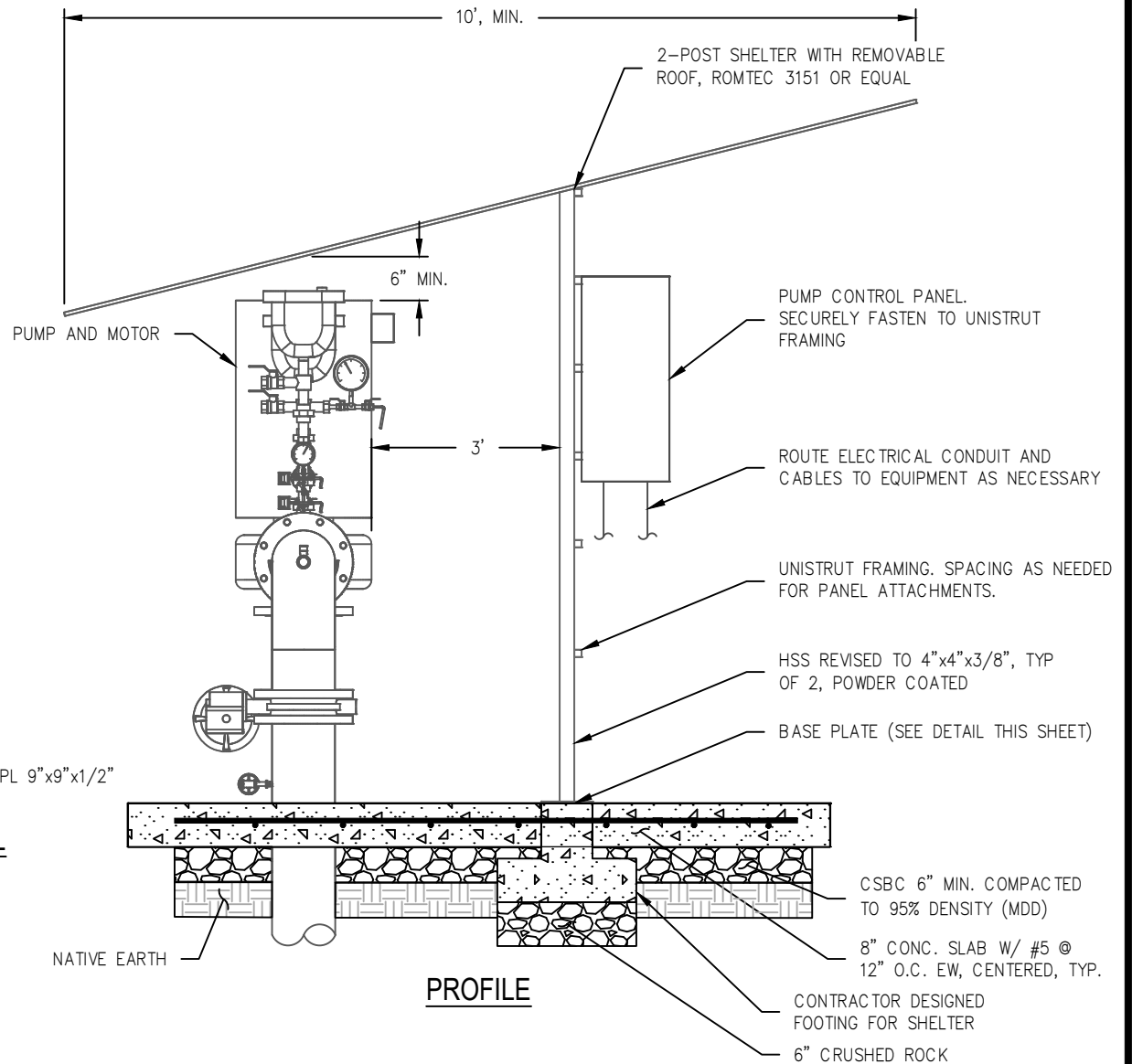
STANDARD DETAIL



SHELTER ROOF PLAN



UNISTRUT BASE PLATE DETAIL



PROFILE

GENERAL NOTES

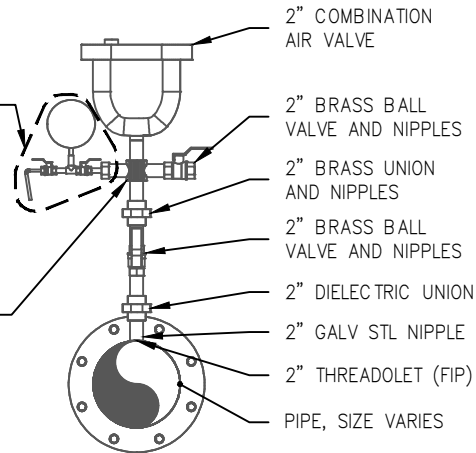
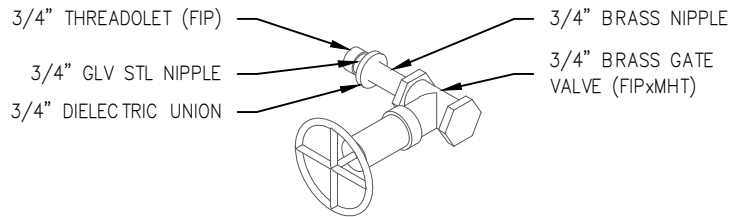
1. ALL CONSTRUCTION AND MATERIALS SHALL MEET BMID CONSTRUCTION SPECIFICATIONS AND BE APPROVED BY BMID.
2. CENTER PUMP/MOTOR AND ELECTRICAL EQUIPMENT UNDER SHELTER.
3. EXTEND ROOF 2' MIN. BEYOND PUMP/MOTOR AND ELECTRICAL EQUIPMENT, EACH SIDE.

BOOSTER PUMP STATION DETAILS**STANDARD DETAIL**

IF REQUIRED:

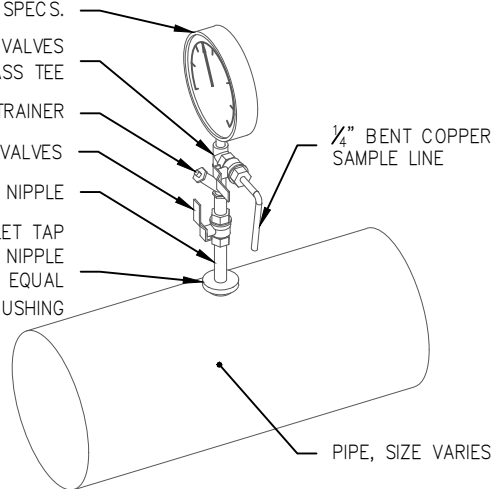
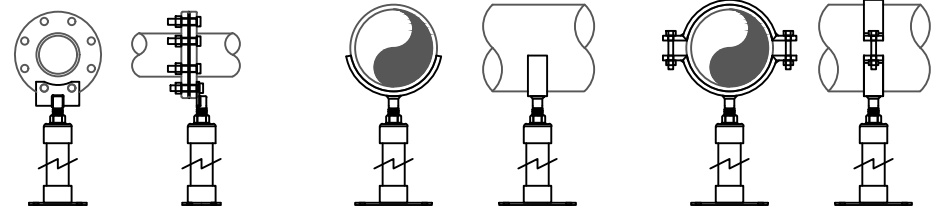
- (1) 2"x1" BUSHING
 (1) 1"x1/4" BUSHING
 (2) 1/4" BRASS BALL VALVE
 (1) 1/4" BRASS TEE
 (1) 1/4" BENT COPPER BLEED/SAMPLE LINE
 (1) PRESSURE GAUGE, SEE SPECS.

2" BRASS TEE AND NIPPLES
 (IF REQUIRED, REPLACE WITH 2" BRASS CROSS)

**2-INCH COMBINATION AIR VALVE AND PRESSURE GAUGE ASSEMBLY****3/4-INCH HOSE PORT**

PRESSURE GAUGE, SEE SPECS.

- 1/4" BRASS BALL VALVES
 (1) 1/4" BRASS TEE
 1/4" BRASS WYE FILTER/STRAINER
 1/4" BRASS BALL VALVES
 1/4" SHORT BRASS NIPPLE
 1" THREADOLET TAP
 1" SHORT GALV STL NIPPLE
 1" DIELECTRIC UNION EQUAL
 1" TO 1/4" BRASS BUSHING

**PRESSURE GAUGE ASSEMBLY****TYPE A - FLANGE SUPPORT**

(TYP. AT VALVES, METERS, AND FITTINGS)

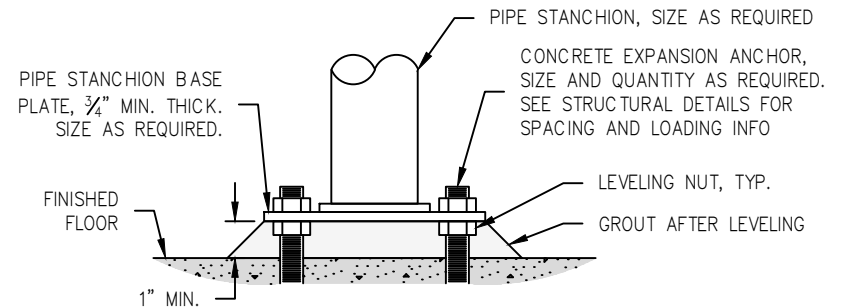
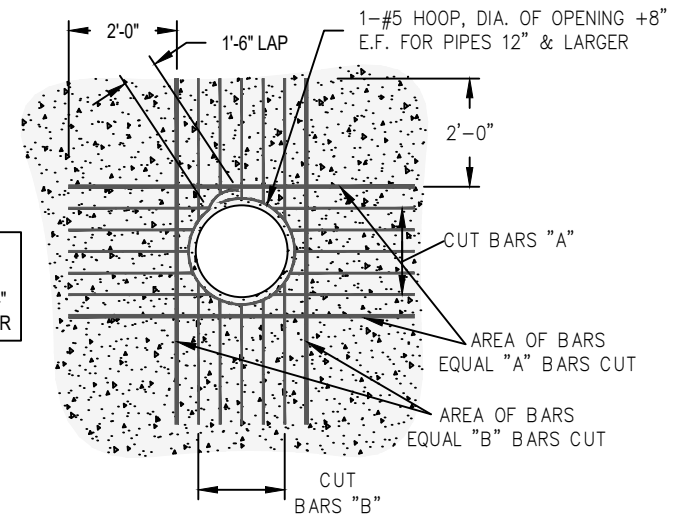
TYPE B - SADDLE SUPPORT

(AS SPECIFIED OR WITH ENGINEER APPROVAL)

TYPE C - SADDLE CLAMP SUPPORT

(TYP. AT PIPING)

1. FLANGE, SADDLE, AND SADDLE CLAMP SUPPORTS SHALL BE "STANDON" BRAND AS MANUFACTURED BY MATERIAL RESOURCES OR EQUAL.
2. SEE PIPE STANCHION DETAIL FOR MORE INFORMATION, TYP.

STANDON PIPE SUPPORT**PIPE STANCHION DETAIL**

NOTE:
 THIS DETAIL USED FOR
 SINGLE PENETRATIONS 4"
 IN DIAMETER AND LARGER

PENETRATION AND OPENING REINFORCEMENT**BADGER MOUNTAIN
IRRIGATION DISTRICT**