

HUNTSVILLE UTILITIES

ELECTRICITY • NATURAL GAS • WATER



Water Engineering Services

Facilities Specifications

QUICK REFERENCE FOR
WATER DEPARTMENT FACILITIES SPECIFICATIONS
Revised 05/2022

| TABLE OF CONTENTS | | |
|--------------------------|--|-------------|
| SECTION | | PAGE |
| 1. | General | 1 |
| 2. | Beginning of Work | 2 |
| 3. | Location | 2 |
| 4. | Other Utilities | 2 |
| 5. | Depth of Cover | 2 |
| 6. | Bedding | 3 |
| 7. | Protection of Pipe | 3 |
| 8. | Mechanical Joint Fittings | 3 |
| 9. | Thrust Restraint | 3 |
| 10. | Valves | 4 |
| 11. | Fire Hydrants | 6 |
| 12. | Joint Deflection | 7 |
| 13. | Services | 7 |
| 14. | Blow-offs | 8 |
| 15. | Injection and Sampling Taps | 9 |
| 16. | Inspection | 9 |
| 17. | Pressure Test | 9 |
| 18. | As-Built Drawings | 10 |
| 19. | Disinfection | 11 |
| 20. | Bacterial Sampling | 11 |
| 21. | Tie-Ins, Adjustments | 11 |
| 22. | Final Acceptance | 13 |
| 23. | Fire Line Installations | 13 |
| 24. | Appendix A – Drawings and Details | 28 |

QUICK REFERENCE FOR
WATER DEPARTMENT FACILITIES SPECIFICATIONS
Revised 05/2022

1. GENERAL

The Contractor shall provide all labor and equipment necessary for the installation of water facilities, which shall include all work necessary for installing ductile iron water mains, valves, fittings, and appurtenances. Main materials shall be furnished by Huntsville Utilities unless otherwise approved or specified, in which case all materials shall be inspected and approved by a Huntsville Utilities representative before installation.

Where Huntsville Utilities furnishes materials, these shall not include any concrete, gravel or pug mix, threaded rods for thrust restraint (or coatings required), traffic control devices, or other miscellaneous items not routinely furnished along with water mains, services, casing pipe, and fittings for a complete installation.

All materials furnished by Huntsville Utilities shall be picked up and/or returned at the Huntsville Utilities Warehouse, located at 4707 Triana Boulevard. Contractors may pick up materials between the hours of: **8:00 a.m. - 2:00 p.m. on weekdays.**

Materials to be supplied by the Developer/Contractor shall conform to Huntsville Utilities current approved standard material specifications, which are available from the Owner. Any materials not specifically approved in these specifications shall be approved in writing by the Engineer or the Owner prior to order and not after receipt at the jobsite. Failure to obtain prior approval shall be sufficient cause for the Owner's representative to reject any materials so delivered to the Contractor.

All pipe, valves, fittings, and appurtenances shall be handled so as to prevent any damage whatsoever, particularly to the lining or coating. All pipe and fittings shall be loaded and unloaded by lifting so as to avoid shock or damage. Under no circumstances shall such materials be dumped, dropped or otherwise handled in a manner which may cause damage. The Contractor shall be responsible for inspecting all materials when they are picked up at the Huntsville Utilities Warehouse, and for insuring the safety and handling of all materials at each job site. It is highly recommended that each Contractor keep his copies of all issue and return tickets to account for all materials assigned to each particular job until the final inspection has been completed. Huntsville Utilities will assume no responsibility for damaged or missing materials once they leave the Warehouse. Any additional or replacement materials needed to complete the job may be charged to the Contractor or to the job work order, at the discretion of Huntsville Utilities, and with an appropriate markup for storage and handling.

Before final completion and acceptance of any project, a materials issued list for the project shall be compared with the drawings and inspection records to determine any discrepancies. The Contractor or Developer shall be responsible for all materials issued and not returned, whether or not they were installed. Appropriate deductions will be made from Contractor's payments or Developer's contract to cover the cost of all such extra items.

It shall be noted that this document is for reference and convenience only, and that nothing contained herein shall override or modify the Standard Construction Specifications as referenced below. This "quick reference" is intended only to cover the most basic and important sections, often without specific details. Both these "quick reference" specifications and detailed specifications are continually updated, changed and modified by Huntsville Utilities. All work shall be accomplished in accordance with the most recent edition of HUNTSVILLE UTILITIES WATER DEPARTMENT STANDARD CONSTRUCTION SPECIFICATIONS, available at the Engineering Office, 112 Spragins Street, Huntsville, AL 35801.

2. BEGINNING OF WORK

No water mains shall be installed until the Inspector has determined that adequate staking and project controls are in place to insure precise location of mains and appurtenances. As a minimum, all lot lines along streets shall be staked and clearly marked, and the Inspector may require additional information, including centerline staking of streets, boundaries of easements and any other control points he deems necessary for proper main installation. Additionally, no mains shall be installed until streets and R.O.W.'s are within 6 inches of final grade and all sewers have been installed.

3. LOCATION

Generally, unless otherwise approved or specified, all mains installed within standard subdivisions shall be located in the area beneath the sidewalk, 5 feet to 6 feet behind the back of curb. At all locations, water mains shall be located a minimum of 10 feet off building walls or footings.

4. OTHER UTILITIES

The location of other utilities should be verified with all individual utilities, as should the status of any existing utility relocation projects. Any damages to utilities or services shall be promptly repaired by the Contractor or affected utility, at the Contractor's expense.

Contractor shall be responsible for coordinating all conflicts and required adjustments with existing or proposed utilities and storm drains. All water mains shall have a minimum of 12" clearance provided between all storm drains, and the water main shall be below the storm drain unless adequate cover is provided over the main. All sewer crossings shall provide a minimum clearance of 18" from edge of pipe to edge of pipe, with water main over the sewer main. No joints shall be allowed within 6' of sewer mains or storm drains on either side of crossings.

Whenever a water main is within three feet (3') of an existing coated steel gas main, or wherever indicated on the plans, polyethylene encasement shall be installed snugly around the pipe so as to prevent the contact of backfill material with the pipe or fittings.

5. DEPTH OF COVER

All water mains shall have a minimum cover of 30 inches. Unless installed under storm drains, or otherwise directed by the Engineer or Inspector, all water mains shall have a maximum cover of 54", measured from final grade. Service lines shall have a minimum cover of 24 inches.

6. BEDDING

All water mains shall be installed on well compacted, select soil or backfill no less than six inches in depth. Additionally, six inches of select soil or gravel shall be placed along either side and on top of all mains prior to backfilling with any rock. Nine inches of clearance shall be provided for all pipe 30" in diameter and larger.

7. PROTECTION OF PIPE

Contractor shall exercise care in keeping all foreign materials out of main before and during installation. Should this requirement not be adhered to, pipe shall be removed, cleaned and replaced, or pipe shall be cleaned by running a series of polyfoam pigs through the pipeline, at the Contractor's expense. At the end of each day's work, all open ends of piping shall be sealed with plugs so designed as to prevent any foreign matter from entering the pipe. Plywood barriers are not acceptable for this purpose.

8. MECHANICAL JOINT FITTINGS

All fittings, unless otherwise specified, shall be ductile iron, mechanical joint, plain end by plain end, and shall be installed using ductile iron restraining glands or rings. Approved glands for this purpose will be "mega-lug" (EBAA Iron) glands and/or "grip-rings" (Romac Industries). All fittings and glands shall be installed in accordance with AWWA specifications, the manufacturer's recommendations, and with Huntsville Utilities specifications. Should any discrepancies exist between the various specifications and recommendations, the most stringent requirement shall apply.

9. THRUST RESTRAINT

All tees, plugs, caps, bends or any other locations where unbalanced forces exist shall be anchored by adequate thrust blocking as defined herein. Concrete for thrust blocking shall be Class "B" concrete (3,000 psi) and shall be placed against undisturbed earth. "Sakrete" is not acceptable for thrust blocking. A minimum of one-third (1/3) cubic yard of concrete for each thrust block shall be used and minimum surface area, in square feet, against undisturbed earth shall be taken from the following table for horizontal bends (table based upon 160 psi test pressures). Where weak soil conditions or higher test pressures are encountered, the bearing area of each thrust block will be increased as required by the Engineer or Inspector.

| Pipe Size | Plug or Tee | 90° | 45° | 22 1/2° | 11 1/4° |
|-----------|-------------|------|------|---------|---------|
| 4" | 1.1 | 1.5 | 1.1 | 1.0 | 1.0 |
| 6" | 2.2 | 3.2 | 1.7 | 1.1 | 1.0 |
| 8" | 4.1 | 5.7 | 3.1 | 1.6 | 1.1 |
| 10" | 6.3 | 9.0 | 4.9 | 2.6 | 1.3 |
| 12" | 9.1 | 12.8 | 7.1 | 3.6 | 1.8 |
| 16" | 16.0 | 22.7 | 12.4 | 6.4 | 3.2 |

| | | | | | |
|-----|-------|-------|-------|------|------|
| 18" | 20.3 | 28.8 | 15.6 | 8.1 | 4.1 |
| 24" | 36.3 | 51.2 | 28.0 | 14.5 | 7.3 |
| 36" | 81.4 | 115.0 | 62.3 | 31.8 | 16.0 |
| 48" | 144.8 | 204.7 | 110.8 | 56.5 | 28.4 |

The Contractor shall insure that all bolts, nuts and retainer glands, except on dead-end stubs, are left clear of concrete thrust blocking for future access. Plywood or other suitable means of confining the concrete and keeping the bolts and nuts clear shall be used, and any excess concrete shall be removed at the Contractor's expense.

Vertical bends where the installation of concrete thrust blocks is difficult or impossible shall be secured by the use of retainer glands and/or threaded rods. Where required by the Inspector or Engineer, Contractor shall verify tightening torques on any and all retainer glands by the use of a torque wrench.

Thrust ties may be required in some instances by the Inspector or Engineer. Where so required, the Contractor shall provide threaded rods, mild steel (A-36) or equivalent, with a minimum diameter of 3/4 inch. Threaded rods shall be installed using approved harness assembly or special bolts or plates so designed for this purpose.

Minimum number of threaded rods shall be as follows:

| Pipe Diameter | # Tie Rods req'd |
|---------------|------------------|
| 3" to 10" | 2 |
| 12" to 14" | 4 |
| 16" to 20" | 6 |
| 24" | 8 |
| 30" to 36" | 12 (1") |
| 48" | 16 (1 1/4") |

Following installation, threaded rods and nuts shall be coated with coal-tar epoxy paint for protection from rust and corrosion.

Dead end stubs shall be anchored into wall of ditch, against undisturbed soil, with concrete and set screw rings (not "mega-lug" or "grip ring" retainer glands) in lieu of backing plug at end of line, unless otherwise approved. See Appendix A for example details.

10. VALVES

All buried valves shall be provided with cast iron valve boxes of proper dimensions to fit over the valve bonnets and to extend to such elevation at or slightly above the finished ground line as is directed by the Inspector. Tops shall be complete with covers and adjustable barrels.

Valve boxes shall be set vertical and concentric with valve stem. Backfill and compact area around valve body with gravel or other suitable and approved granular material before setting valve box so that valve box does not rest directly on valve body or pipeline. Backfill around valve boxes shall be the same as that specified for adjacent pipe, and shall be carefully and thoroughly compacted. Care should be taken to insure that valve box is not displaced from proper alignment or grade. Misaligned valve boxes shall be excavated, plumbed and backfilled at the Contractor's expense.

The use of 6" ductile iron pipe for valve box extensions will be allowed only for extra depth valves, and the bell end of valve box shall be placed over top of valve. Do not place 6" pipe directly over valve nut. Under no circumstances shall plastic pipe be used for a valve box or extension. Any valves installed at a depth greater than 60", measured from final grade to top of valve operating nut, shall have a valve stem riser installed prior to backfill.

All valve boxes, unless otherwise approved, shall have installed a concrete valve pad, two feet square and a minimum of five inches thick (Class "B" concrete) or a precast donut pad, at finished grade level. Valve box pads in streets shall be below level of asphalt paving by approximately two inches (2") so that paving may be placed to the edge of the valve box. Valve boxes in streets shall be adjusted flush with the concrete valve pad so that a 2" valve box riser can be added to bring the box to final pavement grade when asphalt is placed. "Sakrete" concrete is not acceptable for use as a valve pad.

Contractor shall excavate for and install tapping sleeves and tapping valves. Pipe to be tapped shall be thoroughly cleaned and checked for smoothness to insure a watertight seal. Before the tap is made, the interior surface of the tapping sleeve and the exterior surface of the pipe shall be disinfected as approved by the Inspector. No tap shall be made until the tapping sleeve and valve hold a minimum pressure of 200 p.s.i., or 50 p.s.i. above static pressure on the main being tapped, whichever is greater. Resilient seat tapping valves require testing with valve closed and no allowable leakage. For metal seated tapping valves, the following procedure shall be followed:

1. The tapping valve and sleeve shall be tested using a mechanical joint plug, with valve in open position, and shall have zero allowable leakage.
2. The tapping valve shall be closed, mechanical joint plug removed, and pressure maintained on the sleeve side of the tapping valve gate. Allowable leakage shall be 1 ounce of water per inch diameter per hour. This same allowable leakage may be added to the total allowable leakage for the section of water main to be pressure tested following installation.

Before installation, all valves shall be thoroughly cleaned of all foreign materials and inspected for proper operation and for defects or damaged coatings and linings. Valves shall be installed so that stems are vertical and easily accessible from the surface. Joints shall be assembled as per specifications for mechanical joint fittings.

Butterfly valves shall be installed with stems on North and West sides unless otherwise approved. Where two, three or four way valving is called for at intersections, valves shall be installed at equal distances from tees and crosses.

11. FIRE HYDRANTS

All public fire hydrants shall be located so as to provide complete and unobstructed access for a minimum of four feet (4') in all directions. Generally, unless otherwise shown on plans or unless otherwise directed or approved, fire hydrants shall be located at the intersection of the right-of-way and the property lines. As for fire lines, many typical installations will require a fire hydrant within 100' next to the vault or as specified by the Fire Department. (See Appendix A for standard installation details and more information on fire hydrant locations for fire lines and private systems.)

Pumper nozzle shall be facing the street, and shall be no less than 18" nor more than 24" from final ground elevation. Safety flange shall be approximately 2-3 inches above finished ground level to provide access to bolts and nuts.

Hydrant extensions, where required, shall be installed by Contractor and considered incidental to fire hydrant installation. Huntsville Utilities endeavors to supply hydrants with proper depth of bury, but Contractors are encouraged to request taller or shorter hydrants before installation to avoid delays and extra work involved with addition of extensions.

Where hydrant risers are required, the Contractor shall inform himself of the type of hydrant riser to be used and its proper installation, taking special precaution to insure that the break-away flange of the riser is installed next to the hydrant barrel and not below grade.

The Contractor shall check each fire hydrant installation with a level to insure that it is installed plumb. Any fire hydrants improperly located, not plumb or improperly installed and backfilled shall be removed and properly reinstalled at the Contractor's expense.

Wherever possible, control valves shall be anchored directly to the anchoring tee at the main, or by using anchor couplings. If couplings are not available, tie rods should be used. Valves and valve boxes shall be installed as per specifications.

Unless necessary due to terrain, **hydrants shall not be anchored to main or control valves**, but shall be blocked with concrete thrust block. Where needed and approved by Inspector, tie rods shall be installed and coated as per specifications in lieu of or in addition to thrust blocking behind fire hydrant. Excavation for fire hydrants shall be neat and shall leave, along back and bottom of trench, undisturbed earth for blocking. See Appendix A for more details.

Contractor shall furnish solid concrete blocks, 4" x 8" x 16" square, to be installed under fire hydrant base. Hydrant shall be carefully placed on base blocks to prevent breaking and shall be carefully and substantially blocked against firm trench walls using Class "B" concrete. Temporary blocks may be used to hold hydrant plumb while pouring thrust block, which shall have a minimum bearing area of 4 square feet against undisturbed earth. Special care should be taken to insure that weep holes are not plugged or blocked by concrete.

A minimum of four (4) cubic feet of washed gravel or crushed stone shall be placed around the base of all fire hydrants to allow for proper drainage of hydrant barrel after closing.

Gravel shall be installed for a minimum distance of 12" in all directions from hydrant drainage holes. **Pug mix will not be acceptable for this application.** Additionally, all hydrants shall have caps on each nozzle, with chains tied together and secured to hydrant barrel to prevent loss of caps. All caps and threads shall be cleaned and greased by the Contractor to allow for ease of removal in the future.

12. JOINT DEFLECTION

Pipelines intended and/or shown to be laid in a straight line shall be laid straight with no deflection at the joints. No deflection will be allowed unless necessary due to grade, curves or to avoid obstructions.

Should it be necessary to deflect pipe from a straight line, the maximum amount of deflection allowed shall not exceed the values listed in the following table or as recommended by the manufacturer:

| Pipe Diameter | Max. Joint Deflection (deg) | Max Deflection per Joint (in) |
|---------------|-----------------------------|-------------------------------|
| 3" to 30" | 5° | 21" (20' joints) |
| 36" | 4° | 17" (20' joints) |
| 42 to 64" | 3° | 13" (20' joints) |

13. SERVICES

All service lines shall be installed with a swing connection at the main as shown on detail drawings. Standard installations shall include the materials listed below, in addition to 1" polyethylene pipe. In new subdivision installations where only service stubs are required, items marked with an asterisk (*) will be installed by Huntsville Utilities, unless otherwise specified. Where taps are made on 3" and 4" water mains, use 3/4" corporation stop and (2) 1" x 90 ells to construct swing connection. Where 1" meters are specified or indicated, do not reduce to 3/4" cut-off valve and instead use additional 1" x 2" long nipple and 1" cut-off. Corporation stops shall be threaded directly into top of main. All fittings shall have pipe sealant/lubricant or teflon tape installed during installation.

Standard Service Line Materials

| | |
|-------------------------------|-------------------------------------|
| 1" corporation stop | 1" insta-tite coupling (2 required) |
| 1 1/4" x 1" x 90 ell | 1" x 3/4" bushing |
| 1" x 90 ell | 3/4" x 2" long nipple |
| 1" x 2" long nipple (2 req'd) | 3/4" cut-off valve |
| Rome meter box | |

- * 3/4" meter spud
- * 3/4" check valve
- * 3/4" x 5/8" meter

* these materials normally installed by Huntsville Utilities at time of meter installation

Service lines shall be installed perpendicular to mains using shortest possible route. Service lines shall not cross streets or rights-of-way at an angle. On all street crossings, install dirt or clay backfill in the area within 6" of the service line before adding any granular materials.

All service lines shall be continuous; no splices will be allowed. The Contractor shall make best possible use of service line pipe and keep waste and scraps to an absolute minimum. Should the Inspector determine that service line materials are being wasted or misused, the Contractor may be required to purchase additional polyethylene pipe as required.

Minimum cover over all service lines shall be 24 inches. All taps shall be left open until successful completion of pressure test unless otherwise approved, but in no case shall taps be backfilled until visually inspected by a Huntsville Utilities Representative. Should this requirement be ignored, the Contractor will be required to uncover taps for inspection prior to beginning of pressure test.

In new developments, service lines shall be run to either center of lots or property lines, at the developer's discretion, but shall be uniform throughout each individual development. Service lines shall be run to the R.O.W. for standard 50' streets, or shall be run 17' behind back of curb for 46' streetscapes, and cut-off valves shall be inside meter box. Meters shall always be located between the sidewalk and the house. Meter box shall be placed at final grade, and a well marked stake shall be placed at each meter box location. See Appendix A for service line details.

In areas with existing meters, new service lines shall be run adjacent to existing lines to provide for easy and quick connection to existing services on customer's side. This work will usually be covered in more detail in the Contract Documents.

All service lines shall have a detectable locator tape laid both above and along with the pipe. The locator tape shall be wrapped around the pipe as it is installed, and another length of locator tape shall be installed directly over the pipe as the ditch is backfilled, at a depth of no less than 8" nor greater than 16". Tape shall not be placed directly on top of service line, but shall be a minimum of 16" above the pipe. These dimensions may not apply at the meter box location, where the distance above the service line may be less than 16" in order to keep the tape at its proper depth.

All service lines which cross roads shall be encased or sleeved with steel or plastic casing, with casing to extend a minimum of 2' behind the back of the curb. The Developer / Contractor is required to supply materials for this item.

All service lines, regardless of size, which are installed under storm drains shall be encased in plastic or steel casing for a minimum length of 5' beyond the storm drain on either side.

14. BLOW-OFFS

The Contractor shall be required to install any temporary blow-offs at the ends of all mains as required by the Inspector, and to remove these installations upon successful disinfection of the main. It shall be the responsibility of the Contractor to adequately provide for the safe disposal of all flushing water and to protect any structures, subgrade or landscaping as so required. Where the discharge of heavily chlorinated water will cause damage to the environment, the Contractor shall obtain and apply sufficient quantities of a reducing agent to neutralize the remaining chlorine residual.

15. INJECTION AND SAMPLING TAPS

The Contractor shall provide enough taps for the injection of a disinfecting agent, collection of bacteriological samples, and pressure testing as required by the Engineer or Inspector. Cost of all materials, equipment and labor shall be borne by the Contractor. As a minimum, disinfection taps are required within 10 feet of each tie point. Sampling taps are required at each dead end main and along each valved section of main. Contractor shall remove all testing materials and cap the corporations of all test points before final acceptance.

16. INSPECTION

No water mains shall be covered until visually inspected by Water Department Inspectors and all joints should be left open until pressure test is completed. Any mains covered prior to inspection shall be uncovered, at the Contractor's expense.

17. PRESSURE TEST

As soon as a continuous valved section of a new water main has been installed, the Contractor shall proceed immediately to complete flushing and pressure testing as specified. No pressure test shall be conducted until all taps have been installed and all thrust blocking has been in place for a minimum of 48 hours.

The Contractor shall furnish all labor, materials, tools and equipment necessary to fill and flush the lines, and then seal the main for testing. The pipe shall be slowly filled with water and all air expelled from the pipe, and shall then be allowed to stand for 24 hours, after which it shall again be checked for any trapped air. All new lines shall be flushed until clear water is observed, at a minimum velocity of 2.5 feet per second. It shall be the responsibility of the Contractor to provide for adequate disposal of flushing water and to protect existing structures or landscaping from damage from flushing operations. All mains shall be flushed with a full sized flushing assembly unless otherwise approved.

All pressure tests shall be scheduled at least 24 hours in advance, and shall be conducted in the presence of a Huntsville Utilities representative. No pressure test will be started at a time which will result in the completion time being later than 3:00 p.m. The duration of each pressure test shall be a minimum of 2 hours for uncovered pipes and 6 hours for pipelines which have been backfilled. All valves within the section being tested shall be open during the pressure test, including all service connections, fire hydrant control valves, and dead end valves.

The minimum test pressure shall be the **greatest** value of the following:

- a) 50 psi greater than the maximum pressure on main at elevation of test gauge, calculated with nearest reservoir full or nearest pumps running; or
- b) 100 psi calculated at highest elevation of section being tested; or
- c) 160 psi
- d) 200 psi on all required fire line installations where backflow preventer is located inside of the building.

The Contractor shall furnish a gauge capable of reading well in excess of the test pressure, and said gauge shall be in new condition and graduated in one or two psi increments. The pump suction shall be metered or shall be placed in a graduated container such that the amount of water required to maintain test pressure may be accurately measured.

Testing procedure shall be as follows:

1. Pump line to required test pressure and record gauge pressure.
2. Monitor gauge continuously and record pressure after 30 minutes. If, at any time during pressure test, pressure has dropped more than 5 psi, pump back to test pressure and record amount of water required to restore system to test pressure.
3. Continue until completion of required test period, then total the amount of water used to maintain test pressure within 5 psi of required test pressure (plus or minus), which amount of water shall be defined as leakage.

Allowable leakage shall be defined as 10 gallons per 24 hours per mile of pipe, per inch of nominal diameter. Any leakage greater than allowable leakage calculated for test section shall constitute a failing test, and Contractor shall be required to find and eliminate the leak or leaks. In addition, any observed leaks shall be stopped, regardless of test requirements or results.

The Contractor, at his expense, shall locate and repair all defective joints, connections, sections or valves until the leakage is within that allowed. After the Contractor has made the necessary corrections, the main shall be retested as described above until the line passes the necessary requirements.

Generally, short valved sections shall be tested independently, but the Contractor may request that several sections be combined on complex projects. In this case, the allowable leakage for each section shall be computed separately, and the smallest value obtained shall be used for the entire test section in order to eliminate the possibility of a major leak at a single location.

18. AS-BUILT DRAWINGS

The Contractor shall furnish to the Inspector, upon completion of pipe laying operations, a set of as-built drawings containing the following minimum information:

- a. All fire hydrant locations with control valves referenced to hydrants.
- b. Main sizes, if different from plans.
- c. Main locations, referenced to curb, R.O.W., or street centerline. Include depths where not standard. (Note any area where deviations in location or depth were necessary due to conflicts with sewers, electric, etc.).
- d. Location of all main fittings, referenced to valves, fire hydrants, other fittings or other permanent markers as approved by the Inspector.
- e. Valve references in a minimum of two directions for all valves, use a fire hydrant for third if possible. Reference valves to curb in subdivisions, and to road centerline or R.O.W. in other areas. Dimensions from other valves are acceptable, so long as one is referenced to a visible landmark. The presence of a valve stem riser shall be clearly noted along with the depth of the valve or length of the valve stem riser as part of the valve reference.
- f. Service taps referenced to property line and giving depth from final grade to top of main. Reference all services along each street in same direction whenever possible (ex. North and East of property line, etc.).

- g. Flow information from the last fire hydrant on every line, consisting of static and residual pressures and flow rate in full open position. Inspectors will have gauges to assist in gathering this information.

19. DISINFECTION

Following acceptable completion of pressure test, water main will be disinfected by Huntsville Utilities, in accordance with AWWA specifications governing water main disinfection, and will then be flushed to remove chlorine residual. Bacteriological samples will be collected from each dead end main and other locations as required up to the backflow preventer protecting public mains.

20. BACTERIAL SAMPLING

Any and all requirements of the State Health Department, City of Huntsville, State of Alabama or United States of America concerning contamination and bacteria count shall be complied with. Samples collected will be tested at Huntsville Utilities Water Department Laboratory and a report will be made showing results of these tests. Should any mains test bad or unacceptable; Huntsville Utilities will resample, or re-disinfect and then resample, the mains in question. Should bad samples again be collected after two tries to disinfect, it shall be assumed that there is a problem with the main and the Contractor shall be called upon to assist in determining the cause of the problem. Such assistance shall include taking up main and relaying should all other means fail, at no expense to Huntsville Utilities. The Contractor may at any point when trying to obtain satisfactory results from a main which has repeatedly failed health samples, at his own expense, attempt to disinfect mains and hire an independent, approved laboratory to collect and analyze samples under the supervision of Huntsville Utilities.

21. TIE-INS, ADJUSTMENTS

All water main abandonment, tie-ins, adjustments and other related items of work shall be accomplished using new ductile iron materials, including "mega-lug" retainer glands, unless otherwise specified or approved by the Engineer. Whenever possible, offsets, anchor couplings and other one-piece assemblies shall be used in lieu of separate fittings, nipples, ells or other required assembly pieces.

Existing or proposed water mains shall be abandoned by cutting and/or capping, adjusted by the installation of offsets or fittings, or tied-in at the locations as shown on the plans or as directed by the Engineer.

All mains specified, shown or directed to be abandoned, tied-in, adjusted or otherwise modified shall be so modified following acceptance of the new facilities designed to take their place. Outages shall be scheduled in advance and coordinated with all Utility Companies involved. New mains shall be installed to a point as close as practical so that connections can be more easily and swiftly accomplished.

Installation of split retainer glands and concrete kickers on existing mains for thrust restraint shall be anticipated and performed by the Contractor at no additional expense to the Owner. Likewise, short or complex main extensions, replacements or relocations may require installation of temporary valves to facilitate pressure testing and disinfection. These valves are to be removed and returned to the Owner during tie-in operations at no additional cost.

Installation of caps or plugs shall be performed as shown on the detail drawings, by making neat and square cuts upon the existing main, as close as possible together so that the old main may be used for thrust restraint against the cap or plug. Should the old main being abandoned need to be removed for any reason, an additional cut shall be made so that removal of old pipe will not disturb the thrust blocks.

Tie-ins and adjustments shall be made using offsets whenever possible, and the alignment of the mains to be connected shall be considered and determined by the Contractor in advance of final installation of new mains so that connections may be made with a minimum of ells, nipples and other fittings.

Whenever solid sleeves are used, spacer nipples shall be carefully measured, cut to size, and installed inside the sleeve so as to prevent any future movement of the pipe or fittings in either direction.

Threaded rods shall be used for thrust restraint on vertical sections unless otherwise approved. The use of additional thrust restraint(s) to allow for turning water mains back on before concrete sets or cures shall in no way relieve the Contractor from the requirements for concrete kickers on all ells.

No water mains shall be turned off for any work of this nature without previous notice and scheduling of outage. The Contractor shall be responsible for scheduling with the Owner all such outages, a minimum of 24 hours in advance, and the Contractor shall assist in passing out notices to customers if so instructed. The Engineer reserves the right to specify times and dates of outages whenever deemed desirable to coordinate with Huntsville Utilities customers or operations. Unless otherwise specified or specifically approved, outages will not be scheduled for periods exceeding four hours in length or on Friday afternoons.

The Contractor shall be responsible for transporting all required materials to the site of the work, and for assembling on the ground as much of the required piping and fittings as possible, and for excavating the area in which work is to be accomplished, including the existing mains, before any water mains will be turned off. Additionally, no water mains shall be turned off until a Huntsville Utilities representative is present. Failure to have all materials and required work under this specification completed before the time of scheduled outage shall be sufficient cause for the Engineer or Inspector to cancel said work and reschedule at the next most convenient time. In this case, the Contractor shall be responsible for notifying all authorities and/or customers of the delay and the scheduled time for completion of the required work.

All fittings and connections shall be left uncovered until mains are brought back to full pressure, and any leakage shall be promptly repaired by the Contractor. All fittings, nipples, valves, etc. installed under this Section of the Specifications shall be thoroughly disinfected by the Contractor before and during installation by spraying with a chlorine bleach solution, to be supplied by Huntsville Utilities. The Contractor shall be responsible for providing adequate flush points or flushing arrangements to flush all connections and tie-ins following their installation; said required flushing to be coordinated and supervised by Huntsville Utilities personnel.

22. FINAL ACCEPTANCE

Final acceptance shall be granted, in writing, after completion of a project and the date of final acceptance shall constitute the beginning of the Developer's and/or Contractor's one year warranty period. Final acceptance will not be granted until such time that a final inspection has been conducted, and any discrepancies noted have been corrected. Minimum requirements for final acceptance are as follows:

- a. passing pressure test
- b. passing health samples
- c. as-built drawings complete and accurate
- d. all valve boxes to grade and valves operable
- e. all fire hydrants to grade and operable
- f. all service lines at R.O.W. line, staked with meter box installed
- g. all temporary taps capped, blow-offs removed
- h. any excess materials returned to Huntsville Utilities Warehouse

NOTE: Items c - f require completion of curbs, gutters, and final landscaping before final inspection and/or acceptance may be granted.

No final payments will be made to any Contractor until such time as Final Acceptance has been granted, nor will payments be made for any service line installation contracts which may be in effect for the particular project.

Following final acceptance, the Developer or Contractor shall be responsible for any and all repairs or replacements which become necessary for a period of one year. Should emergency repairs be necessary, or should the Developer or Contractor fail to make repairs as requested within a reasonable period of time (two weeks), Huntsville Utilities shall be authorized to make repairs with its own crews or by contract, and all costs incurred shall be billed to the Developer or Contractor.

23. FIRE LINE INSTALLATIONS

All fire lines and private fire sprinklers shall have an approved backflow prevention device (BFP) installed to protect the public water supply. All fire lines shall require the installation of an approved **double check BFP** with approved fire flow meter.

All FDC (Siamese Connections) shall be installed within 100' of a public fire hydrant and at a distance greater than 40' from the building, unless otherwise approved by the Fire Department.

All installations will require inspection and test by a Huntsville Utilities representative up to and including the backflow preventer. Where the BFP is installed in the building, all materials installed from the public water main to the BFP shall be in accordance with Huntsville Utilities Standard Construction Specifications.

Various Fire Line Configurations - (Inspection Requirements)

(See Appendix A for Various Fire Line Configuration Details and for more information on fire line requirements.)

Case 1:

City water main is tapped, fire flow meter is set at the Right-of-Way, and backflow preventer is installed inside the building. In this case, the new main from the fire flow meter to the backflow preventer must meet H.U. specifications as follows:

- 1) The main will be ductile iron pipe.
- 2) The installation of the fire line main, all fittings, and from the tap to the backflow preventer will be inspected by Huntsville Utilities Water Engineering representative.
- 3) Upon installation of the fire line main, it will be flushed, pressure tested, and chlorinated under the supervision of Huntsville Utilities Water Engineering representative up to the backflow preventer.

Case 2:

City water main is tapped, fire flow meter is set, and backflow preventer is installed in a vault at the Right-of-Way.

The requirements are as follows:

- 1) The tap and installation of the backflow preventer will be inspected by the Huntsville Utilities Water Department.
- 2) Main from tap to vault will be flushed, pressure tested, and chlorinated as needed.
- 3) Backflow preventer will not be chlorinated.
- 4) Fire line main from vault to building must be ductile iron and no pressure test or chlorination will be required on this part of the fire line, provided private fire hydrants are installed. Inspections will be provided by Huntsville Fire Department.

Case 3:

City water main is tapped, fire flow meter is set, and backflow preventer is installed in a vault at the Right-of-Way. This is the same as Case 2, except that a fire hydrant is installed at the end of the fire line main.

The requirements are as follows:

- 1) The tap and installation of the backflow preventer will be inspected by Huntsville Utilities Water Department.
- 2) The fire line main to the fire hydrant and to the riser in the building will be ductile iron pipe.
- 3) Main from the vault, to the end of line fire hydrant, and to the fire line riser will require pressure testing or chlorinating procedures by Huntsville Fire Department personnel.
- 4) Backflow preventer will not be chlorinated.
- 5) Since a fire hydrant is at the end of the fire line main, all materials will be ductile iron.

Case 4:

City water main is tapped, fire flow meter is set, and backflow preventer(s) are installed in a vault at the Right-of-Way. This is the same as Case 2, except that several fire hydrants are installed on a looped fire line main with one or more fire line risers to the building.

The requirements are as follows:

- 1) The tap and installation of the backflow preventer will be inspected by Huntsville Utilities Water Engineering representative.
- 2) Main from the vault, around the looped fire line including fire hydrants, and to the fire line riser will require pressure testing and chlorinating procedures by Huntsville Fire Department personnel.
- 3) Backflow preventer will not be chlorinated.
- 4) Since there are fire hydrants on the looped fire line main, all materials will be ductile iron, including the fire line risers.

Maintenance Responsibility

All vaults shall be the responsibility of the owners or their representatives. In vaults where fire lines as well as domestic lines are served from a single meter, Huntsville Utilities will be responsible for the meter, all fittings around the meter, and the bypass line outside the vault. All fittings and backflow devices, on both the domestic and fire line, will be the responsibility of the owners or their representatives. (See Appendix A)

On a fire line, where the city main is tapped and a line is extended to a riser inside the building and with the backflow prevention device located on the riser, the responsibility will be that of the owners or their representatives up to the tap valve or tee.

LEGEND - LINE TYPES

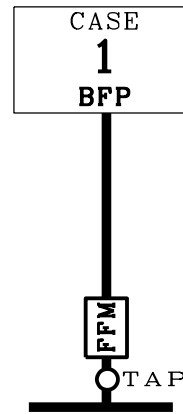
| | |
|--|--|
| | DUCTILE IRON REQUIRED NO INSPECTION NO PRESSURE TEST NO CHLORINATION BY H.U. |
| | DUCTILE IRON REQUIRED INSPECTION REQUIRED PRESSURE TESTED PRIVATE FIRE HYDRANTS |
| | DUCTILE IRON REQUIRED INSPECTION REQUIRED PRESSURE TESTED PUBLIC FH |

LEGEND - SYMBOLS

| | |
|-----|--------------------|
| ● | FIRE HYDRANT |
| ○ | GATE VALVE |
| BFP | BACKFLOW PREVENTER |
| FFM | FIRE FLOW METER |

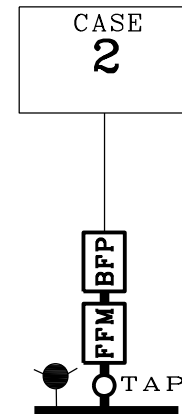
VARIOUS FIRE LINE CONFIGURATIONS

BFP IN BUILDING



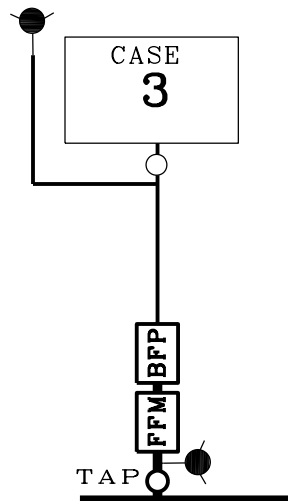
EXISTING WATER MAIN

NO PRIVATE FIRE HYDRANTS. FDC
MAX. 100' FROM FIRE HYDRANT



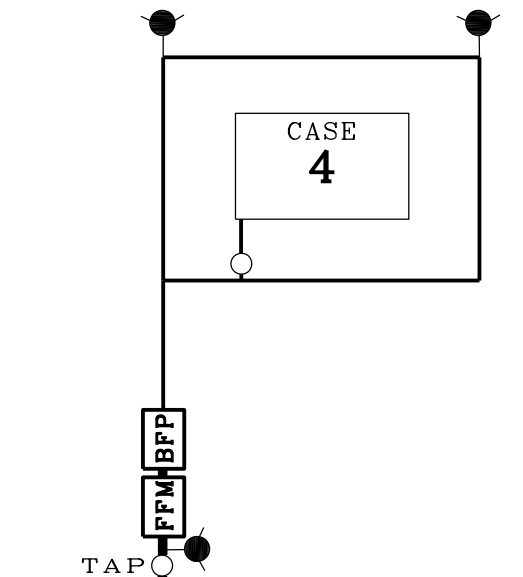
EXISTING WATER MAIN

PRIVATE FIRE HYDRANT



EXISTING WATER MAIN

LOOPED PRIVATE HYDRANTS



EXISTING WATER MAIN

Fire Hydrant Locations and Distribution

These provisions are not mandatory unless specifically referenced in the adopting ordinance.

- **SECTION 508.5**

Fire hydrant systems. Fire hydrants shall comply with Sections 508.5.1 through 508.5.6.

- **SECTION 508.5.1**

Where required. Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet (122m) from a hydrant on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the fire code official.

Exceptions:

1. For Group R-3 and Group U occupancies, the distance requirement shall be 600 feet (183m).
2. For buildings equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the distance requirement shall be 600 feet (183m).

- **SECTION 508.5.2**

Inspection, testing, and maintenance. Fire hydrant systems shall be subject to periodic tests as required by the fire code official. Fire hydrant systems shall be maintained in an operative condition at all times and shall be repaired where defective. Additions, repairs, alterations, and servicing shall comply with approved standards.

- **SECTION 508.5.3**

Private fire service mains and water tanks. Private fire service mains and water tanks shall be periodically inspected, tested, and maintained in accordance with NFPA 25 at the following intervals:

1. Private fire hydrants (all types); Inspection annually and after each operation; flow test and maintenance annually.
2. Fire service main piping; Inspection of exposed, annually; flow test every 5 years.
3. Fire service main piping strainers; Inspection and maintenance after each year.

- **SECTION 508.5.5**

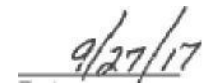
Clear space around hydrants. A 3-foot (914mm) clear space shall be maintained around the circumference of fire hydrants except as otherwise required or approved.

- **SECTION 508.5.6**

Physical protection. Where fire hydrants are subject to impact by a motor vehicle, guard posts or other approved means shall comply with Section 312.



Dan Wilkerson, Fire Marshal, City of Huntsville Fire Department



Date

BFP Tests, Maintenance, and Repairs

All backflow prevention devices, whether existing or new, shall be maintained in a safe and reliable operating condition. It shall be the duty and responsibility of the customer to have a thorough inspection and operational test at the time of installation and at least once a year thereafter, or more often where inspections indicate a need or where more frequent testing is required for high hazard conditions. The initial test may be performed by either a certified backflow prevention tester or by Huntsville Utilities.

The cost of inspection, testing, maintenance and repair of all backflow prevention devices shall be borne by the Customer/Owner.

All devices failing to meet performance standards of AWWA, ASSE, FCCCHR of USC or any other prescribed standard shall be promptly repaired and tested. Any devices exhibiting a history of sub-standard performance shall be placed on a more frequent testing schedule, and continued failure to meet standards shall require replacement with new devices.

Testing and repairs shall be performed by a certified backflow device tester, who has been certified and/or trained to understand the design concepts and intended operation of the device being tested. Programs to train individuals in testing of backflow preventers are available and information concerning these may be furnished by Huntsville Utilities. Only certified testers will be accepted by Huntsville Utilities to do testing and repairs on customer owned backflow prevention devices. Evidence of certification shall be supplied by the customer or tester with the yearly test report.

A test and maintenance record for each backflow preventer shall be maintained by the customer and by Huntsville Utilities. Huntsville Utilities may notify customers when tests are required and will supply the test forms when necessary. A full and complete report of each test shall be forwarded to the Water Engineering Section of Huntsville Utilities, and shall include at least the following information:

Date of installation and location of device
Manufacturer's name, model, and serial number
Date and time of each test or inspection
Inspection report and recommendations, any re-inspections or corrective action taken
Name of authorized person performing test
Date repairs completed
Action to be taken if test results in device failure

If a backflow prevention device is found to be inoperative or malfunctioning, the customer will be given reasonable time to bring the device into compliance. Unless otherwise agreed to by Huntsville Utilities, thirty (30) days shall be considered a reasonable time for correction to be made. An exception to the time period shall be cases involving actual or imminent system contamination, which may require immediate or more rapid corrective measures, as determined by Huntsville Utilities.

If corrective measures are not taken in the prescribed time, termination of water service may be recommended, and the customer shall be issued a letter of intent to terminate service. If

the customer complies with the corrections prior to the deadline stated in this letter, termination procedures will be stopped. Otherwise, the Water Manager or his authorized representative shall cause the water service to the building or premises to be terminated and may take any other such precautionary measure deemed necessary to prevent or eliminate any danger of contamination of the Public Potable Water Supply System.

The Water Manager may cause termination of service if a backflow preventer has been bypassed or failed to be tested as required herein.

The Water Manager may cause termination of service if an air-gap separation system is compromised or altered so as not to be functional as a backflow prevention measure.

The Water Manager may cause termination of service if, in his opinion, a hazardous condition exists which cannot be immediately corrected.

If any case where water service has been terminated for failure to comply with these regulations, service shall not be restored until the system has been brought into full compliance and a written order to reconnect has been given by the Water Manager. Any and all costs associated with termination and reconnection of water service shall be paid by the customer prior to restoration of service.

BFP Devices Required

Determination of whether Backflow Prevention is necessary, and if so, what type of device will be installed, will be made by joint decision of the Huntsville Utilities Water Engineering Department, the Huntsville Plumbing Inspection Department, and the Huntsville Fire Department.

Certified Backflow Prevention Personnel

All Backflow Devices (excluding Dual Check Valves) will be installed either by a certified Backflow Prevention Tester or by person(s) under direct supervision by a certified Backflow Prevention Tester.

Each Plumbing Contractor / Fire Sprinkler Contractor / Irrigation Contractor, on any project that involves Backflow Prevention device(s) shall be able to provide proof that they have in their employ or under sub-contract, a certified Backflow Prevention Tester if requested.

All certified Backflow Prevention Testers shall, upon request, provide documentation of Backflow Prevention school graduation (Name of School / Location, Instructor's Name, Expiration Date of Certification (most Certifications are limited to 2-3 years from Date of Training) Phone number where verification of training can be made) In addition, Testers may be requested to allow observation of their test procedure (under field conditions) by a Representative of Huntsville Utilities Water Engineering Dept / Plumbing Inspection Dept.

Approved Procedure

Installation, Test, and Repair procedures shall conform to USCFCCCHR, ASSE or AWWA specifications.

Approved Test / Repair Forms

Test / Repair forms will be provided by Huntsville Utilities Water Engineering Dept. If a tester is using another form, it will be subject to review / approval by the above department. A copy of the completed form should be sent to the Owner of the premises (or Mechanical / Maintenance Supervisor) where the Backflow Prevention device(s) are located, and a copy should be sent to Huntsville Utilities Water Engineering Dept.

Approved Backflow Prevention Device

Approved Backflow Prevention devices will be only make and models approved by USCFCCCHR or ASSE. All devices will be installed in the horizontal configuration, unless expressly approved by either of the above agencies. Devices installed vertically must be approved in that configuration by one of the above agencies. All Backflow Prevention devices are tested and approved by the above agencies, with specific make/model of shut-off valves. Devices 2" and smaller are listed by manufacturer with ball valves or wheel valves, while devices 2¹/₂" and larger are listed by manufacturer with OS&Y valves. Any device installed with alternate / replacement shut-off valves (not listed in the approval rating, will be considered "failed", until corrections have been made).

Reasons for Rejection / "Failure" of Backflow Prevention Device

Each assembly / device shall have the following information marked on it where it will be visible after the assembly has been installed:

- (a) Name of manufacturer or trademark
- (b) Type and model number of the assembly
- (c) Maximum rated working pressure
- (d) Maximum water temperature for which the assembly is designed
- (e) Serial number consistent with the manufacturer's standard practice
- (f) Nominal valve size
- (g) The direction of water flow through the assembly shall be shown.

Such markings shall be either cast, etched, stamped or engraved on the body of the assembly or on a brass or stainless steel plate securely attached to the assembly with a corrosion resistant means.

Any Backflow Prevention device missing any required test ports, or with other plumbing fittings installed in place of any of the required test ports (which may represent a potential cross-connection) will be considered "failed" until corrections have been made. Pressure gauges (placed on the test ports, by the Owner's representative, for internal monitoring) will

be removed prior to testing, then put back in place, upon completion of testing. A hose bibb connected to any part of the assembly prior to the downstream side of the 2nd (downstream) shut-off valve is considered a cross-connection and will be removed. Any assembly that has a hose bibb, or any other plumbing connection in place of the required test cocks, will constitute reason to reject the device until corrective actions are taken.

Any Backflow Prevention device installed in such a way that access to any part of the device (including shut-off valves and test ports) is restricted or prevented shall be cause for the device to be rejected.

Any Backflow Prevention device installed without both shut-off valves attached to the main body of the backflow device shall be cause for the device to be rejected. Any Backflow Prevention device equipped with non-approved shut-off valves (valves not specified by the manufacturer or valves different than the type used during Seal of Approval testing), shall be cause for the device to be rejected.

Any mechanical fittings (tees, ells, reducers, pressure reducers, etc.) installed between the Backflow Prevention device and the shut-off valves will be cause for the device to be rejected.

Any Backflow Prevention device installed above electrical motors, switch gears, breaker boxes, or within 3 feet laterally (because of the release of water during test procedure) represents a work hazard and will be rejected.

No Backflow Prevention device shall be installed suspended from a ceiling or attached to any wall or other structure, which places the device a greater distance than 4' between the bottom of the device and the floor.

Any Backflow Prevention device installed in a vault constitutes a device located in a confined space. It will be the responsibility of both the Owner's representative and the tester to insure safe working conditions in the confined space. If this cannot be accomplished, the device will be listed as "failed".

Reduced Pressure Zone Assemblies (RPZ or RPA) shall not be installed in a below ground vault or pit. In any building or room where an RPZ / RPA device is installed, it is the Owner's responsibility to ensure a drain shall be installed that is designed to accommodate catastrophic failure of the relief port. In the case of a "full vent" of the relief port, an undersized drain would be overwhelmed, causing possible cross-connections (by submerging the device) or water damage to the surrounding building or structure in no case should the drain be smaller than 2 times the size of the device.

Any Backflow Prevention device installed in a below ground vault or meter-type box in such a way that the test ports or shut-off valve handles are buried will be considered "failed" due to obstruction. Any device installed in a below ground vault or meter-type box which fills up with dirt or mud, due to rain and run-off will be considered "failed" due to obstruction. Any device, which is installed in a vault or meter-box, where access to the shut-off valves or test ports is restricted or blocked, will be considered "failed".

Specific Application Backflow Device Requirements

Typical installations require the backflow device to be located at the meter location. On all fire lines, at minimum, a **Double Check [DC]** assembly will be installed at the service connection, either in a concrete vault at the R.O.W. or inside the building (inside a mechanical room), provided this is acceptable by the Huntsville Fire Department and Huntsville Utilities and that it can be determined that there are no laterals between the City connection and the Backflow Prevention device. If the required device is a detector check assembly, the device should be placed so that a remote "touch-read" pad can be installed on the outside of the nearest external wall. The type device will be based on the degree of hazard.

Lines that go on to private property with a common fire flow meter, then split with laterals going to fire lines, domestic, and/or irrigation systems, shall have individual Backflow Prevention devices on each system line to protect the other lines from potential cross-connection. The type device will be based on the degree of hazard.

On domestic applications where manufacturing or processing, internal to the building, could pollute the City drinking water (create disagreeable looking or tasting water, but not cause a possible health hazard) a **Double Check** device will be required downstream of the meter at the service connection.

On domestic applications where manufacturing or processing internal to the building could contaminate the City drinking water (create health hazards --cause sickness or death from drinking the affected water), pumped systems, and/or buildings which are 4 or more floors tall, a **Reduced Pressure [RPZ or RPA]** device will be required downstream of the meter and must be approved by Huntsville Utilities. The device may be installed inside the building, provided there are no laterals between the meter and the Backflow device. Otherwise, the device will be installed beyond the meter at the service connection. The **RPZ** or **RPA** will not, under any circumstances, be installed in a below ground vault. The device may be installed in an above ground vault, provided that positive drainage away from the vault is equal to a "**Full Vent**" of the relief port assembly.

On domestic applications where Security prevents total access for inspection of all areas affected by plumbing, the hazard will be considered the highest, and an **RPZ** or **RPA** device will be required.

On irrigation applications (lawn sprinkler systems), a **Double Check [DC]** device will be required. On irrigation systems, where chemicals are to be injected into the sprinkler system, a **Reduced Pressure [RPZ or RPA]** assembly will be required, and since it is a Reduced Pressure assembly, it must be installed above ground level. The **RPZ** device may be installed in an above ground vault with soil bermed up around it, provided there is positive drainage away from the device, and the device is located above the ground water table in the immediate area.

On any application where Backflow Prevention device(s) are in place, and the degree of hazard changes to a greater level, it will be the Owner's responsibility to notify the Huntsville Utilities Water Engineering Department and to make any necessary device upgrades (Ex:

Replace a **Double Check** device with an **RPZ** device, because the potential hazard changed from pollution to contamination).

During the planning stage of any construction, which will require Backflow Prevention, Water Engineering should be consulted concerning any problems with valving off the device (and therefore the water supply through the device) for the period of time to test or repair the device. Where "**un-interruptable service**" is required, parallel devices of equal size will be recommended. Then one device could be the primary device while the other one would be a standby.

Any existing structure, which undergoes renovation that affects the existing plumbing and/or the fire suppression system, shall be required to bring their Backflow Prevention protection up to current standards. If there are no Backflow Prevention devices in place, devices will be required. If there are devices in place which no longer conform to current standards, they will be replaced with currently approved devices, based on the degree of hazard. (Ex: A **Dual Check**, which is no longer considered a proper Backflow device, would be replaced with a **Double Check, Double Check Detector Check, or a Reduced Pressure assembly**).

Of the devices (2¹/₂" and larger) that are placed in a below ground vault, the following measurements are to be used as minimum requirements:

- Distance from bottom of Backflow Prevention device to floor of vault **12 inches**
- Distance from sides of Backflow Prevention device to side walls of vault **12 inches**
- Distance from side of Backflow Prevention device (that has test ports to the side) **18 inches**
- Distance from top of Backflow Prevention device to top of vault **18 inches**

Neither handles on ball valves, or wheel handles on gate valves (OS&Y or NRS) shall come within **2 inches** of any wall or ceiling of any vault , when being operated.

Of the devices (2" and smaller) that are placed in a smaller vault or meter-type box, the following measurements are to be used as minimum requirements:

- Distance from bottom of Backflow Prevention device to floor of vault **4 inches**
(a gravel base of **3 inches** shall be placed on top of the soil in the bottom of any vault or meter box, and this will constitute the floor).
- Distance from side of Backflow Prevention device to side wall of box **4 inches**
- Distance from side of Backflow Prevention device (that has test ports to the side) **6 inches**
- Distance from top of Backflow Prevention device to top of box **8 inches**

Neither handles on the ball valves, or wheel valve handles shall come within **2 inches** of any wall or ceiling of vault / box, when being operated.

Compliance to Cross-connection Ordinances

All new businesses being constructed, which require fire line(s), have internal processes which require water, or irrigation requirements, shall install any necessary Backflow Prevention devices (at the service connection) which are stipulated by the Huntsville Utilities Water Engineering Dept.

When renovating an existing business / facility, all backflow prevention requirements shall be complied with, as if the premises were new. If there are no existing backflow prevention devices, if there are some existing backflow devices which are no longer in compliance with current regulations, or if there are existing backflow devices which are currently approved models, but which have been circumvented or had their intended purpose defeated, it will be the Owner's responsibility to make corrections necessary to come into compliance with City Backflow Prevention Ordinances.

Only after the device(s) have been installed and inspected will the water to the device be turned on. If initial testing of the device indicates that it is not operating properly, the plumbing contractor will be notified that they have **30 days** in which to make the necessary corrections. If after 30 days these corrections have not been made, the **General Contractor / Owner** will be notified that within **30 days** the water will be turned off and left off until such time as corrections are made.

After successful testing of the new device, the water will be left on, and future testing will be conducted on an annual (yearly) basis, unless device malfunctions and/or repeated repair would indicate more frequent testing.

Coordination between Agencies

If during the course of an inspection of a new or existing premises, or the testing of new or existing backflow devices, violations are discovered, these will be made known to both the Huntsville Utilities Water Engineering Dept., the Huntsville Plumbing Inspection Dept., and the Huntsville Fire Dept.

Plumbing Requirements (up to Backflow Device)

All piping from Huntsville Utilities water system, up to the required Backflow Prevention device will be of Ductile Iron (sizes 3" and greater) and of Polyethylene (PE) or fire rated C900 PolyVinylChloride or Copper for sizes 2" and smaller.

Installation of Backflow Devices

When installing a Backflow Prevention device(s) at stubbed connections to the Huntsville City Water system, conduct sufficient flushing of the line (prior to connecting device) so that any sediment or debris, which maybe generated, will be removed. Sediment or debris may foul various parts of a backflow device and cause it to partially or completely fail testing (even though the device is new). An in-line Y-strainer with a blow-off port, prior to the backflow device is recommended for periodic flushing of accumulated sediment.

When installing a fire line, in which the Backflow Prevention device is to be located inside the building, refer to "Backflow Test Detail #23L", concerning pressure testing, chlorination & bacteriological testing, and flushing of fire line, prior to device installation.

When installing Backflow Prevention devices under construction site conditions, putting brass plugs in all test ports on the devices, is strongly recommended to protect the threads on the test ports. Any device which is not testable, due to accumulations of grout, scarring of threads from gravel or other equipment abuse during installation and continuing through the testing phase, will be "failed" until such time as these problems can be corrected by the installer. All valve handles shall be in original condition up to and including installation and testing. Bending of ball valve handles to compensate for a tight installation will not be acceptable.

BACKFLOW DEVICE TEST REPORT

Service Address: _____

Name of Premises: _____ Location of Device: _____

Device: _____

| | | | |
|--------------|-------|------|---------------|
| Manufacturer | Model | Size | Serial Number |
|--------------|-------|------|---------------|

Test Kit: _____

| | | |
|--------------|---------------|----------------|
| Manufacturer | Serial Number | Date Certified |
|--------------|---------------|----------------|

| | | | | | | |
|--|--|---|-------------------------------|---------------------------------------|--|--|
| Reduced Pressure Principle Assembly | | RP <input type="checkbox"/> | PVB <input type="checkbox"/> | DCDA <input type="checkbox"/> | | |
| Double Check Valve Assembly | | DC <input type="checkbox"/> | SPVB <input type="checkbox"/> | RPDA <input type="checkbox"/> | | |
| Check Valve #1 | Check Valve #2 | Relief Valve | PVB/SPVB | | | |
| Held at PSID | Backpressure Test | Opened at ____PSID Did not open <input type="checkbox"/> | Air inlet opened at ____PSID | | | |
| Leaked <input type="checkbox"/> | Closed tight <input type="checkbox"/> | | Check Valve held at ____PSID | Did not open <input type="checkbox"/> | | |
| | Leaked <input type="checkbox"/> | | | Leaked <input type="checkbox"/> | | |
| | In direction of flow | | | | | |
| | Closed tight PSID <input type="checkbox"/> | | | | | |
| | Leaked <input type="checkbox"/> | | | | | |
| Line Pressure: _____ PSI | No.2 Shutoff Valve: | Backflow Device: Passed <input type="checkbox"/> | | | | |
| | Closed tight <input type="checkbox"/> | Failed <input type="checkbox"/> | | | | |
| | Leaked <input type="checkbox"/> | | | | | |
| Date: _____ | Time: _____ | Certified _____ | tester # : _____ | | | |
| Test by (Signature) _____ | | Print Name: _____ | | | | |
| Your signature certifies that all information in this section is correct | | | | | | |

AFTER REPAIR TEST REPORT

| | |
|---------------------------------|--|
| R E P A I R S | Cleaned <input type="checkbox"/> Replaced: (List all parts replaced) List any additional repair items not previously addressed: Comments: |
| Date | Time: _____ Certified tester #: _____ |
| : | by (Signature) _____ Print Name: _____ |
| Test | signature certifies that all information in this section is correct |
| Your | Use separate sheets to fill out any additional information obtained after backflow device repair. |
| Note: | |

Appendix A

Appendix A – Drawings and Details

3. Location

- 3A Main Location Detail**
- 3B Main Location Detail**
- 3C Streetscape Main Location**
- 3D Creek Crossing**
- 3E Typical Bore Detail**
- 3F Typical trench Details**

4. Other Utilities

- 4A Minimum Spacing Requirements**
- 4B Typical Common Trench**
- 4C Common Trench w/ Conflict**
- 4D Streetscape Detail**

8. Mechanical Joint Fittings

- 8A Three – Way Valving**
- 8B Pipe Cross Detail**

9. Thrust Restraint

- 9A Thrust Block Locations**
- 9B Offset Details**

10. Concrete Valve Pad and Construction Valves

- 10A Valve Box Detail**
- 10B Sloped Valve Pad Detail**
- 10C Valve Pad Detail**

11. Fire Hydrants

- 11A Fire Hydrant Details**
- 11B Tapped Fire Hydrant**
- 11C Fire Hydrant w/ Anchored Offset**
- 11D End-of-Line Fire Hydrant**
- 11E Reduced End-of-Line Hydrant**
- 11F Standard Fire Hydrant Location**

12. Joint Deflection

- 12A Maximum Allowable Deflection**

13. Meter Service Details

- 13A Standard 1” Meter Detail**
- 13B Meter Detail**
- 13C Meter Bank Detail**

- 13D 1" Tap and Meter Set w/ Yoke
- 13E 1 1/2" Compound Meter w/ 1 1/2" Double Check BFP
- 13F 2" Compound Meter w/ 2" Double Check BFP
- 13G 6" Compound Meter w/ Vault Detail

14. Flushing Assembly and Sampling Taps

- 14A Flushing Assembly Detail

17. Air Release and Pressure Reducing Valves

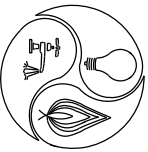
- 17A Air Release Valve
- 17B Air Release and Vacuum
- 17C Pressure Reducing Valve Detail

21. Tie-In, Adjustments

- 21A End-of-Line Valve
- 21B Fire Line Stub

23. Fire Line Installations

- 23A 6" Master Meter w/ 6" BFP Detail
- 23B 8" Master Meter w/ 8" BFP Detail
- 23C 6" Fire Line / 3" Domestic
- 23D 8" Fire Line / 4" Domestic
- 23E Backflow Preventer in Concrete Vault
- 23F Backflow Preventer Spacing #1 - (Inside Building)
- 23G Backflow Preventer Spacing #2 - (Inside Building)
- 23H Fire Line Riser Detail - #1
- 23I Fire Line Riser Detail - #2
- 23J Double Detector Check w/ OS & Y Valves
- 23K Examples of Incorrect Installations of BFP Devices
- 23L Backflow Test Detail
- 23M 6" RPZ in an above ground vault

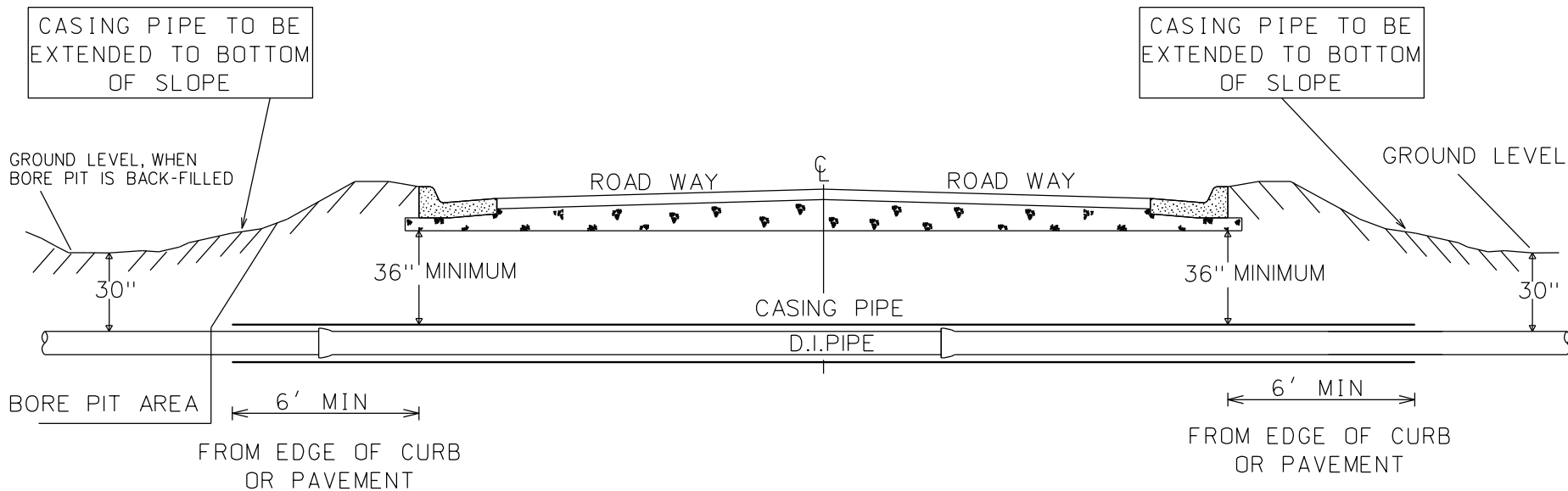
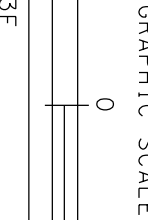


TYPICAL BORE DETAIL

HUNTSVILLE UTILITIES
 WATER DEPARTMENT
 112 SPRAGINS STREET
 HUNTSVILLE, AL 35801
 (256) 535-1400

DRAWN BY: AW
 CHECKED: _____
 DATE: 4/20/2022
 DRAWING NO.: _____
 SCALE: 1" = 6'

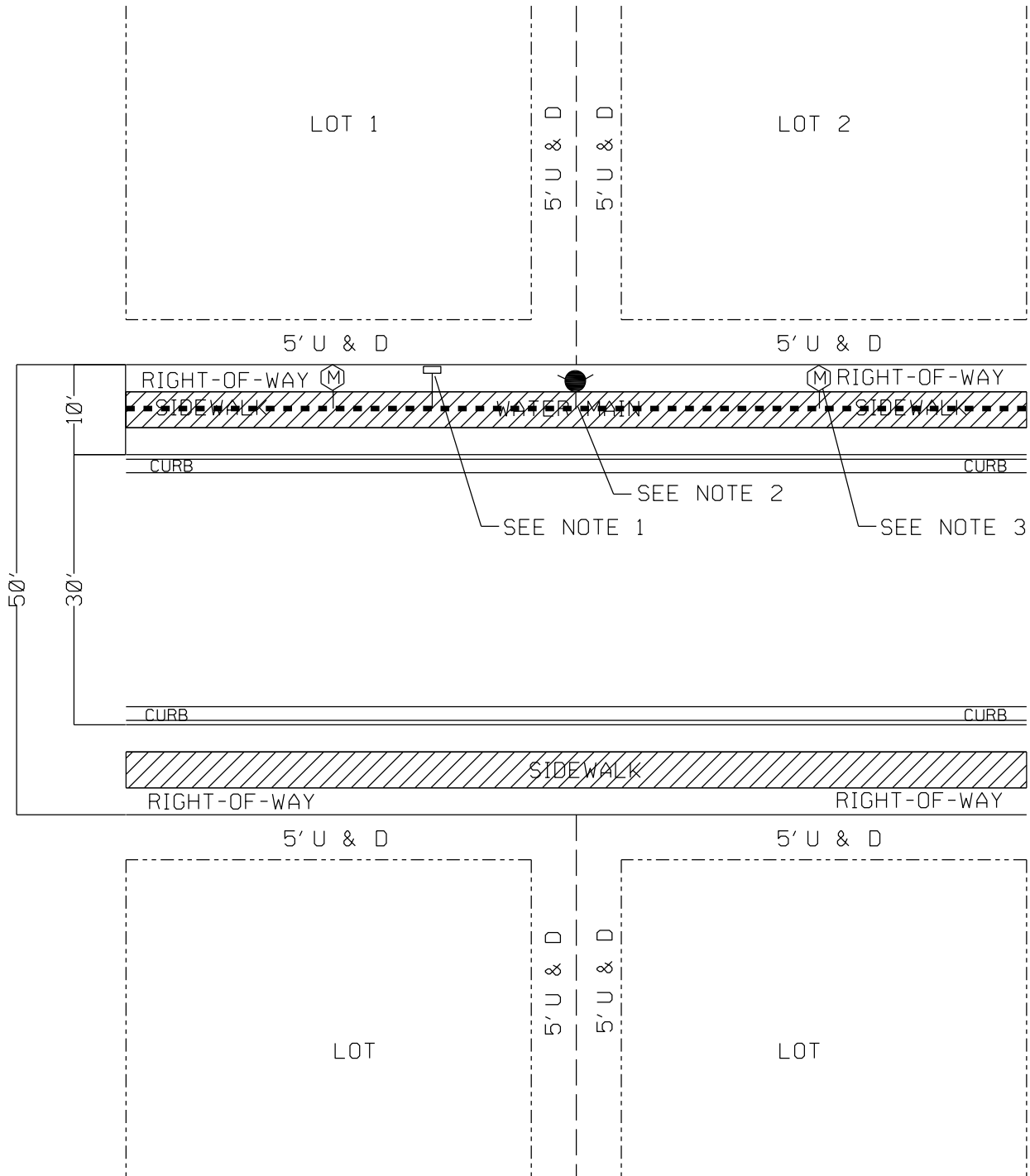
REVISED: _____
 SPEC #: 3E



NOTE: PIPE TO BE RESTRAINED AS SPECIFIED BY HU.

NOTE: CASING SPACERS TO BE USED A MINIMUM OF EVERY 10'.

TYPICAL MAIN LOCATION DETAIL



- NOTE 1: AIR RELEASE VALVE SHALL BE INSTALLED AT THE BACK OF R.O.W WHEN POSSIBLE
- NOTE 2: FIRE HYDRANT SHALL BE INSTALLED AT INTERSECTION OF PROPERTY LINE AND R.O.W. LINE. HYDRANT DISTANCE FROM BACK OF CURB MAY VARY WITH R.O.W. WIDTH
- NOTE 3: METER BOXES SHALL BE INSTALLED AT BACK OF R.O.W. IN THE CENTER OF THE LOT UNLESS SPECIFIED OTHERWISE BY ENGINEER/INSPECTOR



**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS ST.
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 20'

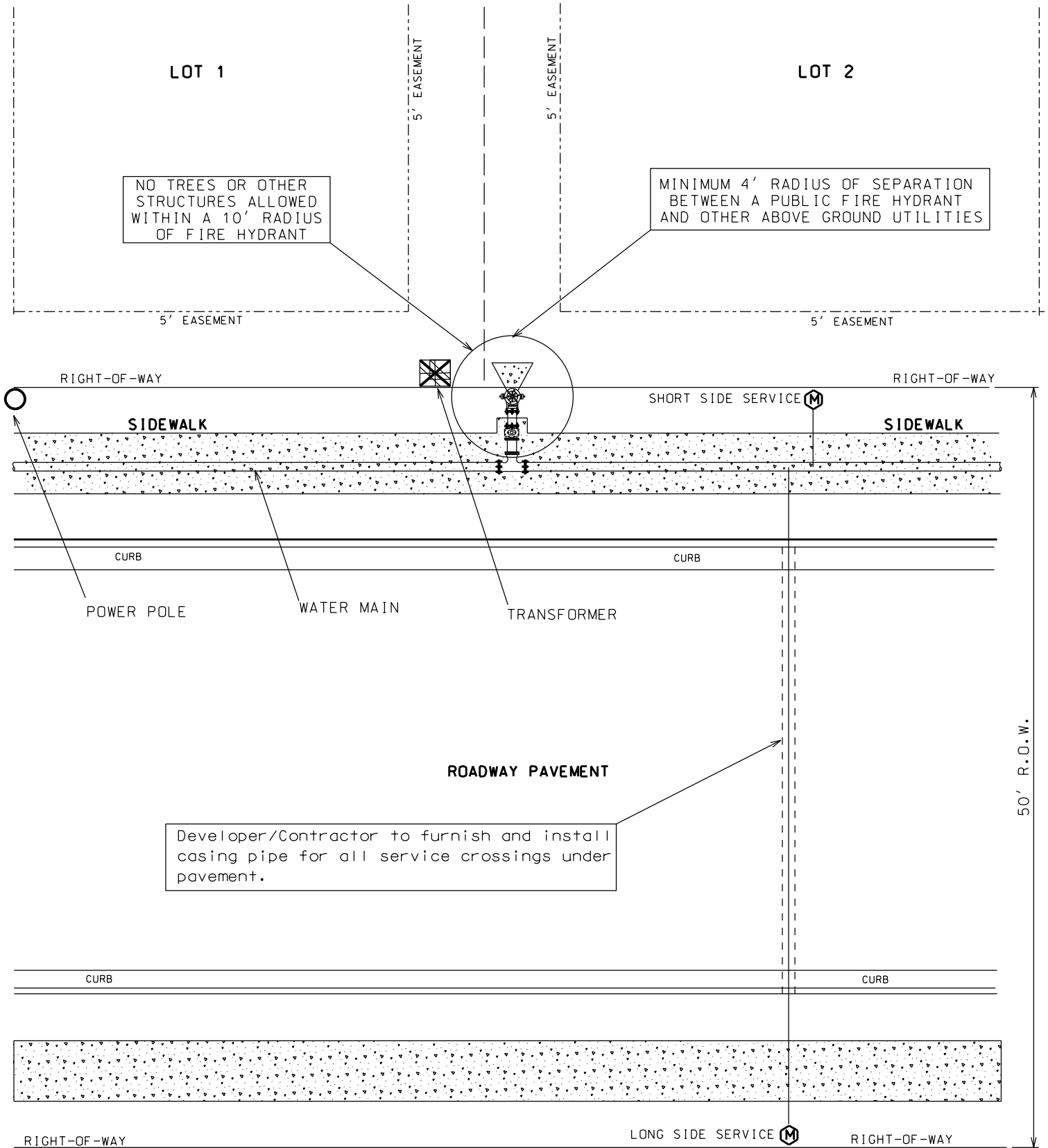
REVISED: _____

GRAPHIC SCALE



SPEC #: 3A

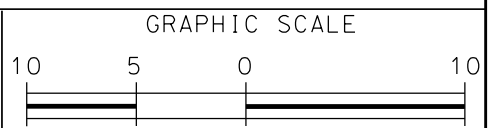
TYPICAL MAIN LOCATION DETAIL



**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

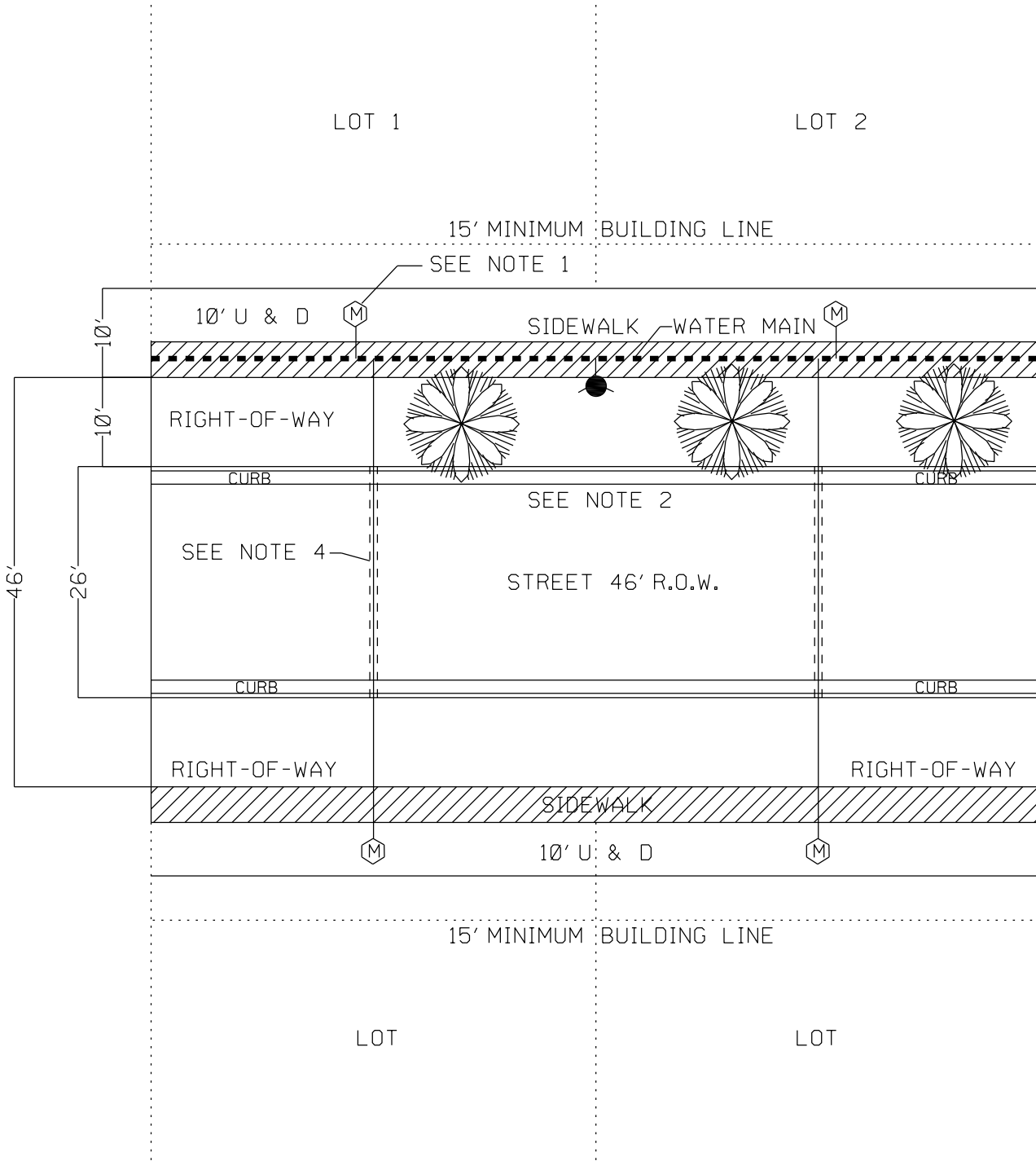
DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 10'

REVISED: _____



SPEC #: 3B

STREET SCAPE MAIN / METER DETAIL



NOTE 1: METER BOXES SHALL BE INSTALLED 17' BEHIND CURB IN CENTER OF LOT UNLESS SPECIFIED OTHERWISE BY ENGINEER/INSPECTOR

NOTE 2: FIRE HYDRANT SHALL BE INSTALLED 7' BEHIND CURB

NOTE 3: WATER MAINS/METERS/FIRE HYDRANTS SHALL BE A MINIMUM 10' FROM TREE CENTERS

NOTE 4: CASING PIPE TO BE FURNISHED AND INSTALLED BY DEV/CONTRACTOR UNDER PAVEMENT.

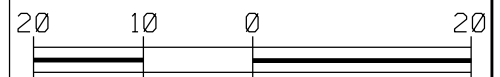


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS ST.
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 20'

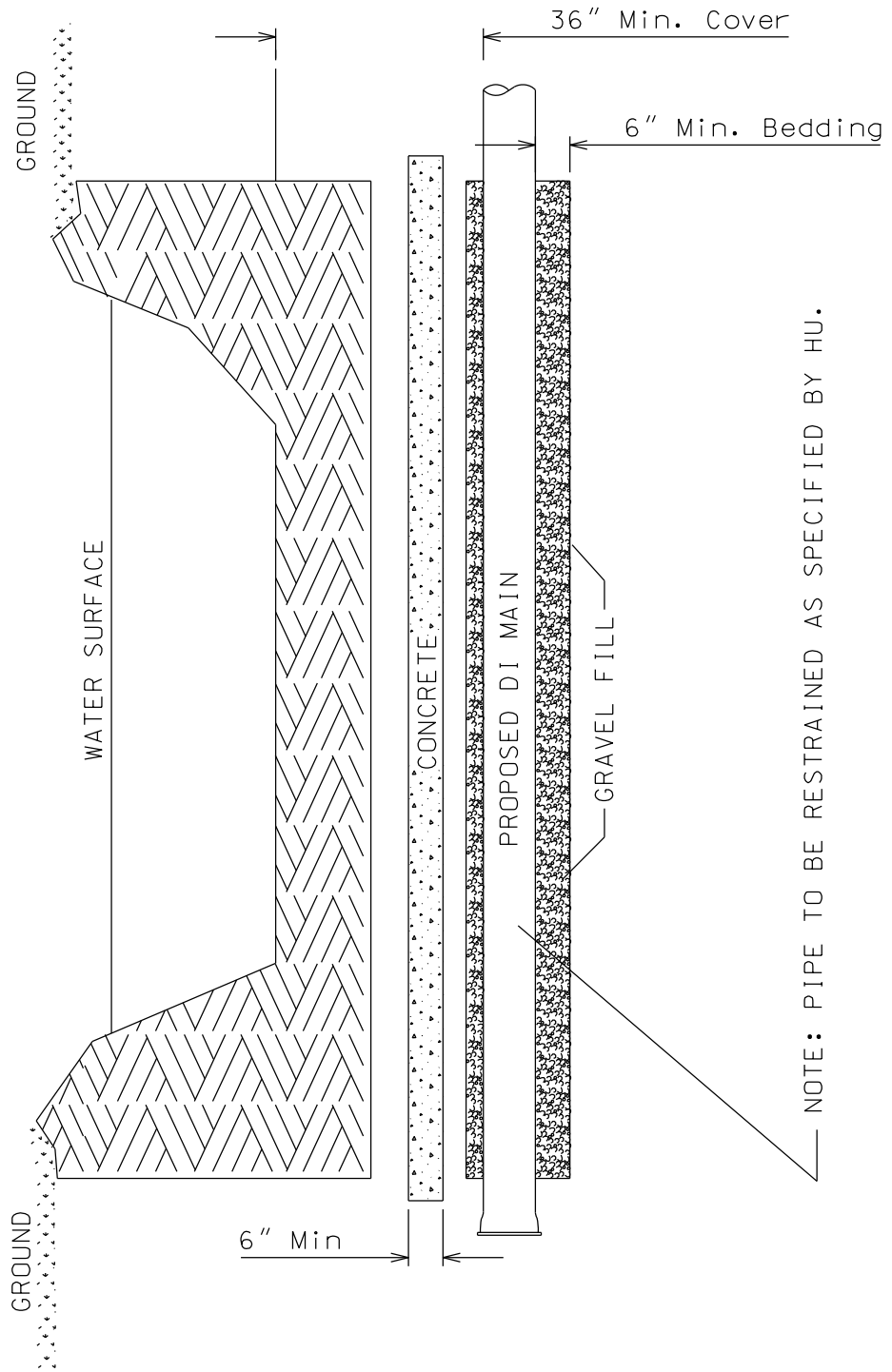
REVISED: _____

GRAPHIC SCALE



SPEC #: 3C

CREEK CROSSING



NOTE: PIPE TO BE RESTRAINED AS SPECIFIED BY HU.

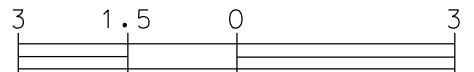


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

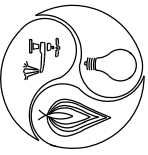
DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 3'

REVISED: _____

GRAPHIC SCALE



SPEC #: 3D

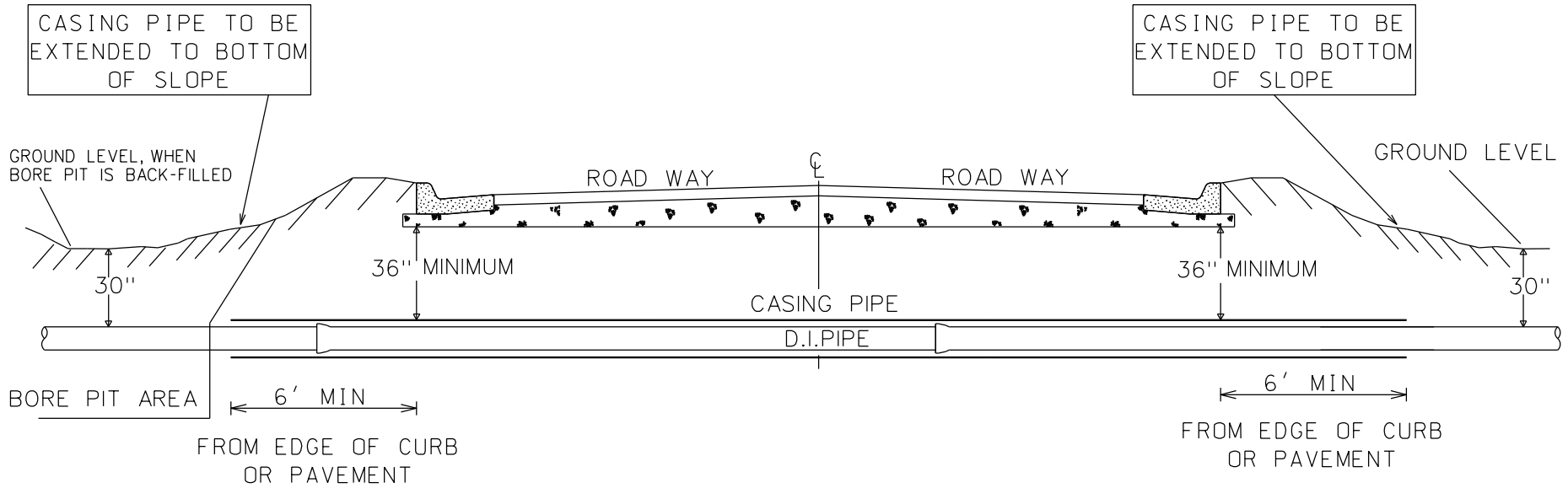
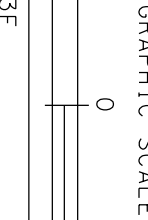


TYPICAL BORE DETAIL

HUNTSVILLE UTILITIES
 WATER DEPARTMENT
 112 SPRAGINS STREET
 HUNTSVILLE, AL 35801
 (256) 535-1400

DRAWN BY: AW
 CHECKED: _____
 DATE: 4/20/2022
 DRAWING NO.: _____
 SCALE: 1" = 6'

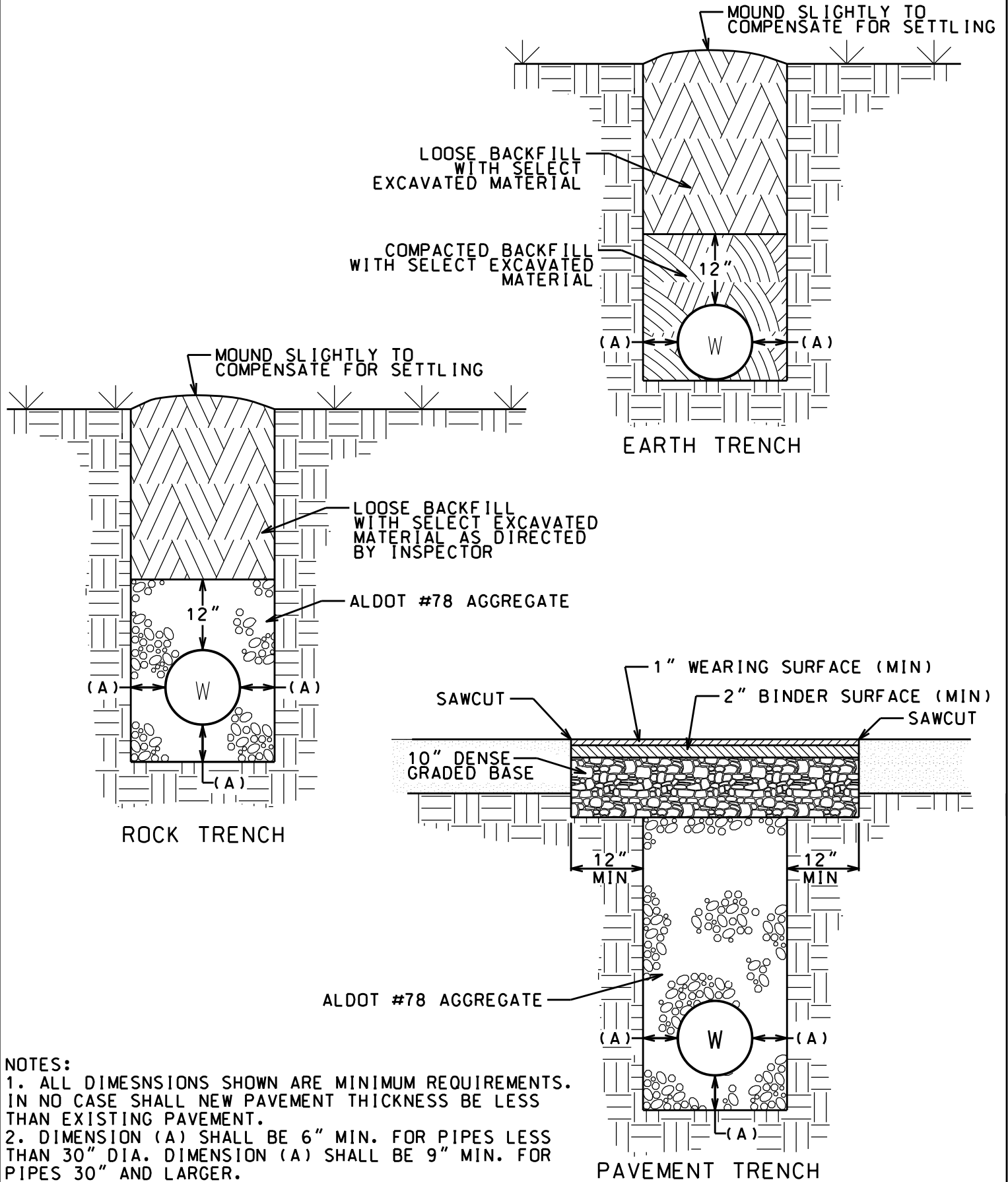
REVISED: _____
 SPEC #: 3E



NOTE: PIPE TO BE RESTRAINED AS SPECIFIED BY HU.

NOTE: CASING SPACERS TO BE USED A MINIMUM OF EVERY 10'.

STANDARD TRENCH DETAILS



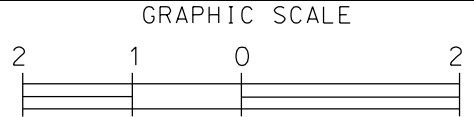
- NOTES:**
1. ALL DIMENSIONS SHOWN ARE MINIMUM REQUIREMENTS. IN NO CASE SHALL NEW PAVEMENT THICKNESS BE LESS THAN EXISTING PAVEMENT.
 2. DIMENSION (A) SHALL BE 6" MIN. FOR PIPES LESS THAN 30" DIA. DIMENSION (A) SHALL BE 9" MIN. FOR PIPES 30" AND LARGER.



**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS ST.
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY:GTS
CHECKED:
DATE:4/20/2022
DRAWING NO.:
SCALE:1" = 2'

REVISED: _____



SPEC #: 3F



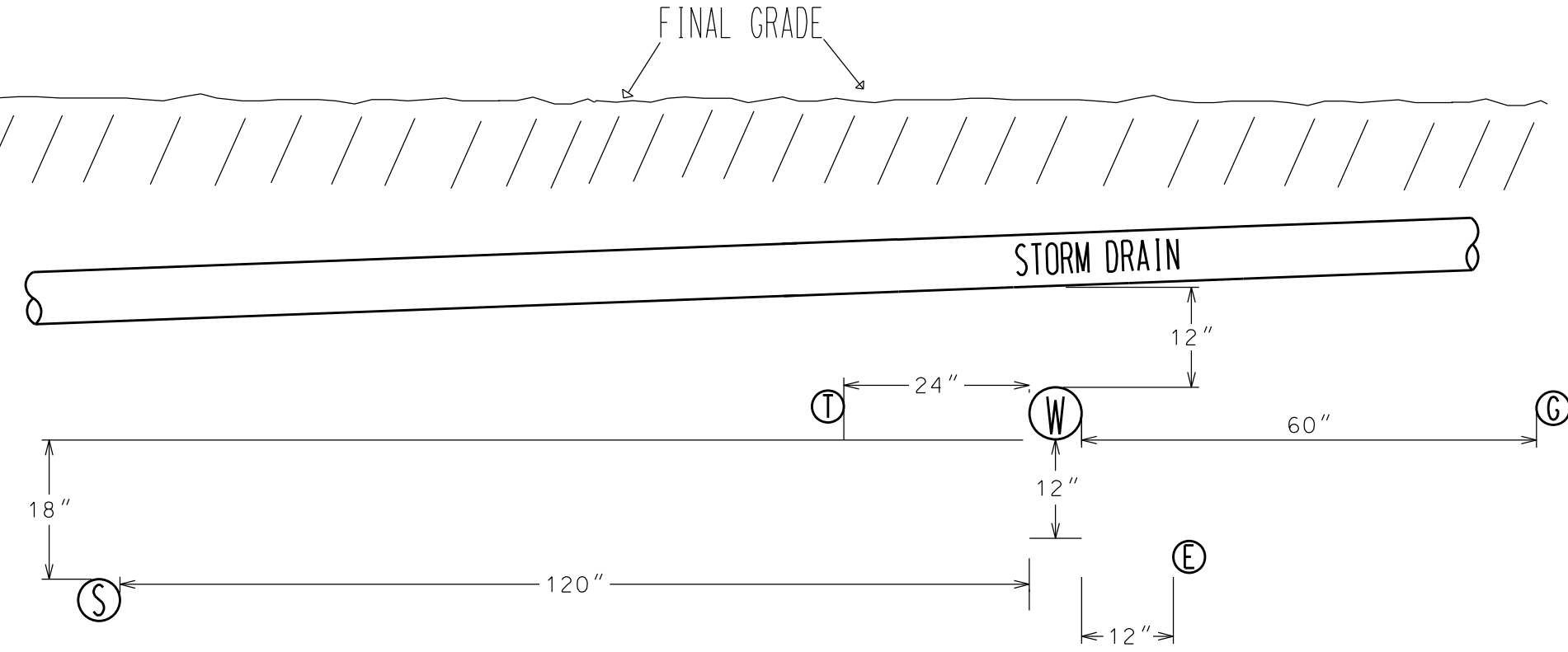
MINIMUM SPACING REQUIREMENTS

HUNTSVILLE UTILITIES
 WATER DEPARTMENT
 112 SPRAGINS STREET
 HUNTSVILLE, AL 35801
 (256) 535-1400

DRAWN BY: AW
 CHECKED:
 DATE: 4/20/2022
 DRAWING NO.:
 SCALE: 1" = 2'
 REVISED:

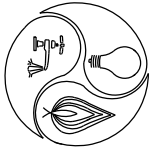
GRAPHIC SCALE

SPEC #: 4A



NOTES:

1. MEASUREMENTS ARE FROM EDGE OF WATER PIPE TO EDGE OF OTHER UTILITIES.
2. ALL DIMENSIONS SHOWN ARE MINIMUMS REQUIRED AND MAY BE GREATER DUE TO DIFFERENT CONDUIT CONFIGURATIONS.

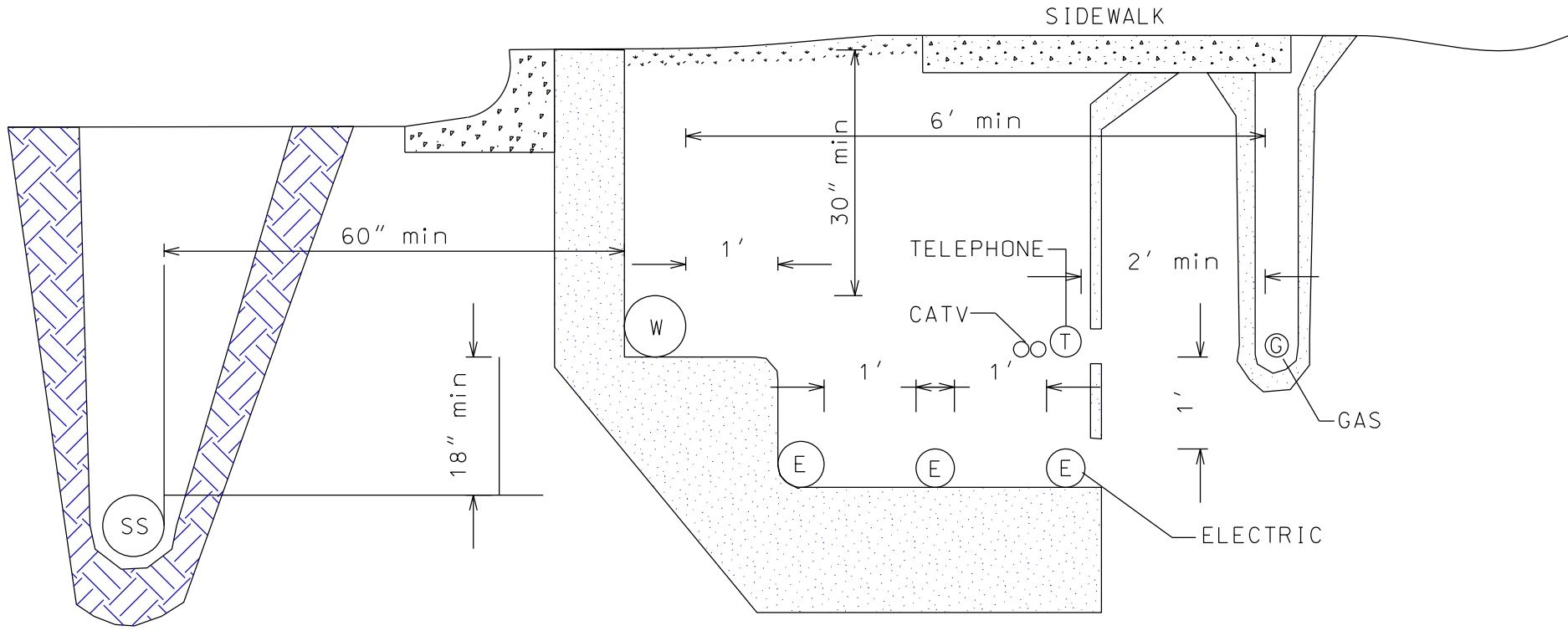


COMMON TRENCH DETAIL (NO CONFLICTS)

HUNTSVILLE UTILITIES
WATER DEPARTMENT
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'
REVISED:

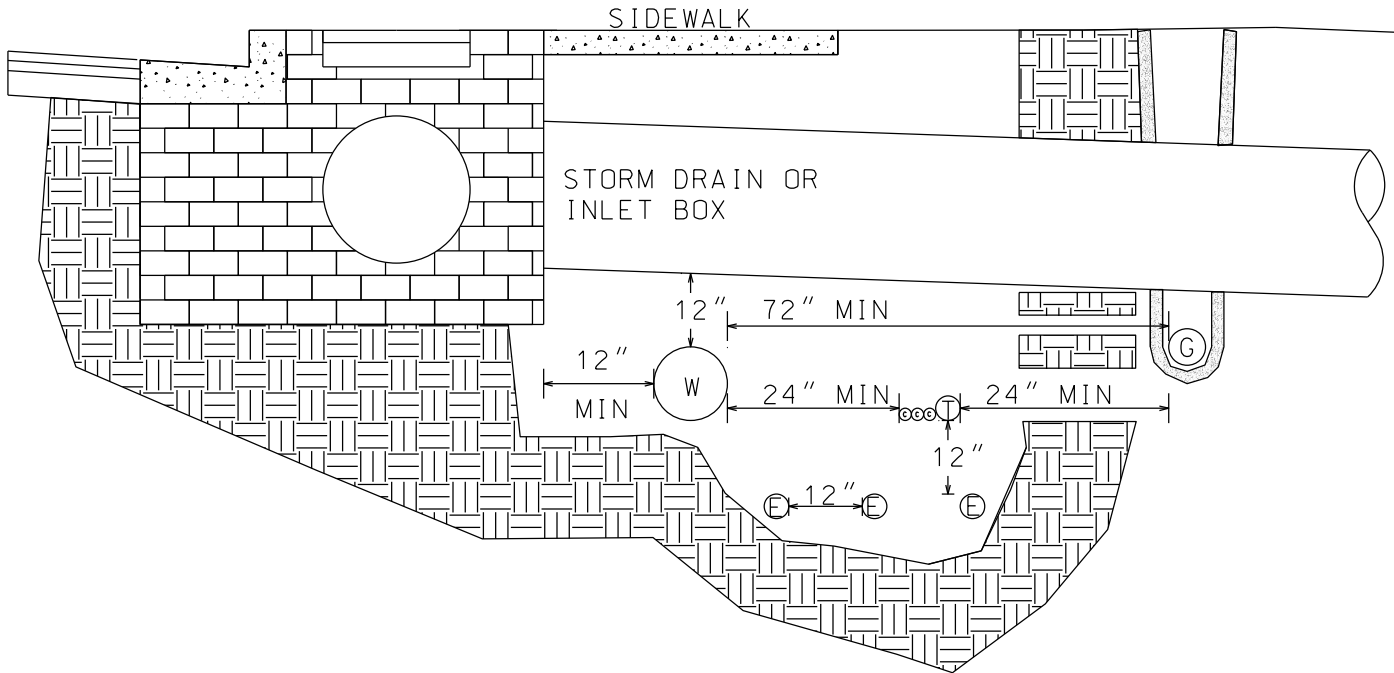
GRAPHIC SCALE
2 1 0 2
SPEC #: 4B



NOTES:

1. EXACT NUMBER, SIZE, AND CONFIGURATION OF CONDUITS WILL VARY. FIGURE ABOVE SHOWS TYPICAL INSTALLATION ONLY. SEE MINIMUM SPACING REQUIREMENTS FOR MORE DETAILS.
2. 4" MINIMUM CLEAR SPACE REQUIRED ALONG SIDES OF CONDUITS IF DITCHLINE IS IN ROCK.
3. COMPACTED PUG MIX OR OTHER BACKFILL AS REQUIRED AND APPROVED BY PUBLIC WORKS SHALL BE INSTALLED UNDER ALL SIDEWALKS AND PAVED AREAS.
4. ALL ELLS, TURNOUTS, ETC. SHALL BE ENCASED IN CONCRETE.
5. LOCATOR TAPE SHALL BE PLACED A MINIMUM OF 6" AND A MAXIMUM OF 12" BELOW FINAL GRADE.

COMMON TRENCH DETAIL (W/ STORM DRAIN CONFLICT)



NOTES:

1. ALL DIMENSIONS SHOWN ARE MINIMUM REQUIREMENTS. SEE MINIMUM SPACING REQUIREMENTS FOR MORE DETAILS CONCERNING SPACING BETWEEN CONDUITS.
2. EXACT NUMBER, SIZE, AND CONFIGURATION OF CONDUITS WILL VARY. FIGURE ABOVE SHOWS TYPICAL INSTALLATION ONLY.
3. 4" MINIMUM CLEAR SPACE REQUIRED ALONG SIDES OF CONDUIT IF DITCHLINE IS IN ROCK.
4. TELEPHONE CONDUIT SHALL NOT BE INSTALLED AT A DEPTH OF COVER LESS THAN WATER.
5. COMPACTED PUG MIX OR OTHER BACKFILL AS REQUIRED AND APPROVED BY PUBLIC WORKS SHALL BE INSTALLED UNDER ALL SIDEWALKS AND PAVED AREAS.
6. ALL ELLS, TURNUPS, ETC. SHALL BE ENCASED IN CONCRETE.
7. LOCATER TAPE SHALL BE PLACED AT A MINIMUM OF 6" AND A MAXIMUM OF 12" BELOW FINAL GRADE OR BELOW GRADE FOR SIDEWALK.

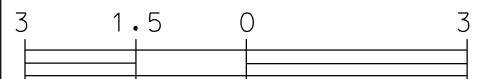


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS ST.
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AG
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 3'

REVISED: _____

GRAPHIC SCALE



SPEC #: 4C



STANDARD STREETScape DETAIL

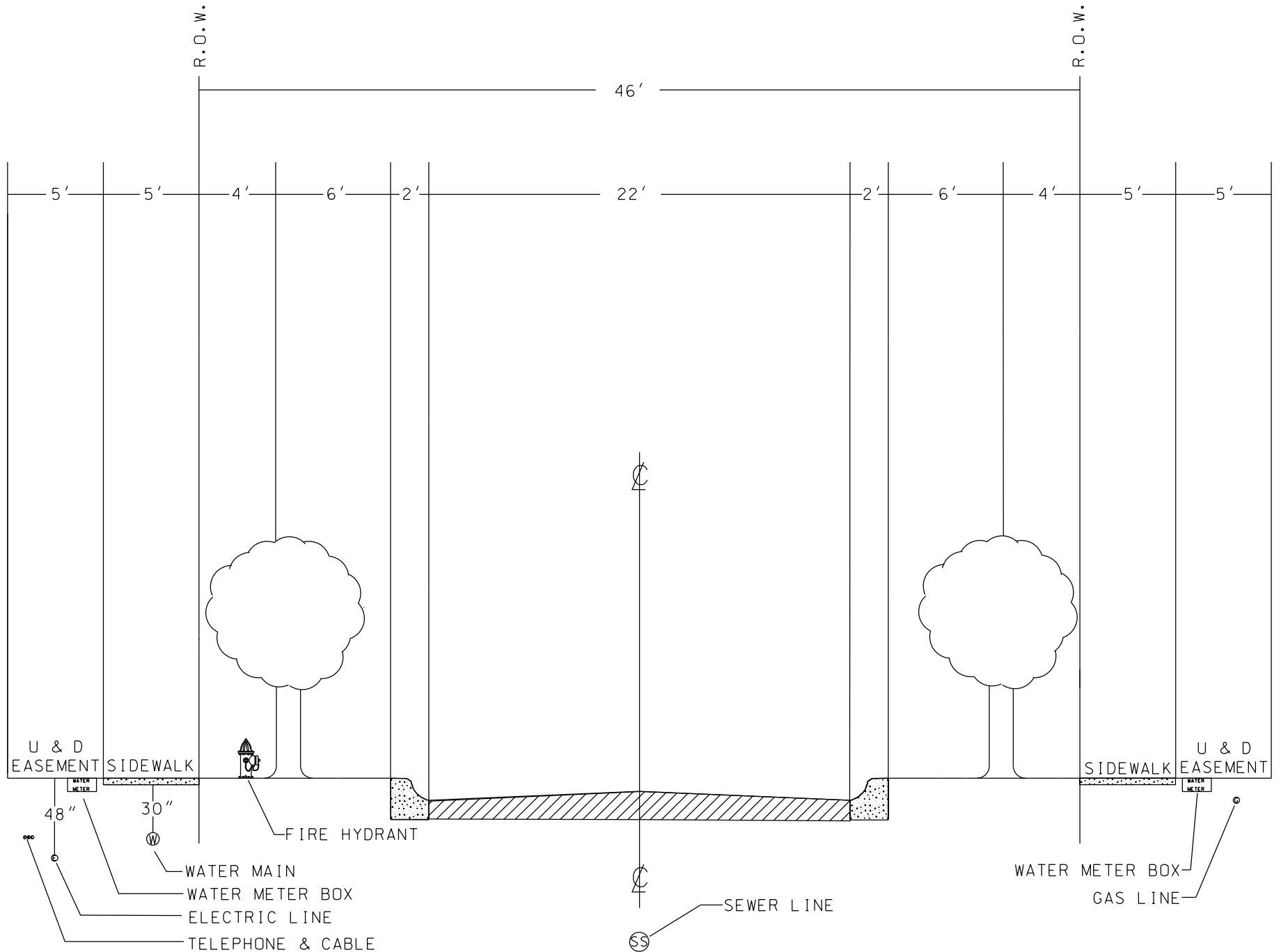
HUNTSVILLE UTILITIES
 WATER DEPARTMENT
 112 SPRAGINS ST
 HUNTSVILLE, AL 35801
 (256) 535-1400

DRAWN BY: JY
 CHECKED:
 DATE: 4/20/2022
 DRAWING NO.:
 SCALE: 1" = 8'

REVISED: _____

GRAPHIC SCALE

SPEC #: 4D



THREE-WAY VALVING DETAIL

NOTE: NO VALVES TO BE LOCATED IN CURB/GUTTER AREA.

12" RESTRAINING RING

12" R.S. GATE VALVE

12" NIPPLE (18" - 24" typ.)

6" NIPPLE

6" R.S. GATE VALVE

6" TYTON PIPE

6" RESTRAINING RING

12" RESTRAINING RING

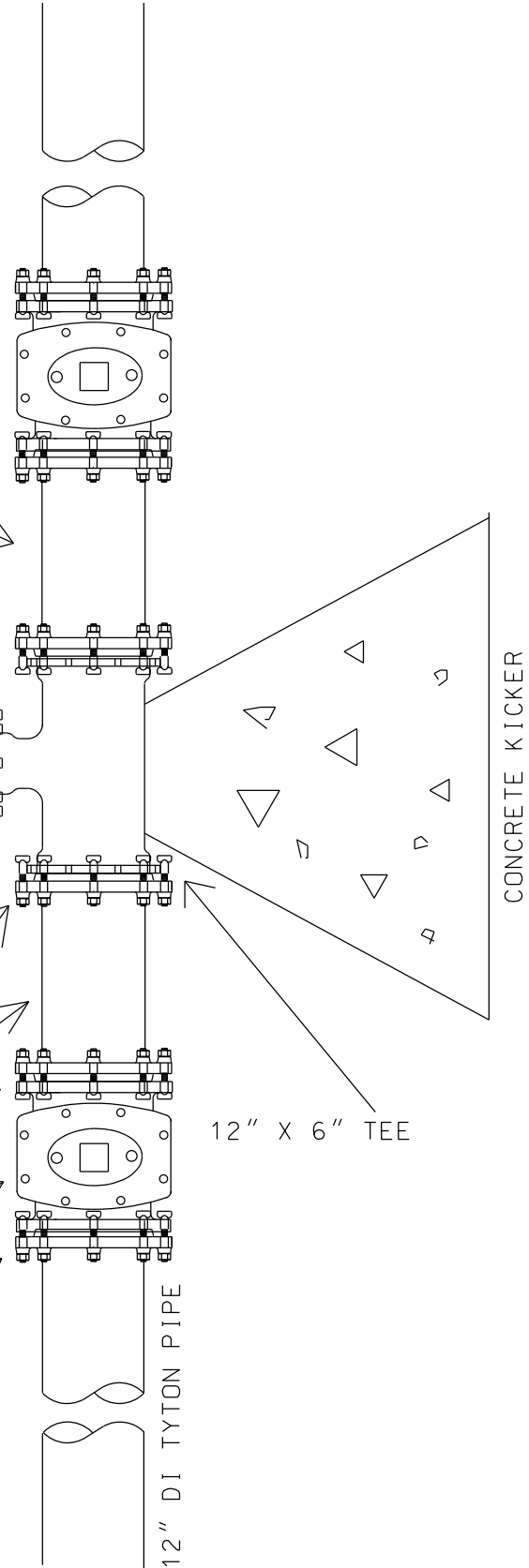
12" NIPPLE

12" RESTRAINING RING

12" R.S. GATE VALVE

12" RESTRAINING RING

ALL NIPPLES SHALL BE EQUAL LENGTHS AND BETWEEN 18 AND 24 INCHES LONG.

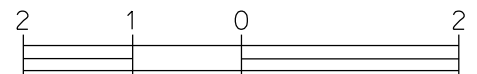


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS ST
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

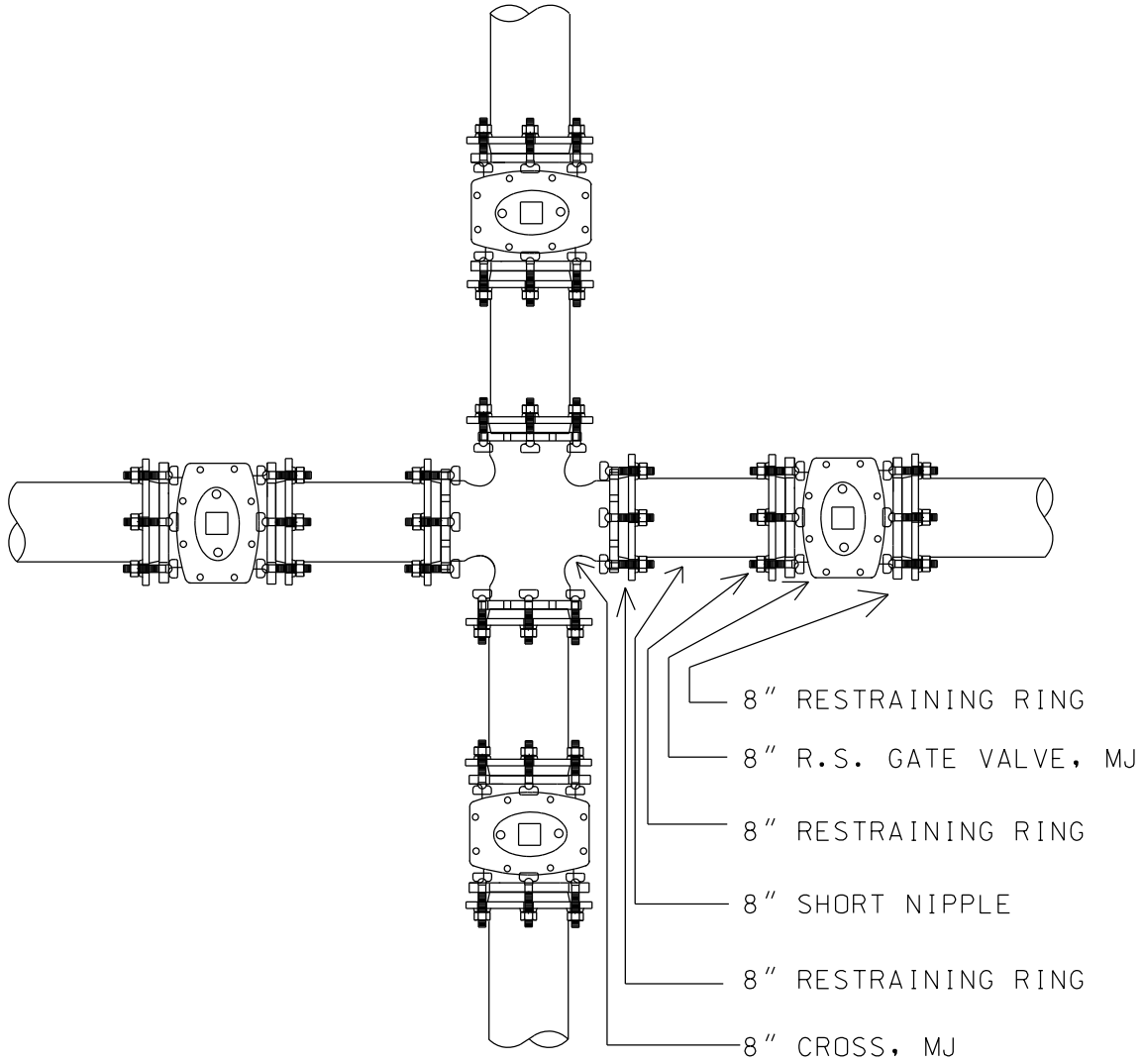
REVISED: _____

GRAPHIC SCALE



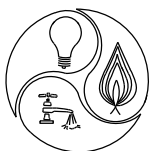
SPEC #: 8A

PIPE CROSS DETAIL



ALL NIPPLES 18" TO 24" LONG AND THE SAME LENGTH

NOTE: NO VALVES TO BE LOCATED IN CURB OR GUTTER AREA.

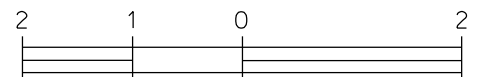


**HUNTSVILLE UTILITIES
 WATER DEPARTMENT**
 112 SPRAGINS STREET
 HUNTSVILLE, AL 35801
 (256) 535-1400

DRAWN BY: AW
 CHECKED:
 DATE: 4/20/2022
 DRAWING NO.:
 SCALE: 1" = 2'

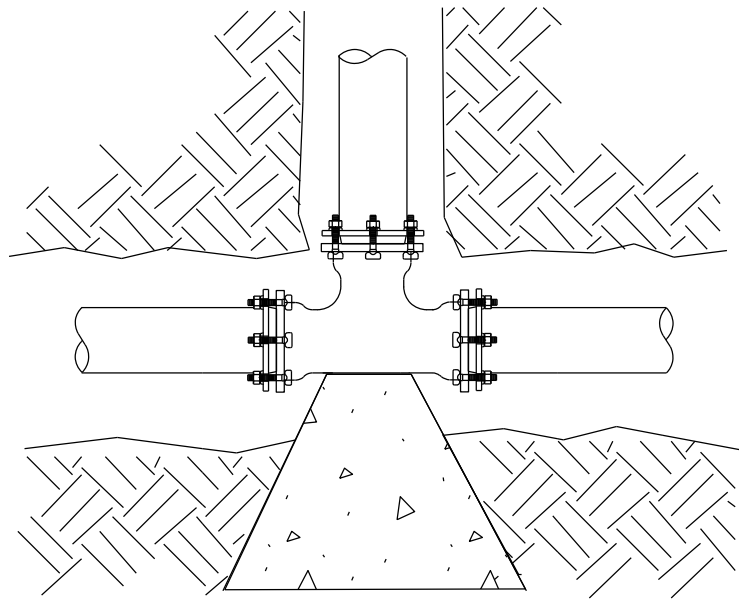
REVISED: _____

GRAPHIC SCALE



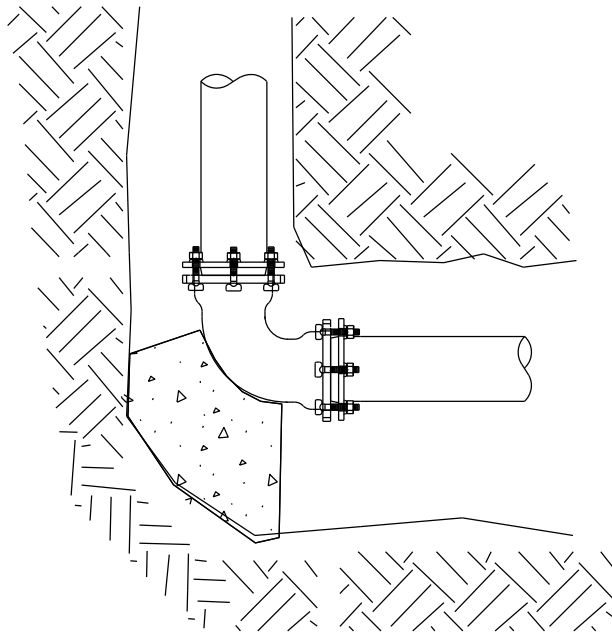
SPEC #: 8B

THRUST BLOCK LOCATIONS

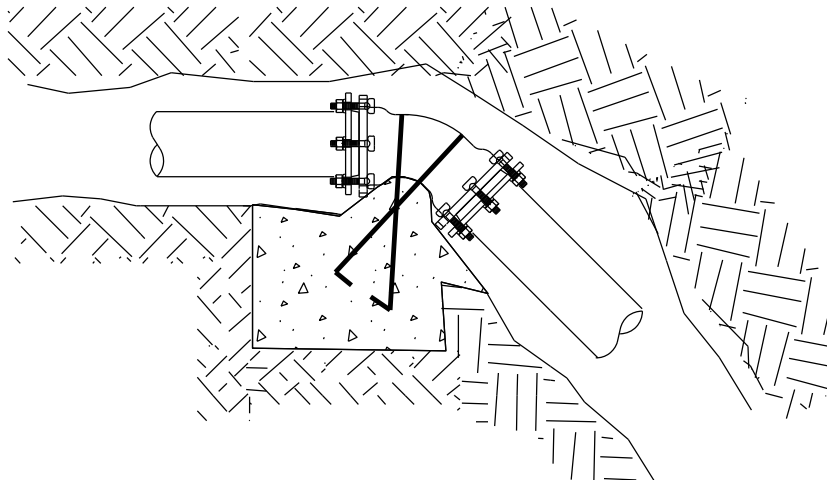


*NOTE: MIN. 1/3
CUBIC YARD ON
ALL FITTINGS

UNDISTURBED SOIL



*NOTE: MIN. 1/3
CUBIC YARD ON
ALL FITTINGS



*NOTE: MIN. 1/3
CUBIC YARD ON
ALL FITTINGS

MEGA LUGS
RETAINER GLANDS
OR AS SPECIFIED
BY AN ENGINEER

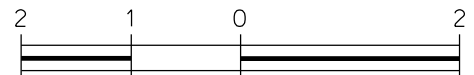


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: JY
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

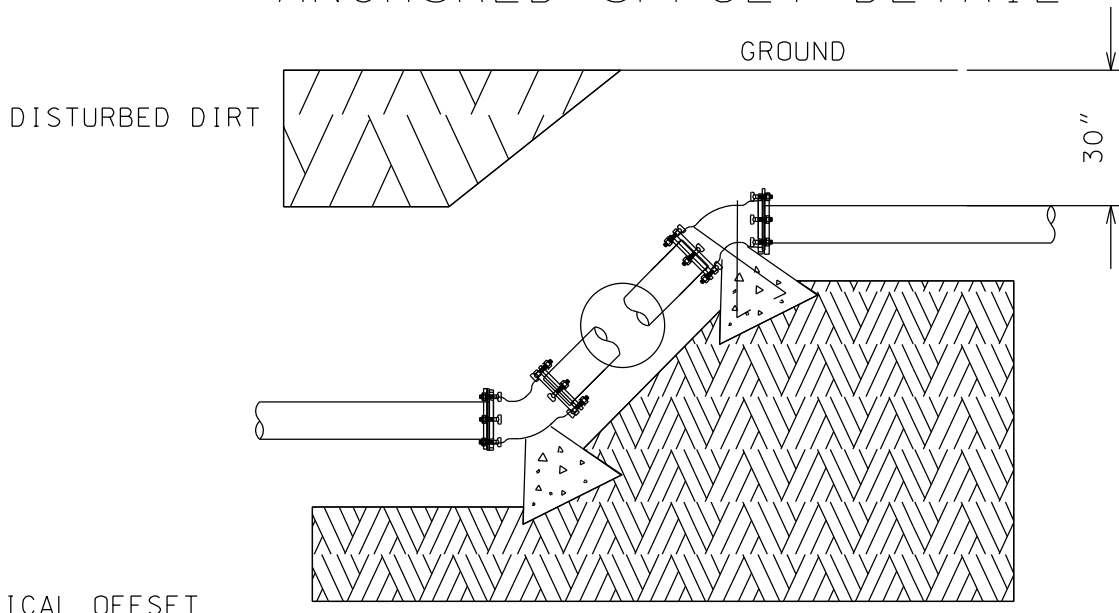
REVISED: _____

GRAPHIC SCALE

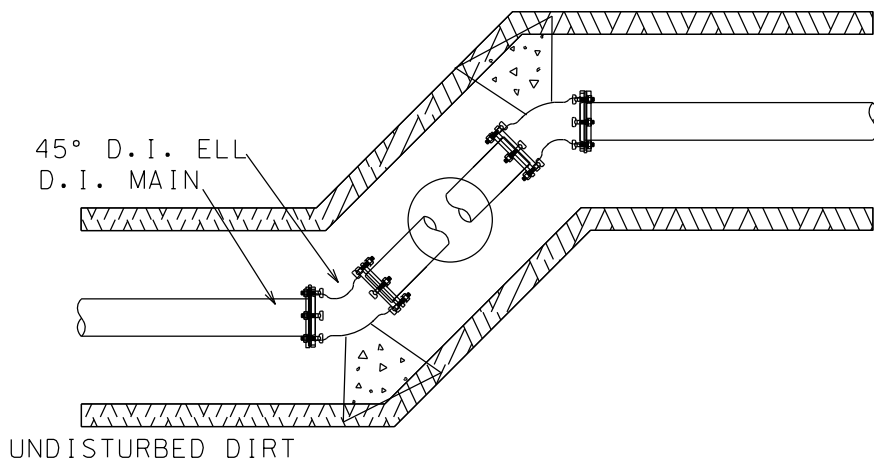


SPEC #: 9A

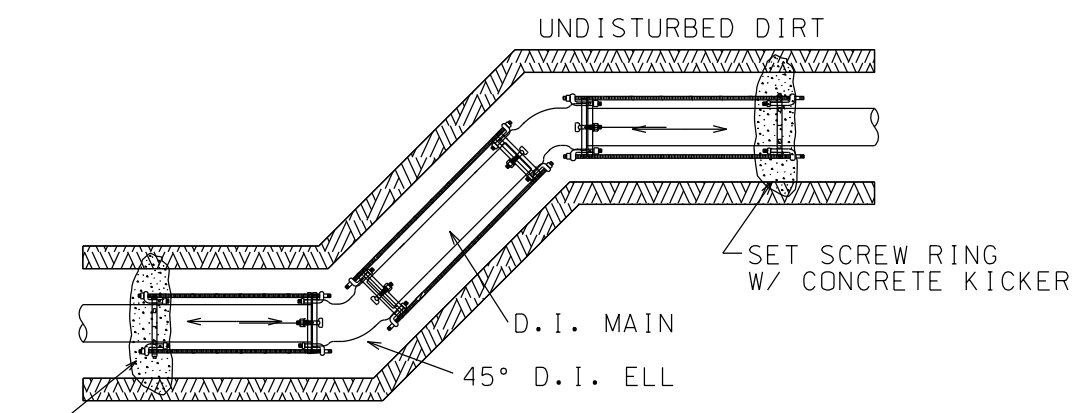
ANCHORED OFFSET DETAIL



VERTICAL OFFSET



HORIZONTAL OFFSET



HORIZONTAL OFFSET
VERTICAL OFFSET

NOTE: TIE RODS MAY BE REQUIRED ON ALL SHOWN FITTINGS. EACH OCCURENCE TO BE DETERMINED BY ENGINEER/INSPECTOR



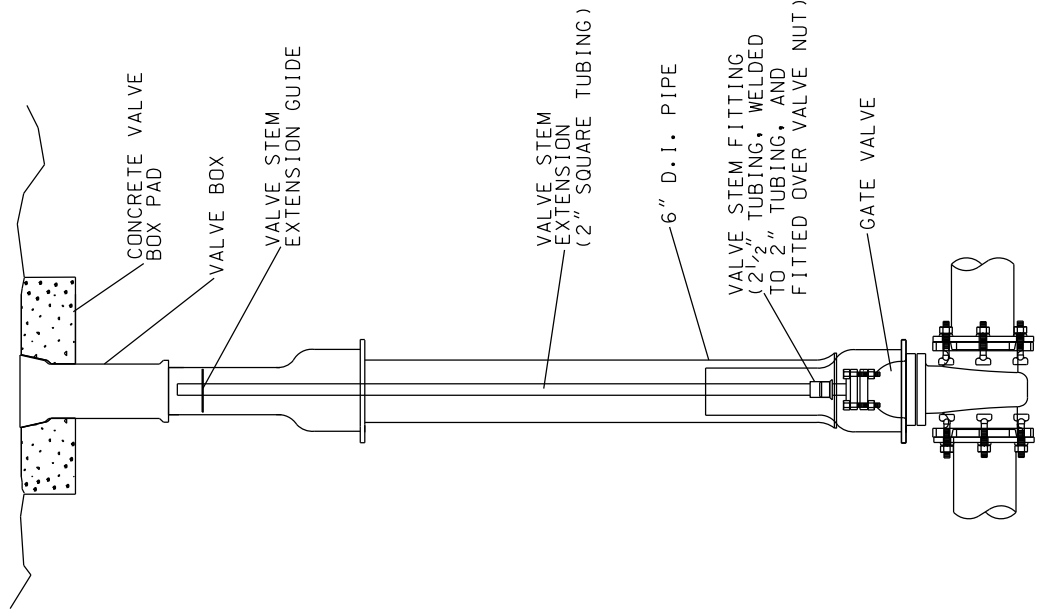
**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 4'
REVISED: _____

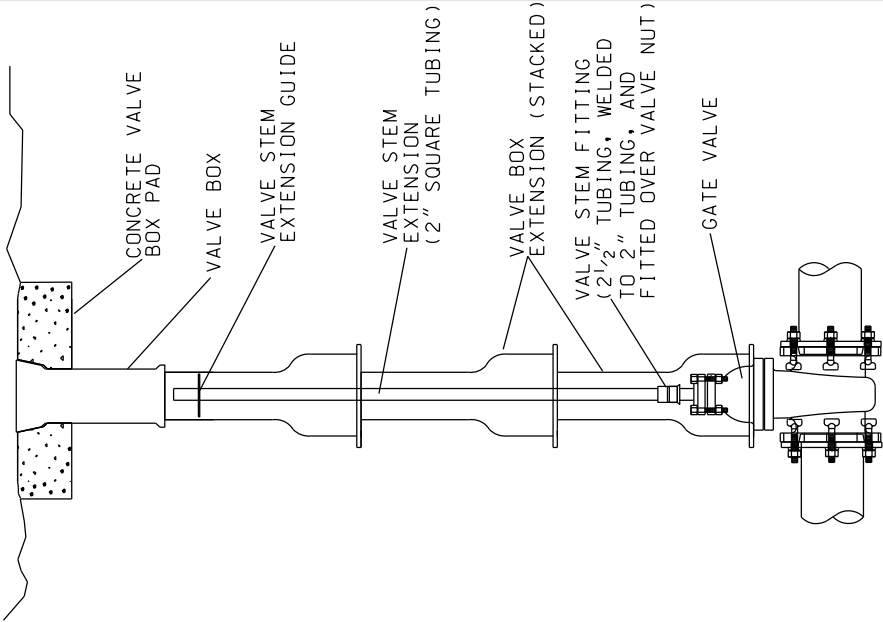
GRAPHIC SCALE
4 2 0 4
SPEC #: 9B

VALVE BOX DETAIL

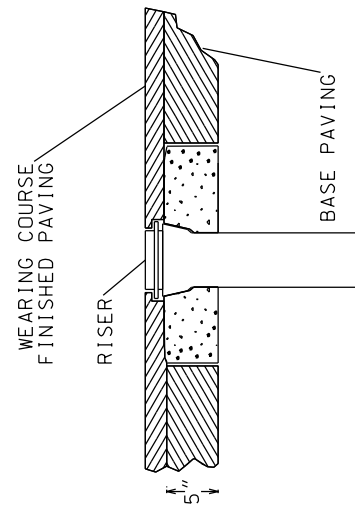
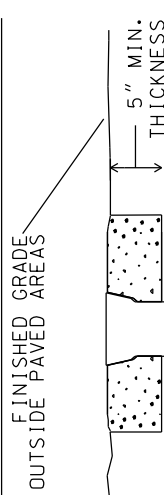
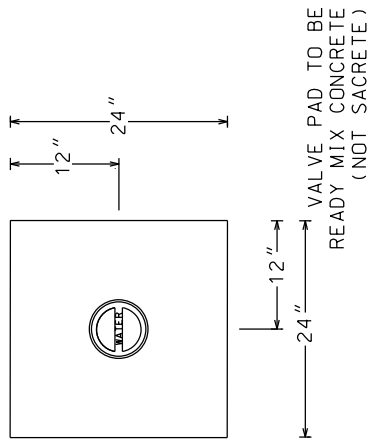
VALVE EXTENSION DETAIL 2
6" PIPE EXTENSION



VALVE EXTENSION DETAIL 1
STACKED EXTENSION



CONCRETE VALVE PAD DETAIL

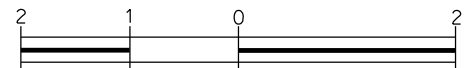


HUNTSVILLE UTILITIES
 WATER DEPARTMENT
 112 SPRAGINS STREET
 HUNTSVILLE, AL 35801
 (256) 535-1400

DRAWN BY: AG
 CHECKED:
 DATE: 4/20/2022
 DRAWING NO.:
 SCALE: 1" = 2'

REVISED: _____

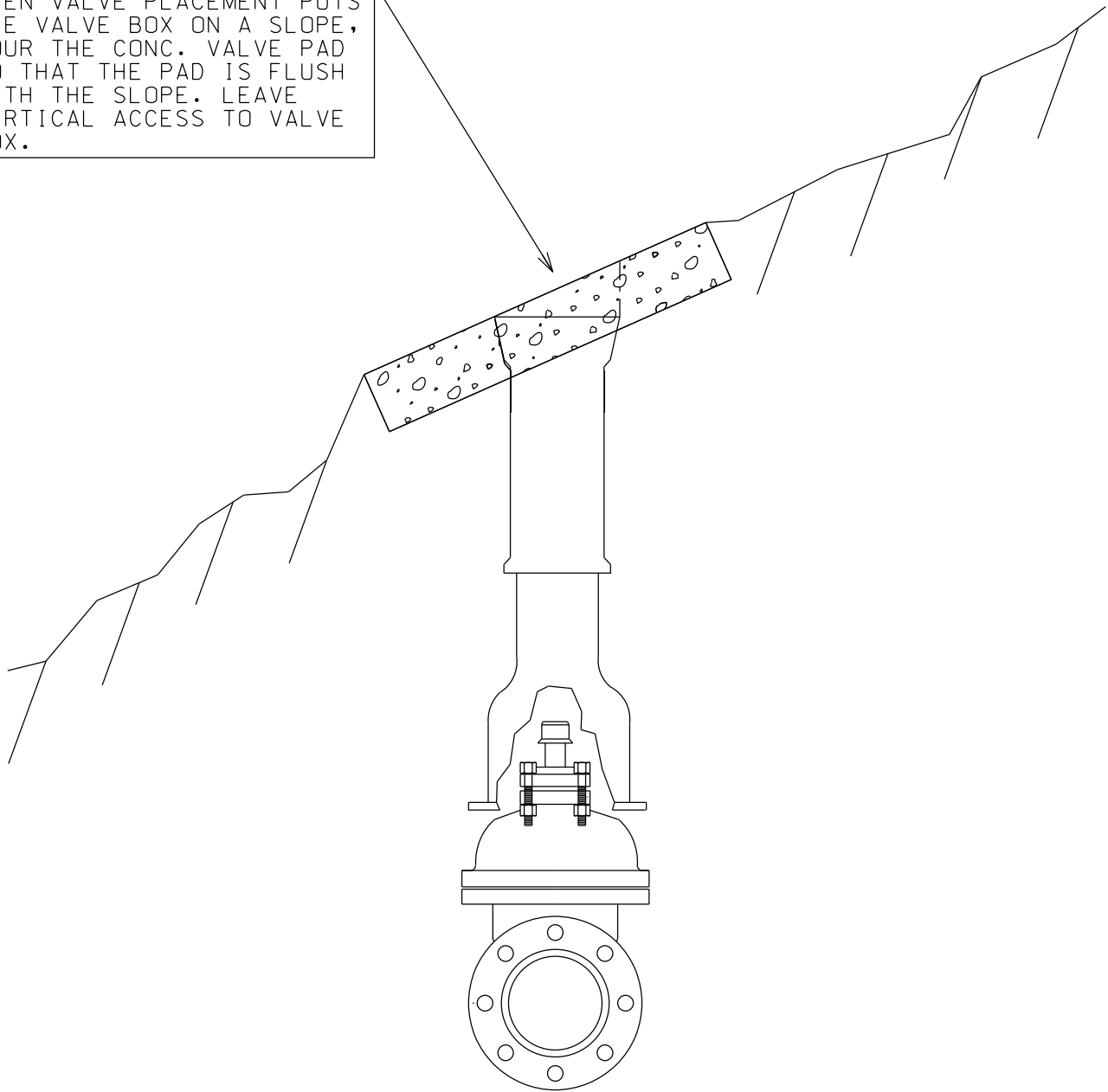
GRAPHIC SCALE



SPEC #: 10A

VALVE BOX PAD DETAIL (SLOPE CONDITIONS)

WHEN VALVE PLACEMENT PUTS THE VALVE BOX ON A SLOPE, POUR THE CONC. VALVE PAD SO THAT THE PAD IS FLUSH WITH THE SLOPE. LEAVE VERTICAL ACCESS TO VALVE BOX.

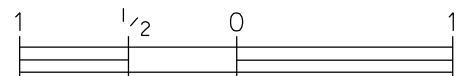


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS ST
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AG
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 1'

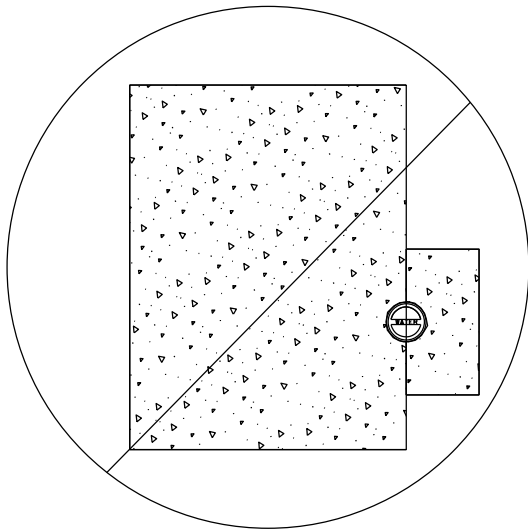
REVISED: _____

GRAPHIC SCALE

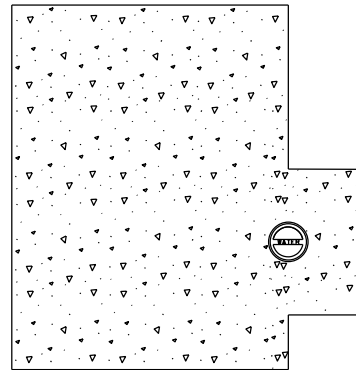


SPEC #: 10B

VALVE BOX PAD DETAIL (IN SIDEWALK)

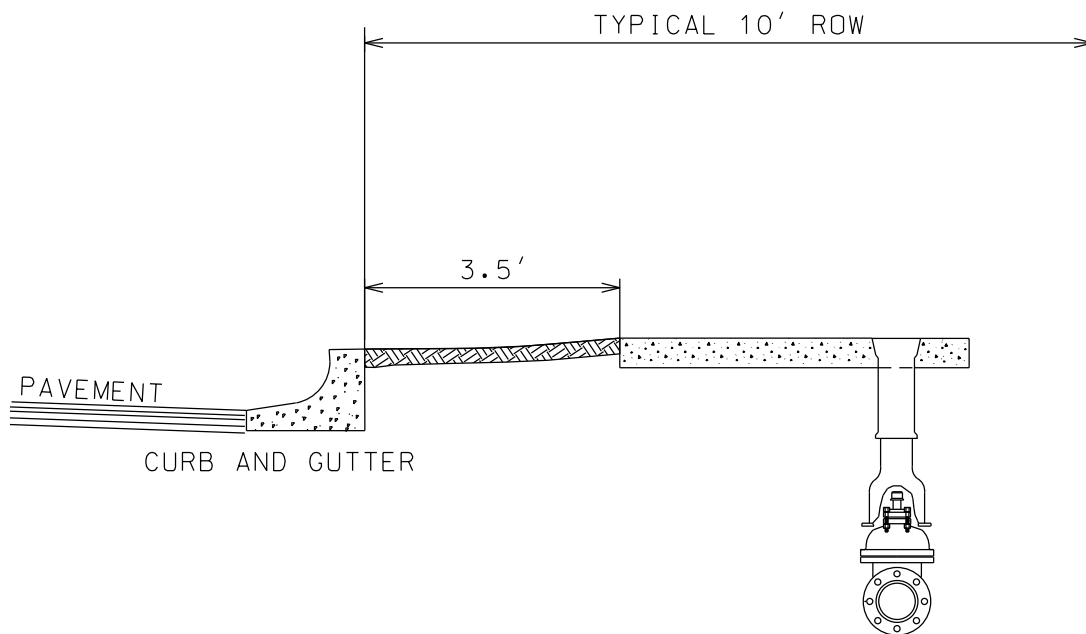


DO NOT POUR A PARTIAL CONCRETE PAD OFF TO THE SIDE OF THE SIDEWALK.



WHEN VALVE BOX IS PARTIALLY IN SIDEWALK AREA, REMOVE THAT SECTION OF SIDEWALK, REFORM, AND POUR AROUND THE VALVE BOX

TOP VIEW



SIDE VIEW

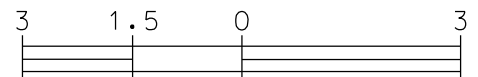


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS ST
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AG
CHECKED:
DATE: 4/20/2022
DRAWING NO. :
SCALE: 1" = 3'

REVISED: _____

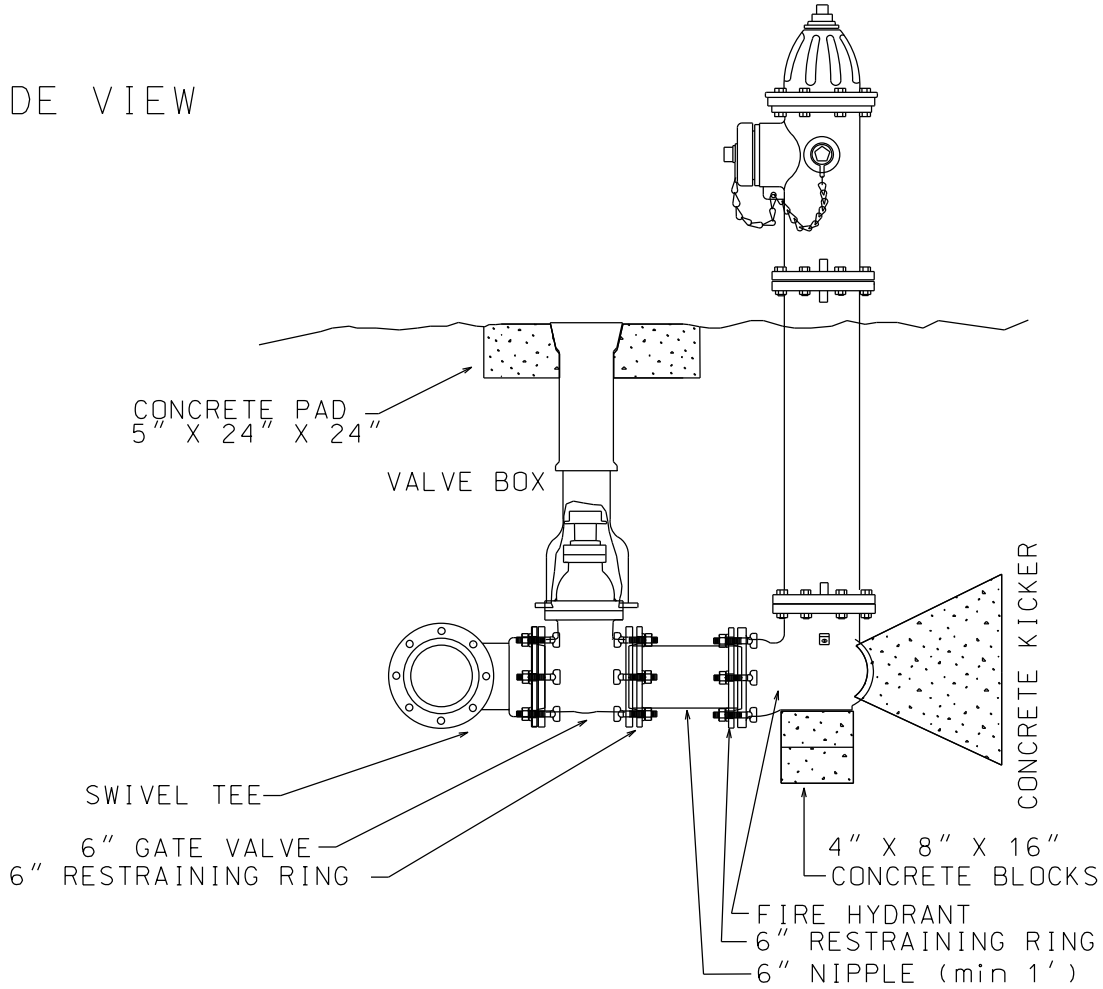
GRAPHIC SCALE



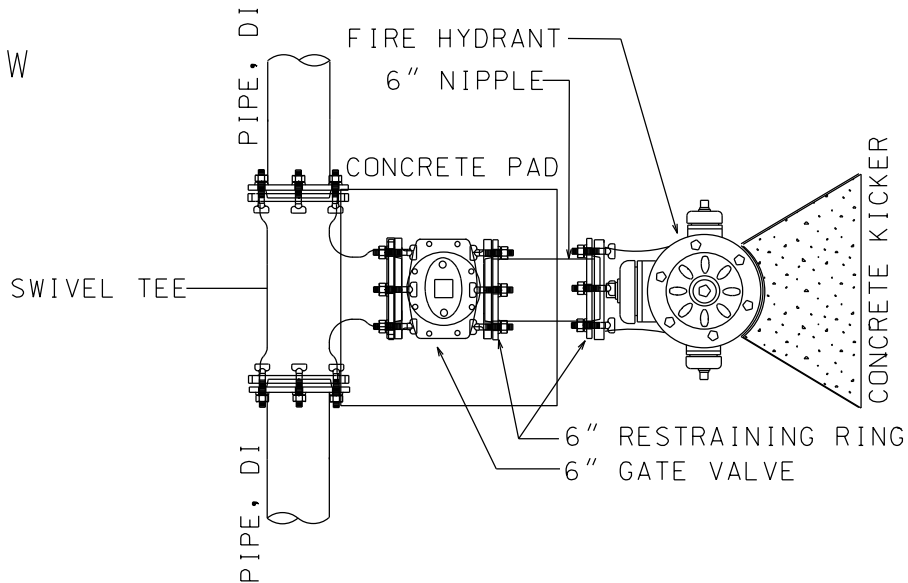
SPEC #: 10C

FIRE HYDRANT DETAILS

SIDE VIEW



TOP VIEW

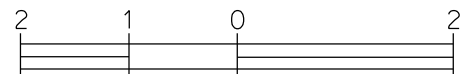


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS ST.
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

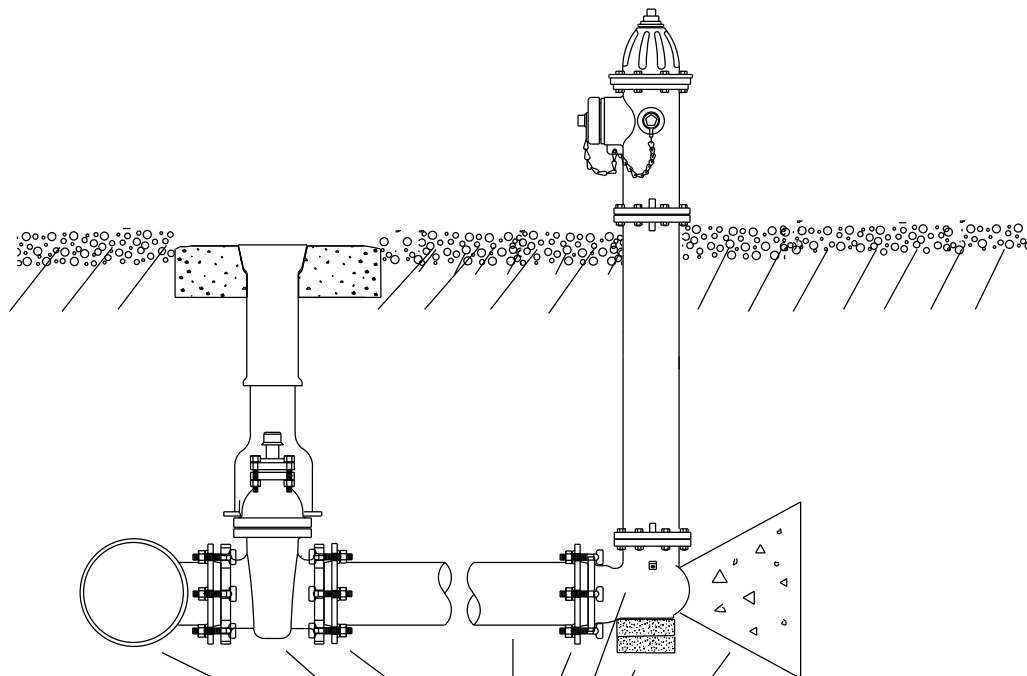
REVISED: _____

GRAPHIC SCALE



SPEC #: 11A

TAPPED FIRE HYDRANT DETAIL



- CONCRETE KICKER
- 4" X 8" X 16" CONCRETE CAPPING BLOCKS
- FIRE HYDRANT
- RESTRAINING RING
- 6" D.I. NIPPLE (VARIABLE LENGTH)
- RESTRAINING RING
- 12" X 6" TAPPING SADDLE AND VALVE

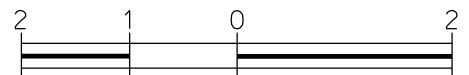


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS ST
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: JY
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

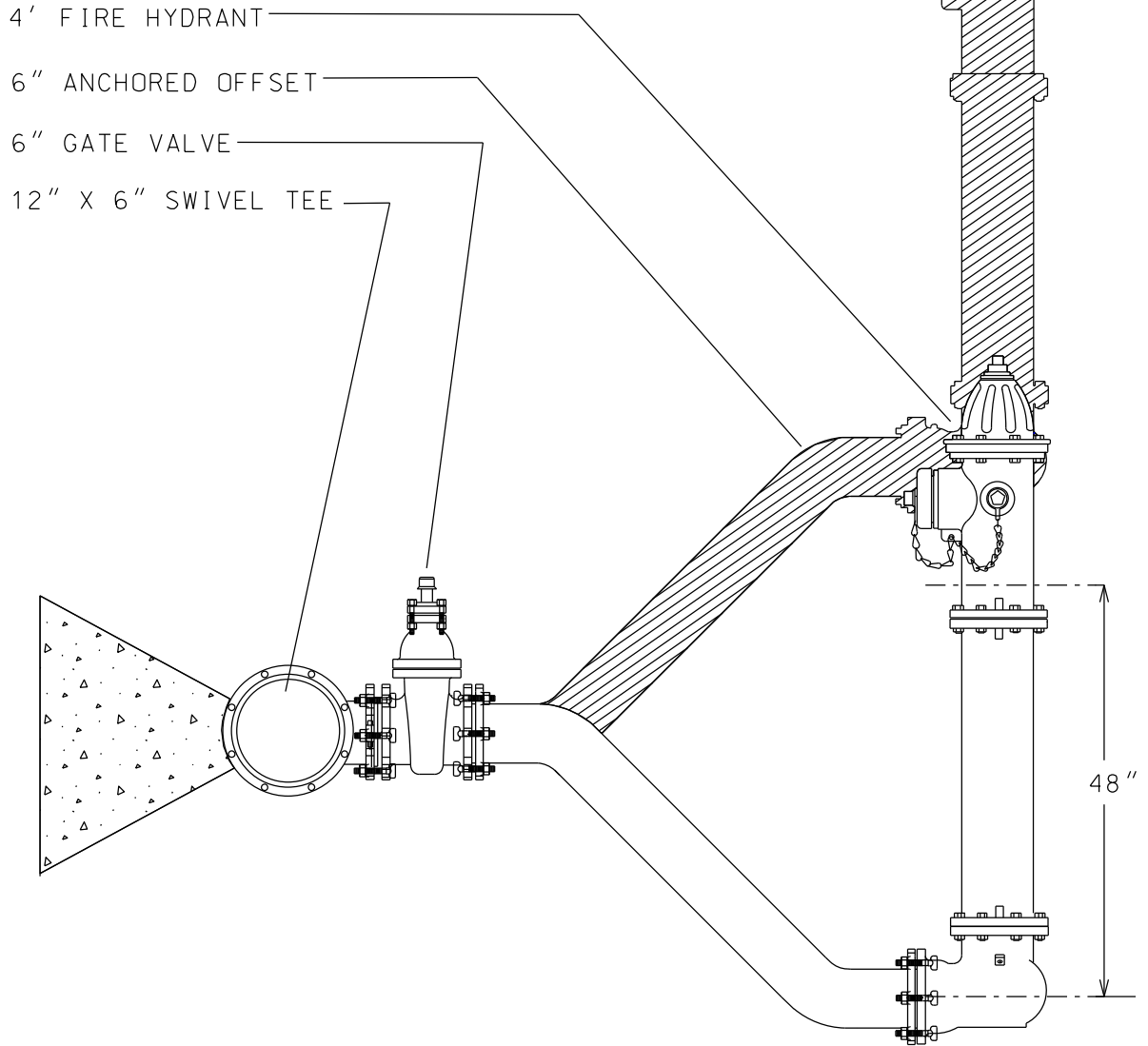
REVISED: _____

GRAPHIC SCALE



SPEC #: 11B

FIRE HYDRANT (W / ANCHORED OFFSET)

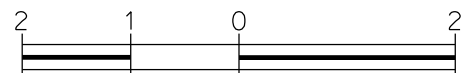


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS ST
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AG
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

REVISED: _____

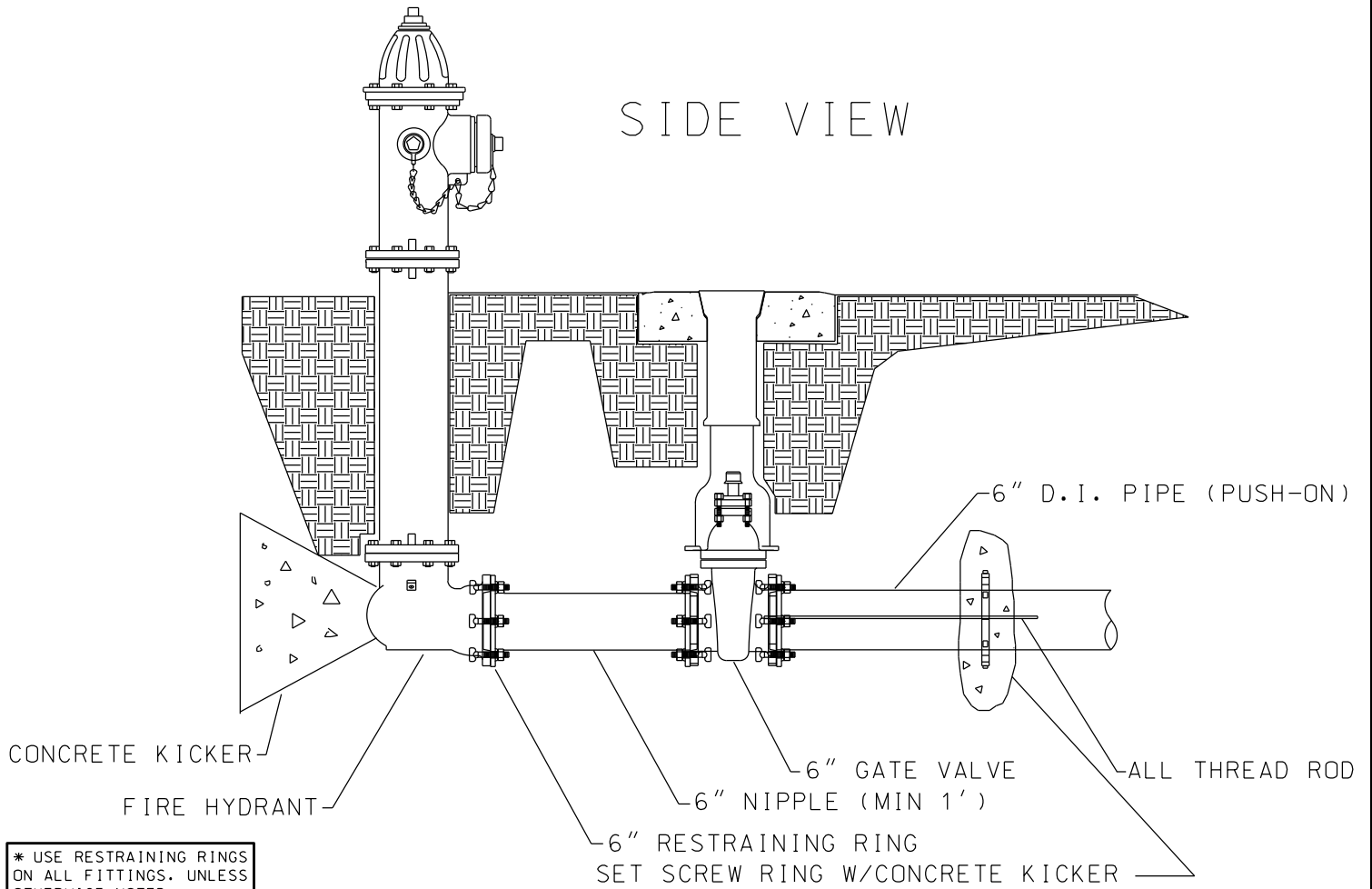
GRAPHIC SCALE



SPEC #: 11C

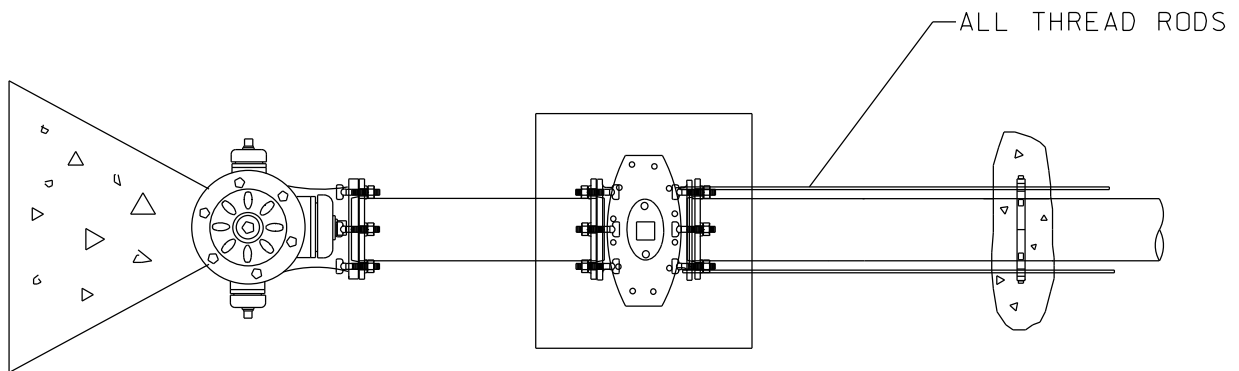
" END OF LINE " FIRE HYDRANT DETAIL

SIDE VIEW



* USE RESTRAINING RINGS
ON ALL FITTINGS. UNLESS
OTHERWISE NOTED

TOP VIEW

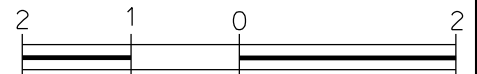


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

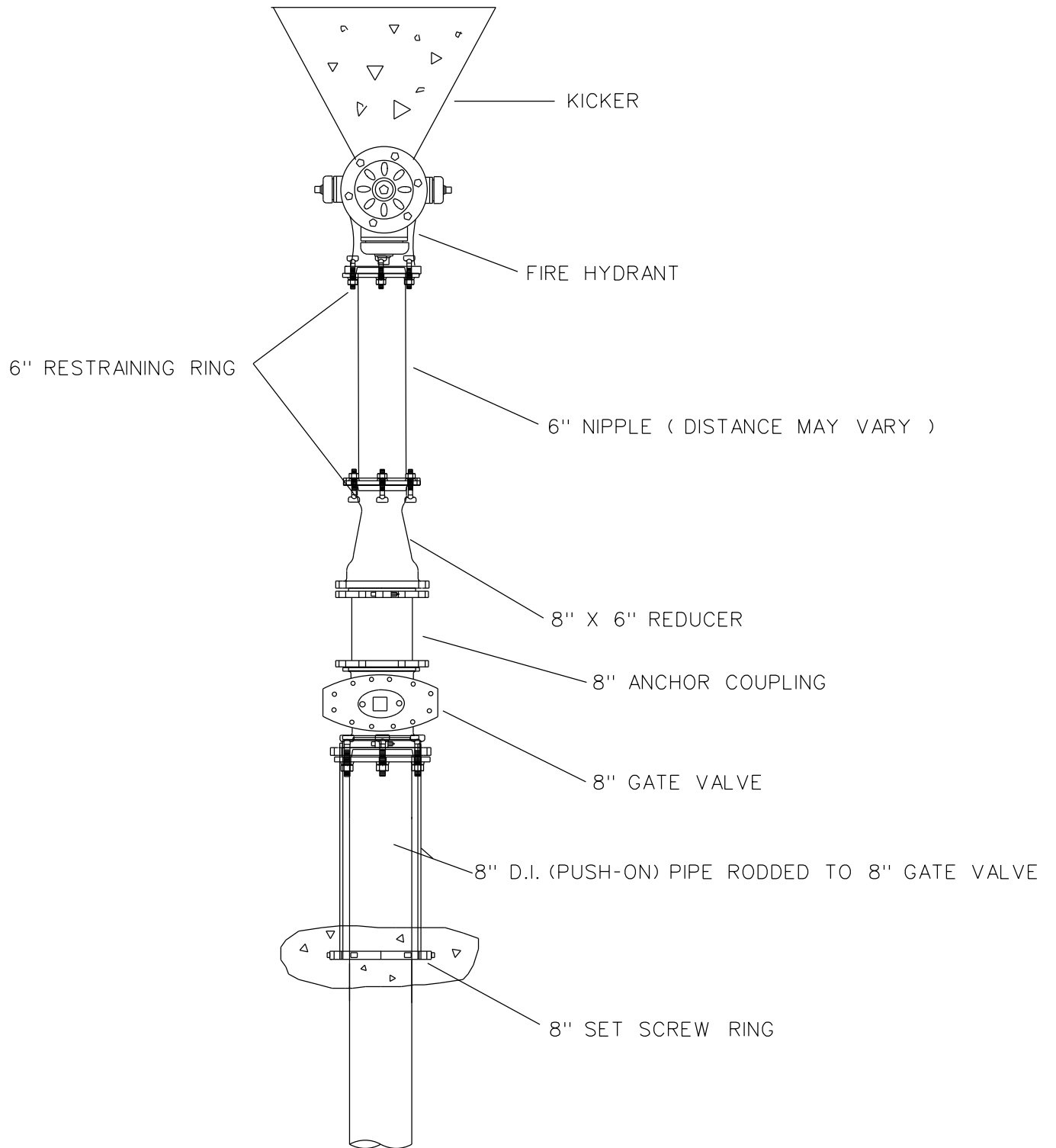
REVISED: _____

GRAPHIC SCALE



SPEC #: 11D

8" REDUCED TO 6" END OF LINE FIRE HYDRANT

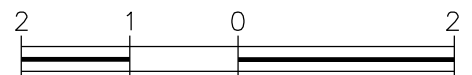


HUNTSVILLE UTILITIES
WATER DEPARTMENT
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

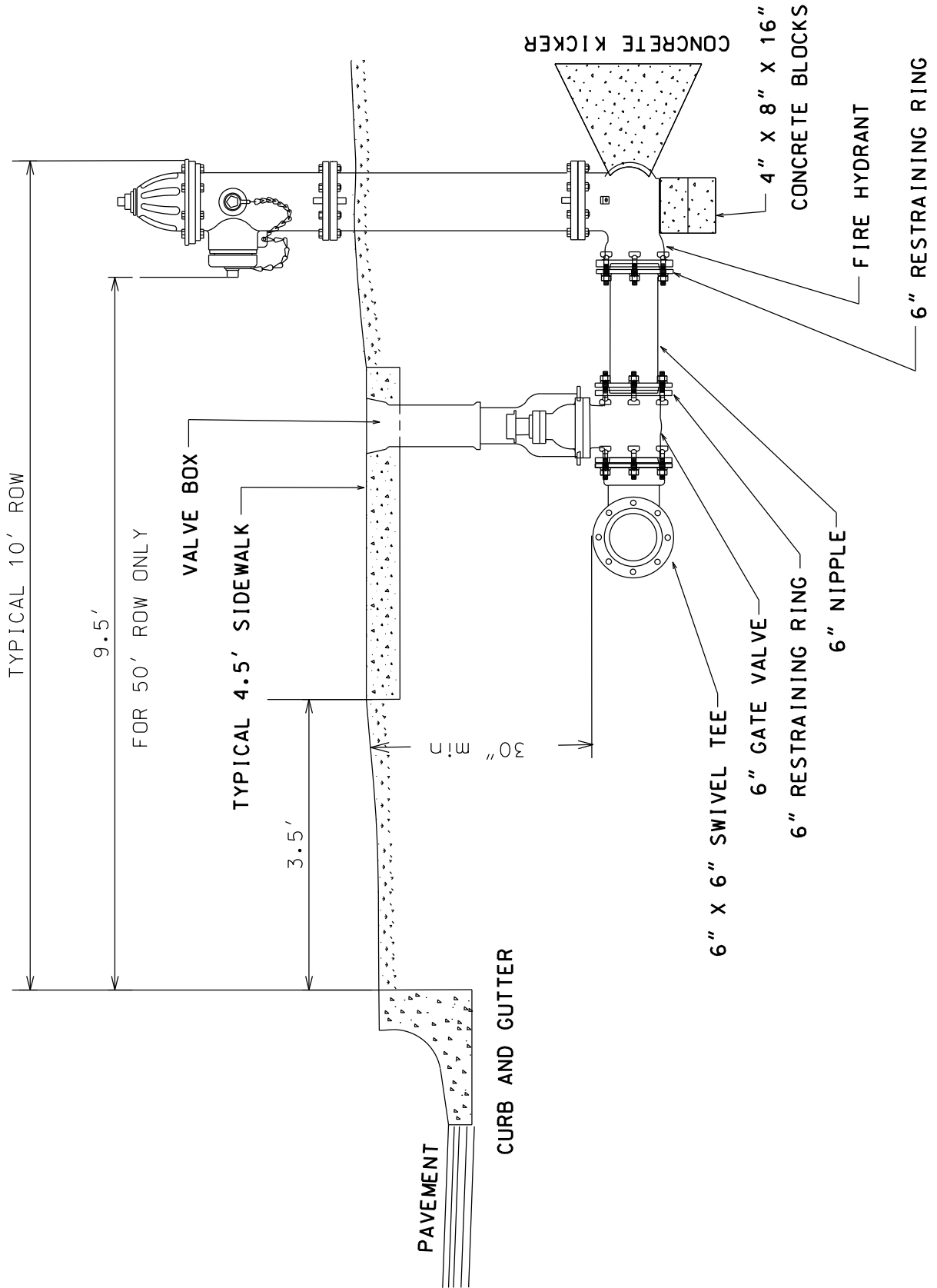
REVISED: _____

GRAPHIC SCALE



SPEC #: 11E

STANDARD FIRE HYDRANT

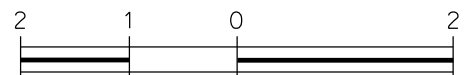


**HUNTSVILLE UTILITIES
 WATER DEPARTMENT**
 112 SPRAGINS STREET
 HUNTSVILLE, AL 35801
 (256) 535-1400

DRAWN BY: AW
 CHECKED:
 DATE: 4/20/2022
 DRAWING NO.:
 SCALE: 1" = 2'

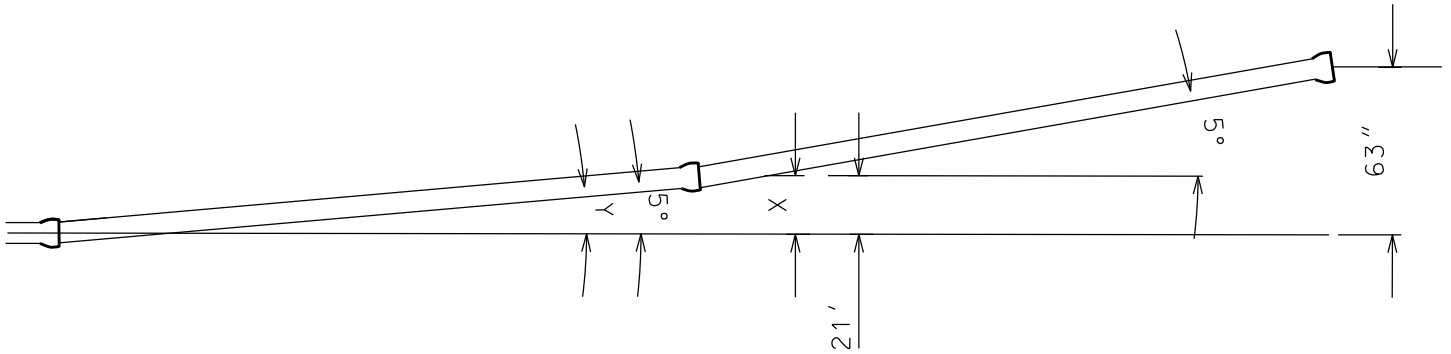
REVISED: _____

GRAPHIC SCALE



SPEC #: 11F

MAXIMUM ALLOWABLE DEFLECTION PUSH-ON JOINT PIPE



| SIZE OF PIPE | Y = MAXIMUM JOINT DEFLECTION IN DEGREES | X = DEFLECTION IN INCHES 20 FOOT LENGTH | APPROXIMATE. RADIUS IN FEET OF SUCCESSION JOINT CURVE |
|--------------|---|---|---|
| 3 | 5 | 21 | 230 |
| 4 | 5 | 21 | 230 |
| 6 | 5 | 21 | 230 |
| 8 | 5 | 21 | 230 |
| 10 | 5 | 21 | 230 |
| 12 | 5 | 21 | 230 |
| 14 | 5 | 21 | 230 |
| 16 | 5 | 21 | 230 |
| 18 | 5 | 21 | 230 |
| 20 | 5 | 21 | 230 |
| 24 | 5 | 21 | 230 |
| 30 | 5 | 21 | 230 |
| 36 | 4 | 17 | 285 |



**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

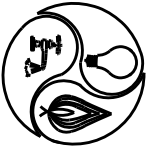
DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: NO SCALE

REVISED: _____

GRAPHIC SCALE
NOT TO SCALE

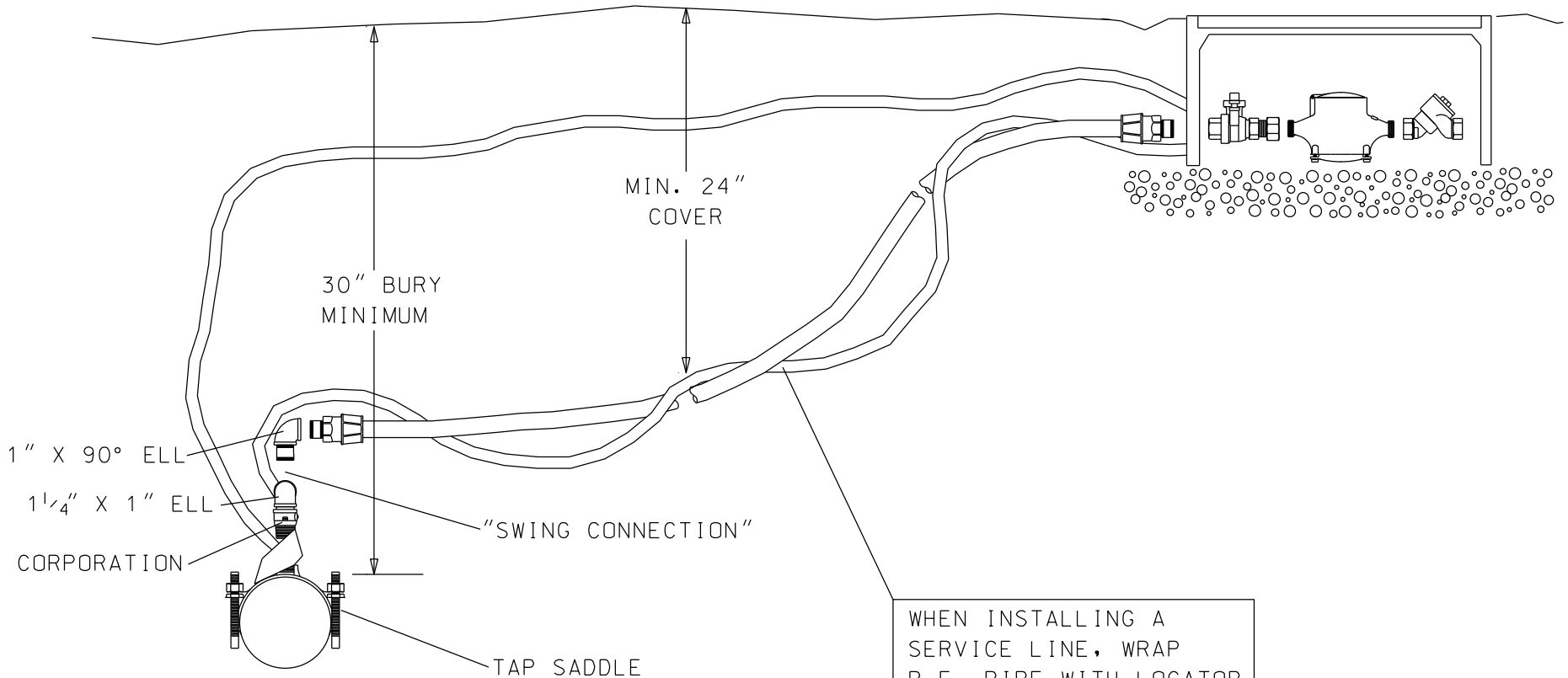


SPEC #: 12A



STANDARD 1" METER DETAIL

HUNTSVILLE UTILITIES
 WATER DEPARTMENT
 112 SPRAGINS STREET
 HUNTSVILLE, AL 35801
 (256) 535-1400



WHEN INSTALLING A SERVICE LINE, WRAP P.E. PIPE WITH LOCATOR TAPE (FROM CORPORATION TO METER BOX) AND BURY LOCATOR TAPE ABOVE PIPE (APPROX. 6" DEEP)

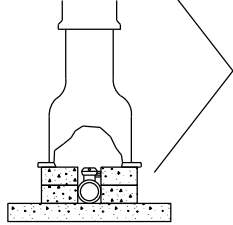
DRAWN BY: AG
 CHECKED:
 DATE: 4/20/2022
 DRAWING NO.: 1'
 SCALE: 1' = 1'
 REVISED: _____

GRAPHIC SCALE

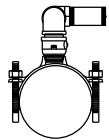
SPEC #: 13A

METER DETAIL WITH CONCRETE METER BOX

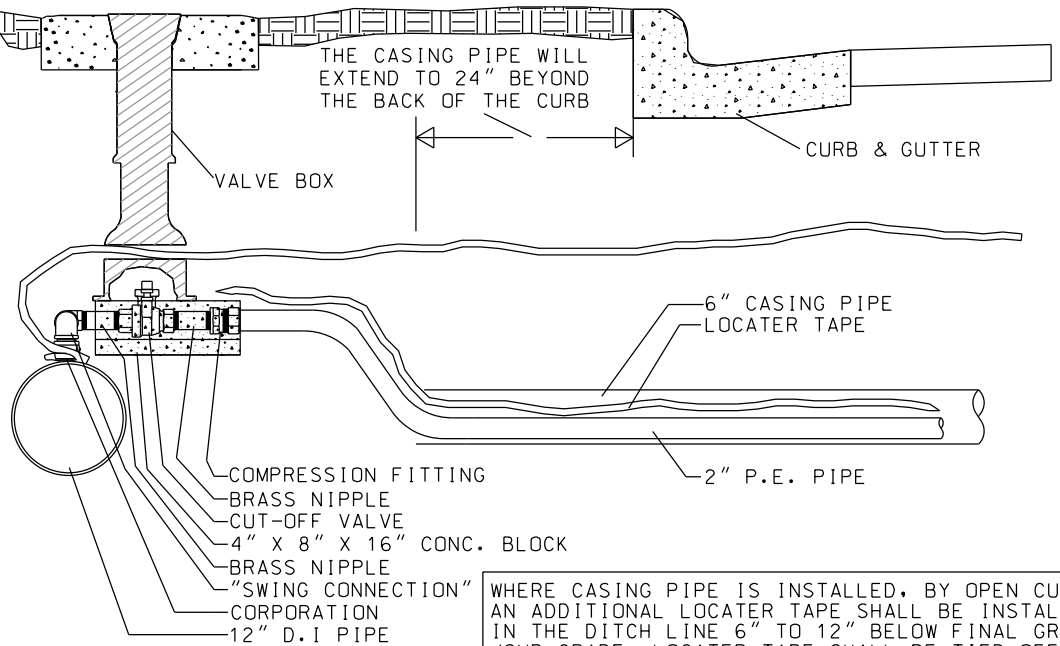
VALVE BOX TO BE LAID ON CAPPING BLOCKS ON EACH SIDE OF PIPE NOT ON THE PIPE ITSELF.



1 1/2" AND 2" SERVICES WILL BE TAPPED ON A 6" AND 8" MAINS WITH A TAP SADDLE



1" SERVICES WILL BE TAPPED DIRECTLY ONTO MAINS 6" AND LARGER

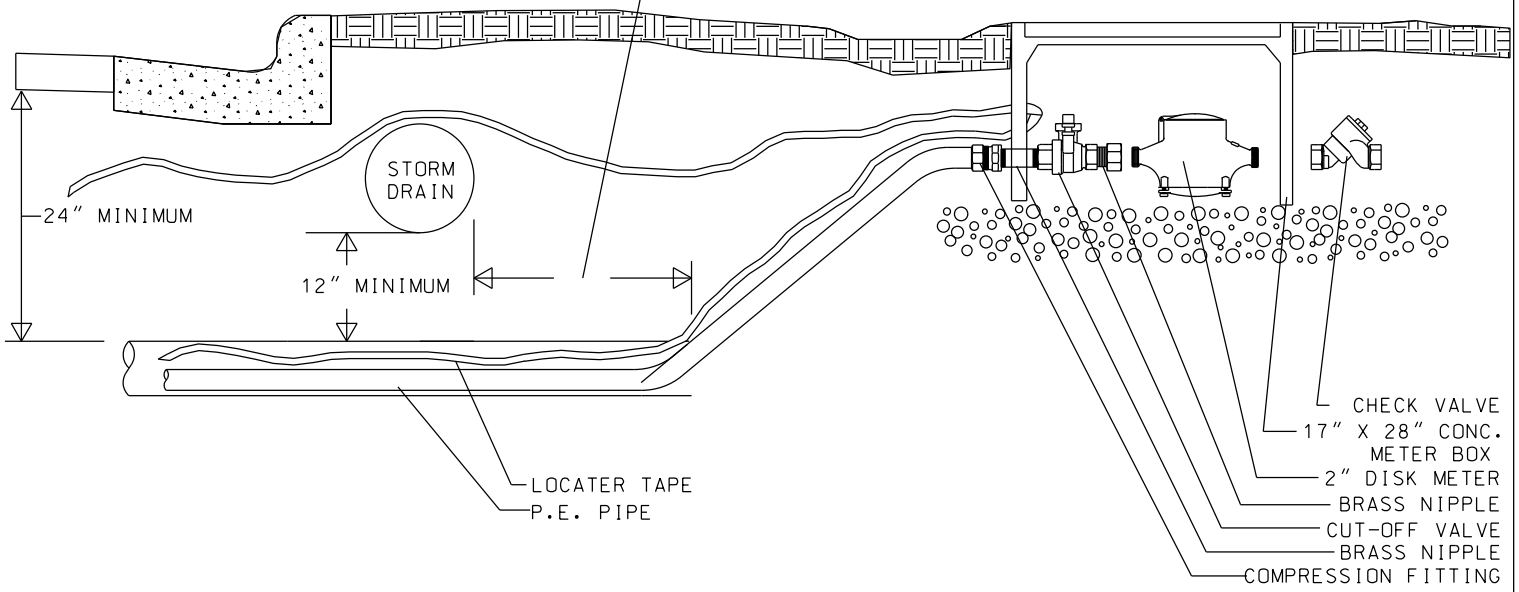


WHERE CASING PIPE IS INSTALLED, BY OPEN CUT, AN ADDITIONAL LOCATER TAPE SHALL BE INSTALLED IN THE DITCH LINE 6" TO 12" BELOW FINAL GRADE /SUB-GRADE. LOCATER TAPE SHALL BE TIED OFF AT EACH END. STARTING AT THE CORPORATION, AND ENDING AT THE CUT-OFF VALVE AT THE METER

WHEN GOING UNDER STORM DRAIN OR OTHER PIPING, THE CASING PIPE WILL EXTEND 24" BEYOND SAID PIPE.

* WHERE EXISTING 2" & 1 1/2" METERS ARE REPLACED, AND THE OLD METERS DO NOT HAVE DUAL CHECK VALVES, DUAL CHECK VALVES WILL NOT BE INSTALLED.

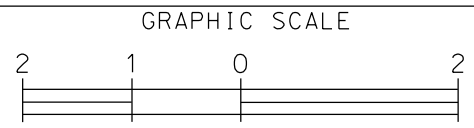
ON ALL NEW 2" AND 1 1/2" METER INSTALLATIONS, A DUAL CHECK VALVE WILL BE INSTALLED.



HUNTSVILLE UTILITIES
WATER DEPARTMENT
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AG
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

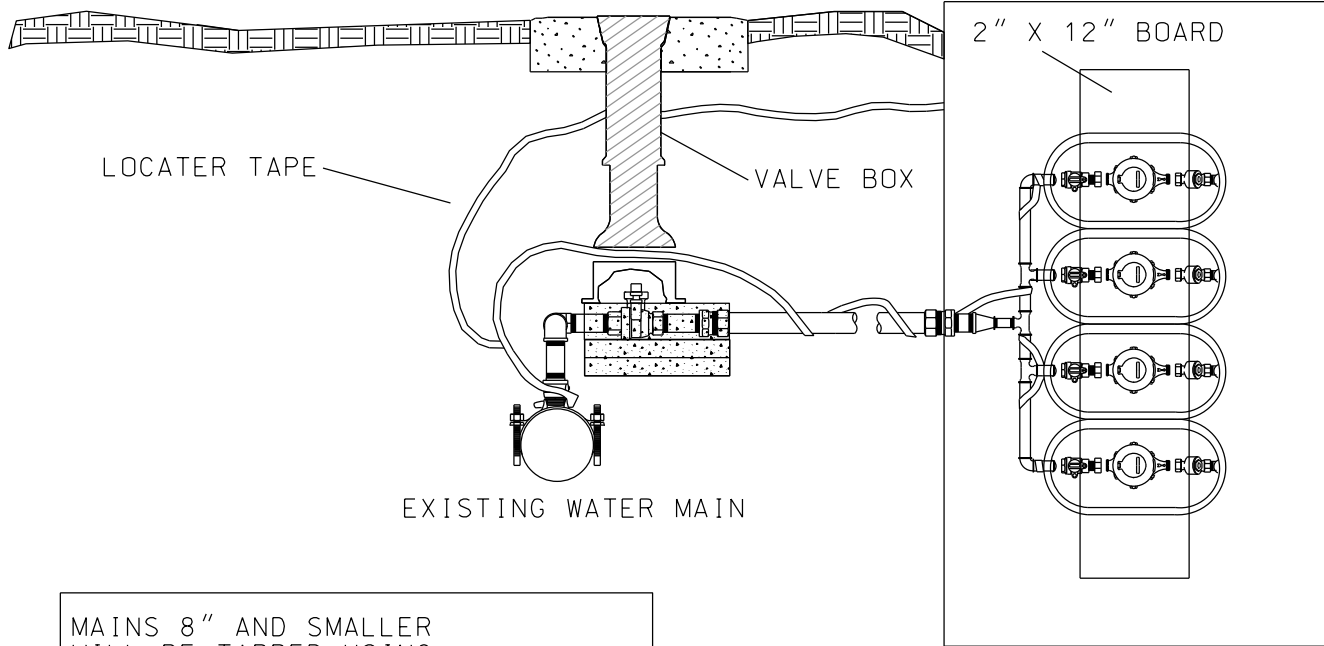
REVISED: _____



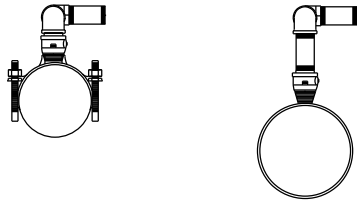
SPEC #: 13B

METER BANK DETAIL

HEADER PIPE AND METER BANK
(ROTATED FOR CLARITY)



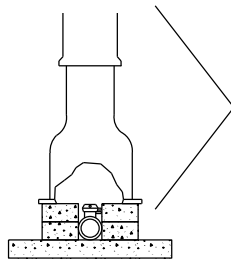
MAINS 8" AND SMALLER
WILL BE TAPPED USING
A TAPPING SADDLE.



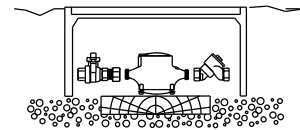
ON ALL MAINS 10" AND
LARGER, 2" AND 1 1/2"
SERVICES WILL BE
TAPPED DIRECTLY.

NOTE: (4) 1" METERS ARE
SHOWN ON A 2" TAP. MORE
1" METERS MAY BE INSTALLED
IF APPROVED BY ENGINEER
OR INSPECTOR

VALVE BOX TO BE LAID
ON CAPPING BLOCKS ON
EACH SIDE OF 2" PIPE
NOT ON THE PIPE ITSELF.



SIDE VIEW



PLACE METERS AND BOXES ON
A PIECE OF PRESSURE TREATED
2" X 12" LUMBER, THEN FILL IN
WITH GRAVEL

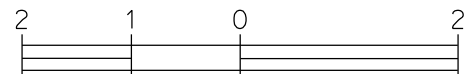


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AG
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

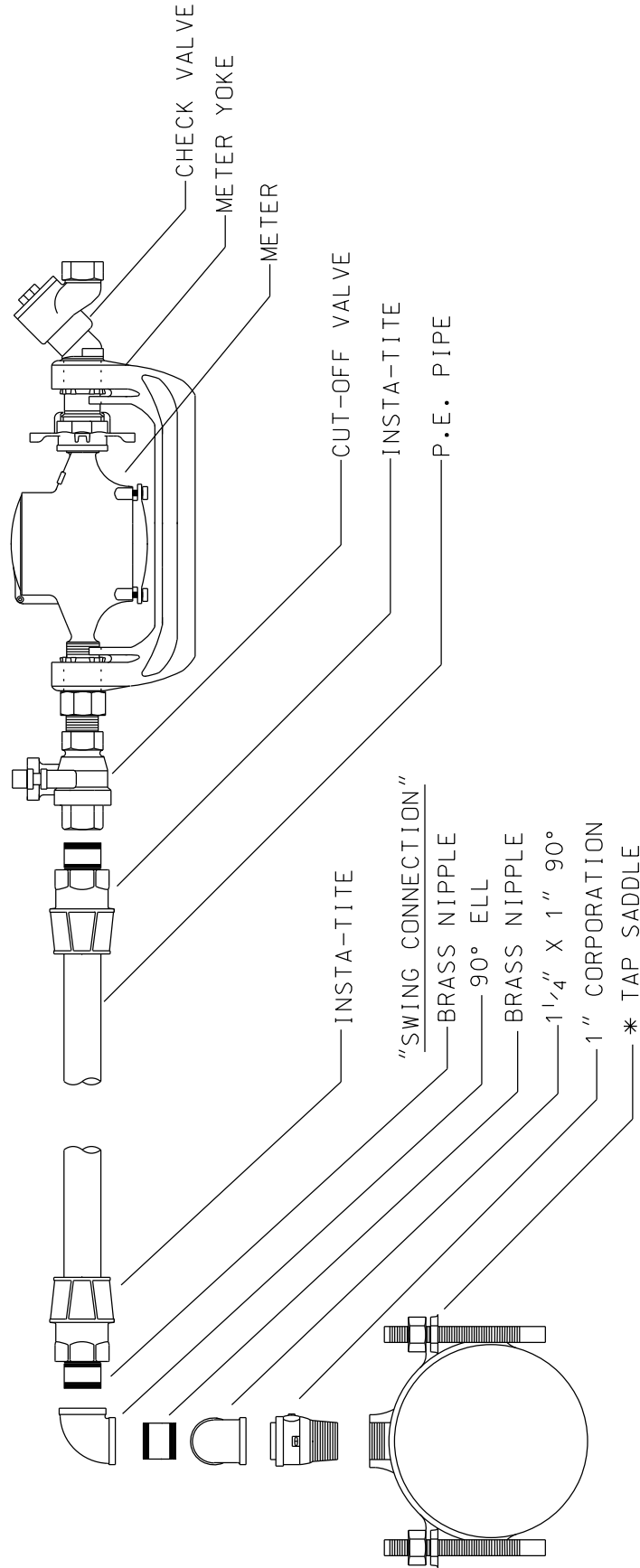
REVISED: _____

GRAPHIC SCALE



SPEC #: 13C

1" TAP AND METER SET W/METER YOKE DETAIL



* TAP SADDLE REQUIRED ON
MAINS SMALLER THAN 6"

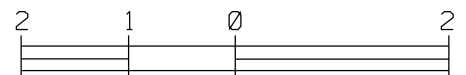


**HUNTSVILLE UTILITIES
 WATER DEPARTMENT**
 112 SPRAGINS STREET
 HUNTSVILLE, AL 35801
 (256) 535-1400

DRAWN BY: AW
 CHECKED:
 DATE: 4/20/2022
 DRAWING NO.:
 SCALE: 1" = 2'

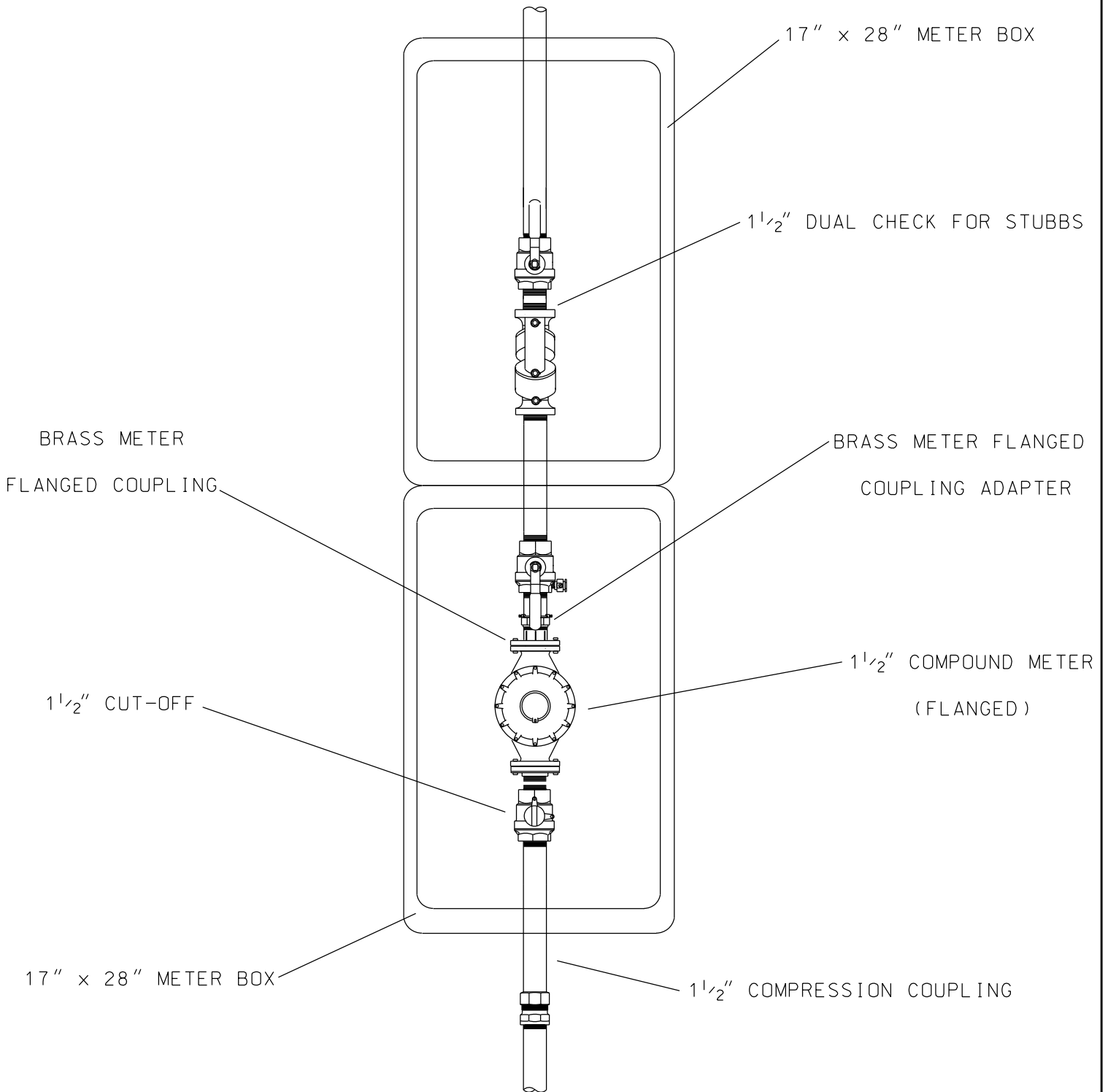
REVISED: _____

GRAPHIC SCALE



SPEC #: 13D

1 1/2" COMPOUND METER DETAIL

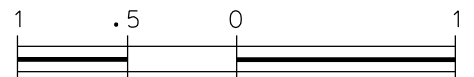


HUNTSVILLE UTILITIES
WATER DEPARTMENT
 112 SPRAGINS STREET
 HUNTSVILLE, AL 35801
 (256) 535-1400

DRAWN BY: JY
 CHECKED:
 DATE: 4/20/2022
 DRAWING NO.:
 SCALE: 1" = 1'

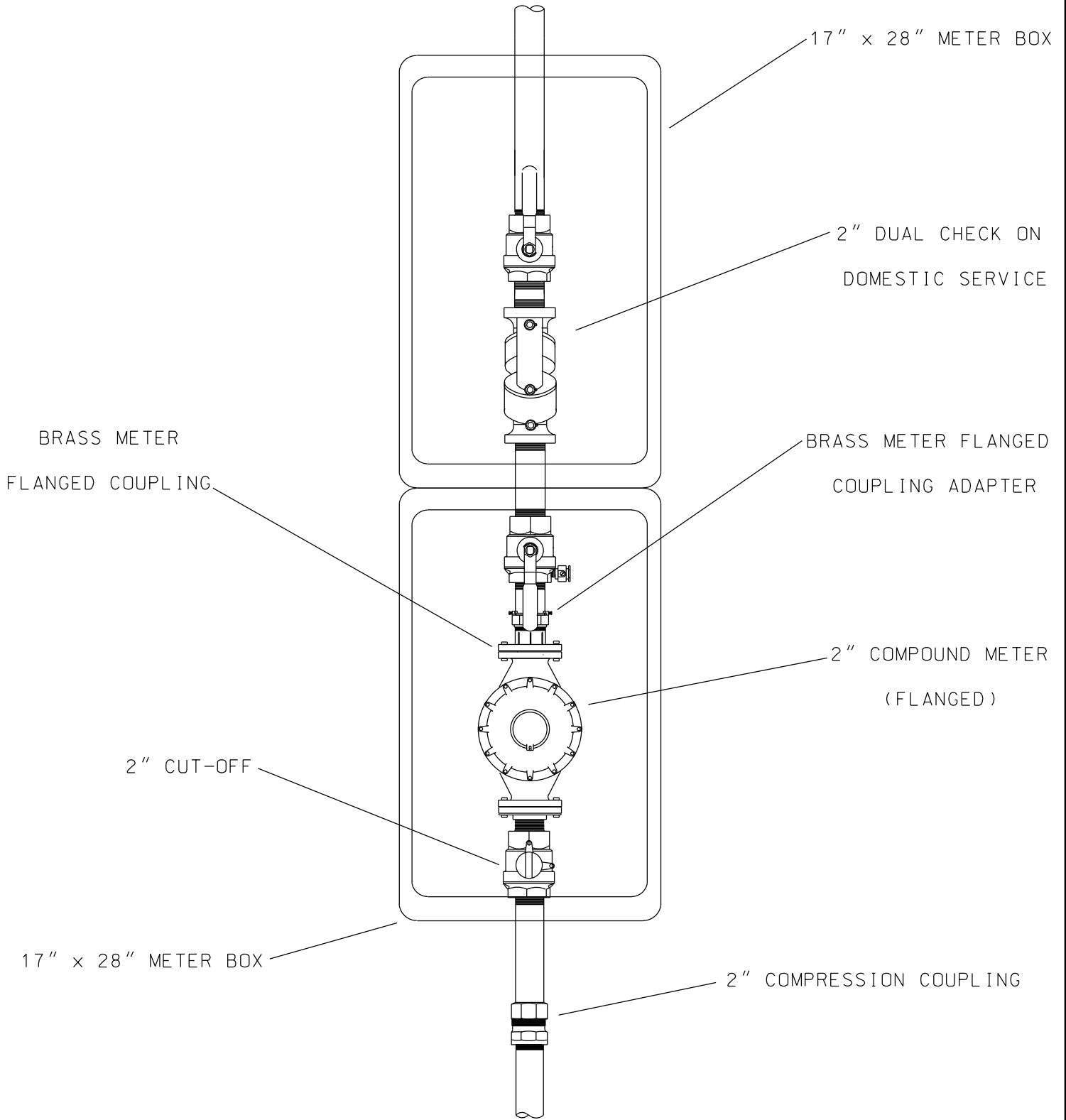
REVISED: _____

GRAPHIC SCALE



SPEC #: 13E

2" COMPOUND METER DETAIL

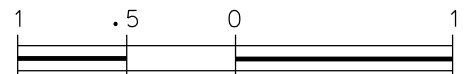


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: JY
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 1'

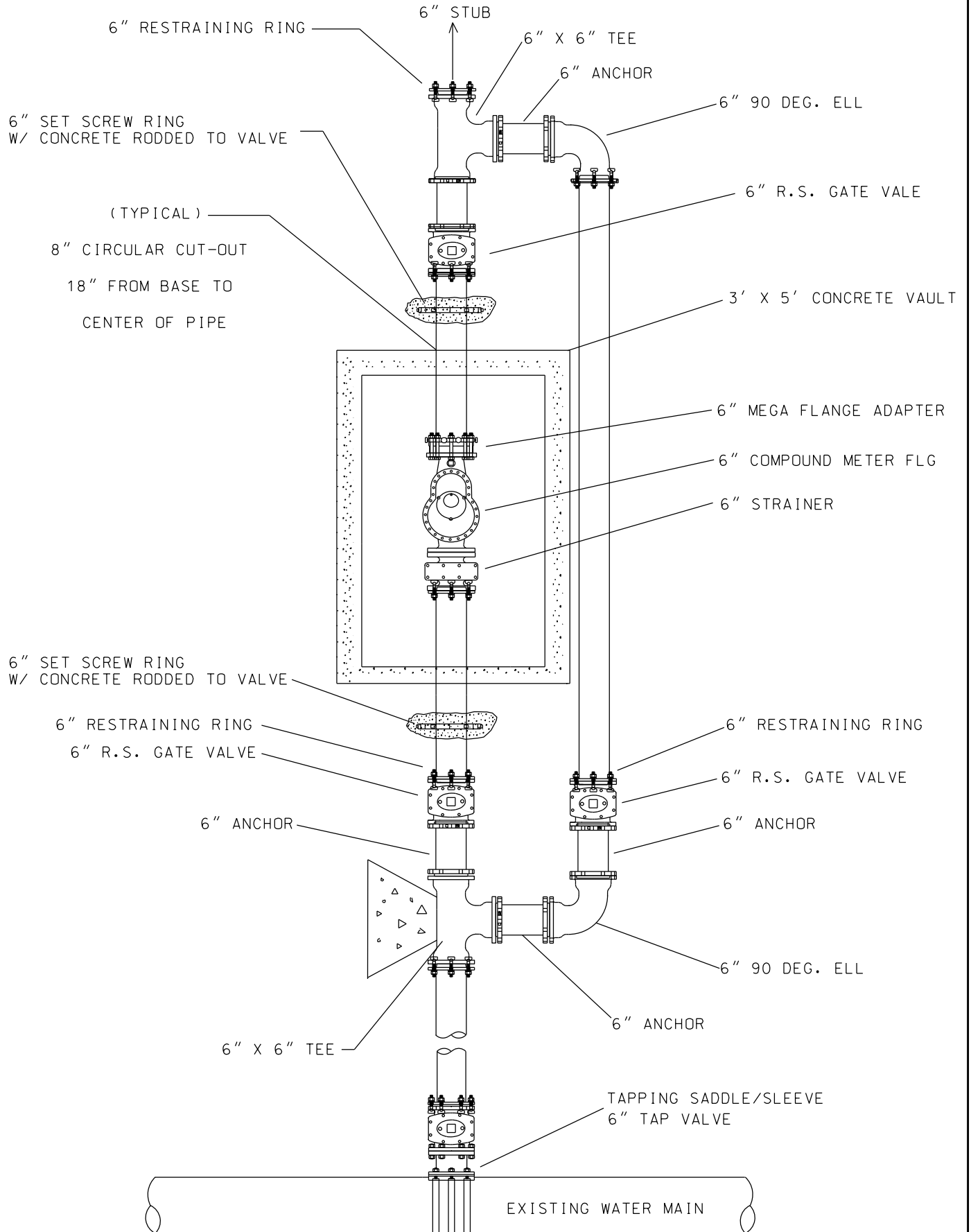
REVISED: _____

GRAPHIC SCALE



SPEC #: 13F

6" COMPOUND METER/VAULT DETAIL

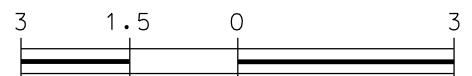


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 3'

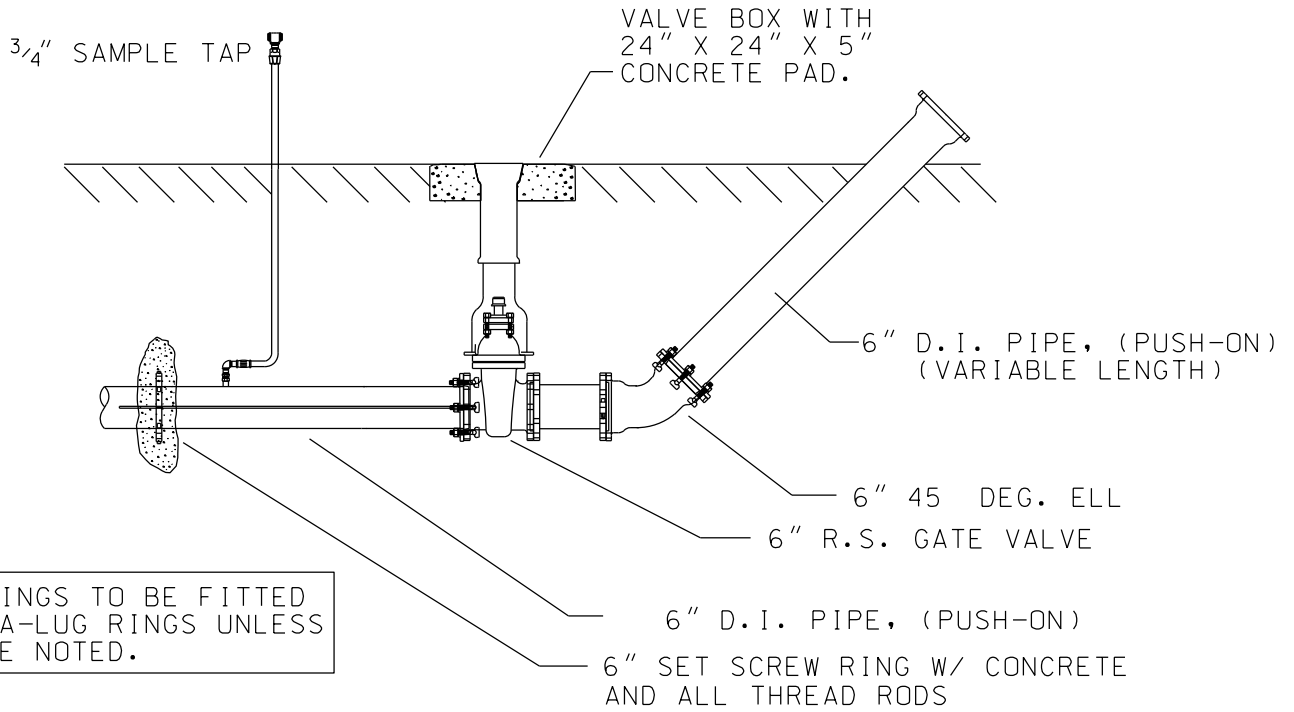
REVISED: _____

GRAPHIC SCALE

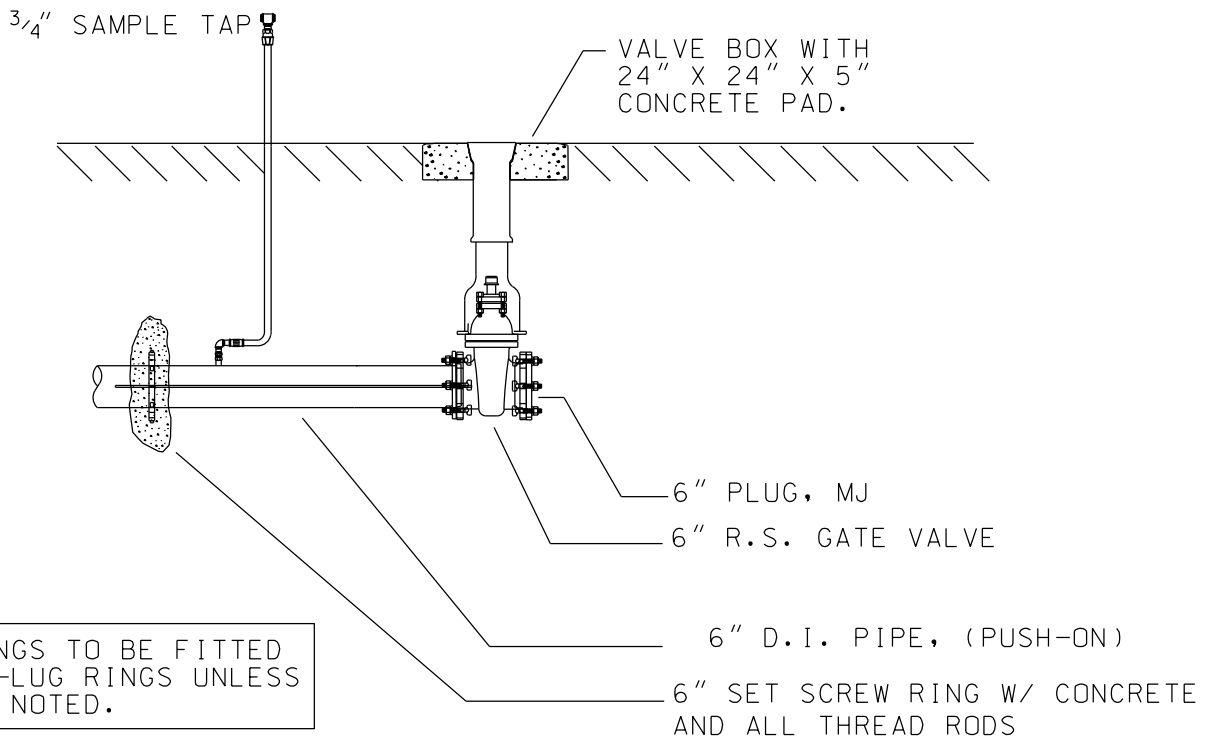


SPEC #: 13G

FLUSHING ASSEMBLY



FLUSHING ASSEMBLY DETAIL #1



FLUSHING ASSEMBLY DETAIL #2

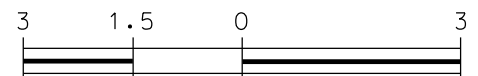


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 3'

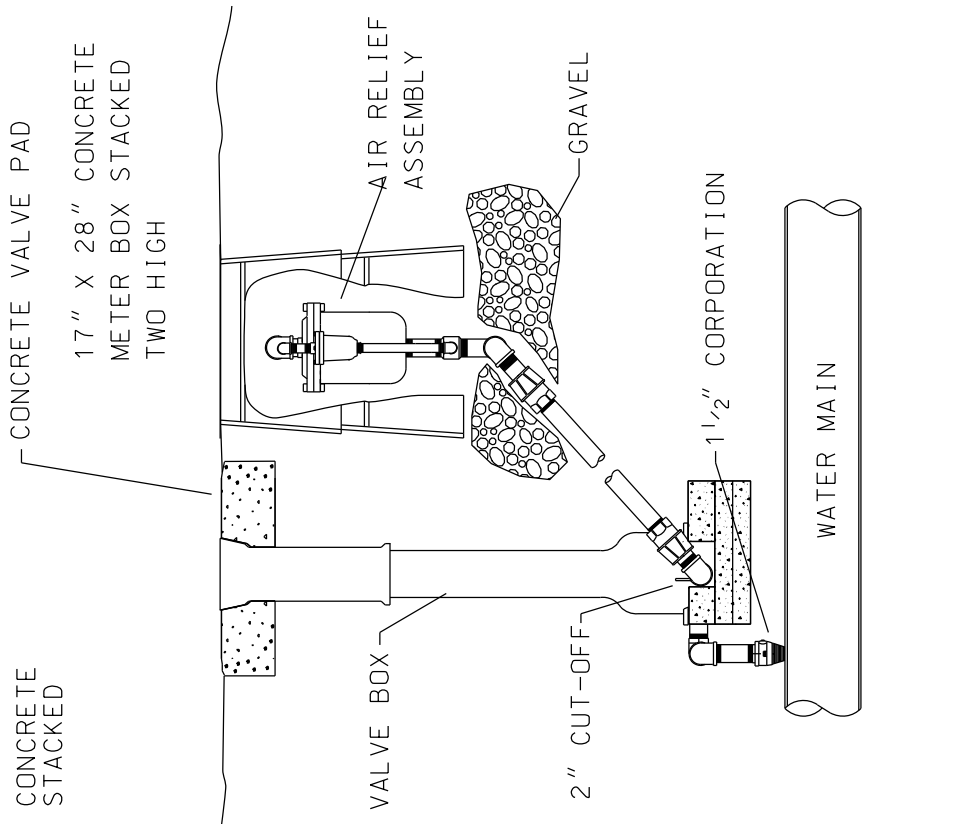
REVISED: _____

GRAPHIC SCALE

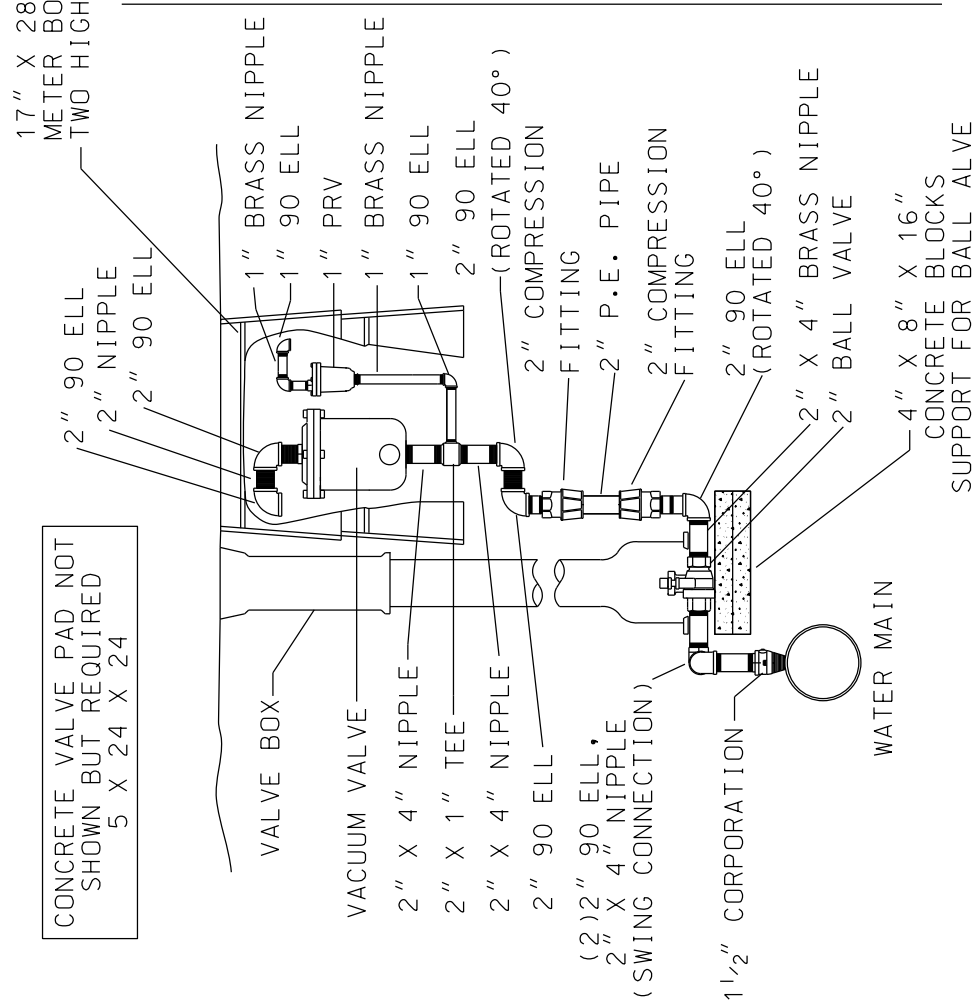


SPEC #: 14A

AIR RELEASE VALVE DETAIL



FRONT VIEW



SIDE VIEW

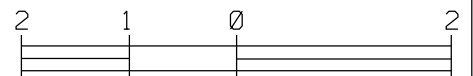


HUNTSVILLE UTILITIES
WATER DEPARTMENT
 112 SPRAGINS STREET
 HUNTSVILLE, AL 35801
 (256) 535-1400

DRAWN BY: AW
 CHECKED:
 DATE: 4/20/2022
 DRAWING NO.:
 SCALE: 1" = 2'

REVISED: _____

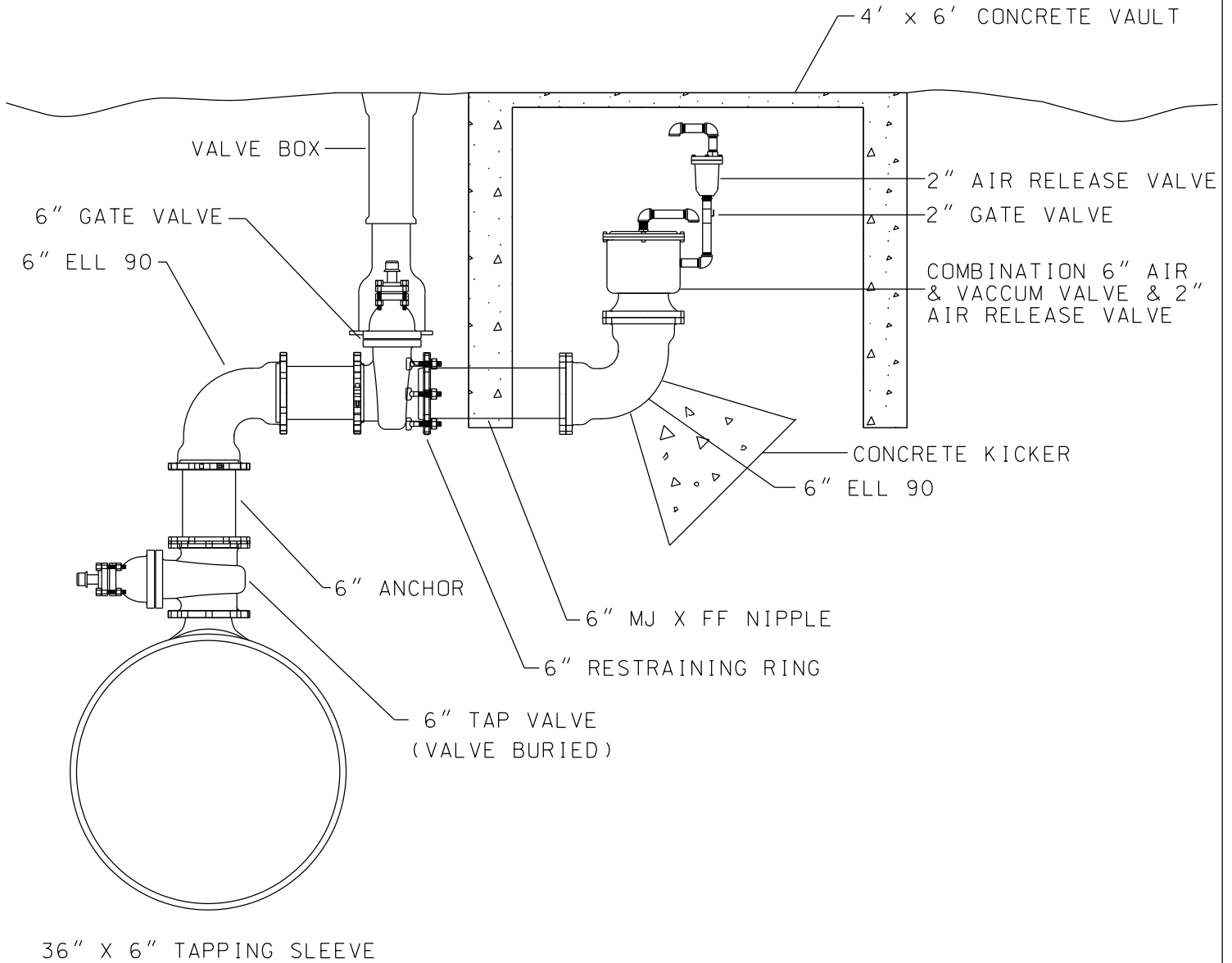
GRAPHIC SCALE



SPEC #: 17A

AIR RELEASE AND VAC DETAIL

DEPTH OF BURY TO BE ADJUSTED TO ACCOMMODATE COMBINATION AIR VALVES

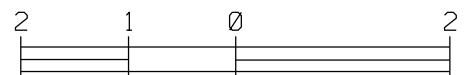


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

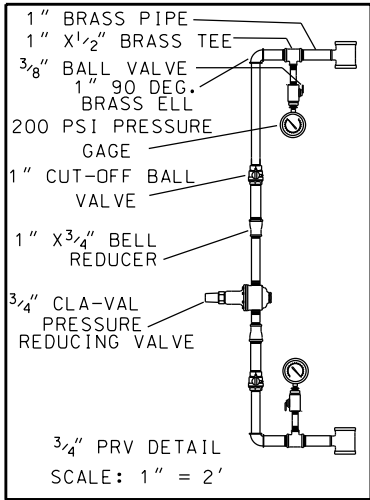
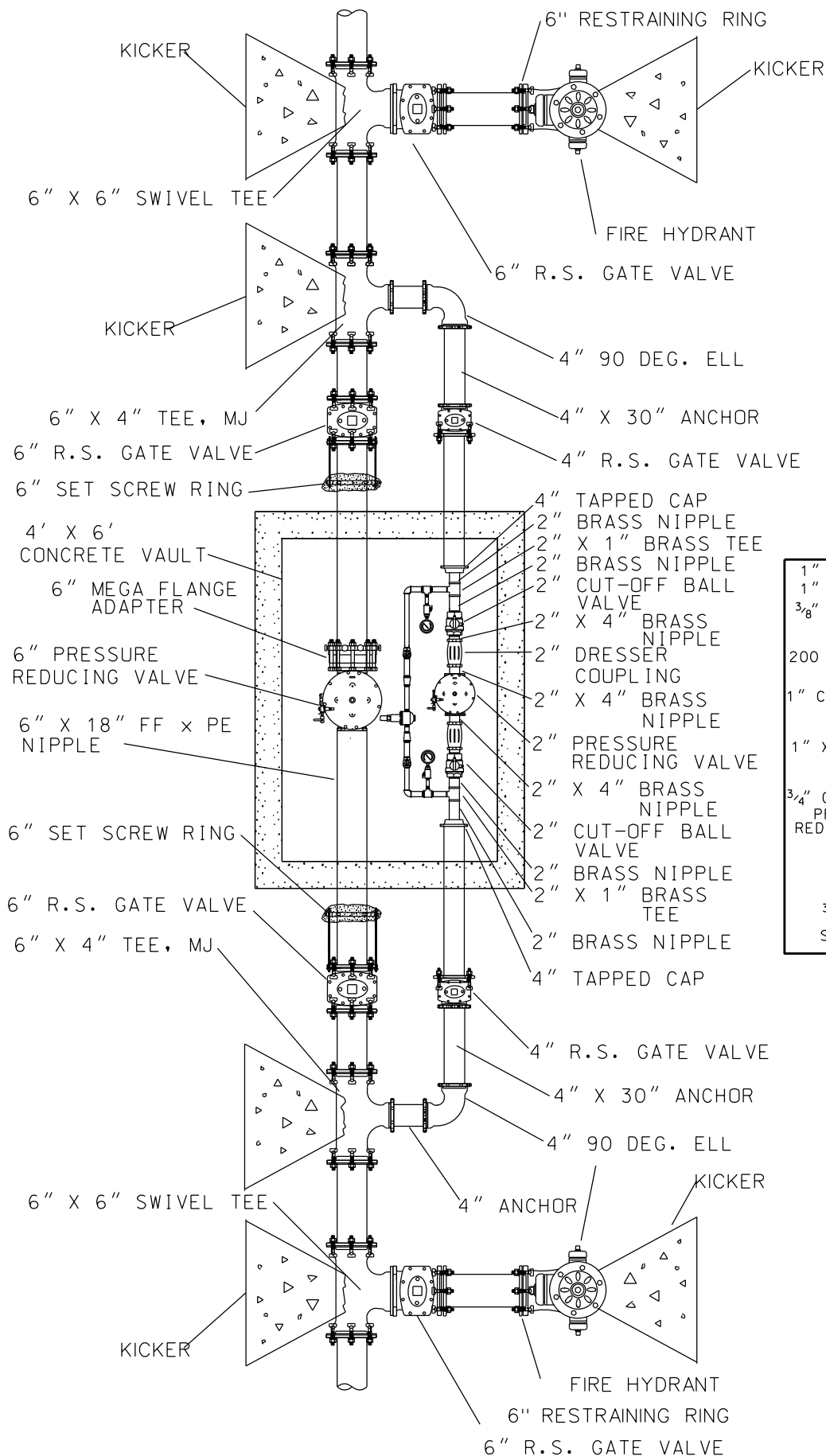
REVISED: _____

GRAPHIC SCALE



SPEC #: 17B

PRESSURE REDUCING VALVE DETAIL



**HUNTSVILLE UTILITIES
 WATER DEPARTMENT**
 112 SPRAGINS STREET
 HUNTSVILLE, AL 35801
 (256) 535-1400
 WATER SUPT: SAM MCELROY

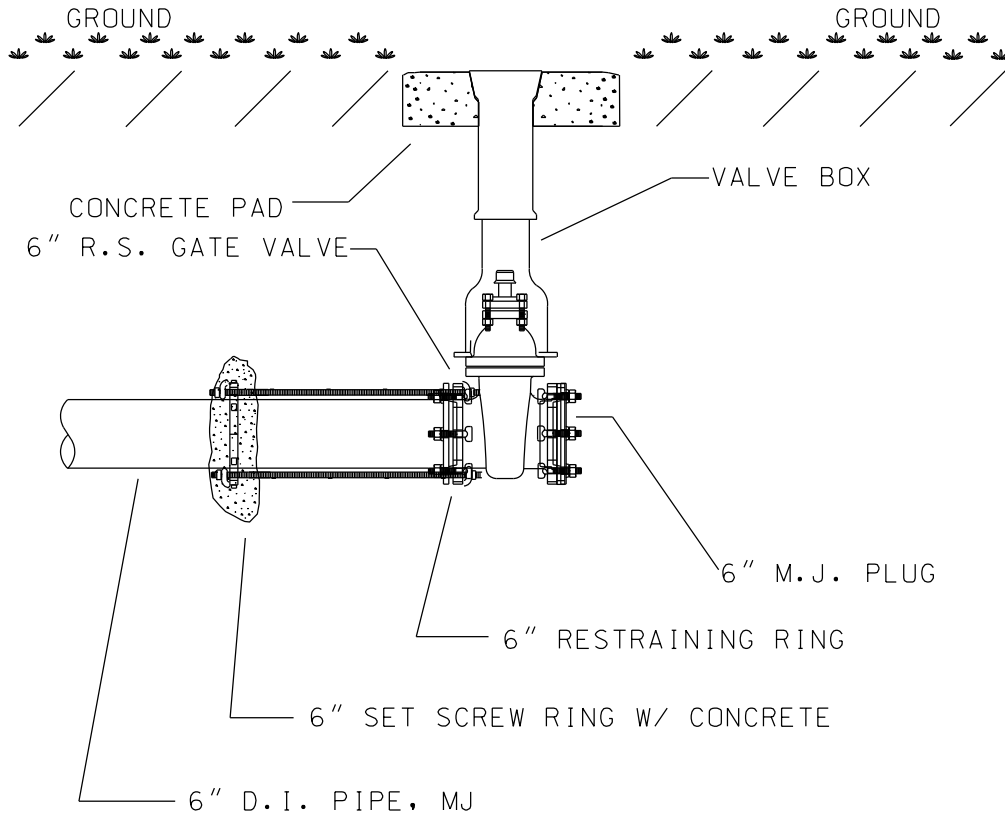
DRAWN BY: AW
 CHECKED:
 DATE: 4/20/2022
 DRAWING NO.:
 SCALE: 1" = 3'
 REVISED: _____

GRAPHIC SCALE

3 1.5 0 3

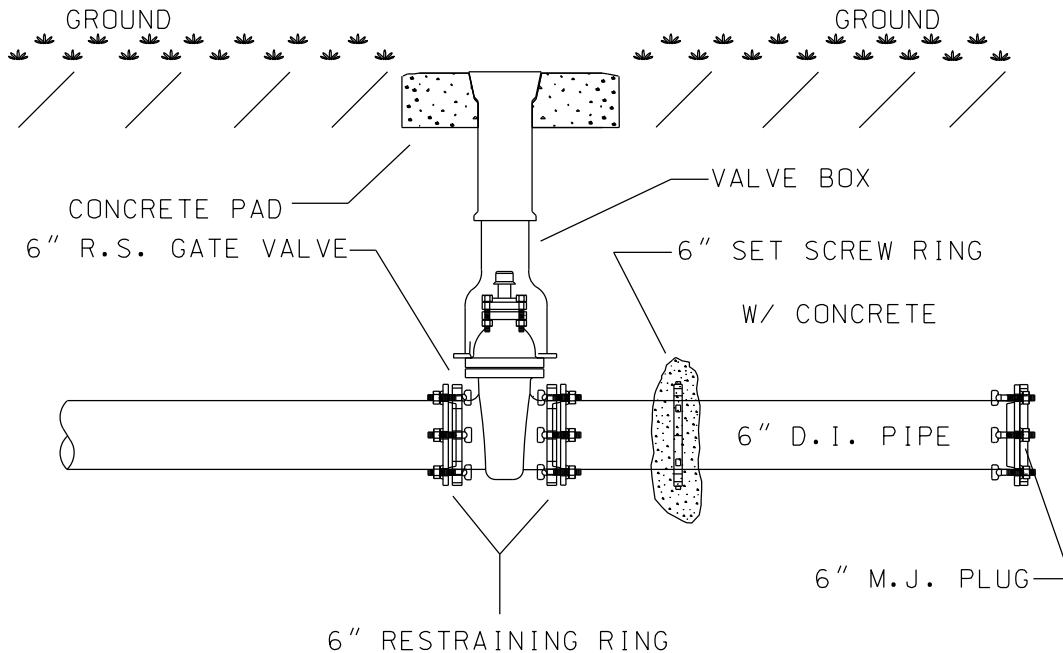
SPEC #: 17C

END-OF-LINE VALVE DETAIL



OPTION 2

OPTION 1

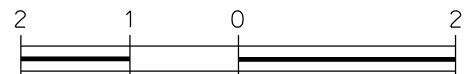


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

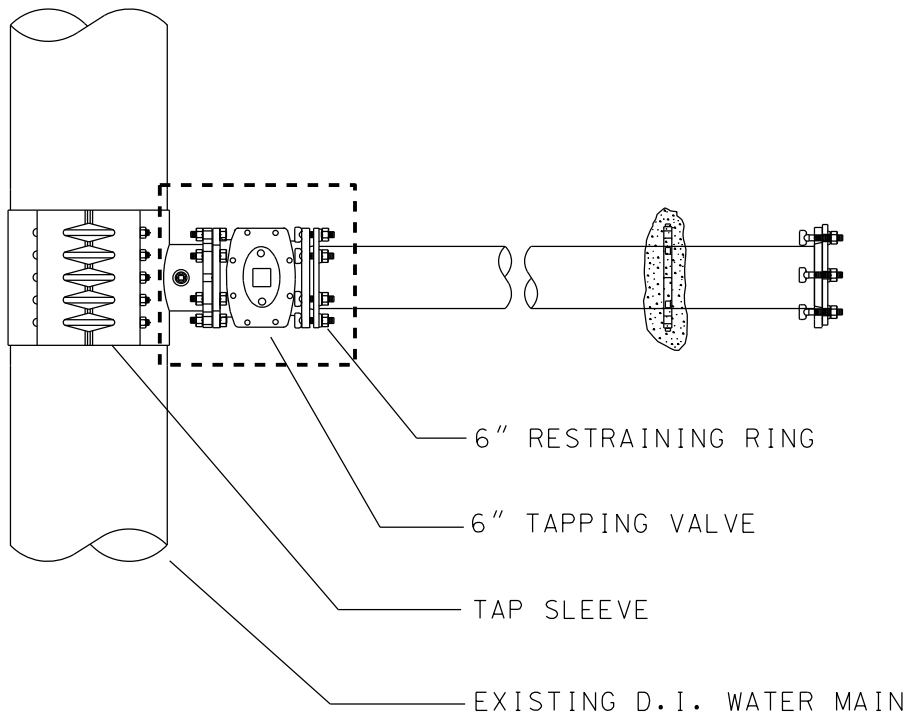
REVISED: _____

GRAPHIC SCALE

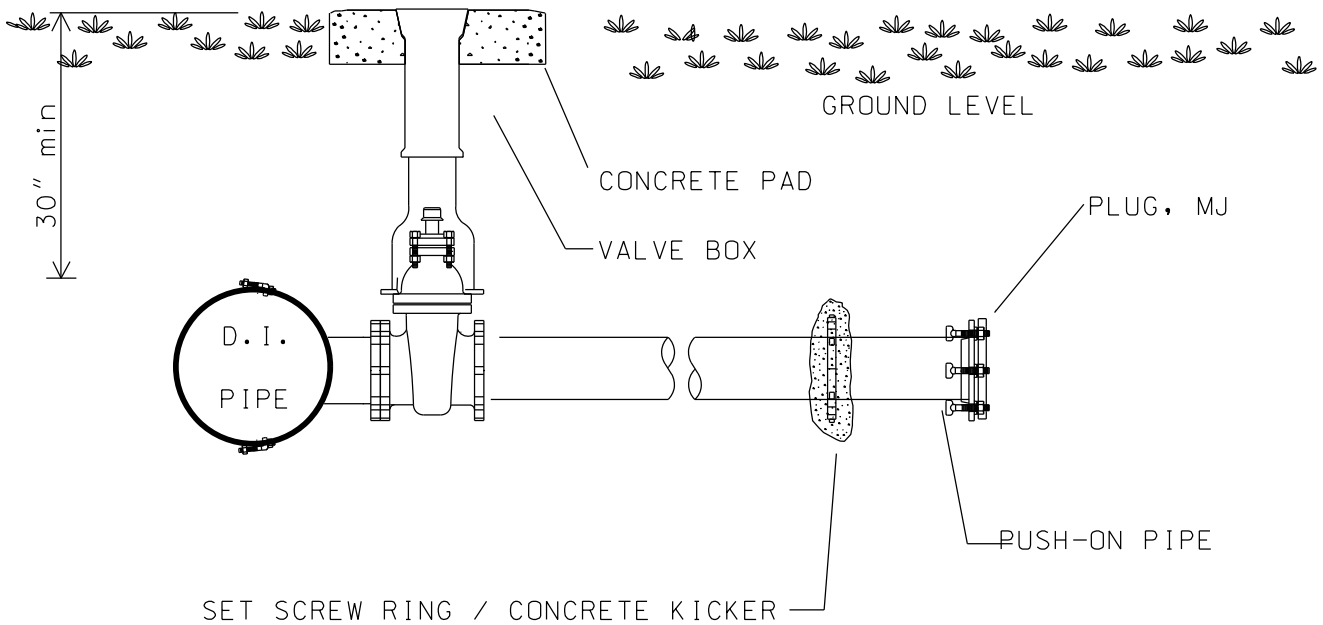


SPEC #: 21A

FIRE LINE STUB DETAIL



TOP VIEW



SIDE VIEW

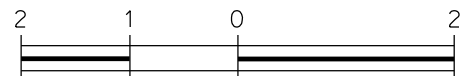


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

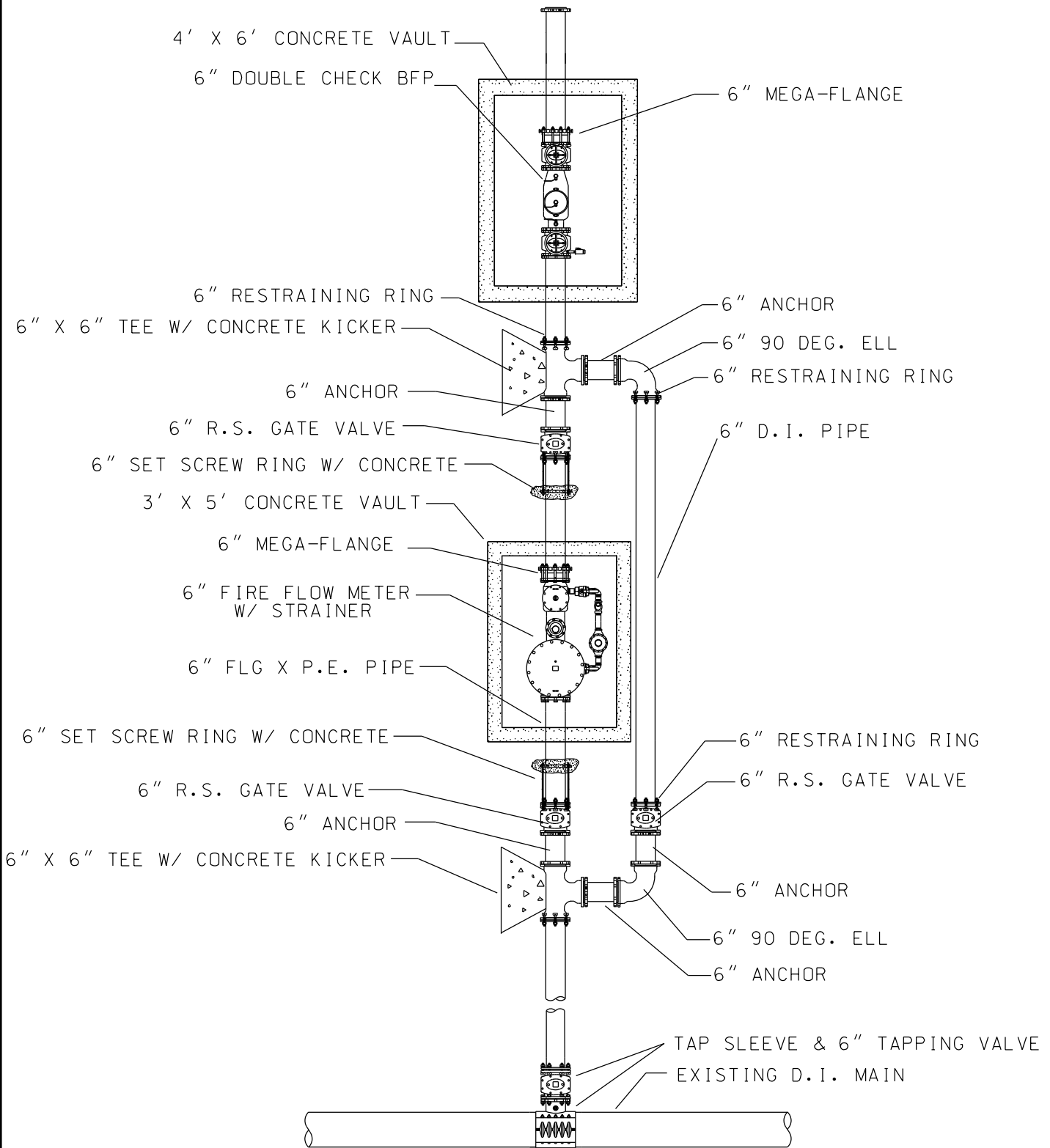
REVISED: _____

GRAPHIC SCALE



SPEC #: 21B

6" MASTER METER W/ 6" BFP DETAIL



HUNTSVILLE UTILITIES
 WATER DEPARTMENT
 112 SPRAGINS ST
 HUNTSVILLE, AL 35801
 (256) 535-1400

DRAWN BY: AW
 CHECKED:
 DATE: 4/20/2022
 DRAWING NO.:
 SCALE: 1" = 5'

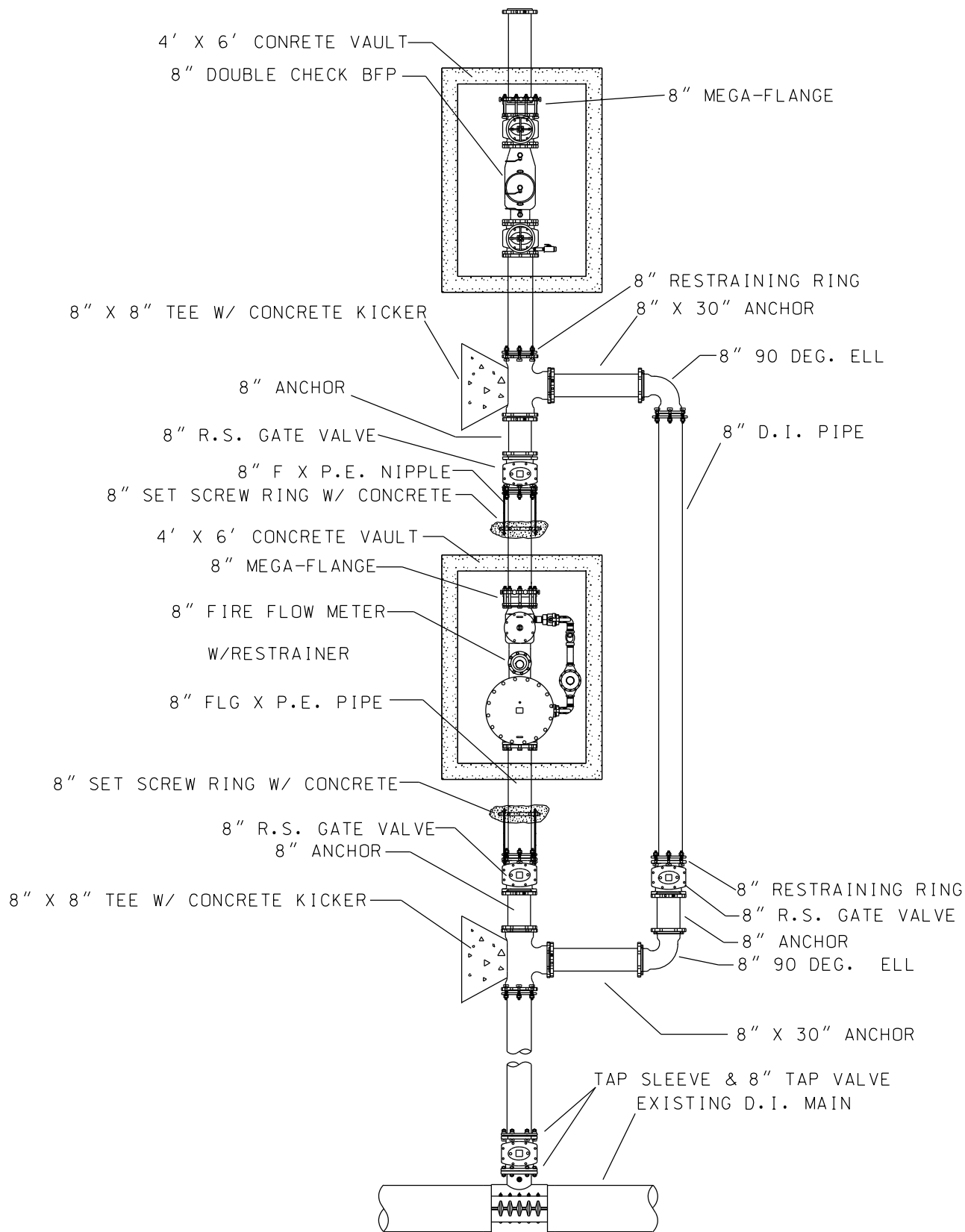
REVISED: _____

GRAPHIC SCALE



SPEC #: 23A

8" MASTER METER W/ 8" BFP DETAIL

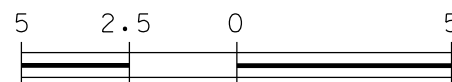


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS ST
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: JY
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 5'

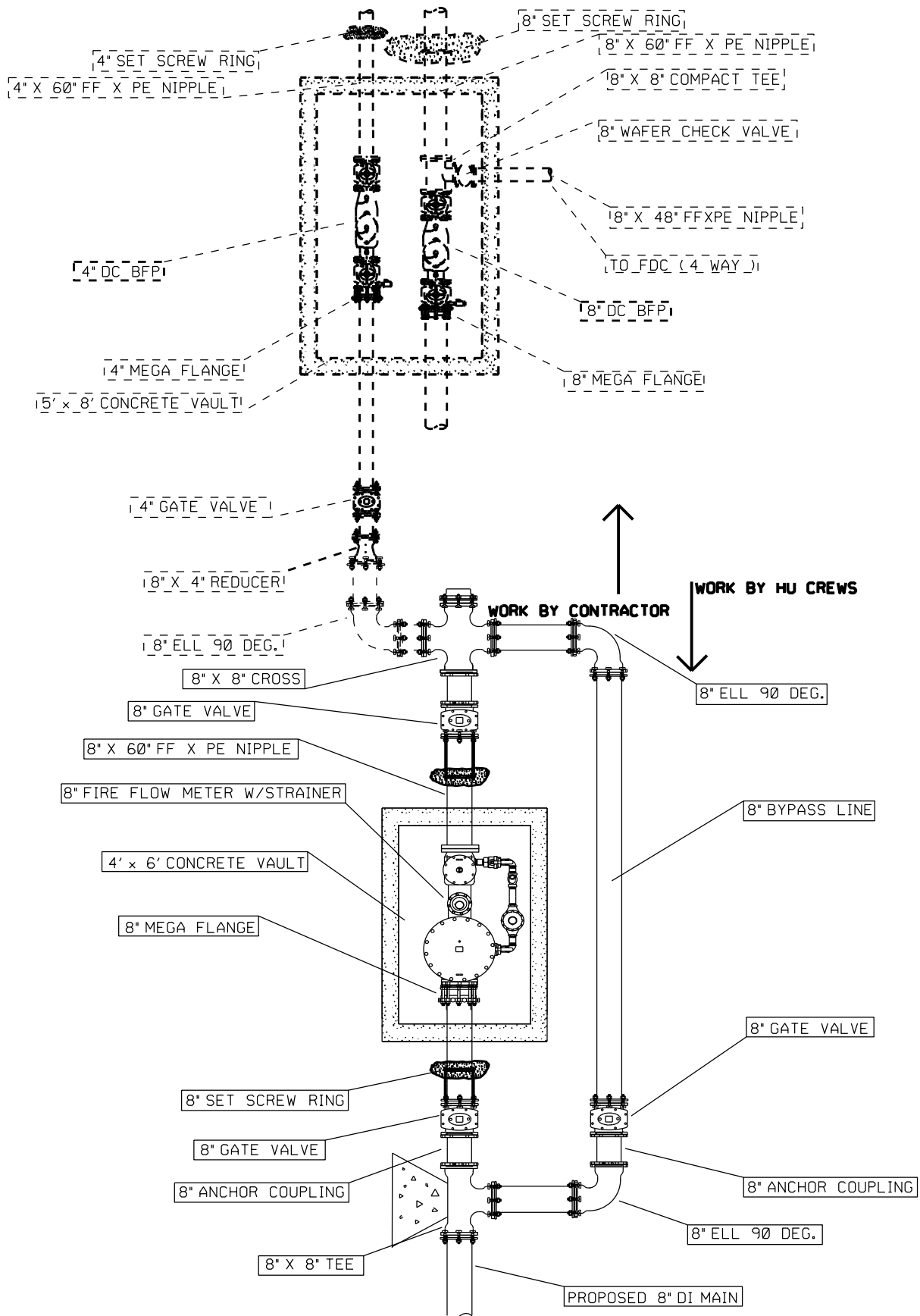
REVISED: _____

GRAPHIC SCALE



SPEC #: 23B

8" FIRE LINE / 4" DOMESTIC

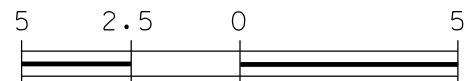


HUNTSVILLE UTILITIES
 WATER DEPARTMENT
 112 SPRAGINS ST
 HUNTSVILLE, AL 35801
 (256) 535-1400

DRAWN BY: HG
 CHECKED:
 DATE: 4/20/2022
 DRAWING NO.:
 SCALE: 1" = 5'

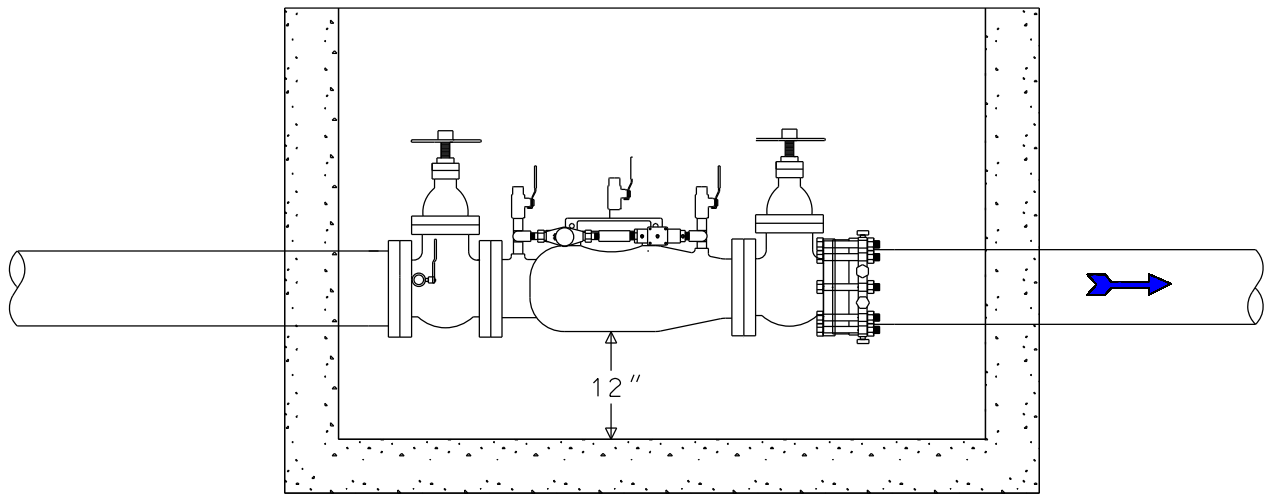
REVISED: _____

GRAPHIC SCALE

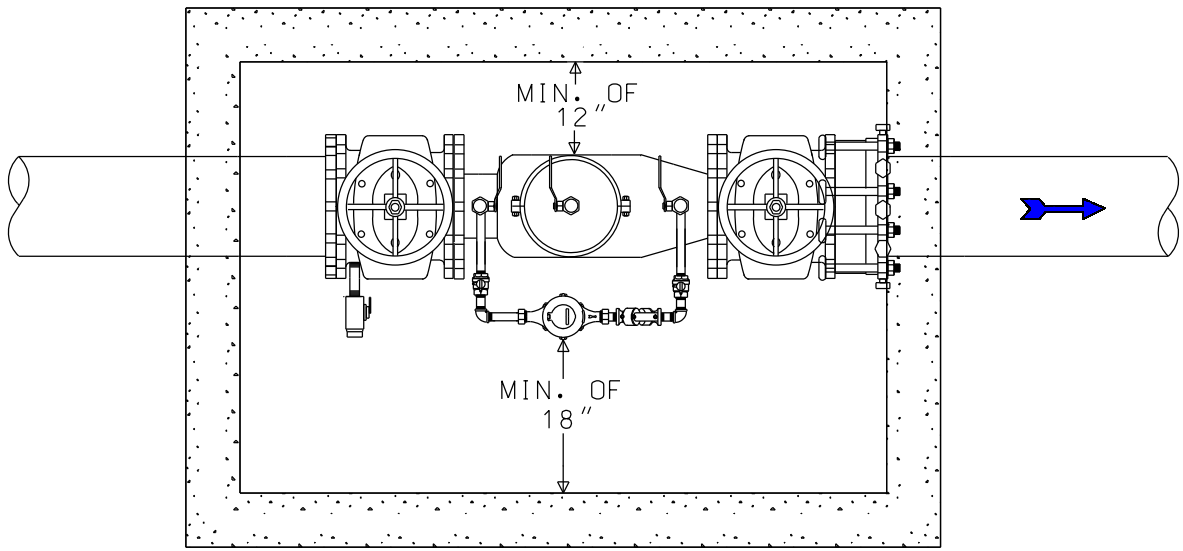


SPEC #: 23D

BACKFLOW PREVENTER IN CONCRETE VAULT



SIDE VIEW



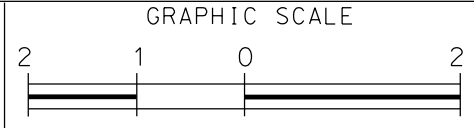
TOP VIEW



**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS ST.
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: JY
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

REVISED: _____

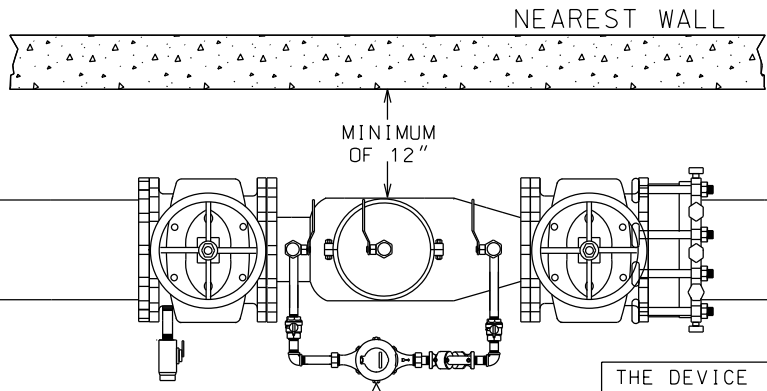
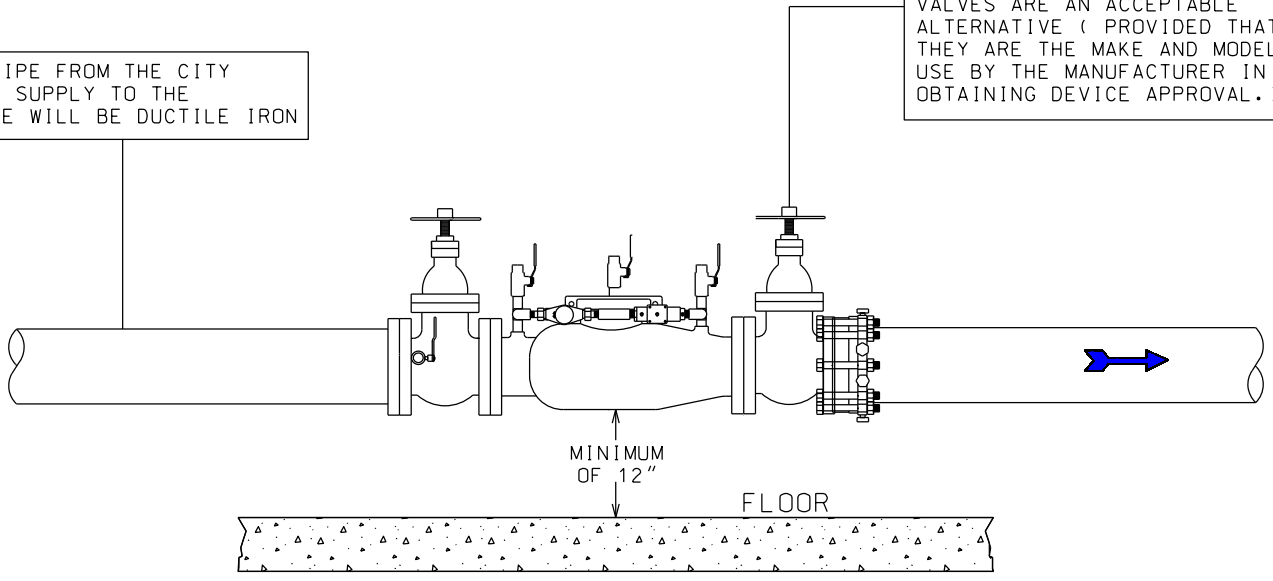


SPEC #: 23E

BACKFLOW PREVENTER SPACING #1 (INSIDE BUILDING)

ALL PIPE FROM THE CITY WATER SUPPLY TO THE DEVICE WILL BE DUCTILE IRON

THIS DRAWING DEPICTS NRS SHUT-OFF VALVES. WHERE ANTI-TAMPER SWITCHES ARE TO BE INSTALLED. O.S. & Y. VALVES ARE AN ACCEPTABLE ALTERNATIVE (PROVIDED THAT THEY ARE THE MAKE AND MODEL USE BY THE MANUFACTURER IN OBTAINING DEVICE APPROVAL.)



THE DEVICE IN THIS DRAWING IS AN AMES 3000SS DOUBLE DETECTOR CHECK. THIS IS NOT TO BE TAKEN AS A RECCOMENDATION OF THIS BRAND DEVICE OVER OTHERS EQUALLY ACCEPTABLE BRANDS

VALVES SHOWN IN THIS DETAIL ARE NRS. O.S. & Y. VALVES MAY BE USED. PROVIDED THEY ARE THE MAKE AND MODEL LISTED BY THE MANUFACTURER AS PART OF THEIR APPROVAL PROCESS.



**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'
REVISED: _____

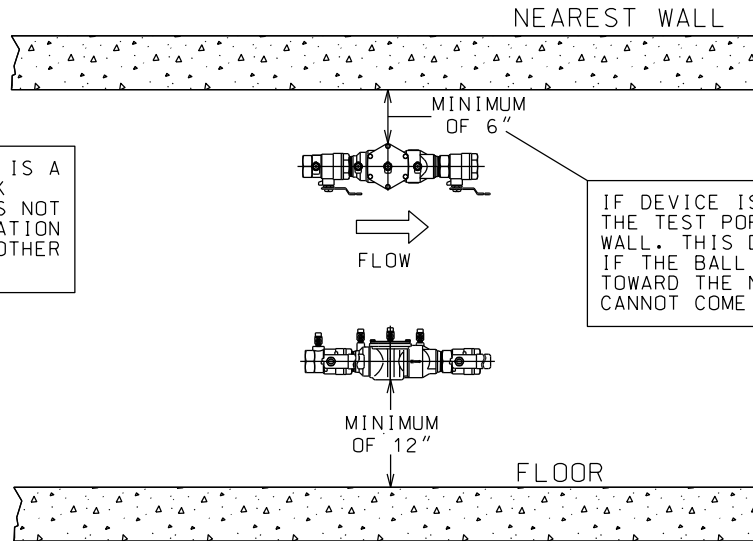
GRAPHIC SCALE
2 1 0 2
SPEC #: 23F

BACKFLOW PREVENTER SPACING #2 (INSIDE BUILDING)

PLACEMENT SPECIFICATIONS FOR DOUBLE CHECK BACKFLOW PREVENTION DEVICES, INSTALLED INSIDE OF BUILDING

THESE DETAILS APPLY TO DEVICE SIZES 2" AND SMALLER

THE DEVICE IN THIS DRAWING IS A 2" AIMES 2000B DOUBLE CHECK BACKFLOW PREVENTER. THIS IS NOT TO BE TAKEN AS A RECOMMENDATION OF THIS BRAND DEVICE OVER OTHER EQUALLY ACCEPTABLE BRANDS

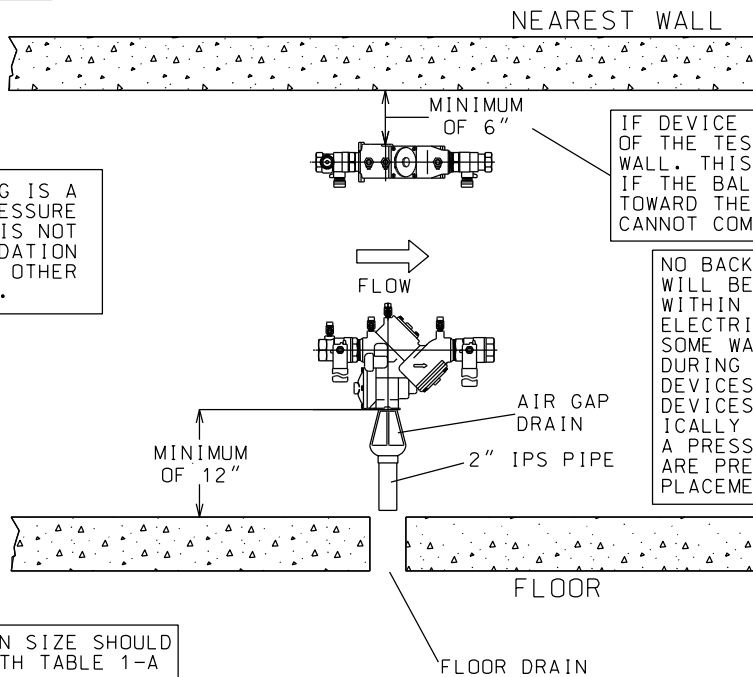


IF DEVICE IS INSTALLED WITH ANY OF THE TEST PORTS FACING THE NEAREST WALL. THIS DIMENSION BECOMES 6". IF THE BALL VALVE HANDLES SWING TOWARD THE NEAREST WALL, THEY CANNOT COME CLOSER THAN 2".

VALVES SHOWN IN THIS DETAIL ARE BALL VALVES. WHEEL VALVES MAY BE USED, PROVIDED THEY ARE THE MAKE AND MODEL LISTED BY THE MANUFACTURER AS PART OF THEIR APPROVAL PROCESS.

PLACEMENT SPECIFICATIONS FOR REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY, INSTALLED INSIDE OF BUILDING

THE DEVICE IN THIS DRAWING IS A 2" AIMES 4000B REDUCED PRESSURE PRINCIPLE ASSEMBLY. THIS IS NOT TO BE TAKEN AS A RECOMMENDATION OF THIS BRAND DEVICE OVER OTHER EQUALLY ACCEPTABLE BRANDS.



IF DEVICE IS INSTALLED WITHIN ANY OF THE TEST PORTS FACING THE NEAREST WALL. THIS DIMENSION BECOMES 8". IF THE BALL VALVE HANDLES SWING TOWARD THE NEAREST WALL, THEY CANNOT COME CLOSER THAN 2".

NO BACKFLOW PREVENTION DEVICE WILL BE INSTALLED ABOVE OR WITHIN 3 FT. Laterally, FROM ANY ELECTRICAL EQUIPMENT OR MOTORS. SOME WATER IS NORMALLY SPILLED DURING THE TEST OF THESE DEVICES, AND REDUCED PRESSURE DEVICES ARE DESIGNED TO PERIODICALLY "VENT" WATER TO MAINTAIN A PRESSURE ZONE. THESE CONDITIONS ARE PREVENTABLE WITH PROPER PLACEMENT

FLOOR DRAIN SIZE SHOULD CONFORM WITH TABLE 1-A

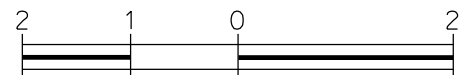


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

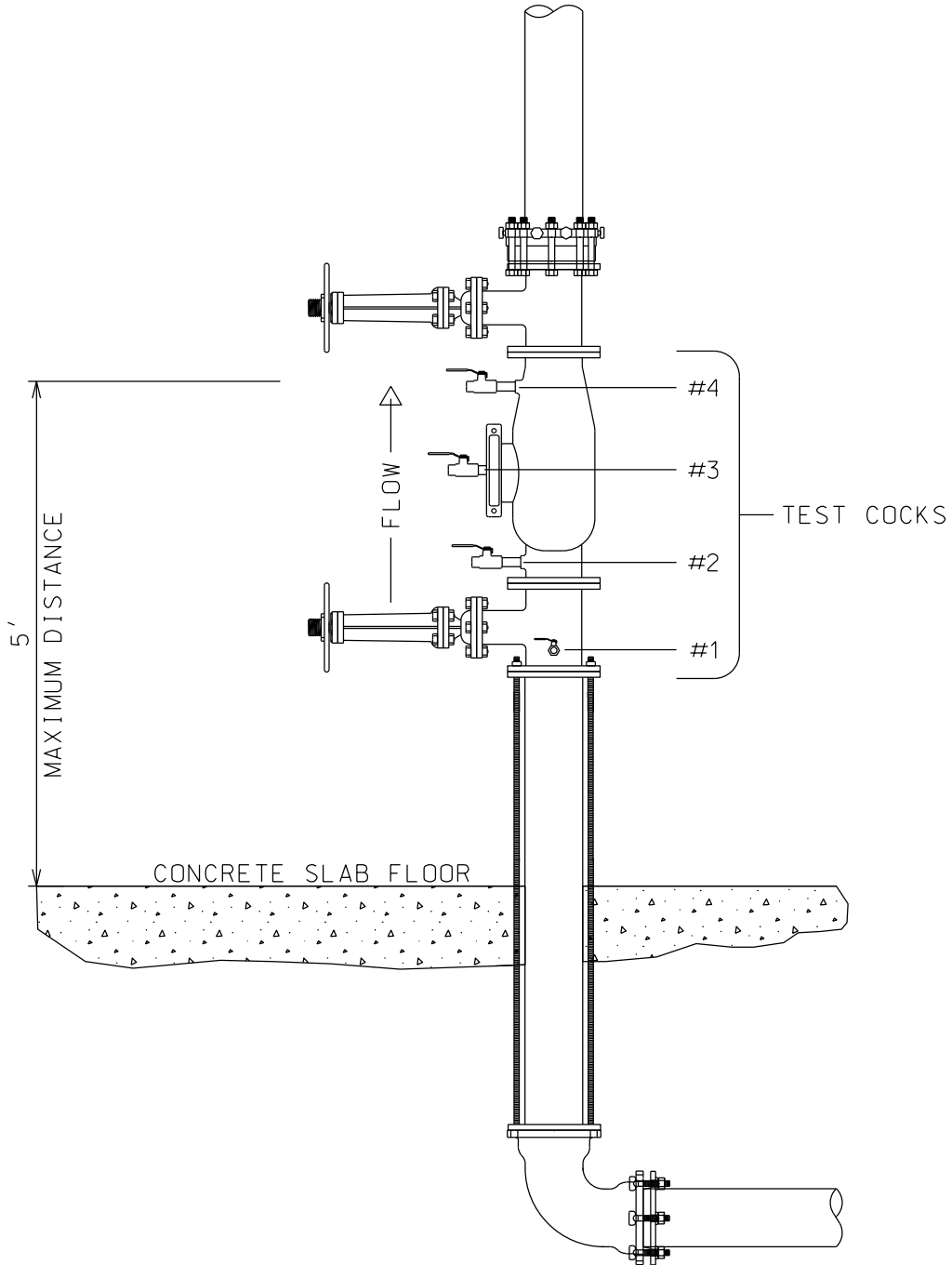
REVISED: _____

GRAPHIC SCALE



SPEC #: 23G

FIRE LINE RISER DETAIL # 1

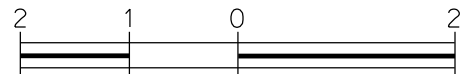


HUNTSVILLE UTILITIES
WATER DEPARTMENT
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

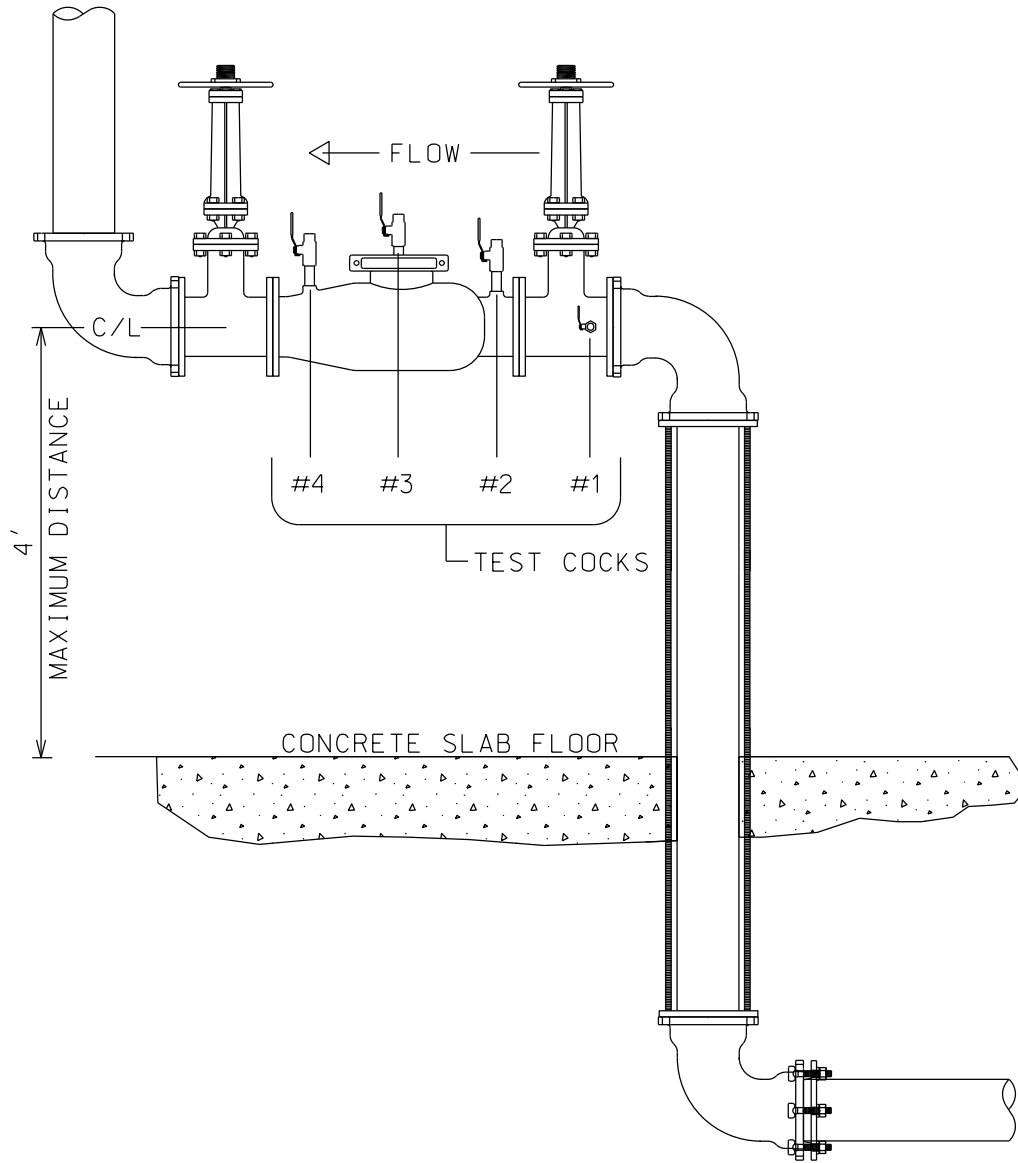
REVISED: _____

GRAPHIC SCALE



SPEC #: 23H

FIRE LINE RISER DETAIL # 2

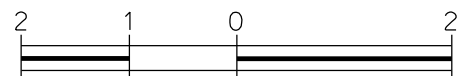


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

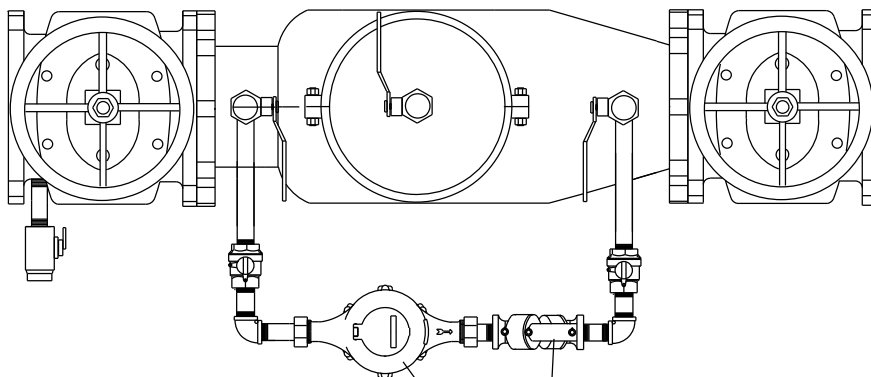
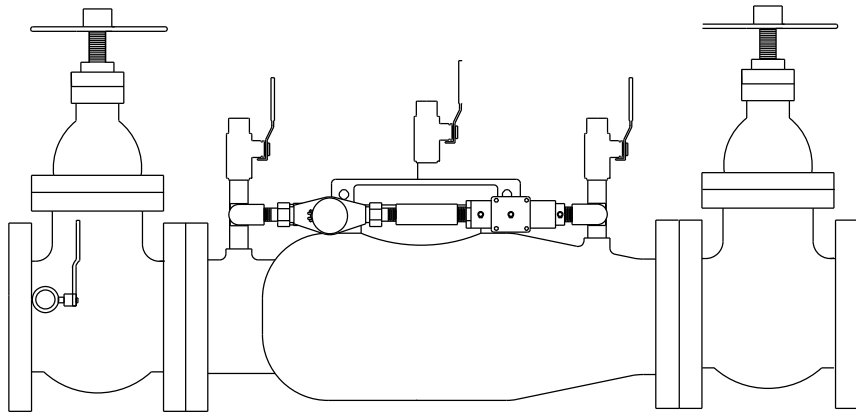
REVISED: _____

GRAPHIC SCALE



SPEC #: 231

DOUBLE CHECK DETECTOR CHECK DEVICE
W/ OS & Y VALVES DETAIL



LOW FLOW BYPASS LINE
3/4" METER AND 3/4"
DOUBLE CHECK ASSEMBLY

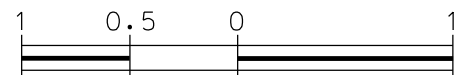


HUNTSVILLE UTILITIES
WATER DEPARTMENT
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: HG
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 1'

REVISED: _____

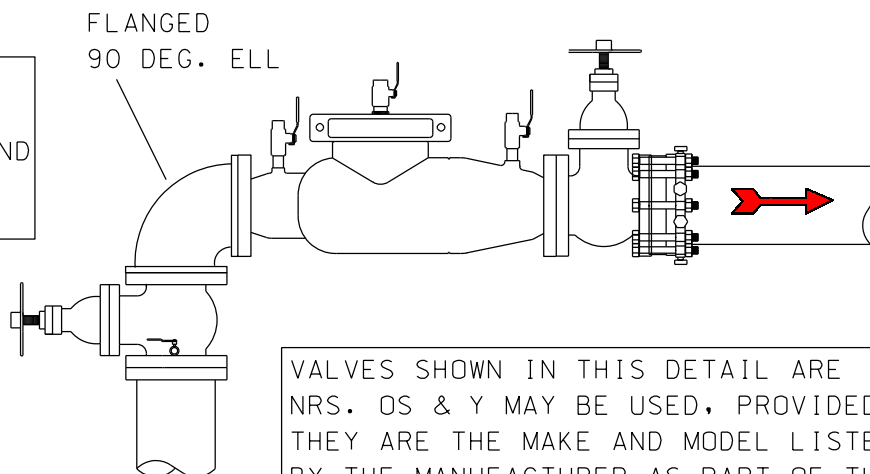
GRAPHIC SCALE



SPEC #: 23J

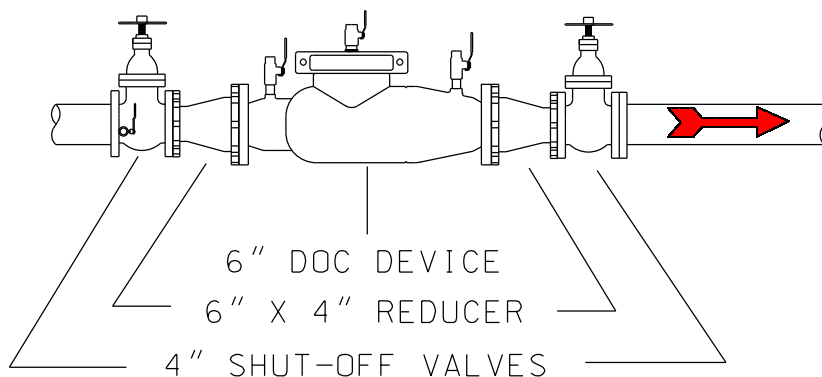
THE EXAMPLES BELOW ARE OF INCORRECT INSTALLATIONS OF BACKFLOW PREVENTION DEVICES

AN ADDITIONAL FITTING
HAS BEEN PLACED BETWEEN
THE #1 SHUT-OFF VALVE AND
THE MAIN BODY OF THE
BACKFLOW DEVICE.

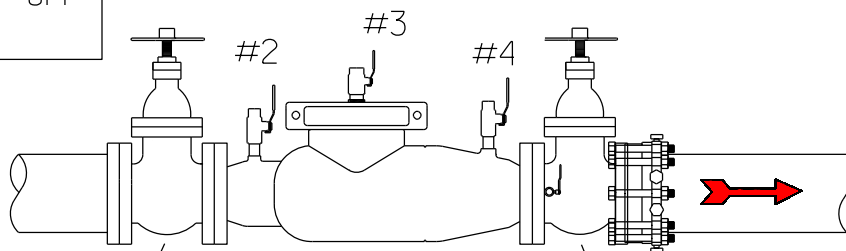


VALVES SHOWN IN THIS DETAIL ARE
NRS. OS & Y MAY BE USED, PROVIDED
THEY ARE THE MAKE AND MODEL LISTED
BY THE MANUFACTURER AS PART OF THEIR
APPROVAL PROCESS.

SMALLER SIZE SHUT-OFF VALVES
THAN THE SIZE OF THE BACKFLOW
DEVICE. THIS NORMALLY OCCURS
WHEN THE CONTRACTOR IS TRYING
TO SAVE MONEY ON THE OVERALL
COST OF THE DEVICE.



#1 AND #2 SHUT-OFF VALVES
HAVE BEEN SWITCHED. AS A
RESULT. THERE IS NO #1 TEST
PORT. WHILE THERE IS AN EXTRA
TEST PORT BEYOND #4 TEST PORT.
THIS NORMALLY OCCURS WHEN THE
DEVICE IS DELIVERED TO THE JOB
SITE WITH DEVICE AND SHUT-OFF
VALVES CRATED SEPERATELY.



SHUT-OFF VALVE
WITHOUT TEST PORT.
THIS IS THE VALVE
THAT #1 TEST PORT
SHOULD BE ON.

SHUT-OFF VALVE
WITH TEST PORT.

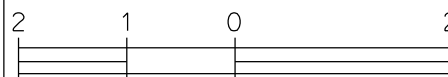


**HUNTSVILLE UTILITIES
WATER DEPARTMENT**
112 SPRAGINS ST
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: JY
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 2'

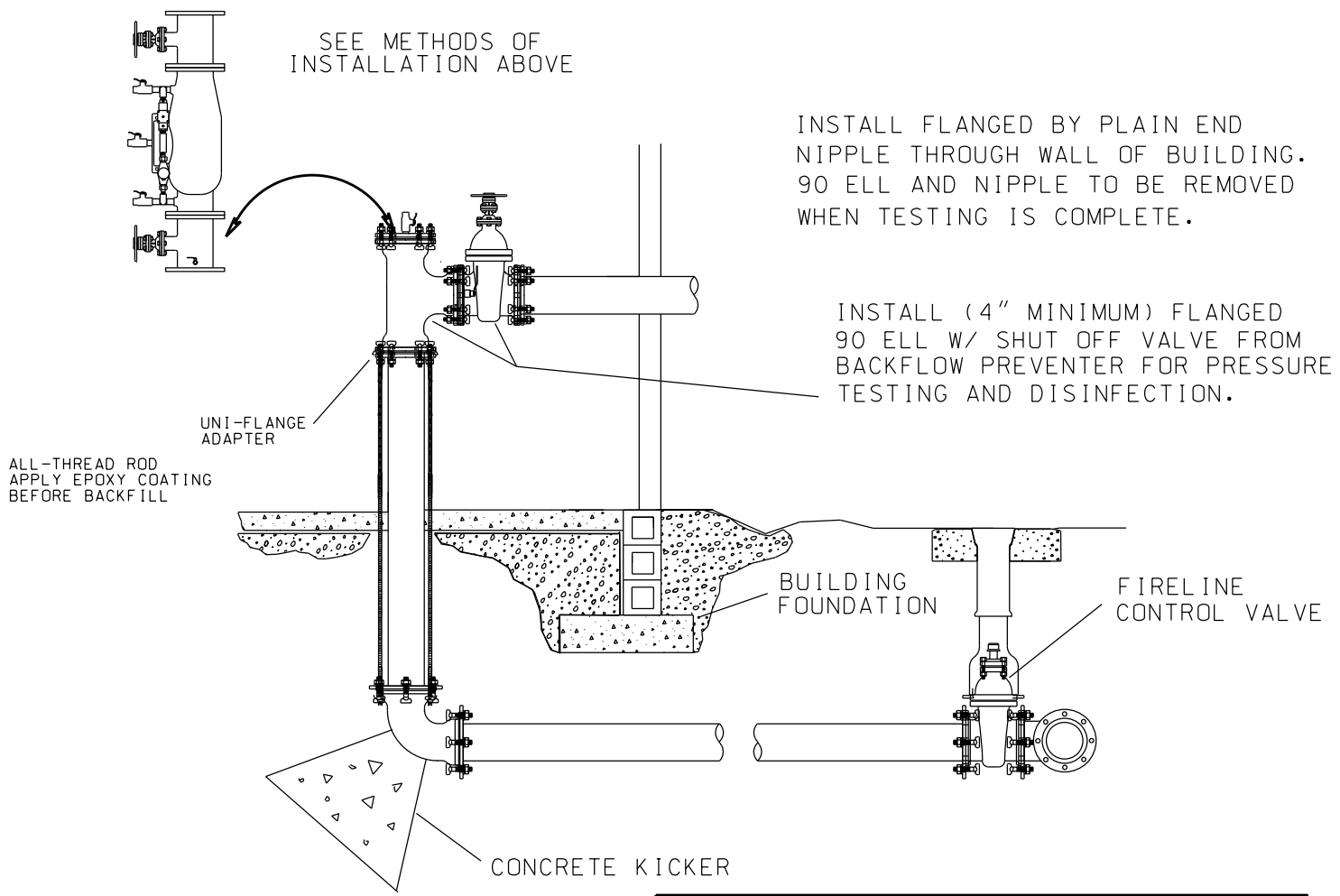
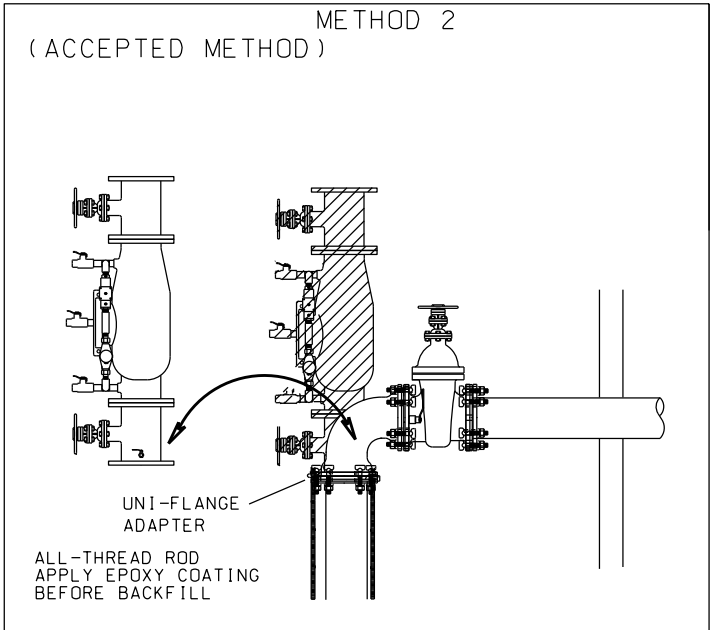
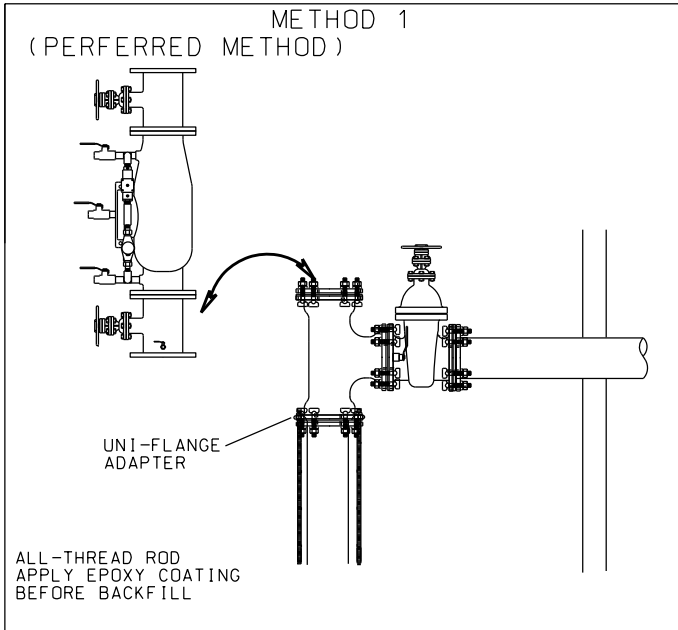
REVISED: _____

GRAPHIC SCALE



SPEC #: 23K

BACKFLOW TEST DETAIL



NOTE: TEMPORARY FLUSH POINT IS TO BE EXTENDED THROUGH OUTSIDE WALL OF THE BUILDING, IF PRESSURE TESTING AND DISINFECTION OF UNDERGROUND FIRELINE CANNOT BE COMPLETED BEFORE CONSTRUCTION OF THE WALL. FLUSHING ASSEMBLY CAN BE LEFT IN PLACE OR REMOVED, ONCE TESTING HAS BEEN COMPLETED.

PREFERRED METHOD

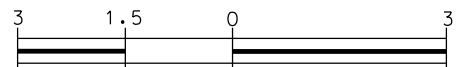


HUNTSVILLE UTILITIES
WATER DEPARTMENT
112 SPRAGINS STREET
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 3'

REVISED: _____

GRAPHIC SCALE



SPEC #: 23L

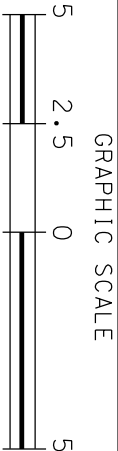


6" RPZ IN AN ABOVE GROUND VAULT (HOT BOX)

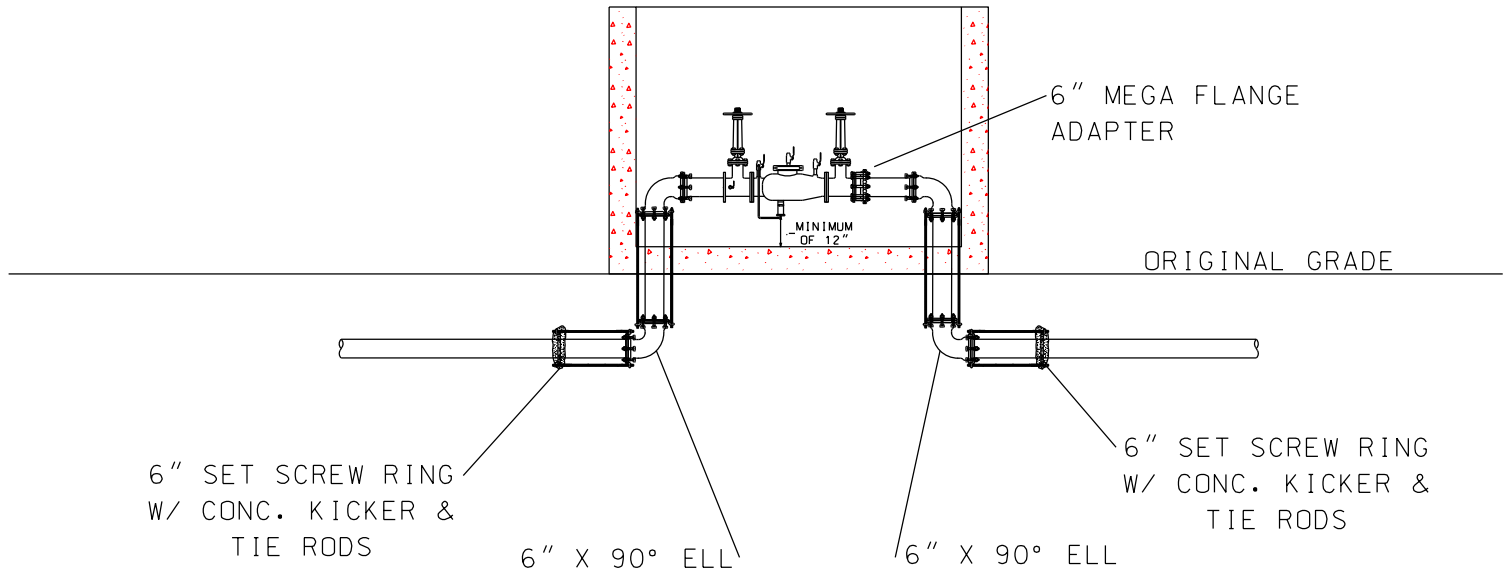
HUNTSVILLE UTILITIES
WATER DEPARTMENT
112 SPRAGINS ST.
HUNTSVILLE, AL 35801
(256) 535-1400

DRAWN BY: AW
CHECKED:
DATE: 4/20/2022
DRAWING NO.:
SCALE: 1" = 5'
REVISED:

SPEC #: 23M



SHOWN IS A 6" REDUCED PRESSURE PRINCIPLE ASSEMBLY WITH FLANGED FITTINGS AND OS&Y VALVES



* DRAIN PIPE FROM VAULT TO POSITIVE DRAINAGE POINT WILL BE SIZED TO ACCOMEDATE A FULL DUMP OF THE DEVICE, BUT IN NO CASE SMALLER THAN 2 TIMES THE DEVICE SIZE AND SHOULD BE DIRECTED TO A POINT WHERE NOTICEABLE VENTING WOULD BE REPORTED.