

OKEECHOBEE UTILITY AUTHORITY

MANUAL OF STANDARDS



MINIMUM STANDARDS FOR THE
DESIGN, CONSTRUCTION AND MAINTENANCE
OF WATER AND WASTEWATER SYSTEMS

October 2015

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STANDARD SPECIFICATIONS

SECTION 1 – GENERAL GUIDELINES

1. General

The Minimum Standards set forth in this document are intended to provide a basis for design and construction for those Utilities which come under the jurisdiction of the Okeechobee Utility Authority (OUA). Applicable Federal, State and local environmental laws and regulations should be considered concurrently with this text. Any variations from these standards are to be approved in advance by the Executive Director or the designated representative. Variations, in general, will not be approved unless requested in writing and are acceptable to the OUA. It is intended that the requirements of these standards shall be applicable in all cases where the facilities being constructed or to be constructed shall be owned and/or operated and maintained by the Okeechobee Utility Authority. These requirements shall also be applicable to those portions of the facilities which will lie within public rights-of-way of the Okeechobee Utility Authority, City of Okeechobee, Okeechobee County and Glades County, State of Florida.

The OUA assumes no responsibility for the design of improvements or for any material specified. Approval of the Plans and Specifications or use of the Minimum Standards does not relieve the Engineer of Record and/or Owner/Developer from his responsibility for providing a complete working system that does not adversely impact the operation of the existing system.

All referenced standards (AWWA, ANSI, ASTM, NSF, etc.) are the latest revisions thereof. The OUA assumes no responsibility for standards developed by outside agencies. Note that the OUA standards may not satisfy other agency requirements. Conflicts shall be deferred to the Executive Director in writing for resolution.

The OUA's responsibility for ownership, operation and maintenance of water mains or water service lines shall end at the meter or backflow prevention device. Hydrant mains and hydrants shall be owned by the OUA, unless stated otherwise. If the hydrant is located in the County, the owner/developer shall be responsible for securing appropriate approvals from Okeechobee County. Fire sprinkler mains shall be owned by the OUA up to the first valve. Proper easements and testing are required for all OUA-owned facilities as described below.

The OUA will not be responsible for maintaining sewer services within private property. The OUA will not operate, maintain or acquire ownership of any on-site wastewater facility that is not constructed to the OUA standards. Responsibility for these mains or lift stations will reside with the owner/developer. Ownership and maintenance of all facilities shall be at the discretion of the OUA.

It shall be the responsibility of the engineer of record to secure proper existing utility information, size facilities and prepare plans all in accordance with these minimum standards. The Executive Director may, at his option, apply more stringent standards where site specific conditions warrant. Copies of all design criteria and calculations shall be provided to the OUA.

All construction plans shall be reviewed and approved by the OUA. No changes shall be made on approved plans without specific OUA concurrence. The OUA will enforce the approved construction and specifications to a level equal to that of the minimum standards.

A preconstruction conference with OUA shall be conducted prior to any construction taking place. The preconstruction shall be scheduled with the Executive Director or his representative after all required permits have been obtained. Copies of all permits and two sets of construction plans shall be provided at the preconstruction conference.

While the OUA will make every effort to ascertain that the plans are in conformance with these standards, the right is reserved to enforce the minimum standards regardless. The OUA also reserves the right to review shop drawings. However, the OUA does not assume any of the obligations or responsibilities of the Engineer of Record.

1.2. Easements

Easements shall be of a sufficient width to guarantee that structures are not placed closer than 10 feet to a facility or main. In addition, the easement will allow unhindered access to all such facilities and mains. For easements adjacent and parallel to road right-of-ways, a minimum 10 feet wide easement shall be provided. A minimum 15 feet wide easement for water and 20 feet for sewer shall be provided for single lines in open areas. A 15 foot wide easement for water and 20 feet for sewer will be necessary for a line that runs down the side property line of a single family type dwelling, or through areas not typically accessible. A 30 foot wide easement will be necessary when multiple utilities (such as water and sewer) are placed parallel to each other. Wider easements may be required by the Executive Director when design conditions warrant. Easements shall be recorded by the owner/developer in a manner and at such time as directed by the OUA. Easements for lift stations shall be reviewed by the OUA and sized on a case by case basis.

All work performed under the auspices of the OUA Minimum Standards shall fully comply with any applicable Federal, State and Local Environmental Laws and Regulations.

1.3. Operation & Maintenance Manuals

The Engineer of Record shall supply to the OUA two (2) complete sets of operation and maintenance manuals for all electrical and mechanical components including pumps, motors, control circuits, radios, sensors, meters, wiring diagrams, etc. An Q&M manual must be provided for all lift station equipment and installed in the control panel (not part of the 2 sets to be supplied to the OUA).

1.4. Shop Drawings

Copies of all approved shop drawings shall be provided to the OUA after final action has been taken by the Contractor and the Engineer of Record and prior to the installation of the pertinent equipment or work. Separate shop drawings shall be submitted for water and wastewater. Where applicable, lift station record drawings shall also be provided separately. Shop drawings, at a minimum, shall include the applicable specification reference, submittal number, indication of review and acceptance by the Contractor and approval/acceptance by the Engineer of Record, along with the date of approval/acceptance. Two (2) copies of approved shop drawings will be retained by OUA.

As many additional copies as the Contractor wishes to have returned shall be submitted in addition to the OUA's two copies.

1.5. Other Agencies

The Engineer of Record is advised that approval of plans and specifications by the OUA is for water and wastewater systems only. Separate approvals for storm water systems; road repair/replacements; electrical work etc. is required from the appropriate office/agency.

1.6. Existing Facilities

All taps, tie-ins, etc. to existing facilities shall only be completed within the presence of a OUA representative. All connections shall be made in accordance with approved plans and specifications as issued by the OUA. Prior to making any wet tap, a pressure test shall be conducted of the tapping sleeve at a pressure of 150 psi for a minimum of 15 minutes prior to making the tap. The OUA shall be given sufficient notification of the scheduled test, so that a representative can observe the test if desired.

1.7. Manufacturers' Recommended Installation Procedures

All manufacturers' recommended installation procedures shall be adhered to strictly. The OUA will not accept any materials or equipment that have not be properly installed or for which the warranties or guarantees have been voided.

1.8. Inspections

A minimum of two business days (48 hours) notice shall be provided to the OUA for required or requested inspections. Any work that is carried out without providing the opportunity for the OUA to inspect may be rejected, or require removal, replacement or uncovering at the sole discretion of the OUA. No inspections conducted by the OUA shall be construed to substitute for or assume any responsibility of the Engineer of Record. Scheduled inspections outside of the normal OUA working hours (M-TH, 7:00 am to 5:30 pm, except holidays) may be accommodated; however, the owner/developer shall reimburse the OUA for personnel required, at 1-1/2 times the normal hourly rate.

1.9 Purchase of Water Meters and Backflow Prevention Devices

Meters and backflow prevention devices shall be purchased from and may be installed by OUA, and shall become the property of the OUA upon installation and acceptance.

1.10 Construction Jumper Meters

Construction Jumper Meters shall be obtained from the OUA associated with a deposit and a monthly fee for usage of water during construction.

SECTION 2 -BASIS OF DESIGN -GENERAL GUIDELINES

Design of all facilities that will be owned or operated by the OUA shall be carried out using the State lane Coordinates, North American Datum of 1983 as the horizontal control. Vertical control shall be based upon the North American Vertical Datum of 1988.

The Design Engineer/Engineer of Record shall apply the following guidelines and submittal criteria for plans submission to the OUA:

- 2.1. Three sets (3) sets of plans and specifications shall be submitted to the OUA. Two sets shall be on 24" x 36" sheets and one set on 11" x 17". Specifications shall be on 8-1/2" x 11" sheets. Specification sheets shall be bound. Use an appropriate scale no smaller than 1" = 50', unless a smaller scale is warranted and approved by the OUA in advance of plan submittal. The scales used shall be same as on a standard engineer's scale. Vertical Profile shall be in a scale of the Plan Horizontal Scale divided by 10.
- 2.2. Submit two (2) sets of paving and drainage plans, preliminary plat showing easements and dedication language, master plan layout for multi-phase project (if applicable), cover sheet with relevant location map, lift station calculations with buoyancy and pump calculations, fire flow calculations, sewer calculations, restraint calculations, applicable D.E.P. permit application forms with attachments if applicable (four (4) copies of each application with original signatures are required).
- 2.3. Show clearly phase lines and match lines as appropriate.
- 2.4. Use standard OUA details.
- 2.5. Provide all applicable detail drawings.
- 2.6. Avoid placing water mains under storm drains, drainage ditches or sewers, if possible.
- 2.7. Call out conflicts with existing utilities, with indicating "over" or "under" on plan sheet.
- 2.8. Profiles are required for all gravity and vacuum sewer mains (show all crossings).
- 2.9. Place gravity sewer data, including manhole invert, rim elevations, and distance between manholes on profile sheets only.
- 2.10. Avoid placing piping outside of road right-of-way areas. Easements are required for all facilities which fall outside of road right-of-ways.
- 2.11. Avoid placing manholes and sewer mains out of pavement areas. Concrete collar required around manholes outside of pavement.
- 2.12. Specifically address meter and service line requirements, and provide supporting calculations and historical data, if applicable. The OUA will use the AWWA Publication, M22 "Sizing Water Service Lines and Meters" as a guideline for establishing meter and service line sizes.
- 2.13. Carefully check specifications to establish that the OUA standards are met. Approved plans will be enforced.
- 2.14. Specify details for all connections to existing facilities.
- 2.15. Provide all hydraulic calculations with lift station submittal.

- 2.16. All drawings submitted shall be neat and legible and shall conform to acceptable standards of drafting. Note all revisions in the revision block.
- 2.17. A Florida Registered Professional Engineer in the appropriate discipline shall sign and seal each set of plans submitted along with supporting calculations and applicable permit applications.
- 2.18. All material specified to be installed shall be new and unused except as approved by the OUA.
- 2.19. Water mains shall be extended across the full width of the property frontage.
- 2.20. Where practicable, sewer service laterals shall be connected to manholes.
- 2.21. Sewer laterals shall have a cleanout at the property line with a 2'x2'x4" concrete pad with an inverted plug, both to be set at final grade.
- 2.22. Engineer of Record shall prepare record drawings from measurements made by a registered land surveyor, and submit signed and sealed drawings prior to acceptance of the project by the OUA.
- 2.23. Water and wastewater may be required on separate sheets.

SECTION 3 – BASIS OF DESIGN – WATER SYSTEMS

The basis of design potable water systems shall be as delineated below, and in accordance with the standard, requirement and recommendations of the following, whichever is more stringent.

- a. Florida Administrative Code, FAC 62-555
- b. Great Lakes Upper Mississippi Basin Recommended Standards for Water Works (Ten States Standards)
- c. American Water Works Association

There shall be no physical connection between a potable water supply and a water supply which would allow unsafe (contaminated) water to enter the potable water system by direct pressure, vacuum, gravity or any other means. All potable water services around sewage pumping facilities shall be provided with an approved reduced pressure backflow-prevention device.

Hydraulic designs shall be based upon pressure data applicable to the portion of the service area which will serve the proposed facility. Air release valves in vaults shall be provided at all local high points in the water main as required by the Executive Director.

Design standards for water mains are as follows:

3.1. Cover

3.1.1. Minimum cover to finished grade over water mains shall be 30 inches except under asphalt roads where the minimum cover shall be 36 inches.

Minimum cover in state roads shall be in accordance with FOOT requirements.

3.1.2. Maximum cover to finished grade over water mains shall be 42 inches unless otherwise approved by the OUA.

3.2. Horizontal Separation

3.2.1. Minimum horizontal separation between potable water lines and other utilities shall be as set forth in FAC 62-555.314, latest revision.

3.2.2. A minimum of 15 feet to buildings, top of bank of lakes and canals and other structures shall be maintained (10 feet absolute minimum -only when unavoidable, and pipe material is required to be DIP).

3.3. Vertical Separation

3.3.1. Minimum vertical separation between potable water lines and other utilities shall be as set forth in FAC 62-555.314

3.4. Layout

3.4.1. Permanent dead ends will not be accepted unless unavoidable and then only with the approval of the OUA. Dead ends, if accepted by the OUA, shall be equipped with a blow-off for flushing purposes.

3.4.2. All water mains shall be placed in right-of-way areas or dedicated easements.

3.5. Water Main Material

Water mains shall be either ductile iron pipe (DIP), polyvinyl chloride (PVC) or high density polyethylene (HDPE) as outlined below.

DIP shall be centrifugally cast and shall conform to AWWA C151/ANSI A21.51. PVC pipe 4-inch to 12-inch diameter shall conform to AWWA C900. PVC pipe 14-inch to 36-inch diameter shall conform to AWWA C905.

For water mains 12-inch diameter or smaller, Ductile Iron Pipe Pressure Class 350 or higher or Polyvinyl Chloride C900 DR 18 or thicker shall be allowed. Pipe larger than 12-inch diameter shall be DIP Pressure Class 250 for 14-inch through 20-inch, Pressure Class 200 or higher for 24-inch and Pressure Class 150 for all larger diameter. PVC larger than 12-inch diameter shall be C905 DR 21, or thicker. Restrained joint DIP up to and including 12-inches diameter shall be Pressure Class 350. Larger than 12-inches diameter restrained pipe shall be as recommended by the restraint manufacturer. Flanged pipe shall be DIP Special Class 53 or higher. Flanged DIP shall have threaded ductile iron fittings and shall conform to the requirements of AWWA C115. All flanges shall be Ductile Iron Class 150, ANSI B 16.5. Flanges shall be flat faced and all joints shall use 1 18-inch black neoprene full faced gaskets. Pipe classes shall be determined based upon the installation and the use intended. Pipe classes shall be appropriately labeled on the drawings.

All PVC pipe for potable water service shall be C 900, Class 150 minimum (DR-18) and bear the approved stamp of the National Sanitation Foundation (NSF). PVC pipe for water main applications shall be color coded blue for water and marked with blue metallic marker tape at least 4 inches wide and not more than 18-inches below finish grade. DIP shall be spiral wrapped with blue marking tape, not more than 18-inches on center. All exposed (above grade) potable water piping (DIP only) shall be color coded Tnemec Safety Blue. All fittings and change in direction shall be marked with a blue locator ball (3M or equal).

Ductile iron pipe and fittings shall be cement lined in accordance with AWWA C104. Mechanical joint ductile iron glands shall be ductile iron. Tee bolts and nuts shall be Cor-Ten steel.

Rubber-ring gaskets shall be suitable for the specified pipe sizes. Rubber-gasket joints shall conform to AWWA C111, and gaskets shall be furnished by the pipe manufacturer with the pipe. A nontoxic vegetable soap lubricant shall be supplied with the pipe in sufficient quantities for installing the pipe. The lubricant shall be approved by NSF for use with potable water mains.

3.5.1. DIP shall be required in the following circumstances:

3.5.1.1. Within 10 feet of all sanitary lines (including gravity sewers, vacuum sewers, pressure sewers, reclaimed water lines, on-site sewage disposal systems) and storm pipes, unless specifically exempted by the Executive Director in accordance with the exception provisions set forth in FAC 62-555.314.

3.5.1.2. Within 15 feet of structures, canals or lakes.

3.5.1.3. Crossings over or under sewers, gas and storm pipes with less than 18

inches separation, with no joint allowed within 8 feet of crossing.

3.5.2. The Executive Director may mandate DIP in any instances of off-site or on-site construction where future abuse to the line is possible due to location or circumstances, extensive length under pavement, or in private property away from right-of-way areas.

3.5.3. Restrained Gaskets for DIP as follows: For 4-inch through 24- 350 shall be U.S. Pipe Field Lok – 350 gasket, American Ductile Iron Pipe fast grip joint or an equivalent product.

The restraint method shall be suitable for the pipe size thickness and test pressure as required for the specific design case. The plans shall indicate the restrained length of pipe each side of the fittings, similar to the charts listed in the Authority's standard details. The standard details refer to a specific set of conditions and the Engineer shall calculate required restrained lengths based upon the specific conditions of each project.

3.5.4. Jack and Bore Installations: Casing pipe used with jack and bores shall be in accordance with requirements of Florida Department of Transportation (FOOT) or railway specifications if applicable. Carrier pipe shall be restrained joint DIP or PVC, as outlined in paragraph 3.5.3 and shall be installed with pipe casing spacers in accordance with the standard details.

3.5.5. Horizontal Directional Drill: Horizontal directional drills (4 inches and larger) where required shall be made with HOPE, SDR 11, conforming to AWWA C906, DIP size. Nominal size shall be shown on the plans (inside diameter). Inside diameter of the H.D.P.E. needs to match the 10 of the existing or proposed line. Outside diameter is generally 1 to 2 inches larger than nominal. Pipe shall be marked by co-extruding multiple equally spaced blue color stripes of the same material as the pipe, or by solid blue colored pipe. HOPE Fittings shall be provided by the pipe manufacturer. Mechanical connections of HOPE to PVC or DIP shall be of the same SDR rating as the pipe. Pipe and fittings may be joined by approved electrofusion couplings meeting ASTM F1055. Two, 10-gauge (AWG) electronic locator wires shall be installed on the directional drilled pipe and shall be brought to grade within a valve box or a locate station box at all entry and exit point locations. No splices or connections shall be allowed underground. The contractor shall run a continuity test in the presence of the OUA prior to final approval. Drilling fluids shall be bentonite slurry only.

3.5.6. Mains may be tapped as long as the tapping line is smaller than the tapped line unless otherwise approved by the OUA. See Section 3.9 for service tap requirements. Equal size line taps not approved by the OUA shall require that a tee be cut into the main. Tees are also required at locations dictated by the Executive Director. Tapped connections in pipe and fittings shall be made in such a manner as to provide a watertight joint and adequate strength against pull-out.

Tapping Sleeves and Valves shall be iron, mechanical joint, or wrap-around type of stainless steel, or epoxy coated steel. Tapping sleeves and valves are required for all taps 4-inches and greater. Taps less than 4-inches shall be provided with a

service saddle. Valves shall be provided on all taps. Tapping sleeves shall be a minimum of 6 feet from pipe joints.

- 3.5.7. Galvanized steel, PVC or PE piping shall only be used as sleeves for the installation of service line tubing under pavement areas. Use of galvanized pipe in the water distribution system in other areas is not acceptable.
- 3.5.8. Where transitions from DIP to PVC are allowed, material for transition shall be indicated and specified.
- 3.5.9. All construction material shall be first quality, not previously used. Repair clamps are not acceptable. Damaged or faulty pipe and materials must be properly replaced. All gaskets shall be new. When connecting to existing valves or fittings, gaskets shall be replaced, not reused.
- 3.5.10. Polyethylene wrap shall be used in all locations subject to corrosive conditions. Locations shall be indicated on the drawings. Wrap shall be 8 mil polyethylene and shall be installed in accordance with ANSI/AWWA C105/A 21.5, Method A. Material shall meet the requirements of ASTM D-1248-latest revision. Wrap for potable water lines shall be blue in color.
- 3.5.11. The Engineer shall provide two complete sets of shop drawings which shall indicate the OUA's specific material requirements. At a minimum, shop drawings shall include all the information listed in paragraph 1.4. In general, material requirements will be guided by the latest revisions of the specifications of AWWA, ANSI, ASTM, and NSF.
- 3.5.12. Only items from the OUA approved product list shall be used. Items for which no approved list is provided shall require prior written approval from OUA. Engineer of Record, shall provide sufficient information to enable the OUA to make a determination of acceptance.

3.6. Water Main Size

The minimum size of water main where fire protection is required shall be 6 inches. The engineer shall be required to demonstrate the adequacy of such sizing. All water main sizes must be approved by the Executive Director.

The new water main shall have the ability to meet maximum daily demands plus fire flow requirements as mandated by DEP and the Appropriate Fire Marshall. The residual design pressure under all conditions shall not be less than 20 psi.

3.7. Valves, Fittings and Appurtenances

Valving of all water distribution systems shall be designed to facilitate the isolation of each section of pipeline between intersections of the network. Generally, the number of valves at an intersection shall be one less than the number of pipes forming the intersection. Gate valves, 12 inches and less, shall be the resilient seat type conforming to AWWA C515. All 12" valves shall be either butterfly or resilient seated gate valves as determined by the design engineer and the OUA. Wafer valves shall not be accepted. Valves shall generally be installed at intervals of not more than 1,000 LF on transmission mains, at

intervals of not more than 500 LF on main distribution loops and feeders, and on all primary branches connected to these mains. In high density areas, valves shall be installed as required by the Executive Director to minimize the number of persons affected by a break.

The Executive Director shall determine which mains are distribution or transmission. Valves shall turn counterclockwise to open. Valves shall be provided with valve stem extensions to within 18-inches of ground surface, where centerline of pipe to grade is greater than four feet.

All valves, bends, tees, crosses and dead ends shall be restrained by a mechanical restraints system as outlined in Paragraph 3.5.3. Calculations for restrained joints shall be provided by the design engineer. In-line valves shall be treated as plugs in carrying out the calculations for mechanical restraints. Concrete thrust blocks shall be allowed only on existing lines and when approved by the Executive Director.

All materials, fittings and appurtenances intended for use in pressure pipe systems shall be designed and constructed for a minimum working pressure of 150 psi unless the specific application dictates a higher working pressure requirement.

Standard pressure pipe fittings of sizes 3-inch 10 and larger shall be ductile iron conforming to AWWA C 153, with mechanical joints unless flanged or restrained joints are required. Gray cast iron fittings are not allowed. Ductile iron fittings shall be cement lined in accordance with AWWA C104. Mechanical joint fittings, 24-inches and smaller shall be rated for 350 psi working pressure. Flanged joint fittings 24-inches and smaller shall be rated for 250 psi working pressure. All fittings 30-inches and larger shall be rated for 250 psi working pressure. For sizes less than 3-inch 10, fittings shall be suitable to the pipe material and application. Glands for mechanical joint fittings shall be ductile iron, and tee bolts and nuts shall be Cor-Ten steel. Only bolt systems furnished by the manufacturer for mechanical joints are acceptable; nuts and bolts shall be new, not reused. Pipe gaskets shall be new as supplied by the pipe manufacturer. All flanges shall be ductile iron Class 150, ANSI B16.5. All flanges shall be flat faced. Full face, 1/8" black neoprene gaskets shall be used on all flanged joints. All joints shall conform to AWWA C111. Bolts, nuts and washers for flanges shall be hot dip galvanized, except T-bolts shall be Cor-Ten steel.

3.8. Fire Hydrants

Fire hydrants shall be provided at no expense to OUA in all water mains, transmission and water distribution systems as required by OUA. Fire hydrants shall be spaced such that the maximum distance for protection will not be more than 1000 feet lineal feet between fire hydrants. The appropriate Fire Marshall shall make recommendations on all hydrant and fire sprinkler line locations during plan review.

Each new hydrant and water main shall be capable of delivering a flow of at least 500 gallons per minute with a residual design pressure of not less than 20 psi.

Fire hydrants shall be of the non-draining dry barrel break-away type conforming to AWWA C502, with two 2-1/2 inch threaded hose nozzles and one 4-1/2 inch threaded pumper nozzle.

All hydrants shall be painted safety yellow.

Hydrants shall have a minimum 5-1/4 inch interior valve opening and be restrained from hydrant to the tee at the main. Restraint by use of "all-thread" rods shall not be allowed. At the discretion of the Executive Director, additional protection for fire hydrants shall be provided including but not limited to concrete filled ductile iron traffic posts. Fire hydrant branches (from main to hydrant) shall be a minimum of 6 inches inside diameter. Each branch shall be provided with a resilient seat gate valve located as close as possible to the main. Hydrants shall be located near road lines with pumper discharge nozzle facing roadway. Hydrants shall be laid to minimize their vulnerability to traffic. The pumper nozzle shall be installed at a minimum of 18-inches and a maximum of 24-inches from center line of the nozzle to surrounding finish grade.

3.9. Water Service Lines and Taps

No direct service taps shall be allowed. Only double strap or wide stainless steel saddles shall be used. Saddles shall be epoxy coated or brass with CC or I.P. thread pattern and material as required by the OUA.

Water service taps on the main shall be spaced at a minimum distance of 18 inches apart and a minimum of 18-inches from a bell or fitting. Consecutive taps shall be offset 45 degrees. All service line taps shall be supplied with corporation stops. Angle meter valves must be installed for each service. All service lines shall be installed in accordance with the construction details of this manual. Service line tubing shall be polyethylene PE 4710 material 250 psi, blue in color and conforming with AWWA C901, SDR 9. Tubing shall be installed in a continuous length with no in-line fittings except for V's for multi meters between corporation stop and angle stop. Tubing shall be routed through a 2-inch PVC sleeve, galvanized steel or polyethylene for services under pavement. Minimum size for single services shall be 3/4-inch. Minimum size for double services shall be 1 inch to the V-branch and 3/4-inch for each service from the V-branch.

Services shall not exceed 100 feet from the main to the meter.

A line valve within 12 inches of the meter shall be required on the building side of the meter in an easily-accessible location for use by the building tenant.

3.10. Meter Installation

Construction plans shall include a typical meter installation for each size meter to be installed as outlined in the OUA's Standard Details. Each unit within a residential building (i.e., duplex, triplex, etc.) shall have a separate meter, unless prior approval is received by the Executive Director. The proper sizing of service lines is the responsibility of the design engineer. Meters will be available in the following sizes only: 5/8X 3/4, 1, 1-1/2, 2, 3, 4-inch, and larger standard sizes as necessary.

Meters 1-inch and smaller shall be installed below grade in meter boxes. All meters 1-1/2 inches and above will require above grade type meter installations as outlined in the OUA's Standard Details. The OUA reserves the right to request historical data for meter sizing.

The OUA assumes no responsibility for undersized meters and problems associated with it. All meters shall be purchased from, and installed by, the OUA. The meters remain the property of the OUA.

Meters should generally be placed in the right of way at the side property line. In developments where the property line is not clearly defined (condominiums) the meter should be placed for ready access as approved by the OUA. Meters shall not be placed in areas that can be fenced, such as backyards. Meter boxes shall be kept out of pedestrian walkways and out of driveway areas. For shopping centers, the developer's engineer should give special consideration to meter layout so as to satisfy these requirements. Meters and backflow prevention devices shall not be installed any closer than 5-feet from any entrance or driveway.

3.11. Backflow Prevention Devices

Backflow prevention devices shall be installed, as required by the Executive Director and as set forth in these Standards. All irrigation systems, water services for industrial/office/commercial, Schools, mobile home parks, multi-family residences, lift stations and any other locations as determined by the Executive Director shall require testable, reduced pressure backflow prevention assemblies, as a minimum level of protection. Single family residences shall be provided with dual check valves, which will be installed by the OUA. All fire lines shall have a double detector check valve with a by-pass meter and appurtenance as outlined in the OUA's Standard Details.

Backflow prevention device assemblies shall be provided with all necessary parts and accessories for a complete operable installation. Assemblies shall be the latest approved product of a manufacturer regularly engaged in the production of equipment of this type. All assemblies shall be as approved by the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California. All assemblies shall be permanently labeled with the following information:

- A. Type of Assembly (Reduced Pressure, Double Check Valve, etc.)
- B. Name or Trademark
- C. Size
- D. Model Number
- E. Direction of Flow (shown by an arrow)
- F. Unit Serial Number
- G. Rated Working Water Pressure (RWWP)
- H. Rated Working Water Temperature (RWWT)

Type and size of assemblies shall be indicated on the drawings.

Backflow prevention device ownership and maintenance responsibilities are set forth in Section of the OUA Resolution 95-10 and 95-9 and future amendments.

The OUA requires the inspection and testing of each above ground Backflow Prevention Device at initial installation and at least annually thereafter. The testing shall be conducted under the supervision of a Certified Tester of Backflow Devices. Results of the tests conducted by a certified tester not employed by the OUA shall be furnished to the OUA immediately after testing.

3.12. System Pressures

The design engineer shall not assume a pressure greater than 35 psi at the meter or detector check valve without confirmation from the OUA. The OUA does not guarantee or warrant any pressure or flow above what the system can furnish. The OUA reserves the right to limit water usage for irrigation in the event of drought, or requirement by DEP or SFWMD (South Florida Water Management District).

3.13. Fire Lines

OUA will provide service for fire lines up to the first valve prior to backflow device. OUA responsibility for fire lines ends at this point. Refer to the Standard Details for illustration.

SECTION 4 -CONSTRUCTION SPECIFICATIONS FOR WATER SYSTEMS

4.1. Installation

Installation of water mains and associated appurtenance shall be in accordance with current AWWA specifications and manufacturer's requirements for their particular products. Loading or unloading and storage of pipe, fittings, valves, etc., shall be done in such a manner so as to avoid damage. The interior of all pipe, fittings, valves, etc., shall be kept free of dirt and foreign matter at all times. All piping shall be placed in a dry trench. All mains shall have a minimum of 30 inches (36 inches under roads and state roads) and maximum of 42 inches of cover to finished grade except where otherwise approved by the OUA. Concrete thrust blocks will be permitted only on existing lines and only with the approval of the Executive Director. Mechanical restraint systems shall be required at each fitting involving a change of direction and as specified in plan details. Concrete gravity blocks will be allowed where required. At all gravity blocks visqueen protection of bolts shall be provided. Calculations shall be provided for restrained joints.

All pipe shall be laid in trenches having a dry and stable bottom. Backfill shall be free of boulders and debris. Pipe shall be fully supported along its entire length. Sharp or rocky material encountered in the base shall be replaced with proper bedding. Pipe shall be laid on line and grade as designed. Pipe joints, gravity blocks, conflicts and service connections shall be left exposed until visually inspected and approved by an OUA inspector.

Metallic backed indicator tape at least 4 inches wide shall be installed over all PVC mains at 18inches below grade. The color shall be blue. A locator ball shall also be placed at each fitting and change in direction of the pipe.

Fire hydrants shall be installed true and plumb with the center of the pumper nozzle a minimum of 18 inches above finished grade. Hydrants shall not be placed in sidewalks. It shall be the responsibility of the developer and contractor to move hydrants placed in the sidewalk.

All valves shall be placed according to plan unless movement is mutually agreed to. All valve stems shall be installed plumb. Valve stem extensions are required as described in Section 3.7. Air relief valves shall be installed at all high points in the pipeline where air can collect as shown on approved plans or as directed by the OUA. Record drawings shall reflect the proper location of all mains, hydrants, services, valves and appurtenance. All taps must be at least 18 inches from a fitting or bell.

All road and railroad crossings and pavement cuttings shall be in accordance with the requirements of the particular authority governing the area.

4.2. Connection to Existing Systems

All connections to existing mains shall be made under the direct supervision of the OUA. Valves on existing mains shall be operated by or under the direct supervision of OUA personnel. Tapping sleeves and valves shall be pressure tested at 150 psi for a minimum duration of 15 minutes prior to tapping. If service must be cut-off to existing customers, the OUA must have three business days' notice to make necessary notifications. The contractor or developer may be required to assist in notifications. If service must be cut off,

the contractor shall be ready to proceed with as much material preassembled as possible at the site to minimize the length of service interruption. The OUA will postpone a service cut-off if, in the opinion of the Executive Director, the contractor is not ready to proceed on Schedule. Such connections may be required to be made at night to minimize effects.

No customer should be without water service for more than four hours. The Developer or Owner shall provide temporary services to Customers who may be without permanent service for over four hours.

Local chlorination will be required for all pipe and fittings used to complete connections with the potable water system. Tapping sleeves and valves shall be chlorinated in accordance with the requirements of AWWA. All wet taps shall be witnessed by the OUA inspector. The pipe coupon shall be preserved and submitted to the OUA inspector.

4.3. Cleaning and Flushing

Foreign material shall be kept out of all pipe or cleaned from the pipe prior to installation. Upon completion of installation, the mains shall be flushed and the water disposed of without creating a nuisance. Flushing must achieve a minimum water velocity of 2.5 feet per second in all portions of the pipe. The duration of the flushing shall be as directed by the OUA. Cannon flushing may be required at the sole discretion of the Executive Director. Temporary fittings, pipe, etc., to allow cannon flushing shall be provided at no cost to the OUA. No flushing shall take place without a OUA representative present.

The existing mains that the new mains are connected to may be required to be flushed under the direction of the OUA when service is restored.

Pigging of lines is an acceptable method of cleaning lines.

4.4. Testing

Contractor and developer shall provide all equipment (including a pressure gauge acceptable to OUA) and materials and labor necessary for pressure and leakage testing, along with fittings and valves for insertion of an OUA pressure gauge. All mains and services shall be tested for leakage. Water shall be supplied to the main at the expense of the developer and contractor and pumped to the required pressure of 150 psi. OUA will provide water at no charge for the first initial cannon flush; all other water for filling, flushing, testing, bacteas, etc. will be billed thru Construction Jumper meter to Contractor/Developer. The main tested shall either be isolated from active potable lines or protected from leakage by a double valve arrangement. All water utilized for the pressure and leakage test shall be potable water with adequate chlorine residual.

Water mains shall be tested by valve sections, based upon the maximum spacing of valves as required in Section 3.7, the maximum length of line to be tested in a single test will be 1,000 feet. However, where approved by the Executive Director a greater length of line may be tested, but the allowable leakage will be only that which is allowed for 1,000 feet. The maximum allowable leakage shall be as determined in accordance with the current AWWA leakage specifications. The standard test length is two hours. Testing procedures shall meet or exceed AWWA C600. The contractor shall successfully complete a pretest prior to scheduling the pressure and leakage test with the OUA. Test

results cannot vary more than 5 psi from the test pressure of 150 psi. The pressure and leakage test must be observed by an OUA representative and the design engineer. The contractor shall replace or adjust components of the pipeline which fail the test. The pipeline shall then be tested as described above until it passes the test criteria. The pressure and leakage test shall be done concurrently. Any pressure that has a pressure loss of 5 psi or more shall be considered as failing. Contractor will be billed for any testing and any water used to retest the lines after the first failure.

Bacteriological testing shall not begin until after the pressure leakage test, flushing and record drawings have been accepted by the OUA.

4.5. Disinfection

Contractor and developer shall provide all equipment and materials necessary for disinfection. All mains shall be disinfected and DEP/Health Department regulations. Bacteriological samples shall be taken from all sections of the main via standard sampling tap assemblies, and sent to an HRS-approved laboratory for analysis. Clearance is required from the DEP/Health Department before the OUA will allow the main to be put into service. Sampling taps and testing chlorinated water used for disinfection shall be flushed to a location that will not damage adjacent property, persons, etc., and shall be provided by the contractor and developer at no cost to the OUA.

All Bacteriological samples collected from a water main shall be done by a Certified Lab employee or in the presence of an OUA Employee. There will be no exceptions.

4.6. Shop Drawings

Shop drawings for all materials and equipment shall be reviewed and approved by the Engineer of Record before the start of construction. Two copies of the approved shop drawings shall be submitted to the OUA and an approved copy shall be kept on the construction site.

4.7. Restoration

Restoration of all areas impacted by the construction shall be restored in timely fashion, to a condition as good as or better than when construction commenced. For grassed and landscaped areas, replacement shall be with the same type of grass as damaged or removed and plantings shall be of the same kind and size as removed or damaged. The contractor shall fertilize water and maintain grassed areas at least until after the first mowing. Plantings shall be maintained by the contractor until they have been shown to have taken root.

Restoration of paved areas shall be completed to the satisfaction of the entity owning the pavement. All joints shall be neatly saw cut. A letter of acceptance of repairs by the owner shall be provided to the OUA.

Preconstruction photos are recommended, or in the case of construction under contract directly with the OUA, preconstruction photos, with a log identifying and describing the photos, are mandatory. A copy shall be submitted to the OUA prior to commencing construction.

OUA will not accept any facilities until all restoration and all punch list items are completed to the satisfaction of the OUA.

SECTION 5 -BASIS OF DESIGN -GRAVITY WASTEWATER SYSTEMS

A. GRAVITY SEWERS

There shall be no physical connection made between a sanitary sewer or storm water sewer system. All gravity sewers, pumping stations/lift stations and force mains shall be designed to deliver peak flows under the following conditions:

5.1. Flow

Wastewater systems shall be designed on the basis of an average per equivalent residential connection (ERC) of 250 gallons of sewage per day. On this basis, lateral sewer services shall be designed with capacities when running full of not less than four times the average flow. Trunk sewers shall have capacities under the same conditions of not less than 2.5 times the average flow. Special allowances may be made for sewage from industrial plants upon approval by the OUA.

5.2. Pretreatment

Industrial wastes from service station wash-racks, lubrication racks, shop floor drains and Laundromats and other industrial customers shall not be connected into the sanitary sewer system without pretreatment specifically approved by the OUA such as grease, oil and sand interceptors or lint traps and preferably should be disposed of separately. Caustic wastes and all other manufacturing wastes shall not be connected into the sanitary sewage system without pre-treatment approved by the OUA. A testing program shall be submitted to the OUA. The owner of the pre-treatment system shall be responsible for testing the wastes, maintaining and operating the pre-treatment system.

All installations where foods are prepared, processed or served shall have a grease trap of adequate capacity with a solids retention device installed through which the wastewater from the preparation area shall pass before entering the sanitary sewer system. The owners shall be responsible for having these grease traps cleaned on a regular basis.

5.3. Gravity Sewer Main Sizes

The minimum allowable size for any gravity sewer main other than house sewer connections shall be 8 inches in diameter. Up sizing of sewer lines to reduce slopes will not be permitted unless justified by calculated flow. When gravity sewers are increased in size, or when a smaller sewer joins a larger one, the invert of the larger sewer should be lowered sufficiently to maintain the same energy gradient.

5.3.1 Gravity Sewer Lateral Sizes

The minimum diameter of a single household connection shall be a minimum of 4". All others and all double services shall be a minimum of 6".

5.4. Gravity Sewer Main Slopes

All gravity sewer mains shall be designed with hydraulic slopes sufficient to give mean velocities, when flowing full or half full, of not less than 2.0 feet per second, based on an acceptable formula. Slopes shall be within a range that will prevent

solid/fluid separation.

The following minimum slopes shall be used for design:

<u>Diameter of Sewer Main</u>	<u>Minimum Slope</u>	<u>Diameter of Lateral</u>	<u>Minimum Slope</u>
8-inch	0.40%	4-inch	1.00%
10-inch	0.28%	6-inch	0.50%
12-inch	0.22%		

Maximum Slopes -OUA will not accept any flows greater than 10 F.P.S.

5.5. Alignment

Gravity sewers of all sizes will be designed with uniform slope and alignment between manholes and shall be laid straight between manholes.

5.6. Cover

5.6.1. Minimum cover to finished grade over gravity sewer lines shall be 48 inches to the crown unless otherwise approved by the Executive Director.

Minimum cover in state roads shall be in accordance with FDOT requirements.

5.6.2. Cover over gravity sewers 14 feet or greater shall require special bedding and the use of ductile iron pipe.

5.7. Separation from Potable Water Lines

Minimum horizontal and vertical separation between gravity sewers and potable water lines shall be as set forth in FAC 62-555.314, latest revision.

5.8. Pipe Material

PVC and DIP shall be acceptable pipe material for gravity sewer lines.

PVC gravity sewer pipe and fittings 4-inch through 12-inch shall comply with ASTM D 3034, SDR 26 and minimum stiffness of 115 psi. PVC gravity sewer pipe 15-inches and larger shall comply with ASTM F 679, with T-1 wall thickness and minimum pipe stiffness of 115 psi. Joints and gaskets shall comply with ASTM F 477. PVC for gravity sewers shall be green. All PVC sewers shall be marked by a metallic, green-colored identification tape at least 4" wide laid 18 inches above the pipe.

Ductile iron pipe shall conform to latest ANSI Specification A21.51 and shall be suitable for 150 psi working pressure. Pipe thickness shall be as required for a minimum of five feet of cover with laying condition 8 (minimum) and computed in accordance with latest ANSI Specification A21.50. The ductile iron shall have a minimum tensile strength of 60,000 psi and minimum yield strength of 48,000 psi. DIP shall be coated outside with a bituminous coating and coated inside with Protecto 401, or manufacturer approved equal, bonded to the pipe wall. Inside and outside coatings shall be applied by the manufacturer. In the case of field cuts, coatings shall be applied in strict compliance with manufacturers' recommendations. DIP shall be continuously painted green over the top third with two part high build epoxy polyamide paint. Ductile iron pipe shall be specified in the following circumstances:

5.8.1. Where dictated by FAC 62-555.314.

- 5.8.2. When there is less than 4 feet of cover to the invert of the pipe. (4 feet of cover to the invert shall be the standard minimum cover, less than 4 feet of cover will not be accepted unless approval is given by the OUA).
- 5.8.3. When the sewer is placed out of a right-of way between buildings or along property lines, or in extensive areas subject to landscaping or under drainage ditches/swales.

5.9. Manholes

Manholes shall be set according to the construction plans and shall be precast in accordance with the OUA Standard Details. Manholes shall comply with ASTM C478. Manholes shall be coated inside and outside with 2 coats of coal tar epoxy, or approved equal. Exterior coating includes the outside bottom. Each coat shall be a different color with the final coat black. Pipe connections to the manhole shall be cut flush with the inside wall of the manhole. Manhole covers shall be rated for roadway use and shall be provided with rain guards.

5.9.1. Location

Manholes shall be installed at the terminal end of each gravity sewer; at every change in grade/direction, size or alignment change; at all sewer intersections; and at distances not greater than 400 feet apart. Manholes shall be placed in accessible locations, preferably in pavement, always flush to the surface except as approved by the OUA. A 3'x3'x6" concrete collar shall be placed around manholes outside of pavement areas. Manholes shall have precast, monolithic pour bases. All manholes shall have precast cones. Flat slabs shall not be accepted. Ram-nek or equivalent shall be placed at joints.

5.9.2. Drop Manholes

An exterior drop pipe shall be provided for a sewer entering a manhole at an invert elevation of 2 feet or more. In cases where the elevation difference between the invert is less than 2 feet, a drop pipe is not required, but a channel shall be constructed to guide the flow into the outgoing channel. There is no restriction on the length of a drop pipe.

5.9.3. Flow Channel

The manhole floor shall have a flow channel made to conform in shape and carrying capacity to that of the sewers. Flow channels within the manholes involving changes of direction or drops shall smoothly direct the flow in accordance with the Standard Details. Bench walls shall be sloped toward the flow channels.

5.9.4. Service Connections

Service connections will be allowed into manholes (not in lift stations) if approved by OUA. All Services will require a clean-out connection at the property line. Clean outs must be provided by owner/contractor at the property line with cap at finish grade.

5.10. Force Main Tie-Ins

In those instances where a force main ties into an existing or proposed manhole an inside drop will be allowed. The drop pipe shall be DIP (lined with Protecto 401), PVC or HDPE with stainless steel straps to secure pipe to wall. Point of tie in shall be approved by OUA.

5.11 Force Main from Private Lift Station

Force mains from private lift stations shall be provided with two valves and one check valve as shown on the Standard Details.

B. VACUUM SEWERS

5.12. General

Vacuum sewer systems shall be AIRVAC systems. Because of the need for compatibility with other collection systems in the OUA service area, no alternate designs shall be acceptable. A companion manual to this Manual of Standards shall be the AIRVAC Design Manual, latest edition. Any discrepancies between this manual and the AIRVAC manual shall be called to the attention of the OUA prior to any submittal of design plans for approval by the OUA.

5.13. Flow

Vacuum sewer collection systems shall be designed on the basis of an average per equivalent residential connection (ERC) of 250 gallons of sewage per day. The Engineer of Record shall establish the appropriate peaking factor to be used in the design. However, the minimum peaking factor shall be not less than 2.5 times the average flow. For purposes of vacuum design, any flow that enters the system by way of a pump shall be considered in terms of the actual discharge pump rate rather than the standard peak flow. Designers shall undertake all reasonable measures for reducing or eliminating ground water from entering the piping network and interface valve pits.

5.14. Pretreatment

Industrial wastes from service station wash-racks, lubrication racks, shop floor drains and Laundromats and other industrial customers shall not be connected into the sanitary sewer system without pretreatment specifically approved by the OUA such as grease, oil and sand interceptors or lint traps and preferably should be disposed of separately. Caustic wastes and all other manufacturing wastes shall not be connected into the sanitary sewage system without pre-treatment approved by the OUA. A testing program shall be submitted to the OUA. The owner of the pre-treatment system shall be responsible for testing the wastes, maintaining and operating the pre-treatment system.

All installations where foods are prepared, processed or served shall have a grease trap of adequate capacity with a solids retention device installed through which the wastewater from the preparation area shall pass before entering the sanitary sewer system. The owners shall be responsible for having these grease traps cleaned on a regular basis.

5.15. Vacuum Sewer Main Sizes

Piping networks for connecting valve pits to collection tanks at vacuum pumping stations shall be 4, 6, 8 or 10-inches in diameter. Service laterals from valve pits to vacuum mains shall be 3 inches diameter. Gravity service lines from customer connections to valve pits shall be the same as for gravity collection systems, 4" minimum for a single household connection, 6" minimum all others and all double services, except that these shall be provided with air intake pipes as shown in the Standard Details of this manual.

5.16. Vacuum Line Sizing and Lengths

The following are design conditions to be used for flows and for the lengths of single main line branches:

<u>Pipe Diameter</u>	<u>Absolute Max. Flow (GPM)</u>	<u>Recommended Max. Flow</u>	<u>Recommended Max Length</u>
3 inch	28	20	300
4 inch	55	38	2,000
6 inch	152	105	*
8 inch	305	210	*
10 inch	544	374	*

5.17. Vacuum Main Profiles

Mains shall be laid out in a "saw tooth" profile with a uniform minimum 0.2% slope, without pockets, sags, dips or summits. Slope tolerance is +/-0.05' per 100-feet. Minimum distance between lifts is 20-feet or 50-feet prior to a series of lifts (as for steep change in grade). To the extent practicable, lifts should be in increments of 1.0-foot for 3 and 4-inch pipe diameters and 1.5-feet lift increments for 6, 8 and 10-inch diameter. In no case shall a lift exceed 3-feet. Minimum fall between lifts shall be 0.25 feet, except for 3-inch pipe when the minimum shall be

0.20 feet. Maximum vacuum loss due to lifts from any flow path (valve to the vacuum station) shall be 13-feet static loss, plus 5-feet friction loss. A green locator ball shall be places at all fittings or change of direction and lifts. All other requirements and recommendations of AIRVAC, Inc. for design and construction shall be closely followed, with the exception of the location of the air intake pipe which shall be installed as shown in the Standard Details.

5.17.1 Vacuum Line Division Valves

Isolation valves (division valves) shall be placed for each branch vacuum sewer near the connection to the main line and at every 1,500-feet.

A) Valves shall conform to AWWA C509087, standard for resilient seated gate valves, as manufactured by waterous company.

B) Two (2) tee keys shall be provided for each valve size required.

C) Buried valves shall be provided with valve boxes and the operating nut shall be extended to within 9", plus or minus 6", of the finished grade. The valve box cover shall have the words "sewer" and "open" with a directional arrow cast on it. O) Provide concrete collar around each division valve and gage tap.

5.18. Separation from Potable Water Lines

Minimum horizontal and vertical separation between vacuum sewers and potable water lines shall be as set forth in FAC 62-555.314, latest revision.

5.19. Vacuum Sewer Pipe Material

5.19.A) Pipe: All buried vacuum mainlines, branch lines and service laterals shall be gasketed PVC SDR 21 200 psi pressure rated pipe per ASTM D2241 and ASTM D3139.

5.19.B) Pipe Gasket: Elastomeric joints are to be "Rieber Style" or approved equal. Manufacturer is required to submit a certification that the pipe seal will operate at 22 inches of mercury vacuum and withstand a vacuum test at 22 inches of mercury vacuum with no leakage after 1 hour with joints deflected as per ASTM D3139.

5.19.C) Fittings & Bends

5.19.C.1. 45 Ells shall be used throughout. Tee fittings, 90 degree ell and vent type ell are not permitted. The only location where a 90 degree ell may be used is at the entering side of the 3" vacuum valve inside valve pit.

5.19.C.2. Solvent Weld Fittings: Shall be PVC Schedule 40 per ASTM D2466 from a PVC compound having a cell classification of 12454 conforming to ASTM D-1784 (manufacturer shall submit a certification that the fittings will operate at and withstand a vacuum test at 22 inches of mercury vacuum for 1 hour with no leakage with joints deflected) as per ASTM D3139. Such fittings shall be as produced by Spears Manufacturing Company (or approved equal).

5.19.C.3. Fabricated or Assembled Gasket Joint Fittings: Shall be IPS diameter fabricated from SDR 21, 200 psi pressure rated PVC pipe per ASTM D2241 or assembled from molded Schedule 40 fittings per ASTM D-2466 and Spigot x Gasket Adapters fabricated from SDR21, 200 psi pressure rated pipe per ASTM D2241. Gasketed joints shall be "Reiber Style" (or approved equal) 200 psi rated complying with ASTM D3139. Gasket material shall be EPDM or SBR unless otherwise specified. Ell's shall be formed from one piece of pipe or assembled from molded Schedule 40 fittings and Spigot x Gasket Adapters (fittings shall be marked "vacuum rated" with a weather proof label affixed to each fitting clearly observable for inspection. Manufacturer shall submit a certification that the fittings will operate at and withstand a vacuum test at 22 inches of mercury vacuum for 1 hour with no leakage with joints deflected) as per ASTM D3139. Such fitting shall be as manufactured by Specified Fittings or Bellingham, Washington, Harco Fittings or Lynchburg, Virginia or approved equal.

5.19.C.4. Molded Gasket Joint Fittings (3"-8", 45° bends only): Shall be for IPS diameter PVC pipe and injection molded from dark gray PVC in one piece. Transition gaskets are not permitted. PVC compound shall meet cell classification 16344 per ASTM D1784. Gasket material shall be EPDM or SBR per ASTM F477. Fittings shall be pressure rated 200 psi by the method of AWWA C907. Gasket joints shall be 200 psi rated per ASTM D3139 and feature a full circumference vacuum shutoff ridge in each gasket groove (Harco VacSeal Joint). Joints shall comply with all vacuum requirements of ASTM D3139. Fittings shall meet an in-plane flattening test of 100% deflection without fraction. Every fitting shall be factory vacuum proof tested and marked "Vacuum Proof Tested" with a weather proof label affixed to each fitting clearly observable for inspection. Manufacturer shall submit a certification that the fittings have been 100% vacuum proof tested,

will operate at continuous vacuum, and will withstand a vacuum test of 22 inches of mercury for 1 hour with no leakage. Three inch diameter to eight inch diameter 45° bends shall be VacTuf Fittings as manufactured by Harco Fittings of Lynchburg, Virginia.

5.19.C.5. Miter cut, butt fused joints: These types of joints are not permitted.

5.19.D Fittings – Wyes

5.19.D.1. Solvent weld: Wye fittings may be fabricated per the requirements of 2.1.C.2 below with the exception that fitting sockets shall be made in accordance with ASTM D-2466 rather than gasketed bell. Fabricated Wye's shall be marked "vacuum rated with a weather proof label clearly observable for inspection (fittings shall be marked "vacuum rated" with a weather proof label affixed to each fitting clearly observable for inspection. Manufacturer shall submit a certification that the fittings will operate at and withstand a vacuum test at 22 inches of mercury vacuum for 1 hour with no leakage with joints deflected) as per ASTM D3139. Such fittings shall be as produced by Spears Manufacturing Company (or approved equal).

5.19.D.2. Fabricated or Assembled Gasket Joint Fittings: Shall be IPS diameter fabricated from SDR 21, 200 psi pressure rated PVC pipe per ASTM D2241 or assembled from molded Schedule 40 fittings per ASTM D-2466 and Spigot x Gasket Adapters fabricated from SDR21, 200 psi pressure rated pipe per ASTM D2241. Gasketed joints shall be "Reiber Style" (or approved equal) 200 psi rated complying with ASTM D3139. Gasket material shall be EPDM or SBR unless otherwise specified. Fittings shall be marked "vacuum rated" with a weather proof label affixed to each fitting clearly observable for inspection. Manufacturer shall submit a certification that the fittings will operate at and withstand a vacuum test at 22 inches of mercury vacuum for 1 hour with no leakage with joints deflected as per ASTM D3139. Such fitting shall be as manufactured by Specific Fittings of Bellingham, Washington, Harco Fittings of Lynchburg, Virginia, or approved equal.

5.19.D.3. Miter Cutt, butt fused joints: These types of joints are not permitted.

5.19 E) Primer: Primer shall be per ASTM F-656

5.19 F) Solvent Cement: Solvent cement shall be per ASTM 2564. Cement shall not be the same color as the primer.

PVC pipe for vacuum sewers shall be color coded, green for sewer and marked with green metallic marker tape at least 4" wide and not more than 18' below finish grade. All fittings and change in direction shall be marked with a green locator ball (3m or equal).

HOPE used for vacuum sewers shall be SOR 11, IPS with green stripes.

5.20. Valve Pits

Valve pits shall be the latest models available from AIRVAC, Inc.

A) Valve Pit Types: Valve pits shall be provided in the following types and depths as shown in the engineer's plans.

TWO (2) PIECE VALVE PITS			
AIRVAC MODEL NO.	OVERALL DEPTH	DEPTH TO INVERT OF GRAVITY INLET 4" STUB-OUT	DEPTH TO INVERT OF GRAVITY INLET 6" STUB-OUT
VP 3030 H	5 FEET	3' 8 7/8"	3' 8 7/8"
VP 3042 H	6 FEET	4' 8 7/8"	4' 8 7/8"

B.) Valve Pit Covers: Model R5900 by Neenah Foundry. Castings shall meet ASTM A-48, class 30 gray cast iron. The words "AIRVAC SEWER" shall appear on top of cover in 1" tall lettering.

Covers for the two-piece valve pits shall have a concealed pick hole and elastomer seals.

A 3'x3'x6" concrete pad will be required in traffic areas.

C) Flexible Connector: an AIRVAC flexible connector shall be used to connect the valve pit to the 3" vacuum service line.

D) Anti-Buoyancy Collar: Valve pit shall include a factory installed AIRVAC integral polyethylene anti-buoyancy collar.

E) Grommets: Valve pits shall include the necessary grommets for the gravity line connections. All pipes that penetrate the valve pit through grommets shall be SDR 21, SDR 26 or SCH 40 pressure rated PVC pipe. No other pipe is acceptable.

F) Stop-Ring: The end of the stub-out pipe that passes through the valve pit grommet shall be beveled. A stop ring shall be used to ensure the pipe does not protrude more than 4" inside the collection sump with an allowable tolerance of $\pm 1/8"$.

G) Valve & Controller: internal breather; type f, full port 3-inch diameter.

H) In-Sump Breather: AIRVAC in-sump breather.

I) Furnished: Vacuum valves & controllers and the in-sump breather shall be furnished by the contractor as part of the valve pit package.

J) Installed: Vacuum valves & controllers and the in-sump breather shall be installed by the owner. Valves shall not be installed in the valve pit until after the homeowner has installed the 4" air-intake.

K) Manufacturer: Vacuum valve and accessories as manufactured by AIRVAC.

Stub outs shall connect to pits through openings fitted with AIRVAC supplied grommets only. No more than 4 connections shall be made in anyone valve pit. Flexible connectors for connecting valve pits to the vacuum sewer main shall also be provided by AIRVAC.

Air intakes shall be provided on all building sewers and shall be located near the valve pits as shown on the Standard Details, rather than next to the building, in order to comply with the requirements of the Okeechobee County Building Department.

5.21. Buffer Tanks

Buffer tanks may be used to accept high sewage flows from schools, apartments, nursing homes, commercial sites and similar applications. Buffer tanks shall be installed only where individual valve pits are not practical to use. All attempts shall be made to minimize the number of such tanks placed in a vacuum collection system. Buffer tanks shall be designed for no more than 30 gallons per minute, peak flow, unless prior approval is granted by the Executive Director and AIRVAC reviews and assists in the design. Valves for Buffer Tanks shall be in their own separate valve pit. Buffer tanks may contain either a single suction pipe (for up to 15 gallons per minute, peak) or dual suction pipe (for more than 15 gallons per minute and no more than 30 gallons per minute). Each suction pipe shall be placed in an 18-inch diameter sump, 12-inches deep in the bottom of the storage area of the tank. All joints and connections in buffer tanks shall be water tight to eliminate groundwater. Above ground venting is required.

See Detail V-1 4, V-15 and V-1 7 for Buffer Tanks.

AIRVAC limits the use of buffer tanks, as follows:

25% rule: No more than 25% of the total peak flow of the entire system shall enter through buffer tanks.

50% rule: No more than 50% of the total peak flow of a single vacuum main (i.e., single flow path) shall enter through buffer tanks.

See the Standard Details for buffer tank construction. Further, all other recommendations and standards of AIRVAC, Inc shall be strictly adhered to when designing and installing buffer tanks.

5.22. Vacuum Stations

Vacuum collection systems shall require a vacuum pumping station, consisting of a collection tank, vacuum pumps, sewage pumps connected to a sewage force main for connecting to the Authority's transmission and treatment system, plus, motor control center, electrical panel, level controls and all associated equipment and components. All vacuum stations shall be package stations, designed in accordance with the latest design manual and manufactured by, AIRVAC, Inc. All stations shall be equipped with standby emergency power generation equipment, sized to keep the station operating fully and completely in case of power outages. All stations shall also be equipped with an odor control system which is approved prior to installation by the Executive Director.

Vacuum stations shall be designed in accordance with the latest design manual and recommendations of AIRVAC, Inc.

Design of the station building shall be as shown in the Standard Details of this manual.

SECTION 6 -CONSTRUCTION SPECIFICATIONS -SANITARY SEWERS

A. GRAVITY SEWERS

6.1. Installation

Sewers shall be laid accurately to both line and grade. The OUA will not accept any line laid with a slope less than 10% of the minimum slope, as outlined in paragraph 5.4. For instance, the minimum acceptable slope on an 8 inch line shall be 0.36%, and then only with the approval of the Executive Director, who shall determine the acceptability based upon considerations, such as line location, expected flow, etc. The OUA reserves the right to verify survey results. Visible leakage, deflections, horizontal misalignment, significant bowing, non-constant slopes between manholes and sagging joints shall each be grounds for rejection of the installed system. The maximum acceptable deviation from the proposed uniform shall be no more than 7.5% of the inside diameter of the sewer and with no greater frequency of occurrence than one each one hundred feet

The minimum cover on a PVC sanitary sewer shall be 4 feet to the invert. DIP shall be placed for all lengths with less than 4 feet of cover, which will require the OUA approval prior to installation.

Green metallic backed indicator tape at least 4" wide shall be installed over sewer line at 18" below finished grade. A green locator ball shall be placed at each fitting and change in direction of the pipe.

Trenches and excavations shall be kept dry while work is in progress. All costs of dewatering shall be the expense of the contractor. Excavated material, such as boulders, logs and unsuitable backfill that is not suitable for backfill shall be removed from the site at the contractor's expense. The pipe barrel shall be uniformly supported along its entire length on undisturbed soil or bedding material. Proper bedding shall be supplied if the existing material includes rock, organic material or other sharp or unstable material.

6.2. Manholes

Manholes shall be set according to the approved construction plans and shall be precast in accordance with the OUA's Standard Details. The manhole invert shall be carefully shaped to conform to the pipe flow channel. Flow channels within the manholes involving changes of direction or drops shall smoothly direct the flow in accordance with the Standard Details. The slope through the manholes shall be constructed so as to not have ponding of water under conditions of no flow. All concrete irregularities found within the precast manholes delivered to the site shall be plastered with cement mortar in such a manner as to give a neat and watertight job.

Manholes shall be core-drilled to provide pipe opening when precast hole is not available. Ram-nek or an equivalent product shall be used at all riser joints. All connections of PVC sewer pipe to manholes shall be made with a precast rubber boot or by link-seal. Manholes shall be fully coated, inside and out, with two coats, 8 mils thickness each, of coal tar epoxy or approved equal.

6.3. Inspection and Testing

All gravity sewer lines shall be inspected and tested in accordance with these requirements. Equipment for performing tests and personnel required for supervision and assistance with items such as removing manhole covers, moving ladders and equipment, holding lights, cleaning, etc., shall be provided by the contractor. Sections of lines which fail to pass the tests, listed below, shall have the defects located and repaired or replaced and retested until leakage is within the specified allowance. The OUA shall be notified a minimum of 48 hours in advance of testing, so that a representative of the OUA may be present. Testing shall be performed after the backfill and road base is in place.

6.3.1. Cleaning

Prior to other tests, all sewer lines shall be cleaned and inspected for major defects. Pre-cleaning by appropriately sized sewer cleaning ball by high velocity jet or other method will be required.

6.3.2. Visual Test

All sewer lines shall be inspected visually to verify accuracy of alignment and free from debris and obstructions. The full diameter of the pipe for straight alignments shall be visible when viewed between consecutive manholes. The method of test shall be by visually lamping with mirrors and lights unless an alternate method is specifically required by the OUA. The Contractor shall provide all OUA required equipment and personnel to do the visual test.

6.3.3. Leakage Test

The locations for performing leakage and the method of testing will be selected by the OUA. Methods of test which are suitable for various conditions are low pressure air exfiltration, water infiltration or water exfiltration. Plugs, caps and branch connections must be secured against blow-off during leakage tests.

6.3.3.1 Air Testing: The duration permitted for a prescribed low pressure exfiltration pressure drop between two consecutive manholes shall be not less than that shown in the following table. The prescribed drop shall not exceed 0.5 psi from 3.5 to 3.0 psi in excess of the groundwater pressure above the top of the sewer.

Minimum Duration For Air Test Pressure Drop

<u>Pipe Size, Inches</u>	<u>Time, Minutes</u>
4	2
6	4
8	5
10	6
12	7
30	18 3/4
36	22

6.3.3.2. Infiltration Testing: Infiltration testing shall be an acceptable method of

leakage tests only when the groundwater level is above the top of the pipe throughout the length being tested. Tests shall be conducted for a minimum of four (4) hours. The allowable infiltration for any portion of sewer system shall be measured by a weir placed in the appropriate manhole and shall not exceed 50 gallons per inch of internal pipe diameter per mile of pipe per day. Laterals are not included in the infiltration calculation.

6.3.3.3 Exfiltration Testing: Exfiltration testing is an acceptable method of test only in dry Areas or when the groundwater level at the time of testing is below the top of the pipe. Tests shall be conducted for a minimum of four (4) hours. The allowable water exfiltration for any length of sewer pipe between manholes shall be measured and shall not exceed 50 gallons per inch of pipe diameter per mile of pipe per day. During exfiltration testing, the maximum internal pipe pressure at the lowest end shall not exceed 25 feet of water or 10.8 psi and the internal water head at the upstream end shall be two feet higher than the top of the pipe. The contractor shall provide and install service plugs as needed to perform test.

- 6.3.4 Deflection Testing (PVC Only): The maximum allowable pipe deflection (reduction in vertical inside diameter) shall be 7.5 percent. Deflection testing is unnecessary when using proper construction practices and inspection during pipe installation and when using proper bedding material. However, the Executive Director reserves the right to require the developer or contractor to perform random deflection tests of pipe at construction locations between successive manholes where the construction encountered unstable trench walls or bottoms, heavy rainfall, high groundwater levels, deep lines or difficulty in achieving compaction. Should deflection tests at three (3) successive test locations be unsatisfactory, then the developer or contractor shall perform the deflection test on the entire sewer system. All locations with excessive deflection shall be excavated and repaired by re-bedding or replacement of the pipe. Optional devices for testing include calibrated television, photography, properly sized go-no go mandrel, sewer ball or deflectometer. To insure accurate testing, all lines shall be thoroughly cleaned prior to deflection testing.
- 6.3.5 The Contractor/Developer shall provide to OUA a video inspection of all gravity sewer lines installed, cleaned and tested. After cleaning and testing the Contractor shall add sufficient clean water to each upper end of the sewer lines to fill any low spots or dips in the lines or man holes. After the water has drained through the network of sewer pipes the Contractor shall make a video of the entire sewer system, in the presence of an OUA representative, and provide a copy for review before final payment is made to the Contractor. Videos shall be made by a pan and tilt, color, self-propelled camera with an acceptable depth gauge or measuring device. Record Drawings as per Section 9 and approval by FDEP is required before the line is placed in service.

B. VACUUM SEWERS

6.4 General

All construction specifications and requirements contained elsewhere in this Manual of Standards shall apply to vacuum sewer system as applicable. In addition, the following specific requirements shall be followed.

6.5. Experience

Construction of vacuum sewer system shall be carried out by contractors with prior experience in vacuum sewer construction. Proposed contractors shall be required to demonstrate to the satisfaction of the OUA that they have successful experience with vacuum sewer systems supplied by AIRVAC, Inc. At minimum, successful shall mean installation of no less than 25,000 lineal feet of vacuum sewers in at least three (3) separate systems. A system is defined as a vacuum sewer system collecting domestic wastewater which is in operation and which contains at least 20 vacuum pits. Contractors that cannot demonstrate successful experience to the satisfaction of the OUA may as an alternate, and with the approval of the Executive Director, engage at its own expense, the services of an AIRVAC, Inc. field representative for training the contractor's personnel for an initial period of four (4) weeks, full time, at the commencement of pipe installation.

6.6. Vacuum Line Testing & Line Flushing

A) A trailer mounted vacuum pump (tmvp) as manufactured by AIRVAC is required for the daily vacuum testing. The unit shall include (1) -8" portable chart recorder, 100 charts, 5 pens, (1) -050 magnehelic gauge kit, tubing and a valve pit test connection with shutoff valve and cam-lock adaptor.

B) A two (2) hour vacuum tightness test of all sewer mains and lateral connections shall be conducted daily in accordance with AIRVAC instructions. (With a vacuum of 22-inches of mercury. Allowable loss of vacuum is 1% per hour over the two hour period. Each day's installation shall be tested along with all previously installed pipe on that main.)

C) Final Test: Upon completion of the installation of vacuum sewer pipe and prior to the installation of vacuum valves, the complete vacuum sewer system shall be vacuum tested. The final test shall follow the same procedures as the daily test, but the duration shall be 4 hours, with 1 % maximum loss of vacuum per hour over the four hour period. A representative of the Engineer of Record shall be present for the duration of the test. Final testing shall be coordinated with the OUA. A minimum of two working days' notice shall be provided to the OUA, who may elect to have a representative on site during the test.

D) After successful final four (4) hour acceptance testing, flush lines to remove debris and foreign materials that accumulated during construction.

6.7. Tolerance

Slope tolerance for the installation of vacuum sewers shall be +/-0.05' per 100-feet.

6.8 Vacuum Sewer Line Installation

A) Install vacuum sewer lines in accordance with engineer's and AIRVAC's guidelines.

B) Vacuum sewer mains shall have a minimum cover of 36" unless otherwise noted.

C) All vacuum sewers shall be laid to the line and grade with the use of construction laser

beam equipment. All pipe which has been designed to slope downward shall be installed to slope continuously downward. There shall be no abrupt sags or bellies in the line. The maximum deviation from planned elevations shall not exceed 0.05 feet in any 100 feet of length. This plus or minus tolerance applies to all pipe sizes.

D) Installation by the horizontal directional drilling (hdd) method is not acceptable, unless prior, written approval is obtained from the engineer. Should engineer approve the use of hdd, the same installation tolerances specified for open-cut would apply, no abrupt sags or bellies would be allowed and the contractor would be required to verify such through electronic means while the pipe is being installed.

6.8.1. Valve Pit Installation

A) Install Valve Pits in accordance with AIRVAC installation instructions.

B) Conduct Sump Pressure test in accordance with AIRVAC instructions.

C) The top of all valve pits shall be flush with the pavement or, when not in the pavement, flush with the finished grade. Top of valve pits elevation shown are representative and may vary due to actual field conditions.

6.8.2 Gravity sewer pipe (Stub-out pipes)

A) All valve pit stub-out pipes, gravity laterals and fittings installed in the public right-of-way shall be pressure rated. Non-pressure rated pipe and foam core pipe is not acceptable.

B) Pipe: SDR 21 & SDR 26: ASTM D2241; SCH 40: ASTM D1784.

C) Fittings: SCH 40: ASTM D1784 and ASTM D2466

D) Stub Outs: Stub out shall be of the pipe material specified in 6.8.2.B and shall be either 4" or 6" in diameter and shall be a minimum of 6' long or the length necessary to extend service to the property line. A stop coupling shall be solvent bonded around the gravity line as shown in the standard details.

6.9. Vacuum Sewer Notes

A) The top of all vacuum pits and valve boxes shall be flush with the pavement or, when not in the pavement flush with the finished grade. Top of vacuum pits elevations shown are representative and may vary due to actual field conditions and engineer's directions.

B) Vacuum sewer mains shall be gasketed SDR 21 PVC unless specified otherwise.

C) Only suitable materials free from excessive moisture shall be used for fill or backfill. Contractor shall remove soil material too wet to permit proper compaction to specified density, spread and allowed to air dry.

D) Road and driveway crossings shall be open cut with saw cut joints unless otherwise noted.

E) Disturbed driveways shall be reconstructed to a condition equal to or better than its previous condition.

F) Construction within right-of-way shall conform to utility and right-of-way use standards.

G) Upon completion, acceptance and certification of the vacuum sewer system, the property owner shall engage a licensed plumbing contractor to make the connection between the existing septic tank lateral and the new wastewater collection system lateral. The plumbing contractor shall coordinate with local building department officials and obtain the necessary building permits and meet all applicable building codes. The existing septic tank and system shall be taken off-line in accordance with health department guidelines.

H) Vacuum sewer mains shall have a minimum cover of 36", unless otherwise noted.

I) New or replaced underground facilities within the right-of-way shall be made detectable utilizing approved industry standard techniques.

J) Testing shall be the responsibility of the contractor. The contractor shall coordinate with the engineer for their direction on where testing is to be conducted.

SECTION 7. BASIS OF DESIGN -WASTEWATER/REUSE FORCE MAINS

7.1. Design Standards

The design standards for force mains and reuse mains shall follow the same criteria as outlined for water mains in the area of cover, horizontal/vertical separation and layout as described in Paragraph 3.1 through 3.4 respectively, except as modified below.

Air release valves in vaults shall be provided at all high points in the force main/reuse mains as required by the Executive Director.

7.2. Force Main/Reuse Main Material

Force mains shall be either ductile iron pipe (DIP), polyvinyl chloride (PVC) or high density polyethylene (HDPE). All reuse mains shall be PVC or HDPE only unless an above grade situation or a circumstance listed in Paragraph 7.2.1. is required, then DIP shall be used.

DIP shall be centrifugally cast and shall conform to AWWA C151/ANSI A21.51. For 12 inch diameter or smaller, ductile iron pipe shall be Class 51 or higher. Pipe larger than 12-inch diameter shall be Class 52 or higher. Flanged pipe shall be Class 53 or higher. Pipe classes shall be determined based upon the installation and the use intended. Pipe classes shall be appropriately labeled on the drawings. Flanged DIP shall have threaded ductile iron fittings and shall conform to the requirements of AWWA C115. All flanges shall be ductile iron class 150, ANSI B 16.5. Flanges shall be flat faced and all joints shall use 1 /8-inch black neoprene full faced gaskets. Ductile iron pipe and fittings shall be coated outside with bituminous coating and inside shall be lined with Protecto 401, or manufacturer approved equal. All exposed (above grade) ductile iron force main shall be color coded

PVC shall be DR 18 conforming to AWWA C90D for 12 inch or smaller and DR 21 conforming to AWWA C905 for larger than 12 inch. Rubber-ring gaskets shall be suitable for the specified pipe sizes. Rubber-gasket joints shall conform to AWWA C111, and gaskets shall be furnished by the pipe manufacturer with the pipe. A nontoxic vegetable soap lubricant shall be supplied with the pipe in sufficient quantities' for installing the pipe.

HDPE shall be SDR 11, conforming to AWWA C906 DIP size. Nominal size shall be shown on the plans (inside diameter). Inside diameter of the H.D.P.E. needs to match the I.D. of the existing or proposed line. Outside diameter is generally 1 to 2 inches larger than nominal. HDPE Fittings shall be provided by the pipe manufacturer. Mechanical connections of HDPE to PVC or DIP shall be of the same SDR rating as the pipe.

Force mains shall be color coded safety green for sewer and pantine purple for reuse mains. DIP shall be painted the appropriate color with Tnemec paint. PVC pipe shall be green for sewer, pantine purple for reclaimed water or spiral wrapped with colored marker tape not more than 18 inches on center. HDPE pipe shall be marked by coextruding multiple equally spaced color stripes of the same material as the pipe, or by solid colored pipe of the appropriate color.

Force mains and reuse mains shall also be marked with appropriately color metallic marker tape at least 4 inches wide and not more than 18-inches below finish grade.

7.2.1. DIP shall be required in the following circumstances:

- 7.2.1.1. In accordance with the provisions set forth in FAC 62-555.314.
- 7.2.1.2. Within 15 feet of structures, canals or lakes.
- 7.2.1.3. Crossings over or under water mains, gas and storm pipes with less than 18 inches separation.
- 7.2.1.4. Beneath all paved streets, excluding driveways or sidewalks.
- 7.2.2. The Executive Director may mandate DIP in any other instances of off-site or on-site construction where future abuse to the line is possible due to location or circumstances, or in private property away from right-of-way areas.
- 7.2.3. Restrained Gaskets for DIP for 4" through 24" shall be: U.S. Pipe Field Lok 350 gasket, American Ductile Iron Pipe Fast Grip Joint, or an equivalent product.

The Restraint Method shall be suitable for the pipe size, thickness and test pressure as required for the specific design case. The plans shall indicate the restrained lengths of pipe each side of the fittings. Refer to the Standard Details.

- 7.2.4. Jack and Bore Installations: Casing pipe used with jack and bores shall be in accordance with requirements of Florida Department of Transportation (FDOT) or railway specifications. Carrier pipe shall be restrained joint DIP.

7.2.5. Horizontal Directional Drill:

Horizontal directional drills (4 inches and larger) where required shall be made with HOPE, SDR 11, conforming to AWWA C906, DIP size. Nominal size shall be shown on the plans (inside diameter). Outside diameter is generally 1 to 2 inches larger than nominal. Pipe shall be marked by co-extruding multiple equally spaced color stripes of the same material as the pipe, or by solid colored pipe of the appropriate color. HOPE Fittings shall be provided by the pipe manufacturer. Mechanical connections of HOPE to PVC or DIP shall be of the same SDR rating as the pipe. Pipe and fittings may be joined by approved electrofusion couplings meeting ASTM F1055. Two, 10-gauge (AWG) electronic locator wires shall be installed on the directional drilled pipe and shall be brought to grade within a valve box or a locate station box at all entry and exit point locations. No splices or connections shall be allowed underground. The contractor shall run a continuity test in the presence of the OUA prior to final approval. Drilling fluids shall be bentonite slurry only.

- 7.2.6. Mains may be tapped as long as the tapping line is smaller than the tapped line unless otherwise approved by the OUA. Equal size line taps not approved by the OUA shall require that a tee be cut in. Tees are also required at locations dictated by the Executive Director. Tapped connections in pipe and fittings shall be made in such a manner as to provide a watertight joint and adequate strength against pull-out. Tapping Sleeves and Valve shall be mechanical joint or wrap-around type of stainless steel, or epoxy coated steel. Tapping sleeves and valves are required for all taps 4-inches and greater. Taps less than 4-inches shall be provided with a service saddle. Valves shall be provided on all taps. Tapping sleeves shall be a minimum of 6 feet from pipe joints.

- 7.2.7. Transitions from DIP to PVC will be allowed where appropriate. Material for transition shall be indicated and specified.

- 7.2.8. All construction material shall be first quality, not previously used. Repair clamps are not acceptable. Damaged or faulty pipe and materials must be properly replaced. All gaskets shall be new. When connecting to existing valves or fittings, gaskets shall be replaced, not reused.
- 7.2.9. Polyethylene wrap shall be used in all locations subject to corrosive conditions. Locations shall be indicated on the drawings. Wrap shall be 8 mil polyethylene and shall be installed in accordance with ANSI/AWWA C105/A 21.5; Method A. Material shall meet the requirements of ASTM D-1248 latest revision.
- 7.2.10. The Engineer shall provide a complete set of "shop" drawings which shall indicate the OUA's specific material requirements. In general, material requirements will be guided by the latest revisions of the specifications of AWWA, ANSI, ASTM and NSF.

7.3. Force Main/Reuse Main Sizes

Force mains and reuse mains shall not be less than 4 inches inside diameter and with a flow velocity of not less than 2.0 FPS and not greater than 4 FPS shall not enter a manhole from a direction contrary to the direction of flow out of the manhole.

Two inch (2") force mains may be allowed on privately owned grinder stations. Upon approval from the Executive Director the Engineer will be required to demonstrate the adequacy of the force main sizing. All force main sizes must be approved by the Executive Director. All force mains shall be sized to deliver peak flow requirements as mandated by the DEP. 2" force main service line tubing shall be polyethylene PE 4710 material 250 psi, green in color and conforming with AWWA C-901 SDR 9.

All reuse mains shall be sized as required for the specific application and will require approval from the Executive Director prior to installation.

7.4. Valves, Fittings and Appurtenances

Valving of all force main and reuse systems shall be designed to facilitate the isolation of each section of pipeline between intersections of the network. Generally, the number of valves at an intersection shall be one less than the number of pipes forming the intersection. Gate valves, 12 inches and less, shall be the resilient seat type conforming to AWWA C515. Valves larger than 12-inches shall be plug valves. Valves shall generally be installed at intervals of not more than 1,000 LF on mains.

Valves shall turn counterclockwise to open. Valves shall be provided with valve stem extensions to within 18-inches of ground surface, where centerline of pipe to grade is greater than four feet.

All valves, bends, tees, crosses and dead ends shall be restrained by a mechanical restraint system as outlined in Paragraph 7.2.2. When approved by the Executive Director, only for existing lines, concrete gravity blocks may be used. Gravity blocks shall be cast in place concrete having a minimum compressive strength of 2,500 psi after 28 days of cure time. Calculations for restrained joints shall be provided by the Engineer. All fittings and change in direction shall be marked with a green locator ball (3m or equal).

All materials, fittings and appurtenances intended for use in pressure pipe systems shall be designed and constructed for a minimum working pressure of 150 psi unless the specific application dictates a higher working pressure requirement.

Standard pressure pipe fittings of sizes 4 inch ID and larger shall be ductile iron conforming to AWWA C153, with mechanical joints unless flanged or restrained joints are required, Gray cast-iron fittings are not allowed, Ductile iron fittings shall be lined with Protecto 401 or approved equal, Mechanical joint fittings, 24 inches and smaller shall be rated for 350 psi working pressure, Flanged joint fittings 24 inches and smaller shall be rated for 250 psi working pressure, All fittings 30 inches and larger shall be rated for 250 psi working pressure. For sizes less than 4 inch 10, fittings shall be suitable to the pipe material and application. Glands for mechanical joint fittings shall be ductile iron, and tee bolts and nuts shall be Cor-Ten steel. Only bolt systems furnished by the manufacturer for mechanical joints are acceptable; nuts and bolts shall be new, not reused. Pipe gaskets shall be new as supplied by the pipe manufacturer. All flanges shall be ductile iron Class 150, ANSI B 16.5. All flanges shall be flat faced. Full face, 1/8" black neoprene gaskets shall be used on all flanged joints. All joints shall conform to AWWA C111. Bolts, nuts and washers for flanges shall be hot dip galvanized.

7.5. Construction

Construction shall be the same as Section 4 except disinfection is not required and force main pressure tests shall be at 100 psi for a minimum of two hours.

SECTION 8 -BASIS OF DESIGN -WASTEWATER PUMPING/LIFT STATIONS

8.1. Type

The standard wastewater lift station shall be a below ground installation with submersible pumps. All stations shall be designed for not less than 240 volt, 3 phase, 60 cycle electric service. The use of phase converters is not acceptable.

All stations shall have an aluminum lightning arrestor, phase monitor, telemetry system, alternating switch relay, HOA (hand, off, automatic) switch and surge capacitor. Telemetry systems shall contain the same cabinet, remote telemetry unit, antenna, grounding, etc., as in use by the OUA.

A junction box shall be added as shown on the Standard Details.

Permanent gas proof seals shall be added in conduits between the junction box and the control panel as shown on the Standard Details. Temporary gas proof seals, such as electrical putty, shall be provided between the wet well and the junction box.

Grinder pumps are not acceptable for OUA owned, operated and maintained stations.

Lift stations shall be equipped with float control systems. Bubbler systems or other systems are not acceptable.

Engineer/Contractor to confirm pump cable size, conduit size, and number of conduits to accommodate all wiring for pumps, panel and Junction Box and to also include a spare.

8.2. Pumps

Two or more pumps are required. When peak flow exceeds 400 gpm, 3 pumps are required. When only two units are provided, each shall be capable of handling the anticipated maximum flow with the same capacity. The pumps shall seat into self-seating bases. The pump and impeller shall pass a minimum of 3 inch solids, and all fixtures and fasteners, including guide rails and brackets shall be of 316 stainless steel. Acceptable pump manufacturers shall be Flygt Corporation, ABS and Davis EMU.

Projects constructed in phases will be allowed only at the discretion of the Executive Director. In projects constructed in phases, master lift stations that will have minimal flows for a considerable time shall be equipped with temporary pumps with reduced capacity, though not less than 50 percent of the permanent pumps.

8.3. Controls

The control panel shall have a 316 stainless steel enclosure, rated NEMA 4X. Control floats shall be located as not to be affected by flows into the wet well or by pump suction. Provisions shall be made to automatically alternate the pumps in use.

An audible high level alarm, in addition to a high level red warning light shall be provided.

8.4. Telemetry System

An emergency alarm and status reporting system with cabinet, radio, alarm points, connection panel, enclosure and suitable antenna shall be provided and located as required by the OUA. Monitoring points shall be as required by the Executive Director. The radio unit shall be identical to others in use throughout the OUA System. The Owner must confirm requirements with the Executive Director prior to initial plan submission.

8.5. Valves and Piping

A plug valve or a resilient seated gate valve is required on the discharge line of each pump. A check valve with outside weighted lever is required between the pump and plug or gate valve. The valves shall be located within a lockable valve vault adjacent to the lift station. A 4-inch diameter pressure gage with SS diaphragm guard and shut off ball valve (brass 1/4-turn) shall be provided on the discharge side of each check valve. Provisions for removal of the gage for cleaning shall likewise be provided. The discharge lines from each pump shall be HDPE Pipe or approved equal.

An emergency pump connection shall be provided and located outside the valve vault and shall be the same size as the pump discharge piping.

8.6. Wet Wells and Valve Vaults

Wet wells shall have a minimum of 6 foot inside diameter. The effective capacity of the wet well, or utilized capacity, shall provide a holding period not to exceed a 10 minute pump cycle (maximum 6 pump starts per hour). The bottom section and slab of the wet well and valve vault shall be a monolithically cast section. The side walls and top slab shall be precast in accordance with ASTM C-478. Alternative methods for constructing wet well bases will be considered only if the size and depth of the wet well is excessive. The wet well floor shall have a minimum slope of 1 to 1 to the intake. Where operation continuity is important, consideration should be given to dividing the wet well into two sections, suitably interconnected, to facilitate repairs and cleaning. Valve vaults shall be sized to accommodate the force main pipe size and associated valves. The bottom floor shall have grout placed at a 1 % slope (minimum) to a 2 inch PVC drain with trap connected to the wet well. The interior of the wet well, including the underside of the top slab shall be coated with sewercoat or rezclad as per manufactures recommendations. The exterior of the wet well, including the outside bottom for precast wet wells and the interior/exterior of the valve vault shall be coated as required for manholes with coal tar epoxy, excluding the above ground exterior portion of either wet well or valve vault. Each coat of the coal tar epoxy or approved equal shall be a different color with the final coat black with a minimum dry film thickness of 8 mils per coat.

8.7. Standby Power Receptacles

Standby power receptacles shall be provided. On lift stations equipped for auxiliary generator power supply, the following plug and receptacle shall be used as manufactured by Russell and Stoll or equal:

100 amp service, JRS 1034, HR Receptacle (Male)

200 amp service, JRS 2034, HR Receptacle (Male)

8.8. Enclosures

All lift stations shall be enclosed by fencing (10 gauge chain link, 6 feet high with three strands of barbed wire at top) with two 8 feet gates centered on the wet well or at a location accepted by the Executive Director. Decorative fencing may also be used with the Executive Director's approval. Direct vehicle access shall be provided for maintenance purposes. Easements of sufficient size or right-of-way are necessary for access, and an easement or deed will be required for the lift station property. The exterior top of the wet well shall be above the 100 Year Flood Plain, or at least 1 foot above the road grade adjacent to the station, whichever is greater. The layout of the station should be such to provide easy access without interference. The fenced area shall be underlain with geotextile fabric and 6 inches of 3/4" washed rock (minimum).

8.9. Water Service

Water service shall be provided at all OUA owned, operated and maintained lift station sites. A 1 1/2 inch service shall be provided with appropriate backflow prevention device and meter, with a 1-1/2 inch ball valve located 36-inches above ground surface. The location of the hose bib shall be as directed .by the Executive Director.

8.10. Privately Owned Stations

Privately owned wastewater force mains and pump/lift stations are discouraged. The Owner of a privately owned force main or pump/lift station is responsible for all maintenance, operation and locates. Two shut off valves, one at the pump station and another at the point of connection to the OUA's system, plus one check valve at the point of connection shall be included. Refer to the Standard Details. The OUA assumes no responsibility for changes in pumping capacity due to decreasing or increasing pressures within the OUA force main network at the point of connection.

Any private lift station must be up-graded to OUA Standards with Telemetry System prior acceptance by OUA.

SECTION 9 -RECORD INFORMATION

Record drawings shall be prepared using the State Plane Coordinates, North American Datum of 1983 for horizontal locations and the North American Vertical Datum of 1988 for vertical measurements.

Record drawings shall be on 24 inch X 36 inch sheets. Record drawing measurements shall be prepared by a Florida registered land surveyor, working under the direction of the Contractor/Developer. Measurements shall be reviewed and record drawings shall be prepared, signed and sealed by the Engineer of Record. Record drawings shall reflect the constructed facilities and shall not state "originally designed/proposed facilities", "per plans," or similar wording.

Two paper copies, signed and sealed by the engineer of record, plus one reproducible copy, shall be provided for all projects. Separate sheets shall be used for water and sewer lines. These drawings shall include elevations, profiles, lengths, stations, and locations, as appropriate, for all facilities including services. In addition, record drawings shall also be provided in electronic format, in a version to be coordinated with OUA.

A preliminary record set shall be submitted to the OUA for review prior to submittal of the final record drawings. The preliminary set shall be "blue line" with all deviations from the construction drawings clearly indicated in red. The preliminary set shall be reviewed, signed and sealed by the Engineer of Record and a professional land surveyor.

Permanent Record Drawings shall be submitted as follows:

- A. 2 paper copies, 24" x 36", one paper copy, 11" x 17" plus a reproducible of each line (water and sewer).
- B. Electronic File on CD formatted for AutoCad in a version to be coordinated with OUA.

SECTION 10-INSPECTION REQUIREMENTS

No work shall be covered until observed by a representative of the Okeechobee Utility Authority (OUA)

The OUA Inspectors may inspect all construction and materials and may also inspect preparation, fabrication or manufacture of components, materials and supplies. The inspector is not authorized to revoke, alter or waive any requirements of the specifications, but is authorized and expected to call to the attention of the developer's engineer and/or contractor any observed failure of work or materials to conform to the plans or specifications. Failure of the Inspector to call to the attention of the Contractor any item not in conformance to the plans and specs shall not constitute acceptance of the item. The inspector shall have the authority to reject materials or suspend the work pending review. The inspector shall in no case act as foreman or perform other duties for the engineer and/or contractor nor interfere with the management of the work. Advice which the inspector may give shall in no way be construed as binding to the OUA or releasing the developer, his engineer or contractor from performing according to the intent of the plans and minimum OUA Standards.

Inspections will be scheduled for regular working hours, Monday – Thursday, 7:00AM – 5:30PM only, except for nights when service disruptions are involved. Work will not be scheduled for weekends or holidays. The OUA shall be provided with at least two full working days' notice for Scheduled inspections. Inspectors will make routine passes to the project to inspect such items as gravity blocks, materials on site, clearances between conflicting lines, etc. Scheduled inspections are also required for jack and bores, setting of wet wells, lift station startups with manufacturer's representative present, and any time an existing OUA facility is to be modified (i.e., manhole tie-in and water taps).

It shall be the engineer's responsibility to Schedule inspections, and their qualified representative shall be present at all Scheduled tests and inspections. A Scheduled inspection will be canceled if the representative is not present. The engineer shall have the Contractor pretest water and force mains and gravity sewers to minimize failures and the need for additional inspections. The engineer shall prepare accurate record drawings and submit to the OUA two days before a lamping to verify adequacy of gravity sewer slopes. In any case, record drawings must be submitted prior to service being provided to any phase of a project.

The Contractor shall be allowed one Scheduled test and one Scheduled retest at no cost for the OUA Inspector. For additional tests, the OUA shall bill the developer for the time of the OUA Inspector at the amount defined within the OUA rate structure.

For any inspection, or tie in, that takes longer than a reasonable amount of time, as determined by the OUA, or when the inspection results in an overtime situation, the inspector's time will be billed back to the contractor. Payment shall be made to OUA prior to final acceptance of the project.

The Contractor shall be solely responsible for safety.

SECTION 11 -PROJECT ACCEPTANCE

No project shall be put into permanent use until the OUA has accepted it. The OUA requires the following items be completed prior to acceptance.

1. Signed and sealed record drawings by the Engineer of Record, along with an electronic copy are received. A written certification has been provided to the OUA by the Engineer of Record that the project has been constructed in substantial compliance with the approved plans and specifications and the conditions set forth in all applicable permits.
2. Release of the project by DEP.
3. OUA Inspector has conducted a final inspection and accepted the project.
4. Owner provides a Release of Lien stating all items given to the OUA are free and clear of liens.
5. Copy of plat with recorded easements, if any, are received.
6. (2) O&M Manuals are received and (1) placed in lift station panel (if applicable).
7. Copies of all testing (Bacteriological, Densities, Pressures, etc.) results are received.
8. Contracts for service are executed.
9. Certification that this project does not detrimentally affect existing mains and pump/lift stations.
10. OUA has been provided a Certificate of Title where required.
11. Value of system separate total cost of water and wastewater systems.
12. All fees due to OUA must be paid.

SECTION 12 -APPROVED PRODUCT LIST

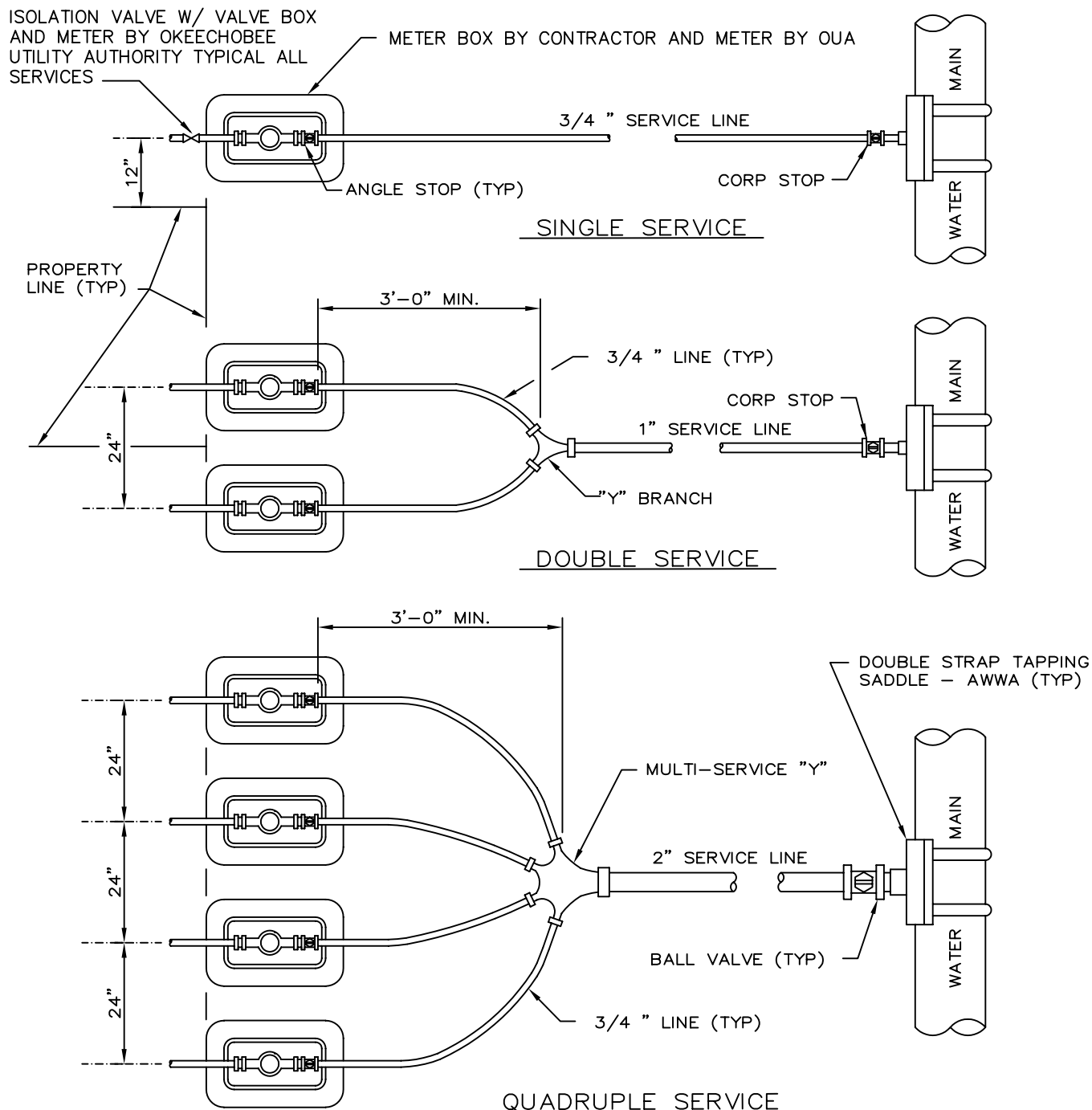
- 12.1. Fire Hydrants, Traffic Type, 5.25" Valve Opening, OSHA Safety Yellow -Non-draining dry barrel break away type.
 - 12.1.1. American Darling #B84B
 - 12.1.2. Clow Medallion
 - 12.1.3. Mueller Centurion
- 12.2. Resilient Seat Gate Valves 4" -12"
 - 12.2.1 Mueller
 - 12.2.2. American/Darling
 - 12.2.3. Clow
- 12.3. Butterfly Valves 12" and Larger
 - 12.3.1. Mueller-Lineseal III
 - 12.3.2. Clow
 - 12.3.3. DeZurik
- 12.4. Tapping Valves (Resilient Seat Type Only)
 - 12.4.1. American/Darling
 - 12.4.3. Mueller
 - 12.4.4. Clow
- 12.5. Tapping Sleeve -Stainless Steel 304 or Epoxy Coated Only
 - 12.4.5.1. Smith-Blair #665, #663
 - 12.4.5.2. JCM Industries #432, #452
 - 12.4.5.3. Ford, Fast or FTSS series
- 12.6. Mechanical Joint and Flanged Fittings (AWWA/ANSI, Cement or poly Lining)
 - 12.6.1 . Tyler/Union
 - 12.6.2. Star
 - 12.6.3. Sigma
 - 12.6.4. American
- 12.7. Corporation Stops, 3/4", 1"
 - 12.7.1. Ford, Series F-1000, CC Taper Thread
 - 12.7.2. Ford, Series F-11 00, Male Iron Pipe
- 12.8. Meter Angle Valves (T -Handle, Locking Wing Type Only)
 - 12.8.1 Ford KV43 Series
- 12.9. Y-Branch
 - 12.9.1. Ford Y44 Series
- 12.10. Tees
 - 12.10.1 Ford T444 Series
- 12.11 Adapters & Couplings for Polyethylene Tubing, Pack Joint – “CTS Only”
 - 12.32.1 Ford Meter Box Co.

- 12.12. Service Saddles (Double Strap Saddles for DI Only and Stainless Steel 304 wide strap for PVC or epoxy coated).
 - 12.12.1. Ford Double Strap, Series 202 BS and FC202
 - 12.12.2. Smith Blair - #317, #397
 - 12.12.3. JCM Industries - #404, #408
- 12.13. Backflow Preventers, Residential
 - Dual Check, In-Line ¾" and 1"
 - 12.13.1. Ford HHS31
 - Commercial, Reduced Pressure 1" and 2"
 - 12.13.2. Watts (Model LF009)
 - 12.13.3. Febco (Model LF825Y)
 - 12.13.4. Wilkens (Model 975XL2)
 - 12.13.5. Ames (Colt Model 400) -3" and up
- 12.14. Meters -5/8"x 3/4" and 1" P.D.
 - 12.14.1. Sensus SR II with TRPL & TRC options to meet NSF-61
- 12.15. Meters -Compound -1 1/2" and Larger, to meet NS F-61
 - 12.15.1. Sensus Omni C-2 with Strainer with TRPL & TRC options to meet NSF-61
- 12.16. Fire Hydrant Meters
 - 12.16.1. Sensus Omni H-2
- 12.17. Meter Boxes/Vaults -Vehicular Area
 - 12.17.1. Oldcastle B09 single concrete meter box
 - 12.17.2. Oldcastle Brooks B09 GP single concrete lid with a 2" hole for reading probe & self closing reading lid with frame.
- 12.18. Meter Boxes/Vaults -Non-Vehicular Area
 - 12.18.1. Carson Plastic Box # 1419 -Single meter box
 - 12.18.2. Carson Plastic Lid #1015 with CI reader
- 12.19. Emergency Alarm and Status Reporting System with 20 Foot Tower and Antenna
 - 12.19.1. Telemetry, as required by OUA
- 12.20. Lift Station Pumps
 - 12.20.1. Davis EMU
 - 12.20.2. Flygt
 - 12.20.3. ABS
- 12.21. Air Release Valves (Water) 1" Minimum
 - 12.21.1. Apco -Model 200 A
 - 12.21.2. Val-Matic -VM 38

- 12.22. Electrical Components
 - 12.22.1. Breaker and Starters -Square D only
 - 12.22.2. Controls 110V -Syrelec or diversified electronics
 - 12.22.3. Phase Monitor -Syrelec or diversified electronics
 - 12.22.4. Stand-by Power Receptacle (250V or 600V) male -Russell and Stoll 240V -JRS 1034HR, 100 Amp; 480V -JRS 2034HR, 200 Amp
- 12.23. Manhole Frame and Covers, Minimum Weight 3341bs.
 - 12.23.1. US Foundry No. 420 B
 - 12.23.2. Neenah Foundry -R -1772 -B
 - 12.23.3 East Jordan Iron works -1072Z / 1072 assembly
- 12.24. Pipe -PVC (Must Meet OUA Standards for Water Mains and Force Mains)
 - 12.24.1. National
 - 12.24.2. JM Eagle
 - 12.24.3. North American
 - 12.24.4. Charlotte
- 12.25. Pipe -DIP -For Water, Cement Lined -For Sewer, Poly lined
 - 12.25.1. U.S. Pipe
 - 12.25.2. American
 - 12.25.3. McWane
 - 12.25.4. Griffin
- 12.26. Pipe -HDPE, SDR 11
 - 12.26.1. Driscoplex by Performance Pipe
 - 12.26.2. Polypipe by Dura-Line
 - 12.26.3. JM Eagle
- 12.27. Valve Boxes (5-1/4" diameter only)
 - 12.27.1. Tyler
- 12.28. Valve Box Risers -Tyler 5 \1.0"
- 12.29. Air Release (Sewer) 2" Minimum
 - 12.29.1. Apco Model 400
 - 12.29.2. Val-Matic -VM 48A
- 12.30. Check Valves (Lever & Weight Type Only)
 - 12.30.1. M & H Style #159-02
 - 12.30.2. American Darling 52 SC
 - 12.30.3. Clow -106 LW
- 12.31. Brass Ball Valves
 - 12.30.1 Ford 1-1/2"#B11-666W
 - 12.30.2 Ford 2" # B11-777W
- 12.32. Polyethylene Tubing (3/4" to 2") SDR 9 CTS PE 4710 250psi
 - 12.32.1 ADS Polyflex
 - 12.32.2 Charter Plastics
 - 12.32.3. Endot

- 12.33 PVC Fittings, Gravity Sewer
 - 12.33.1 HARCO
 - 12.33.2 Multi Fittings
 - 12.33.3. Vassalo
 - 12.33.4. National Pipe
 - 12.33.5 Plastic Trends
- 12.34 PVC Fittings -Pressure
 - 12.34.1. Spears
 - 12.34.2. Lasco
 - 12.34.3. Charlotte
- 12.35 Pipe Joint Restraints -PVC or DIP
 - 12.35.1. EBAA Iron
 - 12.35.2 Uniflange
 - 12.35.3 Ford
- 12.36 Mechanical Joint Restraints -PVC or DIP
 - 12.36.1 EBAA Iron
- 12.37 Manholes
 - 12.37.1 Oldcastle Precast
 - 12.37.2 American Concrete Industries
 - 12.37.3 Hanson Precast
 - 12.37.4 Durastress Underground
 - 12.37.5 Mack Concrete Industries
- 12.38 Vacuum Sewers
 - 12.38.1 AIRVAC, Inc.
- 12.39 Vacuum Sewer Fittings:
 - 12.39.1 Spears
 - 12.39.2 Specified
 - 12.39.3 Marco
- 12.40 Sewer Saddles
 - 12.40.1 Inserta tee
 - 12.40.2 Vassallo
 - 12.40.3 Plastic Trends
- 12.41 Brass Nipples and Fittings, Domestic NSF -61 Approved (Lead Free)
 - 12.41.1 Merit Brass
 - 12.41.2 Lee
- 12.42 MJ Kits (Less Gland)
 - 12.42.1 Pro Select
 - 12.42.2 Birmingham Fastner
 - 12.42.3 Sigma
 - 12.42.4 Star

STANDARD DETAILS



NOTES:

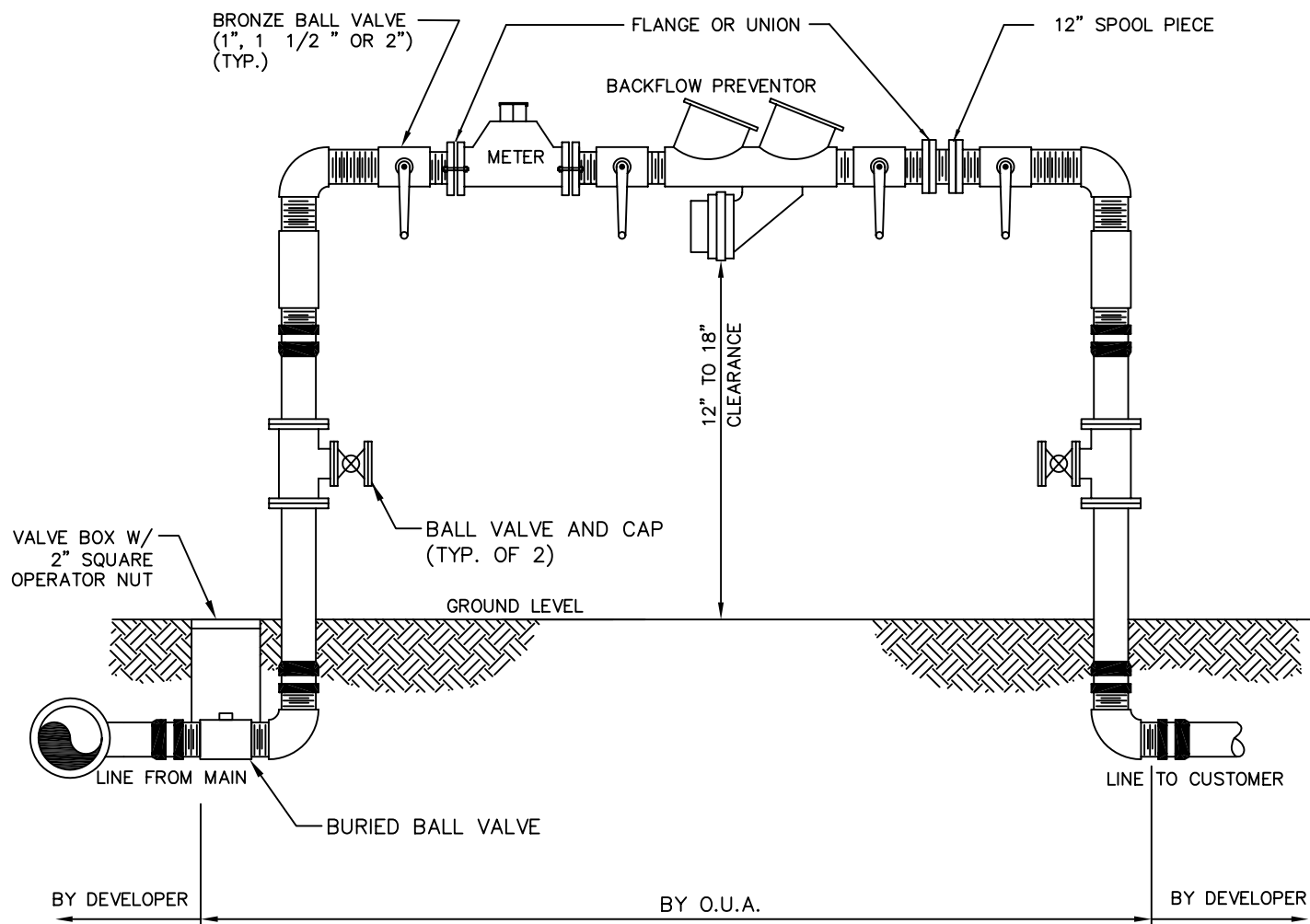
1. AUTHORIZED SERVICE LINE MATERIAL SHALL BE POLYETHYLENE TUBING.
2. MULTIPLE SERVICE/METER INSTALLATIONS OF MORE THAN 4 METERS PER SERVICE AND SERVICE LINES LARGER THAN 2" IN DIAMETER SHALL BE HANDLED ON AN INDIVIDUAL BASIS.
3. NO FITTINGS BETWEEN CORP. STOP & ANGLE VALVE OR CORP. STOP & "Y" BRANCH FOR MULTIMETER INSTALLATIONS.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

REVISION
JULY-07

TYPICAL SERVICE FOR
MULTIPLE SERVICES
(TWO OR MORE)

PAGE No
D2



NOTES:

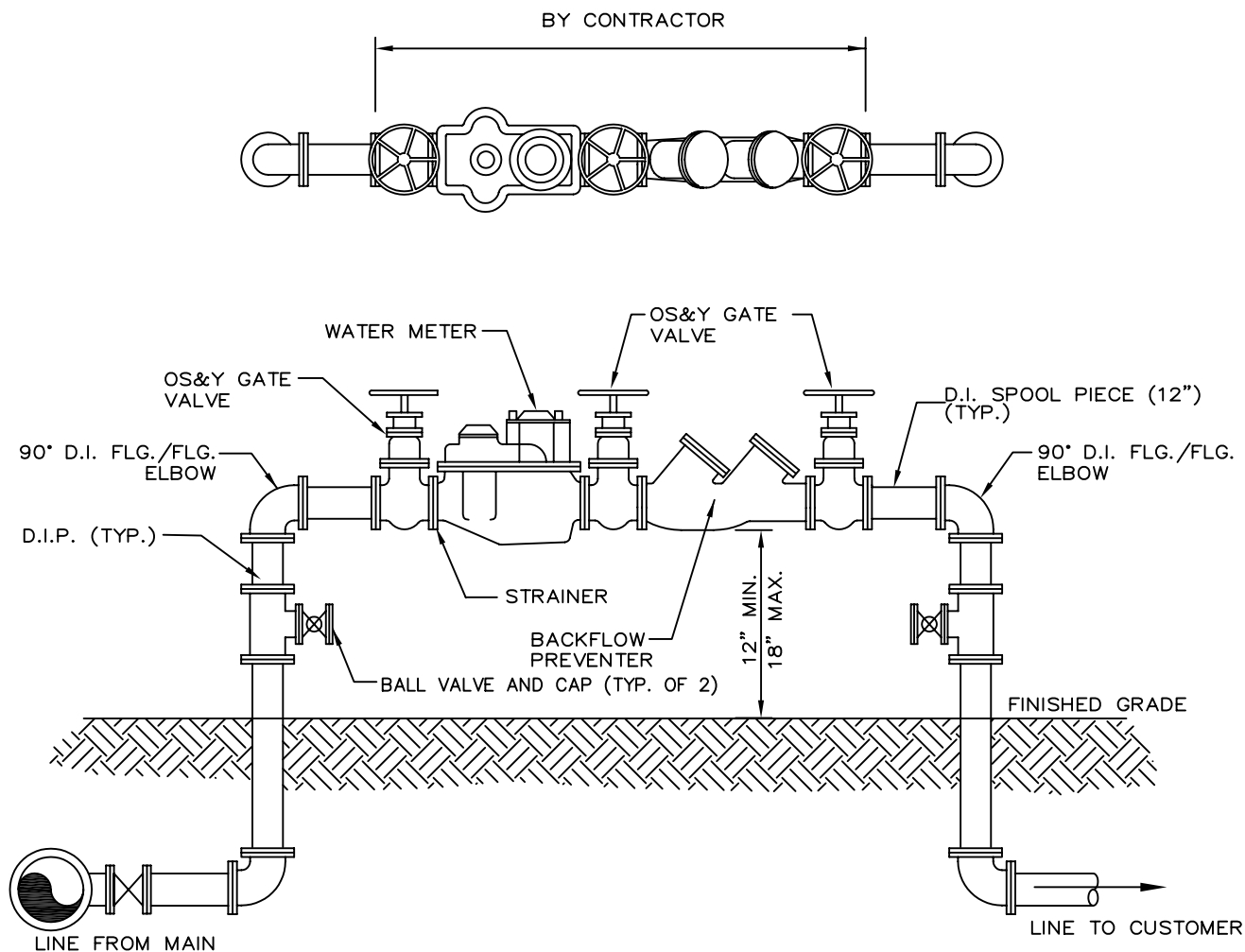
1. ALL PIPING IS METER SIZE.
2. ALL PIPING IS BRASS WITH THREADED FITTINGS.
3. THIS DETAIL IS ALSO APPLICABLE TO 5/8" x 3/4" AND 1" SERVICE WHERE A BACKFLOW PREVENTION DEVICE IS REQUIRED, EXCEPT THAT METER WILL BE INSTALLED IN METER BOX.
4. METERS AND BACKFLOW PREVENTERS ARE TO BE PURCHASED FROM OUA.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

REVISION
JULY-07

1 1/2" AND 2" METER
(ABOVE GROUND)

PAGE No
D3



NOTES:

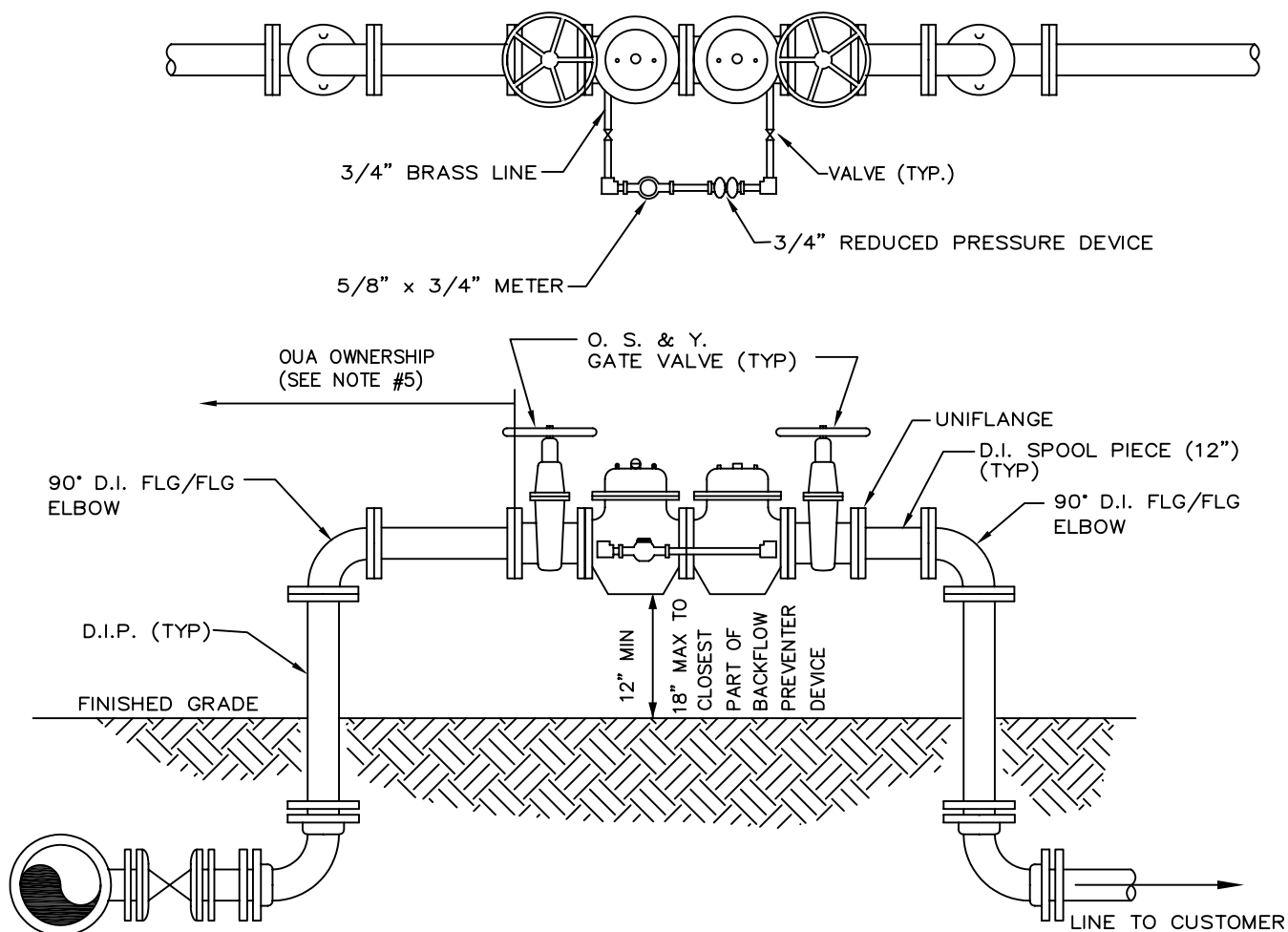
1. ALL PIPE AND FITTINGS SHALL BE CLASS 53 DUCTILE IRON CEMENT LINED.
2. MECHANICAL JOINT FITTINGS SHALL BE REQUIRED UNDERGROUND AND FLANGED FITTINGS FOR ABOVE GROUND USE, NO UNIFLANGES PERMITTED.
3. PAINT THE ENTIRE ABOVE GROUND ASSEMBLY, IN ACCORDANCE WITH THE OUA STANDARD. DO NOT PAINT OVER NAME/SERIAL PLATE OR BRASS FITTINGS.
4. CONTRACTOR TO INSTALL PIPE SUPPORTS AS NEEDED.
5. METER & BACKFLOW PREVENTION DEVICES SHALL BE PURCHASED FROM THE OKEECHOBEE UTILITY AUTHORITY.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

REVISION
JULY-07

3" AND 4" METER / BACKFLOW ASSEMBLY

PAGE No
D4



NOTES:

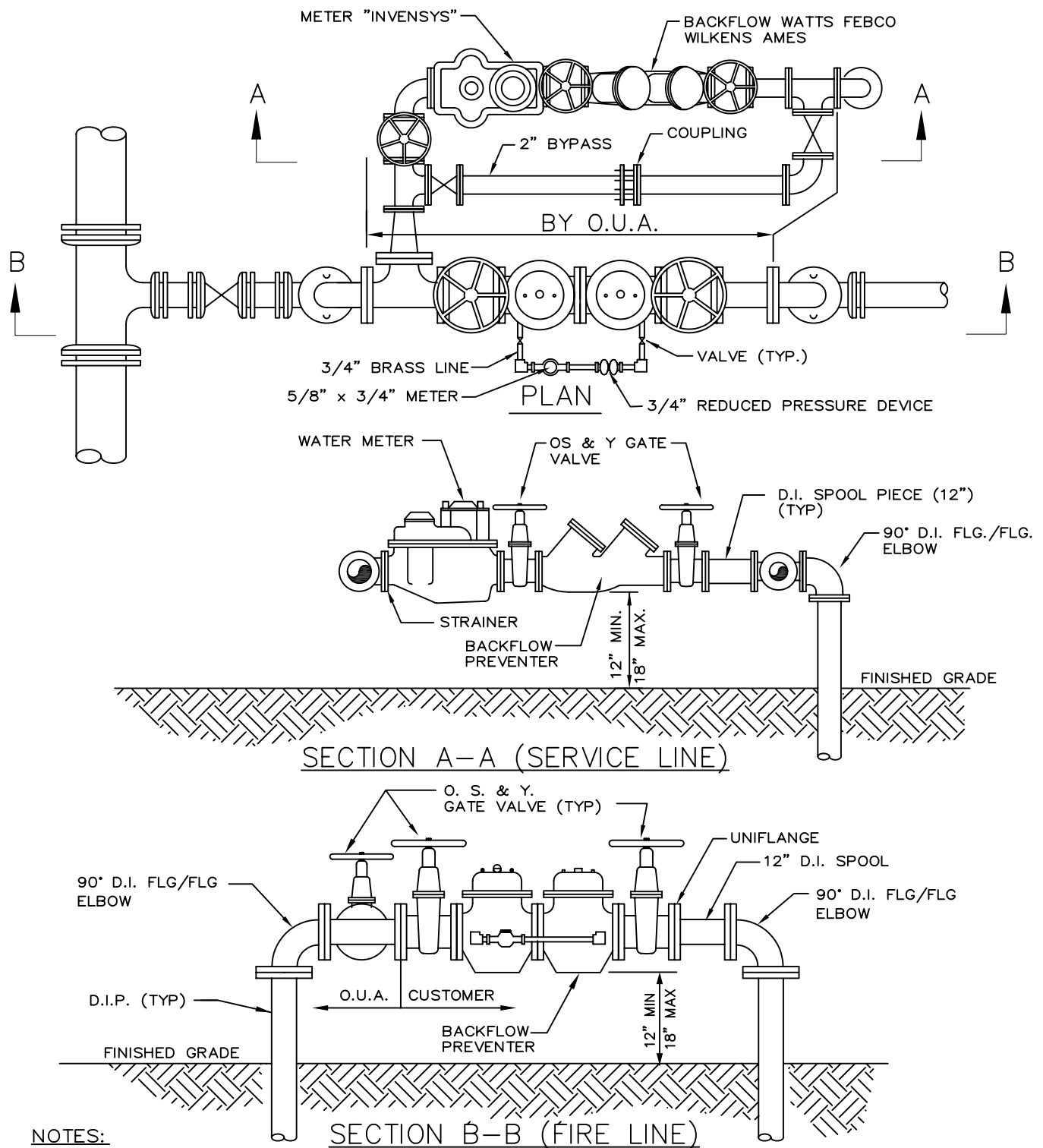
1. ALL PIPE AND FITTINGS SHALL BE CLASS 53 DUCTILE IRON CEMENT LINED.
2. MECHANICAL JOINT FITTINGS SHALL BE REQUIRED UNDERGROUND AND FLANGED FITTINGS FOR ABOVE GROUND USE, NO UNIFLANGES PERMITTED.
3. PAINT THE ENTIRE ABOVE GROUND ASSEMBLY, IN ACCORDANCE WITH THE OUA STANDARDS. DO NOT PAINT OVER NAME/SERIAL PLATE OR BRASS FITTINGS.
4. CONTRACTOR TO INSTALL PIPE SUPPORTS AS NEEDED.
5. ONCE COMPLETED ACCEPTED AND PLACED INTO SERVICE, THE OUA WILL OWN AND MAINTAIN PIPING UP TO FIRST VALVE, PROPERTY OWNER TO OPERATE AND MAINTAIN FIRE LINE FROM THIS POINT.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

REVISION
JULY-07

FIRE LINE ASSEMBLY & DETECTOR CHECK VALVE

PAGE No
D5



NOTES:

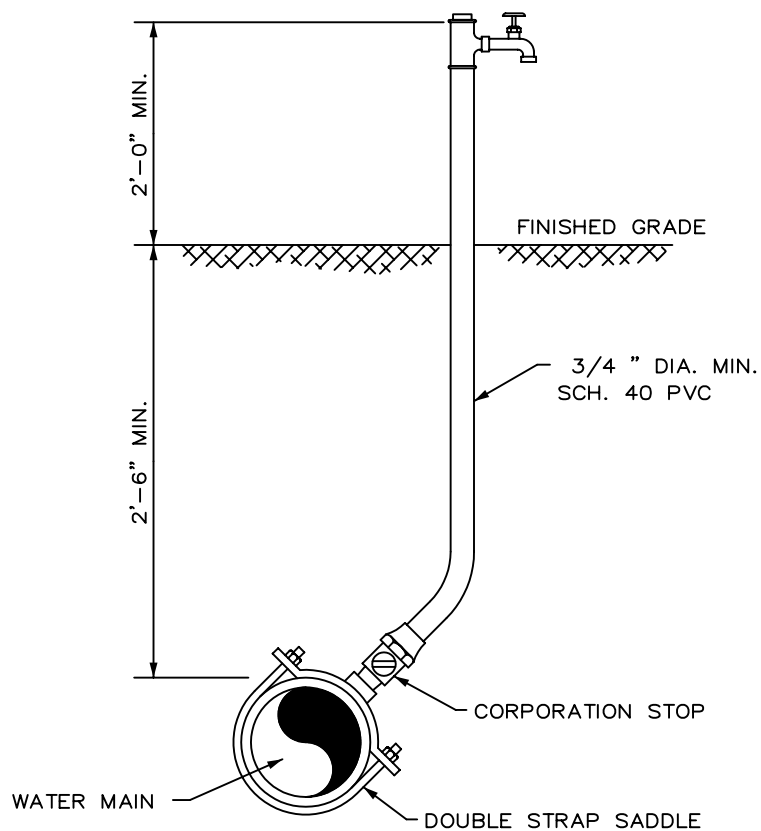
1. ALL PIPE AND FITTINGS SHALL BE CLASS 53 DUCTILE IRON CEMENT LINED.
2. MECHANICAL JOINT FITTINGS SHALL BE REQUIRED UNDERGROUND AND FLANGED FITTINGS FOR ABOVE GROUND USE.
3. PAINT THE ENTIRE ABOVE GROUND ASSEMBLY, IN ACCORDANCE WITH THE OUA STANDARDS. DO NOT PAINT OVER NAME/SERIAL PLATE OR BRASS FITTINGS.
4. CONTRACTOR TO INSTALL PIPE SUPPORTS AS NEEDED.
5. THE CONTRACTOR SHALL PURCHASE THE METER & BACKFLOW ASSEMBLY FROM O.U.A.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

REVISION
JULY-07

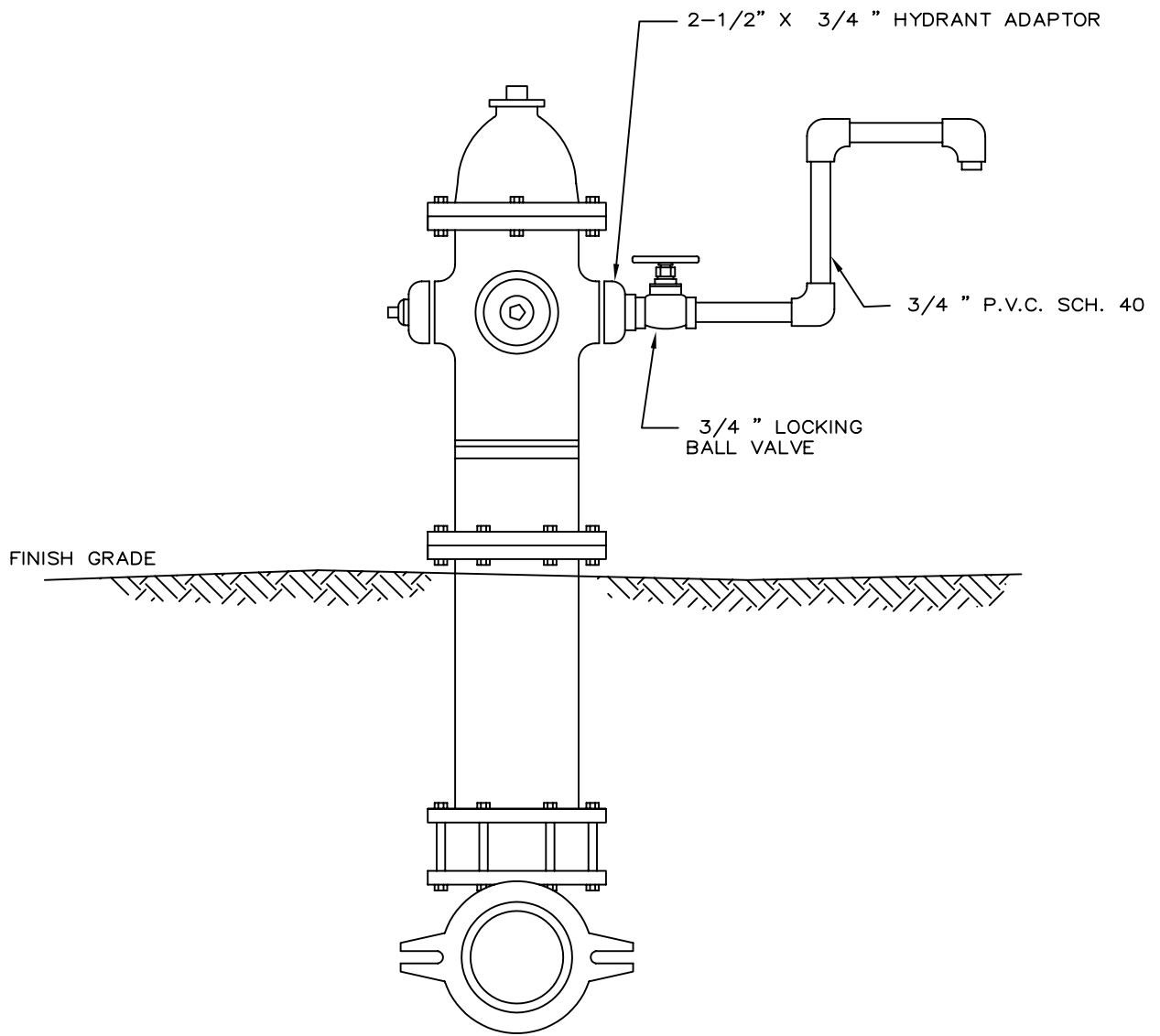
SERVICE AND FIRE LINE ASSEMBLY

PAGE No
D6



NOTES:

1. SAMPLE POINT SHOULD BE ON A SERVICE LINE OR FIRE HYDRANT IF POSSIBLE.
2. SAMPLE POINT TO BE REMOVED BY CONTRACTOR AFTER PROJECT IS ACCEPTED.

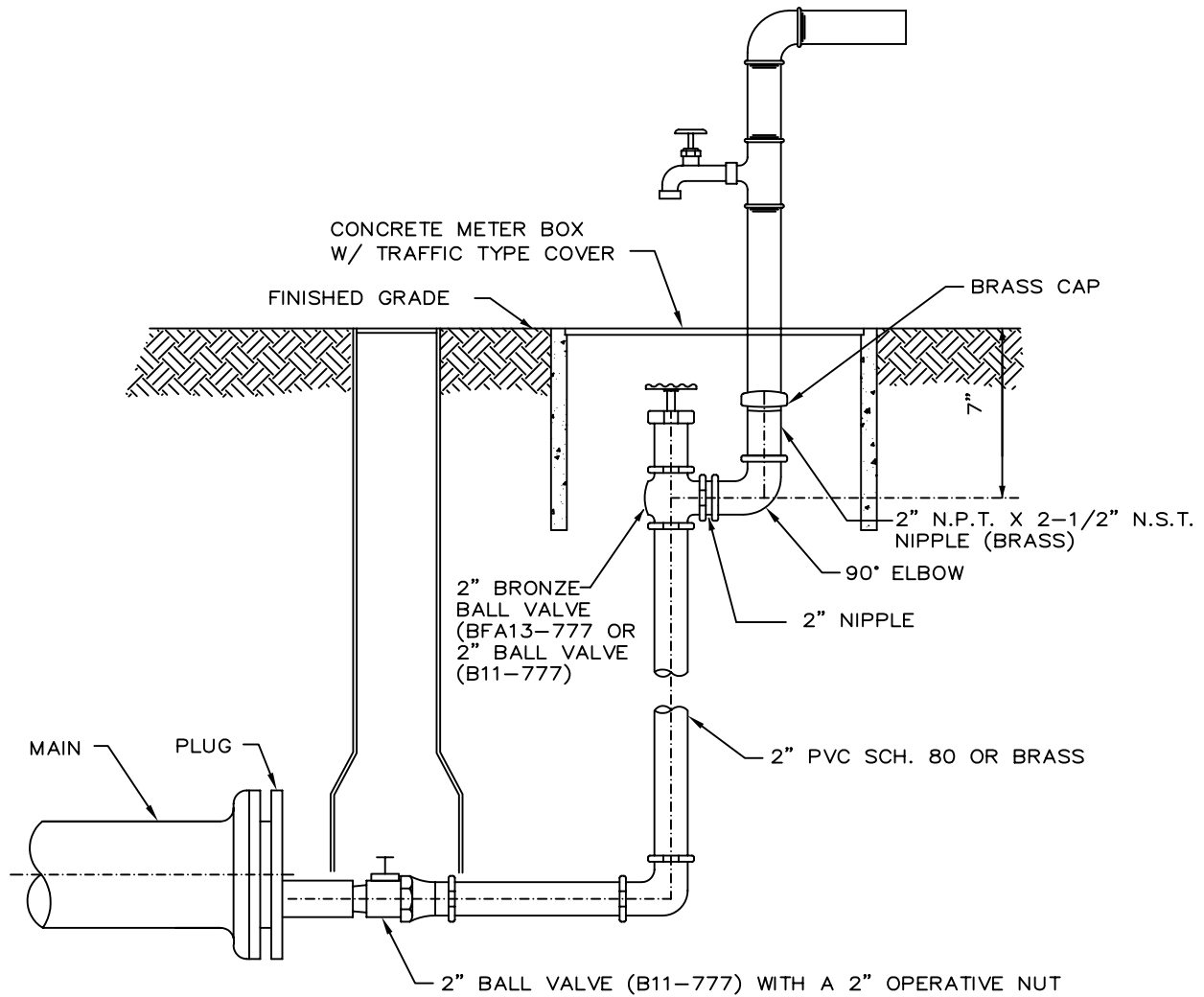


OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

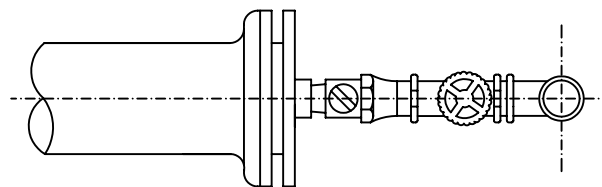
REVISION
JULY-07

SAMPLING POINT (ON HYDRANT)

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ELEVATION



PLAN

NOTES:

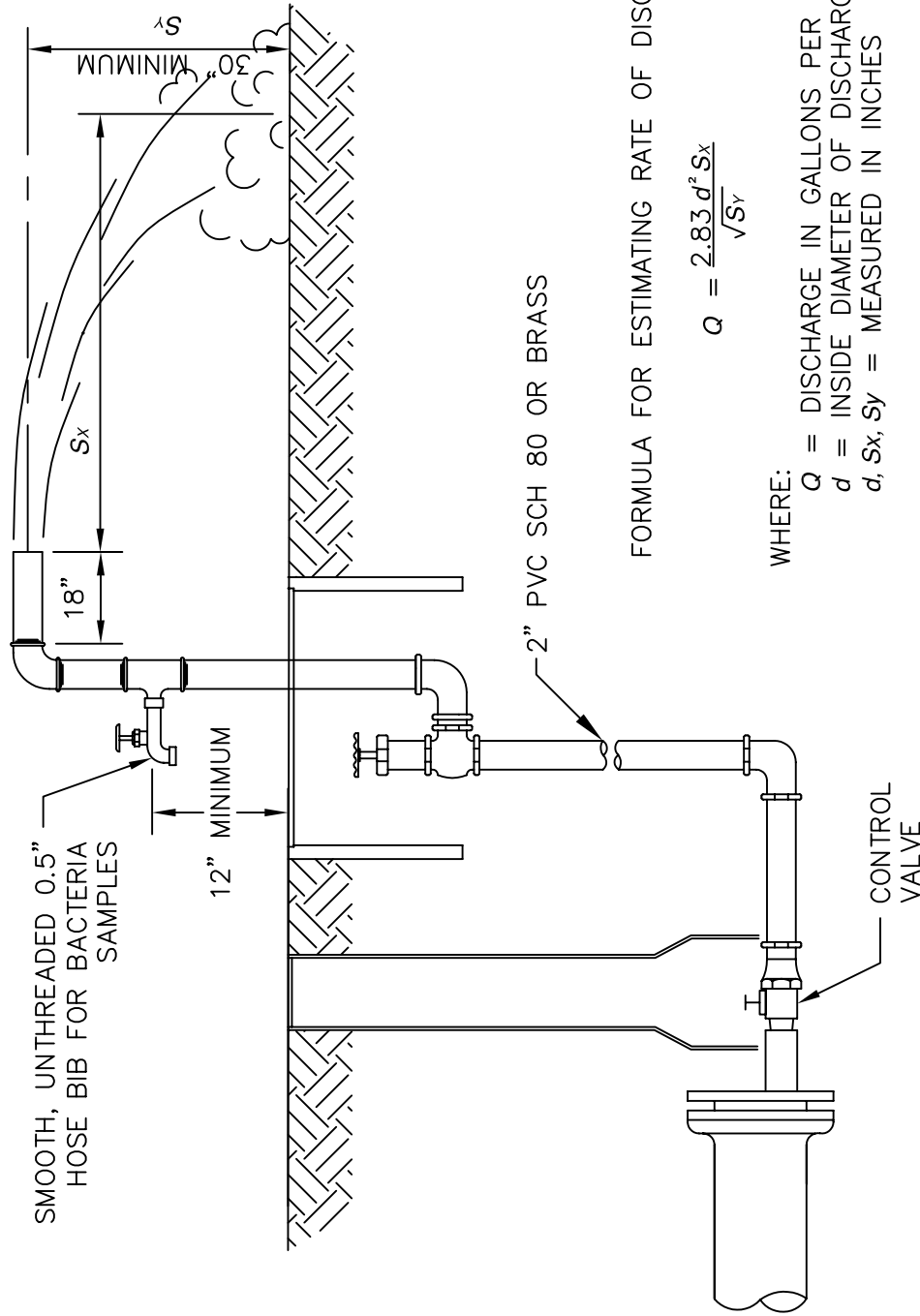
1. GALVANIZED PIPING AND FITTINGS SHALL NOT BE USED ON TEMPORARY OR PERMANENT BLOWOFFS.
2. THE MAIN SHALL BE MECHANICALLY RESTRAINED IN ACCORDANCE WITH THE OUA STANDARDS. THE NUMBER OF PIPE LENGTHS TO BE RESTRAINED SHALL BE PER THE MANUFACTURER RECOMMENDATION.
3. SAMPLE POINT TO BE REMOVED UPON COMPLETION.
4. SEE D9A FOR FLUSHING DETAILS.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

REVISION
JULY-07

TYPICAL 2" TERMINAL END BLOWOFF
AND SAMPLING POINT

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D9



FORMULA FOR ESTIMATING RATE OF DISCHARGE

$$Q = \frac{2.83 d^2 S_x}{\sqrt{S_y}}$$

WHERE:

Q = DISCHARGE IN GALLONS PER MINUTE

d = INSIDE DIAMETER OF DISCHARGE PIPE

d, S_x, S_y = MEASURED IN INCHES

NOTES:

1. REFERENCE, AWWA C651.
2. THIS DETAIL APPLIES TO PIPES UP TO AND INCLUDING 8" DIAMETER. LARGER SIZES SHALL BE HANDLED ON A CASE BY CASE BASIS.
3. PIGGING OF LINES IS AN ACCEPTABLE METHOD OF CLEANING.
4. ABOVE GROUND PIPING TO BE REMOVED UPON COMPLETION OF TESTING.

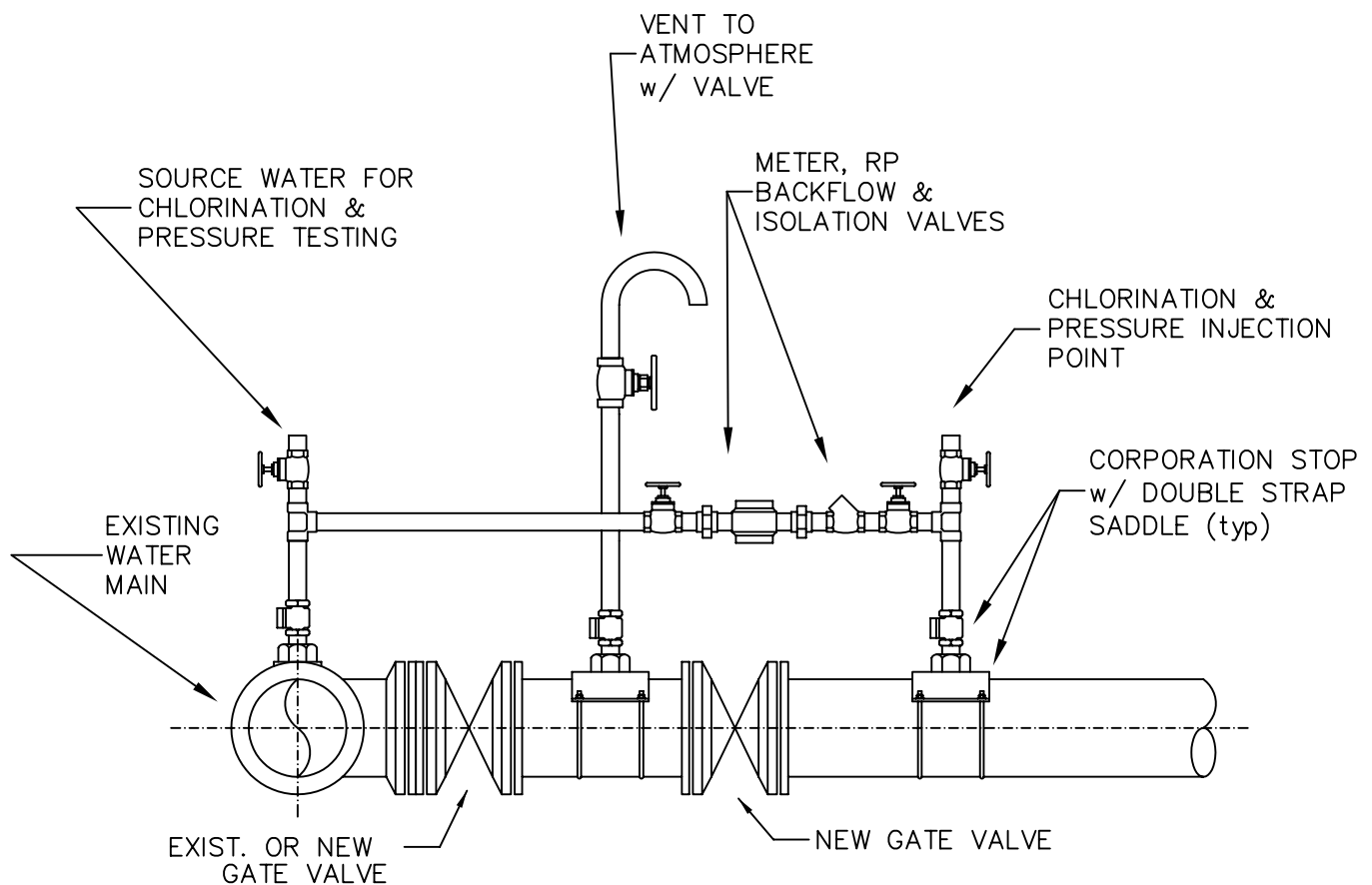
OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

REVISION
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FLUSHING DETAILS

PAGE No

D9A



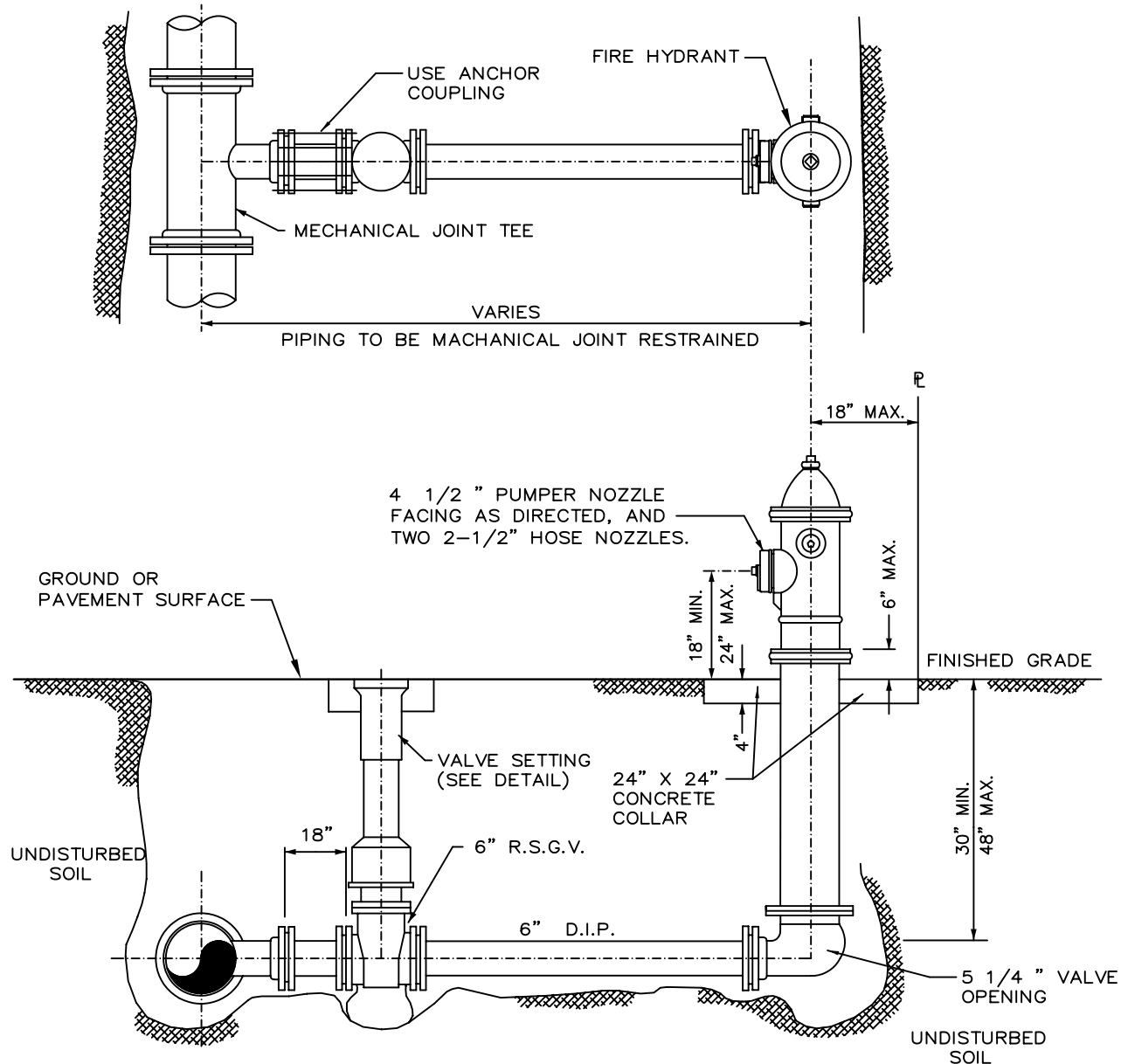
1. WATER MAIN TO BE PRESSURE TESTED AND DISINFECTED ACCORDING TO FDEP REGULATIONS, AWWA STANDARDS AND OUA REQUIREMENTS.
2. BACTERIOLOGICAL TESTING IS TO BE PERFORMED BY CONTRACTOR WITH PRIOR NOTIFICATION OF TESTING TO OUA PERSONNEL.
3. DO NOT REMOVE TEMPORARY CONNECTION UNTIL ALL TESTING HAS BEEN COMPLETED.
4. PROVIDE ALL NECESSARY THRUST BLOCKS OR OTHER RESTRAINTS.
5. FILLING AND FLUSHING LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR AND WITH APPROVAL OF ENGINEER AND/OR OUA.
6. MAIN LINE VALVE TO BE OPENED BY OUA PERSONNEL ONLY AND OPENED FOR CANNON FLUSHING OF NEW PIPING SYSTEM.

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FILLING, DISINFECTING AND TESTING DETAILS

PAGE No
D10



NOTES:

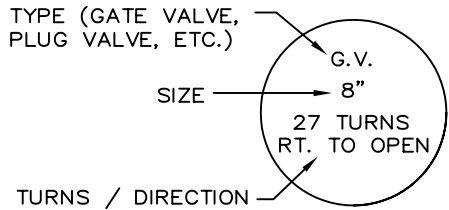
1. HYDRANT SHALL BE INSTALLED PLUMB AND TRUE.
2. THE MODEL COLOR TO BE SAFETY YELLOW, HYDRANT SHALL BE PER OUA REQUIREMENTS.
3. VALVE SHALL BE PLACED ADJACENT TO MAIN, TIED TO TEE.
4. ANCHOR TEES ARE PERMITTED.
5. ALL HYDRANTS SHALL BE TEE'D OFF MAINS.
6. HYDRANTS SHALL NOT BE PLACED IN SIDEWALKS, ROADWAYS OR BIKEPATHS.
7. MEGALUGS ON ALL FITTINGS.
8. HYDRANTS SHALL BE BAGGED UNTIL SYSTEM IS PLACED IN SERVICE.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

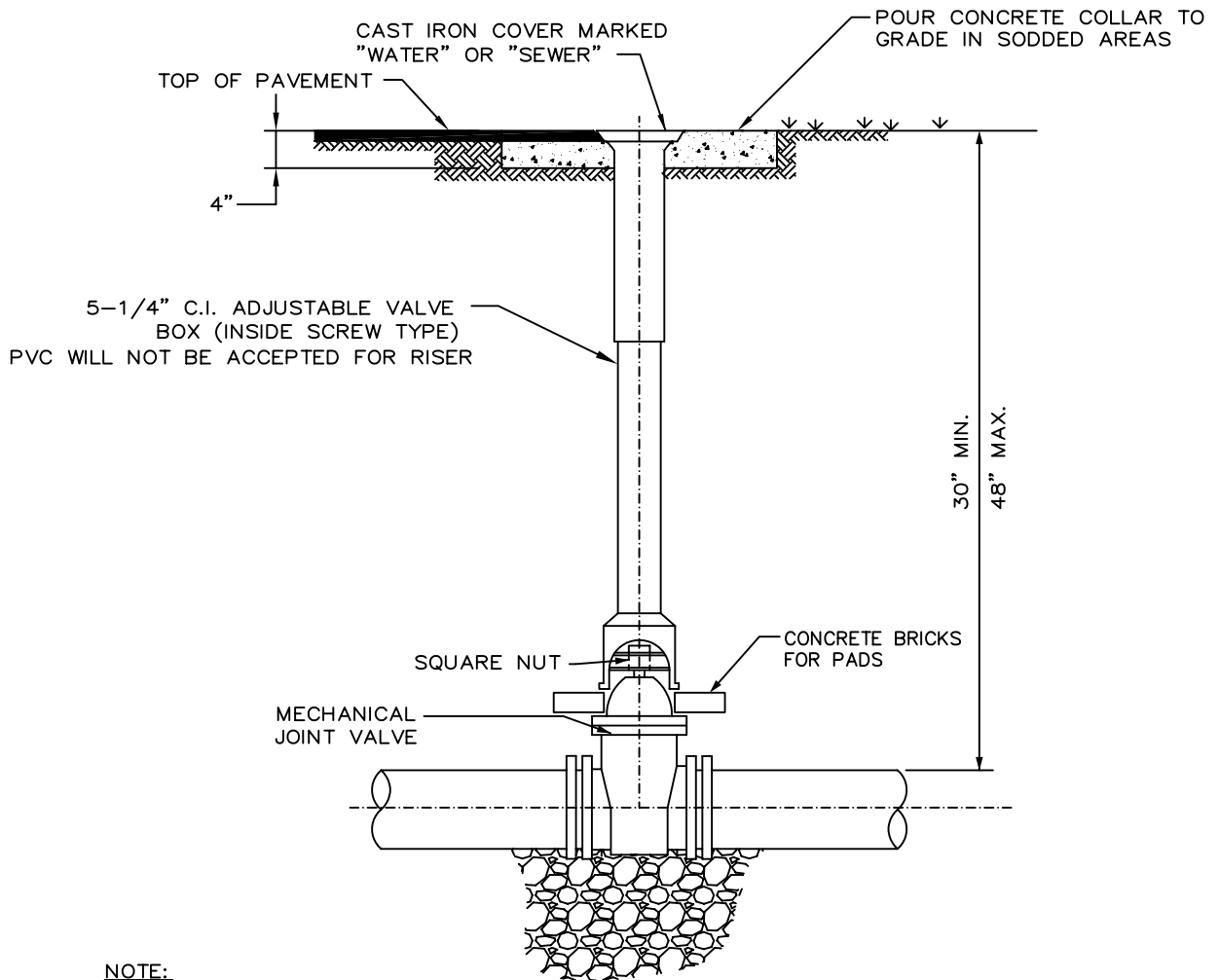
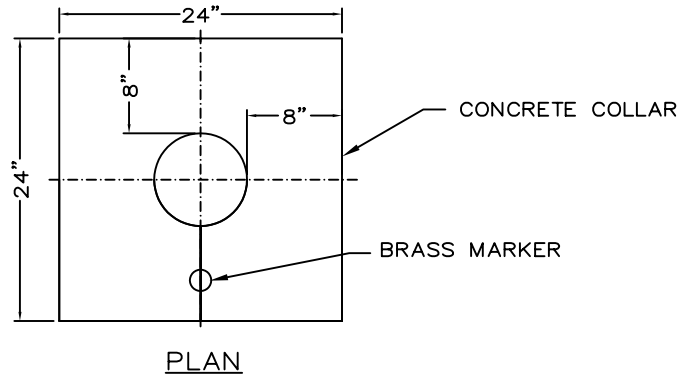
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TYPICAL
FIRE HYDRANT ASSEMBLY

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D11



BRASS MARKER
WITH INFORMATION AS
REQUIRED ABOVE



NOTE:

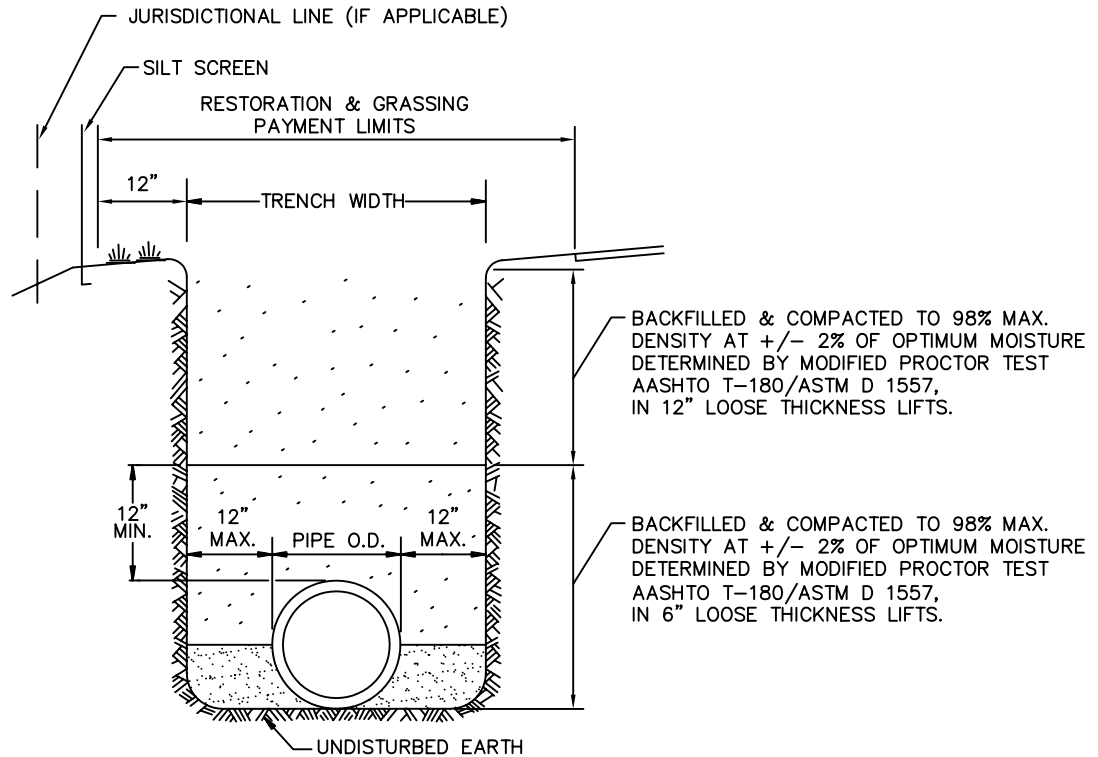
VALVE NUT EXTENSION IS REQUIRED ON ALL VALVES WITH MORE THAN 36" OF COVER. EXTEND NUT TO WITHIN 18" OF VALVE BOX RIM. PROVIDE SOLID BRICK PAD FOR VALVE BOX TO SIT ON.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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TYPICAL VALVE SETTING

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D12



NOTES:

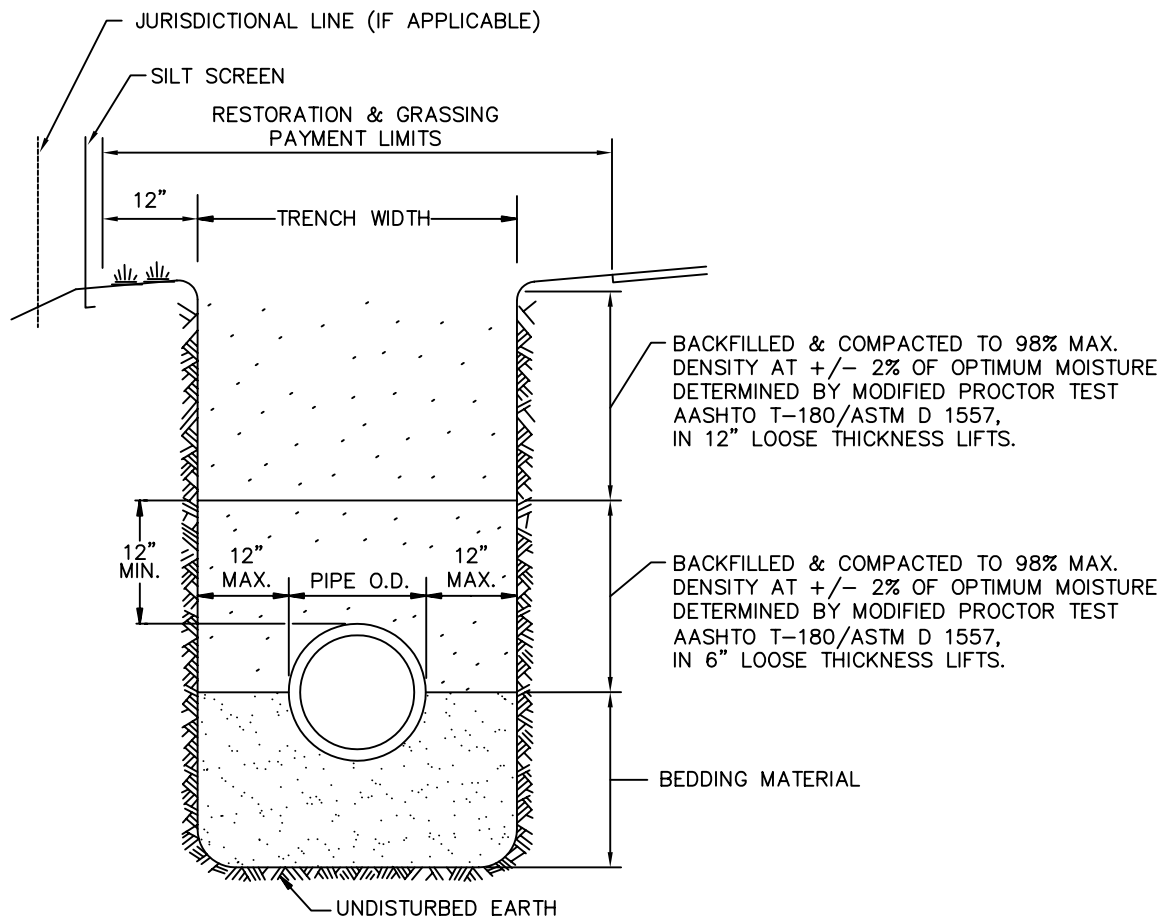
1. BACKFILL MATERIALS SHALL CONSIST OF CLEAN EARTH FILL COMPRISED OF SAND, SAND AND CLAY, GRAVEL, CRUSHED ROCK OR OTHER MATERIALS FROM GROUPS A-1, A-2 OR A-3, AASHTO CLASSIFICATION, FREE FROM ORGANIC MATTER AND VEGETATION, DEBRIS, LARGE CLODS OF EARTH OR STONES. UNSUITABLE IN-SITU MATERIALS SUCH AS MUCK, DEBRIS, LARGE ROCKS AND ROOTS SHALL BE REMOVED AND DISPOSED BY THE CONTRACTOR.
2. THE PIPE SHALL BE FULLY SUPPORTED ALONG ENTIRE LENGTH.
3. THE PIPE TRENCH SHALL REMAIN DRY DURING PIPE LAYING OPERATIONS.
4. ALL TRENCH WORK SHALL CONFORM TO LATEST STANDARDS AS SET FORTH BY THE FLORIDA TRENCH SAFETY ACT AND OR OSHA.
5. FOUR INCH WIDE DETECTABLE TAPE SHALL BE PLACED APPROXIMATELY 12"–18" BELOW FINISHED GRADE AND DIRECTLY ABOVE ALL PRESSURE PIPING. TAPE, WORDING AND COLOR SHALL CONFORM TO CITY STANDARDS.
6. TRAFFIC LANE CLOSURES, MOT PLANS AND ROADWAY REPAIRS MATERIALS SHALL BE PER DIRECTION OF ROAD OWNER. CONTRACTOR TO INQUIRE WITH OWNER ABOUT REQUIREMENTS PRIOR TO BID.
7. 3M LOCATOR BALLS SHALL BE INSTALLED AT EACH FITTING IN THE PIPE LINE CHANGING DIRECTION AND AT EACH CONNECTION.
8. 3M LOCATORS TO BE PROVIDED BY DEVELOPER AS SPECIFIED BY O.U.A.

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TYPICAL TRENCH DETAIL

PAGE No
D13



NOTES:

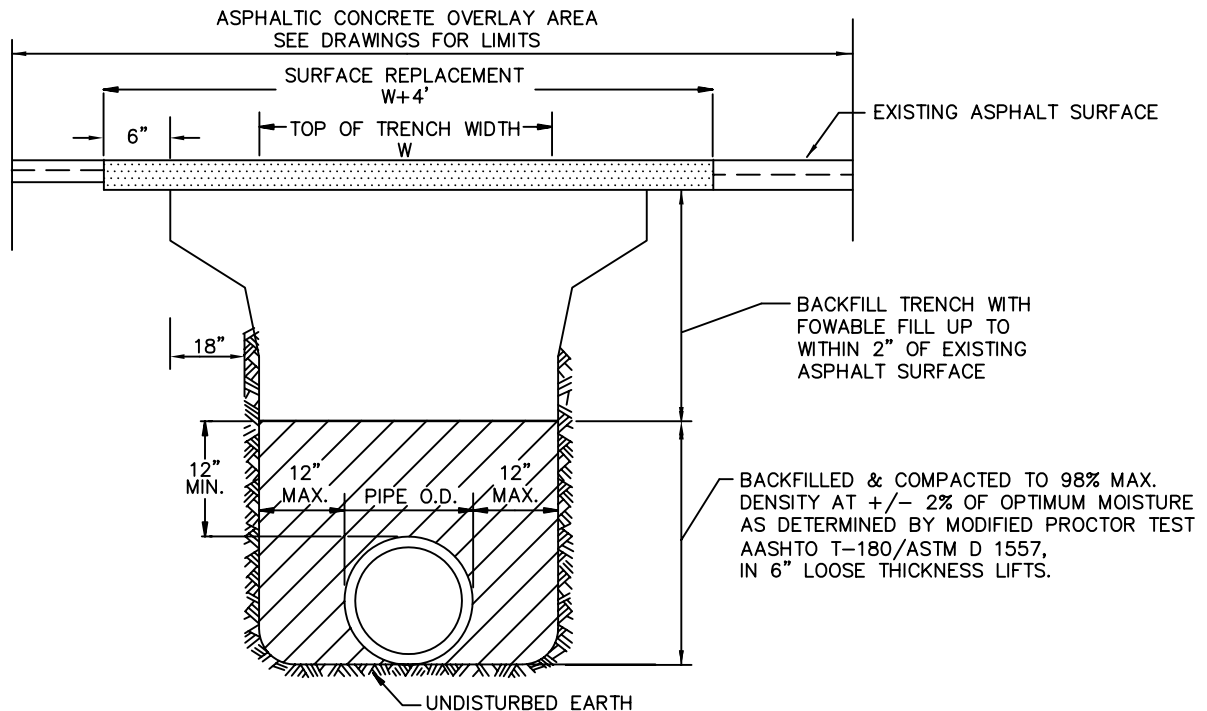
1. BEDDING MATERIAL SHALL CONSIST OF GRANULAR MATERIAL – 1/2" MAX. SIZE, COMPRISED OF SAND, GRAVEL, CRUSHED ROCK OR OTHER MATERIALS FROM GROUPS A-1, A-2 OR A-3, AASHTO CLASSIFICATION, AS APPROVED BY THE ENGINEER AND FREE FROM ORGANIC MATTER AND VEGETATION DEBRIS, LARGE CLOUDS OF EARTH. UNSUITABLE IN-SITU MATERIALS SUCH AS MUCK, DEBRIS AND LARGER ROCK SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR.
 2. THE PIPE SHALL BE FULLY SUPPORTED FOR ITS ENTIRE LENGTH WITH APPROPRIATE COMPACTION UNDER THE PIPE HAUNCHES.
 3. THE PIPE SHALL BE PLACED IN A DRY TRENCH, UNLESS A WET TRENCH INSTALLATION IS APPROVED BY THE OUA.
 4. BACKFILL SHALL BE FREE OF UNSUITABLE MATERIAL SUCH AS LARGER ROCK, MUCK AND DEBRIS.
 5. ALL WORK SHALL CONFORM TO STATE OF FLORIDA TRENCH SAFETY ACT.
 6. 4 INCH WIDE DETECTOR TAPE SHALL BE INSTALLED ABOVE ALL PIPE.
 7. 3M LOCATOR BALLS SHALL BE INSTALLED AT EACH FITTING IN THE PIPE LINE CHANGING DIRECTION AND AT EACH CONNECTION.
 8. 3M LOCATORS TO BE PROVIDED BY DEVELOPER AS SPECIFIED BY O.U.A.
 9. REFER TO SPECIFICATIONS FOR DEPTH OF BACKFILL WHEN BEDDING IS REQUIRED.
- * COMPACT TO AS INDICATED IN ABOVE NOTES, UNDER EXISTING & PROPOSED ROADS. COMPACT TO MATCH SURROUNDING SOILS IN UNDERDEVELOPED AREAS EXCAVATABLE FLOWABLE FILL IS ALSO ACCEPTABLE.

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TYPICAL TRENCH DETAIL – WITH SPECIAL BEDDING

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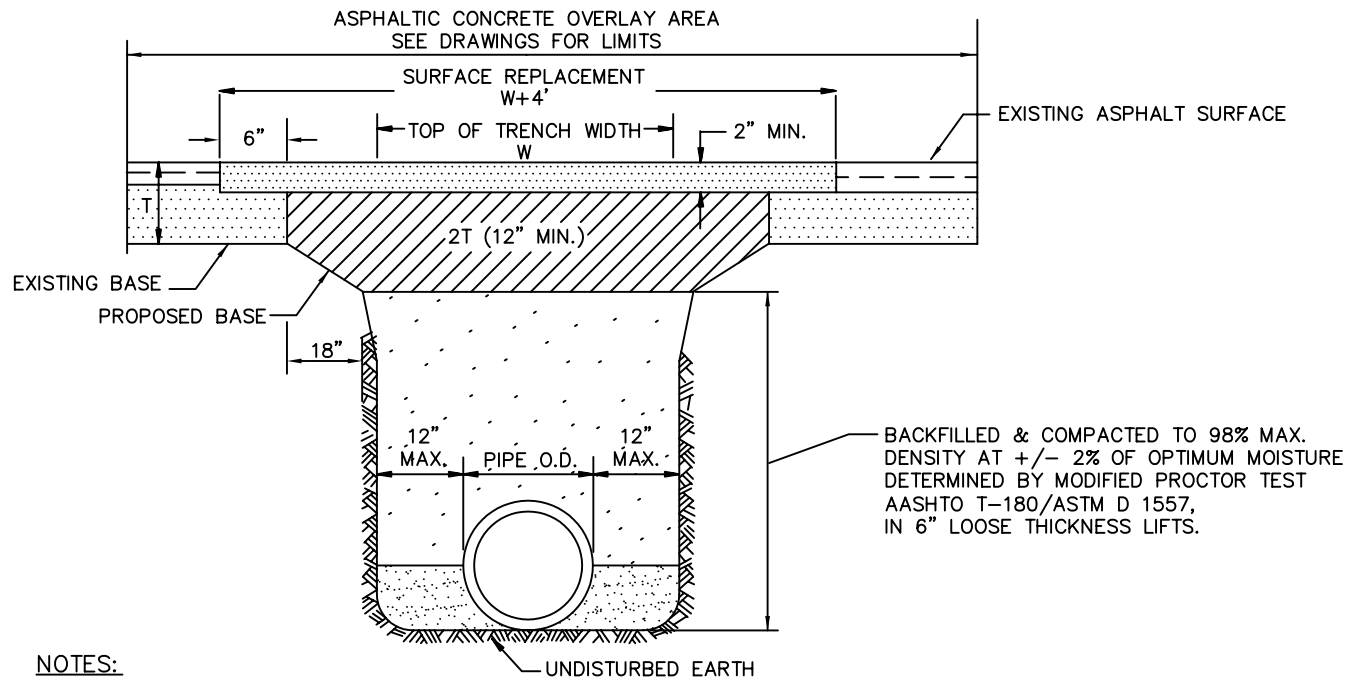
1. BACKFILL MATERIALS AROUND AND UP TO 1 FOOT ABOVE PIPE SHALL CONSIST OF CLEAN EARTH FILL COMPRISED OF SAND, SAND AND CLAY, GRAVEL, CRUSHED ROCK OR OTHER MATERIALS FROM GROUPS A-1, A-2 OR A-3 AASHTO CLASSIFICATION FREE FROM ORGANIC MATTER AND VEGETATION, DEBRIS, LARGE CLODS OR EARTH OR STONES. UNSUITABLE IN-SITU MATERIALS SUCH AS MUCK, DEBRIS, LARGE ROCK AND ROOTS SHALL BE REMOVED AND DISPOSED BY THE CONTRACTOR.
2. FLOWABLE FILL FROM A POINT 12" ABOVE TOP OF PIPE TO 2" BELOW EXISTING ASPHALT SURFACE, SHALL BE READY-MIXED FLOWABLE FILL CONSISTING OF PORTLAND CEMENT, AGGREGATES, WATER AND MINERAL MIXTURES IN COMPLIANCE WITH F.D.O.T. STANDARD SPECIFICATIONS, SECTION 121.
3. THE PIPE SHALL BE FULLY SUPPORTED ALONG ENTIRE LENGTH.
4. THE PIPE TRENCH SHALL REMAIN DRY DURING PIPE LAYING OPERATIONS.
5. ALL TRENCH WORK SHALL CONFORM TO LATEST STANDARDS AS SET FORTH BY THE FLORIDA TRENCH SAFETY ACT AND OR OSHA.
6. FOUR INCH WIDE DETECTABLE TAPE SHALL BE PLACED APPROXIMATELY 12"–18" BELOW FINISHED GRADE AND DIRECTLY ABOVE ALL PRESSURE PIPING. TAPE, WORDING AND COLOR SHALL CONFORM TO O.U.A. STANDARDS.
7. SURFACE COURSE SHALL BE F.D.O.T. MIX, TO MATCH EXISTING PAVEMENT, WITH A THICKNESS EQUAL TO THE EXISTING OR 2", WHICHEVER IS GREATER.
8. PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED BUTT JOINTS, HEATED, RAKED AND SPRAYED WITH A REJUVENATING AGENT. THE PATCH AREA SHALL BE A SMOOTH PLANE SUCH THAT A STRAIGHT EDGE PLACED ACROSS THE PATCH, PARALLEL TO THE TRAFFIC FLOW AND EXTENDING TO UNDISTURBED PAVEMENT SHALL SHOW NO MORE THAN 1/4" IRREGULARITY IN ANY 15 FT. SECTION. ANY IRREGULARITY SHALL BE CORRECTED IN ACCORDANCE WITH F.D.O.T. SPECIFICATIONS.
9. "COLD PATCH" SHALL BE USED FOR TEMPORARY REPAIRS ONLY, AND FOR A PERIOD NOT TO EXCEED 30 DAYS.
10. TRAFFIC LANE CLOSURES, MOT PLANS AND ROADWAY REPAIRS MATERIALS SHALL BE PER DIRECTION OF ROAD OWNER. CONTRACTOR TO INQUIRE WITH OWNER ABOUT REQUIREMENTS PRIOR TO BID.
11. 3M LOCATOR BALLS SHALL BE INSTALLED AT EACH FITTING IN THE PIPE LINE CHANGING DIRECTION AND AT EACH CONNECTION.
12. 3M LOCATORS TO BE PROVIDED BY DEVELOPER AS SPECIFIED BY O.U.A.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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JULY-07

TRENCH REPAIR DETAILS
PAVED AREAS WITH FLOWABLE FILL BACKFILL

PAGE No
D13B



NOTES:

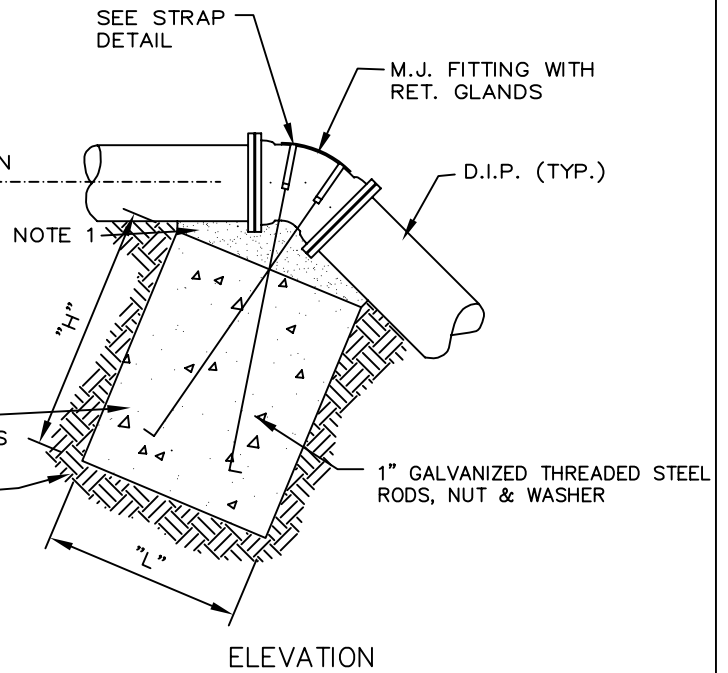
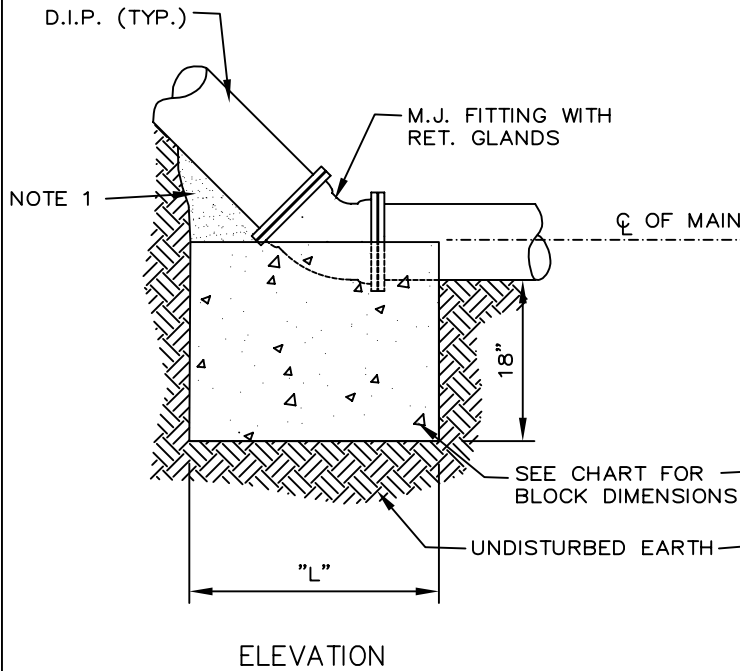
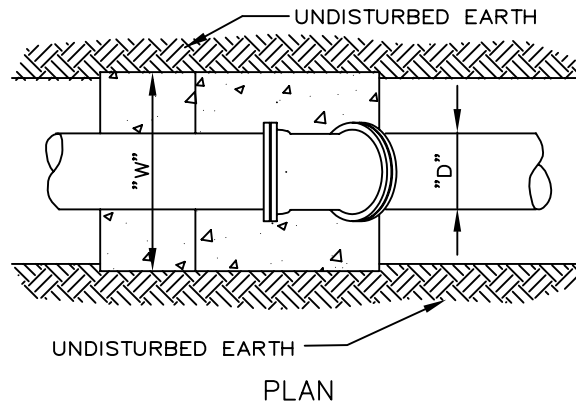
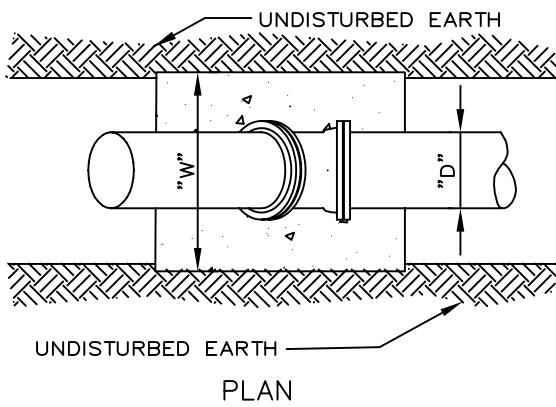
1. BACKFILL MATERIALS SHALL CONSIST OF CLEAN EARTH FILL COMPRISED OF SAND, SAND AND CLAY, GRAVEL, CRUSHED ROCK OR OTHER MATERIALS FROM GROUPS A-1, A-2 OR A-3, AASHTO CLASSIFICATION, FREE FROM ORGANIC MATTER AND VEGETATION, DEBRIS LARGE CLOUDS OF EARTH OR STONES. UNSUITABLE IN-SITU MATERIALS SUCH AS MUCK, DEBRIS, LARGE ROCK AND ROOTS SHALL BE REMOVED AND DISPOSED BY THE CONTRACTOR.
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4. ALL TRENCH WORK SHALL CONFORM TO LATEST STANDARDS AS SET FORTH BY THE FLORIDA TRENCH SAFETY ACT AND OR OSHA.
5. FOUR INCH WIDE DETECTABLE TAPE SHALL BE PLACED APPROXIMATELY 12"-18" BELOW FINISHED GRADE AND DIRECTLY ABOVE ALL PRESSURE PIPING. TAPE, WORDING AND COLOR SHALL CONFORM TO CITY STANDARDS.
6. BACKFILL SHALL BE COMPACTED IN 6" LAYERS WITH MECHANICAL TAMPERS FOR THE FULL WIDTH OF THE TRENCH AND UP TO THE BOTTOM OF THE ROADWAY BASE. PARTICULAR ATTENTION MUST BE GIVEN TO THE ADEQUATE COMPACTION OF THE HAUNCHES OF THE PIPE. THE BACKFILL SHALL BE COMPACTED TO 98% AASHTO T-180/ASTM D 1557 TAKEN AT THE SPRING LINE, AT ONE FOOT ABOVE THE CROWN OF THE PIPE, AND EVERY FOOT VERTICALLY THEREAFTER.
7. BASE MATERIAL SHALL BE THE SAME TYPE AS THE MATERIALS REMOVED.
8. SURFACE REPLACEMENT SHALL BE F.D.O.T. MIX TO MATCH EXISTING PAVEMENT, WITH A THICKNESS EQUAL TO THE EXISTING OR 2" WHICHEVER IS GREATER.
9. PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED BUTT JOINTS, HEATED, RAKED AND SPRAYED WITH A REJUVENATING AGENT. THE PATCH AREA SHALL BE A SMOOTH PLANE SUCH THAT A STRAIGHT EDGE PLACED ACROSS THE PATCH, PARALLEL TO THE TRAFFIC FLOW AND EXTENDING TO UNDISTURBED PAVEMENT SHALL SHOW NO MORE THAN 1/4" IRREGULARITY IN ANY 15 FT. SECTION. ANY IRREGULARITY SHALL BE CORRECTED IN ACCORDANCE WITH F.D.O.T. SPECIFICATIONS.
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11. TRAFFIC LANE CLOSURES, MOT PLANS AND ROADWAY REPAIRS MATERIALS SHALL BE PER DIRECTION OF ROAD OWNER. CONTRACTOR TO INQUIRE WITH OWNER ABOUT REQUIREMENTS PRIOR TO BID.
12. 3M LOCATOR BALLS SHALL BE INSTALLED AT EACH FITTING IN THE PIPE LINE CHANGING DIRECTION AND AT EACH CONNECTION.
13. 3M LOCATORS TO BE PROVIDED BY DEVELOPER AS SPECIFIED BY O.U.A.

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TRENCH REPAIR DETAILS
PAVED AREAS

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BLOCKING DETAIL
FOR
VERTICAL SAG
N.T.S.

BLOCKING DETAIL
FOR
VERTICAL CREST
N.T.S.

NOTES:

1. ANY VOID BETWEEN MAIN AND GRAVITY BLOCK TO BE FILLED WITH GROUT BY CONTRACTOR
2. FITTINGS SHALL BE WRAPPED WITH SUITABLE COVERING TO PREVENT ADHERENCE TO GRAVITY BLOCK.
3. USE MEGALUGS ON ALL FITTINGS.

NOTE: THRUST BLOCKS ONLY ON EXISTING LINES AND WHEN PRE-APPROVED BY THE EXECUTIVE DIRECTOR

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

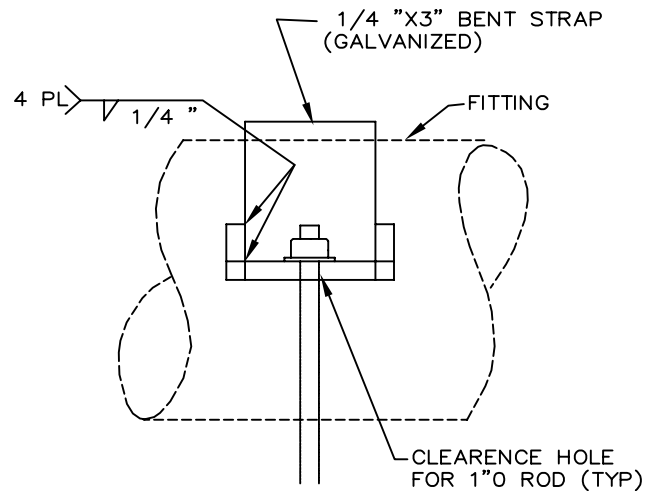
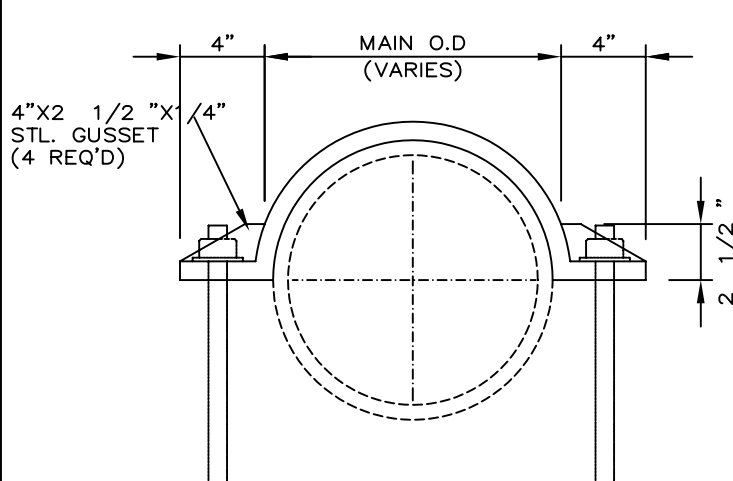
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GRAVITY BLOCKS
FOR PRESSURE PIPING

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D14

PIPE DIA. "D"	VERTICAL CREST											
	DEGREE OF BEND											
	11 1/4°			22 1/2°			45°			90°		
	"W"	"L"	"H"	"W"	"L"	"H"	"W"	"L"	"H"	"W"	"L"	"H"
6"	36"	16"	18"	36"	24"	24"	48"	28"	30"	54"	36"	36"
8"	48"	20"	20"	48"	30"	24"	54"	36"	36"	60"	46"	48"
12"	54"	24"	30"	54"	36"	40"	66"	48"	48"	72"	60"	60"
24"	72"	48"	48"	76"	60"	66"	96"	72"	84"	—	—	—

PIPE DIA. "D"	VERTICAL SAG											
	DEGREE OF BEND											
	11 1/4°			22 1/2°			45°			90°		
	"W"	"L"	—	"W"	"L"	—	"W"	"L"	—	"W"	"L"	—
6"	6"	36"	—	6"	36"	—	18"	36"	—	24"	36"	—
8"	8"	36"	—	12"	36"	—	24"	36"	—	36"	36"	—
12"	18"	36"	—	30"	36"	—	42"	42"	—	54"	48"	—
16"	36"	36"	—	48"	48"	—	60"	60"	—	72"	72"	—
24"	48"	42"	—	60"	54"	—	78"	78"	—	96"	96"	—
36"	60"	54"	—	84"	78"	—	96"	96"	—	120"	120"	—



STRAP DETAIL

NOTES:

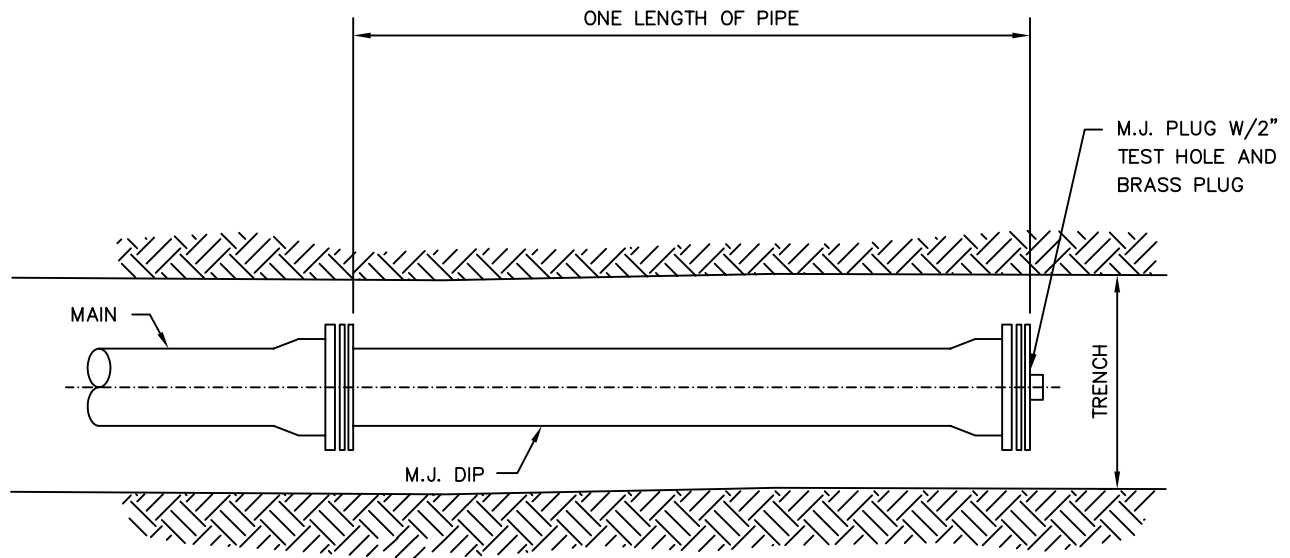
1. GUSSETS REQ'D FOR 16"O AND LARGER MAINS.
2. STRAPS WITH GUSSET TO BE GALVANIZED AFTER WELDING.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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GRAVITY BLOCKS
FOR PRESSURE PIPING

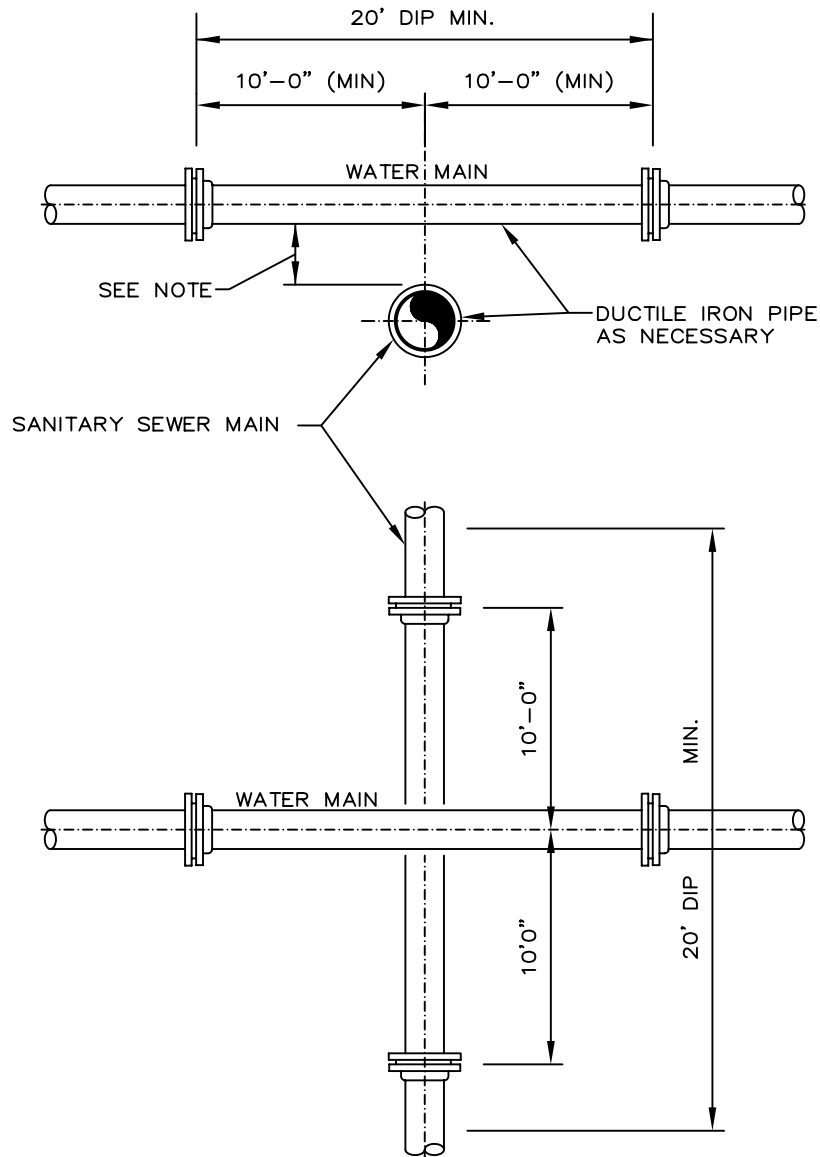
PAGE No
D14A



PLAN

NOTES:

1. TERMINAL END SHALL BE MECHANICALLY RESTRAINED IN ACCORDANCE WITH OUA STANDARD DETAILS. THE NUMBER OF PIPE LENGTHS TO BE RESTRAINED SHALL BE IN ACCORDANCE WITH THE RESTRAINED JOINT TABLES.
2. SEE D9 FOR BLOW-OFF DETAILS.



NOTES:

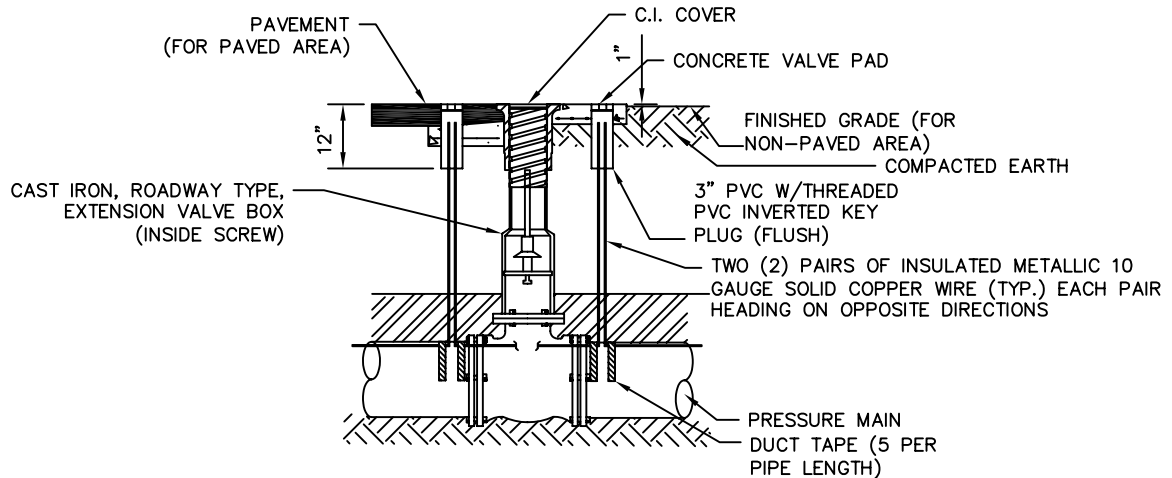
1. WATERMAIN TO CROSS OVER CONFLICT PIPES WHEREVER POSSIBLE, MAINTAINING 30" INCHES COVER AND 6" SEPARATION AS MINIMUMS.
2. REFER TO FLORIDA ADMINISTRATIVE CODE (FAC) CHAPTER 62-555 FOR MINIMUM SEPARATION REQUIREMENTS, BETWEEN POTABLE WATER, RECLAIMED WATER AND WASTEWATER.
3. THESE METHODS ARE TO BE USED WHEN INSUFFICIENT COVER EXISTS TO ALLOW PRESSURE PIPE TO CROSS ABOVE CONFLICT PIPE WITH 6" VERTICAL SEPARATION AND MAINTAIN 30" COVER TO FINISHED GRADE.
4. FITTINGS SHALL BE RESTRAINED WITH MECHANICAL RESTRAINTS (MEGALUG). IN ACCORDANCE WITH OUA STANDARD DETAILS.
5. THE DEFLECTION TYPE CROSSING IS PREFERRED.
6. DO NOT EXCEED 75% OF MANUFACTURERS RECOMMENDED MAXIMUM JOINT DEFLECTION.
7. MECHANICALLY RESTRAIN ALL FITTINGS, AS PER MANUFACTURERS RECOMMENDATION AND OUA STANDARD DETAILS.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

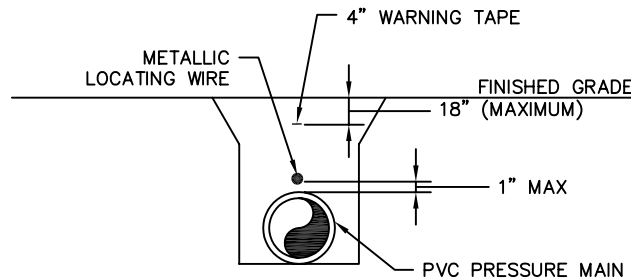
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WATER MAIN – SANITARY SEWER
CONFLICT

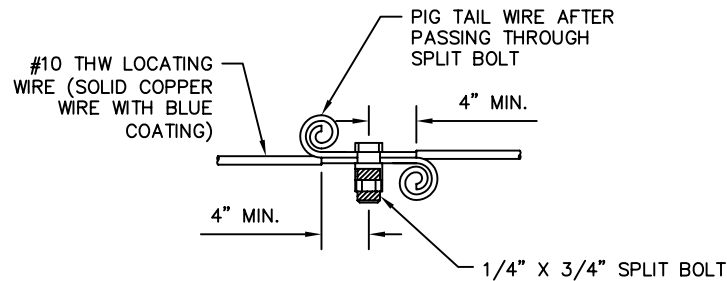
PAGE No
D16



1. ALL PVC PIPE SHALL REQUIRE TWO PAIRS OF INSULATED METALLIC LOCATING WIRES (10 GAUGE SOLID COPPER) TAPED WITH 2" WIDE DUCT TAPE TO TOP CENTERLINE OF THE PIPE AT EVERY JOINT AND AT 4 ADDITIONAL EQUALLY SPACED POINTS PER LENGTH OF PIPE.
2. LOCATING WIRES TO TERMINATE 4" ABOVE GROUND AND FOLDED BACK INSIDE 3" PVC ACCESS PIPE AND PLUGGED.
3. LOCATING WIRES SHALL BE CAPABLE OF DETECTION BY A CABLE LOCATOR AND PASS A FIELD CONDUCTIVITY TEST, OBSERVED BY THE O.U.A., FROM END TO END OF WIRES.
4. SPLICES SHALL BE CAPABLE OF COMPLETE SUBMERSION, SUCH AS BUTT SPLICE WITH RAYCHEM HEAT SHRINK TUBING.
5. NO MORE THAN ONE SPLICE IN LOCATING WIRES BETWEEN VALVES IS ALLOWED.
6. PROVIDE POTTING COMPOUND AT TRACER WIRE JUNCTIONS AND SPLICES.
7. THE ENDS OF ALL LOCATING WIRES, WHETHER THEY ARE SPLICED, CONNECTED, OR TERMINATED, SHALL HAVE THE LAST THREE INCHES PIG TAILED AS DETAILED HEREON.



PVC PIPE LOCATING WIRE



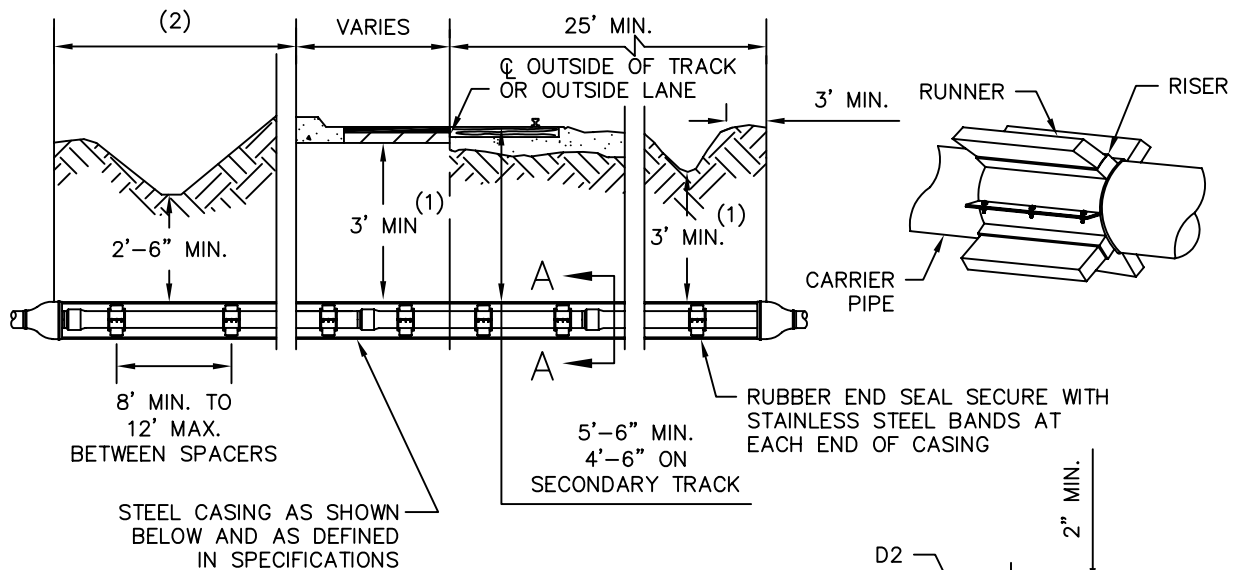
LOCATING WIRE DETAIL

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LOCATING WIRE DETAILS
FOR ALL ROAD CROSSINGS AND BORES

PAGE No
D17



NOTES:

- (1) VERTICAL DIMENSIONS TYPICAL FOR CASINGS.
- (2) WITH CURB: 6' STATE & 2' CITY ROADS MINIMUM WITHOUT CURB: 8' STATE & 4' CITY ROADS MINIMUM.
- (3) STEEL CASING PIPE SHALL CONFORM TO THE REQUIREMENTS OF AWWA C-200 AND ASTM-A139, GRADE B.
- (4) WHEN CASING IS INSTALLED WITHOUT BENEFIT OF A PROTECTIVE COATING, AND SAID CASING IS NOT CATHODICALLY PROTECTED, THE WALL THICKNESS SHOWN SHALL BE INCREASED TO THE NEAREST STANDARD SIZE WHICH IS A MINIMUM OF 0.063" GREATER THAN THE THICKNESS SHOWN EXCEPT FOR DIAMETERS LESS THAN 12.75".
- (5) FOR CONFLICTS BETWEEN THESE DETAILS AND PERMITTING AGENCIES, FOLLOW PERMITTING REQUIREMENTS.

- (6) PRESSURE MAIN TO BE RESTRAINED WITH MANUFACTURERS RESTRAINED JOINTS THROUGH CASING. USE (3) SS CASING SPACER CENTERED ON EACH PIPE LENGTH. TIMBER SKIDS ARE OPTIONAL.

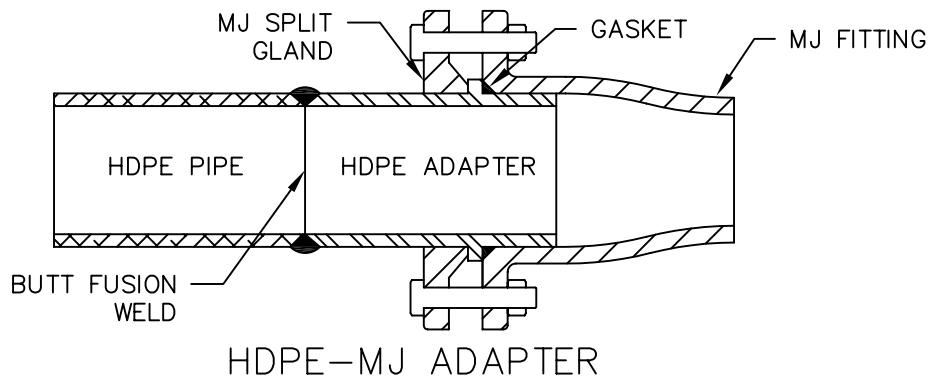
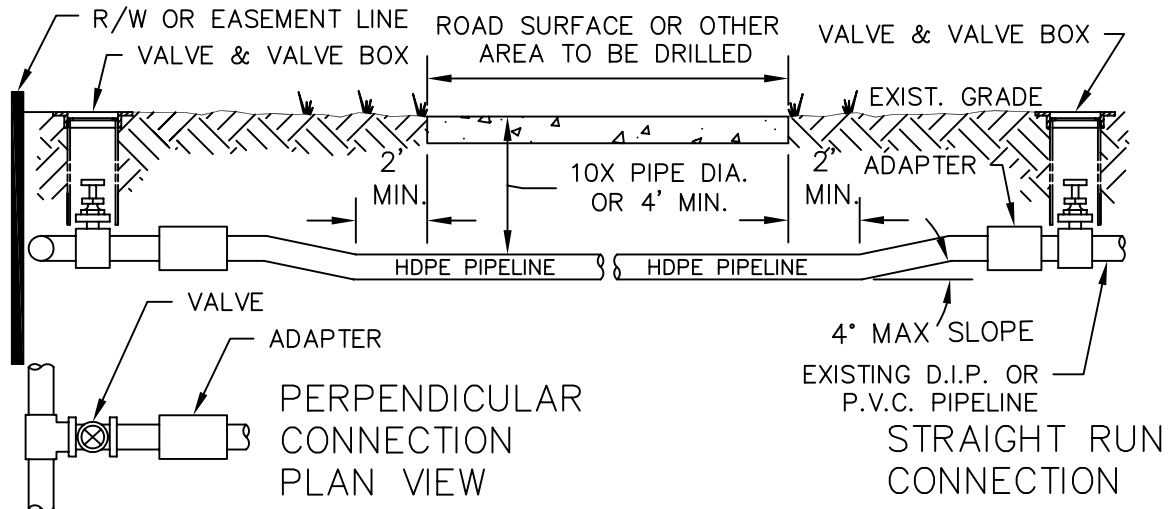
MINIMUM CASING SIZE AND THICKNESS																			
D.I.P.—M.J.	—	—	4"	6"	—	8"	10"	12"	14"	16"	18"	20"	—	24"	30"	36"	42"	48"	
D.I.P.—P.O.	—	—	4"	6"	8"	10"	12"	—	14"	16"	18"	20"	24"	—	30"	36"	42"	48"	
P.V.C.	—	—	4"	6"	—	8"	10"	12"	—	—	—	—	—	—	—	—	—	—	
(3) STEEL CASING PIPE (D2)	8"(5)	10"	12"	14"	16"	18"	20"	24"	24"	30"	30"	30"	36"	36"	42"	48"	54"	60"	66"
WALL THICKNESS (T) ROADS	.188"	.188"	.188"	.250"	.250"	.250"	.250"	.250"	.250"	.312"	.312"	.312"	.375"	.375"	.500"	.500"	.500"	.500"	.500"
(4) WALL THICKNESS (T) R.R.	.188"	.188"	.188"	.219"	.219"	.250"	.281"	.344"	.344"	.406"	.406"	.406"	.469"	.469"	.500"	—	—	—	—

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JACK AND BORE DETAIL

PAGE No
D18



NOTES:

1. DIRECTIONAL DRILLS SHALL BE COMPLETED USING DR11 HDPE PIPE, DIP SIZE: FOR WATER AND SANITARY FORCE MAIN
IPS SIZE: FOR VACUUM SEWER.
2. ALL DIRECTIONAL DRILLS SHALL BE AT A DEPTH OF 10X PIPE DIAMETER BELOW THE ROADWAY SURFACE OR 4' WHICHEVER IS GREATER.
3. ALL HDPE MUST BE COLOR CODED (SAFETY BLUE-WATER, SAFETY GREEN FOR SEWER AND PANTONE PURPLE FOR RECLAIMED WATER); BUTT FUSION WELDED; AND CONNECTED WITH HDPE-MJ ADAPTER.
4. 10 GAUGE SOLID COPPER LOCATING WIRES SHALL BE TAPED TO PIPE FROM VALVE TO VALVE AT A SPACING NO GREATER THAN 5 FEET AND PULLED WITH THE PIPE. SEE D17 FOR ADDITIONAL DETAILS.
5. GRAVITY SEWER BORES AS PREAPPROVED BY OUA.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

REVISION
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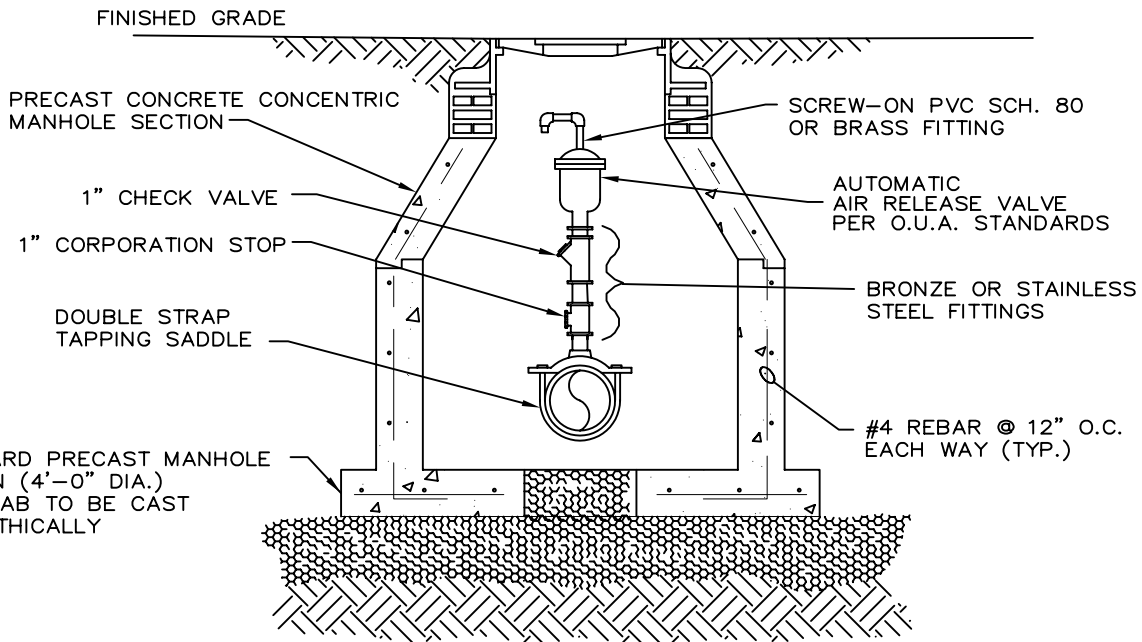
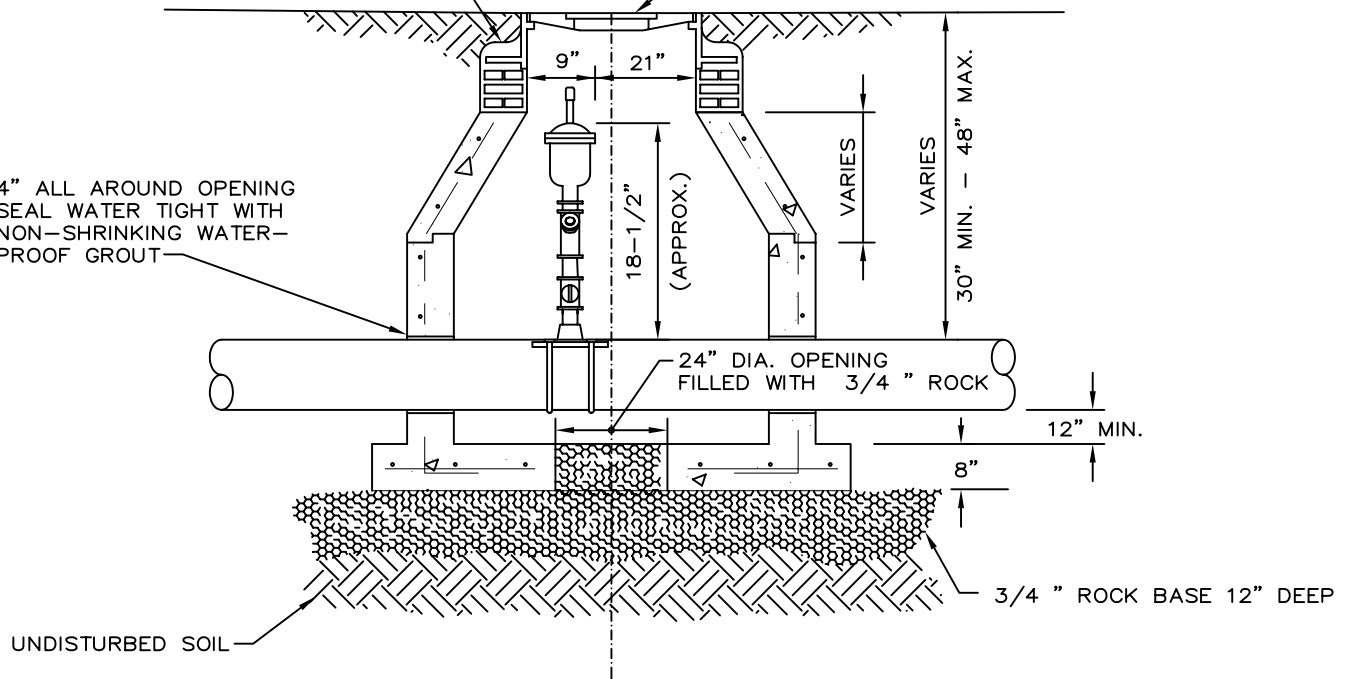
DIRECTIONAL DRILLING DETAIL

PAGE No
D19

ADJUST WITH COURSE(S) OF BRICK AND
MORTAR TO BRING TO GRADE
(MIN. 2 COURSES OF BRICK - 6")
(MAX. 5 COURSES OF BRICK - 18")

"WATER" TO BE CAST IN COVER (SEE
"MANHOLE FRAME AND COVER - 30"
OPENING" DETAIL)

4" ALL AROUND OPENING
SEAL WATER TIGHT WITH
NON-SHRINKING WATER-
PROOF GROUT



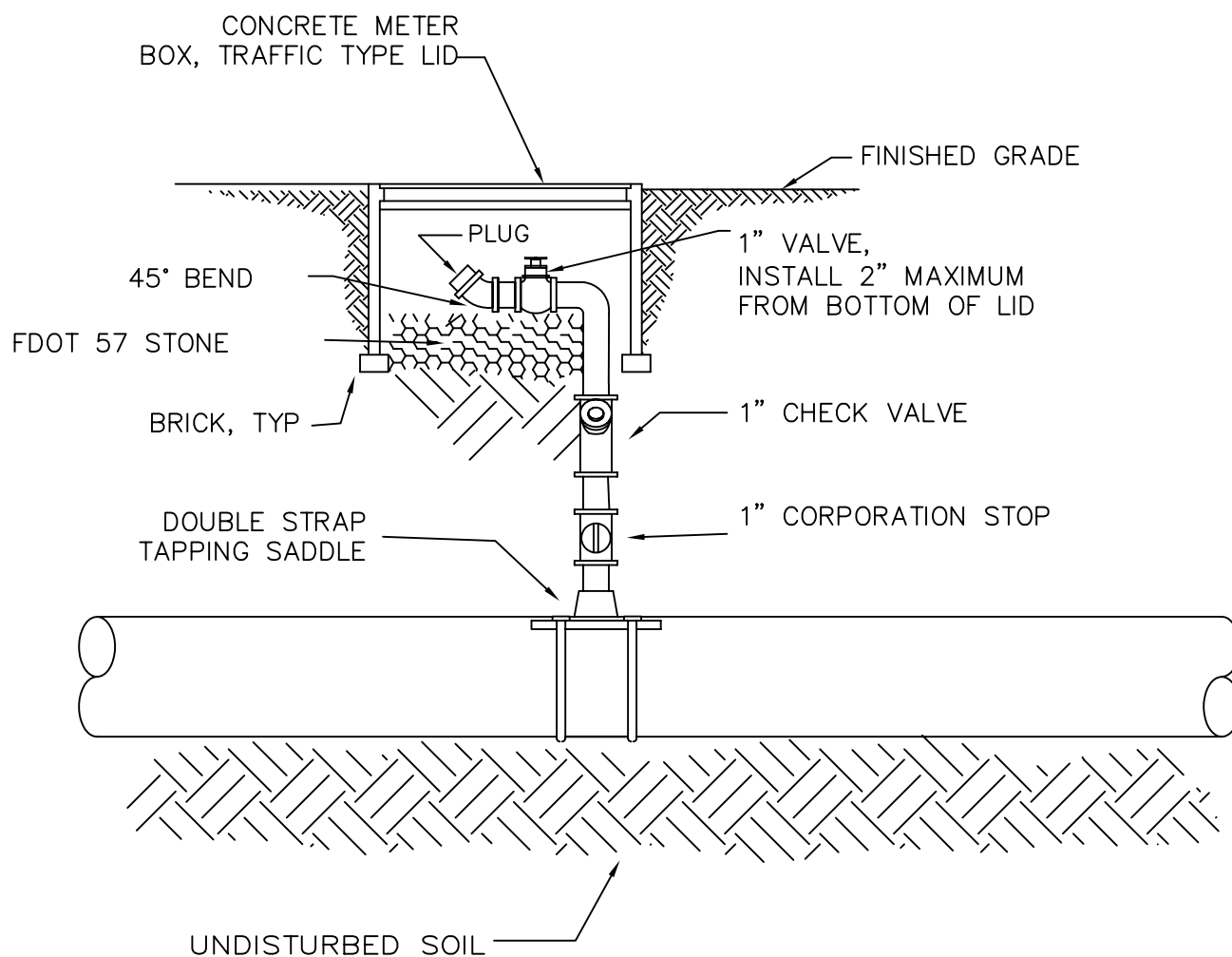
ONLY APPLICABLE WHERE IT CAN BE DEMONSTRATED THAT VENT IS A
MINIMUM OF 18" ABOVE 100 YEAR FLOOD ELEVATION (PER FDEP)

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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AIR RELEASE VALVE (UNDERGROUND WATERMAIN)

PAGE No
D20



GENERAL NOTES:

1. ALL FITTINGS AND PIPING TO BE BRASS.
2. ALL FITTINGS AND APPURTENANCES TO MEET AWWA SPECIFICATIONS AND/OR HAVE NSF APPROVAL.
3. MANUAL AIR RELEASE VALVE REQUIRED IN AREAS LESS THAN 18 INCHES ABOVE 100 YEAR FLOOD ZONE.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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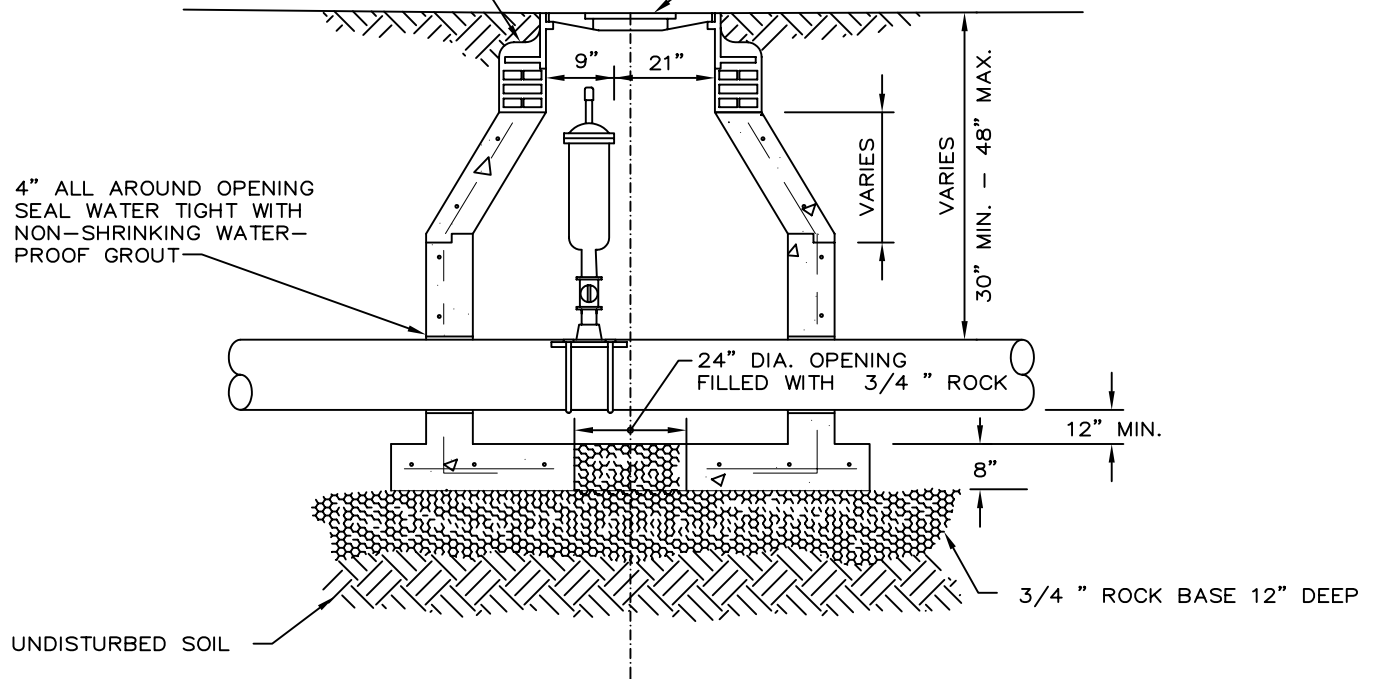
AIR RELEASE VALVE, MANUAL
POTABLE WATER MAIN

PAGE No
D20A

ADJUST WITH COURSE(S) OF BRICK AND
MORTAR TO BRING TO GRADE
(MIN. 2 COURSES OF BRICK - 6")
(MAX. 5 COURSES OF BRICK - 18")

"SEWER" TO BE CAST IN COVER (SEE
"MANHOLE FRAME AND COVER - 30"
OPENING" DETAIL)

4" ALL AROUND OPENING
SEAL WATER TIGHT WITH
NON-SHRINKING WATER-
PROOF GROUT



FINISHED GRADE

PRECAST CONCRETE CONCENTRIC
MANHOLE SECTION

SCREW-ON PVC SCH. 80
OR BRASS FITTING

AUTOMATIC
AIR RELEASE VALVE
PER O.U.A. STANDARDS

2" BALL VALVE WITH
BRASS NIPPLE BETWEEN
SADDLE AND VALVE.

DOUBLE STRAP
TAPPING SADDLE

STANDARD PRECAST MANHOLE
SECTION (4'-0" DIA.)
AND SLAB TO BE CAST
MONOLITHICALLY

#4 REBAR @ 12" O.C.
EACH WAY (TYP.)

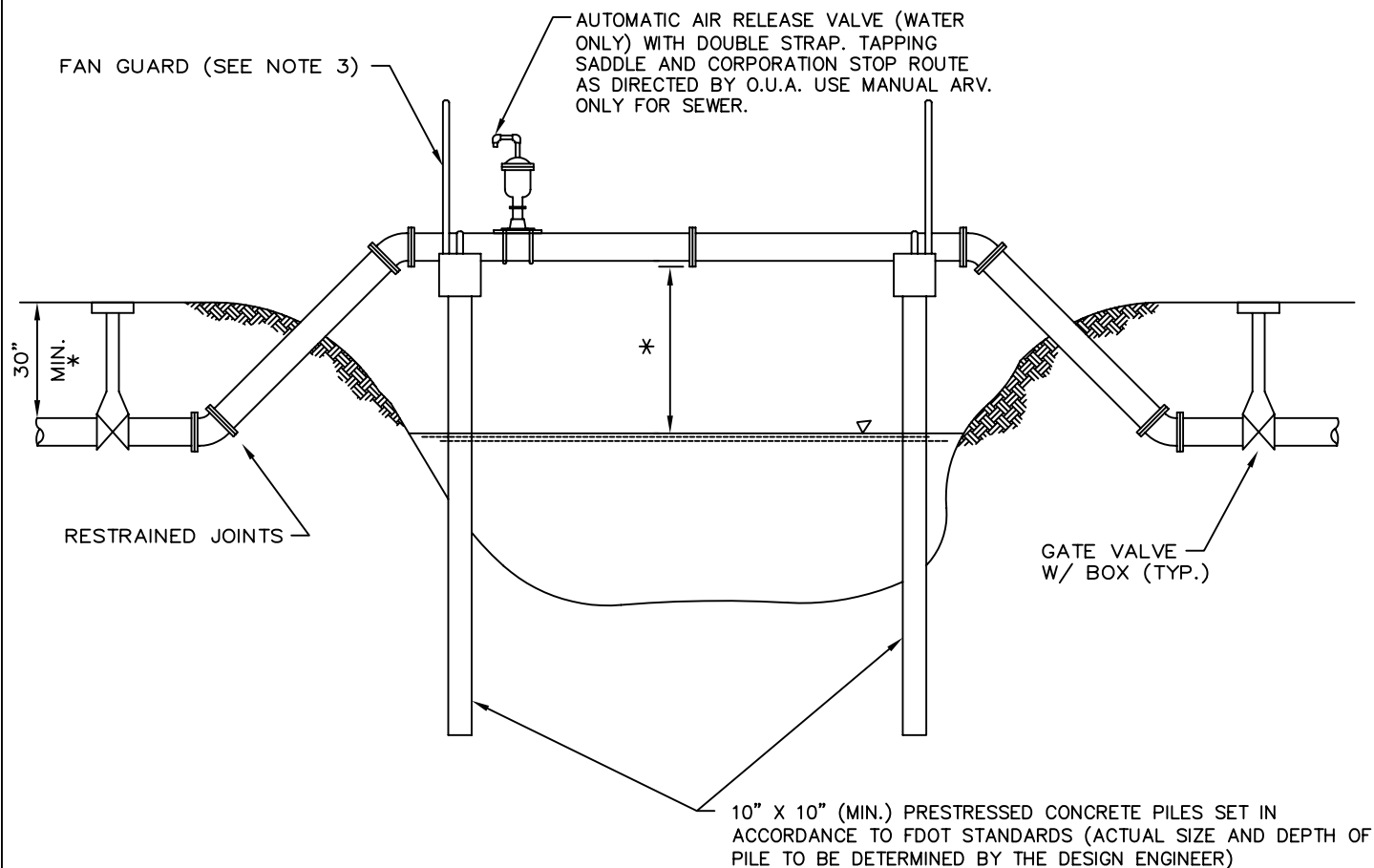
OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS
ONLY APPLICABLE WHERE IT CAN BE DEMONSTRATED THAT VENT IS A
MINIMUM OF 18" ABOVE 100 YEAR FLOOD ELEVATION (PER FDEP)

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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AIR RELEASE VALVE (UNDERGROUND FORCE MAIN)

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D21



NOTES:

1. ALL EXPOSED PIPE SHALL BE DUCTILE IRON WITH FLANGED FITTINGS. RETAINER GLANDS AND UNIFLANGE TYPE FITTINGS ARE NOT ALLOWED. O-RING GASKETS ARE REQUIRED FOR FLANGED FITTINGS AND JOINTS.
2. SPAN LENGTHS AS REQUIRED BY PERMITTING AGENCY AND IN ACCORDANCE WITH PIPE MANUFACTURERS RECOMMENDATION.
3. FAN GUARDS ARE REQUIRED. SEE "TYPICAL FAN GUARD" DETAIL.
4. PIPE SHALL BE CRADLED ON NEOPRENE, 1/2 " THICK MINIMUM.
5. TIE-DOWN STRAPS SHALL FIT PROPERLY AND SECURE PIPE IN CRADLE.
6. PIPE CRADLE IN CAP SHALL CONTACT 1/2 CIRCUMFERENCE OF PIPE.
7. SHOW ULTIMATE CANAL SECTION AND RELEVANT ELEVATIONS AND DISTANCES ON THIS DETAIL.
8. STAINLESS STEEL (316) REQUIRED FOR ALL STRAPS, SADDLES, FLANGE BOLTS, NUTS AND OTHER HARDWARE FOR INSTALLATIONS OVER ALL WATER BODIES (ANTI-GALL COMPOUND TO BE USED WHEN ASSEMBLING STAINLESS STEEL NUTS AND BOLTS).
9. LENGTH OF SPAN WILL DETERMINE NUMBER OF PILES REQUIRED.
10. AERIAL CROSSING TO BE COATED PER F.D.O.T. SPECIFICATIONS ON PIPING ATTACHED TO BRIDGE STRUCTURES.
11. ALL ABOVE GRADE PIPING AND APPURTENANCES (ACCEPT FOR THE FAN GUARD) SHALL BE COATED IN ACCORDANCE WITH OUA STANDARDS.

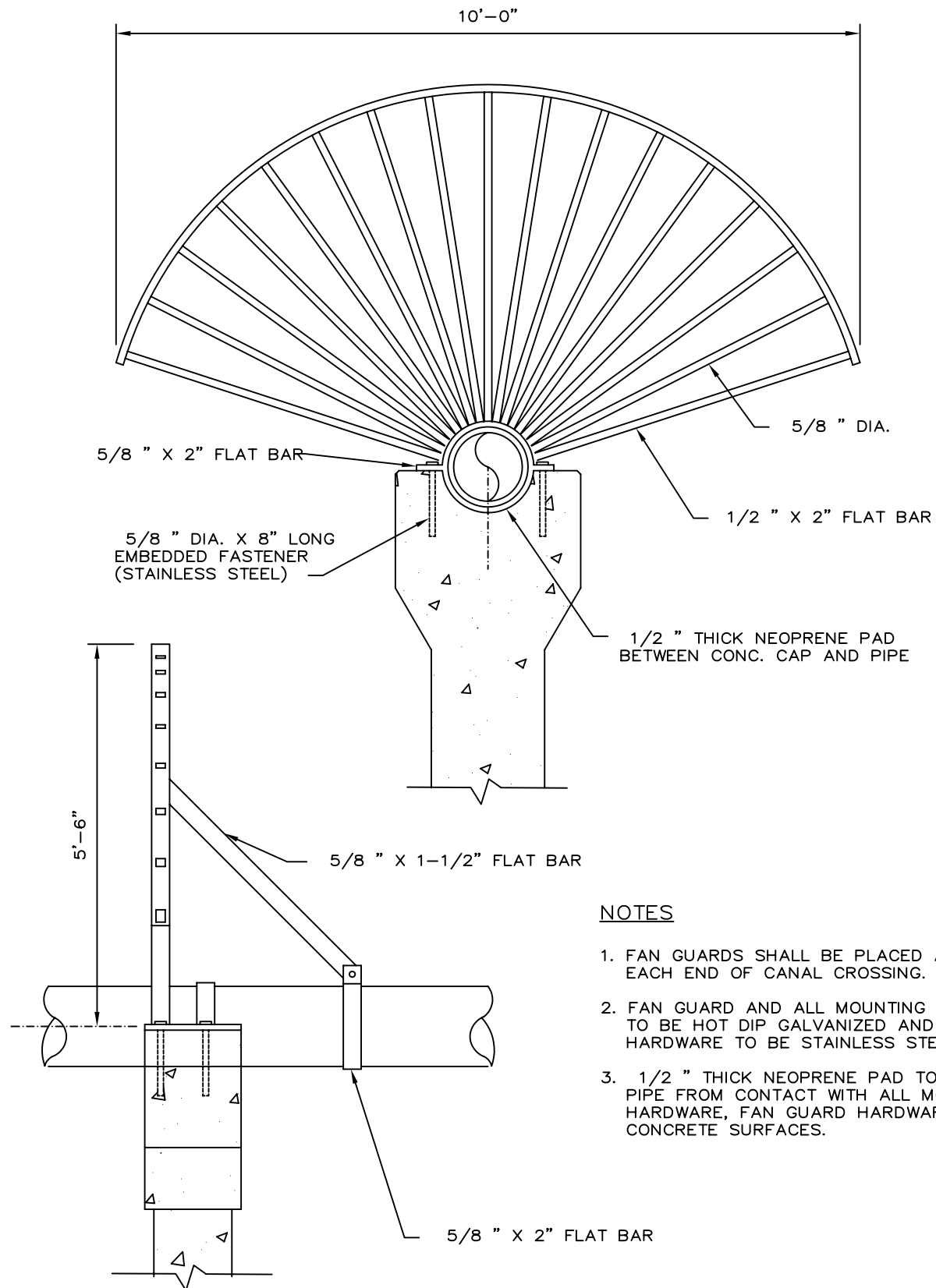
* PER REGULATORY AGENCY

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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JULY-07

CANAL CROSSING (AERIAL)

PAGE No
D22

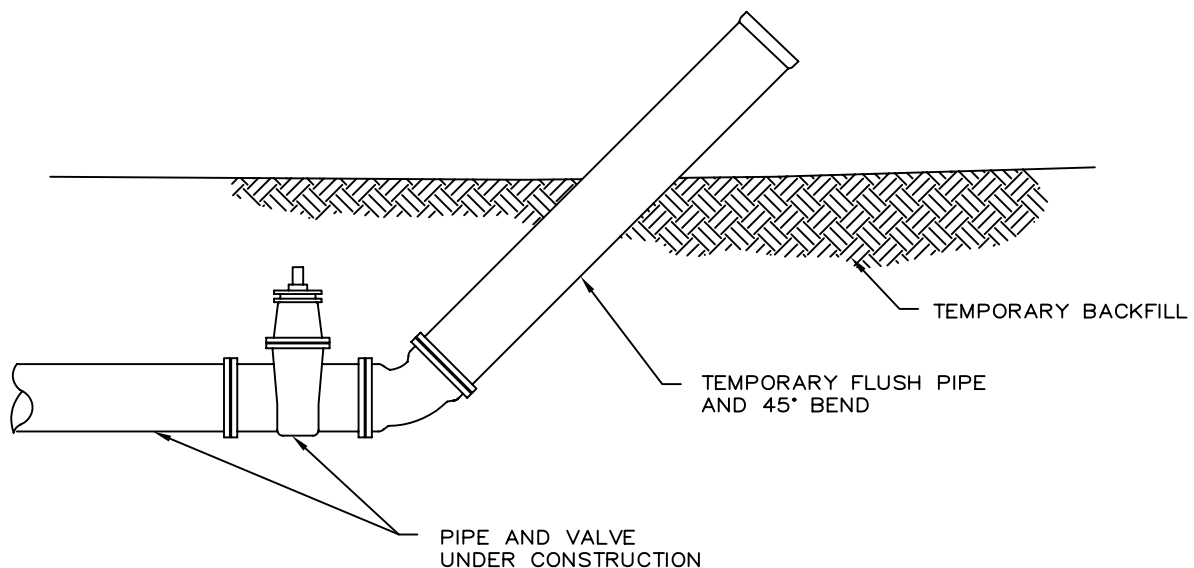


OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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TYPICAL FAN GUARD

PAGE No
D23



NOTES:

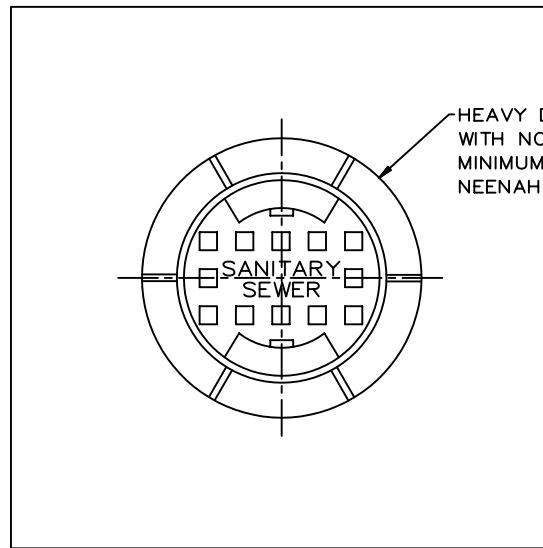
1. UPON COMPLETION OF THE PIPE INSTALLATION FOR ANY SECTION, THE MAINS SHALL BE CANNON FLUSHED TO REMOVE DIRT AND ANY OTHER FOREIGN MATTER BY ACHIEVING A MINIMUM VELOCITY OF 2.5 FEET PER SECOND IN THE PIPE. MAINS MAY BE EITHER TEMPORARILY LAID ABOVE GRADE OR TEMPORARY FITTINGS, PIPE ETC. MAY BE USED TO FACILITATE CANNON FLUSHING.
2. INSTALL A 45° BEND AND ASSOCIATED PIPING AS SHOWN TO DIRECT THE FLUSHING WATER AWAY FROM THE IMMEDIATE WORK AREA AND EXERCISE DUE CARE SO AS TO ENSURE THAT THE WATER USED IN FLUSHING DOES NOT CAUSE A NUISANCE OR INFLICT PROPERTY DAMAGE.
3. BENDS AND PIPING SHALL BE THE SAME SIZE AS THE LINE TO BE FLUSHED.
4. PRIOR TO THE ACTUAL LINE FLUSHING OPERATION. THE CONTRACTOR SHALL PROPERLY NOTIFY THE OUA INSPECTOR OF SUCH INTENDED WATER USE, MINIMUM OF 48 HOURS TO ALLOW COORDINATION WITH WATER PLANT OPERATIONS.
5. NO EXISTING VALVES SHALL BE TURNED ON OR OFF, EXCEPT BY AUTHORIZED OUA PERSONNEL.
6. FLUSHING SHALL NOT BE ACCOMPLISHED WITHOUT THE ACTUAL PRESENCE OF THE OUA INSPECTOR.
7. AFTER THE LINE UNDER CONSTRUCTION HAS BEEN SUCCESSFULLY FLUSHED THE CONTRACTOR SHALL REMOVE THE TEMPORARY PIPING ARRANGEMENT AND PROCEED WITH THE REMAINING CONSTRUCTION AS SPECIFIED.
8. ALL PIPING SHALL BE MECHANICALLY RESTRAINED IN ACCORDANCE WITH OUA STANDARDS. THE NUMBER OF PIPE LENGTHS TO BE RESTRAINED SHALL BE PER MANUFACTURERS RECOMMENDATION.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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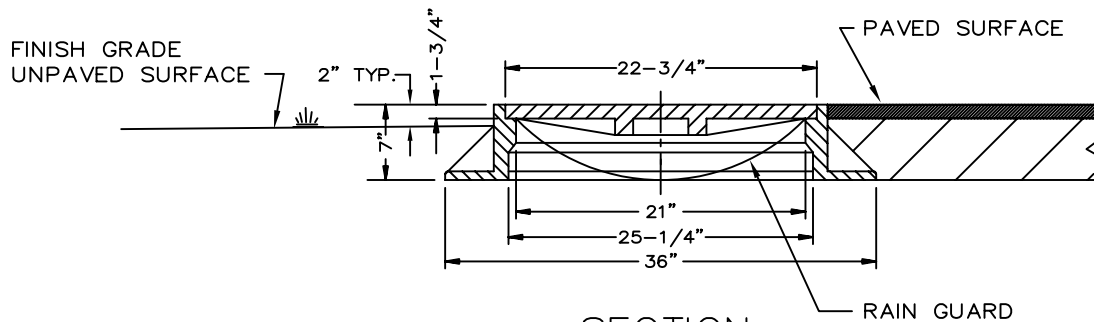
CANNON FLUSHING AND PIGGING DETAIL

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HEAVY DUTY C.I. FRAME AND COVER,
WITH NON-PENETRATING PICK HOLES;
MINIMUM WEIGHT 325 POUNDS;
NEENAH CAT. No. R1772-B OR EQUAL

PLAN



SECTION

NOTES:

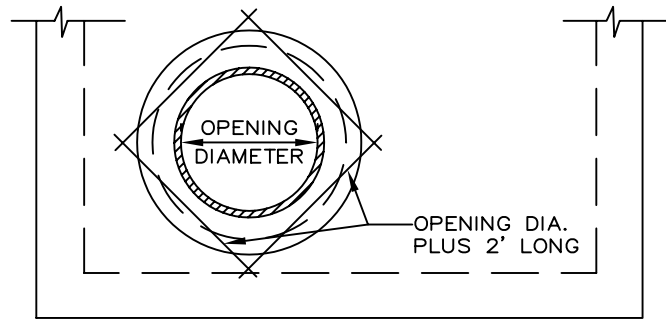
1. A WATER-TIGHT MANHOLE "RAIN GUARD" INSERT SHALL BE INSTALLED IN ALL MANHOLES.
2. A 3'X3'X4' CONCRETE COLLAR SHALL BE INSTALLED WHERE MANHOLE IS INSTALLED IN UNPAVED AREAS
3. "SANITARY SEWER" FOR WASTEWATER APPLICATIONS.
4. "WATER" FOR WATER APPLICATIONS.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

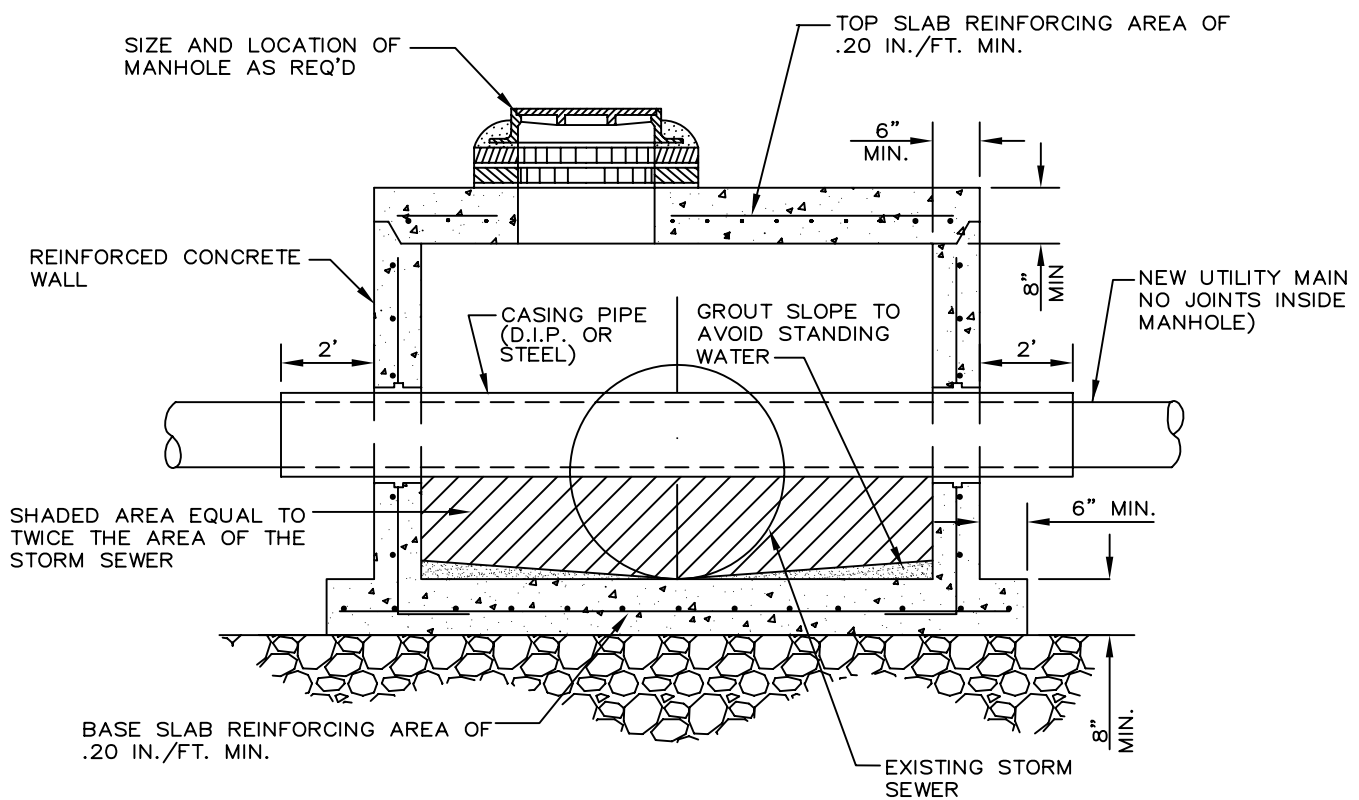
REVISION
JULY-07

STANDARD MANHOLE FRAME AND COVER

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PARTIAL PLAN



NOTES:

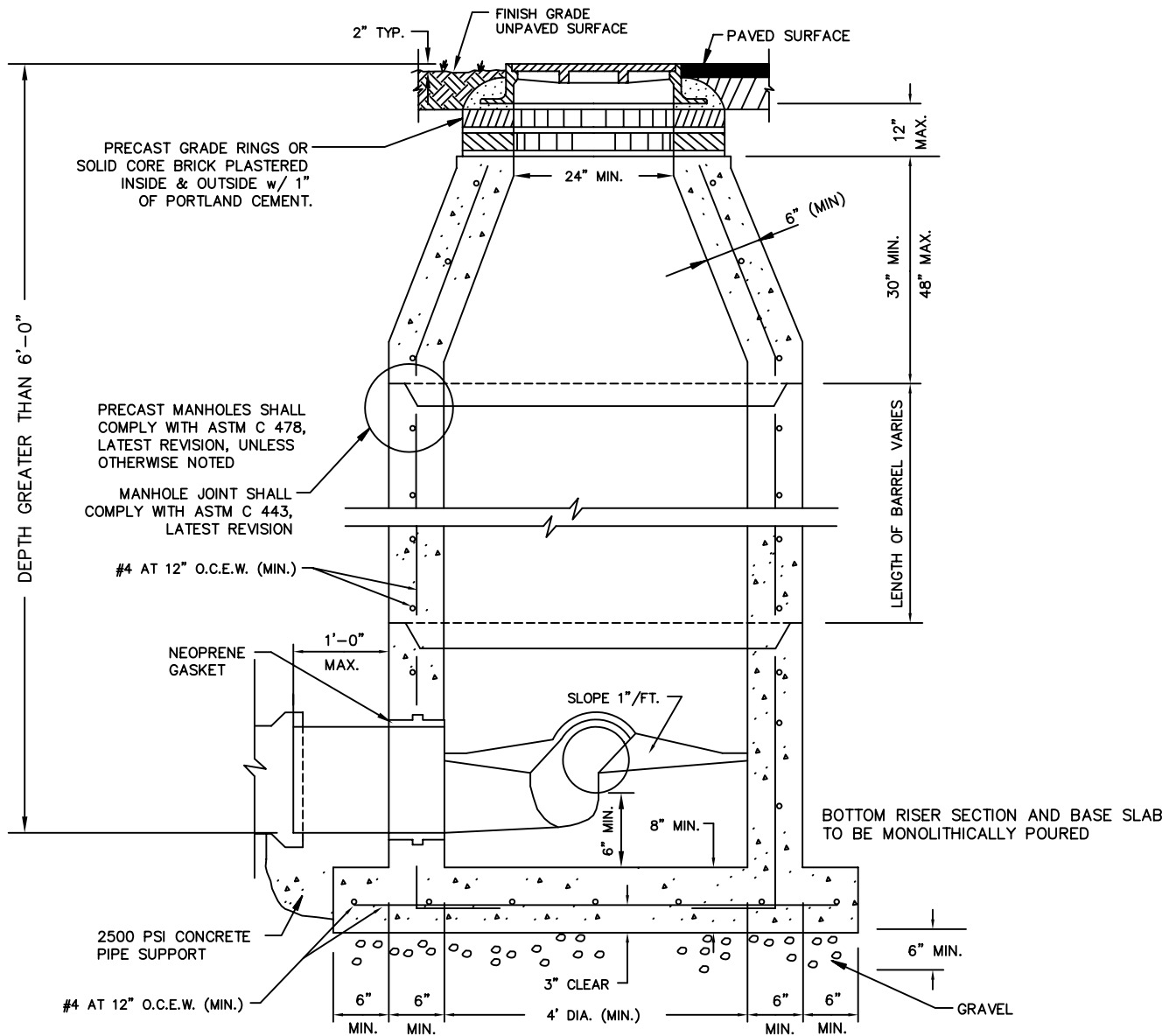
1. WHERE CONDITIONS PERMIT THE LOWEST POINT OF CONFLICT MAIN AT OR ABOVE CENTER LINE OF STORM SEWER.
2. CONFLICT MANHOLES WILL BE ALLOWED WHERE DESIGN PROBLEMS AND ECONOMICS PROVE THEM TO BE THE ONLY VIABLE SOLUTION AS APPROVED BY O.U.A.
3. CONFLICT MANHOLES WILL NOT BE ALLOWED FOR WATER MAINS CROSSING GRAVITY WASTEWATER SYSTEMS.
4. COAT INTERIOR & EXTERIOR WITH 2 COATS COAL TAR EPOXY, 8 MIL. MIN. FRY FILM THICKNESS EACH COAT OR OUA APPROVED EQUAL.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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CONFLICT MANHOLE

PAGE No
D26A



NOTES:

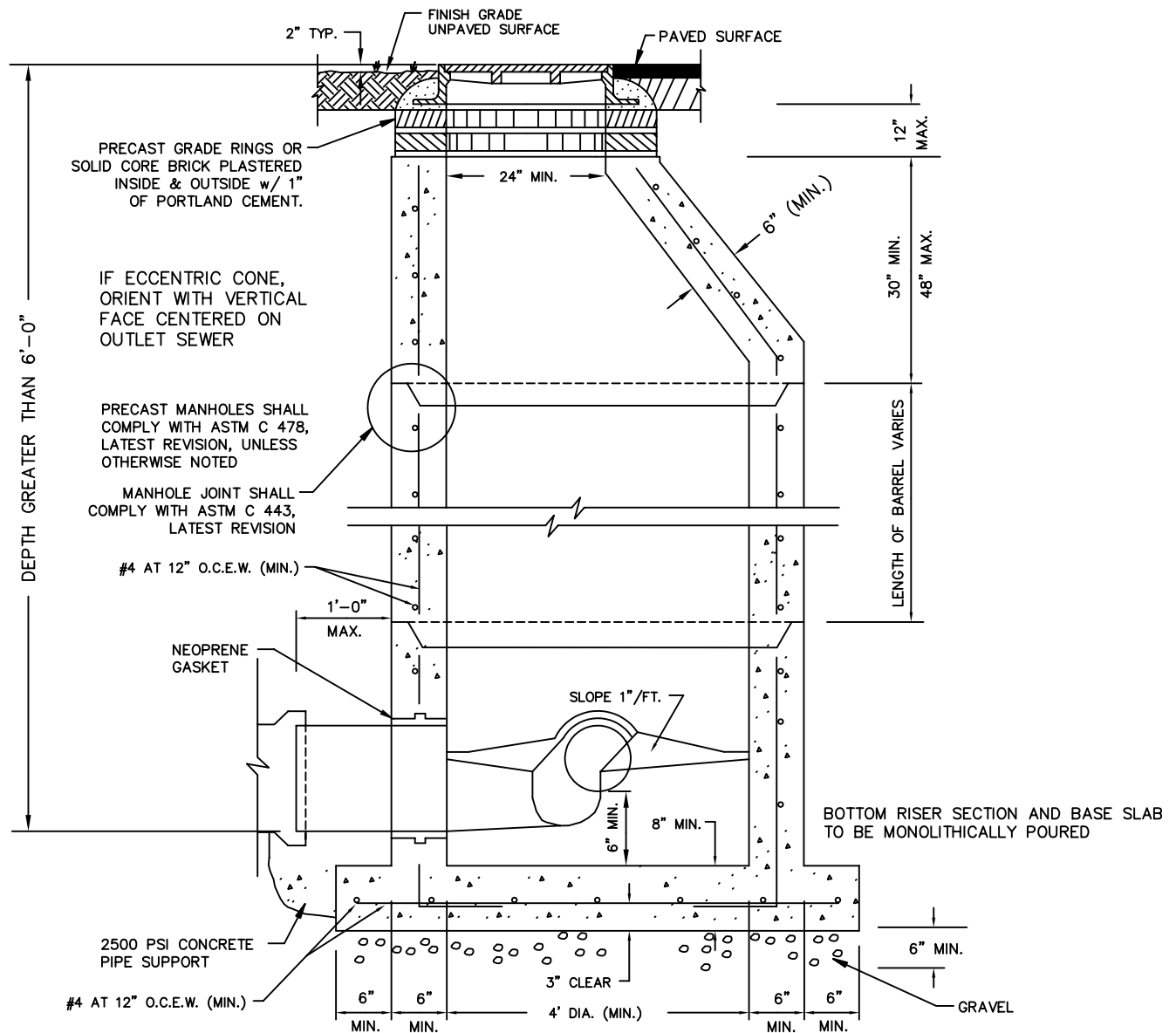
1. PRECAST CONCRETE TYPE II 4000 P.S.I.
2. "RAMNEK" OR EQUAL AT ALL RISER JOINTS (1/2" THICK WITH WIDTH AT LEAST 1/2 THE WALL THICKNESS) WITH GROUT INSIDE AND OUTSIDE.
3. ALL OPENINGS SHALL BE SEALED WITH A WATERPROOF NON-SHRINKING GROUT.
4. FLOW CHANNELS SHALL BE CONSTRUCTED TO DIRECT INFLUENT INTO FLOW STREAM (SEE DETAIL).
5. LIFT HOLES ARE PERMITTED AND SHALL BE SEALED AFTER PLACEMENT OF RISER.
6. ALL PIPE HOLES SHALL BE PRECAST OR CORE-DRILLED.
7. APPROVED RUBBER BOOTS MUST BE USED WITH PVC PIPE.
8. INSIDE DROPS SHALL NOT EXCEED 2.0 FEET.
9. COAT INTERIOR & EXTERIOR WITH 2 COATS COAL TAR EPOXY, 8 mil. MIN. DRY FILM THICKNESS EACH COAT OR OUA APPROVED EQUAL.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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STANDARD MANHOLE (CONCENTRIC CONE)

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D27



NOTES:

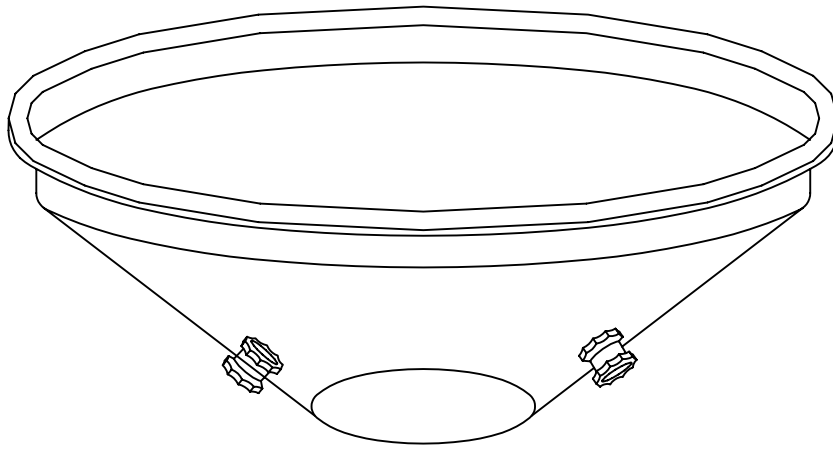
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7. APPROVED RUBBER BOOT MUST BE USED WITH PVC PIPE.
8. INSIDE DROPS SHALL NOT EXCEED 2.0 FEET.
9. COAT INTERIOR & EXTERIOR WITH 2 COATS COAL TAR EPOXY, 8 mil. MIN. EACH DRY FILM THICKNESS COAT OR OUA APPROVED EQUAL.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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STANDARD MANHOLE (ECCENTRIC CONE)

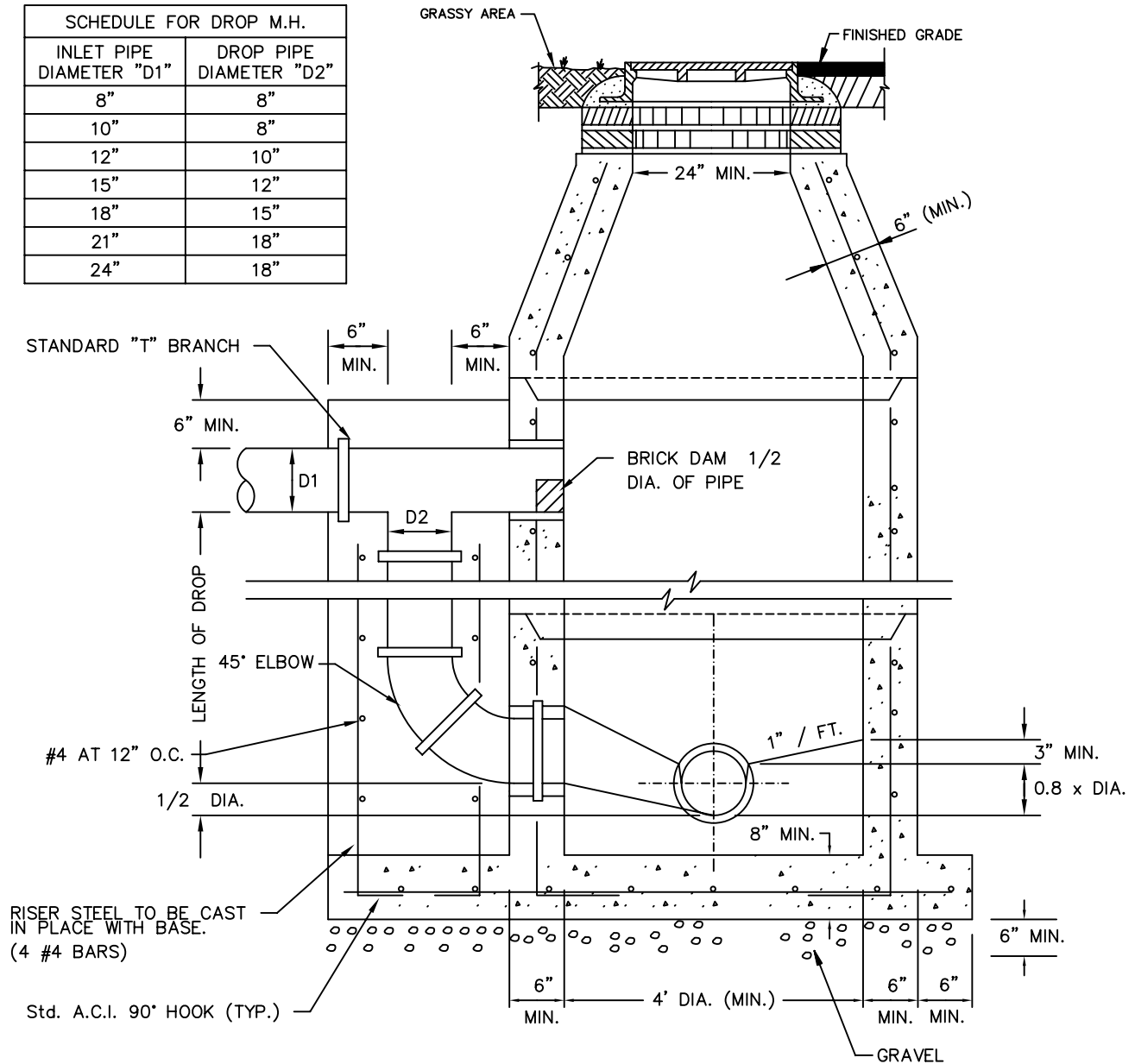
PAGE No
D27A



N O T E S:

1. SEWER RAIN GUARDS SHALL BE INSTALLED ON ALL MANHOLES.
2. SEWER RAIN GUARDS SHALL BE AS MANUFACTURED BY FOSROC-PRECO INDUSTRIES, INC., OR SOUTH WEST PACKING AND SEALS, INC., OR APPROVED EQUAL.

SCHEDULE FOR DROP M.H.	
INLET PIPE DIAMETER "D1"	DROP PIPE DIAMETER "D2"
8"	8"
10"	8"
12"	10"
15"	12"
18"	15"
21"	18"
24"	18"



NOTES:

1. ALL DETAILS AND SPECIFICATIONS FOR STANDARD MANHOLES ARE APPLICABLE EXCEPT FOR REFERENCES TO DROP ASSEMBLY.
2. THE PRECAST BASE SHALL EXTEND FULLY UNDER THE DROP ASSEMBLY.
3. DROP CONNECTIONS SHALL BE REQUIRED WHENEVER AN INFLUENT INVERT IS LOCATED 2.0 FEET OR MORE ABOVE THE MAIN CHANNEL INVERT.
4. SOLVENT TYPE JOINT PVC FITTINGS MAY BE UTILIZED IN THE DROP ASSEMBLY ONLY.

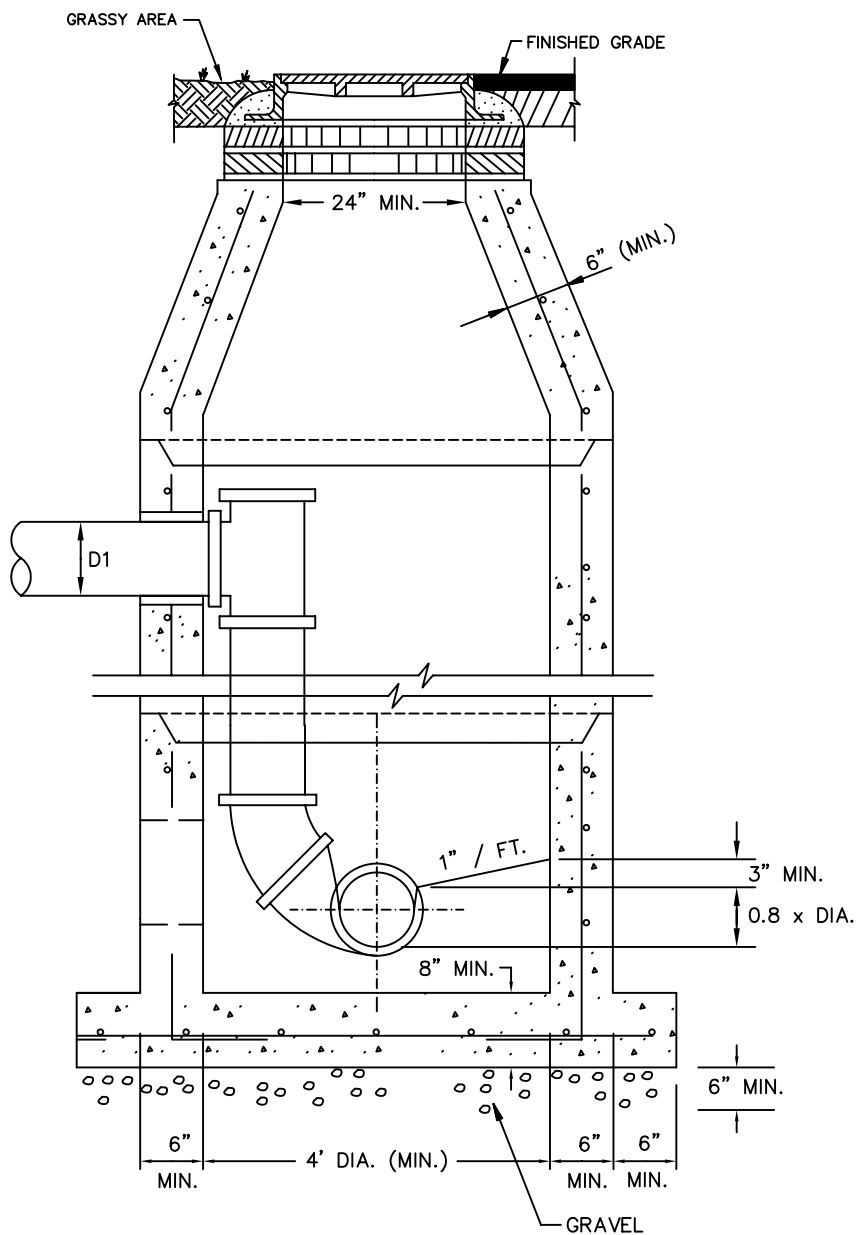
OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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OUTSIDE DROP CONNECTION FOR STANDARD MANHOLE

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D29

SCHEDULE FOR DROP M.H.	
INLET PIPE DIAMETER "D1"	DROP PIPE DIAMETER "D2"
8"	8"
10"	8"
12"	10"
15"	12"
18"	15"
21"	18"
24"	18"



NOTES:

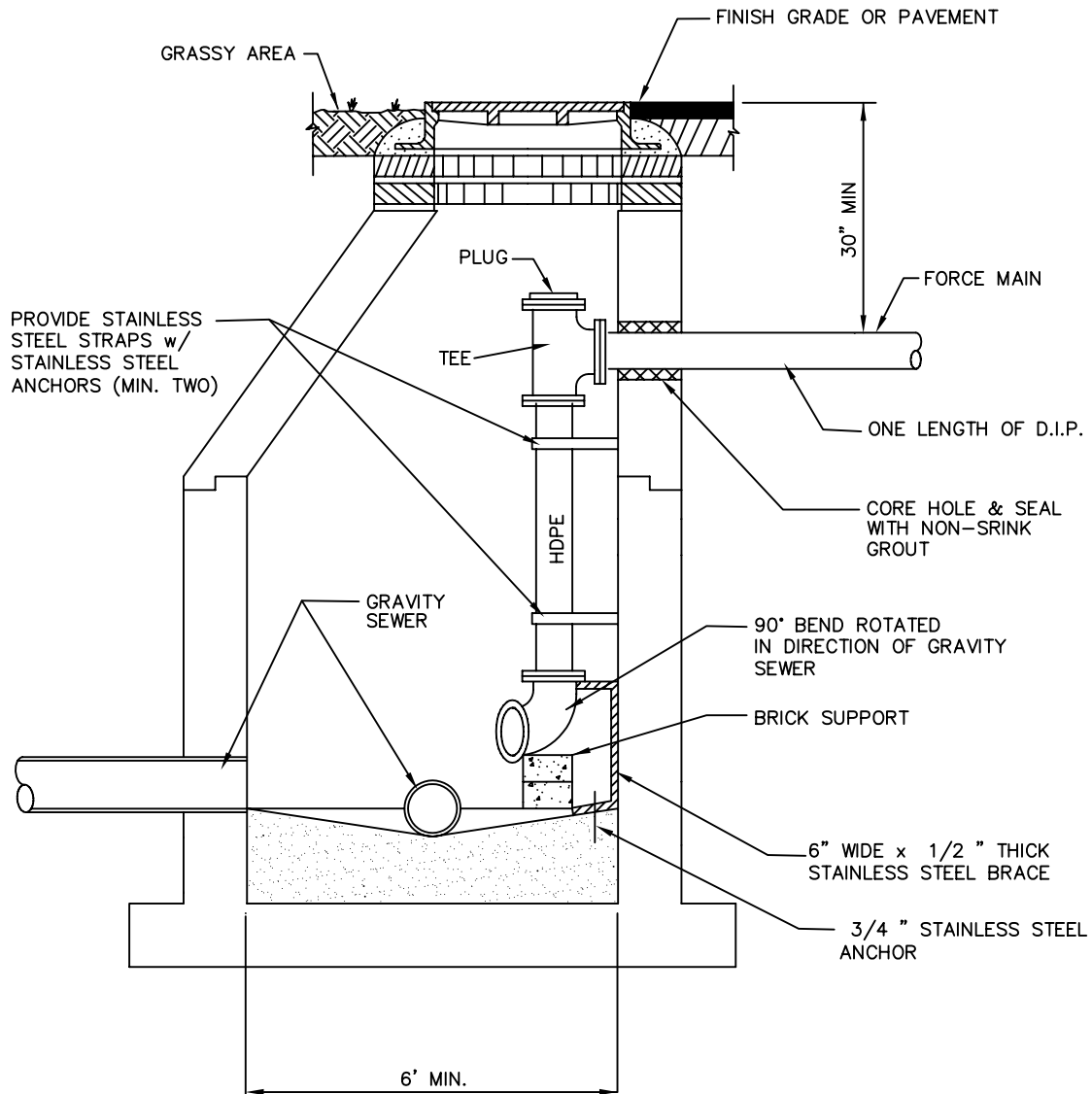
1. ALL DETAILS AND SPECIFICATIONS FOR STANDARD MANHOLES ARE APPLICABLE EXCEPT FOR REFERENCES TO DROP ASSEMBLY.
2. THE PRECAST BASE SHALL EXTEND FULLY UNDER THE DROP ASSEMBLY.
3. DROP CONNECTIONS SHALL BE REQUIRED WHENEVER AN INFLUENT INVERT IS LOCATED 2.0 FEET OR MORE ABOVE THE MAIN CHANNEL INVERT.
4. SOLVENT TYPE JOINT PVC FITTINGS MAY BE UTILIZED IN THE DROP ASSEMBLY ONLY.
5. INSIDE DROP MAY BE USED ONLY IN EXISTING SEWERS AND WITH PRIOR APPROVAL OF OUA.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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INSIDE DROP CONNECTION FOR STANDARD MANHOLE
EXISTING SEWERS ONLY

PAGE No
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NOTES:

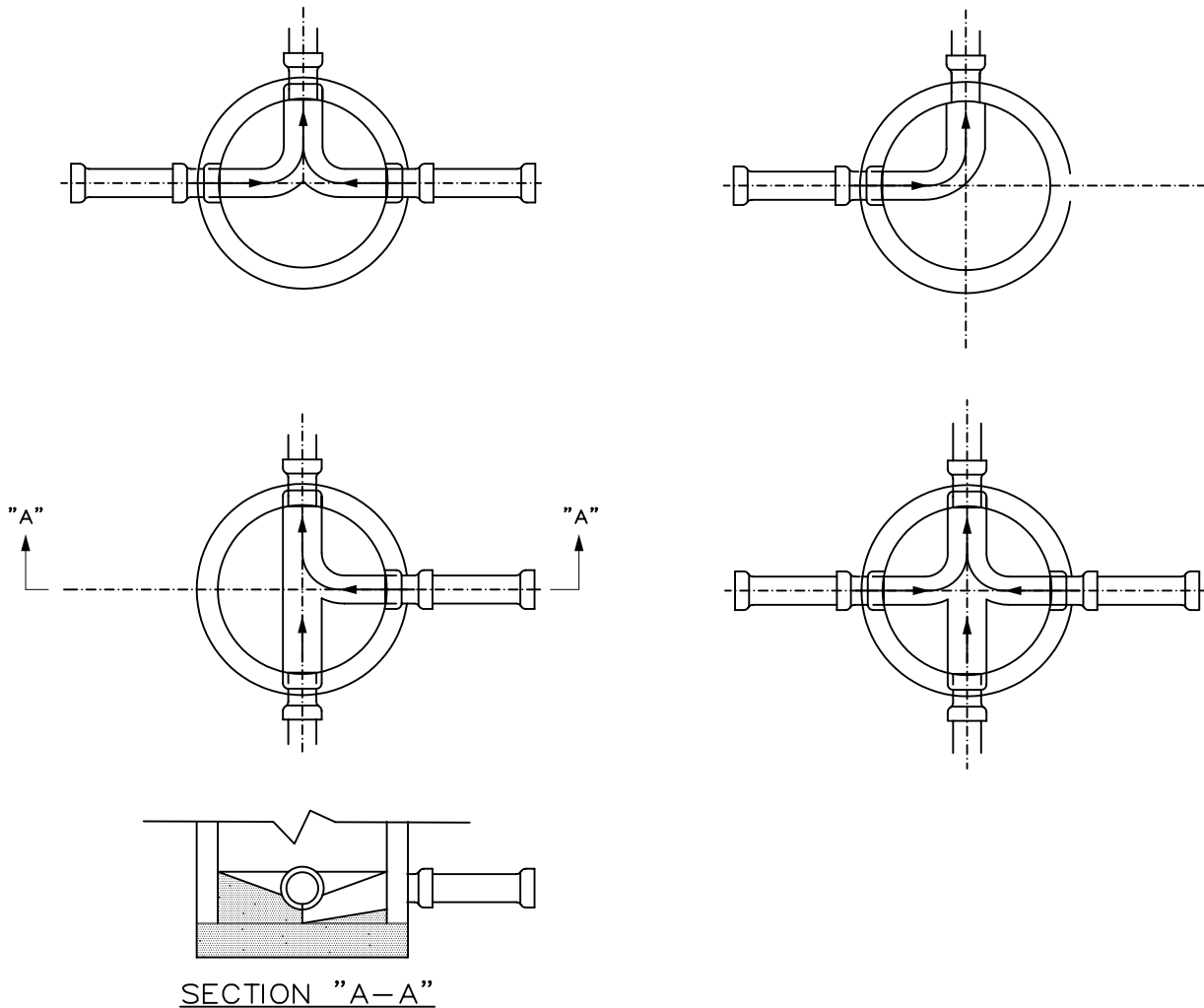
1. SEE MANHOLE NOTES FOR STANDARD MANHOLE.
2. DROP PIPE AND FITTINGS SHALL BE PVC OR HDPE.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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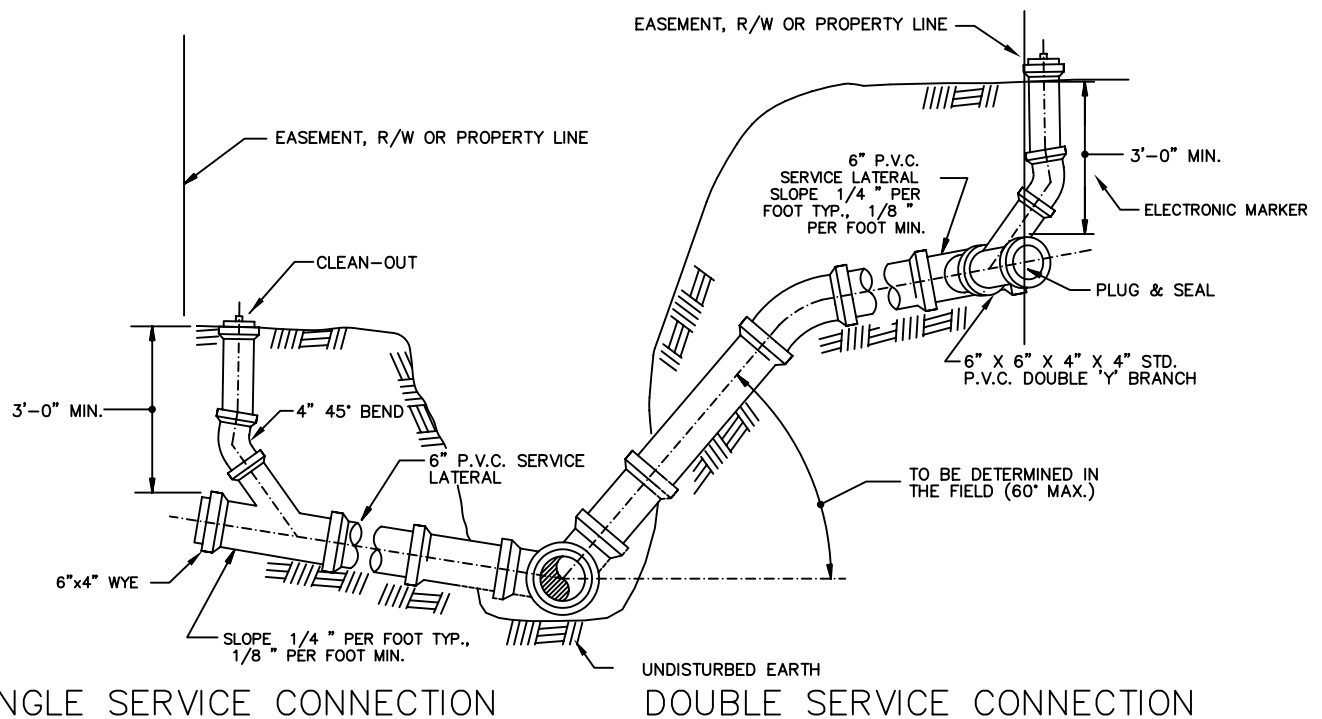
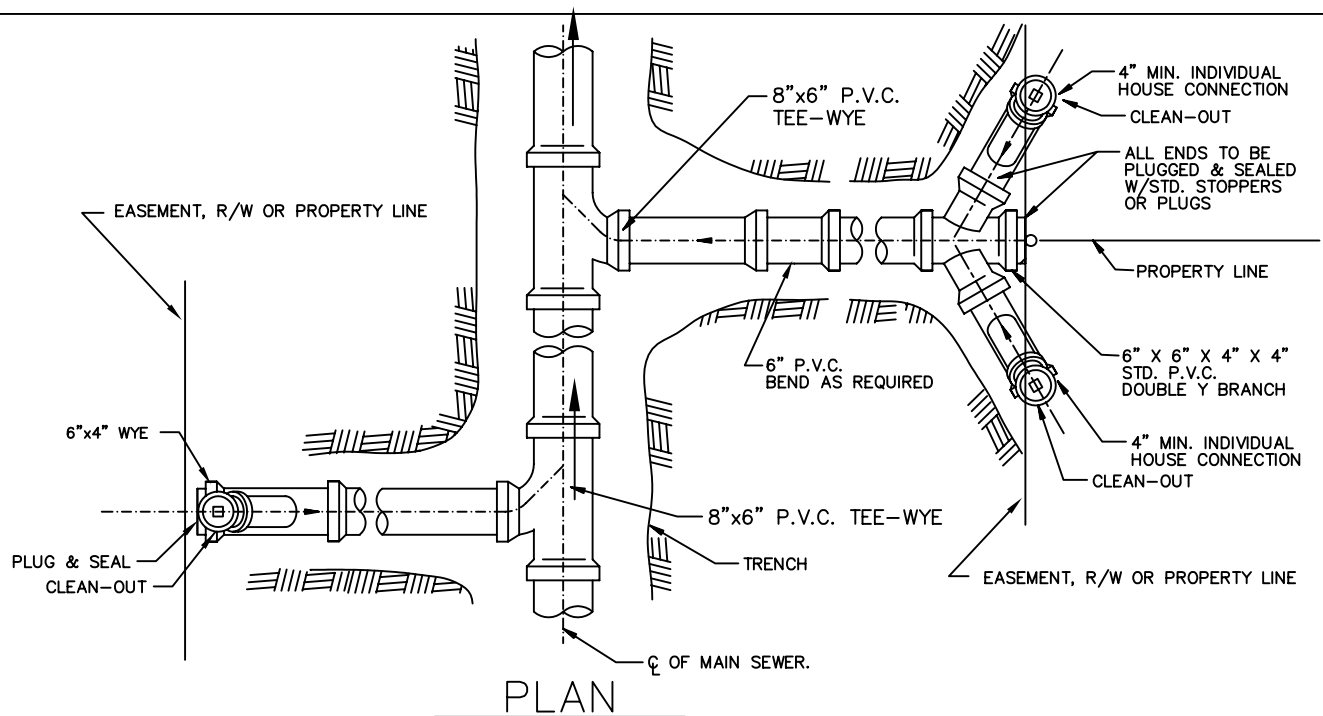
FORCE MAIN TIE-IN
AT MANHOLE

PAGE No
D29B



NOTES:

1. INVERT CHANNELS TO BE CONSTRUCTED FOR SMOOTH FLOW WITH NO OBSTRUCTIONS.
2. SPILLWAYS SHALL BE CONSTRUCTED BETWEEN PIPES WITH DIFFERENT INVERT ELEVATIONS PROVIDING FOR SMOOTH FLOWS.
3. CHANNELS FOR FUTURE CONSTRUCTION (STUBS) SHALL BE CONSTRUCTED, FILLED WITH SAND, AND COVERED WITH 1" OF MORTAR.
4. SLOPE MANHOLE WITH A 1:2 SLOPE FROM MANHOLE WALL TO CHANNEL.
5. INVERT SHALL BE A MINIMUM OF $1/2$ THE DIAMETER OF THE LARGEST PIPE OR 4" DEEP.



SECTION

NOTES:

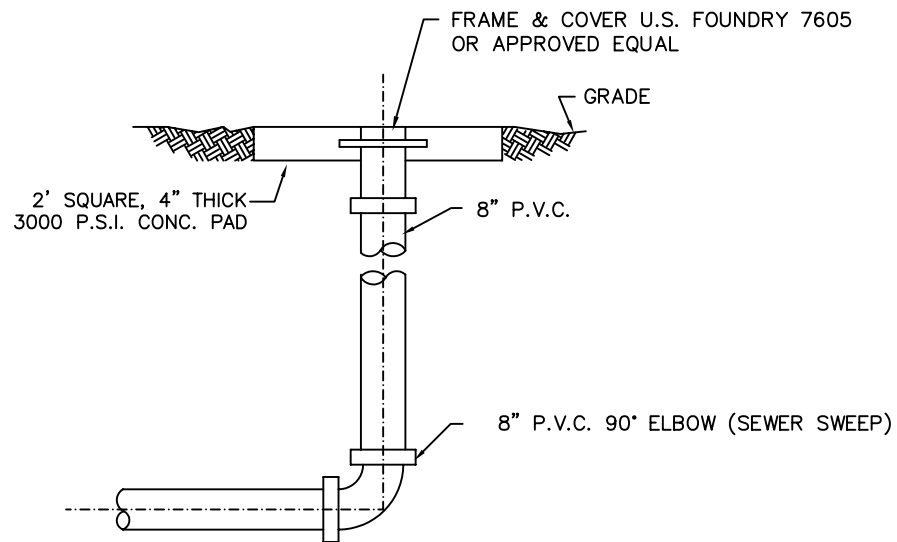
- SERVICE LATERALS SHALL TERMINATE AT PROPERTY LINE AT A DEPTH OF 3 FEET, PLUGGED WATERTIGHT WITH CLEAN-OUT.
- THE MINIMUM DIAMETER OF ALL SERVICE LATERALS SHALL BE 6 INCHES INDIVIDUAL HOUSE CONNECTIONS TO BE 4".
- CONNECTION TO O.U.A. LATERAL SHALL BE MADE WITH A TWO WAY CLEAN-OUT AT PROPERTY LINE BY THE CONTRACTOR OR CUSTOMER MAKING THE CONNECTION.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

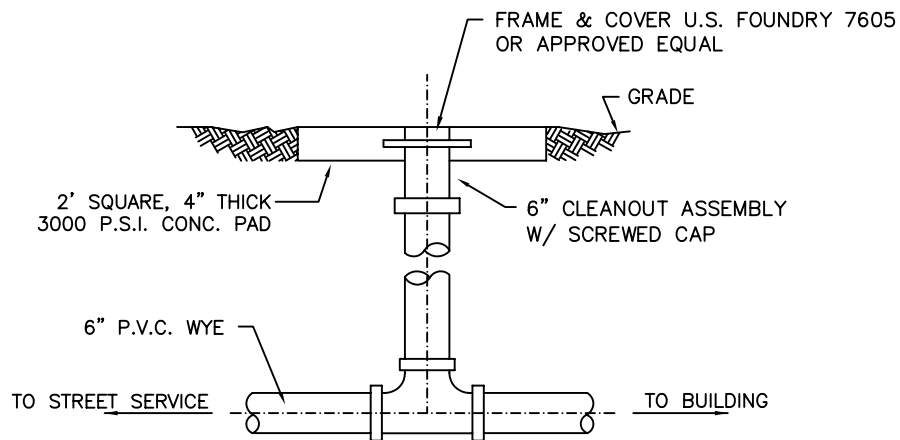
REVISION
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TYPICAL SEWER SERVICE CONNECTION

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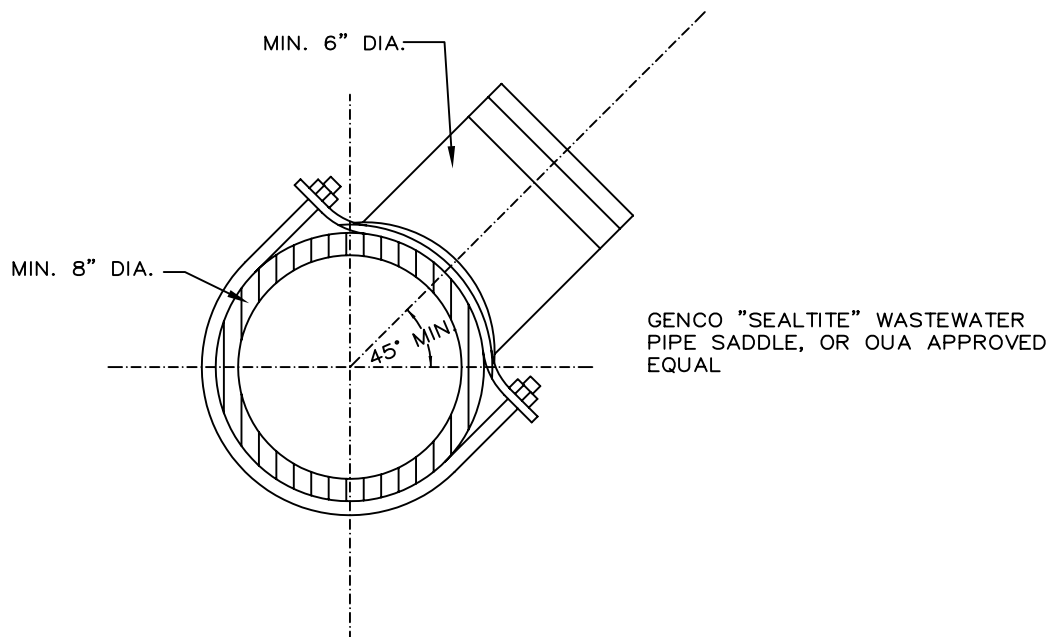
TYPICAL MAIN LINE TERMINAL CLEANOUT



NOTES:

1. TWO WAY CLEANOUT (SWEEP IN BOTH DIRECTIONS).
2. CLEAN OUT SHALL BE LOCATED ON RIGHT OF WAY LINE.
3. ALL CLEAN OUT'S REQUIRE AN INSPECTION.

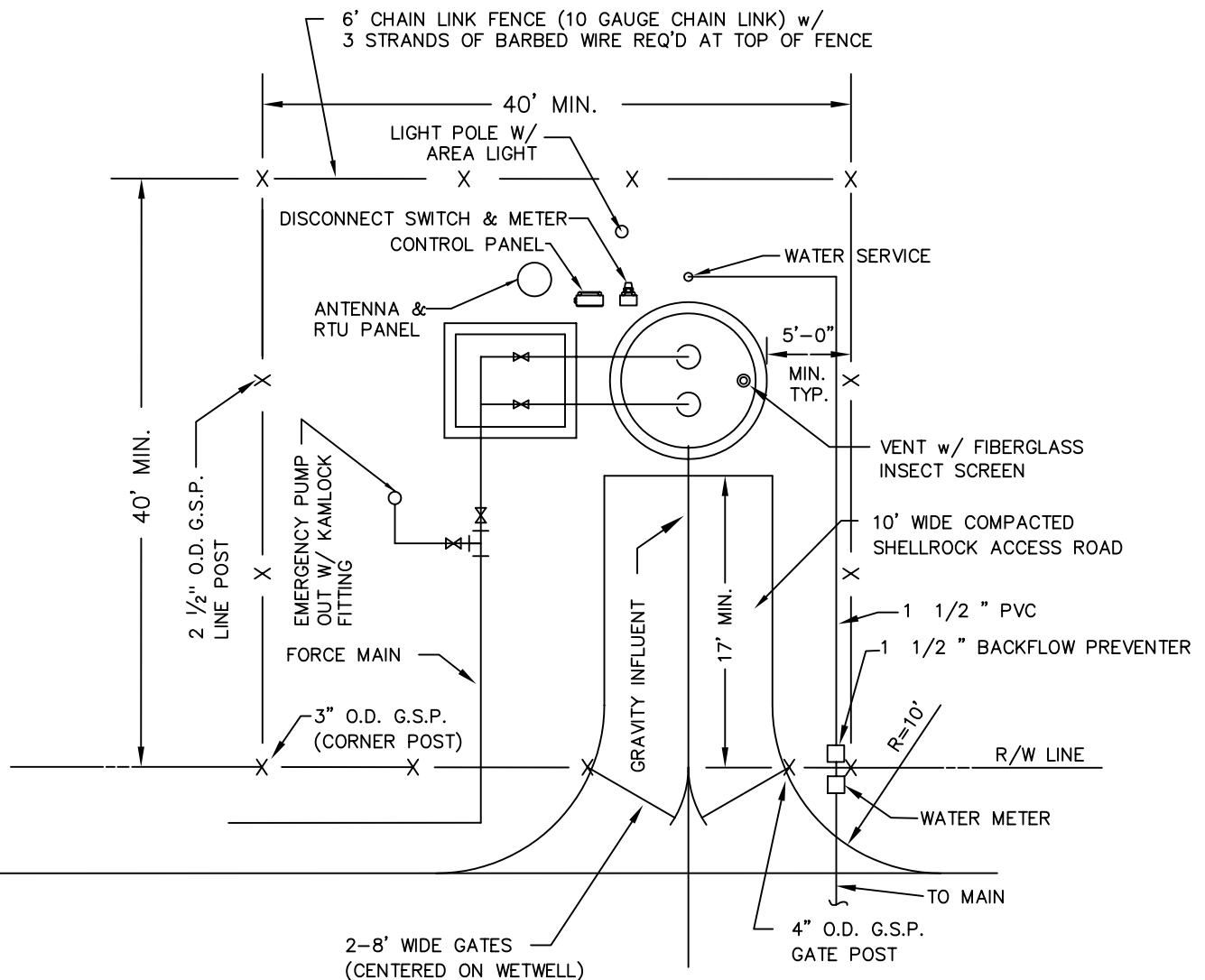
TYPICAL SERVICE LATERAL TWO WAY CLEANOUT



WASTEWATER PIPE SADDLE

NOTE:

1. FOR USE IN ADDING SERVICE TO GRAVITY SEWER MAIN.



NOTES:

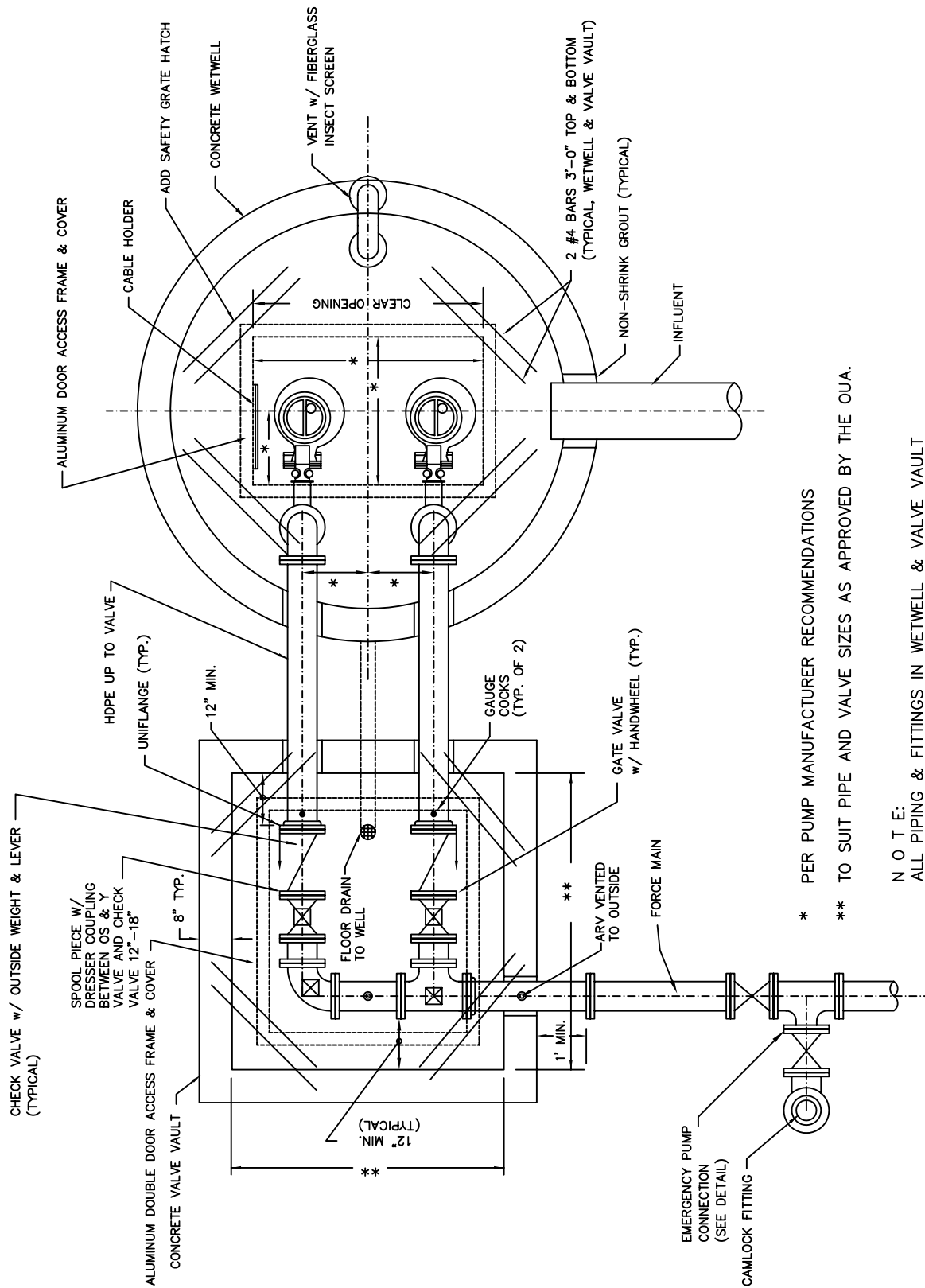
1. FENCED AREA SHALL BE LAID WITH A MINIMUM OF 6" OF 3/4" WASHED ROCK.
2. INFLUENT MAIN SHALL BE CLEAR OF PANEL AND VAULT.
3. PLAN MAY VARY BASED UPON SPECIFIC SITE REQUIREMENTS UPON APPROVAL FROM OUA
4. EMERGENCY PUMP OUT TO BE OUTSIDE VALVE PIT WITH CONCRETE BOX AT FINISH GRADE.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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TYPICAL LIFT STATION LAYOUT
(WITHIN EASEMENT)

PAGE No
D34



* PER PUMP MANUFACTURER RECOMMENDATIONS

** TO SUIT PIPE AND VALVE SIZES AS APPROVED BY THE OUA.

N O T E:
ALL PIPING & FITTINGS IN WETWELL & VALVE VAULT
SHALL BE HDPE.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

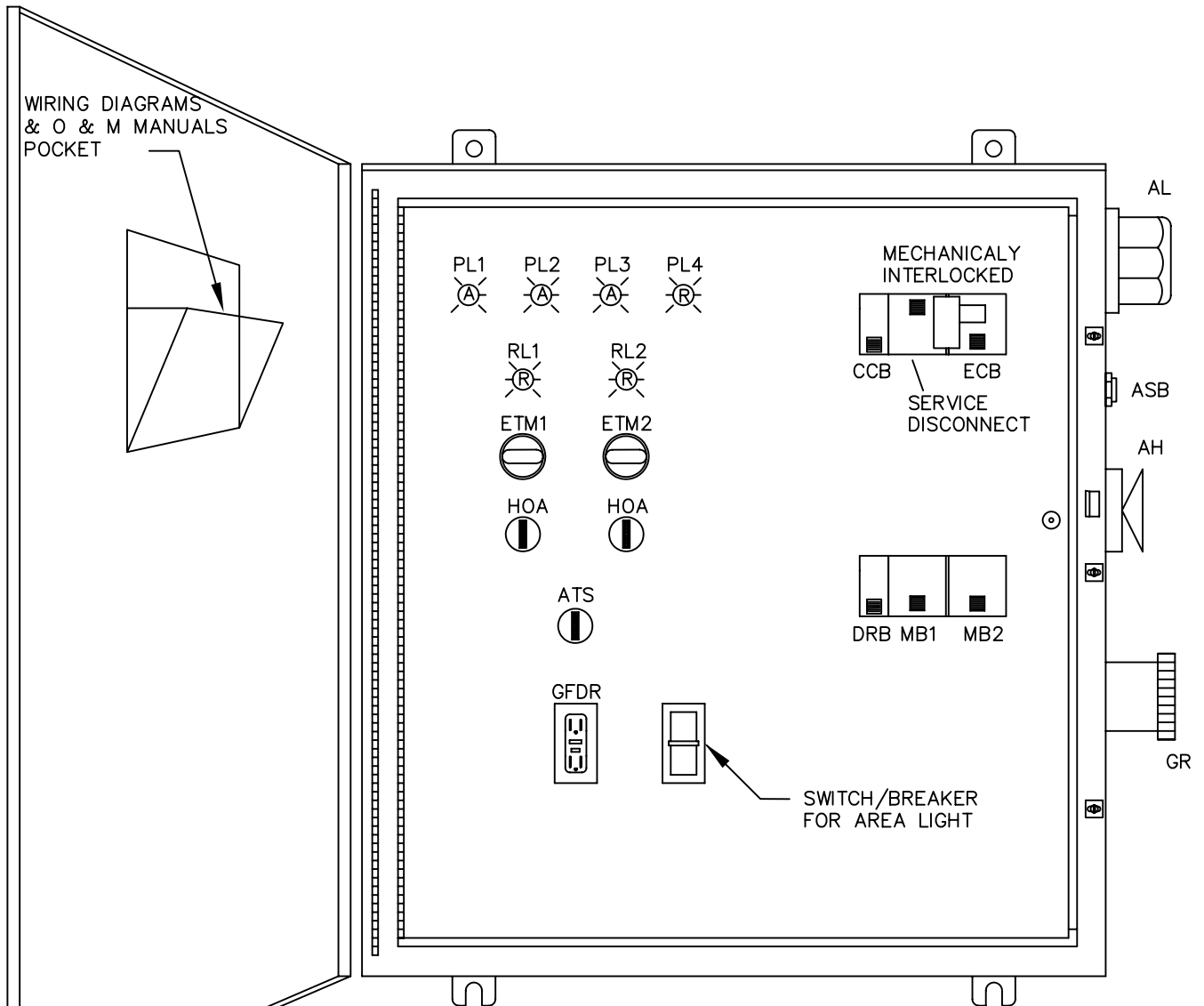
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TYPICAL LIFT STATION
(Plan)

PAGE No
D35

N O T E S:

1. GASKETED WEATHER DOOR WITH GROUND STRAP AND INTERNAL "DEAD FRONT" SAFETY DOOR
2. CABINET SHALL BE 316 SS ENCLOSURE, RATED NEMA 4X.



OUTER DOOR REMOVED TO SHOW DEADFRONT LAYOUT
 NEMA TYPE 4X 316 S.S. ENCLOSURE W/ CONTINUOUS HINGE
 TYPICAL, ACTUAL LAYOUT MAY VARY WITH HORSEPOWER
 A THREE-POINT LATCHING SYSTEM FOR OUTER DOOR

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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CONTROL CABINET

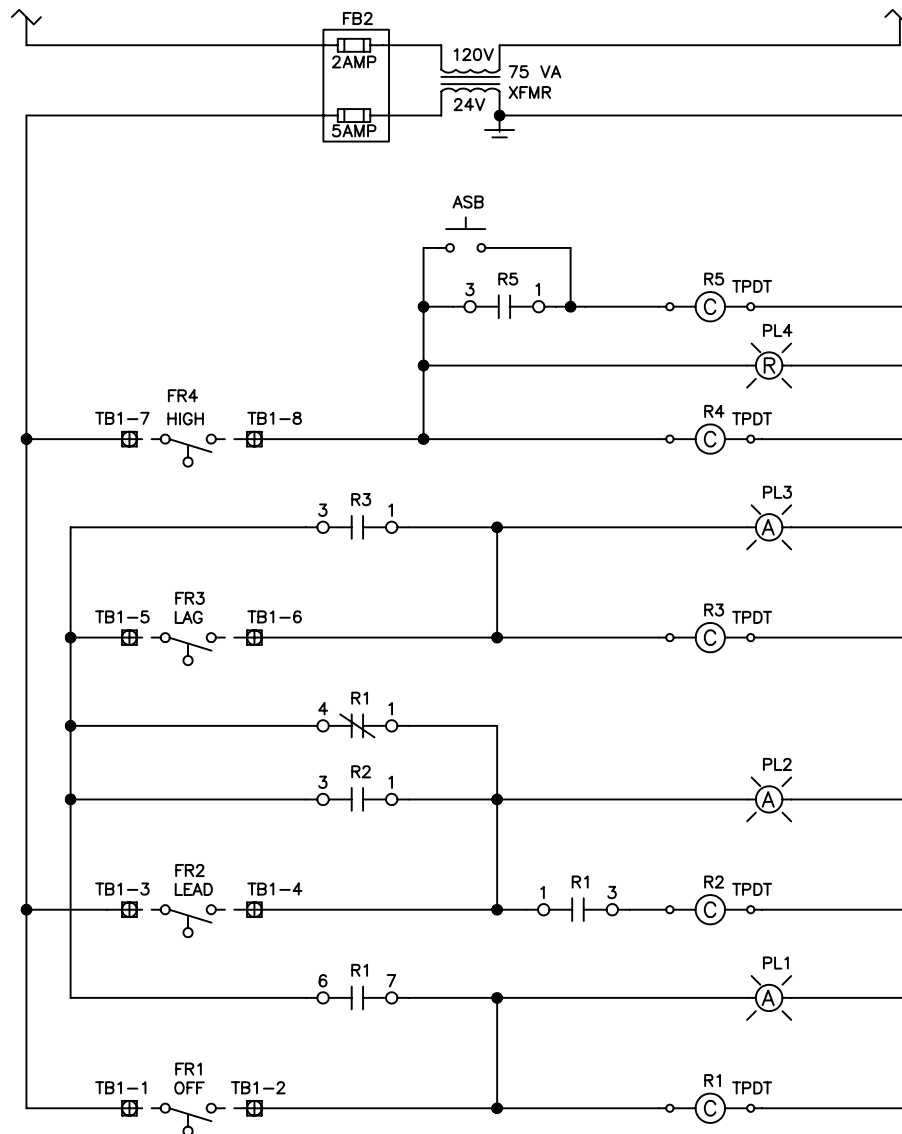
PAGE No
 D37

LEGEND

AB	- ALARM BELL	GR	- GENERATOR RECEPTACLE
AL	- ALARM LIGHT	HOA	- HAND - OFF - AUTO
ASB	- ALARM SILENCE BUTTON	HPS	- HIGH PRESSURE SODIUM
ATS	- ALTERNATOR TEST SWITCH	ISR	- INTRINSICALLY SAFE RELAY
CCB	- CONTROL CIRCUIT BREAKER	MB	- MOTOR BREAKER
DPDT	- DOUBLE POLE DOUBLE THROW	MC	- MINI-CAS
DRB	- DUPLEX RECEPTACLE BREAKER	MCB	- MAIN CIRCUIT BREAKER
GFDR	- GROUND FAULT DUPLEX RECEPTACLE	MS	- MOTOR STARTER
ECB	- EMERGENCY CIRCUIT BREAKER	OL	- OVERLOAD
ETM	- ELAPSED TIME METER	PB	- POWER BLOCK
F	- FUSE	PL	- PILOT LIGHT
FB	- FUSE BLOCK	R	- RELAY
FL	- FLASHER	RL	- RUN LIGHT
FTS	- FLOAT TEST SWITCH	TB	- TERMINAL BLOCK
ALB	- AREA LIGHT BREAKER	TTS	- THERMAL TERMINAL STRIP
P	- PHOTOCELL	XFMR	- TRANSFORMER
PML	- POLE MOUNTED LIGHT		
SP	- SINGLE POLE SWITCH		

NOTES:

- * 1. ALL PILOT LIGHTS, PUSH BUTTONS AND SELECTOR SWITCHES WILL BE NEMA 4X CORROSION RESISTANT, 30.5MM, HEAVY DUTY TYPE, EQUAL TO CUTLER HAMMER SERIES E34 DEVICES.
2. PROVIDE THE FOLLOWING SPARE PARTS WITH EACH CONTROL PANEL:
ONE SET OF OVERLOAD HEATERS
ONE SET OF MOTOR STARTER CONTACTS
ONE PHASE MONITOR
2 PLUG-IN-RELAYS - POTTER & BRUMFIELD
3. PUMP MANUFACTURER SHALL PROVIDE 1 POLE, 20 AMP CIRCUIT BREAKER AND SINGLE POLE SWITCH TO CONTROL POLE LIGHT WITHIN PUMP CONTROL PANEL. POLE MOUNTED LIGHT SHALL INCLUDE PHOTOCELL FOR NIGHT OPERATION ONLY.

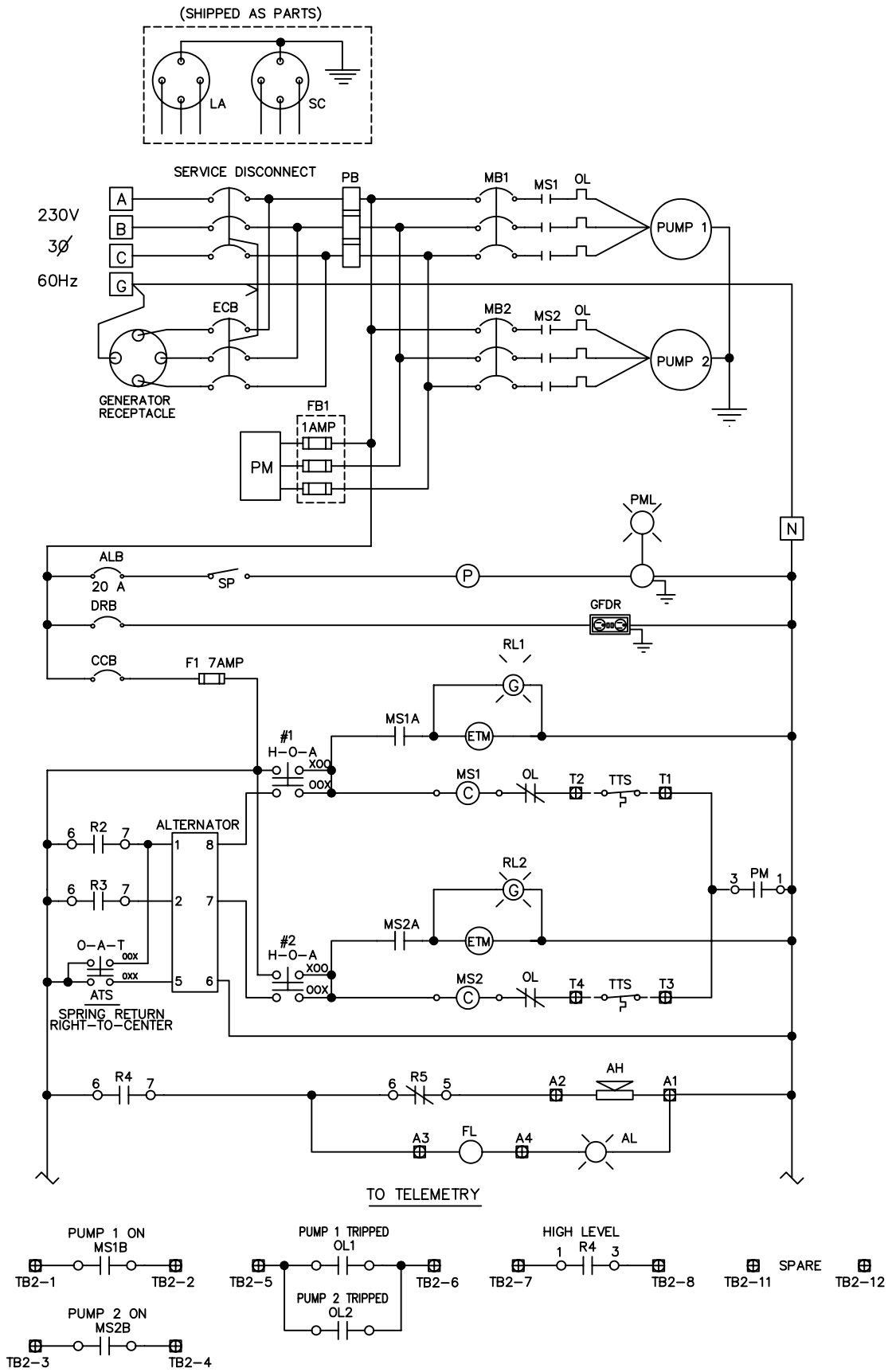


OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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CONTROL PANEL ELECTRICAL SCHEMATIC DIAGRAM

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D39

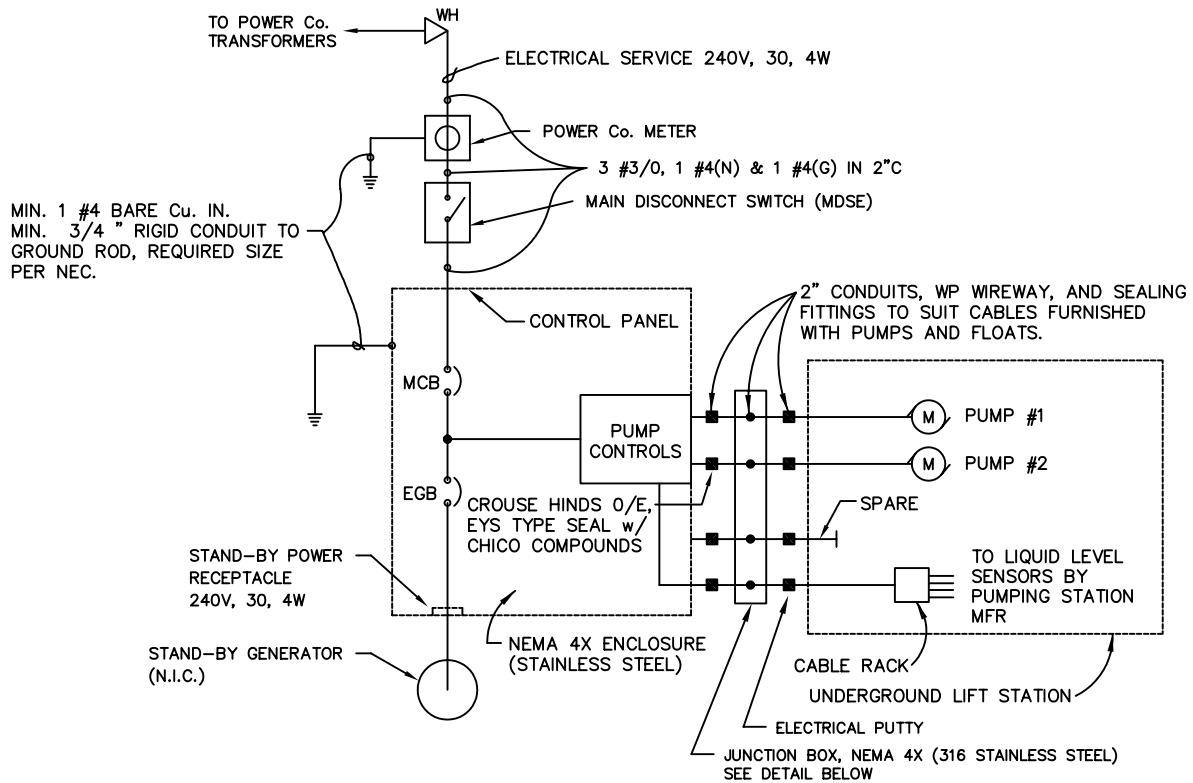


OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

REVISION
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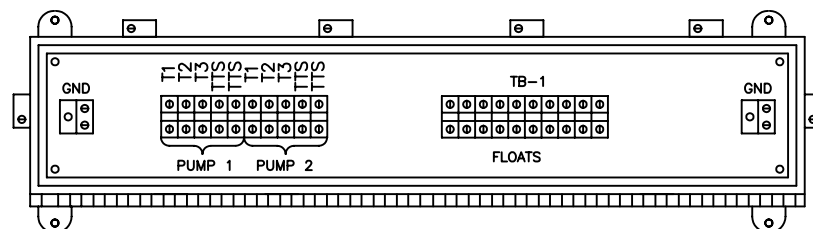
ELECTRICAL SCHEMATIC DIAGRAMS

PAGE No
D40



NOTES:

1. CONDUITS FROM CONTROL PANEL TO JUNCTION BOX TO BE FILLED WITH CHICO COMPOUND.
2. CONDUITS BETWEEN JUNCTION BOX AND WETWELL TO BE FILLED WITH ELECTRICAL PUTTY.



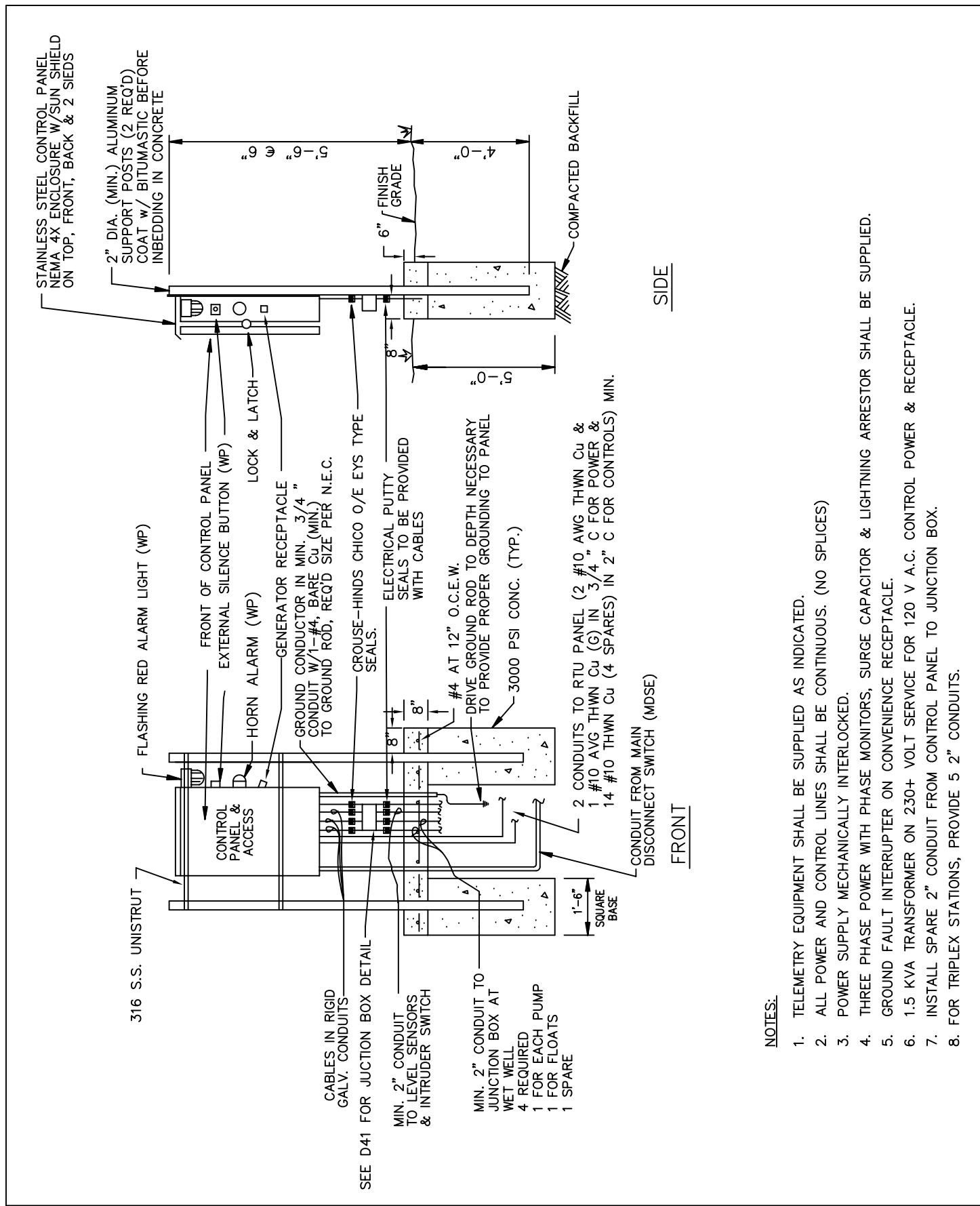
JUNCTION BOX, NEMA 4X 316 S.S.
DOOR REMOVED TO SHOW INSIDE LAYOUT
(8" H X 24" W X 8' D)
MINIMUM

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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ELECTRICAL BLOCK DIAGRAM

PAGE No
D41



NOTES:

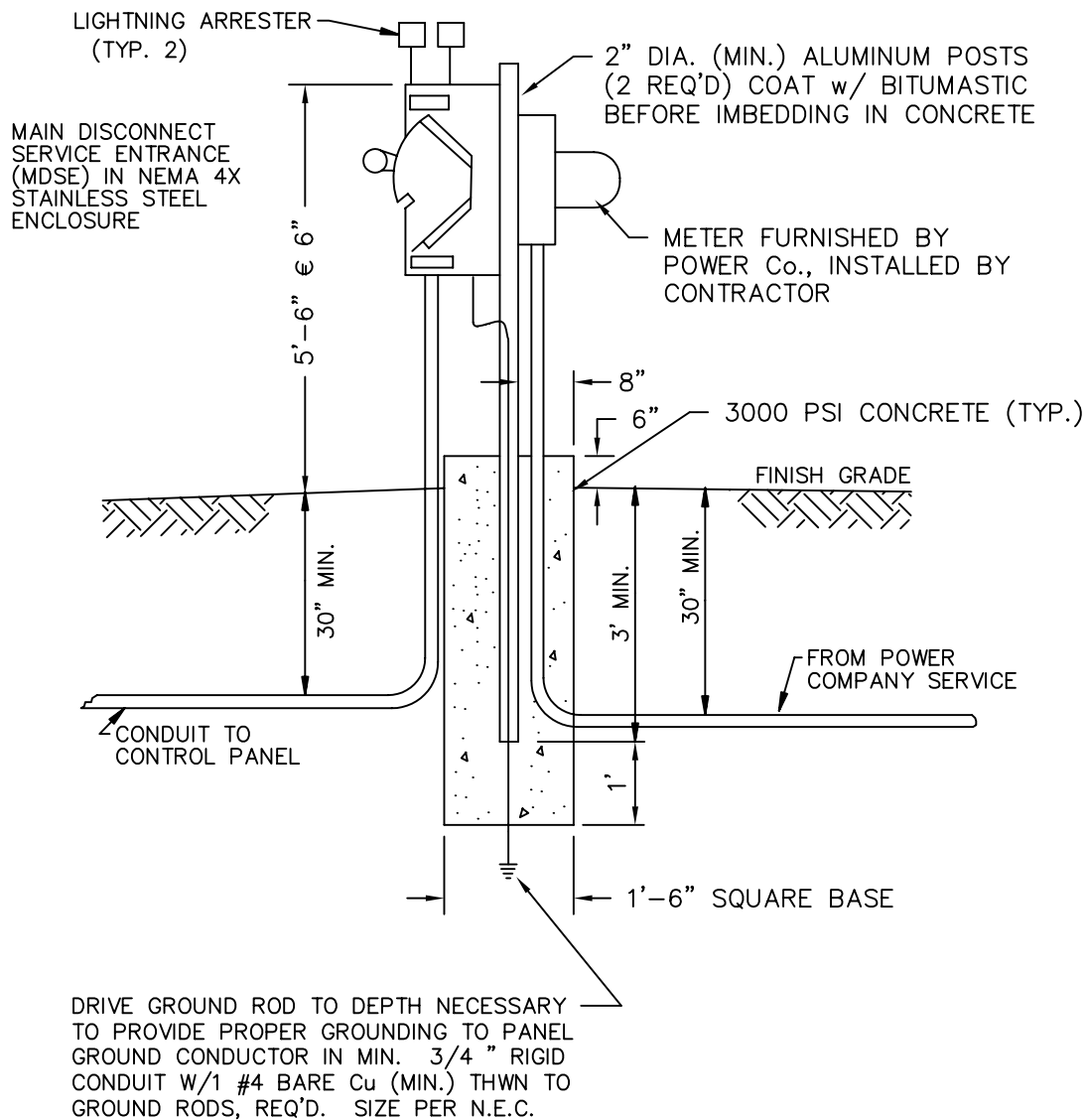
1. TELEMETRY EQUIPMENT SHALL BE SUPPLIED AS INDICATED.
2. ALL POWER AND CONTROL LINES SHALL BE CONTINUOUS. (NO SPLICES)
3. POWER SUPPLY MECHANICALLY INTERLOCKED.
4. THREE PHASE POWER WITH PHASE MONITORS, SURGE CAPACITOR & LIGHTNING ARRESTOR SHALL BE SUPPLIED.
5. GROUND FAULT INTERRUPTER ON CONVENIENCE RECEPTACLE.
6. 1.5 KVA TRANSFORMER ON 230+ VOLT SERVICE FOR 120 V A.C. CONTROL POWER & RECEPTACLE.
7. INSTALL SPARE 2" CONDUIT FROM CONTROL PANEL TO JUNCTION BOX.
8. FOR TRIPLEX STATIONS, PROVIDE 5 2" CONDUITS.

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TYPICAL CONTROL PANEL INSTALLATION

PAGE No
D42



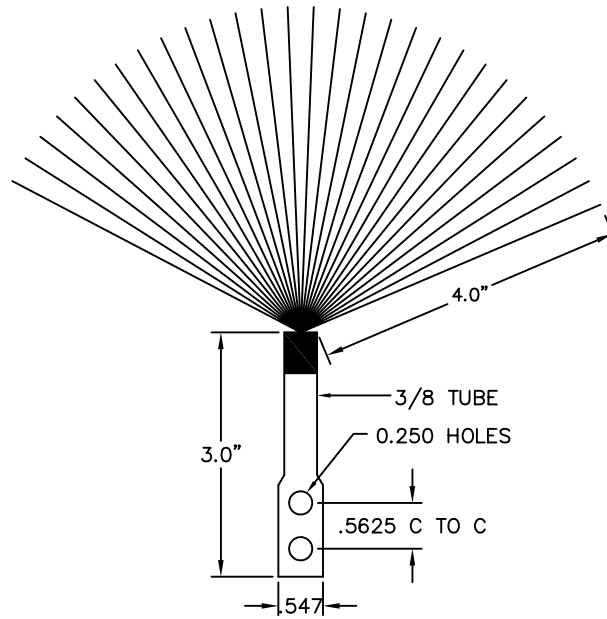
OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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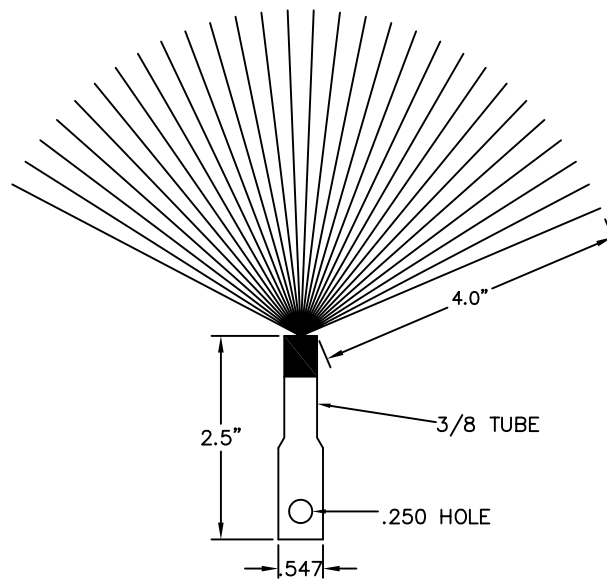
MAIN DISCONNECT SWITCH

PAGE No
D43

LIGHTNING MASTER CORPORATION
MODEL # PP-2S



LIGHTNING MASTER CORPORATION
MODEL # PP-1S

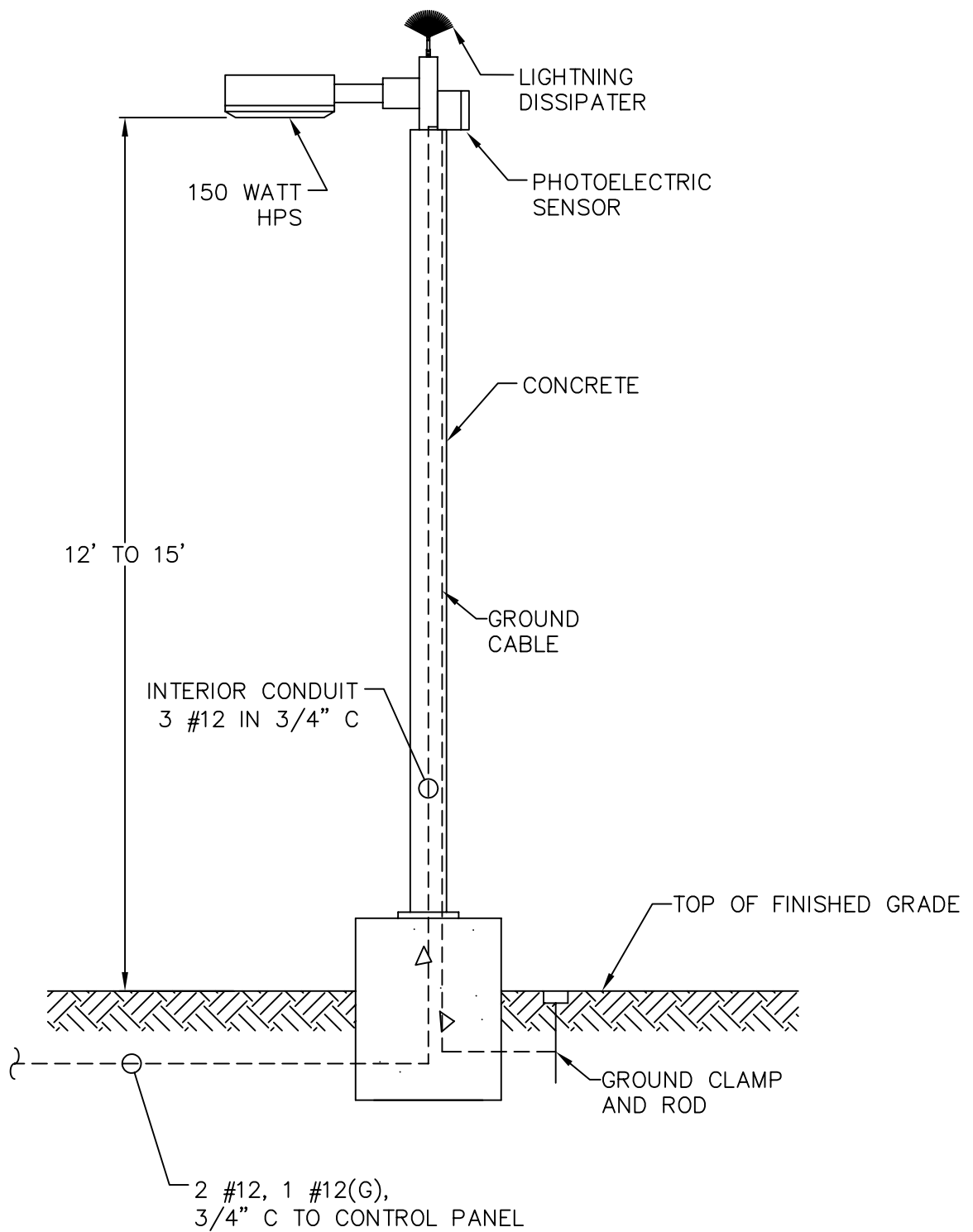


OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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LIGHTING DISSIPATER

PAGE No
D43A

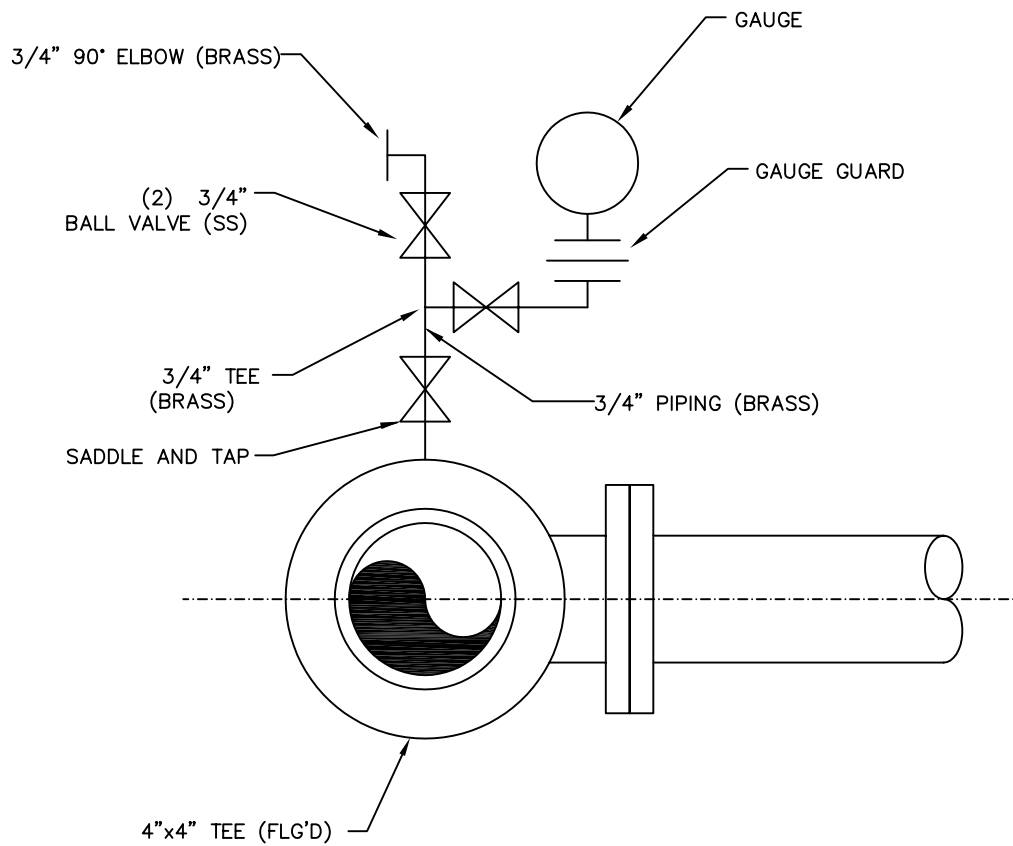


OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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LIGHT POLE DETAIL

PAGE No
D43B



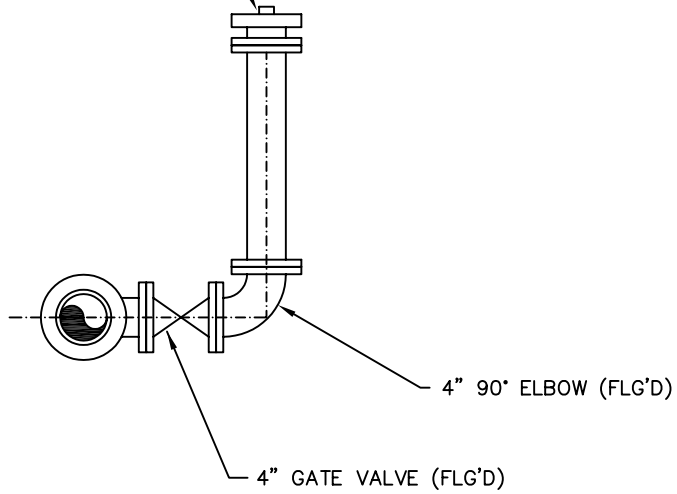
OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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GAUGE COCK DETAIL

PAGE No
D44

4" ALUMINUM "KAMLOK" ADAPTER 633-LAS
w/ LOCKABLE CAP & 1/4 " GAUGE COCK
INTO CAP & 1/4 " BRASS STREET ELL.
PROVIDE 2" CLEARANCE FROM COVER



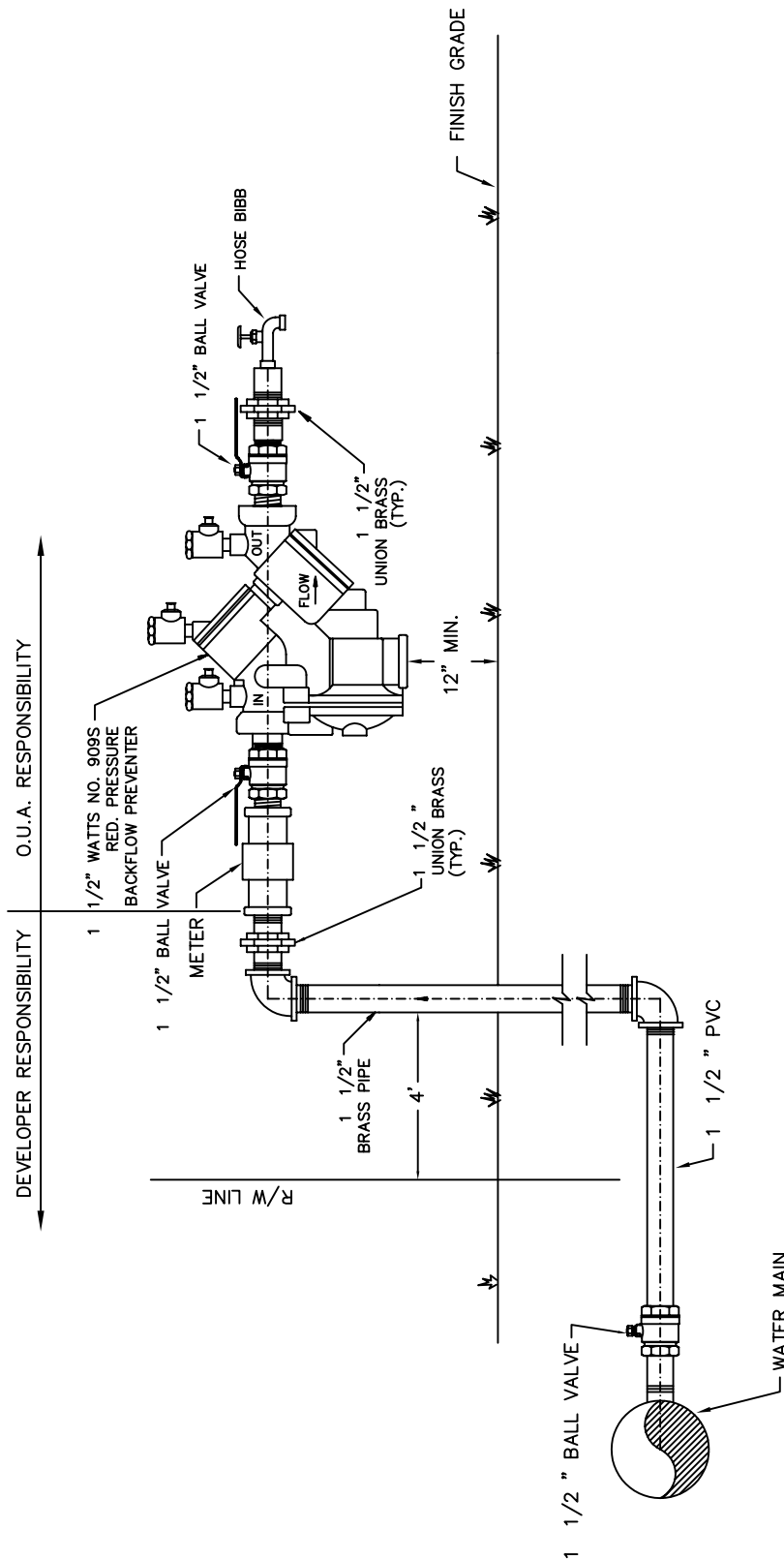
N O T E:
EMERGENCY PUMP OUT CONNECTION SHALL BE PROVIDED AND SHALL BE THE SAME SIZE AS THE
PUMP DISCHARGE PIPING, 4" MINIMUM.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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EMERGENCY PUMP OUT

PAGE No
D45



N O T E S:

1. ALL PIPING AND FITTINGS ARE BRASS, WITH SCREWED FITTINGS.
2. METER AND BACKFLOW PREVENTER TO BE PURCHASED FROM O.U.A. AND INSTALLED BY CONTRACTOR.
3. INSTALL PIPE SUPPORTS AS NEEDED.

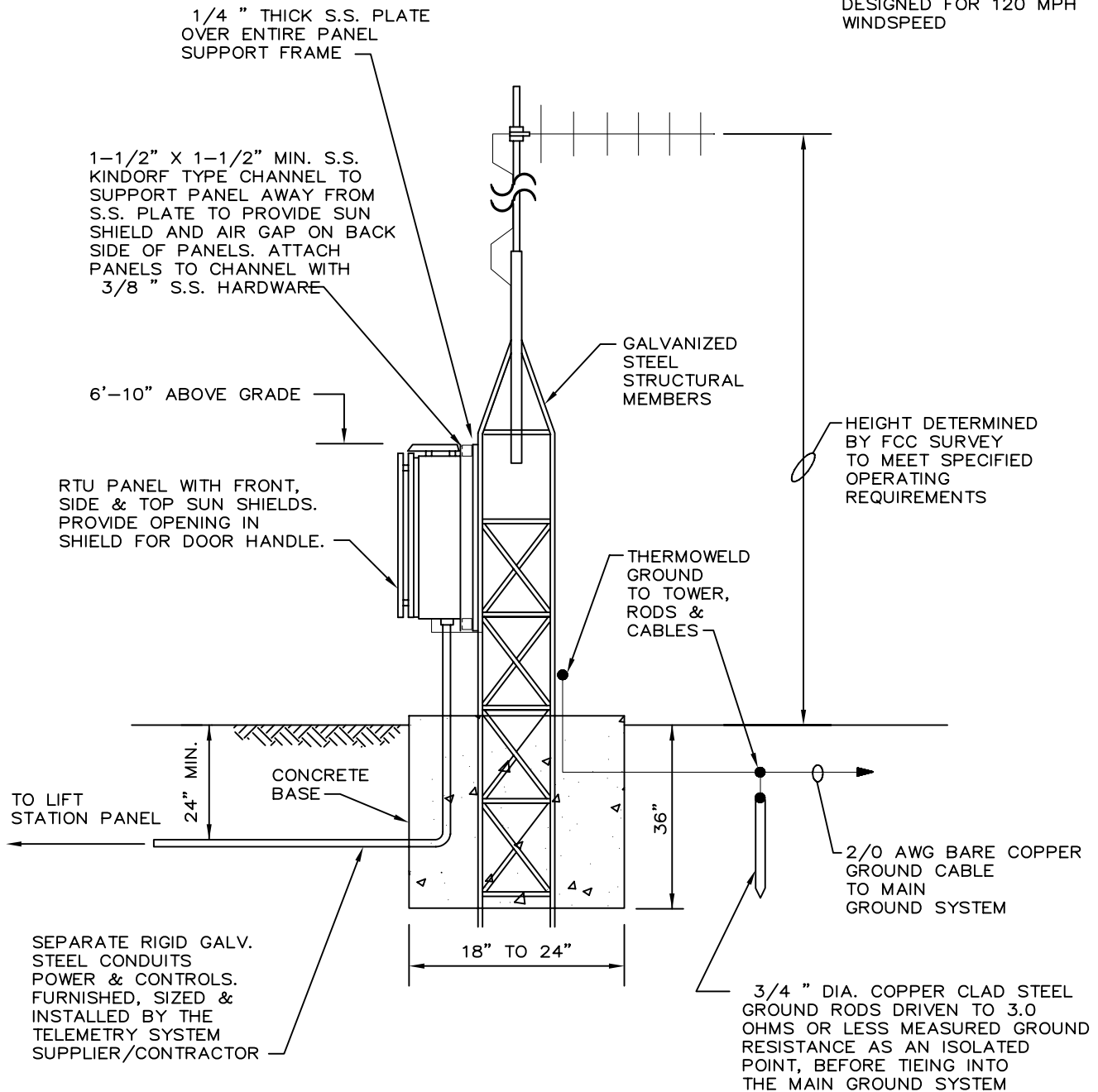
OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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WATER CONNECTION DETAIL AT LIFT STATION

PAGE No
D46

NOTE:
TOWER & FOUNDATION
DESIGNED FOR 120 MPH
WINDSPEED



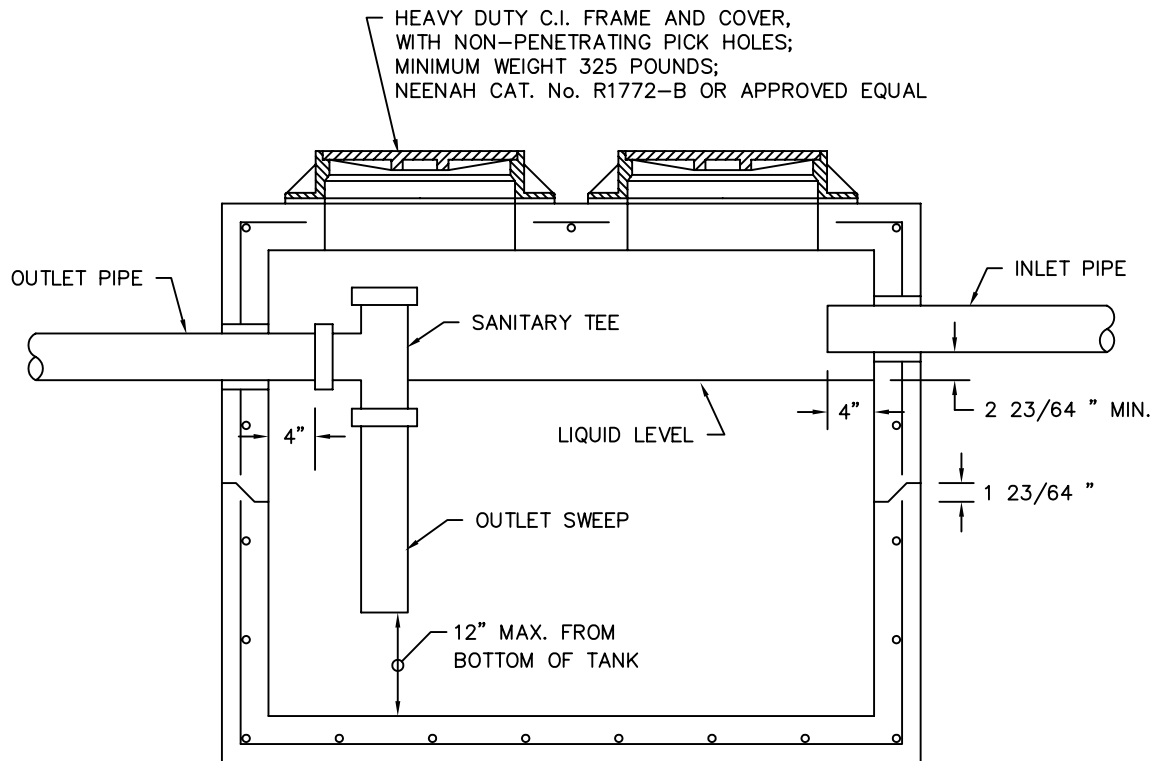
NOTE: MODIFY AS NECESSARY TO COMPLY WITH SYSTEM SUPPLIER APPROVED BY OUA

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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ANTENNA , TOWER & RTU PANEL MOUNTING DETAIL

PAGE No
D47



NOTES:

1. ALL PIPING SHALL BE A MINIMUM OF 4"
2. PIPING SHALL BE INSTALLED USING A CONCRETE MANHOLE ADAPTER.
3. SANITARY 'T' OUTLET SHALL BE INSTALLED 4" INSIDE OF WALL.
4. TANK SHALL BE A MINIMUM OF 1000 GALLONS.
5. TANK SHALL BE TRAFFIC BEARING AND CONCRETE SHALL COMPLY WITH ASTM C 478, LATEST REVISION.
6. WALLS & BOTTOM SLABS SHALL BE MINIMUM 4" THICK REINFORCED CONCRETE.
7. TOP SLAB SHALL BE A MINIMUM 6" THICK REINFORCED CONCRETE.
8. SECTIONS SHALL BE JOINED AND SEALED WITH MINIMUM 1 $\frac{29}{64}$ " "RAM-NEK" SEALER OR EQUIVALENT TO FORM A WATER TIGHT SEAL.
9. RISER JOINTS SHALL COMPLY WITH ASTM C 443, LATEST REVISION.
10. TANK SIZING SHALL BE PER O.U.A. REQUIREMENTS.
11. COVER TO BE SEATED OR USE RAIN GUARDS.
12. NO DOMESTIC WASTE THROUGH GREASE TRAP.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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GREASE, OIL AND SAND INTERCEPTER

PAGE No
D48

MECHANICAL THRUST RESTRAINT CHART 1

PIPE SIZE, in	90° BEND		45° BEND		22 1/2° BEND		11 1/4° BEND		DEADEND/VALVE	
	PVC	DIP	PVC	DIP	PVC	DIP	PVC	DIP	PVC	DIP
4	21	16	9	7	5	4	2	2	45	29
6	28	23	12	10	6	5	3	3	63	40
8	37	29	16	12	8	6	4	3	83	53
10	44	35	18	15	9	7	5	4	99	63
12	51	41	21	17	11	8	5	4	116	74
14	57	46	24	19	12	10	6	5	132	83
16	64	51	27	21	13	11	7	5	149	94
18	70	56	29	24	14	12	7	6	164	104
20	76	61	32	26	16	13	8	6	179	113
24	87	70	36	29	18	14	9	7	208	131

THRUST RESTRAINT CHART BASED UPON THE FOLLOWING:

<u>PVC/DIP</u>	PIPE MATERIAL, AS NOTED
<u>SP</u>	SOIL TYPE (designer to confirm)
<u>1.5</u>	SAFETY FACTOR (minimum)
<u>3</u>	TRENCH TYPE (designer to confirm)
<u>2.5</u>	DEPTH OF BURY, ft (designer to confirm)
<u>150</u>	TEST PRESSURE, psi (minimum)

THE MINIMUM LENGTH OF PIPE OUT OF ANY VALVE OR FITTING SHOULD BE 20 LF.

FITTINGS NOT SHOWN TO BE CALCULATED UTILIZING THE CRITERIA LISTED ABOVE AND SUBMITTED IN A SHOP DRAWING
VALUES SHOWN IN CHART INDICATE LENGTH (LF) OF PIPE TO BE RESTRAINED ON EITHER SIDE OF ITEM LISTED

NOTE 1: ANY CONDITION OTHER THAN THOSE LISTED ABOVE (including poly-wrapped DIP) SHALL REQUIRE REVISION OF THE
TABLE IN ACCORDANCE WITH EBAA IRON, INC., RESTRAINT LENGTH CALCULATOR (V. 5.4).

(<http://www.ebaa.com/engineering.htm> or <http://rcp.ebaa.com>)

NOTE 2: THE REVISED CHARTS SHALL BE SUBMITTED TO OUA AS A SHOP DRAWING SUBMITTAL.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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WATER THRUST RESTRAINT

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MECHANICAL THRUST RESTRAINT CHART 2								
MAIN RUN, in	BRANCH, in	TEE			LARGE SIZE	SMALL LARGE	REDUCER	
		PVC	DIP				PVC	DIP
4	4	1	1		6	4	33	21
6	4	1	1		8	4	60	38
6	6	1	1		8	6	35	22
8	4	1	1		10	4	81	51
8	6	1	1		10	6	61	39
8	8	7	5		10	8	33	21
10	6	1	1		12	4	101	64
10	8	1	1		12	6	85	54
10	10	21	14		12	8	62	39
12	6	1	1		16	4	138	87
12	8	1	1		16	6	126	79
12	12	36	24		16	8	109	68
16	6	1	1		16	12	63	40
16	8	1	1		18	4	154	97
16	16	65	43		18	6	144	91
18	6	1	1		18	8	129	81
18	8	1	1		20	4	171	107
18	18	79	52		20	6	161	101
20	6	1	1		20	8	148	93
20	8	1	1		20	12	113	71
20	20	92	61		24	4	201	127
24	6	1	1		24	6	194	122
24	8	1	1		24	8	183	115
24	24	118	78		24	12	154	97

THRUST RESTRAINT CHART BASED UPON THE FOLLOWING:

<u>PVC/DIP</u>	PIPE MATERIAL, AS NOTED
<u>SP</u>	SOIL TYPE (designer to confirm)
<u>1.5</u>	SAFETY FACTOR (minimum)
<u>3</u>	TRENCH TYPE (designer to confirm)
<u>2.5</u>	DEPTH OF BURY, ft (designer to confirm)
<u>150</u>	TEST PRESSURE, psi (minimum)

THE MINIMUM LENGTH OF PIPE OUT OF ANY VALVE OR FITTING SHOULD BE 20 LF.

FITTINGS NOT SHOWN TO BE CALCULATED UTILIZING THE CRITERIA LISTED ABOVE AND SUBMITTED IN A SHOP DRAWING
VALUES SHOWN IN CHART INDICATE LENGTH (LF) OF PIPE TO BE RESTRAINED ON EITHER SIDE OF ITEM LISTED

NOTE 1: ANY CONDITION OTHER THAN THOSE LISTED ABOVE (including poly-wrapped DIP) SHALL REQUIRE REVISION OF THE
TABLE IN ACCORDANCE WITH EBAA IRON, INC., RESTRAINT LENGTH CALCULATOR (V. 5.4).

(<http://www.ebaa.com/engineering.htm> or <http://rcp.ebaa.com>)

NOTE 2: THE REVISED CHARTS SHALL BE SUBMITTED TO OUA AS A SHOP DRAWING SUBMITTAL.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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MECHANICAL THRUST RESTRAINT CHART 1

PIPE SIZE, in	90° BEND		45° BEND		22 1/2° BEND		11 1/4° BEND		DEADEND/VALVE	
	PVC	DIP	PVC	DIP	PVC	DIP	PVC	DIP	PVC	DIP
4	14	11	6	5	3	3	2	2	30	19
6	19	15	8	7	4	3	2	2	42	27
8	25	20	11	8	5	4	3	2	55	35
10	29	23	12	10	6	5	3	3	66	42
12	34	27	14	12	7	6	4	3	78	49
14	38	31	16	13	8	7	4	3	88	56
16	43	34	18	14	9	7	5	4	99	63
18	47	38	20	16	10	8	5	4	110	69
20	51	41	21	17	11	9	5	4	120	75
24	58	47	24	20	12	10	6	5	139	88

THRUST RESTRAINT CHART BASED UPON THE FOLLOWING:

<u>PVC/DIP</u>	PIPE MATERIAL, AS NOTED
<u>SP</u>	SOIL TYPE (designer to confirm)
<u>1.5</u>	SAFETY FACTOR (minimum)
<u>3</u>	TRENCH TYPE (designer to confirm)
<u>2.5</u>	DEPTH OF BURY, ft (designer to confirm)
<u>100</u>	TEST PRESSURE, psi (minimum)

THE MINIMUM LENGTH OF PIPE OUT OF ANY VALVE OR FITTING SHOULD BE 20 LF.

FITTINGS NOT SHOWN TO BE CALCULATED UTILIZING THE CRITERIA LISTED ABOVE AND SUBMITTED IN A SHOP DRAWING
VALUES SHOWN IN CHART INDICATE LENGTH (LF) OF PIPE TO BE RESTRAINED ON EITHER SIDE OF ITEM LISTED

NOTE 1: ANY CONDITION OTHER THAN THOSE LISTED ABOVE (including poly-wrapped DIP) SHALL
REQUIRE REVISION OF THE TABLE IN ACCORDANCE WITH EBAA IRON, INC., RESTRAINT LENGTH
CALCULATOR (V. 5.4).

(<http://www.ebaa.com/engineering.htm> or <http://rcp.ebaa.com>)

NOTE 2: THE REVISED CHARTS SHALL BE SUBMITTED TO OUA AS A SHOP DRAWING SUBMITTAL.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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FORCE MAIN THRUST RESTRAINT

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D51

MECHANICAL THRUST RESTRAINT CHART 2

MAIN RUN, in	BRANCH, in	TEE		LARGE SIZE	SMALL SIZE	REDUCER	
		PVC	DIP			PVC	DIP
4	4	1	1	6	4	22	14
6	4	1	1	8	4	40	25
6	6	1	1	8	6	23	15
8	4	1	1	10	4	54	34
8	6	1	1	10	6	41	26
8	8	1	1	10	8	22	14
10	6	1	1	12	4	68	43
10	8	1	1	12	6	57	36
10	10	1	1	12	8	41	26
12	6	1	1	16	4	92	58
12	8	1	1	16	6	84	53
12	12	1	1	16	8	73	46
16	6	1	1	16	12	42	27
16	8	1	1	18	4	103	65
16	16	18	12	18	6	96	61
18	6	1	1	18	8	86	54
18	8	1	1	20	4	114	72
18	18	27	18	20	6	108	68
20	6	1	1	20	8	99	62
20	8	1	1	20	12	75	47
20	20	36	24	24	4	134	85
24	6	1	1	24	6	129	81
24	8	1	1	24	8	122	77
24	24	52	35	24	12	103	65

THRUST RESTRAINT CHART BASED UPON THE FOLLOWING:

<u>PVC/DIP</u>	PIPE MATERIAL, AS NOTED
<u>SP</u>	SOIL TYPE (designer to confirm)
<u>1.5</u>	SAFETY FACTOR (minimum)
<u>3</u>	TRENCH TYPE (designer to confirm)
<u>2.5</u>	DEPTH OF BURY, ft (designer to confirm)
<u>100</u>	TEST PRESSURE, psi (minimum)

THE MINIMUM LENGTH OF PIPE OUT OF ANY VALVE OR FITTING SHOULD BE 20 LF.

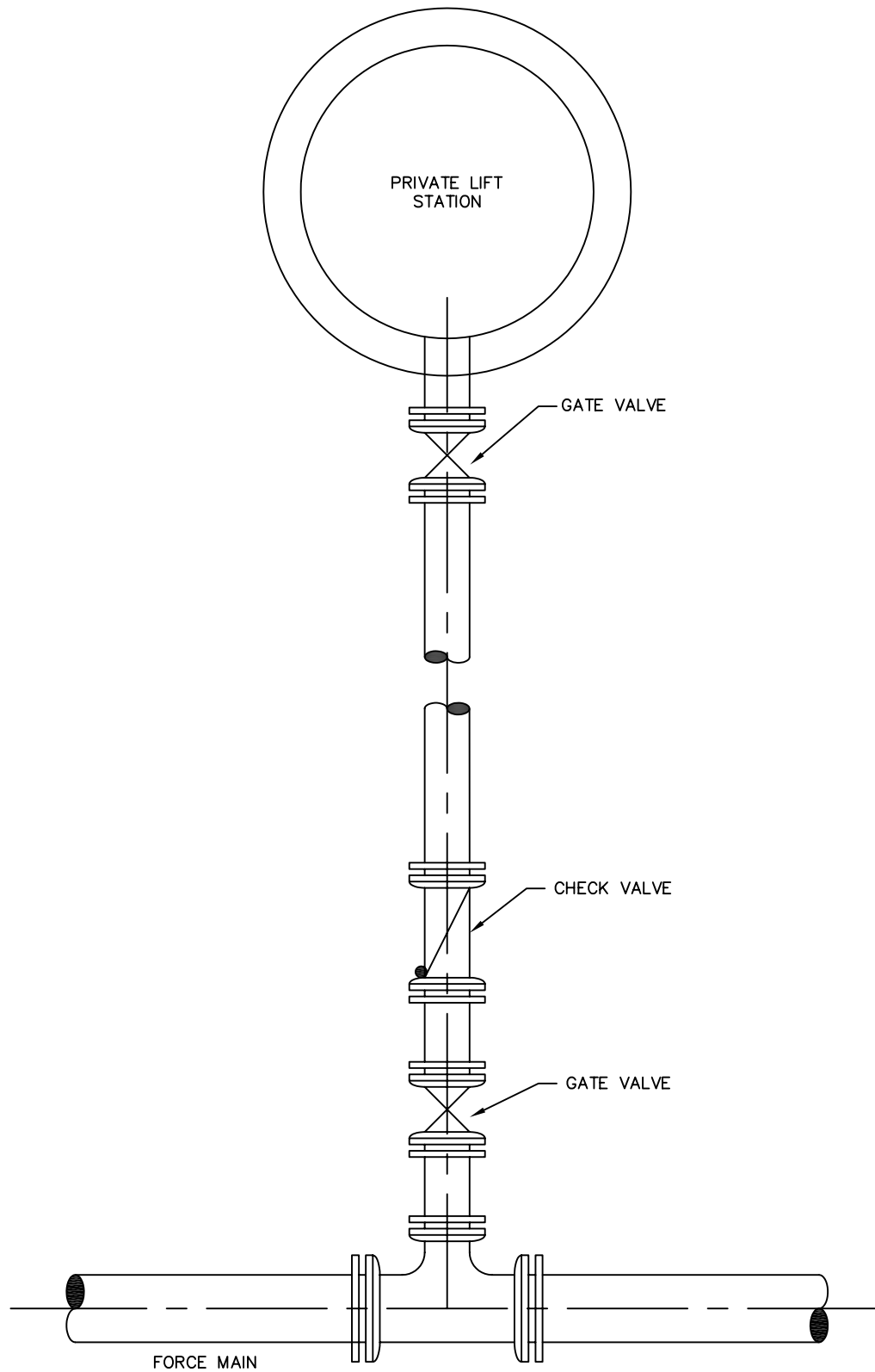
FITTINGS NOT SHOWN TO BE CALCULATED UTILIZING THE CRITERIA LISTED ABOVE AND SUBMITTED IN A SHOP DRAWING
VALUES SHOWN IN CHART INDICATE LENGTH (LF) OF PIPE TO BE RESTRAINED ON EITHER SIDE OF ITEM LISTED

NOTE 1: ANY CONDITION OTHER THAN THOSE LISTED ABOVE (including poly-wrapped DIP) SHALL REQUIRE REVISION OF THE
TABLE IN ACCORDANCE WITH EBAA IRON, INC., RESTRAINT LENGTH CALCULATOR (V. 5.4).
(<http://www.ebaa.com/engineering.htm> or <http://rcp.ebaa.com>)

NOTE 2: THE REVISED CHARTS SHALL BE SUBMITTED TO OUA AS A SHOP DRAWING SUBMITTAL.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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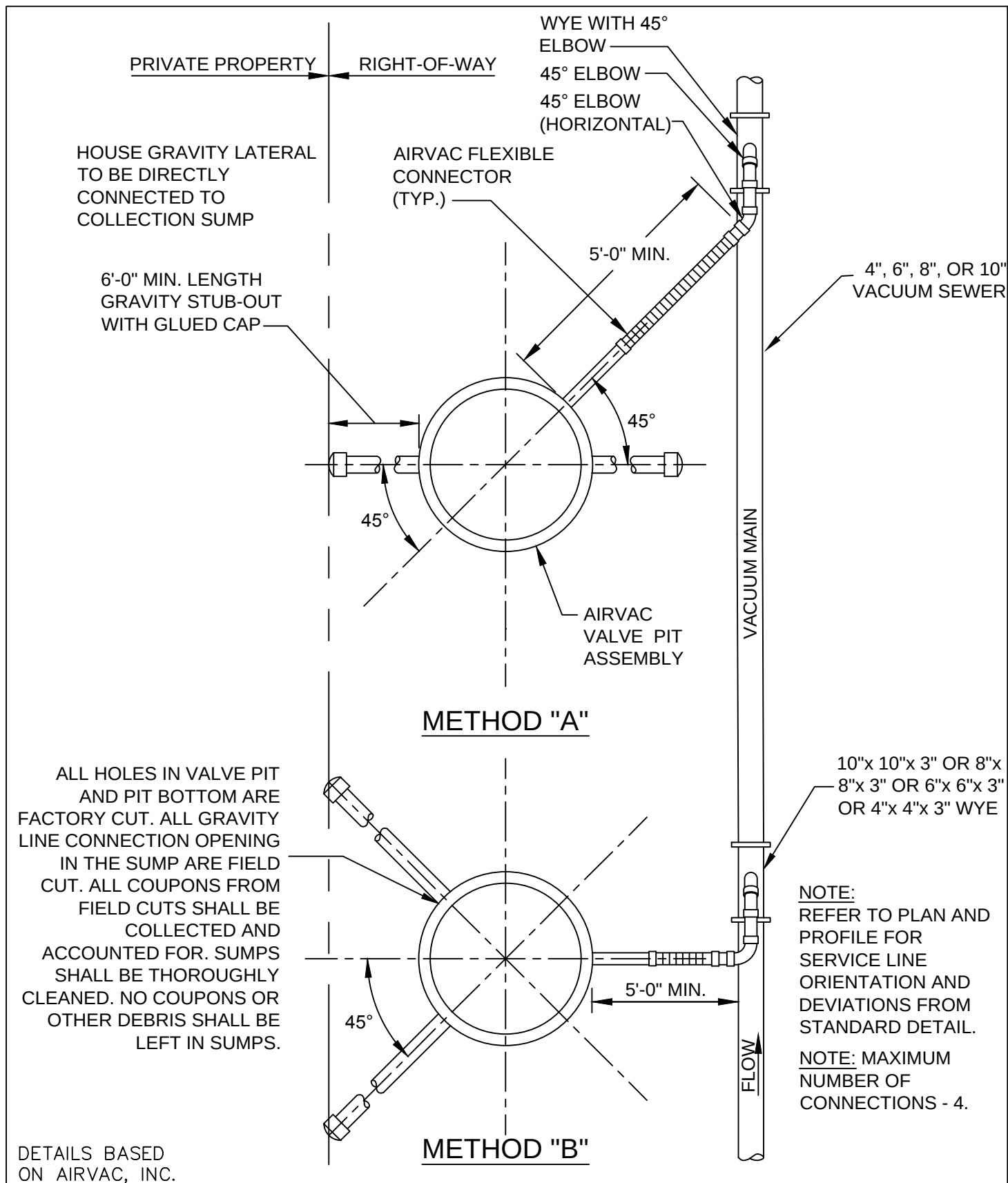


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REVISION
JULY-07

CONNECTION TO OUA FORCE MAIN FROM
PRIVATE LIFT STATION

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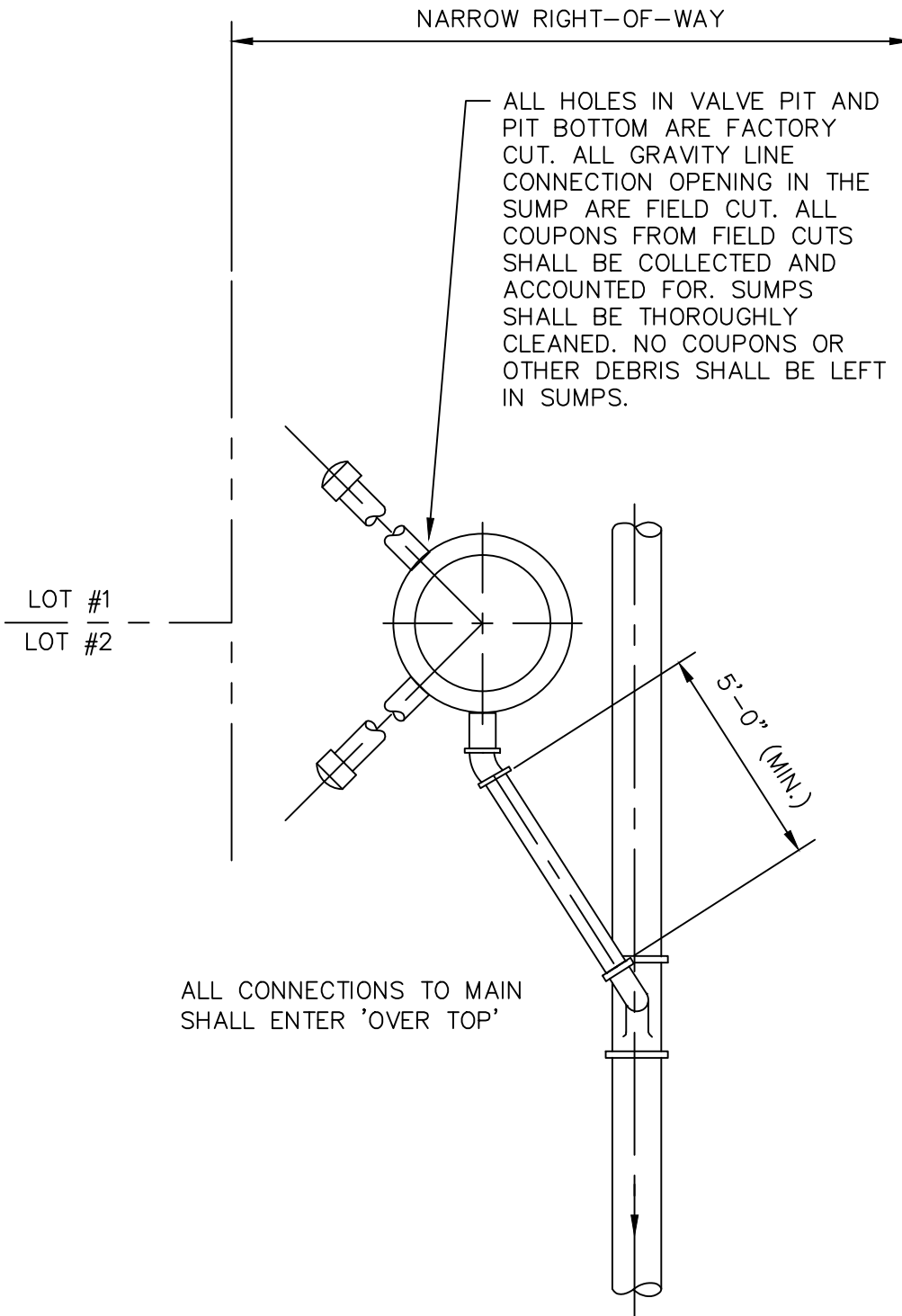


OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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TYPICAL VALVE PIT INSTALLATION

PAGE No
V-1



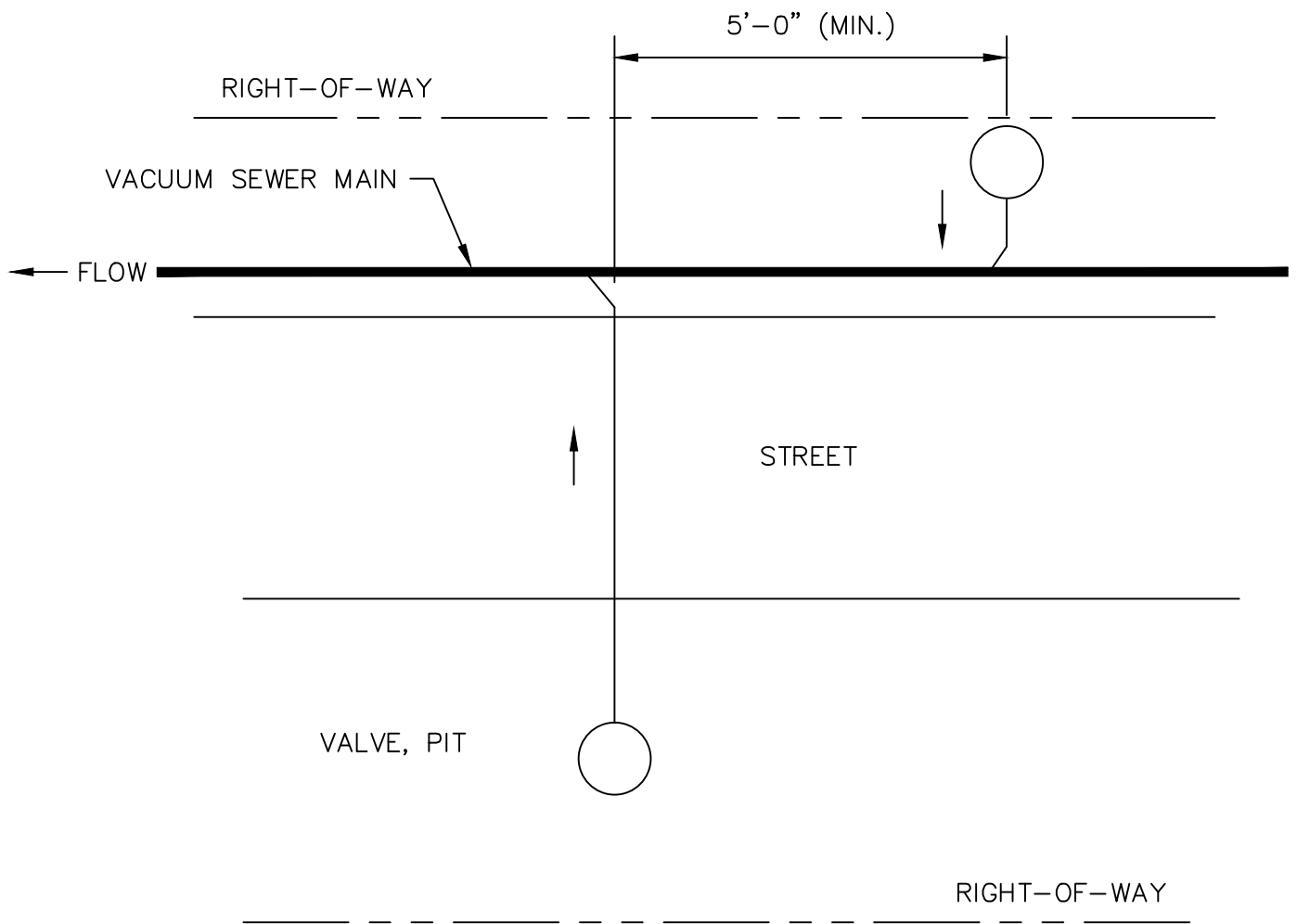
DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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OCT. 2015

VALVE PIT INSTALLATION NARROW ROW

PAGE No
V-2



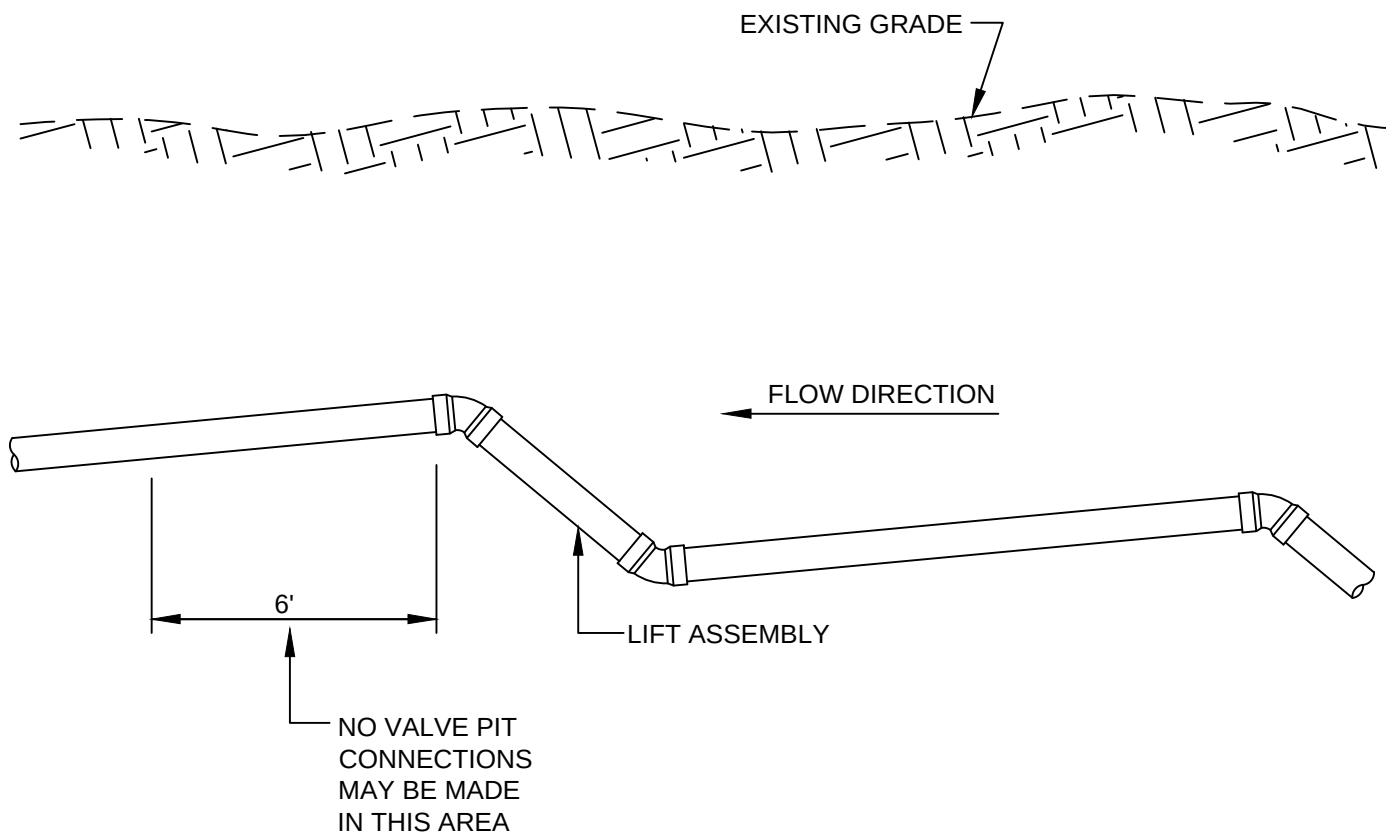
DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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MINIMUM SPACING BETWEEN CONNECTIONS

PAGE No
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DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

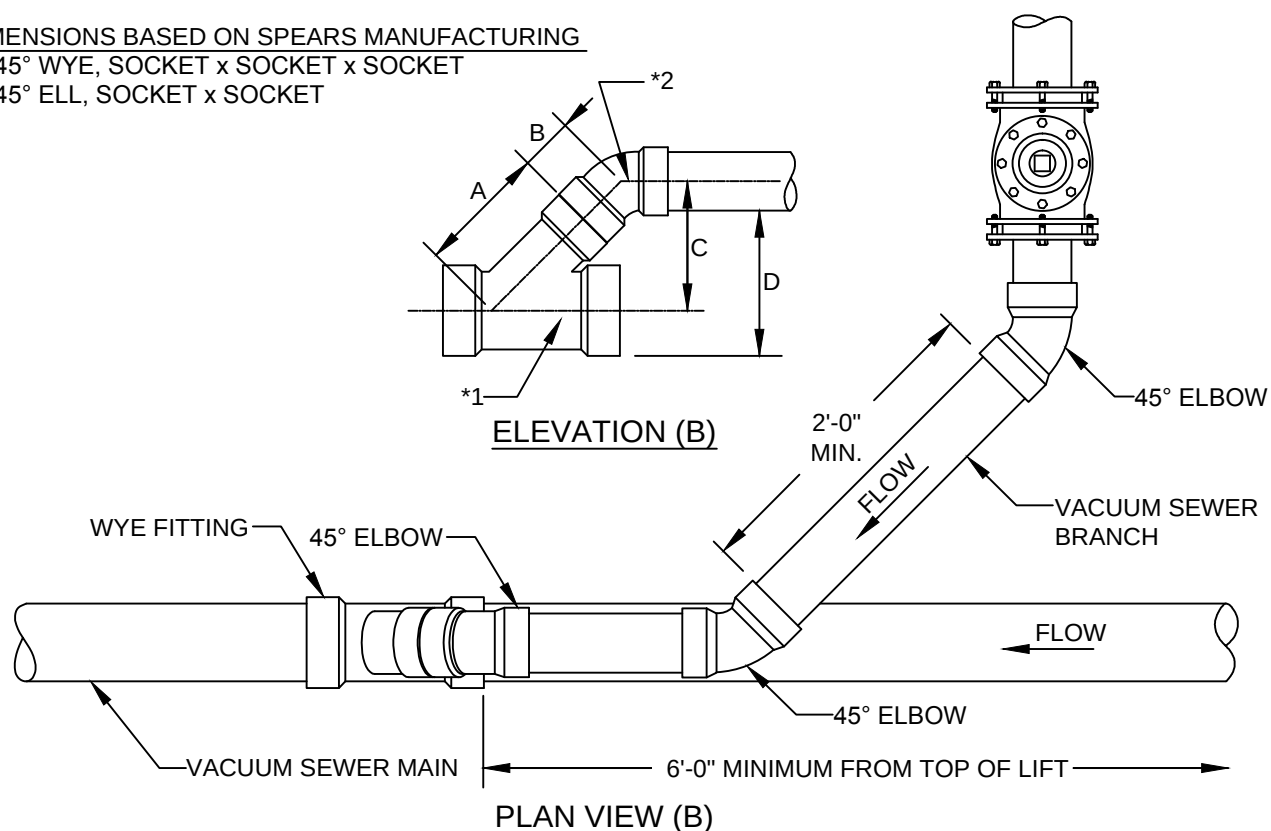
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PROHIBITED CONNECTIONS

PAGE No
V-4

*DIMENSIONS BASED ON SPEARS MANUFACTURING

1. 45° WYE, SOCKET x SOCKET x SOCKET
2. 45° ELL, SOCKET x SOCKET



WYE SIZE	A	B	C	D- INVERT
4 x 4 x 4	8 1/4"	3 3/32"	8.02"	0.67'
4 x 4 x 3	8 7/8"	2 7/8"	8.30"	0.63'
6 x 6 x 6	11 21/32"	5 7/32"	11.93"	0.99'
6 x 6 x 4	10 1/4"	3 3/32"	9.44"	0.78'
6 x 6 x 3	10 1/4"	2 7/8"	9.28"	0.77'
8 x 8 x 8	15 1/4"	6 7/16"	15.34"	1.28'
8 x 8 x 6	16 1/8"	5 7/32"	15.09"	1.26'
8 x 8 x 4	14 1/4"	3 3/32"	12.26"	1.02'
8 x 8 x 3	13"	3 7/8"	11.22"	0.94'
10 x 10 x 10	22 1/8"	8 1/8"	21.34"	1.78'
10 x 10 x 8	16 25/32"	6 7/16"	16.42"	1.37'
10 x 10 x 6	15 7/8"	5 7/32"	14.92"	1.24'
10 x 10 x 4	15 1/2"	3 3/32"	13.15"	1.10'
10 x 10 x 3	14 5/8"	2 7/8"	12.37"	1.03'

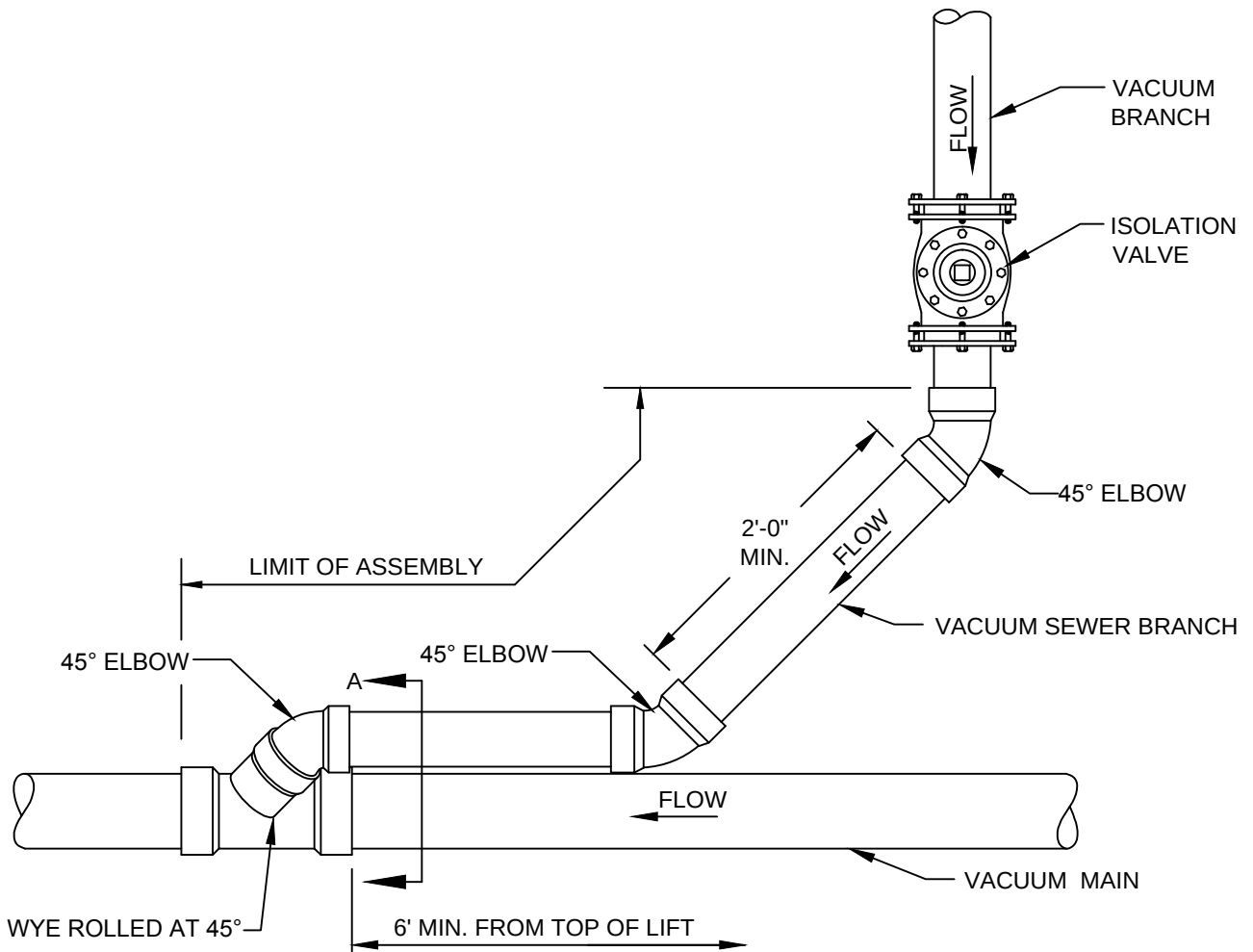
DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

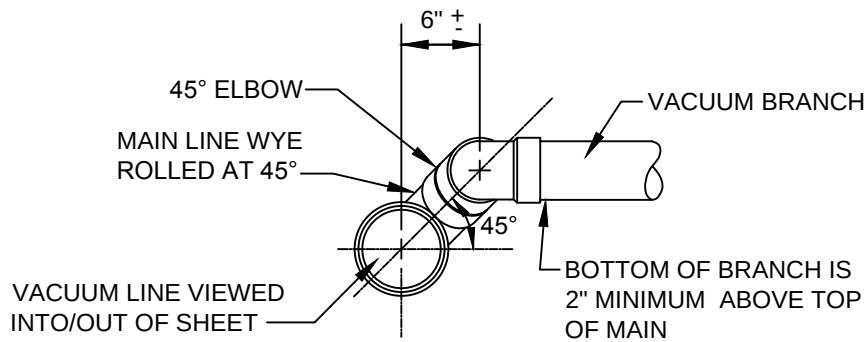
REVISION
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VACUUM BRANCH TO MAIN LINE CONNECTION – OPTION 1

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V-5



PLAN VIEW



SECTION A-A

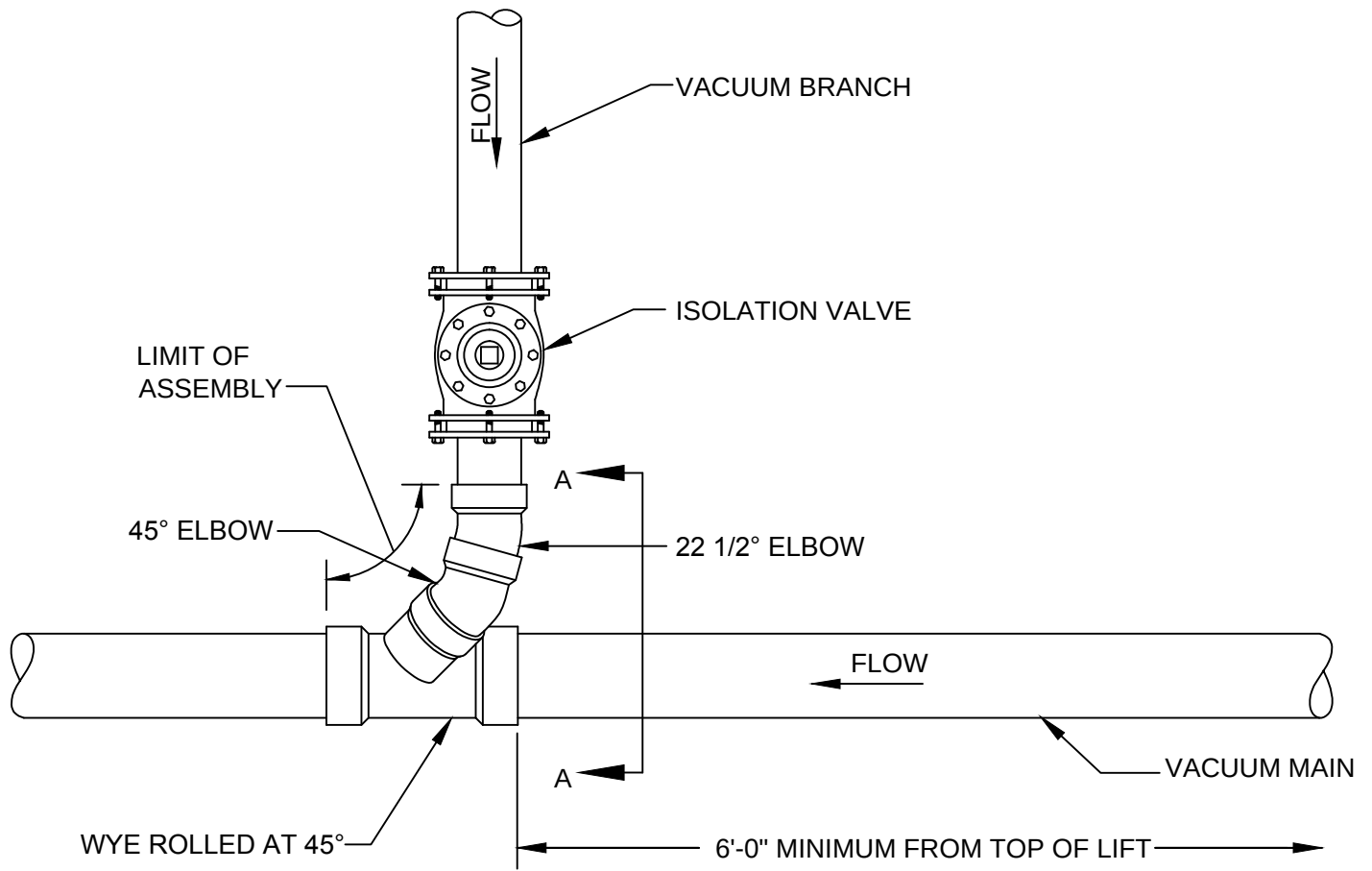
DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

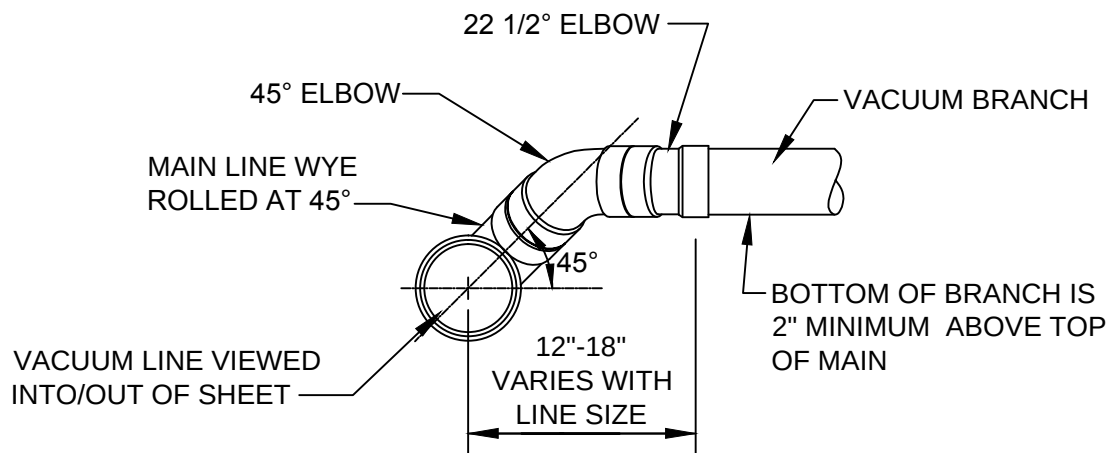
REVISION
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VACUUM BRANCH TO MAIN LINE CONNECTION – OPTION 2

PAGE No
V-5A



PLAN VIEW (A)



SECTION A-A

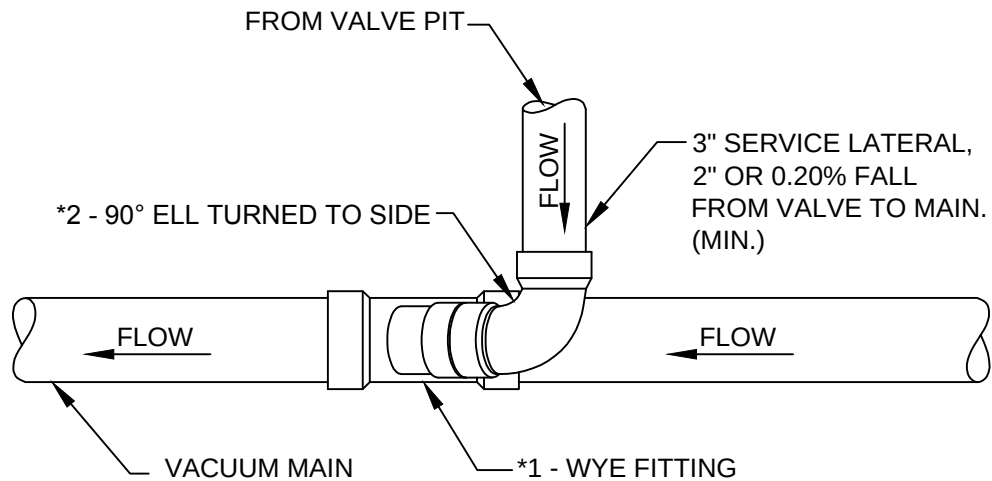
DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

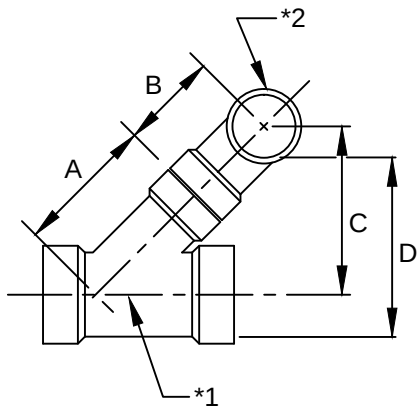
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VACUUM BRANCH TO MAIN LINE CONNECTION – OPTION 3

PAGE No
V-5B



PLAN VIEW



ELEVATION

* DIMENSIONS BASED ON SPEARS MANUFACTURING

1. 45 DEG WYE, SOCKET x SOCKET x SOCKET
2. 90 DEG ELL, SOCKET x SOCKET

WYE SIZE	A	B	C	D- INVERT
4 x 4 x 3	9 1/4"	3 25/32"	9.32"	0.78'
6 x 6 x 3	10 1/2"	3 25/32"	10.21"	0.85'
8 x 8 x 3	13"	3 25/32"	11.86"	1.00'
10 x 10 x 3	14 3/8"	3 25/32"	12.84"	1.10'

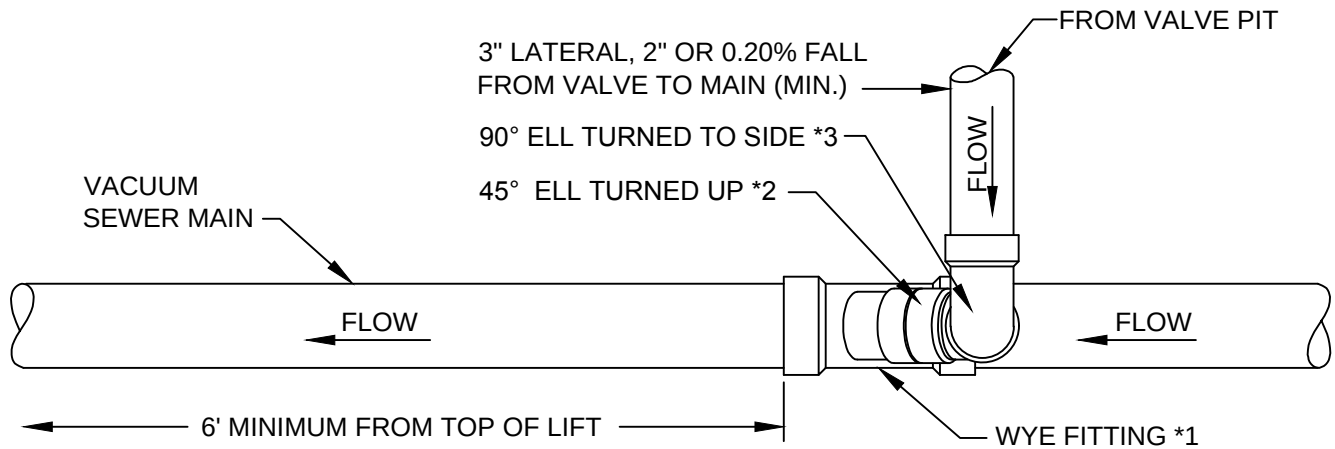
DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

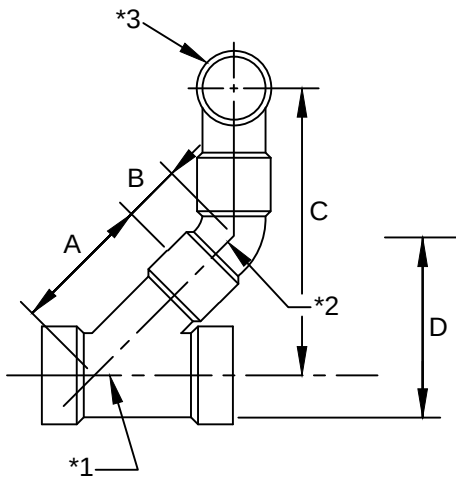
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PREFERRED VALVE PIT TO MAIN CONNECTIONS

PAGE No
V-6



PLAN VIEW



ELEVATION

* DIMENSIONS BASED ON SPEARS MANUFACTURING

1. 45 DEG WYE, SOCKET x SOCKET x SOCKET
2. 45 DEG ELL, SOCKET x SOCKET
3. 90 DEG ELL, SOCKET x SOCKET

WYE SIZE	A	B	C	D	E	F- INVERT
4 x 4 x 3	8 7/8"	2 7/8"	2 7/8"	3 23/32"	14.93"	1.24'
6 x 6 x 3	10 1/4"	2 7/8"	2 7/8"	3 23/32"	15.35"	1.32'
8 x 8 x 3	13"	2 7/8"	2 7/8"	3 23/32"	17.82"	1.48'
10 x 10 x 3	14 5/8"	2 7/8"	2 7/8"	3 23/32"	18.97"	1.58'

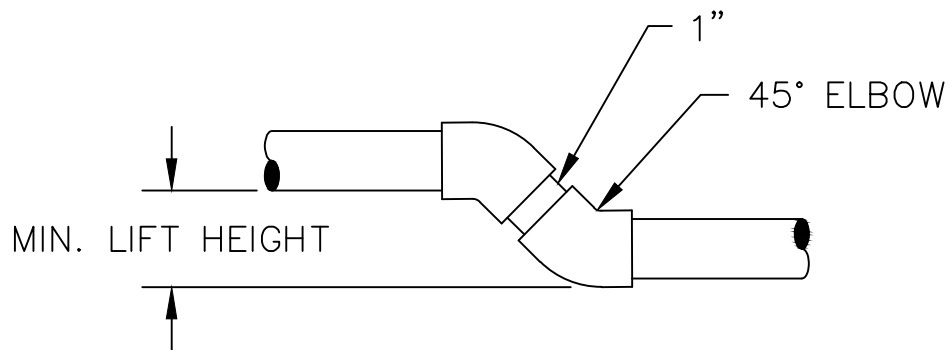
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OCT. 2015

ALTERNATE VALVE PIT TO MAIN CONNECTIONS

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3" PIPE	0.42 FT
4" PIPE	0.43 FT
6" PIPE	0.71 FT
8" PIPE	0.86 FT
10" PIPE	1.07 FT

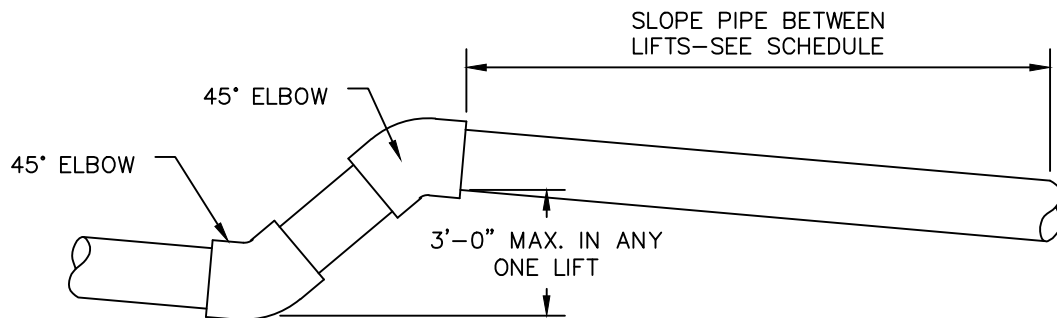
DETAILS BASED
ON AIRVAC, INC.

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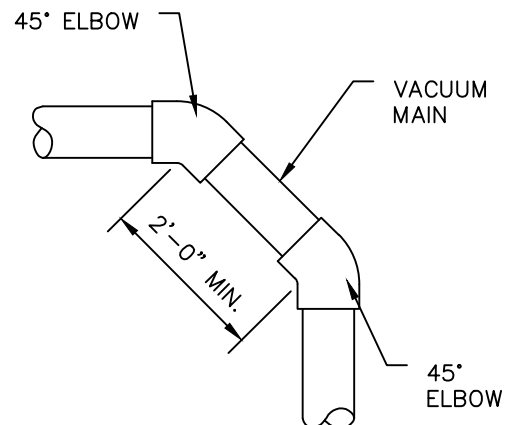
MINIMUM LIFT HEIGHT

PAGE No
V-8



SLOPE SCHEDULE				
PIPE DIAMETER	MINIMUM FALL	0.2% OF DISTANCE		
3"	0.20 FT	0.2%	100 FT	▲
4"	0.25 FT	0.2%	125 FT	▲
6"	0.25 FT	0.2%	125 FT	▲
8"	0.25 FT	0.2%	125 FT	▲
10"	0.25 FT	0.2%	125 FT	▲

USE WHICHEVER SLOPE IS GREATER BETWEEN LIFTS. ABOVE THIS LENGTH ▲ IN DISTANCE, THE 0.2% SLOPE IS GREATER. ANYTHING SHORTER THAN THIS DISTANCE SHOULD USE MINIMUM FALL INDICATED. WHEN NOT BETWEEN TWO LIFTS, USE 0.2% SLOPE.



CHANGE IN DIRECTION

* 90° FITTINGS ARE NOT TO BE USED FOR CHANGE IN DIRECTION

DETAILS BASED
ON AIRVAC, INC.

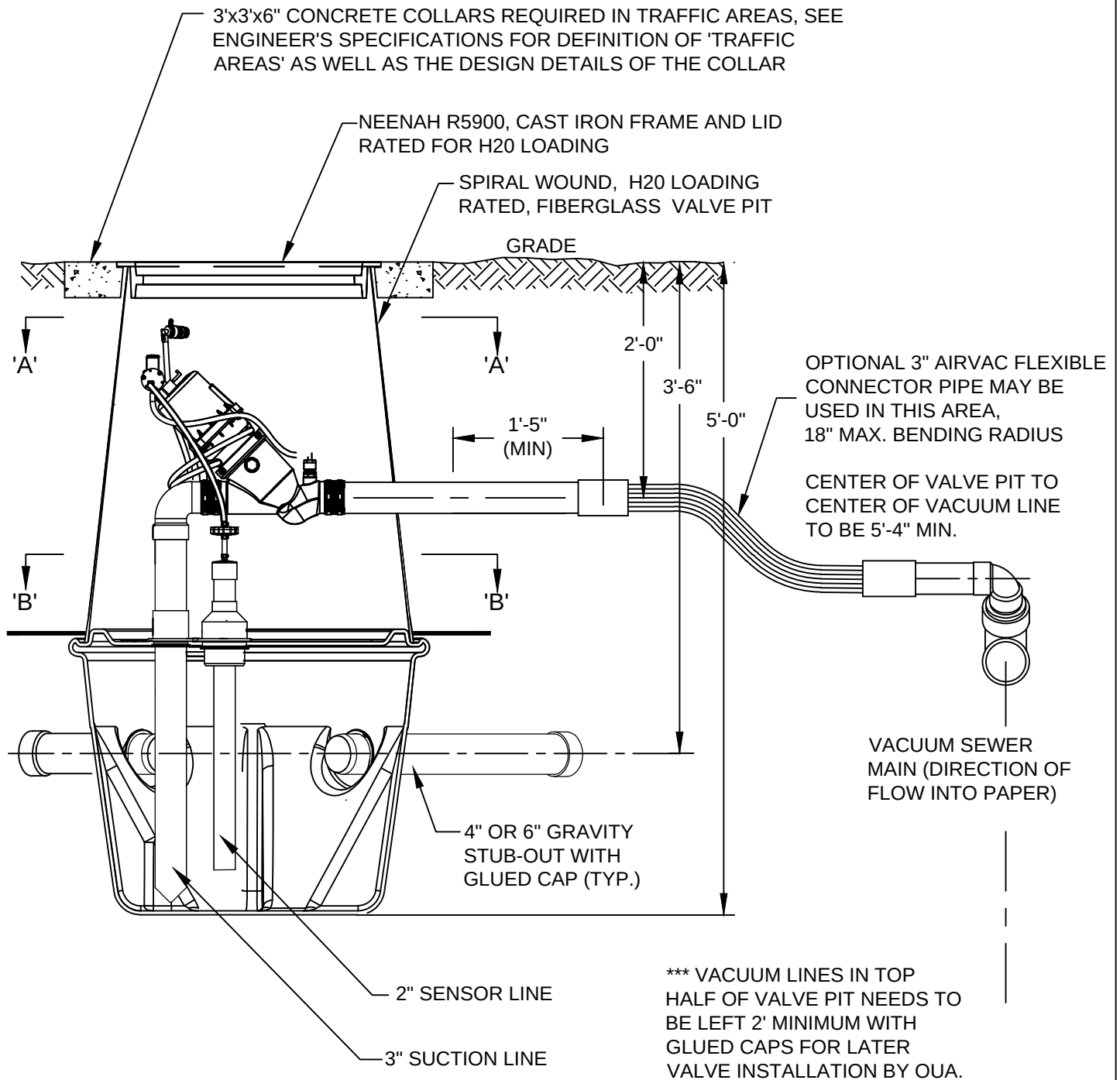
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LIFT DETAIL AND SLOPE SCHEDULE

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V-9

MODEL VP3030H



DETAILS BASED
ON AIRVAC, INC.

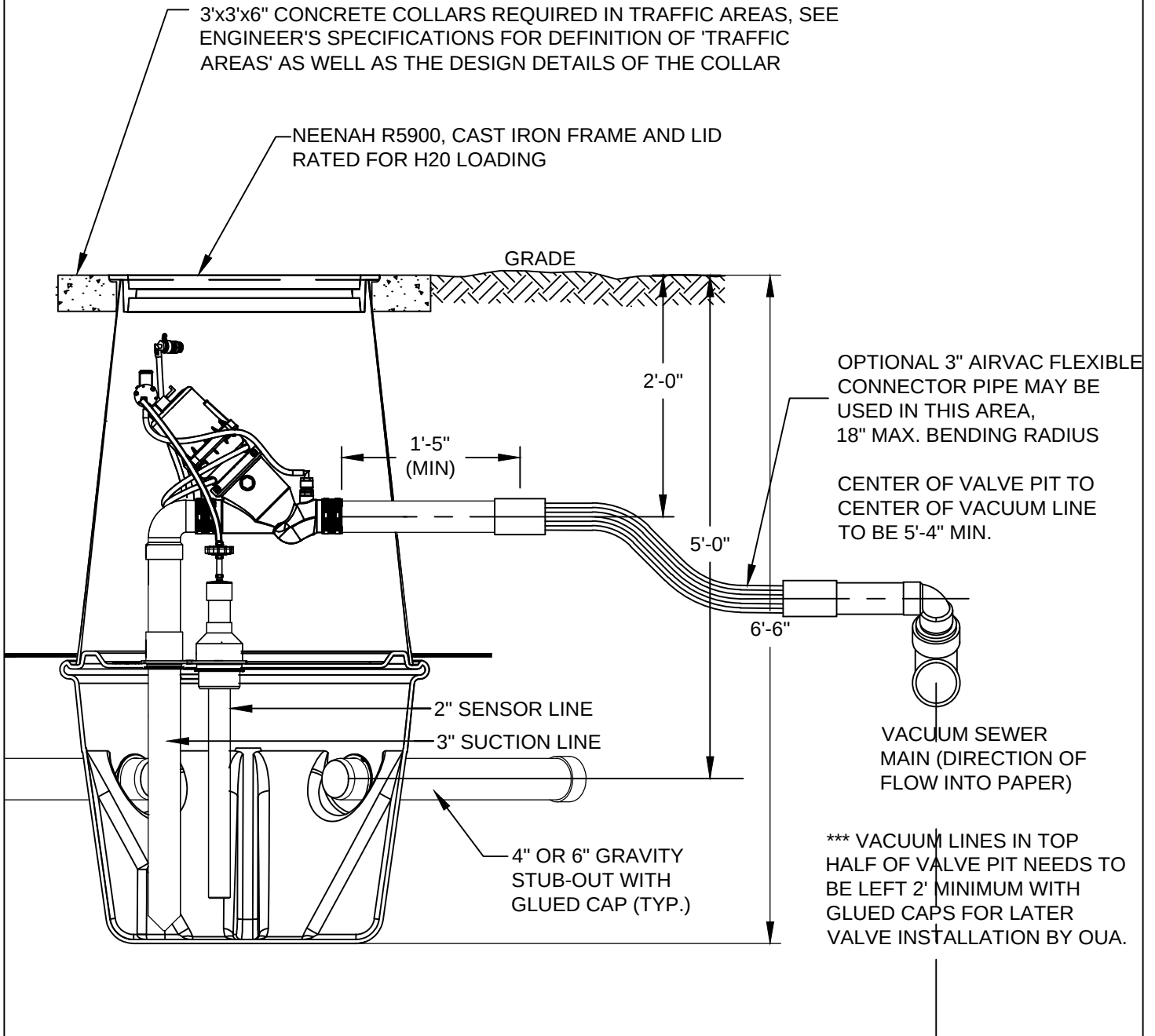
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AIRVAC 2 PIECE VALVE PIT – 5' DEEP

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V-10

MODEL VP3042H



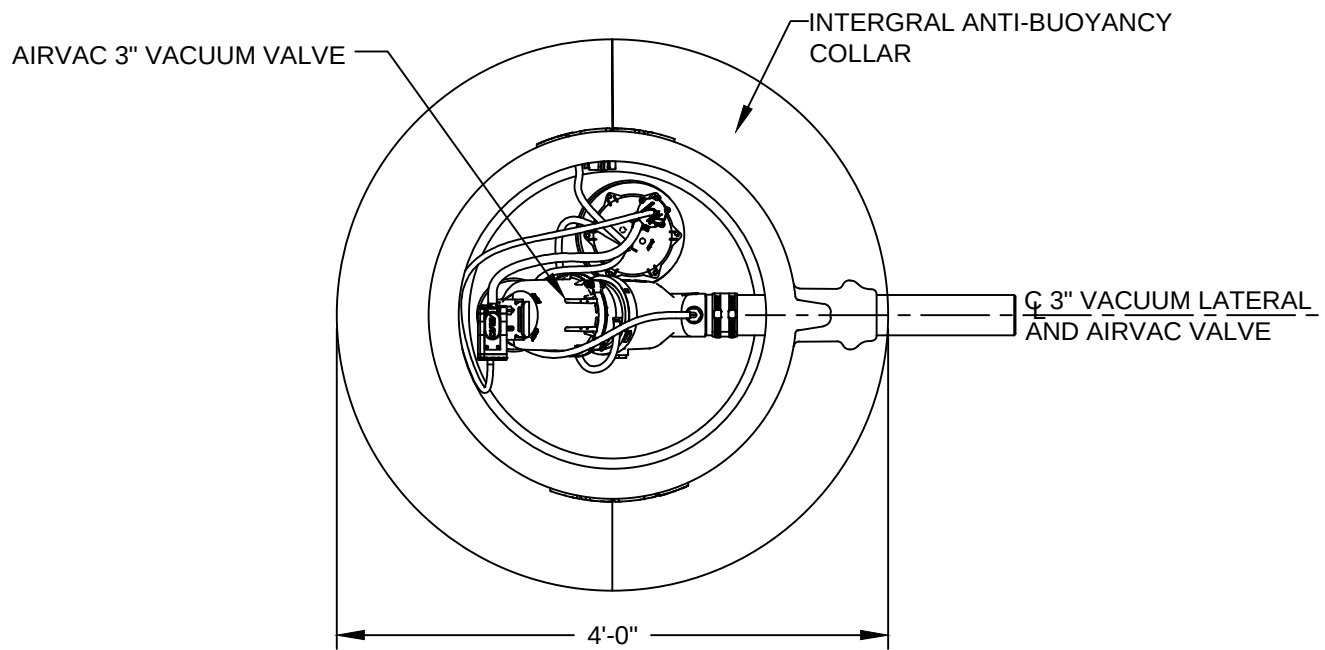
DETAILS BASED
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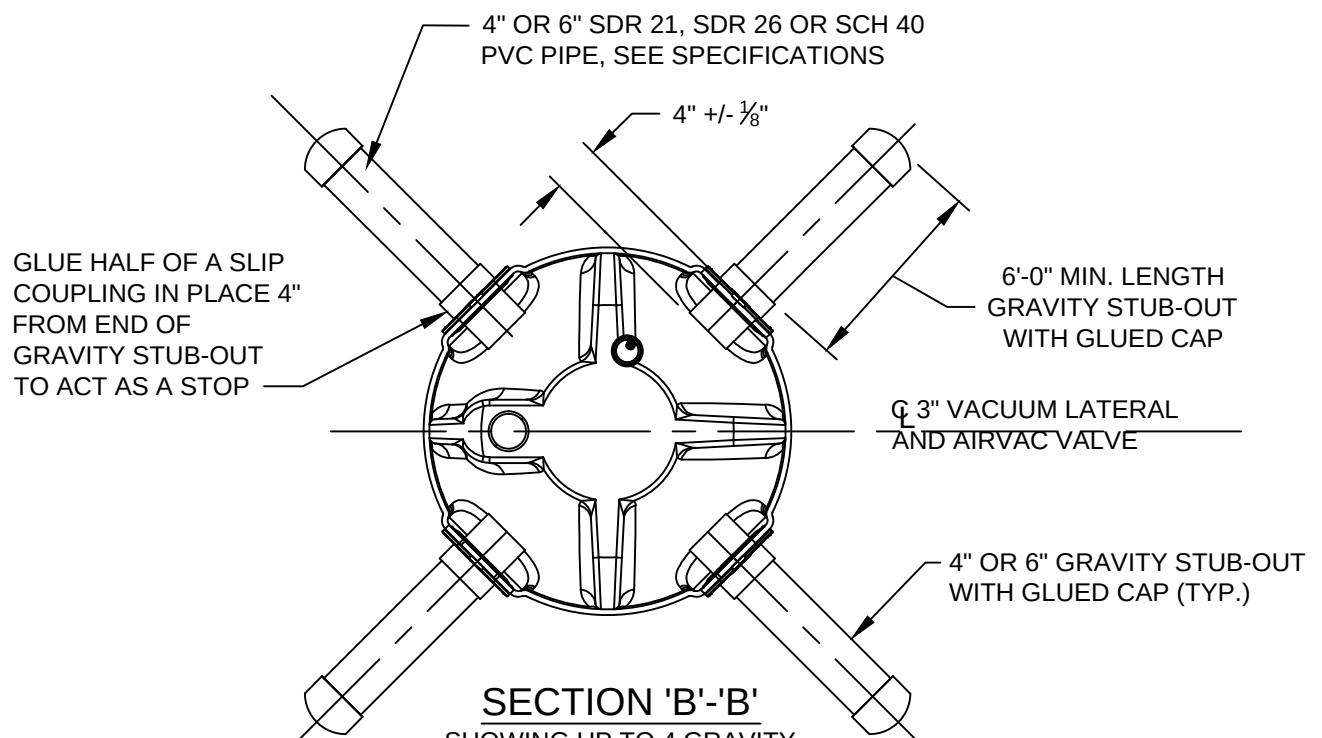
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AIRVAC 2 PIECE VALVE PIT - 6' DEEP

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V-10A



SECTION 'A'-A'



SECTION 'B'-B'
SHOWING UP TO 4 GRAVITY
CONNECTIONS TO SUMP

NOTE: WHEN INSTALLING ANY PIPE THROUGH A GROMMET USE ONLY WATER OR MILD DETERGENT AS A LUBRICANT. NEVER USE PIPE JOINT GREASE.

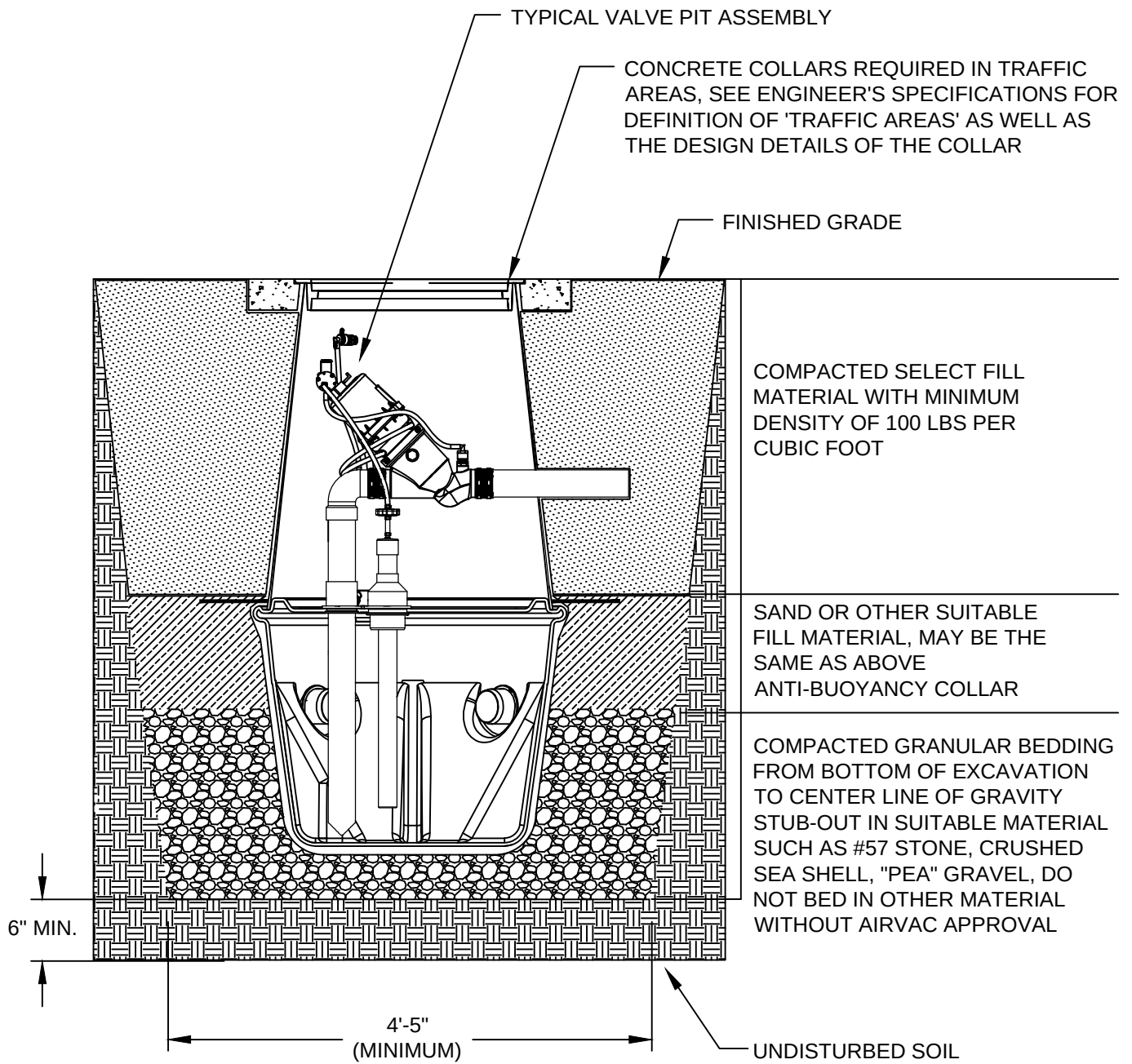
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VALVE PIT SECTIONS 'A' AND 'B'

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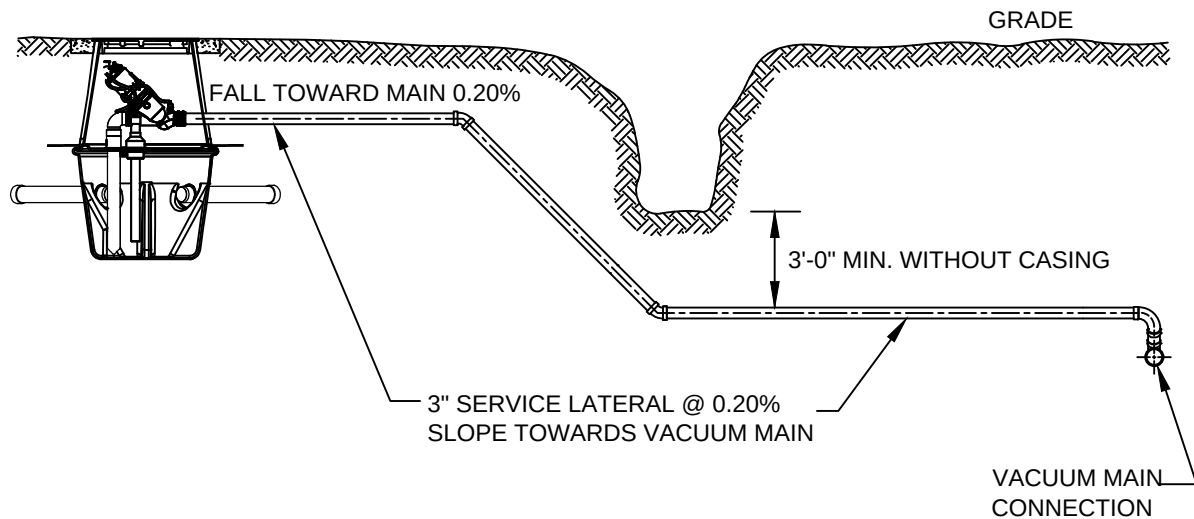
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VALVE PIT BEDDING AND BACK FILL

PAGE No
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NOTES:

1. ALL GROMMETS FOR VALVE PIT AND SUMP SUPPLIED BY MANUFACTURER.
2. ALL HOLES IN VALVE PIT AND PIT BOTTOM ARE FACTORY CUT. ALL GRAVITY LINE CONNECTION OPENING IN THE SUMP ARE FIELD CUT. ALL COUPONS FROM FIELD CUTS SHALL BE COLLECTED AND ACCOUNTED FOR. SUMPS SHALL BE THOROUGHLY CLEANED. NO COUPONS OR OTHER DEBRIS SHALL BE LEFT IN SUMPS.
3. ONLY HOMES OR APARTMENTS WHOSE LOWER FLOOR ELEVATIONS ARE THE SAME SHOULD BE CONNECTED TO A COMMON VACUUM VALVE PIT INSTALLATION. WITH MULTIPLE FLOOR APARTMENTS, EACH FLOOR LEVEL SHOULD BE SERVICED BY ITS OWN VACUUM VALVE PIT PKG.
4. WHEN INSTALLING ANY PIPE THROUGH A GROMMET, USE ONLY WATER OR MILD DETERGENT AS A LUBRICANT, NEVER USE PIPE JOINT GREASE.
5. DO NOT INSTALL VACUUM VALVE UNTIL HOME GRAVITY LINE IS NEARING COMPLETION AND AIR INTAKE PIPING IS IN PLACE.
6. INTERNAL SUMP BREATHER IS TO BE EQUIPPED WITH AUTOMATIC SHUT OFF DEVICES TO PREVENT LIQUID CONTAMINATION OF THE CONTROLLER AND INTERFACE VALVE DURING AN EMERGENCY HIGH LIQUID LEVEL EVENT. THESE DEVICES SHALL BE POSITIVE SEALING, SHALL NOT INHIBIT THE VALVE'S PERFORMANCE UNDER NORMAL CONDITIONS AND SHALL RESET AUTOMATICALLY WHEN RECOVERING FROM AN EMERGENCY HIGH LIQUID LEVEL EVENT.

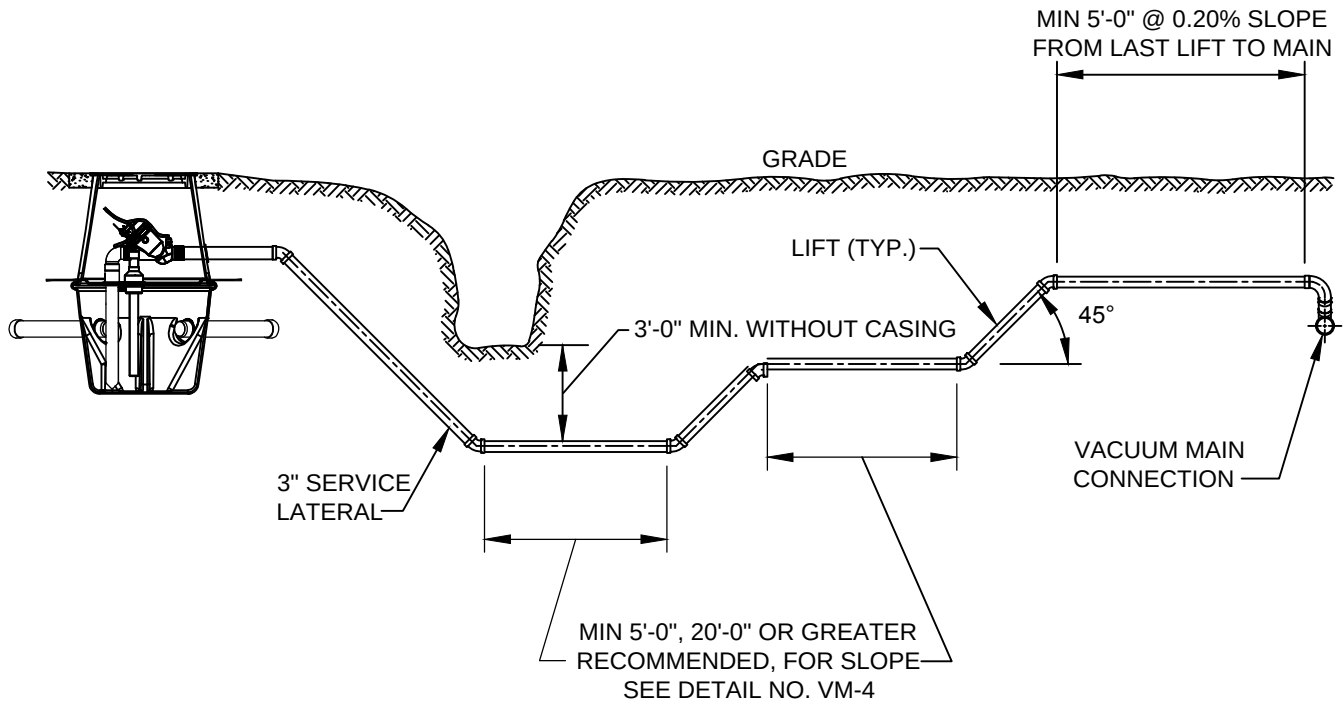
DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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SERVICE LATERAL – CROSSING A SWALE WITH NO LIFTS

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V-12A



SERVICE LATERAL NOTES	
MINIMUM SLOPE ON 3" SERVICE LATERAL	0.20%
MINIMUM SLOPE BETWEEN LIFTS	SEE DETAIL NO. V-9
MAXIMUM NUMBER OF LIFTS	5
MINIMUM DISTANCE, VALVE PIT TO FIRST LIFT	5'-0"
MINIMUM DISTANCE, LAST LIFT TO VACUUM MAIN	5'-0"
MAXIMUM LIFT HEIGHT	3'-0"
RECOMMENDED LIFT HEIGHT	1'-0"

NOTES:

1. ALL GROMMETS FOR VALVE PIT AND SUMP SUPPLIED BY MANUFACTURER.
2. ALL HOLES IN VALVE PIT AND PIT BOTTOM ARE FACTORY CUT. ALL GRAVITY LINE CONNECTION OPENING IN THE SUMP ARE FIELD CUT. ALL COUPONS FROM FIELD CUTS SHALL BE COLLECTED AND ACCOUNTED FOR. SUMPS SHALL BE THOROUGHLY CLEANED. NO COUPONS OR OTHER DEBRIS SHALL BE LEFT IN SUMPS.
3. ONLY HOMES OR APARTMENTS WHOSE LOWER FLOOR ELEVATIONS ARE THE SAME SHOULD BE CONNECTED TO A COMMON VACUUM VALVE PIT INSTALLATION. WITH MULTIPLE FLOOR APARTMENTS, EACH FLOOR LEVEL SHOULD BE SERVICED BY ITS OWN VACUUM VALVE PIT PKG.
4. WHEN INSTALLING ANY PIPE THROUGH A GROMMET, USE ONLY WATER OR MILD DETERGENT AS A LUBRICANT, NEVER USE PIPE JOINT GREASE.
5. DO NOT INSTALL VACUUM VALVE UNTIL HOME GRAVITY LINE IS NEARING COMPLETION AND AIR INTAKE PIPING IS IN PLACE.
6. INTERNAL SUMP BREATHER IS TO BE EQUIPPED WITH AUTOMATIC SHUT OFF DEVICES TO PREVENT LIQUID CONTAMINATION OF THE CONTROLLER AND INTERFACE VALVE DURING AN EMERGENCY HIGH LIQUID LEVEL EVENT. THESE DEVICES SHALL BE POSITIVE SEALING, SHALL NOT INHIBIT THE VALVE'S PERFORMANCE UNDER NORMAL CONDITIONS AND SHALL RESET AUTOMATICALLY WHEN RECOVERING FROM AN EMERGENCY HIGH LIQUID LEVEL EVENT.

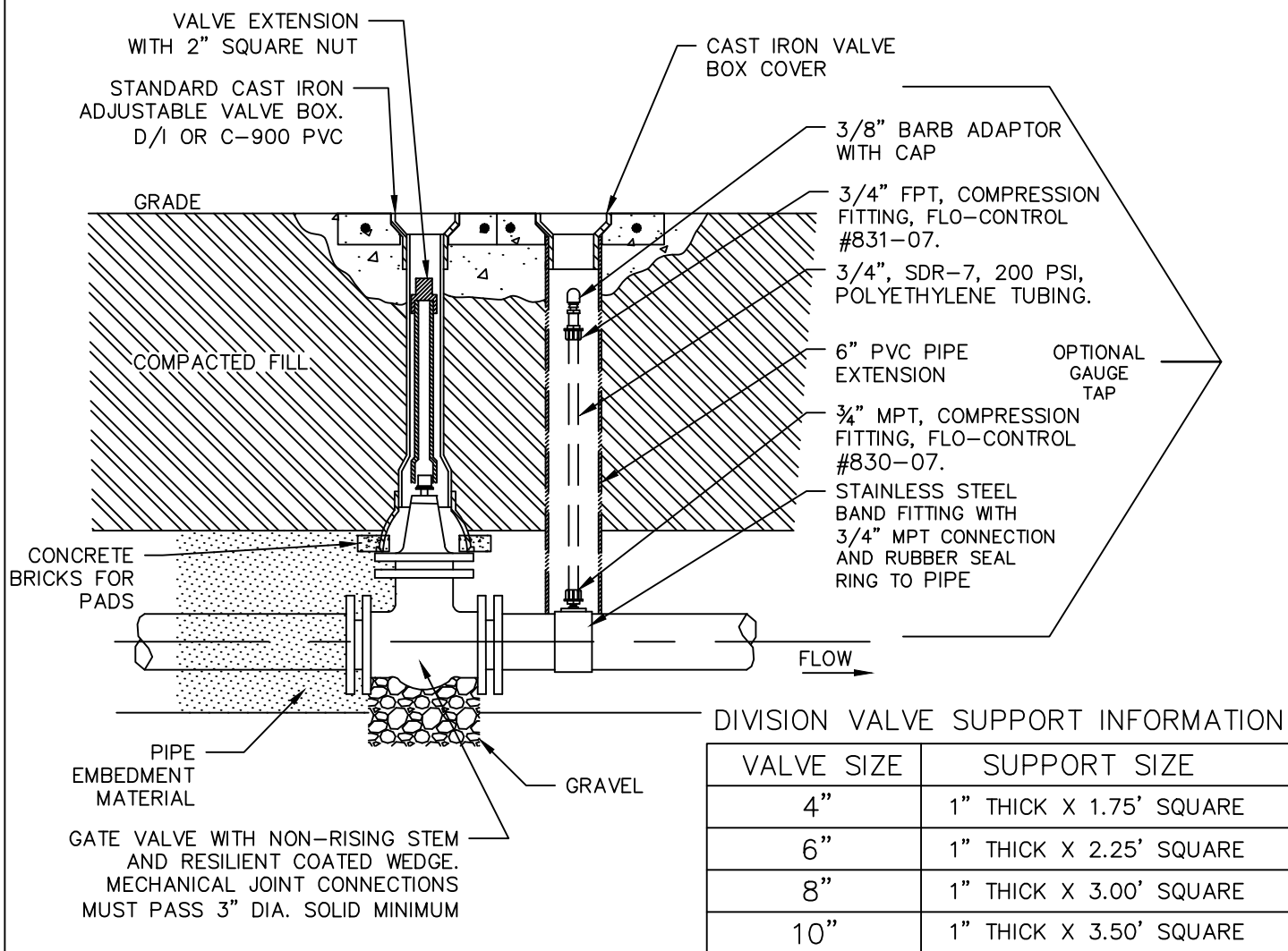
DETAILS BASED
ON AIRVAC, INC.

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OCT. 2015

SERVICE LATERAL – CROSSING A SWALE WITH LIFTS

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V-12B



DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

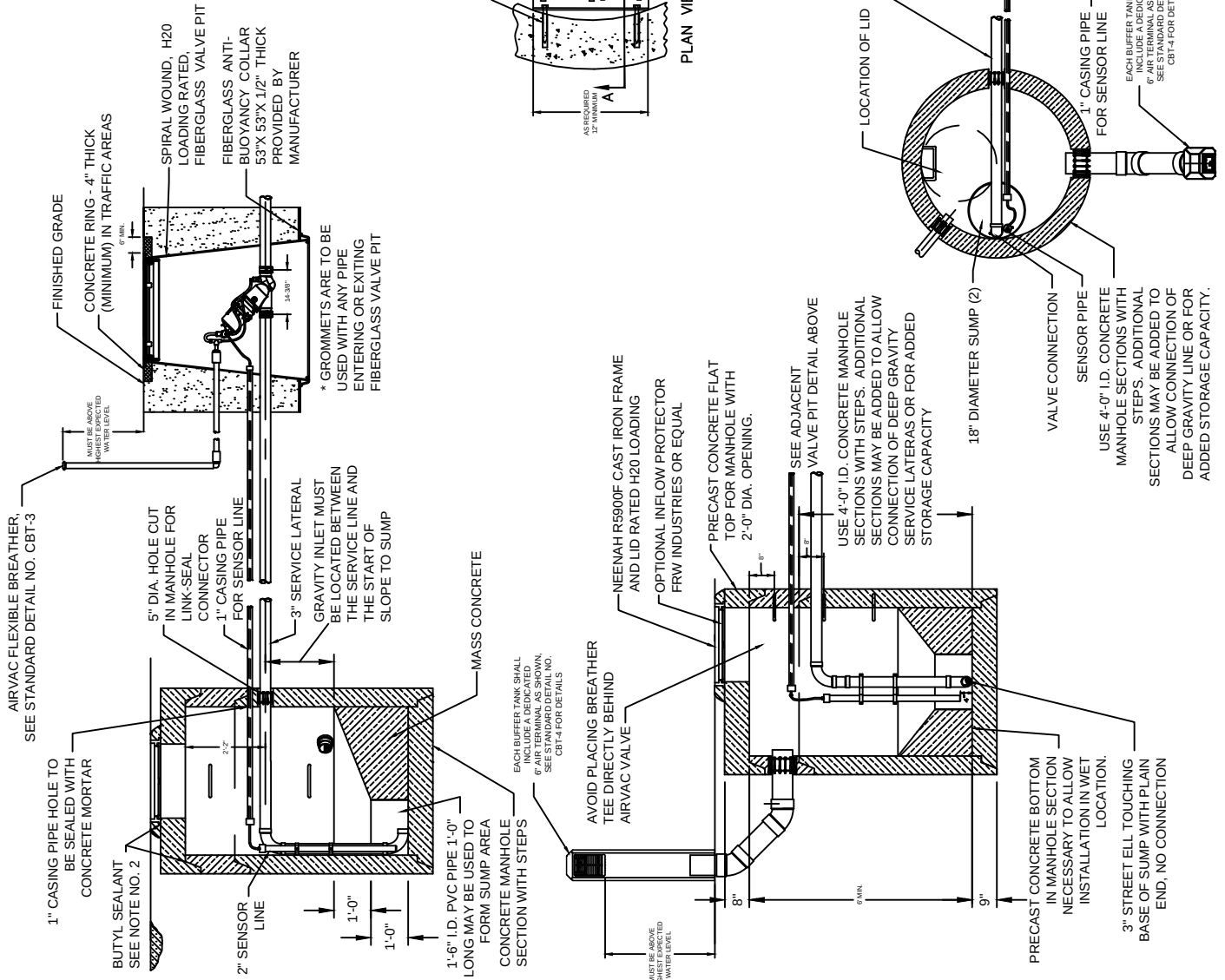
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DIVISION VALVE AND OPTIONAL GAUGE TAP

PAGE No
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DETAILS BASED
ON AIRVAC, INC.

- NOTE:**
1. BREATHER DOME HEIGHT MUST BE ABOVE FLOOD LEVEL AND SHOULD BE PLACED NEXT TO A STATIONARY OBJECT.
 2. BUFFER TANK UNIT MUST BE WATER TIGHT. SEAL ALL JOINTS WITH BUTYL SEALANT. TEST FOR LEAKS PER AIRVAC SPECIFICATIONS IN INSTALLATION MANUAL.
 3. ANY LIFT EXCEEDING 6' MUST BE ADDED TO HEAD LOSSES ON VACUUM MAIN AND SERVICE LINE TO DETERMINE IF SUFFICIENT VACUUM HEAD IS AVAILABLE.
 4. VALVE MUST BE IN SEPARATE PIT OUTSIDE OF BUFFER TANK
 5. SECURE 2" SENSOR PIPE AND 3" SUCTION PIPE TO BUFFER TANK SIDE WALL WITH STAINLESS STEEL UNISTRUT, SEE STANDARD DETAIL NO. CBT-6.
 6. SEWER RAIN GUARDS SHALL BE INSTALLED ON ALL MANHOLES.
 7. SEWER RAIN GUARDS SHALL BE AS MANUFACTURED BY FOSCO-PRCO INDUSTRIES, INC. OR SOUTH WEST PACKING AND SEALS, INC. OR APPROVAL EQUAL.
 8. COAT INTERIOR & EXTERIOR WITH 2 COATS COAL TAR EPOXY, 8 MIL. DFT MIN. EACH COAT

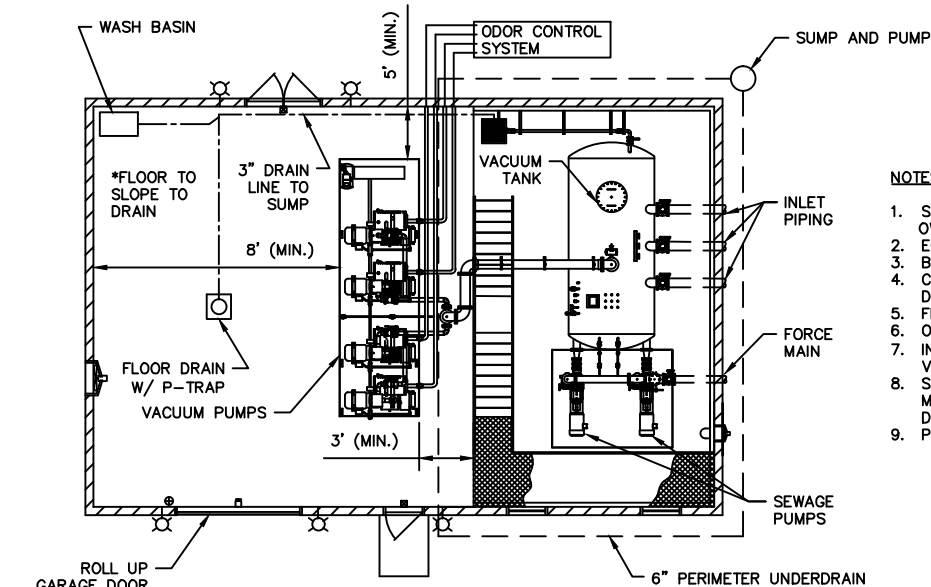
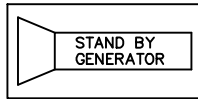


OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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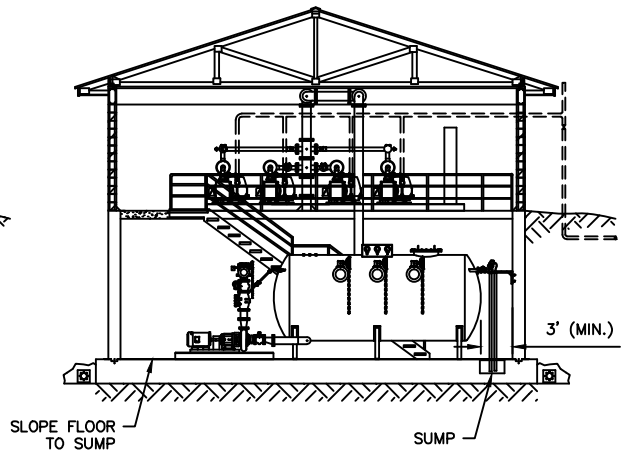
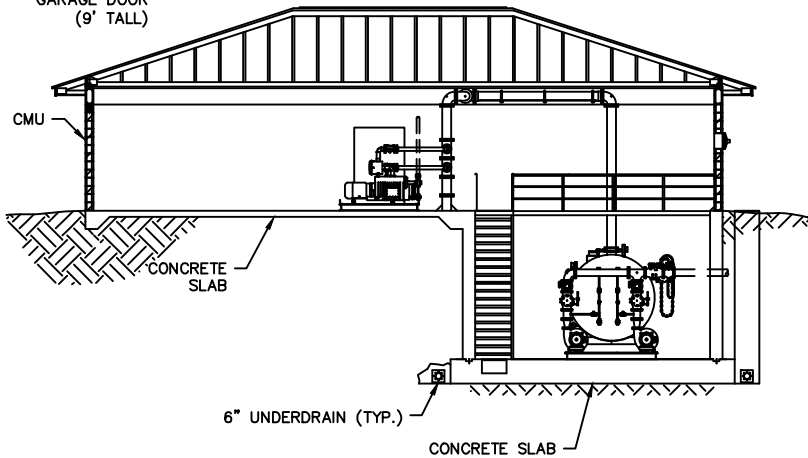
SINGLE BUFFER TANK DETAILS

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V-14



NOTES:

1. SCHEMATIC ONLY. OPTIONAL DESIGNS MAY BE SUBMITTED TO OWNER OR OUA FOR APPROVAL.
2. EQUIPMENT SELECTION AND SIZING BY ENGINEER OF RECORD.
3. BUILDING DESIGN BY QUALIFIED PROFESSIONALS.
4. COORDINATE BUILDING FINISHES AND ROOF WITH OUA AND DEVELOPER.
5. FINAL DESIGN APPROVAL BY OUA.
6. ODOR CONTROL SYSTEM TO BE APPROVED BY OUA.
7. INCORPORATE APPROPRIATE DOORS/WINDOWS, LIGHTING, VENTILATION SYSTEM, SOUNDPROOFING, ETC.
8. STANDBY GENERATOR SHALL BE WEATHERPROOF, EXTERNALLY MOUNTED IN A LOCATION APPROVED BY OUA. PROVIDE SHOP DRAWINGS FOR REVIEW BY OUA.
9. PERIMETER DRAINS AND SUMP SHALL BE REQUIRED.



DETAILS BASED
ON AIRVAC, INC.

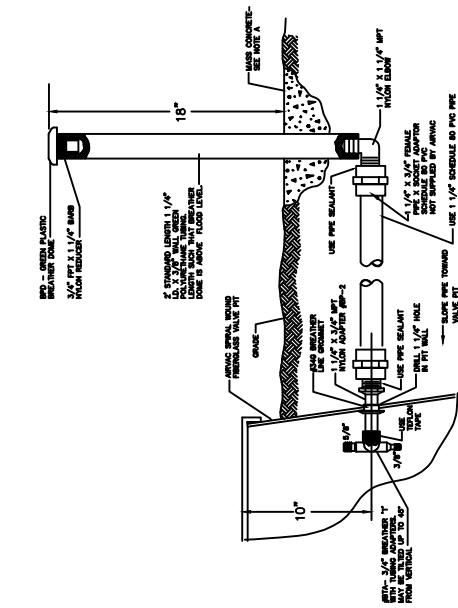
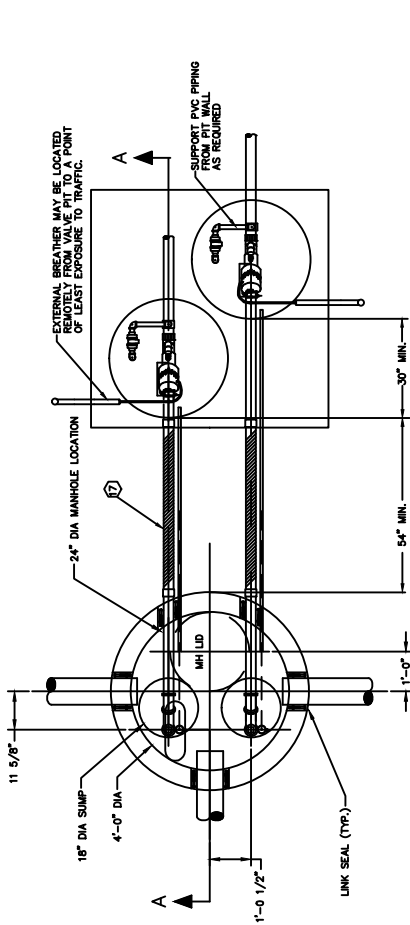
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VACUUM STATION LAYOUT

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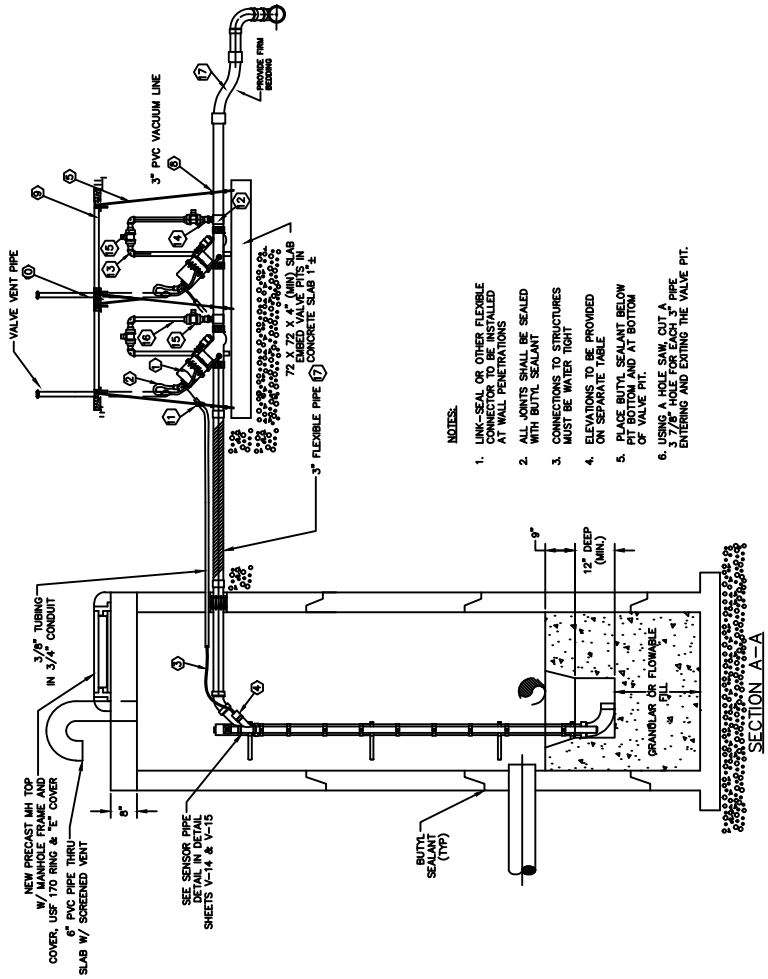
DES	QTY	DESCRIPTION
1	2	3" AIRVAC VALVE WITH CONTROLLER AND NO HUBS
2	2	VALVE AND TUBING SETS WITH CLAMPS, NO SURGE SUPPRESSOR
3	20	EXTRA TUBING FOR REMOTE SENSOR (20 LF)
4	2	2" PVC SENSOR CAP
5	2	FIBERGLASS VALVE PIT WITH NO HOLES
6	2	NOT USED
7	2	NOT USED
8	4	3" AIRVAC GROMMETS
9	2	TRAFFIC BEARING FRAME AND COVER
10	2	EXTERNAL BREATHING ASSEMBLY LESS CONNECTING PIPE
11	2	3/4" GROMMETS
12	2	FORD (OR EQUAL) PIPE REPAIR CLAMP FOR 3" SDR 21 PVC PIPE WITH A 1" FEMALE PIPE THREAD TAPPED OUTLET (304 OR 316 STAINLESS)
13	6	1" SCHEDULE 80 PVC 90 DEGREE ELLS
14	2	1" SCHEDULE 80 PVC MALE PIPE THREAD X SOCKET ADAPTOR
15	4	1" SPEARS BALL VALVE
16	10	1" SCHEDULE 80 PVC PIPE
17	4	3" AIRVAC STANDARD FLEXIBLE CONNECTORS, INLET SIDE OF VALVE AND DISCHARGE SIDE OF VALVE. SOME FIELD MODIFICATION MAY BE NECESSARY FOR PROPER ALIGNMENT.

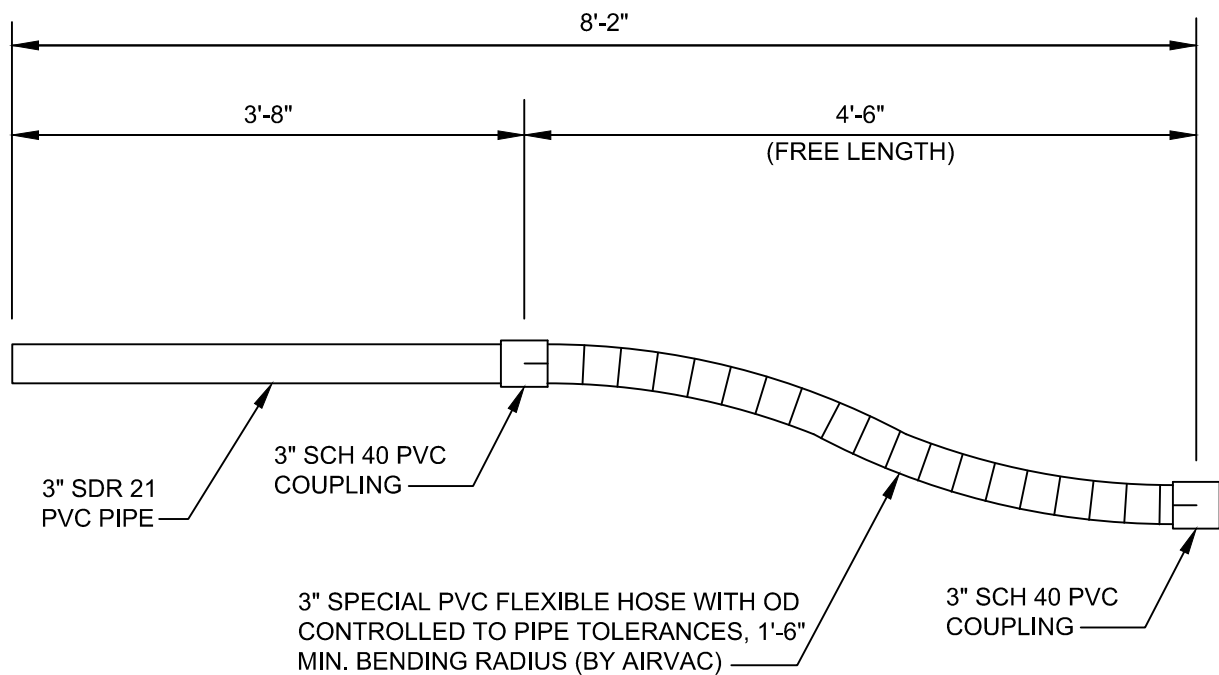


- NOTES:
- ALL VALVES MUST BE INSTALLED TO A MINIMUM OF 4\"/>

10 FLEXIBLE BREATHER DETAIL

DETAILS BASED ON AIRVAC, INC.





NOTE:

1. FLEXIBLE CONNECTOR USED TO CONNECT VALVE PIT TO 3" VACUUM SERVICE LATERAL

2. FLEXIBLE CONNECTOR LENGTH MAY NOT BE ALTERED, DO NOT CUT PVC PIPE OF FLEXIBLE HOSE

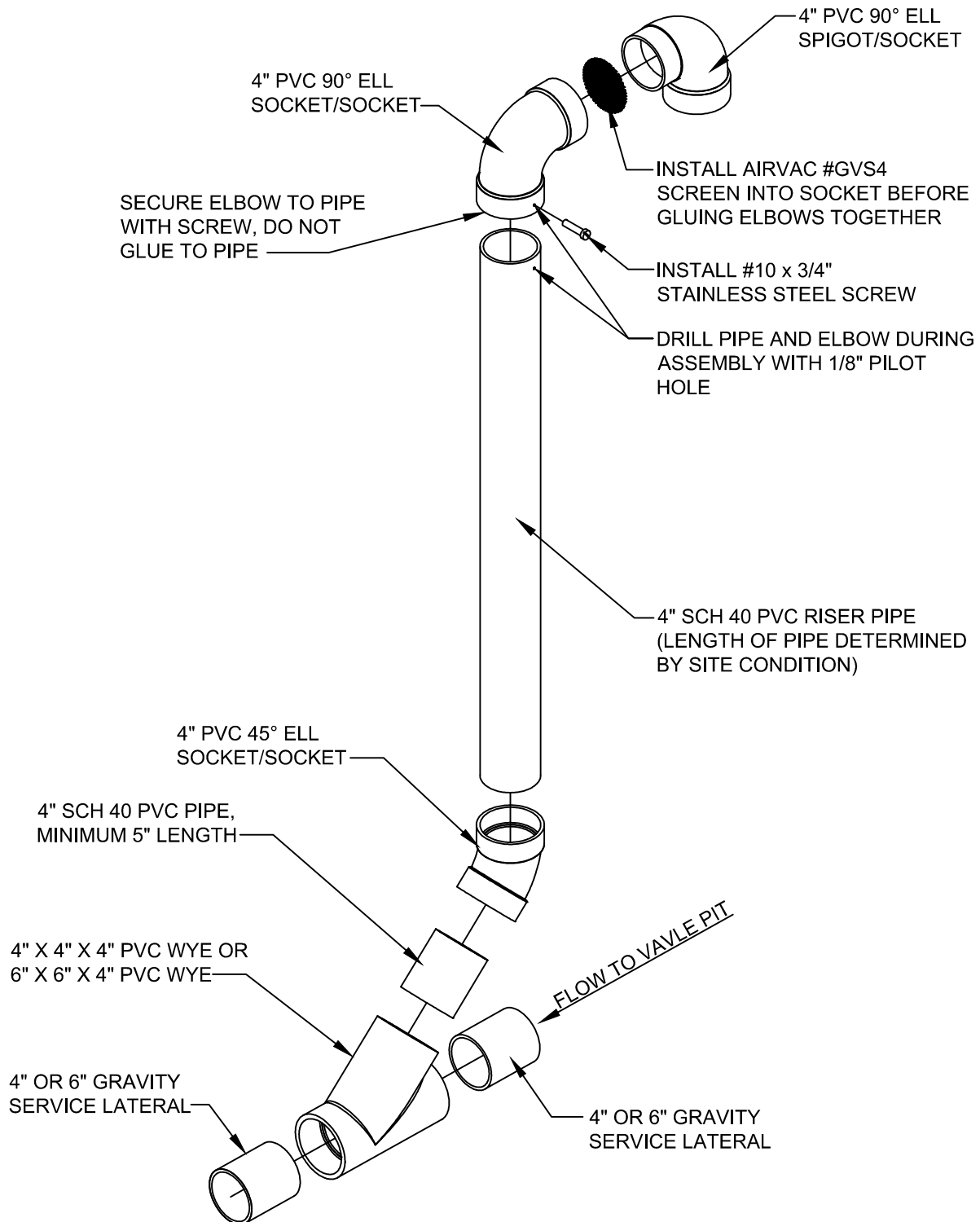
DETAILS BASED
ON AIRVAC, INC.

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AIRVAC FLEXIBLE CONNECTOR

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DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

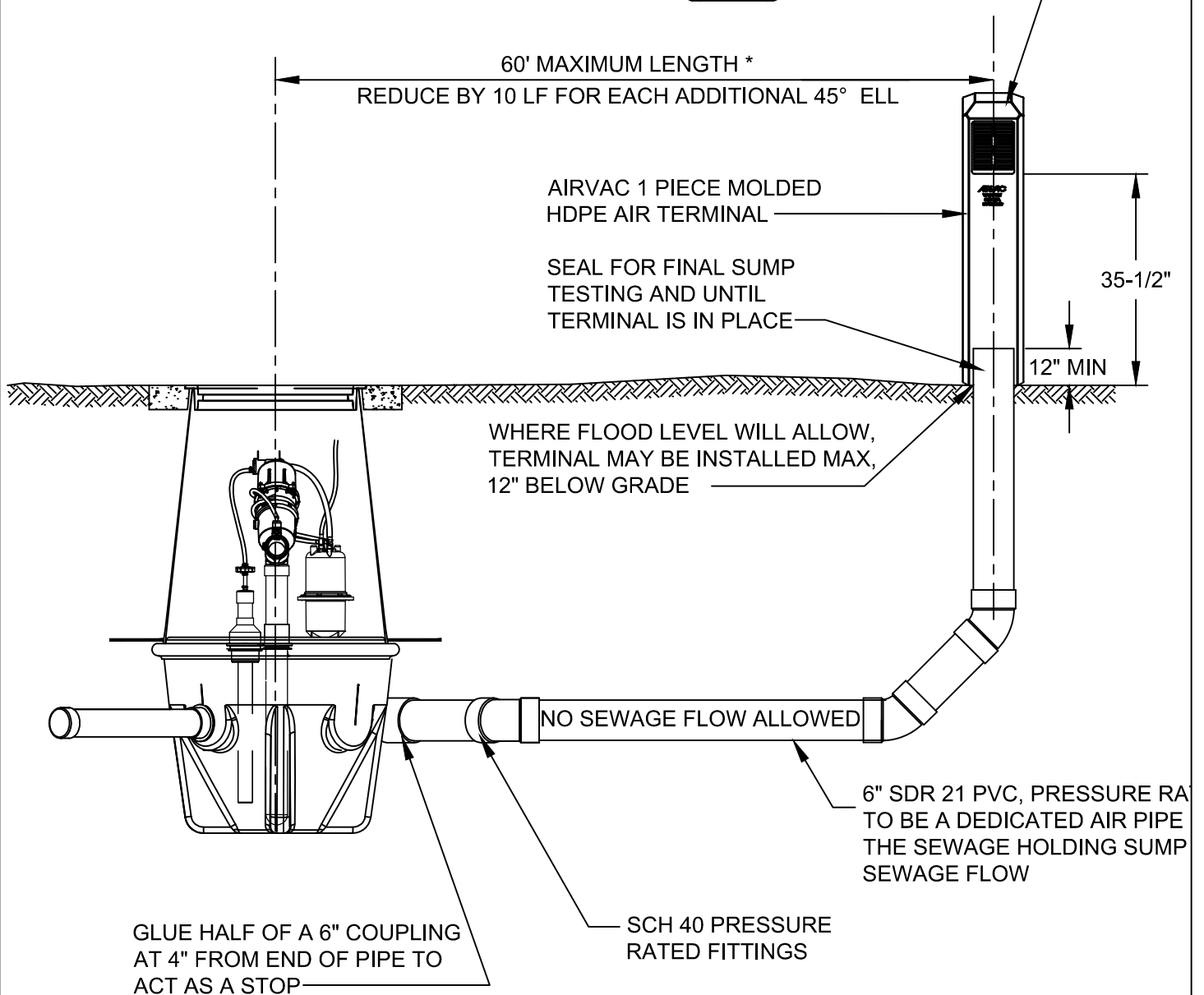
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4" AIR-INTAKE ASSEMBLY

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ENLARGED VIEW OF ACCESS DOOR, INCLUDES AIR INLET WITH SLOTS FOR AIR FLOW. POSITION ABOVE HIGHEST FLOOD WATER LEVEL.



* 20' MIN IN AREAS WITH A WINTER DESIGN
(DRY BULB TEMPERATURE 32° F OR LOWER)

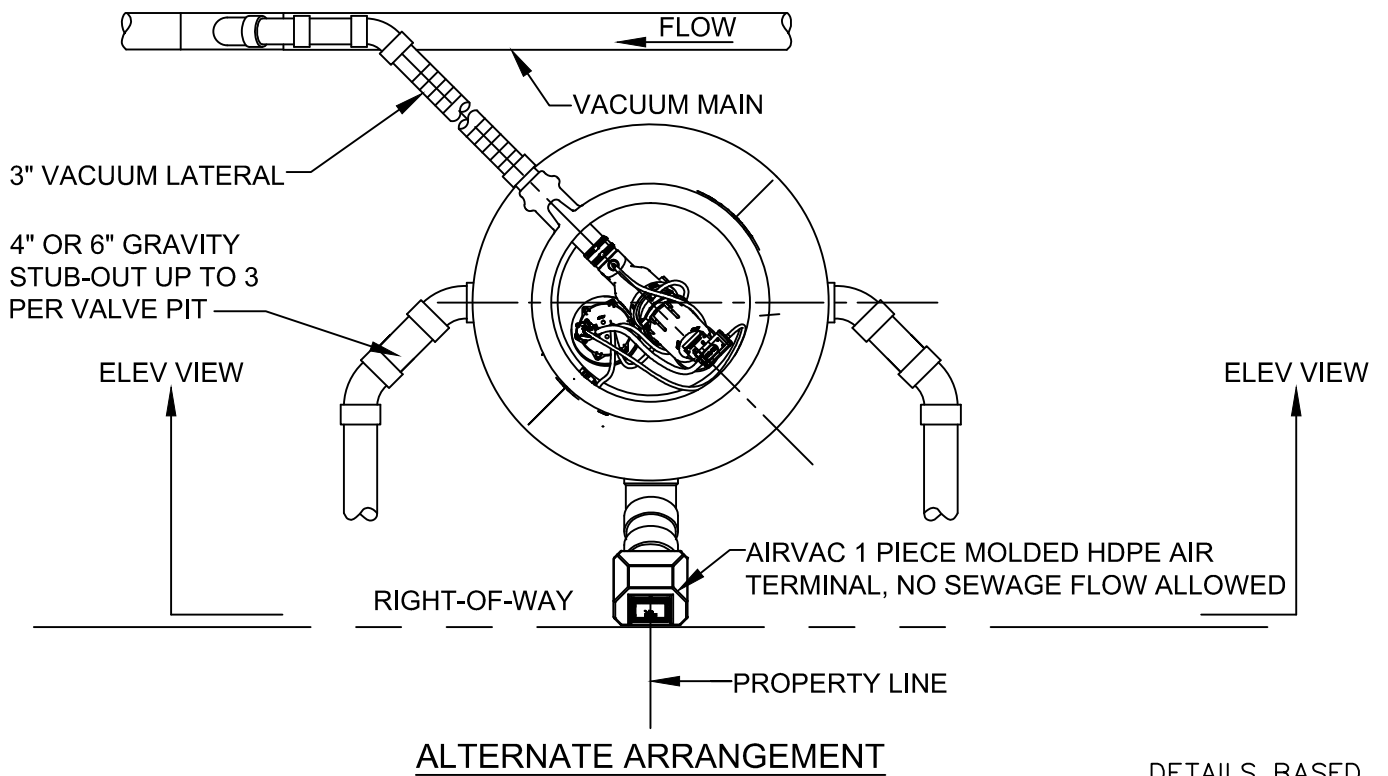
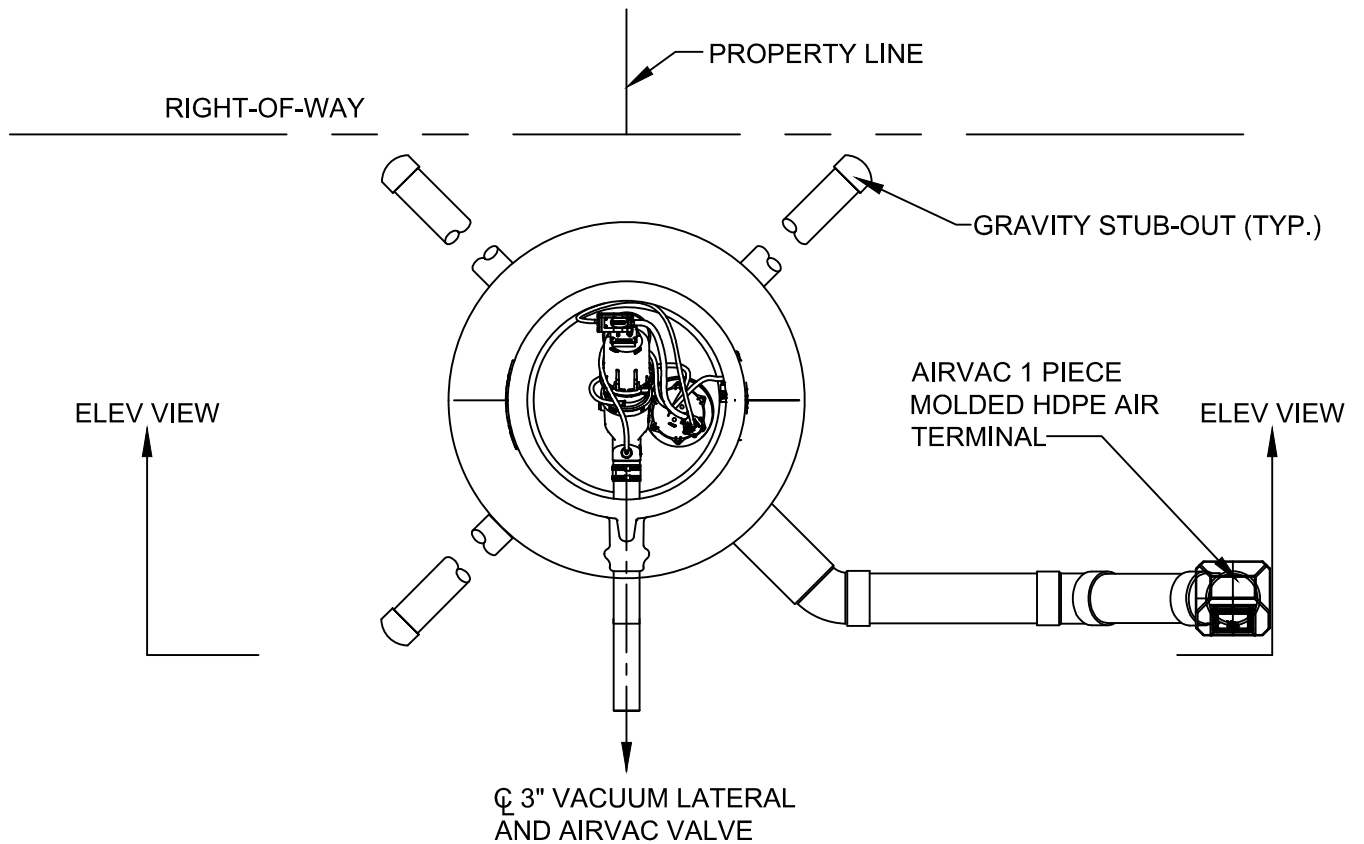
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ON AIRVAC, INC.

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6" DEDICATED AIR TERMINAL (MOLDED) – ELEVATION

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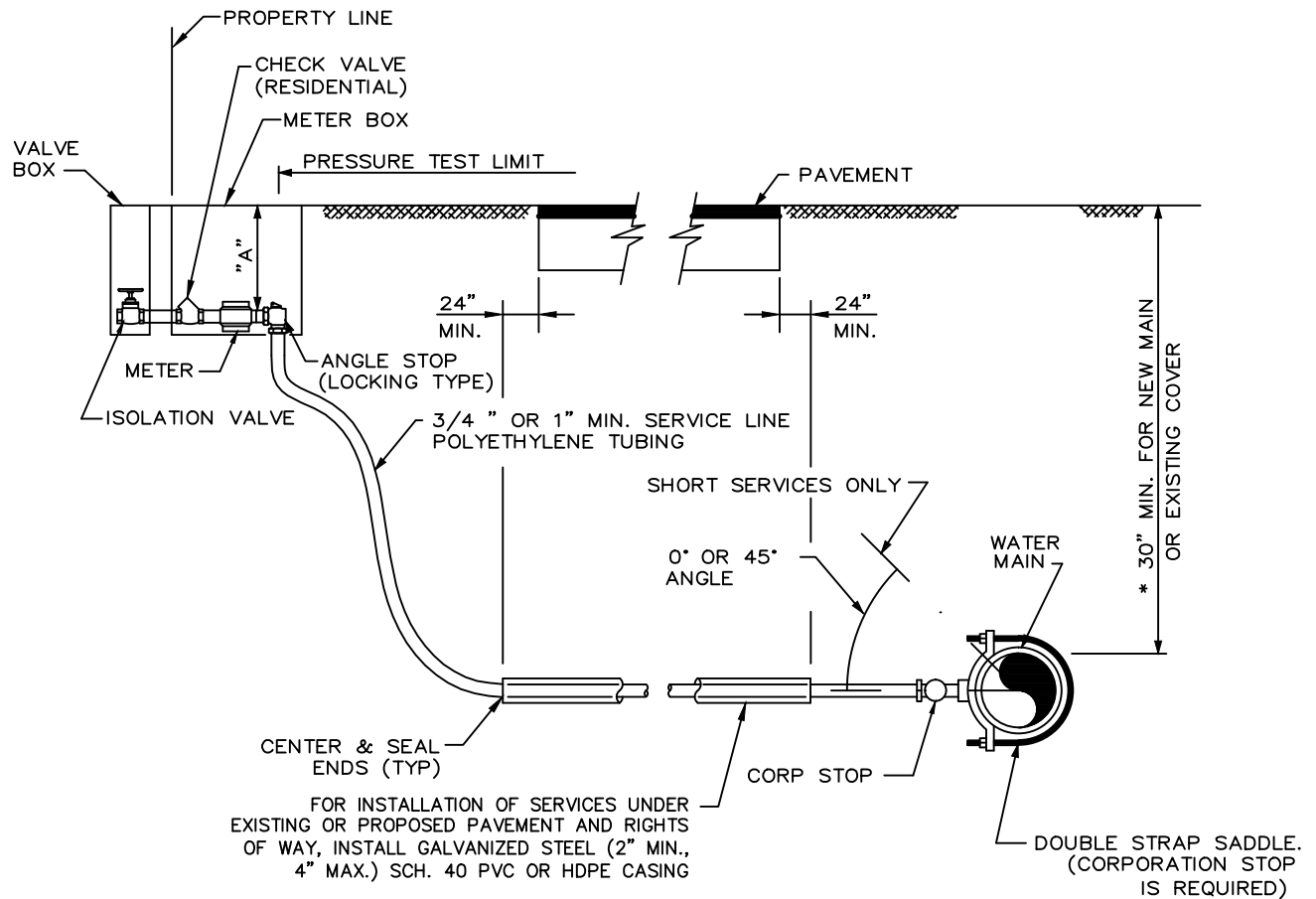
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6" DEDICATED AIR TERMINAL (MOLDED) – PLAN

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NOTES:

1. SUCCESSIVE TAPS INTO THE WATER MAIN SHALL BE SPACED A MINIMUM OF 18" APART. TAPS SPACED BETWEEN 18" TO 48" SHALL BE OFFSET TO EACH SIDE OF THE MAIN, OR OFFSET 45°.
2. METER BOX SHALL BE SET TO CONFORM TO FINISHED GRADE ADJACENT TO PROPERTY LINE. METER BOX SHALL NOT BE PLACED IN SIDEWALK OR DRIVEWAY AREAS. SERVICE LINES SHALL NOT BE PLACED UNDER DRIVEWAYS.
3. SERVICE CONNECTION TUBING TO BE POLYETHYLENE AND MAXIMUM LENGTH OF 100'.
4. ALL 5/8" & 1" METERS REQUIRE A 3/4" & 1" LOCKING ANGLE METER VALVE RESPECTIVELY.
5. AFTER METER INSTALLATION, INSTALL LINE VALVE IN CUSTOMER SERVICE LINE.
6. DIMENSION "A" = 7" (5/8" X 3/4" METER)
= 8" (1" METER)
7. **CONTRACTOR** TO PROVIDE & INSTALL ENTIRE WATER SERVICE UP TO ANGLE STOP INCLUDING METER BOX.
8. **OUA** TO PROVIDE AND INSTALL METER.
9. **OUA** TO INSTALL IN-LINE DUAL CHECK VALVE (RESIDENTIAL).
10. **OUA** TO INSTALL ISOLATION VALVE & BOX ON CUSTOMER SIDE OF METER INSTALLATION.

* 36" MIN. IN STATE ROAD R/W & UNDER ASPHALT

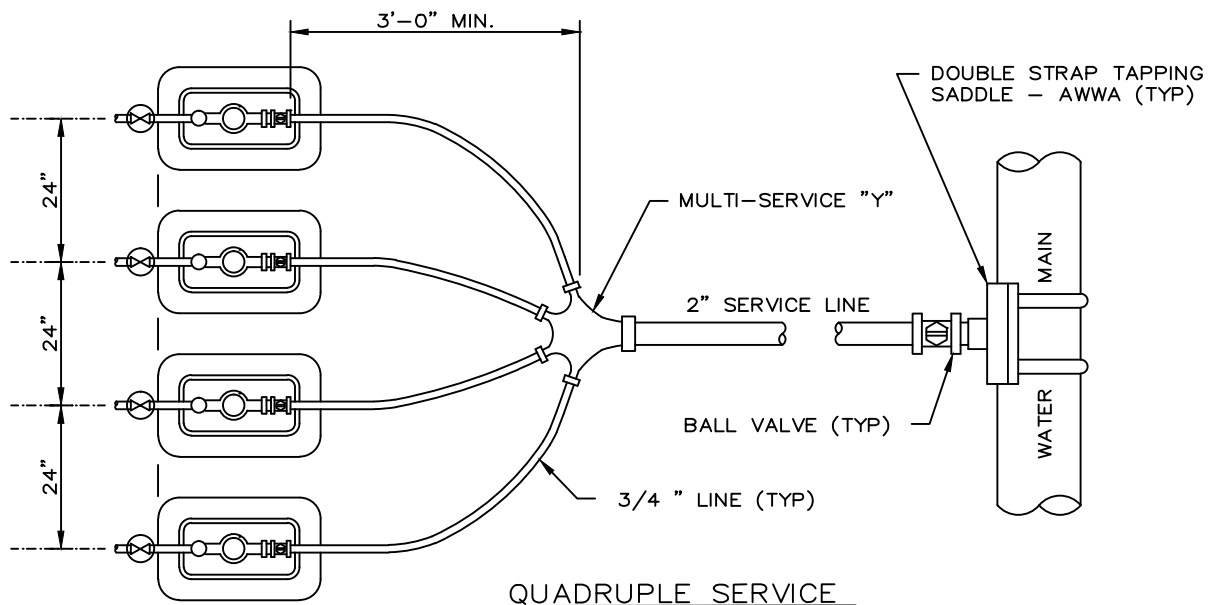
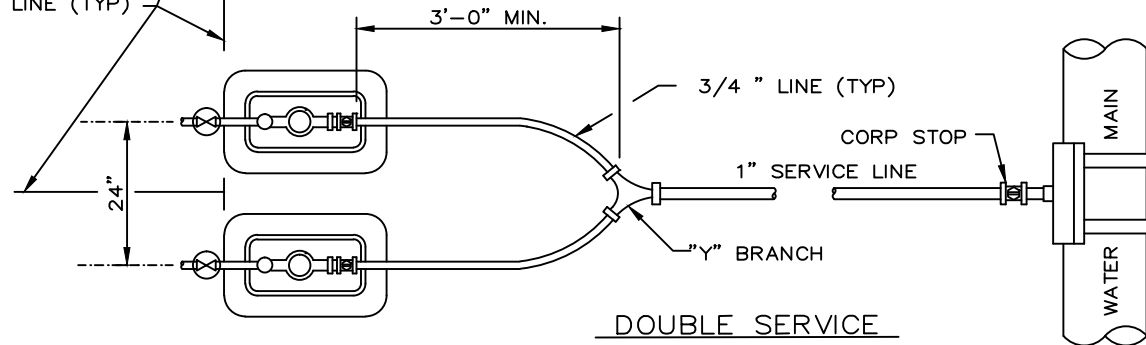
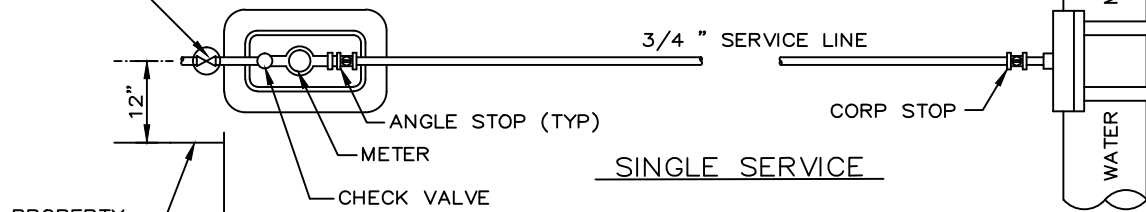
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TYPICAL SERVICE CONNECTION (UNDERGROUND)
FOR
5/8" x 3/4" OR 1" METER

PAGE No
D1

ISOLATION VALVE W/ VALVE BOX
AND METER BY OKEECHOBEE
UTILITY AUTHORITY TYPICAL ALL
SERVICES



NOTES:

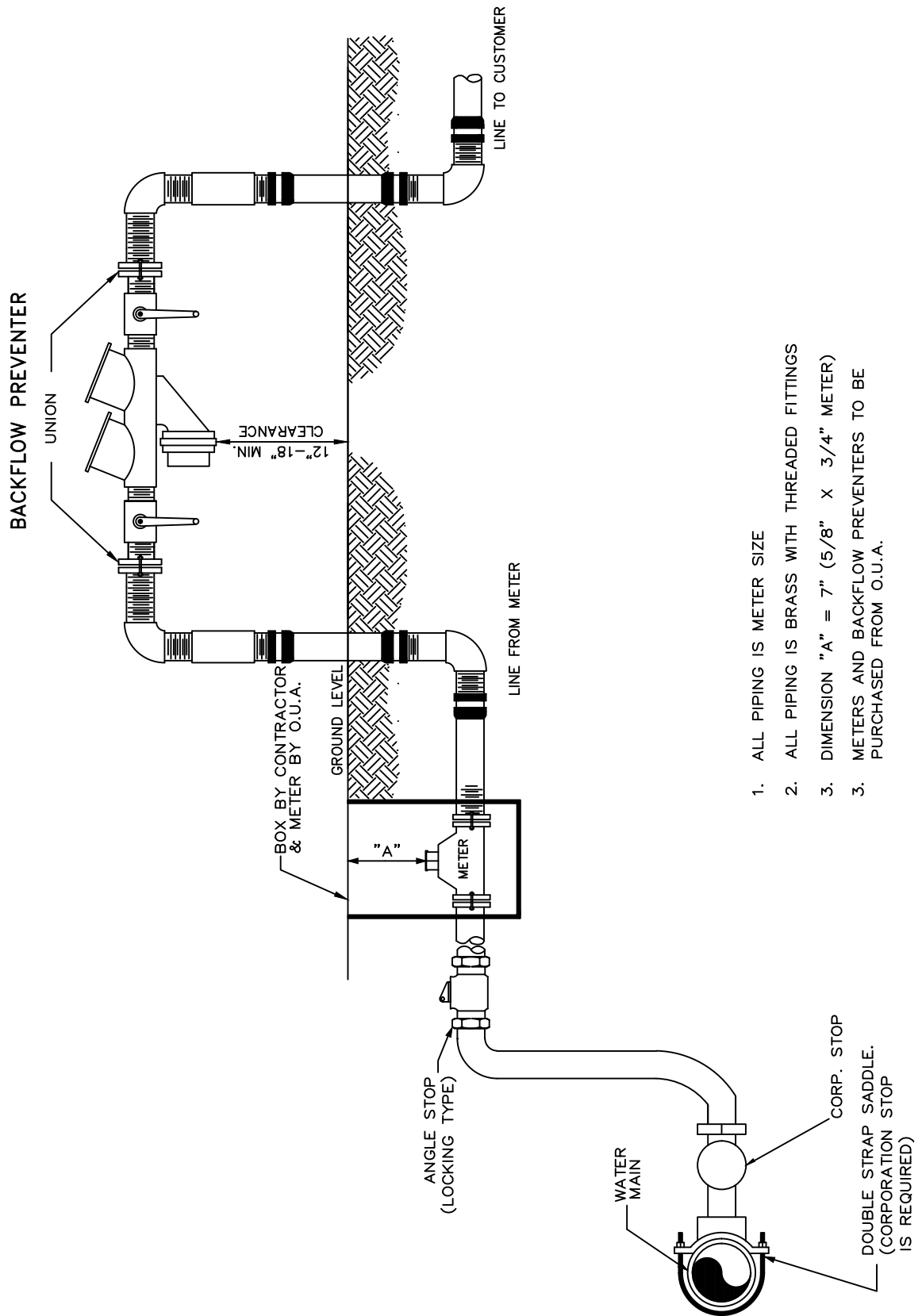
1. AUTHORIZED SERVICE LINE MATERIAL SHALL BE POLYETHYLENE TUBING.
2. MULTIPLE SERVICE/METER INSTALLATIONS OF MORE THAN 4 METERS PER SERVICE AND SERVICE LINES LARGER THAN 2" IN DIAMETER SHALL BE HANDLED ON AN INDIVIDUAL BASIS.
3. NO FITTINGS BETWEEN CORP. STOP & ANGLE VALVE OR CORP. STOP & "Y" BRANCH FOR MULTIMETER INSTALLATIONS.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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TYPICAL SERVICE FOR
MULTIPLE SERVICES
(TWO OR MORE)

PAGE No
D2



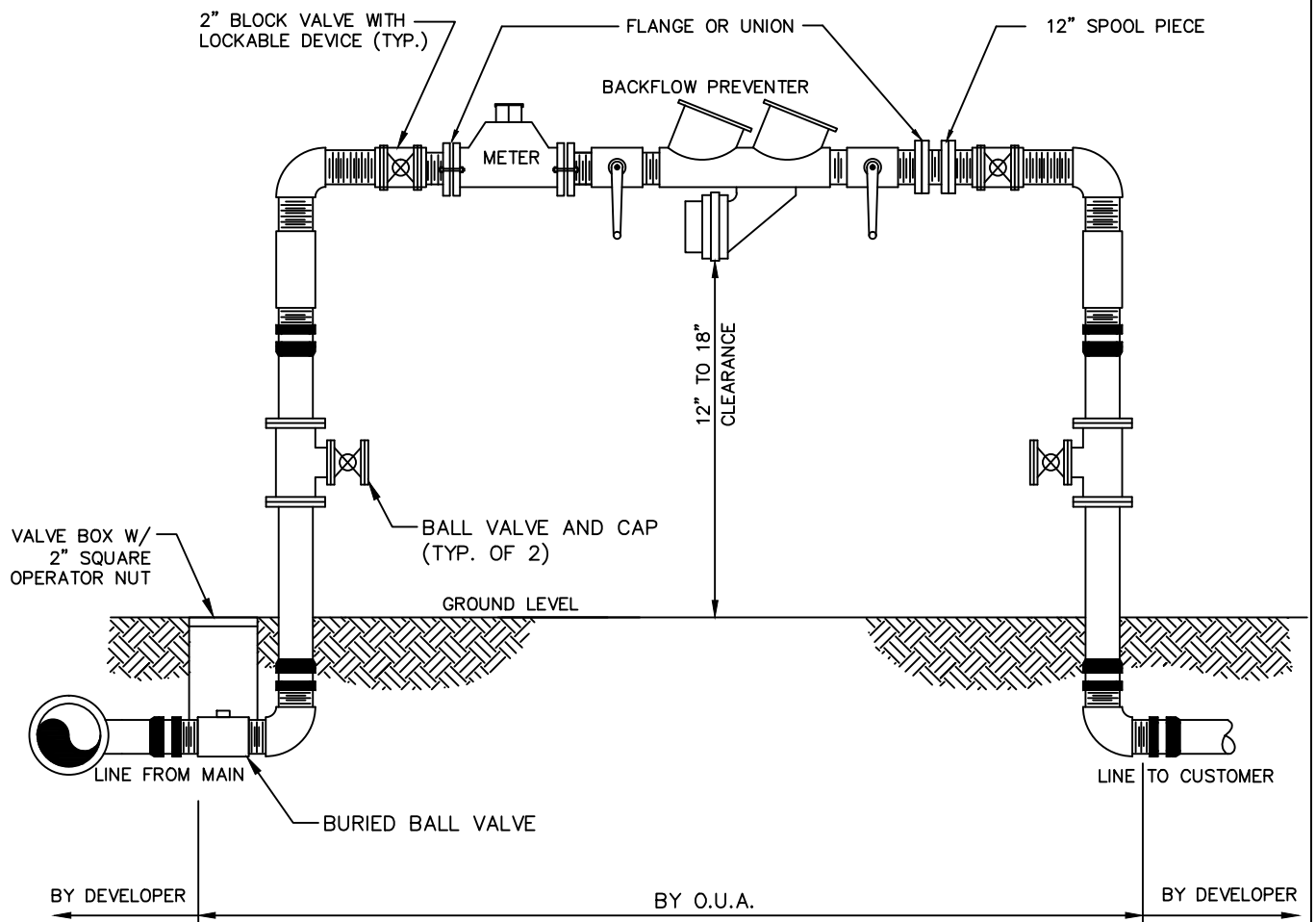
1. ALL PIPING IS METER SIZE
2. ALL PIPING IS BRASS WITH THREADED FITTINGS
3. DIMENSION "A" = 7" (5/8" X 3/4" METER)
3. METERS AND BACKFLOW PREVENTERS TO BE PURCHASED FROM O.U.A.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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5/8" X 3/4" AND 1" METER IN BOX / BACKFLOW ABOVE GROUND

PAGE No
D2A



NOTES:

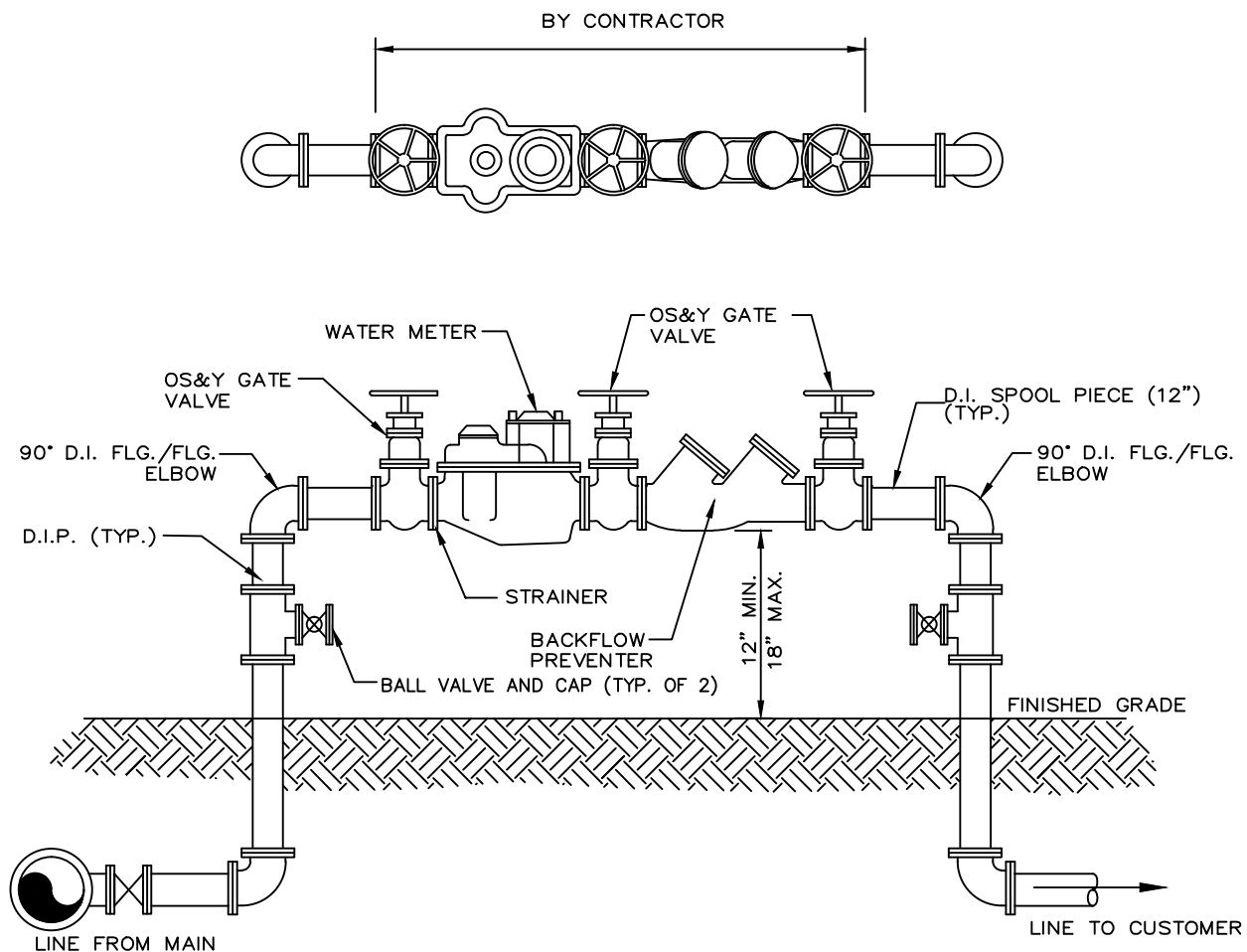
1. ALL PIPING IS METER SIZE.
2. ALL PIPING IS BRASS WITH THREADED FITTINGS.
3. THIS DETAIL IS ALSO APPLICABLE TO 5/8" x 3/4" AND 1" SERVICE WHERE A BACKFLOW PREVENTION DEVICE IS REQUIRED, EXCEPT THAT METER WILL BE INSTALLED IN METER BOX.
4. METERS AND BACKFLOW PREVENTERS ARE TO BE PURCHASED FROM OUA.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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1 1/2 " AND 2" METER/BACKFLOW ASSEMBLY
(ABOVE GROUND)

PAGE No
D3



NOTES:

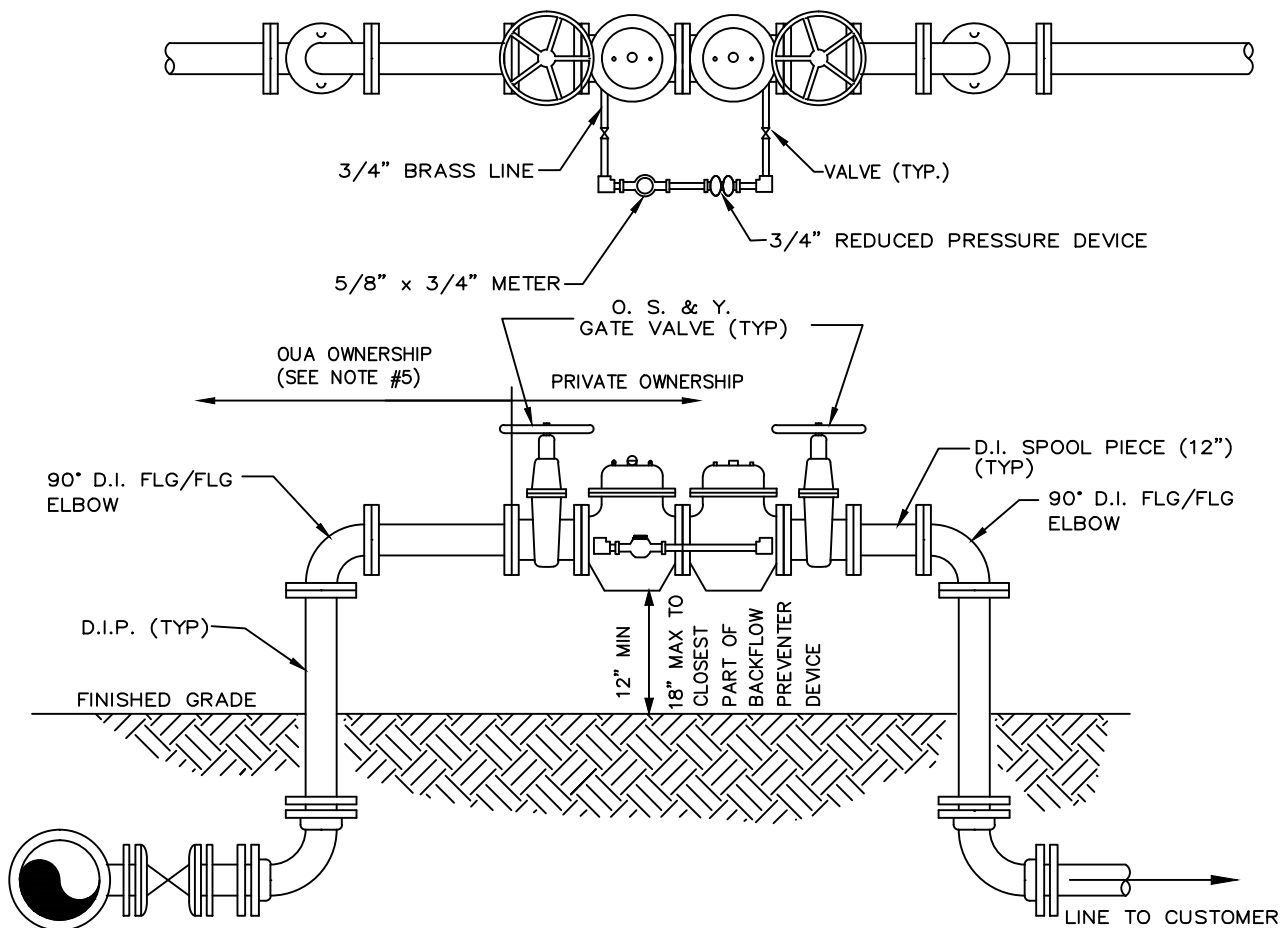
1. ALL PIPE AND FITTINGS SHALL BE CLASS 53 DUCTILE IRON CEMENT LINED.
2. MECHANICAL JOINT FITTINGS SHALL BE REQUIRED UNDERGROUND AND FLANGED FITTINGS FOR ABOVE GROUND USE, NO UNIFLANGES PERMITTED.
3. PAINT THE ENTIRE ABOVE GROUND ASSEMBLY, IN ACCORDANCE WITH THE OUA STANDARD. DO NOT PAINT OVER NAME/SERIAL PLATE OR BRASS FITTINGS.
4. CONTRACTOR TO INSTALL PIPE SUPPORTS AS NEEDED.
5. METER & BACKFLOW PREVENTION DEVICES SHALL BE PURCHASED FROM THE OKEECHOBEE UTILITY AUTHORITY.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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3" AND 4" METER / BACKFLOW ASSEMBLY

PAGE No
D4



NOTES:

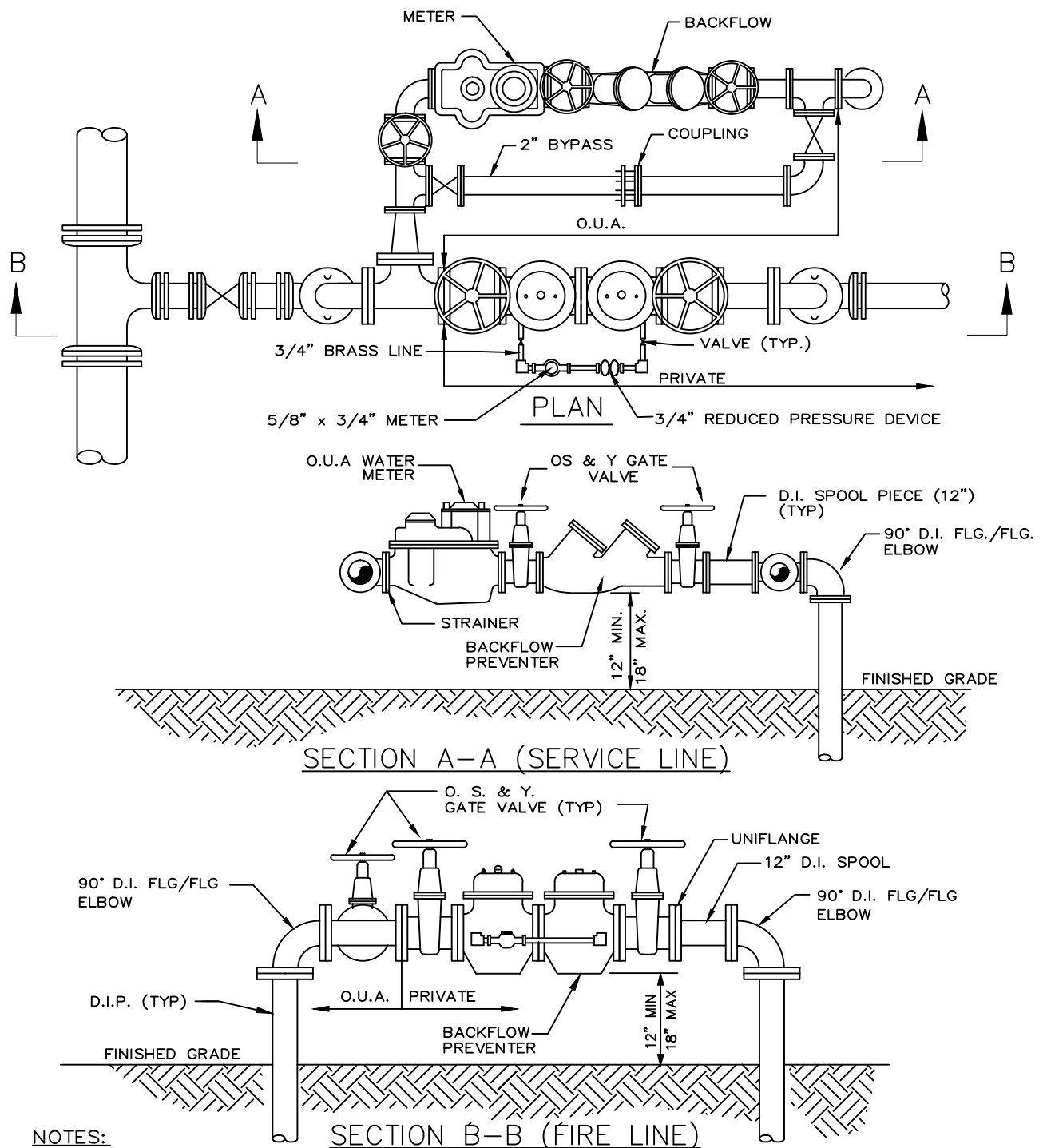
1. ALL PIPE AND FITTINGS SHALL BE CLASS 53 DUCTILE IRON CEMENT LINED.
2. MECHANICAL JOINT FITTINGS SHALL BE REQUIRED UNDERGROUND AND FLANGED FITTINGS FOR ABOVE GROUND USE.
3. PAINT THE ENTIRE ABOVE GROUND ASSEMBLY, IN ACCORDANCE WITH THE OUA STANDARDS. DO NOT PAINT OVER NAME/SERIAL PLATE OR BRASS FITTINGS.
4. CONTRACTOR TO INSTALL PIPE SUPPORTS AS NEEDED.
5. ONCE COMPLETED ACCEPTED AND PLACED INTO SERVICE, THE OUA WILL OWN AND MAINTAIN PIPING UP TO FIRST VALVE, PROPERTY OWNER TO OPERATE AND MAINTAIN FIRE LINE FROM THIS POINT.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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FIRE LINE ASSEMBLY & DETECTOR CHECK VALVE

PAGE No
D5



NOTES:

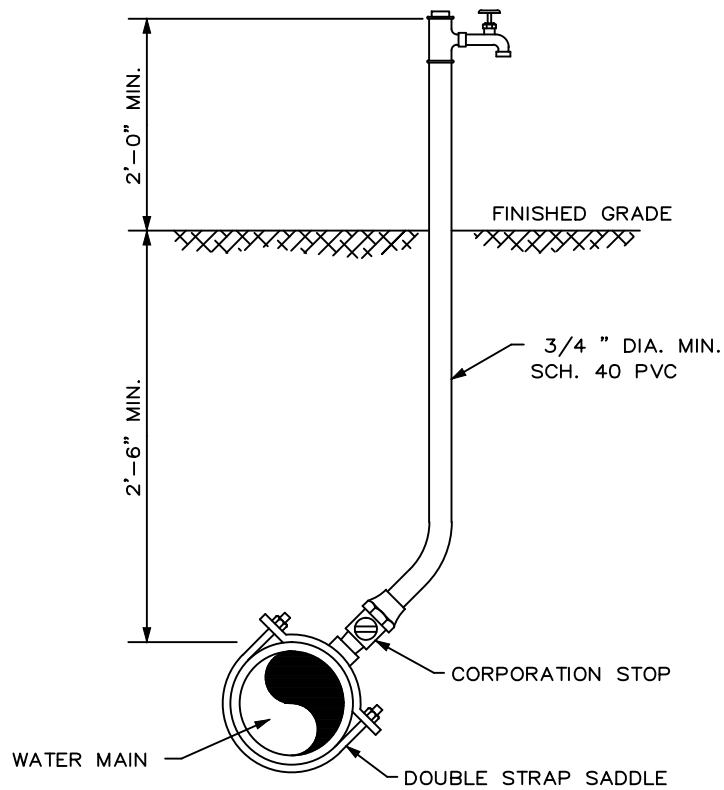
1. ALL PIPE AND FITTINGS SHALL BE CLASS 53 DUCTILE IRON CEMENT LINED.
2. MECHANICAL JOINT FITTINGS SHALL BE REQUIRED UNDERGROUND AND FLANGED FITTINGS FOR ABOVE GROUND USE.
3. PAINT THE ENTIRE ABOVE GROUND ASSEMBLY, IN ACCORDANCE WITH THE OUA STANDARDS. DO NOT PAINT OVER NAME/SERIAL PLATE OR BRASS FITTINGS.
4. CONTRACTOR TO INSTALL PIPE SUPPORTS AS NEEDED.
5. THE CONTRACTOR SHALL PURCHASE THE METER & BACKFLOW ASSEMBLY FROM O.U.A.
6. ONCE COMPLETE, ACCEPTED, AND PLACED INTO SERVICE THE O.U.A WILL OWN AND MAINTAIN PIPING UP THE FIRST VALVE ON THE FIRE LINE AND THE POTABLE METER, AND POTABLE BACKFLOW. THE PROPERTY OWNER TO OPERATE AND MAINTAIN FIRE LINE BACKFLOW AND FIRE LINE FROM THAT POINT.

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SERVICE AND FIRE LINE ASSEMBLY

PAGE No
D6



NOTES:

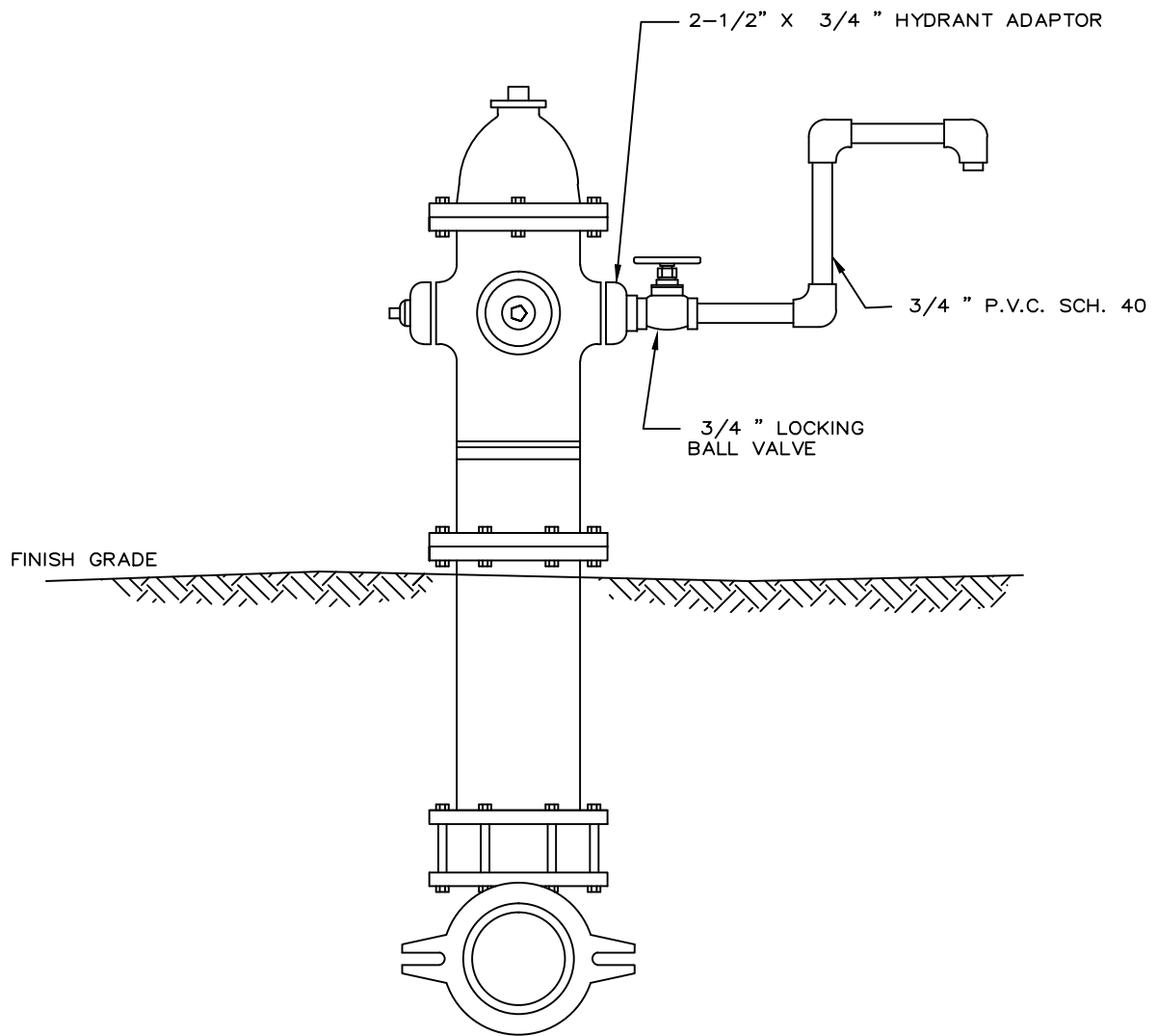
1. SAMPLE POINT SHOULD BE ON A SERVICE LINE OR FIRE HYDRANT IF POSSIBLE.
2. SAMPLE POINT TO BE REMOVED BY CONTRACTOR AFTER PROJECT IS ACCEPTED.

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SAMPLING POINT (ON MAIN)

PAGE No
D7

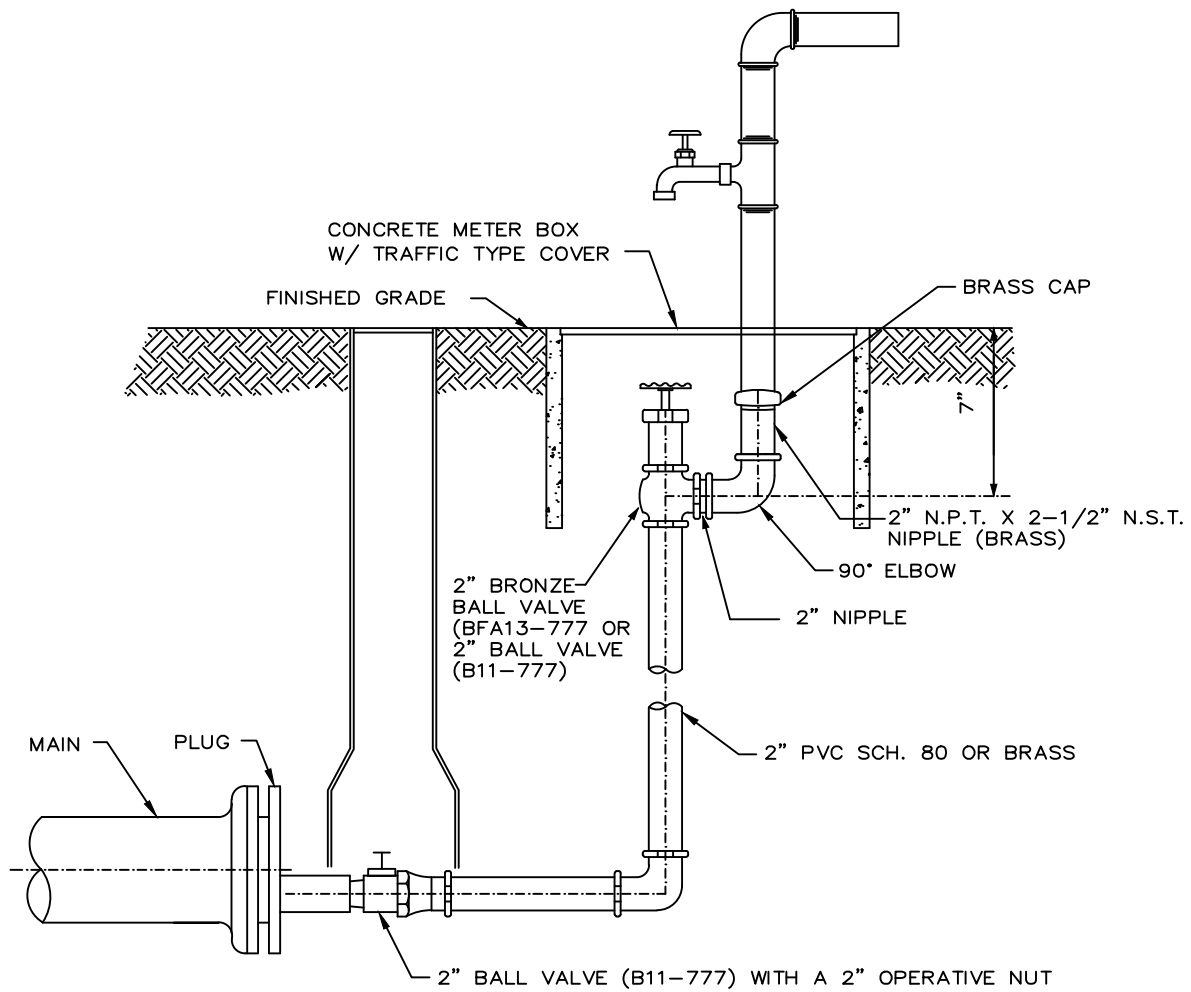


OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

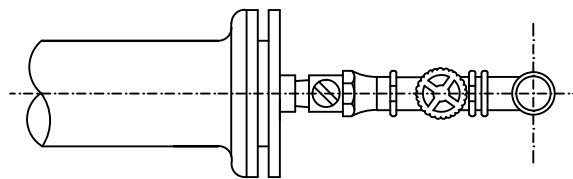
REVISION
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SAMPLING POINT (ON HYDRANT)

PAGE No
D8



ELEVATION



PLAN

NOTES:

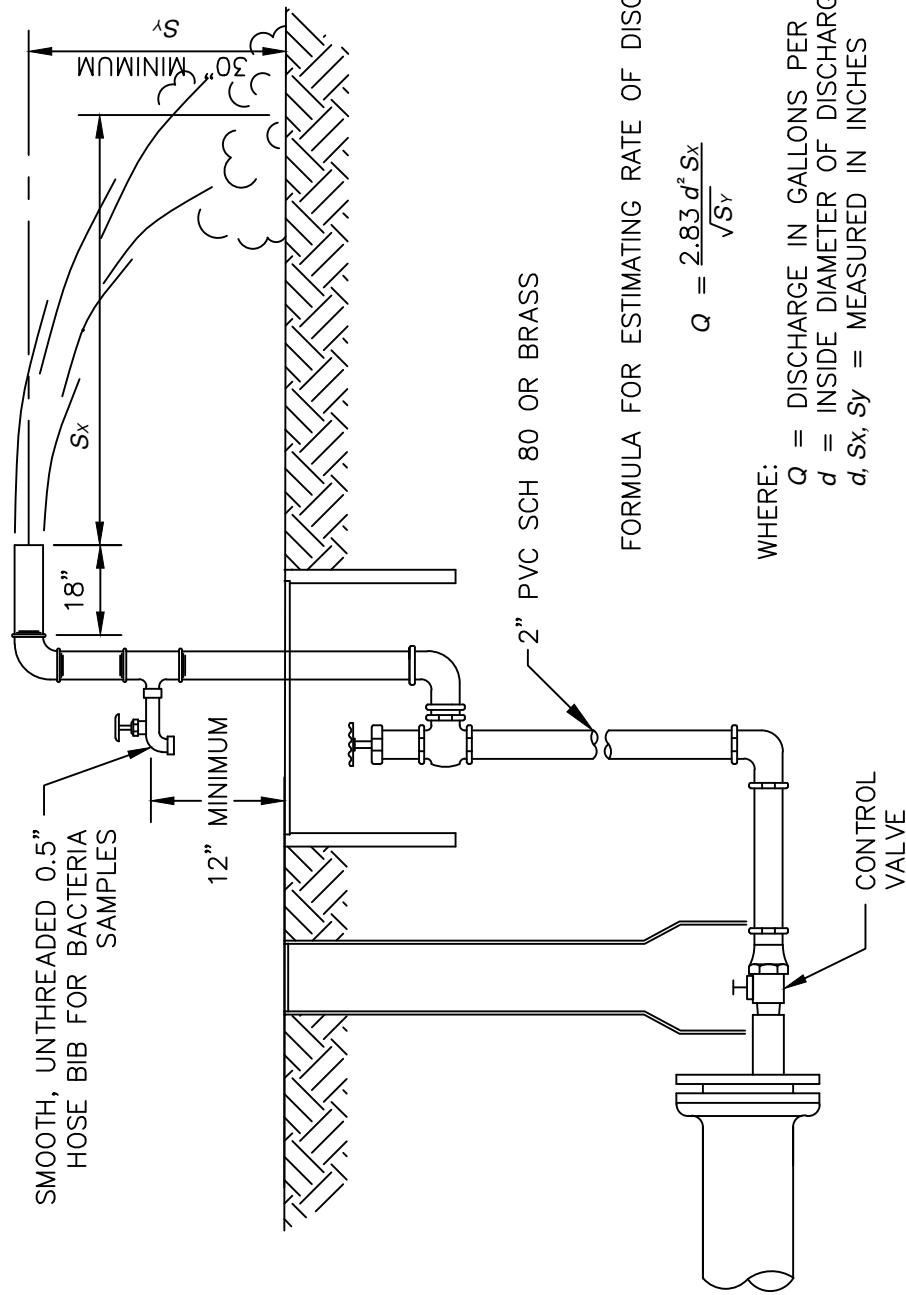
1. GALVANIZED PIPING AND FITTINGS SHALL NOT BE USED ON TEMPORARY OR PERMANENT BLOWOFFS.
2. THE MAIN SHALL BE MECHANICALLY RESTRAINED IN ACCORDANCE WITH THE OUA STANDARDS. THE NUMBER OF PIPE LENGTHS TO BE RESTRAINED SHALL BE PER THE MANUFACTURER RECOMMENDATION.
3. SAMPLE POINT TO BE REMOVED UPON COMPLETION.
4. SEE D9A FOR FLUSHING DETAILS.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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TYPICAL 2" TERMINAL END BLOWOFF
AND SAMPLING POINT

PAGE No
D9



FORMULA FOR ESTIMATING RATE OF DISCHARGE

$$Q = \frac{2.83 d^2 S_x}{\sqrt{S_y}}$$

WHERE:

Q = DISCHARGE IN GALLONS PER MINUTE
 d = INSIDE DIAMETER OF DISCHARGE PIPE
 d, S_x, S_y = MEASURED IN INCHES

NOTES:

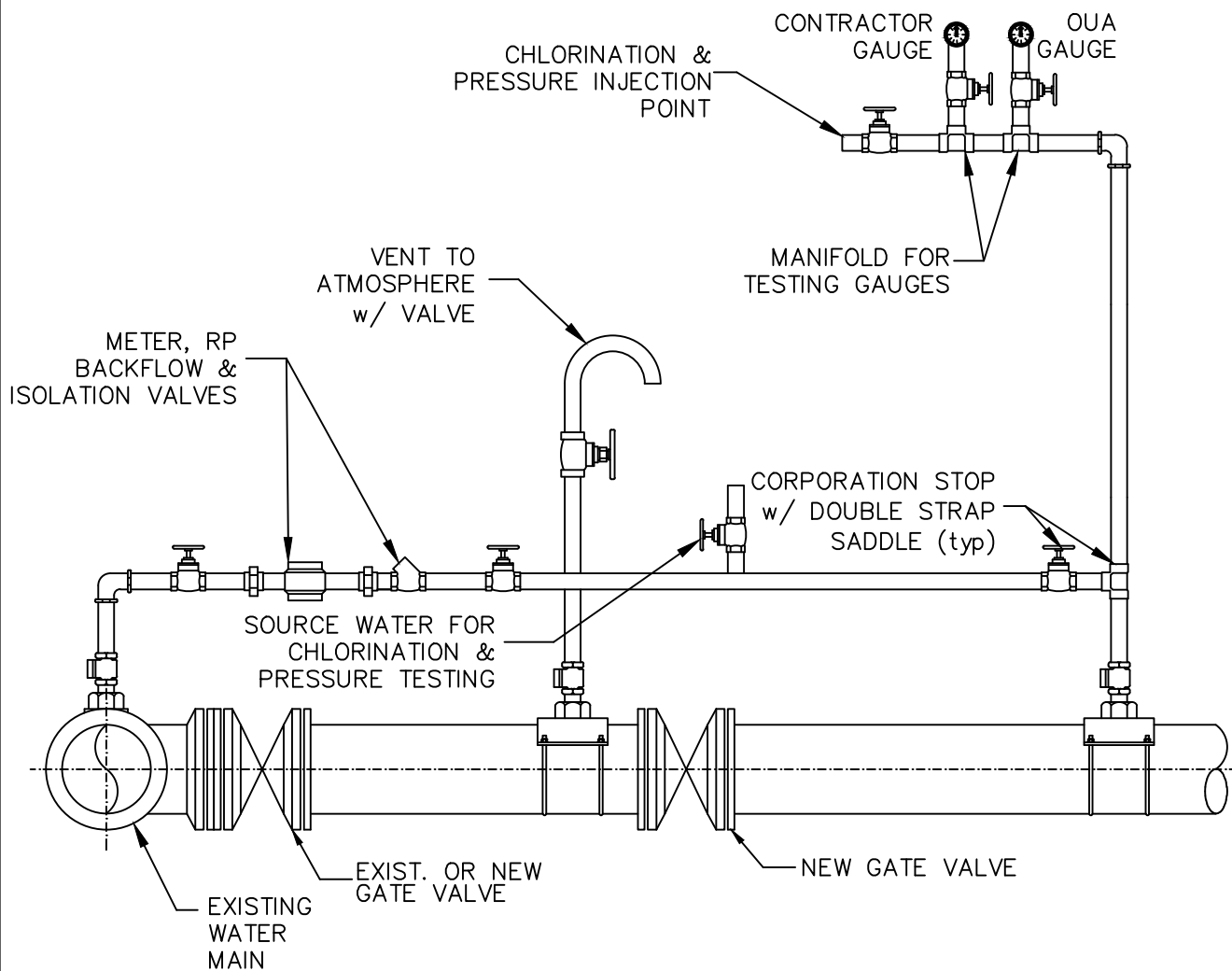
1. REFERENCE, AWWA C651.
2. THIS DETAIL APPLIES TO PIPES UP TO AND INCLUDING 8" DIAMETER. LARGER SIZES SHALL BE HANDLED ON A CASE BY CASE BASIS.
3. PIGGING OF LINES IS AN ACCEPTABLE METHOD OF CLEANING.
4. ABOVE GROUND PIPING TO BE REMOVED UPON COMPLETION OF TESTING.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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FLUSHING DETAILS

PAGE No
D9A



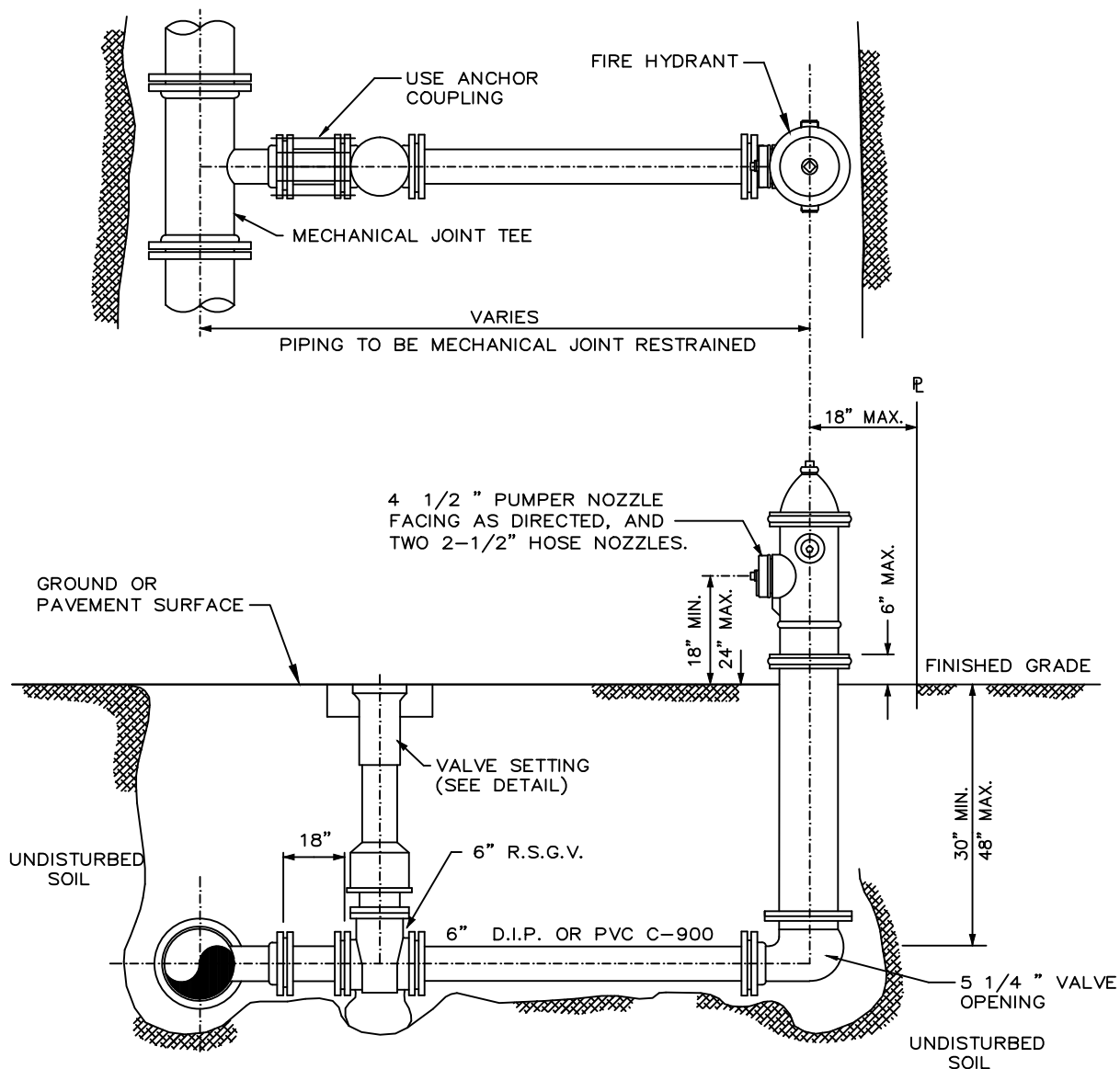
1. WATER MAIN TO BE PRESSURE TESTED AND DISINFECTED ACCORDING TO FDEP REGULATIONS, AWWA STANDARDS AND OUA REQUIREMENTS.
2. BACTERIOLOGICAL TESTING IS TO BE PERFORMED BY CONTRACTOR WITH PRIOR NOTIFICATION OF TESTING TO OUA PERSONNEL.
3. DO NOT REMOVE TEMPORARY CONNECTION UNTIL ALL TESTING HAS BEEN COMPLETED.
4. PROVIDE ALL NECESSARY THRUST BLOCKS OR OTHER RESTRAINTS.
5. FILLING AND FLUSHING LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR AND WITH APPROVAL OF ENGINEER AND/OR OUA.
6. MAIN LINE VALVE TO BE OPENED BY OUA PERSONNEL ONLY AND OPENED FOR CANNON FLUSHING OF NEW PIPING SYSTEM.

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FILLING, DISINFECTING AND TESTING DETAILS

PAGE No
D10



NOTES:

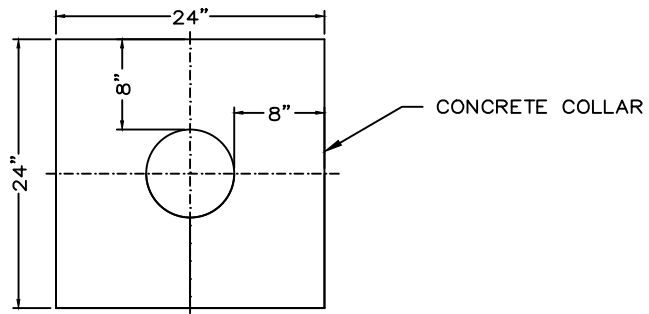
1. HYDRANT SHALL BE INSTALLED PLUMB AND TRUE.
2. THE MODEL COLOR TO BE SAFETY YELLOW, HYDRANT SHALL BE PER OUA REQUIREMENTS.
3. VALVE SHALL BE PLACED ADJACENT TO MAIN, TIED TO TEE.
4. ANCHOR TEES ARE PERMITTED.
5. ALL HYDRANTS SHALL BE TEE'D OFF MAINS.
6. HYDRANTS SHALL NOT BE PLACED IN SIDEWALKS, ROADWAYS OR BIKEPATHS.
7. MEGALUGS ON ALL FITTINGS.
8. HYDRANTS SHALL BE BAGGED UNTIL SYSTEM IS PLACED IN SERVICE.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

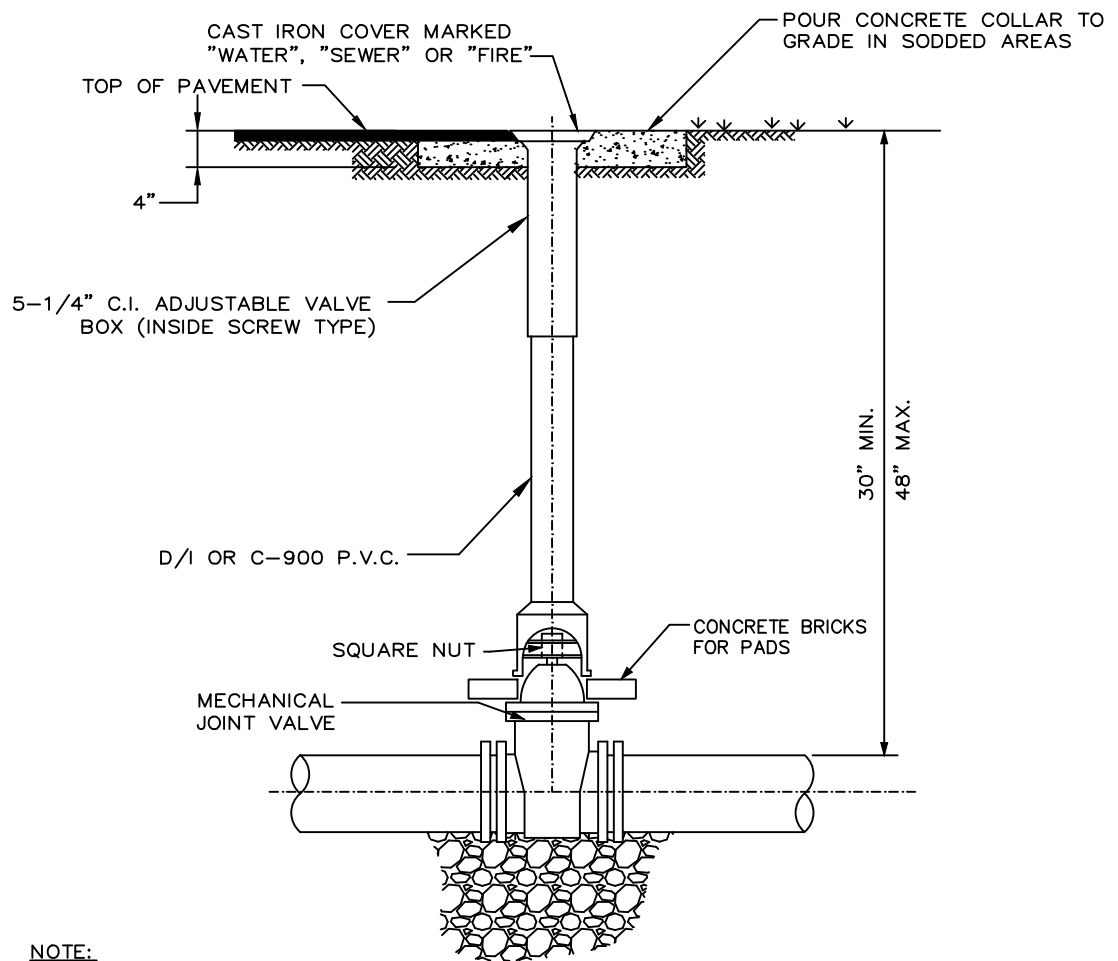
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TYPICAL
FIRE HYDRANT ASSEMBLY

PAGE No
D11



PLAN



NOTE:

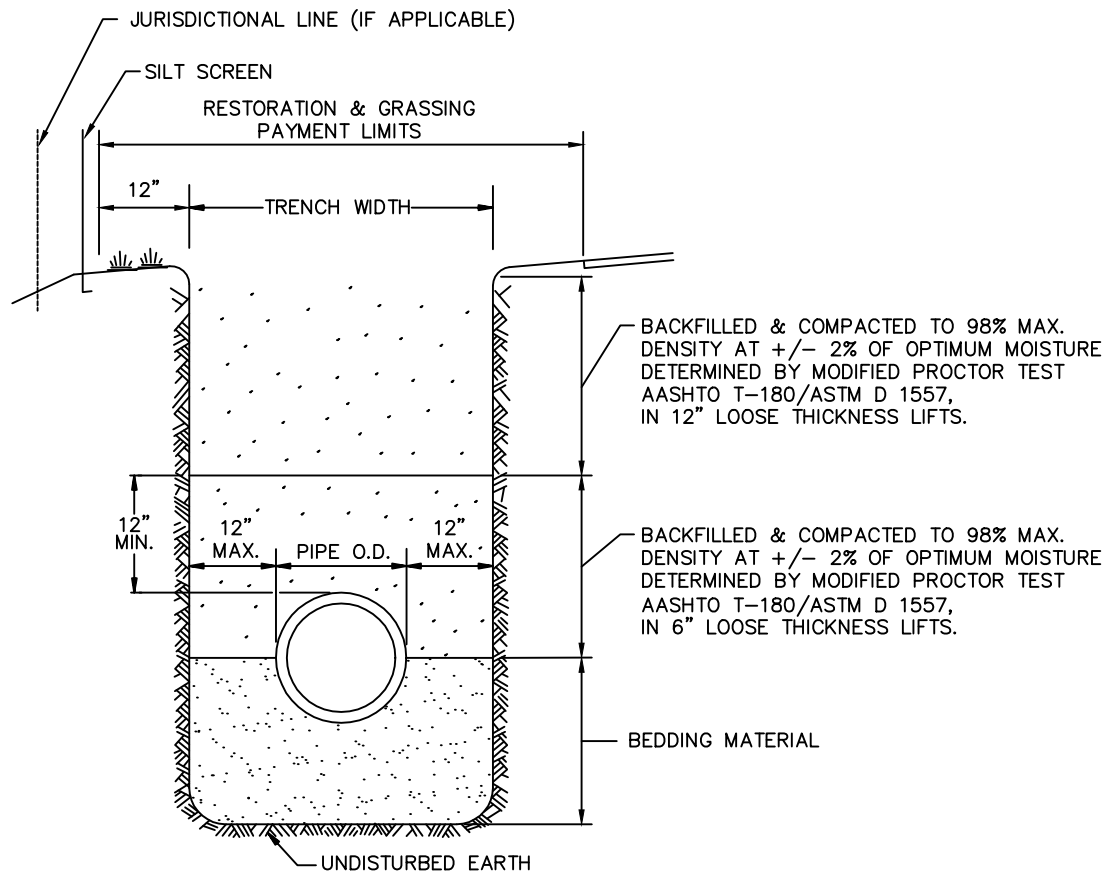
VALVE NUT EXTENSION IS REQUIRED ON ALL VALVES WITH MORE THAN 36" OF COVER. EXTEND NUT TO WITHIN 18" OF VALVE BOX RIM. PROVIDE SOLID BRICK PAD FOR VALVE BOX TO SIT ON.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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TYPICAL VALVE SETTING

PAGE No
D12



NOTES:

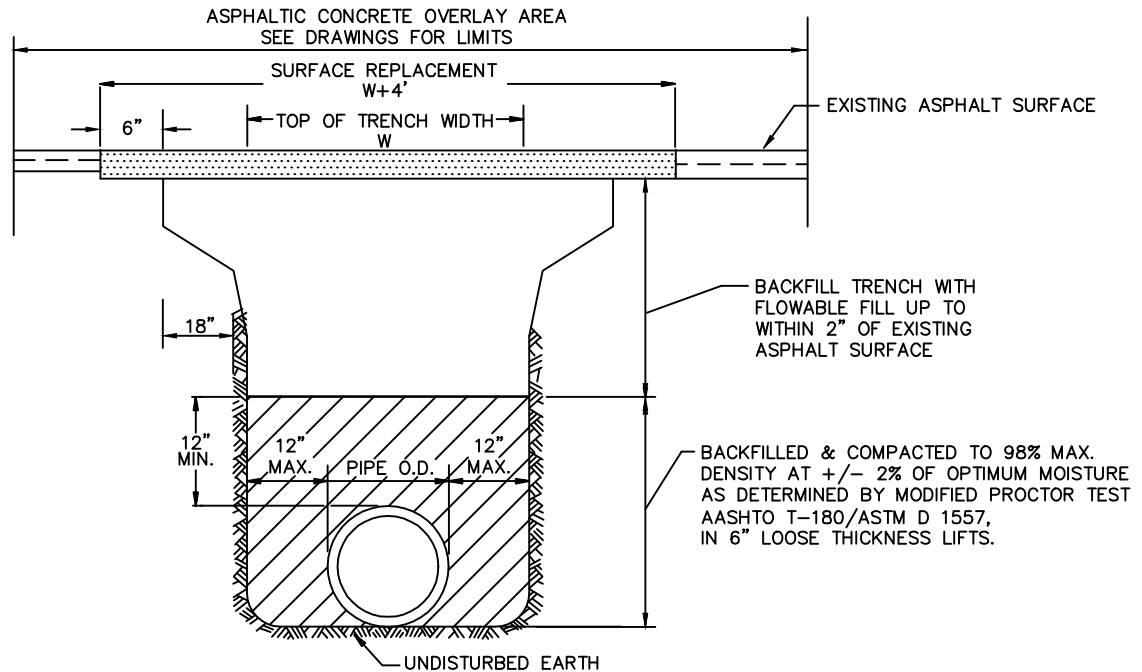
1. BEDDING MATERIAL SHALL CONSIST OF GRANULAR MATERIAL – 1/2" MAX. SIZE, COMPRISED OF SAND, GRAVEL, CRUSHED ROCK OR OTHER MATERIALS FROM GROUPS A-1, A-2 OR A-3, AASHTO CLASSIFICATION, AS APPROVED BY THE ENGINEER AND FREE FROM ORGANIC MATTER AND VEGETATION DEBRIS, LARGE CLOUDS OF EARTH. UNSUITABLE IN-SITU MATERIALS SUCH AS MUCK, DEBRIS AND LARGER ROCK SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR.
 2. THE PIPE SHALL BE FULLY SUPPORTED FOR ITS ENTIRE LENGTH WITH APPROPRIATE COMPACTION UNDER THE PIPE HAUNCHES.
 3. THE PIPE SHALL BE PLACED IN A DRY TRENCH, UNLESS A WET TRENCH INSTALLATION IS APPROVED BY THE OUA.
 4. BACKFILL SHALL BE FREE OF UNSUITABLE MATERIAL SUCH AS LARGER ROCK, MUCK AND DEBRIS.
 5. ALL WORK SHALL CONFORM TO STATE OF FLORIDA TRENCH SAFETY ACT.
 6. 4 INCH WIDE DETECTOR TAPE SHALL BE INSTALLED ABOVE ALL PIPE.
 7. 3M LOCATOR BALLS SHALL BE INSTALLED AT EACH FITTING IN THE PIPE LINE CHANGING DIRECTION AND AT EACH CONNECTION.
 8. 3M LOCATORS TO BE PROVIDED BY DEVELOPER AS SPECIFIED BY O.U.A.
 9. REFER TO SPECIFICATIONS FOR DEPTH OF BACKFILL WHEN BEDDING IS REQUIRED.
- * COMPACT TO AS INDICATED IN ABOVE NOTES, UNDER EXISTING & PROPOSED ROADS. COMPACT TO MATCH SURROUNDING SOILS IN UNDERDEVELOPED AREAS EXCAVATABLE FLOWABLE FILL IS ALSO ACCEPTABLE.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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TYPICAL TRENCH DETAIL – WITH SPECIAL BEDDING

PAGE No
D13A



NOTES:

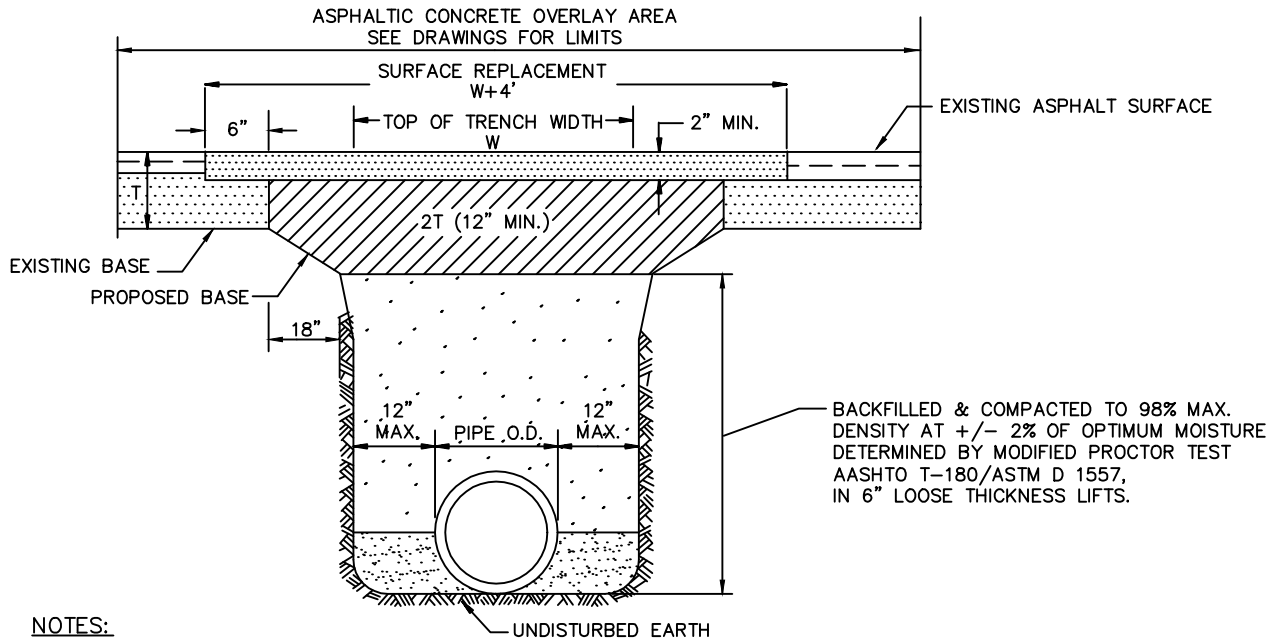
1. BACKFILL MATERIALS AROUND AND UP TO 1 FOOT ABOVE PIPE SHALL CONSIST OF CLEAN EARTH FILL COMPRISED OF SAND, SAND AND CLAY, GRAVEL, CRUSHED ROCK OR OTHER MATERIALS FROM GROUPS A-1, A-2 OR A-3 AASHTO CLASSIFICATION FREE FROM ORGANIC MATTER AND VEGETATION, DEBRIS, LARGE CLODS OR EARTH OR STONES. UNSUITABLE IN-SITU MATERIALS SUCH AS MUCK, DEBRIS, LARGE ROCK AND ROOTS SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR.
2. FLOWABLE FILL FROM A POINT 12" ABOVE TOP OF PIPE TO 2" BELOW EXISTING ASPHALT SURFACE, SHALL BE READY-MIXED FLOWABLE FILL CONSISTING OF PORTLAND CEMENT, AGGREGATES, WATER AND MINERAL MIXTURES IN COMPLIANCE WITH F.D.O.T. STANDARD SPECIFICATIONS, SECTION 121.
3. THE PIPE SHALL BE FULLY SUPPORTED ALONG ENTIRE LENGTH.
4. THE PIPE TRENCH SHALL REMAIN DRY DURING PIPE LAYING OPERATIONS.
5. ALL TRENCH WORK SHALL CONFORM TO LATEST STANDARDS AS SET FORTH BY THE FLORIDA TRENCH SAFETY ACT AND OR OSHA.
6. FOUR INCH WIDE DETECTABLE TAPE SHALL BE PLACED APPROXIMATELY 12"-18" BELOW FINISHED GRADE AND DIRECTLY ABOVE ALL PRESSURE PIPING. TAPE, WORDING AND COLOR SHALL CONFORM TO O.U.A. STANDARDS.
7. SURFACE COURSE SHALL BE F.D.O.T. MIX, TO MATCH EXISTING PAVEMENT, WITH A THICKNESS EQUAL TO THE EXISTING OR 2", WHICHEVER IS GREATER.
8. PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED BUTT JOINTS, HEATED, RAKED AND SPRAYED WITH A REJUVENATING AGENT. THE PATCH AREA SHALL BE A SMOOTH PLANE SUCH THAT A STRAIGHT EDGE PLACED ACROSS THE PATCH, PARALLEL TO THE TRAFFIC FLOW AND EXTENDING TO UNDISTURBED PAVEMENT SHALL SHOW NO MORE THAN 1/4" IRREGULARITY IN ANY 15 FT. SECTION. ANY IRREGULARITY SHALL BE CORRECTED IN ACCORDANCE WITH F.D.O.T. SPECIFICATIONS.
9. "COLD PATCH" SHALL BE USED FOR TEMPORARY REPAIRS ONLY, AND FOR A PERIOD NOT TO EXCEED 30 DAYS.
10. TRAFFIC LANE CLOSURES, MOT PLANS AND ROADWAY REPAIRS MATERIALS SHALL BE PER DIRECTION OF ROAD OWNER. CONTRACTOR TO INQUIRE WITH OWNER ABOUT REQUIREMENTS PRIOR TO BID.
11. 3M LOCATOR BALLS SHALL BE INSTALLED AT EACH FITTING IN THE PIPE LINE CHANGING DIRECTION AND AT EACH CONNECTION.
12. 3M LOCATORS TO BE PROVIDED BY DEVELOPER AS SPECIFIED BY O.U.A.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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TRENCH REPAIR DETAILS
PAVED AREAS WITH FLOWABLE FILL BACKFILL

PAGE No
D13B



NOTES:

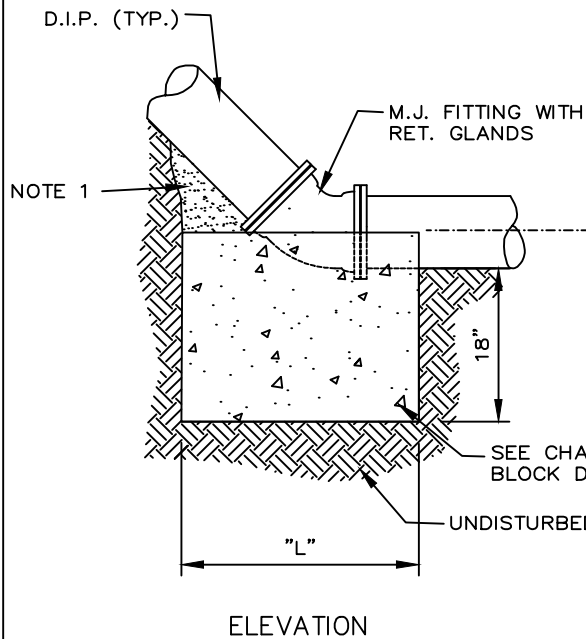
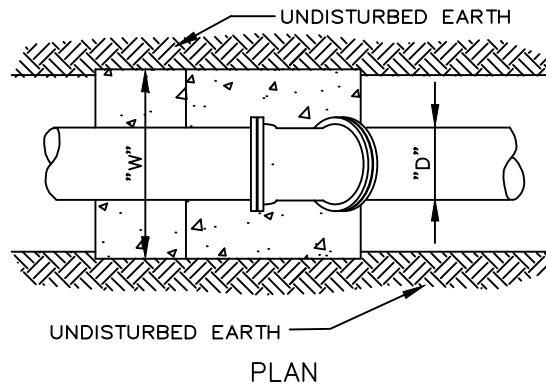
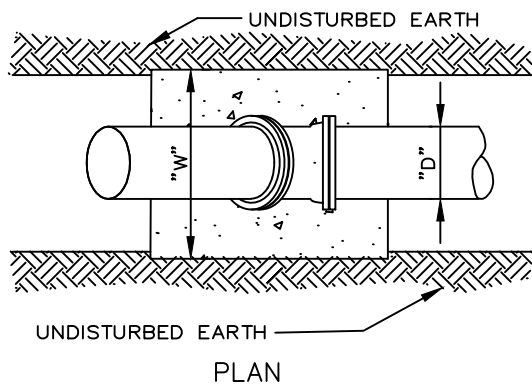
1. BACKFILL MATERIALS SHALL CONSIST OF CLEAN EARTH FILL COMPRISED OF SAND, SAND AND CLAY, GRAVEL, CRUSHED ROCK OR OTHER MATERIALS FROM GROUPS A-1, A-2 OR A-3, AASHTO CLASSIFICATION, FREE FROM ORGANIC MATTER AND VEGETATION, DEBRIS LARGE CLODS OF EARTH OR STONES. UNSUITABLE IN-SITU MATERIALS SUCH AS MUCK, DEBRIS, LARGE ROCK AND ROOTS SHALL BE REMOVED AND DISPOSED BY THE CONTRACTOR.
2. THE PIPE SHALL BE FULLY SUPPORTED ALONG ENTIRE LENGTH.
3. THE PIPE TRENCH SHALL REMAIN DRY DURING PIPE LAYING OPERATIONS.
4. ALL TRENCH WORK SHALL CONFORM TO LATEST STANDARDS AS SET FORTH BY THE FLORIDA TRENCH SAFETY ACT AND OR OSHA.
5. FOUR INCH WIDE DETECTABLE TAPE SHALL BE PLACED APPROXIMATELY 12"-18" BELOW FINISHED GRADE AND DIRECTLY ABOVE ALL PRESSURE PIPING. TAPE, WORDING AND COLOR SHALL CONFORM TO CITY STANDARDS.
6. BACKFILL SHALL BE COMPACTED IN 6" LAYERS WITH MECHANICAL TAMPERS FOR THE FULL WIDTH OF THE TRENCH AND UP TO THE BOTTOM OF THE ROADWAY BASE. PARTICULAR ATTENTION MUST BE GIVEN TO THE ADEQUATE COMPACTION OF THE HAUNCHES OF THE PIPE. THE BACKFILL SHALL BE COMPACTED TO 98% AASHTO T-180/ASTM D 1557 TAKEN AT THE SPRING LINE, AT ONE FOOT ABOVE THE CROWN OF THE PIPE, AND EVERY FOOT VERTICALLY THEREAFTER.
7. BASE MATERIAL SHALL BE THE SAME TYPE AS THE MATERIALS REMOVED.
8. SURFACE REPLACEMENT SHALL BE F.D.O.T. MIX TO MATCH EXISTING PAVEMENT, WITH A THICKNESS EQUAL TO THE EXISTING OR 2" WHICHEVER IS GREATER.
9. PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED BUTT JOINTS, HEATED, RAKED AND SPRAYED WITH A REJUVENATING AGENT. THE PATCH AREA SHALL BE A SMOOTH PLANE SUCH THAT A STRAIGHT EDGE PLACED ACROSS THE PATCH, PARALLEL TO THE TRAFFIC FLOW AND EXTENDING TO UNDISTURBED PAVEMENT SHALL SHOW NO MORE THAN 1/4" IRREGULARITY IN ANY 15 FT. SECTION. ANY IRREGULARITY SHALL BE CORRECTED IN ACCORDANCE WITH F.D.O.T. SPECIFICATIONS.
10. "COLD PATCH" SHALL BE USED FOR TEMPORARY REPAIRS ONLY, AND FOR A PERIOD NOT TO EXCEED 30 DAYS.
11. TRAFFIC LANE CLOSURES, MOT PLANS AND ROADWAY REPAIRS MATERIALS SHALL BE PER DIRECTION OF ROAD OWNER. CONTRACTOR TO INQUIRE WITH OWNER ABOUT REQUIREMENTS PRIOR TO BID.
12. 3M LOCATOR BALLS SHALL BE INSTALLED AT EACH FITTING IN THE PIPE LINE CHANGING DIRECTION AND AT EACH CONNECTION.
13. 3M LOCATORS TO BE PROVIDED BY DEVELOPER AS SPECIFIED BY O.U.A.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

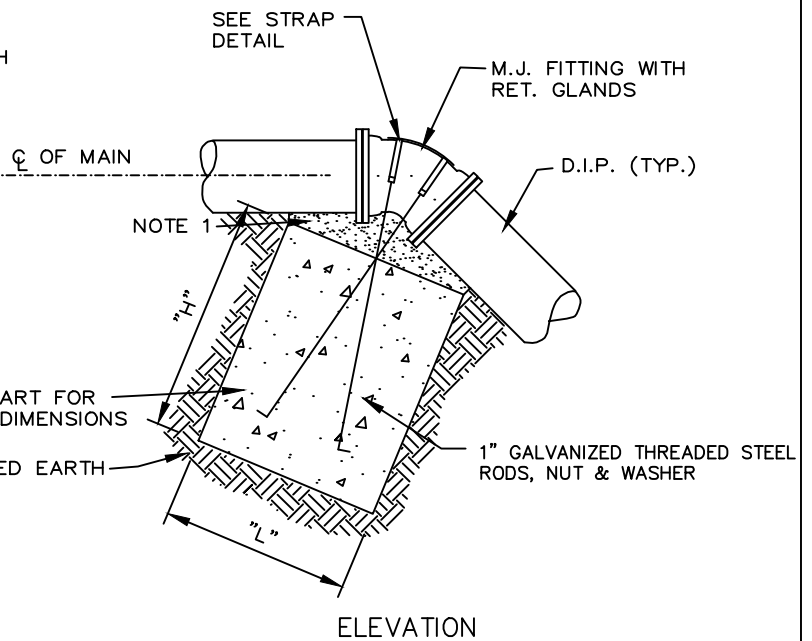
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TRENCH REPAIR DETAILS
PAVED AREAS

PAGE No
D13C



BLOCKING DETAIL
FOR
VERTICAL SAG
N.T.S.



BLOCKING DETAIL
FOR
VERTICAL CREST
N.T.S.

NOTES:

1. ANY VOID BETWEEN MAIN AND GRAVITY BLOCK TO BE FILLED WITH GROUT BY CONTRACTOR
2. FITTINGS SHALL BE WRAPPED WITH SUITABLE COVERING TO PREVENT ADHERENCE TO GRAVITY BLOCK.
3. USE MEGALUGS ON ALL FITTINGS.

NOTE: THRUST BLOCKS ONLY ON EXISTING LINES AND WHEN PRE-APPROVED BY THE EXECUTIVE DIRECTOR

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

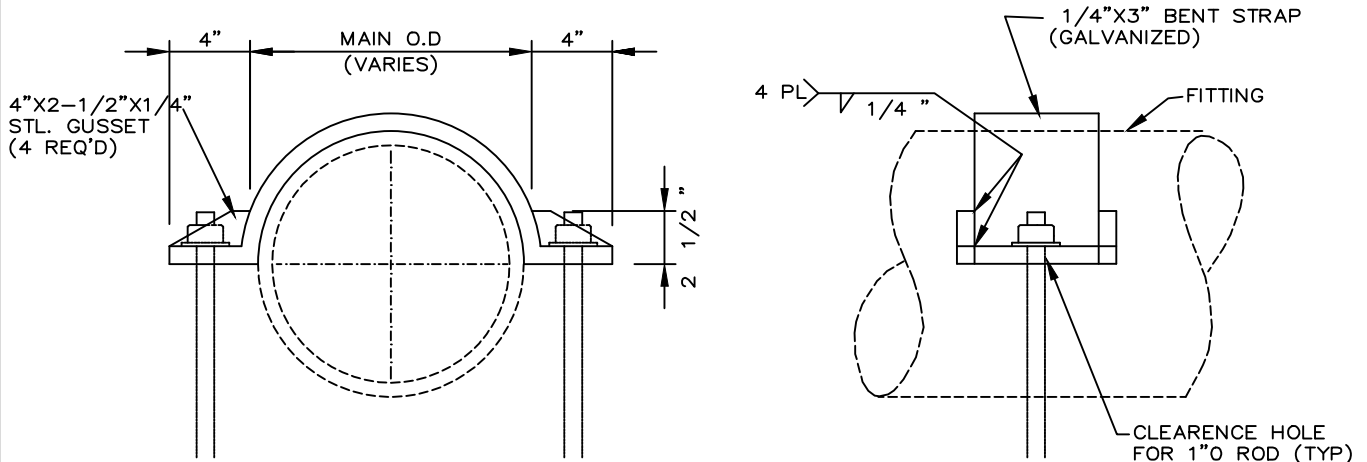
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GRAVITY BLOCKS
FOR PRESSURE PIPING

PAGE No
D14

PIPE DIA. "D"	VERTICAL CREST											
	DEGREE OF BEND											
	11 1/4°			22 1/2°			45°			90°		
	"W"	"L"	"H"	"W"	"L"	"H"	"W"	"L"	"H"	"W"	"L"	"H"
6"	36"	16"	18"	36"	24"	24"	48"	28"	30"	54"	36"	36"
8"	48"	20"	20"	48"	30"	24"	54"	36"	36"	60"	46"	48"
12"	54"	24"	30"	54"	36"	40"	66"	48"	48"	72"	60"	60"
24"	72"	48"	48"	76"	60"	66"	96"	72"	84"	—	—	—

PIPE DIA. "D"	VERTICAL SAG											
	DEGREE OF BEND											
	11 1/4°			22 1/2°			45°			90°		
	"W"	"L"	—	"W"	"L"	—	"W"	"L"	—	"W"	"L"	—
6"	6"	36"	—	6"	36"	—	18"	36"	—	24"	36"	—
8"	8"	36"	—	12"	36"	—	24"	36"	—	36"	36"	—
12"	18"	36"	—	30"	36"	—	42"	42"	—	54"	48"	—
16"	36"	36"	—	48"	48"	—	60"	60"	—	72"	72"	—
24"	48"	42"	—	60"	54"	—	78"	78"	—	96"	96"	—
36"	60"	54"	—	84"	78"	—	96"	96"	—	120"	120"	—



STRAP DETAIL

NOTES:

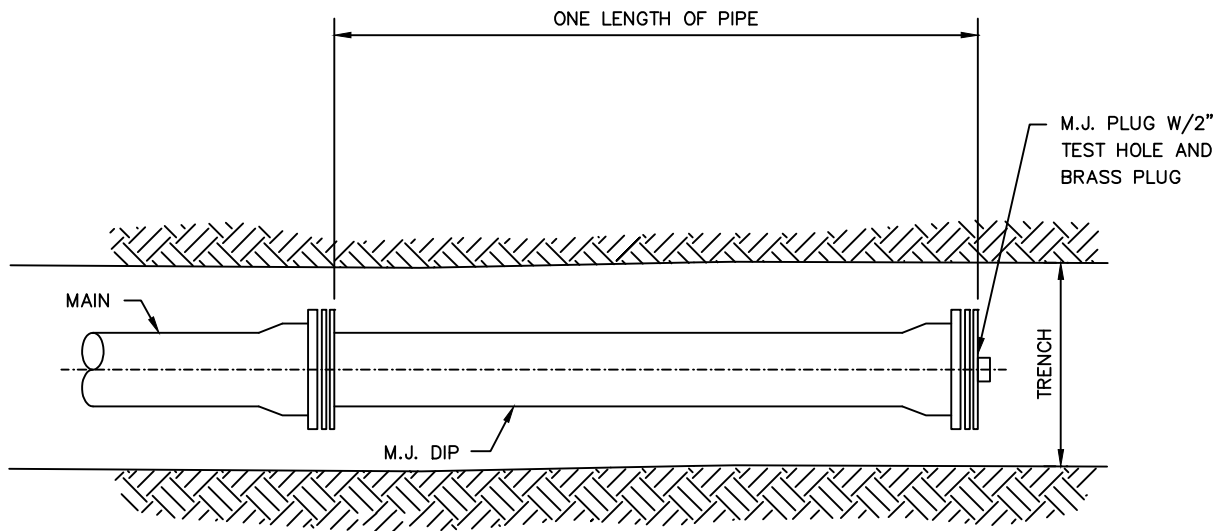
1. GUSSETS REQ'D FOR 16"O AND LARGER MAINS.
2. STRAPS WITH GUSSET TO BE GALVANIZED AFTER WELDING.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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GRAVITY BLOCKS
FOR PRESSURE PIPING

PAGE No
D14A



PLAN

NOTES:

1. TERMINAL END SHALL BE MECHANICALLY RESTRAINED IN ACCORDANCE WITH OUA STANDARD DETAILS. THE NUMBER OF PIPE LENGTHS TO BE RESTRAINED SHALL BE IN ACCORDANCE WITH THE RESTRAINED JOINT TABLES.
2. SEE D9 FOR BLOW-OFF DETAILS.

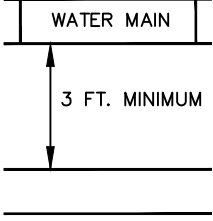
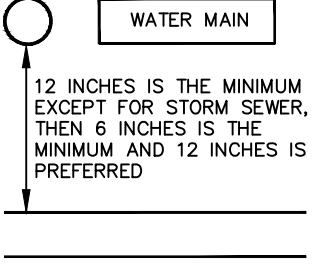
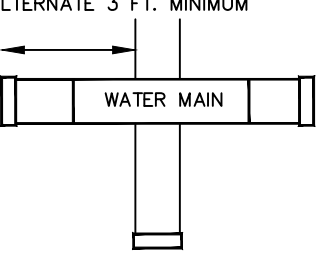
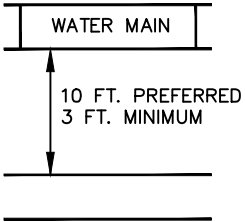
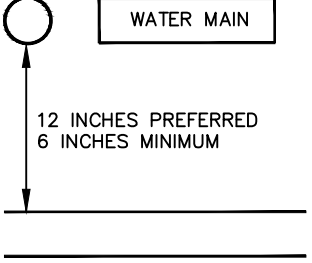
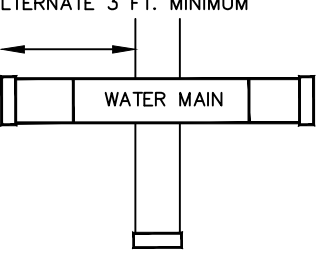
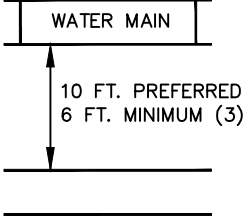
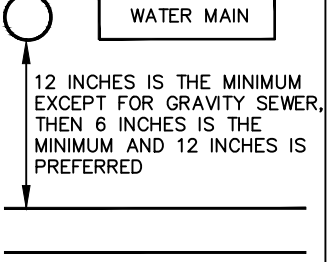
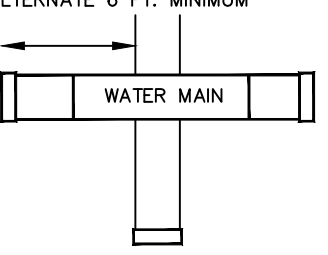
OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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TERMINAL END DETAIL

PAGE No
D15

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH F.A.C. RULE 62-555.314

OTHER PIPES	HORIZONTAL SEPERATION	CROSSING (1)	JOINT SPACING @ CROSSINGS (FULL JOINT CENTERED)
STORM SEWER, STORMWATER FORCE MAIN, RECLAIM WATER (2)			
VACUUM SANITARY SEWER			
GRAVITY OR PRESSURE SANITARY SEWER, SANITARY SEWER FORCEMAIN RECLAIM WATER (4)			
ON-SITE SEWAGE TREATMENT & DISPOSAL	10 FT. MINIMUM	---	---

FAC RULE 62-555.314 NOTES:

1. WATERMAIN TO CROSS OVER CONFLICT PIPES WHEREVER POSSIBLE, MAINTAINING 30 INCHES COVER AND 6 INCHES SEPARATION AS MINIMUMS. WHEN WATER MAIN MUST BE BELOW OTHER PIPE, THE MIN. SEPARATION IS 12 INCHES.
2. RECLAIMED WATER REGULATED UNDER PART III OF CHAPER 62-610, F.A.C.
3. 3 FT FOR GRAVITY SANITARY SEWER WHERE THE BOTTOM OF THE WATER IS LAID AT LEAST 6 INCHES ABOVE THE TOP OF THE GRAVITY SANITARY SEWER.
4. RECLAIMED WATER NOT REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C.

NOTES:

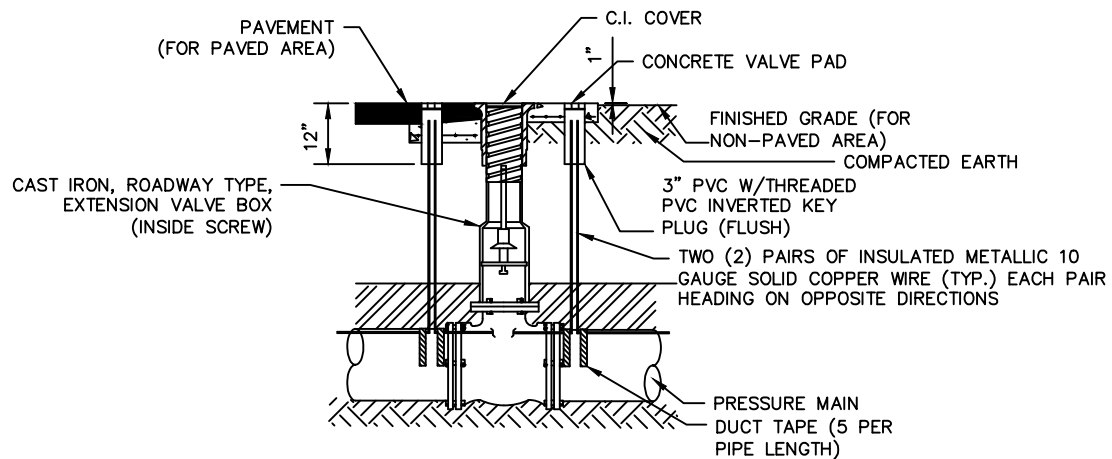
- A. THESE METHODS ARE TO BE USED WHEN INSUFFICIENT COVER EXISTS TO ALLOW PRESSURE PIPE TO CROSS ABOVE CONFLICT PIPE WITH 6 INCHES VERTICAL SEPARATION AND MAINTAIN 30 INCHES COVER TO FINISHED GRADE.
- B. FITTINGS SHALL BE RESTRAINED WITH MECHANICAL RESTRAINTS (MEGALUG). IN ACCORDANCE WITH OUA STANDARD DETAILS.
- C. THE DEFLECTION TYPE CROSSING IS PREFERRED.
- D. DO NOT EXCEED 75% OF MANUFACTURERS RECOMMENDED MAXIMUM JOINT DEFLECTION.
- E. MECHANICALLY RESTRAIN ALL FITTINGS, AS PER MANUFACTURERS RECOMMENDATION AND OUA STANDARD DETAILS.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

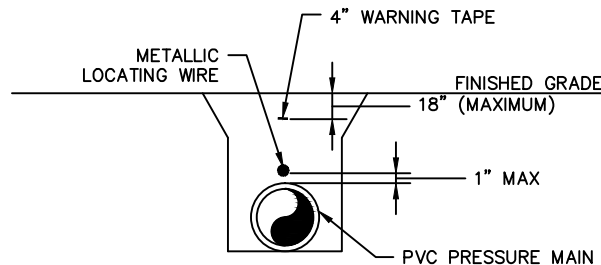
REVISION
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WATER MAIN – SANITARY SEWER
CONFLICT

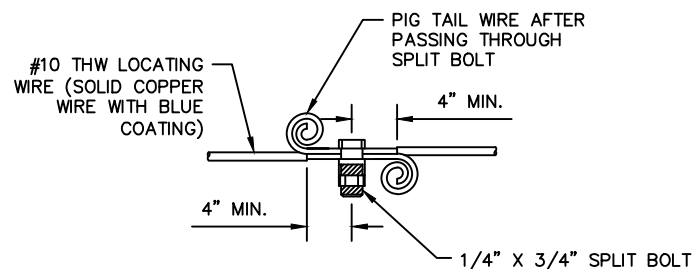
PAGE No
D16



1. ALL PVC PIPE SHALL REQUIRE TWO PAIRS OF INSULATED METALLIC LOCATING WIRES (10 GAUGE SOLID COPPER) TAPED WITH 2" WIDE DUCT TAPE TO TOP CENTERLINE OF THE PIPE AT EVERY JOINT AND AT 4 ADDITIONAL EQUALLY SPACED POINTS PER LENGTH OF PIPE.
2. LOCATING WIRES TO TERMINATE ON EACH END AT A VALVE BOX, 4" ABOVE GROUND AND FOLDED BACK INSIDE VALVE BOX.
3. LOCATING WIRES SHALL BE CAPABLE OF DETECTION BY A CABLE LOCATOR AND PASS A FIELD CONDUCTIVITY TEST, OBSERVED BY THE O.U.A., FROM END TO END OF WIRES.
4. SPLICES SHALL BE CAPABLE OF COMPLETE SUBMERSION, SUCH AS BUTT SPLICE WITH RAYCHEM HEAT SHRINK TUBING.
5. NO MORE THAN ONE SPLICE IN LOCATING WIRES BETWEEN VALVES IS ALLOWED.
6. PROVIDE POTTING COMPOUND AT TRACER WIRE JUNCTIONS AND SPLICES.
7. THE ENDS OF ALL LOCATING WIRES, WHETHER THEY ARE SPLICED, CONNECTED, OR TERMINATED, SHALL HAVE THE LAST THREE INCHES PIG TAILED AS DETAILED HEREON.



PVC PIPE LOCATING WIRE



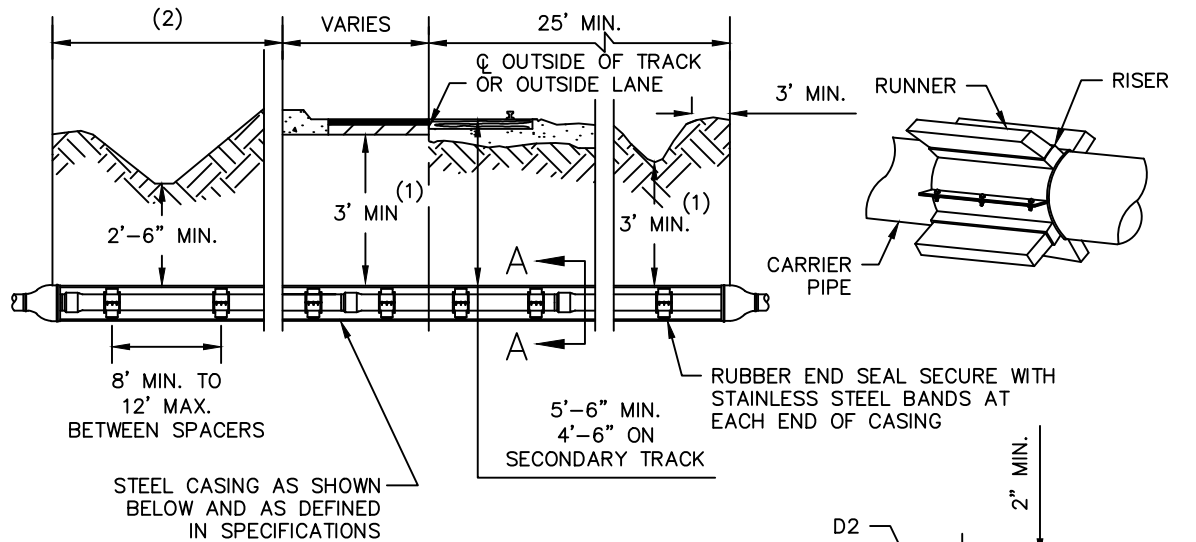
LOCATING WIRE DETAIL

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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LOCATING WIRE DETAILS
FOR ALL ROAD CROSSINGS AND BORES

PAGE No
D17



NOTES:

- (1) VERTICAL DIMENSIONS TYPICAL FOR CASINGS.
- (2) WITH CURB: 6' STATE & 2' CITY ROADS MINIMUM WITHOUT CURB: 8' STATE & 4' CITY ROADS MINIMUM.
- (3) STEEL CASING PIPE SHALL CONFORM TO THE REQUIREMENTS OF AWWA C-200 AND ASTM A-139, GRADE B.
- (4) WHEN CASING IS INSTALLED WITHOUT BENEFIT OF A PROTECTIVE COATING, AND SAID CASING IS NOT CATHODICALLY PROTECTED, THE WALL THICKNESS SHOWN SHALL BE INCREASED TO THE NEAREST STANDARD SIZE WHICH IS A MINIMUM OF 0.063" GREATER THAN THE THICKNESS SHOWN EXCEPT FOR DIAMETERS LESS THAN 12.75".
- (5) FOR CONFLICTS BETWEEN THESE DETAILS AND PERMITTING AGENCIES, FOLLOW PERMITTING REQUIREMENTS.

- (6) PRESSURE MAIN TO BE RESTRAINED WITH MANUFACTURERS RESTRAINED JOINTS THROUGH CASING. USE (3) SS CASING SPACER CENTERED ON EACH PIPE LENGTH. TIMBER SKIDS ARE OPTIONAL.

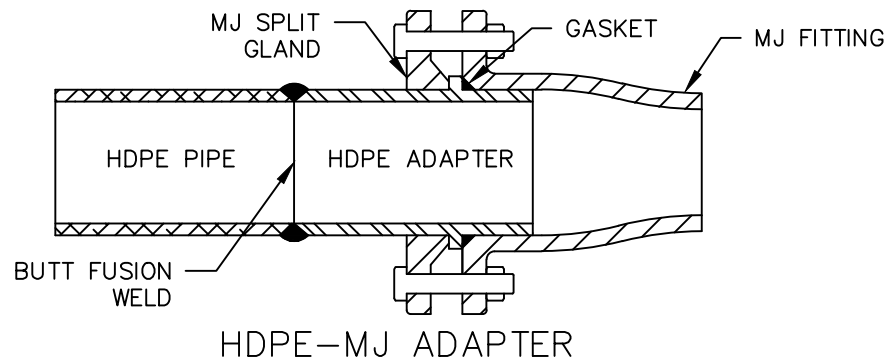
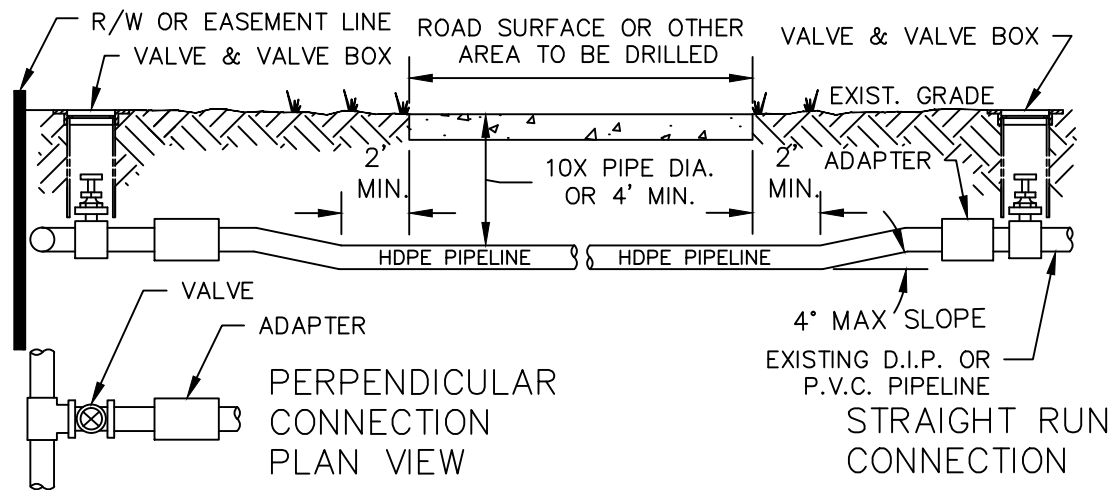
MINIMUM CASING SIZE AND THICKNESS																			
D.I.P.—M.J.	—	—	—	4"	6"	—	8"	10"	12"	14"	16"	18"	20"	—	24"	30"	36"	42"	48"
D.I.P.—P.O.	—	—	4"	—	6"	8"	10"	12"	—	14"	16"	18"	20"	24"	—	30"	36"	42"	48"
P.V.C.	—	—	4"	6"	—	8"	10"	12"	—	—	—	—	—	—	—	—	—	—	—
(3) STEEL CASING PIPE (D2)	8"(5)	10"	12"	14"	16"	18"	20"	24"	24"	30"	30"	30"	36"	36"	42"	48"	54"	60"	66"
WALL THICKNESS (T) ROADS	.188"	.188"	.188"	.250"	.250"	.250"	.250"	.250"	.250"	.312"	.312"	.312"	.375"	.375"	.500"	.500"	.500"	.500"	.500"
(4) WALL THICKNESS (T) R.R.	.188"	.188"	.188"	.219"	.219"	.250"	.281"	.344"	.344"	.406"	.406"	.406"	.469"	.469"	.500"	—	—	—	—

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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JACK AND BORE DETAIL

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D18



NOTES:

1. DIRECTIONAL DRILLS SHALL BE COMPLETED USING DR11 HDPE PIPE,
DIP SIZE: FOR WATER AND SANITARY FORCE MAIN
IPS SIZE: FOR VACUUM SEWER.
2. ALL DIRECTIONAL DRILLS SHALL BE AT A DEPTH OF 10X PIPE DIAMETER BELOW THE
ROADWAY SURFACE OR 4' WHICHEVER IS GREATER.
3. ALL HDPE MUST BE COLOR CODED (SAFETY BLUE-WATER, SAFETY GREEN FOR SEWER AND
PANTONE PURPLE FOR RECLAIMED WATER); BUTT FUSION WELDED; AND CONNECTED WITH
HDPE-MJ ADAPTER.
4. 10 GAUGE SOLID COPPER LOCATING WIRES SHALL BE TAPED TO PIPE FROM VALVE TO VALVE
AT A SPACING NO GREATER THAN 5 FEET AND PULLED WITH THE PIPE. SEE D17 FOR
ADDITIONAL DETAILS.
5. GRAVITY SEWER BORES AS PREAPPROVED BY OUA.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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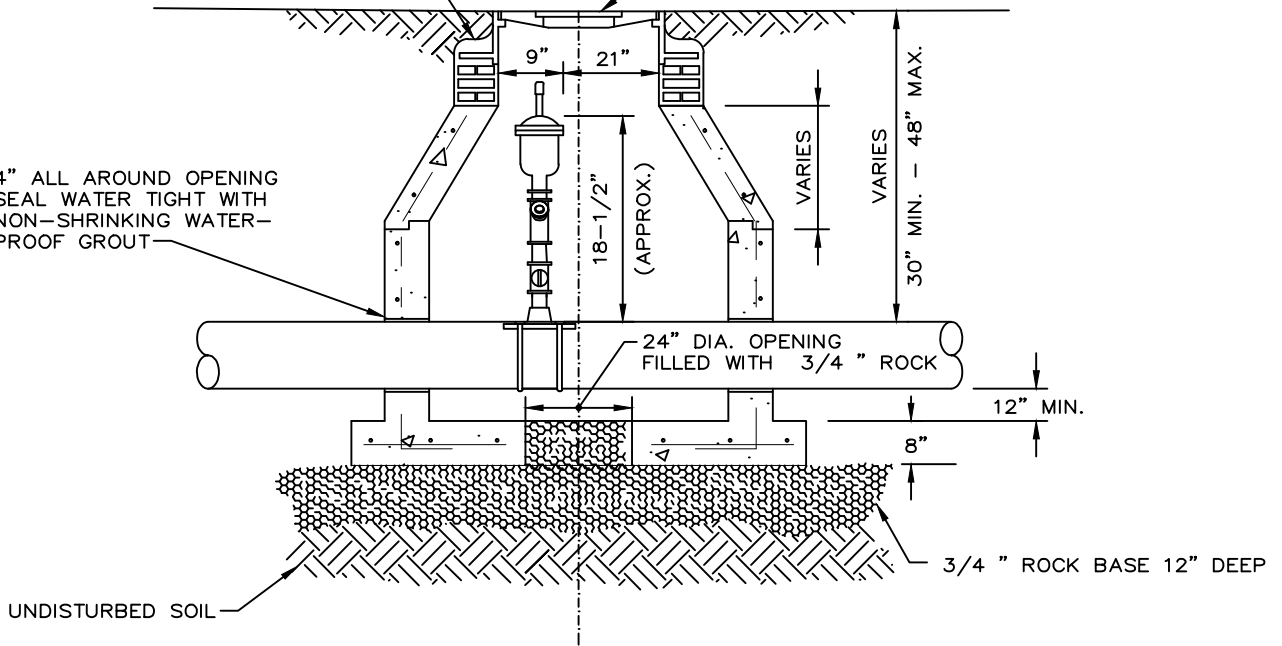
DIRECTIONAL DRILLING DETAIL

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D19

ADJUST WITH COURSE(S) OF BRICK AND MORTAR TO BRING TO GRADE (MIN. 2 COURSES OF BRICK - 6") (MAX. 5 COURSES OF BRICK - 18")

"WATER" TO BE CAST IN COVER (SEE "MANHOLE FRAME AND COVER - 30" OPENING" DETAIL)

4" ALL AROUND OPENING SEAL WATER TIGHT WITH NON-SHRINKING WATER-PROOF GROUT



FINISHED GRADE

PRECAST CONCRETE CONCENTRIC MANHOLE SECTION

1" CHECK VALVE

1" CORPORATION STOP

DOUBLE STRAP TAPPING SADDLE

STANDARD PRECAST MANHOLE SECTION (4'-0" DIA.) AND SLAB TO BE CAST MONOLITHICALLY

SCREW-ON PVC SCH. 80 OR BRASS FITTING

AUTOMATIC AIR RELEASE VALVE PER O.U.A. STANDARDS

BRONZE OR STAINLESS STEEL FITTINGS

#4 REBAR @ 12" O.C. EACH WAY (TYP.)

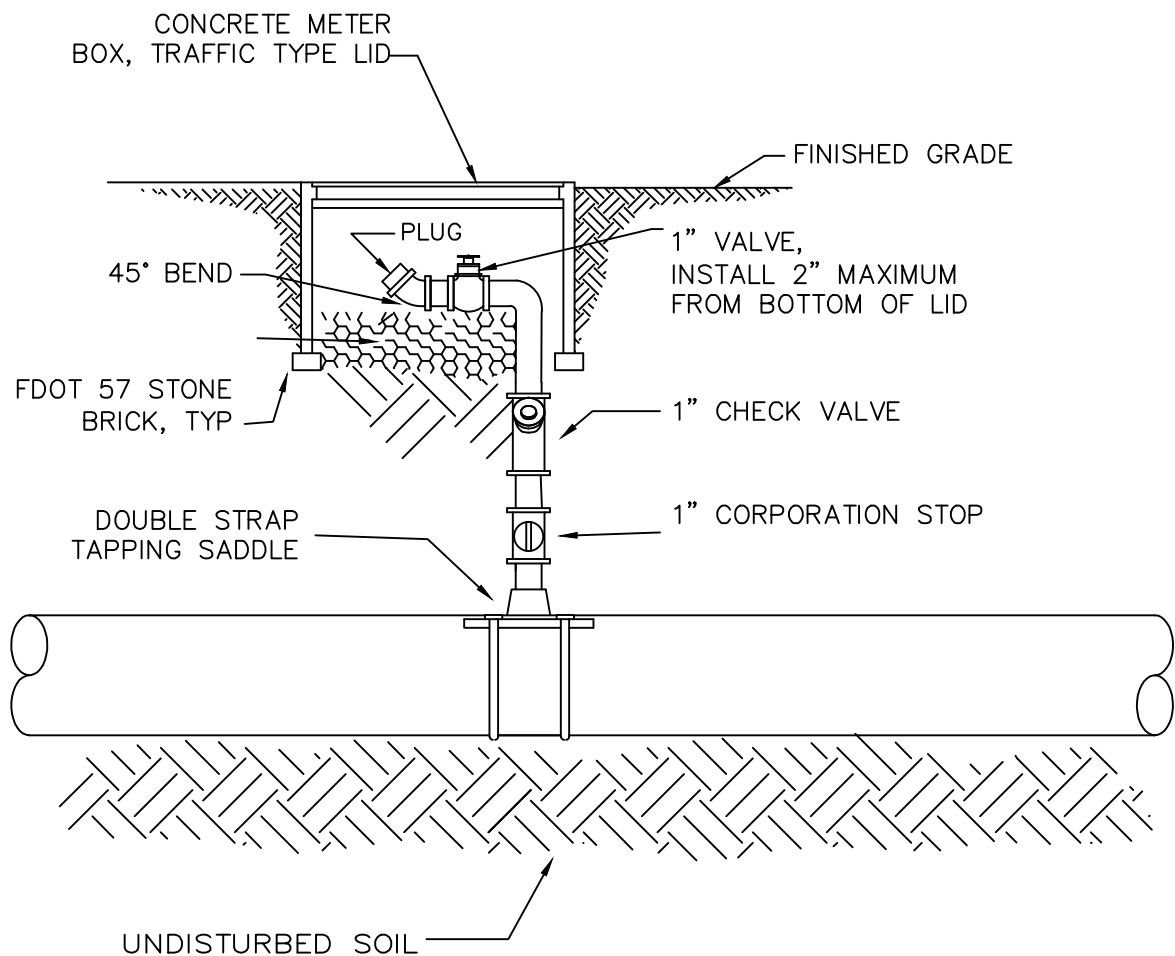
ONLY APPLICABLE WHERE IT CAN BE DEMONSTRATED THAT VENT IS A MINIMUM OF 18" ABOVE 100 YEAR FLOOD ELEVATION (PER FDEP)

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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AIR RELEASE VALVE (UNDERGROUND WATERMAIN)

PAGE No
D20



GENERAL NOTES:

1. ALL FITTINGS AND PIPING TO BE BRASS.
2. ALL FITTINGS AND APPURTENANCES TO MEET AWWA SPECIFICATIONS AND/OR HAVE NSF APPROVAL.
3. MANUAL AIR RELEASE VALVE REQUIRED IN AREAS LESS THAN 18 INCHES ABOVE 100 YEAR FLOOD ZONE.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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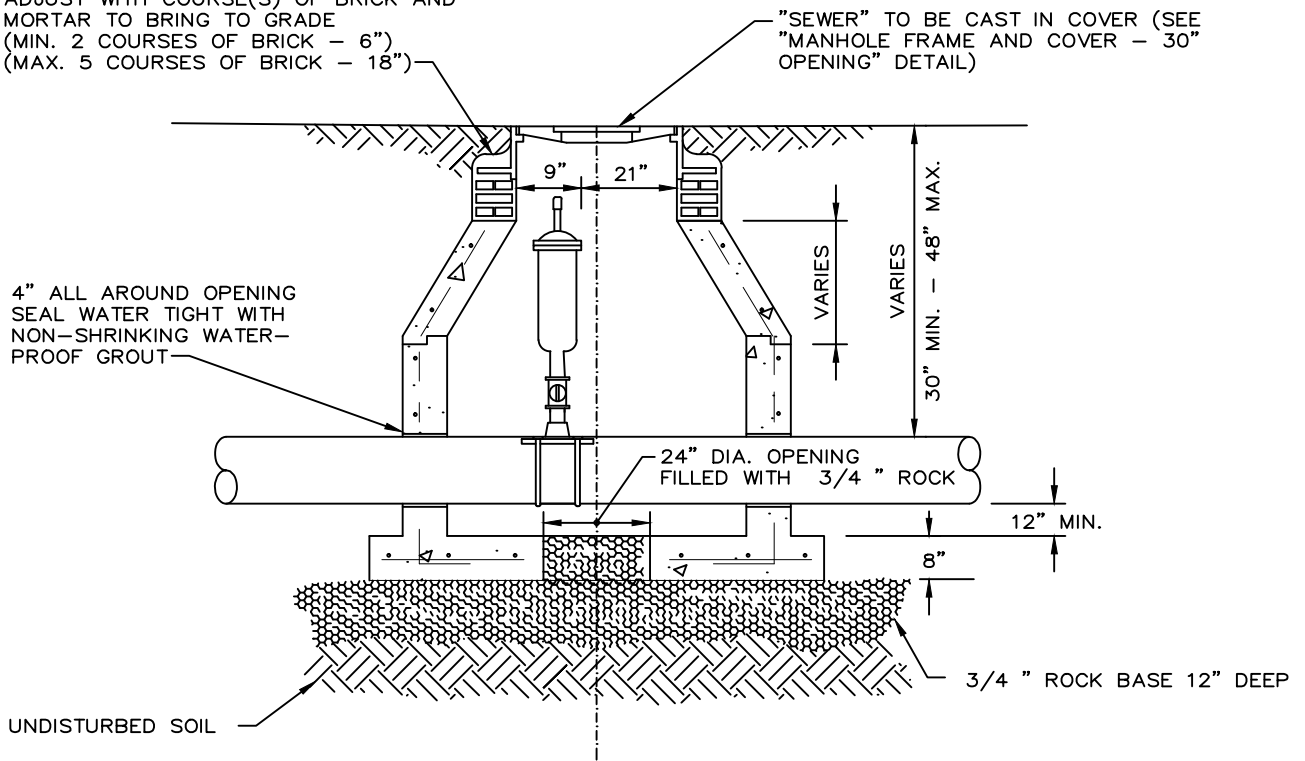
AIR RELEASE VALVE, MANUAL
POTABLE WATER MAIN

PAGE No
D20A

ADJUST WITH COURSE(S) OF BRICK AND MORTAR TO BRING TO GRADE (MIN. 2 COURSES OF BRICK - 6") (MAX. 5 COURSES OF BRICK - 18")

"SEWER" TO BE CAST IN COVER (SEE "MANHOLE FRAME AND COVER - 30" OPENING" DETAIL)

4" ALL AROUND OPENING SEAL WATER TIGHT WITH NON-SHRINKING WATER-PROOF GROUT



FINISHED GRADE

PRECAST CONCRETE CONCENTRIC MANHOLE SECTION

SCREW-ON PVC SCH. 80 OR BRASS FITTING

AUTOMATIC AIR RELEASE VALVE PER O.U.A. STANDARDS

2" BALL VALVE WITH BRASS NIPPLE BETWEEN SADDLE AND VALVE.

DOUBLE STRAP TAPPING SADDLE

STANDARD PRECAST MANHOLE SECTION (4'-0" DIA.) AND SLAB TO BE CAST MONOLITHICALLY

#4 REBAR @ 12" O.C. EACH WAY (TYP.)

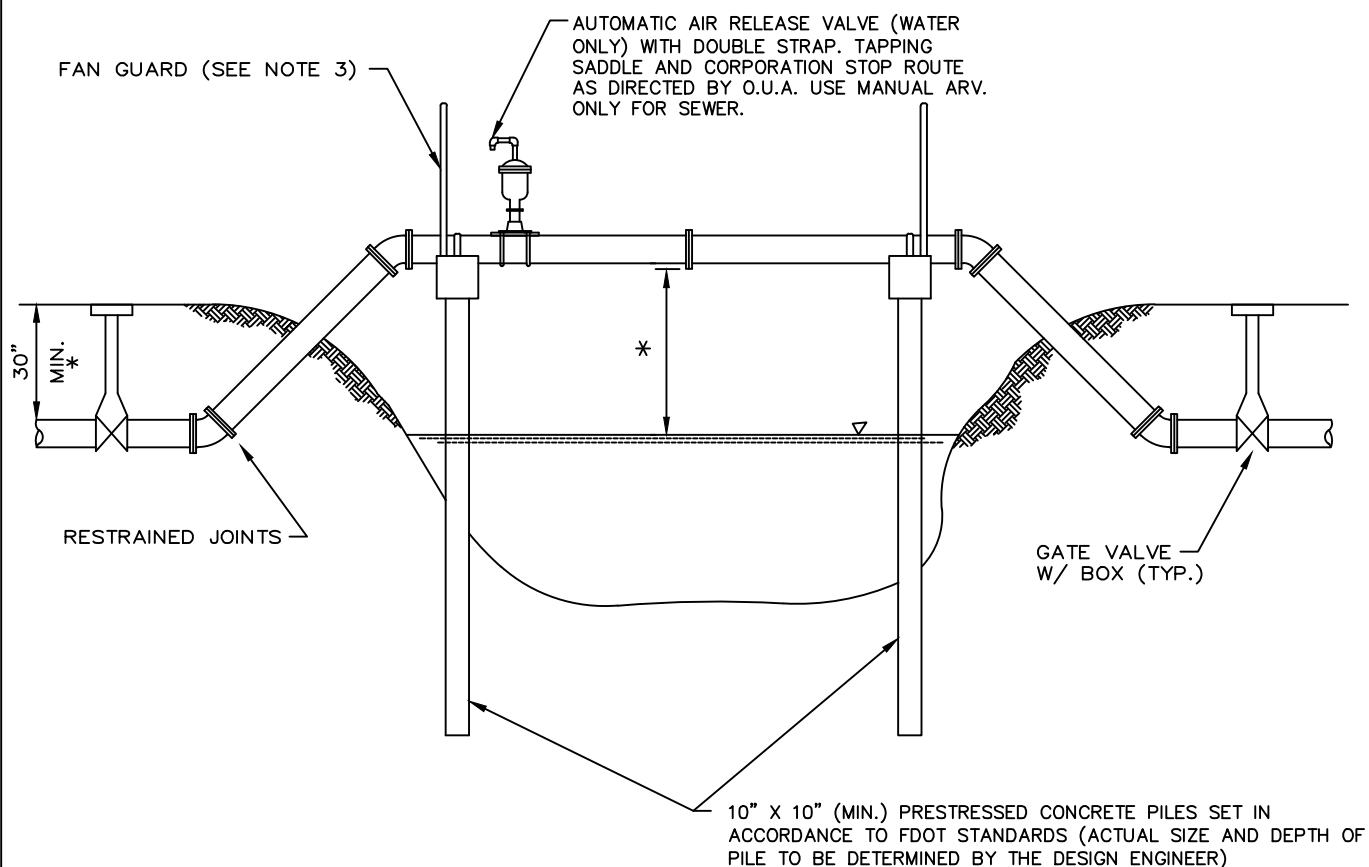
OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS
ONLY APPLICABLE WHERE IT CAN BE DEMONSTRATED THAT VENT IS A
MINIMUM OF 18" ABOVE 100 YEAR FLOOD ELEVATION (PER FDEP)

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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AIR RELEASE VALVE (UNDERGROUND FORCE MAIN)

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NOTES:

1. ALL EXPOSED PIPE SHALL BE DUCTILE IRON WITH FLANGED FITTINGS. RETAINER GLANDS AND UNIFLANGE TYPE FITTINGS ARE NOT ALLOWED. O-RING GASKETS ARE REQUIRED FOR FLANGED FITTINGS AND JOINTS.
2. SPAN LENGTHS AS REQUIRED BY PERMITTING AGENCY AND IN ACCORDANCE WITH PIPE MANUFACTURERS RECOMMENDATION.
3. FAN GUARDS ARE REQUIRED. SEE "TYPICAL FAN GUARD" DETAIL.
4. PIPE SHALL BE CRADLED ON NEOPRENE, 1/2 " THICK MINIMUM.
5. TIE-DOWN STRAPS SHALL FIT PROPERLY AND SECURE PIPE IN CRADLE.
6. PIPE CRADLE IN CAP SHALL CONTACT 1/2 CIRCUMFERENCE OF PIPE.
7. SHOW ULTIMATE CANAL SECTION AND RELEVANT ELEVATIONS AND DISTANCES ON THIS DETAIL.
8. STAINLESS STEEL (316) REQUIRED FOR ALL STRAPS, SADDLES, FLANGE BOLTS, NUTS AND OTHER HARDWARE FOR INSTALLATIONS OVER ALL WATER BODIES (ANTI-GALL COMPOUND TO BE USED WHEN ASSEMBLING STAINLESS STEEL NUTS AND BOLTS).
9. LENGTH OF SPAN WILL DETERMINE NUMBER OF PILES REQUIRED.
10. AERIAL CROSSING TO BE COATED PER F.D.O.T. SPECIFICATIONS ON PIPING ATTACHED TO BRIDGE STRUCTURES.
11. ALL ABOVE GRADE PIPING AND APPURTENANCES (ACCEPT FOR THE FAN GUARD) SHALL BE COATED IN ACCORDANCE WITH OUA STANDARDS.

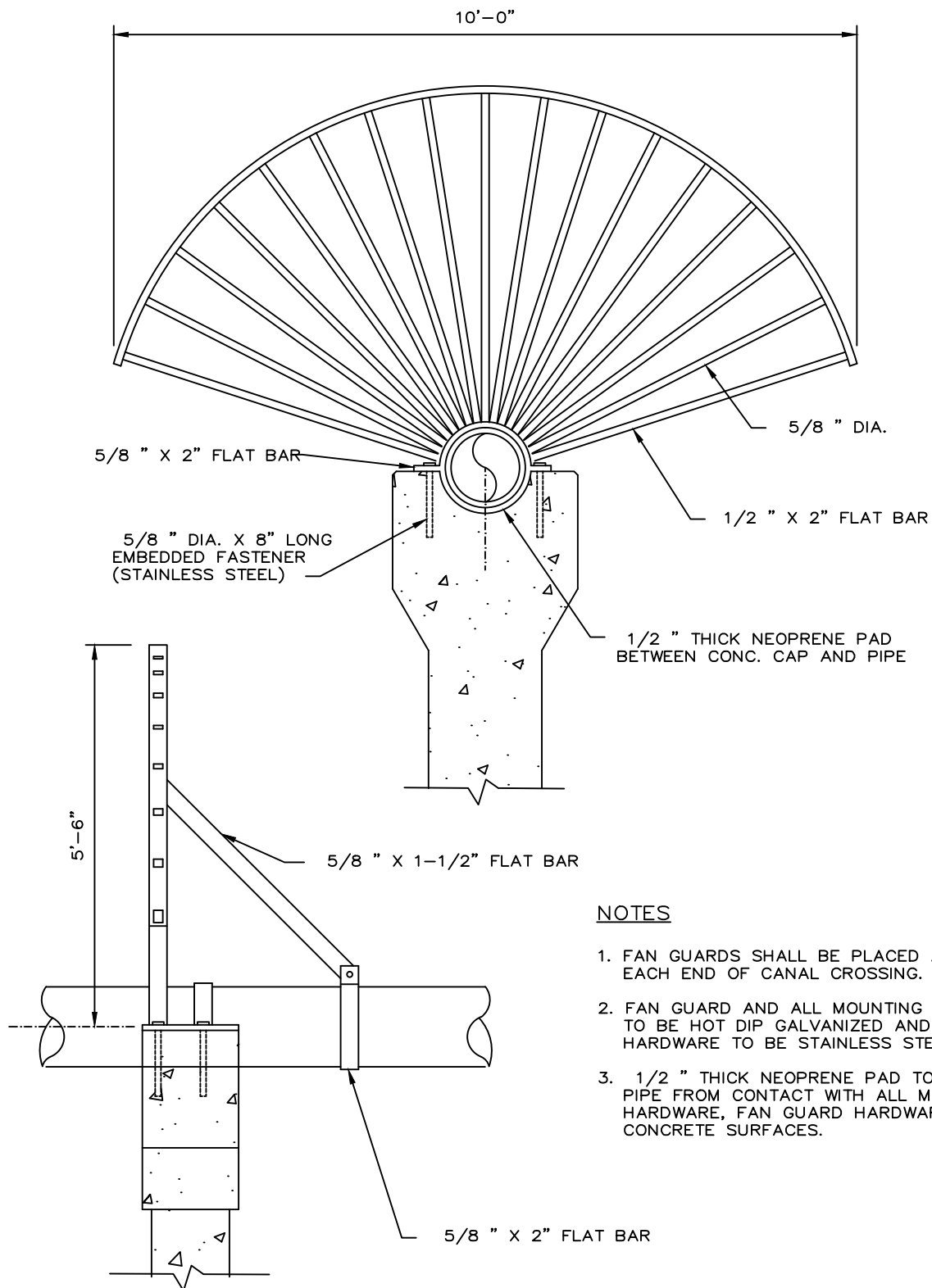
* PER REGULATORY AGENCY

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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CANAL CROSSING (AERIAL)

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D22



NOTES

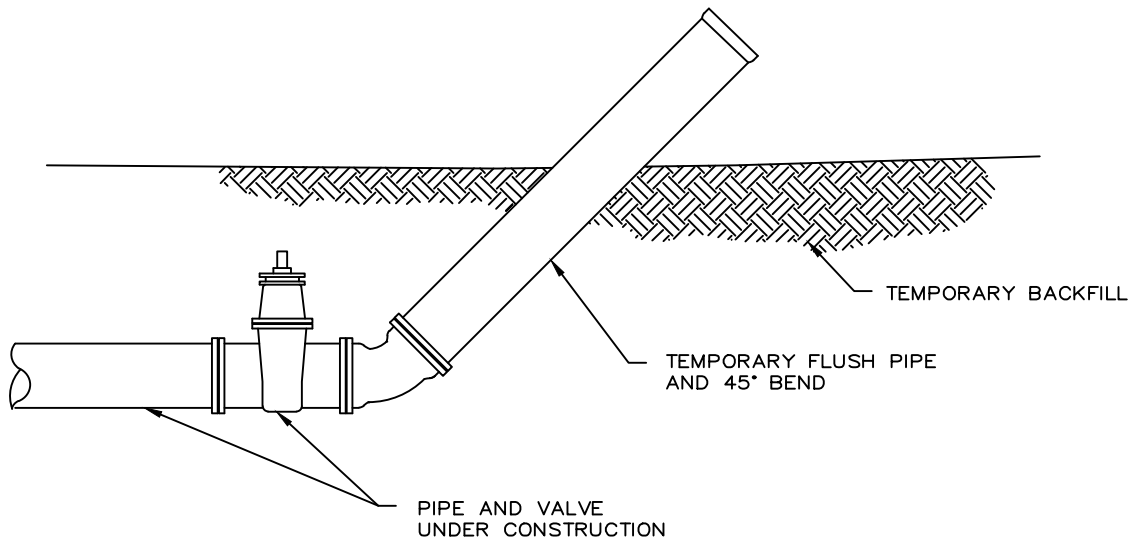
1. FAN GUARDS SHALL BE PLACED AT EACH END OF CANAL CROSSING.
2. FAN GUARD AND ALL MOUNTING BRACKETS TO BE HOT DIP GALVANIZED AND MOUNTING HARDWARE TO BE STAINLESS STEEL.
3. 1/2" THICK NEOPRENE PAD TO INSULATE PIPE FROM CONTACT WITH ALL MOUNTING HARDWARE, FAN GUARD HARDWARE, AND CONCRETE SURFACES.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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TYPICAL FAN GUARD

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D23



NOTES:

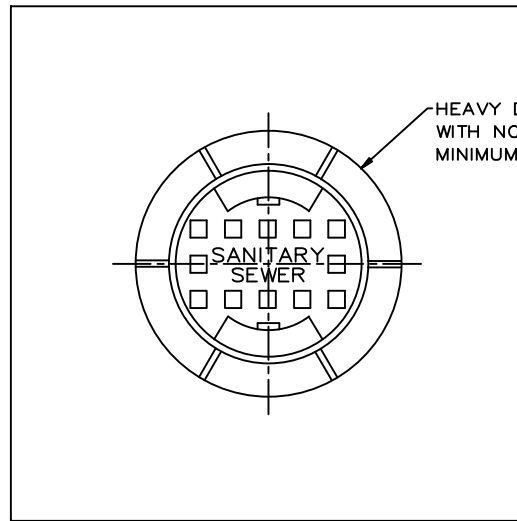
1. UPON COMPLETION OF THE PIPE INSTALLATION FOR ANY SECTION, THE MAINS SHALL BE CANNON FLUSHED TO REMOVE DIRT AND ANY OTHER FOREIGN MATTER BY ACHIEVING A MINIMUM VELOCITY OF 2.5 FEET PER SECOND IN THE PIPE. MAINS MAY BE EITHER TEMPORARILY LAID ABOVE GRADE OR TEMPORARY FITTINGS, PIPE ETC. MAY BE USED TO FACILITATE CANNON FLUSHING.
2. INSTALL A 45° BEND AND ASSOCIATED PIPING AS SHOWN TO DIRECT THE FLUSHING WATER AWAY FROM THE IMMEDIATE WORK AREA AND EXERCISE DUE CARE SO AS TO ENSURE THAT THE WATER USED IN FLUSHING DOES NOT CAUSE A NUISANCE OR INFLECT PROPERTY DAMAGE.
3. BENDS AND PIPING SHALL BE THE SAME SIZE AS THE LINE TO BE FLUSHED.
4. PRIOR TO THE ACTUAL LINE FLUSHING OPERATION. THE CONTRACTOR SHALL PROPERLY NOTIFY THE OUA INSPECTOR OF SUCH INTENDED WATER USE, MINIMUM OF 48 HOURS TO ALLOW COORDINATION WITH WATER PLANT OPERATIONS.
5. NO EXISTING VALVES SHALL BE TURNED ON OR OFF, EXCEPT BY AUTHORIZED OUA PERSONNEL.
6. FLUSHING SHALL NOT BE ACCOMPLISHED WITHOUT THE ACTUAL PRESENCE OF THE OUA INSPECTOR.
7. AFTER THE LINE UNDER CONSTRUCTION HAS BEEN SUCCESSFULLY FLUSHED THE CONTRACTOR SHALL REMOVE THE TEMPORARY PIPING ARRANGEMENT AND PROCEED WITH THE REMAINING CONSTRUCTION AS SPECIFIED.
8. ALL PIPING SHALL BE MECHANICALLY RESTRAINED IN ACCORDANCE WITH OUA STANDARDS. THE NUMBER OF PIPE LENGTHS TO BE RESTRAINED SHALL BE PER MANUFACTURERS RECOMMENDATION.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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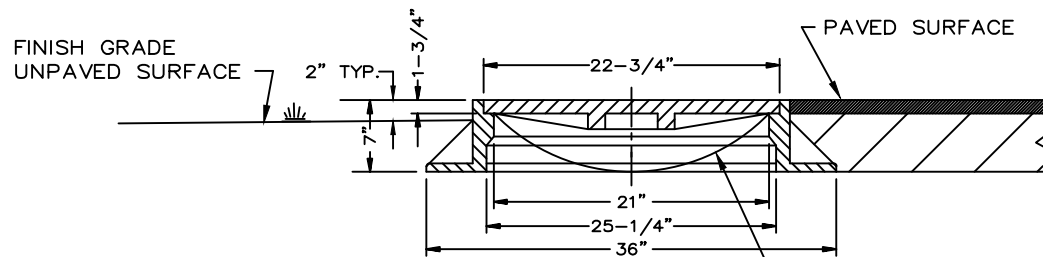
CANNON FLUSHING AND PIGGING DETAIL

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D24



HEAVY DUTY C.I. FRAME AND COVER,
WITH NON-PENETRATING PICK HOLES;
MINIMUM WEIGHT 334 POUNDS;

PLAN



SECTION

NOTES:

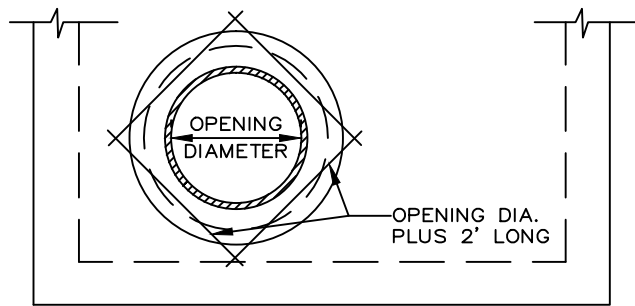
1. A WATER-TIGHT MANHOLE "RAIN GUARD" INSERT SHALL BE INSTALLED IN ALL MANHOLES.
2. A 3'X3'X6" CONCRETE COLLAR SHALL BE INSTALLED WHERE MANHOLE IS INSTALLED IN UNPAVED AREAS
3. "SANITARY SEWER" FOR WASTEWATER APPLICATIONS.
4. "WATER" FOR WATER APPLICATIONS.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

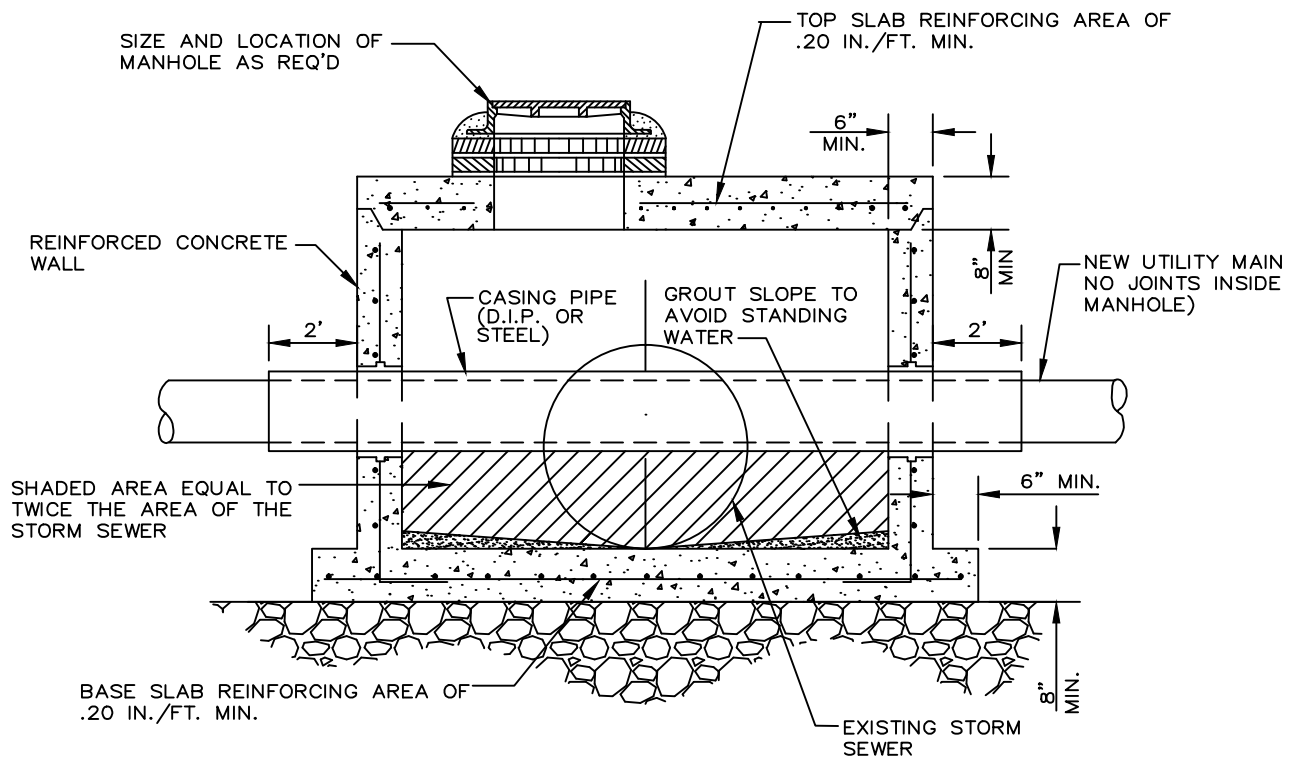
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STANDARD MANHOLE FRAME AND COVER

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PARTIAL PLAN



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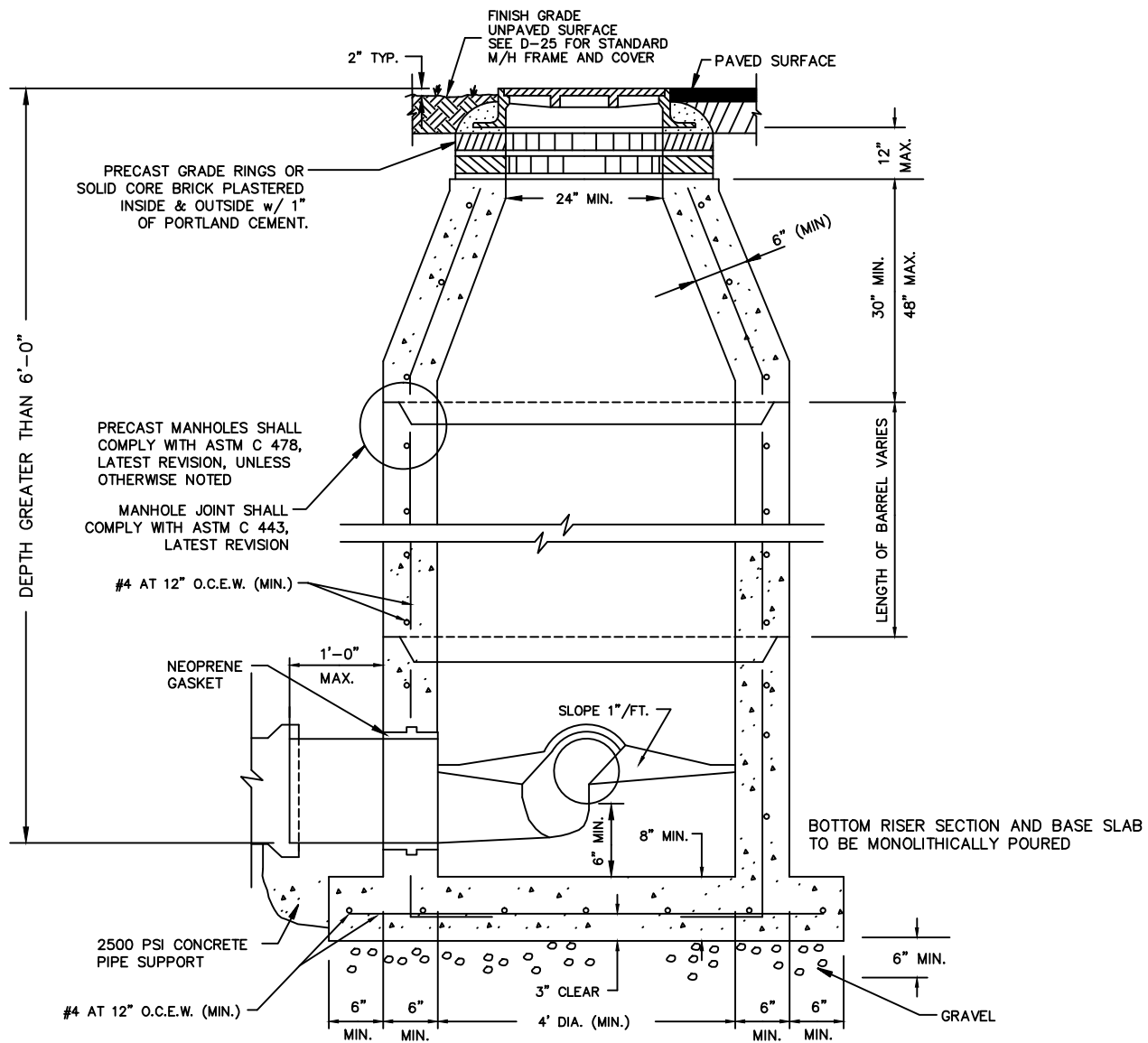
1. WHERE CONDITIONS PERMIT THE LOWEST POINT OF CONFLICT MAIN AT OR ABOVE CENTER LINE OF STORM SEWER.
2. CONFLICT MANHOLES WILL BE ALLOWED WHERE DESIGN PROBLEMS AND ECONOMICS PROVE THEM TO BE THE ONLY VIABLE SOLUTION AS APPROVED BY O.U.A.
3. CONFLICT MANHOLES WILL NOT BE ALLOWED FOR WATER MAINS CROSSING GRAVITY WASTEWATER SYSTEMS.
4. COAT INTERIOR & EXTERIOR WITH 2 COATS COAL TAR EPOXY, OR PRO-TECH COATING, 8 MIL. MIN. FRY FILM THICKNESS EACH COAT OR OUA APPROVED EQUAL.

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CONFLICT MANHOLE

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NOTES:

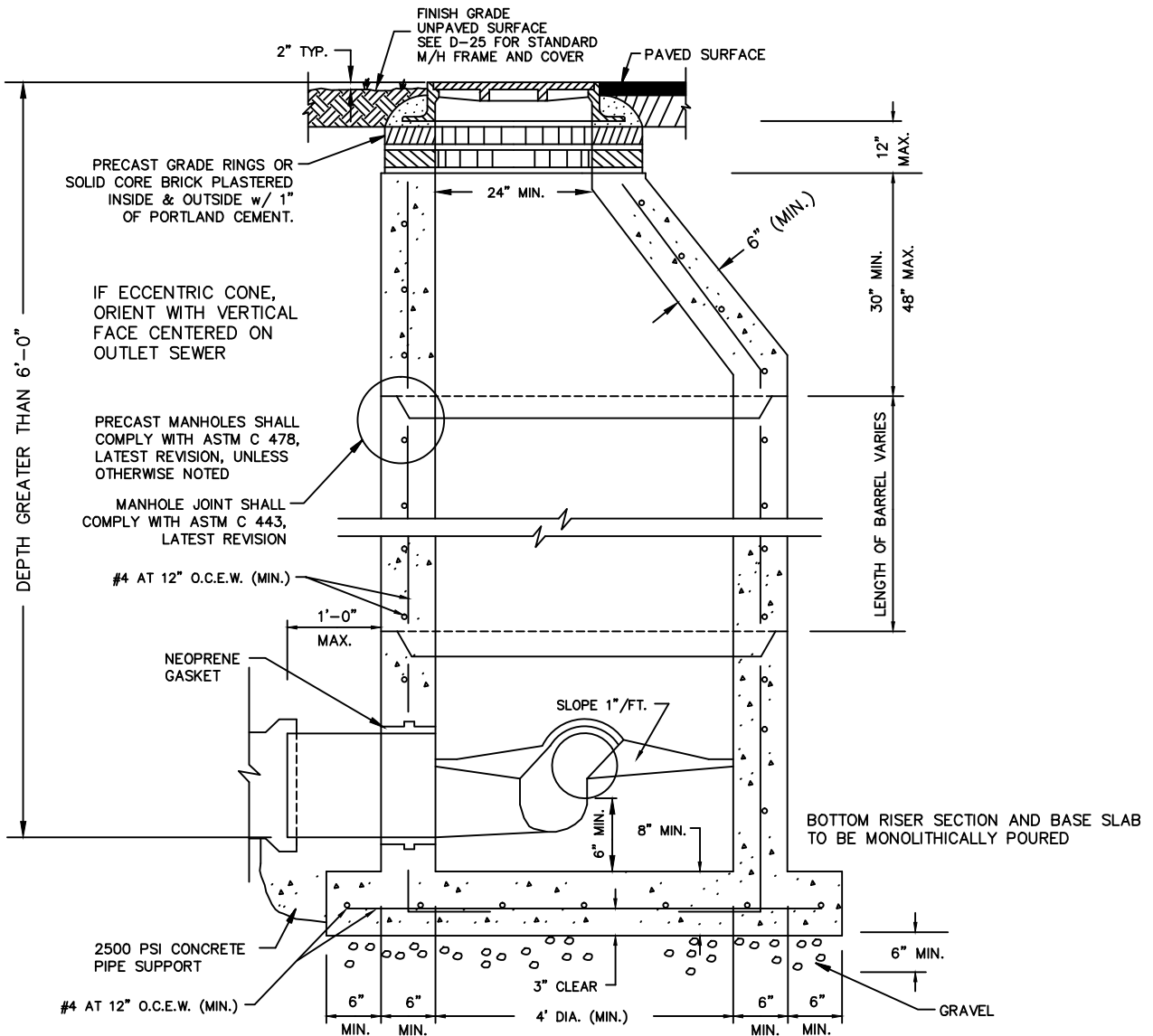
1. PRECAST CONCRETE TYPE II 4000 P.S.I.
2. "RAMNEK" OR EQUAL AT ALL RISER JOINTS (1/2" THICK WITH WIDTH AT LEAST 1/2 THE WALL THICKNESS) WITH GROUT INSIDE AND OUTSIDE.
3. ALL OPENINGS SHALL BE SEALED WITH A WATERPROOF NON-SHRINKING GROUT.
4. FLOW CHANNELS SHALL BE CONSTRUCTED TO DIRECT INFLUENT INTO FLOW STREAM (SEE DETAIL).
5. LIFT HOLES ARE PERMITTED AND SHALL BE SEALED AFTER PLACEMENT OF RISER.
6. ALL PIPE HOLES SHALL BE PRECAST OR CORE-DRILLED.
7. APPROVED RUBBER BOOTS MUST BE USED WITH PVC PIPE.
8. INSIDE DROPS SHALL NOT EXCEED 2.0 FEET.
9. COAT INTERIOR & EXTERIOR WITH 2 COATS COAL TAR EPOXY, OR PRO-TECH COATING, 8 mil. MIN. DRY FILM THICKNESS EACH COAT OR OUA APPROVED EQUAL.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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STANDARD MANHOLE (CONCENTRIC CONE)

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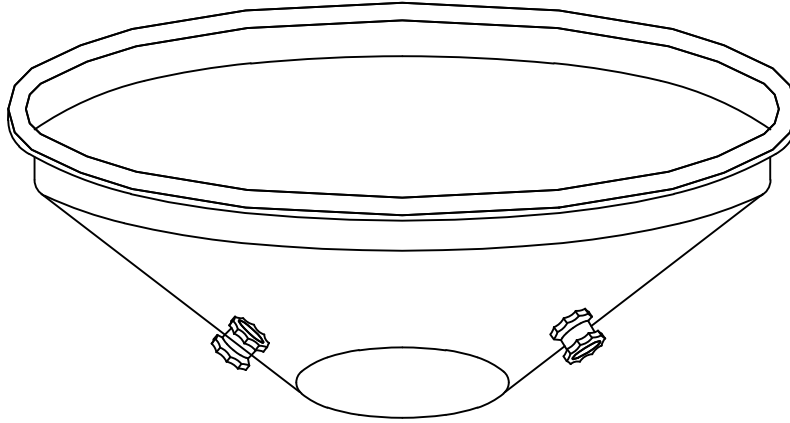
1. PRECAST CONCRETE TYPE II 4000 P.S.I.
2. "RAMNEK" OR EQUAL AT ALL RISER JOINTS (1/2" THICK WITH WIDTH AT LEAST 1/2 THE WALL THICKNESS) WITH GROUT INSIDE AND OUTSIDE.
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6. ALL PIPE HOLES SHALL BE PRECAST OR CORE-DRILLED.
7. APPROVED RUBBER BOOT MUST BE USED WITH PVC PIPE.
8. INSIDE DROPS SHALL NOT EXCEED 2.0 FEET.
9. COAT INTERIOR & EXTERIOR WITH 2 COATS COAL TAR EPOXY, OR PRO-TECH COATING, 8 mil. MIN. EACH DRY FILM THICKNESS COAT OR OUA APPROVED EQUAL.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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STANDARD MANHOLE (ECCENTRIC CONE)

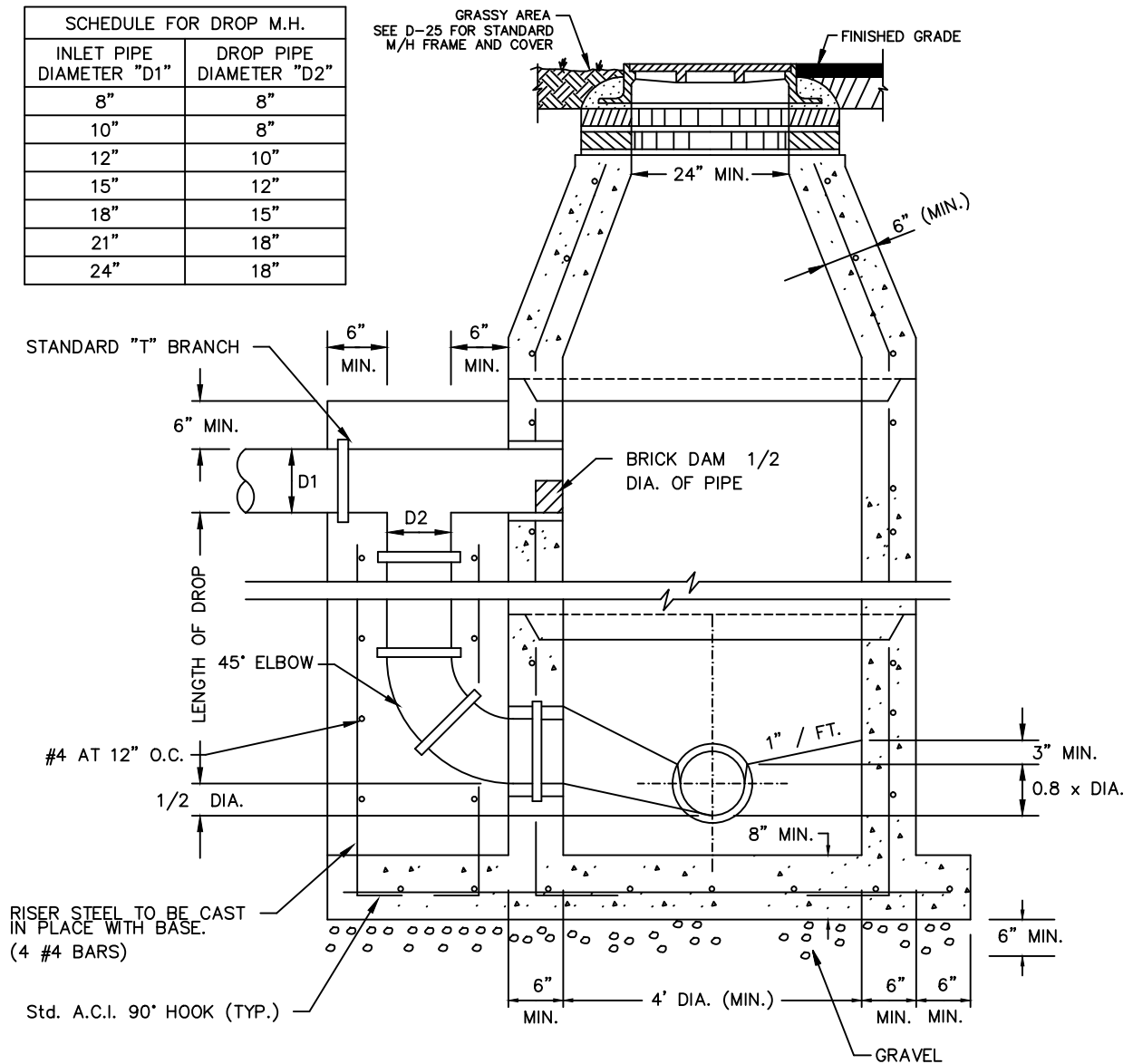
PAGE No
D27A



N O T E S:

1. SEWER RAIN GUARDS SHALL BE INSTALLED ON ALL MANHOLES.
2. SEWER RAIN GUARDS SHALL BE AS MANUFACTURED BY FOSROC-PRECO INDUSTRIES, INC., OR SOUTH WEST PACKING AND SEALS, INC., OR APPROVED EQUAL.

SCHEDULE FOR DROP M.H.	
INLET PIPE DIAMETER "D1"	DROP PIPE DIAMETER "D2"
8"	8"
10"	8"
12"	10"
15"	12"
18"	15"
21"	18"
24"	18"



NOTES:

1. ALL DETAILS AND SPECIFICATIONS FOR STANDARD MANHOLES ARE APPLICABLE EXCEPT FOR REFERENCES TO DROP ASSEMBLY.
2. THE PRECAST BASE SHALL EXTEND FULLY UNDER THE DROP ASSEMBLY.
3. DROP CONNECTIONS SHALL BE REQUIRED WHENEVER AN INFLUENT INVERT IS LOCATED 2.0 FEET OR MORE ABOVE THE MAIN CHANNEL INVERT.
4. SOLVENT TYPE JOINT PVC FITTINGS MAY BE UTILIZED IN THE DROP ASSEMBLY ONLY.

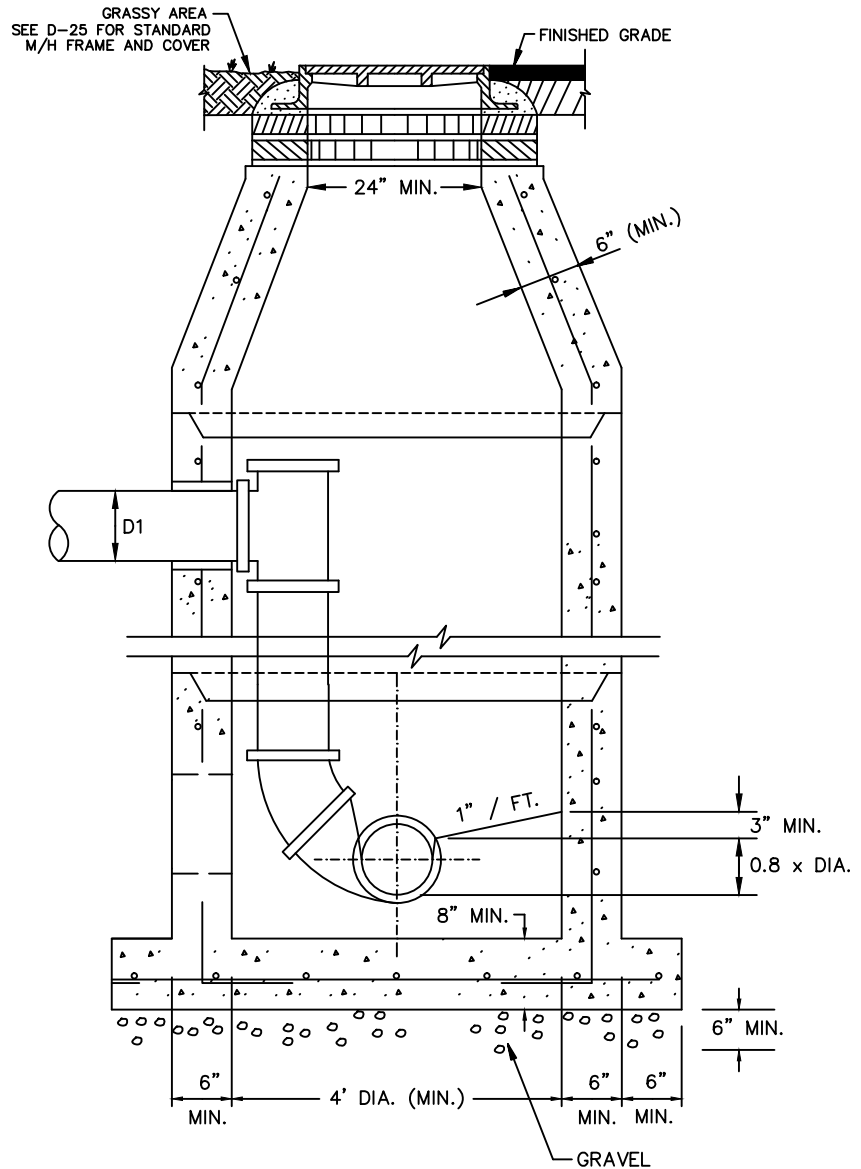
OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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OUTSIDE DROP CONNECTION FOR STANDARD MANHOLE

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D29

SCHEDULE FOR DROP M.H.	
INLET PIPE DIAMETER "D1"	DROP PIPE DIAMETER "D2"
8"	8"
10"	8"
12"	10"
15"	12"
18"	15"
21"	18"
24"	18"



NOTES:

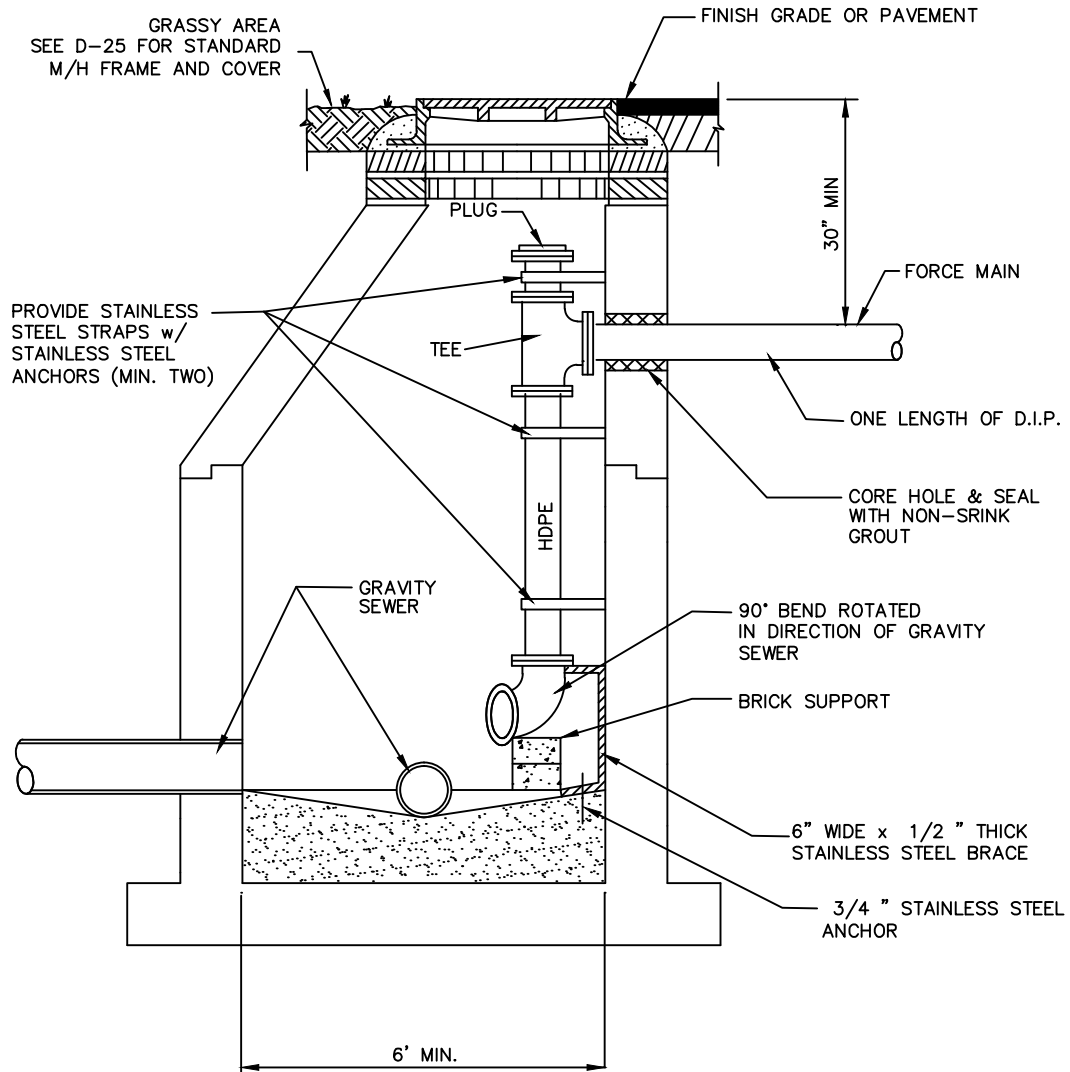
1. ALL DETAILS AND SPECIFICATIONS FOR STANDARD MANHOLES ARE APPLICABLE EXCEPT FOR REFERENCES TO DROP ASSEMBLY.
2. THE PRECAST BASE SHALL EXTEND FULLY UNDER THE DROP ASSEMBLY.
3. DROP CONNECTIONS SHALL BE REQUIRED WHENEVER AN INFLUENT INVERT IS LOCATED 2.0 FEET OR MORE ABOVE THE MAIN CHANNEL INVERT.
4. SOLVENT TYPE JOINT PVC FITTINGS MAY BE UTILIZED IN THE DROP ASSEMBLY ONLY.
5. INSIDE DROP MAY BE USED ONLY IN EXISTING SEWERS AND WITH PRIOR APPROVAL OF OUA.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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INSIDE DROP CONNECTION FOR STANDARD MANHOLE
EXISTING SEWERS ONLY

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D29A



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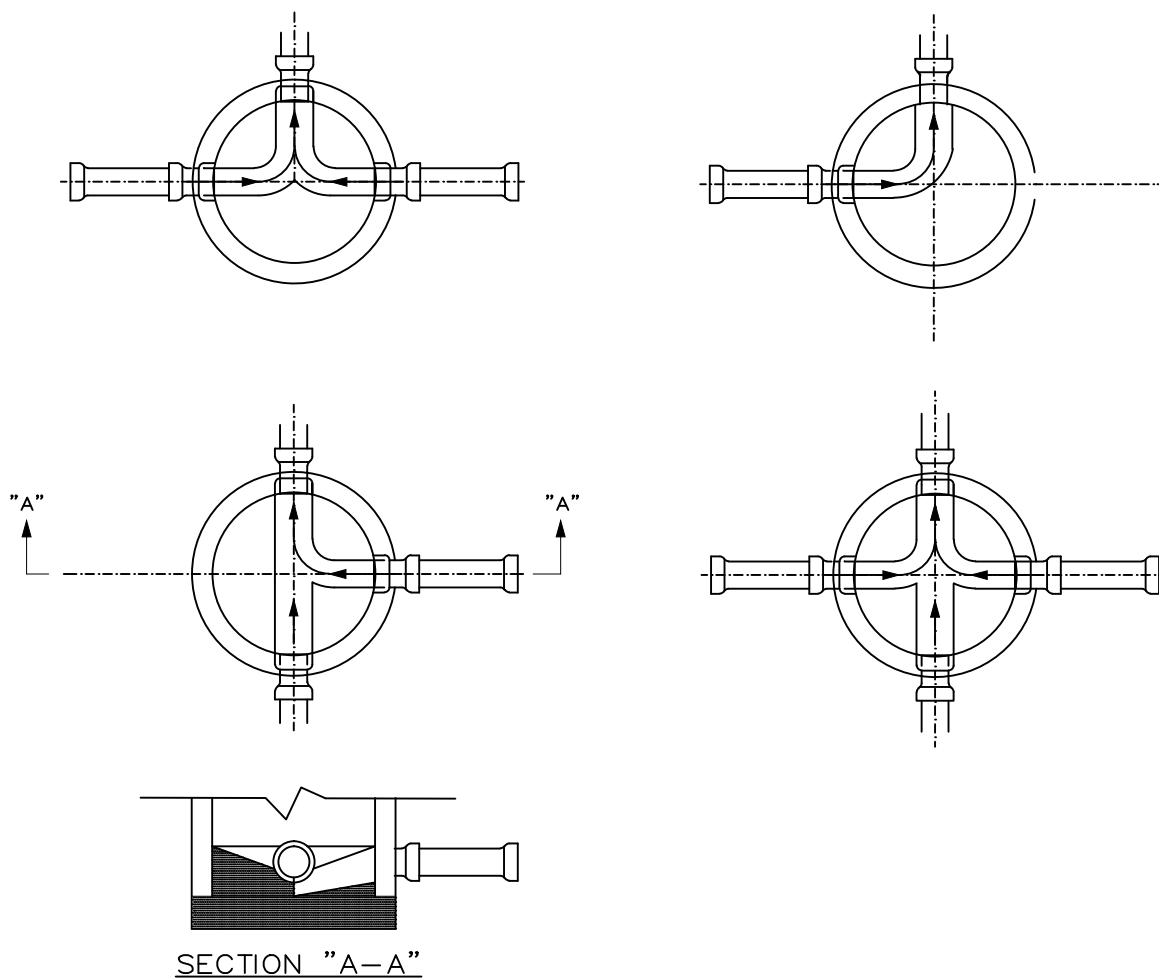
1. SEE MANHOLE NOTES FOR STANDARD MANHOLE.
2. DROP PIPE AND FITTINGS SHALL BE PVC OR HDPE.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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FORCE MAIN TIE-IN
AT MANHOLE

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D29B



NOTES:

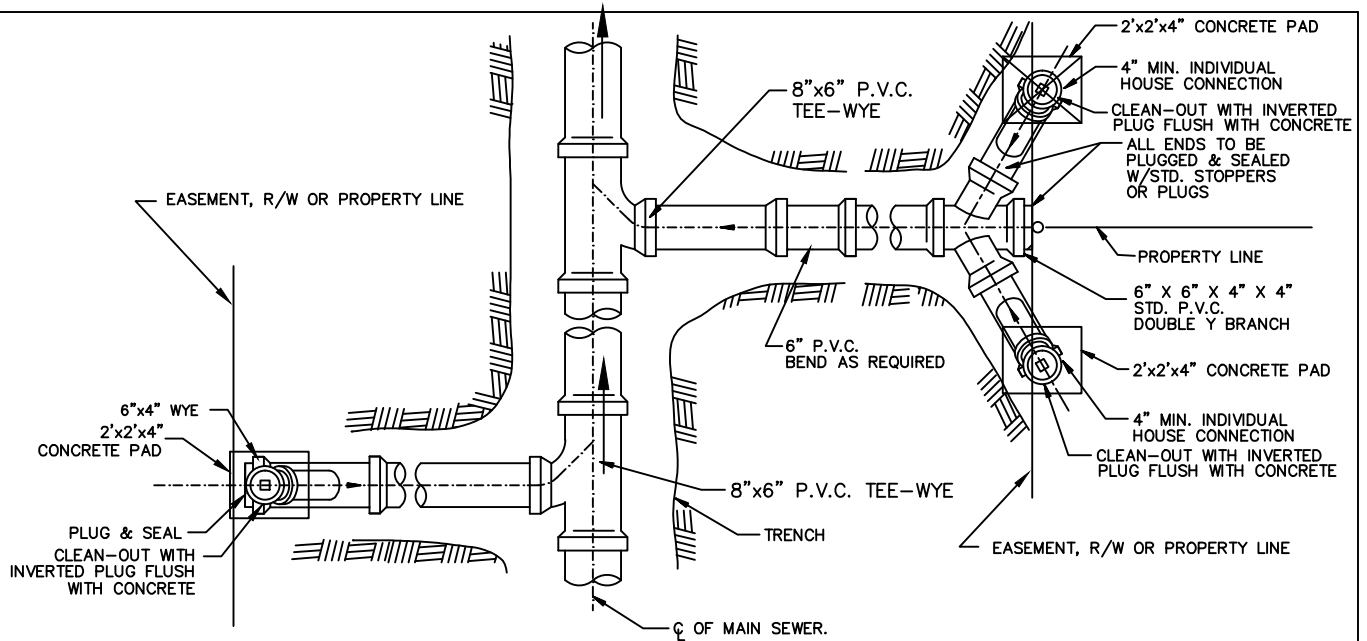
1. INVERT CHANNELS TO BE CONSTRUCTED FOR SMOOTH FLOW WITH NO OBSTRUCTIONS.
2. SPILLWAYS SHALL BE CONSTRUCTED BETWEEN PIPES WITH DIFFERENT INVERT ELEVATIONS PROVIDING FOR SMOOTH FLOWS.
3. CHANNELS FOR FUTURE CONSTRUCTION (STUBS) SHALL BE CONSTRUCTED, FILLED WITH SAND, AND COVERED WITH 1" OF MORTAR.
4. SLOPE MANHOLE WITH A 1:2 SLOPE FROM MANHOLE WALL TO CHANNEL.
5. INVERT SHALL BE A MINIMUM OF $1/2$ THE DIAMETER OF THE LARGEST PIPE OR 4" DEEP.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

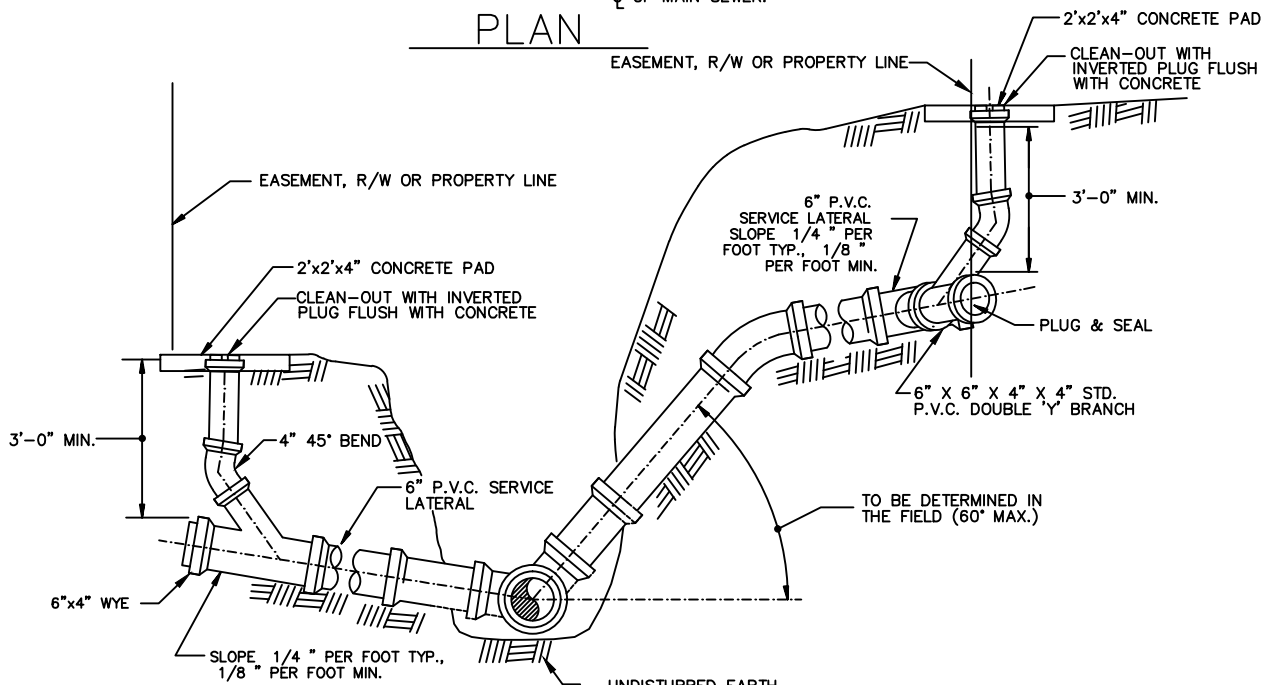
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FLOW PATTERNS FOR MANHOLE INVERTS

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PLAN



SINGLE SERVICE CONNECTION

DOUBLE SERVICE CONNECTION

SECTION

NOTES:

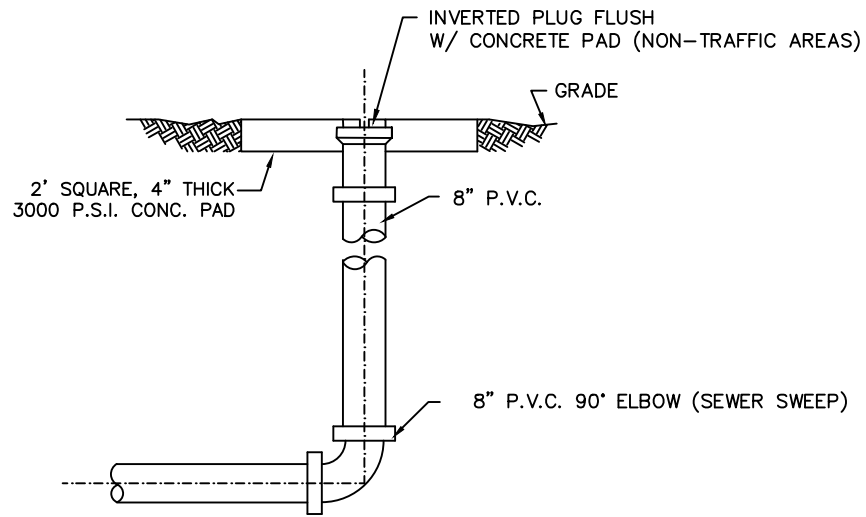
1. SERVICE LATERALS SHALL TERMINATE AT PROPERTY LINE AT A DEPTH OF 3 FEET, PLUGGED WATERTIGHT WITH CLEAN-OUT.
2. THE MINIMUM DIAMETER OF ALL SINGLE HOUSEHOLD CONNECTIONS SHALL BE 4" MINIMUM ALL OTHERS SHALL BE 6" AND ALL DOUBLE SERVICES
3. CONNECTION TO O.U.A. LATERAL SHALL BE MADE WITH A CLEAN-OUT AT PROPERTY LINE BY THE CONTRACTOR OR CUSTOMER MAKING THE CONNECTION, WITH A 2' x 2' x 4" CONCRETE PAD WITH A INVERTED PLUG, BOTH TO BE SET AT FINAL GRADE

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

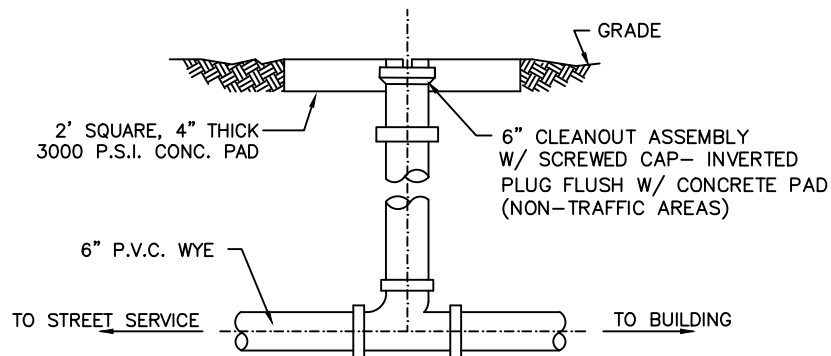
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TYPICAL SEWER SERVICE CONNECTION

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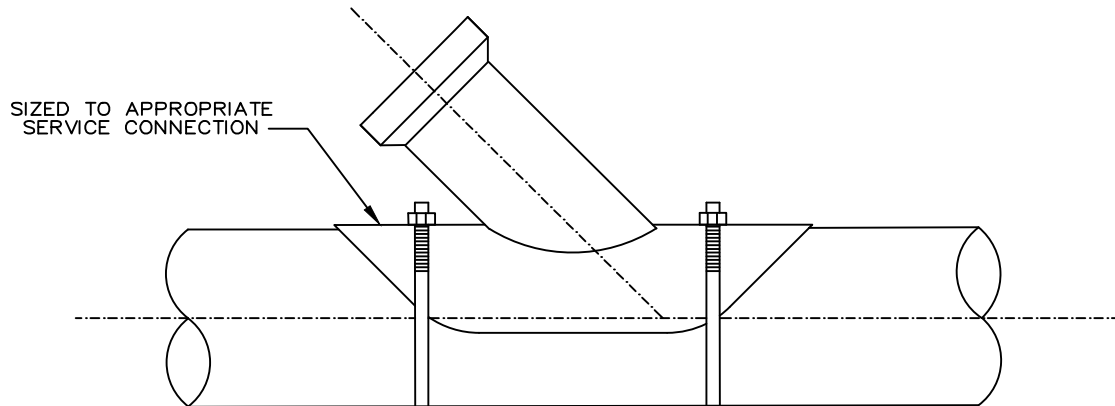
TYPICAL MAIN LINE TERMINAL CLEANOUT



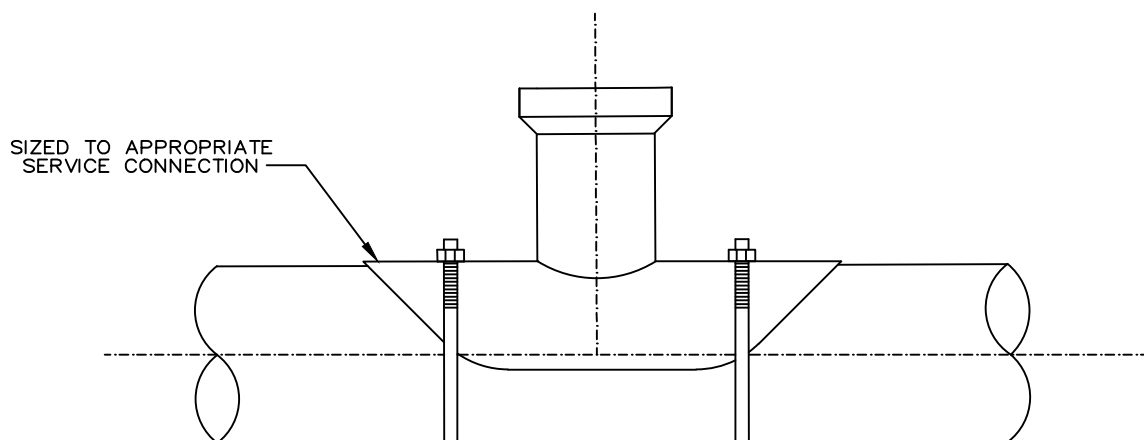
TYPICAL SERVICE LATERAL ONE WAY CLEANOUT

NOTES:

1. ONE WAY CLEANOUT (SWEEP TO STREET SERVICE).
2. CLEAN OUT SHALL BE LOCATED ON RIGHT OF WAY LINE.
3. IN TRAFFIC AREAS A METAL CLEANOUT COVER AND LID SHALL BE INSTALLED OVER PVC CLEANOUT.
4. ALL CLEAN OUT'S REQUIRE AN INSPECTION.



WASTEWATER PIPE SADDLE
(WYE)



WASTEWATER PIPE SADDLE
(TEE)

WASTEWATER PIPE SADDLE

NOTE:

1. FOR USE IN ADDING SERVICE TO GRAVITY SEWER MAIN.
2. INSERT TEE OR PVC SADDLE WYE, OR TEE WITH TWO (2) S/S CLAMPS AND RUBBER GASKET.

DETAILS INCLUDED IN THIS MINIMUM STANDARDS BOOK
ARE FOR DUPLEX LIFT STATIONS.

TRIPLEX LIFT STATIONS AND LARGER DESIGNS WILL
REQUIRE PRIOR APPROVAL BY O.U.A.

LIFT STATIONS DESIGNED FOR A MOBILE GENERATOR
SET-UP WILL INCLUDE EMERGENCY CONTROL BREAKER,
GENERATOR RECEPTACLE

LIFT STATIONS DESIGNED FOR A STATIONARY GENERATOR
WILL NOT HAVE AN EMERGENCY CONTROL BREAKER,
GENERATOR RECEPTACLE AND WILL ALSO INCLUDE A
AUTOMATIC TRANSFER SWITCH

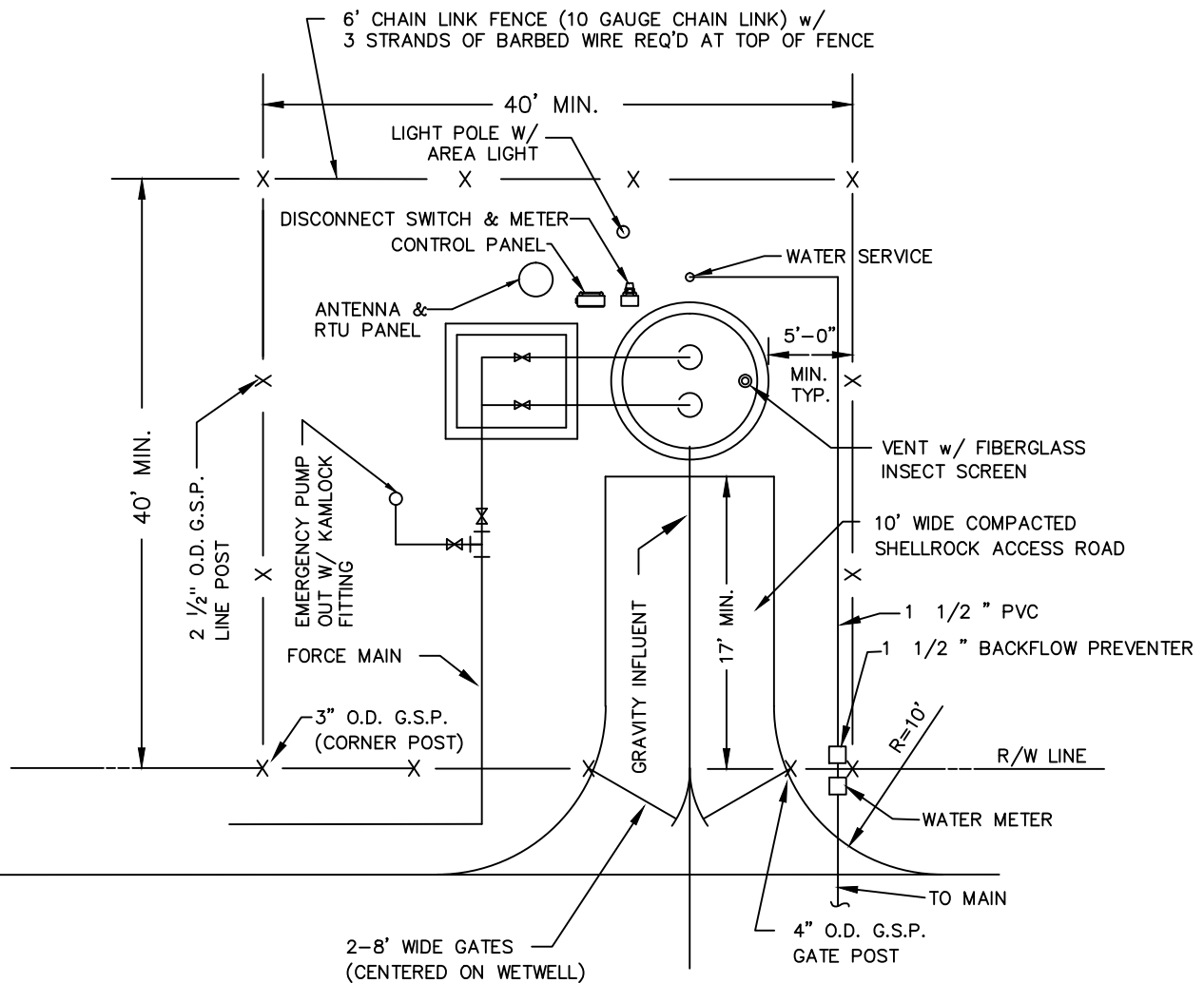
ENGINEER/CONTRACTOR TO CONFIRM PUMP CABLE SIZE,
CONDUIT SIZE AND NUMBER OF CONDUITS TO
ACCOMMODATE ALL WIRING FOR PUMPS, PANEL,
JUNCTION BOX, AND TO INCLUDE A SPARE

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GENERAL NOTES FOR DUPLEX/TRIPLEX
LIFT STATIONS

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N O T E S:

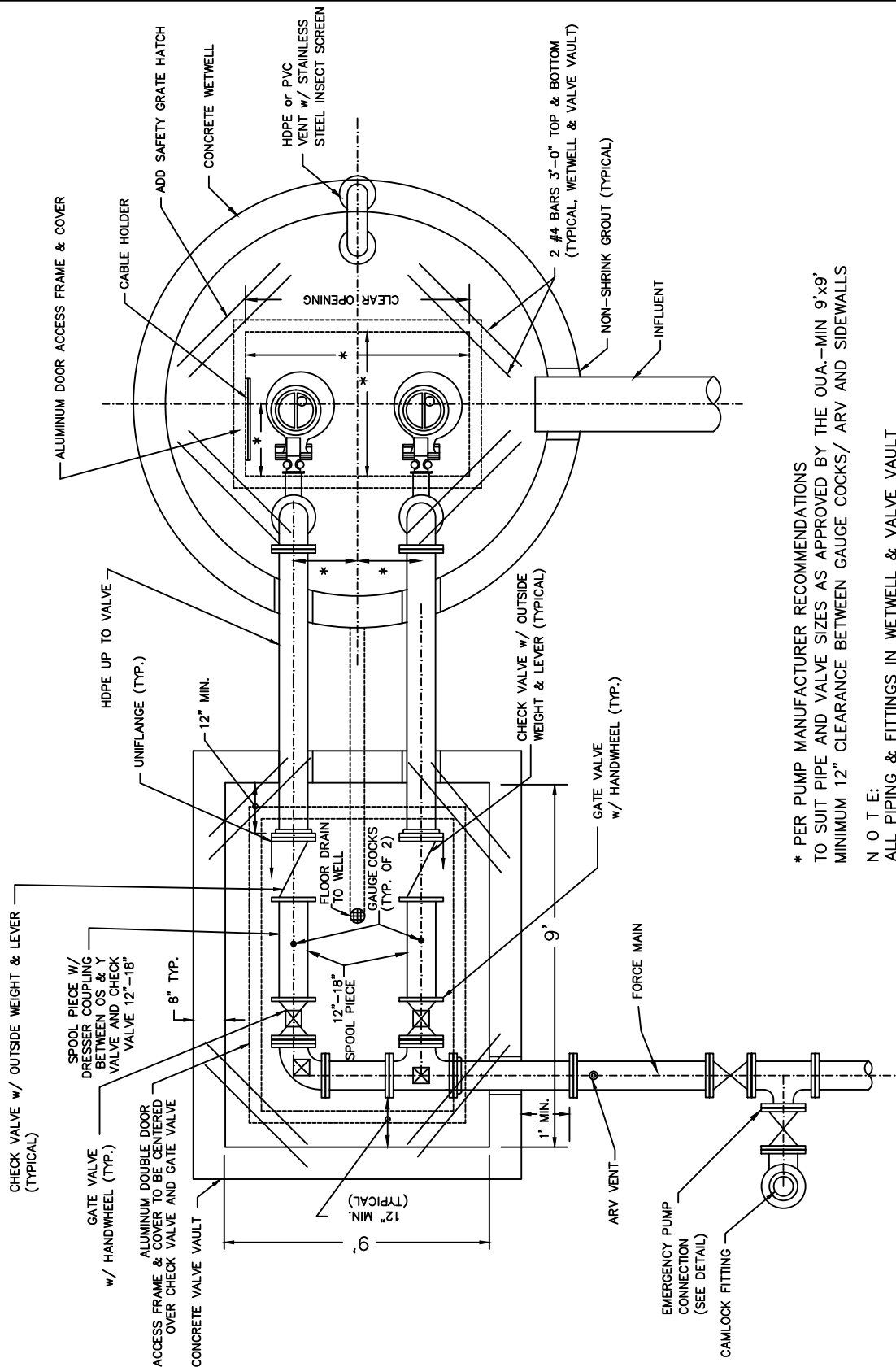
1. FENCED AREA SHALL BE LAID WITH A MINIMUM OF 6" OF 3/4" WASHED ROCK.
2. INFLUENT MAIN SHALL BE CLEAR OF PANEL AND VAULT.
3. PLAN MAY VARY BASED UPON SPECIFIC SITE REQUIREMENTS UPON APPROVAL FROM OUA
4. EMERGENCY PUMP OUT TO BE OUTSIDE VALVE PIT STUBBED UP 3' ABOVE GROUND (SEE DETAIL D-46)

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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TYPICAL LIFT STATION LAYOUT
(WITHIN EASEMENT)

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* PER PUMP MANUFACTURER RECOMMENDATIONS TO SUIT PIPE AND VALVE SIZES AS APPROVED BY THE OUA.—MIN 9'x9' MINIMUM 12" CLEARANCE BETWEEN GAUGE COCKS/ ARV AND SIDEWALLS

N O T E:
ALL PIPING & FITTINGS IN WETWELL & VALVE VAULT SHALL BE HDPE.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

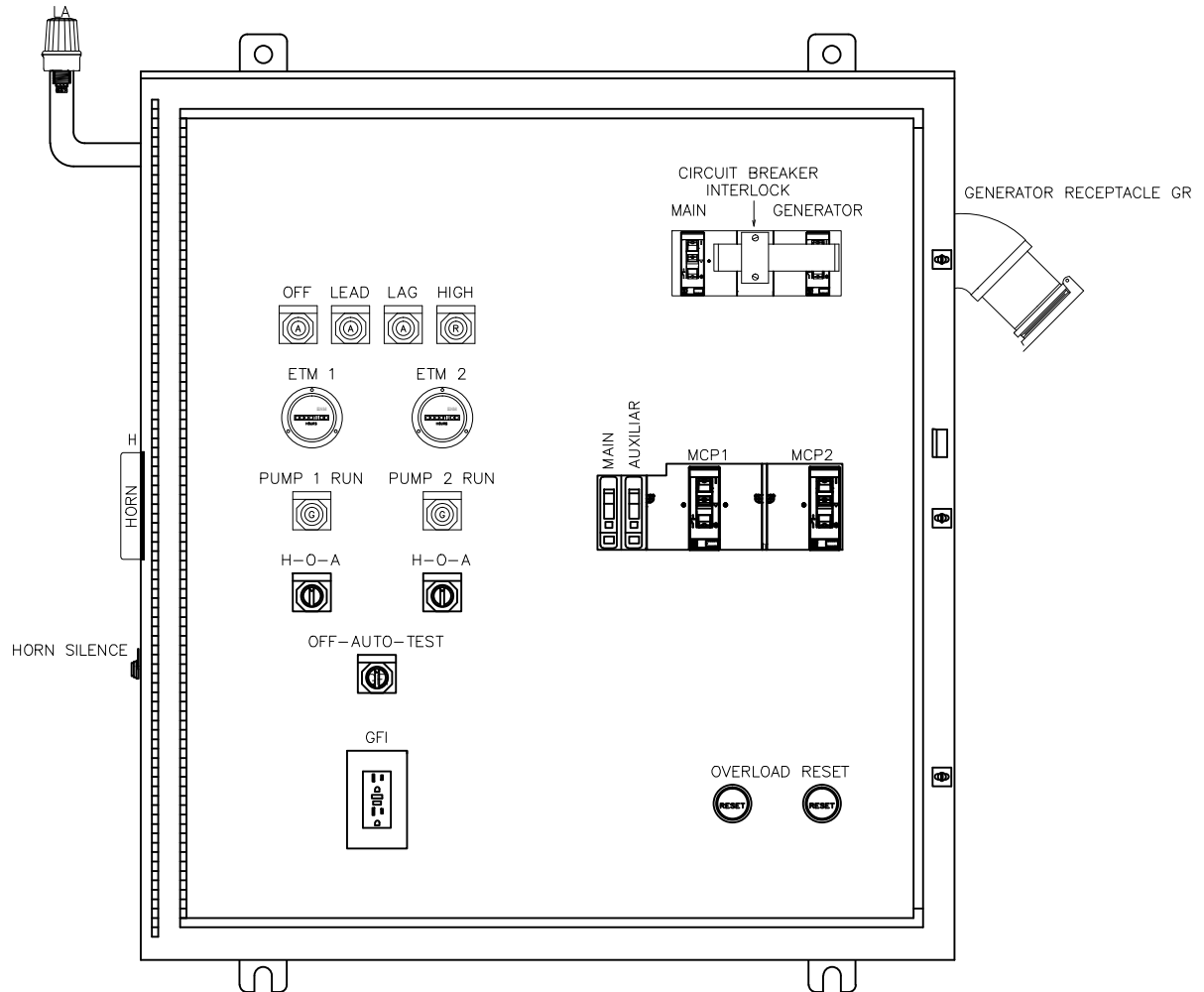
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TYPICAL LIFT STATION
(Plan)

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NOTES:

1. GASKETED WEATHER DOOR WITH GROUND STRAP AND INTERNAL "DEAD FRONT" SAFETY DOOR
2. CABINET SHALL BE 316 SS ENCLOSURE, RATED NEMA 4X.
3. WIRING DIAGRAMS AND O&M MANUALS POCKET TO BE INSTALLED INSIDE CABINET DOOR.
4. ALL PILOT LIGHTS, PUSH BUTTONS AND SELECTOR SWITCHES WILL BE NEMA 4X CORROSION RESISTANT, 30.5MM, HEAVY DUTY TYPE, EQUAL TO CUTLER HAMMER SERIES E34 DEVICES.
5. PROVIDE THE FOLLOWING SPARE PARTS WITH EACH CONTROL PANEL:
ONE SET OF OVERLOAD HEATERS
ONE SET OF MOTOR STARTER CONTACTS
ONE PHASE MONITOR
2 PLUG-IN-RELAYS



OUTER DOOR REMOVED TO SHOW DEADFRONT LAYOUT
NEMA TYPE 4X 316 S.S. ENCLOSURE W/ CONTINUOUS HINGE
TYPICAL, ACTUAL LAYOUT MAY VARY WITH HORSEPOWER
A THREE-POINT LATCHING SYSTEM FOR OUTER DOOR

LA - LAMP ALARM
MCP - MOTOR CIRCUIT PROTECTOR
ETM - ELAPSED TIME METER
H-O-A - HAND-OFF-AUTO

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

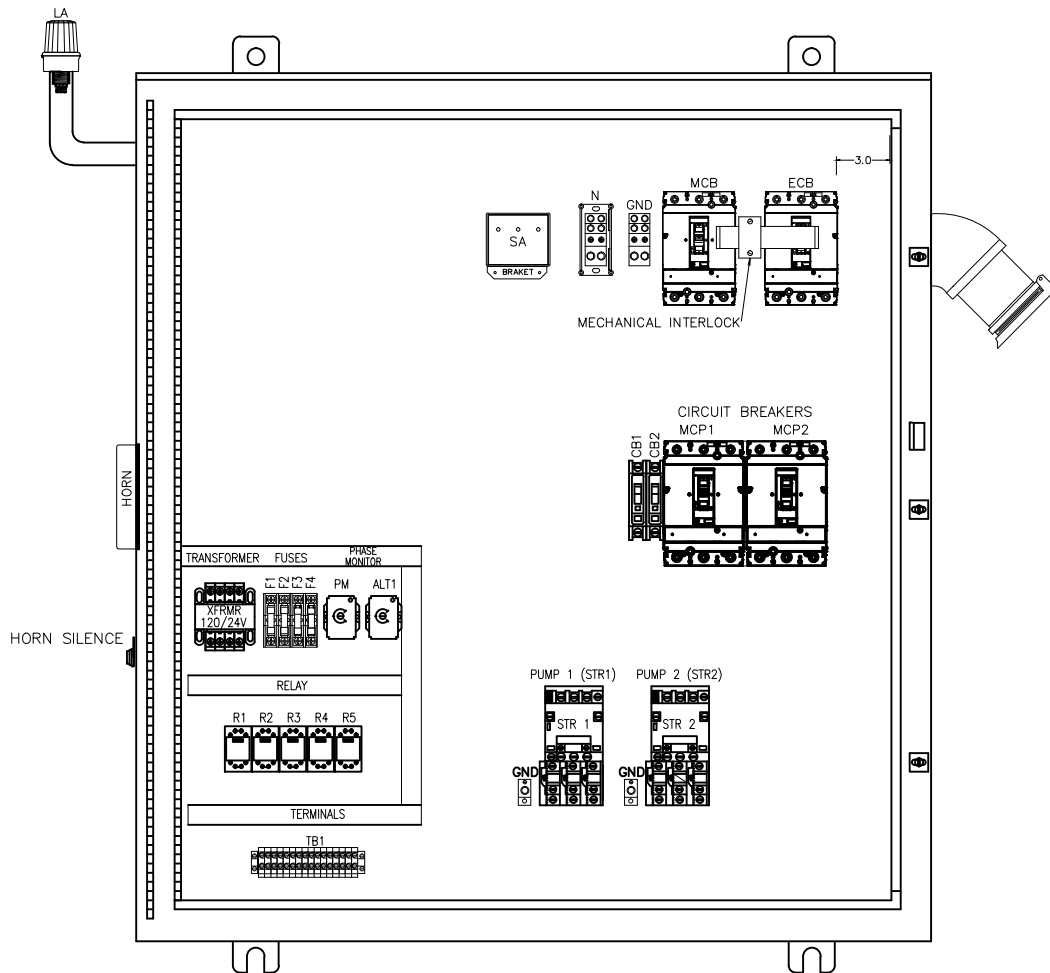
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DUPLEX CONTROL CABINET

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N O T E S:

1. GASKETED WEATHER DOOR WITH GROUND STRAP AND INTERNAL "DEAD FRONT" SAFETY DOOR
CABINET SHALL BE 316 SS ENCLOSURE, RATED NEMA 4X.



OUTER DOOR REMOVED TO SHOW DEADFRONT LAYOUT
NEMA TYPE 4X 316 S.S. ENCLOSURE W/ CONTINUOUS HINGE
TYPICAL, ACTUAL LAYOUT MAY VARY WITH HORSEPOWER
A THREE-POINT LATCHING SYSTEM FOR OUTER DOOR

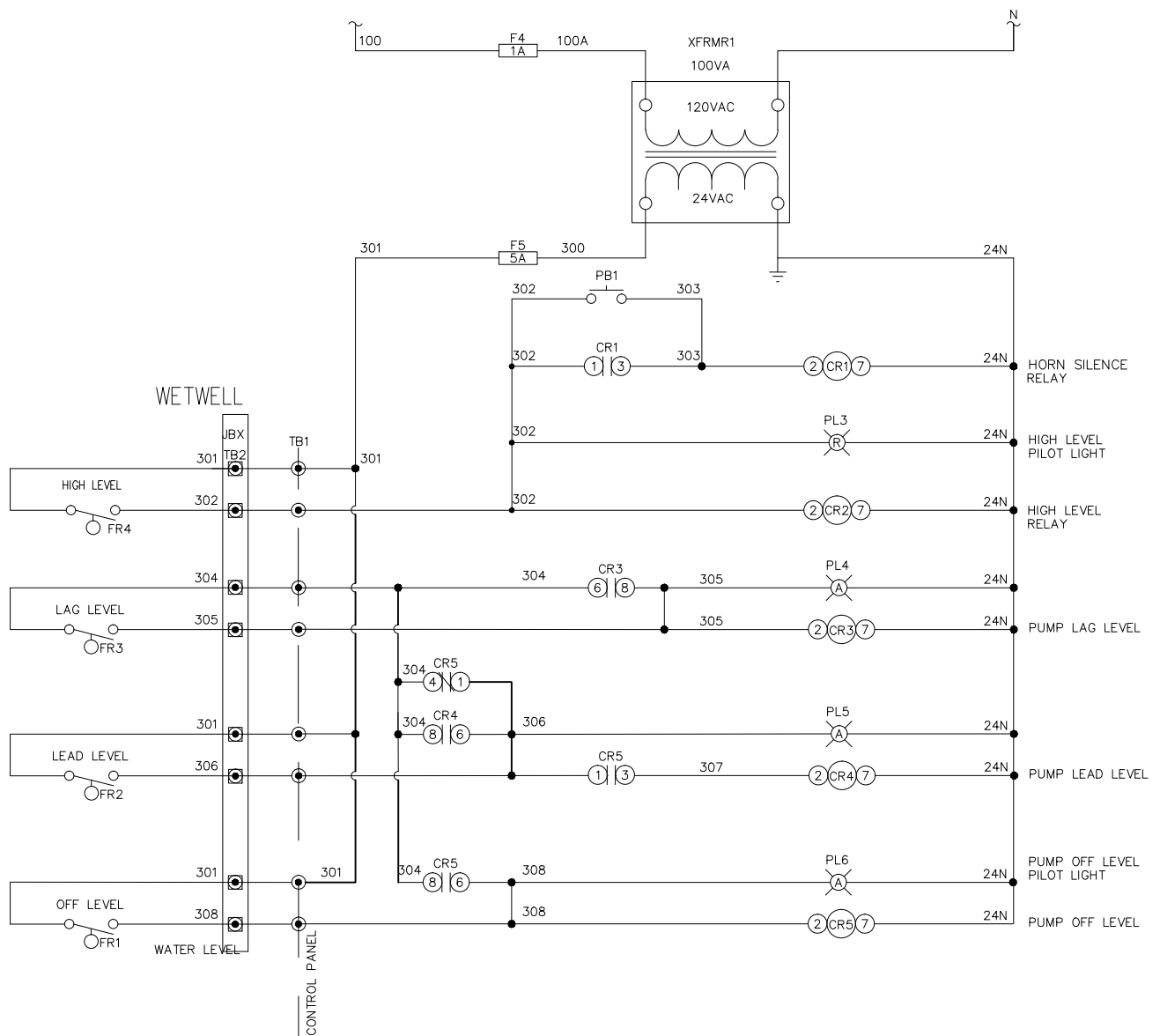
LA	— LAMP ALARM
MCB	— MAIN CIRCUIT BREAKER
ECB	— EMERGENCY CIRCUIT BREAKER
MCP	— MOTOR CIRCUIT PROTECTOR
PM	— PHASE MONITOR
ALT	— ALTERNATOR
STR	— MOTOR STARTER
SA	— SURGE ARRESTOR

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BACK PANEL LAYOUT

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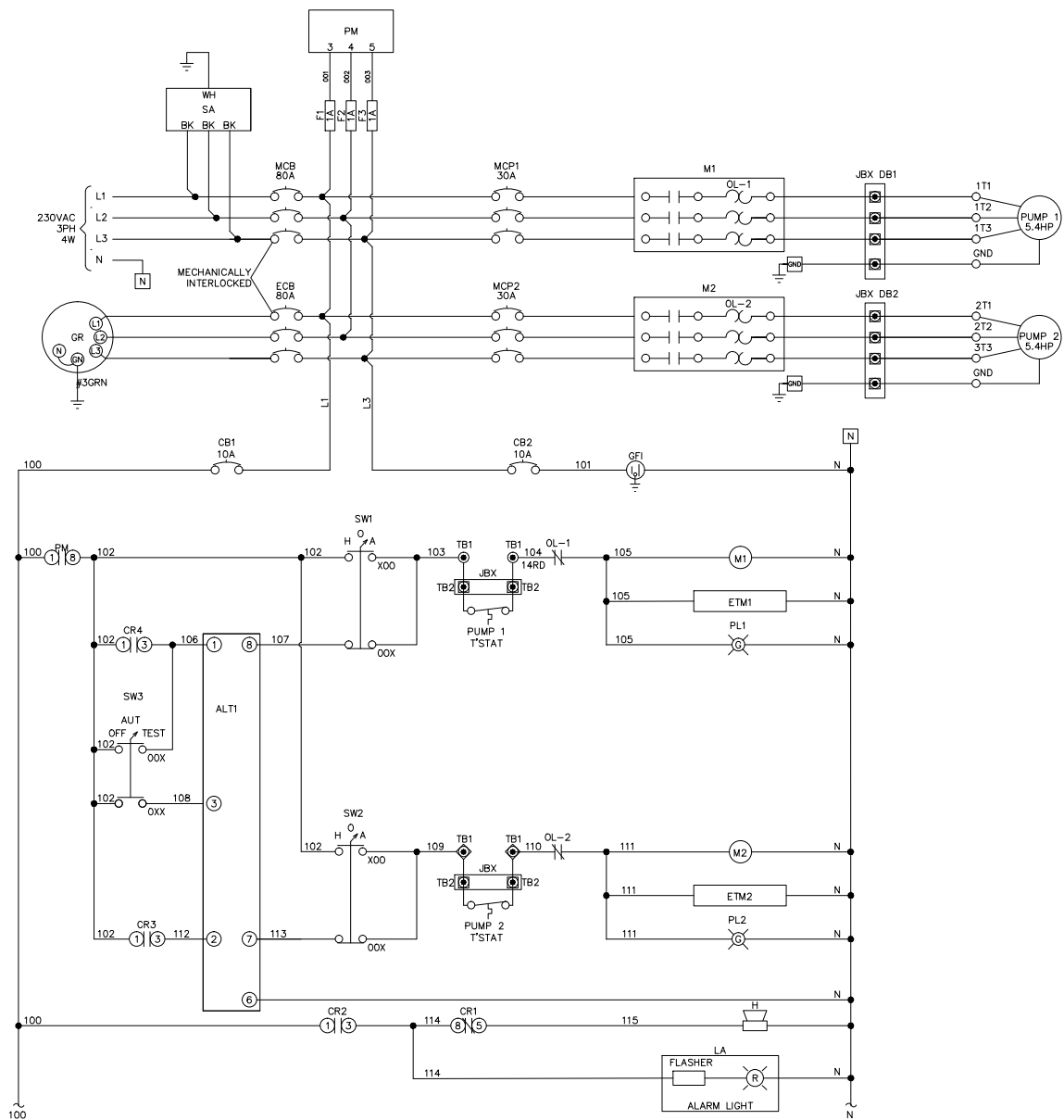


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CONTROL PANEL ELECTRICAL SCHEMATIC DIAGRAM

PAGE No
D40

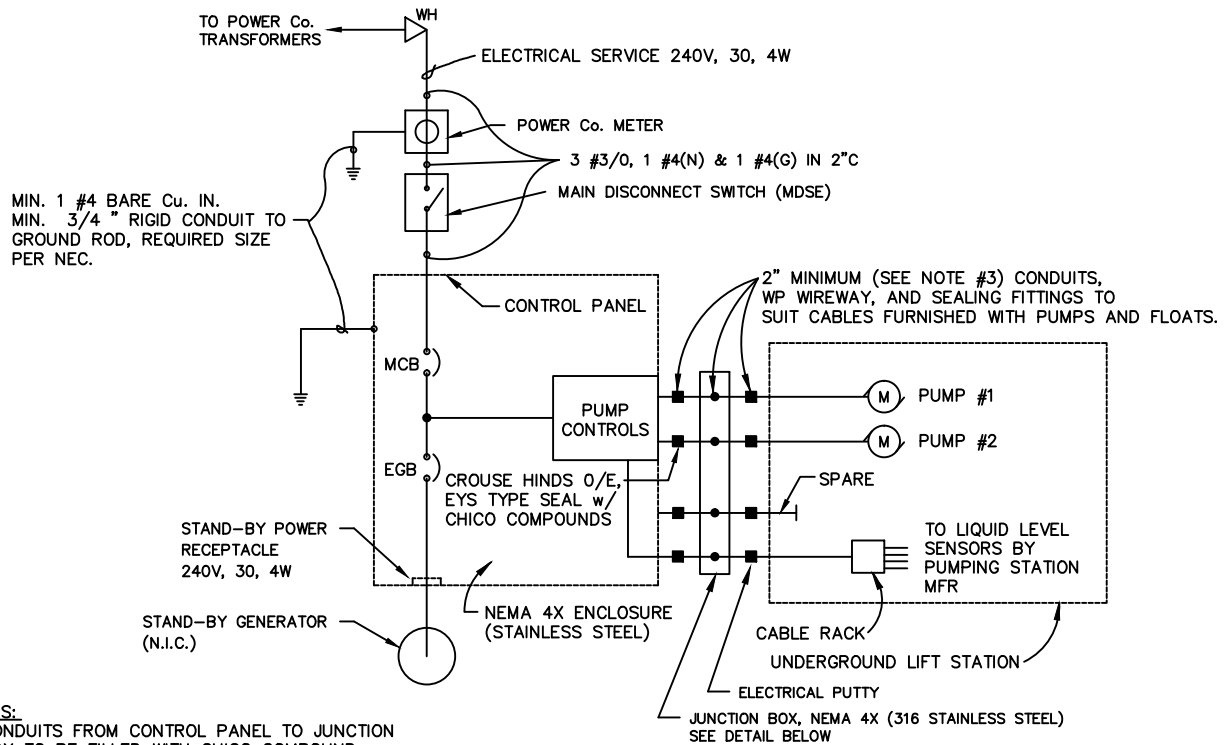


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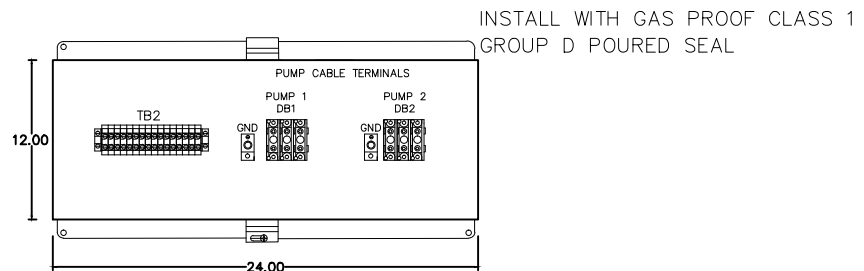
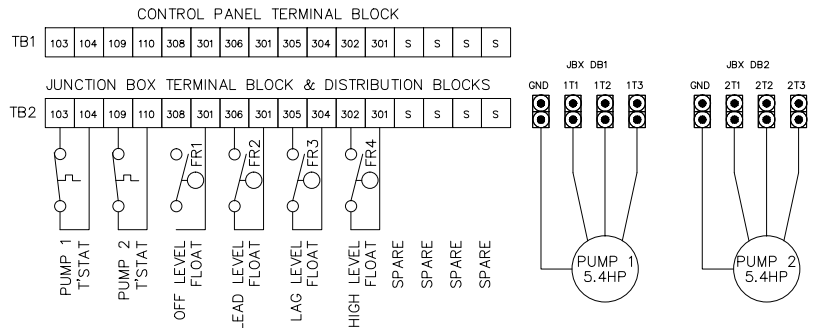
ELECTRICAL SCHEMATIC DIAGRAMS

PAGE No
D41



NOTES:

1. CONDUITS FROM CONTROL PANEL TO JUNCTION BOX TO BE FILLED WITH CHICO COMPOUND.
2. CONDUITS BETWEEN JUNCTION BOX AND WETWELL TO BE FILLED WITH ELECTRICAL PUTTY.
3. ENGINEER/CONTRACTOR TO CONFIRM PUMP CABLE SIZE, AND NUMBER OF CONDUITS TO ACCOMMODATE ALL WIRING FOR PUMPS, PANEL, AND JUNCTION BOX AND TO ALSO INCLUDE A SPARE



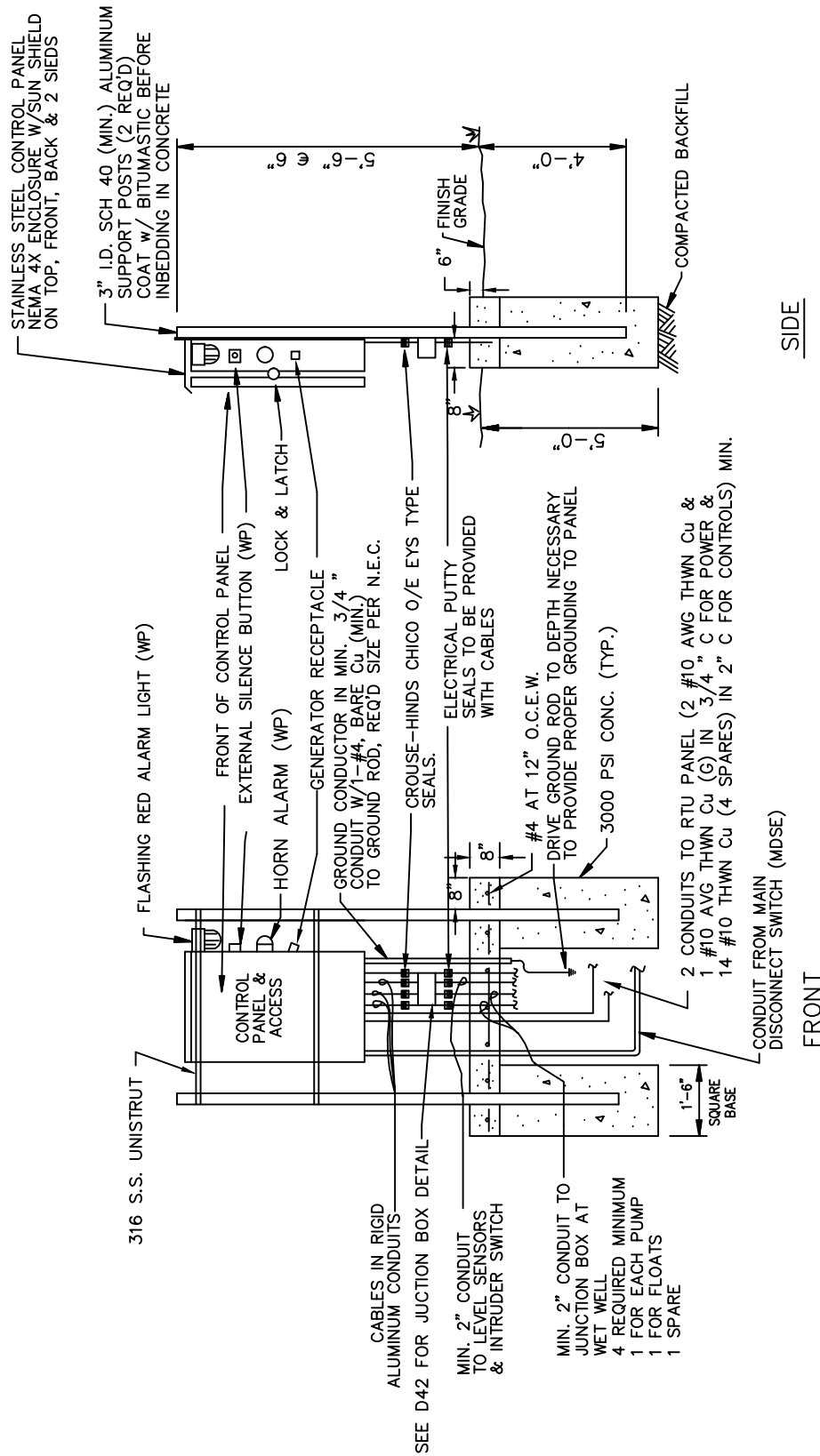
JUNCTION BOX FOR DUPLEX LIFT STATION, NEMA 4X 316 S.S.
DOOR REMOVED TO SHOW INSIDE LAYOUT
(12" H X 24" W X 12" D)
MINIMUM
TRIPLEX-14" H X 36" W X 14" D

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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ELECTRICAL BLOCK DIAGRAM/JUNCTION BOX

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NOTES:

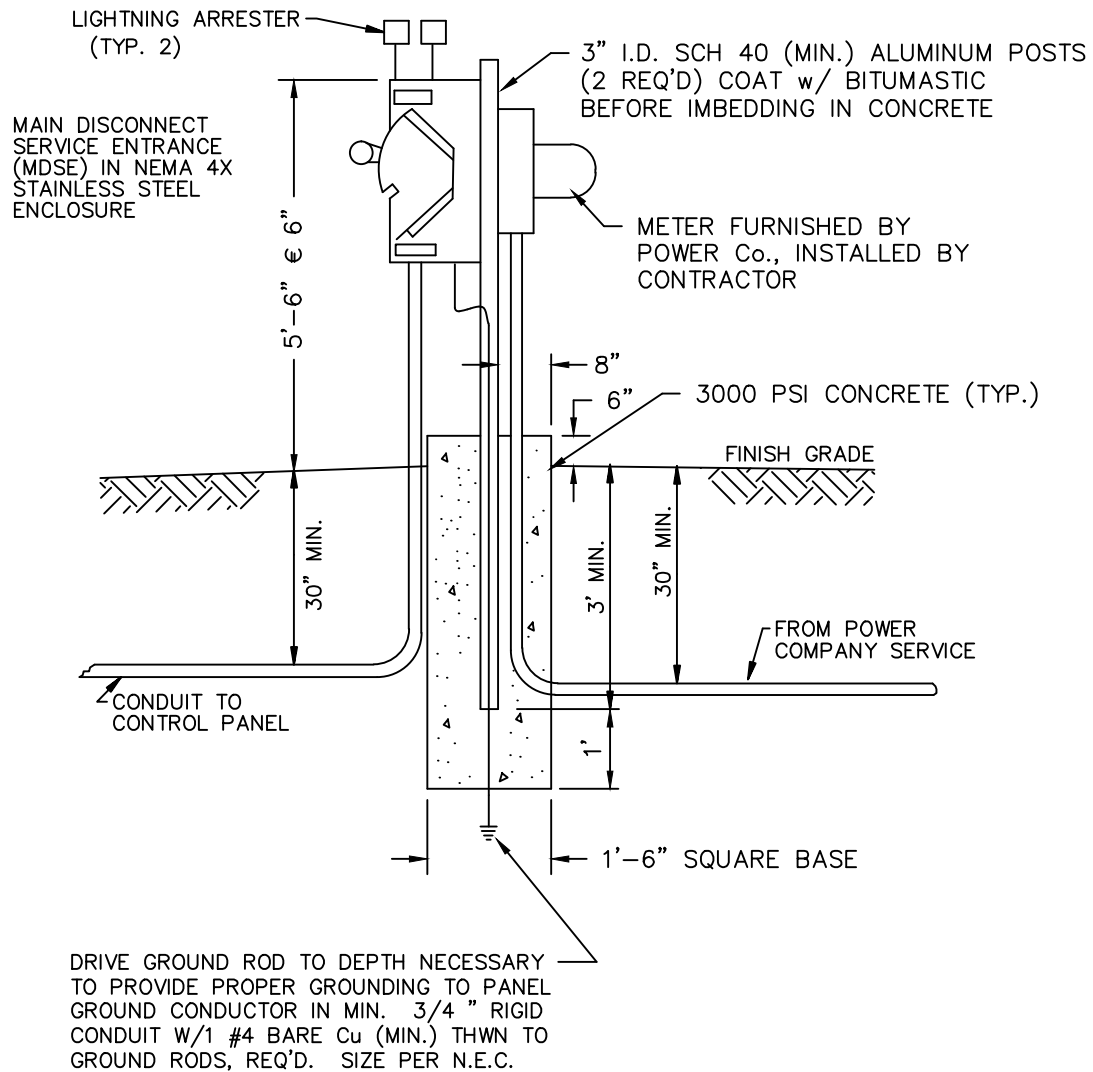
1. TELEMTRY EQUIPMENT SHALL BE SUPPLIED AS INDICATED.
2. ALL POWER AND CONTROL LINES SHALL BE CONTINUOUS. (NO SPLICES)
3. POWER SUPPLY MECHANICALLY INTERLOCKED.
4. THREE PHASE POWER WITH PHASE MONITORS, SURGE CAPACITOR & LIGHTNING ARRESTOR SHALL BE SUPPLIED.
5. GROUND FAULT INTERRUPTER ON CONVENIENCE RECEPTACLE.
6. 1.5 KVA TRANSFORMER ON 230+ VOLT SERVICE FOR 120 V A.C. CONTROL POWER & RECEPTACLE.
7. INSTALL SPARE 2" CONDUIT FROM CONTROL PANEL TO JUNCTION BOX.
8. ENGINEER/CONTRACTOR TO CONFIRM PUMP CABLE SIZE, CONDUIT SIZE, AND NUMBER OF CONDUITS TO ACCOMMODATE ALL WIRING FOR PUMPS, PANEL, AND JUNCTION BOX AND ALSO TO INCLUDE A SPARE

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TYPICAL CONTROL PANEL INSTALLATION

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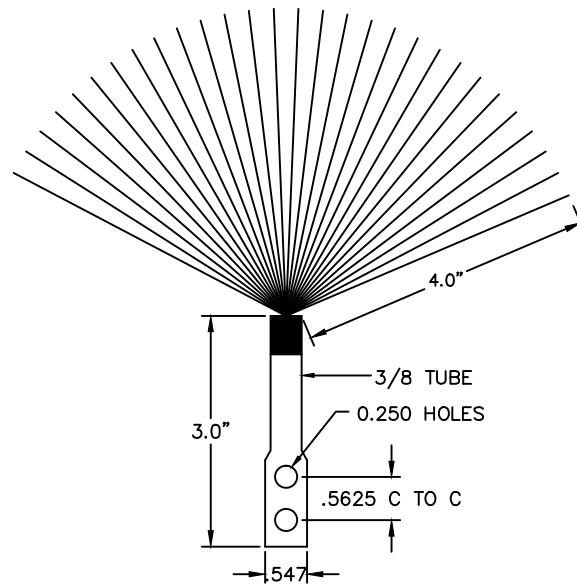
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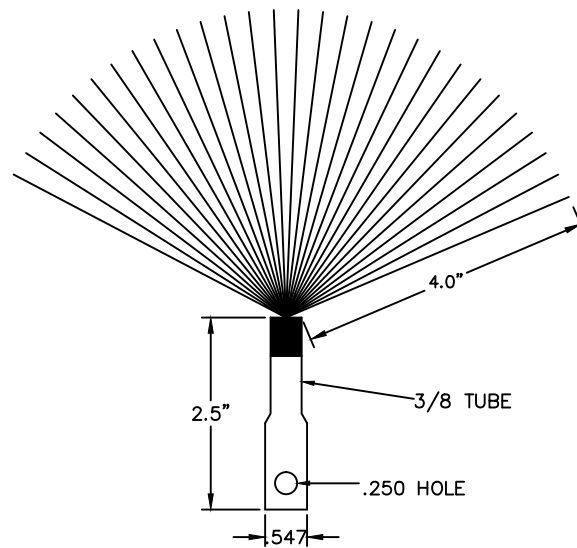
MAIN DISCONNECT SWITCH

PAGE No
D44

LIGHTNING MASTER CORPORATION
MODEL # PP-2S



LIGHTNING MASTER CORPORATION
MODEL # PP-1S

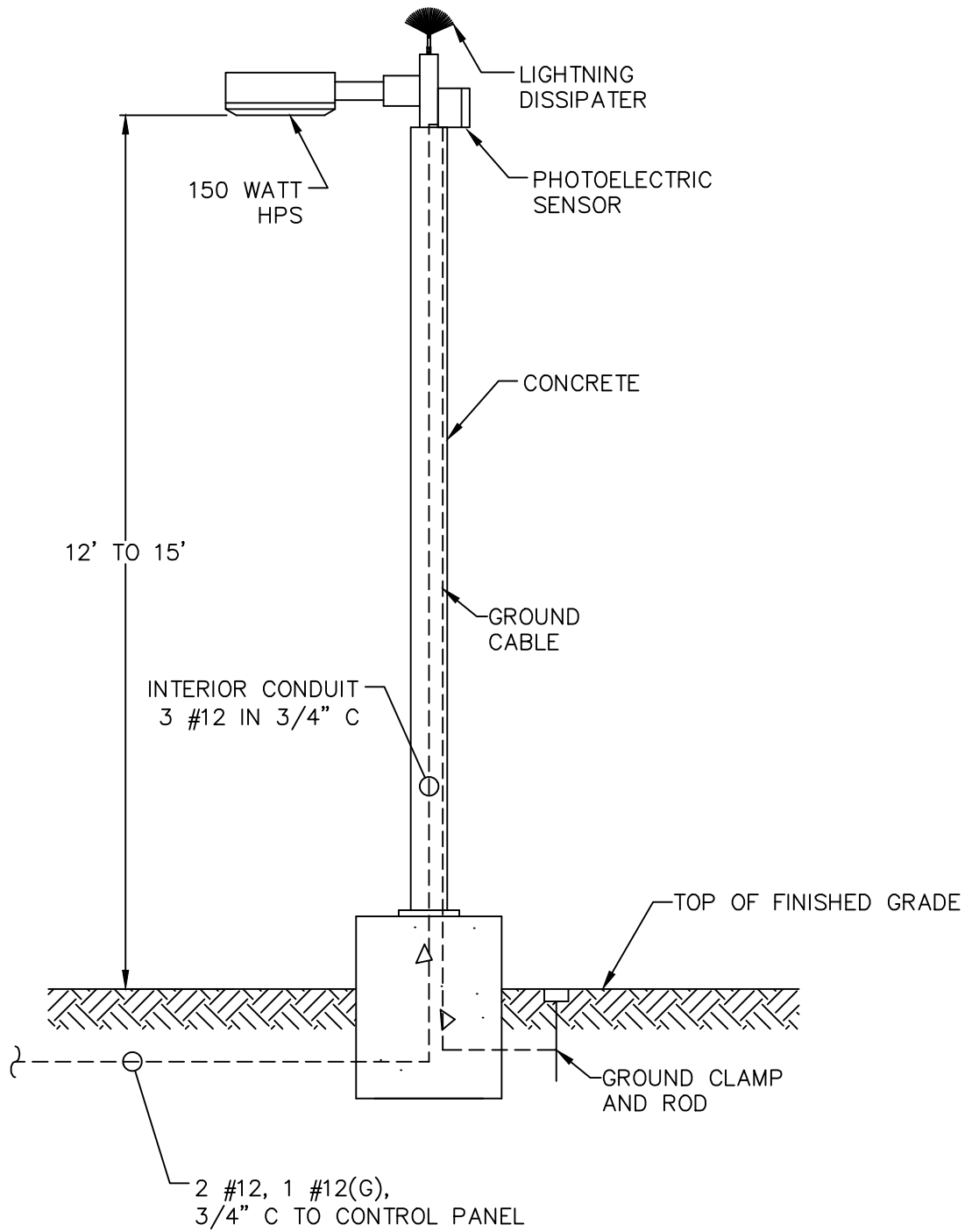


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LIGHTNING DISSIPATER

PAGE No
D44A

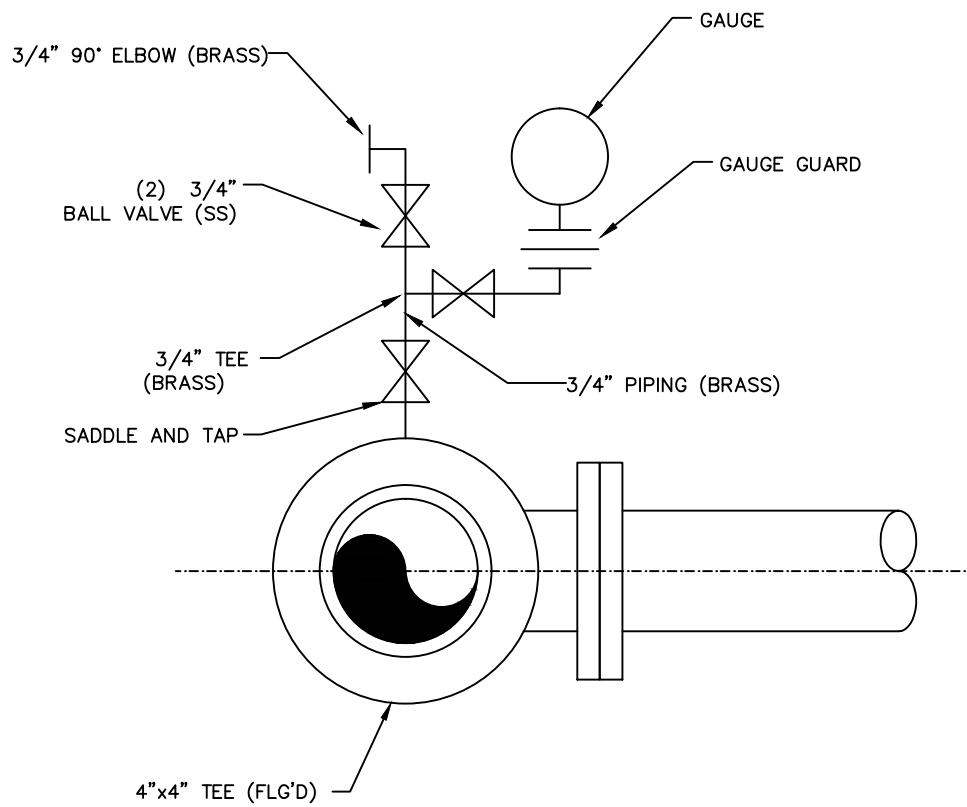


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LIGHT POLE DETAIL

PAGE No
D44B

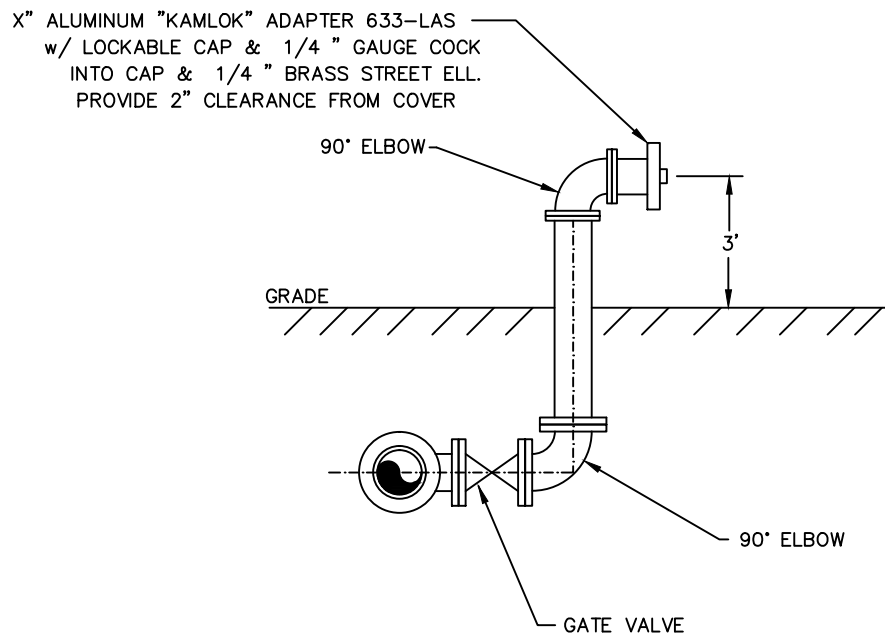


OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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GAUGE COCK DETAIL

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D45



PIPE DIAMETER – X"
X" DETERMINED BY DISCHARGE PIPE SIZE

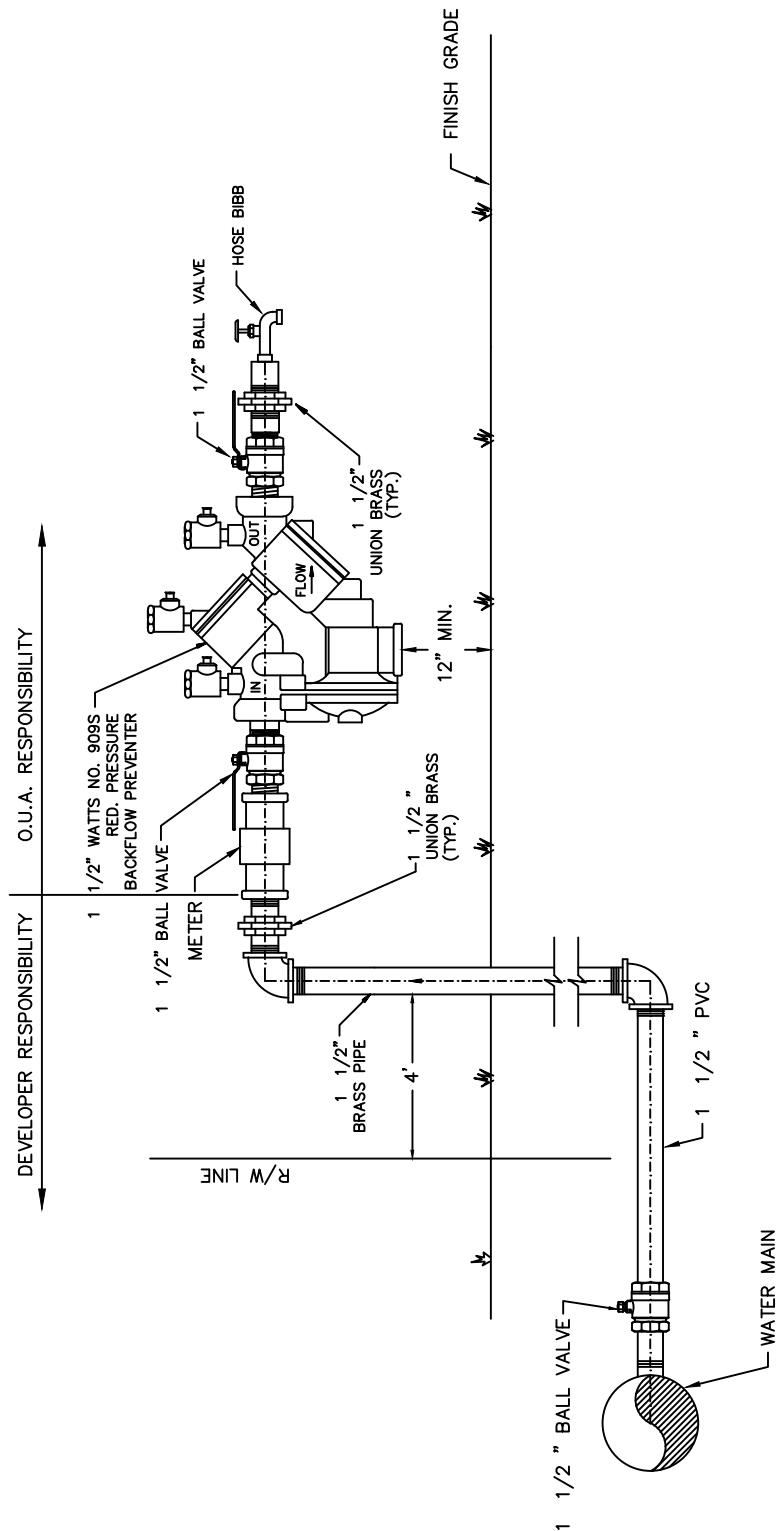
N O T E:
EMERGENCY PUMP OUT CONNECTION SHALL BE PROVIDED AND SHALL BE THE SAME SIZE AS THE
PUMP DISCHARGE PIPING, 4" MINIMUM.

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EMERGENCY PUMP OUT

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NOTES:

1. ALL PIPING AND FITTINGS ARE BRASS, WITH SCREWED FITTINGS.
2. METER AND BACKFLOW PREVENTER TO BE PURCHASED FROM O.U.A. AND INSTALLED BY CONTRACTOR.
3. INSTALL PIPE SUPPORTS AS NEEDED.

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WATER CONNECTION DETAIL AT LIFT STATION

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1/4 " THICK S.S. PLATE
OVER ENTIRE PANEL
SUPPORT FRAME

6'-10" ABOVE GRADE

- GALVANIZED STEEL STRUCTURAL MEMBERS

- THERMOWELD
GROUND
TO TOWER,
RODS &
CABLES ↘

24" MIN.

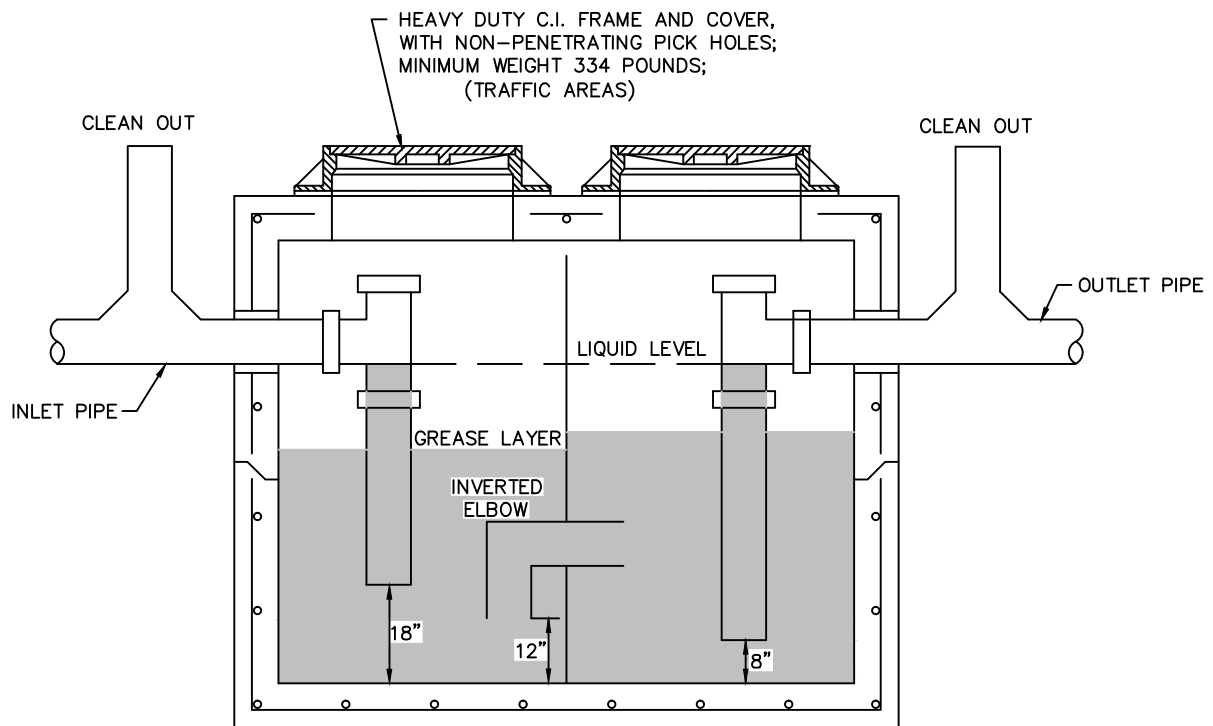
CONCRE
BASE —

18" TO 24"

36"

3/4 " DIA. COPPER CLAD STEEL
GROUND RODS DRIVEN TO 3.0
OHMS OR LESS MEASURED GROUND
RESISTANCE AS AN ISOLATED
POINT, BEFORE TIEING INTO
THE MAIN GROUND SYSTEM

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D48



N O T E S:

1. ALL PIPING SHALL BE A MINIMUM OF 4"
2. PIPING SHALL BE INSTALLED USING A CONCRETE MANHOLE ADAPTER.
3. SANITARY 'T' OUTLET SHALL BE INSTALLED 4" INSIDE OF WALL.
4. TANK SHALL BE A MINIMUM OF 1000 GALLONS.
5. TANK SHALL BE TRAFFIC BEARING AND CONCRETE SHALL COMPLY WITH ASTM C 478, LATEST REVISION.
6. WALLS & BOTTOM SLABS SHALL BE MINIMUM 4" THICK REINFORCED CONCRETE.
7. TOP SLAB SHALL BE A MINIMUM 6" THICK REINFORCED CONCRETE.
8. SECTIONS SHALL BE JOINED AND SEALED WITH MINIMUM 1 29/64 " "RAM-NEK" SEALER OR EQUIVALENT TO FORM A WATER TIGHT SEAL.
9. RISER JOINTS SHALL COMPLY WITH ASTM C 443, LATEST REVISION.
10. TANK SIZING SHALL BE PER O.U.A. REQUIREMENTS.
11. COVER TO BE SEATED OR USE RAIN GUARDS.
12. NO DOMESTIC WASTE THROUGH GREASE TRAP.

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GREASE, OIL AND SAND INTERCEPTER

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MECHANICAL THRUST RESTRAINT CHART 1

PIPE SIZE, in	90° BEND		45° BEND		22 1/2° BEND		11 1/4° BEND		DEADEND/VALVE	
	PVC	DIP	PVC	DIP	PVC	DIP	PVC	DIP	PVC	DIP
4	21	16	9	7	5	4	2	2	45	29
6	28	23	12	10	6	5	3	3	63	40
8	37	29	16	12	8	6	4	3	83	53
10	44	35	18	15	9	7	5	4	99	63
12	51	41	21	17	11	8	5	4	116	74
14	57	46	24	19	12	10	6	5	132	83
16	64	51	27	21	13	11	7	5	149	94
18	70	56	29	24	14	12	7	6	164	104
20	76	61	32	26	16	13	8	6	179	113
24	87	70	36	29	18	14	9	7	208	131

THRUST RESTRAINT CHART BASED UPON THE FOLLOWING:

<u>PVC/DIP</u>	PIPE MATERIAL, AS NOTED
<u>SP</u>	SOIL TYPE (designer to confirm)
<u>1.5</u>	SAFETY FACTOR (minimum)
<u>3</u>	TRENCH TYPE (designer to confirm)
<u>2.5</u>	DEPTH OF BURY, ft (designer to confirm)
<u>150</u>	TEST PRESSURE, psi (minimum)

THE MINIMUM LENGTH OF PIPE OUT OF ANY VALVE OR FITTING SHOULD BE 20 LF.

FITTINGS NOT SHOWN TO BE CALCULATED UTILIZING THE CRITERIA LISTED ABOVE AND SUBMITTED IN A SHOP DRAWING
VALUES SHOWN IN CHART INDICATE LENGTH (LF) OF PIPE TO BE RESTRAINED ON EITHER SIDE OF ITEM LISTED

NOTE 1: ANY CONDITION OTHER THAN THOSE LISTED ABOVE (including poly-wrapped DIP) SHALL REQUIRE REVISION OF THE
TABLE IN ACCORDANCE WITH EBAA IRON, INC., RESTRAINT LENGTH CALCULATOR (V. 5.4).

(<http://www.ebaa.com/engineering.htm> or <http://rcp.ebaa.com>)

NOTE 2: THE REVISED CHARTS SHALL BE SUBMITTED TO OUA AS A SHOP DRAWING SUBMITTAL.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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WATER THRUST RESTRAINT

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MECHANICAL THRUST RESTRAINT CHART 2								
MAIN RUN, in	BRANCH, in	TEE			LARGE SIZE	SMALL LARGE	REDUCER	
		PVC	DIP				PVC	DIP
4	4	1	1		6	4	33	21
6	4	1	1		8	4	60	38
6	6	1	1		8	6	35	22
8	4	1	1		10	4	81	51
8	6	1	1		10	6	61	39
8	8	7	5		10	8	33	21
10	6	1	1		12	4	101	64
10	8	1	1		12	6	85	54
10	10	21	14		12	8	62	39
12	6	1	1		16	4	138	87
12	8	1	1		16	6	126	79
12	12	36	24		16	8	109	68
16	6	1	1		16	12	63	40
16	8	1	1		18	4	154	97
16	16	65	43		18	6	144	91
18	6	1	1		18	8	129	81
18	8	1	1		20	4	171	107
18	18	79	52		20	6	161	101
20	6	1	1		20	8	148	93
20	8	1	1		20	12	113	71
20	20	92	61		24	4	201	127
24	6	1	1		24	6	194	122
24	8	1	1		24	8	183	115
24	24	118	78		24	12	154	97

THRUST RESTRAINT CHART BASED UPON THE FOLLOWING:

<u>PVC/DIP</u>	PIPE MATERIAL, AS NOTED
<u>SP</u>	SOIL TYPE (designer to confirm)
<u>1.5</u>	SAFETY FACTOR (minimum)
<u>3</u>	TRENCH TYPE (designer to confirm)
<u>2.5</u>	DEPTH OF BURY, ft (designer to confirm)
<u>150</u>	TEST PRESSURE, psi (minimum)

THE MINIMUM LENGTH OF PIPE OUT OF ANY VALVE OR FITTING SHOULD BE 20 LF.

FITTINGS NOT SHOWN TO BE CALCULATED UTILIZING THE CRITERIA LISTED ABOVE AND SUBMITTED IN A SHOP DRAWING
VALUES SHOWN IN CHART INDICATE LENGTH (LF) OF PIPE TO BE RESTRAINED ON EITHER SIDE OF ITEM LISTED

NOTE 1: ANY CONDITION OTHER THAN THOSE LISTED ABOVE (including poly-wrapped DIP) SHALL REQUIRE REVISION OF THE
TABLE IN ACCORDANCE WITH EBAA IRON, INC., RESTRAINT LENGTH CALCULATOR (V. 5.4).

(<http://www.ebaa.com/engineering.htm> or <http://rcp.ebaa.com>)

NOTE 2: THE REVISED CHARTS SHALL BE SUBMITTED TO OUA AS A SHOP DRAWING SUBMITTAL.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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WATER THRUST RESTRAINT

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MECHANICAL THRUST RESTRAINT CHART 1

PIPE SIZE, in	90° BEND		45° BEND		22 1/2° BEND		11 1/4° BEND		DEADEND/VALVE	
	PVC	DIP	PVC	DIP	PVC	DIP	PVC	DIP	PVC	DIP
4	14	11	6	5	3	3	2	2	30	19
6	19	15	8	7	4	3	2	2	42	27
8	25	20	11	8	5	4	3	2	55	35
10	29	23	12	10	6	5	3	3	66	42
12	34	27	14	12	7	6	4	3	78	49
14	38	31	16	13	8	7	4	3	88	56
16	43	34	18	14	9	7	5	4	99	63
18	47	38	20	16	10	8	5	4	110	69
20	51	41	21	17	11	9	5	4	120	75
24	58	47	24	20	12	10	6	5	139	88

THRUST RESTRAINT CHART BASED UPON THE FOLLOWING:

<u>PVC/DIP</u>	PIPE MATERIAL, AS NOTED
<u>SP</u>	SOIL TYPE (designer to confirm)
<u>1.5</u>	SAFETY FACTOR (minimum)
<u>3</u>	TRENCH TYPE (designer to confirm)
<u>2.5</u>	DEPTH OF BURY, ft (designer to confirm)
<u>100</u>	TEST PRESSURE, psi (minimum)

THE MINIMUM LENGTH OF PIPE OUT OF ANY VALVE OR FITTING SHOULD BE 20 LF.

FITTINGS NOT SHOWN TO BE CALCULATED UTILIZING THE CRITERIA LISTED ABOVE AND SUBMITTED IN A SHOP DRAWING
VALUES SHOWN IN CHART INDICATE LENGTH (LF) OF PIPE TO BE RESTRAINED ON EITHER SIDE OF ITEM LISTED

NOTE 1: ANY CONDITION OTHER THAN THOSE LISTED ABOVE (including poly-wrapped DIP) SHALL
REQUIRE REVISION OF THE TABLE IN ACCORDANCE WITH EBAA IRON, INC., RESTRAINT LENGTH
CALCULATOR (V. 5.4).

(<http://www.ebaa.com/engineering.htm> or <http://rcp.ebaa.com>)

NOTE 2: THE REVISED CHARTS SHALL BE SUBMITTED TO OUA AS A SHOP DRAWING SUBMITTAL.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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FORCE MAIN THRUST RESTRAINT

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MECHANICAL THRUST RESTRAINT CHART 2								
MAIN RUN, in	BRANCH, in	TEE			LARGE SIZE	SMALL SIZE	REDUCER	
		PVC	DIP				PVC	DIP
4	4	1	1		6	4	22	14
6	4	1	1		8	4	40	25
6	6	1	1		8	6	23	15
8	4	1	1		10	4	54	34
8	6	1	1		10	6	41	26
8	8	1	1		10	8	22	14
10	6	1	1		12	4	68	43
10	8	1	1		12	6	57	36
10	10	1	1		12	8	41	26
12	6	1	1		16	4	92	58
12	8	1	1		16	6	84	53
12	12	1	1		16	8	73	46
16	6	1	1		16	12	42	27
16	8	1	1		18	4	103	65
16	16	18	12		18	6	96	61
18	6	1	1		18	8	86	54
18	8	1	1		20	4	114	72
18	18	27	18		20	6	108	68
20	6	1	1		20	8	99	62
20	8	1	1		20	12	75	47
20	20	36	24		24	4	134	85
24	6	1	1		24	6	129	81
24	8	1	1		24	8	122	77
24	24	52	35		24	12	103	65

THRUST RESTRAINT CHART BASED UPON THE FOLLOWING:

<u>PVC/DIP</u>	PIPE MATERIAL, AS NOTED
<u>SP</u>	SOIL TYPE (designer to confirm)
<u>1.5</u>	SAFETY FACTOR (minimum)
<u>3</u>	TRENCH TYPE (designer to confirm)
<u>2.5</u>	DEPTH OF BURY, ft (designer to confirm)
<u>100</u>	TEST PRESSURE, psi (minimum)

THE MINIMUM LENGTH OF PIPE OUT OF ANY VALVE OR FITTING SHOULD BE 20 LF.

FITTINGS NOT SHOWN TO BE CALCULATED UTILIZING THE CRITERIA LISTED ABOVE AND SUBMITTED IN A SHOP DRAWING
VALUES SHOWN IN CHART INDICATE LENGTH (LF) OF PIPE TO BE RESTRAINED ON EITHER SIDE OF ITEM LISTED

NOTE 1: ANY CONDITION OTHER THAN THOSE LISTED ABOVE (including poly-wrapped DIP) SHALL REQUIRE REVISION OF THE
TABLE IN ACCORDANCE WITH EBAA IRON, INC., RESTRAINT LENGTH CALCULATOR (V. 5.4).

(<http://www.ebaa.com/engineering.htm> or <http://rcp.ebaa.com>)

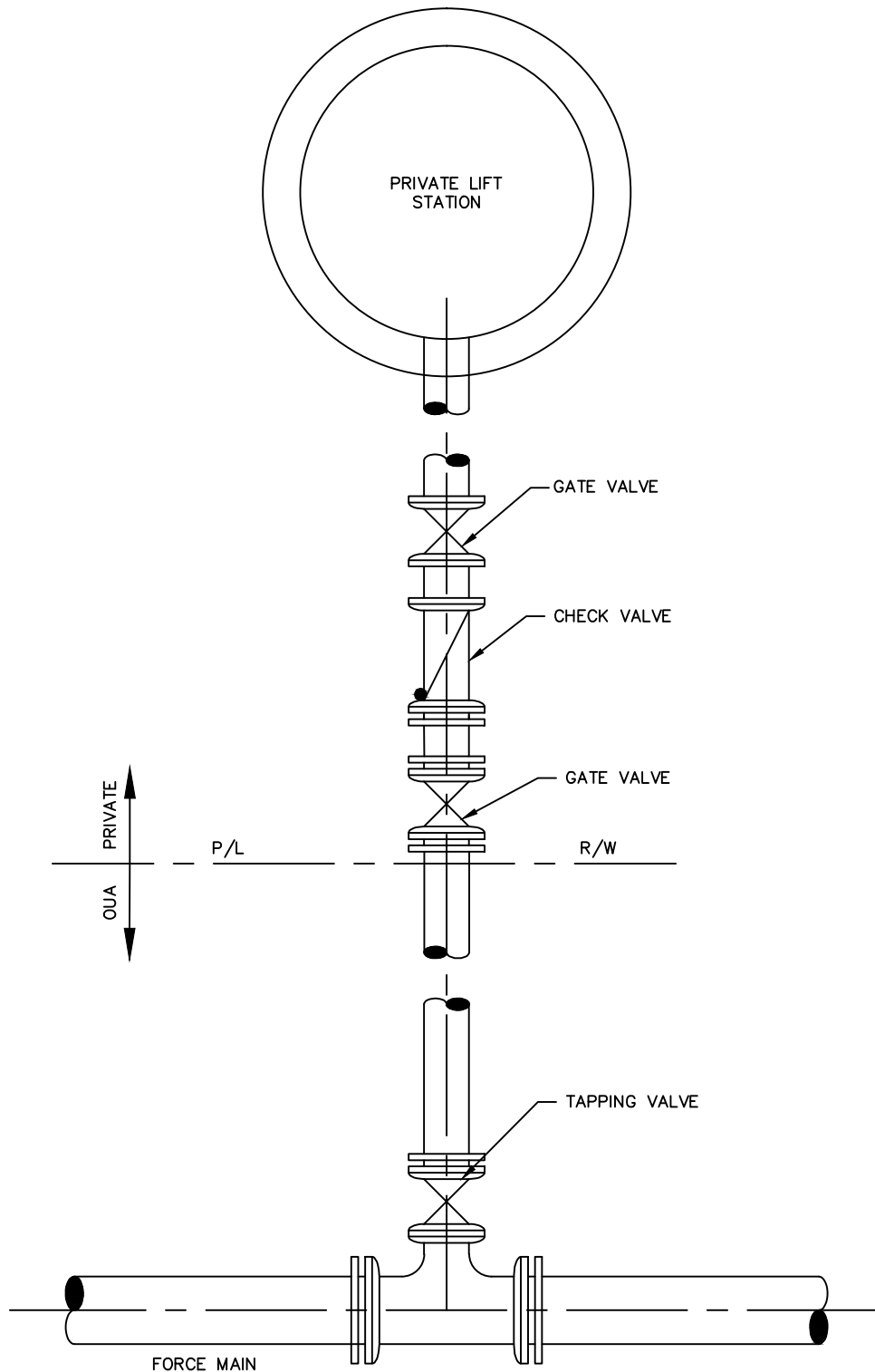
NOTE 2: THE REVISED CHARTS SHALL BE SUBMITTED TO OUA AS A SHOP DRAWING SUBMITTAL.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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FORCE MAIN THRUST RESTRAINT

PAGE No
D53

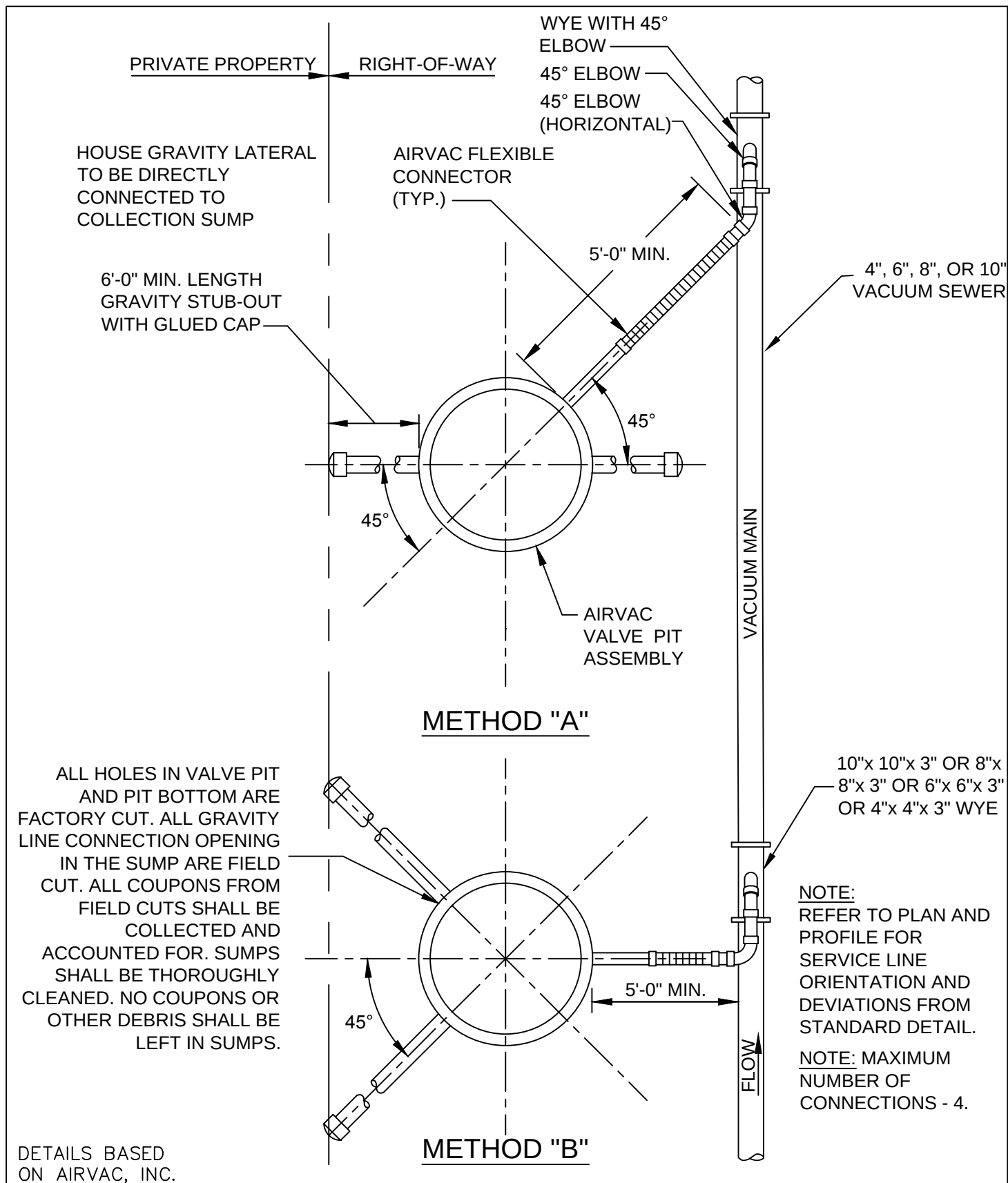


OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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OCT. 2015

CONNECTION TO OUA FORCE MAIN FROM
PRIVATE LIFT STATION

PAGE No
D54

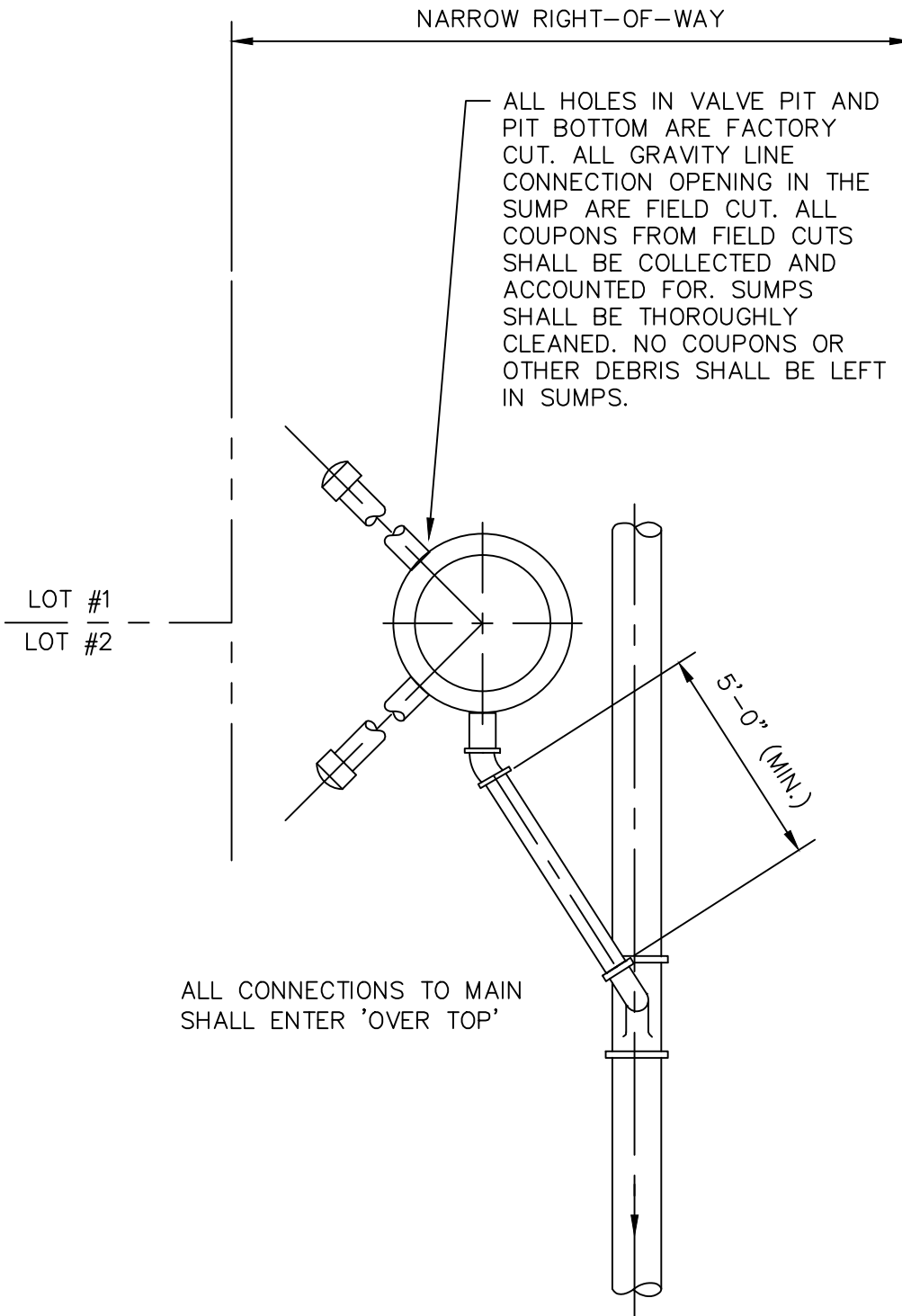


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TYPICAL VALVE PIT INSTALLATION

PAGE No
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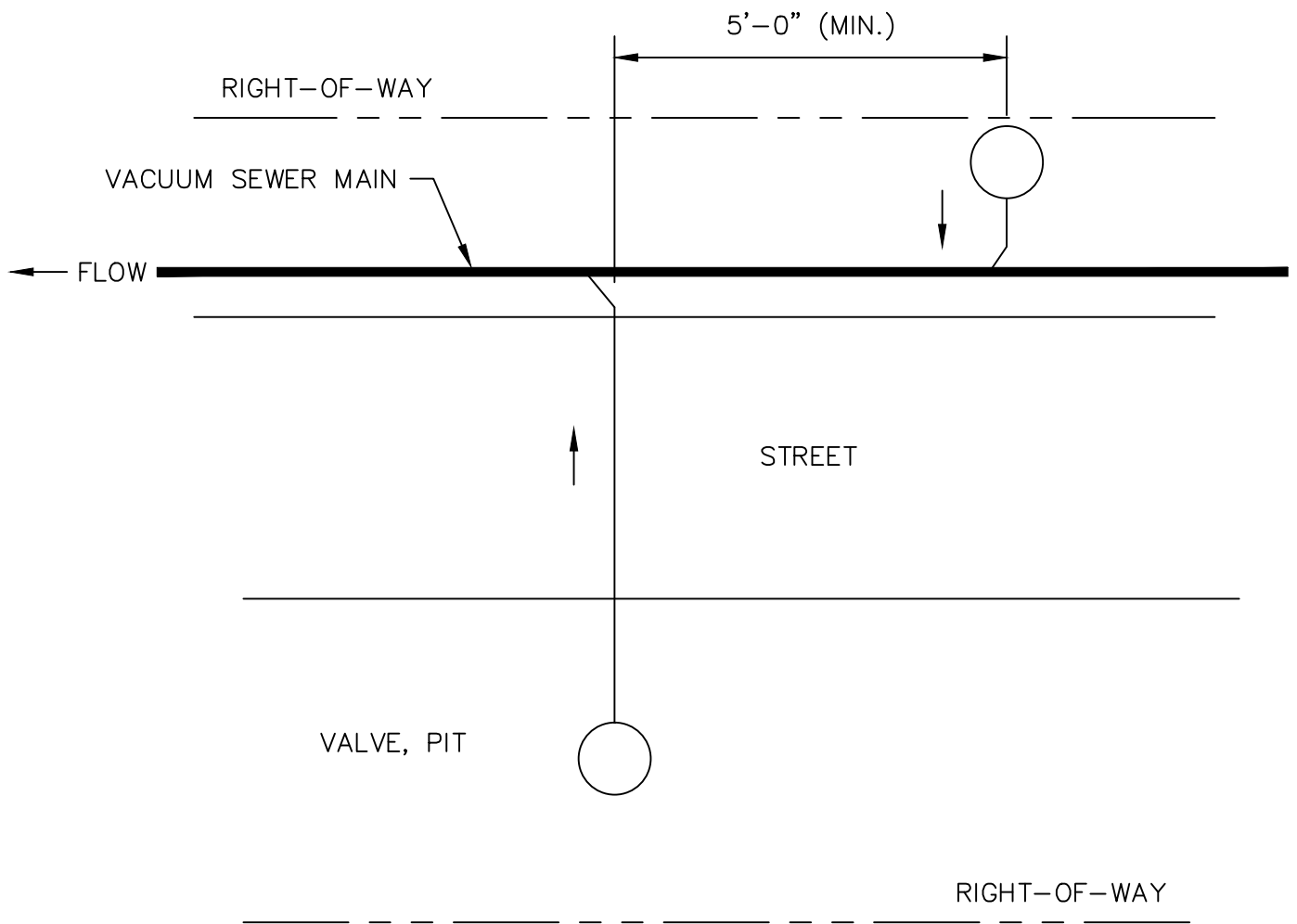
DETAILS BASED
ON AIRVAC, INC.

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VALVE PIT INSTALLATION NARROW ROW

PAGE No
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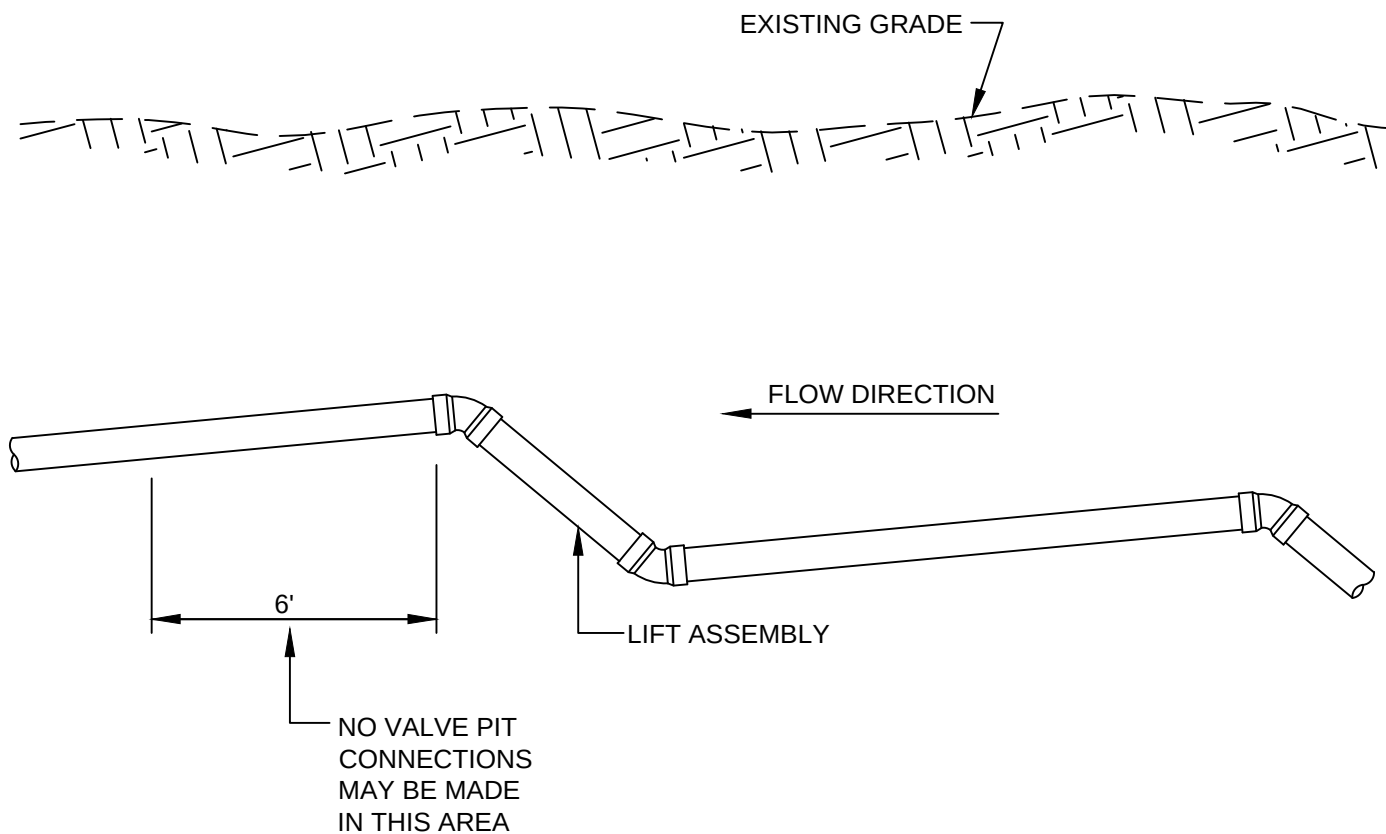
DETAILS BASED
ON AIRVAC, INC.

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MINIMUM SPACING BETWEEN CONNECTIONS

PAGE No
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DETAILS BASED
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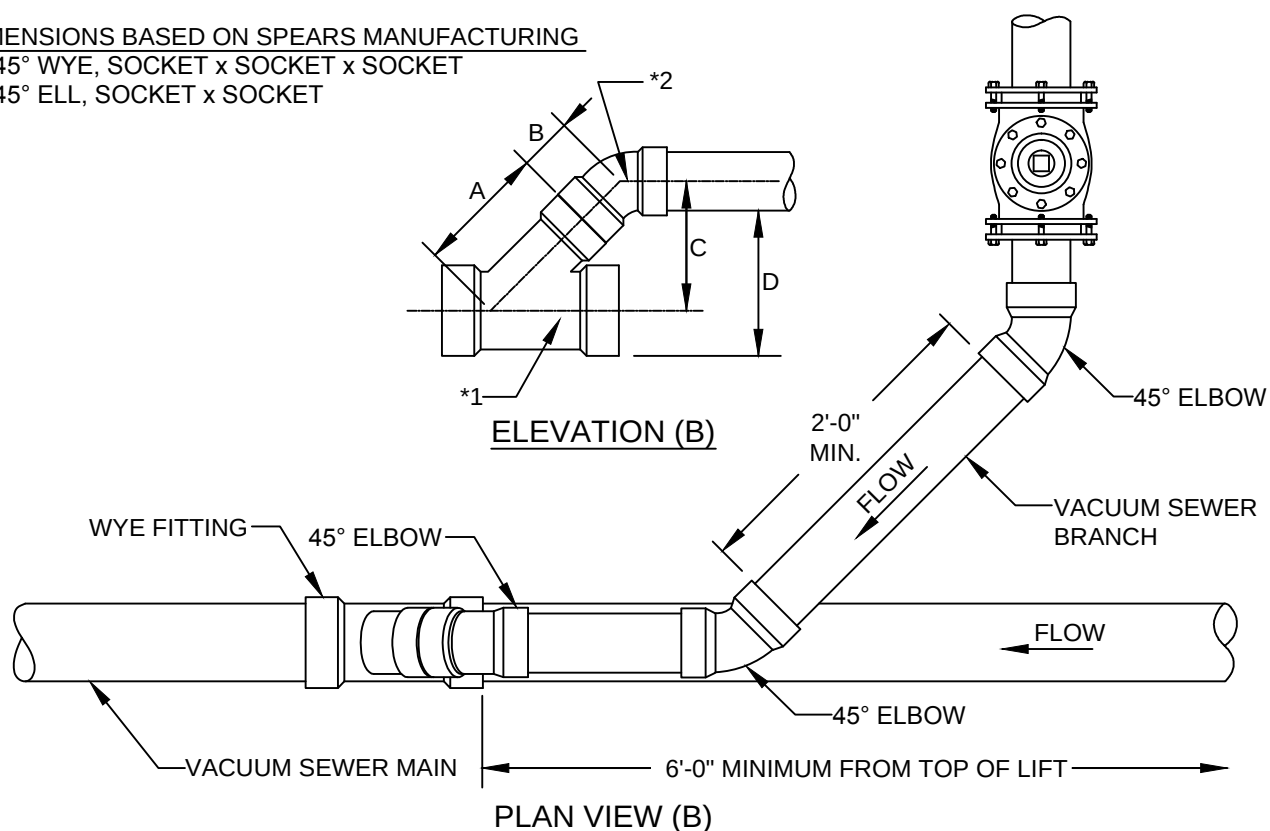
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OCT. 2015

PROHIBITED CONNECTIONS

PAGE No
V-4

*DIMENSIONS BASED ON SPEARS MANUFACTURING

1. 45° WYE, SOCKET x SOCKET x SOCKET
2. 45° ELL, SOCKET x SOCKET



WYE SIZE	A	B	C	D- INVERT
4 x 4 x 4	8 1/4"	3 3/32"	8.02"	0.67'
4 x 4 x 3	8 7/8"	2 7/8"	8.30"	0.63'
6 x 6 x 6	11 21/32"	5 7/32"	11.93"	0.99'
6 x 6 x 4	10 1/4"	3 3/32"	9.44"	0.78'
6 x 6 x 3	10 1/4"	2 7/8"	9.28"	0.77'
8 x 8 x 8	15 1/4"	6 7/16"	15.34"	1.28'
8 x 8 x 6	16 1/8"	5 7/32"	15.09"	1.26'
8 x 8 x 4	14 1/4"	3 3/32"	12.26"	1.02'
8 x 8 x 3	13"	3 7/8"	11.22"	0.94'
10 x 10 x 10	22 1/8"	8 1/8"	21.34"	1.78'
10 x 10 x 8	16 25/32"	6 7/16"	16.42"	1.37'
10 x 10 x 6	15 7/8"	5 7/32"	14.92"	1.24'
10 x 10 x 4	15 1/2"	3 3/32"	13.15"	1.10'
10 x 10 x 3	14 5/8"	2 7/8"	12.37"	1.03'

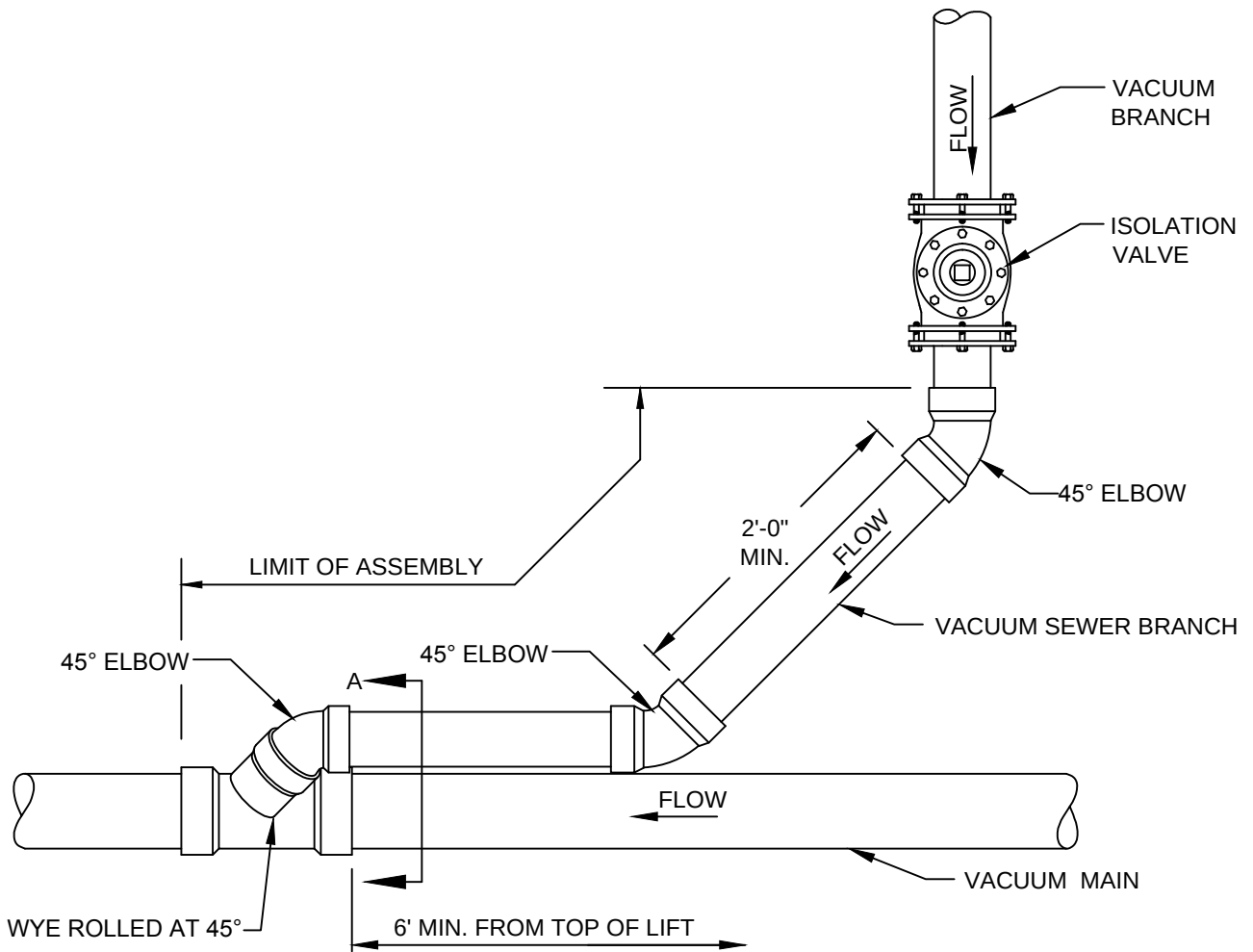
DETAILS BASED
ON AIRVAC, INC.

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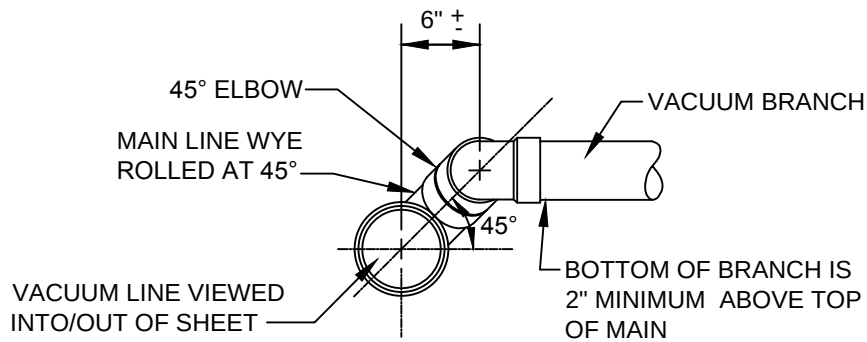
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VACUUM BRANCH TO MAIN LINE CONNECTION – OPTION 1

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PLAN VIEW



SECTION A-A

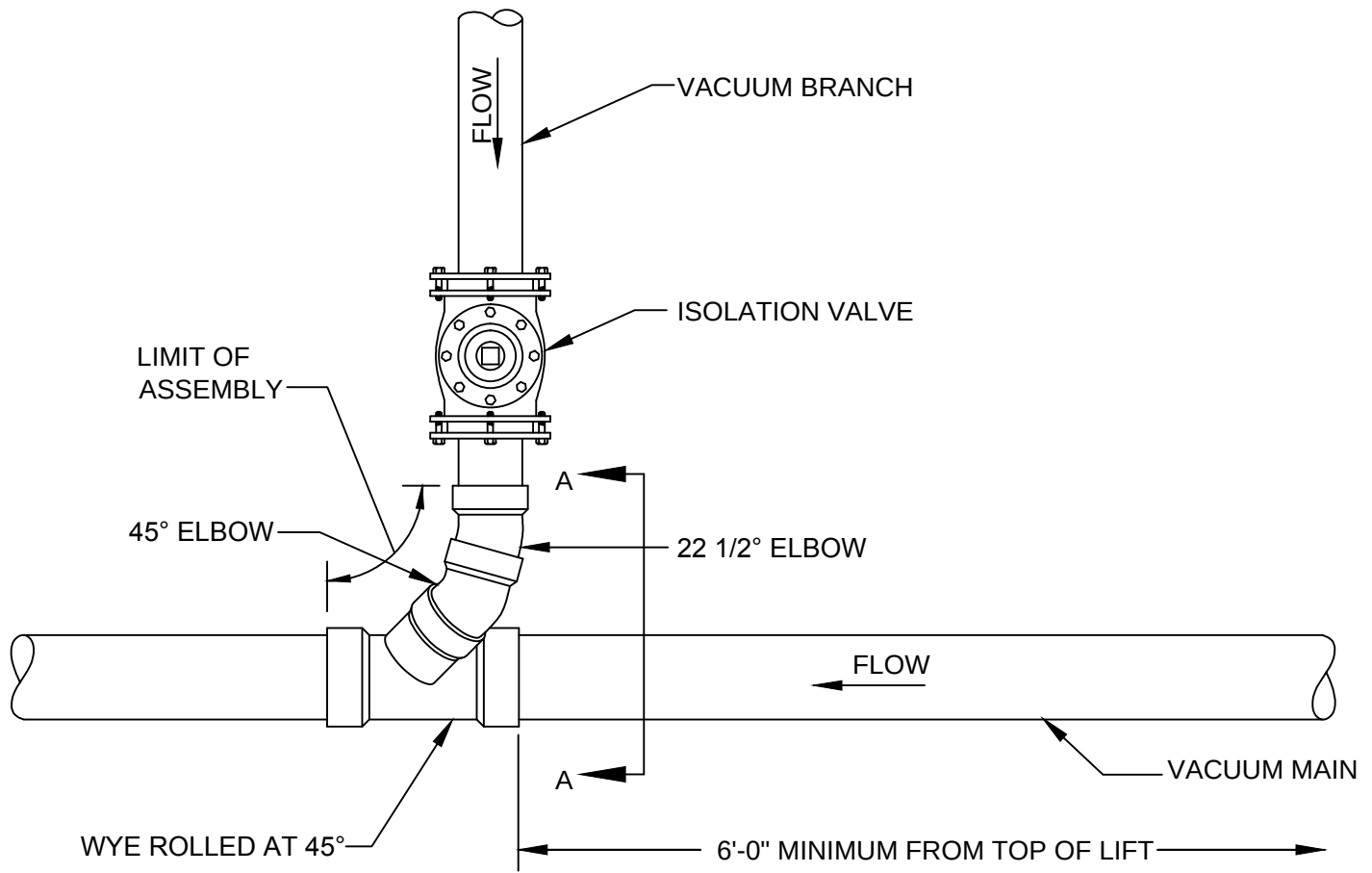
DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

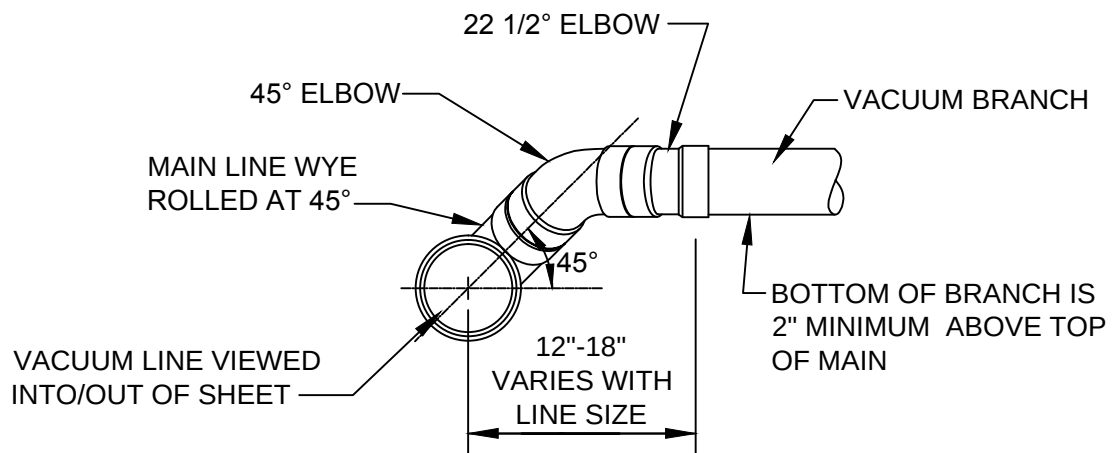
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VACUUM BRANCH TO MAIN LINE CONNECTION – OPTION 2

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PLAN VIEW (A)



SECTION A-A

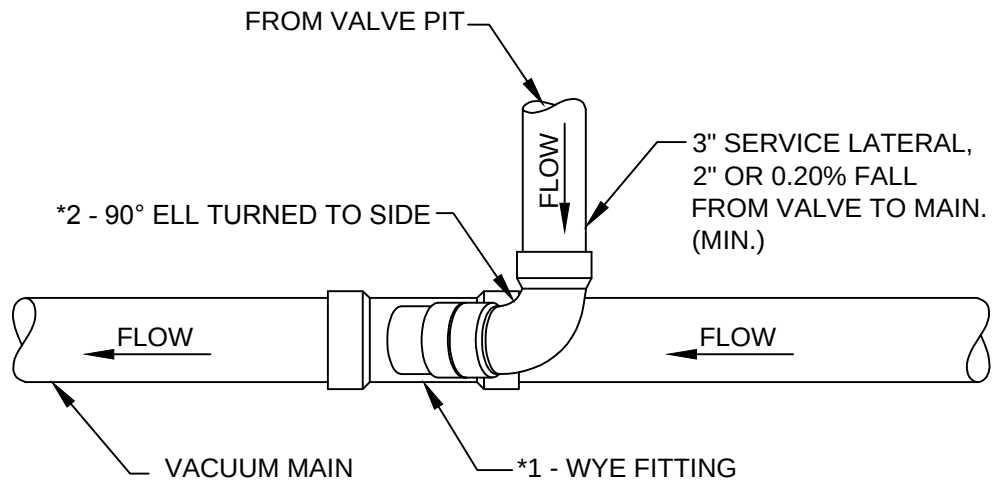
DETAILS BASED
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OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

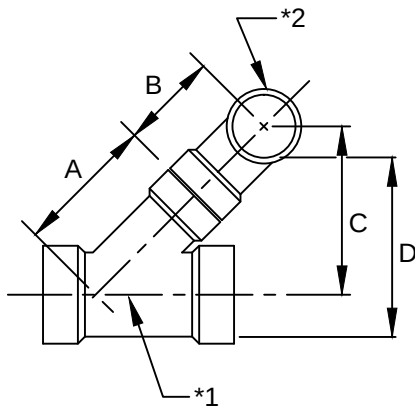
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VACUUM BRANCH TO MAIN LINE CONNECTION – OPTION 3

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V-5B



PLAN VIEW



ELEVATION

* DIMENSIONS BASED ON SPEARS MANUFACTURING

1. 45 DEG WYE, SOCKET x SOCKET x SOCKET
2. 90 DEG ELL, SOCKET x SOCKET

WYE SIZE	A	B	C	D- INVERT
4 x 4 x 3	9 1/4"	3 25/32"	9.32"	0.78'
6 x 6 x 3	10 1/2"	3 25/32"	10.21"	0.85'
8 x 8 x 3	13"	3 25/32"	11.86"	1.00'
10 x 10 x 3	14 3/8"	3 25/32"	12.84"	1.10'

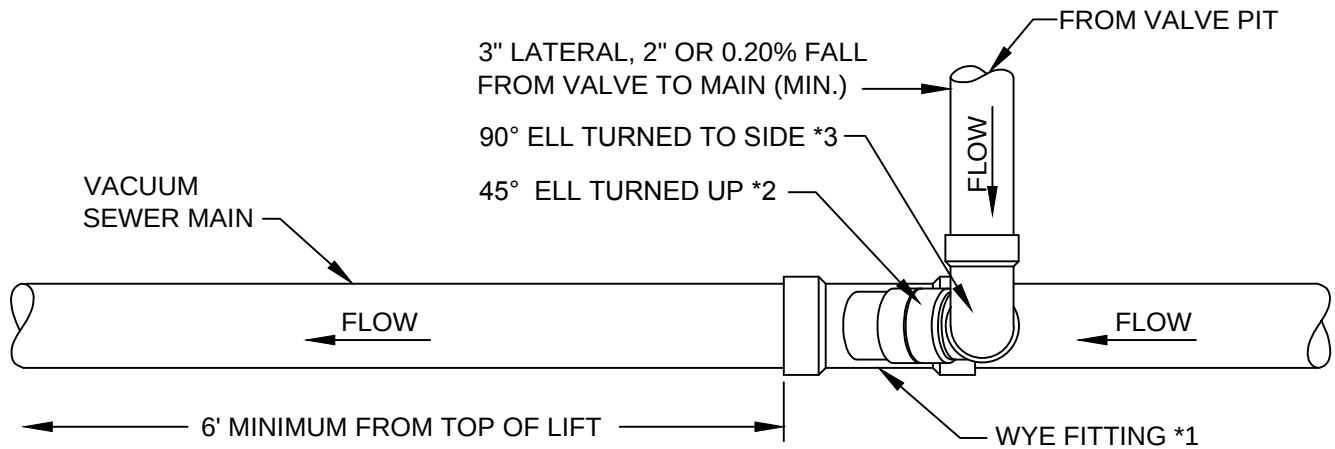
DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

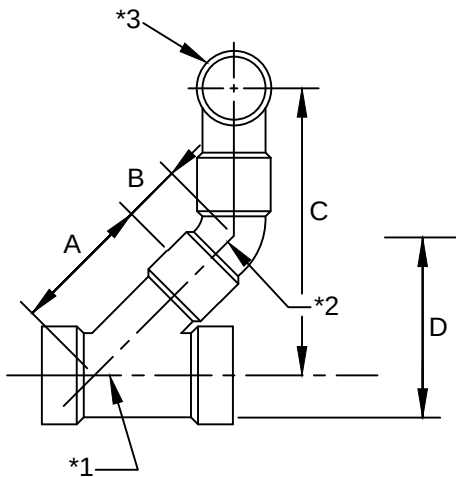
REVISION
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PREFERRED VALVE PIT TO MAIN CONNECTIONS

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PLAN VIEW



ELEVATION

* DIMENSIONS BASED ON SPEARS MANUFACTURING

1. 45 DEG WYE, SOCKET x SOCKET x SOCKET
2. 45 DEG ELL, SOCKET x SOCKET
3. 90 DEG ELL, SOCKET x SOCKET

WYE SIZE	A	B	C	D	E	F- INVERT
4 x 4 x 3	8 7/8"	2 7/8"	2 7/8"	3 23/32"	14.93"	1.24'
6 x 6 x 3	10 1/4"	2 7/8"	2 7/8"	3 23/32"	15.35"	1.32'
8 x 8 x 3	13"	2 7/8"	2 7/8"	3 23/32"	17.82"	1.48'
10 x 10 x 3	14 5/8"	2 7/8"	2 7/8"	3 23/32"	18.97"	1.58'

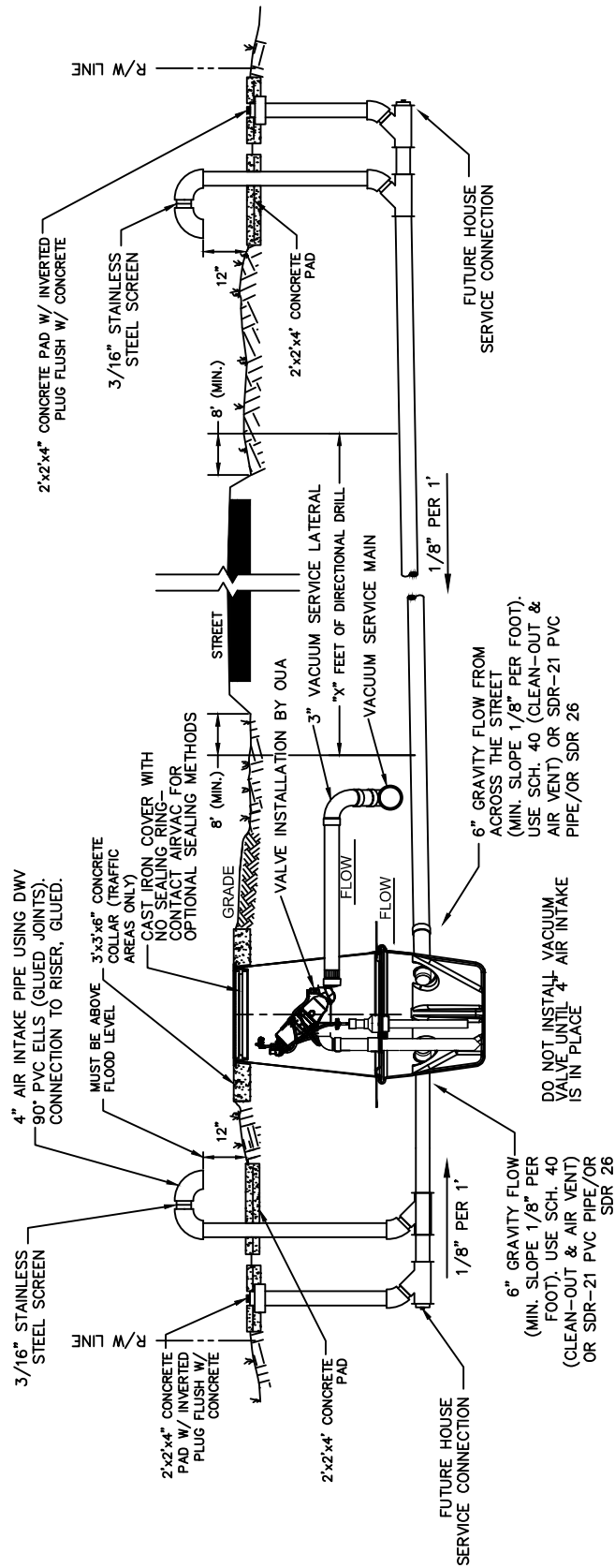
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ALTERNATE VALVE PIT TO MAIN CONNECTIONS

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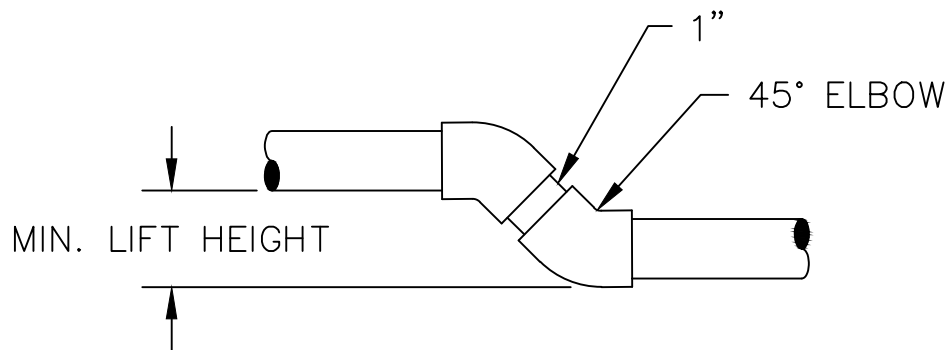
DETAILS BASED
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VALVE PIT / CONNECTION DETAILS

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3" PIPE	0.42 FT
4" PIPE	0.43 FT
6" PIPE	0.71 FT
8" PIPE	0.86 FT
10" PIPE	1.07 FT

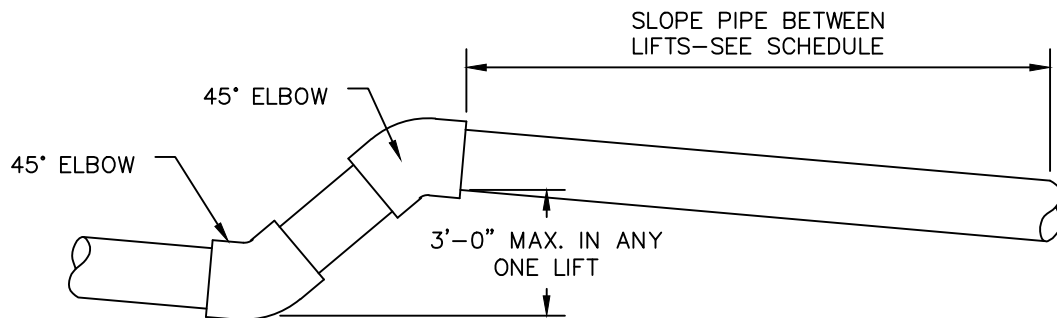
DETAILS BASED
ON AIRVAC, INC.

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OCT. 2015

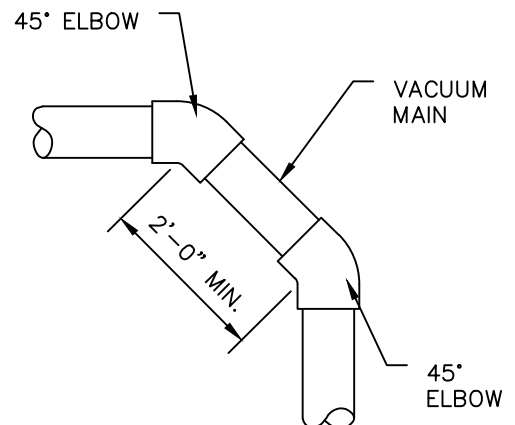
MINIMUM LIFT HEIGHT

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SLOPE SCHEDULE				
PIPE DIAMETER	MINIMUM FALL	0.2% OF DISTANCE		
3"	0.20 FT	0.2%	100 FT	▲
4"	0.25 FT	0.2%	125 FT	▲
6"	0.25 FT	0.2%	125 FT	▲
8"	0.25 FT	0.2%	125 FT	▲
10"	0.25 FT	0.2%	125 FT	▲

USE WHICHEVER SLOPE IS GREATER BETWEEN LIFTS. ABOVE THIS LENGTH ▲ IN DISTANCE, THE 0.2% SLOPE IS GREATER. ANYTHING SHORTER THAN THIS DISTANCE SHOULD USE MINIMUM FALL INDICATED. WHEN NOT BETWEEN TWO LIFTS, USE 0.2% SLOPE.



CHANGE IN DIRECTION

* 90° FITTINGS ARE NOT TO BE USED FOR CHANGE IN DIRECTION

DETAILS BASED
ON AIRVAC, INC.

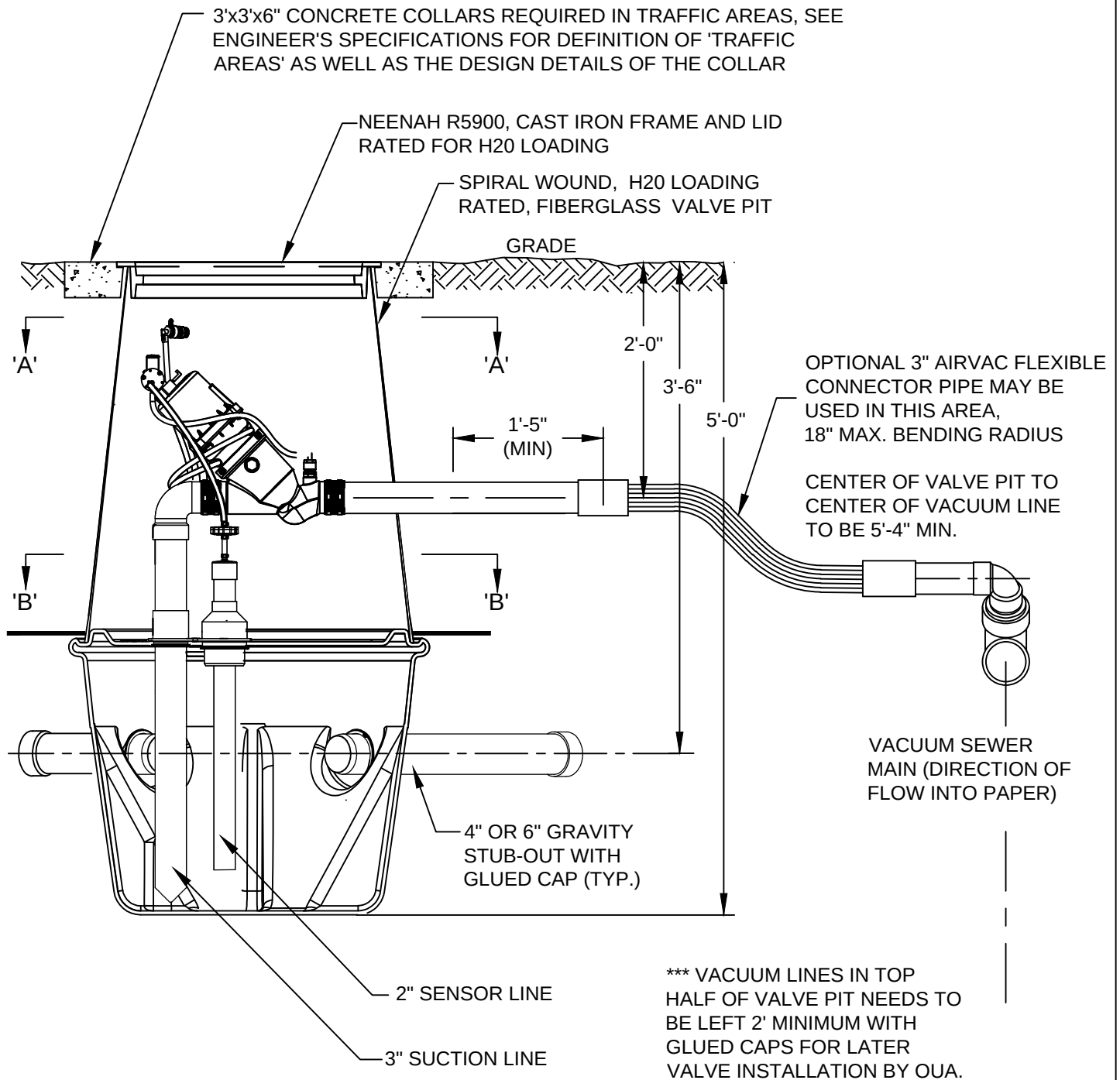
OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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OCT. 2015

LIFT DETAIL AND SLOPE SCHEDULE

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MODEL VP3030H



DETAILS BASED
ON AIRVAC, INC.

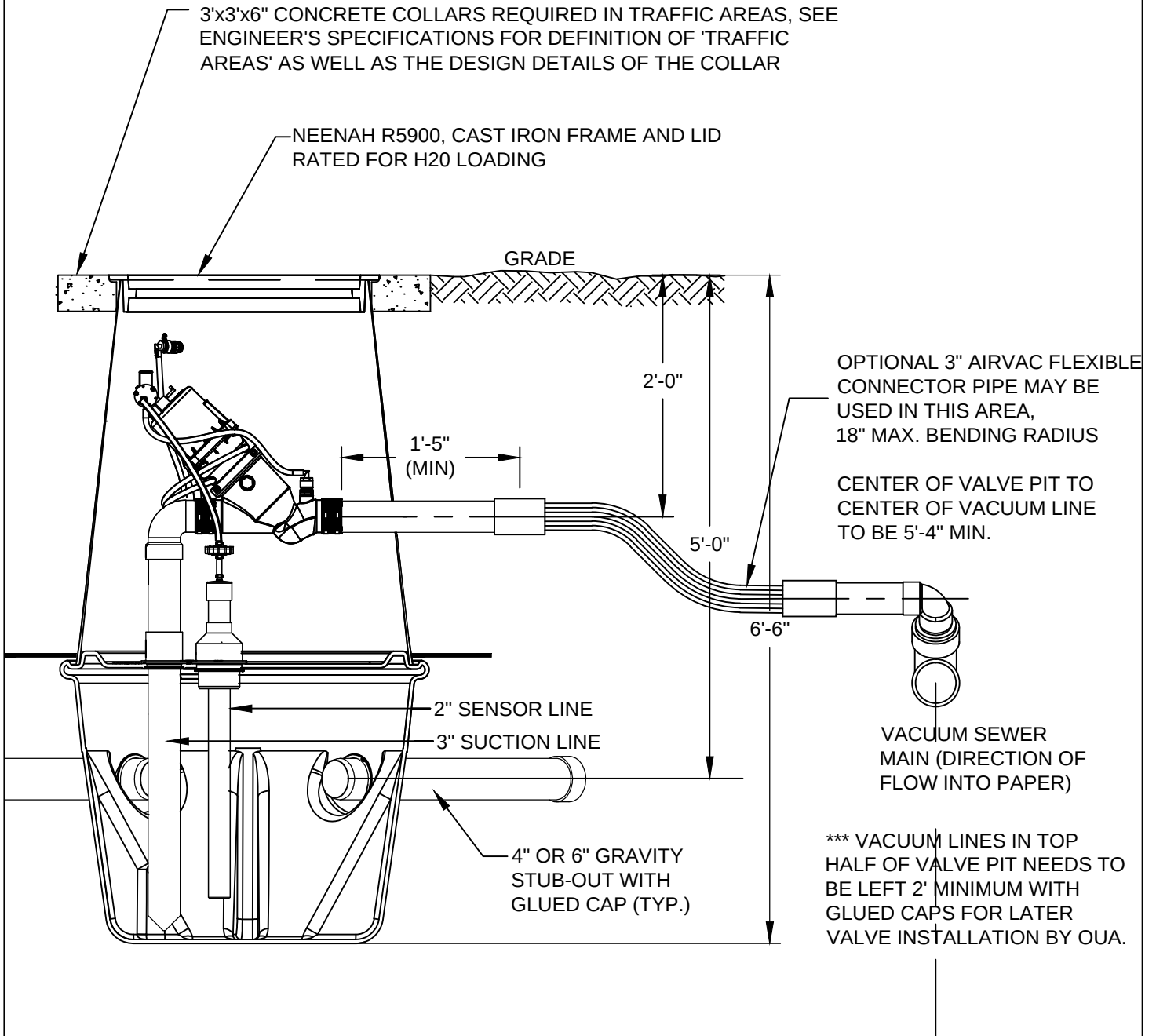
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AIRVAC 2 PIECE VALVE PIT – 5' DEEP

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MODEL VP3042H



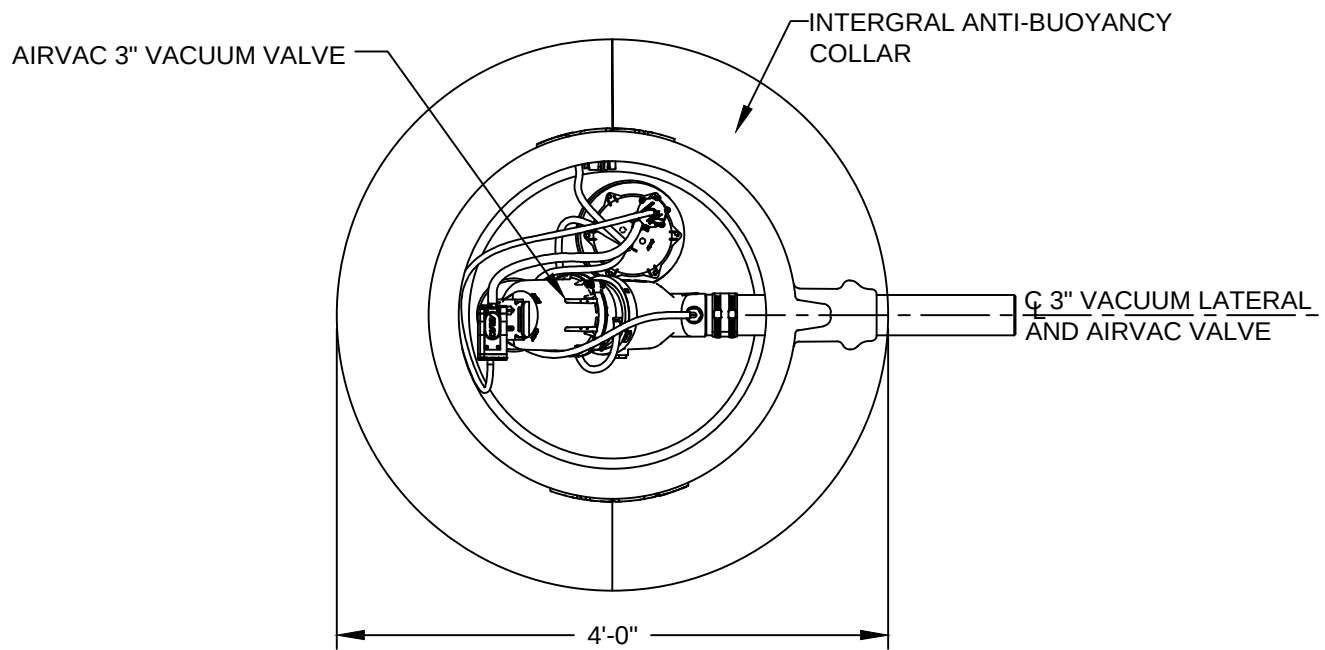
DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

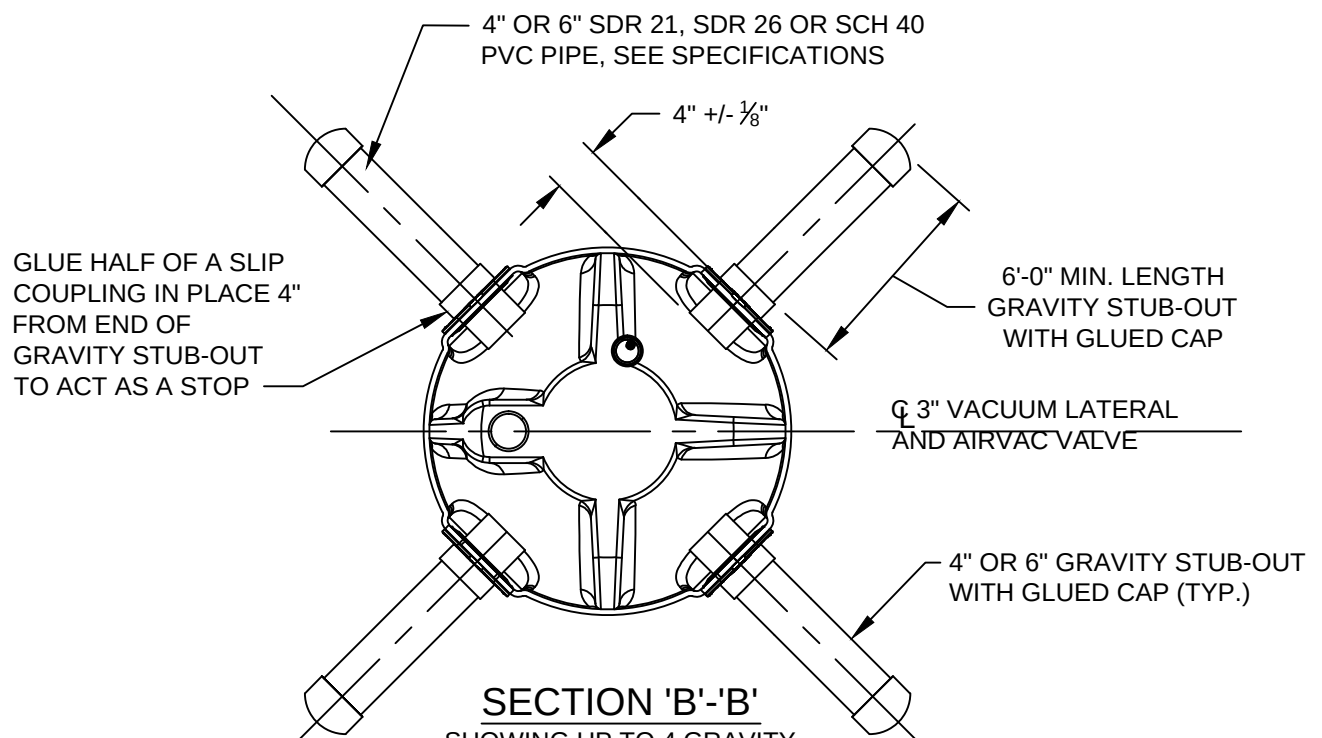
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AIRVAC 2 PIECE VALVE PIT – 6' DEEP

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SECTION 'A'-A'



SECTION 'B'-B'
SHOWING UP TO 4 GRAVITY
CONNECTIONS TO SUMP

NOTE: WHEN INSTALLING ANY PIPE THROUGH A GROMMET USE ONLY WATER OR MILD DETERGENT AS A LUBRICANT. NEVER USE PIPE JOINT GREASE.

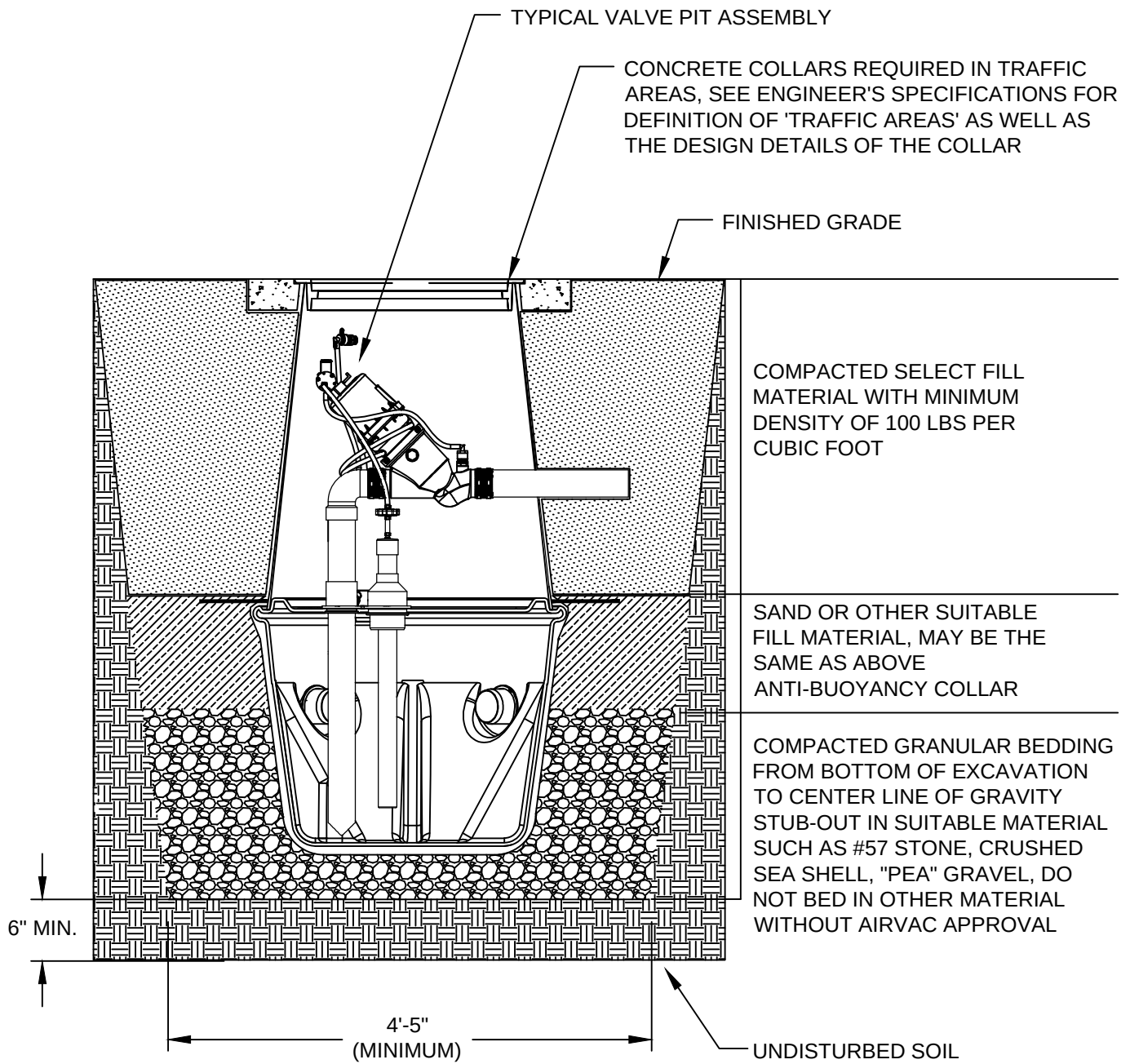
DETAILS BASED
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VALVE PIT SECTIONS 'A' AND 'B'

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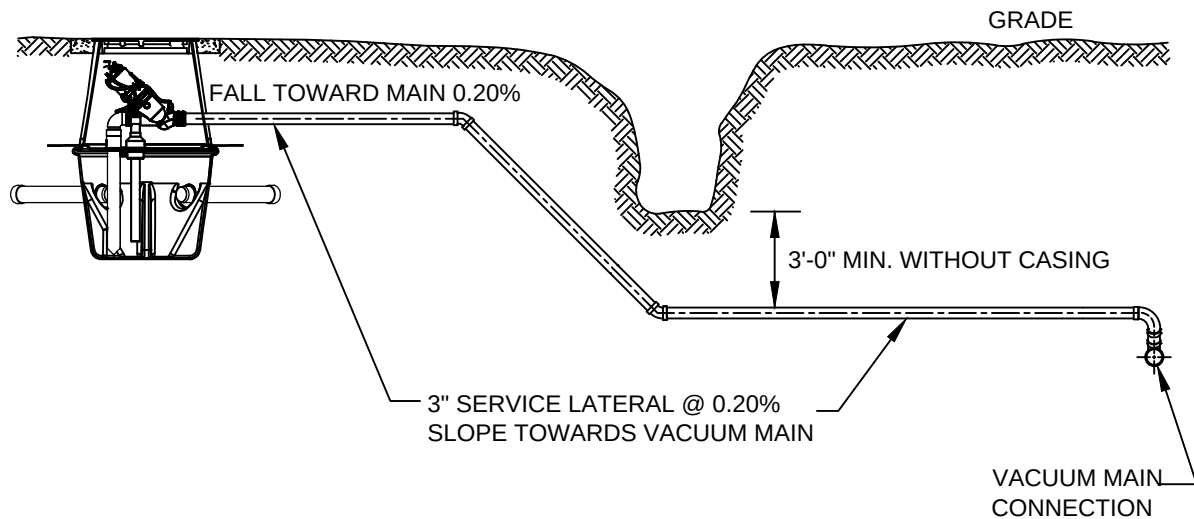
DETAILS BASED
ON AIRVAC, INC.

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VALVE PIT BEDDING AND BACK FILL

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NOTES:

1. ALL GROMMETS FOR VALVE PIT AND SUMP SUPPLIED BY MANUFACTURER.
2. ALL HOLES IN VALVE PIT AND PIT BOTTOM ARE FACTORY CUT. ALL GRAVITY LINE CONNECTION OPENING IN THE SUMP ARE FIELD CUT. ALL COUPONS FROM FIELD CUTS SHALL BE COLLECTED AND ACCOUNTED FOR. SUMPS SHALL BE THOROUGHLY CLEANED. NO COUPONS OR OTHER DEBRIS SHALL BE LEFT IN SUMPS.
3. ONLY HOMES OR APARTMENTS WHOSE LOWER FLOOR ELEVATIONS ARE THE SAME SHOULD BE CONNECTED TO A COMMON VACUUM VALVE PIT INSTALLATION. WITH MULTIPLE FLOOR APARTMENTS, EACH FLOOR LEVEL SHOULD BE SERVICED BY ITS OWN VACUUM VALVE PIT PKG.
4. WHEN INSTALLING ANY PIPE THROUGH A GROMMET, USE ONLY WATER OR MILD DETERGENT AS A LUBRICANT, NEVER USE PIPE JOINT GREASE.
5. DO NOT INSTALL VACUUM VALVE UNTIL HOME GRAVITY LINE IS NEARING COMPLETION AND AIR INTAKE PIPING IS IN PLACE.
6. INTERNAL SUMP BREATHER IS TO BE EQUIPPED WITH AUTOMATIC SHUT OFF DEVICES TO PREVENT LIQUID CONTAMINATION OF THE CONTROLLER AND INTERFACE VALVE DURING AN EMERGENCY HIGH LIQUID LEVEL EVENT. THESE DEVICES SHALL BE POSITIVE SEALING, SHALL NOT INHIBIT THE VALVE'S PERFORMANCE UNDER NORMAL CONDITIONS AND SHALL RESET AUTOMATICALLY WHEN RECOVERING FROM AN EMERGENCY HIGH LIQUID LEVEL EVENT.

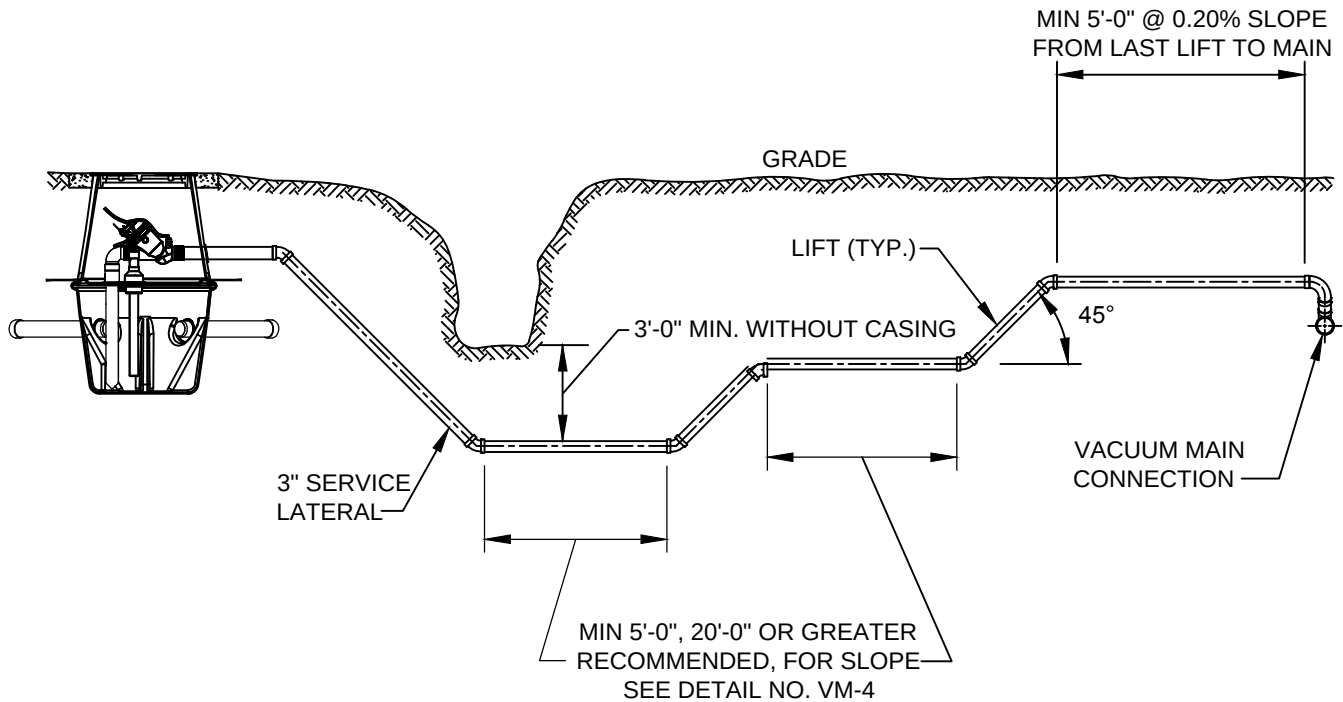
DETAILS BASED
ON AIRVAC, INC.

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SERVICE LATERAL – CROSSING A SWALE WITH NO LIFTS

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SERVICE LATERAL NOTES	
MINIMUM SLOPE ON 3" SERVICE LATERAL	0.20%
MINIMUM SLOPE BETWEEN LIFTS	SEE DETAIL NO. V-9
MAXIMUM NUMBER OF LIFTS	5
MINIMUM DISTANCE, VALVE PIT TO FIRST LIFT	5'-0"
MINIMUM DISTANCE, LAST LIFT TO VACUUM MAIN	5'-0"
MAXIMUM LIFT HEIGHT	3'-0"
RECOMMENDED LIFT HEIGHT	1'-0"

NOTES:

1. ALL GROMMETS FOR VALVE PIT AND SUMP SUPPLIED BY MANUFACTURER.
2. ALL HOLES IN VALVE PIT AND PIT BOTTOM ARE FACTORY CUT. ALL GRAVITY LINE CONNECTION OPENING IN THE SUMP ARE FIELD CUT. ALL COUPONS FROM FIELD CUTS SHALL BE COLLECTED AND ACCOUNTED FOR. SUMPS SHALL BE THOROUGHLY CLEANED. NO COUPONS OR OTHER DEBRIS SHALL BE LEFT IN SUMPS.
3. ONLY HOMES OR APARTMENTS WHOSE LOWER FLOOR ELEVATIONS ARE THE SAME SHOULD BE CONNECTED TO A COMMON VACUUM VALVE PIT INSTALLATION. WITH MULTIPLE FLOOR APARTMENTS, EACH FLOOR LEVEL SHOULD BE SERVICED BY ITS OWN VACUUM VALVE PIT PKG.
4. WHEN INSTALLING ANY PIPE THROUGH A GROMMET, USE ONLY WATER OR MILD DETERGENT AS A LUBRICANT, NEVER USE PIPE JOINT GREASE.
5. DO NOT INSTALL VACUUM VALVE UNTIL HOME GRAVITY LINE IS NEARING COMPLETION AND AIR INTAKE PIPING IS IN PLACE.
6. INTERNAL SUMP BREATHER IS TO BE EQUIPPED WITH AUTOMATIC SHUT OFF DEVICES TO PREVENT LIQUID CONTAMINATION OF THE CONTROLLER AND INTERFACE VALVE DURING AN EMERGENCY HIGH LIQUID LEVEL EVENT. THESE DEVICES SHALL BE POSITIVE SEALING, SHALL NOT INHIBIT THE VALVE'S PERFORMANCE UNDER NORMAL CONDITIONS AND SHALL RESET AUTOMATICALLY WHEN RECOVERING FROM AN EMERGENCY HIGH LIQUID LEVEL EVENT.

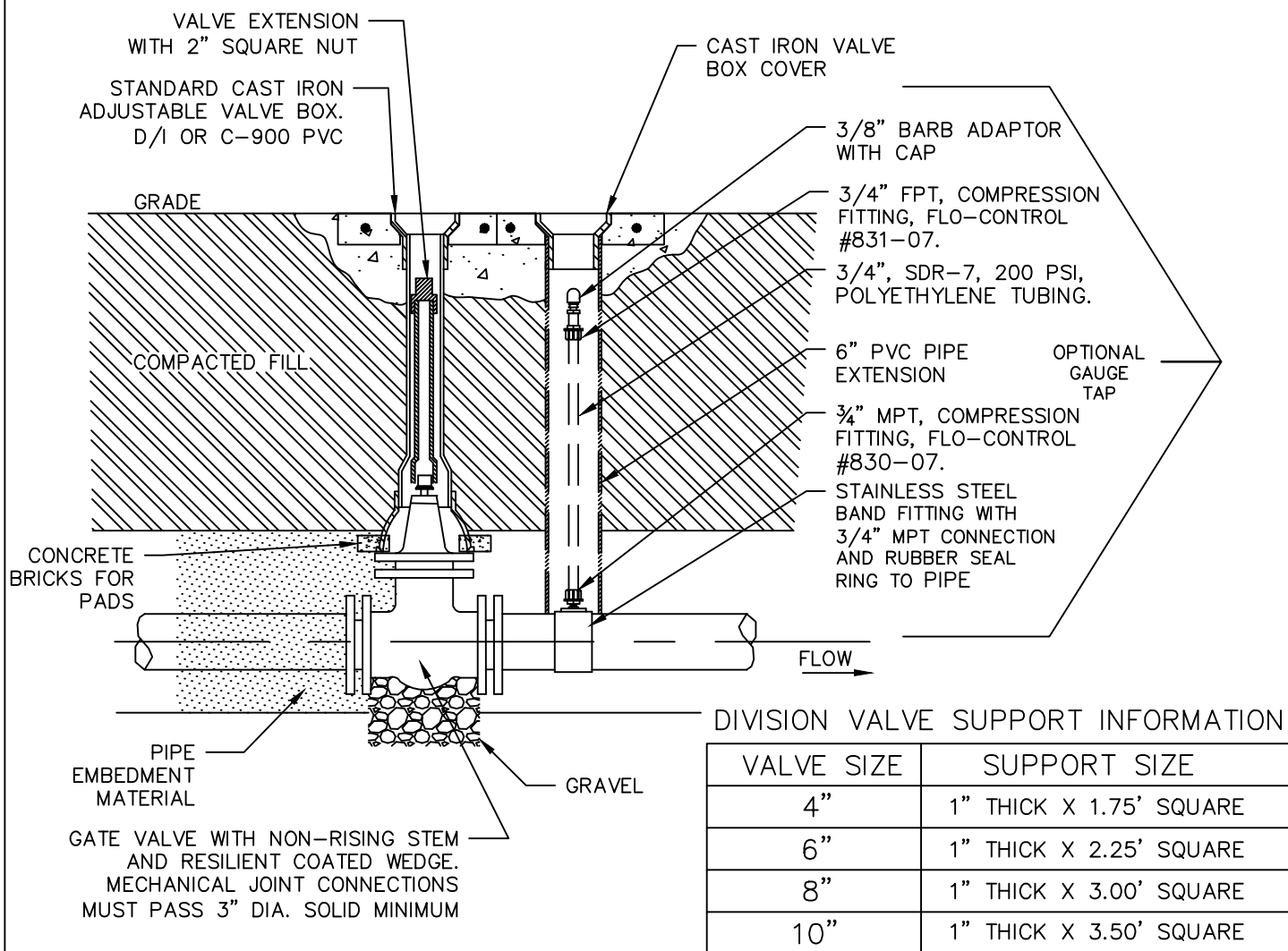
DETAILS BASED
ON AIRVAC, INC.

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SERVICE LATERAL – CROSSING A SWALE WITH LIFTS

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DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

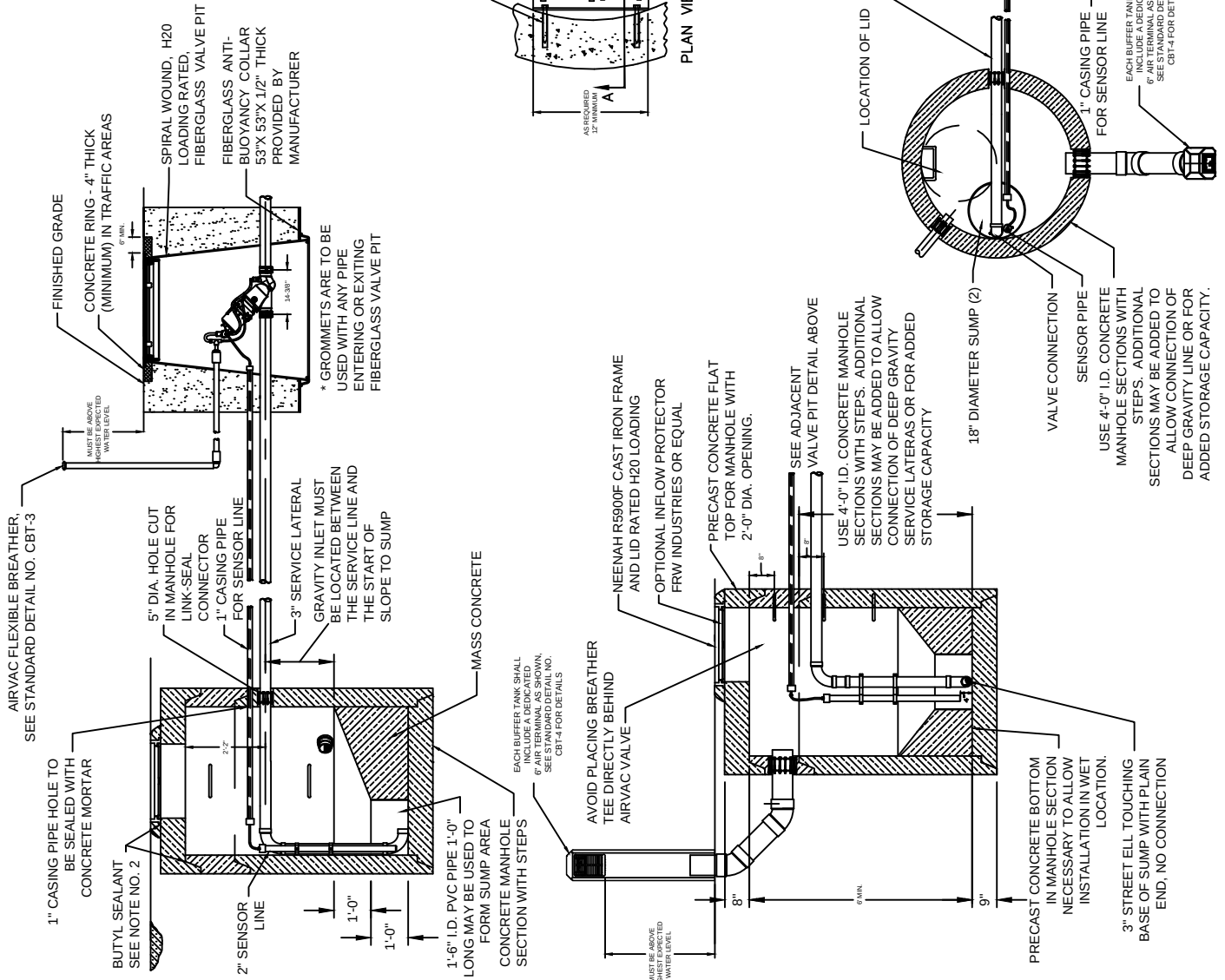
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DIVISION VALVE AND OPTIONAL GAUGE TAP

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DETAILS BASED
ON AIRVAC, INC.

- NOTE:**
1. BREATHER DOME HEIGHT MUST BE ABOVE FLOOD LEVEL AND SHOULD BE PLACED NEXT TO A STATIONARY OBJECT.
 2. BUFFER TANK UNIT MUST BE WATER TIGHT. SEAL ALL JOINTS WITH BUTYL SEALANT. TEST FOR LEAKS PER AIRVAC SPECIFICATIONS IN INSTALLATION MANUAL.
 3. ANY LIFT EXCEEDING 6' MUST BE ADDED TO HEAD LOSSES ON VACUUM MAIN AND SERVICE LINE TO DETERMINE IF SUFFICIENT VACUUM HEAD IS AVAILABLE.
 4. VALVE MUST BE IN SEPARATE PIT OUTSIDE OF BUFFER TANK
 5. SECURE 2" SENSOR PIPE AND 3" SUCTION PIPE TO BUFFER TANK SIDE WALL WITH STAINLESS STEEL UNISTRUT, SEE STANDARD DETAIL NO. CBT-6.
 6. SEWER RAIN GUARDS SHALL BE INSTALLED ON ALL MANHOLES.
 7. SEWER RAIN GUARDS SHALL BE AS MANUFACTURED BY FOSCO-PRCO INDUSTRIES, INC. OR SOUTH WEST PACKING AND SEALS, INC. OR APPROVAL EQUAL.
 8. COAT INTERIOR & EXTERIOR WITH 2 COATS COAL TAR EPOXY, 8 MIL. DFT MIN. EACH COAT



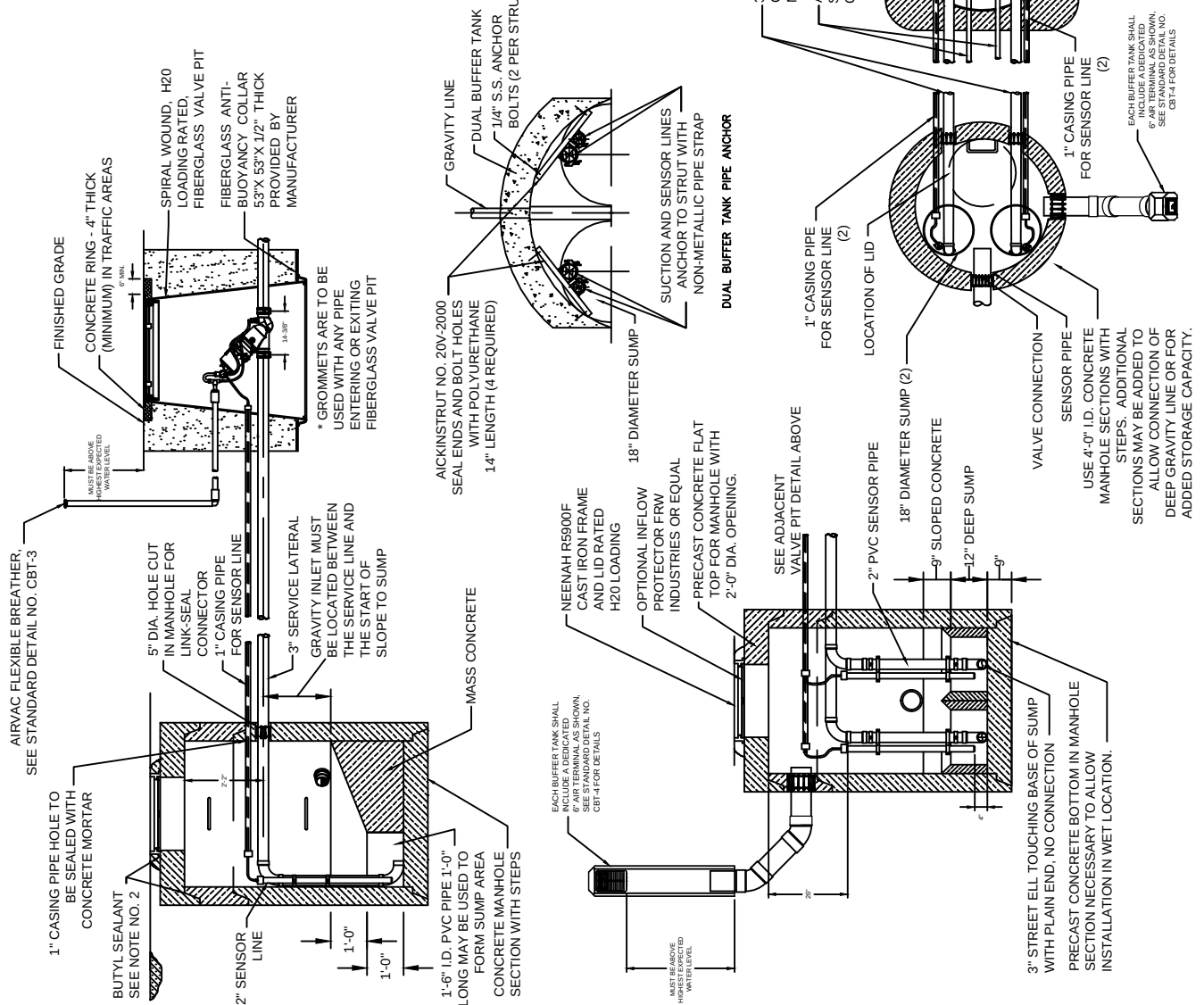
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SINGLE BUFFER TANK DETAILS

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- NOTE:
1. BREATHER DOME HEIGHT MUST BE ABOVE FLOOD LEVEL AND SHOULD BE PLACED NEXT TO A STATIONARY OBJECT.
 2. BUFFER TANK UNIT MUST BE WATER TIGHT. SEAL ALL JOINTS WITH BUTYL SEALANT. TEST FOR LEAKS PER AIRVAC SPECIFICATIONS IN INSTALLATION MANUAL.
 3. ANY LIFT EXCEEDING 6' MUST BE ADDED TO HEAD LOSSES ON VACUUM MAIN AND SERVICE LINE TO DETERMINE IF SUFFICIENT VACUUM HEAD IS AVAILABLE.
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 8. COAT INTERIOR & EXTERIOR WITH 2 COATS COAL TAR EPOXY, 8 MIL. DFT MIN. EACH COAT



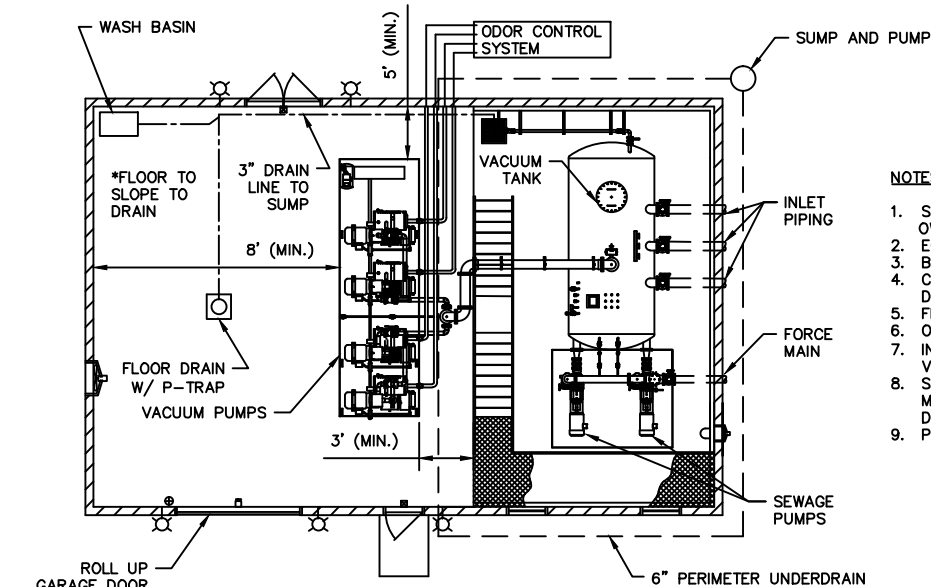
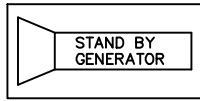
DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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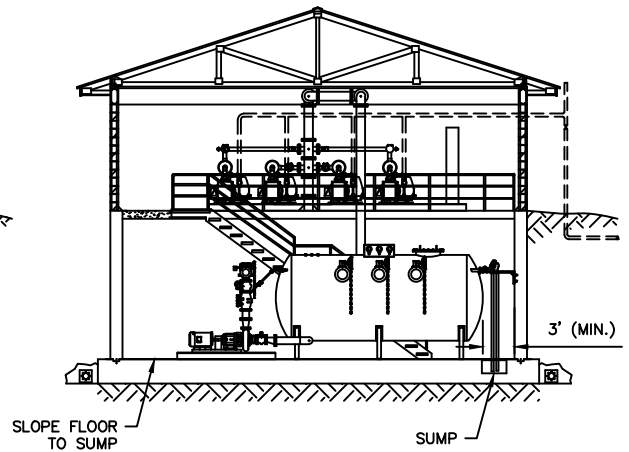
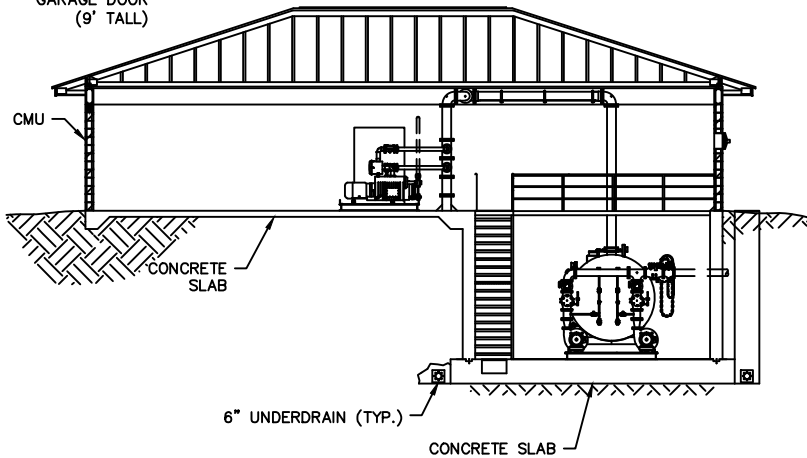
DUAL BUFFER TANK DETAILS

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NOTES:

1. SCHEMATIC ONLY. OPTIONAL DESIGNS MAY BE SUBMITTED TO OWNER OR OUA FOR APPROVAL.
2. EQUIPMENT SELECTION AND SIZING BY ENGINEER OF RECORD.
3. BUILDING DESIGN BY QUALIFIED PROFESSIONALS.
4. COORDINATE BUILDING FINISHES AND ROOF WITH OUA AND DEVELOPER.
5. FINAL DESIGN APPROVAL BY OUA.
6. ODOR CONTROL SYSTEM TO BE APPROVED BY OUA.
7. INCORPORATE APPROPRIATE DOORS/WINDOWS, LIGHTING, VENTILATION SYSTEM, SOUNDPROOFING, ETC.
8. STANDBY GENERATOR SHALL BE WEATHERPROOF, EXTERNALLY MOUNTED IN A LOCATION APPROVED BY OUA. PROVIDE SHOP DRAWINGS FOR REVIEW BY OUA.
9. PERIMETER DRAINS AND SUMP SHALL BE REQUIRED.



DETAILS BASED
ON AIRVAC, INC.

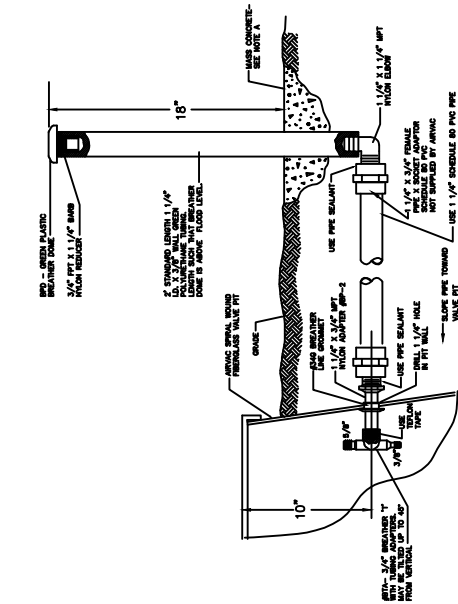
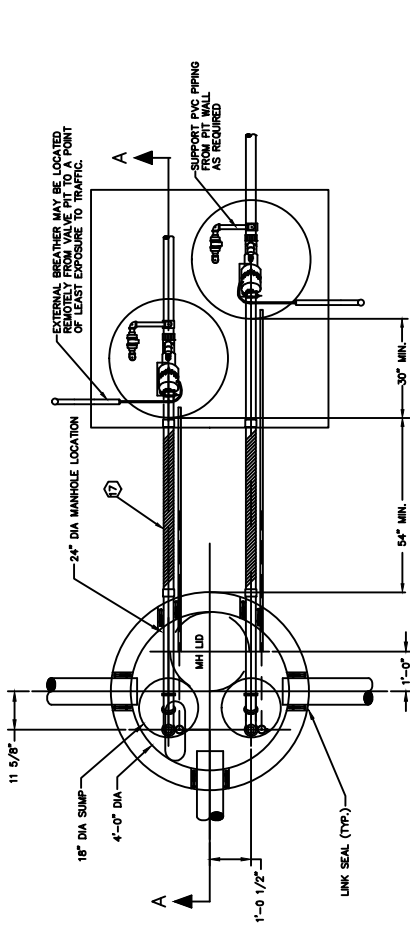
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VACUUM STATION LAYOUT

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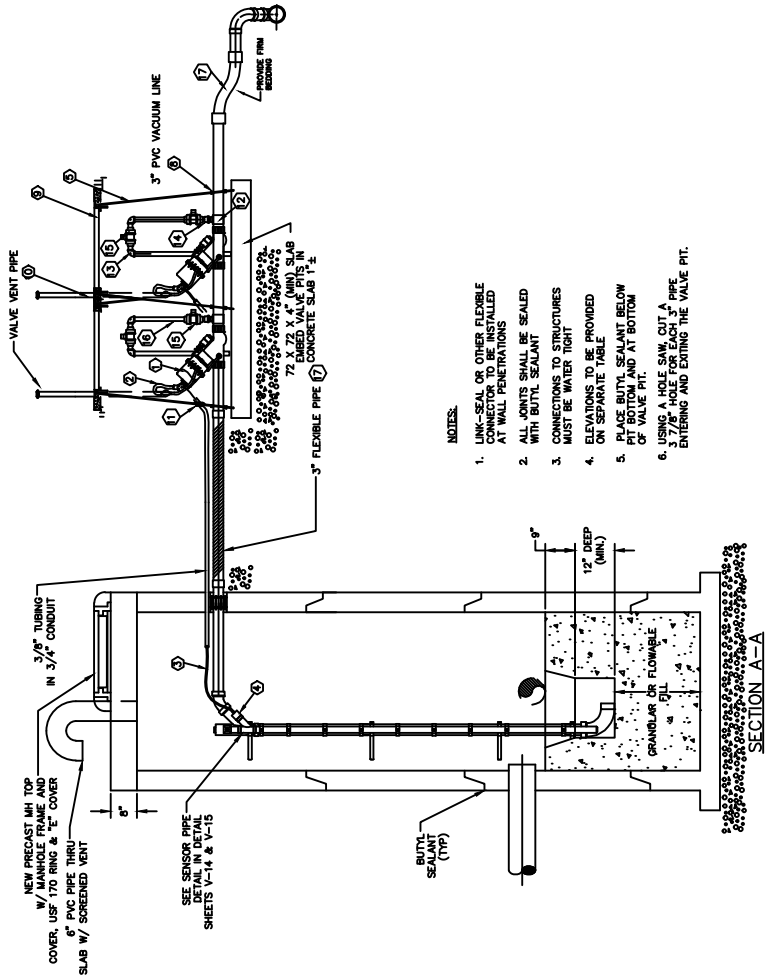
DES.	QTY	DESCRIPTION
1	2	3" AIRVAC VALVE WITH CONTROLLER AND NO HUBS
2	2	VALVE AND TUBING SETS WITH CLAMPS, NO SURGE SUPPRESSOR
3	20	EXTRA TUBING FOR REMOTE SENSOR (20 LF)
4	2	2" PVC SENSOR CAP
5	2	FIBERGLASS VALVE PIT WITH NO HOLES
6	2	NOT USED
7	2	NOT USED
8	4	3" AIRVAC GROMMETS
9	2	TRAFFIC BEARING FRAME AND COVER
10	2	EXTERNAL BREATHING ASSEMBLY LESS CONNECTING PIPE
11	2	3/4" GROMMETS
12	2	FORD (OR EQUAL) PIPE REPAIR CLAMP FOR 3" SDR 21 PVC PIPE WITH A 1" FEMALE PIPE THREAD TAPPED OUTLET (304 OR 316 STAINLESS)
13	6	1" SCHEDULE 80 PVC 90 DEGREE ELLS
14	2	1" SCHEDULE 80 PVC MALE PIPE THREAD X SOCKET ADAPTOR
15	4	1" SPEARS BALL VALVE
16	10	1" SCHEDULE 80 PVC PIPE
17	4	3" AIRVAC STANDARD FLEXIBLE CONNECTORS, INLET SIDE OF VALVE AND DISCHARGE SIDE OF VALVE. SOME FIELD MODIFICATION MAY BE NECESSARY FOR PROPER ALIGNMENT.

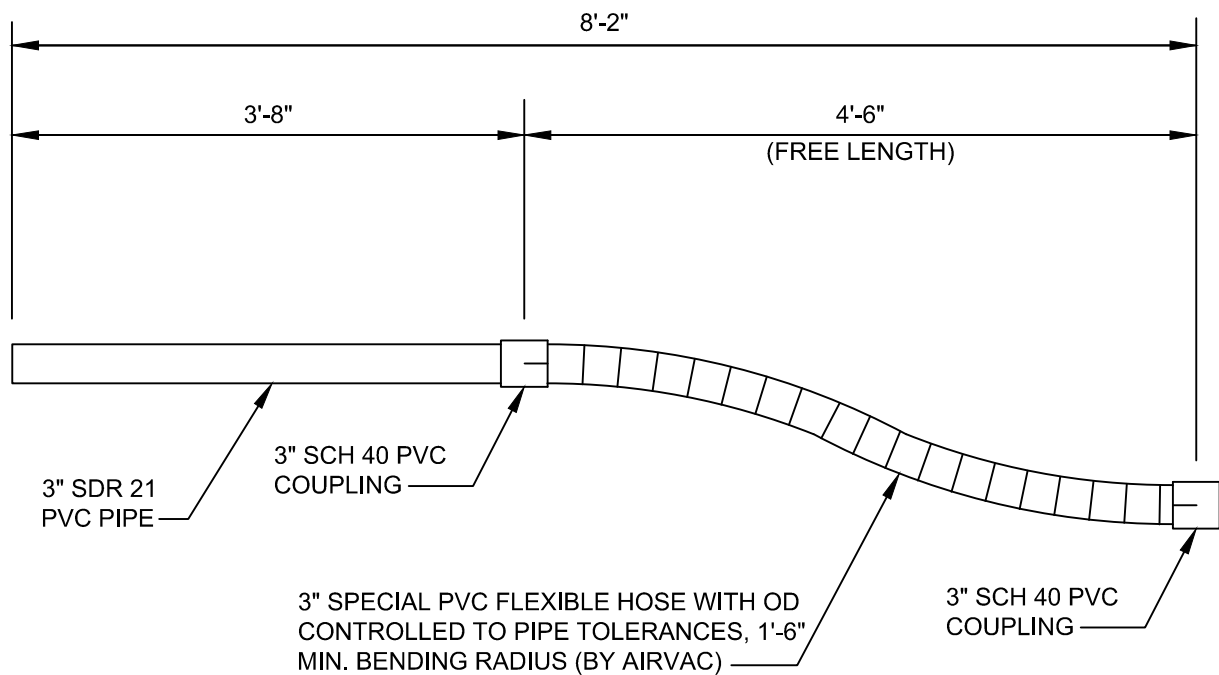


- NOTES:
- ALL VALVES MUST BE INSTALLED TO A STANDARD 4\"/>

10 FLEXIBLE BREATHER DETAIL

DETAILS BASED ON AIRVAC, INC.





NOTE:

1. FLEXIBLE CONNECTOR USED TO CONNECT VALVE PIT TO 3" VACUUM SERVICE LATERAL

2. FLEXIBLE CONNECTOR LENGTH MAY NOT BE ALTERED, DO NOT CUT PVC PIPE OF FLEXIBLE HOSE

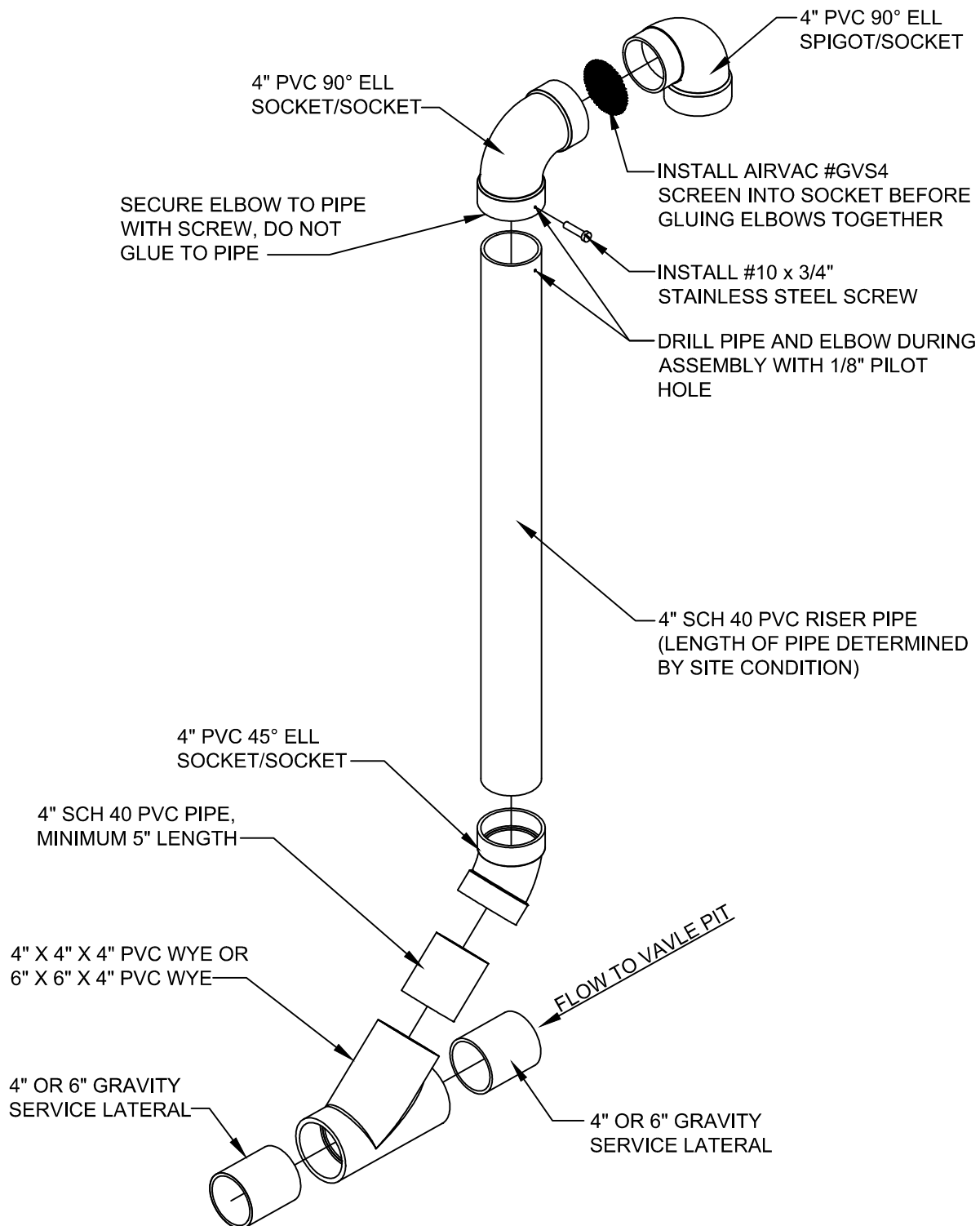
DETAILS BASED
ON AIRVAC, INC.

OKEECHOBEE UTILITY AUTHORITY CONSTRUCTION STANDARDS & DETAILS

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AIRVAC FLEXIBLE CONNECTOR

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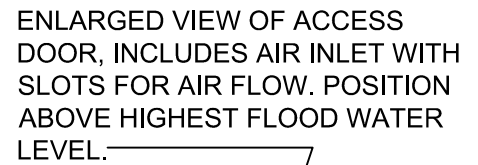
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4" AIR-INTAKE ASSEMBLY

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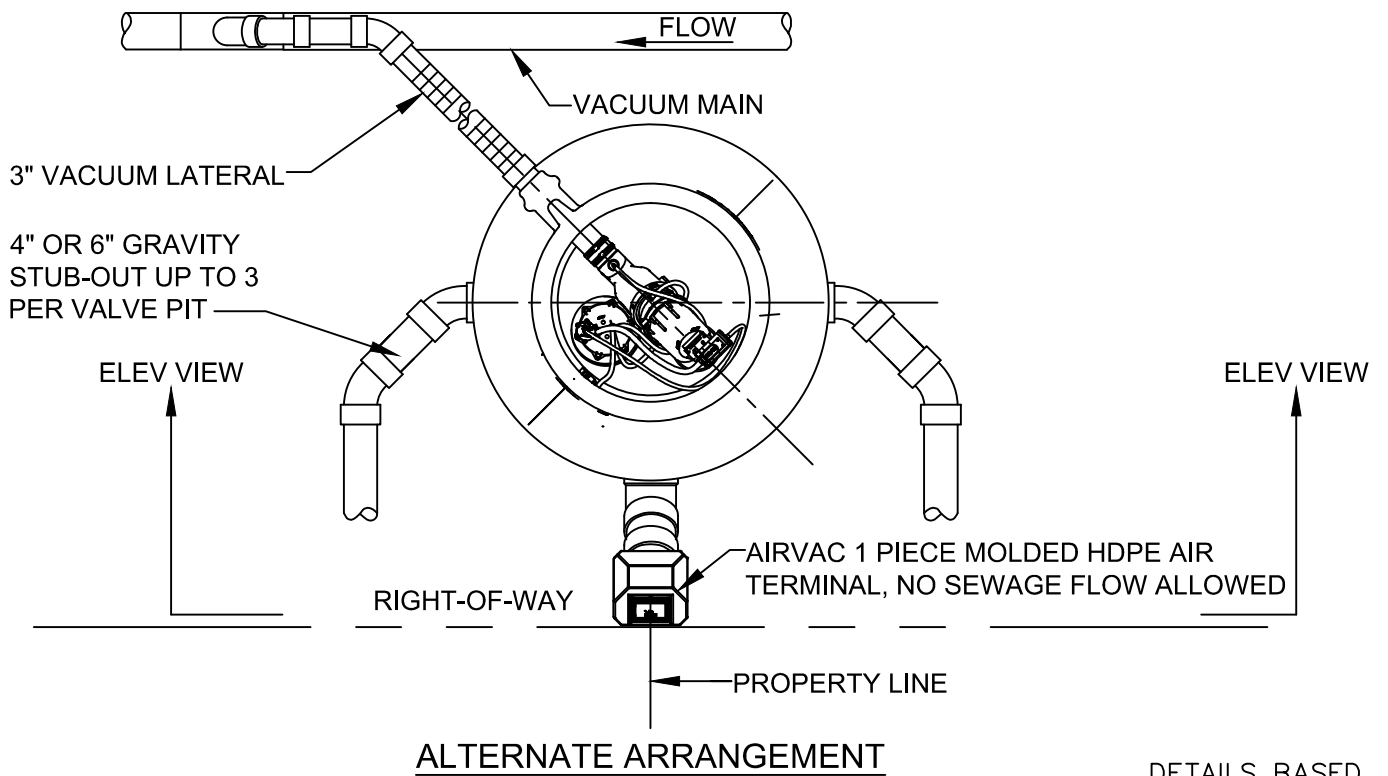
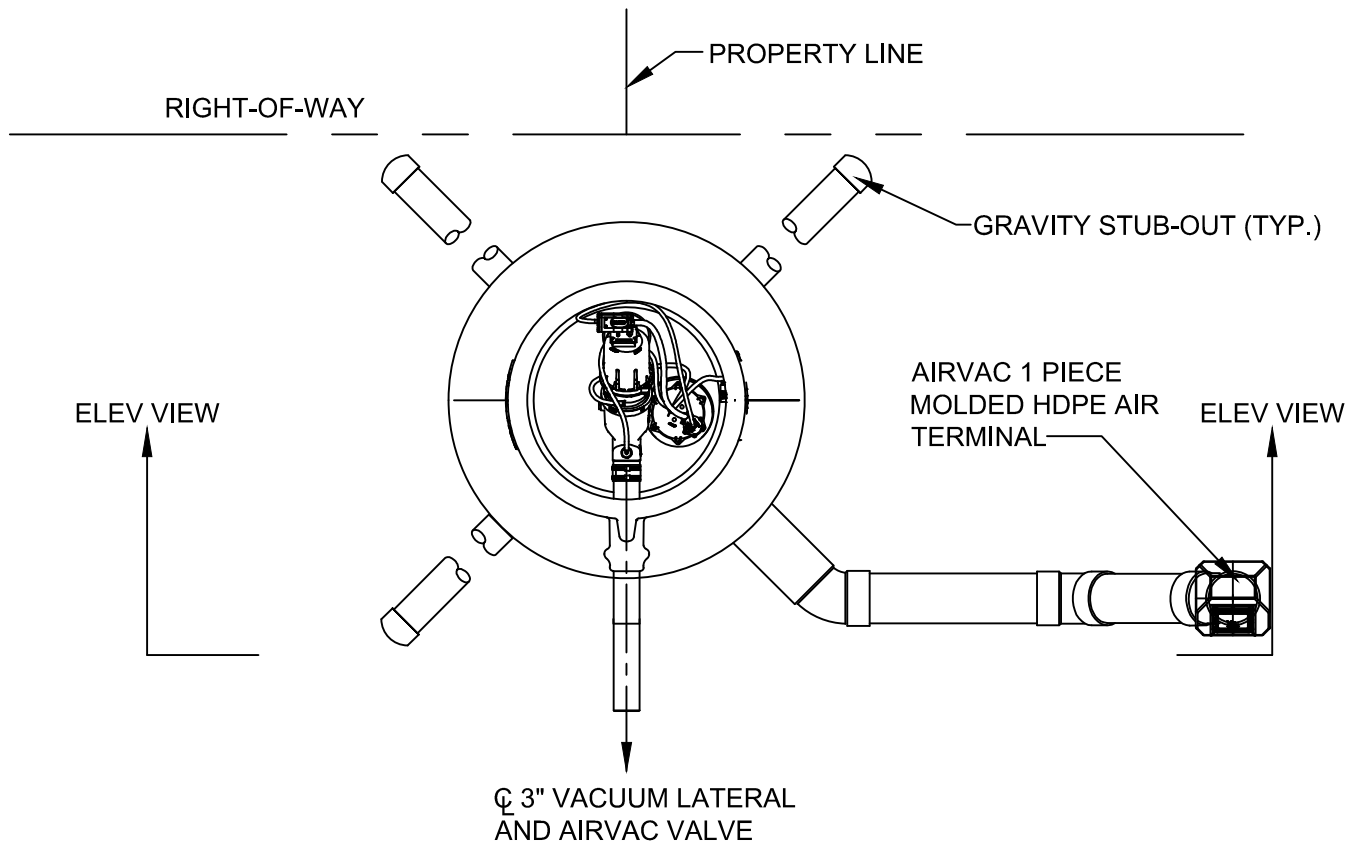
DETAILS BASED
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6" DEDICATED AIR TERMINAL (MOLDED) – ELEVATION

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6" DEDICATED AIR TERMINAL (MOLDED) – PLAN

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