

**BIG SKY COUNTY WATER  
&  
SEWER DISTRICT NO. 363**

**SPECIAL PROVISIONS FOR  
WATER & SEWER  
MAIN EXTENSIONS**

Adopted: June 19, 2001  
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**BIG SKY COUNTY WATER & SEWER DISTRICT NO. 363  
SPECIAL PROVISIONS FOR WATER & SEWER MAIN EXTENSIONS**

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BS-201 Hydrant  
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BS-208 Bollard locations at hydrant  
BS-301 Eccentric Manhole  
BS-302 Manhole  
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BS-303A Sewer Service Line Cleanouts  
BS-304 Chimney Seal  
BS-305 Sewer Service Insulation

# **BIG SKY COUNTY WATER & SEWER DISTRICT No. 363 SPECIAL PROVISIONS FOR WATER & SEWER MAIN EXTENSIONS**

## **INTENT OF THE SPECIAL PROVISIONS**

The Big Sky County Water & Sewer District No. 363 (District) requires that all persons comply with all rules and regulations of the District's Sewer and Water Use Ordinances 97-1001 and 99-1002 respectively in the planning and construction of any sewer and water main extensions within the District's Boundaries. The District uses the Montana Public Works Standard Specifications, Fourth Edition, January, 1996, and all its references, with the following special provision items included to complement the specifications and to clarify those items and issues that are unique to Big Sky. Unless specifically addressed in the MPW Standard Specifications, the Special Provisions For Water & Sewer Main Extensions and the District's Sewer and Water Use Ordinances, all work must comply with the locally applicable laws, codes and regulations. In the event of differing requirements, the most stringent shall apply. For items not specifically addressed by the Special Provisions, the most recent edition of the MPW Standard Specifications will apply.

## **PRE-CONSTRUCTION MEETING**

Before any work commences, a conference attended by the Contractor, Engineer, the Resident Project Representative and a District Representative will be held at the District office at 561 Little Coyote Road, Big Sky, Montana. The Contractor and Engineer shall submit to the District for their review a preliminary progress schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the work. The Contractor shall also provide for the District's approval a plan showing any flow by-pass plans to be used to continue water & sewer service during construction, or water main shutoffs during construction. If construction has the potential to effect roads and traffic, a traffic control plan must be submitted to the District before the pre-construction meeting..

## **PROJECT REPRESENTATIVE**

The Owner/Developer's Engineer will furnish a full time Resident Project Representative to provide inspection of any and all work that will eventually be accepted by the District. This will include, but is not limited to, all trench excavation, pipe bedding, materials, and testing that is required by these specifications and the MPW Standard Specifications. The Engineer shall provide the District with a resume of the Resident Project Representative qualifications for the District's approval at least five working days before the pre-construction meeting is held.

## **PROTECTION OF EXISTING SEWER UTILITIES**

The District shall be notified by the Underground Utility Locate Center (1-800-424-5555) before any work at or near existing sewer and water lines may commence. The Contractor shall take all necessary precautions to protect the District's sewer and water mains and flows when and if they are exposed by work. The Contractor shall be responsible for removing any debris or other material that may inadvertently enter the District's collection system through manholes or open mains by a District approved method. In addition the Contractor is prohibited from discharging or causing to be discharged any waste or substance to the public sewer system as specified in the District's Sewer Use Ordinance. Flushing of water or sewer mains to the District's sewer collection system is prohibited without prior written approval of the District.

## **FINAL INSPECTION**

After a water or sewer main extension has been installed and tested, it shall be inspected for final acceptance by the contractor and the engineer. After the inspection, a punch list will be prepared by the engineer listing the deficiencies or incomplete portions of the project. The extension will be conditionally accepted by the District at the District's sole discretion after the punch list items have been completed and a final walk through is done by a representative from the District, the contractor and the engineer. Final acceptance of the extension will be completed when the engineer has submitted the following:

1. Signed letter certifying that the project has been completed according to the plans and specifications;
2. Stamped and signed as-constructed drawings consisting of two sets of blue line prints, a set of mylar plans consisting of full size sheets and a set consisting of 11 x 17 (ledger) sheets;
3. Copy of the as-constructed drawings in electronic form in AutoCAD Release 14 format;
4. Copy of all inspection filed notes and construction inspection photographs or video tapes;  
and
5. Summary spreadsheet listing final construction costs separated for sewer and water improvements.

**SECTION 02221  
TRENCH EXCAVATION AND BACKFILL  
FOR PIPELINES & APPURTENANT STRUCTURES**

**PART 2 - PRODUCTS**

2.1 PIPE BEDDING MATERIALS

2.1.1 TYPE I PIPE BEDDING

**Delete the first paragraph and replace with:** Type I Pipe Bedding includes the material placed from four inches below the bottom of the pipe, around the pipe, and to six inches over the top of the pipe. Type I Pipe Bedding shall be defined by the District as crushed washed rock having a maximum  $\frac{3}{4}$  inch size. Sand, sandy gravel, and road mix will not be allowed or accepted as Type I Pipe Bedding.

2.1.2 SELECT TYPE I PIPE BEDDING

**Delete the first paragraph and replace with:** Select Type I Pipe Bedding shall consist of soil, sand, or fine gravel, free from clods, lumps or frozen material, or rocks exceeding 1-1/2 inches in its greatest dimension. Select Type I Pipe Bedding will not be accepted by the District for use as pipe bedding.

**PART 3 – EXECUTION**

3.7.2 PIPE BEDDING PLACEMENT

3.7.2.1 TYPE I BEDDING

**Delete this section and replace with:** Place Type I Pipe bedding material four inches under the pipe, around the pipe, and six inches over the pipe as specified in Section 2.2.1. Place in maximum lifts of six inches, using hand or other compaction methods without damaging or disturbing the pipe. Thoroughly compact each layer. Use special care to assure compaction under and around the pipe haunches. Place backfill material in equal lifts on both sides of the pipe for the full trench width. Take care to prevent migration of Type I Bedding into surrounding soils during placement and compaction.

**SECTION 02610A  
WATER MAIN MATERIALS**

**PART 1 – GENERAL**

**Add the following requirement:**

1.3 SUBMITTALS

Supply the District with shop drawings from the pipe and fitting manufacturer for approval before construction starts. Hydrant bury and break away flange height should be specified. The height of the break away flange shall be 6-inches above either the edge of the road if the street does not have curb and gutter, or the top of the curb.

**PART 2 – PRODUCTS**

2.1 GENERAL

**Add the following requirement:**

2.1.3 WATER MAIN PIPE MATERIAL:

Water mains shall be **Class 51 Ductile Iron Pipe**. Minimum main size shall be six inch for hydrant leads and eight inches for all other distribution mains. Mains shall be looped wherever possible.

2.3 CONCRETE CYLINDER PIPE:

**Delete this section.**

2.4 CAST IRON AND DUCTILE IRON FITTINGS

**Delete the first line in the second paragraph and replace with:** Water main fittings shall be flanged wherever possible. Mechanical joint fittings may be used instead of flanged fittings with prior approval from the district.

**SECTION 02610B  
SANITARY SEWER MAIN MATERIALS**

**PART 2 - PRODUCTS**

2.1 POLYVINYL CHLORIDE (PVC) PIPE:

2.1.5 FITTINGS

**Delete this section and replace with:** Tee fittings for connecting service lines will not be allowed by the District. In-line wyes shall be used for connecting service lines and shall be of the same material, construction, and joint design as the sewer main, unless specified otherwise. Assure wye fittings for connecting service lines are of the same material, construction and joint design as the main sewer pipe.

In the event that a service line is being connected to the existing sewer main, the District requires that in place of an in-line wye, a ROMAC Style “CB” sewer saddle or an approved equal be used.

**SECTION 02713  
WATER MAINS**

**PART 2 – PRODUCTS**

2.2 FITTINGS

**Add the following requirements:** Mechanical joint fittings including bends, tees and caps/plugs shall be thrust blocked. All thrust blocks shall be formed instead of poured loose in trench. Polyethylene encasement shall be provided between the fitting and the concrete. Megalug fittings may be used in place of mechanical joint fittings allowing thrust blocks to be eliminated subject to District approval.

**PART 3 – EXECUTION**

3.1 TRENCH EXCAVATION AND BACKFILL FOR WATER MAINS

**Delete the second paragraph and replace with:** Perform pipeline excavation and backfill meeting the applicable requirements of MPW Section 02221; TRENCH EXCAVATION AND BACKFILL FOR UNDERGROUND PIPELINES AND APPURTENANT STRUCTURES, and these modifications.

3.2 PIPE INSTALLATION FOR WATER MAINS

3.2.1 GENERAL

**Add the following requirements:**

Lay and maintain all pipe to the specified lines and elevations with fittings, tees, valves and services at the required locations. Establish line and grade using laser equipment or other district approved methods. Batter boards and string line shall not be allowed to set grade and alignment.

Take every precaution to prevent foreign material from entering the pipe while it is being installed. At times when pipe laying is not in progress, the open ends of the pipe shall be plugged with a tight fitting plug. Clean and remove all foreign material, including sand, gravel, concrete and cement grout by a District approved method. Flushing of the lines with water into the District's collection system shall not be allowed.

### 3.2.5 LAYING OF PIPE

**Add the following requirements:**

TOLERANCES - Install the pipe within 1-inch (13 mm) of the specified alignment and within 1-inch (3 mm) of the specified grade.

**Add the following requirements:**

TAPPING VALVES AND SLEEVES . Tapping sleeves shall be gray iron or ductile iron, split-sleeve, mechanical joint type with end and side gaskets. They shall have a Class 125, ANSI B16.1 outlet flange. They shall be rated for a minimum of 150 psi working pressure and shall contain a threaded plug for testing purposes on the neck or body of the tapping sleeve. Gaskets shall be manufacturers' standard suitable for use in potable water systems. Bolts and nuts shall be Cor-Ten, Dura-Bolt, or stainless steel. The sleeve shall be as manufactured by Mueller Company, Model H-615 or H-304, Tapping valves shall be Mueller, with flanged inlets compatible with the flange of the tapping sleeve and

mechanical joint outlet. Tapping valves shall be iron body, bronze mounted gate valves with non-rising stems with design, construction and pressure rating conforming to AWWA Specification C509. Stem seals shall be double "O" ring seals designed so that the seal above the stem collar can be replaced with the valve under pressure in full open position. The Contractor shall excavate the existing main at the location to be tapped to confirm the appropriate pipe dimensions prior to ordering the fittings. The tapping sleeve shall be installed with the outlet set on the horizontal plane. A concrete thrust block shall be installed as required for the fitting.

**Add the following requirements:**

### 3.2.7 BEDDING

Type I Pipe Bedding will be used as the material placed from four inches below the bottom of the pipe, around the pipe, and to six inches over the top of the pipe. Type I Pipe Bedding shall be defined by the District as crushed washed rock having a maximum  $\frac{3}{4}$  inch size. Sand, sandy gravel, and road mix will not be allowed or accepted as Type I Pipe Bedding.

### 3.2.8 LOCATE WIRE

Place a #10 AWG blue insulated copper location wire directly above and taped to the centerline of the pipe in the Type 1 bedding material over the top of the pipe. Bring this wire to the surface along the outside of each valve box and each curb stop box. Leave or loop at least 12 inches of wire to allow for attaching a meter or locator to the protruding wire at each surfacing location. Wrap the location wire around the base of the top of the curb stop box. The cost for the installation of copper location wire is incidental and shall be figured into other unit bid items. No separate payment will be made for this item.

### 3.2.9 WARNING TAPE

Detectable reinforced underground utility marking tape as manufactured by Thortec, Traceline or approved equal shall be buried directly above the water main and service at a depth of three feet below finished ground elevation. Blue warning tape shall be used for all water lines and shall be clearly marked "water". The location tape shall be a minimum of five mil thickness with a minimum 50 gauge solid aluminum core. Location tape shall be three inches wide. The cost for the installation of marking tape is incidental and shall be figured into other unit bid items

### 3.4 TESTING, CLEANING & DISINFECTION OF WATER MAINS, VALVES & FITTINGS:

**Add the following requirements:** Make all tests after backfill has been completed, but before any surface restoration or street surfacing is completed. Notify the District office at least 48 hours (2) business days before any of the following tests are done. Contractor shall be responsible for finding and repairing all breaks and leaks revealed by the tests. Perform all tests in the presence of the resident inspector and a representative of the District at the District's discretion. The District will not accept new water lines until all required tests are done, and the results submitted in written form to the District Office.

**SECTION 02718  
WATER VALVES AND FIRE HYDRANTS**

**PART 2 - PRODUCTS**

2.3 FIRE HYDRANTS

**Delete the second paragraph and replace with:** Hydrants shall be Mueller or equal with 5 1/4 inch valve openings, 6 inch mechanical joint inlet, one 4-1/2 inch pumper connection and two each 2-1/2 inch hose connections. Hose connection nozzles shall meet ASA specifications B-26 for National Fire Hose Couplings Screw Threads, 7-1/2 threads per inch. Hydrants shall open counter clockwise and have an arrow on the top indicating the opening direction. Hydrants shall have a minimum 6.5 ft bury depth. Hydrants shall be equipped with a 4' ft. snow flag marker. Results from all fire hydrant flow tests shall be provided to the District.

**PART 3 – EXECUTION**

3.1 VALVES

**Add the following requirements:**

3.1.1 VALVE MARKERS

A blue "Carsonite Brand" post (to be supplied by the Big Sky Water And Sewer District) shall be installed to mark each mainline valve. The District will assist the Contractor in choosing the correct offset location for valves located in roadways.

3.1.2 VALVE OPERATION

All existing water main valves are to be operated only by Big Sky Water and Sewer District personnel. Any existing or new water main valves which are used for isolation purposes or to take water from the Big Sky Water and Sewer District's water distribution system for the purpose of filling, testing, chlorination or flushing, shall be operated by Big Sky Water and Sewer District personnel only unless otherwise directed by District personnel. The Contractor requesting operation must make requests to the District office at least 24 hours in advance.

**SECTION 02719  
WATER SERVICE CONNECTIONS**

**PART 2 –PRODUCTS**

**Add the following requirement:** Fittings shall be Ford or Mueller. They shall be insty-tite or compression type connection for IPS PE plastic pipe.

2.2 WATER SERVICE PIPE:

**Delete section 2.2.1 and 2.2.2 and replace with:**

2.2.1 POLYETHYLENE SERVICE PIPE:

Use pipe meeting AWWA Specification C901, “Polyethylene (PE) Pressure Pipe, Tubing and Fittings 1” through 2” for water services. Water service piping shall be polyethylene pipe and a minimum one-inch diameter Class 200 with a DR of 7. Polyethylene pipe to be Phillips Drisco Ultraline 5100 or District approved equal.

2.3 CORPORATION STOPS

**Delete this section and replace with:** Furnish brass corporation stops with inlet to meet AWWA taper “CC” threads and outlet with insty-tite or compression type coupling for IPS polyethylene pipe. Use Mueller or Ford.

2.4 SERVICE CLAMPS

**Delete this section and replace with:** Water service saddles shall be stainless steel full circumference wide band saddles for use on PVC pipe. Bands shall be a minimum of 5-inches wide for a single stud and 7½-inches wide for double stud saddle. All weldments, including studs, side bars and fingers, shall be constructed of premium grade stainless steel. Heavy duty nylon washers shall be provided between nut and keeper bar. Saddle shall be equipped with a heavy duty threaded stainless steel outlet with “CC” threads. A gasket shall be provided to ensure complete sealing and shall not slip during installation. Saddles shall be Rockwell (Smith Blair) or district approved equal.

2.6 CURB BOXES

**Delete this section and replace with:** Furnish extension type curb boxes having a 6-1/2 foot extended length. Boxes shall be cast iron with cast iron lid and brass pentagon plug. Shut-off extension rods shall be installed with curb box. Curb stops shall be Ford ball valve type 1 inch Iron Pipe size Comp X Comp or 1" inch female iron pipe X 1" inch female iron pipe with 1" inch compression insert fittings.

**Add the following requirement:**

2.7 VALVE EXTENSIONS

All valves, including curb stops, shall have key extensions placed on the valve operating nut with a set screw to provide positive attachment to the operating nut. Key extensions shall have a centering ring and be located within one foot of the finished ground surface. Key extensions shall be Mueller or district approved equal.

**PART 3 - EXECUTION**

3.2 SERVICE LINE INSTALLATION

**Delete this section and replace with:** Provide all work and materials for the complete service line installation, including trench excavation and backfill; making the water main tap if necessary; furnishing and installing the corporation stop, curb stop and box, service clamp where necessary, and service line with fittings to make the connections to the stops. Service lines from the edge of the right of way to the structure being served shall be installed by a licensed plumber. Assure all services have a minimum 6-1/2 feet of cover measured as specified in the Big Sky detail BS-205.

All water mains, hydrant leads and service lines are to maintain a minimum of 6.5 feet of cover. If this cover cannot be maintained, insulation board shall be placed in accordance with Technical Data Sheet 5.3.4 developed by Dow Chemical Company.

3.3 END PIPE MARKER

**Delete this section and replace with:** Mark the water service end at property line with a five foot long metal fence post painted blue installed directly behind the curbstop at the edge of the right of way to permanently mark the end of the water service. Where curbs are installed, curbs shall be stamped with a 'W' at the point where each water service lateral crosses the curb, respectively. Letters shall be a minimum of 2-inches high.

3.4 FIRE LINE AND WATER SERVICE LINE

**Add this section:** When a fire suppression line is required, a separate shut-off valve must be installed on the outside of the building for the domestic water service line.

**SECTION 02722  
SANITARY SEWER MAINS**

**PART 2 - PRODUCTS**

2.1 GENERAL

**Delete the first paragraph and replace with:** Furnish sewer pipe and fittings as specified in the Contract Documents and meeting the requirements of Section 02610B. Furnish wye branches of the same material and design as the sewer pipe unless specified otherwise. Pipe strength classifications are shown on the plans and/or are listed in the Contract Documents. Do not use tee branches.

2.2 MANHOLES

2.2.1 GENERAL

**Add the following requirement:** Supply the District with shop drawings from the manhole manufacturer for approval before construction starts. Construct manholes from precast concrete sections having frames, covers, and steps meeting the MPW Standard Specifications and Standard Drawings. At the locations where the manhole(s) will be in an existing or planned road, the Engineer will design for future paving requirements. If the manhole(s) location is within an undeveloped area (e.g. a yard or field) the final elevation of the frame(s) will be at least 12 inches above grade. Manholes deeper than ten feet, measured from the rim elevation to the flow line of the center of the manhole, may use a four-foot eccentric cone as the top barrel section. Any manhole shallower than ten feet shall be “flat topped” and will not use a cone as the top barrel section.

**Add the following requirement:** All connections of sewer main extensions to the District’s existing manholes will, at the Districts sole discretion, require the replacement of the manhole. The replacement will be done at no cost to the District and will be done in accordance Big Sky Special Provisions for Water and Sewer Expansion. All other tie-ins will be done by the use of concrete coring where feasible. All work on existing manholes will require the prior approval of the District. The Contractor shall take all necessary precautions to protect the District’s existing sewer mains and flows when and if they are exposed by work. Care shall be taken by the Contractor to prevent construction debris from entering the District’s collection system. The Contractor and/or owner/developer shall be held responsible for removing any and all debris or other material that may inadvertently enter the District’s collection system through manholes or open mains by a District approved method.

2.2.4 FRAMES AND COVERS

**Delete this section and replace with:** Furnish frames and covers meeting MPW Standard Drawing Nos. 02722-6 and 02722-7 manufactured by Inland Foundry Company, Inc., model 772 C or an equal approved by the District. The lid shall be marked “WSD 363” and “Sewer”. There shall be no through lift holes.

## 2.2.5 CONCRETE BASE

**Delete this section and replace with:** Furnish precast concrete bases that are extended and monolithic with the channel(s) being pre-formed into the base. Channels will have a minimum depth of 7/8 of the pipe diameter. All pre-formed channels shall meet MPW Standard Drawing No. 02722-5-Typical Manhole Channel Details.

## PART 3 – EXECUTION

### 3.1 PIPE INSTALLATION

#### 3.1.1 EXECUTION AND BACKFILL

**Delete this section and replace with:** Perform pipeline excavation and backfill meeting the applicable requirements of MPW Section 02221; TRENCH EXCAVATION AND BACKFILL FOR UNDERGROUND PIPELINES AND APPURTENANT STRUCTURES, and these modifications.

#### 3.1.4 LAYING PIPE

**Delete the first paragraph and replace with:** Lay and maintain all pipe to the specified lines and grades with fittings and manholes at the required locations. Establish line and grade using laser equipment or other approved methods. Batter boards and string line will not be allowed to set grade and alignment.

#### 3.1.5 TOLERANCES

**Delete this section and replace with:** Install the pipe within 1/2-inch (13 mm) of the specified alignment and within 1/8-inch (3 mm) of the specified grade.

#### **Add the following Requirements:**

#### 3.1.6 LOCATE WIRE

Place a #10 AWG insulated copper location wire directly above and taped to the centerline of the pipe in the Type 1 bedding material over the top of the pipe. Bring this wire to the surface along the outside of each manhole and to the end of each service. Bring the wire through the manhole barrel or cone wall immediately below the first step. The penetration through the manhole will be by one inch PVC pipe. The pipe shall have a threaded coupling at the inside wall of the manhole. A one inch by 1/4 inch bushing will be installed that will allow the pipe to be bushed down to 1/4 inch. A Hubbell Junior 5D520 Corrosion Resistant Nylon Strain Relief Cord Connector shall be installed in the 1/4 inch bushing, effectively making the connection between the wire and the pipe penetration waterproof. Enough wire should be left to leave a loop at least 24 inches to allow for attaching a meter or locator above ground to the protruding wire at each surfacing location. At the end of the sewer service line, wrap the location wire around the end of service pipe with electrical tape. The cost for the installation of copper location wire and appurtenances is incidental and shall be figured into other unit bid items.

No separate payment will be made for this item.

### 3.1.7 MARKING TAPE

Detectable reinforced underground utility marking tape as manufactured by Thorotec, Traceline or approved equal shall be buried directly above the sewer main and service at a depth of three feet below finished ground elevation. Safety green warning tape shall be used for all sewer lines and shall be clearly marked "sanitary sewer". The location tape shall be a minimum of five-mil thickness with a minimum 50-gauge solid aluminum core. Location tape shall be three inches wide. The cost for the installation of marking tape is incidental and shall be figured into other unit bid items. No separate payment will be made for this item.

## 3.2 MANHOLES

### 3.2.1 CONSTRUCTION

**Delete the first two paragraphs and replace with:** Construct manholes to the specified dimensions according to MPW Section 02722.2.2; MANHOLES, and 2.2 of these specifications. Make changes in flow direction with a smooth curve of as large a radius as the manhole size will permit. Make changes in channel grade and size gradually and evenly. Channel depth shall be 7/8 of the diameter of the pipe. Channel shall be sloped at a five percent grade from inlet to outlet. Make the floor of the manhole outside the channel smooth and slope toward the channel at one inch per foot (8 cm per meter).

Joint all connections between manhole walls and base, between wall sections adjusting rings and between the manhole lid frame using "Ram-Nek", manufactured by K.T. Snyder Company, or CS-202, Butyl Resin ConSeal, or an approved equal, making the manhole watertight. Make sure the manufactures low to high temperature workability specifications are followed. For all horizontal joints, install a performed, resilient, O-ring type, neoprene gasket in the joint. For all sewer pipes to manhole joints, use gasketed, flexible, watertight connections that will accommodate differential settlement.

**Add the following requirement:** All inlet and outlet pipes to manholes will be grouted around the full circumference of the pipe so that in part there is a continuous flow line from the invert of the pipe to the manhole channel. Any grout that enters the pipe will be removed so that the interior of the pipe is clean and smooth.

### 3.2.2 ADJUSTMENT RINGS

**Delete this section and replace with:** Install adjusting rings on each manhole to bring the manhole top elevation to match the existing or specified grade (see 2.2.1). The Engineer will design manholes to meet future paving requirements. Use manhole rings with a two-inch minimum (5 mm) and 12-inch maximum height. Furnish adjusting rings reinforced with the same percentage of steel as the riser and top. All joints between grade rings will be sealed with "Ram-Nek", manufactured by K.T. Snyder Company, or CS-202, Butyl Resin ConSeal, or a District approved equal.

## **Add the following requirements:**

### 3.2.3 CHIMNEY SEALS

All manholes shall have chimney seals installed between the casting and the manhole. All grade ring joints shall be enclosed in the chimney seal which shall be a Frame/chimney seal that consist of a flexible internal rubber sleeve, interlocking extensions and stainless steel expansion bands as manufactured by Cretex Specialty Products, (406)457-1941, or a pre-approved equal conforming to the following requirements. The District may supply the seals to the contractor at their cost.

The seal shall remain flexible throughout a 25-year design life, allowing repeated vertical movement of the frame of not less than two inches and/or repeated horizontal movement of not less than ½ inch. The sleeve portion of the seal shall be either double or triple pleated with a minimum unexpanded vertical height of either eight inches or ten inches respectively. The sleeve and extension shall have a minimum thickness of 3/16 inches and shall be made from a high quality rubber compound conforming to the applicable requirements of ASTM C-923, with a minimum 1500 psi tensile strength, a maximum 18% compression set and a hardness (durometer) of 48±5. The bands shall be integrally formed from 16 gauge stainless steel conforming to ASTM A-240, Type 304, with no welded attachments, shall have a minimum adjustment range of two diameter inches and a positive locking mechanism. Any screws, bolts or nuts used for this mechanism shall be stainless steel conforming to ASTM F-593 and 594, Type 304.

### 3.2.4 COATING

The exterior of all manholes shall be coated with a damp-proof coating of ConSeal CS – 55 water based concrete coating, or approved equal. All exterior surfaces of the manhole including base, barrel sections and cones shall be coated.

## 3.3 TESTS

### 3.3.1 TESTING NOTIFICATION

**Delete this section and replace with:** Make all tests after backfill has been completed, but before any surface restoration or street surfacing. Notify the District office at least two (2) working days before any of the following tests are done. Be responsible for finding and repairing all breaks and leaks revealed by the tests. Additionally, perform all tests in the presence of the resident inspector and the District Operator(s). The District will not accept new sewer lines until all required tests are done, and the results submitted in written form to the District Office.

### 3.3.2 LIGHT TEST

**Delete this section and replace with:** After the trench has been backfilled and compacted as Specified in MPW, Section 02221, perform a light test between manholes to check alignment and grade for pipe displacement. The light test will be performed by the engineer or resident

inspector. The completed pipeline is to permit a true circle of light to be visible from one manhole to the next. If alignment or grade is not that specified and displacement of pipe is found, the Contractor will remedy all defects.

### 3.3.3 LEAKAGE TEST

#### 3.3.3.2 AIR TEST (ALTERNATE)

**Delete the first paragraph and replace with:** The leakage test is a requirement for final acceptance of the sewer extension by the District. Testing is to be performed in the presence of the resident inspector and a District representative. Testing will be performed after all the trenches have been backfilled and compacted between manholes. Air testing will be allowed for mainline and service laterals only. Manholes shall be water tested. At the discretion of the District, the mainline and service laterals may be water tested.

### 3.3.5 T.V. INSPECTION

**Delete this section and replace with:** The District requires any and all new sewer main extensions to be inspected using a video camera by an impartial contractor qualified in this type of work before final acceptance. All video inspections must be done after the manholes have been grouted. A sewer line is deficient and unacceptable if:

1. The alignment is outside the specified limits.
2. Water ponds in any section of the line equal to or greater than the grade tolerance specified herein under 3.1.5.
3. The pipe has visible defects such as open joints, pinched gaskets, cracked barrels or bell, or similar defects.
4. There is construction debris or foreign material in the line.

Record all television inspections on videotape in VHS format. Pull or, in the case of a tracked unit, drive the camera through the sewer at 30 feet per minute. If the camera is pulled by attaching to the hose of a hydraulic cleaner, assure the hose is not active during the pulling process.

Within ten feet of the manhole in which the camera unit is run from, the operator will turn on the camera lights to look for a full circle from the next manhole. All footage shall be continuously shown on the screen with a commentary by the camera operator. The finished tape will be reviewed by the District before final acceptance of the extension. A copy of the tape and inspection report will be supplied to the District for their records. The costs incurred in any television inspection is considered incidental work for which no separate payment will be made.

**SECTION 02724  
SANITARY SEWER AND STORM DRAIN SERVICES**

**PART 2 – PRODUCTS**

**2.1 GENERAL**

**Delete the first paragraph and replace with:** Furnish all sewer pipe and fittings under this contract meeting Contract requirements and the following. Furnish wye branches of the same material and design as the specified sewer pipe. Pipe strength classifications are specified in the Contract documents. Do not use tee branches. Sewer service lines shall be minimum four-inch schedule 40 PVC pipe. All sewer services shall be marked according to Drawing No. BS-303. The elevation of the service termination shall be noted on the as-constructed drawings. In the event that a service line is being connected to the existing sewer main, the District requires that in place of an in-line wye, a ROMAC Style “CB” sewer saddle or an approved equal be used.

**Add the following requirements:**

Sewer service laterals shall be a minimum diameter of 4-inches. Unless otherwise shown on the drawings, sewer service laterals shall be installed at a minimum slope of 1/4-inch per foot of run. Individual sewer service laterals shall not be connected to manholes unless shown on the drawings and approved by the District.

Ends of all service lines and service fittings shall be provided with approved watertight plugs, caps, or stoppers, suitably braced to prevent blow-off during internal testing. Such plugs or caps shall be removable without damage to the pipe or fitting.

**PART 3 – EXECUTION**

**Add the following requirements:**

**3.9 LOCATE WIRE**

Place a #10 AWG green insulated copper location wire directly above and taped to the centerline of the pipe in the Type 1 bedding material over the top of the pipe. Securely attach locate wire to mainline locate wire with a water-tight connection. Bring this wire to the surface along the outside of each clean-out. Leave or loop at least 12 inches of wire to allow for attaching a meter or locator to the protruding wire at each surfacing location. Wrap the location wire around the base of the top of the clean-out. The cost for the installation of copper location wire is incidental and shall be figured into other unit bid items. No separate payment will be made for this item.

### 3.10 WARNING TAPE

Detectable reinforced underground utility marking tape as manufactured by Thortec, Traceline or approved equal shall be buried directly above the sewer or storm service at a depth of three feet below finished ground elevation. Green warning tape shall be used for all sewer or storm service lines and shall be clearly marked "sewer". The location tape shall be a minimum of five mil thickness with a minimum 50 gauge solid aluminum core. Location tape shall be three inches wide. The cost for the installation of marking tape is incidental and shall be figured into other unit bid items

### 3.11 SERVICE LATERAL CLEANOUTS

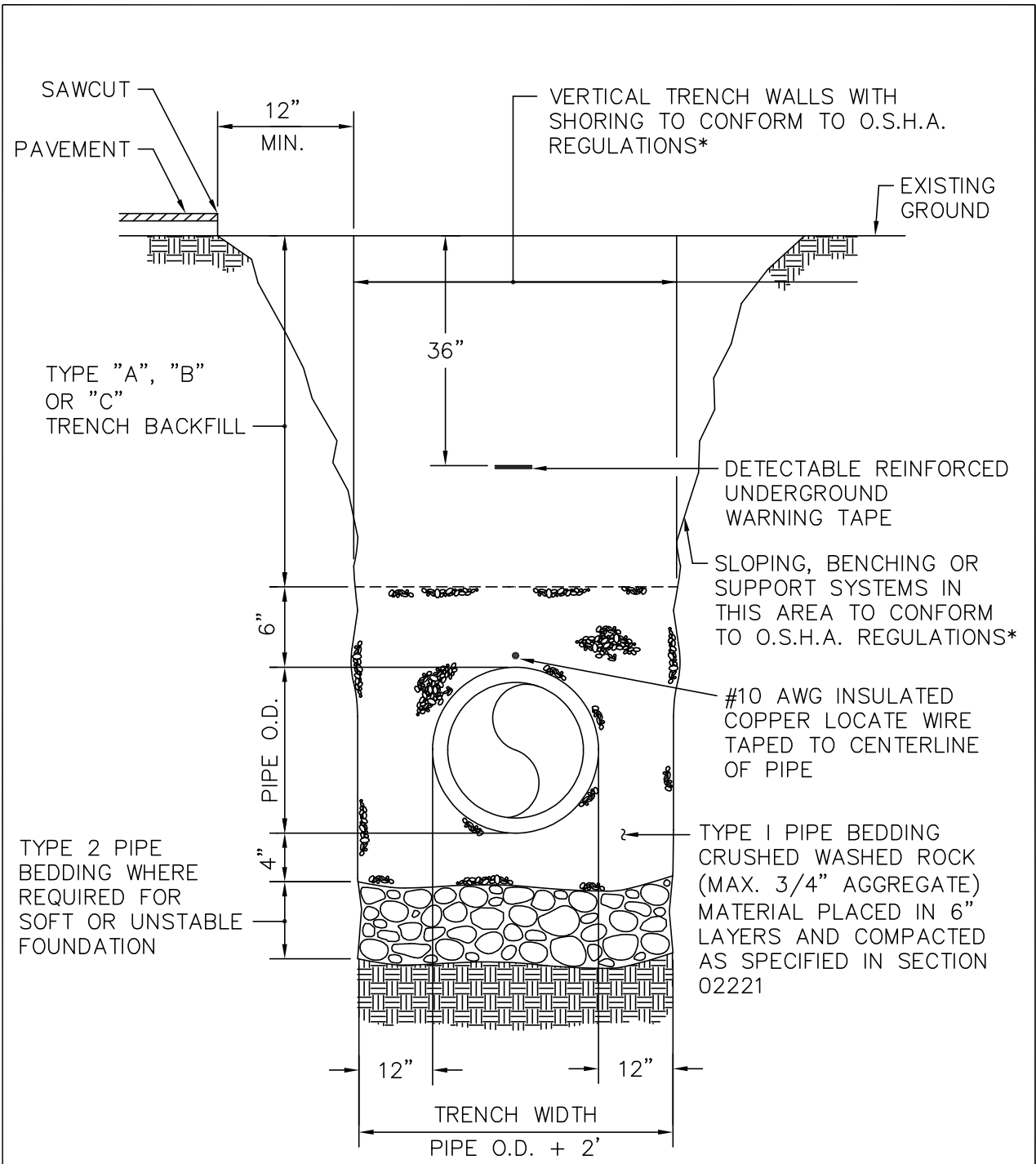
Service lateral cleanouts shall be of the same size, pipe and material as the service lateral. The top of all property line service lateral cleanouts shall be set at finish grade. A 3 foot minimum length of 1-inch by 1-inch by ¼-inch thick angle iron shall be driven in next to each property line cleanout. The top of the angle iron shall be a maximum of 2-inches below finish grade. In the event that a cleanout is in a paved or concreted area, the cleanout shall be protected with a IFCO 247 cleanout cast iron frame and cover with the cover marked "cleanout", or an approved equal.

# STANDARD DRAWINGS

## LIST OF STANDARD DRAWINGS

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BS-101 Trench  
BS-102 Pavement Surface Restoration  
BS-103 Service Insulation  
BS-201 Hydrant  
BS-202 Gate Valve Thrust Block  
BS-203 Valve Thrust Block  
BS-204 Water-Sewer Separation  
BS-205 Water Service Line  
BS-206 Roadside Hydrant Placement  
BS-207 PRV Station  
BS-208 Bollard locations at hydrant  
BS-301 Eccentric Manhole  
BS-302 Manhole  
BS-303 Sewer Service Line  
BS-303A Sewer Service Line Cleanouts  
BS-304 Chimney Seal  
BS-305 Sewer Service Insulation

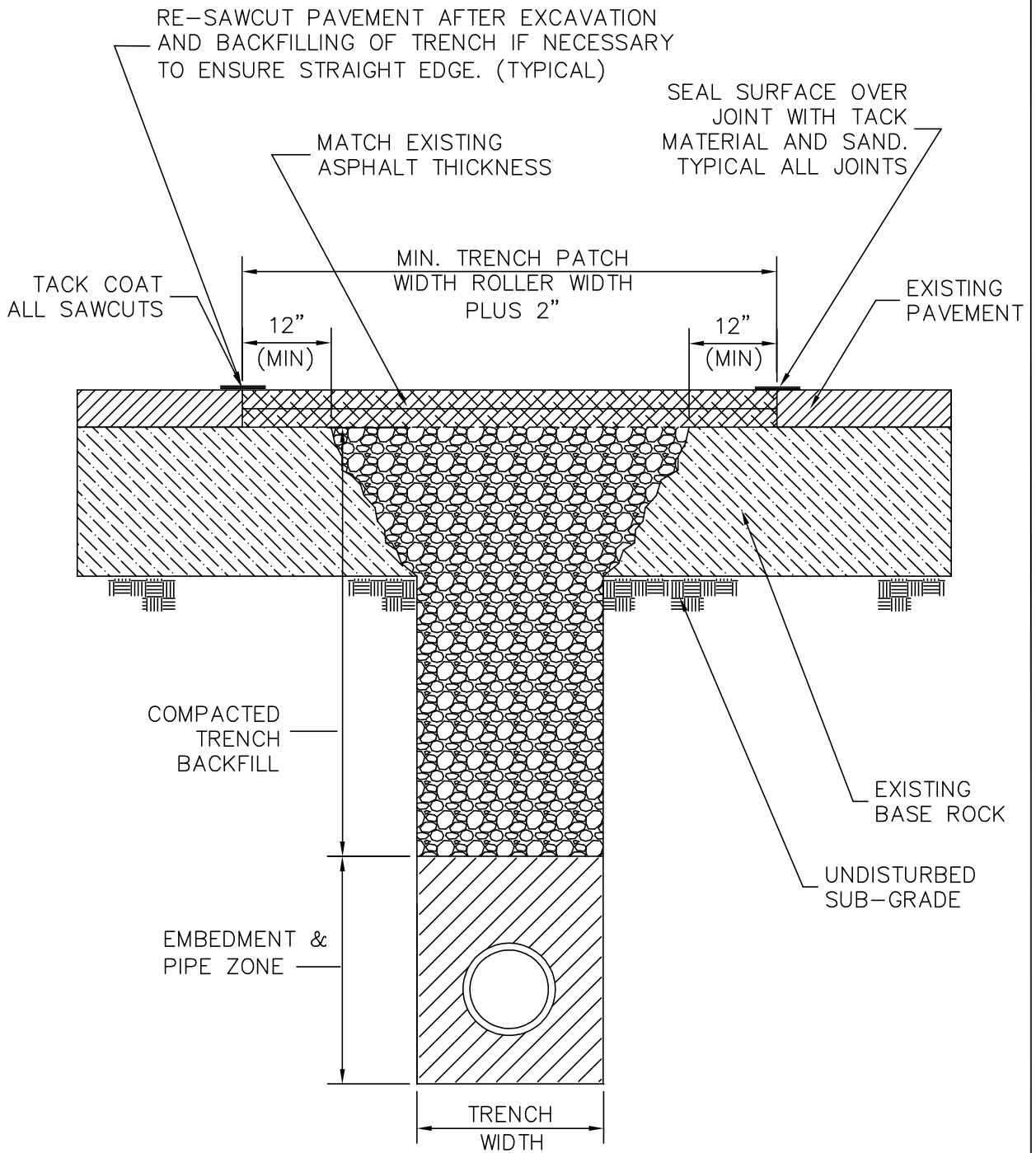


**NOTE:** \*SEE O.S.H.A. CONSTRUCTION STANDARDS FOR EXCAVATION

WHERE TRENCH PASSES THROUGH EXISTING PAVEMENT, THE PAVEMENT SHALL BE CUT ALONG A NEAT VERTICAL LINE A MINIMUM OF 12" FROM THE EDGE OF THE TRENCH OPENING. WHERE NEAT LINE IS LESS THAN 3' FROM EDGE OF EXISTING PAVEMENT OR CURB AND GUTTER SECTION, REMOVE AND REPLACE ENTIRE PAVEMENT SECTION BETWEEN TRENCH AND EDGE OF PAVEMENT.

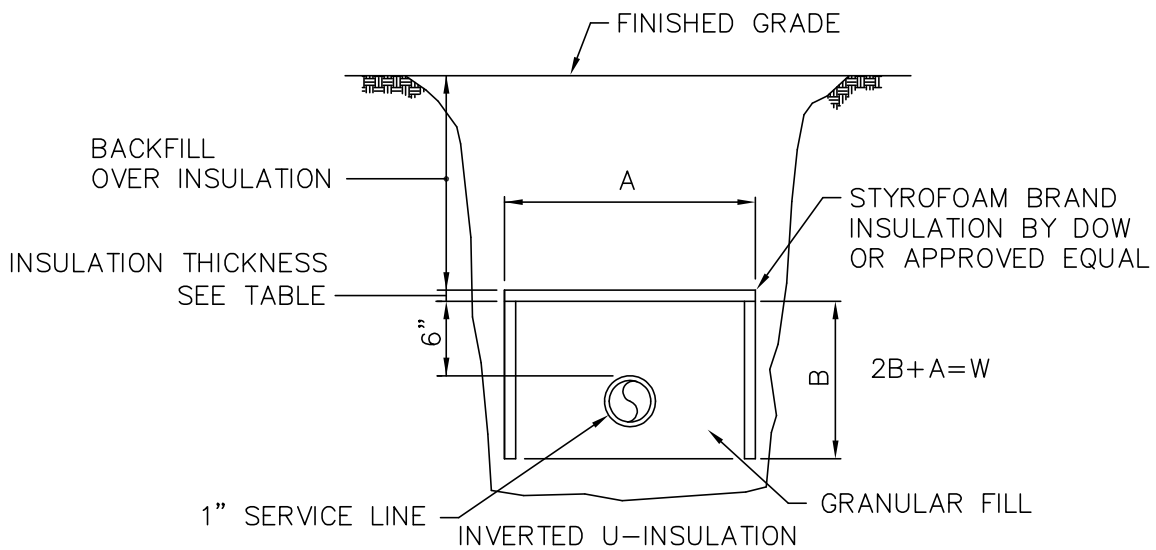
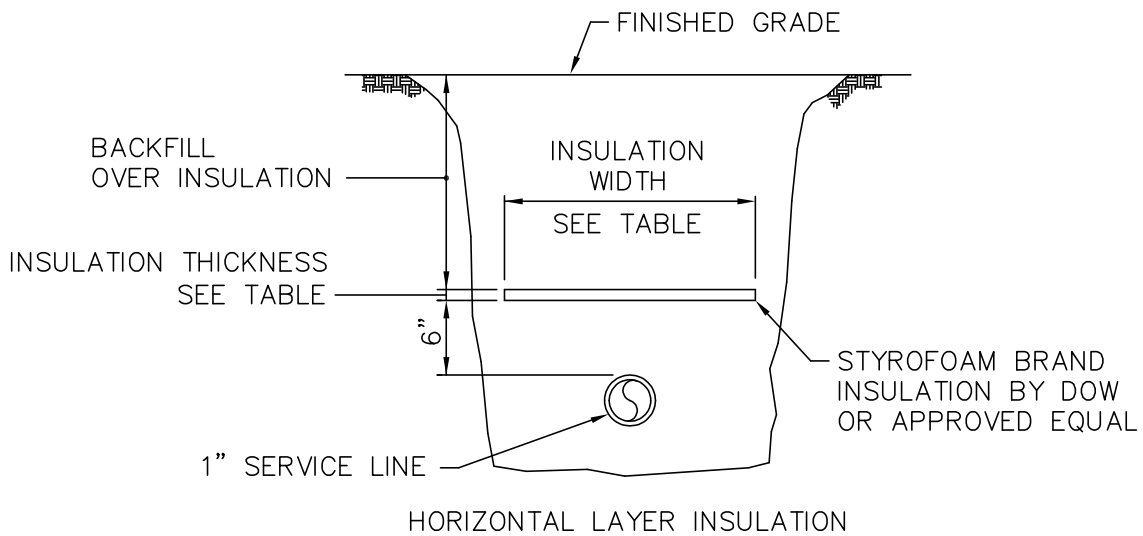
Date: March 26, 2001

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	TRENCH BEDDING AND BACKFILL	DETAIL NO. BS-101
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Date: Feb. 26, 2001

<p>BIG SKY WSD 363 STANDARD SPECIFICATIONS</p>	<p>SCALE: NONE</p>	<p>TRENCH BEDDING AND BACKFILL</p>	<p>DETAIL NO. BS-102</p>
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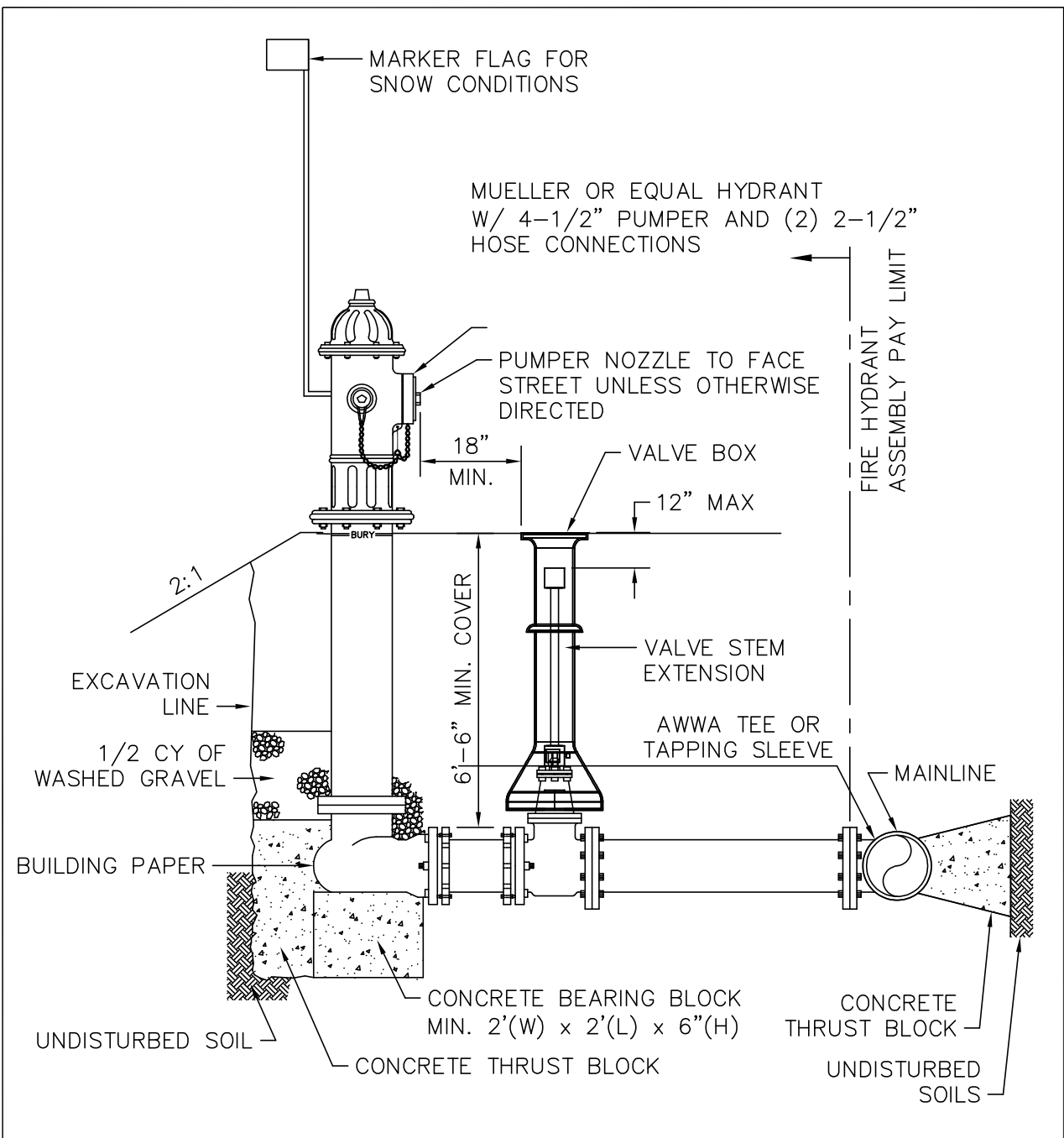


HORIZONTAL LAYER INSULATION			INVERTED U-INSULATION		
DEPTH OF BACKFILL OVER INSULATION	INSULATION THICKNESS	INSULATION WIDTH	DEPTH OF BACKFILL OVER INSULATION	INSULATION THICKNESS	2B+A ≥ WIDTH OF HORIZONTAL LAYER INSULATION
					2B + A
2'-0"	3.0	5'-6"	2'-0"	3.0	≥ 5'-6"
3'-0"	2.5	5'-1"	3'-0"	2.5	≥ 5'-1"
4'-0"	2.0	3'-1"	4'-0"	2.0	≥ 3'-1"
5'-0"	1.5	1'-1"	5'-0"	1.5	≥ 1'-1"
6'-0"	1.0	1'-0"	6'-0"	1.0	≥ 1'-0"
7'-0"*	1.0	1'-0"	7'-0"	1.0	≥ 1'-0"

\*INSULATE UNDER PAVING, SIDEWALK AND DRIVEWAYS ONLY

Date: March 28, 2001

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	BURIED WATER SERVICE LINE INSULATION	DETAIL NO. BS-103
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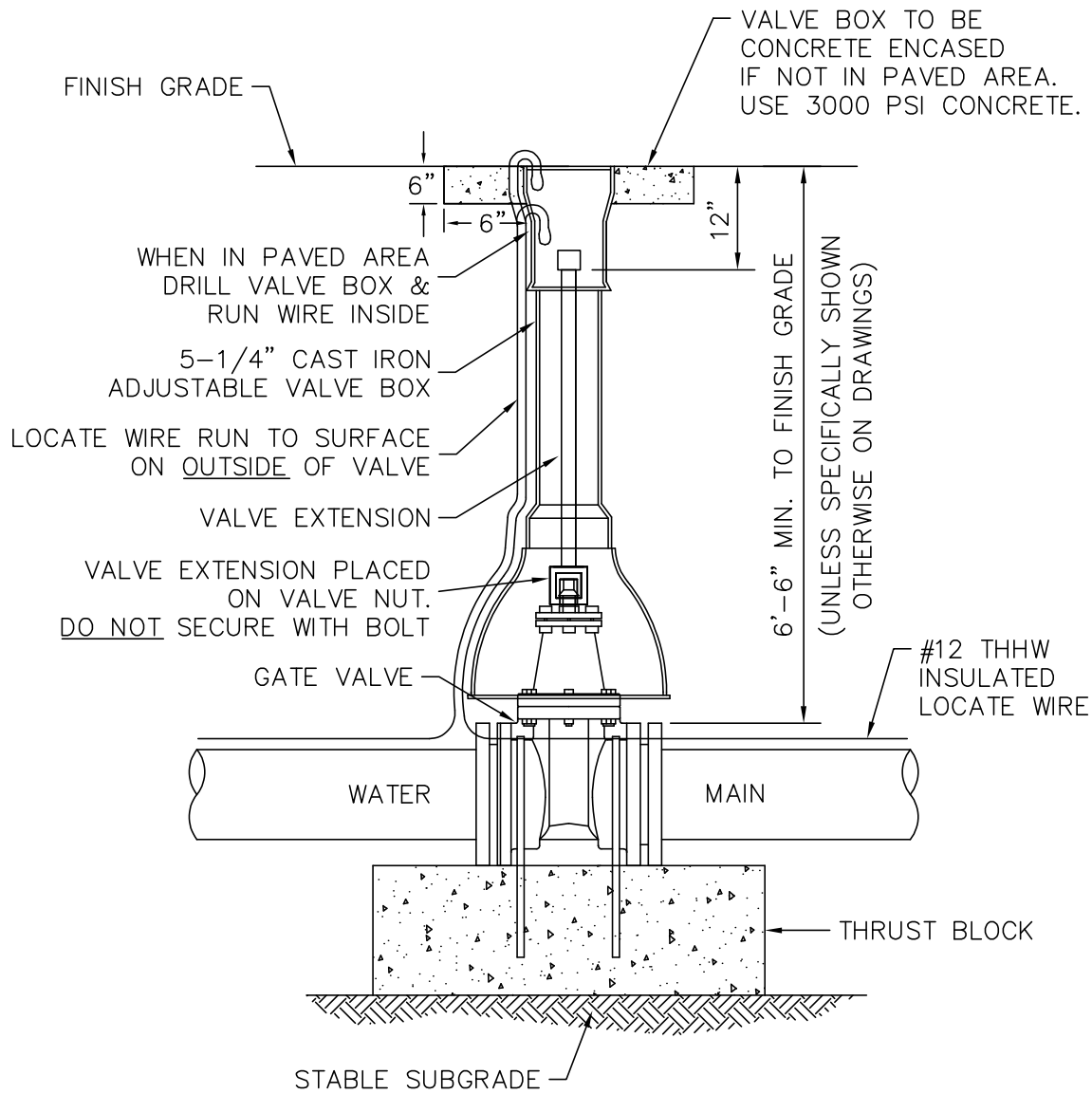


NOTES:

1. THRUST BLOCKING TO BE IN CONFORMANCE TO MPW STANDARD DRAWING 2713-1.
2. FOR BOLTED FITTINGS, BLOCKING SHALL NOT OBSTRUCT BOLTS
3. HYDRANT WEEP HOLES TO REMAIN UNOBSTRUCTED.

Date: AUGUST 8, 2002

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	FIRE HYDRANT SETTING	DETAIL NO. BS-201
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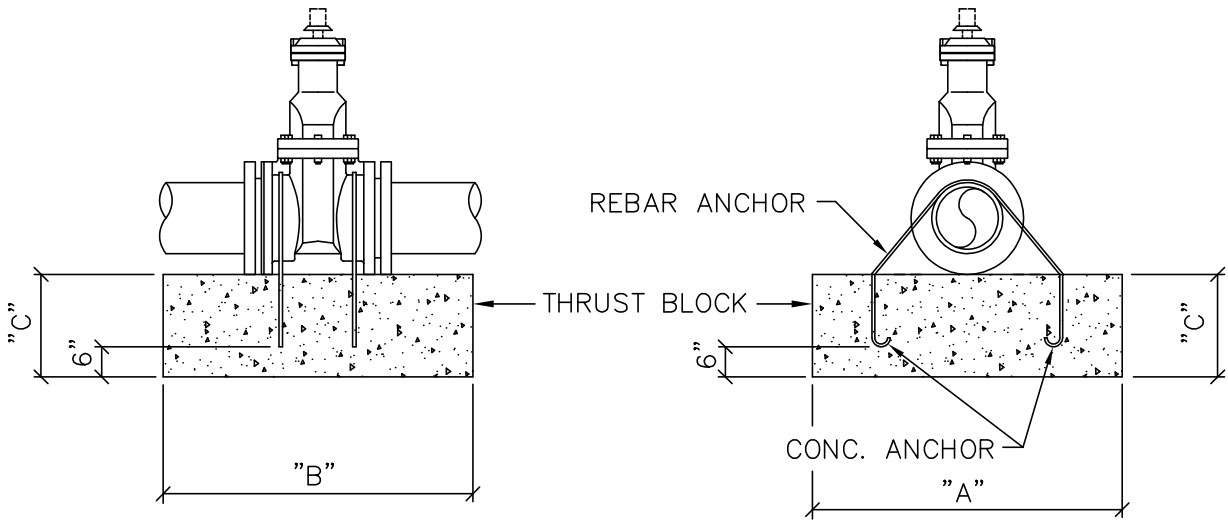


NOTES

1. GATE VALVE SHALL CONFORM TO AWWA C-500 OR C-509.
2. VALVE BOXES SHALL BE PLUMB AND CENTERED DIRECTLY OVER THE VALVE NUT.
3. VALVE BOX TOP SHALL BE ADJUSTED TO MEET FINISHED GRADE.
4. VALVE EXTENSIONS SHALL BE INSTALLED WITH CENTERING RING AND WITHIN 1 FOOT OF FINISH GRADE. EXTENSIONS SHALL NOT BE ATTACHED TO VALVE.

Date: April 21, 2005

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	GATE VALVE & VALVE BOX WITH THRUST BLOCK	DETAIL NO. BS-202
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**NOTE:**

COAT RODS WITH "KOPPERS" BITUMASTIC NO. 50 COATING OR EQUAL

THRUST BLOCK BEARING AREAS																
ANCHOR ROD SIZE	VALVE SIZE	100 PSI			150 PSI			200 PSI			250 PSI			300 PSI		
		"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"	"A"	"B"	"C"
3/4"	6" & 8"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-7"
3/4"	10"	2'-0"	2'-0"	2'-0"	2'-6"	2'-6"	2'-0"	2'-9"	2'-6"	2'-6"	3'-0"	3'-0"	3'-0"	3'-7"	3'-0"	3'-0"
3/4"	12"	2'-3"	2'-0"	2'-0"	3'-0"	3'-0"	2'-8"	3'-5"	3'-0"	3'-0"	4'-3"	3'-0"	3'-0"	5'-1"	3'-0"	3'-0"
1"	14"	2'-3"	2'-0"	2'-4"	3'-5"	3'-0"	3'-0"	4'-6"	3'-0"	3'-0"	4'-0"	4'-0"	4'-0"	4'-9"	4'-0"	4'-0"
1 1/8"	16"	3'-0"	3'-0"	2'-11"	4'-4"	3'-0"	3'-0"	4'-1"	4'-0"	4'-0"	5'-1"	4'-0"	4'-0"	6'-1"	4'-0"	4'-0"
1 1/4"	18"	3'-8"	3'-0"	3'-0"	5'-5"	3'-0"	3'-0"	5'-1"	4'-0"	4'-0"	6'-4"	4'-0"	4'-0"	5'-9"	5'-0"	5'-0"
1 3/8"	24"	4'-4"	4'-0"	4'-0"	6'-5"	4'-0"	4'-0"	6'-6"	5'-0"	5'-0"	6'-5"	6'-0"	6'-0"	7'-8"	6'-0"	6'-0"

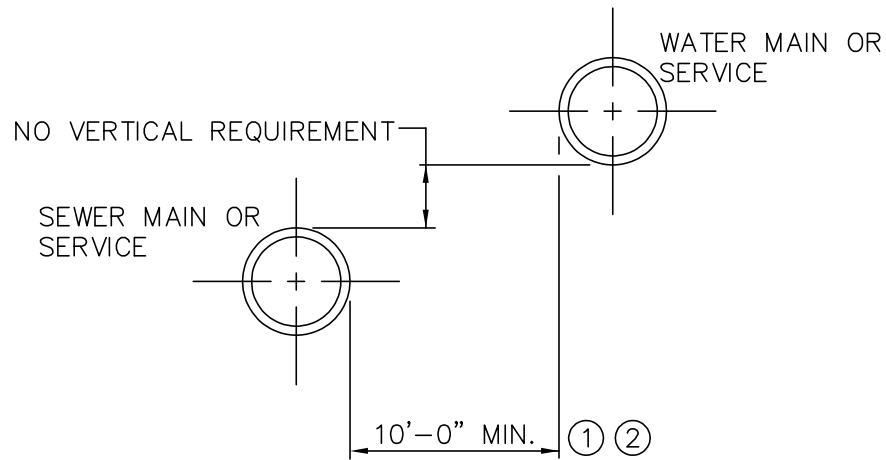
**NOTE:**

PRESSURES SHOWN ABOVE ARE MAXIMUM WORKING PRESSURE IN SYSTEM.

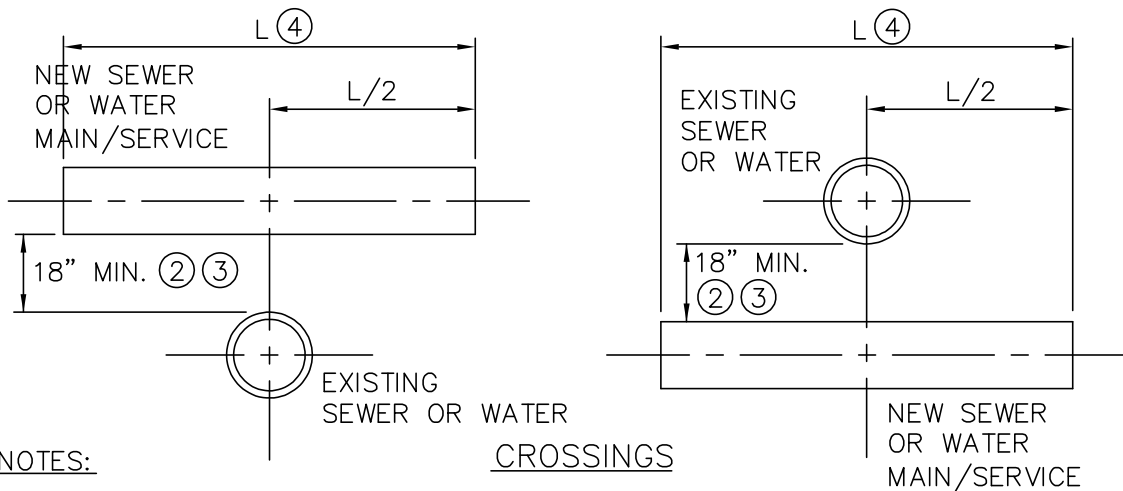
THRUST BLOCKING AND ANCHORS ARE REQUIRED ON VALVES ONLY WHEN SPECIFIED ON THE PLANS OR IN THE SPECIAL PROVISIONS

Date: Feb. 26, 2001

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	THRUST BLOCKING FOR WATER MAIN VALVES	DETAIL NO. BS-203
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PARALLEL ARRANGEMENT

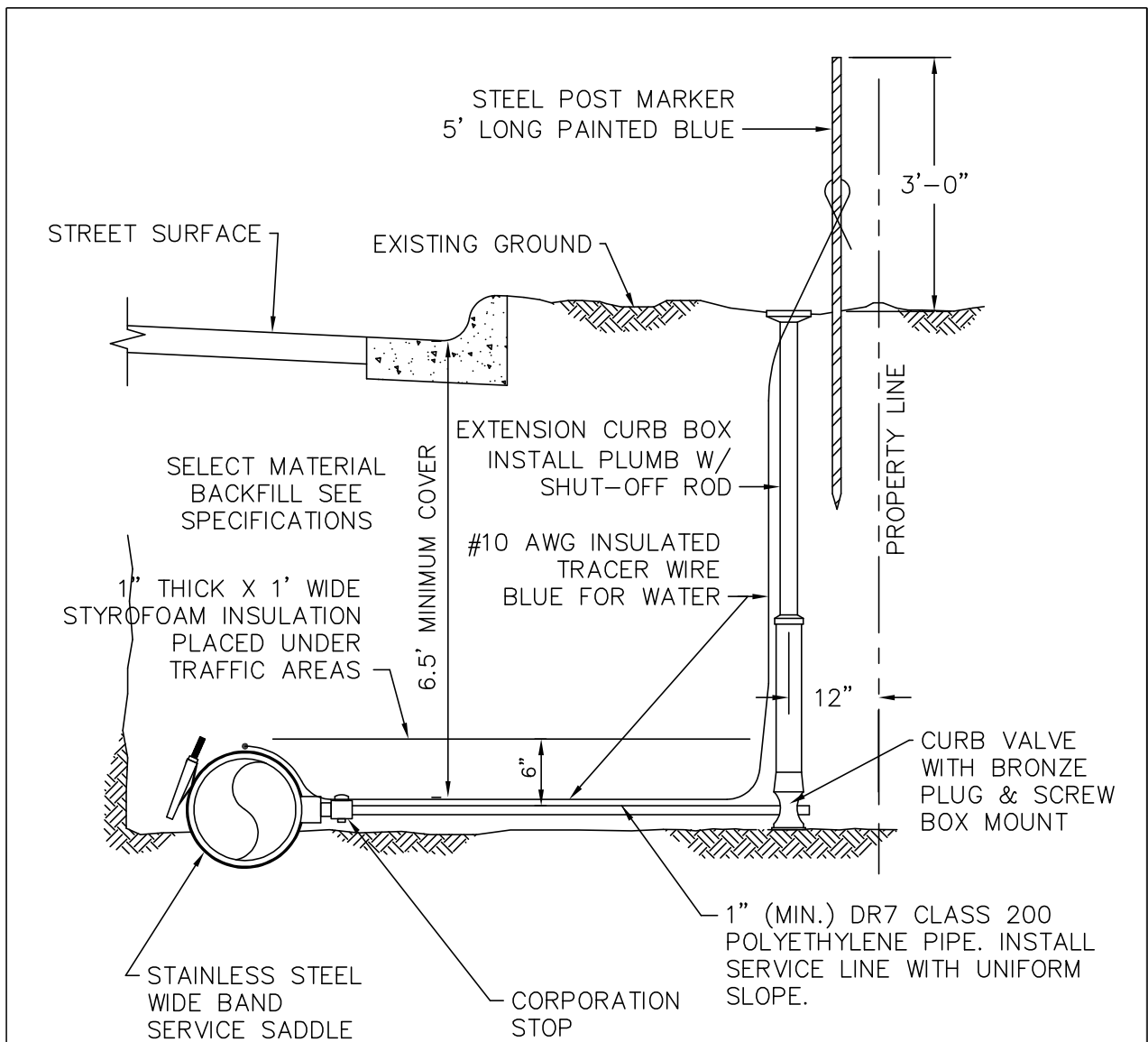


NOTES:

- ① SPECIFIC MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY APPROVAL IS REQUIRED FOR A DISTANCE LESS THAN 10 FEET BETWEEN WATER MAIN AND GRAVITY SEWER. THIS SEPERATION SHALL ALSO APPLY TO WATER AND SEWER SERVICES.
- ② NO EXCEPTION TO THE MIN. SEPARATION REQUIREMENT IS PERMITTED WHEN THE SEWAGE CARRYING PIPE IS A FORCE MAIN. AT CROSSINGS, ONE FULL LENGTH OF WATER MAIN PIPE SHALL BE LOCATED SO THAT BOTH JOINTS WILL BE AS FAR FROM THE FORCE MAIN AS POSSIBLE.
- ③ LESS THAN 18 INCHES OF SEPARATION IS PERMITTED WHEN THE GRAVITY SEWER AT THE CROSSING IS MADE FROM A SINGLE 20 FOOT LENGTH OF AWWA PRESSURE PIPE AND THE CROSSING ANGLE IS APPROXIMATELY 90 DEGREES. SPECIFIC MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY APPROVAL IS REQUIRED FOR A VERTICAL SEPARATION OF LESS THAN 18 INCHES BETWEEN WATER MAIN AND SANITARY SEWER.
- ④ "L" IS A STANDARD LENGTH OF PIPE AS SUPPLIED BY A PIPE MANUFACTURER.
- ⑤ ADEQUATE STRUCTURAL SUPPORT FOR PIPES AT CROSSINGS SHALL BE PROVIDED.

Date: Feb. 26, 2001

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	WATER AND SEWER MAIN AND SERVICE SEPARATION	DETAIL NO. BS-204
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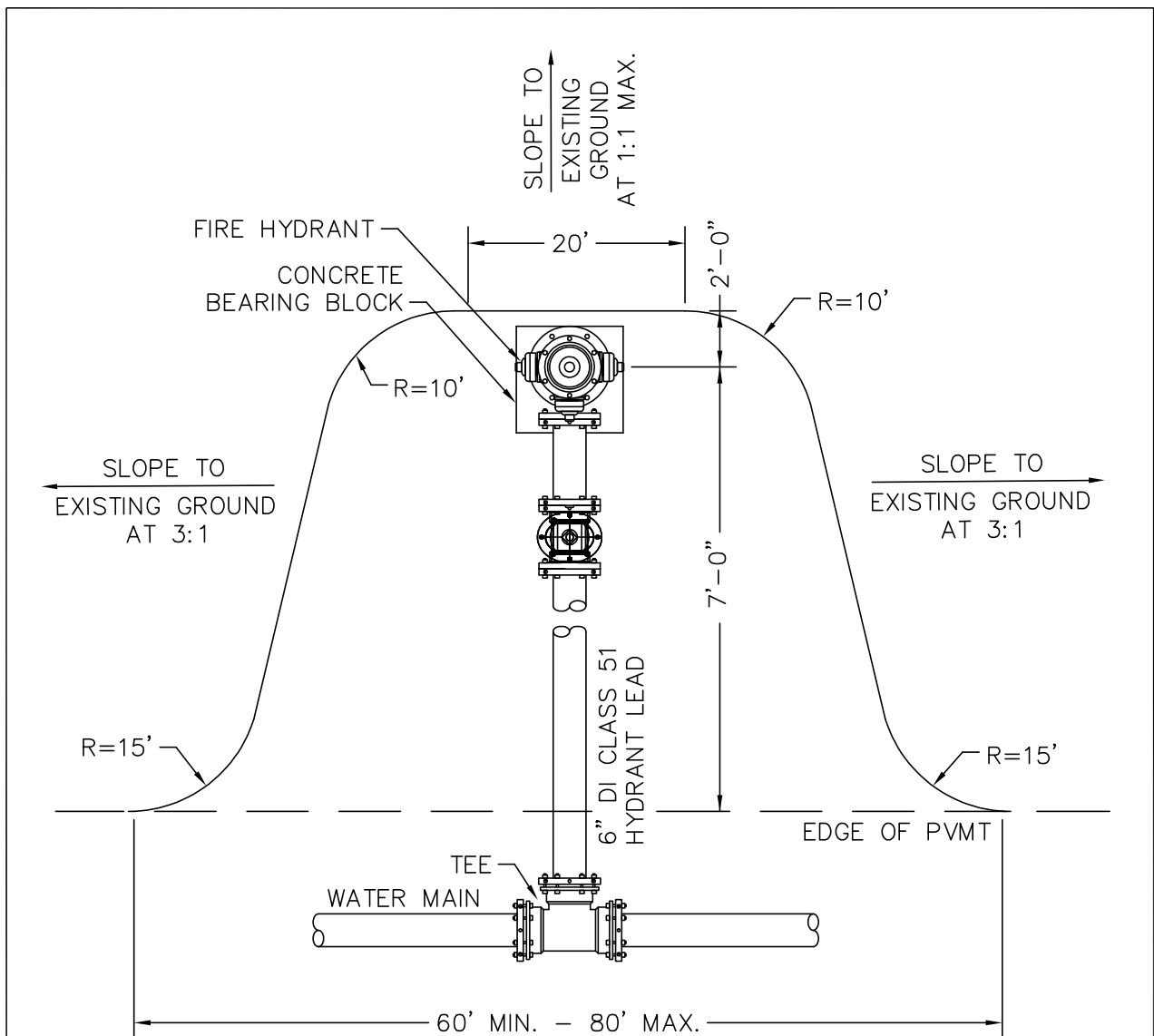


**NOTES**

1. MINIMUM COVER FOR SERVICE LINES SHALL BE MEASURED FROM EXISTING GROUND LINE WHEN GROUND IS LEVEL OR FALLING AWAY FROM STREET, AND MEASURED FROM TOP OF STREET CURB WHEN GROUND IS RISING AWAY FROM STREET.
2. WATER SERVICE LINES SHALL BE INSTALLED WHERE SHOWN ON THE DRAWINGS OR AS SPECIFIED.
3. BEDDING AND PIPE ZONE MATERIAL SHALL BE WASHED ROCK HAVING A MAXIMUM 3/4" SIZE WITHIN 6" OF SERVICE PIPE.
4. WHERE SERVICE LINE IS BURIED UNDER AREAS TRAVELLED BY VEHICLES OR PEDESTRIANS PLACE 2 INCH THICK BY 24 INCH WIDE STYROFOAM INSULATION.

Date: AUGUST 8, 2002

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	WATER SERVICE LINE	DETAIL NO. BS-205
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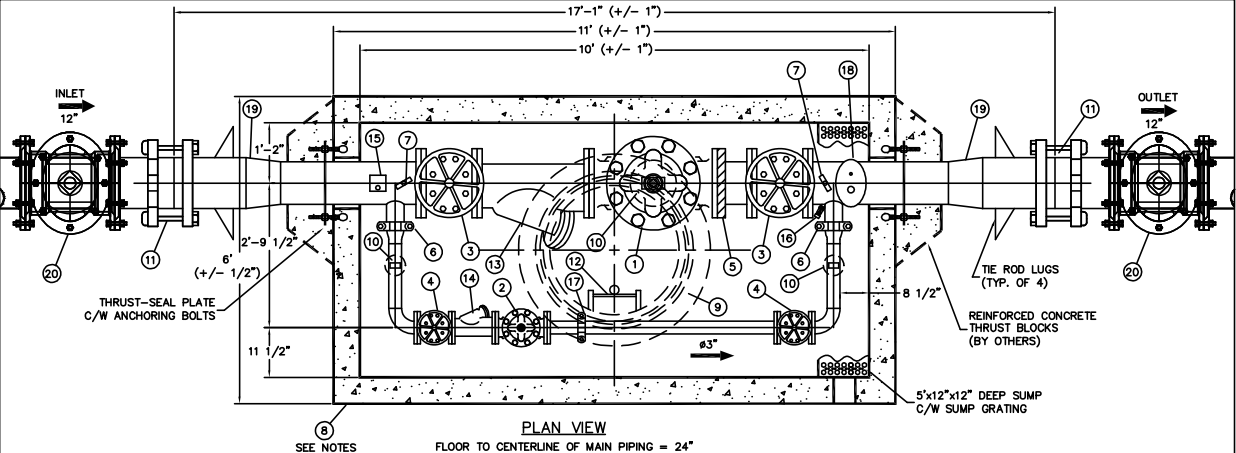
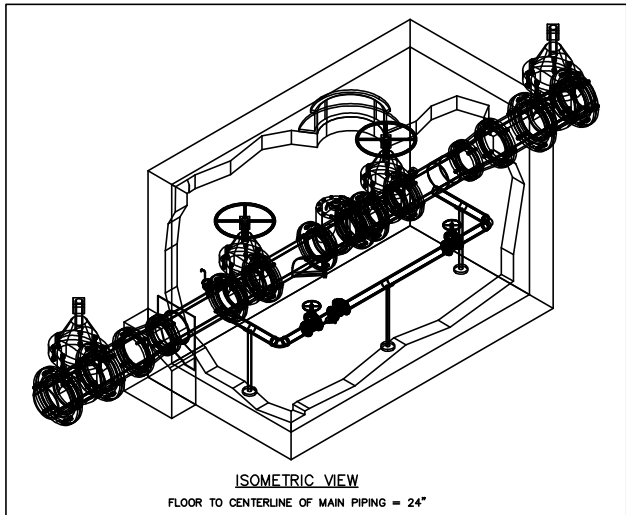


**NOTES:**

1. CONSTRUCT PULLOUT WITH THE FOLLOWING ROAD SECTION:  
 BASE: 6" MINUS PIT RUN – MIN. 9" DEPTH  
 FINISH SURFACE: MIN. 3" DEPTH OF 1" MINUS ROAD MIX.
2. GRAVEL BASE COURSE SHALL BE PLACED IN UNIFORM THICKNESS OF 8" AND COMPACTED TO 95% OF MAX. DRY DENSITY AS DETERMINED BY AASHTO T-180.
3. PULLOUT CONSTRUCTION MUST CONFORM TO THE REQUIREMENTS OF THE ROAD DESIGN STANDARDS IN THE GALLATIN COUNTY SUBDIVISION REGULATIONS.
4. THE FINISHED SURFACE OF EACH HYDRANT PULLOUT SHALL BE UNIFORMLY SLOPED FROM THE EDGE OF PAVEMENT TO THE BURY LINE ON THE HYDRANT.

Date: April 25, 2001

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	FIRE HYDRANT PLACEMENT WITH ROADSIDE PULL-OUT	DETAIL NO. BS-206
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**NOTE CALLOUTS**

- ① 10" CLA-VAL 90G-01BCS PRESSURE REDUCING VALVE C/W X101 POSITION INDICATOR DI BODY, BRONZE TRIM - #150 FLGD (QTY. 1)
- ② 3" CLA-VAL 90G-01BCS PRESSURE REDUCING VALVE C/W X101 POSITION INDICATOR DI BODY, BRONZE TRIM - #150 FLGD (QTY.1)
- ③ 10" MUELLER A2360-6W41 W55 RW NRS GATE VALVE C/W HANDWHEEL - #150 FLGD (QTY. 2)
- ④ 3" MUELLER A2360-6W41 W55 RW NRS GATE VALVE C/W HANDWHEEL - #150 FLGD (QTY. 2)
- ⑤ 10" VICTAULIC #741 COUPLING (QTY. 1)
- ⑥ 4" VICTAULIC #07 COUPLING (QTY. 2)
- ⑦ 4" ENFM 6211 (0-200PSI) PRESSURE GAUGE C/W GAUGE COCK (QTY. 2)
- ⑧ #10565 PRECAST CONCRETE VAULT C/W WHITE LATEX INTERIOR & BLACK TAR EXTERIOR, TOP HALF TO BE INSULATED WITH SPRAYED POLYURETHANE FOAM TO R20 (APPR. 3" THICK) (QTY.1)

**NOTE CALLOUTS**

- ⑨ 30" Ø MANHOLE COVER AND FRAME W/ IFC0773 FROST PROOF COVER & RING, 24" BOLT DOWN COVER H20 STATIC (OFF ROADWAY) LOADING (QTY. 1)
- ⑩ ADJUSTABLE PIPE SUPPORTS (QTY. 3)
- ⑪ 12" ROMAC TRANSITION COUPLINGS (QTY. 2)
- ⑫ ALUMINUM LADDER WITH SAFETY POST (QTY. 1)
- ⑬ 10" MUELLER 758 CAST IRON BODY "Y" STRAINER C/W BLOWDOWN VALVE - #125 FLGD (QTY. 1)
- ⑭ 3" MUELLER 758 CAST IRON BODY "Y" STRAINER C/W BLOWDOWN VALVE - #125 FLGD (QTY. 1)
- ⑮ 1" APCO 50.3 AIR RELEASE VALVE C/W ISOLATION VALVE, EXTENSION & BRASS UNION (QTY. 1)
- ⑯ 3/4" HOSE BIB ASSEMBLY (QTY. 1)
- ⑰ 3" VICTAULIC #07 COUPLING (QTY. 1)
- ⑱ 1" APCO 143C.1 COMBINATION AIR VALVE C/W ISOLATION VALVE, EXTENSION & BRASS UNION (QTY. 1)
- ⑲ 12" x 10" REDUCER, MJ
- ⑳ 12" MUELLER A2360-20 MxMJ RW NRS GATE VALVE W/ OPENING NUT (QTY. 2)

**STANDARD FABRICATION & FINISHING SPECIFICATION**

FABRICATED STEEL PIPE & FITTINGS TO BE SCHEDULE NO. 40 STEEL PIPE FOR SIZES TO 10", AND 3/8" WALL FOR 12" AND LARGER. ALL, 3" LARGER PIPE, INSIDE WETTED SURFACES TO BE SANDBLASTED, EPOXY LINED AND COATED TO AWWA C-210 AND NSF-61 SPECIFICATION. FINISH COATING WILL BE BLUE ENAMEL.

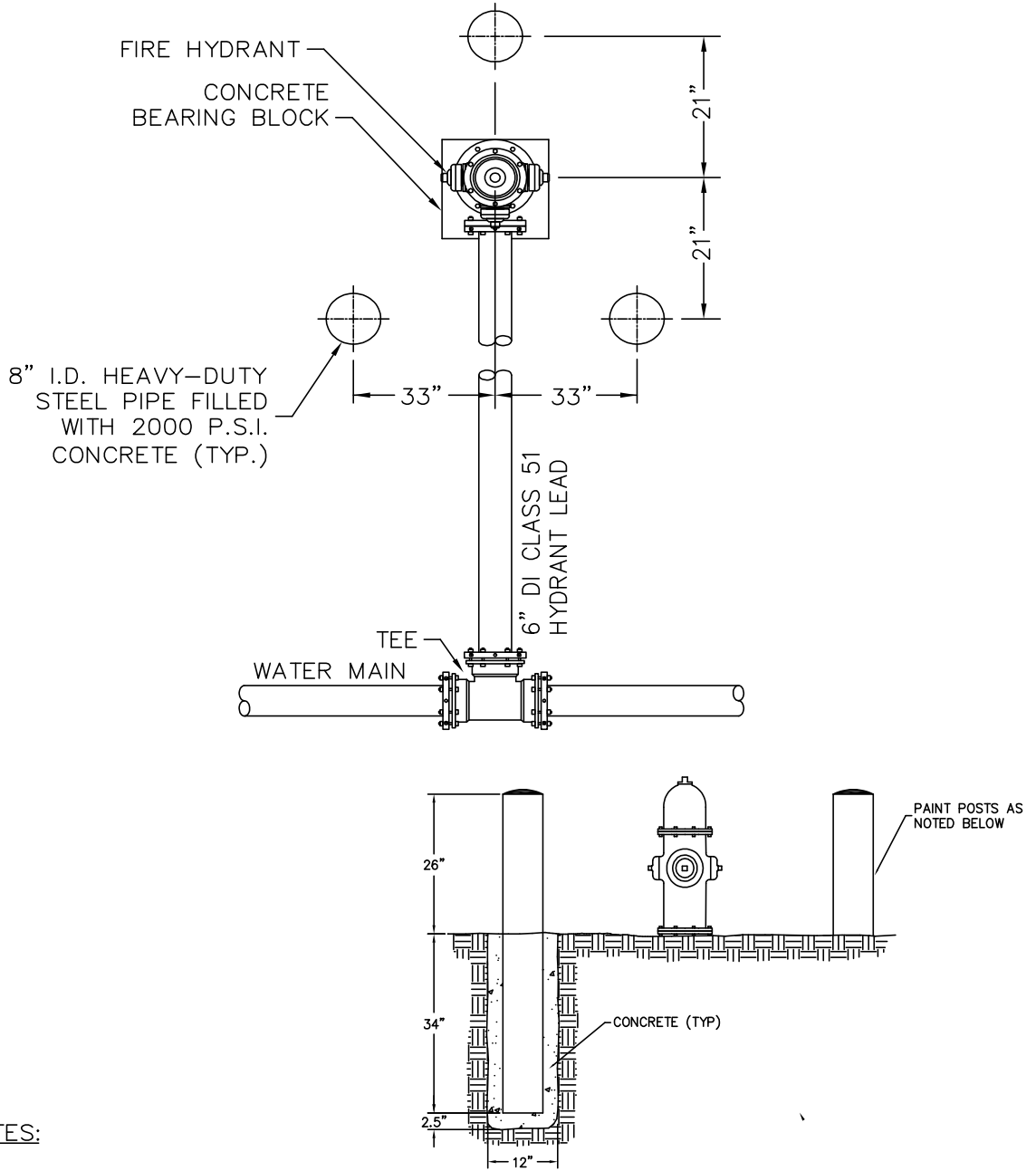
**NOTES:**

- 1. VAULT #10565 (H-20 LOADING) INSIDE DIMENSIONS 10' L x 5' W x 6'-6" H
- 2. VAULT WEIGHT: TOP.....12,300 Lbs BOTTOM.....12,000 Lbs : WEIGHTS ±10%



Date: April 11, 2001

<p>BIG SKY WSD 363 STANDARD SPECIFICATIONS</p>	<p>SCALE: NONE</p>	<p>PRV STATION</p>	<p>DETAIL NO. BS-207</p>
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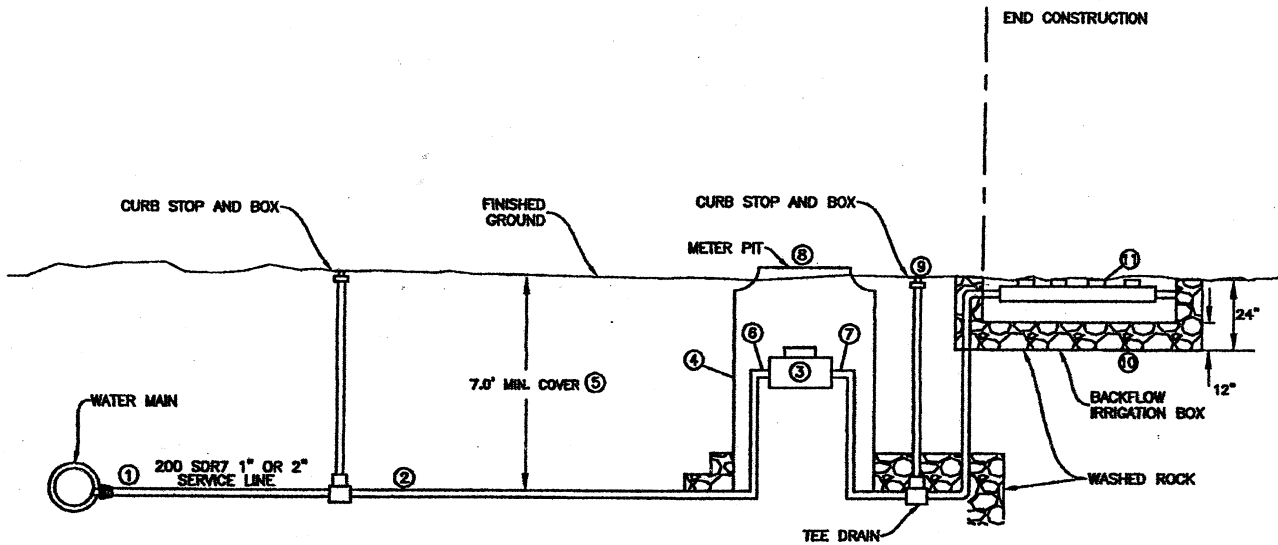


**NOTES:**

1. PLACE BOLLARDS AROUND FIRE HYDRANTS LOCATED IN PARKING LOTS AND AT OTHER LOCATIONS WHERE HYDRANT IS POSSIBLE TO BE HIT BY VEHICLES.
2. BOLLARDS SHALL BE SET AT A MINIMUM OF 3 FEET BELOW FINISHED GRADE
3. PAINT POSTS WITH SHERWIN-WILLIAMS METALATEX SEMI-GLOSS COATING, SAFETY RED (B42 R38 620-4069)

Date: April 11, 2001

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	BOLLARD PLACEMENT AT FIRE HYDRANT	DETAIL NO. BS-208
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1. SERVICE LINE (SEE DETAIL BS-205)
2. LINE SHALL BE 1" TO 2" POLY WITH  $\frac{3}{8}$ " WASHED ROCK BEDDING AND #12 THIN LOCATOR WIRE.
3. METER SIZE  $\frac{3}{4}$ " TO 2"
4. METER PIT SIZE 18" TO 27"
5. BOX DEPTH 84"
6. METER INLET LOCK WING ANGLE BALL VALVE (FULL PORT)
7. METER OUTLET ASSE DUAL CHECK VALVE
8. 18" MUELLER METER BOX LID MODEL #282925 SIDE LOCKING AND ELECTRONIC METER READING FOR MXU.
9. CURB BOX FOR DRAIN
10. IRRIGATION BOX
11. BACKFLOW WATTS SERIES 009  $\frac{3}{4}$ " TO 2"

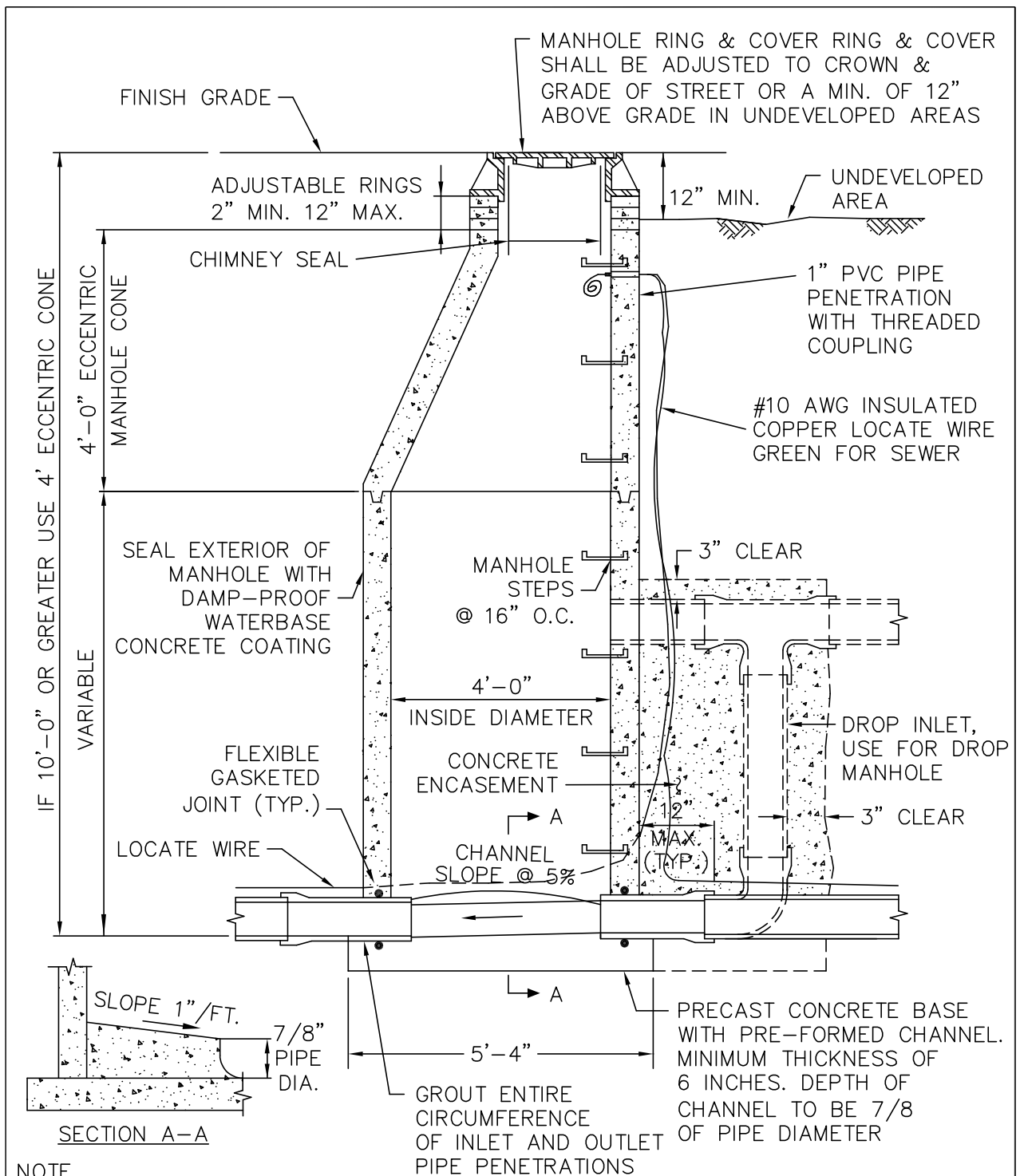
Date: April 17, 2007

BIG SKY WSD 363  
STANDARD SPECIFICATIONS

SCALE:  
NONE

IRRIGATION SERVICE  
AND METER BOX

DETAIL NO.  
BS-209

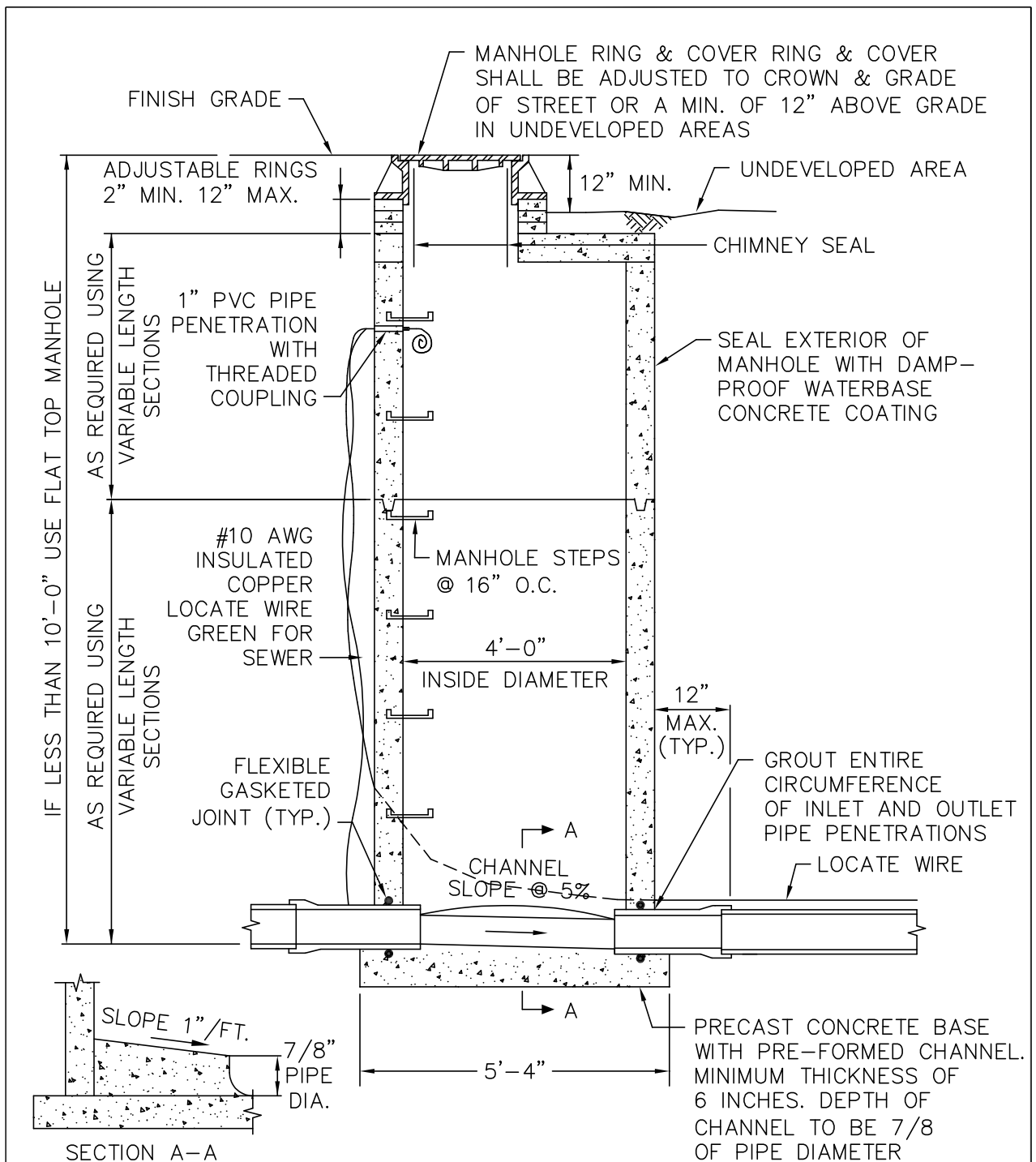


**NOTE**

ALL JOINTS BETWEEN MANHOLE SECTIONS, ADJUSTING RINGS, MANHOLE RING & TOP SECTION, AND AROUND SEWER PIPE INTO MANHOLE SHALL BE WATERTIGHT. JOINTING MATERIAL SHALL BE "RAM-NEK" OR EQUAL FOR ALL JOINTS EXCEPT BETWEEN SEWER PIPE AND MANHOLE WALL WHERE GASKETED, FLEXIBLE, WATERTIGHT CONNECTIONS SHALL BE USED.

Date: Mar. 26, 2001

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	SANITARY SEWER MANHOLE	DETAIL NO. BS-301
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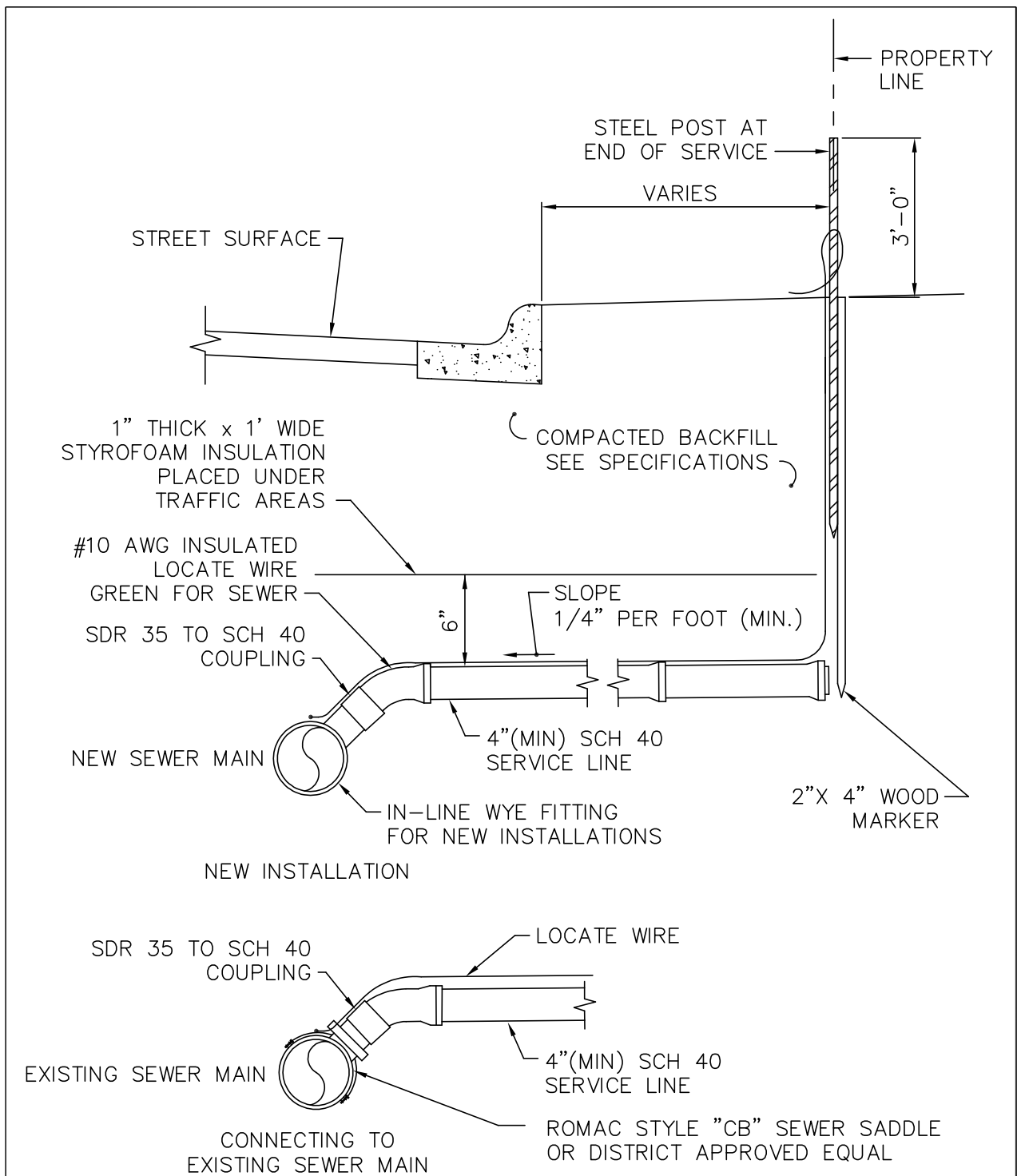


**NOTE**

ALL JOINTS BETWEEN MANHOLE SECTIONS, ADJUSTING RINGS, MANHOLE RING & TOP SECTION, AND AROUND SEWER PIPE INTO MANHOLE SHALL BE WATERTIGHT. JOINTING MATERIAL SHALL BE "RAM-NEK" OR EQUAL FOR ALL JOINTS EXCEPT BETWEEN SEWER PIPE AND MANHOLE WALL WHERE GASKETED, FLEXIBLE, WATERTIGHT CONNECTIONS SHALL BE USED.

Date: Feb. 26, 2001

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	SANITARY AND STORM SEWER MANHOLE	DETAIL NO. BS-302
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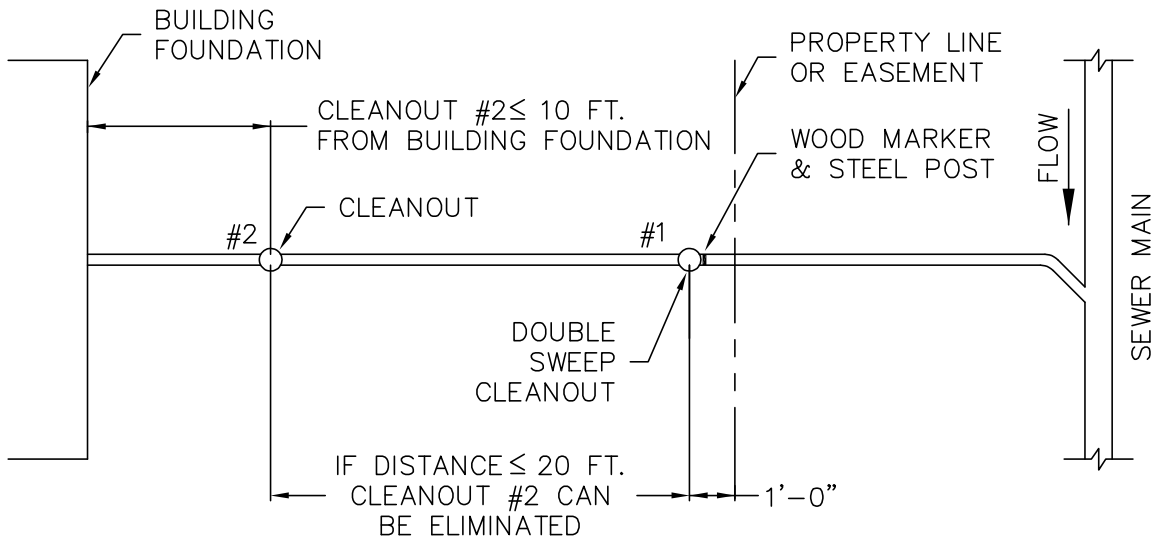


**NOTE**

1. WHERE SERVICE LINE IS BURIED UNDER AREAS TRAVELLED BY VEHICLES OR PEDESTRIANS PLACE 1 INCH THICK BY 12 INCH WIDE STYROFOAM INSULATION.

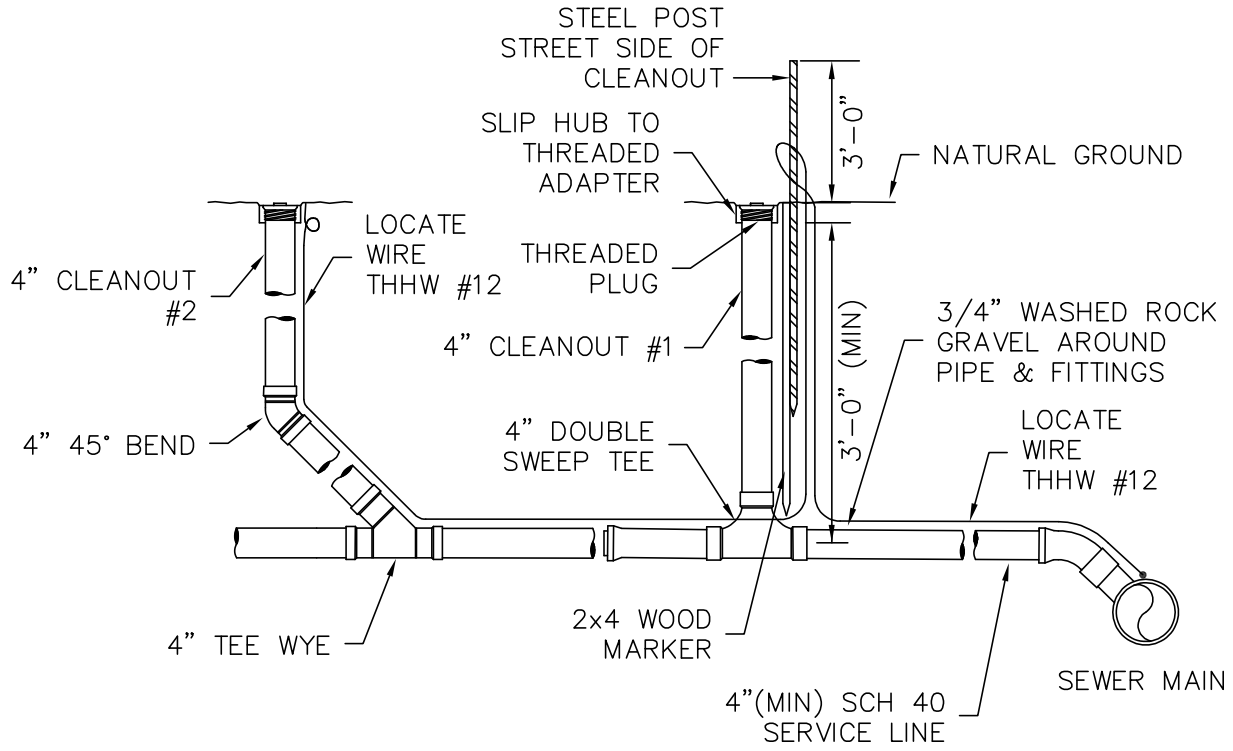
Date: March 28, 2001

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	SANITARY SEWER SERVICE LINE	DETAIL NO. BS-303
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NOTES:

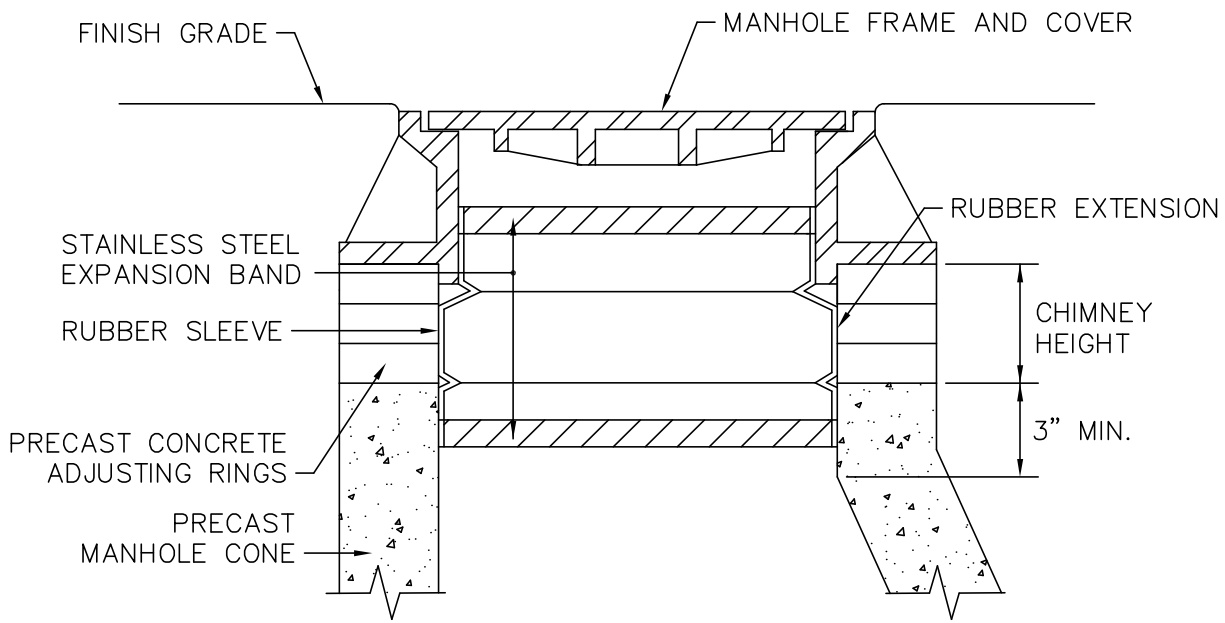
1. CLEANOUTS EVERY 100 FEET.
2. ALL CLEANOUTS NEED TO BE READILY ACCESSIBLE AT THE COMPLETION OF THE PROJECT.



NOTE:  
SEE DETAIL NO BS-305 FOR INSULATION REQUIREMENTS

Date: April 7, 2005

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	SANITARY SEWER CLEANOUT	DETAIL NO. BS-303A
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SECTION

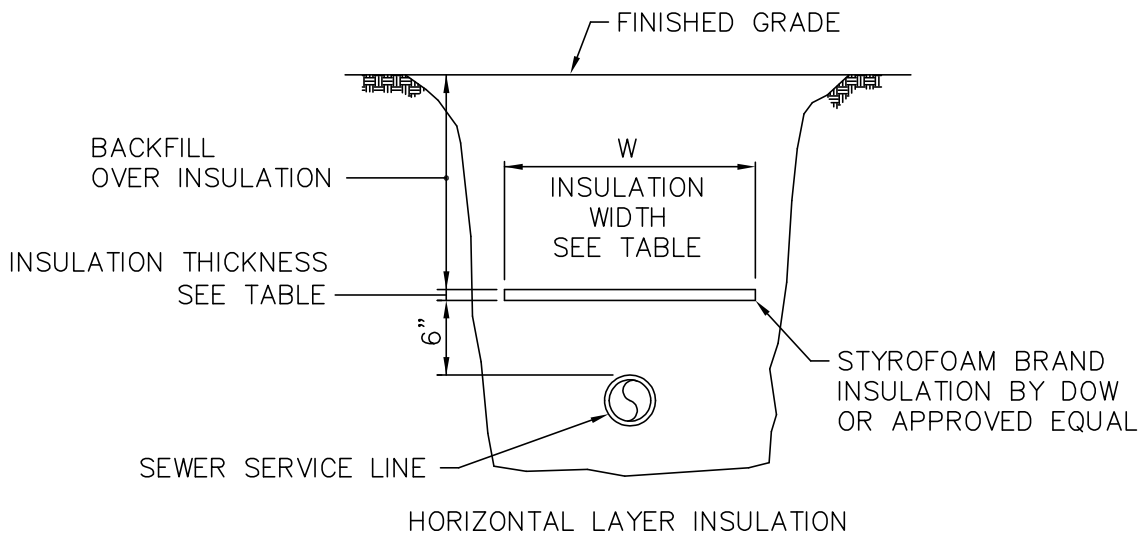
NOTES

1. SEE CHIMNEY HEIGHT TABLE FOR SEAL AND EXTENSION COMBINATIONS NEEDED TO SPAN FROM THE FRAME TO THE TOP OF THE CONE ON MANHOLES WITH VARIOUS CHIMNEY HEIGHTS. FRAME OFFSETS OR DIAMETER DIFFERENTIALS WILL REDUCE THESE SPAN HEIGHTS.
2. THE TOP OF THE CONE MUST HAVE A MINIMUM 3" HIGH VERTICAL SURFACE THAT IS SMOOTH AND FREE OF ANY FORM OFFSETS OR EXCESSIVE HONEYCOMB. IF A 3" HIGH VERTICAL SURFACE IS NOT AVAILABLE ONE MAY BE CREATED USING A CONE DISK FORM AND A NON SHRINK PATCHING MORTAR.

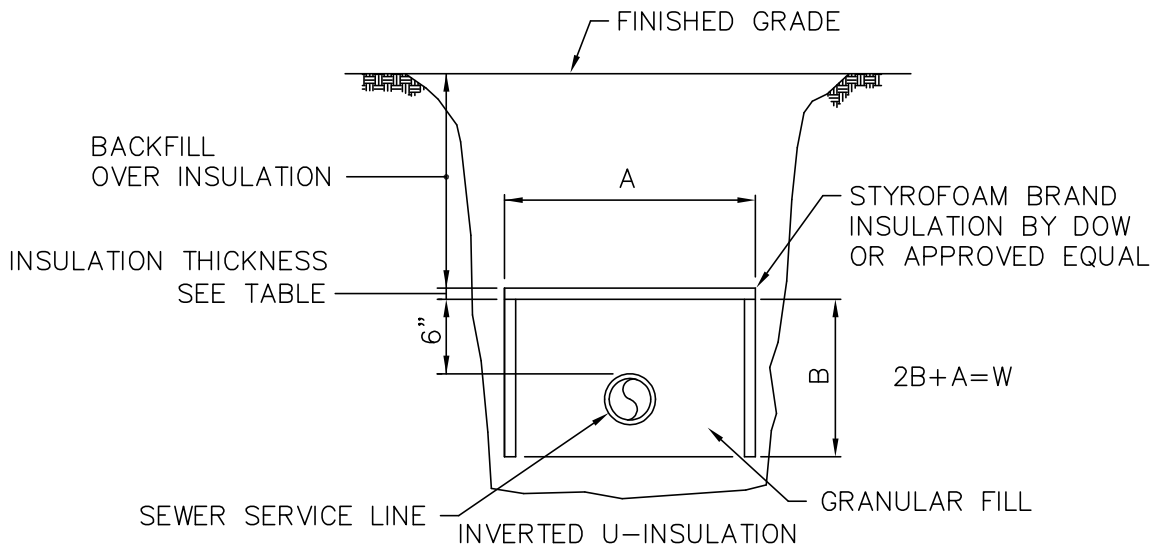
CHIMNEY HEIGHT TABLE		
COMBINATIONS OF SEALS AND EXTENSIONS	TO SPAN HEIGHTS OF:	
	WITH STANDARD SEAL	WITH WIDE SEAL
SEAL ONLY	0" - 4.5"	2" - 7.5"
SEAL + 7" EXTENSION	OVER 4.5" - 10.5"	OVER 7.5" - 13.5"
SEAL + 10" EXTENSION	OVER 10.5" - 13"	OVER 13.5" - 16"
SEAL + MULT. EXTENSIONS	OVER 13"	OVER 16"
ADD 6" OF COVERAGE FOR EACH ADDITIONAL 7" EXTENSION		
ADD 8.5" OF COVERAGE FOR EACH ADDITIONAL 10" EXTENSION		

Date: Feb. 26, 2001

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	INTERNAL MANHOLE CHIMNEY SEAL WITH EXTENSION	DETAIL NO. BS-304
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HORIZONTAL LAYER INSULATION



INVERTED U-INSULATION

HORIZONTAL LAYER INSULATION			INVERTED U-INSULATION		
DEPTH OF BACKFILL OVER INSULATION	INSULATION THICKNESS	INSULATION WIDTH W	DEPTH OF BACKFILL OVER INSULATION	INSULATION THICKNESS	$2B+A \geq$ WIDTH OF HORIZONTAL LAYER INSULATION
					$2B+A$
2'-0"	3.0	6'-6"	2'-0"	3.0	$\geq 6'-6"$
3'-0"	2.5	6'-1"	3'-0"	2.5	$\geq 6'-1"$
4'-0"	2.0	4'-1"	4'-0"	2.0	$\geq 4'-1"$
5'-0"	1.5	2'-1"	5'-0"	1.5	$\geq 2'-1"$

Date: March 28, 2001

BIG SKY WSD 363 STANDARD SPECIFICATIONS	SCALE: NONE	BURIED SEWER SERVICE LINE INSULATION	DETAIL NO. BS-305
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