

City of St. Louis
Department of Public
Utilities
Water Division

POLICIES AND REGULATIONS
FOR

SMALL SERVICE CONNECTIONS

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1. GENERAL INFORMATION

1.0.1 It is a crime to tamper with or operate any appurtenance of the City of St. Louis water distribution system without the prior approval of the Water Division. By City Ordinance and State Law, fines and/or imprisonment are possible. Such action can also be considered a Federal crime and is punishable by significant penalties.

1.0.2 When seeking alterations to the water supply to a property, it is the present property owner's responsibility to correct all water service tap and line service issues that do not meet the requirements detailed within these standards. Examples are unused service taps that were not properly destroyed or undersized or very old service lines.

1.0.3 There is a list of phone numbers on Page 22 detailing which office can answer particular questions regarding regulations or where to obtain permits and applications.

1.0.4 All charges, fees and deposits for services provided by the Water Division as stated in this document are those in effect as of 4/1/2011 and are subject to change without notice.

1.0.5 Within these policies and regulations, all references to a specific standard (AWWA; ANSI etc.) refer to the standard that is at the time of installation in effect.

1.1 DESIGN ISSUES

1.1.1 Approvals: Unless specifically stated elsewhere in this document, the Water Division shall be the only judge if the requirements of these regulations have been met. Federal, State and City legislation and regulations establish these regulations. In addition, many years of experience operating a water distribution system has proved that by following these regulations there are long term savings to both the customer and the City.

1.1.2 Pressure / Flow: The Water Division does not provide information on the available water pressure or flow for a specific location. Adaptors can be borrowed free of charge from the Water Division to attach to a hydrant to assist in field-testing.

1.1.3 Drawing: Detailed information on service line and meter box requirements, are to be shown on the drawing for the type water service connection being installed as well as the meter size and type.

1.1.4 Locating of Facilities: The Water Division will only respond to requests for main locates received through MO-1 Call. The Water Division will mark the location of water mains. Private service lines are not marked or located. Location information of service lines is available from the Estimator. Assistance will be provided to locate a service line valve or stop box, see Page 22.

1.1.5 Service Connection Ownership: The property owner owns the entire service connection from the water main to the structure. This includes all parts of that service connection: the tapping sleeve if used; the shut off valve connected to the main, any additional valves; meter and valve boxes, and all piping. The Water Division owns all water meters. The customer has to pay the initial cost for fire protection (FM & DC) meters.

1.1.6 Improvements to Plumbing System & Structure Rehabs: Whenever improvements are made to a structure (house, building, etc.), the service line to that structure (house, building, etc.) must meet the current requirements of the appropriate building codes. The size of the service line to a structure may have to be increased if additional water using devices are subsequently installed, or if the sizes of the water lines inside the building are increased. For a building that is being renovated, any existing service connection that was made of lead, steel, or unlined cast iron or that is fifty (50) or more years old must be properly destroyed and replaced with a new service connection. If a small service line is being replaced, the corporation must also be replaced. See Page 22 on how to determine the year the tap was installed. See Appendix A for the descriptions of the various levels of Building Alterations as defined by the City of St. Louis Building Code.

1.1.7 Address: Plot plans shall correctly locate structures and provide the correct address as established by the Building Division.

1.1.8 New Tap Required: A new tap on the water main is required whenever:

- New structures will require a new service connection
- Structures undergoing a Level II or Level III Renovation with a lead service line
- Structures undergoing a Level III Renovation with a service tap over fifty (50) years old

1.2 SERVICE LINES

1.2.1 Sizing Service Connection: It is the customer's responsibility to correctly size both the service tap and service line. Consideration should be given for possible future increases in water usage. If in the future, when a larger service connection is needed, it would be installed at a substantial cost paid by the customer. The minimum size of a water service line is established by the appropriate building codes as reviewed by the Fire Marshal's Office for fire protection systems and by the Building Division for general water use or the Revised City Code. The service connection can be larger than the minimum size. The current plumbing code and Revised City Code requires a minimum of a 1" copper service line from the water main to the property line.

1.2.2 Tap & Service Line of Equal Size: The size of the service tap does not have to be the same size as the service line. Prior approval must be obtained from either the Service Delivery Group's Engineering or Meter & Tap Sections to install a service line that is not the same size as the service tap.

1.2.3 Number of Service Lines: With a few exceptions for high risk customers (see Policies & Regulations for Large Service Connections Section 9.2 page 17), and commercial property, a structure can have only one service connection for fire protection (A.S.) and one service connection for general (G.S.) water use, including irrigation systems, or just one combined fire protection and general water use (A.S.-G.S.) service connection. If a new service connection is installed, all existing service connections of the same type, as shown on Water Division records, must be destroyed. See Page 22 on how to make arrangements to view these records.

1.2.3.a Commercial Property: Multiple general service connections can supply the same structure of commercial property if all of the following conditions are met.

- All of the general service connections to the structure are metered
- Each general service connection supplies a part of the structure which has a valid address and has its own separate exterior building entrance facing the street

1.2.4 Tap on Service Line: Except for split service connections, no attachment of any kind shall be made to a service line from the connection on the water main to that fitting which is farthest from the water main: the backflow prevention device, if required; the meter, if one is installed; or the stop & waste valve.

1.2.5 Orientation: The service line MUST RUN STRAIGHT AND PERPENDICULAR from the connection on the water main to the structure, entering the structure at least six (6) or more feet inside the building line. One exception to this rule is the lack of a direct right-of-way. In that situation, the service line is to run parallel to the street curb or alley line at least one (1) foot inside the street or alley limits, until the service line can turn 90 degrees and run straight, entering the structure six (6) or more feet inside the building line. If such a service line is parallel to a street curb or alley line is more than fifty (50) feet long, there shall be two water shut off valves on that line. One as near as possible to the water main as determined by the Water Division and the second immediately after the service turns to enter the property. Limited exceptions to this requirement will be reviewed on a case-by-case basis upon receipt of a written request. Additional installation requirements may be imposed to allow such exception. Poor planning or designs by the developer or contractor are not acceptable justifications for an exception to this regulation.

1.3 MAJOR REDEVELOPMENTS

1.3.1 Description: Major development projects are those projects involving large tracts of land where a number of existing structures may be removed, new structures will be added and the streets rebuilt. The following options are site-specific provisions allowed only upon the approval of the Water Commissioner. Only the Water Division will determine if a project meets the requirements of this section.

1.3.2 New main: It is strongly recommended that the developer consider replacing the existing water mains as part of major development projects, particularly if significant street rehabilitation is to be done.

1.3.3 Existing Service Taps: If a water main is to be abandoned, it is not necessary for all of the existing service connections to be actually destroyed before building demolition begins. The developer must submit detailed plans for the redevelopment. The construction phase of the development is to be under contract and a construction schedule provided. For each individual service tap that should be destroyed, the developer must complete a Tap Destroy Application with the projected date on which the main will be abandoned. A deposit as set by the Water Commissioner is to be submitted to insure that the taps are destroyed or the main abandoned. The Water Division will hold the deposit until the Water Division has actually disconnected the water main and it has actually been abandoned.

1.3.4 New Service Taps: When a new water main is installed as part of a development project, the service taps for the new buildings can be made at the time the main is installed. The developer must submit for approval by the Water Division, drawings detailing the exact location where the main is to be tapped, and where the temporary end of the service lines will be placed. The contractor is responsible for marking the water main for the location of the new service taps. There shall be a cap placed at the temporary end of the service line. Accounts must be opened for each service tap and a deposit as set by the Water Commissioner submitted in advance. The deposit is to pay for a tap destroys if the structure is not built. Once the service has been connected, the deposit would be returned. No allowance will be made for missed marked service tap locations or if the

building line changes such that the service line no longer enters the structure six (6) or more feet inside the building line. The newly installed service tap will then have to be destroyed and a second new service tap installed.

1.3.5 Water Main Installation: The Water Division will accept water mains installed by others under the following conditions:

- The Water Division determined that this water main is necessary
- The water main and all its appurtenances were constructed according to Water Division regulations, MO-DNR Constructions Standards and AWWA Standards
- An authorized representative of the Water Division has inspected the work during construction
- The water main has passed all hydrostatic and water quality tests
- Only Water Division approved appurtenances were used

1.4 OTHER DESIGN CONSIDERATIONS

1.4.1 Fire Hydrants: Only Water Division designed hydrants can be installed. Hydrants shall be installed such that the centerline of the breakaway flange connection is between 3 - 7 inches above the ground elevation. The hydrant shall be set two (2) feet from the center of the hydrant to the back of the curb. Hydrants cannot be located within ten (10) feet of a stormwater inlet or sanitary, stormwater or combined manholes. Hydrants must be at least five (5) feet from any curb rounding, which includes driveway entrances. There shall be a minimum three (3) foot clear radius around the hydrant to provide sufficient room to operate and maintain the hydrant.

1.4.2 Sanitary, Stormwater or Combined Structures: Per Missouri Department of Natural Resources (MO-DNR) Design Guide for Community Water Systems, Section 8.6 "Separation of Water Mains, Sanitary Sewer, and Combined Sewers" establish the minimum separation requirements between potable water mains, appurtenances or service lines and sanitary and combined system lines, inlet or manhole. These requirements state that when lines cross, the potable water line must be at least eighteen (18) inches vertically above any sanitary or combined system lines with no joints in the potable water line for ten (10) feet either side of the crossing. When a potable water line runs parallel to, or pass by a manholes of other structures of a sanitary or combined system, there is to be a horizontal separation of ten (10) feet between potable and the sanitary or combined system appurtenances. If this horizontal separation cannot be maintained, either the potable water appurtenance or the sanitary or combined system appurtenance must be encased in an impervious enclosure around the appurtenance and for at least ten (10) feet either side of the other utility. Concrete encasement is NOT acceptable.

1.4.3 Backflow Prevention Device: The City of St. Louis Plumbing Code and the MO-DNR sets the standards for those applications that require backflow prevention devices. In addition, this document stipulates specific locations where backflow prevention devices are required in fire protection systems. The backflow prevention device shall be installed as close to the source as possible, in a position that is easily accessible for testing and repair, and is protected from freezing or submersion at all times. The installations requirements established by MO-DNR and the City Plumbing Section shall be followed for the installation of all Backflow Prevention Devices.

1.5 CONSTRUCTION

1.5.1 Configurations: Service line and meter box or meter vault installations must conform to the drawings that are specified for the specific type of connection and meter installed.

1.5.2 Permits: The contractor is to obtain all required permits necessary to complete the installation.

1.5.3 Work which can only be performed by Water Division authorized forces:

- Operation of all Water Division owned valves, hydrants and appurtenances
- Making all connections to the existing water distribution system
- Installation, relocation and removal of Water Division owned uncontrolled hydrants
- Meter installation, maintenance and removal
- Obtaining water samples and determining if the samples meet Water Division standards
- Repairs to private valves which require the isolation of the water main, such work is to be billed to the customer

1.5.4 Work to be performed by a plumbing contractor:

- Service line installation and service tap destroys
- Repairs to the service line, private valves and private valve boxes
- Meter and valve box installation, repair and removal
- Relocation of Water Division owned controlled hydrants subject to prior written approval of the Water Division
- New main lays, with all appurtenances, subject to prior written approval of the Water Division of the design and installation

1.5.5 Material Supplied: Only the following items, paid for by the contractor, are supplied by the Water Division. It is the contractor's responsibility to obtain all other items necessary for a complete service line installation. See the appropriate service line installation drawing at the end of these regulations for the material required for a complete service connection.

- Corporation or tapping valve and tapping sleeve when required
- Meters and the concrete cover for meter vaults or double meter vaults
- Valves and fittings necessary to make dual connections or to cut-in or cut-out a connection
- All material necessary to repair or replace a damaged private valve which requires the isolation of the water main
- Water Division fire hydrants

1.5.6 Making a Tap: The contractor requesting a service line connection shall do all excavating, installation of the piping, valve and meter box or meter vault, and complete all backfilling and grade restoration. Only the Water Division will make the actual tap into the main. The contractor is to clearly mark the main at the location of the tap.

1.5.7 Reverse taps: When underground structures prevent the attachment of the tapping equipment used to install the service line tap on the correct side of the water main, a reverse tap may be approved. Reverse taps will not be approved to avoid a surface or near surface obstruction such as trolley tracks.

1.5.8 Excavation: The bottom of the excavation shall be reasonably level with two (2) feet of clearance below the bottom of the water main. The size of an excavation depends on the type of work; see Drawing No. 2 and Table 2 on Page 20, for taps up to 20". The excavation shall be free of water and mud (rock the excavation floor if necessary), have vertical sides and be shored to

OSHA standards. If a pipe bell is exposed in the excavation or other obstacles are encountered, contact the Engineering Office. For taps involving mains larger than 20", contact the Engineering Office.

1.5.9 Shoring of Excavation: The Contractor will be responsible to adequately shore the excavation prior to the Water Division making the tap. Any excavation greater than five (5) feet in depth will require shoring. Shoring must meet OSHA standards. The Water Division inspector shall determine adequacy of the shoring at the time of the tap inspection.

1.5.10 Backfill and Grade Restoration: All backfill and grade restoration shall be done by the Contractor. All backfill material used in the public right-of-way and the final grade shall conform to the regulations of the Street Department. Any excavation not in the paved street is to be restored to the existing grade or as detailed on drawings.

1.5.11 Water Turn On: With the permission of the Engineering or Meter & Tap Sections, water can be used from an unmetered new service connection for construction purposes. The water service connection shall not be considered complete and the water available to the customer until the Water Division has inspected and approved the installation, and the meter, when required, has been installed.

2. TYPES OF SERVICE CONNECTIONS

2.0 Water service connections are divided based upon the following categories:

2.0.1 Size:

Small Service - all service lines that are not made of cast iron or ductile iron pipe

Large Connection (Cast Iron) - all 6" and larger taps, and those 3" & 4" taps installed using cast iron or ductile iron pipe

2.0.2 Use:

General Supply (G.S.) - domestic only

General Supply Limited Service Sprinkler (G.S. LSS) - domestic and limited fire protection

Automatic Sprinkler (A.S.) - fire protection only

Combined (A.S.-G.S.) - both domestic and fire protection

2.0.3 Number: See Drawing No. 1

Single - one service line for one use

Dual - two taps on either side of a line valve, which are then interconnected

Through - two or more taps on different water mains, with all of the service lines interconnected inside the property line

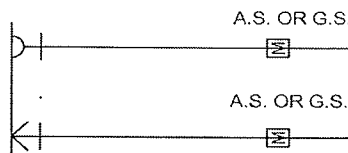
2.0.4 Piping: See Drawing No. 1

Single - one service tap supplying one service line crossing the property line

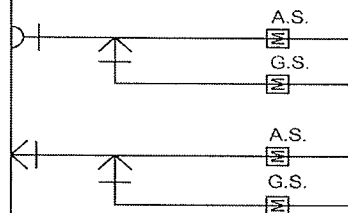
Split - one large service tap supplying two service lines crossing the property line, A.S. & G.S.

TYPE OF SERVICE CONNECTION

STRAIGHT CONNECTION
W/SADDLE OR TEE



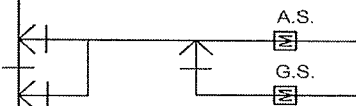
SPLIT CONNECTION
W/SADDLE OR TEE



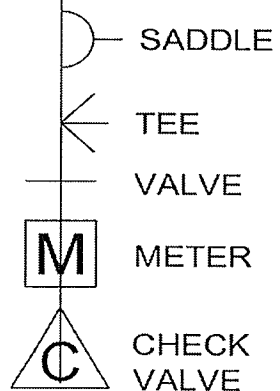
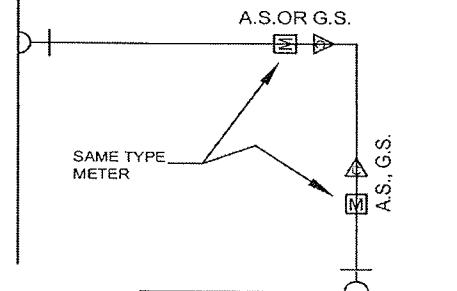
DUAL CONNECTION



SPLIT DUAL CONNECTION



THROUGH CONNECTION



DRAWING #1

Rev. 11-1-2011

3. METERS

3.0.1 All services 2" and greater shall be metered, except for certain fire protection systems.

3.1 ACCESS

3.1.1 Accessible: The meter must be accessible to the Water Division and in the public right-of-way. If for compelling reasons the meter cannot be located in the public right-of way, the property owner must provide easement rights to the Water Division for access to read and maintain the meter. Only the Water Division will determine if the physical conditions at a specific location are considered accessible.

3.1.2 Basement Meter Placement: Water meters can be located in a basement, if the basement is under the sidewalk, or if there are other compelling reasons why the meter cannot be installed outside of the structure. The area around a large meter must be walled off from the rest of the basement with access provided for the Water Division. Only the Water Division will determine if the condition of the specific location warrant inside metering and is accessible. Where inside meters are approved by specific request, the Water Division assumes no liabilities for damages should the installation subsequently leak.

3.2 METER BOX & VAULTS

3.2.1 Installation: The meter will not be installed until the complete service line is installed. There are several different configurations for a meter installation. See the appropriate drawing at the end of these regulations for detail installation requirements.

3.2.1.a Electrical Grounding Jumper: All meter installations not utilizing a meter setter, shall have a permanently install electrical grounding jumper. A length of No. 4 bare stranded copper wire is to be welded, cad welded or brazed to the inlet and outlet piping to the meter. The wire cannot be attached to the piping using the bolts for the water meter. The Jumper is to drop straight down at both attachment points and cross the floor of the meter box or vault. There shall have sufficient length of the jumper to insure no interference with the size and type of meter being installed.

3.2.2 Meter Boxes & Vaults: Meter boxes and vaults are to be sized for the meter being installed, as well as for the location of the installation. Meter boxes and vaults are to be exposed and at the proper grade. See appropriate meter box or vault drawing at the end of these regulations. Meter boxes and vaults are to be located in the public right-of-way. Meter boxes and vaults are normally located close to the curb or in the sidewalk. The lid for meter vault and double meter vaults will be delivered when the meter is ready to be set.

3.2.3 Meter Flanges: The flanges for three (3) inch and larger meters shall be oriented so that two bolt holes on the flange straddle the top center. Only one-piece flanges that are threaded, welded or silver soldered onto pipe shall be used inside meter boxes and vaults. The flanges shall be a minimum of six (6) inches from the sides of the meter box or vault. See Table 3 pg 21 for spacing between meter flanges.

3.2.4 Bypasses: No unmetered bypasses or jumpers around a meter are permitted.

3.2.5 Valve, Meter Suction: A suitable water shut off valve for the type service connections shall be installed between the water main and the meter, in the proper type of valve box or stop box which is to be exposed and at the proper grade.

3.2.6 Valve, Meter Discharge: A suitable valve shall be installed on the discharge side of the meter. This valve shall be located between the meter and immediately inside the structure.

3.3 TYPE & SIZE

3.3.1 Domestic Meters: Owned and supplied by the Water Division. Meters are obtained, installed and maintained at no cost to the customer. The customer will be billed for damages to or the loss of a domestic meter.

3.3.3 Meter Maintenance: Water Division personnel shall only perform Meter work.

3.3.5 Size Domestic Meter: The initial domestic meter installed will be the same size as the service line. The Water Division can replace this meter with one of a different size or type if the Water Division determines that it is warranted. An example would be if the actual water use has changed from the initial estimate.

4. FIRE PROTECTION CONNECTIONS

4.0.1 Fire Marshal: Fire Marshal's Office must approve **all fire protection systems**. Contact that office for specific information about fire protection system connections, see Page 22.

4.1 TYPE CONNECTIONS

4.1.1 Limited Service Sprinkler (LSS) - domestic meter - limited to a total of 20 sprinkler heads

1" service line:	1 sprinkler head per fire area
1 ½" service line:	2 sprinkler heads per fire area
2" service line:	4 sprinkler heads per fire area

4.1.2 SMALL A.S. - no meter - 2" & 3" copper service lines, that supply only sprinkler heads

4.1.3 A.S.-G.S. - Split Service - See Drawing No. 1, page 10. A single service tap into the water main, where the service line is split in the street area providing separate fire protection and domestic service lines into the building.

4.2 BACKFLOW PREVENTION DEVICE REQUIREMENTS

4.2.1 Device Approval: All service line backflow prevention devices and the location of the proposed installation of this device shall be reviewed and approved by both the Plumbing Section

and the Water Division before proceeding with the installation. The proof of compliance with MO-DNR backflow prevention requirements shall be furnished when the application is made for the service connection.

4.2.2 Class I: Approved Reduced Pressure Principle Backflow Preventor

Fire systems that contain any

- Antifreeze or foam solutions

4.2.3 Class II: Approved Double Check/Double Gate Backflow Preventor

Fire system that supplies ONLY sprinkler heads, either wet or dry

- Hose racks or stand pipes
- Private fire hydrants

5. COST ESTIMATES FOR WORK

5.0 Cost: The installation cost for taps are fixed and are available from the Tap Application Counter, see page 22.

6. WATER SERVICE ACCOUNTS & BILLING

6.1 ACCOUNTS

6.1.1 Flat Rate: Most residential water users are billed on a flat rate basis. Flat rate components include the number of rooms, toilets, bathtubs, showers (separate from a bathtub) and front footage of the lot. Metered accounts can be converted to flat rate, when all flat rate account requirements have been met. Flat rate accounts are available to residential structures of six units or less. No commercial or industrial customers can be a flat rate account. Not all flat rate customers are eligible for the service line insurance program. See Page 22 on how to contact the Customer Service Section for more information.

6.1.2 Metered: Except for some specific fire protection systems, all industrial and commercial customers and all service taps 2" and greater must be metered. The customer can request to be metered even if eligible to be a flat rate account.

6.1.3 A change in a building use can change whether a meter is required. See Page 22 on how to contact the Customer Service Section for more information.

6.1.4 New Buildings, Rehabs & Inactive Accounts: For all new construction, building rehabilitation and properties with an inactive water account, the service connection must meet the Water Division's current service connection standards prior to the water service being turned on.

6.1.5 Active Accounts: It is very important that service account information accurately reflects the present user of water service to prevent any interruptions of service. Contact Customer Service Section to resolve issues regarding an outstanding balance for a specific address or customer.

6.1.6 Account Deposit: A deposit as detailed in Table 1 is required. Actual water usage may result in an adjustment in the amount of the required deposit. After two (2) years of prompt payments, the deposit will be refunded with interest.

Table 1 Minimum initial deposit as of 11/1/10 for new-metered accounts

Small Service Connections		Large Service Connections	
1"	\$50.00	4"	\$750.00
1-1/2"	\$190.00	6"	\$1,000.00
2"	\$370.00	8"	\$1,500.00
3"	\$500.00	10"	\$2,500.00
		12" & larger	To be determined

6.2 WATER SERVICE TURN ON

Water will not be turned on until the following has been completed:

- Valve or stop box is exposed and at the correct grade, and the Tee head or valve is accessible
- An account has been opened in the name of the structure's occupant or owner
- All relevant fees, charges and deposits have been paid
- Where required, the meter box or vault meets all existing standards
- Where required, the water meter and/or backflow prevention device have been installed

7. INSPECTIONS - TAP EXCAVATION & METER INSTALLATION

7.1 INSPECTIONS

7.1.1 When Inspection Required: Three inspections are required as listed below for new tap and meter installations. See Page 22 on information to schedule an inspection.

- When the contractor has completed all piping work for the service line & is ready to backfill
- When the contractor is ready for meter installation

7.1.2 Excavation for Tap: The contractor is to excavate at the location of the tap in the size as detailed in Drawing No. 2 and Table No. 2 on Page 20. The water main is to be exposed, cleaned, and the location of the tap clearly marked on the main. All excavations with a depth of five (5) feet or more to the bottom of the excavation shall be shored or stepped per OSHA regulations. The tap will not be scheduled until the excavation has been inspected.

7.1.3 Ready for Backfill: When the Contractor has installed all appurtenances of the service connection to the structure, the Water Division and the Plumbing Section both require that the work be inspected prior to backfilling and grade restoration. The Water Division's second inspection can be done at the same time the tap is installed if arrangements had been made when the tap was scheduled.

7.2 METER SETTING

After completion of all work on the service connection including the installation of all backflow prevention devices which were required, and when ready for meter installation, contact the Meter & Tap Section, Page 22, to schedule an inspection prior to installation of the meter.

8. DESTROYING SERVICE TAPS

8.0.1 Only a Water Division authorized representative is allowed to witness and approve a service tap destroy. PLUMBING INSPECTORS DO NOT HAVE THAT AUTHORITY.

8.1 GENERAL REQUIREMENTS

8.1.1 Tap Location: The Water Division will locate the water main only after receipt of such a request through Mo-1 Call, but will not mark private taps. The contractor can obtain private tap location information from the Estimator; see Page 22 for contact information.

8.1.2 Excavation Location: The contractor is to excavate at the recorded location of the tap.

8.1.3 Tap Not Found: If the tap cannot be located in the initial excavation, the contractor shall expose the water main for five (5) feet either side of the recorded location of the tap. When the Water Division is satisfied that a reasonable effort was made to locate the tap but it was not found, the contractor shall be released from having to destroy the tap.

8.1.4 Demolition Permit: All service taps indicated on Water Division's records to a structure must be destroyed before the Water Division will approve the issuance of a Demolition Permit, except as allowed in Section 8.1.5.

8.1.5 Water Used During Building Demolition: The Water Division will approve the use of an existing tap during the structure's demolition. The approval will be given to issue a Demolition Permit provided that the contractor has placed a deposit with the Water Division to insure that the contractor destroys the tap (\$1,000.00 for a small service tap; \$5,000.00 for a large service tap). The contractor has thirty calendar days to destroy the service tap. The deposit will be refunded if the contractor has destroyed the service tap within that period. The deposit will be forfeited if the tap is not destroyed within thirty (30) calendar days of receipt of the deposit. Time extension can be obtained if requested in writing. The existing service taps CANNOT be used for any new structure.

8.1.5 Leakage: If the service tap valve cannot be completely shut or if there is a water leak at the valve or piping, the Water Division will make the necessary repairs to stop the leakage. Work by the Water Division will not begin until receipt of a written request to make the repairs. The contractor shall be billed on a time and material basis for this work.

8.1.6 Inspection of Destroy: Requests for inspection of the tap destroy should be made the day before the inspection is to be made. The contractor is to have both street excavation and plumbing permits. Normally there is no charge for taps destroy inspection. If it is necessary to make additional inspections due to the contractor not being ready or not having properly performed the required tasks, the contractor shall be billed for each additional inspection.

8.2 STEPS TO DESTROY A TAP

The Contractor must obtain plumbing and excavation permits before beginning any work related to a tap destroy.

8.2.1 Small Service Taps:

- The corporation is to be exposed, cleaned and shut off
- The service line is to be cut and removed from the corporation
- The threads on the discharge end of the corporation shall be cut so they are unusable
- If the corporation is pulled, the contractor can install a metal plug in the corporation tap hole until the Water Division can install a repair clamp
- Contact the Meter & Tap Section for a site inspection, see Page 22

9. SMALL (1" - 3") SERVICE CONNECTIONS

9.0 A small service connection is any connection with a service tap less than six (6) inches in diameter and where the installed service line is a metal pipe, not cast iron or ductile iron.

9.1 DESIGN

9.1.1 Technical Questions: Contact Meter & Tap Section, Page 22.

9.1.2 Tap Application: Contact the Pipe Yard office Tap Application Counter, Page 22.

9.1.3 Connection Types: Small service connections shall only be a Single Number and Single Piping as detailed in Section 2.0. It can only be used for fire protection (A.S.), general use (G.S.), this includes irrigation systems, or general use with Limited Service Sprinklers (G.S.-LSS).

9.1.4 Size: The current plumbing code requires a minimum of a 1" copper service line from the water main to the stop and waste valve in the building. The small service line cannot be greater than 3" in diameter copper pipe.

9.1.5 Water Shut Off Box: For 1" to 2" service lines, the stop box shall be "St. Louis Pattern" Stop Box made of ABS plastic with cast iron lid and trim with adjustable height. It must be exposed and to the proper grade. The stop box is to be located in the public right-of-way usually in the sidewalk or tree lawn area placed one (1) foot behind the curb. For 3" service connections only, the water shut off valve shall be located in a pyramid type meter box when a meter is installed, see Drawings C308GZ and C308EZ, or if no meter is installed either a cast iron two-piece valve box, see Section 11.3.2 or a 20" round meter box, see Section 11.3.4 is to be used to provide access to the shut off valve.

9.1.6 Water Shut Off Valve: For 1" to 2" service lines, the water shut off valve shall be a properly sized "Minneapolis Pattern" curb stop with suitable Tee head, flare or pack joint. The Tee head shall be correctly connected to the stop box. For 3" service lines only, the water shut off valve shall be a 3" two piece ball valve, see Section 11.3.1, installed inside a meter box on the supply side

of the meter, if installed. In cases where several structures are supplied from a single service tap, there shall be a Tee head and stop box independently controlling the water supply to each structure.

9.1.7 Meter boxes: The meter box for a small service connection is to be located between the Tee head and stop & waste valves, in the public right-of-way, see Section 3.1.1. Under special conditions the small service meter can be located inside the structure. Inside meters MUST be accessible to the Water Division. Only the Water Division will determine if the specific location warrants an inside meter and if that location is considered as accessible. Where inside meters are approved by specific request, the Water Division assumes no liabilities for damages should the installation subsequently leak. Small service meter boxes shall conform to Section 11.4.4.

9.1.8 Tap into Large Main: Small service tap shall not be made on 20" and larger water main unless that main is the smallest water main available or approved by the Water Commissioner.

9.1.9 Drawings: See Drawing B309BZ for specific details on material and installation requirements.

9.2 SIZES AVAILABLE

Size: 1", 1-1/2", 2" & 3"

- 1" tap is directly tapped into all mains 6" and larger
- 1-1/2" tap requires a tapping saddle for 6" & 20" water mains
- 2" tap requires a tapping saddle for 6"& 20" water mains
- 3" service tap will consist of two (2) - 2" taps, requires tapping saddles

9.3 SPECIAL SMALL SERVICE LINES

9.3.1 Temporary Use of Existing Service Connection for Redevelopments:

- 1" or less service line which will be metered within two weeks of approval
- Building is still standing but is to be destroyed at some specified future date
- Application is to include the date that construction is to begin and is expected to be completed
- Entire service line becomes the responsibility of the applicant
- Pay all fees and a deposit as detailed in section 8.1.5 for the Water Division to destroy the tap if necessary
- Service line is to run straight from meter to the construction trailer

9.3.2 Yard Hydrant:

Available at specific locations, with the approval of the Water Commissioner

- Tee head controlled and metered
- Freeze proof, lockable hydrant, with discharge no larger than the size of service line
- Service line no larger than 2"
- Non-removable vacuums break on the hydrant nozzle or as the Plumbing Section determines, shall be installed as backflow prevention device.

10. MATERIAL SPECIFICATIONS

10.1 COPPER PIPE

10.1.1 Copper Pipe: Only heavy wall copper tubing designated for underground applications (Type K), shall be used on small service connections.

10.1.2 Copper Pipe Joints: All joints shall be made with compression or flare type fittings, or silver soldered. Inside the meter box only, threaded fitting can be used on 1-1/2" to 3" copper service lines. No lead or other soft solder can be used.

10.2 VALVE, BOX, SETTERS

10.2.1 Water Shut Off Valve:

1", 1-1/2" or 2": Minneapolis Pattern Curb Stop - ball valve type with suitable Tee head

3": two piece, full port, brass ball valve rated at 400 psi, N.P.T. threaded or solder ends, o-ring/PTFE stem seal, PTFE ball seal, 316 stainless steel operating handle & handle retaining nut

10.2.2 Stop Box:

1" - 2" Tee Head: St. Louis Pattern #306, ABS plastic with cast iron lid and rim, with adjustable height

3" stop valve: cast iron two piece screw-type adjustable height 5 1/4" shaft valve box with cast iron lid marked "Water".

10.2.3 Meter Boxes, Vaults and Valve Boxes: All meter boxes, meter vaults and valve boxes shall be constructed as shown on the drawings at the end in these regulations or by approved precast vaults/boxes. Contractors shall submit shop drawings to the Water Division for approval when precast vaults or boxes are to be used when the tap request is submitted. Service connections larger than two (2) inches in size shall have flanged meter connections as called for in ANSI/AWWA C110 Standards.

10.2.4 Meter and Valve Box & Cover: Minimum requirements can use larger or stronger box & cover.

1" meter setter & 3" ball valve - out of traffic

20" round x 36" "Sono-Loc" Plastic Meter Box

With Light circular frame & cover for 20" round meter box - Drawing No. B257Z

1-1/2" & 2" meters out of traffic;

Pyramid Box (Slab No. 1 & No. 2) - Drawings No. C308IZ, B309BZ

Precast Pyramid Box - Drawing No.

With Light Square frame with circular cover (out of traffic) - Drawing No. B221Z

2" & smaller meters, 3" ball valves, and all resilient seat valves in traffic

Pyramid Box (Slab No. 1 & No. 2) - Drawings No. C308IZ, B309BZ

Precast Pyramid Box - Drawing No.

With special circular frame & cover (in traffic) - Drawing No. B329Z

3" to 8" meters, except F.M. meters - in/out of traffic

Large Pyramid Box (Slab No. 2 & No. 3) - Drawings No. C308IZ, C308EZ

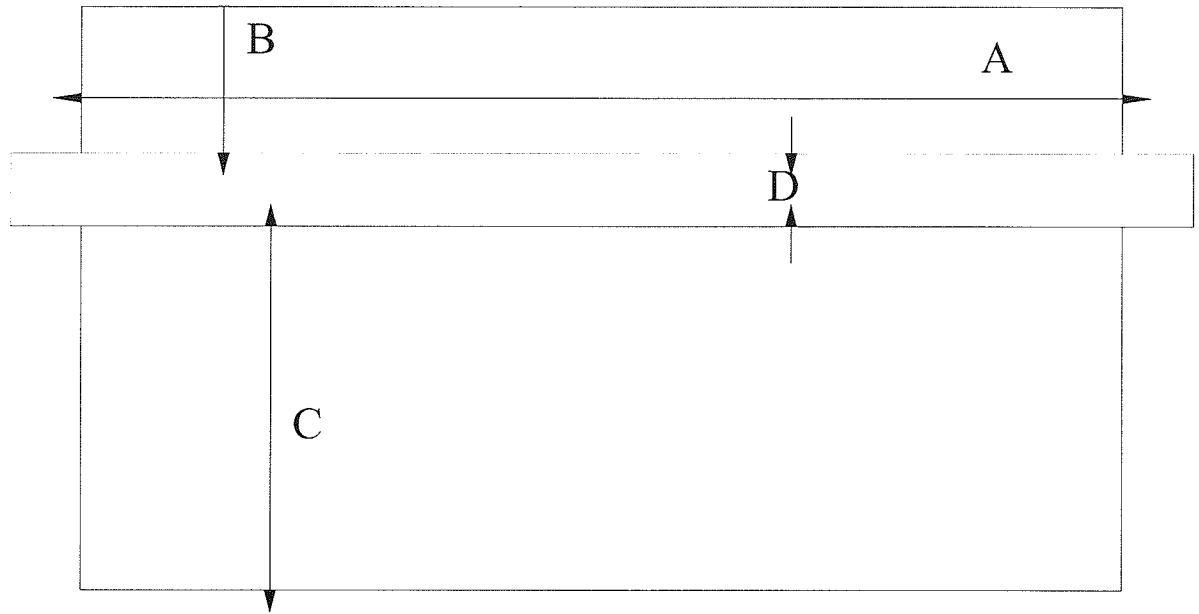
With dual three part frame & cover - Drawing No. C283Z

10.2.5 Meter Setter:

5/8" - 1" meters: copper setter equal Ford #84

1-1/2"-2" meters: Angle Meter Stop (FIP x meter flange) equal Mueller #H-14286-01 (on the outlet side), and #H-14204 (on the inlet side)

3" and larger meters: one piece flanges threaded, welded or silver soldered onto pipe, set with parallel faces and separated as directed in Table 5, Page No. 22.



Drawing #2 Shape of Excavations

Table 2

Sizes of Excavations

Tap Size	Main Size	A	B	C	D	L X W
1 - 1"	6" - 12"	4'	1'	4'	1'	4' x 6'
1 - 1"	15" - 20"	4'	1'	4'	2'	4' x 7'
1 - 1-1/2" or 2"	6" - 12"	5'	1'	5'	1'	5' x 7'
1 - 1-1/2" or 2"	15" - 20"	5'	1'	5'	2'	5' x 8'
2 - 2"	6" - 12"	7'	1'	5'	1'	7' x 7'
2 - 2"	15" - 20"	7'	1'	5'	2'	7' x 8'
6" to 10" *	6" - 10"	5'	2'	7'	1'	5' x 10'
6" to 20" *	12" - 20"	6'	2'	7'	2'	6' x 11'
Tap Cut out or Replacement						
6" to 12" *	6" - 12"	6'	2'	5'	1'	6' x 8'
6" to 20" *	15" - 20"	8'	2'	5'	2'	8' x 9'
Dual Connection						
6" to 12" *	6" - 12"	11'	2'	5'	1'	11' x 8'
6" to 20" *	15" - 20"	13'	2'	5'	2'	13' x 9'

* Tap size cannot exceed size of water main.

Table 3 STANDARD METER LAYING LENGTHS

METER SIZE	BOX TYPE	TYPE METER	METER LENGTH	GASKET & ADAPTOR ALLOWANCE	TOTAL LENGTH
Small Service Connections					
5/8"	R or P	Domestic	1" Ford #84 Meter Setter		11"
3/4"	R or P	Domestic	1" Ford #84 Meter Setter		11"
1"	R or P	Domestic	1" Ford #84 Meter Setter		11"
1-1/2"	P	Domestic	13"	½"	13-1/2"
2"	P	Domestic	17"	½"	17-1/2"
3"	LP	Domestic	24"	½"	24-1/4"
Large Service Connections					
3" ¹	LP	Domestic	24"	6-3/4"	30-3/4"
4" ²	LP	Domestic	29"	4-1/4"	33-1/4"
6"	LP	Domestic	36-1/2"	½"	37"
8"	LP	Domestic	30-1/8"	½"	30-5/8"
10"	V	Domestic	41"	½"	41-1/2"
16"	V	Domestic	48-1/8"	½"	48-5/8"
4"x 2" FM ²	V	Domestic & Fire	33"	4-1/4"	37-1/4"
6"x 2" FM	V	Domestic & Fire	45"	½"	45-1/2"
8"x 2" FM	V	Domestic & Fire	53"	½"	53-1/2"
10"x 2" FM	DV	Domestic & Fire	68"	½"	68-1/2"
4"x 1" DC ²	LP	Fire	16-1/2"	4-1/4"	20 3/4"
6"x 1" DC	LP	Fire	22-1/2"	½"	23"
8"x 1" DC	LP	Fire	26-1/2"	½"	27"
10"x 2" DC	V	Fire	36"	½"	36-1/2"

R - Round meter box see Section 11.3.4 Page 17

P - Pyramid meter box see Drawing No. C308GZ

LP - Large pyramid meter box see Drawing No. C308EZ

V - Vault meter box see Drawing No. B-350-CZ

DV - Double vault meter box see Drawing No. C317-Z

1 - 6" Flange on inlet side and 3" flange on outlet side - use one (1) 6" x 3" meter adapter

2 - 6" Flange on inlet side and 4" flange on outlet side - use one (1) 6" x 4" meter adapter

If inlet & outlet piping are the same diameter, flange spacing should be as listed for that size meter.

CONTACT INFORMATION

- Water main locations - MO-One Call** 1-800-344-7483
The Water Division will only respond to facility locate requests received through Mo-One Call
- Problems - Dispatchers - Service Delivery Group - 4600 McRee** 314-633-9000 or
Water coming up, damage to Water Division property 314-771-4880
Help find or locate a valve or stop box Fax 314-771-4057
Low pressure / flow into facility
Emergency water Turn / Off
- All Meters & Small Service Lines - Meter & Tap Section - 4600 McRee** 314-633-9061
Small service technical information Fax 314-664-4074
All sizes and types of meter information
To schedule an inspection of a small tap destroy
To schedule an installation of a small service tap 1" - 3"
To schedule an inspection of meter box and meter installation
To obtain help on small service line performance
- Service Tap Application Counter - Service Delivery Group - 4600 McRee** Fax 314-664-4074
Purchase Small Tap (1" – 3" tap) 314-633-9029
Applications for a small service tap
Requirements for small service connections, 3" and smaller
Bidding, Scheduling & Status of Service Line Repair Program (Prop W)
- Information on the locations of all service taps 314-633-9024
Estimate for work to be performed by the Water Division
To obtain information on Water Division facilities in a specific area
Requirements for large service connections, 6" and larger
Purchase: Large Tap (greater than 3"); hydrant relocate; or other work
- Engineering - Service Delivery Group - 4600 McRee** 314-633-9023
Technical information on large service connections Fax 314-664-4074
To schedule field inspections for large service connections 6" & larger
To schedule field inspections on main lays
To schedule inspection of large tap destroy
Review of engineering plans for proposed developments
- Accounts - Customer Service Section - 1640 S. Kingshighway** 314-771-2255
Opening a new account
Water rates
Deposit requirements new accounts
Water Turn On & Off, during normal business hours
- Fire Protection Systems - Fire Marshall's Office** 314-289-1900
- Plumbing Systems - One Stop Building Permits, Building Division** 314-622-3313
- Excavation Permits - Street Department** 314-647-3111 x 1019

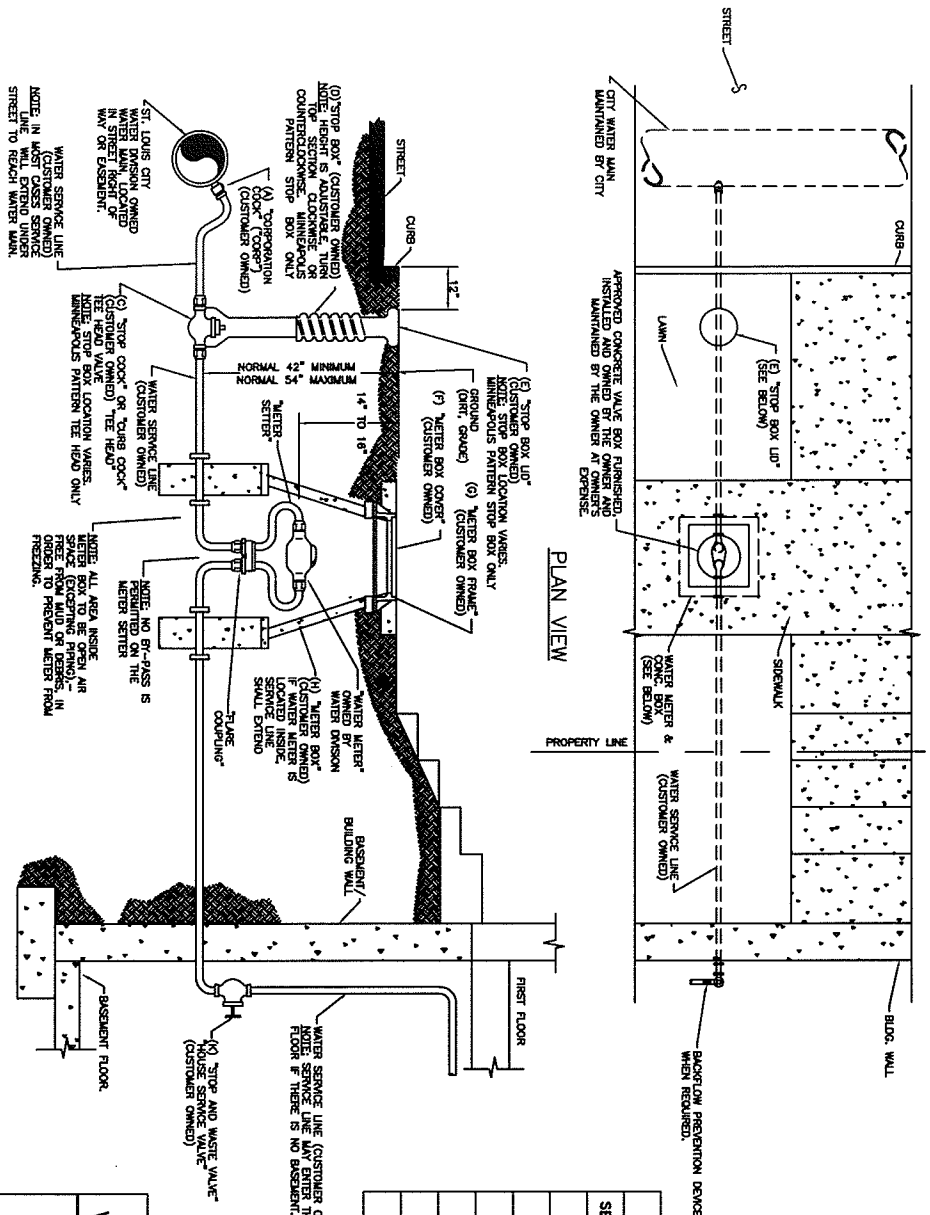
Check List for Small Taps – 1” to 3”

To Get the Tap you NEED

- Accurate address for the structure
- Address has to have an opened account
- Copy Plumbing Permit
- Copy Excavation Permit
- Fire Marshall’s Approval (if required)
- Sale slip Backflow Prevention Device (if it is required)
- Pay for tap (fix fee, will not be done on OT)
 - For fire flow meter (if required)
- Schedule tap when excavation is ready

Placement & Condition of Excavation

- Service Tap located at least 6’ inside building line
- Excavation sized for type tap see Table 2 pg 20
- Service line straight & perpendicular to main
- Excavation
 - shored,
 - rocked,
 - dry & mud free
- Main exposed,
 - clean
 - no pipe bell in immediate area of new tap (three feet)
 - no other taps in immediate area of new tap (three feet)



NOTE: 3" SERVICE LINE DOES NOT HAVE STOP BOX, VALVE IS INSTALLED IN METER BOX. 3" A.S. (IF NOT IN TRAFFIC) CAN BE INSTALLED IN 20" ROUND BOX.

METER SETTINGS

SERVICE SIZE	VEHICLE TRAFFIC	METER TYPE	DRAWING	FRAME DWG.
1"	NO	20" ROUND	SECT. 11.3.4	B257Z
1"-2"	YES	PYRAMID	C308GZ	B221Z
1"-2"	YES	PYRAMID	C308GZ	B329Z
3"	YES	LARGE PYRAMID	C308EZ	C283Z
3" A.S.	NO	20" ROUND	SECT. 11.3.4	B257Z

REVISIONS

NO.	DATE	BY	NOTE
-1	12-1-88		
0	6/19/98	WLETC	REDRAWN
1	5/19/2004	DL	TABLE MODIFIED

CITY OF ST. LOUIS - DEPARTMENT OF PUBLIC UTILITIES
WATER DIVISION - SERVICE DELIVERY GROUP
 TYPICAL SMALL SERVICE
 PIPE CONNECTION

W.O. NO. _____ SHEET _____ OF _____

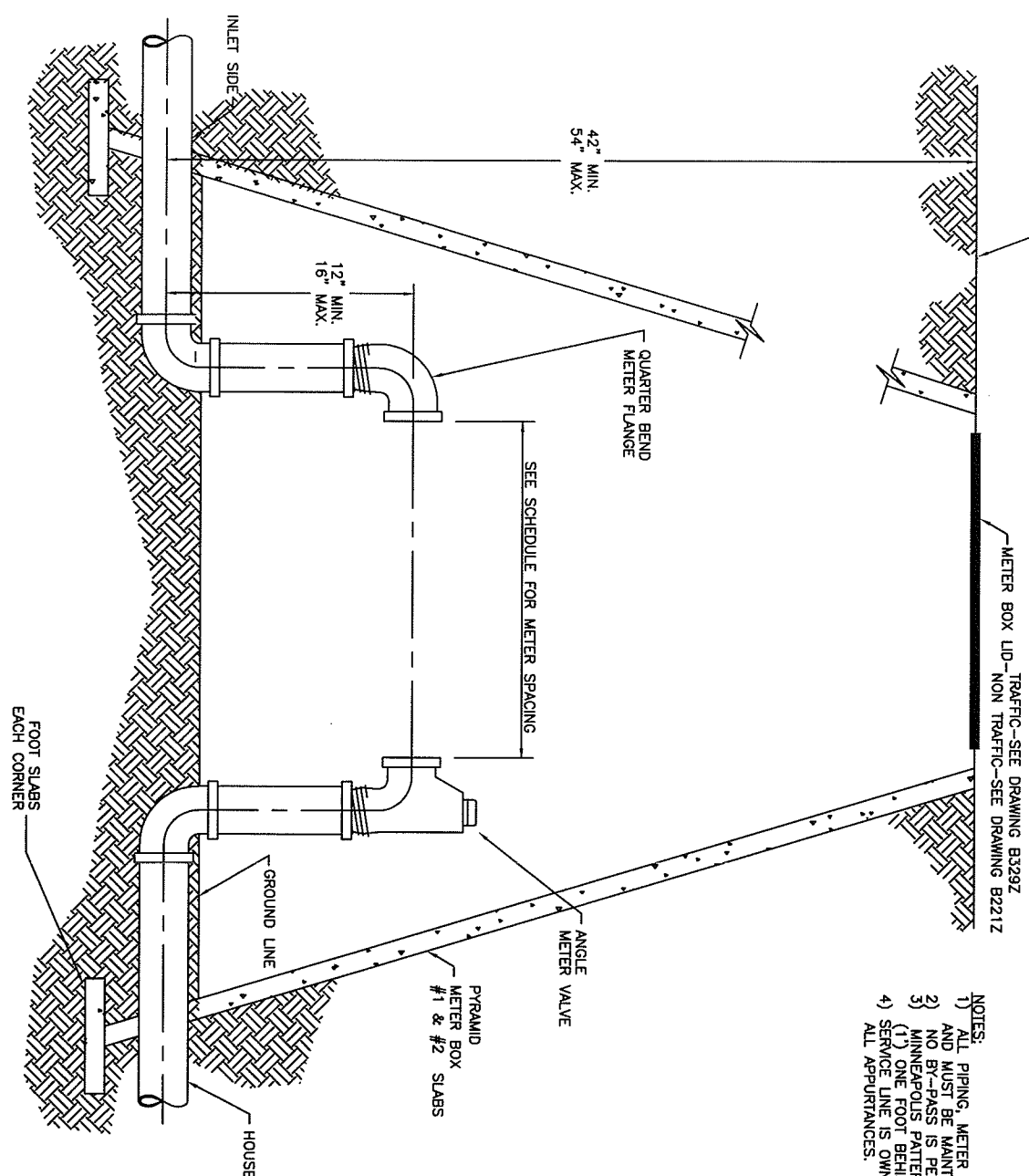
DESIGNED BY: _____ DRAWN BY: WILEY CHECKED BY: M.A.N.

APPROVED BY: _____ SCALE: NOT TO SCALE

FILE NO: _____ DRAWING NO: B309BZ DATE CREATED: 6/11/98

CITY OF ST. LOUIS
 1 1/2" AND 2" METER SETTER REQUIREMENTS

1PC 1 1/2" - 2" H-14286-01 ANGLE METER STOP WITH LOCK WING
 F.I.P. x METER FLANGE
 1PC 1 1/2" - 2" H-14204 QUARTER BEND METER COUPLING
 F.I.P. x METER FLANGE



- NOTES:
- 1) ALL PIPING, METER BOX, FRAME AND COVER BELONG TO THE CUSTOMER AND MUST BE MAINTAINED BY THE CUSTOMER.
 - 2) NO BY-PASS IS PERMITTED ON THE METER SETTER.
 - 3) MINNEAPOLIS PATTERN T-HEAD AND STOP BOX SHALL BE PLACED (1) ONE FOOT BEHIND THE CURB.
 - 4) SERVICE LINE IS OWNED AND MAINTAINED BY THE CUSTOMER INCLUDING ALL APPURTANCES.

THE PLUMBING CONTRACTOR IS TO FABRICATE THE METER SETTER ACCORDING TO FIELD CONDITIONS. ALL SOLDER JOINTS SHALL BE WITH SILVER SOLDER BOTH THE ANGLE METER VALVE AND THE QUARTER BEND METER COUPLING WILL FIT EITHER 1 1/2" OR 2" METERS. BOTH HAVE 2" FEMALE IRON PIPE CONNECTIONS.

METER SIZE	SPACING
5/8" TO 1"	FORD #84 METERSETTING
1-1/2"	13-1/2"
2"	17-1/2"

REVISIONS			
NO.	DATE	BY	NOTE
1	9-7-2004	D.L.	DIMENSIONS
2	5-13-2004	D.L.	DWG. CHANGES

CITY OF ST. LOUIS - DEPARTMENT OF PUBLIC UTILITIES
 WATER DIVISION - SERVICE DELIVERY GROUP

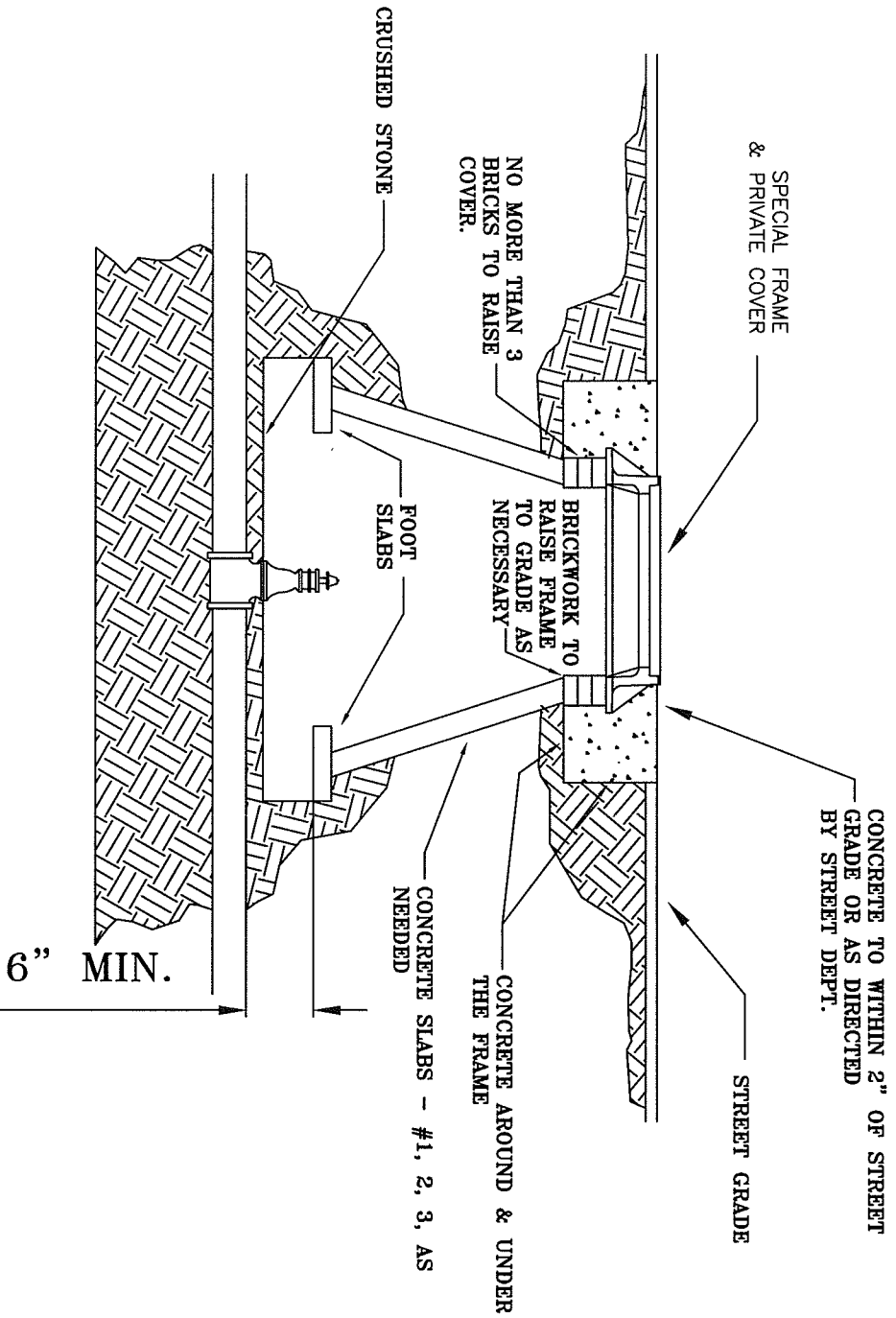
PYRAMID METER BOX
 SETTER REQUIREMENTS

W.O. NO. _____ SHEET _____ OF _____

DESIGNED BY: _____ DRAWN BY: WILEY _____ CHECKED BY: MAAM _____

APPROVED BY: _____ SCALE: NOT TO SCALE

FILE NO: _____ DRAWING NO: C3096Z DATE CREATED: 6/12/98

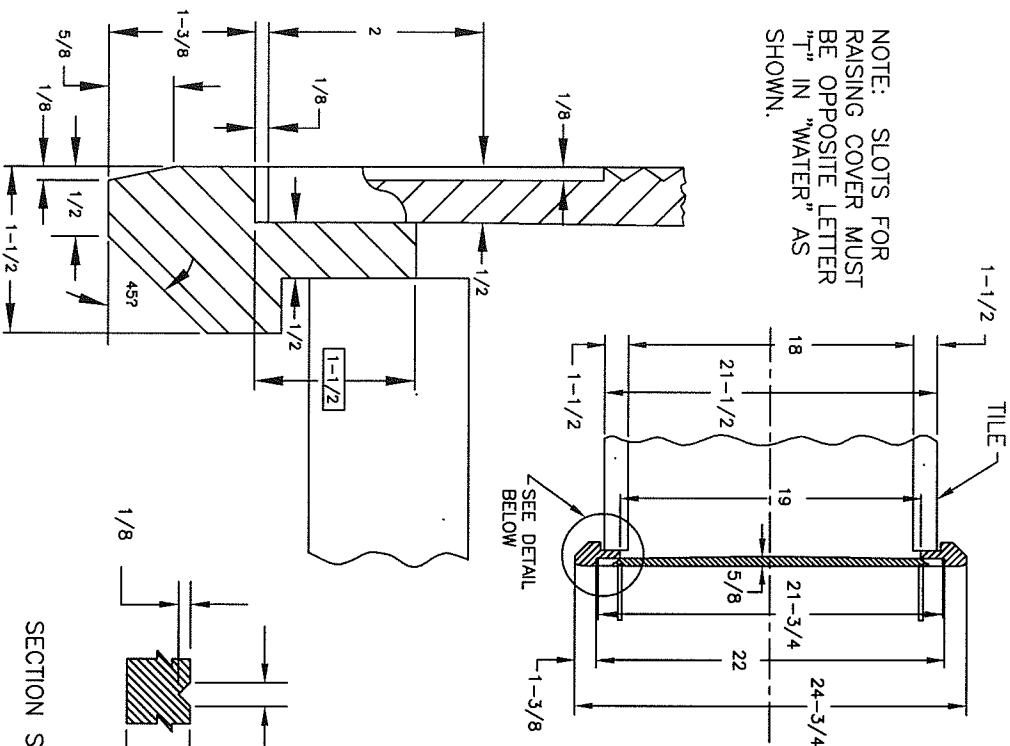


NOTES:

- 1.) FOOT SLABS IS TO BE AT LEAST 6" FROM MAIN OR SERVICE LINE.
- 2.) IF VALVE IS ATTACHED TO A TAPPING SLEEVE, VALVE BOX IS TO STRADDLE VALVE & MAIN.
- 3.) APPROVED RISER CAN BE USED TO RAISE COVER.
- 4.) GATE VALVE - FULL DOME IS TO BE EXPOSED.
- 5.) BALL VALVE - ENTIRE VALVE IS TO BE EXPOSED.

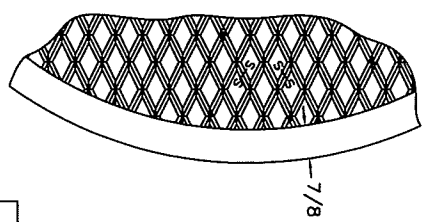
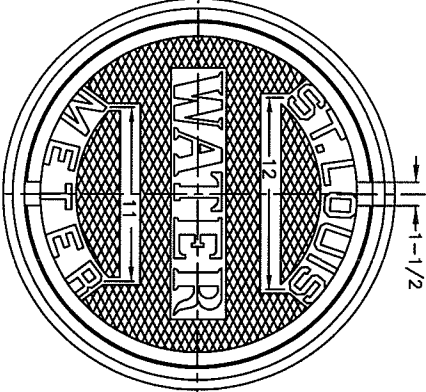
CITY OF ST. LOUIS - DEPARTMENT OF PUBLIC UTILITIES			
WATER DIVISION - SERVICE DELIVERY GROUP			
VALVE BOX INSTALLATION OR ADJUSTMENT DETAIL		SHEET 1 OF 1	
W.O. NO.	DRAWN BY: DL	CHECKED BY:	SCALE: NO SCALE
DESIGNED BY:	APPROVED BY:	DRAWING NO: C310AZ	DATE CREATED: 5/14/2004

NOTE: SLOTS FOR RAISING COVER MUST BE OPPOSITE LETTER "T" IN "WATER" AS SHOWN.



DETAIL ENLARGED 7 TIMES

FULL SIZE DETAIL OF PART OF COVER TO BE ROUGHENED



WEIGHT OF FRAME ONLY: 45 LBS.
 WEIGHT OF COVER ONLY: 50 LBS.
 TOTAL WEIGHT: 95 LBS.

SIDE VIEW

SEAL
 PLOTTING NOTES:
 For including in C.I. Specs, plot on gear printer using 1/8" driver. NOT TO SCALE and plot of 0.075"-1". Adjust line weights for best appearance.

REVISIONS

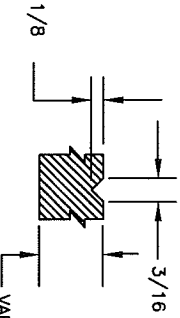
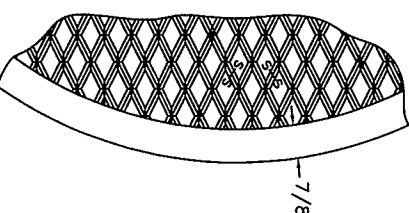
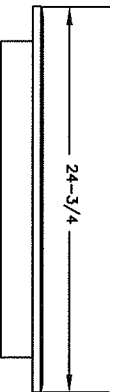
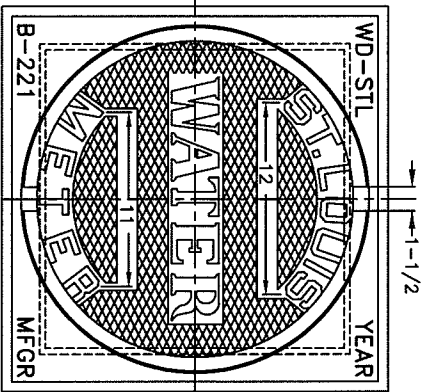
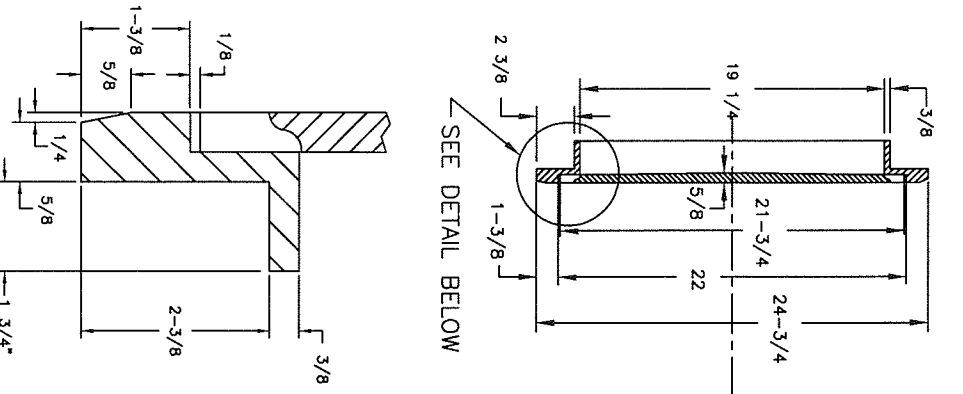
NO.	DATE	BY	NOTE
-5	04-09-1930	MG	ORIG. ISSUE
-4	02-02-1948	WH	
-3	12-17-1954	JN	
-2	02-18-1955	JN	
-1	08-31-1959	TS	

CITY OF ST. LOUIS - DEPARTMENT OF PUBLIC UTILITIES
 WATER DIVISION - SERVICE DELIVERY GROUP

LIGHT CIRCULAR FRAME AND COVER
 FOR 20 INCH TILE METER BOX

W.O. NO. SHEET 1 OF 1

DESIGNED BY: MG	DRAWN BY: CAD	CHECKED BY: TRS
APPROVED BY:	SCALE: 1/8" = 1"	
FILE NO: DRAWING NO: B257Z	DATE CREATED: 09-20-1991	



- NOTES:
1. ALL LETTERING IN FRAME TO BE IMBEDDED. 1/8"
 2. SLOTS FOR RAISING COVER MUST BE OPPOSITE LETTER "T" IN "WATER" AS SHOWN

FULL SIZE DETAIL OF PART OF COVER TO BE ROUGHENED

SEAL
 PLOTTING NOTES:
 For including in C.I. Specs, plot on laser printer using the driver to SCALE and plot at 0.075=1. Adjust line weights for best appearance.

REVISIONS			
NO.	DATE	BY	NOTE
-6	01-27-1928	MG	ORIG. ISSUE
-5	04-04-1928	MG	
-4	09-30-1929	FEK	
-3	07-01-1948	GRW	
-2	12-17-1954	JN	
-1	05-21-1958	JL	

CITY OF ST. LOUIS - DEPARTMENT OF PUBLIC UTILITIES
WATER DIVISION - SERVICE DELIVERY GROUP
 LIGHT SQUARE FRAME WITH CIRCULAR COVER
 FOR PYRAMID METER BOXES

W.O. NO. _____ SHEET 1 OF 1

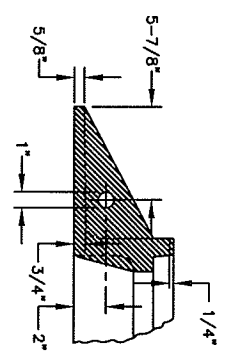
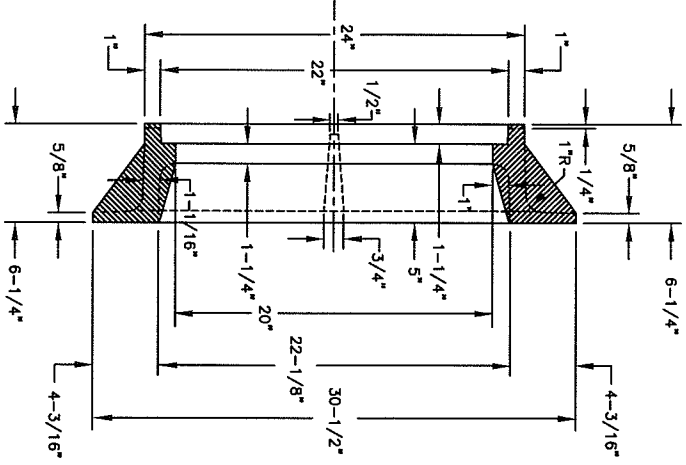
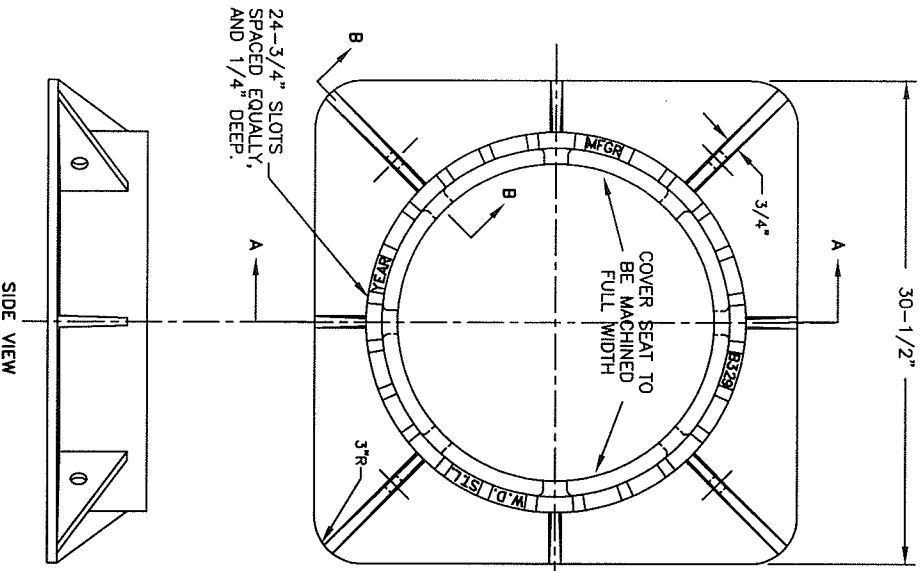
DESIGNED BY: MG DRAWN BY: CAD CHECKED BY: TRS

APPROVED BY: _____ SCALE: 1/8" = 1"

FILE NO.: B2212 DRAWING NO: B2212 DATE CREATED: 10-03-1991

DETAIL
 ENLARGED 5 TIMES

WEIGHT OF FRAME ONLY: 75 LBS
 WEIGHT OF COVER ONLY: 50 LBS.
 TOTAL WEIGHT: 125 LBS



REVISIONS

NO.	DATE	BY	NOTE
-5	03-26-1937	TEF	ORIG. ISSUE
-4	05-16-1938	TEF	
-3	09-07-1939	TEF	
-2	10-05-1945	JN	REPLACING B-213
-1	05-20-1958	JL	
0	5-7-2004	D.L.	TITLE CHANGE

CITY OF ST. LOUIS - DEPARTMENT OF PUBLIC UTILITIES
WATER DIVISION - SERVICE DELIVERY GROUP
 "SPECIAL" CAST IRON CIRCULAR FRAME
 FOR VEHICLE TRAFFIC AREAS

W.O. NO. _____ SHEET 1 OF 1

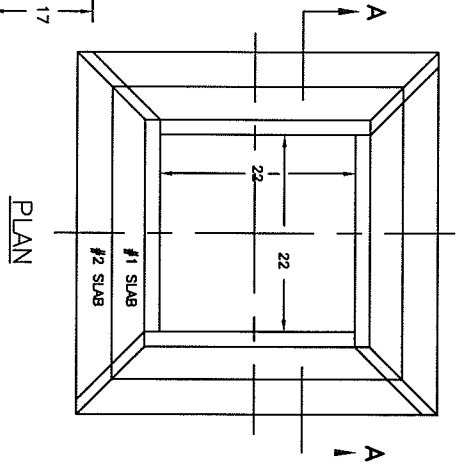
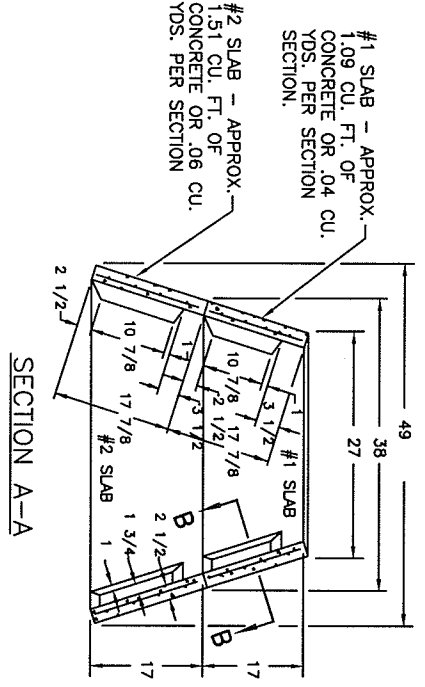
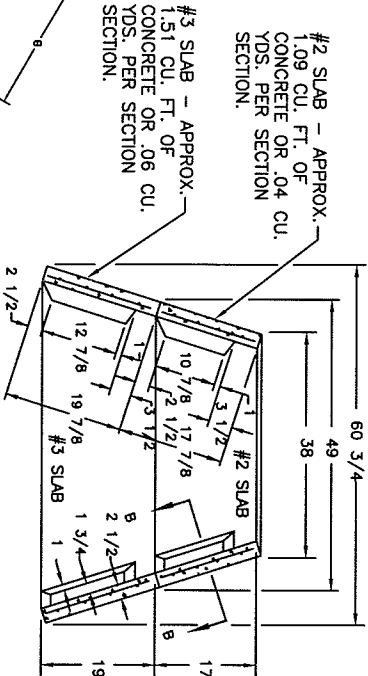
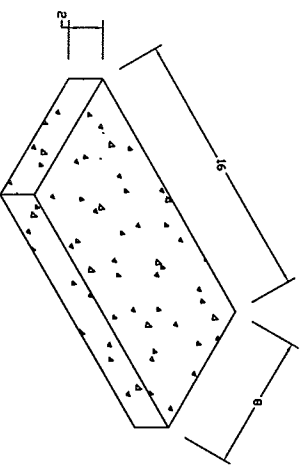
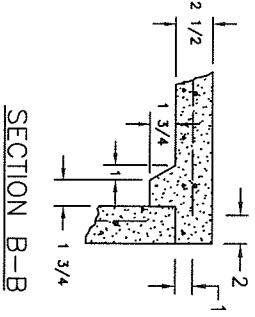
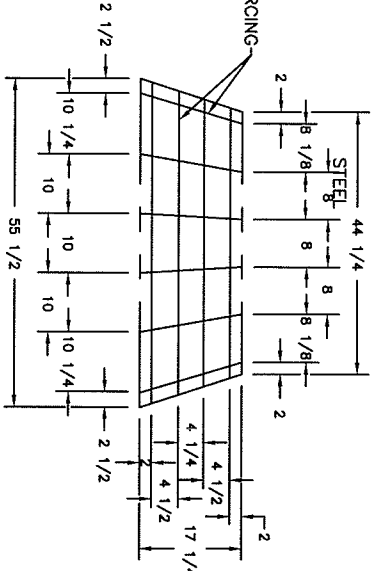
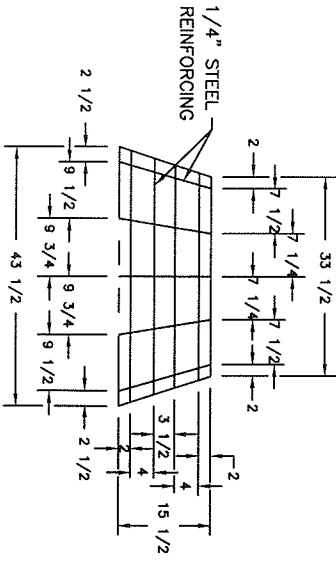
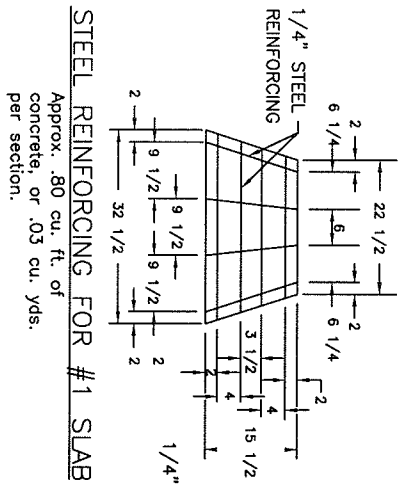
DESIGNED BY: _____ DRAWN BY: CAD CHECKED BY: TRS

APPROVED BY: _____ SCALE: 1/8" = 1"

FILE NO: _____ DRAWING NO: B3292 DATE CREATED: 10-11-1991

NOTE: W.D.-ST.L.,YEAR
 B-329 & MFGR'S NAME
 TO BE IMBEDDED 1/8"

EST. WEIGHT: 263 LBS (8-17-1948)



SEAL
PLUMBING NOTES:
For Insulating in C.I. Pipes, use Lumar
Insulation and in Ducts, use Duct
Insulation and in all other cases, use
Insulation and in all other cases, use
Insulation for best appearance.

CITY OF ST. LOUIS - DEPARTMENT OF PUBLIC UTILITIES
WATER DIVISION - SERVICE DELIVERY GROUP

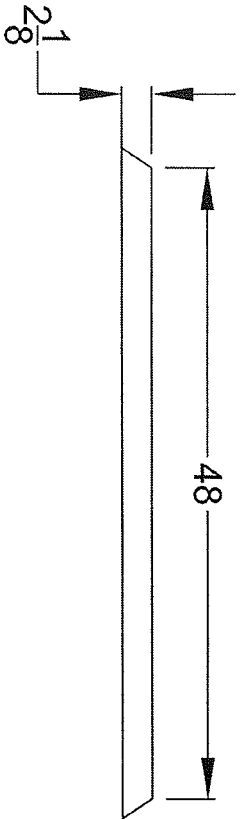
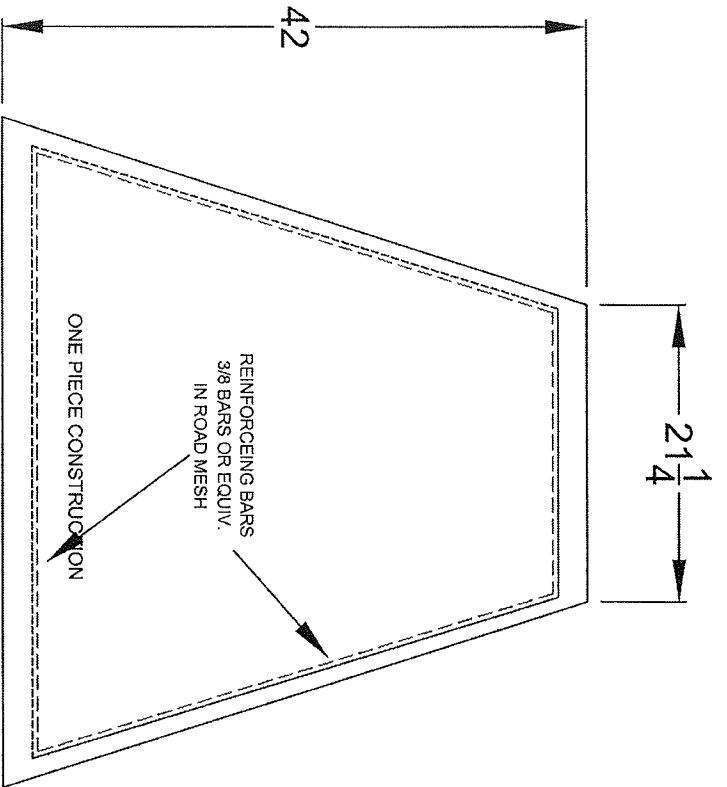
CONSTRUCTION DETAILS FOR
PYRAMID CONCRETE SLABS
#1, 2, & 3

W.O. NO. SHEET 1 OF 1

DESIGNED BY: DRAWN BY: D.L. CHECKED BY: TRS

APPROVED BY: SCALE: NONE

FILE NO.: DRAWING NO: C3081Z DATE CREATED: 5-11-2004



2" SERVICE BOX

W.O.		SHEET 1 OF 1	
DESIGNED BY:		OFFICE OF DESIGN AND CONSTRUCTION WATER DIVISION DEPARTMENT OF PUBLIC UTILITIES CITY OF ST. LOUIS, MISSOURI	
SURVEYED BY:			
DRAWN BY:			
CADD BY:	D.L.		
CHECKED BY:			
NO.	DATE	BY	APPROVED BY:
1	3/27/11	D.L.	DATE: 3/27/11
			FILE NO.
			SCALE: FULL SCALE
			DWG. NO. C099C