

## 505 WATER SERVICE INSTALLATION

### 505.1 DEFINITION

A service line is comprised of the piping and related appurtenances including the connection installed from the Des Moines Water Works water main to the outlet connection of the first shut off device within the building to be served.

### 505.2 APPLICATION

Refer to Section 503.

### 505.3 GENERAL LOCATION REQUIREMENTS (Revised January 2024)

All service lines shall conform to the following requirements:

- 505.3.1 The water service shall normally be installed perpendicular to the main from the tap to the right-of-way line and shall tap in front of and within the projected lot lines of the property to be serviced. (Figures 1-2 & 5-12)
- 505.3.2 A clearance of not less than 12" shall be maintained between the service line and any pipe, cable, or conduit in the same trench.
- 505.3.3 Service lines shall have a cover, wherever feasible, of not less than 5'. Whenever the local plumbing code conflicts with this section, the plumbing code shall be followed.
- 505.3.4 The water service shall extend through and beyond the outer wall of the building (see Section 509 for meter setting). Where the building has a rear basement or rear cellar only, the service may extend underground beyond the inner foundation wall a maximum of 2' and then may go vertically through the rear basement floor or wall or extend around the building and enter through the side of the basement wall. (Figure 8)
- 505.3.5 In a building with a poured floor that has no basement, the service shall extend inside the outer wall of the building and into the building at which point it shall go vertical through the floor and a meter setting made. (Figure 9)

- 505.3.6 For a building with a crawl space, see Figure 10.  
For a building with a standard basement, see Figure 7.
- 505.3.7 Materials will conform with Iowa Department of Natural Resources requirements if located within 200' of a Leaking Underground Storage Tank (LUST), see Figure 36.

#### 505.4 SIZE OF WATER SERVICE LINES

- 505.4.1 New or replacement residential service lines shall not be less than 1" inside diameter. Reconnection of existing 3/4" type K copper water service lines from an existing main to a new main shall be allowed. Use of existing 3/4" type K copper water service stubs shall be allowed provided they meet the requirements of these Rules and Regulations.
- 505.4.2 Commercial, industrial, and fire service lines shall be properly sized for the required demand but shall be no smaller than that specified for a residential service.

#### 505.5 MATERIAL FOR SERVICE PIPING 2" AND SMALLER

- 505.5.1 All water service pipes through 2" shall be type K copper, red brass or PEX pipe as specified in section 505.5.2
- 505.5.2 PEX A 200 psi. pipe can be used for 1" – 2" water service installations as follows:
- a. From the tap to the meter inside the premise on water service replacements. If PEX pipe is used PEX shall be installed all the way from the stop box to meter, from the tap to the stop box, or from the tap to the meter. PEX shall not be used for repairs or partial replacements.
  - b. New water service installations from the tap to the meter inside the premise provided that the entire service line is installed as one installation.
  - c. PEX pipe can be used between the main and the meter pit or stop box in rural areas of the former SE Polk system.

Type K copper is required for all service lines which run parallel to the street before entering the property. Type K copper is required from the tap to the stop box for all new water service stubs in new developments and all other instances where the water service is stubbed to the stop box. Copper can also be used from the stop box to the meter inside the premise on any service line through 2”.

- 505.5.2.1 This section has been eliminated.
- 505.5.2.2 PEX pipe shall be blue in color for all 1-inch installations.
- 505.5.2.3 PEX pipe shall be installed as one continuous piece from the tap to the stop box. Splicing of PEX pipe between stop box and meter inside the building is discouraged and will only be approved under special circumstances.
- 505.5.2.4 PEX pipe shall not be used within 200’ of a Leaking Underground Storage Tank or in other areas where the soil may be contaminated. A copy of the assessment report from the IDNR indicating there is no potential health risk will be required for use of PEX pipe when working within a 500’ radius of a LUST site. Information on the location of Leaking Underground Storage Tanks may be obtained from the Iowa Department of Natural Resources by following the instructions in Figure 36.
- 505.5.2.5 Tracer wire shall be installed when PEX pipe is used. The tracer wire shall be installed according to Des Moines Water Works’ specifications (Figure 1A, 1B, 1C, 16B). Tracer wire shall be installed with all water service lines except when the water service line is type K copper or red brass. Tracer wire specifications shall be as follows:
  - a. For open cut installations, the tracer wire shall be No.12 AWG solid single copper conductor with a minimum tensile strength of 150 pounds. Insulation shall be 45 mil, high-density, high molecular weight polyethylene (HDPE) and rated for direct burial, 30 volts, and blue in color.

- b. When directional drilling/boring the tracer wire shall be No. 12 AWG, extra-high strength copper clad steel conductor (EHS-CCS) with a minimum 1,150 pounds break load. Insulation shall be 45 mil, high-density, high molecular weight polyethylene (HDPE) and rated for direct burial, 30 volts, and blue in color.
- c. When conduit is used the tracer wire shall be placed inside the conduit. When conduit is not used tracer wire shall be installed alongside the pipe and shall be fastened to pipe with zip ties a minimum of every 5 feet.
- d. Anode Ground Rod shall be 3/8-inch minimum diameter, 8-foot minimum length, steel rod uniformly coated with metallically bonded electrolytic copper. Anode Ground Rod shall be spliced to tracer wire using a high-strength, corrosion resistant copper alloy ground rod clamp.
- e. Splice Kits, when approved, shall be DryConn Direct Bury Lug Aqua (SKU 90220)
- f. Tracer wire connectors shall be Rhino TriView, TracerPed, or approved equal. Wire connectors shall contain three internal terminals with two shunts, be 5 feet in length, white in color, and triangular in shape. Removable top cap, three 2-7/8-inch by 14-inch custom vinyl decals No. SD-5594K, and tri-grip anchor.

505.5.2.6 PEX pipe shall be stored in a way that prevents damage as a result of crushing or piercing, excessive heat, harmful chemicals, or exposure to sunlight for prolonged periods.

505.5.2.7 Joint methods for attaching PEX pipe to fittings shall meet AWWA C 904 Standards and ASTM F1960, F2080, or F1807 Specifications. Fittings shall be installed in accordance with PEX Pipe Manufactures Installation Guidelines and related plumbing codes.

505.5.2.8 A tracer wire inspection is required for all PEX service line installations. Contact Des Moines Water Works at 283-8772 when the installation is ready for inspection.

#### 505.6 SERVICE LINE APPURTENANCES (Revised January 2024)

All water service lines shall include a curb stop or valve between the water main and the property line as follows:

##### 505.6.1 WATER SERVICES 2" IN DIAMETER OR LESS

Service lines 2" in diameter or less shall have a curb stop installed within a stop box located 1' to 6' out from the property line. (Pleasant Hill stop boxes will be 1' to 8' out from property line.) Stop boxes installed in rural areas shall be installed within these guidelines outside of the drainage ditch areas whenever possible. Where the water main is located in a frontage easement on the same side of the road as the property to be served, the curb stop shall be placed 5' from the water main towards the property to be served. (See Figure 37). If an alternate location for the curb stop is necessary, approval of the alternate location shall be received from Des Moines Water Works prior to installation. When the main that the water service is connected to is a private or public water main in an easement, the stop box shall be installed 5' from curb of street. Where unusual circumstances prevent this location, the curb stop and stop box may be placed in the street but in such event must be installed within a roadway box. The curb stop shall be installed in the water service pipe so that the tee head is parallel with the curb when the water is turned off. The curb stop shall not have a waste opening.

#### 505.6.1.1 CURB STOP/VALVE STANDARD

An unobstructed main shut-off on the water supply line for each customer shall be provided on public property, private property where public access is provided, or another location approved by the Des Moines Water Works. The shut-off shall be located as shown. (Figures 1, 2, and 34)

The shut-off for existing 3/4" service lines and new or existing 1" through 2" services shall consist of a curb stop (Type: "T" handle, quarter-turn, ball valve conforming to AWWA C800 and a stainless steel self-centering rod with a stainless-steel pin installed within a stop box housing with a 1" upper section and an Erie style lid. (See DMWW Specifications) The curb stop shall have valve head checks that limit rotation to 90 degrees and operate clockwise to shut off. The "T" handle on the curb stop will be parallel with the curb when the water is turned off. When installed, the curb stop shall not be less than 5' or more than 7' below the surface of the ground.

If the water service connection taps the water main outside of the property line, a general box will be required at a location specified by Des Moines Water Works.

#### 505.6.1.2 STOP BOX STANDARD (CURB BOX)

Stop boxes for 1" through 2" water service lines shall be of the extension type, 1" upper section, stainless steel self-centering rod, stainless steel pin, and Erie style lid. All stop box installations shall be completed in such a manner that the top of the rod is between 12" and 24" below the surface, the lid is level with the surrounding surface, and the stop box does not present a hazard to the public. Stop boxes installed in paved areas shall be installed in a manner that prevents the lid of the stop box from being cast into the concrete. (Figures 1-2 & 14-15)

The design of all valves, curb stop boxes and valve boxes must meet the standards of the Des Moines Water Works.

New copper service lines 2” or less in diameter shall be one continuous piece of pipe from the corporation stop to the curb stop and one continuous piece of pipe from the curb stop to the inlet valve at the meter with no fittings when these distances are less than 100’ in length. Only one fitting shall be allowed per 100’ of pipe. On 2” service lines, only one fitting shall be allowed per 60’ of pipe.

505.6.2 WATER SERVICES LARGER THAN 2”

For the water services larger than 2” the valve shall be installed on the water service line adjacent to the water main. (Figure 22) The valve shall be installed in a roadway box.

505.6.3 Any valves, roadway boxes and precast concrete manhole vaults must have the approval of the Des Moines Water Works.

505.6.4 Curb stop boxes, roadway boxes and precast concrete manhole vaults shall be installed so that they will function properly and so that an access to the shut-off device is maintained. All shall be set vertically so the top is flush with the surrounding surface so as not to be a hazard to the public.

505.6.5 All service lines shall have a shut-off device or valve inside the building where the service enters the building. There shall be no appurtenances between this valve and the main, other than the curb stop, or valve as previously described, or when an outside meter is approved. (Figures 1-2)

505.6.6 Tracer wire shall be installed with all water service lines except when the water service line is type K copper or red brass. The tracer wire shall be installed according to Des Moines Water Works’ specifications (see figures 17, 18, 20, 20A, 24, 26, and 35). Tracer wire specifications shall be as follows:

- a. For open cut installations the tracer wire shall be No. 12 AWG solid single copper conductor with a minimum tensile strength of 150 pounds. Insulation shall be 45 mil, high-density, high molecular weight polyethylene (HDPE) and rated for direct burial, 30 volts, and blue in color.
- b. When Directional Drilling/Boring the tracer wire shall be No. 12 AWG, extra-high strength copper clad steel conductor (EHS-CCS) with a minimum 1,150 pounds break load. Insulation shall be 45 mil, high-density, high molecular weight polyethylene (HDPE) and rated for direct burial, 30 volts, and blue in color.
- c. When conduit is used the tracer wire shall be placed inside the conduit. When conduit is not used tracer wire shall be installed alongside the pipe and shall be fastened to pipe with zip ties a minimum of every 5 feet.
- d. Anode Ground Rod shall be 3/8-inch minimum diameter, 8-foot minimum length steel rod uniformly coated with metallically bonded electrolytic copper. Anode Ground Rod shall be spliced to tracer wire using a high-strength, corrosion resistant copper alloy ground rod clamp.
- e. Splice Kits, when approved, shall be DryConn Direct Bury Lug Aqua (SKU 90220)
- f. Tracer wire connectors shall be Rhino TriView, TracerPed, or approved equal. Wire connectors shall contain three internal terminals with two shunts, be 5 feet in length, white in color, and triangular in shape. Removable top cap, three 2-7/8-inch by 14-inch custom vinyl decals No. SD-5594K, and tri-grip anchor.



## 505.7 COMBINATION SERVICE PIPES

A property requiring a domestic service line and a fire protection service line may be served from a single tap. When a single tap is used, the fire protection service line shall extend straight from the main into the property to a “tee” located outside the property line with valves on the fire and domestic lines in public right-of-way or the service may split immediately inside the building. The fire service shall run straight through the “tee” to a gate valve immediately following the “tee”. The domestic shall “tee” off the fire service immediately outside the property line or immediately inside the building and have a shut off valve following the “tee”. (Figures 20 & 33)

## 505.8 MAINTENANCE OF WATER SERVICES

- 505.8.1 If an existing water service is to be repaired, the materials used for the repair shall be of the type and size specified for new services. If it is determined that half or more of either section of the service, between the main and the curb stop or the curb stop and the building, must be replaced, then that entire section must be replaced with materials as approved for new services and a new stop box complete with stainless steel self-centering rod, stainless steel pin, and Erie style lid must be installed. (See DMWW Specifications) Dissimilar metals may not be used in the repair of a service unless insulators are used.
- 505.8.2 If an existing 2” or smaller curb stop does not meet Section 505.6.1 of these Rules and Regulations, it does not need to be upgraded unless more than half of the service line from the main to the curb stop or from the curb stop to the building is being replaced.
- 505.8.3 If an existing arch pattern stop box, or the rod in an existing arch pattern stop box, must be replaced and the curb stop meets the requirements of Section 505.6.1, a rod and an arch pattern stop box which meet current requirements can be used with the existing curb stop. The rod can be attached to the curb stop using a stainless-steel pin or an approved self-attaching coupling.

## 505.9 PUBLIC AND PRIVATE WATER MAINS (Revised January 2024)

A private water main is a privately owned and maintained water line used to provide service to multiple service line connections on a single qualifying property. Private water mains may provide fire service, domestic service, or a combination of fire and domestic service to properties such as apartment complexes, shopping centers, and town homes.

Public water mains will be installed in public Right-of-Way (ROW) or in easements on private property where necessary, and private water mains will be installed on private property.

Installation of a public water main on private property will only be considered by the Des Moines Water Works where:

- a) The installation is deemed by the Des Moines Water Works to be necessary or beneficial to the distribution system of the Des Moines Water Works and an easement can be obtained.

OR

- b) All of the following conditions are met:
  - a. No public water main is available to effectively serve the property.
  - b. A public water main cannot be installed in public ROW to effectively serve the property.
  - c. The proposed water main is installed in a residential development in a street-like setting.
  - d. There are no fences, walls, structures, or similar obstacle impeding access to the water main and Des Moines Water Works staff have unrestricted access to the water main.
  - e. A 40-foot-wide water main easement, centered on the new water main is provided by the owner of the real property and reviewed by Des Moines Water Works staff.
  - f. The water main should be spaced 5 ft. from any parallel utilities.
  - g. No structure or projection thereof, such as balconies, decks, or similar structures, will be built within 20 ft. of the water main.
  - h. The water main is installed at a depth of 5-6 feet. Exceptions to the depth, subject to the approval of DMWW, may be made for utility crossings and other special circumstances.
  - i. Des Moines Water Works has reviewed plans and approved of the proposed public water main.

Qualifying properties must be a single property owned by a single owner, entity, or association and must not be divided by public right-of-way.

For requirements related to jointly owned private water mains serving multiple qualifying properties see Section 505.9.2.

505.9.1 GENERAL

- 505.9.1.1 The design and location of new private water mains and alterations to existing private water mains must be reviewed by the Des Moines Water Works prior to construction to insure all Des Moines Water Works requirements are met. Additionally, the requirements of the applicable plumbing codes must also be met.
- 505.9.1.2 Private water mains must be constructed and maintained in accordance with minimum specification prescribed by the Des Moines Water Works Department of Engineering generally consistent with the applicable specification of Des Moines Water Works for its own mains. All private water main materials shall also comply with applicable plumbing code requirements.
- 505.9.1.3 The owner of a private water main shall be solely responsible for all costs of installing, operating, and maintaining the private water main in good condition and shall be solely liable for any and all loss, damage or injury to persons or property arising from the installation, ownership, maintenance, or use of the private water main.
- 505.9.1.4 Des Moines Water Works shall have no responsibility for any costs of installing, operating, and maintaining any private water main and shall not be liable for any and all loss, damage or injury to persons or property arising from the installation, ownership, maintenance, or use of the private water main.

505.9.1.5 System development fees for private water mains will be assessed based on the size of the connection to a Des Moines Water Works owned water main unless individual metered service connections are made off of the private water main in which case fees will be assessed as if the individual metered connections were made to a Des Moines Water Works owned water main.

505.9.1.6 Private water mains must be located within public access way, pursuant to an easement in a form approved by Des Moines Water Works and filed of record for the benefit of all property served by the main and for the benefit of Des Moines Water Works.

## 505.9.2 JOINTLY OWNED PRIVATE WATER MAINS

505.9.2.1 A jointly owned private water main is a privately owned and maintained water line used to provide service to multiple service line connections on multiple qualifying properties. Jointly owned private water mains may provide fire service, domestic service, or a combination of fire and domestic service to properties not more than one of which has frontage on public right-of-way.

505.9.2.2 Qualifying properties must be adjoining, must not be separated by public right-of-way, and not more than one of the properties can have frontage on public right-of-way.

505.9.2.3 In addition to the General Requirements set forth in 505.9.1 above the following conditions shall be met for jointly owned private water mains:

505.9.2.3.1 An Iowa Department of Natural Resources Construction Permit must be obtained through Des Moines Water Works for construction of new or alterations to existing jointly owned private water mains prior to the start of construction.

505.9.2.3.2 Maintenance and repair responsibilities and liabilities for jointly owned private water mains serving multiple properties shall be shared among all property owners who own properties which receive service from the main. The liability of such owners shall be joint and several, except to the extent otherwise approved by Des Moines Water Works for good cause. The owners shall jointly and severally indemnify and hold harmless, Des Moines Water Works, and its respective officers, employees, trustees, and agents from any and all loss, damage or injury to persons or property arising from the installation, ownership, maintenance, or use of the jointly owned private water main.

505.9.2.3.3 An easement document containing provisions covering maintenance, repair and ownership responsibilities consistent with the provisions of this Rule 505.9, in a form approved by Des Moines Water Works must be executed, must contain a legal description of the affected properties, must run with the land, must be filed of record with the County Recorder, and a copy of the easement must be provided to Des Moines Water Works before the jointly owned private water main connection or a new connection to an existing jointly owned private water main will be made.

505.9.2.3.4 System development fees for connections made to jointly owned private water mains serving multiple properties will be assessed as if the connections were made to a Des Moines Water Works owned water main.

505.9.3 TRANSMISSION MAINS

Private water mains shall not tap Des Moines Water Works owned transmission mains without permission from Des Moines Water Works. Such permission may be contingent upon the requirement to provide redundant connections to the transmission main.

505.9.4 SERVICE LINES SERVED FROM PRIVATE WATER MAINS

505.9.4.1 Buildings, business units or town homes which do not front a public water main shall be served from a private water main meeting the requirements of Section 505.9.

505.9.4.2 Buildings, business units or town homes that front public right-of-way may tap an available public water main or a private main.

505.9.4.3 Individual service lines connected to a private water main shall meet all requirements of Des Moines Water Works Rules and Regulations and applicable plumbing codes.

505.9.4.4 Ownership of individual service lines from a private water main to the building, business unit or town home, including maintenance responsibility, shall be defined in the lease or association agreement.

505.9.4.5 Individual service lines in manufactured home complexes connected to a private water main shall be installed, owned, and maintained by the complex owner.

505.9.5 DUPLEX/FLAT

Duplexes/flats shall not be served through a private water main.

505.9.5.1 Duplexes/flats shall install water service in one of the following ways:

- a. Install individual taps, individual stop boxes, and individual meters for each living unit.
- b. Install one tap, one stop box, and one meter to supply both living units. (See 509.5 Metering of Duplexes/Flats)

For the purpose of this section, multiple duplexes/flats owned by one common owner will be considered an apartment complex and can be served from a private water main.

505.9.6 METERING OPTIONS

Multiple metering options are available for buildings, business units and town homes served from private water mains. In general, only one meter will be installed for each individual service line connected to a private water main. See metering requirements in Section 509.

505.9.7 SUBMITTAL PROCEDURES

505.9.7.1 The following must be submitted, reviewed, and approved before a private water main connection to a Des Moines Water Works owned water main can be approved:

505.9.7.1.1 Site plan including the following minimum information:

- a. Existing Des Moines Water Works owned water mains with main size and relative location with respect to right-of-way lines and existing curb lines.

- b. Location of the proposed taps, valves, hydrants, and fittings.
- c. Routing of proposed private water main within public right-of-way and on private property. In general, valves located on private property for the individual fire and domestic service(s) must be located in paved, non-parking areas such as driveways and sidewalks. Valves must be located in such a manner as to permit operation by the Des Moines Water Works 24 hours a day.
- d. Location of existing and proposed building(s) on property to be served by the private water main.
- e. Legal description of property to be served.
- f. Proposed paved areas including parking lots, driveways, and sidewalks.
- g. North arrow and any dimensions required for clarity.
- h. Include statement that all private water main work shall be completed in accordance with Des Moines Water Works Standard Specifications.

505.9.7.1.2 Fire flow requirements and the riser detail (if applicable for the project).

505.9.7.1.3 Load profile for any domestic or process service line 2" or larger in diameter. (See Section 503.2.1.5)



505.9.7.1.4 City of Des Moines Fire Marshall review form granting approval for the fire service, where applicable.

505.9.7.1.5 "System Development Fee" payment (See Schedule of Charges, Section 511).

505.9.7.1.6 Mechanical details showing the location and type of backflow prevention device to be installed, if required.

505.9.7.2 Once items 1-6 above have been received and approved by Des Moines Water Works the owner's representative may contact Des Moines Water Works to enter a tap request.

505.9.7.3 One (1) "as-built record drawing" of the private water main shall be submitted to the Des Moines Water Works within 30 days of its construction and before the meter is set, unless otherwise approved by the Des Moines Water Works

#### 505.9.8 PRESSURE TESTING

505.9.8.1 All private water mains and appurtenances shall be tested for leakage in compliance with applicable plumbing code requirements.

505.9.8.2 The Plumbing Contractor shall notify Des Moines Water Works when the private water main is installed and ready to be filled for pressure testing and disinfection.

505.9.8.3 The pressure test, when applied to private water mains, may or may not be witnessed by Des Moines Water Works personnel since these services are under the jurisdiction of the Building Inspection Department. Therefore, a certificate of compliance shall be submitted to Des Moines Water Works stating the test pressure has been performed and listing duration of test, total leakage, allowable leakage, and stating that the test met all requirements.

## 505.9.9 DISINFECTION

505.9.9.1 Following satisfactory pressure tests all private water mains shall be disinfected, sampled, and tested as follows:

505.9.9.1.1 The form of chlorine used and the procedures for disinfection shall be as outlined in AWWA Standard C-651. A minimum free residual chlorine concentration of 10 mg/l shall be maintained for the 24-hour disinfection period.

505.9.9.1.2 After the 24-hour disinfection period, the private water main shall be flushed to remove all free chlorine.

505.9.9.1.3 Immediately following flushing of the private water main and again at least 24 hours after flushing, samples of water from the private water main shall be taken to be tested by Des Moines Water Works. Approximately one sample will be taken for each 1,200 feet of private water main. Test results will be available 24 hours from the time when the samples were submitted for testing. Samples must show the absence of coliform organisms and other contaminants and must meet requirements of the Iowa Department of Natural Resources to be considered acceptable. Water used for flushing and sampling shall be provided by the Des Moines Water Works for up to 2 flushing and sampling procedures, if required, to pass laboratory tests.

If either of the first two sets of samples do not pass laboratory tests, the piping represented by those samples must be flushed and rechlorinated by the Contractor at the discretion of, and as directed by Des Moines Water Works. Any labor and equipment costs incurred by the Des Moines Water Works for further disinfection, flushing, or sampling shall be billed to the Plumbing Contractor.

#### 505.9.10

#### WATER MAIN EXTENSIONS FOR BENEFIT OF SPECIFIC PROPERTIES

Each water service must tap in front of the property to be served. Not all properties have access to existing water mains. In cases where service is desired and there is no water main, a new water main must be installed at the expense owner or owners requesting service. The need for a water main extension will be evaluated during the water service application process. The property owner or owners will be advised of the need for a water main extension and given the option to proceed with installation at their expense.

If the property owner or owners chooses to proceed with installation of a water main extension the new water main will be installed by a Des Moines Water Works' contracted installer and the cost of the installation, including inspection and administration costs must be paid in full in advance by the property owner or owners.