

CRR POLICY 1311: UNDERGROUND FIRE LINE PLAN SUBMITTALS

Created: January 28, 2019 Revised: July 13, 2020 Effective Date: Immediate
Community Risk Reduction Division – 928-204-8926



This policy is promulgated in accordance with Section 104.1 of the 2012 International Fire Code (IFC) and is an official interpretation of NFPA 24 Chapter 4 (2010 Edition).

The following shall apply to all plan submittals for the installation or modification of underground fire lines.

Sedona Fire District requires that underground fire line plans submitted for review shall contain pertinent engineering details and shall also bear the wet-stamp and signature of an Arizona registered engineer. Additionally, chapter 4 of NFPA 24 states;

4.1.1 Working plans shall be submitted for approval to the authority having jurisdiction before any equipment is installed or remodeled.

4.1.2 Deviation from approved plans shall require permission of the authority having jurisdiction.

4.1.3 Working plans shall be drawn to an indicated scale on sheets of uniform size, with a plan of each floor as applicable, and shall include the following items that pertain to the design of the system:

1. Name of owner
2. Location, including street address
3. Point of compass
4. A graphic representation of the scale used on all plans
5. Name and address of contractor
6. Size and location of all water supplies
7. The following items that pertain to private fire service mains:
 - a. Size
 - b. Length
 - c. Location
 - d. Weight
 - e. Material
 - f. Point of connection to city main
 - g. Sizes, types, and locations of valves, valve indicators, regulators, meters, and valve pits
 - h. Depth at which the top of the pipe is laid below grade
 - i. Method of restraint
8. The following items that pertain to hydrants:
 - a. Size and location, including size and number of outlets and whether outlets are to be equipped with independent gate valves
 - b. Whether hose houses and equipment are to be provided, and by whom
 - c. Static and residual hydrants used in flow
 - d. Method of restraint
9. Size, location, and piping arrangement of fire department connections

4.1.4 The working plan submittal shall include the manufacturer's installation instructions for any specially listed equipment, including descriptions, applications, and limitations for any devices, piping, or fittings.

4.2.1 Installation work shall be performed by fully experienced and responsible persons.

4.2.2 The authority having jurisdiction shall always be consulted before the installation or remodeling of private fire service mains.

General Requirements

- 1) All underground lines shall begin at the point of connection to the underground circulating public/private water main. A valve shall be provided at the point of connection such that the fire sprinkler underground service line can be isolated from the public/private water distribution system.
- 2) All underground lines shall terminate at the top of the spigot no more than 5-feet inside the building and 1-foot above finished floor.
- 3) All ductile iron, retaining rods, and other non-corrosive resistant components shall be externally coated for corrosion or poly wrapped.

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- 4) The exact location of the static/residual hydrant and the flow hydrant shall be indicated on the design drawings.
- 5) Provide an embedment detail for piping. (See details)

Fire Department Connection (FDC)

- 6) FDC shall be a separate and independent service main from the underground water line
- 7) FDC's for automatic sprinkler systems and/or standpipe systems for new buildings shall be equipped with a 2 ½" Siamese connection.
- 8) All FDC's shall be equipped with locking Knox FDC Caps. Knox products may be ordered online at www.knoxbox.com.
- 9) Check valves shall be accessible for 5-year inspection. If located underground, shall be installed within a meter can/valve box.
- 10) FDC shall be facing and visible from the fire lane.
- 11) FDC must be within 150-feet of a fire hydrant.
- 12) FDC installed in a "yard" should have 12" x 12" x 4" concrete pad placed at the base to provide additional stability.
- 13) The FDC shall be clear and unobstructed with a minimum of a 3-feet clear all-weather path from fire lane access.
- 14) The FDC shall be installed 18-48 inches above grade.
- 15) Fire hose threads shall be national standard hose thread.
- 16) Underground piping shall be designed and constructed as required for an underground fire main using NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances, as the installation standard.
- 17) The FDC shall discharge into the system on the discharge side of the pump if a pump is present.
- 18) Where the FDC is subject to vehicular damage, the connection shall be protected. Protection components shall not be closer than 36-inches to the connection and shall not interfere with the operation of the connection.
- 19) The pipe size and arrangement of the FDC should conform to the latest edition of NFPA 13, Standard for the Installation of Sprinkler Systems.

Inspection Requirements

- 20) Installer shall provide a completed Underground Piping Materials & Certification "U" form at the beginning of the inspection.
- 21) Visual: All underground piping, joints, and thrust blocks must be uncovered and exposed, with labeling of the pipe legible from grade. All ductile iron, retaining rods, and other nonplastic components shall be externally coated for corrosion and poly wrapped.
- 22) Hydrostatic Test: Visual inspection must be approved prior to hydrostatic test. The test will be at 200 psi or at 50-psi pressure in excess of the maximum static pressure when the maximum static pressure exceeds 150 psi, for a minimum of two hours. Testing to be from the gate valve to the top of the spigot, no pressure drop or gain allowed.
- 23) Flush: Upon completion of the underground hydrostatic test, the underground piping will be flushed, witnessed by the Fire Department. All piping used to flush must be properly secured or restrained. The flushing must be completed prior to stacking the riser to the overhead piping.

Submittal Requirements

- 24) Plans shall be clear and legible and all sheets shall be in a common and appropriate scale (preferably computer generated). A minimum of three (3) sets of plans and minimum of one (1) set of specifications/cut sheets shall be submitted. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review. Plans that do not conform to the submittal requirements or are not clearly legible will be rejected and require a re-submittal.
- 25) Plans shall include all items required by NFPA 24 and;
 - a. Standard details (see attached pages for standard detail sets).
 - b. Location and size of all thrust blocks.
 - c. Thrust block details. (See detail)
 - d. Detail of spigot piece and/or in building riser turn. (See detail)

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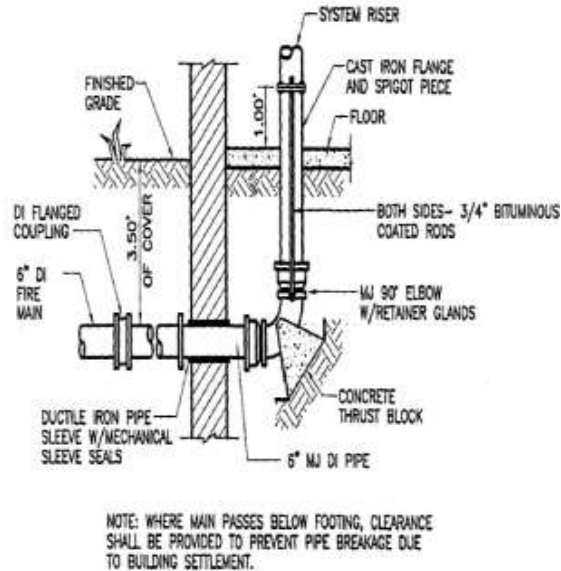
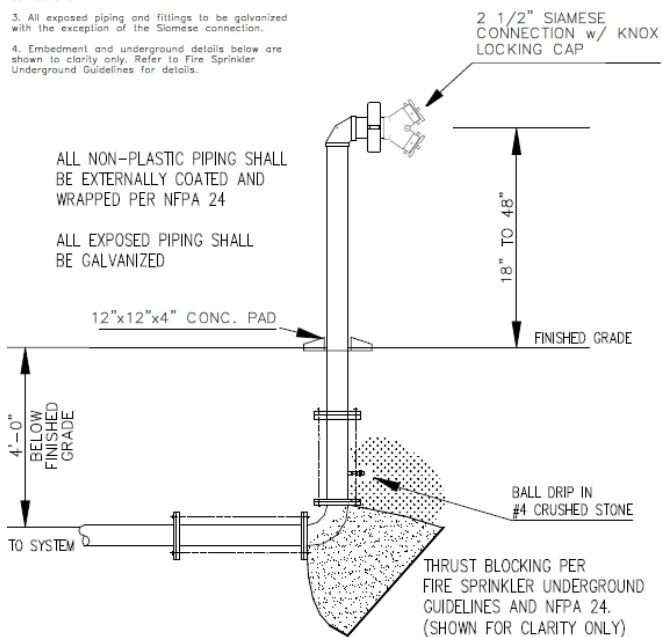
- e. Embedment detail to include depth of bury and backfill specifications. (See detail)
- f. Type of fittings/joints, method of connection and rod size.
- g. Remote FDC detail if applicable.

The following details are provided as examples ONLY.

Actual details may vary based on engineering requirements, manufacturer's instructions, and/or other factors.

GENERAL NOTES

1. Minimum pipe size leading to the FDC shall be determined by hydraulic calculations, but shall be a minimum of 4" for all systems. A 6" minimum pipe is required for all systems with a total demand exceeding 750 GPM.
2. Knox locking caps are required on all connections.
3. All exposed piping and fittings to be galvanized with the exception of the Siamese connection.
4. Embedment and underground details below are shown to clarify only. Refer to Fire Sprinkler Underground Guidelines for details.

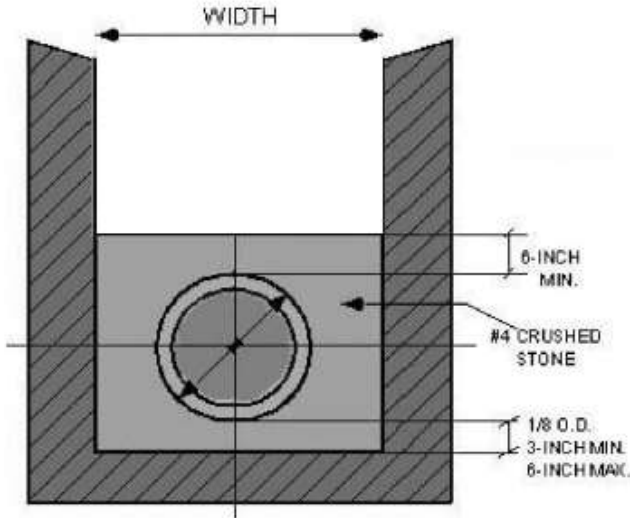


DETAIL – FIRE PROTECTION SYSTEM RISER

NO SCALE

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PIPE SIZE (IN.)	MINIMUM BEARING AREA AGAINST UNDISTURBED SOIL (SQ.FT.)					
	A	B	C	D	E	F
4	2	2	1	1	1	2
6	4	3	3	1	1	3
8	8	5	4	2	1	5
10	12	8	6	3	2	8
12	16	12	9	5	2	12
14	22	15	12	6	3	15
16	29	20	16	8	4	20
18	36	25	20	10	5	25
20	44	32	24	12	6	32
24	64	45	35	18	9	45
30	100	71	54	28	14	71

NOTES:
 1. THRUST IS BASED ON A WORKING PRESSURE OF 150 PSI.
 2. BEARING AREA IS BASED ON A SAFE SOIL BEARING LOAD OF 1500 PSF.
 3. BLOCKING SHALL BEAR AGAINST FITTINGS ONLY AND SHALL BE CLEAR OF THE JOINT.

Any comments or questions regarding the above information may be submitted to:
 Community Risk Reduction Division
 Sedona Fire District
 2860 Southwest Drive
 Sedona, AZ 86336

crm@sedonafire.org