	Presidio Trust **Fire Marshal's Office** ***1750 Lincoln Blvd. San Francisco, California 94129***	**Date**: August 7, 2023 **Revision**: **Standard**: ***FDA-007***
Title: **Underground Fire Service and Fire Hydrant Standard**	**Approved By**: *Tomas Kaselionis*	

SCOPE

This Standard is applicable to all private underground piping for hydrants and/or sprinkler supply lines within the Presidio Trust, Area B. This standard is not applicable to underground piping serving fire sprinkler systems designed in accordance with NFPA 13D or for undergrounds piping less than 4 (four) inches in nominal diameter serving fire sprinkler systems designed in accordance with NFPA 13R.

Any water service up to the discharge of a backflow assembly shall also conform to the Presidio Trust's latest Utility Design Guide, Standards, and Specifications available from the Trust Utilities Engineering Department. If discrepancies between the Fire Marshal's and the Trust Utilities Engineering requirements occur, the more restrictive requirement shall be assumed to apply. Discrepancies should be brought to the attention of a Trust representative for conformance with the overall objective of the work prior to proceeding with the work.

Fire Hydrants shall be installed and maintained per the following NFPA Standards:

- National Fire Protection Association, NFPA 1, Standard for Fire Code
- National Fire Protection Standard Association, NFPA 13, Standard for Instillation of Sprinkler Systems
- National Fire Protection Association, NFPA 24, Standard for Installation of Private Fire Service Mains and Their Appurtenances
- National Fire Protection Association, NFPA 291, Standard for Recommended Practice for Water Flow Testing and Marking of Hydrants

1. PERMIT FEES

1.1. Permit fees shall be assessed in accordance with the Permit Fee Schedule as adopted in the Presidio Trust Area B.

2. DESIGNER & INSTALLER

2.1 Underground fire protection plans shall be designed by a California licensed contractor (Class A, C-16, C-36, or C-34) or by a Registered Professional Engineer (Civil, Mechanical, or California Fire Protection), licensed by the State of California (Board of Professional Engineers). All copies of the plans shall be stamped and signed by the licensed individuals (when applicable).

2.2 Class A, C-16, C-36, and C-34 contractors can only design underground fire service projects if their staff performs the entire installation without subcontracting any of the work out.

3. SUBMITTAL REQUIREMENTS

3.1. Submit electronic digital 100% CD in .PDF Format and hydraulic calculations to the Presidio Permitting Office.

3.2. Plans shall be legible, scaled to nationally recognized standards.

3.3. When hydraulic calculations are required current water flow data is required from the Presidio Trust Utilities Engineering Department.

4. PLAN DETAILS

4.1 Legend.

4.2 The contractor's name, telephone number, address, and California State contractor's license number and classification.

4.3 Applicable codes and standards used for the system design (e.g., 2019 NFPA 24 Standard for Installation of Private Fire Service Mains and their Appurtenances).

4.4 Project location, including the full legal address of the facility, and building number(s).

4.5 All driveways and fire department access roads shall be shown on plans.

4.6 Location of public mains and all public hydrants within 300 feet of the site.

4.7 Location of all valves. Specify the type for each (e.g., post indicator valve (PIV), key gate valve, system control valve, double detector check (DDC), outside stem and yoke (OS&Y), etc.).

4.8 Pipe size, class, type, etc.

4.9 Thrust block locations or specify the means of restraint as approved by NFPA 24.

4.10 Material data submittal.

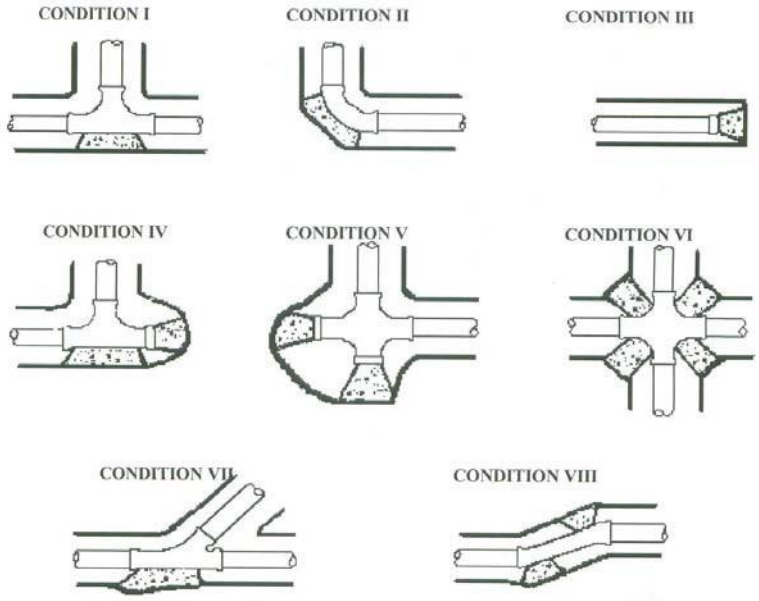
5. DESIGN REQUIREMENTS

5.1 Any water service up to the discharge of a backflow assembly shall also conform to the Presidio Trust's latest Utility Design Guide, Standards and Specifications available from the Trust Utilities Engineering Department.

5.2 Only Presidio Trust, Area B approved back flow preventers (BFP) shall be utilized in the hydraulic calculations.

5.3 Manufacture's specifications and pressure loss charts for the back flow preventer and the water meter where applicable.

5.4 Thrust blocks, or another approved method of thrust restraint, shall be provided wherever pipe changes direction. Thrust block calculations are required with every submittal when thrust blocks are utilized. Calculations are required to be in accordance with NFPA 24.



$$Area = \frac{7.9\ \text{ft}^2\,(0.541)\left(\frac{150}{100}\right)}{\left(\frac{3000}{1000}\right)} = 2.1\ \text{ft}^2$$

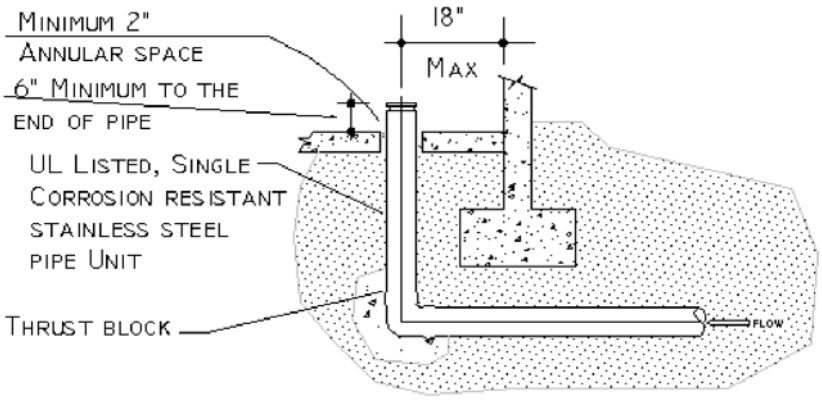
5.5 Depth of cover shall be a minimum of 30 (thirty) inches from the top of the pipe.

5.6 Construct trench in accordance with the latest applicable standard construction detail provided by the Presidio Trust Utilities Engineering.

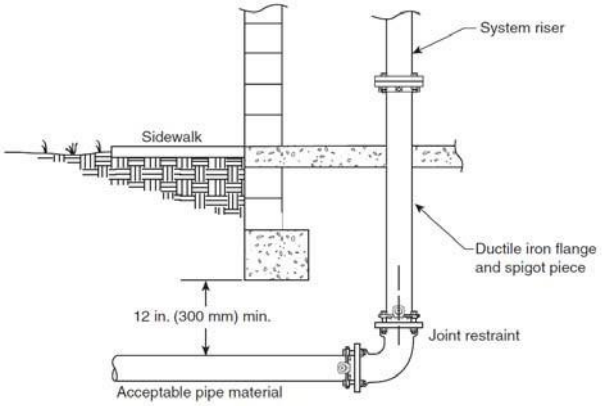
5.7 All bolts used for underground connections—including T bolts—shall be stainless steel. All bolts and ferrous fittings shall be cleaned and thoroughly coated with asphalt or other corrosion retarding material after assembly and prior to the installation of polytube.

5.8 A minimum two (2) inch clearance shall be provided where the pipe passes through slabs or walls. The underground system shall terminate at the riser flange and placed a maximum of 18 inches from an exterior wall and six (6) inches above the slab.

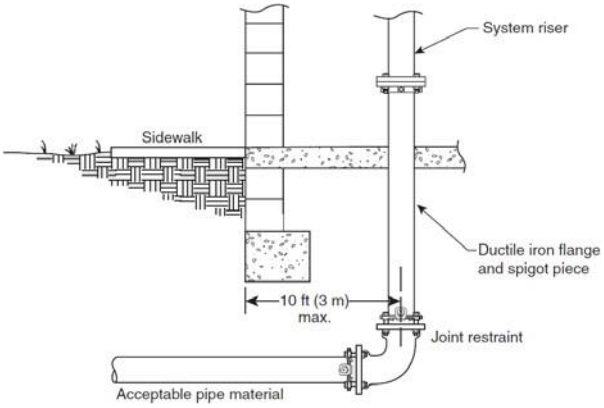
5.9 When a pipe runs under footings or foundations of the building, a single corrosion resistant stainless steel pipe unit assembly is required. The pipe shall terminate a maximum of 18 inches from the exterior wall and a minimum of 6 (six) inches above the finished floor. A minimum of four (4) inches of clearance (annular space) shall be provided where the pipe passes through the floor or wall.



5.10 Piping shall be installed a minimum of 12 (twelve) inches (300 mm) below the bottom of building foundations or footers.



5.11 Where approved, private fire service mains supplying systems within the building shall be permitted to extend more than 10 (ten) feet under the building.



5.12 PIV's or other approved indicating valves, shall be located a minimum of 40 (forty) feet from the building served. Where it is *impractical* to locate control valve(s) 40 (forty) feet from the building served, they may be located closer by one of the following methods:

4.12.1 Approved wall mount indicating valves: Located on exterior walls without openings within 15 (fifteen) feet of the valve/s.

4.12.2 Other approved manner acceptable to the Presidio Trust Area B based on site conditions.

5.13 Fire Department Connections (FDCs) shall be located on the address side of the building.

5.14 FDCs shall be mounted at 48 (forty-eight) inches above grade or access level. FDCs shall provide at a minimum 36 (thirty-six) inch by 36 (thirty-six) inches by 4 (four) inch square concrete pad.

5.15 FDCs shall be located within 100 (one hundred) feet of a public hydrant.

5.16 The FDC shall be in a position allowing hose lines to be readily and conveniently attached. The FDC shall contain a minimum of *two* 2½" (two and one-half inch) inlets. When the sprinkler and/or standpipe demand is greater than 500 (five hundred) gpm additional inlets shall be provided for each additional 250 (two hundred fifty) gpm to maximum of 8 (eight) inlets.

5.17 FDCs shall have durable signs clearly indicating the address of the facility they serve.

5.18 Large, private, fire-service mains shall have post indicating type sectional control valves at appropriate points to permit isolation of the system in the event of a break or during repair or extension (A large system is considered one with more than 6 [six] connections including fire hydrants).

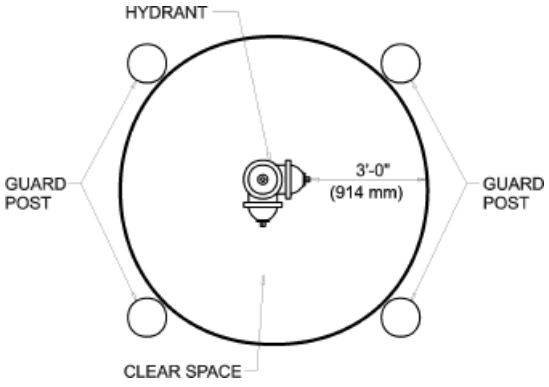
6. FIRE HYDRANTS

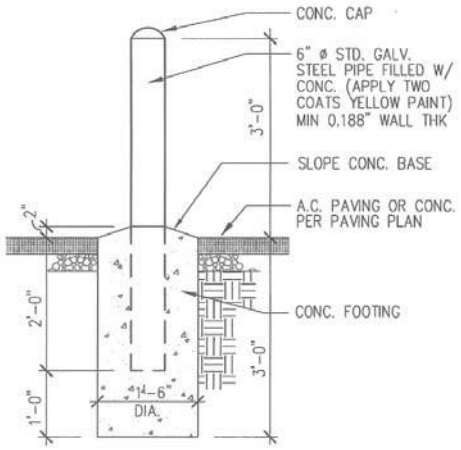
6.1 Fire Hydrant center of hose outlet shall be not less than 18 (eighteen) inches or more than 36 (thirty-six) inches above final grade.

6.2 All fire hydrants shall be wet barrel equivalent to the CLOW #860 type with a 4 (four) inch steamer outlet and two 2-1/2 (two and one-half) inch hose outlets. The 4 (four) inch outlet shall be directly facing the street.

6.3 The 4 (four) inch outlet shall face the fire department access road. All outlets shall be provided with National Standard threads (NST). Private hydrants shall be painted OSHA safety yellow.

6.4 When subject to mechanical damage from fire protection equipment shall be protected with bollards.





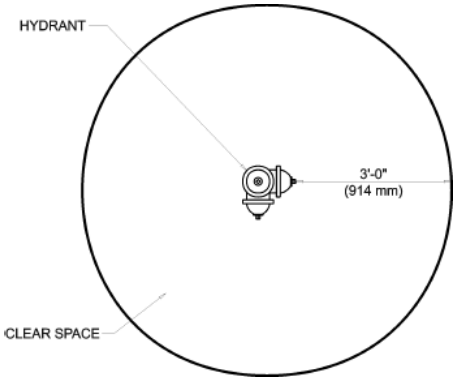
6.5 Fire hydrant supply piping shall be a minimum of 6 (six) inches in diameter. The lowest valve-operating nut shall be a minimum of 18 (eighteen) inches above grade and the hydrant flange shall be a minimum of 2 (two) inches above grade.

6.6 A keyed gate valve shall be provided for each hydrant in an accessible location. Keyed gate valves shall be located within 6 (six) to 10 (ten) feet of the hydrant in an area that is unobstructed and clearly visible. Valves shall not be located in parking stalls.

6.7 All fire hydrants shall have a "Blue Reflective Pavement Marker" indicating their location. Private hydrants and markers are to be maintained in good condition by the property owner. See attached Fire Hydrant Diagram.

6.8 Vegetation shall be selected and maintained in such a manner as to allow immediate location of—and unobstructed access to—all hydrants, control valves, fire department connections, and other devices or areas used for firefighting purposes. A minimum of 3 (three) foot clearance shall be provided around all hydrants and post indicating valves.

6.9 A minimum of 3 (three) foot clearance shall be provided on at least one side of a detector check assembly to allow proper operation of the device. The front of FDC and the adjacent fire access roadway shall be free of any obstructions. Vehicle parking shall not obstruct access to any fire department equipment.



7. ROUGH & HYDROSTATIC TESTING

7.1 Thrust blocks shall be in place and properly cured.

7.2 All piping shall be in place and exposed for visual inspection.

7.3 Pipe shall be laid on a minimum 6 (six) inch bed of clean sand.

7.4 Bolts and ferrous joints shall be coated with asphaltic sealant or other corrosion retarding material.

7.5 Pipe must be disinfected and sampled for bacteriological contamination prior to connection to water main. Any piping installed upstream of the backflow prevention device shall be installed in accordance with the Presidio Trust's latest Utility Design Guide, Standards, and Specifications available from the Trust Utilities Engineering Department. A Water Connection and Testing Plan is required.

7.6 Pipe shall be center loaded with clean sand to prevent uplift, but all joints shall remain exposed. The system shall be hydrostatically tested at 200 (two hundred) psi (or 50 [fifty] psi over maximum static pressure, whichever is greater) for a duration of at least 2 (two) hours prior to the arrival of the Presidio Trust Area B Fire Marshal's Office fire inspector.

7.7 A time stamped photo of when the test started shall be available.

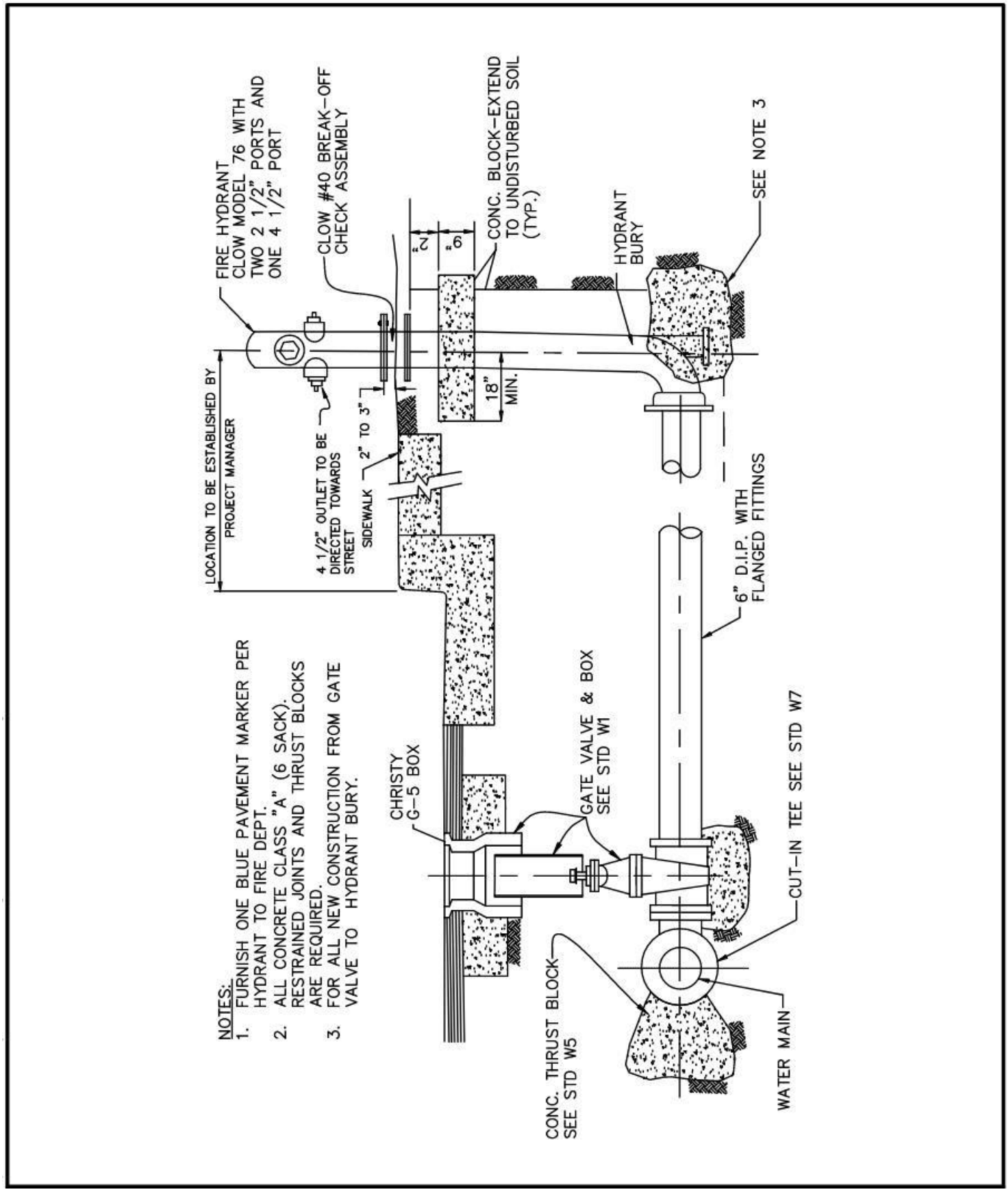
8. FIRE HYDRANT DIAGRAM

8.1 Confirm latest version of Fire Hydrant Standard Construction Detail with Presidio Trust Utilities Engineering Department prior to installation.

8.2 The 6 (six) inch DIP with Flanged or MJ Fittings. Flanged joints shall only be installed above grade or below grade in a vault.

See diagram below

FIRE HYDRANT DIAGRAM



9. FLUSHING OF SYSTEM

9.1 All portions of the underground system shall be flushed to remove debris.

9.2 The minimum flow velocity shall be ten (10) feet per second, which is necessary to clean the pipe and lift foreign material to an aboveground flushing outlet. The following table shall be utilized to base the number of hose connections required:

Nominal Pipe Size		Flow Rate	
in.	mm	gpm	L/min
2	50	100	380
2½	65	150	570
3	75	220	833
4	100	390	1500
5	125	610	2300
6	150	880	3350
8	200	1560	5900
10	250	2440	9250
12	300	3520	13,300

9.3 Discharged water shall be collected, diverted to an approved location, or properly treated.

10. INSPECTION SCHEDULING

10.1 Inspection appointments can only be made by the permit applicant or designated representative. It is the responsibility of the permit applicant or designated representative to have a representative to be present at all inspections. Failure to do so will result in the cancellation of the inspection and a re-inspection fee will be assessed.

10.2 The Presidio Trust Area B Water Utility shall be contacted prior to any flush. The installing Contractor shall coordinate the flush inspection between both the Presidio Trust Area B Fire Marshal's Office and Water Utility.

11. GRANTING FINAL

11.1 Complete and submit NFPA Acceptance form for installation/modification of underground fire service.

11.2 Electronic As-Built's for the project is submitted and validated accurately.

DEFINITIONS

BFP – Back Flow Preventers

DIP – Ductile Iron Pipe

DDC – Double Detector Check

FDC – Fire Department Connections

GPM – Gallons Per Minute

MJ – Mechanical Joint Pipe

OS&Y – Outside Stem and Yoke

PIV – Post Indicator Valve