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Underground Fire Supply Guide

This guide outlines private underground fire supply requirements found in the 2014 Oregon Fire Code (OFC) (Section 507) and NFPA 24 (Chapter 4), and overall public and private hydrant specifications as they relate to hydrant color and adapter installations. This guide includes plan review submittal requirements subject to approval by Gresham Fire & Emergency Services (GFES) as the authority having jurisdiction. Approval must be granted prior to the installation or modification of any portion of private fire protection system equipment and work may only be performed under benefit of permit through the local building department. Work that deviates from any approved plans shall require additional written approval from GFES. To facilitate a quick water supply connection during emergency operations all new fire hydrants must have a Storz hose adapter installed as described in this guide.

Required Fire Flow shall meet the requirements in OFC 507, and Appendix B & C.

Plan Review Submittal Requirements:
The following requirements are based on NFPA 24 – 4.1.3. Private fire service main working plans shall be submitted on a separate page from the other utilities.

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

- Plans for private fire service mains are required to be designed and stamped by an architect or engineer registered in Oregon and qualified in the area of practice
- Name of owner and/or project
- Location, including street address
- Point of compass
- A graphic representation of the scale used on the plans
- Size and location of all water supplies
- Size and location of standpipe risers, hose outlets, hand hose, monitor nozzles and related equipment
- Name, address and contact information of system designer **AND** installation contractor
- The following items pertain to private fire service mains:
    1. Size
    2. Length
    3. Location
    4. Weight
    5. Material
    6. Point of connection to city main
    7. GFES approved vault detail. For details see **Appendix I**

8. Size, type and location of all valves, piping, post-indicator valves (PIV), fire department connections (FDC), regulators, meters and valve pits
9. Depth at which the top of the pipe is set below grade
10. Method of restraint.

- The following items pertain to PIV's and FDC's
    1. PIV shall be installed 36" above finished grade (to the top of the valve) and be provided a handle pad locked in place
    2. FDC shall be installed 18" – 48" above finished grade (to the center of the cap) and be provided with brass screw in male plugs
    3. PIV and FDC shall be located no closer than 40' to any structure
    4. FDC shall be within 50' of a public hydrant. GFES shall approve location
    5. When not readily apparent which building and/or area a PIV and FDC covers, identifying markings shall be provided. The signage shall be made of permanent **white** in color plastic or metal signs with a minimum **2" red** numbers. Sign shall be securely attached to the PIV or FDC stem. Identify with numbers the address and if applicable the portion of the building protected by that specific FDC or PIV. For details see **Appendix II**
    6. PIV and FDC's may be required to be protected from damage

- The following items pertain to fire hydrants:
    1. Size and location, including size and number of outlets and whether outlets are to be equipped with independent gate valves
    2. Private fire hydrants shall be painted SAFETY RED. Public hydrants shall be painted in the color as required by the local water authority
    3. All fire hydrants shall have a 5-inch Storz adapter with National Standard Threads installed on the 4 ½ -inch fire hydrant outlet. The adapter shall be constructed of high-strength aluminum alloy, have a Teflon coating on the seat and threads, and use a rubber gasket with two (2) set screws to secure it in place. The adapter shall be provided with an aluminum alloy pressure cap. The cap shall be attached to the hydrant barrel or Storz adapter with a cable to prevent theft of the cap. Model shall be a STORZ HPHA50 – 45NHWCAP or equal approved by GFES. See **Appendix III**
    4. Hydrant shall be installed not less than 18" or more than 36" above finished grade to the centerline of the hose outlets
    5. Hydrant(s) may be required to be protected from damage
    6. Hydrant shall be located no closer than 40' to structures
    7. Provide static and residual pressure data from hydrants used in flow test.
    8. Identify method of restraint. The back of the hydrant elbow shall include thrust blocking per NFPA 24 - Figure A.7.3.1.
    9. A **Contractors Material & Test Certificate for Underground Piping** and a **Checksheet for test of Private Fire Hydrants** report for each hydrant shall be provided at the fire supply final inspection. Provide a hydrant map with hydrants numbered. Map must correspond with test reports provided on GFES hydrant service report forms. For details see **Appendix IV**

Appendix I

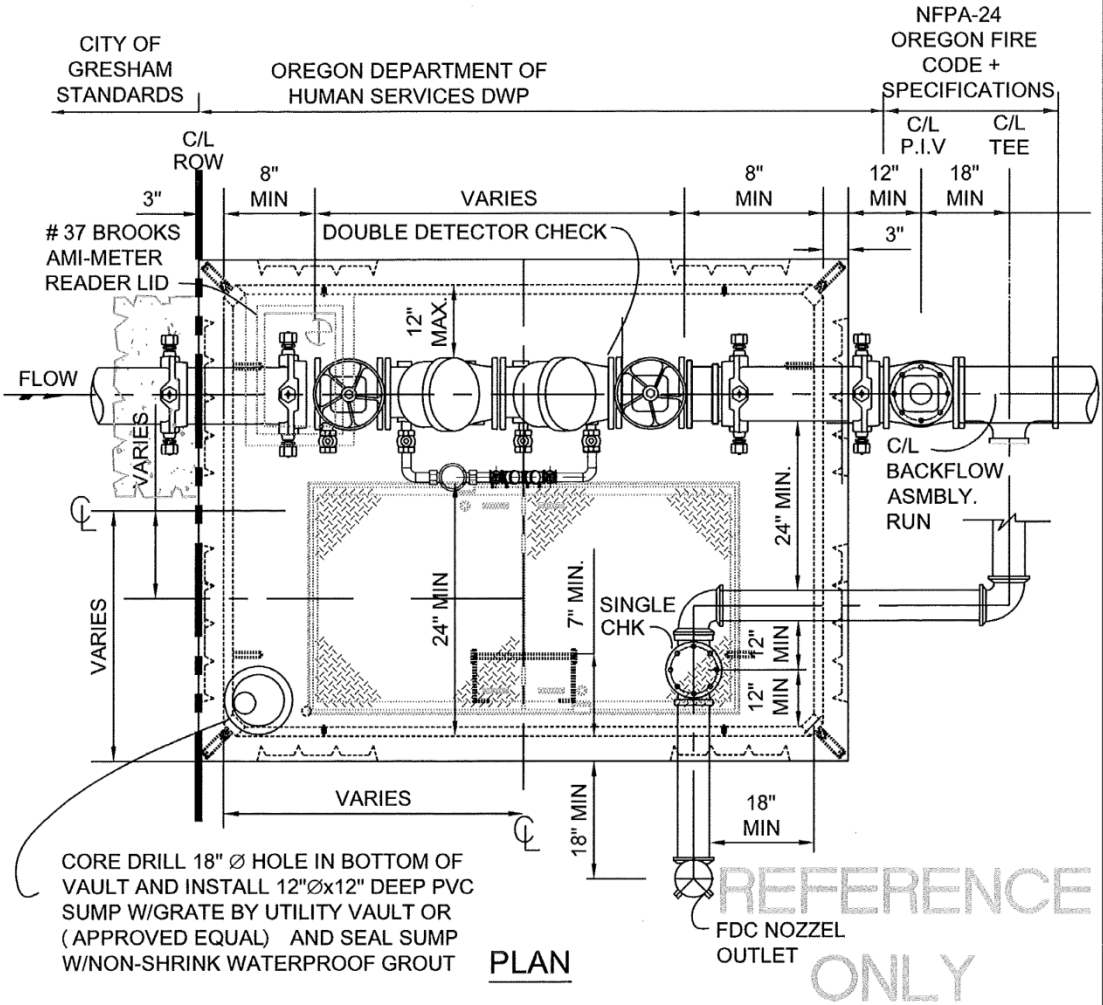
Approved Vault Detail

BACK FLOW VAULT		
SIZE	VAULT WITH FDC *	VAULT W/0 FDC *
3	676-LA	577-LA
4	676-LA	577-LA
6	676-LA	676-LA
8	687-LA	687-LA
10	5106-LA	5106-LA

* OR APPROVED EQUAL BY WATER ENG.

NOTES:

1. CONTRACTOR TO SEAL ALL OPENINGS IN VAULT WITH NON-SHRINK GROUT.
2. CONTRACTOR TO INSTALL CONCRETE BALLAST 3 CU YDS MIN. AROUND BASE OF VAULT WHERE FLOODING OR HIGH GROUND WATER EXIST.
3. CLEARANCE BETWEEN WALL AND DEVICE 8" MIN., TO 12" MAX.
4. THRUST BLOCK 1'-0" MIN THICKNESS
5. DETECTOR METER TO READ IN CUBIC FEET - AMI METER
6. FOR SPECIFICATION ON DBL CK VALVE BACKFLOW ASSEMBLY SEE DOUBLE CHECK DWG. NO. 516F
7. COAT ALL OUTSIDE CONC SURFACES OF VAULT W/CRYSTAL SEAL (OR APPROVED EQUAL)
8. WHEN A FIRE HYDRANT IS ON SITE FDC AND PIV FACILITIES WOULD BE IN A DIFFERENT LOCATION.



PLAN

DRAWN	RWL		DEPARTMENT OF ENVIRONMENTAL SERVICES	SCALE	N.T.S.
DIV.	WATER		CITY OF GRESHAM	DATE	MARCH 2012
REV.	DATE	APPR.	1333 N.W. EASTMAN PARKWAY, GRESHAM, OREGON 97030	APPR.	
			DOUBLE CHECK VALVE (DETECTOR) BACKFLOW ASSEMBLY PLAN VIEW	DWG. NO.	516B

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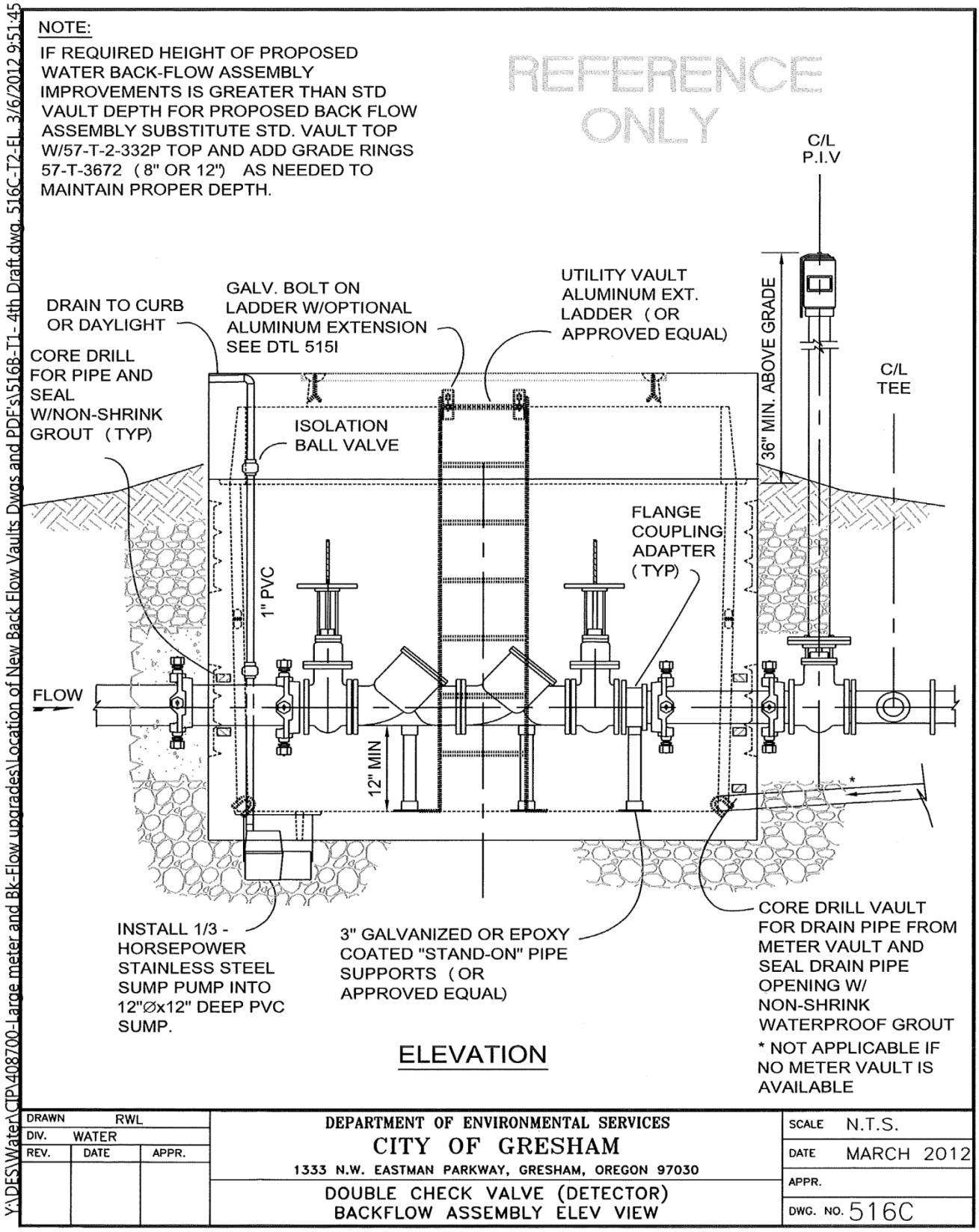
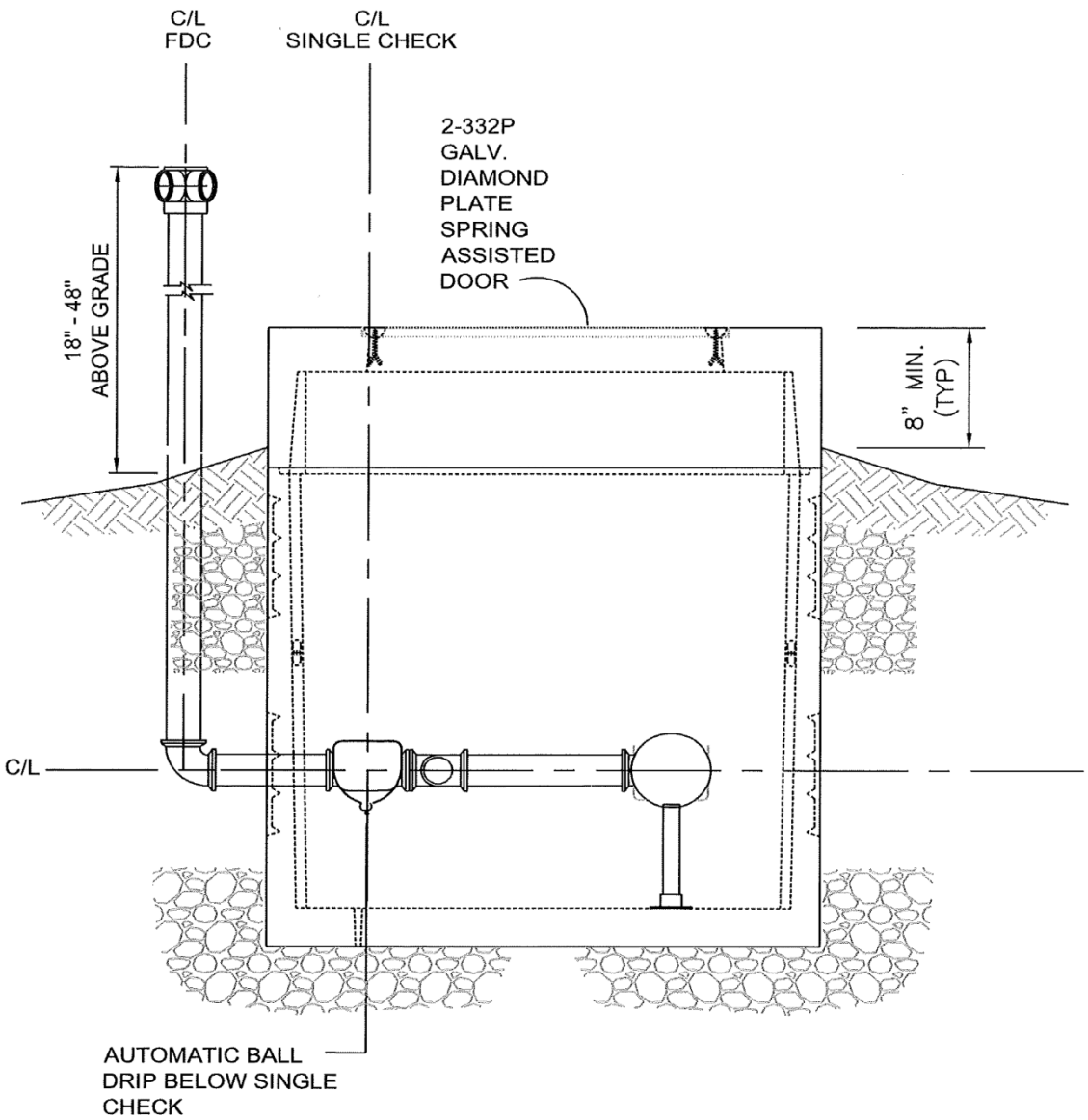

NOTE:
IF REQUIRED HEIGHT OF PROPOSED WATER BACK-FLOW ASSEMBLY IMPROVEMENTS IS GREATER THAN STD VAULT DEPTH FOR PROPOSED BACK FLOW ASSEMBLY SUBSTITUTE STD. VAULT TOP W/57-T-2-332P TOP AND ADD GRADE RINGS 57-T-3672 (8" OR 12") AS NEEDED TO MAINTAIN PROPER DEPTH.
REFERENCE ONLY
C/L P.I.V
DRAIN TO CURB OR DAYLIGHT
GALV. BOLT ON LADDER W/OPTIONAL ALUMINUM EXTENSION SEE DTL 515I
UTILITY VAULT ALUMINUM EXT. LADDER (OR APPROVED EQUAL)
36" MIN. ABOVE GRADE
C/L TEE
CORE DRILL FOR PIPE AND SEAL W/NON-SHRINK GROUT (TYP)
ISOLATION BALL VALVE
FLANGE COUPLING ADAPTER (TYP)
1" PVC
FLOW
12" MIN
*
INSTALL 1/3 - HORSEPOWER STAINLESS STEEL SUMP PUMP INTO 12"Øx12" DEEP PVC SUMP.
3" GALVANIZED OR EPOXY COATED "STAND-ON" PIPE SUPPORTS (OR APPROVED EQUAL)
CORE DRILL VAULT FOR DRAIN PIPE FROM METER VAULT AND SEAL DRAIN PIPE OPENING W/ NON-SHRINK WATERPROOF GROUT
* NOT APPLICABLE IF NO METER VAULT IS AVAILABLE
ELEVATION
Y:\DES\Water\CIP\408700-Large meter and Bk-Flow upgrades\Location of New Back Flow Vaults Dwgs and PDF's\516B-T1 - 4th Draft.dwg, 516C-T2-EL, 3/6/2012 9:51:45
DRAWN RWL
DIV. WATER
REV. DATE APPR.
DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY OF GRESHAM
1333 N.W. EASTMAN PARKWAY, GRESHAM, OREGON 97030
DOUBLE CHECK VALVE (DETECTOR) BACKFLOW ASSEMBLY ELEV VIEW
SCALE N.T.S.
DATE MARCH 2012
APPR.
DWG. NO. 516C



END ELEVATION

REFERENCE
ONLY

DRAWN RWL	DEPARTMENT OF ENVIRONMENTAL SERVICES	SCALE N.T.S.
DIV. WATER	CITY OF GRESHAM	DATE MARCH 2012
REV. / DATE / APPR.	1333 N.W. EASTMAN PARKWAY, GRESHAM, OREGON 97030	APPR.
	DOUBLE CHECK VALVE (DETECTOR) BACKFLOW ASSEMBLY SIDE VIEW	DWG. NO. 516D

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Appendix II

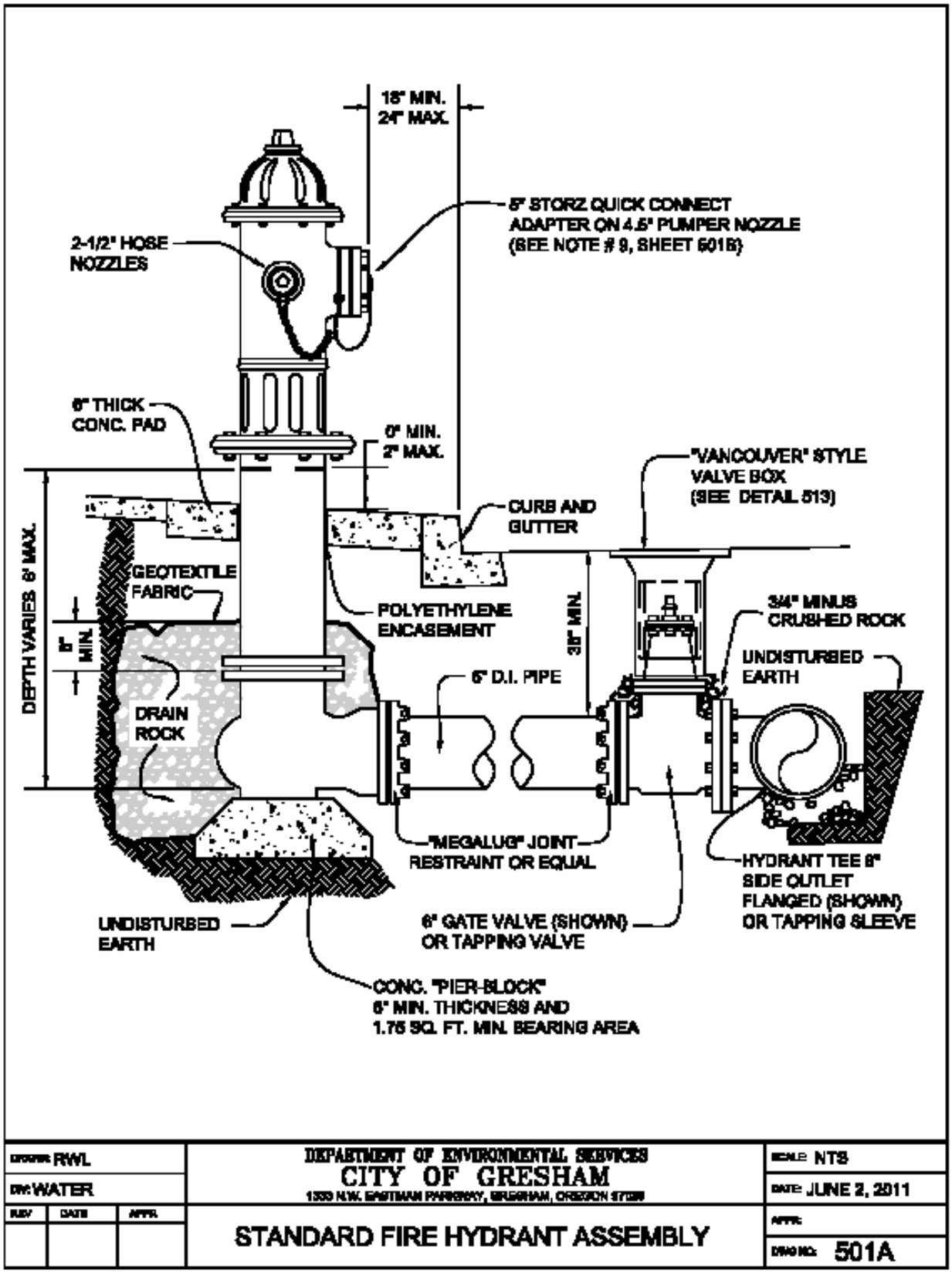
Approved PIV/FDC signage examples

Example 1: Rigid plastic sign with address range of buildings covered. Includes brass caps on FDC.

Example 2: Flexible metal sign with address range of buildings served. Includes pad locked PIV handle.

Appendix III

Approved Standard Hydrant Assembly with Storz Adapter Installed



NOTES:

1. HYDRANT TO BE MUELLER SUPER CENTURION 250, MDL A-423 ONLY WITH 1-½"OPERATION NUT. SEE 502.12, DIVISION 5, "WATER TECHNICAL REQUIREMENTS" FOR ADDITIONAL SPECIFICATIONS.
2. HYDRANT COLOR TO BE YELLOW SHERWIN WILLIAMS GCC-5006, OR APPROVED EQUAL.
3. RESTRAIN ALL JOINTS AND 10 LF MIN. EACH SIDE OF TEE ON MAIN LINE.
4. MIN. 4 CU. FT. OF 1½"-¾" CLEAN DRAIN ROCK SHALL BE PLACED AROUND THE HYDRANT SHOE A MIN. OF 6" ABOVE DRAIN OUTLETS. GEOTEXTILE FABRIC MEETING THE REQUIREMENTS OF SECTION 205.02.11 SHALL BE PLACED AROUND THE DRAIN ROCK AS SHOWN.
5. WHERE CURB TIGHT SIDEWALK (NO PLANTER STRIP) AND CURB EXIST, HYDRANT PUMPER PORT SHALL BE PLACED AT BACK OF SIDEWALK, OR AS DIRECTED BY ENGINEER.
6. BURY OF HYDRANT SHALL BE MEASURED FROM BURY LINE TO THE BOTTOM OF CONNECTING PIPE. DEPTH OF BURY SHALL BE 6' MAX., UNLESS OTHERWISE APPROVED BY THE ENGINEER.
7. HYDRANT VALVE SHALL BE MUELLER RESILIENT WEDGE GATE VALVE #A-2360-16 OR APPROVED EQUAL.
8. PLACE A 36"x36"x6" THICK CONC. PAD AROUND HYDRANT. PLACE ANY ADJACENT SIDEWALK AT THE TIME HYDRANT PAD IS POURED. ALL PIPE IN CONTACT WITH CONCRETE SHALL BE WRAPPED WITH POLYETHYLENE FILM IN ACCORDANCE WITH AWWA C105 AND SECTION 503.16.08.
9. STORZ ADAPTER SHALL BE 5" x 4.5" HARRINGTON HPHA 50 - 45 NH/CAP, OR APPROVED EQUAL.

DRAWN: RWL			DEPARTMENT OF ENVIRONMENTAL SERVICES CITY OF GRESHAM 1333 N.W. EASTMAN PARKWAY, GRESHAM, OREGON 97030	SCALE: NTS
DIV: WATER				DATE: JUNE 2, 2011
REV	DATE	APPR	STD. F.H. ASSEMBLY SPECIFICATIONS	APPR:
				DWG NO: 501B

The adapter shall be constructed of high strength aluminum alloy, heavy Teflon coating on the seat and threads and use a rubber gasket with two set screws to secure it in place. The adapter shall be provided with an aluminum alloy pressure cap. The cap shall be attached to the hydrant barrel or Storz adapter with a cable to prevent theft of cap. Private Hydrants shall be painted RED. Public Hydrants shall be painted as required by the local water authority.

Appendix IV

CHECK SHEET FOR TEST OF PRIVATE FIRE HYDRANTS

Test to be performed according to 2011 NFPA 25
(One form for each hydrant)

Name of Building: _____

Address: _____

Location of hydrant: _____

Make of hydrant: _____

1. How many fire hydrants are there on this system? _____
2. What are the sizes of the outlets on the hydrant? _____
3. What were the sizes of the outlets that were flowed? _____
4. What was the static pressure? _____
5. What was the residual pressure? _____
6. What is the maximum hydrant flow calculated at 20 PSI residual pressure?_____
7. Did the hydrant drain properly after the hydrant was closed? _____

Please answer **Yes** or **No** to the following:

All hydrant threads ANFH connection standard screw threads? Y___ N___

Access obstructed?	Y___N___	Nipples loose?	Y___ N___
Barrel broken?	Y___N___	Off at gate?	Y___ N___
Base leaks?	Y___N___	Opens hard?	Y___ N___
Caps missing?	Y___N___	Will not open?	Y___ N___
Caps; poor spanner fit?	Y___N___	Set improperly?	Y___ N___
Chatter?	Y___N___	Stem broken?	Y___ N___
Dome missing?	Y___N___	Stem leaking?	Y___ N___
Faced wrong?	Y___N___	Poor spanner fit?	Y___ N___
Gate valve accessible?	Y___N___	Set too low/high?	Y___ N___

Were the following completed?:

Caps wire brushed and graphitized Yes _____ No_____

Stem lubed Yes _____ No_____

Is Hydrant out of service Yes _____ No_____

If yes, was the Fire Marshal's Office notified? Yes _____ No _____

Explain any problems: _____

_____

Qualified person conducting test and service:

Print Name_____ Signature_____

Representing (Company name) _____Phone ( )_____

Address _____ Date of Service_____

Contractors Material & Test Certificate for Underground Piping

Date_____ Project Name_____
Property Address_____

Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative. All defects shall be corrected and the system left in service before leaving the project site.
This certificate shall be filled out and signed by both representatives. Copies shall be provided to Gresham Fire & Emergency Services as the authority having jurisdiction (AHJ), owners, and contractors. It is understood that the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

Plans:
Have plans been approved and permitted by the City of Gresham? ☐ Yes ☐ No

Installation conforms to approved plans? ☐ Yes ☐ No

Equipment used is approved? ☐ Yes ☐ No
If no, explain deviations_____

Instructions:
Has person in charge of fire protection system been instructed as to location of control valves and maintenance of this equipment? ☐ Yes ☐ No
If no, explain_____
Have copies of appropriate instructions and care and maintenance charts been left on premises? ☐ Yes ☐ No
If no, explain_____

Location:
Describe location of supply to the building_____

Underground pipes & joints:
Pipe conforms to _____ Standard. ☐ Yes ☐ No
Fittings conform to_____Standard. ☐ Yes ☐ No
If no, explain_____

Joints needing anchorage clamped, strapped, or blocked in accordance with _____Standard. ☐ Yes ☐ No
If no, explain_____

Testing:
Flushing: Flow the required rate until water is clear as indicated by no collection of foreign material in burlap bags at outlets such as hydrants and blow-offs. Flush at flows not less than:
400 gpm - 4" pipe 600 gpm - 5" pipe 750 gpm - 6" pipe
1000 gpm - 8" pipe 1500 gpm - 10" 2000 gpm - 12" pipe
When supply cannot produce stipulated flow rates, obtain maximum available.

New underground piping flushed according to _____ Standard. ☐ Yes ☐ No
By (company):_____If no, explain:

How flushing was obtained: ☐ Public Water ☐ Tank/reservoir ☐ Fire pump

Through what type opening: ☐ Hydrant butt ☐ Open pipe

Lead in flushed according to _____ Standard. ☐ Yes ☐ No
By (company) _____ if no, explain:

How flushing was obtained: ☐ Public Water ☐ Tank/reservoir ☐ Fire pump

Through what type opening: ☐ Y connection to flange & spigot ☐ Open pipe

Hydrostatic: Hydrostatic tests shall be made at not less than 200 psi for two hours or 50 psi above static pressure in excess of 150 psi for two hours.
All new underground piping hydrostatically tested at _____psi for _____hours.

Joints covered? ☐ Yes ☐ No

Leakage: New pipe laid with rubber gasket joints shall have little or no leaks at the joints. The amount of leakage at the joints shall not exceed 2 qts. per hour per 100 joints regardless of pipe diameter. The leakage shall be distributed over all joints. If such leakage occurs at a few joints the installation shall be considered **unsatisfactory** and necessary repairs made. The amount of allowable leakage specified above may be increased by 1 fl. ounce per inch valve diameter per hour for each metal seated valve isolating the test section. If dry barrel hydrants are tested with the main valve open, so the hydrants are under pressure, an additional 5 oz. per minute leakage is permitted for each hydrant.

Total amount of leakage measured: _____ gallons for _____ hours.
Allowable leakage: _____ gallons for _____ hours.

Hydrants

Number installed: _____ Type and make: _____

5" Storz adapter installed? ☐ Yes ☐ No

All operate satisfactorily? ☐ Yes ☐ No

Control Valves

Water control valves left wide open? ☐ Yes ☐ No
If not, state reason_____

Hose threads of fire department connection/ hydrants to local standards? ☐ Yes ☐ No

Date left in service with all control valves open: _____

Installation Contractor

Name_____ Phone _____

Signatures of Test Witnesses

For property owner _____ Title_____ Date_____
For sprinkler contractor _____ Title _____ Date_____