

# Tualatin Valley Fire & Rescue



## Fire & Life Safety Requirements for Fire Department Access and Water Supplies

This guide is intended to provide assistance in the application of the fire code in all areas served by Tualatin Valley Fire & Rescue.

### Fire Marshal's Offices:

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## **Notes to Users**

### **Authority and Scope**

Tualatin Valley Fire & Rescue has elected to administer and enforce the Oregon Fire Code under the authority granted to us by ORS 476.030. The Oregon Fire Code is the International Fire Code, 2010 Edition, as published and copyrighted by the International Code Council, which has been amended and adopted by the Oregon State Fire Marshal's Office. In order to further the Oregon State Fire Marshal's goal of promoting fire code consistency throughout the state, Tualatin Valley Fire & Rescue enforces the Oregon Fire Code with no local amendments.

Tualatin Valley Fire & Rescue has prepared this guide to provide good faith guidance to building officials, contractors, business owners, the public, and fire marshals on local interpretations and practices that are considered to be in compliance with the Oregon Fire Code. The intent is to clarify aspects of the code that are vague or non-specific by addressing selected issues under normal conditions. This guide does not create or replace code provisions, and is not an adopted policy. The reader is cautioned that the guidance detailed in this guide may or may not apply to their specific situation, and that the Tualatin Valley Fire & Rescue retains final authority to determine compliance.

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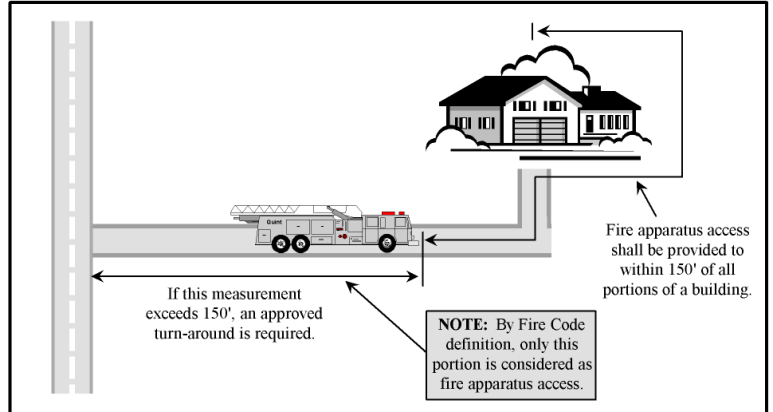
# Fire Apparatus Access

**FIRE APPARATUS ACCESS ROAD EXCEPTIONS:** The requirements for fire apparatus access may be modified as approved by the fire code official where any of the following apply: (OFC 503.1.1 Exception)

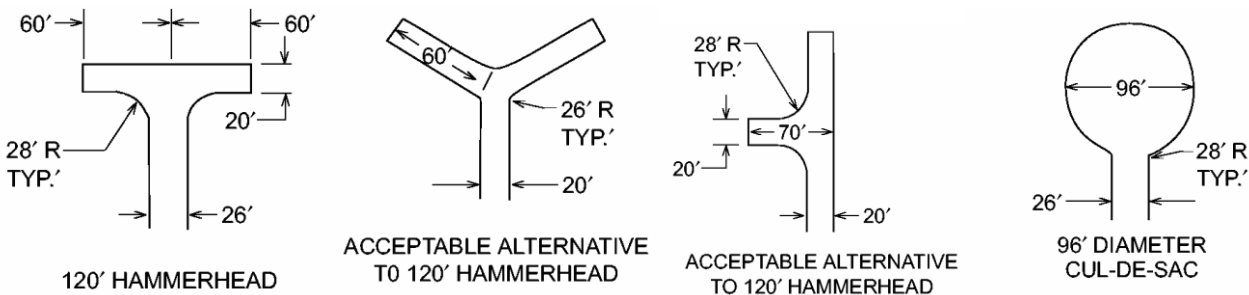
- 1) Buildings are equipped throughout with an approved automatic fire sprinkler system (the approval of this alternate method of construction shall be accomplished in accordance with the provisions of ORS 455.610(5)).

## FIRE APPARATUS ACCESS ROAD DISTANCE FROM BUILDING AND TURNAROUNDS:

Access roads shall be within 150 feet of all portions of the exterior wall of the first story of the building as measured by an approved route around the exterior of the building. An approved turnaround is required if the remaining distance to an approved intersecting roadway, as measured along the fire apparatus access road, is greater than 150 feet. (OFC 503.1.1)

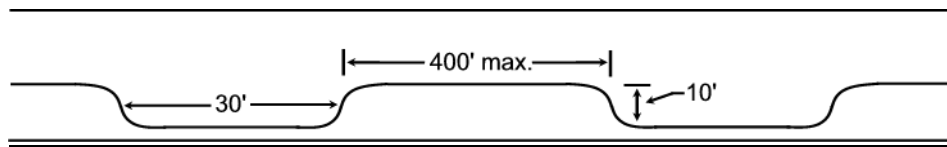


**DEAD END ROADS AND TURNAROUNDS:** Dead end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved turnaround. Diagrams of approved turnarounds are shown below: (OFC 503.2.5)



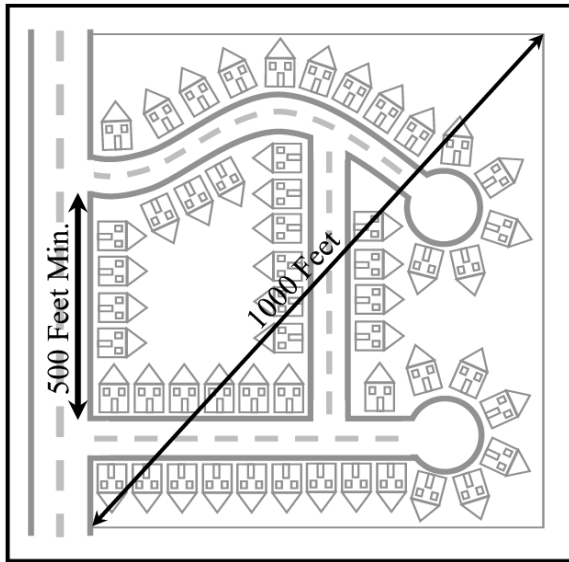
**TURNING RADIUS:** The inside turning radius and outside turning radius shall be not less than 28 feet and 48 feet respectively, measured from the same center point. (OFC 503.2.4 & 103.3)

**TURNOUTS:** When a fire apparatus access road exceeds 400 feet in length, turnouts 10 feet wide and 30 feet long shall be provided in addition to the required road width and shall be placed no more than 400 feet apart, unless otherwise approved by the fire code official. These distances may be adjusted based on visibility and sight distances. (OFC 503.2.2)



**MULTIPLE ACCESS ROADS:** Developments of one- and two-family dwellings where the number of dwelling units exceeds 30, multiple-family residential projects having more than 100 dwelling units and where vehicle congestion, adverse terrain conditions or other factors that could limit access, as determined by the fire code official, shall be provided with not less than two approved means of access. Exceptions may be allowed for approved automatic sprinkler system. The approval of fire sprinklers as an alternate shall be accomplished in accordance with the provisions of ORS 455.610(5). (OFC D106 & OFC D107)

**MULTIPLE ACCESS ROADS SEPARATION:** Where two access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses. (OFC D104.3)



**ADDITIONAL ACCESS ROADS – COMMERCIAL:** Where buildings exceed 30 feet in height or three stories in height shall have at least three separate means of fire apparatus access. Buildings or facilities having a gross area of more than 62,000 square feet shall be provided with at least two separate means of fire apparatus access. Buildings up to 124,000 square feet provided with fire sprinkler may have single access. (OFC D104)

**ADDITIONAL ACCESS ROADS – ONE- OR TWO-FAMILY RESIDENTIAL:** Where there are more than 30 one- or two-family dwelling units, not less than two separate approved means of access shall be provided. Where there are more than 30 dwelling units and all are protected by approved residential sprinkler systems, a single access will be allowed. (OFC D107)

**GRADE:** Fire apparatus access roadway grades shall not exceed 10 percent. Intersections and turnarounds shall be level (maximum 5%) with the exception of crowning for water run-off. When fire sprinklers are installed, a maximum grade of 15% may be allowed. The approval of fire sprinklers as an alternate shall be accomplished in accordance with the provisions of ORS 455.610(5) and OAR 918-480-0100. (OFC 503.2.7 & D 103.D)

**FIRE APPARATUS ACCESS ROAD WIDTH AND VERTICAL CLEARANCE:** Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet (26 feet adjacent to fire hydrants (OFC D103.1)) and an unobstructed vertical clearance of not less than 13 feet 6 inches. (OFC 503.2.1 & D103.1)

Note: When serving two or less dwelling units and accessory buildings, the driving surface may be reduced to 12 feet, although the unobstructed width shall be 20 feet. Turning radii for curves and turnarounds on reduced width roads shall be not less than 28 feet and 48 feet respectively, measured from the same center point.

**FIRE APPARATUS ACCESS ROADS WITH FIRE HYDRANTS:** Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet. (OFC D103.1)

**AERIAL FIRE APPARATUS ROAD WIDTH:** Buildings more than 30 feet in height shall have fire apparatus access roads constructed for use by aerial apparatus with an unobstructed driving surface width of not less than 26 feet. (OFC D105)

**SURFACE AND LOAD CAPACITIES:** Fire apparatus access roads shall be of an all-weather surface that is easily distinguishable from the surrounding area and is capable of supporting not less than 12,500 pounds point load (wheel load) and 60,000 pounds live load (gross vehicle weight). Documentation from a registered engineer that the final construction is in accordance with approved plans or the requirements of the Fire Code may be requested. (OFC D102.1)

**BRIDGES:** Private bridges shall be designed and constructed in accordance with the State of Oregon Department of Transportation and American Association of State Highway and Transportation Officials Standards *Standard Specification for Highway Bridges-17*. A building permit shall be obtained for the construction of the bridge if required by the building official of the jurisdiction where the bridge is to be built. The design engineer shall prepare a special inspection and structural observation program for approval by the building official. The design engineer shall give in writing final approval of the bridge to the fire district after construction is completed. Maintenance of the bridge shall be the responsibility of the party or parties that use the bridge for access to their property. The fire district may at any time, for due cause, ask that a registered engineer inspect the bridge for structural stability and soundness at the expense of the property owner(s) the bridge serves. (OFC 503.2.6)

**GATES:** Gates securing fire apparatus roads shall comply with all of the following: (OFC D103.6) Electric automatic gates shall comply with ASTM 220-5 and UL 325.

- ◆ Minimum unobstructed width shall be not less than the required roadway surface width, or two 10 foot sections with a center post or island.
- ◆ Gates serving three or less single-family dwellings shall be a minimum of 12 feet in width.
- ◆ Gates shall be set back at minimum of 30 feet from the intersecting roadway.
- ◆ Gates shall be of the swinging or sliding type
- ◆ Manual operation shall be capable by one person
- ◆ Electric gates shall be equipped with a means for operation by fire department personnel
- ◆ Locking devices shall be approved.

**NO PARKING SIGNS:** Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, "No Parking" signs shall be installed on one or both sides of the roadway and in turnarounds as needed. Roads 26 feet wide or less shall be posted on both sides as a fire lane. Roads more than 26 feet wide to 32 feet wide shall be posted on one side as a fire lane.

Signs shall read "NO PARKING - FIRE LANE" and shall be installed with a clear space above grade level of 7 feet. Signs shall be 12 inches wide by 18 inches high and shall have red letters on a white reflective background. (OFC D103.6)



**PAINTED CURBS:** Where required, fire apparatus access roadway curbs shall be painted red and marked "NO PARKING FIRE LANE" at approved intervals. Lettering shall have a stroke of not less than one inch wide by six inches high. Lettering shall be white on red background. (OFC 503.3)

## **Firefighting Water Supplies**

**FIREFIGHTING WATER SUPPLY EXCEPTIONS:** The requirements for firefighting water supplies may be modified as approved by the fire code official where any of the following apply: (OFC 503.1.1 Exception)

- 1) Buildings are equipped throughout with an approved automatic fire sprinkler system (the approval of this alternate method of construction shall be accomplished in accordance with the provisions of ORS 455.610(5)).
- 2) There are not more than two Group R-3 or Group U occupancies.

Fire Flow Worksheet and Instructions - [http://www.tvfr.com/resources/new\\_construction.aspx](http://www.tvfr.com/resources/new_construction.aspx)

**COMMERCIAL BUILDINGS – REQUIRED FIRE FLOW:** The minimum fire flow and flow duration for buildings other than one- and two-family dwellings shall be determined according to OFC Appendix B. The required fire flow for a building shall not exceed the available GPM in the water delivery system at 20 psi.

**Note:** Appendix B, Section B106, Limiting Fire-Flow is also enforced, save and except for the following:

- In areas where the water system is already developed, the maximum needed fire flow shall be either 3,000 GPM or the available flow in the system at 20 psi, whichever is greater.
- In developed areas, the maximum needed fire flow shall be 3,000 GPM at 20 psi.

**SINGLE FAMILY DWELLINGS - REQUIRED FIRE FLOW:** The minimum available fire flow for one and two-family dwellings served by a municipal water supply shall be 1,000 gallons per minute. If the structure(s) is (are) 3,600 square feet or larger, the required fire flow shall be determined according to OFC Appendix B. (OFC B105.2)

**RURAL BUILDINGS - REQUIRED FIRE FLOW:** Required fire flow for rural and suburban areas in which adequate and reliable water supply systems do not exist shall be calculated in accordance with National Fire Protection Association Standard 1142, 2007 Edition. (OFC B107)

- Residential and accessory structures less than 3,600 square feet, including all floors, garage and basement shall not require a water supply.

**NOTE:** Structures protected by an automatic fire sprinkler system are not required to have a water supply other than that required to supply the fire sprinkler system.

**ACCESS AND FIRE FIGHTING WATER SUPPLY DURING CONSTRUCTION:** Approved fire apparatus access roadways and fire fighting water supplies shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. (OFC 1410.1 & 1412.1)

**PREMISE IDENTIFICATION:** New and existing buildings shall have approved address numbers; building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Address numbers shall be Arabic numerals or alphabet letters. Numbers shall be a minimum of 4 inches high with a minimum stroke width of 0.5 inch. (OFC 505.1)

## Fire Hydrants

**FIRE HYDRANTS – COMMERCIAL BUILDINGS:** Where a portion of the building is more than 400 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the building, on-site fire hydrants and mains shall be provided. (OFC 507.5.1)

Note: This distance may be increased to 600 feet for buildings equipped throughout with an approved automatic sprinkler system.

**FIRE HYDRANTS – ONE- AND TWO-FAMILY DWELLINGS & ACCESSORY STRUCTURES:** Where a portion of a structure is more than 600 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the structure(s), on-site fire hydrants and mains shall be provided. (OFC 507.5.1)

**FIRE HYDRANT NUMBER AND DISTRIBUTION:** The minimum number and distribution of fire hydrants available to a building shall not be less than that listed in Table C 105.1. See page 9 for hydrant proximity to FDC. (OFC Appendix C)

**TABLE C105.1  
NUMBER AND DISTRIBUTION OF FIRE HYDRANTS**

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS <sup>a, b, c</sup> (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT <sup>d</sup>
1,750 or less	1	500	250
2,000-2,250	2	450	225
2,500	3	450	225
3,000	3	400	225
3,500-4,000	4	350	210
4,500-5,000	5	300	180
5,500	6	300	180
6,000	6	250	150
6,500-7,000	7	250	150
7,500 or more	8 or more <sup>e</sup>	200	120

For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.

a. Reduce by 100 feet for dead-end streets or roads.

b. Where streets are provided with median dividers which can be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis up to a fire-flow requirement of 7,000 gallons per minute and 400 feet for higher fire-flow requirements.

c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.



- d. Reduce by 50 feet for dead-end streets or roads.
- e. One hydrant for each 1,000 gallons per minute or fraction thereof

**Considerations for placing fire hydrants may be as follows:** (OFC C104)

- ⊕ Existing hydrants in the area may be used to meet the required number of hydrants as approved. Hydrants that are up to 600 feet away from the nearest point of a subject building that is protected with fire sprinklers may contribute to the required number of hydrants. (OFC 507.5.1)
- ⊕ Hydrants that are separated from the subject building by railroad tracks shall not contribute to the required number of hydrants unless approved by the fire code official.
- ⊕ Hydrants that are separated from the subject building by divided highways or freeways shall not contribute to the required number of hydrants. Heavily traveled collector streets only as approved by the fire code official.
- ⊕ Hydrants that are accessible only by a bridge shall be acceptable to contribute to the required number of hydrants only if approved by the fire code official.
- ⊕ When evaluating the placement of hydrants at apartment or industrial complexes the first hydrant(s) to be placed shall be at the primary access and any secondary access to the site. After these hydrants have been placed other hydrants shall be sited to meet the above requirements for spacing and minimum number of hydrants.

**FIRE HYDRANT DISTANCE FROM AN ACCESS ROAD:** Fire hydrants shall be located not more than 15 feet from an approved fire apparatus access roadway unless approved by the fire code official. (OFC C102.1)

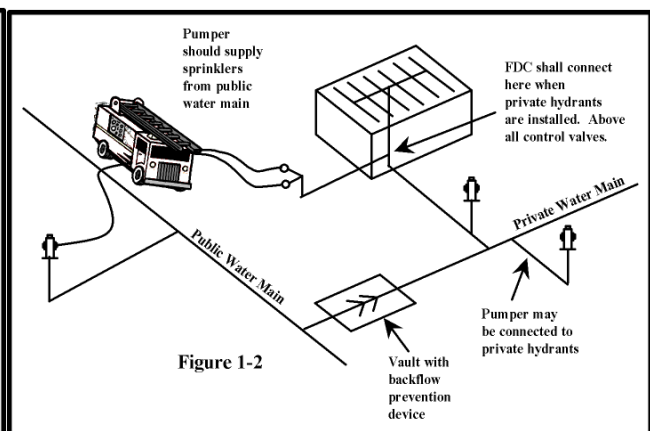
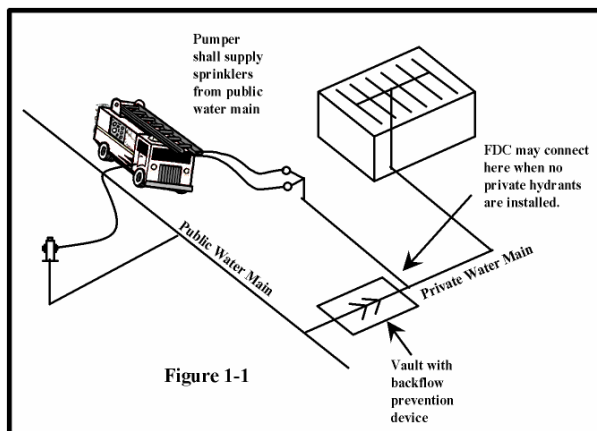
**REFLECTIVE HYDRANT MARKERS:** Fire hydrants locations shall be identified by the installation of reflective markers. The markers shall be blue. They shall be located adjacent and to the side of the center line of the access roadway that the fire hydrant is located on. In the case that there is no center line, then assume a center line and place the reflectors accordingly. (OFC 510.1)

**PHYSICAL PROTECTION:** Where fire hydrants are subject to impact by a motor vehicle, guard posts, bollards or other approved means of protection shall be provided. (OFC 507.5.6)

**CLEAR SPACE AROUND FIRE HYDRANTS:** A 3 foot clear space shall be provided around the circumference of fire hydrants. (OFC 507.5.5)

**FIRE DEPARTMENT CONNECTIONS:** A fire hydrant shall be located within 100 feet of a fire department connection (FDC). Fire hydrants and FDC's shall be located on the same side of the fire apparatus access roadway. (OFC 912 & NFPA 13)

- Fire department connections (FDCs) shall normally be located remotely and outside of the fall-line of the building. FDCs may be mounted on the building they serve, when approved.
- The following systems shall not require a fire department connection:
  - (1) Buildings located in remote areas that are inaccessible for fire department support
  - (2) Large-capacity deluge systems exceeding the pumping capacity of the fire department
  - (3) Single-story buildings not exceeding 2000 ft<sup>2</sup> in area



## **Key Boxes**

**Knox Box:** A Knox Box for building access is required for this building. Please contact the Fire Marshal's Office for an order form and instructions regarding installation and placement. (OFC 506.1)

**FIRE DEPARTMENT ACCESS TO EQUIPMENT:** Fire protection equipment shall be identified in an approved manner. Rooms containing controls to HVAC, fire sprinkler risers and valves or other fire detection, suppression or control features shall be identified with approved signs. (OFC 509.1)

**ANGLE OF APPROACH AND DEPARTURE:** The angles of approach and departure for fire apparatus roads shall not exceed 8 degrees. (OFC 503.2.8, NFPA 1901)

## **Smoke and Heat Vents**

**MANUAL RELEASE:** Manual releases shall be provided for use during fire suppression operations. Individual exterior release mechanisms shall be provided for each vent. (OFC 2309.7 & Section 910)

