



# Travis County ESD No. 12

11200 Gregg Lane  
Manor, Texas 78653  
(512) 272-4502

FirePrevention@tcesd12.com



## NEW CONSTRUCTION GUIDELINE FOR COMMERCIAL AND MULTI-FAMILY DEVELOPMENTS

### CONSTRUCTION AND DEMOLITION ACCESS

Approved vehicle access for emergency response situations shall be provided to all construction or demolition sites. Vehicle access shall be provided to within 100 feet of temporary or permanent fire department connections. Vehicle access shall be provided by either temporary or permanent roads, capable of supporting 85,000 pounds under all weather conditions. Vehicle access shall be maintained until permanent fire apparatus access roads are available. Temporary address signage shall also be provided during construction. (IFC 3310.1)

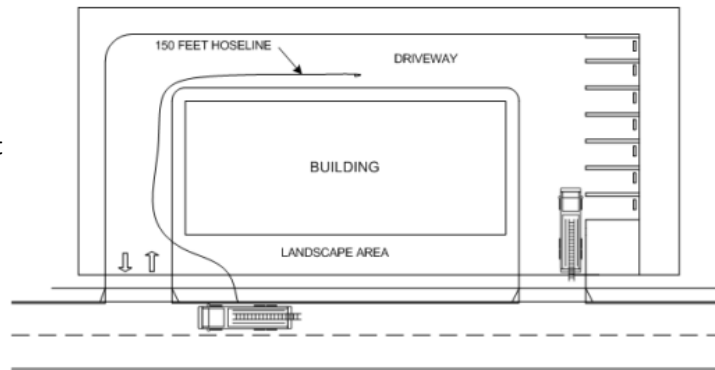
### FIRE APPARATUS ACCESS ROADS

Access roads shall be provided for every facility, building, or portion of a building hereafter constructed or moved into or within the jurisdiction. (IFC 503.1.1) Fire apparatus access roads shall have an unobstructed vertical clearance of 14 feet as amended.

### FIRE APPARATUS ACCESS ROAD DISTANCE FROM BUILDINGS

The fire apparatus access road shall extend to within 150 feet of all portions of the facility and all portions of the exterior walls of the first story of the building as measured by an approved route around the exterior of the building or facility. (IFC 503.1.1 as amended)

Note: The measurement shall be by a fire department approved route.



### APPROVED ROUTE

An approved route shall be defined as one in which the buildings are located in proximity to a street or fire apparatus access road which is accessible by firefighting apparatus and from which the furthestmost part of all buildings may be reached at ground level by a fire hose which is attached to the apparatus and is not in excess of 150 feet.

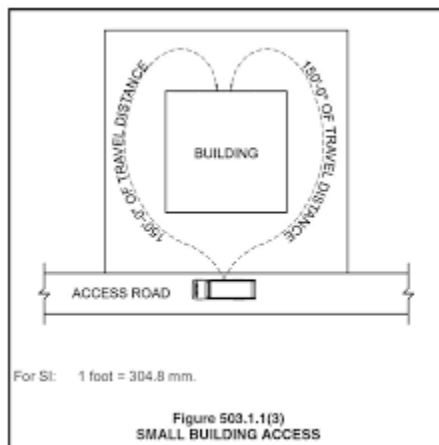
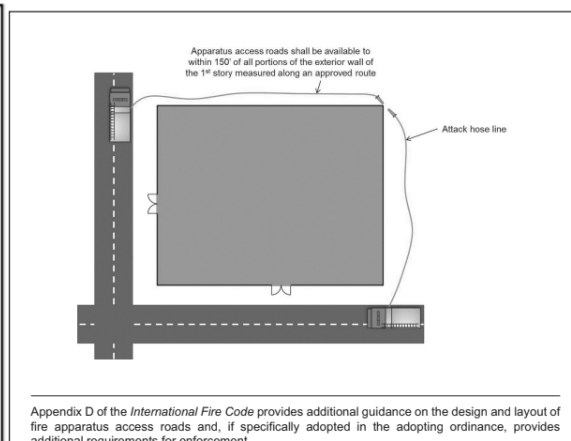


Figure 503.1.1(3)  
SMALL BUILDING ACCESS



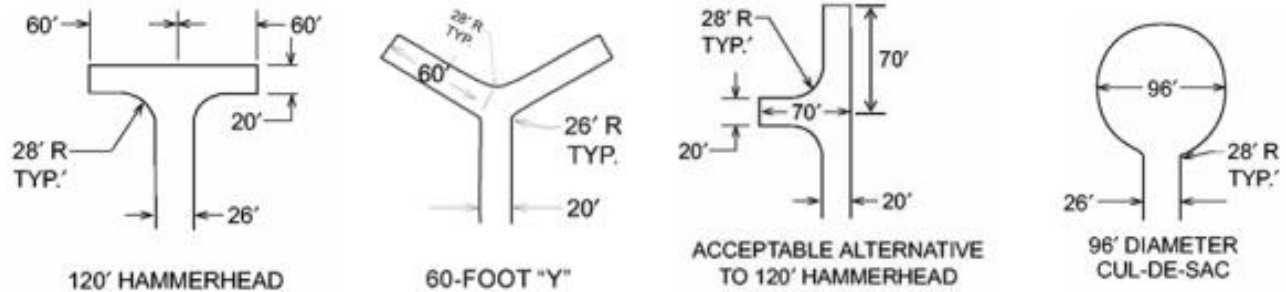
Appendix D of the International Fire Code provides additional guidance on the design and layout of fire apparatus access roads and, if specifically adopted in the adopting ordinance, provides additional requirements for enforcement.

## ADDITIONAL ACCESS

The fire code official is authorized to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

## DEAD ENDS AND ROADS IN EXCESS OF 150 FEET (TURNAROUNDS)

Dead end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved area for turning around fire apparatus.



## TURNING RADIUS

Fire apparatus access roads shall be designed with a minimum 25-foot inside turning radius and a minimum 50-foot outside turning radius, measured from the same center point. (IFC D103.3 as amended)

## ADDITIONAL ACCESS ROADS – COMMERCIAL/INDUSTRIAL HEIGHT

Buildings exceeding 30 feet or 3 stories in height shall have at least two means of fire apparatus access for each structure. (IFC D104.1)

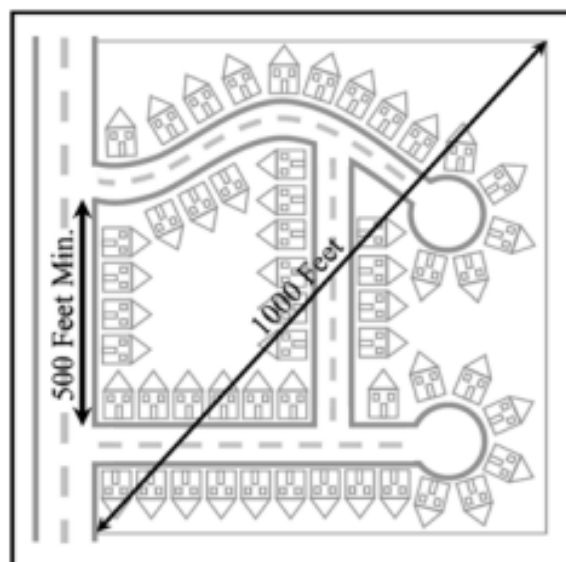
## ADDITIONAL ACCESS ROADS – MULTI-FAMILY RESIDENTIAL DEVELOPMENTS

Projects having more than 100 dwelling units shall be provided with two separate and approved fire apparatus access roads. Exception: Projects having up to 200 dwelling units may have a single approved fire apparatus access road when all buildings, including nonresidential occupancies, are equipped throughout with an approved automatic sprinkler system in accordance with section 903.3.1.1, 903.3.1.2.

Projects having more than 200 dwelling units shall be provided with two separate and approved fire apparatus roads, regardless of whether they are equipped with an approved automatic sprinkler system. (IFC D106)

## MULTIPLE ACCESS ROADS SEPARATION/REMOTENESS

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 lot or area to be served, measured in a straight line between accesses. (IFC D104.3, D106.3) Any exceptions shall be approved in writing by the Fire Chief.



## ACCESS ROAD GRADE

Fire apparatus access roads shall not exceed 10 percent in grade. (IFC 503.2.7/D103.2)

## ANGLE OF APPROACH/GRADE FOR TURNAROUNDS

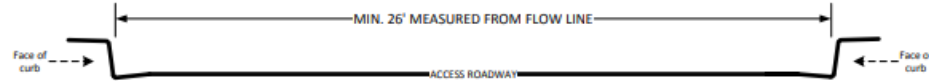
Turnarounds shall be as flat as possible and have a maximum of 5% grade with the exception of crowning for water run-off. (IFC 503.2.8)

## ANGLE OF APPROACH/GRADE FOR INTERSECTIONS

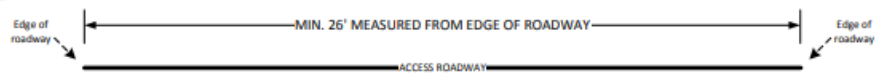
Intersections shall be level (maximum 5%) with the exception of crowning for water run-off. (IFC 503.2.8)

## FIRE APPARATUS ACCESS ROAD DESIGN

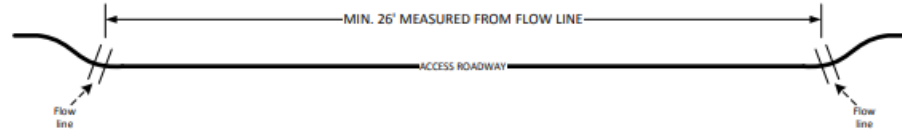
### CURBED ROAD



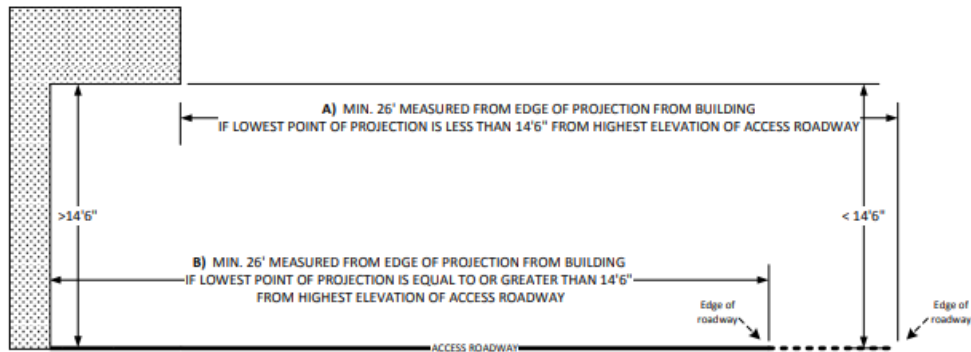
### FLAT ROAD



### ROLLED CURB



### EDGE OF BUILDING OR PROJECTION



## AERIAL APPARATUS OPERATING GRADES

Portions of aerial apparatus roads that will be used for aerial operations shall be as flat as possible. Front to rear and side to side maximum slope shall not exceed 10%. (IFC D103.2)

## AERIAL FIRE APPARATUS ACCESS ROADS

Buildings with a vertical distance between the grade plane and the highest roof surface that exceeds 30 feet in height shall be provided with a fire apparatus access road constructed for use by aerial apparatus with an unobstructed driving surface width of not less than 26 feet. For the purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of the parapet walls, whichever is greater. Any portion of the building may be used for this measurement, provided that it is accessible to firefighters and is capable of supporting ground ladder placement. (IFC D105.1).

## AERIAL FIRE APPARATUS OPERATIONS

At least one of the required aerial access routes shall be located within a minimum of 15 feet and a maximum of 30 feet from the building and shall be positioned parallel to one entire side of the building. The side of the building on which the aerial access road is

positioned shall be approved by the Fire Marshal. Overhead utility and power lines shall not be located over the aerial access road or between the aerial access road and the building. (IFC D105.3, D105.4)

### FIRE APPARATUS ACCESS ROAD WIDTH AND VERTICAL CLEARANCE

Fire apparatus access roads shall have an unobstructed driving surface width of not less than 25 feet if no fire hydrant is present and 26 feet if a fire hydrant is present and an unobstructed vertical clearance of not less than 14 feet. (IFC 503.2.1 as amended) The 26 foot dimension shall extend 20 feet before and after the point of the hydrant.

### SURFACE AND LOAD BEARING CAPACITY OF FIRE APPARATUS ACCESS ROAD

Fire apparatus access roads shall be of an all-weather surface such as concrete, asphalt, or other approved driving surface capable of supporting the imposed load of fire apparatus weighing at least 85,000 pounds or the weight of the heaviest fire response apparatus, whichever is greater. (IFC D102.1)

### HOSE PULL (DISTANCE FROM ENGINE TO BUILDING)

The dimension of 150 feet when used in relation to fire department access is commonly referred to as “hose pull distance.” Hose pull represents the amount of fire hose that firefighters must pull from the engine to reach the structure. This is the maximum distance that firefighters can effectively pull a fire hose or carry other equipment to combat a fire.

Hose pull may not exceed 150 feet from the apparatus to the most remote point of the perimeter of the structure. The hose pull distance is set at 150 feet due to a variety of factors, including standard hose lengths, weight of equipment, hydraulic properties, and accepted operational procedures. Hose pull is measured along the firefighter path of travel, avoiding obstacles, not “as the crow flies.

### HOSE LAY (DISTANCE FROM HYDRANT TO ENGINE)

Hose lay represents the amount of hose that must be laid out of the engine to supply water to the engine from the hydrant. Gates across fire lanes, topography, and other obstructions to firefighting and emergency operations affect hose lay requirements. No point along the portion of the fire lane serving the structure may be farther from a hydrant than the distance specified in IFC Table C102.1. (IFC C102.1, C103.1 as amended)

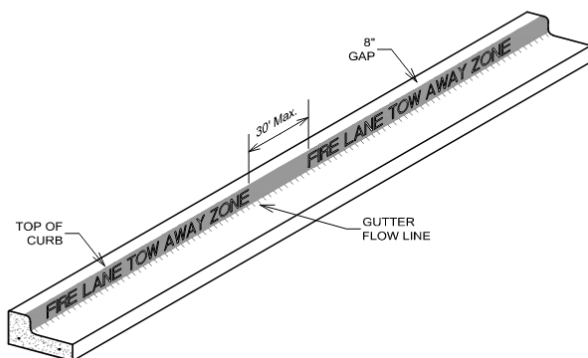
### GATES

The gate(s) shall be an electronic operating gate. Gate(s) shall be of the swinging or sliding type. A single gate serving two-way traffic shall be a minimum unobstructed width of 25 feet. When two gates are installed and each only serves one direction of travel, they shall have 15 feet of clear open width each. . The gate control shall be operable with a Knox Gate Key Switch keyed for Travis County ESD No. 12 and identified with a KNOX sign. A manual override shall require that gates open fully until normal power is restored.

### FIRE LANE MARKINGS

#### NOTE:

Fire lane striping to be 6” wide red paint with “FIRE LANE TOW AWAY ZONE” in 4” tall white letters. Wording may not be spaced greater than 30’ apart. Striping to be painted on the face of curb when present and painted flat on the parking surface when it is not.



Where required by the fire code official, fire apparatus access roads shall be marked as follows: Where curb and guttering exist, all of the fire apparatus access roads shall be painted red and be conspicuously and legible marked with the warning “FIRE LANE – TOW AWAY ZONE” in white letters and at least four inches tall, at intervals not exceeding 35 feet.

Where no curb and guttering exist, fire apparatus access roads shall be marked with permanent “FIRE LANE – TOW AWAY ZONE” signs at intervals not exceeding 50 feet. Signs shall have a minimum dimension of 12 inches wide by 18 inches high and have red letters on a white reflective background. Signs shall be posted on one side or both sides of the fire apparatus road. (IFC D103.6 as amended)

# FIREFIGHTING WATER SUPPLIES

## REQUIRED FIRE FLOW

The minimum fire flow and flow duration shall be determined in accordance with IFC Section B105.2 and Reference Table B105.1(2). The required fire flow for a building shall not exceed the available GPM in the water delivery system at 20 psi. Travis County ESD No. 12 allows for a 50% reduction if buildings are sprinklered as amended. Minimum required flow for all buildings shall be 1500 gpm.

**TABLE B105.1(2)  
REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2**

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute) <sup>a</sup>	FLOW DURATION (hours)
Type IA and IB <sup>a</sup>	Type IIA and IIIA <sup>a</sup>	Type IV and V-A <sup>a</sup>	Type IIB and IIIB <sup>a</sup>	Type V-B <sup>a</sup>		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	3
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m<sup>2</sup>, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code*.

b. Measured at 20 psi residual pressure.

## FIRE FLOW WATER AVAILABILITY

Applicants shall provide documentation of a fire hydrant flow test or flow test modeling of water availability from the local water purveyor if the project includes a new structure or increase in the floor area of an existing structure. Tests shall be conducted from a fire hydrant within 400 feet for commercial projects, or 600 feet for residential development. Only flow tests dated within one year will be accepted. Water availability information may not be required to be submitted for every project.

## HYDRANT SPACING

Where required by Section 507.5.1, a minimum of one (1) hydrant within 300 feet of all portions of exterior walls (lowest point of fire department access). This measurement is taken around the perimeter of the building and down the access road to the hydrant (measurement not taken as a radius). Exception: The fire chief is authorized to accept an increase of up to 10 percent where existing fire hydrants provide all or a portion of the required fire hydrant service. (IFC C103.1 as amended)

## NUMBER OF FIRE HYDRANTS AND DISTRIBUTION

The minimum number and distribution of fire hydrants available to a building shall not be less than that listed in Table C 102.1. (IFC C102.1)

**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

**Table Footnotes:**

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

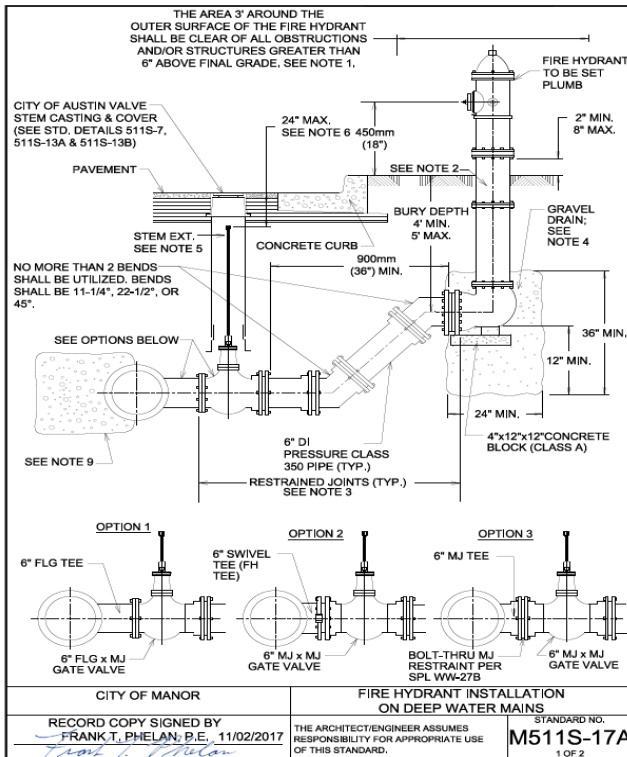
- Reduce by 100 feet for dead-end streets or roads.
- Where streets are provided with median dividers which can be crossed by firefighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant 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.
- 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.
- Reduce by 50 feet for dead-end streets or roads.
- One hydrant for each 1,000 gallons per minute or fraction thereof.

**HYDRANT INSTALLATION**

Fire hydrants must be installed with the center of the 4.5-inch steamer opening at least 18 inches above finished grade. The 4.5-inch opening must face the driveway or street and must be totally unobstructed to the street. Set back from the face of the hydrant to the back of the curb shall be in accordance with all applicable codes and standards. Note that on private property, set back shall be three (3) to six (6) feet to avoid vehicular damage, unless specifically approved by the Fire Chief. (IFC 102.2 as amended)

**PRIVATE FIRE HYDRANTS**

Private fire hydrants shall conform with the City of Manor Standard No. M511s-17A. They shall be painted red in color.



**NOTES:**

- DIMENSION FROM OUTER FACE OF CURB TO OUTERMOST PART OF ANY NOZZLE CAP SHALL BE NOT LESS THAN 5', NOR MORE THAN 6'; NO PART OF A HYDRANT OR ITS NOZZLE CAPS SHALL BE WITHIN 6" OF ANY SIDEWALK OR PEDESTRIAN RAMP, ANY FIRE HYDRANT PLACED NEAR A STREET CORNER SHALL BE LOCATED OUTSIDE THE CURVE RADIUS AND A MINIMUM OF 4' FROM RAMP.
- ONE BARREL EXTENSION NOT EXCEEDING 2' LENGTH MAY BE INSTALLED DIRECTLY BELOW THE FIRE HYDRANT IN ORDER TO MEET THE REQUIRED BURY DEPTH OF 4' TO 5'; BREAK AWAY BOLTS (SHOE TYPES) SHALL BE PROPERLY SPACED AND PLACED.
- FIRE LINE SHALL HAVE ALL JOINTS RESTRAINED FROM MAIN TO FIRE HYDRANT. JOINTS SHOWN MAY VARY. SEE SPL WW-27, WW-27A, AND WW-27B FOR RESTRAINT OPTIONS.
- BELOW EACH HYDRANT, A DRAINAGE PIT 2' IN DIAMETER AND 1' DEEP SHALL BE EXCAVATED AND FILLED WITH COMPACTED COARSE GRAVEL OR BROKEN STONE MIXED WITH COARSE SAND UNDER AND AROUND THE BOWL OF THE HYDRANT, AND TO A LEVEL 6" ABOVE THE HYDRANT DRAIN OPENING (SEE STD. SPEC. 510). THE HYDRANT DRAINAGE PIT SHALL NOT BE CONNECTED TO A SANITARY SEWER. THE DRAIN GRAVEL SHALL BE COVERED WITH FILTER FABRIC TO PREVENT BLOCKAGE OF VOIDS IN THE GRAVEL BY MIGRATION OF BACKFILL MATERIAL. THE BOWL OF EACH HYDRANT SHALL BE WELL BRACED AGAINST UNEXCAVATED EARTH AT THE END OF THE TRENCH TAKING CARE NOT TO OBSTRUCT THE HYDRANT DRAIN HOLES, IF THE HYDRANT LEAD IS NOT RESTRAINED TO THE MAIN.
- WELD SOCKET 2-1/2" x 2" TO 1" SCH. 40 ROUND STEM EXTENSION, FIT ON OPERATING NUT. USE SCH. 50 ROUND STEM EXTENSION FOR LENGTHS OVER 10'. VALVE STEM EXTENSIONS SHALL CONSIST OF A SINGLE PIECE OF REQUIRED LENGTH WITH A SOCKET ON ONE END AND A NUT ON THE OTHER.
- VALVE STEM EXTENSIONS ARE REQUIRED ON ALL VALVES THAT EXCEED 3' DEEP FROM FINISHED GRADE. VALVE STEM EXTENSIONS SHALL BE PLACED SUCH THAT THE EXTENSION NUT IS BETWEEN 18" AND 24" FROM FINISHED GRADE.
- FOR FIRE HYDRANT LEADS AT A MAIN OUTLET LARGER THAN 6" DIAMETER, OUTLET SHALL BE FLANGED AND A FLANGE x FLANGE REDUCER SHALL BE INSTALLED DIRECTLY ON THE OUTLET.
- WRAP 8 mil POLYETHYLENE WRAP ON ALL BURIED PIPE AND FITTINGS.
- THRUST BLOCKING REQUIRED FOR PIPE SIZE & SOIL CONDITION (SEE STD. DETAIL 510-6)
- STEAMER NOZZLE TO BE 4.5" NST FIRE THREAD CONNECTION.
- FIRE HYDRANTS SHALL BE PAINTED RED.

CITY OF MANOR	FIRE HYDRANT INSTALLATION ON DEEP WATER MAINS
RECORD COPY SIGNED BY FRANK T. PHELAN, P.E., 11/02/2017	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.
STANDARD NO. <b>M511S-17A</b>	1 OF 2

**REFLECTIVE FIRE HYDRANT MARKERS**

Fire hydrant locations shall be identified by the installation of blue reflective markers. 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.

**PHYSICAL PROTECTION OF FIRE HYDRANTS**

Where fire hydrants are subject to impact by a motor vehicle, guard posts, bollards or other approved means of protection shall be provided. (IFC 312, 507.5.6)



## **CLEAR SPACE AROUND FIRE HYDRANTS**

A 3-foot clear space shall be maintained around the circumference of fire hydrants. (IFC 507.5.5)

## **FIRE DEPARTMENT CONNECTIONS (FDC)**

FDC's shall be located in accordance with the following:

- The FDC(s) shall be located so that when in-use, the fire apparatus and hose connections to the FDC and to the supply hydrant will not obstruct access to the building for other fire apparatus. (IFC 912.2)
- FDC(s) shall be located on street side of building or facing approved apparatus access roads. (IFC 912.2.1)
- The FDC(s) shall be within 100 feet of a fire hydrant as required locally. (IFC 912.2)
- The FDC(s) shall be wall-mounted on the building it serves or be remotely located (IFC 912.2)
- FDC(s) shall be installed at a height between 24 inches and 48 above grade (IFC 912.2.1)
- The FDC(s) shall be fully visible, and recognizable from the street or nearest point of the fire department vehicle access or as otherwise approved (IFC 912.2.1)
- Where the FDC(s) is/are subject to impact by a motor vehicle, bollards or other vehicle impact protection must be provided in accordance with IFC 312. (IFC 912.4.3)
- The FDC(s) shall be provided with Knox Locking Caps as required locally. (IFC 912.4.1)