

# Fire Department Access & Water Supply



Lieutenant Donna A. McGuire

## Fire Access and Water Supply -- NFPA 1, Chapter 18

- Fire has existed since the dawn of Humankind.
- The destructive force of fire has long been documented, researched, experienced, and **feared**.
- Building construction features and fire safety systems are the first line of defense from morbidity and mortality.

Fire Safety has been broken down into two key questions...

- Someone thought... what can we do to prevent fires?
- Someone else thought... how can we save lives when a fire breaks out?

Solution;

The creation of "THE FIRE MARSHAL"

- Significant tragedy drives code improvements and changes.
- Humankind must learn from its mistakes

**The Anne Arundel County Fire Marshal Reviews Site Plans and Building Plans for EVERYONE'S benefit**

### **Major Factors**

Building Construction **was** heavy timber with furnishings made of natural materials.

**Now** Building Construction is of lightweight materials, and the furnishings are made from synthetic and toxic materials.

- This transition in materials creates faster burning, hotter burning, & more toxic effluent than fires of the past.
- You have LESS time to safely get out of a building on fire.
- Many deaths have been attributed to a lack of code compliance.
- Fire Access issues and Water Supply shortfalls can lead to injury and DEATH.

There is a false sense of security with automatic sprinkler protection:

- Most sprinkler systems are not designed to put a fire completely out.
- Sprinklers are designed to give occupant time to get out of a building alive.
- Sprinklers buy the fire department time to attempt rescue & extinguishment.

**The following provides images and facts about how unobstructed fire access & adequate water supply helps save lives and property**

# **CHAPTERS**

- 1. Obstructions to Fire Department Access Roadways**
- 2. Parked Vehicles**
- 3. Setbacks and Building Separation**
- 4. Hydrants**
- 5. Drafting Tanks**
- 6. Open Water Drafting**
- 7. Critical Flow Rate/ Fire Flow**
- 8. Access to the Rear of Buildings**
- 9. FD Turn-Arounds “T”, “Y”, & “Cul-de-sac”**
- 10. Structures Burn- Fireground Needs**
- 11. Parking Restrictions**

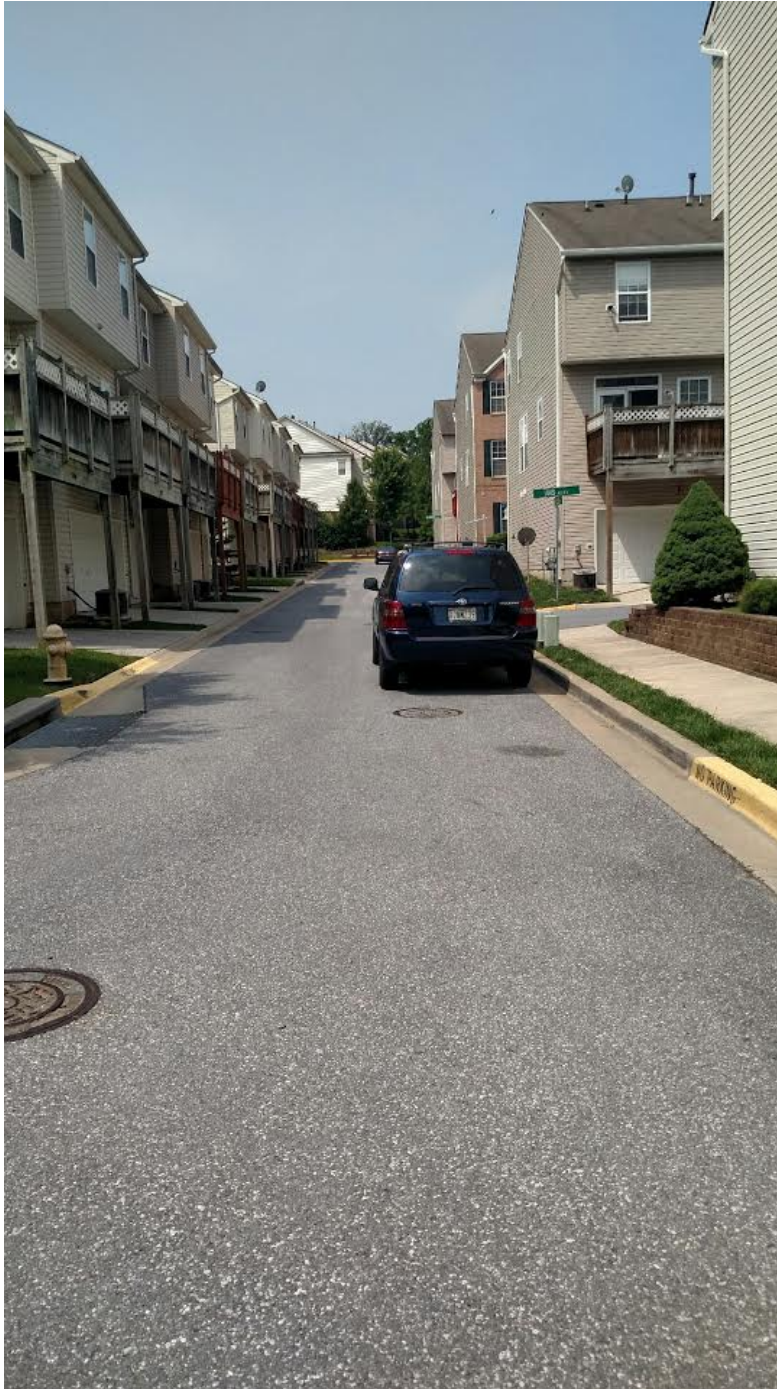
## 1. Obstructions to FDAR's

- Increases response time
- Limits apparatus positioning
- Increases distance to Water Supply from a hydrant
- Limits ability of vehicles to get out of the FD's way
- Changes firefighting tactics
- Places additional exposures & hazards upon firefighters



(Parole Towne Center 2016)

## 2. Parked Vehicles



Limit ability to hook up to a hydrant

Limit apparatus entry

Limit Equipment/  
tool deployment

Create longer dead ends

Eliminate ability to turn down roadways

Block FDC's



(Truck 29- 11/2018 Box Alarm)

Civil Citations were issued to all vehicles – Enforcement actions are TOO LATE!!



**MD Vehicle law TR21-1003.**

### 3. SETBACKS & BUILDING SEPERATION



Radiant Heat

Liquids Flowing

Pump Operator  
Exposures

Apparatus Damage

Apparatus Positioning  
is limited

Loss of adjoining  
structures



A single parked vehicle can cut off neighborhood access



Opposing traffic- delays and limitations

Box truck is wider than a sedan

Citizens may fail to park at the curb legally (12in of edge) TR 21-1004

Roads must be 24 foot wide for two way travel

## 4. HYDRANTS



(Sign Post blocks hydrant wrench)

- Proper Distance to curb or pavement edge (6 feet), DPW= “adjacent”
- Proper Height (Steamer greater than 18” above grade)
- Water Mains shall be capable of supplying adequate fire flow
- Hydrant Spacing; Determined by development type (300, 500, 750)
- Hydrant Coverage; Within 400 feet all exterior portions of every structure
- Linear measurements; Radial measurements are **never** practical
- Adequate amount of hydrants for aggregate fire flow

## 5. Underground Draft Tanks



Provide On-Site water supply

Must remain unobstructed

Tested twice a year

Sized between;

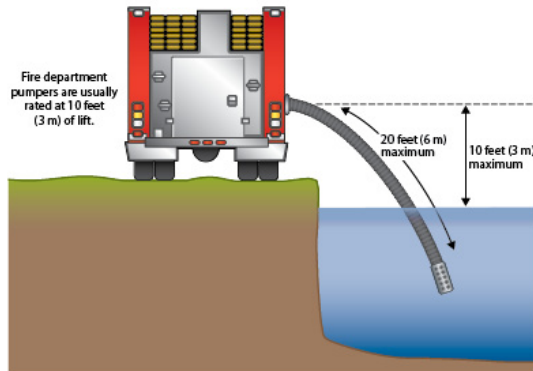
5,000 – 100,000 gallons

(Reference the I64/ I64A - DPW  
design manual)

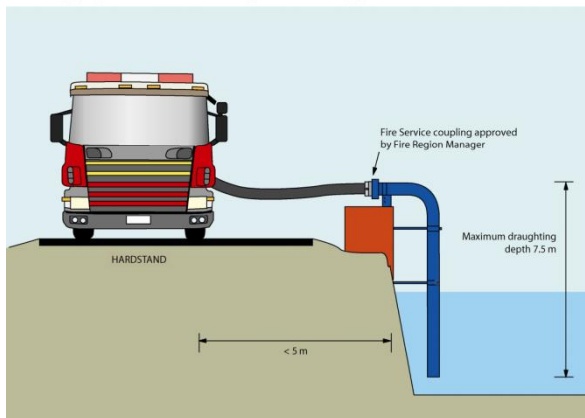


- Found in areas without a water distribution system

## 6. Open Water Drafting



Source: Coral Springs Regional Institute of Public Service Driver-Engineer Workbook; used with permission.



### Tanker Operations



## Accessibility of Water

### Problems;

1. Inability to reach the water source with the fire engine
2. Inadequate depth of the water source
3. Freezing weather
4. Tide conditions and changes
5. Mud, silt, and debris
6. Wet or soft ground conditions
7. Boats or lifts blocking ramps
8. Maximum vertical lift for pumpers
9. Must meet “50 year drought” conditions



Childs Point Fatal Fire- 16,000sq' House

## 7. Critical Flow Rate (CFR)

- Every gallon of water applied to a fire removes about 8,000 BTU. (One BTU is the amount of heat energy needed to raise the temperature of one pound of water by one Fahrenheit degree)
- One gallon per minute removes approximately 500,000 BTU's of heat from the fire per hour.
- One GPM would take away the heat produced by five gas-fired, house heating furnaces.

If water is applied below the CFR, the fire will not be darkened.

### Fire Flow Calculations

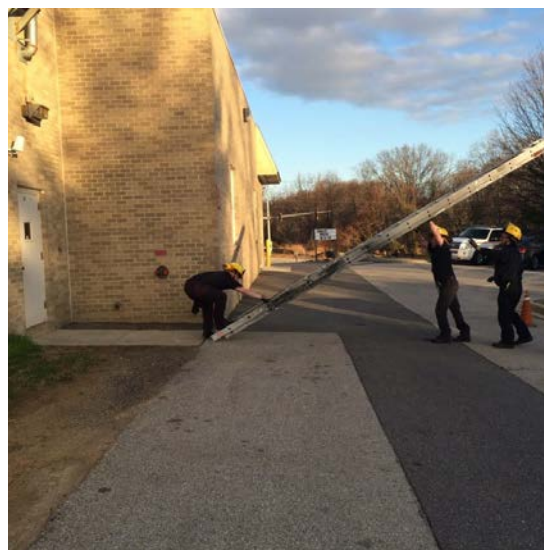
NFPA 1, Chapter 18

Minimum GPM required = [Length x Width (in feet)]/3. (NFA)



## 8. Access to the Rear of Buildings

- Ground ladder deployment
- Hose drag
- Must be without obstructions (look at the fence & SWM pond above)
- Master Stream positioning
- Occupant rescue
- Exposures
- Utility Shut off
- Stretcher movement
- Firefighter Evacuation



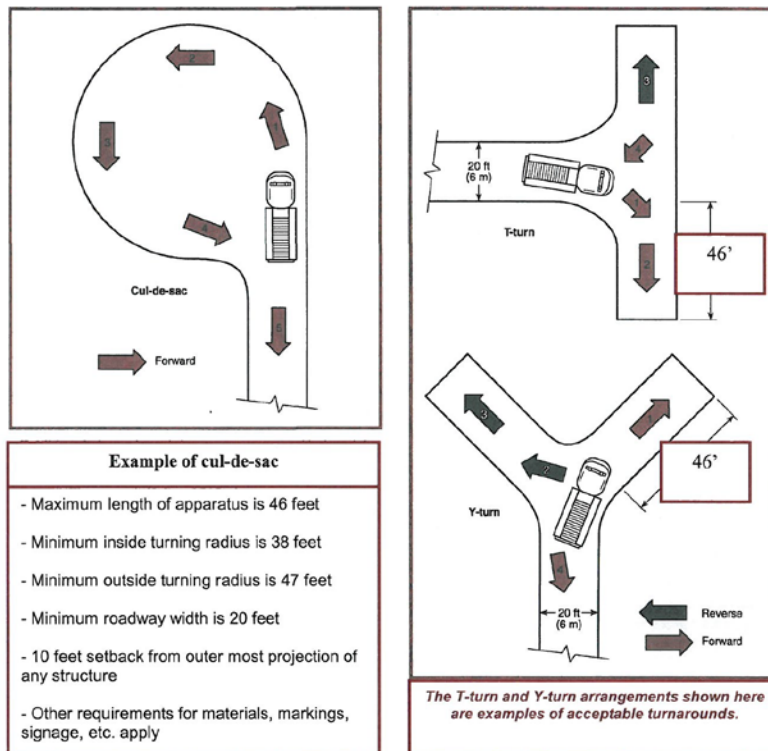
Station 40, 35' 2 section ladder

## 9. FD Turn-Arounds; “T” “Y” & “Cul de sac”

- Eliminate dead end road lengths
- Allow necessary positioning of apparatus
- Approximately 80 percent of FD accidents occur while backing
- Permits hose drag to structures
- Designed to accommodate typical fire department equipment

### ANNE ARUNDEL COUNTY FIRE DEPARTMENT FIRE MARSHAL DIVISION

Examples of acceptable turn-arounds



(Not to Scale)

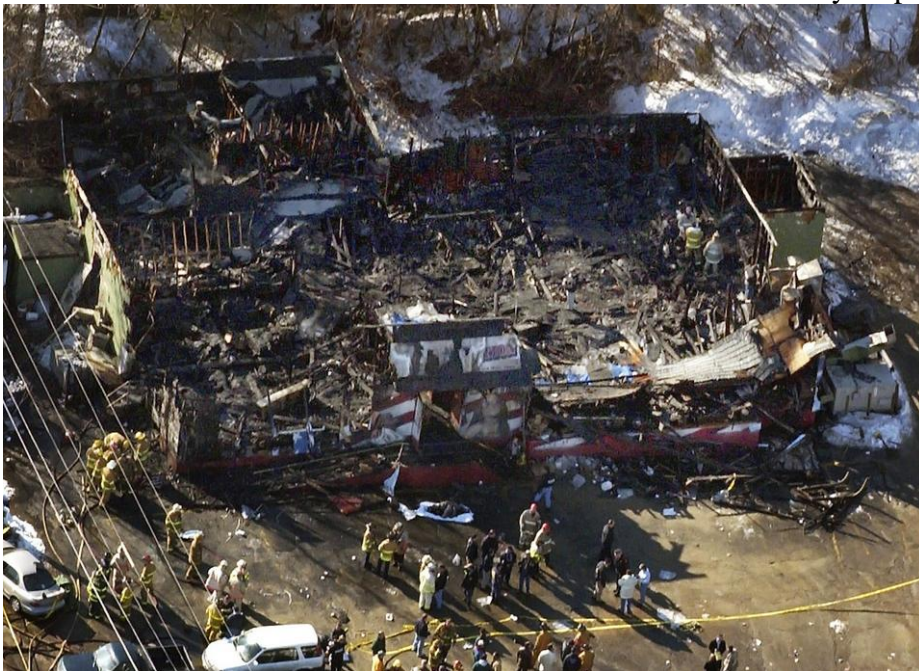
## 10. Structures Burn



Tent



AA County Triple Fatal- Group home fire 2018



Station Nightclub (100 dead)



“Fuse 47” 4/24/2017 P.G. County  
51 Million Dollar Loss

## Supply Hose

(Why we need room to work...)

- Supply Hose is needed for **each** attack pumper and aerial apparatus
- Fire Flow Rate must be adequate or structure will be lost
- Apparatus positioning is key for water application
- Firefighters must be able to work out of apparatus compartments
- Tools and Equipment are large and heavy



(Fatal in Boston 11/21/17)

### **Attack Lines-**

FOUR (4) for every fire at Minimum\*

1. Primary attach
2. Back- up line
3. Charlie Side
4. Rapid Intervention



Aerial Outriggers



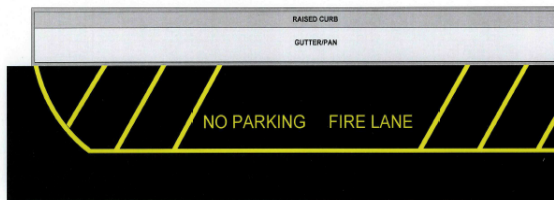
Intersections



# 11. Parking Restrictions

Parking Restrictions (help) ensure adequate access

- NFPA 1 requires 20 feet in width without obstructions
- Developments are permitted to have narrow road widths but shall prohibit on-street parking via signs and pavement markings
- Fire access roadways are required for residential and commercial developments
- Fire department access roadways (FDAR) include both public and private roadways



Letter & Striping Dimensions

- ALL STRIPING** - minimum 6" thick lines
- OUTER LINE** - 3' from curb edge or road edge
- ENDS of DESIGNATED AREA** - can be curved/rounded or boxed
- ANGLED LINES** - 6' apart except where lettered graphics are placed
- NO PARKING FIRE LANE graphic** - minimum 8" high, 2" cut out, at
- NO PARKING FIRE LANE signs** - per standard detail- At each end of with additional signs as needed at 100 ft. spacing

ANNE ARUNDEL COUNTY  
FIRE DEPARTMENT  
FIRE LANE SIGN STANDARD DETAIL



- Sign material and lettering shall be engineering grade/reflective
- Graphics and border shall be RED on WHITE background
- Font shall be Highway-style B or C as indicated
- Sign shall be installed 7 ft above grade
- Arrows on the ends should point in only one direction toward the fire lane. Signage within the fire lane should show arrows pointing in both directions.



28 feet = One Sided Parking

36 feet = Two Sided Parking

Less than 28 feet = No on-street parking