City of Santa Clara
The Center of What's Possible

SANTA CLARA FIRE DEPARTMENT
FIRE PREVENTION & HAZARDOUS MATERIALS DIVISION
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FIRE DEPARTMENT EMERGENCY APPARATUS ACCESS

This standard is a summary of Fire Department clarifications of City and State Codes. Information contained herein applies to typical circumstances and may not address all situations.

PURPOSE:

This standard is intended to provide detailed instruction for installing and maintaining adequate, unobstructed fire department access roadways for emergency vehicles and emergency personnel to buildings, structures, complexes, subdivisions or other developments as required by the California Fire Code and City of Santa Clara Fire Department Standards.

DEFINITIONS:

Fire Apparatus Access Road – The means for emergency equipment and personnel to access a building or facility for emergency purposes. Roadways must extend to within 150 feet of all portions of the exterior of the ground floor of any structure and must meet specified criteria for width, pavement characteristics, roadway gradient, turning radius, etc. Extenuating circumstances, increased hazards, and additional fire safety features may affect these requirements.

Fire Lane Identification – Fire lane identification will be required when it is necessary to restrict parking of vehicles in order to maintain the required width of fire access roadways for emergency vehicle use. Unlawful use of fire lanes will be enforced by the local law enforcement agency in accordance with California Vehicle Code, Section(s) 22500-22526.

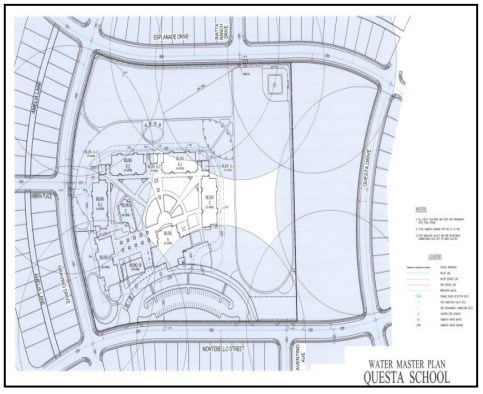
Knox Systems – Knox systems are used to secure keys for buildings or protect fire protection system components. All Knox systems are only accessible to fire department personnel.

Traffic Calming Devices - Traffic calming devices include: speed bumps, humps, dots, round-a-bouts, bollards, etc. and are not permitted on any fire access road, unless specifically approved by the Fire Prevention and Hazardous Materials Division.

A. PLAN SUBMITTIAL REQUIREMENTS:

1. Construction documents must be submitted to the Fire Prevention and Hazardous Materials Division as part grading or civil review and approval process. Depending on the scope of the development more detailed construction documents may be required to be submitted to the Fire Prevention and Hazardous Materials Division:

a. Fire Apparatus Access Roadways	f. Fire Hydrants (public & private)
b. Fire Lane Identification	g. Fire Department Connection(s)
c. Gates and Bollards	h. Post Indicator Valve (PIV)
d. Access Walkways/Ladder Pads	i. Other Fire Protection Equipment
e. Addresses	j. Knox Systems



B. TIMING OF INSTALLATION:

When fire apparatus access roads are required to be installed, such improvements shall be installed and made serviceable prior to and during the time of construction, except when alternative methods of protection are approved by the Fire Prevention and Hazardous Materials Division.

C. FIRE DEPARTMENT ACCESS ROADWAY REQUIREMENTS:

Fire apparatus access roadways shall be provided for every facility, building, or portion of a building hereafter constructed or moved when any portion of an exterior wall of the first story of the building is located more than 150 feet from fire apparatus access as measured by an approved route around the exterior of the building. The dimension of 150 feet in relation to fire department access is commonly referred to as hose pull distance. Hose pull is measured along a path that simulates the route a firefighter may take to access all portions of the exterior of a structure from the nearest fire access road. All obstructions such as fences, planters, vegetation, topography, and other structures must be considered when determining whether the building is accessible from a particular location on the fire access roadway (**see Figure 1 of this standard for details**).

1. **Multiple Access Points**:
   A. **Commercial & Industrial Developments**: Buildings or facilities having a gross building area of more than 62,000 square feet shall be provided with two separate and approved fire apparatus access roads.

   B. **Multi-Family Residential Developments:** Multiple-family residential project having more than 100 dwelling units shall be provided with two separate and approved fire access apparatus roads

   C. **Remoteness**: Where two access roads are required they shall be placed a distance apart equal to not less than one half the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses.

2. **Aerial Apparatus**
   Buildings or facilities greater than 30 feet in height shall have fire apparatus access constructed for use by aerial apparatus. At least one of the required access routes meeting this condition shall be located with a minimum of 15 feet and a maximum of 30 feet from the protected building, and shall be positioned parallel to one entire side of the building as determined by the Fire Prevention and Hazardous Materials Division.

2. **Width**
   The minimum width of a fire access roadway is 26 feet.

   Exception:
   1) Building which do not exceed 30 feet in height, and/or not required to have private fire hydrants may be a minimum of 20 feet in width.

3. **Parking**
   No parking is permitted on streets narrower than 32 feet in width. Parking on one side is permitted on a private roadway that is at least 26 feet but less than 38 feet in width. Parking on two sides is permitted on a private roadway 38 feet or more in width (**see Figures 2 & 3 of this standard for details**).

4. **Vertical Clearance**
   Fire access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches. Aerial apparatus access roads may require additional vertical clearance as determined by the Fire Prevention and Hazardous Materials Division (**see Figure 4 of this standard for details**).

5. **Surface**
   A paved surface designed and maintained to support the imposed load of fire apparatus with a gross vehicle weight of 75,000 pounds.

6. **Grade**
   The grade for access roads shall not exceed 10 percent to facilitate fire ground operations. The grade may be increased to a maximum of 15 percent for approved lengths of access roadways, when all of the structures served by the access road are protected by automatic fire sprinkler systems with approval of the Fire Prevention and Hazardous Materials Division.

7. **Approach & Departure Angles**
   The angle of approach shall not exceed 12.0 degrees, angle of departure 10.0 degrees and breakover angle 5.82 degrees, unless approved by the Fire Prevention and Hazardous Materials Division (**see Figure 5 of this standard for details**).

8. **Turning Radii**
   The minimum inside turning radius for fire access roads shall be 36 feet or greater.

9. **Dead-End Access Roadways**
   Dead-end fire access roads in excess of 150 feet in length (measured from the curb perpendicular to the roadway) shall be provided with an ***approved*** turning around. Turnarounds are ***approved*** on a project-by-project basis depending on various factors, including but not limited to, fire department access, engineered fire protection, and project design.

   The final determination of acceptable configuration is made by the Fire Department not the project design team.

10. **Bridges & Culvert**
    Where a bridge or culvert crossing is part of a fire apparatus access road, the bridge shall be constructed and maintained in accordance with AASHTO HB 17. Bridge and culvert crossings that serve as part of fire apparatus access roads shall be designed for a live load of a minimum 75,000 pounds gross vehicle weight. Vehicle load limits shall be posted on both entrances to the bridge and/or culvert crossing when required by the Fire Marshal.

11. **Traffic Calming Devices**
    Traffic calming devices are not permitted on any designated fire access roadway, unless approved by the Fire Prevention and Hazardous Materials Division, which includes speed bumps, humps, dots, round-a-bouts, bollards, etc.

D. PREMISE IDENTIFICATION:

1. See the Santa Clara Fire Department, Premises Identification/Addressing standard for specific details.

E. FIRE LANE IDENTIFICATION:

1. Fire apparatus access roads shall be marked with permanent signage "NO PARKING-FIRE LANE – CVC 22500.1". In only specific circumstances signage with "NO STOPPING-FIRE LANE – CVC 22500.1" may be used upon approval. Signs shall have a minimum dimension of 12 inches wide by 18 inches high and have red letters on a white reflective background. The word "NO" shall be presented in a reverse color arrangement in the upper left-hand corner. Signs shall be posted on one or both sides of the fire apparatus road as required (**see Figure 6 of this standard for details**).

2. All designated fire lanes with raised curbs shall be painted red. "NO PARKING – FIRE LANE" or "NO STOPPING – FIRE LANE" shall be in white paint, 6 inches in height with a minimum 1-inch stroke, except curb heights less than 6 inches may have reduced letter sizes for the vertical signage on the curb, but shall not be less than 4 inches. Lettering shall be painted at an interval of every 25 feet (**see Figure 6 of this standard for details**).

3. Property owners shall not designate and/or identify any roadway on their property as a fire lane without prior approval from the Fire Prevention and Hazardous Materials Division. All signs and curb markings are to be installed and maintained by the property owner.

   Exception:
   1) Alternative fire lane signage may be considered on a case-by case basis.

F. ACCESS TO FIRE HYDRANTS:

Fire hydrants located on a public or private roadway shall have an unobstructed clearance of not less than 30 feet (15 feet either side of the fire hydrant) in accordance with California Vehicle Code 22514. Fire land signage in compliance with California Vehicle Code 22500.1 shall be provided as noted above.

G. GATES AND BOLLARDS:

The Fire Prevention and Hazardous Materials Division shall review plans for all new access gates, bollards or barriers that may impede emergency vehicle or personnel access to a structure or facility. All electric automatic opening gates shall be equipped secondary power source to function during power loss.

1. **Gates**
   Openings for access gates located across fire apparatus access roads shall be a minimum of 20 feet of clear width, and shall provide a minimum unobstructed vertical clearance of 13-feet, 6 inches **(see Figure 7 of this standard for details)**.

   1) **Automatic Gates**
      All gates installed on designated fire department access roads are required to electrically automatic powered gates. Gates shall be provided with an emergency battery power supply, or shall be a fail-safe design, allowing the gate to be pushed open without the use of special knowledge or equipment.

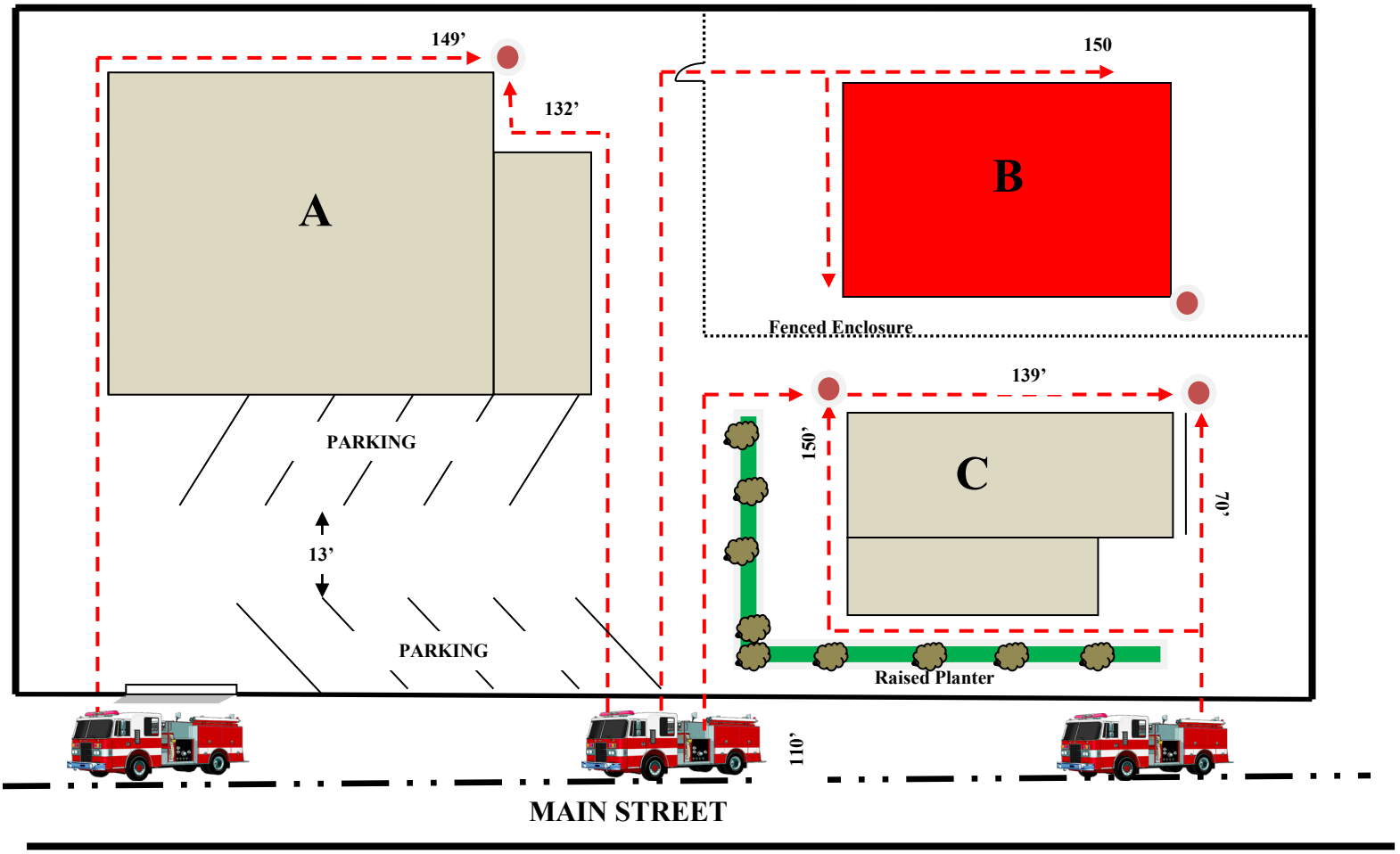
      To control the automatic gates a detector/strobe switch shall be installed to allow emergency vehicles (e.g., fire, police, ems) to flash a vehicle mounted strobe light towards the detector/strobe switch, which in turn overrides the system and opens the gate. The gates shall be equipped with a TOMAR Strobe Switch or 3M OPTICOM Detector to facilitate this override. Said device shall be mounted at a minimum height of seven-feet (7') above the adjacent road surface and is subject to an acceptance test witnessed by the Fire Department prior to final approval of the project.

   2) **Manually Operated Gates – Construction Sites**
      Manual gates and barrier shall be provided with Knox Padlocks, Model 3770 manufacturer by the Knox Company **(see Knox Systems Installation standard for detailed information)**. The Knox padlocks are used to secure manually operated gates or barriers and can be used in conjunction with the property owner's padlock to allow access for both property owners, as well as emergency responders. This access control system requires testing by the Fire Prevention and Hazardous Materials Division prior to final approval of the project **(see Knox Systems Installation standard for detailed information)**.

2. **Bollards**
   Bollards on emergency vehicle access roadways shall be constructed of steel not less than 6 inches in diameter. Spaced not less than 6'- 6" inches feet between posts on center. The center bollard or bollards shall be automatic retractable pneumatic type. The bollard(s) shall fail in the retracted position upon loss of power (**see Detail 8 – Pneumatic Bollard Installation**).

   To control the automatic pneumatic bollard(s) a detector/strobe switch shall be installed to allow emergency vehicles (e.g., fire, police, ems) to flash a vehicle mounted strobe light towards the detector/strobe switch, which in turn overrides the system and retracts the bollard(s). The bollard(s) shall be equipped with a TOMAR Strobe Switch or 3M OPTICOM Detector to facilitate this override. Said device shall be mounted at a minimum height of seven-feet (7') above the adjacent road surface and is subject to an acceptance test witnessed by the Fire Department prior to final approval of the project.

FIGURE 1 – Fire Department Perimeter Access



<u>Informational Guidance</u>:
Assume that the parking lot is not accessible to fire apparatus due to the turning radii and fire lane widths less than the required minimums:

1. All portions of building "A" are within 150' of the public road as measured along the path of firefighter travel.

2. Building "B" is not accessible; the presence of a fence enclosure forces firefighters to backtrack once they pass through the gate, increasing their travel distance beyond 150'.

   a. On-site fire apparatus access roadways or a change in the location of the gate would be necessary to provide access to Building "B".

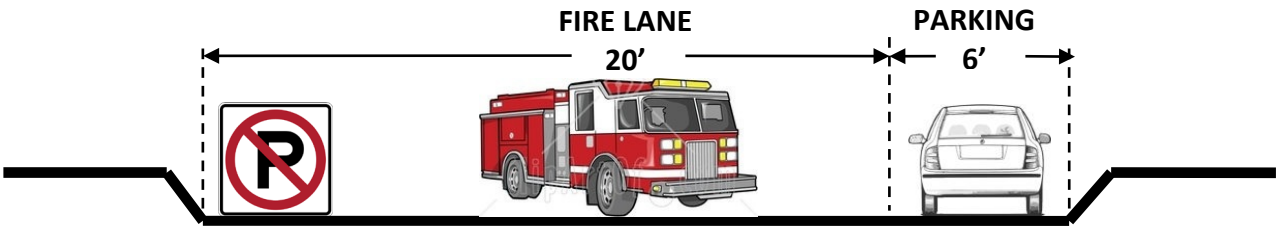
3. Building "C" is also accessible despite the obstruction posed by the raised planter.

<u>Legend</u>:

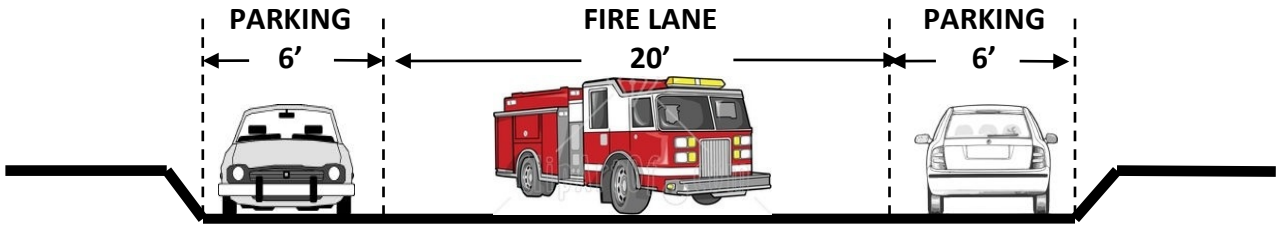
● *-Denotes furthest point on the exterior of the building as measured along the path of firefighter travel around the exterior of the building.*

FIGURE 2 – Engine Road Width

Roadway less than 26’
***Parking is prohibited and roadway is required to be posted as a fire lane.**



Roadway at least 26’ but less than 32’
***Roadway is required to be posted as a fire lane on at least one side.**



Roadway 32’ or wider
***Parking is permitted on both sides of the roadway.**

<u>Informational Guidance</u>:

- Minimum road width shall be 26 feet when fire hydrants are installed along access roads.
- Dead end access road in excess of 500 feet in length shall have a width of not less than 26 feet.

FIGUIRE 3 – Aerial Access Road Width

Roadway less than 26’
***Parking is prohibited, and roadway is required to be posted as a fire lane.**

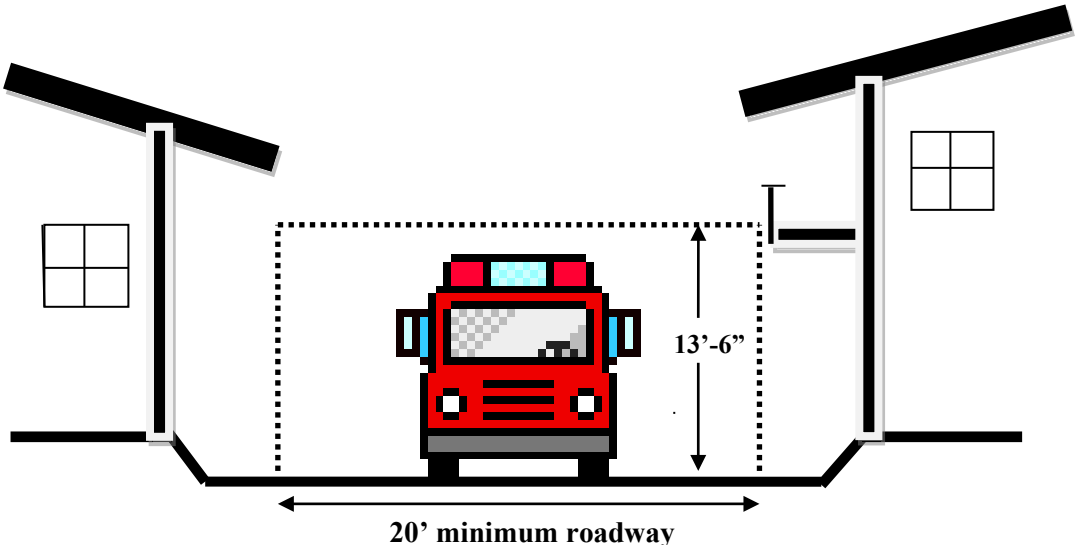
Roadway at least 26’ but less than 32’
***Roadway is required to be posted as a fire lane on at least one side.**

Roadway 38’ or wider
***Parking is permitted on both sides of the roadway.**

<u>Informational Guidance</u>:

- All dimensions are minimums from face-of-curb to face-of-curb, exclusive of shoulders or rolled curbs.
- Aerial apparatus access roads may require additional width as determined by the Fire Prevention and Hazardous Materials Division.

FIGUIRE 4 – Vertical Clearance

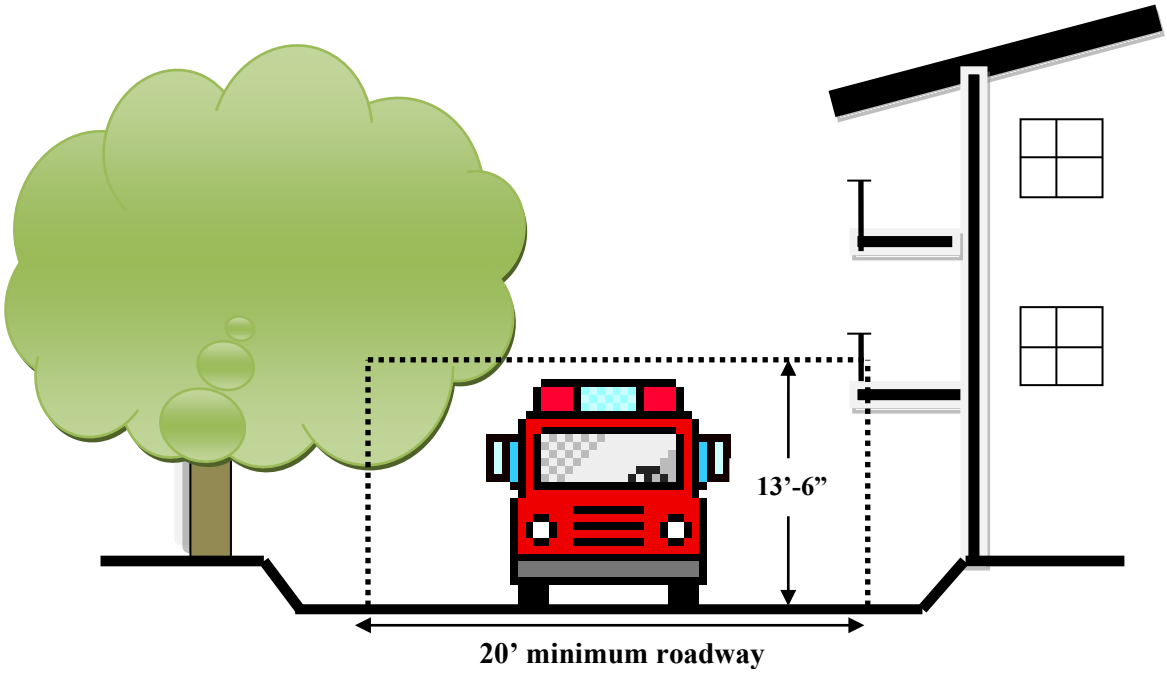


PROPER CLEARANCE PROVIDED

Eaves, balconies, and other obstructions do not encroach upon the 20’ wide by 13’-6” high fire access roadway envelope.

Exception:

1. Aerial apparatus access roads may require additional vertical clearances as determined by the Fire Prevention and Hazardous Materials Division.



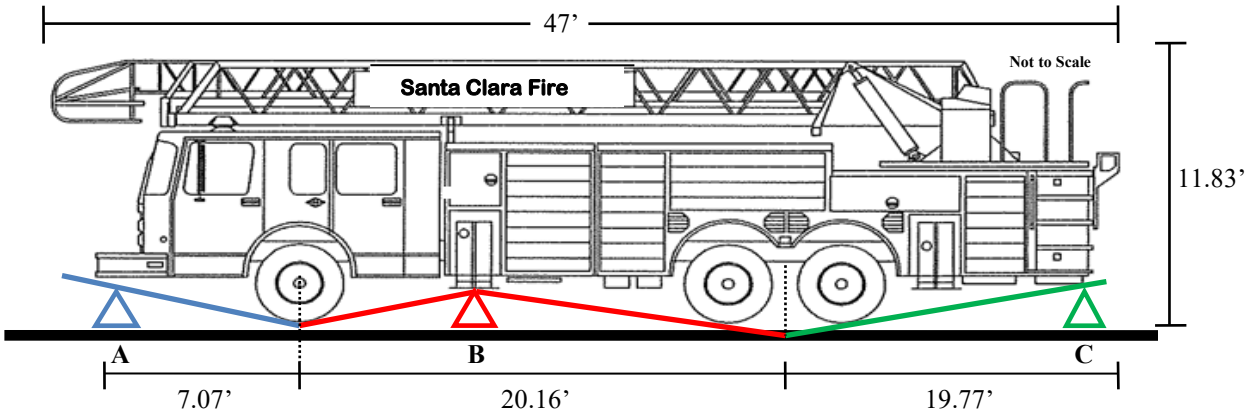
INSUFFICIENTCLEARANCE

A 20’ wide roadway has been provided, but eaves and vegetation effectively reduce the clear dimension below required minimums.

FIGURE 5 – Apparatus Specifications

PURPOSE:

The apparatus illustration noted below is not to scale and reflects a compilation of the most restrictive elements of our emergency vehicle fleet. The design of all fire access roadways utilizing Autoturn, or similar computer modeling software, require a formal written submittal be made showing the roadway design meets and/or exceeds the requirements outlined in the California Fire Code, as amended by local ordinance. Any and all deviations from the minimum requirements shall be approved by the Fire Marshal.



APPARATUS SPECIFICATIONS:

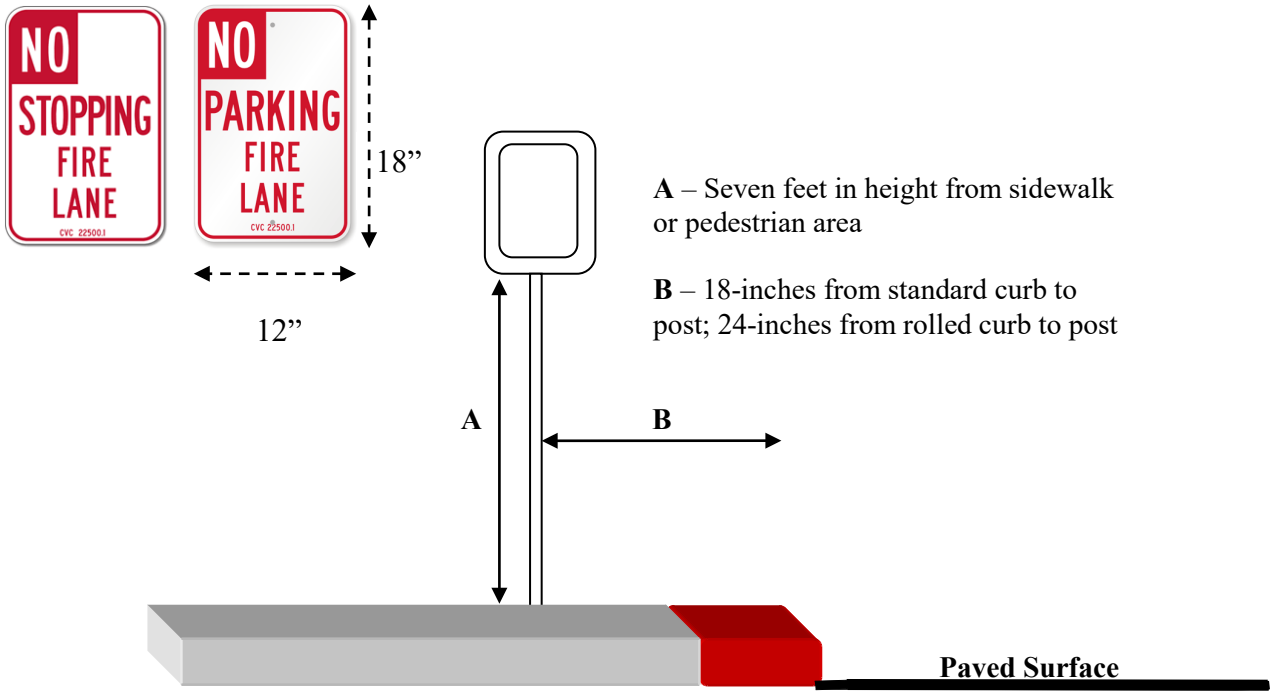
- Length: 47.0 feet
- Width: 9.5 feet (mirror-to-mirror)
- Height: 11.83 feet
- Front Bumper to Front Axel: 7.07 feet
- Rear Axle to Rear Bumper 19.77 feet
- Wheelbase: 20.16 feet
- Turning Radius: 46.25 feet
- Gross Vehicle Weight (GVW) 75,000 pounds
- Angle of Approach (maximum): 12.0 degrees (noted as "A" above)
- Angle of Departure (maximum): 10.0 degrees (noted as "B" above)
- Breakover Angle (maximum): 5.82 degrees (noted as "C" above)

FIGURE 6 – Fire Lane Identification

STANDARD CURB DETAIL:

ROLLED CURB DETAIL:

SIGN INSTALLATION DETAILS:



Informational Guidance:

- Signs may be mounted on existing posts, fences or buildings, if post, fence, or building is no more than 24 inches from the curb or edge of road surface.

FIGURE 7 – Gate Clearance & Access

Manual Gate Construction Site

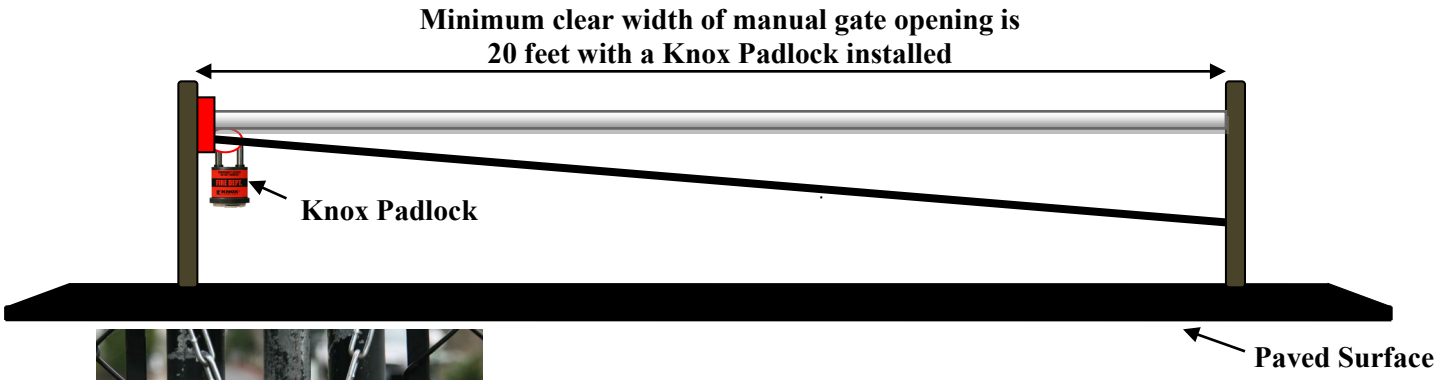
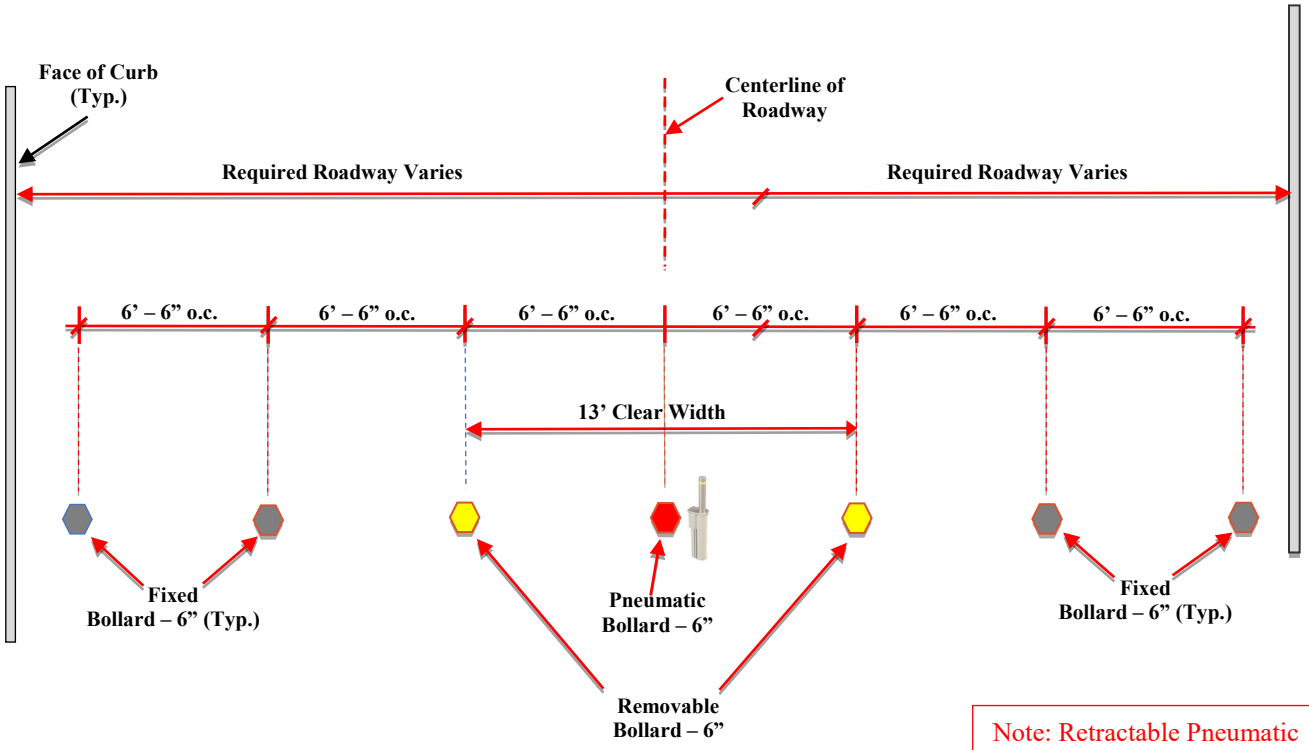
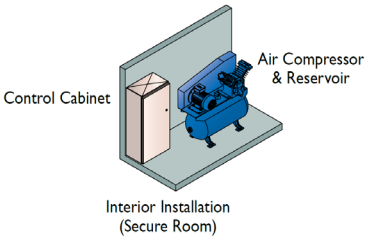


FIGURE 8 – RETRACTABLE PNEUMATIC BOLLARD DETAIL



*Other installation configurations with multiple pneumatic bollards may be acceptable.

Note: Retractable Pneumatic bollard(s) are required to be equipped with Opticom Detector or TOMAR Strobe Switch.



FIRE DEPARTMENT ACCESS ROUTE (ENTRY/EXIT)

METAL BOLLARDS ADJACNET TO PNEUMATIC BOLLARDS