

# Orange City Fire Department

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## Fire Master Plans for Commercial & Residential Development



# Fire Master Plans for Commercial & Residential Development

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## PURPOSE

The effectiveness of emergency response and firefighting operations is directly related to the proper installation and maintenance of fire access roadways, the proper sitting of hydrants, adequate water supply, and access to structures. This document is a general guideline pertaining to the creation and maintenance of fire department access roadways, access walkways to and around buildings, laddering to emergency escape and rescue windows, and hydrant quantity and placement as required by the 2022 California Fire and Building Codes (CFC and CBC) and as amended by local ordinance. This guideline includes requirements for:

- Plan submittal
- Fire access roadway design
- Fire lane identification
- Premises identification
- Fire lane obstructions
- Access for residential development
- Alternative engineered fire access systems
- Access requirements in Very High Fire Hazard Severity Zones
- Hydrant quantity, spacing, placement, and identification
- Water availability and fire flow
- Access to structures
- Laddering to emergency escape and rescue windows
- Access during construction

## SCOPE

These guidelines apply to new, remodeled, reconstructed, or relocated residential or commercial structures and developments to which emergency response may be necessary. The information contained in this document is intended to assist the applicant in attaining compliance and to ensure that privately owned roadways necessary for emergency response purposes will be available for use at all times.

The following definitions are provided to facilitate the consistent application of this guideline:

*Access Walkways* - An approved walking surface leading from fire access roadways to exterior doors, the area beneath rescue windows, and other required openings in structures.

*Bollards* - Permanent or removable poles that are placed across a roadway for the purpose of restricting vehicular access to a portion of a site or to protect a piece of equipment from potential vehicular damage. Bollards are not permitted across a fire access roadway.

*Fire Apparatus Access Roads* - The means for emergency apparatus to access a facility or structure for emergency purposes. Roadways must extend to within 150 feet of all portions of the exterior of the first floor of any structure and must meet specified criteria for width, pavement characteristics, roadway gradient, turning radius, etc. Fire apparatus access roads are also referred to as fire lanes.

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*Fire Lane Identification* – Signs or curb markings that allow fire apparatus access roads to be readily recognized so that they will always remain unobstructed and available for emergency use.

*Gates and Barriers* - Devices that restrict pedestrian and vehicle ingress and egress to and from a facility.

*Gate and Barrier Locks* - Devices that are installed on gates and barriers to secure a property or facility.

*Hazardous Fire Area*- An area designated by a public agency or determined by the fire code official as presenting a hazard due to the presence of combustible vegetation or due to the proximity of combustible vegetation to structures.

*Hose Pull* – The effective distance (150 feet is standard) that firefighters can drag a hose from fire apparatus to attack a fire. Hose pull is measured along a simulated path of travel accounting for obstructions and not “as the crow flies.” See Attachments 20 and 21.

*Premises Identification* - The visual means (address numbers) used to readily identify a property or facility street address. It may also be used to distinguish separate buildings within a single facility or property.

*Rescue Openings* – Exterior doors or windows required in all sleeping rooms in R occupancies located below the fourth story of a building that allow rescue of trapped occupants. See CBC Section 1030.

*Very High Fire Hazard Severity Zone (VHFHSZ)* – A designated area in which the type and condition of vegetation, topography, fire history, and other relevant factors increase the possibility of uncontrollable wildland fire. Structures within a VHFHSZ require special construction features to protect against wildfire hazards; please consult with the local building department and refer to CBC Chapter 7A and CFC Chapter 49 for specific requirements.

## **SUBMITTAL REQUIREMENTS**

### **1. Plan Submittal Requirements**

Plans shall be provided to demonstrate compliance with all codes and other regulations governing water availability for firefighting and emergency access to sites and structures within the City of Orange. In addition, changes to existing structures or sites shall be reviewed by the OFD (Orange Fire Department) to ensure that the modifications do not affect water availability or access.

#### **A. Submittals**

- 1) A copy of the Fire Master Plan shall be included with the plan package submitted to the Planning Department for the Staff Review Committee.

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- 2) Sites and buildings that will be modified will require a Fire Master Plan when determined by the Fire Department.
  - 3) Construction plans for new developments, commercial or residential, which are submitted to the City of Orange Building Department for permit and review shall have a Fire Master Plan included in each set of plans submitted.
- B. Scope – The scope of work shall be clearly indicated on the plan.
- C. Building Data – Information related to the building’s location, use, and construction shall be clearly indicated on the plan.
- 1) Include the project’s street address, tract, and tentative tract number; provide the identification that is most applicable at the time of submittal
  - 2) Indicate the types of occupancy uses as defined in California Building Code (CBC) Section 302.
  - 3) Indicate the construction type of each building and whether footnote ‘d’ from CBC Table 601 is being applied for a 1-hour construction type equivalency.
  - 4) Indicate the building height on the plans as defined in CBC Chapter 2. If the building height is greater than 50 feet, also indicate the elevation change (measured from finished floor to finished floor) between the lowest floor giving access to the structure and the highest occupied floor or occupied roof deck. If this distance is more than 75 feet, the building will be subject to additional requirements for high-rise structures.
  - 5) Note the type of sprinkler system installed/proposed (e.g., NFPA 13, 13-R, or 13-D).
  - 6) For sprinklered structures larger than 18,000 square feet, provide an allowable area calculation (and a mixed occupancy calculation, if the building houses multiple occupancies) to demonstrate that the building can be of the specified size and construction type. CBC Tables 504, 506.
- D. Fire Master Plan Notes – Include the OFD Fire Master Plan Notes on the plan. Some notes may need to be customized depending on the type of project or scope of work. See Attachment 1.
- E. Water Availability – Water availability information may not be required to be submitted for every project, and plans may be submitted with a hydrant flow test pending, but the applicant should understand that project approval may be delayed if it is determined during review that this information is required. If the project requires evaluation of the available fire flow, it will not be approved without a flow test conducted by the Developer’s representative and witnessed by a representative of the Fire Department. Water availability information must be no older than one year.

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- F. Complete Attachment 2, Fire Master Plan Submittal Checklist, and verify that basic project information has been provided and that general access and water requirements have been addressed on the plan.
- G. Operations pre-emergency incident planning disk - Submit an electronic copy of the fire master plan on a compact disk upon issuance of the building permit. This information is used by emergency response personnel to efficiently manage emergency incident activities and resources. Fire master plans depicting single family residential developments or temporary site conditions are exempt from this requirement. Other projects requiring a fire master plan may also be exempted at the discretion of the Fire Department depending on the scope of the project or extent of modification to the site.
- 1) CDs or electronic files must be labeled with the City of Orange permit number, project name, date, street address (e.g. 123 Main Street). If the address is not available, provide the tract number.
  - 2) The drawings must be provided in pdf file formats.
  - 3) The following information shall be provided in the drawing:
    - a) Vicinity map indicating cross streets
    - b) Complete building address, apartment designators, suite numbers (when defined), etc.
    - c) Scaled site plan inclusive of the following information:
      - Detailed building footprint with all entrances identified
      - All on-site access roadways
      - Parking configuration
      - All on-site walking paths around buildings
      - Any barriers that affect movement on the property (walls, fences, gates, etc.)
      - Fire hydrant locations
      - Knox box locations
  - 4) The following information should be provided in the drawing, if available:
    - Fire sprinkler/standpipe control valve locations
    - Fire sprinkler/standpipe fire department connection (FDC) location
    - Fire alarm control panel (FACP) and remote annunciator locations

## 2. Fire Access Roadways

Fire access roadways, commonly referred to as fire lanes, shall be provided for every facility or building when any portion of an exterior wall of the first story is located more than 150 feet from a public roadway, as measured along an approved route. Extenuating circumstances, increased hazards, and additional fire safety features may affect these requirements.

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A. Fire Apparatus Access Road Design - Fire access roadways must be engineered to support emergency response apparatus. Roadways must be designed to facilitate turning radii of apparatus and meet requirements for gradient, height clearance, and width. Specific criteria pertaining to the design of fire access roadways are detailed below.

1) Fire access roadways shall be designed, constructed, and maintained to support the imposed loads of OFD fire apparatus with a total weight of 68,000 pounds. Apparatus weight is distributed as 46,000 pounds on tandem rear axles and 22,000 pounds on the front axle. The surface shall be designed, constructed, and maintained to provide all-weather driving capabilities. *A letter or statement, wet-stamped and signed by a registered engineer, shall be provided on the plans certifying that any new roadway meets this 68,000-pound, all-weather requirement.* Road base without an appropriate topping or binding material does not satisfy the all-weather requirement. CFC 503.2.3

2) Number of Fire Apparatus Access Roads Required:

a) One is required if any portion of an exterior wall of the first story of a building is located more than 150 feet from a fire access roadway. That access is to be measured by an approved route around the exterior of the building (see Section 9: Access to Structures and Attachment 20). *CFC 503.1.1*

b) More than one road is required if it is determined that access by a single road may be insufficient due to terrain, location, travel distance, potential fire or life-safety hazards, or other factors that could limit access or if vehicle congestion, railways, roadway exceeds 600 feet in length, or weather conditions could impair the single-entry point. Supplementary access points shall be located to facilitate evacuation and emergency operations and minimize congestion or obstruction during an emergency incident. *CFC 503.1.2*

3) Location of Fire Apparatus Access Roads:

For purposes of determining the suitability of public roads and fire access roadways for staging fire apparatus and facilitating fire suppression operations for a particular structure, the following criteria shall apply:

a) To protect fire apparatus, personnel, and equipment from damage and injury from falling debris, the edge of fire access roadways serving multi-story buildings should be located no closer than 10 to 30 feet from the building, the actual distance being a function of overall building height with consideration given to building construction, presence of openings, and other potential hazards. As distances greater than 40 feet inhibit the use of vehicle-mounted ladders while distances closer than 20 feet do not allow for a proper laddering angle, the edge of fire lanes serving structures four or more stories in height shall be located between 20 and 40 feet from the building. These distances are measured from the face of the building to the top edge of the curb face or rolled curb flow line nearest the structure. To ensure that vehicular access and egress from dead-end fire access roadways serving multi-

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story buildings are maintained at all times, staging areas shall be provided along the roadway to permit fire apparatus to pass ladder trucks that have outriggers extended. Consideration shall be given to the length of the roadway, roof and building design, obstructions to laddering, and other operational factors in determining the number, location, and configuration of such staging areas. CFC503.1.1

- 4) Width of Fire Access Roads - The minimum width of a fire access roadway is 20 feet. Divided fire access roads shall be subject to review and approval by the fire code official. Each lane shall be a minimum width of 14 feet *CFC 503.2.1, 503.4, 503.2.2*

Fire apparatus access roads in hazardous fire areas shall have an unobstructed width of not less than 28 feet. The width shall be maintained to an approved point outside of the Hazardous Fire Area. When the road serves no more than three dwelling units and the road does not exceed 150 feet in length, the road width may be 24 feet. This length may be increased to 400 feet where serving no more than three dwelling units and all structures accessed from the roadway are protected by automatic fire sprinklers.

The width of fire department access roads is measured from top face of the curb to top face of the curb on streets with standard vertical curbs and gutters, and from flow line to flow line on streets with rolled, sloped, flared, or other non-vertical curb and gutter configurations. Flow line is the lowest continuous elevation on a curb. Road sections and curb details or approved city street improvement plans may be required to verify the method of measurement.

- 5) Parking Restrictions - No parking is permitted on roadways that are narrower than 28 feet in width. Parking on one side is permitted on a roadway that is at least 28 feet but less than 36 feet in width. Parking on two sides is permitted on a roadway 36 feet or more in width. These restrictions apply to all roads serving as fire lanes, except those located in Hazardous Fire Areas. See Attachment 3
- 6) Vertical Clearance - Fire access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches. If trees are located adjacent to the fire access roadway, place a note on the plans stating that all vegetation overhanging the fire access roadway shall be maintained to provide a clear height of 13 feet 6 inches at all times. See Attachments 4 and 5. *CFC 503.2.1*
- 7) Fire Apparatus Access Road Grade - The grade for access roads shall not exceed 12% grade. Cross-slope shall not be greater than 2% for paved access roadways. *CFC 503.2.7, 503.2.8*
- 8) Inside and Outside Turning Radii - The inside turning radius for an access road shall be a minimum of 20. The outside turning radius for an access road shall be a minimum of 50 feet. Measurements shall be from same center point. As fire apparatus are unable to negotiate tight “S” curves, a 56-foot straight leg must be provided between these types of compound turns or the radii and/or road width must be increased accordingly. See Attachment 6. *Note: to accommodate the CFC 503.2.4*



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- 9) Dead-end Access Roadways - Dead-end roadways more than 150 feet shall be designed and constructed with approved turnarounds or hammerheads. Turnarounds shall meet the turning radius requirements identified above.
- 10) Bridges - When a bridge is required as part of an access road, it shall be a minimum of 20' in width and designed and constructed to accommodate a total weight of 68,000 pounds. Apparatus weight is distributed as 46,000 pounds on tandem rear axles and 22,000 pounds on the front axle. *CFC 503.2.6*
- 11) Continuity of fire lanes- When any portion of a street, drive aisle, or other roadway is required to be a fire lane and the roadway is longer than 150 feet, the remainder of the roadway shall be treated as a fire lane to a logical point of termination at another approved fire lane: at an approved hammerhead or turnaround, at an intersection with a public road suitable for use as a fire lane.

At the discretion of the fire code official, if the portion of the roadway that is required to be a fire lane is no more than 150 feet long the fire lane may be terminated at that point provided that the remainder of the roadway beyond is clearly not suitable or intended for use as a fire lane. This may be due to factors including but not limited to, insufficient width or vertical clearance, excessive grade, change in paving material /driveway apron, or other physical constraints or obvious visual indicators, as approved. *CFC 503.1.1, 503.2.5*

### 3. Fire Access Roadway Identification CFC 503.3

Fire lane identification will be required when it is necessary to restrict parking of vehicles 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 the California Vehicle Code (CVC). See Attachment 8.

- A. Sign and Curb Marking Options - Areas designated as a fire lane require an acceptable method of marking that shall be approved prior to installation. Examples of dimensions and acceptable options for signage installations and markings are found in Attachments 9 through 14. The following methods are acceptable means of identifying designated fire lanes for private streets. Choose either option 1 OR option 2 below.
  - 1) Specific areas designated by the OFD as fire lanes must be marked with red curbs meeting the specifications in Attachment 9. In addition, where the number of entrances into the area marked with fire lanes is limited, all such vehicle entrances to the designated area shall be posted with approved fire lane entrance signs meeting the specifications in Attachment 10. This option is preferred by the OFD.
  - 2) “Fire Lane—No Parking” signs meeting the specifications in Attachment 12 shall be posted immediately adjacent to each designated fire lane and at intervals not to exceed 100 feet, unless otherwise approved by the fire code official. In addition, where the number of entrances into the area marked with fire lanes is limited, all such vehicle entrances to the designated area, shall be posted with approved fire lane entrance signs.

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## 4. Premises Identification *CBC 501.2, CFC 505.1*

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. Where required by the fire code official, address numbers shall be provided in additional approved locations to facilitate emergency response. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall be a minimum of 4 inches (101.6mm) high with a minimum stroke width of 0.5 inch (12.7mm) for R-3 occupancies. For all other occupancies, the numbers shall be a minimum of 8 inches high with a minimum stroke width of 1 inch and shall be approved by the fire code official. Address numbers shall be illuminated during hours of darkness. Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole, or other sign or means shall be used to identify the structure. Address numbers shall be maintained.

Approved diagrammatic representations shall be positioned at all entrances to building complexes. The diagrammatic representations shall show the overall site, location of the viewer, buildings and units and the addresses or unit designations within the complex and shall be internally or externally illuminated as approved during the hours of darkness.

## 5. Obstructions to Emergency Vehicle Access

Existing or proposed gates and barriers crossing fire apparatus access roadways must be shown on the plans. Information such as the location, type of gate (e.g., swinging, sliding), dimensions, and method of operation (manual, electric) must also be provided. Note or identify the following on the fire master plan:

- A. Clear Width and Vertical Clearances – Gated openings for egress and ingress of vehicles shall not be less than 20 feet clear width. The vertical clearance shall not be less than 13 feet 6 inches, including landscaping and/or trees. The minimum clear width on either side of a median is 14 feet. *CFC503.2.1*
- B. Turning Radii - The minimum inside turning radius is 20 feet with an outside radius of 50 feet for both the exterior and the interior approach to the gate. *CFC 503.2.4*
- C. Setbacks from First Interior Turn - A 45-foot minimum unobstructed setback is required from a gate to the first turn to allow emergency apparatus clearance.
- D. Manually Operated Gate and Barrier Design - Typical gate designs may include sliding gates, swinging gates or arms, or guard posts with a chain traversing the opening.
  - 1) For gates and barriers that are not used on a frequent basis or those that are located such that they have a reasonable likelihood of being blocked by vehicles, vegetation, furniture, or other obstructions (e.g., secondary fire department vehicle ingress/egress points, gates accessed from plazas or turf block areas), permanent signage constructed of 18-gauge steel or equivalent shall be attached on each face of the gate or barrier that reads “FIRE LANE—NO PARKING” or similar. See Attachment 15 for an example of a barrier sign. *CFC 503.3*

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- 2) Manually operated gates and barriers shall have Knox padlocks, or weather-resistant Knox key boxes. The key box shall be placed four to five feet above the roadway surface at the right side of the access gate in a conspicuous location that is readily visible and accessible. The key box must be clearly labeled "FIRE DEPT." *CFC 506*
- 3) Where the gate will be used for purposes other than emergency vehicle access, if the gate can be reached by emergency personnel from both sides, installation of a Knox box containing a key to operate an owner-supplied padlock is recommended.

## E. Electrically Operated Gates and Barriers

- 1) In the event of loss of normal power to the gate operating mechanism, it shall be automatically transferred to a fail-safe mode allowing the gate to be pushed open by a single firefighter *without any other actions, knowledge, or manipulation of the operating mechanism being necessary and without the use of battery back-up power*; this shall be noted on the plan. The manufacturer's specification sheet demonstrating compliance with this method of operation during power loss shall be provided or scanned directly onto the plan. Should the gate be too large or heavy for a single firefighter to open manually, a secondary source of reliable power by means of an emergency generator or a capacitor with enough reserve to automatically, immediately and completely open the gate upon loss of primary power shall be provided for fail-open operation. A capacitor, but not a battery, may also be used for fail-open operation where the gate operating mechanism does not have a fail-safe mode.
- 2) The gate control for electronic gates shall be operable by a Knox emergency override key switch (with dust cover). The key switch shall be placed between 42" and 48" above the roadway surface at the right side of the access gate within two feet of the edge of the roadway. The key switch shall be readily visible and unobstructed from the fire lane leading to the gate. The key switch shall be clearly labeled "FIRE DEPT."
- 3) Upon activation of the key switch, the gate shall open and remain open until returned to normal operation by means of the key switch. Where a gate consists of two leaves, the key switch shall open both simultaneously if operation of a single leaf on the ingress side does not provide for the width, turning radii, or setbacks necessary for fire apparatus to navigate the vehicle entry point. Note this requirement on the plan.
- 4) The key switch shall be labeled with a permanent red sign with not less than ½" contrasting letters reading "FIRE DEPT" or with a "Knox" decal. Note this requirement on the plan.

- F. Gate and Barrier Locks - Gate or barrier locks shall be reviewed and approved prior to their installation on any new and/or existing access gate or barrier. Authorization/order forms for Knox products may be obtained through the Fire Prevention Office at 714-288-2541; specify whether the order form is for a vehicle/pedestrian gate or a building. Knox key switches and key boxes serving only vehicle gates and not buildings shall be submastered for use by both the fire and police department.

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## 6. Residential Tract Developments

Since local law enforcement resources are limited for parking enforcement purposes in private developments, the OFD requires a viable parking enforcement plan from the developer prior to approving the fire master plan. Parking enforcement plans shall include:

- A. Detailed information specifically identifying who will be responsible for enforcing the plan.
- B. Powers granted to the entity shall include vehicle towing for parking violations (include language similar to that provided in Attachment 8 of this guideline).
- C. The level of enforcement to be carried out within the development.

This information must be integrated into the fire master plan. Evidence that the enforcement plan is permanently incorporated into the Conditions, Covenants, and Restrictions (CCRs) and/or recorded against the deed shall be provided prior to OFD approval of the final map. Once approved, these provisions cannot be amended without written approval by the OFD. See Attachment 16 for a sample enforcement letter.

## 7. Engineered Alternative Fire Apparatus Access Systems

The following criteria will be used when evaluating an alternative engineered access surface material for a specific application (e.g., “Turf block,” “Grasscrete”). Prior to installation, the design professional must incorporate these criteria into a plan submittal subject to approval by OFD, which reserves the right to limit the amount or extent of alternative surface serving as required fire department access to a structure or site.

- A. Calculations and a statement stamped and signed by a registered civil engineer or other qualified registered professional shall certify that the proposed surface and substrate meets the criteria of an all-weather driving surface and is capable of withstanding the minimum weight of 68,000 pounds imposed by OFD apparatus. Apparatus weight is distributed as 46,000 pounds on tandem rear axles and 22,000 pounds on the front axle. *Note: the OFD recommends a minimum weight capability of 71,000 pounds in order to support our largest apparatus.*
- B. Manufacturer’s specification of the material being installed must indicate that the application is consistent with the manufacturer’s recommendations.
- C. Material shall only be installed on slopes of no more than one degree (1.75% grade), unless otherwise specified by the manufacturer, and drainage shall be provided as required to provide adequate traction for OFD apparatus. Surfaces shall be crowned or sloped to one side to drain water away from the roadway; surfaces shall not have a “V” or other configuration causing water to accumulate in the fire access roadway. This information shall be detailed on the plan.

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- D. The design shall include a curb cut that delineates entry onto the engineered fire access surface from a street. A 4” or lower curb cut or a rolled/ramped curb is acceptable. The curb cut must be shown on the plan. The entry to the area shall be clearly marked as a fire lane with either a red curb or sign to prevent the entry from being blocked.
- E. A minimum four-inch wide concrete strip around the perimeter of the designated area shall be specified on the plan to clearly delineate the extent of fire department access. If the area is accessible to or intended to be used by anyone other than emergency responders, the concrete curb shall be painted red and stenciled “Fire Lane—No Parking” in white every 30 feet or portion thereof. In areas where painting the curb is not feasible, alternative methods of delineating the extent of the fire access roadway, such as by stamping “Fire Lane—No Parking” into the concrete, posting of signs, or by the use of red reflectors, may be acceptable if approved by the OFD plan review staff. Describe the method of identifying the extent of the fire access roadway clearly on the plan.
- F. The following sentence shall be placed, verbatim, as a note on the plan: “Final approval is subject to actual field acceptance testing utilizing OFD fire apparatus.”
- G. A clause requiring the maintenance of alternative access roadways shall be placed in the CCRs, deed, and/or similar documents.

## 8. Hydrant and Water Availability Requirements

Applicants must provide documentation that hydrants are provided in the quantity and spacing described in California Fire Code (CFC) Appendix C. The quantity and spacing of hydrants are governed by the fire flow required for the structure(s) served. The required fire flow is dependent upon the size of the structure, type of construction, and whether the building is equipped with fire sprinklers. This information must be shown clearly on the plans to assist in the determination of the fire flow requirement.

- A. Water Availability – To facilitate the review process and avoid untimely delays in project approval, applicants are strongly encouraged to arrange a hydrant flow test with the local water department prior to submitting plans to the OFD, if the project includes a new structure or increase in the floor area of an existing structure. Water availability information may not be required to be submitted for every project, and plans may be submitted with a hydrant flow test pending, but the applicant should understand that project approval may be delayed if it is determined during review that this information is required. If the project requires evaluation of the available fire flow, it will not be approved until the fire flow test is conducted and all pertaining requirements are fulfilled.
  - 1) Determine the required fire flow from CFC Table B105.1, provided in Attachment 17. A 75% reduction in fire flow, not less than 1,500 gpm (but not duration) may be taken when the fire-flow calculation area consists only of buildings equipped with an approved automatic fire sprinkler system.

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- 2) Contact the local water purveyor to request a current fire hydrant flow test report. In some cases, the water company may allow or require a qualified third party to perform the flow test for you.
  - a) In newly developed areas without water infrastructure, the water department may issue a “will-serve” letter indicating the expected amount of water that will be delivered once the water system is installed and operational.
  - b) If multiple hydrants are located within the maximum distance allowed by CFC Table C105.1, the amount of water available from each hydrant may be combined, provided that the hydrants are flowed simultaneously.
  - c) It is the applicant’s responsibility to ensure that the following information is provided at a minimum on either the water company’s test data sheet and/or the OFD Water Availability form:
    - (a) Static pressure and residual pressure in psi and observed flow in gpm
    - (b) Calculated flow in gpm at 20 psi.
  - d) Scan or photocopy the completed form or data sheets onto your plans or include the original with your plan submittal.

*Note: The above water flow information is to show the water availability for the project. This is not the same flow test required for the design of automatic fire protection systems. The flow test for the design of automatic fire protection system design are required to be conducted per NFPA 13 and 24 and shall be witnessed by a fire department representative.*

- 3) Please ensure that the fire area, building size, construction type, and flow data are complete and accurate. Errors or omissions in this information may result in plans having to be resubmitted or fire flow testing being redone.
- B. Fire-Flow Calculation Area – The fire-flow calculation area shall be the total floor area of all floor levels within the exterior walls, and under the horizontal projections of the roof of a building, except as modified in Section B104.3. Portions of buildings which are separated by fire walls without openings, constructed in accordance with the California Building Code are allowed to be considered as separate fire-flow calculation areas. The fire-flow calculation area of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors. *CFC Appendix B Section B104*
- C. Hydrant Location – Hydrants shall be provided along the length of the fire access roadway in the quantities and up to the maximum distances prescribed in CFC Table C-105.1. See Attachments 18 and 21.

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- 1) Hydrants must be located no more than three feet from the edge of a fire access roadway and cannot be in areas where they will be visually or operationally obstructed (behind fences or walls, in bushes, behind parking spaces, etc.). Clearance shall be provided to a distance no less than three feet from the perimeter of the hydrant. Where hydrants are located in landscaped areas, a 4x4' concrete pad may be required by the OFD inspector to ensure that vegetation does not encroach on this clear space.
  - 2) The hydrant outlets must face the fire access roadway. Where both outlets cannot face the fire access roadway (e.g., the hydrant is located in a landscape peninsula or island in a parking lot; the hydrant), the 4" outlet shall take precedence.
  - 3) The hydrant shall be located at least 40 feet from the building(s) it serves. Where it is impractical to locate the hydrant 40 feet from adjacent structures, additional hydrants may be provided, or the hydrant may be located closer provided that nearby walls do not contain openings and the hydrant is not otherwise located where it can be rendered inoperable due to damage from collapsed walls, debris, or excessive heat.
  - 4) Hydrants shall be located so that a hose line running between the hydrant and the fire department connection(s) (FDCs) served by that hydrant does not cross driveways, obstruct roads or fire lanes, or otherwise interfere with emergency vehicle response and evacuation of a site.
  - 5) Hydrants and fire department connections shall not be located behind parking stalls or in other locations where they are likely to be blocked by vehicles or other objects. Whenever possible, hydrants shall be placed at street and drive aisle intersections in preference to mid-block locations. Where on-street parking is allowed, hydrants should be placed in the shortest parkways between adjacent driveways, at corners and chokers where parking is not normally allowed, and in similar areas where impact to space available for parking and the potential for hydrants to be obstructed is minimized. Where adherence to the spacing requirements of CFC Table C-105.1 does not permit hydrant locations to be optimized in this manner, the fire code official may authorize alternative spacing.
  - 6) Hydrants and fire department connections should not be located where apparatus staged at these appurtenances would then encroach on minimum fire apparatus turning radii unless alternative routes are available. Hydrants shall not be placed in the "bulb" end of a cul-de-sac where apparatus staged at the hydrant would prevent the cul-de-sac from being used as a turnaround.
- D. Protection of Hydrants – Where hydrants are located such that they are exposed to potential damage from vehicular collision, they shall be protected by curbs or bollards. See Attachment 19.
- 1) If vehicles can approach the hydrant from more than one direction, the hydrant shall be protected by four bollards of concrete-filled pipe four inches in diameter and

# Fire Master Plans for Commercial & Residential Development

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mounted in concrete in a square around the hydrant. The bollards need to be spaced a minimum of three feet from the perimeter of the hydrant. The bollards must be placed so that their location does not impede access to or use of the hydrant. Two bollards may protect hydrants that can be approached from only one side.

- 2) Hydrants may not require protection by bollards if they are located such that the potential for collision is minimal or if they are sufficiently protected by a standard concrete curb at least six inches in height.

## E. Hydrant Color

- a) Private hydrants (hydrants separated from the city main by and located downstream from a backflow prevention device) shall be painted OSHA safety yellow.
- b) Private hydrants which are supplemented by a fire pump or fire department connection shall be painted OSHA safety red.

## 9. Access to Structures

- A. Hose pull – The dimension of 150 feet when used in relation to fire department access is commonly referred to as “hose pull distance.” As the name implies, this is the maximum distance that firefighters can effectively pull a fire hose or carry other equipment to combat a fire. 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. See Attachments 20 and 21.
  - 1) 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 public road or fire lane. Under most circumstances, hose pull will not be a straight-line distance and should *not* be measured “as the crow flies.”
  - 2) All obstructions such as fences, planters, vegetation, and other structures must be considered when determining whether a building is accessible from a particular location on the fire access roadway. Topography may also affect the potential access route and any significant changes in elevation must be accounted for when measuring hose pull distances.
  - 3) Hose pull measurements begin at a point in the street located 10 feet from the edge of the curb.
- B. Access walkways - CFC 504.1 specifies the installation of approved access walkways from fire access roadways to exterior openings required by either the CBC or CFC. The OFD may require the construction of such walkways depending upon particular site conditions or project parameters. These conditions include, but are not limited to, building use or occupancy, topography, vegetation, and surface conditions. Design professionals must carefully consider these issues when developing a project site.



# Fire Master Plans for Commercial & Residential Development

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- 1) Access walkways must be provided to all required egress doors from a building, all firefighter access doorways in buildings with high-piled storage, and the area beneath each rescue window, at a minimum. Access walkways will typically be required around the entire perimeter of a structure to facilitate control of a fire through any other available openings.
  - 2) Access walkways must be a minimum of five feet in width.
  - 3) Access walkways shall consist of a surface that lends itself to safe use during building evacuation, firefighting, and rescue efforts. Solid surface walkways such as concrete or asphalt are preferable, though alternative surfaces such as decomposed granite (DG), gravel, or grass are permissible under certain conditions. Ground covers and shrubs that prevent or impede laddering of structures are not permitted to be planted on or adjacent to access walkways.
  - 4) Where the grade itself presents a slip or fall hazard, an access walkway with a slip-resistant surface and/or stairway must be provided.
  - 5) The type of material provided for the access walkway and/or other specifications shall be indicated on the fire master plan and are subject to approval by the OFD.
- C. Path of travel obstructions - Firefighter access to and emergency egress from required openings must remain free and unobstructed at all times. Architects, landscape designers, and facility managers must take care to ensure that fences, planters, and vegetation will not interfere with access and egress routes.
- 1) Fences - Walls, fences, hedges, and similar obstructions may not be located within the area designated as an access walkway unless a gate through the obstruction equipped with an approved padlock or Knox box has been provided for firefighters to access the perimeter of the structure. If the wall or fence blocks travel from required egress openings to the public way or an open area at least 50 feet from the structure (“safe dispersal area” per CBC 1028.5), a gate operable by the occupants evacuating the structure must be provided that allows unimpeded egress to the public way. Where doors in the path of emergency egress travel are required to be equipped with panic hardware, gates shall likewise be similarly equipped. These requirements may not apply to individual single family residences.
  - 2) Vegetation - As stated previously, certain types of ground cover and low-growing plants present an impediment to firefighting and rescue operations and are prohibited from being planted in the access walkway. In addition, taller vegetation such as shrubs and trees may not be located where they will, either when planted or upon maturation, present an obstruction to accessing rescue windows. Raised planter areas are not allowed to be used as rescue ladder access points where the change in elevation could be a potential impediment to firefighter access.

# Fire Master Plans for Commercial & Residential Development

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- 3) Key boxes and key switches - Knox devices shall be provided where necessary to ensure immediate access for firefighting, rescue, and other emergency purposes.
- a) Location - At a minimum, Knox devices shall be provided for the following locations:
- gates along the paths of firefighter travel from the fire lane to all points along the perimeter of the structure
  - gates to pool enclosures
  - building gates or doors leading to interior courtyards containing rescue windows
  - building gates or doors leading to exterior hallways or balconies providing access to residential units or tenant suites
  - gates in exterior enclosures containing hazardous or combustible material storage
  - buildings using hazardous materials or processes
  - exterior doors to rooms containing main alarm panels or annunciators
  - doors and gates providing access to parking structures
  - within the fire command center in high-rises and other large buildings
  - main entry to buildings equipped throughout with an alarm system and not staffed 24/7
  - facilities where a high-volume of after-hours calls is expected or experienced
  - doors and gates to other areas identified by the fire department

When approved by the OFD, a frangible padlock or chain that can be cut with bolt cutters or a Knox padlock may be used in lieu of a key box for exterior hazardous or combustible materials storage areas.

Knox boxes or switches shall be located adjacent to and clearly visible from the gate or door served. For gates in walls and fences up to six feet in height, they shall be securely mounted at a height of five feet above grade; on buildings they shall be mounted five feet above grade, in a location that is easily accessible to firefighters and, when required, police officers. Shared Knox devices (see section 9.C.3.e below) shall meet the installation requirements of both the OFD and the police department refer to the City of Orange Municipal Code and Security Ordinance for specific requirements. Boxes and switches are not required to be electronically monitored; if they are, they shall not initiate an alarm signal that requires a response by the fire department.

- b) Key box Contents - The key used to unlock the gate or door shall be kept in the key box. When the key unlocks more than the individual adjacent gate or door, a label or tag shall be attached to the key identifying the gates or doors it operates. Where multiple gates or doors are served by a single box, two or more copies of the key(s) are recommended so that a copy will be available to each engine company responding to the site.

# Fire Master Plans for Commercial & Residential Development

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- c) Electric Locks – Electromagnetically or electromechanically locked pedestrian gates and doors shall be equipped either with a Knox box containing a key to open the lock or, if the door lock cannot be operated with a key from the exterior, a Knox key switch shall be provided adjacent to the door. Where key switches are provided, the door or gate lock shall remain disengaged until the key switch is returned to the “normal” closed or locked position.
- d) Vehicle gates - See sections 5.E through 5.G for more information on requirements for Knox boxes and key switches serving vehicle gates across fire lanes.
- e) Master and Sub-master Keying - Knox devices that provide access only to the perimeter of buildings and exterior common areas shall be sub-mastered for dual use by the fire and police departments. Where access to interior *common* areas of buildings is mandated by the local security or municipal code, Knox devices shall also be sub-mastered. Knox boxes containing keys to access any interior *private* spaces, such as the interior of single tenant buildings or individual suites in a multi-tenant building, shall be mastered for use by the fire department only.
- f) Ordering Knox Devices - Contact the Fire Prevention office at (714) 288-2541 to request Knox order forms or for directions concerning ordering directly from the Knox website. When requesting the form or placing an order, specify whether you need Knox devices for vehicle/pedestrian gates or building access. When completing the order form, remember to indicate whether your device needs to be sub-mastered for police department use.

## 10. Access during construction

Access and water supply during construction shall comply with CFC Chapter 33 and the provisions listed in this section and, where applicable, elsewhere in this guideline. Construction activities at job sites not complying with these requirements may be suspended at the discretion of the OFD inspector until a reasonable level of compliance is achieved.

At no time shall construction projects impair or obstruct existing fire access roadways or access to and operation of existing fire hydrants serving other structures. Should existing roadways or hydrants need to be moved or otherwise altered during construction, the developer shall provide alternative access routes and other mitigation features to ensure adequate fire and life-safety protection. Such alternatives and features shall be submitted to the OFD for review and approval prior to alteration of existing conditions.

- A. Lumber drop inspection – an inspection shall be scheduled with an OFD inspector to verify that access roadways and operable hydrants have been provided for buildings under construction.
  - 1) For buildings of Type IV and V construction (and non-combustible structures that may have a portion of the exterior walls, façade, or other building elements comprised of wood or other combustible material), a lumber drop inspection shall occur prior to bringing combustible building materials on site.

# Fire Master Plans for Commercial & Residential Development

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- 2) For other construction types (Type I, II, III) with exterior walls built of non-combustible materials, an inspection shall occur prior to commencing interior construction involving combustible materials (e.g., wooden mezzanines or partition walls, carpet, cabinetry or other woodwork, furniture, etc.). In concrete tilt-up and masonry buildings, wooden panelized roofing systems are exempt from this requirement.
  - 3) An inspection shall occur prior to construction reaching 40 feet in height for buildings of any construction type that will have four or more floors when complete.
  - 4) The street address of the site shall be prominently posted at each entrance. For projects on streets that do not have a name or street signs posted yet, the sign shall include the project name and tract/lot number.
  - 5) Gates through construction fencing shall be equipped with a Knox padlock or Fire Department approved lock.
  - 6) When required by the OFD inspector, fire lanes shall be posted with “Fire Lane—No Parking” signs or no parking areas shall be otherwise identified to maintain them free of obstructions during construction.
  - 7) Provisions shall be made to ensure that hydrants are not blocked by vehicles or obstructed by construction material or debris. A three-foot clear space shall be provided around the perimeter of the hydrant and no parking or similar obstructions shall be allowed along the adjacent road within 15 feet of the hydrant. Inoperable hydrants shall be bagged.
- B. Temporary Fire Access Roads - Temporary access roads (construction roads that do not match the final location and configuration of permanent roads as approved on a Fire Master Plan) and temporary hydrants may be permitted for single family residential model construction or a single detached custom home less than 5,000 square feet in area with the conditions listed below. They may be allowed on a case-by-case basis for other structures with additional requirements, as determined by the fire code official.
- 1) Plans for temporary access shall be submitted to the City of Orange Building Department for Fire Department’s review and approval. Plans shall be drawn to scale and show permanent (existing) roadways, proposed temporary roadway locations, location of models, space dedicated to storage of construction materials, location of lumber storage, and parking for work crews and construction vehicles. The plans shall clearly state that they have been submitted for review and approval of temporary fire department access and hydrants.
  - 2) Plans shall be stamped and signed by a licensed civil engineer stating that the temporary access road can support 68,000 pounds of vehicle weight in all-weather conditions. The road base material shall be over soil compacted to at least 90% and be mixed or topped with a suitable binding material to provide all-weather characteristics; road base alone does not satisfy this requirement.

# Fire Master Plans for Commercial & Residential Development

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- 3) Provide a parking plan for the construction site detailing how the fire lane no parking regulations will be enforced. Include a clause in the letter stating that “the job-site superintendent is responsible for informing the work crews of parking requirements and that the entire job-site is subject to shut down by the OFD inspector if parking is in violation of fire lane posting.” The letter shall be written on company letterhead and scanned onto the plan.
  - 4) Aboveground invasion lines are acceptable for water supply.
    - a) Provide drawings detailing how the line will be secured in place (e.g. size, depth, and interval rebar tie-downs) and protected from vehicular damage (e.g., K-rails or bollards).
    - b) An invasion line may be run underground if the depth of bury can support the weight of a fire apparatus.
    - c) The temporary water line must provide the required fire flow; calculations may be required.
    - d) The pipe shall be listed for fire service.
    - e) Fire hydrants shall consist of a minimum 6” barrel with one 2-1/2” outlet and a 4” outlet. ( Note: this on the plan)
  - 5) All other access and water requirements shall apply (e.g., width, approach clearance, premises identification, locks, gates, barriers, etc.).
  - 6) The approved plan for temporary access and water supply shall be available at the construction site prior to bringing combustible building materials on-site.
  - 7) An inspection by OFD personnel is required to verify adherence to the approved plan prior to bringing combustible materials on-site.
- C. Phased access - Incremental installation of permanent access roadways as shown on a fire master plan may be permissible for commercial and residential developments. If phased installation is anticipated, the site superintendent or designee shall review the installation process with an OFD inspector during the lumber drop inspection or pre-construction meeting. Depending on the complexity of the installation, size of the project, and other project-specific factors, the inspector may allow phased installation to proceed immediately or may first require that all or some of the following items are satisfied:
- 1) Plans for phased access shall be submitted to the City of Orange Building Department for Fire Department review and approval. The phasing plans may either be submitted as part of the original fire master plan submittal or as a revision to an approved fire master plan. Plans shall be drawn to scale and demonstrate that all access and water requirements are met during all phases of construction and that approval of one phase

# Fire Master Plans for Commercial & Residential Development

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does not compromise or complicate completion of the subsequent phases. Plans shall show for each phase of construction:

- the extent of building construction
  - location of operable hydrants serving all buildings under construction
  - the location of construction fencing, barriers, and vehicle access gates
  - the location of all temporary or permanent “Fire Lane—No Parking” signs
  - equipment/material staging locations
  - worker parking areas (see item “4” below)
- 2) Phasing plans shall be stamped and signed by a licensed civil engineer stating that the access road can support 68,000 pounds of vehicle weight in all-weather conditions. The road base material shall be over soil compacted to at least 90% and be mixed or topped with a suitable binding material to provide all-weather characteristics; road base alone does not satisfy this requirement. The final road section, less the final lift of asphalt topping, may be acceptable if certified by the engineer.
  - 3) The phasing plan shall identify any anticipated areas where fire department access roadways may be temporarily inaccessible due to trenching, slurry coating, striping, or other construction activities after they have been installed and inspected. The plan shall indicate the anticipated period of impairment and include provisions for providing plating over trenches and alternative access routes, notification to the fire department, and/or other forms of mitigation when such roadways are impaired.
  - 4) Provide a parking plan for the construction site detailing how the fire lane no parking regulations will be enforced. Include a clause stating that “the job-site superintendent is responsible for informing the work crews of parking requirements and that the entire job-site is subject to be shut down by the OFD inspector, if parking is in violation of fire lane posting.”
  - 5) The approved phasing plan shall be available at the construction site prior to bringing combustible building materials on-site. A lumber drop inspection by an OFD inspector will be required prior to the commencement of each phase; additional inspection fees will be due for each phase.
  - 6) All other access and water requirements shall apply (e.g., width, approach clearance, premises identification, locks, gates, barriers, etc.).

# Fire Master Plans for Commercial & Residential Development

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# Fire Master Plans for Commercial & Residential Development

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## ATTACHMENT 1

### OFD Fire Master Plan Notes

All of the notes listed in the **INSPECTION REQUIREMENTS** and **GENERAL REQUIREMENTS** sections shall be placed, verbatim, on the plan under the heading “ORANGE CITY FIRE DEPARTMENT NOTES.” Include individual notes, as applicable, from the **PROJECT-SPECIFIC REQUIREMENTS** section.

#### INSPECTION REQUIREMENTS

1. OFD site inspections are required for this project. Please schedule all field inspections at least 48 hours in advance. Call the Fire Prevention office at (714) 288-2541 for Inspection Scheduling.
2. A lumber drop inspection shall be performed prior to delivery to the site. All-weather access roads capable of supporting 68,000 lbs., topped with asphalt, concrete, or equivalent shall be in place and hydrants operational at time of lumber drop inspection.
3. For projects with fuel modification, a vegetation clearance inspection is required prior to a lumber drop inspection. To schedule an appointment, call the Fire Prevention office at (714) 288-2541.
4. Phased installation of fire access roads requires additional inspections.
5. An original approved, signed, wet-stamped OFD fire master plan shall be available on-site.
6. Access roads and hydrants shall be maintained and remain clear of obstructions at all times.
7. Areas where parking is not permitted shall be clearly identified.
8. Obstruction of fire lanes and hydrants may result in cancellation or suspension of inspections and a notice of correction or citation will be issued.
9. Temporary fuel tanks of 60 or more gallons shall be reviewed, inspected, and permitted by the OFD prior to installation and use.
10. The project address shall be clearly posted and visible from the public road during.
11. All gates which are required for fire department access shall be equipped with either a Knox or fire department padlock.
12. Buildings of four or more stories shall be provided with stairs and a standpipe before reaching 40 feet in height.

#### GENERAL REQUIREMENTS

13. Fire Lane widths shall be measured from top face of the curb to top face of the curb for fire lanes with standard curbs and gutters and from flowline to flowline for fire lanes with modified curb designs (e.g., rolled, ramped, etc). The developer is responsible to verify that all approved public works or grading department street improvement plans or precise grading plans conform to the minimum street width measurements per the approved OFD Fire Master Plan.
14. Permanent, temporary, and phased emergency access roads shall be designed and maintained to support an imposed load of 68,000 lbs. and surfaced to provide all-weather driving capabilities.
15. Additional fire lane markings may be required at the time of inspection depending on field conditions.
16. Address numbers shall be located and be of a color and sized to be plainly visible and legible from the roadway.
17. Access gates shall be approved prior to installation and shall follow Chapter 5 of the CFC.
18. Approved access walkways shall be provided to all required openings and all rescue windows.
19. Vegetation shall be selected and maintained in such a manner as to allow immediate access to all hydrants, valves, fire department connections, pull stations, extinguishers, sprinkler risers, alarm control panels, rescue windows, and other devices or areas used for firefighting purposes. Vegetation or building features shall not obstruct address numbers or inhibit the functioning of alarm bells, horns, or strobes.
20. Dumpsters and trash containers larger than 1.5 cubic yards shall not be stored in buildings or placed within 5 feet of combustible walls, openings or combustible roof eave lines unless protected by an approved sprinkler system.
21. Any future modification to the approved Fire Master Plan or approved site plan, including but not limited to road width, grade, speed humps, turning radii, gates, or other obstructions, shall require review, inspection, and approval by the OFD.



# Fire Master Plans for Commercial & Residential Development

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22. Approval of this plan shall not be construed as approval of any information or project conditions other than those items and requirements identified in related portions of the 2022 CFC and CBC and Orange Municipal Code. This project may be subject to additional requirements not stated herein upon examination of actual site and project conditions or disclosure of additional information.

**PROJECT-SPECIFIC REQUIREMENTS (Include only those notes that are applicable to the project as designed; some notes may need to be modified to address specific project conditions)**

23. An underground piping plan is required for the installation of an automatic fire sprinkler system or for a private fire hydrant system. A separate plan submittal is required.
24. A chemical classification and hazardous materials compliance plan shall be approved by the OFD prior to any hazardous materials being stored or used on site. A separate plan submittal is required.
25. Buildings used for high-piled storage shall comply with CFC requirements. A separate plan submittal is required if materials will be stored higher than 12 feet for lower-hazard commodities, or higher than five feet for high-hazard commodities such as plastics, rubber, flammable/combustible liquids, tires, carpet, etc.
26. An automatic fire sprinkler system shall be installed in accordance with applicable codes and ordinances, amendments, and guidelines. Sprinkler systems, other than those listed in CFC Chapter 9, shall be monitored by an approved central station. Separate plan submittals for the sprinkler and monitoring systems are required. Design of an automatic fire sprinkler system shall be based on a current flow test (within 12 months of the submitted design) which has been conducted per NFPA 13 requirements and witnessed by a fire department representative.
27. Buildings containing industrial refrigeration systems shall comply with CFC requirements. A separate plan submittal is required if refrigerant quantities exceed thresholds.
28. A fire alarm system shall be installed in accordance with applicable codes and ordinances, amendments, and guidelines. A separate plan submittal is required.
29. Structures located in a Fire Hazard Severity Zone, Special Fire Protection Area, or Wildland-Urban Interface Fire Area are subject to the construction requirements prescribed in Chapter 7A of the 2022 CBC and/or Section 327 of the 2022 CRC. Construction materials/methods are reviewed and inspected by the Building Department.
30. One or more structures shown on this plan are located adjacent to a fuel modification area. Changes to the fuel modification zone landscaping, new structures, or addition/alteration to existing structures requires review and approval by the OFD.

# Fire Master Plans for Commercial & Residential Development

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## ATTACHMENT 2

### Fire Master Plan Submittal Checklist

#### **PROJECT INFORMATION**

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- |   |                              |  |
|---|------------------------------|--|
| Scope of project is clearly defined on the plan?                  | <input type="checkbox"/> Yes |  |
| Tract/Tentative Tract/Parcel Map Number has been provided?        | <input type="checkbox"/> Yes |  |
| Standard OFD fire master plan notes are included?                 | <input type="checkbox"/> Yes | (Notes are tailored to this project, where applicable)                   |
| Building area, construction, occupancy, sprinklers noted on plan? | <input type="checkbox"/> Yes |  |
| Allowable area calculation provided on plan?                      | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (Building less than 3,000 sq. ft.)          |
| AM&M request letter scanned onto plan?                            | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (No alternate methods proposed)             |
| Sheets not relevant to fire master plan removed from plan set?    | <input type="checkbox"/> Yes |  |
| Access/hydrant phasing plan provided?                             | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (No phasing of access/hydrant installation) |
| Operations incident planning CD/electronic file provided?         | <input type="checkbox"/> Yes | <input type="checkbox"/> No (Will provide prior to plan approval)        |

#### **WATER AND HYDRANTS**

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- |   |                              |  |
|---|------------------------------|--|
| Water availability form completed and provided?         | <input type="checkbox"/> Yes | <input type="checkbox"/> No (In process; or no change in demand) |
| All hydrants within 400' of the site are shown on plan? | <input type="checkbox"/> Yes |  |
| Are hydrants provided/spaced per CFC Appendix C?        | <input type="checkbox"/> Yes |  |

#### **ACCESS AND ROADWAYS**

---

- |  |                              |  |
|--|------------------------------|--|
| Extent of the access roadway is clearly shown on the plan?       | <input type="checkbox"/> Yes |  |
| Turning radii and width (incl. road sections) shown on the plan? | <input type="checkbox"/> Yes |  |
| Exterior of all structures within 150' hose pull distance?       | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (AM&M proposed) |
| Engineer's certification provided for new paving?                | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (No new paving) |
| Walkable surface provided to required openings?                  | <input type="checkbox"/> Yes |  |
| Road and walkway grades >12% shown on plan?                      | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A                 |

#### **FIRE LANE IDENTIFICATION**

---

- |   |                              |   |
|---|------------------------------|---|
| Red curbs are identified with bold or dashed lines?             | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (Signs provided)     |
| Location of each "Fire Lane—No Parking" sign shown?             | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (Red curbs provided) |
| Fire lane entrance sign provided at each vehicle entrance?      | <input type="checkbox"/> Yes |   |
| Detail drawings of red curbs/"No Parking"/entrance signs shown? | <input type="checkbox"/> Yes |   |

#### **GATES AND OBSTRUCTIONS**

---

- |   |                              |  |
|---|------------------------------|--|
| Are all gates, fences, and planters shown?          | <input type="checkbox"/> Yes |  |
| Are vehicle gates identified as manual or electric? | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (No gates)        |
| Manual vehicle gates have "No Parking" sign noted?  | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (No manual gates) |
| Knox boxes/locks/switches are noted on plans?       | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (No gates)        |
| OFD gate notes/specifications included on plan?     | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (No gates)        |

#### **OTHER REQUIREMENTS**

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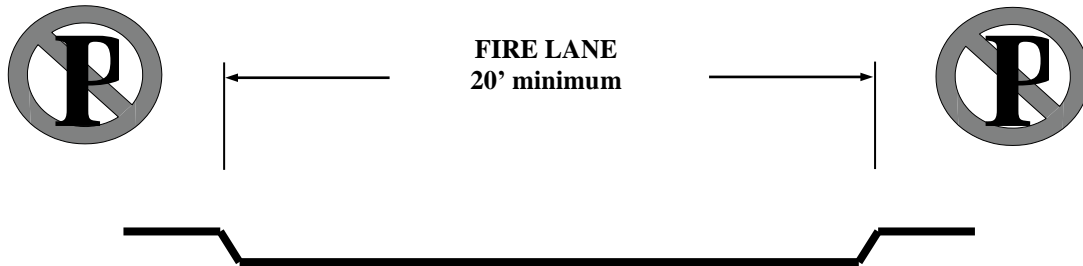
- |  |                              |  |
|--|------------------------------|--|
| Premises ID/address monument location shown on plan?     | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (Single family homes)       |
| Trash enclosures are located at least 5' from buildings? | <input type="checkbox"/> Yes | <input type="checkbox"/> No (Enclosures are sprinklered) |
| Two entry points provided for 29 or more residences?     | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (Non-residential project)   |
| Buildings >75' to highest occupiable floor called out?   | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (No high-rise structures)   |
| Parking enforcement letter provided?                     | <input type="checkbox"/> Yes | <input type="checkbox"/> N/A (Public streets only)       |

*NOTE: This is only a listing of basic Fire Master Plan submittal requirements. Other information or requirements may be necessary depending on conditions specific to each project.*

## ATTACHMENT 3

### Minimum Road Widths

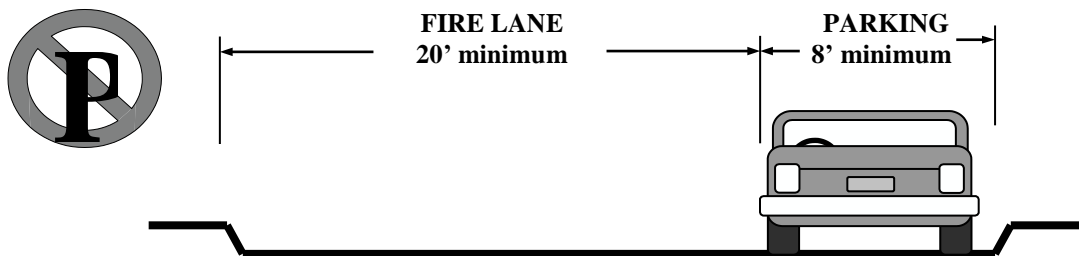
Measured from top face of curb to top face of curb for standard vertical curbs or flow line to flow line for rolled, ramped, or other curb types.



#### ROADWAY LESS THAN 28'

*Parking prohibited.*

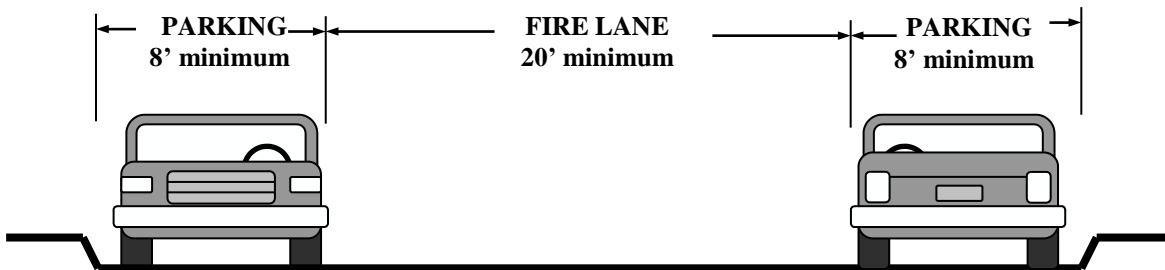
*Roadway is required to be posted as a fire lane.*



#### ROADWAY AT LEAST 28' BUT LESS THAN 36'

*Parking permitted on one side only.*

*Roadway is required to be posted as a fire lane.*



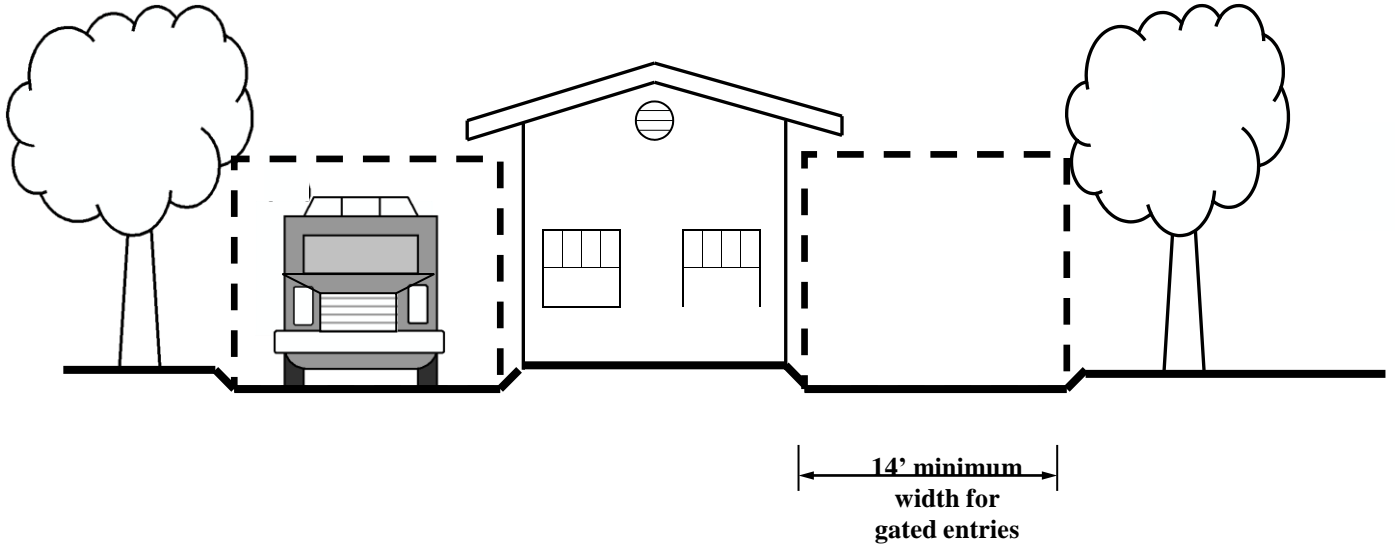
#### ROADWAY 36' OR WIDER

*Parking permitted on both sides*

## ATTACHMENT 4

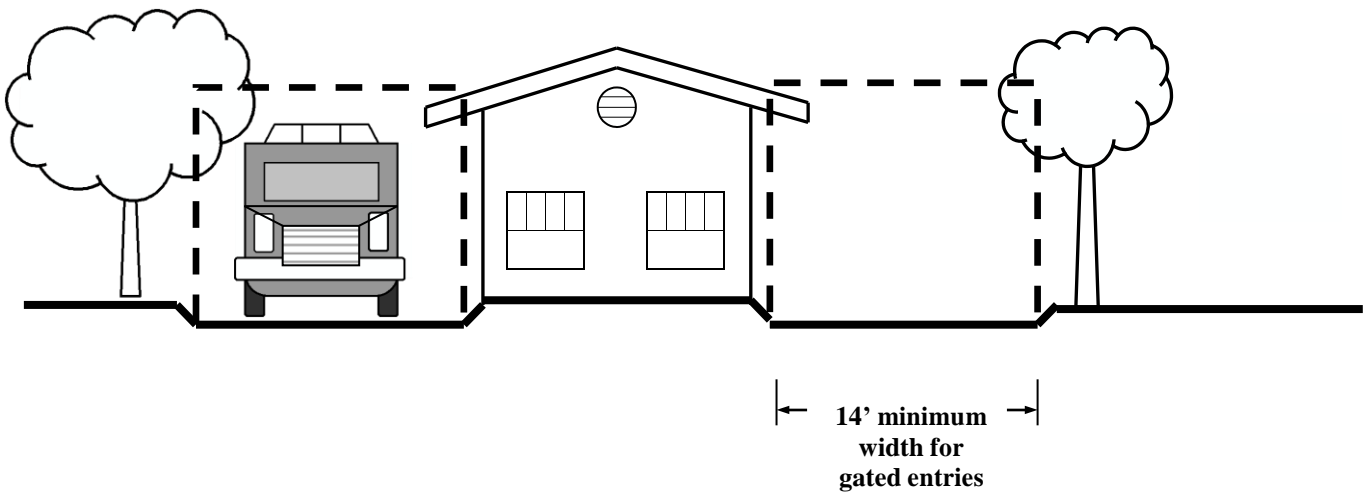
### Fire Apparatus Access Roadway Clearance For Typical Gated Community Guard House

*Fire lane width reductions detailed below are applicable only to the area immediately adjacent to the guard house or gate. Roads leading up to and beyond the guard house or gate shall meet standard fire lane width requirements prescribed in Section 2.A.5 of this guideline.*



#### PROPER CLEARANCE PROVIDED

*Eaves and vegetation do not encroach upon the 14'-wide by 13'-6" high minimum dimensions allowed for the fire access roadway next to the guard house.*

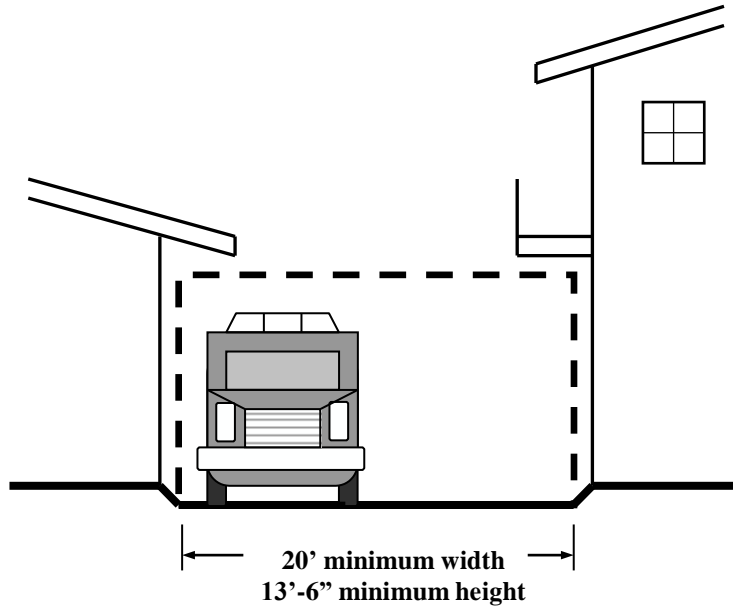


#### INSUFFICIENT CLEARANCE

*While a 14'-wide access roadway is provided next to the guard house, eaves and vegetation encroach upon the minimum clear height of the fire lane.*

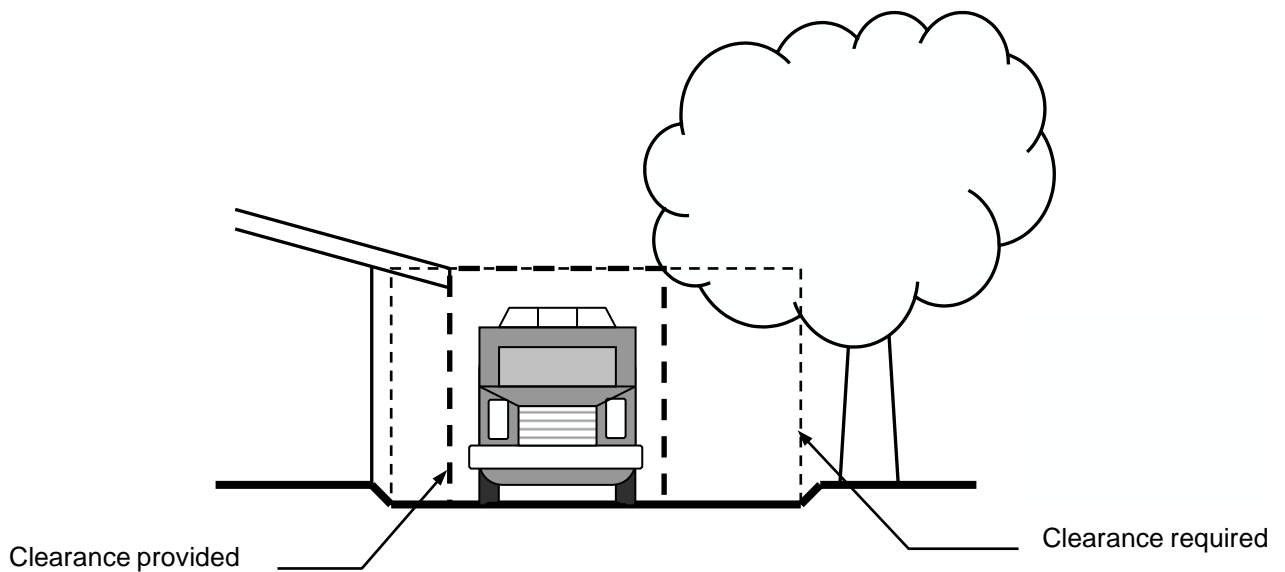
## ATTACHMENT 5

### Fire Apparatus Access Roadway Clearance



#### PROPER CLEARANCE PROVIDED

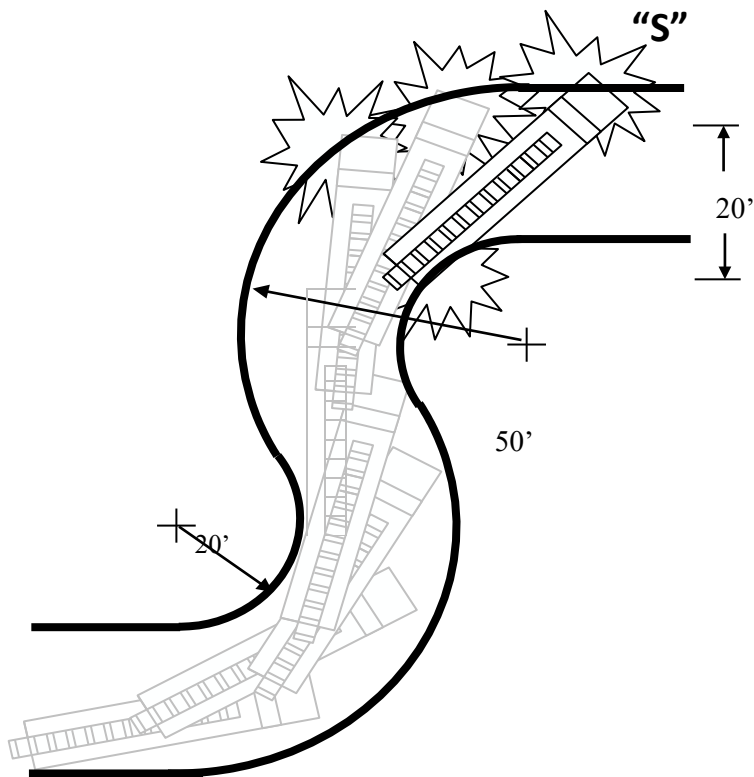
*Eaves, balconies, and other obstructions do not encroach upon the 20' wide by 13'-6" high fire access roadway envelope.*



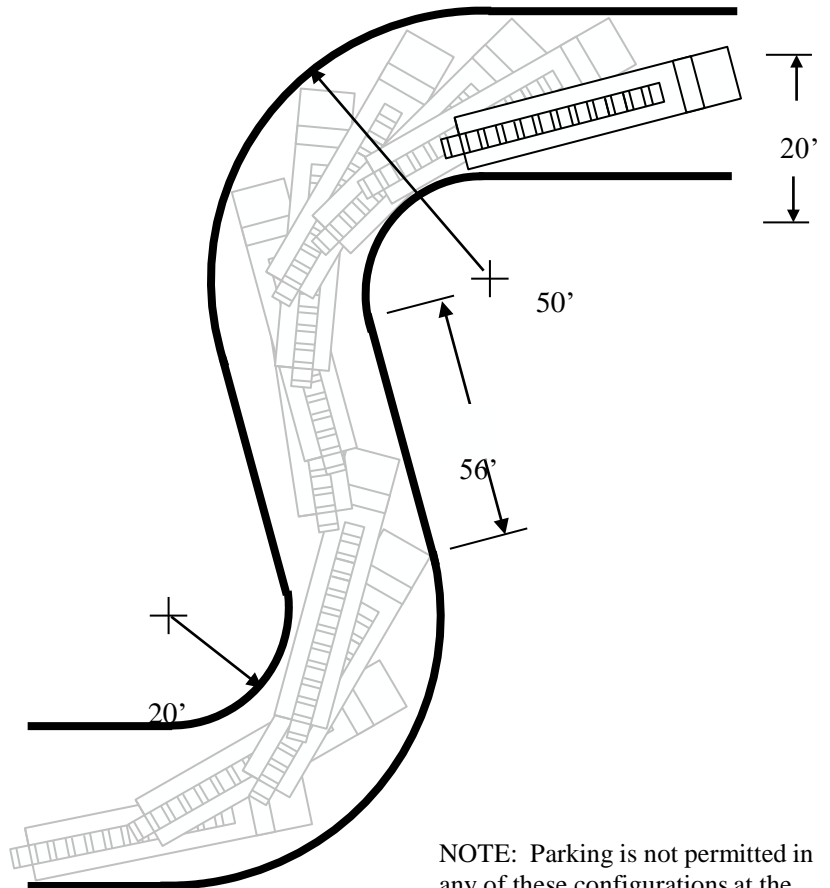
#### INSUFFICIENT CLEARANCE

*A 20'-wide roadway has been provided, but eaves and vegetation effectively reduce the clear dimensions below required minimums.*

## ATTACHMENT 6



**NOT PERMITTED**  
OFD apparatus are unable to negotiate tight "S" curves, such as the one shown to the left.



### PERMITTED

A 56' straight leg is required between the turns in a compound curve to provide sufficient recovery distance for the apparatus. Alternatively, the length of the straight leg may be reduced if the road width and/or turning radii are increased to allow for a wider turn.

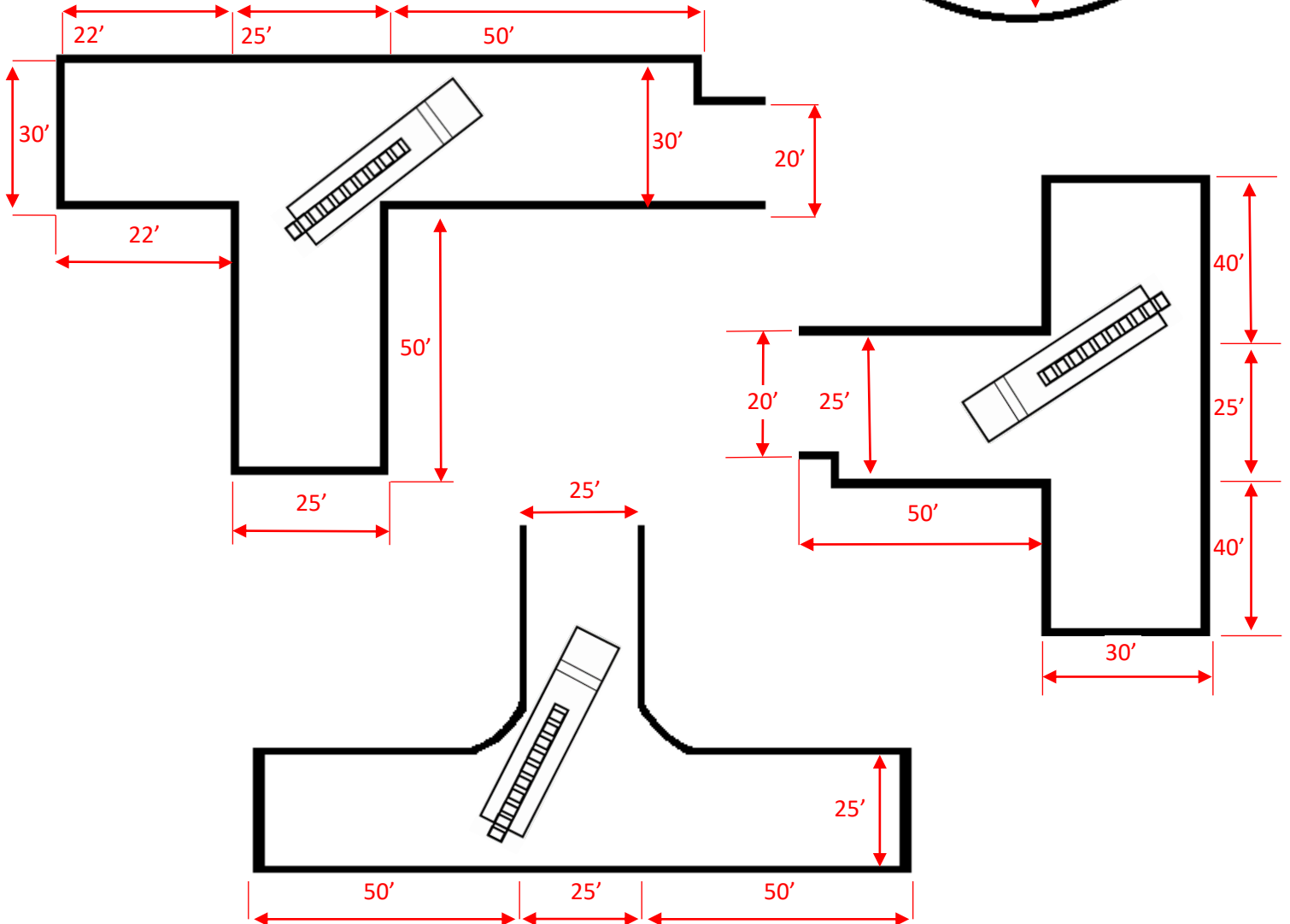
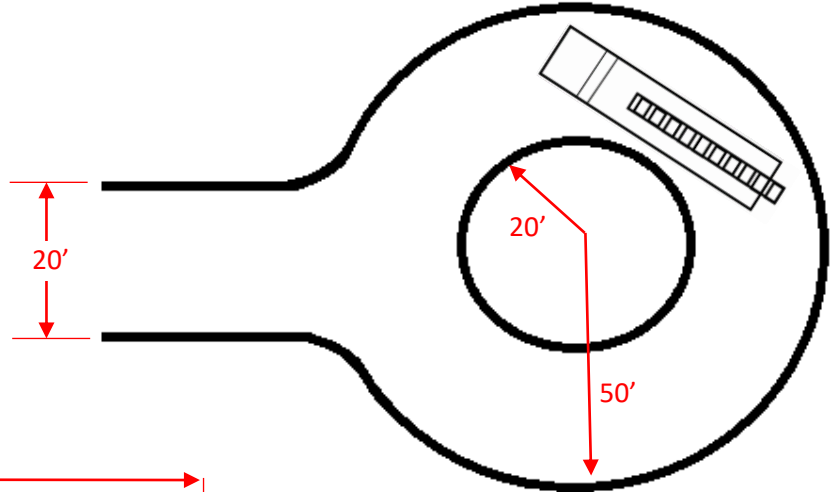
NOTE: Parking is not permitted in any of these configurations at the dimensions shown.

*Drawing not to scale; for illustration purposes only.*

# Fire Master Plans for Commercial & Residential Development

## ATTACHMENT 7 Minimum Turnaround and Hammerhead Dimensions

NOTE: Parking is not permitted in any of these turnarounds or hammerheads at the dimensions shown.



# Fire Master Plans for Commercial & Residential Development

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## ATTACHMENT 8 Fire Lane Parking Violations

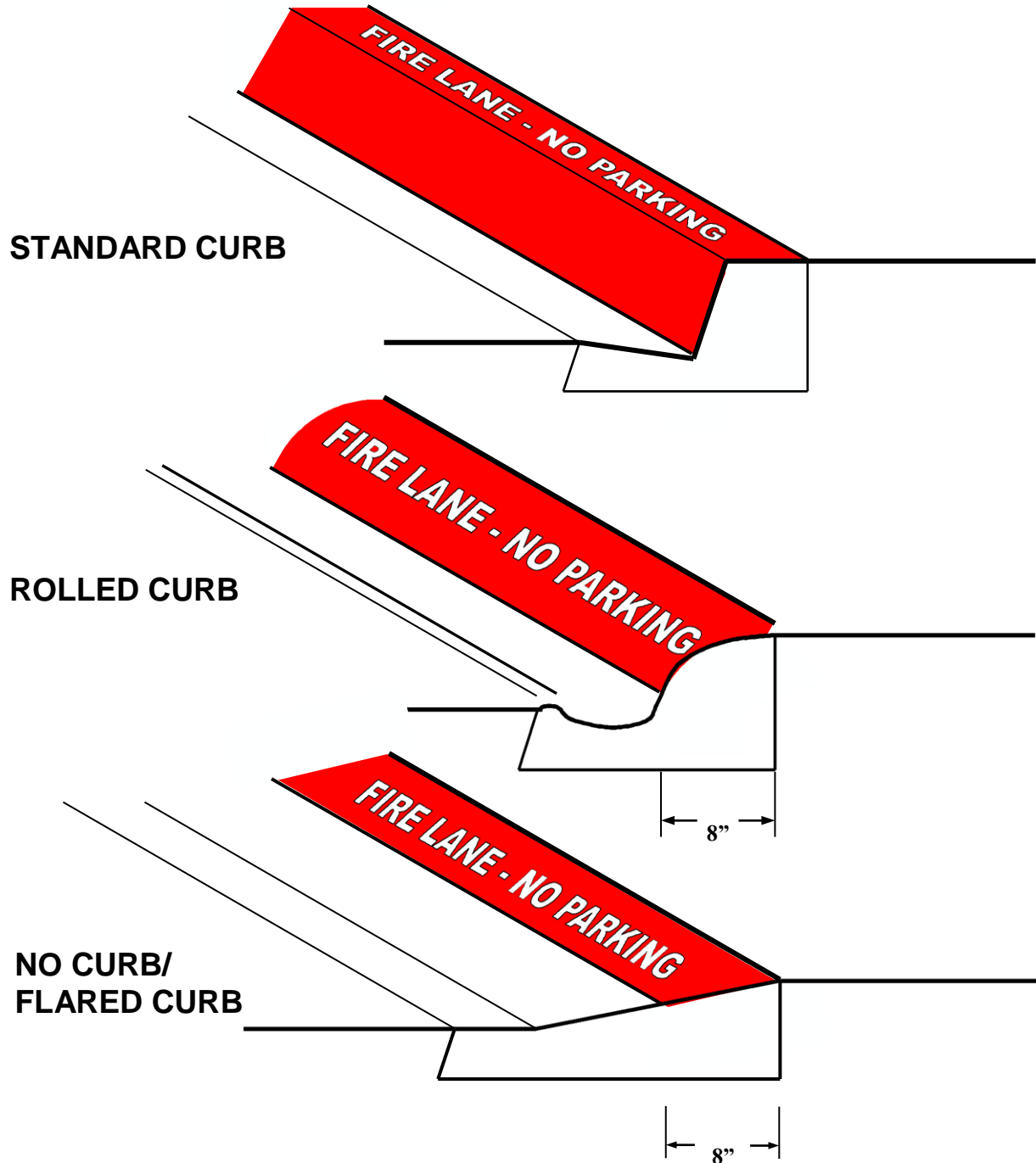
The California Fire Code (CFC) and California Vehicle Code (CVC) specify rules of the road for stopping, standing, and parking in fire lanes or near fire hydrants.

- A. Section 22500.1 states that no person shall stop, park, or leave standing any vehicle whether attended or unattended, in any location designated as a fire lane by the OFD except when necessary to avoid conflict with other traffic or in compliance with the direction of a peace officer or official traffic control device. Vehicles illegally parked in a fire lane may be towed per CVC 22953(b).
- B. There shall be no parking of any vehicles other than fire department vehicles within 15 feet of either side of a fire hydrant in accordance with CVC 22514(c). Such vehicles may be towed per CVC 22651(e).
- C. CVC 22658(a) permits the owner or person in lawful possession of any private property, subsequent to notifying local law enforcement, to cause the removal of a vehicle parked on such property to the nearest public garage, if:
  - 1) A sign is displayed in plain view at all entrances to the property specifying:
    - a) The ordinance prohibiting public parking, *and*
    - b) A notation indicating that vehicles will be removed at the owner's expense, *and*
    - c) The telephone number of the local traffic law enforcement agency, *or*
  - 2) The lot or parcel upon which the vehicle is parked has a single-family dwelling.
- D. CFC 503.4 states that the required width of a fire apparatus access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances shall be maintained at all times.
- E. CFC 507.5.4 states that vehicles and other obstructions shall not be placed or kept near fire hydrants, fire department inlet connections or fire-protection system control valves in a manner that would prevent such equipment or fire hydrants from being immediately discernible. The fire department shall not be deterred or hindered from gaining immediate access to fire-protection equipment or hydrants.



## ATTACHMENT 9

### Fire Lane Identification – Red Curbs



1. Fire Lane entrance sign(s) shall also be provided per Attachment 10 or 11.
2. Curbs shall be painted OSHA safety red.
3. "FIRE LANE – NO PARKING" shall be painted on top of curb in 3" white lettering at a spacing of 30' on center or portion thereof.

## ATTACHMENT 10

### Specifications for Fire Lane Entrance Signs

To be used only at *vehicle entry points*  
to areas that contain “Fire Lane—No Parking” signs or red curbs



All sign and lettering dimensions shown are minimums. “Arial Narrow” font used is used in sample above though other legible sans-serif fonts may be acceptable.

This sign shall be posted at all vehicle entrances to areas marked with either red curbs or fire lane “No Parking” signs. Signs shall be securely mounted facing the direction of travel and clearly visible to oncoming traffic entering the designated area. Signs shall be made of durable material and installed per Attachments 13 and 14.

Towing company contact information is required for all properties with a standing written agreement for services with a towing company per the California Vehicle Code.

## ATTACHMENT 11

### Specifications for Alternate Location of Towing Company Information

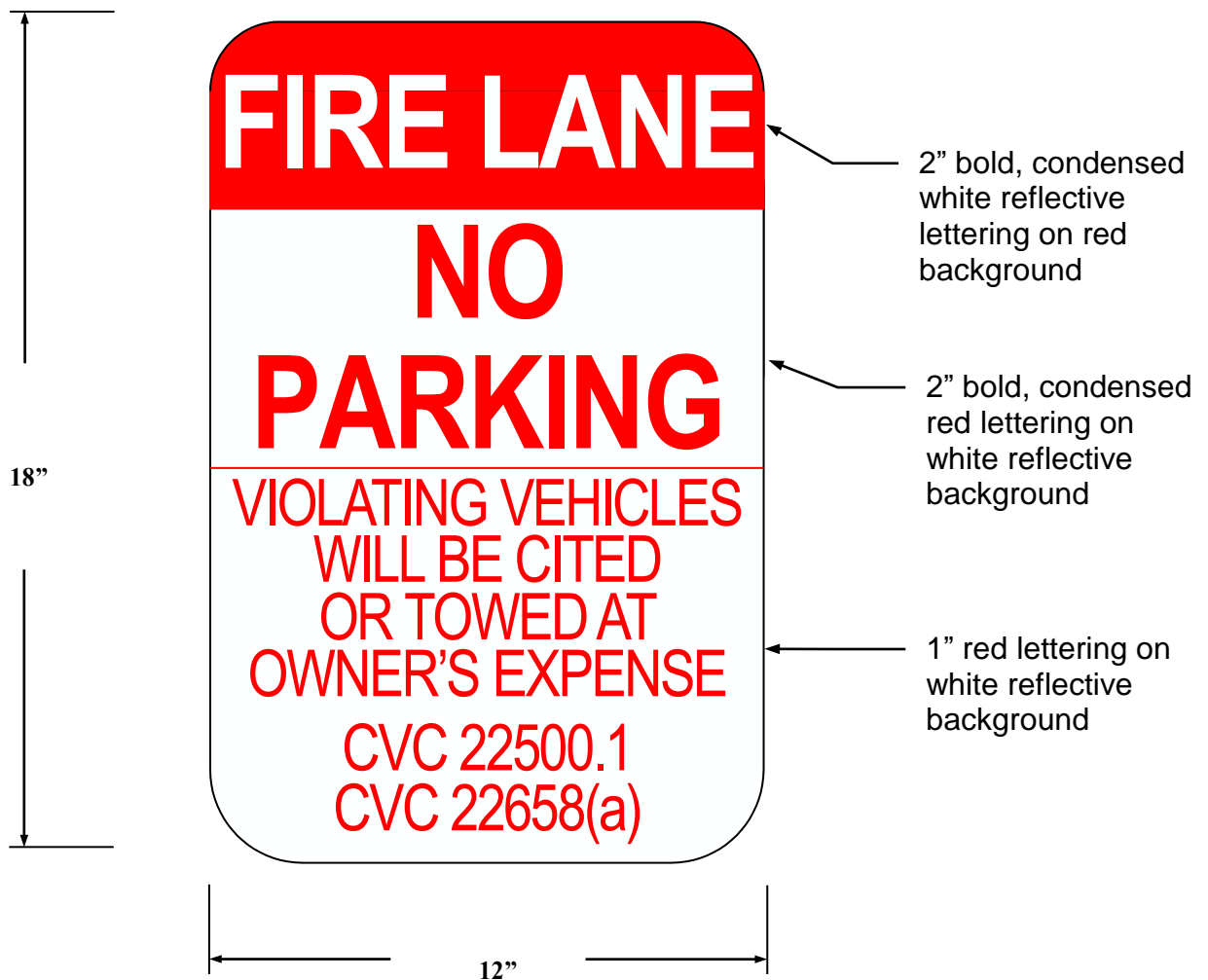


Towing company contact information is required for all properties with a standing written agreement for services with a towing company per the California Vehicle Code.

To facilitate periodic changes in towing company contracts, the towing company contact information may be posted on a separate sign mounted directly below the fire lane entrance sign instead of on the entrance sign itself. The method of attachment to the post shall not obscure the wording on either sign.

## ATTACHMENT 12

### Specifications for Fire Lane No Parking Signs

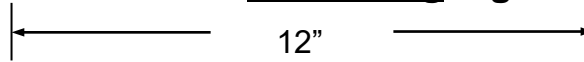


All sign and lettering dimensions shown are *minimums*. "Arial Narrow" font used is used in sample above though other legible sans-serif fonts may be acceptable.

Signs shall be securely mounted facing the direction of travel and clearly visible to oncoming traffic entering the designated area. Signs shall be made of durable material and installed per Attachments 13 and 14.

## ATTACHMENT 12a

### Specifications for Alternative Fire Lane No Parking Signs



Additional verbiage shall be 1" bold, condensed red lettering on white reflective background. Where parking stalls are not present, sign may omit "except in designated stalls" and sign height may be reduced to 18".

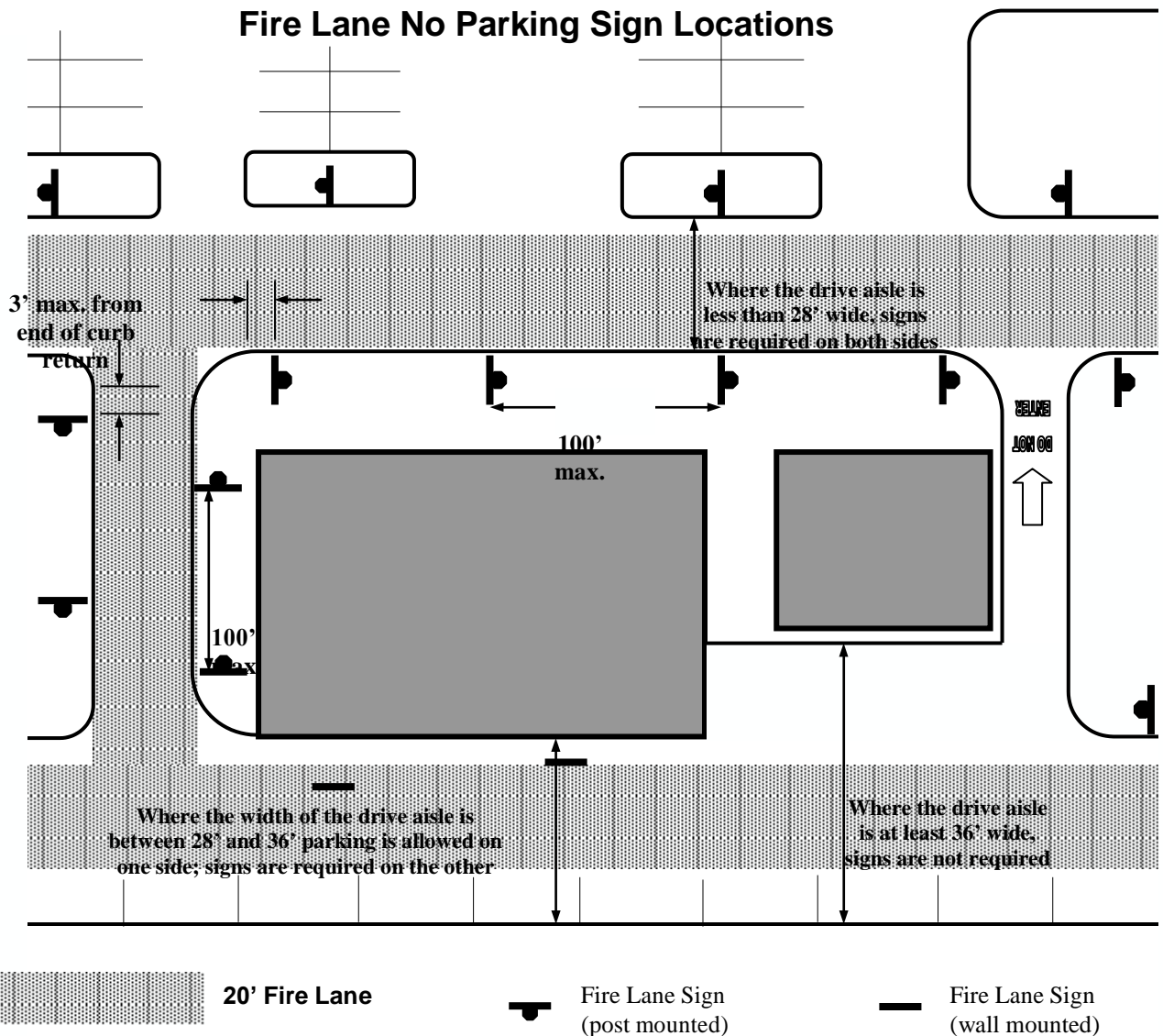
Specifications for the rest of the sign shall match those of standard fire lane no parking signs.

All sign and lettering dimensions shown are *minimums*. "Arial Narrow" font used is used in sample above though other legible sans-serif fonts may be acceptable.

Signs shall be securely mounted facing the direction of travel and clearly visible to oncoming traffic entering the designated area. Signs shall be made of durable material and installed per Attachments 13 and 14.

## ATTACHMENT 13

### Fire Lane No Parking Sign Locations

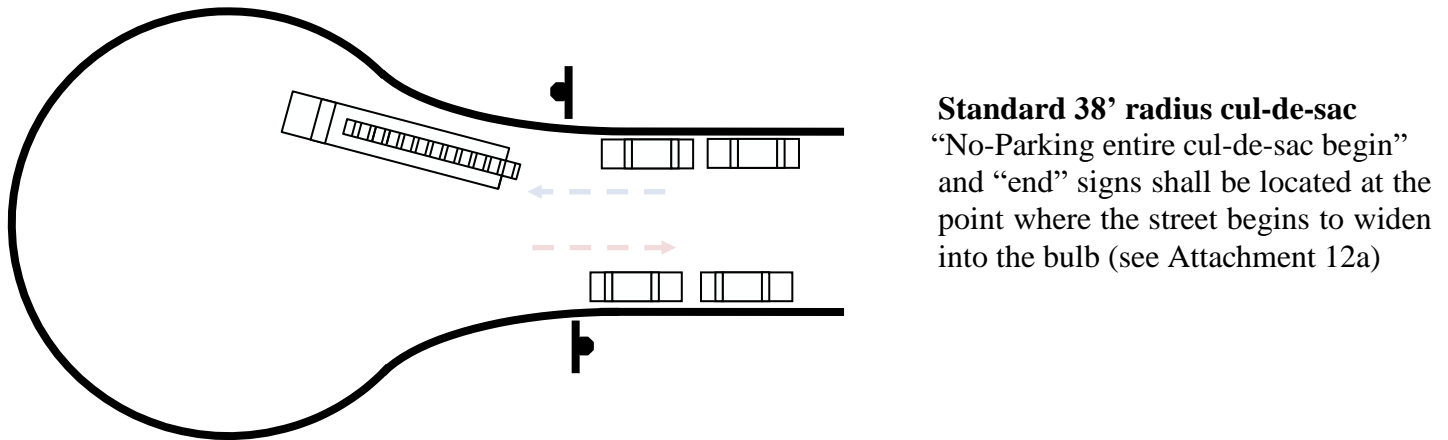


Signs are required within 3' of the end of the curb return at the beginning of each "block" along the fire lane and spaced a maximum of 100' along the entire designated lane. A sign shall be located within a reasonable distance of the end of each block as necessary to clearly identify the extent of the no parking zone. One sign is required for each island adjacent to the fire lane that is large enough to accommodate a parked car.

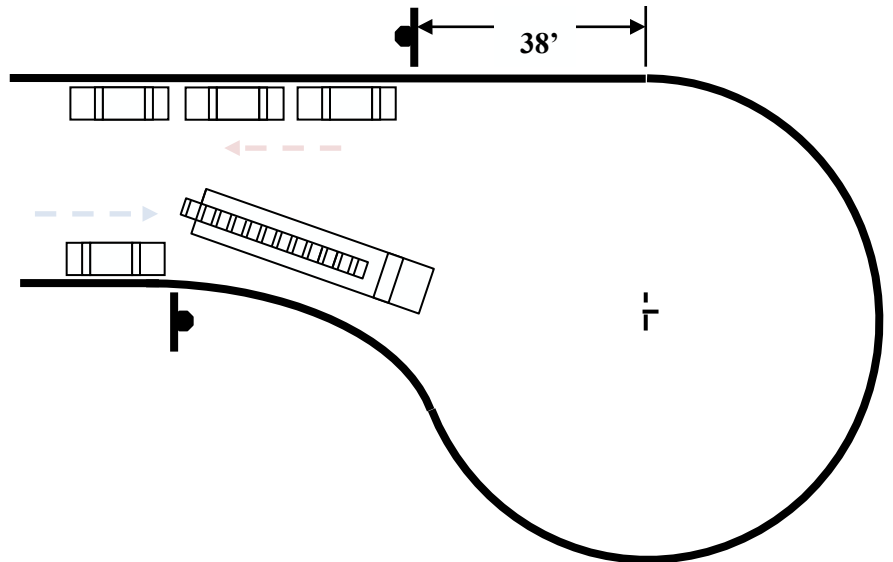
Signs shall be securely mounted facing the direction of travel and clearly visible to oncoming traffic entering the designated area. Signs shall be made of durable material and installed per Attachment 14. Where sign posts are not practical, signs may be mounted on a wall or fence and are allowed to be oriented perpendicular to the length of the fire lane. OFD inspectors will determine if additional signs or sign locations are required.

## ATTACHMENT 13a

### Fire Lane No Parking Sign Locations for Cul-de-sacs Designed Per Public Works Department Standard Plans and Specifications



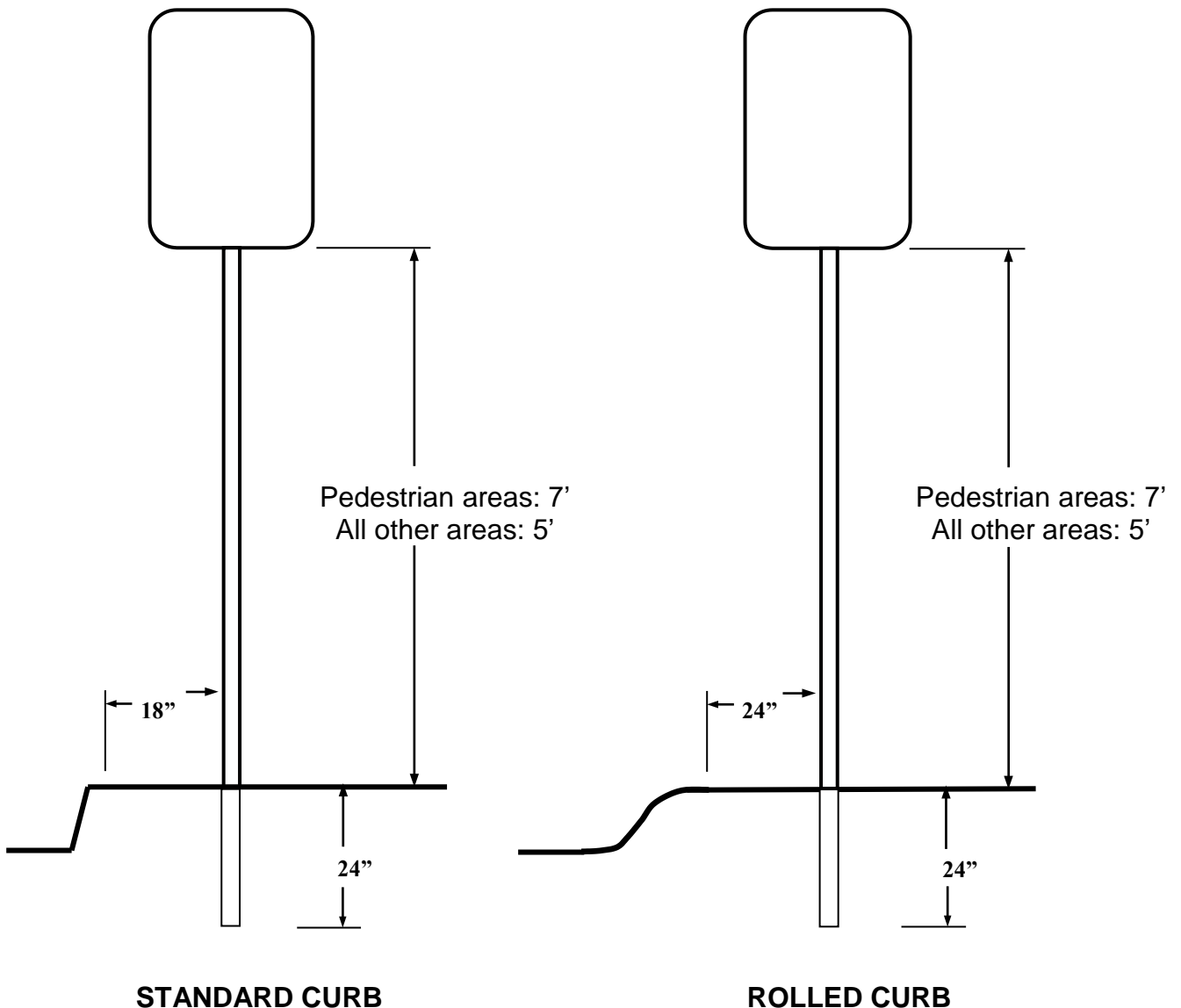
**Offset 38' radius cul-de-sac:** “No-Parking entire cul-de-sac begin” and “end” signs shall be located at the point where the street begins to widen into the bulb and at a point 38' from where the cul-de-sac and street are tangent (see Attachment 12a)



*Drawing  
not to scale*

## ATTACHMENT 14

### Mounting Specifications for Fire Lane Entrance and No Parking Signs



Signs shall be mounted facing the direction of vehicular travel.

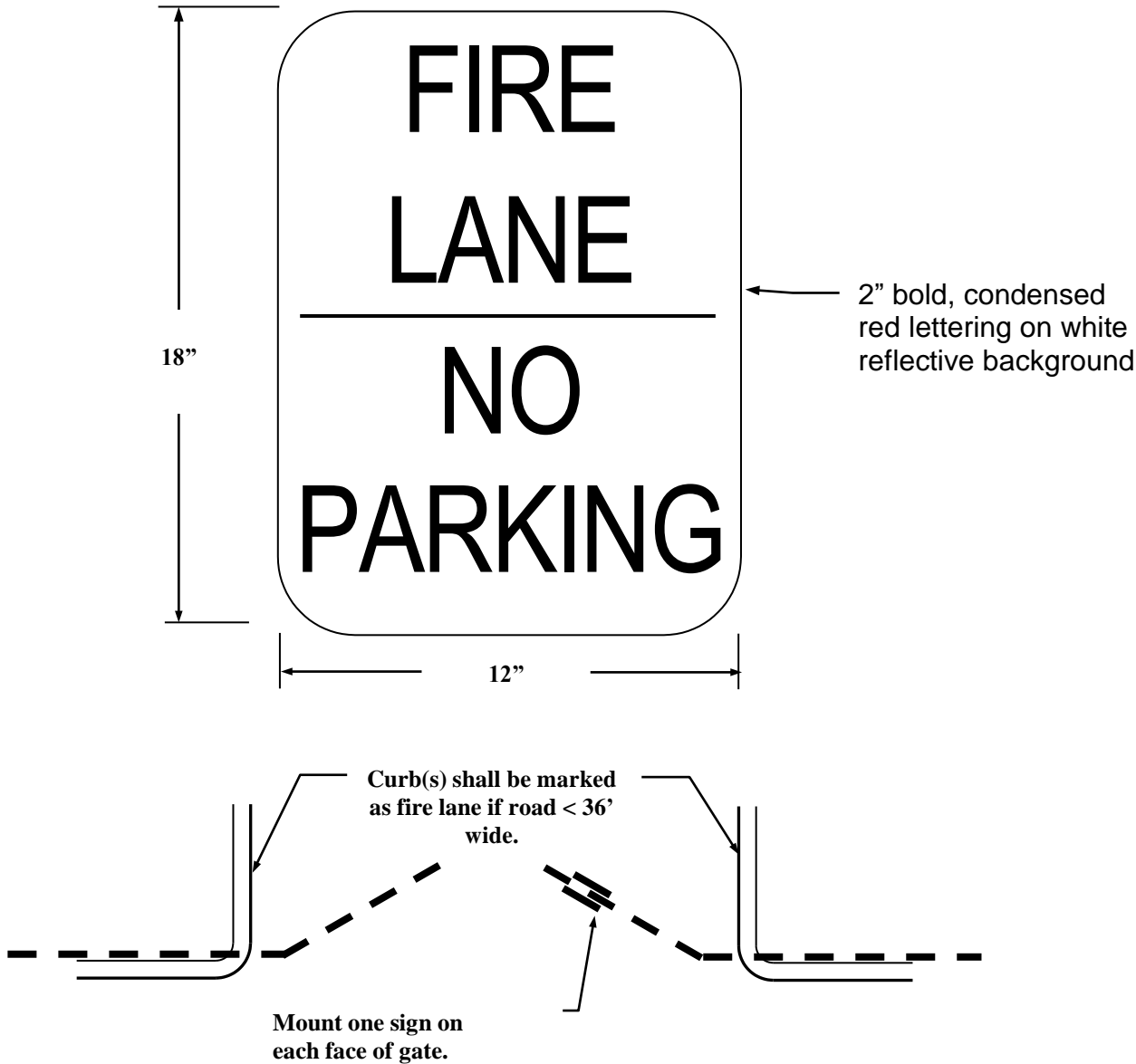
Signs may be mounted on existing posts or buildings where the centerline of the sign is no more than 24" from the edge of the roadway.

Depth of bury shall be a *minimum* of 24" and rebar, a concrete footing, or another method to prevent removal of the sign is recommended. Footings for signs located in the public right-of-way shall be per the local jurisdiction's requirements.



**ATTACHMENT 15**

**Specifications for  
“Fire Lane - No Parking” Signs for  
Manually Operated Gates and Barriers**



All sign and lettering dimensions shown are minimums. “Arial Narrow” font used is used in sample above though other legible sans-serif fonts may be acceptable.

“Fire Lane—No Parking” sign shown in Attachment 12 may be used as an alternative. Signs shall be securely mounted on the front and back face of the gate clearly visible to traffic entering the designated area. Signs shall be made of a durable material.

# Fire Master Plans for Commercial & Residential Development

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## ATTACHMENT 16

### Sample Parking Enforcement Letter

Date

Fire Prevention Bureau  
Orange City Fire Department  
1176 E. Chapman Ave.  
Orange, CA 92866

Re: *(Project Name, Location, and Service Request Number)*  
Parking Enforcement Plan

The fire lane parking enforcement plan for the above referenced project is stated as follows:

All fire lanes within *(list development address or tract information)* shall be maintained and in no event shall parking be permitted along any portion of a street or driveway that requires fire lanes or any area designated as a fire lane for turn-around purposes either during construction or after occupancy.

*(Association name)* shall adopt reasonable rules and regulations regarding the parking of vehicles along the streets, roads and or drives within the project that are not in conflict with applicable law.

In furtherance thereof, *(Association name)*, through its officers, committees, and agents, will establish the “parking” and “no parking” areas within the property in accordance with Section 22658.2 of the California Vehicle Code and OMC 15.32.010. The law shall be enforced through such rules and regulations by all lawful means, including, written warnings, citing, levying fines, and towing vehicles in violation.

*(Association name)* will contract with a certified patrol and towing company to remove vehicles that violate no parking restrictions. First time violators will receive a written warning and with subsequent violations, the vehicle shall be subject to towing. The vehicle owner shall be responsible for all costs incurred in remedying such violation, including without limitation towing cost, citations, and legal fees.

Company Name  
Authorized Agent Signature

Cc:

# Fire Master Plans for Commercial & Residential Development

## ATTACHMENT 17

### CFC TABLE B105.1: Minimum Required Fire Flow and Flow Duration for Buildings as adopted by the OFD

FIRE FLOW CALCULATION AREA (square feet)					FIRE FLOW (gallons/min) <sup>2</sup>		Flow Duration
Type IA/IB <sup>1</sup>	Type IIA/IIIA <sup>1</sup>	Type IV/VA <sup>1</sup>	Type IIB/IIIB <sup>1</sup>	Type VB <sup>1</sup>	Unsprinklered <sup>3</sup>	Sprinklered <sup>4</sup>	
0-22700	0-12700	0-8200	0-5900	0-3600	1500	1500	2
22701-30200	12701-17000	8201-10900	5901-7900	3601-4800	1750	1500	
30201-38700	17001-21800	10901-12900	7901-9800	4801-6200	2000	1500	
38701-48300	21801-24200	12901-17400	9801-12600	6201-7700	2250	1500	
48301-59000	24201-33200	17401-21300	12601-15400	7701-9400	2500	1500	
59001-70900	33201-39700	21301-25500	15401-18400	9401-11300	2750	1500	
70901-83700	39701-47100	25501-30100	18401-21800	11301-13400	3000	1500	3
83701-97700	47101-54900	30101-35200	21801-25900	13401-15600	3250	1500	
97701-112700	54901-63400	35201-40600	25901-29300	15601-18000	3500	1500	
112701-128700	63401-72400	40601-46400	29301-33500	18001-20600	3750	1500	
128701-145900	72401-82100	46401-52500	33501-37900	20601-23300	4000	1500	4
145901-164200	82101-92400	52501-59100	37901-42700	23301-26300	4250	1500	
164201-183400	92401-103100	59101-66000	42701-47700	26301-29300	4500	1500	
183401-203700	103101-114600	66001-73300	47701-53000	29301-32600	4750	1500	
203701-225200	114601-126700	73301-81100	53001-58600	32601-36000	5000	1500	
225201-247700	126701-139400	81101-89200	58601-65400	36001-39600	5250	1500	
247701-271200	139401-152600	89201-97700	65401-70600	39601-43400	5500	1500	
271201-295900	152601-166500	97701-106500	70601-77000	43401-47400	5750	1500	
295901+	166501+	106501-115800	77001-83700	47401-51500	6000	1500	
		115801-125500	83701-90600	51501-55700	6250	1563	
		125501-135500	90601-97900	55701-60200	6500	1625	
		135501-145800	97901-106800	60201-64800	6750	1688	
		145801-156700	106801-113200	64801-69600	7000	1750	
		156701-167900	113201-121300	69601-74600	7250	1813	
		167901-179400	121301-129600	74601-79800	7500	1875	
		179401-191400	129601-138300	79801-85100	7750	1938	
		191401+	138301+	85101+	8000	2000	

<sup>1</sup> **Construction Types:** based upon actual construction without applying 1-hour equivalency allowed by CBC Table 601 footnote 'd'.

<sup>2</sup> **Fire flow:** measured at 20 psi.

<sup>3</sup> **Unsprinklered homes:** Minimum fire flow for a detached, unsprinklered single-family residence/duplex up to 3600 sq. ft. is 1000 gpm for one hour. Fire-flow and flow duration for dwellings having a fire-flow calculation area in excess of 3,600 square feet shall not be less than that specified in the table above.

<sup>4</sup> **Sprinklered homes:** When a detached single-family residence/duplex is equipped with an approved automatic sprinkler system, the fire flow may be reduced to 500 gpm for ½ hour and 50% of that required for an unsprinklered structure for one hour.

# Fire Master Plans for Commercial & Residential Development

## ATTACHMENT 18

**CFC TABLE C105.1: Hydrant Quantity and Spacing as adopted by the OFD**

<b>FLOW REQUIREMENT</b> from Table B105.1	<b>Minimum # of Hydrants</b>	<b>Average Hydrant Spacing (feet)</b> <sup>1, 2, 3, 6</sup>	<b>Maximum Distance to Hydrant (feet)</b> <sup>4,7</sup>
up to 1750	1	500	250
1751-2250	2	450	225
2251-2500	3	450	225
2501-3000	3	400	225
3001-4000	4	350	210
4001-5000	5	300	180
5001-5500	6	300	180
5501-6000	6	250	150
6001-7000	7	250	150
7001+	8 or more <sup>5</sup>	200	120

<sup>1</sup> Reduce by 100 feet for dead-end streets or roads.

<sup>2</sup> Where streets are provided with median dividers which can be crossed by fire fighters pulling hose lines, or where arterials 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.

<sup>3</sup> 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.

<sup>4</sup> Reduce by 50 feet for dead-end streets or roads.

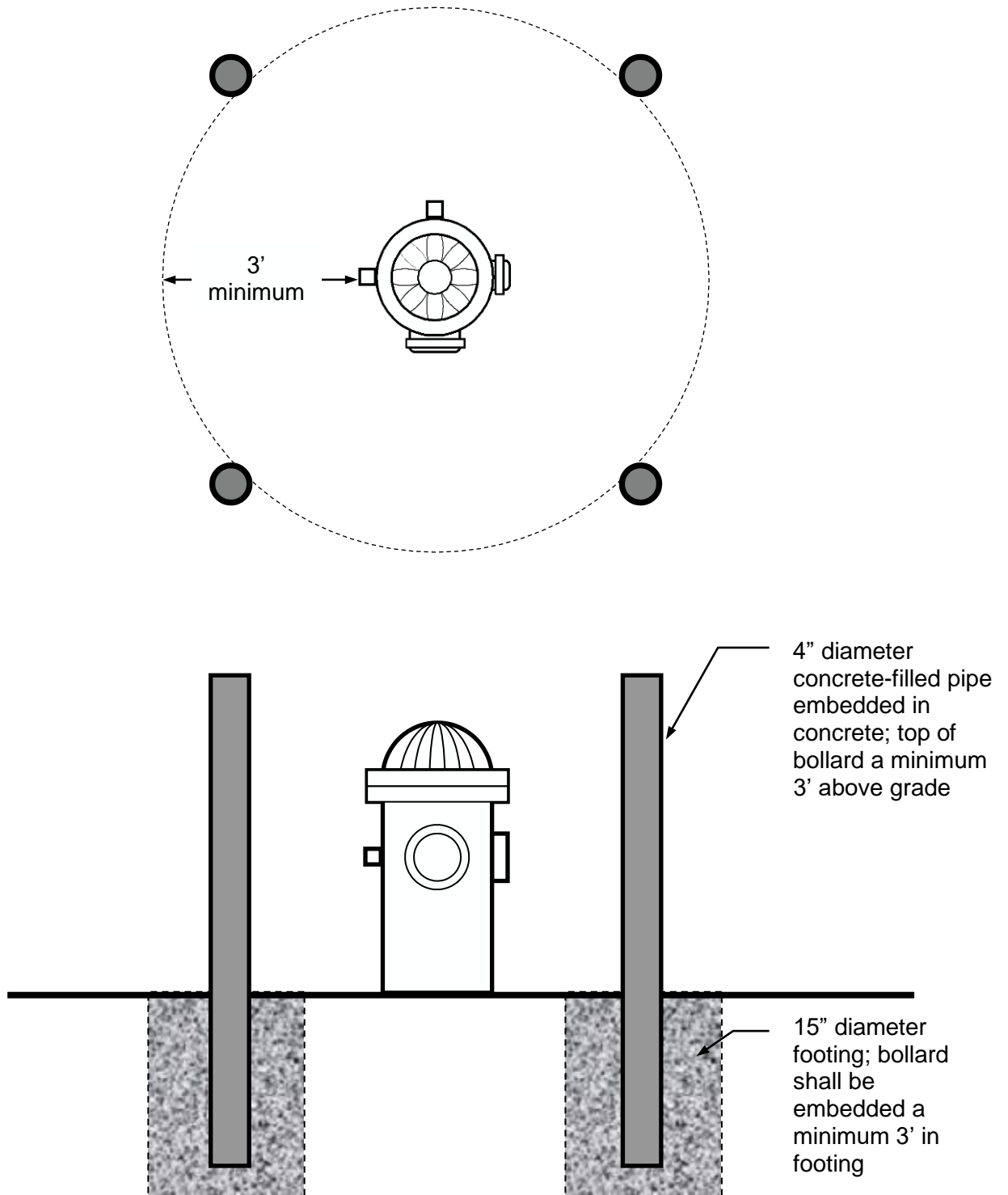
<sup>5</sup> One hydrant for each 1,000 gallons per minute or fraction thereof.

<sup>6</sup> The spacing between hydrants serving only detached sprinklered single family residences/duplexes may be increased to 600 feet.

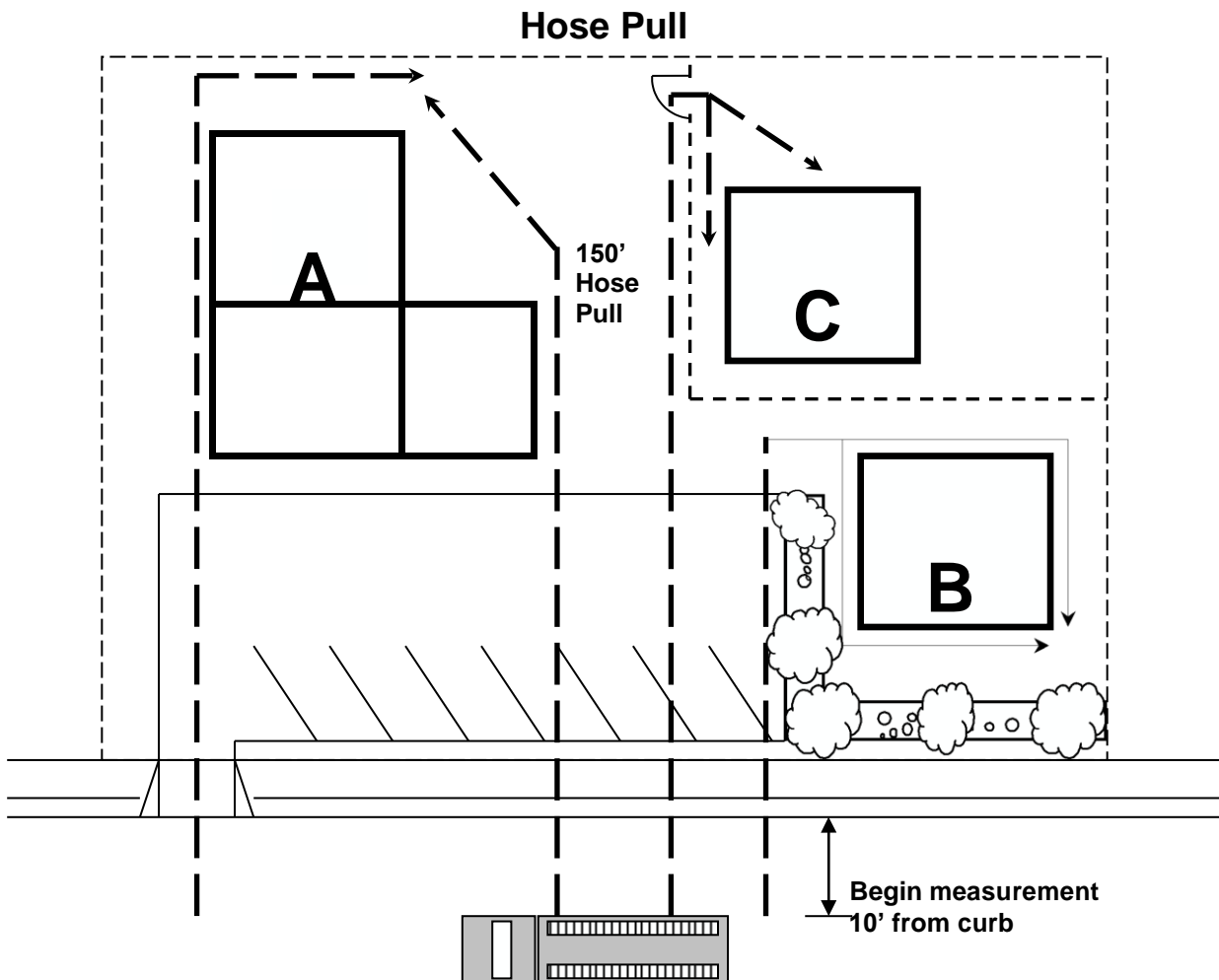
<sup>7</sup> The maximum distance to a hydrant serving a sprinklered detached single family residence/duplex may be increased to 300 feet.

## ATTACHMENT 19

### Protection of Hydrants, Detector Checks, Fire Department Connections, and other Appurtenances



## ATTACHMENT 20



In the example above, assume that the parking lot is not accessible to fire apparatus due to turning radii and fire lane widths less than the required minimums.

- All portions of building “A” are within 150’ feet of the public road as measured along the path of firefighter travel. This building is in access.
- Building “B” is also in access despite the obstruction presented by the planter and hedges.
- Building “C” is out of access; the presence of a chain-link fence forces firefighters to backtrack once they pass through the gate, increasing their travel distance beyond 150’. On-site fire access roadways or a change in the location of the gate and would be necessary to provide access to Building “C”

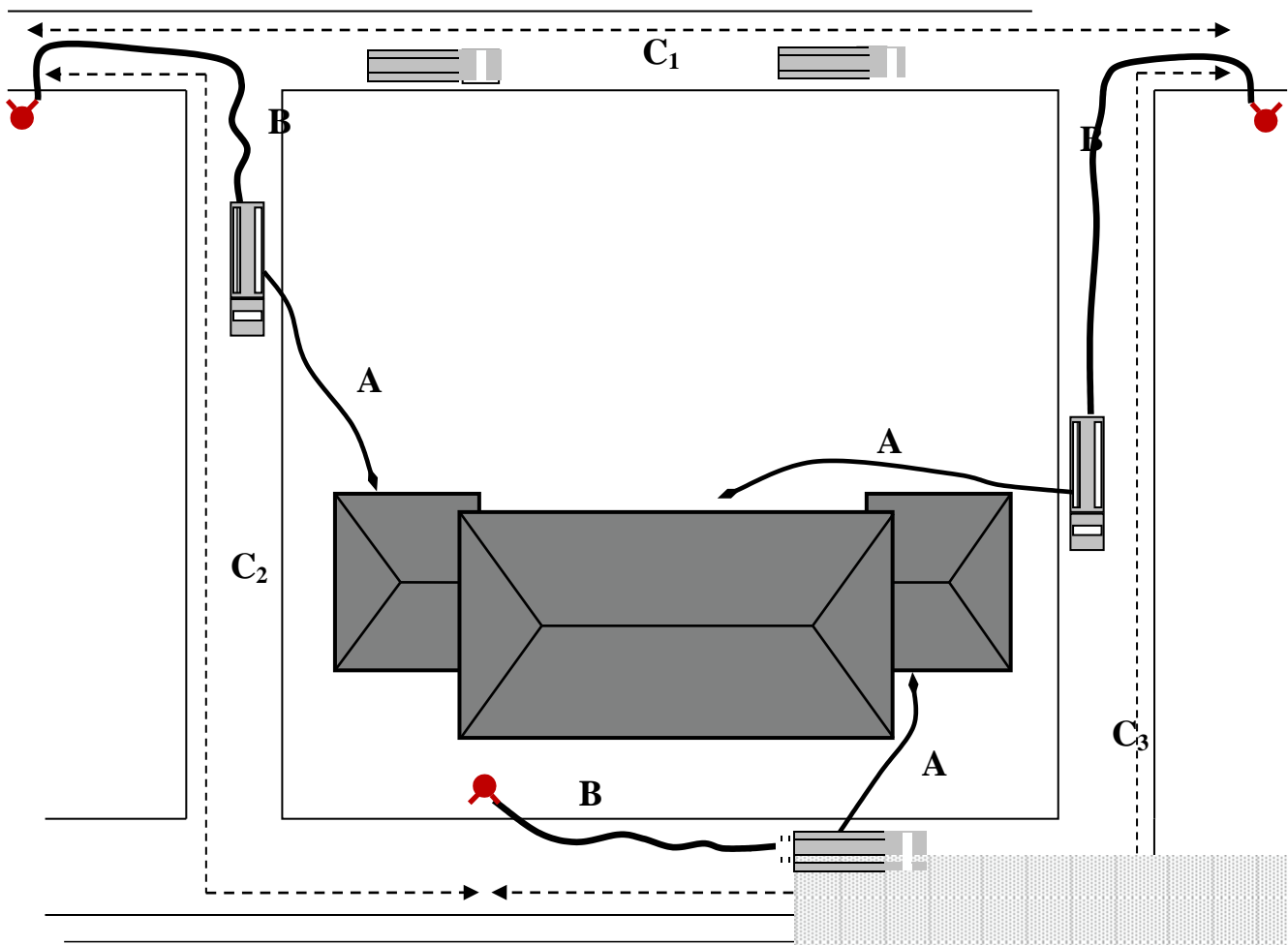
## ATTACHMENT 21

### Hose Pull vs. Hose Lay

**A: Hose Pull (Distance from Engine to Building):** Represents the amount of fire hose that firefighters must pull from the engine to reach the structure. Hose pull may not exceed 150' from the apparatus to the most remote point of the perimeter of the structure. Hose pull is measured along the firefighter path of travel, avoiding any obstacles, not "as the crow flies." In the diagram below, firefighters would be able to reach the entire perimeter of the building by pulling no more than 150' of hose from one or more fire engines staged in the shaded portion of the fire lane; the engine in the unshaded roadway has a hose pull distance greater than 150' and the building would be considered "out of access" from that point. For hydrant evaluation purposes, the shaded part of the fire lane is considered to serve the building and must meet hose lay requirements. See Attachment 20 for further information on hose pull measurement and access to structures.

**B: Hose Lay (Distance from Engine to a Hydrant):** Represents the amount of hose that must be laid out of the engine to supply water to the engine from the hydrant. No point along the portion of the fire lane serving the structure (the shaded road) may be farther from a hydrant than the distance specified under "Maximum Distance" in CFC Table C105.1 (see Attachment 18). The hydrant may be located along portions of the fire lane that exceed the hose pull distance (unshaded roadway) provided that it is 1) on the same property, 2) on an adjacent property where an emergency access easement has been obtained, or 3) on a public road leading to the fire lane serving the property. *Hose lay is measured along the vehicle path of travel in the fire lane, not "as the crow flies."*

**C: Hydrant Spacing (Distance between Hydrants)**—the distance between hydrants serving the building shall not exceed twice the "Maximum Distance" listed in CFC Table C105.1, as measured along the fire lane. Hydrants located on portions of the fire lane that do not serve the building do not need to be evaluated for spacing relative to each other, only with respect to hydrants that do serve the structure. For example, when evaluating hydrant placement for the building shown in the diagram below, C<sub>1</sub> may exceed the hydrant spacing requirements, while C<sub>2</sub> and C<sub>3</sub> cannot. The "Average Spacing" from Table C105.1 shall be maintained to prevent multiple hydrants from being concentrated in only one portion of the fire lane.



## ATTACHMENT 22

### Emergency Access Walkways And Ladder Access to Emergency Escape and Rescue Doors and Windows

California Fire Code Section 504.1 – Approved access walkways leading from fire apparatus access roads to exterior openings shall be provided.

#### **Emergency Access Walkway Specifications:**

- Surface – all weather
- Width – 6 feet minimum
- Location – an approved route between the fire access lane and all portions of the exterior of the first story of a building required by the Chief.
- Special locations – Interior courts – all emergency access walkways serving interior courts should be enclosed within 1- hour minimum rated construction, and have not less than an 8' ceiling height.
- Ladder Accommodation – A rectangle, 6' wide by 24' long, must be able to navigate the walkway.

#### **Ladder Access Specifications:**

- Butt placement for the ladder should be v4 the working length of the ladder away from the building and the door or window being laddered, directly below the door or window being laddered. (e.g. a three-story building with 2 and 3 story window sill heights of 12 and 24 feet, respectively, should have a clear area directly below the windows for ladder butt at 3 and 6 feet away from the building).
- A rectangular area, 6'X24' in length, shall be provided for raising the ladder from the horizontal position (i.e. on the ground) to the building. One end of the rectangle shall rest at the butt placement location.
- The space between the tip of the ladder and the door or window being laddered should be clear, allowing the area of travel of the tip of the ladder as it is being raised.
- A 2'X2' "ladder access area", directly in front of the ladder butt as it rests against the building in the laddered position, and as one faces the building, should be provided.
- A column extending 7' vertically from the "ladder access area" and extending up the ladder to the window or door being laddered should be provided to allow clearance for the firefighters climbing the ladder