

CONTRACTOR'S

RED BOOK

Fire Department Access
and Design Engineering Information

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ORANGE COUNTY



Orange County Fire Rescue Department
"An Accredited; Class One Department"

OFFICE OF THE FIRE MARSHAL
David G. Kilbury, Fire Marshal

January 2019



ORANGE COUNTY

INTRODUCTION

In the interest of protecting life and property, the Orange County Fire Rescue Department (OCFRD) developed the Red Book to inform the public, designers, architects, and engineers of our specific needs for both new and existing buildings. Areas covered include water supply, access to and around buildings being constructed or remodeled, change of use or other modifications, as well as, information specific to the Authority Having Jurisdiction (AHJ).

The Florida Fire Prevention Code authorizes the Fire Chief, Fire Marshal or designee to make interpretations, render judgment and grant administrative relief in situations where the code and standards regarding site-specific issues conflict, are not clear, or do not provide for an acceptable level of life safety.

In the process of developing this book, the following documents were referenced:

- Current adopted edition of the Florida Fire Prevention Code
- Orange County Comprehensive Plan
- Orange County Ordinances
- Florida Statutes 633
- Florida Administrative Code 69A

The Orange County Fire Rescue Department is one of several agencies that works directly with the Community Environmental Development Services Department, County Commission, Public Works and Traffic Engineering Division with regard to site development within Orange County. We also consult with those interested in pursuing a development project through the Technical Review Committee of the Development Review Committee.

The following information provides minimum standards and is designed to cover common issues and questions that may develop during the course of a project. These requirements are subject to change; therefore, any plans for construction and or renovations should be submitted for review and any questions forwarded to the Orange County Fire Rescue Department, Office of the Fire Marshal.

AUTHORITY

The Fire Marshal is authorized by: Florida Statutes, the Florida Fire Prevention Code, and the Orange County Code of Ordinances to enforce fire safety regulations as specified in Ordinance, Chapter 18 Fire Prevention.

It is not the intention of this Standard to contradict or set aside any provision of any other higher level of law or code. If any conflict is discovered, the more restrictive law or code shall prevail.

Compliance with this Standard does not demonstrate compliance or lack of compliance with any other law or code pertaining to other topics.

ADMINISTRATION AND SCOPE

This edition of the Red Book shall apply to both new and existing structures and their associated properties located in Orange County as indicated.

This standard provides a method of providing for and maintaining adequate and unobstructed emergency access for fire department apparatus and personnel to buildings, structures, hazardous occupancies or other premises, as may be required for mitigation of emergencies.

DEFINITIONS

Access Control Gate or Barrier - Any gate or barrier placed across a fire apparatus access road to restrict other vehicles or use.

Approved - Acceptable to the Authority Having Jurisdiction.

Authority Having Jurisdiction (AHJ) - The individual who is responsible for approving equipment, materials, installation and procedures relating to fire safety. The AHJ for the unincorporated areas of Orange County as well as the cities of Edgewood, Belle Isle, Eatonville and the Town of Oakland is herein referred to as the "Orange County Fire Marshal" or "Fire Marshal".

Building - Any structure used or intended for supporting or sheltering any use or occupancy.

Construction Documents - Documents that consist of scaled design drawings and specifications for the purpose of construction of new facilities or modification to existing facilities.

Concerned Party - Includes owners, developers, architects, engineers, planners, and the public.

Cul-de-sac - Street with only one outlet that terminates in a vehicular turnaround appropriate for the safe and convenient reversal of traffic movement.

Dead End - Street with only one outlet that terminates without a vehicular turnaround provided.

Emergency - A fire, explosion, or hazardous condition that poses an immediate threat to the safety of life or damage to property.

Fire Apparatus Access Road - A road that provides fire apparatus access from a fire station to a facility, building or portion thereof. This is a general term inclusive of all other terms such as fire lane, public street, private street, parking lot lane, and access roadway.

Fire Department Connection (FDC) - A connection to the building's sprinkler system and/or standpipe system used to supply water under pressure from a fire engine.

Fire Hydrant - A connection to a water main for the purpose of supplying water to fire hose or other fire protection apparatus.

Fire Lane - The road or other means developed to allow access and operational setup for fire-fighting and rescue apparatus. It is the area designated by the Fire Marshal, or their designee, as a "No Parking-Fire Lane" area to allow for access and use by fire department and other emergency personnel.

Fire Protection System - A system individually designed to protect the interior or exterior of a specific building or buildings, structure or other special hazard from fire. Such systems include, but are not limited to, water sprinkler systems, water spray systems, carbon dioxide systems, foam extinguishing systems, dry chemical systems, and halon and other chemical systems used for fire protection use. Such systems also include any overhead and underground fire mains, fire hydrants and hydrant mains, standpipes and hoses connected to sprinkler systems, sprinkler tank heaters, air lines, thermal systems used in connection with fire sprinkler systems, and tanks and pumps connected to fire sprinkler systems (Chapter 633 FS).

Needed Fire Flow - The flow rate of a water supply, measured at 20 psi residual pressure that is available for firefighting. Needed fire flow is used to determine the number, location and water supply of fire hydrants for a risk (or the required alternate protection where no water lines are provided).

Street - A public thoroughfare that has been dedicated for vehicular use by the public and can be used for access by fire department vehicles.

Structure - That which is built or constructed.

Summarily Abate - To immediately judge a condition to be a hazard to life or property and to order immediate correction of such condition.

Travel Distance - The distance that would be traveled by a fire engine laying out hose. It is to be measured along the centerline of the traffic lane that would be traveled, from the hydrant to the nearest point of the building.

FIRE ACCESS AND WATER SUPPLY

When fire or medical emergencies occur, ready access to the structures involved and to components of their fire suppression systems are essential for effective fire department operations. Adequate design for ingress and egress of emergency vehicles and the designation and uniform marking of “Fire Lanes” help to ensure this objective is met.

The Fire Marshal is authorized by Florida Statutes, the Florida Fire Prevention Code, and Orange County Code of Ordinances to designate fire lanes for use by emergency apparatus. The Office of the Fire Marshal (OFM) shall establish required fire access and fire lanes for all new construction projects during the Development Site Review phase for all new construction and renovation projects.



NEEDED FIRE FLOW

Needed fire flow (**NFF**) is the flow rate of a water supply, measured at 20 psi residual pressure that is available for firefighting. Needed fire flow is used to determine the number, location and water supply of fire hydrants for a risk (or the required alternate protection where no water lines are provided). There are two methods to determine NFF.

Section 18.4.5 (NFPA 1) of the Florida Fire Prevention Code provides the method and calculations to determine NFF. The second method is through the Development Review Committee (**DRC**) process. Projects that are reviewed at DRC shall comply with Orange County Subdivision Rules and Regulations or Section 18.4.5 whichever is greater.

FIRE ACCESS

1

Fire access/fire lanes shall have an all-weather driving surface with not less than 20 feet of unobstructed width.

- a. Be able to withstand live loads of fire apparatus (a required minimum weight of 43 tons).
- b. And have a minimum of 13 feet, 6 inches of vertical clearance.

2

An approved turnaround for fire apparatus shall be provided where an access road to a building is a dead end and in excess of 150 feet in length.

- a. Acceptable turnarounds can include cul-de-sac, T-turn, or Y-turn in accordance with the Florida Fire Prevention Code and acceptable as approved by the AHJ (see Exhibit 1, page 12).
- b. The AHJ or their designee shall approve the grade, surface and location of the fire access/fire lane.
- c. See exceptions as noted in the Florida Fire Prevention Code.

3

Building Access: A fire department access road shall extend to within 50 feet of at least one exterior door that can be opened from the outside and that provides access to the interior of the building.

4

Fire lanes for fire department access to buildings shall be provided at the start of a project and shall be maintained and unobstructed throughout construction.

- a. Permanent markings are not required until the building is complete or occupied for use.
- b. During construction, a fire lane with a stabilized road surface acceptable to the Fire Marshal, or designee, shall be provided and maintained to all areas of the project.

5

Unusual situations, such as those relating to access to fire hydrants, fire department connections and buildings may warrant deviation from this standard.

- a. Such situations will be evaluated and approved on an individual basis by the Fire Marshal, or designee.
- b. The Fire Marshal, or designee, may require the posting of additional signage to ensure adequate turning radius for fire apparatus is maintained where needed.

Existing fire access and fire lanes shall be evaluated during routine maintenance fire inspections to determine their need to comply with the current edition of this Standard. Fire lanes shall be established for existing buildings by the Fire Marshal, or designee, when it is determined that inadequate fire department access is provided.

It shall be the responsibility of the owner/tenant to maintain fire lanes free of all obstructions at all times, including parked vehicles, dumpsters, construction materials, excessive vegetation and storage of any type.

FIRE LANE SIGN REQUIREMENTS:

- 1** **Material:** Anodized aluminum.
- 2** **Gauge:** 0.08 inches.
- 3** **Dimensions:** 18 inches high x 12 inches wide.
- 4** **Sign** shall be a white background and red letters.
- 5** **Description:** Freestanding signs shall have the wording "NO PARKING FIRE LANE BY ORDER OF THE FIRE DEPARTMENT" in red letters on a white background.
- 6** **Sign Surface Background:** To be covered with white reflective type material such as "scotch-lite".
- 7** **Height:** The sign shall be a maximum of 7 feet in height from the roadway to the bottom of the sign.
- 8** **Locations:** Signs shall be within sight of the traffic flow and shall be a maximum of 60 feet apart, beginning no more than 15 feet from the ends of any fire lane.
- 9** **Additional signs** shall be provided as determined by the Fire Marshal, or designee, and in accordance with this standard.
- 10** **In addition** to the required signage, Fire Lane marking in accordance with Option # 1 or # 2 shall be provided. Final approval of the specific fire lane marking application shall be approved by the AHJ.

CURB MARKING (OPTION # 1):

- 1** **Color:** DOT Safety Yellow, White or Red
- 2** **Marking:** The top and face of a curb, where provided, shall be completely painted for the entire length of the fire lane.
- 3** **Location:** As determined by the Fire Marshal, or designee, and in accordance with this standard.

PAVEMENT STRIPING (OPTION # 2):

- 1** **Color:** DOT Safety Yellow, White or Red
- 2** **Striping:** Striping shall extend diagonally out 3 feet (36 inches) from the curb or from the edge of the pavement. Stripes should be 3 inches wide.
- 3** **Lettering** shall be 24 inches high in white, yellow or red colors and state "Fire Lane No Parking."
- 4** **Distance between stripes:** 2 feet.
- 5** **Location:** As determined by the Fire Marshal, or designee, and in accordance with this standard.

FIRE HYDRANTS

- 1** Fire lanes with appropriate signage, as noted previously, shall be provided at all fire hydrant locations.
- 2** Fire hydrants shall be located not more than 12 feet from the fire department access road.
- 3** A 36-inch clear space shall be maintained around the circumference of fire hydrants, except as otherwise required or approved.
- 4** A clear space of not less than 60 inches shall be provided in front of each hydrant connection having a diameter greater than 2 ½ inches.
- 5** Fire hydrants shall be located not less than 40 feet from buildings to be protected, unless approved by the AHJ (7.2.3 NFPA 24).
- 6** Where subject to vehicular damage fire hydrants shall be protected unless located within a public right of way.

Fire hydrants shall be color coded with an approved system indicating the available flow capacity as follows:

7

- i.** Class AA - Light Blue (1500 gpm or greater)
- ii.** Class A - Green (1000-1499 gpm)
- iii.** Class B - Orange (500 - 999 gpm)
- iv.** Class C - Red (less than 500 gpm)

8

The number and placement of required fire hydrants shall be in accordance with Chapter 18 of NFPA (FFPC).

9

Post Indicator Valves shall be located not less than 40 feet from the building (6.2.11 NFPA 24).

FIRE DEPARTMENT CONNECTIONS

1

Fire department connections shall be located at the nearest point of fire department apparatus accessibility or at a location approved by the Authority Having Jurisdiction (5.9.5.1 NFPA 24).

2

Fire department connections shall be located and arranged so that hose lines can be attached to the inlets without interference (5.9.5.2 NFPA 24).

3

Where required by the AHJ approved signs, approved roadway surface markings, or other approved notices shall be provided and maintained to identify fire department access roads or to prohibit the obstruction thereof or both. Fire department connections shall be identified with an approved fire lane sign and installed as follows:

- a. A sign designed in accordance with Florida D.O.T. standards, as listed above, shall identify all FDCs. It shall have the wording "No Parking, Fire Department Connection."
- b. The length of the fire lane shall be 10 feet, extending 5 feet on either side of the centerline.

4

Additional signage shall be required whenever an FDC is not readily visible to approaching fire apparatus.

- a. Such signs shall have "FDC" in red letters at least 6 inches high, and additional relevant information in red letters at least six (6) inches high (e.g. "Behind Retaining Wall") or a red arrow to indicate direction of travel to the FDC.

5

Additional signage is also required when the building supplied by an FDC is not easily discerned.

- a. Such signs shall have the physical address or the occupancy name called out in red letters at least six (6) inches high (e.g. "11,252" or "Bldg. A").

6

Supplemental curb marking or pavement striping is required for every FDC to clearly mark the boundaries of the fire lane. This will help to alert the public of the need to stay out of the area and will assist in enforcement of the no parking zone

ACCESS TO STRUCTURES OR AREAS

The AHJ shall have the authority to require an access box(es) to be installed in an accessible location where access to, or within, a structure or area is difficult because of security. The access box(es) shall be of an approved type listed in accordance with UL 1037. (FFPC 18.2.2.1)



1. All occupancies served by Internal Automatic Fire Detection or Suppression System, having a connection to a Central or Remote Station Monitoring Facility, shall be provided with a Knox Access Box. The Knox Access Box must be approved by the Office of the Fire Marshal



a. The KnoxBox access box shall be located:

- At or near the recognized main public entrance, adjacent to the fire annunciator panel, on the exterior of the structure with locations to be approved by the Plan Review Office.

- The Access Box shall be located at a height of not less than five (5) feet and not more than six (6) feet above final grade.

2. Gated subdivisions, developments, or secured properties with automated gates, shall be provided with Click2Enter technology and a secondary Knox remote key switch for gate operation



a. Click2Enter with Knox remote key switch must be permitted through the Office of the Fire Marshal

FIRE APPARATUS ACCESS DESIGN

OCFRD responds to and mitigates many different types of emergencies; therefore, we have a variety of vehicles. Some are very large and require much more area to maneuver and operate than others.

For example, ladder trucks are in excess of 46 feet in length and, when set up to operate with outriggers deployed, can exceed 20 feet in width. Additional room is needed for fire personnel to utilize the equipment stored on the sides of the trucks. Also, the number of vehicles needed on an incident and the room to quickly accommodate multiple types of vehicles is crucial. Depending on the situation, structure fires can require significant manpower and equipment. A typical structure fire may require as many as five engine companies, two ladder trucks, an Incident Command vehicle, support vehicles, ambulances and police vehicles. Larger incidents would, of course, dictate more resources.

The Fire Marshal is authorized by Florida Statutes, the Florida Fire Prevention Code, and Orange County Code of Ordinances to designate fire lanes for use by emergency apparatus. The Office of the Fire Marshal (OFM) shall establish required fire access and fire lanes for all new construction projects during the Development Site Review phase for all new construction and renovation projects.

1. Roadway Design

- 1.1** Public roadways shall be constructed to D.O.T, and Orange County standards.
- 1.2** Public alleys proposed for use for fire apparatus access must meet the following:
 - Shall be constructed to D.O.T, and Orange County standards.
 - Minimum 20-foot unobstructed width
 - Fire lane signs posted per Orange County specifications.
 - Unobstructed height clearance of 13 feet, 6 inches.
- 1.3** All roadways proposed for fire department access shall be engineered and constructed of an all-weather driving surface of asphalt or concrete able to support the live weight of fire apparatus (43 tons).
- 1.4** Alternative methods such as brick pavers, road base, gravel, etc. may be considered on a case-by-case basis. A State of Florida Certified Civil Engineer must approve the design and installation as meeting the requirements in writing.
- 1.5** Access roadways designed to incorporate materials that allow grass to grow through or upon the surface such as Grass Rings, Geoblock, Grasstone or Grass Crete are generally not approved. It has been our experience that these types of alternatives are unacceptable surface areas because they tend to disappear with time and the limits are unknown to the driver of fire apparatus, causing it to be unreliable. These may be allowed on a case-by-case basis with permanent marking and delineation as approved by the AHJ.

2. Roadway Widths

- 2.1** Minimum widths for apparatus access shall be as follows: Widths are measured curb face to curb face or, where there are no curbs, edge of pavement to edge of pavement. These areas must be maintained unobstructed.
- 2.2** Fire department access roads shall have an unobstructed width of not less than 20 ft (6.1 m). (Chapter 18 NFPA 1/FFPC).
- 2.3** Access roadways with a width of 34 feet or more do not require fire lane signs. Parking is allowed on both sides of the roadway.
- 2.4** Access roadway widths may be reduced to a minimum of 27 feet. Roadways 27 to 33 feet wide shall have fire lane signs posted on one side of the roadway. Parking is allowed on only one side of the street.
- 2.5** Access roadway widths less than 27 feet shall have fire lane markings on both sides of the roadway. Parking is not allowed on either side of the street.
- 2.6** An unobstructed vertical clearance of 13 feet - 6 inches shall be maintained above all fire department access ways. Obstructions include, but are not limited to, wires, tree limbs, awnings, etc.
- 2.7** The OCFRD acknowledges the occasional desire to reduce access roadway widths for installation purposes of devices such as gates, keypads, mailboxes and areas of parking lots where the roadway is not needed for access to a structure. The design and construction shall be approved on a case-by-case basis.

3. Gates and Other Devices

- 3.1** Gates and other devices designed to limit access are in most cases discouraged but may be allowed and sometimes required. The designs of these devices are approved on a case-by-case basis.
- 3.2** Gates and other approved devices designed to limit access shall be provided with the approved Click-2-Enter Rapid Entry System with a key switch manual override and KnoxBox (Chapter 18 NFPA 1/FFPC).
- 3.3** Removable bollards designed to slide into the ground within the access ways are not permitted unless the design is approved by OCFRD.

4. Fire Department Access

- 4.1** Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 feet from fire department access roads as measured by an approved route around the exterior of the building or facility. (See exhibit #2 for typical hose lay measurement.)
- 4.2** If the building/facility is equipped with an automatic fire sprinkler system, the distance is increased to 450 feet. Fire department access is essential to providing effective manual fire suppression operations. Remote sections of the building need to be limited in order to ensure that hose streams, aerial fire apparatus and fire fighters can access most portions of the building. (See exhibit #2 for typical hose lay measurement.)

- 4.3** A fire department access road shall extend to within 50 feet of at least one exterior door that can be opened from the outside and that provides access to the interior of the building (Chapter 18 NFPA 1/ FFPC).
- 4.4** Grades shall not exceed 4%. The gradient for fire access road shall not exceed the maximum approved (Chapter 18 NFPA 1/FFPC).
- 4.5** Private driveways for one- and two-family dwellings shall be provided with fire department access to within 50 feet of all first-story exterior portions of the structures upon the property (Chapter 18 NFPA 1/FFPC).

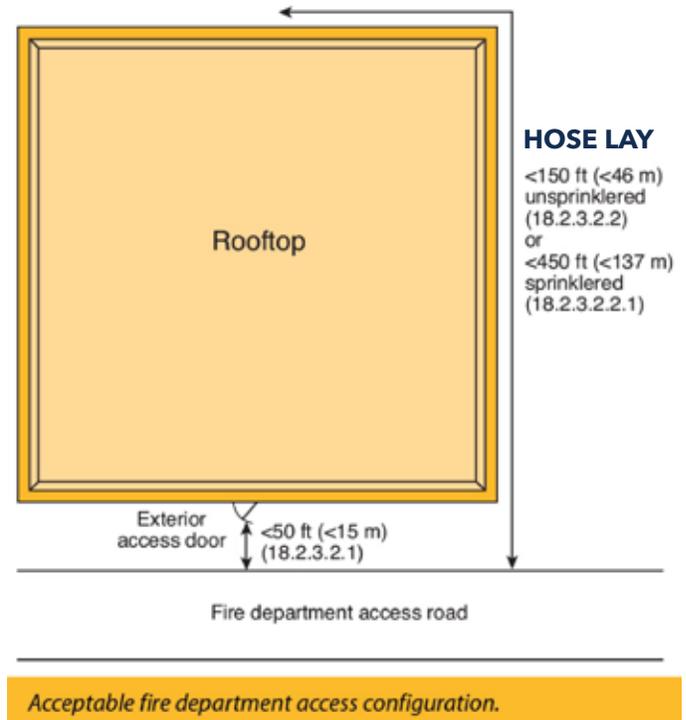
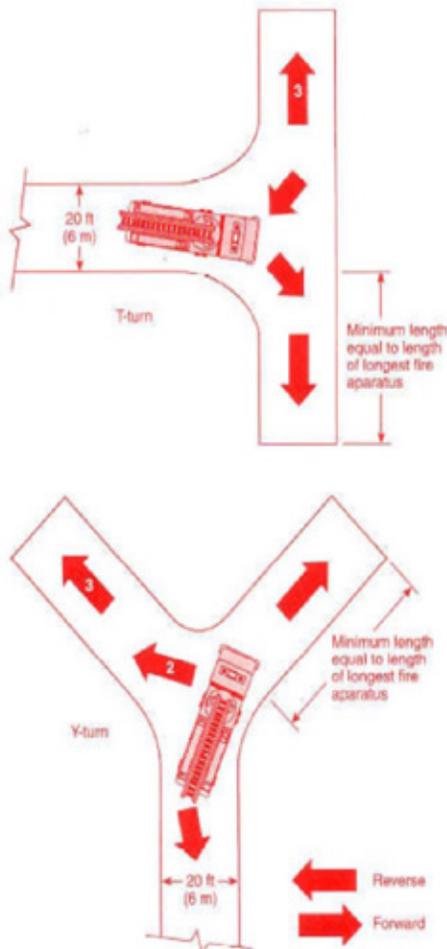
5. Turnarounds and Maneuvering

- 5.1** A truck turning analysis for all three Orange County Fire Rescue apparatuses (Platform, Aerial, and Pumper), shall be required. (See Exhibits 3.0 -3.2 for specifications.)
- 5.2** Dead-end fire department access roadways in excess of 150 feet shall be provided with an approved turnaround. An approved turnaround shall be by the following means:
- 5.3** A cul-de-sac with an appropriate turning radius approved by AHJ.
- 5.4** A T-Turn or Y-Turn with an extension of the "T or Y" to be a minimum length of the largest fire department apparatus. (See Exhibit 1.)
- 5.5** Turnarounds, cul-de-sacs, and intersections of streets shall not exceed a grade as approved.

ACCESS TO BUILDINGS UNDER CONSTRUCTION OR MODIFICATIONS

Required street and on-site fire hydrants/water mains shall be installed, operable tested, inspected, and approved by the Orange County Fire Rescue, Office of the Fire Marshal prior to starting construction.

- Fire department access roads shall be established, engineered, and maintained serviceable for fire protection and emergency purposes in accordance with the approved development plan and Florida Fire Prevention Fire Code.
- Access roads shall be kept clear of all obstructions such as, but not limited to, low-hanging wires, construction materials, construction equipment, contractor trailers, and contractor vehicles.
- Where required, fire lanes shall be posted when the access road is established.
- Street name identification and building addresses shall be installed at the time the access road is established.



**ORANGE COUNTY FIRE DEPARTMENT
FIRE TRUCK AUTOTURN EXHIBIT**

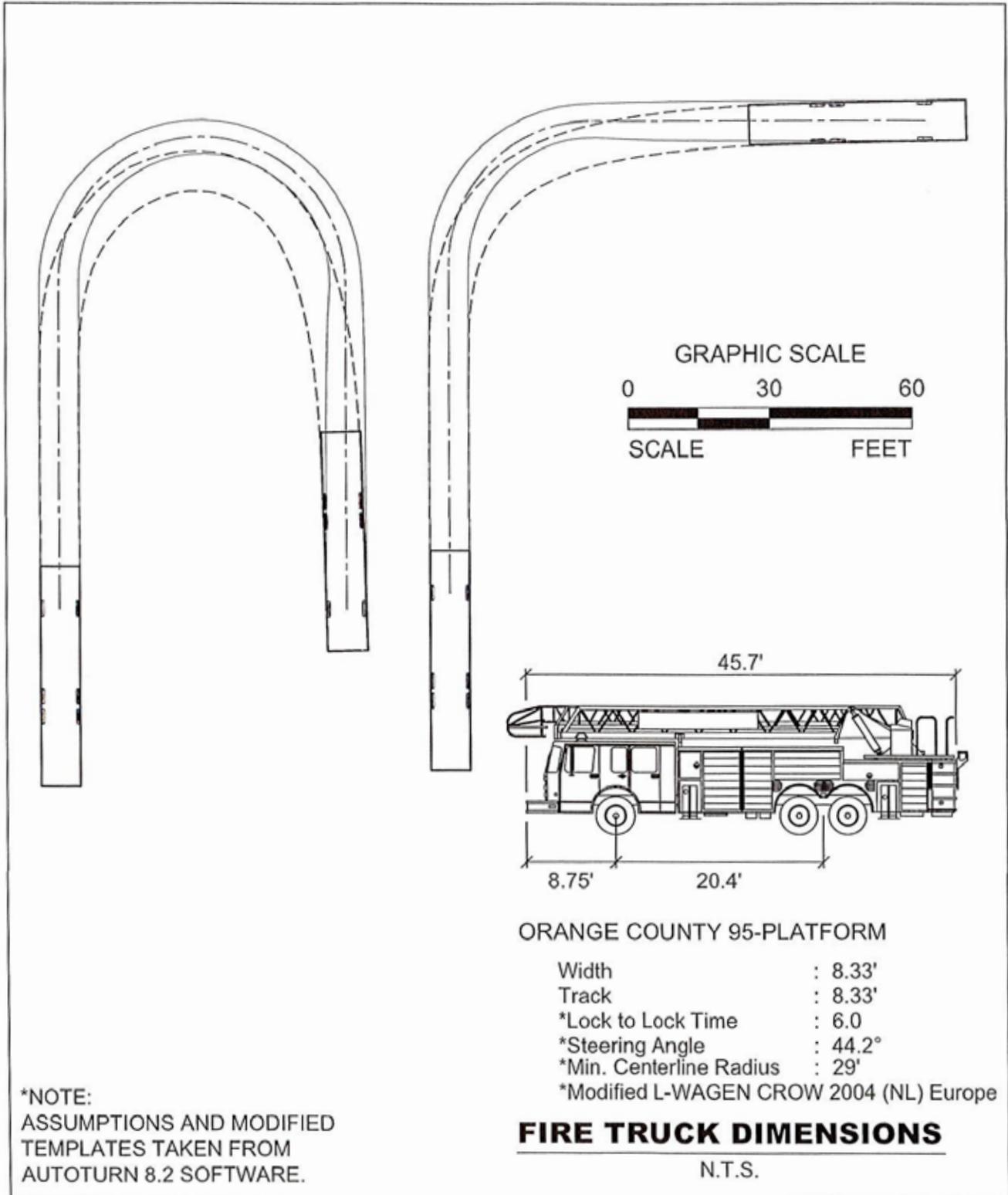


Exhibit 3.0

**ORANGE COUNTY FIRE DEPARTMENT
FIRE TRUCK AUTOTURN EXHIBIT**

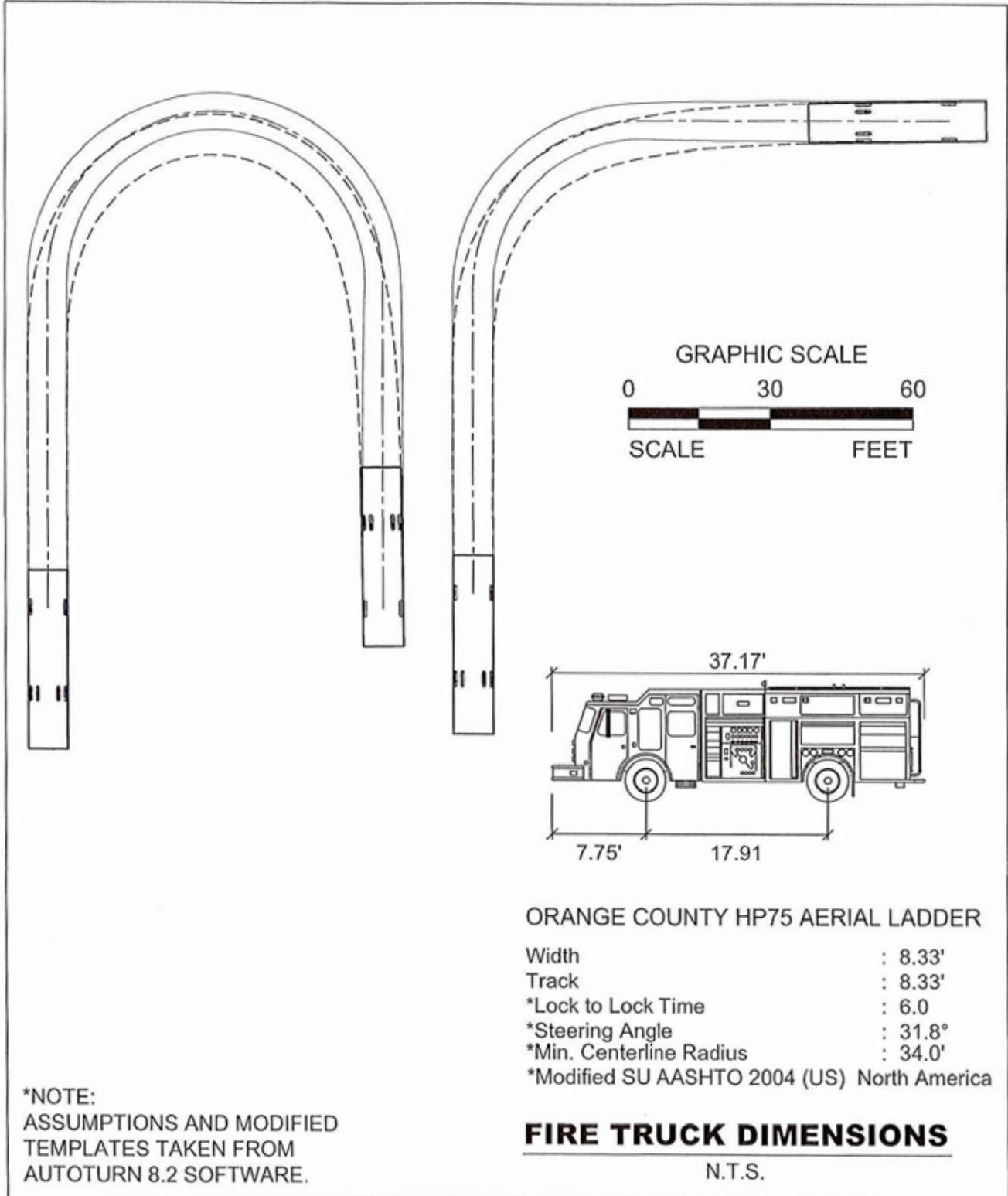


Exhibit 3.1

ORANGE COUNTY FIRE DEPARTMENT
FIRE TRUCK AUTOTURN EXHIBIT

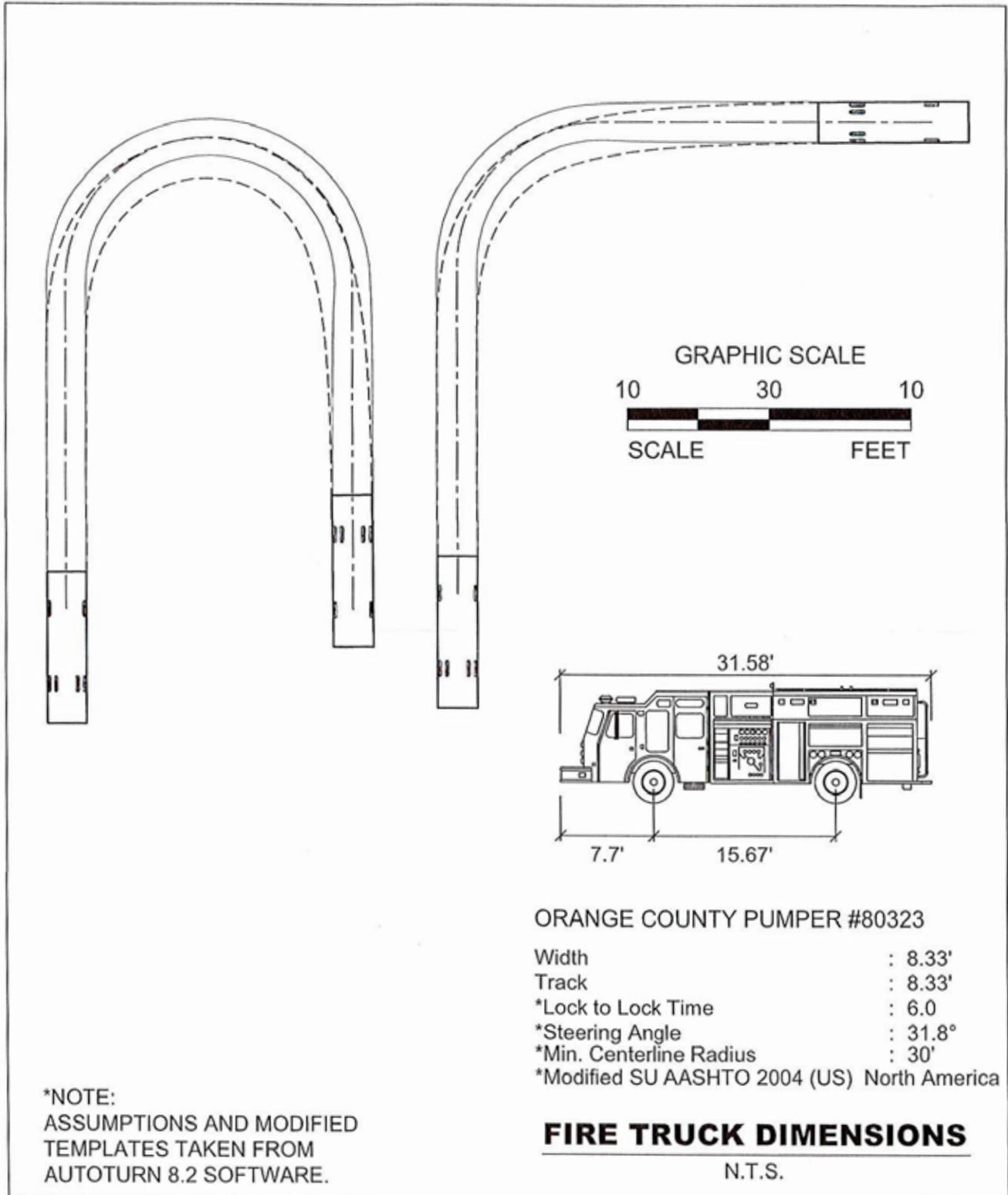


Exhibit 3.2



APPEAL AND ADJUSTMENTS:

If a concerned party is not satisfied with a decision of the Fire Marshal, or designee, an appeal may be made to the Orange County Fire and Life Safety Code Board of Adjustments and Appeals, as provided for in State law (NFPA 1.10.4).

The OFM shall also establish required water supply and hydrant location to the site and/or structure to be protected.

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If you have any questions or comments regarding the information contained within, or if you need assistance interpreting these requirements, please contact:

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