NFPA®

1140

Standard for Wildland Fire Protection

2022

Includes
NFPA 1051 | NFPA 1141 | NFPA 1143 | NFPA 1144

NFPA®

NFPA® 1140

Standard for Wildland Fire Protection

2022 Edition

NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471
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NFPA® 1140

Standard for

Wildland Fire Protection

2022 Edition

This edition of NFPA 1140, *Standard for Wildland Fire Protection*, was prepared by the Technical Committees on Wildland Fire Management and Wildland and Rural Fire Protection and released by the Correlating Committee on Professional Qualifications. It was issued by the Standards Council on May 24, 2021, with an effective date of June 13, 2021.

This edition of NFPA 1140 was approved as an American National Standard on June 13, 2021.

Origin and Development of NFPA 1140

The 1995 edition of NFPA 1051, *Standard for Wildland Fire-Fighter Professional Qualifications*, was the first edition of the document. Originally, NFPA 1051 focused on the skills and knowledge necessary to perform wildland firefighting. Through the course of many editions, it was expanded to include suppression and pre-suppression activities, officer-related positions, power tools and equipment, and requisite skills and knowledge. Ultimately, this resulted in the 2016 edition of NFPA 1051, *Standard for Wildland Firefighting Personnel Professional Qualifications*.

The 1985 edition of NFPA 1141 was the first edition of the document. Originally, NFPA 1141 was focused on fire protection for planned building groups. Through the course of many editions, it expanded to include community infrastructure; wildland, rural, and suburban areas; and requirements for land use. Ultimately, this resulted in the 2017 edition of NFPA 1141, *Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas*.

Originally, the 1934 edition of NFPA 295, *Community Forest Fire Fighting Equipment*, covered the baseline topics most associated with NFPA 1143, *Standard for Wildland Fire Management*. The 2003 edition included a complete rewrite and a new document number and title. The original rewrite of NFPA 1143 for the 2003 edition focused on recognizing the national fire plan and various mitigation efforts to assist ailing forests and endangered communities adjacent to forest areas. Through the course of many editions, NFPA 1143 expanded to include the full cycle of wildland fire management; modernized equipment usage; alignment with NFPA professional qualifications standards; and alignment with the requirements associated with the National Wildfire Coordinating Group, National Incident Management System, public information officers, and safety officers. Ultimately, this resulted in the 2018 edition of NFPA 1143.

Originally, the 1935 edition of NFPA 224, *Fire Protection and Prevention for Summer Homes in Forested Areas*, covered the baseline topics most associated with NFPA 1144, *Standard for Reducing Structure Ignition Hazards from Wildland Fire*. Over the course of multiple editions, the document number transitioned to 1144. The 2002 edition of NFPA 1144 saw significant revision to the wildland fire risk and hazard severity assessment system. Through the course of many editions, NFPA 1144 expanded to include individual structure hazards; combustible, non-combustible, and ignition-resistant material; planning development in threatened areas; Firewise® communities; water-based elements; and structure/roofing materials meeting ASTM testing standards. Ultimately, this resulted in the 2018 edition of NFPA 1144.

The 2022 edition of NFPA 1140, *Standard for Wildland Fire Protection*, marks the first of the consolidation efforts of NFPA's Emergency Response and Responder Safety (ERRS) standards. At the April 2019 NFPA Standards Council Meeting, the Council directed NFPA staff and all NFPA ERRS Committees to consolidate and unify NFPA standards with similar content areas. The goal of this effort is to increase usability, reduce errors and conflicts, and ultimately produce greater quality standards.

The 2022 edition of NFPA 1140 marks the integration of NFPA 1051, 1141, 1143, and 1144 into a single wildland fire safety standard to support this effort. One effect of this integration is that key

terms have been consolidated into single definitions. In addition, the annex on air operations for wildland fire incidents that was previously in NFPA 1143 has been removed, as adequate coverage of the topic would be beyond the scope of the standard, and aircraft safety procedures are already addressed in A.20.4.3 of that standard.

The 2022 edition also includes several important changes. A requirement for continuing professional development has been added for all wildland firefighting positions. Permission to reduce the minimum separation distance between buildings in wildland areas if both buildings are protected with automatic sprinkler systems has been eliminated. A requirement for automatic sprinkler systems for all one- and two-family dwellings and all apartment occupancies has been added. Multi-agency operational plans for community safety and emergency preparedness must now incorporate planning for physical space, including maintenance of the space to ensure its functionality. Finally, the requirements for building construction and design materials have been updated for consistency with current building codes.

For more information about the ERRS consolidation project see nfpa.org/errs.

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Committee Scope: This Committee shall have primary responsibility for the management of the NFPA Professional Qualifications Project and documents related to professional qualifications for fire service, public safety, and related personnel.

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Committee Scope: This committee shall have the primary responsibility for documents on fire protection in wildland, rural, and suburban areas.

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NFPA 1140

Standard for

Wildland Fire Protection

2022 Edition

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Information on referenced and extracted publications can be found in Chapter 2 and Annex L.

Chapter 1 Administration

1.1 Scope. This standard provides the minimum requirements for wildland fire management and the associated professional qualifications for wildland fire positions.

1.2 Purpose. The purpose of this standard is to specify the minimum requirements for fire protection and emergency services infrastructure in wildland, rural, and suburban areas; wildland fire management practices and policies; methods of assessing wildland fire ignition hazards; and job performance requirements (JPRs) for wildland fire positions.

1.3* Application. This standard can be applied as follows:

(1) Chapters 1 through 3; 4 through 9; and Annexes A, B, C, D, E, F, G, H, I, and L constitute the 2022 edition of NFPA 1051.
(2) Chapters 1 through 3; 10 through 18; and Annexes A and L constitute the 2022 edition of NFPA 1141.
(3) Chapters 1 through 3; 19 through 23; and Annexes A, J, and L constitute the 2022 edition of NFPA 1143.
(4) Chapters 1 through 3; 24 through 26; and Annexes A, J, K, and L constitute the 2022 edition of NFPA 1144.

1.4 Equivalency. Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard.

1.4.1 Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.

1.4.2 The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

1.5 Units. In this standard, equivalent values in SI units shall not be considered as the requirement, as these values can be approximate. *(See Table 1.5.)*

Table 1.5 US-to-SI Conversions

Quantity	US Unit/ Symbol	SI Unit/Symbol	Conversion Factor
Length	inch (in.)	millimeter (mm)	1 in. = 25.4 mm
	foot (ft)	meter (m)	1 ft = 0.305 m
Area	square foot (ft^2)	square meter (m^2)	1 ft^2 = 0.0929 m^2

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1, *Fire Code,* 2021 edition.

NFPA 10, *Standard for Portable Fire Extinguishers,* 2022 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems,* 2022 edition.

NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes,* 2022 edition.

NFPA 13R, *Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies,* 2022 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems,* 2019 edition.

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances,* 2022 edition.

NFPA 30, *Flammable and Combustible Liquids Code,* 2021 edition.

NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work,* 2019 edition.

NFPA 54, *National Fuel Gas Code,* 2021 edition.

NFPA 58, *Liquefied Petroleum Gas Code,* 2020 edition.

NFPA 72®, National Fire Alarm and Signaling Code®, 2022 edition.

NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations,* 2022 edition.

NFPA 291, *Recommended Practice for Water Flow Testing and Marking of Hydrants,* 2022 edition.

NFPA 470, *Hazardous Materials Standards for Responders,* 2022 edition.

NFPA 703, *Standard for Fire-Retardant-Treated Wood and Fire-Retardant Coatings for Building Materials,* 2021 edition.

NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications,* 2017 edition.

NFPA 1026, *Standard for Incident Management Personnel Professional Qualifications,* 2018 edition.

NFPA 1035, *Standard on Fire and Life Safety Educator, Public Information Officer, Youth Firesetter Intervention Specialist, and Youth Firesetter Program Manager Professional Qualifications,* 2015 edition.

NFPA 1051, *Standard for Wildland Firefighting Personnel Professional Qualifications,* 2020 edition.

NFPA 1141, *Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas,* 2017 edition.

NFPA 1142, *Standard on Water Supplies for Suburban and Rural Fire Fighting,* 2022 edition.

NFPA 1143, *Standard for Wildland Fire Management,* 2018 edition.

NFPA 1144, *Standard for Reducing Structure Ignition Hazards from Wildland Fire,* 2018 edition.

NFPA 1451, *Standard for a Fire and Emergency Service Vehicle Operations Training Program,* 2018 edition.

NFPA 1500™, *Standard on Fire Department Occupational Safety, Health, and Wellness Program,* 2021 edition.

NFPA 1521, *Standard for Fire Department Safety Officer Professional Qualifications,* 2020 edition.

NFPA 1561, *Standard on Emergency Services Incident Management System and Command Safety,* 2020 edition.

NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments,* 2021 edition.

NFPA 1616, *Standard on Mass Evacuation, Sheltering, and Reentry Programs,* 2020 edition.

NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting and Urban Interface Fire Fighting,* 2022 edition.

NFPA 5000®, Building Construction and Safety Code®, 2021 edition.

2.3 Other Publications.

2.3.1 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM D2898, *Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing,* 2017.

ASTM D3909/D3909M, *Standard Specification for Asphalt Roll Roofing (Glass Felt) Surfaced With Mineral Granules,* 2014.

ASTM D6662, *Standard Specification for Polyolefin-Based Plastic Lumber Decking Boards,* 2017.

ASTM D7032, *Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite and Plastic Lumber Deck Boards, Stair Treads, Guards, and Handrails,* 2017.

ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials,* 2020.

ASTM E108, *Standard Test Methods for Fire Tests of Roof Coverings,* 2020a.

ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials,* 2020.

ASTM E136, *Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C,* 2019a.

ASTM E2652, *Standard Test Method for Assessing Combustibility of Materials Using a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C,* 2018.

ASTM E2768, *Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test),* 2018.

ASTM E2886/E2886M, *Standard Test Method for Evaluating the Ability of Exterior Vents to Resist the Entry of Embers and Direct Flame Impingement,* 2020.

ASTM E2957, *Standard Test Method for Resistance to Wildfire Penetration of Eaves, Soffits and Other Projections,* 2017.

2.3.2 AWWA Publications. American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235.

AWWA M31, *Distribution System Requirements for Fire Protection,* fourth edition, 2008.

2.3.3 FEMA EMI Publications. FEMA Emergency Management Institute, 16825 S. Seton Avenue, Emmitsburg, MD 21727.

ICS-100, *Introduction to the Incident Command System,* 2018.

IS-700, *An Introduction to the National Incident Management System,* 2018.

2.3.4 NWCG Publications. National Wildfire Coordinating Group, 3833 S. Development Avenue, Boise, ID 83705.

NFES 1077, *Incident Response Pocket Guide (IRPG),* 2018.

NWCG L-180, *Human Factors in the Wildland Fire Service,* 2008.

NWCG S-130, *Firefighter Training,* 2008.

NWCG S-190, *Introduction to Wildland Fire Behavior,* 2020.

NWCG S-215, *Fire Operations in the Wildland/Urban Interface,* 2013.

2.3.5 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials,* 2018.

UL 790, *Standard Test Methods for Fire Tests of Roof Coverings,* 2018.

2.3.6 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections.

NFPA 1, *Fire Code*, 2021 edition.

NFPA *101*®, *Life Safety Code*®, 2021 edition.

NFPA 901, *Standard Classifications for Incident Reporting and Fire Protection Data*, 2021 edition.

NFPA 1142, *Standard on Water Supplies for Suburban and Rural Fire Fighting*, 2022 edition.

NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting and Urban Interface Fire Fighting*, 2022 edition.

NFPA 5000®, *Building Construction and Safety Code*®, 2021 edition.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

3.2.4* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.5 Shall. Indicates a mandatory requirement.

3.2.6 Should. Indicates a recommendation or that which is advised but not required.

3.2.7 Standard. An NFPA Standard, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrase "standards development process" or "standards development activities," the term "standards" includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

3.3 General Definitions.

3.3.1 Accessory Building or Structure. Any building or structure used incidentally to another building.

3.3.2 Adjacent Ground Elevation. The reference plane representing the average elevation of the finished ground level measured at a distance of 10 ft (3 m) from all exterior walls of the building.

3.3.3 Agency. A division of government with a specific function or a nongovernmental organization (e.g., a private business) that offers a particular kind of assistance.

3.3.4 Alternative. A system, condition, arrangement, material, or equipment submitted to the authority having jurisdiction as a substitute for a requirement in a standard.

3.3.5* Apparatus. A motor-driven vehicle or group of vehicles designed and constructed for the purpose of fighting fires.

3.3.6 Area.

3.3.6.1 ***Built-Out Area.*** Those portions of a development that have been populated to planned capacity with structures.

3.3.6.2 ***Gross Floor Area.*** The floor area within the inside perimeter of the outside walls of the building under consideration with no deduction for basements, hallways, stairs, closets, thickness of interior walls, columns, or other features.

3.3.6.3 ***Unbuilt Area.*** Those portions of a development intended to be built on that have not yet been populated with structures.

3.3.7 Attack.

3.3.7.1* ***Extended Attack.*** A wildland fire that cannot be controlled by initial attack resources within an established period of time as determined by the AHJ and additional firefighting resources are arriving, en route, or being ordered by the incident commander.

3.3.7.2* ***Initial Attack.*** An aggressive suppression action consistent with firefighter and public safety and values to be protected.

3.3.8* Breakover. A fire edge that crosses a control line or natural barrier intended to confine the fire and the resultant fire.

3.3.9 Building. A structure, usually enclosed by walls and a roof, constructed to provide support or shelter for an intended occupancy.

3.3.10 Building Construction. Types of construction based on the combustibility and the fire resistance rating of a building's structural elements.

3.3.11* Burning Out. Setting fire inside a control line to consume the fuel between the edge of the fire and the control line.

3.3.12 Check-In. The process whereby resources first report to an incident.

3.3.13 Combustible (Material). A material that, in the form in which it is used and under the conditions anticipated, will ignite and burn; a material that does not meet the definition of noncombustible or limited-combustible. [**5000,** 2021]

3.3.14 Command. The act of directing and/or controlling resources by virtue of explicit legal, agency, or delegated authority.

3.3.15 Confine. To restrict the fire within determined boundaries established either prior to the fire or during the fire.

3.3.16 Contain. To take suppression action that can reasonably be expected to check the fire spread under prevailing and predicted conditions.

3.3.17 Control. The point in time when the perimeter spread of a wildland fire has been halted and can be reasonably expected to hold under foreseeable conditions.

3.3.18 Control Line. All constructed or natural barriers and the treated fire edge used to control a fire.

3.3.19 Cul-de-Sac. A roadway that ends in a circular turnaround.

3.3.20* Curb Cut. Reduced curb height to facilitate vehicle passage over or across a curb.

3.3.21 Dead End. A passageway, or portion thereof, from which there is only one means of egress.

3.3.22 Defensible Space. An area where the selection, location, grouping, and maintenance of combustible materials and vegetation are conducted in such a manner that the opportunity to ignite a structure or its attachments is minimized.

3.3.23 Driveway. A means of vehicular access to or from the land of a private property owner and a street, road, or highway.

3.3.24 Dwelling Unit. One or more rooms arranged for complete, independent housekeeping purposes, with space for eating, living, and sleeping; facilities for cooking; and provisions for sanitation. [**5000,** 2021]

3.3.25 Equipment.

3.3.25.1 ***Heavy Equipment.*** Ground vehicles used in the suppression of wildland fires, such as dozers, tractors, plows, and their transport vehicles. Heavy equipment does not include fire apparatus.

3.3.25.2 ***Wildland Firefighting and Urban Interface Firefighting Protective Clothing and Equipment.*** Items of compliant protective clothing and equipment products that provide protection from some risks, but not all risks, of emergency incident operations. [**1977,** 2022]

3.3.26 Evacuation. The temporary movement of people and their possessions from locations threatened by wildland fire.

3.3.27 Evacuation Plan. See 3.3.74.1.

3.3.28 Extended Attack. See 3.3.7.1.

3.3.29 Finance. The incident management section responsible for all incident costs and financial considerations.

3.3.30 Fire.

3.3.30.1* ***Prescribed Fire (Burning).*** Any fire ignited by management actions to meet specific objectives.

3.3.31 Fire Behavior. The manner in which a fire reacts to the variables of fuels, weather, and topography.

3.3.32 Fire Department. The governmental or other organization that is responsible for providing fire protection and other emergency services to an area.

3.3.33 Fire Flow. The flow rate of a water supply, measured at 20 psi (138 kPa) residual pressure, that is available for firefighting.

3.3.34 Fire Hazard. A fuel complex, defined by its kind, arrangement, volume, condition, and location, that determines the ease of ignition and resistance to fire control.

3.3.35 Fire Hydrant. A valved connection on a water supply system having one or more outlets and that is used to supply hose and fire department pumpers with water.

3.3.36 Fire Lane. An approved means of access or other passageway designated and identified to provide access for emergency apparatus where parking is prohibited.

3.3.37* Fire Protection. All measures taken to reduce the burden of fire on the quality of life.

3.3.38 Fire Protection System. Any fire alarm device or system or fire-extinguishing device or system, or combination thereof, that is designed and installed for detecting, controlling, or extinguishing a fire or otherwise alerting occupants, or the fire department, or both, that a fire has occurred.

3.3.39 Fire Resistive. Ignition-resistant construction methods using building materials and design features that reduce the vulnerabilities of buildings to ignite from wind-blown embers (firebrands) and other wildfire exposures.

3.3.40 Fire Suppression. All the work of confining and extinguishing wildland fires.

3.3.41 Fuel Modification. Any manipulation or removal of fuels to reduce the likelihood of ignition or the resistance to fire control.

3.3.42 Fuels. All combustible materials, including but not limited to vegetation and structures.

3.3.43 Ground Fuels. All combustible materials such as grass, duff, loose surface litter, tree or shrub roots, rotting wood, leaves, peat, or sawdust that typically support combustion.

3.3.44* Hazard Assessment System. A system to evaluate and rate pertinent factors such as fire and weather history, fuels, improvements, topography, and access to develop and implement mitigation strategies.

3.3.45 Heavy Equipment. See 3.3.25.1.

3.3.46* Heavy Timber Construction. Type IV (2HH) construction as defined in *NFPA 5000*.

3.3.47 Height. As applied to a building, the vertical distance from the adjacent ground elevation to the average elevation of the roof of the highest story.

3.3.48 Hot Spot. A particularly active part of a wildland fire.

3.3.49 Ignition-Resistant Material. A type of building material that resists ignition or sustained flaming combustion. *(See 25.2.3.)*

3.3.50* Immediate Landscaped Area. The area of the structure ignition zone extending at least 30 ft (9 m) from the foundation of the structure, including the footprint on decks and all extensions, and the area in which the vegetation has been modified for reduced combustibility or aesthetic purposes, such as lawns and gardens.

3.3.51 Improved Property. A piece of land or real estate upon which a structure has been placed, a marketable crop is growing (including timber), or other property improvement has been made.

3.3.52 Incident. An occurrence, either human-caused or a natural phenomenon, that requires action or support by emergency services personnel to prevent or minimize loss of life or damage to property and/or natural resources.

3.3.53 Incident Action Plan (IAP). See 3.3.74.2

3.3.54 Incident Commander (IC). The individual responsible for the management of all incident operations at the incident site.

3.3.55* Incident Management System (IMS). A system that defines the roles and responsibilities to be assumed by responders and the standard operating procedures/standard operating guidelines (SOPs/SOGs) to be used in the management and direction of emergency incidents and other functions.

3.3.56* Initial Attack. See 3.3.7.2.

3.3.57* Jurisdiction. The power, right, or authority to interpret and apply the law.

3.3.58 Land Development. The change of use of a parcel of land or contiguous parcels of land controlled by a single landowner or by a group of landowners with or without a common agreement to control the land so as to provide the buildings and infrastructure for residential and/or commercial purposes.

3.3.59 Land Use. The type or degree of activity occurring or intended to occur on a piece of land.

3.3.60 Liaison. The individual responsible for the coordination of activities with assisting agencies.

3.3.61 Logistics. The incident management section responsible for providing facilities, services, support, and materials for the incident.

3.3.62 Lookout. A person designated to observe the fire or a portion of a fire and warn the crew when there is a change in fire activity or when there is danger of becoming trapped. (WFM-AAA)

3.3.63 Means of Access. The method by which vehicles travel to or from structures, including but not limited to roadways, driveways, fire lanes, and parking lots.

3.3.64 Mitigation. Action that moderates the severity of a fire hazard or risk.

3.3.65 Mop-up. The act of making a fire safe after it is controlled, such as extinguishing or removing burning material along or near the control line, felling dead trees (snags), and trenching logs to prevent rolling.

3.3.66 Municipal-Type Water System. A system having water pipes servicing fire hydrants and designed to furnish, over and above domestic consumption, a minimum of 250 gpm (950 L/min) at 20 psi (138 kPa) residual pressure for a 2-hour duration.

3.3.67 Noncombustible Material. See Section 10.2.

3.3.68* NWCG. National Wildfire Coordinating Group.

3.3.69 Occupancy. The purpose for which a building or other structure, or part thereof, is used or intended to be used. [**5000,** 2021]

3.3.70 Operations. The incident management section responsible for all tactical operations at the incident.

3.3.71 Out of Service. Resources assigned to an incident but unable to respond for mechanical, rest, or personnel reasons.

3.3.72 Patrol. To systematically observe and check a length of control line during or after its construction to prevent breakovers (slopovers), control spot fires, or extinguish overlooked hot spots.

3.3.73 Personal Protective Equipment. See 3.3.25.2, Wildland Firefighting and Urban Interface Firefighting Protective Clothing and Equipment.

3.3.74 Plan.

3.3.74.1 ***Evacuation Plan.*** A plan specifying safe and effective methods for the temporary movement of people and their possessions from locations threatened by wildland fire.

3.3.74.2* ***Incident Action Plan (IAP).*** A plan that contains objectives reflecting the overall incident strategy, specific tactical actions, and supporting information for a specific period of time.

3.3.74.3 ***Structure Protection Plan.*** A plan specifying safe and effective methods to protect structures and other improvements from the threat of damage from an advancing fire.

3.3.75 Planning. The incident management section responsible for the collection, evaluation, and dissemination of tactical information related to the incident and for preparation and documentation of incident management plans.

3.3.76 Preparedness. Activities that lead to a safe, efficient, and cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination.

3.3.77* Prescribed Fire (Burning). Any fire ignited by management actions to meet specific objectives.

3.3.78 Prevention. Activities, including public education, law enforcement, personal contact, and reduction of fuel hazards, directed at reducing the incidence of fires.

3.3.79 Protection in Place. The strategy and tactics used to protect or shelter people and/or animals from an advancing wildland fire in a safe area, as an alternative to evacuation.

3.3.80 Public Safety Element. A section of a land use plan that describes the hazards to public safety and how they are to be mitigated.

3.3.81 Resources. All personnel and major items of equipment that are available, or potentially available, for assignment to incidents.

3.3.82 Risk. A measure of the probability and severity of adverse effects that result from exposure to a hazard.

3.3.83 Road. Any accessway, not including a driveway, that gives access to more than one parcel and is primarily intended for vehicular access.

3.3.84 Roadway. Any public or private street, including bridges and rights of way.

3.3.85 Rural. Those areas that are not unsettled wilderness or uninhabitable territory but are sparsely populated with densities below 500 persons per square mile. [**1142,** 2022]

3.3.86 Shelter in Place. The strategy and tactics used to protect or shelter people and/or animals from an advancing wildland fire in a safe area, as an alternative to evacuation.

3.3.87 Size-Up. The observation and evaluation of existing factors in order to develop objectives, strategies, and tactics for fire suppression.

3.3.88 Slope. An upward or downward incline or slant, calculated as the rise divided by the run and expressed as a percentage.

3.3.89* Special Interest Area. Areas established and managed for their unique special feature.

3.3.90 Stakeholder. An individual, or representative of same, having an interest in the successful completion of a project. [***101,*** 2021]

3.3.91* Standpipe. A pipe and attached hose valves and hose (if provided) used for conveying water to various parts of a building for firefighting purposes.

3.3.92 Story. The portion of a building located between the upper surface of a floor and the upper surface of the floor or roof next above. [**5000,** 2021]

3.3.93 Strategy. The general plan or direction selected to accomplish incident objectives.

3.3.94 Street.

3.3.94.1 ***Private Street.*** Any accessway normally intended for vehicular use not dedicated as a public street.

3.3.94.2 ***Public Street.*** A thoroughfare that has been dedicated for vehicular use by the public.

3.3.95 Strike Team. Specified combinations of the same kind and type of resources, with common communications and a leader.

3.3.96 Structure. That which is built or constructed, an edifice or building of any kind, or any piece of work artificially built up or composed of parts joined together in some definite manner.

3.3.97* Structure Assessment. An evaluation to determine the structure's potential to be ignited by an approaching wildland fire.

3.3.98* Structure Ignition Zone. The area around a specific structure and associated accessory structures, including all vegetation that contains potential ignition sources and fuels.

3.3.99* Structure Protection. To protect structures and other improvements from the threat of damage from an advancing wildland fire.

3.3.100 Structure Protection Plan. See 3.3.74.3.

3.3.101 Suburb or Suburban. Those moderately inhabited areas with population densities of at least 500 persons per square mile but less than 1000 persons per square mile. [**1142,** 2022]

3.3.102 Tactics. Deploying and directing resources on an incident to accomplish the objectives designated by strategy.

3.3.103 Task Force. Any combination of single resources assembled for a particular tactical need, with common communications and a leader.

3.3.104 Topography. The land surface configuration.

3.3.105* Unified Command. A standard method to coordinate command of an incident where multiple agencies have jurisdiction.

3.3.106* Values at Risk. Public and private resources, which include, but are not limited to, property, structures, physical improvements, natural and cultural resources, community infrastructure, and economic, environmental, and social values.

3.3.107 Water Supply. A source of water for fire suppression activities.

3.3.108 Wildland. Land in an uncultivated, more or less natural state and covered by timber, woodland, brush, and/or grass. [**901,** 2021]

3.3.109* Wildland Fire. A fire that originates in or extends to vegetative fuels and that can involve structures or other combustible materials.

3.3.110 Wildland Fire Officer I. The person responsible for supervising and directing a single wildland fire suppression resource, such as a hand crew or an engine.

3.3.111 Wildland Fire Officer II. The person responsible for commanding and managing resources in the suppression of all aspects of an extended attack wildland fire or an initial attack exceeding the capability of the Wildland Fire Officer I.

3.3.112* Wildland Firefighter I. The person at the first level of progression who has demonstrated the knowledge and skills necessary to function safely as a member of a wildland fire suppression crew under direct supervision.

3.3.113* Wildland Firefighter II. The person at the second level of progression who has demonstrated the skills and depth of knowledge necessary to function under general supervision.

3.3.114* Wildland/Urban Interface. A geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels, resulting in the potential for ignition of the structures within the area from flames or firebrands of a wildland fire.

3.3.115* Wildland/Urban Interface Coordinator. The person responsible for the development of the plan(s) for the reduction of the fire risks and hazards associated in the wildland/urban interface.

3.3.116 Wildland/Urban Interface Protection Specialist. The person responsible for the development and/or implementation of a plan to protect people, animals, communities, individual structures, or other improvements from a wildland fire.

3.3.117 Wildland/Urban Intermix. An area where structures are intermingled with wildland fuels.

Chapter 4 Wildland Firefighter I (NFPA 1051)

4.1 Administration.

4.1.1* Scope. Chapters 4 through 9 identify the minimum JPRs for Wildland Firefighter I, Wildland Firefighter II, Wildland Fire Officer I, Wildland Fire Officer II, Wildland/Urban Interface Protection Specialist, and Wildland/Urban Interface Coordinator.

4.1.2* Purpose. The purpose of Chapters 4 through 9 are to specify the minimum JPRs for service as a Wildland Firefighter I, Wildland Firefighter II, Wildland Fire Officer I, Wildland Fire Officer II, Wildland/Urban Interface Protection Specialist, and Wildland/Urban Interface Coordinator.

4.1.2.1 Chapters 4 through 9 shall define a Wildland Firefighter I, Wildland Firefighter II, Wildland Fire Officer I, Wildland Fire Officer II, Wildland/Urban Interface Protection Specialist, and Wildland/Urban Interface Coordinator.

4.1.2.2 The intent of Chapters 4 through 9 shall be to ensure that personnel serving as a Wildland Firefighter I, Wildland Firefighter II, Wildland Fire Officer I, Wildland Fire Officer II, Wildland/Urban Interface Protection Specialist, and Wildland/Urban Interface Coordinator are qualified.

4.1.2.3* Chapters 4 through 9 shall not address organization or management responsibility.

4.1.2.4 It is not the intent of Chapters 4 through 9 to restrict any jurisdiction from exceeding or combining these minimum requirements.

4.1.2.5 JPRs for each level and position are the tasks personnel shall be able to perform to carry out the job duties.

4.1.2.6* A Wildland Firefighter I, Wildland Firefighter II, Wildland Fire Officer I, Wildland Fire Officer II, Wildland/Urban Interface Protection Specialist, and Wildland/Urban Interface Coordinator shall remain current with the general knowledge and skills and JPRs addressed for each level or position of qualification.

4.1.3 Application. The application of this standard is to specify which requirements within the document shall apply to Wildland Firefighter I, Wildland Firefighter II, Wildland Fire Officer I, Wildland Fire Officer II, Wildland/Urban Interface Protection Specialist, and Wildland/Urban Interface Coordinator.

4.1.3.1 The JPRs shall be accomplished in accordance with the requirements of the authority having jurisdiction (AHJ) and all applicable NFPA standards.

4.1.3.2 It shall not be required that the JPRs be mastered in the order in which they appear. The AHJ shall establish instructional priority and the training program content to prepare personnel to meet the JPRs of this standard.

4.1.3.3* Performance of each requirement of this standard shall be evaluated by personnel approved by the AHJ.

4.1.3.4 The JPRs for each level or position shall be completed in accordance with recognized practices and procedures or as defined by law or by the AHJ.

4.1.3.5 Qualification Requirements.

4.1.3.5.1 Personnel assigned the duties of Wildland Firefighter I shall meet all the requirements defined in Chapter 4 prior to being qualified.

4.1.3.5.2 Personnel assigned the duties of Wildland Firefighter II shall meet all the requirements defined in Chapter 5 prior to being qualified.

4.1.3.5.3 Personnel assigned the duties of Wildland Fire Officer I shall meet all the requirements defined in Chapter 6 prior to being qualified.

4.1.3.5.4 Personnel assigned the duties of Wildland Fire Officer II shall meet all the requirements defined in Chapter 7 prior to being qualified.

4.1.3.5.5 Personnel assigned the duties of Wildland/Urban Interface Protection Specialist shall meet all the requirements defined in Chapter 8 prior to being qualified.

4.1.3.5.6 Personnel assigned the duties of Wildland/Urban Interface Coordinator shall meet all the requirements defined in Chapter 9 prior to being qualified.

4.1.3.6 The AHJ shall provide personal protective clothing and the equipment necessary to conduct assignments.

4.1.3.7 JPRs involving exposure to products of combustion shall be performed in approved PPE.

4.1.3.8 Prior to training to meet the requirements of this standard, personnel shall meet the following requirements:

(1) Educational requirements established by the AHJ
(2) Age requirements established by the AHJ
(3)* Medical requirements established by the AHJ
(4)* Job-related physical performance requirements established by the AHJ

4.1.3.9 Wherever in Chapters 4 through 9 the terms *rules, regulations, policies, procedures, supplies, apparatus,* or *equipment* are referred to, it is implied that they are those of the AHJ.

4.1.3.10* For each level of progression, as identified in Chapters 4 through 9, persons shall participate in continuing professional development activities to maintain competency with the JPRs covered in this standard for each level and position for which they are professionally qualified.

4.2 General. The Wildland Firefighter I shall meet the JPRs defined in Sections 4.2 through 4.6.

4.2.1* General Prerequisite Knowledge. Fireline safety and use and limitations of personal protective equipment; AHJ policy on fire shelter use; basic wildland fire behavior; fire suppression techniques; basic wildland fire tactics; the firefighter's role within the AHJ incident management system; AHJ required first aid; and NFES 1077, *Incident Response Pocket Guide (IRPG).*

4.2.2* General Prerequisite Skills. Basic verbal communications and the use of required personal protective equipment.

4.3 Human Resource Management. No JPRs at this level.

4.4 Preparedness.

4.4.1 Definition of Duty. Activities in advance of fire occurrence to ensure safe and effective suppression action.

4.4.2* Maintain assigned personal protective equipment, given the standard equipment issue, so that the equipment is serviceable and available for use on the fireline and defects are recognized and reported to the supervisor.

(A) Requisite Knowledge. Maintenance of personal protective equipment, including inspection, the recognition of unserviceable items, and proper cleaning procedures.

(B) Requisite Skills. No requisite skills required at this level.

4.4.3* Maintain assigned suppression hand tools and equipment, given tools and equipment and AHJ maintenance specifications, so that assigned equipment is maintained and serviceable and defects are recognized and reported to the supervisor.

(A) Requisite Knowledge. Inspection of tools and assigned suppression equipment, the recognition of unserviceable items, and required maintenance techniques.

(B)* Requisite Skills. Sharpening and other maintenance techniques for assigned suppression equipment, and use of required maintenance equipment.

4.4.4* Maintain personal gear kit, given a deployment and AHJ policies, so that mobilization response readiness meets AHJ requirements.

(A) Requisite Knowledge. Contents of a personal gear kit, type and duration of the incident, and AHJ policies.

(B) Requisite Skills. None specified.

4.5 Mobilization. No JPRs at this level.

4.6 Suppression.

4.6.1 Definition of Duty. All activities to confine and extinguish a wildland fire, beginning with dispatch.

4.6.2 Assemble and prepare for response, given an assembly location, an assignment, incident location, mode of transportation, and the time requirements, so that arrival at the incident with the required personnel and equipment meets AHJ guidelines.

(A)* Requisite Knowledge. Equipment requirements, AHJ time standards and special transportation considerations (weight limitations), and AHJ safety and operational procedures for various transportation modes.

(B) Requisite Skills. None specified.

4.6.3 Recognize hazards and unsafe situations, given a wildland or wildland/urban interface fire and the standard safety policies and procedures of the AHJ, so that the hazard(s) and unsafe condition(s) are communicated to the supervisor and appropriate action is taken.

(A) Requisite Knowledge. Basic wildland fire safety, fire behavior, and suppression methods.

(B) Requisite Skills. None specified.

4.6.4 Construct a fireline, given a wildland fire, AHJ line construction standards, suppression tools, water or other suppression agents, and equipment, so that the fireline conforms to the construction standard.

(A) Requisite Knowledge. Principles of fireline construction, techniques, and standards.

(B)* Requisite Skills. Proper use of hand tools, fire stream practices, and agent application.

4.6.5 Secure the fireline, given a wildland fire and suppression tools, water or other suppression agents, and equipment, so that burning materials and unburned fuels that threaten the integrity of the fireline are located and abated.

(A) Requisite Knowledge. Line improvement techniques and safety considerations.

(B)* Requisite Skills. Use of basic ignition devices only under direct supervision.

4.6.6 Describe the methods to reduce the threat of fire exposure to improved properties given a wildland/urban interface fire, suppression tools, and equipment so that improvements are protected.

(A) Requisite Knowledge. Wildland fire behavior, wildland fuel removal, structure protection methods, and equipment and personnel capabilities.

(B) Requisite Skills. The use of methods to protect improvements.

4.6.7 Mop up fire area, given a wildland fire, suppression tools, and water or other suppression agents and equipment, so that burning fuels that threaten escape are located and extinguished.

(A) Requisite Knowledge. Mop-up principles, techniques, and standards.

(B) Requisite Skills. Use of basic tools and techniques to perform mop-up operations.

4.6.8 Patrol the fire area, given a wildland fire, suppression tools, and equipment, so that containment of the fire area is maintained.

(A) Requisite Knowledge. Patrol principles, techniques, and standards.

(B) Requisite Skills. Observe, identify, and take action on potential threats.

Chapter 5 Wildland Firefighter II (NFPA 1051)

5.1* General. Prior to progressing to the Wildland Firefighter II level, the Wildland Firefighter I shall meet the JPRs defined in Sections 5.1 through 5.5.

5.1.1* General Prerequisite Knowledge. The Wildland Firefighter II role within the incident management system, basic map reading and compass use or other locating device, radio procedures, chain saws and pumps, and record keeping.

5.1.2 General Prerequisite Skills. Orienteering, operation of chain saws and pumps, record keeping, and radio use.

5.2 Human Resource Management.

5.2.1 Evaluate the readiness of assigned crew members, given a wildland fire, an assigned task, and AHJ equipment standards, so that crew members are equipped and supplied for suppression duties.

(A) Requisite Knowledge. AHJ standards and personnel inspection procedures.

(B) Requisite Skills. Inspect members' personal protective equipment, tools, supplies, qualifications, and physical fitness level.

5.2.2 Brief assigned personnel, given an assignment, supporting information, and equipment requirements, so that the personnel are informed of specific tasks, standards, safety, operational, and special interest area considerations.

(A)* Requisite Knowledge. Incident and task information necessary to carry out assignments.

(B) Requisite Skills. Briefing skills.

5.2.3* Lead wildland firefighters in the performance of a task, given an assignment and performance standards, so that the task is completed within the standards in accordance with AHJ guidelines.

(A) Requisite Knowledge. Leadership techniques for small groups.

(B) Requisite Skills. The application of requisite knowledge to lead wildland firefighters to complete the task in a manner that is within the standard.

5.3 Preparedness.

5.3.1 Definition of Duty. Responsibilities in advance of fire occurrence to ensure that tools, equipment, and supplies are fire ready.

5.3.2* Maintain chain saws and portable pumps as designated by the AHJ, given AHJ maintenance specifications, supplies, and tools, so that equipment is maintained and serviceable and defects are recognized and repaired.

(A) Requisite Knowledge. Maintenance procedures for chain saws and portable pumps as designated by the AHJ.

(B) Requisite Skills. Preventive maintenance and repair of chain saws and portable pumps as designated by the AHJ.

5.3.3 Inspect tools and equipment, given AHJ specifications, so that suitability of the tools and equipment for fire use is ensured.

(A) Requisite Knowledge. Tool and equipment inspection guidelines.

(B) Requisite Skills. The ability to inspect the tools and equipment according to guidelines.

5.4 Mobilization. No JPRs at this level.

5.5 Suppression.

5.5.1 Definition of Duty. All activities to contain and extinguish a wildland or wildland/urban interface fire beginning with dispatch.

5.5.2 Select fireline construction methods, given a wildland fire and line construction standards, so that the technique used is compatible with the conditions and meets AHJ standards.

(A) Requisite Knowledge. Resource capabilities and limitations, fireline construction methods, and AHJ standards.

(B) Requisite Skills. None specified.

5.5.3 Reduce the risk of fire exposure to improved properties, given a wildland or wildland/urban interface fire and available tools and equipment, so that improvements are protected from fire.

(A) Requisite Knowledge. Knowledge of fire behavior in both wildland and improved properties, the effects of fuel modification to reduce the hazard, and NWCG S-215, *Fire Operations in the Wildland/Urban Interface*.

(B) Requisite Skills. The use of tools and equipment to protect the improved property.

5.5.4* Operate a chain saw, given an assignment at a wildland fire and operational standards, so that the assignment is completed in a safe manner.

(A) Requisite Knowledge. AHJ standards for chain saw operation and safety, tool selection, and personal protective equipment used during saw use.

(B)* Requisite Skills. Site preparation, handling and cutting techniques, use of wedges, saws, and equipment storage and transportation.

5.5.5 Operate water delivery equipment, given an assignment at a wildland fire and operational standards, so that the proper equipment is selected, desired nozzle pressure is attained, and flow is maintained.

(A)* Requisite Knowledge. Basic hydraulics, pump and water delivery system capabilities, operation of pumps, basic drafting, and associated equipment.

(B) Requisite Skills. Placement, operation, and system setup.

5.5.6 Operate a portable radio, given AHJ policies, so that communication is clear, concise, and accurate.

(A) Requisite Knowledge. AHJ operational standards for portable radios.

(B) Requisite Skills. Operation of portable radios.

5.5.7* Secure the area of suspected fire origin and associated evidence, given a wildland fire and AHJ procedures, so that all evidence or potential evidence is protected from damage or destruction and reported to a supervisor.

(A) Requisite Knowledge. Knowledge of types of evidence and the importance of site security and evidence preservation.

(B) Requisite Skills. Evidence preservation techniques and use of marking devices for site security.

5.5.8 Serve as a lookout, given an assignment at a wildland fire as per AHJ procedures, so that firefighters are updated or warned when conditions change.

(A)* Requisite Knowledge. Basic fire behavior and how to recognize hazardous situations, communications methods, equipment, and procedures.

(B) Requisite Skills. The ability to accurately describe fire behavior and changes in fire behavior through verbal communication, hand signals, or use of communication equipment.

Chapter 6 Wildland Fire Officer I (NFPA 1051)

6.1 General. Prior to progressing to the Wildland Fire Officer I level, the Wildland Firefighter II shall meet the JPRs defined in Sections 6.1 through 6.5.

6.1.1 Prerequisite Knowledge. Authority and responsibility of cooperating jurisdictional agencies, formal and informal agreements between jurisdictional agencies, the incident management system used by the jurisdiction, and the Wildland Fire Officer I role within that system.

6.1.2 Prerequisite Skills. None specified.

6.2 Human Resource Management.

6.2.1* Definition of Duty. Lead and supervise human resources to accomplish assignments in a safe and efficient manner.

6.2.2 Evaluate assigned personnel, given AHJ personnel performance standards, so that members are capable of performing assigned tasks and individuals not meeting the standards are identified and that corrective actions are taken.

(A) Requisite Knowledge. AHJ personnel policies and procedures, performance standards, and evaluation.

(B) Requisite Skills. The ability to observe, evaluate, counsel, and document personnel as to fitness for duty in accordance with AHJ policies and procedures.

6.2.3 Verify the qualifications of assigned personnel, given an assignment or task, so that individual firefighter qualifications are appropriate, deficiencies are identified and reported, and corrective action is taken.

(A) Requisite Knowledge. AHJ qualifications standards.

(B) Requisite Skills. The ability to assess personnel qualifications for assignment in accordance with AHJ policies and procedures.

6.2.4 Provide for first aid or medical treatment, given an injured or ill firefighter and AHJ policies and procedures, so that treatment is provided, appropriate notifications are made, and required administrative reports are completed.

(A) Requisite Knowledge. AHJ accident and illness reporting procedures.

(B) Requisite Skills. Report writing and written communications.

6.2.5 Evaluate job performance of assigned personnel, given AHJ standards, so that the information is provided to the individual being evaluated and all required forms are completed.

(A) Requisite Knowledge. Basic performance evaluation.

(B) Requisite Skills. Administrative and written communication skills.

6.3 Preparedness.

6.3.1 Ensure overall readiness of assigned crew, vehicle, and equipment, given AHJ standards, policies, and procedures, so that operational readiness is maintained.

(A) Requisite Knowledge. Crew needs, equipment readiness, and AHJ standards, policies, and procedures.

(B) Requisite Skills. Assessment, decision-making, and written and verbal communication skills.

6.4 Mobilization.

6.4.1 Definition of Duty. Collect AHJ dispatch information, assemble assigned resources, travel to designated location, and check in.

6.4.2 Obtain complete information from AHJ dispatch, given AHJ standard operating procedures, so that travel route, assignment, time needed, and point of contact are determined.

(A) Requisite Knowledge. AHJ dispatch, travel, accident, and equipment breakdown procedures.

(B) Requisite Skills. None specified.

6.5 Suppression.

6.5.1* Definition of Duty. Supervision of a single resource involved in wildland fire suppression, and when first on scene, assume command of initial attack incident, until relieved.

6.5.2* Size up an incident to formulate an incident action plan, given a wildland fire and available resources, so that incident objectives are set and strategies and tactics are applied according to AHJ policies and procedures.

(A) Requisite Knowledge. Size-up procedures, fire behavior, resource availability and capability, and suppression priorities.

(B)* Requisite Skills. Identification of values at risk, setting objectives, and selection of correct wildland fire suppression strategies.

6.5.3* Develop an initial report on conditions, given incident information and AHJ policies and procedures, so that required incident information is communicated to the AHJ communications center and updated as needed.

(A) Requisite Knowledge. AHJ incident information requirements and size-up procedures.

(B) Requisite Skills. Identification and communication of relevant incident information.

6.5.4* Establish an incident command post (ICP), given AHJ policies and procedures, so that the location is identified and communicated to personnel.

(A) Requisite Knowledge. Factors affecting appropriate ICP locations.

(B) Requisite Skills. Ability to establish an ICP.

6.5.5 Deploy resources to suppress a wildland fire, given an assignment, personnel, equipment, and AHJ policies and procedures, so that appropriate suppression actions are taken and safety of personnel is ensured.

(A)* Requisite Knowledge. Fireline location and construction techniques, ignition procedures, capabilities of firefighting equipment and personnel, radio communications capabilities and protocols, and techniques for the proper and safe deployment of the assigned resources.

(B)* Requisite Skills. The ability to assess and assign personnel and equipment.

6.5.6* Maintain incident records, given AHJ policies and procedures and applicable forms, so that required information is documented.

(A) Requisite Knowledge. AHJ incident documentation procedures.

(B) Requisite Skills. None specified.

6.5.7 Evaluate incident conditions, given a wildland fire, so that progress, changes in fuels, topography, weather, fire behavior, personnel safety, and other significant events are identified and communicated to the supervisor and to assigned and adjoining personnel.

(A)* Requisite Knowledge. Intermediate wildland fire behavior.

(B) Requisite Skills. Collect wildland fire weather, fuels, and topographic information.

6.5.8 Communicate with supervisors, crew members, and adjoining personnel, given a wildland fire incident, so that progress, changes in conditions, fire behavior, and other significant events are current.

(A) Requisite Knowledge. Wildland fire behavior, other hazards and factors related to the wildland fire environment.

(B) Requisite Skills. Ability to communicate.

6.5.9* Provide for the logistical needs of assigned resources, given a wildland fire, assigned resources, and AHJ policies and procedures, so that personnel and equipment needs are met in accordance with AHJ policies.

(A) Requisite Knowledge. Short- and long-term needs as determined by the incident.

(B) Requisite Skills. Identification of logistical needs.

6.5.10 Analyze incident needs, given assigned resources and incident status, so that additional resources needed are ordered or excess resources are identified and released in accordance with AHJ policies and procedures.

(A) Requisite Knowledge. AHJ policies and procedures related to resource ordering and release.

(B) Requisite Skills. Decision making.

6.5.11 Provide incident information to the incoming replacement incident commander, given a wildland fire, so that the transfer of command is completed and the new incident commander has the information necessary to operate.

(A) Requisite Knowledge. AHJ policies and procedures for transfer of command.

(B) Requisite Skills. The ability to communicate verbally and in writing and to document.

6.5.12 Deploy resources to mop up a wildland fire, given a wildland fire, personnel, equipment, and AHJ policies and procedures, so that appropriate mop-up actions are taken.

(A) Requisite Knowledge. Wildland fire behavior, environment factors, and resource capability.

(B) Requisite Skills. The ability to conduct a risk assessment.

6.5.13 Complete wildland fire suppression operations, given a wildland fire that has been controlled and mopped up in accordance with AHJ policies and procedures, so that the fire area is extinguished and resources are returned to service.

(A) Requisite Knowledge. AHJ policies and procedures for demobilization and termination of the incident.

(B) Requisite Skills. Decision making.

6.5.14* Respond to requests for incident information, given AHJ policies and procedures, so that response is accurate, within the policies, and provided in a time-sensitive manner.

(A) Requisite Knowledge. AHJ policies and procedures for release of incident information.

(B) Requisite Skills. The ability to communicate verbally and in writing.

6.5.15 Complete personnel time and equipment use records, given AHJ policies, procedures, and related forms, so that the information is accurate and in compliance with standards established by the AHJ.

(A) Requisite Knowledge. Basic wildland fire business management and AHJ policies and procedures for proper record keeping.

(B) Requisite Skills. The ability to communicate in writing.

6.5.16* Prepare final incident reports, given an extinguished wildland fire and AHJ policies and procedures, so that the reports are complete, accurate, and submitted on time.

(A) Requisite Knowledge. AHJ incident reporting policies and procedures.

(B) Requisite Skills. The ability to fill out forms.

Chapter 7 Wildland Fire Officer II (NFPA 1051)

7.1 General. Prior to progressing to the Wildland Fire Officer II level, the Wildland Fire Officer I shall meet the JPRs defined in Sections 7.1 through 7.5.

7.1.1 Prerequisite Knowledge. Authority and responsibility for implementing formal and informal agreements between jurisdictional agencies, the incident management system used by the jurisdiction, and the Wildland Fire Officer II's role within that system.

7.1.2 Prerequisite Skills. None specified.

7.2 Human Resource Management. No JPRs at this level.

7.3 Preparedness. No JPRs at this level.

7.4 Mobilization.

7.4.1* Supervise multiple resources, given an assignment and resources, so that they are mobilized in accordance with AHJ policies and procedures.

(A) Requisite Knowledge. AHJ policies and procedures covering the movement of multiple resources.

(B) Requisite Skills. The ability to assess the readiness of assigned resources.

7.5 Suppression.

7.5.1 Definition of Duty. Command multiple resources in the suppression of a wildland fire that exceeds the qualification level of the Wildland Fire Officer I.

7.5.2* Develop, validate, modify, and document an incident action plan for each operational period, given an action plan, so that strategies and tactics are applied according to AHJ policies and procedures in accordance with incident objectives.

(A) Requisite Knowledge. Availability and capability of resources and agency suppression priorities based on personnel safety and values at risk.

(B)* Requisite Skills. Identification of values at risk, objective setting, and selection of correct wildland fire suppression strategies and tactics.

7.5.3 Evaluate the need for and location of incident facilities, given AHJ policies and procedures, so that the location is sited, identified, and communicated to personnel.

(A) Requisite Knowledge. Factors affecting the need for appropriate incident facilities.

(B) Requisite Skills. Ability to evaluate and establish incident facilities.

7.5.4 Maintain incident records, given AHJ policies and procedures and applicable forms, so that required information is documented.

(A) Requisite Knowledge. AHJ incident documentation procedures.

(B) Requisite Skills. Record keeping.

7.5.5* Obtain incident information from the outgoing incident commander, given a wildland fire, so that the transfer of command is completed and the new incident commander has the information necessary to operate.

(A) Requisite Knowledge. AHJ policies and procedures for transition in command.

(B) Requisite Skills. The abilities to communicate verbally and in writing and to document.

Chapter 8 Wildland/Urban Interface Protection Specialist (NFPA 1051)

8.1 General. Prior to progressing to the Wildland/Urban Interface Protection Specialist level, the Wildland Fire Officer II shall meet the JPRs defined in Sections 8.1 through 8.6.

8.1.1 Prerequisite Knowledge. Authority and responsibility of assisting and cooperating agencies, the incident management system used by the AHJ, and the role of the Wildland/Urban Interface Protection Specialist within the system; Chapters 19 through 26 of this standard; and basic understanding of structural protection in the wildland/urban interface.

8.1.2 Prerequisite Skills. The ability to prepare written reports and protection plans and implement them and to work with cooperating agencies.

8.2 Human Resource Management. No JPRs at this level.

8.3 Preparedness. No JPRs at this level.

8.4 Mobilization. No JPRs at this level.

8.5 Suppression.

8.5.1 Risk and Hazard Assessment. Assess the actual and potential risks, hazards, and values at risk for the wildland/urban interface fire incident, given incident intelligence, predicted fire behavior, and AHJ policies, so that all risks, hazards, and values at risk are identified for planned mitigation efforts.

(A) Requisite Knowledge. Have an understanding of the factors that constitute wildland/urban interface fire hazards and risks and the impacts they will have on fire suppression efforts.

(B) Requisite Skills. The ability to prioritize the various risks and hazards as a plan of operations is being developed.

8.5.2 Hazard Mitigation Practices. Apply appropriate action(s), given resources, materials, and strategies, so that the risks, hazards, and values at risk are mitigated.

(A) Requisite Knowledge. An understanding of the various construction materials and types; the requirements for defensible space as related to fuels, topography, and the building construction; and the various mitigation actions associated with the various risks and hazards.

(B) Requisite Skills. The ability to assess, plan, and communicate.

8.5.3 Information. Provide internal and external briefings on the development of a structure protection plan, given specified audiences, AHJ policy, and an overall education strategy, so that the specified audiences are informed regarding the wildland/urban interface protection effort.

(A) Requisite Knowledge. Understanding of public presentation techniques.

(B) Requisite Skills. The ability to communicate.

8.5.4 Evacuation Planning. Participate in an evacuation or shelter-in-place plan in conjunction with assisting and cooperating agencies, given incident intelligence, predicted fire behavior, community maps, and resources, so that the public is protected.

(A) Requisite Knowledge. Understanding of the responsibilities of the various authorities as well as local, state, and federal laws and regulations that govern evacuations, and shelter-in-place techniques.

(B) Requisite Skills. The ability to participate in an evacuation plan for an incident and to activate an evacuation plan.

8.5.5 Hazardous Materials. Analyze the potential involvement of various hazardous materials, given incident information and resources, so that hazardous conditions are identified and mitigated.

(A) Requisite Knowledge. A working knowledge of the types of hazardous materials that can be involved and the hazards they can pose to the public, firefighting personnel, and the environment; NFPA 470, awareness level JPRs.

(B) Requisite Skills. The ability to assess and to communicate verbally and in writing.

8.5.6 Structure Protection Plan. Develop and monitor a structure protection plan, given incident intelligence, current and predicted fire behavior, community data, and available resources, so that various structures and other improvements that are or might be threatened during a wildland/urban interface incident are protected and the plan is modified as needed.

(A) Requisite Knowledge. The availability and capability of fire apparatus, equipment, and personnel that can be involved in an incident; the elements of a structure protection plan; incident objectives; and the effects of weather.

(B) Requisite Skills. The ability to develop and implement a structure protection plan and to constantly evaluate the wildland fire situation and change and modify the structure protection plan accordingly.

8.6 Post-Incident — Data Collection.

8.6.1 Develop a plan to gather damage assessment data, given incident information, data, structure valuation estimate, and resources for a wildland/urban interface fire, so that all pertinent data are collected for analysis.

(A) Requisite Knowledge. An understanding of Global Positioning Systems (GPS) and Geographic Information Systems (GIS) methodology and equipment and methods to obtain damage assessment data.

(B) Requisite Skills. The ability to develop and implement a plan to gather damage assessment data and the tools to accomplish the task.

Chapter 9 Wildland/Urban Interface Coordinator (NFPA 1051)

9.1 General. The Wildland/Urban Interface Coordinator shall meet the JPRs as defined in Sections 9.1 through 9.9 and meet all of the requirements of Public Fire and Life Safety Educator II specified in NFPA 1035.

9.1.1 Prerequisite Knowledge. Requirements of Wildland Firefighter I specified in Chapter 4; NWCG S-215, *Fire Operations in the Wildland/Urban Interface*; Chapters 24 through 26 of this standard; applicable codes and standards of the AHJ; and funding sources, including grants.

9.1.2 Prerequisite Skills. The ability to communicate verbally and in writing and to write reports and grants.

9.2 Human Resource Management. No JPRs at this level.

9.3 Preparedness.

9.3.1 Analyze and evaluate the jurisdictional area, given a wildland/urban interface area, so that a hazard, risk, and values at-risk rating is established in accordance with the adopted policies, procedures, codes, and standards of the AHJ.

(A) Requisite Knowledge. An applicable hazard assessment system to be used to assign a level of risk to life and improved property from wildland fire.

(B) Requisite Skills. The ability to apply the hazard assessment system to a project, property, or jurisdictional area.

9.3.2 Analyze the public safety element, given the general and growth management plans of the AHJ, so that all wildland/urban interface fire issues are identified.

(A) Requisite Knowledge. Fire and life safety issues, public safety issues, community concerns, available community resources, governmental regulations, environmental issues, and technological changes.

(B) Requisite Skills. The ability to analyze trends and demographics and prepare public safety elements and plans.

9.3.3 Assist planners and developers in the planning phase of subdivisions, given a proposed project, so that compliance with wildland/urban interface policies, procedures, codes, and standards of the AHJ is ensured.

(A) Requisite Knowledge. Subdivision planning and jurisdictional guidelines.

(B) Requisite Skills. The ability to interact with planners, developers, contractors, government officials, partnerships, and collaborative efforts.

9.3.4 Process a plan review application, given a proposed project in a wildland/urban interface area, so that the application is evaluated and processed in accordance with the applicable policies, procedures, codes, and standards of the AHJ.

(A) Requisite Knowledge. Application process for plan review and the applicable policies, procedures, codes, and standards.

(B) Requisite Skills. The ability to communicate verbally and in writing on matters related to the applicable policies, procedures, codes, and standards.

9.3.5 Facilitate the resolution of deficiencies identified during the plan review, given a submittal and the established practices and procedures of the AHJ, so that deficiencies are identified, documented, and reported to the plan submitter with applicable references and alternative methods for compliance.

(A) Requisite Knowledge. Policies and procedures of the AHJ regarding the communication of discrepancies and the appeals process as related to the codes and standards of the AHJ.

(B) Requisite Skills. The ability to communicate verbally and in writing.

9.3.6 Write recommended conditions of approval for proposed projects, given wildland/urban interface standards of the AHJ, so that the project is in compliance.

(A) Requisite Knowledge. Knowledge of fire-resistive construction and landscaping techniques and subdivision regulations, procedures, and processes of the AHJ.

(B) Requisite Skills. The ability to work with and educate planners, developers, contractors, and homeowners, and to write clearly and concisely and speak during public meetings before planning and zoning boards, homeowners' associations, and special interest groups.

9.3.7 Investigate wildland/urban interface safety complaints, given a reported situation or condition, so that complaint information is recorded and processed.

(A) Requisite Knowledge. Applicable policies, procedures, codes, and standards adopted by the AHJ.

(B) Requisite Skills. The ability to interpret policies, procedures, codes, and standards, communicate verbally and in writing, recognize problems, and refer complaints.

9.4 Mobilization. No JPRs at this level.

9.5 Suppression. No JPRs at this level.

9.6 Post-Incident.

9.6.1 Collect data on wildland/urban interface fire threats, losses, effectiveness of mitigation measures, and public education, given a data collection system and needed tools, so that all pertinent data are collected for analysis.

(A) Requisite Knowledge. Data collection, evaluation methods, and statistical analysis methods and resources.

(B) Requisite Skills. The ability to collect and analyze data in order to implement an evaluation strategy.

9.7 Administration.

9.7.1 Recommend policies and procedures, given management objectives, for the delivery of wildland/urban interface programs so that the policies and procedures are in accordance with the codes and standards of the AHJ.

(A) Requisite Knowledge. Policies and procedures of the AHJ related to code enforcement, and sources of detailed and technical information relating to fire protection and life safety.

(B) Requisite Skills. The ability to identify effective construction methods and materials related to fire safety, to read and interpret construction plans and specifications, to communicate verbally and in writing, to educate, to conduct research, to make decisions, to recognize problems, and to resolve conflicts.

9.7.2 Develop written correspondence to communicate fire protection and prevention requirements, given wildland/urban interface issues, so that the correspondence reflects research and accurate interpretation of applicable policies, procedures, codes, and standards.

(A) Requisite Knowledge. Applicable policies, procedures, codes, and standards adopted by the AHJ and the interrelationship among those codes and regulations.

(B) Requisite Skills. The ability to conduct code-related research and to clearly express code requirements verbally and in writing.

9.7.3 Select or create checklists and forms, given applicable policies, procedures, codes, and standards of the AHJ, so that information required and used to address the wildland/urban interface fire issues is clear and concise.

(A) Requisite Knowledge. Elements required by the applicable policies, procedures, codes, and standards.

(B) Requisite Skills. The ability to clearly express requirements of the AHJ in writing and organize those requirements in a logical and complete format for use as a guide to perform uniform and effective interface safety inspections.

9.8 Hazard Mitigation.

9.8.1 Generate a strategic plan with necessary procedural guidelines and mitigation treatments, given a fire-prone ecosystem, a wildland/urban interface area, applicable policies, procedures, codes, and standards, so that the strategic plan meets AHJ requirements for adoption.

(A) Requisite Knowledge. Applicability and effectiveness of various mitigation treatments and the application of pertinent policies, procedures, codes, and standards.

(B) Requisite Skills. The ability to discern the local political and budgetary environment.

9.8.2 Provide leadership, given a strategic plan and procedural guidelines, so that fuel modifications designed to reduce wildland/urban interface hazards are implemented.

(A) Requisite Knowledge. Techniques pertinent to selective tree thinning, brush disposal, pruning, grazing, mowing, prescribed fire (including air quality and smoke management), and chemical treatments.

(B) Requisite Skills. The ability to prepare clear written treatment prescriptions, to demonstrate the capability to communicate orally in a clear, concise, and effective manner, willingness to interact with diverse groups, and a capacity to initiate and sustain needed activities.

9.8.3 Recommend mitigation strategies, given an existing development or a proposed project, so that strategies are applied in accordance with the applicable policies, procedures, codes, and standards.

(A) Requisite Knowledge. Fuel types, wildland fire behavior, building construction, defensible space, and mitigation strategies.

(B) Requisite Skills. The ability to select an effective wildland/urban interface mitigation strategy.

9.8.4 Recommend modifications to codes and standards of the AHJ, given wildland/urban interface issues, so that the proposed codes and standards are written to address the problem, need, or deficiency.

(A) Requisite Knowledge. State statutes or local ordinances establishing or empowering the AHJ to adopt, enforce, and revise codes and standards; the legal instruments establishing or adopting codes and standards; and the development and adoption process for legislation or regulations.

(B) Requisite Skills. The ability to recognize problems, communicate, and identify risk and cost benefits.

9.8.5 Develop hazard mitigation plans, given policies, procedures, codes, and standards, so that an existing development within the jurisdictional area is brought into compliance.

(A) Requisite Knowledge. A knowledge of wildland/urban interface hazard mitigation planning documents and the use of prescribed burning and other fuel modification techniques, defensible space concepts, building construction, codes and standards, landscaping, and maintenance.

(B) Requisite Skills. The ability to develop written plans.

9.8.6 Provide technical expertise to AHJ staff, developers, home builders, homeowners, landscapers, consultants, and others, given an interface area, so that the wildland/urban interface threat is reduced.

(A) Requisite Knowledge. Understanding of the roles and responsibilities of other agencies, departments, and personnel whose involvement is crucial to address the threat.

(B) Requisite Skills. Demonstrated ability to educate others to achieve goals specified in a strategic plan.

9.9 Public Education.

9.9.1 Develop and implement a public education program, given a comprehensive educational strategy, so that the hazards and risks associated with the wildland/urban interface are reduced.

(A) Requisite Knowledge. Understanding of local fire prevention goals, fundamentals of public education program delivery methods, and available tools to get the public to respond.

(B) Requisite Skills. The ability to identify individual and collective fire education needs and to recognize effective communication tools necessary to implement and measure success of delivery strategies.

9.9.2 Develop or oversee the development of written, electronic, audio-visual, or display material, given objectives and specified audience(s), so that affected interests are educated and informed on the wildland/urban interface fire environment and mitigation techniques.

(A) Requisite Knowledge. Data resources and information systems, including format and materials, learning theory, computer, video and audio writing, editing, and social media formats and platforms.

(B) Requisite Skills. The ability to assemble information in a specific format, generate written or audio-visual materials, write persuasively and effectively, recognize and use powerful images, and identify and organize outreach to affected audiences and the community at large.

9.9.3 Coordinate or provide presentations, given identified fire and life safety goals and objectives, so that the public is informed on wildland/urban interface issues.

(A) Requisite Knowledge. Potential community partners with shared concerns and resources, community concerns, and available community resources.

(B) Requisite Skills. The ability to facilitate meetings, motivate partners to achieve goals, and prepare presentations.

Chapter 10 General Requirements for Fire Protection Infrastructure in Wildland, Rural, and Suburban Areas (NFPA 1141)

10.1 Administration.

10.1.1* Scope. Chapters 10 through 18 cover the requirements for the fire protection infrastructure in wildland, rural, and suburban areas where there is an intended change of land use or intended land development.

10.1.2 Purpose. The purpose of Chapters 10 through 18 is to develop fire protection and emergency services infrastructure to reduce the impact of land use changes in wildland, rural, and suburban areas.

10.1.3 Application.

10.1.3.1* Chapters 10 through 18 shall apply to land development or changes in land use in wildland, rural, and suburban areas.

10.1.3.1.1 In addition to other requirements in this standard, land use changes in wildland areas shall be subject to the requirements in Chapters 24 through 26.

10.1.3.1.2 All new construction in wildland/urban interface areas shall be designed, located, and constructed to comply with Chapters 24 through 26.

10.1.3.2 If the AHJ determines that additions to existing structures or new structures have a negative impact on the fire protection of existing land use, the requirements of this standard shall be permitted to be imposed.

10.1.3.3 Equivalencies, Alternatives, and Modifications.

10.1.3.3.1 Equivalencies. Chapters 10 through 18 shall apply equivalency as defined in Section 1.4.

10.1.3.3.2 Alternatives. The specific requirements of this standard shall be permitted to be altered by the AHJ to allow alternative methods that will secure equivalent fire safety, but in no case shall the alternative afford less fire safety, in the judgment of the AHJ, than that which would be provided by compliance with the provisions contained in this standard.

10.1.3.3.3 Modifications. The AHJ is authorized to modify any of the provisions of Chapters 10 through 18 upon application in writing by the owner, a lessee, or a duly authorized representative where there are practical difficulties in the way of carrying out the provisions of the standard, provided that the intent of the standard shall be complied with, public safety secured, and substantial justice done.

10.1.3.3.4 Conformance. Buildings with equivalencies, alternatives, or modifications approved by the AHJ shall be considered as conforming with Chapters 10 through 18.

10.1.3.3.5 Alternative Fire Protection Features.

10.1.3.3.5.1 Each application of an alternative fire protection feature shall be filed with the AHJ.

10.1.3.3.5.2 Each application for an alternative fire protection feature shall be accompanied by such evidence, letters, statements, test results, or other supporting information as required to justify the request.

10.1.3.3.5.3 The AHJ shall keep a record of the actions of such applications.

10.1.3.3.5.4 A signed copy of the AHJ's decision shall be provided for the applicant.

10.1.3.4 Requirements.

10.1.3.4.1 Chapters 10 through 18 shall be enforced by the AHJ designated by the governing body.

10.1.3.4.2* The AHJ shall have the authority to apply the requirements in Chapters 10 through 18 that are specifically addressed for buildings or other structures that are deemed to possess significant life or property loss potential.

10.1.3.4.3 If the fire department is not the AHJ, the AHJ shall consult with the fire department on all matters relative to the enforcement of Chapters 10 through 18 to ensure that the needs of the fire department are met in providing fire protection.

10.1.3.4.4 Provisions in Excess of Standard Requirements. Nothing in Chapters 10 through 18 shall be construed to prohibit a better development plan, building construction type, fire protection infrastructure, or an otherwise safer condition than that specified by the minimum requirements of Chapters 10 through 18.

10.1.3.4.5 The AHJ shall use recognized fire protection measures to meet local conditions because Chapters 10 through 18 do not set forth general fire protection features or procedures addressed in other codes or standards.

10.1.3.4.6 Conflicts.

10.1.3.4.6.1 When a requirement in a referenced document is less restrictive than requirements in Chapters 10 through 18, the requirements of Chapters 10 through 18 shall apply.

10.1.3.4.6.2 When a conflict between a general requirement and a specific requirement occurs, the specific requirement shall apply.

10.1.3.4.7* Prior to occupancy of any portion of the development, supporting infrastructure shall be installed, operational, and approved by the AHJ.

10.1.3.5 Public Notification.

10.1.3.5.1 The applicant for a land development or land use change shall provide written documentation and illustrative maps to the AHJ that specify areas that will be included in the proposed land development or land use change.

10.1.3.5.2 One or more published public announcements shall be made to publicize one or more public hearings at which the AHJ will present the proposed project, outline proposed methods to comply with Chapters 10 through 18 using best applicable data, and allow testimony by the public.

10.1.3.5.3 The applicant for a land use or land development change shall submit a written proposal to the AHJ regarding the level to which Chapters 10 through 18 shall be imposed, including justifications that demonstrate compliance, fire service impact, and responses to the public testimony.

10.1.3.5.4 The AHJ shall review the applicant's land use or land development change proposal and public testimony and render a written final determination if the proposed land use or land development change complies with Chapters 10 through 18.

10.1.3.6 Public Appeals Process. Any person shall be permitted to appeal a decision of the AHJ. A process for appeal shall be made available to the public by the appropriate administrative body of the local adopting authority.

10.1.3.6.1 Adoption Appeals.

10.1.3.6.1.1 Appeals shall be permitted, in part or whole, to the adoption of Chapters 10 through 18.

10.1.3.6.1.2 Upon appeal, the designated local government having authority shall affirm, modify, or disapprove in writing the determination of the AHJ in accordance with 10.1.3.5.3.

10.1.3.6.2 Other Appeals. Appeals of individual requirements shall be permitted when it is claimed that any one or more of the following conditions exist:

(1) The true intent of the requirements described in Chapters 10 through 18 has been incorrectly interpreted.
(2) The provisions of Chapters 10 through 18 do not fully apply.
(3) A decision is unreasonable or arbitrary as it applies to alternatives or new materials.

10.1.3.7 Impact Assessment. The AHJ shall conduct an impact assessment of the proposed land development or change in land use to determine the extent of impact on fire services currently available, as specified in Chapter 12 of this standard.

10.2 General. As a minimum, the AHJ shall require preliminary, working, and as-built plans to be submitted in a timely manner.

10.2.1 Plans shall demonstrate compliance with this standard.

10.2.1.1 The AHJ shall be permitted to require the review by an approved independent third party with expertise in the matter to be reviewed at the developer's expense.

10.2.1.2 The independent reviewer shall provide an evaluation and recommend necessary changes to the proposed plan development.

10.2.1.3 The AHJ shall be authorized to require design submittals to bear the stamp of a registered design professional.

10.2.1.4 Review and approval by the AHJ shall not relieve the applicant of the responsibility of compliance with this standard.

10.3 Noncombustible Material. See 25.2.1.

Chapter 11 Means of Access (NFPA 1141)

11.1 General.

11.1.1 This section shall apply to all means of access, publicly or privately owned, whether or not they are designated as public thoroughfares.

11.1.2 Means of access shall be provided to all buildings more than 400 ft^2 (37 m^2) in ground floor area and to public occupancies with structural components.

11.1.3 The AHJ shall have the authority to require a means of unlocking any security feature that is installed.

11.1.3.1 Any gates shall not be located closer than 30 ft (9.144 m) from an intersection and shall open in the direction of emergency vehicle travel unless other provisions are made for safe personnel operation.

11.1.3.2 The clear opening through gates shall have a usable width at least 2 ft (0.6 m) wider than the means of access it controls.

11.1.4 Number of Means of Access.

11.1.4.1* A land development shall have one or more means of access in accordance with Table 11.1.4.1(a), Table 11.1.4.1(b), or 11.1.4.2, whichever produces the greatest number.

11.1.4.2 Where residential areas are mixed with nonresidential areas, the minimum number of access routes shall be determined by calculating five parking spaces for each dwelling unit, adding that number to the parking spaces count for the nonresidential area, and using Table 11.1.4.1(b).

Table 11.1.4.1(a) Required Number of Access Routes for Residential Areas

Number of Households	Number of Access Routes
0–100	1
101–600	2
>600	3

Table 11.1.4.1(b) Required Number of Access Routes for Nonresidential Areas

Number of Parking Spaces	Number of Access Routes
0–1250	1
1251–3000	2
>3000	3

11.1.4.3 Where multiple means of access are required, one of the means of access shall be permitted to be restricted for emergency use only, when approved by the AHJ.

11.1.4.4 Where multiple means of access are required, they shall be located as remotely from each other as practical and acceptable to the AHJ.

11.2 Roadways. Roadways shall be constructed and maintained in accordance with this section.

11.2.1* The legal right-of-way for a roadway shall accommodate the width necessary for the construction, drainage, erosion control, and maintenance of the roadway, and provisions for utilities and sidewalks.

11.2.2 Roadways shall be constructed of a hard, all-weather surface designed to support all legal loads of the jurisdiction.

11.2.3 Roadways shall have a minimum clear width of 12 ft (3.7 m) for each lane of travel, excluding shoulders and parking.

11.2.3.1 Curves shall not reduce the width of the roadway.

11.2.3.2 Provisions shall be made for drainage, snowbanks, parking, utilities, and the like such that they do not impinge on the minimum clear width.

11.2.4 Where parking is permitted, such space shall be provided in accordance with Section 11.4.

11.2.5 Any roadway intersecting with another shall be sloped to prevent the accumulation of water and ice on either roadway.

11.2.6 At least 13 ft 6 in. (4.2 m) nominal vertical clearance shall be provided and maintained over the full width of the roadway.

11.2.7 Turns in roadways shall be constructed with a minimum radius of 60 ft (18.2 m) to the outside of the turn.

11.2.8 Median left-turn lanes and traffic signals shall be provided at intersections where necessary to prevent traffic from impeding fire department response time.

11.2.9 Where required by the AHJ, any traffic signal system shall have an automatic means for fire apparatus to control the signals to maintain an unimpeded right-of-way.

11.2.9.1 Sight distance shall be incorporated into the design of intersections.

11.2.10* Bridges and culverts shall be designed to accommodate a minimum of 100-year flood elevations and flows in accordance with accepted engineering practices.

11.2.11 Vehicle load limits shall be posted at both entrances to bridges where required by the AHJ.

11.2.12 Easements shall be obtained to permit vegetation clearance alongside roads to minimize the likelihood of evacuation routes being blocked during wildfire or other natural disasters.

11.2.13* Roadways shall not be designed and constructed to include speed bumps or speed humps.

11.2.14 Alternative traffic calming devices such as chicanes and roundabouts shall be acceptable with approval by the AHJ.

11.2.15 Roadway design shall incorporate provisions for emergency pull-offs, spaced according to the AHJ.

11.2.16 Grades.

11.2.16.1 Grades shall not be more than 10 percent, except as permitted by this section.

11.2.16.2* Grades steeper than 10 percent shall be permitted by the AHJ where mitigation measures can be agreed upon by the fire department and the road engineering department, taking into consideration climate, traffic load, environmental conditions, the number of turns that would affect traffic flow, and the ability of fire apparatus to operate on steeper grades.

11.2.16.3 The angle of approach and the angle of departure shall not exceed 8 degrees at any point on the roadway or its intersection with another roadway or fire lane.

11.2.16.4 Where local conditions do not allow the maximum angles of approach and departure be limited to 8 degrees, the AHJ shall permit greater angles where local emergency apparatus can accommodate such angles.

11.2.16.5 Where grades are less than 0.5 percent, the road shall be crowned in the center to prevent pooling of water in a traveled way.

11.2.16.6 The design of grade crossings at railroad tracks shall be done by a professional engineer with expertise in railroad grade crossings.

11.2.17 Dead Ends.

11.2.17.1 Every dead-end roadway more than 300 ft (91 m) in length shall be provided at the closed end with a turnaround having no less than a 120 ft (36.6 m) outside diameter of the traveled way.

11.2.17.2* The length of any cul-de-sac shall not exceed the firefighting capability of the fire department.

11.2.17.3* A cul-de-sac exceeding 1200 ft (366 m) in length shall be provided with approved intermediate turnarounds at a maximum of 1200 ft (366 m) intervals.

11.2.18 Signage.

11.2.18.1 Addresses and Street Names.

11.2.18.1.1 Addresses shall be assigned in a logical, consistent manner based on the local addressing system.

11.2.18.1.2 Street names shall be phonetically unique.

11.2.18.2 Sign assemblies with the name of each road shall be constructed of noncombustible material and installed at each intersection.

11.2.18.3 These signs shall be installed a minimum of 7 ft (2.1 m) above the traveled way.

11.2.18.4 The letters on the signs shall be no less than 4 in. (100 mm) in height, with at least a 0.5 in. (12.7 mm) stroke, reflective and of a contrasting color to the background of the sign.

11.2.18.5 Where required by the AHJ, signs shall also include references to address numbers pertinent for that section of the road.

11.2.18.6 Where required by the AHJ, signs shall be erected at intersections indicating directions and distance to the nearest water supply.

11.2.18.7 Where the location of the nearest water supply is not obvious, signs or other directional symbols shall be erected indicating directions and distance to the nearest water supply.

11.2.18.8 The beginning of every dead-end roadway and developments with only single access shall have signage indicating that there is not a second outlet.

11.3* Fire Lanes.

11.3.1 Approval.

11.3.1.1 Fire lane plans shall be reviewed and approved by the AHJ and the fire department responsible for the protection of the property.

11.3.1.2 Changes to access points, gates, or fire lane layout shall be pre-approved by the AHJ.

11.3.2 Driveways, parking lot lanes, delivery lanes, and private roadways shall be permitted to be used as fire lanes if they meet the requirements of this section.

11.3.3 Fire lanes shall be constructed of a hard, all-weather surface designed to support any vehicle within the legal load limits of the jurisdiction.

11.3.4 The grade from a fire lane to the exterior wall of the grade level floor of a building shall not exceed 10 percent.

11.3.5 Fire lanes connecting to roadways shall be provided with curb cuts extending at least 2 ft (0.6 m) beyond each edge of the fire lane.

11.3.6 Fire Lane Width.

11.3.6.1 Fire lanes intended for one-way travel shall provide a minimum of 16 ft (5 m) in width of traveled way.

11.3.6.2 Fire lanes providing two-way travel shall be a minimum of 24 ft (7.3 m) in width of traveled way.

11.3.6.3 The AHJ shall be permitted to allow a reduction in fire lane width where the sole purpose of the fire lane is for emergency access and operations.

11.3.6.4 Fire lane widths shall not include shoulders, sidewalks, or drainage.

11.3.7 Extra width shall be provided where the fire department determines such width is necessary to position apparatus for operations during an incident.

11.3.8 Turns in fire lanes shall be constructed to provide sufficient width to accommodate the largest piece of fire apparatus available to be operated on the fire lane, but in no case shall the radius to the outside curb line be less than 50 ft (15.2 m).

11.3.9 All grades in fire lanes shall meet the requirements of 11.2.5.

11.3.10 At least 13 ft 6 in. (4.2 m) nominal vertical clearance shall be provided and maintained over the full width of a fire lane.

11.3.11 The angle of approach and the angle of departure shall not exceed 8 degrees at any point on the fire lane or its intersection with other roads or fire lanes.

11.3.12 When a bridge is required to be used as part of a fire apparatus access road, it shall be constructed and maintained in accordance with nationally recognized standards. [**1:**18.2.3.5.5.1]

11.3.12.1 The bridge shall be designed for a live load sufficient to carry the imposed loads of fire apparatus. [**1:**18.2.3.5.5.2]

11.3.12.2 Vehicle load limits shall be posted at both entrances to bridges where required by the AHJ. [**1:**18.2.3.5.5.3]

11.3.13 Any bridge constructed as part of a fire lane shall provide width of no less than that required for the fire lane.

11.3.14 Dead-end fire lanes that exceed 300 ft (91 m) in length shall be provided with a minimum 120 ft (36.6 m) diameter turnaround at the closed end of the fire lane.

11.3.15 The clear opening through gates in fire lanes shall be at least 2 ft (0.6 m) wider than the traveled way.

11.3.16 All gates at the entrance to fire lanes shall be located a minimum of 30 ft (9.144 m) from the roadway and shall open away from the roadway, unless other provisions are made for safe personnel operation.

11.3.16.1 The AHJ shall have the authority to require a means of unlocking any security feature that is installed.

11.3.16.2 If needed, fire department personnel shall have ready access to any manual releases that could be required if there is an interruption of utility power.

11.3.16.3 Means shall be provided to override normal operation and allow any gate to remain open until manually closed.

11.3.17 An acceptable plan for wintertime maintenance of access through any gates and along any fire lane shall be submitted to the fire department responsible for the protection of the property.

11.3.18 Approved "No Parking — Fire Lane" signs shall be posted in accordance with the instructions of the fire department having responsibility and a method of enforcing such provisions shall be provided by the local jurisdiction.

11.4 Parking Lots.

11.4.1* The minimum lengths of parking lot stalls shall be measured end to end as shown in Figure 11.4.1, and the minimum stall length and aisle widths shall be as shown in Table 11.4.1.

Table 11.4.1 Minimum Parking Lot Stall Dimensions and Minimum Aisle Lengths

Parking Angle	Minimum Stall Length		Minimum Aisle Width, One-Way Traffic Flow		Minimum Aisle Width, Two-Way Traffic Flow	
Degrees	ft	m	ft	m	ft	m
45	27.5	8.4	16	4.9	24	7.3
60	23.7	7.2	16	4.9	24	7.3
75	20.9	6.4	23	7.0	24	7.3
90	18.5	5.6	26	7.9	26	7.9

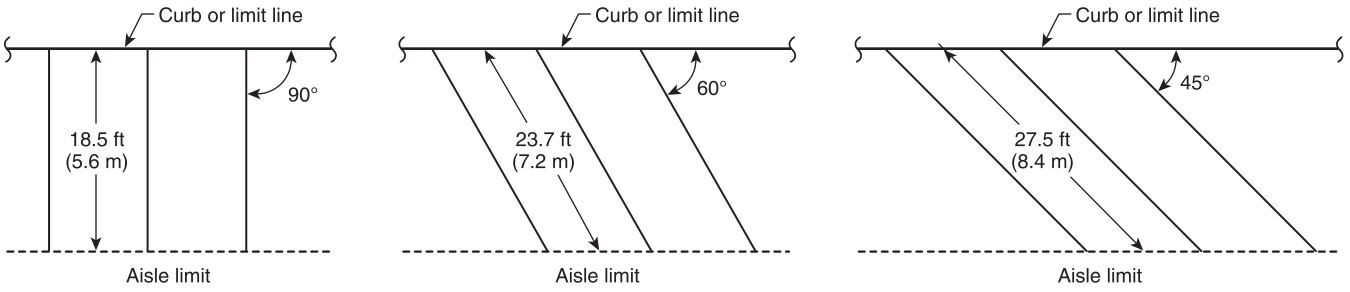

FIGURE 11.4.1 Measurements for Parking Stall Length.

11.4.2 Parking lot aisles adjacent to any building shall provide a travel lane with a minimum 24 ft (7.3 m) clear width.

11.4.3 The minimum turning radius for parking lot aisles necessary for fire department apparatus access shall be determined by the fire department having responsibility.

Chapter 12 Building Access and Separation (NFPA 1141)

12.1 General. At least one approved means of fire apparatus access shall be provided to each building in accordance with this section.

12.1.1* Approved fire apparatus access shall be provided to within 150 ft (45 m) of any point of the exterior wall of each building.

12.1.1.1 The requirements of 12.1.1 shall be permitted to be extended to 300 ft (91 m) for any building protected by an automatic sprinkler system installed and maintained according to NFPA 13 or NFPA 13R, whichever is applicable.

12.1.2 Approved fire apparatus access shall be provided to within 50 ft (15.2 m) of at least one exterior door providing access to the interior of the building.

12.1.2.1 The requirement of 12.1.2 shall not apply to one- and two-family dwellings.

12.1.3* Any building, other than a one- or two-family dwelling, exceeding two stories or 30 ft (9.144 m) in height above average adjacent ground elevation and not protected by an automatic sprinkler system installed and maintained in accordance with NFPA 13 or NFPA 13R shall have an approved means of fire apparatus access to within 30 ft (9.144 m) of all points of at least 50 percent of the exterior wall perimeter.

12.1.4* Any building exceeding three stories or 35 ft (10.7 m) in height above average adjacent ground elevation and protected by an automatic sprinkler system installed and maintained in accordance with NFPA 13 or NFPA 13R, whichever is applicable, shall have an approved means of fire apparatus access to within 30 ft (9.144 m) of an exterior wall.

12.2 Building Separation.

12.2.1 Unless governed by other locally adopted regulations, any building shall be separated from any other buildings by at least 30 ft (9.144 m) and be set back at least 30 ft (9.144 m) from a property line.

12.2.2 Any building that exceeds two stories or 30 ft (9.144 m) in height above the average adjacent ground elevation and that is not protected by an automatic sprinkler system installed and maintained according to NFPA 13 or NFPA 13R, shall be separated from any other structure by at least 50 ft (15.2 m) and be set back at least 30 ft (9.144 m) from a property line.

Chapter 13 Premises Identification (NFPA 1141)

13.1 General. All premises having an assigned address under 11.2.18.1 shall be identified by signage bearing the assigned address.

13.1.1 Premises address signage shall meet the requirements of 13.1.2 through 13.1.6.

13.1.2 Sign assemblies shall consist of noncombustible materials.

13.1.3 Sign background shall be of a reflective material and of a contrasting color to the address numerals or letters.

13.1.4 Address numerals or letters shall be of a reflective material, of a contrasting color to the sign background, and with a height of not less than 4.0 in. (102 mm) with a 0.5 in. (13 mm) stroke.

13.1.5 Spacing between address numerals or letters shall be between 0.5 in. (13 mm) and 1.0 in. (25 mm).

13.1.6 A minimum border of 1.0 in. (25 mm) of sign background shall be maintained around the address letters or numerals.

13.2 Visibility. When address signage affixed directly to the premises is not visible from the roadway, additional signage shall be provided at the point of intersection between the premises driveway and the roadway.

13.2.1 End-of-driveway signage shall comply with all requirements for premises signage in 13.1.1 and the following:

(1) Mounted between 4.0 ft (1.2 m) and 7.0 ft (2.1 m) above grade
(2) Posted no further than 5.0 ft (1.5 m) from either the driveway or roadway travelled way, and on the same side of the road as the serviced driveway
(3) Oriented perpendicular to the direction of travel on the roadway, and clearly visible and legible from both directions of travel on the roadway

13.2.2 End-of-driveway signage shall be maintained free of any visual obstructions, such as weeds, debris and snow.

13.2.3 End-of-driveway signage shall be replaced whenever damaged or when reflectivity or legibility has been degraded.

Chapter 14 Fire Protection (NFPA 1141)

14.1 Automatic Fire Protection.

14.1.1 All buildings, other than one- and two-family dwellings and apartments, that are more than two stories or more than 30 ft (9.144 m) above the adjacent ground elevation shall be fully protected with automatic sprinkler systems installed and maintained according to NFPA 13 or NFPA 13R, as permitted for the occupancy.

14.1.1.1 Where incidental portions of a building exceed two stories or 30 ft (9.144 m) in height and are not normally occupied, the provisions of 14.1.1 shall not apply.

14.1.2 All one- and two-family dwellings shall be protected with automatic sprinkler systems installed in accordance with NFPA 13D.

14.1.3 All apartment occupancies shall be protected with automatic sprinkler systems installed and maintained in accordance with NFPA 13 or NFPA 13R.

14.1.4 Any other residential building, other than one- and two-family dwellings or apartments, shall have an automatic sprinkler system installed in accordance with NFPA 13 or NFPA 13R as permitted for the occupancy.

14.1.5* Where municipal-type water systems are available, fire department connections for sprinkler systems designed in accordance with NFPA 13 or NFPA 13R shall be located not more than 100 ft (30.5 m) along an approved path from a fire hydrant and be arranged so that hose lines can be readily and conveniently attached to inlets without interference from any nearby objects, including buildings, signs, fences, posts, or other fire department connections.

14.1.6 Fire department connections shall be located to facilitate the establishment of a continuous supplemental water supply where municipal-type water systems are not available and be arranged so that hose lines can be readily and conveniently attached to inlets without interference from any nearby objects, including buildings, signs, fences, posts, or other fire department connections.

14.2 Manual Fire Protection.

14.2.1 Standpipe Systems.

14.2.1.1 General. The design and installation of standpipe systems shall be in accordance with this section and NFPA 14.

14.2.1.2 Standpipe systems shall not be required in one- and two-family dwellings.

14.2.1.3 High-rise buildings shall be protected throughout by a Class I standpipe system.

14.2.1.4 Where municipal-type water systems are provided, the requirements of 14.2.1 shall apply to all new buildings that meet any of the following conditions:

(1) More than three stories above grade
(2) More than 50 ft (15 m) above grade and containing intermediate stories or balconies
(3) More than one story below grade
(4) More than 20 ft (6.1 m) below grade

14.2.1.5 Where municipal-type water systems are not provided, the requirements of 14.2.1 shall apply to all new buildings that meet any of the following conditions:

(1) More than two stories in height above grade
(2) More than 40 ft (12.2 m) above grade and containing intermediate stories or balconies
(3) More than one story below grade
(4) More than 20 ft (6.1 m) below grade

14.2.1.6* Fire Department Connections for Standpipes. Where municipal-type waster systems are provided, fire department connections for standpipe systems shall be located not more than 100 ft (30.5 m) from the nearest fire hydrant connected to an approved water supply.

14.2.1.6.1 The location of the fire department connections shall be permitted to exceed 100 ft (30.5 m) subject to the approval of the authority having jurisdiction.

14.2.1.6.2 Where municipal-type water systems are not provided, fire department connections shall be located as required by the authority having jurisdiction to facilitate the establishment of a continuous supplemental water supply.

14.2.1.6.3 Fire department connections shall be located and arranged so that hose lines can be readily and conveniently attached to inlets without interference from any nearby objects, including buildings, signs, fences, posts, or other fire department connections.

14.2.1.6.4 Fire department connections shall be located not less than 18 in. (457 mm) nor more than 48 in. (1219 mm) above the level of the adjoining ground, sidewalk, or grade surface.

14.2.2* Fire Extinguishers. Fire extinguishers shall be provided as specified in Table 13.6.2 of NFPA 1 and installed in accordance with NFPA 10.

14.3 Automatic Fire Warning Systems.

14.3.1 Any residential buildings containing more than two living units shall have a local fire alarm system designed and installed in accordance with *NFPA 72*.

14.3.2 In any residential buildings containing four or more living units, the local fire alarm system shall retransmit to an approved central station.

14.3.3 For nonresidential structures exceeding 1000 ft^2 (93 m^2) gross floor area, an approved fire warning or alarm system shall be installed in accordance with *NFPA 72*.

14.3.3.1 For nonresidential structures exceeding 5000 ft^2 (465 m^2) gross floor area, such systems shall retransmit an alarm to an approved central station.

14.3.3.2 Alarms or warning systems shall be tested and maintained in accordance with *NFPA 72*.

Chapter 15 Water Supply (NFPA 1141)

15.1 General.

15.1.1 Where water mains or fire hydrants are provided for fire protection purposes, the following shall apply:

(1) Water mains or fire hydrants installed on public property or in a utility easement shall be installed and maintained in accordance with AWWA M31, *Distribution System Requirements for Fire Protection.*
(2) Water mains or fire hydrants installed on nonpublic property shall be installed and maintained in accordance with NFPA 24.

15.1.2 Where there are no water mains for fire protection purposes, NFPA 1142 shall apply.

15.1.3 The number and type of fire hydrants and connections to approved water supplies shall be capable of delivering the required fire flow to one or more buildings of a development as determined by the AHJ using locally adopted codes or as specified per the following conditions:

(1) For areas without municipal-type water systems, NFPA 1142 shall be applied.
(2) For areas with municipal-type water systems, Annex G of NFPA 1142or the locally adopted fire code shall be consulted for guidance.

15.1.4 Fire Hydrants.

15.1.4.1 Fire hydrants shall be marked in accordance with NFPA 291 and shall be made visible from the road by reflective marking or signage as designated by the AHJ.

15.1.4.2 All identification signs for fire hydrants shall be approved by the applicable authority prior to installation if they are to be located in the right-of-way or are subject to other laws.

15.1.4.3 Fire hydrants located in parking areas shall be protected by barriers that will prevent physical damage from vehicles without obstructing fire hydrant operation.

15.1.4.4 Fire hydrants shall be located within 6 ft (1.8 m) of the edge of the pavement unless the fire department determines another location is more acceptable for fire department use. Consideration shall be given to locating fire hydrants such that fire apparatus can be connected to the fire hydrant without impeding traffic flow.

15.1.4.5* Threads on fire hydrant outlets shall be American National Fire Hose Connection Screw Threads and shall be equipped with thread adapters where local fire department threads are different.

15.1.4.6 The area around fire hydrants shall remain clear of obstructions, including vegetation, signs, fences, light posts, and so forth.

15.2* Water Supply Distribution. Water sources shall be located such that the required fire flow for any building in the development can be established and maintained within 5 minutes of arrival with the fire department resources available.

15.3 Areas with Municipal-Type Water Systems.

15.3.1 For areas with municipal-type water systems, the required fire flow shall be determined as specified in NFPA 1142, Annex G, Municipal-Type Water System, or the locally adopted fire code.

15.3.2 For a required fire flow exceeding 1500 gpm (5700 L/min), the water supply system shall be capable of delivering that fire flow for at least 2 hours at 20 psi (138 kPa) residual pressure.

15.3.3 For all required fire flows other than those described in 15.3.2, the water supply system shall be capable of delivering the required fire flow for at least 1 hour at 20 psi (138 kPa) residual pressure.

15.3.4 Modifications.

15.3.4.1 Decreases. Fire flow requirements shall be permitted to be decreased by the AHJ for isolated buildings or a group of buildings in rural areas or suburban areas where the development of full fire flow requirements is impractical as determined by the AHJ.

15.3.4.2 Increases.

15.3.4.2.1 Fire flow shall be permitted to be increased by the AHJ where conditions indicate an unusual susceptibility to group fires or conflagrations.

15.3.4.2.2 An upward modification of fire flow shall not be more than twice that required for the building under consideration.

15.3.5 Fire hydrants in partially built-out or built-out areas shall be installed at a spacing not to exceed 500 ft (152 m) of vehicle travel distance from a building unless the fire department having jurisdiction determines that closer fire hydrant spacing is required.

15.3.6* In unbuilt areas, fire hydrants shall be installed at not more than 1500 ft (456 m) spacing with provisions in place to install fire hydrants to meet 15.3.5 as the area is built out.

15.3.7 The fire department shall approve the location of all fire hydrants.

15.3.8 For nonresidential buildings, a fire hydrant shall be located within 500 ft (150 m) of each point of entry.

15.3.9 In residential areas, fire hydrants shall be supplied by not less than a 6 in. (150 mm) diameter main installed on a looped system or by not less than an 8 in. (200 mm) diameter main if the system is not looped or the fire hydrant is installed on a dead-end main exceeding 300 ft (91 m) in length.

15.3.10* In nonresidential areas, detailed fire flow calculations shall be provided and used to determine necessary pipe sizing.

15.3.10.1 Future development in the area shall be considered when fire flow requirements are calculated.

15.3.11 Dead-end mains shall not exceed 600 ft (183 m) in length for main sizes less than 10 in. (250 mm) in diameter.

15.4 Acceptance.

15.4.1 The contractor or installer of new water supply systems or extensions to existing water supply systems shall demonstrate by actual test that the capacity of the water supply system will meet the fire protection design requirements.

15.4.2 The AHJ shall witness the tests, approve the results, and provide a copy of test results to the fire department.

Chapter 16 Fire Protection During Construction (NFPA 1141)

16.1* General Requirements. The provisions of NFPA 241 shall apply in addition to the specific requirements of this chapter.

16.1.1 Before the infrastructure is installed, and prior to the location and construction of buildings or portions thereof, fire protection plans shall be submitted to and approved by the AHJ.

16.1.2 Prior to the delivery of combustible materials and the start of any building construction, the water supply for fire protection, whether temporary or permanent, shall be acceptable to the AHJ and shall be available.

16.1.3 Prior to the final occupancy of any building, the permanent water supply for fire protection, including fire hydrants and fire suppression systems, shall be installed, tested, and acceptable to the AHJ.

16.1.4 Fire department vehicular access to all buildings under construction shall be provided at all times.

16.1.4.1 In areas where ground surfaces are soft or likely to become soft, hard all-weather surface access roads shall be provided.

16.1.5 Combustible trash and debris shall be placed completely within an approved container or removed from the site at the close of each working day.

16.1.6 Flammable or combustible liquids or gases shall be stored, handled, and used on the construction site in accordance with the applicable provisions of NFPA 30, NFPA 54, and NFPA 58.

16.1.7 Temporary heating devices shall be of an approved type, located away from combustible materials, and attended and maintained by competent personnel.

16.1.8 Smoking shall be prohibited, except in those areas where approved. Where required by the AHJ, "No Smoking" signs shall be posted.

16.1.9 Cutting and welding operations shall be in accordance with NFPA 51B.

16.2 Extinguishing Equipment.

16.2.1 At least one portable fire extinguisher having a rating of at least 10-A:120-B:C shall be within a travel distance of 75 ft (23 m) or less to any point of a building under construction.

16.2.2 Personnel normally on the construction site shall be instructed in the use of the fire extinguishers provided.

Chapter 17 Community Safety and Emergency Preparedness (NFPA 1141)

17.1* General.

17.1.1 The AHJ shall be responsible for the adoption and maintenance of a multi-agency operational plan for the protection of lives and property during significant emergency incidents.

17.1.2 The primary goal of the plan shall be to protect people in the affected area, including emergency personnel responding to the incident, from injury or loss of life.

17.2 Assessment of Hazards. The AHJ shall identify hazards, the likelihood of their occurrence, and the vulnerability of people, property, the environment, and the community itself to those hazards.

17.3 Operational Plan. The plan shall contain, as a minimum, command, training, community notification and involvement, public fire safety information and education, public safety and evacuation, and mutual assistance elements.

17.3.1 Command Element.

17.3.1.1 The plan shall contain a command element that clearly defines the responsibilities and authorities of all agencies and organizations that will be used in management of the incident.

17.3.1.2 Supporting resources such as social service agencies, local media, law enforcement, and so forth shall be included.

17.3.1.3 An incident management system shall be used in accordance with NFPA 1561.

17.3.2 Training Element. Training, qualification, and equipment requirements shall be prepared to ensure that all personnel and equipment assigned to an emergency incident will be able to carry out assignments in a predictable, safe, cooperative, and effective manner.

17.3.3 Community Notification and Involvement Element. Public preparation shall include the following:

(1) The establishment of a communication system to provide rapid and accurate information to the public regarding emergency incidents that endanger their community, including detailed instructions for public notification of impending evacuation
(2) Information regarding actions to be taken for self-protection
(3) Information regarding appropriate assistance that can be rendered by the public to fire protection agencies in the management of emergency incidents
(4) Security measures to protect the evacuated area

17.3.4 Public Fire Safety Information and Education Element.

17.3.4.1 The AHJ shall prepare and implement a public safety information and education program.

17.3.4.2 The program, at a minimum, shall identify and analyze the following:

(1) Fire causes and hazards
(2) Life and property risks from other natural and technological hazards
(3) Prevention and safety programs
(4) Target audiences
(5) Activities

17.3.5 Public Safety and Evacuation Element.

17.3.5.1 A public safety and evacuation element shall provide for the safety of residents and area workers threatened by potential emergency incidents.

17.3.5.2 The public safety and evacuation element shall include the following:

(1) Incident personnel authority and criteria for ordering evacuations or relocations
(2) Incident personnel responsibilities in evacuations or relocations

(3) Procedures for public notification of impending evacuations or relocations
(4) Routes for evacuations or relocations
(5) Shelter locations
(6) Policy addressing the issue of persons who choose to not evacuate or relocate
(7) Policy for allowing evacuees to return when the current emergency has passed

17.3.6 Mutual Assistance Element.

17.3.6.1 Mutual assistance (mutual aid) agreements shall be developed that detail those services and resources available to support the management of emergency incidents.

17.3.6.2 Mutual assistance agreements shall be reviewed annually.

17.3.6.3 Mutual assistance agreements shall specify the following:

(1) Legal authorities
(2) Command organization
(3) Fiscal responsibilities
(4) Operational and logistical responsibilities

17.3.7* Physical Space Element.

17.3.7.1 The plan shall contain a physical space element that defines access routes and open space(s) to support the operational plan, in accordance with the community risk assessment.

17.3.7.2 The plan shall address maintenance of the operational physical spaces, in accordance with 17.3.7.1, to ensure functionality in accordance with the operational plan.

Chapter 18 Capacity of Fire Protection Services (NFPA 1141)

18.1* Assessment.

18.1.1 An assessment shall be conducted to determine the impact of the land use change on fire protection services.

18.1.2 The assessment shall be conducted by a person with qualifications acceptable to the AHJ.

18.1.3 The assessment shall be conducted at the expense of the developer.

18.1.4 The assessment shall address the following:

(1) *Dispatching.* Are the current system and staff able to handle the increased call volume likely to be generated by the buildout resulting from the land use change?
(2) *Fire station locations.* In order to maintain an acceptable level of fire department and emergency response times within the response area, are current fire stations distributed and designed to service changing demands resulting from the land use changes and development?
(3) *Fire service resources.* Are there adequate fire apparatus and staffing to meet the increased service demands likely to be generated by the buildout?
(4) *Special services.* Will the development introduce a need for special services not currently within the capability of the fire department?

18.2* Mitigation. Where the assessment determines that the existing fire department cannot maintain its current level of service delivery while also providing services to the proposed development, the fire department and the developer shall jointly determine how to mitigate the impact on the delivery of fire services or increase the capability of the fire department and how those services are to be provided.

Chapter 19 Risk/Hazard Assessment and Mitigation (NFPA 1143)

19.1 Administration.

19.1.1 Scope. Chapters 19 through 23 provide minimum requirements to fire protection organizations on the management of wildland fire, including prevention, mitigation, preparation, and suppression.

19.1.2* Purpose. The purpose of Chapters 19 through 23 are to specify management practices and policies necessary for a fire protection organization to develop a wildland fire management program.

19.1.3 Wildland Fire Management Policies.

19.1.3.1 The AHJ shall develop a policy for managing the organization in all aspects of wildland fire, including prevention, mitigation, preparation, and suppression.

19.1.3.1.1 As a minimum, the policy shall be established in accordance with legal mandates, organization priorities, planning procedures, incident management, personnel safety and training, and cooperative agreements.

19.1.3.1.2 Additional policy items shall be included as determined necessary by the AHJ.

19.1.3.2 Where the possibility of wildland fire constitutes a threat, the AHJ shall have a management plan to perform the activities as required by Chapters 19 through 23.

19.1.3.3 The goal shall be to reduce wildland fire loss through the establishment, maintenance, and coordination of policies and programs addressing fire prevention, risk assessment and mitigation, planning, incident management, personnel, infrastructure, training, communications, fire suppression capabilities, and safety.

19.2* General. The AHJ shall develop a written risk and hazard assessment and mitigation plan based on values at risk and consistent with firefighter and public safety.

19.3 Values at Risk.

19.3.1 The AHJ shall involve the community, landowners, industry, and other stakeholders in the identification of values to be protected within the jurisdiction.

19.3.2 The values shall include, but not be limited to, health, safety, property, and resource values, as well as the social, economic, environmental, and political concerns of the local jurisdiction.

19.4 Ignition Risk Assessment.

19.4.1 The AHJ shall evaluate the potential and historical sources of ignition.

19.4.2* The evaluation shall include both natural and human sources of ignition.

19.5* Fire Hazard Assessment.

19.5.1 The AHJ shall assess the severity of wildland fires within or threatening the jurisdiction.

19.5.2 The assessment shall consider, but not be limited to, the following:

(1) Vegetation (fuels)
(2) Topography
(3) Aspect
(4) Fire history
(5) Historical fire weather
(6) Fire danger rating
(7) Potential fire behavior
(8) Firefighting capabilities and limitations
(9) Ingress and egress

19.5.3 In the assessment of wildland fire hazards to structures, the requirements in Chapters 24 through 26 shall apply.

19.6* Mitigation Plan.

19.6.1 Plan Development. Based on the values, ignition risk assessment, and fire hazard assessment, the AHJ shall develop a plan identifying the required mitigation activities, responsible party, priorities, and implementation schedule.

19.6.1.1* This plan shall be developed and implemented in coordination with the stakeholders.

19.6.2 Activities. The mitigation activities shall include, but not be limited to, the details outlined in 19.6.3 through 19.6.8.

19.6.3 Ignitions. The AHJ shall identify the prevention activities that reduce the occurrence of human-caused ignition.

19.6.4 Fuels Treatment.

19.6.4.1 The AHJ shall identify activities necessary to mitigate fire behavior characteristics through fuel modification.

19.6.4.2 Acceptable methods of fuel treatment include, but are not limited to, prescribed burning by qualified personnel, mowing, pruning, removing, species substitution, mulching, chemical treatments, converting to compost, and grazing.

19.6.5* Public Education. The AHJ shall appoint a qualified individual(s) whose duties shall include, but not be limited to, the following:

(1) Scheduling and facilitating public meetings to identify values at risk, wildland fire threats, and potential mitigation strategies
(2) Disseminating information concerning activities and their status through development and distribution of prevention information
(3) Familiarizing press and media representatives with the threat of wildland fire and mitigation strategies

19.6.6 Structures.

19.6.6.1 Where a wildland fire ignition risk and fire hazard severity assessment indicates the need, mitigation activities for existing construction shall be consistent with Chapters 24 through 26.

19.6.6.2 The design criteria for new construction and land development in and near wildland fire threats shall be consistent with Chapters 10 through 18 and 24 through 26.

19.6.7 Infrastructure. The AHJ shall evaluate and consider the need for modification or additions to the infrastructure, including the following:

(1) Roads — including ingress/egress
(2) Water supply
(3) Communications
(4) Utility corridors
(5) Transportation corridors
(6) Airports

19.6.7.1 All new or modified infrastructure shall comply with the provisions of Chapters 10 through 18.

19.6.8* Special Considerations. The AHJ shall comply with civil and environmental laws in the planning and implementation of mitigation activities, including those pertaining to threatened and endangered species and historical and cultural resources.

19.7* Evaluation of Mitigation Plan. The AHJ shall, on an annual basis, review the mitigation plan to monitor progress of mitigation activities and to determine whether priorities have changed.

Chapter 20 Preparedness (NFPA 1143)

20.1 Wildland Fire Response Planning.

20.1.1 The AHJ shall evaluate the capabilities and limitations of existing firefighting resources.

20.1.2 When the situation indicates that additional resources are needed, consideration shall be given to the following:

(1)* Mutual aid and cooperative fire protection agreements
(2) Budget adjustments for additional personnel, apparatus, or other equipment
(3) Government and private sector grants
(4) Volunteer recruitment
(5) Additional training
(6) Improved tactics
(7) Use of improved and innovative techniques

20.1.3 Preparedness Planning. The AHJ shall develop a written preparedness plan(s) for wildland fire management consistent with firefighter and public safety.

20.1.3.1 The plan(s) shall be based on life safety, followed by property and natural resources to be protected, as well as the political, social, economic, environmental, and other concerns of the local jurisdictions.

20.1.3.2 This plan shall, on an annual basis, be reviewed and, at a minimum, include the following:

(1) Identification of specific wildland fire hazards, ignition risks, and potential hazard areas within the jurisdiction and other hazards that have a negative effect on wildland fire management efforts
(2) Identification of fire protection features such as lakes, rivers, water points, natural firebreaks, potential escape routes, and other areas or features that are beneficial to wildland fire management efforts
(3)* A list of firefighting resources, including personnel, apparatus, and equipment
(4) A list of all cooperating agencies and other mutual aid resources and the procedures for requesting assistance from those agencies and resources
(5) A reference to any and all existing mutual aid agreements, contracts, and other protection agreements applicable to wildland fire management efforts
(6) A list of specific objectives relating to training, safety, response times, and staffing levels

(7) A list of other resources that provide analyses of fire cause, identification of special fire hazards, identification of ignition risks, assessment of fire protection problems related to the wildland/urban interface and the impact on developed areas, and proposed measures to reduce fire occurrence
(8) Mass evacuation, sheltering, and re-entry guidance in accordance with NFPA 1616

20.2* Financial Planning. The financial element of the preparedness plan shall include, at a minimum, the contractual agreements to provide for the following services:

(1) Fuel, oil, and lubricants
(2) Medical services, including injury reports
(3) Catering services, food, and drinking water
(4) Incident-specific personnel hiring and compensation
(5) Outside services, including lodging and communications
(6) Equipment maintenance
(7) Specialized firefighting equipment
(8) Purchasing practices, procedures, and agreements
(9) Other incident support
(10) Backfill costs and the duration for which these are to be included

20.3* Safety Requirements. The AHJ shall develop safety requirements that include 20.3.1 through 20.3.5.

20.3.1 The AHJ shall develop a safety program that includes all aspects of wildland fire incident operation, personnel welfare, and the use of personal protective clothing and equipment.

20.3.1.1 The program shall be established in accordance with jurisdictional policies and procedures and reflect the established guidance provided by NFPA 1500.

20.3.1.2* All personal protective clothing and equipment shall meet the requirements of NFPA 1977.

20.3.2 The safety officer's function shall be to carry out duties in accordance with established wildland fire incident procedures and the criteria outlined in NFPA 1521.

20.3.3 Protective measures shall be taken for apparatus and equipment used during wildland fire incidents.

20.3.4 Equipment operators shall meet the requirements of NFPA 1002 and be trained as outlined in NFPA 1451.

20.3.5 The AHJ shall follow the medical examination standards established in NFPA 1582.

20.4* Training and Qualifications.

20.4.1 All wildland firefighters shall have a working knowledge and the skills of wildland fire safety practices and procedures meeting the requirements in National Wildfire Coordinating Group (NWCG) S-130, *Firefighter Training;* S-190, *Introduction to Wildland Fire Behavior;* L-180, *Human Factors in the Wildland Fire Service;* ICS-100, *Introduction to the Incident Command System; and IS-700, An Introduction to the National Incident Management System.*

20.4.2* All personnel responding to wildland fire shall meet the job performance requirements of Chapters 4 through 9.

20.4.3* All members of the agencies and organizations involved in wildland fire suppression shall be trained in safety procedures around air operations.

Chapter 21 Incident Management (NFPA 1143)

21.1* Organizational Structure. In the management of wildland fire incidents, the AHJ shall utilize an incident management system (IMS) as specified in NFPA 1561.

21.1.1 At the initial stages of the incident, all command and support functions shall be the direct responsibility of the incident commander (IC).

21.1.2 As the incident grows in size and complexity, the functions shall be delegated as appropriate to qualified personnel as specified in NFPA 1026.

21.1.3 The organizational structure identified in Section 21.1 shall be compliant with the National Incident Management System (NIMS).

21.2* Functional Responsibilities. Each of the following functions as specified in 21.2.1 through 21.2.3.4 shall be addressed regardless of the size and complexity of the incident:

(1) Incident command
(2) Operations
(3) Planning
(4) Logistics
(5) Finance

21.2.1* Incident Command Functions.

21.2.1.1* The responsibilities of incident command shall be carried out by the IC.

21.2.1.2 These responsibilities shall include, but not be limited to, the following:

(1)* Developing the command and support organization for the incident
(2) Establishing a command post
(3) Developing, reviewing, revising, evaluating, approving, and distributing an incident action plan (IAP) for each operational period
(4) Ensuring adequate safety measures are followed, using the following principles:
    (a) Activities that present a significant risk to the safety of firefighters shall be limited to situations where there is a potential to save endangered lives.
    (b) In those situations where improved property is threatened but lives are not at risk, threats to firefighter safety shall be minimized.
(5) Maintaining command throughout the duration of the incident, including transfer and termination of command
(6)* Acquiring a formal Delegation of Authority from the AHJ
(7) Controlling access of essential and nonessential individuals to the incident scene
(8) Maintaining awareness of situation status
(9) Evaluating progress of the incident
(10) Maintaining awareness of deployment of all assigned units
(11) Maintaining personnel accountability
(12) Requesting additional resources as needed
(13) Notifying key people, officials, and the AHJ of incident status
(14) Approving release of information to the public
(15) Approving the demobilization of resources

21.2.2* Command Staff Functions.

21.2.2.1 Public Information Officer.

21.2.2.1.1 The public information officer shall develop and release approved information about the incident to the news media, to incident personnel, and to other appropriate agencies and organizations.

21.2.2.1.2 Only one public information officer shall be assigned for each incident, including incidents operating under unified command and multijurisdictional incidents.

21.2.2.1.3 The public information officer shall be permitted to have assistants as necessary, and the assistants shall be permitted to also represent assisting agencies or jurisdictions.

21.2.2.1.4 The following are the major responsibilities of the public information officer, which shall apply to any incident:

(1) Determine from the IC if there are any limits on information release
(2) Develop material for use in media briefings
(3) Obtain IC's approval of media releases
(4) Inform media and conduct media briefings
(5) Arrange for tours and other interviews or briefings as requested
(6) Obtain media information that can be useful to incident planning
(7) Maintain current information summaries and displays on the incident and provide information on the status of the incident to assigned personnel
(8) Maintain unit log
(9) Participate in planning meeting

21.2.2.2 Liaison Officer.

21.2.2.2.1 Incidents that are multijurisdictional, or have several agencies involved, shall be permitted to establish the position of liaison officer on the command staff.

21.2.2.2.2* The liaison officer shall be the contact for the personnel assigned to the incident by assisting or cooperating agencies.

21.2.2.2.3 The following are the major responsibilities of the liaison officer, which shall apply to any incident:

(1) Be a contact point for agency representatives
(2) Maintain a list of assisting and cooperating agencies and agency representatives
(3) Assist in establishing and coordinating interagency contacts
(4) Keep agencies supporting the incident aware of incident status
(5) Monitor incident operations to identify current or potential inter-organizational problems
(6) Participate in planning meetings and provide current resource status, including limitations and capability of assisting agency resources
(7) Maintain unit log

21.2.2.3 Safety Officer.

21.2.2.3.1 Standard operating procedures/standard operating guidelines (SOPs/SOGs) shall define criteria for the response or appointment of a safety officer.

21.2.2.3.2* The safety officer and assistant safety officer(s) shall be specifically identifiable on the incident scene.

21.2.2.3.3

21.2.2.3.3.1 The safety officer shall monitor conditions, activities, and operations to determine whether they fall within the criteria as defined in the incident's risk management plan.

21.2.2.3.3.2 When the perceived risk(s) is not within these criteria, the safety officer shall take action as outlined in 21.2.1.2(4).

21.2.2.3.4 The following are the major responsibilities of the safety officer, which shall apply to any incident:

(1) Participate in tactics and planning meetings.
(2) Identify hazardous situations associated with the incident.
(3) Review the IAP for safety implications.
(4) Exercise emergency authority to stop and prevent unsafe acts.
(5) Investigate accidents that have occurred within the incident area.
(6) Assign assistants as needed.
(7) Review and approve the medical plan.
(8) Maintain the unit log.

21.2.3 General Staff Functions.

21.2.3.1 Operations Function. The operations function shall be responsible for carrying out the strategic and tactical plans of the incident and shall include incident and post-incident planning and actions.

21.2.3.1.1 The responsibilities of operations are carried out by the IC until delegated to a qualified operations section chief.

21.2.3.1.2 These responsibilities shall include but not be limited to the following:

(1) Evaluating, organizing, and assigning the available resources following SOPs/SOGs based on the scale and complexity of operations
(2) Identifying the number of qualified and equipped people available, their physical condition, their experience and skill levels, and their availability
(3) Designating the types and amount of equipment and apparatus available within a specified response time, where the resources are located, how they can be transported to the incident, and the suitability of such equipment for use in wildland fire management considering terrain and other local conditions
(4) Carrying out tactical functions to support the IAP
(5) Ensuring that all the safety elements of the IAP are followed
(6) Maintaining accountability for all tactical resources
(7) Developing the operations portion of the IAP, including tactical work assignments, and participating in the planning meeting
(8) Requesting resources as needed to implement the IAP
(9) Maintaining close contact with subordinate tactical supervisors
(10) Directing the release of resources from assigned status (not release from the incident)
(11) Implementing tactical changes to the IAP during the operational period as necessary
(12) Maintaining close communication with the IC
(13) Maintaining the unit log

21.2.3.2 Planning Function. The planning function shall be the responsibility of the IC for the preparation of all plans

necessary to carry out the purpose and goals of the fire management agencies and organizations.

21.2.3.2.1 The responsibilities of planning are carried out by the IC until delegated to a qualified planning section chief.

21.2.3.2.2 These responsibilities shall include, but not be limited to, the following:

(1) Organizing a planning section to include the following units as necessary:
   (a) Resources unit
   (b) Situation unit
   (c) Documentation unit
   (d) Demobilization unit
   (e) Specialized positions
(2) Collecting, evaluating, developing, and disseminating information
(3) Accounting for organizational structure, availability of resources, and deployment of resources
(4) Maintaining, documenting, and displaying situation and resource status
(5)* Developing the proposed IAP in coordination with command and general staff
(6) Disseminating the IAP for each operational period
(7) Reassigning personnel already on site to IMS organizational positions as appropriate
(8) Determining the need for any specialized resources in support of the incident
(9) Overseeing preparation of incident demobilization plan
(10) Maintaining the unit log

21.2.3.3 Logistics Function. The logistics function shall be responsible to the IC for providing service and support resources that meet the goals and purposes of the wildland fire management effort.

21.2.3.3.1 The responsibilities of logistics shall be carried out by the IC until delegated to a qualified logistics section chief.

21.2.3.3.2* These responsibilities shall include but not be limited to the following:

(1) Assessing and determining the need for facilities, communications, support services, supplies, and equipment
(2) Organizing a logistics section to include the following units as necessary:
   (a) Supply unit
   (b)* Facilities unit
   (c)* Ground support unit
   (d)* Communications unit
   (e) Food unit
   (f) Medical unit
(3) Managing all incident logistics
(4) Providing logistical input during the tactics meeting and through required documents for preparing the IAP
(5) Participating in the planning meeting
(6) Identifying the anticipated and known incident service and support requirements
(7) Requesting or acquiring additional resources as needed
(8) Preparing and disseminating the communications plan and medical plan for the IAP
(9) Implementing the traffic plan
(10) Supporting demobilization

21.2.3.4 Finance/Administration Function. The IC shall be responsible for the finance/administration function for all aspects of financial management in support of the fire protection organization.

21.2.3.4.1 The responsibilities of finance/administration shall be carried out by the IC until delegated to a qualified finance section chief.

21.2.3.4.2 These responsibilities shall include but not be limited to the following:

(1) Organizing a finance/administration section to include the following units as necessary:
   (a) Time unit
   (b) Procurement unit
   (c) Compensation/claims unit
   (d) Cost unit
(2) Managing all the financial aspects of an incident
(3) Providing financial and cost analysis information to the IC and to others as requested
(4) Gathering the pertinent information from briefings with responsible agencies
(5) Developing an operating plan for the finance/administration section
(6) Filling supply and support needs
(7) Meeting with representatives of assisting and cooperating agencies as needed
(8) Maintaining daily contact with the agency administrator's headquarters on finance/administration matters
(9) Ensuring that all personnel time records are completed and transmitted to home agencies according to policy
(10) Participating in the planning meeting
(11) Providing financial input to demobilization planning
(12) Ensuring that all the obligation documents (e.g., contracts and purchase orders) initiated at the incident are prepared and completed
(13) Following a methodology for the disbursement of funds

21.3 Multijurisdictional Incidents. AHJs shall implement a unified command system or a single command system to coordinate among responsible agencies or organizations.

21.4 Coordination. The IC shall coordinate with all assisting and cooperating agencies or organizations.

Chapter 22 Fire Suppression (NFPA 1143)

22.1 Size-Up. Upon arrival, the IC shall conduct a size-up to determine the extent of the fire and its potential, taking into consideration the following factors:

(1) Incident type
(2) Location/jurisdiction
(3) Incident size
(4) Incident status
(5) Incident command and fire name
(6) Weather conditions
(7) Radio frequencies
(8) Best access routes
(9) Special hazards or concerns
(10) Additional resource needs

22.2* Fire Engagement and Management.

22.2.1* The IC shall deploy personnel and equipment to the incident according to strategic and tactical plans [the incident

action plan (IAP)], within the priorities established for the incident and with consideration for the safety of the public and incident-assigned personnel.

22.2.2 Once the threat to life and property is evaluated, the IC shall plan for and execute tasks necessary for the overall management of the incident.

22.2.3 The IAP shall address the following issues:

(1) Firefighter and public safety
(2) Available resources
(3) Overall incident strategy
(4) Tactical operations

22.3 Mop-Up and Demobilization.

22.3.1 When the IAP requires containment and management of the fire, the IC shall ensure that mop-up operations meet the needs of the local unit and facilitate the return of the incident to the local fire manager.

22.3.2 The IC shall ensure that the demobilization of resources is carried out in a safe, effective, and efficient manner.

Chapter 23 Post-Incident Activities (NFPA 1143)

23.1* Reporting.

23.1.1 The AHJ or designee shall complete and file incident reports as required.

23.1.2 Such reports, whether hard copy or electronic, shall be filed within the time frame specified by the state, provincial, or federal authority.

23.2 Incident Review and Close Out.

23.2.1 After completion of the incident, the AHJ, in conjunction with the IC, shall conduct a review of the actions taken during the incident.

23.2.2 Designated personnel from all functional areas of the incident shall be in attendance to provide for a thorough review of the operation.

23.2.3 The AHJ shall review all activities related to the incident, including safety practices and provisions; strategy and tactics to accomplish overall objectives; the deployment of personnel, equipment, and apparatus; support functions; and the overall management of the incident.

23.2.4 The AHJ shall take corrective actions in all areas where deficiencies exist or problems occurred.

23.2.5 All reviews and evaluations shall be conducted as constructive critiques to determine the facts related to the incident.

23.2.6 As a minimum, evaluations shall cover the following:

(1) Examination of accidents, injuries, or fatalities connected to the incident to determine cause(s) and contributing factors and, where applicable, to recommend corrective actions
(2) Examination of the actions used on the incident and confirmation of effective decisions or corrected deficiencies
(3) Identification and evaluation of new or improved procedures, techniques, or tactics used on the incident
(4) Identification of potential alternative procedures, techniques, tactics, or equipment for effective use in future incidents
(5) Examination of the incident to determine fire cause(s) and contributing factors and, where applicable, to recommend preventive or mitigating measures

23.3 Finance/Administration.

23.3.1 The AHJ shall satisfy all financial commitments related to the incident, including cost-share agreements.

23.3.2 The AHJ shall review and investigate any known financial claims or potential liabilities related to the incident.

23.3.3 The AHJ shall prepare and distribute the required documentation that will provide the necessary information to initiate the issuing of reimbursable bills to the appropriate parties.

23.3.4 The AHJ shall establish a process to ensure all financial obligations are met.

Chapter 24 Assessing Wildland Fire Hazards in the Structure Ignition Zone (NFPA 1144)

24.1 Administration.

24.1.1* Scope. Chapters 24 through 26 provide a methodology for assessing wildland fire ignition hazards around existing structures, residential developments, and subdivisions and improved property or planned property improvement that will be located in a wildland/urban interface area, and provides minimum requirements for new construction to reduce the potential of structure ignition from wildland fires.

24.1.2 Purpose.

24.1.2.1* Chapters 24 through 26 shall be used to assess fuel sources in the structure ignition zone for their potential to ignite structures and to identify possible mitigation measures to reduce the possibility of structure ignition.

24.1.2.2 Chapters 24 through 26 provide minimum standards for design, construction, and landscaping for structures in the wildland/urban interface.

24.1.3 Application.

24.1.3.1 Chapters 24 through 26 shall apply to all existing structures, residential developments, and subdivisions and improved property or planned property improvement that will be located in a wildland/urban interface area, including commercial, ranch and farm structures, manufactured homes, and structures in recreational vehicle parks.

24.1.3.2 Chapters 24 through 26 shall not be construed as prohibiting any design, construction, or landscaping activity that will provide fire protection or hazard reduction at least equivalent to that required by this standard and that which has been set forth by the AHJ.

24.1.4 Equivalency. Chapters 24 through 26 shall apply equivalency as defined in Section 1.4.

24.1.4.1* Chapters 24 through 26 shall not be used to lessen or negate general fire protection requirements or procedures addressed in other standards.

24.1.4.2 The AHJ shall use recognized fire protection standards and measures as necessary to meet local conditions.

24.1.4.3 Where extremely high-hazard conditions exist, the AHJ shall determine equivalent requirements that provide a level of protection no less than would be afforded by full compliance with Chapters 24 through 26.

24.2 General.

24.2.1* In cases in which the AHJ determines that existing improved property is, or a planned property improvement will be, located in a wildland/urban interface or intermix area, the AHJ shall perform, or cause to be performed, a wildland fire hazard assessment of each structure ignition zone in the development to determine relative risk, the extent of wildland fire hazard, and applicable mitigation measures.

24.2.2* The structure assessment shall, at a minimum, include the following:

(1) Identification and documentation of the wildland fire hazards in the ignition zone(s) for each structure within wildland fire hazard areas, according to the elements and conditions in Section 24.3
(2) Determination of mitigation measures for vegetation, other combustibles, and the structure, including the periodic maintenance associated with such measures
(3) Establishment of priorities relative to mitigating the risks from wildland fire
(4) Evaluation of the site for conflagration hazards associated with the property to provide information for fire operations strategies should the site or surrounding properties become involved with fire

24.2.3 The wildland fire hazard assessment shall be the basis for recommended mitigation measures relative to the vegetation, other combustibles, and structures on the site.

24.3* Structure Assessment Elements and Conditions. As a minimum, the structure assessment shall cover elements and conditions indicated in 24.3.1 through 24.3.5.

24.3.1 Overview of the Surrounding Environment. The structure assessment shall document the conditions of 24.3.1.1 through 24.3.1.5 in the assessment of the surrounding environment, as they will place the structure in the most risk from ignition by a wildland fire.

24.3.1.1* The structure assessment shall document the location of the structure in relation to predominant topographical features, such as flat open areas, ridges, saddles, steep slopes, natural chimneys like steep narrow draws, or small canyons, that will increase the ignition potential of the structure.

24.3.1.2* The structure assessment shall document local weather conditions, including wind, relative humidity, temperature, and fine fuel moisture content.

24.3.1.3* The structure assessment shall document nearby structures using the same criteria as the primary structure.

24.3.1.4* The structure assessment shall document any neighboring properties that could impact the ignition zone of the property being assessed.

24.3.1.5* The structure assessment shall document the structure's location on the slope relative to the structure's potential exposure to heat from a wildland fire.

24.3.2 From Chimney to Eaves. The structure assessment shall document the conditions of 24.3.2.1 through 24.3.2.6 to observe construction and vegetation as they place the structure in the most risk from ignition by a wildland fire.

24.3.2.1* The structure assessment shall document the type and construction of roofing materials.

24.3.2.2* The structure assessment shall document the condition of roofing materials and assemblies.

24.3.2.3* The structure assessment shall document all skylights in roof assemblies.

24.3.2.4* The structure assessment shall document the potential of roof gutters and areas where exterior walls meet roof or deck surfaces to collect litter on surfaces or in crevices.

24.3.2.5* The structure assessment shall document the construction materials of gutters, downspouts, and connectors.

24.3.2.6* The structure assessment shall document the materials and construction used in eaves of roof overhangs.

24.3.3 From Top of Exterior Wall to Foundation. The structure assessment shall document the conditions of 24.3.3.1 through 24.3.3.6 to observe construction and vegetation as they place the structure in the most risk from ignition by a wildland fire.

24.3.3.1* The structure assessment shall document the materials and construction used in exterior walls and exterior siding.

24.3.3.2 The structure assessment shall document the materials used for gutter downspouts and connectors on exterior walls.

24.3.3.3* The structure assessment shall document the materials used in windows and other openings in vertical surfaces.

24.3.3.4* The structure assessment shall document the location, size, and screening of ventilation openings.

24.3.3.5* The structure assessment shall document all attached accessory structures as part of the primary structure.

24.3.3.6* The structure assessment shall document areas next to or under a structure where combustible materials that present a source of flame exposure to the structure might collect.

24.3.4* From Foundation to the Immediate Landscaped Area. The structure assessment shall document the conditions of 24.3.4.1 through 24.3.4.5 to observe construction and vegetation, as they place the structure in the most risk from ignition by a wildland fire.

24.3.4.1* The structure assessment shall document all vegetative fuels and other combustible materials adjacent to and within 30 ft (9 m) of the structure for their potential to contribute to the intensity and spread of wildland fire.

24.3.4.2* The structure assessment shall document the presence and location of all heat and flame sources within 30 ft (9 m) of the primary structure.

24.3.4.3* The structure assessment shall document all projections attached to the primary structure.

24.3.4.4* The structure assessment shall document detached structures within 30 ft (9 m) of the primary structure that

might be ignited by flames, radiant heat, or firebrands from wildland fires.

24.3.4.5* The structure assessment shall document vehicle parking areas within 30 ft (9 m) of any surface of the structure.

24.3.5 From the Immediate Landscaped Area to the Extent of the Structure Ignition Zone. The structure assessment shall document the conditions of 24.3.5.1 through 24.3.5.8 to observe construction and vegetation, as they place the structure in the most risk from ignition by a wildland fire.

24.3.5.1* The structure assessment shall document vegetation within the area between the outer edge of the immediate landscaped area and the extent of the structure ignition zone as potential fuel that can convey the fire to the structure.

24.3.5.2* The structure assessment shall document the species and location of trees and the separation of tree crowns within the area between the outer edge of the immediate landscaped area and the extent of the structure ignition zone.

24.3.5.3* The structure assessment shall document the presence and location of all heat and flame sources within the area between the outer edge of the immediate landscaped area and the extent of the structure ignition zone.

24.3.5.4* The structure assessment shall document detached structures within the area between the outer edge of the immediate landscaped area and the extent of the structure ignition zone that might be ignited by flames, radiant heat, or firebrands from wildland fires.

24.3.5.5* The structure assessment shall document vehicle parking areas within the area between the outer edges of the immediate landscaped area and the extent of the structure ignition zone.

24.3.5.6* The structure assessment shall document all projections attached to the primary structure that extend beyond the immediate landscaped area.

24.3.5.7 The structure assessment shall document all other factors that can affect the risk of ignition or the spread of wildland fire on improved property within the structure ignition zone, including the risk of structure fires spreading to vegetation.

24.3.5.8 Any structure that fails to comply with the requirements of Chapter 25 shall be deemed to increase the risk of the spread of wildland fire to improved property and the risk of fires on improved property spreading to wildland fuels.

24.4 Development of Wildland Fire Hazard Mitigation Plan.

24.4.1 From the information gathered in each structure assessment, the AHJ shall require or cause to be developed a wildland fire hazard mitigation plan and schedule to address the wildland fire hazards identified in the specific structure ignition zone assessment.

24.4.2 The AHJ shall work with applicable agencies and organizations to resolve any conflicts between recommended wildland fire hazard mitigation measures and mitigation measures or objectives of other hazards.

24.4.3* This plan shall include, but not be limited to, the following:

(1) Specific mitigation recommendations based on the hazard assessment to reduce the ignition potential around and including the structure
(2) Construction modification or retrofit necessary to reduce the identified hazards as a minimum or to comply with the provisions of Chapter 25
(3) Fuel modification recommendations as specified in Chapter 26
(4) A hazard mitigation implementation and maintenance schedule approved by the AHJ

24.4.4* The history of wildland fire in the area under assessment shall be considered in determining required hazard mitigation plan.

24.4.5* The AHJ shall approve the mitigating measures relative to access, water supply, and construction based upon the structure assessment established in 24.2.2.

24.4.6 From the information gathered in each structure assessment, the AHJ shall require or cause to be developed a wildland fire hazard severity map of each residential development area addressed.

24.4.7 The map shall include, but not be limited to, the following data elements:

(1) Lot designations
(2) Structure locations on each lot
(3) Locations of wildland fire evacuation centers or safety zones
(4) Hazard severity for each lot
(5) Overlapping ignition zones
(6) Location of fire hydrants, cisterns, or other water sources for firefighting

24.5 Mitigation Implementation and Enforcement.

24.5.1 The AHJ shall require the property owner to develop and comply with the approved wildland fire hazard mitigation plan and schedule according to 24.4.1.

24.5.2 No permit associated with construction shall be issued if the provisions of this standard are not addressed.

24.5.3 No permit associated with occupancy shall be issued until the provisions of this standard are satisfied.

Chapter 25 Building Design, Location, and Construction (NFPA 1144)

25.1 Construction in Wildland Areas.

25.1.1 General.

25.1.1.1 All new construction in wildland/urban interface areas shall be designed, located, and constructed to comply with Chapters 10 through 18 of this standard and the local building code.

25.1.1.2 In case of conflicts between Chapters 10 through 18 of this standard and the local building code, the more stringent fire protection requirements shall be utilized to mitigate the ignition potential and combustibility of structures exposed to potential wildland fire.

25.1.2 Construction Documents. The AHJ shall be provided with plans and specifications for each project regulated by this standard.

25.1.2.1 Construction documents shall clearly indicate the methods, materials, and processes employed to meet the requirements of this standard and the location of each structure or feature drawn to scale.

25.1.2.2 Construction documents shall include a vicinity map that provides details regarding the vicinity within 300 ft (91 m) of property lines, including other structures, slope, vegetation, fuel breaks, water supply systems, and access roads.

25.1.3 Location.

25.1.3.1* Separation distances between primary and accessory structures on each lot and structures on adjacent lots shall not be less than 30 ft (9 m).

25.1.3.2* Buildings located closer than 30 ft (9 m) to a vegetated slope shall require special mitigation measures as determined by the AHJ.

25.1.3.3* The AHJ shall be permitted to require a noncombustible wall or barrier where sufficient space is unavailable between the structure and undisturbed native vegetation or slopes.

25.1.3.4 Vegetation shall be modified to mitigate hazardous conditions within 30 ft (9 m) of the foundations prior to the start of construction.

25.1.3.5* All slash from vegetation modification and construction debris shall be treated or removed prior to or immediately upon completion of construction.

25.2 Construction Design and Materials.

25.2.1* Noncombustible Building Materials. Noncombustible building materials shall be materials that comply with any one of the following:

(1)* The building material, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release combustible vapors when subjected to fire or heat.
(2) The building material is reported as passing ASTM E136, *Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C.*
(3) The building material is reported as complying with the pass/fail criteria of ASTM E136 when using the test method and procedure in ASTM E2652, *Standard Test Method for Assessing Combustibility of Materials Using a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C.*

25.2.2 Fire-Retardant-Treated Wood.

25.2.2.1 Fire-retardant-treated wood shall meet the requirements of Chapter 4 of NFPA 703.

25.2.2.2 The use of paints, coatings, stains, or other surface treatments shall not be considered fire-retardant-treated wood.

25.2.3 Ignition-Resistant Building Materials. Ignition-resistant building materials shall maintain their fire performance in accordance with 25.2.3.1 through 25.2.3.3 and their mechanical performance in accordance with 25.2.3.4 under conditions of use.

25.2.3.1 Surface Burning.

25.2.3.1.1 Materials that, when tested in accordance with the test procedures set forth in ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials*, for an extended test period of 30 minutes, or with the test procedures of ASTM E2768, *Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)*, shall demonstrate performance on the front and back faces in accordance with 25.2.3.2 and 25.2.3.3.

25.2.3.1.2 Panel products shall be tested with a ripped or cut longitudinal gap of 1⁄8 in. (3.2 mm) centered in the ASTM E84/UL 723 apparatus.

25.2.3.2 Flame Spread. Material shall exhibit a flame spread index not exceeding 25 during the first 10 minutes of the test.

25.2.3.3 Flame Front. Material shall exhibit a flame front that does not progress more than 10.5 ft (3.2 m) beyond the centerline of the burner at any time during the 30-minute test.

25.2.3.4* Weathering. Materials shall meet the performance requirements for weathering contained in the following standards, as applicable to the materials and the conditions of use:

(1) Method A in ASTM D2898, *Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing*, for fire-retardant-treated wood, wood-plastic composite, and plastic lumber materials
(2) ASTM D7032, *Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite and Plastic Lumber Deck Boards, Stair Treads, Guards, and Handrails*, for wood-plastic composite materials
(3) ASTM D6662, *Standard Specification for Polyolefin-Based Plastic Lumber Decking Boards*, for plastic lumber materials

25.2.3.5 Identification. Ignition-resistant building materials shall be listed and labeled in accordance with 25.2.3.1 through 25.2.3.4.

25.2.4* Other Building Materials. Building materials not addressed in 25.2.1, 25.2.2, or 25.2.3 shall meet the performance requirements for weathering contained in the applicable standards for the building materials and the conditions of use.

25.3* Roof Design and Materials.

25.3.1 The requirements for roof covering assemblies shall be according to 25.3.1.1 through 25.3.1.1.4.

25.3.1.1 Only listed roof coverings tested and rated as Class A in accordance with ASTM E108, *Standard Test Methods for Fire Tests of Roof Coverings*, or UL 790, *Standard Test Methods for Fire Tests of Roof Coverings*, shall be used.

25.3.1.1.1 The roof covering shall be tested with all of the assembly components representing the as-built condition in service.

25.3.1.1.2 Any panel products in addition to the structural deck incorporated to improve the fire performance of the assembly in the test shall be tested with a between-panel joint in the tested assembly.

25.3.1.1.3 The between-panel joint shall be located in vertical alignment with the appropriate burning brand.

25.3.1.1.4 The between-panel joint shall be located no further than 6 in. (150 mm) from the between-panel joint of the wood-based sheathing material.

25.3.2 Roof gutters, downspouts, and connectors shall be noncombustible, and roof gutters shall be covered with an

approved noncombustible means to minimize the accumulation of debris.

25.3.3 Vents or vent assemblies shall resist the intrusion of flames and embers according to either of the following:

(1) Vents and assemblies shall demonstrate the ability to resist the intrusion of flame or embers through the opening when tested in accordance with ASTM E2886/E2886M, *Standard Test Method for Evaluating the Ability of Exterior Vents to Resist the Entry of Embers and Direct Flame Impingement*, and comply with all of the following:
   (a) There shall be no flaming ignition of the cotton material during the ember intrusion test.
   (b) There shall be no flaming ignition during the integrity test portion of the flame intrusion test.
   (c) The maximum temperature of the unexposed side of the vent shall not exceed 662°F (350°C).

(2)* Where permitted by the AHJ, vents shall be permitted to be screened with a corrosion-resistant, noncombustible wire mesh, with the mesh opening not to exceed nominal ⅛ in. (3.1 mm) in size.

25.3.4 Eaves shall be enclosed with exterior fire-retardant-treated wood, ignition-resistant materials, noncombustible materials, or materials exhibiting resistance to wildfire penetration when tested to ASTM E2957, *Standard Test Method for Resistance to Wildfire Penetration of Eaves, Soffits and Other Projections.*

25.3.4.1 The test shall be conducted on a minimum of three test specimens, and the following conditions of acceptance shall be met:

(1) Absence of flame penetration of the eaves or horizontal projection assembly at any time
(2) Absence of structural failure of the eaves or horizontal projection subassembly at any time
(3) Absence of sustained combustion of any kind at the conclusion of the 40-minute test

25.3.4.2 If any one of the three tests do not meet the conditions of acceptance in 25.3.4.1, three additional tests shall be run.

25.3.4.3 All of the additional tests shall meet the conditions of acceptance in 25.3.4.1.

25.3.5 Where roofing material has an airspace under the roof covering over a combustible deck, a 72 lb (32.7 kg) cap sheet complying with ASTM D3909/D3909M, *Standard Specification for Asphalt Roll Roofing (Glass Felt) Surfaced With Mineral Granules*, shall be rolled out under the entire roof deck or fire-retardant-treated plywood, be used as sheathing, and be blocked with noncombustible materials at the eaves, ridges, and hips.

25.3.6* Attic spaces shall be ventilated as approved for the building configuration, the climatological conditions of the site, and the moisture and temperature conditions associated with the occupancy and use of the building. [**5000:**38.8.1]

25.3.7 Metal drip edge shall be installed at all the rake and eave edges.

25.4* Overhanging Projections. All projections shall be constructed of heavy timber, noncombustible materials, exterior fire-retardant-treated wood, or ignition-resistant materials.

25.5 Overhanging Buildings. The underside of overhanging buildings and supporting structural elements shall be constructed of any one of the following:.

(1) Noncombustible materials, in accordance with 25.2.1
(2) Fire-retardant-treated wood, in accordance with 25.2.2
(3) Ignition-resistant materials, in accordance 25.2.3
(4)* Heavy timber
(5) An assembly with a 1-hour fire resistance rating when tested in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*

25.6 Exterior Vertical Walls.

25.6.1 Exterior vertical wall coverings shall comply with one of the following:

(1) The exterior vertical wall coverings shall be noncombustible material, in accordance with 25.2.1.
(2) The exterior vertical wall coverings shall meet the requirements for ignition-resistant materials, in accordance with 25.2.3.
(3) The exterior vertical wall coverings shall be fire-retardant-treated wood, in accordance with 25.2.2, and be listed and labeled for exterior use.
(4) The exterior vertical wall coverings shall consist of an exterior wall assembly exhibiting a minimum 1-hour fire resistance rating, when tested in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials.*
(5) The exterior vertical wall coverings shall comply with the requirements set by the AHJ if the AHJ determines that the wildland fire risk and structure assessment indicates a need for greater protection.

25.6.2 All exterior walls shall be protected with 2 in. (50 mm) nominal solid blocking between exposed rafters at all roof overhangs, under the exterior wall covering on all sides exposed to native vegetation, as determined by the AHJ.

25.6.3 When appendages and projections are attached to exterior walls required to exhibit a fire resistance rating, they shall be constructed to maintain the fire resistance rating of the wall.

25.6.4* A minimum of 6 in. (150 mm) noncombustible vertical separation between a horizontal surface and siding shall be maintained.

25.7 Exterior Openings.

25.7.1* Exterior windows, windows within exterior doors, and skylights shall be tempered glass, multilayered glazed panels, glass block, or have a fire-resistance rating of no less than 20 minutes.

25.7.2 Window screening shall be installed and constructed using noncombustible mesh to minimize the collection of embers (firebrands) and their entry through open windows.

25.7.3 Exterior doors shall be solid-core wood no less than 1¾ in. (45 mm) thick, be constructed with noncombustible materials, or have a fire protection rating of no less than 20 minutes.

25.7.4* Vents for attics, subfloors, and walls, excluding dryer vents, shall resist the intrusion of flames and embers in accordance with 25.3.3.

25.8 Chimneys and Flues.

25.8.1 Every fireplace and wood stove chimney and flue shall be provided with an approved spark arrester constructed of a

minimum 12-gauge welded wire or woven wire mesh, with openings not exceeding ½ in. (12.7 mm).

25.8.2 Vegetation shall not be allowed within 10 ft (3 m) of a chimney outlet.

25.9* Accessory Structure(s). Accessory structures shall be constructed to meet the requirements of this chapter or shall be separated from the main structure by a minimum of 30 ft (9 m).

25.10 Mobile and Manufactured Homes.

25.10.1 Permanently located mobile and manufactured homes with an open space beneath shall have a skirt of noncombustible materials, exterior fire-retardant-treated wood, or other ignition-resistant material.

25.10.2 Any enclosed space beneath the mobile or manufactured home shall be vented according to 25.3.3.

25.11 Vehicle Parking Areas. Vehicle parking areas within the immediate landscaped zone shall be maintained free of dry grasses and fine fuels that could be ignited by hot exhaust systems or firebrands.

25.12 Exterior Exposure Hazards.

25.12.1* Heat and flame sources that are unprotected or unsupervised shall not be permitted within 30 ft (9 m) of the primary structure.

25.12.2 Incinerators, outdoor fireplaces, permanent barbecues, and grills shall not be built, installed, or maintained in hazardous fire areas without prior approval of the AHJ.

25.12.3 Openings in incinerators, outdoor fireplaces, permanent barbecues, and grills shall be provided with an approved spark arrester, screen, or door.

25.12.4 Propane tanks and other combustible liquids storage shall conform to NFPA 58 and the wildland fire hazard mitigation plan required in Section 24.4.

25.12.5 Other combustible materials within 30 ft (9 m) of any structure shall be removed or stored in conformance with the wildland fire hazard mitigation plan as approved by the AHJ.

Chapter 26 Fuel Modification Area (NFPA 1144)

26.1* General. Where the wildland fire mitigation plan requires establishment of a fuel modification area, the modifications shall extend to the limits of the structure ignition zone.

26.2 Fuels Modification and Treatment.

26.2.1* Surface fuels, including native vegetation and plants used for landscaping within the defined landscaping zones, shall be treated or removed.

26.2.2 Live vegetation within the fuel modification area shall have dead material removed and shall be thinned and pruned in conformance with the wildland fire mitigation plan, as approved by the AHJ.

26.2.3 Dead and downed fuels within 30 ft (9 m) of all buildings shall be removed or treated to maintain the fuel modification area in conformance with the wildland fire mitigation plan, as approved by the AHJ.

26.2.4 Vegetation under trees within the fuel modification area shall be maintained at a height that will preclude ground fire from spreading in the tree crown.

26.2.5* Tree crowns within the structure ignition zone shall be spaced to prevent structure ignition from radiant heat.

26.2.6 The fuel modification plan shall include a maintenance element identifying and defining the responsibility for continued and periodic maintenance.

Annex A Explanatory Material

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.1.3 Beginning with the publication of NFPA 1140, new editions of NFPA 1051, NFPA 1141, NFPA 1143, and NFPA 1144 will not be published as separate, standalone standards. Where an authority having jurisdiction elects to adopt the latest edition of one or more of the previous standards, the adopting language should refer to the specific chapters of this document, as identified in Section 1.3.

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase "authority having jurisdiction," or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.2.4 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

A.3.3.5 Apparatus. (NFPA 1143) Examples include engines and tenders.

A.3.3.7.1 Extended Attack. (NFPA 1051) An extended attack incident is a wildfire that has not been contained/controlled by the initial attack forces and additional firefighting resources are arriving, en route, or being ordered by the initial attack incident commander. See Figure A.3.3.7.1. (Note: An extended attack incident fits into the Type 3 incident as regards complexity.) An extended attack incident is normally characterized by the following:

(1) Usually less than 100 acres in size. In some rural/wildland areas where the values at risk are low and fuels are primarily rated for 100 hours or less, the fire size could be significantly larger.
(2) Firefighting resources vary from several single resources to several task force/strike teams.
(3) The incident can be divided into divisions, but it would not meet the division supervisor complexity in regards to span-of-control.
(4) The incident is expected to be contained/controlled in the first operational period. If not, it can transition into a more complex incident (Type 2 organization).
(5) Generally, a written incident action plan might not be needed or prepared.
(6) Some of the command and general staff positions such as operations, planning, logistics, safety, and liaison might be filled.
(7) Staging areas can be utilized, and in some instances a small incident base can be established.

General staff positions are filled as needed.

A.3.3.7.2 Initial Attack. (NFPA 1051) Also called *initial action.*

A.3.3.8 Breakover. (NFPA 1051) Also called *slopover.*

A.3.3.11 Burning Out. (NFPA 1051) Burning out is done on a small scale in order to consume unburned fuel and aid control line construction. Burning out should not be confused with "backfiring," which is a larger-scale tactic to eliminate large areas of unburned fuels in the path of a fire or to change the direction of force of the convection column.

A.3.3.20 Curb Cut. (NFPA 1141) Curb cut can be an abrupt reduction or a tapering reduction for the length of the curb on each side of the means of access.

A.3.3.22 Defensible Space. (NFPA 1051) The area is cleared of combustibles with the following intent:

(1) To protect life and property from wildland fire
(2) To reduce the potential for fire on improved property spreading to wildland fuels
(3) To provide a safe working area for firefighters protecting life and improved property

A.3.3.30.1 Prescribed Fire (Burning). A written, approved prescribed fire plan must exist and any local, state, or federal requirements must be met prior to ignition.

A.3.3.37 Fire Protection. (NFPA 1141) Fire protection includes measures such as fire prevention, fire detection and suppression, built-in fire protection systems, and planning and building codes.

A.3.3.44 Hazard Assessment System. (NFPA 1051) The ratings generated should be the basis for implementation of mitigation strategies.

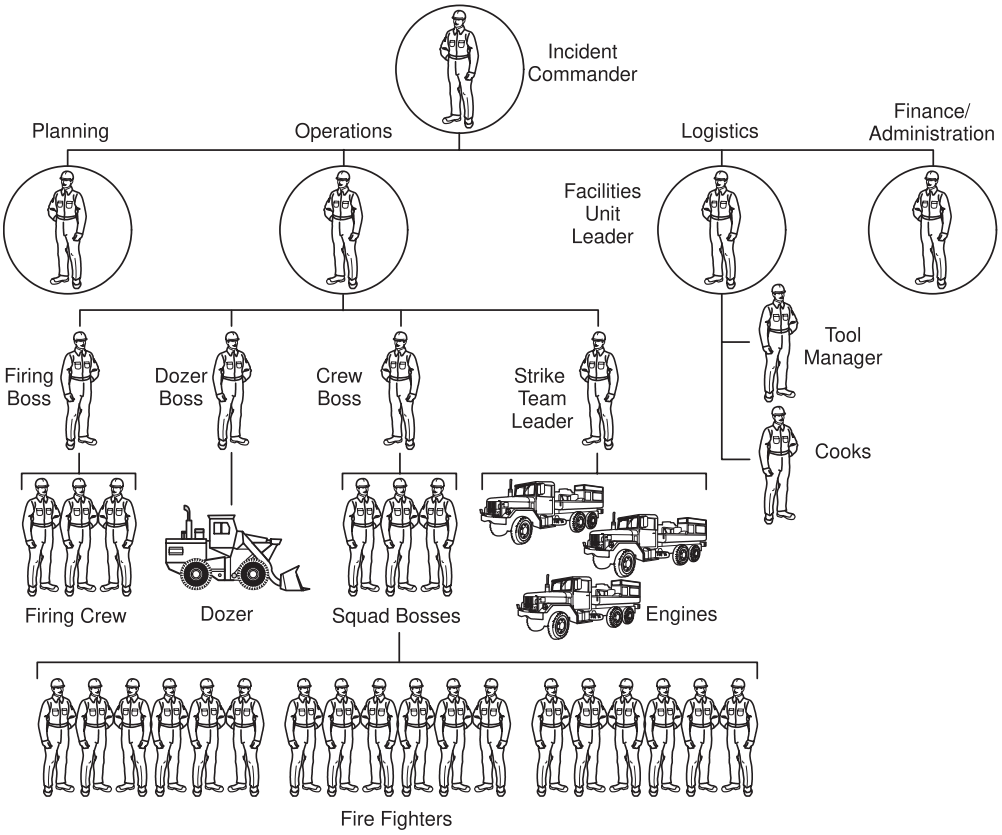

FIGURE A.3.3.7.1 Example of an Extended Attack Organization.

A.3.3.46 Heavy Timber Construction. (NFPA 1144) Annex C contains an excerpt from *NFPA 5000* as additional information about heavy timber construction.

A.3.3.50 Immediate Landscaped Area. (NFPA 1144) This area, as defined by the AHJ, often referred to as the "defensible space" between an improved property and a potential wildland fire, is where combustible materials and vegetation have been removed or modified to reduce the potential for fire on improved property spreading to wildland fuels or to provide a safe working area for firefighters protecting life and improved property from wildland fire.

A.3.3.55 Incident Management System (IMS). The system is also referred to as an incident command system (ICS). [**1561,** 2020]

The implementation of HSPD-5 led to the development of the National Incident Management System (NIMS). The NIMS is a system mandated by HSPD-5 that provides a consistent nationwide approach for federal, state, local, and tribal governments; the private sector; and nongovernmental organizations to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. To provide for interoperability and compatibility among federal, state, local, and tribal capabilities, the NIMS includes a core set of concepts, principles, and terminology. HSPD-5 identifies these as the ICS; multi-agency coordination systems; training; identification and management of resources (including systems for classifying types of resources); qualification and certification; and the collection, tracking, and reporting of incident information and incident resources. [**1561,** 2020]

In addition to the NIMS, the process also incorporates the National Response Plan. The National Response Plan is defined as a plan mandated by HSPD-5 that integrates federal domestic prevention, preparedness, response, and recovery plans into one all-discipline, all-hazards plan. [**1561,** 2020]

A.3.3.56 Initial Attack. (NFPA 1051) See A.3.3.7.2.

A.3.3.57 Jurisdiction. Public agencies have jurisdiction at incidents related to their legal responsibilities and have authority for incident mitigation. The jurisdictional authority at an incident can be political/geographical (e.g., city, county, state, or federal boundary lines) or functional (e.g., police department or health department).

A.3.3.68 NWCG. (NFPA 1051) The fires in the early 1970s stimulated the formation of the National Wildfire Coordinating Group (NWCG). NWCG is currently made up of the Department of Agriculture Forest Service (FS); four Department of the Interior agencies — the Bureau of Land Management (BLM), the National Park Service (NPS), the Bureau of Indian Affairs (BIA), and the Fish and Wildlife Service (FWS); Federal Emergency Management Agency (FEMA); the United States Fire Administration (USFA); state forestry agencies through the National Association of State Foresters (NASF); and the Inter-Tribal Timber Council. The purpose of the NWCG is to coordinate programs of the participating wildfire management agencies to avoid duplication and to provide a means of constructively working together.

A.3.3.74.2 Incident Action Plan (IAP). The plan might be oral or written. When written, the plan can have a number of attachments, including incident objectives, an organization assignment list, an assignment list, an incident radio communication plan, a medical plan, a traffic plan, a safety plan, weather and fire behavior forecasts, and an incident map.

A.3.3.77 Prescribed Fire (Burning). (NFPA 1051) A written, approved prescribed fire plan must exist and any local, state, or federal requirements must be met prior to ignition.

A.3.3.89 Special Interest Area. (NFPA 1051) They include geological, historical, and archaeological areas of interest; habitats of threatened or endangered species; and other memorable features.

A.3.3.91 Standpipe. See NFPA 14.

A.3.3.97 Structure Assessment. (NFPA 1144) This assessment includes elements and condition of objects within the structure ignition zone (i.e., the fuels and vegetation in the yard and adjacent to the structure, roof environment, decking and siding materials, prevailing winds, topography, fire history, and related conditions) with the intent of mitigating hazards and risks from wildland fire.

A.3.3.98 Structure Ignition Zone. (NFPA 1144) The "zone" includes the structures and their immediate surroundings 0–200 ft (0–60 m). Under some conditions, 100 ft (30 m) or less around structures might be enough distance to treat, while intense fire potential in heavier fuels might require the surroundings to extend to 200 ft (60 m) from the structure. The area and shape of the structure ignition zone is site-specific. Home ignition zone (HIZ) is a term used when referring to dwellings and noncommercial structures.

A.3.3.99 Structure Protection. (NFPA 1051) This normally does not include an attack on a fire that is inside the structure.

A.3.3.105 Unified Command. (NFPA 1143) Unified command is a team effort that allows all agencies with jurisdictional responsibility, either geographical or functional, to manage an incident by establishing a common set of objectives and strategies. This should be accomplished without loss of or abdication of authority, responsibility, or accountability.

A.3.3.106 Values at Risk. (NFPA 1143) Such resources include timber, watershed, wildlife, unique scenic and recreation areas, range, air quality, structures, and people.

A.3.3.109 Wildland Fire. (NFPA 1143) The terms *wildfire* and *wildland fire* are often used interchangeably. This document prefers the term *wildland fire* as all-encompassing when referring to fires in the wildland, wildland/urban interface, and wildland/urban intermix areas.

A.3.3.112 Wildland Firefighter I. Under NWCG PMS 310-1, *NWCG Standards for Wildland Fire Position Qualifications,* this position correlates to a Firefighter II.

A.3.3.113 Wildland Firefighter II. (NFPA 1051) This person should function safely and effectively as a member of a wildland fire suppression crew of equally or less experienced firefighters to accomplish a series of tasks. The Wildland Firefighter II can be called upon to provide leadership and temporary supervision for a small crew. The Wildland Firefighter II maintains direct communications with a supervisor.

A.3.3.114 Wildland/Urban Interface. (NFPA 1144) The term *wildland/urban interface* can distort the perception of the primary issue. It can direct attention to where structures are located (e.g., at the edge of communities near the wildland) rather than if the structures are highly ignitable. This can cause

emergency planners to focus on things that will not make a significant impact on reducing structure loss (e.g., how firefighters and equipment get there, what type of fire equipment is needed, and the location of fire hydrants and water sources) if there are more structures at risk than equipment to protect them, or if it becomes too dangerous for firefighting forces to be present.

The essence of this issue is not where structures and domestic landscapes adjoin wildland, but the location, density, and availability of ignitable structures. Which structures are at the greatest risk: ignition-resistant homes bordering the wildland or a dense subdivision with wood shingle roofs several miles away from wildland fuels? The wildland/urban interface is not a geographic location, but rather a set of conditions that can exist in many communities.

A.3.3.115 Wildland/Urban Interface Coordinator. (NFPA 1143) This person coordinates with local residents, local government, and the responsible fire service agency.

A.4.1.1 This standard does not address prescribed fire requirements. AHJs can choose to use any or all of these requirements as they deem appropriate.

A.4.1.2 The committee believes that this document specifies the minimum JPRs for Wildland Firefighter I, Wildland Firefighter II, Wildland Fire Officer I, Wildland Fire Officer II, Wildland/Urban Interface Protection Specialist, and Wildland/Urban Interface Coordinator. The committee recognizes that emergency services organizations might have to invest considerable resources to provide the equipment and training needed to perform safely and efficiently. The committee does not mean to imply that organizations with limited resources cannot provide response services, only that the individuals charged with responsibilities are qualified to specific levels according to this standard.

A.4.1.2.3 Organization or management responsibilities should be addressed by the agency that personnel represent. The AHJ should define the agency requirements for progression to positions of management responsibility.

A.4.1.2.6 The committee recognizes the importance of formal and continuing education and training programs to ensure a Wildland Firefighter I, Wildland Firefighter II, Wildland Fire Officer I, Wildland Fire Officer II, Wildland/Urban Interface Protection Specialist, and Wildland/Urban Interface Coordinator has maintained and updated the necessary skills and knowledge for the level of qualification. Continuing education and training programs can be developed or administered by local, state, provincial, or federal agencies as well as professional associations and accredited institutions of higher education. The methods of learning would include areas of technology, refresher training, skills practices, and knowledge application to standards. The subject matter should directly relate to the requirements of this standard.

A.4.1.3.3 It is recommended, where practical, that evaluators be individuals who were not directly involved as instructors for the requirement being evaluated.

A.4.1.3.8(3) NFPA 1582 establishes medical requirements for structural firefighters. These requirements might need to be modified for individuals involved in the suppression of wildland fires. The medical and work capacity (fitness) requirements for this standard should be based on in-depth consideration of essential wildland firefighting functions. The following essential functions are what firefighters are expected to perform during wildland fire suppression duties, as determined in a comprehensive job task analysis:

(1) Operate both as a member of a team and as an individual at incidents of uncertain duration
(2) Work in areas where sustaining traumatic or thermal injuries is possible
(3) Wear personal protective equipment and carry gear weighing up to 13.6 kg (30 lb) while performing firefighting tasks
(4) Perform demanding work for extended periods in the heat while wearing equipment that impairs body-cooling mechanisms
(5) Face exposure to respirable particulates, carbon monoxide, and other gases, and, if required, wear respiratory protective equipment that places an added burden on the respiratory system
(6) Work for long periods of time on tasks requiring sustained physical exertion
(7) Make transitions from rest to arduous effort
(8) Use manual and power tools as designated by the AHJ in the performance of duties
(9) Perform a variety of tasks in rough, steep terrain, exposed to snags, rocks, and other hazards
(10) Spend extensive time exposed to the elements
(11) Tolerate wide fluctuations in temperature while performing duties
(12) Operate in environments of stress, poor visibility, high noise, and dangerous footing
(13) Perform difficult tasks and make life-and-death decisions during emergencies

A.4.1.3.8(4) Physical fitness requirements should be developed and validated by the AHJ. Physical fitness requirements should be in compliance with applicable equal opportunity and Americans with Disabilities Act regulations and other legal requirements. Additional information can be found in the NWCG publication NFES 1596, *Fitness and Work Capacity*.

A.4.1.3.10 Remaining professionally competent is important for any practitioner. In the rapidly changing and developing field of the fire service, this is particularly important. The authority having jurisdiction might consider establishing a path by which members can demonstrate continued JPR compliance and competency through continuing education or practice within the field consistent with current duties. It is recommended that any such program consider the following factors:

(1) Demonstrated and documented knowledge of and competence with additions and/or revisions to the latest editions of the standards.
(2) Documented training and education (including online) related to the changes to the standards since the last certification.
(3) Documented experience in the field (i.e., emergency operational experience for firefighters, fire officers, instructors, etc.).
(4) Demonstrated and documented performance of duties, which might include a skills assessment.
(5) Annual performance appraisals.
(6) Documented teaching and instruction related to the field.
(7) Commendations, awards, and/or recognition of performance of the related duties.

Other items for consideration can include the following:

(1) Memberships in professional organizations, including any positions held or special activities involved in the membership.
(2) Published articles in trade journals, web-based publications, and other information distribution platforms.
(3) Research and development activities related to the field.
(4) Documented attendance at relevant conferences and training events.

The above list is not all-inclusive, and other factors specific to the field should be considered.

A.4.2.1 Information related to wildland fires can be found in NFES 1077, *Incident Response Pocket Guide*, NFES 2943, *Wildland Fire Incident Management Field Guide*, and the NFES 2712, *The New Generation Fire Shelter* video. Section A.20.4 of this standard states that all personnel should receive training in first aid and CPR. The safety and welfare of personnel is the first and foremost consideration in all incident operations and decisions. A wildland firefighter must have a working knowledge of the following fire suppression safety standards and procedures:

(1) Fire behavior *(see NWCG S-190, Introduction to Wildland Fire Behavior)*
(2) Ten standard fire orders *(see NFES 1077, Incident Response Pocket Guide)*, which include the following:
    (a) Keep informed of fire weather conditions and forecasts
    (b) Know what our fire is doing at all times
    (c) Base all actions on current and expected behavior of the fire
    (d) Identify escape routes and safety zones and make them known
    (e) Post lookouts when there is possible danger
    (f) Be alert; keep calm; think clearly; act decisively
    (g) Maintain prompt communications with your forces, your supervisor, and adjoining forces
    (h) Give clear instructions and ensure that they are understood
    (i) Maintain control of your forces at all times
    (j) Fight fire aggressively, having provided for safety first
(3) Eighteen "Watch Out" situations *(see NFES 1077, Incident Response Pocket Guide)*, which include the following:
    (a) Fire not scouted and sized up
    (b) In country not seen in daylight
    (c) Safety zones and escape routes not identified
    (d) Unfamiliar with weather and local factors influencing fire behavior
    (e) Uninformed on strategy, tactics, and hazards
    (f) Instructions and assignments not clear
    (g) No communication with crew members/supervisors
    (h) Constructing line without a safe anchor point
    (i) Building fireline with fire below
    (j) Attempting frontal assault on a fire
    (k) Unburned fuel between you and the fire
    (l) Cannot see the main fire, not in contact with anyone who can
    (m) On a hillside where rolling material can ignite fuel below
    (n) Weather getting hotter and drier
    (o) Wind increasing or changing direction
    (p) Getting frequent spitfires across the line
    (q) Terrain and fuels making escape to safety zones difficult
    (r) Taking a nap near the fireline
(4) Downhill indirect line construction guidelines *(see NFES 1077, Incident Response Pocket Guide)*
(5) LCES (lookouts, communications, escape routes, and safety zones), which include the following procedures:
    (a) Adequate lookouts should be posted to observe potential changes in fuel, weather, topography, and fire behavior.
    (b) Communication should be provided for and maintained with the supervisor at all times.
    (c) Escape routes for emergency evacuation will be identified and clearly understood by all firefighters.
    (d) Safety zones in cleared or natural areas devoid of flammable material should be reconnoitered and/or provided for and known to all crew members.
(6) NFES 2712, *The New Generation Fire Shelter* video, https://www.youtube.com/watch?v=QJsY6foLh8o.

A.4.2.2 The selection, care, and maintenance requirements for protective clothing and equipment are found in NFPA 1877.

A.4.4.2 Wildland firefighting personal protective equipment care and maintenance should be in accordance with NFPA 1877.

A.4.4.3 The tools and equipment provided to the wildland firefighter vary from jurisdiction to jurisdiction and can include such items as fireline hand tools (shovel, ax, fire rake, Pulaski, flapper, etc.) and basic water application equipment (backpack pumps, hose, nozzles, hose clamps, and fittings, etc.).

A.4.4.3(B) Maintenance equipment would include those items, such as files, sandpaper, wedges, and so forth, used to maintain fire suppression hand tools.

A.4.4.4 The firefighter should be self-sufficient for 24 to 48 hours.

A.4.6.2(A) Personal equipment standards, response and travel time standards, personal equipment weight limitations, and preferred modes of transportation all can vary by the AHJ.

A.4.6.4(B) The term *agent* in this requirement refers to any suppressant or retardant that would be applied with a hose stream, including water, foam, wet water, and other retardants.

A.4.6.5(B) See NWCG S-130, *Firefighter Training*, for additional information on burning out and basic ignition devices.

A.5.1 The Wildland Firefighter II assists in the training of other firefighters in the application of knowledge and skills areas, including safety and the maintenance and use of suppression tools and equipment.

A.5.1.1 See NFES 2865, *PMS 475 Basic Land Navigation*, for information on using maps and compasses.

A.5.2.2(A) See NFES 1077, *Incident Response Pocket Guide*, for additional information on briefing subordinates.

A.5.2.3 The Wildland Firefighter II is expected to be able to lead small groups of assigned personnel to accomplish specific tasks. The primary responsibility is personnel safety and the timely completion of the assigned task. *(See NFES 1077, Incident*

Response Pocket Guide, and NFES 2865, PMS 475 Basic Land Navigation.)

A.5.3.2 The tools and equipment provided to the Wildland Firefighter II vary from jurisdiction to jurisdiction and can include such items as chain saws and portable pumps. It is not the intent of the committee that the Wildland Firefighter II perform specialized repair functions on power tools. For additional information, see NWCG S-211, *Portable Pumps and Water Use*, and NWCG S-212, *Wildland Fire Chain Saws.*

A.5.5.4 See NWCG S-212, *Wildland Fire Chain Saws,* for additional information.

A.5.5.4(B) The transportation of power saws also involves the transport of flammable and combustible liquids. Wildland firefighters should follow agency guidelines and other regulations regarding the safe transport of these materials.

A.5.5.5(A) See NWCG S-211, *Portable Pumps and Water Use,* for additional information.

A.5.5.7 See NFES 1874, *Guide to Wildfire Origin and Cause Determination Handbook*, NFPA 921, and NFPA 1033 for additional information.

A.5.5.8(A) See NWCG S-134, *Lookouts, Communications, Escape Routes, Safety Zones (LCES)*, and S-130, *Firefighter Training*, for additional information on fireline lookouts; and NWCG S-190, *Introduction to Wildland Fire Behavior.*

A.6.2.1 See NWCG L-280, *Followership to Leadership*, and NFPA 1021 for additional supervisory information.

A.6.5.1 Initial attack is the action taken by resources that are first to arrive at an incident. All wildland fires that are controlled by suppression forces undergo initial attack. The number and type of resources responding to initial attack vary depending upon fire danger, fuel type, values at risk, and other factors. Generally, the initial attack involves relatively few resources and an incident size is small. Characteristics of an initial attack incident include the following:

(1) Resources vary from a single resource to several single resources, possibly a single task force or strike team.
(2) Normally limited to one operational period — at least the containment phase. Mop-up can extend into multiple periods.
(3) Normally does not require a written incident action plan.

The initial attack incident commander is normally the most experienced firefighter on the scene and is responsible for performing all command and general staff functions. *(See Figure A.6.5.1.)*

A.6.5.2 See A.7.5.2.

A.6.5.2(B) Suppression priorities should consider values at risk such as life, property, natural resources, special interest areas, and so forth. Additional information about suppression resource capabilities is found in NFES 1077, *Incident Response Pocket Guide.*

A.6.5.3 Basic information in a report should include the following:

(1) Fire name
(2) Location
(3) Access
(4) Terrain
(5) Size of fire

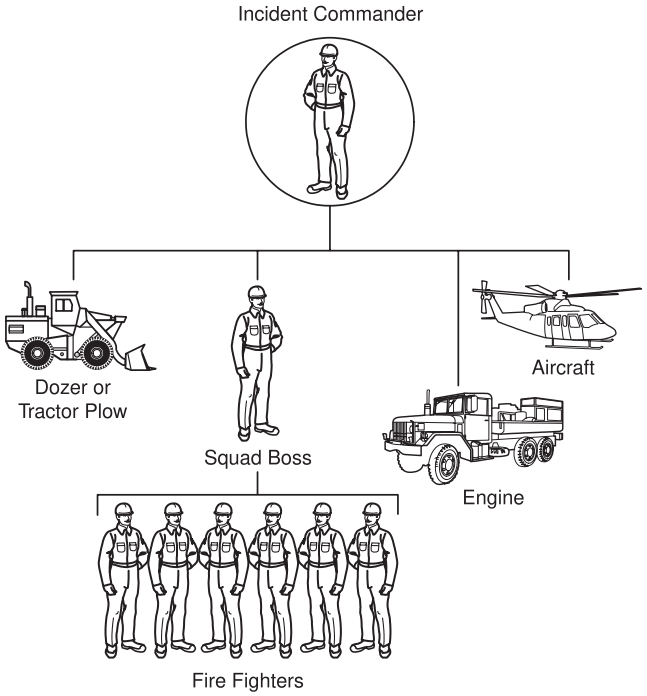

FIGURE A.6.5.1 Example of Initial Attack Organization.

(6) Anticipated control problems
(7) Cause (known, suspected)
(8) Values threatened
(9) Anticipated time of control
(10) Weather
(11) Resources on the fire
(12) Resources needed, if any
(13) Fire behavior

A.6.5.4 In many incidents of this size, the ICP could be a vehicle or other easily identified point. The location of the ICP should be determined with due consideration given to safety, access to incoming resources, and communications needs.

A.6.5.5(A) The Wildland Fire Officer I is responsible for all initial attack incident activities, including development and implementation of strategic decisions; approval of ordering and release of resources; and coordinating with other agencies, jurisdictions, and affected entities and organizations. In instances involving multi-agency response, unified command can be used. Unified command is an element of an incident management system that provides a method for agencies or for individuals who have jurisdictional or functional responsibility to jointly manage an incident through a common set of objectives.

A.6.5.5(B) Additional information on the use of heavy equipment and aircraft can be found in NWCG S-200, *Initial Attack Incident Commander*; NWCG S-219, *Firing Operations*; NWCG S-236, *Heavy Equipment Boss*; NWCG S-230, *Crew Boss (Single Resource)*; and NWCG S-270, *Basic Air Operations.*

A.6.5.6 Incident records should contain essential incident information, such as the following:

(1) Incident objectives and strategy
(2) Changes in the situation

(3) Tactical decisions
(4) Organization
(5) Sketch map
(6) Safety problems and hazards
(7) Equipment use
(8) Other agency information needs

The Incident Command System (ICS) Form 201 (incident briefing) is an example of a format to document this information. In many initial actions, control is effected very quickly and the need for written documentation is minimal. However, in longer duration incidents, it is much more important, and, if the incident expands into an extended attack or more complex situation, good documentation is essential to provide for an efficient transition. *(See Figure E.1 for recommended form.)*

A.6.5.7(A) For additional information regarding intermediate fire behavior, see NWCG S-290, *Intermediate Wildland Fire Behavior*.

A.6.5.9 Logistical needs for initial action incidents are usually minimal; however, some items to consider are the following:

(1) Water supply
(2) Fuel for equipment
(3) Meals and drinking water

Should the initial action continue for extended periods of time, additional logistical requirements could include the following:

(1) Sanitation facilities
(2) Lighting
(3) Provisions for sleeping
(4) Relief resources

A.6.5.14 The Wildland Fire Officer I is expected to respond to media inquiries on a limited basis. It is essential that the Wildland Fire Officer I can determine when to refer media requests to the proper authority within the agency. NWCG S-203, *Introduction to Incident Information*, provides information on this subject.

A.6.5.16 Final incident reports could include personnel and equipment reports, personnel evaluations, financial documents, fire reports, accident forms, and post-incident evaluations as required by the AHJ.

A.7.4.1 Multiple resources might or might not be organized into strike teams or task forces.

A.7.5.2 The incident action plan is based on a size-up of the situation, including such things as the following:

(1) Analysis of hazards to firefighters
(2) Estimated rates of spread
(3) Actual and potential threat to values
(4) Incident objectives in priority order
(5) Strategies for protecting values and for suppressing the fire
(6) Fuel, topography, current and predicted weather

The plan outlines the most appropriate method of attack with the resources available, including such things as the following:

(1) Tactical directions to achieve incident objectives
(2) A coordinated sequence of events
(3) Resource assignments
(4) Immediate support needs

The plan emphasizes safety information covering all hazards and relevant safety principles. ICS Form 201, *Incident Briefing*, is the first written documentation for the incident and serves as a briefing document for incoming incident commanders. *(See Figure E.1 for sample form.)* For more information, see NFES 1077, *Incident Response Pocket Guide*.

A.7.5.2(B) See NWCG S-300, *Extended Attack Incident Commander*, and NWCG S-215, *Fire Operations in the Wildland/Urban Interface*, for additional information.

A.7.5.5 Early recognition that a wildland fire will not be controlled by the initial attack forces is important. As soon as the Wildland Fire Officer II recognizes that additional forces are needed or knows additional forces are en route, he or she must withdraw from direct fireline suppression and do the following:

(1) Establish an ICP check-in point to receive, brief, and assign incoming forces.
(2) Document incident status and resource information in writing (e.g., ICS Form 201).
(3) Sketch a map of the fire and identify resource assignments.
(4) Document the fire organization.
(5) Keep track of all resources that are on the scene, en route, and ordered.
(6) Document strategy, tactics, and current actions.
(7) If available, assign a status check-in recorder to handle this documentation when the following occurs:
    (a) The fire is expanding rapidly.
    (b) Numerous resources are arriving or are being ordered.
    (c) Radio contact is constant.
(8) Keep the designated officer, dispatch, the incoming replacement incident commander, or other higher level officer informed of the following:
    (a) Status of the fire
    (b) Progress of the suppression forces
    (c) Additional resources needed
    (d) Weather conditions, especially changes
    (e) Special situations such as values threatened
(9) As additional forces arrive, do the following:
    (a) Divide the fire into areas of responsibility such as right and left flank, or Division A and Division B.
    (b) Assign individuals responsibility for these areas.

See NFES 1077, *Incident Response Pocket Guide*, for additional information on the transition of command.

A.10.1.1 Land use changes in wildland, rural, and suburban areas often occur in areas where there might be an inadequate water supply, inadequate fire department resources, extended fire department response time, limited access, hazardous vegetation, unusual terrain, or unusual characteristics. Without the involvement of the fire department from the outset, the resulting changes could create a situation where the fire department cannot properly access structures or have the resources necessary to deal with emergencies at the property and where the occupants might not be able to escape the incident.

This standard addresses the design of subdivisions and development in areas where threats of natural disasters or human-caused hazards in suburban/rural areas are not addressed by other planning and development documents. Moreover, in

many areas of the US, building and fire codes might not have been adopted, in which case this standard is meant to apply.

A.10.1.3.1 Wildland, rural, and suburban areas have conditions, threats, and needs that might be different from those assumed under other codes and standards. In addition, other codes and ordinances might not be in place to guide fire departments in many rural areas.

A.10.1.3.4.2 Structures could include such occupancies as amphitheaters, grandstands, or other public assembly structures that could need fire protection infrastructure.

A.10.1.3.4.7 Supporting infrastructure includes roads, bridges, water supply systems, and similar utilities.

A.11.1.4.1 The information in Table 11.1.4.1(a) was crudely estimated using Equation 8-3 in the 1997 *Highway Capacity Manual* (Transportation Research Board 1997).

[A.11.1.4.1]

$$SFi = 2800(v/c)_i f_d f_w f_g f_{HV}$$

This equation states that a road's service flow rate (SFi) in vehicles per hour (vph) is the product of the volume-to-capacity ratio for level-of-service $i(v/c)_i$ and a set of adjustment factors for directional traffic distribution f_d, lane and shoulder width f_w, grade f_g, and the presence of heavy vehicles f_{HV}. A narrow, mountainous road operating at level-of-service F (0.78) (maximum capacity) is assumed (for this analysis) with 100 percent of the traffic in one direction (0.71) on a 9 ft (2.7 m) wide lane and 2 ft (0.6 m) shoulder (0.70) heading downhill (1) with the possible 3 percent presence of large recreational vehicles (0.75) for an estimate of capacity per exit in clear visibility conditions with moderate demand rates of 814 vph (rounded to 800). In communities with uphill exits, wider roads, or no recreational vehicles, this can be adjusted. Concentrated demand could greatly degrade this flow rate to level-of-service F where capacity can no longer be reliably estimated. Also, it should be noted that this number is very optimistic because it does not consider driveways along a road or other merge points that could create flow turbulence. This information, from "Public Safety in the Urban–Wildland Interface: Should Fire-Prone Communities Have a Maximum Occupancy?," is provided only to reference the rationale and background for the round numbers in the tables, not for specific calculations.

A.11.2.1 When approving a development, the AHJ should consider whether future rights-of-way might be needed for widening streets or providing additional means of access as the project is built out or adjacent properties are considered for development. Where there is a perceived need, the AHJ should work with the developer to set aside such rights-of-way for future use.

A.11.2.10 Driveway entrances constructed of multiple surfaces of dirt, concrete, and asphalt are usually a single vehicle width and cross the culvert leading into the actual driveway. The culverts often have either a metal or plastic pipe laid into them and the driveway is built over the pipe. During the response effort of the Black Forest Fire in Colorado in 2013, at least three incidents were cited where the integrity of the plastic pipe had been compromised by the fire and resulted in fire apparatus getting stuck in the culvert area. This situation can compromise egress of the occupants as well as the safety of responding fire crews. Fire apparatus access roads should be designed and maintained to support the imposed load of a fire apparatus and withstand the impacts of (or from) fire.

A.11.2.13 A wide variety of traffic calming devices is available. Prior to installation of any of these devices, the AHJ should work with the emergency response departments to ensure traffic calming devices can be negotiated by emergency response vehicles in a safe and timely manner without damage to those vehicles. More information on the impact of traffic calming devices on emergency vehicles can be found in "The Influence of Traffic Calming Devices on Fire Vehicle Travel Times", by the Portland, OR, Office of Transportation and the Fire Rescue and Emergency Services. (For brevity, the tables have been eliminated from the following summary, but the full report is available at www.portlandoregon.gov.)

The Influence of Traffic Calming Devices on Fire Vehicle Travel Times. January 1996, *Portland Bureau of Fire, Rescue, and Emergency Service and the Traffic Calming Section Bureau of Traffic Management of the Portland Office of Transportation.*

Introduction. Traffic calming devices are used on Portland's neighborhood streets when traffic conditions are out of character with their adjacent residential, institutional, and recreational land uses. Calming devices are used to slow vehicle speeds, to encourage the use of more appropriate streets for through trips, and to enhance pedestrian, bicycle, and transit safety. The devices have proven to be effective without significantly impacting convenience, mobility, and travel time for drivers. At the same time, certain devices affect the speed of various fire vehicles and may increase overall response times. In 1995, the city's Fire Bureau and Bureau of Traffic Management conducted a thorough data collection effort to help quantify the relationship between three types of traffic calming devices and fire vehicle travel times. The study was conducted to determine how speed bumps and traffic circles affect fire vehicle travel times.

Research Method. The testing considered four variables that influence the speed at which a fire vehicle can be negotiated around traffic circles or across speed bumps. The variables tested were the driver (36 different drivers), the type of fire vehicle (six fire vehicles of varying characteristics), the desirable vehicle speed, and the types of calming devices. Test runs were conducted on a total of six streets: two with 22-foot speed bumps; two with 14-foot speed bumps; and two with traffic circles. The speed and time data for each test run (four per vehicle/street, total 24 per street) was transcribed and used to calculate the distance traveled after each second as well as the vehicle's distance from the starting line after each second of the run. For various combinations of the four variables, the time needed to travel a length of street that had no calming device was compared to the time needed to travel the same length with a calming device. The difference between these times equals the delay associated with the calming device. Delays-per-device were calculated for desirable response speeds of 25, 30, 35, and 40 mph.

Findings.

Depending on the type of fire vehicle and the desirable response speed, the three devices were found to create a range of delays for each device as follows:

(1) 14-foot bumps: 1.0 to 9.4 seconds of delay per bump
(2) 22-foot bumps: 0.0 to 9.2 seconds of delay per bump
(3) Traffic circles: 1.3 to 10.7 seconds of delay per circle

The drivers' performances did not appear to significantly influence the results. Their choices of deceleration and acceleration rates as well as their choices of minimum speeds near the devices were very consistent.

Conclusions. The results provide quantitative data that can be used in the determination of the impacts of one or more traffic calming devices on fire response times along a given emergency response route. Additional information is necessary in order to make a complete assessment of these impacts. This includes: 1) the types of fire vehicles responding to emergencies; 2) the desirable and appropriate speed of fire vehicles at each of the calming devices located along the response route; 3) the geographical area that will be affected by any increase in delay to response times; and 4) the use of this route by fire vehicles given the likely demand for emergency services and the availability of good alternative routes. A full assessment of the impacts on response times for a given set of traffic calming devices needs to be balanced with the benefits of traffic calming on reducing speeding problems and enhancing public safety and livability along neighborhood streets. This paper provides the initial quantitative data that is necessary to begin to weigh the pros and cons of traffic calming.

Recommendations.

1. Pursue full assessments of the impacts of specific traffic calming projects, either planned or existing projects, on emergency vehicle responses. The results of this assessment then needs to be compared to the benefits of the traffic calming project, especially the benefits to public safety.

2. To provide both fast response for emergency services and slower overall traffic speeds on neighborhood streets, a public process should be undertaken to address the tradeoffs (options) between these two community values and to provide policy direction for implementing traffic calming on a citywide basis. These options include the use of traffic signal preemption devices, the locating of new fire stations, fire vehicle modifications to minimize weight-to-horsepower ratios, securing and cushioning certain pieces of equipment, and improving vehicle suspensions. This should be done by revising the Transportation Element to include a classification for emergency response routes.

A.11.2.16.2 When considering whether to allow steeper grades, the fire department should recognize that fire apparatus is designed to operate on grades of 6 percent unless it is specifically designed for steeper grades. Moving over a steeper grade is different from operating on a steep grade for a prolonged period of time. Steep grades also often involve switchbacks, which will slow both access for fire apparatus and traffic flow exiting an area if there is a wildland fire. If the steeper grades are being allowed in areas where there are large amounts of natural fuels, the potential for a wildland fire must be recognized.

A.11.2.17.2 The AHJ should consider distances to water sources, fire flow, apparatus and equipment capabilities, and personnel availability when determining the acceptable length of a cul-de-sac.

A.11.2.17.3 Figure A.11.2.17.3 shows an example of a design for an intermediate turnaround in a cul-de-sac that exceeds 1200 ft (366 m).

A.11.3 A fire lane can be a subsurface construction of hard material designed to support the heaviest piece of fire apparatus likely to be driven on it and then covered with no more than 3 in. (75 mm) of soil, sod, or both or to the specifications of an engineered subsurface system. When a subsurface fire lane is constructed, it should be identified in a manner acceptable to the fire department.

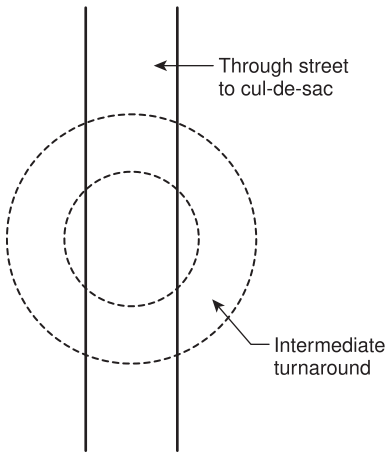

FIGURE A.11.2.17.3 Example of an Intermediate Turnaround.

A.11.4.1 The AHJ should consider requiring wider aisles if it is anticipated that the aisle areas will be used for tactical operations during an incident at the property.

A.12.1.1 Preconnected hose lines on pumping fire apparatus are normally 200 ft to 250 ft (60 m to 75 m) in length. The 150 ft (45 m) requirement allows firefighters to stretch hose lines to a building access point on any exterior wall with a normal fire-fighting crew and have sufficient hose for fire-fighting operations inside the building.

A.12.1.3 The means of access for fire apparatus required by 12.1.3 is to allow an aerial ladder or elevating platform fire apparatus to have access to the exterior of the building to support fire-fighting operations.

A.12.1.4 The means of access for fire apparatus required by 12.1.4 is to allow an aerial ladder or elevating platform fire apparatus to have access to the exterior of the building in at least one location if aerial operations should become necessary. The required access in 12.1.2 can serve as this access if it extends to within 30 ft (9.144 m) of the building.

A.14.1.5 The AHJ should consider the fire-hydrant-to-building proximity in determining the location of the fire department connection pursuant to enforcement of this subsection. Fire hydrants should be located no closer than 50 ft (15.2 m) to the building being protected by the sprinkler system. This can be accomplished by locating the fire department connection away from the building.

A.14.2.1.6 The AHJ should consider the fire-hydrant-to-building proximity in determining the location of the fire department connection pursuant to enforcement of this section. Fire hydrants should be located no closer than 50 ft (15.2 m) to the building being protected by a standpipe system. This can be accomplished by locating the fire department connection away from the building.

A.14.2.2 This requirement can be met by providing one multipurpose dry chemical fire extinguisher or one Class A and one Class B:C fire extinguisher. The reasoning behind the requirement to locate these extinguishers in the dwelling unit is to prevent theft.

A.15.1.4.5 See NFPA 1963.

A.15.2 It is assumed that water from a municipal-type water system will be immediately available. When a municipal-type water system is not available, NFPA 1142 requires that water delivery rate be established within 5 minutes of arrival at the incident.

A.15.3.6 It is anticipated that a stub and valve with box will be installed and left for connection of future fire hydrants.

A.15.3.10 See AWWA M31, *Distribution System Requirements for Fire Protection,* for guidance on pipe sizing.

A.16.1 NFPA 1 extracts most of its requirements for fire protection during construction from NFPA 241. The requirements in Chapter 10 of this standard should be used along with the provisions of NFPA 241, as applicable.

A.17.1 Extensive information and resources about disaster management and emergency preparedness are available in *NFPA 1600*. *NFPA 1600* promotes a common understanding of the fundamentals of planning and decision making to help entities examine all hazards and produce an integrated, coordinated, and synchronized program.

A.17.3.7 The AHJ should consider requiring the inclusion of maintained open areas or the dual-purposing of common and public facilities in new developments that can be used for the following purposes:

(1) Ground operations support: Open areas designed to accommodate space-demanding fire support activities, such as apparatus staging, water supply, and similar activities
(2) Air operations support: Open areas designed to accommodate the needs of firefighting and medical evacuation (MEDEVAC) helicopters
(3) Resident refuge: Open areas or designated facilities or structures designed to permit planned shelter-in-place activities or to serve as potential areas of refuge if safe evacuation is not possible
(4) Temporary refuge areas/safety zones: Areas designed as potential temporary refuge areas or safety zone locations for fire crews
(5) Multi-purpose areas, facilities, or structures: Open areas or structures designed to accommodate multiple activities as described above, so long as these activities are not mutually exclusive given their nature and the size and design of the open area or facility

Maintained open areas should have the following characteristics:

(1) Be of sufficient size, accessibility, ground cover, and slope to accommodate the planned activity or activities
(2) Be legally and functionally accessible for emergency use through public ownership or binding agreement
(3) Be clearly and permanently identified using retroreflective signage or other means
(4) Have provisions for continual maintenance of ground cover, drainage, and access — as well as snow removal if the area is intended for all season use — to ensure continuous availability

The number, size, configuration, and designation of the maintained open areas and public facilities necessary for a development should be determined by the AHJ based on the projected emergency needs; the population serviced; the potential for additional visitation; the local topographic, fuel, and potential fire environment conditions; and other appropriate considerations.

Complementary Use of Maintained Open Areas. Designated open areas might accommodate complementary emergency infrastructures, including but not limited to dry hydrant access aprons, cistern access points, and any other infrastructure deemed appropriate by the AHJ.

The use of designated open areas or common use facilities for nonemergency purposes (such as public recreation or gathering spaces) is acceptable, so long as no modifications are made to the areas that would prevent immediate use for their intended emergency purpose.

A.18.1 If it is recognized that the land use change will have significant impact on the fire protection demand, outside assistance might be required to perform the assessment. The AHJ might want to pass the cost of this assessment on to the developer.

A.18.2 Examples of possible solutions include expanding mutual aid or automatic aid agreements, requiring the developer to provide on-site facilities, requiring the developer to fund the augmentation of services, and requiring more built-in fire protection. For larger developments, regional planning for providing fire protection and EMS services can often identify better methods of providing the additional services needed than individualized local planning.

A.19.1.2 This standard provides wildfire management information and minimum requirements for communities in rural and forested areas. Many of these communities are exposed to the dangers of large fires involving many acres of natural fuels, such as forest, grass, or brush. To prepare for such emergencies, the responsible fire protection organizations and individuals should be aware of the most recent and useful wildland fire management techniques, equipment, training, and operations.

This standard includes a list of mandatory requirements that must be met if firefighters are to be safe in the prevention and suppression of wildland fires. Additional information on large equipment, heavy power tools, specialized wildland firefighting equipment, and techniques for landscape management, prescribed fire, smoke management, community and subdivision planning, and other mitigation measures is available in other publications.

In many rural and wildland areas, forest, grass, crop, and brush fires are a continual problem. These fires, if not controlled, can endanger human life and cause serious damage to property, natural resources, and the environment. Evaluation of wildland fires has shown that fire damage can be prevented or minimized if mitigation efforts are made and when, in the case of such fires, aggressive suppression actions by trained firefighters are executed in the early stages of fire development.

A.19.2 The wildland/urban interface coordinator should be responsible for developing the risk and hazard assessment with community and stakeholder involvement. For specific information regarding hazard and risk assessment in wildland areas, refer to, Figure A.24.2.2, which shows a structure assessment guide, and Table A.24.2.2, which illustrates a sample structure assessment rating form.

A.19.4.2 These sources can include, but are not limited to, the following:

(1) Natural occurrences (e.g., lightning, volcanic eruptions)
(2) Utility and transportation corridors
(3) Industry
(4) Recreation
(5) Arson

A.19.5 The probability of a wildland fire starting is dependent on an ignition source, fuel conditions, and the weather. Accurate determination of fire danger can be made only through specific weather-related observations such as temperature, humidity, wind speed, and fuel moisture. These observations are used by systems such as the National Fire Danger Rating System and the Canadian Forest Fire Danger Rating System.

A seasonal risk analysis is a method of incorporating important information into a fire hazard assessment. A seasonal risk analysis requires fire managers to step back, review current and predicted weather and fuels information, compare this information with historic weather and fuels records, and predict the upcoming fire season's severity and duration for any given area. It is important to incorporate drought indices into this assessment. Information from a seasonal risk analysis can be used to modify step-up and re-attack plans. It provides the basis for actions such as prepositioning critical resources, requesting additional funding, and modifying memoranda of understanding (MOUs) to meet anticipated needs.

Each AHJ selects and compares to normal the current value and seasonal trend of one or more of the following indicators that are most useful in predicting fire season severity and duration:

(1) National Fire Danger Rating System (NFDRS) [or Canadian Forest Fire Danger Rating System (CFFDRS)] index values [Energy Release Component (ERC), Burning Index (BI)]
(2) Temperature levels
(3) Precipitation levels
(4) Humidity levels
(5) Palmer Drought or Standardized Precipitation Index
(6) 1000-hour fuel moisture (timber fuels)
(7) Vegetation moisture levels, live fuel moisture (brush fuels), and curing rate (grass fuels)
(8) Episodic wind events (moisture drying days)

A.19.6 It is important to identify problems or potential problems. Identification of priority wildland fire mitigation should look at a number of variables, including ignition risks, fire hazards, and values.

Once risks, hazards, and values have been evaluated, it is possible to determine when, where, and how to implement fire mitigation programs. By comparing an area's potential to have an ignition (risks) with its potential to burn after ignition (hazards) and identifying the values threatened by a wildland fire, a fire prevention plan can be written. This plan can focus on the highest priority wildland fire problems within a given area. It is not necessary to have an extensive fire mitigation effort in an area where a number of risks exist but the hazard is minimal and no real values are threatened. In contrast, it is important to have a comprehensive effort in an area where there are substantial risks, a high hazard, and a threat to high values.

The wildland fire mitigation plan should address what needs to be done in each area based on the type of activities and uses. It should define what actions will take place and when, and who is responsible. Wildland fire mitigation activities fall into three broad categories:

(1) *Education.* Education is aimed at changing people's behavior by informing them. People can be informed through printed materials, mass media (radio, television, etc.), one-on-one contacts, or group presentations. Information can also be delivered through signs, displays, fairs, parades, and so forth.
(2) *Engineering.* Engineering is an activity designed to shield an ignition source (e.g., spark arrester) or remove the fuel that would ignite from a spark (e.g., clearance around a home).
(3) *Enforcement.* Enforcement is used to gain compliance with fire codes and ordinances. The wildland fire mitigation plan should select the most cost-effective mix of activities to mitigate potential fire problems within each priority area. The wildland fire mitigation plan should be evaluated on an annual basis. If ignitions are occurring in an area where an active fire mitigation program is implemented, the fire mitigation activities should be reviewed. This review could result in a change of activities within the area. If the plan is working, there will be no need to make any changes.

A.19.6.1.1 Examples of stakeholders include, but are not limited to, the following:

(1) Neighboring fire organizations
(2) Police organizations
(3) Public works agencies
(4) Service/support organizations
(5) Public utilities
(6) Medical/health facilities
(7) Media and the general public
(8) Dispatch/communications centers
(9) Insurance companies
(10) Local government stakeholders
(11) Homeowner organizations
(12) Environmental agencies and organizations
(13) Planners, builders, and developers
(14) Other special interest groups

These stakeholders could have plans or activities that should be integrated with the wildfire mitigation plan. Furthermore, the jurisdiction for which the AHJ is developing the mitigation plan might be required to develop a Community Wildfire Protection Plan (CWPP) as mandated by the federal Healthy Forests Restoration Act (P.L. 108-148). The guidelines for CWPPs require stakeholder coordination and should be followed in this case. Guidelines can be found at http://www.safnet.org/policyandpress/cwpphandbook.pdf.

A.19.6.5 Depending on the needs of the AHJ, an individual with qualifications as a public fire and life safety educator or as a public information officer might be suitable. NFPA 1035 provides information on qualifications for these types of positions.

A.19.6.8 In the pursuit of wildfire safety and mitigation, the AHJ will need to coordinate plans and activities with a wide variety of stakeholders. In this process, care should be taken to avoid conflicts with existing laws or local ordinances and to minimize the possibility of creating new hazards (fire and other) while mitigating identified wildfire hazards.

A.19.7 Periodic review and revision of the mitigation plan will help to determine if activities are reaching the goals of reducing fire hazards and if priorities need to be shifted to meet changing conditions.

A.20.1.2(1) Several model plans exist. Some state and federal agencies have standard elements for inclusion in such plans. *NFPA 1600* provides additional guidance to the AHJ for developing all-hazard preparedness plans and ensuring consistency with state and federal plans. The AHJ should use the following as the basis for establishing new cooperative agreements and for reviewing existing cooperative agreements:

(1) Cooperation in prevention, pre-incident, and suppression operations *[see Figure A.20.1.2(1)(a) and Figure A.20.1.2(1)(b) for model agreement language]*
(2) Coordination in development and implementation of wildland fire management plans, protection standards, strategies, tactics, and procedures
(3) Identification of parties responsible for implementing various aspects of the agreement
(4) Existence of a command structure *(see Chapter 21)*
(5) Communications capability
(6) Minimum qualification requirements of personnel
(7) Existence of an annual operating plan used to define and update specific operating procedures prior to each fire season

A.20.1.3.2(3) *Equipment.*

Hand Tools. Tools needed will vary by sections of the country due to differences in fuels, soil, and topography. All equipment selected for fire management work should be maintained and used for the type of work for which it was designed. Many national standards and specifications are available to help fire department organizations purchase the proper equipment. Assistance in selecting appropriate tools can be obtained from federal, state, or provincial wildland fire-fighting agencies.

Power Saws. Power saws are an essential tool for fire suppression activities. Information on power saws can be secured from the manufacturers as well as from operators who have used the various makes and types. Because fire suppression can require carrying saws long distances over rough terrain, saw weight is an important consideration. Saws should be equipped with approved spark arresters to minimize the possibility of hot exhaust particles igniting nearby fuels. References for information on approved spark arresters for power saws can be found in Annex J.

Tractor Plows and Dozers. Tractor plows and dozers are valuable tools for wildland fire suppression *[see Figure A.20.1.3.2(3)(a) and Figure A.20.1.3.2(3)(b)]*. Most fire departments will not find it economical to own tractors or bulldozers, but they should evaluate the capabilities under existing conditions of terrain, fuels, and rates of fire spread. Heavy tractor equipment is available from construction and logging operators, whose names and telephone numbers should be included in the fire plan. Qualified supervision should be provided to monitor operation.

Any tractor plows or dozers used for wildland fire suppression should be equipped with protective canopies, winches, and adequate lights for operating at night. Unless turbocharged, tractor plows or dozers should also be equipped with approved spark arresters. References for information on approved spark arresters for tractor plows and dozers can be found in Annex C.

A.20.2 *Supplemental Fire Suppression and Cost-Share Agreement.* This agreement provides for a coordinated cooperative fire suppression operation on this fire and describes the cost divisions. This agreement is a supplement to the master agreement/contract among the agencies listed. See http://www.nwcg.gov/teams/ibpwt/documents/cooprelations/master_coop_agreement_template.pdf for the full text of the master agreement template. *(See Figure A.20.2.)*

A.20.3 Firefighting requires fast action, sustained effort, and greater energy than most other work. Firefighting is hazardous. In the United States, firefighting has one of the highest accident rates of any occupation. Safety procedures and principles must be practiced. Most accidents can be prevented by careful procedures and training before emergencies. The safety and welfare of the entire fire-fighting organization are the responsibility of the IC. All persons in authority are likewise responsible for the safety of the personnel under their direction.

SAMPLE FIRE DEPARTMENT MUTUAL AID AGREEMENT

WHEREAS, the governmental units of _____ have rendered mutual aid in fire services in the past and anticipate a continuing demand for such mutual aid and cooperation in the use of their fire personnel and equipment for the safety, health, and welfare of the people of their respective governmental units during times of emergency;

NOW THEREFORE, _____ does hereby agree that its fire department will render mutual aid to _____ under the following conditions:

(1) In the event of any serious emergency, the parties to this agreement shall cooperate in an effort to provide fire services subject to the terms and conditions prescribed in this agreement.

(2) The fire chief, the director of public safety, or commanding officer of the fire department of the parties to this agreement, or such other individual as the governing body of such governmental unit may from time to time designate by resolution, shall have the authority in the event of serious emergency to determine whether men and/or equipment shall be sent beyond the jurisdictional limits of the responding party. It is the intention of this agreement to vest in each party to this agreement the sole right to determine when its needs will permit it to respond to a call by the other unit of government, and it is further agreed by the parties thereto that if the fire department shall refrain from sending any personnel and/or equipment beyond its jurisdiction, that such unit thus failing to respond shall not be liable for damage to the party to this agreement.

(3) The fire chief, director of public safety, or commanding officer of the department requesting mutual aid shall be in command of all units responding from other governmental units. All personnel and equipment of a responding unit shall be under the immediate command of the highest ranking officer attached to such responding units. All commands and orders for the use of such personnel and equipment shall be made for the commanding officer of the requesting department through the ranking officer of the units responding, whenever possible. The officer in charge of the department sending assistance shall, however, at all times have the power to recall to the responding department any personnel or equipment from an assistance mission.

(4) Each governmental unit entering this agreement shall continue to provide the same salaries, compensation for death or disability, and retirement and furlough payments to their employees who are assigned to render assistance to another governmental unit in performance of this agreement as that employee would receive if on duty within the corporate limits of the governmental unit by which he or she is employed. (Cost of repairs and maintenance of equipment used or expended while rendering assistance under this agreement will be borne by the governmental unit owning the equipment.)

(5) When a governmental unit responds with mutual aid, it should be understood that the responsibility of providing and/or requesting aid to protect the unprotected area is that of the responding unit.

(6) Either party to this agreement shall be permitted at any time to withdraw from further participating in this agreement by giving 30 days prior written notice of termination to the other parties of this agreement.

In witness whereof, the parties sign and execute this agreement as of this _____ day of _____, 20____.

FIGURE A.20.1.2(1)(a) Sample Fire Department Aid Agreement. *(Source: Michigan Townships Association, www.michigantownships.org)*

MODEL COOPERATIVE FIRE PROTECTION AGREEMENT

Suggested Items for Consideration During Development

I. Title

II. Authorities

Reference applicable laws or higher level agreements.

III. Purpose/Recitals

Describe why agreement is necessary.
Describe who is involved.
Describe mutual benefit.

IV. Definitions

The key definitions in this section will standardize usage in the context of the agreement, thereby simplifying and improving communications. Include as appropriate key definitions such as the following:

Reciprocal (Mutual Aid) Fire Protection: Reciprocal initial attack zones for lands of intermingled or adjoining protection responsibility can be established. Within such zones a supporting party will, upon request or voluntarily, take initial attack action in support of the protecting party as they are in a position to provide. The protecting party will not be required to reimburse the supporting party for costs incurred. The reciprocal assistance period, defined in Annual Operating Plans, does not usually exceed 24 hours.

Reimbursable (Cooperative) Fire Protection: The protecting party can request fire suppression resources from supporting parties, per conditions set in the agreement, (and Annual Operating Plans). Such resources are to be paid for by the protecting party.

Offset (Exchange) Fire Protection: The parties are permitted to exchange responsibility for fire protection for lands under their jurisdiction. The rate of exchange will be based upon comparable cost, acreage involved, complexity, and other factors as might be appropriate and mutually agreed to by the parties. The exchange zones are often documented in Annual Operating Plans. The goal is to gain an equal exchange that provides greater overall fire protection.

Fee Basis (Contract) Fire Protection: For an agreed upon fee, one party is permitted to assume fire protection responsibilities on lands under the jurisdiction of another. The terms and conditions of such arrangements are generally outlined in a contract agreement.

Annual Operating Plan: An annually updated document that outlines operational procedures in support of a multi-year Cooperative Fire Protection Agreement. Annual Operating Plans are normally developed locally, and must be authorized by appropriate officials.

V. Interagency Cooperation

Identify sources of oversight and direction as needed to cover specific actions. Require local Annual Operating Plans. Enable and direct cooperative efforts, such as the following:

(1) Area coordinating group
(2) Local cooperative initiatives
(3) Joint projects and local agreements
(4) Incident command system
(5) Interagency dispatch centers/service centers
(6) Multi-agency coordination (MAC) groups
(7) Fire prevention
(8) Prescribed fire and fuels management
(9) Licensing training
(10) Communication systems
(11) Weather data processing system
(12) Automatic weather stations
(13) Aviation operations
(14) Joint facilities
(15) Inmate use
(16) Military resources

VI. Fire Protection

Define jurisdictional responsibilities and limitations. Include protection area and boundaries. Methods of fire protection assistance pursuant to agreement, as follows:

(1) Reciprocal
(2) Reimbursable
(3) Offset
(4) Fee basis or contract

VII. Fire Suppression

(1) Closest forces concept
(2) Shared resources
(3) Joint resources
(4) Fire notifications
(5) Protection priorities

FIGURE A.20.1.2(1)(b) Model Cooperative Fire Protection Agreement. *(Source: National Wildland/Urban Interface Fire Program)*

MODEL COOPERATIVE FIRE PROTECTION AGREEMENT *(continued)*

(6) Boundary fires
(7) Independent action on lands protected by another agency
(8) Applicable suppression response policies
(9) Escaped fire situation analysis (EFSA)
(10) Determination of cause and preservation of evidence
(11) Fire reports and documentation
(12) Post-fire analysis
(13) Law enforcement actions
(14) Fire disasters and relief

VIII. Reimbursements

Appropriated fund limitation: "Nothing herein shall be interpreted as obligating the parties to this agreement to expend funds, or as involving them in any contract or other obligation for the future payment of money in excess of appropriations authorized by law and administratively allocated for the work contemplated in this Agreement."

(1) Specific reimbursable services and procedures
(2) Cost sharing (for incidents affecting more than one agency)
(3) Procurement
(4) Billing procedures

IX. General Provisions

(1) Duration of emergency assignments
(2) Loaned equipment
(3) Mutual sharing of information
(4) Local cooperation (levels in terms of geographical authority)
(5) Accident investigations
(6) Nonwildland fire and medical aid responses
(7) Previous agreements (replacement intentions)
(8) Employment policy
(9) Suppression and damage collection
(10) Waiver of claims (liability responsibility to remain with employing party)
(11) Third-party claims (liability to third parties)
(12) Officials not to benefit ("No member of, or delegate to Congress or Resident Commissioner shall be admitted to any share or part of this Agreement or to any benefit to arise therefrom, unless it is made with a corporation for its general benefit.")
(13) Amendments procedures
(14) Examination and audit (specific auditable agreement provisions)
(15) Civil rights
(16) Duration of agreement (number of years or indefinite; describe termination progress

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FIGURE A.20.1.2(1)(b) ***Continued***

FIGURE A.20.1.3.2(3)(a) A Dozer Equipped with Protective Canopy, Lights, Brush Guards, and a Winch.

FIGURE A.20.1.3.2(3)(b) Tractor Plows Being Used in Suitable Terrain to Build Firelines. *(Courtesy of Florida Division of Forestry)*

A.20.3.1.2 During wildland fire management activities, protective clothing should include approved head protection, gloves, protective footwear, and flame-resistant clothing as defined in NFPA 1977.

Hard hats reduce the number of serious injuries and must be worn on the fireline. A safety hard hat with chin strap is preferred, but a standard firefighter's helmet can be permitted to be worn as an alternative. Lightweight "bump" hats are unacceptable because they do not provide adequate protection in wildland fire management.

Footwear should be leather lace-up boots. It is recommended that boots be without steel toes except for those used by chain saw operators as required by the AHJ. The boots should have slip-resistant soles, such as a hard rubber lug-type or tractor tread, which allows for maximum traction and prevents melting when exposed to normal fireline conditions. Soles should not be made of composition rubber or plastic, which have low melting points. This does not preclude the use of boots with smooth, hard rubber soles or those with a well-defined tread. However, the disadvantage of those soles is their tendency to slip on smooth rocks, logs, dry grass, and pine needles, surfaces that are often encountered in wildland fires. The height of the boot tops should be a minimum of 8 in. (20.32 cm). Low-quarter boots or shoes should not be worn because they do not provide ankle support, keep out sparks and dirt, or protect from stubs and other foreign objects. Pull-on-type boots, such as structural firefighting rubber boots, cowboy boots, or engineering boots, are not recommended because they do not provide adequate ankle support and protection, do not keep out sparks and dirt, and are loose-fitting and can cause blisters.

Fire shelters should be worn only by individuals trained in their use but should be available for use by all firefighters during suppression activities. Flame-resistant clothing designed for wildland firefighting should be worn. Loose-fitting clothing reduces chafing and affords more protection. Collars and cuffs should be buttoned to protect the arms and neck from heat, burns, scratches, and insects. Gloves should be worn to protect hands. Firefighters should wear goggles for eye protection in smoky or dusty environments.

A.20.4 All personnel should receive initial and refresher training in first aid, fireline safety, fire behavior, and techniques and methods of wildland fire suppression. Hands-on training with hand tools and equipment, as well as crew and fireline organization, should be included. Crew leaders and company officers need specialized training in fire management tactics to ensure their competence when directing fire suppression operations. It is recommended that cooperative training with other wildland fire management agencies and organizations be conducted. Federal, state, and provincial forest fire officers have technical training materials and are available to assist.

Many agencies and organizations have established programs to provide training in structural firefighting. Training in wildland fire tactics and techniques can be obtained from state, provincial, or federal wildland fire protection agencies, which conduct special fire schools, seminars, and other forms of instruction. A number of publications dealing with wildland fire management are available from state forestry offices or from the National Wildfire Coordinating Group (NWCG). *(See Annex C.)*

SUPPLEMENTAL FIRE SUPPRESSION AND COST-SHARE AGREEMENT

Exhibit F

The purpose of this agreement is to provide for a coordinated cooperative fire suppression operation on this fire and to describe the cost divisions. This agreement is a supplement to the Master Cooperative Wildland Fire Management Agreement or _____ (list other agreement and number) between the agencies listed.

(1) Fire name _____ Origin date _____ Time _____

(2) Origin: Township _____ Range _____ Section _____

(3) Estimated size _____ acres at the time of this agreement.

(4) Agency _____ Fire # _____ Accounting code _____
Agency _____ Fire # _____ Accounting code _____
Agency _____ Fire # _____ Accounting code _____
Agency _____ Fire # _____ Accounting code _____
Agency _____ Fire # _____ Accounting code _____

(5) This agreement becomes effective on: _____
_____
at _____ and remains in effect until amended or terminated.

(6) Overall direction of this incident will be by ( ) Unified Command, or by ( ) Single Command structure. Identify below personnel filling the following positions:

Position	Name(s)	Agency
Incident Commander		
Agency Administrator		
Representative		
Liaison		
Finance		
Operations		

(7) Suppression action will be subject to the following special conditions and land management considerations:
_____
_____
_____

(8) Geographic responsibility (if appropriate) by agency is defined as follows:
Agency _____ Geographic responsibility _____
Agency _____ Geographic responsibility _____
Agency _____ Geographic responsibility _____
Agency _____ Geographic responsibility _____

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FIGURE A.20.2 Sample Supplemental Fire Suppression and Cost-Share Agreement. *(Source: Master Cooperative Wildland Fire Management and Stafford Act Response Agreement, National Wildfire Coordinating Group, 2007)*

SUPPLEMENTAL FIRE SUPPRESSION AND COST-SHARE AGREEMENT *(continued)*

(9) The agency responsible for structural protection will be _____

_____

(10) Special operational conditions agreed to (include as appropriate air operations, base camp, food service, fire investigation, security, etc.). List cost share information in Item #11.

_____

_____

_____

_____

_____

_____

_____

(11) Fire suppression COSTS will be divided between agencies as described:

Cost Centers	Agency	Agency	Agency

(12) Other conditions relative to this agreement (notifications, incident information, etc.) _____

_____

_____

(13)

Agency	Agency	Agency	Agency
Signature	Signature	Signature	Signature
Title/Date	Title/Date	Title/Date	Title/Date

List of attachments (if any): _____ / _____ / _____

FIGURE A.20.2 ***Continued***

A.20.4.2 The safety and welfare of personnel are the first and foremost considerations in all incident operations and decisions. The following references provide basic knowledge of fire suppression safety standards and procedures:

(1) Fire behavior: NWCG S-190, *Introduction to Wildland Fire Behavior*.

(2) Ten standard fire orders: NFES 1077, *Incident Response Pocket Guide*. These fire orders are as follows:

(a) Keep informed on fire weather conditions and forecasts.
(b) Know what your fire is doing at all times.
(c) Base all your actions on the current and expected behavior of the fire.
(d) Identify escape routes and make them known.
(e) Post lookouts when there is possible danger.
(f) Be alert. Keep calm. Think clearly. Act decisively.
(g) Maintain prompt communications with your forces, your supervisor, and adjoining forces.
(h) Give clear instructions and ensure they are understood.
(i) Maintain control of your forces at all times.
(j) Fight the fire aggressively, having provided for safety first.

(3) Eighteen watch out situations: NFES 1077, *Incident Response Pocket Guide*. These situations are as follows:

(a) Fire not scouted and sized up
(b) In country not seen in daylight
(c) Safety zones and escape routes not identified
(d) Unfamiliar with weather and local factors influencing fire behavior
(e) Uninformed on strategy, tactics, and hazards
(f) Instructions and assignments not clear
(g) No communication link between crew members and supervisor
(h) Constructing line without safe anchor point
(i) Building line downhill with fire below
(j) Attempting frontal assault on fire
(k) Unburned fuel between you and fire
(l) Cannot see main fire and not in contact with anyone who can
(m) On a hillside where rolling material can ignite fuel below
(n) Weather becoming hotter and drier
(o) Wind increasing or changing direction
(p) Getting frequent spot fires across line
(q) Terrain or fuels making escape to safety zones difficult
(r) Feeling like taking a nap near the fire line

(4) Four major common denominators of fire behavior on fatal and near-fatal fires, as outlined in NWCG-NFES 2225, *Common Denominators of Fire Behavior on Tragedy and Near-Miss Forest Fires,* are as follows:

(a) On relatively small fires or deceptively quiet areas of large fires
(b) Amid relatively light fuels, such as grass, herbs, and light brush
(c) When there is an unexpected shift in wind direction or wind speed
(d) When fire responds to topographic conditions and runs uphill

The alignment of topography and wind during the burning period should always be considered a trigger point to re-evaluate your strategy and tactics.

(5) Downhill indirect line construction guidelines: NFES 1077, *Incident Response Pocket Guide*.

(6) LCES (lookouts, communications, escape routes, and safety zones): LCES Course, NWCG S-134, *Lookouts, Communications, Escape Routes, and Safety Zones (LCES)*. LCES include the following:

(a) Adequate lookouts posted to observe potential changes in fuel, weather, topography, and fire behavior
(b) Communication provided for and maintained with the supervisor at all times
(c) Escape routes for emergency evacuation identified and clearly understood by all firefighters
(d) Safety zones in cleared or natural areas devoid of flammable material reconnoitered or provided for and known to all crew members

(7) The ten wildland/urban interface fire watch out situations: NFES 1077, *Incident Response Pocket Guide*. These situations are as follows:

(a) Poor access and narrow, congested one-way roads
(b) Bridge load limits
(c) Wooden construction and wood shake roofs
(d) Power lines, propane tanks, and hazmat threats
(e) Inadequate water supply
(f) Natural fuels closer than 30 ft (9 m) to structures
(g) Structures in chimneys, box or narrow canyons, or on steep slopes (30 percent or greater)
(h) Extreme fire behavior
(i) Strong winds
(j) Evacuation of public (panic)

A.20.4.3 *Fixed-Wing Aircraft.* The use of fire retardants dropped from aircraft is a modern, sophisticated attack tool in wildland fire management *[see Figure A.20.4.3(a)]*. It is probable that members of fire departments will become involved in the use of airtankers; therefore, they should be cognizant of the safety rules regarding airtanker operations.

Ground forces should be warned when drops will be made in their area. Often the airtanker pilot will make a dry run or high pass over the portion of the fire where the drop will be made. This indicates that the drop will be made within 1 to 3 minutes. If drops have already been made in the area, there usually will be no dry runs.

A firefighter who is unable to retreat to a safe place when an airdrop is imminent should observe the following safety procedures:

(1) Lie face down with head toward oncoming aircraft and hard hat in place. If possible, grab something solid and get behind it to prevent being carried or rolled about by the drop. Spread feet apart for better body stability and to assist digging in.
(2) Hold tools out to the side and away from the body. Flying tools or equipment can cause injury.
(3) Do not run unless escape is assured. Never stand up in the path of an airdrop.
(4) Stay away from large old trees and snags. Tops, limbs, or entire trees could break and fall, causing injury.

After the retardant drop has been made, there is a follow-up advantage on the fire. However, the following factors should be considered after the drop:

(1) Most retardants are slippery; therefore, be careful of footing and wipe off all hand tools, in particular the handles.

(2) Heavy application of retardant on surfaced roads can be hazardous and should be washed down as soon as possible.
(3) Retardant should be washed from equipment and structures as soon as possible to prevent damage to finishes.
(4) Retardant could also damage agricultural or ornamental vegetation; actions should be taken to minimize such damage.

Rotary Wing Aircraft (Helicopters). The use of helicopters has become a key part of wildland fire protection *[see Figure A.20.4.3(b) and Figure A.20.4.3(c)]*. As with any other piece of fire-fighting equipment, definitive safety rules should be followed when using or operating equipment near a helicopter. The following safety procedures apply to helicopter operations:

(1) Approach and departure
    (a) Get the pilot's attention and permission before approaching the helicopter.
    (b) Always approach in full view of the pilot. Never approach from the rear of the helicopter.
    (c) Always approach or depart in a crouched position. Gusts of wind can cause the rotor blades to drop low to the ground.
    (d) Safety helmets should be held to prevent their being blown away or blown up into the rotors by the rotor blast.
    (e) Never approach or depart from a helicopter from or to ground that is upslope from the main rotor. Rotors are almost invisible when turning at high speed or under poor lighting conditions.
    (f) Keep clear of the main and tail rotors at all times. Do not walk to the rear of the helicopter when entering or exiting the helicopter.
    (g) Carry all long-handled tools in such a manner that the handles will not be raised into the rotor path.
(2) Working around heliports
    (a) Stay at least 100 ft (30 m) from helicopters at all times unless you have a specific job that requires otherwise. Your presence can cause confusion and disrupt the pilot's concentration.
    (b) Do not face a landing helicopter unless you are wearing goggles.
    (c) Do not remain in an area that is under the flight path of any helicopter.
    (d) Do not smoke within 50 ft (15 m) of any helicopter or fueling area.
(3) In-flight safety
    (a) Do not smoke in the helicopter.
    (b) Use the seat belt and keep it secured until the pilot instructs you to leave the helicopter.
    (c) Ensure that all loose gear and helmets, maps, papers, and so forth, are held to prevent their being blown about the helicopter or out the windows.
    (d) Do not let any gear get in the way of the pilot or the pilot's controls.
    (e) Never throw anything out of a helicopter.
    (f) Do not talk to the pilot, unless necessary, during takeoff and landing.
    (g) Be alert for hazards such as other aircraft and telephone and power lines.
    (h) Never slam the doors of a helicopter. The doors do not have spring-loaded locks, so the handles must be physically turned to close the door.

FIGURE A.20.4.3(a) An Airtanker Making a Drop of Fire Retardant on a Wildland Fire.

FIGURE A.20.4.3(b) A Helicopter Using a Bucket to Make a Water Drop on a Wildland Fire.

FIGURE A.20.4.3(c) Heavy-Lift Helicopter Making a Water Drop on a Wildland Fire. *(Courtesy of Erickson Air-Crane)*

A.21.1 To provide fire prevention and control and to protect life and property from wildland fire, a community should establish the following:

(1) A designated formal organization headed by a fire chief or fire warden charged with the responsibility of prevention and suppression of wildland fires. The chief would be in charge of the entire departmental operation. The chief should be appointed by the governing body, if one exists, or elected by the membership on the basis of merit and ability. The chief can be a paid professional, a part-time paid employee, or a volunteer.
(2) A well-organized, equipped, and trained fire company or crew who will operate under the authority of the chief, fire warden, or subordinate officer. If attacked at once, most small wildland fires can be handled by a well-trained squad or company of two to five firefighters. Large or fast-moving fires require more firefighters, more equipment, expert supervision, and extensive radio and telephone communications.
(3) Three or four small companies or squads of five or six firefighters, with leaders, can be grouped together under the command of a crew leader or company officer. The leader can be one of several crew leaders commanding similar groups. All personnel under the leader's command, as well as others concerned with incident management, should know who the crew leader is and the scope of the leader's authority. The crews or companies can be assigned to action only on a designated portion of the main fire. This designated portion of the fire is called a *sector* or *division*.

A.21.2 On a small incident, one person can handle all of the functions in Section 21.2.

A.21.2.1 The first responsible authority (ranger, warden, company officer, crew leader, or other officer) who arrives at the emergency is the incident commander (IC) until someone with higher authority assumes command. Whenever a new IC assumes command, all officers, crew leaders, and others involved in the incident should be notified. The IC is responsible for planning and directing the fire management efforts; assembling crews of fire companies and telling them where and how to work; making the best use of personnel; arranging for communications, rest periods, and relief crews; making the best use of equipment and tools; obtaining supplies; and ensuring that the fire is extinguished before the last crews are released from the scene. In other words, the IC is responsible for all activities and operations at an emergency incident. The IC delegates more and more responsibility to assistants as the needed organizational effort grows, but the IC is always the final authority and bears total operational responsibility.

A.21.2.1.1 The responsibilities listed might not be necessary at all incidents. This listing of responsibilities is not in any particular order.

A.21.2.1.2(1) The IC should provide for public information, safety, and liaison functions in which each function should be filled as needed depending on the size and complexity of the incident. Command staff functions should include those elements of the IMS that operate in direct support of the IC and contribute to the overall management of the incident.

A.21.2.1.2(6) A Delegation of Authority is the formal process authorizing the IC to act on behalf of the AHJ. See Figure A.21.2.1.2(6).

A.21.2.2 The IMS should include command staff functions that are activated upon escalation of an incident or with multiple alarms. Specific individuals should be designated to respond and assume command staff duties.

A.21.2.2.2.2 These are personnel other than those on direct tactical assignments or those involved in a unified command.

A.21.2.2.3.2 This can be accomplished by wearing a reflective vest, helmet, or other indicator.

A.21.2.3.2.2(5) The planning function should include the development of alternative strategies. The IAP should include, as appropriate, a safety plan (from the safety officer), an incident traffic plan (from ground support), a communications plan (from the communications unit), and other supporting plans.

A.21.2.3.3.2 Logistics should provide services and support systems to all the organizational components involved in the incident, including facilities, transportation, supplies, equipment maintenance, fueling, feeding, communications, and medical services for incident-assigned personnel. The logistics function is vital to the proper management of organizations involved in wildland fire management. Resource determinations need to be made before, during, and following wildland fire incidents. For many fire protection organizations, existing resources need to be reapplied only to meet wildland fire management requirements.

DELEGATION OF AUTHORITY

Colorado State Office
Montrose Field Office

As of 1800, May 20, 2005, I have delegated authority to manage the Crystal River Fire, Number E353, San Juan Resource Area, to Incident Commander Bill Jones and his Incident Management Team.

The fire, which originated as four separate lightning strikes occurring on May 17, 2005, is burning in the Crystal River Drainage. My considerations for management of this fire are the following:

(1) Provide for fire fighter and public safety.

(2) Manage the fire with as little environmental damage as possible. The guide to minimum impact suppression tactics (MIST) is attached.

(3) Key cultural features requiring priority protection are Escalante Cabin, and overlook boardwalks along the south rim.

(4) Key resources considerations are protecting endangered species by avoiding retardant and foams from entering the stream; if the ponderosa pine timber sale is threatened, conduct a low intensity under burn and clear fuels along road 312.

(5) Restrictions for suppression actions include no tracked vehicles on slopes greater than 20 percent on meadow soils, except where roads exist and are identified for use. No retardant will be used within 100 ft of water.

(6) Minimum tools for use are Type 2/3 helicopters, chainsaws, hand tools, and portable pumps.

(7) My agency Resource Advisor will be Eric Johnson (wildlife biologist).

(8) The NE flank of the fire borders private property and must be protected if threatened. John Dennison of the Big Pine Fire Department will be the local representative.

(9) Manage the fire cost-effectively for the values at risk.

(10) Provide training opportunities for the resources area personnel to strengthen our organizational capabilities.

(11) Minimum disruption of residential access to private property, and visitor use consistent with public safety.

_____ _____

(Signature and Title of Agency Administrator) (Date)

Amendment to Delegation of Authority

The Delegation of Authority dated May 20, 2005, issued to Incident Commander Bill Jones for the management of the Crystal River Fire, number E353, is hereby amended as follows. This will be effective at 1800, May 22, 2005.

(3) Key cultural features requiring priority protection are: Escalante Cabin, overlook boardwalks along the south rim, and the Ute Mountain study site.

(12) Use of tracked vehicles authorized to protect Escalante Cabin.

_____ _____

(Signature and Title of Agency Administrator) (Date)

FIGURE A.21.2.1.2(6) Sample Delegation of Authority. ***(Source: USDA Forest Service)***

A.21.2.3.3.2(2)(b) If the IC or logistics section chief determines the need for facilities, the following items should be considered:

(1) Location for appropriate facilities
(2) Evaluation of the physical facilities and usable space required to meet pre-incident planning objectives
(3) Identification of locations for apparatus storage, equipment and personnel staging, base camp operations, lodging of personnel, and support services sites

The establishment of appropriate facilities and usable space locations is an important aspect of the logistics function. Elements that should be considered when determining strategic locations include probable wildland fire locations, other emergency services available, adequacy of public roads and utilities, scope of communications networks, and extent of outside assistance required. A general checklist for facilities includes the following items:

(1) Keep incident facilities at a manageable size.
(2) Enforce rules of conduct at facilities.
(3) Provide a bulletin board at an assembly area.
(4) Maintain proper accountability of all property.
(5) With safety in mind, locate a sleeping area.
(6) Participate in the development of a demobilization plan.
(7) Control dust when needed.
(8) Consider environmental protection when locating incident facilities.
(9) Keep first aid facilities accessible and well marked.
(10) Inspect facilities for safety and fire hazards and take corrective action when needed.
(11) Consider and supply computer support when needed.
(12) Have well-marked parking areas.
(13) Keep facilities clean.
(14) Locate shaded eating areas.

A.21.2.3.3.2(2)(c) The IC or logistics section chief determines the need for various kinds of ground support. The logistics pre-incident plan should identify necessary support services, including personnel, equipment, and supplies, that facilitate continual operations throughout the incident. These can include the following: *General Ground Support.* The ground support checklist should include the following:

(1) Provide direction signs on roads to facilities and drop points that are included in the traffic plan.
(2) Place signs at incident facilities and drop points.
(3) Plan adequate rest for drivers.
(4) Isolate and place signs at fuel storage area.
(5) Develop and enforce vehicle control plan.
(6) Plan for transportation for both personnel and equipment to and from incident camp to actual incident.
(7) Provide maintenance and fueling according to schedule.
(8) Inspect equipment condition.
(9) Maintain all equipment records.
(10) Provide transportation and support vehicles.

Emergency Medical Support. The logistics function should determine the required level of emergency medical support and identify available resources. During incidents, appropriate emergency medical support, including transportation capabilities, should be made at the incident locations.

Food Services Support. The logistics function should determine the required level of food services support and identify available resources. Applicable health standards should be reviewed and placed in perspective with the size and complexity of anticipated incident activity. Pre-incident plans should include identification of providers and probable location sites and include available utilities, tentative operation schedules, and contract prices. The food service checklist should include the following:

(1) Sanitation requirements (i.e., state, local, and OSHA) should be met.
(2) Food service sanitation requirements should be met.
(3) Food handlers should keep hands clean and should avoid handling food without wearing proper clothing and gloves.
(4) Food handlers should be free of communicable disease.
(5) Perishable foods should be stored under refrigeration at 40°F (4°C) or lower until served.
(6) Hot foods should be kept at 150°F (66°C) or higher until served.
(7) Reusable food utensils should be cleaned and immersed for 2 minutes in at least 170°F (77°C) water.
(8) First aid material and first aid treatment should not be in kitchen or serving areas.
(9) Recycling should be considered.

Sanitation Services Support. The logistics function should determine the required level of sanitation services, including resources for ample toilets, with cleaning, inspection, and maintenance schedules; trash and garbage collection and removal to approved sites; and ample replacement of consumable supplies. The sanitation checklist should include the following:

(1) Provide adequate toilet facilities and establish a regular inspection and maintenance schedule to keep them clean.
(2) Provide trash and garbage collection points and daily removal.
(3) Locate garbage or trash collection points downwind of sleeping or eating areas.

Water Supply. The logistics function should determine the requirements for potable water and identify sources and a system of water distribution. The water supply checklist should include the following:

(1) Use a safe local water supply or haul it from a domestic water supply in trucks approved for potable water only.
(2) Have the water tested and protect it from contamination.

Security. The logistics function should determine and provide for security for personnel and equipment.

A.21.2.3.3.2(2)(d) The IC or logistics section chief determines the need for a communications function, which can include resources such as various radio networks (fixed and portable); landline and cellular telephones; pagers, scanners, and other audible alert equipment; and computer, data, and fax capabilities.

Communications needs can also include radio system needs, including frequency allocation, availability, and compatibility of equipment between responding agencies, transmission and security priorities and procedures, and equipment assignment and accountability.

The communications element of the logistics function is vital to personnel safety and organizational effectiveness when wildland fires occur. A functional communications network provides rapid notification of wildland fire emergencies, alerting of organizational units, notification of the general public of

incident status and/or evacuation needs, and uninhibited communication with key cooperators and other outside agencies.

A communications system by which fires and emergencies can be reported to the fire organization is essential. There must be telephone communications to some central location that serves as a dispatch center. An emergency telephone number, publicized in the response area and published in the local telephone company directory (e.g., 9-1-1), must be established.

A.22.2 The threat to the lives of firefighters and the public is always the highest priority, and the IC's fire attack decision should be based on safety as the top priority. For low-intensity fires, consideration should be given to direct tactics. For high-intensity fires with unpredictable fire behavior or difficult terrain, considerations should be given to initiating established protective actions and indirect tactics.

A.22.2.1 Several types of wildland fire-fighting chemicals are used in wildland fire management. Each chemical product has specific requirements for mixing, handling, and applying. Most suppliers are willing to provide the necessary expertise and/or training for working with their product. Wildland fire chemicals can be applied to a fire by fixed-wing airtankers, including single-engine airtankers (SEATS), helicopters with buckets or fixed tanks, fire engines, portable pumps, or back pumps.

The types of wildland firefighting chemicals are as follows:

Long-Term Retardants. Long-term retardants contain salts (phosphate fertilizers) that alter the way the fire burns, decreasing the fire intensity and slowing the advance of the fire, even after the water has evaporated. The water aids in uniform dispersal of the chemical over the target area. Long-term retardants continue to work until they are removed by water application, rain, or erosion.

Long-term retardants are used with direct or indirect tactics. They can also be used to protect structures and forest fuels adjacent to a fireline, to aid in prescribed burning and backfiring, and to aid in mop-up.

Class A Foams. The foam solution is a homogeneous mixture of water and a foam concentrate. An aerated solution is created by forcing or entraining air into a foam solution by means of specialized equipment or by cascading it through the air at a high velocity.

Foam fire suppressants contain foaming and wetting agents. The foaming agents affect the accuracy of an aerial drop, how fast the water drains from the foam, and how well the products cling to the fuel surfaces. The wetting agents increase the ability of the drained water to penetrate fuels. The selection of concentrate dilution (between 0.1 and 1.0 percent by volume) and application equipment will yield a range of products with different uses, as shown in the following:

(1) Foam solutions and very sloppy foam with little bubble structure for mop-up where the wetting agent increases penetration of the water into the fuel and char
(2) Fluid foam for wet line and reducing the runoff of the applied water
(3) Dry foam for insulating blankets and exposure protection

The fire suppression and protection effectiveness of Class A foams depends on their capability to retain moisture. As the water evaporates, so does the fire suppression capability of suppressing fire. Under optimum conditions, suppressants remain effective from a few minutes to 1 hour.

Foams can be used as part of direct tactics in support of on-the-line fire crews or for short-term protection of structures (e.g., decks, outbuildings) and forest fuels adjacent to a fireline, as well as in prescribed burning, backfiring, and mop-up. For more information on Class A foams and their application in structure firefighting, refer to NFPA 1150 and NFPA 1145.

Water Enhancers (Gels). Water enhancers, often referred to as gels, alter the physical characteristics of water in increased effectiveness, accuracy of aerial drops, and adhesion to fuels (by clinging to vertical and smooth surfaces). The fire suppression or protection effectiveness for water enhancers depends on the amount and characteristics of the water they contain. Water enhancers are mixed with water at low concentrations (less than 3 percent). When mixing most of the water enhancers, the amount of concentrate required to obtain a desired consistency is dependent on the hardness of the water used. Specialized mixing and blending equipment might be required, and cleanup is more difficult than with foams. Gel products are not compatible with each other. Gels contain thickeners but might not contain wetting agents. Because of the incompatibility of the products with salts, including those in retardants, thorough cleanup is necessary when first changing to gels. Always follow the manufacturer's recommendations for preparation, mixing, application, and cleanup.

Water enhancers can be used in direct tactics.

A.23.1 The reporting of fires is an important function of the AHJ. Fire reports provide a realistic and factual basis for fire prevention planning, support for funding requests, and aid in organizational development. The reports can be significant documents during investigations and in insurance claims adjustment cases. A report must be completed on every fire or false alarm responded to by the fire department. It is important that information be compiled while it is fresh in the reporting officer's mind. The U.S. Fire Administration (USFA), in conjunction with the National Fire Information Council (NFIC), has developed the National Fire Incident Reporting System (NFIRS), which includes several modules that provide information specific to wildland fire incidents. At the state level, NFIRS provides for the collection of reports on incidents to which local communities responded. NFIRS uses the local databases from individual states to form the national database. The USFA analyzes this database and publishes the analysis. Current forms are available from the following web site: www.nfirs.fema.gov. The basic form, NFIRS-1 *[see Figure A.23.1(a)]*, captures data relevant to fire location (B), incident type (C), dates and times (E1), actions taken (F), resources (G1), estimated dollar losses and values (G2), and completed modules (e.g., NFIRS-8, Wildland Fire). NFIRS-8 *[see Figure A.23.1(b)]* focuses on wildland fire and provides in-depth information about, among other things, the cause of the fire (D1), human factors contributing to ignition (D2), the weather (H), and National Fire Danger Rating System (NFDRS) fuel model at origin (K). Although field forms can assist in information gathering, the NFIRS system is a computer-based program developed to reduce recordkeeping time and improve output reporting capability. The AHJ should complete and file incident reports as required.

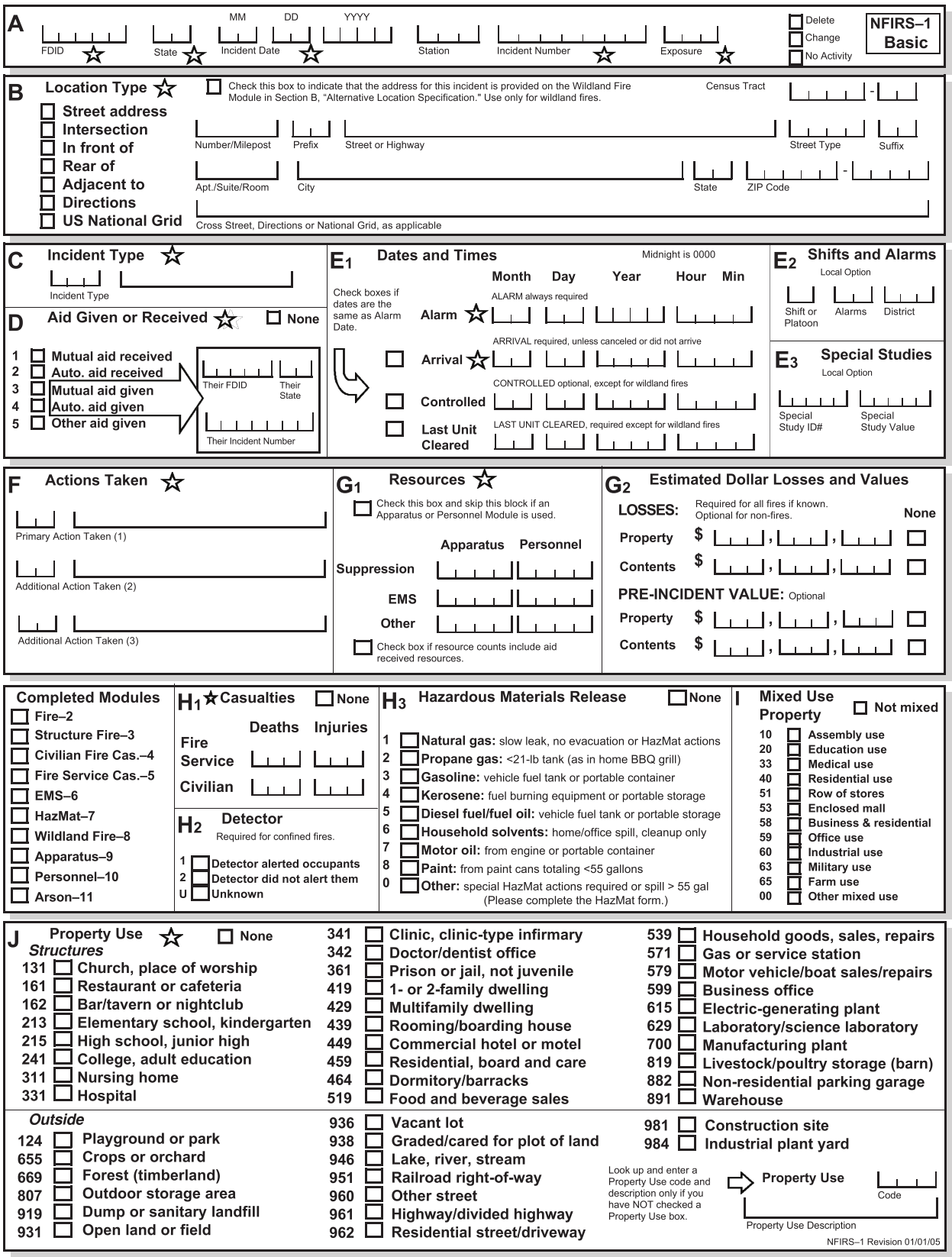

FIGURE A.23.1(a) NFIRS-1, Basic Reporting Form.

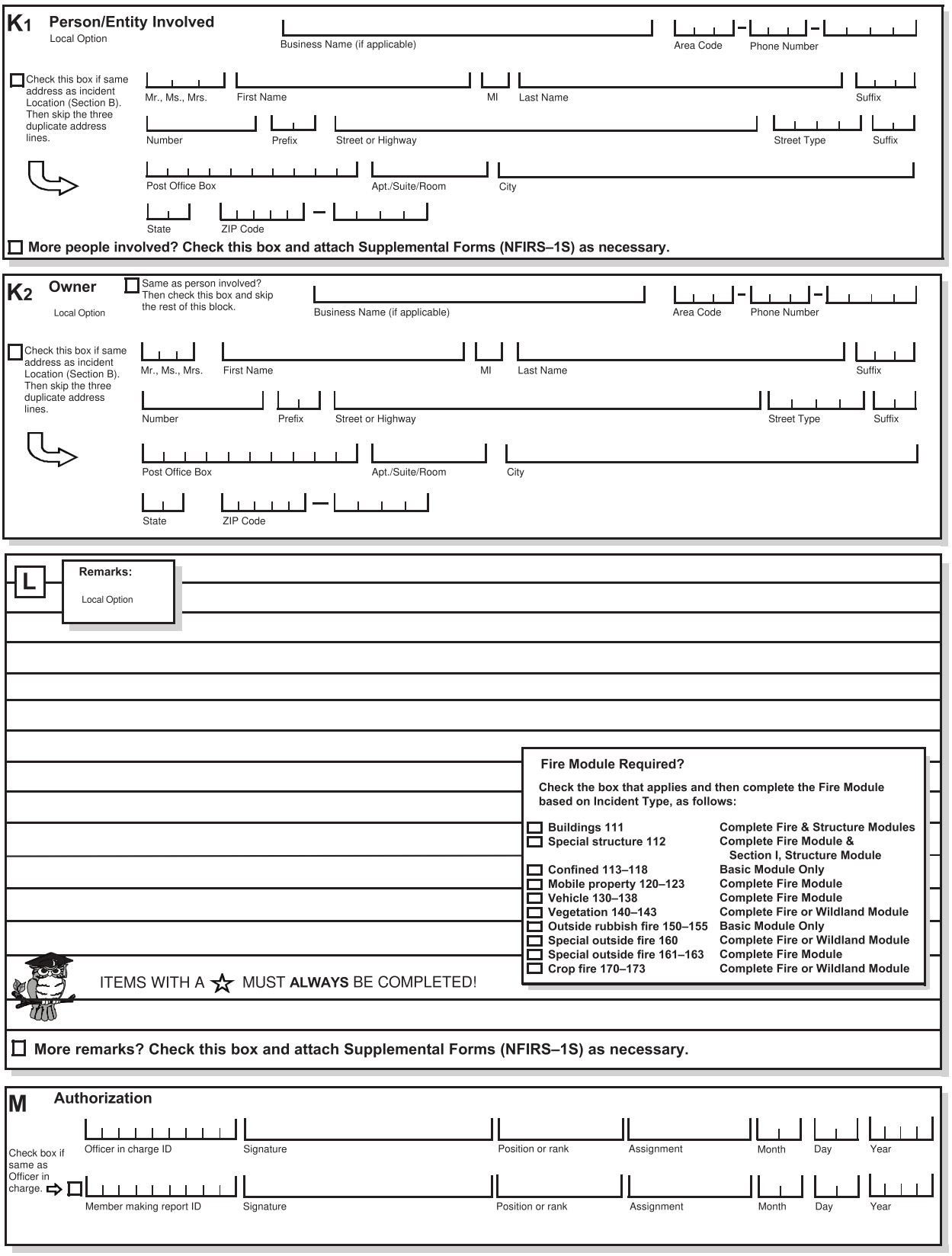

FIGURE A.23.1(a) *Continued*

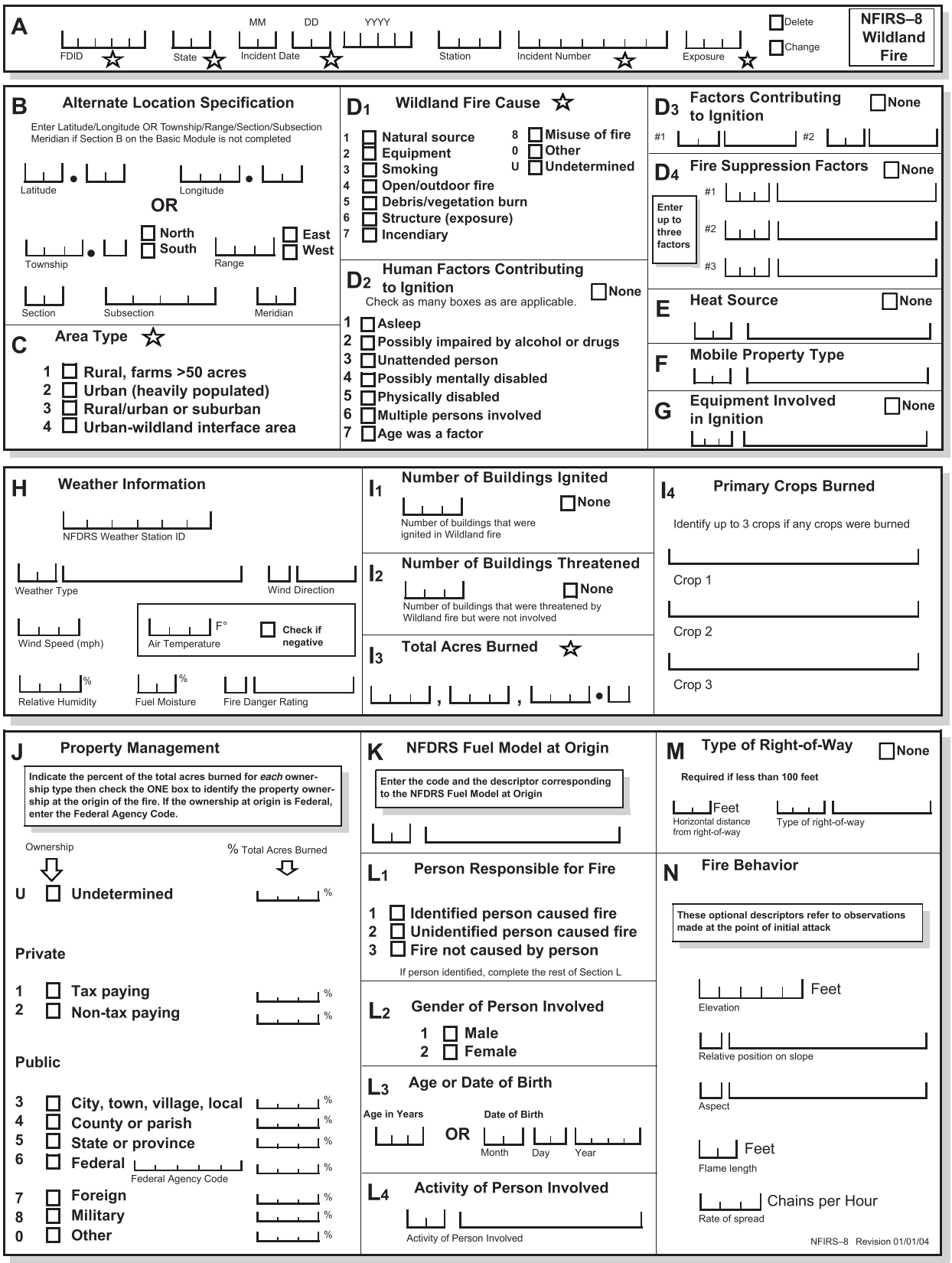

FIGURE A.23.1(b) NFIRS-8, Wildland Fire Reporting Form.

A.24.1.1 Residential developments and subdivisions are intended to include clubhouses, community meeting and activity centers, municipal buildings, offices, farm and ranch structures, and other structures within development boundaries.

A.24.1.2.1 In the case of extreme fire behavior, ignition of any structure can occur, but if mitigation measures are implemented and maintained, damage can be limited or avoided. Life safety is paramount in all fire situations, and residents and occupants are encouraged to plan for timely evacuation or shelter.

A.24.1.4.1 The optimal goal of this standard is to provide residential structures in wildland/urban interface areas with the ability to survive a wildland fire without the intervention of firefighting forces. Preventing ignition to these structures will reduce the exposure of firefighters and residents to hazards that threaten life and injury and will reduce catastrophic home losses. Mitigating ignition hazards that reduce the threat to structures can optimize the deployment of personnel and apparatus during the fire. This approach will allow for a more effective and efficient commitment of resources for fire protection.

A.24.2.1 Any person assigned to conduct structure assessments should meet the qualifications of Wildland/Urban Interface Coordinator in accordance with Chapter 9 of this standard. Information about the course is available at www.firewise.org.

A.24.2.2 Figure A.24.2.2 and Table A.24.2.2 are examples of two different approaches to hazard assessment.

Figure A.24.2.2 is an example of an assessment guide with assessment information based on observation of the areas around the structure. This form, intended to be given to the resident, can be very useful by indicating the most serious hazards and the mitigation recommendation(s) that can be taken to reduce the ignition hazard. In this example, samples of the kind of information noted in an assessment are given as observations and suggestions for mitigation.

This example of an assessment guide is designed to help determine how vulnerable the structure will be during a wildland fire and to convey to the resident those items that should be corrected (mitigated) so that their home will have a better chance to survive a wildland fire. This form is offered as an example of the kind of tool that might be useful during a site visit as a guide for assessing the structure ignition zone. Remember, the following assessment items are for *prevention/mitigation* measures to be done *well in advance* of wildland fire season.

Figure A.24.2.2 is a form used to document observations, collect data, provide a hazard assessment, and give mitigation recommendations for the resident. From the mitigation recommendations, a mitigation plan and schedule is developed in accordance with Section 24.4.

Table A.24.2.2 is a modified rating form based on the 2013 edition of NFPA 1144. Infrastructure elements of water supply, signage, and other fire suppression resources have been deleted, since the presence or absence of such resources does not modify the existing hazards of the structure. The table is presented only as an example of a rating system and should be modified to meet the environmental conditions of the area under consideration.

A numeric rating form that will yield a hazard rating number can have a variety of uses, for example, determining relative hazards among several properties and mapping overall hazard ratings on a map. However, residents and homeowners often accept the rating number as finite and undertake mitigation measures that will merely reduce the rating rather than actually reduce the ignition potential of the structure.

A.24.3 It is critical to keep in mind that the ignition of the structure might occur from one or more of the following sources:

(1) Big flames (crown fire or intense surface fire). One objective of observation of the conditions and elements and subsequent mitigation recommendations is to keep crown fire and high intensity surface fire at a distance of 100–200 ft (30–60 m) or more from home and other potential hazards (combustibles, buildings, etc.).
(2) Small flames (surface fire). Another objective is to keep small flames at a distance of 30 ft (9 m) or more from home(s) and combustible attachments (decks).
(3) Firebrands (embers). A final and essential objective is to eliminate beds of fine fuel and entry points for firebrands on and near home(s).

A.24.3.1.1 Wildland fire dangers exist in flat land areas, as well as in mountainous terrain. In addition, property line limitations often preclude effective vegetation mitigation, and alternatives for mitigation are needed.

A.24.3.1.2 Local weather conditions or prevailing winds play a role in fire behavior (e.g., from which direction a fire is most likely to come, to the intensity and speed of fire travel, depending on the degree of slope), and the direction from which a wildland fire is most likely to approach the structure is an important exposure consideration. Sources of local weather records and fire weather history from the National Weather Service, National Oceanic and Atmospheric Administration (NOAA), local weather bureaus, or wildland fire agencies can be a valuable resource in assessing existing structures or in planning for new construction.

A.24.3.1.3 Adjacent ignitable structures (garages, carports, sheds, gazebos, utility cabinets) can contribute to heat intensity, flame contact, and fire spread from firebrands.

A.24.3.1.4 Overlapping zones could have a positive result in that the outermost extent of a structure ignition zone might be a neighboring parking lot or already treated vegetation area, such as a fuel modification. On the other hand, the overlap might include other private or public lands, which could make mitigation more difficult because it could involve state or federal agencies or absentee landowners who do little or no vegetation management or hazard mitigation.

A.24.3.1.5 Structure location on a slope increases the structure's exposure to heat (e.g., structure setback from the slope is sufficient to reduce its radiant heat exposure). Setback distances of the structure can be measured in accordance with A.25.1.3.2.

Table A.24.2.2 Example of Structure Assessment Rating Form

Rating Values by Areas Assessed	Overview of Surrounding Environment (24.3.1)	From Chimney to Eaves (24.3.2)	From Top of the Exterior Wall to Foundation (24.3.3)	From Foundation to Immediate Landscaped Area (24.3.4)	From Immediate Landscaped Area to Extent of Structure Ignition Zone (24.3.5)
Topographical Features					
(1) Topographical features that adversely affect wildland fire behavior (24.3.1)	0–5				
(2) Areas with history of high fire occurrence (24.4.4)	0–5				
(3) Areas exposed to unusually severe fire weather and strong, dry winds (24.3.1.3)	0–5				
(4) Local weather conditions and prevailing winds (24.3.1.2)	0–5				
(5) Separation of structure on adjacent property that can contribute to fire spread/behavior (24.3.1.3)	0–5			0–5	0–5
Vegetation — Characteristics of predominant vegetation					
(1) Light (e.g., grasses, forbs, sawgrasses, and tundra) NFDRS Fuel Models A, C, L, N, S, and T	5			15	5
(2) Medium (e.g., light brush and small trees) NFDRS Fuel Models D, E, F, H, P, Q, and U	10			20	5
(3) Heavy (e.g., dense brush, timber, and hardwoods) NFDRS Fuel Models B, G, and O	15			25	15
(4) Slash (e.g., timber harvesting residue) NFDRS Fuel Models J, K, and L	15			30	20
Topography (24.3.1.1, 24.3.4, 24.3.5)					
(1) Slope 5–9%				1	1
(2) Slope 10–20%				4	2
(3) Slope 21–30%				7	3
(4) Slope 31–40%				10	6
(5) Slope >41%				15	10
Building Setback, relative to slopes of 30% or more (24.3.1.5, 25.1.3.2)					
(1) ≥30 ft (9.14 m) to slope	1				
(2) <30 ft (9.14 m) to slope	5				
Roofing Materials and Assembly, nonrated (24.3.2.1, 24.3.2.3)		50*			
Ventilation Soffits, without metal mesh or screening (24.3.3.4)		20			
Gutters, combustible (24.3.2.4, 24.3.2.5)		5			
Building Construction (predominant)† (24.3.4)					
(1) Noncombustible/fire-resistive/ignition-resistant siding and deck			Low		
(2) Noncombustible/fire-resistive/ignition-resistant siding and combustible deck			Medium		
(3) Combustible siding and deck			High		
Fences and Attachments, combustible (24.3.4.3)				15	
Placement of Gas and Electric Utilities					
(1) One underground, one aboveground	3				
(2) Both aboveground	5				
Fuel Modification within the structure ignition zone (24.3.4, 24.3.5)					
(1) 71–100 ft (21–30 m) of vegetation treatment from the structure(s)					5
(2) 30–70 ft (9–21 m) of vegetation treatment from the structure(s)				7	
(3) <30 ft (9 m) of vegetation treatment from the structure(s)				15	
No Fixed Fire Protection (NFPA 13, 13R, 13D sprinkler system)			5		
TOTALS (if numerical ranking is desired)					

(continues)

Table A.24.2.2 *Continued*

Rating Values by Areas Assessed	Overview of Surrounding Environment (24.3.1)	From Chimney to Eaves (24.3.2)	From Top of the Exterior Wall to Foundation (24.3.3)	From Foundation to Immediate Landscaped Area (24.3.4)	From Immediate Landscaped Area to Extent of Structure Ignition Zone (24.3.5)
Hazard Rating Scale (Compare with above totals)					
Slight Structure Ignition Hazards from Wildland Fire	0–14	0–14	0–14	0–14	0–14
Moderate Structure Ignition Hazards from Wildland Fire	15–29	15–29	15–29	15–29	15–29
Significant Structure Ignition Hazards from Wildland Fire	30–49	30–49	30–49	30–49	30–49
Severe Structure Ignition Hazards from Wildland Fire	50+	50+	50+	50+	50+

*Nonrated and combustible roof assemblies are predominantly structural exposures and severely increase the ignition hazard from wildland fire.
†The table provides both numerical and value rankings (low, medium, high). The user is urged to assign the value ranking of low, medium, or high based on the other ignition factors prevalent at the assessment site. For example, a deck made of combustible materials might rank low if it is small in size and the rest of the site is in a low fuel loading area that will not promote a large amount of firebrands. That same deck might rate high if it is in an area of high fuel loading that will promote numerous firebrands. Numeric values can be substituted as a local option.

A.24.3.2.1 All common coverings (composition shingles, tile, and, in many cases, metal) typically have a fire-resistive roofing classification adequate for interface fire protection if the covering material is tightly assembled to resist firebrand intrusion.

Untreated wood roofing is easily ignited and a major hazard. The only wood roof coverings that can be considered acceptable are wood shakes or shingles that have been treated at the factory by a pressure-impregnation fire-retardant process, tested for fire resistance, and certified with a fire-resistant roofing classification of Class A, Class B, or Class C. Pressure-treated wood roofing looks very similar to the hazardous untreated wood roofing, and currently there is no permanent identification method. If in doubt, assume wood roofing is untreated unless documentation is provided.

A.24.3.2.2 Look for gaps in the roof covering that might allow small wind-blown firebrands to penetrate under the covering and ignite material below.

Some fire-resistive roof coverings are designed or installed with gaps that allow firebrand intrusion under the covering and have resulted in firebrand intrusion and ignition of the building under the roof covering. The worst example is roof coverings that allow combustible debris to blow under the covering or that allow rodents and birds to bring nesting material in under the roof covering. Clay (Spanish or straight barrel mission) tile roof covering can have this problem unless eave closures or "bird stops" are used to close the convex opening created by the shape of the tile at the eave. Metal tile roofing installed on top of old wood roofing left in place has been a problem. If you can see wood through gaps in metal tile roof covering, firebrands can penetrate and ignite the building.

A.24.3.2.3 Plastic skylights can melt from radiant heat or flaming embers or both. Deformation can result in large openings that can allow the entry of embers and other flaming materials. Skylights constructed of multilayered glazed panels or tempered glass provide increased protection from heat and embers.

A.24.3.2.4 The roof is the most vulnerable part of the structure and is subject to the collection of combustible vegetative litter (e.g., leaves, pine needles) or other debris and buildup that can be ignited by firebrands. Can litter build up and accumulate on surfaces next to combustible, perpendicular walls? Will combustible decking or roofing provide ember beds next to combustible, perpendicular walls?

Heat trapping under eaves does not occur until the wall supports flaming combustion as indicated by the portions of the wall that were protected (shaded) and did not char during experiments conducted by the USDA Forest Service Fire Sciences Lab in Missoula, MT.

A.24.3.2.5 Gutters and downspouts collect leaves and pine needles. Gutters and eave troughs made from combustible materials (e.g., wood, vinyl) are as vulnerable to firebrand collection as the roof and other parts of the structure. If leaf litter is allowed to gather in gutters, firebrands or embers can ignite the leaf litter, which in turn could ignite combustible eave materials or overhangs. If gutters are attached to combustible fascia boards, the fascia board should be considered as a possible fuel that can be ignited by fine fuels burning in the gutters.

Gutters that pose a fire threat from an approaching wildland fire are often pulled down by attending firefighters. For the resident, an alternative might be to remove the gutters along the side(s) of the house most prone to the collection of leaves and needles and install a noncombustible drip line shown in Figure A.24.3.2.5. Removing gutters eliminates the collection of dry leaves and needles along the roof line and fascia board. Also reduced is the possibility of ice damage to the roof in the winter. The use of a gravel bed for drip lines along the leeward side(s) of the house provides reduced ignition potential and reduced wind hazard, since the gravel would be less likely to be blown by high winds on the leeward elevations. The windward sides of the house can be landscaped with mulch (less impact damage in case of wind events) if protected with low volume sprinklers to raise the fine fuel moisture levels in times of high fire danger.

A.24.3.2.6 Eaves should be boxed to prevent flying embers from entering small spaces.

STRUCTURE ASSESSMENT GUIDE

Date of assessment: *22 Nov* Property address: *70 Norris Rd.*

Resident: *John and Jane Doe* Property owner: *Same*

PRIMARY INFORMATION

Assessment Items	Mitigation Recommendations
1. OVERVIEW OF SURROUNDINGS	
How is the structure positioned in relationship to severe fire behavior? *The house is located near the peak of a ridge at local map reference Q-4-12. The setbacks from the lot lines are approximately 15–20 ft. There is a slight sloping of the lot away from the house within 50 ft of the lot line to the north.*	*Since prevailing winds during fire season are most likely from the west-southwest, keep pine needles and leaf litter cleaned up on roadside berm.*
Type of construction: *Wood frame construction with brick façade on the front. Vinyl siding on back and two sides.*	
2. CHIMNEY TO EAVES	
Inspect the roof — noncombustible? Shingles missing? Shingles flat with no gaps? *Noncombustible roofing in good shape.*	*Inspect roof each spring for damage, especially after a hard winter or windstorm.*
Gutters — present? Noncombustible? *Aluminum gutters at all eaves. No overhanging limbs nearby. Pine needles and leaf litter not likely to collect in large quantities.*	*Keep gutters free of pine needles and leaves. Check early spring and fall.*
Litter on roof, in gutters, in crevices? *Fairly clean. Not much of a concern. Easy to maintain.*	
3. TOP OF THE EXTERIOR WALL TO FOUNDATION	
Attic, eaves, soffit vents, and crawl spaces: *Not much of a concern.*	
Inspect windows and screens — metal screens? Multi-paned windows? Picture windows facing vegetation? *Metal screens on all windows. Some windows on west side are double-paned. Some high vegetation near front windows. Low vegetation in rear.*	*Keep front bushes pruned and watered during fire season. Replace any missing or torn screens immediately, especially in the front.*
Walls and attachments — noncombustible? Will they collect litter? *Not much of a concern.*	
Decks — combustible materials? *Wooden deck and privacy fence on south side. No skirting or screening beneath deck. Deck in good condition. Small vegetation around deck from overhanging tree limbs. Some collection of leaves and needles near deck and wooden stairs.*	*Prune trees closest to deck and privacy fence. Remove the pine needles and leaves. Store combustibles elsewhere — perhaps the shed in the backyard — especially during high fire danger periods. Put skirting or 1/4 in. wire mesh around deck openings.*

FIGURE A.24.2.2 Structure Assessment Guide — Example with Notations.

STRUCTURE ASSESSMENT GUIDE *(continued)*

Assessment Items	Mitigation Recommendations
3. TOP OF THE EXTERIOR WALL TO FOUNDATION *(continued)*	
Fences. *Wooden stockade fence joins house on north side. Wooden fencing also on south side. Chain link in rear along lot line. Neighbor's wooden fence is less than 2–3 ft from their wooden fence — will allow leaves and embers to accumulate.*	*Keep wooden fence perimeter clear of dry leaves and other combustible materials like chairs, wood, etc. If the chance presents itself to use noncombustible materials to separate fence from house, you should consider it.*
Flammable material next to or under the structure. *None observed.*	
Combustible materials near or on the structure where walls meet roof or decking surfaces. *Plastic outdoor furniture pads on deck might pose problem from ember shower.*	*Keep combustible chair pads put away except when in use.*
Crawl spaces, attic vents, soffits. *All appear to be in excellent condition and protected.*	
Nooks and crannies and other small spaces. *All appear to be in excellent condition and protected.*	
4. FOUNDATION TO IMMEDIATE LANDSCAPED AREA	
Landscaped (managed) vegetation — separation distances, maintenance, plant selection? Firewise Landscaping Zones? *Lawn well cared for. Leaf and needle accumulation along east side (rear of property) with small stand of trees. Front and south side have mix of pine and other vegetation.*	*Be sure to keep these areas well tended, pine needles cleared and limbs pruned. Lawn needs to be kept green and mowed. Plants irrigated, pruned and raked — especially during high fire danger periods.*
Propane tanks. *No large ones. Outdoor grill has small tank.*	*Make sure this area is kept clear of any combustibles — especially when using the grill.*
Vehicle and RV use and parking, including lawn mowers, etc. *Parking in front. Mower storage in shed is 40–50 ft from NE corner of house. Plastic children's play house near wooden fence along north side but over 30 ft from house.*	
5. IMMEDIATE LANDSCAPED AREA TO EXTENT OF HOME IGNITION ZONE	
Inspect vegetation clearance and crown separation. *Lot is rather small and the neighboring properties' vegetation is more dense than this one. Trees in back should pose little concern as prevailing winds will not communicate fire toward house.*	*Work with neighbors to improve all three lots to reduce the hazards on this corner. The neighbors behind this address and those on either side might benefit from some clearance that might take place, but the separation of those properties appears to be sufficient.*

FIGURE A.24.2.2 ***Continued***

FIGURE A.24.3.2.5 Mitigating Risk of Leaf- and Needle-Filled Gutters. *(Courtesy of Firewise Communities Program. Photo by G. Johnston.)*

A.24.3.3.1 Identify the wall covering or siding (e.g., wood, vinyl, brick, stucco) and determine the possibility of litter buildup and accumulation on surfaces next to walls. Under low radiant heat levels, vinyl siding is damaged and falls off a wall, which can leave openings for firebrands exposing the interior of the home to ignition through eave vents and other possible openings. Vinyl is difficult to ignite by firebrands or radiant heat, but will sustain combustion when directly contacted by flames.

Hanging ½ in. (12.5 mm) or thicker drywall on the exterior wall studs prior to adding stucco, siding, and so forth can increase the fire rating.

A.24.3.3.3 Windows should be constructed of multi-paned or tempered glass that will resist fracture from intense heat in accordance with 25.7.1, and window screens made from a material that will not allow hot firebrands to enter the home's interior in accordance with 25.7.2.

A.24.3.3.4 Check attic, crawl space, eave, and soffit vents for appropriate protection (e.g., metal screening, noncombustible skirting) to prevent entry of firebrands. Roof turbine vents should be screened to prevent the entry of firebrands into attic spaces.

A.24.3.3.5 Examples of attached structures include decks, lean-to overhangs, patio covers, carports, balconies, fences, and similar structures that could be ignited by convection or firebrands.

A.24.3.3.6 Areas on, next to, or under a structure should be kept free of combustible fuel such as debris, vegetation, wooden furniture, brooms, welcome mats, furniture cushions, gasoline cans, firewood stacks, or piled construction materials. Look for combustible walkways, fencing, or decking attached to the structure, highly combustible fuels adjacent to the structure (e.g., junipers near decks and walkways), combustible materials (e.g., building materials, firewood) stored under decks or adjacent to the structure, animal nests among combustible structural fuels, and landscaping materials (e.g., bark mulch, ground cover plants) near the structure and surrounding plants that might support flaming combustion or that could easily be ignited by firebrands.

A.24.3.4 The structure ignition zone includes the spatially arranged traditional landscaping zones, but can exceed the extent of the property line. Figure A.24.3.4 illustrates the relationship of the structure and immediate landscaped area to the larger structure ignition zone. Within the immediate landscaped area [from the structure to approximately 30 ft (9 m)], often referred to as the defensible space, special consideration should be given that any combustible materials (e.g., plants, lawn furniture, litter, construction materials) should be removed in the 0 ft to 5 ft (0 m to 1.5 m) zone immediately adjacent to the structure and reduced in the zone from 5 ft to 30 ft (1.5 m to 9 m) to minimize the chance for ignition of the structure. The total structure ignition zone includes any spatially arranged landscaping area and can exceed the extent of the property line. The level of risk of ignition within the total area of the ignition zone depends on the type of construction and is further influenced by slope, soils, and other site-specific conditions.

The AHJ should require the development of a landscape plan for the property. Such plans should address four zones around the property as follows:

(1) The most immediate landscaped area is the closest to the house and includes the area encircling the structure for at least 30 ft (9 m) on all sides. The landscaped vegetation within 30 ft (9 m) of structures should be irrigated as needed, cleared of dead vegetation, and/or planted with succulents and other plants (where appropriate) that are low in combustibility potential. Plantings should be limited to carefully spaced, low-growing, low-combustibility species, grasses, and lawns. Shrubs planted next to the structure should be of low combustibility, no more than 18 in. (45 cm) in height, and not planted against the home. The planting bed should be noncombustible (e.g., stone, gravel, bare ground) or irrigated if combustible materials (e.g., bark mulch) are used.
All highly combustible plants, such as junipers and ornamental conifers, should be removed or trimmed and maintained to be ignition resistant. Vegetation deposits (dry leaf and pine litter) that can support surface fire and flames should be removed regularly. Areas of vegetation (natural areas, undeveloped areas, landscaped areas, fields, etc.) that exist near the structure should be evaluated for the possibility of causing ignition of the structure.

(2) Progressing outward from the structure, the types and densities of vegetation should change to reduce the continuity of vegetation fuels. For example, plantings can be done in islands. Trees can be introduced into this zone with careful consideration of their combustibility and continued maintenance to separate crowns and avoid ladder fuels. Tree placement should be planned so that the edge of the canopy of the tree when fully mature is no closer than 10 ft (3 m) to the edge of the structure.

(3) Progressing even farther from the structure, more medium-sized plants and well-spaced trees can be planted in well-spaced groupings to reduce exposure to wildland fire and help maintain privacy. The volume of vegetation (i.e., fuel) should be kept as low as possible or practical.

(4) The most distant area [100 ft to 200 ft (30 m to 60 m)] from the structure determines the extent of the structure ignition zone. Plants in this furthermost area should be

carefully pruned and thinned, and highly combustible vegetation removed. Particular attention should be paid to the types and densities of the vegetation in this area. For example, some vegetation and trees generate more firebrands than others and require additional thinning, removal, or replacement.

A.24.3.4.1 Vegetative fuels include live vegetation, mulch and landscaping materials, slash piles, composting piles, and firewood storage.

Combustible vegetation close enough to windows to provide intense radiant heat or flame contact should be pruned, moved, or substituted with smaller, lower combustibility plants. Figure A.24.3.4.1(a) illustrates the use of low combustibility plants separated by a gravel area next to the foundation.

Mulch is an alternative to noncombustible landscaping materials such as gravel and rock. The size and texture of mulching materials affects its ignition and fire spread potential. Larger organic materials are preferable to smaller materials.

Landscaping with mulch can be acceptable if the mulch is protected with low volume sprinklers to raise the fine fuel moisture levels and offset its combustibility in times of high fire danger. The installation of sprinklers for areas using mulch for landscaping is shown in Figure A.24.3.4.1(b).

Figure A.24.3.4.1(c) describes the physical similarities of the NFDRS fuel models with fire behavior fuel models. See Annex I for fuel model classifications.

A.24.3.4.2 Typical heat and flame sources include, but are not limited to, propane heaters, barbecue cookers, and grills.

A.24.3.4.3 Attachments include, but are not limited to, permanent and temporary construction such as decks, fences, awnings, lean-to buildings; and combustible walkways, fencing, or decking attached to the home.

Figure A.24.3.4.3(a) shows a typical deck where combustible decking materials could result in the gathering of embers next to combustible walls and where the construction and design of decks, balconies, and porches with open spaces underneath could allow leaf and needle debris and embers to collect.

FIGURE A.24.3.4.1(a) Foundation Planting and Landscaping. *(Courtesy of Firewise Communities Program. Photo by K. Clineff.)*

Figure A.24.3.4.3(b) illustrates one method of separating a combustible fence from the structure by the installation of a transitional section of noncombustible (iron) fencing. Similar use of masonry or stone can provide the same fire-resistant separation.

FIGURE A.24.3.4 The Structure Ignition Zone. *(Source: Firewise Communities Program.)*

FIGURE A.24.3.4.1(b) Use of Low Volume Sprinklers in Organic Material. ***(Courtesy of Firewise Communities Program. Photo by G. Johnston.)***

A.24.3.4.4 Examples of such structures include, but are not limited to, hot tubs, utility sheds, outbuildings, detached garages and carports, gazebos, trellises, auxiliary structures, stables, barns and other structures within 30 ft (9 m) of the primary structure, outdoor furniture, and recreational structures (e.g., children's playhouses, swing sets). In some cases, separation distances from lot lines might require the inclusion of neighboring residential structures in the assessment.

A.24.3.4.5 Parking vehicles on areas of dry grasses and fine fuels could result in ignition by hot exhaust systems or firebrands. Also, a fire that originates from a parked vehicle could present an exposure hazard to the primary structure or nearby vegetation. Any dry vegetation beneath the vehicle could cause ignition of the vehicle, which in turn could cause structure ignition; conversely, the ignition of the structure could cause ignition of the vehicle, which could present additional dangers to responding firefighters.

A.24.3.5.1 Evaluation of the vegetative fuels should include the following:

(1) Can vegetative fuels lead surface fire and flames to the structure?
(2) Have ladder fuels been eliminated within the structure ignition zone?
(3) Are tree crowns separated enough to prevent big flames from coming within 30 ft (9 m) of the structure?

A.24.3.5.2 The location (placement) of trees and the separation between them is important to prevent ignition of the structure from radiant heat and to reduce the concentration of leaf fall and needle drop near the structure. Adequate separation and control of ignition potential are factors that affect fire intensity and are dependent on the size, density, and species of trees and vegetation.

Consider using islands of trees that offer separation of trees from the structure and other combustibles. Figure A.24.3.5.2(a) illustrates the use of such planting islands that preserve key trees for aesthetics while providing shade and exposure separation from structures. Figure A.24.3.5.2(b) shows that small planting islands within an expanse of maintained lawn provides both separation and low combustibility protection from ignition close the structure.

A.24.3.5.3 Typical heat and flame sources include, but are not limited to, propane- and charcoal-fired barbecue cookers, heaters, and grills.

A.24.3.5.4 Examples of such structures include, but are not limited to, hot tubs, utility sheds, outbuildings, detached garages and carports, gazebos, trellises, auxiliary structures, stables, barns and other structures between the immediate landscaped area and the extent of the structure ignition zone, outdoor furniture, and recreational structures (children's playhouses, swing sets). In some cases, separation distances from lot lines might require the inclusion of neighboring residential structures in the assessment.

A.24.3.5.5 See A.24.3.4.5.

A.24.3.5.6 Attachments include, but are not limited to, permanent and temporary construction such as decks, fences, awnings, and lean-to buildings.

A.24.4.3 Access and evacuation concerns along with fire suppression capabilities (such as fire station location, water supply, road widths, and grades) are important to overall fire protection and safety. Likewise, vegetation clearance and maintenance along private roadways, driveways, and water supplies are important elements in fire suppression and emergency evacuation. Since these elements do not relate specifically to reducing the ignition potential of the structure, these are covered in Chapters 10 through 18, NFPA 1142, and 17.3.5.3 of NFPA 1.

A.24.4.4 The frequency of wildland fire occurrence will affect the priorities of the mitigation measures and the periodic maintenance schedule of the property being assessed.

A.24.4.5 Chapters 10 through 18 provide guidance on planning and installing fire protection infrastructure.

A.25.1.3.1 The primary structure is that structure for which the property is being used, for example, a single family residence, multiple family residential units consisting of townhouses, apartment buildings, duplex units, commercial buildings, community and activity centers, municipal buildings, offices, farm and ranch structures, and other structures.

A.25.1.3.2 Figure A.25.1.3.2 illustrates how setback is measured.

Physical Description Similarity Chart of NFDRS and FBO Fuel Models

NFDRS Models Realigned to Fuels Controlling Spread Under Severe Burning Conditions

NFDRS Fuel Models	Fire Behavior Fuel Models													
	1	2	3	4	5	6	7	8	9	10	11	12	13	
A Western Annuals	X													Grass
L Western Perennial	X													
S Tundra	X					3rd			2nd					
C Open Pine with Grass		X							2nd					
T Sagebrush with Grass		X			3rd	2nd								
N Sawgrass			X											
B Mature Brush over 6 ft (1.8 m)				X										Shrub
O High Pocosin				X										
F Intermediate Brush					2nd	X								
Q Alaskan Black Spruce						X	2nd							
D Southern Rough						2nd	X							
H Short-Needle Closed (Normal Dead)								X						Timber
R Hardwood Litter (Summer)								X						
U Western Long-Needle Pine									X					
P Southern Long-Needle Pine									X					
E Hardwood Litter (Fall)									X					
G Short-Needle Closed (Heavy Dead)										X				
K Light Slash											X			Slash
J Medium Slash												X		
I Heavy Slash													X	
	Grass				Shrub				Timber			Slash		

FIGURE A.24.3.4.1(c) Sample of a Physical Description Similarity Chart of NFDRS and FBO Fuel Models.

A.25.1.3.3 Noncombustible walls and barriers are effective for deflecting radiant heat and windblown embers from structures. These walls and barriers are usually constructed of noncombustible materials (concrete block, bricks, stone, stucco) or earth with emergency access openings built around a development where 30 ft (9 m) of defensible space is not available. These walls are usually 6 ft (1.8 m) tall, with openings provided every 200 ft (60 m) out into the undisturbed open space. Often there is some maintenance work required in the vegetation along the outside of the wall, so these openings also double as maintenance access points as well as emergency exits for firefighters to escape through when they are working on wildland fires outside the walls in the open space zone. Figure A.25.1.3.3(a) and Figure A.25.1.3.3(b) illustrate the placement of these barriers on the upslope and the downslope near structures. Note that the area on the slope has had a fuel modification treatment that helps reduce the likelihood of fire, heat, and embers igniting the structure.

Note that the drainage provisions shown in Figure A.25.1.3.3(b) prevent damage from storm water runoff and that storm drainage measures have been designed to direct runoff.

A.25.1.3.5 For more information, see NFPA 241. Acceptable methods of fuel treatment include, but are not limited to, prescribed burning by qualified personnel, mowing, pruning, removing, substitution, mulching, converting to compost, and grazing.

A.25.2.1 The provisions of 25.2.1 do not require inherently noncombustible materials to be tested in order to be classified as noncombustible materials.

A.25.2.1(1) Examples of such materials include steel, concrete, masonry, and glass.

A.25.2.3.4 Weathering includes exposure to temperature, moisture, and ultraviolet radiation.

FIGURE A.24.3.4.3(a) Leaf Litter and Needles Collect in Small Spaces. *(Courtesy of Firewise Communities Program.)*

FIGURE A.24.3.4.3(b) Transition Fence Separates Combustible Fence from Structure. *(Courtesy of Firewise Communities Program. Photo by G. Johnston.)*

FIGURE A.24.3.5.2(a) Planting Islands Offer Exposure Protection, Preserve Aesthetics. *(Courtesy of Firewise Communities Program. Photo by G. Johnston.)*

FIGURE A.24.3.5.2(b) Small Planting Islands Within an Expanse of Maintained Lawn. *(Courtesy of Firewise Communities Program. Photo by D. Frazier.)*

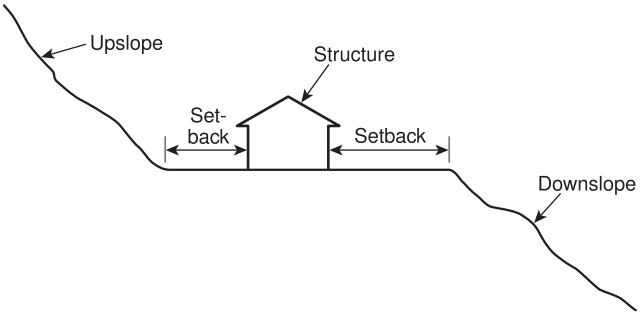

FIGURE A.25.1.3.2 Setback Measurement from the Structure to the Edge of the Predominant Slope.

FIGURE A.25.1.3.3(a) Noncombustible Barrier on the Edge of a Downslope. ***(Courtesy of Firewise Communities Program. Photo by J. Smalley.)***

FIGURE A.25.1.3.3(b) Noncombustible Barrier Behind a House on the Edge of the Upslope. ***(Courtesy of Firewise Communities Program. Photo by J. Smalley.)***

A.25.2.4 Weathering includes exposure to temperature, moisture, and ultraviolet radiation.

A.25.3 Roof covering assemblies are tested for the following three levels of fire exposure:

(1) Severe (Class A)
(2) Moderate (Class B)
(3) Light (Class C)

The following descriptions of the expected performance of roofs meeting those classifications is based on ASTM E108, *Standard Test Methods for Fire Tests of Roof Coverings*:

(1) Class A tests are applicable to roof coverings that are effective against severe test exposure, that afford a high degree of fire protection to the roof deck, that do not slip from position, and that do not present a flying brand hazard.
(2) Class B tests are applicable to roof coverings that are effective against moderate test exposure, that afford a moderate degree of fire protection to the roof deck, that do not slip from position, and that do not present a flying brand hazard.
(3) Class C tests are applicable to roof coverings that are effective against light test exposure, that afford a light degree of fire protection to the roof deck, that do not slip from position, and that do not present a flying brand hazard.

It is important to realize that the roofs are installed in a very specific manner for testing. For this reason, the class ratings should be thought of as roof covering assembly tests. In other words, in order to meet the standard at which it is rated, a roof covering material should be installed in the same manner as is described in its listing.

A.25.3.3(2) The use of a wire mesh screen should be predicated on the presence of other protections against flame intrusion, such as fuel modification in accordance with Chapter 26.

A.25.3.6 The design of ventilation of enclosed roof spaces can be found in the *ASHRAE Handbook — Fundamentals*. Traditional methods of ventilating the roofs of buildings include criteria for ventilated attics using the following:

(1) Cross-ventilation should be provided for each separate space by openings protected against the entrance of rain and snow. For roof decks with a minimum slope of 2:12, ventilation to the underside of the roof deck should be provided at both a low point (soffit) and high point (ridge or gable end) of the roof.
(2) The total net area of ventilation should be at least $1/150$ of the roof area, projected on a horizontal plane. The minimum required net free ventilating area is permitted to be reduced to $1/300$ of the roof area of the space ventilated, provided that a vapor retarder having a transmission rate not exceeding 1 perm in accordance with ASTM E96/E96M, *Standard Test Methods for Water Vapor Transmission of Materials*, is installed on the warm side of the attic insulation and provided that 50 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 36 in. (915 mm) above eave or cornice vents, with the balance of the required ventilation provided by eave or cornice vents.

(3) A minimum of 1 in. (25 mm) of air space should be provided between insulation and roof sheathing where the insulation is located at the plane of the ceiling.
(4) Blocking and bridging should be arranged so as not to interfere with the movement of air.

A.25.4 Projections include exterior balconies, carports, decks, patio covers, unenclosed roofs and floors, and similar architectural appendages and projections.

A.25.5(4) Annex K contains an excerpt from *NFPA 5000®* with additional information about heavy timber construction.

A.25.6.4 Areas that encourage the collection of combustibles include window wells, inside corners of exterior walls and other nooks and crannies where dry leaves, pine needles, and other combustible litter can gather and whose ignition would present a source of flame exposure to the structure. Similar areas include storage areas for lumber, deck furniture, brooms, and such that are open to the outside.

A.25.7.1 Dual pane windows satisfy this requirement.

A.25.7.4 Attic, subfloor, and wall vents should not be installed in a location that faces combustible heavy vegetative fuels, and the location should not increase the moisture load of the space. When exposed to nearby steep slopes, vents can also pose a potential fire hazard due to firebrand showers.

A.25.9 Accessory structures include, but are not limited to, outbuildings, patio covers, gazebos, palapas, and similar outdoor structures.

A.25.12.1 Unprotected heat and flame sources include, but are not limited to, open burning without spark protection, barbecue pits, clay or stone fireplaces, and fire pits. Supervision of burning includes the presence of a source of water or other extinguishing equipment.

A.26.1 A minimum distance for fuel modification should be 30 ft (9 m) from structures. However, in those cases in which property boundaries limit the distance or involve overlapping ignition zones, collaborative efforts between property owners could be necessary to achieve the proper fuel modification.

A.26.2.1 Acceptable methods of fuel treatment include, but are not limited to, prescribed burning by qualified personnel, mowing, pruning, removing, substitution, mulching, converting to compost, and grazing.

Vegetation. Fire resistance in plants depends on many variables, including location, growing conditions, and maintenance. Plants should be chosen that are suitable for the geographic region and the location in the landscape, and plants with similar needs should be grouped to minimize care. Plant characteristics that reduce maintenance needs include the following:

(1) Drought-resistant
(2) Pest-resistant
(3) Native
(4) Noninvasive
(5) Slow-growing
(6) Wind-resistant
(7) Thriving without supplemental fertilizing

High Combustibility (fire-prone, fire-tolerant) Plants. Some plants burn readily because they are adapted to survive in fire-dependent ecosystems and can contain volatile compounds that support fire. Fire-prone plants have traits (i.e., adaptations) that help them to survive fire, such as thick bark or extensive roots. They often contain resins, oils, or waxes that ignite easily and burn intensely. Fire-prone plants will flame, not smolder, when preheated and ignited with a match. They should be removed from Zone 1 of the landscape, as illustrated in Figure A.24.3.4, Figure A.24.3.5.2(a), and Figure A.24.3.5.2(b). Where it is not practical or desirable to remove a fire-prone plant, surrounding it with open space or fire-resistant plants can reduce the hazard. Typical characteristics of fire-prone plants include the following:

(1) Volatile resins, oils, or waxes, indicated by leaves that are aromatic when crushed
(2) Narrow leaves or needles (often evergreen)
(3) Waxy or fuzzy leaves
(4) Accumulation of fine, twiggy, dry, or dead material on the plant or on the ground under the plant
(5) Loose, papery, or thick bark

Low Combustibility Plants. In place of fire-prone plants, landscapers and homeowners should use low combustibility plants, often referred to as fire-resistant plants. Although all plants will burn at some point, wildland fire researchers have shown that some types of plants, including many native plants, resist burning more than others. Additionally, some ornamental plants, when properly irrigated and maintained, are more resistant to fire than others. Low combustibility plants are typically low fuel volume, non-oily, nonresinous plants that are also drought-resistant, have small thick leathery leaves, and produce very little dead plant material. Typical characteristics of fire-resistant plants include the following:

(1) High moisture content in leaves
(2) Low oil or resin content (not aromatic)
(3) Drought tolerance or drought resistance
(4) Minimal seasonal accumulation of dead vegetation, or accumulation of dead leaves that are somewhat resistant to fire because they hold moisture in the soil (large, flat leaves)
(5) Limited foliage and few dead branches
(6) Open or loose branching habit
(7) Easy maintenance and pruning

A.26.2.5 Studies of structural ignition from radiant heat indicate that ignitions are unlikely to occur from burning vegetation beyond 120 ft (36.6 m) from a structure. Therefore, clearing of vegetation and thinning of trees to a distance of 120 ft (36.6 m) from a dwelling — as in a zoned Firewise landscape — will prevent ignition of a structure from the radiant heat from a flame front in a high-risk ecosystem (Cohen and Butler, 1996).

A tree crown spacing of 18 ft (5.5 m) for trees within the Zone 1 defensible space [within 30 ft (9 m) of a structure] will reduce radiant heat to at or below the level where ignition of wood occurs, with closer spacing of trees allowed in the zones further from the structure, as described in Table A.26.2.5. These tree-spacing recommendations apply equally to thinning of mature trees or planting of new trees in high- or extreme-risk areas. Tree spacing is measured between the outer edges of the crowns of mature trees, so new trees must be planted with spacing equivalent to the estimated diameter of the mature crown.

Table A.26.2.5 Recommended Tree Crown Spacing to Prevent Structural Ignition from Wildland Fire Radiant Heat

Zone	Distance from Structure	Recommended Tree Crown Spacing
1	0–30 ft (0–9 m)	18 ft (5.5 m)
2	30–60 ft (9–18 m)	12 ft (3.7 m)
3	60–100 ft (18–30 m)	6 ft (1.8 m)
4	Beyond 100 ft (30 m)	No restrictions

Table A.26.2.5 illustrates general clearance distances for tree crowns. However, these distances can be adjusted by the AHJ in consideration of species of trees and understory vegetation, slope of the property, the proximity to other neighboring structures, overlapping ignition zones, and other site-specific factors.

Annex B Explanation of the Professional Qualifications Standards and Concepts of JPRs (NFPA 1051)

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

B.1 Explanation of the Professional Qualifications Standards and Concepts of Job Performance Requirements (JPRs). The primary benefit of establishing national professional qualifications standards is to provide both public and private sectors with a framework of the job requirements for emergency services personnel. Other benefits include enhancement of the profession, individual as well as organizational growth and development, and standardization of practices.

NFPA professional qualifications standards identify the minimum job performance requirements (JPRs) for specific emergency services levels and positions. The standards can be used for training design and evaluation, certification, measuring and critiquing on-the-job performance, defining hiring practices, job descriptions, and setting organizational policies, procedures, and goals.

Professional qualifications standards for specific jobs are organized by major areas of responsibility defined as *duties*. For example, the firefighter's duties might include education, fire department communications, fireground operations, and preparedness and maintenance, whereas the fire and life safety educator's duties might include and implementation, planning and development, and evaluation. Duties are major functional areas of responsibility within a specific job.

The professional qualifications standards are written as JPRs. JPRs describe the performance required for a specific job and are grouped according to the duties of the job. The complete list of JPRs for each duty defines what an individual must be able to do in order to perform and achieve that duty.

B.2 The Parts of a JPR.

B.2.1 Critical Components. The JPR comprises three critical components, which are as follows:

(1) Task that is to be performed, partial description using an action verb *(See Figure B.2.1 for examples of action verbs used in the creation of JPRs.)*
(2) Tools, equipment, or materials that are to be provided to complete the task
(3) Evaluation parameters and performance outcomes

Table B.2.1 gives an example of the critical components of a JPR.

B.2.1.1 The Task to Be Performed. The first component is a concise statement of what the person is required to do. A significant aspect of that phrase is the use of an action verb, which sets the expectation for what is to be accomplished.

B.2.1.2 Tools, Equipment, or Materials That Should Be Provided for Successful Completion of the Task. This component ensures that all the individuals completing the task are given the same tools, equipment, or materials when they are being evaluated. Both the individual and the evaluator will know what should be provided in order for the individual to complete the task.

B.2.1.3 Evaluation Parameters and Performance Outcomes. This component defines — for both the performer and the evaluator — how well the individual should perform each task. The JPR guides performance toward successful completion by identifying evaluation parameters and performance outcomes. This portion of the JPR promotes consistency in evaluation by reducing the variables used to gauge performance.

B.2.2 Requisite Knowledge and Skills. In addition to these three components, a JPR describes requisite knowledge and skills. As the term *requisite* suggests, these are the necessary knowledge and skills the individual should have prior to being able to perform the task. Requisite knowledge and skills are the foundation for task performance.

B.2.3 Examples. With the components and requisites combined, a JPR might be similar to the two examples in B.2.3.1 and B.2.3.2.

B.2.3.1 Example: Firefighter I. Perform overhaul at a fire scene, given PPE, attack line, hand tools, flashlight, and an assignment, so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished.

Table B.2.1 Example of a JPR

Component	Example
(1) Task to be performed	(1) Perform overhaul at a fire scene,
(2) Tools, equipment, or materials	(2) given PPE, attack line, hand tools, flashlight, and an assignment,
(3) Evaluation parameters and performance outcomes	(3) so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished.

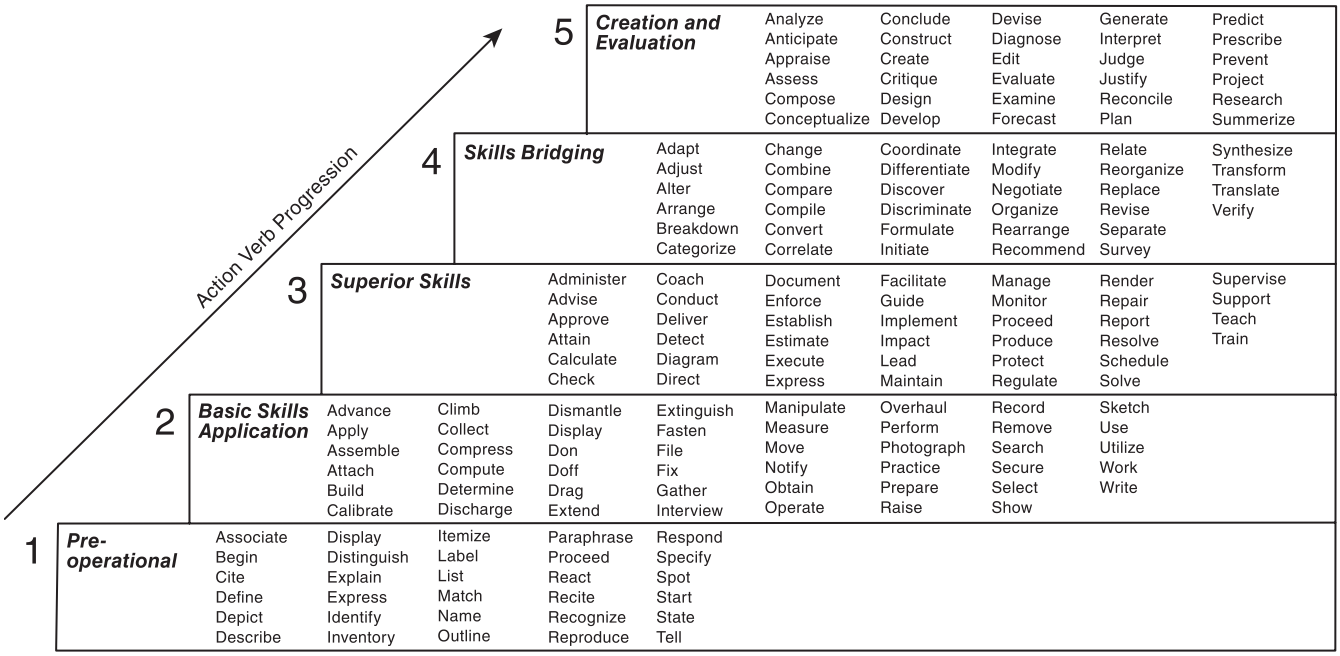

FIGURE B.2.1 Examples of Action Verbs.

(A) Requisite Knowledge. Knowledge of types of fire attack lines and water application devices for overhaul, water application methods for extinguishment that limit water damage, types of tools and methods used to expose hidden fire, dangers associated with overhaul, signs of area of origin or signs of arson, and reasons for protection of fire scene.

(B) Requisite Skills. The ability to deploy and operate an attack line; remove flooring, ceiling, and wall components to expose void spaces without compromising structural integrity; apply water for maximum effectiveness; expose and extinguish hidden fires in walls, ceilings, and subfloor spaces; recognize and preserve signs of area of origin and arson; and evaluate for complete extinguishment.

B.2.3.2 Example: Fire and Life Safety Educator II. Prepare a written budget proposal for a specific program or activity, given budgetary guidelines, program needs, and delivery expense projections, so that all guidelines are followed and the budget identifies all the program needs.

(A) Requisite Knowledge. Knowledge of budgetary process; governmental accounting procedures; federal, tribal, state, and local laws; organizational bidding process; and organization purchase requests.

(B) Requisite Skills. The ability to estimate project costs; complete budget forms; requisition/purchase orders; collect, organize, and format budgetary information; complete program budget proposal; and complete purchase requests.

B.3 Potential Uses for JPRs.

B.3.1 Certification. JPRs can be used to establish the evaluation criteria for certification at a specific job level. When used for certification, evaluation should be based on the successful completion of JPRs.

The evaluator should verify the attainment of requisite knowledge and skills prior to JPR evaluation. Verification could be through documentation review or testing.

The individual seeking certification should be evaluated on the completion of the JPRs. The individual should perform the task and be evaluated based on the evaluation parameters and performance outcomes. This performance-based evaluation is based on practical exercises for psychomotor skills and written examinations for cognitive skills.

Psychomotor skills are those physical skills that can be demonstrated or observed. Cognitive skills cannot be observed but rather are evaluated on how an individual completes a task (process-oriented) or a task's outcome (product-oriented).

Performance evaluation requires that individuals be given the tools, equipment, or materials listed in the JPR in order to complete the task.

Table B.3.1 provides examples of how assessment methodologies can be utilized by a certifying body.

Table B.3.1 Assessment Methodology Sample Utilization

Assessment of…	How Assessed?	How Scored?	Methodology is Likely…
Knowledge/facts *Action verb examples:* identify, define, list, cite, state, choose, name	A written test in which the candidate is required to provide specific answers to specific questions related to the JPRs *Examples:* multiple choice, sequencing, true/false, fill-in-the-blank	Responses are scored in relation to the answer that has been determined to be correct.	Cognitive
A manipulative skill in real time *Action verb examples*: climb, build, perform, raise, haul, don	A skills test to evaluate a candidate's ability to perform physical tasks in real time *Examples:* donning SCBA, raising ladders, tying rescue knots	The directly observed performance with the correct performance outcome of the skill is normally indicated as part of the yes/no or pass/fail scoring checklist.	Psychomotor (skills)
A cognitive skill that cannot be directly observed; the application of knowledge to yield a product *Action verb examples:* develop, create, write	A work product created by the candidate usually outside of the classroom setting *Examples*: creating a budget, report, proposal, lesson plan, incident action plan	Scoring rubric for expected responses evaluating how a candidate completes the task outcome after submission. Used to differentiate consistently between different degrees of candidate performance.	Product
A mental activity to perform a cognitive skill in real time that cannot be directly observed *Action verb examples:* inspect, investigate	Candidate performs the activity in the presence of the evaluator; the verbalization of mental thought "First, I…, then I…," etc. *Examples:* performing an inspection, conducting an investigation	Scoring rubric with questions and expected verbal responses. Used to differentiate consistently between different degrees of candidate performance.	Process
Documentation of the candidate's experience, training, and education against all JPRs *Action verb examples*: attend, participate, testify	A list of acceptable documents or items for each and every JPR *Examples:* coursework at training or college, participation in a certain number of investigations, testifying at court	This portfolio is evaluated using criteria that have been identified by the agency.	Portfolio

B.3.2 Curriculum Development and Training Design and Evaluation. The statements contained in this document that refer to job performance were designed and written as JPRs. Although a resemblance to instructional objectives might be present, these statements should not be used in a teaching situation until after they have been modified for instructional use.

JPRs state the behaviors required to perform specific skills on the job, as opposed to a learning situation. These statements should be converted into instructional objectives with behaviors, conditions, and the degree to be measured within the educational environment.

While the differences between JPRs and instructional objectives are subtle in appearance, their purposes differ. JPRs state what is necessary to perform the job in practical and actual experience. Instructional objectives, on the other hand, are used to identify what students should do at the end of a training session and are stated in behavioral terms that are measurable in the training environment.

By converting JPRs into instructional objectives, instructors would be able to clarify performance expectations and avoid confusion caused by the use of statements designed for purposes other than teaching. Instructors would also be able to add jurisdictional elements of performance into the learning objectives as intended by the developers.

Requisite skills and knowledge could be converted into enabling objectives, which would help to define the course content. The course content would include each item of the requisite knowledge and skills ensuring that the course content supports the terminal objective.

B.3.2.1 Example: Converting a Firefighter I JPR into an Instructional Objective. The instructional objectives are just two of several instructional objectives that would be written to support the terminal objective based on the JPR.

JPR: Perform overhaul at a fire scene, given PPE, attack line, hand tools, flashlight, and an assignment, so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished.

Instructional Objective (Cognitive): The Firefighter I will identify and describe five safety considerations associated with structural integrity compromise during overhaul as part of a written examination.

Instructional Objective (Psychomotor): The Firefighter I will demonstrate the designed use of tools and equipment during overhaul to locate and extinguish hidden fires without compromising structural integrity.

B.3.2.2 Example: Converting a Fire and Life Safety Educator II JPR into an Instructional Objective. This instructional objectiveis just one of several instructional objectives that could be written to support the terminal objective based on the JPR.

JPR: Prepare a written budget proposal for a specific program or activity, given budgetary guidelines, program needs, and delivery expense projections, so that all guidelines are followed and the budget identifies all program needs.

Instructional Objective (Cognitive): The Fire and Life Safety Educator II will list and describe the bidding process for the purchase of a published program using budgetary guidelines, program needs, and the guidelines established by local organizational procedures as part of a written examination.

Instructional Objective (Psychomotor): The Fire and Life Safety Educator II will lead in the purchase of a specific fire and life safety educational program by following the bidding process to completion, using local organizational guidelines, including budgetary procedures, program needs, and delivery expense projections.

B.4 Other Uses for JPRs. While the professional qualifications standards are used to establish minimum JPRs for qualification, they have been recognized as guides for the development of training and certification programs, as well as a number of other potential uses. These areas might include the following:

(1) *Employee Evaluation/Performance Critiquing.* The professional qualifications standards can be used as a guide by both the supervisor and the employee during an evaluation. The JPRs for a specific job define tasks that are essential to perform on the job, as well as the evaluation criteria to measure completion of the tasks.

(2) *Establishing Hiring Criteria.* The professional qualifications standards can be helpful in a number of ways to further the establishment of hiring criteria. The authority having jurisdiction (AHJ) could simply require certification at a specific job level — for example, Firefighter I. The JPRs could also be used as the basis for pre-employment screening to establish essential minimal tasks and the related evaluation criteria. An added benefit is that individuals interested in employment can work toward the minimal hiring criteria at local colleges.

(3) *Employee Development.* The professional qualifications standards can be practical for both the employee and the employer in developing a plan for the employee's growth within the organization. The JPRs and the associated requisite knowledge and skills can be used as a guide to determine the additional training and education required for the employee to master the job or profession.

(4) *Succession Planning.* Succession planning addresses the efficient placement of individuals into jobs in response to current needs and anticipated future needs. A career development path can be established for targeted employees to prepare them for growth within the organization. The JPRs and requisite knowledge and skills could then be used to develop an educational path to aid in the employee's advancement within the organization or profession.

(5) *Establishing Organizational Policies, Procedures, and Goals.* The professional qualifications standards can be functional for incorporating policies, procedures, and goals into the organization or agency.

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Annex C Overview of the Job Performance Requirements (NFPA 1051)

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

C.1 Overview of JPRs for Wildland Firefighter, Wildland Fire Officer, Wildland/Urban Interface Specialist, and Wildland/Urban Interface Coordinator. Table C.1(a) provides the user with an overview of the JPRs and shows the progression of the Wildland Firefighter levels found in the document. Table C.1(b) provides the user with an overview of the JPRs and shows the progression of the Wildland Fire Officer levels found in the document. Table C.1(c) provides the user with an overview of the JPRs and shows the progression of the Wildland/Urban Interface Protection Specialist and Coordinator levels found in the document. It is intended to assist the user with the implementation of the requirements and the development of training programs using the JPRs.

Table C.1(a) Overview of JPRs for Wildland Firefighter

Wildland Firefighter I	Wildland Firefighter II
General	
4.2 General. The Wildland Firefighter I shall meet the JPRs defined in Sections 4.2 through 4.6.	**5.1 General.** Prior to progressing to the Wildland Firefighter II level, the Wildland Firefighter I shall meet the JPRs defined in Sections 5.1 through 5.5.
Human Resource Management	
4.3 Human Resource Management. No JPRs at this level.	**5.2 Human Resource Management.** **5.2.1** Evaluate the readiness of assigned crew members, given a wildland fire, an assigned task, and AHJ equipment standards, so that crew members are equipped and supplied for suppression duties. **5.2.2** Brief assigned personnel, given an assignment, supporting information, and equipment requirements, so that the personnel are informed of specific tasks, standards, safety, operational, and special interest area considerations. **5.2.3** Lead wildland firefighters in the performance of a task, given an assignment and performance standards, so that the task is completed within the standards in accordance with AHJ guidelines.
Preparedness	
4.4 Preparedness. **4.4.1 Definition of Duty.** Activities in advance of fire occurrence to ensure safe and effective suppression action. **4.4.2** Maintain assigned personal protective equipment, given the standard equipment issue, so that the equipment is serviceable and available for use on the fireline and defects are recognized and reported to the supervisor. **4.4.3** Maintain assigned suppression hand tools and equipment, given tools and equipment and AHJ maintenance specifications, so that assigned equipment is maintained and serviceable and defects are recognized and reported to the supervisor. **4.4.4** Maintain personal gear kit, given a deployment and AHJ policies, so that mobilization response readiness meets AHJ requirements.	**5.3 Preparedness.** **5.3.1 Definition of Duty.** Responsibilities in advance of fire occurrence to ensure that tools, equipment, and supplies are fire ready. **5.3.2** Maintain chain saws and portable pumps as designated by the AHJ, given AHJ maintenance specifications, supplies, and tools, so that equipment is maintained and serviceable and defects are recognized and repaired. **5.3.3** Inspect tools and equipment, given AHJ specifications, so that suitability of the tools and equipment for fire use is ensured.
Mobilization	
4.5 Mobilization. No JPRs at this level.	**5.4 Mobilization.** No JPRs at this level.
Suppression	
4.6 Suppression. **4.6.1 Definition of Duty.** All activities to confine and extinguish a wildland fire, beginning with dispatch. **4.6.2** Assemble and prepare for response, given an assembly location, an assignment, incident location, mode of transportation, and the time requirements, so that arrival at the incident with the required personnel and equipment meets AHJ guidelines.	**5.5 Suppression.** **5.5.1 Definition of Duty.** All activities to contain and extinguish a wildland or wildland/urban interface fire beginning with dispatch. **5.5.2** Select fireline construction methods, given a wildland fire and line construction standards, so that the technique used is compatible with the conditions and meets AHJ standards.

(continues)

Table C.1(a) *Continued*

Wildland Firefighter I	Wildland Firefighter II
4.6.3 Recognize hazards and unsafe situations, given a wildland or wildland/urban interface fire and the standard safety policies and procedures of the AHJ, so that the hazard(s) and unsafe condition(s) are communicated to the supervisor and appropriate action is taken.	**5.5.3** Reduce the risk of fire exposure to improved properties, given a wildland or wildland/urban interface fire and available tools and equipment, so that improvements are protected from fire.
4.6.4 Construct a fireline, given a wildland fire, AHJ line construction standards, suppression tools, water or other suppression agents, and equipment, so that the fireline conforms to the construction standard.	**5.5.4** Operate a chain saw, given an assignment at a wildland fire and operational standards, so that the assignment is completed in a safe manner.
4.6.5 Secure the fireline, given a wildland fire and suppression tools, water or other suppression agents, and equipment, so that burning materials and unburned fuels that threaten the integrity of the fireline are located and abated.	**5.5.5** Operate water delivery equipment, given an assignment at a wildland fire and operational standards, so that the proper equipment is selected, desired nozzle pressure is attained, and flow is maintained.
4.6.6 Describe the methods to reduce the threat of fire exposure to improved properties given a wildland/urban interface fire, suppression tools, and equipment so that improvements are protected.	**5.5.6** Operate a portable radio, given AHJ policies, so that communication is clear, concise, and accurate.
4.6.7 Mop up fire area, given a wildland fire, suppression tools, and water or other suppression agents and equipment, so that burning fuels that threaten escape are located and extinguished.	**5.5.7** Secure the area of suspected fire origin and associated evidence, given a wildland fire and AHJ procedures, so that all evidence or potential evidence is protected from damage or destruction and reported to a supervisor.
4.6.8 Patrol the fire area, given a wildland fire, suppression tools, and equipment, so that containment of the fire area is maintained.	**5.5.8** Serve as a lookout, given an assignment at a wildland fire as per AHJ procedures, so that firefighters are updated or warned when conditions change.

Table C.1(b) Overview of JPRs for Wildland Fire Officer

Wildland Fire Officer I	Wildland Fire Officer II
General	
6.1 General. Prior to progressing to the Wildland Fire Officer I level, the Wildland Firefighter II shall meet the JPRs defined in Sections 6.1 through 6.5.	**7.1 General.** Prior to progressing to the Wildland Fire Officer II level, the Wildland Fire Officer I shall meet the JPRs defined in Sections 7.1 through 7.5.
Human Resource Management	
6.2 Human Resource Management. **6.2.1 Definition of Duty.** Lead and supervise human resources to accomplish assignments in a safe and efficient manner. **6.2.2** Evaluate assigned personnel, given AHJ personnel performance standards, so that members are capable of performing assigned tasks and individuals not meeting the standards are identified and that corrective actions are taken. **6.2.3** Verify the qualifications of assigned personnel, given an assignment or task, so that individual firefighter qualifications are appropriate, deficiencies are identified and reported, and corrective action is taken. **6.2.4** Provide for first aid or medical treatment, given an injured or ill firefighter and AHJ policies and procedures, so that treatment is provided, appropriate notifications are made, and required administrative reports are completed. **6.2.5** Evaluate job performance of assigned personnel, given AHJ standards, so that the information is provided to the individual being evaluated and all required forms are completed.	**7.2 Human Resource Management.** No JPRs at this level.
Preparedness	
6.3 Preparedness. **6.3.1** Ensure overall readiness of assigned crew, vehicle, and equipment, given AHJ standards, policies, and procedures, so that operational readiness is maintained.	**7.3 Preparedness.** No JPRs at this level.
Mobilization	
6.4 Mobilization. **6.4.1 Definition of Duty.** Collect AHJ dispatch information, assemble assigned resources, travel to designated location, and check-in. **6.4.2** Obtain complete information from AHJ dispatch, given AHJ standard operating procedures, so that travel route, assignment, time needed, and point of contact are determined.	**7.4 Mobilization.** **7.4.1 Definition of Duty.** Supervise multiple resources, given an assignment and resources, so that they are mobilized in accordance with AHJ policies and procedures.
Suppression	
6.5 Suppression. **6.5.1 Definition of Duty.** Supervision of a single resource involved in wildland fire suppression, and when first on scene, assume command of initial attack incident, until relieved. **6.5.2** Size up an incident to formulate an incident action plan, given a wildland fire and available resources, so that incident objectives are set and strategies and tactics are applied according to AHJ policies and procedures. **6.5.3** Develop an initial report on conditions, given incident information and AHJ policies and procedures, so that required incident information is communicated to the AHJ communications center and updated as needed.	**7.5 Suppression.** **7.5.1 Definition of Duty.** Command multiple resources in the suppression of a wildland fire that exceeds the qualification level of the Wildland Fire Officer I. **7.5.2** Develop, validate, modify, and document an incident action plan for each operational period, given an action plan, so that strategies and tactics are applied according to AHJ policies and procedures in accordance with incident objectives. **7.5.3** Evaluate the need for and location of incident facilities, given AHJ policies and procedures, so that the location is sited, identified, and communicated to personnel.

(continues)

Table C.1(b) *Continued*

Wildland Fire Officer I	Wildland Fire Officer II
6.5.4 Establish an incident command post (ICP), given AHJ policies and procedures, so that the location is identified and communicated to personnel.	**7.5.4** Maintain incident records, given AHJ policies and procedures and applicable forms, so that required information is documented.
6.5.5 Deploy resources to suppress a wildland fire, given an assignment, personnel, equipment, and AHJ policies and procedures, so that appropriate suppression actions are taken and safety of personnel is ensured.	**7.5.5** Obtain incident information from the outgoing incident commander, given a wildland fire, so that the transfer of command is completed and the new incident commander has the information necessary to operate.
6.5.6* Maintain incident records, given AHJ policies and procedures and applicable forms, so that required information is documented.	
6.5.7 Evaluate incident conditions, given a wildland fire, so that progress, changes in fuels, topography, weather, fire behavior, personnel safety, and other significant events are identified and communicated to the supervisor and to assigned and adjoining personnel.	
6.5.8 Communicate with supervisors, crew members, and adjoining personnel, given a wildland fire incident, so that progress, changes in conditions, fire behavior, and other significant events are current.	
6.5.9 Provide for the logistical needs of assigned resources, given a wildland fire, assigned resources, and AHJ policies and procedures, so that personnel and equipment needs are met in accordance with AHJ policies.	
6.5.10 Analyze incident needs, given assigned resources and incident status, so that additional resources needed are ordered or excess resources are identified and released in accordance with AHJ policies and procedures.	
6.5.11 Provide incident information to the incoming replacement incident commander, given a wildland fire, so that the transfer of command is completed and the new incident commander has the information necessary to operate.	
6.5.12 Deploy resources to mop up a wildland fire, given a wildland fire, personnel, equipment, and AHJ policies and procedures, so that appropriate mop-up actions are taken.	
6.5.13 Complete wildland fire suppression operations, given a wildland fire that has been controlled and mopped up in accordance with AHJ policies and procedures, so that the fire area is extinguished and resources are returned to service.	
6.5.14 Respond to requests for incident information, given AHJ policies and procedures, so that response is accurate, within the policies, and provided in a time-sensitive manner.	
6.5.15 Complete personnel time and equipment use records, given AHJ policies, procedures, and related forms, so that the information is accurate and in compliance with standards established by the AHJ.	
6.5.16 Prepare final incident reports, given an extinguished wildland fire and AHJ policies and procedures, so that the reports are complete, accurate, and submitted on time.	