

NFPA®

909

Code for the Protection of
Cultural Resource Properties—
Museums, Libraries, and
Places of Worship

2021



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NFPA® 909

Code for the

Protection of Cultural Resource Properties — Museums, Libraries, and Places of Worship

2021 Edition

This edition of NFPA 909, *Code for the Protection of Cultural Resource Properties — Museums, Libraries, and Places of Worship*, was prepared by the Technical Committee on Cultural Resources. It was issued by the Standards Council on November 2, 2020, with an effective date of November 22, 2020, and supersedes all previous editions.

This document has been amended by one or more Tentative Interim Amendments (TIAs) and/or Errata. See "Codes & Standards" at www.nfpa.org for more information.

This edition of NFPA 909 was approved as an American National Standard on November 22, 2020.

Origin and Development of NFPA 909

Since the first NFPA document was issued on this subject in 1948 (*Protecting Our Heritage*), the Technical Committee on Cultural Resources has developed a series of recommended practices to govern these specialized buildings and sites. Five separate documents governing libraries, museums, places of worship, historic structures, and historic sites existed in 1996.

In each case, the documents were written as recommended practices or guides. There were a number of reasons why the documents were developed and maintained as such. One reason had to do with the delicate nature of the facilities and sites. Unlike commercial buildings, "new" historic structures are not constructed. In other words, all the historic structures are existing, making retrofit of many common fire protection systems impractical to install in some cases. In addition, retrofit of fire alarm systems or sprinkler systems can be cost prohibitive for a smaller, historically significant structure. Unfortunately, many of the readily available solutions to correct fire protection problems in other types of existing facilities might not be practical in the case of older, historic buildings.

A number of philosophical issues centered on the methods used to protect cultural resource facilities. One main item dealt with a structured fire prevention program that is carried out by the facility operator. The span of these protection schemes must account for structures ranging from single-family dwellings to public libraries to public museums.

In 1997, work on a comprehensive project to merge the five separate documents was completed. A new standard, NFPA 909, *Standard for the Protection of Cultural Resources, Including Museums, Libraries, Places of Worship, and Historic Properties*, consolidated the fire protection requirements for libraries, museums, and places of worship into one document. This milestone recognized that many traditional fire protection solutions do not work unless significant resources are applied to a given problem or situation. This same philosophy was carried over to the 2001 edition of NFPA 909. A continued focus of the 2001 edition was the need to have a structured fire prevention program that would be carried out by the facility operator.

The status of the 2001 edition was upgraded to a code, rather than a standard, in recognition of the wide range of requirements that exist in NFPA 909. Specifically, sections of NFPA 909 stipulate when and where certain requirements are mandatory. In addition to those changes, the chapter on historic structures and buildings was completely revised. That chapter defers to NFPA 914, *Code for Fire Protection of Historic Structures*.

The 2005 edition of NFPA 909 underwent a major reorganization in accordance with the *Manual of Style for NFPA Technical Committee Documents*. Technical changes included the deletion of a previous annex on fire risk assessment in heritage premises in favor of reference to more current approaches to the subject. Other changes included the type of automatic sprinklers to be used in cultural



resource properties and the activation of fire dampers. In addition, emergency action checklists and inspection forms were added for places of worship.

The 2010 edition of NFPA 909 was a complete revision that reflected the addition of security to the committee's scope. Technical changes included the addition of "hazards other than fire" to the goals and objectives; required a vulnerability assessment; added new chapters on planning for protection, emergency operations, and security; and included a new annex describing commonly used premises protection systems and equipment.

Building on the myriad changes made for the 2010 edition, the committee added new provisions to the 2013 edition and clarified many requirements. The application and use of certain materials such as noncombustible and limited-combustible materials were revised to note how they are to be used rather than simply defining them. A number of changes were accepted that centered on the operational features of the facility — a critical component in these occupancies. The changes included determining the loss thresholds that a property can tolerate, maintaining a line of communication with the authority having jurisdiction, and clarifying the list of elements that the vulnerability assessment needs to consider. An expanded set of requirements was added to assist the governing body in executing supplemental inspections of automatic sprinkler systems with regard to concerns over interior corrosion.

Updates for the 2017 edition included expanded provisions for outdoor collections and archaeological sites and their protection against wildfire; further clarification of sprinkler system corrosion protection criteria; mandated integrated system testing per NFPA 4, *Standard for Integrated Fire Protection and Life Safety System Testing*; and the addition of numerous events to Annex B, Fire Experience in Cultural Properties.

Revisions for the 2021 edition include an added reference to the emergency action plan requirements of NFPA 101 to Chapter 6, as well as the addition of cyber attack and active shooter events to the vulnerability assessment criteria in Chapter 8. References to ASTM E119 and UL 263 have also been added for the determination of fire resistance rating and NFPA 241 for construction, alteration, and demolition operations in Chapter 9. Other revisions include expanded requirements for protection of wet collections, added guidance in Annex A on the selection of fire protection contractors, updated loss data and illustrative fires in Annex B, new information in Annex M on the second phase of the project addressing the effect of extinguishing agents on cultural resource materials, and updated referenced publications and extracts.

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Committee Scope: This Committee shall have primary responsibility for documents on fire safety and security for libraries, museums, places of worship, and historic structures and their contents, but shall not overlap the provisions of NFPA 101, *Life Safety Code*, and NFPA 731, *Standard for the Installation of Electronic Premises Security Systems*.

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Museums, Libraries, and Places of Worship**

2021 Edition

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

Chapter 1 Administration**1.1 Scope.**

1.1.1 This code describes principles and practices of protection for cultural resource properties (including, but not limited to, museums, libraries, and places of worship), their contents, and collections, against conditions or physical situations with the potential to cause damage or loss.

1.1.2 This code covers ongoing operations and rehabilitation and acknowledges the need to preserve culturally significant and character-defining building features and sensitive, often irreplaceable, collections and to provide continuity of operations.

1.1.3* Principles and practices for life safety in cultural resource properties are outside the scope of this code. Where this code includes provisions for maintaining means of egress and controlling occupant load, it is to facilitate the evacuation of items of cultural significance, allow access for damage limitation teams in an emergency, and prevent damage to collections

through overcrowding or as an unintended consequence of an emergency evacuation.

1.1.4 Library and museum collections that are privately owned and not open to the public shall not be required to meet the requirements of this code.

1.2* Purpose. The purpose of this code shall be to prescribe a comprehensive program, consistent with the mission of the organization, that protects cultural resource properties and their contents and collections from conditions or physical situations having the potential to cause damage or loss.

1.3* Application. This code shall apply to culturally significant structures, spaces within other buildings used for culturally significant purposes, and their contents.

1.3.1 New Cultural Resource Property Occupancies. The requirements of this code shall apply to the following:

- (1) New buildings or portions thereof occupied as a cultural resource property
- (2) Additions made to a cultural resource property
- (3) Existing buildings or portions thereof upon change of occupancy to a cultural resource property

1.3.2 Existing Cultural Resource Property Occupancies.

1.3.2.1 An existing building in which a cultural resource property occupancy is housed that was established prior to the effective date of this code shall be permitted to be approved for continued use if it conforms to or is made to conform to provisions of this code to the extent that, in the opinion of the authority having jurisdiction, reasonable protection is provided and maintained.

1.3.2.2 The requirements of this code shall apply when any of the following occur:

- (1)* Changes in the construction classification, occupancy of a space, or the way a space is used
- (2) Alterations, renovations, or modifications that affect the performance of existing fire protection features and systems, including fixed fire protection, detection and suppression, compartmentation, electronic premises security systems, and physical security devices
- (3) Changes that add new sources of ignition or change the nature of the fire load
- (4)* Modifications to operations that increase the vulnerability to deliberate acts by third parties, staff, or visitors; natural disasters; or other reasonably foreseeable hazards
- (5) Changes in the contents that affect the performance of existing fire protection features and systems, including fixed fire protection, detection and suppression, compartmentation, electronic premises security systems, physical security devices, or features intended to mitigate the effects of other conditions or physical situations with the potential to cause damage or loss

1.3.2.3 Libraries, museums, and places of worship housed in historic structures shall also comply with the requirements of NFPA 914.

1.4 Equivalency.

1.4.1* Nothing in this code is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, or effectiveness, provided that the following conditions are met:

- (1) Technical documentation is submitted to the authority having jurisdiction to demonstrate equivalency or superiority.
- (2) The system, method, or device is acceptable to the authority having jurisdiction.

1.4.2 Cultural resource properties or portions of such structures that do not strictly comply with this code shall be considered to be in compliance if it is shown that equivalent protection is provided or that in the opinion of the authority having jurisdiction no unacceptable risk is created or continued through noncompliance.

1.4.3 A designer capable of applying more complete and rigorous analysis to evaluate and address special or unusual problems shall have latitude in the development of the applicable design.

1.4.3.1 In such cases, the designer shall be responsible for demonstrating the validity of the approach.

1.4.3.2 This code shall not eliminate the need for competent engineering judgment.

1.4.3.3 This code shall not be intended to be used as a design handbook.

1.5 Compliance Options.

1.5.1 General. Building design, protection features, and protection programs meeting the collection preservation, building preservation, and continuity of operations goals and objectives of Chapter 4 shall comply with the provisions of 1.5.2, 1.5.3, or both.

1.5.2 Prescriptive-Based Options. A prescriptive-based design shall be in accordance with Chapters 1 through 8, Sections 9.1 through 9.12, Section 9.14, and Chapters 10 through 15 of this code.

1.5.3 Performance-Based Options. A performance-based design shall be in accordance with Chapters 1 through 8, Sections 9.1 through 9.11, Section 9.13, and Chapters 10 through 15 of this code.

1.5.4 Management Operational Systems. Management operational systems that comply with Chapter 10 of this code shall be permitted as an element of a prescriptive-based or performance-based solution.

1.6* Enforcement. This code shall be administered and enforced by the authority having jurisdiction designated by the governing authority. (See Annex F for sample wording for enabling legislation.)

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this code 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 4, *Standard for Integrated Fire Protection and Life Safety System Testing*, 2021 edition.

NFPA 10, *Standard for Portable Fire Extinguishers*, 2018 edition.

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam*, 2021 edition.

NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*, 2021 edition.

NFPA 12A, *Standard on Halon 1301 Fire Extinguishing Systems*, 2021 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2019 edition.

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

NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*, 2017 edition.

NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems*, 2019 edition.

NFPA 17, *Standard for Dry Chemical Extinguishing Systems*, 2021 edition.

NFPA 17A, *Standard for Wet Chemical Extinguishing Systems*, 2021 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, 2020 edition.

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

NFPA 31, *Standard for the Installation of Oil-Burning Equipment*, 2020 edition.

NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials*, 2021 edition.

NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Film*, 2019 edition.

NFPA 42, *Code for the Storage of Pyroxylin Plastic*, 2002 edition.

NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals*, 2019 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 70®, *National Electrical Code®*, 2020 edition.

NFPA 72®, *National Fire Alarm and Signaling Code®*, 2019 edition.

NFPA 75, *Standard for the Fire Protection of Information Technology Equipment*, 2020 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2021 edition.

NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*, 2021 edition.

NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations*, 2021 edition.

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

NFPA 110, *Standard for Emergency and Standby Power Systems*, 2019 edition.

NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*, 2019 edition.

NFPA 232, *Standard for the Protection of Records*, 2017 edition.

NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*, 2019 edition.

NFPA 259, *Standard Test Method for Potential Heat of Building Materials*, 2018 edition.

NFPA 265, *Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile or Expanded Vinyl Wall Coverings on Full Height Panels and Walls*, 2019 edition.

NFPA 286, *Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*, 2019 edition.

NFPA 289, *Standard Method of Fire Test for Individual Fuel Packages*, 2019 edition.

NFPA 505, *Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations*, 2018 edition.

NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*, 2019 edition.

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

NFPA 731, *Standard for the Installation of Premises Security Systems*, 2020 edition.

NFPA 750, *Standard on Water Mist Fire Protection Systems*, 2019 edition.

NFPA 780, *Standard for the Installation of Lightning Protection Systems*, 2020 edition.

NFPA 914, *Code for the Protection of Historic Structures*, 2019 edition.

NFPA 1123, *Code for Fireworks Display*, 2018 edition.

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

NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*, 2021 edition.

NFPA 2010, *Standard for Fixed Aerosol Fire-Extinguishing Systems*, 2020 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 E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, 2020.

ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, 2019.

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

ASTM E1591, *Standard Guide for Obtaining Data for Fire Growth Models*, 2013.

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 E2965, *Standard Test for Determination of Low Levels of Heat Release Rate for Materials and Products Using an Oxygen Consumption Calorimeter*, 2017.

ASTM E3082, *Standard Test Methods for Determining the Effectiveness of Fire Retardant Treatments for Natural Christmas Trees*, 2017e1.

2.3.2 ICC Publications. International Code Council, 500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001.

ICC A117.1, *Accessible and Usable Buildings and Facilities*, 2017.

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

UL 263, *Fire Tests of Building Construction and Materials*, 2011, revised 2019.

UL 294, *Access Control System Units*, 2018.

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

2.3.4 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*, 2018 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2019 edition.

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

NFPA 72®, *National Fire Alarm and Signaling Code®*, 2019 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2018 edition.

NFPA 101®, *Life Safety Code®*, 2018 edition.

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

NFPA 731, *Standard for the Installation of Electronic Premises Security Systems*, 2017 edition.

NFPA 805, *Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants*, 2015 edition.

NFPA 914, *Code for the Protection of Historic Structures*, 2019 edition.

NFPA 921, *Guide for Fire and Explosion Investigations*, 2017 edition.

NFPA 1141, *Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas*, 2017 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*, 2018 edition.

NFPA 5000®, *Building Construction and Safety Code®*, 2018 edition.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this code. 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* Code. A standard that is an extensive compilation of provisions covering broad subject matter or that is suitable for adoption into law independently of other codes and standards.

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 Addition. An increase in the building area, aggregate floor area, height, or number of stories of a structure.

3.3.2 Alter/Alteration. A modification, replacement, or other physical change to an existing facility. [5000, 2018]

3.3.3 Analysis.

3.3.3.1 Sensitivity Analysis. An analysis performed to determine the degree to which a predicted output will vary given a specified change in an input parameter, usually in relation to models. [101, 2018]

3.3.3.2 Uncertainty Analysis. An analysis performed to determine the degree to which a predicted value will vary. [101, 2018]

3.3.4 Arson. The crime of maliciously and intentionally, or recklessly, starting a fire or causing an explosion. [921, 2017]

3.3.5 Barrier.

3.3.5.1 Fire Barrier. A continuous membrane or a membrane with discontinuities created by protected openings with a specified fire protection rating, where such membrane is designed and constructed with a specified fire resistance rating to limit the spread of fire. [101, 2018]

3.3.5.2 Smoke Barrier. A continuous membrane, or a membrane with discontinuities created by protected openings, where such membrane is designed and constructed to restrict the movement of smoke. [5000, 2018]

3.3.6 Book Stack. Shelving dedicated to the storage of library materials.

3.3.6.1* Multi-Tier Book Stack. A system of back-to-back metal (steel or wrought iron) bracket shelving stacked by being bolted together into multiple levels or tiers at approximately 7 ft (2.1336 m) intervals to form a book stack with walkways for each tier suspended from the posts or columns supporting the bracket shelving sections in each range.

3.3.6.2 Single-Tier Book Stack. Freestanding bracket, cantilever, or case shelving enclosed on one floor by a fire compartment.

3.3.7* Buildings. Structures, usually enclosed by walls and a roof, constructed to provide support or shelter for an intended occupancy. [5000, 2018]

3.3.7.1 Existing Building. A building erected or officially authorized prior to the effective date of the adoption of this edition of the code by the agency or jurisdiction. [101, 2018]

N 3.3.7.2 Historic Building. For the purpose of this code, a building that is designated, or deemed eligible for such designation, by a local, regional, or national jurisdiction as having historical, architectural, or cultural significance. [914, 2019]

3.3.8 Character-Defining Feature. A prominent or distinctive aspect, quality, or characteristic of a cultural resource property that contributes significantly to its physical character.

3.3.9 Collections. Prehistoric, historic, or religious objects, works of art, scientific specimens, archival documents, archaeological sites and artifacts, library media, and cultural materials assembled according to some rational scheme and maintained for the purpose of preservation, research, study, exhibition, publication, or interpretation.

3.3.10 Collections Storage Room. An enclosure providing a safe and secure environment for collections including vaults and bookstacks.

3.3.11 Combination System. See 3.3.84.1.

3.3.12 Compact Storage Module. An assembly of shelving sections mounted on carriages with the arrangement of carriages on tracks so as to provide one moving aisle serving multiple carriages between fixed end ranges. [See Figure H.1(a) and Figure H.1(b).]

3.3.13 Compact Storage System. A storage installation composed of multiple compact storage modules. [See Figure H.1(c).]

3.3.14 Compartment. See 3.3.24.

3.3.15 Compliance. Adherence or conformance to laws and standards. [914, 2019]

3.3.15.1 Compliance Audit. An examination or inspection by the authority having jurisdiction or a designee to verify adherence to or conformance with design features and management programs required for the building to continue to satisfy the provisions of an approved performance-based alternative to a prescriptive code requirement.

3.3.16 Conservation. The professional practice of examination, documentation, treatment, and preventative care devoted to the preservation of a cultural resource property, collections, or both.

3.3.17* Cultural Resource Properties. Buildings, structures, or sites, or portions thereof, that are culturally significant or that house culturally significant collections for museums, libraries, and places of worship.

3.3.18 Damage Limitation. Written procedures that outline and prioritize the actions to take following a disaster to minimize property damage and loss.

- 3.3.19 Design Specification.** A building characteristic and other conditions that are under the control of the design team. [5000, 2018]
- 3.3.20 Design Team.** A group of stakeholders including, but not limited to, representatives of the architect, client, and any pertinent engineers and other designers. [101, 2018]
- 3.3.21 Electronic Premises Security System.** See 3.3.84.2.
- 3.3.22 Exposure Fire.** A fire that starts at a location that is remote from the area being protected and grows to expose that which is being protected. [101, 2018]
- 3.3.23 Fire Alarm System.** See 3.3.84.3.
- 3.3.24 Fire Compartment.** A space within a building that is enclosed by fire barriers on all sides, including the top and bottom. [101, 2018]
- 3.3.25 Fire Hazard.** Any situation, process, material, or condition that, on the basis of applicable data, can cause a fire or explosion or provide a ready fuel supply to augment the spread or intensity of a fire or explosion, all of which pose a threat to life or property.
- 3.3.26 Fire Model.** Mathematical prediction of fire growth, environmental conditions, and potential effects on structures, systems, or components based on the conservation equations or empirical data. [805, 2015]
- 3.3.27 Fire Protection System.** See 3.3.84.4.
- ▲ 3.3.28 Fire Resistance Rating.** The time, in minutes or hours, that materials or assemblies have withstood a fire exposure as established in accordance with the test procedures of ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*.
- 3.3.29* Fire Retardant.** A liquid, solid, or gas that tends to inhibit combustion when applied on, mixed in, or combined with combustible materials. [1, 2018]
- 3.3.30* Fire Safety Manager.** A person identified by the governing body who is responsible for developing, implementing, exercising, and conducting routine evaluations of fire safety provisions of the code.
- N 3.3.31 Fire Suppression.** The activities involved in controlling and extinguishing fires. [1500, 2018]
- ▲ 3.3.32 Fire Watch.** The assignment of a person or persons to an area for the express purpose of notifying the fire department, the building occupants, or both, of an emergency; preventing a fire from occurring; extinguishing small fires; protecting the public from fire and life safety dangers. [1, 2018]
- 3.3.33 Firestop.** A specific system, device, or construction consisting of the materials that fill the openings around penetrating items such as cables, cable trays, conduits, ducts, pipes, and their means of support through the wall or floor openings to prevent the spread of fire. [5000, 2018]
- 3.3.34 Fuel Load.** The total quantity of combustible contents of a building, space, or fire area, including interior finish and trim, expressed in heat units or the equivalent weight in wood. [921, 2017]
- 3.3.35 Goal.** A nonspecific overall outcome to be achieved that is measured on a qualitative basis. [101, 2018]
- 3.3.36 Governing Body.** The board of directors, trustees, owner, or other body charged with governance and fiduciary responsibility of a cultural resource property.
- 3.3.37 Hazard.** A condition or a physical situation with a potential for loss or damage.
- 3.3.38* Hazardous Area.** An area of a structure or building that poses a degree of hazard greater than that normal to the general occupancy of the building or structure. [5000, 2018]
- 3.3.39 Historic Fabric.** Original or added building or construction materials, features, and finishes that existed during the period that is deemed to be most architecturally or historically significant, or both.
- 3.3.40* Historic Structure.** A building, bridge, lighthouse, monument, pier, vessel, or other construction that is designated or that is deemed eligible for such designation by a local, regional, or national jurisdiction as having historic, architectural, or cultural significance.
- 3.3.41 Hot Work.** Work involving burning, welding, or a similar operation that is capable of initiating fires or explosions. [51B, 2019]
- 3.3.42* Impairment.** An abnormal condition, during either a planned or emergency event, where a system, component, or function is inoperable. [72, 2019]
- 3.3.43* Incendiary Fire.** A fire that has been deliberately ignited under circumstances in which the person knows the fire should not be ignited.
- 3.3.44 Initiating Device.** A system component that originates transmission of a change-of-state condition, such as in a smoke detector, manual fire alarm box, or supervisory switch. [72, 2019]
- 3.3.45 Input Data Specification.** Information required by the verification method. [101, 2018]
- 3.3.46* Library.** Any building or place in which books and other media are kept for reading, reference, research, or lending.
- 3.3.47 Limited-Combustible Material.** See 9.12.7.2.
- 3.3.48* Management Operational Systems.** Management initiatives, such as oversight and intervention, planning, and staff training used as an element in achieving compliance with prescriptive or performance-based code solutions.
- 3.3.49 Means of Egress.** A continuous and unobstructed way of travel from any point in a building or structure to a public way consisting of three separate and distinct parts: (1) the exit access, (2) the exit, and (3) the exit discharge. [101, 2018]
- 3.3.50 Modification.** The reconfiguration of any space, the addition or elimination of any door or window, the addition or elimination of load-bearing elements, the reconfiguration or extension of any system, or the installation of any additional equipment. [5000, 2018]
- 3.3.51* Museum.** An institution that acquires, conserves, researches, communicates, and exhibits material evidence of people and their environment for purposes of study, education, and enjoyment.

3.3.52 Noncombustible Material. See 9.12.7.1.

3.3.53 Notification Appliance. A fire alarm system component such as a bell, horn, speaker, light, or text display, that provides audible, tactile, or visible outputs, or any combination thereof. [72, 2019]

3.3.54 Objective. A requirement that needs to be met to achieve a goal. [101, 2018]

3.3.55 Occupancy. The purpose for which a building or other structure, or part thereof, is used or intended to be used. [5000, 2018]

3.3.56 Occupant Characteristics. The abilities or behaviors of people before and during a fire. [101, 2018]

3.3.57 Occupant Load. The total number of persons that might occupy a building or portion thereof at any one time. [5000, 2018]

3.3.58 Performance-Based Design Approach. A design process where fire safety solutions are designed to achieve a specified goal for a specified use or application.

3.3.59 Performance Criteria. Threshold values on measurement scales that are based on quantified performance objectives. [101, 2018]

3.3.60 Place of Worship. Any building that functions primarily as a group meeting place for the practice of religion, which includes, but is not limited to, churches, synagogues, cathedrals, temples, mosques, and meeting halls.

3.3.61 Plenum. A compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system. [90A, 2018]

3.3.62 Preservation. The act or process of applying measures necessary to sustain the existing form, integrity, and materials of a historic building, structure, or collections.

3.3.63 Private. Intended for or limited to the use of some particular person(s) or group.

3.3.64 Project Team. A group of stakeholders including, but not limited to, representatives of architects, clients, engineers and designers, authorities having jurisdiction, and preservation specialists.

3.3.65 Proposed Design. A design developed by a design team and submitted to the authority having jurisdiction for approval. [101, 2018]

3.3.66 Protected Premises. The physical location protected by a fire alarm system, fire suppression system, electronic premises protection system, or other type of protection system.

3.3.67 Protection. Features, systems, and programs implemented to prevent or minimize loss from fire, arson, vandalism, theft, natural disasters, disruptive events, and similar hazards to property, collections, or operations.

3.3.68 Public. Of, pertaining to, or affecting a population or a community as a whole; open to all persons.

3.3.69 Rehabilitation. For the purpose of this code, the act or process of making possible a compatible use of a property through repair, alteration, and additions, while preserving those portions or features that convey its historic, cultural, or architectural value.

3.3.70 Renovation. The replacement in kind, strengthening or upgrading of building elements, materials, equipment, or fixtures that does not result in a reconfiguration of the building or spaces within. [5000, 2018]

3.3.71 Restoration. The act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods of its history, reconstruction of missing features from the restoration period, and repair of damaged or altered features from the restoration period.

3.3.72 Risk. A measure of the probability and severity of adverse effects that result from exposure to a hazard. [1451, 2018]

3.3.73 Safety Factor. A factor applied to a predicted value to ensure that a sufficient safety margin is maintained. [101, 2018]

3.3.74 Safety Margin. The difference between a predicted value and the actual value where a fault condition is expected. [101, 2018]

3.3.75 Scenario. Set of circumstances and/or an order of events in an incident that is feasible and reasonably foreseeable.

3.3.75.1 Design Fire Scenario. A fire scenario selected for evaluation of a proposed design.

3.3.75.2* Fire Scenario. A set of conditions that defines the development of fire, the spread of combustion products throughout a building or portion of a building, the reactions of people to fire, and the effects of combustion products. [101, 2018]

▲ 3.3.76 Secondary Storage. Storage separate from the main collections, usually of low use collections.

3.3.77 Security. The quality or state of relieving from exposure to danger, acting to make safe against adverse contingencies, or taking measures to guard against hazards, including, but not limited to, accidents, deliberate acts, natural disasters, or other conditions or physical situations with the potential to cause damage or loss.

3.3.78 Security Manager. A person identified by the governing body who is responsible for developing, implementing, exercising, and conducting routine evaluations of security provisions of the code.

3.3.79 Smoke Detector. A device that detects visible or invisible particles of combustion. [72, 2019]

3.3.80* Special Event. Any activity outside of the normal daily operations.

3.3.81 Sprinkler System. See 3.3.84.5.

3.3.82 Stakeholder. An individual, or representative of same, having an interest in the successful completion of a project. [101, 2018]

3.3.83 Structure. That which is built or constructed and limited to buildings and nonbuilding structures as defined herein. [5000, 2018]

3.3.84 System.

3.3.84.1 Combination System (as related to premises security). A system that provides premises security as a portion of a

single control unit, or multiple control units that work together to provide one integrated control. [731, 2017]

3.3.84.2 Electronic Premises Security System. A system or portion of a combination system that consists of components and circuits arranged to monitor or control activity at or access to a protected premises. [731, 2017]

3.3.84.3 Fire Alarm System. A system or portion of a combination system that consists of components and circuits arranged to monitor and annunciate the status of fire alarm or supervisory signal-initiating devices and to initiate the appropriate response to those signals. [72, 2019]

3.3.84.4 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. [1141, 2017]

△ **3.3.84.5 Sprinkler System.** A system, commonly activated by heat from a fire and discharges water over the fire area, that consists of an integrated network of piping designed in accordance with fire protection engineering standards that includes a water supply source, a water control valve, a waterflow alarm, and a drain. The portion of the sprinkler system above ground is a network of specifically sized or hydraulically designed piping installed in a building, structure, or area, generally overhead, and to which sprinklers are attached in a systematic pattern. [13, 2019]

3.3.85* Utilities. Building service control and distribution systems and their associated equipment, pipes, ducts, wires, and cables.

3.3.86 Verification Method. A procedure or process used to demonstrate or confirm that the proposed design meets the specified criteria. [101, 2018]

3.3.87 Vertical Opening. An opening through a floor or roof. [101, 2018]

Chapter 4 Goals and Objectives

4.1 General. The governing body of the cultural resource property shall adopt protection goals and objectives that reflect the acceptable level of loss for both of the following:

- (1) Items of cultural significance
- (2) Interruption of service to the client community

4.2 Goals.

4.2.1 Collection Preservation. The collection preservation goal of this code shall be to provide a reasonable level of protection for collections against conditions or physical situations with the potential to cause damage or loss, including, but not limited to, fire, products of combustion, and fire suppression agents and activities; deliberate actions of third parties, staff, or visitors; or natural disasters.

4.2.2 Building Preservation. The building preservation goal of this code shall be to provide a reasonable level of protection for buildings, their unique characteristics, and their fabric against conditions or physical situations with the potential to cause damage or loss, including, but not limited to, fire, products of combustion, and fire suppression agents and activities;

deliberate actions of third parties, staff, or visitors; or natural disasters.

4.2.3 Continuity of Operations. The continuity of operations goal of this code shall be to provide a reasonable level of protection against disruption of facility operations consistent with the organization's mission and protection goals.

4.3* Objectives.

4.3.1 Collection Preservation. Protection features, systems, and programs shall be designed, approved, implemented, and maintained to protect and preserve the original qualities of the collection.

4.3.1.1 Structural integrity shall be maintained to protect items in the collections that are not intimate with the initiating event for the time needed to evacuate, relocate, or defend them in place.

4.3.1.2 Access for emergency responders shall be provided for the time specified in 4.3.1.1 to evacuate, relocate, or defend collection objects in place.

4.3.2 Building Preservation.

4.3.2.1 Protection features, systems, and programs shall be designed, approved, installed, and maintained to preserve the original qualities or character of a building, structure, site, or environment.

4.3.2.2 Removal or alteration of any distinctive architectural features for the purpose of improving fire protection or life safety shall be minimized.

4.3.3 Continuity of Operations. Protection features, systems, and programs shall be designed, approved, implemented, and maintained to minimize disruption of operations consistent with the cultural resource property's mission and protection goals.

Chapter 5 Protection Plan

5.1* General.

5.1.1* The governing body of a cultural resource property shall adopt a protection plan that addresses operations during conditions or physical situations with the potential to cause damage or loss including, but not limited to, the following:

- (1) Fires
- (2) Deliberate acts of third parties, staff, or visitors
- (3) Other disruptive or potentially adverse events including, but not limited to, the following:
 - (a) Severe weather
 - (b) Earthquake
 - (c) Loss of communications
 - (d) Failure of critical building systems
 - (e) Flood
 - (f) Loss of utilities (gas, electricity, water, etc.)
 - (g) Use of the facility as a designated critical operations area for emergency management agencies

5.1.2 The protection plan shall include, but shall not be limited to, components covering operations developed in compliance with Chapter 6, fire safety management developed in compliance with Chapter 7, and security developed in compliance with Chapter 8.

5.2 Responsibilities of Governing Body.

5.2.1 The governing body shall provide stewardship to care for and to protect the items of cultural significance entrusted to it (*see* 5.3.2).

5.2.2 The governing body shall confer with the authority having jurisdiction or the planning team (*see* 5.3.2).

5.2.3* The governing body shall be responsible for the conduct of the vulnerability assessment of the cultural resource property.

5.2.4* The governing body shall define the goals and objectives developed in compliance with Sections 4.2 and 4.3.

5.2.5 The governing body shall establish the loss tolerability thresholds for the cultural resource property.

5.2.6 The governing body shall evaluate the results of the vulnerability assessment against the loss tolerability thresholds and develop protection strategies to mitigate the risks that could prevent achieving the goals and objectives.

5.2.7 The governing body shall oversee the development of a protection plan to eliminate, manage, or control risks identified as exceeding the tolerability thresholds established in compliance with 5.3.8.2 to achieve the protection goals and objectives developed in compliance with Sections 4.2 and 4.3.

5.2.8* Organization. The governing body shall identify a person or persons responsible for protection of the cultural resource property, its contents, collections, and operations.

5.3 Planning Process.

5.3.1 General. The process for developing the protection plan shall comply with 5.3.2 through 5.3.8 and Figure 5.3.1.

5.3.2 Planning Team.

5.3.2.1 The governing body shall identify a planning team to oversee the development of the protection plan for the cultural resource property.

5.3.2.2* The planning team shall have expertise in cultural resource property preservation and protection and demonstrated knowledge and understanding of the culturally significant elements of the structure and its collections.

5.3.3 Collect Information.

5.3.3.1 Codes, Standards, and Regulations. The planning team shall review all fire safety and security-related codes, standards, and regulations to identify requirements applicable to the cultural resource property.

5.3.3.2* Survey. The planning team shall conduct a detailed survey of the facility's operations, building protection features, and the culturally significant features of the structure and collection.

5.3.3.2.1 Structure.

5.3.3.2.1.1* Exterior. The building survey shall identify those character-defining features and finishes that make the exterior of the building significant.

5.3.3.2.1.2* Interior. The building survey shall identify all significant interior spaces, floor plan organization, and character-defining features and finishes in the building.

5.3.3.2.2 Collections. The survey shall identify all significant collections, archives, and other contents of cultural significance, their location, and any unique vulnerability to damage or loss.

5.3.3.2.3 Operations. The planning team shall identify the facility's client community and the effect of a disruption of operations on the delivery of service to that community, including those that impact business generating revenue.

5.3.4 Prioritization of Significant Elements, Collections, and Operations. The planning team shall determine primary and secondary significance of all culturally significant elements, collections, or both, and the primary and secondary operational priorities for the facility.

5.3.5* Potential Threat Identification.

5.3.5.1 The planning team shall identify conditions that could contribute to the loss or damage of property (structure or collections) by fire; foreseeable crimes; deliberate acts of third parties, staff, or visitors; or other events with the potential to cause damage or loss.

5.3.5.2 Potential threats shall include but not be limited to those listed in Figure 5.3.5.2, and their identification shall be conducted in accordance with that checklist.

5.3.6* Tolerability Evaluation. The planning team shall evaluate the tolerability of potential threats identified in 5.3.5 based on the cultural resource property's protection goals and objectives developed in compliance with Sections 4.2 and 4.3, the assessment of likelihood of occurrence and potential severity required in Figure 5.3.5.2, and the tolerability thresholds developed in compliance with 5.2.5.

5.3.7* Loss Scenarios. Potential loss scenarios shall be considered for all intolerable threats identified in 5.3.6.

5.3.8 Risk Analysis.

5.3.8.1 The loss scenarios identified in compliance with 5.3.7 shall be evaluated with respect to their potential frequency and severity of the conditions identified.

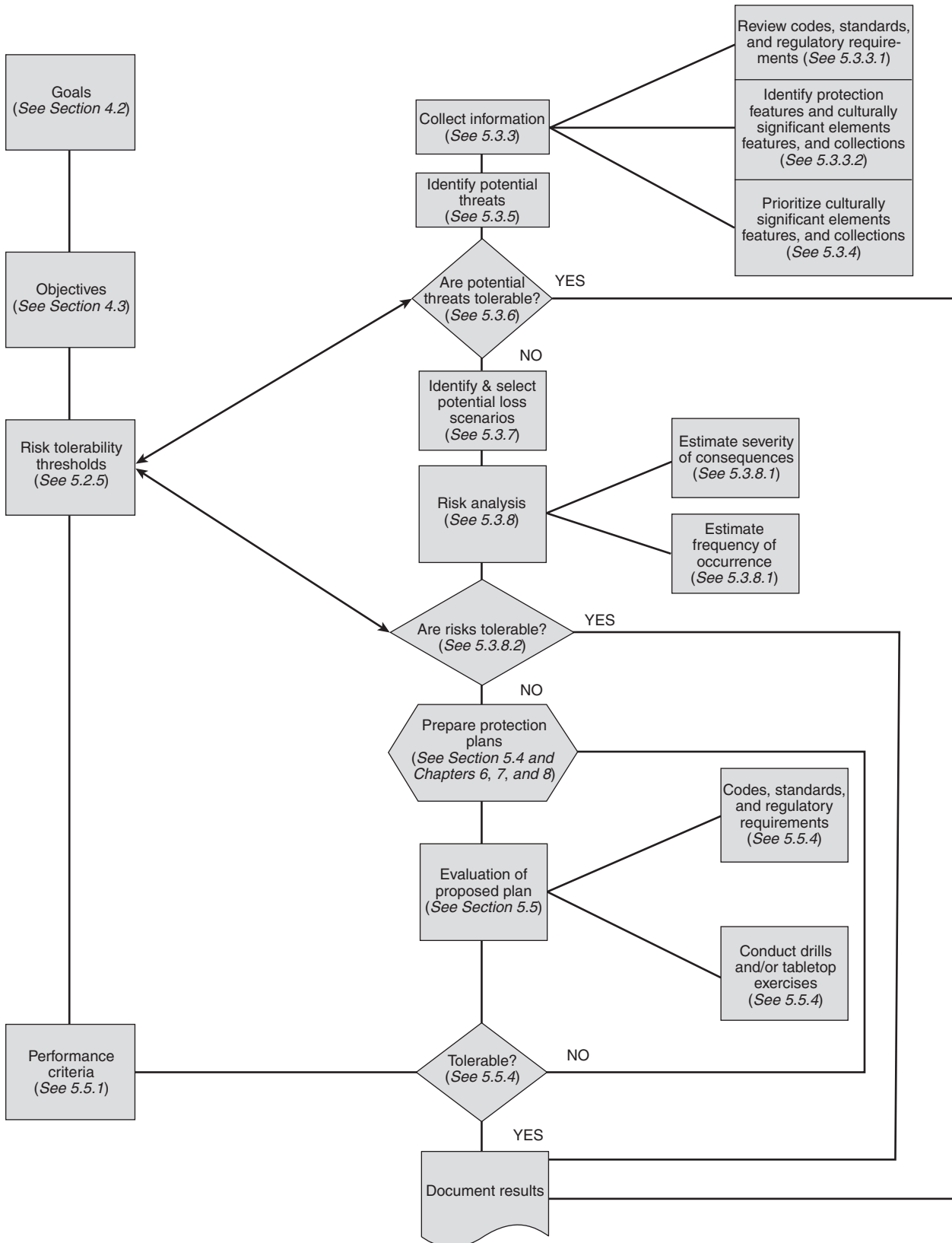
5.3.8.2 The planning team shall determine risk tolerability by a comparison of the risk identified from the loss scenarios developed in 5.3.7 with the goals and objectives developed in compliance with Sections 4.2 and 4.3 and the tolerability thresholds developed in compliance with 5.2.5.

5.4 Protection Plan Components.

5.4.1 The protection plan shall include provisions for each category of events identified in the vulnerability assessment required in 5.2.3 that exceeds the tolerability thresholds established by the governing body.

5.4.2 Planning for each category of event shall include provisions for all of the following as applicable to the event:

- (1) Preparation for incident/event/threat
- (2) Prevention of incident
- (3) Notification of incident
- (4) Verification of incident
- (5) Response to incident
- (6) Assessment of potential damage
- (7) Mitigation/limitation of damage
- (8) Recovery of collections and buildings from incident
- (9) Post-emergency evaluation of the protection plan



▲ FIGURE 5.3.1 Planning Flow Chart.

POTENTIAL THREATS ASSESSMENT								
		Likelihood of Occurrence			Potential Severity			
	N/A	Low	Moderate	High	Low	Moderate	High	
Unintentional Act								
Fire/explosion	☐	☐	☐	☐	☐	☐	☐	
Health emergency	☐	☐	☐	☐	☐	☐	☐	
Hazardous material spill or release	☐	☐	☐	☐	☐	☐	☐	
Transportation accident	☐	☐	☐	☐	☐	☐	☐	
Intentional Act								
Terrorism	☐	☐	☐	☐	☐	☐	☐	
Cyber attack	☐	☐	☐	☐	☐	☐	☐	
Arson	☐	☐	☐	☐	☐	☐	☐	
Theft	☐	☐	☐	☐	☐	☐	☐	
Vandalism	☐	☐	☐	☐	☐	☐	☐	
Sabotage	☐	☐	☐	☐	☐	☐	☐	
Civil disturbance, public unrest, mass hysteria, riot	☐	☐	☐	☐	☐	☐	☐	
Strike	☐	☐	☐	☐	☐	☐	☐	
System Failure								
Loss of electricity	☐	☐	☐	☐	☐	☐	☐	
Water leak	☐	☐	☐	☐	☐	☐	☐	
Building collapse/structural failure	☐	☐	☐	☐	☐	☐	☐	
Fuel shortage	☐	☐	☐	☐	☐	☐	☐	
Communications system interruption	☐	☐	☐	☐	☐	☐	☐	
Air/water pollution contamination	☐	☐	☐	☐	☐	☐	☐	
Water control structure, dam, or levee failure	☐	☐	☐	☐	☐	☐	☐	
HVAC system failure	☐	☐	☐	☐	☐	☐	☐	
Loss of protection systems	☐	☐	☐	☐	☐	☐	☐	
Geological								
Earthquake	☐	☐	☐	☐	☐	☐	☐	
Tsunami	☐	☐	☐	☐	☐	☐	☐	
Volcano	☐	☐	☐	☐	☐	☐	☐	
Landslide/mudslide	☐	☐	☐	☐	☐	☐	☐	
Biological								
Pandemic disease	☐	☐	☐	☐	☐	☐	☐	
Animal or insect infestation	☐	☐	☐	☐	☐	☐	☐	
Meteorological								
Flood, flash flood, seiche, tidal surge	☐	☐	☐	☐	☐	☐	☐	
Drought	☐	☐	☐	☐	☐	☐	☐	
Wildland fire (forest, brush, grass, ground)	☐	☐	☐	☐	☐	☐	☐	
Snow, ice, hail, sleet, avalanche	☐	☐	☐	☐	☐	☐	☐	
Windstorm, tropical cyclone, hurricane, tornado, water spout, dust/sand storm	☐	☐	☐	☐	☐	☐	☐	
Extreme heat/cold	☐	☐	☐	☐	☐	☐	☐	
Lightning	☐	☐	☐	☐	☐	☐	☐	
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▲ FIGURE 5.3.5.2 Potential Threats Assessment.

Shaded text = Revisions. ▲ = Text deletions and figure/table revisions. • = Section deletions. ■ = New material



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5.4.3 The protection plan shall be in writing and shall be approved by the governing body.

5.5 Protection Plan Evaluation.

5.5.1 The governing body shall develop performance criteria to measure the effectiveness of the protection plan.

5.5.2 Protection plan performance shall be evaluated against the performance criteria whenever significant changes occur but no less than annually.

5.5.3 The fire safety manager and the security manager identified in compliance with Section 10.2 shall have the authority to develop, implement, exercise, and conduct routine evaluations of the protection plan and its emergency operations component.

5.5.4 An evaluation of the protection plan shall include, but shall not be limited to, review of current codes, standards, and regulatory requirements, and conducting **tabletop** exercises and partial or full-scale drills at regular intervals but no less than annually.

Chapter 6 Protection Plan — Emergency Operations

6.1 Developing Emergency Operations Procedures.

▲ **6.1.1*** The planning team established in accordance with 5.3.2 shall have responsibility for developing the emergency operations component of the cultural resource property's protection plan. The emergency operations component of the protection plan shall be based on the assessment conducted in accordance with 5.2.3 and Section 5.4.

6.1.2* The emergency operations component of the protection plan shall follow an incident command system (ICS) model to facilitate coordination with local emergency response agencies.

6.1.3* The emergency operations component of the protection plan shall specify the responsibilities and the organization of the response and recovery team.

6.2 Contents. The emergency operations component of the protection plan, as a minimum, shall include the applicable tasks detailed in Chapter 5.

6.3 Identification of Emergency Operations Personnel.

6.3.1 All personnel designated or involved in emergency operations shall be supplied with a means of identification, which shall be visible at all times.

6.3.2 Specific means of identification for incident command system (ICS) personnel shall be provided, such as vests, baseball caps, or hard hats.

6.4 Continuity of Essential Building Systems. The emergency operations component of the protection plan shall include contingencies for the continuity of the following essential building systems, as required:

- (1) Electricity
- (2) Water
- (3) Heating, ventilation, air conditioning (HVAC)
- (4) Fire alarm, fire detection, and fire suppression systems
- (5) Security systems
- (6) Fuel sources
- (7) Communication systems

6.5 Occupant Management. Planning shall include alerting, locating, and managing all staff and other occupants in an emergency, as well as consideration of all of the following:

- (1) Emergency response
- (2) Emergency evacuation
- (3) Emergency shelter
- (4) Temporary housing
- (5) Transportation of staff and other occupants
- (6) Critical incident stress management

6.6 Emergency Action Plan. The emergency action plan shall be in accordance with Section 4.8 of NFPA 101.

6.6.1* The emergency action plan shall include provisions for all of the following:

- (1) Notifying the fire department or other emergency responders of the type and location of the emergency
- (2) Directing the fire department or other emergency responders to the incident location once they arrive
- (3) Posting emergency notification and response procedures for staff and other occupants
- (4) Conducting annual exercises to ensure effectiveness
- (5) Incorporating lessons learned from the exercises into the emergency action plan
- (6) Developing evacuation, relocation, and shelter-in-place procedures appropriate to the building, its occupants, emergencies, and hazards
- (7) Determining the appropriateness of the use of elevators
- (8) Documenting the type and coverage of building fire protection systems
- (9) Other items required by the authority having jurisdiction

▲ **6.6.2** Emergency telephone numbers shall be posted on or adjacent to all telephones.

6.7 Developing Procedures for Removal or Relocation of Collections.

6.7.1 The emergency operations component of the protection plan shall include emergency evacuation procedures for collections and other items of cultural significance prepared in cooperation with the local fire department, other applicable authorities, or external vendors.

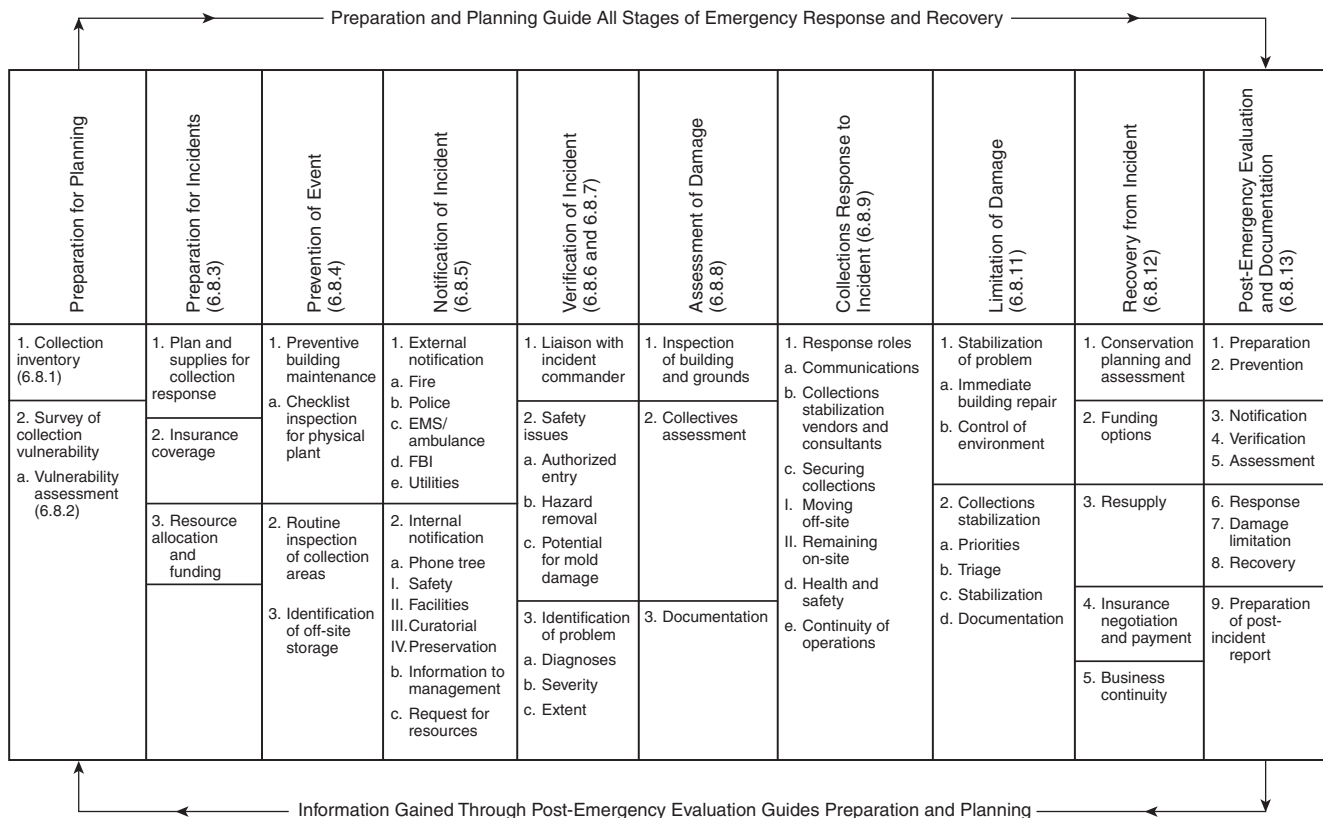
6.7.2 The emergency evacuation procedures shall include the following:

- (1) Provisions for normal operating conditions and for special events
- (2) Provisions for temporary and special exhibits
- (3) Provisions for training and drills to be conducted at intervals identified in the protection plan, but not less than annually
- (4) Provisions for staff training and drills to adjust for altered circumstances and increases in visitation during special events and exhibits
- (5) Provisions for notifying the local fire and security service in advance of special events that could affect the emergency evacuation procedures

6.8 Damage Limitation. The protection plan shall include a damage limitation component that shall comply with 6.8.1 through 6.8.12 and Figure 6.8.

6.8.1 Collection Inventory.

6.8.1.1* A periodic inventory of all items in a collection shall be conducted to verify their presence and condition.



▲ FIGURE 6.8 Damage Limitation.

6.8.1.2 The inventory shall account for all permanent collection objects, those on loan, and those in the temporary custody of the cultural resource property.

6.8.1.3* Inventory records shall include basic identifying information for each object, and shall include photographs or videos of objects.

6.8.1.4 Inventory records shall be securely stored and backed up, with a copy stored off-site.

6.8.2* Collection Vulnerability. The vulnerability assessment conducted in compliance with 5.2.3 shall consider the special hazards to objects in the collection.

6.8.2.1* The cultural resource property shall maintain a current list of all types of materials and media represented in its collections and a description of enclosures or storage furnishings in which collections are housed.

6.8.2.1.1 New acquisitions shall routinely be added to the list.

6.8.2.1.2* Changes in storage locations or layout shall be reflected in the list.

6.8.2.2* The locations of any known prior and/or chronic water penetration or other infrastructure problems shall be documented.

6.8.2.3* In seismic zones, shelving and furniture shall be evaluated to assess seismic stability.

6.8.2.4* Below-grade and subterranean storage could place collections at higher risk. An assessment of off-site storage shall be conducted for the following:

- (1) Climate
- (2) Fire protection
- (3) Natural hazards
- (4) Security
- (5) Procedures for emergency recovery
- (6) Adjacent occupancies and utilities

6.8.2.5* The effects of water on each type of material represented within collections storage areas shall be evaluated.

6.8.3 Preparation for Incidents.

6.8.3.1* The protection plan shall identify collection objects of significance and shall include procedures to protect in place, evacuate, or recover those items.

6.8.3.2* A basic emergency response supply and equipment kit(s) shall be assembled and maintained.

6.8.3.3* A complete copy of all insurance documents shall be stored off-site.

6.8.3.4* Resource Allocation and Funding. The cultural resource property shall create and identify financial priorities for implementing protection measures.

6.8.4 Prevention of Event.

6.8.4.1* A written schedule for regular building inspections and maintenance shall be developed and implemented.

6.8.4.2 Chronic building problems, including areas vulnerable to water penetration, shall be identified.

6.8.4.2.1 Where collections are at risk, they shall be relocated.

6.8.4.2.2 If relocation is not possible, the collection shall be covered or otherwise protected until the vulnerability can be eliminated.

6.8.4.3 Routine Inspection of Collection Areas. Regular inspection of both on-site and off-site collection storage areas shall be performed to identify leaks, condensation, water stains, peeling paint, mold, and pests, unusual deposits of soot or particulate matter, and signs of physical damage such as cracks. The presence of any of these signs might indicate a building vulnerability that shall be addressed to prevent more significant problems in an emergency.

6.8.5 Notification of Incident.

6.8.5.1 The protection plan shall include a protocol for notifying external first responders and/or the emergency response team upon discovery of an undesirable event.

6.8.5.1.1 Each staff member of the cultural resource property shall have access to an up-to-date emergency call list that can be activated by any staff member upon discovery of an incident.

6.8.5.1.2* An emergency response team will coordinate response and recovery of cultural collections. Each team member shall have specific responsibilities, and there shall be an alternate for each position in the event that someone is unavailable to respond.

6.8.5.2 In the event of an emergency the individual who is first on the scene shall be responsible for notifying the emergency response team coordinator, and if that person is not available, the next responder on the telephone list until someone can be found to respond. The first responder shall act as the emergency team coordinator until the coordinator can reach the site.

6.8.6* Verification of Incident. Before implementing recovery activities, the emergency response team shall identify the problem and its source and determine its severity and the extent of damage in so far as it is safe and reasonable

6.8.7* Liaison with Incident Commander. Where a catastrophic event impacts multiple institutions or an entire locale, the cultural resource property shall name a member of the emergency response team to act as the institutional liaison to the local, state, or federal incident management team.

6.8.8 Assessment of Damage.

6.8.8.1* Collections Assessment. The emergency response team shall assess damage to collections.

6.8.8.2* Documentation. The protection plan shall include provisions for documentation of damage to collections.

6.8.9* Response Roles. Specific emergency response roles and responsibilities shall be assigned to response personnel from within (and/or outside of) the cultural resource property. Roles shall include, but shall not be limited to, the following:

- (1) Collections stabilization
- (2) Communication (internal and external)
- (3) Health and safety
- (4) Location of recovery effort (on- or off-site)

(5) Securing collections

(6) Vendors and consultants

6.8.10* Identification of Storage. The protection plan shall identify locations, on- and off-site, that can serve as emergency storage for evacuated collections and as a triage area for initial collection stabilization during a response.

6.8.11 Limitation of Damage.

6.8.11.1 Building Stabilization.

6.8.11.1.1 Damage to the building envelope that allows penetration of moisture and debris, or has compromised shelving, or other storage or exhibit furnishings shall be corrected as soon as possible to provide a stable area in which to house, inspect, or recover collections.

6.8.11.1.2* The collections storage or exhibit environment shall be controlled to prevent other additional damage such as the growth and spread of mold.

6.8.11.2* Collections Stabilization. The protection plan shall include measures for stabilization of at-risk collections.

6.8.12* Recovery from Incident. The protection plan shall include steps for recovery from the incident.

6.8.13* Post-Emergency Evaluation and Documentation. A written post-incident report shall be completed and shall be scaled to the magnitude of the incident.

6.9 Security.

6.9.1 The security component of the protection plan shall include provisions for protection of the cultural resource property's collections and buildings during emergencies.

6.9.2 The emergency operations component of the protection plan shall identify resources to implement emergency security activities that are sufficient to achieve the protection goals and objectives developed in compliance with Sections 4.2 and 4.3.

6.10 Public Affairs.

6.10.1 The governing body shall designate a media spokesperson to facilitate news releases during emergencies.

6.10.2 An area shall be designated where media representatives can be assembled, where they will not interfere with the operations of the cultural resource property, emergency response, and damage limitation activities, or endanger the collections.

6.11 Operational Recovery. The protection plan shall include measures to restore operational capability to pre-event levels. Fiscal aspects shall be considered because of restoration costs of the facility and its contents and possible cash flow losses associated with the disruption.

6.12 Staff Training.

6.12.1* The cultural resource property shall implement a training program that includes an overview of the protection plan and concepts of the incident command system.

6.12.2 Training on the protection plan and the incident command system shall be conducted at the time of hire. Site-specific training shall be conducted for employees upon reporting to their department or assuming their positions. All employees shall receive training annually thereafter.

6.12.3 Exercises. The cultural resource property shall conduct at least one drill of the emergency operations component of the protection plan annually.

6.13 Emergency Operations.

6.13.1 The decision to activate the emergency operations component of the protection plan shall be made by the designated response coordinator in accordance with the cultural resource property's activation criteria.

6.13.2 The decision to terminate emergency operations shall be made by the governing body or the designated authority in coordination with the response coordinator, the authority having jurisdiction, and other civil or military authorities involved. Provisions shall be made to notify all those involved in the emergency operation that emergency operations have been terminated.

Chapter 7 Protection Plan — Fire Safety Management

7.1 Vulnerability Assessment.

7.1.1* A vulnerability assessment, conducted in accordance with 5.2.3 and Section 5.4, shall be used to develop the fire safety management component of the protection plan, and a copy of the assessment shall be attached to the protection plan. (See Figure 5.3.1, *Planning Flow Chart*.)

7.1.2 The vulnerability assessment shall include a survey to identify existing and potential fire hazards.

7.1.3 The survey shall include the following:

- (1) Identification of fire hazards inherent to the cultural resource property
- (2) Identification of conditions that increase the threat of arson (see 8.1.2)
- (3) Identification of fire risks and means-of-egress problems created by special events
- (4) An assessment of expected increases in visitation during special events, celebrations, and special exhibitions and procedures in place to identify and take action to prevent the number of occupants from exceeding building and means-of-egress capabilities
- (5) Identification of temporary or special exhibitions that can create special fire protection risks and means-of-egress problems or that can compromise existing fire protection systems
- (6) Identification of existing fire protection systems

7.1.4* The vulnerability assessment shall be used to establish priorities for correction of fire hazards identified in the survey based on the severity of the hazards and the difficulty and cost of abating them.

7.1.5 The vulnerability assessment shall identify where increased fire protection measures/systems are needed in order to achieve the protection goals and objectives developed in compliance with Sections 4.2 and 4.3.

7.2* Fire Safety Management.

7.2.1* General. The governing body of the cultural resource property shall establish a written fire safety management component of the protection plan that complies with this section for systematic achievement of the fire safety goals and objectives developed in compliance with Sections 4.2 and 4.3.

7.2.2 The fire safety management component of the protection plan shall comply with this section and shall provide for systematic achievement of fire safety goals and objectives developed in compliance with Sections 4.2 and 4.3.

7.2.3 The fire safety management component of the protection plan shall include provisions for an annual comprehensive facility inspection and procedures to document and correct problems and potential threats identified during the inspection. (See Annexes I and J for additional information.)

7.2.4 The fire safety management component of the protection plan shall be updated annually or when any addition, alteration, modification, or change in the occupancy occurs.

7.3* Fire Safety Manager.

7.3.1 The governing body shall appoint a fire safety manager who is responsible for implementation of the fire safety management component of the protection plan.

7.3.2 The fire safety manager shall be responsible for oversight of all of the following:

- (1) Egress systems
- (2) Fire prevention
- (3) Fire inspections
- (4) Periodic property surveys
- (5) Operation, maintenance, and testing of fire protection equipment, including fire detection and fire suppression systems
- (6) Management operational systems (see Chapter 10)

7.3.3* The fire safety manager shall monitor controls developed for fire hazards inherent to the cultural resource property.

7.3.4 The fire safety manager shall review and approve plans for new displays or exhibits, new construction, renovation, modification, restoration, or reconfiguration of space.

7.3.5 After any incident the fire safety manager shall review lessons learned from the incident with the planning team (see 5.3.2). The planning team shall make changes as appropriate to the fire safety management component of the protection plan and retrain staff on the changes as necessary.

7.4 Documentation.

7.4.1* The fire safety manager shall maintain a current file of the cultural resource property's fire protection records.

7.4.2 As a minimum, records of the following shall be kept:

- (1) The protection plan
- (2) Training of staff and volunteers, including fire evacuation drills, damage limitation, and use of portable fire extinguishers
- (3) Inspection, testing, and maintenance reports for all fire safety equipment and systems, including records of actions taken to correct deficiencies
- (4)* As-built plans, specifications, wiring and layout diagrams, and acceptance test reports for all fire protection systems
- (5) Inspection reports by local code enforcement officials, the authority having jurisdiction, local fire service officials, and insurance loss control representatives, including records of actions taken to correct deficiencies identified during each inspection

- (6) Fire protection systems actuation and alarm reports that include information on the cause of the alarm or activation, the response, and any corrective action(s) taken
- (7) Full reports of all fire incidents, including the cause, extent of damage, response, and recovery activities

▲ 7.5 Training.

7.5.1 The fire safety manager shall ensure that all staff, including volunteers and interns, receive initial and annual training pertinent to their assigned emergency responsibilities.

7.5.2 Training shall be reinforced by annual drills.

Chapter 8 Protection Plan — Security

8.1 Vulnerability Assessment.

8.1.1* A vulnerability assessment shall be conducted in accordance with 5.2.3 and Section 5.4 that examines all of the following:

- (1) Potential threats from crimes
- (2) Losses through the deliberate actions of third parties, staff, or visitors, including an active shooter event
- (3) Breaches in security caused by natural disasters
- (4) Other conditions or physical situations with the potential to cause damage or loss

8.1.2* The vulnerability assessment shall include, but shall not be limited to, all of the following:

- (1) Threats from conditions that increase the risk of arson
- (2) Threats posed by construction, alteration, renovation, or modification projects
- (3) Threat potential of terrorist activity
- (4) Threat of a cyber attack
- (5) Threats from an active shooter event

8.2* Security Component of Protection Plan.

8.2.1 A security component of the protection plan shall be prepared and adopted.

8.2.2 The security component shall be based on the results of an analysis of all of the following:

- (1) Potential threats identified in the vulnerability assessment
- (2) Loss tolerability threshold adopted by the governing body
- (3) Goals and objectives set for the cultural resource property

8.2.3* Arson prevention shall be included in the cultural resource property's protection goals and objectives developed in compliance with Sections 4.2 and 4.3.

8.2.4 The security component of the protection plan shall include screening all personnel, including part-time and volunteers, against records of known fire setters.

8.2.5* Book returns shall comply with one of the following:

- (1) They shall be constructed to prevent the spread of fire and smoke from the return into the rest of the library.
- (2) They shall be located in an outside receiving bin away from the exterior walls of the building.

8.2.6* The security component of the protection plan shall include protective measures for potential acts of terrorism.

8.2.7* The security component of the protection plan shall include procedures for all of the following:

- (1) Responding to unattended objects, containers, or packages
- (2) Responding to bomb threats
- (3) Handling suspicious parcels and letters
- (4) Responding to explosions and fires
- (5) Responding to chemical, biological, and radiological threats
- (6)* Protecting against cyber risk
- (7) Protecting against and responding to an active shooter event

N 8.2.8* The security component of the protection plan shall include protective measures against an active shooter event.

8.3 Security Program.

8.3.1* Pre-Employment Screening. All employees and volunteers shall be subjected to pre-employment screening.

8.3.2* Access Control. Procedures shall be implemented to screen and identify official visitors, contractors, and others who have access to nonpublic areas of the cultural resource property.

8.3.3 Parcel Control. Procedures shall be implemented to control the flow of property in and out of the cultural resource property.

8.3.4 Electronic Premises Security Systems.

8.3.4.1* Where the vulnerability assessment indicates the need for an electronic premises security system, the system shall be designed by a qualified person.

8.3.4.2* Electronic premises security systems shall be installed in accordance with NFPA 731.

8.3.5* Physical Security Devices.

8.3.5.1 Installation and Maintenance. Where part of the protection plan, physical security devices, including but not limited to locks, doors, windows, safes, vaults, and strong rooms, shall be installed and maintained in accordance with the manufacturer's specifications.

8.3.5.2 Delayed-Egress Electrical Locking Systems.

▲ 8.3.5.2.1 Approved, delayed-egress electrical locking systems shall be permitted to be installed on door assemblies serving low- and ordinary-hazard contents in buildings protected throughout by an approved, supervised automatic fire detection system in accordance with NFPA 72 or an approved, supervised automatic sprinkler system in accordance with NFPA 13, and where permitted in Chapters 11 through 43 of NFPA 101, provided that all of the following criteria are met:

- (1) The delay of the delayed-egress electrical locking system shall deactivate allowing unobstructed egress upon actuation of one of the following:
 - (a) Approved, supervised automatic sprinkler system in accordance with NFPA 13
 - (b) Not more than one heat detector of an approved, supervised automatic fire detection system in accordance with NFPA 72
 - (c) Not more than two smoke detectors of an approved, supervised automatic fire detection system in accordance with NFPA 72
- (2) The delay of the delayed-egress electrical locking system shall deactivate allowing unobstructed egress upon loss of power controlling the lock or locking mechanism.

- (3) An irreversible process shall release the **electrical** lock in the direction of egress within 15 seconds, or 30 seconds where approved by the authority having jurisdiction, upon application of a force to the release device under all of the following conditions:
 - (a) The force shall not be required to exceed 67 N (15 lbf).
 - (b) The force shall not be required to be continuously applied for more than 3 seconds.
 - (c) The initiation of the release process shall activate an audible signal in the vicinity of the door opening.
 - (d) Once the **electrical** lock has been released by the application of force to the releasing device, **rearming the delay electronics** shall be by manual means only.
- (4) A readily visible, durable sign that conforms to the visual characters requirements of ICC/ANSI A117.1, *Accessible and Usable Buildings and Facilities*, shall be located on the door leaf adjacent to the release device in the direction of egress, and shall read as follows:
 - (a) **PUSH UNTIL ALARM SOUNDS, DOOR CAN BE OPENED IN 15 SECONDS**, for doors that swing in the direction of egress travel
 - (b) **PULL UNTIL ALARM SOUNDS, DOOR CAN BE OPENED IN 15 SECONDS**, for doors that swing against the direction of egress travel
- (5) The egress side of doors equipped with delayed-egress **electrical locking systems** shall be provided with emergency lighting in accordance with Section 7.9 of NFPA 101.
- (6) Hardware for new installations shall be listed in accordance with UL 294, *Access Control System Units*.
[101:7.2.1.6.1.1]

8.3.5.2.2 Delayed egress locking devices shall be tested regularly, but not less than quarterly, and a written record of the test and the results shall be kept.

8.3.5.3 Access-Controlled Egress Door Assemblies. Where provided, access-controlled egress door assemblies shall comply with NFPA 101.

8.4 Construction Areas. Security precautions for construction areas shall be in accordance with 9.14.12.

8.5* Vacant Areas. Structures or portions thereof that are vacant shall be included in the vulnerability assessment required by Section 8.1.

Chapter 9 New Construction, Addition, Alteration, Renovation, and Modification Projects

9.1* General. New construction, additions, alterations, renovations, and modifications, hereafter referred to as the project, shall comply with the applicable building code and the requirements of this chapter.

9.2* Application of Code. This code shall be applied to projects in accordance with the process described in Figure 9.2.

9.3* Project Team. The governing body shall identify a project team to oversee the application of the code to the cultural resource property.

9.3.1 The project team shall include persons with expertise in cultural resource property preservation and protection.

9.3.2 Persons named to the team to comply with 9.3.1 shall have a demonstrated knowledge and understanding of the culturally significant elements of the structure and its contents.

9.4* Survey. The project team shall conduct a detailed survey including but not limited to the following:

- (1) Operating and protection features of the protection plan
- (2) Culturally significant features of the structure and collections impacted by the project

9.4.1 Structure.

9.4.1.1* Exterior. The survey shall identify those character-defining features and finishes that make the exterior of the building significant.

9.4.1.2* Interior. The survey shall identify all significant interior spaces, floor plan organization, and character-defining features and finishes in the building.

9.4.2 Collections. The survey shall identify all significant collections, archives, and other contents of cultural significance, their location, and any unique vulnerability to damage or loss.

9.5 Operations. The project team shall identify the facility's client community and the effect of a disruption of operations on the delivery of service to that community.

9.6 Prioritization of Significant Elements, Collections, and Operations.

9.6.1 The project team shall determine primary and secondary significance of all culturally significant elements, collections, or both, and the primary and secondary operational priorities for the facility.

9.6.2* Planned modifications or additions shall be assessed to determine their impact on culturally significant elements, collections, and the operation.

9.7 Potential Threat Identification and Evaluation.

9.7.1 The project team shall identify conditions that could contribute to the loss of property, including but not limited to the structure, site, and collections, by fire; foreseeable crimes; deliberate acts of third parties, staff, or visitors; or other events with the potential to cause damage or loss in the areas affected by the project.

9.7.1.1 The project team shall review all fire safety and security related requirements to determine if and where the cultural resource property is deficient with respect to applicable codes.

9.7.1.2 The project team shall evaluate the building to determine the potential paths of fire spread, both internal and external, that are inherent to its design.

9.7.2 Means of Egress.

9.7.2.1 The project team shall evaluate life safety aspects of the building in accordance with the requirements of the applicable building or life safety code.

9.7.2.2 The project team shall identify egress systems and any deficiencies, including, but not limited to, number of exits, exit capacity, exit fire resistance, smoke control, dead-end corridors, travel distances, and unenclosed stairs and shall develop plans to mitigate the deficiencies.



FIGURE 9.2 Code Application Process.

9.7.3 The project team shall evaluate the tolerability of the potential threats identified in 9.8.1 based on the cultural resource property's protection goals and objectives developed in compliance with Sections 4.2 and 4.3 and the tolerability thresholds developed in compliance with 5.2.5.

9.8 Vulnerability Assessment and Evaluation.

9.8.1 The project team shall evaluate the potential consequences and estimate the frequency of damage or losses from all potential threats identified in 9.7.3 as unacceptable using methods described in Section 5.3.

9.8.2 The project team shall determine risk tolerability by comparing the risk from the potential threats identified in 9.7.3 with the goals and objectives developed in compliance with Sections 4.2 and 4.3 and the tolerability thresholds developed in compliance with 5.2.5.

9.9 Plans and Designs.

9.9.1 The project team shall develop plans and designs to eliminate, manage, or control risks identified as intolerable in 9.8.2.

9.9.2 The project team shall evaluate planned modifications or additions to determine their impact on culturally significant elements, collections, and operations.

9.9.3 Alternative methods that offer equivalent or greater protection while preserving the character-defining spaces, features, finishes, and collections of the cultural resource property shall be permitted.

9.9.4 The project team shall identify any impact the project might have on the existing protection plan and notify those responsible for updating or changing it.

9.10 Options.

9.10.1 Projects that satisfy the objectives developed in compliance with Section 4.3 shall be subject to the compliance audit required by 9.13.39.

▲ 9.10.2 Where projects do not satisfy the objectives developed in compliance with Section 4.3 or have protection deficiencies, the project team shall develop a corrective action plan that satisfies one of the following:

- (1) Prescriptive compliance, including equivalencies, alternatives, and modifications
- (2) Performance-based compliance
- (3) Any combination of items 9.10.2(1) and 9.10.2(2)

9.10.3 Option Evaluation and Selection.

9.10.3.1* Selection Criteria.

9.10.3.2 The project team shall evaluate the available options and select a method for applying the code.

9.10.3.3 Prescriptive solutions shall meet requirements of Chapters 1 through 8, Sections 9.1 through 9.12, Section 9.14, and Chapters 10 through 15 of this code, including any exceptions contained within the referenced prescriptive codes and standards.

9.10.3.4 Performance-based solutions shall be developed in accordance with Chapters 1 through 8, Sections 9.1 through 9.11, and Section 9.13 of this code.

9.11 Design Review. The project team shall review and approve the preferred design approach for achieving compliance.

9.12* Prescriptive-Based Option.

9.12.1 Prescriptive requirements of the applicable codes shall be applied with the intent of achieving the goals and objectives developed in compliance with Sections 4.2 and 4.3.

9.12.2 Application of prescriptive requirements shall include alternatives, equivalencies, modifications, or any combination thereof.

9.12.3* Alternatives. Prescribed alternative methods of compliance with the applicable code shall be identified.

9.12.4* Equivalency.

9.12.4.1 The authority having jurisdiction shall approve other fire safety approaches, systems, methods, or devices that are equivalent or superior to those prescribed by this code, provided adequate documentation is submitted to demonstrate equivalency.

9.12.4.2* Approaches, systems, methods, or devices approved as equivalent by the authority having jurisdiction shall be recognized as being in compliance with this code.

9.12.5* Modifications of Requirements.

9.12.5.1 The requirements of the applicable codes shall be permitted to be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction, but only where it is also clearly evident that a reasonable degree of safety is provided.

9.12.5.2 The modifications allowed, and any additional requirements imposed as a result, shall be documented in the protection plan.

▲ 9.12.6* Compensatory Features. Where equivalencies are proposed, the following fire safety features shall be considered as compensatory:

- (1) Noncombustible or limited-combustible construction materials
- (2) Noncombustible or fire-retardant treated interior finish materials
- (3) Noncombustible or fire-retardant treated materials for furnishings and contents
- (4) Rated walls and doors that prevent the horizontal spread of fire and smoke, to subdivide building areas or to segregate specific hazards, such as boilers, furnaces, or storage areas, from the remainder of the building
- (5) Enclosure of stairways, ventilation shafts, and other vertical openings with rated construction to prevent the vertical spread of fire and smoke
- (6)* Firestops and fireblocks to prevent the spread of fire within walls, between rafters and joists, and through horizontal and vertical fire barriers
- (7)* Fire-resistive construction using fire-resistive materials
- (8)* Fire detection and alarm systems that sound an alarm within the structure and that transmit an alarm signal to an alarm-monitoring location or to a local fire department
- (9) Automatic fire suppression systems
- (10) Automatic and manual standpipe systems
- (11) Management and operational controls that meet the requirements of Chapter 10

- (12) Installation of arc-fault circuit-interrupters (AFCIs)
- (13) Height of ceilings, with recognition that a large volume of space above head height provides occupants at floor level additional time to evacuate the room or building

9.12.7 Materials.

9.12.7.1 Noncombustible Material.

9.12.7.1.1* A material that complies with any one of the following shall be considered a noncombustible material:

- (1)* The material, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat
- (2) The material is reported as passing ASTM E136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*
- (3) The material is reported as complying with the pass/fail criteria of ASTM E136 when tested in accordance with the test method and procedure in ASTM E2652, *Standard Test Method for Behavior of Materials in a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C*.

[5000:7.1.4.1.1]

9.12.7.1.2 Where the term *limited-combustible* is used in this code, it shall also include the term *noncombustible*. [5000:7.1.4.1.2]

9.12.7.2 Limited-Combustible Material. A material shall be considered a limited combustible material where all the conditions of 9.12.7.2(1) and 9.12.7.2(2), and the conditions of either 9.12.7.2.1 or 9.12.7.2.2 are met: [5000:7.1.4.2]

- (1) The material does not comply with the requirements for a noncombustible material, in accordance with 9.12.7.1. [5000:7.1.4.2(1)]
- (2) The material, in the form in which it is used, exhibits a potential heat value not exceeding 3500 Btu/lb (8141 kJ/kg), when tested in accordance with NFPA 259. [5000:7.1.4.2(2)]

▲ **9.12.7.2.1** The material shall have the structural base of a noncombustible material with a surfacing not exceeding a thickness of 1/8 in. (3.2 mm) where the surfacing exhibits a flame spread index not greater than 50 when tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or UL 723, *Test for Surface Burning Characteristics of Building Materials*. [5000:7.1.4.2.1]

▲ **9.12.7.2.2** The material shall be composed of materials that, in the form and thickness used, neither exhibit a flame spread index greater than 25 nor evidence of continued progressive combustion when tested in accordance with ASTM E84 or UL 723, and are of such composition that all surfaces that would be exposed by cutting through the material on any plane would neither exhibit a flame spread index greater than 25 nor exhibit evidence of continued progressive combustion when tested in accordance with ASTM E84 or UL 723. [5000:7.1.4.2.2]

▲ **9.12.7.2.3** Materials shall be considered limited-combustible materials where tested in accordance with ASTM E2965, *Standard Test for Determination of Low Levels of Heat Release Rate for Materials and Products Using an Oxygen Combustion Calorimeter*, at an incident heat flux of 75 kW/m² for a 20-minute exposure, and both the following conditions are met:

- (1) The peak heat release rate shall not exceed 150 kW/m² for longer than 10 seconds.
- (2) The total heat released shall not exceed 8 MJ/m². [5000:7.1.4.2.3]

9.12.7.2.4 Where the term *limited-combustible* is used in this code, it shall also include the term *noncombustible*. [5000:7.1.4.2.4]

9.12.8 Fire Spread Control.

9.12.8.1 New openings in fire-rated assemblies, such as for doorways and pipe and duct penetrations, shall have self-closing or automatic fire doors and automatic fire dampers having fire resistance ratings in accordance with the applicable building code.

9.12.8.2 Actuation of any automatic fire protection system in a fire area shall close all automatic fire dampers in the fire areas served by the system.

9.12.8.3 Penetrations in fire-rated assemblies around wiring, pipes, ducts, and so forth, shall be sealed with approved materials to maintain the integrity of the fire-rated assembly.

9.12.8.4 New elevator shafts, dumbwaiters, stairways, and other vertical openings through the structure shall be constructed in a manner to prevent the spread of fire, smoke, and heat from one level to another.

9.12.8.5 New doors in fire-rated assemblies that are required to remain in the open position for any reason shall be equipped with approved door-holding devices controlled by a listed device or system.

▲ **9.12.8.6** Unless otherwise required by the applicable building code, the fire resistance rating required by this code shall be assessed by testing in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*.

▲ 9.12.9* Protection Systems.

▲ **9.12.9.1 Existing Protection Systems.** The project team shall evaluate the design and layout of existing premises security, fire detection, and fire suppression systems for impairments caused by the project work.

9.12.9.2 New Construction. New construction shall include all of the following features:

- (1) Fire detection systems as required by applicable codes
- (2) Automatic fire sprinkler systems or alternative suppression systems
- (3) Electronic premises security systems as required in the protection plan

9.12.10* Fire Detection and Alarm Systems. Fire detection and alarm systems shall comply with the requirements of NFPA 72.

9.12.10.1 Where a fire detection system is required, smoke detectors shall be installed where ambient conditions permit.

9.12.10.2 Where ambient conditions will adversely affect the performance, reliability, or normal operation of smoke detectors, other forms of detection technology, such as heat detection, shall be used.

9.12.11 Electronic Premises Security Systems. Electronic premises security systems shall comply with the requirements of NFPA 731.

9.12.12 Alarm Monitoring.

▲ **9.12.12.1** Automatic fire suppression systems shall be monitored by a fire alarm system complying with NFPA 72 or other approved, applicable standard.

9.12.12.2 Fire detection and alarm systems shall transmit alarm, supervisory, and trouble signals to an approved supervising station.

9.12.12.3 The supervising station and the communications methods used for fire alarm signal transmission shall comply with the requirements of NFPA 72.

9.12.12.4 Electronic premises security systems shall transmit alarm, trouble, and environmental signals to an approved monitoring station.

9.12.12.5 The monitoring station and the communications methods used for signal transmission shall comply with the requirements of NFPA 731.

9.12.13* Automatic Fire Sprinkler Systems.

9.12.13.1 Automatic fire sprinkler systems shall comply with the requirements of NFPA 13.

9.12.13.2* Standard response sprinklers shall be permitted for use in light hazard areas.

9.12.13.3* Corrosion Protection. Preaction and dry pipe systems shall be designed to minimize the risk of corrosion in accordance with the requirements of 9.12.13.3.1 through 9.12.13.3.6.5.

▲ **9.12.13.3.1*** Branch lines shall be pitched at least 4 mm/m ($\frac{1}{2}$ in. per 10 ft), and mains shall be pitched at least 2 mm/m ($\frac{1}{4}$ in. per 10 ft).

9.12.13.3.2 Auxiliary drains shall be provided at all dry system low points in accordance with NFPA 13.

9.12.13.3.2.1* Auxiliary drains shall be provided at all preaction system low points in accordance with the requirements for dry pipe systems whether the preaction system piping is subject to freezing or not.

9.12.13.3.2.2 Auxiliary drains shall be operated in accordance with the requirements of NFPA 25.

9.12.13.3.3* Where steel pipe is used in dry pipe and preaction systems, it shall be assumed that the water supplies and environmental conditions contribute to unusual corrosive properties.

▲ **9.12.13.3.4** A corrosion protection plan incorporating the design features and components required by NFPA 13 shall be developed to address piping corrosion.

9.12.13.3.5 Sprinkler piping and fittings shall be inspected annually for signs of corrosion, leakage, and physical damage, in accordance with NFPA 25.

9.12.13.3.6* An internal corrosion evaluation of system piping shall be conducted at intervals not to exceed 5 years.

9.12.13.3.6.1 The evaluation shall include an internal inspection of the piping condition near the sprinkler riser and the opening of the flushing connection on a system main.

9.12.13.3.6.2 Alternative nondestructive examination methods shall be permitted.

9.12.13.3.6.3 Where the inspection or examinations required by 9.12.13.3.6.1 or 9.12.13.3.6.2 reveal that pitting, nodules, tubercles, or carbuncles are present, an obstruction investigation shall be conducted in accordance with the requirements of NFPA 25.

9.12.13.3.6.4 Repairs shall be made as necessary.

9.12.13.3.6.5 Nonmetallic pipe shall not be required to be inspected internally.

9.12.13.4 CPVC Pipe.

9.12.13.4.1* CPVC pipe shall be stored and handled in accordance with the manufacturer's installation instructions and the applicable requirements of NFPA 13.

9.12.13.4.2* CPVC pipe shall be installed in accordance with the manufacturer's installation instructions.

9.12.13.4.3* The governing body of the cultural resource property shall develop plans and procedures to ensure CPVC pipe is not exposed to physical damage or incompatible materials over the life of the sprinkler system.

9.12.14 Alternative Fire Suppression Systems. Where other types of fire suppression systems are provided, they shall comply with the applicable standard referenced in Table 9.12.14.

9.12.15* Standpipe and Hose Systems. Standpipe and hose systems, where required, shall comply with the requirements of NFPA 14.

9.12.16* Portable Fire Extinguishers. Portable fire extinguishers shall be selected, installed, and maintained in compliance with the provisions of NFPA 10.

9.12.17* Testing of Integrated Systems. Integrated fire protection and life safety systems shall be tested in accordance with NFPA 4.

▲ **Table 9.12.14 Fire Suppression System Installation Standards**

Fire Suppression System Type	NFPA Standard
Low-, medium-, and high-expansion foam systems	NFPA 11
Carbon dioxide systems	NFPA 12
Halon 1301 systems	NFPA 12A
Water spray fixed systems	NFPA 15
Deluge foam-water sprinkler systems	NFPA 16
Dry chemical systems	NFPA 17
Wet chemical systems	NFPA 17A
Water mist systems	NFPA 750
Clean agent extinguishing systems	NFPA 2001
Aerosol extinguishing systems	NFPA 2010

9.12.18 Roof Coverings.

9.12.18.1 Unlisted combustible roof coverings shall be treated with an approved fire-retardant coating.

9.12.18.2 The facility shall maintain a record of the treatment, including certificates of approval of retardant, application method, and retreatment schedule.

9.12.18.3 Fire-retardant coated roof coverings shall be retreated in accordance with the manufacturer's specifications.

9.12.19 Emergency Power.

9.12.19.1* Emergency generators, where required, shall comply with the requirements of NFPA 110.

9.12.19.2 Emergency generators shall have sufficient capacity to support critical fire safety functions and fire suppression systems, where required.

9.12.19.3* Emergency generators that support other functions considered essential shall have sufficient capacity to support all functions with no degradation of fire safety system support.

9.12.20* Hazardous Areas. Hazardous areas shall be separated from other areas by a fire separation rated for a minimum of 1-hour fire resistance rating.

9.12.21 Interior Finishes. Interior finish materials shall comply with the requirements of the applicable building code, except that the use of textile wall coverings and textile ceiling coverings shall comply with 9.12.21.1, 9.12.21.2, or 9.12.21.3.

Δ 9.12.21.1 Textile wall coverings and textile ceiling coverings tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or UL 723, *Test for Surface Burning Characteristics of Building Materials*, having a flame spread index of 0 through 25 and a smoke developed index of 0 through 450, shall be permitted where one of the following conditions is met:

- (1) Rooms or areas are protected by an approved automatic sprinkler system.
- (2) Partitions do not exceed three-quarters of the floor-to-ceiling height or do not exceed 2330 mm (8 ft) in height, whichever is less.
- (3) Textile wall coverings extend not more than 1220 mm (48 in.) above the finished floor on ceiling-height walls and ceiling-height partitions.

9.12.21.2 Textile wall coverings tested using method B of the test protocol of NFPA 265 shall be permitted where all of the following conditions are met:

- (1) Flame shall not spread to the ceiling during the 40 kW
- (2) During the 150 kW exposure, the following criteria shall be met:
 - (a) Flame shall not spread to the outer extremities of the sample on the 2440 mm × 3660 mm (8 ft × 12 ft) wall.
 - (b) Flashover shall not occur.

9.12.21.3 Textile wall coverings and textile ceiling coverings tested in accordance with NFPA 286 shall be permitted where all the following conditions are met:

- (1) Flames shall not spread to the ceiling during the 40 kW exposure.
- (2) During the 160 kW exposure, the following criteria shall be met:

- (a) Flame shall not spread to the outer extremities of the sample on the 2440 mm × 3660 mm (8 ft × 12 ft) wall.
- (b) Flashover shall not occur.
- (3) The peak heat release rate throughout the test shall not exceed 800 kW.
- (4) For new installations, the total smoke released throughout the test shall not exceed 1000 m² (10,760 ft²).

9.12.22* Lightning Protection. A lightning protection system, where required, shall be designed, installed, and maintained in accordance with NFPA 780.

9.12.23 Location. A cultural resource property located within or attached to a building or structure classified as industrial or storage or containing high-hazard contents as classified by the applicable building code shall be separated from the other use area by walls or partitions and floor or floor-ceiling assemblies having a fire resistance rating in accordance with the applicable building code.

9.12.24 Collection Storage Areas. This section shall apply to building areas used for collection storage areas.

9.12.24.1 Construction.

9.12.24.1.1 Collection storage areas shall be enclosed by fire barriers having a minimum 1-hour fire resistance rating.

9.12.24.1.2 Collection storage areas adjoining incinerator rooms, furnace and boiler rooms, paint shops, and other spaces having a significant fire hazard shall be separated from such spaces by a fire barrier having a 2-hour fire resistance rating.

9.12.24.2 Emergency Lighting. Emergency lighting shall be provided for safe egress and shall comply with the requirements of the applicable building code, fire code, or life safety code.

9.12.24.3 Fire Protection.

9.12.24.3.1 Collection storage areas shall be provided with all of the following fire alarm system components:

- (1) Notification appliances
- (2) Manual fire alarm boxes
- (3) Automatic smoke detection

9.12.24.3.2* An approved automatic fire suppression system shall be provided in collection storage areas greater than 46.25 m² (500 ft²) unless the space contains only noncombustible collections including packing or crating materials, cabinets, and shelves or where all collections are stored inside approved noncombustible cabinets.

9.12.24.4* Compact Storage.**9.12.24.4.1 Fire Suppression System.**

9.12.24.4.1.1 An automatic fire suppression system shall be required for compact storage of collections.

9.12.24.4.1.2 Where the compact storage system consists entirely of enclosed noncombustible cabinets and no collections or other combustibles are stored outside of the enclosed cabinets, automatic fire suppression shall be permitted to be omitted subject to the approval of the authority having jurisdiction.

9.12.24.4.1.3* The design shall recognize the nature of the potential threat of a fire that originates in a compact mobile storage unit, where fuel loads are invariably large and fire growth is significantly different from that in other kinds of storage.

9.12.24.4.1.4 System Design.

(A)* The automatic fire suppression system, the compact storage system, and the storage compartmentalization features shall be designed to limit fire damage in accordance with the facility's fire safety objectives.

(B) Design calculations shall include the number and size of the storage modules, the separation provided between the modules end-to-end and back-to-back, and type of material being stored.

(C) Sprinkler systems shall be wet pipe, single interlock preaction, or non-interlock preaction systems.

(D) Dry pipe or double-interlock preaction sprinkler systems shall not be installed in compact storage areas.

(E) Where compact storage is installed in an existing storage area, the existing automatic fire detection and fire suppression systems shall be modified as required to accommodate the increased fire loading.

9.12.24.5 Utilities.

9.12.24.5.1 Utilities other than those supporting fire suppression, fire detection, and security systems, or that directly serve the space, shall not pass through collection storage areas.

9.12.24.5.2 Controls for utilities that serve the collection storage area shall be located outside the space so that access to the controls does not require entry into the collections storage areas.

9.12.24.5.3 Controls for utilities that serve collection storage areas shall be designed to allow isolation of storage space utilities in an emergency.

9.12.24.5.4 Electrical distribution power panels shall not be installed in collection storage areas.

9.12.24.6* Smoke Control. Approved systems shall be provided to prevent smoke and soot from entering collection storage areas.

9.12.24.7 Wet Collections.

N 9.12.24.7.1 Shelving units used to hold wet collections shall meet the following requirements:

- (1) Designed to support the loads placed on them
- (2) Tied together or anchored securely to prevent an earthquake or other event from toppling one or more shelves
- (3) Constructed with raised lips and barriers across all open shelves to prevent containers from falling off the shelf
- (4) Anchored and braced in storage areas that are subject to earthquakes
- (5)* Designed such that anchors and bracing provide shelving with strength equal to or greater than the building structure

N 9.12.24.7.2 Wet collection storage areas shall be designed to limit damage to collections and the building in accordance with the facility's fire safety objectives.

N 9.12.24.7.2.1 Wet collection storage areas of 46.45 m² (500 ft²) or less shall be enclosed with a minimum of 2-hour fire-rated construction.

N 9.12.24.7.2.2 Storage areas greater than 46.45 m² (500 ft²) shall meet the separation requirements of NFPA 30 for liquid warehouses.

N 9.12.24.7.2.3 Wet collections shall be protected with an automatic water-based fire suppression system.

N 9.12.24.7.2.4 Automatic sprinkler systems shall be wet pipe, single interlock, or noninterlock pre-action sprinkler systems.

N 9.12.24.7.2.5 Area smoke detection and gas detection shall be provided for wet collection storage areas and shall be installed in accordance with the requirements of NFPA 70 for Class I, Division II locations.

9.12.24.8* Book Stacks.

9.12.24.8.1 The fire load within a fire compartment containing a multi-tier book stack shall be determined by combining the fuel loading of all levels or tiers in the multi-tier book stack enclosed by the fire compartment.

9.12.24.8.2 An automatic fire detection system designed and installed in compliance with NFPA 72 shall be installed in single-tier book stacks.

9.12.24.8.3 A sprinkler system designed and installed in compliance with NFPA 13 shall be installed in the book stacks.

9.12.24.8.4 Smoke barriers shall be installed in all vertical openings between tiers or decks of multi-tier book stacks.

9.12.24.9 Security.

9.12.24.9.1 Collections storage areas shall be equipped with burglary-resistant locks.

9.12.24.9.1.1 Keyed locks shall have a strike bolt into a solid frame.

9.12.24.9.1.2 Strike plates shall be fastened through the frame and into the structure.

9.12.24.9.2 Doors shall be of a solid-core design or steel construction.

9.12.24.9.2.1 Hinges shall be on the secure side of the door.

9.12.24.9.2.2 When the door must swing out, the hinges shall be protected using nonremovable hinge pins or hinges that incorporate security studs.

9.12.24.9.2.3 Door frames shall be fastened to the wall studs.

9.12.24.9.3 Where collections storage rooms are equipped with intrusion alarms, the alarms shall be installed in accordance with NFPA 731.

9.12.24.10 Secondary Storage Facilities. Secondary storage facilities greater than 46.25 m² (500 ft²) shall be protected by automatic fire sprinklers installed in compliance with NFPA 13.

9.12.24.10.1 Vertical Shelf Barriers. Shelving shall be provided with full height solid vertical transverse barriers of 9.5 mm ($\frac{3}{8}$ in.) plywood or particleboard, 22 ga. sheet metal, or equivalent, from face of aisle to face of aisle, spaced at intervals not exceeding 13.7 m (45 ft).

9.12.24.10.2 Powered Industrial Trucks. Use, maintenance, and operation of powered industrial trucks shall comply with NFPA 505.

9.12.25* Exhibit Design and Construction.

9.12.25.1 Protection Plan.

9.12.25.1.1 The fire safety manager shall review exhibit installation plans to ensure compliance with the protection plan.

Δ 9.12.25.1.2 The proposed exhibit shall not compromise or adversely affect the following in the exhibit, the exhibition area, or the building:

- (1) Egress systems, equipment, and measures
- (2) Emergency access
- (3)* Fire protection systems
- (4) Fire safety
- (5) Emergency lighting systems

9.12.25.1.3 Special lighting effects in the exhibit and exhibition area shall not reduce illumination below the minimum level specified by the applicable building code, fire code, or life safety code for egress.

9.12.25.1.4 Special lighting effects shall not create a fire hazard.

9.12.25.1.5 The fire safety manager shall be informed and involved at every stage including preliminary planning, design, fabrication, and installation for each exhibit mounted or installed.

9.12.25.2 Exhibit Cases.

9.12.25.2.1 Fixed exhibit cases that are integral with the building structure in fully protected buildings or where fire suppression systems are required by the applicable building code shall be equipped with approved fire detection and suppression systems.

9.12.25.2.1.1* Fixed or movable exhibit cases that are not integral with the building structure in fully protected buildings or where fire suppression systems are required by the applicable building code shall be equipped with approved fire detection systems.

9.12.25.2.1.2 Fire suppression systems shall be permitted to be deleted when the exhibit cases have all of the following:

- (1) No internal ignition sources
- (2) Full enclosure with complete sides, top, and bottom that are not integral with the building structure
- (3) Do not communicate directly with the primary HVAC system or with void spaces in the walls, floor, or ceiling
- (4) Fixed cases constructed of metal, glass, or other noncombustible material
- (5) The areas around the exhibit cases protected by an automatic fire suppression system

9.12.25.2.2* Light fixtures, motors, active climate control systems, or other electrical or mechanical components installed in exhibit cases shall be located outside the artifact chamber.

9.12.25.2.3* Where flammable or highly combustible materials are displayed in exhibit cases, whether movable or fixed, the cases or the areas in which they are located shall be protected by approved fire detection and fire suppression systems.

9.12.25.3 Exhibit Materials.

9.12.25.3.1* Exhibits shall be fabricated and constructed using materials that are either noncombustible or fire retardant treated.

9.12.25.3.2* When the fire-retardant treatment may harm a collection object, exhibit construction or backing materials shall not be fire retardant treated when all of the following are true:

- (1) The fire retardant material is close enough to the collection object to have the capacity to harm.
- (2) The distance for capacity to harm is calculated for each collection object in the case.
- (3) Fire-retardant treatment is only omitted where it has the capacity to harm a collection object.

9.12.25.3.3 Exhibit construction or backing materials treated with a chemical fire retardant shall be retreated at intervals in accordance with the manufacturer's specifications.

9.12.25.4 Electrical Requirements.

9.12.25.4.1 Electrical wiring and work installed for an exhibit shall comply with the provisions of *NFPA 70*.

9.12.25.4.2* Arc-fault circuit-interrupters (AFCIs) shall be required in new exhibit construction.

9.12.25.5 Fire Protection.

9.12.25.5.1* Temporary walls and exhibit components shall not interfere with the following:

- (1) Coverage for fire alarm notification appliances
- (2) Operation of fire alarm manual station or automatic detection device
- (3) Spacing and location of automatic fire sprinklers
- (4) Operation of other automatic fire suppression system

9.12.25.5.2 Where interference with a fire protection system cannot be avoided, the system shall be modified to comply with the requirements of the applicable installation standard.

9.12.25.5.3 Display areas shall be evaluated for change in classification of occupancy and commodity as required by NFPA 13.

9.12.25.5.4 When there is a change in classification of occupancy or commodity, automatic fire suppression systems shall be redesigned or modified to protect the new classification.

9.12.26 Hazardous Areas.

9.12.26.1 General. Hazardous areas shall comply with both of the following:

- (1) Be separated from other areas by a minimum of 1-hour fire-rated construction
- (2) Be protected by an automatic fire suppression system

9.12.26.2* Painting. Paint spraying and spray booths shall comply with NFPA 33.

9.12.26.3* Laboratories. Laboratories shall comply with NFPA 45.

9.12.26.3.1 Laboratories shall be protected by an automatic fire suppression system.

9.12.26.3.2 Where required, explosionproof or intrinsically safe-type lighting fixtures, motors, and switches shall be installed in compliance with *NFPA 70*.

9.12.27 Public Areas.

9.12.27.1 Tiered structures and other elevated platforms on which people are permitted to sit shall be of noncombustible construction.

9.13* Performance-Based Option.

9.13.1 Application. The requirements of this section shall apply to protection systems and life safety systems designed using the performance-based option permitted by 9.10.3.

9.13.2 Goals and Objectives. The performance-based design shall meet the goals and objectives of this code identified in Sections 4.2 and 4.3.

9.13.3* Approved Qualifications. The performance-based design shall be prepared by a person with qualifications acceptable to the authority having jurisdiction.

9.13.4* Independent Review. The authority having jurisdiction shall be permitted to require review and evaluation of the proposed design by an approved, independent third party.

9.13.5 Sources of Data.

9.13.5.1 The source for each input data requirement that must be met using a data source other than a design fire scenario, an assumption, or a building design specification shall be identified and documented.

9.13.5.2 Such data shall be characterized as to the degree of conservatism reflected, and a justification for the source shall be provided.

9.13.6 Final Determination. The authority having jurisdiction shall make the final determination as to whether the performance objectives have been met.

9.13.7* Maintenance of Design Features.

9.13.7.1 Design features and management programs required for the building to continue to meet the performance goals and objectives of this code shall be maintained for the life of the building.

9.13.7.2 These management programs shall include compliance with all documented assumptions and design specifications.

9.13.7.3 Any variations to a management program shall require the approval of the authority having jurisdiction prior to the actual change.

9.13.8 Special Definitions. The following is a list of special terms used in this chapter:

- (1) Design fire scenario (*See 3.3.75.1.*)
- (2) Design team (*See 3.3.20.*)
- (3) Exposure fire (*See 3.3.22.*)
- (4) Fire model (*See 3.3.26.*)
- (5) Fire scenario (*See 3.3.75.2.*)
- (6) Fuel load (*See 3.3.34.*)
- (7) Input data specification (*See 3.3.45.*)
- (8) Occupant characteristics (*See 3.3.56.*)
- (9) Performance criteria (*See 3.3.59.*)
- (10) Proposed design (*See 3.3.65.*)
- (11) Safety factor (*See 3.3.73.*)

- (12) Safety margin (*See 3.3.74.*)
- (13) Sensitivity analysis (*See 3.3.3.1.*)
- (14) Stakeholder (*See 3.3.82.*)
- (15) Uncertainty analysis (*See 3.3.3.2.*)
- (16) Verification method (*See 3.3.86.*)

9.13.9 Performance Criteria.

9.13.9.1 A cultural resource property shall meet the performance criteria for cultural resource property and collection conservation and continuity of operations.

9.13.9.2 Each design shall meet the objectives specified in Section 4.3 if, for each design fire scenario, assumption, and design specification, the performance criteria in 9.13.10 through 9.13.12 are met.

9.13.10 Collections Preservation Performance Criteria. No items of cultural value other than those intimate with the initiating event shall be exposed to instantaneous or cumulative untenable conditions.

9.13.11* Cultural Resource Property Preservation Criteria. Culturally significant features, rooms, spaces, or contents shall not be exposed to instantaneous or cumulative fire effects that would cause irreversible damage.

9.13.12 Continuity of Operations Criteria. The cultural institution shall not experience a disruption of routine operations greater than the risk tolerability thresholds developed in compliance with 5.2.5.

9.13.13 Design Specifications and Other Conditions.

9.13.13.1* Design specifications and other conditions used in the performance-based design shall be demonstrated to the authority having jurisdiction to be realistic and sustainable.

9.13.13.2 Assumptions and Design Specifications Data.

9.13.13.2.1 Each assumption and design specification used in the design shall be accurately translated into input data specifications, as appropriate for the calculation method or model.

9.13.13.2.2 Any assumptions and design specifications that the design analyses do not explicitly address or incorporate and that are therefore omitted from input data specifications shall be identified, and a sensitivity analysis of the consequences of that omission shall be performed.

9.13.13.2.3 Any assumptions and design specifications modified in input data specifications because of limitations in test methods or other data generation procedures shall be identified, and sensitivity analysis of the consequences of the modification shall be performed.

9.13.13.3* Building Characteristics. Characteristics of the building or its contents, equipment, or operations not inherent in the design specifications but that affect occupant behavior or the rate of hazard development shall be explicitly identified.

9.13.13.4* Operational Status and Effectiveness of Building Features and Systems. The performance of protection systems and building features shall reflect the documented performance of components of those systems or features unless design specifications are incorporated to modify the expected performance.

9.13.13.5 Occupant Characteristics.

9.13.13.5.1* General. The selection of occupant characteristics to be used in the design calculations shall be approved by the authority having jurisdiction and shall provide an accurate reflection of the expected population of building users.

9.13.13.5.2 Occupant characteristics shall represent the normal occupant profile unless design specifications are used to modify the expected occupant features.

9.13.13.5.3 Occupant characteristics shall not vary between design scenarios except as authorized by the authority having jurisdiction.

9.13.13.5.4* Response Characteristics. Each of the following basic performance characteristics shall be considered:

- (1) Sensibility
- (2) Reactivity
- (3) Mobility
- (4) Susceptibility

9.13.13.5.4.1 Estimations of these characteristics shall reflect the expected distribution in a population appropriate to the use of the building.

9.13.13.5.4.2 The source of the data for these characteristics shall be documented.

9.13.13.5.5 Location. The assumption shall be made that in every normally occupied room or area at least one person will be located at the most remote point from the exit.

9.13.13.5.6* Occupant Load.

9.13.13.5.6.1 The design shall be based on the maximum number of people that every occupied room or area is expected to contain.

9.13.13.5.6.2 Where success or failure of the design is contingent on a maximum number of occupants, operational controls shall be used.

9.13.13.5.7* Staff Assistance. The ability of trained employees to be included, as part of the protection system, shall be identified, and the necessary training and capabilities documented.

9.13.13.6 Emergency Response Personnel. Design characteristics or other conditions related to the availability, speed of response, effectiveness, roles, and other characteristics of emergency response personnel shall be specified, estimated, or characterized sufficiently for evaluation of the design.

9.13.13.7* Post-Construction Conditions. Design characteristics or other conditions related to activities during the life of the building that affect the ability of the building to meet the stated goals and objectives shall be specified, estimated, or characterized sufficiently for evaluation of the design.

9.13.13.8 Off-Site Conditions. Design characteristics or other conditions related to resources or conditions outside the property being designated that affect the ability of the building to meet the stated goals and objectives shall be specified, estimated, or characterized sufficiently for evaluation of the design.

9.13.13.9* Consistency of Assumptions. The design shall not include mutually inconsistent assumptions, specifications, or statements of conditions.

9.13.13.10* Special Provisions. Additional provisions not covered by 9.7.1.1 but that are required for the design to comply with the performance objectives shall be documented.

9.13.14* Design Fire Scenarios.

9.13.14.1 The authority having jurisdiction shall approve the parameters used in design fire scenarios.

9.13.14.2 The proposed design shall be regarded as meeting the goals and objectives if it achieves the performance criteria for each required design fire scenario (*see 9.13.16*).

9.13.15* Evaluation.

9.13.15.1 Design fire scenarios shall be evaluated using a method acceptable to the authority having jurisdiction and appropriate for the conditions expected to be present.

9.13.15.2 Each scenario shall be challenging, but realistic, with respect to at least one of the following scenario specifications:

- (1) Initial fire location
- (2) Early rate of growth in fire severity
- (3) Smoke generation

9.13.16* Required Design Fire Scenarios.

9.13.16.1 Design fire scenarios shall include but not be limited to those specified in 9.13.16.2 through 9.13.16.9.

9.13.16.1.1 Each scenario shall include a life safety aspect (Part A) and a building protection aspect (Part B) when applicable.

9.13.16.1.2 Scenarios demonstrated by the design team to the satisfaction of the authority having jurisdiction as inappropriate for the building use and conditions shall not be required.

9.13.16.2* Design Fire Scenario 1. Design Fire Scenario 1 shall be an occupancy-specific design fire scenario representative of a typical fire for the occupancy.

9.13.16.2.1 This scenario shall explicitly account for the following:

- (1) Occupant activities, number, and location
- (2) Room size
- (3) Nature and significance of furnishings and contents
- (4) Fuel properties and ignition sources
- (5) Ventilation conditions

9.13.16.2.2 The first item ignited and its location shall be explicitly defined.

9.13.16.3* Design Fire Scenario 2. Design Fire Scenario 2 shall be an ultrafast-developing fire in the primary means of egress with interior doors open at the start of the fire.

9.13.16.3.1 Part A. This design fire scenario shall address a reduction of the number of available means of egress.

9.13.16.3.2 Part B. This design fire scenario shall address an increase in the effects of a rapidly spreading fire on interior finish and structural components.

9.13.16.4* Design Fire Scenario 3. Design Fire Scenario 3 shall be a fire that starts in a normally unoccupied room and that potentially endangers a large number of occupants in a large room or other area nearby.

9.13.16.4.1 Part A. This design fire scenario shall address a fire that starts in a normally unoccupied room and migrates into the space that can hold the greatest number of occupants in the building.

9.13.16.4.2 Part B. This design fire scenario shall address a fire that starts in an unoccupied space and that potentially can grow and endanger the area of greatest cultural significance or the most significant elements of the collections.

9.13.16.5* Design Fire Scenario 4. Design Fire Scenario 4 shall be a fire that originates in a concealed wall or ceiling space adjacent to a large number of occupants in a large room.

9.13.16.5.1 Part A. This design fire scenario shall address a fire that originates in a concealed wall or ceiling space that does not have either a detection system or suppression system, and that spreads into the room within the building that potentially can hold the greatest number of occupants.

9.13.16.5.2 Part B. This design fire scenario shall address a fire that originates in a concealed wall or ceiling space with neither a detection system nor a suppression system and that potentially can grow and endanger the area of greatest cultural value or the most significant elements of the collection.

9.13.16.6* Design Fire Scenario 5. Design Fire Scenario 5 shall be a slow-developing fire that is shielded from the fire protection systems and is in close proximity to a high-occupancy area.

9.13.16.6.1 Part A. This design fire scenario shall address a relatively small ignition source that causes a significant fire.

9.13.16.6.2 Part B. This design fire scenario shall address a relatively small ignition source that causes a significant fire that potentially endangers the area of greatest cultural value or the most significant elements of the collection as the result of the delayed suppression of the fire.

9.13.16.7* Design Fire Scenario 6.

9.13.16.7.1 Design Fire Scenario 6 shall be the most severe fire that results from the largest possible fuel load characteristic of the normal operation of the building.

9.13.16.7.2 This section shall address the concern of a rapidly developing fire with occupants present.

9.13.16.8* Design Fire Scenario 7.

9.13.16.8.1 Design Fire Scenario 7 shall be an outside exposure fire.

9.13.16.8.2 This scenario shall address a fire that starts remotely from the area of concern and either spreads into the area, blocks escape from the area, or develops untenable conditions within the area

9.13.16.9* Design Fire Scenario 8. This scenario shall be a fire that originates in ordinary combustibles in a room or area with each passive or active fire protection system rendered unavailable one by one.

9.13.16.9.1 This set of design fire scenarios shall address each fire protection system or fire protection feature, considered individually, being unreliable or unavailable.

9.13.16.9.2* Design Fire Scenario 8 shall not be required for fire protection systems where the level of reliability in conjunction

with the design performance in the absence of the system is acceptable to the authority having jurisdiction.

9.13.17 Design Fire Scenario Data.

9.13.17.1 Each design fire scenario used in the performance-based design proposal shall be translated into input data specifications, as appropriate for the calculation method or model.

9.13.17.2 Any design fire scenario specifications that the design analyses do not explicitly address or incorporate, and that are therefore omitted from the data input specifications, shall be identified, and a sensitivity analysis of the consequences of that omission shall be performed.

9.13.17.3 Any design fire scenario specifications modified in input data specifications, because of limitations in test methods, or other data generation procedures shall be identified, and a sensitivity analysis of the consequences of the modification shall be performed.

9.13.18 Evaluation of Proposed Design.

9.13.18.1 A proposed design's performance shall be assessed relative to each performance objective in Section 4.3 and each applicable scenario in Section 9.5, with the assessment conducted through the use of appropriate calculation methods.

9.13.18.2 The authority having jurisdiction shall approve the choice of assessment methods.

9.13.18.3 The design professional shall use the assessment methods to demonstrate that the proposed design will achieve the goals and objectives as measured by the performance criteria in light of the safety margins and uncertainty analysis for each scenario given the assumptions.

9.13.19 Input Data.

9.13.19.1 Input data for computer fire models shall be obtained in accordance with ASTM E1591, *Standard Guide for Obtaining Data for Fire Growth Models*.

9.13.19.2 Data for use in analytical models that are not computer-based fire models shall be obtained using appropriate measurement, recording, and storage techniques to ensure the applicability of the data to the analytical method being used.

9.13.19.3 A complete listing of input data requirements for all models, engineering methods, and other calculation or verification methods required or proposed as part of the performance-based design shall be provided.

9.13.19.4* Uncertainty in input data shall be analyzed and, as determined appropriate by the authority having jurisdiction, addressed through the use of conservative values.

9.13.20* Output Data. The assessment methods used shall accurately and appropriately produce the required output data from input data based on the design specifications, assumptions, and scenarios.

9.13.21* Validity. Evidence shall be provided that confirms the validity and appropriateness of assessment methods used for the proposed building, use, and conditions.

9.13.22* Safety Factors. Approved safety factors shall be included in the design methods and calculations to reflect uncertainty in the assumptions, data, and other factors associated with the performance-based design.

9.13.23* Documentation Requirements.

9.13.23.1 All aspects of the design, including those described in 9.13.24 through 9.13.35, shall be documented.

9.13.23.2 The format and content of the documentation shall be acceptable to the authority having jurisdiction.

9.13.24 Technical References and Resources.

9.13.24.1 The authority having jurisdiction shall be provided with documentation to support the validity, accuracy, relevance, and precision of the proposed methods.

9.13.24.2 The engineering standards, calculation methods, and other forms of scientific information provided shall be appropriate for the particular applications and methodologies used.

9.13.25 Building Design Specifications. All details of the proposed building design that affect the ability of the building to meet the stated goals and objectives shall be documented.

9.13.26 Performance Criteria. Performance criteria, with sources, shall be documented.

9.13.27 Occupant Characteristics. Assumptions regarding occupant characteristics shall be documented.

9.13.28 Design Fire Scenarios. Descriptions of design fire scenarios shall be documented.

9.13.29 Input Data. Input data to models and assessment methods, including sensitivity analysis, shall be documented.

9.13.30 Output Data. Output data from models and assessment methods, including sensitivity analysis, shall be documented.

9.13.31 Safety Factors. Safety factors utilized shall be documented.

9.13.32 Prescriptive Requirements. Retained prescriptive requirements shall be documented.

9.13.33* Modeling Features.

9.13.33.1 Assumptions made by the model user and descriptions of models used, including known limitations, shall be documented.

9.13.33.2 Documentation shall be provided that indicates the validity and appropriateness of the assessment methods used to address the design specifications, assumptions, and scenarios.

9.13.34 Evidence of Modeler Capability. The design team's relevant experience with the models, test methods, databases, and other assessment methods used in the performance-based design proposal shall be documented.

9.13.35 Use of Performance-Based Option. Design proposals shall include documentation that provides anyone involved in ownership or management of the building with notification of the following:

- (1) The building was approved as a performance-based design with certain specified design criteria and assumptions.
- (2) Any remodeling, modification, renovation, change in use, or change in the established assumptions shall require re-evaluation and re-approval.

- (3) All special events shall be reviewed and approved based upon the designs developed under this chapter.

9.13.36 Records. Records required in 9.13.23 shall be maintained for the life of the current performance-based design.

9.13.37 Initial Compliance Audit. The project team shall perform an initial compliance audit upon completion of the implementation phase to ensure compliance with the selected design approach.

9.13.38 Approval. The authority having jurisdiction shall make the final determination as to whether compliance has been achieved.

9.13.39 Periodic Compliance Audit.

9.13.39.1 Periodic compliance audits shall be performed to ensure continued compliance with the selected design approach.

9.13.39.2 Periodic compliance audits and closing conferences shall be conducted in accordance with Section 10.8 through 10.8.2.

9.14* Precautions During New Construction, Addition, Alteration, Renovation, and Modification Projects.

9.14.1 New construction, addition, alteration, renovation, and modification projects shall comply with NFPA 241 and Section 9.14.

9.14.2* All persons involved with the design of the building, exhibits, and other aspects of the project shall have a demonstrated knowledge of the cultural significance of the structure, the collection, or both.

9.14.3* All persons involved with the construction process shall be thoroughly briefed on the significance and importance of the structure, spaces, character-defining features, and collections prior to the beginning of the work.

9.14.4* Contractor Selection. Contractors selected to work on the project shall have a demonstrated knowledge and experience in working with cultural resource properties.

9.14.5* Contracts. All construction, alteration, renovation, and modification contracts shall specify methods and responsibility for controlling fire hazards.

9.14.6* Initial Meeting/Indoctrination of Contractors.

9.14.6.1 Prior to beginning work on projects, an introductory meeting shall be held with the contractors, subcontractors, and representatives of the cultural resource property.

9.14.6.2 All persons involved in the construction process shall be thoroughly briefed on the significance and importance of the structure, spaces, character-defining features, and collections prior to beginning work.

9.14.6.3 The initial meeting shall cover the project fire safety program, including special protection for existing facilities and contents, emergency precautions, notification of both emergency services and curatorial staff, and security issues pertinent to the project.

9.14.7 Supervision During Construction. The governing body of the cultural resource property shall designate its own representative who shall have the authority to specify additional

protection requirements for the construction project necessary to safeguard the existing facility, its contents, and fabric.

9.14.7.1 The governing body's representative shall have the authority to enforce the cultural resource property's protection requirements and to stop work or other activities when they jeopardize the safety or security of the facility or its contents.

9.14.7.2 This supervision shall include the following:

- (1) Site security and monitoring of contractors and visitors
- (2) Isolation of construction from the existing building and collections
- (3) Location and handling of flammable and combustible liquids and flammable gases
- (4) Removal of rubbish and combustibles
- (5) Hot work and other sources of ignition
- (6)* Handling of sprinklers and other fire protection system components

9.14.7.3* Following suspension of work each day, the representative or designee shall conduct a walk-through of the work area and surroundings to ensure that the site is secured and fire hazards have been eliminated or controlled.

9.14.8 Control Area.

9.14.8.1 A suitable location at the site shall be designated as a control area and shall be equipped with floor plans, utility control plans, emergency contact telephone numbers, labeled keys, and appropriate material safety data sheets.

9.14.8.2 Where security is of concern, this area shall be locked.

9.14.9 Emergency Communication.

9.14.9.1 Prior to beginning any renovations, modifications, or alterations, workers shall be instructed on emergency communications procedures.

9.14.9.2 A fixed telephone, cellular telephone, or equivalent method of summoning the fire service or local police shall be provided and readily available.

9.14.9.3 The telephone number of the fire service and the local police shall be prominently posted, and shall be on or immediately adjacent to each fixed telephone.

9.14.9.4 Written instructions shall be posted on how to call police for a security breach, notify the local fire service of a fire, and on actions for security officers or other staff to take after the police or fire service have been notified.

9.14.10* Pre-Fire Plan.

9.14.10.1 Access for fire department apparatus to the immediate job site shall be provided at the start of construction and maintained until all construction is completed.

9.14.10.2 Free access from the street to fire hydrants and to outside connections for standpipes, sprinklers, or other fire extinguishing equipment, whether permanent or temporary, shall be provided and maintained at all times.

9.14.11 Pedestrian Walkways. Protective pedestrian walkways shall not impede access to hydrants, fire department connections, or fire extinguishing equipment.

9.14.12* Security.

9.14.12.1 Access to construction areas shall be limited to personnel authorized by the owner or contractor.

9.14.12.2* Security officers assigned to the construction areas and the fire safety manager shall receive daily updates from those responsible for construction on the status of and impairments to the fire protection equipment, special hazards including hot work, modified access routes, and emergency procedures.

9.14.12.3 Existing electronic premises security systems and physical security systems shall be maintained in proper working order during the project to the extent consistent with the nature of the construction.

9.14.12.4 Openings that provide access into protected areas in the cultural resource property shall be covered or secured to prevent unauthorized access into the facility.

9.14.12.5 Ladders and stairways on scaffolding that provide access to upper levels of the cultural resource property shall be secured to prevent unauthorized persons from using the scaffolding to gain access to the facility.

9.14.13 Protection System Impairments.

9.14.13.1 The provisions of Section 12.4 shall apply when fire protection systems or equipment are taken out of service.

9.14.13.2 The provisions of Section 12.5 shall apply when electronic premises protection systems are taken out of service.

9.14.14 Fire Protection Systems.

9.14.14.1 Fire Alarm Systems.

9.14.14.1.1 Existing fire detection and alarm systems shall be maintained in proper working order during the project to the extent consistent with the nature of the construction.

9.14.14.1.2* Protection During Construction.

9.14.14.1.2.1 Where detectors are installed for signal initiation during construction, they shall be cleaned and verified to be operating in accordance with the listed sensitivity, or they shall be replaced prior to the final acceptance test of the system. [72:17.7.1.12.1]

9.14.14.1.2.2 Where detectors are installed but not operational during construction, they shall be protected from construction debris, dust, dirt, and damage in accordance with the manufacturer's recommendations and verified to be operating in accordance with the listed sensitivity, or they shall be replaced prior to the final acceptance test of the system. [72:17.7.1.12.2]

9.14.14.1.2.3 Where detection is not required during construction, detectors shall not be installed until after all other construction trades have completed cleanup. [72:17.7.1.12.3]

9.14.14.1.3 Smoke detectors used in temporary detection systems inside the construction area that are covered to keep out dust and dirt while work is in progress shall be uncovered at the end of each work day.

9.14.14.1.4 After final construction cleanup by all trades, all smoke detectors shall be cleaned or replaced.

9.14.14.1.5 Reacceptance testing in accordance with *NFPA 72* shall be performed after any adjustment, modification, or repair to any system wiring or component.

9.14.14.2 Fire Suppression Systems.

9.14.14.2.1 During construction operations, free access to permanent, temporary, or portable fire extinguishing equipment and systems shall be maintained.

9.14.14.2.2* Water for fire suppression shall be available throughout all phases of construction.

9.14.14.2.3 Disconnected or shut off standpipes or fire suppression systems shall be restored to service as soon as it is practical.

9.14.14.2.4* Fire hydrants, sprinklers, standpipes and sprinkler fire department connections, and hose outlet valves shall not be obstructed.

9.14.14.3 Standpipes.

9.14.14.3.1 New standpipes that are required or existing standpipes in buildings being altered shall be maintained in accordance with the progress of building activity so that the standpipes are always ready for fire department use.

9.14.14.3.2 Class I manual dry standpipes shall be permitted where approved by the authority having jurisdiction.

9.14.14.3.3 Where required by the responding fire department, hose and nozzles shall be provided and maintained ready for use as soon as either a temporary or permanent water supply is available.

9.14.14.4 Automatic Fire Suppression Systems.

9.14.14.4.1 Where automatic fire suppression systems are provided, the installation shall be placed in service and monitored as soon as it is practical.

9.14.14.4.2 Where fire suppression systems existed prior to the rehabilitation project, the system shall be kept in service as long as possible during the rehabilitation work.

9.14.14.4.3 Where fire suppression systems must be taken out of service for modification, the local fire department shall be notified and the system shall be returned to service as soon as possible.

9.14.14.4.4 Automatic fire suppression systems shall be kept in proper working order during the project to the extent consistent with the nature of the construction.

9.14.14.5 Portable Fire Extinguishers.

9.14.14.5.1 Portable fire extinguishers shall be provided in accordance with *NFPA 10*.

9.14.14.5.2* Not less than one portable fire extinguisher as required by 9.14.14.5.1 shall be provided on each floor near each usable stairway.

9.14.14.5.3 Portable fire extinguishers shall be accessible and protected from accidental damage.

9.14.15 Separation of Construction Areas.

9.14.15.1 Each construction area shall be isolated by partitions that will resist the spread of fire to other parts of the building.

9.14.15.2 Fire walls and exit enclosures required for the completed building shall be given priority during construction.

9.14.15.3 Fire doors with approved closing devices and hardware shall be installed as soon as practical and before combustible materials are introduced.

9.14.15.4 Fire doors shall not be obstructed from closing.

9.14.15.5 Environmental Conditions. Openings in structures susceptible to damage from high winds that could cause skewing and misalignment of the structure, disruption of water supplies or delivery systems for fire protection, or malfunction of the building's electronic premises security systems shall have secure coverings.

9.14.16 Egress.

9.14.16.1 Required exits and normal guard routes shall be maintained or supplementary routes provided.

9.14.16.2 Where construction blocks an exit route, adjoining spaces shall also be closed, as necessary, to avoid excessive crowding in common paths of travel or dead ends.

9.14.16.3 At least one stairway shall be provided in usable condition at all times in multistory buildings.

9.14.17 Ignition Sources.

9.14.17.1 Hot work operations shall comply with 9.14.24.

9.14.17.2 Temporary heating equipment shall comply with 9.14.26.

9.14.17.3 On-site recharging of gas cylinders shall be prohibited.

9.14.17.4 Temporary lighting and wiring shall comply with the requirements of *NFPA 70*.

9.14.17.5* Only high efficacy lighting shall be used as temporary lighting.

9.14.18 Smoking. Smoking shall be prohibited or restricted to designated areas.

9.14.18.1 Smoking shall be prohibited inside any building or building space or area under construction, renovation, modification, or repair.

9.14.18.2 Where smoking is allowed, the governing body of the cultural resource property shall designate a smoking area outside of the work area where contractors and workers are permitted to smoke.

9.14.18.2.1 The designated smoking area shall be clearly and publicly identified and shall be located a sufficient distance away from all combustible and flammable materials or liquids to prevent a fire from starting.

9.14.18.2.2 Receptacles for spent smoking materials shall be provided in the designated smoking area.

▲ 9.14.18.2.3 A portable fire extinguisher in compliance with the provisions of *NFPA 10* shall be located at each designated smoking area.

9.14.18.2.4 If located inside the cultural resource property, the smoking area shall fully comply with all of the requirements of Section 11.5.

9.14.19 Flammable and Combustible Liquids.

9.14.19.1 No more than a 1-day supply of paint thinners, solvents, and other flammable and combustible liquids used in the project shall be kept in the building.

9.14.19.2 Flammable liquids shall be stored in approved safety cabinets and containers.

9.14.19.3 Quantities of flammable and combustible liquids in excess of those necessary to complete a day's work shall be stored at least 15 m (50 ft) away from the main construction project.

9.14.19.4 Gasoline-powered engines, such as those used in compressors and hoists, shall not be permitted inside the building.

9.14.20 Electrical Systems.

9.14.20.1 Prior to construction, the electrical equipment and circuits that might be impacted by the alteration, addition, renovation, or modification work shall be identified, relocated, and made safe by a qualified person.

9.14.20.2 Electrical wiring and equipment shall be installed in compliance with the requirements of *NFPA 70*.

9.14.20.3 Temporary lighting, bulbs, and fixtures shall be installed so they do not come in contact with combustible materials.

9.14.20.4 Circuit breakers for circuits that are not in use shall be shut off.

9.14.20.5 Temporary wiring shall be removed immediately upon elimination of the need for which the wiring was installed.

9.14.21 Construction Offices, Trailers, and Sheds.

9.14.21.1 Construction offices, trailers, sheds, and other temporary facilities of combustible construction shall comply with Section 4.2 of *NFPA 241*.

9.14.21.2 Heating devices used in construction offices and sheds shall be listed for the purpose.

9.14.21.3* A minimum clearance of 1 m (39 in.) shall be maintained around stoves and heaters, and a minimum clearance of 150 mm (6 in.) shall be maintained around all chimney and vent connectors to prevent ignition of adjacent combustible materials.

9.14.21.4 Structures, equipment, and materials shall not impede egress of occupants or workers from the building or hinder access by fire apparatus to hydrants and fire department connections or to the building by emergency response personnel or damage limitation teams.

9.14.21.5 The areas beneath all temporary offices and other facilities shall not be used for the storage of construction materials, equipment, or supplies, and measures shall be put in place to ensure that no combustible waste matter is allowed to accumulate in these areas.

9.14.22 Construction Equipment.

9.14.22.1 Internal combustion engine-powered air equipment, such as compressors, hoists, derricks, and pumps, shall be placed so the exhaust discharges away from combustible materials and air intakes for the building heating, ventilation, and air-conditioning (HVAC) system.

9.14.22.2 A minimum clearance of 150 mm (6 in.) shall be maintained between equipment exhaust piping and combustible materials.

9.14.22.3 Service areas and fuel for construction equipment shall not be located inside the building.

9.14.23* Construction Materials.

9.14.23.1* Flammable and combustible liquids shall comply with 9.14.19.

9.14.23.2 Combustible construction components stored inside the building shall be strictly limited to that necessary for that day's work.

9.14.23.3 Where construction is to be of protected steel, combustible storage shall not be placed in areas where specified fire-resistive coatings have not been applied to structural members.

9.14.23.4 Storage of highly combustible materials such as foam, plastic, and rubber products shall not be permitted inside the building.

9.14.23.5 Storage of construction materials shall not impede egress from buildings or access of fire apparatus to hydrants or to the building.

9.14.23.6 Tarpaulins or plastic sheeting, if used, shall be noncombustible or of a fire-retardant variety.

9.14.24 Welding, Cutting, and Other Hot Work Operations.

9.14.24.1 Welding, cutting and other hot work operations shall comply with the requirements of *NFPA 51B*.

9.14.24.2 The person designated to be in charge of fire protection shall issue a hot work permit each day that cutting, welding, and other hot work are being conducted as required by Section 11.6.

9.14.24.3* At the close of the workday the person responsible for fire protection on the site shall inspect areas where welding, cutting, or other hot work operations have been conducted for hot metal or smoldering combustible materials.

9.14.24.4 Flammable gas cylinders used in the welding or cutting process shall be protected from vehicle damage and high temperatures.

9.14.25 Plumbing.

9.14.25.1 Plumbing work involving open flames shall be conducted only under the supervision of the person in charge of fire protection and shall require a hot work permit reissued each day.

9.14.25.2 The provisions of 9.14.24 shall apply for cutting and welding operations.

9.14.26 Temporary Heating Equipment.

9.14.26.1 Temporary heating equipment shall be listed for the purpose.

9.14.26.2 Temporary heating equipment shall be installed in accordance with its listing, including clearance to combustible material, equipment, and construction.

N 9.14.26.3 Temporary heating equipment shall be installed, used, and maintained in accordance with the manufacturer's instructions.

9.14.26.4 Temporary heating equipment shall comply with NFPA 54, NFPA 31, and NFPA 211.

9.14.26.5 Temporary heating devices shall be used only on a stable surface in a protected location where the equipment will not be overturned.

9.14.26.6 Portable equipment using oil or liquefied petroleum gas as fuel shall be moved to a well-ventilated area away from combustible material and allowed to cool prior to refueling.

9.14.26.7* The travel distance from all portable heating devices to not less than one portable fire extinguisher complying with NFPA 10 shall not exceed 9 m (30 ft).

9.14.26.8 Chimney or vent connectors from direct-fired heaters, where required, shall be maintained at least 457 mm (18 in.) from combustible materials.

9.14.26.9 Temporary heating equipment shall be attended and maintained by trained personnel.

9.14.27 Roofing.

9.14.27.1 Tar Kettles.

9.14.27.1.1 Tar kettles used in roofing shall comply with Section 16.7 of NFPA 1.

9.14.27.1.2* Fire extinguishers shall be located as required in 16.7.1.6 of NFPA 1.

9.14.27.2 Liquefied Petroleum Gas (LPG).

9.14.27.2.1 Cylinders or containers used for fueling tar kettles shall be protected against tampering and vandalism.

9.14.27.2.2 Containers shall be kept 6 m (20 ft) from combustible materials or spare containers.

9.14.27.2.3 When possible, cylinders and containers shall be placed in a secured area for protection against tampering.

9.14.27.2.4 Cylinders or containers that cannot be secured in a protected area shall have the dome covers locked and secured, or the valve handle shall be removed or secured in the off position.

9.14.27.2.5 Storage of LP-Gas cylinders on rooftops shall not be permitted.

9.14.27.2.6 Used roofing mops shall not be stored inside the building.

9.14.28 Demolition Work.

9.14.28.1 Gas supplies shall be shut off at a point outside the affected area and shall be capped.

9.14.28.2 Electrical service shall be reduced or eliminated in the affected area.

9.14.28.3 Hot work shall not be permitted in combustible buildings except as outlined in Section 11.6.

9.14.28.4 Fire walls, fire doors, cutoffs, and other fire separation assemblies shall be maintained intact where possible.

9.14.29 Other Hazardous Operations. The fire safety manager shall conduct an assessment of operations that intro-

duce fire hazards to determine if the risk is consistent with the facility's fire safety objectives.

9.14.29.1 Paint-stripping operations that involve heat-producing devices shall not be permitted.

9.14.29.2 Floor sander dust accumulation bags shall be emptied into closed metal containers outside of the building before the close of the day.

9.14.30 Housekeeping.

9.14.30.1 The accumulation of debris or rubbish shall not be permitted inside construction areas or close to a source of ignition.

9.14.30.2 Debris and rubbish shall be removed daily from the site and shall not be burned in the vicinity.

9.14.30.3 Contractors shall provide receptacles for rubbish, papers, and other debris.

9.14.30.4 A chute for the removal of debris shall be erected on the outside of the building.

9.14.30.5 Burning waste materials on the premises shall not be permitted.

Chapter 10 Management Operational Systems

10.1* General.

10.1.1* This chapter shall establish criteria for management operational systems that are acceptable as elements of a prescriptive solution or performance-based approach as provided in Section 1.5.

10.1.2 Other operational control features shall be permitted subject to the approval of the authority having jurisdiction.

10.2 Responsibility/Authority.

10.2.1 The owner, governing board, or other body having custody over the building shall designate a fire safety manager and security manager.

10.2.2 The fire safety manager shall have the authority to implement all the fire safety components of the approved protection plan including, but not limited to, the following:

- (1) Directing the actions of the building staff and occupants with regard to fire safety
- (2) Entering into legally binding contractual agreements with the authority having jurisdiction
- (3) Ordering required fire safety drills and exercises
- (4) Halting contractor and maintenance operations that might threaten the fabric or contents of the building

10.2.3 The security manager shall have the authority to implement all the security components of the approved protection plan.

10.3 Reporting Incidents.

10.3.1* All incidents including, but not limited to, fires, criminal acts, damage to property, or other intentional or accidental acts or conditions with the potential to cause harm, however small, shall be reported to the fire safety manager, the security manager, or to both. In addition, all fires shall be reported to the local fire department and all criminal activity shall be reported to the local law enforcement agency.

10.3.2 When a crime occurs or a fire is deemed suspicious, the security manager, fire safety manager, or both shall take steps to ensure that the scene is secured pending investigation.

10.4 Operational Requirements.

10.4.1* Operational controls, or a plan of operations, shall be developed that include all special provisions that are granted as part of a performance-based or a prescriptive-based approach in evaluating the building as defined by the planning team (*see Chapter 9*) and as approved by the authority having jurisdiction.

10.4.2* Operational controls shall include the special provisions pertaining to the management, operations, and stewardship of the cultural resource property, its collections, and other culturally significant objects or architectural features.

10.4.3* Operational controls shall be defined as part of the protection plan.

10.4.4 Procedures for Opening and Closing. The protection plan shall include checklists that identify specific activities required in conjunction with opening and closing the building on a daily basis and for any special events that are held on the property.

Δ 10.5 Emergency Response.

N 10.5.1 The fire safety manager and the security manager shall implement the emergency operations component of the protection plan developed in accordance with Chapter 6 and shall be responsible for periodic testing and evaluation of emergency operations procedures; for regularly updating the protection plan to accommodate changes in staff, the facility, the operations, or to address deficiencies identified in testing the emergency operations procedures; and for ensuring continued compliance with agreed-upon operational controls.

N 10.5.2 The fire safety manager shall coordinate with the responding fire department for the purpose of preplanning their emergency response.

10.6 Training.

10.6.1 The fire safety manager, security manager, building staff, and volunteers shall be trained as agreed upon with the authority having jurisdiction.

10.6.2 At a minimum, training shall include the provisions of the fire safety management, security, and emergency operations components of the protection plan.

10.6.3 Drills.

10.6.3.1 Drills shall be conducted to reinforce training and to evaluate staff and volunteer preparedness at intervals agreed upon by the fire safety manager, security manager, and the authority having jurisdiction but not less than annually.

10.6.3.2 Where required, the authority having jurisdiction shall be notified in advance of all drills.

10.6.4 Additional training shall be obtained when any of the following conditions occur:

- (1) The use, occupancy, structure, or internal layout of the building changes.
- (2) Drills indicate that staff or volunteers are not sufficiently familiar with the facility's protection plan and equipment to respond properly under emergency conditions.

- (3) Special events that introduce unusual occupancies or conditions are scheduled.
- (4) Portable fire extinguishers constitute a part of the protection plan.
- (5) New materials, substances, or products are introduced into the building.

10.7 Documentation.

10.7.1 The fire safety manager shall be responsible for maintaining a current file of the cultural resource property's fire safety records (*see Section 7.4*).

10.7.2 The security manager shall be responsible for maintaining a current file of the security training and drills.

10.7.3 All records shall be made available to the authority having jurisdiction on request.

10.8 Compliance Audit.

10.8.1 The authority having jurisdiction or its designee shall conduct a compliance audit at intervals identified in the approved protection plan but not less than annually.

10.8.2 Additional compliance audits shall be conducted prior to special events (*see Chapter 13*).

10.8.3 Closing Conference.

10.8.3.1 Upon completion of the periodic compliance audit, the authority having jurisdiction or its designee shall conduct a closing conference with the fire safety manager or the individual or group designated by the governing body as responsible for planning protection for the cultural resource property.

10.8.3.2 The closing conference shall identify all areas of noncompliance with the approved protection plan.

10.8.3.3 Following the periodic compliance audit, any deficiencies shall be addressed, with corrective action taken and documented in the fire safety log or as specified in the cultural resource property's approved protection plan.

10.9 Enforcement. Where a compliance audit reveals noncompliance with the approved protection plan, or changes in the use or arrangement of the building, the authority having jurisdiction shall be notified.

10.10 Modification of the Plan. Proposed modifications to the protection plan shall be approved by the authority having jurisdiction.

Chapter 11 Fire Prevention

11.1* General. This chapter shall outline the minimum protection criteria necessary for protection of cultural resource properties.

11.2 Decorations.

11.2.1 Decorative materials, including those used for special events, occasions, and holidays, shall be noncombustible or shall comply with the fire performance requirements of NFPA 1 for assembly occupancies.

11.2.2 Decorations shall be kept a minimum of 1 m (36 in.) from ignition sources, such as light fixtures, radiators, candles, electric heaters, and other heat-generating devices.

11.2.3 Draperies, curtains, and other similar loosely hanging furnishings and decorations shall meet the flame propagation performance criteria contained in NFPA 701.

11.2.4* Fire-retardant treatment of historically significant fabrics shall not be required where such treatment will cause damage to the fabric. This provision shall apply only on an object by object basis and where alternate protection measures are approved.

11.2.5 The use of Christmas trees and other decorative vegetation shall be in accordance with NFPA 1 and 11.2.6.

N 11.2.6 Combustible Decorative Vegetation. [101:10.3.9]

N 11.2.6.1 Flammability of Combustible Artificial Decorative Vegetation. Combustible artificial decorative vegetation shall meet one of the following:

- (1) The flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701
- (2) A maximum heat release rate of 100 kW when tested to NFPA 289, using the 20 kW ignition source [101:10.3.9.1]

N 11.2.6.2 Fire-Retardant Treatments for Natural Cut Christmas Trees. Where fire-retardant treatments are applied to natural cut Christmas trees, the fire-retardant treatment shall comply with both Test Method 1 and Test Method 2 of ASTM E3082, *Standard Test Methods for Determining the Effectiveness of Fire Retardant Treatments for Natural Christmas Trees*. [101:10.3.9.2]

N 11.2.6.3 Electrical Equipment. [101:10.3.9.3]

N 11.2.6.3.1 Electrical wiring and listed luminaires used on combustible artificial decorative vegetation shall be listed for that application. [101:10.3.9.3.1]

N 11.2.6.3.2 The use of electrical wiring and of luminaires constructed entirely of metal shall not be permitted on combustible artificial decorative vegetation. [101:10.3.9.3.2]

N 11.2.6.4 Open Flames. Candles and open flames shall not be used on or near combustible artificial decorative vegetation. [101:10.3.9.4]

11.3* Fire Spread Control.

11.3.1 Interior doors shall be kept closed when the building is not occupied except as permitted in 11.3.2.

11.3.2 Where doors are required to remain open for interior ventilation and air movement concerns are critical to the conservation of historic building fabric, collections, or both, or where the interior doors are themselves part of the historic fabric, careful and professional analysis of the open doors' impact shall be performed, and documented alternative methods to control fire spread shall be implemented.

11.4* Housekeeping.

11.4.1 Stairwells, corridors, doorways, and any other portions of the means of egress for a building shall be maintained free of combustibles, trash containers, and other materials.

11.4.2 Attics.

11.4.2.1 Attic spaces shall be kept clean, free of combustibles, and locked.

11.4.2.2 Combustible materials shall be permitted to be stored in attics protected by automatic suppression systems designed to allow such storage.

11.4.3* Electrical rooms, mechanical rooms, and telephone closets shall be kept free of combustibles and locked.

11.4.4 Stacks, exhaust ducts, and filters shall be cleaned as frequently as necessary to prevent the buildup of combustible dusts and fibers.

11.4.5 Plenums and void spaces shall not be used for storage and shall be kept clean and free of combustibles.

11.4.6 Rags, clothing, and waste material contaminated with oils, such as animal or vegetable oils, paints, thinners, wax, furniture polish, and other liquids or compounds that could cause spontaneous heating, shall be isolated from other combustibles in metal containers with tight-fitting metal lids.

11.4.7 Ventilated metal lockers shall be provided for storage of highly combustible supplies and workers' clothing contaminated with combustible or flammable liquids.

11.4.8 Packing Materials.

11.4.8.1 Combustible packing materials, such as shredded paper, foamed polystyrene packing material ("peanuts"), plastic, and excelsior, shall be stored in metal containers with self-closing covers.

11.4.8.2 Where packing materials cannot be protected using metal containers with self-closing covers, dedicated crating and packing areas shall be enclosed by fire barriers having a fire resistance rating of not less than 1 hour or shall be equipped with sprinklers.

11.4.9 Trash shall be collected and disposed of at the end of each workday and more often if necessary.

11.4.10 Dumpsters used for bulk collection of trash or recyclable paper shall be constructed of metal with metal covers.

11.4.11 Dumpsters and other large trash containers inside buildings shall be stored in one of the following ways:

- (1) In trash rooms having both automatic sprinklers and a 1-hour fire resistance rating
- (2) In loading dock areas separated from the rest of the building with a 2-hour fire resistance rating or 1-hour fire resistance rating and protected with automatic sprinklers

11.4.12* Trash containers, dumpsters, and other central waste-disposal units located outside shall be kept at a minimum distance of 4.6 m (15 ft) from all parts of a building exterior, including but not limited to windows, doors, roof eaves, and utility controls.

11.5* Smoking. Smoking shall be prohibited inside buildings except in designated areas that meet the following requirements:

- (1) Smoking areas shall be clearly and publicly identified.
- (2) Smoking areas shall be provided with suitable ashtrays and other receptacles for the proper disposal of smoking materials.
- (3) Smoking areas shall be physically separated from the rest of the building with a minimum 1-hour fire resistance rating for walls, ceilings, and floors.
- (4) Portable fire extinguishers shall be provided in accordance with NFPA 10 at each designated smoking area.

11.6 Hot Work.

11.6.1 Limitations on Hot Work Operations.

11.6.1.1 Hot work shall not be permitted in or near the premises, unless there is no other viable alternative.

11.6.1.2* Where there is no other viable alternative to conducting hot work on the premises, such hot work shall comply with the requirements of NFPA 51B.

11.6.2 Hot Work Permit.

11.6.2.1 A hot work permit, issued by the fire safety manager or designee, shall be required to authorize work with any open flame devices used in soldering, brazing, cutting, welding, or paint removal.

11.6.2.2 The hot work permit shall prescribe measures to protect the collections.

11.7 Open Flames.

11.7.1 Approval. Use of open flames and flame-producing devices, such as candles, oil lamps, fireplaces, forges, kilns, glassblowers, and cook stoves shall be approved by the authority having jurisdiction.

11.7.2 Precautions. The following precautions shall be taken to control open flame and flame-producing devices:

- (1) All employees working around open flame or flame-producing devices shall be trained in the proper use and operation of the device and in emergency response procedures.
- (2) Open flames and flame-producing devices shall be monitored constantly by a trained person.
- (3) The travel distance from any area where open flames or flame-producing devices are in use to not less than one portable fire extinguisher complying with NFPA 10 shall not exceed 9 m (30 ft).
- (4) Candles shall be kept a minimum of 1.25 m (4 ft) from combustible window treatments and wall or ceiling hangings.
- (5) Fireplaces shall be covered with a fire screen when not used for cooking or similar demonstrations.
- (6) Open flames within 31 m (100 ft) of the building shall not be left unattended.
- (7) Open flames either inside or outside the building shall be extinguished prior to shutdown of the facility.

11.7.3 Chimneys.

11.7.3.1 Chimneys that serve active fireplaces or stoves shall be provided with a spark arrester and maintained in good working order in accordance with the provisions of NFPA 211.

11.7.3.2 Chimneys that serve active fireplaces or stoves shall be inspected and cleaned annually by a competent person in accordance with the provisions of NFPA 211.

11.7.3.3 Vegetation within 3050 mm (10 ft) of a chimney outlet shall be removed.

11.8 Electrical Hazards.

11.8.1 Electrical circuits shall be protected with an arc fault circuit interrupter in accordance with NFPA 70.

11.8.2 Portable electrical appliances shall be provided with thermal and electrical limit controls that will cause the appliance to fail in a safe condition.

11.8.3 Temporary wiring, including extension cords, shall comply with the requirements of NFPA 70.

11.8.4 Decorative lighting and similar accessories used for holiday lighting and similar purposes shall comply with Articles 410 and 590 of NFPA 70.

11.8.5 Cabling. Readily accessible cabling installations for all systems within the property shall be inspected for physical damage, missing box covers, electrical overloading, and connection integrity in compliance with NFPA 70.

11.9 Penetrations. The fire safety manager shall inspect the cultural resource property regularly to ensure penetrations through fire barriers or fire walls are sealed according to the applicable code.

11.10 Structural Fire Protection. The fire safety manager shall inspect accessible structural fire protection regularly to ensure the material is in place and maintained in good condition.

11.11* Lightning Protection. The fire safety manager shall ensure that the lightning protection system, where installed, is inspected and maintained in good working condition by qualified personnel. (See NFPA 780.)

11.12 Protection from Wildland Fires.

11.12.1* The governing body of a cultural resource property located in a wooded area or surrounded by fire-prone vegetation or heavy brush shall incorporate the requirements of NFPA 1144 into the fire safety management component of the protection plan.

11.12.2 Reduction of fuel loading in the landscape surrounding and owned by the cultural resource property shall be implemented in accordance with the requirements of NFPA 1144.

11.12.3 Where the landscape is historic and either a contributing element to the property's historic designation, or designated itself, the governing body shall obtain the evaluation and recommendation of a professional historic landscape architect for reducing fire loading that could threaten either the cultural resource property or the historic landscape.

11.12.3.1 The evaluation shall include an analysis with respect to the requirements of NFPA 1144.

11.12.3.2 The resulting recommendations of the evaluation shall be included in the fire safety management component of the protection plan.

11.12.4 Access roads shall be maintained and kept fully accessible at all times to accommodate fire service vehicles.

11.13 Water Control. Provisions shall be made for removal of accumulated water from manual and automatic firefighting operations.

Chapter 12 Inspection, Testing, and Maintenance of Protection Systems

12.1* General. This chapter shall establish requirements for inspection, testing, and maintenance of protection systems of cultural resource properties.

12.2 Fire Protection Systems.

12.2.1 Fire protection systems shall be inspected, tested, and maintained in accordance with the manufacturer's recommen-

dations and the applicable requirements of NFPA 4, NFPA 25, and NFPA 72, and any applicable standard from Table 9.12.14.

12.2.2 Responsibility.

12.2.2.1 The governing body of the cultural resource property shall be responsible for the inspection, testing, and maintenance of fire protection systems.

12.2.2.2 Inspection, testing, and maintenance shall be implemented in accordance with procedures meeting or exceeding those established in the standard for that type of fire protection system and in accordance with the manufacturer's instructions.

12.2.2.3 Service personnel shall be qualified and experienced in the inspection, testing, and maintenance of fire alarm systems. Qualified personnel shall include, but not be limited to, one or more of the following:

- (1) Personnel who are factory trained and certified for fire alarm system service of the specific type and brand of system
- (2) Personnel who are certified by a nationally recognized fire alarm certification organization acceptable to the authority having jurisdiction
- (3) Personnel who are registered, licensed, or certified by a state or local authority
- (4) Personnel who are employed and qualified by an organization listed by a nationally recognized testing laboratory for the servicing of fire alarm systems

12.2.3* Inspection. Inspection and testing frequencies, responsibilities, test routines, and reporting procedures shall comply with the applicable code or standard from Table 9.12.14, NFPA 25, and NFPA 72.

12.2.4 Testing. All fire protection systems shall be tested to verify that they function as intended.

12.2.4.1 Test results shall be compared with those of the original acceptance test (if available) and with the most recent test results.

12.2.4.2 Records shall be retained for the next test and for 1 year thereafter.

12.2.5 Maintenance.

Δ 12.2.5.1 Maintenance and repairs shall be performed to keep all fire protection systems operable.

12.2.5.2 As-built system installation drawings, original acceptance test records, and device or equipment manufacturer's maintenance bulletins shall be retained by the fire safety manager to assist in the development and maintenance of the inspection, testing, and maintenance standards for all fire protection equipment, systems, and components.

12.3 Electronic Premises Security Systems.

12.3.1 All electronic premises security systems shall be tested, inspected, and maintained in compliance with the manufacturer's recommendations.

12.3.2 Personnel who have developed competence through training and experience shall perform inspection, testing, and maintenance of electronic premises security systems.

12.3.3* Inspection. Inspection and testing frequencies and test routines shall comply with the manufacturer's recommendations.

12.3.4 Testing. All electronic premises security systems shall be tested to verify that they function as intended.

12.3.4.1 Test results shall be compared with the original specifications for the system, the results of the original acceptance test (if available), and with the results of the most recent test. Any variances in the performance of the system shall be documented and corrections made to bring system performance to an acceptable level.

12.3.4.2 Records shall be retained for the next test and for 1 year thereafter.

12.3.5 Maintenance.

12.3.5.1 Maintenance shall be performed to keep all electronic premises security systems operable, and necessary repairs shall be made.

12.3.5.2 The security manager shall retain as-built system installation drawings, original acceptance test records, and device or equipment manufacturer's maintenance bulletins to assist in the developing and maintaining of the inspection, testing, and maintenance standards for all electronic premises security equipment, systems, and components.

12.4 Impairments to Fire Protection Systems.

12.4.1 General. When an emergency or a preplanned activity takes any fire protection system out of operational service, measures shall be taken during the impairment to ensure that increased risks are minimized and the duration of the impairment is limited.

12.4.1.1 Where fire protection systems such as sprinkler systems, fire pumps, and fire detection and alarm systems are out of service for 4 hours or more, the fire safety manager shall notify the fire department and post a fire watch.

12.4.1.2 The fire watch shall be provided with an approved means to notify the fire department.

12.4.2 Planned Impairments.

12.4.2.1 The fire safety manager shall authorize all preplanned impairments in advance of work.

12.4.2.2* The fire safety manager shall be responsible for verifying that written procedures for impairments are in place before authorizing a system impairment.

12.4.3 Procedure.

12.4.3.1 A written procedure shall be established and implemented by the fire safety manager to control any emergency or preplanned impairment.

12.4.3.2 The procedure shall include not less than the following:

- (1) Identification and tagging of all impaired equipment and systems
- (2) Inspection and risk evaluation
- (3) Identification of extent or expected duration of impairment
- (4) Notification of fire department
- (5)* Notification of other personnel or organizations as appropriate
- (6)* Statement of additional measures deemed necessary for the duration of the impairment of the systems

- (7)* Actions and notifications to be taken when all impaired equipment and systems are restored to operational service
- (8) Prior to preplanned impairment, assembly of all necessary parts, tools, materials, and labor at the impairment site before the system or equipment is removed from service
- (9) Expedition of all repair work

12.4.4 Restoring Systems to Service. When all impaired systems are restored to operational service, the fire safety manager shall verify that the following items have been completed:

- (1) Any necessary inspections and tests required by the appropriate section of the applicable standards referenced in Section 9.12 for the fire protection system or equipment involved have been conducted to verify that affected systems and equipment are operational.
- (2) Those individuals notified in accordance with 12.4.3.2 have been advised that protection has been restored.
- (3) Impairment tags have been removed.

12.5 Impairments to Electronic Premises Security Systems.

12.5.1 General. When an emergency or a preplanned activity takes any electronic premises security system out of operational service, measures shall be taken during the impairment to ensure that increased risks are minimized and to limit the duration of the impairment.

12.5.1.1* Where electronic premises security systems are out of service for 4 hours or more, the security manager shall post security personnel or make other arrangements for security until the systems are restored.

12.5.1.2 Security personnel shall be provided with an approved means to notify the local police.

12.5.2 Planned Impairments.

12.5.2.1 The security manager shall authorize all planned impairments in advance of work.

12.5.2.2* The security manager shall be responsible for verifying that written procedures for impairments are in place before authorizing a system impairment.

12.5.3 Procedure.

12.5.3.1 A written procedure shall be established and implemented by the security manager to control any emergency or planned impairment.

12.5.3.2 This procedure shall include, as a minimum, the following:

- (1) Identification and tagging of all impaired equipment and systems
- (2) Inspection and risk evaluation
- (3) Identification of extent or expected duration of impairment
- (4) Notification of police department
- (5)* Notification of other personnel or organizations as appropriate
- (6)* Statement of additional measures deemed necessary for the duration of the impairment of the systems
- (7)* Actions and notifications to be taken when all impaired equipment and systems are restored to operational service

- (8) Prior to planned impairment, assembly of all necessary parts, tools, materials, and labor at the impairment site before the system or equipment is removed from service
- (9) Expedition of all repair work

12.5.4 Restoring Systems to Service. When all impaired systems are restored to operational service, the security manager shall verify that the following items have been completed:

- (1) Any necessary inspections and tests required by NFPA 731 have been conducted to verify that affected systems and equipment are operational.
- (2) Those individuals notified in accordance with 12.5.3.2(5) have been advised that protection has been restored.
- (3) Impairment tags have been removed.

12.6 Heating, Air-Conditioning, and Cooking Equipment.

12.6.1 Heating, air-conditioning systems, and cooking appliances shall be maintained in accordance with the manufacturer's specifications and shall comply with NFPA 90A, NFPA 90B, and NFPA 96.

12.6.2 Heaters and ductwork, including hoods and ducts for ranges, shall be kept free of flammable and combustible deposits.

12.7 Chimneys. Chimneys for active stoves or fireplaces shall be inspected and cleaned annually in compliance with the requirements of NFPA 211.

12.8* Electrical Systems. Electrical systems shall be maintained in compliance with NFPA 70 and the manufacturer's instructions.

12.9 Fire Barriers. The integrity of fire barriers shall comply with the applicable building code.

12.10 Fire-Retardant-Treated Materials. Applied coatings and treatments shall be maintained in accordance with NFPA 703.

12.11 Fire Extinguishers. Portable fire extinguishers shall be inspected, tested, and maintained in accordance with NFPA 10.

Chapter 13 Special Events

13.1* General. Plans for special events shall be reviewed and approved by the fire safety manager and the security manager. A vulnerability assessment shall be conducted for each special event, and security procedures appropriate to the risk shall be developed.

13.2 Occupant Loading.

13.2.1 The event coordinator shall ensure that the number of occupants admitted to the building is monitored and controlled so that the occupant load does not exceed the capacity of the means of egress, nor for the number of exits required by the applicable building code, fire code, or life safety code.

13.2.2 Orderly circulation of guests shall be maintained when special events are planned for large groups.

13.3 Means of Egress.

13.3.1 Exits, access to exits, and all other evacuation capabilities shall be maintained.

13.3.2 Tables, plants, stages, or other temporary fixtures shall not visually or physically obstruct an exit, exit sign, or exit access, or reduce the width of an exit passage.

13.3.3 Prior to performance or event, staff (especially temporary or part-time staff), contractor personnel, attendees, and participants shall be notified of the following:

- (1) How fire alarms are annunciated (i.e., audibly, visually, by voice communication, or a combination of these methods)
- (2) Locations of exit routes, exits, and assembly points
- (3) How to safely evacuate the area

13.3.4 Key staff, including event coordinators, volunteers, and security, shall be familiar with exit routes and shall ensure that exits are obvious, operable, and not blocked or restricted in any way.

13.3.5 Upon activation of the fire alarm, occupants shall be evacuated from the building according to the egress plan.

13.4 Cooking Equipment.

13.4.1 Cooking and food warming shall be undertaken only in facilities built for the purpose, and only electric food-warming equipment shall be used in other areas.

13.4.2 All cooking and food warming shall be closely supervised at all times.

13.4.3 Not less than one portable fire extinguisher shall be located within 3050 mm (10 ft) of any cooking, food-warming, or related operation and shall be identified clearly.

13.4.4 Fire extinguishers provided for the protection of cooking appliances that use combustible cooking media (vegetable or animal oils and fats) shall be listed and labeled for Class K fires and installed in accordance with NFPA 10.

13.5 Smoking. Smoking shall be prohibited except as permitted in Section 11.5.

13.6 Fireworks. Demonstrations of fireworks shall be held outside the building or structure and shall conform to NFPA 1123.

13.7 Combustibles.

13.7.1 Tents and canopies shall be noncombustible or certified as having been treated with an approved fire-retardant coating.

13.7.2 Draperies, bunting textiles, wood, and miscellaneous support and decorative materials used inside the building shall be noncombustible, impregnated with an approved fire retardant, or treated with an approved fire-retardant coating.

13.8 Electrical Equipment.

13.8.1 Electrical appliances and equipment, including temporary installations, shall be listed, and wiring shall comply with *NFPA 70* or the applicable electrical standard or code.

13.8.2 Exposed electrical wiring and extension cords shall not be placed across travel or exit routes.

13.8.3 A licensed or registered electrician shall verify that electrical circuits do not exceed their rated capacity.

13.9 Access Control.

13.9.1 Systems for controlling access to sensitive or high-value areas shall be maintained to prevent unauthorized access to culturally significant collections.

13.9.2 Areas intended for public access shall be clearly delineated to prevent unintended intrusions into protected areas.

13.9.3 Security or event staff shall be stationed where they can observe ingress and egress of guests to prevent unauthorized or unintended intrusions into protected areas.

Chapter 14 Museums, Libraries, and Their Collections

14.1 General.

14.1.1 The requirements of Chapters 1 through 13 shall apply to all museums and libraries.

14.1.2 This chapter shall apply to buildings, rooms, or spaces within buildings that store or display museum collections, buildings, or spaces within buildings that provide storage for library collections available to the public or community served by the library, and historic buildings exhibited or used as museums or that have library collections and readings rooms serving the public.

14.1.3 Library and museum collections that are privately owned and are not open to the public shall not be required to meet the requirements of this code.

14.1.4* This chapter shall supplement existing codes and standards to apply specifically to buildings or portions of buildings devoted to museum or library use.

14.1.5 New construction, addition, alteration, renovation, and modification projects shall comply with the requirements of Chapter 9.

14.1.6* Planning. The governing body of the museum or library shall be responsible for developing and implementing the protection plan in accordance with Chapter 6.

14.1.7 Special Exhibits. When special exhibits are expected to draw large crowds, controls shall be established to ensure that lines and assembly or waiting areas, whether inside or outside of the facility, do not impair evacuation capabilities or emergency access; to limit the number of visitors in each area within the facility to the posted maximum occupancy; and to maintain the security of collections.

14.2 Fire Prevention.

14.2.1 Drapes, Curtains, and Props. Drapes, curtains, props, and similar decorations shall be noncombustible or shall be treated with a listed, approved fire retardant in accordance with the manufacturer's recommendations.

14.2.2 Fire-Retardant Treatments.

14.2.2.1 The fire safety manager shall maintain records of all chemical fire-retardant treatments.

14.2.2.2 Records of fire-retardant treatments shall include the certificate of approval for each fire-retardant coating used, application method, and retreatment schedule.

14.2.3 Decorative Materials. Decorative materials used for special occasions and holidays shall be used in accordance with Section 11.2.

14.2.4* Housekeeping. Housekeeping shall be maintained as required by Section 11.4.

14.2.4.1 Shipping and receiving areas shall be kept clear of accumulated combustible packing and crating materials.

14.2.4.2 Discarded packing materials shall be disposed of daily in accordance with 11.4.8 through 11.4.9.

14.2.5* Controls shall be implemented and maintained to minimize and control fire hazards in conservation laboratories and studios, restoration, cleaning, and treatment areas, and exhibit construction and fabrication areas.

14.2.6 Hot Work and Open Flames.

14.2.6.1 Hot work operations shall comply with the requirements of Section 11.6.

14.2.6.2 Open flame demonstrations shall be in accordance with Section 11.7.

14.2.7 Flammable and Combustible Liquids.

14.2.7.1 Flammable and combustible liquids, including but not limited to paints, pesticides, and solvents used in conservation areas, shall be stored in accordance with NFPA 30.

14.2.7.2 Cabinets or rooms for the storage or dispensing of flammable liquids shall comply with the requirements of NFPA 30.

14.2.7.3 Listed safety containers shall be provided for the storage and use of flammable and combustible liquids.

14.2.7.4 No more than a 1-day supply of flammable or combustible liquids shall be kept in the building except in an approved storage cabinet or room.

14.2.7.5 Flammable or combustible pesticides used to rid collection objects of insects or mold infestations shall be stored, handled, and used in accordance with the provisions of NFPA 30.

14.2.8 Hazardous Areas.

14.2.8.1* Paint spraying and spray booths shall comply with NFPA 33.

14.2.8.2* Laboratories shall comply with NFPA 45.

14.2.8.3 Print Shops and Binderies. Low flash point inks, blanket wash solutions, and adhesives shall be used and stored in compliance with NFPA 30.

14.2.9 Appliances.

14.2.9.1 Hot plates and other heat-producing appliances shall be listed for their application.

14.2.9.2 Hot plates and other heat-producing appliances shall be maintained in accordance with the manufacturer's instructions.

14.2.9.3 Pilot lights at wall switches or on the appliances shall be provided to indicate visually that the appliance is energized.

14.2.10 Waste receptacles shall be self-closing metal containers.

14.3* Security. Controls shall be implemented and maintained to prevent intentional or inadvertent intrusions from public areas into protected areas.

14.3.1 The installation of an electronic premises security system shall be in accordance with 8.3.4.

14.3.2 Physical security devices shall be installed in accordance with 8.3.5.

14.4 Collection Storage Rooms.

14.4.1* Fire Prevention.

14.4.1.1* Smoking shall be prohibited in all collection storage rooms.

14.4.1.2* Fixed space heaters installed in accordance with the listing and approved by the authority having jurisdiction shall be permitted in collection storage rooms.

14.4.1.3 Portable space heaters shall not be permitted except where the building contents have been removed and the building turned over to the contractor for a construction, renovation, or modification project.

14.4.1.4* Combustible storage containers and supplies shall be kept a minimum of 1 m (36 in.) from potential sources of ignition.

14.4.1.5 Housekeeping. Housekeeping shall be maintained as required by Section 11.4.

14.4.2* Where compact storage is installed in an existing storage area, the existing automatic fire detection and fire suppression systems shall be modified as required to accommodate the increased fire loading.

14.4.3 Security.

14.4.3.1 Access to collection storage areas shall be limited to personnel authorized in the approved security component of the protection plan.

14.4.3.2 Keys to collections storage areas shall only be issued to those staff members who are authorized to have access to collection storage areas in the approved security component of the protection plan.

14.4.3.3 Visitors shall not be allowed access to collections storage areas except when escorted by a staff member authorized in the approved security component of the protection plan to escort visitors into collections storage.

14.4.4 Hazardous Materials.

14.4.4.1* Cellulose Nitrate Film. Storage and handling of cellulose nitrate motion picture film shall comply with the requirements of NFPA 40.

14.4.4.2 Pyroxylin Plastic. Storage of materials or media containing pyroxylin plastic shall comply with NFPA 42.

14.4.4.3 Wet Collections.

14.4.4.3.1* Storage of collections preserved in combustible or flammable liquids shall comply with the requirements of NFPA 30 and 9.12.24.7.

14.4.4.3.2 Containers used for storing specimens in combustible, flammable, or toxic liquids shall have tight-sealing lids that minimize evaporation loss or spillage of contents should the container tip over.

14.4.4.3.3 Safety precautions to be taken when topping off containers in wet collection storage rooms shall include all of the following:

- (1) The operator shall confirm the locations of portable fire extinguishers immediately prior to topping off containers.
- (2) The operator shall be trained in the use of portable fire extinguishers.
- (3) Only one jar at a time shall be open in the room.
- (4) The container being filled shall be placed in a tray or basin to capture spills.
- (5) Dispensing of ethanol shall be from an approved container of not more than a 5 gal (19 L) capacity, having a spring-closing lid and spout cover, and designed to safely relieve internal pressure when subjected to fire exposure.
- (6) Materials for cleaning up spills shall be on hand.
- (7) Spills shall be cleaned up immediately.

14.4.4.3.4 Carts used to transport storage containers shall be sturdy and designed to carry their loads close to the ground.

N 14.4.4.3.5 Measures shall be taken to reduce the risk of fires in wet collection areas, including all of the following:

- (1) Storage of ordinary combustibles shall be prohibited.
- (2) Operations shall be limited to the support of wet collections storage.
- (3) Security measures shall be provided to limit access for approved individuals only.
- (4) Bulk storage of ethanol or other flammable liquids shall not be located in wet collection areas.

14.4.5* Storage of Records. Collection accession and other vital records and archival materials shall be stored and protected in accordance with NFPA 232.

14.4.6 Electronic Media.

14.4.6.1 Concealed spaces, combustible electric cable insulation, and storage of paper and records associated with electronic data processing equipment shall comply with the requirements of NFPA 75.

14.4.6.2 Storage of Video, Audio Tapes, and Computer Media. Bulk storage of video, audio, and computer tapes greater than 500 standard VHS tapes or the equivalent shall meet the following requirements:

- (1) Tapes shall be stored in metal storage cabinets in rooms with a minimum 1-hour fire resistance rating.
- (2) Automatic smoke detection shall be provided in the storage room.

14.4.7* Book Stacks.

14.4.7.1 The fire load within a fire compartment containing a multi-tier book stack shall be determined by combining the fuel loading of all levels or tiers in the multi-tier book stack enclosed by the fire compartment.

14.4.7.2 Storage on floor-to-ceiling shelving in multi-tier book stacks shall be permitted where a sprinkler system, designed in accordance with the requirements for this occupancy in NFPA 13 is installed.

Chapter 15 Places of Worship

15.1 General.

15.1.1 The requirements of Chapters 1 through 13 shall apply to buildings used as places of worship.

15.1.2* This chapter shall supplement existing codes and standards and shall apply specifically to buildings, parts of buildings, or enclosed structures that function as a place of worship.

15.1.3 Protection of areas within or associated with a place of worship that function as a museum to display or store artifacts and areas functioning as libraries, book storage, or document storage shall conform to Chapter 14.

15.1.4 New construction, addition, alteration, renovation, and modification projects shall comply with the requirements of Chapter 9.

15.2 Responsibility. The governing body and leadership of the place of worship shall be responsible for the development and implementation of a fire safety program in accordance with Chapter 7 and a security program in accordance with Chapter 8.

15.3 Protection Plan.

15.3.1 The governing body of the place of worship shall be responsible for conducting a vulnerability assessment as required in 5.2.3.

15.3.2* Based on the vulnerability assessment required in 15.3.1, the governing body shall develop a protection plan for the facility in accordance with Chapter 5.

15.3.3 The protection plan shall be readily accessible to the fire department and shall include provisions for the following:

- (1) Notifying the appropriate emergency response agency and directing first responders to the location of the incident
- (2) Posting emergency telephone numbers on or adjacent to all telephones
- (3)* Developing evacuation procedures for all areas to include occupants that require special evacuation assistance
- (4) Identifying historical records such as marriage, birth, and baptismal certificates, valuable artifacts, and relics of special significance and providing for their removal, salvage, or both
- (5) Developing a security program to accomplish the goals and objectives in accordance with Sections 4.2 and 4.3

15.4 Occupant Loading. When special services, programs, commemorations, exhibits, or holidays are expected to draw large crowds, controls shall be established to ensure that lines and assembly or waiting areas, whether inside or outside of the place of worship, do not impair evacuation capabilities or emergency access; to limit the number of visitors in each area within the facility to the posted maximum occupancy; and to maintain the security of the contents.

15.5 Training.

15.5.1 All staff and employees of the place of worship and key volunteers shall be trained in the provisions of the emergency evacuation procedures in the protection plan and the fire department notification procedures.

15.5.2 Training shall include damage limitation procedures for items of cultural significance.

15.6 Fire Prevention.

15.6.1 Draperies and Decorations.

15.6.1.1 All combustible draperies and decorations shall be treated with a fire-retardant compound.

15.6.1.2 Fire-retardant treatment of religious and historically significant fabrics shall not be required where such treatment will cause damage to the fabric. This provision shall apply only on an object-by-object basis and where alternate protection measures are approved.

15.6.1.3 Decorations and draperies shall be kept a minimum of 1 m (36 in.) from ignition sources, including candles, censers, light fixtures, radiators, and electric heaters.

15.6.1.4 Decorative materials used for special occasions and holidays shall be noncombustible or shall be treated with a listed and approved fire retardant.

15.6.2* Housekeeping. Housekeeping practices in accordance with Section 11.4 shall be maintained.

15.6.2.1 Concealed spaces in the attic, basement, organ pipe runs, steeples, and beneath stairs and raised altar areas shall be kept free from accumulations of combustible materials.

15.6.2.2 Flammable liquids such as paints, varnishes, cleaning solvents, and floor polishes shall be stored inside an approved flammable liquids storage cabinet.

15.6.2.3 Quantities of flammable liquids stored inside the building shall be stored and used in compliance with NFPA 30.

15.6.2.4 Approved, self-closing trash containers shall be used to house oily rags.

15.6.2.5 Trash disposal shall be performed regularly.

15.6.2.6 Power lawn mowers, snow blowers, and other gas-powered implements shall not be stored within the structure.

15.7 Fire Protection Systems. Fire suppression and detection systems shall be incorporated in all existing construction in accordance with the governing body's fire safety goals and objectives.

15.8 Candles and Censers. The use of all open flame devices shall comply with the applicable life safety and fire prevention code.

15.8.1 All lit candles shall be maintained a minimum of 1 m (36 in.) from combustible draperies and hangings.

15.8.2 All fixed candles shall be supported to prevent them from tipping over.

15.8.3 Following the extinguishment of all candles and incense fires, an individual shall remain on the premises for 30 minutes to guard against potential reignition.

15.8.4 Incense fires in censers shall be extinguished after use and before the censers are stored.

15.9 Historical Records and Artifacts. Valuable record storage shall be protected in accordance with NFPA 232.

15.10 Special Facilities.

15.10.1 Kitchens.

15.10.1.1 Kitchen Maintenance.

15.10.1.1.1 Kitchens shall be maintained in a clean and orderly manner.

15.10.1.1.2 Surfaces and equipment shall be kept free of grease, and food wastes shall be disposed of promptly.

15.10.1.1.3 Means of egress from kitchens shall be maintained free of trash containers and other materials.

15.10.1.2 Residential Cooking Appliances.

15.10.1.2.1 Listed residential cooking appliances shall be permitted in kitchens and shall be installed and maintained in accordance with their listings.

15.10.1.2.2 Residential cooking appliances in kitchens that are not used for commercial cooking and are ancillary to the operation of the place of worship, and where cooking does not produce grease-laden vapors, shall be provided with a listed household/consumer hood.

15.10.1.3 Commercial Cooking Appliances. Listed commercial cooking appliances shall be provided with a hood and exhaust system, grease removal devices, auxiliary equipment, and fire-extinguishing equipment in compliance with NFPA 96.

15.10.1.3.1 Equipment shall be used, inspected, and maintained in compliance with NFPA 96.

15.10.1.3.2 Only nonflammable cleaners shall be used.

15.10.2 Schools.

15.10.2.1 Preschool or nursery school facilities located in a place of worship shall comply with the applicable building code, fire code, or life safety code.

15.10.2.2 The governing body shall consult the local authority having jurisdiction prior to establishing a school in their building.

15.10.3* Homeless Shelters.

15.10.3.1 Sleeping rooms for the homeless shall comply with the applicable building code, fire code, or life safety code.

15.10.3.2 The governing body shall consult the local authority having jurisdiction prior to adding sleeping facilities to a place of worship.

15.10.3.3* Measures and procedures shall be put in place to limit access of homeless clients to non-shelter areas of the building.

15.10.4* Sanctuaries, Auditoriums, and Gymnasiums. Sanctuaries, auditoriums, and gymnasiums shall comply with the applicable building code, fire code, or life safety code.

15.10.5 Libraries. Libraries shall be protected in accordance with Chapter 14.

15.10.6 Artifacts and Museum/Exhibit Areas. Museum areas, including artifact and exhibit areas, shall be protected in accordance with Chapter 14.

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.1.1.3 Cultural resource properties should comply with the provisions of NFPA 101.

A.1.2 Examples of physical conditions or situations that have potential to cause damage or loss to property, collections, or operations include, but are not limited to, fire, flood, hurricane, or vandalism.

A.1.3 Such structures include, but are not limited to, buildings that store or display museum or library collections, historic structures, and places of worship. These structures also include spaces within other buildings used for such culturally significant purposes.

A.1.3.2.2(1) An example of such a change would be the conversion of an office area into collections storage or exhibition space.

A.1.3.2.2(4) Examples of such modifications would include the addition of a high-value or highly vulnerable item to the collection, a high-profile special event, a controversial exhibit with the potential for violence, or the addition of collections that are vulnerable to severe weather, vandalism, or other threats, such as a new outdoor sculpture garden, changes in storage configuration, or the addition of compact mobile shelving.

A.1.4.1 This code is intended to be available for adoption or use internationally. Even in jurisdictions within the United States, other standards might have been adopted in lieu of certain NFPA publications referred to herein. In accordance with 1.4.1, nothing in this code would prohibit regulated parties from making use of alternative standards or codes that are approved by the authority having jurisdiction.

A.1.6 The governing authority, as referenced in Section 1.6, is not intended to exclude the governing body, as defined in 3.3.36.

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 author-

ity. 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.3.2.3 Code. The decision to designate a standard as a “code” is based on such factors as the size and scope of the document, its intended use and form of adoption, and whether it contains substantial enforcement and administrative provisions.

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.3.3.6.1 Multi-Tier Book Stack. The system is usually erected inside a structural shell housing the book stack. Typically a vertical opening (space gap or “deck-slit”) is present between the walkway and the ranges at each tier from the bottom tier to the top tier. [See Figure A.9.12.24.8(a) and Figure A.9.12.24.8(b).]

A.3.3.7 Buildings. The term building is construed as if followed by the words “or portion thereof.” A historic building is one designated by a local, regional, or national, or international jurisdiction as having historic, architectural, or cultural significance. Designation could be in an official existing or future international, national, regional, or local historic register, listing, or inventory. Properties that meet the criteria for eligibility should be treated as eligible. This also includes buildings in historic districts that are not architecturally distinguished, but whose scale, proportions, materials, and details are consistent with the character of the district.

A.3.3.17 Cultural Resource Properties. Such properties include, but are not limited to, museums, libraries, historic structures, and places of worship.

A.3.3.29 Fire Retardant. Chemical fire retardants improve reaction to fire or fire-resistance properties of treated materials, such as delaying ignition or lowering the heat release rate. On a wood building element, such as a wall, partition, column, or other material, a fire-retardant treatment reduces the flame spread index and/or the smoke developed index.

A.3.3.30 Fire Safety Manager. In smaller organizations, this role can be combined with that of another position or appointment. In larger cultural resource properties, the person’s responsibilities should be permitted to include supervision of other fire protection staff. The authorized person should be an employee of the cultural resource facility who has certification, education, training, and/or experience with generally accepted fire protection practices. Alternatively, cultural resource properties should be permitted to designate appropriate outside persons such as consulting fire protection engineers, fire service personnel, insurance company loss control representatives, local code officials, or other individuals with similar fire protection credentials.

A.3.3.38 Hazardous Area. Examples include the following:

- (1) Storage or use of combustibles or flammables
- (2) Storage or use of toxic, noxious, or corrosive materials
- (3) Use of heat-producing appliances

A.3.3.40 Historic Structure. Examples listed (i.e., buildings, bridges, lighthouses, monuments) are from “How to Define Categories of Historic Properties,” *National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation*.

A.3.3.42 Impairment. An impairment is a system component or function that is not working properly, which can result in the system or unit not functioning when required. This might be due to an intentional act, such as closing a valve or disabling an initiating device. The impairment also might be caused by a deficiency in a piece of equipment or subsystem. An example of emergency impairment is physical damage to a control unit or wiring. Examples of a planned impairment include the addition of new devices or appliances or the reprogramming of system software. [72, 2019]

A.3.3.43 Incendiary Fire. Arson fires are incendiary fires.

A.3.3.46 Library. The term *library* covers an extremely wide range of situations; a library can be a small special or valuable collection in a private home or other building, or it can be a separate section in a building used for many purposes. It can also be a multi-million dollar complex of buildings, the purpose of which is to provide not only storage of books, but also study and reading areas, catalog rooms, work rooms, binderies, art collections, shops, and places of public assembly. However, all libraries have one characteristic in common: ample fuel in the form of books and other library materials, which can include compact discs, microforms, magnetic tapes, phonograph records, and motion picture films — cellulose nitrate, that can burn and contribute to a serious fire, as well as safety film.

A.3.3.48 Management Operational Systems. Where cultural resource properties have trained staff, the institution can take advantage of that resource as an element in the overall fire protection program. Management involvement and a trained staff play a vital role in a comprehensive protection program, and training and management oversight can eliminate many common factors that contribute to fire or security incidents. For example, should a fire occur, trained staff, using portable fire extinguishers, might be able to suppress the fire before it threatens culturally significant collections. After a fire, a trained and appropriately equipped staff with an effective damage limitation procedures can mitigate damage to threatened objects.

A.3.3.51 Museum. The American Association of Museums defines a museum as an organized and permanent nonprofit institution essentially educational or aesthetic in purpose, with professional staff, which owns and uses tangible objects, cares for them, and exhibits them to the public on some regular schedule.

A.3.3.75.2 Fire Scenario. A fire scenario defines the conditions under which a proposed design is expected to meet the fire safety goals. Factors typically include fuel characteristics, ignition sources, ventilation, building characteristics, and occupant locations and characteristics. Fire scenarios include more than the characteristics of the fire itself but exclude design specifications and any characteristics that do not vary from one fire to another; the later are called assumptions. The term fire

scenario is used here to mean only those specifications required to calculate the fire’s development and effects, but in other contexts, the term can be used to mean both the initial specifications and the subsequent development and effects (i.e., a complete description of fire from conditions prior to ignition to conditions following extinguishment).

A.3.3.80 Special Event. Special events include receptions, dinners, private viewings, filming operations, and similar activities held at the cultural resource property for specific groups (e.g., members, boards, outside organizations).

A.3.3.85 Utilities. Utilities can include lighting and electrical power services; telecommunication and security services; electrical control circuits; HVAC distribution and control circuits and duct systems; water, steam, waste water, and drain pipes and services; fire suppression systems, including water-based and non-water-based; oil, gas, hydraulic, and pneumatic systems; and any other electrical or mechanical building services.

A.4.3 See NFPA 550 for a method to determine fire protection objectives.

A.5.1 Chapter 5 is intended to aid in developing, maintaining, and evaluating effective protection and emergency management programs. For additional information on emergency management programs, see *NFPA 1600*.

A.5.1.1 This chapter provides the governing body of a cultural resource property with a framework to develop a protection plan.

A.5.2.3 An important part of a vulnerability assessment is a risk analysis, a careful examination of what could cause harm to people, the environment, property, collections, or the cultural resource property’s continuity of operations objectives so the governing body can identify whether adequate precautions have been taken or more should be done to prevent damage or loss. There are many websites and documents (such as NFPA 730) that discuss vulnerability and risk principles and how to apply them to specific situations. Vulnerability assessment and risk analysis includes the following activities:

- (1) Defining assessment scope
- (2) Identifying the potential threats and/or loss scenarios
- (3) Determining who or what might be harmed and how
- (4) Evaluating the risks through estimation of the likelihood of occurrence and the severity of the consequences
- (5) Determining risk tolerability
- (6) Managing risk — deciding on measures to eliminate, prevent, or mitigate the risks
- (7) Documenting findings and implementing them based on cost considerations
- (8) Reviewing and updating risk assessments based on changes or new information

Conditions in the cultural resource property change over time, and these changes can increase or decrease the vulnerability of the facility and/or the collection to potential threats. Construction projects, new exhibits, a traveling exhibit, or a new item in the collection can have a significant impact on the vulnerability assessment, so it is important for the governing body to review the vulnerability assessment regularly, and when planning construction, renovation, modifications, alternations, special events, or changes in exhibits.