CHAPT 5A - BUILDING CODE

Draft for discussion purposes
(DPW - Building Division)

3/30/21 Draft

Note to the reader:
This draft incorporates by reference, the International Building Code, 2018 Edition, (IBC), and Hawaii State Building Code into chapter 5A of the Hawai‘i County Code. Proposed changes to the language of the IBC, that have been incorporated into the Code, are indicated using brackets and strike outs for repeals and underscoring for additions.

Please note that this draft does not include PART II of the bill that will contain amendments to other ordinances.

“CHAPTER 5A. BUILDING CODE.

Article 1. General Provisions.

Section 5A-1-3. Scope; exceptions.

[~~This chapter shall apply to the design, construction, alteration, relocation, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures within the County inland of the shoreline high-water line. Exceptions to these minimum requirements are listed below:~~

~~This chapter shall not apply to:~~

~~(1) Work or installations not covered by the International Building Code, 2006 Edition, as adopted and amended by the State Building Code, chapter 180, title 3 Hawai‘i Administrative Rules;~~

~~(2) Work on buildings or premises owned by or under the direct control of the Federal government;~~

~~(3) Work in public State or County road right-of-ways for utility installations, street lighting, traffic signals, police and fire alarms, bridges, poles, hydraulic flood control structures, and mechanical equipment not specifically regulated in this code where installed:~~

~~(A) Outside the proposed premises or boundary lines in a subdivision under development; or~~

~~(B) In an approved subdivision, where the work is in planned or actual roadways or other common infrastructure areas; or~~

~~(4) Pursuant to section 448E-13, Hawai‘i Revised Statutes, work by employees of a public utility within the State under a franchise or charter granted by the State~~

~~which is regulated by the public utilities commission and community antennae television company, while so employed;~~

~~(5) Agricultural buildings, structures, and appurtenances without electrical power and plumbing systems are exempt from permit and construction code requirements, pursuant to section 46-88, Hawai'i Revised Statutes, except as otherwise provided for in this construction code. No electrical power shall be connected to a building or structure without first obtaining a permit for the electrical work.~~]

This chapter shall apply to the design, construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures.

Exception: Detached one- and two-family dwellings and multiple single-family dwellings and townhouses not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures* not more than three stories above *grade plane* in height shall be permitted to comply with the residential building code, chapter 5B, Hawai'i County Code if provided with debris impact protection in accordance with Section 1609.2 Protection of Openings. Exception 3 in Section 1609.2 shall not apply.
{from State IBC Amendment}

Section 5A-1-5. Existing buildings.

(a) Permitted buildings in existence at the time of the adoption of this chapter may have their existing permitted use or occupancy continued if such use or occupancy was legal at the time of the adoption of this chapter, provided such continued use does not constitute a hazard to the general safety and welfare of the occupants and the public.

(b) Alteration, repair, addition, and change of occupancy. Alteration, repair, addition, and change of occupancy to a building or structure in existence at the time of the adoption of this chapter shall comply with the requirements [~~of chapter 34 of the International Building Code, relating to existing structures, until the adoption by the County of the International Existing Building Code~~] of the existing building code, chapter 5C, Hawai'i County Code.

Section 5A-1-6. Definitions. *{Includes only proposed changes to this section}*

"**Building**" means any structure used or intended for supporting or sheltering any use or occupancy. The term shall include but not be limited to, any structure mounted on wheels such as a trailer, wagon, or vehicle which is parked and stationary for any 24-hour period, and is used for business or living purposes; provided, however, that the term shall not include a push cart or push wagon which is readily movable and which does not exceed 25 square

feet in area, nor shall the term include a trailer or vehicle, used exclusively for the purpose of selling any commercial product therefrom, which hold a vehicle license and actually travels on public or private streets.

To the extent context otherwise permits and/or requires, the definitions of "building" as used in chapters: 5A, the building code; 5B, the residential building code; 5C, the existing building code; 5D, the electrical code; 5E, the energy conservation code; and 5F, the plumbing code; are incorporated by reference herein. *{202, IBC; 5-71(1).}*

"**Construction code**" means collectively: chapter 5, the construction administrative code; chapter 5A, the building code; chapter 5B, the residential building code; chapter 5C, the existing building code; chapter 5D, the electrical code; chapter 5E, the energy conservation code; chapter 5F, the plumbing code; and all administrative rules adopted pursuant to these chapters.

"**Existing building**" means a building erected prior to the effective date of this chapter, or one for which a legal permit has been issued.

"**Existing structure**" means a structure erected prior to the effective date of this chapter, or one for which a legal permit has been issued. *{202, IBC.}*

"[**IBC**" means the ICC, International Building Code, 2018 Edition, as copyrighted by the International Code Council, Inc., 4051 West Flossmoor Road, Country Club Hills, IL, 60478-5795].

"**Permit**" means a formal authorization issued by the authority having jurisdiction that authorizes performance of specified work, pursuant to the construction code, including the following chapters and all administrative rules adopted pursuant to these chapters:

(1) 5, the construction administrative code;
(2) 5A, the building code;
(3) 5B, the residential building code;
(4) 5C, the existing building code;
~~(3)~~ (5) 5D, the electrical code;
~~(4)~~ (6) 5E, the energy conservation code; and
~~(5)~~ (7) 5F, the plumbing code.

[~~"**Section**" means a section of a chapter of the International Building Code.~~]

[~~"**Table**" means a table in this chapter.~~]

Section 5A-1-8. Conflict.

(a) If any provisions of this code conflict with or contravene provisions of the Hawai‘i State Building Code or the International Building Code 2018 Edition that have been incorporated by reference, the provisions of this code shall prevail as to all matters and questions arising out of the subject matter of such provisions.

(b) In situations where two or more provisions of this code and any applicable law, other than those provided for in subsection (a), cover the same subject matter, the stricter shall be complied with.

Section 5A-1-9. References to model codes.

The codes and standards referenced in this code shall be considered to be part of the requirements of this code to the prescribed extent of each such reference and as further regulated in Sections 5A-1-8.

(1) Wherever referenced in this code, the International Building Code shall mean the building code, chapter 5A, Hawai‘i County Code.
(2) Wherever referenced in this code, the International Residential Code, shall mean the residential building code, chapter 5B, Hawai‘i County Code.
(3) Wherever referenced in this code, the International Existing Building Code, shall mean the existing building code, chapter 5C, Hawai‘i County Code.
(4) Wherever referenced in this code, the ~~ICC~~ International Electrical Code shall mean the electrical code, chapter 5D, Hawai‘i County Code.
(5) Wherever referenced in this code, the International Energy Conservation Code, shall mean the energy conservation code, chapter 5E, Hawai‘i County Code.
(6) Wherever referenced in this code, the International Plumbing Code shall mean the plumbing code, chapter 5F, Hawai‘i County Code.
(7) Wherever in this Code reference is made to the International Fuel Gas Code, the provisions of the International Fuel Gas Code shall be deemed to be only guidelines and not mandatory.
(8) Wherever in this Code reference is made to the International Mechanical Code, the provisions of the International Mechanical Code shall be deemed to be only guidelines and not mandatory.
(9) Wherever in this Code reference is made to the International Property Maintenance Code, the provisions of the International Property Maintenance Code shall be deemed to be only guidelines and not mandatory.
(10) Wherever referenced in this code, the International Fire Code shall mean the fire code, chapter 26, Hawai‘i County Code.

Exception: Where enforcement of a code provision would violate the conditions of the listing of the equipment of appliance, the condition of the listing shall govern.

{To address references in the IEBC to other Model Codes 5A-1-9; State IEBC Sections 102.4 and 102.4.4-102.4.11}

Article 2. Installation Requirements.

{Repeal existing article 2 and replace with the following}

Section 5A-2-1. International building code adopted.

(a) The "International Building Code, 2018 Edition," as published in 2017 by the International Code Council, Incorporated, 4051 West Flossmoor Road, Country Club Hills, IL 60478, is adopted by reference and made a part of this code, subject to any amendments hereinafter set forth in this chapter. Hereafter, the "International Building Code, 2018 Edition," shall be referred to as the "International Building Code." The appendices of the International Building Code are not adopted unless otherwise provided in this chapter.

(b) The scope, technical specifications, and exemptions set forth in the International Building Code, are hereby adopted as the standard for building work covered by this code, provided there are no specific provisions in any other section of this code covering the particular matter.

(c) A copy of the International Building Code, shall be available for public inspection at the Hilo and Kailua-Kona offices of the department of public works and at the office of the County clerk.

(d) The International Building Code, adopted and incorporated by reference into this code, shall be subject to the amendments hereinafter set forth.

(1) Chapter 1, "Scope and Administration," of the International Building Code is deleted in its entirety.

(2) Chapter 1, Part 2 – "Administration and Enforcement" of the International Building Code is deleted in its entirety.

(3) Section 202, "Definitions" of the International Building Code is amended by adding the following definitions:

"**BUILDING, ENCLOSED** is a building that does not comply with the requirements for open or partially enclosed building."

"**BUILDING, OPEN** is a building having each wall at least 80 percent open. Ao>= Ag where:

1. Ao = total area of openings in a wall that receives positive external pressure, in ft2 (m2); and

2. Ag = the gross area of that wall in which Ao is identified, in ft2 (m2)."

"**BUILDING, PARTIALLY ENCLOSED** is a building that complies with both of the following conditions:

1. The total area of openings in a wall that receives positive external pressure exceeds that sum of the areas of openings in the balance of the building envelope (walls and roof) by more than 10 percent; and

2. The total area of openings in a wall that receives positive external pressure exceeds 4 ft² (0.37 m²) or 1 percent of the area of that wall, whichever is smaller, and the percentage of openings in the balance of the building envelope does not exceed 20 percent.

These conditions are expressed by the following equations:

1. $Ao > 1.1Aoi$

2. $Ao > 4$ ft² (0.37 m²) or > 0.01 Ag, whichever is smaller, and $Aoi/Agi \leq 0.20$

Where:

Ao, Aq are defined for open building.

Aoi = the sum of the areas of openings in the building envelope (walls and roof) not including Ao, in ft² (m²).

Agi = the sum of the gross surface areas of the building envelope (walls and roof) not including Ag, in ft² (m²)."

"BUILDING OFFICIAL is the director of the County department of public works or the director's authorized representative."

"CARPORT is a private garage which is at least 100 percent open on one side, excluding required braced walls, and with 50 percent net openings on another side or which is provided with an equivalent of such openings on two or more sides."

A private garage which is 100 percent open on one side and 25 percent open on another side with the latter opening so located to provide adequate cross ventilation may be considered a carport when approved by the building official. Carports not open on two or more sides shall be considered to be a garage"

"EXISTING BUILDING is a building for which a legal building permit has been issued, or one which complied with this Code in effect at the time the building was erected."

{from Proposed COH Amendment}

(4) Section 202, "Definitions" of the International Building Code is amended by amending the definition of AREA OF REFUGE to read as follows:

"AREA OF REFUGE. An area where persons unable to use *stairways* can remain temporarily to await instructions or assistance during emergency evacuation. Area of rescue assistance."

{from State IBC Amendment (7)}

(5) Section 202, "Definitions" of the International Building Code is amended by amending the definition of BUILDING to read as follows:

"BUILDING. Any structure [~~utilized~~] used or intended for supporting or sheltering any use or occupancy. The term shall include but not be limited to any structure mounted on wheels such as a trailer, wagon or vehicle which is parked and stationary for any 24-hour period, and is used for business or living purposes; provided, however, that the term shall not include a push cart or push wagon which is readily movable and which does not exceed 25 square feet in area, nor shall the term include a trailer or vehicle, used exclusively for the purpose of selling any commercial product therefrom, which hold a vehicle license and actually travels on public or private streets."

(6) Section 202, "Definitions," of the International Building Code is amended by amending the definition of STRUCTURAL OBSERVATION to read as follows:

"**STRUCTURAL OBSERVATION**. [~~The visual observation of the structural system by a *registered design professional* for general conformance to the *approved construction documents*.~~] Structural observation is equivalent to "observation of construction" of the structural system, as defined in Chapter 16-115, Hawai'i Administrative Rules, implementing Hawaii Revised Statutes Chapter 464. Structural observation does not include or waive the responsibility for the inspection required by Section 5-8-4, Hawai'i County Code, Section 1705 of the International Building Code, or other sections of this code."

{from State IBC Amendment (8)}

(7) Section 202, "Definitions," of the International Building Code is amended by amending the definition of "TSUNAMI DESIGN GEODATABASE" to read as follows:

> "**TSUNAMI DESIGN GEODATABASE.** The ASCE database (version 2016-1.0) of Tsunami Design Zone maps and associated design data for the states of Alaska, California, Hawaii, Oregon, and Washington. https://asce7tsunami.online/"
> *{proposed Hawaii County Amendment to provide database link}*

(8) Section 202, "Definitions," of the International Building Code is amended by amending the definition of "WINDBORNE DEBRIS REGION" to read as follows:

> "**WINDBORNE DEBRIS REGION.**
> [~~Areas within hurricane-prone regions located:~~
> 1. ~~Within 1 mile (1.61 km) of the coastal mean high-water line where the basic design wind speed, *V*, is 130 mph (58 m/s) or greater; or~~
> 2. ~~In areas where the basic design wind speed is 140 mph (63.6 m/s) or greater.~~]
>
> ~~For *Risk Category* II buildings and structures and *Risk Category* III buildings and structures, except health care facilities, the windborne debris region shall be based on Figure 1609.3(1). For *Risk Category* IV buildings and structures and *Risk Category* III health care facilities, the windborne debris region shall be based on Figure 1609.3(2).~~] Areas in Hawai'i where the basic design wind speed is 130 mph (63 m/s) or greater. For *Risk Category* II buildings and structures, the windborne debris region shall be based on Figure 1609.3(5). For *Risk Category* III buildings and structures, the windborne debris region shall be based on Figure 1609.3(6). For *Risk Category* IV buildings, the windborne debris region shall be based on Figure 1609.3(7)."
> *{from State IBC Amendment Appendix W (W102)}*

(9) Subsection 310.4.1, "Care facilities within a dwelling," of the International Building Code is amended to read as follows:

> "**310.4.1 Care and/or assisted living facilities within a dwelling**. Care and/or assisted living facilities, licensed by the State, for five or fewer persons receiving care that are within a single-family dwelling are permitted

to comply with the [~~International Residential Code~~] Chapter 5B, Hawai‘i County Code, provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 of this code or Section P293001.3.104 of the [~~*International Residential Code*~~] Chapter 5B, Hawai‘i County Code."

{Proposed COH amendment for clarity of State licensed care or assisted living facilities}

(10) Subsection 403.4.5, "Emergency responder radio coverage," of the International Building Code is amended to read as follows:

"**403.4.5 Emergency responder radio coverage.** Emergency responder radio coverage shall be provided in accordance with [~~Section 510 of the *International Fire Code*~~] the Hawai‘i County Fire Code, Chapter 26, Hawai‘i County Code."

{from Oahu IBC Amendment for clarity}

(11) Subsection 403.4.6, "Fire command," of the International Building Code is amended to read as follows:

"**403.4.6 Fire command.** [~~A *fire command center* complying with Section 911 shall be provided in a location *approved* by the fire code official.~~] Fire command stations must comply with the Hawai‘i County Fire Code, Chapter 26, Hawai‘i County Code."

{from Oahu IBC Amendment for clarity}

(12) Subsection 403.6.2, "Occupant evacuation elevators," of the International Building Code is deleted in its entirety.

{from State IBC Amendment (9)}

(13) Section 423, "Storm Shelters," of the International Building Code is deleted in its entirety and replaced with the following:

"**SECTION 423**
COMMUNITY STORM SHELTERS

423.1 General. In addition to other applicable requirements in this code, community storm shelters and the following specific Risk Category IV buildings shall be constructed in accordance with ICC-500:

1. Designated earthquake, hurricane or other emergency shelters.
2. Designated emergency preparedness, communication, and operation centers and other facilities required for emergency response.

423.1.1 Scope. This section applies to the construction of storm shelters constructed as separate detached buildings or constructed as safe rooms within buildings for the purpose of providing safe refuge from storms that produce high winds, such as hurricanes. Such structures shall be designated to be hurricane shelters.

Exception: Emergency preparedness, communication, and operation centers and other facilities required for emergency response shall remain designated for emergency response only.

423.2 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

COMMUNITY STORM SHELTER. A building, structure, or portion thereof, constructed in accordance with ICC/NSSA 500 Standard on the Design and Construction of Storm Shelters and designated for use during a severe wind storm event such as a hurricane."

{from State IBC Amendment incorporating appendix "U" (U101)
County amendment: The facilities shall be designed to ICC-500, exception to designate emergency function facilities as hurricane shelters may hinder the primary function of emergency response.}

(14) Chapter 4, "Special Detailed Requirements Based on Occupancy and Use," of the International Building Code is amended by adding Section 429, "Hawai'i Residential Safe Room" to read as follows.

"**SECTION 429**
HAWAII RESIDENTIAL SAFE ROOM

429.1 Performance-based design criteria. The residential safe room shall meet the minimum performance specifications of Sections 429.1.1 through 429.10.

429.1.1 Intent and scope. The intent of the residential safe room is to temporarily provide an enhanced protection area, fully enclosed within a *dwelling* or within an accessory structure to a residence, which is designed and constructed to withstand the wind pressures, windborne debris impacts, and other requirements of this section.

429.1.2 Alternative standards.

1. Manufactured safe room designs subject to approval. A manufactured safe room or safe room kit may be substituted if documentation is submitted and approved by the building official. The safe room shall be engineered, tested, and manufactured to meet or exceed the criteria of this section.
2. FEMA in-residence shelter designs permitted. It shall be permissible to build FEMA In-Residence Shelters of up to 64 square feet of floor area with walls up to 8 feet long that are built in accordance with construction details of FEMA 320.

429.2 Site criteria. Residential safe rooms shall not be constructed within areas subject to stream flooding, coastal flooding or dam failure inundation within any of the following areas:

1. FEMA Special Flood Hazard Areas (SFHA) subject to rainfall runoff flooding or stream or flash flooding;
2. Coastal zones "V" or "A" identified in the Flood Insurance Rate Map (FIRM) issued by FEMA for floodplain management purposes, in which the flood hazard are tides, storm surge, waves, tsunamis, or a combination of these hazards; or
3. Areas subject to dam failure inundation as determined by the Department of Land and Natural Resources.

429.3 Size of safe room. The safe room shall be designed to provide a minimum of 15 square feet per person in a room which does not need to exceed 120 square feet (11 m^2) of floor area.

429.4 Provisions for exiting. The safe room shall be equipped with an inward-swinging interior door and an impact-protected operable window or exterior door suitable for a means of alternative exiting in an emergency.

429.5 Design for dead, live, wind, rain, and impact loads.

429.5.1 Structural integrity criteria.

1. The residential safe room shall be built with a complete structural system and a complete load path for vertical and lateral loads caused by gravity and wind.
2. The building that the residential safe room is in shall be assumed to be destroyed by the storm and shall not be taken as offering any protective shielding to the safe room enclosure.
3. The ceiling structure and wall shall be capable of supporting a superimposed debris load of the full weight of any building floors and roof above, but not less than 125 psf.

4. The residential safe room enclosure shall be capable of simultaneously resisting lateral and uplift wind pressures corresponding to a 145 mph 3-second peak gust ultimate design wind speed, determined in accordance with ASCE – 7, Minimum Design Loads for Buildings and Other Structures. The site exposure factor shall be based on exposure C or the exposure shown in Figure 1609.4, whichever is the greater. The values for the gust factor and the directionality factor shall be taken as 0.85. Topographic wind amplification caused by mountainous terrain shall be considered in accordance with the building code. Internal pressure shall be determined in accordance with ASCE – 7.
5. The residential safe room shall be anchored to a foundation system capable of resisting the above loading conditions.

429.5.2 Windborne debris impact protection of building enclosure elements. The entire enclosure of the safe room, including all walls, ceilings, and openings, fixed or operable windows, and all entry doors into the safe room, shall meet or exceed Level D requirements of ASTM E 1996 (Table 422.5-1), or be an approved assembly listed in Section 429.5.4. Any wall or ceiling penetration greater than 4 square inches shall be considered an opening.

Exception: Electrical outlet boxes and interior lighting switches not penetrating more than 2.5-inches into the interior wall surface and a plumbing piping or conduit not greater than 1.5-inch in diameter shall be exempted from this requirement.

429.5.3 Cyclic pressure loading of glazing and protective systems. Impact protective systems shall meet the ASTM E 1996 cyclic pressure requirement for the loading given in Table 429.5-1.

Table 429.5-1
WINDBORNE DEBRIS PROTECTION AND CYCLIC PRESSURE CRITERIA FOR RESIDENTIAL SAFE ROOMS

ASTM E 1996 Missile Level Rating	Debris Missile Size	Debris Impact Speed	Enclosure Wall Ceiling, and Floor Cyclic Air Pressure Testing - maximum inward and maximum outward pressures

D	2 x 4 weighing 9.0 lb. +/- 0.25 lb., and with min. length 8 ft. +/- 4-inch	50 ft./sec. or at least 34 mph	35 psf inward 45 psf outward

429.5.4 Approved Debris Impact Resistant Wall Assemblies. The following methods of wall assembly construction shall be deemed to comply with Section 429.5.2:

1. 3/4-inch plywood on wood studs spaced at 16 inches on-center with #8 X 3 inch wood screws at 6 inches on-center.
2. 3/4-inch plywood attached to double studs spaced at 16 inches on-center with #8 X 3 inch wood screws at 6 inches on-center.
3. 8-1/4 inch cementitious lap siding over 22 gage sheet metal attached to 350S-162-33 studs spaced at 24 inches on-center.
4. 8-1/4 inch cementitious lap siding attached to 350S-162-33 studs spaced at 24 inches on-center studs with interior 3/4-inch interior plywood sheathing.
5. 8-1/4 inch cementitious lap siding attached to 350S-162-33 studs spaced at 24 inches on-center with 1/2-inch interior 22 gage sheet metal composite gypsum wallboard.
6. 8-1/4 inch cementitious lap siding attached to 2 inch X 4 inch wood studs spaced at 16 inches on-center with 1/2-inch interior 22 gage sheet metal composite gypsum wallboard.
7. 8-1/4 inch cementitious lap siding attached to 2 inch X 4 inch wood studs spaced at 16 inches on-center with 22 gage sheet metal and 1/2-inch interior gypsum wallboard.
8. Cementitious lap siding attached to 5/8-inch structural plywood on 2 inch X 4 inch wood studs spaced at 16 inches on-center.
9. Cementitious-panel siding attached to 5/8-inch structural plywood on 2 inch X 4 inch or 362S-137-43 steel studs spaced at 16 inches on-center.
10. EFS with 1/2-inch dens-glass gold exterior sheathing on 362S-137-43 steel studs spaced at 16 inches on-center and 1/2-inch interior gypsum wallboard.
11. 24 gage steel sheet (50 ksi) on girts.
12. Concrete with a thickness of 4 inches with reinforcing.
13. Concrete masonry units with a thickness of 6 inches with partial grouting and reinforcing spaced at 24 inches on-center.
14. Concrete masonry units with a thickness of 8 inches with partial grouting and reinforcing spaced at 24 inches on-center.
15. Interior or exterior wall with laterally braced 2 inch x 4 inch wood studs with sheathing on either side of 22 gage sheet metal.

Sheathing shall be attached to studs with fasteners at 6 inches (152 mm) on center for edge and field fastening.

429.6 Ventilation. The residential safe room shall be naturally ventilated to allow the enclosure to have approximately one air change every two hours. This requirement may be satisfied by 12 square inches of venting per occupant. There shall be at least two operable vents. The vents shall be protected by a cowling or other device that shall be impact tested to comply with ASTM E 1996-14 Level D. Alternatively, the room shall be evaluated to determine if the openings are of sufficient area to constitute an open or partially enclosed condition as defined in ASCE 7.

429.7 Communications. The residential safe room shall be equipped with a phone line and telephone that does not rely on a separate electrical power outlet. Alternatively, a wireless telephone shall be permitted to rely on an Uninterruptible Power Supply (UPS) battery device.

429.8 Construction documents. Construction documents for the residential safe room shall be directly prepared by a Hawaii licensed professional structural engineer.

429.9 Special inspection. The construction or installation of the residential safe room shall be verified for conformance to the drawings in accordance with the appropriate requirements of Chapter 17 of the International Building Code.

429.10 Notification. The owner of the safe room shall notify the State Department of Defense and County Civil Defense Agency of the property's tax map key or global positioning system coordinates."

{from State IBC Amendment incorporating appendix "U" (U102)
COH exception to keep emergency functions designated as emergency only.}

(15) Section 430, "STATE- AND COUNTY-OWNED PUBLIC HIGH OCCUPANCY BUILDINGS - DESIGN CRITERIA FOR ENHANCED HURRICANE PROTECTION AREAS" of the International Building Code is added to read as follows:

"SECTION 430 STATE- AND COUNTY-OWNED PUBLIC HIGH OCCUPANCY BUILDINGS - DESIGN CRITERIA FOR ENHANCED HURRICANE PROTECTION AREAS

430.1 Intent. The purpose of this section is to establish minimum life safety design criteria for enhanced hurricane protection areas in high occupancy state- and county-owned buildings occupied during hurricanes of up to Saffir Simpson Category 3**.**

430.2 Scope. This section shall apply to state- and county-owned buildings which are of Risk Category III and IV defined by Table 1604.5 and of the following specific occupancies:

1. Enclosed and partially enclosed structures whose primary occupancy is public assembly with an occupant load greater than 300.
2. Health care facilities with an occupant load of 50 or more resident patients, but not having surgery or emergency treatment facilities.
3. Any other state- and county-owned enclosed or partially enclosed building with an occupant load greater than 5,000.
4. Hospitals and other health care facilities having surgery or emergency treatment facilities.

Exception: Facilities located within flood zone V and flood zone A that are designated by the owner to be evacuated during hurricane warnings declared by the National Weather Service, shall not be subject to these requirements.

430.3 Site criteria.

430.3.1 Flood zones. Comply with ASCE 24-14, Flood Resistant Design and Construction, based on provisions for Risk Category III.

1.Floor slab on grade shall be 1.5 foot above the base flood elevation of the county's flood hazard map, or a higher elevation as determined by a modeling methodology that predicts the maximum envelope and depth of inundation including the combined effects of storm surge and wave actions with respect to a Category 3 hurricane, nor less than the flood elevation associated with a 500-year mean recurrence interval.

2. Locate outside of V and Coastal A flood zones unless justified by site-specific analysis or designed for vertical evacuation in accordance with a method approved by the building official. When a building within a V or Coastal A flood zone is approved, the bottom of the lowest structural framing member of any elevated first floor space shall be 2 feet above the base flood elevation of the county's flood hazard map, or at higher elevation as determined by a modeling methodology that predicts the maximum envelope and depth of inundation including the combined effects of storm surge and wave actions with respect to a Category 3 hurricane, nor less than the flood elevation associated with a 500-year mean recurrence interval.

430.3.2 Emergency vehicle access. Provide at least one route for emergency vehicle access. The portion of the emergency route within the site shall be above the 100-year flood elevation.

430.3.3 Landscaping and utility laydown impact hazards. Landscaping around the building shall be designed to provide standoff separation sufficient to maintain emergency vehicle access in the event of mature tree blowdown. Trees shall not interfere with the functioning of overhead or underground utility lines, nor cause laydown or falling impact hazard to the building envelope or utility lines.

430.3.4 Adjacent buildings. The building shall not be located within 1,000 feet of any hazardous material facilities defined by Table 1604.5. Unanchored light-framed portable structures shall be not permitted within 300 feet of the building, unless the windborne debris hazard of the portable structure uplift is mitigated.

430.4 Enhanced hurricane protection area program requirements.
430.4.1 Applicable net area. At least 50 per cent of the net square feet of a facility shall be constructed to qualify as an enhanced hurricane protection area. The net floor area shall be determined by subtracting from the gross square feet the floor area of excluded spaces, exterior walls, columns, fixed or movable objects, equipment or other features that under probable conditions cannot be removed or stored during use as a storm shelter.

430.4.2 Excluded spaces. Spaces such as mechanical rooms, electrical rooms, storage rooms, attic and crawl spaces, shall not be considered as net floor area permitted to be occupied during a hurricane.

430.4.3 Occupancy capacity. The occupancy capacity shall be determined by dividing the net area of the enhanced hurricane protection area by 15 square feet net floor area per person.

430.4.4 Toilets and hand washing facilities. Toilet and hand washing facilities shall be located and accessible from within the perimeter of the enhanced hurricane protection area.

430.4.5 Accessibility. Where the refuge occupancy accommodates more than 50 persons, provide an ADA-accessible route to a shelter area at each facility with a minimum of 1 wheelchair space for every 200 enhanced hurricane protection area occupants determined in accordance with Section 430.4.3.

430.5 Design wind, rain, and impact loads.

430.5.1 Structural design criteria. The building main wind force resisting system and structural components shall be designed per ASCE 7 for a 145 mph minimum peak 3-second gust ultimate design wind speed. Topographic and directionality factors shall be the site-specific values determined per Section 1069.3.2. Design for interior pressure shall be based on the largest opening in any exterior facade or roof surface.

430.5.2 Windborne debris missile impact for building enclosure elements. Exterior glazing and glazed openings, louvers, roof openings and doors shall be provided with windborne debris impact resistance or protection systems conforming to ASTM E1996-14 Level D, i.e., 9 lb. 2 X 4 @ 50 fps (34 mph).

430.5.3 Cyclic pressure loading of impact resistive glazing or windborne impact protective systems. Resistance to the calculated maximum inward and outward pressure shall be designed to conform to ASTM E1996-14.

430.5.4 Windows. All unprotected window assemblies and their anchoring systems shall be designed and installed to meet the wind load and missile impact criteria of this section.

430.5.5 Window protective systems. Windows may be provided with permanent or deployable protective systems, provided the protective system is designed and installed to meet the wind load and missile impact criteria and completely covers the window assembly and anchoring system.

430.5.6 Doors. All exterior and interior doors subject to possible wind exposure or missile impact shall have doors, frames, anchoring devices, and vision panels designed and installed to resist the wind load and missile impact criteria or such doors, frames, anchoring devices, and vision panels shall be provided with impact protective systems designed and installed to resist the wind load and missile impact criteria of this section.

430.5.7 Exterior envelope. The building enclosure, including walls, roofs, glazed openings, louvers and doors, shall not be perforated or penetrated by windborne debris, as determined by compliance with ASTM E1996-14 Level D.

430.5.8 Parapets. Parapets shall satisfy the wind load and missile impact criteria of the exterior envelope.

430.5.9 Roofs

430.5.9.1 Roof openings. Roof openings (e.g., HVAC fans, ducts, skylights) shall be provided with protection for the wind load and missile impact criteria of Sections 430.5.2 and 430.5.3.

430.5.9.2 High wind roof coverings. Roof coverings shall be specified and designed according to the latest ASTM Standards for high wind uplift forces and Section 1507, whichever is the greater.

430.5.9.3 Roof drainage. Roofs shall have adequate slope, drains and overflow drains or scuppers sized to accommodate 100-year hourly rainfall rates in accordance with Section 1611.1, but not less than 2-inches per hour for 6 continuous hours.

430.6 Ventilation

430.6.1 Mechanical ventilation. Mechanical ventilation as required in accordance with the International Mechanical Code. Air intakes and exhausts shall be designed and installed to meet the wind load and missile impact criteria of Sections 430.5.2 and 430.5.3.

430.6.2 HVAC equipment anchorage. HVAC equipment mounted on roofs and anchoring systems shall be designed and installed to meet the wind load criteria. Roof openings for roof-mounted HVAC equipment shall have a 12-inch-high curb designed to prevent the entry of rain water.

430.7 Standby electrical system capability. Provide a standby emergency electrical power system per Chapter 27 and NFPA 70 **Article 700** Emergency Systems and **Article 701** Legally Required Standby Systems, which shall have the capability of being connected to an emergency generator or other temporary power source. The emergency system capabilities shall include:

1. An emergency lighting system;
2. Illuminated exit signs;
3. Fire protection systems, fire alarm systems and fire sprinkler systems; and
4. Minimum mechanical ventilation for health/safety purposes.

430.7.1 Emergency generator. When emergency generators are pre-installed, the facility housing the generator, permanent or portable, shall be an enclosed area designed to protect the generators from wind and missile impact.

Generators hardened by the manufacturer to withstand the area's design wind and missile impact criteria shall be exempt from the enclosed area criteria requirement.

430.8 Quality assurance

430.8.1 Information on construction documents. Construction documents shall include design criteria, the occupancy capacity of the enhanced hurricane protective area, and Project Specifications shall include opening protection devices. Floor plans shall indicate all enhanced hurricane protection area portions of the facility and exiting routes there from. The latitude and longitude coordinates of the building shall be recorded on the construction documents.

430.8.2 Special inspection. In addition to the requirements of Chapter 17, special inspections shall include at least the following systems and components:

1. Roof cladding and roof framing connections;
2. Wall connections to roof and floor diaphragms and framing;
3. Roof and floor diaphragm systems, including collectors, drag struts and boundary elements;
4. Vertical windforce-resisting systems, including braced frames, moment frames and shear walls;
5. Windforce-resisting system connections to the foundation; and
6. Fabrication and installation of systems or components required to meet the impact-resistance requirements of Section 1609.1.2.

Exception: Fabrication of manufactured systems or components that have a label indicating compliance with the wind-load and impact-resistance requirements of this code.

430.8.3 Quality assurance plan. A construction quality assurance program shall be included in the construction documents and shall include:

1. The materials, systems, components, and work required to have special inspection or testing by the building official or by the registered design professional responsible for each portion of the work;
2. The type and extent of each special inspection;
3. The type and extent of each test;
4. Additional requirements for special inspection or testing for seismic or wind resistance; and
5. For each type of special inspection, identification as to whether it will be continuous special inspection or periodic special inspection.

430.8.4 Peer review. Construction documents shall be independently reviewed by a Hawaii-licensed structural engineer. A written opinion report

of compliance shall be submitted to Hawaii Emergency Management Agency, the building official, and the owner.

430.9 Maintenance. The building shall be periodically inspected every three years and maintained by the owner to ensure structural integrity and compliance with this section. A report of inspection shall be furnished to the State Civil Defense.

430.10 Compliance re-certification when altered, deteriorated, or damaged. Alterations shall be reviewed by a Hawaii-licensed structural engineer to determine whether any alterations would cause a violation of this section. Deterioration or damage to any component of the building shall require an evaluation by a Hawaii-licensed structural engineer to determine repairs necessary to maintain compliance with this section."

{from State IBC Amendment incorporating appendix "U" (U103)

(16) Subsection 903.2.8, "Group R" of the International Building Code is amended to read as follows:

"**903.2.8 Group R.** An a*utomatic sprinkler system* installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R *fire area*.

Exception: In accordance with section 46-19.8, Hawai'i Revised Statutes, "Fire sprinklers; residences," until June 30, 2027 the installation or retrofitting of automatic fire sprinklers or an automatic fire sprinkler system shall not be required in:

1. Any new or existing detached one- or two-family dwelling unit in a structure used only for residential purposes; and
2. Nonresidential agricultural and aquacultural buildings and structures located outside an urban area.

Provided this exception shall not apply to new homes that require a variance from access road or firefighting water supply requirements."

{from State IBC Amendment (13). Conformed to subsec R313.2, IRC.}

(17) Section 906, "Portable Fire Extinguishers," of the International Building Code is deleted in its entirety and replaced with the following:

"**SECTION 906**
PORTABLE FIRE EXTINGUISHERS

906.1 General. Portable fire extinguishers shall be provided as required by the Hawai'i County Fire Code, Chapter 26, Hawai'i County Code."

{from State IBC Amendment (14)}

(18) Section 911, "Fire Command Center," of the International Building Code is deleted in its entirety and replaced with the following:

"**SECTION 911**
FIRE COMMAND CENTER

911.1 General. Where required by other sections of this code, a fire command center for fire department operations shall be provided and shall comply with the Hawai'i County Fire Code, Chapter 26, Hawai'i County Code."

{from State IBC Amendment (15)}

(19) Section 913, "Fire Pumps" of the International Building Code is deleted in its entirety and replaced with the following:

"**SECTION 913**
FIRE PUMPS

913.1 Fire Pumps. Where provided, fire pumps shall be installed in accordance with the Hawai'i County Fire Code, Chapter 26, Hawai'i County Code."

{from State IBC Amendment(16)}

(20) Subsection 1008.3.1, "General," of the International Building Code is amended to read as follows:

"**1008.3.1 General**. In the event of power supply failure in rooms and spaces that require two or more means of egress, an emergency electrical system shall automatically illuminate all the following areas:

1. *Aisles*
2. *Corridors*
3. *Exit access stairways* and *ramps*.
4. Enclosed stairways of buildings more than two stories in height."

{from State IBC Amendment (17)}

(21) Subsection 1010.1.2, "Door swing," of the International Building Code is amended to read as follows:

"**1010.1.2 Door swing**. Egress doors shall be of the pivoted or side-hinged swinging type.

Exceptions:

1. Private garages, office areas, factory and storage areas with an *occupant load* of 10 or less.
2. Group I-3 occupancies used as a place of detention.
3. Critical or intensive care patient rooms within suites of health care facilities.
4. Doors within [~~or serving~~] a single *dwelling unit* in Groups R-2 and R-3.
5. In other than Group H occupancies, revolving doors complying with Section 1010.1.4.1.
6. In other than Group H occupancies, special purpose horizontal sliding, accordion or folding door assemblies complying with Section 1010.1.4.3.
7. Power-operated doors in accordance with Section 1010.1.4.2.
8. Doors serving a bathroom within an individual *sleeping unit* in Group R-1.
9. In other than Group H occupancies, manually operated horizontal sliding doors are permitted in a *means of egress* from spaces with an *occupant load* of 10 of less."

{COH proposed amendment to eliminate contradiction with R311.3 of the IRC}

(22) Subsection 1010.2, "Gates," of the International Building Code is amended to read as follows:

"**1010.2 Gates**. Gates serving the *means of egress* system shall comply with the requirements of this section. Gates used as a component in a *means of egress* shall conform to the applicable requirements for doors.

[~~Exception~~] <u>Exceptions</u>:

1. Horizontal sliding or swinging gates exceeding the 4-foot (1219 mm) maximum leaf width limitation are permitted in fences and walls surrounding a stadium.
2. <u>Security gates may be permitted across corridors or passageways in school buildings if there is a readily visible durable sign on or adjacent to the gate, stating 'THIS GATE IS TO REMAIN SECURED IN THE OPEN POSITION WHENEVER THIS BUILDING IS IN USE'. The sign shall be in letters not less than one inch high on a contrasting background. The use of this exception may be revoked by the building official for due cause.</u>"

{from State IBC Amendment (18)}

(23) Subsection 1027.2, "Use in a means of egress," of the International Building Code is deleted in its entirety.

"[~~**1027.2 Use in a means of egress**. *Exterior exit stairways* shall not be used as an element of a required *means of egress* for Groups I-2 occupancies. For occupancies in other than Group I-2, *exterior exit stairways* and *ramps* shall be permitted as an element of a required *means of egress* for buildings not exceeding six stories above *grade plane* or that are not *high-rise buildings*.~~]"
{from State IBC Amendment (19)}

(24) Chapter 10, "Means of Egress," of the International Building Code is amended by adding Subsection 1030.2.2, "Glass jalousie windows," to read as follows:

"**1030.2.2 Glass jalousie windows**. Glass jalousie windows complying with Section 2403.5, and the minimum net clear dimensions per Section 1030.2.1, may be used for emergency escape or rescue windows."
{from State IBC Amendment (20)/ COH amendment}

(25) Chapter 11, "Accessibility," of the International Building Code is deleted in its entirety and replaced with the following:

"**1101 Scope**. Buildings or portions of buildings shall be accessible to persons with disabilities in accordance with the following provisions:

1. For construction of buildings or facilities of the State and County governments, compliance with Section 103-50, Hawai'i Revised Statutes, administered by the Disability and Communication Access Board, State of Hawai'i.

2. Department of Justice's Americans with Disabilities Act Standards for Accessible Design.

3. Housing and urban development recognized "safe harbors" for compliance with the Fair Housing Acts design and construction requirements.

4. Other pertinent laws relating with disabilities shall be administered and enforced by agencies responsible for their enforcement.

Prior to the issuance of a *building* permit, the owner (or the owner's representative, professional architect, or engineer), shall submit a statement that all requirements, relating to accessibility for persons with disabilities, shall be complied with."
{from State IBC Amendment (21). - conformed with IRC R320.1 - par (33).}

(26) Subsection 1202.1, "General," of the International Building Code is amended to read as follows:

"**1202.1 General**. Buildings shall be provided with natural ventilation in accordance with Section 1202.5, or mechanical ventilation in accordance with the [~~*International Mechanical Code*~~] Title 11, Chapter 39, Hawai'i Administrative Rules (Department of Health).

[~~Where the air infiltration rate in a *dwelling unit* is less than 5 air changes per hour where tested with a blower door at a pressure 0.2 inch w.c. (50 Pa) in accordance with Section R402.4.1.2 of the *International Energy Conservation Code-Residential Provisions*, the *dwelling unit* shall be ventilated by mechanical means in accordance with Section 403 of the *International Mechanical Code*. *Ambulatory care facilities* and Group I-2 occupancies shall be ventilated by mechanical means in accordance with Section 407 of the *International Mechanical Code*.~~]"

{from Oahu IBC Amendment}

(27) Chapter 12, "Interior Environment," of the International Building Code is amended by adding a new Subsection 1202.3.1, "Unvented attic spaces," to read as follows:

"**1202.3.1 Unvented attic spaces**. The attic space shall be permitted to be unvented when the design professional determines it would be beneficial to eliminate ventilation openings to reduce salt-laden air and maintain relative humidity at 60 per cent or lower to:

1. Avoid corrosion to steel components;
2. Avoid moisture condensation in the attic space; or
3. Minimize energy consumption for air conditioning or ventilation by maintaining satisfactory space conditions in both the attic and occupied space below."

{from State IBC Amendment (22)}

(28) Subsection 1202.5.1, "Ventilation area required," of the International Building Code is amended to read as follows:

"**1202.5.1 Ventilation area required**. The openable area of the openings to the outdoors shall be not less than [4] 5 percent of the floor area being ventilated."

{from Oahu IBC Amendment and existing Ch 5A-2-1(d)(8)310.3.5}

(29) Subsection 1202.5.1.1, "Adjoining spaces," of the International Building Code is amended to read as follows:

"**1202.5.1.1 Adjoining spaces**. Where rooms and spaces without openings to the outdoors are ventilated through an adjoining room, the opening to the adjoining room shall be unobstructed and shall have an area of not less than [~~8~~]10 percent of the floor area of the interior room or space, but not less than 25 square feet (2.3 m^2). The openable area of the openings to the outdoor shall be based on the total floor area being ventilated.

Exceptions:
Exterior openings required for *ventilation* shall be allowed to open into a sunroom with *thermal isolation* or a patio cover provided that the openable area between the sunroom addition or patio cover and the interior room shall have an area of not less than [~~8~~] 10 percent of the floor area of the interior room or space, but not less than 20 square feet (1.86 m^2). The openable area of the openings to the outdoors shall be based on the total floor area being ventilated.

{from Oahu IBC Amendment and existing Ch 5A-2-1(d)(8)310.3.5.}

(30) Subsection 1204.2, "Natural light," of the International Building Code is amended to read as follows:

"**1204.2 Natural light**. The minimum net glazed area shall be not less than [~~8~~] 10 percent of the floor area of the room served."

{from Oahu IBC Amendment and existing Ch 5A-2-1(d)(8)310.3.5}

(31) Section 1206, "Sound Transmission," of the International Building Code is deleted in its entirety.

{from Oahu IBC Amendment}

(32) Subsection 1301.1.1, "Criteria," of the International Building Code is amended to read as follows:

"**1301.1.1 Criteria**. Buildings shall be designed and constructed in accordance with the [~~International Energy Conservation Code~~] Energy Conservation Code, Chapter 5E, Hawai'i County Code."

{Proposed COH amendment Ch 5}

(33) Chapter 15, "Roof Assemblies and Rooftop Structures," of the International Building Code is amended by adding Subsection 1502.5, "Slope," to read as follows:

"**1502.5 Slope.** Roofs shall be sloped a minimum of 1 unit vertical in 48 units horizontal (2 per cent slope) for drainage unless designed for water accumulation in accordance with Section 1611. Leaders, conductors and storm drains shall be sized on the basis of Figure 1611.1 and the Plumbing Code, Chapter 5F, Hawai'i County Code."

{from State IBC Amendment (23)}

(34) Chapter 15, "Roof Assemblies and Rooftop Structures," of the International Building Code is amended by adding Subsection 1502.6, "Roof drains," to read as follows:

"**1502.6 Roof drains**. Unless roofs are sloped to drain over the roof edges, roof drains shall be installed at each low point of the roof."

{from State IBC Amendment (24)}

(35) Subsection 1507.1, "Scope," of the International Building Code is amended to read as follows:

"**1507.1 Scope**. Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions. For the purposes of Section 1507 high wind requirements for roof coverings, wherever the term V_{asd} is used, it shall be $V_{eff\text{-}asd}$, which is the effective ultimate design wind speed, $V_{eff\text{-}ult}$ multiplied by $\sqrt{0.625}$. The effective ultimate design wind speeds are given in Figure 1609.3.2 (a) for Risk Category II and Figure 1609.3.3 (a) for Risk Category III and IV."

{from State IBC Amendment (25)}

(36) Subsection 1602.1, "Notations," is amended by amending the notation of "*V_{asd}*" to read as follows:

"*V[~~asd~~]* **eff-asd** = [~~Allowable~~] Effective allowable stress design wind speed, miles per hour (mph) (km/hr) where applicable, calculated per Section 1609.3.1, that includes the effect of the special Hawai'i factors for topographic effects and directionality."

(37) Subsection 1602.1, "Notations," is amended by amending the notation of "*V*" to read as follows:

"*V* = Basic design wind speeds, miles per hour (mph) (km/hr) determined from Figure 1609.3(1) through 1609.3(8) or ASCE 7 map for the Risk Category, applied to the strength design of the structure."

(38) Subsection 1602.1, "Notations," is amended by adding a notation of "V_{unt}" to read as follows:

> "V_{unt} = Ultimate design wind speed miles per hour, (mph) (km/hr), of the region prior to any pressure calculation adjustments of topographic effects per Section 1609.3.2 or directionality effects per Section 1609.3.3."

{from State IBC Amendment (25)
State Comment: Changed definition from Vult to Vunt so that it's not confused with Vult in the IRC.}

(39) Subsection 1603.1, "General," of the International Building Code is amended to read as follows:

> "**1603.1 General**. *Construction documents* shall show the size, section and relative locations of structural members with floor levels, column centers and offsets dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.9 shall be clearly indicated on the *construction documents*.
>
> **Exception**: *Construction documents* for buildings constructed in accordance with the *conventional light-frame construction* provisions of Section 2308 shall indicate the following structural design information:
> 1. Floor and roof [~~dead and~~] live loads.
> 2. Ground snow load, P_g.
> 3. Basic design wind speed, *V*, miles per hour (mph)(km/hr) and effective allowable stress design wind speed, *[*~~V_{asd}~~*]* $V_{eff\text{-}asd}$, as determined in accordance with Section 1609.3.1 and wind exposure.
> 4. Design spectral response acceleration parameters, S_{DS} and S_{D1}.
> 5. *Seismic design category* and *site class*.
> [~~5~~]6. Flood design data, if located in flood hazard areas established in Section 1612.3.
> [~~6~~]7. Design load-bearing values of soils.
> [~~7~~]8. Rain load data."

{from State IBC Amendment (27)}

(40) Subsection 1603.1.4, "Wind design data," of the International Building Code is amended to read as follows:

> "**1603.1.4 Wind design data**. The following information related to wind loads shall be shown, regardless of whether wind loads govern the design of the lateral force-resisting system of the structure:

1. Basic design wind speed, *V*, miles per hour (mph) and effective allowable stress design wind speed, *[~~V~~ ~~asd~~]* $V_{eff\text{-}asd}$,as determined in accordance with Section 1609.3.1.
2. *Risk Category*.
3. Wind exposure, Applicable wind direction if more than one wind exposure is utilized.
4. The applicable internal pressure coefficient.
5. Design wind pressures to be used for exterior component and cladding materials not specifically designed by the *registered design professional* responsible for the design of the structure, psf (kN/m²)."

{from State IBC Amendment Appendix W (104)}

(41) Chapter 16, "Structural Design," of the International Building Code is amended by adding a new subsection 1607.1.1, "Live loads posted," to read as follows:

"**1607.1.1 Live loads posted.** In commercial or industrial buildings, for each floor or portion thereof designed for live loads exceeding 100 psf (4.80 kN/m^2), such design live loads shall be conspicuously posted by the owner or owner's authorized agent in that part of each story in which they apply, using durable signs. It shall be unlawful to remove or deface such notices."

{from State IBC Amendment (6).
State comment: The IBC section 106 requires posting where the design exceeds 50 psf—which is many occupancies. This amendment will reduce the number of occupancies which require signs.}

(42) Subsection 1609.1.1, "Determination of wind loads," of the International Building Code is amended to read as follows:

"1609.1.1 Determination of wind loads. Wind loads on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7. Minimum values for Directionality Factor, K_d, Velocity Pressure Exposure Coefficient, K_z, and Topographic Factor, K_{zt}, shall be determined in accordance with Section 1609. The type of opening protection required, the basic design wind speed, *V*, and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:
1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.

2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of the AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.
5. Designs using TIA-222 for antenna-supporting structures and antennas, provided [~~that the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment~~] the effect of topography is included in accordance with Section 1609.3.3 Topographic effects.

6. Wind tunnel tests in accordance with [~~ASCE 49 and Sections 31.4 and 31.5~~] Chapter 31 of ASCE 7, subject to the limitations in Section 1609.1.1.2.

The wind speeds in Figures 1609.3(1) through 1609.3(8) are basic design wind speeds, V, and shall be converted in accordance with Section 1609.3.1 to allowable stress design wind speeds, $V_{eff\text{-}asd}$, when the provisions of the standards referenced in Exceptions 4 and 5 are used."
{from State IBC Amendment Appendix W105}

(43) Subsection 1609.1.1.1, "Applicability," of the International Building Code is amended to read as follows:

"**1609.1.1.1 Applicability**. The provisions of ICC 600 are applicable only to buildings located within Exposure B or C as defined in Section 1609.4.[~~The provisions of ICC 600, AWC WFCM and AISI S230 shall not apply to buildings sited on the upper half of an isolated hill, ridge or escarpment meeting all of the following conditions:~~
~~1. The hill, ridge or escarpment is 60 feet (18 288 mm) or higher if located in Exposure B or 30 feet (9144 mm) or higher if located in Exposure C.~~
~~2. The maximum average slope of the hill exceeds 10 percent.~~
~~3. The hill, ridge or escarpment is unobstructed upwind by other such topographic features for a distance from the high point of 50 times the height of the hill or 2 miles (3.22 km), whichever is greater.~~]
The prescriptive provisions of ICC 600, AWC WFCM, or AISI S230 shall not be permitted for either of the following cases:
1. Structures which are more than three stories above grade plane in height.
2. Structures designed using exception 3 in Section 1609.2, Protection of Openings."
{from State IBC Amendment Appendix W(105)}

(44) Subsection 1609.2, "Protection of openings," of the International Building Code is amended to read as follows:

"1609.2 Protection of openings. In *windborne debris regions*, glazing in buildings shall be impact resistant or protected with an impact-resistant covering meeting the requirements of an *approved* impact-resistant standard or ASTM E1996 and ASTM E1886 referenced herein as follows:

1. Glazed openings located within 30 feet (9144 mm) of grade shall meet the requirements of the large missile test of ASTM E1996.

2. Glazed openings located more than 30 feet (9144 mm) above grade shall meet the provisions of the small missile test of ASTM E1996.

3. Glazing in Risk Category II, III or IV buildings located over 60 feet (18 288 mm) above the ground and over 30 feet (9144 mm) above aggregate surface roofs located within 1,500 feet (458 m) of the building shall be permitted to be unprotected.

4. Glazing in Risk Category IV buildings and structures, and those Risk Category III buildings of the following occupancies shall be provided with windborne debris protection:
   a. Covered structures whose primary occupancy is public or educational assembly with an occupant load greater than 300.
   b. Health care facilities with an occupant load of 50 or more resident patients, but not having surgery or emergency treatment facilities.
   c. Any other public building with an occupant load greater than 5,000.

5. Glazing in Risk Category I, II, and other Risk Category III buildings and structures are subject to the following exceptions:

   Exceptions:
   1. Wood structural panels with a minimum thickness of 7/16 inch (11.1 mm) and a maximum panel span of 8 feet (2438 mm) shall be permitted for opening protection in one- and two-story buildings [~~with a mean roof height of 33 feet (10 058 mm) or less that are~~] classified as [~~a~~] Group R-3 or R-4 occupancy. Panels shall be precut so that they shall be attached to the framing surrounding the opening containing the product with the glazed opening. Panels shall be predrilled as required for the anchorage method and shall be secured with the attachment hardware provided. Attachments

shall be designed to resist the components and cladding loads determined in accordance with the provisions of ASCE 7, with corrosion-resistant attachment hardware provided and anchors permanently installed on the building. Attachment in accordance with Table 1609.2 with corrosion-resistant attachment hardware provided and anchors permanently installed on the building is permitted for buildings with a mean roof height of 45 feet (13 716 mm) or less where $V_{eff\text{-}asd}$ [~~determined in accordance with Section 1609.3.1~~] does not exceed 140 mph (63 m/s).

2. Glazing in *Risk Category* I buildings [~~as defined in Section 1604.5~~], including greenhouses that are occupied for growing plants on a production or research basis, without public access shall be permitted to be unprotected.

3. [~~Glazing in *Risk Category* II, III or IV buildings located over 60 feet (18 288 mm) above the ground and over 30 feet (9144mm) above aggregate surface roofs located within 1,500 feet (458 m) of the building shall be permitted to be unprotected.~~] Risk Category II buildings shall be permitted to be designed with unprotected openings subject to the following requirements:

   a. For each direction of wind, determination of enclosure classification shall be based on the assumption that all unprotected glazing on windward walls are openings while glazing on the remaining walls and roof are intact and are not assumed to be openings.

   b. Partially enclosed and open occupancy R-3 buildings without wind-borne debris protection shall also include a residential safe room in accordance with Section 429, Hawaii residential safe room, or alternatively provide an equivalently sized room structurally protected by construction complying with Section 429.5."

{from State IBC Amendment Appendix W105}

(45) Table 1609.2 "Windborne Debris Protection Fastening Schedule For Wood Structural Panels," of the International Building Code is amended to read as follows:

"**Table 1609.2**
Windborne Debris Protection Fastening

Schedule For Wood Structural Panels [a,b,c,d]

Fastener Type	Fastener Spacing (inches)		
	Panel Span ≤ 4 feet	**4 feet < Panel Span ≤ 6 feet**	**6 feet < Panel Span ≤ 8 feet**
No. 8 wood-screw-based anchor with 2-inch embedment length	16	10	8
No. 10 wood-screw-based anchor with 2-inch embedment length	16	12	9
1/4-inch diameter lag-screw-based anchor with 2-inch embedment length	16	16	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.448N = 0.454 kg, 1 mile per hour = 0.447 m/s = 1.609 km/h.

a. This table is based on a [~~140 mph~~] 175 mph ultimate design wind [~~speeds~~] speed and a 45-foot mean roof height.
b. Fasteners shall be installed at opposing ends of the wood structural panel. Fasteners shall be located not less than 1 inch from the edge of the panel.
c. Anchors shall penetrate through the exterior wall covering with an embedment length of 2 inches minimum into the building frame. Fasteners shall be located not less than 2-1/2 inches from the edge of concrete block or concrete.
d. Where panels are attached to masonry or masonry/stucco, they shall be attached using vibration-resistant anchors having a minimum [~~ultimate~~] withdrawal capacity of 1,500 pounds.

{from State IBC Amendment Appendix W105}

(46) Subsection 1609.2.2, "Application of ASTM E1996," of the International Building Code is amended by amending the portion of this subsection that amends paragraph 6.2.2.3 of ASTM E1996 by replacing the less than or equal to symbol in the following phrase with the less than symbol as shown:

"$V \leq$ 160 mph (63 m/s)"
is replaced with
"$V <$ 160 mph (63 m/s)"

As amended the portion of this subsection that amends paragraph 6.2.2.3 of ASTM E1996 would read as follows:

"6.2.2.3 *Wind Zone 3*-150 mph (58 m/s) ≤ basic design wind speed, $V <$ 160 mph (63 m/s),
or 140 mph (54 m/s) ≤ basic design wind speed, $V \leq$ 160 mph (63 m/s) and within one mile (1.6 km) of the coastline. The coastline shall be measured from the mean high water mark."

{from State IBC Amendment Appendix W105}

(47) Subsection 1609.2.3, "Garage Doors," of the International Building Code is amended to read as follows:

"**1609.2.3 Garage doors.**
Garage door glazed opening protection for windborne debris shall meet the requirements of [~~an~~] the *approved* impact-resisting standard [~~or~~] of ANSI/DASMA 115."

{from State IBC Amendment Appendix W105}

(48) Subsection 1609.3, "Basic design wind speed," of the International Building Code is amended to read as follows:

"**1609.3 Basic design wind speed**. The basic design wind speed, *V*, in mph, for the determination of the wind loads shall be determined by Figures 1609.3(1) through (8). The basic design wind speed, *V*, for use in the design of Risk Category II buildings and structures shall be obtained from Figures 1609.3(1) and 1609.3(5). The basic design wind speed, *V*, for use in the design of Risk Category III buildings and structures shall be obtained from Figures 1609.3(2) and 1609.3(6). The basic design wind speed, *V*, for use in the design of Risk Category IV buildings and structures shall be obtained from Figures 1609.3(3) and 1609.3(7). The basic design wind speed, *V*, for use in the design of Risk Category I buildings and structures shall be obtained from Figures 1609.3(4) and 1609.3(8). The basic design wind speed, *V*, [~~for the special wind regions indicated near mountainous terrain and near gorges shall be in accordance with local jurisdiction requirements. The basic design wind speeds, *V*, determined by the local jurisdiction shall be in accordance with Chapter 26 of ASCE 7~~] shown for Hawai'i in Figures 1609.3(5) through 1609.3(8) include topographic effects near mountainous terrain and near gorges, and shall be used with a topographic factor K_{zt} of 1.0 and the directionality factors given in Table 26.6-1 of ASCE 7.

[~~In nonhurricane-prone regions, when the basic design wind speed, *V*, is estimated from regional climatic data, the basic design wind speed, *V*, shall be determined in accordance with Chapter 26 of ASCE 7.~~] Alternatively, when determining wind loads using both the explicit topographic factors given in section 1609.3.2 and the explicit directionality factors of section 1609.3.3, the ultimate design wind speed, V_{unt}, in mph, without topographic effects shall be as follows:
Risk Category I buildings and structures: 115 mph
Risk Category II buildings and structures: 130 mph
Risk Category III buildings and structures: 145 mph
Risk Category IV buildings and structures: 153 mph"

{from State IBC Amendment Appendix W105}

(49) Subsection 1609.3.1, "Wind speed conversion," of the International Building Code is amended to read as follows:

"**1609.3.1 Wind speed conversion**. Where required, the basic design wind speeds of Figures 1609.3.(1) through 1609.3(8) shall be converted to effective allowable stress design wind speeds,[~~V_{asd}~~]$V_{eff\text{-}asd}$, using Table 1609.3.1 or Equation 16-33.

[~~$V_{asd} = V\sqrt{0.6}$~~] $V_{eff\text{-}asd} = V\sqrt{0.625}$ **(Equation 16-33)**

where:

[~~V_{asd}~~] $V_{eff\text{-}asd}$ = [~~Allowable~~] Effective allowable stress design wind speed applicable to methods specified in Exceptions 4 and 5 of Section 1609.1.1 and for Section 2308.7.5.
V = Basic design wind speeds determined from Figures 1609.3(1) through 1609.3(8)."

{from State IBC Amendment Appendix W; updated section 2308.7.5 from state appendix W105}

(50) Table 1609.3.1, "Wind speed conversions," of the International Building Code is amended to read as follows:

"**TABLE 1609.3.1**
WIND SPEED CONVERSIONS [a, b, c]

V	100	110	120	130	140	150	160	170	180	190	200
[~~V_{asd}~~] $V_{eff\text{-}asd}$	78	85	93	101	108	116	124	132	139	147	155

For SI: 1 mile per hour = 0.44 m/s.
a. Linear interpolation is permitted.
b. [~~V_{asd}~~] $V_{eff\text{-}asd}$ = [~~Allowable~~] Effective allowable stress design wind speed applicable to methods specified in Exceptions 4 through 5 of Section 1609.1.1 and for Section 2308.7.5.
c. V = basic design wind speeds determined from Figures 1609.3(1) through 1609.3(8)."

{from State IBC Amendment Appendix W; updated section 2308.7.5 from state appendix W105}

(51) Chapter 16, "Structural Design," of the International Building Code is amended by adding a new Subsection 1609.3.2, "Topographic effects," to read as follows:

"**1609.3.2 Topographic effects.** Wind speed-up effects caused by topography shall be included in the calculation of wind loads by using the factor K_{zt}, where K_{zt} is given in Figures 1609.3.2(a).

Exception:
Site-specific probabilistic analysis of directional K_{zt} based on wind-tunnel testing of topographic speed-up shall be permitted to be submitted for approval by the building official.
Basic design wind speed, V, is determined per Figures 1609.3(5) through 1609.3(8) that already include topographic effects near mountainous terrain and near gorges, which shall be used with a topographic factor K_{zt} of 1.0 and the directionality factors given in Table 26.6-1 of ASCE 7."

{from State IBC Amendment Appendix W105}

(52) Chapter 16, "Structural Design," of the International Building Code is amended by adding Figure 1609.3.2(a), "County of Hawai‘i Peak Gust Topographic Factor K_{zt}," to read as follows:

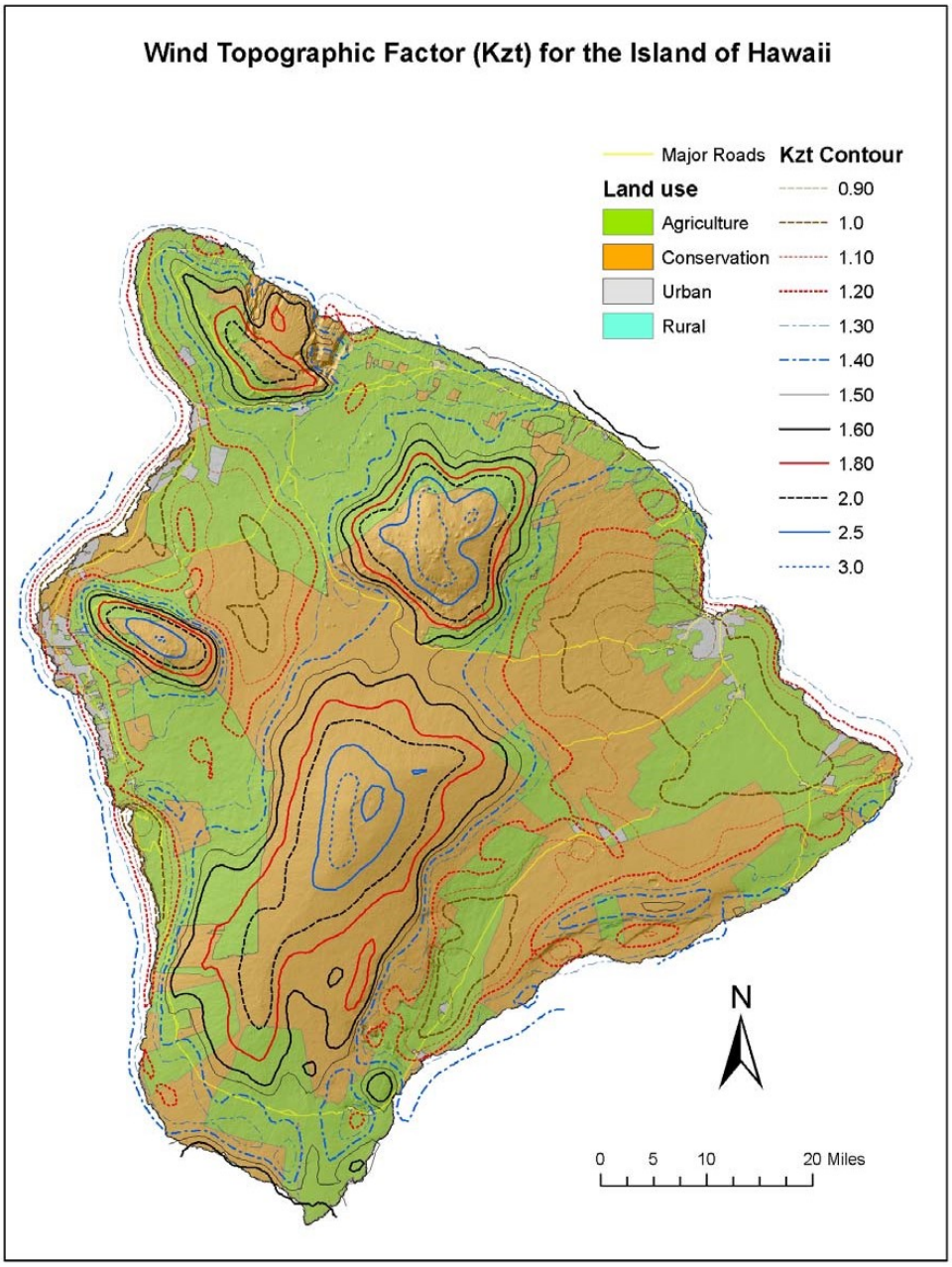


Figure 1069.3.2(a), County of Hawai‘i Peak Gust Topographic Factor K_{zt}
{from State IBC Amendment Appendix W105}

(53) Chapter 16, “Structural Design,” of the International Building Code is amended by adding Subsection 1609.3.3, “Directionality factor,” to read as follows:

"**1609.3.3 Directionality factor.** The wind directionality factor, K_d, shall be determined from Tables 1609.3.3(a)(1) and 1609.3.3(b)(1).

Exception: Basic design wind speed, V, is determined per Figures 1609.3(5) through 1609.3(8) that already include topographic effects near mountainous terrain and near gorges, which shall be used with a topographic factor Kzt of 1.0 and the directionality factors given in Table 26.6-1 of ASCE 7."

{from State IBC Amendment Appendix W105}

(54) Chapter 16, "Structural Design," of the International Building Code is amended by adding Table 1609.3.3(a)(1), "K_d Values for Main Wind Force Resisting Systems Sited in Hawaii County," to read as follows:

"**Table 1609.3.3(a)(1)**
K_d Values for Main Wind Force Resisting Systems Sited in Hawaii County [a,b]

Topographic Location on the Island of Hawaii	Main Wind Force Resisting Systems		Main Wind Force Resisting Systems with Totally Independent Systems in Each Orthogonal Direction		Biaxially Symmetric and Axisymmetric Structures of any Height and Arched Roof Structures
	Mean Roof Height less than or equal to 100 ft.	Mean Roof Height greater than 100 ft.	Mean Roof Height less than or equal to 100 ft.	Mean Roof Height greater than 100 ft.	
Sites in North Kohala, South Kohala, South Kona, South Hilo, and Puna Districts at an elevation not greater than 3000 ft.	0.65	0.70	0.70	0.75	0.85
All other sites	0.70	0.80	0.75	0.80	0.95

a. The values of K_d for other non-building structures indicated in ASCE-7 Table 26.6-1 shall be permitted.
b. Site-specific probabilistic analysis of K_d based on wind-tunnel testing of topography and peak gust velocity profile shall be permitted to be submitted for approval by the Building Official, but K_d shall have a value not less than 0.65."

{from State IBC Amendment Appendix W105}

(55) Chapter 16, "Structural Design," of the International Building Code is amended by adding Table 1609.3.3(b)(1), "K_d Values for Components and Cladding Sited in Hawaii County," to read as follows:

"**Table 1609.3.3(b)(1)**
K_d Values for Components and Cladding of Buildings Sited in Hawaii County [a,b]

Topographic Location on the Island of Hawaii	Components and Cladding		
	Mean Roof Height less than or equal to 100 ft.	Mean Roof Height greater than 100 ft.	Risk Category IV Buildings and Structures
Sites in North Kohala, South Kohala, South Kona, South Hilo, and Puna Districts at an elevation not greater than 3000 ft.	0.65	0.70	0.70
All other sites	0.70	0.80	0.85

a. The values of K_d for other non-building structures indicated in ASCE-7 Table 26.6-1 shall be permitted.
b. Site-specific probabilistic analysis of K_d based on wind-tunnel testing of topography and peak gust velocity profile shall be permitted to be submitted for approval by the Building Official, but in any case subject to a minimum value of 0.65."

{from State IBC Amendment Appendix W105}

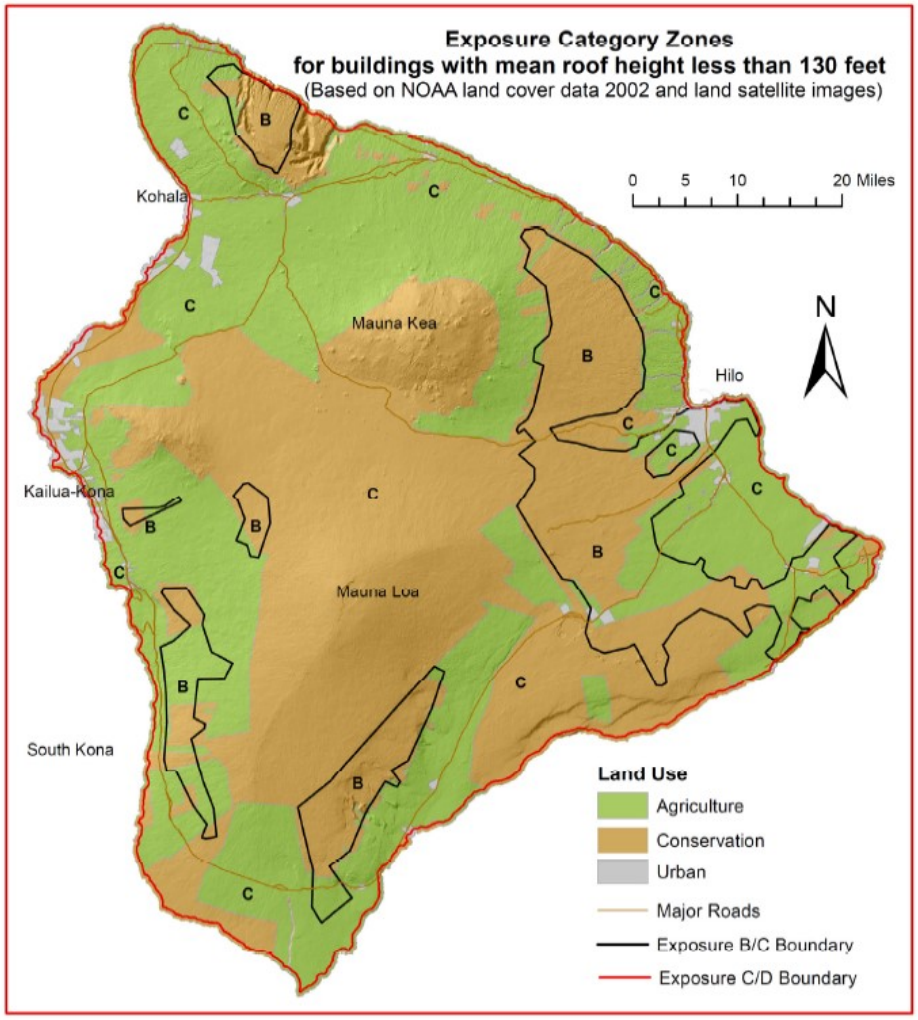
(56) Subsection 1609.4.1, "Wind directions and sectors," of the International Building Code is amended to read as follows:

"**1609.4.1 Wind directions and sectors**. For each selected wind direction considered, at which the wind loads are to be evaluated, the exposure of the building or structure shall be determined for the two upwind sectors extending 45 degrees (0.79 rad) either side of the selected wind direction. The exposures in these two sectors shall be determined in accordance with Sections 1609.4.2 and 1609.4.3 and the exposure resulting in the highest wind loads shall be used to represent winds from that direction.

Exception: Exposure categories shall be permitted to be determined using Figure 1609.4(a)."

{from State IBC Amendment Appendix W105}

(57) Chapter 16, "Structural Design," of the International Building Code is amended by adding Figure 1609.4(a), "Exposure Category Zones for Hawaii County," to read as follows:



Notes:
1. Intermediate exposures, between categories B and C and between C and D, are permitted when substantiated per ASCE 7 recognized methodology.
2. Sites located within the C (coastal) zone shall be permitted to be evaluated for exposure category B for the wind directions where an adjacent B zone exists in the applicable upwind sector.
3. Sites located within 600 feet from the coastline shall be exposure category D for onshore wind directions.
4. For buildings whose height is equal to or greater than 130 ft, exposure category shall be determined per Section 1609.4.1.
5. For buildings whose mean roof height is less than or equal to 30 ft, exposure category shall be permitted to be evaluated per Section 1609.4.

Figure 1609.4 (a) Exposure Category Zones for Hawaii County

{from State IBC Amendment Appendix W105}

(58) Chapter 16, "Structural Design," of the International Building Code is amended by adding the following to read as follows:

a. Subsection 1609.5.4, "Roof-mounted solar collectors for buildings."

b. Subsection 1609.5.4.1, "Rooftop solar panels parallel to the roof surface on buildings of all heights and roof slopes."

c. Subsection 1609.5.4.2, “Rooftop solar collectors for buildings of all heights with flat roofs or gable or hip roofs with slopes less than 7 degrees.”
d. Subsection 1609.5.4.3, “Roof-top solar panels for all other conditions.”
e. Subsection 1609.5.4.4, “Additive panel wind loads.”
f. Subsection 1609.5.4.5, “Ballasted panels.”
g. Subsection 1609.5.4.6, “Permeability.”
h. Subsection 1609.5.4.7, “Shielding.”
i. Figure 1609.5.4-1, “Solar Collector Dimensions.”
j. Figure 1609.5.4-2, “Solar Collector Pressure Equalization Factor, γ_a, for Enclosed and Partially Enclosed Buildings of all Heights.”
k. Figure 1609.5.4-3, “Rooftop Solar Collectors for Buildings of all Heights With Flatroofs or Gable or Hip Roofs With Slopes Less Than 7 Degrees (See Notes 1-3 Below).”

“**1609.5.4 Roof-mounted solar collectors for buildings**. The design wind force for roof-mounted solar collector panels located on buildings shall be determined based on the location and height of the panel system and the configuration of the roof, in accordance with Sections 1609.5.4.1 through 1609.5.4.7. In addition to all the other applicable provisions of this Code, the roof itself shall be designed for both of the following:

1. The case where solar collectors are present. Wind loads acting on solar collectors in accordance with this section shall be applied simultaneously with roof wind loads specified in other sections acting on areas of the roof not covered by the plan projection of solar collectors. For this case, unless otherwise noted, roof wind loads specified in other sections need not be applied on areas of the roof covered by the plan projection of solar collectors.
2. Cases where the solar arrays have been removed or are absent.

The following variables are defined for use in determining the design wind force applied to rooftop solar collectors/panels:

A = the area of the solar panel element.
d_1 = For rooftop solar array, horizontal distance orthogonal to the panel edge to an adjacent panel array or the building edge, ignoring any rooftop equipment. See Figures 1609.5.4-1 or 1609.5.4-3, in ft.
d_2 = For rooftop solar arrays, horizontal distance from the edge of one panel to the nearest edge in the next row of panels. See Figure 1609.5.4-1 or 1609.5.4-3, in ft.
F = the design wind force normal to each panel determined in accordance with Section 1609.5.4

h = Mean Roof height of a building except that eave height shall be used for roof angle θ, less than or equal to 10 degrees, in ft.

h_1 = height of a solar panel above the roof at the lower edge of the panel measured perpendicular to the surface of the roof, See Figures 1609.5.4-1 or 1609.5.4-3, in ft.

h_2 = height of a solar panel above the roof at the upper edge of the panel measured perpendicular to the surface of the roof, See Figures 1609.5.4-1 or 1609.5-3, in ft.

h_{pt} = Mean parapet height above the adjacent roof surface.

L_p = panel chord dimension, in ft, for use with rooftop solar collectors as shown in Figures 1609.5.4-1 or 1609.5.4-3.

W_L = Width of a building on its longest side.

W_S = Width of a building on its shortest side.

γ_E = Array edge factor

θ = Angle of the roof surface, in degrees. See Figures 1609.5.4-1 or 1609.5.4-3.

ω = Angle that the solar panel makes with the roof surface, in degrees. See Figures 1609.5.4-1 or 1609.5.4-3.

1609.5.4.1 Rooftop solar panels parallel to the roof surface on buildings of all heights and roof slopes. Pursuant to ASCE 7 29.4.4, the design wind force determined in accordance with this section shall apply to rooftop solar collectors meeting the following conditions:

1. Rooftop solar collectors are located on enclosed or partially enclosed buildings of any height.
2. Panels are parallel to the roof surface, within a tolerance of 2°.
3. The maximum height above the roof surface, h2, shall not exceed 10 inches (254 mm).
4. A minimum gap of 0.25 inches (6.4 mm) shall be provided between all panels.
5. The spacing of gaps between panels shall not exceed 6.7 ft (2.04 m).
6. The array shall be located at least $2h_2$ from the nearest roof edge, gable ridge, or hip ridge.

The design wind force for rooftop solar collectors shall be determined by Equation 1609.5-1:

$$F = q_h GC_p \gamma_E \gamma_a A \text{ (lb) (N)} \qquad \textbf{(Equation 1609.5.4-1)}$$

Where:

GC_p = external pressure coefficient for Components and Cladding of roofs with respective roof zoning for the corresponding location on the roof, with the effective wind area, A, equal to that of the solar panel.
γ_E = Array edge factor for use with rooftop solar collectors. Where;
γ_E = 1.5 for panels that are exposed and those within a distance 1.5(L_p) from the end of a row at an exposed edge of the array;
γ_E = 1.0 elsewhere, as illustrated by the example array configuration shown in Figure 1609.5.4-3.

A panel is defined as exposed if d_1 to the roof edge > 0.5h and one of the following applies:
1. d_1 to the adjacent array > 4 ft (1.22m)
2. d_2 to the next adjacent panel > 4 ft (1.22m)

γ_a = solar collector pressure equalization factor, from Figure 1609.5.4-2.

The force F shall be permitted to be applied to the centroid of the calculated pressure.

1609.5.4.2 Rooftop solar collectors for buildings of all heights with flat roofs or gable or hip roofs with slopes less than 7 degrees. Pursuant to ASCE 7 29.4.3, The design wind force determined in accordance with this section shall apply to rooftop solar collectors meeting the following conditions:
1. Rooftop solar collectors are located on enclosed or partially enclosed buildings of any height.
2. Flat, gable, or hip roofs with slopes, $\theta \leq 7$ degrees.
3. Panels installation shall conform to the following limitations:
   - $Lp \leq 6.7$ ft (2.04 m)
   - $\omega \leq 35$ degrees
   - $h1 \leq 2$ ft (0.61 m)
   - $h2 \leq 4$ ft (1.22 m)
4. A minimum gap of 0.25 inches (6.4 mm) shall be provided between all panels.
5. The spacing of gaps between panels shall not exceed 6.7 ft (2.04m).
6. The minimum horizontal clear distance between the panels and the edge of the roof shall be the larger of $2(h_2 - h_{pt})$ and 4 ft for the design pressures in this section to apply.

The design wind force for rooftop solar collectors shall be determined by Eq. 1609.5.4-2:

$F = q_h GC_{rn} A$ (lb) (N) **(Equation 1609.5.4-2)**

Where:

$GC_m = \gamma_p \gamma_c \gamma_E (GC_{rn})_{nom}$ **(Equation 1609.5.4-3)**

Where:

$(GC_{rn})_{nom}$ = nominal net pressure coefficient from Figure 1609.5.4-3. (ASCE 29.4-7)

$\gamma_p = min\left(1.2,\ 0.9 + \frac{h_{pt}}{h}\right)$ = parapet height factor.

h_{pt} = mean parapet height above the adjacent roof surface (ft).

$\gamma_c = max\left(0.6 + 0.06L_p,\ 0.8\right)$

γ_E = Array edge factor for use with rooftop solar collectors. Where;

γ_E = 1.5 for panels that are exposed and those within a distance 1.5(L_p) from the end of a row at an exposed edge of the array;

γ_E = 1.0 elsewhere, as illustrated by the example array configuration shown in Figure 1609.5-3. (ASCE 29.4-7)

A panel is defined as exposed if d_1 to the roof edge > 0.5h and one of the following applies:

1. d_1 to the adjacent array > max (4h2, 4 ft(1.22m))
2. d_2 to the next adjacent panel > max (4h2, 4 ft (1.22m))

The force F shall be permitted to be applied to the centroid of the calculated pressure.

When $\omega \leq 2$ degrees, $h_2 \leq 0.83$ ft (0.25 m), and a minimum gap of 0.25 in. (6.4 mm) is provided between all panels, and the spacing of gaps between panels does not exceed 6.7 ft (2.04 m), the procedure of 1609.5.4.1 shall be permitted.

1609.5.4.3 Roof-top solar panels for all other conditions.

The normal force on other configurations of roof-top panels not regulated by ASCE 7 Chapter 29 shall be not less than that determined by Equation 1609.5.4-4:

$F = q_h(GC_p)C_N A$ (lb) (N) **(Equation 1609.5.4-4)**

Where:

C_N = pressure coefficients for monoslope free roofs from ASCE 7-16 Table 30.8-1 considering each elevated panel as a free roof surface in clear wind flow. The angle θ used for the determination of C_N shall be measured as the angle of the panel with respect to the plane of the roof (ω in Figure 1609.5.4-1). Values of C_N for forces on the panel may be taken as the Zone 1 coefficients.

Exception: Zone 2 coefficients for C_N shall be used where the panel angle, ω, is greater than 7.5 degrees; panels are located a distance less than or equal to twice the roof height measured from a roof corner; and the parapet is greater than 24 inches (610 mm) in height above the roof.

GC_p = the component and cladding external pressure coefficient for roofs for the roof zone corresponding to the location of the solar panel, and the effective wind area shall be that of the solar panel. The minimum magnitude of negative pressure values of GC_p in Zone 1 shall be taken as -1.0.

A = the total area of the solar panel element.

When located in roof zone 2 or 3 as defined in ASCE 7, the force F shall be applied with an eccentricity equal to a third of the solar panel width.

1609.5.4.4 Additive panel wind loads. The load on the panel shall be applied as point load anchorage reactions additive to the resultant of the pressure determined acting on the portion of the roof underlying the panel.

1609.5.4.5 Ballasted panels. Panels that are ballasted for uplift resistance and tilted at an angle α of 10 degrees or more from a horizontal plane shall be designed to resist the force determined by Equation 1609.5.4-5:

$$F_{ballast} \geq F\left(\frac{\mu\cos\beta + \sin\beta}{\mu\cos\alpha - \sin\alpha}\right)$$ (lb) (N) **(Equation 1609.5.4-5)**

Where:

F = the normal force on each panel determined in accordance with Section 1609.5.4.

α = the angle of the roof plane with respect to horizontal.

β = the angle of tilt of the panel with respect to the roof plane.

μ = the static friction coefficient between the panel base and its bearing surface.

Alternatively, to resist uplift and sliding, ballasted panels that are tilted at an angle of less than 10 degrees from a horizontal plane shall each be ballasted to resist a force equal to 2 times the normal force on each panel. Ballasted panels that are tilted at an angle between 10 degrees to 25 degrees from a horizontal plane shall each be ballasted to resist a force equal to 8 times the normal force on each panel.

1609.5.4.6 Permeability. A reduction of load on the panels for permeability of the panel system shall not be permitted unless demonstrated by approved wind-tunnel testing or recognized documentation for the type of panel system being considered. Testing or documentation shall replicate the panel separation spacing and height above the roof.

1609.5.4.7 Shielding. A reduction of load on the panels for shielding provided by the roof or other obstruction shall not be permitted unless demonstrated by approved wind-tunnel testing or recognized documentation for the type of panel system being considered. Testing or documentation shall replicate the panel separation spacing and height above the roof."

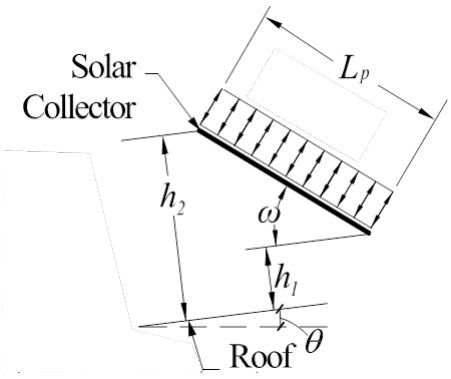


Figure 1609.5.4-1 Solar Collector Dimensions.

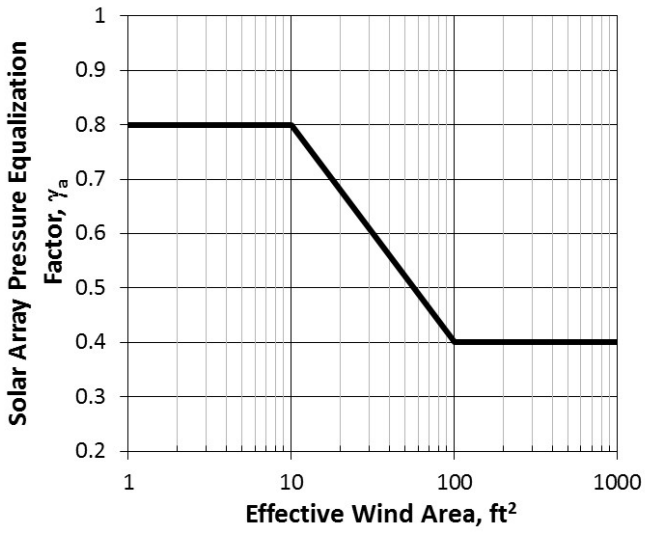


Figure 1609.5.4-2 Solar Collector Pressure Equalization Factor, γ_a, for enclosed and partially enclosed buildings of all heights.

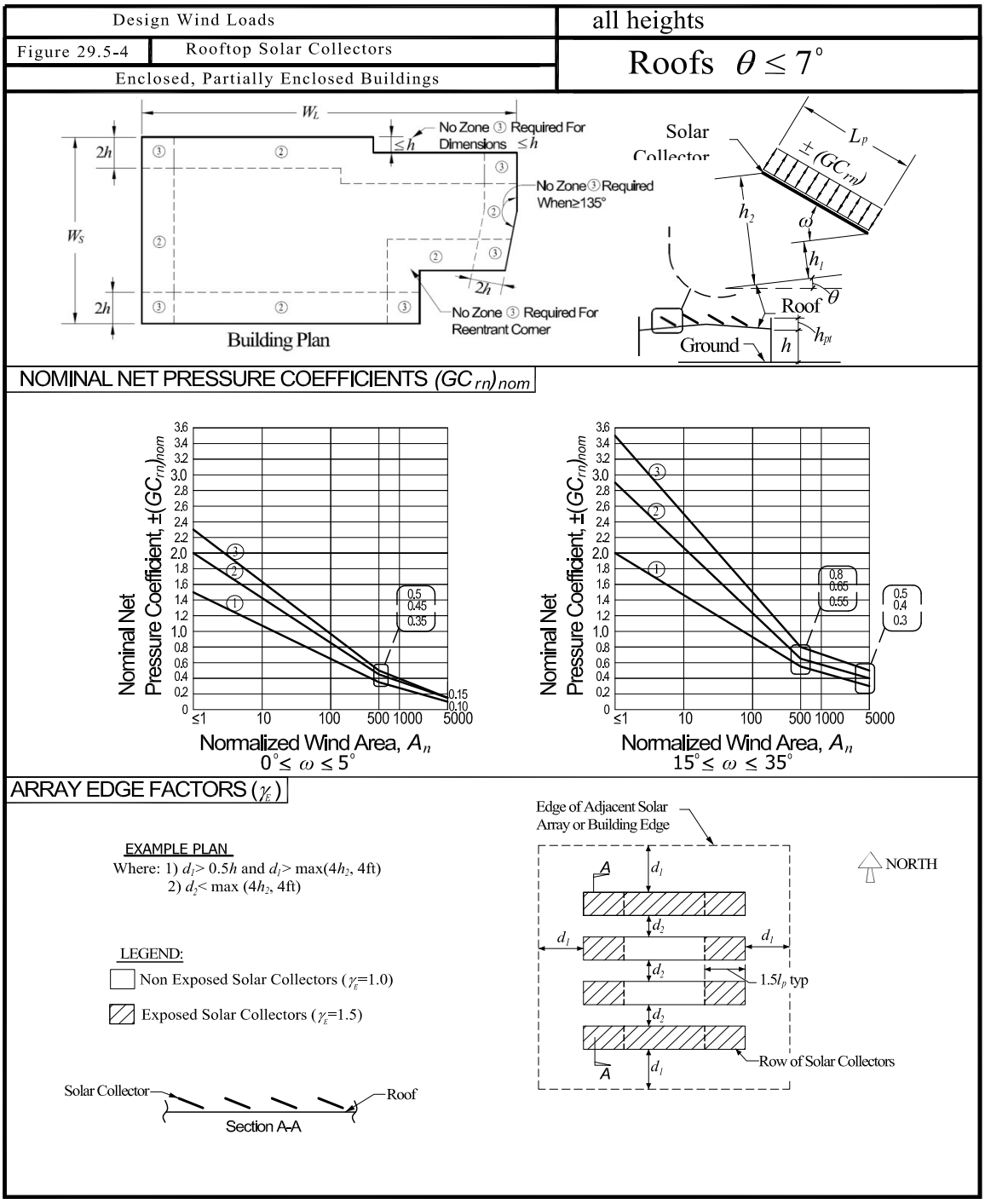


Figure 1609.5.4-3 Rooftop Solar Collectors for Buildings of all Heights With Flatroofs or Gable or Hip Roofs With Slopes Less Than 7 Degrees (see notes 1-3 below)

Notes for Figure 1609.5.4-3:
1. (GC_{rn}) acts towards (+) and away (-) from the top surface of the panels.
2. Linear interpolation shall be permitted for ω between 5° and 15°.
3. Notation:

$$A_n = \left(\frac{1000}{[max(L_b, 15)]^2}\right) A_r$$

An = normalized wind area for rooftop solar collectors

$L_b = min(0.4\,(h\,W_L)^{0.5},\ h,\ W_S)$, in ft.

W_L = width of a building on its longest side in Figure 1609.5.4-3, in ft.

W_S = width of a building on its shortest side in Figure 1609.5.4-2, in ft.

{from ASCE 7 and State IBC Amendment Appendix W}

(59) Table 1613.2.5(1), "Seismic Design Category Based On Short-Period (0.2 Second) Response Acceleration," of the International Building Code is amended to read as follows:

"**Table 1613.2.5(1)**
Seismic Design Category Based On
Short-Period (0.2 Second) Response Acceleration

Value of S_{DS}	Risk Category		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
~~[0.50g ≤ S_{DS}]~~	~~[D]~~	~~[D]~~	~~[D]~~
0.50 ≤ S_{DS} < 0.60g	C	D	D
0.60g ≤ S_{DS}	D	D	D

{from State IBC Amendment 30}

(60) Table 1613.2.5(2), "Seismic Design Category Based On 1-Second Period Response Acceleration" of the International Building Code is amended to read as follows:

"**Table 1613.2.5(2)**
Seismic Design Category Based On 1-Second Period Response Acceleration

Value of ***SDI***	Risk Category		
	I or II	**III**	**IV**
$S_{DI} < 0.067g$	A	A	A
$0.067g \leq S_{DI} < 0.133g$	B	B	C
$0.133g \leq S_{DI} < 0.20g$	C	C	D
~~[$0.20g \leq S_{DI}$]~~	~~[D]~~	~~[D]~~	~~[D]~~
$0.20g \leq S_{DI} < 0.27g$	C	D	D
$0.27g \leq S_{DI}$	D	D	D"

{from State IBC Amendment (31)}

(61) Chapter 16, "Structural Design," is amended by adding Figure 1615.2(a), "Minimum Height of Highest Occupiable Floor for Risk Category II Buildings to Require Tsunami Design – State of Hawai'i" to read as follows:

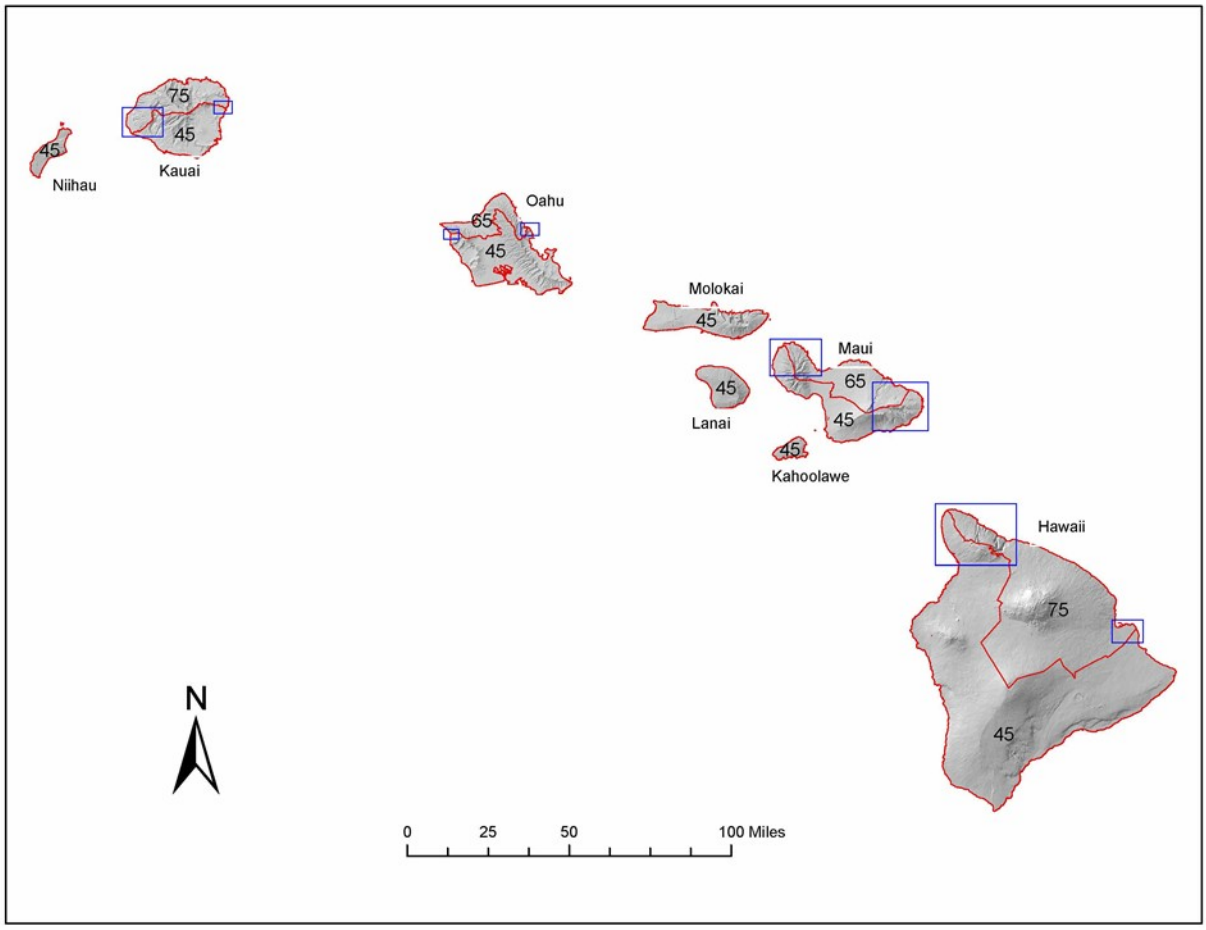


Figure 1615.2(a)
Minimum Height of Highest Occupiable Floor for
Risk Category II Buildings to Require Tsunami Design – State of Hawai‘i

(62) Chapter 16, "Structural Design," is amended by adding Figure 1615.2(b), "Minimum Height of Highest Occupiable Floor for Risk Category II Buildings to Require Tsunami Design – County of Hawai‘i," to read as follows:

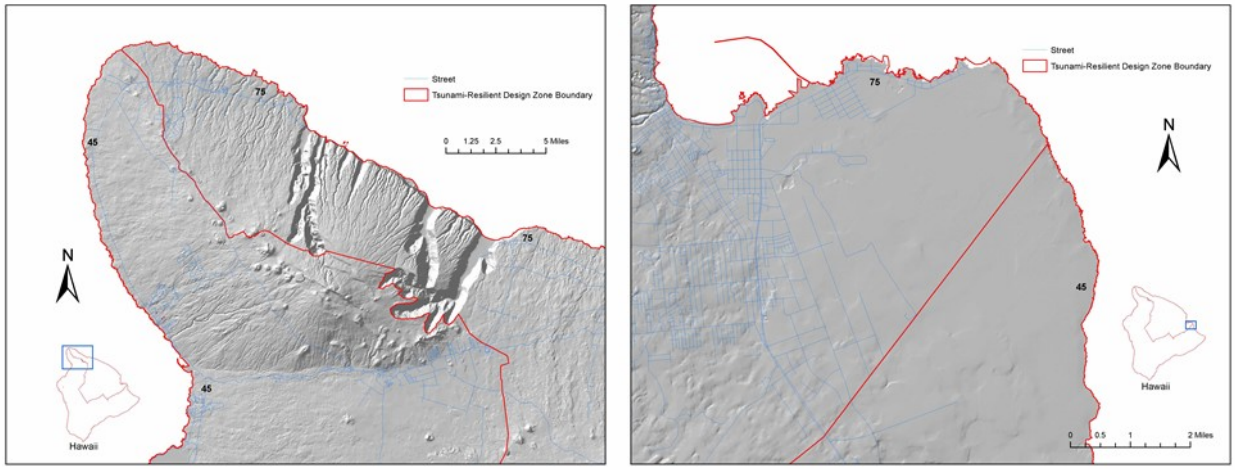


Figure 1615.2(b)
Minimum Height of Highest Occupiable Floor for
Risk Category II Buildings to Require Tsunami Design – Hawai‘i Transitions"

(63) Subsection 1704.2, "Special inspections and tests," of the International Building Code is amended to read as follows:

"**1704.2 Special inspections and tests**. Where application is made to the *building official* for construction as specified in [~~Section 105~~] Article 4, Chapter 5, Hawai‘i County Code, the owner or the *registered design professional in responsible charge* acting as the owner's authorized agent, [~~other than the contractor,~~] shall employ one or more approved [~~agencies~~] special inspectors independent of the contractors performing the work to provide *special inspections* and tests during construction on the types of work specified in Section 1705 and identify the approved [~~agencies~~] *special inspectors* to the *building official*. These *special inspections* and tests are in addition to the inspections by the *building official* that are identified in [~~Section 110~~] Article 8, Chapter 5, Hawai‘i County Code.

Exceptions:

1. *Special inspections* and tests are not required for construction of a minor nature or as warranted by conditions in the jurisdiction as *approved* by the *building official*.
2. Unless otherwise required by the *building official*, *special inspections* and tests are not required for Group U occupancies that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.
3. *Special inspections* and tests are not required for portions of structures designed and constructed in accordance with the cold-formed steel light-frame construction provisions of Section 2211.1.2 or the conventional light-frame construction provisions of Section 2308. For these structures, Section 1705.11 shall nevertheless apply.
4. The contractor is permitted to employ the approved [~~agencies~~] *special inspectors* where the contractor is also the owner.
5. The employment of a *special inspector* shall not be required for construction work for any government agency that provides for its own *special inspections* and tests.
6. *Special inspections* and tests are not required for building components unless the design involves the practice of professional engineering or architecture as defined by Chapter 464, Hawai‘i Revised Statutes."

{from State IBC Amendment (33)}

(64) Subsection 1704.2.1, "Special inspector qualifications," of the International Building Code is amended to read as follows:

"**1704.2.1 Special inspector qualifications.** Prior to the start of the construction, [~~the~~] each approved [~~agencies~~] *special inspectors* shall provide written documentation to the *building official* demonstrating the competence and relevant experience or training of the *special inspectors* who will perform the *special inspections* and tests during construction. Experience or training shall be considered to be relevant where the documented experience or training is related in complexity to the same type of *special inspection* or testing activities for projects of similar complexity and material qualities. These qualifications are in addition to qualifications specified in other sections of this code.

The *registered design professional in responsible charge* and engineers of record involved in the design of the project are permitted to act as the approved [~~agency~~] *special inspector* and their personnel are permitted to act as special inspectors for the work designed by them, provided they qualify as special inspectors."

{from State IBC Amendment (34)}

(65) Subsection 1704.2.3, "Statement of special inspections," of the International Building Code is amended to read as follows:

"**1704.2.3 Statement of special inspections.** The applicant shall submit a statement of *special inspections* in accordance with Section [~~107.1~~] 5-4-2, Hawai'i County Code as a condition for permit issuance. This statement shall be [~~in accordance with~~] deemed to be satisfied by Section 1704.3.

[~~Exception: A statement of *special inspections* is not required for portions of structures designed and constructed in accordance with the cold-formed steel light-frame construction provisions of Section 2211.1.2 or the conventional light-frame construction provisions of Section 2308.~~]"
{from State IBC Amendment (35) & COH}

(66) Subsection 1704.2.4, "Report requirement," of the International Building Code is amended to read as follows:

"**1704.2.4 Report requirement.** [~~*Approved agencies* shall keep records of special inspections and tests. The *approved agency* shall submit reports of *special* inspections and tests to the *building official* and to the *registered design professional* in *responsible charge*. Reports shall indicate that work inspected or tested was or was not completed in conformance to *approved construction documents*. Discrepancies shall be brought to the immediate attention of the contractor for correction. If they are not corrected, the discrepancies shall be brought to the attention of the *building official* and to the *registered design professional in responsible charge* prior to the completion of that phase of the work. A final report documenting required *special inspections* and tests, and correction of any discrepancies noted in the inspections or tests, shall be submitted at a point in time agreed upon prior to the start of work by the owner or the owner's authorized agent to the *building official*.~~] *Special inspectors* shall keep records of *special inspections* and tests. The *special inspector* shall submit reports of *special inspections* and tests to the owner and licensed engineer or architect of record. Reports shall indicate whether the work inspected and tested was done in conformance to approved construction documents. Discrepancies shall be brought to the immediate attention of the contractor for correction, then, if uncorrected, to the licensed engineer or architect of record and to the *building official*. The *special inspector* shall submit a final signed report to the owner and licensed engineer or architect of record, stating whether the work requiring *special inspection* was, to the best of the inspector's knowledge, in conformance with

the approved plans and specifications and the applicable workmanship provisions of this code.

Prior to the final inspection by the *building official* per article 8, chapter 5, Hawai‘i County Code, the licensed engineer or architect of record shall submit a written statement verifying receipt of the final *special inspection* reports and documenting that there are no known unresolved code requirements that create significant public safety deficiencies."

{from State IBC Amendment (36)}

(67) Subsection 1704.3, "Statement of special inspections," of the International Building Code is amended to read as follows:

"**1704.3 Statement of special inspections**. Where *special inspections* or tests are required by Section 1705, the *registered design professional in responsible charge* shall prepare a statement of *special inspections* in accordance with Section 1704.3.1 for submittal by the applicant in accordance with Section 1704.2.3.

[~~Exception: The statement of *special inspections* is permitted to be prepared by a qualified person *approved* by the *building official* for construction not designed by a *registered design professional*.~~]

The construction drawings shall include a complete list of special inspections required by this section."

{from State IBC Amendment (37) COH Amendment.}

(68) Subsection 1704.6, "Structural observations," of the International Building Code is deleted in its entirety and replaced with the following:

"**1704.6 Structural observations**. The owner shall employ a *registered design professional* to perform structural observations. Structural observations shall be performed in accordance with Section 464-5, Hawai‘i Revised Statutes, administered and enforced by the Department of Commerce and Consumer Affairs.

Prior to the final inspection required pursuant to the Construction Administrative Code, Chapter 5, Hawai‘i County Code, the licensed engineer or architect of record shall submit a written statement verifying receipt of the final special inspection reports and documenting that to the best of their knowledge, information and belief, there are no known unresolved code requirements that create significant public safety deficiencies."

{from State IBC Amendment (39) carry over from IBC 2012}

(69) Subsection 1705.3, "Concrete construction," of the International Building Code is amended to read as follows:

"**1705.3 Concrete construction.** *Special inspections* and tests of concrete construction shall be performed in accordance with this section and Table 1705.3.

Exception: Unless required by section 1705.11, "Special inspections for wind resistance," or Section 1705.12, "Special inspections for seismic resistance," [~~Special~~] *special inspections* and tests shall not be required for concrete used in:

1. Isolated spread concrete footings of buildings three stories or less above grade plane that are fully supported on earth or rock[~~.~~] where:
   1.1. The footings support columns of light-frame construction.
   1.2. The structural design of the footing is based on a specified compressive strength, f'_c, not more than 2,500 pounds per square inch (psi) (17.2 MPa), regardless of the compressive strength specified in the approved construction documents or used in the footing construction.
2. Continuous concrete footings supporting walls of buildings three stories or less above *grade plane* that are fully supported on earth or rock where:
   2.1. The footings support walls of light-frame construction.
   2.2. The footings are designed in accordance with Table 1809.7.
   2.3. The structural design of the footing is based on a specified compressive strength, f'_c, not more than 2,500 pounds per square inch (psi) (17.2 MPa), regardless of the compressive strength specified in the *approved construction documents* or used in the footing construction.
3. Nonstructural concrete slabs supported directly on the ground, including prestressed slabs on grade, where the effective prestress in the concrete is less than 150 psi (1.03 MPa).
4. Concrete foundation walls constructed in accordance with Table 1807.1.6.2.
5. Concrete patios, driveways and sidewalks, on grade."

{from State IBC Amendment (39)}

(70) Subsection 1705.11, "Special inspections for wind requirements," of the International Building Code is amended to read as follows:

"**1705.11 Special inspections for wind resistance.** *Special inspections* for wind resistance specified in [~~Sections~~] Section 1705.11.1 [~~through 1705.11.3~~,]

unless exempted by the exceptions to Section 1704.2, are required for buildings and structures constructed [~~in the following areas:~~

~~1. In wind Exposure Category B, where V_{asd} as determined in accordance with Section 1609.3.1 is 120 miles per hour (52.8 m/sec) or greater.~~

~~2. In wind Exposure Category C or D, where V_{asd} as determined in accordance with Section 1609.3.1 is 110 mph (49 m/sec) or greater~~]

where the basic design wind speed, *V*, is 120 mph (53 m/sec) or greater."

{from State IBC Amendment (40)

*State Comment: This effectively reduces the threshold of basic wind speed, V, that requires special inspection from a basic wind speed of sqrt(1.6)*120 = 152 mph in exposure B to 120 mph and sqrt(1.6)*110 = 139 mph in Exposure C & D to 120 mph. This basically means everywhere in Hawaii.}*

(71) Subsection 1705.11.1, "Structural wood," of the International Building Code is amended to read as follows:

"**1705.11.1 [~~Structural wood.~~** *~~Continuous special inspection~~* ~~is required during field gluing operations of elements of the main windforce-resisting system. *Periodic special inspection* is required for nailing, bolting, anchoring and other fastening of elements of the main windforce-resisting system, including wood shear walls, wood diaphragms, drag struts, braces and hold-downs.~~

~~Exception: *Special inspections* are not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other elements of the main windforce-resisting system, where the specified fastener spacing at panel edges is more than 4 inches (102 mm) on center.~~]

Complete Load Path and Uplift Ties. Special inspection is required for metal connectors, anchors, or fasteners for wood and cold-formed steel construction at the following locations: roof ridges, roof rafters to beam or wall supports, beams to posts, posts or walls to floor framing or foundation below, ground anchors, and all other connections that are part of the load path to resist uplift forces. The special inspector need not be present during the installation of all of the connectors, provided that the special inspector verifies that all of the connectors are installed in conformance with the requirements of this code.

Continuous special inspection is required during field gluing operations of elements of the main windforce-resisting system. "

{from State IBC Amendment (41)}

(72) Subsection 1705.11.2, "Cold formed steel light-frame construction," of the International Building Code is deleted in its entirety.

[**~~1705.11.2 Cold-formed steel light-frame construction~~**. *~~Periodic special inspection~~* ~~is required for welding operations of elements of the main windforce-resisting system. *Periodic special inspection* is required for screw attachment, bolting, anchoring and other fastening of elements of the main windforce-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.~~

~~Exception:~~ *~~Special inspections~~* ~~are not required for cold-formed steel light-frame shear walls and diaphragms, including screwing, bolting, anchoring and other fastening to components of the windforce resisting system, where either of the following applies:~~

1. ~~The sheathing is gypsum board or fiberboard.~~
2. ~~The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).~~]

{from State IBC Amendment (41)}

(73) Subsection 1705.11.3, "Wind-resisting components," of the International Building Code is deleted in its entirety.

"[**~~1705.11.3 Wind-resisting components.~~**

~~Periodic special inspection~~ ~~is required for fastening of the following systems and components:~~

1. ~~Roof covering, roof deck and roof framing connections.~~
2. ~~Exterior wall covering and wall connections to roof and floor diaphragms and framing.~~]"

{from State IBC Amendment (41)}

(74) Subsection 1810.3.6, "Splices," of the International Building Code is amended to read as follows:

"**1810.3.6 Splices**. Splices shall be constructed so as to provide and maintain true alignment and position of the component parts of the deep foundation element during installation and subsequent thereto and shall be designed to resist the axial and shear forces and moments occurring at the location of the splice during driving and [~~for design load combinations. Where deep foundation elements of the same type are being spliced, splices shall develop not less than 50 percent of the bending strength of the weaker section. Where~~

~~deep foundation elements of different materials or different types are being spliced, splices shall develop the full compressive strength and not less than 50 percent of the tension and bending strength of the weaker section. Where structural steel cores are to be spliced, the ends shall be milled or ground to provide full contact and shall be full-depth welded.~~] under service loading.

Splices occurring in the upper 10 feet (3048 mm) of the embedded portion of an element shall be designed to resist at allowable stresses the moment and shear that would result from an assumed eccentricity of the axial load of 3 inches (76 mm), or the element shall be braced in accordance with Section 1810.2.2 to other deep foundation elements that do not have splices in the upper 10 feet (3048 mm) of embedment."

{from State IBC Amendment (42)}

(75) Subsection 1810.3.6.1, "Seismic Design Categories C through F," of the International Building Code is deleted in its entirety:

"[~~**1810.3.6.1 Seismic Design Categories C through F.**~~
~~For structures assigned to Seismic Design Category C, D, E or F splices of deep foundation elements shall develop the lesser of the following:~~
~~1. The nominal strength of the deep foundation element.~~
~~2. The axial and shear forces and moments from the seismic load effects including overstrength factor in accordance with Section 2.3.6 or 2.4.5 of ASCE 7.~~]"

{from State IBC Amendment (42)}

(76) Chapter 19, "Concrete," of the International Building Code is amended by adding Subsection 1904.3, "Concrete strap-type anchors," to read as follows:

"**1904.3 Concrete Strap-Type Anchors**. Concrete strap-type anchors made out of cold-formed steel shall not be used along the perimeter edges of a slab on grade where the steel does not have at least 1-1/2 inches side cover or other adequate protection."

{from State IBC Amendment (43)}

(77) Chapter 19, "Concrete," of the International Building Code is amended by adding Subsection 1905.1.9, "ACI 318, Section 19.3.2.1 – Water cement ratio," to read as follows:

"**1905.1.9 ACI 318, Section 19.3.2.1. Water cement ratio.** Modify ACI 318 Table 19.3.2.1 as follows: Change the Maximum w/cm ratio for Exposure Class Cl to 0.50."

{from State IBC Amendment (44)}

(78) Chapter 19, "Concrete," of the International Building Code is amended by adding Subsection 1905.1.10, "ACI 318, Section 20.7 Embedments," to read as follows:

"**1905.1.10 ACI 318, Section 20.7 Embedments.** Add ACI 318, Section 20.7.5 Anchor Bolts at the Perimeter Edge of a Slab on Grade. Anchor bolts shall be hot dipped galvanized in accordance with ASTM F2329 and have a minimum concrete side cover of 1-1/2 inches unless provisions have been made to protect the anchor bolts from corrosion."

{from State IBC Amendment (45)}

(79) Chapter 19, "Concrete," of the International Building Code is amended by adding Subsection 1905.2, "ACI 318, Section 1.4.2," to read as follows:

"**1905.2 ACI 318, Section 1.4.2.** Revised ACI 318, Section 1.4.2 to read as follows: '1.4.2 Applicable provisions of ACI 318 shall be permitted to be used for structures not governed by the general building code. Where repairs and rehabilitation are not required to satisfy the provisions of ACI 318, the provisions of ACI 562-16 shall be permitted to be used for the assessment, repair, and rehabilitation of existing structures.'"

{from State IBC Amendment (46)}

(80) Chapter 21, "Masonry," of the International Building Code is amended by adding Subsection 2104.1.3, "Cleanouts" to read as follows:

"**2104.1.3 Cleanouts**. Cleanouts shall be provided for all grout pours over 5 feet 4 inches in height. Special provisions shall be made to keep the bottom and sides of the grout spaces, as well as the minimum total clear area required by TMS 602 clean and clear prior to grouting.

Exception: Cleanouts are not required for grout pours 8 feet or less in height providing all of the following conditions are met:

1. The hollow masonry unit is 8-inch nominal width or greater.
2. The specified compressive strength of masonry, f'm, is less than or equal to 2,000psi as determined per TMS 602 Table 2;
3. Fine grout is used complying with ASTM C-476 with a minimum compressive strength of 3,000 psi; and
4. Special Inspection is provided."

{from State IBC Amendment (47)}

(81) Chapter 22, "Steel," of the International Building Code is amended by adding Subsection 2203.2, "Protection of sill track" to read as follows:

"**2203.2 Protection of sill track.** Cold formed steel framing sills that directly bear on concrete or masonry that is in direct contact with earth shall be shielded along the exterior flange and bottom of the sill track with a self-adhered rubberized asphalt flashing material with a minimum thickness of 25 mil (0.64 mm) or other moisture barrier conforming to ASTM D412, D570, and E96/E96M."

{from State IBC Amendment (48)}

(82) Subsection 2211.1.2, "Prescriptive framing," of the International Building Code is amended to read as follows:

"**2211.1.2 Prescriptive framing.** Detached one- and two-family *dwellings* and *townhouses*, less than or equal to three *stories above grade plane*, shall be permitted to be constructed in accordance with AISI S230 subject to the limitations therein. Prescriptive framing shall not be applicable for structures designed using exception 3 in Section 1609.2, Protection of Openings."

{from State IBC Amendment (49)}

(83) Subsection 2302.1, "General," of the International Building Code is amended to read as follows:

"**2302.1 General.** The design of structural elements or systems, constructed partially or wholly of wood or wood-based products, shall be in accordance with one of the following methods:

1. *Allowable stress design* in accordance with Sections 2304, 2305 and 2306.
2. *Load and resistance factor design* in accordance with Sections 2304, 2305 and 2307.
3. *Conventional light-frame construction* in accordance with Sections 2304 and 2308.
4. AWC WFCM in accordance with Section 2309.
5. The design and construction of log structures in accordance with the provisions of ICC 400.

Exception:
Prescriptive requirements applicable to the exterior roof and wall enclosure in 2304, 2308 and 2309 shall not be applicable for structures designed using exception 3 in Section 1609.2, Protection of Openings.

Method 3 and method 4 shall not be applicable for structures designed using exception 3 in Section 1609.2, Protection of Openings."

{from State IBC Amendment (50)
State Comment: The exception relieves the prohibited use of windows without debris protection when using the prescriptive design methods. }

(84) Subsection 2303.1.9, "Preservative-treated wood," of the International Building Code is amended read as follows:

"**2303.1.9 Preservative-treated wood.** [~~Lumber, timber, plywood, piles and poles supporting permanent structures required by Section 2304.12 to be preservative treated shall conform to AWPA U1 and M4. Lumber and plywood used in permanent wood foundation systems shall conform to Chapter 18.~~] Structural lumber, including plywood, posts, beams, rafters, joists, trusses, studs, plates, sills, sleepers, roof and floor sheathing, flooring and headers of new wood-frame buildings and additions shall be:

1. Treated in accordance with AWPA Standard U1 (UC1 thru UC4B) for AWPA Standardized Preservatives, all marked or branded and monitored by an approving agency. Incising is not required, providing that the retention and penetration requirements of these standards are met.
2. For SBX disodium octaborate tetrahydrate (DOT), retention shall be not less than 0.28 pcf B_2O_3 (0.42 = pcf DOT) for exposure to Formosan termites. All such lumber shall be protected from direct weather exposure as directed in AWPA UC1 and UC2.
3. For structural glued-laminated members made up of dimensional lumber, engineered wood products, or structural composite lumber, pressure treated in accordance with AWPA U1 (UC1 thru UC4B) or by Light Oil Solvent Preservative (LOSP) treatment standard as approved by the building official. Water based treatment processes as listed in paragraphs 1 and 2 are not allowed to be used on these products unless specified by a structural engineer for use with reduced load values and permitted by the product manufacturer.
4. For structural composite wood products, treated by non-pressure processes in accordance with AWPA Standard U1 (UC1, UC2 and UC3A) or approved by the building official."

{from State IBC Amendment (51)}

(85) Subsection 2303.9.1, "Identification," of the International Building Code is deleted in its entirety and replaced by Subsection 2301.9.1, "Treatment," to read as follows:

"**[~~2303.1.9.1 Identification.~~** ~~Wood required by Section 2304.12 to be preservative treated shall bear the quality mark of an inspection agency that maintains continuing supervision, testing and inspection over the quality of the preservative-treated wood. Inspection agencies for the preservative-treated wood shall be listed by an accreditation body that complies with the requirements of the American Lumber Standards Treated Wood Program, or equivalent. The quality mark shall be on a stamp or label affixed to the preservative-treated wood, and shall include the following information:~~

~~1. Identification of treating manufacturer.~~
~~2. Type of preservative used.~~
~~3. Minimum preservative retention (pcf).~~
~~4. End use for which the product is treated.~~
~~5. AWPA standard to which the product was treated.~~
~~6. Identity of the accredited inspection agency.~~]

2303.1.9.1 Treatment. Wood treatment shall include the following:

1. A quality control and inspection program which meets or exceeds the current requirements of AWPA Standards M2-01 and M3-03;
2. Inspection and testing for the treatment standards as adopted by this code shall be by an independent agency approved by the building official, accredited by the American Lumber Standards Committee (ALSC) and contracted by the treating company;
3. Field protection of all cut surfaces with a preservative, which shall be applied in accordance with AWPA Standard M4-02 or in accordance with the approved preservative manufacturer's ICC-Evaluation Services report requirements."

{from State IBC Amendment (51)}

(86) Subsection 2303.9.2, "Moisture Content," of the International Building Code is amended by renumbering it to Subsection 2303.9.3 and to read as follows:

"**[~~2303.1.9.2~~] 2303.1.9.3 Moisture content**. Where *preservative-treated wood* treated with a water-borne preservative is used in enclosed locations where drying in service cannot readily occur, such wood shall be at a moisture content of 19 percent or less before being covered with insulation, interior wall finish, floor covering or other materials."

{from State IBC Amendment (51)}

(87) Chapter 23, "Wood," of the International Building Code is amended by adding Subsection 2301.9.2, "Labeling," to read as follows:

"**2303.1.9.2 Labeling.** Labeling shall be applied to all structural lumber 2 inches or greater in nominal thickness, with the following information provided on each piece as a permanent ink stamp on one face or on a durable tag permanently fastened to ends with the following information:

1. Name of treating facility;
2. Type of preservative;
3. AWPA use category;
4. Quality mark of third party inspection agency;
5. Retention minimum requirements; and
6. Year of treatment.

All lumber less than 2 inches in nominal thickness, shall be identified per bundle by means of a label containing information that satisfies the above requirements. Labels measuring no less than 6 inches by 8 inches shall be placed on the lower left corner of the strapped bundle."

{from State IBC Amendment (51)}

(88) Subsection 2304.6.1, "Wood structural panel sheathing," of the International Building Code is amended to read as follows:

"**2304.6.1 Wood structural panel sheathing.** Where wood structural panel sheathing is used as the exposed finish on the exterior of outside walls, it shall have an exterior exposure durability classification. Where wood structural panel sheathing is used elsewhere, but not as the exposed finish, it shall be of a type manufactured with exterior glue (Exposure 1 or Exterior).[~~Wood structural panel sheathing, connections and framing spacing shall be in accordance with Table 2304.6.1 for the applicable wind speed and exposure category where used in enclosed buildings with a mean roof height not greater than 30 feet (9144 mm) and a topographic factor (K_{zt}) of 1.0.~~] Wood structural panel wall sheathing or siding used as structural sheathing shall be capable of resisting wind pressures in accordance with Section 1609. Maximum effective wind speeds for wood structural panel sheathing used to resist wind pressures shall be in accordance with Table 2304.6.1 for enclosed buildings with a mean roof height not greater than 30 feet (9144 mm)."

{from State IBC Amendment (52) Appendix W (107)}

(89) Table 2304.6.1, "MAXIMUM ALLOWABLE STRESS DESIGN WIND SPEED, V_{asd} PERMITTED FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES[a,b,c]" of the International Building Code is amended to read as follows:

"**TABLE 2304.6.1**
MAXIMUM EFFECTIVE ALLOWABLE STRESS DESIGN WIND SPEED, [~~V_{asd}~~] $V_{eff\text{-}asd}$ PERMITTED FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES[a,b,c]

MINIMUM NAIL		MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		MAXIMUM EFFECTIVE ALLOWABLE STRESS DESIGN WIND SPEED, [V_{asd}] $V_{eff\text{-}asd}$[d] (MPH)		
Size	Penetration (inches)				Edges (inches o.c.)	Field (inches o.c.)	Wind exposure category		
							B	C	D
6d common (2.0" × 0.113")	1.5	24/0	3/8	16	6	12	110	90	85
		24/16	7/16	16	6	12	110	100	90
						6	150	125	110
8d common (2.5" × 0.131")	1.75	24/16	7/16	16	6	12	130	110	105
						6	150	125	110
				24	6	12	110	90	85
						6	110	90	85

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.
a. Panel strength axis shall be parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength axis perpendicular to supports.
b. The table is based on wind pressures acting toward and away from building surfaces in accordance with [~~Section 30.7~~] Chapter 27 of ASCE 7. Lateral requirements shall be in accordance with Section 2305 or 2308.
c. Wood structural panels with span ratings of wall-16 or wall-24 shall be permitted as an alternative to panels with a 24/0 span rating. Plywood siding rated 16 on center or 24 on center shall be permitted as an alternative to panels with a 24/16 span rating. Wall-16 and plywood siding 16 on center shall be used with studs spaced a maximum of 16 inches on center.
d. [~~V_{asd}~~] $V_{eff\text{-}asd}$ shall be determined [~~in accordance with~~] from Figure 1609.3.2.1 and Sections 1609.3.1 and 1609.3.2."

{from State IBC Amendment (52) Appendix W (108)}

(90) Table 2308.7.5, "REQUIRED RATING OF APPROVED UPLIFT CONNECTORS (pounds)[a,b,c,e,f,g,h]" of the International Building Code is amended to read as follows:

"Table 2308.7.5
REQUIRED RATING OF APPROVED UPLIFT CONNECTORS (pounds)[a,b,c,d,e,f,g,h,i]

[~~NOMINAL~~] EFFECTIVE ALLOWABLE STRESS DESIGN WIND SPEED, [~~V_{asd}~~] $V_{eff\text{-}asd}$, 3-sec gust[i]	ROOF SPAN (feet)							OVERHANGS (pounds/feet)[d]
	12	20	24	28	32	36	40	
85	-72	-120	[~~-145~~] -144	[~~-169~~] -168	[~~-193~~] -192	[~~-217~~] -216	[~~-241~~] -240	-38.55
90	-91	[~~-152~~] -151	[~~-182~~] -181	[~~-213~~] -212	[~~-243~~] -242	[~~-274~~] -272	[~~-304~~] -305	-43.22
100	-131	[~~-281~~] -218	-262	-305	-349	[~~-393~~] -392	-436	-53.36
110	-175	-292	[~~-351~~] -350	-409	-467	-526	-584	-64.56
120	-240	-400	-480	-560	-640	-720	-800	-76.83
130	-304	-506	-607	-708	-810	-911	-1012	-90.17

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 1.61 km/hr, 1 pound = 0.454 Kg, 1 pound/foot = 14.5939 N/m.

a. The uplift connection requirements are based on a 30-foot mean roof height located in Exposure B. For Exposure C or D and for other mean roof heights, multiply the above loads by the adjustment coefficients below.

Exposure	Mean Roof Height (feet)									
	15	20	25	30	35	40	45	50	55	60
B	1.00	1.00	1.00	1.00	1.05	1.09	1.12	1.16	1.19	1.22
C	1.21	1.29	1.35	1.40	1.45	1.49	1.53	1.56	1.59	1.62
D	1.47	1.55	1.61	1.66	1.70	1.74	1.78	1.81	1.84	1.87

For SI: 1 inch – 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 1.61 km/hr, 1 pound = 0.454 Kg, 1 pound/foot = 14.5939 N/m.

b. The uplift connection requirements are based on the framing being spaced 24 inches on center. Multiply by 0.67 for framing spaced 16 inches on center and multiply by 0.5 for framing spaced 12 inches on center.

c. The uplift connection requirements include an allowance for 10 pounds of dead load.

d. The uplift connection requirements do not account for the effects of overhangs. The magnitude of the above loads shall be increased by adding the overhang loads found in the table. The overhang loads are also based on framing spaced 24 inches on center. The overhang loads given shall be multiplied by the overhang projection and added to the roof uplift value in the table.

e. The uplift connection requirements are based [~~on~~] upon wind loading on end zones as defined in [~~Figure 28.5-1~~] Chapter 30, Figure 30.5-1, of ASCE 7. Connection loads for connections located a distance of 20 percent of the least horizontal [~~dimension~~] dimensions of the building from the corner of the building are permitted to be reduced by multiplying the table connection value by 0.7 and multiplying the overhang load by 0.8.

f. For wall-to-wall and wall-to-foundation connections, the capacity of the uplift connector is permitted to be reduced by 100 pounds for each full wall above. (For example, if a 500-pound rated connector is used on the roof framing, a 400-pound rated connector is permitted at the next floor level down.)

g. Interpolation is permitted for intermediate values of [~~V_{asd}~~] basic wind speeds and roof spans.

h. The rated capacity of approved tie-down devices is permitted to include up to a 60-percent increase for wind effects where allowed by material specifications.
i. [~~V_{asd}~~] $V_{eff\text{-}asd}$ shall be determined [~~in accordance with Section~~] from Figure 1609.3.2.1 and Sections 1609.3.1 and 1609.3.2."

{from State IBC Amendment (53) Appendix W (109)}

(91) Subsection 2304.12, "Protection against decay and termites," (including subsections 2304.12 through 2304.12.7) of the International Building Code is deleted in its entirety and replaced with the following:

"**2304.12 Protection against decay and termites.** Wood shall be protected from decay and termites in accordance with the applicable provisions of Sections 2304.12.1 through 2304.12.10.

2304.12.1 General. Where required by this section, protection from decay and termites shall be provided by the use of naturally durable or preservative-treated wood.

2304.12.2 Wood used above ground. Structural lumber installed above ground shall be preservative-treated wood in accordance with Section 2303.1.9.

2304.12.2.1 Soil treatment and termite barriers. Where structural lumber of wood frame buildings or structures are supported directly on the ground by a concrete slab, or concrete and/or masonry foundation, Formosan subterranean termite protection shall be provided by either chemically treating the soil beneath and adjacent to the building or structure by a Hawai‘i licensed pest control operator, or stainless steel termite barrier, or other termite protection measures approved by the building official.

All soil treatment, stainless steel termite barrier, and termite protection measures shall be installed according to manufacturer's recommendations for control of Formosan subterranean termites, with chemical barriers applied at the maximum label rates.

2304.12.3 Wood in ground contact. Wood supporting permanent buildings and structures, which is in direct soil contact or is embedded in concrete or masonry in direct contact with earth shall be treated to the appropriate commodity specification of AWPA Standard U1.

Wood in direct soil contact but not supporting any permanent buildings or structures shall be treated to the appropriate commodity specification of AWPA Standard U1 for ground contact.

2304.12.4 Retaining walls. Wood in retaining or crib wall shall be treated to AWPA Standard U1.

2304.12.5 Wood and earth separation. Where wood is used with less than 6-inch vertical separation from earth (finish grade), the wood shall be treated for ground-contact use.

Where planter boxes are installed adjacent to wood frame walls, a 2-inch-wide (51 mm) air space shall be provided between the planter and the wall. Flashings shall be installed when the air space is less than 6 inches (152 mm) in width. Where flashing is used, provisions shall be made to permit circulation of air in the air space. The wood-frame wall shall be provided with an exterior wall covering conforming to the provisions of section 2304.6.

2304.12.6 Under-floor clearance for access and inspection. Minimum clearance between the bottom of floor joists or bottom of floors without joists and the ground beneath shall be 24 inches; the minimum clearance between the bottom of girders and the ground beneath shall be 18 inches.

Exception: Open slat wood decks shall have ground clearance of at least 6 inches for any wood member.

Accessible under-floor areas shall be provided with a minimum 18 inch-by 24 inch access opening, effectively screened or covered. Pipes, ducts and other construction shall not interfere with the accessibility to or within under-floor areas.

2304.12.7 Wood used in retaining walls and cribs. Wood installed in retaining or crib walls shall be preservative treated in accordance with AWPA U1 (Commodity Specifications A or F) for soil and fresh water use.

2304.12.8 Weather exposure. All portions of timbers (over 5-inch nominal width) and glued-laminated timbers that form structural supports of a building or other structure shall be protected by a roof, eave, overhangs, flashings, or similar coverings. All wood or wood composite panels, in weather-exposed applications, shall be of exterior type.

2304.12.9 Water splash. Where wood-frame walls and partitions are covered on the interior with plaster, tile or similar materials and are subject to water splash, the framing shall be protected with approved waterproof paper conforming to Section 1404.2.

2304.12.10 Pipe and other penetrations. Insulations around plumbing pipes shall not pass through ground floor slabs. Openings around pipes or similar penetrations in a concrete or masonry slab, which is in direct contact with earth, shall be filled with non-shrink grout, BTB, or other approved physical barrier."

{from State IBC Amendment (54)}

(92) Subsection 2308.1, "General," of the International Building Code is amended to read as follows:

"**2308.1 General.** The requirements of this section are intended for *conventional light-frame construction*. Other construction methods are permitted to be used, provided that a satisfactory design is submitted showing compliance with other provisions of this code. Interior nonload-bearing partitions, ceilings and curtain walls of *conventional light-frame construction* are not subject to the limitations of Section 2308.2. Detached one- and two-family dwellings and townhouses not more than three *stories above grade plane* in height with a separate means of egress and their accessory structures shall be permitted to comply with [~~the *International Residential Code*~~] Chapter 5B, Hawai'i County Code, subject to the limitations of Section 2308.2 and Section 5A-1-3, Hawai'i County Code."

{from State IBC Amendment (55)}

(93) Subsection 2308.1.1, "Portions exceeding limitations of conventional light-frame construction," of the International Building Code is amended to read as follows:

"**2308.1.1 Portions exceeding limitations of conventional light-frame construction.** Where portions of a building of otherwise *conventional light-frame construction* exceed the limits of Section 2308.2 and the other provisions of this code, those portions and the supporting load path shall be designed in accordance with accepted engineering practice and the provisions of this code. For the purposes of this section, the term "portions" shall mean parts of buildings containing volume and area such as a room or a series of rooms. The extent of such design need only demonstrate compliance of the nonconventional light-framed elements with other applicable provisions of this code and shall be compatible with the performance of the conventional light-framed system."

{from State IBC Amendment (55)}

(94) Subsection 2309.1, "Wood Frame Construction Manual," of the International Building Code is amended to read as follows:

"**2309.1 Wood Frame Construction Manual.** Structural design in accordance with the AWC WFCM shall be permitted for buildings assigned to Risk Category I or II subject to the limitations of Section 1.1.3 of the AWC WFCM, Section 1609.1.1.1 and the load assumptions contained therein. Structural elements beyond these limitations shall be designed in accordance with accepted engineering practice."
{from State IBC Amendment (56)
State Comment - *Modified to indicate that exception 3 in 1609.2 is not applicable due to enclosed classification for wind design.}*

(95) Subsection 3001.3, "Referenced standards" of the International Building Code is amended to add a new section 3001.3.1 to read as follows:

*"***3001.3 Referenced standards.** Except as otherwise provided in this code, the design, construction, installation, *alteration*, repair and maintenance of elevators and conveying systems and their components shall conform to the applicable [~~standard~~] standards specified in the following:

1. Table 3001.3; [~~and~~]
2. ASCE 24 for construction in flood hazard areas established in Section 1612.3; and
3. The Administrative Rules of the Department of Labor and Industrial Relations, Division of Occupational Safety and Health, Title 12, Subtitle 8, Part 11 Elevators and Related Systems."

{from State IBC Amendment (57)}

(96) Section 3109, "Swimming Pools, Spas and Hot Tubs," of the International Building Code is amended to read as follows:

"**3109.1 General.** [~~The design and construction of swimming pools, spas and hot tubs shall comply with the International Swimming Pool and Spa Code.~~] Swimming pools shall comply with the requirements of sections 3109.2 through 3109.5 and other applicable sections of this code.

3109.2 Definition. The following term is defined in Chapter 2: "SWIMMING POOLS".

3109.3 Public swimming pools. Public swimming pools shall be completely enclosed by a fence at least 4 feet (1290 mm) in height or a screen enclosure. Openings in the fence shall not permit the passage of a 4-inch-diameter (102 mm) sphere. The fence or screen enclosure shall be equipped with self-closing and self-latching gates.

Exception: Swimming, dipping, or wading pools located on the premises of a hotel are not required to be enclosed.

3109.4 Residential swimming pools. Residential swimming pools shall comply with Sections 3109.4.1 through 3109.4.3.

Exception: A swimming pool with a power safety cover or a spa with a safety cover complying with ASTM F 1346 need not comply with Section 3109.4.

3109.4.1 Barrier height and clearances. The top of the barrier shall be at least 48 inches (1219 mm) above grade measured on the side of the barrier that faces away from the swimming pool. The vertical clearance between grade and the bottom of the barrier shall be not greater than 2 inches (51 mm) measured on the side of the barrier that faces away from the swimming pool. Where the top of the pool structure is above grade, the barrier is authorized to be at ground level or mounted on top of the pool structure, and the vertical clearance between the top of the pool structure and the bottom of the barrier shall be not greater than 4 inches (102 mm).

3109.4.1.1 Openings. Openings in the barrier shall not allow passage of a 4-inch-diameter (102 mm) sphere.

3109.4.1.2 Solid barrier surfaces. Solid barriers which do not have openings shall not contain indentations or protrusions except for normal construction tolerances and tooled masonry joints.

3109.4.1.3 Closely spaced horizontal members. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is less than 45 inches (1143 mm), the horizontal members shall be located on the swimming pool side of the fence. Spacing between vertical members shall be not greater than 1.75 inches (44 mm) in width. Where there are decorative cutouts within vertical members, spacing within the cutouts shall be not greater than 1.75 inches (44 mm) in width.

3109.4.1.4 Widely spaced horizontal members. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is 45 inches (1143 mm) or more, spacing between vertical members shall be not greater than 4 inches (102 mm). Where there are decorative cutouts within vertical members, spacing within the cutouts shall be not greater than 1.75 inches (44 mm) in width.

3109.4.1.5 Chain link dimensions. Mesh size for chain link fences shall be not greater than a 2.25 inch square (57 mm square) unless the fence is provided with slats fastened at the top or the bottom which reduce the openings to not more than 1.75 inches (44 mm).

3109.4.1.6 Diagonal members. Where the barrier is composed of diagonal members, the opening formed by the diagonal members shall be not greater than 1.75 inches (44 mm).

3109.4.1.7 Gates. Access doors or gates shall comply with the requirements of Sections 3109.4.1.1 through 3109.4.1.6 and shall be equipped to accommodate a locking device. Pedestrian access gates shall open outward away from the pool and shall be self-closing and have a self-latching device. Gates other than pedestrian access gates shall have a self-latching device. Release mechanisms shall be in accordance with Sections 1008.1.8 and 1109.13. Where the release mechanism of the self-latching device is located less than 54 inches (1372 mm) from the bottom of the door or gate, the release mechanism shall be located on the pool side of the door or gate at least 3 inches (76 mm) or more, below the top of the door or gate, and the door or gate and barrier shall be without openings greater than 0.5 inch (12.7 mm) within 18 inches (457 mm) of the release mechanism.

3109.4.1.8 Dwelling wall as a barrier. Where a wall of a *dwelling* serves as part of the barrier, one of the following shall apply:

1. Doors with direct access to the pool through that wall shall be equipped with an alarm that produces an audible warning when the door and/or its screen, if present, are opened. The alarm shall be listed in accordance with UL 2017. The audible alarm shall activate within 7 seconds and sound continuously for a minimum of 30 seconds after the door and/or its screen, if present, are opened and be capable of being heard throughout the house during normal household activities. The alarm shall automatically reset under all conditions. The alarm shall be equipped with a manual means, such as touchpad or switch, to temporarily deactivate the alarm for a single opening. Such

deactivation shall last for not more than 15 seconds. In dwellings not required to be Accessible, Type A or Type B units, the deactivation switch shall be located 54 inches (1372 mm) or more above the threshold of the door. In dwellings required to be Accessible, Type A or Type B units, the deactivation switch shall be located not higher than 54 inches (1372 mm) and not less than 48 inches (1219 mm) above the threshold of the door.

2. The pool shall be equipped with a power safety cover that complies with ASTM F 1346.

3. Other means of protection, such as self-closing doors with self-latching devices, which are *approved*, shall be accepted so long as the degree of protection afforded is not less than the protection afforded by Section 3109.4.1.8, Item 1 or 2.

3109.4.1.9 Pool structure as barrier. Where an aboveground pool structure is used as a barrier or where the barrier is mounted on top of the pool structure, and the means of access is a ladder or steps, then the ladder or steps either shall be capable of being secured, locked or removed to prevent access, or the ladder or steps shall be surrounded by a barrier which meets the requirements of Sections 3109.4.1.1 through 3109.4.1.8. When the ladder or steps are secured, locked or removed, any opening created shall not allow the passage of a 4-inch diameter (102 mm) sphere.

3109.4.2 Indoor swimming pools. Walls surrounding indoor swimming pools shall not be required to comply with Section 3109.4.1.8.

3109.4.3 Prohibited locations. Barriers shall be located so as to prohibit permanent structures, equipment or similar objects from being used to climb the barriers.

3109.5 Entrapment avoidance. Suction outlets shall be designed and installed in accordance with ANSI/APSP-7."

{COH Amendment; SBCC did not adopt or amend the ISPSC so the 2012 provisions were included.}

Article 3. Adoption, Amendment, and Addition of Appendices.

Division 1. Appendices of International Building Code Adopted.

Section 5A-3-1. Appendices not applicable.

Provisions in the appendices of the International Building Code, 2018 Edition, shall not apply unless specifically adopted.

Section 5A-3-2. Appendices adopted.

The following appendices of the IBC are hereby adopted and incorporated by reference herein and made a part of this code, subject to the amendments hereinafter set forth in this article:

(1) Appendix C, Group U-Agricultural Buildings; and
(2) Appendix I, Patio Covers.

Section 5A-3-3. Amendments to Appendix C; Group U – Agricultural Buildings.

Section C101, General, is amended by adding the following:

"**C101.2 Horticulture buildings.** Buildings and structures of Group U Occupancy for horticultural use with covering of wire screen, cheesecloth, or non-rigid plastic sheets are not required to conform to the requirements of Chapters 4-9, 11-26, 28, 30, 31, 34 and 35 of this code when located in areas zoned for agricultural use and not part of any other structure.

C101.3 Fences.

C101.3.1 General. Fences shall be constructed in accordance with this code and all applicable County and State regulations.

C101.3.2 Barbed or razor wire fences. Barbed or razor wire shall not be used for construction of any fence.

Exceptions:

(a) Barbed or razor wire may be used in fences enclosing the following premises, provided that barbed or razor wire shall be placed along or above the height of 6 feet from the ground, subject to the approval of the fire department:

(1) Any "public utility" as defined in section 269-1, Hawai‘i Revised Statutes;
(2) Premises in industrial zoned districts and used for storage or handling of hazardous materials, and premises zoned I-2 or I-3, intensive or waterfront industrial districts which are used for industrial purposes and are not adjacent to premises used for other purposes;
(3) Zoos for keeping animals and birds for public view or exhibition;
(4) Jails, prisons, reformatories, and other institutions which are involved in law enforcement or military

activities where security against entry is an important factor.

(b) Barbed wire may be used in premises used for pasturing livestock, including but not limited to: horses; cattle; sheep; goats; camelids; and pigs, or to keep wild animals out.

Section C101.3.3 Construction barrier. See Section 3306 for fences allowed during construction or demolition."

Division 2. Appendices Added to the International Building Code.

Section 5A-3-21. Appendices added to International Building Code.

The following appendices are hereby added to the International Building Code and made a part of this code, as set forth in full in this article:

~~(1) Appendix L, Factory-Built Housing~~

(2) Appendix M, Thatch Material on Exterior of Buildings – Protection Against Exposure Fires;

~~(3) Appendix U, Hawai'i Hurricane Sheltering Provisions for New Construction;~~

~~(4) Appendix W, Hawai'i Wind Design Provisions for New Construction;~~

(5) Appendix X, Indigenous Hawaiian Architecture Structures; and

~~(6) Appendix Y, Tiny Houses.~~

Section 5A-3-22. Appendix L; Factory-Built Housing.

Appendix L; Factory-Built Housing.is moved to Hawaii County Code Chapter 5B Residential Code.

Section 5A-3-23. Appendix M; Thatch Material on Exterior of Buildings - Protection Against Exposure Fires.

Appendix M is added to read as follows:

"APPENDIX M
THATCH MATERIAL ON EXTERIOR OF BUILDINGS; PROTECTION AGAINST EXPOSURE FIRES
SECTION M101
GENERAL

M101.1 General. Thatched materials used on the roof on a building shall be protected by manually operated sprinkler heads, with adequate water supply, pipe size, and sprinkler head spacing in accordance with sprinkler system requirements set forth in this section.

Exception: Approved synthetic thatched roofing material per Hawaii County Code Chapter 5 Section 5-2-23, meeting the performance requirements of section 1504 of this code and a

Class A fire classification per section 1505 of this code shall be exempt.

Thatched materials used on the wall of a building shall be protected by manually operated outside sprinklers. Size and spacing of sprinklers and pipe size shall be in accordance with Chapter 7, "Outside Sprinklers and Protection Against Exposure Fires," of the National Fire Codes of the National Fire Protection Association. Controls shall be set forth in this section.

SECTION M102
APPLICABILITY

M102.1 Applicability. Thatched material on the exterior of buildings shall be permitted only upon buildings located in areas zone for resort (V Resort-Hotel by the Planning Department) uses which primarily service the tourist trade when approved by the building official.

Exception: Approved synthetic thatched roofing material per Hawaii County Code Chapter 5 Section 5-2-23, meeting the performance requirements of section 1504 of this code and a Class A fire classification per section 1505 of this code shall not be limited to V-Resort-Hotel by the Planning Department.

The thatched material permitted in this section shall be used for decorative purposes on the roof or wall of buildings. The building, independent of the thatched material, shall comply with all applicable provisions of this appendix.

When thatched material is used as permitted in this section, and an appropriate permit is obtained therefore, outside sprinklers for protection against exposure fires shall be required as hereinafter provided.

SECTION M103
SPRINKLER

M103.1 General. Sprinklers shall be located at the high point of the roof. Upright or pendant sprinklers shall be used for gable roofs. Sidewall sprinklers shall be used for shed roofs.

M103.2 Spacing of Sprinklers. The maximum width of roof with one row of sprinklers shall be as follows:

Roof Slope	Orifice Size (In inches)	Width of Roof
1:3 or greater	3/8	15'
1:3 or greater	½	20'
1:3 or greater	17/32	25'
Less than 1:3	3/8	10'
Less than 1:3	½	15'
Less than 1:3	17/32	20'

Maximum spacing of sprinklers on branch lines (along ridge) shall be as follows: 3/8- inch orifice – 6 feet; ½-inch orifice – 8 feet; 17/32-inch orifice – 10 feet.

Conical roofs may be protected with one sprinkler at the apex if the diameter of the roof does not exceed the width of roof referred to in this section.

Where the width of a roof exceeds the width allowed for one row of sprinklers, as provided in the table in this section, two or more rows of sprinklers shall be required. The rows of sprinklers shall be placed such that the entire roof area is protected.

M103.3 Areas Protected. Each area (zone) of thatched material that is separated from another thatched area by an open space of 20 feet or more or by incombustible construction of 20 feet or more shall be considered a separate area (zone).

Risers to each separate zone shall not be less than that shown in subsection M103.5, Riser and Pipe Size, except as modified as follows:

(1) More than one zone may be protected by one valve, if the supply is adequate.

(2) If one area (zone) is larger than can be protected with the existing supply, the zones can be subdivided into subzones if the following criteria are met: An area of at least 800 square feet is protected by the subzone control valve; there is at least a 10 percent overlap in coverage of adjoining subzones; and operation of the manual control valves will automatically transmit an alarm to the fire department.

M103.4 Water Supply. The sprinkling system shall have a separate connection to the water main in the street, to an approved automatic fire-extinguishing system supply line, to a wet standpipe supply line, or to a domestic supply of adequate size. The water supply required shall be determined from either of the following:

(1) Flow per sprinkler for the largest zone, with residual pressure at the highest sprinkler at 15 pounds per square in with all heads operating, shall be as follows:

Orifice Size (In inches)	Gallons Per Minute
3/8	15
1/2	20
17/32	25

(2) The flow shall be hydraulically calculated so as to discharge at least 0.11 gallons per minute per square foot of surface area to be sprinkled.

M103.5 Riser and Pipe Size. Pipe sizes shall be determined from the flow as calculated in subsection M103.4, Water Supply. However, no pipe less than one inch in size shall be used. The following table may be used in conjunction with this flow calculated for the selection of pipe or riser sizes.

Orifice Size (In inches)	Pipe or Riser Size							
	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"
	No. of Sprinklers							
3/8	3	4	7	11	21	37	40	40
1/2	2	3	5	8	15	27	40	40
17/32	1	2	4	6	11	19	30	38

M103.6 Number of Sprinklers Served. The number of sprinklers on a branch line shall not exceed six. Center feet shall be used for six or more sprinklers. The number of sprinklers under control of each control valve shall not exceed forty. At the location of each valve, there shall be a drain connection and a ¼-inch valve test connection to accommodate pressure gauge.

M103.7 Material Installed Above Grade. Piping shall be galvanized steel schedule 40 with galvanized malleable iron fittings or hard drawn copper with silver solder fittings. Pipes shall be securely fastened to the structure.

Valves shall be manual type approved and listed by the Underwriters' Laboratories or by other approved testing agencies. Valves shall be installed outdoors and so located as to be readily accessible in case of fire. Signs indicating the use of valves shall be conspicuously posted.

M103.8 Local Alarm. Any one system with 20 or more sprinklers under control of one valve shall be complemented with a local fire alarm, either electrically or mechanically operated."

Section 5A-3-24. Appendix U; Hawai‘i Hurricane Sheltering Provisions for New Construction.

Appendix U is moved into the body of the Proposed amendments.

Section 5A-3-25. Appendix W; Hawai‘i Wind Design Provisions for New Construction.

Appendix W is moved into the body of the Proposed amendments.

Section 5A-3-26. Appendix X; Indigenous Hawaiian Architecture Structures.

Appendix X is added to read as follows:

“APPENDIX X
INDIGENOUS HAWAIIAN ARCHITECTURE STRUCTURES
SECTION X101
GENERAL

X101.1 Scope. The provisions of this appendix shall apply exclusively to Indigenous Hawaiian Architecture Structures. The purpose of these provisions is to acknowledge and establish procedures for designing and constructing indigenous Hawaiian architecture structures.

X101.2 Publications incorporated by reference. The following publications are incorporated by reference and made a part of these provisions. Where there is a conflict between Appendix X and the referenced documents, Appendix X shall prevail.

(1) “Hawaiian Thatched House” (1971), by Russell A. Apple, published by the United States Department of the Interior,
(2) “Hale Construction Standards” (2000), by Francis Sinenci and Bill Sides,
(3) “The Hawaiian Grass House in Bishop Museum” (1988), by Catherine C. Summers, and
(4) “Arts and Crafts of Hawaii, Section II, Houses” (1957) by Te Rangi Hiroa (Peter H. Buck)

X101.3 Definitions. For purposes of this appendix, the following words and terms shall have the meanings shown herein. Refer to Chapter 2 for general definitions.

CERTIFIED HALE BUILDER. Means a person who has obtained a certificate of completion for satisfactorily completing a course in Hawaiian hale construction from the University of Hawai‘i, or any of its community colleges, or as approved by the Building Official.

GROUP OF STRUCTURES. A group of indigenous Hawaiian architecture structures that are in close proximity to each other and have an aggregate floor area of 1,800 square feet or less.

INDIGENOUS HAWAIIAN ARCHITECTURE STRUCTURE or HALE. A structure that is consistent with the design, construction methods and uses of structures built by Hawaiians in the 1800’s, which uses natural materials found in the Hawaiian islands, and complies with this appendix and references.

SEPARATION. The clear distance between two structures.

SETBACK. The clear distance between a structure and a property line.

SECTION X201
MATERIAL REQUIREMENTS

X201.1 Hale Materials. Hale shall be constructed using only materials grown and harvested in the State of Hawai‘i.

X201.2 Wood Framing Material. The wood members for the hale, such as posts and rafters, shall be, but not limited to

hardwoods of unmilled, straight sections of trunks or branches of the following species:

(1) Casaurina equisitafolia (ironwood).
(2) Prosopis-allid (kiawe).
(3) Eucalyptus robusta (eucalyptus).
(4) Psidium cattleianum (strawberry guava).
(5) Metrosideros polymorpha (ohia).
(6) Rizophora mangle (mangrove).

Exception: Ardisia elliptica (inkberry) may be used only for roof purlins as an alternative to specified woods listed in Items 1 through 6.

X201.3 Roofing and Siding. Thatched roofing and siding materials for the hale may be any grass or leaf material grown and harvested in the State of Hawai‘i, to include but not be limited to pili, kualohia, pueo, kawelu, sugar-cane leaves, and ti leaves.

X201.4 Cord. Natural or synthetic cord used for lashing structural members of the hale shall be 400 pound test. Cord used for tying floating purlins and thatched materials shall be 100 pound test. All cord used on the hale shall be shades of green, tan, brown or black.

X201.5 Metal Prohibited. Metal shall not be used for the construction of the hale.

SECTION X202
SIZE AND LOCATION

X202.1 Height and Size Limitation. Hale shall be one-story, detached structure(s) not to exceed 1,800 square feet. Hale shall not exceed the size indicated in Table X202.1.

Table X202.1
Maximum Size of Hale (feet)

Hale Halawai	Hale Kuʻai	Hale Noa	Hale Waʻa
30 X 60	14 X 20	14 X 24	30 X 60

X202.2 Zoning Requirements. Hale shall comply with minimum yard requirements in chapter 25, Zoning Code, Hawai‘i County Code.

X202.3 Minimum Separation. The minimum separation between a hale and another structure shall be at least 10 feet for

a one-story structure; 15 feet for a two-story structure; or a distance equal to the height of the hale, whichever is more. The minimum separation between two hale shall be at least 10 feet or a distance equal to the height of the taller hale.

X202.4 Hale Noa. Hale noa structures may only be constructed on property where a separate residence exists on the property.

SECTION X203
ALLOWABLE AND PROHIBITED USES

X203.1 Allowable uses. To the extent permitted by other applicable law, allowable uses for hale structures shall be in accordance with Table X203.1.

Table X203.1
Allowable Use for Each Hale Type

Use	Hale Halawai	Hale Kuʻai	Hale Noa	Hale Waʻa
Eating (ai)	Allowed	Allowed	Not permitted	Allowed
Assembling (halawai)	Allowed	Allowed	Not permitted	Allowed
Sleeping (moe)	Not permitted	Not permitted	Allowed	Not permitted
Retailing (e.g., fruits) (kuʻai)	Allowed	Allowed	Not permitted	Allowed
Storage (papaʻa)	Not permitted	Allowed	Not permitted	Allowed

X203.2 Prohibited Uses and Activities. The following uses and activities shall be prohibited from occurring within or near the hale:

(1) Cooking.
(2) Open flames.
(3) Generators.
(4) Extension cords.
(5) Electrical switches, fixtures, or outlets.
(6) Plumbing faucets, fixtures, or drains.
(7) Power tools.
(8) No screen, mesh, plastic or any other similar material shall be attached to the hale.

(9) Hale shall not be used as a food establishment as defined in the administrative rules adopted by the State of Hawai‘i, Department of Health.

X203.3 Maintenance. The hale shall be maintained by the owner to ensure structural integrity. Repairs for maintenance of the hale shall not require additional building permits.

SECTION X301
FIRE PROTECTION

X301.1 Fire Protection Classifications. Fire protection for Indigenous Hawaiian architecture structures shall be as required in Table X301.1.

Table X301.1
Fire Protection Requirements Based on Setback

CLASS	SETBACK REQUIREMENTS	FIRE PROTECTION REQUIREMENTS
A	The structure (or a group of structures) is: 1. Located at least 100 feet from any existing structure on the same or neighboring properties; and 2. Located at least 100 feet from any property line, except as follows: a. If the property line abuts a public way, the 100 feet minimum setback for that property line shall be reduced by the width of the public way, b. If the property line abuts the shoreline, the minimum setback for that property line shall be the shoreline setback, or c. For any hale ku‘ai in the agricultural district that is less than 200 square feet, that is completely open on three sides, and that is used as an agricultural products stand and if the property line abuts a public way, the minimum setback for that property line shall be 15 feet.	No fire protection is required for the structure.
B	The structure (or a group of structures) that conforms to applicable zoning setback requirements but does not satisfy Class A setback requirements.	Automatic fire sprinkler system shall be installed in accordance with design standards in Section X301.2. An electrical permit is required for fire sprinklers systems.

X301.2 Automatic Fire Sprinklers. The design standards for automatic fire sprinklers for Class B indigenous Hawaiian architecture structures shall be in accordance with NFPA 13.

Exception: The design standards for automatic fire sprinklers for Class B indigenous Hawaiian architecture structures shall be permitted as follows:

(1) 18 gallons per minute for a single head at 140 square feet maximum coverage of roof area.
(2) 13 gallons per minute for each subsequent head at 140 square feet maximum coverage of roof area per head.
(3) The minimum supply pressure at the base of the riser shall not be less than 40 pounds per square inch.
(4) The minimum residual pressure at the highest sprinkler shall be not less than 12 pounds per square inch.
(5) Sprinkler head spacing shall not exceed 14 feet.
(6) Sprinkler heads shall be open type upright, pendent, or sidewall with 1/2-inch or 17/32-inch orifice and have a wax corrosion resistant coating.
(7) The total number of sprinklers on a branch shall not exceed 6 heads.
(8) The total number of sprinklers shall not exceed the quantity shown in the following table:

Piping Size	Number of Sprinklers
1 inch diameter	2 sprinklers
1¼ inch diameter	3 sprinklers
1½ inch diameter	5 sprinklers
2 inch diameter	10 sprinklers
2½ inch diameter	30 sprinklers
3 inch diameter	60 sprinklers

(9) The above pipe schedule shall not apply to hydraulically designed systems.
(10) The water density shall not be less than 0.10 gpm per square foot.
(11) The source of water may be by domestic water meters, detector check meter, underground well, storage tank, swimming pool, ponds, etc., but must meet the design requirements for adequate pressure and duration.

(12) Water supply shall be sufficient to provide 30 minutes duration.
(13) If domestic water meters are used as the source of water for the fire sprinklers, without a storage tank and booster pump, the maximum number of heads shall not exceed the following table:

Size of Water Meter	Number of Sprinklers
5/8 inch water meter	1 sprinkler
¾ inch water meter	2 sprinklers
1 inch water meter	3 sprinklers
1½ inch water meter	7 sprinklers
2 inch water meter	11 sprinklers
3 inch water meter	27 sprinklers

(14) The piping material shall be hard drawn copper with silver solder or brazed fittings, or carbon steel with corrosion-resistant coatings. Plastic pipes shall not be allowed, except for below grade supply pipes.
(15) Fire sprinkler system shall be actuated by smoke detectors located at the highest points of the roof and spaced as recommended by the manufacturer.
(16) Flow control valves shall be either hydraulically or electrically operated with a manual override switch.
(17) Where the width of a roof exceeds the width allowed for one row of sprinklers, two or more rows of sprinklers shall be placed such that the entire roof area is protected.
(18) Prevailing wind direction shall be considered in the placement of sprinklers.
(19) Deflectors for sprinklers shall be parallel with the roof surface or tilted slightly towards the peak of the roof.
(20) Fire sprinklers system shall have a local alarm activated by a smoke detector.

X301.3 Certification of Water Supply. For any hale that requires fire protection pursuant to X301.1, the applicant shall provide a certification from a licensed engineer or a licensed C-20 contractor that the water supply for the fire sprinkler system has been tested and is capable of delivering the required fire flow for 30 minutes duration.

X302 Smoke Alarm. Any hale used for sleeping shall have an approved battery operated smoke alarm installed in the hale.

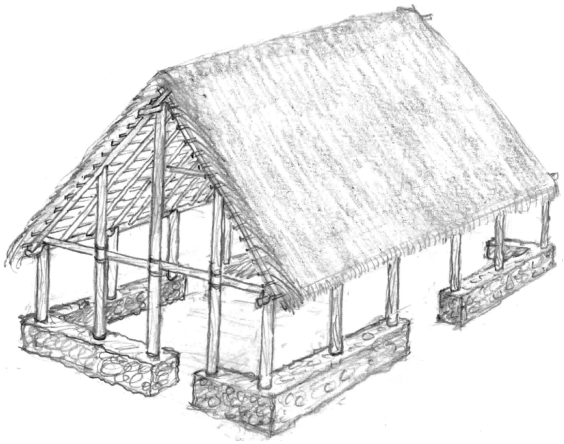
SECTION X401
DESIGN STANDARDS

X401.1 General Design standards. All types of hale shall be designed and constructed in accordance with the standards set out in this section.

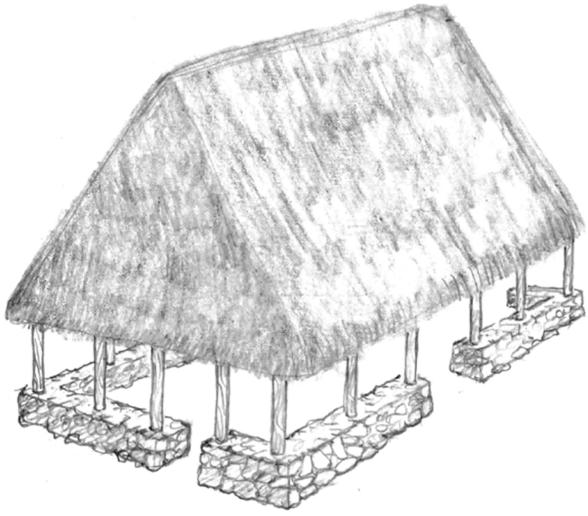
(1) The minimum diameter size of all structural members shall be measured at the member's midpoint, except that the minimum diameter size of posts shall be measured at the smaller end. For structure sizes not specifically shown in the tables, the requirements in the next larger width size shall be applicable.
(2) The specifications for structural members were estimated based on no wind loads. Hale shall be constructed to allow all thatching materials to separate from the structure prior to adding significant loads.
(3) The mix formula for mortar specified in these rules shall be one part portland cement, four parts clean sand, and sufficient fresh water to make the mixture workable.
(4) Every hale, except hale noa, shall have at least two sides completely open.
(5) Lashing and thatching methods shall comply with illustrations found in "Arts and Crafts of Hawai‘i" or "The Hawaiian Grass House in Bishop Museum."

X402 Allowable Designs. Hale shall be designed and constructed in accordance with the requirements in Sections 402.1 through 402.4.

X402.1 Hale Halawai. Each end of the Hale Halawai may be open or thatched. The ends may also be constructed with a thatched roof hip as an alternate design. Hale Halawai shall be designed in accordance with the following schematics and illustrations. Structural components for Hale Halawai shall meet the size and spacing requirements in Table X402.1(a). Foundations for Hale Halawai shall be designed in accordance with Table X402.1(b).



HALE HALAWAI
Open End Style



HALE HALAWAI
Thatched End Style

FRAMING SCHEMATIC

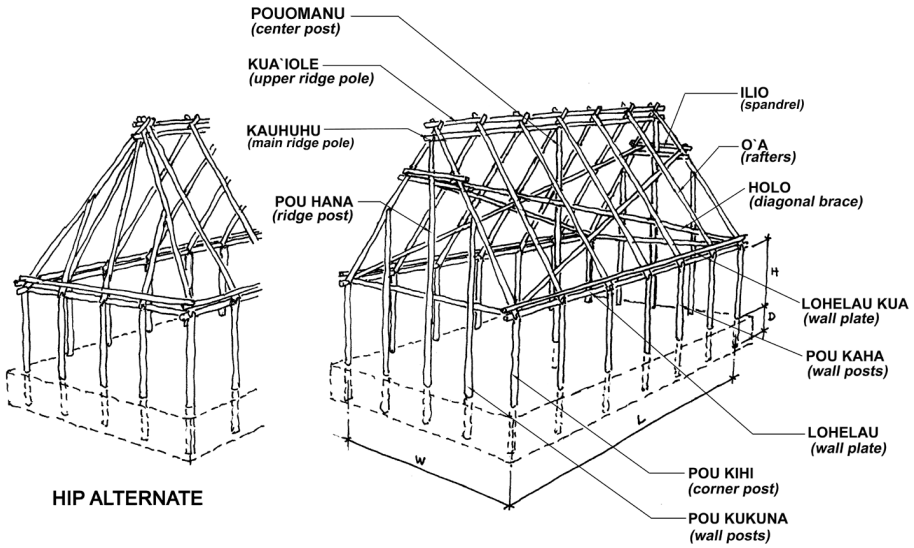
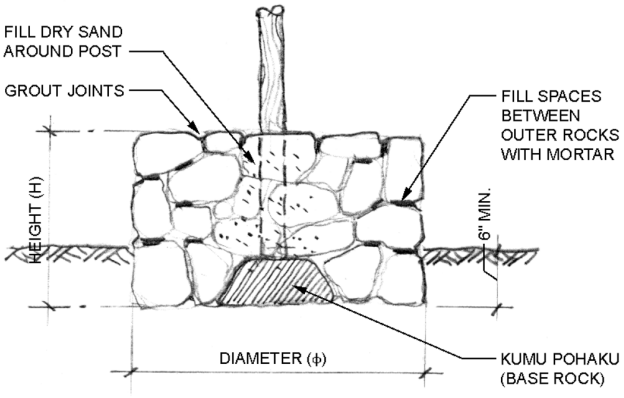
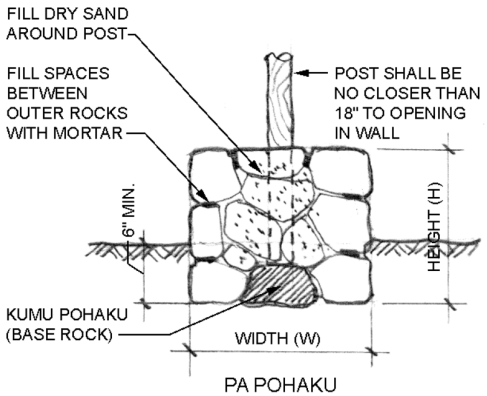


Table X402.1(a)
Size and Spacing Requirements for Structural Components used in Hale Halawai

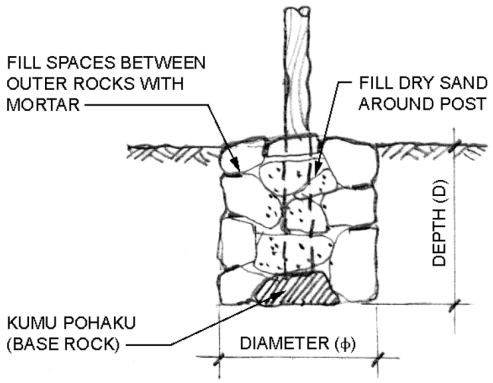
Size W x L x H	***Pou Kihi***	***Pou Kukuna & Pou Kaha***	***Pou Hana***	***Pouomanu***	***O'a***	***Kuaiole & Holo***	***Kauhuhu***	***Lohelau***	Maximum post spacing (feet)	Maximum rafter spacing (feet)
	Minimum Diameter (inches)									
12' x 20' x 7'	4	3½	4	4	3½	2½	3	3	5	3
14' x 24' x 7'	4	4	4½	4½	3½	2½	3	3½	5	3
24' x 30' x 7'	5	4½	4½	4½	4	2½	3	3½	5	3
25' x 50' x 7'	5½	5	5½	5½	4	2½	3	3½	5	3
30' x 60' x 7'	6	5½	6	6	4½	2½	3	4	5	3



KAHUA
(PEDESTAL)



PA POHAKU
(FOUNDATION WALL)

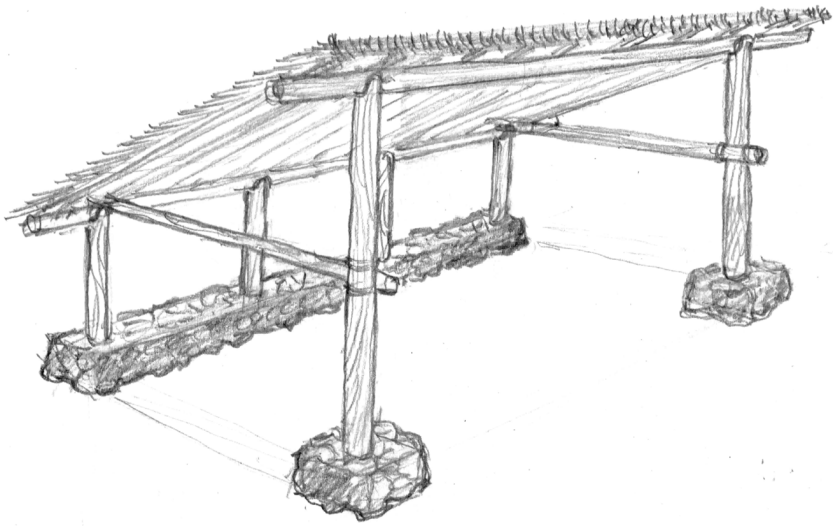


POU KANU
(BURIED POST)

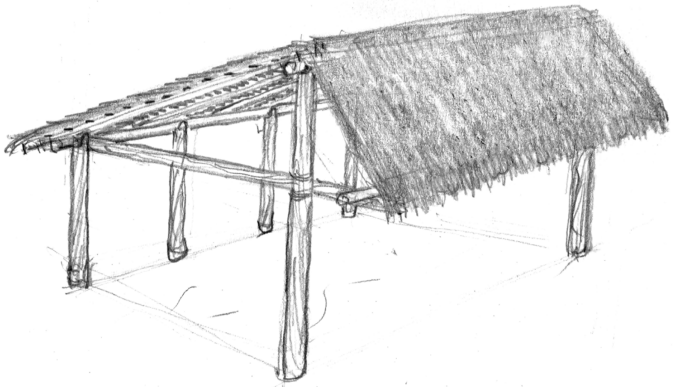
Table X402.1(b)
Foundation Design for Hale Halawai

Size (W x L x H)	**Foundation Type**		
	Kahua Diameter x Height	**Pa Pohaku** Width x Height x Length	**Pou Kanu** Diameter x Depth
12' x 20' x 7'	3'6"φ x 24"H	2'6"W x 2'8"H x 4'0"L	30"φ x 2'8"D
14' x 24' x 7'	3'8"φ x 24"H	2'6"W x 2'8"H x 4'0"L	30"φ x 2'9"D
24' x 30' x 7'	4'0"φ x 30"H	3'0"W x 3'0"H x 4'0"L	36"φ x 3'0"D
25' x 50' x 7'	4'0"φ x 30"H	3'0"W x 3'0"H x 4'0"L	36"φ x 3'0"D
30' x 60' x 7'	4'0"φ x 30"H	3'0"W x 3'3"H x 4'0"L	36"φ x 3'3"D

X402.2 Hale Ku‘ai. Hale Ku‘ai shall be designed in accordance with the following schematics and illustrations. Structural components for Hale Ku‘ai shall meet the size and spacing requirements in Table X402.2(a). Foundations for Hale Ku‘ai shall be designed in accordance with Table X402.2(b).

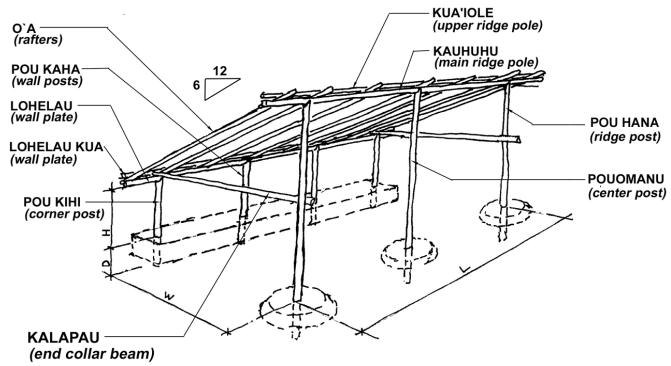


HALE KU‘AI
SHED STYLE



HALE KU‘AI
GABLE STYLE

FRAMING SCHEMATIC 1



FRAMING SCHEMATIC 2

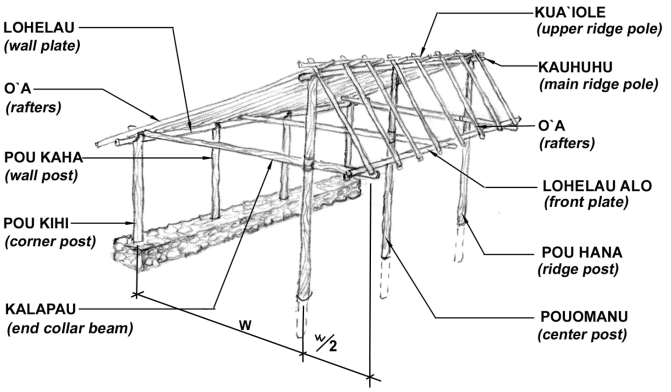
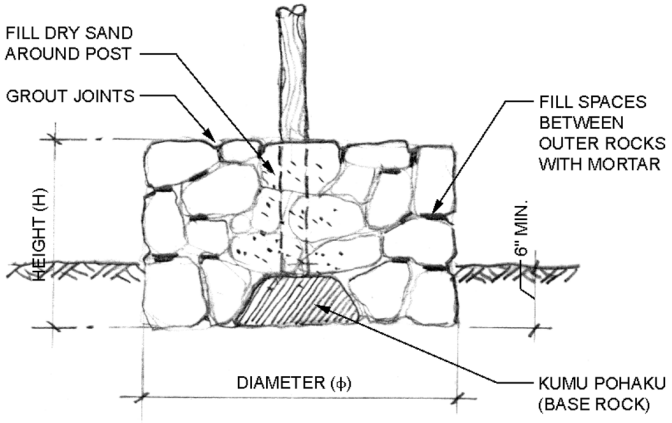


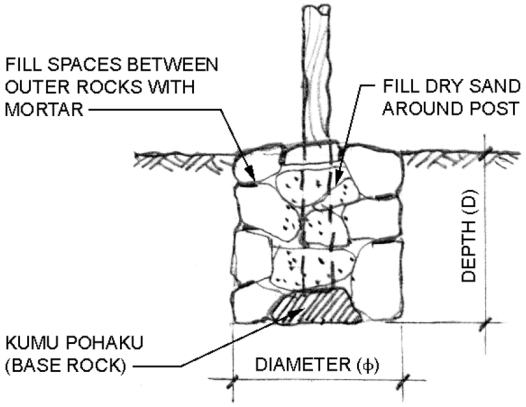
Table X402.2(a)
Size and Spacing Requirements for Structural Components used in Hale Ku‘ai

Size (W x L x H)	***Pou Kihi***[a]	***Pou Kaha***[a]	***Pou Hana***[b]	***Pouo Manu***[b]	***O‘a***	***Kuaiole & Holo***	***Kauhuhu***	***Lohelau***	Maximum rafter spacing (feet)
	Minimum Diameter (inches)								
5' x 10' x 5'	4	3	3	4	3	2	3	2	4
9' x 12' x 5'	4	3	3	4	3	2	3½	2	4
12' x 16' x 5'	4½	3½	4	4	3½	2	4	2½	4
14' x 20' x 5'	4½	3½	4	4	3½	2½	4½	2½	4

[a] The maximum post spacing for pou kihi and pou kaha is five feet.
[b] The maximum post spacing for pou hana and pouomanu is twelve feet.



KAHUA
(PEDESTAL)

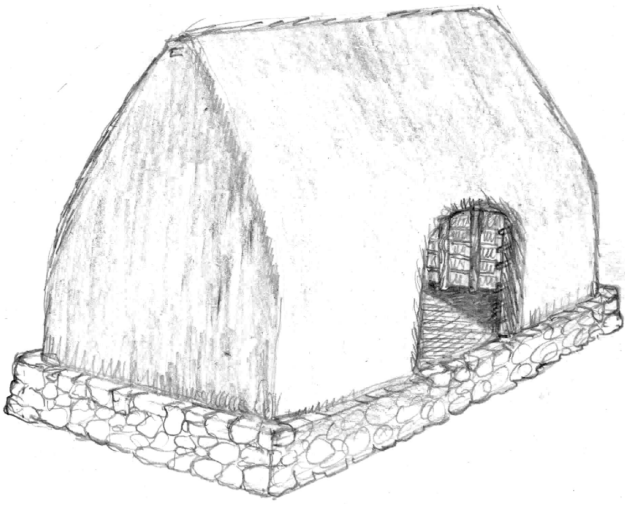


POU KANU
(BURIED POST)

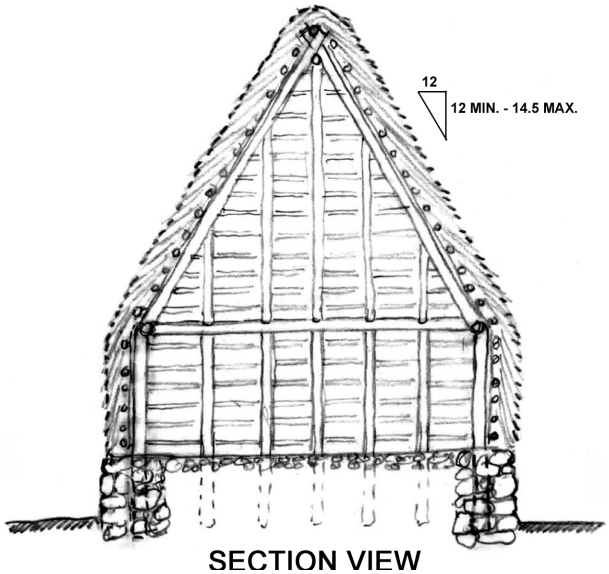
Table X402.2(b)
Foundation Design for Hale Ku‘ai

Size (W x L x H)	**Foundation Type**		
	Kahua Diameter x Height	**Pa Pohaku** Width x Height x Length	**Pou Kanu** Diameter x Depth
5' x 10' x 5'	3'0"φ x 24"H	2'6"W x 2'0"H x 4'0"L	30"φ x 2'6"D
9' x 12' x 5'	3'4"φ x 24"H	2'6"W x 2'0"H x 4'0"L	30"φ x 2'6"D
12' x 16' x 5'	3'6"φ x 24"H	2'6"W x 2'8"H x 4'0"L	30"φ x 2'8"D
14' x 20' x 5'	3'8"φ x 24"H	2'6"W x 2'8"H x 4'0"L	30"φ x 2'9"D

402.3 Hale Noa. Hale Noa shall have at least two openings. One opening shall be at least 3 feet wide and 5 feet high, and the other opening shall be at least 2 feet wide and 3 feet high. Hale Noa shall be designed in accordance with the following schematics and illustrations. Structural components for Hale Noa shall meet the size and spacing requirements in Table X402.3(a). Foundations for Hale Noa shall be designed in accordance with Table X402.3(b).



HALE NOA



SECTION VIEW

FRAMING SCHEMATIC

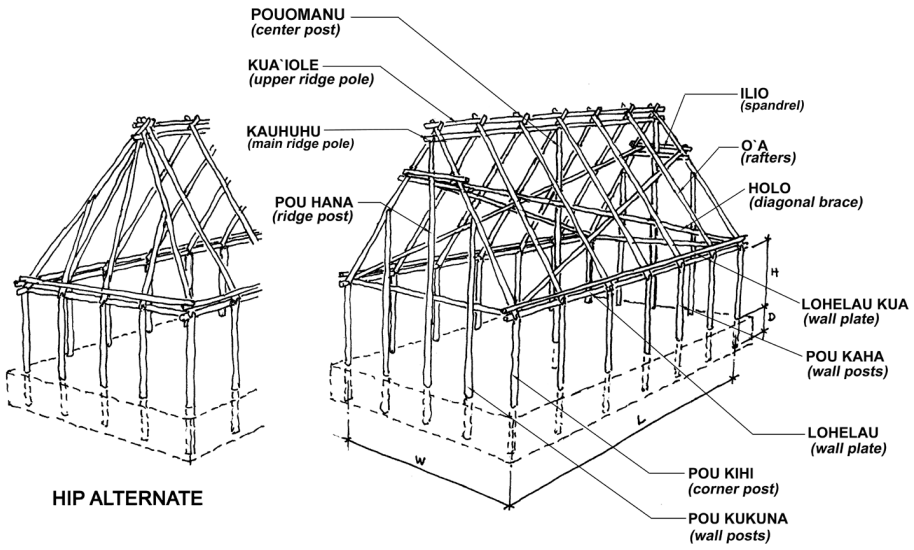
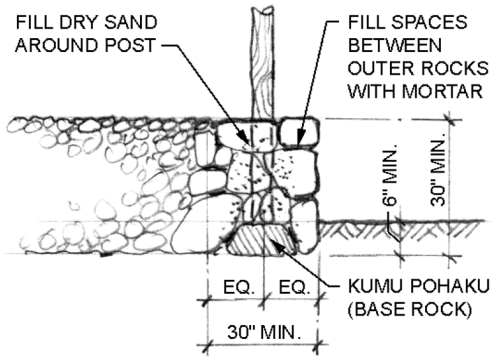


Table X402.3(a)

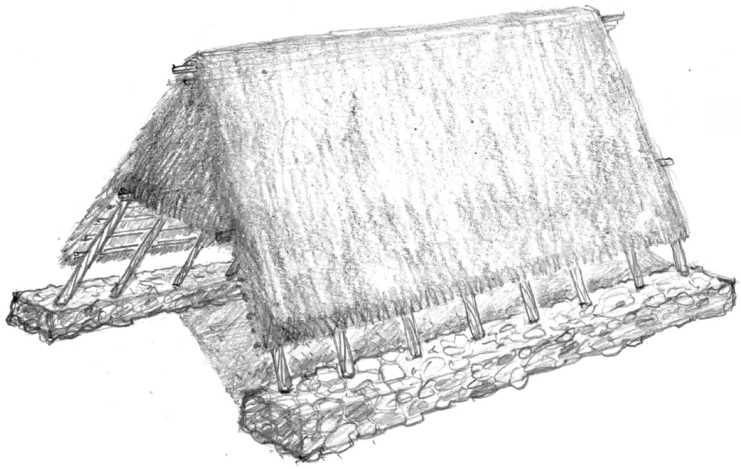
Size and Spacing Requirements for Structural Components used in Hale Noa

Size W x L x H	***Pou Kihi***	***Pou Kukuna & Pou Kaha***	***Pou Hana***	***Pouomanu***	***O'a***	***Kuaiole & Holo***	***Kauhuhu***	***Lohelau***	Maximum post spacing (feet)	Maximum rafter spacing (feet)
	Minimum Diameter (inches)									
9' x 12' x 7'	3½	3	4	3	3	2½	3½	2½	6	4
12' x 20' x 7'	4	4½	4	3	3½	2½	3½	2½	6	4
4' x 24' x 7'	5½	4½	4	3	3½	2½	3½	3	6	4



PAEPAE
(HOUSE PLATFORM)

402.4 Hale Wa‘a. Hale Wa‘a shall be designed in accordance with the following schematics and illustrations. Structural components for Hale Wa‘a shall meet the size and spacing requirements in Table X402.4.



HALE WA‘A

FRAMING SCHEMATIC

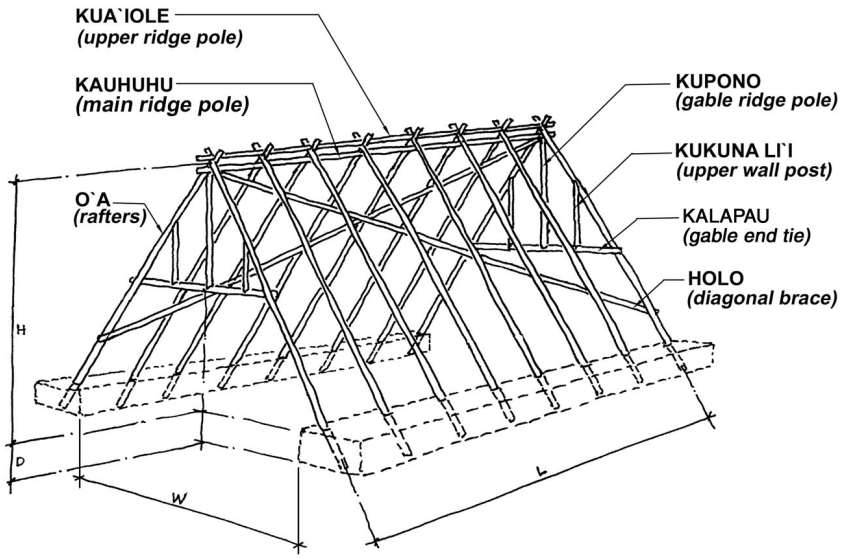
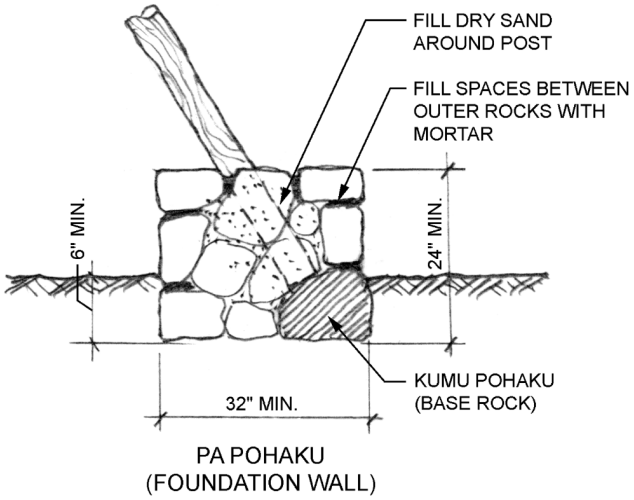


Table X402.4
Size and Spacing Requirements for Structural Components used in Hale *Wa'a*

Size (W x L)	***O'a***	***Kuaiole & Holo***	***Kauhuhu***	Spacing between Rafters	Minimum ridge Height (H)
20' x 60'	4"	3"	4"	4' to 5'	22½'
25' x 60'	5"	3"	4"	4' to 5'	27½'
30' X 60'	5½"	3"	4"	4' to 5'	27½'



Section 5A-3-27. Appendix Y; Tiny Houses.

Appendix Y is moved to Hawaii County Code Chapter 5B Residential Code.

Article 4. Building Work Within Special Flood Hazard Areas.

Section 5A-4-1. General applicability.

(a) The provisions of this article shall apply to new construction or the renovation and major alteration, addition, or reinstallation of any existing buildings or structures, within a special flood hazard area as identified by chapter 27, Hawai‘i County Code. Such construction work shall comply with chapter 16 of the International Building Code, and chapter 27, Floodplain Management.

(b) The provisions of this article shall not apply to the following:
   (1) Any building or structure exempted from chapter 27;
   (2) Any building or structure which has been granted a flood control variance pursuant to article 5, chapter 27; or
   (3) Any building or structure lawfully existing prior to November 8, 1993, subject to the provisions of chapter 27.

Section 5A-4-2. Definitions.

As used in this article, unless it is apparent from the context that a different meaning is intended:

“Base flood elevation” means the water surface elevation of the base flood.

"Flood or flooding" means:

(1) A general and temporary condition of partial or complete inundation of normally dry land areas from:
    (A) The overflow of inland or tidal waters;
    (B) The unusual and rapid accumulation or runoff of surface waters from any source; or
    (C) Mudslides (i.e., mudflows) which are approximately caused by flooding as defined in paragraph (1)(B) of this definition and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current; or
(2) The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in paragraph (1)(A) of this definition.

"Special flood hazard area" means an area having special flood or flood-related erosion hazards, and shown on the Flood Insurance Rate Maps as Zones A, AO, AE, A99, AH, VE, or V.

"Water-tight" when referring to construction below the inundation level, means constructed to exclude moisture and withstand the hydraulic pressure resulting from the anticipated depth of inundation.

Section 5A-4-3. General Requirements.
Contractor will provide a certified flood zone elevation mark on jobsite for flood zone elevation reference point."