

County of Maui Office Of Recovery Construction Standards CDBG DR

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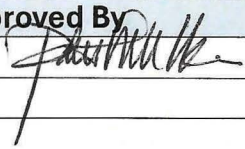
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1. INTRODUCTION

These County of Maui Office of Recovery (County OOR) Construction Standards serve as a unified framework for designing and building both single-family and multi-family housing in the County of Maui, Hawai'i. The document builds on nationally accepted building codes and proven design practices while tailoring them to Maui's unique environmental hazards—strong winds, hurricanes, wildfires, floods, earthquakes, termites and the corrosive marine atmosphere. The purpose is to protect the life, health and property of residents by setting minimum requirements for safety, resilience and sustainability, while also encouraging innovation and flexibility. Building codes are adopted as law by local governments and specify the minimum requirements for structural systems, plumbing, electrical, energy efficiency and other aspects of construction. This document integrates those codes with standards and guidelines adapted to Maui's conditions. It is organized into the following parts:

- **Definitions** – key terms used throughout the document.
- **Rules for contractors and program requirements** – procedural and administrative requirements that ensure accountability without creating unnecessary delays.
- **Standards** – technical requirements common to all housing and additional provisions specific to single-family or multi-family buildings.

By clearly separating definitions, rules and standards, this document aims to streamline permitting and construction, improve consistency, and allow alternative designs or materials when they achieve equal or better performance. The goal is efficiency, flexibility and accountability: contractors can propose innovative solutions, inspectors can verify compliance using standard checklists, and agencies can monitor outcomes without imposing excessive administrative burdens.

2. DEFINITIONS, ACRONYMS, AND INITIALISMS

This section clarifies terminology used in these standards. Understanding these terms ensures consistent interpretation and application:

- **ADA** – Refers to the Americans with Disabilities Act.
- **AFCI** - Refers to a arc fault circuit interrupter (safety device).
- **Building code** – A set of legally binding rules adopted by a state or local jurisdiction that specify minimum requirements for the design, construction and maintenance of buildings. Codes cover structural systems, plumbing, mechanical systems, energy efficiency and other features to safeguard life, health and property. Once adopted, codes have the force of law.

- **Construction Manager (CM)** – refers to the contractor or builder awarded the contract for construction management services.
- **Construction Director** – The County’s designated representative responsible for administering the housing construction program and ensuring compliance with applicable codes, program standards, and federal requirements. The Construction Director (or designee) coordinates the review and approval of plans, change orders, and inspections; facilitates communication among the homeowner, Construction Manager (CM), and County agencies; and ensures that construction activities are performed efficiently, safely, and in accordance with approved designs and program objectives.
- **Fire-resistance rating** – The duration, in hours, that an assembly (such as a wall, floor or roof) can withstand fire exposure while maintaining its structural function. These ratings are determined by standardized tests and are indicated as 1-hour, 2-hour, etc.
- **GFCI** - Refers to a ground fault circuit interrupter (safety device).
- **Guideline** – An advisory document that offers best practices or recommended methods. Guidelines provide additional clarity but are not intended to be enforced as law.
- **Hazardous and Substandard Conditions** - Shall include any condition that threatens the health and or safety of the occupants. Substandard conditions include any condition that threatens, defeats or will lead to the lack of functional viability of a single feature of a home.
- **Multi-family housing** – A residential building containing **five or more dwelling units**, including apartments, condominiums, or townhouses with shared walls and common areas. This definition follows **HUD program guidance** for CDBG-DR housing activities. Local building or zoning codes may classify multifamily housing differently for permitting purposes.
- **Non-combustible material** – A material that will not ignite, burn, or release flammable vapors when subject to fire. Examples include masonry, concrete, steel and fiber-cement cladding.
- **Roof / Roofing**: The top covering of a dwelling designed to protect from wind, water, and fire exposure. Roofing materials shall be non-combustible or Class A fire-rated in accordance with local code and Firewise USA® guidance. Standing-seam metal roofing is preferred for its resistance to wind, fire, and corrosion, but Class A asphalt shingles may be permitted where cost, availability, or design constraints justify their use, provided all underlayment and flashing meet equivalent fire-resistance standards.
- **Single-family housing** – A detached dwelling unit designed to be occupied by one household. Single-family homes may include accessory dwelling units and are typically located on individual lots.
- **Standard** – A consensus-based technical document that provides specific criteria, test methods or design guidance on a particular topic. Standards may be referenced

by codes, in which case compliance becomes mandatory; otherwise they serve as recommended practices.

These definitions are provided for clarity; where terms are defined in codes or standards, those definitions apply.

3. RULES FOR CONSTRUCTION MANAGER AND PROGRAM REQUIREMENTS

This section sets forth procedural requirements that contractors, builders, design professionals and program administrators must follow when working on projects subject to these standards. The intent is to maintain accountability and quality while minimizing administrative delays and allowing creative, cost-effective solutions.

- **Compliance and responsibility** – The CM must comply with the adopted building codes, these standards, and all applicable ordinances. Each project must be led by licensed professionals (architects, engineers, and contractors) who are accountable for code compliance and safety.
- **Contractual requirements** – The County of Maui Request for Proposal No. 25-26/P-57, titled “*Design and Construction in Support of Community Development Block Grant – Disaster Recovery (CDBG-DR) Single Family Homeowner Reconstruction Program*” (hereinafter referred to as the “Construction Management Solicitation”), and the resulting Construction Management Contract to be executed with the selected Construction Manager (CM), are both incorporated herein by reference. The CM shall adhere to all applicable requirements of the Construction Management Contract, the Solicitation, and these Construction Standards. In the event of any conflict among these documents, the Construction Management Contract shall govern.
- **Documentation and submittals** – The CM shall submit complete plans, specifications, and schedules for review before construction. They must use standardized digital forms and checklists to accelerate plan review. They must maintain updated as-built drawings, material certificates, and inspection records; these documents may be audited.
- **Environmental protection and safety** – The CM shall protect natural resources by managing stormwater, controlling erosion, minimizing dust, and properly handling waste and hazardous materials. The CM shall provide safe working conditions and comply with occupational safety regulations.
- **Flexibility and efficiency** – The rules above are designed to be streamlined. When possible, agencies will avoid duplicative paperwork and will accept electronic submissions and electronic signatures. The CM should bundle requests when

possible and are encouraged to identify process improvements that save time without compromising safety.

- **Local workforce and training** – Where feasible, the CM shall hire and train local workers in resilient building practices, including wildfire-resistant construction, high-wind detailing, and corrosion protection. This builds local capacity and reduces reliance on outside labor.
- **Preparing for Final Inspection** - Upon completion of construction, but prior to final inspection, the contractor will:
 - Remove all construction debris from the site;
 - Clean and mop all floors;
 - Clean all new and existing paint from other finished surfaces including window glass and mirrors;
 - Leave all newly installed items in operating condition;
 - Start all other electrical and mechanical systems;
 - Put all hardware in operating condition; and
 - Schedule a meeting with the homeowner to furnish equipment manuals, warranty documents, and provide home operational and maintenance instructions as needed.
- **Project scheduling and coordination** – The CM shall develop a clear project schedule with milestones for permitting, construction phases, inspections, and closeout. The CM must coordinate with utility providers and inspectors to avoid delays. The CM should communicate changes promptly and seek approvals only when necessary, rather than repeating routine steps.
- **Quality control and inspections** – The CM shall implement internal quality control procedures and ensure that critical construction stages are inspected by qualified personnel. Correct deficiencies immediately to avoid costly rework.
- **Reporting and accountability** – The CM shall provide regular progress and financial reports to program administrators. The CM shall maintain transparency on budgets and schedules and participate in audits or reviews.
- **Use of materials and alternative methods** – The CM shall use corrosion-resistant, fire-resistant, and code-approved materials appropriate to Maui's climate and hazards. The CM may propose alternative materials, products, or construction methods if they can demonstrate equivalent or superior performance, durability, and safety. The program will evaluate alternatives promptly to encourage innovation. All materials used shall be new. All work shall be done with skilled craftsmen and accomplished with care. The CM shall provide samples to the homeowner for selection for all materials as cited in the individual specifications and provide reasonable time to the homeowner to make selections. The CM shall submit a letter to the contract administrator, signed by the homeowner, stating that the homeowner approves of colors and quality of items such as, but not limited to: (1) paint, (2) flooring materials, (3) brick, (4) shingles, (5) siding, (6) door/window/drawer hardware, and (7) countertops.

- **Work Area** - The work area shall be left clean and free from clutter at the end of each day, and the contractor (not the homeowner) will be responsible for storage of materials and tools.
- **Work & Change Order Approvals** - No work will be approved except that which is established in the contract and in written approved change orders. Whenever the need for clarification results in a change, such issues will result in a written change order prior to any work being completed. Any unforeseen or hidden condition shall be reported to the Construction Director immediately or no later than 3 workdays. Any item that conflicts with these standards shall be reported immediately by the contractor.

4. GENERAL REQUIREMENTS (CONTEXT AND CODES)

- **Adopted codes** – The County of Maui has adopted the 2018 International Building Code (IBC), International Residential Code (IRC), International Existing Building Code (IEBC) and International Energy Conservation Code (IECC) with local amendments. New construction and major repairs must comply with these codes as of 28 Oct 2023.
- **Climate and hazard context** – Maui faces tropical storms, hurricanes, high winds, salty marine air, seismic activity, heavy rainfall, and the potential for wildfires. The Lahaina wildfires (August 2023) underscored the need for non-combustible exterior assemblies and defensible space. Hawai'i's building code designs for wind speeds up to 130 mph, though stronger gusts may occur. Salt-laden air causes corrosion and termites thrive in the warm, humid climate. Flooding from storm surge, tsunamis, or inland rainfall threatens low-lying sites.

5. COMMON STANDARDS (APPLICABLE TO SINGLE-FAMILY AND MULTI-FAMILY HOUSING)

A. Site Selection and Preparation

- **Access** - Walkways, driveways, and parking pads shall be provided as required by federal, state, or local jurisdiction and as follows:
 - Provide safe access for residents and emergency vehicles. Walkways and driveways should be constructed of durable, slip-resistant materials, and graded to prevent standing water.
 - Walkways that include two or more steps or decks more than 30 inches high shall include railing installed per building code.

- Walkways shall consist of 3- to 4-foot-wide concrete with specified finish from front entrance of the home (front porch) connecting to the driveway or concrete ADA parking pad.
- **Floodplain Construction Standards:** All structures located in flood hazard areas shall be elevated at least two (2) feet above the Base Flood Elevation (BFE) or the Federal Flood Risk Management Standard (FFRMS) base flood elevation, whichever is higher. Construction must include corrosion-resistant flood vents, elevated utilities, and submission of an Elevation Certificate at project closeout.
- **Grading** - The following shall apply:
 - Finish Grade at house foundation shall provide positive drainage away from structure and shall start a minimum of 6 inches below finish floor at slab on grade or a minimum of 6 inches below pier footings for elevated floor.
 - Grading below elevated floor slab shall provide positive drainage away from house footprint and prevent pooling under the house.
- **Hawai'i-Friendly Landscaping - Hawai'i-Friendly Landscaping and Firewise Defensible Space** - Landscaping shall follow Firewise USA® defensible-space standards in wildfire-prone areas and Hawai'i-Friendly Landscaping principles for long-term maintenance and resilience.\
 - Maintain a 5-foot noncombustible zone around all structures, consistent with Firewise USA® guidance. This zone shall be free of combustible mulch, dry vegetation, or flammable materials.
 - Limited noncombustible vegetation (such as succulents or fire-resistant plants) may be used within the 5-foot zone only if located at least 24 inches from exterior walls to reduce moisture retention and pest intrusion.
 - Beyond the 5-foot zone, apply Hawai'i-Friendly Landscaping practices, including the use of native or drought-tolerant species and proper spacing for irrigation efficiency and maintenance.
 - Shade trees are encouraged on the south and west sides to reduce heat gain, provided they do not compromise defensible-space requirements.
- **Roof Gutters and Stormwater Reuse** - All homes shall include continuous roof gutters and downspouts designed to direct rainwater away from foundations and pedestrian areas. Where site conditions permit, gutters shall be connected to drainage channels, landscaped swales, or "Gutters to Garden" systems that capture and reuse stormwater for irrigation. Downspouts should discharge into planted areas or storage basins rather than paved surfaces to reduce runoff and promote infiltration. Systems shall comply with County stormwater and erosion-control requirements, and materials shall be corrosion-resistant and rated for coastal environments.
- **Parking** -In Maui's environment, parking surfaces should withstand tropical rains and salt (e.g., concrete or permeable pavers). Ensure clear evacuation routes and space for emergency services.
- **Topography and soils** – Homes should be built on stable soils outside of floodways and steep slopes. Established housing guidelines require sites to be free of debris and properly graded to drain water away from foundations. Avoid building in gulches

or areas prone to rockfall. A geotechnical report should evaluate soil bearing capacity and slope stability. Where the site has already been selected and evaluated by the program, this requirement may be waived.

- **Universal Design** – Universal design features—such as no-step entries, wider doorways and accessible ground-floor bathrooms—are required to improve accessibility for residents with disabilities or limited mobility.
- **Wildfire defensible space** – All wildfire measures in these standards align with the *Firewise USA® Home Ignition Zone* principles. Establish an **immediate zone** extending 0–5 ft from the building that is entirely non-combustible (gravel, hardscape, bare soil) and free of combustible vegetation and other materials. Maintain an **intermediate zone** from 5–30 ft where vegetation is thinned, shrubs and trees are spaced, and lower limbs are pruned to reduce fuel continuity. On steep slopes or in densely built areas, extend an **extended zone** 30–100 ft and reduce ground fuels and ladder fuels. Maintain defensible space annually and ensure at least 20 ft of clearance between structures to prevent fire spread.
- **Tree Protection** - Existing trees designated to remain on site shall be protected with fencing or barriers placed beyond the tree’s drip line prior to construction. Protective measures shall comply with ANSI A300 standards to prevent soil compaction, root damage, or contamination during site work.

B. Utilities and Infrastructure

- **Water supply and wastewater** – Homes may connect to municipal water, wells, or rainwater catchment. Established design standards require safe water supply, backflow prevention and adequate septic or sewer systems. Many rural areas rely on cesspools; new construction should include septic or sewer connections and.
- **Electric service** – Electrical systems must meet the National Electrical Code. Install surge protection because of frequent lightning, and ensure that service panels, wiring, and fixtures are corrosion-resistant. Design standards call for tamper-resistant receptacles and arc-fault and ground-fault protection.
- **Telecommunications and renewable energy** – Design roofs to accommodate photovoltaic arrays and solar water heaters in compliance with Hawai‘i law. All homes shall be solar-ready, with roof conduit, electrical provisions, and unobstructed area for future PV installation. Rough-ins shall comply with the latest Hawai‘i Energy Code and NEC Article 690.
- **Underground Utilities** - To improve resilience and reduce visual and storm-related impacts, electrical service lines shall be installed underground wherever technically feasible and financially practical. Coordination with utility providers shall ensure compliance with applicable safety codes and accessibility for maintenance.

C. Structural Standards and Building Envelope

I. Foundations

- **Adopted Codes** – All building slabs, piers, and other supporting structures shall be designed and sealed by a licensed professional engineer (PE), per Adopted Codes.
- **Engineered design and elevation** – Foundations should be engineered with proper footings and reinforcing. For raised structures, use reinforced concrete piers or slabs with moisture and termite barriers. Elevate the building above grade to reduce flood risk and provide ventilation.
- **Corrosion and termite protection** – Anchor bolts, straps and connectors must be hot-dip galvanized or stainless steel to withstand salt air. Treat framing with borates or use naturally resistant species such as ‘ōhi‘a or redwood.
- **Seismic and wind loads** – Design foundations to resist uplift and lateral forces from earthquakes and hurricanes using hold-down anchors, tie-downs and cross-bracing. Follow the wind speed maps in the IBC/IRC (130 mph or higher) and consult structural engineers to address higher uplift.
- **Durability and Moisture Resistance:** Exterior assemblies shall incorporate corrosion-resistant fasteners, moisture-tolerant materials, and positive drainage details. All wall and roof assemblies shall be designed to prevent trapped moisture and promote drying, in accordance with FEMA P-320 and FEMA 55 guidelines.

II. Floors

- **Moisture and durability** – Floors should be level and include vapor barriers or moisture-resistant underlayment. Use concrete slabs with vapor barriers or raised wood floors with insect-resistant materials. Floor coverings should resist humidity and termites (e.g., ceramic tile, polished concrete, treated hardwood).
- **Structural support** – Increase joist sizing and spacing to handle hurricane uplift and seismic forces. Provide hurricane clips where floors connect to walls.

III. Walls and Exterior Cladding

- **Fire resistance** – Exterior walls should achieve at least a 1-hour fire-resistance rating and 2-hour ratings where structures are within close proximity. Use non-combustible cladding such as fiber-cement board, stucco over masonry, metal panels, or concrete. Avoid vinyl or untreated wood siding.
- **Moisture management and corrosion** – Install high-permeability house wrap to allow walls to dry. Use corrosion-resistant fasteners and flashing. Provide rain-screen ventilation behind cladding to allow air circulation. Include inspection gaps and termite shields between cladding and grade.

- **Insulation and air sealing** – Meet or exceed IECC R-value requirements using rigid foam, spray foam, or other insulation that does not support mold growth. Seal all penetrations and joints to create a continuous air barrier.
- **Paint** – Interior and exterior walls shall be free from chipped, cracking, or peeling paint.
- **Siding** – Exterior siding shall be smooth and free from gaps, cracks, rot, termite damage, holes, and other damage.

IV. Roofs

- **Roof Systems:** Roof assemblies must comply with the highest applicable fire-resistance rating (Class A) and be designed to resist hurricane-force winds. Standing-seam metal roofs are the preferred system for new construction and reconstruction because of their superior performance in both wildfire and wind events. Class A asphalt shingles may be accepted when properly installed with corrosion-resistant fasteners, fire-resistant underlayment, and drip edges. The program will continue to evaluate long-term cost, maintenance, and fire performance data to determine whether a full transition to metal roofing should be adopted in future revisions of these standards.
- **Hurricane ties and uplift resistance** – Provide a continuous load path from roof to foundation using hurricane straps, tie-down anchors, and ring-shank nails. Limit roof overhangs and avoid flat roofs to reduce debris and ember accumulation.
- **Drainage and ventilation** – Install corrosion-resistant gutters and downspouts that drain away from foundations. Provide roof vents screened with 1/8-inch metal mesh to prevent embers from entering while allowing attic ventilation.
- **Appearance** - Roofs must be smooth and free from defects.

V. Windows, Doors and Openings

- **Tempered and multi-pane glass** – Use tempered, insulated, and laminated glazing to resist wind-borne debris and radiant heat. Avoid large single panes on walls facing adjacent structures.
- **Frames and weather sealing** – Choose aluminum, fiberglass, or treated wood frames. Install gaskets and weather stripping for airtightness and corrosion resistance.
- **Screens and vents** – Cover all vent openings with 1/8-inch metal mesh to block embers. Do not use plastic mesh.
- **Doors** – Use non-combustible or fire-resistant doors (solid wood, metal, or fire-rated composite). All exterior doors shall be a minimum size (as required by Universal Design), insulated, and be equipped with security locks, including at least one deadbolt per door. A peephole is required on main entrance exterior door.

D. Weatherization and Energy Efficiency

- **Continuous air barrier** – Seal all penetrations and joints. Use low-permeance vapor retarders on the warm side of insulation and ensure that assemblies can dry in both directions.
- **Reflective roofing and radiant barriers** – Use light-colored roofing and radiant barriers to reduce solar heat gain. Provide eave ventilation with ember-resistant vents.
- **High-performance windows and shading** – Specify low-e glass with impact resistance and incorporate shading devices such as awnings, louvers, or overhangs. Orient windows to maximize natural ventilation and daylight while minimizing heat gain.

E. Electrical and Lighting Systems

- **Protection and grounding** – Provide ground-fault circuit interrupters (GFCIs) and arc-fault circuit interrupters (AFCIs) in accordance with the National Electrical Code. Install whole-house surge suppressors and proper grounding because of frequent lightning. Use corrosion-resistant panels and conduits.

F. Plumbing and Water Systems

- **Corrosion-resistant piping** – Use CPVC, PEX or coated copper piping. Protect metals from galvanic corrosion. Provide accessible shut-off valves.
- **Solar water heating** – As required per State law, homes must provide roof space and plumbing for collectors and storage tanks.
- **Bathtubs & Showers** - Each dwelling unit shall include at least one full bathroom equipped with a bathtub or an accessible shower, consistent with the Universal Design and Accessibility standards described in the Universal Design section below. In units with more than one bathroom, the second bathroom may include either a bathtub or a shower. Faucets shall operate smoothly, be free of leaks, and shut off completely. Toilets and bathrooms shall have doors with privacy-type locks to ensure occupant security and comfort.

G. Mechanical Systems and Indoor Air Quality

- **Mechanical Cooling** - Each single-family home shall include ductless mini-split air-conditioning units installed in the main living area and the master bedroom. Additional bedrooms shall be pre-wired and roughed-in to allow future installation of mini-split units. Rough ins shall include electrical circuits, condensate drainage, and refrigerant line sleeves, all sealed to maintain building envelope integrity. Mini-split

systems shall meet or exceed 15.2 SEER2 efficiency, use corrosion-resistant outdoor units, and be mounted above the Base Flood Elevation (BFE) or as required by code..

- **Passive Cooling** - Homes shall remain primarily designed for passive cooling and natural ventilation through cross-breezes, operable windows, and ceiling fans. Mini-splits will supplement comfort while preserving the home's energy efficiency and resilience.
- **Vented Fans** - All ranges, bathrooms, and utility rooms shall have ENERGY STAR-rated or equivalent power-vented fans and shall exhaust to the exterior.
- **Design Limitations and Future Flexibility** - Single-family homes designed primarily for passive cooling cannot be retrofitted for central air conditioning without major redesign. Providing rough-ins for mini-split systems ensures flexibility for future comfort upgrades while preserving the home's efficiency and structural integrity.

H. Fire Safety and Wildfire Resistance

- **Exterior assemblies** – Use non-combustible or fire-resistant materials for siding, decking and fences. Avoid untreated wood near structures. For decks, use metal or fire-resistance-rated composite materials; enclose soffits and avoid storing combustible items underneath.
- **Roof and eaves** – Provide Class A roofing and limit joints where embers can accumulate. Box in eaves with non-combustible soffits. Install spark arrestors on chimney flues.
- **Defensible space** – Maintain vegetation defensible space as described in the Site Selection and Preparation Section. Use gravel or hardscape near structures.
- **Fire detection and suppression** – Install smoke alarms, carbon monoxide detectors and at least one fire extinguisher per floor. Consider interior fire sprinklers, especially in multi-family housing or remote areas where response times are long.

I. Implementation, Inspections and Variance Process

- **Permitting and inspections** – The CM shall obtain building permits and undergo plan review by Maui County. Inspections verify compliance with codes, structural details, and energy standards.
- **Variance process** – When site conditions, cultural considerations, or historic preservation requirements make strict compliance with these program construction standards impractical, the builder or design professional may request a variance from the program standards. The variance must demonstrate equal or greater safety, durability, and performance and be supported by documentation prepared by a Hawai'i-licensed architect or engineer. This provision applies only to the program's construction standards and does not authorize variances from the Hawai'i Building Code or other applicable federal, state, or County regulations. All projects must remain fully code compliant.

- **Maintenance and homeowner education** – The CM shall provide owners with manuals covering maintenance of corrosion-resistant materials, wildfire landscaping and hurricane preparation. Educate residents about emergency evacuation procedures, tsunami warning systems and shelter locations.

6. SINGLE-FAMILY HOUSING STANDARDS

Single-family homes are detached dwellings intended for one household. They often occupy individual lots and offer flexibility for indoor–outdoor living and multi-generational households. In addition to the general standards above, consider the following:

A. Site and Space Planning

- **Indoor–outdoor living** – Incorporate lanais (covered porches), decks or courtyards to facilitate outdoor living. Use non-combustible materials and design overhangs to avoid trapping embers during wildfires.
- **Multi-generational living** – Many Maui families accommodate extended family. Provide ground-floor bedrooms and bathrooms for elders, wide doorways, and accessible bathrooms.
- **Accessory Dwelling Units:** Whenever feasible, residential site design should accommodate the potential inclusion of an Accessory Dwelling Unit (ADU)—either attached or detached—to expand long-term housing options. ADUs provide flexibility for multi-generational living, rental income, and workforce housing, while making efficient use of existing infrastructure. Site layouts should consider space for separate utility connections, independent access, and compliance with applicable zoning and septic or sewer capacity. Incorporating ADU potential at the design stage supports the County’s goals for housing affordability and community resilience.
- **Carports** – If providing carports, they should be constructed of fire-resistant materials and securely anchored.
- **Driveways and Parking Pads:** Whether the home has a garage or a parking pad, it must have a 9-foot-wide and 20-foot-long concrete driveway from the street to garage or pad. The length of the driveway may only be less if the distance from the house to street access restricts the longer driveway. If the driveway must be longer than 20 feet, the Construction PM will determine the required length on a case-by-case basis and whether the extended driveway is concrete or gravel.
- **Flooring Material** – Flooring material for different areas shall be:
 - **Living room** – Carpet or vinyl plank flooring;
 - **Dining room** – Carpet or Vinyl plank flooring;
 - **Kitchen** – Vinyl plank flooring;
 - **Bedrooms** – Carpet or vinyl plank flooring;
 - **Closets** – Carpet or vinyl plank flooring;

- **Bathrooms** – Ceramic or porcelain tile; and
 - **Utility** – Vinyl plank flooring.
- **Window Sizes, Quantities & Standards** – Windows shall be the following:
 - Window size, type, and placement shall be determined during the design phase of each home model and shall comply with applicable building codes. Homes shall provide adequate natural light, ventilation, and emergency egress in all habitable rooms to ensure comfort, health, and safety.
 - Operable window area in each habitable room shall meet the minimum code-required percentage of the floor area for light and ventilation, and at least half of that window area shall be capable of being opened for airflow.
 - All operable windows and other openings used for ventilation shall be screened with corrosion-resistant mesh (minimum 16 mesh per inch) to prevent the entry of insects and debris while maintaining airflow.
 - Where natural ventilation is not feasible—such as in bathrooms or interior spaces—mechanical exhaust ventilation shall be provided to ensure adequate air changes and humidity control.
- **Ramps and landings** – Where homes are elevated for flood or ventilation, design ramps with a slope of no more than 1:12 and include landings. Guardrails must be corrosion-resistant and able to withstand high winds.

B. Electrical

- **Lighting** – Provide a front porch light and a secondary egress door light.
- **Breaker Box** - Unless otherwise required by building and local codes, breaker box is to be located on the first floor in the utility room or garage. In the event that the home does not have a utility room or garage, the breaker box should be located at a place that it is unblocked and easily accessible outside of the home's common areas (living and dining room, hallways, etc.).
- **Fans & Light Fixtures**
 - Every habitable room shall have at least one ceiling fan (with light) controlled by a wall switch.
 - Every toilet room, bathroom, laundry, furnace room, and hallway (hallway where applicable) shall contain at least one supplied ceiling or wall-type electric light fixture, controlled by a wall switch.
- **Appliances**
 - All heavy-duty appliances, i.e., refrigerators, stoves, washers, dryers, microwaves, etc., shall be supplied with their own outlets on separate circuits, as applicable.
 - Each home shall include ENERGY STAR-rated laundry appliances, with front-loading washers preferred for reduced water and energy consumption. High-efficiency top-loading washers may be substituted when front-loading models are impractical or conflict with accessibility needs.

- Each home shall include a full-size ENERGY STAR-rated range with oven, refrigerator, and dishwasher. Refrigerators shall have a minimum capacity of 14 cubic feet, and dishwashers shall use no more than 3.5 gallons per cycle. Range hoods or microwaves with integrated venting shall exhaust to the exterior and comply with mechanical ventilation requirements.
- **Exterior Outlets** - Provide a minimum of two exterior weatherproof electrical convenience outlets installed in accordance with local building codes and NEC requirements.

C. Structural and Mechanical Considerations

- **Water Heaters** - Every dwelling shall be equipped with solar water-heating facilities, properly installed, free of leaks, and capable of supplying sufficient hot water for bathing and general domestic use. Solar water heaters shall comply with Hawai'i Revised Statutes §196-6.5 and applicable County building and plumbing codes. Systems shall include solar collectors, insulated piping, and storage tanks designed for the site's exposure and hot water demand.
- Where solar water heating is not feasible due to technical or site constraints (such as multi-family configurations or shading limitations), an on-demand tankless water heater or a high-efficiency heat-pump water heater may be used with County approval. Alternate systems must provide a continuous flow of hot water at a minimum of 102°F, include properly installed shutoff valves, and meet all applicable energy and safety standards.
- Installation Requirements:
 - Each system shall include a functioning pressure-relief valve set to release at 150 psi or 210°F, with discharge piped to a visible exterior location.
 - Water heaters shall be installed in enclosed, sealed closets designed for this purpose, with combustion air (if applicable) drawn from outside the living area.
 - Gas units located in garages shall be installed at least 18 inches above the floor to prevent ignition of fuel vapors.
Sealed closets shall include a recessed slab and drain pan or catch basin piped to the exterior. Flooring shall be water-resistant material.
 - Units installed in attics must comply with access requirements and include drain pans with overflow routed to a visible exterior location.
 - Exterior-rated tankless water heaters may be mounted on the side or rear of the structure when permitted by code and manufacturer specifications.
- **Gutters to Garden** - Each single-family dwelling shall include roof gutters and downspouts designed to manage roof runoff effectively. When feasible, water shall be diverted to gardens or landscaped areas to support low-impact development and reduce strain on municipal drainage systems.

- **Solar and Cooling Rough-Ins** - Each single-family home shall be solar-ready and equipped with installed ductless mini-split air-conditioning systems in the main living area and master bedroom. Additional bedrooms shall be rough-in ready for future installation. Mini-splits shall comply with efficiency and corrosion-resistance standards noted above. Roof assemblies, shading, and insulation must continue to support passive cooling strategies to minimize energy use and maintain occupant comfort.
- **Shut Off Valves** - The following shut off valves shall be installed:
 - One owner's shut off at the meter or supply source;
 - One shut off at each toilet;
 - One shut off each for hot and cold water at each sink/lavatory;
 - One supply side shut off at each water heater; and
 - At least two exterior faucets shall be installed.
- **Roofs** – Roof systems must be designed for hurricane winds and wildfire exposure. Provide slopes between 4:12 and 6:12 to facilitate drainage and resist uplift. Provide attic access openings at least 22×30 inches. Install a continuous ridge vent or equivalent balanced ventilation along with soffit vents protected with ⅛-inch metal mesh to resist embers. Provide corrosion-resistant drip edges and flashing at all roof edges, valleys and penetrations.

D. Universal Design and Accessibility

- All new single-family construction shall incorporate Universal Design features that promote long-term accessibility, safety, and adaptability for residents of all ages and abilities. These features are required as part of the base design and may not be removed or altered. Universal Design promotes comfort and independence while allowing flexibility for homeowners to make personal choices about certain adaptable elements.
- **Mandatory Universal Design Features**
 - 36-inch hallways to accommodate wheelchairs and strollers.
 - Adequate turning radius in the kitchen and other major rooms.
 - Lever-style door handles on all interior and exterior doors.
 - 36-inch-wide interior bedroom, bathroom, and exterior entry doors.
 - One no-step entrance providing direct access to the primary living area.
 - Accessible circulation layout, including at least one bedroom and bathroom on the main living level (for multi-story homes).
- **Bathroom Requirements**
 - Each dwelling unit shall include at least one full bathroom with either a bathtub or accessible shower, consistent with these Universal Design principles. In homes with more than one bathroom, the additional bathroom may include either a bathtub or a shower. Faucets shall operate smoothly, be free of leaks, and shut off completely.

- Optional Universal Design Features
 - Homeowners may opt out of certain features that are easily modified or replaced after occupancy, such as:
 - Grab bars in bathrooms
 - Chair-height toilets
 - Roll-under vanities
 - Shower seats or handheld wands
- Reasonable Accommodations
 - If a single-family homeowner or household member is disabled or otherwise protected under the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, the program will provide reasonable accommodations and additional accessibility features as required by HUD guidance. These accommodations will be determined through individual assessment and documented in the homeowner's file.

E. Completion, Warranty, and Documentation

- All homes shall undergo final inspection by the County or Program Administrator to confirm compliance with these standards.
- Each home shall receive a Certificate of Occupancy prior to closeout.
- A one-year workmanship warranty shall be provided by the contractor covering materials and labor.
- Homes located in designated flood hazard areas must submit proof of flood insurance coverage prior to occupancy.

F. Energy Efficiency & Resilience

- Energy efficiency in Maui focuses on reducing interior heat gain, maximizing natural ventilation, and lowering electricity demand while maintaining occupant comfort. Although HUD no longer mandates a specific energy standard, all projects shall incorporate cost-effective, climate-appropriate measures suitable for island conditions.

I. Building Envelope and Passive Design

- **Shading:** Use roof overhangs, covered lanais, and vertical shading devices on east and west façades.
- **Insulation:** Provide radiant-barrier roof decking or R-13 ceiling insulation (minimum) under light-colored roofs. Wall insulation may be limited where cross-ventilation is achieved.
- **Reflective Surfaces:** Require light-colored, high-albedo roof coatings and exterior finishes to reduce heat absorption.

- **Windows:** Specify double-pane low-E windows with SHGC ≤ 0.40 and insect-screened operable panels to encourage natural ventilation.

II. Cooling and Ventilation

- **Air Conditioning** - Homes shall be designed for natural ventilation and passive cooling using operable windows, cross-ventilation, and ceiling fans. To enhance comfort and efficiency, ductless mini-split air-conditioning units shall be installed in the main living area and master bedroom, with rough-ins provided for other bedrooms. Roof and wall assemblies shall incorporate insulation, radiant barriers, and reflective finishes to minimize solar heat gain.
- **Ceiling Fans:** Provide Energy Star-rated ceiling fans in main living areas and bedrooms.
- **Natural Ventilation:** Encourage design for cross-breezes and use of jalousie or operable windows on opposing walls.

III. Lighting and Appliances

- **Lighting:** Require LED fixtures with integrated dimmers.
- **Appliances:** All appliances shall be Energy Star-certified, with emphasis on inverter-type refrigerators.

IV. Renewable Energy and Water Heating

- **Solar PV Readiness:** All new homes shall be solar-ready, with roof space, conduit, and panel labeling for future PV installation.
- **Battery Infrastructure:** Where program budgets allow, provide rough-in for battery storage.

V. Water and Energy Nexus

- **Low-flow fixtures:** Faucets ≤ 1.5 gpm, showerheads ≤ 2.0 gpm, toilets ≤ 1.28 gpf.
- **Rainwater Harvesting:** Encourage rainwater collection for irrigation to reduce municipal demand.

7. MULTI-FAMILY HOUSING STANDARDS

Multi-family housing includes duplexes, townhouses, apartments, and condominiums. These buildings house multiple families within a single structure and therefore require additional considerations:

A. Building Envelope and Fire Separation

- **Fire-resistance rated assemblies** – Provide 2-hour fire-resistance rated walls and floors between units to prevent fire spread and ensure occupant safety. Seal penetrations with fire-stopping materials. Use non-combustible materials for stairways, balconies, and corridors.
- **Sound insulation** – Use resilient channels, insulation, and staggered studs to reduce noise transmission between units. Provide acoustic seals around doors and windows.
- **Ingress and egress** – Each unit should have at least two exits leading to a safe area. Install illuminated exit signs and emergency lighting in common areas. Ensure stairwells and hallways are wide enough for evacuation and accessible to people with disabilities.
- **Balconies and exterior corridors** – Design balconies and exterior corridors with corrosion-resistant materials and guardrails. Provide ember-resistant vents and minimize combustible materials on balconies.

B. Mechanical, Electrical, and Plumbing Systems

- **Centralized systems** – Multi-family buildings often use centralized mechanical systems. Size HVAC and hot water systems based on occupant load and ensure adequate ventilation for interior units. Provide easily accessible shut-off valves for each dwelling.
- **Metering and controls** – Provide individual meters for each unit where feasible, or sub-metering to encourage energy conservation. Install centralized control panels in a secure, accessible location.
- **Broadband Infrastructure** - All multifamily projects shall include broadband infrastructure in accordance with HUD 90 FR 1754, ensuring reliable and affordable digital access for residents. Broadband installation shall include conduit and junction points suitable for future fiber or cable upgrades and shall be coordinated with telecommunications providers.
- **Centralized Controls** - Common-area HVAC and lighting systems shall include centralized, programmable controls to optimize energy performance and occupant comfort. Systems shall support demand response or smart-grid capability where available, allowing for automated adjustments and energy savings.

C. Amenities and Common Areas

- **Parking and circulation** – Provide adequate off-street parking spaces and protected pedestrian pathways. Consider carpool or electric vehicle parking and secure bicycle storage. Use durable, corrosion-resistant construction for parking structures.

- **Laundry, storage, and trash rooms** – Design shared laundry facilities and trash rooms with fire-resistant construction and proper ventilation. Provide secure, weather-protected storage areas for residents.
- **Recreation and community spaces** – When including community rooms, playgrounds, or green spaces, design them for shade, wind protection and accessibility. Use non-combustible furnishings and maintain vegetation to reduce wildfire risk.
- **Open Spaces** - Multifamily sites shall include a minimum of 10% contiguous open space, exclusive of parking and driveways. This open area shall provide recreation or gathering space for residents and may include gardens, shaded seating areas, or play zones. Open spaces shall be designed with accessibility, shade, and visibility for safety in mind.
- **Shade and Outdoor Comfort** - A minimum of 30% of open common areas shall be shaded using trees, pergolas, canopies, or roof overhangs to reduce heat exposure and enhance outdoor livability. Shaded seating and gathering areas shall be integrated into site design to encourage community interaction and resilience to heat events.

D. Universal Design and Accessibility

- All new multifamily construction shall incorporate Universal Design and Accessibility features to enhance safety, adaptability, and equitable access for residents. These requirements apply to both individual dwelling units and shared spaces.
- Minimum Multifamily Accessibility Requirements
 - At least 5% of dwelling units shall be accessible to persons with mobility impairments, and 2% shall be accessible to persons with hearing or vision impairments, per Section 504 of the Rehabilitation Act and ADA Standards §§604–609.
 - Accessible units shall be distributed throughout the project and have equal access to amenities.
 - Accessible routes shall connect parking areas, building entrances, and all common-use spaces.
 - Light switches and electrical outlets shall be installed between 15 and 48 inches above the floor.
 - Non-slip flooring materials throughout units and common areas.
 - Blocking in bathroom walls to support future grab bar installation.
 - Reinforced stair handrails and adequate lighting along all circulation paths.
 - Adaptable kitchen layouts that allow under-counter wheelchair access at sinks and work surfaces.
 - Visual and auditory smoke and CO₂ alarms in all accessible units.
 - Contrasting floor colors or textures to aid visual navigation.

E. Additional Hazard Considerations for Multi-Family Housing

- **Vertical evacuation** – In tsunami or flood zones, provide safe vertical evacuation routes to roofs or upper floors, and post signage. Ensure structural capacity for occupants to congregate in these areas.
- **Fire suppression systems** – Multi-family buildings should be equipped with automatic fire sprinklers, standpipes, and fire alarm systems. Provide fire department connections and ensure water supply capacity.
- **Wind and seismic design** – Larger building footprints and heights demand robust structural systems. Use shear walls, braced frames, and moment-resisting frames to handle wind and seismic loads. Anchor exterior cladding and balconies securely.

G. Energy Efficiency & Resilience

Multifamily housing in Maui shall be designed to reduce energy use, enhance indoor comfort, and ensure long-term durability under conditions of high humidity, salt exposure, and intense solar heat. While no formal green certification is required, all projects shall incorporate energy-, water-, and resource-efficiency strategies consistent with the Hawai'i Energy Code and the intent of HUD CPD Notice 16-04 or successor guidance. Designs shall emphasize passive cooling, material durability, and wildfire-resilient construction, ensuring performance appropriate to island climate and community resilience goals. resilience.

I. Building Envelope and Passive Cooling

- **Roofing:** Light-colored, reflective roof finishes (≥ 0.70 Solar Reflectance Index) or cool roof membranes to minimize heat absorption.
- **Insulation:** Minimum R-19 for roof assemblies and R-11 for walls; use rigid foam or closed-cell spray insulation resistant to moisture and salt.
- **Windows:** Double-pane low-E windows with SHGC ≤ 0.40 , operable for cross-ventilation; integrate insect-screened openings or jalousie panels.
- **Shading:** Provide covered lanais, horizontal louvers, or deep roof overhangs on east and west façades to reduce direct solar gain.
- **Air Sealing:** Use polyurethane foam sealant or equivalent around window and door penetrations to limit humidity infiltration.

II. Mechanical Cooling and Ventilation

- **System Efficiency:** All split or central heat-pump systems must achieve a minimum 15.2 SEER2 and 8.2 HSPF2.
- **Dehumidification:** Incorporate variable-speed or inverter-driven systems with integrated humidity control or standalone dehumidifiers in common areas.

- **Natural Ventilation:** Use corridor vents, clerestory openings, or rooftop wind scoops to enhance passive airflow through shared spaces.
- **Placement:** Locate all outdoor condensing units above BFE or FFRMS elevation, secured against wind uplift and corrosion.
- **Ductwork:** Seal and insulate ducts to R-8 minimum; avoid locating ducts in unconditioned attic spaces where possible.

III. Centralized and Shared Systems

- **Water Heating:** For multifamily buildings, install centralized solar-assisted, instant (tankless), or heat-pump water-heating systems sized for building occupancy.
 - Where individual units use tank-type water heaters, ensure a UEF ≥ 0.92 (≤ 55 gal) or 0.88 (> 55 gal).
 - Locate equipment in mechanical closets with floor drains and corrosion protection.
- **Laundry Facilities:** All shared or in-unit laundry facilities shall include ENERGY STAR-rated front-loading washers that use no more than 15 gallons per cycle and high-efficiency dryers with moisture sensors. Front-loading washers are preferred for their superior water and energy performance and shall be installed in all multifamily units where space and accessibility allow. Where front-loading units are not feasible due to site or design limitations, high-efficiency top-loading alternatives may be approved by the County.
- **Appliances** - All dwelling units shall include ENERGY STAR-rated, full-size kitchen appliances, including a range with oven, refrigerator (minimum 18 cubic feet), and dishwasher (≤ 3.5 gallons per cycle). Microwaves may be integrated with range hoods provided they meet clearance and exhaust requirements.

IV. Lighting and Controls

- **Common Areas:** All exterior and shared interior lighting shall be LED with motion sensors or photocells.
- **Individual Units:** Fixtures must be ENERGY STAR rated, with dimmer switches or occupancy sensors in living and utility spaces.
- **Emergency Lighting:** Equip corridors and stairs with battery-backup LED fixtures, tested annually.

V. Water Efficiency and Management

- **Plumbing Fixtures:** Faucets ≤ 1.5 gpm, showerheads ≤ 2.0 gpm, and toilets ≤ 1.28 gpf (Water Sense certified).

- **Condensate & Greywater:** Where feasible, route HVAC condensate or greywater to landscape irrigation to reduce potable demand.
- **Rainwater Harvesting:** Encourage roof collection for irrigation or non-potable uses, consistent with County plumbing and backflow prevention standards.

VI. Renewable Energy Readiness

- **Solar PV Systems:** Provide conduit and roof space for future PV installation; design electrical rooms and metering to allow connection of community solar arrays.
- **Battery Storage:** Rough-in conduit and space for modular battery systems capable of supporting emergency lighting or refrigeration.
- **EV Charging:** Provide a minimum of one Level 2 charging space per ten units (rounded up) and infrastructure for future expansion.

VII. Indoor Air Quality and Moisture Control

- **Ventilation:** Provide continuous or demand-controlled mechanical ventilation per ASHRAE 62.2.
- **Materials:** Use low-VOC adhesives, sealants, and paints ($\text{VOC} \leq 50 \text{ g/L}$ interior).
- **Mold Resistance:** Use cement board or treated gypsum in bathrooms and coastal exposures; maintain 6 mil vapor barriers under slabs.
- **Drying:** Design balconies and wall assemblies for drainage and drying; ensure that exhaust fans vent directly outdoors.

VIII. Resilient Operations and Maintenance

- Provide unit-level utility metering for electricity and water to encourage conservation.
- Post durable energy and maintenance guides in mechanical rooms and community areas.
- Encourage resident education on efficient appliance use, air-flow management, and humidity control.
- Multifamily developments shall provide individual or submetered systems for electricity and water usage, where feasible, to encourage conservation and ensure accurate utility billing. Central systems shall include accessible monitoring points to allow building management to track and optimize energy performance.

8. CONCLUSION

These County OOR *Construction Standards* offer a comprehensive framework for designing and building single-family and multi-family homes that are resilient, sustainable and culturally respectful. By adhering to Maui’s adopted codes and incorporating hazard-mitigation strategies—such as non-combustible materials, wind and seismic engineering, corrosion resistance and energy efficiency—developers and homeowners can create safe and durable housing. The standards emphasize flexibility for multi-generational living, community engagement. As codes evolve and lessons from recent disasters are incorporated, these guidelines should be updated to ensure that Maui’s housing stock remains resilient and supportive of its residents.