Part 3: Alterations

2025 Residential Stretch Code Existing Buildings

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As one, we form Mass Save®, with the common goal of helping residents and businesses across Massachusetts save money and energy, leading our state to a clean and energy efficient future.

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Presented by:

PSD

Moving Energy Efficiency Forward

We combine building science with technology to help utility companies, program implementers, and building performance professionals achieve energy savings.

Agenda

- Introduction
- Massachusetts Energy Code
- Chapter 5 [RE] Overview
- Residential Additions
- Repairs
- Compliance Paths
- Solar Ready and EV Ready
- Case Studies
- Summary/Closing

Learning Outcomes

Gain insight into the implementation of the Energy and Stretch Code for Minor Modifications

Utilize the suitable compliance paths according to the nature of the project

Obtain insight into the implementation of the Energy and Stretch Code for Level 3 alterations

Learn how the code accommodates repairs to existing buildings

Poll Question #1

Which of the following best describes your field of work?

A. Builder

B. Architect

C. Code Official

D. HERS Rater

E. Passive House Consultant

2025 Massachusetts Residential Energy Code

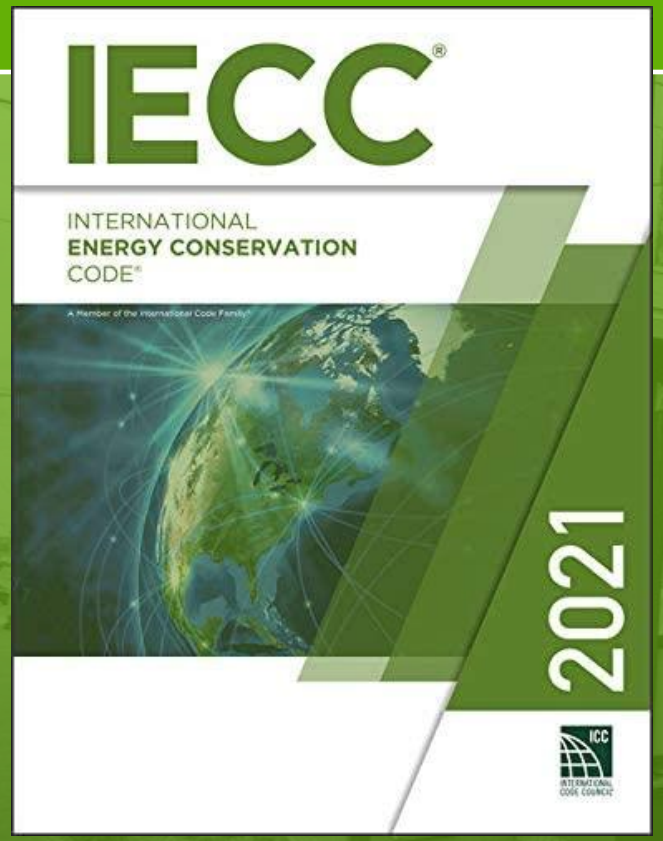
Base Code	Stretch Code	Specialized Code
2021 IECC w/MA Amendments; 780 CMR Chapter 11R (residential) & 780 CMR Chapter 13 (commercial) 780 CMR 10th Edition is the current MA Building Code	2021 IECC w/MA Amendments; 225 CMR Chapter 22 (residential) & 225 CMR Chapter 23 (commercial)	2021 IECC w/MA Amendments; 225 CMR Chapter 22 + Appendix RC (residential) & 225 CMR Chapter 23 + Appendix CC (commercial)

Source: MA DOER

Current Energy Code Options

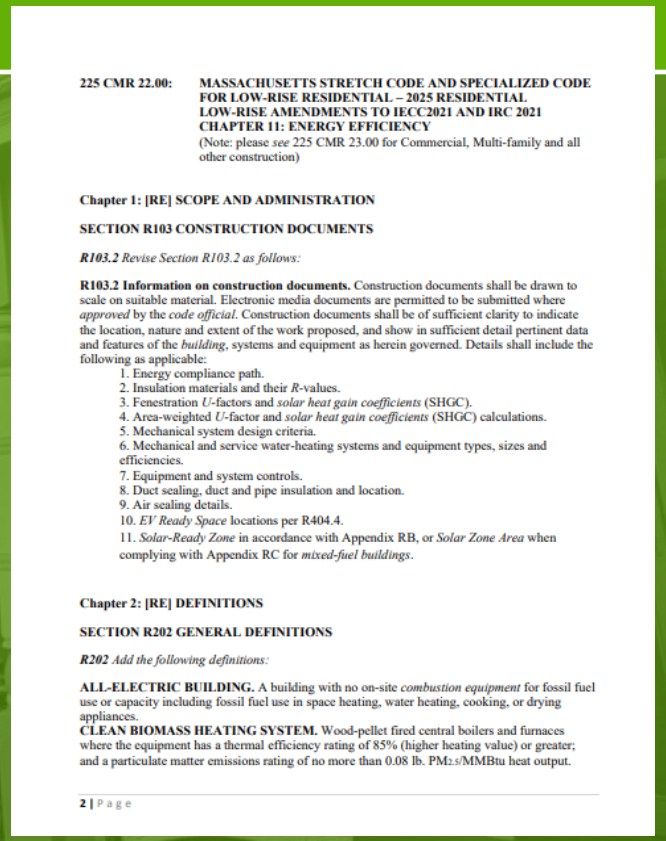
The 2023 Massachusetts Energy Code

The 2021 IECC



Source: ICC

Massachusetts Amendments



225 CMR 22.00: MASSACHUSETTS STRETCH CODE AND SPECIALIZED CODE FOR LOW-RISE RESIDENTIAL – 2025 RESIDENTIAL LOW-RISE AMENDMENTS TO IECC2021 AND IRC 2021 CHAPTER 11: ENERGY EFFICIENCY
(Note: please *see* 225 CMR 23.00 for Commercial, Multi-family and all other construction)

Chapter 1: [RE] SCOPE AND ADMINISTRATION

SECTION R103 CONSTRUCTION DOCUMENTS

R103.2 *Revise Section R103.2 as follows:*

R103.2 Information on construction documents. Construction documents shall be drawn to scale on suitable material. Electronic media documents are permitted to be submitted where *approved* by the *code official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the *building*, systems and equipment as herein governed. Details shall include the following as applicable:

1. Energy compliance path.
2. Insulation materials and their *R*-values.
3. Fenestration *U*-factors and *solar heat gain coefficients* (SHGC).
4. Area-weighted *U*-factor and *solar heat gain coefficients* (SHGC) calculations.
5. Mechanical system design criteria.
6. Mechanical and service water-heating systems and equipment types, sizes and efficiencies.
7. Equipment and system controls.
8. Duct sealing, duct and pipe insulation and location.
9. Air sealing details.
10. *EV Ready Space* locations per R404.4.
11. *Solar-Ready Zone* in accordance with Appendix RB, or *Solar Zone Area* when complying with Appendix RC for *mixed-fuel buildings*.

Chapter 2: [RE] DEFINITIONS

SECTION R202 GENERAL DEFINITIONS

R202 *Add the following definitions:*

ALL-ELECTRIC BUILDING. A building with no on-site *combustion equipment* for fossil fuel use or capacity including fossil fuel use in space heating, water heating, cooking, or drying appliances.
CLEAN BIOMASS HEATING SYSTEM. Wood-pellet fired central boilers and furnaces where the equipment has a thermal efficiency rating of 85% (higher heating value) or greater; and a particulate matter emissions rating of no more than 0.08 lb. $PM_{2.5}$/MMBtu heat output.

Source: MA DOER

The 2025 Massachusetts Energy Code

Base Code

Stretch Code

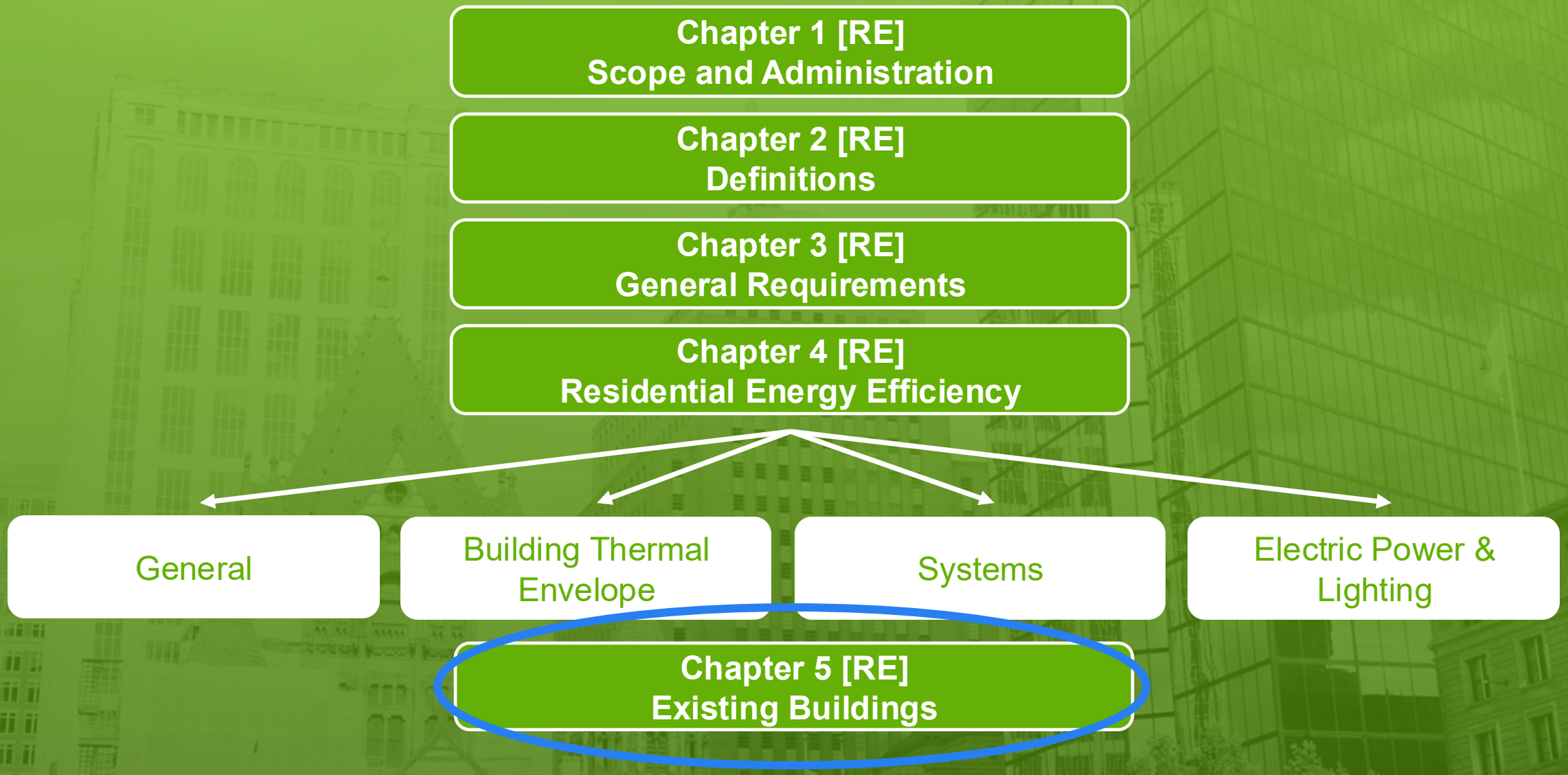
Municipal Opt-In Specialized Stretch Code

MA Stretch Energy Code

The residential Stretch Energy Code…

- Is developed by the MA Department of Energy Resources (DOER)
- Results in greater energy savings than the Base Energy Code
- Requires new homes and large additions and alterations to receive a HERS Rating or Passive House certification
- Requires compliance with 2021 IECC “mandatory” provisions (Passive House excluded)
- Is adopted at the level of the local jurisdiction

The Base Code and (Most) Stretch Code Alterations



Poll Question #2

Residential Alterations are covered under Chapter 5 of the Massachusetts Energy Code.

A. True

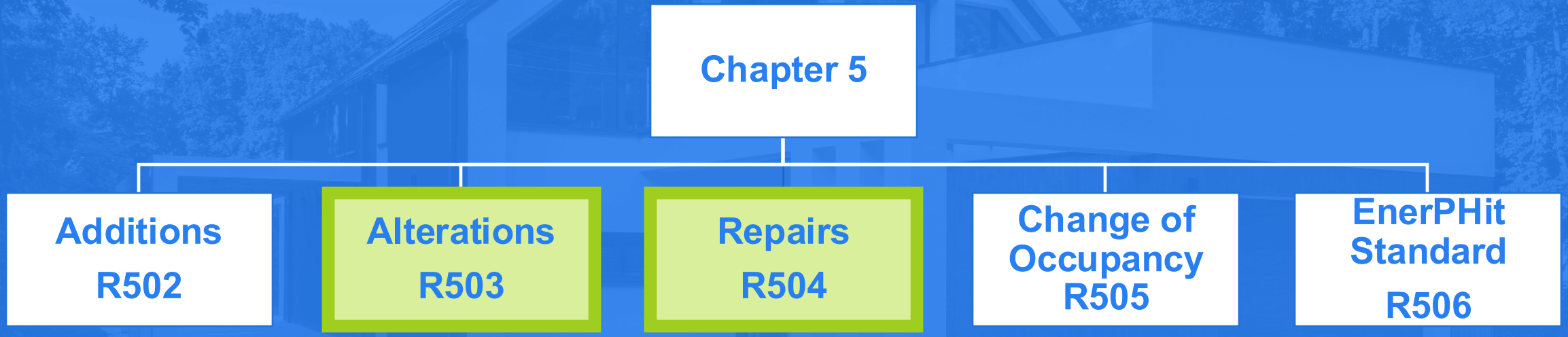
B. False

Chapter 5 Overview

Residential Provisions

Chapter 5 of the MA Amended 2021 IECC

The provisions for existing buildings are found in MA Amended 2021 IECC Chapter 5



Existing Buildings

R501.1.1 General

- Unaltered portions of the existing building or system shall not be required to comply
- This code shall not be used to require the removal, alteration or abandonment of, nor prevent the continued use of an existing building, provided it was legal when it was built

Source: PSD

New and Replacement Materials

- Materials required for any modifications, renovations, repairs, or change of use, or relocated buildings must comply with the corresponding section of Chapter 5 is required.
- Like materials to be used for Repair provided it is safe to do so
- Hazardous materials are prohibited where code for new construction would disallow their use in buildings with similar
  - Occupancy
  - Purpose
  - Location

Existing Building Compliance

For any modifications, renovations, repairs, or change of use, or relocated buildings compliance with the corresponding section of Chapter 5 is required.

Maintenance

- Buildings and structures must be kept in a safe and sanitary condition
- All systems and component required by code must be maintained to comply with the code at time of installation
- The provisions of Chapter 5 should not be used as a justification for removing energy conservation, fire protection and safety systems and devices in existing structures

Historic Buildings

R501.6 Energy code does not apply ***provided***:

- A report is submitted to the code official demonstrating that compliance with a provision would threaten, degrade or destroy the historic form, fabric or function of the building
- The report must be signed by one of the following:
  - Owner
  - Registered design professional
  - Rep of the State Historic Preservation Office or historic preservation AHJ

Source: Mass Save

Residential Alterations

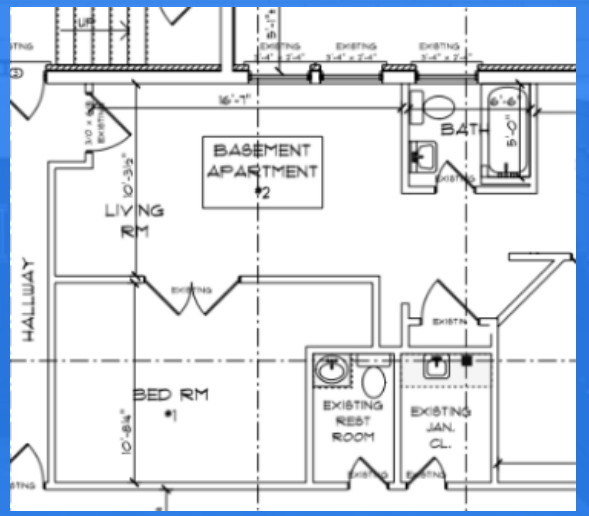
Section R503

Definitions

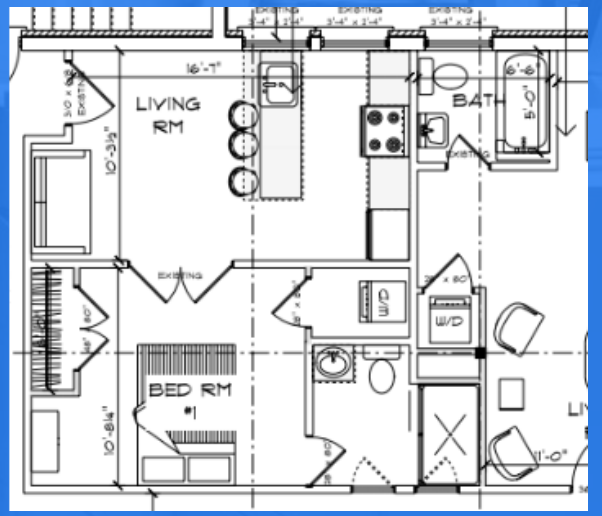
Chapter 2 Definition:

ALTERATION. Any construction, retrofit or renovation to an existing structure other than repair or addition. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, addition or change to the arrangement, type or purpose of the original installation.

Source: PSD



BEFORE



AFTER

Source: PSD

Types of Alterations

Image Source : ICC

Image Source : ICC

Major Alteration:

- Level 3 Alteration per IEBC – work area exceeds 50% of building area
- IRC Extensive Alteration – total area of all work areas exceeds 50% of dwelling unit
- > 1000 ft^2 or 100% of conditioned floor area

Minor Alteration:

- Less than 1,000 ft^2 of conditioned floor area
- Less than 100% of the existing conditioned floor area

Poll Question #3

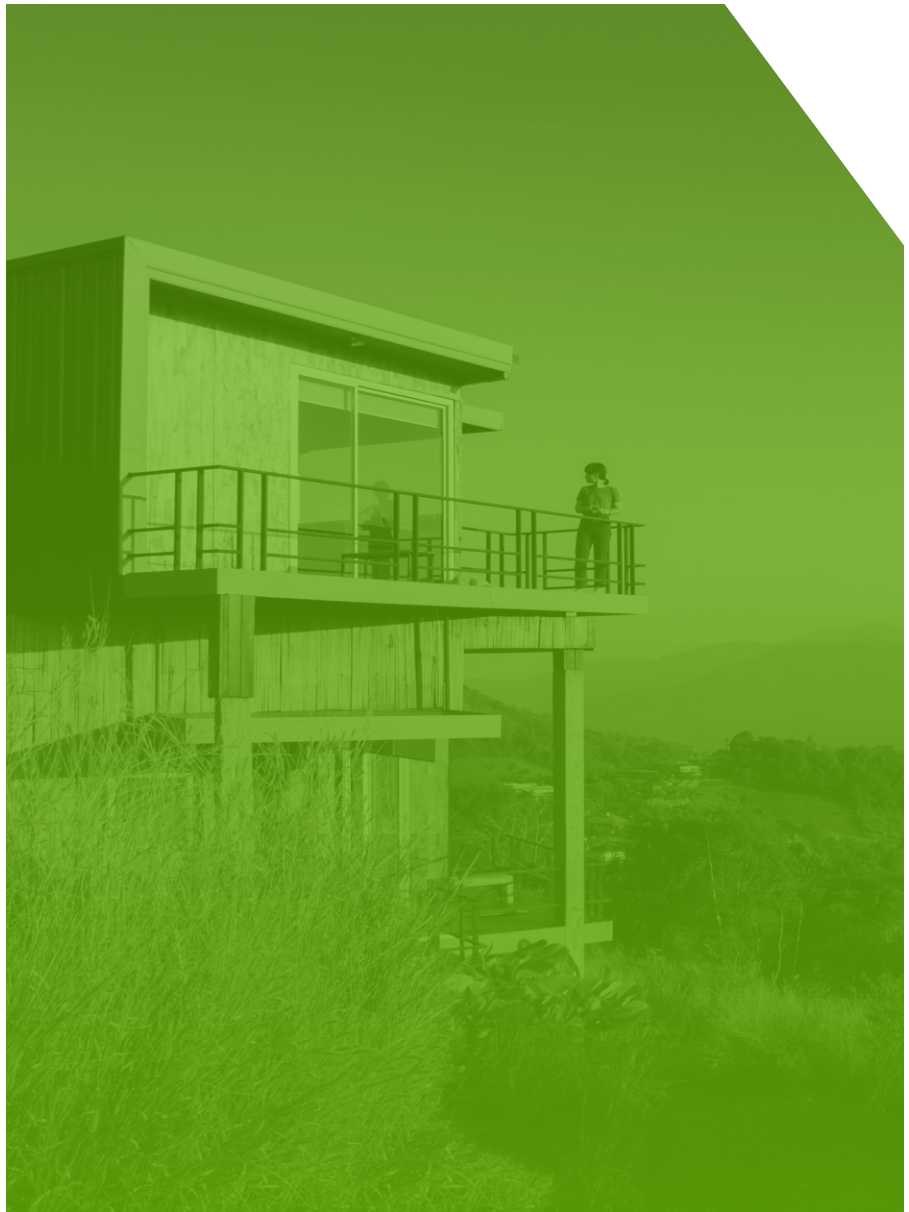
Multiple answers. In which of the following cases should insulation be installed?

A. Alteration exposing framing cavity in the wall, but the cavity is filled with insulation

B. Alteration exposing framing cavity in the wall, but the cavity has no insulation

C. Unconditioned basement converted to conditioned basement

D. None of the above



Section R503 Alterations

New Building Thermal Envelope assemblies that are part of the alteration shall comply as if new construction

Except:

- Storm windows
- Existing insulation
- Exposed ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation with a minimum of R-3.7 per inch for the depth of the cavity
- Cavities that are not exposed
- Roof recover
- Roofs w/o cavity insulation or where sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing

Section R503 Alterations

Replacement Fenestration

If existing fenestration is replaced, the new fenestration must meet the code required U-Factor of 0.30 and SHGC of NR

- Applies regardless of existing frame being replaced or not
- Fenestration also includes doors, so a replacement door should also meet the requirement

Source : PSD

Source : Retrotec

Section R503 Alterations

Heating & Cooling Systems

New heating and cooling systems that are part of the alteration need to comply with:

- Controls
- Duct insulation
- Duct sealing
- Duct testing
- Duct leakage

Exception to duct leakage testing:

Where ducts from an existing heating and cooling system are extended

Section R503 Alterations

Service Hot Water Systems

New service hot water systems that are part of the alteration need to meet requirements of a new system in “new construction”

Source: PSD

Section R503 Alterations

New lighting included in the Alteration shall comply as if new construction – **100% High Efficacy**

Exception:

- If less than 10% of fixtures are replaced do not have to be upgraded
- If installed interior lighting power is not increased

High-Efficacy Light Sources

- Lamps with at least 65 lumens per watt
- Luminaires with at least 45 lumens per watt

Source: PSD

Residential Repairs

Section R504

Definitions

Chapter 2 Definition:
REPAIR. The reconstruction or renewal of any part of an existing building for the purpose of its maintenance or to correct damage.

Source: PSD

Source: PSD

Section
R504 Repairs

- Repairs are to follow the requirements for Maintenance (R501.3)
- Required to keep building in a safe and sanitary condition.
- Non-damaged components requiring modification to complete repair are part of repair
- Ordinary repairs/maintenance do not require permits.
- Maintenance or repair does not require pre-existing nonconforming energy or fire safety components to be upgraded to current code.

Source: PSD

Source: PSD

Section R504 Repairs

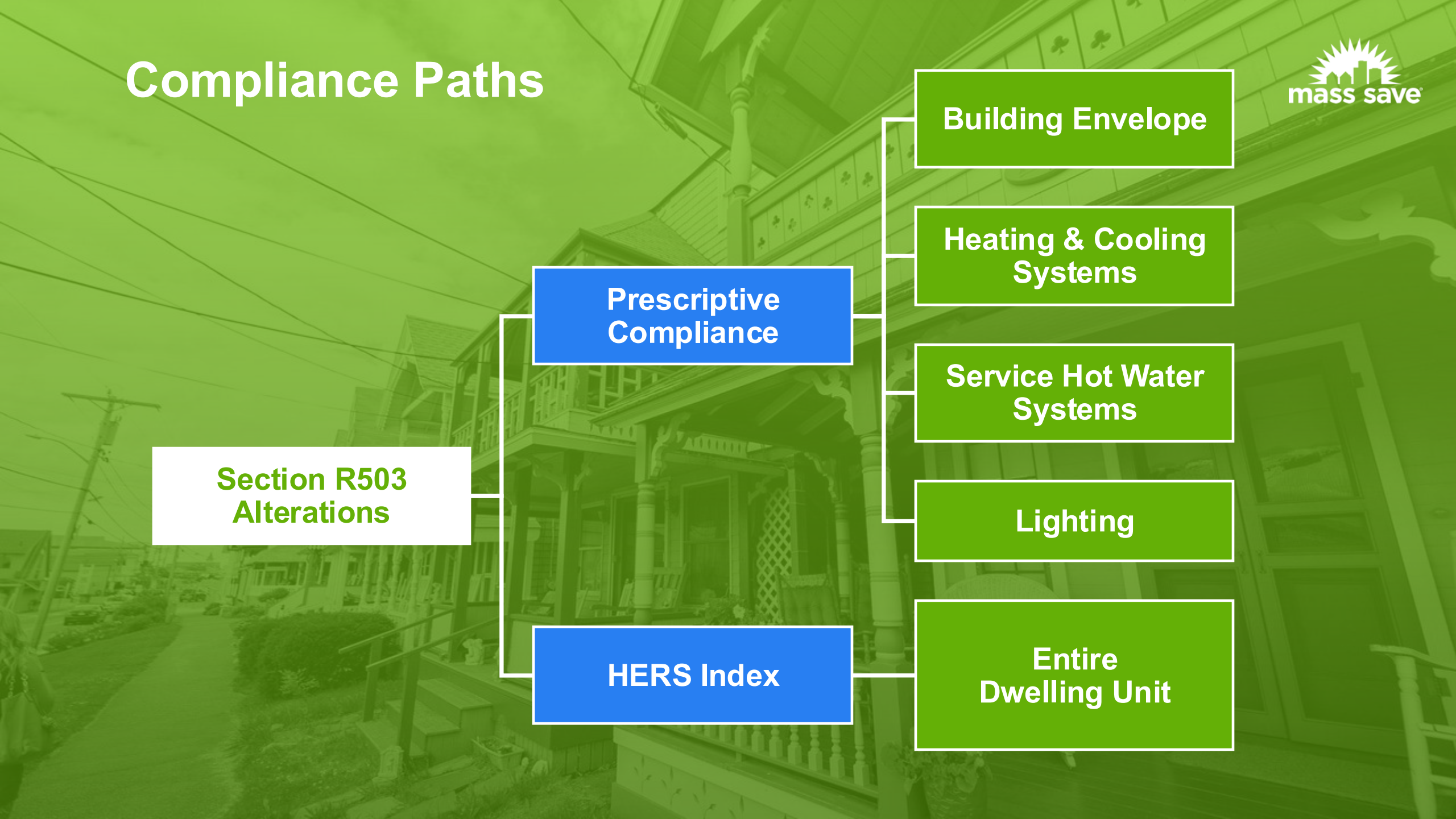
Some types or repairs recognized by code:

- Glass-Only Replacements
- Roof Repairs
- Lighting Repairs
  - Bulb only
  - Ballast

Source: PSD

Compliance Paths

Compliance Paths

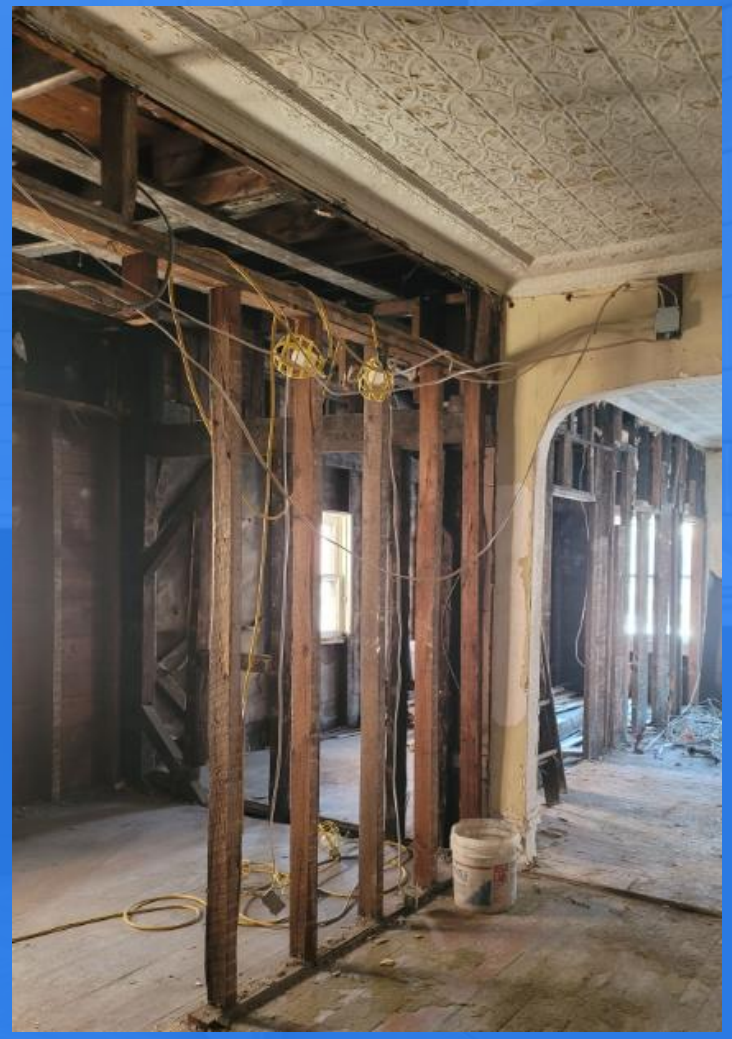


Prescriptive Compliance

Minor Alterations:

- New work complies with current code
- Existing untouched components can stay as is

Source: PSD



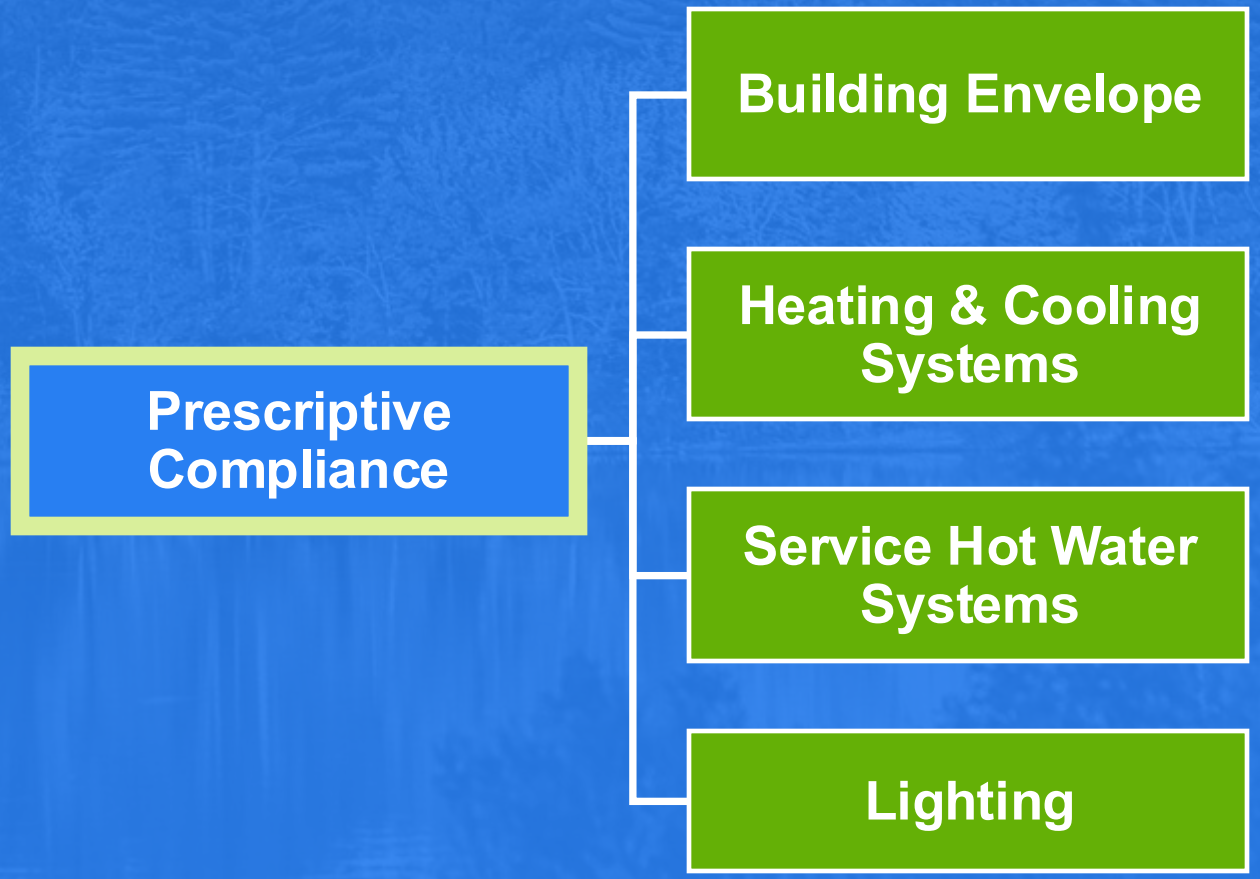
Source: PSD

Prescriptive Compliance

New work in alterations follow sections:

- R503.1.1 Building Envelope
- R503.1.1.1 Replacement Fenestration
- R503.1.2 Heating and Cooling Systems
- R503.1.3 Service Hot Water Systems
- R503.1.4 Lighting

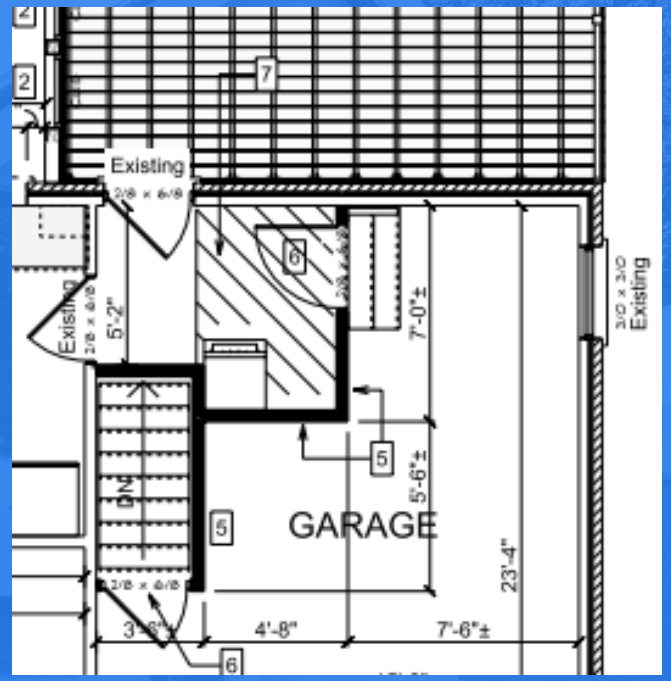
These section direct the user to the pertinent section in Chapter 4 for new construction



Alterations – Prescriptive Compliance Envelope

The alteration must meet:

- R402.1 General requirements (prescriptive R-values)
- R402.2 Specific insulation requirements (e.g. attic hatches and doors)
- R402.3.1 – R402.3.5 Maximum area-weighted fenestration U-factor and SHGC
- R402.4 Air leakage requirements



2	Install New Window, Dbl Insul. Glazing, Low E, U=.29 min, Top of Window and Location Determined in the Field. Provided (2) 2x8's Min.
3	New Door (Size Noted), Door style and finish TBD
4	Provide new (2) 1-3.4" x 11-7/8" LVL Flush Beam w/ (4) 2x4 Posts each side. Hang Existing Ceiling Joists w/ Simposon LUS26Z or Equal
5	Provide new 2x4 Wd Framed Wall, Studs @ 16" o/c; Single Bottom Plate; Dbl. Top Plate,, R-15 Fiberglass Insulation w/ Vaport Barrier; 1/2" Gyp Bd. on interior Side; 1/2" Type X Gyp Bd on Garage Side; Taped, Sanded and Painted.
6	New C Label, Metal Insulated Door/Frame with Self Closing Hinges. Sizes per Plan
7	Build new Raised Floor. 2x6 Floor Joists @ 16" o/c; 3/4" T&G OSB Subfloor (Match Adjacent); Permiter of Platform to be supported by 2x4 stub wall w/ PT Bot. Plate on Sill Sealer, Wall to be Insulated w/ R-15 Insulation. Wall to be finished on Garage Side w/ 1/2" Type X Gyp Bd., Taped, Sanded and Painted
8	New Bathroom Fixtures per layout. Refer to Supplier's Layouts.
9	New Exhaust Fans Vented to Exterior per Code.
10	New Smoked Detectors/Carbon Monoxide Alarm per Code. System to be Interconnected and have battery

Source: PSD

Changes to Prescriptive Values for Climate Zone 5

	2018 IECC	MA Amended 2021 IECC
FENESTRATION U-FACTOR	0.30	0.30
SKYLIGHT U-FACTOR	0.55	0.55
GLAZED FENESTRATION SHGC	NR	NR
CEILING R-VALUE	49	49
WOOD FRAME WALL R-VALUE	20 or 13+5	**30 or 20+5ci or 13+10ci or 0+20ci**
MASS WALL R-VALUE	13/17	13/17
FLOOR R-VALUE	30	30
BASEMENT WALL R-VALUE	15/19	**15ci or 19 or 13+5ci**
SLAB R-VALUE & DEPTH	10, 2ft.	**10ci and 4'**
CRAWL SPACE WALL R-VALUE	15/19	**15ci or 19 or13+5ci**

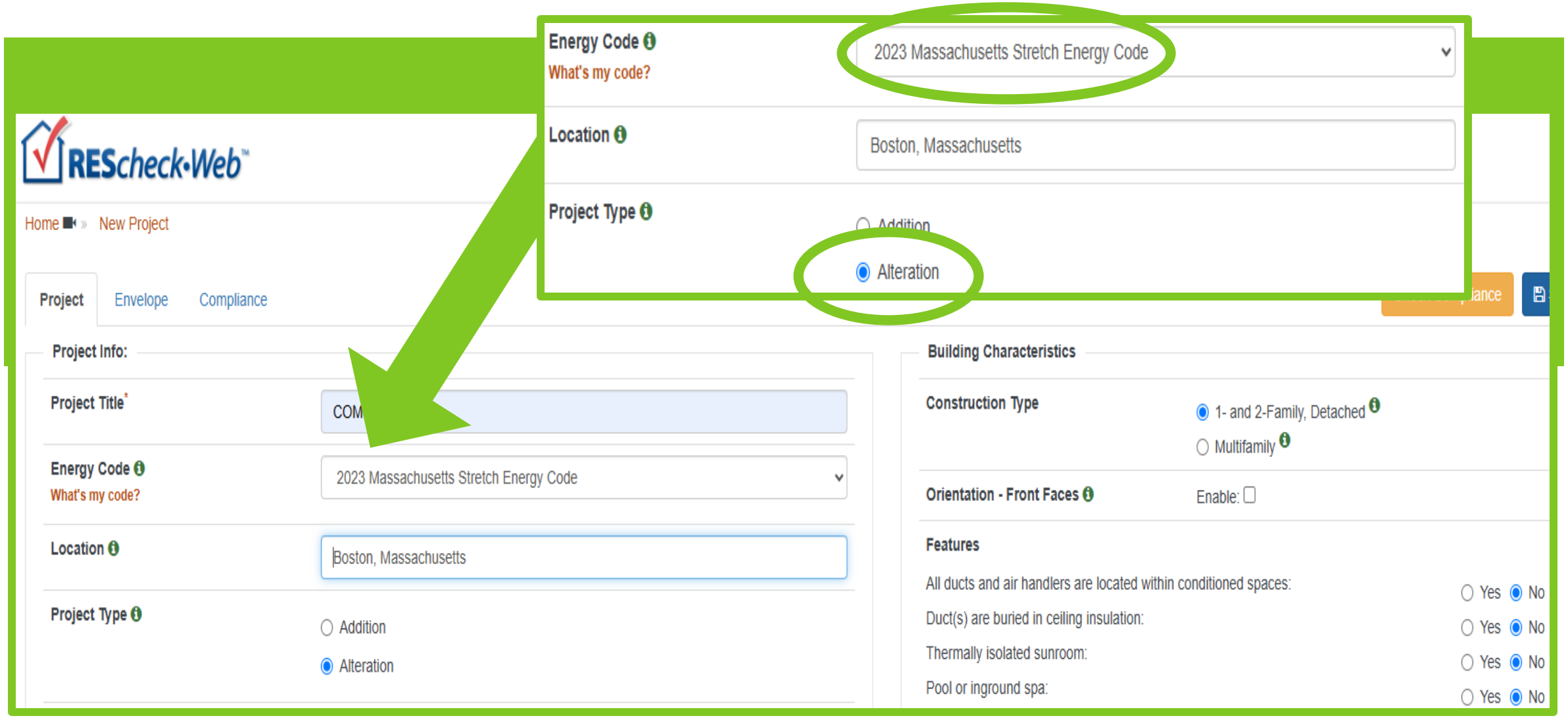
Prescriptive Compliance – Total UA Alternative

- The UA Alternative allows tradeoff of insulation values from Table R402.1.2
- Uses REScheck-Web software to calculate the total UA of the project.
- Compliance is where the proposed UA of the project is less than or equal to the total UA derived from using the values in the Table.
- Considers exemptions for existing systems.

www.energycodes.gov/states-can-use-rescheck-show-compliance

Source: US DOE

REScheck – Alterations



Source: US DOE

REScheck – Alterations Exceptions

Component: Wall 2

Alteration Detail:

- (●) No exemptions apply to this assembly
- ( ) Alteration exposes a framing cavity but the cavity is completely filled with insulation
- ( ) Alteration does not expose a framing cavity

Component: Window 1

Alteration Detail:

- ( ) Alteration only replaces glazing (i.e., glass units) in the existing sash or frame
- ( ) Alteration ONLY installs window film on single-pane existing glazing.
- ( ) Alteration only installs storm windows over existing glazing
- (●) No exemptions apply to this assembly

Component: Floor 1

Alteration Detail:

- (●) No exemptions apply to this assembly
- ( ) Alteration exposes a framing cavity but the cavity is completely filled with insulation
- ( ) Alteration does not expose a framing cavity

Component: my Ceiling

Alteration Detail:

- (●) No exemptions apply to this assembly
- ( ) Alteration involves reroofing where neither sheathing nor insulation is exposed
- ( ) Alteration exposes a framing cavity but the cavity is completely filled with insulation
- ( ) Alteration does not expose a framing cavity

Source: US DOE

REScheck – Alterations

Generated by RES*check-Web* Software

Compliance Certificate

Project A Sample Project

Energy Code:	**2021 IECC**
Location:	**Boston, Massachusetts**
Construction Type:	**Single family**
Project Type:	**Alteration**
Orientation:	**Bldg. faces 180 deg. from North**
Climate Zone:	**5 (5641 HDD)**
Permit Date:	
Permit Number:	

Construction Site:
123 Main St.
Dogtown, WA 99352

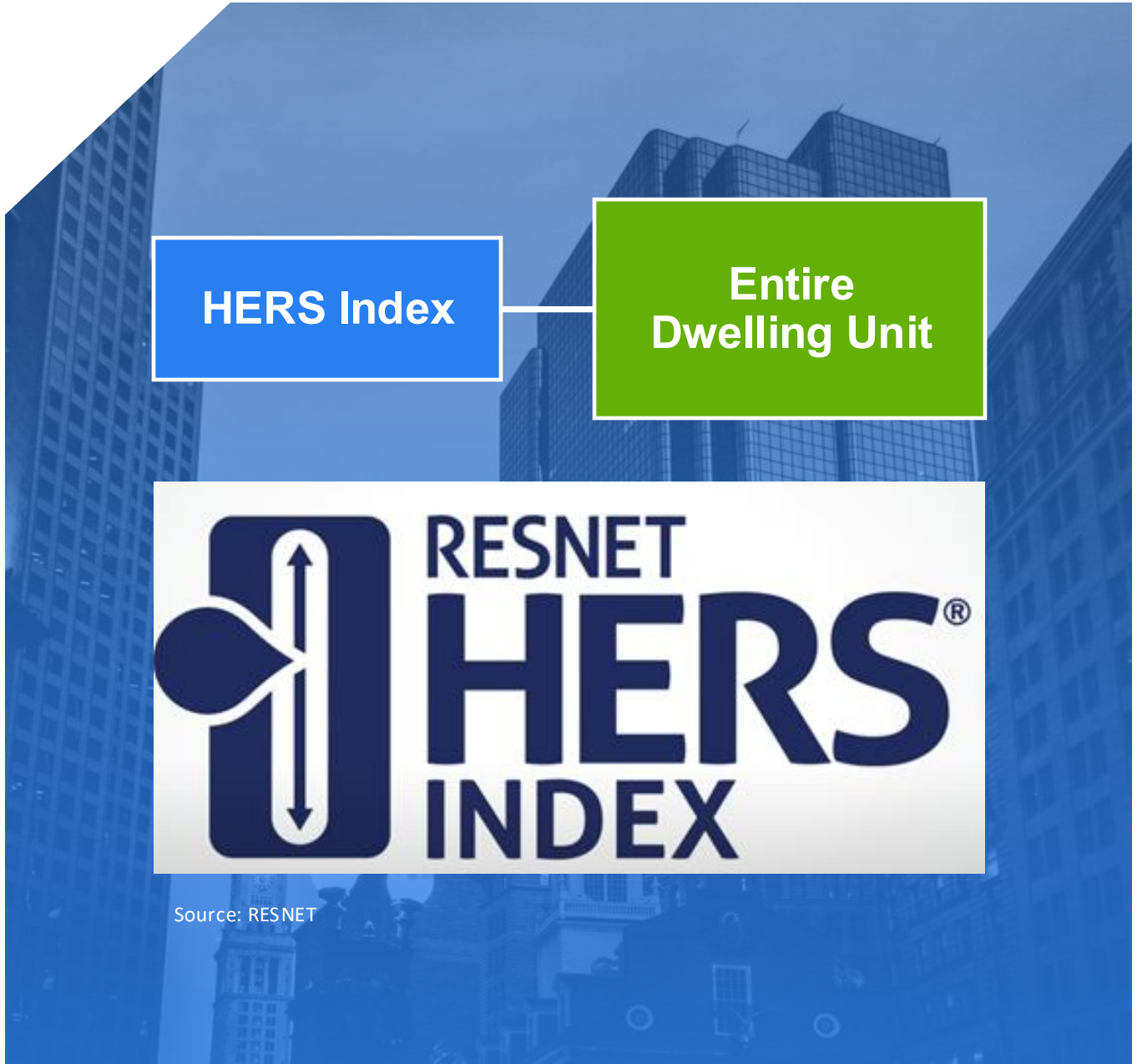
Owner/Agent:
R. Franklin
321 W. Tenth
Dogtown, WA 99532
509.888.7777

Designer/Contractor:
Anne Hatchet
Acme Home Designers
555 Paire Ridge
Dogtown, WA 99532
509.888.999

Source: US DOE

HERS Compliance

- Required for “Level 3 Alterations”
- The entire dwelling unit is included in the rating
- Rating per Table R406.5



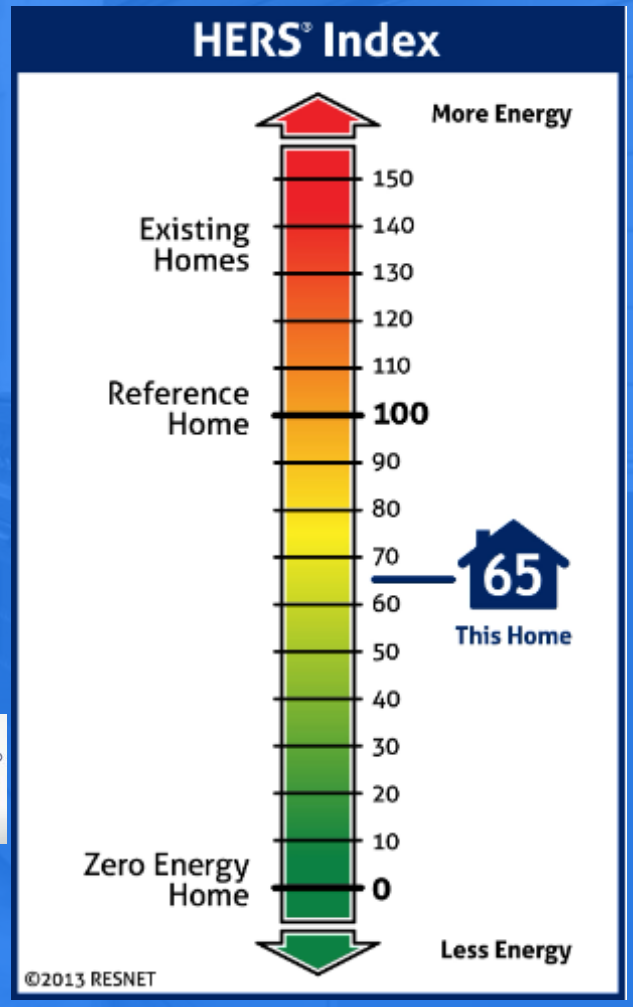
HERS Index

A certified Home Energy Rater assesses the energy efficiency of a home, assigning it a relative performance score. The lower the number, the more energy efficient the home. A typical home built to 2006 energy efficiency standards scores 100 on the HERS® Index.

- A home with a HERS® Index Score of 70 is 30% more energy efficient than a standard new home
- A home with a HERS® Index Score of 130 is 30% less energy efficient than a standard home

Some variables included in a HERS Rating:

- All exterior walls (both above and below grade)
- Floors over unconditioned spaces (like garages or cellars)
- Ceilings and roofs
- Attics, foundations and crawlspaces
- Windows and doors, vents and ductwork
- HVAC systems, water heating system, and your thermostat



Source: RESNET

Level 3 Alterations

Table R406.5 Maximum Energy Rating Index

Clean Energy Application	New Construction – Permits after July 1, 2024	New Construction – With R406.5.2 embodied carbon credit	Accessory Dwelling Units	Major Alterations, Additions, and Changes of Use
Mixed-Fuel Building	42	45	52	65
Solar Electric Generation*	42	45	55	70
All-Electric Building	45	48	55	70
Solar Electric* and All-Electric Building	45	48	58	75

**Solar Electric Generation = Solar photovoltaic array rated at 4kW*

a. Maximum HERS rating prior to onsite renewable electric generation in accordance with Section R406.5

b. The building shall meet the mandatory requirements of Section R406.2.

c. Alterations, Additions or Change of use covered by Section R502.1.1 or R503.1.5 are subject to this maximum HERS rating, except for Historic Buildings which may opt to follow R503.1.1 for alterations.

Clean Energy Options

Accessory dwelling units (ADUs) following Section R406 or existing buildings and additions following IECC chapter 5[RE] may use clean energy trade-offs to increase the maximum allowable HERS rating for each unit separately served by any combination of the following:

1. Solar Electric Generation: Solar photovoltaic array rated at 4 kW or higher shall offset 3 HERS points for new ADUs, and **5 HERS points** for alterations, change of use to Residential R-use occupancies or for **fully attached additions**.
2. All-Electric Buildings shall offset 3 HERS points for each dwelling unit in new construction, including new ADUs, and **5 HERS points** for alterations, change of use to Residential R-use occupancies and **fully attached additions.**

If both are included the project can offset an additional 5 points

Clean Energy Application	Major Alterations, Additions, and Changes
Mixed-Fuel Building	65
Solar Electric Generation*	70
All-Electric Building	70
Solar Electric* and All-Electric Building	75

Energy Rating Index – Mandatory Requirements

Formerly Listed as Mandatory Requirements

Now in One Table

Section	Title
	General
R401.3	Certificate
	Building Thermal Envelope
R402.1.1	Vapor retarder
R402.2.3	Eave Baffle
R402.2.4.1	Access hatches and doors
R402.2.10.1	Crawl space wall insulation installation
R402.4.1.1	Installation
R402.4.1.2	Testing
	Mechanical
R403.1	Controls
R403.3	Ducts (except R403.3.2, R403.3.3, and R403.3.6)
R403.4	Mechanical system piping insulation
R403.5.1	Heated water circulation and temperature maintenance systems
R403.5.3	Drain water heat recovery units
R403.6.1	**Heat or energy recovery ventilation (HRV/ERV)**
R403.7	Equipment sizing and efficiency rating
R403.8	System serving multiple dwelling units
R403.9	Snow and ice melt systems
R403.10	Energy consumption of pools and spas
R403.11	Portable spas
R403.12	Residential pools and permanent residential spas
	Electrical Power and Lighting Systems
R404.1	Lighting equipment

Image Source: Upcodes.com

Energy Rating Index: Documentation Permit Application

Prior to the issuance of a **building permit**:

- A **HERS compliance report** which includes a HERS index score of 65 or lower, or otherwise complies via renewable trade-offs
- **A description of energy features**
- A statement that the rating index score is “**based on plans**”

R406.6.2 Documentation for Permit Application Energy Rating Index

Home Energy Rating Certificate

Projected Report
Based on Plans

Rating Date: 2024-10-01
Registry ID:
Ekotrope ID: LZg0qgod

HERS® Index Score: 65
Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

Annual Savings $2,692
*Relative to an average U.S. home

Home:
Builder:

Your Home's Estimated Energy Use:

	Use (MBtu)	Annual Cost
Heating	69.3	$1,491
Cooling	0.1	$5
Hot Water	3.8	$145
Lights/Appliances	21.1	$803
Service Charges		$84
Generation (e.g. Solar)	0.0	$0
Total:	**94.3**	**$2,527**

This home meets or exceeds the criteria of the following:

HERS Index

Home Feature Summary:

Home Type: Single family detached
Model: N/A
Community: N/A
Conditioned Floor Area: 2,230 ft²
Number of Bedrooms: 5
Primary Heating System: Boiler • Natural Gas • 78.2 AFUE
Primary Cooling System: Air Conditioner • Electric • 13 SEER
Primary Water Heating: Residential Water Heater • Electric • 0 Energy Factor
House Tightness: 2480 CFM50 (6.89 ACH50)
Ventilation: 40 CFM, 40 CFM • 28 Watts, 20 Watts • Exhaust Only
Exhaust Only
Duct Leakage to Outside: 150 CFM @ 25Pa (10 / 100 ft²)
Above Grade Walls: R-25
Ceiling: Attic, R-54
Window Type: U-Value: 0.29, SHGC: 0.35
Foundation Walls: N/A
Framed Floor: R-5

Rating Completed by:

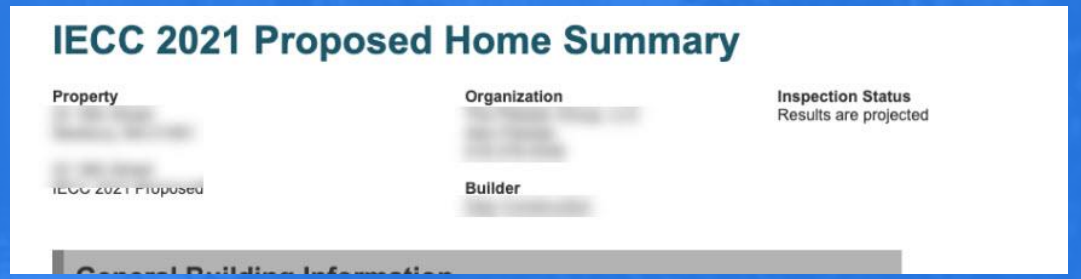
Energy Rater: PSD Test Rater
RESNET ID: 2632473
Rating Company: Performance Systems Development
950 Danby Road Ithaca NY, 14850
Rating Provider: Performance Systems Development_TESTING
124 Brindley Street, Ithaca NY 14850
607-277-6240

PSD Test Rater, Certified Energy Rater
Date: 2/26/25 at 6:29 AM

ekotrope

Ekotrope RATER - Version:4.2.2.3579
The Energy Rating Disclosure for this home is available from the Approved Rating Provider.
This report does not constitute any warranty or guarantee.

Source: RESNET



IECC 2021 Proposed Home Summary

Property
[redacted]
IECC 2021 Proposed

Organization
[redacted]

Inspection Status
Results are projected

Builder
[redacted]

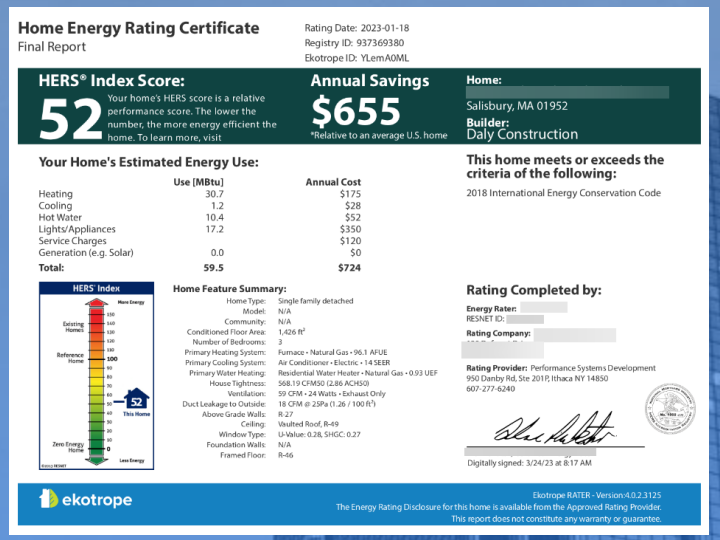
Source: RESNET

MA Residential Amendments

ERI Documentation – Final

Prior to the issuance of a ***certificate of occupancy***:

1. A *copy of the final certificate* indicating that the HERS rating index score for each unit is verified to be 65 or less or otherwise complies via renewable trade-offs,
2. Completed *IECC 2021 Reference Home Summary (Verified).*
3. A *copy of the certificate*, as required by Section R401.3 for each unit listing the final HERS index score of the dwelling unit



Home Energy Rating Certificate
Final Report

Rating Date: 2023-01-18
Registry ID: 937369380
Ekotrope ID: YLemA0ML

HERS® Index Score: 52
Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit

Annual Savings $655
*Relative to an average U.S. home

Home:
Salisbury, MA 01952
Builder:
Daly Construction

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	30.7	$175
Cooling	1.2	$28
Hot Water	10.4	$52
Lights/Appliances	17.2	$350
Service Charges		$120
Generation (e.g. Solar)	0.0	$0
Total:	**59.5**	**$724**

This home meets or exceeds the criteria of the following:
2018 International Energy Conservation Code

HERS Index

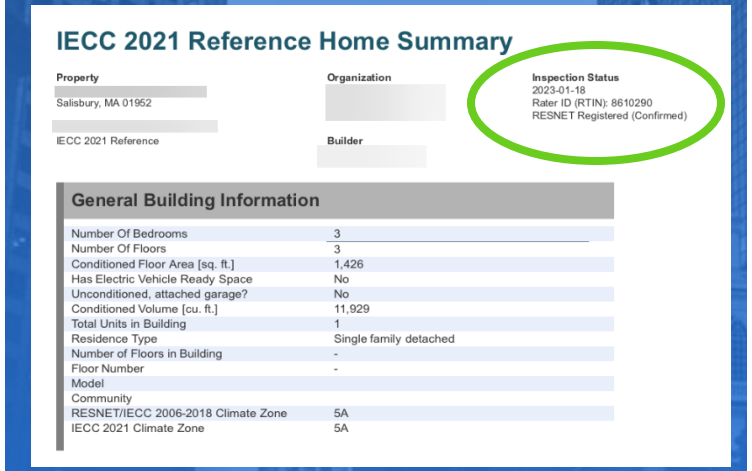
Home Feature Summary:

Home Type:	Single family detached
Model:	N/A
Community:	N/A
Conditioned Floor Area:	1,426 ft²
Number of Bedrooms:	3
Primary Heating System:	Furnace • Natural Gas • 96.1 AFUE
Primary Cooling System:	Air Conditioner • Electric • 14 SEER
Primary Water Heating:	Residential Water Heater • Natural Gas • 0.93 UEF
House Tightness:	568.19 CFM50 (2.86 ACH50)
Ventilation:	59 CFM • 24 Watts • Exhaust Only
Duct Leakage to Outside:	18 CFM @ 25Pa (1.26 / 100 ft²)
Above Grade Walls:	R-27
Ceiling:	Vaulted Roof, R-49
Window Type:	U-Value: 0.28, SHGC: 0.27
Foundation Walls:	N/A
Framed Floor:	R-46

Rating Completed by:
Energy Rater:
RESNET ID:
Rating Company:
Rating Provider: Performance Systems Development
950 Danby Rd, Ste 201P, Ithaca NY 14850
607-277-6240
Digitally signed: 3/24/23 at 8:17 AM

ekotrope
Ekotrope RATER - Version:4.0.2.3125
The Energy Rating Disclosure for this home is available from the Approved Rating Provider.
This report does not constitute any warranty or guarantee.

Source: RESNET



IECC 2021 Reference Home Summary

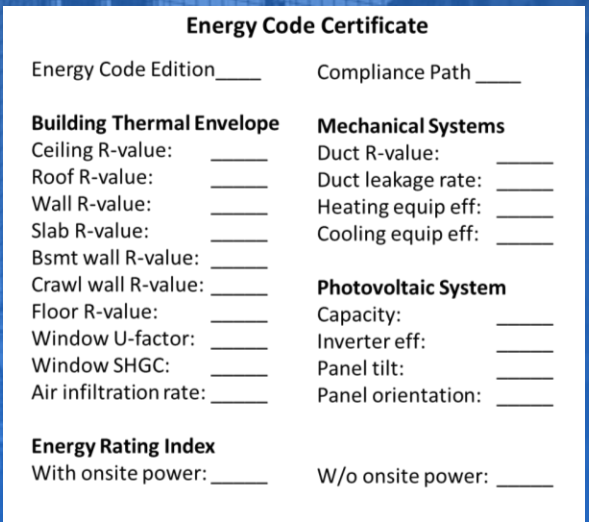
Property
Salisbury, MA 01952
IECC 2021 Reference

Organization
Builder

Inspection Status
2023-01-18
Rater ID (RTIN): 8610290
RESNET Registered (Confirmed)

General Building Information

Number Of Bedrooms	3
Number Of Floors	3
Conditioned Floor Area [sq. ft.]	1,426
Has Electric Vehicle Ready Space	No
Unconditioned, attached garage?	No
Conditioned Volume [cu. ft.]	11,929
Total Units in Building	1
Residence Type	Single family detached
Number of Floors in Building	-
Floor Number	-
Model	
Community	
RESNET/IECC 2006-2018 Climate Zone	5A
IECC 2021 Climate Zone	5A



Energy Code Certificate

Energy Code Edition____ Compliance Path ____

Building Thermal Envelope
Ceiling R-value: _____
Roof R-value: _____
Wall R-value: _____
Slab R-value: _____
Bsmt wall R-value: _____
Crawl wall R-value: _____
Floor R-value: _____
Window U-factor: _____
Window SHGC: _____
Air infiltration rate: _____

Mechanical Systems
Duct R-value: _____
Duct leakage rate: _____
Heating equip eff: _____
Cooling equip eff: _____

Photovoltaic System
Capacity: _____
Inverter eff: _____
Panel tilt: _____
Panel orientation: _____

Energy Rating Index
With onsite power: _____ W/o onsite power: _____

Solar Ready/EV Ready

Not Applicable to Alterations and Changes of Use

Examples

Alterations
Kitchen Remodeling Example

A kitchen in an existing home is being remodeled. Including:

- New drywall
- New plumbing with ¾” copper piping
- Replacement of a window
- All new lighting fixtures

What code requirements apply?

Source: Creative Commons

Poll Question #4

Which of the following are true of this kitchen remodeling example?

A. Exposed wall cavities must be filled with insulation with a minimum of R-3.7 per inch for the depth of the cavity.

B. 100% of luminaires must be high-efficacy

C. New service hot water piping ¾” or greater should be insulated to R-3

D. All of the above

Alterations
Kitchen Remodeling Example

- Exposed wall cavities must be filled with insulation with a minimum of R-3.7 per inch for the depth of the cavity.
- Hot water pipes insulated to R-3
- New window U-factor ≤ 0.30
- 100% of luminaires must be high-efficacy

Source: Creative Commons

Alterations – Reroofing Example

- An existing home is getting a new roof and there is no insulation in the roof cavities.
- The cavities are not exposed during reroofing, but the sheathing is exposed.

What does the energy code require with respect to insulating the roof?

Source: PNNL Building America Solution Center

Alterations – Reroofing Example

Section R503.1.1 – If roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated above or below the sheathing.

Note: This only applies if the roof is part of the thermal envelope

Source: PNNL Building America Solution Center

Alterations – Basement Remodeling Example

A conditioned basement in an existing home is being remodeled. During remodeling, 2x4 wall cavities were exposed but they were already filled with insulation.

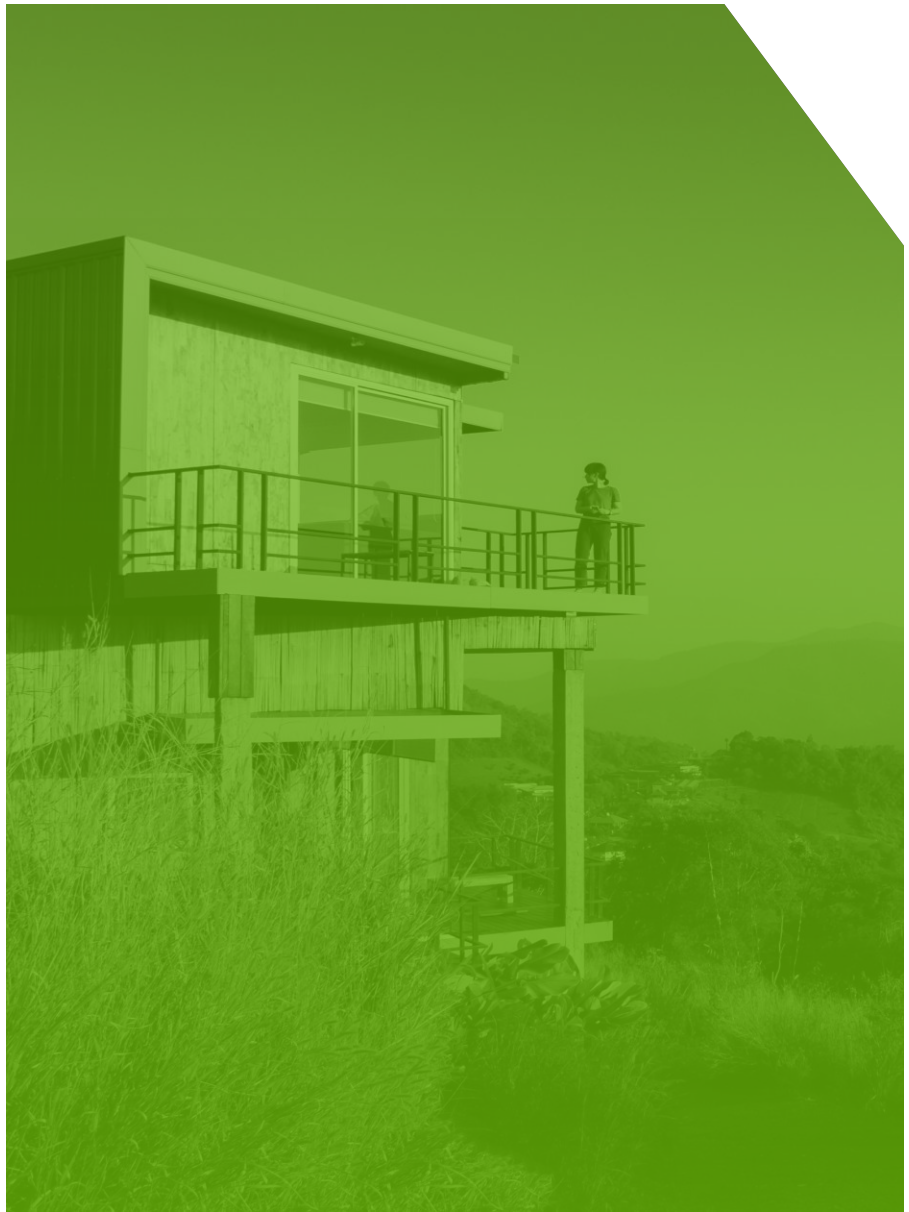
Do the walls have to meet prescriptive minimum R-values (R-15ci or 19 or 13+5ci)?

Source: PSD

Alterations – Basement Remodeling Example

The minimum R-value requirement for exposed cavities is R3.7 per inch for the depth of the cavity, as per Exception 2 of R503.1.1.

Summary/Closing



Alterations Summary

- Level 3 Alterations: Alterations that meet the IEBC definition for Level 3 Alteration or IRC Extensive Improvement and exceeding 1,000 ft^2 or exceeding 100% of the existing conditioned floor area, shall require the dwelling unit to comply with the maximum HERS ratings for alterations, additions or change of use shown in Table R406.5.
- Alterations 1000 ft^2 and under, follow chapter 5 (prescriptive) for existing buildings
- Solar Ready does not apply to alterations regardless of size
- Alterations 1000 ft^2 and under do not require a blower door test
- Historical Buildings may still file for exemptions if work would detract from the historical nature of the building
- EV Ready does not apply to existing buildings

Mass Save Incentive Programs

Residential Rebates and Incentives

Rebates for appliances, heating systems and more.

www.masssave.com/en/residential/rebates-and-incentives

Low Rise/Repair & Additions

Incentives for energy efficient building and renovating

- Single Family Homes
- Multi-Family 3 stories and residential-metered heat
- New Construction
- Major Renovations and Large Additions
- Residential Energy Code
- Residential HVAC and DHW Systems only
- On-site testing and verification completed by program-approved HERS Raters
- Incentives for commercially metered buildings/units are not available

Details at: www.masssave.com/en/saving/residential-rebates/new-construction

Low-Rise/Repairs & Additions

Incentives for energy efficient building and renovating

Benefits of Working with a HERS Rater

Diagnostic testing

- Blower door and duct leakage tests (pre- and post-tests, ideally)
  - Help with Code compliance documents
- Infrared testing
- Ventilation commissioning
- Quantify savings

Plan analysis

- Drives deeper energy savings
- Improves occupant comfort

Technical guidance and expertise

- Create a comprehensive plan for energy efficiency
- Can act as a liaison between homeowner, builder, architect, and trades

Access to Mass Save incentives

- Can be paid to builder or homeowner

Low-Rise/Repairs & Additions

Incentives for energy efficient building and renovating

Renovations and Additions

Gut Renovations and Additions

- Renovations are ideally at least 50% gut projects
- Substantial HVAC changes
- Clear project scope
- Small jobs like kitchen/bath remodels are not a good fit
- Additions should be at least 500 SF

Participants include Builders, Developers & Homeowners

Program-approved HERS Rating companies

Access to Mass Save 0% interest HEAT Loan

- Up to 7 years and $25,000

Process Similar to LR with addition of Preliminary Inspection

Energy Code Support

Questions about the energy code?

Energy Code Support Hotline:

855-757-9717

Energy Code Support Email:

energycodesma@psdconsulting.com

Thanks!

Massachusetts Energy Code Technical Support Program

WE ARE MASS SAVE®:

BERKSHIRE GAS
An AVANGRID Company

Cape Light Compact

EVERSOURCE

Liberty

nationalgrid

Unitil