CHARLES D. BAKER
GOVERNOR

KARYN E. POLITO
LIEUTENANT GOVERNOR

JAY ASH
SECRETARY OF HOUSING AND ECONOMIC DEVELOPMENT

Commonwealth of Massachusetts
Division of Professional Licensure
Office of Public Safety and Inspections
1000 Washington Street • Boston • Massachusetts • 02118

JOHN C. CHAPMAN
UNDERSECRETARY OF CONSUMER AFFAIRS AND BUSINESS REGULATION

CHARLES BORSTEL
COMMISSIONER, DIVISION OF PROFESSIONAL LICENSURE

BOARD OF BUILDING REGULATIONS AND STANDARDS
NOTICE OF MEETING

In accordance with the provisions of G.L. c. 30A § 20, notice is hereby given that the Board of Building Regulations and Standards (BBRS) will convene a regular monthly meeting and public hearing on:

December 11, 2018 @ 1:00 p.m. until approximately 4 p.m.
@
The Office of Public Safety & Inspections (OPSI)
50 Maple Street in Milford

Posted on December 4, 2018

It is anticipated that the topics shown below will be discussed at the aforementioned meeting:

AGENDA

Roll Call, by BBRS Chair:

John Couture, Chair	☐ present ☐ absent	Robert Anderson, or designee	☐ present ☐ absent
Kerry Dietz, Vice Chair	☐ present ☐ absent	Peter Ostroskey, or designee	☐ present ☐ absent
Richard Crowley, Second Vice Chair	☐ present ☐ absent	Michael McDowell	☐ present ☐ absent
Steve Frederickson	☐ present ☐ absent	Susan Gleason	☐ present ☐ absent
Kevin Gallagher	☐ present ☐ absent	Lisa Davey	☐ present ☐ absent
Cheryl Lavalley	☐ present ☐ absent		

Public Hearing Portion

1. In accordance with Massachusetts General Law (MGL) c143, §94(o), Board members will hear testimony relating to the 2018 International Energy Conservation Code (IECC) as modified by Massachusetts proposed amendments, inclusive of the Stretch Energy Code. Copies of proposed changes are attached to this agenda. The 2018 IECC may be viewed @ https://codes.iccsafe.org/content/IECC2018P2.

- **Proposal Number 12-1-2018** – Consider revising Sections N1103.3.3 (R403.3.3).
  Proponent: Catherine Flaherty, *Air Conditioning Association of New England* (ACCA), *Inc.*

- **Proposal Number 12-2-2018** – Consider revising Sections N1103.6.2.
  Proponent: Catherine Flaherty, *Air Conditioning Association of New England* (ACCA), *Inc.*

- **Proposal Number 12-3-2018** – Consider revising Sections R806.5.
  Proponent: David Weitz, *CLEAResult for Mass Save.*

- **Proposal Number 12-4-2018** – Consider adoption of the 2018 IECC as required by c143, §94(o).
  Proponent: Department of Energy Resources (DOER) and others.

Regular Meeting

1. **Review\Vote** approval of November 14, 2018 BBRS draft meeting minutes.
2. **Review\Vote** approval of October 15, 2018 BOCC draft meeting minutes.
3. **Discuss** letter from Massachusetts Federation of Building Officials (MFBO), President dated December 1, 2018.
4. **Review\Approve** proposed BOCC
   a.) Exam Approval Form
   b.) Continuing Education Policy Revision
5. **Discuss** progress relating to the next edition of 780 CMR.
6. **Discuss** Advisory Committee make-up.
   a.) Cannabis
   b.) Fire Prevention\Fire Protection (FPFP)
   c.) Geotechnical Advisory Committee (GAC)
7. **Discuss** progress of Manufactured Buildings Study Group.
8. **Discuss** approval of 120 new CSLs issued in the month of November, 2018.
9. **Discuss** Draft FAQ for Residential Code pertaining to Sections R105.3.1.1, R322, AJ101.3
10. **Discuss\Vote**
    CSL Average Passing Score\Medical\Military\Age or Continuing Education Requirements.
    a.) Mark Monroe CS-098909 (*Age consideration*)
    b.) Robert Glover CS-060228 (*Age consideration*)
    c.) Jorge Lage CS-056274 (*Medical*)
11. **Discuss** CSL Continuing Education Waiver Request for State Department Employee.
12. **Discuss** 2019 meeting dates.
13. **Discuss** full Board Training.
14. **Discuss** other matters not reasonably anticipated 48 hours in advance of meeting.

12-1-2018

The Commonwealth of Massachusetts

Office of Public Safety & Inspections

Board of Building Regulations and Standards

One Ashburton Place - Room 1301

Boston, MA 02108

780 CMR - MASSACHUSETTS BUILDING CODE - AMENDMENT PROPOSAL FORM

Code (Indicate with an 'x')	_ Ninth Edition Base _ Ninth Edition One- and Two-Family Dwellings X IECC Amendments	*State Use Only*	
Date: 8/22/2018	**N1103.3.3 (R403.3.3)**	**Date Received:**	
Code Section:	**R403 SYSTEMS – Duct testing**	**Code Change Number::**	
Name and company affiliation if any: **Air Conditioning Association of New England, Inc.**			
Address: **11 Robert Tower Blvd. #234** **North Attleboro, MA 02763**		**Telephone: 508-839-3407** **Email: cflaherty@acane.org**	

Indicate with an 'x' the type of amendment proposed:

_X_Change Section __Add new section __Delete section and substitute __Delete section; no substitute

__ Other, Explain:

Please type below the proposed amendment. If you propose to change a section, please copy the original text from the appropriate 2015 I-code and\or Massachusetts amendment. Indicate with strike out the text you propose to delete and add new text in either *italic* or red font. Also you please provide justification of your proposal as a second page and include information on the **Introduction and Background** of your proposal, **Pro *and* Con Reasons for Adoption** of it, a summary of estimated **Costs for Building Owners**, and **Life Safety Benefits** for building occupants. Also, please indicate whether or not the proposal has been presented to the International Code Council (ICC) for consideration. If not, please explain why the proposal is unique to Massachusetts. When complete email this file to Cesar.Lastra@state.ma.us. Please use additional pages if necessary.

Post-construction or rough-in testing and verification shall be done by a HERS Rater, HERS Rating Field Inspector, ~~or~~ an applicable BPI Certified Professional or a Professionally Competent Licensed Sheet Metal Worker.

Introduction and Background:

We feel that this amendment in its current form, does not produce the intended results. Licensed HVAC/Sheet Metal professionals possess the prerequisite knowledge and are uniquely equipped with the necessary tools to test duct system leakage rates.

Pro *and* Con Reasons for Adoption: Pros: Cons:

1. **This amendment is in direct conflict with the Massachusetts General Laws. Duct testing is by statute the domain of the Sheet Metal Board. (See supporting document (1) on the next page).**
2. **This amendment is impractical. It places a burden on people who are not always equipped to do such work, like having a tall ladder.**

3. **It unnecessarily imposes additional costs on consumers by duplicating services that in many cases were already done by the HVAC people.**
4. **It greatly inconveniences the consumer by imposing one more sub-contractor and at least one more inspection and requiring the consumer to take additional days off from work. It is hard to schedule HERS Raters around the customer's needs.**
5. **This amendment contradicts State Law regarding licensing and singles out one trade (sheet metal workers) from checking and testing their own work. Other trades can test their own work.**
6. **The AHJ has no power to enforce the provision in this amendment on persons not licensed under the BBRS. HERS Raters and BPI persons hold certifications that are not under the jurisdiction of the Commonwealth.**
7. **The IECC 2015 and IRC 2015 model codes are purposely neutral on the qualifications required for testing a ducted system. Ma. State law is very clear on this same question; it is the work of a licensed sheet metal worker.**
8. **It should be noted that the ICC Model Codes have clear statements of intent. (See supporting document (2) below**

Costs to Building Owners:

This will decrease the cost to the building owner.

Life Safety Benefits:

The adoption of this amendment has no impact on the Life Safety Benefits.

Supporting Documents:

(1) *HOUSE- No. 4804 (excerpt)*
In the Year Two Thousand and Eight
AN ACT RELATIVE TO THE LICENSING OF SHEET METAL WORKERS AND SHEET METAL CONTRACTORS.
Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

SECTION 1. Chapter 13 of the General Laws is hereby amended by inserting at the end There of the following section:—……..
*"Sheet metal", manufacturing, fabrication, assembling, handling, erection, installation, dismantling, conditioning, adjustment, alteration, repairing, and servicing of all commercial and industrial air-veyor systems including, but not limited, air handling systems regardless of the material used, including specifically the handling, fabricating, setting, installation, assembling, dismantling, adjustment, alteration, reconditioning, repairing of all duct-work; installation of fans, sheaves, belt guards, dampers, louvers, screens, registers, grilles, diffusers, sound traps, attenuators, mixing boxes, access doors related to air handling systems, breaching, hoods, and any and all appurtenances relating to heating, ventilation, air conditioning and exhaust systems, commercial and industrial architectural sheet metal water shed roof systems, **the testing, adjusting, and balancing of all air-handling equipment and ductwork**, the fabrication and installation of commercial and industrial kitchen hoods, kitchen vents, bathroom exhaust vents and fans.*

(2) N1101.2 (R101.3) Intent.
This code shall regulate the design and construction of buildings for the effective use and conservation of energy over the useful life of each building. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve this objective. **This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances.**
6.

12-2-2018

The Commonwealth of Massachusetts

Office of Public Safety & Inspections

Board of Building Regulations and Standards

One Ashburton Place - Room 1301

Boston, MA 02108

780 CMR - MASSACHUSETTS BUILDING CODE - AMENDMENT PROPOSAL FORM

Code (Indicate with an 'x')	_ Ninth Edition Base _ Ninth Edition One- and Two-Family Dwellings X IECC Amendments	*State Use Only*	
Date: 8/22/2018	**N1103.6.2**	**Date Received:**	
Code Section:	**R403 SYSTEMS – Mechanical Ventilation**	**Code Change Number::**	
Name and company affiliation if any: **Air Conditioning Association of New England, Inc. (ACA/NE)**			
Address: **11 Robert Tower Blvd #234** **North Attleboro, MA 02763**		**Telephone: 508-839-3407** **Email: cflaherty@acane.org**	

Indicate with an 'x' the type of amendment proposed:

_X_Change Section __Add new section __Delete section and substitute __Delete section; no substitute

__ Other, Explain:

Please type below the proposed amendment. If you propose to change a section, please copy the original text from the appropriate 2015 I-code and\or Massachusetts amendment. Indicate with strike out the text you propose to delete and add new text in either *italic* or red font. Also you please provide justification of your proposal as a second page and include information on the **Introduction and Background** of your proposal, **Pro *and* Con Reasons for Adoption** of it, a summary of estimated **Costs for Building Owners**, and **Life Safety Benefits** for building occupants. Also, please indicate whether or not the proposal has been presented to the International Code Council (ICC) for consideration. If not, please explain why the proposal is unique to Massachusetts. When complete email this file to Cesar.Lastra@state.ma.us. Please use additional pages if necessary.

Installed performance of the mechanical ventilation system shall be tested and verified by a HERS Rater, HERS Rater Field Inspector, ~~or~~ an applicable BPI Certified Professional or a Professionally Competent Licensed Sheet Metal Worker, and measured using a flow hood, flow grid, or other air flow measuring device in accordance with RESNET Standard Chapter 8 or ACCA Standard 5.

Introduction and Background:

We feel that this amendment in its current form, does not produce the intended results. Licensed HVAC/Sheet Metal professionals possess the prerequisite knowledge and are uniquely equipped with the necessary tools to test duct system leakage rates.

Pro *and* Con Reasons for Adoption: Pros: Cons:

1. **This amendment is in direct conflict with the Massachusetts General Laws. Duct testing is by statute the domain of the Sheet Metal Board. (See supporting document on the next page).**

2. **This amendment is impractical. It places a burden on people who are not always equipped to do such work, like having a tall ladder.**
3. **It unnecessarily imposes additional costs on consumers by duplicating services that in many cases were already done by the HVAC people.**
4. **It greatly inconveniences the consumer by imposing one more sub-contractor and at least one more inspection and requiring the consumer to take additional days off from work. It is hard to schedule HERS Raters around the customer's needs.**
5. **This amendment singles out one trade from checking and testing their own work. All other trades are allowed to test their own work.**
6. **The AHJ has no power to enforce the provision in this amendment on persons not licensed under the BBRS. HERS Raters and BPI persons hold certifications that are not under the jurisdiction of the Commonwealth.**
7. **The IECC 2015 and IRC 2015 model codes are purposely neutral on the qualifications required for testing the performance of the mechanical ventilation system. Ma. State law is very clear on this same question; it is the work of a licensed sheet metal worker.**

Costs to Building Owners:

This will decrease the cost to the building owner.

Life Safety Benefits:

The adoption of this amendment has no impact on the Life Safety Benefits.

Supporting Documents:

(1) *HOUSE- No. 4804 (excerpt)*
In the Year Two Thousand and Eight
AN ACT RELATIVE TO THE LICENSING OF SHEET METAL WORKERS AND SHEET METAL CONTRACTORS.
Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

SECTION 1. Chapter 13 of the General Laws is hereby amended by inserting at the end There of the following section:—.....
*"Sheet metal", manufacturing, fabrication, assembling, handling, erection, installation, dismantling, conditioning, adjustment, alteration, repairing, and servicing of all commercial and industrial air-veyor systems including, but not limited, air handling systems regardless of the material used, including specifically the handling, fabricating, setting, installation, assembling, dismantling, adjustment, alteration, reconditioning, repairing of all duct-work; installation of fans, sheaves, belt guards, dampers, louvers, screens, registers, grilles, diffusers, sound traps, attenuators, mixing boxes, access doors related to air handling systems, breaching, hoods, and any and all appurtenances relating to heating, ventilation, air conditioning and exhaust systems, commercial and industrial architectural sheet metal water shed roof systems, **the testing, adjusting, and balancing of all air-handling equipment and ductwork**, the fabrication and installation of commercial and industrial kitchen hoods, kitchen vents, bathroom exhaust vents and fans.*

12-3-2018

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Daniel Bennett
Secretary

The Commonwealth of Massachusetts
Department of Public Safety
Board of Building Regulations and Standards
One Ashburton Place, Room 1301
Boston, Massachusetts 02108-1618

Phone (617) 727-3200
Fax (617) 727-5732
www.mass.gov/dps

Matthew Moran
Commissioner

Richard Crowley
Chairman

Robert Anderson
Administrator

MASSACHUSETTS STATE BUILDING CODE – CODE AMENDMENT FORM

Impacted code:	☐ 9th Edition Base Code ☑ 9th Edition Residential Code	State Use Only	
Date Submitted:	**September 5, 2018**	Date Received:	
Code Section:	**2018 IRC Section R806.5**	Code Change Number:	
Name of proponent:	**David Weitz**		
Company / Organization represented, if any:		CLEAResult for Mass Save Check ☐ if representing self	
Address (number, street, city, state, ZIP:		**50 Washington Street, Westborough, MA 01581**	
Telephone number:	**508-365-3312**		
Email address:	**David.weitz@clearesult.com**		

PLEASE CHECK OFF THE TYPE OF AMENDMENT PROPOSED

☐ Change existing section language ☐ Add new section ☐ Delete existing section and substitute
☐ Delete existing section, no substitute ☑ Other, Explain: Add exception to an existing section

PLEASE TYPE THE PROPOSED AMENDMENT BELOW. If you propose to change a section, please copy the original text from either the relevant model code and/or MA amendment. Indicate, with a strikethrough, the text that you propose to delete. Please also indicate any new text in both *italic* and red font. Finally, for each proposal submitted, please provide the justification items requested below. Completed code amendment forms may be emailed to Felix Zemel, Director of Code Development and Manufactured Buildings at felix.zemel@state.ma.us. Please attach additional pages as necessary.

Existing language:

Proposed changes: Add following 806.5, sub 5.3 – "*Exception: In existing buildings, unvented enclosed rafter assemblies of up to eight linear feet and with ventilated spaces above are allowed when completely filled with fibrous material dense packed in the cavity. Cellulose insulation installed at minimum 3.4 pounds per cubic foot shall be considered dense packed.*"

Background and rationale: The roof ventilation requirements in Section R806 of the International Residential Code are written fundamentally for new construction, and provide many options for various configurations. While for the most part these requirements are transferable to existing buildings, there are

some circumstances where this is not feasible, and where it is impracticable to retrofit insulation and ventilation in an existing roof system because of limited access.

For more than 30 years, insulation contractors working in utility-based and low-income programs in Massachusetts have used dense-packed cellulose in limited sloped roof areas of cape-style houses, eyebrow roofs, mansard roof cavities, and the similar construction types where short lengths of rafters run between soffit areas (e.g., knee walls) and attic caps. Although this practice is not explicitly allowed by building code, it has been regularly accepted by building officials. There is no evidence of damage or failure to roof sheathing, framing, or other building systems, despite many thousands of homes receiving this treatment. Approximately 4500 homes per year are treated this way by CLEAResult alone, any many more by other Mass Save vendors and low-income agencies.

The problem with achieving the R806 ventilation requirements in these assemblies is that it is practically impossible to install a vent chute between the soffit and attic cap. There is often very limited space in the soffit and attic areas, prohibiting the vent chute from being fed up or down through the enclosed rafter space. Additionally, roofing nails that penetrate through the sheathing make it impossible to feed the vent chutes through the cavity.

The reason for roof venting is to allow accumulated moisture to dissipate from the assembly so that it does not cause structural deterioration or lead to biologic growth. There are three basic ways that moisture accumulates in assemblies. In order of importance, based on the amount of potential moisture, these are: (1) bulk water intrusion caused by leaks from roofs, flashing, or plumbing/mechanical systems; (2) moisture that is carried into the assembly by air leakage; and (3) vapor diffusion through building materials. The code's roof ventilation requirements are not intended to protect the structure from bulk water intrusion, but instead are meant to address the other two mechanisms.

Dense packing of an enclosed rafter assembly significantly reduces air flow within the cavity, and thereby limits the amount of water vapor that is introduced. In this regard, a dense packed assembly is both more energy efficient and less prone to moisture accumulation. Any water vapor that does make its way into the assembly has multiple ways of being released. First, the insulation material itself has reservoir capacity to store moisture and release it over time. Existing ceiling systems are extremely unlikely to have a Class I vapor retarder, so moisture can diffuse directly through the plaster, drywall, or wood finish. For the exception being requested, the unventilated assembly is limited to eight linear feet with an additional requirement that a ventilated attic cap area exist above the enclosed rafter space. This means that accumulated moisture can dissipate as it wicks through the insulation toward the ventilated area.

This proposed exception is founded on building science principles of moisture movement in residential buildings. More important, it is based on three decades of practice in Massachusetts, with thousands of installations and no known failures. This proposal will allow for the proper insulation of roof assemblies that will perform more efficiently and be less prone to ice dams and other moisture problems.

This proposal was presented to the Energy Advisory Committee at its September 4, 2018 meeting, and received a unanimous endorsement with a vote of seven members in favor and zero opposed. (As the proponent of the amendment, I abstained from voting.)

Pros of the proposed change: This exception will codify what is already common practice in Massachusetts, but for which it has been necessary to make an alternate means argument on a case-by-case basis. It will eliminate a formal barrier to insulating portions of existing homes for which it is impracticable to achieve the roof ventilation requirements, but will not compromise the structural or biological integrity of buildings.

Cons of the proposed change: There are no predictable cons to the proposed change.

Estimated impact on life safety: There are no impacts on life safety.

Estimated impact on cost: This are no impacts on cost.

12-4-2018

780 CMR: MASSACHUSETTS AMENDMENTS TO THE *INTERNATIONAL BUILDING CODE 2015*

CHAPTER 13: ENERGY EFFICIENCY

1300.1 Add the following sections as follows:

1301.1.1 Revise subsection as follows:

[E] 1301.1.1 Criteria. Buildings shall be designed and constructed in accordance with the *International Energy Conservation Code* ~~2015~~ 2018 ("IECC") as amended by 780 CMR 13.00. These amendments are intended to expressly apply to the IECC, and are also applicable, in intent, to ANSI/ASHRAE/IESNA 90.1.

Exception 1: Temporary structures, as regulated by section 3103, do not need to comply with the building envelope requirements of 780 CMR 13.00.

Exception 2: Applications for building permits and related construction and other documents filed through July 1, 2019 may comply either with 780 CMR 13.00 and 780 CMR 115: Appendix AA, effective January 1, 2019, or with the versions of these provisions in effect immediately prior to January 1, 2019, but not a mix of both. After July 1, 2019, concurrency with the prior version of 780 CMR ends, and all applications for building permits and related construction and other documents shall comply with 780 CMR as amended effective January 1, 2019 only.

C202 Revise Section by inserting the following definitions:

Electric Vehicle. An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current.

Informational note: defined as in 527 CMR 12 section 625.2.

Electric Vehicle Supply Equipment (EVSE): The conductors, including the ungrounded, grounded, and equipment grounding conductors, and the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

Informational note: defined as in 527 CMR 12 section 625.2.

Electric Vehicle Charging Space ("EV Ready Space"): A designated parking space which is

provided with one dedicated 50-ampere branch circuit for EVSE servicing Electric Vehicles.

C103.2 Revise sub-section by inserting the following:

#13 EV Ready Spaces locations in accordance with C405.9.3

C401.2 Revise section as follows:

C401.2 Application. Commercial buildings shall comply with one of the following:

1. The requirements of ANSI/ASHRAE/IESNA 90.1-~~2013~~2016, as modified by ~~C401.2.2 and~~ C402.3, C405.9, and C406.1 ~~if following Appendix G~~. If following Appendix G, then use ANSI/ASHRAE/IESNA 90.1 – 2013 as modified by C401.2 (as amended), C402.1.5, C402.3, C405.9, and C406.
2. The requirements of sections C402 through C405. In addition, commercial buildings shall comply with section C406 and tenant spaces shall comply with section C406.1.1.
3. The requirements of sections C402.1.5, C402.5, C403.2, C404, C405.2, C405.3, C405.4, C405.6 and C407. The building energy cost, or the total annual energy use on either a site or source energy basis, shall be equal to or less than 85% of the standard reference design building. Source energy calculations shall comply with C401.2.2.1.
4. Residential use buildings up to five stories may elect to comply with the energy provisions of section N1106 (R406) found in 780 CMR 51.00: *Massachusetts Residential Code*~~, provided all units are separately rated, separately metered, individually heated and cooled, and have kitchens~~.

C401.2.2 through C401.2.2.~~2~~3 Add subsection as follows:

C401.2.2 Performance Rating Method. Replace ANSI/ASHRAE/IESNA 90.1-2016 APPENDIX G PERFORMANCE RATING METHOD, Section G1 in its entirety with ANSI/ASHRAE/IESNA 90.1-2013 APPENDIX G PERFORMANCE RATING METHOD, Section G1.

C401.2.~~2~~3 Performance Rating Method for Source Energy. Add exception to ANSI/ASHRAE/IESNA 90.1 APPENDIX G PERFORMANCE RATING METHOD, section G1.1.

Exception: When Appendix G is used for the comparison of building energy consumption only, the comparison may be performed on site energy and/or on a source energy basis.

C401.2.2~~2~~3.1 Source Energy Method. For the purpose of quantifying the projected Source Energy consumption of a building, the Site to Source Fuel Conversion factors in Table
401.2.2 shall apply.

Table 401.2.~~2~~ 3 Site to Source Fuel Conversion Factors

Load Type	Factor
Electric power use at the utility meter	3.01
Natural Gas	1.09
Fuel Oil	1.13
LPG	1.12
Purchased District Heating	
Hot Water	1.35
Steam	1.45
Purchased District Cooling	0.99
Fossil fuels not listed	1.1
Purchased Combined Heat and Power District Heat	~~0~~*

*~~Note:~~ A source fuel conversion for purchased district heat supplied by a combined heat and power central utility will be published by the Massachusetts Department of Energy Resources on a per district system basis.

C401.2.~~2~~3.2 Approved Software for Source Energy Calculation with Combined Heat and Power.

1. Determination of the source energy consumption and usage intensity, when using purchased combined heat and power district heat, shall be performed as an exceptional calculation using the Department of Energy Resources ("DOER") approved Excel worksheet.
2. Determination of the source energy consumption and usage intensity for heat generated by a combined heat and power system located on-site shall be performed using software meeting the requirements of ASHRAE 90.1 Normative Appendix G Performance Rating Method, section G2.2 Simulation Program, and has an explicitly stated capability to determine both the site and source energy use intensity for combined heat and power systems without the requirement for exceptional calculations as defined in ASHRAE 90.1 Appendix G section G2.5.

C401.2.4 Performance rating Method Baseline Building Vertical Fenestration. Add following Table G3.1.1-1 Baseline Building Vertical Fenestration Percentage of Gross Above-Grade-Wall Area.

Table G3.1.1-1 Baseline Buildings Vertical Fenestration Percentage of Gross Above-Grade-Wall Area

Building Area Types	Baseline Building Gross Above-Grade-Wall Area
Multifamily	24%

C402.2.45 Delete the exception.

C402.3 through C402.3.1 Delete the section and subsection, and replace with the following sections C402.3 through C402.3.6:

C402.3 Rooftop Solar Readiness. New low-rise commercial buildings and additions of less than four stories above grade, with not less than 2,400 square feet of roof area that is either flat or oriented between 110 degrees and 270 degrees of true north, shall comply with sections C402.3.1 through C402.3.6.

Exceptions:

1. Assembly Group A-2 and A-3, and High Hazard Group H buildings.
2. Buildings with a permanently installed on-site renewable energy system.
3. Flat roof areas designed for rooftop vehicle parking facilities.
4. Buildings with a solar-ready zone that is shaded for more than 50% of daylight hours annually.
5. Buildings and structures, as designed and shown in construction documents, that do not meet the conditions for a solar-ready zone area are exempt from the requirements of C402.3.

C402.3.1 Construction Document Requirements for Solar-ready Zone. Construction documents shall indicate the solar-ready zone where applicable.

C402.3.2 Solar-ready Zone Area. The total solar-ready zone area shall consist of an area not less than ~~1,600 square feet, or~~ 50% of the roof area that is either flat or oriented between 110 degrees and 270 degrees of true north, exclusive of mandatory access or set back areas as required by 527 CMR: *Board of Fire Prevention Regulations* (also known as the Massachusetts Fire Code).

C402.3.3 Obstructions. Solar-ready zones shall consist of an area free from obstructions including, but not limited to, vents, chimneys, and roof-mounted equipment.

Note: Nothing in C402.3.3 shall require any construction documents to be redesigned or reconfigured so as to create a solar-ready zone area.

C402.3.4 Roof Load Documentation. The structural design loads for roof dead load and roof live load shall be clearly indicated on the construction documents.

C402.3.5 Interconnection Pathway. Construction documents shall indicate pathways for routing of conduit or plumbing from the solar-ready zone to the electrical service panel or service hot water system.

C402.3.6 Electrical Service Reserved Space. The main electrical service panel shall have a reserved space to allow installation of a dual pole circuit breaker for future solar electric installation and shall be labeled "For Future Solar Electric".

C402.4.1 Revise section as follows:

Maximum Area. The vertical fenestration area, not including opaque doors and opaque spandrel panels, shall not be greater than 30 percent of the gross above-grade wall area. Above-grade wall areas shall not include wall areas for mechanical system enclosures that are above the primary roof assembly. The skylight area shall not be greater than 3 percent of the gross roof area.

C402.5.1.2 Delete clay or shale masonry as a prescribed air barrier material or assembly as follows:

C402.5.1.2 Air Barrier Compliance Options. A continuous air barrier for the opaque building envelope shall comply with section C402.5.1.2.1 or C402.5.1.2.2.

C402.5.1.2.1 Materials. Materials with an air permeability not greater than 0.0004 cfm/ft^2 under a pressure differential of 0.3 inch water guage (75 Pa) when tested in accordance with ASTM E 2178 shall comply with this section. Materials in Items 1 through 15 shall be deemed to comply with this section, provided joints are sealed and materials are installed as air barriers in accordance with the manufacturer's instructions.

C402.5.1.2.2 Assemblies. Assemblies of materials and components with an average air leakage not greater than 0.04 cfm/ft^2 under a pressure differential of 0.3 inch of water guage (75 Pa) when tested in accordance with ASTM E 2357, ASTM E 1677 or ASTM E 283 shall comply with this section. Assemblies listed in Items 1 through 2 shall be deemed to comply, provided joints are sealed and the requirements of section C402.5.1.1 are met.

C402.6 Add section as follows:

C402.6 Approved Calculation Software Tools. The following software tools are sufficient to demonstrate compliance with section C401.2 options 1 or 2:

1. **COMcheck:** COMcheck-Web or COMcheck for Windows Version 4.~~0.61.0~~, or later, which can be accessed at: https://www.energycodes.gov/.
2. Any other software tool approved by the BBRS.

~~**C405.1** Revise section as follows:~~

~~**C405.1 General (Mandatory).** This section covers lighting systems controls, the maximum lighting power for interior and exterior applications and electrical energy consumption.~~

~~**Exception:** Dwelling units within commercial buildings shall not be required to comply with sections 405.2 through 405.5, provided that they comply with sections R404.1 and R404.2.~~

~~Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers shall comply with section C403.2.15 or C403.2.16.~~

C405.9 Add a section as follows:

C405.9 Electric Vehicle Charging Spaces ("EV Ready Spaces"). Group A-1, B, E, I, M and R buildings with four or more passenger vehicle parking spaces on the premises shall provide EV Ready Spaces for a percentage of parking spaces not less than:

a. 5% of first 80 spaces,
b. 3% of all spaces more than 80.

The branch circuit shall be identified as "EV READY" in the service panel or subpanel directory, and the termination location shall be marked as "EV READY". The circuit shall terminate in a NEMA 6-50 or NEMA 14-50 receptacle or a Society of Automotive Engineers (SAE) standard J1772 electrical connector.

Exceptions:

1. Parking spaces and garage spaces intended exclusively for storage of vehicles for retail sale or vehicle service.
2. This requirement will be considered met if all spaces which are not EV Ready are separated from the meter by a public right-of-way.
3. Parking spaces which are limited to parking durations of less than an hour.

C405.10 Reserved

C406.1 Revise section as follows:

C406.1 Requirements. Buildings following both ASHRAE and IECC shall comply with at least ~~two~~ three of the following:

1. More efficient HVAC performance in accordance with section C406.2.
2. Reduced lighting power density system in accordance with section C406.3.
3. Enhanced lighting controls in accordance with section C406.4.
4. On-site supply of renewable energy in accordance with section C406.5.
5. Provision of a dedicated outdoor air system for certain HVAC equipment in accordance with section C406.6.
6. High-efficiency service water heating in accordance with section C406.7.
7. Enhanced envelope performance in accordance with Section C406.8.
8. Reduced air-infiltration in accordance with Section 406.9.
9. Renewable space heating in accordance with Section 406.10.
10. Renewable service water heating in accordance with Section C406.11.
~~6.~~11. Wood-frame construction in accordance with Section 406.12.

~~**Exception 1:** Buildings in municipalities not served by a participating Mass Save investor-owned gas or electric utility provider shall comply with at least one of the requirements in section C406.1.~~

~~**Exception 2:** Buildings being designed utilizing ANSI/ASHRAE/IESNA 90.1-2013 shall comply with Item 2 of C406.1 as well as at least one of the remaining items listed in C406.1.~~

C406.5 Revise section as follows:

C406.5 On-site Renewable Energy. The ~~T~~total minimum ratings of on-site renewable energy systems shall ~~comply with~~be one of the following:

1. ~~Provide not~~ Not less than 1.71 Btu/h per square foot (5.4 W/m^2)0.50 watts per square foot (5.4 W/m^2) of conditioned floor area.
2. ~~Provide n~~Not less than 3% of the design energy used within the building for building mechanical and service water heating equipment and lighting regulated in chapter 4.
3. ~~Provide n~~Not less than 65% of the total annual energy used within the building for building space and service water heating with biomass fuel using direct vented combustion mechanical equipment rated at a minimum of 80 AFUE. The biomass fuel shall meet the eligible fuel and emission criteria under M.G.L. c. 25A, § 11F½ (Massachusetts alternative energy portfolio standard).
4. ~~Provide n~~Not less than 65% of the total annual energy used within the building for building space and service water heating using a geothermal heat pump system with a coefficient of performance of not less than 4.

C406.10 Add Section as follows:

C406.10 Renewable Space Heating. All space heating shall be provided with cold-climate air source heat pump having rated coefficient of performance (COP) of at least 1.9 at 5 degrees Fahrenheit source air and at least 2.5 at 17 degrees Fahrenheit source air.

C406.11 Add section as follows:

C406.11 Renewable Service Water Heating. All service water heating shall be provided with an electric air source heat pump.

C406.12 Add section as follows:

C406.12 Wood construction. All building framing is comprised of wood members and no metal framing is used.

C407.6.1.1 through C407.6.1.5 Add subsections as follows:

C407.6.1.1 Approved Alternative Energy Performance Methods. The requirements of this section are approved performance methods to demonstrate compliance with section C407 without calculation of a standard reference design:

1. **RESNET Approved Software for Home Energy Rating**

System ("HERS"). For residential units within a building up to five stories above grade plane, and with independent unit-level heating and cooling systems, a HERS rater verified index score of 55 or less for the finished units together with a completed and HERS rater verified ENERGY STAR Thermal Enclosure Checklist may be used. Compliance with this section requires that the criteria of C402.4, C403.2, C404 and C405 are met.

2. **Passive House Institute US ("PHIUS") or Passive House Institute ("PHI") Approved Software.** Projects certified as meeting the PHIUS+ 2015: Passive Building Standard – North America, or newer, demonstrated using ~~another approved~~ software by PHIUS ~~or PHI~~, where ~~PHIUS certification is demonstrated Specific Space Heat Demand, as modeled~~ by a Certified Passive House Consultant; or, Projects certified as meeting Certified Passive House standard using software by PHI, where PHI certification is demonstrated by a Certified Passive House Designer ~~is less than or equal to tenkBTU/ft^2/year~~. Compliance with this section requires that the criteria of C402.4, C403.2, C404 and C405 are met.

3. **ENERGY STAR Homes 3.1 Path.** New residential structures, or additions to existing residential structures, or portions thereof, as certified to conform with the ENERGY STAR Certified Homes standard, Version 3.1.

4. Any other software approved for this purpose by the BBRS.

C407.6.1.2 Documentation. The following documentation is required for energy code compliance under subsection C407.6.1.1, Item 1:

1. If using RESNET approved ~~the~~ HERS software:
   a. Prior to the issuance of a building permit, the following items shall be provided to the building official:
      i. a HERS compliance report which includes a proposed HERS index score of 55 or lower;
      ii. a description of the unit's energy features; and
      iii. a statement that the rating index score is "based on plans."
   b. Prior to the issuance of a certificate of occupancy, the following items shall be provided to the building official:
      i. a copy of the final certificate indicating that the HERS rating index score for each unit is verified to be 55 or less, with all completed HERS rater verified ENERGY STAR checklists and design reports (including, but not limited to: Rater Field Checklist, Rater Design Review Checklist, Thermal Enclosure Checklist, HVAC Commissioning Checklist, Thermal Bypass Inspection Checklist, HVAC Design Report) are ~~Thermal Enclosure Checklist, is~~ to be submitted to the building official. The HERS rating compliance shall be determined before electrical renewable energy systems are credited.
      ii. a certificate, as required by section R401.3, is required for each unit and will list the HERS index score of the dwelling

unit.

2. If using the PHIUS or PHI software:
   a. Prior to the issuance of a building permit, the following items shall be provided to the Building Official:
      i. A list of compliance features; and
      ii. A statement that the estimated Specific Space Heat Demand is "based on plans".

   b. Prior to the issuance of a certificate of occupancy, the following item shall be provided to the Building Official:
      i. A copy of the final report, submitted on a form that is approved to document compliance with PHIUS+ 2015 standards. Said report shall indicate that the finished building achieves a Certified Passive House Consultant-verified Specific Space Heat Demand of less than or equal to 10kBTU/ft^2/year.
3. If using ENERGY STAR Homes, Version 3.1 path:
   a. Prior to the issuance of a building permit, the following items(s) shall be provided to the Building Official:
      i. A copy of the preliminary HERS rating, based on plans.
   b. Prior to the issuance of a certificate of occupancy, the following items shall be provided to the Building Official:
      i. A copy of the final ENERGY STAR Homes certificate;
      ii. A copy of the certified HERS rating; and
      iii. A copy of the signed ENERGY STAR Thermal Enclosure System Checklist.

C407.6.1.3 Energy Rating Index. The Energy Rating Index ("ERI") shall be a numerical integer value that is based on a linear scale constructed such that the ERI reference design has an Index value of 100 and a residential building that uses no net purchased energy has an Index value of zero. Each integer value on the scale shall represent a 1% change in the total energy use of the rated design relative to the total energy use of the ERI reference design. The ERI shall consider all energy used in the residential building. The RESNET HERS index is the approved ERI approach in the Commonwealth.

C407.6.1.4 ERI-based Compliance. Compliance based on an ERI analysis requires that the rated design be shown to have an ERI less than, or equal to, the appropriate value listed in Table C407.6.1.4, when compared to the ERI reference design prior to issuance of any credit for on-site renewable electric generation.

C407.6.1.4.1 Trade-off for Onsite Renewable Energy Systems. New construction following C407.6.1.3 and existing buildings and additions following C501.4 mayuse any combination of the following renewable trade-offs to increase the maximum allowable HERS index score for each unit separately served by any combination of the

following:

1. Renewable Electric Generation: Solar photovoltaic array rated at 2.5kW or higher shall offset five HERS points;
2. Renewable Space Heating: Clean Biomass Heating System, solar thermal array, cold climate air source heat pump having rated coefficient of performance (COP) of at least 1.9 at 5 degrees Fahrenheit and at least 2.5 at 17 degrees Fahrenheit. or geothermal heat pump, or a combination of these systems, operating as the primary heating system shall offset five HERS points; and
3. Solar thermal array for primary domestic hot water heating or Clean Biomass Stove shall offset two HERS points.

Note: a Clean Biomass Stove offset may not be combined with a primary heating system offset.

Table C407.6.1.4 Maximum HERS Ratings with Onsite Renewable Energy Systems.

Renewable Energy Source	Maximum HERS Index Score[a]	
	New construction	Whole house renovations; additions
None	55	65
Solar Electric Generation*~~PV > 2.5kW; Renewable~~ Space Heating	60	70
~~60~~	~~70~~	
DHW	~~57~~	67
Production & Space Heating	65	75
Production & DWH	~~62~~	72
Production & Space Heating & DHW	67	77
~~Solar PV; Renewable primary heating & solar thermal DHW~~	~~62~~	~~72~~
~~Solar PV & Renewable primary heating & solar thermal DHW~~	~~67~~	~~77~~

[a] *Maximum HERS index score prior to onsite electric renewable electric generation in accordance with C407.6.1.4

C407.6.1.5 Verification by Approved Agency. Verification for compliance with section C407.6.1 through C407.6.1.4.1 shall be completed by an approved third party. For compliance using a HERS Index Score or ENERGY STAR for Homes 3.1 certification, verification of compliance shall be completed by a certified HERS rater. For compliance with PHIUS+ 2015 or PHI, compliance shall be completed by a certified Passive House consultant.

C502.2 Add a sub-section as follows:

C502.2.7 Electric Vehicle Charging Spaces ("EV Ready Spaces"). The number of *EV Ready Spaces* for the addition shall comply with the requirements for new construction.

Exception

1. Where the existing electric service is not being upgraded and capacity is not available.

780 CMR 51.00: MASSACHUSETTS RESIDENTIAL CODE (*Unique to Massachusetts*)

Chapter 11: ENERGY EFFICIENCY

N1100.1 Add the following sections as follows:

1100.1 Adoption. Buildings shall be designed and constructed in accordance with the *International Energy Conservation Code* ~~2015~~ 2018 ("IECC"), as amended by Chapter 11 of 780 CMR 51.00.

Exception: Applications for building permits and related construction and other documents filed through July 1, 2019 may comply either with 780 CMR 51.00: Chapter 11, effective January 1, 2019, or with the versions of those provisions in effect immediately prior to January 1, 2019, but not a mix of both. After July 1, 2019, concurrency with the prior version of 780 CMR ends and all applications for building permits and related construction and other documents shall comply with 780 CMR as amended effective January 1, 2019 only.

N1101.1 (R401.1) Revise the section as follows:

N1101.1 (R401.1) Scope. This chapter regulates the energy efficiency for the design and construction of buildings regulated by 780 CMR. Municipalities which have adopted the Stretch Energy Code shall use the energy efficiency requirements of 780 CMR 110 *Appendix AA*.

N1101.5 (R103.2) Add the following to this subsection:

#9 *EV Ready Space* locations per N1104.2/R404.2.

N1101.6 (R202) Add and/or revise the following defined terms:

~~**CLEAN BIOMASS STOVE.** Wood or pellet-fired stoves that are EPA certified; and have a particulate matter emissions rating of no more than 3.5 g/hr for non-catalytic wood and pellet stoves; or 2.0 g/hr for catalytic wood and pellet stoves.~~

CLEAN BIOMASS HEATING SYSTEMS. Wood-pellet fired central boilers and furnaces where the equipment has a thermal efficiency rating of 80% (higher heating value) or greater; and a particulate matter emissions rating of no more than 0.15 lb/MMBtu PM heat output.

Electric Vehicle. An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other

source of electric current.

Informational note: defined as in 527 CMR 12 section 625.2.

Electric Vehicle Supply Equipment (EVSE): The conductors, including the ungrounded, grounded, and equipment grounding conductors, and the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

Informational note: defined as in 527 CMR 12 section 625.2.

Electric Vehicle Charging Space ("EV Ready Space"): A designated parking space which is provided with one dedicated 50-ampere branch circuit for *EVSE* servicing *Electric Vehicles.*

HIGH EFFICIENCY LAMPS, Light-emitting diode (LED) lamps with an efficiency of not less than the following:

1. 60 lumens per watt for lamps over 40 watts;
2. 50 lumens per watt for lamps over 15 watts to 40 watts,
3. 40 lumens per watt for lamps 15 watts or less.

RESIDENTIAL BUILDING. For this code, includes detached one- and two-family dwellings and townhouses as well as *Group* R-2, R-3, and R-4 buildings four stories or less in height above grade plane.

N1101.13 (R401.13) Revise the section as follows:

N1101.13 (R401.2) Compliance. Projects shall comply with one of the following: 1. Sections N1101.14 (R401.3) through N1104 (R404).

2. Section N1105 (R405) and the provisions of sections N1101.14 (R401.3) through N1104 (R404) labeled "Mandatory."

3. An energy rating index ("ERI") approach, or approved alternative energy performance rating method in section N1106 (R406) and the provisions of sections N1101.14 (R401.3) through N1104 (R404) labeled "Mandatory." Qualifying approaches under N1106 (R406) include the following:

   a. Certified RESNET HERS rating with Massachusetts amendments.
   b. Certified Energy Star Homes, Version 3.1.
   c. Certified Passivehaus performance method.

N1101.14 (R401.3) Add the following to the end of the paragraph:

The Certificate shall list the final HERS index score when applicable.

51.0 : continued

~~**Table N1102.1.2 (R402.1.2)** Revise the table as follows:~~

~~Climate Zone 5 and Marine 4 Fenestration U Factor shall be "0.30".~~

~~**Table N1102.1.4 (R402.1.4) Revise the table as follows:**~~

~~Climate Zone 5 and Marine 4 Fenestration U-Factor shall be "0.30".~~

N1102.1.5.1 (R402.1.5.1) Add the subsection as follows:

N1102.1.5.1 (R402.1.5.1) Approved Software for Total UA Alternative: The follc

1. REScheck Version 4.6.4~~-~~5.1 or later, available at: http://www.energycodes.gov/rescheck
2. REScheck-Web available at https://energycode.pnl.gov/REScheckWeb/

N1103.3.3 (R403.3.3) Add the following paragraph before the exception:

Post-construction or rough-in testing and verification shall be done by a HERS Rater, HERS Rating Field Inspector, or an applicable BPI Certified Professional.

N1103.6 (R403.6) Replace the section as follows:

N1103.6 (R403.6) Mechanical Ventilation (Mandatory). Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating. Each dwelling unit of a residential building shall be provided with continuously operating exhaust, supply or balanced mechanical ventilation that has been site verified to meet a minimum airflow per:

1. R406.3 for buildings following the ERI approach in R401.2;
~~1~~2. Energy Star Homes Version 3.1; ~~2~~3
~~ASHRAE 62.2-2013; or~~
~~4~~3. the following formula for one- and two-family dwellings and townhouses of three or less stories above grade plane:

$Q = .03 \times CFA + 7.5 \times (N_{br} + 1) - 0.052 \times Q_{50} \times S \times WSF$

Where: CFA is the conditioned floor area in ft^2 N_{br} is the number of bedrooms

Q_{50} is the verified blower door air leakage rate in cfm measured at 50 Pascals S is the building height factor determined by this table:

Stories above grade plane	1	2	3
S	1.00	1.32	1.55

WSF is the shielded weather factor as determined by this table:

County	WSF
Barnstable	0.6

Berkshire	0.52
Bristol	0.54
Dukes	0.59
Essex	0.58
Franklin	0.52
Hampden	0.49
Hampshire	0.59
Middlesex	0.55
Nantucket	0.61
Norfolk	0.52
Plymouth	0.53
Suffolk	0.66
Worcester	0.59

N1103.6.2 (R403.6.2) through N1103.6.6 (R403.6.6) Add the subsections as follows:

N1103.6.2 (R403.6.2) Verification: Installed performance of the mechanical ventilation system shall be tested and verified by a HERS Rater, HERS Rating Field Inspector, or an applicable BPI Certified Professional, and measured using a flow hood, flow grid, or other airflow measuring device in accordance with either RESNET Standard Chapter 8 or ACCA Standard 5.

51.0 : continued

N1103.6.3 (R403.6.3) Air-moving Equipment, Selection and Installation. As referenced in ASHRAE Standard 62.2-2013, section 7.1, ventilation devices and equipment shall be tested and certified by Air Movement and Control Association ("AMCA") or Home Ventilating Institute ("HVI") and the certification label shall be found on the product. Installation of systems or equipment shall be carried out in accordance with manufacturers' design requirements and installation instructions. Where multiple duct sizes and/or exterior hoods are standard options, the minimum size shall not be used.

N1103.6.4 (R403.6.4) Sound Rating. Sound ratings for fans used for whole building ventilation shall be rated at a maximum of one sone.

Exception: HVAC air handlers and remote-mounted fans need not meet sound requirements. There shall be at least four feet of ductwork between the remote-mounted fan and intake grille.

N1103.6.5 (R403.6.5) Documentation. The owner and the occupant of the dwelling unit shall be provided with information on the ventilation design and systems installed, as well as instructions on the proper operation and maintenance of the ventilation systems. Ventilation controls shall be labeled with regard to their function, unless the function is obvious.

N1103.6.6 (R403.6.6) Air Inlets and Exhausts. All ventilation air inlets shall be located a minimum of ten feet from vent openings for plumbing

drainage systems, appliance vent outlets, exhaust hood outlets, vehicle exhaust, or other known contamination sources; and shall not be obstructed by snow, plantings, or any other material. Outdoor forced air inlets shall be covered with rodent screens having mesh openings not greater than ½ inch. A whole house mechanical ventilation system shall not extract air from an unconditioned basement unless approved by a registered design professional. Where wall inlet or exhaust vents are less than seven feet above finished grade in the area of the venting including, but not limited to, decks and porches, a metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight feet above grade directly in line with the vent terminal. The sign shall read, in print no less than ½ inch in size, "MECH. VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS."

Exceptions:

1. Ventilation air inlets in the wall shall be separated from dryer exhausts and contamination sources exiting through the roof by a minimum of three feet.
2. No minimum separation distance shall be required between local exhaust outlets in kitchens/bathrooms and windows.
3. Vent terminations that meet the requirements of the *National Fuel Gas Code* (NFPA 54/ ANSI Z223.1) or equivalent.

Amend N1104.3 (R404.2) as follows:

~~Reserved~~ N1104.2 (R404.2) Electric Vehicle Charging Spaces ("EV Ready Spaces") (Mandatory). *EV Ready Spaces* shall be provided in accordance with Table N1104.2 (R404.2). The branch circuit shall be identified as "EV READY" in the service panel or subpanel directory, and the termination location shall be marked as "EV READY". The circuit shall terminate in a NEMA 6-50 or NEMA 14-50 receptacle or a Society of Automotive Engineers (SAE) standard J1772 electrical connector.

Table N1104.2 (R404.2) EV ready space requirements

Type of Building	Number of parking spaces
R-3	At least 50%
R-2	At least 20%

Exceptions:

1. In no case shall the number of required *EV Ready Spaces* be greater than the number of parking spaces otherwise required by local ordinance.
2. This requirement will be considered met if all spaces which are not *EV Ready*:
   a. Are located more than 130 ft from the nearest electrical panel or sub-panel location, or
   b. Are separated from the premises by a public right-of-way.

N1106.1 (R406.1) through N1106.1.2 Revise and/or add the section and subsections as

follows:

N1106.1 (R406.1) Scope. This section establishes criteria for compliance using an Energy Rating Index ("ERI") analysis, or approved alternative energy performance rating methods.

N1106.1.1 (R406.1.1) Approved Alternative Energy Performance Methods. The following rating threshold criteria are sufficient to demonstrate energy code compliance under section N1106 (R406) without calculation of a standard reference design. The mandatory provisions of subsection N1106.2 (R406.2) also apply:

1. **ENERGY STAR Homes 3.1 Path.** New buildings or additions to an existing building, building system or portion thereof shall be certified to conform to the ENERGY STAR Certified Homes, Version 3.1 standard.
2. **Passive House Institute US ("PHIUS") or Passive House Institute ("PHI") Approved Software.** Projects certified as meeting the PHIUS+ 2015 or 2018: Passive Building Standard – North America, or newer demonstrated using ~~another~~ approved software by PHIUS ~~or PHI~~, where PHIUS certification is demonstrated ~~specific space heat demand, as modeled~~ by a certified passive house consultant~~, is less than or equal to 10 kBTU/ft^2/year.~~; or Project certified as meeting Certified Passive House standard using software by PHI, where PHI certification is demonstrated by a Certified Passive House Designer. Compliance with this section requires that the criteria of C402.4, C403.2, C404 and C405 are met.
3. Any other software approved by the Board of Building Regulations and Standards.

51.0 : continued

N1106.1.2 (R406.1.2) Documentation. The following documentation is required for energy code compliance under subsection N1106.1.1 (R406.1.1):

1. If using the RESNET approved HERS software:
   a. Prior to the issuance of a building permit, the following items must be provided to the Building Official:
      i. a HERS compliance report which includes a proposed HERS index score of 55 or lower or otherwise complies via renewable trade-offs;
      ii. a description of the unit's energy features; and
      iii. a statement that the rating index score is "based on plans"
   b. Prior to the issuance of a certificate of occupancy, the following items must be provided to the building official:
      i. a copy of the final certificate indicating that the HERS rating index score for each unit is verified to be 55 or less or otherwise complies via renewable trade-offs, with all completed HERS rater verified ENERGY STAR checklists and design reports

(including, but not limited to: Rater Field Checklist, Rater Design Review Checklist, Thermal Enclosure Checklist, HVAC Commissioning Checklist, Thermal Bypass Inspection Checklist, HVAC Design Report) are to be submitted to the building official. The HERS rating compliance shall be determined before electrical renewable energy systems are credited.

ii. a certificate, as required by subsection R401.3, is required for each unit, and will list the HERS index score of the dwelling unit.

~~1.~~2. If using ENERGY STAR Homes, Version 3.1 path:

a. Prior to the issuance of a building permit, the following item shall be provided to the building official:

i. A copy of the preliminary HERS rating, based on plans.

b. Prior to the issuance of a certificate of occupancy, the following items shall be provided to the building official:

i. A copy of the final ENERGY STAR Homes certificate;

ii. A copy of the certified HERS rating; and

iii. A copy of the signed ENERGY STAR Thermal Enclosure System Checklist.

~~2.~~3. If using PHIUS or PHI passive house software:

a. Prior to the issuance of a building permit, the following items shall be provided to the building official:

i. A list of compliance features; and

ii. A statement that the estimated specific space heat demand and other Passive House certification requirements are~~is~~ "based on plans."

b. Prior to the issuance of a certificate of occupancy, the following item shall be provided to the building official:

i. A copy of the final report, submitted on a form that is approved to document compliance with current PHIUS or PHI standards. Said report shall indicate that the finished building achieves a certified passive house consultant-verified ~~specific space heat demand of less than or equal to 10kBTU/ft^2/year~~ Standard.

N1106.3 (R406.3) Add the following sentence to the end of the paragraph:

The RESNET Home Energy Rating System ("HERS") index is the approved ERI approach in the Commonwealth.

N1106.4 (R406.4) Revise the section as follows:

N1106.4 (R406.4) ERI-based Compliance. Compliance based on an ERI analysis requires that the rated design be shown to have an ERI less than or equal to the appropriate value listed in Table N1106.4 (R406.4) when compared to the ERI reference design prior to credit for onsite renewable electric generation.

Table R406.4

Maximum Energy Rating Index

CLIMATE ZONE	ENERGY RATING INDEX
5	55

a. In all cases, when using the ERI analysis of Section 406.4, the building shall meet the mandatory requirements of Section R406.2 and the building thermal envelope shall be greater than or equal to the levels of efficiency and SGHC Table R402.1.2 or Table R402.1.4 subject to the following modifications:

1. Revise Table R402.1.2 by striking out the value appearing in the row entitled "5 and marine 4", column "FENESTRATION U-FACTOR" with .32.

2. Revise Table R402.1.4 by striking out the value appearing in the row entitled "5 and marine 4", column "FENESTRATION U-FACTOR" with .32.

N1106.4.1 (R406.4.1) Add the subsection, and associated table, as follows:

N1106.4.1 (R406.4.1) Trade-off for Onsite Renewable Energy Systems. New construction following N1106.3 (R406.3) or existing buildings and additions following N1107.4 (R407.4) may use any combination of the following renewable energy trade-offs to increase the maximum allowable HERS rating for each unit separately served by any combination of the following:

1. Renewable Electric Generation: Solar photovoltaic array rated at 2.5kW or higher shall offset five HERS points.
2. Renewable Space Heating: Clean biomass heating system, solar thermal array, cold climate air source heat pump having rated coefficient of performance (COP) of at least 1.9 at 5 degrees Fahrenheit and at least 2.5 at 17 degrees Fahrenheit, or geothermal heat pump, or a combination of these systems, operating as the primary heating system shall offset five HERS points.
3. Renewable Domestic Hot Water Heating (DHW): Solar thermal array or heat pump for primary domestic hot water heating ~~or a clean biomass stove~~ shall offset two HERS points.

~~Note: A clean biomass stove offset may not be combined with a primary heating system offset.~~

51.0 : continued

Table N1106.4.1 (R406.4.1). Maximum HERS Ratings with Onsite Renewable Energy Systems

	Maximum HERS index score [a]

Renewable Energy Source	New construction	Whole house renovations; additions
None	55	65
Solar Electric Generation~~PV > 2.5kW; Renewable primary heating system~~	60	70
Space Heating	60	70
DHW	57	67
Production & Space Heating	65	75
Production & DHW	62	72
Production, Space Heating, & DHW	67	77
~~Solar PV; Renewable primary heating and solar thermal DHW~~	~~62~~	~~72~~
~~Solar PV & Renewable primary heating and solar thermal DHW~~	~~67~~	~~77~~

[a] Maximum HERS rating prior to onsite ~~electric~~ renewable electric generation in accordance with section N1106.4 (R406.4).

N1106.5 (R406.5) Revise the section as follows:

> **N1106.5 (R406.5) Verification by Approved Agency**. Verification of compliance with section N1106 shall be completed by an approved third party. For compliance using a HERS rating or Energy Star Homes 3.1 certification, verification of compliance shall be completed by the certified HERS rater. For compliance using PHIUS+ 2015 or PHI software, verification of compliance shall be completed by a certified passive house consultant.

N1108.1.1 (R502.1.1) Add a new subsection as follows:

> **N1108.1.1.5 (R502.1.1.5) Electric Vehicle Charging Spaces ("EV Ready Spaces").** The number of *EV Ready Spaces* for the addition shall comply with the requirements in N1104.2 (R404.2) for new construction.
>
> **Exception**
> Where the existing electric service capacity is not being upgraded and capacity is not available.

N1108.1.2 (R502.1.2) Add an exception to the subsection as follows:

> **Exception**: Alternatively, the addition and any alterations that are part of the project shall comply with N1106 (R406) and shall achieve a maximum HERS index using Table N1106.4.1 (R406.4.1).

Chapter 12: MECHANICAL ADMINISTRATION

M1201.1 Revise the section as follows:

M1201.1 Scope. The provisions of Chapters 12 through 23 of 780 CMR 51.00 shall regulate the design, installation, maintenance, alteration and inspection of mechanical systems that are permanently installed and used to control environmental conditions within buildings. These chapters shall also regulate those mechanical systems, system components, equipment and appliances specifically addressed in this code.

For the provisions of Chapters 12 through 23 of 780 CMR 51.00 governed by the specialized codes (*see* 780 CMR 1.00: *Scope and Administration* (*Unique to Massachusetts*)), *see* the applicable specialized codes. Provisions related to work otherwise governed by 780 CMR 51.00 shall be retained if not in conflict with other sections of 780 CMR 51.00. Enforcement of work governed by the specialized codes shall be by those persons so authorized.

Additional requirements for boilers and other pressure vessels may be found in M.G.L. c. 146 and 522 CMR: *Board of Boiler Rules*, as applicable.

Chapter 13: GENERAL MECHANICAL SYSTEM REQUIREMENTS

M1303.2 Add the section as follows:

M1303.2 Solid Fuel-burning Central Heating Appliance Labeling. Solid fuel-burning boilers or warm air furnaces shall bear a permanent and legible factory-applied label supplied to the manufacturer and controlled by an approved testing agency; such label shall contain applicable items in section M1303.1 and the following information:

a. Type of appliance (boiler or warm air furnace); and
b. Boilers, pressure vessels, and pressure relief devices shall be stamped in accordance with
M.G.L. c. 146, §§ 24 and 34.

51.0 : continued

Chapter 14: HEATING AND COOLING EQUIPMENT

M1401.6 Add section and associated subsections as follows:

M1401.6 Used Solid Fuel-burning Appliances. Used solid fuel-burning appliances that predate the listing requirements set forth in 780 CMR 51.00 may be utilized but the installation of such appliances shall otherwise conform to the requirements of 780 CMR 51.00. as applicable, and such installations shall be inspected by the building official (or fire official in such towns that utilize the fire official for such inspection purposes).

M1401.6.1 Clearances to Combustibles. In the absence of listed clearances

and floor protection requirements, used solid fuel-burning appliances shall be installed in accordance with the clearances of 780 CMR 51.00.

M1401.6.2 Floor Protection General. Floor protection listing requirements for a used appliance shall be met. In the absence of listing requirements, solid fuel-burning appliances shall have floor protection that is noncombustible material applied to the combustible or noncombustible floor area underneath and extending in front, to the sides and to the rear of a heat producing appliance, and have the necessary thermal conductivity to satisfy the floor protection requirements of the appliance. Various "hearth rugs," "mats," "tile board," "hearth board" and similar products sold as floor protectors may be noncombustible but may not satisfy thermal conductivity requirements of this section.

M1401.6.2.1 Floor Protection Requirements. Floor protection requirements shall be:

1. four inches (102 mm) of millboard having a thermal conductivity k = 0.84 (Btu) (inch)/(ft^2) (hour) (°F);
2. a noncombustible floor protector of the same overall thermal conductivity in (1.); or
3. approved by a registered design professional.

Exception: If existing floor protection can be demonstrated to have been adequate for a previous installation of a used solid fuel-burning appliance, then such floor protection shall be allowed. If calculations demonstrate that the existing floor protection has a thermal conductivity lower than that set by this section, then the existing floor protection may be maintained.

M1414.1 Revise the section as follows:

M1414.1 General. Fireplace stoves shall be listed, labeled and installed in accordance with the terms of the listing. Fireplace stoves shall be tested in accordance with UL 737. Also *see* Chapter 10 of 780 CMR 51.00 for detailed guidance on solid fuel-burning appliances.

Chapter 15: EXHAUST SYSTEMS (no amendments)

Chapter 16: DUCT SYSTEMS

M1601.3 Replace the section as follows:

M1601.3 Duct Insulation Materials. Duct insulation shall conform to the following requirements and the requirements of Chapter 11 of 780 CMR 51.00.

M1601.4 Replace the section as follows:

M1601.4 Installation. Duct installation shall comply with Subsections M1601.4.1 through M1601.4.7 and the requirements of Chapter 11 of 780 CMR 51.00.

51.00: continued

M1601.4.6 Revise the first paragraph of the subsection as follows:

> **M1601.4.6 Duct Insulation.** Duct insulation shall be installed in accordance with the following requirements and the requirements of Chapter 11 of 780 CMR 51.00. Where conflict exists between the requirements of this section and Chapter 11 of 780 CMR 51.00, the requirements set forth in Chapter 11 of 780 CMR 51.00 shall govern.

Chapter 17: COMBUSTION AIR

M1701.1 Revise the section as follows:

> **M1701.1 Scope.** Solid fuel-burning appliances shall be provided with combustion air in accordance with the appliance manufacturer's installation instructions. Oil-fired appliances shall be provided with combustion air in accordance with 527 CMR: *Board of Fire Prevention Regulations*. The methods of providing combustion air in this chapter do not apply to fireplaces, fireplace stoves and direct vent appliances. The requirements for combustion and dilution air for gas-fired appliances shall be in accordance with Chapter 24 of 780 CMR 51.00.

Chapter 18: CHIMNEY AND VENTS

M1801.1 Delete the last sentence in the paragraph. **M1801.11** Delete the exception to requirement 1. **M1801.12** Add the following exception to the subsection:

> **Exception:** Unless common connection is allowed by 248 CMR: *Board of State Examiners of Plumbers and Gas Fitters* or 527 CMR: *Board of Fire Prevention Regulations*. If allowed, the common flue shall be of such size to serve all appliances connected if such appliances were operated simultaneously. Note that 248 CMR and 527 CMR are enforced by gas inspectors and the heads of fire departments, respectively.

Chapter 19: SPECIAL APPLIANCES, EQUIPMENT AND SYSTEMS (no amendments)

Chapter 20: BOILERS AND WATER HEATERS (no amendments)

Chapter 21: HYDRONIC PIPING

M2101.3 Revise the subsection as follows:

M2101.3 Protection of Potable Water. The potable water system shall be protected from backflow in accordance with the provisions of the Department of Environmental Protection and/or the local water purveyor, as applicable.

Chapter 22: SPECIAL PIPING AND STORAGE SYSTEMS

Delete all sections of CHAPTER 22 and replace with the following:

M2201 SPECIAL PIPING AND STORAGE SYSTEMS. Special laws, regulations, or both include requirements for oil tanks, piping, fittings, connections, installation, and oil pumps and valves. Refer to
M.G.L. c. 148, § 13, M.G.L. c. 148, § 37, 527 CMR: *Board of Fire Prevention Regulations*, 522 CMR:
Board of Boiler Rules, and EPA regulations. *See* also 780 CMR 51.00 for tank structural design.

Chapter 23: SOLAR THERMAL ENERGY SYSTEMS

M2301.1 Add two notes to the end of the section as follows:

NOTES:

1. Additional requirements for boilers and other pressure vessels may be found in
M.G.L. c. 146 and 522 CMR: *Board of Boiler Rules*, as applicable.

51.00: continued

2. Where solar thermal systems involve matters of potable water and/or wastewater, *see*
248 CMR: *Board of State Examiners of Plumbers and Gas Fitters*.

Chapter 24: FUEL GAS

For the fuel gas provisions of Chapter 24 of 780 CMR 51.00, *see* 248 CMR: *Board of State Examiners of Plumbers and Gas Fitters*. Provisions of 248 CMR related to work otherwise governed by 780 CMR 51.00 shall be retained if not in conflict with other sections of 780 CMR 51.00.

Chapters 25 THROUGH 33: PLUMBING

For the plumbing provisions of Chapters 25 through 33 of 780 CMR 51.00, *see* 248 CMR 10.00: *Uniform State Plumbing Code*. Provisions of 248 CMR related to work otherwise governed by 780 CMR 51.00 shall be retained if not in conflict with other sections of 780 CMR 51.00.

Chapters 34 THROUGH 43: ELECTRICAL

For the electrical provisions of Chapters 34 through 43 of 780 CMR 51.00, *see* 527 CMR 12.00: *Massachusetts Electrical Code (Amendments)*. Provisions of 527 CMR 12.00 related to work otherwise governed by 780 CMR 51.00 shall be retained if not in conflict with other sections of 780 CMR 51.00.

Chapter 44: REFERENCED STANDARDS (no amendments)

APPENDICES

Appendix A: SIZING AND CAPACITIES OF GAS PIPING (Reserved)

Appendix B: SIZING OF VENTING SYSTEMS SERVING APPLIANCES EQUIPPED WITH DRAFT HOODS, CATEGORY I APPLIANCES, AND APPLIANCES LISTED FOR USE WITH TYPE B VENTS (Reserved)

Appendix C: EXIT TERMINALS OF MECHANICAL DRAFT AND DIRECT-VENT VENTING SYSTEMS (Reserved)

Appendix D: RECOMMENDED PROCEDURE FOR SAFETY INSPECTION OF AN EXISTING APPLIANCE SYSTEMS (Reserved)

Appendix E: MANUFACTURED HOUSING USED AS DWELLINGS (Adopted as revised)

AE102.2 Revise the section as follows:

AE102.2 **Additions, Alterations or Repairs**. Additions, alterations and repairs made to a manufactured home shall conform to 780 CMR 51.00 and the specialized codes.

AE201 Add two sentences to the definition of "MANUFACTURED HOME" as follows:

A manufactured home (mobile home) is not a manufactured building. For manufactured buildings, *see* 780 CMR 110.R3.

AE301.4 Reserved

AE302 through **AE307** Reserved

AE4

02

Rese

rved

AE5

05

Rese

rved

AE5

07

Rese

rved

51.0 : continued

Appendix F: PASSIVE RADON GAS CONTROLS (Adopted as revised)

AF101.1 Revise the section as follows:

AF101.1 General. This appendix contains minimum requirements for new construction in the high radon potential counties as listed in Table AF101(1) regardless of the radon levels at the site. These requirements are intended to provide a passive means of resisting radon gas entry and prepare the dwelling for post-construction radon mitigation, if necessary. *See* Figure AF102. Active construction techniques, rather than passive techniques, shall be permitted to be used where approved.

Alternatively, the passive system requirements of ANSI/AARST Standard Designation

#CCAH: *Reducing Radon in New Construction of One & Two Family Dwellings and Townhouses*, 2013 may be used for new construction in Zone 1, or approved equal system.

Irrespective of which approach is used, no testing is required as follows:

1. for the radon levels at the site prior to construction;
2. for the radon control system when completed; or
3. in the building after completion of the project.

Therefore, such testing shall not be a condition of issuing a certificate of occupancy.

AF102.1 Revise the definition of "GAS-PERMEABLE LAYER" as follows:

GAS-PERMEABLE LAYER. A gas-permeable layer shall consist of one of the following:

1. A uniform layer of clean aggregate that is not less than four inches (102 mm) thick. The aggregate shall consist of material that will pass through a two inch (51 mm) sieve and be retained by a ¼-inch (6.4-mm) sieve.
2. A uniform layer of sand (native or fill) that is not less than four inches (102 mm) thick and that is overlain by a soil gas collection mat or soil gas matting installed in accordance with the manufacturer's instructions. The soil

gas mat or matting shall be designed for this purpose and condition, and have the capacity to freely transport soil gases to the collection point from the most remote area.

AF103.2.2 Revise the subsection as follows:

AF103.2.2 Sumps. Sumps open to soil or serving as the termination point for subslab drain tile loops shall be covered with a gasketed or sealed lid. Sumps used as the suction point in a sub slab depressurization system shall have a lid designed to accommodate the vent pipe. Sumps used as a floor drain shall have a lid equipped with a trapped inlet. Drainage systems that lead outside the foundation walls shall be isolated or trapped so as not to short-circuit the depressurization system.

AF103.3.1 Revise the subsection as follows:

AF103.3.1 Soil-gas-retarder. The soil in basements and enclosed crawl spaces shall be covered with a soil-gas-retarder. The soil-gas-retarder shall be lapped not less than 12 inches (305 mm) at joints and shall extend to foundation walls enclosing the basement or crawl space. The soil gas-retarder shall fit closely around any pipe, wire or other penetrations of the material. Punctures or tears in the material shall be sealed or covered with additional sheeting. The membrane shall extend upward six inches and shall be sealed to the perimeter footing or wall with an ASTM C290 class 25 or higher sealant or equal.

AF103.3.2 Revise the subsection as follows:

AF103.3.2 "T" Fitting and Vent Pipe. A "T" fitting shall be inserted beneath the soil-gas- retarder and be connected to a three-inch minimum vertical vent pipe. The vent pipe shall extend through the conditioned space of the dwelling and terminate not less than 12 inches (305 mm) above the roof in a location not less than ten feet (3,048 mm) away from any window or other opening into the conditioned spaces of the building that is less than two feet (610 mm) below the exhaust point. The horizontal legs of the "T" fitting shall connect to two five-foot long pieces of four-inch diameter perforated pipe laid horizontally in a 50 in^2 bed of gravel, filled with the same gravel as used in the gas-permeable layer.

51.00: continued

AF103.4.2 Revise the subsection as follows:

AF103.4.2 Soil-gas-retarder. A soil-gas-retarder shall be placed on top of the gas-permeable layer prior to casting the slab or placing the floor assembly. The soil-gas retarder shall cover the entire floor area with separate sections lapped not less than 12 inches (305 mm) and shall extend upward six inches and be sealed to the wall with an ASTM C290 class 25 or higher sealant or equal. The soil-gas-

retarder shall fit closely around any pipe, wire, or other penetrations of the material. Punctures or tears in the material shall be sealed or covered. Under-slab insulation, if used, shall be placed on top of the sheeting.

AF103.4.3 Revise the subsection as follows:

AF103.4.3 "T" Fitting and Vent Pipe. Before a slab is cast or other floor system is installed, a "T" fitting shall be inserted below the slab or other floor system and the soil-gas- retarder. The "T" fitting shall be connected to a three-inch minimum vertical vent pipe. The vent pipe shall extend through the conditioned space of the dwelling and terminate not less than 12 inches (305 mm) above the roof in a location not less than ten feet (3,048 mm) away from any window or other opening into the conditioned spaces of the building that is less than two feet (610 mm) below the exhaust point. The horizontal legs of the "T" fitting shall connect to two five-foot long pieces of four-inch diameter perforated pipe laid horizontally in a 50 in^2 bed of gravel, filled with the same gravel as used in the gas-permeable layer.

Appendix G: PIPING STANDARDS FOR VARIOUS APPLICATIONS (Reserved)

Appendix H: PATIO COVERS (Adopted in full)

Appendix I: PRIVATE SEWAGE DISPOSAL (Adopted as amended)

AI101.1 Revise the section as follows:

AI101.1 Scope. Private sewage disposal systems shall conform to the requirements of 310 CMR 15.000: *The State Environmental Code, Title 5: Standard Requirements for the Siting, Construction, Inspection, Upgrade and Expansion of On-site Sewage Treatment and Disposal Systems and for the Transport and Disposal of Septage*, and any additional legal restrictions imposed by the municipal health department.

Appendix J: EXISTING BUILDINGS AND STRUCTURES (Adopted as amended)

AJ101.1 Revise the section as follows:

AJ101.1 General. The purpose of *Appendix J* is to encourage the continued use or reuse of legally existing buildings and structures. The provisions of *Appendix J* are intended to permit work in existing buildings that is consistent with the purpose of 780 CMR 51.00. Compliance with these provisions shall be deemed to meet the requirements of 780 CMR 51.00.

Features of existing construction which do not meet the requirements of 780 CMR 51.00 for new construction shall be presumed to have met the regulations, codes or laws in effect at the time of construction or alteration and, if so, shall be deemed to be existing nonconforming. Unless stated otherwise, nothing in *Appendix J* shall require the upgrading or replacement of any existing nonconforming feature or component of an existing building, provided the

feature, component or system is in serviceable condition. Components or features of an existing building which, in the opinion of the building official, are dangerous, unsafe, damaged, significantly deteriorated or which otherwise present a threat to occupants or to public safety shall be remediated in accordance with 780 CMR 51.00.

Any new building system or portion thereof shall conform to 780 CMR 51.00 for new construction to the fullest extent practicable. However, individual components of an existing building system may be repaired or replaced without requiring that system to comply fully with 780 CMR 51.00 unless specifically required by *Appendix J*.

For compliance of work governed byother codes, including the specialized codes, *see* section R101.4.

51.0 : continued

AJ102.1 Revise the section as follows:

AJ102.1 General. Regardless of the category of work being performed, the work shall not cause the structure to become unsafe or adversely affect the performance of the building; shall not cause a system regulated by 780 CMR 51.00 to become unsafe, hazardous, insanitary or overloaded; and unless expressly permitted by these provisions, shall not make the building any less compliant with 780 CMR 51.00 or to any previously approved alternative arrangements than it was before the work was undertaken.

AJ102.3 Revise the section as follows:

AJ102.3 Smoke, Carbon Monoxide and Heat Protection. Smoke, carbon monoxide and heat protection shall be provided when required by this section and designed, located and installed in accordance with the provisions for new construction. *See* sections R314, R314.5, and R315.

AJ102.3.1 through AJ102.3.3 Add the subsections as follows:

AJ102.3.1 Adding or Creating One or More Sleeping Rooms.

1. **Single-family Dwelling.** When one or more sleeping rooms are added or created to an existing dwelling, the entire dwelling shall be provided with smoke, heat and carbon monoxide protection.
2. **Two-family Dwelling.** When one or more sleeping rooms are added or created to one dwelling unit, that unit shall be provided with smoke, heat and carbon monoxide protection detectors. When sleeping rooms are added or created to both units, the entire building shall be provided with smoke, heat and carbon monoxide protection.
3. **Townhouses Dwelling Unit.** When one or more sleeping rooms are added or created to an existing dwelling unit, the entire unit shall be provided with smoke, heat, and carbon monoxide protection.

AJ102.3.2 Complete Reconstruction. If a dwelling or townhouse building undergoes reconstruction such that more than 50% of walls and ceilings are open to framing, then the entire existing building shall be provided with smoke, heat and carbon monoxide protection.

AJ102.3.3 Adding an Attached Garage. If a garage is created under or attached to an existing dwelling unit, a heat detector shall be provided in the garage in accordance with R314.8.

AJ102.7.1 Add subsection as follows:

AJ102.7.1 Documentation of Compliance Alternatives. The building official shall ensure that the BBRS is provided with information regarding any and all compliance alternatives accepted by the building official within two weeks of acceptance.

AJ102.10 through AJ102.14 Add sections and associated subsections as follows:

AJ102.10 Unlined Chimneys. Where new HVAC appliances are connected to an unlined chimney, the chimney lining requirements of 248 CMR: *Board of State Examiners of Plumbers and Gas Fitters* or 527 CMR: *Board of Fire Prevention Regulations*, as applicable, and those of the appliance manufacturer, shall be satisfied. If the appliance is a solid fuel-burning appliance, the chimney shall be relined to satisfy requirements both of the code for new construction and those of the manufacturer, as applicable.

AJ102.11 Latent Conditions. When latent conditions are observed and which are determined by the licensed construction supervisor, the owner or the building official to be dangerous or unsafe, or when a component or system is determined to be unserviceable, said conditions shall be corrected in accordance with applicable provisions of 780 CMR 51.00. A building permit shall be obtained or the building permit shall be amended in accordance with the provisions of section R105 in order to reflect the necessary required work and the approval shall be obtained from the building official prior to commencement of the corrections.

Exception: If the public safety so warrants, corrective actions are permitted to be made prior to amending the building permit application, providing that the building official is notified in writing within 24 hours of actions taken pursuant to this exception. This exception shall not be construed as to authorize constructive approval nor set aside the requirements to amend the permit application, nor shall the authority of the building official to enforce 780 CMR 51.00 be abridged. Such corrective actions shall be documented by the construction supervisor or the owner and submitted to the building official within 48 hours of the completion of the action under this exception. Such corrective work shall not be concealed until the building official has inspected and approved

the work.

AJ102.12 Energy Efficiency. *See* section N1100.

AJ102.13 Roofing and Reroofing. *See* Chapter 9 of 780 CMR 51.00 generally and section R907.

AJ102.14 Accessibility for Persons with Disabilities. Accessibility requirements shall be in accordance with 521 CMR: *Architectural Access Board.*

AJ103.1 Revise the subsection as follows:

AJ103.1 General. If a building permit is required at the request of the prospective permit applicant, the building official or his or her legal designee may meet with the prospective applicant to discuss plans for any proposed work under these provisions prior to the application for the permit. The purpose of this preliminary meeting is for the building official to gain an understanding of the prospective applicant's intentions for the proposed work, and to determine, together with the prospective applicant, the specific applicability of these provisions.

AJ301.1.2 Delete the subsection in its entirety. **AJ301.2 and AJ301.3** Delete in their entirety.

AJ401.2.1 Add the subsection as follows:

AJ401.2.1 Emergency Escape and Rescue Windows. For one- and two-family dwellings and townhouses of no more than three stories in height, all emergency escape windows from sleeping rooms shall have a net clear opening of 3.3 ft^2 (0.307 m^2). The minimum net clear opening shall be 20 inches by 24 inches (508 mm by 610 mm) in either direction except that windows in sleeping rooms of existing dwellings which do not conform to these requirements may be replaced without conforming to these dimensional requirements, provided that the windows do not significantly reduce the existing opening size.

Exception: Replacement windows utilized as emergency escape and rescue windows, other than double-hung windows, shall generally conform to the requirements of this section without conforming to the cited dimensional requirements, provided that such replacement windows do not significantly reduce the existing opening size.

AJ401.4 Replace the subsection as follows:

AJ401.4 Structural. Unreinforced masonrytownhouse buildings shall have parapet bracing and wall anchors installed at the roofline whenever a reroofing permit is issued if required by 780 CMR 34.00: *Existing Structures*. Such parapet bracing

and wall anchors shall be of an approved design. Where renovations may decrease the structural performance of the existing building, such proposed activities shall be evaluated by a registered design professional for adequacy, prior to such actual structural renovation.

AJ501.1 Revise the subsection as follows:

AJ501.1 Newly Constructed Elements. Additions, newly constructed elements, components and systems shall comply with the requirements of 780 CMR 51.00.

Exceptions:

1. Operable windows may be added without requiring compliance with the light and ventilation requirements of section R303.
2. Newly installed electrical equipment shall comply with the requirements of section AJ501.5.

51.00: continued

AJ501.4 Revise the subsection as follows:

AJ501.4 Structural. The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the alteration and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of 780 CMR 51.00. Where alterations may decrease the structural performance of the existing building, such proposed activities shall be evaluated by a registered design professional for adequacy, prior to such actual structural alterations.

AJ501.5 Revise the subsection as follows:

AJ501.5 Electrical Equipment and Wiring. *See* 527 CMR 12.00: *Massachusetts Electrical Code (Amendments).*

AJ601.5 Add a subsection as follows:

AJ601.5 Structural. Where reconstruction may decrease the structural performance of the existing building, such proposed activities shall be evaluated by a registered design professional for adequacy, prior to such actual structural reconstruction.

AJ701 Add a section as follows:

AJ701 HISTORIC BUILDINGS

AJ701.1 General. For historic building requirements, *see* 780 CMR 34.00: *Existing Building Code.*

Appendix K: SOUND TRANSMISSION (Adopted in full)

Appendix L: PERMIT FEES (*see* 801 CMR 4.00: *Rates*, as applicable) (Reserved)

Appendix M: HOME DAY CARE – R-3 OCCPANCY (Reserved)

Appendix N: VENTING METHODS (Reserved)

Appendix O: AUTOMATIC VEHICULAR GATES (Adopted

in full) **Appendix P: SIZING OF WATER PIPING SYSTEM**

(Reserved) **Appendix Q** (Reserved)

Appendix R: LIGHT STRAW-CLAY CONSTRUCTION (Reserved)

Appendix S: STRAWABLE CONSTRUCTION (Reserved)

Appendix T: RECOMMENDED PROCEDURE FOR WORST-CASE TESTING OF ATMOSPHERIC VENTING SYSTEMS UNDER N1102.4 OR N1105 CONDITIONS # 5 ACH_{50} (Reserved)

Appendix U: SOLAR-READY PROVISIONS – DETACHED ONE- AND TWO-FAMILY DWELLINGS, MULTIPLE SINGLE-FAMILY DWELLINGS (TOWNHOUSES) (Adopted as

amended) Delete Appendix U

and replace as follows:

SECTION AU101 (RB101) SCOPE

AU101.1 (RB101.1) General. These provisions shall be applicable for new construction, except additions.

51.0 : continued

SECTION AU102 (RB102) GENERAL DEFINITIONS

SOLAR-READY ZONE. A section or sections of the roof or building overhang designated and reserved for the future installation of a solar photovoltaic or solar thermal system.

SECTION AU103 (RB103) SOLAR-READY ZONE

AU103.1 (RB103.1) General. New detached one- and two-family dwellings, and multiple single-family dwellings (townhouses) with not less than 600 ft^2 (55.74 m^2) of roof area oriented between 110° and 270° of true north shall comply

with sections AU103.2 through AU103.8 (RB103.2 through RB103.8).

EXCEPTIONS:

1. New residential buildings with a permanently installed on-site renewable energy system.
2. A building with a solar-ready zone that is shaded for more than 70% of daylight hours annually.
3. Buildings and structures as designed and shown in construction documents that do not meet the conditions for a solar-ready zone area.

AU103.2 (RB103.2) Construction Document Requirements for Solar-ready Zone. Construction documents shall indicate the solar-ready zone where applicable.

AU103.3 (RB103.3) Solar-ready Zone Area. The total solar-ready zone area shall consist of an area not less than 300 ft^2 (27.87 m^2) exclusive of mandatory access or set back areas as required by 527 CMR: *Board of Fire Prevention Regulations*. New multiple single-family dwellings (townhouses) three stories or less in height above grade plane and with a total floor area less than or equal to 2,000 ft^2 (185.8 m^2) per dwelling shall have a solar-ready zone area of not less than 150 ft^2 (13.94 m^2). The solar-ready zone shall be composed of areas not less than five feet (1,524 mm) in width and not less than 80 ft^2 (7.44 m^2) exclusive of access or set back areas as required by 527 CMR.

AU103.4 (RB103.4) Obstructions. Solar-ready zones shall consist of an area free from obstructions, including but not limited to vents, chimneys, and roof-mounted equipment.

Note: Nothing in AU103.4 (RB103.4) shall require any construction documents to be redesigned or reconfigured so as to create a solar-ready zone area.

AU103.5 (RB103.5) Roof Load Documentation. The structural design loads for roof dead load and roof live load shall be clearly indicated on the construction documents.

AU103.6 (RB103.6) Interconnection Pathway. Construction documents shall indicate pathways for routing of conduit or plumbing from the solar-ready zone to the electrical service panel or service hot water system.

~~**AU103.7 (RB103.7) Electrical Service Reserved Space.** The main electrical service panel shall have a reserved space to allow installation of a dual pole circuit breaker for future solar electric installation and shall be labeled "For Future Solar Electric." The reserved space shall be positioned at the opposite (load) end from the input feeder location or main circuit location.~~

AU103.7 (RB103.7). Reserved

AU103.8 (RB103.8) Construction Documentation Certificate. A permanent certificate, indicating the solar-ready zone and other requirements of this section, shall be posted near the electrical distribution panel, water heater or other conspicuous location by the builder or registered design professional.

Appendix AA STRETCH ENERGY CODE

AA101 Purpose and Adoption. The purpose of the stretch energy code is to provide a more energy efficient code alternative for new buildings. The stretch energy code may be adopted or rescinded by any municipality in the commonwealth in the manner prescribed by law.

AA102 Applicability. Municipalities that have adopted the stretch energy code shall use the energy efficiency requirements of this appendix as provided in AA103 and AA104. These requirements replace all previous stretch energy code requirements.

51.00: continued

AA103 New Buildings.

AA103.1 R-use Buildings. In all R-use buildings, of four stories or less above grade plane with one or more dwelling units, each dwelling unit shall comply with IECC 2018 section ~~R1106~~ (R406~~)~~ of 780 CMR 51.00 as amended and all mandatory requirements of Chapter 13 and 51, as applicable.

AA103.2 Large Area and High Energy Use Buildings. All buildings over 100,000 ft^2, and new supermarkets, laboratories and conditioned warehouses over 40,000 ft^2 shall comply with 780 CMR 13.00: *Energy Efficiency* as amended and shall demonstrate energy use per ft^2 at least 10% below the energy requirements of ANSI/ASHRAE/IESNA 90.1 *Appendix G (as amended)* Performance Rating Method on either a site or source energy basis. The additional efficiency package options selected in accordance with C406.1 shall be included in calculating the baseline building performance value.

Exception: Exclusively R-use buildings complying with AA103.1 dwelling unit requirements.

AA103.3 Other New Buildings. New buildings not covered in AA103.1 and AA103.2 shall comply with 780 CMR 13.00: *Energy Efficiency as amended* or Chapter 11 of 780 CMR 51.00 as amended~~pplicable~~ based on the use and occupancy of the building.

AA104 Existing Buildings. For alterations, renovations, additions or repairs of existing buildings in these municipalities, the energy efficiency requirements of 780 CMR 13.00 as amended or Chapter 11 of 780 CMR 51.00 as amended shall be used as applicable based on the use and occupancy of the building.

APPENDIX AA STRETCH ENERGY CODE

AA101 Purpose and Adoption. The purpose of the stretch energy code is to provide a more energy efficient code alternative for new buildings. The stretch energy code may be adopted or rescinded by any municipality in the commonwealth in the manner prescribed by law.

AA102 Applicability. Municipalities that have adopted the stretch energy code shall use the energy efficiency requirements of this appendix as provided below. These requirements replace all previous stretch energy code requirements.

AA103 New Buildings.

AA 103.1 R-use Buildings. In all R-use buildings of four stories or less above grade plane with one or more dwelling units, each dwelling unit shall comply with IECC 2018 section ~~N1106 (~~R406~~)~~ of 780 CMR 51.00: *Massachusetts Residential Code* as amended and all mandatory requirements of Chapter 13 and 51, as applicable.

AA103.2 Large Area and High Energy Use Buildings. All buildings over 100,000 ft^2 and new supermarkets, laboratories and conditioned warehouses over 40,000 ft^2 shall comply with 780 CMR 13.00: *Energy Efficiency* as amended and shall demonstrate energy use per square foot at least 10% below the energy requirements of ANSI/ASHRAE/IESNA 90.1 APPENDIX G-2013 (as amended) Performance Rating Method on either a site or source energy basis. The additional Efficiency Package Options selected per C406.1 shall be included in calculating the baseline building performance value.

Exception: Exclusively R-use buildings complying with AA103.1 dwelling unit requirements.

AA103.3 Other New Buildings. New buildings not covered in AA103.1 and AA103.2 shall comply with 780 CMR 13.00: *Energy Efficiency* as amended or Chapter 11 of 780 CMR 51.00: *Massachusetts Residential Code* as ~~applicable~~ amended based on the use and occupancy of the building.

AA104 Existing Buildings. For alterations, renovations, additions or repairs of existing buildings in these municipalities, the energy efficiency requirements of 780 CMR 13.00: *Energy Efficiency* as amended or Chapter 11 of 780 CMR 51.00: *Massachusetts Residential Code* as amended shall be used as applicable based on the use and occupancy of the building.