Plan Review Checklist On-Line Submission

Interior Renovation

9th edition, Massachusetts State Building Code

Part 1. Interior Renovation Plan Review

The following symbols indicate in this plan review items have been satisfied for the purpose of plan review. ✘ ✔

If section states "complete" that indicates that section is satisfied move to next section.

If unchecked that item needs to be addressed.

Property Address:_____

Review by:_____

Review Date Started:_____ Completed Review Date_____

E-Mail Address _____ Phone Number _____

☐ Permit Application Denied

☐ Approved as submitted

☐ Approved as noted

☐ Resubmit with requested information for approval

Project Information:

- o Type of Proposed Work
- o Market or Affordable
- o Is Owner doing the Work
- o Property Type
- o Total Number of Dwellings
- o Brief Description of Proposed Work

Site Information:

- o Lot Area
- o Frontage
- o Zoning Overlay District
- o Flood Zone Deignations
- o Water Supply
- o Sewage Disposal system
- o Zoning District
- o Flood Zone Information
- o Construction Type

Structure Setbacks:

- o Required Front Yard Setbacks
- o Required Right Side Yard Setbacks
- o Required Left Side Yard Setbacks
- o Required Rear Yard Setbacks
- o Provided Front Yard Setbacks
- o Provided Right Side Yard Setbacks
- o Provided Left Side Yard Setbacks
- o Provided Rear Yard Setbacks

Construction Details:

- o # Bedrooms
- o # Garage
- o Finished Basement s.f.
- o Occupancy Load 3rd Floor
- o Unfinished Bsmt s.f.
- o 2nd floor s.f.
- o Occupancy Load 2nd Floor
- o Other Space s.f
- o Occupancy Load Other Space
- o Use Group
- o # Floor
- o Total Decks & Porches s.f.
- o 3rd Floor s.f.
- o 1st Floor s.f.
- o Occupancy Load 1st Floor
- o Building Code Edition
- o Garage s.f.
- o Subdivision Name
- o Sprinkler System
- o IEBC Prescriptive Compliance Narrative if under IBC, this includes repairs, alterations, relocation of buildings, additions and change of occupancy.

Estimated Construction Cost:

- o Building
- o Plumbing
- o Fire Protection
- o Electric
- o Mechanical (HVAC)
- o Total Estimated Cost

Registered Home Improvement Contractor:

- o Contractor's Name
- o Business Name
- o Registration #
- o Registration Expiration Date
- o Mailing Address
- o Preferred Telephone #
- o Email

License Construction Supervisor:

- o Name
- o Mailing Address
- o Phone #
- o Email
- o License #
- o Expiration Date

Homeowner License Exemption:

- o Name Homeowner
- o Phone #
- o Homeowner Signature

☐ **1. Completed Energy Conservation Code Collection Checklist**

Score + Store

Residential Data Collection Checklist
2018 International Energy Conservation Code - Residential Provisions
Climate Zone 5

Building ID: _____ **Date:**_____ **Name of Evaluator(s):**_____

Building Contact (optional): Name:_____ **Phone:**_____ **Email:**_____

Building Name: _____ **Address:**_____ **Conditioned Floor Area:**_____ ft^2

Stretch code requirement for new construction please provide the projected HERS rating from the Accredited HERS Rater that you hire.

Accredited HERS Rater

Compliance Approach (check all that apply): ☐ Prescriptive ☐ Trade-Off ☐ Performance ☐

Compliance Software Used: _____ **Above-Code Program:**_____

Building Type: 1-and 2-Family, Detached: ☐ 1-and 2-Family Dwellings ☐ Modular ☐ Townhouse

Multifamily: ☐ Apartment ☐ Condominium

Foundation Type: ☐ Basement ☐ Slab ☐ Conditioned Crawl Space ☐ Floor Over Unconditioned Space

Project Type: ☐ New Building ☐ Existing Building Addition ☐ Existing Building Renovation

2015 IECC Section #	Pre-Inspection/Plan Review	Prescriptive Code Value	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
103.1, 103.2 [PR1][1]	Construction drawings and documentation demonstrate energy code compliance for the building envelope.				☐ Complies ☐ Does Not Comply ☐ Not Observable ☐ Not Applicable	
103.1, 103.2, 403.7 [PR3][1]	Construction drawings and documentation demonstrate energy code compliance for lighting and mechanical systems. Systems serving multiple dwelling units must demonstrate compliance with the IECC Commercial Provisions.				☐ Complies ☐ Does Not Comply ☐ Not Observable ☐ Not Applicable	
302.1, 403.6 [PR2][2]	Heating and cooling equipment is sized per ACCA Manual S based on loads calculated per ACCA Manual J or other methods approved by the code official.		Heating: Btu/hr_____ Cooling: Btu/hr_____	Heating: Btu/hr_____ Cooling: Btu/hr_____	☐ Complies ☐ Does Not Comply ☐ Not Observable ☐ Not Applicable	

TABLE R402.4.1.1 AIR BARRIER AND INSULATION INSTALLATION[a]

Shower/tub on exterior wall	The air barrier installed at exterior walls adjacent to showers and tubs shall separate the wall from the shower or tub.	Exterior walls adjacent to showers and tubs shall be insulated.

2. **Construction Drawings**

Cover Sheet

- o Address with Assessor Map and Parcel
- o Date of latest revision
- o Window, door, skylight and cladding schedule showing associated positive and negative design pressure and zone number including manufacturers specifications cut sheets on each type window, door, skylight and cladding being installed.
- o Floor Plan (all levels)
- o Building dimensions Space designation – (ie: living room, kitchen, bedroom, storage, etc.)
- o Demonstrate light and ventilation compliance §R303.1 or §IBC 1203 & 1205
- o Door and window location per schedule on cover sheet, identifying egress windows and safety glazing
- o Show attic access size and location
- o Location and type of smoke detectors and carbon monoxide detectors & completed install permit.
- o 903.2 Where Required. Automatic sprinkler systems in new buildings and structures shall be provided in the locations described in Table 903.2 and this Section. Note. Automatic sprinkler systems may be required by M.G.L. c. 148, § 26A, 26A½, 26G, 26G½, 26H or 26I, or M.G.L. c. 272 §§ 86 through 86d
- o Emergency escape and rescue required. Basements, habitable attics and every sleeping room shall have at least one operable emergency escape and rescue opening.
- o IBC 102.6:4 Existing Means of Egress, Lighting and Ventilation

102.6:4 Existing Means of Egress, Lighting and Ventilation. The building official may cite any of the following conditions in writing as a violation and order the abatement within a time frame deemed necessary by the building official to make the building environment safe, healthy, or otherwise comply with 780 CMR: 1. Inadequate number of means of egress. 2. Egress components with insufficient width or so arranged to be inadequate, including signage and lighting. 3. Inadequate lighting and ventilation. Where full compliance for means of egress, lighting and ventilation are not practical, the building official may accept compliance alternatives, engineering, or other evaluations that adequately address the deficiency.

R308.4.5 Glazing and wet surfaces. Glazing in walls, enclosures or fences containing or facing hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, showers and indoor or outdoor swimming pools where the bottom exposed edge of the glazing is less than 60 inches (1524mm) measured vertically above any standing or walking surface shall be considered to be a hazardous location. This shall apply to single glazing and each pane in multiple glazing.

Exception: Glazing that is more than 60 inches (1524mm), measured horizontally and in a straight line, from the water's edge of a bathtub, hot tub, spa, whirlpool or swimming pool or from the edge of a shower, sauna or steam room

3. Mechanical Plan Review

- o Identify the location and supply spec's of required mechanical ventilation of bathrooms at the ventilation rates noted in 780 CMR §R303.3
- o 2015 IECC R403.5 Mechanical ventilation (Mandatory). Location of unit must be marked on plans Specification along with installation maunal must be submitted.
- o If utilizing existing equipment, you MUST submit a heat loss calculation showing existing loads and also proposed new loads (manual J)
- o Heating system location, size (BTU), location of fuel source and method of combustion air make-up (manual S)
- o Location of ductwork…if installed in exterior wall, the Energy Conservation Application Form noted above must reflect decreased R-value or indicate method of maintaining exterior wall integrity (manual D)
- o Completed Mechanical Permit application

4. Framing Plan

- o Conventional framing plan all levels including roof, showing size, spacing and direction of structural members
- o Conventional header and beam sizes, spans and bearing clearly showing load path to foundation (ie: doorways, windows, archways, overhead doors, covered porches and decks and structural ridges). Detail showing insulated headers.
- o Engineered floor framing and roof truss plans stamped by a professional registered engineer in the Commonwealth of Massachusetts.
- o Raised rafter construction details stamped by a professional registered engineer in the Commonwealth of Massachusetts.
- o Floor Fire Protection §R302.13
- o Engineered manufactured beams and columns stamped by a registered professional engineer in the Commonwealth of Massachusetts. Calculations shall be site specific verifying they generated the loads indicated and that the input and output data provided is site specific to include verification of load path and column adequacy to foundation…disclaimers of any kind shall be rejected.

Any person who is aggrieved by an interpretation, order, requirement, direction or failure to act by any state or local agency or official charged with the administration or enforcement of the State Building Code (780 CMR) or any of its rules and regulations, may file an appeal with the Building Code Appeals Board as prescribed in M.G.L. c. 143, §100

CHECKLIST FOR APPLICATION CHECKLIST

1. Owner's Authorization Form Completed
2. Signed contract between homeowner and the registered home improvement contractor subject to MGL c 142
3. In lieu of submitting a signed contract as the owner of record, the owner shall submit Signed Affidavit for Home Improvement Contractor Required Contract Terms
4. Electronic Set of plans for the building or structure
5. Mechanical Application (If applicable)
6. Smoke Detector Application, Sprinkler install approval from The Fire Department
7. Copies of Variances or Special Permits Granted by The Planning Board or Zoning Board of Appeals or any other Town Boards
8. Worker's Compensation Certificate
9. Insurance Binder from Insurance Company made out to the Town
10. Homeowner License Exemption (If applicable)
11. Copy of Construction Supervisor License
12. Copy of Home Improvement Registration (If applicable)
13. Statement for disposal of debris (If applicable)
14. Massachusetts Energy Compliance Report
15. Site Plan prepared by Engineer or Registered Land Surveyor showing location of buildings or structure to lot lines also proposed location of new structures as per 780 CMR 110.10

International Existing Building Code
Understanding the Compliance Methods

The 2018 edition of the International Building Code (IBC) requires the use of the International Existing Building Code (IEBC) when a project intends to modify an existing building. This includes repairs, alterations, relocation of buildings, additions and change of occupancy.

The IEBC is beneficial to the building owner and the project design team because it allows "flexibility to permit the use of alternative approaches to achieve compliance with minimum requirements" that may be otherwise impractical with full enforcement of the IBC. The intent of the IEBC is still to maintain minimum levels of safety regarding "fire prevention, structural and life safety features of the rehabilitated building."

In order to use the IEBC, the design professional and/or applicant must select one of three compliance methods that they feel best suits their scope of work. The three potential compliance methods offer different strategies for dealing with the application of code requirements to the existing building.

Option 1: Prescriptive Compliance Method (Chapter 5)

Generally when using the Prescriptive method, the proposal must comply with the provisions of the International Building Code (IBC). This method has some specific requirements for structural upgrades depending on project scope, and offers some minor exceptions to full compliance with the IBC in certain scenarios.

Option 2: Work Area Compliance Method (Chapter 6 through 12)

This method categorizes alterations into three levels, based on the scope of work. Each level has specific code provisions and exceptions that may apply to the area of work, the affected building story, or the entire building depending on the scope of the alteration. Projects in levels 2 and 3 must comply with the previous levels' requirements.

Level 1 – Minor alterations that include the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose.

Level 2 – Alterations that include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment. The majority of tenant improvements fall into this level. Depending on the scope of work, upgrades to sprinkler systems, open floor penetrations, and/or means of egress may be required.

Level 3 –Alterations, including those mentioned in other levels, where the work area exceeds 50% of the building area. In certain situations, this level may require improving safety of certain building features beyond the work area.

Option 3: Performance Compliance Method (Chapter 13)

The Performance method may be the most flexible, but also requires the most thorough evaluation of the existing building. Using a numerical scoring system involving 19 safety parameters and the degree of code compliance for each, this method allows the project design team to show that alterations, while not meeting new construction requirements, improve the current situation.

Natural Light and Ventilation Worksheet

Space Designation	Floor Area Square Feet	Light (8% Required)	Light (Actual)	Ventilation (4% Required)	Ventilation (Actual)

Natural and Mechanical Ventilation:

Each habitable room must be provided with natural ventilation through open screened window or door areas that total at least 4% of the floor area of the room. As an alternative, the code permits mechanical ventilation. Most major manufacturers of ventilation equipment offer balanced supply and exhaust fan units for this purpose. Simple exhaust fans are not permitted since the resulting negative house air pressure is a safety hazard and infiltration is insufficient. Another code permitted alternative is to provide outside air directly into the return air plenum of a forced air HVAC unit in the required amount of 15 CFM per bedroom plus 15 CFM. Mechanical ventilation equipment manufacturer's specifications must be provided. (AJ501.6)(2009 IRC, R303)

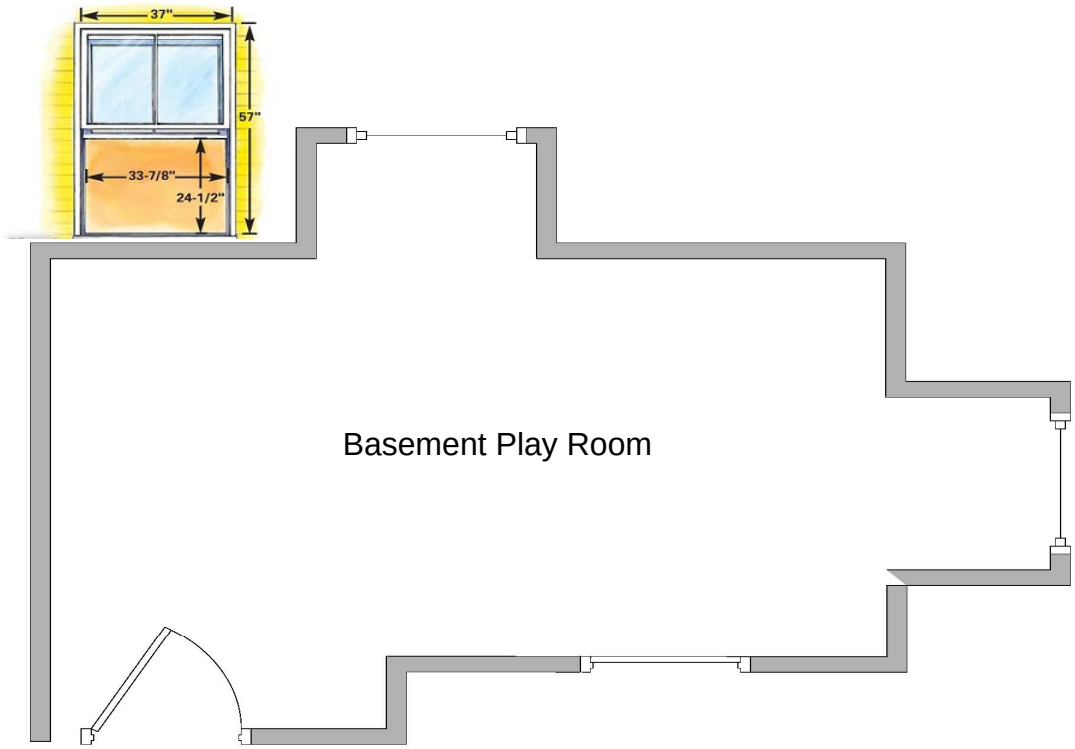
Equation below is how to convert square inches to square footage
1st Equation is for natural light (8%)
37 inches x 57 inches = 2,109 square inches / 144 = 14.65 square footage
2nd Equation is for natural ventilation (4%)
33.87 inches x 24.50 inches = 828.8 square inches / 144 = 5.76 square footage

This space has three windows one door with no screen.
Natural light would be each window 14.65 time three window equals 43.95 square feet
Natural ventilation would be each window 5.76 times three windows equals 17.28 square feet

example of natural light and ventilation work sheet

Space Designation	Floor Area Square Feet	Light (8% Required)	Light (Actual)	Ventilation (4% Required)	Ventilation (Actual)
Basement Play Room	336	26.88	43.95	13.44	17.28

typical double hung



SECTION R314 SMOKE ALARMS

R314.1 Smoke detection and notification. All smoke alarms shall be listed in accordance with UL 217 and installed in accordance with the provisions of this code and the household fire warning *equipment* provisions of NFPA 72.

R314.2 Smoke detection systems. Household fire alarm systems installed in accordance with NFPA 72 that include smoke alarms, or a combination of smoke detector and audible notification device installed as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms. Where a household fire warning system is installed using a combination of smoke detector and audible notification device(s), it shall become a permanent fixture of the occupancy and owned by the homeowner. The system shall be monitored by an *approved* supervising station and be maintained in accordance with NFPA 72.

Exception: Where smoke alarms are provided meeting the requirements of Section R314.4.

R314.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
3. On each additional *story* of the *dwelling*, including *basements* and habitable attics but not including crawl spaces and uninhabitable *attics*. In *dwellings* or *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.

When more than one smoke alarm is required to be installed within an individual *dwelling* unit the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit.

R314.3.1 Alterations, repairs and additions. When *alterations*, repairs or *additions* requiring a *permit* occur, or when one or more sleeping rooms are added or created in existing *dwellings*, the individual *dwelling unit* shall be equipped with smoke alarms located as required for new *dwellings*.

R314.5 Heat Detector. A single heat detector listed for the ambient environment shall be
installed in:
1. Any integral garage ("garage under") or attached garage to the main house (detached garages do not require a heat detector).
2. A new addition attached garage to an existing dwelling. If the existing house contains a fire detection system that is compatible with the garage heat detector, then the detector shallbe interconnected to the existing system. Where the existing fire detection system is not compatible with the garage heat detector, the garage heat detector shall be connected to a sounder (occupant notification appliance) or compatible heat detector containing a sounding device, located in the dwelling and within 20 feet (6096 mm) of the nearest door to the garage from the dwelling. The required garage heat detector is neither required to incorporate audible alarm notification nor is any audible notification device required in the garage.

R314.5.1 Heat Detector Placement. For flat-finished ceilings, the single heat detector shall be placed on or near the center of the garage ceiling. For sloped ceilings having a rise to run of greater than one foot in eight feet (305 mm in 2438 mm), the single heat detector shall be placed in the approximate center of the vaulted ceiling but no closer than four inches (102 mm) to any wall.

R315.1 Governing Regulations. Carbon monoxide alarms (alarms) for new construction and
existing dwellings shall be furnished, installed and maintained by the owner in accordance with this section, M.G.L. c. 148, § 26F½ , 527 CMR 31.00: *Carbon Monoxide Alarms*, 248 CMR, NFPA 720 and the manufacturer's instructions.

R315.2 Installation Locations. One alarm shall be installed on each story of a dwelling unit, including basements and cellars (but not including crawl

spaces and uninhabitable attics). When mounting a carbon monoxide alarm on a story with a bedroom, the alarm, shall be located outside of bedrooms but no further than 10 feet of any bedroom door. If a combination smoke/carbon monoxide alarm is used, its location must comply with this section.

R315.3 New Construction. Alarms shall either be an interconnected 120V or part of a low voltage combination system or wireless system. Alarms shall have secondary (standby) power from monitored batteries in accordance with NFPA 72. For fire alarm control units (panels) and wireless systems, the panel battery shall serve as the source of secondary power. Alarms shall be UL 2034 or UL 2075 listed, as applicable. Alarms may be interconnected with fire alarms providing they are compatible and the fire alarms take precedence.

R315.4 Existing Dwellings. For existing dwellings, carbon monoxide alarms shall be provided in accordance with Section 315 for new construction, as applicable, for the following circumstances:
1. When one or more bedrooms are added or created in a dwelling unit, the entire dwelling
shall be provided with alarms.
2. When a dwelling unit undergoes complete reconstruction such that all walls and ceilings are open to framing the entire dwelling unit shall be provided with alarms.
3. In an existing two-family dwelling, when one or more bedrooms are added or created in both of the two dwelling units, the entire building shall be provided with alarms.
4. In a townhouse building when one or more bedrooms are added or created in a dwelling then that dwelling unit shall be provided with carbon monoxide alarms.
5. In a townhouse building when a dwelling unit undergoes complete reconstruction such that all walls and ceilings are open to framing, that dwelling unit shall be provided with carbon monoxide alarms.

COMMONWEALTH OF MASSACHUSETTS
STATE BUILDING CODE
780 CMR, 9th Edition

FIRE PROTECTION SYSTEMS
CHAPTER 9

GUIDELINES FOR THE PREPARATION
OF FIRE PROTECTION SYSTEM
NARRATIVE REPORTS

780 CMR – 901.2.1 Tier One Construction Documents
Process by which Building Permit is obtained

780 CMR – 901.2.1 Tier Two

Process by which Building Department & Fire Department approves the commencement of the installation of fire protection systems
page 15 of Construction Control Document and page 8 of Fire Protection Narrative must be sign by Building Department also Fire Department before any fire protection commencement begins

After Tier One is obtained, Tier Two is the process by which the Building Department and Fire Department approves the commencement of the installation of fire protection systems

To All Contractors: FIRE DEPARTMENT CONSTRUCTION AND TIER 2 REQUIRED DOCUMENTS

For Plan Review, Approval to Install and Rough Inspections

- **Two (2) Copies of all required Tier II documents shall be submitted in separate, marked packets to the Fire Department and the Building Department, respectively, for all required and non-required Fire Protection/Detection Systems.**
- **All documents shall be submitted prior to receiving an Authorization of Commencement to Install, as depicted in the Building Packet, page 8, Construction Control Document or page 15 of the Fire Protection Narrative.**
- **Fee Schedule: Fire Alarm Systems (Residential and Commercial) $50.00 per Unit.**
  One Unit=one apartment, one condo, one commercial tenant space.
  Sprinkler System-$100.00

The fee shall accompany the Fire Department required document packet, in the form of a check, made out to the Town of Grafton. This check shall be separate from, and in addition to, any Building Department fees.

- **All required documents are to be submitted as a package. Partial submittals will not be accepted.**
- **Required documents are also needed for modifications, alterations, additions or deletions of an existing system.**

If a Fire Department pre-construction conference is needed, contact the Fire Department business office.

FIRE PROTECTION SYSTEMS NARRATIVE REPORTS

The interaction of fire protection systems can be extremely complex. The detection of a fire in a building by an automatic device may be designed to initiate other life saving fire protection systems or devices, or other mechanical systems

In some circumstances life different individuals or different companies may design safety systems, which are required to interact. The narrative report is intended to provide a single document, which describes the design rationale of all fire protection systems and the interface between systems. It is an invaluable tool for building officials, fire officials, building owners and maintenance personnel.

780 CMR 901.2.1 Tier One Construction Documents requires the submission of so called fire protection systems narrative reports as part of the construction documents, which must be filed in order to obtain a building permit or must be submitted along with the requirements for a Tier Two Review for aprroval prior to installation of any Fire Protection Equipment.

The following document has been developed to assist end users of the Massachusetts State Building Code in the preparation "***narrative reports***" for fire protection systems as required in 780 CMR 9 (Section 901.2.1)

NARRATIVE REPORTS
As regulated by 9th Edition, 780 CMR, Section 901.2.1

GENERAL
901.2.1.1 Fire Protection Construction Documents:

1. a. Basis (methodology) of design for the protection of the occupancy and hazard for compliance with 780 CMR and applicable NFPA Standards, in the form of a narrative report.

   b. Sequence of operation of all fire protection systems and operation in the form of a narrative report.

   c. Testing criteria to be used for final system acceptance in the form of a Narrative report.

DEFINITION
A Narrative Report is a written summary description of the building or structures and all applicable fire protection systems and related operational features. Explains the analogy and methodology used by the designers in the design of the systems for the protection of the building occupants and emergency response personnel for all required and non-required fire protection systems.

APPLICABILITY
Required fire protection system installed in new buildings or structures, required fire protection system modification or addition to an existing system, non-required fire protection systems regulated by regulatory codes other than 780 CMR or voluntarily installed require approval, permits and inspections by building and fire department officials.

The enforcement provision of 780 CMR requires that a narrative report be submitted as part of the plan review and prior to the issuance of building permit. Administratively depending on the project size, scope and complexity, the code official should make a reasonable decision as to require a full comprehensive or partial report.

A Narrative Report for detached one and two family dwellings is not a requirement of Section 901.2.1 Tier One Construction Documents, however a limited version of the narrative Report identifying the type and style of household fire warning systems to be installed is recommended.

PURPOSE
Expedites the plan review and inspection process by building and fire officials. It is maintained on file for use at time of final inspection and periodic reviews during future field inspections. Is referenced to insure that all future modifications, alterations, addition

or deletion to the original systems are current and that the original system's protection and required system performance are not compromised or have been altered without building or fire official prior review.

Building owners benefit by knowing how their building's fire protection and life safety systems work and provides procedures and method for testing and maintenance. A copy of the Narrative Report should be kept on the premises and be available for review prior to testing or proposed modifications to be made to any portion of the building's life safety systems

DEVELOPMENT & SUBMISSION FORMAT

Prepared by a qualified, identified individual who has "taken charge" in the development of an entire coordinated "report" which includes all information regarding the design basis, sequence of operation and testing criteria associated with all required or non-required fire protection systems set forth by applicable Laws, Regulations and Standards.

The "report" is to be submitted with plans and specifications for review and approval by code officials prior to the issuance of a building permit. The Narrative Report should be written in a clear conversational format. The installation specification is not considered a Narrative Report. The Narrative Report is a stand alone document, 8½" x 11" for filing and ease of use by code officials, including an administrative cover page identifying the project name, building address, name, address and phone number of the individual who has "taken charge" in the preparation of the Narrative Report.

COMMENTARY

The promulgation of the State Building Code is written in a way to require uniformity for all buildings and structures regardless of local conditions. The intent of the codes can be subjective and interpretative by both designers and code officials; uniformity is not always necessarily achieved.

The Narrative Report attempts to clarify to the code official the designer's intent and his interpretation of the code. The code official may agree or disagree with the designer's interpretation.

Historically the requirements for fire protection systems have become site specific and building code requirements not uniformly enforced. The size of the community, fire department staffing, fire department equipment availability and suppression tactics established by the local fire department have effected the uniformity of enforcement. Site specific requirements less than or more than the building code requires may have reasonable intent; however, this type of enforcement in some cases has proven to be controversial in the applicability of code uniformity.

The Narrative Report can be a valuable instrument when accurately prepared; it will establish a line of communication between the designer and the code official resulting in what the building code mandates, uniformity and consensus in the interpretation of the codes.

901.2.1 Tier One Construction Documents
(a.i..) BASIS (METHODOLOGY) OF DESIGN
This portion of the narrative report should be broken down into the following six sections

SECTION 1 901.2.1 Tier One Construction Documents - Building Description
This section identifies specific features of a building that contributes to the overall understanding of the fire protection systems and features required to be identified in the Narrative Report

a) Building "Use" Group
b) Total square footage of building
c) Building height
d) Number of floors above grade
e) Number of floors below grade
f) Square footage per floor
g) Type(s) of occupancies (hazards) within the building
h) Type(s) of construction
I) Hazardous material usage and storage
j) High storage of commodities within a building usually over 12 ft.
k) Site access arrangement for emergency response vehicles

SECTION 2 - Applicable Laws, Regulations and Standards
This section identifies regulatory codes and standards that may have an impact in the design and plan approval of the required and the non-required fire protection systems as per the requirements of 780 CMR, requiring the preparer of the Narrative Report to have had conducted a comprehensive code research

a) 780 CMR code sections "Fire Protection System Requirements" and Edition

b) NFPA Standards and Edition used for design of each specific fire protection system

c) Applicability of Sections of M.G.L., Chapter 148, "Fire Prevention"

d) Applicability of Sections of 527 CMR "Fire Prevention Regulations"

e) Applicability of "approved" local by-laws or ordinances *(state specific ordinance)*

f) Applicability of specialized codes (plumbing, elevator, and electrical, architectural access)

g) Applicability of Federal Laws (OSHA, ADA, etc.)

SECTION 3 - Design Responsibility for Fire Protection Systems

This section identifies the accountability for a specific fire protection system design and the accountability for the integration of the fire protection systems constituting a building life safety system.

a) The professional engineer (PE) fully designs (complete layout and calculations) and specifies the fire protection system or systems to be installed, reviews and approves the installing contractor's shop drawings. The PE is considered the engineer of record and certifies system installation for code compliance at completion.

b) The professional engineer (PE) provides a partial design and specifies the design criteria to be used by the installing contractor who finalizes the system layout, provides calculations to confirm the design criteria. The PE reviews and approves the installing contractor's final layout and calculations. The PE is considered the engineer of record and certifies system installation for code compliance at completion.

c) Design-build, the installing contractor completely designs and specifies (develops a full system layout, design criteria and calculations), installs the stem and certifies system installation for code compliance at completion. There may be a professional engineer involved but not necessarily.

Whichever above method is selected, the project requires an engineer of record to assume responsibility for the coordination of each specific fire protection system requiring integration, forming an entire building life safety system.

SECTION 4 - Fire Protection Systems to be Installed

This section identifies key "performance design criteria" and features for each specific fire protection system

a) Water supply, fire mains and hydrants
b) Automatic sprinkler systems and components
c) Standpipe systems and components
d) Fire alarm systems and components
e) Automatic fire extinguishing systems
f) Manual suppression systems
g) Smoke control/management systems
h) Kitchen cooking equipment and exhaust systems
I) Emergency power equipment
j) Hazardous material monitoring equipment
k) Seismic considerations

The description (specific features) for the above fire protection systems shall also indicate if the system is:

- Required by Regulations, Law or "approved" by-law or Ordinance
- Non-required, developer provides voluntarily
- A complete new system
- An addition or expansion to existing system
- A modification/repair to existing system
- Level of protection to be provided, 100% or partial protection or exempt by regulatory code

SECTION 5 - Features Used in the Design Methodology

This section identifies the designer's intent in the overall design and criteria development of either a required or a non-required system.

a) Building occupant notification and evacuation procedures
b) Emergency response personnel, site and systems features
c) Safeguards, fire prevention and emergency procedures during new construction and impairment plans associated with existing system modifications.
d) Method for future testing and maintenance of systems and documentation

SECTION 6 - Special Consideration and Description

This section identifies the designer's intent to deviate from prescriptive requirements of regulatory codes and standards with alternative methods.

a) Application of "performance-base design" in lieu of prescriptive code requirement
b) Interpretation/clarification between designer and code officials
c) Waiver or variance sought through the regulatory appeal process

901.2.1 Tier One Construction Documents

(1. a. ii.) SEQUENCE OF OPERATION

This portion of the narrative report is a difficult section to write as it entails the specific operation of system devices and equipment and their related integration.

SECTION 1

a) An operational description of either a system or specific devices within a system and the "resulting action" associated with the operation of the system or specific devices

b) The operational description shall include all interconnected (integrated) fire protection systems and devices required or non-required forming an entire building life safety system

c) All signage indicating equipment location, operational and design features and certified documents attesting to system installation integrity

This section of the narrative report can be brief as in a simple system such as a one story 15,000 sq.ft. mercantile building with only a sprinkler system and fire alarm notification devices. Or complex, such as in a 25 story high-rise hotel with fire pumps, emergency generator, fire alarm and sprinkler zones, automatic standpipes, automatic voice and manual evacuation signals, smoke management system, automatic elevator recall, special extinguishing systems, remote annunciation, automatic locking devices, alarm retransmission methods and emergency response procedures.

The sequence of operation of a building life safety system, particularly with complicated systems must be reviewed and understood by code officials. A team approach should be used by developers, designers, equipment suppliers, contractors including code officials to clearly describe and understand the proper operation of the integrated systems.

When a complex system is proposed, the initial narrative report of the "sequence of operation" should be viewed only as a draft. At various stages of installation modifications may be made. The designers should submit a final narrative for approval by the code officials prior to witnessing a system acceptance.

Communication between the developers and code officials is an important element particularly in this phase, as the building codes and the NFPA Standards tend to be flexible and interpretative.

901.2.1 Tier One Construction Documents
(1. a. iii.) TESTING CRITERIA
This portion of the narrative report should be broken down into the following three sections

SECTION 1 - Testing Criteria
This section identifies the individual in charge who will coordinate the final acceptance testing and witnessed by appropriate code officials

Personnel

a) Identification of professional in charge for setting up and coordinating all testing

b) Method of verification and confirmation by professional in charge that all fire protection systems, equipment and devices have been individually tested and tested as an entire system when specific systems are integrated to form a building life safety system

c) Method of coordination by professional in charge of all contractors, equipment distributors and code officials required to perform and witness all testing, testing

dates and times, notification to public utilities, personnel required to perform all required testing as a system or individual system component testing

SECTION 2 - Equipment and Tools

This section will identify the necessary equipment available on site at time of witnessing the operational features of the fire protection systems, integrated building life safety and systems that require validation from code officials to expedite the acceptance testing.

a) Identification of equipment and procedures to be used to verify system performance

Example:

Manufacturer's instructions
Specifier's special instructions
Approved Narrative Report, sequence of operation section
Smoke machines
Smoke candles
Sound meters
Fire hoses, nozzles
Flow measuring devices
Gauges
Voltage meters
Magnets
Communication radios
Fire department equipment
Special tools
Notification announcements

SECTION 3 - Approval Requirements

This section identifies all the "close-out" documents for the code officials' departmental records

a) Establish method of approval required (verbal or written) from code official if system satisfies all operational code compliance requirements

b) Establish method of remedial action when a system or portion of a system fails to operate satisfactorily

c) Documentation to be submitted to code officials at completion verifying that systems are in compliance with all laws, regulations and standards and pre-approved narrative reports

d) Documentation as required by 780 CMR, Section 901.2.1

e) Documentation to be submitted to code officials listing names, addresses and telephone number of personnel for emergency notification

DEFINITIONS

Fire Protection Systems - Automatic sprinkler systems, fire detection system, fire alarm notification system, smoke control system, kitchen hood suppression system, etc.

Building Life Safety System - A combination of fire protection systems and other building fire protection features such as automatic door closers, emergency generators, emergency egress lighting, elevator systems, etc., interconnected or integrated with multiple fire protection systems functioning simultaneously when activated.

Preparer of Narrative Report - An individual who has taken charge of a project and has knowledge of required and non-required fire protection systems and buildings life safety systems. *The designer in charge of a specific design for a fire protection system may prepare their portion of the Narrative Report to be submitted to the individual who has "taken charge". The individual who has "taken charge" shall compile the data from the designer of each system and prepare a single, comprehensive and coordinated final Narrative Report describing each system* and when applicable a description of how each system interfaces with the building life safety system's integration and sequence of operation. The take charge individual may be the architect, engineer of record, and the designer of any of the fire protection systems or an independent qualified consultant.

REQUIREMENTS TO OBTAIN INSTALLATION OF FIRE PROTECTION EQUIPMENT PERMITS
FROM
THE BUILDING DEPARTMENT

2. Tier Two, Shop Drawings - Prior to installation of fire protection systems, shop drawings, where applicable, shall be submitted to the *building official* and fire official and shall contain, but not be limited to; detailed design layout, equipment specifications, system sequence of operation, and analysis to substantiate the design. Shop drawings shall note the name(s), license number(s) and license expiration date(s) of the contractor(s) installing the fire protection systems.

Exception. For shop drawings of Fire Alarm and Detection Systems *see* section 907.1.2 for applicable requirements.

3. Tier Three, Record Drawings - As built plans shall be provided to the building owner for all fire protection and life safety systems that are sealed as reviewed and approved by the *registered design professional* or legally recognized professional performing Construction Control. Where changes to original shop drawings are minor, a list of as-built changes shall be permitted to be submitted where sealed and reviewed and approved by the *registered design professional* or legally recognized professional performing Construction Control.

Enclosed in this packet for your convenience is the required fire protection construction document check list.

REQUIRED FIRE PROTECTION CONSTRUCTION DOCUMENTS

- All documents shall be submitted prior to the installation of all required and non-required fire protection/detection systems. A building permit **shall be obtained prior to installation**.
- This includes: modification, alterations, additions or deletions to an existing system.

This check sheet is to accompany the submittal of all required documents for plan approval and review.

******All required documents are to be submitted as a package. Partial submittals will not be accepted.

All installations shall be done according to the provisions of M.G.L. Chapter 148, CMR's 780 and 527 and NFPA.

	REQUIRED DOCUMENTS	**Included**	**Missing**	**N/A**
1.	**PLANS-** 1set of wet stamped plans shall be submitted with catalog sheets of all devices; In addition to the number of sets the contractor would want returned after markup/review.			
2.a.	**Narrative Report-**Basis of design for the protection of the occupancy and hazards.			
b.	Narrative is to include: scope of work to be performed, use group, building construction type and hazard use group.			
c.	Narrative is to include sequence of operation of all fire protection systems.			
d.	Narrative is to include testing criteria to be used for final system acceptance.			
3.	A copy of the **State License** of every person who will be working on systems.			
4.	Plans shall include **Building & Site Access** for firefighting and rescue vehicles and personnel.			
5.	Plans shall include **Hydrant** location and water supply information.			

	REQUIRED DOCUMENTS	Included	Missing	N/A
6.	Plans shall include **Automatic Sprinkler System-***type/description and design layout* of all equipment.			
7.	Plans shall include **Automatic Sprinkler System-***control equipment* location.			
8.	Plans shall include **Kitchen Extinguishing System(s)-***type/description and design layout* of equipment.			
9.	Plans shall include **Kitchen Extinguishing System(s)-***control equipment* location.			
10.	Plan shall include **Automatic Standpipe System-** *type/description and design layout* of equipment.			
11.	Plan shall include **Standpipe System-**type and location of hose valve(s).			
12.	Fire Department **Siamese Connection-**type and location. When was flow test taken? Where was flow test taken from?			
13.	**Fire Protective Signaling System-** Type/Description and design layout of Fire Protective Signaling System(s).			
14.	**Fire Protective Signaling System-**Control Equipment and remote annunciator location.			
15.	**Fire Protection System(s)-**equipment room location.			
16.	**Fire Protection System(s)-**equipment identification and operational signs.			
17.	**Fire Protection System(s)-**alarm/ supervisory signal transmission method and location.			
18.	**Auxiliary Equipment-**Life Safety Systems required to be integrated as part of the fire protective signaling system.			
19.	**Smoke Control or Exhaust System-** *type/description and design layout* of equipment.			
20.	**Smoke Control or Exhaust System-***control equipment* location.			

780CMR – 901.2.1 Tier Two Process
Approves the commencement of the installation of
Fire protection systems
Page 15 of Construction Control Document and page 8 of Fire Protection
Narrative must be sign by Building Department also Fire Department
Before any fire protection commencement begins
Tier Two is the process by which the Building Department and
Fire Department approves the commencement of the installation of fire
protection systems

To All Contractors:

FIRE DEPARTMENT CONSTRUCTION AND TIER 2 REQUIRED DOCUMENTS

For Plan Review, Approval to Install and Rough Inspections

- Two (2) Copies of all required Tier II documents shall be submitted in separate, marked packets to the Fire Department and the Building Department, respectively, for all required and non-required Fire Protection/Detection Systems.

- All documents shall be submitted prior to receiving an Authorization of Commencement to Install, as depicted in the Building Packet, page 8, Construction Control Document or page 15 of the Fire Protection Narrative
- Fee Schedule: Fire Alarm Systems (Residential and Commercial) $50.00 per Unit. One Unit=one apartment, one condo, one commercial tenant space. Sprinkler System-$100.00

The fee shall accompany the Fire Departmentrequired document packet, in the form of a check, made out to the Town of Grafton. This check shall be separate from, and in addition to, any Building
Department fees.

- All required documents are to be submitted as a package. Partial submittals will not be accepted.
- Required documents are also needed for modifications, alterations, additions or deletions of an existing system.

If a Fire Department pre-construction conference is needed, contact the Fire Department business office.

APPROVAL COMMENCEMENT to INSTALL FIRE PROTECTION SYSTEMS

Required information for Tier Two Review as per Chapter 9 Section 901.2.1(2)

Date:_____

Project Name: _____

Project Location _____

Contractor Name: _____

Address: _____

City_____ State_____ Zip_____

Tel No_____ Fax No_____

Contractor License Number: _____License Expiration Date:_____

Installing Contractor Name: _____

Installing Contractor License Number: _____License Expiration Date:_____

FIRE PROCTECTION CONTRACTOR RESPONSIBILITIES

IN ACCORDANCE WITH THE MASSACHUSETTS STATE BUILDING CODE I WILL PERFORM THE CONTRACTORS SERVICES REQUIRED AS FOLLOWS:

1.Execution of all work in accordance with the approved construction documents.
2.Execution and control of all methods of construction in a safe and satisfactory manner in accordance with all applicable local, state, and federal statutes and regulations.
3.Upon completion of the construction, I shall to the best of his knowledge and belief that such has been done in substantial accord with 780 CMR Massachusetts State Building Code 8th Edition.

_____

Signature of Responsible Party Date

_____

Building Department Approval Date

_____

Fire Department Approval Date