DEPARTMENT OF NEIGHBORHOOD DEVELOPMENT

DESIGN

REQUIREMENTS

& GUIDELINES

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This is a working version of the DND Design Requirements & Guidelines as DND is coordinating final edits with its partner funders and housing development agencies.
# TABLE OF CONTENTS

I. **MASSACHUSETTS MULTIFAMILY NEW CONSTRUCTION DESIGN REQUIREMENTS & GUIDELINES, AS DEVELOPED WITH DHCD, MASSHOUSING, AND MHP**  
   1

II. **APPENDIX A: EXAMPLE UNIT LAYOUT DIAGRAMS**  
    21

III. **DEPARTMENT OF NEIGHBORHOOD DEVELOPMENT DESIGN & CONSTRUCTION REVIEW PROCESS**  
    27  
    A. DESIGN SUBMISSION REQUIREMENTS  
       27  
    B. DESIGN REVIEW PROCESS  
       28

IV. **DEPARTMENT OF NEIGHBORHOOD DEVELOPMENT DESIGN REQUIREMENTS FOR EXISTING BUILDINGS AND SPECIAL OCCUPANCIES**  
   29  
   A. DESIGN REQUIREMENTS FOR REHABILITATION & PRESERVATION  
      29  
   B. DESIGN GUIDELINES FOR SPECIAL OCCUPANCIES  
      31
Massachusetts Multifamily New Construction
DESIGN REQUIREMENTS & GUIDELINES

Developed by DHCD, DND, MassHousing, and MHP

This is a working draft and should not be considered a final version of the Massachusetts Multifamily New Construction Design Requirements & Guidelines.

TABLE OF CONTENTS

1. INTRODUCTION 2
2. CODE COMPLIANCE 3
   A. FEDERAL 3
   B. MASSACHUSETTS 3
   C. LOCAL (CITY) 3
   D. EXISTING STRUCTURES 3
3. PRIORITIES 4
   A. ENERGY CONSERVATION 4
   B. REDUCTION OF CARBON FOOTPRINT 4
4. DESIGN REQUIREMENTS 5
   A. DESIGN REQUIREMENTS FOR RESIDENTIAL OCCUPANCY 5
   B. DESIGN REQUIREMENTS FOR SPECIAL OCCUPANCIES 7
5. DESIGN GUIDELINES 8
   A. DESIGN GUIDELINES FOR SITE AND BUILDING PLANNING 8
   B. DESIGN GUIDELINES FOR UNIT LAYOUTS AND INTERIOR DIMENSIONS 11
   C. DESIGN GUIDELINES FOR MATERIALS AND SPECIFICATIONS 12
i. INTRODUCTION

This document was developed in conjunction with the Department of Housing and Community Development (DHCD), MassHousing, Massachusetts Housing Partnership (MHP), and the Department of Neighborhood Development, along with other design and construction professionals with the express goal of consolidating standards from various affordable housing agencies into a single document. DND has adopted these design requirements and guidelines as their Design Standards.

DOCUMENT APPROVAL

Department of Housing and Community Development (DHCD) Authorized Agent:

MassHousing Authorized Agent:

Massachusetts Housing Partnership (MHP) Authorized Agent:

Department of Neighborhood Development (DND) Authorized Agent:

The following DESIGN REQUIREMENTS & GUIDELINES are intended to promote the construction of affordable multi-family residential dwellings of high quality, which are cost-effective to build and operate, use reliable materials and systems, and support the activities of renters and buyers.

A major goal of these requirements and guidelines is to encourage the creation of multi-family residential dwellings which:

- Result in prudent and economical construction
- Are sensitive to existing residential building types, existing massing, setbacks, siting and open space elements of the neighborhood.
- Make intelligent use of the interior and exterior space to enhance the quality of life of residents and neighbors.
- Encourage sustainability strategies which result in low maintenance costs, energy efficiency, and minimal environmental impact on public infrastructure.

This document makes a distinction between Design Requirements - minimum requirements for the design and construction of new affordable multi-family residences which Architects and Developers must incorporate regardless of the specific conditions of the project; and Design Guidelines - design principles that provide guidance in the design and construction of affordable multifamily residences. Architects and Developers should adhere to these guidelines; however their actual application may differ based on the specific conditions of the project.

This document distinguishes four levels of compliance, which are described in descending order as follows:

- Compliance with Local, State, and Federal regulations
- Compliance with Priorities
- Compliance with Design Requirements
- Compliance with Design Guidelines
1. **CODE COMPLIANCE**

Projects must comply with the design and construction requirements of the most recent prevailing Federal, State and local codes and regulations, as applicable without limitation to the following list. Where there is conflict, the more stringent requirement should be applied.

**A. FEDERAL**

- Federal Fair Housing Amendments Act
- Section 504 of the Federal Rehabilitation Act
- Uniform Federal Accessibility Standards
- Americans With Disabilities Act
- U. S. Department of Energy
- Federal HUD Section 8 Housing Quality Standards
- Federal Environmental Protection Agency Regulations

**B. MASSACHUSETTS**

- MA State Building Code and Related Codes
  - Fuel Gas and Plumbing
  - National Electrical Code
  - MA Fire Regulations/National Fire Protection Agency
  - MA Elevator Regulations
  - MA Architectural Access Board Regulations
  - MA Stretch Code
  - MA State Sanitary Code
- MA Department of Environmental Protection
- MA Department of Public Health/ State Sanitary Code
- State HOME, HSF, FCF, and LIHTC Programs

**C. LOCAL (CITY)**

- Municipal Zoning Ordinances
  *(Note: For Boston, this may include Zoning Article 80 Project Review and Article 37 U.S. Green Building Council’s LEED Certification Equivalency:)*
- Local Historical Regulations and Restrictions
- Other regulatory guidelines from municipal agencies

**D. EXISTING STRUCTURES**

Where projects incorporate existing structures, the following also may apply:

- Federal Department of the Interior Standards for Rehabilitation
- Federal HUD Cost Effective Energy Standards in Rehabilitation Projects
- MA Historic Commission
2. PRIORITIES

While the development cost of affordable housing is a paramount concern, the following priorities of energy conservation and carbon footprint reduction must be incorporated into the development designs as required, or if not required, when it is financially feasible to do so and where there is an opportunity through special grants, utility programs, financing enhancements, funding conditions, or market demand to achieve higher levels of compliance.

A. ENERGY CONSERVATION

ENERGY STAR QUALIFIED HOMES

- For Multifamily homes, compliance with the applicable Energy Star Multifamily program is required to the greatest degree possible.
- Affordable housing developments designed to comply with the International Residential Code for One- and Two-Family Dwellings are required to comply with the US Environmental Protection Agency’s (EPA) ENERGY STAR for Qualified New Homes programs, or its equivalent, and be certified thereto.

Buildings are to be designed to be dry, clean, well ventilated, safe, free of contaminants, pest free and easily maintained.

COMMISSIONING

- Commissioning of building systems by qualified independent third parties should be included as a basic service.

B. REDUCTION OF CARBON FOOTPRINT

- While actual LEED “certification” by the USGBC is not required, sustainable features are highly desirable. Lenders, funders and local agencies may have specific requirements.
- Alternative energy generation should be actively pursued and incorporated into designs to offset the use of carbon emitting fuels.

C. UNIVERSAL DESIGN

- The application of “universal design principles” to newly constructed dwelling units is an important way to plan for the long term livability of dwelling units over the lifetime of residents. Development proposals are to focus on the creation of bathroom and kitchen layouts which normalize universal design principles and enhance accessibility across all project dwelling units. (See Appendix A: Example Unit Layout Diagrams and the Enterprise Aging in place guidelines.)
3. **DESIGN REQUIREMENTS**

This section sets forth the minimum Design Requirements for the design and construction of new affordable multi-family residences. Architects and Developers must incorporate these requirements into the design and construction of affordable multifamily residences regardless of the specific conditions of the project. *If any of these Design Requirements cannot be met, a narrative explanation must be provided.*

**A. DESIGN REQUIREMENTS FOR RESIDENTIAL OCCUPANCY**

*(See Appendix A: Example Unit Layout Diagrams for graphic illustrations of the Design Requirements and Guidelines.)*

**SOUND CONTROL**
- Architects and Developers are required to review construction detailing and materials for compliance with Code requirements for sound control.

**MULTI-FAMILY HOUSING DIMENSIONAL DESIGN REQUIREMENTS**

This section sets forth the minimum Design Requirements for major room sizes. Architects and developers must prepare furniture plans to ensure rooms can be reasonably furnished with clear space to maneuver around the furniture. *(See Section 4.B. Interior layouts & Dimensional Design Guidelines for overall Unit areas.)*

**Primary Bedroom**
- 12’ x 10’ clear dimension minimum (120 square feet)
- Accommodates one Queen bed, dresser, and 2 nightstands. 2 occupants

**Secondary Bedrooms**
- 10’ x 10’ clear dimension minimum (100 square feet)
- Accommodates two Twin beds, dressers, 2 desks and chairs. 2 occupants

**Living Room Area**
- 12’ min imum clear dimension along an exterior wall with access to natural light x 10’ clear minimum dimension in the opposing direction (150 square feet minimum)
- Accommodates a 6 foot couch, 2 easy chairs, coffee table, 2 side tables and a place for a television in a location viewable from the seating
- Locate living and dining areas in the corner of the building in corner units to benefit from windows facing multiple directions.

**Dining Room Area**
- 10’ x 10’ clear dimension minimum (100 square feet minimum )
- Accommodates an 8 person table in 3 bedroom, 6 person table in 2 bedroom, 4 person table in 1 bedroom
- In studios and 1 and 2 bedroom units only, the dining room may overlap with the living room as long as the total living and dining area is not less than 200 square feet with a 12’ clear width.

**Circulation**
- Unit circulation cannot require passing through the kitchen work area, except where practical in studio units.
- Minimize excess circulation to maximize unit efficiency.
- Provide furnishing plans in order to confirm circulation between furnishings.
Closets
- Closets in bedrooms shall be a minimum of 4’-0” x 2’-0” deep.
- An entry closet shall be provided and be a minimum of 3’-0” x 2’-0” deep.
- Closet shelving shall allow for a full bearing, white, vinyl coated steel shelf w/ integral clothes rod.
- Linen storage is to be provided as a cabinet or shelving within a closet, preferably not within a full bathroom. A separate closet is not required.

BATHROOMS
- Adequate storage shall be provided for bathrooms.
- No more and no fewer than one full bathroom shall be provided in 0, 1, or 2-bedroom units.
- One full-bathroom and one half-bathroom are required in 3-bedroom units. If cost effective, a 3-bedroom unit may provide a shower in the half bathroom.
- Two full bathrooms are required in 4-bedroom units. A shower stall may be substituted for one bathtub.
- Flooring under removable base cabinets in bathrooms must be installed at initial construction.
- Vanities should have HUD “Severe Use” cabinet construction, high pressure plastic laminate or solid-wood formaldehyde-free doors/frames, and door and drawer pulls.
- All full bathrooms shall receive 2-24” towel bars, one robe hook, a shower curtain rod, a toilet paper holder, and a mirror-front medicine cabinet.
- All half bathrooms shall receive 2 towel bars, one robe hook, a toilet paper holder, and a wall mirror.

UNIT VENTILATION
- Ducting shall run straight to the exterior, pulled tight without kinks or bends, with insulated duct discharging through a galvanized steel or aluminum wall or roof cap with a back draft damper, insect screen and wind hood.
- Range hoods shall be vented to the outdoors.
- Bathroom exhaust systems should operate continuously at low speed and include switching to boost discharge ventilation following occupant use by at least 50%.
- All bathroom doors shall be undercut 1/2” to promote required air changes throughout the unit.
- Fresh air must be mechanically supplied to units.

KITCHEN
- All applicable kitchen appliances shall be Energy Star rated.
- Ranges and range hoods shall be 24” minimum width in studio and one bedroom units, and 30” minimum in two, three and four bedroom units.
- Garbage disposers where provided shall be 1/2 HP minimum.
- Dishwashers where provided shall have water use of 6.0 gallon or less per cycle.
- Frost-free refrigerators shall have a separate freezer door and be 12 Cu. Ft. minimum in studio and one-bedroom units and 18 Cu. Ft. minimum in two- and three-bedroom units.
- Kitchen sinks shall be 22” x 30” x 6” minimum, 20 gauge minimum stainless steel accommodating a single handle faucet with spray attachment.
- Countertops should be one-piece square-edged, .050” thick minimum high pressure laminate, with 4” integral “post-formed”, coved backsplash. Adhesives should be water-based.
- Cabinets shall have high pressure laminate or solid wood formaldehyde-free doors and drawers with pulls and frames complying with ANSI/KCMA A161.1 cabinet specifications. Thermofoil and particle board cabinets are not allowed.
- All medium-density fiberboard (MDF) used in cabinetry and countertops shall be formaldehyde free.
- Finish flooring shall continue under refrigerators, stoves, dishwashers, and removable base cabinets in kitchens.
- Provide 18” to 24” minimum linear counter space on both sides of the range and sink. Where the range abuts a side wall (e.g., in an existing kitchen), there must be a washable, easily cleaned back material to provide protection against heat and grease, with ceramic tile or stainless steel preferred.
- A dishwasher is required in three- and four-bedroom units.
- Provide 12” – 18” vertical pantry cabinetry for storage rather than small closets.
LAUNDRY
- Washing machines must have braided stainless steel flex connection lines as a means of protecting against overflow and leaking that would damage other units.

GENERAL ELECTRICAL DESIGN REQUIREMENTS
- Individual electric metering shall be provided.
- Switched ceiling-mounted lighting fixtures are required in building common areas, entry foyers and unit hallways, stairwells, kitchens (including additional fixture over sink), dining areas, unit primary bedrooms, bathroom ceilings and over mirror, walk-in closets, and basements, including in renovation projects.
- Lighting in unit secondary bedrooms and living rooms shall be at minimum by switched control of one receptacle in a duplex receptacle box for connection to an occupant-furnished lamp.
- Provide appropriate technology for current telephone, data, and communications systems.
- Provide projects receiving low-income housing tax credits with a high-speed data network.
- Provide 20 amp circuits under windows for AC units in living room and master bedroom.

GENERAL MECHANICAL, ELECTRICAL & PLUMBING DESIGN REQUIREMENTS
For the following points, provide a narrative summary describing the parameters of the system, including but not limited to rationale for system and fuel selection, energy efficiency, metering (individual or common), controls, maintenance, operation, first cost vs. life cycle costing, utility cost impacts on owner and residents, utility or other rebates, and relationship to building envelope design. Calculations for systems may be requested by funding agencies.

- HVAC Design, Maintenance, and Operation
- Electrical and lighting designs
- Plumbing Fixtures and Fittings

B. ACCESSIBILITY REQUIREMENTS

The Department of Neighborhood Development seeks to enhance the access to accessible dwelling units in the City of Boston by increasing the number of fully accessible dwelling units required in DND development proposals. New construction rental projects consisting of 20 or more units with an elevator must include 10% fully accessible dwelling units. These project dwelling units similarly must comply with 521 CMR 9.4 Group 2 Dwelling Units. The percentage of dwelling units required by 521 CMR 9.7 Sleeping Accommodations for Persons who are Deaf or Hard of Hearing remains unchanged at 2% of the project dwelling units.
4. DESIGN GUIDELINES

The following Design Guidelines explain the context for Section 3, DESIGN REQUIREMENTS, and are intended to compliment them in the production of quality housing that is attractive, comfortable, and marketable to prospective residents or buyers. Project Developers and Architects should demonstrate compliance with the Design Guidelines described below. It may not be feasible to comply with all of these Design Guidelines, but the project sponsor or architect is encouraged to contact the funding agency to discuss their application where compliance is not possible.

A. DESIGN GUIDELINES FOR SITE AND BUILDING PLANNING

The following section outlines commonly understood principles for the building planning and site design of multifamily residential buildings. These principles are not applicable to every context, neighborhood or city, however they provide specific guidance intended to shape a development team’s proposal early in the development process.

SITE SELECTION AND DESIGN

- It is a primary concern that all housing developments fit into and enhance existing neighborhoods.
- In general, sites available for development are within the context of existing communities. Over time each of these neighborhoods has developed a unique character. Developers are encouraged to build upon the uniqueness of these neighborhoods and should seek to infill and knit together the residential fabric. Developers should consider the proximity of existing publicly-accessible or community-based open space, public transit and other basic community resources that are within walking distance of any proposed development.

STREET BOUNDARIES

- Use of clear boundaries to define public and private space can create a sense of security and comfort, especially in dense urban neighborhoods. The public (sidewalk edge) boundary of the property should be defined using fencing, walls, hedges, line of trees, or other landscape material. Street edge fencing material and height should match fencing in the neighborhood or complement with decorative metal picket fencing. Street edge fencing should not be opaque (solid) and should allow visual penetration.
- Street trees should be provided within the sidewalk or along the property line. The trees should match the existing street trees in type and planting detail. Existing rows of trees along a street should be maintained. Missing street trees should be provided, one tree per 25 lineal feet of street frontage. The caliper width should be not less than 3” diameter. Trees should be of indigenous species and of a growth form suited to their intended location and function. Tree species selection and locations should consider their proximity to underground utilities and overhead wires. Street and parking lot trees should be provided at a typical spacing of one tree per 15 ft for columnar shaped trees, 25 ft for small to medium height shade and ornamental trees, and 35 ft for large, spreading shade trees. Trees planted in close proximity to sidewalks should be deep-rooting species. Tree root barriers should be installed to protect adjacent pavements from tree root damage. Local zoning may take precedence over recommendations.

OPEN SPACE

- It is important that development proposals design open space for residents particularly for families and children who occupy the building(s). Areas for active and passive outdoor activities such as play space, sitting areas, and areas dedicated for gardening are highly desirable. In addition the public face of the project is to improve the quality of life along the street creating public spaces which are both
accessible and sustainable. Patios, front yards, porches, or balconies are smaller open spaces that assist in creating the community interaction of larger open spaces.

- Porch platforms for typical housing are best designed with a minimum drop of 6" below the first finished floor level, and for adaptable units, flush with the first finished floor level.
- All exterior dwelling entrances perform better in weather when they have weather-protected entries such as canopies, covered porches or recessed alcoves.

**Placement & Orientation of Buildings on Sites**

- New buildings should align with the front edge of existing buildings along a street. At a corner, buildings should be placed to align with existing buildings facing both streets. Foundation wall heights should mirror the foundation wall height of residential buildings within the neighborhood context. On sites without existing buildings, new buildings should be placed to be compatible with the neighborhood. Building siting should take into account pedestrian and vehicle access to the site, maintenance such as snow storage and trash areas.
- When appropriate to the context, buildings should be placed on the site with consideration to optimum solar orientation and wind direction for natural ventilation and wind buffering. Methods for providing summer shading for south-facing walls and the implementation of photovoltaic systems on the south-facing area of the roof should be considered. Interim measures such as solar-ready conduit runs, structural provisions, space allocation for converters and other equipment, etc., as part of the original construction are highly desirable.

**Parking**

- The zoning requirements for off-street parking should be achieved with parking layouts designed to minimize curb cuts and minimize area of pavement (impervious surfaces).
- Parking lots should be buffered from adjacent properties with landscaping. It is preferred that parking lots not be visible from the street.
- Bicycle storage is desirable in designated covered and secured parking areas.

**Storm Water Management**

**Surface Drainage**

- The area around the existing foundation should be graded away from foundations and compacted to insure proper drainage with emphasis on protecting the abutting properties or the public walkway. Where setbacks limit space to less than ten feet, provide swales or drains designed to carry water away from the foundation. Grade changes between existing properties are discouraged (mounds, retaining walls, etc.).
- Projects should attempt to maximize storm water management on-site through the use of low-impact development (LID) techniques such as rain gardens, bioswales, and permeable paving.

**Subsurface Drainage**

- Where required by site conditions, subsurface drainage should provide a continuous system connected to an engineered, subsurface drainage system. Piping should be surrounded with washed or clean gravel that is fully wrapped with fabric cloth.
- Sump pumps if required should have mechanically attached covers with full gasket seal.

**Landscaping**

- Landscaping should be compatible with the neighborhood, compliment the building, provide an important visual amenity to the residents, and provide adequate dedicated space for children to play. Landscaping should maximize the use of active and passive open space areas. All new planting should be allergy reducing. Landscape elements should be designed to reduce the heat island effect, assist in storm water management of the site, reduce the overall irrigation water demand and water budget, and provide opportunities for snow storage in the winter.
- A landscaping plan should be provided showing detailed drawings of landscaping, i.e., fencing, planting beds, trees and shrubs (species and sizes) retained and removed, play areas, lighting, seating, and all features adding to the aesthetic quality of the site and optimizing the use of the existing
property. Planting should not be permitted in July or August unless an appropriate watering/maintenance plan is provided. All plant material should be warranted for one year.

- All unpaved areas should be landscaped and planted. Landscaping materials and vegetation should conform to xeriscaping standards – a low maintenance landscaping methods which use 90% or more indigenous species that are drought-tolerant to conserve water used for irrigation to 20% or more reduction. Native plants and trees should be used. If portions of the lot are located on a steep slope, control erosion and reduce long-term runoff effects through use of terracing and retaining walls. The goal of these strategies should be to reduce overall irrigation demand by at least 55% of the overall irrigation water demand water budget. The estimates should be calculated and prepared by a landscape professional.

- The use of conventional turf should be limited to 20% or less of the total landscape area. Do not use turf in densely shaded areas and in areas with a slope of 25. When restoring grade, a 6” minimum deep planting bed of clean loam/topsoil should be included. New grade should slope away from buildings and fit the existing neighboring grades, particularly at street or sidewalk. Provide clean screened loam raked free of 1” or larger stones, building debris and other non-organic materials as needed. All lawns should be maintained by the general contractor until after the first mowing. Six inch plant cover should be maintained at sloped areas which are prone to washout. Avoid leaving straight sloped areas – instead try to include landform grading which is more resistant to erosion.

- Drip irrigation systems should be used if irrigation is required.

- Rainwater harvesting is strongly recommended.

- Parking birms, where employed, should be designed with more robust materials than sod, such as low maintenance shrubs or ground covers.

**BUILDING COMPOSITION, CHARACTER AND MATERIALS**

- The building’s characteristics and materials should focus on detailing of high quality rather than the use of many different materials for the exterior envelope. A single material should compose the majority of the building envelope. The character of the building is to be consistent on all sides of the building and offer the same engagement to the pedestrian at the front and the rear where appropriate. Blank, unfenestrated elevations should be avoided especially along public streets. Where possible the building composition should allow for cross ventilation. The ground floor commercial and retail uses are typically composed of taller spaces with large windows and signage bands above. They create a uniform character at the street edge and can be lit at night so as to contribute to ambient street lighting. Materials at the ground floor should be durable and are typical composed of masonry for longevity.

- Floor plans are more economical when they stack vertically.

- Communal facilities should be situated on the ground floor.

- Buildings should provide visual and noise barriers between public and private spaces. Sound control between units and public hallways or common spaces should be carefully considered.

- Basements should be provided as needed for mechanical systems, additional storage areas or programmatic spaces. However, areas subject to flooding may need to explore other options.

- Where applicable, extending eaves 18 inches to 2 feet keeps water away from the building.

- Historical District guidelines should be met where applicable. Wherever possible, window configuration and size should conform to that of the surrounding neighborhood. Where wood sashes are employed as an element due to historical considerations, it is preferred that these windows be supplied with true divided light configuration, and not snap-in muntin grilles.
B. DESIGN GUIDELINES FOR UNIT LAYOUTS AND INTERIOR DIMENSIONS

This section sets forth the minimum Design Guidelines for overall Unit areas.

(See Section 3.A. Design Requirements for Residential Occupancy for major room sizes and Appendix A: Example Unit Layout Diagrams for graphic illustrations of the Design Requirements and Guidelines.)

TARGET UNIT SIZES

- Unit square footage is measured from the inside face of the units’ bounding walls and includes usable storage space, stairwells and hallways inside the unit, as well as space occupied by interior walls within the unit. Fifty percent of the area under sloped ceilings with greater than 5'-0” clearance and less than 7'-6” clearance should be included in the unit square footage when considering the following guidelines:
  - Studio: 500 square feet
  - One bedroom: 600 square feet
  - Two bedroom: 750 square feet
  - Three bedroom: 1000 square feet
  - Four bedroom: 1,100 square feet

- These square footages represent target sizes. Units much larger or smaller than these targets will be questioned in terms of livability or excess cost.
- Architects and Developers are reminded that accessible (Massachusetts Architectural Access Board Regulations, Group 1) bathrooms are required in all units, unless the unit is fully accessible or a hearing/vision impaired unit. Provisions for adaptable bathrooms as defined in Federal Fair Housing Amendments Act should be incorporated in all designs.

UNIT LAYOUT BEST PRACTICES

- The type and configuration of kitchens in a development should be standardized to the greatest extent possible in order create efficiencies for purchasing cabinetry, appliances, equipment, and finishes.
- Circulation spaces should be designed efficiently and kept to a minimum and access to bedrooms and bathrooms should only be from circulation spaces.
- Living, dining, and kitchen areas should be proportional to the number of bedrooms. For example, 3 bedroom units should have larger common living spaces than 2 bedroom units. In family units, the living and dining areas must be distinct spaces.
- Bedrooms and living/dining areas must have direct access to natural light. Kitchens should also have direct access to natural light where possible, but if necessary can receive indirect natural light. Bathrooms and closets/mech. spaces are the best elements to locate farthest from natural light.
- Layout of buildings and units should optimize the use of space, provide spacious furnishable main living areas, and provide adequate storage. Project Architects and Developers must provide furnishing plans and demonstrate compliance with general principles for efficient layout of furniture commensurate with the probable number of occupants.

UNIVERSAL DESIGN PRINCIPLES

Circulation

- Stairways and ramps should have continuous handrails at switchbacks, and handrails should extend past the immediate end of the stair. Highlight the edges of stair treads, ramp edges, and landings to improve visibility.
• Consider providing a seating area near the elevators for residents who have difficulty standing for a long period of time.
• Consider providing power-assisted entry doors into the building.
• Provide flush thresholds and wide interior doors (3’0”).
• Provide door hardware that can be operated without tight grasping or twisting. U-shaped handles and levers are preferable to door knobs.
• Provide signage with high light-on-dark visual contrast, using a legible and appropriately sized font.
• Ensure all controls and devices are within accessible reach ranges. Provide light controls with large flat panels instead of small toggle switches.

Kitchen
• Provide lazy susans in corner base cabinets for more accessible storage. Provide drawers instead of base cabinets for easier access to storage.
• Provide under-cabinet lighting for increased visibility on kitchen work area.

Bathrooms
• Specify non-slip tile for flooring.
• Provide blocking in bathrooms for future installation of grab bars and shower seat.
• Ensure all tub and shower controls can be operated without tight grasping or twisting. Provide hand-held shower spray units instead of fixed shower heads.

C. DESIGN GUIDELINES FOR MATERIALS AND SPECIFICATIONS

The following are minimum Design Guidelines for the use of materials and specifications applied to multifamily new construction. The construction methodology or best practices may require a similar but alternative methodology that exceeds these Design Guidelines.

TESTING
• Concrete and soil compaction tests should be performed by a qualified testing lab for all buildings where applicable. Water leakage and/or masonry tests may be required in certain buildings.

SITE WORK

Demolition
• The removal of all hazardous materials such as asbestos containing materials (ACM’s) and lead based paint should be carried out according to all applicable State and Federal regulations, including but not limited to the Massachusetts Department of Public Health, Massachusetts Department of Environmental Protection and U.S. Environmental Protection Agency.
• The Developer should have a complete understanding of the scope of shoring or other site or building stabilization should they be required.
• The demolition and excavation scope is to include strategies which divert usable soils and debris from landfills through recycling or reuse where acceptable.

Soil Remediation – 21 E’s
• A summary and an accurate estimate of the 21-E soil remediation plan should be provided including grading plans and soil tests.

Fencing
• Use of vinyl-covered chain link fencing should be restricted to property edges that do not face a public street. Heavy-duty vinyl-covered chain link fencing at least 48” high, with 2” diameter, black, hot-dipped galvanized posts no more than 10’0” apart and set in concrete footings 8” in diameter and at least 30” below finish grade. Provide top and bottom rails as recommended by manufacturer. Include gates as required for access to walkways.
**CONCRETE**

**Foundation**
- Provide damp-proofed foundations resting on proper footings on undisturbed or properly compacted soil. Install Code-compliant thickness or greater extruded polystyrene at exterior of foundations from footing to grade level, after damp proofing has dried and prior to backfill.

**Basement Slabs**
- Install basement concrete slab on 4” bed of 0.5” diameter or greater clean or washed gravel, covered with minimum 6 mil polyethylene sheeting lapped minimum of 12” at joints; or alternately a minimum of 4” uniform layer of sand, overlain with a layer or strips of geo-textile drainage matting, covered with polyethylene sheeting lapped a minimum of 12” at joints. Two inch or greater Code-compliant thickness of expanded polystyrene rigid insulation (EPS) or extruded polystyrene insulation (XPS) to be installed under the entire slab to inhibit heat loss and moisture problems.
- Control/isolation joints should be provided in basement slabs. One inch XPS should be installed vertically at slab edge, 4” high, to provide a thermal break between the slab and the foundation wall.

**Moisture Content**
- Where flooring is to be installed above concrete or other poured installations (for example to control sound or provide fire protection), the moisture content should meet flooring manufacturers’ installation and warranty requirements. Adhesives used in the installation of flooring are subject to failure where concrete moisture content is present. Therefore, high performance concrete admixtures and/or spray moisture barriers free of all volatile organic compounds (VOC’s) and mold and bacteria growth inhibitors should be used to ensure moisture content acceptable for all flooring applications anticipated for the project.

**Walkways**
- Walkways should be 4” thick 4,000 psi (air-entrained) w/ broom finish, set on a 6” base of 3/4” crushed stone at all front entrances.

**Retaining Walls**
- Cast in place concrete, concrete interlocking concrete masonry units or fieldstone may be considered. The use of pressure-treated timbers is not allowed.

**ROUGH CARPENTRY**

**Lumber**
- Preservative pressure treated wood (PPT) should be used at all locations where framing joins exterior concrete. Where PPT lumber is used, this lumber should be arsenic free. Use alternatives to chromated copper arsenate treated wood (CCA).
- Wood product sheathing should be installed in strict accordance with manufacturers’ exposure, spacing, and span ratings and should be stamped by a recognized agency to show those ratings.

**Wood Blocking**
- Prior to insulating and finishing walls, solid 2” nominal blocking should be installed where accessories such as grab bars, towel bars, soap dishes and toilet paper holders are to be located. Insulation materials should be cut to fit around such blocking. Solid blocking should also be installed for future access accommodations such as installation of grab bars, adjustable counters, and hardware in conformance with FFHAA.

**FINISH CARPENTRY AND MILLWORK**

**Cabinetry**
- Cabinet drawers should be full-length (minimum of 18”) and designed with a durable, full length, side-mounted, double runner suspension system with manual positive stops. A full-length steel system with nylon wheels is preferred. Monorail systems are not recommended.
• Drawer bottoms should have a minimum thickness of: 1/8” tempered hardboard or plywood, or 1/4” inch hardboard or high-density particle board. Drawer sides should have a minimum thickness of 7/16”.
• Cabinet bottoms should have a minimum thickness of: 1/4” tempered hardboard or plywood, or 3/8” if hardboard or high-density particle board. Cabinet sides should have a minimum thickness of ½”. Toe kicks should be totally enclosed.
• Wall cabinets should have a minimum of two wood nailing strips (top and bottom). Minimum dimensions for nailers should be ¾” x ½”.
• All cabinet interiors should be treated with a water resistant substance.

Interior Door & Window Casing
• Window aprons and casings should be painted pine. Head and jamb with a minimum dim of 11/16”x2-1/2”. All window trim is to be back primed.

Baseboard Trim
• One piece pine molding, finger-jointed and primed, is preferred. Wood base should be used within units and is acceptable in all areas. “Speed-Base” or approved equal medium-density fiberboard (MDF) is also acceptable for painted applications.

BUILDING ENCLOSURE

Thermal and Moisture Protection
• An agency may request calculations to indicate the most cost effective insulation level or require other thermal and moisture protection measures, testing or inspection in conjunction with priorities or initiatives of the agency (See Section 2, Priorities).
• Alternatives to fiberglass batt insulation such as cellulose (recycled newsprint), cotton, wool, low-density open-cell polyurethane foam, and recycled-content glass fiberglass should be fully explored. On interior below grade walls, avoid using a separate vapor barrier or below grade wall insulation that can trap moisture inside wall systems.
• Please refer to http://www.buildingscience.com/resources for residential wall assembles.

Masonry
• Masonry veneer walls should be designed and constructed in conformance with the Brick Institute of American Technical Note 28B. This note requires among other items: 9 gauge corrosion resistant wire ties spaced a minimum of 24” on center vertically and horizontally securely attached to the stud for all veneer construction above 3 stories, air space be a minimum of 1” and be kept clear of mortar droppings, and flashing be provided at all horizontal surfaces including floor lines.
• Gypsum sheathed backup walls should be covered with 15# felt or have all penetrations and joints in the waterproof paper coating covered with mastic waterproofing.
• Aluminum flashing embedded in masonry should be protected against corrosion by protective coating.

Drainage Plane
• Provide a drainage plane between exterior cladding and house wrap material.

Ice Damming
• A self-adhered bituthene product should be used on the first 3'-0” of the roof sheathing on all pitched roof applications as well as 3'-0” to both sides of valleys and cheek walls prior to installing the metal drip edge, felt paper and shingles. Roof pitches less than 5 in 12 should be completely covered with the modified bitumen underlayment.

Flashings and Sealing Materials
• All plumbing, electrical and other penetrations of walls and floors should be sealed with polyurethane caulk. The use of exposed anodized aluminum flashing anywhere other than step flashing at dormer and cheek walls is strongly discouraged.
• The following lists of metals are suggested for the appropriate locations:
  o Chimney and cricket locations: sheet lead flashing.
  o Roof parapet cap flashing, EPDM coping or gravel stop, skylight flashing and base flashing, roof junctures, edges, windows, doors and other exterior openings: lead coated copper, or .050 Ga. factory-painted aluminum flashing.
• Provide continuous roll flashing at shed roofs. Flashing should be factory painted – no mill finish.
• All windows should receive pan flashing including pan flashing at sills, side flashing. Install pan flashing over building paper at sill and corner patches.
• All sealants should consist of low or no VOC’s.
• Seal all wall, floor, and joint penetrations with rodent-proof materials.
• All visible pipe penetrations through walls, floors, and cabinets (including interiors) should be sealed and covered with escutcheons.

Roof
• Provide step flashing at intersections of roof and walls with the exception of continuous flashing at metal and rubber membrane roofs. Use metal kick out flashing at the end of roof/wall intersections to direct water away from the wall.

Gutters and Downspouts
• All pitched roofs including porches should have gutters. Vinyl gutters are strongly discouraged. Gutters should be sized per Code requirements, and either seamless 0.032 Ga., factory-painted aluminum or match existing, securely fastened with straps of the same material and color as the gutters and sealed per manufacturer’s recommendations. Gutters/downspouts should not discharge into gutters or roof below.
• Downspouts should be sized to required roof surface area or should be .027 Ga. rectangular downspouts. Downspouts with type ‘A’ and ‘B’ elbows should be securely fastened to the sidewall with straps of the same material and color as the downspouts. Divert run-off water away from the structure at the base of each downspout using pre-cast concrete splash guards tied into the storm drainage where required or emptying to a lateral pipe that deposits water on a finish grade a minimum of 5’ from the foundation or connected to a pre-cast drywell. Downspouts should not discharge at or near entryways or sidewalks.

Asphalt Roof Shingles
• Fiberglass/asphalt roof shingles or equivalent, with a minimum 25 year warranty.

Flat Roofing
• Flat roof applications should receive light colored, fully adhered compounded rubber sheet elastomeric (EPDM) single membrane 0.060” thick sheets installed by the manufacturer’s certified installer, and applied per manufacturer’s warranted specifications. Large roof areas may consist of mechanically fastened and ballasted EPDM.

Siding
• All exterior siding materials should be back primed as required. All cladding material should be installed according to manufacturer’s specifications. When using trim with cementitious siding and/or panel, use 5/4” minimum thickness trim. The use of vinyl siding is not allowed.

Windows
• All windows should be Energy Star rated. Calculations may be requested by the Agency to indicate the most thermally cost effective window type.
• High performance window glazing – argon filled (Low-E) – is suggested, meeting or exceeding the following requirements: windows should have a National Fenestration Rating Council (NFRC) rating, Code-compliant Solar Heat Gain Coefficient (SHGC), and U-Factor to meet Energy Star rating.
• Caulk all window and door units with ethylene copolymer caulk, using backer rod closed cell polyethylene as needed. Window shim spaces should be filled with low-expanding foam sealer.
• Windows should have architecturally appropriate exterior casings on 3 sides and a protruding sill.
• All the aluminum windows should conform as a minimum to American Architectural Manufacturers Association (AAMA) commercial type and be for wind load based on AAMA formulae.
• For insulating glass, the warranty period should be 5 years after seal date permanently imprinted on unit, but not less than 5 years after date of substantial completion.
• All window treatments must be cordless for child safety. All windows should receive properly-sized window shades: fiberglass-coated, vinyl plastic, fire-retardant, fade-resistant roller shades with large diameter cotton cord attached to slat. Mini-blinds are discouraged since the blinds themselves may pose a choking risk.

Safety and Security
• Where safety is of concern, provide door and window contacts for a security alarm systems at ground floors and easily accessed lower floors. Exterior security bars and grills are discouraged.
• Window guards or limiters must be incorporated. In the City of Boston, special concern should be paid to window guards where children age 6 or under will be living. Guards should be operable-type interior aluminum or steel bars, clear window opening should be fully protected with no openings greater than 4 inches, tested to withstand 150 pounds pressure; with quick-release mechanism for emergency exiting (without use of tools or force). (Guardian Angel Window Guards meet the requirements of the “Kids Can’t Fly” standard and are preferred by some fire departments.) Guards should be located where the sill height is accessible to children and is more than 10 Ft. above the finish grade at the window. Heavy gauge “safety” screens do not meet guidelines for fall protection as suggested above.

DOORS
Steel Doors
• Provide 18 gauge interior door frame minimum and 16 gauge exterior door frame when set in exterior and interior masonry door sets.
• Exterior doors shall be ‘embossed,’ rather than use decorative plastic applied molding, to prevent sagging when used in conjunction with storm doors.

Storm/Screen Combination Exterior Doors
• The use of combination storm and screen doors at entries, front and rear is suggested for rental units. Such doors should be properly sized for the opening and the frame caulked with a phenolic caulking material (color to match). In applications involving owner/tenant semi-detached structures, units should require storm/screen doors front and rear.

Unit Entry Doors
• Provide steel entry doors. A peep hole shall be provided.

Interior Doors
• Provide solid core wooden doors.
• All doors shall have a baseboard mounted stop as part of the hardware package to prevent damage to wall finishes. Stop finish shall match door hardware finish.

Egress to Patio or Deck
• Sliding doors accessing the exterior are discouraged as they pose safety, security, and energy issues. Hinged doors with adjacent windows or sidelights are preferred. Patio/deck doors should step down to allow out-swinging doors to open when snow is present. Accessible units should have flush thresholds to the deck.

Door Hardware
• Exterior doors should provide 2-3/4” backset, lever handle hardware locksets, aluminum and hardwood adjustable thresholds and weather-stripping.
• Interior unit entry doors should provide 2-3/4” backset, lever handle hardware locksets and keyed-alike deadbolts, hardwood threshold.
• Bathrooms / Master bedrooms should provide privacy sets.
• Other interior unit doors (passage) may have knobs when not required to have lever handles at accessible units, but levers are encouraged throughout for universal design.
• Exterior or interior doors should have a baseboard-mounted stop to prevent damage to wall finishes. Stop finish should match door hardware finish.

FINISHES
• All finishes should be durable, easy to maintain, provide a long useful life, and eventually be recyclable. In addition, finishes should not contribute to respiratory ailments due to off-gassing over time. All adhesives should consist of low or no VOC’s.

Ceramic Tile
• At bathroom walls where ceramic tile is to be installed, it should be at least 4 1/4” square, should be installed in thin-set mortar on a cement backer board of 1/2” thick glass fiber-reinforced cement tile backer substrate installed with galvanized roof nails per manufacturer’s recommendations. The use of moisture resistant drywall (MR board or ‘green board’) is discouraged as a tile backer.
• MR wall board is recommended in areas without tile in full bathrooms.
• At bath tubs, the tile should extend a minimum of 6’-0” above the finish floor, complete with all necessary trim pieces and caps, including a soap dish without a grip bar. Seal all openings behind tub and shower enclosures to minimize airflow.
• Bathroom floors should be either tiled with a floor grade ceramic tile, non-slip glazed or unglazed, and include a ceramic sanitary base (tile trim piece or cap) at all wall and floor junctures; or “inlaid” with linoleum sheet goods with one-piece painted wood or MDF baseboard.

Linoleum
• To ensure minimum out-gassing and durability, where desirable, linoleum is allowed in common stairs and hallways of multifamily buildings and in kitchen, bathroom, entry and vestibules within dwelling units.

Vinyl Composition Tile (VCT) and Vinyl Plank:
• Vinyl composition plank or tile flooring is allowed when it is highly durable, easy to maintain, made of recycled materials, and able eventually to be recyclable.
• Water based adhesives should be used. VCT adhesives should have VOC content less than or equal to 50 g/L less water. Vinyl composition flooring where provided is recommended to be a minimum 1/8 inch thick in conformance with “high traffic” recommendations of HUD Minimum Property Standards.

Wood Laminate Flooring
• The use of wood laminate flooring is not permitted.

Engineered Wood & Hardwood Flooring
• Engineered wood/hardwood floor is allowed throughout dwelling unit except for kitchen and bathroom.

Carpet
• The use and location of carpeting should be limited sharply due to asthma, respiratory, and maintenance concerns.
• All carpeting and padding should meet the Carpet and Rug Institute (CRI) indoor air quality guidelines and “Green Label Plus Program”.
• Carpeting when provided is recommended to have the following specifications in conformance with HUD Bulletin, UM 44-D (http://portal.hud.gov/hudportal/HUD?src=/program_offices/administration/hudclips/bulletins/umbs):
  • Use of Type 1, Class 2 for unit interiors
  • Use of Type 11, Class 2 for elderly or handicapped units and public spaces.
• A separate pad in conformance with applicable flame spread and material standards should be provided in all but handicapped units and public spaces.
Painting

- All paint or stains or varnishes should be limited to low (50g/L) or no VOC except as noted below.
  Paint products should be applied at the rate specified by the manufacturer with the following minimum applications.

  **Gypsum Drywall – Ceilings** – 1 coat of latex-base primer and 1 coat latex-base interior flat (ceiling white) paint. Kitchens and bathrooms should receive 1 coat primer and 2 coats semi gloss odorless Alkyd enamel. Existing ceilings should receive stain/mold kill primer. Sand finish ceilings should not be applied in kitchens or bathrooms.

  **Gypsum Drywall – Walls** – 1 coat latex-base primer and 2 coats interior latex-base egg shell paint. Kitchens and bathrooms should receive 1 coat primer and 2 coats semi gloss odorless Alkyd enamel. Existing ceilings should receive stain/mold kill primer.

  **Plaster Ceilings** – 1 coat latex-base primer and 2 coats latex-based interior flat (ceiling white) paint. Kitchens and bathrooms should receive 1 coat primer and 2 coat semi gloss odorless Alkyd enamel.

  **Plaster Walls** – 1 coat latex-base primer and 2 coats latex-based egg shell paint.

  **Stained Woodwork** – 1 coat oil-base interior wood stain and 2 coats satin or semi gloss polyurethane varnish. VOC content less than or equal to 250 g/L. All stain should be low or no VOC.

  **Natural Finish Woodwork** – 1 coat sanding sealer and 2 coats satin or semi gloss polyurethane varnish. Clear wood finishes should contain VOC content less than or equal to 350 g/L (varnish) and 550 g/L (lacquer). All varnish should be low or no VOC.

  **Painted Woodwork** – 1 coat interior enamel undercoat and 2 coats interior semi gloss odorless alkyd enamel.

  **Ferrous Metal** – 1 coat rust-inhibiting (such as by Rust-o-lem or equal) primer, 1 coat interior enamel undercoat and 1 coat interior semi gloss odorless alkyd enamel. Anticorrosive and antitrust paints applied to interior ferrous metal substrates should contain VOC contents less than or equal to 250 g/L.

  **Painted Wood Finish (Exterior)** – 1 coat exterior primer and 2 coats semi gloss alkyd enamel. All new exterior trim and siding should be back primed.

  **Transparent Wood Finish (Exterior)** – 1 coat oil-base sealer and 2 coats spar varnish.

  **Zinc Coated Metal** – Whenever using galvanized metal, the surfaces should be cleaned with a non-petroleum-based solvent, removing pre-treatment, oil and contaminants from the surface prior to applying 1 coat galvanized metal primer, 1 coat interior enamel undercoat and 1 coat interior semi-gloss odorless alkyd enamel.

**GENERAL MECHANICAL AND ELECTRICAL GUIDELINES**

- To reduce review and approval time and allow for the economies of scale inherent in larger purchases, to the extent possible Architects should specify system components from a single manufacturer/distributor.

- Architects should specify three acceptable and equivalent manufacturers for equipment in order to obtain competitive pricing.

**PLUMBING**

- All sanitary lines below floor slabs should be cast iron bell and spigot or equal. PVC is not recommended.

- Spaces with appliances and equipment that may leak substantial amounts of water such as water heaters and clothes washers should be provided with a floor drain or floor pan and drain.

- Air cushions should be provided at least every set of fixtures to prevent water hammer.
• Bath lavatory and faucet: 'cultured marble' integral bowl with front overflow and backsplash. U.S. Environmental Protection Agency (EPA) WaterSense labeled single lever chrome washerless faucet with aerator, flow restrictor, lift rod, and pop-up drain. 0.5 gpm is recommended.
• Kitchen faucet: Single handle faucet with spray attachment. 1.75 gpm is recommended.
• Toilet: two piece close-coupled siphon jet vitreous china (white), EPA WaterSense labeled, round bowl toilet, 12” rough, solid plastic closed seat and cover, chrome supply and flexible riser. 750 minimum solid gram removal is recommended.
• Bath tub and fittings: white porcelain finish steel with sound-deadening polymer backing, non-slip bottom, chrome plated drain/waste/overflow with strainer. Enameled steel tubs and fiberglass tubs with integral surrounds are discouraged. EPA WaterSense labeled chrome, pressure-balancing, anti-scald bath/shower valve and diverter, spout, and shower head.

Water Supply
• Underground water service: Type K copper ¾” minimum diameter
• Hot and cold water piping: Type L
• Drain, waste, and vent piping: Type DWV.

Hose Bibs
• Hose bibs should be of the freeze-proof type and lockable for water conservation.

LAUNDRY
• If unit is individually metered for gas with a washer/dryer hookup, a gas dryer hookup shall be provided.

HEATING
• Central boiler controls should allow building management to easily control the following functions:
  o To shut off distribution when outside temperature reaches a pre-set temperature.
  o To modulate delivered water temperature in response to outside temperature
  o To modulate delivered water temperature in response to time of day.
• Design and size HVAC equipment properly using the latest editions of ACCA Manuals J, S, &D, respectively, the ASHRAE Handbook of Fundamentals, or an equivalent computation procedure.
• Space and water heating equipment that involves combustion should be designed and installed with closed combustion (i.e., sealed supply air and exhaust ducting.)

Heating Equipment
*Note: The following paragraphs describe examples of systems frequently used in residential construction:

Typical Example of Sealed-Combustion Forced Hot Water Systems
• Keep the system (including boiler and distribution pipes) entirely within the conditioned envelope. Provide high efficiency sealed-combustion gas-fired boiler with an Annual Fuel Utilization Efficiency (AFUE) of 85% or better. Domestic hot water heater should be an insulated stainless steel storage tank with tempering valve and separate zone valve and/or circulator, heavy duty hot water baseboard radiation element complete with bleeder valves and durable covers and trim. System should be complete and operational prior to occupancy. Particular attention to location of vent terminations relative to walkways and windows should be paid for design and Code compliance.

Typical Example of Forced Warm Air Systems
• Provide a high efficiency or hydro-air system to heat warm air. Gas fired boiler should have an AFUE of 92% or better. Provide new flue pipe with sections fastened with sheet metal screws as per Code. Provide new supply and return sheet metal plenums, required safety switches, thermostat and all wiring necessary for proper operation. Provide all sheet metal ducting, properly secured with straps, sealed with mastic, according to code on both supply and return with dampening capabilities to each habitable room. All ductwork should be sealed per MA State Building Code (780 CMR J4.4.8.2 Duct Sealing),
and Energy Star Homes guidelines. All ducts should be located within the envelope. All grilles and registers should meet specifications for their particular application, i.e., floor or wall discharge. The system should be adaptable to receive air conditioning at a future date. Domestic hot water should be provided by a device with efficiency (EF) greater than 6.1 with sealed or direct vent construction.

- For oil-fired applications, provide all the above, and include a retention head oil burner, 275 gallon oil storage tank with plastic-sheathed soft copper supply buried in the floor slab, and a ‘kill switch’ located near the basement stairs. Oil furnace AFUE should be 85% or higher.
- Limit duct air leakage outside the conditioned envelope. The tested duct leakage rate should be less than or equal to 3.0 cfm at 25 Pascals per 100 square feet of conditioned floor area (for each installed system).

**Thermostat Controls**

- Energy Star labeled programmable set-back thermostats are desirable.

**VENTILATION**

- A time clock or other device easily controlled by building management should be provided to shut off mechanical ventilation when not required.
- Energy Recovery or Heat Recovery Ventilation Systems (ERV/HRV) where proposed should have accompanying analysis to demonstrate cost effectiveness included in the narrative description of building systems.

**ELECTRICAL**

**Public and Common Metering**

- Meters and Type “T” gang boxes at exterior should be mounted on backer boards such as molding-trimmed MDO fastened to the sheathing.
- Where applicable, locate load center in a convenient location within each unit.

**Wiring**

- If aluminum wiring is used in code-permitted locations, connections should be made with appropriate compression fittings.

**Lighting**

- Ceiling mounted light fixtures are preferred.

**FIRE PROTECTION**

**Fire Sprinkler Systems**

- Drawings should be fully engineered based upon recent hydrant flow tests and bear the stamp of a licensed fire protection engineer.
- Standpipes and sprinkler piping are best when not exposed below finished ceilings. Use concealed pendant type sprinkler heads and trim plates.

***END OF MASSACHUSETTS MULTIFAMILY NEW CONSTRUCTION DESIGN REQUIREMENTS AND GUIDELINES***
APPENDIX A: EXAMPLE UNIT LAYOUT DIAGRAMS

This appendix is intended to supplement the Massachusetts Multifamily New Construction Design Requirements & Guidelines by provided visual examples of the principles described in that document. (See Section 3.A. Design Requirements for Residential Occupancy and Section 4.B. Interior layouts & Dimensional Design Guidelines.)
Unit Layout Design Considerations

- Minimum clearances in bedrooms
- Minimum clearances in living and dining

Circulation

Access to natural light

Storage space

Guideline Unit Sizes

<table>
<thead>
<tr>
<th>Type</th>
<th>Size (sf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studio</td>
<td>500</td>
</tr>
<tr>
<td>One Bedroom</td>
<td>600</td>
</tr>
<tr>
<td>Two Bedroom</td>
<td>750</td>
</tr>
<tr>
<td>Three Bedroom</td>
<td>1000</td>
</tr>
<tr>
<td>Four Bedroom</td>
<td>1100</td>
</tr>
</tbody>
</table>

Example Unit (3 Bedroom Corner Unit)

**DO** locate bedroom and bathroom doors off of hallways for privacy.

**DO NOT** locate bedroom and bathroom doors off of the living area.

**DO** provide bedroom closets with minimum dimensions 4’ x 2’.

**DO** provide larger living and dining areas in larger units.

**DO** orient the 12’ min. clearance for the living area parallel to an exterior wall.

**DO** locate living and dining areas on the corner in corner units.

**DO** provide furniture plan showing functional spaces and appropriate clearances.

**DO** provide a distinct dining area, especially in family units.

**DO** provide access to natural light in living rooms, dining areas, and bedrooms.

**DO** create a defined area for the kitchen.

**DO NOT** require unit circulation to pass through kitchen work area.

**DO** provide coat closets near the entry with minimum dimensions 3’ x 2’.

**DO** provide linen storage as a utility cabinet or as shelving built into a closet. A separate linen closet is not required.
Example Unit Layouts

3 Bedroom
Typical Unit

2 Bedroom
Corner Unit

2 Bedroom
Typical Unit
Kitchen Design Considerations

Accessible maneuvering space
Clearances for appliances

Example Kitchen Layout

Accessibility:
The cabinet below the sink must be removed to ensure maneuvering clearances.
A wall oven must be installed.
The range must be replaced by a cooktop with clearance below.

Universal Design:
Provide drawers instead of below counter cabinets for more accessible storage.
Galley Kitchen

DO consider opening kitchen with a half wall or extending the counter.

L Shaped Kitchen

DO provide a corner lazy Susan base cabinet for more accessible use of below counter space.

DO NOT require unit circulation to pass through the kitchen work area. If the dining table is placed within “L” area, the primary circulation path must not require passing between the dining table and kitchen.

Island Kitchen

DO provide counter height seating at island.

DO NOT consider island seating as a replacement for a distinct dining area.

DO NOT require unit circulation to pass between the kitchen and island.

U Shaped Kitchen

DO consider opening kitchen with a half wall or extending the counter.

DO provide lazy Susan base cabinets in the corners for more accessible use of below counter space.

DO place refrigerator away from the corners.
III. DEPARTMENT OF NEIGHBORHOOD DEVELOPMENT  
DESIGN & CONSTRUCTION REVIEW PROCESS

A. DESIGN SUBMISSION REQUIREMENTS

At the time of application for funding, the Design Submission is to consist of the following:

- 1 full size bound schematic design sets (24x36)
- 1 set of outline specifications
- 1 digital (CD) copy of the schematic design drawings and outline specifications

The design submission is to focus on the best description of the physical design of the proposed project. The set is to illustrate the site planning for the development. The building(s) proposed relationship to contextual features and existing buildings. Documentation should focus on illustrating the massing, how the building will meet the streetscape and provide an overall context in which to understand the scale of the building(s) and their exterior finish. The set is also to include the interior spatial layout of each floor, dimensioned typical unit layouts, and all building elevations. Typical unit layouts are necessary in quickly evaluating compliance with dimensional standards. Guidelines for the composition of the set are outlined below:

COVER SHEET

- Preliminary Review of Building and Zoning Code (indicate required and proposed zoning.)
- Preliminary MAAB Review
- Preliminary description and evaluation of MEP FP and HVAC systems (indicate required and proposed) based on code.
- Proposed building(s) type, gross and net square footage
- Unit type (1bd, 2bd, etc.) distribution by floor, square footage - identify handicap & visual access units.
- Developer’s Name, Architect’s Name and Consultant Names

SITE PLAN

- A preliminary description of site dimension, lot lines, existing streets, location of adjacent buildings, and relative site elevations.
- Identify any environmental constraints such as wetlands, steep grades, ledge, etc.

GRAPHIC DESCRIPTION OF DEVELOPMENT CONCEPT

- Typical building plans and elevations (1/8” = 1’-0” scale)
- Typical unit plans include SF, dimensions, Accessibility (¼” = 1’-0” scale).
- Typical wall section (3/4” = 1’-0” scale). Include R-values
- Exterior and interior photographs of building for renovations

STREETSCAPE AND MASSING

- Perspectival views of the proposed building(s) and its relationship to abutting buildings and existing grade.
- 3D models and renderings which convey the exterior finish and character of the building on the site

OUTLINE SPECIFICATIONS

- Outline specifications for the proposed project prepared by the project architect. The specifications should clearly indicate who completed them and on what date.
B. DESIGN REVIEW PROCESS

DND Design Review Process can be located on the DND website at:
https://www.boston.gov/departments/neighborhood-development/neighborhood-development-housing-policies
IV. DEPARTMENT OF NEIGHBORHOOD DEVELOPMENT
DESIGN REQUIREMENTS FOR EXISTING BUILDINGS AND
SPECIAL OCCUPANCIES

A. DESIGN REQUIREMENTS FOR REHABILITATION &
PRESERVATION

Preservation project development teams are to provide a comprehensive rehabilitation strategy, which combines the established 20-year Capital Needs Assessment (C.N.A.) with practical green building and energy performance recommendations. Applicants are to provide a C.N.A. and the replacement reserve analysis which focuses on improving the quality of life of residents, ensuring the long-term stabilization of the building and protecting the health and safety of building occupants. Green building recommendations are to use LEED for Homes, Healthy Homes, and Energy star as a basis and pay particular attention to improving poor indoor air quality, inadequate ventilation and other unhealthy interior conditions for residents. The energy performance assessment is to evaluate where improvements can be made to reduce operating costs by improving the energy and water efficiency of the building(s). Considerable improvements can be obtained by providing workshops to introduce conservation strategies and healthy homes measures to residents. Where unit layout or reconfiguration is proposed the rehabilitation strategy is to address these modifications.

CAPITAL NEEDS ASSESSMENT
The C.N.A. is to project the potential capital costs over a 20-year period using a quantity inventory of building components (including the age and expected life of these components), data on their current cost, assumed rates of inflation and a schedule of replacement. The C.N.A. must have been conducted less than 2 years prior to the submission to this application for funding. Projects with multiple buildings must complete a C.N.A. for each building.

A complete C.N.A. will include a detailed 20-year capital needs worksheet. A report summarizing the existing property conditions with color photos, a description of projected needs as reflected in the C.N.A. and final replacement recommendations are to accompany the worksheet. In addition applicants are to provide the following:

- A chart or (bar) graph to summarize costs in each building system or major work category between years 1-20 as recommended by the C.N.A.
- A narrative summary of the following priority areas as reflected by the immediate replacement recommendations in the C.N.A. This narrative is also to focus on life safety upgrades required by code:
  - Building Stabilization – exterior envelope, structure, egress
  - Mechanical, Electrical, Plumbing & Fire Protection Systems
  - Hazardous Materials & De-leading
  - Ventilation, Indoor Air Quality – bath, kitchen, common area
  - Interior Quality & Finish – including healthy homes
REPLACEMENT RESERVES
The replacement reserve analysis is to project the funds required for capital improvements over a 20-year period. The analysis should include the prior 3 to 5 years reserves. Each of the following documents is to include a chart or (bar) graph to illustrate the analysis. Also include capital costs with the chart or graph for comparison:
- A replacement reserve projection based on existing reserves.
- A replacement reserve projection based on the reserves proposed in the rehabilitation strategy.

GREEN BUILDING & ENERGY PERFORMANCE
Operating expenses are to specifically include utility cost for gas, electricity and water. Maintenance costs are to be included as an operating expense, if repairs to fixtures, heating equipment, appliances, lighting, etc. can be quantified. An analysis of existing operating costs should include historical trends 3 to 5 years prior and an energy audit conducted by a qualified energy auditor or home energy rater. More extensive thermal imaging and deconstructive exploration is to be conducted when known deficiencies exist in the building envelope (roof, floors, exterior walls, etc.) Operating savings are to be determined from identifying where “energy” improvements have the greatest cost benefit (life cycle cost compared to payback period.) These operating savings are to be projected over a 20-year period based on the rehabilitation strategy.

Use LEED for Homes, Healthy Homes and Energy star as a basis for Green building and pay particular attention to improving poor indoor air quality, inadequate ventilation and other unhealthy interior conditions for residents. A complete assessment will include a summary of the “green” and “energy” improvements with a description of expected resident benefits, operating cost reductions including utility savings. Thermal imaging, investigative photos & reports from the energy audit and detailed spreadsheets analyzing existing operating expenses and proposed operating savings (cost benefits) are to be provided. In addition applicants are to provide the following:
- A 20-year projection of operating cost savings based on the rehabilitation strategy.

REHABILITATION STRATEGY SUMMARY CHART
Please include a chart or (bar) graph, which combines operational savings, replacement reserves and capital needs over a 20-year period in a single illustration. Capital needs improvements are to be broken into categories based on the rehabilitation strategy. This graph is to reflect an understanding of the fund allocation within the capital improvements in comparison to the funds/savings allocated to replacement reserves.

ACCESSIBILITY AND RELOCATION
Applicants are to clearly explain any need to modify the existing configuration of units for any reason including accessibility and life safety. Applicants are to determine whether the renovation scope of work (when compared to the building value) triggers compliance with accessibility regulations. A unit inventory listing the unit, unit square footage and number of bedrooms is to be provided in order to assess the impact of reconfiguration on the existing unit mix. Applicants are also to summarize temporary or permanent displacement caused by the reconfiguration of units (Note URA requirements in the Application Process). Provide the following in addition to the narrative explanation described above:
- A unit inventory organized per building listing each unit’s major rooms, their dimensions and square footages is to be provided.

MODERATE REHABILITATION
Compliance with unit size and room dimensions is not required for Moderate Rehabilitation Preservation projects where the interior layout of residential units remains unchanged and systems upgrades are the focus of the proposed project.
UNIT MODIFICATION - RECONFIGURATION
Rehabilitation strategies that minimize the reconfiguration of existing units is highly preferred and encouraged by DND. However, DND understands that there are cases where the existing residence serves a program or serves a particular target population and the existing accommodations are no longer adequate for the program. In addition the characteristics of the building (dimensions, window locations, square footage, interior layout, circulation, etc.) provide specific constraints on the configuration of units. In these cases, the developments teams are not required to meet the unit sizes listed in multifamily new construction standards (See Section 4.B. Interior layouts & Dimensional Design Guidelines for overall Unit areas.) The team is to schedule a site visit and meet with DND design staff to explain the need for reconfiguration and discuss the approach to reconfiguration prior to submission to a funding round. The development team should reference the new construction multifamily dimensional design guidelines (See Section 4.B. Interior layouts & Dimensional Design Guidelines for overall Unit areas.) and local code to access whether proposed interior rooms are adequately sized.

ADAPTIVE REUSE
New construction standards are to be used where an existing building is being adapted from nonresidential use to a residential use and when residential units are proposed to be completely gutted.

GUT RENOVATION
When residential units are proposed to be completely gutted, the development team must substantiate the need for this approach. The Rehabilitation Strategy narrative is the place to explain how the development team has verified that the Capital Needs and Useful life of systems and building components have reached the point of complete overhaul.

B. DESIGN REQUIREMENTS FOR SPECIAL OCCUPANCIES

SINGLE PERSON OCCUPANCY (SPO) DIMENSIONAL DESIGN REQUIREMENTS
This section sets forth the minimum Design Requirements for SPO Units. SPO Housing is defined as a residential property that includes single room dwelling units. Each unit is for occupancy by a single eligible individual.

SPO Type 1, 2 and 3 must contain 150 sf of basic living/sleeping area and are to be furnished with a single bed space, dresser, mirror, nightstand, writing desk, 2 chairs, small table and a shelf with space for tv/radio.

SPO Type 4 must contain 240 sf of basic living/sleeping area and is to be furnished with a single bed space, dresser, mirror, nightstand, writing desk, 2 chairs, a dining table, 4 chairs and a shelf with space for tv/radio.

The four (4) SPO types are described below:

SPO Type 1 must contain a closet (15sf), small sink, under counter refrigerator, and microwave oven (may be permitted) within the unit.

- Cooking facilities and a private bath are not contained within the unit.
- Congregate cooking, bath (or shared), dining and support facilities such as TV room, reading areas, community living rooms, etc. must be located on-site.
SPO Type 2 must contain a private bath with shower (40sf), a closet (15sf), small sink, under counter refrigerator, and microwave oven (may be permitted) within the unit.

- Cooking facilities are not contained within the unit.
- Congregate cooking, dining and support facilities such as TV room, reading areas, community living rooms, etc. must be located on-site.

SPO Type 3 must contain a private bath with shower (40sf), a closet (15sf) and 35 sf of cooking facilities with a sink, 2 linear feet counter, 2 burner stove and an under counter refrigerator. The square footage of the cooking area includes 3’ clearance in front of counter.

- Congregate dining and support facilities such as TV room, reading areas, community living rooms, etc. are not required to be located on-site. Some support facilities are however recommended.

SPO Type 4 must contain a full kitchen and a private bath with shower (40sf) and closet (15sf) within the unit.

- 35 sf of cooking facilities with a sink, 2 linear feet counter, a small 4 burner stove and a 12 cu. ft. upright refrigerator. The square footage of the cooking area includes 3’ clearance in front of counter. (This resident may require off site special needs.)
- Congregate dining and support facilities such as TV room, reading areas, community living rooms, etc. are not required to be located on-site. Some support facilities are however recommended.

**ARTIST LIVE/WORK HOUSING**

The minimum level of fit-out that is required to obtain a Certificate of Occupancy Permit from the Inspectional Services Department and meets the artists’ needs for open and flexible space is desired. Proposed housing for artists which includes space for their work shall meet the following requirements:

**INTERIOR LAYOUT**

- Studios and hallways shall be oversized in width to accommodate shipping of large works.
- Loading bays shall be located directly adjacent to a direct route to elevators.
- Freight elevators shall be provided to carry oversize/overweight objects; and allow for noise, weekend and late night deliveries.
- All spaces shall be ADA adaptable and a reasonable number shall be ADA accessible.
- Shared baths/kitchens may be considered for selected units.
- The window to room ratio shall be adequate for natural light. The ideal source of light for workspace is from the North. Interior or “borrowed light” is important for deep spaces. Track lighting for studio photography, dance, and theater is preferred.
- Ceiling heights shall allow for the creation of large works and large equipment, including machinery and lighting.

**SOUND AND LOADING REQUIREMENTS**

- Wall and floor construction shall have adequate sound insulation to prevent the transmission of sound from machinery, equipment, or repetitive tasks.
- Floors shall be constructed to provide extra weight-bearing capacity. Highly finished floors are not required. Sprung wood floors for dance/theater performers shall be included as an upgrade.

**MEP AND FIRE PROTECTION**

- Plumbing shall include an easy installation of service sinks if required.
- Units shall be fully wired for new technologies, inclusive of electrical wiring that can accommodate high use and small equipment. Electrical capacity shall meet the various needs of different art forms.
- Live/work space, particularly those where there are children living in the unit, shall include an appropriate fire rated separation between the live and work areas.
- Fire protection systems shall include the ability to address industrial accidents.
Fire insulation shall be adequate for open flames.
Special ventilation and air handling techniques shall be tailored to ensure the safety and health of residents, visitors, and neighbors. All workspaces shall be vented via the outside wall while providing a central ventilation system to the roof.

COMMON AREAS
- Oversized dumpster capacity shall be provided.
- Containers shall be provided for the disposal of toxic/hazardous materials (turpentine, paints, etc.)
- Common space or meeting space shall include display space for both art work and rehearsal.
- Access for outdoor work area shall be provided to all tenants.
- Security shall reflect the needs of artists who may have on-site sales, employees, and customers.

OTHER OCCUPANIES THAT MAY BE DEVELOPED

COMPACT LIVING
ASSISTED LIVING UNITS
ELDERLY HOUSING UNITS
DMR/DMH GROUP HOMES

***END OF DEPARTMENT OF NEIGHBORHOOD DEVELOPMENT DESIGN REQUIREMENTS AND GUIDELINES***