



Department of Neighborhood Development
Neighborhood Housing Development Division
Design, Construction and Open Space Unit
RESIDENTIAL DESIGN STANDARDS

NEIGHBORHOOD HOUSING DEVELOPMENT DIVISION

Design Construction and Open Space Unit

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PREFACE

The following preface has been provided to point out the updates and clarifications which have been made to the June 2008 version of the Residential Design Standards. No changes have been made to any of the dwelling unit dimensional standards. The goal is to update outdated information, remove redundancies and clarify common ambiguities.

- A minor clarification has been made to Architectural Services.
- Bidding Phase has been added under Project Reviews.
- Green Building and Sustainable Design categories have been added to organize similar topics under a common category. Reference to DND's certification process for LEED for HOMES has been edited for clarity.
- The Energy Star Qualified Homes section has been updated to reflect current Energy Star programs.
- A Rehabilitation and Preservation section has been added in order to communicate key design & construction related expectations and priorities.
- Reference to Boston Complete Streets and Grow Boston Greener has been added under Open Space and Trees and Landscaping respectively.
- General notes have been added to Multifamily and Single and Two Family Housing Dimensional Standards instead the notes in the previous document. Clarification was made to whether unit sizes are minimums or maximums. The repeated reference to exceptions was removed and placed under the Unit Modification Section.
- "*in One and Two Family Homes*" was removed from category Storm/Screen Combination Exterior Doors as storm/screen doors may also be required in multifamily dwellings.
- Flooring Finishes has been reformatted and edited.
- Ventilation has been updated to clarify multifamily expectations and the use of ERV/HRV systems where proposed.
- A closed circuit security camera system section has been added.

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INTRODUCTION

DND has developed design standards for new construction and the rehabilitation of existing buildings to ensure that all projects conform to current applicable regulations, and to promote cost effective, environmentally-responsible, quality design. For each project reviewed by DND the goal is to achieve the highest quality product within the cost constraints of the project. The standards are based upon regulatory requirements imposed by the Department of Housing and Urban Development (HUD), under the State HOME program and CDBG Funding for home-ownership projects.

A major goal of DND design guidelines for new construction and rehabilitation projects is to encourage the creation and preservation of residential dwellings which:

- *Respect the architectural detailing such as corbels, dentil molding, columns, cornice detail, window/door pediment, etc prevalent in the neighborhood in new construction. Every effort is to be made to preserve or replicate such details in existing buildings.*
- *Are sensitive to the residential building types, existing massing, set backs, siting and openspace elements of the neighborhood.*
- *Results in cost effective construction.*
- *Results in low maintenance costs and energy efficiency for renters and homeowners.*
- *Use existing interior and exterior space to enhance the quality of life of the residents and neighbors.*
- *Minimizes environmental impact on City infrastructure and promotes public health.*
- *Minimizes environmental impact at the regional, national, and global level by reducing green house gas emissions and water use.*

PROCEDURES

The development team is encouraged to meet with DND prior to application for funding. Developers and architects should schedule a meeting with the Design Construction and Open space Unit (DCOSU) early in the conceptual design phase of a proposed project. This initial meeting will provide an opportunity to review the housing need being served, the programmatic goals, the siting of the development, sustainable design strategies, among other issues. A staff architect from the DCOSU will be assigned to the project to work with the development team and will provide ongoing design and cost saving technical assistance as required. Upon receipt of a proposed new construction or renovation project, DND will conduct a feasibility study in relation to design requirements, guidelines and project cost and subsidy.

PROJECT REVIEWS

The DND Design Review Policy outlines the specific submission requirements at initial application and at subsequent phases of design review. Projects shall receive Application, Schematic Design, Design Development, and Construction Document & Conditional Approval, and Design & Construction Approval at respective stages in the development of drawings, specifications, and construction costs based on compliance with these standards.

Bidding Phase

Development teams are to review the DND Bid Policy prior to submitting Construction Documents for Conditional Approval. The Bid Document Review process and Submission Requirements are outlined on the DND website under housing policies. A complete "Bid Package" including Section 3 requirements (also available online) must be reviewed by the assigned the Staff Architect prior to being sent to contractors.

ARCHITECTURAL SERVICES

The developer shall provide DND with written copies of the Standard Form of Agreement between Owner and the Architect (AIA B-Series form), verifying the commissioning of their architect for the project. In addition include the proposal for services, if the scope of professional services is not clearly outlined in the AIA documents.

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This document will be provided to DND after the issuance of the Award Letter and with the submission of schematic drawings for Application and Schematic Design Review. The Project Architect shall provide full design services including, but not limited to, architectural, structural, mechanical, electrical, plumbing, civil, and landscaping drawings and specifications. Revisions to the drawings and specifications as a result of DND's design review process, cost cutting or "value engineering", community meetings and meetings with City agencies, are considered part of the design services. Weekly site visits are required during construction

OTHER AGENCY GUIDELINES

Projects shall comply with the design and construction requirements of other agencies including but not limited to the following list. Where there is a conflict, the more stringent requirement shall apply. DND will not review projects for compliance with other regulations; developers are required to seek the necessary public approvals for their projects.

- City of Boston Municipal Agencies; including BW/SC Site Plan Guidelines
- Department of Housing and Urban Development;
- Massachusetts Department of Public Health
- State HOME, HSF, FCF, and LIHTC programs;
- Boston Landmarks Commission;
- The Secretary Of The Interior's Standards For Rehabilitation;
- Massachusetts State Building Code (latest edition);
- Energy Star Homes Certification program
- Boston Zoning Code;
- Rules and Regulations of the Massachusetts Architectural Access Board;
- Federal Fair Housing Amendments Act;
- Massachusetts Fair Housing Law;
- Section 504 of the Federal Rehabilitation Act; Americans with Disabilities Act;
- Cost Effective Energy Conservation Standards: Design must meet HUD Cost-Effective Energy Standards in Rehabilitation Projects.
- Architectural Barriers Act;
- Uniform Federal Accessibility Standards (USAF)

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GREEN BUILDING

SUSTAINABLE DESIGN

The City of Boston and DND recognize that buildings in their construction, operation, and maintenance have a substantial impact on the environment and the people who live within them. It is important to DND that buildings positively contribute to the human and environmental health of our residents and our neighborhoods as buildings consume large amounts energy, water and generate the majority of solid waste in the United States. Thus the sustainable design and green building practices which are embodied within the DND Residential Design Standards contribute to the city's efforts to decrease energy and water usage, reduce operating and maintenance cost, improve the efficiency and longevity of building systems.

ARTICLE 37

The City of Boston's Zoning Commission has adopted a Green Building article, Article 37, into the Zoning Code. Proposed developments under Article 80 Large Project review are subject to the provisions of Article 37. Up to four (4) of the required points may be obtained from the Boston Green Building Credits identified in Article 37, Appendix A and included in the calculation toward achieving a LEED certifiable project under the Article. The purpose of Article 37 is to ensure that major building projects are planned, designed, constructed, and managed to minimize adverse environmental impacts; to conserve natural resources; to promote sustainable development; and to enhance the quality of life in Boston. For Information on Article 37 consult the Boston Redevelopment Authority website under Zoning.

LEED FOR HOMES

LEED for Homes (including LEED for Homes Midrise) is the basic standard for DND Residential Construction for both new construction and renovation/rehabilitation of existing buildings. In addition Energy Star (ASHRAE 62.1, 62.2, 90.1 & 90.2) and Healthy Homes construction & material guidelines are prerequisite sustainable design and green building strategies which must be incorporated into all development proposals. (EQ4) (EQ5) The building design must demonstrate that the constructed building will meet or exceed LEED Silver and these prerequisites. Adherence to these design and construction strategies and their requirements are crucial to achieving the City's sustainability goals.

Certification

Actual "certification" by the USGBC is not required. The project team must demonstrate during the design review process and certify at the end of the construction that the building(s) have met all prerequisites and fulfilled criterion to reach the "Silver" certification level established by the USGBC. It is understood that the LEED certification entails a higher level of reporting and ongoing documentation. LEED certification is not being discouraged; simply the higher level of reporting and documentation required for LEED certification is not required under these guidelines. At application the development team will provide a checklist and a narrative describing the sustainability approaches within the project. The checklist and narrative must outline the LEED for Home credits that have been targeted, the number of points sought within each category and method/approaches employed within the building design and siting of the project to achieve the targeted credits. An updated checklist and narrative is required at each stage of design review and must be maintained through construction completion. *See Index of LEED-H rating categories.*

Integrated Design Workshop

During the schematic design phase, the project team is to conduct a full day integrated design workshop. The integrated project team should be composed of an architect, mechanical engineer, builder, civil engineer, and landscape architect or other engineers/consultants as required. Each member of the integrated team is to be familiar with green building and sustainable design principles. At least one member of the integrated team is to be a LEED accredited professional. The goal of the workshop will be to optimize the integration of the sustainability strategies with the building design and siting. DND design staff will attend this workshop. As a follow up to this workshop, the integrated team is to meet with the DND design and construction staff to review to the progress toward achieving sustainability goals outlined within this workshop. (ID1)

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LEED Index

LEED-H Rating System Categories	Credits	
Innovation and Design Process (ID)		
ID1 - Integrated Project Planning	2	
ID2 - Durability Management Process	0	
ID3 - Innovative / Regional Design	0	
Location and Linkages (LL)		
LL1 – LEED-ND Neighborhood Design	0	
LL2 - Site Selection	2	
LL3 - Preferred Locations	3	
LL4 – Infrastructure	1	
LL5 - Community Resources & Public Transit	1-3	
LL6 - Access to Open Space	0-1	
Sustainable Sites (SS)		
SS1 - Site Stewardship	0	
SS2 - Landscaping	4-7	
SS3 - Local Heat Island Effects	0-1	
SS4 - Surface Water Management	3	
SS5 - Non-Toxic Pest Control	1.5-2	
SS6 - Compact Development	2-4	
Water Efficiency (WE)		
WE1 - Water Reuse	2-4	
WE2 - Irrigation System	3	
WE3 - Indoor Water Use	3-6	
Energy and Atmosphere (EA)		
EA1 - Energy Star Labeled Home	10-16	
EA2 - Insulation	2	
EA3 - Air Infiltration	0-3	
EA4 - Windows	2-3	
EA5 - Heating and Cooling Distribution System	2-3	
EA6 - Space Heating and Cooling	2-4	
EA7 - Water Heating	3-6	
EA8 - Lighting	3	
EA9 - Appliances	2-3	
EA10 - Renewable Energy	0	
EA11 - Residential Refrigerant Management	0-1	

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Material and Resources (MR)		
MR1 - Material Efficient Framing	0.5-4	
MR2 - Environmentally Preferable	4-8	
MR3 - Waste Management	3	
Indoor Environmental Quality (IEQ)		
IEQ 1 - Energy Star with IAP	0-13	
IEQ 2 - Combustion Venting	0-2	
IEQ 3 - Moisture Control	0-1	
IEQ 4 - Outdoor Air Ventilation	2	
IEQ 5 - Local Exhaust	0-1	
IEQ 6 - Distribution of Space Heating and Cooling	0-1	
IEQ 7 - Air Filtering	0-2	
IEQ 8 - Contaminant Control	2-4	
IEQ 9 - Radon Protection	0	
IEQ 10 - Garage Pollutant Protection	1-3	
Awareness and Education (AE)		
AE1 - Education for Homeowner and / or Tenants	2	
AE2 - Education for Building Managers	1	

ENERGY STAR QUALIFIED HOMES

DND requires that affordable housing developments meet the US Environmental Protection Agency's (EPA) ENERGY STAR for Qualified New Homes guidelines, or its equivalent. Energy star provides technical assistance and requires in-field inspection & testing/verification by an independent Home Energy Rater for projects enrolled in the Energy star program. This requirement applies to both new construction and "gut" rehabilitation of existing buildings. Energy star homes are 15% to 20% more energy efficient than a home built to 2004 IRC International Residential Code and are to be designed to meet the efficiency performance standard of 85 or lower on the Home Energy Rating System (HERS) Index. All construction must be Energy Star Homes certified.

Recent Green Affordable Housing Program residential projects have achieved a HERS Index from 75 HERS to as low as 50 HERS. DND's expectation is that the majority of projects will be able to achieve a HERS Index between 70 and 65 HERS at minimum. (EA1)

There are two paths to qualify a home to meet ENERGY STAR's guidelines for energy efficiency. Both paths require independent verification and On-Site Inspection by a qualified Home Energy Rater:

ENERGY STAR Performance Path provides flexibility to select a custom combination of measures for each home that is equivalent in performance to the minimum requirements of the ENERGY STAR Reference Design Home. Equivalent performance is assessed through energy modeling.

ENERGY STAR Prescriptive Path provides a single set of measures that can be used to construct an ENERGY STAR qualified home. Modeling is not required; however, no tradeoffs are allowed.

Development teams must provide documentation of the project's enrollment and confirmation from Energy Star that the project qualifies for Energy Star when responding to DND request for proposals.

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Qualified Homes

Energy star defines building types, which qualify for enrollment. These types and conditions are listed below. Refer to the Energy Star for more information. The following homes are eligible to earn the ENERGY STAR:

One to Three Family Dwellings	Single-family homes, detached homes, townhomes, row homes, duplexes, and triplexes
Units in Multifamily buildings with 4 units or fewer.	----
Units in Multifamily buildings	Three stories or fewer above grade
Units in Multifamily buildings that have their own heating, cooling, and hot water systems, separate from other units.	Four or five stories above grade – dwelling units occupy 80% or more of the occupiable square footage of the building. Exclude commercial / retail space when assessing whether the 80% eligibility threshold has been met in mixed use buildings.

ENERGY STAR QUALIFIED MULTIFAMILY HIGH RISE BUILDINGS

DND requires that new or substantially rehabilitated Multifamily High Rise (MFHR) building must meet strict guidelines for energy efficiency set by EPA, making them designed to be at least 15% more energy efficient than MFHR buildings built to the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1-2007. The developer must provide EPA or its designated agent with program specific submittals. These submittals, which must be validated by a licensed professional, are used to demonstrate that the program's requirements have been met, that all prerequisites are included, and that each energy conservation measure is installed to specification.

If the building includes both residential and commercial space, the residential and residential-associated common space must consist of more than 50% of the occupiable square footage of the entire building; and the residential space must be separately metered from the commercial space

Qualified Multifamily High Rise Buildings

The following new construction or substantially rehabilitated multifamily buildings are eligible to earn the ENERGY STAR:

Building Type 1	Multifamily buildings with 5 or more units Four or five stories Has a central heating, cooling or hot water system or The space occupied by dwelling units is less than 80% of the occupiable residential square footage of the building
Building Type 2	Multifamily buildings with 5 or more units 6 or more stories

NON-QUALIFIED ENERGY STAR PROJECTS

Residential development proposals, which do not qualify for energy star, must comply with energy efficiency performance criteria equivalent to Energy Star. Energy efficiency performance must meet or exceed ASHRAE 90.1-2007 (or current) by 20% or demonstrate comparable savings, when modeled according to Appendix G. The performance of the building must be certified by an independent third party through on site field inspection and testing (equivalent to Energy Star Multifamily Highrise Building Protocols.) The developer must discuss the strategy for certifying performance with DND.

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New Construction & Rehabilitation Projects

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Procedure

When applying for DND funds, developers must confirm that the proposed non-qualifying project will meet DND requirements by providing DND with the following information:

- The name and contact information for the “qualified” energy modeler conducting the energy assessment of the building and the name of company providing energy modeling services.
- The baseline, benchmark or reference design used for the energy model. This “baseline” must be equivalent to “baseline” criteria used by Energy Star.
- The name of company providing field inspection and testing on site and the name and contact information for the field inspector.
- A written description of the process of certification and in field inspection.

HEALTHY HOMES REQUIREMENTS

DND is also committed to reducing the impact of respiratory ailments such as asthma on families residing in units funded by the City of Boston. Recommendations of The New England Asthma Regional Council (ARC) and the Boston Urban Asthma Coalition (BUAC) have been incorporated into these Design Standards. All single or multi-family residential homes shall incorporate construction methods and materials that will minimize building conditions that are known to trigger asthma and respiratory problems of the occupants. Buildings are to be designed to keep it dry, clean, well ventilated, safe, free of contaminants, pest free and well maintained. (SS5)

CONSTRUCTION METHODS (ADVANCED BUILDING TECHNIQUES)

In projects with five or more total units, preference will be given to projects that primarily use either panelized construction technologies or are stick-built on site using advanced building techniques. Framing and estimating practices are to be used which limit (to 10% or less) the percentage of framing material order in excess of the estimated material required for construction. (MR1). **RENEWABLE ENERGY &**

PHOTOVOLTAIC READY DESIGN

DND’s Green Affordable Housing Program works in collaboration with organizations such as the Massachusetts Technology Collaborative, Commonwealth Solar and others, to support the introduction of renewable energy technology into affordable housing. The use of renewable energy strategies is encouraged in all developments. In the event that renewable energy systems are not being implemented in a project, DND requires that the building design is “solar ready” such that solar electric and solar thermal systems can be easily installed at a later date. (EA10) The developer and architect are to anticipate the future introduction of solar technologies in the preliminary orientation and siting of the building. Development proposals must incorporate MEP conduit/chases; structural loads and anchoring needed to provide solar electric and solar thermal renewable energy systems in the future.

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REHABILITATION AND PRESERVATION

Preservation project development teams are to provide DND with a comprehensive rehabilitation strategy, which combines the established 20-year Capital Needs Assessment (C.N.A.) with practical green building and energy performance recommendations. At Application, a C.N.A. and the replacement reserve analysis is to be provided 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 be used 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.

UNIT MODIFICATION

Projects, which involve the renovation of existing buildings, must consult with the DND design staff to discuss the application of livability standards. Especially if adherence creates construction difficulty, substantially increases costs, and/or reduces the number of existing units. Development teams must clearly explain any need to modify the existing configuration of units. 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.

ACCESSIBILITY & LIFE SAFETY

Development teams are to determine whether the renovation scope of work (when compared to the building value) triggers compliance with accessibility or life safety regulations.

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 year 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

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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.

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. In addition 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

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.

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LIVABILITY

INTERIOR LAYOUT & DESIGN

The following items address issues that have been raised by Boston residents concerning dwelling use, furniture layout, flexibility, future expansion options, and general comfort.

GENERAL PRINCIPLES

Layout of buildings and units should meet the following general principles:

- Circulation space shall be designed efficiently and kept to a minimum.
- Avoid plumbing on exterior walls.
- Bathrooms shall not open onto living/dining spaces.
- Coat closets shall be located near dwelling entrances.
- Access to rooms shall be from circulation spaces and not directly through the kitchen.
- Window location shall provide for cross ventilation in rooms (where possible) and through units
- Buildings shall provide visual and noise barriers between public and private spaces. Minimum sound control (STC-50) between units and public hallways or common spaces shall be provided.
- Basements shall be provided in new construction unless subsurface soil conditions are unsuitable and costly to remove. If basements are not provided, adequate storage space shall be provided.
- Windows shall be provided in basements. (EA4) Window wells are not permitted.

MULTI-FAMILY HOUSING DIMENSIONAL STANDARDS

General

The unit sizes at the sizes listed are minimum square footages.

Apartments containing an interior stair between two or more floors within a unit, add 50 square feet per floor to the minimum square footage requirements.

The maximum square footage (with DND approval) may be reduced if additional private basement storage for each apartment is provided. If basement storage is provided, shelving shall be installed to keep items off basement floor.

Net Square Footage is measured from the centerline of the exterior wall, and includes usable storage space, stairwells and hallways inside the unit, as well as space occupied by interior walls. Net Square Footage does not include basement or attic storage areas, common stairwells, and common hallways. However, Net Square Footage does include 50% of the area under sloped ceilings with greater than 5'-0" clearance and less than 7'-6" clearance.

UNIT SIZES

Studios shall be approximately 500 net sq.ft.

1 Br. shall be approximately 750 net sq.ft

2 Br. shall be approximately 900 net sq.ft.

3 Br. shall be approximately 1,200 net sq.ft.

4 Br. shall be approximately 1,400 net sq.ft.

MINIMUM ROOM SIZE

Use/Room	Min. Area	Min. Dim.
Living Room	150 SF	12'-0"
Dining Room	100 SF	10'-0"
Living/Dining (1 Bed)	200 SF	12'-0"

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Living/Dining (2 Bed)	225 SF	12'-0"
Primary Bedroom	120 SF	11'-0"
Secondary Bedroom	100 SF	9'-0"
Full Bath	35 SF	5'-0"
Hallways	N/A	3'-0"
Coat Closet	6 SF	2'-0"
Bedroom Closets	8 SF	2'-0"
Linen Closets	4 SF	1'-6"
Storage (basement. or other)	30 SF	2'-0"

MINIMUM NUMBER OF BATHROOMS

- 2 Br. unit shall have 1 full bathroom.
- 3 Br. unit shall have 1-1/2 bathrooms.
- 4-or-more-Br. unit shall have 2 full bathrooms.

MINIMUM KITCHEN COUNTER SPACE

Do not include the sink or stove in the measurement of the linear footage. Linear footage should be counted from the front face of the counter.

- Studio unit shall have at least 4 linear feet.
- 1Br. unit shall have at least 6 linear feet.
- 2 Br. unit shall have at least 8 linear feet.
- 3 Br. unit shall have at least 10 linear feet.
- 4+ Br. unit shall have at least 12 linear feet.

SINGLE & TWO FAMILY HOUSING DIMENSIONAL STANDARDS

General

The unit sizes at the sizes listed are maximum square footages.

Gross Square Footage is measured from the exterior face of the exterior wall, and includes usable storage space and hallways inside the unit, as well as space occupied by interior walls. Gross Square Footage does not include basement or unfinished attics, porches, common stairwells, and common hallways. However, Gross Square Footage does include 50% of the area under sloped ceilings with greater than 5'-0" clearance and less than 7'-6" clearance.

For units containing an interior stair between two or more floors within the unit, add 50 square feet per floor to the maximum square footage requirements.

With DND approval, the maximum square footage may be reduced if basement storage per unit is provided.

UNIT SIZE

- 2 Br. in a two family shall not be greater than 1,000 gross sq. ft.
- 3 Br. in a two family shall not be greater than 1,200 gross sq. ft.
- 3 Br. Duplex shall not be greater than 1,300 gross sq. ft.
- 3 Br. Single-family shall not be greater than 1,400 gross sq. ft.

MINIMUM ROOM SIZE

Use/Room	Min. Area	Min. Dim.
Living Room	150 SF	12'-0"
Dining Room	120 SF	10'-0"

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Engineered Wood & Hardwood Flooring

Engineered Wood/Hardwood floor is allowed throughout dwelling unit except for kitchen and bathroom. If existing flooring is hardwood, floor refinishing is encouraged. (ID2)

FLOOR FINISHES – COMPOSITE FLOORING

Composite Plank or Tile flooring may be allowed with approval. These flooring finishes must be highly durable, easy to maintain, made of recycled materials, and be eventually recyclable. Common composite flooring types are listed below.

The use of sheet good is not allowed without approval. Incidental tears or scratches in sheet good can mean complete replacement of flooring. If approved sheet goods shall not be used as a standard floor treatment throughout dwelling units and will be limited to entryways, bathrooms, and dining rooms.

Linoleum

Linoleum is allowed in common stairs and hallways of multifamily buildings and in kitchen, bathroom, entry and vestibules within dwelling units. To ensure minimum out-gassing and durability and where possible, all linoleum shall be equal to Marmoleum.

Wood Laminate Flooring

Wood laminate flooring is a material composed of a core layer made of medium-density fiberboard or high density fiberboard, a decorative layer containing a photo rendering to mimic wood and a protective wear layer designed to resist abrasion, stains, fading, etc. Installation conditions and the warranty of Wood laminate flooring will be reviewed upon submission of product documentation. If approved, wood laminate flooring can be installed in living rooms, dining rooms and bedrooms.

Vinyl Composition Tile (VCT):

The use of vinyl flooring, either sheet goods or vinyl composition tile (VCT) is not allowed without approval. If approved, VCT can only be installed in kitchens, bathrooms, common stairs (treads and risers) and hallways. Water based adhesives shall be used. (MR2) VCT adhesives must have VOC content less than or equal to 50 g/L less water.

FLOOR FINISHES – CARPET

Carpet may not be used without approval. The use and location of carpeting shall limited sharply. All carpeting and padding shall meet the Carpet and Rug Institute (CRI) indoor air quality standards and Green Label Plus Program. (MR2)

Carpeting should itself be low-emitting and adhered to the floor with low emitting adhesives. Where possible, use carpet with recycled content fiber and the ability to be recycled at the end of its usable life. Where used, carpeting of approved quality (26 Oz. minimum fabric face weight per square yard, level loop), secured with tackless wood-strip fasteners and synthetic jute or foam padding is the standard for unit living rooms and bedrooms. Where approved, hallways, living rooms and bedrooms shall receive carpeting. (Dining rooms may also be covered with level loop carpet, with review of sample by DND). Where carpet is approved within multifamily dwelling units at least one bedroom in a 2 or 3 bedroom unit must use engineered wood flooring or an approved composite flooring material. Carpet is not allowed in a one bedroom unit.

Carpeting (in 1 to 3 family dwellings) shall be restricted to the following locations: Stairs within units, hallways, one bedroom in a 2 BR unit and two bedrooms in a 3(+) bedroom unit. if approved, common stairs and hallways shall have a minimum of 28 oz. carpet and heavy padding. Indoor carpet and carpet pad adhesives must have VOC content less than or equal to 50 g/L less water. (MR2)

BATHROOM FLOORS

In order to ensure minimum out-gassing and durability, the entire full bathroom floor shall be either tiled with a floor grade tile, non-slip glazed or unglazed, and include a sanitary base (tile trim piece or cap) at all wall and floor junctures, or linoleum (where possible use Marmoleum or equal) with one-piece painted wood or MDF baseboard. Vinyl composition tile is not approved for full bathroom floors. (ID2)

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- *High-efficiency storage water heater – Energy Factor greater than or equal to 0.53 (80 Gallon)*
- *High-efficiency storage water heater – Energy Factor greater than or equal to 0.57 (60 Gallon)*
- *High-efficiency storage water heater – Energy Factor greater than or equal to 0.61 (40 Gallon)*
- *Storage or tank less water heater – Energy Factor greater than or equal to 0.8*
- (EA7)

Thermostat Controls

The use of programmable set-back thermostats is required to promote energy savings. Install Energy Star labeled programmable thermostat (except heat pumps and hydronic systems). (EA6)

Residential Refrigerant

Refrigerants used in DND projects should not contribute to ozone depletion. Install non-HCFC refrigerants (e.g., R-410a) (EA11)

VENTILATION

Non-vented combustion appliances are not allowed in DND projects. (EQ2) In multifamily developments bathroom exhaust systems can either operate at low speed continuously with a manual booster setting or operate intermittently (when switched on) to exhaust at a high speed. Continuously operating systems are preferred by DND.

Where Energy Recovery or Heat Recovery Ventilation Systems (ERV/HRV) are proposed to provide heat transfer between the incoming outdoor air stream and the exhaust air stream, these systems shall be independent systems for each dwelling unit for the purpose of supplying fresh air to tightly insulated unit when natural ventilation with windows is unlikely during heating season. Central ERV/HRV for multiple dwelling units is not allowed without system commissioning by certified professionals to ensure design flow rate is maintained within each unit. ERV/HRV systems must be listed by a certified testing lab. (EQ4)

Bathroom Ventilation System

At full bathrooms, install exhaust fan designed for (EQ4) continuous operation such as Panasonic 110 CFM "super quiet" .5 sone fan unit (Panasonic FV08VQ at 2 bedroom units and FV11VQ at 3 bedroom or larger units) connected to the outdoors with 6" insulated duct discharging through a galvanized steel or aluminum wall or roof cap with a back draft damper, insect screen and wind hood. Ducting for kitchen and bath exhaust shall run straight to the exterior and pulled tight without kinks or bends. Controls shall be 'Airtrack Programmer' by Tamarack Technology of Wareham, MA, or equal to boost ventilation by 50%, adjustable from 15 to 60 minutes for bathroom exhaust discharge. All bathroom doors shall be undercut 1/2" to promote required changes throughout. Consult the Energy Star Homes project coordinator for alternative approved ventilation strategies.

Vented Range hoods

Vented range hoods must be used and vented to the exterior.

Dryer Ventilation

All dryers shall be vented to the exterior. (ID2)

Contaminant Control

Upon installation, seal all permanent ducts and vents to minimize contamination during construction. Remove all seals after all phases of construction are completed. (EQ8)

DIVISION 16: ELECTRICAL

The electrical components shall include, but are not limited to the following:

OUTLETS, SWITCHES & WIRING

Ceiling Outlets - Living Rooms, dining Rooms, and bedrooms require a ceiling-mounted fan box and controlled by switching, whether or not a fan is intended to be used. The installation of a blank canopy

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(white) for future use will complete the installation. If the room has one entrance door, one single-pole switch is required. If the room is accessible from two locations, two three-way switches are required. Switches should be located on the knob side of the door, approximately 48 A.F.F. In bedrooms and living rooms, wire half of a duplex receptacle to a switch at the entry door. Conveniently located load center with circuit breakers in each unit.

- Switched outlets in Living Room and Bedrooms.
- 3 way switching for living rooms, kitchens, and hallways.
- 20 Amp circuits in Living Room and Master Bedroom for AC units under windows.
- Provide outlet in basement for future dehumidifier.
- All electrical devices at exterior walls and top floor ceilings should have airtight boxes or 'polyfans'.

Wiring - To the greatest extent possible, RoHS (Restriction of Hazardous Substances) compliant wiring should be used for all wiring types. RoHS wiring is typically lead free and includes reduced levels for cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB), and polybrominated diphenyl ether (PBDE) substances, which have been found to be harmful to human health.

METERING

Public and Common Metering - In dwellings with two or more units, a separate Public Meter with all common area circuitry shall be provided. Meters and T boxes at exterior shall be mounted on backer boards such as molding-trimmed MDO fastened to the sheathing.

Sub Panel metering - Whenever running a service line from the Main panel board to a sub panel board, the use of aluminum wire is not permitted. The sub panel shall be fed by a copper conductor with ground.

SECURITY ALARM SYSTEM

Door and window contacts at lower levels and any easily accessed upper windows and doors.

- Security alarm system: door and window contacts at lower levels and any easily accessed upper windows and doors.

LIGHTING, CEILING FANS, OCCUPANCY SENSORS

All lighting shall meet Energy Star Qualified Homes National Program Requirements for Lighting Equipment – Energy Star Qualified CFLs or pin-based lighting in 80% of fixtures in RESNET-defined Qualifying Lighting Fixture Locations, shall be installed approved by DND. (Also see Advanced Lighting Package (EA8) requirements, which require a minimum of 60% hardwired Energy star fixtures and 100% Energy star qualified ceiling fans.) Lighting shall use compact fluorescent bulbs whenever possible.

- Attempts at energy conservation re: lighting levels should not sacrifice those light levels, but rather match them, (foot candles or lumens of lighting), to the needs of the areas illuminated.
- Front and rear porch lights in one and two family rehabilitation projects.
- Ceiling fixtures in building common areas, entry foyers and unit hallways, stairwells, kitchens including additional fixture over sink, bathroom ceiling and over mirror, walk-in closets and basements.

Bedroom Lighting must be provided. A switched, ceiling mounted, light fixture shall be provided.

Clothes Closet Lighting must be provided in walk-in closets. An external switched, wall mounted, light fixture over door head shall be provided.

Ceiling Fans - All ceiling fans must be Energy Star qualified. (EA8)(EA9)

Occupancy Sensors - All Bathrooms and Bedrooms shall be equipped with occupancy sensors. (EQ5)

VOICE AND DATA SERVICE

Phone jacks or modem connections shall be installed in the Kitchen, Living Room and all Bedrooms. All projects receiving low-income housing tax credits will be required to install a high-speed data network.

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- Telephone jacks in Kitchens, Living Room and all Bedrooms.
- Cable jacks in Living Room and Master Bedroom.

CLOSED CIRCUIT SECURITY CAMERA SYSTEM

Note where required by the Building Code closed circuit security camera system must be provided at each entrance to the building allowing occupants to observe who is seeking entrance to the building with their television set. (10 or more apartments.)

FIRE/SMOKE DETECTORS

Smoke detectors shall be hard-wired to comply with the Electrical Code. Additionally, any smoke detector within 20 FT of a kitchen or bathroom shall have a Photoelectric head with a battery back-up to comply with the Fire Marshall's regulation, currently in effect, which shall include a detector in every bedroom. Thus, with battery back-ups, storms and / or black outs will not jeopardize the fire protection provided. A carbon monoxide monitor must be installed on each floor. (EQ2)

- Hard-wired smoke detectors.