



MSHDA STANDARDS OF DESIGN

The Michigan State Housing Development Authority (“MSHDA”) **Standards of Design** defines the design process and the specific requirements for multifamily housing financed by MSHDA. This version of the **Standards of Design** replaces all previous versions.

Nothing in this Standard shall be interpreted to waive the requirements under the Michigan Building Codes, The Federal Fair Housing Act, The Uniform Federal Accessibility Standards, The Americans with Disabilities Act or any other applicable law.

Introduction

The MSHDA Standards of Design are to be used in conjunction with the following MSHDA Programs:

1. Direct Lending Program
2. 4%/9% Low-Income Housing Tax Credit (LIHTC) developments that utilize the MSHDA Direct Lending Program

The Standards of Design are not required for developments that are only utilizing 9% LIHTC with no other MSHDA resources. If 9% LIHTC developments use MSHDA Project Based Vouchers or any other HUD funding they must meet the Uniform Federal Accessibility Standard (UFAS) requirements. UFAS requires 5% of units be made accessible for people with mobility impairments plus an additional 2% be made accessible for people with sensory impairments. If the developer has received points in the Qualified Allocation Plan (QAP) for additional accessibility and/or visitability, plans will be reviewed for QAP compliance.

The front part of the Standards of Design applies to new construction and adaptive re-use projects. Family developments use the black text. *while senior developments follow the orange, italic Times New Roman text* in addition to the rest of the document.

Rehab developments use the second part of the Standards and use the new construction descriptive information when items are being replaced as part of the re-financing of the property.

00000 General Design Requirements

00010 General Design Parameters

All housing financed by MSHDA must meet the following parameters:

- MSHDA Design Standards
- Latest applicable codes e.g.
 - Michigan Building Codes
 - Energy Codes, NEC, ASHRAE, NFPA,
 - State Elevator Code
 - Applicable ordinances
 - Fair Housing Amendments Act.

Additionally, the following federal regulations shall apply:

- Developments that utilize federal programs or funding must follow Section 504 of the Rehabilitation Act of 1973 and the Uniform Federal Accessibility Standards (UFAS);
- Developments that have space that is used for public functions must follow the Americans with Disabilities Act (ADA).

Design parameters discussed and agreed to at Pre-Design meetings, including Development Amenities, shall be incorporated into the design and construction documents.

Architects, engineers, and developers should note that these Standards are minimums. Good architectural and engineering practices and manufacturer recommendations shall also be observed. MSHDA Design Review comments may address such good practices.

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Design Development Policies

A. Architectural Design Responsibility

Developers shall employ State of Michigan licensed architects for design and contract administration services. The design architects shall have experience appropriate to the design of housing proposed for the particular development and shall carry Errors and Omissions Insurance. The design architects shall contract with currently licensed landscape architects and engineers as necessary to carry out the design. Exceptions shall be that civil engineering site work and survey work may be contracted directly by the developer; however, the architect will be required to coordinate the civil engineering with other design work.

The Owner-Architect Agreement requires the design architect to confirm that the construction documents conform to the MSHDA Standards of Design, The Federal Fair Housing Act and any other standards and procedures as may be in effect. When developments are funded with federal assistance (HOME units) Section 504 of the Rehabilitation Act of 1973 applies, and all service and submissions of the Architect shall also comply with the Minimum Guidelines and Requirements for Accessible Design as contained in 36 CFR Part 1190, *et seq*, or any subsequent replacement regulations, as well as the HUD Minimum Property Standards, and Manual of Acceptable Practices.

Typically, construction trade or design/build contractors and subcontractors shall not be employed to carry out design work. Where work such as fire suppression design, irrigation design, truss design and commercial kitchen design are carried out by design build contractors, the architect shall be responsible for coordinating and accepting their work.

B. Errors and Omissions Insurance

Design and/or supervisory architects shall retain effective professional liability insurance in form, amount, and term satisfactory to MSHDA.

All architects must furnish evidence of professional liability insurance satisfactory to MSHDA prior to the date of submission of any preliminary drawings and/or specifications to MSHDA. The insurance policy must be in full force and effect as of the date of submission and must be kept in effect for a period of one year after substantial completion.

AMOUNT OF COVERAGE

Design and Supervisory

Errors and Omissions insurance in an amount equal to the greater of \$1,000,000 or 10% of the construction contract amount depending on the project size with a deductible minimum of \$10,000 to maximum of \$100,000

Supervisory only

Errors and Omissions insurance in an amount of \$250,000 for buildings with up to 3 floors and \$500,000 for buildings 4 floors or more with a deductible minimum of \$5,000 to maximum of \$25,000

C. Design and Supervision of Housing more than Three Stories in Height

MSHDA requires that appropriate experience of a proposed Design Architect be documented prior to MSHDA approval of the architect's firm. Experience is particularly critical in the design of housing developments more than three (3) stories in height. A registered structural engineer with appropriate experience must prepare related structural drawings. All firms proposed for doing such work shall submit documentation of their background in such design and further shall submit professional résumés documenting relevant experience of their participating architects and engineers for MSHDA review before proceeding with design. In cases where a Design Architect's firm does not have a qualified structural engineer possessing such experience on staff, a licensed independent structural engineering firm must be retained by the Design Architect. During construction, MSHDA requires that the approved structural engineer participate in the supervision of such structures.

00021 Architectural Design Responsibility

MSHDA relies heavily on the professional competency of participating architectural firms and on the MSHDA design process as documented in the MSHDA Standards of Design. For this process to work effectively, participants must encourage the free expression of both designing and reviewing architects. The Design Architects should fully express themselves in the design submissions and in their responses to reviews furnished by MSHDA and must not submit proposals or certify drawings which they, as professionals, do not agree with or which are not prepared by, or under the direction of, the Design Architects' firms.

It should be noted that MSHDA will not approve multiple professional service contracts. All architectural, planning, engineering, landscaping and other services, which contribute to the drawings and specifications by which a housing development is built, shall be in the employ of or under the direction of the Design Architect. Exceptions shall be that Civil Engineering site work and Survey work may be contracted directly by the developer; however, the architect will be required to coordinate the Civil Engineering with other design work.

Participation of the Contractor

The Authority encourages constructive participation by the Contractor during the design process inviting the Contractor's regular input to help maintain cost control for the proposed housing development. Recognizing that field experience has given Contractors unique and invaluable insights into cost-saving construction techniques, MSHDA seeks the benefit of this experience as it relates to the design process. To facilitate a constructive exchange of ideas, MSHDA also forwards review comments to the Sponsor and to the Contractor, as well as to the Design Architect.

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Reviewer Listing

Architecture Review Consultants

The Design Forum, Inc.
560 Fifth St. NW, Suite 302
Grand Rapids, MI 49504
(616) 438-9101
Contact: Neale Bauman

Site Review Consultants

VIRIDIS Design Group
313 North Burdick Street
Kalamazoo, MI 49007
(269) 978-5143
Contact: Woody Isaacs

00040 Accessibility Policy

New construction (structures containing 3 units or more):

A percentage of the units as required by State Law, but no less than 1% of the total units, shall be fully accessible.

If the development is primarily town homes, accessible units shall be ranch units.

For ease in exiting in emergencies, accessible units shall be located on the ground floor (at grade) if possible.

Rehabilitation: Accessible units shall be modified to be as accessible as is reasonable.

Federal Funding:

Where federal funds such as HOME funds or housing vouchers are used in financing a development, the design must comply with all applicable Federal regulations, specifically compliance with the Uniform Federal Accessibility Standards. Under UFAS, the required number of units designed for physical accessibility is 5% of the total number of units plus an additional 2% of the units be made accessible for persons with hearing and vision impairments. (Refer to HUD 24 CFR Part 8)

**00045 Environmental Design Concerns
Mitigation**

Design and construction documents shall incorporate work necessary to mitigate environmental concerns identified by MSHDA and the Owner's consultants unless these concerns are addressed prior to construction start and are outside the limits of the construction documents. Mitigation methods shall be in conformance with a plan prepared in conformance with applicable State and Federal regulations and accepted by MSHDA.

Hazardous Material Notification

In all developments involving demolition or rehabilitation, specifications shall be written to include the following:

"In carrying out the work of this contract, should the contractor encounter asbestos or other toxic materials the contractor shall:

- Notify all parties to this contract;
- Notify applicable State and Local authorities; and (if the cleanup is to be carried out under the direction of the contractor)
- Make application for permits necessary for removal (or other methods of mitigating the potential harmful effects) of such materials; and
- Upon receipt of required permits mitigate potential harmful effects of such materials in accordance with permits and applicable codes and laws."

If the contractor is not to be responsible for mitigation, the sponsor/developer/owner shall carry out mitigation in accordance with the requirements as stated above.

00050 Field Engineering Submission Requirements
00051 Boundary and Topographic Site Survey

The purpose of these specifications is to designate and describe the minimum requirements for a boundary and topographic site survey for use in the design and construction of MSHDA housing developments.

A. General

In general, the surveyor shall perform all field work necessary to accurately determine property lines and existing physical conditions of the site, set monument markers, establish benchmarks and ascertain and record on a topographical map and boundary survey drawing the information and data as required and hereinafter specified. The surveyor shall obtain such information and data from public and other records, including a review of underlying documents to current (within 30 days) title work, as may be required to complete the work. All data and information required by these specifications shall be shown on the survey drawing or designated as nonexistent. Boundary and topographical work shall be signed and sealed by a licensed professional surveyor.

Compass direction shall be shown by an accurately positioned North Arrow designated as (A) magnetic north or (B) true north.

The legal description shall appear on the face of the survey map. Said description shall conform entirely to the survey. Whatever form is utilized, the precise legal description shall be preceded by identification of the appropriate street address if one is available. Acceptable forms of legal description are the metes and bounds description or the lot and block description. Any contiguous plot shall be described by a single perimeter description of the entire property. Division into parcels shall be avoided unless such is requested to serve a special purpose. If the property is described as being on a filed map, the survey map should contain a legend relating the plot to the map on which it is shown.

Two benchmarks referenced to an established datum shall be marked on a permanent object adjacent to the site and clearly located and described on the survey drawing.

Boundary lines of the site shall be shown in bearings and distances.

The survey drawing shall be prepared at a scale of not less than one inch equal to 50 feet.

All corners of the site and other boundary line intersections not previously marked by a monument shall be marked. Where existing structures preclude setting monuments at the intersection of property lines, a brass pin should be set in the property line extended, tagged and so noted, along with the distance from the true corner. At least one corner of the property shall be designated by course and distance from a readily discernible reference marker. Location and description of each marker shall be shown on the survey drawing.

The total area within boundary lines shall be designated on the drawing in square feet and in acreage, as well as the area of the property of each ownership within the boundary lines.

B. Easements, Encroachments, Improvements

Indicate all servient and beneficial easements and any and all easements appurtenant to the property indicating the identity by Liber and Page, if any, the origin (e.g. Deed from A to B), if applicable, and nature. It is also desirable to describe an easement appurtenant to a fee parcel by using a separate parcel description.

Accurately and clearly indicate the location, dimensions and nature of (A) all encroachments upon the property; (B) all encroachments upon adjoining property, streets or alleys by any buildings, structures or other improvements upon the property; and (C) all party walls between, with or adjoining the property and other property.

Indicate position, size and material of all improvements on the property, including buildings, retaining walls, architectural walls, areaways, driveways, paving, etc. Indicate existence and location of off-site structures within 10 feet of the property lines.

Indicate the location of all adjacent building lines. Note names of adjoining property owners.

C. Trees

Indicate location, species and size of trees over six inches in trunk diameter, measured at breast height.

D. Roads and Right of Ways

The following data shall be indicated on survey drawing for all streets, alleys, roads, highways, and rights-of-way adjacent to the site:

- Distance from property lines and dimensions;
- Type and condition of material;
- Type of curb and gutter;
- Elevations of sidewalk along edge nearest site at 50-foot intervals at corners and points of slope change;
- Elevations of top of curbs and flowline of gutters at 50-foot intervals at corners and points of slope change;
- Description of proposed sidewalk curb and gutter improvements, contemplated date of installation and proposed locations and elevations.

E. Utilities

The following data pertaining to utilities adjacent to the site shall be shown and noted on the survey drawing:

- Location, type and capacity of available electric service, including lines, poles and manholes;
- Location of water mains, hydrants and manholes, indicating size of water mains;
- Location and size of gas mains, including type, pressure and source of gas supply;
- Location, size, direction of flow, rate of fall and type of material of sanitary, storm or combined sewer mains. Indicate public or private and if use is exclusively for sanitary wastes or storm water drainage. Indicate elevations of flowline, "in" and "out" inverts and location of manholes.
- If a utility is not available at the site, it shall be noted if service is available in the community and where.
- List the company or governmental body of jurisdiction for all utilities.

F. Topography

Elevations of the site shall be taken on a grid suitable to the topography and size of the site. Contour lines shall be drawn at intervals that accurately reflect the existing topography of the site. Contour lines shall be at one-foot intervals. Elevations shall be marked on contour lines at regular intervals and shall be based on USGS datum.

G. Miscellaneous Information

Note other information pertaining to site conditions, e.g. abandoned underground foundations, ditches, culverts, mine shafts, tunnels, wells, sanitary drain fields, excavations, etc. Also indicate locations of all waterways, wetlands and established floodplains and floodways.

In addition to other contractual services, the surveyor shall obtain and/or verify requisite information and data from public records, including names, locations, dimensions and elevations of streets, curbs, gutters, sidewalks, established building lines, easements, utilities, proposed improvements, condemnations, etc., necessary for, and incidental to, a completed site survey, preparation of the drawing thereof and the certification by the surveyor that the data represented therein is true and correct.

H. Coordination with Legal Survey

The survey shall also meet the requirements of MSHDA's Legal document 026.

The drawing shall also have the imprint of the surveyor's registration seal or, in lieu thereof, a certification as to his state registration or license. The "Surveyor's Certificate" (Legal document 025) is required to be executed, sealed and submitted to MSHDA as a prerequisite to Initial Closing. Legal forms may be obtained from MSHDA's Legal Affairs Division.

The surveyor shall cooperate with the Title Company, Abstractor or Attorneys selected by the Sponsor to furnish title information in connection with the site in order that the numbering of certificates or opinions of title will correspond with the maps furnished by the surveyor. The surveyor shall review the Title Insurance Commitment/Policy for the parcel of property to insure the survey and the Title Insurance Commitment/Policy describe the same parcel of property. The survey must disclose all easements, rights-of-way and encroachments set forth in the Title Insurance Commitment/Policy by Liber and Page Number.

00052**Soil Boring Reports**

The soil survey is to be performed under the direction of a civil or geotechnical engineer registered in the State of Michigan. The entire site is to be inspected to note variations in types of soils and ground water conditions. Locations for borings are to reflect varying site conditions. Special attention is to be given to boring locations in low or marshy areas, areas where there is a history or evidence of fill or where rock may be expected.

Soil borings are to be made with a drilling rig, taking samples as often as the character of the soil changes, and describing it in accordance with acceptable engineering standards. Samples are to be submitted to a soil specialist for analysis.

The engineer is to indicate the location of borings on a boundary survey and log the borings on the site plan or on a separate document. The logs are to use an exaggerated vertical scale to indicate, with acceptable key names and symbols, the nature of soil composition at each stratum to a depth of 15 to 20 feet.

For sites anticipating high-rise buildings, borings are to be concentrated in the area of the anticipated building location. At least one of these borings shall be drilled to a depth of 100 feet or to hardpan.

Borings are to be performed after buildings have been located on the site plan. There shall be one boring per building for low-rise structures and one boring per wing for mid-rise structures with a minimum of three to four borings for this building type. Borings shall also be carried out in parking areas and roadways.

The engineer shall indicate bearing capacities of soils at various levels with a recommendation for the footing / foundation type for proposed structures and shall provide a recommendation for pavement design of roads and parking.

The engineer shall note and make recommendations on ground water conditions and remedies as needed.

00053 Soils Investigation for Previously Developed Sites

Where proposed developments are to be located on previously developed sites, a soils investigation plan shall be submitted to the Authority and receive Authority agreement prior to Authority Feasibility. The intent of the plan is to determine the extent of underground debris that needs to be removed in order to construct the proposed development's buildings, parking, and utilities. The plan shall be based on the location of previous structures using a review of historical Sanborn Insurance maps, similar historical information, historical aerial photographs, previous environmental investigations, and the proposed location of future buildings, parking and utilities.

The plan shall call for test pit trenches, using a backhoe, to be dug across the width of all areas of previous structures. The extent of the test pit trenches shall be explicitly delineated in the plan. The extent shall be suitable to determine the amount and cost of debris removal and replacement of excavated materials. The test pits shall be a minimum of 18" wide and to the depth of virgin soil.

Prior to undertaking the soil investigation, and only after plan approval, the development team shall notify the Authority's Construction staff as to the time and place of the investigation to allow Authority staff to observe the soil investigation. A complete soils report of the investigation, prepared by a qualified professional soils engineer, shall be submitted to the Authority.

This soils investigation shall not remove the development team from the responsibility to carry out soil borings necessary to adequately determine the bearing capacity of the soil and recommend an adequate structural design for buildings, parking and utilities.

After the soils investigation and subsequent report, the developer, contractor and architect shall estimate the costs necessary to remove the underground debris and provide a "buildable" site. The costs shall be submitted to the Authority as a separate line item on the Authority's Trade Payment Breakdown (TPB) form. This line item shall also include costs necessary to cover all environmental remediation of the site. The Authority shall review the soils removal costs and the environmental remediation costs as part of the TPB approval process for Feasibility.

The "soft costs" portion of the Pro Forma for the development, as included in the Feasibility and Commitment action by the Authority's Board, shall include a contingency for the removal of underground debris, environmental remediation and site restoration to a "buildable" condition, in an amount equal to or exceeding 1.5% of the construction contract amount.

00100 Design Review Process

The Design Review Process includes the following stages:

- Initial Staff Review
- Site Analysis / Site Concept
- Design Development / Feasibility
- Construction Documents / Commitment

A. Initial Staff Review

The process starts when an application is received. The Housing Development Officer (HDO) sends a memo to MSHDA staff with information about the development team, the development type, size and location. The Chief Architect and Chief Construction Manager will visit the site.

B. Site Analysis / Site Concept

The Site Analysis and Site Concept Review meeting is a response to the preparation and submission of a Site Analysis and a Site Concept in accordance with MSHDA's Submission Requirements. This submission is prepared by the Developer's Design Team and submitted to MSHDA and to MSHDA's Site and Architectural Review Consultants ten working days prior to the scheduled Review Meeting.

The MSHDA Site and Architectural Review Consultants will prepare and distribute a written review prior to the meeting. The Developer's Design Team shall prepare a written response for discussion at the meeting.

The purpose of the Site Analysis / Site Concept meeting is to:

- explain the MSHDA Design Review Process
- discuss the site analysis
- agree on a conceptual plan for the development
- discuss applicable requirements
- discuss specific programmatic parameters
- agree on program amenities
- and to set forth a specific schedule

The Site Analysis / Site Concept meeting is a meeting of members of the Development Team, Authority staff from Development, Design, Market Analysis, Management and other areas as affected, and the Authority Site Review Consultant.

Site Concept Review meeting shall precede site plan approval by the local municipality.

The soils report shall be submitted to the Chief Construction Manager prior to Feasibility.

C. Design Development / Feasibility

The Review of Design Development or Feasibility Drawings is the next stage of the Design Review Process. A complete Feasibility Submission, in accordance with the submission Requirements in the MSHDA Standards of Design, is made directly to MSHDA and MSHDA's Site and Architecture Design and Engineering Review Consultants. Allow ten (10) working days after documents are received for the Consultants to complete their review.

After the documents have been corrected to meet the Review Consultants comments submit the documents to the MSHDA and the Review Consultants. After ten (10) working days for the Consultants to complete their review, a Feasibility Design Review Meeting is held.

The participants at the meeting shall be members of the Development Team, Authority staff from Development, Design, Market Analysis, Management and other areas as affected, and the Authority Site and Architecture Design Review Consultants.

The MSHDA Site, Architecture Design, and Engineering Review Consultants will prepare and distribute written reviews prior to the meeting. The Developer's Design Team shall prepare a written response.

The purpose of this step is to definitively set forth and agree upon a design solution consistent with the Site Analysis and Site Concept, the Authority's Standards, the construction budget available to the development and, appropriate to, the needs of the anticipated future residents. The Development Team shall identify desired variances from the MSHDA Standards of Design. In requesting a variance, the Development Team shall provide, for MSHDA's consideration, the reasons for requesting a waiver.

D. Construction Documents / Commitment

The Review of Construction Documents or Commitment Drawings is the next stage of the Design Review Process. A complete Commitment Submission is made directly to MSHDA. Allow ten (10) working days for the staff to complete their review.

The purpose of this step is to complete construction documents consistent with the Design Development or Feasibility drawings, the Authority's Standards, the construction budget available to the development and, appropriate to, the needs of the anticipated future residents. The Development Team shall identify desired variances from the MSHDA Standards of Design. In requesting a variance, the Development Team shall provide, for MSHDA's consideration, the reasons for requesting a waiver.

00110 Design Drawing and Specification Submission Requirements

00111 General

It is necessary that the programming, planning, design and construction of housing developments be based on a logical, step-by-step process that proceeds from the general to the specific, from the overall to the detailed. Such a process will also provide MSHDA with a rational sequence for the review of applications for financial assistance. Therefore, the development process will be divided into three phases:

Phase 1: Concept Plan

Phase 2: Design Development / Feasibility

Phase 3: Construction Documents / Commitment

The intent, content and requirements of each phase are outlined herein. Adherence to these requirements will ensure expeditious process of applications and minimize the need for modifications. Each submission is to include the following basic information:

A. All sheets should have:

Number; graphic and lettered scale; north arrow; sheet title.

B. Title Sheet

Development location, including location map; Sponsor; Architect; Landscape Architect, Site Planner, Surveyor, Engineer (if applicable); special consultants; revision dates; MSHDA number; index of contents; and signature block with lines for the sponsor, architect, contractor, surety if there is on and MSHDA.

C. Development Data Summary on Title Sheet including: (detailed area calculations are not required at Site Concept Phase)

- Total number of family units; area per unit type (net and gross); breakdown of the number of each type of unit (breakdown is to include barrier free units).
- Total number of family parking spaces (covered and uncovered).
- *Total number of senior units; area per unit type (net and gross); breakdown of the number of each type of unit (breakdown is to include barrier free units).*
- *Total number of senior parking spaces (covered and uncovered).*
- Total area of the site in acres.
- Gross area tabulation, e.g. senior building, senior commons, family building, family commons, commercial building.

00112 PHASE 1: Concept Plan

The intent is to prepare a concept appropriate to the site. The concept plan shall indicate general building masses, circulation (vehicular and pedestrian), parking, open spaces, special facilities, and site features portraying the overall intent, spatial form and system of development. It shall be prepared on a site topography base map with contours at no greater than 2' intervals and at a scale no smaller than 1" = 50'.

Structures:

- Indicate location, arrangement and general groupings.
- Locate any recreation or service structures.

Circulation:

- Indicate roadways, parking areas and services.
- Indicate the general walkway system and the connection to common facilities.

Utilities:

- Indicate major trunk lines and connection points to existing utilities. Show easements.

Recreation:

- Indicate open spaces and facilities.
- Indicate parking and service for common facilities.
- Indicate area for tot lot(s).

Parking Location

Grading:

- General character
- Snow storage areas
- Mounds and berms
- On-site storm water detention / retention
- Indicate any special problems

Planting:

- Consider existing vegetation in concept development
- General planting concept

00113

PHASE 2: Design Development/Feasibility

Submit one copy to MSHDA and to each Design Review Consultant (Site, Architectural, and Engineering).

Provide a Development Data Summary (refer to Title Sheet specifications).

A. Site Plan

The design shall be developed from the concept plan. The Design Development Plan shall refine the arrangement and functional groupings of units to a more exact scale to create a meaningful sequence of usable spaces. Specific relationship of unit arrangement, of the structure to the site, site grading, circulation, lighting, paving, screening, setbacks, parking, play areas and recreation areas shall be presented. This plan should be produced at a scale of 1" = 50' or larger and include:

Structures:

- Location, shape, size, arrangements and groupings.

Circulation and Parking:

- Indicate location and materials of vehicular and pedestrian routes.
- Indicate parking/dwelling unit relationship, location and number of spaces.
- Delineate the accessible route throughout the site.

Soils:

- Depth and analysis of topsoil
- Locate soil borings and present data (may be separate report).

Utilities:

- Indicate general major utility layout, easements and connections.
- Irrigation source.

Recreation:

- Location and type of facilities (tot lot).

Grading:

- Resolve special and typical relationships
- General character, existing and proposed contours at 1' intervals, section, etc.
- Berms and mounds
- Storm water management; Detention and Retention areas
- Snow storage areas

Planting:

- Indicate character
- Indicate screening concepts, relationship to units and open space, etc., with sections or sketches

Lighting:

- Location and Character (catalog illustration), height, wattage and photometric.

Alta Survey:

- reference to 00050 Field Engineering Submission Requirements, 00051 Boundary and Topographic Site Survey.

B. Residential and Community Buildings

Definitive designs for typical dwelling units, residential buildings and community building(s) shall be developed and submitted to MSHDA. These designs shall be based on careful study of the development program and concept plan.

Dwelling Unit Schedule:

- Total number of units.
- Number and percent of total of each unit type.
- Net Area and Gross Area of each unit type.

Dwelling Unit Design Development:

- Floor plans and sections (with dimensions), as required, at 1/4"=1'-0" scale for each unit type (including door swings, doors and window locations).
- Room area, dimensions and designation of each room and space (including storage).
- Demonstration of the "furnishability" of each unit type.
- Plans and elevations of typical residential buildings (groups of town houses) at 1/8"= 1'-0" scale.
- Indicate basic construction technique and exterior materials. Key residential building plans to site plan.
- Outline specification.

Community Facilities:

- Floor plans, sections and elevations (with dimensions) at 1/4" = 1'-0" scale of community building(s).
- Indicate room areas.
- Gross area of community building(s).
- Outline specification.

Nonresidential Facilities:

- Plans and elevations of commercial and other nonresidential facilities included in development as appropriate.

Additional Information:

- Such information as is necessary to fully illustrate development conditions

00114 PHASE 3: Construction Contract Documents/Commitment

Submit one copy of the construction documents to MSHDA.

00114.1 When the plans and specs have been accepted, provide the Chief architect with:

- The date that will be on the documents at initial closing;
- An electronic version of the sheet index formatted to 8 ½" x 11";
- An electronic version of the spec book table of contents.

01140.2 Initial closing documents

Before printing drawings email the Chief Architect to determine which of our construction specialist will be monitoring construction, some prefer half-size drawings rather than full-size drawings.

- One full size set of documents including addenda and bulletins to be signed on the cover and initialed on each page by you, owner, contractor and surety if there is one. MSHDA keeps this set for the life of the mortgage.
- Five full sets signed on the cover by everyone that is distributed to owner, architect, contractor, surety and our construction specialist. If there is no surety or the surety does not want a set, bring four sets construction documents.
- A pdf of the plans and specs including addenda and bulletins on a memory stick for MSHDA to keep.

00115

Color and Material Selections:

Exterior and interior material selections shall be submitted and approved prior to initial closing. Upon receipt of a satisfactory submission, the Design Chief Architect shall issue a letter of approval. All approved submissions shall be retained by MSHDA and transmitted to MSHDA's Construction Specialist for field verification. Where a change in a specific item is desired after approval has been received, the Architect shall submit the request for change. Approval shall be given prior to placing an order for the new item.

A. Submission Format

Exterior and interior material selections shall be submitted on neutral color boards, e.g. illustration boards. The boards are to be clearly labeled indicating where selections are intended to be used clarifying and distinguishing between selections for units and community spaces.

Selections shall be accompanied by written specifications regarding material name and identifying number, color and manufacturer. Where graphic location of materials warrants an explanation or numerous floor plan changes have occurred since Feasibility submissions floor plans necessary to indicate material locations shall also be submitted.

B. Exterior Material Selections:

Samples of actual materials to be used in exterior construction are to be submitted.

Aluminum products may be represented by flat stock; paints or stains may be represented by "color chips" of paper. All visible surfaces are to be represented, including but not limited to, as follow:

Brick, siding, roofing, trim, gutters, downspouts, frames, doors and graphics.

C. Interior Material Selections:

Samples of actual finishes and materials to be used are to be submitted. Surfaces, fixtures, etc., are to be represented, including but not limited to, as follows:

Carpet, vinyl products, ceramic tiles, quarry tiles, base trim, counter tops, wall coverings, paints, ceiling finishes, cabinets, all door finishes, appliances, draperies, and blinds.

00150 Specific Design Standards

These Design Standards are guidelines to features and facilities which the Authority has found essential for sound affordable housing. In exceptional cases, departures from the Standards may be considered through the Design Review Process by which they may be accepted, rejected, or result in modified design, depending on the circumstances. In the case of measurable or numeric Standards, Standards given as minimum may be exceeded and maximums should not be exceeded.

A. General Building Arrangement

- Dwelling units shall not be in basement spaces or where the finish floor of the habitable area is entirely below grade.
- Efficiency units must demonstrate sufficient size, layout, and/or furnishings to meet livability requirements for the local rental market. There must be sufficient anticipated demand as detailed in the market study to warrant this unit type. Efficiency units must include a full kitchen (including full-sized refrigerator, stovetop, and oven), have thoughtful layouts that make efficient use of the space, be furnished with appliances or fixtures that contribute to the livability and the convenience of the unit, and have creative storage options. Consideration will also be given to the inclusion of additional amenities and common areas for tenants to utilize outside of the rental unit.
- Units of three-bedroom or larger size shall have their entry at grade level. Their habitable spaces may be placed on a second-floor level, but not at third floor level or above. Adequate sound insulation must be provided between units on separate floor levels.
- Site plans shall not concentrate three- and four-bedroom units into one area. Concentrating units in such a manner has an adverse impact on parking and site maintenance.
- In all buildings that are designed to include a multiple number of dwelling units, an enclosed access shall be provided to any of those units that are located above grade. This access may be individual stair enclosures or common stair enclosures.
- All units shall have broadband internet available in the living or dining room. The installation must result in broadband infrastructure that meets the Federal Communications Commission’s (FCC’s) requisite broadband speeds.
- Units with three or more bedrooms shall have a clothes washer and dryer hook-ups in the unit.

B. Site Design

- A tot lot shall be provided and include a bench with a shade tree. When a development is more than 50 units, two tot lots shall be included.
- An easy to read lighted site sign shall be easy to read from the road and include the development name, address, phone numbers, accessibility logo, Equal Housing Logo
- Delineate the areas to have lawn sprinkled.
- Delineate the accessible route to all site amenities, public sidewalks, bus stops
- Dumpster enclosures shall have a man door for accessibility.
- Where carports are provided, they shall be lit under the canopy.

Future Electric Vehicle (EV) Infrastructure Requirements

- All New Construction, Adaptive Reuse, and Substantial (Gut) Rehab projects will be required to incorporate the following requirements in order to accommodate future EV charging stations.

- A conduit system installed between the building electrical service panel to the EV-Ready parking spaces. The conduit system is required to be sufficient to support electrical wiring associated with the future installation of Electric Vehicle Charging Stations that will serve Future EV parking spaces.
- The project’s electrical system is required to be designed to accommodate the future electrical loads and electrical equipment associated with providing a minimum Level-2 charge capability to the required number of spaces.
- The building’s electrical panel must be sized to accommodate the future overcurrent devices needed for the EV-Ready system or space for an additional panel may be reserved to accommodate such devices.
- Conduit, electrical panel slots, and floor/wall space reserved for future EV system components are required to be durably labeled: “For Future EV Charging Stations.”
- The EV infrastructure installed must be sized sufficiently to accommodate Level-2 charging stations equal to at least 5% of the total units in the building.

C. Common Space

1. Community Space:

- Developments require community spaces for activities, office space (including work areas) for rent up and continued leasing, maintenance spaces and storage space for flammable items. Proposed furnishings for Community Buildings shall be appropriate for the spaces to be furnished and for the intended resident.
- Community space is not required for developments of less than 48 units, however the development team must satisfactorily provide for office and maintenance operations.

2. Elevators:

- Buildings that have the following characteristics shall be equipped with at least one elevator of sufficient size (approximately 5' x 7') so as to facilitate move-ins/outs and emergencies.
 - Three or more stories
 - Senior buildings with two or more stories³
 - Developments that include barrier free units that are not zero-step
- Buildings with 100 or more dwelling units or of three or more stories shall be equipped with at least two elevators. One such elevator shall be located and of sufficient size (approximately 5' x 7') so as to facilitate move-ins/outs and emergencies.

3. Accessible Units

Accessible units shall not be arranged all in one wing of a building in order to allow accessible units to be spread throughout the building and to ensure adequate accessible parking options. Such units shall be located on the floor at grade for ease of exiting in an emergency but shall be located throughout that floor.

4. Congregate Housing

At a minimum, congregate housing shall include facilities and services for common dining, housekeeping and personal health services.

5. Congregate Common Spaces:

- *Management, mail pick-up and primary vertical circulation functions shall be grouped at the primary entrance and lounge.*
- *All common facilities shall be accessible without passing directly through the lounge. If provided, medical and social services, central dining facilities and similar common facilities (including trash removal) shall be grouped near the*

- main circulation elements but in such a way that it is not necessary for a resident to pass through the lobby or the lounge to reach them.*
- *The design shall provide easy “way finding” cues to distinguish location within a building. These cues can include clear organization in the design of space and circulation, plants, lighting, features, color (carpet, walls, features), furnishings, and consistent signs.*
 - *Provide glass panels adjacent to or in doors to common area rooms, allowing residents to see into a room before attempting to open the door.*
 - *Proposed furnishings for Common spaces shall be appropriate for the spaces to be furnished and for the intended resident.*
6. **Circulation**
Common corridors shall be a minimum of five (5) feet wide. For reasons of eliminating visual and physical corridor length, the maximum length of a corridor shall be 150’. For this measurement, a corridor shall be defined as ending at any intersection with another corridor resulting in a visual terminus or where common space provides a significant visual break or offset. The maximum length of travel from a unit to an elevator shall be 150’. The maximum length of travel from the farthest unit to common dining and/or office facilities shall be minimized through building arrangement. No ramps shall be used in corridors.
7. **Community rooms**
All community rooms shall be provided with a kitchen that shall minimally have a double bowl sink, garbage disposal, a range/oven, a refrigerator, and a barrier free workspace.
8. **Crafts rooms**
All crafts rooms shall be provided with a sink with gooseneck faucet and plaster trap. All craft rooms shall have negative air pressure.
9. **Maintenance Space**
Common maintenance space shall be provided for storage and as a work area. Maintenance buildings or in large buildings, maintenance spaces shall be provided at all developments. Buildings or spaces shall be heated and insulated, a toilet for staff shall be provided. The maintenance space shall be approximately 400 square feet. Provision shall be made for the storage of flammable materials. Workbenches and storage shelves shall be provided within the maintenance space.
10. **Common Laundry**
 - *Common laundry rooms shall be provided with a table for folding laundry and a rod for hanging clothes.*
 - *If feasible, common laundry rooms shall have a window to the exterior.*
 - *Common laundry rooms shall have a floor drain.*
 - *Common laundry rooms shall have a seating area within, immediately adjacent to, or in line of sight of the laundry room.*
 - *All laundry rooms shall have negative air pressure.*
11. **Trash Compactor and Trash Chute**
 - *The trash compactor room shall be designed so that the trash gondola can be easily wheeled in and out of the space without sharp turns.*
 - *A hose bib shall be provided within the trash compactor area for ease in washing down the area. A wash down sprayer shall be provided for within the trash chute. The residents shall not have to carry trash through the main lobby to dispose of their trash. A remote trash room shall be provided as needed.*
 - *All trash rooms shall have negative air pressure.*
12. **Package Shelves**
Where dwelling unit entries are accessed from common corridors, entry package shelves shall be placed immediately outside each dwelling unit entry with a minimum dimension of twelve (12) inches.

13. In buildings with multiple units for senior residents, storage may be in cubicles located in common area storage rooms.

D. Dwelling Unit Design

The minimum square feet for a one-bedroom unit shall be 600 square feet with 20' being the least dimension in the unit.

The adequacy of the design of dwelling units shall, for the greatest part, be measured by the dwelling units "furnishability" and the inclusion of several key components. "Furnishability" shall be shown to accommodate the following:

- 1. Living Room:** Minimum dimension of 11'-6".
 - Sofa
 - Two chairs
 - Coffee table
 - Television on a table
- 2. Foyer** including a 3' minimum coat closet
- 3. General Storage** (near the exterior door)
 - Provide closets containing storage based on the number of bedrooms;
One-bedroom: 15 sq. ft. minimum
Two-bedroom: 18 sq. ft. minimum
Three-bedroom: 22 sq. ft. minimum
- 1. Dining area requirements:**
 - Table to accommodate two people in a one-bedroom unit, four people in a two-bedroom unit and six people in a three-bedroom unit.
 - Stool seating for two at a kitchen island is acceptable in one-bedroom units.
- 4. Kitchen:** (minimum of 48" between counters)
 - Double bowl sink, with garbage disposal and 18" minimum counters each side
 - Faucet shall be a single lever type.
 - Task light over sink
 - Dishwasher shall be required
 - Range/oven: with counter on one side of 18" minimum
 - Exhaust hood with task light
 - "Frost Free" Refrigerator/freezer with 15" minimum counter on latch side
 - Natural light shall be provided; borrowed light using pass-throughs and open areas over cabinets is acceptable.
 - Cabinets at a pass-through shall allow a vertical opening of 24" minimum.
 - Appliance and cabinet doors and drawers shall not conflict.
 - Countertop work surface shall be a minimum of six lineal feet with cabinets above and below.
 - Space and an electrical outlet for a countertop microwave oven shall be provided or a microwave/range hood combination may be used.
 - Provide a cabinet above the refrigerator.
 - A pantry is desirable, especially in barrier free designed units.
- 5. Master bedroom:** (least dimension 9'-0")
 - Queen bed
 - Two nightstands

- At least one dresser
 - Closet with minimum six lineal feet of hanging rod
6. **Secondary bedroom:** (least dimension 9'-0"; 90 sq. ft. minimum)
- Two twin beds
 - Two nightstands
 - Dresser
 - Closet with minimum four lineal feet of hanging rod
7. **Linens closet** near bedrooms with minimum two lineal feet and five shelves
8. **Bathroom**
- In all dwelling units visitors shall have access to a water closet and lavatory without having to circulate through a bedroom.
 - Water Closet
 - Bathtub and/or shower
 - Lavatory with vanity (vanity top in barrier free designed units)
 - Faucets shall be a single lever type for sink and tub/shower
 - Mirror
 - Medicine cabinet or base cabinet with drawers
 - Toilet paper holder
 - Two Towel bars
 - Grab bars, as required
9. **Outdoor space**
- The incorporation of patios and balconies will be determined on an as-needed basis in order to ensure marketability of the units. The quality of tenant amenities within the development or in close proximity to the development will be considered as part of this review as well.
 - Patios or balconies will be required to have a 5'-0" least dimension.
 - One-bedroom - 45 sq. ft. minimum
 - Two-bedroom - 60 sq. ft. minimum
 - Three-bedroom - 80 sq. ft. minimum
 - Patios shall be concrete.

E. Acoustical Rating

Listed Acoustical or Sound ratings for floor/ceiling assemblies shall be as follows:

- Sound Transmission Class (STC) rating of 55
- Impact Insulation Class (IIC) rating of 55

Demonstrate the STC and IIC on the floor/ceiling details in the drawings.

- 02000 Site Work**
Site design shall take advantage of positive site features and characteristics and shall address and mitigate negative site features. Site analysis and design concept shall be developed to respond to these features. None conforming sites are subject to waivers.
- 02001.11 Parking Lots**
Designs shall not contain dead end parking lots.
- 02001.12 Collector Roads**
Designs shall have no parking along collector roads.
- 02001.13 Parking Ratios**
Parking shall be required to meet the lesser of the following:
- Local code requirements
 - For developments that are located in vehicle-dependent areas or that lack sufficient public/alternative transportation:
 - 0.8:1 parking ratio for senior developments
 - Minimum 1:1 parking ratio for non-senior developments
 - For non-senior projects with an average of at least 1.5-bedrooms per unit = 1.25:1 parking ratio
 - For non-senior projects with an average of at least 2-bedrooms per unit = 1.5:1 parking ratio
- 02001.16 Drive Widths**
- Collector drives shall be a minimum of 22'-0" in width.
 - Drives within parking areas shall be a minimum of 20'-0".
- 02001.17 Parking Spaces**
- Parking spaces within developments shall be a minimum of 9' in width.
 - *Parking spaces in senior developments shall be a minimum of 10' in width.*
- 02001.18 Curbing**
- All drives, parking areas and parking islands shall be curbed.
 - Curbing shall be concrete.
 - Curb profiles shall accommodate snow plowing in identified areas.
 - The Authority recommends main drives and collector roads be crowned with drainage along curbs.
- 02001.19 Catch Basins**
- Catch basins shall not be located under carports.
 - Drainage shall be away from carports and not towards or through carports.
 - Catch Basins shall have concrete collars.
- 02001.2 Design of Walkways**
- There shall be an internal system of walkways.
 - BF ramps shall be provided at curb crossings.
 - Walks shall be concrete.
 - Asphalt "walking trails" may be provided.
- 02001.3 Widths**
Walkways along parking spaces where cars may overhang the walk shall be 6'-0" wide or as

required by ADA, FHA, or local ordinance, whichever the greater.

02001.4 Patios

- The incorporation of patios and balconies will be determined on an as-needed basis in order to ensure marketability of the units. The quality of tenant amenities within the development or in close proximity to the development will be considered as part of this review as well.
- Dwelling units at grade shall have concrete patios with a minimum area of 80 sq. ft.
- *Dwelling units at grade shall have patios with a minimum area of 45 sq. ft.*

02001.5 Lawn areas

Grades at lawns shall slope a minimum of 2%, swales at a minimum of 2%, and berms at a maximum of a 1 on 3 "mowable" slopes.

Riprap or stone is not an acceptable landscaping material.

02001.6 Maintenance Strips

A maintenance strip, not less than 18" in width, to protect siding from mowing operations, shall be provided along all non-masonry building facades. Stone mulch is not acceptable in family developments. This maintenance strip shall extend beyond the roofline where gutters and downspouts are not provided.

02280 Termite Control

Termite control shall be provided in locales that have had previous evidence of termites as determined by the design architect. Toxicants shall be applied by a contractor licensed by the manufacturer to soil beneath concrete slabs on grade and along inside and outside the perimeter of foundation walls.

02780 Exterior Lighting

02780.1 Light Poles

Building mounted lighting for purposes of lighting parking lots and walks, to or from parking, shall not be used but rather pole-mounted lights shall be used for such purposes. Pole bases shall be located 3'-0" back of curb where cars are parked along the curb.

02780.2 Lamps

Combination photocells or timers shall control exterior lighting. Cut-off lamp fixtures and internal reflectors or other means shall be used to minimize light trespass beyond the property or into adjacent windows.

02780.3 Lighting Levels

Exterior lighting levels for parking and walkways shall be a minimum of ½ foot candle. Lighting shall be even, and "hot" spots are to be avoided. Switched light fixtures under the control of residents may not be used in the foot-candle calculation. All designs should consider the character and location of the development.

02780.4 Carport Lighting

Lighting shall be provided beneath carports at the same ½ foot candle lighting level required for parking.

02860

Tot or Play Lots

- At least one tot and/or play lots shall be provided.
- One tot lot per 50 units, rounded up shall be required.
- Play equipment shall be installed per manufacturer's recommendations for safety and configuration.
- In addition to the play equipment, provide a bench and a shade tree.
- Where accessible routes serve ground level play components:
 - The vertical clearance shall be 80 inches high minimum.
 - The running slope not steeper than 1:16 or 6.25%.
 - The cross slope shall not be steeper than 1:48 or 2.08%.
 - Openings in floor or ground surfaces shall not allow passage of a sphere more than ½ inch diameter.
 - Changes in level between ¼ inch high minimum and ½ inch high maximum shall be beveled with a slope not steeper than 1:2.
- Engineered wood fiber surfaces will require frequent maintenance to comply with the ASTM F 1951-99 standard because of surface displacement due to user activity or other factors. Designers and operators are likely to choose materials that best serve the needs of each play area. The type of material selected will affect the frequency and cost of maintenance.
- Rubber surfacing and some engineered wood fiber products meet the ASTM F 1951-99 standard. The fact that a specific product meets the ASTM 1951-99 standard does not necessarily mean that all other similar products will meet the standard. Some jurisdictions and municipalities require surface systems to have certificates of compliance with ASTM standards.

02870

Dumpster Enclosure and Gate

All dumpsters will be surrounded by a gated enclosure. Include a man door for accessibility.

02900

Plantings

Select native species where practical.

Plant Sizes

- Shade trees shall have a minimum caliper of 2 ½".
- Flowering trees shall have a minimum caliper of 1 ½".
- Evergreen trees shall have a minimum height of 5'-0", with an average height of all evergreen plants of 6'-0". Mulch all tree saucers with a minimum of 3" of finely processed shredded bark mulch. Mass plantings of evergreen seedlings should be considered for use in screening objectionable views.
- Tree stakes shall be within mulch saucers.

Locations

- Plants shall be planted so that at maturity they remain at least 12 inches from all buildings.
- When planted beneath windows, they shall not exceed the height of the windowsill at maturity.

02980

Site Signs

A lighted development sign containing Fair Housing and Equal Opportunity logos shall be provided.

03000 Concrete

03001 Walk Intersections

Walk intersections shall have a radius or angle configuration that protects the lawn from "cutting the corner". MSHDA prefers a haunch design where the straight leg(s) of the haunch is no less than 12" and the 45-degree diagonal leg of the haunch is no less than 17" (12" x 1.414). The bottom of the haunch connects with the straight run of the intersecting walk.

03030 Concrete Finishing Materials

All exposed concrete floors in common areas shall be sealed using an epoxy stabilized chlorinated rubber or an acrylic polymer.

03050 Concrete Work

- **Preparation of Base.** Excavate to the required depth and to a width that will allow forming. Remove unsuitable material below the required depth and replace with sound earth. Shape base to conform to the section shown on the plans and compact to 95%.
- **Forms.** Use either fixed forms or slip forms. Provide straight, full-depth, unwarped forms that will resist springing during concrete placement. Firmly stake fixed forms.
- **Placing and Finishing Concrete.** Wet the base before placing concrete. Do not place concrete on a frozen base or on a base that is unstable from excessive moisture. Place the concrete and consolidate before finishing. Place and finish concrete in a continuous operation. If replacing gutters in addition to curb ramps, transition the gutter cross section in advance of the curb ramp to meet the dimension and profile in MDOT Standard Specifications for Construction Section 803 8-9 the MDOT Standard Plan R-28 series. Use the same reinforcement pattern present in the existing gutter. Place the railing sockets for concrete steps in the plastic concrete or drill into the hardened concrete. Float the surface to produce a smooth surface, free from irregularities. Round the edges and joints with a finishing tool. Texture the surface of sidewalks, curb ramps, driveways, and steps with a coarse broom transverse to the direction of travel.
- **Sidewalk Joints.** Construct transverse and longitudinal expansion and plane-of-weakness joints at intervals and locations shown in the MDOT Standard Plan R-29 series. Align transverse joints with like joints in adjacent slabs. Construct joints with faces perpendicular to the surface of the sidewalk and no greater than ¼ inch from the position shown on the plans. Construct transverse joints at right angles to the centerline of the sidewalk and longitudinal joints parallel to the centerline. Spade or vibrate and compact the concrete to fill voids at the faces of the joints. Place expansion joint filler the full depth of the joint. Recess the top of the joint filler ¼ to ½ inch below the finished surface. Cut the plane-of-weakness joints into the concrete after floating. Cut plane-of-weakness joints to at least one-fourth the thickness of the sidewalk and from ⅛ to ¼ inch wide. Do not seal the joints.
- **Concrete Steps:** Use Grade 3500 for concrete for steps. Precast steps will be allowed.

06000 Wood and Plastics

06001 Base Trim

All rooms with floor coverings shall have base trim.

06010 Lumber

Balconies

- Wood framing at balconies, decks and patio fences shall be pressure treated lumber.

- Deck boards and trim shall be treated lumber, cedar or composite materials are an acceptable alternative.
- Balconies shall be at least 5'-0" to accommodate wheelchairs.
- Dwelling units above grade shall have balconies with a minimum area of 80 sq. ft.
- *Dwelling units above grade shall have balconies with a minimum area of 45 sq. ft.*

Fence

- All wood fence materials shall be treated, cedar or composite materials are an acceptable alternative above grade.

Exterior Trim

- Exterior Trim shall be treated, composite or cedar. Trim may be other wood species if back-primed and stained.

06190 Trusses

Energy heels are required.

Where no gutters are provided, roof overhangs shall be no less than 24".

06240 Laminates

Stools (Sills)

- Window Stools with plastic laminate shall be sealed with plastic laminate on all sides.
- Cultured marble stools are preferred.
- Painted wood stools are not acceptable.

Counter tops

Counter tops shall not have sharp exposed corners. Corners protruding in excess of 1-1/2" shall be rounded or have a 45-degree corner.

06600 Plastic Fabrications

Casings and trim

Polystyrene molded door casing and baseboard shall not be used.

07000 Thermal & Moisture Protection

07195 Sheathing

Sheathing shall be a nailable wood product. All joints shall occur over wood structural members on walls.

07200 Insulation

No plumbing should occur in an exterior wall. If plumbing in the exterior wall cannot be avoided, a furred out and insulated space for the plumbing shall be provided.

07200.4 Crawl Space

Crawl Spaces shall be mechanically conditioned spaces.

07310 Shingles

- Shingles shall have a minimum 25-year warranty.
- All old roofing is to be removed.

- New shingles, flashings, underlayments, and accessories to be installed following National Roofing Contractors Association (NRCA) guidelines and manuals.
- Three-tab shingles are not allowed.

07500 Membrane Roofing

Membrane roofing shall have a minimum 10-year warranty on labor and materials.

07650 Flashing

All roof systems to include industry best practices as they relate to flashings and roof penetrations. Kickout flashing shall be located where a roof and exterior wall intersect, where the wall continues past the lower roof-edge and gutter, and where gutters terminate at the side of a chimney.

07650.1 Stepped Roofs

Stepped sloped roofs shall be flashed with appropriate metal flashing and ice and water shield or equal two feet vertically where the sloped roof meets the vertical wall.

07710 Gutters

Gutters and downspouts and, where necessary, rain diverters shall be used on all developments.

07920 Sealants and Caulking

Caulk all exterior joints of dissimilar materials.

08000 Doors & Windows

Bi-fold doors shall not be used.

08001.1 Sliding glass doors

- In areas where the crime of breaking and entering is prevalent, pass doors in lieu of sliding doors shall be used as access to ground level patios.
- Particular attention during design shall address FHA requirements for thresholds and for 32" actual clear width for egress.
- Sliding glass doors shall be forced entry resistant meeting AAMA/WDMA/CSA 101/I.S.2/A440-17 or current equivalent standard.
- *Pass doors, in lieu of sliding glass doors, to patios and balconies are required in housing for senior residents.*

08001.2 Bathroom Doors

- *Bathroom doors shall swing outward.*

08100 Metal Doors and Frames

- Exterior unit entry doors shall have foam filled cores and be no less than 1-3/4" thick.
- Jambs at the strike area shall be reinforced with an equivalent of a plywood plate 3/8" x 3-1/2" x 6" nailed to the back of the jamb.
- Doorjambs shall be reinforced with 2" x 4" horizontal bracing at latch height.
- In-swinging exterior and unit entry doors shall have rabbeted jambs.

08200 Wood and Plastic Doors

Doorframes or casing shall not be polystyrene.

Where allowed by code, doors may be undercut a maximum of 1" to provide return air from bedrooms and bathrooms.

08390 Screens and Storm Doors

Sliding screen doorframes may not be rolled form frames.

08500 Windows
Security and operation

Windows within eight feet of grade, or otherwise accessible without the use of a ladder, shall be forced entry resistant meeting AAMA/WDMA/CSA 101/I.S.2/A440-17 or current equivalent standard. Windows shall have a breakaway effort of less than 30 pounds for single hung windows and 20 pounds for sliders. Windows shall have an operating effort of 18 pounds for single hung and 12 pounds for sliders.

08630 Vinyl Windows

Vinyl windows shall be certified as meeting or exceeding AAMA/WDMA/CSA 101/I.S.2/A440-17 (or subsequent revisions) and shall have fully welded construction.

08710 Finish Hardware

08710.1 Lever handles

Door handles shall be the lever type.

08710.2 Peephole/viewer

All unit entry doors shall have peepholes and all barrier free units shall have a second peephole at 45 inches above the finish floor. Peepholes shall be fitted with a fisheye viewer.

08710.3 Locksets

- The dead bolt shall have a 1" throw. The dead latch shall have a 1/2" throw. Unit entry hardware shall not have parts made of plastic.
- Bathrooms and master bedrooms shall have door locks. Interior doors may not be locked against egress or panic release operation.
- Exterior doors from common spaces, stairs, maintenance areas etc. shall have adjustable self-closing devices, self-locking dead latches and trigger bolt protection.
- *Senior unit entries shall have door locks with simultaneous retraction of the dead bolt and dead latch from the inside and a single key operation from the exterior.*

08710.4 Hinge Pins

Out-swinging exterior doors shall have non-removable hinge pins or shall have security type hinges that prevent unauthorized door removal.

08710.5 Alarms

Exterior doors in buildings designed for multiple dwelling units for residents in areas where security from trespass is anticipated as a substantial problem shall have door ajar alarms wired to a central control panel. Such security areas shall include large metropolitan areas as determined by MSHDA's Marketing staff.

- 08742 Lobby access**
Main entrance doors to buildings designed for access to multiple dwelling units for residents shall have electric door release.
- 08780 Cabinet and Drawer Hardware**
In dwelling units designed for seniors and in barrier free units, cabinets and drawers shall have easily graspable pulls.
- 08810 Glass**
Doors at laundry rooms shall have integral glazing or glazing immediately adjacent to provide visibility.
- 09000 Finishes**
- 09001.1 Floor covering**
Floor covering must be provided over all substrates of plywood, "gypcrete" or lightweight concrete.
- 09001.2 Concrete floors**
All exposed concrete floors in common areas shall be sealed using an epoxy stabilized chlorinated rubber or an acrylic polymer.
- 09250 Gypsum Board**
Dwelling units shall have drywall ceilings. Painted concrete ceilings are acceptable where the concrete is part of the structural system.

Ceilings and walls in kitchens and baths shall have a smooth washable surface.
- 09650 Vinyl Flooring**
Resilient flooring or vinyl tile shall be used in kitchens, baths and laundry areas (except in basements).
Vinyl plank, vinyl tile, and resilient tile shall not be used over wood substrate. The minimum wear layer in units is .012" and .020" in public spaces.
Directly glued vinyl plank, vinyl tile, and resilient tile shall not be used over wood substrate.

Listed Acoustical or Sound ratings for floor/ceiling assemblies shall be as follows:
▪ Sound Transmission Class (STC) rating of 55
▪ Impact Insulation Class (IIC) rating of 55
Demonstrate the STC and IIC on the wall and floor/ceiling details in the drawings.
- Wall Base**
Wall base trim shall be used in all habitable spaces. Base trim shall not be polystyrene.

09681**Carpet**

Carpeting shall be the usual floor finish material in all rooms except kitchens, bathrooms and laundries.

All carpeting shall meet the requirements of HUD Use of Materials Bulletin UM44D. Carpet shall be used in accordance with the type and class required per the Bulletin. Per UM44D, all carpeting shall be stamped and labeled as meeting the requirements of the Bulletin. An exception to the requirement of stamping and labeling may be granted for common area carpeting i.e. carpeting in lobbies, lounges, community rooms, libraries etc., (not corridors at residential entries). Carpeting in these areas may be certified by the manufacturer as having met or exceeded the performance standards of UM44D and need not be stamped and labeled, if such carpeting exceeds the pile weight and density required by UM44D by 25% or greater. This exception is intended to allow the use of higher quality "feature" carpeting in limited quantities, without adding the cost of laboratory authorized stamping and labeling. Such exceptions must receive written approval from MSHDA prior to the contractor or sponsor or owner ordering the carpet.

MSHDA prefers all carpeting within dwelling units to be nylon, however polypropylene or a blend of nylon and polypropylene is acceptable.

The minimum critical radiant flux limits for carpeting in corridors and is 0.45 watts/cm². This limit shall be reduced to 0.22 watts/cm² where the building has fire sprinkler protection.

The limit for carpeting in corridors and exitways shall be 0.22 watts/cm². Carpeting shall meet applicable requirements of UM44D.

Carpet tiles are not allowed in units.

09682**Carpet Pad**

All carpet pad must meet the requirements of UM72.

Carpet pad is required under carpeting except in barrier free units.

09900**Painting****09900.1****Interior**

- All paint over interior drywall shall meet or exceed the limit of 400 strokes on the "scrubability" testing standards established in the most recent version of ASTM #D-2486 and be low VOC.
- Kitchens and baths shall be painted with a washable semi-gloss paint. Satin sheen or eggshell finish paint may be used if a satin or eggshell finish is used throughout the residential unit.
- Dwelling units shall have painted drywall ceilings. Painted concrete ceilings are acceptable where the concrete is part of the structural system.

9900.3**Exterior**

- Exterior wood shall have at least 2 coats of stain.
- Vents penetrating roofs, with the exception of stainless-steel vents, shall be painted with appropriate paint to match the roof shingles.
- Exterior composite materials shall be installed, painted and caulked following manufacturer recommendations.

10000 Specialties

10001 Package Shelves

- *Package shelves at unit entries shall be provided*
- *Package shelves shall provide a minimum area of one square foot.*
- *Ninety-degree corners shall have a radius.*
- *A package shelf shall be provided at the elevator(s) on the first floor.*

10002 Handrails

- *Handrails shall be provided on both sides of all corridors for residents.*

10550 Mailboxes

- *Verify postal requirements with local USPS postmaster.*
- *Comply with accessibility codes.*

10800 Toilet and Bath Accessories

- *Toilets in senior developments should be comfort height 17"-19" seat height.*
- *Tub units should have a step-in height of 16" or lower on senior developments.*

10801.2 Bathroom doors shall swing out.

10820 Grab Bars

- *Tub and/or shower enclosures with integral grab bars substantially complying with the grab bar requirements may be used with approval, prior to initial closing, by the MSHDA Chief Architect.*
- *Grab bar on an adjacent wall to the water closet. One vertical grab bar 18 inches minimum in length shall be mounted with the bottom of the bar located between 39 inches and 41 inches above the floor, and with the center line of the bar located between 39 inches and 41 inches from the rear wall.*
- *Grab bars shall be provided at all bathtubs.*
- *One 24" long, 1" minimum in diameter, grab bar shall be placed at 45 degrees, centered on the side opposite the accessible side, and with the lowest point of the bar 12" above the tub rim. The highest end of the diagonal bar shall be at the control end of the bathtub.*
- *One 24" long, 1" minimum in diameter, grab bar shall be placed vertically at the control end of the bathtub at the outside edge with the top of the bar 4'-6" above the floor.*
- *Grab bars shall be provided at all showers.*
- *One 24" long, 1" minimum in diameter, grab bar shall be placed at 45 degrees, centered on the side opposite the accessible side, and with the lowest point of the bar 29" above the shower floor. The highest end of the diagonal bar shall be at the control end of the shower.*
- *An identical bar shall be placed vertically at the control end of the shower at the outside edge with the top of the bar 4'-6" above the floor.*

It is preferred to have water closets located adjacent to a wall 48" in length (perpendicular to the plumbing wall) to facilitate the future addition of a grab bar.

**10825 Residential Bath Accessories
Medicine Cabinets**

- Recessed medicine cabinets are preferred and may be substituted with a drawer base cabinet, subject to approval.
- They shall not be located on an exterior or rated wall.

11000 Equipment

11250 Water Softeners

Any domestic water supply with hardness in excess of 200 milligrams/liter of Calcium Carbonate shall be treated by water softening the domestic hot water. This determination will be made by MSHDA’s Chief Architect and will be based upon water quality data provided by the Drinking Water and Radiological Protection Division of the Michigan Department of Environmental Quality.

Domestic hot water only shall be treated. Where it is economically infeasible to treat only the hot water the domestic cold water may also be treated.

11452 Residential Appliances

- All dwelling unit appliances including range/oven, refrigerator, dishwasher, washers and dryers, shall be by a single group manufacturer.
- Refrigerators shall be placed so that the door will be able to swing 180 degrees to allow removal of all drawers and accessibility.

11452.1 Refrigerators

All refrigerators shall be frost-free (no-frost) refrigerator/freezers with two separate compartment doors.

11452.2 Range/Ovens

- All ranges and ovens shall be four (4) burner electric appliances with a minimum width of 30 inches. Gas range/ovens may be used where they have automatic ignition and automatic pilot shutoff.
- Ranges shall have grease shields.
- Controls shall be in the back in family kitchens.
- *Ranges shall be self-cleaning.*
- *Controls shall be in the front in senior kitchens..*

11452.3 Microwave ovens

An electrical outlet shall be conveniently placed for a countertop microwave oven. Microwave and exhaust hoods combinations are also acceptable.

11452.4 Exhaust Hoods

- A task light is required.
- Firestops are required at all range hoods.

11452.5 Garbage Disposal Units

Garbage disposal units shall be provided.

11452.7 Washers and Dryers

If washers and dryers are provided within dwelling units, side-by-side washers and dryers are preferred. Stacked washers and dryers may be allowed if they are full size, have the same cycle time as side-by-side machines, and the unit design allows adequate space for future

replacement of the stacked washer and dryer.

11455 Kitchen and Bath Cabinets

- All cabinets shall comply with the design and construction of the Kitchen Cabinet Manufacturers Association and shall be certified as such.
- All cabinets shall have hardwood stiles and rails. All cabinets except sink bases shall have backs.
- *Overhead kitchen cabinets shall be placed 15" above countertop (exception at pass-throughs, ranges and refrigerators).*
- All bathrooms shall have vanities. In bathrooms designed to be barrier free, to provide "roll under access" a reduced vanity size may be used, or a lavatory set in a countertop may be used. Wall hung lavatories may not be used.
- In the primary bath, if the vanity is longer than 39", drawers shall be provided on one side of the vanity.
- *Kitchen and bath cabinets shall have easily grasped door and drawer pulls.*
- *Cabinets in units designed for senior residents may have frames of composite wood materials provided the design, materials and installation ensures the screw holding capacity of the frame is equal to or exceeds that of oak. All cabinets except sink bases shall have backs.*

12000 Furnishings

12505 Blinds

Blinds shall be cordless and be provided at all windows and door wall openings. Blinds must be integral in swing doors.

**12664 Tables and Accessories
Laundry Rooms**

In common laundry rooms, a table and a hanging rack meeting ADA requirements shall be provided.

14000 Conveying Systems

14200 Elevators

- Hooks and removable pads shall be provided in elevators that will be used for move-ins.
- Buildings that have the following characteristics shall be equipped with at least one elevator of sufficient size (approximately 5' x 7') so as to facilitate move-ins/outs and emergencies.
 - Three or more stories
 - Senior buildings with two or more stories
 - Developments that include barrier free units that are not zero-step
- Buildings with 100 or more dwelling units or of three or more stories shall be equipped with at least two elevators. One such elevator shall be located and of sufficient size (approximately 5' x 7') to facilitate move-ins/outs and emergencies.

15000 Mechanical

15010 Design

Energy load data for heating, cooling and electrical energy loads comprised of summary

loads of each type of dwelling shall be included as part of the Commitment Submission.

15010.2 Heating and Cooling

All dwelling units shall have individual mechanically ventilated HVAC units. Through wall or window mounted air conditioning is not acceptable in new construction.

Where unit entries are located at grade for units that have living areas above grade i.e. individual entry stacked units, a supply air duct run shall be provided at the grade level entry foyer. At a minimum, this duct shall be provided in the ceiling of this foyer. Electrical heat maybe used when ductwork is not feasible.

Electrical heating shall not be used except high-efficiency electric furnace(s) or as specifically approved by MSHDA. Allowable in the foyer of multi-unit building.

All common corridors in developments shall be air-conditioned and provide positive air pressure. Corridor make-up air shall maintain corridor temperature at 76 degrees F in the summer and 70 degrees F in the winter.

Common laundries, craft rooms and trash and trash compactor rooms shall all be designed to have negative pressure.

15010.3 Appliances

Garbage disposal units shall be provided in all dwelling unit kitchens and common space kitchens.

Exhaust hoods over ranges/ovens shall include a task light.

15050 Basic Materials and Methods

15050.2 Valves

Hot and cold water shut off valves for each living unit shall be provided. Valves shall be installed at all service connections and in all branch lines and risers.

15050.7 Wall, Floor and Ceiling Plates

In finished spaces and within sink and vanity bases, furnish a chromium plated sectional escutcheon on each pipe or hanger rod penetrating the wall, floor or ceiling. Plates shall fit snugly.

15050.8 Plastic Drainpipe

Cellular foam core PVC shall not be used for wet pipes.

15180 Pipe Insulation

Insulation shall be continuous over pipes, valves and fittings, etc.

No plumbing should occur in an exterior wall. If plumbing in the exterior wall cannot be avoided, a furred out and insulated space for the plumbing shall be provided.

15250 Water Softeners and Water Conditioning

Any domestic water supply with hardness in excess of 200 milligrams/liter of Calcium Carbonate shall be treated by water softening domestic hot water. This determination will be made by MSHDA Design and Technical Resource staff and will be based upon water

quality data provided by the Drinking Water and Radiological Protection Division of the Michigan Department of Environmental Quality.

Domestic hot water only shall be treated. Where it is economically infeasible to treat only the hot water the domestic cold water may be treated.

15460 Plumbing Fixtures and Trim

Kitchen sinks shall be double bowl and shall be stainless steel. Sinks shall have a single lever control. A garbage disposal shall be provided. Lavatories shall not be fiberglass material. Wall hung lavatories shall not be used in any units. In common areas where wall hung lavatories are used; use wall chairs to support the lavatories.

- All bathtub bottoms shall have a non-slip finish.
- New bathtubs shall be porcelain enamel on steel or cast iron or constructed of fiberglass reinforced plastic. The finished product shall meet the standards set forth in Porcelain Enameled Formed Steel Plumbing Fixtures, ANSI A112.19.4.1977.
- All bathroom water controls shall be single lever controls.
- All exposed fittings, trimmings, faucets, traps and exposed connections shall be chromium plate brass.
- Faucets shall be heavy brass, compression type with renewable seats and discs or cartridge style.
- Provide a stop or shut-off valve in the water connection(s) to each water heater, water closet, group of fixtures and main riser.
- Common laundry areas shall have a floor drain.
- Roll in showers shall have a floor drain outside of the shower.
- Showerheads in accessible units shall be height adjustable using a 24" slide bar device.
- *All showerheads, whether in bathtubs or showers, shall be height adjustable using a 24" slide bar device.*

15470 Water Heaters

15470.1 Residential Water Heaters

All dwelling units shall have individual water heaters. Water heaters shall be Energy Star-rated and electric or gas-fired.

Where permitted shutoff valves for inlet and outlet lines shall be provided for ease of replacement.

15470.2 Commercial Water Heaters

Water heaters shall be gas-fired. All common water heaters shall be of the continuous recirculation design.

All copper fin-tube domestic water heaters with storage tanks shall have solid state electronic controls to circulate water through the boiler based upon a drop-in water temperature in the storage tank.

15500 Fire Protection Systems

- If building(s) are equipped with a fire protection system, then unit smoke detectors shall activate if the fire protection system flow alarm activates.
- Firestops are required at all range hoods.
- Wet system piping shall not be in the attic or unconditioned spaces.
- Backflow preventers are required for wet pipe systems.

- Nitrogen gas is preferred over compressed air in dry pipe fire protection systems.

15600 Heat Generation

15600.1 Boilers and Chillers

Gas fired boilers and chillers shall be used where heating systems are not provided for each dwelling unit. Boiler systems shall have two or more boilers and shall be furnished with a control panel designed to reset the supply water temperature based on the outdoor temperature. The Control panel shall step fire the boilers in sequential order. A heat exchanger is to be provided so that each unit may have cool air. Systems shall be designed to evenly and adequately distribute conditioned air throughout the living unit.

All heating systems shall be designed so that each living unit has at least one thermostat to control space temperature.

15900 Mechanical Controls

15900.1 Thermostats

- In all heating/cooling systems, unit thermostats shall be placed on an interior wall, at 48" above the finish floor, away from the direct flow of forced air and drafts.
- Thermostats in common areas shall have automatic setback controls.
- *Thermostats shall have large easy to read displays and settings.*

16000 Electrical

16010 Design

Electrical service shall be designed so that all dwelling units can be metered separately.

Large multipurpose rooms shall be wired so that one half the fixtures may be shutoff and a uniformly reduced lighting level is achieved with the balance of the lighting wired in a similar manner.

An electrical outlet shall be conveniently placed for a countertop microwave oven, unless a built-in microwave is being provided.

16010.1 Doors

Main entrance doors to buildings designed for access to multiple dwelling units for residents shall have electric door release.

16140 Wiring Devices

Switches

A dwelling unit's bath exhaust fan shall be switched separately from the lights. Bathroom lights shall be the first switch adjacent to the door latch; the second switch shall be for the bathroom exhaust fan.

16200 Emergency Generator

An emergency generator shall be provided buildings with elevators. Additionally, any building that is required to have a fire pump for the fire protection system, unless a diesel fire pump is provided, shall have a natural gas fired emergency generator.

Emergency Generators shall provide automatically transferred power for the full operation of all loads essential for the safety of human life as defined in N.E.C. and Life Safety Code

101.

In addition, the system shall include but not be limited to lighting in areas of refuge, emergency elevator (with cab size capable of handling a stretcher horizontally), and emergency call systems.

Where capacity exists in a generator sized for the above equipment, recirculation pumps on boilers and make up air supply shall be powered off that generator.

16500 Lighting

16500.1 Lighting Levels

Average illumination levels at the task surface shall be:

- 50 fc offices
- 15 fc corridors, lobby, stairs
- 30 fc kitchen countertop, sink and range surfaces
- 15 fc toilet rooms and bathrooms at vanity top
- 10 fc bathrooms at bathtub
- 10 fc storerooms, mechanical rooms, electrical rooms, etc.

Egress emergency lighting shall be maintained at a 1 foot-candle level inside the building and to a point 20 feet outside the building exits.

16500.2 Night lights

A night light, or outlet for a night light, shall be provided near the bedroom/bathroom area in all units.

16503 Poles, Posts, and Standards

Building mounted lighting for purposes of lighting parking lots and walks to or from parking shall not be used. Pole mounted lights of an appropriate height shall be used for such purposes. Aluminum poles are preferred.

Lighting shall be provided beneath carports at the same ½-foot candle lighting level required for parking.

16510 Interior Luminaires

16510.1 Corridor Lighting

Wiring systems shall be designed to allow shutdown of half the corridor lighting at night. This does not apply to garden apartment buildings with common corridors.

Corridor lighting shall be a minimum of 15 foot-candles.

16510.2 Bedroom Lighting

Each bedroom shall have a ceiling mounted light fixture.

16510.3 Kitchen Lighting

Each kitchen shall have a task light above the sink and a ceiling mounted general kitchen light. Additionally, the range hood shall have a task light.

16510.4 Fixture Types
Bare bulb porcelain fixtures shall not be used except in basements and mechanical closets.

16520 Exterior Luminaires
Exterior lighting shall be controlled by photocells. Luminaires shall be designed to reduce light spillage into unwanted areas.

Site development signs shall be illuminated.

16520.1 Balcony and Patio Lighting
Balconies and patios shall have a switched light.

16522 Roadway and Parking Luminaires
Exterior lighting levels for parking and walk areas shall be a minimum of 1/2 foot-candle. Provide a maximum to minimum foot-candle ratio of 10 within the limits of the parking area and walks to buildings.

16720 Alarm and Detection Systems

16720.1 Smoke Detectors

- All dwelling unit smoke detectors shall have a photoelectric type close to the kitchen, ionized detectors may be used elsewhere.
- If building(s) are equipped with a fire protection system, then unit smoke detectors shall activate if the fire protection system flow alarm activates.
- The operation of this system shall be discussed during the design stage with the local fire department to determine how the system shall operate. The operation of the system shall comply with the fire department regulations, however the capabilities of the system, as required herein, shall not be diminished.

Carbon Monoxide Detectors

Each apartment shall have carbon monoxide detector, even when natural gas isn't used in the unit or building.

16720.2 Emergency Call or Medical Alert Systems

An emergency call system shall be installed in all buildings designed for senior residents using pull cord stations in the bathroom and bedrooms or a medical alert system with wearable alert devices.

The system shall be a "fully addressable" system and include:

- *a light, and only a light (not to include a bell or alarm) over the unit entry;*
- *an annunciator panel located in the manager's office or reception area on a light display, and a sound is emitted to indicate the dwelling unit in which the emergency was activated; and*
- *optionally a remote annunciator panel located in the manager's unit.*

To be "fully addressable" the display at the office annunciator panel(s) shall differentiate between the smoke detector alarm signal and the emergency call signal and shall be able to identify from which dwelling unit the call originated. The system must require a manual reset at the annunciator panel. The system shall have the capability to send the same identifying information to a remote location off-site to a monitoring agent, a pager, etc.

The operation of this system shall be discussed during the design development stage with the local emergency medical service provider to determine how the system shall operate.

The operation of the system may comply with the service provider regulations; however, the

capabilities of the system shall not be diminished.

16722 Building Security and Detection Systems

Intrusion alarms shall be installed within residential units, which are at grade or otherwise accessible to intrusion, in areas where criminal trespass is a substantial problem as determined by MSHDA marketing staff.

16760 Intercommunications

All buildings that are designed to include a multiple number of dwelling units accessible through a common entry shall have a two-way intercom between the main entry and the individual units. Intercom communications shall not result in costs to the resident. In areas where added security is necessary, as determined by MSHDA and the development's management company, door releases at common entries shall be at the door and not remotely operated.

16770 Broadband Infrastructure

A broadband infrastructure that meets the Federal Communications Commission's (FCC's) requisite broadband speeds must be installed. Broadband speeds must be 25 megabits per second (mbps) download and 3 mbps upload to meet the FCC's broadband requirements.

16780 Television Systems

- A central TV antenna system shall be provided unless three major networks and public television can be received at the site without cost to the resident or basic cable is to be provided at no cost to the residents.
- All units shall be wired for cable television.
- Television antenna and cable outlets shall be provided on at least two walls of the living room and one location in the master bedroom.
- All antenna and cable wiring shall be concealed within walls.

16850 Electric Heating

Electrical heating shall not be used except high-efficiency electric furnace(s) or as specifically approved by MSHDA.

Rehab Standards of Design

The Michigan State Housing Development Authority (MSHDA) **Rehab Standards of Design** defines the design process and the specific requirements for **occupied** multifamily housing financed through the Authority.

00052 Investigation of Structures to be Rehabbed

The Sponsor/Owner shall obtain and submit a report from a licensed structural engineer regarding structural capacities and conditions of the building(s).

The Sponsor/Owner shall also obtain and submit a report from a licensed architect or a licensed engineer in association with a contractor licensed to do repair work on the mechanical and electrical system(s) to be preserved.

Any and all basement areas must be inspected. Any settling, cracks, water infiltration, heaving, and rotted wood must be noted and repaired as part of the rehab. Past repairs must also be noted.

00100 Rehab Design Review Process

A. Site Visit

At the site visit the Owner will have a preliminary CNA that incorporates the proposed Scope of Work. This visit is for MSHDA staff and its representative to determine the overall condition of the property. We look at the general neighborhood, grounds, structures, common areas, mechanical and electrical rooms, and typical apartments.

B. Final Scope of Work is determined, and final CNA is ordered.

The Development team and MSHDA staff meet to discuss the preliminary CNA line by line to determine the final scope of work and replacement reserves.

The participants at the meeting shall be members of the Development Team including the architect, contractor, and management agent and Authority staff from Development, Design, Market Analysis, Asset Management, the Authority Site and Architecture Design Review Consultants and other areas as needed.

The purpose of this step is to definitively set forth and agree upon a Scope of Work consistent with the CNA, the Authority's Rehab Standards, and the construction budget available to the development and appropriate to the needs of the anticipated future residents. The Development Team shall identify desired variances from the MSHDA Standards of Design. In requesting a variance, the Development Team shall provide for MSHDA's consideration, the reasons for requesting a waiver and the proposed alternative to meeting the Standards of Design objectives. Meeting notes are prepared by the Housing Development Officer. Following acceptance of the notes, a Final CNA is ordered, and the Design Team can start work on the construction documents.

C. Construction Documents / Commitment

Submit 2 copies of the construction documents and a unit matrix showing which units receive new elements.

The Review of Construction Documents is the next stage of the Design Review Process. A complete submission is made directly to MSHDA and MSHDA's Site, Architecture, and Engineering Review Consultants. After ten working days for the Consultants to complete their review, a Commitment Design Review Meeting is held. The MSHDA Design Review Consultants will prepare and distribute written reviews prior to the meeting. The Developer's Design Team shall prepare a written response.

The purpose of this step is to complete construction documents consistent with the Scope of Work, the Authority's **Rehab Standards**, the construction budget available to the development and appropriate to the needs of the anticipated future residents. Other meetings may occur at the request of the developer, architect, or MSDHA.

D. Contingency Wish-List

The Development team submits a contingency wish-list to MSDHA for approval prior to the start of construction.

00120 Replacement Criteria

The following criteria are to be used in MSHDA financed rehab where interior building components are to be reused.

The evaluation of building components, using these criteria, shall be done by the assigned MSHDA staff person in cooperation with the supervising architect, owner, and contractor.

Components not covered in this listing shall be evaluated using the listed criteria for similar components. Replacement components shall meet the Standards for new construction.

A. General

- Painting: Repaint all painted surfaces and paint all repaired surfaces to match existing and/ or adjacent. Lead based paint shall be abated in conformance with applicable law.
- Drywall: Must be clean, smooth, and match existing drywall as new.
- Floor Covering: Unless existing is as new, all sheet vinyl is to be replaced. Reuse carpet only if it has no stains, no worn areas and each room within a unit matches. Ceramic tile bathroom floors must have no chips or cracks and be clean. If a ceramic floor is not acceptable, it may be replaced, or it may be overlaid with new sheet vinyl after reparation of existing flooring to be a smooth, clean surface not subject to telegraphing the joints.
- Closet Shelving: Wood shelving must be smooth, tight fitting, with no delaminating, and be properly anchored. Wire shelving is acceptable.
- Blinds: Unless existing is as new, new blinds shall be provided. Existing blinds shall comply with MSHDA Standards of Design.
- Appliances, Motors and Other Equipment: Life cycle costing should be considered. The projected life of existing appliances, motors and other existing equipment should be equal to

or exceed five (5) years. If the projected life is less than five years, replacement is required.

- Infrared asphalt repair must include non-prorated ten (10) year warranty against cracking.

B. Kitchens

- Kitchen Appliances: Reuse only if they function properly, have good overall appearance, and only minor scratches.
- Kitchen Counter Tops: No bad chips, burns, stains, cracks, or deformities; must match within same kitchen and be adequately anchored. Counters shall be plastic laminate or better. Painted or epoxy coatings are not acceptable.
- Kitchen Cabinets: Must function properly and provide equal or greater capacity as original; new and existing in same kitchen must match; hardware must match; no deep gouges or broken pieces or parts.

In developments for seniors, cabinets must have easily graspable hardware pulls.

- Kitchen Sinks: No cracks or chips (unless chip can be satisfactorily re-glazed); must function properly and be adequately anchored; small light stains are acceptable. Disposal must function properly and not leak. When replacing the sink, replace the valves.

C. Bathrooms

- Bath Vanity, Vanity Top, Lavatory (sink) and Medicine Cabinet: Remove any wall-hung sink and replace with new vanity and lavatory (sink). Existing vanities, sinks, tops, legs, and medicine cabinets must meet criteria for kitchen tops, cabinets and sinks above. When replacing the sink, also replace the valves.
- Bathtub, Showers, Water Closets, Wall Surround (Ceramic Wall Tile or Fiberglass): Bathtubs and shower bases shall have no cracks or chips (unless chip can be satisfactorily re-glazed – may not be re-glazed more than once); must function properly and be adequately anchored; small light stains are acceptable. Fixtures must function properly. Ceramic wall tile and fiberglass surrounds must have no chips or cracks and be clean with no bad stains or deformities and tiles must match within same bathroom and be adequately anchored.
- New Bathtubs shall be porcelain enamel on steel or cast iron or constructed of fiberglass reinforced plastic. The finished product shall meet the standards set forth in Porcelain Enameled Formed Steel Plumbing Fixtures, ANSI A112.19.4.1977. Per HUD: Free-standing metal or plastic showers are not acceptable and must be replaced.

D. Doors and Door Hardware

- Unit Interior Doors: Repairs will be allowed on minor cracks and punctures only; otherwise, new doors will be installed. Repaired doors must function properly, be smooth and tight fitting with no delaminating. All door finishes within unit must match. Repaint all painted doors. Previously unpainted (stained) doors may be painted to match doors within units.
- *New bathroom doors shall swing out in senior apartments.*
- Unit Entry Door: All entry doors are to be new with new door hardware that is non-locking against egress.

- Door Hardware: All unit entry door hardware is to be new and shall meet MSHDA criteria for entry door hardware. Interior hardware must function properly and have clean appearance.
- Senior residents require interconnecting hardware on unit entry door.

E. Windows

- Interior Trim: All window finishes within a unit must match. Repaint all painted window trim. Previously unpainted (stained) trim may be painted to match all window trim within units. At all window units, seal perimeter.
- Window Glazing and Sash: All windows and sash shall be thermal break with insulating glass and a low-E coating. All window units are to be free of paint and have functional locks. Replace all torn screens, broken glass, and insulating glass that has spoiled thermal seals.

F. Plumbing

Must function properly. See fixtures in Bathrooms and Kitchens above.

G. Mechanical

- Heating, Air Conditioning Units and Covers: Must function properly and have clean and neat appearance with no large dents or visible damage. Paint covers to match adjacent walls.
- Existing ductwork and dryer ducts shall be vacuumed by a professional.
- Existing boilers and lines shall be flushed.
- When new boilers are installed add a filter to the boiler.

H. Electrical

- When kitchen cabinets are replaced add a task light above the sink.
- Electrical wiring: Replace all aluminum wiring smaller than #4 or used for branch service other than to a range.
- Electrical Fixtures, Outlets, Switches, Exhaust Fans, etc.: Must function properly and have clean appearance with no chips, cracks, or paint.
- Smoke Detectors: Must function properly and have clean appearance.
- Carbon monoxide (CO) alarms shall be replaced or added if there are no in-unit CO alarms.
- Replacement smoke and carbon monoxide detectors shall preferably be hard-wired.
- Smoke and CO detectors shall be replaced according to manufacturer's specifications.

I. Crack Sealing: I recommend we follow MDOT recommendations especially when it comes to temperature requirements for particular treatments & material specifications.

- Follow manufacturer's recommendation for material installation.
 - Primary Crack: Crack 1/8 inch to 1/4 inch wide with less than 25% of its length having secondary cracking.
 - Secondary Crack: Series of parallel cracks with no or few interconnecting cracks to the primary crack
- Compressed Air System. Provide and use a compressed air system that produces a continuous, high-volume, high-pressure stream of clean, dry air to prepare cracks. Equip the air compressor with a moisture separator to remove oil and water from the air supply. Provide a compressor capable of producing at least 100 psi at a continuous air flow of 150 cfm. Saw, clean, and fill all primary transverse cracks. Traverse crack as a crack less than 10 degrees off of perpendicular to the centerline.
 - The following cracks should not be sealed:
 - a. Secondary cracks.
 - b. Multiple nearby cracks that have raveled; and

- c. Multiple cracks that include broken asphalt.
- Approved methods of repair:
 - Stand Alone Overband Crack Fill. If no other surface treatment is required on the pavement, fill visible cracks that are less than 1¼ inch wide
 - Melter Applicator. Provide a melter applicator consisting of a boiler kettle equipped with pressure pump, hose, and applicator wand.
 - Equip the unit with the following:
 - Shutoff control on the applicator hose;
 - Mechanical agitator in the kettle to provide continuous blending;
 - Thermometers to monitor the material temperature and the heating oil temperature; and
 - Thermostatic controls that allow the operator to regulate material temperature up to 425°F.
 - Application Wand. Apply the material using either a wand followed by a V-shaped or U-shaped squeegee or a round application head with a concave underside
 - Recycled Rubber Joint Filler must meet the requirements of ASTM D1751
 - Epoxy resin adhesive must be capable of being injected into, and flow along, a crack 0.005 inch wide. Select epoxy-resin adhesive from the Qualified Products List. Use a fast-setting grout or fast-set temporary seal as recommended by the epoxy resin adhesive manufacturer. Perform injection when concrete and ambient air temperatures are above 50°F
 - Backer rod for use with a hot-poured joint sealant must be solid, round, heat-resistant, closed-cell, cross-linked PE foam meeting the requirements of ASTM D5249 for Type I.

J. Concrete Work:

- **Preparation of Base.** Excavate to the required depth and to a width that will allow forming. Remove unsuitable material below the required depth and replace with sound earth. Shape base to conform to the section shown on the plans and compact to 95%.
- **Forms.** Use either fixed forms or slip forms. Provide straight, full-depth, unwarped forms that will resist springing during concrete placement. Firmly stake fixed forms.
- **Placing and Finishing Concrete.** Wet the base before placing concrete. Do not place concrete on a frozen base or on a base that is unstable from excessive moisture. Place the concrete and consolidate before finishing. Place and finish concrete in a continuous operation. If replacing gutters in addition to curb ramps, transition the gutter cross section in advance of the curb ramp to meet the dimension and profile in MDOT Standard Specifications for Construction Section 803 8-9 the MDOT Standard Plan R-28 series. Use the same reinforcement pattern present in the existing gutter. Place the railing sockets for concrete steps in the plastic concrete or drill into the hardened concrete. Float the surface to produce a smooth surface, free from irregularities. Round the edges and joints with a finishing tool. Texture the surface of sidewalks, curb ramps, driveways, and steps with a coarse broom transverse to the direction of travel.
- **Sidewalk Joints.** Construct transverse and longitudinal expansion and plane-of-weakness joints at intervals and locations shown in the MDOT Standard Plan R-29 series. Align transverse joints with like joints in adjacent slabs. Construct joints with faces perpendicular to the surface of the sidewalk and no greater than ¼ inch from the position shown on the plans. Construct transverse joints at right angles to the centerline of the sidewalk and longitudinal joints parallel to the centerline. Spade or vibrate and compact the concrete to fill voids at the faces of the joints. Place expansion joint filler the full depth of the joint. Recess the top of the joint filler ¼ to ½ inch below the finished surface. Cut the plane-of-weakness joints into the concrete after floating. Cut plane-of-weakness joints to at least one-fourth the thickness of the sidewalk and from ⅛ to ¼ inch wide. Do not seal the joints.

- **Patching, Repair, and Overlay Mixtures:**
 - Work that consists of mortar and concrete mixtures for patching, repair, and concrete overlays General Requirements. Provide air-entrained concrete or mortar, do not use slag aggregates.
 - Mortar and Concrete Patching Mixtures: Types F-L, M, C-L, C-L-HE, C, and C-HE. Provide either regular strength or high-early strength patching mixtures.
 - Latex Modified Concrete (LMC) Overlay Mixture. Provide 100% crushed 26A coarse aggregate. Ensure that LMC meets the strength requirements of Grade 4500 concrete.
 - Silica Fume Modified Concrete (SFMC) Overlay Mixture. Provide 100% crushed 26A coarse aggregate. Ensure that SFMC meets the strength requirements of Grade 4500 concrete. Supply the silica fume admixture in dry-densified form. Remove dry-densified silica fume from packaging. Do not incorporate the packaging into the concrete mix
- **Concrete Steps:** Use Grade 3500 for concrete for steps. Precast steps will be allowed.

END OF STANDARDS