



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.

The following Standards are criteria of the Multifamily Design Review Process for the Michigan State Housing Development Authority. It is the intent of these Standards and the Design Review Process to insure that housing financed through MSHDA's Multifamily lending programs is the best housing that can be provided.

It is also the intent of the Design Review Process to determine whether specific items within the Standards should be modified or waived for an individual development in order to meet that development's unique site, design, financing, or market constraints. If a specific requirement is proposed to be modified or requested to be waived it is the responsibility of the Development Team to note the change and provide the appropriate documentation to support the modification prior to the Design Review Team's determination. At a minimum, the documentation shall indicate why the requirement is not feasible and what the alternative is to meet the Standards objectives.

The format of this document is intended as an easy reference and one that can be easily updated. Please update your copy of these Standards as new or modified pages are issued.

General Policy Statement

MSHDA will undertake rehab projects when they provide the best development alternative, meet MSHDA targeted objectives, and provide a reasonable risk with a reasonable prediction that the property will be successful. Successful outcomes are measured in terms of providing a continuing marketable development, a stable resident population, a well maintained structure, and repayment of the loan throughout the term of the loan.

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MSHDA Rehab Standards of Design

Occupied Housing Developments

- A. An analysis by MSHDA staff shall be made to determine if the proposal will meet the overall objectives set forth in the General Policy Statement on the previous page.
- B. Location and site selection shall be important underwriting considerations of acceptance for processing.
 - 1) Locations shall provide appropriate parking that meets MSHDA standards.
 - 2) Locations shall provide reasonable security.
 - 3) Locations shall provide appropriate outdoor spaces for the development's residents.
 - 4) Locations shall provide nearby amenities for the targeted resident population and meet MSHDA's Site Selection Criteria.
- C. The design of the existing building shall be an important consideration of the acceptance for processing.
 - 1) All units shall have central air conditioning.
 - 2) Private balconies or patios shall be provided for each unit.
 - 3) Rehab proposals shall provide units and common spaces that are marketable, provide living conditions comparable to new construction, and provide a development that is cost effective to operate and maintain.
 - 4) Living units shall have acceptable views.
 - 5) Living units located below slab on grade conditions are not desirable.
 - 6) Elevators in family developments are not desirable. However, elevators are required in senior developments with more than one story.
 - 7) Walk-up buildings with three or more stories are not acceptable.
 - 8) In family developments, common corridors shall serve no more than five units.
 - 9) Exterior elevations that consist primarily of concrete block that are painted or coated with epoxy coatings are not acceptable.
 - 10) Flat roofs on low-rise structures are not desirable.
 - 11) Living units shall be furnishable as defined in the Standards of Design.
 - 12) Parking shall be secure, well lit, and adjacent to the building.
- D. If commercial space is to be located within the structure, an analysis of the marketability and financial impact of the proposed commercial space shall be prepared by the development team. Uses inappropriate for, or incompatible with, the target population shall not be allowed.
- E. Where the development proposal involves the rehab of an existing occupied development, a Rehab Capital Needs Assessment (CNA) shall be required. The CNA shall include the owners proposed Scope of Work.
- F. The proposed design and costing shall address all CNA identified needs through the proposed construction or replacement reserves.
- G. Where the development proposal includes the reuse of internal building components, the reuse shall be done in accordance with MSHDA's Replacement Criteria **(00120)**.
- H. All replacement materials shall be equal to materials and methods of construction as required in the MSHDA Standards of Design for new construction. Green building materials and practices shall also be considered when they can assist in the development meeting the General Policy Statement.
- I. Financing shall provide a construction contingency equal to no less than 5% of the construction contract. Site, scope, environmental concerns and other factors may justify a higher contingency as determined by appropriate MSHDA staff.

MSHDA Rehab Standards of Design

00000 General Design Requirements

00010 General Design Parameters

General design parameters for housing financed by MSHDA shall include these **Standards**, latest applicable codes (e.g. Michigan Building Codes, NEC, ASHRAE, NFPA, State Elevator Code), applicable ordinances, Fair Housing Amendments Act, Michigan State Building Code Rules, and the Michigan State Construction Code Barrier Free design requirements. Also, the following regulations shall apply:

- 1) When Federal programs or funding is involved in the development, use Section 504 of the Rehab Act of 1973 and the Uniform Federal Accessibility Standards; and
- 2) When areas within the development are used for public functions, use the Americans with Disabilities Act.

00011 Miscellaneous Reference Standards

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.

00020 Design Development Policies

A. Architectural Design Responsibility

Developers shall employ State of Michigan licensed architects for design and supervisory 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 licensed landscape architects and engineers as necessary to carry out the design. Exceptions shall be that Civil Engineering site work, Survey work, and Environmental work may be contracted directly by the developer, however, the architect will be required to coordinate the contracted work with other design work.

The Owner-Architect Agreement asks 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 Rehab 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, and Manual of Acceptable Practices.

Typically, 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 contractors; the architect shall be responsible for coordinating and accepting their work.

MSHDA Rehab Standards of Design

B. Errors and Omissions Insurance

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

All architects must furnish evidence of professional liability insurance satisfactory to the Authority prior to the date of submission of any preliminary drawings and/or specifications to the Authority. 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

00021 Architectural Design Responsibility

The Authority relies heavily on the professional competency of participating architectural firms and on the Authority's design process as documented in the **MSHDA Rehab Standards of Design**.

It should be noted that the Authority 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, Survey work, and Environmental work may be contracted directly by the developer, however, the architect will be required to coordinate the contracted work 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, the Authority seeks the benefit of this experience as it relates to the design process. To facilitate a constructive exchange of ideas, the Authority also forwards review comments to the Sponsor and to the Contractor, as well as to the Design Architect.

00040 Barrier Free Policy

A. Rehab:

Barrier Free units shall be provided as required by State Law. Where market demand dictates, MSHDA may require that a higher percentage of Barrier Free units be provided.

B. Federal Funding:

Where Federal funds, such as HOME, NSP, HVP, or other Federal funds, are used in financing a development, the design must comply with the Uniform Federal Accessibility Standards (UFAS). Under UFAS, requires that 5% of the units be physically accessible and 2 % of the units be accessible for hearing/visually impaired residents. (Refer to HUD 24 CFR Part 8) (Refer also to **00010**.)

00045 Environmental Design Concerns

Design and construction documents shall incorporate work necessary to mitigate environmental concerns identified by MSHDA and the Owner's consultants unless these concerns are

MSHDA Rehab Standards of Design

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 materials must be removed by a qualified contractor. Encapsulation of hazardous materials is not acceptable.

A. Mitigation

Design and construction documents shall incorporate or identify 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.

B. Hazardous Material Notification

In all developments involving demolition or rehab, 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:

- 1) Stop work immediately and secure the area;
- 2) Notify all parties to this contract;
- 3) Notify applicable State and Local authorities;
- 4) Make application for permits necessary for removal (or other methods of mitigating the potential harmful effects) of such materials (if the cleanup is to be carried out under the direction of the contractor); and
- 5) 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.

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.

MSHDA Rehab Standards of Design

00100 Design Review Process

A. Site Visit

Ideally 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 in order 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 **Standards for Rehab**, 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

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 **Standards for Rehab**, 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.

MSHDA Rehab Standards of Design

00110 Design Drawing and Specification Submission Requirements

00111 General

The design drawing and specification submissions process is outlined in the **MSHDA Standards of Design**. The intent, content and requirements of each phase are outlined herein. Adherence to these requirements will insure expeditious process of applications and minimize the need for modifications. Each submission is to include the following basic information:

1) **All sheets should have:**

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

2) **Title Sheet**

Development location, including location map and address; Sponsor; Architect; Landscape Architect, Site Planner, Surveyor, Engineer (if applicable); special consultants; revision dates; MSHDA number; index of contents; and signature block.

3) **Development Data Summary, (on Title Sheet) including:**

Total number of units, breakdown the number of each type of unit (e.g. family, senior, barrier free, etc.); area per unit type (net and gross); total number of 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, etc.).

00114 Construction Contract Documents

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

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

1) **List of Drawings:**

Title Sheet
Alta Survey
Demolition Plan
Road and Building Location Plan
Site Plans
Planting Plans
Exterior Elevations
Unit Floor Plans
Unit Elevations
Architectural Construction Details
Schedules
Mechanical Plans
Electrical Plans

2) **Contents of Sheets:**

A. Miscellaneous Site Considerations (apply to proper sheet)

Site Bench Mark
Lighting systems, including photometric site lighting plans
Carports and garages
Electrical outlets
Waste receptacles
Entrance signs
Street and directional signs
Parking layout
Play courts
Recreation equipment
Street furniture including bicycle racks
Screens, walls, etc.
Flagpoles
Planting tubs
Sculpture, ceramics, etc.
Soil Erosion and Control (use key system per Michigan Public Act 347)

MSHDA Rehab Standards of Design

Dumpster enclosures
Mail distribution locations and details
Storage and maintenance out buildings

B. Title Sheet

Reference 00111 2) Title Sheet above

C. Alta Survey

D. Demolition Plan

Removal of Existing Structures, roads, paved areas, utilities and vegetation
Removal of any existing utilities within any structures to remain

E. Road and Building Location Plan

Proposed roads and buildings
All base lines and match lines
Building locations
Road center line data
Indicate property line coordinates and data

F. Site Layout Plan

Property lines
Match lines
North arrow
All roads excluding existing roads to be abandoned
Walks and paving (identify types of paving)
Play areas and athletic field
Fences, walls, gutters/downspouts
Site utilities
Building key plan
Graphic scale
Material identification or construction details

G. Planting Plans

Property lines
Match lines
Limit of contract
Legend
Planting details, including spacing of plants
Maintenance edges at buildings
Swales and berms
Buildings, roads, walks, steps, walls, fences, signs, gutters, etc.
Trees, shrubs, lawn (types of seeded or sodded areas)
Coordinate all plant material with utility lines, irrigation and structures
Plant list (scientific and common name, size, root condition, and special instructions)
Seed and sod limits
Topsoil stockpile (seed area when topsoil is removed)
Indicate existing material to remain and to be removed
Erosion net and staked sod where necessary

MSHDA Rehab Standards of Design

H. Irrigation Plans

- Sprinkler head location
- Zones
- Control boxes for each location

I. Exterior Elevations (scale not less than 1/8"= 1'-0")

- Design of all exterior views, including courts and offsets
- Each unit façade type and major variation thereof
- Indication and extent of all major exterior materials
- Existing and proposed grades at buildings
- Floor lines and elevations, floor-to-floor heights
- Windows, doors, openings, vents, louvers, utility meters and equipment
- Outline, depth below grade and stepping of building footings
- Connection conditions between units
- Foundation and areaway outlines
- Exterior lighting system

J. Unit Floor Plans (scale not less than 1/4"= 1'-0")

- Separate floor level plans of each unit type
- Unit dimensions, including outdoor patios, terraces, porches and overall dimensions
- Window and exterior door locations, size and/or schedule key
- Interior door locations, swing, sizes and/or schedule key
- Dimensional location of interior partitions, openings, railings and stairs
- Location of all permanently installed features and equipment, including kitchen appliances, cabinets, shelving and plumbing fixtures
- Each living unit type identified by letter and/or numerical designation

K. Unit Elevations (scale not less than 3/4"= 1'-0")

- Window and door indication, sizes and/or schedule key
- Cabinet and appliance sizes and location
- Specialty items (e.g. intercom, pull cords, etc.)

L. Architectural Construction Details

Interior details (scale not less than 3/4"= 1'-0")

- Elevation and plan (if not adequately presented on unit plans) of kitchen and bath counters, cabinets and fixtures
- Details of any built-in cabinet work, fireplaces and equipment
- Meeting points of dissimilar materials
- Flashing details for exterior materials (e.g. roofing, siding, masonry, etc.)

M. Schedules

- Door & hardware
- Window
- Finishes

N. Mechanical Plans

- New system location and features
- Tie in points to existing systems
- Equipment schedules

O. Electrical Plans

- New system location and features
- Tie in points to existing systems
- Equipment schedules

P. Specifications

MSHDA Rehab Standards of Design

Complete specification of all materials and work to be performed for all aspects of construction shall be in conformance with the **Uniform System for Construction Specifications, Data Filing and Cost Accounting (CSI)**.

00115 Color and Material Selections

Exterior and interior material selections shall be submitted and approved **prior to the second Construction Draw**. Upon receipt of a satisfactory submission, the Design Review Officer shall issue a letter of approval. All approved submissions shall be retained by MSHDA and transmitted to MSHDA's Construction Manager 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 family units, senior 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 follows:

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. Paints may be represented by "color chips" of paper. Appliance, hardware and light fixture colors may be provided in writing. 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 and hardware finishes, appliances, draperies, blinds, and light fixtures.

Interior selections may include two alternate color schemes for family units and two alternate color schemes for senior units.

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.

A. General

- 1) 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.
- 2) Drywall: Must be clean, smooth, and have as an homogeneous surface as new.

MSHDA Rehab Standards of Design

- 3) 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 so as to be a smooth, clean surface not subject to telegraphing the joints.
- 4) Closet Shelving: Wood shelving must be smooth, tight fitting, with no delaminating, and be properly anchored. Wire shelving is acceptable.
- 5) Draperies or Blinds: Unless existing is as new, new draperies or blinds shall be provided. Existing draperies and blinds shall comply with MSHDA Standards of Design.
- 6) 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.

B. Kitchens

- 1) Kitchen Appliances: Reuse only if they function properly, have good overall appearance, and only minor scratches.
- 2) 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.
- 3) 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.
- 4) 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.

C. Bathrooms

- 1) 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.
- 2) 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); 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.

D. Doors and Door Hardware

- 1) 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.

MSHDA Rehab Standards of Design

- 2) Unit Entry Door: All entry doors are to be new with new door hardware that is non-locking against egress.
- 3) 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

- 1) 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.
- 2) 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

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.

H. Electrical

- 1) Electrical wiring: Replace all aluminum wiring smaller than #4 or used for branch service other than to a range.
- 2) Electrical Fixtures, Outlets, Switches, Exhaust Fans, etc.: Must function properly and have clean appearance with no chips, cracks, or paint.
- 3) Electrical Receptacles and Switch Cover Plates: Replace all cover plates.
- 4) Smoke Detectors: Must function properly and have clean appearance. Replacement smoke detectors shall preferably be hard-wired. Photoelectric detectors shall be used in sleeping rooms and halls. Photoelectric detectors are not required in kitchens.

MSHDA Rehab Standards of Design

02000 Site Work

Expect that trees and scrubs may need to be pruned and/or replaced.

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. This maintenance strip shall extend beyond the roofline where gutters and downspouts are not provided. A weed barrier shall be provided in the maintenance strip. Stone mulch is not allowed at family developments.

02780 Exterior Lighting (Also see 16500 Lighting)

02780.1 Poles

Building mounted lighting, for purposes of lighting parking lots and walks to or from parking, shall be avoided and preferably not be used. 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. Lighting must be coordinated with the landscape plan.

02780.3 Lighting Levels

Exterior lighting levels for parking and walkways shall be a minimum of ½-foot candle (5.4 lumens/square meter). 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 (5.4 lumens/square meter) lighting level required for parking.

02810 Irrigation

The irrigation plan must conform to the landscape plan, as well as other site features. Appropriate equipment and design principles shall be practiced regarding terrain, planting materials, exposure and obstructions. Zones for sun and shade if practical. Separately zone sprinklers with differing precipitation rates, particularly sprays and rotaries. Where it is not practical to separately zone full and part circle rotaries, use matched precipitation rate sprinklers or increase the nozzle size of the full circle sprinklers to more nearly match the precipitation rate of the part circle sprinklers. A maximum 20 percent pressure differential in the mainline will be allowed. For example, if pressure in the mainline at the water source is 55 psi, pressure at the furthest point on the mainline shall be 44 psi or greater (55 psi less 20 percent or 11 psi). Velocities in the mainline pipe are to be 5 feet per second or less. Velocities in the lateral pipe are to be 6 feet per second or less. Over-spray on public roads, parking areas, or buildings is prohibited. Over-spray across walks is acceptable with MSHDA approval. Booster pumps shall be approved by the local municipality.

02860 Tot or Play Lots

Tot and/or play lots shall be provided in family developments. Play equipment shall be installed per manufacturers' recommendations for safety and configuration. In addition to play equipment, there shall be a bench and shade tree.

02870 Seating

Provide seating in outdoor common areas (e.g. patios, tot/play lots, etc.) In housing for senior residents, exterior seating and common area seating shall have backs and arms.

MSHDA Rehab Standards of Design

02900 Plantings Sizes

Shade trees shall have a minimum caliper of 2 ½".

Flowering trees shall have a minimum caliper of 1 1/2".

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.

02980 Development Sign

A lighted development sign containing Fair Housing and Equal Opportunity logos shall be provided (refer also to **16520 Exterior Luminaires**.)

05720 Handrails

Handrails shall be provided on both sides of all corridors in buildings designed for senior residents.

06240 Laminates

A. Sills

Window Sills with plastic laminate shall be sealed with laminate on all six sides. Cultured marble sills are preferred. Painted wood sills are not acceptable.

B. 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. Paint or epoxy coatings are not acceptable countertop surfaces.

In housing for senior residents, the front edge of the counter shall be rolled.

06600 Plastic Fabrications

A. Casings and Trim

Polystyrene molded door casing and baseboard shall not be used.

07310 Shingles

Shingles shall have a minimum 25 year warranty. Roofing scheduled to be replaced shall have all old roofing removed. New shingles, flashings, underlayments, and accessories to be installed following National Roofing Contractors Association (NRCA) guidelines and manuals and manufacturer recommendations.

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.

07710 Gutters

Gutters and downspouts and, where necessary, rain diverters shall be used on all developments, unless a specific exception is granted. Where no gutters are provided, roof overhangs shall be no less than 24".

MSHDA Rehab Standards of Design

08000 Doors & Windows

08001 Doors

All exterior doors and windows shall have an Energy Star label.

In dwelling units designed for seniors new bathroom doors shall swing outward.

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. Pass doors, in lieu of sliding glass doors, to patios and balconies are required in housing for senior residents. Patio doors on the ground level in family units shall be equipped with locks at a height that prevents children from being able to unlock and open the door.

08200 Wood and Plastic Doors

Doorframes or casing shall not be polystyrene.

In senior and barrier free designed units, bi-fold doors shall have easily graspable pulls, such as 'C' pulls.

08310 Sliding Glass Doors

Sliding glass doors shall be forced entry resistant meeting AAMA/NWWDA 101/I.S.2-97 or current equivalent standard.

Aluminum sliding glass doors are preferred to have a baked-on finish in lieu of an anodized finish.

08500 Metal Windows

A. 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/NWWDA 101/I.S.2-97 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.

B. Finish

Metal windows shall have a baked enamel paint finish.

08630 Vinyl Windows

Vinyl windows shall be certified as meeting or exceeding ANSI/AAMA 101-93 (or subsequent revisions) and shall have fully welded construction.

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/NWWDA 101/I.S.2-97 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.

08670 Storm Sash

Basement windows shall be double-glazed, have storm windows or be vented glass block.

MSHDA Rehab Standards of Design

08710 Finish Hardware

08710.1 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.

08710.2 Locksets

All unit entries shall have a single key operation from the exterior. 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 and shall be non-locking against egress. Bathrooms and master bedrooms shall have door locks that are non-locking against egress, panic release operation.

Exterior doors from common spaces, stairs, maintenance areas etc. shall have adjustable self-closing devices, self-locking dead latches, trigger bolt protection and non-locking against egress.

08710.3 Lever Handles

In buildings designed for senior residents, door handles to be used by the residents shall be of the lever type.

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.

08742 Electric Locksets

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 senior or handicapped residents, cabinets and drawers shall have easily graspable pulls. In dwelling units designed for senior or handicapped residents, graspable pulls such as 'C' pulls shall be provided at bi-fold doors.

09000 Finishes

09250 Gypsum Board

Ceilings and walls in kitchens and baths shall have a smooth washable surface.

09650 Resilient Flooring

VCT shall not be used over wood substrate. Vinyl flooring must have a 15 year warranty.

A. Wall Base

Wall base trim shall be used in all habitable spaces. Base trim shall not be polystyrene.

MSHDA Rehab Standards of Design

09681 Carpet

Carpeting shall be padded and be the typical floor finish material in all rooms except kitchens, toilet/baths, laundry, storage, mechanical, and similar rooms.

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.

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

The limit for carpeting within **senior units, and corridors and exitways in family developments**, shall be 0.22 watts/cm². Carpeting for family units shall meet applicable requirements of UM44D.

09682 Carpet Pad

Carpet padding is required under all carpeting except for barrier free apartments. All carpet pad must meet the requirements of UM72. Carpet pad that contains the flame retardant chemicals PentaBDE and OctaBDE will not be accepted.

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.

Kitchens and baths shall be painted with a washable semi-gloss paint. Satin sheen or egg shell finish paint may be used if a satin or egg shell finish is used throughout the residential unit. Using one paint type (satin or egg shell) throughout is preferable to MSHDA.

Dwelling units shall have painted drywall ceilings. Painted concrete ceilings are acceptable where the concrete is part of the structural system.

Flat paint is not acceptable in common corridors and common areas.

09900.2 Exterior

Exterior wood shall have at least 2 coats of paint or stain with the first coat being of a slightly lighter color than the finish coat.

If the exterior is stained, exterior stain shall not be the transparent or semi-transparent type.

Vents penetrating roofs, with the exception of stainless steel vents, shall be painted with appropriate paint to match the roof shingles.

10800 Grab Bars

In buildings designed for senior residents, 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

MSHDA Rehab Standards of Design

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. An alternative to this diagonal grab bar may be proposed. 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.

Nothing in this Standard shall be interpreted to waive the requirements for blocking under the Federal Fair Housing Act.

10825 Residential Bath Accessories

Medicine Cabinets

Medicine cabinets shall be recessed, not surface mounted.

11000 Equipment

11001 Appliances

Each type of dwelling unit appliance including range/oven, refrigerator, dishwasher, washers and dryers, shall be by a single group manufacturer.

Refrigerators, washers, dishwashers and air conditioners shall be Energy Star rated.

Range and ovens, and dryers shall be energy efficient to the extent that the appliances are rated in the top 1/2 in energy efficiency ratings of the appliance type.

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 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 also be treated.

11452 Residential Appliances

11452.1 Refrigerators

Refrigerators shall be frost-free (no-frost), Energy Star rated refrigerator/freezers with two separate compartment doors.

11452.2 Range/Ovens

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 in units designed as barrier free or for senior residents shall have front controls with indicator lights. Range/ovens in units designed as barrier free, shall be self-cleaning unless a roll-under access space (for cleaning) is located adjacent to the appliance.

11452.5 Garbage Disposal Units

Garbage disposal units shall be provided.

MSHDA Rehab Standards of Design

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. Cabinets in units designed for senior residents may have frames of composite wood materials provided the design, materials and installation insures the screw holding capacity of the frame is equal to or exceeds that of oak. All cabinets except sink bases shall have backs.

In units designed for senior residents, kitchen and bathroom cabinets shall have easily grasped door and drawer pulls.

12600 Furniture

In housing for senior residents common area seating and exterior seating shall have backs and arms for support.

12664 Tables and Accessories

Laundry Rooms

In common laundry rooms provide seating, a folding table of 30" to 34" in height, and a hanging rack.

15000 Mechanical

Where duct work is added or becomes exposed mastic shall be applied to the joints to conserve energy.

15010.2 Heating and Cooling

High efficiency HVAC systems are preferred.

HVAC systems must be mechanically ventilated.

All common spaces 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. Laundries, craft rooms, disposal and trash compactor rooms shall all be designed to have negative pressure.

All dwelling units designed for family occupancy shall have individual controls and metering on the HVAC units.

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 heating shall only be allowed in building entries unless it is a high efficiency system.

15250 Water Softeners and Water Conditioning

see **11250 Water Softeners**.

MSHDA Rehab Standards of Design

15460 Plumbing Fixtures and Trim

Kitchen sinks shall be double bowl and shall be stainless steel.
Single lever controls shall be used in all sinks, bath tubs and showers.
A garbage disposal shall be provided.
Lavatories shall not be fiberglass material.

In housing for senior residents and for barrier free designed units, all showerheads, whether in bathtubs or showers, shall be height adjustable. Showerheads in barrier free design units shall be height adjustable using a slide bar device. In non-barrier free designed units for senior residents, a flexible detachable head with brackets allowing several mounting heights is an acceptable alternative.

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, sink, and main riser.

15470 Water Heaters

15470.1 Residential Water Heaters

All dwelling units designed for family occupancy shall have individual water heaters. Water heaters shall be gas-fired.

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

Water heaters are not to be used as a primary heat source.

15470.2 Commercial Water Heaters

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

15500.1 Fire Sprinkler Heads

All fire sprinkler heads within residential space shall be white in color and have a minimal cowling. Heads recessed into ceilings and walls are preferable.

15600 Heat Generation

15600.1 Modular Boilers

High efficiency boilers with a filter system are preferred.

Gas fired boilers 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.

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

MSHDA Rehab Standards of Design

15600.2 Gas Fired Furnaces

High efficiency furnace systems are preferred.

Furnace filters shall not be of fiberglass material. All furnaces shall bear all applicable UL and AGA seals of approval.

15900 Mechanical Controls

15900.1 Thermostats

Thermostats in common areas shall have automatic setback controls.

Each dwelling unit shall contain a working thermostat. Programmable thermostats are preferred.

16200 Emergency Generator

An emergency generator shall be provided in any MSHDA financed multi-story building exceeding forty feet to the top floor. 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 an 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.

The emergency generator shall be provided with a fuel supply that will operate such a generator for a minimum of 24 hours. No underground storage tanks shall be used.

16500 Lighting

16500.1 Lighting Levels

Average foot candle levels at the task surface shall be:

- 50 fc offices (538 lumens/square meter)
- 15 fc corridors, lobby, stairs (161 lumens/square meter)
- 30 fc kitchen counter top, sink and range surfaces (323 lumens/square meter)
- 15 fc toilet rooms and bathrooms at vanity top (161 lumens/square meter)
- 10 fc bathrooms at bathtub (108 lumens/square meter)
- 10 fc store rooms, mechanical rooms, electrical rooms, etc. (108 lumens/square meter)

In housing for senior residents, provide lighting at vanity tops equal to 30 fc (323 lumens/square meter). Fixtures shall be selected to provide a minimum of glare.

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. Coordinate lighting and landscape plans. Lighting shall be provided beneath carports at the same ½-foot candle (5.4 lumens/square meter) lighting level required for parking. Lamps for lighting carports shall be the same HID lighting type.

16510 Interior Luminaires

16510.1 Corridor Lighting

MSHDA Rehab Standards of Design

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 fluorescent lighting. This requirement is not to discourage attractive fixtures such as wall sconces as these fixtures, with a variety of lamp types, are available for fluorescent applications. Corridor lighting shall be a minimum of 15 foot-candles (161 lumens/square meter).

16510.2 Common Area Lighting

Common area lighting shall be fluorescent lighting. Exceptional situations may exist where incandescent lighting may be used, however, alternative fluorescent fixtures should be evaluated for all common area conditions.

16510.3 Kitchen Lighting

Dwelling unit kitchen lights shall be fluorescent. 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.

16520 Exterior Luminaires

Common exterior lighting shall be selected for energy efficiency. Exterior lighting shall be controlled by photocells. Luminaires shall be designed to reduce light spillage into unwanted areas.

Site development signs shall be illuminated.

16522 Roadway and Parking Luminaires

Exterior lighting levels for parking and walk areas shall be a minimum of 1/2 foot-candle (5.4 lumens/square meter). Provide a maximum to minimum foot-candle ratio of 10 within the limits of the parking area and walks to buildings. Coordinate lighting and landscape plans.

16720 Alarm and Detection Systems

16720.1 Smoke Detectors

All dwelling unit smoke detectors shall be photoelectric except in the kitchen.

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 potential problem.

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.

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.

END OF STANDARDS