

MISSOURI HOUSING DEVELOPMENT COMMISSION

**DESIGN/CONSTRUCTION COMPLIANCE
GUIDELINES**

MHDC Form 1200

Effective January 1, 2020



920 Main Street, Suite 1400
Kansas City, MO 64105

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INTRODUCTION

The primary objectives of this document are to set forth guidelines and standards for the design and construction of Missouri Housing Development Commission (MHDC) supported multifamily developments, to aid in the determination of acceptability of proposed multifamily projects and to aid the Architects, Owners and Contractors in preparing complete submissions that will allow smoother commitment processing and construction disbursement processing. **The guidelines stated herein are in effect for all developments approved in future application rounds beginning with the 2014 Notice of Funding Availability competitive round. This document may, at the discretion of MHDC, be revised at any time to reflect changes in the industry, federal or state regulations, or MHDC requirements. Revisions will be posted to the MHDC web site and incorporated into this document (see Exhibit “H”).**

It is the responsibility of the Owners and their agents to provide MHDC with the appropriate documentation to insure smooth and timely processing of architectural exhibits for firm commitment, loan closings and final project acceptance.

On rare occasion, it may become necessary to request a variance from the guidelines set forth in this document for a particular development. All variances must be requested prior to the issuance of the firm commitment, and approved in writing using the form of waiver shown in Exhibit “G.”

This document may not include all laws governing the construction of housing. It is the responsibility of the members of the development team to ensure all laws, rules and regulations are followed in the construction of this development. Any express or implied approval by MHDC of plans, specifications, scopes of work, or construction completion or any other document is solely a representation that MHDC confirms that for the purpose of MHDC’s internal review process the document(s) or activity provided for review meets the guidelines described herein. Any such approval by MHDC shall not be construed as a representation of any kind whatsoever that any or all law(s), rule(s), regulation(s), ordinance(s), policies and/or code requirements of any federal, state, and local jurisdiction have been satisfied.

SECTION I: DEFINITIONS & ABBREVIATIONS

Architect - The professional architect or engineer, licensed in the state of Missouri, providing design and construction administration services to the owner required by the Standard Form of Agreement between Owner and Architect for a Federally Funded or Federally Insured Project, AIA Document B108-2009 and the MHDC rider, Amendment to AIA Document B108. Construction administration includes all architectural services required after the start of construction through the latent defects inspection.

Conditional Reservation - This is the first stage of MHDC approval of the Owner's application for funds.

Construction Closing - The loan closing for construction/permanent loans prior to the start of construction.

Conversion - The point at which, after all of MHDC's requirements have been met, the final draw has been submitted to the title company for final disbursement, and the MHDC construction/permanent loan is ready to convert from construction to permanent status. This was previously referred to as the "Final Closing."

Energy Star - ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy intended to generate energy savings and protect the environment through energy efficient products and practices.

Fair Housing Act Design Requirements - Generally means that an adult in a wheelchair can maneuver through the public and common spaces, get into certain units, maneuver through the unit and has limited access to fixtures and appliances. To be considered compliant for MHDC-funded developments the design must meet the requirements of the Fair Housing Act Design Manual (see the Fair Housing Act at 42 U.S.C. 3601-19, implementing regulations at 24CFR Part 100 and the regulations at 24CFR Part 107 (Equal Opportunity in Housing).

Firm Commitment - This is the second stage of MHDC approval of the Owner's application for funds.

Home Investment/Home Partnership Program (HOME) – federal funding source from the U.S. Department of Housing and Urban Development (HUD) to States in order to provide decent and affordable housing, particularly for low- and very low-income Americans.

Housing Trust Fund (HTF) – federal funding source from the National Housing Trust Fund for acquisition, rehabilitation, or new construction or rental housing.

Independent Inspection Agency - Where the term "independent inspection agency" is used in the standards, the reference is to an agency which maintains a program of continuous control, testing and inspection over the quality of the product. Such an agency must conform to procedures set forth in ANSI Z34.1-87, and shall be acceptable to HUD.

Manufactured Components - Generally refers to prefabricated framing and structural components such as trusses and panelized systems which are assembled in a factory setting and transported to the development site for installation.

Manufactured Housing - Generally refers to housing assembled in a factory setting and transported to the development site for installation. Examples include system built housing, modular homes and mobile homes.

Public Space - An open space on the premises accessible to a public way or street, such as a yard, court, or open space dedicated to public use and abutting the premises.

Section 3 - Section 3 of the Housing Urban Development Act of 1968, as amended (12 U.S.C. 1701u).

Substantial Completion - Indicates the work performed under the construction contract has been reviewed and found, to the architect's best knowledge, information and belief to be substantially complete. Substantial completion is the stage in the progress of work when the work or designated portion is sufficiently complete in accordance with the contract documents so that the owner can occupy or utilize the work for its intended use.

Universal Design - Generally means that people with varying abilities and sizes can maneuver into and through the space and use the fixtures and appliances with minor modifications. The seven principles of Universal Design include 1) Equitable Use, 2) Flexibility in Use (easy to adapt), 3) Simple and Intuitive Use, 4) Perceptible Information, 5) Tolerance for Error, 6) Low Physical Effort and 7) Size and Space for Approach and Use. There are no published rules or standards for achieving compliance with Universal Design and there is no right or wrong answer; it is a matter of realizing these principles through thoughtful design and attention to detail.

AA	Aluminum Association
AAMA	American Architectural Manufacturers Association
ACI	American Concrete Institute
AFPA	American Forest and Paper Association
AHA	American Hardboard Association
AIA	American Institute of Architects
ANSI	American National Standards Institute
ARMA	Asphalt Roofing Manufacturers Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating & Air Conditioning Engineering
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
BOCA	Building Officials and Code Administrators
CABO	Council of American Building Officials
cfm	Cubic feet per minute
CFR	Code of Federal Regulations
CPSC	Consumer Product Safety Commission
CRI	Carpet and Rug Institute

CS	Commercial Standard
DOT	Department of Transportation
EO	Executive Order
EPA	Environmental Protection Agency
ext.	Exterior
F	Fahrenheit (degrees)
FHA	Federal Housing Administration
FGMA	Flat Glass Marketing Association
FHDA	Fir and Hemlock Door Association
FS	Federal Specification
gals	Gallons
HTF	Housing Trust Fund (also known as National Housing Trust Fund)
HUD	Department of Housing and Urban Development
in.	Inches
int.	Interior
ISWA	Insect Screening Weavers Association
mph	Miles per hour
MPS	Minimum Property Standards
MR	Materials Release
MS	Manual Series
NAHB-RF	National Association of Home Builders - Research Foundation
NAIMA	North American Insulation Manufacturers Association
NAS	National Academy of Sciences
NIBS	National Institute of Building Sciences
NIST	National Institute of Standards and Technology
NCDC	National Climatic and Data Center
NFPA	National Fire Protection Association
NOFMA-OFGR	National Oak Flooring Manufacturers Association - Official Flooring Grading Rules
NRCA	National Roofing Contractors Association
NSDJA	National Sash and Door Jobbers Association
NTMA	National Terrazzo & Mosaic Association
NWMA	National Woodwork Manufacturers Association
oz	Ounces
PHCC	National Association of Plumbing, Heating and Cooling Contractors
PCI	Pre-stressed Concrete Institute
PTI	Post-Tensioning Institute
psf	Pounds per square foot
PVC	Polyvinyl chloride
RFCI	Resilient Flooring Covering Institute
SGCC	Safety Glazing Certification Council
SI	International Standard (Metric)
TCA	Tile Contractors of America
T & G	Tongue and Groove
UL	Underwriters Laboratories
UM	Use of Materials Bulletin
USDA	United States Department of Agriculture
WM	Wood Molding and Millwork Producers
WQA	Water Quality Association (Formerly Water Conditioning Foundation)

SECTION II: GENERAL DEVELOPMENT ACCEPTABILITY

GENERAL REQUIREMENTS:

The proposed development must be designed and constructed to:

1. Comply with applicable local, state and federal ordinances and laws
2. Provide facilities, equipment and amenities appropriate for use by the intended occupants
3. Meet the needs of the affordable rental market and the neighborhood in which it is located
4. Meet the established construction budget
5. Be economical to maintain

SITE AND ENVIRONMENTAL CONSIDERATIONS

1. No part of any residential structure may be located within 30 feet of the outer boundary of a high-pressure gas or liquid petroleum transportation pipeline easement.
2. No part of any residential structure may be located within 100 feet (horizontal) of any high voltage transmission lines or their supports.
3. All lead contaminated assemblies shall be abated. For the control of lead hazards see MHDC's Environmental Review Guidelines Form 1400.
4. All asbestos laden materials shall be abated. For the control of asbestos laden materials, see MHDC's Environmental Review Guidelines Form 1400.
5. All occupied facilities shall be free of radon above accepted EPA levels. For the control of radon hazards, please see MHDC's Environmental Review Guidelines Form 1400

CODE AND ZONING REQUIREMENTS:

1. Developments (including those federally funded with HOME or National Housing Trust Fund - HTF) must comply with all construction codes and local zoning ordinances as adopted by the governmental authority in which the project is located.

In the absence of locally adopted codes, the latest available edition of the following should be utilized:

- International Building Code (2018)
- International Plumbing Code
- International Mechanical Code, the NFPA 70
- National Electrical Code (2014)

- International Residential Code
 - *Note: All doors exiting to the outside from single family houses, duplexes, and single story row style residential units are considered by MHDC to be egress doors. Egress doors shall be subject to the limitations of the 2018 International Residential Code with no exceptions.*
- International Energy Conservation Code - as published by the International Code Council (ICC) (2018)

2. Uniform Physical Conditions Standard (UPCS)

In accordance with HOME Rule 24 CFR 5.703, UPCS is an inspection protocol created by HUD that is used to evaluate the condition of housing. This protocol establishes minimum property condition standards for rehabilitation and is more comprehensive than Housing Qualify Standards (HQS). This should be used as a guide when establishing rehabilitation requirements.

3. HUD Rehabilitation Standards

In accordance with 24 CFR 92.251(b) for federally funded projects must meet all applicable state and local codes, ordinances, and zoning requirements.

REHABILITATION STANDARDS:

Projects funded with or without federal HOME and National Housing Trust Fund (HTF) funds shall comply with Missouri Housing Development Commission (MHDC) rehabilitation standards indicated in Exhibit J.

PROPERTY STANDARDS FOR REHABILITATION PROJECTS

(See also Exhibit J)

1. *Major Systems* - All major systems must be assessed and include: structural support; roofing; cladding and weatherproofing (e.g., windows, doors, siding, gutters) plumbing, electrical, heating, ventilation, and AC. The owner must estimate (based on age and condition) the remaining useful life of these systems upon project completion of each major system. For rental housing, if the remaining useful life of one or more major system (that is/are scheduled to remain) is less than the applicable period of affordability, then the owner must establish a replacement reserve with monthly payments that are deemed adequate by MHDC to repair or replace the system(s) as needed. To assist the owner in assessing major systems the owner must commission an architect or engineer to carry out this assessment.

2. *Capital Needs Assessment* - For multifamily housing projects of 26 units or more, the owner must undertake a capital needs assessment (CNA) in a format to comply with MHDC Form 1201 Physical Needs Assessment Guidelines. The CNA must determine all work that will be performed in the rehabilitation of the housing and the long-term physical needs of the project. The CNA must include determining the useful life of major systems upon project completion (including structural support, roofing, cladding and weatherproofing (e.g. windows, doors, siding, gutters), plumbing, electrical, and heating, ventilation, and AC). If the remaining useful life of one or more major system is less than the affordability period, then the owner must establish a replacement reserve with monthly payments that are deemed adequate by MHDC to replace the system(s) as needed.
3. *Construction Documents and Cost Estimate* - The construction documents (i.e. written scope of work to be performed) must be in sufficient detail to establish the basis for a uniform inspection of the housing to determine compliance with the standards. A cost estimate for rehabilitation must be provided.
4. *Frequency of Inspections* - An initial property inspection will be required to identify the deficiencies that must be addressed, along with a progress and final inspection to determine that work was done in accordance with work write-ups, is required.
5. *Section 3 and Labor Standards* - Projects receiving Federal funding shall include Section 3 & Labor Standards / Federal Cross-Cutting Requirements.

ACCESSIBILITY REQUIREMENTS

All developments must be designed and constructed or rehabilitated to meet the following requirements:

1. *Uniform Federal Accessibility Standards* of April 1, 1988 (24 CFR 100.205)
2. *Fair Housing Act* (42 U.S.C. 3601-19) and implementing regulations at 24 CFR Part 100
3. *Section 504 of the Rehabilitation Act of 1973* (29 U.S.C. 794) and implementing regulations at 24 CFR Part 8
4. *Architectural Barriers Act of 1968*, as amended (42 U.S.C. § 4151 et seq.)
5. *Americans with Disabilities Act* Titles II and III (28 CFR Part 25 & 36)
6. ***Universal Design:***

For all new construction single family, duplex units, multi-plex units, and all new construction senior housing, regardless of the number of units in the development, be designed utilizing the principles of Universal Design. Required elements are attached hereto as Exhibit "D." This requirement is in addition to the requirement for accessibility for persons with mobility, hearing,

and or visual impairments

At a minimum, provide the following:

a. New construction of five or more units:

A minimum of one unit, to equal no less than 5% of the total units, accessible to physically handicapped persons and wheelchair users, with an additional 2% of the units usable by those with hearing or visual impairments. Common areas must be accessible.

b. Substantial rehabilitation in properties with 15 or more units:

A minimum of one unit, to equal no less than 5% of the total units, accessible to physically handicapped persons and wheelchair users, with an additional 2% of the units usable by those with hearing or visual impairments. Common areas must be accessible.

c. Other alterations:

A minimum of one unit, to equal no less than 5% of the total units, accessible to physically handicapped persons and wheelchair users to the extent feasible. Common areas must be accessible to the extent feasible. There must be accessible routes from the entrance of the property to the common areas and accessible units.

The accessibility requirements and standards listed above require a 'portion' of Kitchen counters and upper cabinets to be accessible to physically disabled persons in a wheelchair.

Thus, similar to Universal Design, there are no right or wrong answers. MHDC requires that all of the required accessible units have kitchens with a minimum of 50% of the countertops and upper cabinets meet wheelchair accessibility standards

ACQUISITION OF STANDARD HOUSING

1. Existing housing that is acquired with federal funding (such as HOME and/or HTF) for rental housing, and that was newly constructed or rehabilitated less than 12 months before the date of commitment of federal funds must meet the property standards of paragraph (a) or paragraph (b) of this section, as applicable, of this section for new construction and rehabilitation projects. Compliance must be documented based upon a review of approved building plans and Certificates of Occupancy, and an inspection that is conducted no earlier than 90 days before the commitment of the federal assistance.
2. All other existing housing that is acquired with HOME and/or HTF assistance for rental housing must meet the rehabilitation property standards requirements of paragraph (b) of this section. Compliance must be documented based upon an inspection that is conducted no earlier than 90 days before the commitment of HOME and/or HTF assistance. If the property does not meet these standards, HOME and/or HTF funds cannot be used to acquire the property unless it is

rehabilitated to meet the standards of paragraph (b) of this section.

3. Existing housing that is acquired for homeownership (e.g., downpayment assistance) must be decent, safe, sanitary, and in good repair. Standards must be established to determine that the housing is decent, safe, sanitary, and in good repair. At minimum, the standards must provide that the housing meets all applicable State and local housing quality standards and code requirements and the housing does not contain the specific deficiencies proscribed by HUD based on the applicable inspectable items and inspected areas in HUD-prescribed physical inspection procedures (Uniform Physical Condition Standards) issued pursuant to 24 CFR 5.705. The participating jurisdiction must inspect the housing and document this compliance based upon an inspection that is conducted no earlier than 90 days before the commitment of HOME and/or HTF assistance. If the housing does not meet these standards, the housing must be rehabilitated to meet the standards of this paragraph (c)(3) or it cannot be acquired with HOME and/or HTF funds.
4. Occupied housing by tenants receiving federally funded tenant-based rental assistance. All housing occupied by tenants receiving federally funded tenant-based rental assistance must meet the standards in 24 CFR 982.401, or the successor requirements as established by HUD.

GENERAL DESIGN REQUIREMENTS

(See also Section X - Design and Construction Standards)

1. ENERGY STAR and WaterSense-labeled products should be installed when older obsolete products (such as windows, doors, lighting, fans, water heaters, furnaces, boilers, air conditioning units, refrigerators, clothes washer & dryers, dishwashers, toilets, showers, and faucets) are replaced as part of the approved rehabilitation work, and such products are appropriate for achieving energy efficiency for the climate area in which the housing is located.

New construction developments and renovated properties that are replacing appliances and components must install Energy Star appliances.
2. All developments which utilize natural gas must be equipped with a hardwired combination smoke and carbon monoxide detector. If this is not feasible, a written request for a waiver of this requirement must be reviewed and approved. Natural gas leak detectors must be installed in all developments which utilize natural gas.
3. In the St. Louis and Kansas City metropolitan areas, include the use of cages to surround and secure air conditioning units is required. The Owner may petition MHDC for variance.
4. Property (Monument) Sign(s), if included in the project, should include the following minimum information:

- The property name
 - On-site office number and/or manager's emergency contact number as well as the local TDD/TTY number
 - Fair Housing Logo
 - Handicap Logo (if applicable)
5. Broadband Infrastructure – For new commitments made after January 19, 2017 for a new construction housing project of a building with more than four rental units, the construction must include installation of broadband infrastructure, as this term is defined in 24 CFR 5.100, except where the participating jurisdiction determines and, in accordance with §92.508(a)(3)(iv), documents the determination that:
- The location of the new construction makes installation of broadband infrastructure infeasible; or
 - The cost of installing the infrastructure would result in a fundamental alternation in the nature of its program or activity or in an undue financial burden.

SECTION III: REQUIRED DESIGN AND CONSTRUCTION SERVICES

GENERAL REQUIREMENTS

The services of a professional Architect, licensed to practice in the state of Missouri, are required on all projects.

1. Developments utilizing off-the-shelf plans must employ an Architect to take possession of the plans. Failure to engage an Architect acceptable to MHDC shall be the basis for rejection of the application.
2. The principal or an authorized licensed architect representing the Architectural firm is required to stamp the Construction Documents. Construction Documents include construction drawings, construction specifications, change orders illustrations or directives, ASI illustrations or directives, DSI illustrations or directives.
3. The principal or an authorized licensed architect representing the Architectural firm shall sign off on monthly and final inspection reports, change orders, draw requests, and any other applicable documentation before its submission to MHDC. MHDC may request a resolution setting forth the names of the Architect's authorized representatives, along with their resumes, for the file.

MANUFACTURED HOUSING

1. All Manufactured Housing must be designed by a professional architect or engineer registered in the state of Missouri. All Construction Documents illustrating or describing any or all components must be sealed, signed and dated by an Architect.
2. All Manufactured Housing and Manufactured Components must comply with locally-adopted building and zoning codes and seismic requirements.
3. Manufactured Housing must be constructed on a permanent foundation
4. All Manufactured Housing and Manufactured Components with concealed spaces must be inspected during fabrication and assembly at the plant by a third-party inspector registered in the State of Missouri and performing services under contract with the Owner. The inspecting party shall file inspection reports with the Owner and MHDC.
5. The project architect is advised to contact the City to determine whether the City will require its representative to perform an inspection at the plant.
6. MHDC requires factory specifications and warranties for review prior to the commencement of construction.

OFF THE SHELF DESIGNS

If the Owner chooses to use off-the-shelf design plans which are purchased from a third party (such as a book of house plans), the Owner must present to MHDC a copy of the invoice and the terms of the purchase.

The design plan must be submitted to the Architect of record for review and approval. This shall also include any changes to the off-the-shelf design plans which were requested by the Owner and approved by the third party. The terms of the purchase shall give an Architect rights to (a) make minor modifications and/or define in further detail all portions of the off-the-shelf design plans as may be necessary for the site where the improvements are to be constructed; (b) take possession, sign, seal and date the off-the-shelf design plans.

The terms of the purchase shall include whether or not there is a right to reproduce the off-the-shelf design plans for future use, including the right of the Owner to vary from the original plan.

SUSTAINABLE HOUSING

If an Owner commits in the application process to the design or the design and certification of a property under the sustainable housing provisions of the Qualified Allocation Plan, the development must be designed, constructed, and verified to the level committed by the Owner. MHDC staff and its representatives will confirm the fulfillment of the sustainable housing commitment at plan review, during construction, and upon completion of construction through site visits and the review of supporting documentation.

If a development is not achieving green certification, MHDC must receive a letter from a certified green professional certifying, the development has met the green standards committed to in the application and the MHDC firm commitment.

OWNER-ARCHITECT AGREEMENT

Owner-Architect Agreement. Architectural services shall be contracted using AIA Document B108-2009, Standard Form of Agreement between Owner and Architect for a Federally Funded or Federally Insured Project. The MHDC rider, Amendment to AIA Document B108-2009, shall be signed and attached to the Agreement. See attached Exhibit "A."

1. The scope of services shall provide all architectural, structural, mechanical, electrical, civil, landscape and other consulting services necessary to clearly identify the requirements for construction of the project.
2. The scope of services must include adequate provisions for the administration of the construction contract.
3. The scope of services shall designate the responsibility for the services to be provided whether by the architect, owner or others.
4. Modifications may be made to the Owner-Architect Agreement by striking out inapplicable provisions and inserting additional provisions in Article 12. Changes

shall not delete any service, either by the Architect or Owner, necessary to the project.

5. Required services may not be sublet or delegated to anyone not acceptable to MHDC.
6. No modification of the MHDC rider is permitted with the exception of Item 14. Latent Defect Inspections are not required on Tax Exempt Bond deals. As a result Item 14 on Exhibit 'A' shall be stricken out and initialed by both Owner and Architect.

BASIS OF COMPENSATION

The fee shall be a fixed fee for the services provided by the Architect as stated in the Agreement. The amount of compensation for design services and for construction phase services shall be separately identified and is subject to MHDC approval. The Construction Phase services should reflect an amount sufficient to compensate the Architect for required construction supervision services. MHDC reserves the right to adjust the fee structure based upon the amount of inspections deemed necessary in its sole discretion.

SECTION IV: APPLICATION PACKAGE

GENERAL REQUIREMENTS

The MHDC staff will review the Owner, General Contractor, Environmental Professional and the architectural exhibits included in the Owner's funding application for general site-related issues, rehabilitation issues, qualifications and cost verification.

The following exhibits shall be included in the Owner's application for funding:

OWNER'S RESPONSIBILITIES:

1. All identity of interests between Architect, Owner/Developer, Contractor, Subcontractors and Suppliers must be disclosed.
2. Physical Needs Assessment for rehabilitation projects prepared by or in concert with a licensed architect or engineer. See MHDC Form 1201 for MHDC Physical Needs Assessment Standards.
3. For historic buildings proposing a fully gutted rehabilitation, a letter from a structural engineer or equally qualified professional that certifies the building has been inspected and is structurally sound for the intended use
4. Site Evaluation (MHDC Form 1302) and all substantiating information/maps, including pertinent zoning information for the site and the surrounding area.

ARCHITECT'S RESPONSIBILITIES:

1. City/Locality Map
2. Site Plan
3. Photographs of existing buildings if the project involves rehabilitation
4. Preliminary architectural drawings, including building and unit plans. Exterior and interior building finishes notations are required

GENERAL CONTRACTOR'S RESPONSIBILITIES

There are no responsibilities in connection with the submission of the application package.

SECTION V: FIRM COMMITMENT PACKAGE

FIRM COMMITMENT PACKAGE - REVIEW

The MHDC staff will review the construction documents and cost exhibits submitted as part of the Owner's Firm Commitment package. Also, please refer to Exhibit "E"

1. The MHDC architectural staff shall review the firm commitment submission documents and prepare comments for the MHDC underwriting staff. A copy of these comments will be forwarded to the Architect for review and response
2. The Architect must provide MHDC with a written response to the architectural staff's comments on the construction documents submitted for firm commitment. This response should itemize how each of the MHDC architectural staff's comments or questions will be addressed. If modifications are to be made to the construction documents as part of the response, these should be made in the form of addenda. Once MHDC has approved the architectural exhibits and the construction documents, including any addenda or revisions made prior to the construction loan closing, no changes or variances will be allowed unless written approval is given by MHDC

FIRM COMMITMENT PACKAGE - REQUIRED EXHIBITS

OWNER'S RESPONSIBILITIES

1. *AIA Document B108-2009* - Standard Form of Agreement between Owner and Architect for a Federally Funded or Federally Insured Project. If this agreement does not include all required architectural and engineering disciplines, include copies of all consulting contracts
2. *Amendment to AIA Document B108-2009 (MHDC Rider)* - By checking the appropriate box on Item 8, the rider indicates whether the Architect shall inspect construction improvements once or twice monthly. MHDC shall have the right in its sole discretion to require inspections by the Architect more than once a month as it deems necessary
3. *Contractor's/Mortgagor's Cost Breakdown, MHDC Form FIN 115* - See General Contractor's responsibilities
4. *Physical Needs Assessment* –
 - Current within six months of firm submission for rehabilitation of existing multifamily developments
 - For buildings being converted from other uses to multifamily, provide a detailed scope of work for the building structure and any components that will not be replaced during construction

5. *Geotechnical Engineering Report* –

- Identify and describe soils by the nomenclature of the Unified Soils Classification System.
 - Borings must be in, or adjacent to, the proposed foundation area. At least one boring must be made for every 2500 sq. ft. of foundation area. For buildings supported on pilings, one boring must be made for every 1600 sq. ft. of foundation area. Borings must be at least to the bottom of the proposed footings and deep enough to locate bearing strata, which will support the proposed structure. When rock is encountered, the depth of drilling into the rock shall be sufficient to establish rock quality regarding voids, fissures and strength.
 - Should the development be comprised of single family dwellings or duplexes that contain less than 2500 sq. ft. of foundation area per structure, the required soil boring requirements will be evaluated by MHDC on a case by case basis.
 - Requirements for soil borings on scattered site developments shall be evaluated by MHDC on a case by case basis.
 - When ground water conditions influence the building design, observation of ground water levels must be recorded at the time of the boring and at least 48 hours later.
 - For future phases, if a basic site plan has been prepared that identifies potential footprints of buildings; one boring must be completed within the footprint of each building. If a basic site plan has not been prepared, the developer may use its best efforts to identify potential building areas, with no less than one boring per a five-acre area.
 - Identify whether the geological conditions of the development site are such that radon may exceed acceptable levels in completed buildings.
 - A copy of the Geotechnical Engineering Report must be bound into the specifications.
6. *For new construction developments* - the Owner must certify that it has consulted with the Architect and General Contractor to conform to the *International Residential Code Section R318-Protection Against Subterranean Termites*. Documentation of the measures taken must be incorporated into the construction documents and must be part of the scope of work
7. *For developments with existing buildings* - regardless of the construction materials, a termite inspection report must be provided by a licensed Pest Control Company. If termite infestation is found in the report, the scope of work must include what steps will be taken to eliminate the problem. The scope of work must be updated during construction if additional damage is found All environmental review items as outlined in the Environmental Review Guidelines Form 1400

ARCHITECT'S RESPONSIBILITIES

1. One complete set of Construction Documents adequate to describe the proposed site development; architectural, structural, mechanical and electrical components of the project in sufficient detail to verify compliance with local zoning and building requirements and with all federal regulations.
2. Off the Shelf Design plans
3. If the Owner chooses to use off-the-shelf design plans which are purchased from a third party (such as a book of house plans), the Owner must present to MHDC a copy of the invoice and the terms of the purchase.
4. The design plan must be submitted by the Architect of record for review and approval. The Architect of record shall sign, seal and date the off-the-shelf design plans with revisions, edits, additions.
5. An index of drawings on 8½" x11" paper, which includes the drawing number, drawing title and date of latest revision. Include on the list the project manual or specifications with its date, and any addenda with their issuance dates. When MHDC is the construction lender, this list must be updated prior to the construction loan closing as the index must be included as exhibit "B" in the Capital Advance Construction Contract. Please provide an additional copy of the drawing list(s) directly to the MHDC Legal Department.
6. A revision to the *Development Characteristics Worksheet*, providing an update to any changes in amenities provided as of the submission of the Firm Commitment Package.

GENERAL CONTRACTOR'S RESPONSIBILITIES

1. *MHDC Form FIN 115 - Contractor's/Mortgagor's Cost Breakdown* –

Must be fully completed with labor costs and material costs separately itemized and the work description clarifying each line item. This form is available on the MHDC web site.

When subcontractor work and material suppliers work exceeds \$10,000.00, their actual bids must be attached. These bids must be itemized clearly enough to verify costs.

Please note the following documents which must be bound within the bid documents:

- HOME-financed developments with 12 or more HOME-assisted units must include the current edition of the *General Conditions of the Contract for Construction* (AIA Document A201) as amended, the *Federal Labor Standards Provisions* (form HUD-4010).
- Developments receiving Risk Share insurance must include the current edition of the *General Conditions of the Contract for Construction* (AIA Document A201) as amended, and *Supplementary Conditions of the Contract for Construction* (Form HUD-2554).

- For developments receiving both HOME funds and Risk Share insurance, only form HUD-2554 is required.
2. *MHDC 2502* - Master Subcontractor List - List all major subcontractors by work category. This list must be updated at closing and throughout construction.
 3. For developments receiving HOME funding or Risk Share insurance, submit a Section 3 Plan for the construction of the development as outlined in the "Section 3 Compliance Guide".
 4. *Contractor's Qualification Statement*, AIA Form A305

SECTION VI: CLOSING

OWNER'S RESPONSIBILITIES:

Davis Bacon Act: The Davis-Bacon Act of 1931 and additional laws known as the Related Acts are a collection of United States federal laws which established the requirement for paying prevailing wage on certain public works or publicly funded projects. These laws require all contractors and subcontractors pay some of their employees particular wage rates depending on the type of work each employee performs. Davis-Bacon laws do not apply to all developments. Only certain circumstances will trigger the applicability of Davis-Bacon such as developments with twelve (12) or more HOME units.

The owner must verify that the wage determination provided by MHDC has been updated within 10 days of the construction loan closing. It is the Owner's responsibility to request this update from MHDC at the appropriate time. Note: this wage determination, as set by determinations from the Department of labor for Davis-Bacon, must come from MHDC and be bound into the specifications/project manual. Copies of the wage determination obtained from websites are not acceptable.

ARCHITECT'S RESPONSIBILITIES:

1. Provide one (1) complete electronic set of plans and specifications/project manuals signed and sealed for construction loan closings.
2. MHDC requires plans and specifications to be sealed and signed by the Architect of record with date. The first sheet of each set must be 'wet' sealed, signed and dated using blue ink, or electronically signed. Subsequent sheets may be scanned copies of the signed, sealed, and dated drawings. The specification/project manual booklets must have a place at the front for 'wet' seals, also signed and dated by the Architect of record using blue ink, or electronically signed.
3. Changes in the Construction Documents made after firm commitment must be submitted to MHDC in the form of addenda or revisions for review prior to initial construction loan closing. Revision dates should be clearly marked on all documents. Revisions should be clearly marked on drawing sheets using standard "revision cloud" or other means acceptable to MHDC.
4. Provide a copy of the updated drawing index (refer to Section V; paragraph B 2(c), when MHDC is the construction lender.

GENERAL CONTRACTOR'S RESPONSIBILITIES:

1. Submit an updated FIN-115 showing the final construction budget for the

development as of the closing date, executed by the General Contractor and the Owner.

2. Provide copies of all building permits issued by the appropriate authority. In the event the development is located in an area where building permits are not issued, provide MHDC with evidence that local officials have approved the construction of the development.
3. Submit an updated list of major subcontractors for each work category on the form *MHDC 2502- Master Subcontractor List*.
4. Schedule a preconstruction conference for a time after the closing of the construction loan at a location acceptable to MHDC. No construction activity may commence prior to the preconstruction conference. Attendees must include: the General Contractor (and/or prime subcontractor), MHDC representatives (schedule through the Architecture Department), the project superintendent, the Architect and an Owner's representative. MHDC will require additional participants, such as major subcontractors and the payroll clerk.

On all projects utilizing HOME funds or Risk Share insurance, failure to schedule this preconstruction meeting, or failure to include the specified representatives in this meeting, may be grounds to rejecting a disbursement request.

5. Provide a copy of the construction progress schedule to MHDC's third party inspector.
6. A schedule of progress meetings and payment application inspections must be provided at the preconstruction conference. It is required on projects with MHDC construction loans that monthly progress meetings be coordinated with MHDC's third party inspector to insure timely payment application processing.
7. Be advised that if Section 3 applies to the development, a subcontractor may be required to provide MHDC with a Section 3 Plan, depending upon the amount of the contract award.

SECTION VII: CONSTRUCTION RESPONSIBILITIES - MHDC CONSTRUCTION/PERMANENT LOANS AND PERMANENT-ONLY LOANS

OWNER'S RESPONSIBILITIES:

Provide MHDC architectural staff with the following:

1. Contact Information for Development Team (including Architect, General Contractor's project manager and/or superintendent, Owner's representative, and others as required). Include addresses, e-mail, and phone numbers and update list as required throughout construction.
2. Copy of the executed construction contract prior to the preconstruction conference, if MHDC is not the construction lender.
3. If construction is being staged, then a turnover schedule must be provided and updated monthly.
4. Copies of drawings and specifications for any off-site improvements relating to the development, if not previously provided to MHDC.
5. The *Application and Certification for Payment* (on AIA Document G702 with continuation sheet G703) along with all other draw request forms and required back-up documentation. (See the Construction Disbursement Guide, MHDC 2400 for instructions.)

All deviations from the approved construction documents must be recorded and approved in writing by MHDC. MHDC shall have the right in its sole discretion to require inspections by the Architect of record more than once a month as it deems necessary.

The Owner, General Contractor and all Subcontractors must comply with federal, state and local laws concerning hiring practices and labor standards and comply with Section 3 requirements (with contracts of \$100,000 or greater).

ARCHITECT'S RESPONSIBILITIES:

1. Copies of all field inspection reports prepared by the Architect of record. These reports should include the time and date of inspection, weather information and approximate percentage of project completion
2. Copies of drawings and specifications for any off-site improvements relating to the project, if not previously provided to MHDC
3. Copies of all *Architect's Supplemental Instructions and Change Orders* (on AIA Document G701) and all other deletions, additions and modifications (including material and equipment substitution) in whatever form these changes are executed

4. Field Reports – During the construction phase, the Architect of record shall make site visits to inspect all work and materials at a minimum of once monthly and execute a Field Report for each site visit. Copies of all Field Reports are to be submitted to the Owner and MHDC’s architectural staff on a monthly basis. Owners are encouraged to consider the benefits of frequent oversight provided by the Architect, especially for complex scopes of work. (See *Appendix 3-MHDC Sample Site Observation Report*)
5. Inspections - The Architect shall perform footing/foundation inspections and a complete open wall inspection of each building prior to installation of gypsum board. The frequency of inspection shall be agreed upon by the Architect and the Owner with the execution of the MHDC rider, Amendment to the AIA B108-2009.

GENERAL CONTRACTOR’S RESPONSIBILITIES:

1. Progress Meetings - The schedule of progress meetings and payment application inspections must be updated throughout construction. It is required on projects with MHDC construction loans that monthly progress meetings be coordinated with MHDC’s architectural staff or third party representative to insure timely payment application processing.
2. Update the form *MHDC 2502 - Master Subcontractor List* monthly throughout construction
3. Provide copies of any approved shop drawing submittals, data sheets, test results or certifications, if requested.
4. *Application and Certification for Payment* (on AIA Document G702 with continuation sheet G703)

Note: originals of AIA Documents G701, G702 and G703 should be submitted to MHDC’s Construction Disbursement Department for Construction/Permanent Loans processing. (See the Construction Disbursement Guide, MHDC 2400 for instructions.)

5. Be prepared at all times to give the MHDC architectural staff or third-party representative the right of reasonable access to the construction site and the right to inspect all work performed and materials furnished for the project.
6. Notify MHDC architectural staff or its third-party representative at the time each building is ready for an open-wall inspection, framing is complete and electrical wiring, plumbing lines and ductwork is installed.
7. The Owner, General Contractor and all subcontractors must comply with federal, state and local laws concerning hiring practices and labor standards.

If Section 3 applies to the development, a subcontractor may be required to provide MHDC with a Section 3 Plan, depending upon the amount of the contract award.

SECTION VIII: CONSTRUCTION COMPLETION

OWNER'S RESPONSIBILITIES:

1. Notify the MHDC architectural staff in writing when construction has reached 90% completion and submit copies of certificates of substantial completion executed as of that point in time.
2. Assure that any environmental abatement or other mitigating requirements noted in the environmental review are accomplished to the satisfaction of MHDC. See *MHDC's Environmental Guidelines Form 1400* for more details.

ARCHITECT'S RESPONSIBILITIES:

1. Provide MHDC with the following:
 - Punch list and final inspection report (*see Exhibit "B" Sample Punch List*).
 - A fully executed AIA Document G704-2000 Certificate of Substantial Completion ("G704") and Occupancy Permit for each building/floor/unit. More than one address may be listed on a G704.
 - A final G704 that declares the entire project as being complete.
2. All architectural field reports shall be delivered to MHDC prior to the final payment for construction is issued.

GENERAL CONTRACTOR'S RESPONSIBILITIES:

1. Coordinate occupancy and punch list inspections of all units/buildings with the MHDC architectural staff. Obtain from the Architect a G704 for each building/floor inspected, along with a single, final G704 that references the entire project as being complete. All G704 reports are subject to MHDC approval. All punch list items must be completed prior to occupancy.
2. Contractor shall fully inspect the completed construction, formulate a punch list of incomplete items and make corrections, alterations and additions to address all punch list items prior to requesting the Architect's and MHDC's final inspection.
3. Final Inspection - Schedule a final inspection with MHDC's third party inspector. This inspection may be scheduled concurrent with the Architect's punch list inspection(s) provided that inspection occurs when the work is complete.
4. Submit to MHDC a copy of the Final Punch list with all work signed off by the General Contractor and Architect.
5. Submit to MHDC a complete list of all changes made to the approved construction documents in the form of Change Order logs, ASI logs and/or meeting note logs (if changes were made via meeting notes).

SECTION IX: CONVERSION OF CONSTRUCTION/PERMANENT LOANS AND CLOSING OF PERMANENT-ONLY LOANS

OWNER'S RESPONSIBILITIES:

1. Provide MHDC with a copy of the certificate of occupancy or final inspection report [from the governmental unit having jurisdiction] from the General Contractor.

In the event the development is located in an area where building permits and subsequent certificates of occupancy are not issued, obtain and provide MHDC with an acknowledgement of the completed construction from the county assessor.

2. Provide MHDC the *Final Architect's Certification*, executed by the Architect of Record. (See attached Exhibit "C.")
3. Provide MHDC with a list of final "incomplete items" and their approximate value. MHDC reserves the right to approve or deny any incomplete items and an escrow to provide payment for its completion. If MHDC approves incomplete items, the final inspection will establish the amount to be withheld from the final construction draw, which will be held in an escrow account.
4. Attend the latent defect inspection to be held about nine months after Substantial Completion with the MHDC staff inspector, Architect, General Contractor, and property manager.
5. Assure all latent defect citations are corrected to the satisfaction of MHDC.
6. Provide requested documentation to confirm completion of lead-based paint or asbestos abatement, provide operating and maintenance plans, or file required records in order to satisfy mitigating items from the environmental review. (See *MHDC's Environmental Review Guidelines Form 1400 for further details.*)
7. Provide MHDC with a termite inspection letter (report) from a licensed pest control company regarding termite treatment during construction and/or inspection for termite infestation. This report shall indicate the warranty period and is required for all building types.
8. Provide MHDC with copies of certification from green program selected and declared to be certified in the application and the MHDC firm commitment.

For developments not being certified, MHDC must receive a letter from a certified green professional certifying the development has complied with the green standards selected.

ARCHITECT'S RESPONSIBILITIES:

1. Participate in the latent defect inspection with the MHDC staff inspector, Owner, General Contractor, and property manager. (See Exhibit "F" Latent Defect

Inspection)

2. Execute a copy of *The Final Architect's Certification* confirming the development has been constructed according to the approved plans and specifications. (See *Exhibit "C"*)

GENERAL CONTRACTOR'S RESPONSIBILITIES:

1. Obtain Certificates of Occupancy for every building permit issued.
2. *Latent Defects Escrow.* A latent defects escrow in an amount equal to 2.5% of the construction contract amount must be established by the Contractor at final closing. The escrow will be held for 15 months from the date of substantial completion, as established by the MHDC-approved G-704 for the entire project. The escrow, less any amount necessary to correct deficiencies not paid by the warranty or General Contractor, will be released only after an inspection and approval by the Owner, the Architect and MHDC. An MHDC compliance officer shall schedule this inspection, and attendance by the Owner, Contractor, and the Architect will be required. (See *Exhibit "F," Latent Defect Inspection*)

SECTION X – EXHIBITS A-I:

EXHIBIT "A"

AMENDMENT TO AIA DOCUMENT B 108-2009

Standard Form of Agreement Between Owner and Architect for Design Services

The Provisions of this Amendment supersede and void all inconsistent provisions of the Agreement.

1. The Owner and the Architect represent that they are familiar with the MHDC requirements, including all standards as set forth in publications given to them by MHDC for this Project and will perform all services in accordance with the applicable requirements of MHDC.
2. The Owner and the Architect recognize the interest of MHDC in the Project and any action or determination by either the Owner or the Architect is subject to acceptance or rejection by MHDC.
3. The portion of the Architect's services and responsibilities and the Owner's responsibilities shall not be sublet or delegated to anyone not acceptable to MHDC.
4. The Owner agrees to follow MHDC requirements regarding the use of off-the-shelf design plans and provide MHDC a copy of the invoice and the terms of the purchase which demonstrate whether the Owner has a right to reproduce the off-the-shelf design plans for future use, whether the Owner has a right to vary from the original plan, and whether the Architect of record has been given the right to (a) make minor modifications and /or define in further detail all portions of the off-the-shelf design plans as may be necessary for the site where the improvements are to be constructed; (b) take possession, sign, seal and date the off-the-shelf design plans.
5. The Architect will advise MHDC as well as the Owner of any omissions, substitutions, defects and deficiencies observed in the Work of the Contractor while Architect is on site per Section 8 of this agreement.
6. An Architect licensed in the state of Missouri shall stamp all drawings, specifications, "ASIs", "DSIs", and change orders.
7. The Architect shall sign off on monthly inspection reports and the final inspection report before its submission to MHDC and shall issue Certificates of Payment and Certificates of Substantial Completion. These certificates shall be in the form prescribed by MHDC.
8. The Architect of record shall make a minimum of (*check one*) one visit, two visits to the project per month throughout the construction period. MHDC in its sole discretion has the right to request additional inspections by the Architect as it deems necessary. Copies of the inspection reports shall be provided to MHDC by the Architect.
9. The Architect of record shall perform a footing/foundation inspection at the first available building and subsequent footing/foundation inspections as available at regularly scheduled field visits. Architect shall also conduct an open wall inspection of each building prior to installation of sheet rock (drywall). Copies of these inspection reports shall be provided to MHDC by the Architect.
10. The Architect will furnish copies of all field orders and field reports to MHDC in addition to the Owner.
11. The agreement shall not be terminated without five days prior written Notice to MHDC.

12. The Owner and the Architect shall recognize as a valid reason for termination, any request by MHDC for termination because of inadequate performance, undue delay or representation which may make the further services of the Architect unacceptable to MHDC.
13. If the Project for which the drawings or specifications prepared by the Architect has not been completed and there is a default or foreclosure, MHDC may use the drawings or specifications to complete construction of the Project without additional cost.
14. The Architect, Contractor, Owner and MHDC shall participate in a post construction punchlist inspection (Latent Defects Inspection) no sooner than nine (9) months after the date of Substantial Completion, nor later than eleven (11) months. The Architect shall issue a list of construction contract punchlist defect items arising out of this inspection which shall be acknowledged by the Owner, Contractor and MHDC.

(Seal)
Attest:

OWNER:

By: _____

(Seal)
Attest:

ARCHITECT:

By: _____

EXHIBIT "B"
SAMPLE
PUNCH LIST

AAA Architects
 1111 South First Street
 First City, Missouri
 Phone 816-555- 1111 Fax 816-555-1112

Inspection Report for First City Apartments
 2222 South Second Street
 First City, Missouri

Date of Inspection

Note: The following are to be completed or corrected by the Contractor prior to final acceptance of the Project. The Contractor shall return a copy of this list to the Architect (*or Engineer*) after each item has been addressed, properly dated and initialed by the person responsible for corrective action.

DESCRIPTION	CONTRACTOR ADDRESSED <i>(initial & date)</i>	ARCHITECT ACCEPTED <i>(initial & date)</i>
Site		
1. Curb cuts not installed	_____	_____
2. Lawn not seeded	_____	_____
Building #1		
1. Install screens	_____	_____
2. Termites have eaten hole in living room floor. Repair and apply termite treatment.	_____	_____

*This format is recommended in terms of the layout. Other information may be added per design firm's policy if desired. The basic information, however; the work descriptions, the Contractor's initialed response for **each** item and the Architect's (or Engineer's) acceptance of **each** item is required.*

EXHIBIT "C"
FINAL ARCHITECT'S CERTIFICATION

Development Name:
MHDC No.

TO: MISSOURI HOUSING DEVELOPMENT COMMISSION

In order to induce the **MISSOURI HOUSING DEVELOPMENT COMMISSION** ("MHDC") to advance the final installment of permanent loan proceeds in the amount of \$ _____ for the development of _____, located in _____, **Missouri** ("Development"), and with the intent that MHDC rely upon the statements set forth herein as a basis for so doing, the undersigned hereby certifies as follows:

The above referenced Development has been built in accordance with the Plans and Specifications, which were prepared by _____, a Missouri _____ and incorporated as part of the Construction Contract. Any changes made to the approved Contract Documents during construction have been documented after review and approval by the undersigned and MHDC.

All defined terms of this document bear the same meaning as in the Construction Contract executed in conjunction with the Development.

ARCHITECT:

By: _____
Name: _____
Title: _____

Date: _____

EXHIBIT “D”

MHDC UNIVERSAL DESIGN

MHDC requirements for Universal Design on New Construction in affordable housing developments:

1. Equitable Use:

- a. Minimum 36” door with a “no-step” entry, at accessible entries.
- b. Provide 60” rotation maneuvering space on exterior and interior latch side of accessible entries, with 18” minimum front approach clearance at latch side.
- c. Flat landing surfaces leading to doorways and at both sides of all accessible entry doorways.
- d. No thresholds and/or change of walking surface greater than ½” rise. Sliding glass doors may require a threshold rise each side to accommodate the threshold height limit.
- e. Continuous accessible path, minimum 42” width (excepting FHA’s steep site rule), from parking and the public access to the unit, maximum 1:20 slope; 1:12 slope may be considered where space or conditions mitigate. On multiple story buildings with no elevator, upper floors may waive this item and Universal Design measures that can be easily retrofitted at a later date, including items 2 (a), 6 (a), and 7 (g).
- f. Patio or Deck landing at same level as interior floor at accessible entry doors.
- g. Mailboxes to be at an accessible location on the accessible route.
- h. Lever action door hardware.

2. Flexibility in Use:

- a. 24” Blocking or plywood substrate in bathrooms for future grab bars where needed, horizontal and vertical at all toilets, showers, and tubs. Around toilets, substrate up to 42” Above Finish Floor (AFF) (or blocking centered at 30” AFF). In shower and tub areas, substrate up to 60” AFF (or blocking centered at 42”); tubs may have shower fixture with integral grab bars.
- b. All electrical devices and environmental controls to be mounted between 15” and 48” AFF.
- c. On Townhouse developments provide a bedroom and a fully accessible bathroom on the main level of the unit as well as laundry if included. This requirement item is only required at accessible units. Stairways on all Townhouse units, regardless of accessibility, are required to be a minimum of 42” in width.

3. Simple and Intuitive:

- a. Lever action or grip friendly plumbing fixtures, trim, controls, door, and cabinet hardware.
- b. Buttons on control panels that can be distinguished by touch.
- c. Front mounted controls on appliances, 15”-48” AFF.
- d. Thermostat controls that are user friendly to adjust by feel and read easily.

4. Perceptible Information:

- a. Signage with color contrasting print in addition to generally recognized icons.
- b. Create color or texture contrast between light switches/wall outlets and surrounding surfaces as well as contrasting colors between countertops and flooring and walls.
- c. Color contrast or texture change between wet rooms (bath, laundry, kitchen) and adjoining spaces.
- d. Contrasting lit doorbell or internal light when a doorbell is installed.
- e. Minimum 4” high house numbers posted in contrasting colors.
- f. Contrasting colors between wiring devices [receptacles and light switches] and surrounding surfaces
- g. Contrasting colors between steps and landing or living space.
- h. Contrasting colors between different floor coverings.
- i. Contrasting colors between plumbing fixtures and flooring/countertops.

5. Tolerance for Error:

- a. Slip-resistant surfaces, especially in bathrooms, kitchens and entry areas. High gloss surfaces, ‘smooth’ ceramic floor tile, or similar flooring is not acceptable.
- b. Provide for ease of maintenance of all flooring. Deep pile carpets, highly textured masonry, or similar floor finishes are not acceptable.
- c. Ventilation to meet current ASHRAE 62.2 standard where applicable. Operable ventilation for bathrooms and kitchens highly recommended.
- d. Light switches with large flat pads.

6. Low Physical Effort:

- a. Provide minimum of one low threshold shower on primary level; tubs are acceptable with backing installed for wall mount or overhead lift. On Townhouse developments this item is only required at accessible units.
- b. One operable window in each bedroom and living room, with 36” maximum sill heights; 44” in garden level (partial below grade) is acceptable.
- c. Self-closing fire rated doors must be on lowest setting while complying with the enforced building code.
- d. No interior ramps.

7. Size and space for approach and use:

- a. 36 inch minimum width doors.
- b. 60 inch clear turning space provided in at least one bathroom and in the kitchen; 60” T-turns acceptable where conditions warrant.
- c. 42 inch wide residential unit and common hallways
- d. Provide for parallel or front approach to all sinks and appliances.
- e. 20% of storage space within 15-48” reach AFF.
- f. Bottom of bathroom mirror within 40” AFF.
- g. Allow knee clearance below one lavatory and below a 30-32” height kitchen workstation which may be a pull-out accessory.

- h. Toilet set at a minimum of 18" off one sidewall from toilet center in a space that is at least 48" wide on accessible units only.
- i. Shower controls on nearest wall to opening at 15"-48" AFF, controls setback not to exceed 15".

EXHIBIT "E"

CONTRACT [FOR CONSTRUCTION] DOCUMENTS

- I. Construction Documents must include the following:
 - A. Specifications or Project Manual:
 1. A current edition of AIA Document A201, General Conditions of the Contract for Construction. An original of this document must be bound into the set of construction documents submitted to MHDC. It may not be included by reference only. This document may not be modified.
 2. Additions to the General Conditions may be made in the form of Supplementary General Conditions. Other project requirements should be included in the Division 1 General Requirements section of the technical specifications.
 3. HOME-financed developments with 12 or more HOME-assisted units must include the current edition of the "General Conditions of the Contract for Construction" (AIA Document A201) as amended, the "Federal Labor Standards Provisions" (form HUD-4010), and a current wage determination as provided by MHDC. Note that the wage determination must be verified and updated within 10 days of the construction loan closing and provided as an addendum to the specifications manual.
 4. Developments receiving Risk Share insurance must include the current edition of the "General Conditions of the Contract for Construction" (AIA Document A201) as amended, the "Supplementary Conditions of the Contract for Construction" (form HUD-2554), and a current wage determination as provided by MHDC. Note that the wage determination must be verified and updated within 10 days of the construction loan closing and provided as an addendum to the specifications manual.
 5. Specifications to clarify construction administration requirements.
 6. Technical specifications as required to clarify materials and methods of construction.
 7. Geotechnical Engineering Report (bound into the specifications or project manual).
 8. Provide 'Protection against Subterranean Termites' section in specification/project manual.
 - B. Drawings, illustrations, plans.
 1. A cover sheet with the following information:
 - (a) Project name, location and MHDC project number.
 - (b) Names and addresses of the Architect, the professional providing construction administration if not the same, the Owner, the General Contractor, and MHDC.
 - (c) Spaces for the signature of each of the entities listed above. See 'Exhibit I' for example signature block for items (b) and

- (c).
 - (d) A tabulation of the living units by unit type, number of each type in each building, number of non-rental living units and totals. Include a tabulation of all accessible, adaptable, universally designed or Fair Housing compliant units. Include a brief description of the universal design principles used in the design.
 - (e) Square footage of each unit type, each building, and all non-residential spaces included in the project.
 - (f) Location map.
 - (g) Number of covered, uncovered and accessible parking spaces.
 - (h) Description of building codes enforced by the local governing body and/or used in the project design.
 - (i) Accessibility standards used in the project design with all exceptions to compliance identified.
 - (j) Description of universal design principals as listed in Exhibit "D" that has been incorporated into the project design.
2. Site plan, grading, drainage and site MEP plan(s) and details. Identify on the site plan all accessible parking spaces, the accessible route(s) through the development and note all accessible, adaptable and Fair Housing compliant units.
 3. Landscape plan. If a landscape allowance is used, submit a preliminary plan showing general plant types, quantities and locations. Submit the final landscape drawing during construction, identifying quantities, plant types, seed and sod areas and other landscape information.
 4. Dimensioned floor plans of sufficient detail to review individual unit and building layouts.
 5. Exterior building elevations indicating all exterior materials and heights.
 6. Structural plans and details including all required connection details.
 7. Wall sections and construction details, including stair details. Note all fire resistive assemblies by detail and design assembly number such as IBC, UL or USG design number. Indicate how penetrations through all fire resistive construction is to be protected and specify materials used.
 8. Drawings detailing how accessibility requirements for residential units and common spaces are being met. Include site impracticality calculations for reductions to complete Fair Housing compliance.
 9. Schedules as required to indicate door and window sizes and door, window and finish materials.
 10. Mechanical, electrical line voltage, communication/control low voltage, and plumbing plans, details, and specifications for all mechanical equipment. If any or all of these systems are proposed

and accepted as a "design/build" portion of the work, the Owner shall insure that the design portion of the work and its full documentation, sealed by a registered engineer, be located at the work site prior to any work being performed.

11. Sustainability.
 - (a) Information necessary to demonstrate compliance with the 2012 International Energy Conservation Code (IECC) as published by the ICC. MHDC may request additional information, such as calculations, performance criteria and data sheets as backup to the IECC compliance.
 - (b) Information necessary to demonstrate compliance with the energy conservation or green building program selected and declared in the application package.
 - (c) Full documentation that the energy conservation program selected and declared in the application package was implemented, along with a copy of certifications, if applicable.
12. Electrical plans and schedules, as required.
13. Fire alarm and sprinkler systems, if included in the project, may be in the form of specifications only for firm commitment submittal. Shop drawings, including complete system layouts, for these systems must be submitted during construction.
14. Property (Monument) Sign(s), if included in the project, should include the following minimum information:
 - (a) The property name.
 - (b) On-site office number and/or manager's emergency contact number as well as the local TDD/TTY number.
 - (c) Fair Housing Logo.
 - (d) Handicap Logo (if applicable).

EXHIBIT "F"

LATENT DEFECT INSPECTION

The latent defect escrow will be released only after an inspection and approval by the Owner, the Architect, and MHDC.

- A. Participation. A representative of the Owner, Property Manager, the General Contractor, the Architect and MHDC shall inspect the property as a single group after the eighth month and before the thirteenth month of the date of the development-wide G704.
- B. This G704 must state or will imply the date of the commencement of the 12-month warranty period, which will establish the approximate date of the latent defect inspection nine months afterwards.
- C. All citations and deficiencies discovered at the latent defect inspection must be corrected prior to the release of the latent defect escrow. In the event this cannot be accomplished by the Owner by the date of expiration of the latent defect escrow, MHDC may, in its sole discretion, choose to extend the expiration date or use the latent defect escrow to correct the deficiencies.
- D. The Owner shall be responsible for the correction of all latent defect citations and deficiencies regardless of the occupancy of a unit prior to the issuance of the final G704 for the entire project.
- E. The Owner shall submit to MHDC a copy of the latent defect inspection list with all work signed off by the General Contractor and Owner or Property Manager. MHDC reserves the right to conduct additional latent defect inspections if deficiencies are not corrected to its satisfaction.

EXHIBIT "G"

**FORM OF REQUEST FOR VARIANCE/WAIVER OF A
REQUIREMENT SET FORTH IN THE
DESIGN/CONSTRUCTION COMPLIANCE GUIDELINES**

Development Name:
Development Number:
Ownership Entity ("Owner"):
Architect:
General Contractor:

Variance/Waiver Request:

Justification for Request:

Requested this ___ day of _____.

OWNER

(Printed Name)
(Title)

ARCHITECT

(Printed Name)
(Title)

GENERAL CONTRACTOR

(Printed Name)
(Title)

The request has been: Accepted Denied

Comment:

Reviewed on this ____ day of _____.

**MISSOURI HOUSING DEVELOPMENT
COMMISSION**

Name: _____

Title: _____

Name: _____

Title: _____

EXHIBIT "H"

REVISIONS TO THE AUGUST 1, 2009 DESIGN/CONSTRUCTION COMPLIANCE GUIDELINES ("COMPLIANCE GUIDELINES")

Any revision to the Compliance Guidelines subsequent to August 1, 2009 will be set forth in this Exhibit "H," and is incorporated into and made a part of the Design/Construction Compliance Guidelines. Each revision will have a date which it goes into effect and will specify the category of developments to which it applies.

<u>Notice Date/ Effective Date</u>	<u>Revision/ Affected Developments</u>
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3/2/2012	Developments approved for funding in 2012.
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All reference to AIA Document B181 Standard Form of Agreement Between Owner and Architect For Housing Services indicated in the Design/Construction Guidelines shall be changed to read **AIA Document B108 Standard Form of Agreement Between Owner and Architect for a Federally Funded or Federally Insured Projects.**

03/02/2015	Developments approved for funding in 2015.
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Performed miscellaneous updates and clarifications throughout Guidelines. Addition of 'Exhibit I'; Signature Block Example.

06/29/2015	Developments approved for funding in 2016.
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Updated Exhibit "D" MHDC Universal Design.

03/05/2018	Developments approved for funding in 2018.
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Update Guideline to include Rehabilitation Standards for Developments. Addition of Exhibit "J" Rehabilitation Specifications.

EXHIBIT "I"

Signature Block Example

SIGNATURE BLOCK	
_____ ARCHITECT: (Name) ADDRESS	_____ DATE
_____ OWNER: (Name) ADDRESS	_____ DATE
_____ GENERAL CONTRACTOR: (Name) ADDRESS	_____ DATE
_____ BONDING COMPANY: (Name, only if applicable) ADDRESS	_____ DATE
_____ MISSOURI HOUSING DEVELOPMENT COMMISSION 920 Main, Suite 1400 Kansas City, MO 64105	_____ DATE

SECTION XI – REHABILITATION SPECIFICATIONS – EXHIBIT J:



Missouri Housing Development Commission

General Rehabilitation Specifications

Exhibit "J"

Missouri Housing Development Commission
920 Main; Suite 1400
Kansas City, MO 64105
(816) 759-6600

Revised March 2018

GENERAL SPECIFICATIONS

DIVISION 1--GENERAL

SECTION 1A - DEFINITIONS

1. **MHDC** - the Missouri Housing Development Commission or its authorized representative.
2. **Contractor** - the individual or firm contracting with the Owner for performance of any or all of the work specified by the *Scope of Work Summary*.
3. **Owner** - the person, persons or their authorized representative identified as such on the *Scope of Work Summary* and contracting with the Contractor for performance of the prescribed work.
4. **Building Code** - means the current Building Codes recognized by the Authority Having Jurisdiction (AHJ), which include: International Building Code, International Residential Code (with exceptions), International Property Maintenance Code, International Energy Conservation Code, International Plumbing Code, International Mechanical Code, International Fuel Gas Code, International Existing Building Code, NFPA Life Safety Code, National Electric Code, and ANSI A117.1 American National Standards for Accessibility & Usable Buildings.

SECTION 1B - REFERENCES/STANDARDS

All work to be performed and materials supplied shall conform to the standards of the following professional societies.

1. Concrete work shall conform to the standards of the American Concrete Institute (ACI).
2. All masonry work shall be installed in accordance with the National Concrete Masonry Association.
3. Steel work shall conform to the standards and grading rules of the American Steel Association.
4. Plywood shall conform to the grading rules of the American Plywood Standards Committee.
5. Lumber shall conform to the grading rules of the American Lumber Standards Committee.
6. Roof shingles shall carry an Underwriter's Laboratory label for conformance to the fire resistance standards, and shall conform to the Asphalt Roofers Manufacturer's Association.
7. Other materials shall meet the standard under the specification division as specified.
8. All electrical work shall be installed in accordance with the National Electric Code.
9. All plumbing shall be installed in accordance with the International Plumbing Code.

10. All heating systems shall be installed in accordance with ASHRAE, the International Energy Conservation Code, the International Mechanical Code and Fuel Gas Code.
11. All construction work shall comply with the International Building Code, the International Residential Code, the NFPA Life Safety Code, and the ANSI A117.1 American National Standards for Accessibility & Usable Buildings.
12. Energy Star Certified homes, Version 3, National Program Requirements.
13. ASTM--94 Specifications for ready mixed concrete.
14. ASTM--C150 Specifications for Portland cement.
15. ASTM--C270 Specifications for mortar for unit masonry.
16. ASTM--A185 & A615 concrete reinforcing.
17. ASTM--C1116 fiber reinforcing in concrete.
18. ACI--318 concrete reinforcing.

SECTION 1C - GENERAL SPECIFICATIONS FOR HOUSING REHABILITATION

These General Rehabilitation Standards provide minimum specifications for items, materials, and installation to be furnished under the construction contract for the rehabilitation of residential properties. These minimum standards are designed to ensure that properties are free of foreseeable hazards and adverse conditions that may affect the life, health, and safety of the occupants. These specifications were prepared by MHDC staff for use in the housing rehabilitation projects that utilize federal funding for HUD-administered housing projects. Any questions on the intent or interpretation of these specifications shall be referred to MHDC staff for clarification.

SECTION 1D - CODES, ORDINANCES, AND STANDARDS

Work required by the Work Write-Up or any specifications shall be performed in accordance with all applicable codes, ordinances, and these attached General Rehabilitation Standards (GRS) prepared by MHDC. If a contradiction exists between the Codes and the *Scope of Work Summary* or the GRS, the requirement of the Code will apply, except when the requirement of the *Scope of Work Summary* or the GRS exceeds those of the Codes. In that case, whichever requirement in the Work Write-Up or the GRS is most stringent will apply.

The current Building Code recognized by the Authority Having Jurisdiction (AHJ) and includes the following standards: International Building Code, International Residential Code (with exceptions), International Property Maintenance Code, International Energy Conservation Code, International Plumbing Code, International Mechanical Code, International Fuel Gas Code, International Existing Building Code, NFPA Life Safety Code, National Electric Code, and ANSI A117.1 American National Standards for Accessibility & Usable Buildings. All above-noted Codes, specifically the International Building Code and International Residential Code, will be simply referenced as the Building Code throughout these GRS.

SECTION 1E - GENERAL CONDITIONS

The work shall include all labor, materials, equipment, permits, work write-ups, and drawings for the completion of the work identified and reasonably inferred as necessary to produce the intended results by the Contract Documents. The intended results shall correct all health and safety (life threatening) issues; major systems issues (structural; roofing; cladding; windows; doors, plumbing; electrical; and heating, ventilation, and air conditioning); lead-based paint hazards; accessibility concerns; and any applicable disaster mitigation issues as listed in the *Uniform Physical Condition Standards – Comprehensive Listing (see Appendix 4)*.

The remaining useful life of the major systems must be determined for rental housing and a capital needs assessment will be required for projects of 26 units or more. The major systems for homeownership housing must have a minimum remaining useful life span of 5 years.

SECTION 1F - PERMITS, BONDS, LICENSES, AND INSPECTIONS

Any and all permits, bonds or licenses required for the execution of the work specified by the *Scope of Work Summary* shall be obtained and paid for by the Contractor prior to the start of that work. Contractors and subcontractors are responsible for obtaining any progress or final inspections from the local jurisdiction's building departments and MHDC. Failure to call for the required inspections or proceeding without inspection, such as covering work without approval and deviating from approved plans and specs, may result in violations that could include no payment.

Progress field reports shall be submitted to MHDC by Architect of Record. The following information shall be included in the field report as indicated in the *Sample MHDC Site Observation Report (See Appendix 3)*.

Upon project completion, each unit must be decent, safe, sanitary, and in good repair. Each unit must comply with the items contained in the *Housing Quality Standards and Uniform Physical Conditions Standards*.

These items include the following.

1. Exterior:

- A. Foundations: All foundations must be sound and free from hazards.
- B. Stairs, Porches, and Rails: All stairs, porches, and rails must be sound and free from hazards.
- C. Roof and Gutters: The roof and gutters must be sound and free from hazards.
- D. Exterior Surfaces: All exterior surfaces must be sound and free from hazards.
- E. Manufactured Homes: Units must be properly set, contain permanent foundations, and be tied down.
- F. Fencing and Gates: All fencing and gates must be sound and free from hazards.
- G. Grounds and Storm Drainage: Proper drainage must be provided, no erosion present, and no overgrown vegetation present.

- H. Mailboxes and Signs: No missing or damaged components should be present.
- I. Market Appeal: Site should be free of litter and any visible graffiti.
- J. Parking Lots and Drives: All parking lots and drives must be sound and free from hazards.
- K. Play Areas and Equipment: Play areas and equipment should be safe and free of any hazards.
- L. Refuse Disposal: Site should be free of hazards and adequate storage for refuse must be provided.
- M. Retaining Walls: Retaining walls must be sound and free from hazards.
- N. Walks, Steps, and Ramps: All walks, steps, and ramps must be sound and free from hazards.

2. Interior:

- A. Living Room: Is a living room present?
- B. Kitchen: Is a kitchen present?
- C. Bath: Is a bathroom present?
- D. Other Rooms Used for Living: Are other rooms used for living present?
- E. Electric: Is the electrical system free of hazards? Does each room have two working outlets or one working outlet with one working light fixture?
- F. Window: Is at least one window present? Windows must be free of deterioration and missing or broken panes.
- G. Doors: All doors must be sound and free of hazards or deterioration.
- H. Security: All windows and doors that are accessible from the exterior must be lockable.
- I. Ceiling: All ceilings must be sound and free from hazards.
- J. Walls: All walls must be sound and free from hazards.
- K. Floors: All floors must be sound and free from hazards.
- L. Stove/Range: Unit must have a working stove or range free from hazards.
- M. Refrigerator: Unit must have a working refrigerator free from hazards.
- N. Sink: Unit must have a permanently-attached sink and in good working order with hot and cold water.
- O. Dishwasher and Garbage Disposal: If dishwasher and garbage disposal are provided, they must be in working condition and free of hazards.
- P. Space for Storage, Preparation and Serving Food: Adequate space for storage, preparation, and serving food must be provided.
- Q. Toilet: A toilet must be present and in good working condition.
- R. Lavatory: A lavatory must be present, permanently attached, and in good working condition with hot and cold water.

- S. Tub/Shower: A tub or shower must be present and in good working condition with hot and cold water.
- T. Ventilation: A window must be provided in the bath or a mechanical exhaust system in good working condition. Mechanical ventilation must discharge air to the exterior.
- U. Smoke Detectors: At least one battery-operated smoke detector or hard-wired smoke detector in working order must be provided on each level of a unit.
- V. Heating: Heating adequately capable of providing heat to all rooms, free from hazards, and properly ventilated as necessary must be provided.
- W. Water Heater: All water heaters must be properly located, installed in a safe manner, and not contain any hazards.
- X. Plumbing: The plumbing system must be free of leaks and corrosion. The system must be an approved public or private system.
- Y. Sewer: The sanitary system must be properly connected to an approved public or private system.
- Z. Call for Aid: All call for aid or emergency call systems must be operable.

3. **Health & Safety:**

- A. Access: Must be able to enter a unit without passing through another unit.
- B. Exits: Acceptable fire exits must be provided from a unit that is not obstructed.
- C. Infestation: All units must be free of infestation from rodents, vermin, insects, and other pests.
- D. Garbage and Debris: The site and units must be free of all litter, garbage, and debris.
- E. Interior Stairs/Common Halls: All areas must be safe and free of hazards.
- F. Other Interior Hazards: All areas must be safe and free of hazards.
- G. Elevators: All elevators must have a current inspection certificate and be in safe, working condition.
- H. Air Quality: The site and units must be free of any air pollutants that threaten the occupants' health.
- I. Site and Neighborhood: Site and neighborhood must be free from any health and safety issues.
- J. Flammable and Combustible Materials: Properties must not contain any type of improperly-stored flammable and combustible materials.
- K. Lighting: Site and unit must not contain any broken or missing light fixtures or bulbs.
- L. Emergency Power: All auxiliary lighting and exit signs must be in good working order.
- M. Fire Protection: Properties must not contain any expired fire extinguishers or missing and damaged sprinkler heads or equipment.

SECTION 1G - INSURANCE REQUIREMENTS

Each contractor must carry adequate liability insurance coverage, as well as proper workers' compensation coverage. The contractor shall not commence work until he/she has obtained all insurance required.

SECTION 1H - PROJECT INSPECTION

The Contractor shall visit the project site and determine any conditions which may affect his work. This shall include inspection of the site and structure(s). Any conditions affecting his work shall be taken into consideration in his bid proposal and execution of the work to be performed.

SECTION 1I - STANDARDS AND WORKMANSHIP

Work required by the *Scope of Work Summary* and these GRS shall be performed with specified or approved equal materials and equipment by mechanics skilled in their respective trades. Standards for satisfactory quality workmanship shall be established by the intent of the contract, compliance with all applicable codes, ordinances, these GRS, accepted trade and industry standards, and MHDC. The Contractor shall also warrant his work against faulty materials and workmanship for a period of one year and replace same at the direction of MHDC at no cost to the Owner or MHDC.

SECTION 1J - MATERIALS

Unless otherwise specified, all materials and equipment incorporated in the work required by the *Scope of Work Summary* and these GRS shall be new and of the quality specified by these GRS. The Contractor shall, if requested, furnish evidence as to the kind and quality of materials. It is the intent of the *Scope of Work Summary* to permit the use of materials of any manufacturer so long as they are fully consistent with the quality and performance requirements of these GRS. Substitution shall be approved and executed by contract change order. It shall be understood that the use of materials other than those designated, without prior approval by contract change order, shall constitute a violation of the contract and that the Owner or MHDC shall have the right to require the removal of such materials and their replacement with the designated materials at the Contractor's expense.

SECTION 1K - WORK DESCRIPTION

A *Scope of Work Summary* for each property, identified by Owner and address, will indicate all work to be performed with locations. Locations may be related to drawings which are included as part of the work summary. Anything specified on the drawings and not listed in the work summary shall be treated as if required. Work specified by the *Scope of Work Summary* shall comply with the requirements of these GRS. Each item of the summary includes reference to specific requirements of these GRS. These references do not preclude the requirement to meet all other applicable requirements of these GRS. All work specified by the *Scope of Work Summary* shall include all labor, material, equipment, and permits necessary to perform the work unless otherwise specified.

If there is a conflict between the requirements of these GRS and the requirements of the *Scope of Work Summary* which may include drawings, the Contractor shall notify MHDC for a determination as to which applies.

SECTION 1L - COMPLIANCE WITH MANUFACTURERS' RECOMMENDATIONS

Installation of products, assemblies, and equipment specified will be in accordance with manufacturers' instructions, recommendations, and specifications. Associated installation products, methods, and hardware shall be as recommended by the manufacturers.

SECTION 1M - ENGINEERING

When engineering is required as part of the *Work Summary*, the engineering requirements shall supersede the requirements of these GRS. Engineering required for the execution of the work shall be obtained by the Owner, seller, or Contractor.

SECTION 1N - PROPERTY DAMAGE AND SECURITY

The correction of any damage to the project site or adjacent properties as a result of any activities associated with the Contractor's execution of the work shall be the responsibility of the Contractor. Settlement actions for damages shall be to the satisfaction of the property Owner(s). The Contractor shall ensure security of buildings by use of existing locking devices and boarding of any openings as a result of his work. New work and newly-installed products shall be protected from damage through completion of the project. Any damage to such work or products shall be repaired or products replaced to the satisfaction of the Owner and MHDC. The Contractor shall be held responsible for any damage or defacement caused in the process of delivery of materials or execution of work. Responsibility shall include the repair or replacement cost of damaged surfaces.

SECTION 1O - INSTRUCTION MANUALS AND WARRANTIES

When provided by the manufacturer, the Contractor shall provide to the Owner the owner's manuals, guarantees, warranties, and certificates for furnished materials and equipment.

SECTION 1P - TRASH REMOVAL

The Contractor shall remove from the site all trash, debris, and waste materials accumulated during fulfillment of the contract by the Contractor, subcontractor, and any other personnel used in the performance of the contract. Trash, debris, and waste materials awaiting removal from the site shall be controlled to avoid scattering and unsightly accumulation. The Contractor shall not use the Owner's trash facility. The premises and dwelling units shall be free from excessive accumulations of rubbish and garbage that presents a health and safety hazard. The owner must provide proper facilities for the placement of all rubbish and garbage.

SECTION 1Q - MARKET APPEAL

Any unusual negative site characteristics that have a negative impact on the curb appeal of the project must be corrective. These items include deterioration of any items, graffiti, and litter.

DIVISION 2 - DEMOLITION & SITE WORK

SECTION 2A - DEMOLITION

Any damage or loss resulting from demolition activities shall be corrected at the expense of the Contractor. Safety conditions shall be maintained at all times, and the Contractor shall use all precautions necessary, especially at excavations, to provide the necessary protection for the Owner, the public, and inspectors visiting the site. Debris as a result of demolition shall be removed from the site, streets, adjoining walks, and properties. Debris shall be removed from the site in approved containers to legal disposal sites in accordance with local ordinances and applicable environmental regulations.

SECTION 2B - EXCAVATION

Open holes and excavations as a result of demolition shall be filled with earth material free of rubbish or rocks larger than 3" in diameter. Fill shall be mechanically compacted in 6" lifts to a minimum of 90% of the maximum proctor density ASTM D-698. Fill shall not be flooded. When only a component of a structure or equipment/fixture therein is removed, it shall be removed complete without damage to other portions of the property. When any unsightly voids, holes, outlines, etc., are left as a result of such removal, they shall be repaired and finished to match adjacent materials and finishes.

SECTION 2C - TREE AND SHRUB REMOVAL

Tree or shrub removal specified shall include removal of stump and roots to a depth of approximately 12" below finish grade level, backfilling of excavation, and hauling debris from site.

SECTION 2D - FENCE REMOVAL

Fencing along property line shall be removed only with the written consent of the property Owner. This consent shall be obtained by the Owner and forwarded to MHDC. Fencing material, including concrete below grade, shall be removed from site.

SECTION 2E - STRUCTURES

When a structure is to be demolished, the entire structure and all debris shall be removed from site, including all foundations, sidewalks, steps, retaining walls, floor slabs, etc. Demolition should begin at top levels and work down through the building. When only a portion of a structure is to be demolished, the remaining structure, including concrete portions, shall be neatly cut or finished off.

SECTION 2F - INTERIOR

When interior demolition is performed, all adjacent areas and furnishings shall be protected from damage and dust. When any existing mechanical or electrical component requires relocation as a result of demolition, it shall be relocated in a functional manner.

SECTION 2G - CONCRETE (WALLS, STEPS, STOOPS, WALKS, DRIVES, ETC.)

Demolition and removal of concrete shall include concrete below grade.

SECTION 2H - MASONRY CHIMNEYS

When a chimney or portion thereof is removed, all resulting openings shall be filled in to match adjacent structural and finish materials so that no outlines remain. If chimney supported any shelving, rods, etc., these items shall be replaced with new material to fit new space. When a chimney is removed entirely, the chimney foundation may remain unless otherwise specified.

SECTION 2I - EQUIPMENT AND FIXTURES

When an item of equipment or fixture is removed, it shall be removed complete to include all associated ducting, piping, wiring, and connections in or passing through finished spaces. When removal of any such piping, ducting, or wiring results in any abandoned lines, they shall be properly capped or terminated. Termination of lines shall be outside of finished spaces and all evidence of their existence shall be removed. When a heating system or unit is removed, it shall be removed complete to include furnace or boiler, all ducting or piping (supply and return), gas supply and flue, registers or radiators, thermostats, and all other related hardware. If the condition, installation, and location of gas supply and venting are in compliance with these general specifications and all applicable codes, they may be used for the replacement system if a replacement system is specified. When only a component of the unit is to be removed, it shall be removed complete without damage to other portions of that system.

SECTION 2J - UTILITIES

When electric appliances are changed from electric to gas and installed in the same location, the existing service shall remain. When gas appliances are changed from gas to electric and installed in the same location, the existing service shall remain. Gas shall be shut off and properly capped. When the Contractor's work results in any abandoned utility or other service lines or equipment, the appropriate authority shall be notified so that the lines or equipment can be removed or properly deactivated. When the work results in any abandoned piping, ducting, wiring, fittings, or associated equipment readily visible or accessible, it shall be disconnected and removed. When an electrical box contains a device that is to be abandoned, the box shall not be used as a junction box if the cover would be in a finished space.

SECTION 2K - JUNK AND TRASH

All junk and trash shall be removed and disposed in a proper manner. Area shall be raked or swept clean and level with surrounding grade. Disposal shall be in accordance with local ordinances.

SECTION 2L - SALVAGE RIGHTS

Owner has salvage rights only when identified in the *Scope of Work Summary*. Unless specified that items are to be provided to or returned to the Owner, the Contractor shall be responsible for removing and disposing of all debris.

SECTION 2M - EARTHWORK

1. Excavation:

Excavate to grades specified on the Work Write-Up. The bottoms of footing foundation trenches are to be level. Footings must rest on undisturbed natural soil or properly compacted, engineered fill. Haul all excess excavated dirt from site or as directed in Work Write-Up.

2. Backfill:

A. General: Backfill and grade to obtain finish grades as specified. Backfill material shall be free of organic material, construction debris, and any rocks larger than 2" in diameter. Backfill shall be placed to expose 6" of foundation while providing positive drainage away from the unit. Backfill shall not be placed on frozen or muddy surfaces.

B. Compaction: Backfill shall be compacted to a minimum of 90% of the maximum Proctor Density ASTM D-698. Compaction shall be by mechanical tamping. Water shall not be used for compacting.

C. Engineering: Engineering report shall supersede A and B.

3. Grading and Drainage:

Site grading shall accomplish the following:

A. Allow drainage of surface water away from structure 6" within the first 10' (5% slope).

B. Avoid concentrating runoff onto neighboring properties.

C. Minimize erosion.

D. Provide wood-to-earth separation for affected structures on property.

E. In areas where dirt has been disturbed, the area is to be free of all rocks larger than 1" in diameter and rubbish and have a rake finish.

F. Swales shall be a minimum of 5' from building and contain a minimum 2% slope.

G. Soil shall be compacted, uniformly spread and be suitable for plant growth.

SECTION 2N - DRIVEWAYS

1. Preparation:

- A. Establish proper grade and drainage to include removing or providing additional soil as required to meet applicable requirements of Division 2, Sections 2B and 2M-3.
- B. The subgrade shall be evenly graded to a depth that will permit the installation of the required new materials to the desired finish grade. When establishing driveways in locations where no previous driveways have occurred, geotechnical fabric is to be placed prior to placing the first lift of stone.
- C. Sod or vegetation shall be removed, and any soft or mucky places shall be dug out and filled with a granular material thoroughly compacted.

2. Gravel Installation:

- A. Gravel installation shall include edging of 4" redwood, cedar, treated wood, or galvanized metal securely staked prior to installation of gravel. Note: Edging may be omitted if edge of gravel abuts sidewalk, curb, structure, or other suitable edge.
- B. Finish material shall be as specified and a minimum of 4" deep and spread uniformly over the entire area.

3. New Asphalt Installation:

- A. Asphalt pavement shall have a minimum compacted thickness of 2". Base shall be of crushed stone, gravel, or durable road material and properly compacted to 4" minimum thickness.
- B. Asphalt material shall be obtained from a local established asphalt batch plant and asphalt driveways shall be constructed only by a contractor or subcontractor that specializes in asphalt work. Surface shall be rolled with a 5- to 10-ton roller; areas inaccessible to a power roller shall be thoroughly tamped with hot iron tamper. Asphalt shall be applied only in suitable weather conditions. The Contractor will pay special attention to properly attaching the new driveway to all existing sidewalks, porches, garage floors, and any other abutting areas.

4. Asphalt Repair:

- A. Bituminous paving is to be repaired by removing loose material and cleaning area with water or air pressure. Repairs are to be made with an approved asphalt patch material following the manufacturer's instructions for installation.
- B. Existing blacktop driveway shall be resurfaced by installing and rolling 1½" of new bituminous surfacing over the existing sound base prepared as required by asphalt paving methods.

5. Concrete Installation: see Division 3, Sections 3A and 3C

SECTION 20 – FENCING

1. **General:**

The exact location of any new fencing shall be established by the property Owner.

2. **Fence Repair:**

Sections of all types of fences to be repaired shall be restored to a condition comparable to new, including gates. Replacement materials shall match existing.

3. **Chain Link:**

- A. **Fabric:** Chain link fabric shall be 1-1½ gauge wire woven in a 2" galvanized mesh. Fabric shall be tied to posts and top rail with aluminum or galvanized wire.
- B. **Posts:** Line posts shall be 1 5/8" OD galvanized pipe spaced at a maximum of 10'0" on center and set in concrete a minimum of 24" below grade. End posts, corner posts, and gate posts shall be 2½" OD galvanized pipe set in concrete a minimum of 30" below grade. Holes shall be large enough to provide space for 2" of concrete around post.
- C. **Top Rails:** Top rails of 1 3/8" OD galvanized pipe shall be included in all installations.
- D. **Gates:** Gates shall be constructed of 1 3/8" OD galvanized pipe with welded or factory fitted joints. Fabric in gates shall be same as fence.
- E. **Fittings and Hardware:** Fittings and hardware shall be either galvanized steel, aluminum, or galvanized malleable metal. Provide and install all fittings and hardware for a complete installation.

4. **Wood:**

- A. **Material:** Fencing components shall be of material specified.
- B. **Fasteners:** Nails, staples, bolts, etc. shall be galvanized or cadmium plated.
- C. **Posts:** Posts shall be 4" x 4" spaced a maximum of 8'0" on center and set in concrete a minimum of 30" below grade. Concrete shall be sloped ½" from post to finished grade. Posts shall be set on 6" of gravel at bottom. Hole shall be large enough to provide space for 4" of concrete around post.
- D. **Rails:** Fences with vertical board facings shall have 2" x 4" rails. Two rails are required for fences up to 6'0" high. Rails shall be securely fastened to posts to rigidly support all loads.
- E. **Facing Boards:** Facing boards shall be of the style specified. Facing boards with knots exceeding 1/3 of board width will not be accepted. When style of fence is such that boards may be fastened to either side of posts, the Contractor shall have the Owner specify the selected side in writing.
- F. **Gates:** Gates shall match the fence in which they are placed and shall include all hardware necessary for the specific application. Hinges shall be bolted to both support post and gate. Gates shall be constructed to withstand normal usage and shall include a minimum of one cross brace secured by a gusset at each end.

SECTION 2P - LANDSCAPE WORK

1. Tree and Shrub Placement:

Plants shall be nursery grown, sound, healthy, vigorous, free from plant diseases and insects or their eggs, and shall have normal, healthy root systems.

2. Tree and Shrub Pruning:

Trees and shrubs shall be pruned in accordance with accepted nursery practice. Broken and disfigured branches shall be removed. When limbs larger than 2" in diameter are removed, the butt ends that remain on the tree shall be properly sealed. Pruning shall ensure adequate clearance from structures and utility lines. All new trees are to be staked in place until such time as the root ball has imbedded into the existing soil.

3. Existing Shrubs:

Plants should be dug up and prepared for storage in a proper manner that does not damage the branches, root system, and future development of the plant. The plant should be protected from drying out.

4. Sodding:

A. Preparation: Preparation for sodding shall include:

- 1) Removal of all vegetation to ground level.
- 2) Removal of all rock and rubbish, rototilling, and raking to provide a smooth, firm base.
- 3) Establishment of proper grade and drainage including removal or addition of suitable soil as required for finish, sodded surface to meet requirements of Section 2M-3 of this Division.

B. Material: Sod shall be a strain or blend of strains of Kentucky Blue Grass and supplied by a turf farm whose sod meets the requirements of the American Sod Producers Association.

C. Installation:

- 1) Sod shall be installed within time limit set forth by turf farm supplying sod.
- 2) Fertilize as recommended by turf farm supplying sod (one application required).
- 3) Provide property owner with warranty and written care and maintenance instructions supplied by turf farm.

5. Lawn Reconditioning:

Lawn reconditioning shall consist of the following:

A. Preparation: Preparation for seeding shall include:

- 1) Raking all debris from area to be reconditioned and scratch surface as required.
- 2) Fertilizing with starter fertilizer as recommended by seed producer.

3) Topsoil shall be used to establish the finish grade and be evenly spread to a minimum of 2-4".

B. Material: Seed shall be a strain or blend of strains of Kentucky Blue Grass as recommended by local suppliers.

C. Placement: Placement of seed shall include:

1) Spreading seed and raking in accordance with seed provider's instructions.

2) Providing initial watering.

3) Providing property Owner with written care and maintenance instructions from seed producer.

6. **Rock**:

Rock installation shall consist of the following:

A. Preparation: Preparation for rock shall include:

1) Establish proper grade and drainage including removal or addition of soil to meet requirements of Section 2M-3 of this Division.

2) Grade the subgrade evenly to a depth of 4" below desired finish grade.

B. Placement: Placement rock shall include:

1) Edging installation, if specified, shall be securely staked prior to installation of rock.

2) Subgrade covering installation of 6 mil visqueen over entire subgrade prior to installation of rock.

3) Finish material placement a minimum of 4" deep and spread uniformly over entire area.

SECTION 2Q - ACCESS

Access to each dwelling unit must be free of any obstructions and is required from parking areas or other amenities on site. Access to the unit must also be private. A building must contain an alternate means of exit in case of fire. The emergency exit from a building may consist of fire stairs, another door, or windows. The emergency exit must not be blocked.

SECTION 2R - PLAYGROUND/PLAY AREAS

Existing playground or play areas must be maintained in decent and safe condition. All equipment must be free from any defects. The areas must contain mulch and be enclosed by a fence capable of supporting all loads.

SECTION 2S - POOLS

Swimming pools, decorative fountains, or retention ponds must be enclosed by a fence suitable to prevent unwanted activities or unsupervised children access to those areas. Entrance locations must have acceptable locking hardware.

SECTION 2T - SITE AND NEIGHBORHOOD

The site and neighborhood must be reasonably free from disturbing noises or other dangers to the health, safety, and general welfare of the occupants. The site and neighborhood may not be subject to serious adverse natural or manmade environmental conditions, such as dangerous walks or steps, flooding, poor drainage, sewer hazards, mudslides, air pollution, noise, vermin, or fire hazards.

DIVISION 3 - CONCRETE

SECTION 3A - GENERAL REQUIREMENTS

1. **Preparation:**

- A. Concrete work shall include all excavation, backfill, and compaction required for complete job. Surfaces adjacent to concrete shall be restored to match adjacent surfaces, unless otherwise specified.
- B. Sod and vegetation shall be removed and any soft or mucky places shall be dug out and filled with granular material thoroughly compacted.

2. **Concrete Design:**

- A. Concrete shall reach the following minimum compression strengths within 28 days.
 - 1) Concrete walls and interior slabs: 2500 pounds per square inch (psi).
 - 2) Driveways, curbs, sidewalks, patios, porches and garage floors: 3000 psi.
- B. All cast-in-place concrete shall be from a local, established concrete plant that can provide specified design mixes and supply product data if necessary.
- C. All slab-on-grade concrete will be placed on a minimum of 4" of compacted, crushed stone.

3. **Form Work:**

- A. **Walls:** Cast-in-place concrete shall be formed with wood; steel; aluminum; plastic; a composite of cement and foam insulation; or a composite of cement and wood chips. Forms shall be substantially free of surface defects and sufficiently tight to prevent leakage. They shall be properly braced and tied to maintain the design position and shape. Form ties shall be steel; solid plastic; foam plastic; a composite of cement and wood chips or foam plastic; or other suitable material capable of resisting the fluid pressures of fresh concrete. In no case shall supporting forms or shoring be removed until sufficient strength has been obtained to support the member's weight and any superimposed loads. Form ties shall be removed to a point flush with concrete surface or recessed and grouted.
- B. **Flat Work:** Cast in place flat work shall be formed with 2x material or steel forms, except that flat work more than 4" above grade shall be formed with the same materials noted above for walls. Forms shall be properly braced and tied to maintain the design position and shape. In no case shall supporting forms or shoring be removed until sufficient strength has been obtained to support the member's weight and any superimpose loads.

4. **Mixing:**

Unless prior approval is obtained in writing from the Owner with MHDC concurrence, all concrete shall be ready-mixed and transported to the site by an established ready-mix company. All concrete exposed to freezing is to have 5% +/- 1% air added to the mix.

5. **Reinforcement:**

- A. **Walls:** Concrete stem foundation walls shall have a minimum of one #4 bar within 12" of the top of the wall and one #4 bar located 3"-4" from the bottom of the footing.
- B. **Flat Work:** Concrete floors, walks, decks, porches, patios, and driveways shall have reinforcing materials. Reinforcement shall consist of reinforcing bars, steel wire, steel welded wire fabric, polypropylene fibers, or by accepted engineering practices. Block outs (12" minimum clear distance in all directions) must be installed around all valve boxes, manholes, poles, etc., encountered in walk or driveway areas. Concrete shall be placed in the blocked out areas at a point in time after the walk or driveway has been cast. Resilient bituminous fiber expansion joint must be installed around the blocked out area between the two pours.
- C. **Pads:** Unless otherwise specified, all pads must be reinforced as per Section 3A 5-B above, or by accepted engineering practices.

6. **Placing:** Concrete shall be placed continuously where possible or provide construction joints with reinforcement for transfer of stress. Concrete work shall be straight and plumb with square corners and shall be placed in such a manner that when forms are removed no honeycombs, large voids, or form marks are evident and face has a generally uniform appearance. If these requirements are not met, the Contractor shall be responsible for surfacing entire face to a uniform appearance.

7. **Protection of Concrete:** Concrete shall be protected from any weather condition which could compromise the strength or appearance of the finished concrete. The Contractor shall protect the concrete from traffic and vandalism until concrete will withstand normal traffic without damage. The Contractor shall be responsible for repairing or removing and replacing, without added cost to the Owner or MHDC, any concrete, the strength or appearance of which is damaged from improper protection, workmanship or materials.

8. **Repair of Concrete Surfaces:** Repair shall be true and level with adjacent surfaces and finishes shall match existing. Repair of concrete surfaces shall include:

- A. Removing existing spalling concrete, loose concrete, or loose cement coating.
- B. Cleaning area to ensure good bonding of patch material.
- C. Wetting the surface and keeping moist during entire process.
- D. Filling all voids and cracks with a mixture of concrete and bonding agent placed in accordance with manufacturer's recommendations.
- E. Repairing any existing cement coating.

SECTION 3B - CONCRETE WALLS

1. Concrete Foundation Walls:

- A. Cast-in-place foundation walls must be a minimum of 8" thick and a maximum of 4'0" in height. Foundation walls over 4'0" in height shall be constructed in accordance with accepted engineering practices and shall include installation of all recommended foundation drain systems. Installation shall include sump pump and pit when required to get water to grade.
- B. The top of finish walls shall be such that no more than two sill plates are required to maintain finish floor elevation. Beam pockets shall be formed and beam support shall be provided.
- C. When constructing a foundation for an existing structure, the new foundation shall be placed so that vertical alignment with the existing exterior walls and corners is achieved.

2. Concrete Retaining Walls:

- A. Retaining walls not laterally supported at the top must not exceed 2'0" in height.
- B. Walls over 2'0" in height shall be constructed in accordance with accepted engineering practices.

3. Piers:

Piers shall be a minimum of 12" in diameter and 36" in depth unless otherwise specified.

SECTION 3C - CONCRETE FLAT WORK

1. Concrete Walks, Ramps, Steps, Stoops, Patios, Driveways, and Aprons:

- A. Total thickness of all concrete shall be 4" minimum. Exposed surfaces shall be free of honeycombs, voids, and form marks and have a generally uniform appearance. Provide exterior flat concrete with light broom finish. Proper drainage shall be maintained away from all building walls with a minimum slope of 1/8" per foot. Edges shall be tooled with a device designed specifically for this purpose.
- B. Concrete walks shall be a minimum of 36" wide, unless otherwise specified. When walk joins steps that are wider than walk, the walk shall be tapered to step width from a point approximately 48" from steps. Score sidewalks with 1/2" control joints at a maximum of 5'0" on center and provide 1/2" x 4" resilient bituminous fiber expansion joints at points where walk abuts existing concrete.
- C. Score driveways and patios with 1/2" control joints at a maximum of 10'0" on center in both directions. Provide and install 1/2" x 4" resilient bituminous fiber expansion joints every 20 linear feet (lf) of driveway and at points where driveway and patios abut existing concrete. Control joints are to be tooled in place at the time of the placement or saw cut as soon as the concrete will withstand the weight of the workman and saw.

D. Vehicle garage door apron shall be poured flush with garage floor, and extend 1' to each side of garage door opening and extend out 2' flush with driveway grade. Slope aprons away from the garage at a minimum of $\frac{1}{4}$ " per foot.

2. **Interior Concrete Floors:**

A. Floors shall have steel trowel finish, smooth, and free from trowel marks. Aggregate shall be tamped away from surface using tools designed for this purpose. A 4" base course and 6 mil vapor barrier with joints lapped 6" are required for interior slabs on grade. Interior concrete floor slabs shall be a minimum of four inches (4") thick, with one-half inch ($\frac{1}{2}$ ") x four inch (4") resilient bituminous fiber expansion material at perimeter of floor and at any other structural elements.

B. Concrete floors shall be finished (except where floors are shown to slope to drain) with a maximum one-quarter inch ($\frac{1}{4}$ ") variation in an eight foot (8'0") distance in any direction.

C. Garage floors shall be sloped for drainage to overhead door opening and include a concrete apron (see paragraph 1 of this section).

SECTION 3D - SIDEWALKS, CURBS, CURB RAMPS, AND DRIVEWAY APRONS

Sidewalks, curbs, curb ramps, and driveway aprons located within public street or alley rights-of-way must be designed and constructed in accordance with local jurisdiction requirements. Handicapped-accessible curb ramps of a type and design approved by the local jurisdiction must be provided at all street and alley intersections. The portion of driveway aprons located within a public street or alley right-of-way must be constructed of concrete with a thickness of 6" minimum. All work taking place within a public right-of-way must be approved by the local jurisdiction, and the Contractor shall be responsible for obtaining such approval.

DIVISION 4 - MASONRY

SECTION 4A - GENERAL REQUIREMENTS

1. **Placing:** Masonry shall be laid in running bond with level courses, uniform joints, square corners, and plumb verticals. Joints to be struck flush where covered with finish or not exposed to view and with a concave tool where exposed. When new and existing masonry are joined, transition shall be structurally sound and watertight, and if exposed, shall be uniform in appearance. Work shall include all necessary anchors, lintels and ties.
2. **Cold Weather Precaution:** Masonry work shall be protected from any weather condition which could compromise the strength or appearance of the finished work.
3. **Mortar:** Masonry mortar shall be mixed using a masonry cement specifically designed for this application. Type S or M mortar shall be used for reinforced masonry, masonry below grade, and masonry in contact with earth. Type N mortar shall be used for above-grade load-bearing and non-load-bearing walls and for interior partitions.

SECTION 4B - FOUNDATIONS AND RETAINING WALLS

1. **Preparation:** Masonry work shall include all excavation, backfill, reinforcing, coring, etc. as specified:

Foundation Walls: Masonry foundation walls must be a minimum of 8" thick and wall heights must comply with section R404 of the IRC, or be constructed in accordance with accepted engineering practices. Foundation walls that enclose usable or habitable space below grade must include damp-proofing, a foundation drain system, or a sump pump and pit when required to get water to grade. All joints in all locations are to be fully bedded and tooled whether they are visible or not.
2. **Retaining Walls:**
 - A. Retaining walls not laterally support at the top must not exceed 2'0" in height.
 - B. Walls over two feet 2'0" in height shall be constructed in accordance with accepted engineering practices.
3. **Piers:** Masonry piers must not exceed 10 times their least dimension. Isolated piers must be grouted solid unless their unsupported height is less than 4 times their least dimension. Hollow piers must have a 4" pier cap or solid masonry unit or have the top course of the pier filled with grout or concrete.
4. **Mortar:** Masonry mortar shall be mixed using a masonry cement specifically designed for this application. Type S mortar shall be used for reinforced masonry, masonry below grade, and masonry in contact with earth. Type N mortar shall be used for above-grade load-bearing and non-load-bearing walls and for interior partitions.

SECTION 4C - REPAIR OF EXISTING

1. **Walls:** When repair of existing masonry is specified all materials and installation methods used shall match existing materials and finishes as closely as possible. Any or all of the following methods, as required, shall be used to achieve this.
 - A. **Tuck Pointing:** When tuck-pointing is required the work shall include:
 - 1) Removing existing mortar to a minimum of 3/4" and all loose and deteriorated mortar.
 - 2) Cleaning joint edges to ensure good bonding.
 - 3) Wetting the surface and keeping moist during the entire process.
 - 4) Forcing mortar into joints with caulking tool.
 - 5) Striking joint to seal and blend in with existing.
 - 6) Cleaning entire surface to remove all mortar from face of masonry (brick, rock or stone).
 - B. **Resetting Existing Units:** Existing masonry units may be reused if undamaged and clean.
 - C. **Parging:** When parging is required, the work shall have a uniform and even finish and shall include:
 - 1) Brushing and washing down entire surface to remove loose and deteriorated material.
 - 2) Keeping surface damp while applying parging.
 - 3) Coating entire surface with skim coat of masonry mixed at a ratio of three parts sand and one part masonry cement.
 - D. **Shotcrete:** When shotcreting is required, refer to International Building Code ("IBC"), the finish shotcrete surface shall not contain sags, segregation, honeycombing, sand pockets, or other obvious defects.
2. **Chimney:** When a chimney is to be repaired, this includes tuck pointing, replacing damaged or missing masonry and parging, and installing a new cap and/or flue extension where necessary. Chimney caps are not to be less than 4" thick at their thinnest location.

DIVISION 5 - METALS

SECTION 5A - RAILINGS AND HANDRAILS

Railings shall be custom manufactured and securely anchored. Prefabricated railing kits may be acceptable only when approved by the Owner and MHDC. Joints are to be rigid and dressed down to a smooth, even surface. Railings shall be painted with one coat of metal primer and two coats of suitable finish paint.

SECTION 5B - FOUNDATION AND ATTIC VENTS

1. **General:**

When openings for vents are constructed care shall be taken to avoid unnecessary damage to adjacent components.

2. **Foundation Vents:**

Foundation vents shall have a means of closing and shall be screened with corrosion resistant wire mesh. Vents shall not be placed in close proximity to existing or new plumbing. Vents shall be standard quality brands designed for the specific application.

3. **Attic Vents:** Attic vents called for shall be screened with corrosion resistant wire mesh and shall provide protection against entrance of rain or snow. Vents shall be standard quality brands designed for the specific application.

DIVISION 6 - CARPENTRY

SECTION 6A - FRAMING

1. **General:** Framing specified shall ensure that the construction provides safe support of all design loads and a suitable base for attachment of finish material. Framing lumber shall be identified by the Grade Mark of a recognized grading association. Framing shall be level and plumb, and where possible all corners shall be square. Window and door openings shall be level, plumb, and square. Engineering requirements shall supersede all requirements of this section.
2. **Sill Plates:** When new sill plates are specified, closed cell foam weather stripping, grout, or other gasket material shall be installed under the new plates. The new plates must be attached to the foundation with ½" bolts spaced 6' on center with at least one bolt within 12" of each corner and a minimum of 2 bolts per plate. Sill plates shall be protected against decay and termites.
3. **Posts and Beams under Floor Joists:** Posts and beams shall consist of:
 - A. Three 2" x 8" or 2" x 10" members fastened together to form a beam or the equivalent. Posts of 4" x 4" wood, 3" pipe, or general unit masonry construction spaced in accordance with the IRC are acceptable. Wood posts or pipes must be fastened to both beam and pad with brackets designed for the specific application. Installation shall assure that all beam member joints break over support posts and all points of contact with beam are shimmed for solid bearing.
 - B. Pads supporting each post 16" square x 16" deep poured-in-place concrete with two horizontal #4 rebar in each direction. Top of pad shall be level and provide a smooth surface to install block for masonry piers, brackets for wood posts, or to properly attach steel posts.
4. **Floor Framing:** For new floor systems, joist size and spacing shall be as specified in the Work Write-Up. When additional floor framing is necessary, new joist size shall be consistent with existing members.
5. **Subflooring:** Subflooring shall be plywood OSB (oriented strand board) or waferboard. Subflooring shall be glued and nailed. When matching existing, new subfloor shall provide a uniformly smooth transition.
6. **Furring and Leveling of Existing Floors:**
 - A. Remove all base and trim so that new floor sheathing will contact wall.
 - B. When leveling of floor(s) is specified, floor shall be leveled to the high point of the area being leveled unless otherwise specified. When leveling is specified for a particular room, it shall extend into any new and existing closet or pantry located in or adjacent to that room.
 - C. When leveling of floor(s) is specified, continuous furring strips shall be used. Furring material shall be of structural grade and shall be installed to obtain a structurally sound and level surface for installation of finished flooring (see Division 9, Section 9E).

- D. When furring strips run parallel to existing floor joists, they shall be installed directly over floor joists.
- E. Contact shall be maintained the entire length of the continuous furring strip between the existing floor and furring strips and the furring strips and new floor sheathing.
- F. The spacing of the furring strips and sheathing shall conform to the requirements of the IBC or IRC for spacing and sheathing thickness.
- G. Sheathing shall conform to subflooring requirements of paragraph 5 above.
- H. If shimming is necessary, shimming material shall be a structural material with full bearing.

7. Changes in Floor Level:

When leveling the floor in one area causes level differences from adjacent floors of more than 1/2", this change shall take place at openings. When such a change in levels does occur, the transition shall be made as follows:

- A. When the difference is 3" or more, treat as a step with a vertical riser. Finish of riser shall be the same as adjoining wall or either of the two adjacent floors. Owner and MHDC shall approve finish prior to installation.
- B. When the difference is less than 3", provide a tapered rise compatible with adjacent floors constructed of solid material. Finish of tapered rise shall be the same as adjacent floor finish, unless otherwise specified. Slope shall not exceed one in five.

8. Walls:

- A. New walls shall be constructed of 2" x 4" studs at 16" on center, continuous length from soleplate to double top plate and all ends shall be cut square. Wall framing shall include blocking for all planned accessories. Location of all openings shall be as per drawings. Exterior walls shall have two continuous beads of caulking applied between soleplate and subfloor.
- B. When furring of walls is specified, all furring material shall be of structural grade and shimmed as needed to obtain a rigid and plumb surface for installation of finish material.

9. Ceiling Framing:

- A. Framing members for new ceilings in existing spaces shall be properly sized for span and spaced 16" on center. Members shall be anchored to provide a rigid level plane with provision for perimeter nailing of wallboard.
- B. Additional framing members for reinforcement shall be properly sized, located, and anchored to meet the structural requirements of the Building Code.
- C. When intermediate beams are added to support ceiling joists, the beam shall be continuous between supporting members, properly sized, located, and anchored to meet the structural requirements of the Building Code. When the beam is installed in a finished space, it shall be finished to match adjacent surfaces, unless otherwise specified.

10. **Rafters and Trusses:**

Rafters and trusses shall be set to provide an even plane for roof sheathing so that finished roofing has an even surface and provides a smooth transition between existing and new roofing. Rafter size and spacing shall be as specified. Rafters shall run full length without joints. When roof trusses are specified, they shall be engineered and approved drawings must be submitted showing compliance with the IRC.

11. **Roof Sheathing:**

Roof sheathing shall be plywood or OSB (oriented strand board). When matching existing sheathing, transition shall provide a uniformly smooth surface.

12. **Wood Decks, Ramps, Steps, Railings, Retaining Walls:**

A. **Material:** Decks, ramps, steps, and railing structural components shall be approved construction grade lumber. Decking, stair treads, all guardrail components, and handrails shall be redwood, treated wood, or weather-resistant composite material. Fasteners shall be galvanized or cadmium plated. Material used shall be free of loose or missing knots. Redwood shall be sealed (see Division 9 Section 9C). Retaining wall components shall be designated for landscape use by the manufacturer.

B. **Construction:** Construction details shall be in accordance with the *Scope of Work Summary* and/or drawings, if applicable.

13. **Repair of Framing and Structural Members:**

When the repair of framing or structural members is specified, the repair shall achieve the strength and load bearing capacity of the original member.

SECTION 6B - PORCHES, STOOPS AND DECKS

1. **Replacement of Components (Flooring, Ceiling, Columns, Railings, Steps, and Skirting and Lattice):**

Replacement of any components shall be with like material in style, size, and installation unless otherwise specified. Finger joint material may be used when painted. New unfinished material shall be primed or sealed and ready for final finish. Members shall be securely fastened and installed to meet at even levels and cut to abut uniformly adjacent members.

2. **Repair:**

When repair of components is specified, it shall consist of matching existing materials in size, style, and finish including decorative and ornamental moldings. Repair shall include all material and methods necessary to achieve uniformity between new and existing members.

SECTION 6C - INTERIOR TRIM, CLOSET COMPONENTS AND SHELVING

1. **Material:**

- A. New interior trim shall match predominant existing material in size, style, and finish, including any decorative and ornamental molding. Trim material shall be kiln dried or otherwise seasoned solid wood. Synthetic wood or veneered trim shall not be accepted. Trim material shall be dressed free of tool marks and other objectionable defects. When finish is to be natural or stain, trim material shall be stain grade. Finger joint material shall not be accepted. When trim is to be painted, material may be finger joint.
- B. Clothes closet, pantry closet, and open shelf material shall be 3/4" x 12" minimum wood bullnose or vinyl-covered wired shelving unless otherwise specified. Linen closet shelf material shall be 3/4" x 16" minimum wood bullnose with a minimum of five shelves. Shelves shall be painted to match adjacent finish. Closet shelf wall support shall be 1" x 4" material secured to solid backing or appropriate wire shelf brackets. Clothes closet rod shall be 1" diameter wood or metal, supported on ends with manufactured wall brackets. Rod shall not be painted. All fasteners will be attached to studs or proper blocking for all shelves. No drywall anchors will be accepted in shelving support.
- C. When closet rod and shelf are to be lowered, the height shall be coordinated with the Owner and MHDC.

2. **Installation:**

- A. Trim members shall be securely fastened tight to wall and installed to run true to line, meet at even levels to adjacent corner members, and all line cuts and miters shall be even so as to abut uniformly to adjacent members. This work shall be accurately and neatly performed and the joints shall be secured to prevent separation. Trim shall be joined only at corners except for runs in excess of 12'0", in which one splice will be permitted midway of run. Casings around all openings shall be joined only at corners. External corners shall be mitered and internal corners shall be mitered or coped. Splicing of trim shall be done with mitered joints over solid backing. Fasteners used in installation shall be set below the surface. Holes shall be filled smooth with surface. When material is to be stained, fill shall match stain color.
 - B. Continuous support secured to solid backing shall be installed at ends and back of closet shelves. Clothes closet shelf and rod shall have a center support bracket if span is more than (5'0"). Bracket shall be specifically designed for shelf and rod installation and securely fastened to solid backing and installed level. Rod shall be installed at a height of 56" above floor unless otherwise specified.
 - C. Pantry closet and open shelves shall have center support brackets if span is more than 5'0". Bracket shall be specifically designed for shelf installation and securely fastened to solid backing.
3. **Repair:** Existing interior trim which is broken, splintered, cracked, chipped, warped, or otherwise defective shall be replaced or repaired with new material. Repair shall include all materials and methods necessary to achieve uniformity between new and

existing members. Installation shall conform to all requirements of this section unless otherwise specified.

SECTION 6D - INTERIOR WALL PANELING

1. **Material:** See *Scope of Work Summary*
2. **Installation:** Paneling shall be installed on solid wall surfaces. It shall not be fastened directly to furring strips or open framing. Any holes in existing wall material with an area exceeding one square foot to include holes from construction activity shall be repaired. Paneling shall be installed plumb and level. When paneling abuts trim it shall be tightly fitted. Exposed paneling edges shall not be accepted.
3. **Repair:** Repair of wall paneling shall consist of securing loose wall paneling and components.

SECTION 6E - INTERIOR SOFFIT

When repair of interior soffits is specified, it shall provide construction that will support all design loads and provide a suitable base for attachment of cabinets. Framing shall be level and plumb. When soffits are specified, the finished edge shall project a minimum of 1½" past the finished edge of the wall cabinet. Soffit edges shall run parallel to wall cabinets. Soffits shall have a minimum of ½" drywall, taped and finished to match adjacent surfaces.

SECTION 6F - KITCHEN, BATH AND UTILITY CABINETS

1. **General:**
 - A. Cabinets shall conform to ANSI A161.1 "Recommended Minimum Construction and Performance Standards for Kitchen Cabinets". Cabinets shall be certified by the National Kitchen Cabinet Association.
 - B. No plastic or vinyl transfer finishes shall be accepted. No plastic drawers, drawer fronts, or doors shall be accepted.
 - C. Wall and base cabinets shall be of the same construction and same outside appearance.
 - 1) Face frames shall be solid ¾" thick hardwood.
 - 2) Sides of cabinets shall be a minimum of ¾" plywood and prefinished to match cabinet front when exposed.
 - 3) Tops and bottoms shall be a minimum ¾" thick plywood or medium density fiberboard.
 - 4) Cabinets shall have backs constructed of a minimum 1/8" hardboard.
 - 5) Interior of all cabinets shall have a melamine finish.

- 6) Shelves shall be a minimum of 5/8" thick medium density fiberboard surfaced with a melamine finish.
- D. Cabinet installations shall include all accessories, operating and mounting hardware, filler strips, panels, and molding provided by the cabinet manufacturer for complete installation.
- E. When utility or pantry cabinets are specified, they shall match kitchen cabinets in style and finishes.

2. **Installation:**

- A. Cracks and voids in walls and floor and at junction of walls and floor shall be permanently filled and sealed prior to installation of cabinets.
- B. Where existing cabinets are removed and the area is not covered by new cabinets, the walls, floor, and trim shall be finished to match adjacent finishes.
- C. Cabinet doors shall be properly aligned and drawers shall operate freely. Hardware shall operate smoothly and easily. Cabinets shall be installed straight, level, plumb and be securely anchored with screws of proper size and quantity. Cabinets on either side of an appliance shall align front and top. Cabinets shall be secured to each other and to the wall by counter sinking screws neatly through the rails and stiles of the cabinets. Any screw not penetrating solid material shall be removed. Holes and any damage to the interior finish shall be filled and refinished.
- D. When shims are used in leveling cabinets, they shall be securely fastened and capable of supporting loads.
- E. When trim exists where new cabinets are to be installed, base and trim shall be cut and removed to avoid scribing cabinets. Base and trim shall be fitted tightly and neatly to newly installed cabinets.
- F. When cabinet installation is not tight fitting at floors, walls and ceiling, continuous molding shall be installed.
- G. Openings necessary for plumbing and mechanical components shall be cut so that a properly-sized escutcheon or trim will conceal the opening(s). If structural integrity of the cabinet is diminished as a result of cutting, such openings shall be reinforced.

3. **Replacement and Repair of Components:**

When replacement of cabinet components is specified, components to be replaced shall be consistent in style, material, and finish with existing cabinet. When repair of cabinet components is specified, repair shall restore component to its original appearance, structural integrity, and operation.

4. **Alterations & Removal:**

When wall cabinets are to be lowered, the height shall be coordinated with the Owner and the MHDC. When existing countertops are to be supported as a result of base cabinet removal, see the *Scope of Work Summary (Doc. 13.D)* or drawings.

When reconstruction of base cabinets is specified, see the *Scope of Work Summary (Doc. 13.D)* or drawings.

SECTION 6G - COUNTERTOPS

1. **General**: Countertops shall be shop built. Surfaces shall be minimum 1/16" thick high-pressure plastic laminate. Laminate shall be applied to all exposed edges. Countertops shall have a minimum 4" backsplash. End splash shall be installed where countertop abuts walls or built-in cabinet work. If top consists of more than one section, sections shall be assembled to achieve a structurally sound, rigid, single-unit top. Joints shall be tight, aligned, and smooth. Countertop allowance shall include the retail cost of the complete top ready for installation.
2. **Installation**: Edges that abut walls or other cabinets shall be scribed to fit tight to that surface. Countertop abutting walls shall be fitted with a maximum 1/8" opening prior to caulking. Caulking shall be uniformly applied and finished to be neat and smooth. No molding will be accepted. Openings cut and holes drilled for plumbing fixtures, electrical components, and appliances shall be neat and close fitting. Tops shall be secured to cabinet with screws installed into core of top through base cabinet.
3. **Repair**:
Repair of countertops shall consist of the following:
 - A. Adhering all loose laminates and other coverings with a product specifically designed for this purpose.
 - B. Securing loose top to cabinets.
 - C. Removing deteriorated sealant at walls and around plumbing fixtures replacing with new sealant specifically designed for this purpose. Sealant shall be uniformly applied and finished to be neat and smooth.

SECTION 6H - STAIR OPENINGS, STAIR UNITS, HANDRAILS AND GUARDRAILS

1. **General**: The design, construction, and installation of all stair units shall be the responsibility of the Contractor. If code requirements preclude installation of stair unit in a specified location, the Contractor shall notify the local jurisdiction before constructing the stair unit. Stair units may be job built or pre-manufactured and shall include landings as required. When the construction of a new stair opening or modification of an existing stair opening (including modifications for head room) is specified, it shall include all framing necessary to modify the existing, or create a new opening sized to accommodate the existing or specified stair unit and provide all necessary clearances. Structural members shall be approved construction-grade materials; for exterior stairs, fasteners shall be galvanized or cadmium plated. Material used for stair units shall be free of loose or missing knots. Unless otherwise specified, new stair units shall have treads and risers for closed construction and stair treads shall be 5/4" material pre-manufactured for this application. New stair unit installations shall include new handrail and appropriate hardware. Handrail shall be 1 1/4" to 2" in circular cross

section or have a perimeter of at least 4" and not more than 6". The handrail must be continuous the full length of the stairs, ends must be returned to the wall or post, and the rails must be mounted so a space not less than 1½" is present between the wall and handrail. Handrails shall be finished with a natural finish unless otherwise specified. Finger joint material may be used only when handrails are to be painted. When guardrails are specified, they shall consist of posts, rails, balusters, and necessary hardware, or finished frame walls.

2. **Installation**: Stair units shall be installed plumb and level; treads shall be level and each riser shall be plumb. Where stair units meet wall surfaces, transition shall include finish wood molding or continuous skirtboard. Handrail installations shall meet applicable code requirements. Handrail brackets shall be screwed to structural members or to securely anchored backing.
3. **Repair**: When repair of a stair unit, handrail, or guardrail is specified, it shall include the repair or replacement of any damaged, deteriorated, or missing component or portion thereof. This shall include the repair or replacement of any associated brackets, screws, and hardware. Components shall be returned to a like-new and structurally-sound condition. Repairs shall match existing materials in style and finish.

DIVISION 7 - MOISTURE PROTECTION

SECTION 7A – DAMP PROOFING

Damp proofing shall be applied in conjunction with new foundation construction when specified and conform to IRC requirements and accepted engineering practices.

Foundation walls that enclose interior space or floors below grade shall be damp proofed from the top of the footing to the finished grade. Areas with a high water table that enclose interior space and floors below grade must be waterproofed in the same manner. Damp proofing consists of 3/8" parging that is covered with a bituminous coating, acrylic cement, surface-bonded cement, or any waterproofing method noted below. Waterproofing consists of two-ply hot-mopped felts, 55-lb. roll roofing, 6 mil polyvinyl chloride, 6 mil polyethylene, 40 mil polymer-modified asphalt, 60 mil flexible polymer cement, 1/8" cement fiber-reinforced waterproof cement, or 60 mil solvent-free liquid synthetic rubber.

SECTION 7B - PERIPHERAL DRAINS AND SUMP PUMP SYSTEMS

1. **Peripheral Drains:**

Peripheral drains shall be installed in conjunction with new foundation construction when specified and conform to IRC and accepted engineering practices. Drains shall be required around all foundations that enclose habitable or usable space below grade and in areas with a high water table.

2. **Sump Pump Systems:**

When a new sump pump system is specified where none exists, it shall include sump pit with container and cover designed for this application, sump pump, all electrical connections, and discharge drainage to exterior of structure. Sump pit container shall be a minimum of 18" diameter by 24" deep, designed for this application. Sump pumps shall be submersible type, minimum 1/3 horsepower (hp), automatic control, and UL approved. Discharge line with check valve shall extend from the pump through the exterior wall at a height to permit discharge into a splash block set on grade. A concrete splash block shall be included as part of this installation. When a new sump pump is to be installed in an existing system, existing components of the system shall be inspected and repaired or replaced to ensure proper operation. Pump shall be piped with solid PVC pipe only for the discharge line from the pump.

SECTION 7C - CAULKING

1. **General:** The requirements of this section shall apply to all interior and exterior work where caulking is common practice to provide a finished product or in preparation for final finish. This includes new work, repairs and alterations, and preparation for painting.
2. **Material:** Caulking shall be acrylic latex caulk unless otherwise specified.
3. **Preparation:** Surfaces to which caulking is to adhere shall be clean, dry, frost free, and sound. Loose material shall be removed prior to application. Joints greater than 3/8" in depth shall be partially filled with a rope or yarn backup (backer rod) material as recommended by the manufacturer of the caulking.
4. **Application:** Caulking shall be handled according to the manufacturer's written instructions. The completed application shall provide a weathertight surface. The caulking shall be uniformly applied and the finished surface shall be neat and smooth.

SECTION 7D - INSULATION

1. **General:** When space limitations will not allow sufficient insulation to meet the "R Value" required by this section, these spaces will be insulated to achieve the highest "R Value" possible. The Contractor shall provide a certification of "R Value" for all insulation to the Owner and the MHDC.
2. **Material:** Insulation shall be standard quality brands of batt, blanket, or loose thermal insulating materials fully suitable for the particular installation. Insulation shall be delivered to the site in manufacturer's original packaging with seals unbroken and labels intact. Insulation materials shall be noncombustible, nontoxic, and shall not attract insects or vermin.
3. **Installation:**
 - A. Attics (rooms or spaces immediately below the roof) shall be insulated to meet the International Energy Conservation Code. A minimum value of R-38 is required pending MHDC staff review. Attic insulation shall be installed between all heated and unheated spaces. Refer to specifications or *Scope of Work Summary (Doc. 13.D)*.
 - B. Exterior wall cavities shall be insulated to meet the International Energy Conservation Code, to include all voids between framing and window and door units when exposed. A minimum of R-20 or R-13 + R-5 is required pending MHDC staff review and location of unit. If finished wall surfaces must be disturbed for installation, surface shall be repaired and finished so that no evidence of work is apparent. Refer to specifications or *Scope of Work Summary (Doc. 13.D)*.
 - C. Exterior crawl space walls shall be insulated to meet the International Energy Conservation Code. A minimum value of R-19 to R-30 is required pending MHDC review and location of unit. Floors over exterior space must be insulated as attic spaces as noted in Section 7D-3A. Refer to specifications or *Scope of Work Summary (Doc. 13. D)*.

- D. Required clearances shall be maintained between mechanical and electrical components and insulation.

SECTION 7E - ROOFING

1. **General:** *(see requirements of Division 7, Section 7F)*

- A. **Preparation:** Roofing installations shall include the removal of any existing material to meet local code requirements (see Division 2, Section 2A). When roof sheathing is exposed, secure any loose sheathing, and replace defective with material of same thickness to establish a firm, true base. When installation is over existing roofing, set protruding nails, nail down loose roofing, and replace curled or warped roofing material to achieve an even surface. Clear roof surface of debris. Roofing installations shall include new roof jacks. Should the home already have two or more layers of roofing, all previous roofing will be removed prior to installing a new roof.
- B. **Repair:** Color and design of roofing material shall match existing adjacent roofing as closely as possible.

2. **Shingle Roofing:**

A. **Material:**

- 1) 3-tab shingles shall be a minimum of 235 lbs. per square.
- 2) T-lock asphalt shingles shall be a minimum of 240 lbs. per square.
- 3) 3-tab fiberglass shingles shall be a minimum of 225 lbs. per square.
- 4) T-lock fiberglass shingles shall be a minimum of 225 lbs. per square.
- 5) Wood shingles shall be No. 1 cedar shingles with a minimum of 205-225 lbs. per sq.

B. **Installation:**

- 1) When asphalt shingles are to be installed over existing roofing, a minimum of 30 lb. roofing felt shall be applied prior to installation.
- 2) When asphalt shingles are to be installed directly over roof sheathing, a minimum of 15 lb. roofing felt shall be applied prior to installation.
- 3) Shingles shall run true to horizontal line, meet at uniform levels at ridges, be cut and properly fitted adjacent to protruding members and other shingles with allowance for thermal expansion, and true to a set line in valleys and along eaves and rakes. Shingles adjacent to eaves and rakes shall be adequately nailed along same.
- 4) New shingles shall extend ½" beyond rake and eave edges.

3. **Roll Roofing:**

A. **Material:**

- 1) Mineral-surfaced, single-coverage asphalt roll roofing shall be a minimum of 90 lbs. per square.
 - 2) Mineral-surface, double-coverage asphalt roll roofing shall be a minimum of 110 lbs. per square.
- B. **Installation:**
- 1) Roll roofing shall be run true to horizontal line, be cut even, and properly fitted to adjacent protruding members.
 - 2) Roll roofing shall be cemented and securely nailed.
 - 3) Roll roofing installations shall include a minimum of 15 lb. felt and 9" edge strips.
Edge strips shall overhang eaves and rakes 1/4" to 3/8".
4. **Built Up Roofing:**
- A. **Material:** Built-up roofing felt shall be 15 lb. fiberglass. Cement shall be hot bituminous asphalt. Cant strips shall be installed at all vertical intersections.
 - B. **Installation 3-Ply:** Built-up roofing shall be composed of 3 plies of felt, alternating with hot layers of asphaltic cement. A final layer of 9/16" roof aggregate shall be applied to a hot layer of flooded asphaltic cement.
 - C. **Installation 4-Ply:** Built-up roofing shall be composed of 4 plies of felt, alternating with hot layers of asphaltic cement. A final layer of 9/16" roof aggregate shall be applied to a hot layer of flooded asphaltic cement.
5. **EPDM Rubber Roofing:**
- A. **Material:** All materials by Firestone Building Products.
 - B. **Installation:** As per manufacturer's specifications.

SECTION 7F - SHEET METAL

1. **Roof Flashing:**
 - A. Roofing installations shall include new valley flashing and other flashing necessary to achieve a weather-tight installation.
 - B. Valley flashing shall be metal flashing material minimum No. 28-gauge galvanized sheet gauge corrosion resistant metal; other flashing shall be No. 26-gauge galvanized sheet corrosion resistant metal. Installation shall be in accordance with industry standards. Installation shall achieve weather-tight performance without the use of excessive and unsightly mastics.
 - C. Shingle and roll roofing installations shall include style "A" metal drip edge along all eaves and rakes, drip edge shall not be installed in less than 4'0" lengths. Overhang of all existing roofing shall be trimmed back to allow proper installation of drip edge.

D. Built up roof installations shall include gravel stop along all edges, flashing at vertical intersections, and parapet wall caps.

2. **Gutters and Downspouts:**

A. **General:** Gutters shall be installed so that water flow from roof will be caught by the gutters. Each downspout shall drain a maximum of 600 square feet of roof area and downspouts shall be spaced to drain a maximum of 30 linear feet of gutter. Downspouts that discharge onto a roof shall terminate with an elbow a maximum of 1" above roof. Downspouts shall be located so that water will be diverted a minimum of 30" away from structure and will drain away from the foundation without draining onto adjoining properties.

B. **Material:** Gutters shall be seamless 5" K Style. Galvanized steel gutter material shall be minimum of No. 26 gauge. Aluminum gutter material shall be a minimum of .027 " in thickness. Downspouts and downspout extensions shall be 3" x 2" corrugated rectangular material to match gutters. Splash blocks shall be precast concrete.

C. **Installation:** Gutters shall have a uniform slope at the rate of one-sixteenth inch (1/16") per foot to downspout. Gutters shall be installed under drip edge when it exists. Hangers shall be securely fastened and shall be spaced a maximum of 36" on center. Strap hangers shall be concealed under roofing material. Corners and drops shall be fastened with sheet metal screws and end caps shall be stapled or crimped. Corners, drops, and end caps shall be sealed to be watertight using a mastic designed for this purpose. Downspouts shall be securely fastened at top and bottom; if over 10'0" in length, a third intermediate fastener shall be installed equal distance between top and bottom fasteners. Elbows shall be fastened with sheet metal screws and downspouts shall terminate with an elbow. Installation of gutters, downspouts, and accessories shall be in accordance with trade standards. Galvanized gutters, downspouts, and accessories shall be primed and painted (see Division 9, Section 9C).

D. **Repair:** Repair of gutters shall include removal of all debris from gutters and realignment to achieve pitch for proper drainage. Loose gutters and downspouts shall be securely anchored and resealed. Splash blocks or extensions shall be provided and installed where missing. Repairs shall be with materials to match existing.

SECTION 7G - EXTERIOR SIDING

1. **General:**

A. **Preparation:** Preparation for siding installation shall include securing any loose wood members and replacing defective members with like material prior to installing new siding. Any existing caulking which will interfere with proper installation of new siding shall be removed. New wood furring shall be installed as required to ensure finish wall is reasonably plumb and even. Air/water

infiltration paper will be installed per manufacturer's recommendations. The back side of any exterior wood siding and trim will be primed.

B. **Installation:**

- 1) Siding shall be installed to run level, plumb, and true to line, and meet at even levels at corners and existing siding. Siding abutting trim and adjacent siding shall be squarely cut and properly fitted.
 - 2) Caulking shall be installed around all openings and abutting wood trim. Color of caulking shall match finish color of siding.
 - 3) Installation shall include all flashing, trim, and accessories necessary for a finished, weather-resistant product. Surface preparation and installation of siding, flashing, and accessories shall be in accordance with manufacturer's recommendations.
 - 4) New unfinished lap and plywood siding shall be primed or sealed ready for final finish.
2. **Lap Siding:** Vertical joints shall be staggered so that any two joints will be separated by at least two siding strips. Short pieces of siding shall not be concentrated in one area. Corner trim shall fit tightly and true to vertical line of structure. Insulated backer shall be installed with all metal and vinyl siding.
3. **Repair:** When repair of siding is specified, it shall consist of the repair or replacement of any damaged or deteriorated siding members. Finish and design and siding material shall match existing adjacent siding as closely as possible. Siding used for repair or to fill in voids shall be laced into existing siding so that vertical joints shall have a minimum horizontal separation of 24".

SECTION 7H - SOFFIT, FASCIA, AND EXTERIOR TRIM

1. **General:** Members shall be securely fastened and installed to run true to line and meet at even levels at corners. Cuts and miters shall be even so as to abut uniformly to adjacent member. New unfinished material shall be primed or sealed and ready for final finish.
2. **Wood:**
 - A. **Fascia and Trim:** New material shall be redwood or clear pine, unless otherwise specified. Corners and in-line joints shall be mitered.
 - B. **Soffit:** New soffit material shall be a minimum of three-eighths inch (3/8") exterior grade plywood, plugged, and sanded unless otherwise specified. Fascia shall be plowed to receive soffit.
3. **Vinyl and Metal:** Vinyl and metal members shall be installed per manufacturer's recommendations with all accessories necessary for a complete installation. Backing materials shall be as recommended by manufacturer.

4. **Repair**: When repair of components is specified, it shall consist of matching existing material in size, style, and finish including decorative and ornamental molding. Repair shall include all materials and methods necessary to achieve uniformity between new and existing members.

DIVISION 8 - DOORS, WINDOWS, AND OTHER ENTRIES

SECTION 8A - DOORS AND FRAMES

1. **General**: Whenever door units are installed, frames, sills, and thresholds shall be plumb, level, square, and rigid. Frames shall be sized to fit the opening and wall thickness. Whenever doors are installed in existing frames, frames, sills, and thresholds shall be repaired as necessary to provide square, plumb, level, and rigid openings for the new installation. New doors shall fit properly in their frames and shall operate smoothly and easily. Contractor shall repair any voids or holes left as a result of removing existing hardware. When openings are constructed or existing openings modified, headers shall be provided to maintain the structural integrity of the wall and be in compliance with applicable codes. Care shall be taken to avoid unnecessary damage to adjacent components. In the event that damage occurs as a result of construction, damaged components shall be repaired or replaced to match existing in style and finish. When opening modification results in voids in adjacent surfaces, voids shall be filled to achieve uniformity between new and existing materials.
2. **Repair of Existing Doors, Frames and Hardware**: When repair of any door unit component is specified, it shall consist of ensuring that the component specified functions properly. Any damaged or deteriorated portion of the component shall be repaired or replaced and finished to match existing.
3. **Enlargement of Door Opening**: When existing door openings are enlarged as specified, it shall consist of providing properly sized framing materials to the opening to support all imposed loads. Headers and jack studs must be sized and constructed in compliance with the building code or by accepted engineering practices.
4. **Replacement of Door Components**: When replacement of any door unit component is specified, it shall consist of removing the damaged component and installing a like component that provides all functions, style, and finish of the original. Replacement component shall be adjusted to function properly.
5. **Finishes**: New doors shall be finished (see Division 9, Section 9C).
6. **Exterior Doors**:
 - A. **Material**:
 - 1) **Doors**: 1 3/4" solid core exterior grade, faced veneer of wood, masonite, or metal.
 - 2) **Glass/Glazing**: (see Section 8C)
 - 3) **Frame**: One-piece frame, may be finger joint if painted.
 - 4) **Casing**: Casing shall match existing exterior and interior materials, style, and finishes (see Division 6, Section 6C, and Division 7, Section 7H)

5. Hardware: Residential grade (Kwick-Set or equal) consisting of 1½ pair of 4" x 4" butts, key-in-knob entry lockset and single throw deadbolt keyed alike, one-way viewer, and one wall or floor stop.
 6. Weatherstripping: Residential quality weatherstripping of magnetic, vinyl, or aluminum with neoprene seal.
 7. Threshold: Aluminum or wood with vinyl insert or aluminum or wood in conjunction with vinyl door sweep.
- B. Installation: Openings between door casing and exterior wall material shall be caulked with a paintable silicone sealant. When accessible, voids between door unit and framing shall be insulated. Doors shall be weather tight with a weather tight threshold. Installation shall be in such a manner that side and head margins are uniform. Bottom shall clear finish floor through entire swing. Complete exterior door unit shall consist of door, rabbeted jamb, butts, casings on both sides, key-in-knob entry lockset, weatherstripping, threshold, and door stop as described in paragraph 6A. Installation will include drip cap over door. Exterior door installation shall include door and all hardware and weatherstripping as described in paragraphs 6A,(1.),(5.),(6.).

7. **Interior Doors:**

A. Passage Doors - Material:

- 1) Door: 1 3/8" minimum thickness, hollow core wood veneer or solid core wood veneer.
- 2) Frame: One-piece frame, may be finger joint if painted.
- 3) Casing and Stops: Casing and stops shall match existing materials, styles, and finishes (see Division 6, Section 6C).
- 4) Hardware: Residential grade (Kwick-Set or equal); bath doors shall have privacy lockset, all others shall have passage set. Installation shall include one pair of 3½" x 3½" butts and one wall or floor mounted doorstop.
- 5) Threshold: Beveled solid wood.

B. Bifold and Bypass Doors - Material:

- 1) Door: 1 3/8" minimum thickness, hollow core wood veneer or 1" minimum solid wood or metal.
- 2) Frame: One-piece frame, may be finger joint if painted.
- 3) Casing: Casing shall match existing materials, styles, and finishes and include trim to conceal track (see Division 6, Section 6C).
- 4) Hardware: Hardware necessary for a complete installation, to include pulls and guides.

C. Pocket Doors - Material:

- 1) Door: 1 3/8" minimum thickness, hollow core wood veneer or solid core wood veneer.
- 2) Frame: Opening shall be finished with a wooden frame, may be finger joint if painted.
- 3) Casing: Casing shall match existing materials, styles, and finishes (see Division 6, Section 6C).
- 4) Hardware: Hardware necessary for a complete installation, to include pulls. Bath doors shall have privacy lock set designed specifically for this application.

D. Accordion Doors - Material:

- 1) Door: 1 3/8" minimum thickness, wood or vinyl.
- 2) Frame: Opening shall be finished with wooden frame, may be finger joint if painted.
- 3) Casing: Casing shall match existing materials, style, and finishes and include trim to conceal track (see *Division 6, Section 6C*).
- 4) Hardware: Hardware as provided by the manufacturer for a complete installation.

E. Installation: Complete interior door units shall consist of all materials as described under specific door headings above and shall be installed in such a manner that side and head margins are uniform and will remain so with normal use. Door shall clear finish floor through entire swing or motion. Interior door installation shall include all hardware as described in applicable "Hardware" paragraphs above.

8. **Glass Doors for Tub and Shower Enclosures:**

A. Material:

- 1) Frame: Jambs, head rails, and sills shall be extruded anodized aluminum.
- 2) Doors: Frame or frameless, maximum two-panel door for tub enclosure.
- 3) Glass and Glazing: (see *Section 8C*)

B. Installation: Shower stall door and tub enclosure assemblies shall consist of all components provided by the manufacturer for the specific model and application, to include all jambs, head rails, sills, door, and all operating hardware. New assembly shall be watertight.

9. **Storm and Screen Doors:**

A. Wood Storm Doors - Material:

- 1) Door: Frame shall be 1 1/8" thick select clear kiln dried ponderosa pine with interchangeable glass and screen inserts sized for secure tight fit. Screen wire shall be 16 x 18 heavy duty aluminum mesh (see *Section 8D*).

- 2) Frame: To be installed in existing finished opening.
- 3) Hardware: Machine-finished plated thumb latch, no key locking handle, air- draulic closure, and corrosive-resistant metal chain. Easy change locking latches for glass and screen interchanging; three 3" x 1½" brass-plated hinges for half surface, face mount, or offset installation.
- 4) Weatherstripping: Full perimeter weatherstripping of wood with neoprene or wood with wool pile. Door to have bottom sweep fitted weathertight.

B. Aluminum Storm Doors - Material:

- 1) Door: 1¼" maximum and 1 1/16" minimum extruded hollow shape, 6063-T6 alloy aluminum, and minimum .055 thickness. Door shall be self-storing. Screen wire shall be 16 x 18 heavy-duty aluminum mesh (see Section 8D).
- 2) Frame: Frame shall be aluminum Z-bar type.
- 3) Hardware: Machine finished plated thumb latch, no key locking handle, air-draulic closure, and corrosive resistant metal chain. Hinges shall be four Oilite bearing Z- bar type.
- 4) Weather stripping: Full perimeter weather stripping of nylon electropile with waterproof backing. Door to have expander and vinyl bottom sweep.

C. Vinyl Storm Doors - Material:

- 1) Door: Frame shall be 1¼" maximum and 1 1/6" minimum by 3", extruded hollow shape rigid vinyl. Door shall be self-storing. Screen wire shall be 16 x 18 heavy- duty aluminum mesh (see Section 8D).
- 2) Frame: Frame shall be vinyl Z-bar type.
- 3) Hardware: Machine finished plated thumb latch, no key locking handle, air-draulic closure, and corrosive resistant metal chain. Hinge shall be full length.
- 4) Weather stripping: Full perimeter weather stripping of nylon electropile with waterproof backing. Door to have expander and vinyl bottom sweep.

D. Wood Screen Doors - Material:

- 1) Door: Frame shall be 1 1/8" wood. Screen wire shall be 16 x 18 heavy-duty aluminum mesh (see Section 8D).
- 2) Frame: To be installed in existing finished opening.
- 3) Hardware: Machine finished plated thumb latch, no key locking handle, air-draulic closure, and corrosive resistant metal chain. Three, 3½" x 1½" brass-plated hinges for half surface, face mount, or offset installation.

E. Installation: Complete storm screen door units shall consist of all components as described under materials listings for the specific type of door listed above. Swing of door shall be approved by Owner.

10. **Door Openers:** When an automatic door opener is specified, it shall include the installation of a 110-volt electrical outlet connected to an existing circuit and located within 18" of the door opener unit. Exact location shall be coordinated with door opener installer. Installation of electrical wiring and apparatus shall comply with the requirements of Division 16, Section 16A. When an automatic door opener is specified, it shall be installed according to manufacturer's installation instructions using only specified or supplied hardware. Installation shall be accomplished by the supplier's installer. Installation of an automatic door opener shall include the removal of storm door if existing. Removal shall comply with requirements of Division 2, Section 2A.

11. **Overhead Garage Door:**
 - A. **Material:** When an overhead door unit is specified, it shall include four-section door, all tracks and track hangers, rollers and lifting hardware, keyed locking hardware, stop molding with weather seal, tension springs and hardware, and bottom weather seal. Overhead garage door shall be wood, masonite, or steel and when of sandwich construction shall have a minimum 1 3/8" thick polystyrene insulating core. When overhead garage door is of single skin and frame construction, it shall have a minimum frame thickness of 1 3/8" with a polystyrene insulating backing. When overhead garage door is of wood construction with recessed panels, it shall have a minimum frame thickness of 1 3/8".
 - B. **Installation:** Overhead garage doors and their components shall be installed to fit and operate correctly. Overhead garage doors shall be weather tight with particular emphasis given to seal at floor. Overhead garage door tracks shall be securely anchored and rigidly installed.

SECTION 8B - WINDOWS AND FRAMES

1. **Primary Windows:**
 - A. **Complete Window Units:**
 - 1) **General:** Complete window units shall include casing, sill, stool, apron, lifts, locks, screens, and all hardware necessary for a complete installation. Frames shall be sized to fit the opening and wall thickness. Style and finish of window unit will be identified *Scope of Work Summary (Doc. 13.D)*. When an opening is constructed in a concrete or masonry wall, the rough opening shall be constructed with redwood, pressure treated lumber, or minimum 16-gauge hollow metal. When openings are constructed or existing openings modified, headers shall be provided to maintain the structural integrity of the wall. Care shall be taken to avoid unnecessary damage to adjacent components. In the event that damage occurs as a result of construction, damaged components shall be repaired or replaced to match existing in style and finish.

- 2) Finishes: New wood window units shall be finished (see Division 9, Section 9C).
 - 3) Materials:
 - Window Units: Wood, aluminum, vinyl, vinyl clad.
 - Casing: Casing shall match existing exterior and interior materials, style, and finishes (see Division 6, Section 6C and Division 7, Section 7H)
 - Hardware: Hardware shall be residential grade and shall be designed for the application.
 - Glass and Glazing: (see Section 8C)
 - 4) Installation: Whenever complete window units are installed, units shall be plumb, level, square, and rigid. Unless otherwise specified top of window unit shall align with existing windows in room. Voids between window unit and framing shall be insulated. Joints on exterior walls between window unit and wood, masonry, or metal shall be caulked with a silicone sealant. Window units shall have a drip cap and be weather tight.
- B. Replacement Window Kits and Replacement Sash:
- 1) General: Replacement window kits shall include jamb liners, sash with glass and glazing, clips, fasteners, hardware, screens, and other accessories as supplied by the manufacturer for proper installation. In addition, new side and head stops, both interior and exterior, shall be included. Replacement sash shall include new sash milled to match existing with glass and glazing, operating mechanism, and hardware to match existing. Replacement window kits and replacement sash shall be fitted properly in the existing frames and shall operate smoothly and easily. New wood shall be finished to match existing frame (see Division 9, Section 9C).
 - 2) Materials:
 - Window Sash: Wood, aluminum, vinyl, vinyl clad.
 - Hardware: Hardware shall be residential grade and shall be designed for the application.
 - Glass/Glazing: (see Section 8C)
 - 3) Installation: Whenever replacement window kits or a replacement sash are installed, existing frame shall be repaired as necessary to provide square, plumb, level, and rigid opening for new installation. Contractor shall repair or replace damaged trim incidental to the window. Replacement window kits shall be installed in accordance with manufacturer's recommendations.
- C. Repair of Existing Sash, Frames, and Hardware: When repair of any window unit component is specified, it shall consist of ensuring that the component specified functions properly. Any damaged or deteriorated portion of the component shall be repaired or replaced and finished to match existing.

- D. Replacement of Window Components: When replacement of any window component is specified, it shall consist of removing the damaged component and installing a like component that provides all functions, style, and finish of the original. Replacement component shall be adjusted to function properly.

2. **Storm Windows**:

- A. General: Storm windows shall be self-storing combination storm and screen units. Window shall be installed straight, plumb, and level in existing openings to ensure a weather tight enclosure and shall be securely anchored in accordance with the manufacturer's recommendations and be easily operable. Frame and sash member joints shall be mitered, neatly fitted, and securely fastened together with plated screws or welded joints. Weep holes shall be provided in frames. Storms and screens shall be compatible with the primary window operation and shall be neatly fitted with appropriate hardware so that the sash and screen can be removed from the inside. Installation shall include screens and necessary hardware. Exterior of primary windows and frames shall be cleaned prior to installation of storm windows. After installation all storm windows and their screens shall be thoroughly cleaned without using abrasive cleaning agents.

B. Aluminum Storm Windows:

- 1) Material: Window frames shall be extruded mill finish aluminum 6063 T6 alloy with nominal wall thickness of .055". Screens shall be standard mill or charcoal aluminum. Weather stripping for interlocking panels shall be nylon electropile with waterproof backing. Aluminum windows shall conform to the Aluminum Window Manufacturer's Association standards (see Section 8C).
- 2) Installation: Windows shall be installed over a bead of silicone caulking with plated screws finished to match frame. Caulking shall ensure a weather tight installation.

C. Vinyl Storm Windows:

- 1) Material: Window frames shall be welded vinyl extrusion of one-piece construction. Screens shall be standard mill or charcoal aluminum. Weatherstripping for interlocking panels shall be nylon electropile with waterproof backing (see Section 8C).
- 2) Installation: Windows shall be installed over a bead of silicone caulking with plated screws finished to match frame. Caulking shall ensure a weather tight installation.

- D. Replacement of Storm Window Components: When replacement of any storm window component is specified, the new component shall match the original in all aspects.

- E. Repair of Existing Storm Windows: When repair of any storm window component is specified, it shall consist of ensuring that the component specified

functions properly. Any damaged or deteriorated portion of the component shall be repaired or replaced.

SECTION 8C - GLASS AND GLAZING

1. **General:** Glass shall be PPG, LOF, or equal. Thickness and type of glass and glazing shall be as recommended by the manufacturer for the specific application. Bathroom windows shall be glazed with obscure glass. Upon completion all glass shall be free of cracks, rattles and be clean.
2. **Exterior Doors:** Door lights shall be insulated glass installed to be weather tight.
3. **Glass Doors (Tub and Shower Enclosures):** Glass in tub and shower enclosures shall be safety-tempered glass.
4. **Storm Doors:** Storm door glass shall be double-strength tempered safety glass.
5. **Primary Windows:** Complete window units and replacement window kits shall have a minimum of ½" insulated glass. Unless otherwise specified, replacement sash, glass and glazing shall match existing.
6. **Storm Windows:** Storm window glass shall be double-strength.
7. **Replacement:** Glass replacement shall include the removal of all broken glass, old putty, and debris from window sash. Unless otherwise specified, replacement glass and glazing shall match existing in type, style, thickness, and installation. Glass set in metal with glazing clips shall be back-puttied with putty appropriate for the purpose, or set in neoprene glazing bed. Glass set in wood shall be secured in place with glazing points and faced puttied. Glazing compound shall be a quality commercial non-lead brand.

SECTION 8D - WINDOW SCREENS AND FRAMES

1. **General:** Whenever window screens are specified, they shall be constructed and installed to match existing in material, fabrication, operation, hardware, and finish. If existing screens are not present, screen frames shall be 1 1/16" x 2 1/2". For screens exceeding 4'0" in either dimension, an intermediate member of the same size shall be installed. Frames shall be constructed with rabbeted joints to provide a square and rigid frame. Screen mesh shall be 16 x 18 heavy-duty aluminum tightly stretched and secured to frame. Mesh edge shall be concealed with ½" half round molding.
2. **Repair:** When repair of any window screen component is specified, it shall consist of ensuring that the component specified functions properly. Any damaged or deteriorated portion of the component shall be repaired or replaced.

SECTION 8E - AREA WELLS

1. **General:** The size of area wells required for egress shall be determined by applicable code requirements. The size of non-egress area wells shall be established by the width of the window and depth below grade. Width from foundation wall for non-egress area wells shall be 24" unless otherwise specified. The top of area wells shall be a minimum of 2" above grade. Area wells shall be securely fastened to the foundation wall at the top, bottom and intermediately. Area wells shall have a minimum of 8" of crushed stone the top of which shall be a minimum of 4" below window sill. Unless otherwise specified, area well covers shall be pre-manufactured. Metal grills shall be No. 9 gauge expanded metal with reinforced edge. Area well covers shall be secured and if used on egress window, shall be easily released. When the depth of the area well is greater than 44", a permanently- attached egress ladder shall be installed. When area well is constructed of wood, the ladder shall be wood; when constructed of metal, the ladder shall be metal. When constructed of masonry or concrete, the ladder may be wood or metal.
2. **Wood Area Wells:** When the width of area well exceeds 40", the area well shall be constructed of treated material 6" x 6" minimum. Corners furthest from the foundation wall shall be laced and corners adjacent to foundation wall shall be stacked. Number 4 rebars shall be driven continuously through all members to a depth of 24" below well bottom at all four corners. Posts adjacent to foundation wall shall be 2" x 4" minimum and anchored to foundation wall. When the width of area well is less than 40", the walls may be 2" x 6" material stacked on edge. Wall members shall be redwood or treated material. Posts furthest from foundation wall shall be 4" x 4" installed a minimum of 24" below well bottom. Posts adjacent to foundation wall shall be 2" x 4" minimum and anchored to foundation wall.
3. **Metal Area Wells:** Metal area wells shall be one-piece corrugated galvanized 20-gauge metal manufactured for this specific application.

SECTION 8F - CRAWL SPACE, CELLAR, BASEMENT, AND ATTIC ENTRIES

1. **Interior:** When the construction of a new interior crawl space, cellar, or attic entry is specified, it shall include cutting of opening, framing of opening, entry cover with hardware, trim, and finishes necessary for a complete, functional, and structurally-sound installation. Finishes shall match surrounding finishes.
2. **Exterior:** When the construction of a new exterior crawl space, cellar, or basement entry is specified, it shall include excavation, entry well, cutting of opening, framing of opening, entry cover or door unit with hardware, trim, flashing, and finishes necessary for a complete, functional, and structurally-sound installation. Construction of entry well shall include provisions for drainage.
3. **Ladders and Stairs:** When a ladder is specified, it shall be wood or metal and permanently fastened and structurally sound to provide safe access. When stairs are specified, they shall be constructed of wood or concrete and installed in compliance with all other requirements of these specifications.

4. **Repair:** When repair of any entry component is specified, it shall be returned to a like-new and structurally-sound condition. This shall include the repair or replacement of any associated hardware. Repairs shall include all material and methods necessary to achieve uniformity between new and existing materials.

DIVISION 9 - FINISHES

SECTION 9A - STUCCO

1. **General:** When stucco is specified, installation methods and materials used shall adhere to trade standards. All materials shall be products manufactured for the specific application. Finish stucco surfaces shall be true and uniform. Work shall include preparation necessary for existing work to receive and adjoin new work. Installation shall include wire lath, ties, and fasteners. Appropriate metal bead or stop shall be installed at all edges and corners. Expansion joints shall be placed to minimize stress within the stucco finish from structural movement. Stucco shall not be applied when temperature of surrounding air is below 40 degrees Fahrenheit and falling, unless precautions against freezing are provided.
2. **Repair of Existing Stucco:** When stucco repair is specified, work shall include the removal of damaged stucco. Repair shall include new lath and stucco to match adjoining work in finish texture and color.

SECTION 9B – DRYWALL

1. **General:** When removal of existing wall or ceiling material is specified, all materials necessary to achieve a solid, sound surface for installation of new drywall shall be removed. When removal of existing wall material is specified on exterior walls prior to installation of new wallboard, exterior walls shall be insulated as required (see Division 7, Section 7D-3B). When removal of existing wall material is specified on walls where handrail brackets, grab bars, etc., are located, solid blocking shall be installed prior to installation of new drywall. Preparations for wallboard installation shall include all furring and shimming necessary to achieve a straight and plumb surface. Except for overlay installations, all new wallboard shall extend behind trim. Trim shall be tight to face of wallboard without damage or distortion to trim installation. Any drywall treatment, preparation, or installation specified in a given room shall include closets and pantries in or adjacent to this room unless otherwise specified. Fasteners of adequate length to penetrate framing members by a minimum of 3/4" shall be used. When overlay or new drywall is specified, unless otherwise specified, trim shall remain in place. When trim is to be removed and reinstalled, care shall be taken to avoid damage or scarring trim material. In the event a member is damaged, it shall be replaced with a like member. Trim shall be marked and identified for reinstallation in the same location. Reinstallation shall comply with requirements of Division 6, Section 6C. When trim is to remain, wallboard shall be cut to fit tightly against trim. When wallboard projects beyond trim, a transitional molding shall be installed to complement existing trim. When overlaying existing walls or ceilings, it is intended that the wall and ceiling materials will not be removed. However, if the Contractor elects to remove it, then it becomes his responsibility to comply with any additional requirements of the Building Code to include insulating exterior walls as required (see Appendix 4; Division 7, Section 7D; and Division 13, Section 13A). Drywall

contractor shall protect adjacent areas, furnishings, fixtures, electrical cover plates, finished hardware, heater covers, and grills from splattering, spillage, or damage during wallboard installation and from taping and texturing applications.

2. **Material:** Wallboard shall be ½” on walls and ceilings, with tapered edges unless otherwise specified. Wallboard installed in bathrooms shall be water-resistant. Type “X” fire-rated wallboard shall be installed where required by applicable codes. Nails or screws shall be treated to prevent rusting or spotting.
3. **Installation:** Care should be taken to stagger and minimize end joints. Wallboard shall be first applied to ceiling, then to walls. When both sides of partitions are to receive wallboard, joints on opposite sides shall be staggered. Wallboard shall be carefully fitted and sized prior to fastening in place. Edges and ends of wallboard shall occur on framing members, except those edges and ends which are perpendicular to the framing members. Electrical boxes and mechanical openings shall be flush with finished wallboard surface. Exposed exterior corners shall be protected with metal corner bead. Wallboard joints and inside corners shall be covered with a tape and compound designed for this specific purpose. Drywall compound shall be applied in accordance with the manufacturer’s recommendations to include maintaining the minimum temperature during curing. Drywall application shall include the filling of all holes, gouges, and imperfections with drywall compound. Drywall work shall provide a true, even, smooth plane that when finished reveals no joints, fastener heads, or holes under normal lighting and viewing conditions. Texture shall be uniformly applied to the entire surface.
4. **Repair:** Repairing damaged areas shall include removing damaged material to framing on two opposite sides of damaged area and replacing with like material securely fastened to framing. Tape and finish to match adjacent surfaces and finishes with no visible signs of repair.

SECTION 9C - PAINTING

1. **General:**
 - A. **Material:** Paint materials shall be standard quality brands and fully suitable for the intended purpose. Paint materials shall be delivered to site in manufacturer’s sealed containers with original labels. The printed instructions shall clearly identify the suitability of the material for the type of exposure, surface to be covered, and type of service to which paint will be subject. Special consideration shall be given to ensure that the new finish will adhere to and be compatible with the existing surface. The Contractor shall furnish the Owner with color samples and the color selected by the Owner shall be initialed by both parties and a copy provided to the MHDC. No lead-based paint shall be used.
 - B. **Preparation:** All surfaces must be repaired, clean, and in a paintable condition prior to the start of any work. All new materials will be primed and have two finish coats applied. Painting contractor shall apply paint or finishes only to surfaces prepared in accordance with this section. Painting or finishing of any

surface by the painting contractor shall be considered acceptance that the surface preparation will provide for a first class job. Painting contractor shall protect vegetation, adjacent areas, and furnishings from splattering, spillage, or damage during painting. Contractor shall be responsible for paint removal or repair of damage to the Owner's satisfaction. Finish hardware, electrical cover plates, heater covers, and grills shall be removed prior to painting surrounding surfaces or otherwise protected. Painting contractor shall, after conferring with Owner, remove all abandoned hardware, including hooks, screws, nails, anchors, wire, etc. and set nails and fill holes. Painting contractor shall ensure that all surfaces to be finished are free of peeling, blistered, or crazed paint; foreign material; minor holes, cracks, or irregularities; and must be clean, smooth, and dry. Repair and patchwork shall be made with material appropriate for the specific application to achieve a sound repair. When preparing masonry for paint, remove any surface effervescence with a product designed for this purpose. Any area to be painted showing signs of mold or mildew shall be treated with a good fungicide and all areas shall be thoroughly dry before painting. Upon completion, the entire area shall be cleaned and left in a neat condition.

- C. Application: Each coat of paint shall be well brushed or rolled on, worked out evenly and allowed to dry before subsequent coat is applied. Finish work shall be uniform in color; smooth and free from defects; and smooth and free of brush marks, lap marks, bleeding, ghosting, and shadowing. Edges where paint adjoins other materials or colors shall be sharp and clean. New and previously-unpainted hardware, hardware accessories, electrical fixtures, switches, and receptacle and cover plates are not to be painted. Items of this nature previously painted shall be painted to match surrounding finish except when items are plated metal, in which case, old paint shall be removed. When doors are finished, top, bottom, and side edges shall be included. When windows are finished, bottom of lower sash rail and meeting faces of the meeting rails shall be included. The painting contractor shall verify in writing with the Owner which windows are not operable before painting and will not be responsible for making those windows operable. Failure to do so may require the painting contractor to make all windows operable. Windows that are operable before painting will be operable after painting. Bare wood shall be primed and painted, except that to be stained or clear sealed.

2. **Exterior:**

- A. General: Exterior painting shall be done only during favorable weather. Oil paint shall be applied when the temperature is above 40 degrees Fahrenheit, latex paint shall be applied when the temperature is above 50 degrees Fahrenheit and is expected to remain so for three hours after application. Temperature minimums shall be surface temperatures as well as air temperatures. Previously-painted windows, doors, and their trims are part of exterior painting, including those found behind storm windows or doors. Wood screen and storm window frames shall be included in exterior painting. If either is stored at the time, it is the Owner's responsibility to make them available to the Contractor. Previously-painted foundations, decks, concrete porches, and stoops shall be

part of exterior painting. Natural finished items are not to be painted unless specifically noted. When new gutters and downspouts are specified, the existing fascia and specifically noted. When new gutters and downspouts are specified, the existing fascia and any new fascia shall be painted prior to installation of the new gutters. Exterior metal and plastic surfaces shall be painted, including railings, roof flashing, chimneys, chimney caps, and mechanical components.

B. Material: In addition to the requirements of Section 9C, 1, exterior paints shall have a minimum of 35% plus or minus 2% volume of solids for the paint.

C. Preparation: Sanding, wire brushing, scraping, and power washing are acceptable methods of cleaning. Joints and seams shall be caulked prior to painting to achieve a weather-tight and smooth finish. Loose or deteriorated putty, including points, for sash shall be replaced.

3. **Interior:**

A. General: Finishes specified in a particular room shall extend into any new and existing closet, built in cabinets or pantry located in or adjacent to that room. Walls, ceilings, and previously painted doors, windows, trim, and shelving shall be included. Natural finished items are not to be painted unless specifically noted. Cabinet doors, and drawers shall be closeable and operable after painting.

B. Material: In addition to the requirements of Section 9C, 1, interior paints shall have a minimum of 30% plus or minus 2% volume of solids for the paint. Finishes used in kitchens, baths, and utility areas shall be durable and washable.

C. Preparation: It is not intended that wood surfaces scheduled for refinishing or painting be completely stripped down to bare wood. Rather, it is intended that scratches and other surface blemishes be treated so as to make them unnoticeable. When wallpaper exists on a surface that is to be painted, it shall be the responsibility of the general contractor to determine the appropriate preparation so that the final finish is in compliance with all requirements of this Section.

4. **Cabinets**: Peeling, blistered, or crazed paint shall be removed. Preparation of cabinet surfaces shall include filling of all voids, holes, cracks, surface irregularities, and unevenness of existing paints so as to be unnoticeable after final finish is applied. Special attention shall be given to the removal of grease, mildew, and other foreign matter unique to kitchen and bath locations. When cabinets are finished, interior, shelves, doors, and drawers shall be included. Wall cabinet tops, when there is no soffit, bottoms and exposed ends, including stove and refrigerator cavities, shall be included. When cabinet doors or drawers are finished, all surfaces inside and out shall be included. After refinishing all cabinet doors and drawers shall operate smoothly, easily, and close tight.

5. **Gutters, Downspouts, Flashing, Vents and Metal Railings**: New metals not previously painted shall be primed with a rust-preventing metal primer manufactured for the specific application. Previously-painted metals shall be spot primed where necessary. Finish shall inhibit rust and be manufactured for the specific application.

SECTION 9D - WALL COVERING (CERAMIC TILE AND WALLPAPER)

1. **General:** All surfaces to be covered shall be clean, smooth, and free of foreign material, holes, cracks, and irregularities and must be dry. Adjacent areas and furnishings shall be protected from splattering, spillage or damage during installation.
2. **Ceramic Wall Tile:**
 - A. **Preparation:** Existing walls shall be treated with a water-resistant sealant designed specifically for this purpose.
 - B. **Material:** Tile and grout shall be suitable for the area and application. Adhesives and other application materials shall be those recommended specifically by the manufacturer of the tile. Tile allowance shall include the retail cost of the tile only. Tile will be installed on properly-installed cement-based backer board.
 - C. **Installation:** Where possible, lay out work so that no tile less than 1/2 size occurs. The adhesive shall be applied to the entire surface to be tiled with a notched spreader blade. Tile shall be set by "floating method"; surface of tiles shall be flush. In shower area height of last course of tile shall extend a minimum of one full tile above showerhead. Tile shall extend into window recesses (sill and sides) at same height as wall tile. Tile installations shall be trimmed with tile specifically designed for the application. Joints shall be uniform, shall align vertically and horizontally and be plumb and level. Tile joints shall be filled with white grout unless otherwise specified. Joints between tub and tile and between tile and any dissimilar material shall be sealed with a tub and tile sealant. Joints shall be sponged and tooled.
 - D. **Repair:** When repairing an existing tile wall, remove all cracked, loose, chipped, or otherwise defective tile. Repair sub-surface wall material as necessary to provide a smooth and water-resistant surface for installation of replacement tile. New tile being installed next to existing tile shall match existing as closely as possible in size, color, texture and glaze. Existing tile may be cleaned and reused when feasible. When repairing and sealing grout, remove all loose and deteriorated grout and sealant prior to installing new. Installation shall conform to all requirements of this section.
3. **Wallpaper:**
 - A. **Preparation:** Existing surfaces shall be prepared to ensure that the seams or any other features of any existing wall covering will not be visible through new covering. Sealant shall be applied as recommended specifically by the manufacturer of the wall covering. Surfaces shall be coated with sizing as recommended by the manufacturer of the wall covering. Special consideration shall be given to ensure the new covering will adhere to and not affect the stability of the existing surface.
 - B. **Material:** The type of paper used shall be suitable for the area and application. Wall covering allowance shall include the retail cost of covering only.

- C. Installation: Wall covering surface shall be smooth, tight, and free of bubbles. Paper shall be plumb with seam type recommended by the manufacturer. Abutting seams shall be tight and patterns shall align. Edges shall be fitted tightly against all trim. Edges where wall covering adjoins other material or finishes shall be sharp and clean. Wallpaper shall be installed behind all wall and ceiling accessories (grills, cover plates, fixtures, etc.).
- D. Repair: Repair of wallpaper surfaces shall consist of adhering wallpaper with product specifically designed for this purpose.

SECTION 9E - FLOOR COVERINGS AND FINISHES

- 1. **General**: Flooring contractor shall install finish flooring materials only to surfaces prepared in accordance with the requirements of the finish material manufacturer. The placement of any finish flooring materials shall indicate the acceptance of the surface and compliance with all requirements of this section by the installer. When adhesives are used, they shall be designed for the specific application. Installation of floor coverings shall be accomplished by a skilled craftsman. Prior to installation over concrete, all cracks, depressions, and voids shall be filled or repaired. Where leveling is required, a product designed specifically for this purpose shall be used. Concrete surface shall be sealed with a sealant designed for this application prior to installation of floor covering. Floor surfaces to receive underlayment or finish floor covering shall be dry, smooth, and clean. Floor coverings and finishes specified in a particular room shall extend into any new and existing closet or pantry located in or adjacent to the room. Floor coverings shall be cut evenly and close fitting at walls and all projections and seams shall be held to a minimum. Avoid seams in high traffic areas. Floor coverings shall be installed so that patterns align in both directions. Fill strips shall not be less than 9" in width or less than 36" in length. The transition between rooms with different floor finishes shall occur at the center of the opening or the door when the door is in the closed position. When new finish floors are specified, installation shall include trimming bottoms of existing doors that are to remain to clear new finish floor. The Contractor shall be responsible for keeping the new floor covering clean and protected from stains and all other damage until acceptance by Owner or final inspection. Patching of damaged vinyl is not acceptable. The General Contractor shall ensure care instructions for products installed are provided to the Owner.
- 2. **Vinyl**:
 - A. Material: Vinyl allowance shall include the retail cost of vinyl floor covering only.
 - 1) Vinyl Sheet Goods: Shall be of a reputable manufacturer and meet minimum FHA standard.
 - 2) Base: Rubber, vinyl, or wood.
 - 3) Stair Nosing: Aluminum, vinyl, or rubber.

- B. Installation: Vinyl installations, except when over concrete, shall include underlayment. Existing base shoe shall be removed prior to installation of vinyl. Water closet shall be removed prior to installation of vinyl. When reinstalling water closet, a new bowl wax seal shall be installed. Seams shall be tight, straight, uniform, and welded watertight using manufacturer's seam sealer. Vinyl shall be fitted tight and sealed at tub and around all floor penetrations to be watertight. Transition from one floor covering type to another shall be made using a molding product designed for the specific materials and conditions. The vinyl installation shall include all necessary trim items including pipe escutcheons for a complete and professional installation. Installation of vinyl floor covering on stairs shall include a nosing trim specifically designed for this purpose. Tread and risers shall be one piece with no exposed edges. Rubber and vinyl base shall be continuous between corners, and all interior and exterior corners shall be premolded. For wood baseboard or base shoe installation, see Division 6, Section 6C. After floor has set sufficiently to become seated, clean with a neutral cleaner recommended by manufacturer. Floors and rubber base shall be left clean, smooth, and free from air pockets, buckles, cracks, and exposed edges.
- C. Repair: Vinyl repairs shall be made using manufacturer's recommended products and procedures. Finish repair shall be smooth, even, and impervious to water. Any additional vinyl required for repair shall match all characteristics of existing vinyl and pattern shall align.

3. **Carpet:**

- A. Material: Carpet allowance shall include the retail cost of carpet only.
- 1) Wool, acrylic, or modacrylic pile carpet shall be 25 ounces per square yard minimum.
 - 2) 100% nylon pile carpet shall be 20 ounces per square yard minimum.
 - 3) Pad shall be 1/2" pad, 5 pound, rebond minimum, unless otherwise specified.
 - 4) Bath and kitchen carpet shall be water resistant designed for this use and shall be installed over flooring impervious to water.
- B. Installation: Base shoe shall be removed prior to installation of carpet. Surface of base exposed after removal of base shoe shall be finished to match adjacent surface. Installation shall be in accordance with carpet industry practices and standards. Finished carpet installation shall be free of scallops and puckers. Fasten tack strips to the floor by the most appropriate method to give permanent holding qualities. Lay pad in the largest possible lengths and widths using the minimum number of sections and lay flat without bubbles or wrinkles. Bond pad to concrete and staple to wood floors. Lay out the pad so that seams do not fall directly under the carpet seams. Tape pad seams where necessary to ensure seams remain tight. Make carpet seams uniform, unnoticeable, and permanent by the method appropriate for the type of carpet and in accordance with industry practices and standards. Treat all joining edges, regardless of seaming method, with a seam adhesive. Seams must have a minimum breaking strength of 100 pounds per inch and must be capable of withstanding all carpet cleaning

processes. Products used in the seaming process shall be appropriate for the application. After installation, remove all debris, moldings, scraps, and other foreign matter. Remove any soiled spots or adhesive from the face of the carpet with the appropriate spot remover recommended by the carpet manufacturer. Remove all loose threads and vacuum carpeting.

4. **Underlayment:** Unless otherwise specified, 1/4" material (Luan plywood, AC plywood, waferboard, or fiber reinforced gypsum underlayment) designed and stamped for use as underlayment shall be installed.

5. **Wood Flooring (Repair and Refinishing):**
 - A. **Repair:** When patching or replacing flooring, material and installation shall match existing. Where patch is more than two boards wide, the end joints shall be staggered a minimum of 4". Sand patched area and feather into existing flooring. Stain and finish new sections of flooring to match existing.

 - B. **Refinish:** Remove base shoe with care prior to sanding; save for reinstallation. Reinstall base shoe after flooring has been refinished. Reinstall base shoe, and if damaged, provide new base shoe and refinish to match existing removed (see Division 6, Section 6C). Re-nail all loose flooring, set nails, and fill all holes with a product specifically designed for this purpose. Floor surface shall be machine sanded with appropriate-grit paper to achieve a smooth uniform surface. When machine sanding is impossible, hand sand to achieve a smooth, even surface. A minimum amount of wood surface shall be removed. Apply wood filler to floor surface with a product designed for this purpose. Apply a minimum of two coats of polyurethane floor finish. When floors are to be stained, apply stain evenly.

SECTION 9F - PLASTER REPAIR

General: Properly prepare the area to receive patching plaster. Proper preparation shall include the removal of loose or damaged plaster cut out to clean, sharp edges to solid lath material. The areas to be patched shall be filled by one of the following methods.

1. **Wallboard Method:** Areas to be patched shall be filled with a thickness of wallboard that will allow the finish plaster coat to match the adjoining surface in plane, finish, and texture. The wallboard shall be securely fastened to a solid backing.

2. **Plastering Method:** Surfaces to be patched shall be dampened immediately before application of the new three-coat wet plaster; all surfaces shall be smooth and free of bulges and match the adjoining surface in plane, finish, and texture.

DIVISION 10 - SPECIALTIES

SECTION 10A - FOUNDATION AND ATTIC VENTS

1. **General:** When openings for vents are constructed, care shall be taken to avoid unnecessary damage to adjacent components.
2. **Foundation Vents:** Foundation vents shall have a means of closing and shall be screened with corrosion-resistant wire mesh. Vents shall not be placed in close proximity to existing or new plumbing, gas meters, or furnace intake vents. Vents shall be standard quality brands designed for the specific application.
3. **Attic Vents:** Attic vents specified shall be screened with corrosive resistant wire mesh and shall provide protection against entrance of rain or snow. Vents shall be standard quality brands designed for the specific application.

SECTION 10B - MEDICINE CABINETS AND BATH ACCESSORIES

1. **General:** Medicine cabinet and bath accessories shall be installed level and securely anchored using manufacturer's hardware at standard heights, unless otherwise requested by Owner. When installed over sink, medicine cabinet shall be centered above sink. Locations of accessories shall be coordinated with Owner.
When "all" bath accessories are specified, the following shall be provided:
 - A. Two towel bars; one 24", one 30"
 - B. One paper dispenser
 - C. One shower rod (not required with glass enclosure)
 - D. One soap dish
 - E. When tilted extension mirror is specified, location shall be coordinated with Owner and MHDC.
2. **Repair:** When repair of medicine cabinet or bath accessory is specified, repair shall restore item to its original appearance and operation and be securely anchored.

SECTION 10C - HOUSE NUMBERS

When new house numbers are specified, they shall be a minimum of 5" in height, made of black- or brass-finished metal and be securely fastened with screws or nails supplied by the manufacturer.

SECTION 10D - SIGNAGE AND MAIL BOXES

All signage shall be legible, include all required information, and be in good repair. When a mail box is specified, it shall be U. S. Postal-approved and if post is provided, post may be wood or metal and shall include a platform for securing the mail box. Post shall be set in concrete and mail box shall be installed according to U. S. Postal Service requirements.

SECTION 10E - GRAB BARS

When grab bars are specified, all mounting holes shall be used and each screw shall be securely anchored in solid backing. If solid backing does not exist, installation shall include the removal of existing wall or ceiling covering, installation of solid backing securely anchored to wall or ceiling framing, and the replacement of wall or ceiling finishes to original condition. Heights and locations shall be coordinated with the Owner and the MHDC. Horizontal bars shall be installed level and all vertical bars shall be plumb unless otherwise specified.

DIVISION 11 - EQUIPMENT

SECTION 11A - APPLIANCES

1. **General:** Appliances shall be delivered to site in manufacturer's containers and protected during construction. The Contractor shall be responsible for furnishing appliances in proper operating condition and without any defects or damages including the finish. The Contractor shall provide to the Owner operation instructions, guarantees, and warranty certificates for the furnished appliances. The energy-rating label shall remain on all appliances. When relocation of existing appliances is specified, installation requirements of this Section shall be adhered to except that the requirements for all features to operate faultlessly shall apply only to those features operating prior to relocation. The Contractor shall reconnect existing appliances temporarily removed during construction.

2. **Installation:** The Contractor shall be responsible for constructing openings for built-in appliances. The installation of appliances shall include all mechanical, electrical, and plumbing service connections necessary for all features of the appliance to function properly. When new connections are required, they shall be installed behind the appliance and out of sight. Existing connections may be used if applicable code requirements are met (see Divisions 15 and 16). The Contractor shall check and make all necessary adjustments to ensure that installed appliances and features operate faultlessly. Range, refrigerator, and dishwasher shall be installed level. Installation of garbage disposal shall include wall switch above counter top backsplash.

3. **Reconditioning Range, Refrigerator, and Dishwasher:**
 - A. Reconditioning of appliances shall include assuring the proper operation of all controls, motors, and the functions of all accessories and components. Unit shall be cleaned.
 - B. Cleaning of appliances shall include the removal of all grease, oil, dirt, dust, and debris from all finishes, elements, and components of the appliance.

4. **Appliance Refinishing:** Refinishing kitchen appliances shall be accomplished by a subcontractor recognized as a professional in this type of refinishing and using products designed specifically for this application.

DIVISION 12 - FURNISHINGS

Intentionally left blank for future use.

DIVISION 13 - SPECIAL CONSTRUCTION

SECTION 13A - HAZARDOUS MATERIALS (LEAD-BASED PAINT AND ASBESTOS-CONTAINING MATERIALS)

1. **Lead-Based Paint:** The requirements of State and federal regulations must be complied with when performing any work involving lead-based paint, including but not limited to the following activities.
 - A. **Disclosure:** A seller or lessor of target housing shall disclose to the purchaser or lessee the presence of any known lead-based paint and/or lead-based paint hazards.
 - B. **Acquisition and Federal Rehab Assistance:** In projects that are part of federally-assisted acquisition and rehabilitation, the grantee or PJ shall provide the lead hazard information pamphlet in accordance with 24 CFR Part 35. Lead-based paint requirements for rehabilitation fall into three categories that depend on the amount of federal assistance provided. The three categories are: (1) assistance of up to and including \$5,000 per unit; (2) assistance of more than \$5,000 up to and including \$25,000 per unit; and (3) assistance of more than \$25,000 per unit. The type of lead-based evaluation and hazard reduction requirements is dependent on the amount of federal assistance provided per unit.
 - C. **Lead-Safe Work Practices Qualified Bidders:** Common renovation activities like sanding, cutting, and demolition can create hazardous lead dust and chips by disturbing lead-based paint, which can be harmful to adults and children. To protect against this risk, the EPA requires all contractors or firms performing renovation, repair, and painting projects that disturb lead-based paint in pre-1978 homes, child care facilities, and schools be certified by EPA and that they use certified renovators who are trained by EPA-approved training providers to follow lead-safe work practices. Individuals can become certified renovators by taking an eight-hour training course from an EPA-approved training provider. Only these General Contractors who have completed a State-approved **LEAD-SAFE RENOVATOR TRAINING PROGRAM** or are licensed by the State Health Department as **LEAD ABATEMENT CONTRACTORS** are recommended to bid on HDF rehabilitation projects.
 - D. **Lead-Based Paint Removal/Abatement Qualified Bidders:** Only General Contractors licensed by the State Health Department as **LEAD ABATEMENT CONTRACTORS** and that have been approved by the MHDC.
 - 1) The lead abatement contractor will be responsible for ensuring his/her supervisors and workers attend appropriate training and hold the appropriate State licenses.

It is the responsibility of the General Contractor to ensure that proof of the aforementioned training and licensing is provided to the MHDC for the

Owner and his/her workers.

- 2) When lead-based paint is to be removed from building component surfaces, the component shall remain in place when accomplishing the removal.
- 3) When lead-based paint is to be removed from building component surfaces, the component shall remain in place when accomplishing the removal.

E. The MHDC requires that all units constructed prior to 1978 must be tested for lead-based paint that utilizes federal funding for rehabilitation.

2. **Asbestos-Containing Materials**: Asbestos-containing materials shall be handled and disposed of in accordance with State and Federal Regulations.

A. The National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations under the Clean Air Act specify work practices to be followed during demolition and renovation of all structures.

B. The Missouri Department of Natural Resources – Division of Environmental Quality requires an asbestos inspection prior to any proposed renovation and demolition activities. The Missouri Department of Natural Resources – Division of Environmental Quality regulates the abatement and disposal of asbestos-containing materials, renovation operations, and demolition activities in Missouri (per 10 CSR 10-6-241 and 10 CSR 10-6-6.250).

SECTION 13B - AIR QUALITY

The site and dwelling units must be free of air pollutant levels that threaten the occupants' health. The dwelling unit must be free from dangerous levels of carbon monoxide, sewer gas, fuel gas, dust, mold, and other harmful pollutants. Adequate air circulation is required in the dwelling unit.

SECTION 13C - PEST CONTROL (ROACHES, TERMITES, AND VERMIN)

1. **Roaches**: When roach treatment is specified, it shall be accomplished by a professional exterminator company licensed to perform this type of service. Type and kind of treatment shall be determined by the professional exterminator. The Contractor shall be responsible for the initial treatment and any recommended follow-up shall be the responsibility of the Owner.

2. **Termites**: When termite treatment is specified, it shall be accomplished by a professional exterminator company licensed to perform this type of service. Type and kind of treatment shall be determined by the professional exterminator. The Contractor shall be responsible for the initial treatment and any recommended follow-up shall be the responsibility of the Owner.

It shall be the responsibility of the Contractor to repair or replace any damaged components caused by the treatment for termites.

3. **Vermin:** Any unit must be free of rodents and heavy accumulations of trash, garbage, or other debris that may harbor vermin. The unit must contain adequate barriers to prevent infestation.

SECTION 13D - FIRE ALARM SYSTEM, CARBON MONOXIDE, AND EMERGENCY POWER

When fire alarm and smoke detectors are specified, they must be installed according to the Building Code. (See Division 16, Section 16B and 16C). If a hearing-impaired person is present, the smoke detectors must have an alarm for hearing-impaired persons as specified in NFPA 74. If fuel-burning appliances are provided in a dwelling unit, carbon monoxide detectors are required to be installed based on the manufacturer's recommendations. When fire sprinklers, emergency lighting, and exit signs are specified, they must be installed according to the appropriate building code. If emergency power is provided, it must be sized accordingly, operate all necessary equipment, and be installed according to the building code.

SECTION 13E - FIRE PROTECTION SYSTEM

New one- and two-family dwellings over one level in height, new one- and two-family dwellings containing a basement, and new one- and two-family dwellings containing a crawl space with a fuel-burning appliance below the first floor shall provide one of the following methods for fire protection of floors: (1) a ½" gypsum wallboard membrane, 5/8" wood structural panel membrane, or equivalent on the underside of the floor framing member; (2) wood floor assemblies using dimension lumber or structural composite lumber equal or greater than 2" x 10" nominal dimension, or other approved floor assemblies demonstrating equivalent fire performance; or (3) an automatic fire sprinkler system as set forth in section R313.2 of the International Residential Code for One- and Two-Family Dwellings. All new windows installed must meet the fire egress requirements noted in the building code.

SECTION 13F - STORED FLAMMABLE MATERIALS

Flammable materials, including paint, solvent fluids, paper, gas, etc., shall not be stored or accumulated in an unsafe or unapproved manner in any dwelling unit or on site.

SECTION 13G – ACCESSIBILITY

1. **Section 504 (24 CFR 8)**: The requirements of the federal regulations must be complied with when performing any work involving the new construction or alterations of existing multifamily housing.

- A. New multifamily housing consisting of five or more units must be designed and constructed to be readily usable by persons with disabilities.

- 1) A minimum of 5% of the dwelling units in the project must be accessible to individuals with mobility impairments. An additional 2% of the dwelling units must be accessible to individual with sensory impairments.
- 2) The construction standard for all accessibility requirements is the Uniform Federal Accessibility Standard.

Rehabilitation indicates that if alterations are undertaken to a housing project that has 15 or more units, and the rehabilitation costs will be 75% or more of the replacement cost of the completed project, then such projects are considered to have undergone “substantial alterations” are subject to the accessibility requirements noted in (1) for new construction above.

The construction standard for all accessibility requirements is the Uniform Federal Accessibility Standard.

2. **Americans with Disabilities Act (24 CFR 36)**: The requirements of the federal regulations must be complied with when performing any work involving the new construction or alterations of existing multifamily housing.

- A. When public areas are altered in multifamily projects constructed on or before January 26, 1993, they must be altered in accordance with the 2010 ADA standards.

- B. Public areas must be designed and constructed in accordance with the 2010 ADA standards in multifamily projects constructed after January 26, 1993.

3. **Fair Housing Act (24 CFR 100.205)**: The requirements of the federal regulations must be complied with when performing any work involving the new construction or alterations of existing multifamily housing.

All multifamily housing projects constructed after March 13, 1991, must comply with the seven design standards noted below:

- A. an accessible entrance on an accessible route;
- B. accessible public and common use areas;
- C. usable doors;
- D. accessible routes into and through the dwelling unit;
- E. accessible light switches, electrical outlets, and environmental controls;

- F. reinforced bathroom walls for grab bars, and
- G. usable kitchens and bathrooms.

SECTION 13H - DISASTER MITIGATION

These standards require housing to be improved to mitigate any potential impacts from potential disasters, such as earthquakes, floods, and wildfires. Improved housing must comply with State or local codes, ordinances, and any other HUD requirements. Whenever possible, the design should place all building improvements, ingress and egress outside of the floodplain and include construction design for flood mitigation features. Any potential wind or storm damage to units is typically covered by homeowner's insurance. Any other potential disaster issues will be mitigated as necessary.

SECTION 13I - MANUFACTURED HOUSING

1. Construction standards for new manufactured housing units must comply with 24 CFR 32890, 24 CFR 3282, and 24 CFR 8385.
2. All manufactured housing must be installed on a permanent concrete foundation.
3. All manufactured housing must be properly tied down.
4. All road transport accessories, such as wheel and hitching devices, must be removed.

DIVISION 14 - CONVEYING SYSTEMS

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DIVISION 15 - MECHANICAL

SECTION 15A - GENERAL REQUIREMENTS

Equipment shall be designed for the intended applications. Equipment and items installed under this section shall operate safely without leakage, undue noise, vibration, or corrosion. Equipment shall bear a permanent and legible factory-applied nameplate to permit identification of manufacturer, model number, and type of unit. In addition, all units shall have the energy guide label approved by the Federal Trade Commission. A furnace, boiler, or water heater supported from the ground shall rest on a 4" concrete slab extending not less than 3" above the adjoining ground level. Cutting, drilling, and refinishing necessary for the proper execution of all work under this division shall be the responsibility of the Contractor. When damage to framing or structural members occurs as a result of the work, the damaged members shall be reinforced to achieve the strength and load bearing capacity of the original member. Match existing materials in size, style, and finish, including decorative and ornamental moldings. Repairs shall include all materials and methods necessary to achieve uniformity between new and existing members. Repairs shall meet all building code requirements. When a mechanical pit is specified, it shall include a concrete floor with concrete block walls constructed in accordance with drawings. If the walls exceed 44" in height, there shall be a ladder installed as part of this installation. When work under this Section results in abandoned utilities or mechanical components, see Division 2, Sections 2I and 2J.

SECTION 15B - PLUMBING

1. General:

- A. Newly-installed piping shall be concealed in walls, ceilings, and floors unless passing through spaces not intended to be finished. In unfinished basements, piping locations shall be coordinated with the Owner to ensure piping will be concealed by future construction.
- B. Whenever possible, water pipes shall not be installed in outside walls, ventilated attics, or locations where freezing may occur. When it is necessary to install water pipes in these areas, they must be protected from freezing.
- C. Copper pipe connected to galvanized pipe shall be installed with dielectric connectors.
- D. Sill cocks shall be frost-free, anti-siphon, and installed a minimum of 10" above finish grade unless otherwise approved by the Owner. Installation in new location shall include water supply line.
- E. When a plumbing line is repaired, it shall be made fully functional using like materials.

Damage, voids, and holes created as a result of work required under this Section shall be professionally repaired and refinished to eliminate all evidence of said work.

F. Whenever possible, replace galvanized water piping still in service.

2. **Service Lines (Sewer, Water and Gas):**

A. Excavation: Excavation requirements shall apply to the installation of all service lines. Contractor shall be responsible for the location of all underground services to the property. Excavation shall conform to all local, State, and federal requirements. Any damage or loss resulting from excavating activities shall be corrected at the expense of the Contractor. This includes, but is not limited to, sidewalks, driveways, fencing, and retaining walls. Excavation of trenches shall not undermine or disturb the stability of the building foundation. Excavated trenches shall run in a straight line and provide continuous support for piping along its full length. Trenches shall be back filled evenly using acceptable fill material and thoroughly compacted (see Division 2, Section 2M).

B. New Sewer Line: When a new sewer line is specified, it shall be installed from the sewer main to inside the structure foundation. Foundation opening around the pipe shall be sealed to be watertight. Installation shall include exterior clean out and the location to be approved by Owner. When a new sewer line is specified and a grease trap is an active part of the sewer system, the grease trap will be bypassed. When a grease trap is to be bypassed, the cover shall be removed and the grease trap shall be cleaned and filled with sand. Every sewer line abandoned as a result of work by the Contractor shall be plugged or capped outside the foundation wall. Foundation openings abandoned as a result of the Contractor's work shall be plugged and sealed to be watertight.

C. Sewer Line Repair: When repair of a sewer line is specified, the location of blockage or damage shall be determined by the Contractor. Information related to prior efforts to clear the line and likely location of blockage or damage may be available from Owner. Blockage or damage shall be removed by whatever means necessary. If this requires excavation and repair of sewer line, work shall comply with all requirements of this section.

D. Sewer Line Cleaning: When the sewer line is to be cleaned, it shall be cleaned from the blockage to the main.

E. New Water Service Line: When a new water service line is specified, it shall be installed from the water main to meter located inside dwelling. Existing exterior meters shall be relocated to interior of dwelling with exterior remote counter. Location of both shall be coordinated with Owner. Work shall include the reinstallation of curb stop valve and box. Water service lines shall be of a design and size to meet applicable code requirements.

F. Water Service Line Repair: Repair of line and components shall be accomplished to achieve strengths and durability necessary to prevent leakage

and maintain existing water flow. Work shall comply with applicable requirements of this Section.

- G. Water Meter Relocation: When a water meter is to be relocated, the new location shall be coordinated with Owner.
- H. New Gas Service Line (when no service exists): When a new gas service line is specified, it shall be installed from gas main to meter. Contractor shall be responsible for installation from meter to property line and for coordinating the installation from property line to gas main with the utility company. Location of gas meter shall be coordinated with Owner.
- I. Gas Service Line Replacement: When an existing gas service line is abandoned, installation requirements of Section 15B, Paragraph 2H, F shall apply. When existing gas service line is to be used as a conduit for the replacement line, the replacement line shall be installed from the gas main to meter. Meter may remain in existing location, except that meters located within structure shall be relocated to exterior. New location shall be coordinated with Owner.
- J. Gas Meter Relocation: When a gas meter is to be relocated, new location shall be coordinated with Owner.

3. **Building Lines (Drains/Vents, Water, Gas):**

- A. Drains/Vents: When a new fixture drain line is specified, it shall be from fixture to rough plumbing connection. When drain line is exposed, it shall be chrome finished. When replacement of all drain lines is specified, new lines shall be installed from inside of foundation to all fixtures and shall include fixture traps. When replacement of the entire drain/vent system is specified, replacement shall include all new drains from inside of foundation to all fixtures, including fixture traps and vents from all fixture drains through roof. When installing or replacing a portion of the drain/vent system is specified, new material shall be connected to existing with approved methods. When repair of drain/vent line is specified, repair shall achieve strength, durability, and flow of the original line.
- B. Water Lines: When replacement of all water supply lines is specified, new lines shall be installed from inside foundation wall, or from meter when located inside dwelling, to all existing and proposed fixtures, faucets, and mechanical equipment requiring water supply. For fixtures with shut-off valves, new valves and supply lines from valves to faucet shall be installed. New shut-off valves shall be installed symmetrically at the center line of the fixture. New water supply lines may be copper or plastic and must comply with the International Plumbing Code. When new fixture supply lines are specified, installation shall be from fixture to shut-off valve. When new fixture supply lines are specified without shut-off valves, installation shall be from the fixture to rough connection. When repair of a water supply line is specified, repair shall achieve strength, durability, and flow of original line.

- C. Gas Lines: When replacement of existing or installation of new gas supply line is specified, new line shall be installed from nearest properly-sized supply line to appliance or equipment. Shut-off and flexible connector shall not be visible upon final installation of dryer or stove in finished areas. When repair of a gas supply line is specified, repair shall achieve strength, durability, and flow of original line.

4. **Fixtures:**

- A. General: Plumbing fixtures shall be delivered to site in manufacturer's containers and protected during construction. Fixtures and plumbing accessories shall be new and installed according to all applicable plumbing codes. Fixtures installed in a new location shall include supply lines, drains, and vents. Sinks installed in cabinets shall have chrome-finished or copper supply lines; and new chrome-finished brass shut off valves. Escutcheons shall be installed where plumbing lines pass through walls or floors of cabinets. Fixtures with exposed supply lines shall have chrome-finished risers and new chrome-finished brass shut-off valves. Valves shall be installed at floor or wall with escutcheons so that only valves and risers are exposed. Shut-off valves are not required on claw foot tub installations. Drains and supply lines for claw foot tubs shall be chrome-finished above floor line. Fixtures with exposed drain lines shall have chrome-finished P-traps and drain pipes. When existing fixtures with lead traps or drains are replaced, lead shall be replaced with PVC or ABS plastic. When a fixture component is to be replaced, it shall be of like-quality and design of original, unless otherwise specified, and shall be installed and adjusted to operate properly. When a faucet is to be repaired, the repair shall return the faucet to its original operation.
- B. Water Closets: When a new water closet is specified, it shall consist of bowl, tank, and cover constructed of vitreous china with seat and lid properly sized to fit water closet. It shall be installed with new wax ring sleeve and securely fastened with bolts and caps specifically designed for this application.
- C. Sinks: New kitchen sinks shall be stainless steel, porcelain enamel over steel, or porcelain over cast iron with a minimum depth of 8" and basket strainer(s). When a kitchen sink and faucet installation is specified, it shall include sink, sink basket strainer(s), P-trap, chrome faucet with spray (unless otherwise specified), and supply lines. New bath sinks shall be vitreous china, cultured marble, onyx, and porcelain enamel over steel or porcelain over cast iron, with waste pop-up and pop-up lever. When a bath sink and faucet installation is specified, it shall include sink, faucet with pop-up, P-trap, chrome faucet, and supply lines. Sinks are to be secured to countertop with appropriate sink fasteners and shall not be installed on post formed edge of countertops. Perimeter of sink rim shall be sealed with plumber's putty and all excess putty removed. Before installation of wall-hung sinks, the Contractor shall ensure that a minimum of 2" x 6" blocking is installed in the wall. Brackets specifically designed for the support of the sink shall be installed. When the sink design provides for support leg installation, chrome-finished support legs specifically designed for this application shall be installed.

- D. Tubs: New tubs shall be 14" minimum in height, porcelain enamel over steel, porcelain over cast iron, or fiberglass, with complete bathtub waste assembly and P-trap. Tubs shall have a slip-resistant surface unless otherwise specified. Tub shall be set level and supported at floor and wall. When a tub faucet is specified, it shall consist of valve(s) and spigots. When a combination tub/shower faucet is specified, it shall consist of valve(s), spigot, and shower head. Valves, spigots, and shower heads shall be chrome unless otherwise specified.
- E. Showers: New shower bases shall be fiberglass, plastic, or concrete with Coloroy membrane liner and ceramic finish. Complete shower base shall include waste assembly and P-trap. When a shower faucet is specified, it shall consist of valve(s) and shower head. Shower head shall be chrome finished unless otherwise specified. Shower wall finishes shall be as specified and installed according to the manufacturer's installation instruction. Shower bases shall be set level.
- F. Washer Drip Pan: New washer drip pan installation shall consist of a drip pan designed for this application, flush mounted in wall with finish trim, supply valves, and all piping and connections to building supply, drain, and vent systems.

5. **Water Heaters:**

- A. General: Water heaters shall be American Gas Association certified or UL listed and have a five-year limited warranty tank.
- B. Gas Fired: New gas-fired water heater in a new location shall include all venting flues, gas supply lines and connections, water lines and connections, gas and water shut off valves, T&P valve with drip leg, and combustion air supply. When a new gas-fired water heater is specified to replace an existing water heater in same location, it shall include gas and water connections and T&P valve with drip leg. Installation shall include the inspection of all existing venting flues, gas and water piping and valves, and combustion air supply. If necessary to meet applicable codes, the replacement or repair of these items shall be included. When a new gas line connection from water heater to shut off is specified, it may be rigid or approved flexible gas line.
- C. Electric: When a new electric water heater is specified in a new location, it shall include water line connections and valves, wiring and connections, and T&P valve with drip leg. When a new electric water heater is specified to replace an existing water heater in same location, it shall include water line connections, electrical connections, and T&P valve with drip leg. Installation shall include the inspection of all existing related wiring, water piping, and valves. If necessary to meet applicable codes, the replacement or repair of these items shall be included.

SECTION 15C - PLUMBING FIXTURE REFINISHING

Refinishing of plumbing fixtures shall be accomplished by a subcontractor recognized as a professional in this type of refinishing and using products designed specifically for this application.

SECTION 15D - PLUMBING

1. **Barrier-Free Water Closet**: For installation, see Division 15, Sections 15A and 15B.
2. **Barrier-Free Lavatory**: For installation, see Division 15, Sections 15A and 15B.
3. **Job-Built Barrier-Free Showers**: See Work Write-Up and Division 15, Sections 15A and 15B.
 - A. When a barrier-free shower is specified, it shall include:
 - 1) Installation of a roll-in shower base to include relocating the existing floor drain or installation of new floor drain and vent as applicable.
 - 2) When a pre-manufactured base is specified, it shall be manufactured by a recognized firm and be designed for the specific application. Base shall include pre-manufactured transition ramp designed for this application and constructed to be compatible with shower base.
 - 3) When a poured-in-place concrete base is specified, it shall consist of a waterproof membrane specifically designed for this application, formed and poured concrete base with proper drainage, and ceramic tile finish. Base shall include transition ramp constructed as specified.
 - 4) Converting existing faucet to shower operation only or installation of new faucet if none exists.
 - 5) Replacement of existing shower head with new shower head or hand-held personal shower system; or installation of standard shower riser, if none exists, with shower head or hand-held personal shower system.
 - 6) Installation of additional matching tile so that shower walls are uniform and complete or installation of new tile in total shower area.
 - 7) Installation of chrome plated metal shower curtain rod if none exists.
 - B. When wall construction is specified, it shall be included and consist of all framing, drywall and finishes.
4. **Pre-Manufactured Barrier-Free Shower Enclosure**: Shower enclosure per manufacturer's specifications.
5. **Hand-Held Personal Shower System**: When a hand-held personal shower system is specified, it shall include a diverter valve, hand-held personal shower head with wall holder, and a flexible hose with a minimum length of 108". This shall be a complete system manufactured for this application.

SECTION 15E - HEATING

1. **Forced Air and Hot Water:**

- A. **General:** Heating systems shall be capable of maintaining a minimum temperature of 70 degrees Fahrenheit when the outside temperature is minus 10 degrees at a point 3' above the floor in the center of all habitable rooms and other spaces. Heating systems shall be designed, installed, and balanced or adjusted to provide for the distribution of heat to all habitable rooms and other spaces in accordance with the calculated heat loss of the spaces to be heated. New units shall be sized and have ratings to ensure proper heating of all habitable rooms within the dwelling. Heat loss calculations used for this purpose shall be available upon request. When a new heating system is to be installed, Contractor shall submit a drawing showing the location of all heating system components to include the location of furnace/boiler, flue, registers/radiators, and thermostat. Design shall be submitted and approved by Owner prior to commencement of installation. If in following the requirements of this Section an existing chimney or flue is to be used, it shall be cleaned as part of the installation and, if necessary, brought into compliance with applicable codes. Supply and return piping for hot water systems and all supply duct work for warm air systems located in attic, ventilated crawl space, and other unconditioned spaces shall be insulated with material having thermal characteristics equivalent to 2" blanket insulation. Duct work and flues passing through finished areas must be enclosed. The enclosure location shall be approved by the Owner and finished to match the adjoining surfaces. New system installations shall be complete and shall include a minimum 90% energy-efficient furnace or boiler; all venting flues, proper returns, gas connections, supply lines, valves, controls, electrical connections, thermostat, and combustion air to provide perimeter- type heating through rigid metal ducting or piping with appropriate registers or radiators. Furnaces and boilers that require drainage of evaporative water where floor drain is not available shall be equipped with a system to discharge water specifically designed for this application.
- B. **Forced Air:** Whenever existing ductwork is to be reused, it shall be cleaned throughout as part of new installation. Sheet metal work shall be accurately formed, fitted snugly, and properly secured. Runs, including those under base cabinets, shall be rigid metal ducting with properly-sized registers. Registers shall be installed in the floor unless otherwise specified. Supply registers shall be equipped with shut-off dampers.
- C. **Hot Water:** Piping shall not be installed or located where freezing may occur. Piping shall be copper. If conditions warrant, plastic piping may be used with written approval from the Owner and the MHDC. Number of zones and zone layout shall be approved by Owner.

2. **Electric Units:**

A. When a separate electric heating unit is specified, it shall be permanently installed and thermostatically controlled. Its design and location shall be approved by the Owner. Installation shall include all circuits, wiring, and connections.

B. Electric heating unit shall be sized to meet the requirements of Section 15E, Paragraph 1A for the room where unit is installed.

3. **Service and Repair:**

A. When servicing of a furnace or boiler is specified, it shall include the following as applicable:

- 1) Checking and adjusting the thermostat, fan control, limit control, zone valves, and belts.
- 2) Replacing the filter(s).
- 3) Light cleaning and lubricating of the motor(s), pump(s), etc.
- 4) Bleeding the air from hot water systems.
- 5) Checking flue, gas supply lines, gas valves, and heat exchangers for leaks.
- 6) Bringing any necessary repairs to the attention of the Owner and MHDC.

B. When a component of a heating system is replaced, it shall be of like quality and design of original and shall be installed and adjusted to operate properly.

C. When repairs are made to the heating system, the repairs shall ensure the efficiency and integrity of the system is returned as originally installed.

D. After servicing, the mechanical contractor shall leave a certificate on the furnace or boiler indicating his company name, the work or repair completed, and the date completed.

SECTION 15F - VENTILATION (RANGE HOODS, BATH FANS, AND DRYER VENTS)

1. **Range Hoods:** When a ducted range hood is specified, it shall include ductwork designed for the shortest practical run to the exterior and all necessary hardware and electrical connections. Range hood venting through cabinets shall be enclosed with like material purchased from cabinet manufacturer. When a ductless range hood is specified, it shall include all necessary hardware and electrical connections.

2. **Bath Fans:** When a bath fan is specified, it shall be installed with a separate wall switch, venting duct with damper, all necessary hardware, accessories, and electrical connections. Venting duct shall extend to the exterior and be protected against the elements.

3. **Dryer Vents**: When a dryer vent is specified, it shall consist of a venting duct to the exterior (maximum length of 8'0") with damper and weather cap designed for this application.
4. **Replacement of Components**: When a component of a range hood or bath fan is replaced, it shall be of like quality and design of original and shall be installed to operate properly.

DIVISION 16 - ELECTRICAL

SECTION 16A - GENERAL

Electrical wiring and devices installed shall be UL approved. Wiring shall be copper. Wiring installation shall be concealed in walls, ceilings, and floors. Materials and devices used shall be clearly marked to permit identification of manufacturer, model, and type. Cutting or drilling of walls, floors, ceilings, and partitions for the installation of electrical work and the closing and refinishing of openings cut for access shall be the responsibility of the Contractor. Finishes shall conform to the conditions of the surrounding areas. When damage to structural members occurs as a result of the work, the damaged members shall be reinforced to achieve the structural integrity of the original member. Existing electrical wiring and devices throughout the building which will not be used shall be disconnected and removed in all spaces that are accessible (see Division 2, Section 2J). No switches shall be installed behind a door. New devices, equipment, and fixtures shall be designed for their specific applications. New light fixtures shall include new bulbs in all sockets, size and style as recommended by manufacturer. When a doorbell is specified, it shall consist of all necessary wiring (concealed), push button located convenient to entry, transformer, and bell tones per the *Scope of Work Summary*. Location of bell tone shall be coordinated with Owner. Underground electrical installations shall include restoring excavation and surrounding area to the original condition. Where more than one living unit is supplied from a single service entrance panel, the disconnect- and circuit-protecting devices for each unit shall be clearly identified. The Contractor shall provide to the Owner, operation instructions, guarantees, warranties, and certificates for furnished devices when provided by the manufacturer.

SECTION 16B - TOTAL REWIRE

When a total rewire is specified, it shall include the following:

1. **New 200 Amp Service**: New service shall include mast and wiring, meter base, and meter. If the mast penetrates the roof, a new roof jack shall be installed. Service shall include a new drop from pole to mast.
2. **New 200 Amp Distribution Panel**: New distribution panel shall include new breakers and breakers shall be identified and labeled in the service panel to indicate what they service. Location shall be coordinated with Owner, local jurisdiction, and power company.
3. **Circuit Rewiring**: Circuit rewiring shall include:
 - A. New wiring from the distribution panel to all existing openings and all electrically- operated interior and exterior devices and fixtures permanently wired into the structure's electrical system. Outlets servicing major appliances shall be relocated if necessary to ensure outlet is behind appliance and out of sight after appliances are installed. When any existing opening or device is

- located in violation of any applicable codes, it shall not be rewired. When any device or fixture is in an unsafe condition, it shall not be reconnected. At the time such determination is made, it shall be brought to the attention of the Owner.
- B. Any additional openings, devices (including smoke detectors), and wiring required to meet all applicable codes (see Division 16, Sections 16 A and 16C).
 - C. Any additional openings, devices, and requirements specifically specified (see Division 16, Sections 16A and 16C).
 - D. New switches, outlets, and trim for all existing and added openings. Any existing decorative or custom trim plates shall be replaced only after coordination with Owner.
 - E. Fixtures specified by the Work Write-Up. Fixture allowance shall be retail cost only.
 - F. Where work requiring a permit occurs that have attached garages or in units with fuel- burning appliances, carbon monoxide alarms shall be provided outside of each separate sleeping area in the immediate vicinity of the bedrooms.

SECTION 16C - ADDITIONS TO EXISTING SYSTEM

When additional outlets, switches, or fixtures are specified, the boxes shall be securely anchored to support devices or fixtures to be installed and shall be installed flush with finish surfaces. Openings shall be cut so that they are concealed by standard size trim plates. When additional outlets, switches, or fixtures are specified, installation shall include boxes, wiring from service feeders to boxes, grounding-type outlets and switches with trim plates, and fixtures. Devices and trim plates shall match existing in style and color. Height and alignment (horizontal or vertical) shall be consistent with similar existing devices. Location of openings shall be coordinated with Owner. Fixtures installed over sinks shall be located on center line of sinks. When an additional 220-volt outlet is specified, installation shall include box, wiring feeder from distribution panel to box, proper-size breaker, proper outlet for intended appliance, and trim plate. When smoke detectors are specified as required by the state building code, they shall be hard-wired into the electrical system. Hardwired smoke detectors are required in each bedroom, outside of each sleeping area in the immediate vicinity of each bedroom, and on each level on the unit. Smoke detectors must also be interconnected.

SECTION 16D - REPLACEMENT OF EXISTING ELECTRICAL COMPONENTS

When replacement of a switch, outlet, or light fixture is specified, it shall consist of replacing the existing with new, installing in existing box, and attaching to the existing wiring. It shall also include the replacement of missing or broken trim plates. Replacement components shall match style and color of original components.

SECTION 16E - SECURING ELECTRICAL COMPONENTS

Securing of an electrical component shall consist of anchoring the device so that it is properly secured to meet the requirements of the intended use. Rewiring an existing fixture shall consist of replacing all existing wiring and damaged or broken bulb receptacles. Materials used shall match original in style and installation. Electrical system repairs shall consist of identifying and repairing or replacing the problem component(s) so that the system functions properly.

SECTION 16F - DETACHED GARAGE

When the rewire of a detached garage is specified, the main structure distribution panel shall be used and the requirements of Division 16, Section 16B-3 shall apply.

APPENDIX 1 - 2012 INTERNATIONAL ENERGY CONSERVATION CODE

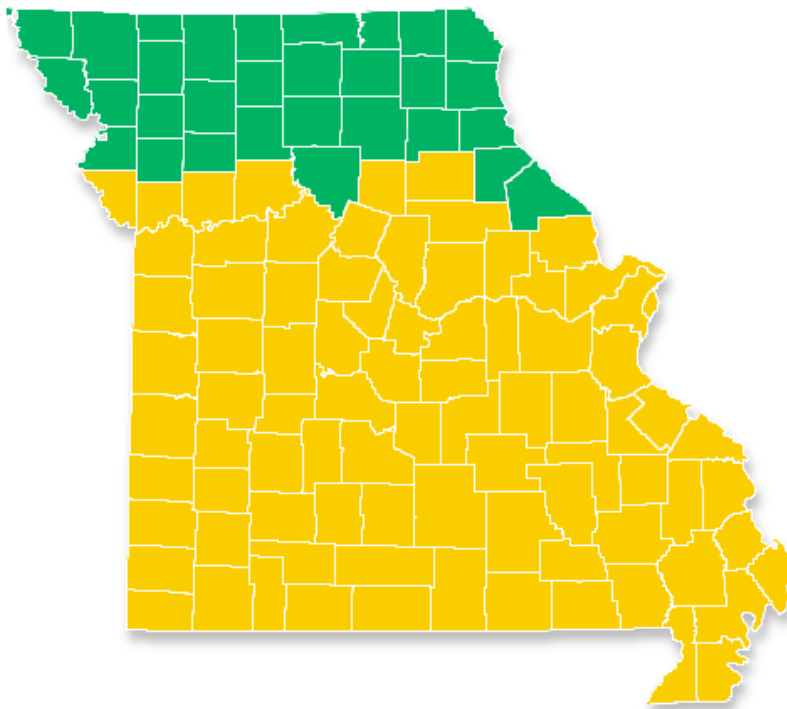
Residential buildings include one- and two-family dwellings, townhouses, and multifamily housing three stories or less in height. All residential buildings must demonstrate compliance with the 2012 International Energy Conservation Code.

There are a couple of ways to ensure compliance with the 2012 International Energy Conservation Code. The two approaches include a prescriptive package method that lists the minimum R-value or U-factor requirement for each building component such as walls, roofs, and windows. The other method is the performance approach. This approach sets criteria using simulated energy performance analysis that includes heating, cooling, and water heating energy. This approach allows the design to be compared to a baseline or reference design to verify efficiency and annual energy use. The performance approach allows more flexibility but requires significantly more time and effort. The prescriptive package approach is fast and easy to use, but can be restrictive because it is typically based on worst- case scenario. All units in Missouri will be located in either zone 4 or 5. The zone the unit is constructed in dictates the level of energy efficiency required.

All energy efficiency requirements are noted in Chapter 4 of the 2012 International Energy Conservation Code. As noted above the easiest and fastest compliance tool for compliance is the prescriptive package approach. Listed below are the minimum energy efficiency requirements for all units constructed in Missouri.

- A permanent certificate shall be completed and posted on or in the electrical distribution panel box completed by the builder or registered design professional. The certificate must list the R-values, U-factors, SHGC of fenestration for all insulation and windows installed, and efficiencies of the HVAC system and water heating equipment.
- All joints and seams in the building thermal envelope must be thoroughly sealed to limit air infiltration and the building has been tested or visually inspected.
- All recessed lighting must be labeled and sealed.
- At least one thermostat must be provided for each separate HVAC system. A programmable thermostat is required for forced air furnaces.
- All ducts, air handlers, and filter boxes must be sealed. Testing is required for ducts installed in unconditioned space.
- All mechanical system piping carrying fluids above 105° must be insulated to a minimum of R-3.
- HVAC systems must be properly sized in accordance with *ACCA Manual S* based on building loads calculated in accordance with *ACCA Manual J* or other approved heating and cooling calculation methodologies.

- R-49 ceiling or attic insulation for zone 4 and 5.
- R-19 floor insulation for zone 4 and R-30 floor insulation for zone 5.
- Mass walls are above grade concrete, masonry, brick, or log and require R-8 continuous insulation on the interior or exterior of the unit or R-13 cavity insulation on the interior for zone 4. R-13 continuous insulation on the interior or exterior of the unit or R-17 cavity insulation on the interior is required for zone 5.
- Basement or crawl space masonry walls require R-10 continuous insulation on the interior or exterior of the unit or R-13 cavity insulation on the interior for zone 4. R-15 continuous insulation on the interior or exterior of the unit or R-19 cavity insulation on the interior is required for zone 5.
- Floor slabs require R-10 insulation for a depth of 2 feet.
- Windows must be insulated with a minimum .35 fenestration U-factor for zone 4. A minimum .32 fenestration U-factor is required for zone 5.
- Skylights must contain a minimum .55 fenestration U-factor.
- Exterior wall insulation values are dependent on zones. R-20 or 13+5 for zone 4 and zone 5, R-13 cavity insulation and R-5 continuous insulated sheathing on exterior wall.
- Energy Star-rated appliances (dishwasher, refrigerator) and other building materials recommended. Other Energy Star-rated building materials include: air-source heat pumps, central air conditioners, gas and oil furnaces, high- efficiency hot water heaters, Energy Star-rated light fixtures (LED), and Energy Star-rated doors and windows.



Climate Zone 4 (Except Marine)	
Ceiling R-value	49
Wood Frame Wall R-value	20 or 13+5 ^h
Mass Wall R-value ⁱ	8/13
Floor R-value	19
Basement Wall R-value ^c	10/13
Slab R-value ^d , Depth	10, 2 ft
Crawlspace Wall R-value ^c	10/13
Fenestration U-Factor ^b	0.35
Skylight U-Factor ^b	0.55
Glazed fenestration SHGC ^{b, e}	.40

Climate Zone 5 & 4 Marine	
Ceiling R-value	49
Wood Frame Wall R-value	20 or 13+5 ^h
Mass Wall R-value ⁱ	13/17
Floor R-value	30 ^g
Basement Wall R-value ^c	15/19
Slab R-value ^d , Depth	10, 2 ft
Crawlspace Wall R-value ^c	15/19
Fenestration U-Factor ^b	0.32
Skylight U-Factor ^b	0.55
Glazed fenestration SHGC ^{b, e}	NR

For SI: 1 foot = 304.8 mm.

- a. *R*-values are minimums. *U*-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall not be less than the *R*-value specified in the table.
- b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- c. “15/19” means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. “15/19” shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. “10/13” means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
- d. R-5 shall be added to the required slab edge *R*-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.
- e. There are no SHGC requirements in the Marine Zone.
- f. Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.
- g. Or insulation sufficient to fill the framing cavity, R-19 minimum.
- h. First value is cavity insulation, second is continuous insulation or insulated siding, so “13+5” means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation *R*-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used – to maintain a consistent total sheathing thickness.
- i. The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

APPENDIX 2 – NATIONAL PROGRAM REQUIREMENTS FOR ENERGY STAR CERTIFIED HOMES

APPENDIX 3 – SAMPLE MHDC SITE OBSERVATION REPORT

NOTE: The following is an EXAMPLE document listing items to be included in the field report submitted to MHDC from the Architect of Record.

Site Observation Report No.:
 Prepared for: Missouri Housing Development Commission

Development Name:	Inspection Date & Time:
MHDC No.:	Weather:
Location:	Type of Meeting:
Type of Construction:	Pay Request #:
# of Units:	% of Completion:
# of Bldgs.:	Inspector:

ATTENDEE

PROGRESS SUMMARY:

Construction in Conformance with Schedule: Yes No
 Comments:

PAY REQUESTS:

PR No.	Date:	Current Payment Due:	Balance to Finish Including Retainage	% Complete

CHANGE ORDERS:

CO No.	Date:	Description:	Amount:

POTENTIAL CHANGE ORDER ITEMS DISCUSSED:

SAMPLE

ACCEPTED TIME REVISIONS:

Date	Description	Number of days

Revised Completion Date _____

ONLY

POTENTIAL CONCERNS & ISSUES:

(Include photos, name of attendee you informed of the concerns, the party responsible for remedies, what the remedy will be, and a target date for resolve)

ATTACHMENTS: Photos

SUBMITTED BY:

By: _____

(Signature)

Printed Name:

Title:

Report Submittal Date:

APPENDIX 4 - UNIFORM PHYSICAL CONDITION STANDARDS