



**City of Duluth
Construction Services & Inspections Division**

411 West First Street • Room 210 • Duluth, Minnesota • 55802-1194
218-730-5300 • Fax: 218-730-5901 • www.duluthmn.gov/onestop/

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Summary of Residential Code Requirements

The first step in beginning your residential construction project is to determine the major requirements of the Minnesota Residential Code (MRC) and Duluth Unified Development Chapter (UDC). The following guide will help you on your way to preparing documents for plan review and help you anticipate the most common issues which arise during construction.

The State of Minnesota delegates administration of the Minnesota State Building Code (MSBC) to municipalities and requires the designation of a building official responsible for enforcement of the building code including issuing building permits. Construction of and improvements to one and two family dwellings and townhouses are required by the State of Minnesota to be in accordance with the 2015 MSBC, which includes the 2015 Minnesota Residential Energy Code, Chapter 1322, as well as the 2015 Minnesota Residential Code, which includes the 2012 International Residential Code (IRC) as amended by Minnesota Rules Chapter 1309. The City of Duluth 2010 Unified Development Chapter (UDC) includes zoning and other land use regulations.

The purpose of this code is to establish minimum requirements to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment and to provide safety to firefighters and emergency responders during emergency operations. The purpose of the code is not to create, establish, or designate a particular class or group of persons who will or should be especially protected or benefited by the terms of the code.

We strongly encourage purchase of applicable codes to use as a reference when designing and beginning the construction of a building project. Copies of the 2015 Minnesota residential and energy codes with amendments are available at the Minnesota Bookstore at <http://www.comm.media.state.mn.us/bookstore/mnbookstore.asp>. The 2010 Duluth Unified Development Chapter, which includes land use and zoning regulations, is available for viewing online at <http://www.duluthmn.gov/planning/current-planning/zoning-regulations/> and in the Construction Services' office. Copies may be purchased at the Planning office front desk.

Applicable Minnesota Rules are also available online at:
<http://codes.iccsafe.org/app/book/toc/2015/Minnesota/Residential/index.html>

A detailed and complete set of plans will greatly help speed your project along. This will result in fewer delays during plan review and will minimize problems during construction.

The intent of this handout is to summarize code requirements and regulations to assist in the planning of projects and preparation of construction documents. Refer to the entire building code for a complete list of building code requirements.

The Minnesota State Residential Code classifies four occupancy categories: R202

IRC - 1 Single Family Dwelling
IRC - 2 Two family Dwelling

IRC - 3 Townhouse
IRC - 4 Accessory structures

Residences (also see UDC Regulations regarding types of residences.)

MRC R202

Dwelling: Single Family

Any building that contains one dwelling unit used, intended, or designed to be built, used, rented, leased, let or hired out to be occupied, or occupied for living purposes.

Dwelling: Two Family

Any building that contains two separate dwelling units with separation either horizontal or vertical on one lot that is used, intended, or designed to be built, used, rented, leased, let or hired out to be occupied, or occupied for living purposes.

Dwelling: Townhouse

A single family dwelling unit constructed in a group of two or more attached units in which each unit extends from the foundation to roof and with open space on at least two sides of each unit. Each single family dwelling unit shall be considered to be a separate building. Separate building service utilities shall be provided to each single family dwelling unit when required by other chapters of the *Minnesota State Building Code*.

Location on Lot

MSRC R302.1, Duluth Unified Development Chapter

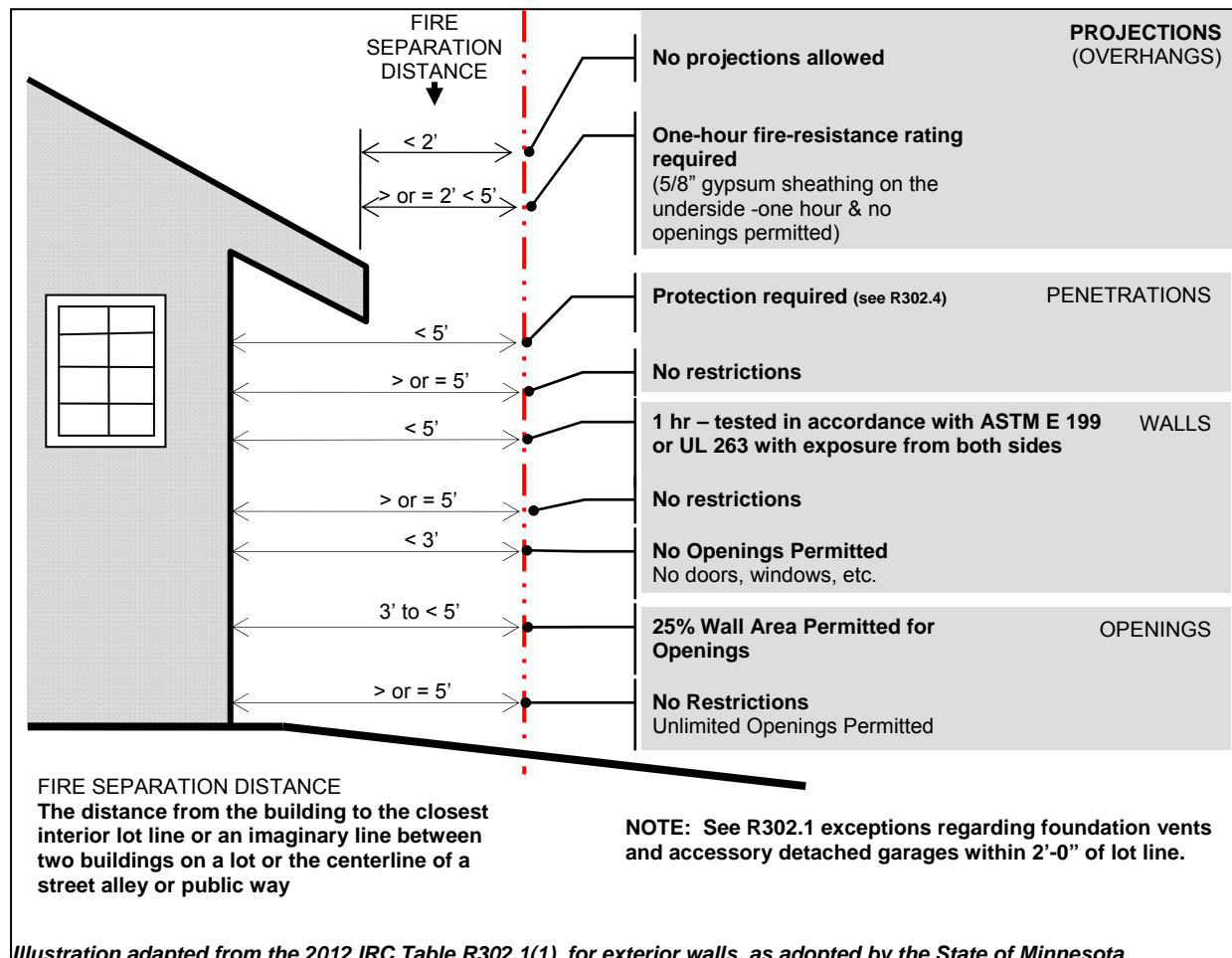
Zoning setback requirements may be more restrictive than building code requirements. Refer to the Duluth Unified Development Chapter regarding the specific setback requirements for your project. Zoning setbacks are from property lines. Site plans are required.

Surveys. Refer to our office policy handout for survey requirements. MSBC 1300.0130, Subp. 4

Fire separation distance is the distance measured from the building face to the closest interior lot line, to the centerline of a street, alley or public way, or to an imaginary line between two buildings on the property. The distance shall be measured at right angles from the lot line. R202

Exterior wall – distance to property line (per diagram below). Construction, projections, openings and penetrations of exterior walls of dwellings and accessory buildings shall comply with Table R302.1(1); for dwellings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904 shall comply with Table R302.1(2). These provisions shall not apply to walls, projections, openings or penetrations in walls perpendicular to the line used to determine the fire separation distance. Walls of dwellings and accessory structures located on the same lot. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the lot. Projections beyond the exterior wall shall not extend over the lot line. Detached garages accessory to a dwelling located within 2 feet of a lot line are permitted to have roof eave projections not exceeding 4 inches. Foundation vents installed in compliance with this code are permitted. R302.1

Exterior Walls – Dwellings Without Fire Sprinklers

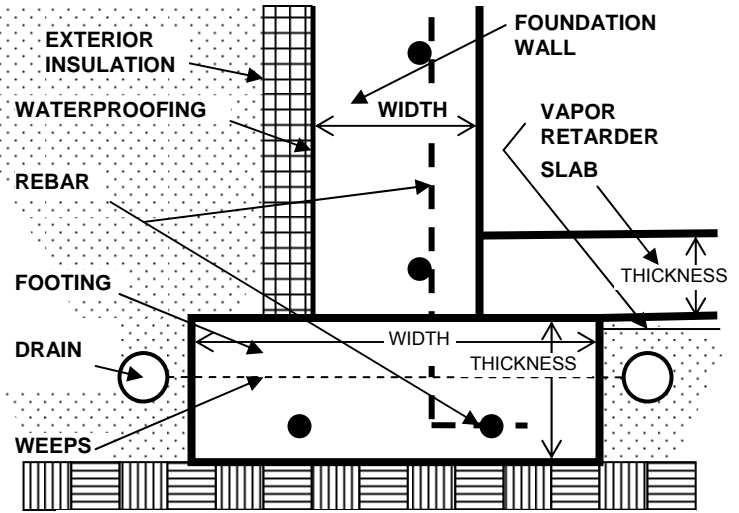


Distance between the dwelling and an accessory building on the same lot. Per the 2015 Minnesota State Residential Code, Section R302.6, accessory buildings that are placed less than 3 feet from the dwelling unit on the same lot shall have the interior side of such exterior wall protected with not less than ½ inch gypsum board. In addition, for the wall of the accessory structure that is less than 3 feet to the dwelling wall, any door opening(s) in the accessory structure are regulated by Section R302.5, which requires that doors shall be solid wood not less than 1 ¾ inches in thickness, solid or honeycomb core steel doors not less than 1 ¾ inches in thickness, or 20 minute fire-rated doors. No glazed openings are allowed in the accessory building wall if less than 3 foot separation distance (wall to wall) to the dwelling. *This does not apply to walls that are perpendicular to the dwelling wall.

Footings MSRC Section 403, MN Rules 1303.1600

As a general rule, minimum footing size is 20" x 8", reinforced with (2) - #4 rebar placed 3 inches (cover) above the footing bottom. This will suffice for most conventional light frame residences that are 2 stories or less in height, with basements considered to be stories. See Table R403.1 for buildings with 3 or more stories and brick or masonry construction. In the City of Duluth we assume 1,500 psf soil bearing as a default value. To determine a higher bearing capacity, a report from a geotechnical engineer will need to be provided. A minimum of (1) - #4 rebar vertical shall be provided in piers.

Reinforcing bars in footings in contact with earth may be used to ground buildings per NEC 250.50 and 250.52. Residences are required to be grounded.



Example of a foundation detail

Foundation Walls

MN Rules Chapter 1303, 1309 & 1322

Rebar. See section R404 for numerous tables that show minimum reinforcing steel requirements. Both vertically spaced rebar and horizontally spaced rebar are required, depending upon the type of wall that is being proposed.

Plans. Wall thickness, height of backfill, type of soil used for backfill, reinforcing of concrete and anchorage must be clearly shown on plans for all foundation types. Plans must be fully descriptive of the work that is being proposed.

Frost depth. Minimum depth from grade to bottom of footing in Duluth is 60 inches. 1303.1600

Foundation anchorage. Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of braced wall panels at building interiors on monolithic slabs, and all wood sill plates shall be anchored to the foundation with anchor bolts spaced a maximum of 6 feet on center. Bolts shall be at least ½ inch in diameter and shall extend a minimum of 7 inches into concrete or grouted cells of concrete masonry units. A nut and washer shall be tightened on each bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches or less than 7 bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundation that are not part of a braced wall panel shall be positively anchored with approved fasteners. Sill plates and sole plates shall be protected against decay where required by Section R317. When vertical reinforcing is required by other sections of this code, the foundation anchor bolts shall align with the reinforcing. All anchor bolts installed in masonry shall be grouted in place with at least 1 inch of grout between the bolt and masonry. R403.1.6

Poured concrete foundations must comply with the MSRC Chapter 4 or be designed and plans certified by a Minnesota licensed structural engineer.

Masonry foundations must comply with the MSRC Chapter 4 or be designed and plans certified by a Minnesota licensed structural engineer. To minimize damage from freezing of block below grade, it is recommended to use three-core block with all cores fully filled.

Insulated concrete form (ICF) foundations shall comply with the published manufacturer's data, the MSRC Chapter 4 or be designed by a Minnesota licensed structural engineer.

Wood foundations must comply with the MSRC Chapter 4 or be designed and plans certified by a Minnesota licensed structural engineer. Complete plans, sections and details are required clearly showing compliance with the building code.

Frost protected shallow foundations must comply with the MSRC Chapter 4 and the 2015 Minnesota Residential Energy Code. See Construction Services' **Frost Protected Shallow Foundations** handout. Complex projects may require a design and drawings certified by a Minnesota licensed structural engineer.

Waterproofing. Concrete and masonry basements must be waterproofed as per R406.2. Any product proposed that is not prescribed in this section requires Building Official approval and must be specified on the construction documents.

Surface drainage. Surface drainage shall be diverted to a storm sewer conveyance or other approved point of collection that does not create a hazard. Lots shall be graded so as to drain surface water away from foundation walls. The grade shall fall a minimum of 6 inches within the first 10 feet. R401.3

Foundation drainage. Drains shall be provided around all concrete or masonry foundations that retain earth and enclose habitable or usable spaces located below grade. Drainage tiles, gravel or crushed stone drains, perforated pipe or other approved systems or materials shall be installed at or below the area to be protected and shall discharge by gravity or mechanical means into an approved drainage system. Gravel or crushed stone drains shall extend at least 1 foot beyond the outside edge of the footing and 6 inches above the top of the footing and be covered with an approved filter membrane material. The top of open joints of drain tiles shall be protected with strips of building paper, and the drainage tiles or perforated pipe shall be placed on a minimum of 2 inches of washed gravel or crushed rock at least one sieve size larger than the tile joint opening or perforation and covered with not less than 6 inches of the same material. R405.1

- Drain tiles shall be installed around the perimeter of all footings, both inside and outside of the building for foundations that retain earth and enclose habitable or useable spaces located below grade. Perimeter drain tiles shall be connected by cross tiles through the footings (weeps). Cross weeps shall be a minimum 2 inch diameter PVC (or approved equal). They shall be located flush with the top of the footing. Cross weep spacing shall not exceed 10 foot on center, with a minimum of one cross weep per length of footing.
- Radon mitigation systems may be tied into the foundation drainage system when approved by the building official.
- Perimeter drain tiles shall discharge into a sealed sump pit that will allow the subsurface ground water to be discharged by gravity to daylight or by a sump pump.

Exterior foam insulation installed vertically must be protected above grade and to 6 inches below grade. When installed horizontally, protection is required where foam is less than 12 inches below the ground surface or that portion of horizontal insulation extending outward more than 24 inches. 1322.0303.2.1, R403.3.2

Floors

MSRC Chapter 5, MN Rules Chapter 1303

See Construction Services' **Radon** handout for more floor requirements for new dwellings.

Fire protection of floors. Floor assemblies not required to have a fire-resistance rating must be provided with a ½ inch gypsum wallboard membrane, 5/8 inch wood structural panel membrane, or equivalent on the underside of the floor framing members. There are exceptions such as providing an automatic sprinkler system or if the floor framing is 2x10 or large. R501.3

Concrete floors. A 6-mil poly vapor retarder is required under concrete floors except in unheated structures. Fill material shall be free of vegetation and foreign material, compacted to ensure uniform support and, except where approved, shall not exceed 24 inches for clean sand or gravel and 8 inches for earth. A 4 inch thick base course of clean graded sand, gravel or crushed stone shall be placed on the prepared sub-grade when the slab is below grade. R506

Under-floor space (such as a crawl space). Ventilation is required with min net openings of 1 sf per 150 sf of under floor area. The ventilation may not be required in some circumstances in accordance with R408.3. Access shall be provided to all under-floor spaces. Access openings through the floor shall be a minimum of 18" x 24". Openings through a perimeter wall shall be not less than 16" x 24". R408.4

Floor framing plans must be submitted with construction documents for plan review. Where engineered lumber products are to be used, provide erection and shop drawings indicating all trusses, I-joists, beams, columns, etc.

Walls

MSRC Chapters 5, 6 and 7, MN Residential Energy Code

Plans. A wall section must be submitted with construction documents depicting all components of the proposed wall assembly. MSRC Section R317 requires the use of treated or decay resistant wood in some situations.

Vapor retarder. A Class I or Class II vapor retarder is required on the interior side of frame walls in Climate Zones 6 and 7. Class II vapor retarders are permitted only when specified on the construction documents. R702.7

Material vapor retarder class. The vapor retarder class shall be based on the manufacturer's certified testing or a tested assembly. The following shall be deemed to meet the class specified: R702.7.2

- Class I: Sheet polyethylene, unperforated aluminum foil.
- Class II: Kraft-faced fiberglass batts.

Eave baffle. For air permeable insulations in vented attics, a baffle shall be installed adjacent to soffit and eave vents. Baffles shall maintain an opening equal or greater than the size of the vent. The baffle shall extend over the top of the attic insulation. The baffle shall be permitted to be any solid material. 1322.0402.2.3

Wall sections. Wall sections must be provided, see MSRC Chapters 5 and 6. See sample drawings available in Construction Services' office.

Headers and beams. Indicate all required headers (over window and door openings) and beams. See Tables R502.5(1) and R502.5(2) or provide engineering.

Wall bracing. See R602.10 for complete design requirements. Typically, corners require a section 4 feet wide sheathed with plywood or OSB. The code allows for alternate bracing methods. Plans must indicate the method use for required wall bracing.

Roof and Ceiling

MSRC Chapters 8 and 9, MN Residential Energy Code

Ventilation. Typically, a 1 inch minimum gap is required from the soffit ventilation to roof or ridge vents. See IRC Section 806 for specific ventilation requirements. Unvented attic assemblies (hot roof) are now allowed when constructed as per the requirements of R806.5. See Construction Services' **Unvented Attic Assemblies** handout.

Attic Access. Opening shall be a minimum of 22" x 30", with at least 30 inches of clear head room and shall be gasketed to prevent heat loss. Locate attic access in a hall, room or similar location. R807.1

Ice Barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier that consists of a least two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet, shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point at least 24 inches inside the exterior wall line of the building. R905.2.7.1

Truss uplift resistance. Trusses shall be attached to supporting wall assemblies by connections capable of resisting uplift forces as specified on the truss design drawings. Uplift forces shall be permitted to be determined as specified by Table R802.11, if applicable, or as determined by accepted engineering practice. R802.11.1.2

Minimum Design Live Loads

MSRC R301.5

The following structural design live loads are minimum values. Dead loads for structures depend on the materials that are used. Care should be taken in the design to meet the following requirements:

Exterior balconies and decks	40 psf
Fire escapes	40 psf
Passenger vehicle garages	50 psf, except elevated garage floors shall support 2,000 lbs over 20 sq. in.
Uninhabitable attics without storage	10 psf
Uninhabitable attics with storage	20 psf
Rooms other than sleeping rooms	40 psf
Sleeping rooms	30 psf
Stairs	40 psf or 300 lbs concentrated over 4 sq. in., whichever produces greater stresses
Guards in handrails	200 lbs in a single concentrated load applied in any direction at any point along the top (Typically (2) – ½ inch diameter thru-bolts, with solid blocking to joists and no notches.)

Climatic and Geographic Design Criteria

Table R301.2(1) and Table 1322.0403.5.17

Ground Snow Load	60 psf
Roof Snow Load	42 psf
Wind Speed	90 mph
Wind Exposure Category	Determined on a site specific basis
Seismic Design Category	A (Not Applicable)
Frost depth	60 inches
Winter Design Temperature	-20 degrees F
Subject to Damage From:	Weathering
	Termites
	Decay
	Severe
	Slight to moderate
	None to slight

Light, Ventilation and Heating

MSRC R303

Habitable rooms, adjoining rooms and bathrooms all require both ventilation and lighting. Both natural and artificial methods are permitted. See the above code section in this regard. As a general rule, if natural lighting and ventilation is to be provided, window openings shall be 8% of the floor area for lighting and 4% of the floor area for ventilation.

Habitable space is a space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces. R202

Required glazed openings shall open directly onto a street or public alley, or a yard or court located on the same lot as the building. R303.8

Required heating. Every dwelling unit shall be provided with heating facilities capable of maintaining a minimum room temperature of 68°F at a point 3 feet above the floor and 2 feet from exterior walls in all habitable rooms at the design temperature. R303.9

Minimum Room Areas

MSRC R304

Minimum area. Every dwelling unit shall have at least one habitable room that shall have not less than 120 sf of gross floor area. R304.1

Other rooms: Except kitchens habitable rooms shall have a floor area of not less than 70 sf, except every kitchen shall have not less than 50 sf of gross floor area. R304.2

Minimum dimensions. Except kitchens, habitable rooms shall not be less than 7 feet in any horizontal dimension. R304.3

Ceiling Height

MSRC R305

Minimum height: Habitable space, hallways, bathrooms, toilet rooms, laundry rooms, and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet. The required height shall be measured from the finish floor to the lowest projection from the ceiling. R305.1

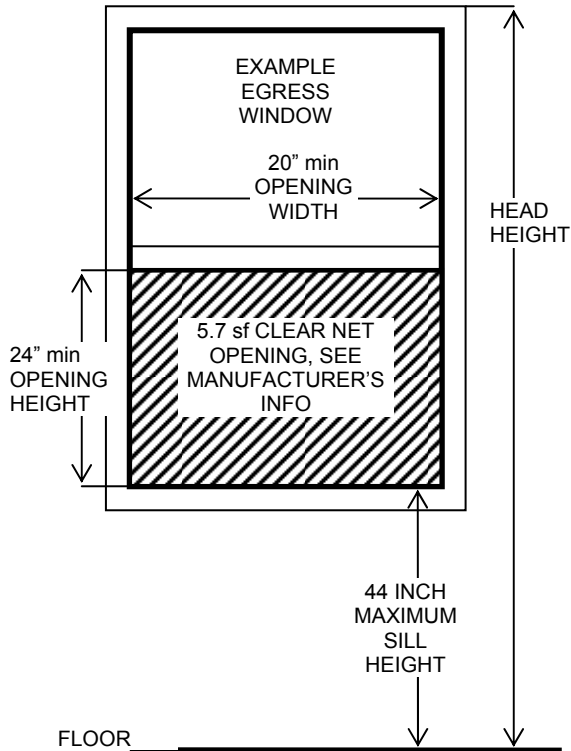
Exceptions:

1. For rooms with sloped ceilings, at least 50 percent of the required floor area of the room shall have a ceiling height of at least 7 feet and no portion of the required floor area may have a ceiling height of less than 5 feet.
2. Bathrooms shall have a minimum ceiling height of 6 feet 8 inches at the center of the front clearance area for the water closets, bidets, or sinks.

Egress Windows

MSRC R310

Emergency escape and rescue openings. Basements, habitable attics, and every sleeping room shall have at least one openable emergency escape and rescue opening. Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room, but not be required in adjoining areas of the basement. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 44 inches measured from the finished floor to the bottom of the clear opening. Where a door opening having a threshold below the adjacent ground elevation serves as an emergency escape and rescue opening and is



provided with a bulkhead enclosure, the bulkhead enclosure shall comply with Section 310.3. The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. Emergency escape and rescue openings with a finished sill height below the adjacent ground elevation shall be provided with a window well in accordance with Section R310.2. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way. R310.1

Minimum opening area. All emergency escape and rescue openings shall have a minimum net clear opening of 5.7 sf, except grade floor openings shall have a minimum net clear opening of 5 sf (see window well handout). Most window manufacturers list this information. R310.1.1

Minimum opening height and width. The net clear opening height shall be 24 inches minimum. The net clear opening width shall be 20 inches minimum. R310.1.2, R310.1.3

Operational constraints. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools or special knowledge. R310.1.4

Replacement windows. Replacement windows installed in buildings regulated by the International Residential Code shall be exempt from the maximum sill height requirements of Sections R310.1, including subsections R310.1.1, R310.1.2, and R310.1.3 if the replacement window is the manufacturer's largest standard size rough opening. The replacement window shall be the same operating style as the existing window or style that provides for an equal or greater window opening area than the existing window. R310.1.5

Licensed facilities. Windows in rooms used for foster care or day care licensed or registered by the State of Minnesota shall comply with the provisions of Section R310.1.5, or all of the following conditions, whichever is more restrictive: R310.1.5.1

1. Minimum of 20 inches in clear opening width;
2. Minimum of 20 inches in clear opening height;
3. Minimum of 648 square inches (4.5 square feet) clear opening; and
4. Maximum of 48 inches from the floor to the sill height.

Window wells. Window wells required for emergency escape and rescue shall have horizontal dimensions that allow the door or window of the emergency escape and rescue opening to be fully opened. The horizontal dimensions of the window well shall provide a minimum net clear area of 9 sf with a minimum horizontal projection and width of 36 inches, and shall provide at least 36 inches vertically under decks and porches. The required ladder or steps shall be permitted to encroach a maximum of 6 inches into the required dimensions of the window well. Footing depth below grade must be maintained at window well locations. Provide horizontal rigid insulation at the bottom of the window well in retrofit applications. See Construction Services' **Window Well** handout for more information. R310.2

Ladder and steps in window wells. Window wells with a vertical depth greater than 44 inches below the adjacent ground level shall be equipped with a permanently affixed ladder or steps usable with the window in the fully open position. Ladders or rungs shall have an inside width of at least 12 inches, shall project at least 3 inches from the wall and shall be spaced not more than 18 inches on center vertically for the full height of the window well. R310.2.1

Drainage. Window wells shall be designed for proper drainage by connecting to the building's foundation drainage system or by an approved alternate method. R310.2.2

Bars, grills, covers and screens. Bars, grills, covers, screens or similar devices are permitted to be placed over emergency escape and rescue openings, bulkhead enclosures, or window wells that serve such openings, provided the minimum net clear opening size equals that required for egress windows. Release or removal shall be from the

inside and shall not require the use of a key, tool, special knowledge or force greater than that which is required for normal operation of the escape and rescue opening. R310.4

Window Fall Protection. Window fall protection is required in all new residential construction. Replacement windows are not required to comply with the requirements. R312.2

Window Sills. In dwelling units, where the lowest part of the opening of an operable window is located more than 72 inches above the finished grade or surface below, the lowest part of the window opening shall be a minimum of 36 inches above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4-inch diameter sphere where such openings are located within 36 inches of the finished floor. R312.2.1

Window Opening Control Devices. Window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section R310.1.1. R312.2.2

Automatic Fire Sprinkler Systems.

MSRC R313

Townhouse automatic fire sprinkler systems. An automatic residential fire sprinkler system is required to be installed in townhomes. The automatic sprinkler system must be designed and installed in accordance with IRC Section P2904 or NFPA13D. R313.1, R313.1.1

Exception: An automatic residential fire sprinkler system shall not be required when additions or alterations are made to existing townhouses that do not have an automatic residential fire sprinkler system installed.

One- and two-family dwellings automatic fire systems. An automatic residential fire sprinkler system is required to be installed in one- and two-family dwellings. The automatic sprinkler system must be designed and installed in accordance with IRC Section P2904 or NFPA13D. R313.2, R313.2.1

Exceptions:

1. Detached one-family dwelling, less than 4,500 square feet of floor area. Floor area shall include all floors and basements, excluding garages.
2. An automatic residential fire sprinkler system shall not be required if additions, alterations, or repairs are made to existing buildings that do not have an automatic residential sprinkler system installed.

State-licensed facilities. One- and two-family dwellings and townhouse buildings containing facilities required to be licensed or registered by the state of Minnesota shall be provided with an automatic sprinkler system required by the applicable licensing provisions of that agency or according to this part, whichever is more restrictive. R313.4

Flashing

MSRC R703.8

Approved corrosion-resistive flashing shall be provided in the exterior wall envelope in such a manner as to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Typical locations include deck ledger boards and other horizontal projections, among other conditions addressed by the code. The flashing shall extend to the surface of the exterior wall finish and shall be installed to prevent water from reentering the exterior wall envelope. Flashing shall be installed in the locations required in R703.8.

Window and door flashing shall be according to manufacturer's instructions. Instructions shall be available on job site for inspectors.

Pan flashing is required at all exterior windows and doors unless another flashing method is provided by the product manufacturer. Typically, pan flashing is installed so that it slopes to the exterior and has a sealed back dam to prevent water from entering the wall cavity or interior spaces. Refer to the code section for approved methods. R703.8.1

Step flashing is required at locations such as wall to roof intersections and chimneys. R703.8

Kick-out flashing is required to be installed so as to divert water away from where the eave of a sloped roof intersects a vertical sidewall. The kick-out flashing on the roof must be a minimum of 2½ inches long. Where flashing is of

metal, the metal must be corrosion resistant with a thickness of not less than 0.019 inch (No. 26 galvanized sheet).
R903.2.1

Safety Glass (Glazing)

MSRC R308.4

Hazardous locations. The following are considered specific hazardous locations for the purposes of glazing:

Glazing in doors. Glazing in all fixed and operable panels of swinging, sliding and bi-fold doors shall be considered a hazardous location. R308.4.1

Glazing adjacent doors. Glazing in an individual fixed or operable panel adjacent to a door where the nearest vertical edge of the glazing is within a 24-inch arc of either vertical edge of the door in a closed position and where the bottom exposed edge of the glazing is less than 60 inches above the floor or walking surface shall be considered a hazardous location. R308.4.2

Glazing in windows. Glazing in an individual fixed or operable panel that meets all of the following conditions shall be considered a hazardous location:

1. The exposed area of an individual pane is larger than 9 square feet;
2. The bottom edge of the glazing is less than 18 inches above the floor;
3. The top edge of the glazing is more than 36 inches above the floor; and
4. One or more walking surfaces are within 36 inches, measured horizontally and in a straight line, of the glazing.

Glazing in guards and railings. Glazing in guards and railings, including structural baluster panels and nonstructural in-fill panels, regardless of area or height above a walking surface shall be considered a hazardous location. R308.4.4

Glazing and wet surfaces. Glazing in walls, enclosures or fences containing or facing hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, showers and indoor or outdoor swimming pools where the bottom exposed edge of the glazing is less than 60 inches measured vertically above any standing or walking surface shall be considered a hazardous location. This shall apply to single glazing and all panes in multiple glazing. R308.4.5

Glazing adjacent stairs and ramps. Glazing where the bottom exposed edge of the glazing is less than 36 inches above the plane of the adjacent walking surface of stairways, landings between flights of stairs and ramps shall be considered a hazardous location. R308.4.6

Glazing adjacent to the bottom stair landing. Glazing adjacent to the landing at the bottom of a stairway where the glazing is less than 36 inches above the landing and within 60 inches horizontally of the bottom tread shall be considered a hazardous location. R308.4.7

Identification. Each pane of glazing installed in hazardous locations shall be provided with a manufacturer's or installer's label, designating the type and thickness of glass and the safety glazing standard with which it complies, which is visible in the final installation. R308.1

Sanitation

MSRC R306

Toilet facilities. Every dwelling unit shall be provided with a water closet, lavatory, and a bathtub or shower. R306.1

Kitchen. Each dwelling unit shall be provided with a kitchen area and every kitchen area shall be provided with a sink. R306.2

Sewage disposal. All plumbing fixtures shall be connected to a sanitary sewer or to an approved private sewage disposal system. R306.3

Water supply to fixtures. All plumbing fixtures shall be connected to an approved water supply. Kitchen sinks, lavatories, bathtubs, showers, bidets, laundry tubs and washing machine outlets shall be provided with hot and cold water. R306.4

Toilet, Bath and Shower Spaces

MSRC R307, MN Plumbing Code 4715.1220

Space required. Fixtures shall be spaced, as a minimum, in accordance with the diagram below:

Bathtub and shower spaces. Bathtub and shower floors and walls above bathtubs with installed showerheads and in shower compartments shall be finished with a nonabsorbent surface. Such nonabsorbent wall surfaces shall extend to a height of not less than 6 feet above the floor. R307.

Plumbing Considerations for Residential Additions. The holder of the building permit is responsible for the items listed here, ensuring that existing water and sewer lines are not compromised.

Any work to a sewer or water line requires a separate plumbing permit and must be completed by either a licensed mater plumber or a pipelayer qualified and bonded to do such work.

Where a sewer lateral is located within the footprint of the residence:

1. Water service shall be sleeved from under new footings to the existing structure and constructed of type K copper.
2. Sewer shall be Schedule 40 plastic or cast iron within the footprint of the building to a point beyond the footprint which is not less than 5 feet from the building.
3. A cleanout 4 inches in diameter is required within 10 feet of the point where the sewer exits the building.
4. Any existing house traps and house trap vents from the existing structure shall be removed.

Questions regarding plumbing requirements can be directed to:

John Malone, East Plumbing Inspector 730-5168
Al Kivisto, West Plumbing Inspector 730-5169

Means of egress

MSRC R311

Means of egress. All dwellings shall be provided with a means of egress as provided in this section. The means of egress shall provide a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the dwelling to the exterior of the dwelling at the required egress door without requiring travel through a garage. R311.1

Egress door. At least one egress door shall be provided for each dwelling unit. The egress door shall be side-hinged, and shall provide a minimum clear width of 32 inches when measured between the face of the door and the stop, with the door open 90 degrees. The minimum clear height of the door opening shall not be less than 78 inches in height measured from the top of the threshold to the bottom of the stop. R311.2

Hallways. The minimum width of a hallway shall not be less than 3 feet. R311.6

Egress facilities. Exterior landings, decks, balconies, stairs and similar facilities shall be positively anchored to the primary structure to resist both vertical and lateral forces or shall be designed to be self-supporting. Attachment shall not be accomplished by use of toenails or nails subject to withdrawal. R311.5.1

Ramps

MSRC R311.8

Ramps shall have a maximum slope of one unit vertical in 12 units horizontal. Handrails shall be provided on at least one side of all ramps exceeding a slope of one unit vertical in 12 units horizontal. A minimum 3' x 3' landing shall be provided at the top and bottom of ramps, where doors open onto ramps and where ramps change direction.

Stairways

MSRC R311.7

Stairways. Stairways shall not be less than 36 inches in clear **width** at all points above the permitted handrail height and below the required headroom height. **Handrails** shall not project more than 4½ inches on either side of the stairway and the minimum clear width of the stairway at and below the handrail height, including treads and landings, shall not be less than 31½ inches where a handrail is installed on one side and 27 inches where handrails are provided on both sides. The maximum **riser height** shall be 7¾ inches and the minimum tread depth shall be 10 inches. The riser height shall be measured vertically between leading edges of the adjacent treads. The **tread depth** shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The walking surface of treads and landings of a stairway shall be sloped no steeper than one unit vertical in 48 units horizontal (2%). The greatest riser height within any flight of stairs shall not exceed the smallest by more than ¾ inch. The greatest tread depth within any flight of stairs shall not exceed the smallest by

more than $\frac{3}{8}$ inch. Open risers are permitted, provided that the opening between treads does not permit the passage of a 4 inch diameter sphere. The minimum **headroom** in all parts of the stairway shall not be less than 6'-8" measured vertically from the sloped plane adjoining the tread nosing or from the floor surface of the landing or platform.

Winder treads. Winder treads shall have a minimum tread depth of 10 inches measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches at any point within the clear width of the stair. R311.7.5.2.1

Spiral stairways. Spiral stairways are permitted, provided the minimum clear width at and below the handrail shall be 26 inches with each tread having a $7\frac{1}{2}$ -inch minimum tread depth at 12 inches from the narrower edge. All treads shall be identical, and the rise shall be no more than $9\frac{1}{2}$ inches. A minimum headroom of 6 feet 6 inches shall be provided. R311.7.10.1

Stairway illumination. All interior and exterior stairways shall be provided with a means to illuminate the stairs, including the landings and treads. R303.7

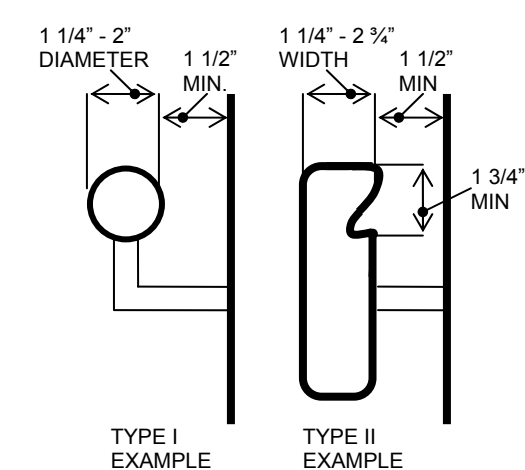
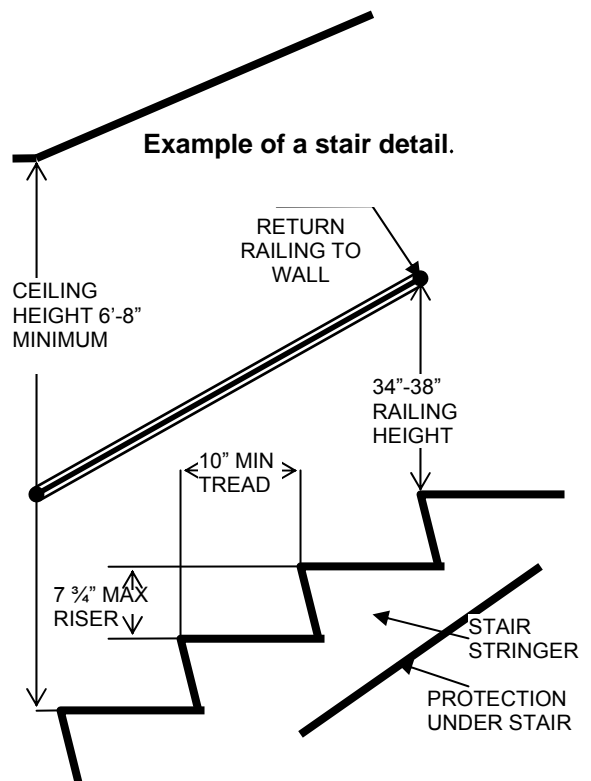
Under stair protection. Enclosed accessible space under stairs shall have walls, under stair surface, and soffits protected on the enclosed side with $\frac{1}{2}$ inch gypsum board. R302.7

Floors and landings at exterior doors. There shall be a landing or floor on each side of each exterior door. The width of each landing shall not be less than the door served. Every landing shall have a minimum dimension of 36 inches measured in the direction of travel. R311.3

Floor elevations at the required egress doors. Landings or finished floors at the required egress door shall not be more than $1\frac{1}{2}$ inches lower than the top of the threshold. R311.3.1

Exception: The landing or floor on the exterior side shall not be more than $7\frac{3}{4}$ inches below the top of the threshold provided the door does not swing over the landing or floor.

Landings for stairways. There shall be a floor or landing at the top and bottom of each stairway. The minimum width perpendicular to the direction of travel shall be no less than the width of the flight served. Where the stairway has a straight run, the minimum depth in the direction of travel shall be not less than 36 inches. R311.7.6



Handrails

MSRC R311.7.8 Handrails. Handrails having minimum and maximum heights of 34 inches and 38 inches, respectively, measured vertically from the nosing of the treads (to the top of the gripping surface), shall be provided on at least one side of stairways. All required handrails shall be continuous the full length of the stairs with four or more risers from a point directly above the top riser of a flight to a point directly above the lowest riser of the flight. Ends shall be returned or shall terminate in newel posts or safety terminals. Handrails adjacent to a wall shall have a space of not less than $1\frac{1}{2}$ inches between the wall and the handrail. Handrails may be interrupted by a newel post at a turn. The use of volute, turnout, or starting easing is allowed over the lowest tread. Design live load of 200 pounds applied in any direction is required.

Handrail grip size. All required handrails shall be of one of the following types or provide equivalent graspability. See illustration:

Guards

MSRC R312

Guards required. Guards shall be located along the open sides of floors, stairs, ramps, and landings that are located more than 30 inches measured vertically to the floor or grade below. Insect screening shall not be considered a guard. Guards and handrails shall be designed to withstand a single 200 pound concentrated load applied in any direction at any point along the top. R312.1.1, Table R301.5, footnote f

Height. Required guards at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches high measured vertically above the adjacent walking surface, adjacent fixed seating or the line connecting the leading edges of the treads. R312.1.2

Guard opening limitations. Required guards shall not have openings from the walking surface to the required guard height which allow passage of a sphere 4 inches in diameter, except the triangular openings at the open side of stair, formed by the riser, tread and bottom rail of a guard, shall not allow passage of a sphere 6 inches in diameter. Guards on the open side of stairs shall not have openings which allow passage of a sphere $4\frac{3}{8}$ inches in diameter. R312.1.3

Smoke Alarms

MSRC R314

Smoke alarms shall be installed in each sleeping room, outside of each separate sleeping area in the immediate vicinity of the bedrooms, as well as each additional story of the dwelling, including basements and habitable attics, but not including crawl spaces and uninhabitable attics. When more than one smoke alarm is required to be installed, the alarm devices shall be interconnected in such a manner that all devices will activate if one is activated. All smoke alarms shall be hardwired with battery back-up and installed in accordance with the provisions of this code and the household fire warning equipment provisions of NFPA 72. R314.3

Alterations, Repairs and Additions. An individual dwelling unit shall be equipped with smoke alarms located as required for new dwellings when alterations, repairs (including installation or replacement of windows or doors), or additions requiring a permit occur; or one or more sleeping rooms are added or created in existing dwellings. R314.3.1

CO Detectors

MSRC R315

Carbon monoxide alarms. For new construction, every one-family dwelling unit, two-family dwelling unit, and each townhouse dwelling unit shall have an approved and operational carbon monoxide alarm installed when one of the following conditions occur: R315.1

1. Fuel-fire appliance are installed; or
2. Have attached garages.

Installation. Carbon monoxide alarms shall be installed outside and not more than 10 feet from each separate sleeping area or bedroom. Alarms shall be installed on each level containing sleeping areas or bedrooms. R315.1.1

Where required in existing dwellings. Where work requiring a permit occurs in existing dwellings that have attached garages or in existing dwellings within which fuel-fired appliances exist, carbon monoxide alarms shall be provided in accordance with Section 315.1. R315.3

Foam Plastic

MSRC R316

Spray foam insulation requires specific approval for each project for the proposed use. Technical data and test results (ICC Evaluation Services Reports or equal) shall be submitted for review by the Building Official at the time of building permit application.

Thermal barrier. All foam plastic or foam plastic cores in manufactured assemblies used in building construction shall have a flame-spread rating of not more than 75 and shall have a smoke-developed rating of not more than 450 and, except where otherwise noted, shall be separated from the interior of a building by minimum $\frac{1}{2}$ inch gypsum board or an approved finish material equivalent to a thermal barrier. R316.3, R316.4

Attics and crawlspaces. Within attics and crawlspaces where access is required by other sections of the code and entry is made only for purposes of repairs or maintenance, foam plastics shall be protected against ignition by $1\frac{1}{2}$ inch thick mineral fiber insulation, $\frac{1}{4}$ inch-thick wood structural panels, $\frac{3}{8}$ inch particleboard, $\frac{1}{4}$ inch hardboard, $\frac{3}{8}$ inch

gypsum board, or corrosion-resistant steel having a base metal thickness of 0.016 inch or 1½ inch thick cellulose insulation. R316.5.3.

Foam plastic in the rim joist area. Foam plastic shall be permitted to be spray applied to a sill plate and header without the thermal barrier subject to all of the following: R316.5.11

1. The maximum thickness of the foam plastic shall be ¾ inches.
2. The density of the foam plastic shall be in the range of 0.5 to 2.0 pounds per cubic foot.
3. The foam plastic shall have a flame spread index of 25 or less and an accompanying smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723.

Vapor Retarders

MSRC R506, R702.7

In all above grade framed walls, floors, and roof/ceilings comprising elements of the building thermal envelope, a Class I or II vapor retarder shall be installed on the interior side of the framing. Class II vapor retarders are permitted only when specified on the construction documents. It need not be sealed unless it also serves as the air barrier required by the energy code. A 6-mil polyethylene or approved vapor retarder with joints lapped not less than 6 inches shall be placed between the concrete floor slab and the base course or the prepared subgrade where no base course exists. The vapor retarder may be omitted from garages, utility buildings, unheated storage rooms having an area less than 70 square feet, carports and from driveways, walks, patios and other flatwork not likely to be enclosed and heated at a later date. See Construction Services' **Radon** handout for more requirements for new dwellings. R506, R702.7

Material vapor retarder class. The vapor retarder class shall be based on the manufacturer's certified testing or a tested assembly. The following shall be deemed to meet the class specified: R202, R702.7.2

Class I: 0.1 perm or less (sheet polyethylene, unperforated aluminum foil)

Class II: $0.1 < \text{perm} \leq 1.0$ perm (kraft-faced fiberglass batts)

Energy Code

MN Rules Chapter. 1322

New detached one- and two family dwellings and townhouses shall comply with the 2015 Minnesota Residential Energy Code. Some of the most common tabular R-values are as follows: Ceiling R-49, Walls R-21, Foundation Walls and Rim R-15, Floors R-30, Slab R-10. Windows and doors shall have a U-factor no greater than .32. See handout and the Minnesota Residential Energy Code for additional information, including air barrier and foundation insulation requirements.

Radon

MN Rules Chapter 1303.2400

Radon mitigation is required in all new residential structures listed below: 1303.2401, 1303.2402, 1303.2403

- A. One-family dwellings;
- B. Two-family dwellings;
- C. Townhouses;
- D. Apartment buildings;
- E. Condominiums;
- F. Multistory buildings that include any residential occupancy;
- G. Any addition to an existing dwelling that currently has a radon control system incorporated into the existing building.

An informational handout for radon is available in Construction Services' office.

Decks

MSRC R507

Deck informational packet is available with application and instructions in Construction Services' office and online at: <http://www.duluthmn.gov/media/122655/ResidentialDecksFullPack3-2013.pdf>

Attached Garages

Opening protection. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and residence shall be equipped with solid wood doors not less than

1³/₈ inches in thickness, solid or honeycomb core steel doors not less than 1³/₈ inches thick, or 20-minute fire-rated doors. R302.5.1

Duct penetration. Ducts in the garage and ducts penetrating the walls or ceilings separating the dwelling from the garage shall be constructed of a minimum No. 26 gage sheet steel or other approved material and shall have no openings into the garage. R302.5.2

Dwelling/garage fire separation. The garage shall be separated from the dwelling as required by Table R302.6.

**TABLE R302.6
DWELLING/GARAGE SEPARATION**

SEPARATION	MATERIAL
From the residence and attics	Not less than ½ -inch gypsum board or equivalent applied to the garage side. Vertical separation between the garage and the residence attic shall extend to the roof sheathing or rafter blocking.
From all habitable rooms above the garage	Not less than 5/8 -inch Type X gypsum board or equivalent
Structural members supporting floor/ceiling assemblies or garage ceiling used for separation required by this section	Not less than ½ -inch gypsum board or equivalent applied to the garage side of structural members supporting the floor/ceiling assemblies or garage ceiling. Structural members include, but are not limited to: walls, columns, beams, girders, and trusses.
Garages located less than 3 feet from a dwelling unit on the same lot	Not less than ½ -inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area. This provision does not apply to garage walls that are perpendicular to the adjacent dwelling unit wall.

Garage floors. Attached garage floor drains must drain to daylight or connect to the sanitary sewer. Concrete floor slabs in unheated garages can be moved by the affects of frost. Pour the garage floor separate from the foundation and place walls directly on the foundation to allow this movement to be independent so it does not affect other elements of the structure.

Fire sprinklers. Attached garages of two-family dwellings and townhouse buildings shall be protected by fire sprinklers and installed in compliance with Section R313.3.

Braced wall panels. See R602.10 for complete design requirements. Typically, corners require a section 4 feet wide sheathed with plywood or OSB. The code allows for alternate bracing methods. Plans must indicate the method use for required wall bracing.

Carports. Carports shall be open on at least two sides. Carport floor surfaces may be concrete, asphalt, sand, gravel, crushed rock, or natural earth. Carports not open on at least two sides shall be considered a garage and shall comply with the provisions of this section for garages. R309.2

Detached Garages

Detached garage floor drains may connect to the sanitary sewer if the garage has a frost protected foundation or may drain to daylight. Detached garage floor drains in a garage with a non-frost protected foundation may drain to daylight.

Construction Documents

MN Rules 1300.0130

Now that you have the basic building code requirements for your residential permit application, it is up to you to provide complete drawings and any other information that describes exactly what you intend to do. The more information you provide, the easier it will be to understand by both plan reviewers and building inspectors. This will greatly help speed your project along, which will help everyone avoid unexpected delays.