CITY OF
MANDAN
"WHERE THE WEST BEGINS"

2014

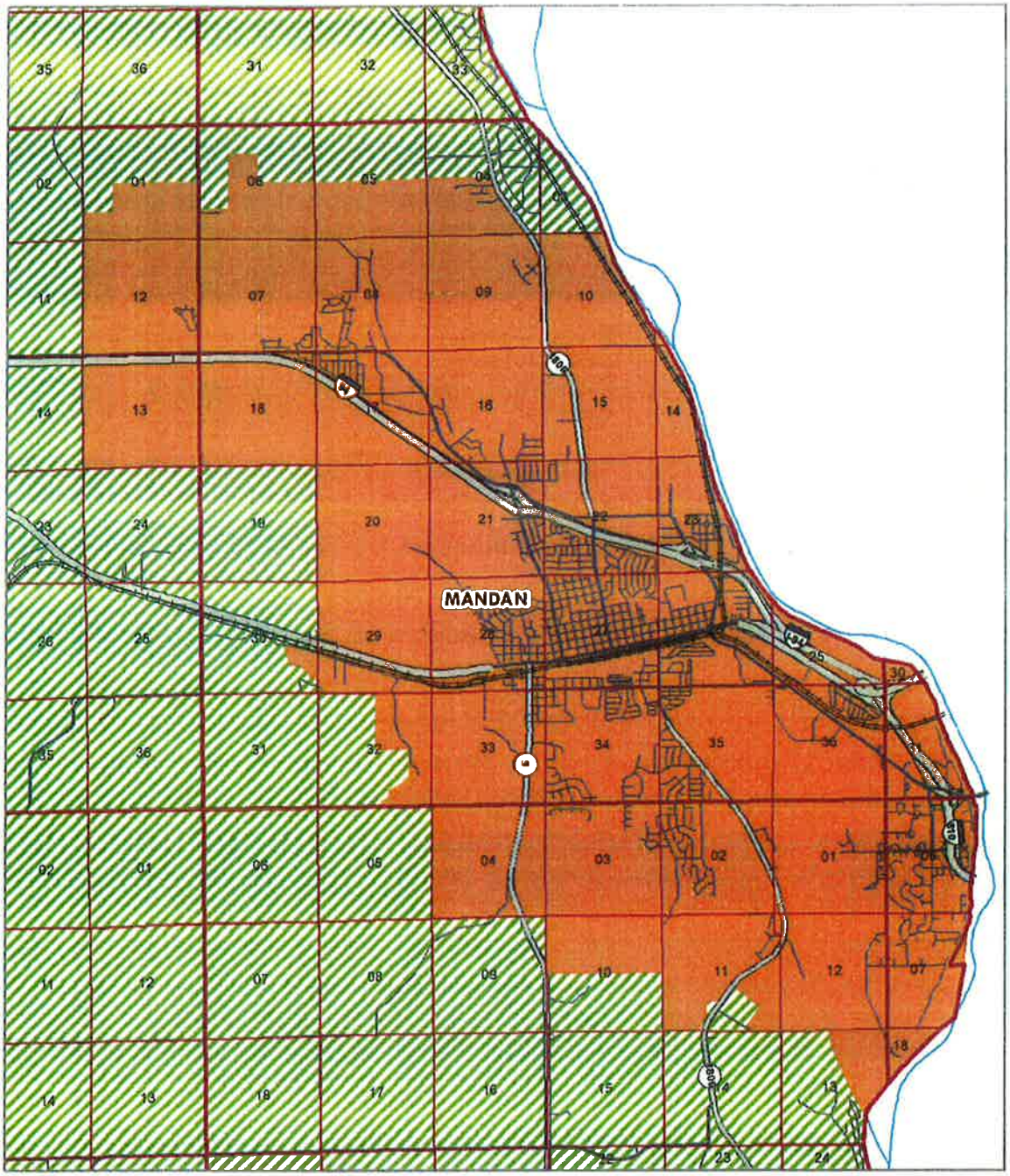
CONTRACTOR'S HANDBOOK

City of Mandan Building Department
205 2nd Ave. NW
Mandan, ND 58554
701-667-3230

STAFF

Doug Lalim, *Building Official*
Jon Benz, *Building Inspector*
George Railsback, *Building Inspector*
Steve Roe, *Building Inspector*
Carolyn Reisenauer, *Admin. Assistant/Permitting*

Exhibit "A" : **Zoning Jurisdiction for the City of Mandan and Morton County** **DRAFT** 11/6/2013



"WHERE THE WEST BEGINS"

CITY OF MANDAN

MANDAN CITY HALL - 205 2nd Avenue NW
MANDAN, NORTH DAKOTA 58554
701-667-3215 • *FAX: 701-667-3223* • www.cityofmandan.com

CITY DEPARTMENTS	
ADMINISTRATION	667-3215
ASSESSING/BUILDING INSPECTION	667-3230
BUSINESS DEVELOPMENT	667-3485
CEMETERY	667-6044
ENGINEER/PLANNING & ZONING	667-3225
FINANCE	667-3213
FIRE	667-3288
HUMAN RESOURCES	667-3217
LANDFILL	667-0184
MUNICIPAL COURT	667-3270
POLICE	667-3455
PUBLIC WORKS	667-3240
WASTEWATER TREATMENT	667-3278
SPECIAL ASSESSMENTS	667-3271
UTILITY BILLING	667-3219
WATER TREATMENT	667-3275

NEW SUBDIVISION POLICY

POLICY-THE NEW PROPOSED SUBDIVISION WILL FALL UNDER THE FOLLOWING REQUIREMENTS AND GUIDELINES:

1. **A STORM WATER MANAGEMENT PERMIT THRU THE ENGINEERING DEPT. NEEDS TO BE APPROVED BEFORE ANY LAND DEVELOPMENT OR LAND DISTURBING.**
2. **A BUILDING PERMIT WILL NOT BE ISSUED UNTIL STREET CURB AND GUTTER AND A STREET SURFACE APPROVED BY THE CITY ENGINEERING DEPT.**
3. **TEMPORARY STREET SIGNS SHALL BE INSTALLED TO IDENTIFY ALL STREETS FOR EMERGENCY SERVICES, APPROVED BY THE FIRE CHIEF.**
4. **ALL INDIVIDUAL CONSTRUCTION SITES SHALL BE REQUIRED TO HAVE CONSTRUCTION GARBAGE CONTAINERS OR DUMPSTERS ON SITE TO KEEP MATERIALS AND GARBAGE FROM BLOWING OFF SITE. ON WINDY DAYS GARBAGE CONTAINERS MUST BE TARPED.**
5. **ALL CONSTRUCTION SITES SHALL HAVE PORTA-POTTIES ON SITE OR BATHROOM FACILITIES AVAILABLE FOR ALL CONSTRUCTION WORKERS AND SUB CONTRACTORS, APPROVED BY THE CITY BUILDING INSPECTOR, WITHIN A REASONABLE DISTANCE.**
6. **ALL FIRE HYDRANTS SHALL BE IN WORKING ORDER.**
7. **NO CERTIFICATE OF OCCUPANCY WILL BE ISSUED UNTIL COMPLETION OF AT LEAST FIRST LIFT OF ASPHALT PAVEMENT.**

NOTICE TO CONTRACTORS

ADDRESS NUMBERS MUST BE 6" SIZE LETTERING, AND SPRAYED ON THE BUILDING. THE COLORED PERMIT CARD MUST ALSO BE ON SITE. IF THIS REQUIREMENT IS NOT FOLLOWED, A 24 HOUR SHUT DOWN PERIOD WILL BE ENFORCED. IF OU HAVE ANY QUESTIONS FEEL FREE TO CONTACT THE BUILDING INSPECTIONS OFFICE AT 701-667-3230.

FOR INSPECTION, YOU MUST CALL IN AT LEAST 4 HOURS PRIOR TO SETTING UP AN INSPECTION. INSPECTORS SCHEDULES FILL UP FAST. WE APPRECIATE YOU UNDERSTANDING IN THIS MATTER AND WILL CONTINUE WITH GREAT SERVICE. THANK YOU FOR YOUR UNDERSTANDING AND COOPERATION.

THANK YOU,

DOUG LALIM
BUILDING OFFICIAL

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Permits for Multi-Family (More than 4 units), Commercial, Industrial and Public Facilities.

Need to submit the following documents to apply for a Building Permit:

1. **Two Complete sets of Construction Documents (24X36)**
2. **Including Civil, Architectural, Structural, Code Review Cover Sheet.**
3. **Copy of any additional Information on proposed Property. (Flood Plain, Easements, Etc.)**
4. **Fill out Permit Application**

Construction Documents will then be routed to the appropriate Staff and Departments for their review. Which include: Engineering, Planning, Fire Department. The Building Dept. will do the Plan Review.

Construction may not begin before the permit is issued and posted on the Jobsite.

All construction sites shall be required to have construction garbage containers or dumpsters on site to keep materials and garbage from blowing off site. Also, a porta-pottie shall be on site for workers use.

A Building Permit will not be issued until the above items have been submitted and reviewed.

Revised: 10-2-13

WHEN A PERMIT IS REQUIRED:

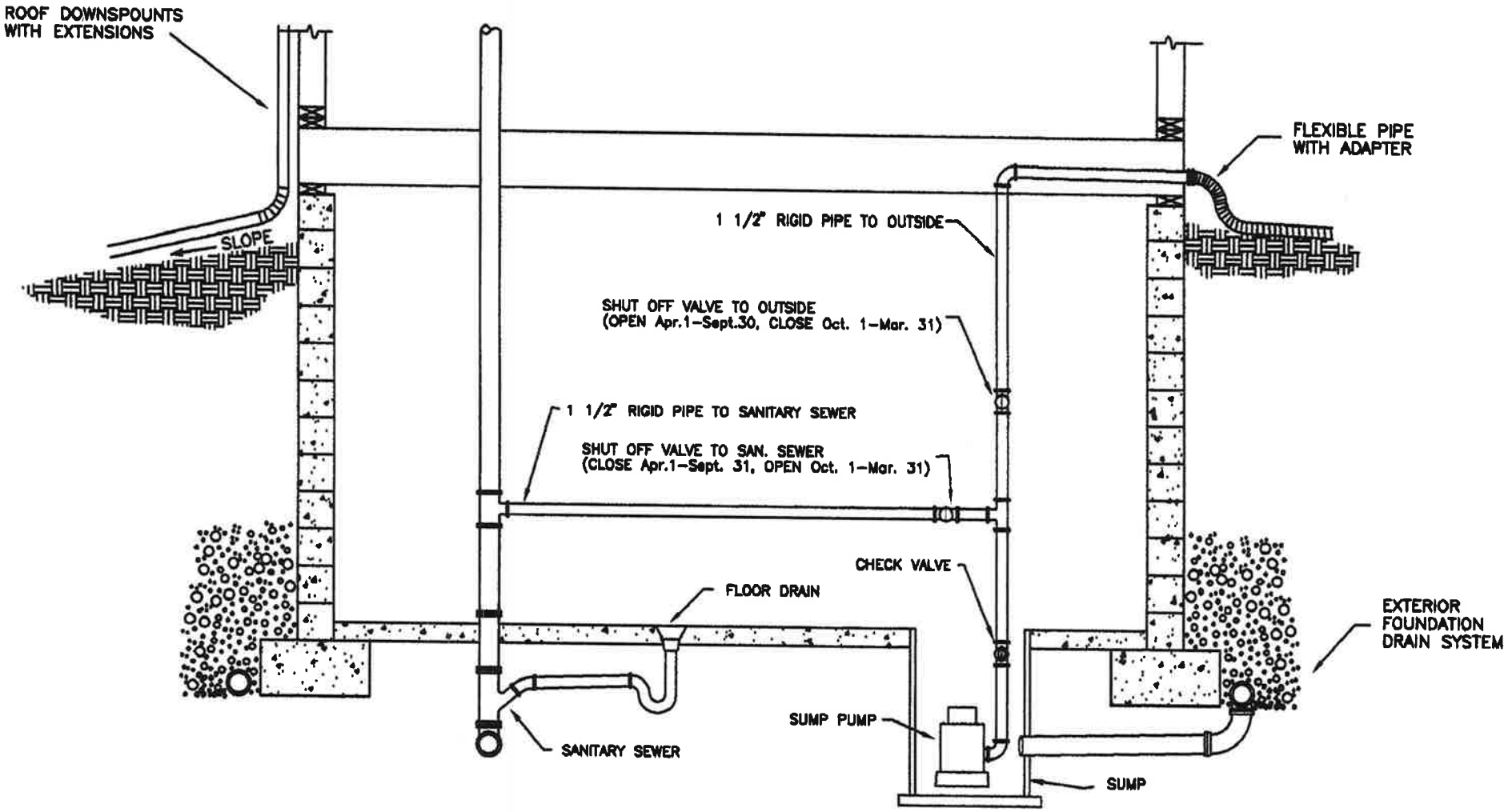
1. Any commercial remodel;
2. Anything that is structural (including residential);
3. Any construction in residential that the total job exceeds $2,000.00 material and labor;
4. Replacement windows need a permit when the total job exceeds $2,000.00 material and labor or if the rough opening is altered;

WORK EXEMPT FROM A PERMIT:

1. One-story storage buildings under 120 square feet;
2. Fences not over 7 feet in height;
3. Retaining walls not over 4 feet in height;
4. Sidewalks and driveways on private property not over 30" above grade;
5. Painting, papering, tiling, carpeting, cabinets, countertops, and similar work;
6. Residential reroofing.

** MAKE SURE TO ALLOW ENOUGH TIME FOR ROUTING PLOT PLANS.

** PLEASE PICK UP YOUR PERMITS IN A TIMELY MANNER.

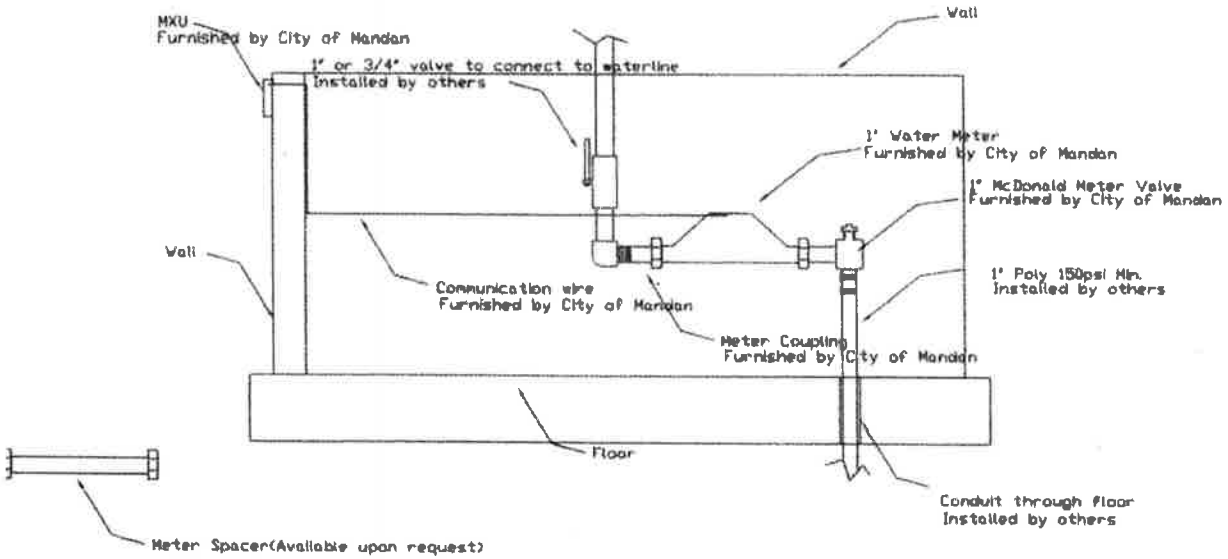


2-WAY SUMP PUMP DETAIL WITH SEASONAL WAIVER

City of Mandan, North Dakota

Note:

1.) Water meter shall be located in basement or mechanical/utility room
2.) Meter shall be placed (30" Min. and 42" Max.) from where the water service line penetrates the wall or floor.
3.) Meter shall be installed in a horizontal position. Supports are required on both sides of the meter.
4.) The base of the water meter shall be set at a height of (30" Min. and 42" Max) from the floor.
5.) It is recommended that a floor drain be located in the room containing the water meter, and be within 5' of the meter.
6.) Meters may not be located above the first floor or ground level. (No exceptions)
7.) Meters may not be installed in crawl space. (No exceptions)
8.) No meter shall be placed: Above or behind a water heater, Furnace, Washer, Dryer, or other such obstructions limiting access to the meter.
9.) A meter pit is required if: There is no basement, mechanical/utility room, or the water service is 150' or longer.
10.) A minimum of 2' working clearance is required around 1" or smaller water meters.
11.) Contact the City of Mandan Water Department if the described installation requirements cannot be satisfied.



Standard Small Meter Installation

Not To Scale

Mr. Excavator

North Dakota law requires you to call this number before you dig:

Effective March 1, 1998, you can call the
North Dakota one call system at

1-800-795-0555

which enables you to contact most utilities with one call

REVISED AUGUST 1, 2001

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TO: **CONTRACTORS OR OTHER INTERESTED PARTIES**

DATE: **APRIL 1, 2011**

SUBJECT: **MOVEMENT OF VEHICLES OVER CURBS**

According to the following City code, the movement of vehicles over a curb is prohibited:

Section 10-04-09 Movement of vehicles over curbs prohibited--Exceptions.

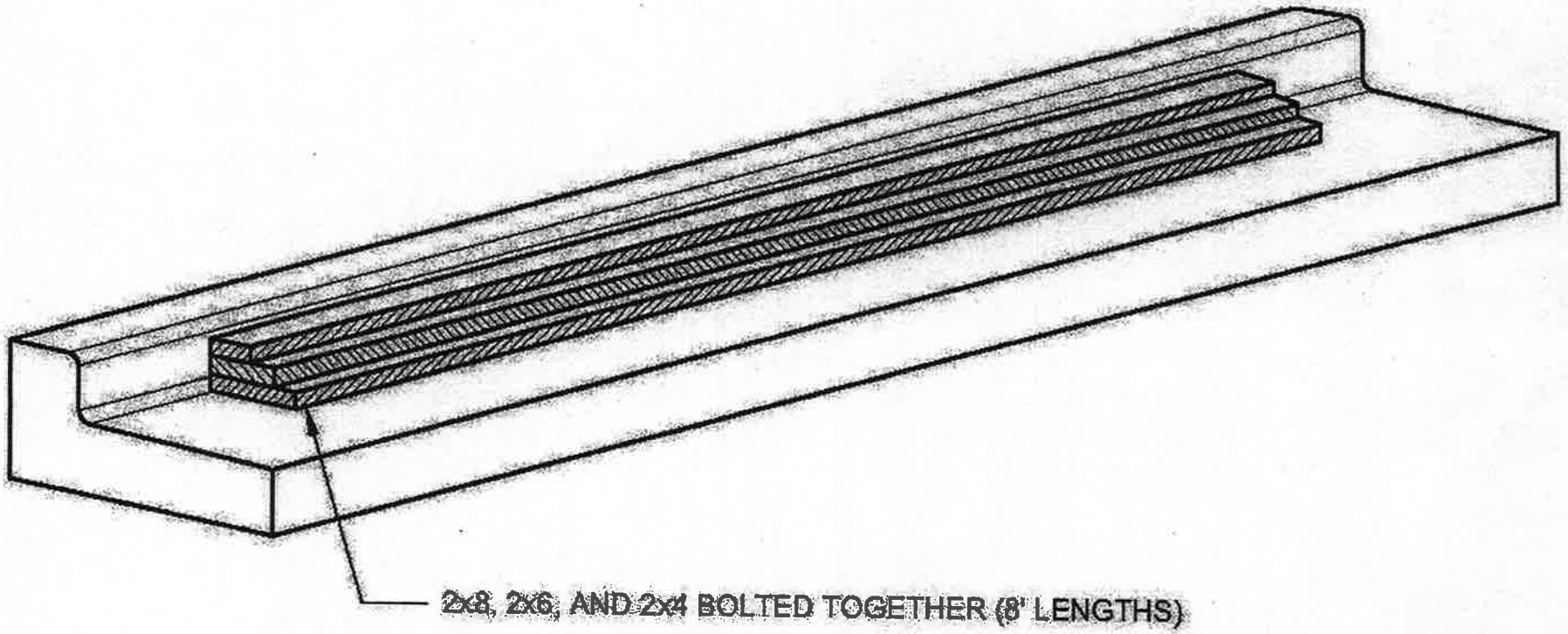
1. Moving Vehicle Across Curb Prohibited--Exceptions. No person, firm or corporation shall move or cause to be moved over any curb within the city any engine, tractor, wagon, motor vehicle, truck or other vehicle, object or thing unless the curb over which the same is to be moved shall be protected by wooden planks or dirt placed or laid in such a manner so as not to cause damage or settling to such curb or any portion thereof when such vehicle, object or thing is moved across such curb; provided, however, dirt fill shall not be used upon any paved street within the city.

2. Duty to remove fill from curb. It shall be the duty of the owner of the premises abutting such curb and the person, firm or corporation placing or constructing such fill to remove the same immediately after such vehicle, object or thing has been moved across such curb.

3. Penalty. Any person, firm or corporation violating any of the terms of provisions of this section shall, upon conviction, be punished by a fine not to exceed one hundred dollars or by imprisonment not to exceed ninety days or both such fine and imprisonment.
Source: MCC § 8-02-30 (1979)

BE ADVISED, this is written notification that if complaints are received this code shall be enforced.

If you'd like to further discuss this matter, please feel free to contact the Engineering Department at 667-3225.


2x8, 2x6, AND 2x4 BOLTED TOGETHER (8' LENGTHS)

Residential Building Permit Application

New Single and Two-Family Dwellings, Remodels

Building Department, 205 2nd Ave NW, Mandan, ND 58501 Phone: (701) 667-3230 Fax: (701) 667-3481

Date _____

Contractor _____ ND License # _____ Phone _____

Type of Home _____ Valuation _____

Property Owner _____ Address _____

Legal _____

Describe Work _____

☐ Single Family ☐ Townhouse ☐ Condo ☐ Twinhome ☐ Duplex

Property Line Wall? (2 family dwellings only) ☐ Yes ☐ No

Type of Property Line Wall: ☐ 2 – 1HR FR Walls ☐ 1 – 2HR FR Wall

Subcontractors:

Electrical _____ ND License # _____

Plumbing _____ ND License # _____

Concrete _____ ND License # _____

Mechanical _____ ND License # _____

Excavator _____ ND License # _____

Sidewalk _____ ND License # _____

Heating: ☐ Forced Air ☐ Hot Water ☐ Air Cond.

Location and Size of Deck _____

Truss Design Submitted ☐ Yes ☐ No

Foundation: ☐ Concrete ☐ PWF ☐ ICF

Basement Sq. Ft _____ Finished _____

1st Floor Sq. Ft. _____ Finished _____

2nd Floor Sq. Ft. _____ Finished _____

3rd Floor Sq. Ft. _____ Finished _____

Garage: ☐ Attached ☐ Detached Sq. Ft. _____

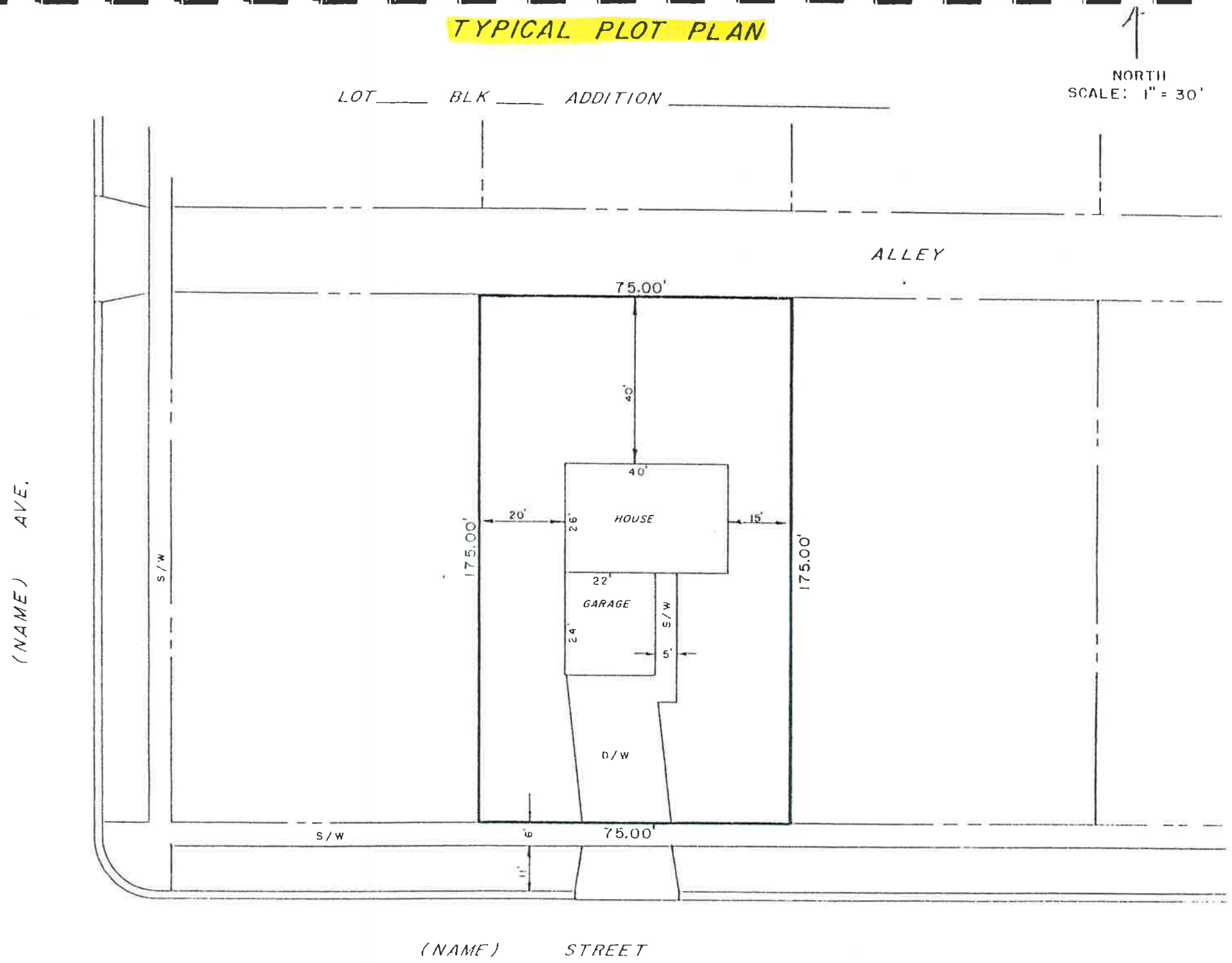
NOTICE: *Separate permits are required for electrical, plumbing, heating or air conditioning. This permit becomes null and void if work or construction authorized is not commenced within 180 days, or if construction work is suspended or abandoned for a period of 180 days at any time after work is commenced. All permits for residential construction shall expire in 365 days.*

I have carefully read the complete application and know the same is true and correct. I understand the ordinances governing the construction activity described in this application, and agree to comply with all provisions of the City ordinances, State laws, and all property restricts, whether herein specified or not. As the owner of the above property or a duly authorized agent, I hereby grant permission to enter the premises and make all necessary inspections.

_____ _____ _____

Signature of Applicant Printed Name Date

TYPICAL PLOT PLAN



ADDRESS:_____

CITY OF MANDAN
INSULATION FORM

ROOF AREA:

Type of Insulation_____

R or U value is_____

Number of inches in ceiling_____

WALL AREA:

Exterior sheeting type_____

Sheeting R or U value_____

Wall insulation type_____

Wall R or U value & inches_____

RIM JOIST:

Type of insulation_____

R or U value_____

FLOOR JOIST, CRAWL SPACE AND ETC:

Type of insulation_____

R or U value_____

BASEMENT WALL INSULATION:

Type_____

R value_____

Exterior and interior total square footage _____

ROOF VENTS:

Square footage of attic area_____

Number of vents_____

Vent area_____

MUST COMPLETE ENTIRE FORM
MUST MEET CURRENT IECC CODE

FAX (701) 667-3481

RESIDENTIAL CODES FOR CITY OF MANDAN

The next pages are examples of sections of the 2012 International Residential Code. This booklet covers a minor few Codes and does not represent the whole 2012 IRC.

R501.3

Fire Protection of Floors

CHANGE TYPE: Addition

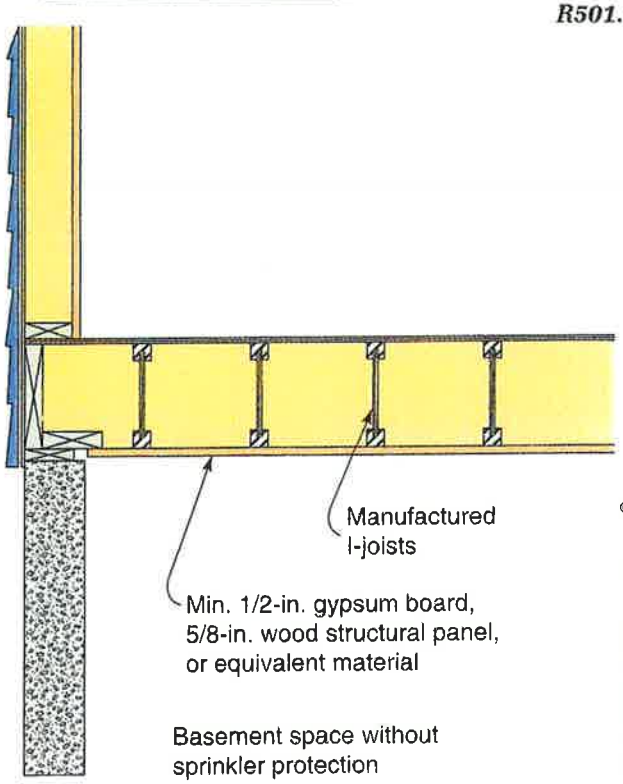
CHANGE SUMMARY: With some exceptions, the code now requires ½-inch gypsum board or equivalent material to be applied to the underside of floor assemblies in buildings regulated by the IRC.

2012 CODE: **R501.3 Fire Protection of Floors.** Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a ½-inch gypsum wallboard membrane, ⅝-inch wood structural panel membrane, or equivalent on the underside of the floor framing member.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA13D, or other approved equivalent sprinkler system.
2. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.
3. Portions of floor assemblies can be unprotected when complying with the following:
   - 3.1 The aggregate area of the unprotected portions shall not exceed 80 square feet per story
   - 3.2 Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.

R501.3 continues



Fire protection of floors

R501.3 continued

4. Wood floor assemblies using dimension lumber or structural composite lumber equal to or greater than 2-inch by 10-inch nominal dimension, or other approved floor assemblies demonstrating equivalent fire performance.

CHANGE SIGNIFICANCE: Installation of ½-inch gypsum board, ⅝-inch wood structural panel, or other approved material is now required on the underside of floor assemblies of dwelling units and accessory buildings constructed under the IRC. The change addresses concerns for firefighter safety and incidents of injury or death to firefighters while fighting residential fires due to the collapse of floors. The application of gypsum wallboard or other approved material intends to provide some protection to the floor system against the effects of fire and delay collapse of the floor. This provision primarily is aimed at light-frame construction consisting of I-joists, manufactured floor trusses, cold-formed steel framing, and other materials and manufactured products considered most susceptible to collapse in a fire.

There are a number of exceptions to this new rule. Solid-sawn lumber and structural composite lumber perform fairly well in retaining adequate strength under fire conditions. Therefore, floors framed with nominal 2 x 10s or larger of these materials are exempt from this section's fire protection requirements. Similarly, if sprinklers are installed to protect the space below the floor assembly, additional protection is not required. Crawlspaces without storage or fuel-fired appliances are not considered to contain sufficient fuel load to present an undue hazard to floor collapse. The code also exempts small areas of ceiling, such as may occur in a utility room in a basement, from the fire protection requirements, provided the space is not open to other portions of the floor system. Therefore, fireblocking is required to isolate the unprotected area from the protected area of the floor system.

International Code Council®

Open web floor trusses require a fire protection membrane applied to the underside.

R322.3.5 in V Zones); (3) materials and finishes below the design flood elevation are flood resistant (see Section R322.1.8); and (4) service equipment and systems comply with Section R322.1.6. Because of these limitations, garages must not be converted to accommodate other uses.

R309.4 Automatic garage door openers. Automatic garage door openers, if provided, shall be listed and labeled in accordance with UL 325.

❖The code does not require an automatic garage door opener. However, if one is installed, it must be listed and labeled in accordance with UL 325. Federal law requires automatic residential garage door openers to conform to the entrapment protection requirements of UL 325.

R309.5 Fire sprinklers. Private garages shall be protected by fire sprinklers where the garage wall has been designed based on Table R302.1(2), Footnote a. Sprinklers in garages shall be connected to an automatic sprinkler system that complies with Section P2904. Garage sprinklers shall be residential sprinklers or quick-response sprinklers, designed to provide a density of 0.05 gpm/ft^2. Garage doors shall not be considered obstructions with respect to sprinkler placement.

❖Section R309.5 provides a limitation on the application of Table R302.1(2) by only allowing use of sprinkler incentives in areas where sprinklers are provided. Normally, garages aren't required to have sprinklers; however, where a designer chooses to take advantage of reduced separation requirements for a garage wall, it is appropriate for the garage to be provided with sprinklers as a means of property protection. Proposed design criteria for sprinklers were derived from NFPA 13R Section 6.8.3.3, which addresses sprinkler protection for garages in buildings protected by NFPA 13R sprinkler systems. Often, garage protection is provided by dry pendant or dry sidewall sprinklers connected to a wet pipe sprinkler system.

SECTION R310
EMERGENCY ESCAPE AND RESCUE OPENINGS

R310.1 Emergency escape and rescue required. *Basements*, habitable attics and every sleeping room shall have at least one operable 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. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 44 inches (1118 mm) 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 R310.3. 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.

Exception: *Basements* used only to house mechanical *equipment* and not exceeding total floor area of 200 square feet (18.58 m^2).

❖Because so many fire deaths occur as a result of occupants being asleep in a residential building during a fire, the code requires that all basements, habitable attics and sleeping rooms have windows or doors that may be used for emergency escape or rescue. These emergency openings must open directly into a public street, public alley, yard or court. The requirement for emergency escape and rescue openings in sleeping rooms exists because a fire will usually have spread before the occupants are aware of the problem, and the normal exit channels may be blocked. The requirement for basements and habitable attics exists because they are so often used as sleeping rooms. For example, a fire in a mechanical room adjacent to a stairway could engulf the only means of egress for the basement without the egress window or door.

Openings required for emergency escape or rescue must be located on the exterior of the building so that rescue can be performed from the exterior. Alternatively, occupants may escape through that opening to the exterior of the building without having to travel through the building itself. Therefore, where openings are required, they should open directly into a public street, public alley, yard or court. After the occupants pass through the emergency escape and rescue opening, their continued egress is essential. Where a basement contains sleeping rooms and a habitable space, an emergency escape and rescue opening is required in each sleeping room, but is not required in adjoining areas of the basement. The same would hold true for a subdivided habitable attic, since there would be an emergency escape window on that level.

There is an exception for basements used only to house mechanical equipment with a total floor area not exceeding 200 square feet (18.58 m^2). Attics that housed only mechanical equipment would not be considered habitable attics.

The dimensions prescribed in the code and as illustrated in Commentary Figure R310.1, for exterior wall openings used for emergency egress and rescue, are based, in part, on extensive testing by the San Diego Building and Fire Departments to determine the proper relationships of the height and width of window openings to adequately serve for both rescue and escape. The minimum of 20 inches (508 mm) for the width is based on two criteria: the width necessary to place a ladder within the window opening and the width necessary to admit a fire fighter with full rescue equipment, including a breathing apparatus. The minimum 24-inch (610 mm) height is based on the minimum size necessary to admit a fire fighter with full rescue equipment. By requiring a minimum net clear opening size of the least 5.7 square feet (0.53 m^2), the code provides for an opening of adequate dimensions.

To be accessible from the interior of the sleeping room, attic or basement, the emergency escape and rescue opening cannot be located more than 44 inches (1118 mm) above the floor. The measurement is to be taken from the floor to the bottom of the clear opening.

The required opening dimensions must be achieved by the normal operation of the window, door or hatch from the inside without the use of keys, tools or special knowledge. The window industry is a highly competitive market. Manufacturers are constantly developing new products that are easier to clean and possess higher thermal protection properties. It is important to keep in mind that no special knowledge for operation of the egress window is a key operational constraint. It is impractical to assume that all occupants can operate a window that requires a special sequence of operations to achieve the required opening size. Although most occupants are familiar with the normal operation to open the window, children and guests are frequently unfamiliar with special procedures necessary to remove the sashes. The time spent comprehending special operations unnecessarily delays egress from the bedroom and could lead to panic and further confusion. Thus, windows that achieve the required opening dimensions only by performing a special sequence of operations, such as the removal of sashes or mullions, are not permitted. For example, if a specific area of the window has to be depressed or manipulated to allow the sash to be removed or released to achieve the open area requirement of 5.7 square feet (0.53 m^2), the window does not qualify as an egress window.

R310.1.1 Minimum opening area. All emergency escape and rescue openings shall have a minimum net clear opening of 5.7 square feet (0.530 m^2).

Exception: *Grade* floor openings shall have a minimum net clear opening of 5 square feet (0.465 m^2).

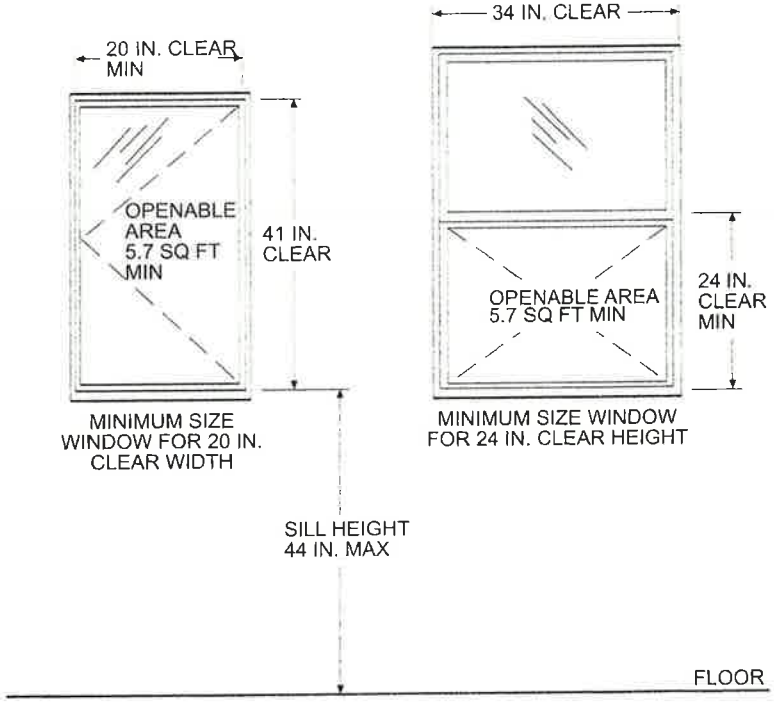
❖Where an emergency escape and rescue window is located at grade level, the opening size requirement is reduced to 5 square feet (0.46 m^2). This results from the increased ease of access from the exterior and the probability that a ladder will not be needed (see Commentary Figure R310.1).

R310.1.2 Minimum opening height. The minimum net clear opening height shall be 24 inches (610 mm).

❖The minimum opening height for emergency space and rescue is 24 inches (610 mm), based on the minimum dimension of a fire fighter with full rescue equipment (see Commentary Figure R310.1).

R310.1.3 Minimum opening width. The minimum net clear opening width shall be 20 inches (508 mm).

❖This section establishes a minimum width of 20 inches (508 mm) for emergency space and rescue openings, based on the minimum dimension of a fire fighter with full rescue equipment (see Commentary Figure R310.1).



For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m^2.

Figure R310.1
EMERGENCY ESCAPE AND RESCUE WINDOW

R312

Guards and Window Fall Protection

CHANGE TYPE: Modification

CHANGE SUMMARY: The provisions for window fall protection have been relocated from Chapter 6 to Chapter 3. The terminology for window opening control devices has been updated for consistency with the referenced standard ASTM F 290. Operation criteria found in the 2008 edition of the standard have been deleted from the prescriptive provisions of the IRC.

2012 CODE:

SECTION R312
GUARDS AND WINDOW FALL PROTECTION

R312.1 Guards. Guards shall be provided in accordance with Sections R312.1.1 through R312.1.4.

R312.1.1 Where Required. [No change to text]

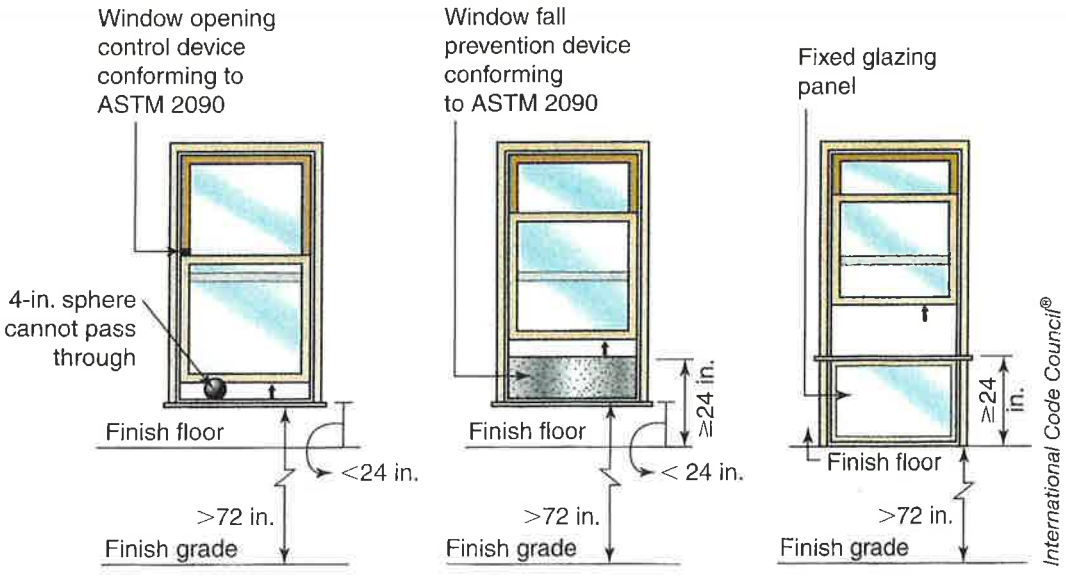
R312.1.2 Height. [No change to text]

R312.1.3 Opening Limitations. [No change to text]

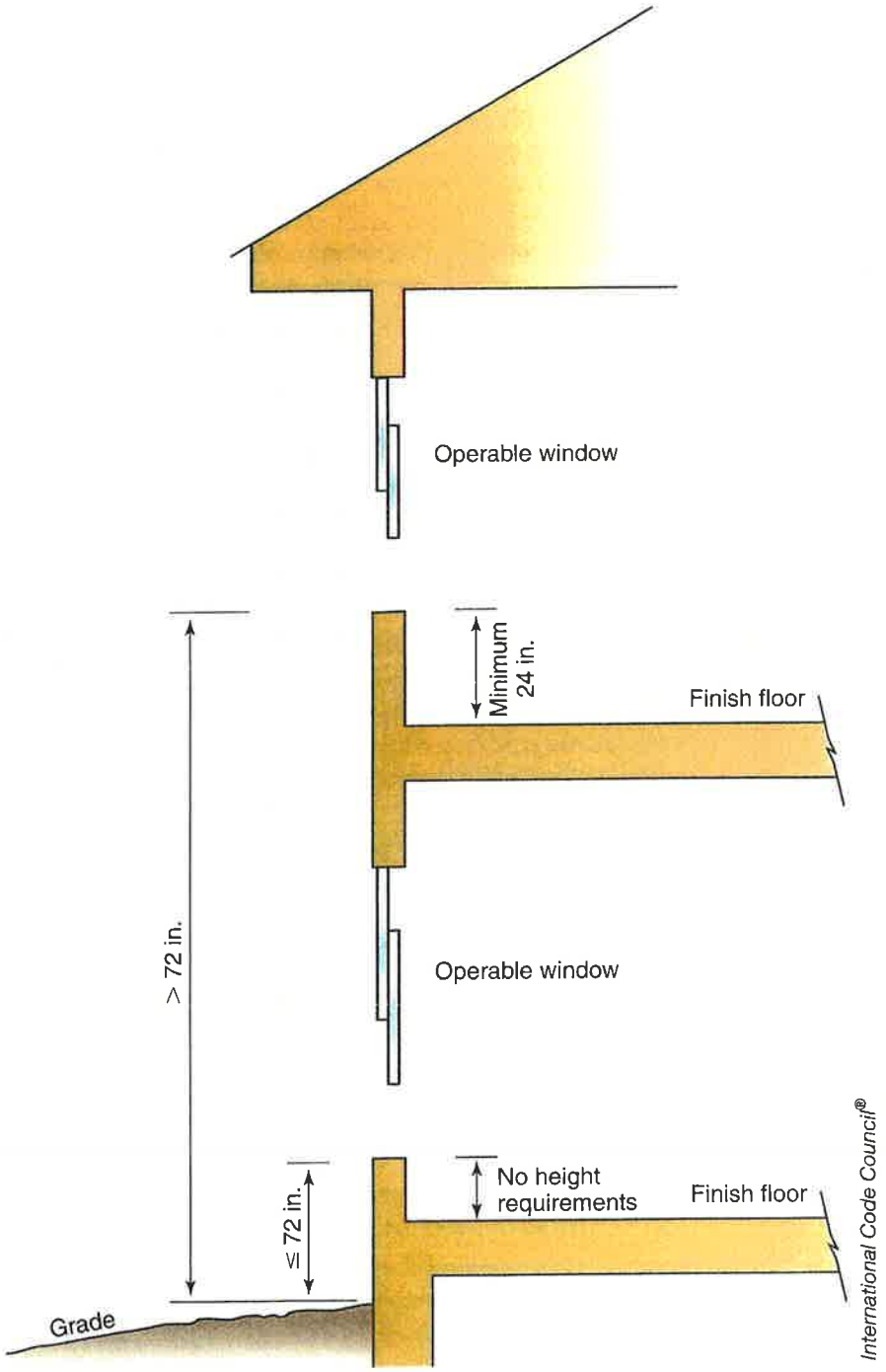
R312.1.4 Exterior Wood/Plastic Composite Guards. [No change to text]

R312.2 Window Fall Protection. Window fall protection shall be provided in accordance with Sections R312.2.1 and R312.2.2.

~~**R612.2**~~ **R312.2.1 Window Sills.** In dwelling units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished grade or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor of the room in which the window is located. Operable



Alternatives to minimum window sill height.



Minimum window sill height for fall protection.

sections of windows shall not permit openings that allow passage of a 4-inch (102 mm) diameter sphere where such openings are located within 24 inches (610 mm) of the finished floor.

Exceptions:

1. Windows whose openings will not allow a 4-inch diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.

R312 continues

R308.4

Hazardous Locations for Glazing

CHANGE TYPE: Clarification

CHANGE SUMMARY: The provisions for hazardous locations related to the installation of glazing have been reorganized for ease of use and consistent application. Each item in the numbered list of hazardous locations has been placed in a separate subsection and given a descriptive title.

2012 CODE: R308.4 Hazardous Locations. The ~~following~~ locations specified in Sections R308.4.1 through R308.4.7 shall be considered specific hazardous locations for the purposes of glazing.

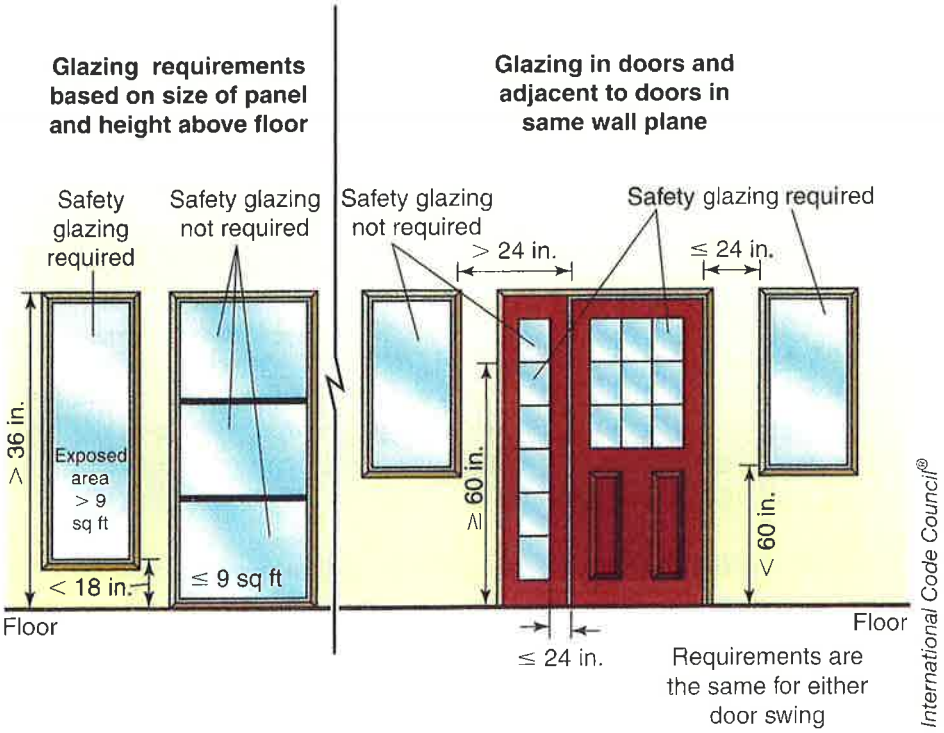
~~1.~~ **R308.4.1 Glazing in Doors.** Glazing in all fixed and operable panels of swinging, sliding, and bifold doors shall be considered a hazardous location.

Exceptions:

1. Glazed openings of a size through which a 3-inch diameter (76 mm) sphere is unable to pass.
2. Decorative glazing.

~~2.~~ **R308.4.2 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 (610 mm) arc of either vertical edge of the door in a closed position and ~~whose~~ where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) above the floor or walking surface shall be considered a hazardous location.

R308.4 continues

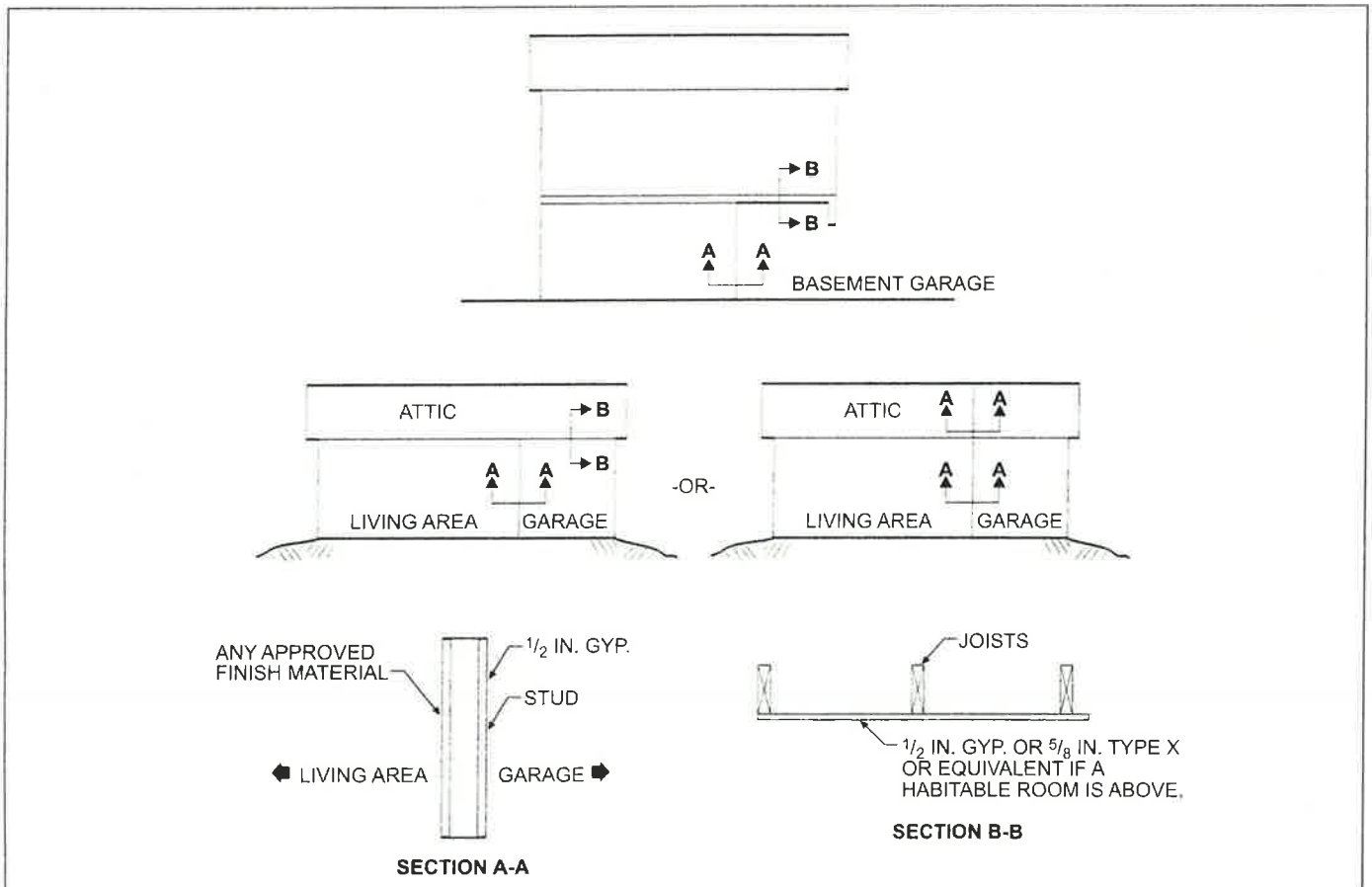


Safety glazing locations

TABLE R302.6
DWELLING/GARAGE SEPARATION

SEPARATION	MATERIAL
From the residence and attics	Not less than $^1/_2$-inch gypsum board or equivalent applied to the garage side
From all habitable rooms above the garage	Not less than $^5/_8$-inch Type X gypsum board or equivalent
Structure(s) supporting floor/ceiling assemblies used for separation required by this section	Not less than $^1/_2$-inch gypsum board or equivalent
Garages located less than 3 feet from a dwelling unit on the same lot	Not less than $^1/_2$-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.



For SI: 1 inch = 25.4 mm.

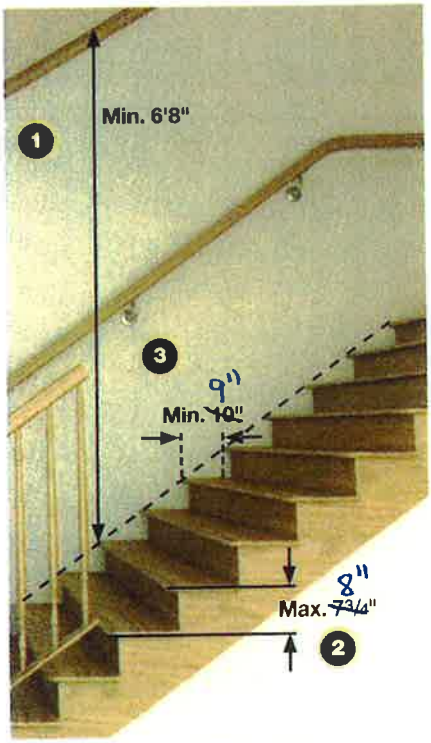
Figure R302.6
SEPARATION BETWEEN ATTACHED GARAGES AND DWELLING UNITS

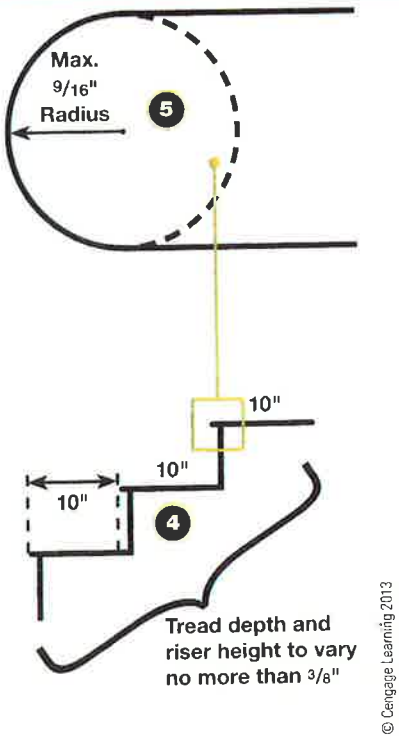
R302.7 Under-stair protection. Enclosed accessible space under stairs shall have walls, under-stair surface and any soffits protected on the enclosed side with $^1/_2$-inch (12.7 mm) gypsum board.

❖Often times the space under a stairway is used for storage because this space is often of little use for other purposes. The code permits the use of an open space beneath a stair without the need for any additional protection. Additionally, if the space is walled off and there is no access to the area, the code is also not concerned. If, however, the area beneath the stairway is enclosed and any type of access is provided into the space, the walls, soffits and ceilings of the enclosed space must be protected on the enclosed side with at least $^1/_2$-inch (12.7 mm) gypsum board.

R302.8 Foam plastics. For requirements for foam plastics see Section R316.

STAIRS, GENERALLY





No.	Code	Description
	R311.7	Except for spiral stairs, the minimum width is 36" above the handrails.
1	R311.7.2	Minimum headroom for stairs is 6' 8" measured vertically from the sloped line adjoining the tread nosing or the floor surface of the landing or platform on that portion of the stairway.
2	R311.7.5.1	Riser height is limited to ~~7¾"~~ 8" measured vertically between leading edges of adjacent treads.
3	R311.7.5.1	The minimum tread is ~~10"~~ 9" measured horizontally between the vertical planes of the foremost projection of the adjacent treads and at a right angle to the tread's leading edge.
4	R311.7.5	Greatest tread depth or riser height within any flight of stairs may not exceed the smallest by more than ⅜". The greatest nosing projection cannot exceed the smallest by more than ⅜".
5	R311.7.5.3	The radius of the curvature at the nosing cannot be greater than 9/16". A nosing not less than ¾" nor greater than 1¼" must be on stairs with solid risers.

You Should Know

- Risers must be vertical or sloped. See Section R311.7.5.1 in the IRC code book.
- The vertical rise on any flight of stairs may not exceed 12'.
- Stairways shall not be less than 36" in clear width at all points above the permitted handrail height and below the required headroom height.

Exceptions:

1. The use of a volute, turnout or starting easing shall be allowed over the lowest tread.
2. When handrail fittings or bendings are used to provide continuous transition between flights, transitions at winder treads, the transition from handrail to guardrail, or used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed the maximum height.

❖Where handrails are required, they must be installed at a height within the limits of at least 34 inches (864 mm) and not more than 38 inches (965 mm). This height is to be measured vertically to the top of the handrail from the plane adjoining the tread nosings of the flight or the surface of the ramp slope. Exception 1 allows common starting fittings used as terminals over the lowest tread to fall outside the required height range. Exception 2 allows transition fittings to exceed the required height when used to provide a continuous rail at changes in the pitch of the rail within the stairway.

R311.7.8.2 Continuity. Handrails for stairways shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail 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 $1^1/_2$ inch (38 mm) between the wall and the handrails.

Exceptions:

1. Handrails shall be permitted to be interrupted by a newel post at the turn.
2. The use of a volute, turnout, starting easing or starting newel shall be allowed over the lowest tread.

❖This required handrail is to be continuous for the length of the flight. Where stairway flights are separated by landings or floor levels, handrails are not required (see Commentary Figure R311.7.8.2). The term "continuous" means not only that a single handrail must run from the top riser to the bottom riser, but it also indicates that users should be able to grasp the handrail and maintain their grasp without having to release the rail where it is supported. There is no requirement within the code for installation of a second handrail, but depending on the design and the placement of the required handrail, the requirement for a guard should be reviewed. The two exceptions to this section create situations where the graspable portion of the handrail may not be completely continuous from the top riser to the bottom riser. These traditional situations are well known to the occupants and have not been shown to represent a safety hazard requiring their restriction.

The ends of handrails are to be returned to the wall or floor, or to end in some type of terminal that will not catch clothing or limbs. A clear space of at least $1^1/_2$ inches (38 mm) is necessary between the handrail and any abutting wall. This distance will permit the fingers to slide past any adjacent rough surface that may cause injury, and it will provide an adequate distance so that the handrail may be quickly grabbed as an assist in the arrest of a fall.

R311.7.8.3 Grip-size. All required handrails shall be of one of the following types or provide equivalent graspability.

1. Type I. Handrails with a circular cross section shall have an outside diameter of at least $1^1/_4$ inches (32 mm) and not greater than 2 inches (51 mm). If the handrail is not circular, it shall have a perimeter dimension of at least 4 inches (102 mm) and not greater than $6^1/_4$ inches (160 mm) with a maximum cross section of dimension of $2^1/_4$ inches (57 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).
2. Type II. Handrails with a perimeter greater than $6^1/_4$ inches (160 mm) shall have a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of $^3/_4$ inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of at least $^5/_{16}$ inch (8 mm) within $^7/_8$ inch (22 mm) below the widest portion of the profile.

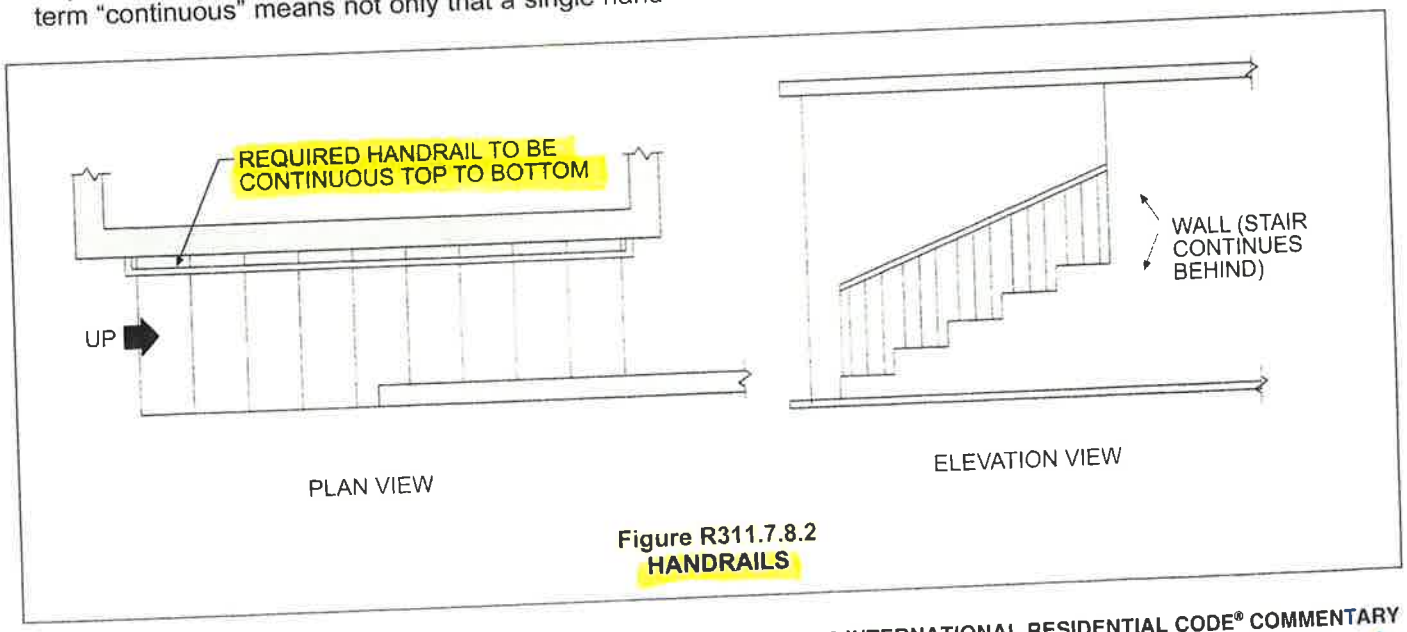


Figure R311.7.8.2
HANDRAILS

R315

Carbon Monoxide Alarms

CHANGE TYPE: Addition

CHANGE SUMMARY: The 2009 IRC requires carbon monoxide alarms in new dwellings and in existing dwellings when work requiring a permit takes place. The carbon monoxide alarms must be installed in the immediate vicinity of sleeping areas.

2009 CODE: **Section R315 Carbon Monoxide Alarms**

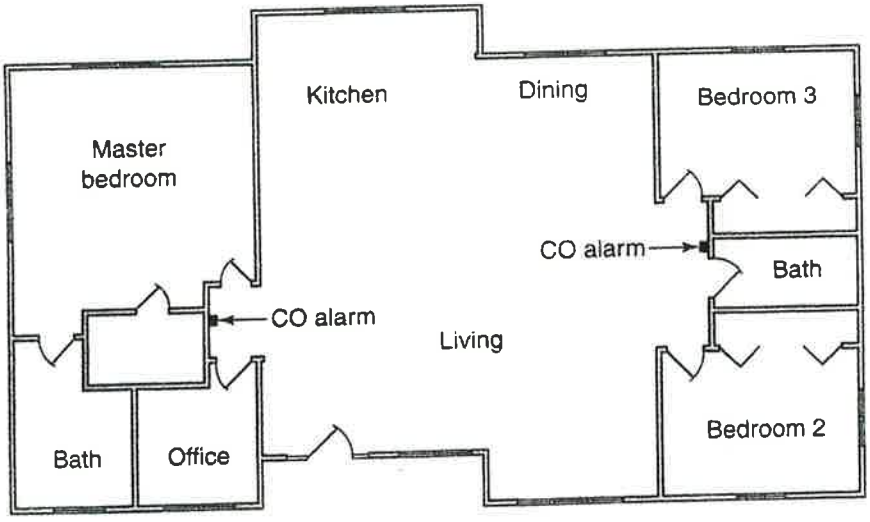
R315.1 Carbon Monoxide Alarms. For new construction, an approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms in dwelling units within which fuel-fired appliances are installed and in dwelling units that have attached garages.

R315.2 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 R315.1.

R315.3 Alarm Requirements. Single station carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.

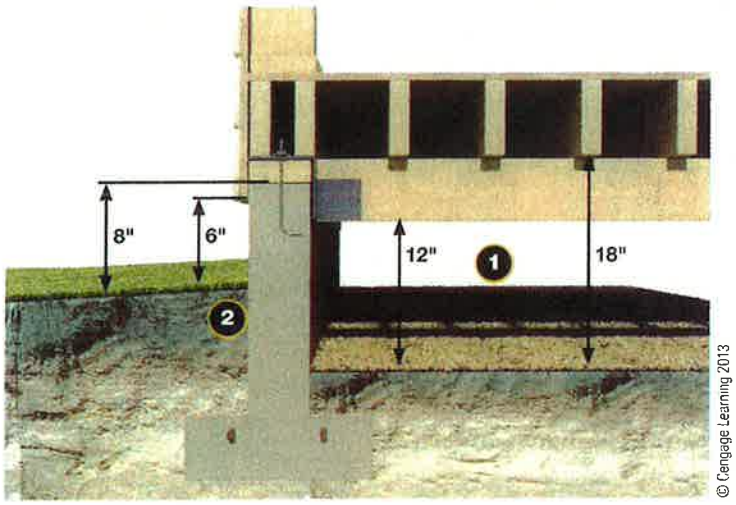
CHANGE SIGNIFICANCE: Carbon monoxide alarms are now required in new dwelling units constructed under the 2009 IRC. Because the source of unsafe levels of carbon monoxide in the home is typically from faulty operation of a fuel-fired furnace or water heater, or from the exhaust of an automobile, this new requirement applies only to homes containing fuel-fired appliances or having an attached garage. Carbon

R315 continues



Carbon monoxide (CO) alarm installed in the immediate vicinity of each sleeping area

PRESERVATIVES



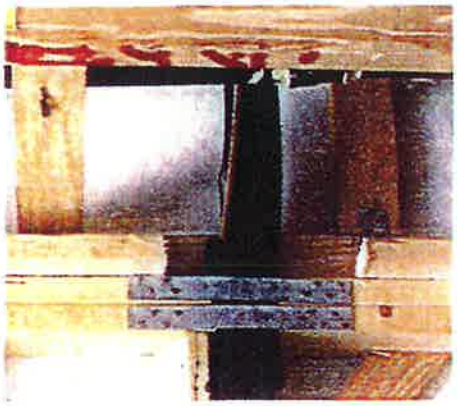
No.	Code	Description
1	R317.1	Protection of wood must be provided at the following locations: • Wood joists closer than 18″ and wood beams closer than 12″ from exposed ground • Wood framing members and sills and sleepers in contact with concrete or masonry less than 8″ from exposed ground • Ends of wood girders entering masonry or concrete walls with less than ½″ clearance on tops, sides, and ends • Wood siding, sheathing, and wall framing on the exterior with less than 6″ from the ground or 2″ from concrete steps, slabs, etc. • Wood structural members supporting moisture-permeable floors or roofs exposed to weather such as concrete or masonry slabs • Wood furring strips or framing members attached directly to the interior of concrete or masonry walls below grade except where an approved vapor barrier is installed
	R317.1.1	Field-cut ends, notches, and drilled holes must be treated in accordance with the AWPA M-4 standard.
2	R317.1.2	All wood in contact with the ground, embedded in concrete, or exposed to the weather must be approved, prescriptively treated wood suitable for ground contact.
	R317.1.4	Wood columns must be approved wood of natural resistance to decay or preservative-treated type unless elevated 1″ above concrete or 6″ above earth and covered by an approved impervious barrier.
	R317.1.5	Glu-laminated timbers exposed to weather and not properly protected must be preservative treated or manufactured with naturally durable wood.

You Should Know

- Naturally durable or preservative-treated wood is still required where local experience demonstrates a need.
- Fasteners and connectors in contact with preservative-treated wood must hot dipped, zinc-coated, galvanized steel, stainless steel, silicon bronze, or copper.

R602.6.1

Drilling and Notching of Top Plate



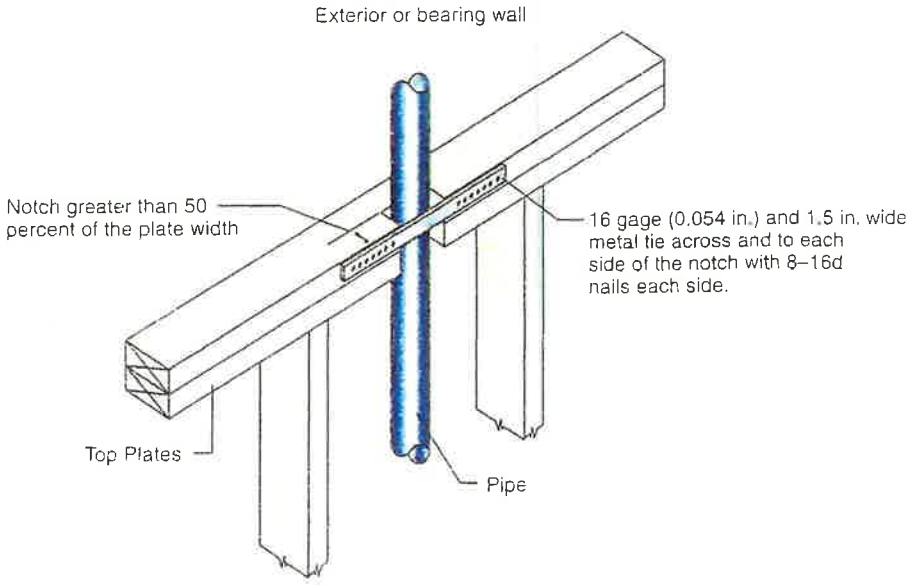
CHANGE TYPE. Clarification

CHANGE SUMMARY. The code has been revised to clarify that only one metal tie is required to connect double top plates when top plates are cut, notched, or drilled to more than 50% of their width.

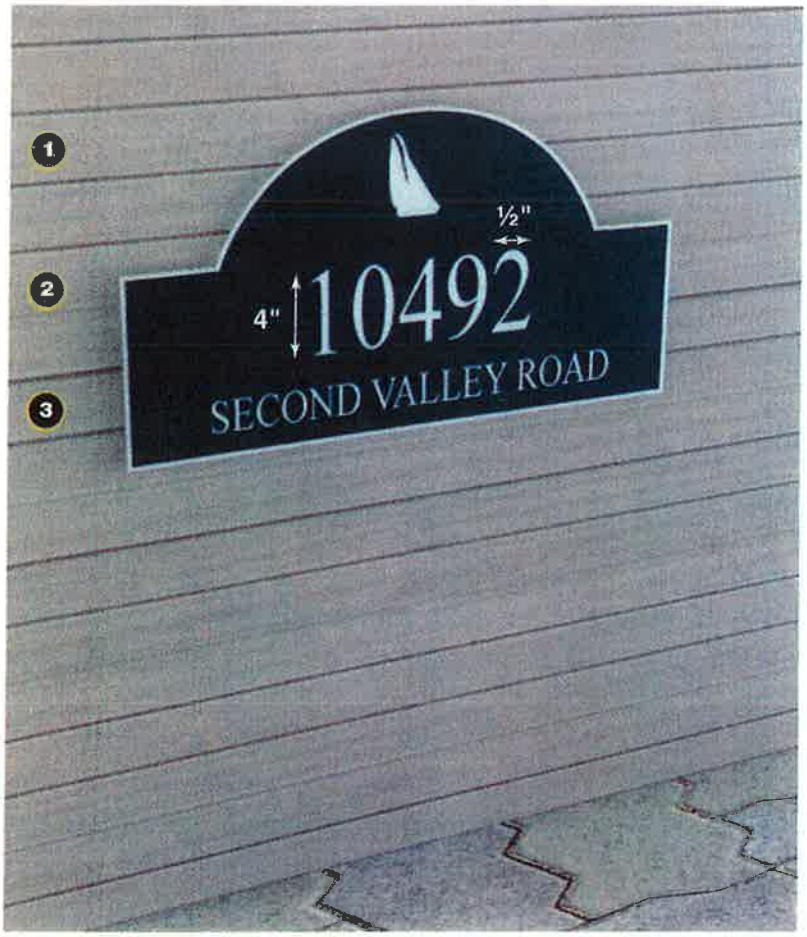
2006 CODE: R602.6.1 Drilling and Notching of Top Plate. When piping or ductwork is placed in or partly in an exterior wall or interior load-bearing wall, necessitating cutting, drilling, or notching of the top plate by more than 50 percent of its width, a galvanized metal tie of not less than 0.054 inches thick (1.37 mm) (16 ga) and 1 ½ inches (38 mm) wide shall be fastened ~~to each plate~~ across and to the plate at each side of the opening with not less than eight 16d nails at each side or equivalent. See Figure R602.6.1.

> **Exception:** When the entire side of the wall with the notch or cut is covered by wood structural panel sheathing.

CHANGE SIGNIFICANCE. When top plates are notched, cut, or drilled to more than 50% of their width, thereby severely reducing the cross-sectional area that is needed to carry the applicable loads and jeopardizing the continuity of the structural system, the code requires that galvanized metal ties of at least .054 inch thick and 1.5 inches wide be used to connect the two sides of the top plates weakened by the cut or notch. Cutting, notching, and drilling of top plates are sometimes necessary to accommodate the installation of plumbing pipes or electrical wiring. Many have interpreted this section as a requirement for two such galvanized plates at each cut, where two top plates have been used. This interpretation is partially based on the 2003 code text ". . . shall be fastened to each plate across . . ." and partially based on the fact that when two top plates are present and both are cut, it is reasonable to assume that both plates need to be strengthened. This inter-



ADDRESS NUMBERS



No.	Code	Description
1	R319.1	Address numbers must be plainly legible and visible from the street or road. Where this is not possible, a monument, pole, or other sign must identify the address of the structure at the street or road.
2		The numbers shall be in contrast to the background and in Arabic writing.
3		The numbers must be 4" high with a minimum stroke of ½".

You Should Know

- Address signage is important because an emergency vehicle must be able to find your building during an emergency.

where the air is static and an explosive gas/air mixture could be created. Return, supply and exhaust air ducts are not considered to be a plenum. These ducts are supply, return and exhaust air conduits constructed as components of a ductwork system. A furnace plenum is part of a ductwork system and would be treated as an air duct (see the definition of "Furnace plenum").

This section now prohibits what was once a common practice, that is, the practice of placing a bank of gas meters on one end of a townhouse complex and running the load side gas line from each meter through the attic or crawl spaces of the townhouse units to reach the units served. For example, the gas supply line for the unit farthest away from the meter bank will pass through all of the other units to reach the unit it serves. This is a concern because of what might be done to the piping within the units through which it passes and because of the potential for one of the units to be destroyed by fire thereby damaging the gas piping that passes through the fire walls/separation walls between units. Townhouses are considered to be separate buildings in the *International Residential Code*® (IRC®) and are constructed to prevent fire from spreading beyond the unit of origin. This is similar to the provision in the IRC that prevents electrical service entrance conductors from passing through dwelling units other than the unit served (see Commentary Figure 404.3).

404.4 Piping in solid partitions and walls. Concealed *piping* shall not be located in solid partitions and solid walls, unless installed in a chase or casing.

❖ As with the alternative installation requirements in Section 404.8, this section allows installation of gas piping within solid walls or partitions only if the piping is installed within a chase or casing to protect the pipe from stress and from corrosive effects of wall materials such as concrete.

404.5 Piping in concealed locations. Portions of a *piping* system installed in concealed locations shall not have unions, tubing fittings, right and left couplings, bushings, compression couplings and swing joints made by combinations of fittings.

Exceptions:

1. Tubing joined by brazing.
2. Fittings *listed* for use in concealed locations.

❖ A concealed location is a location that requires the removal of permanent construction in order to gain access (see the definition of "Concealed location"). The space above a dropped ceiling having readily removable lay-in panels or other locations that have removable access panels are not considered to be concealed locations for the purposes of this section. Concealed locations include wall, floor and ceiling cavities bounded by permanent finish materials, such as gypsum board, masonry or paneling. Unions and mechanical joint tubing fittings are not permitted in

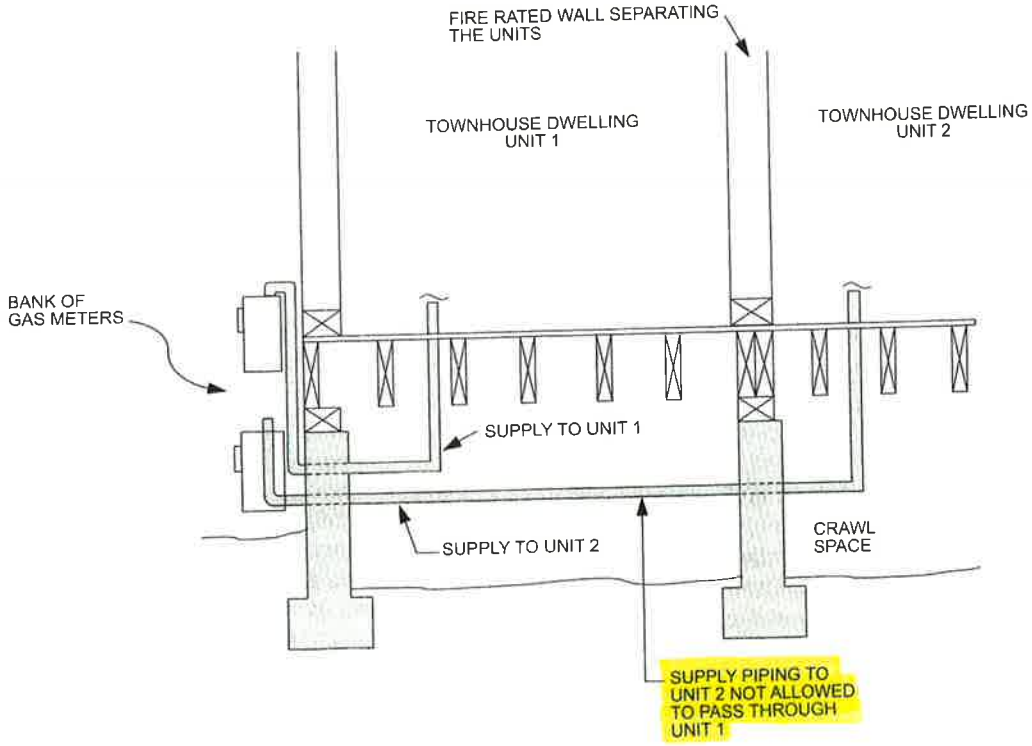


Figure 404.3
PROHIBITED TOWNHOUSE INSTALLATION

15

with Chapters 34 through 43. Penetrations of electrical outlet boxes shall be in accordance with Section R302.4.

❖The application of this section has its basis in the exterior wall requirements found in Section R302.1 that deal with the building's location on the lot. The definition of a townhouse in Section R202 should be reviewed, as well as the requirement for structural independence in Section R302.2.4. In general, because the "exterior wall" of the townhouse is essentially being constructed with no fire separation distance where one townhouse adjoins another, the code requires, by Section R302. 1, that the wall have not less than a 1-hour fire-resistance rating. The adjacent townhouse would have the same requirement. Therefore, the general requirement at this location (based on Sections R302.1 and R302.3) would be that each townhouse has its own "exterior wall." This would result in the construction of two separate 1-hour walls located side by side where one townhouse adjoins another.

Because of the difficulties involved in construction and the potential for unnecessary duplication, the exception offers an alternative to the two separate 1-hour walls by permitting the construction of a shared or "common" 2-hour-rated wall between the townhouses.

See Commentary Figure R302.2 for an illustration of the two separate 1-hour walls and the common 2-hour wall. This exception has its basis in the actions of many building officials who permit this type of common wall as an alternative method of construction using provisions similar to those found in Section R104.11. Because the common wall has the potential to create an interconnection between the adjacent dwelling units and reduce the clear separation that would exist if two separate walls were constructed, the code places limits on services being located within the wall. This exception does not permit the inclusion of any type of plumbing, mechanical equipment, ducts or vents within the cavity of the common wall. This prohibition is applicable even if the penetrations or openings are protected by the penetration provisions of Section R302.4 or if a damper is installed in the duct or vent. The prohibition on plumbing includes all types of plumbing materials and systems, as well as water supply and drainage piping of either combustible or noncombustible materials. However, the exception permits the cavity of the wall to be used for electrical installations if they comply with the electrical provisions of the code and the penetrations are properly protected.

R302.2.1 Continuity. The fire-resistance-rated wall or assembly separating *townhouses* shall be continuous from the foundation to the underside of the roof sheathing, deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed *accessory structures*.

❖This section addresses the continuity of the fire-resistance-rated wall or assembly separating townhouses using the exception in Section R302.2. The requirements are conceptually similar to the continuity issues that exist in Section R302.3. These provisions, by regulating the extensions and terminations of the wall, can make possible the separation of dwelling units from each other.

R302.2.2 Parapets. Parapets constructed in accordance with Section R302.2.3 shall be constructed for *townhouses* as an extension of exterior walls or common walls in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof surfaces.

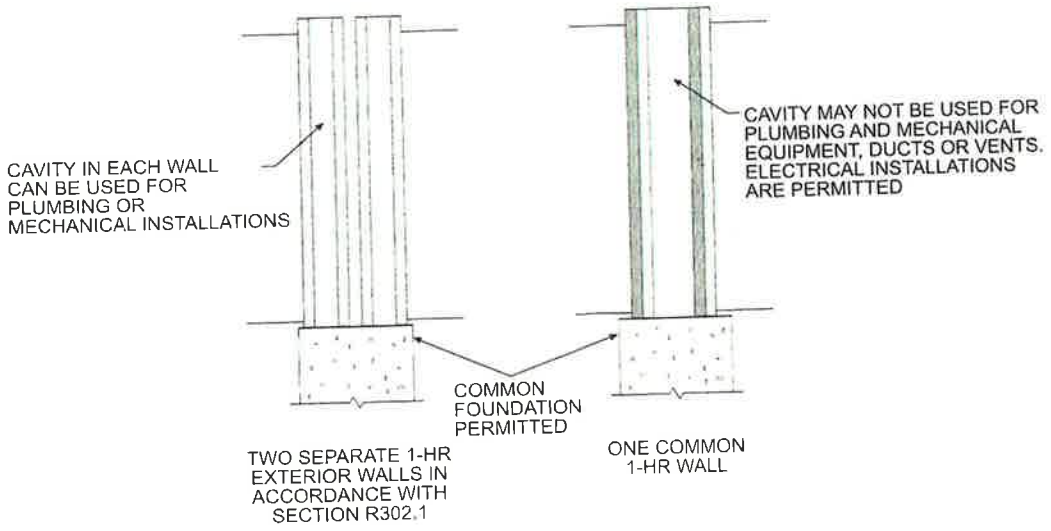
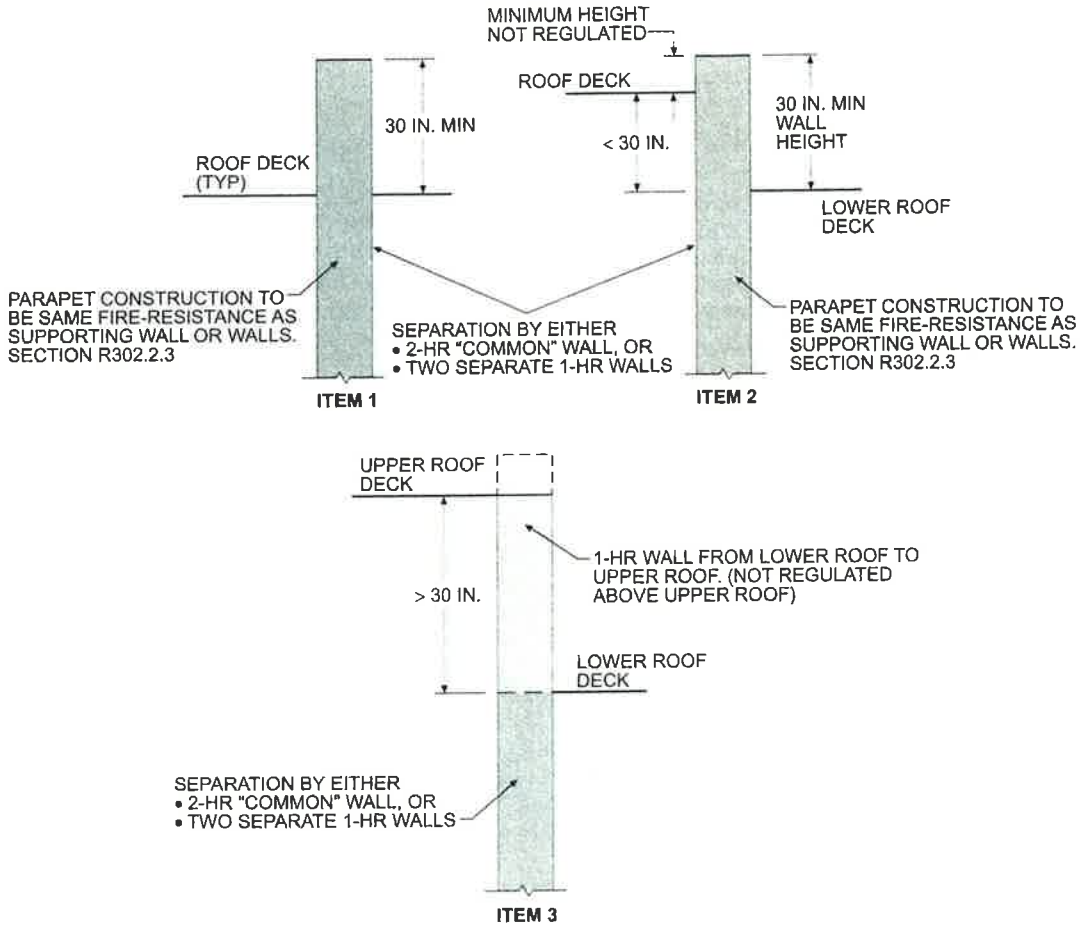
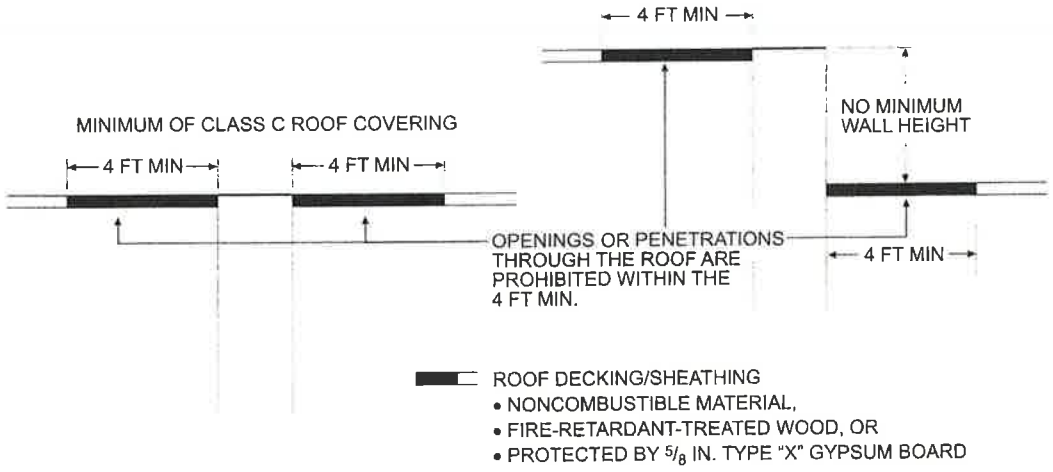


Figure R302.2
DWELLING UNIT SEPARATION FOR TOWNHOUSES



For SI: 1 inch = 25.4 mm.

Figure R302.2.2(1)
PARAPET REQUIREMENTS FOR WALL BETWEEN TOWNHOUSES



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Figure R302.2.2(2)
EXCEPTION TO ELIMINATE PARAPET

IRC Chapter 11
Energy Code

- **N1101.4.1 Attic Insulation** - The thickness of blown in or sprayed roof ceiling insulation shall be written in inches on markers that are installed at least one for every 300 square feet throughout the attic space. Each marker shall face the attic access opening.

- **N1101.7.1 Protection of exposed foundation insulation**. Insulation applied to the exterior of basement walls, crawl space walls, and the perimeter of slab-on-grade floors shall have a rigid, weather-resistant protective covering.

- **N1101.9 Certificate** – a permanent certificate shall be posted on or in the electrical distribution panel. The certificate shall list the R-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawlspace wall and/or floor) and ducts outside of conditioned spaces, U-factors for fenestration (windows and doors)

- **Table N1102.1 Insulation and fenestration requirements** (see attached chart)

- **N1102.2.1 Ceilings with attic spaces** – R-38 shall be deemed to satisfy the requirement for R-49 wherever the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves.

- **N1102.2.2 Ceilings without attic spaces** – the required R-49 can be reduced to R-30 when roof/ceiling assembly does not allow sufficient space for the required insulation. This reduction is limited to 500 square feet in area.

- **N1102.2.3 Access hatches and doors** – access doors from conditioned spaces to unconditioned spaces (attics and crawl spaces) shall be weather-stripped and insulated to a level equivalent to the insulation on the surrounding surfaces.

- **N1102.2.6 Floors** – Floor insulation shall be installed to maintain permanent contact with the underside of the subfloor decking.

- **N1102.2.7 Basement Walls** – exterior walls associated with conditioned basements shall be insulated from the top of the basement wall down to 10 feet below grade or to the basement floor, whichever is less. Walls associated with unconditioned basements shall meet this requirement unless the floor overhead is insulated in accordance with sections N1102.1 and N1102.2.6

- **N1102.2.8 Slab on Grade Floors** – slab on grade floors shall be insulated in accordance with Table N1102.1

- **N1102.2.9 Crawl Space Walls** – as an alternative to insulating floors over crawl spaces, insulation of crawl space walls shall be permitted when the crawl space in not vented to the outside. Crawl space wall insulation shall be permanently fastened to the wall and extend downward from the floor to the finished grade level. Exposed earth in unvented crawl space foundations shall be covered with a continuous class I vapor retarder. All joints of the vapor retarder shall be overlapped by 6 inches and sealed or taped.

- **N1102.4.1 Building Thermal Envelope** – the following shall be caulked gasketed, weather-stripped or otherwise sealed with an air barrier material
    1. All joints, seams and penetrations
    2. Site-built windows, doors and skylights.
    3. Openings between window and door jambs and framing
    4. Utility penetrations
    5. Dropped ceilings or chases adjacent to the thermal envelope
    6. Knee walls
    7. Walls and ceilings separating the garage from conditioned spaces.
    8. Behind tubs and showers on exterior walls
    9. Common walls between dwelling units.
    10. Attic access openings
    11. Rim joints junction
    12. Other sources of infiltration

- **N1103.1.1 Programmable Thermostat** – North Dakota amended to delete programmable thermostat requirement

- **N1103.2.2 Duct sealing** – ducts, air handlers, filter boxes and building cavities used as ducts shall be sealed. Joints and seams shall comply with section M1601.4. Duct leakage test is amended out of code by North Dakota amendments

SECTION N1102
BUILDING THERMAL ENVELOPE

N1102.1 Insulation and fenestration criteria. The *building thermal envelope* shall meet the requirements of Table N1102.1 based on the climate zone specified in Table N1101.2.

N1102.1.1 *R*-value computation. Insulation material used in layers, such as framing cavity insulation and insulating sheathing, shall be summed to compute the component *R*-value. The manufacturer's settled *R*-value shall be used for blown insulation. Computed *R*-values shall not include an *R*-value for other building materials or air films.

N1102.1.2 *U*-factor alternative. An assembly with a *U*-factor equal to or less than that specified in Table N1102.1.2 shall be permitted as an alternative to the *R*-value in Table N1102.1.

N1102.1.3 Total UA alternative. If the total *building thermal envelope* UA (sum of *U*-factor times assembly area) is less than or equal to the total UA resulting from using the *U*-factors in Table N1102.1.2, (multiplied by the same assembly area as in the proposed building), the building shall be considered in compliance with Table N1102.1. The UA calculation shall be done using a method consistent with the ASHRAE *Handbook of Fundamentals* and shall include the thermal bridging effects of framing materials. The SHGC requirements shall be met in addition to UA compliance.

TABLE N1102.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR	SKYLIGHT[b] *U*-FACTOR	GLAZED FENESTRATION SHGC	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE	MASS WALL *R*-VALUE[k]	FLOOR *R*-VALUE	BASEMENT[c] WALL *R*-VALUE	SLAB[d] *R*-VALUE AND DEPTH	CRAWL SPACE[c] WALL *R*-VALUE
1	1.2	0.75	0.35[j]	30	13	3/4	13	0	0	0
2	0.65[i]	0.75	0.35[j]	30	13	4/6	13	0	0	0
3	0.50[i]	0.65	0.35[e, j]	30	13	5/8	19	5/13[f]	0	5/13
4 except Marine	0.35	0.60	NR	38	13	5/10	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35	0.60	NR	38	20 or 13 + 5[h]	13/17	30[g]	10/13	10, 2 ft	10/13
6	0.35	0.60	NR	49	~~20 or 13 + 5[h]~~ R-19	15/19	30[g]	10/13	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	49	21	19/21	30[g]	10/13	10, 4 ft	10/13

a. *R*-values are minimums. *U*-factors and solar heat gain coefficient (SHGC) are maximums. R-19 batts compressed in to nominal 2 × 6 framing cavity such that the *R*-value is reduced by R-1 or more shall be marked with the compressed batt *R*-value in addition to the full thickness *R*-value.

b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

c. The first *R*-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.

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 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 N1101.2 and Table N1101.2.

g. Or insulation sufficient to fill the framing cavity, R-19 minimum.

h. "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25% or less of the exterior, R-5 sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25% of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.

i. For impact-rated fenestration complying with Section R301.2.1.2, the maximum *U*-factor shall be 0.75 in zone 2 and 0.65 in zone 3.

j. For impact-resistant fenestration complying with Section R301.2.1.2 of the *International Residential Code*, the maximum SHGC shall be 0.40.

k. The second *R*-value applies when more than half the insulation is on the interior.