

Excerpts from the 2018 International Residential Code

Applicant's Name: _____

Type of Structure: _____

Application Number: _____

Cross-reference your plans with this listing for additional requirements that are not detailed on your plans.

These code excerpts have been taken from the 2018 International Residential Code (IRC), 2018 International Mechanical Code (IMC), 2018 Uniform Plumbing Code (UPC) and other related codes. Energy requirements are based on the 2018 Washington State Energy Code (WSEC). Water efficiency standards are based on the Washington Administrative Code (WAC). **These code excerpts are a part of the reviewed plans and are conditions of the permit approval; they shall remain with the approved plans.** For ease of use and to save space, not all of the text of these excerpts has been taken verbatim from the code, nor have we attempted to list all code requirements.

The review and approval of submitted plans and/or specifications does not permit the violation of any section of the building code or other applicable codes enforced or any Ordinances, State or Federal law and the building official is authorized to prevent the occupancy of any structure in violation of said codes and ordinances. The plan review is designed as an aid for the contractor/homeowner builder for determining general code compliance. Any items not covered by this listing and in question should be addressed to this office. IRC 105.4

Comments: _____

SECTION 1 - GENERAL BUILDING PLANNING AND CONSTRUCTION

- Premises Identification.** The project address must be marked on site before the first inspection. Address must be permanently posted according to IRC 319 and Grant County Code Title 10 Chapter 10.36 before final inspection, including permanent posting of all county and private roads giving access to the property. Address identification shall be maintained.

Each residence shall have an approved address placed in a position that is visible and the numbers plainly legible from the street or road fronting the property. These numbers shall contrast with their background. Numbers shall be a minimum of 4 inches high with a stroke width of ½ inch. (IRC 319.1)

For locations where the residence is more than one hundred (100) feet from the county road or where visibility is blocked or obstructed from the county road, the approved address shall also be permanently posted at the access from county road with a uniform address marker as described in Grant County Code Title 10 Chapter 10.36.070 (b) and (c).

2. **Site Location.** Property lines to be clearly identified on site (i.e. stakes and string) to ensure the structure is located in accordance with the approved plans and meets required minimum setbacks.
3. **Living areas.** Habitable rooms shall have a floor area of not less than 70 square feet. Habitable rooms shall not be less than 7 feet in any horizontal dimension. (IRC 304.1 & 304.2) See also Grant County handout regarding minimum required dimensions for single-family dwelling unit.
4. **Ceiling height.** Habitable space, hallways and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet. Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches. (IRC 305.1)
5. **Light.** All habitable rooms shall have an aggregate glazing area of not less than 8 percent of the floor area of such rooms. (IRC 303.1) Exception: The glazed areas need not be installed in rooms where artificial light is provided capable of producing an average illumination of 6 footcandles over the area of the room at a height of 30 inches above the floor level.

A minimum of 90% of permanently installed lamps shall be high efficiency. WSEC R404.1

Ventilation. Dwelling units shall be equipped with local exhaust and whole house ventilation systems designed and installed as specified in Section M1507.3. (IRC 303.4)

6. **Exhaust ventilation.** Local exhaust shall be provided in each kitchen (minimum 100 cfm), bathroom, water closet, laundry room, indoor swimming pool, spa (minimum 50 cfm) and other rooms where water vapor or cooking odor is produced. (IRC M1505.4.4 and Table M1505.4.4)

Exhaust ducts shall terminate outside the building. (IRC M1501.1) Exhaust ducts shall be equipped with back-draft dampers. Kitchen ducts/range hood ducts shall have a smooth interior surface. (IRC M1503.1) All exhaust ducts in unconditioned spaces shall be insulated to a minimum of R-4. (IMC 403.8.4.1)

Whole-House mechanical ventilation systems. Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1505.4.1 through M1505.4.4.

M1505.4.3 Mechanical ventilation rate. Ventilation rate in cubic feet per minute $= (0.01 \times \text{total square foot area of house}) + [7.5 \times (\text{number of bedrooms} + 1)]$ **Equation 15-1**

SECTION II – INGRESS / EGRESS – FIRE LIFE SAFETY

7. **Safety glazing.** Safety glazing is required in, but not limited to, the following locations: (IRC 308.1 & 308.4)
 - a. Glazing in all fixed and operable panels of swinging, sliding and bifold doors. (IRC 308.4.1)
 - b. Glazing in an individual fixed or operable panel adjacent to a door where the bottom exposed edge of the glazing is less than 60 inches above the floor or walking surface and either:
 - i. The glazing is within 24 inches of either side of the door in the plane of the door in a closed position
 - ii. The glazing is on a wall perpendicular to the plane of the door in a closed position and within 24 inches of the hinge side of an in-swinging door. (IRC 308.4.2)
 - c. Glazing in an individual fixed or operable panel that meets all 4 conditions: (IRC 308.4.3)
 - i. The exposed area of an individual pane is larger than 9 square feet
 - ii. The bottom edge of the glazing is less than 18 inches above the floor
 - iii. The top edge of the glazing is more than 36 inches above the floor

- iv. One or more walking surfaces are within 36 inches, measured horizontally and in a straight line
- d. Glazing in guards and railings, including structural baluster panels and nonstructural in-fill panels, regardless of area or height above a walking surface. (IRC 308.4.4)
- e. Glazing in walls, enclosures or fences containing or facing hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, showers and indoor or outdoor swimming pool areas where the bottom exposed edge of the glazing is less than 60 inches measured vertically above any standing or walking surface. This shall apply to single glazing and all panes in multiple glazing. (IRC 308.4.5)
- f. 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. (IRC 308.4.6)
- g. Glazing adjacent to the landing at the bottom of a stairway where the glazing is less than 36 inches above the landing and within a 60-inch horizontal arc less than 180 degrees from the bottom tread nosing. (IRC 308.4.7)

Other Glazing

- h. Where the top of the sill of an operable window opening is located less than 24 inches above the finished floor and greater than 72 inches above the finished grade or other surface below on the exterior of the building, the operable window shall comply with one of the following: (IRC 312.2.1)
 - i. Operable windows with openings that will not allow a 4-inch-diameter sphere to pass through the opening where the opening is in its largest opened position.
 - ii. Operable windows that are provided with window fall prevention devices that comply with ASTM 2090.
 - iii. Operable windows that are provided with window opening control devices that comply with Section R312.2.2.

8. Emergency escape and rescue openings.

- a. Basements, habitable attics and every sleeping room shall have not less than one operable emergency escape and rescue opening.
- b. Where basements contain one or more sleeping rooms, an emergency egress and rescue opening shall be required in each sleeping room. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way. (IRC 310.1)
- c. Emergency escape and rescue openings where the sill height is below grade shall be provided a window well. (IRC 310.2.2)

9. Window wells.

- a. The horizontal area of the window well shall be not less than 9 square feet, with a horizontal projection and width of not less than 36 inches. The area of the window well shall allow the emergency escape and rescue opening to be fully opened. (IRC 310.2.3)
- b. Window wells with a vertical depth greater than 44 inches 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 not less than 12 inches, shall project not less than 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. (IRC 310.2.3.1)

- 10. Window covers.** Where bars, grilles, covers, screens or similar devices are placed over emergency escape and rescue openings, are wells, or window wells, the minimum net clear opening size shall comply with sections R310.2.1 through R310.2.3, and such devices shall be releasable or removable from the inside without the use of a key, tool, special knowledge or force greater than that required for the normal operation of the escape and rescue opening.(IRC 310.4)

11. Egress from sleeping rooms.

- a. All emergency escape and rescue openings shall have a net clear opening of not less than 5.7 square feet (821 square inches) with a net clear height opening of not less than 24 inches and a net clear width of not less than 20 inches. The net clear opening dimensions shall be obtained by the normal operation of the opening from the inside. (IRC 310.2.1)
- b. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys, tools or special knowledge. (IRC 310.1.1)
- c. Emergency escape and rescue openings shall have a sill height of not more than 44 inches above the floor. (IRC 310.2.2).

12. Residence egress. Not less than one egress door shall be provided for each dwelling unit. There shall be a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the dwelling to the required egress door without requiring travel through a garage. The required egress door shall open directly into a public way or to a yard or court that opens to a public way. The required egress door shall be side-hinged, and shall provide a clear width of not less than 32 inches where measured between the face of the door and the stop, with the door open 90 degrees. The clear height of the door opening shall be not less than 78 inches measured from the top of the threshold to the bottom of the stop. (IRC 311.1, 311.2)

13. Landings at exterior doors.

- a. 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 dimension of not less than 36 inches measured in the direction of travel. (IRC 311.3)
- b. **Required Egress Door** according to item 12 above. Landings or finished floors shall be not more than 1 ½ inches lower than the top of threshold *if the door swings over the landing or floor*. Landings or floors shall not be more than 7¾ inches lower than the top of the threshold *if the door does not swing over the landing or floor*. (IRC 311.3.1)
- c. **Other exterior doors.** Doors other than the required egress door shall be provided with landings or floors not more than 7 ¾ inches below the top of the threshold. (IRC 311.3.2)
 - i. On exterior doors, other than the required egress door, a top landing is not required where a stairway of not more than two risers is located on the exterior side of the door, provided the door does not swing over the stairway.
- d. **Storm and screen doors** shall be permitted to swing over all exterior stairs and landings. (IRC 311.3.3)

14. Smoke and carbon monoxide alarms.

Smoke alarms. Smoke alarms shall comply with NFPA 72 and Section 314. Smoke alarms shall be listed in accordance with UL 217. Combination smoke and carbon monoxide alarms shall be listed in accordance with UL 217 and UL 2034. (IRC 314.1, 314.1.1)

- a. Smoke alarms shall be installed in the following locations: (IRC 314.3)
 - i. In each sleeping room.
 - ii. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
 - iii. On each additional story of the dwelling, including basements and habitable attics. In dwellings or dwelling units with split-levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

- iv. Smoke alarms shall be installed a minimum of 3 feet horizontally from the door opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by Section 314.3.
- v. In napping areas in family child day care homes.
- b. Multiple alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all the alarms in an individual dwelling unit. Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm. (IRC 314.4)
- c. Where alterations, repairs or additions requiring a permit occur, or where one or more sleeping rooms are added or created in existing dwellings, the individual dwelling unit shall be equipped with smoke alarms as required for new dwellings; the alarm devices shall be interconnected and hard wired or wireless as per IRC 314.4. Contact our office for exceptions. (IRC 314.2.2)
- d. All points on the ceiling shall have a smoke alarm within a distance of 30 ft travel distance or shall have an equivalent of one smoke alarm per 500 sq. ft. of floor area. (NFPA 72 29.5.1.3.1)
- e. Smoke alarms and smoke detectors shall not be installed within a 36 inch horizontal path from the supply registers of a forced air heating or cooling system and shall be installed outside of the direct airflow from those registers. (NFPA 72 29.8.3.4(7))
- f. Smoke alarms and smoke detectors shall not be installed within a 36 inch horizontal path from the tip of the blade of a ceiling-suspended (paddle) fan. (NFPA 72 29.8.3.4(8))

Carbon monoxide alarms.

- g. Carbon monoxide alarms in dwelling units shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms and on each level of the dwelling and in accordance with the manufacturer's recommendations. Where a fuel burning appliance is located within a bedroom or its attached bathroom, a carbon monoxide alarm shall be installed within the bedroom. (IRC 315.3)

15. Fire blocking and draft stops. Fireblocking shall be provided in accordance with Section 302.11. (IRC 602.8) In combustible construction, fireblocking shall be provided to cut off all concealed draft openings (both vertical and horizontal) and to form an effective fire barrier between stories, and between a top story and the roof space. (IRC 302.11) Fireblocking shall be provided in wood-frame construction in the following locations:

- a. In concealed spaces of stud walls and partitions, including furred spaces and parallel rows of studs or staggered studs, as follows:
 - i. Vertically at the ceiling and floor levels.
 - ii. Horizontally at intervals not exceeding 10 feet.
- b. At all inter-connections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings.
- c. In concealed spaces between stair stringers at the top and bottom of the run. Enclosed spaces under stairs shall comply with IRC 302.7.
- d. At openings around vents, pipes, ducts, cables and wires at ceiling and floor level, with an approved material to resist the free passage of flame and products of combustion. The material filling this annular space shall not be required to meet the ASTM E 136 requirements.
- e. All spaces between chimneys and floors and ceilings through which chimneys pass shall be fire blocked with non-combustible material. (IRC 1003.19)
- f. Fire blocking of cornices of a two-family dwelling is required at the line of dwelling unit separation.
- g. **Exterior walls** of a structure that are at least 5 feet from a property line may be non-fire rated. Walls that are less than 5 feet from a property line must be of 1-hour fire resistive construction per ASTM E119 or UL 263 on both sides of the wall. (IRC Table 302.1(1))
- h. **Roof eave overhangs** less than 5 feet but more than 2 feet from a property line may be non-rated if eave fire blocking is provided from the wall top plate to the underside of roof sheathing.

Roof eave fire resistive rating may be reduced to 0 hours on the underside of the eave provided no gable vent openings are installed. (IRC Table 302.1(1))

16. **Fire Separation – Garage to Dwelling Openings.** 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 1 3/8 inches in thickness, solid or honeycomb core steel doors not less than 1 3/8 inches thick, or 20-minute fire rated doors, equipped with a self-closing device. (IRC 302.5.1)
17. **Ducts.** Ducts in the garage and ducts penetrating the walls or ceilings separating the dwelling from the garage shall be constructed of minimum No. 26 gauge sheet steel or other approved material and shall have no openings into the garage. (IRC 302.5.2)
18. **Dwelling-Garage Separation Required.**
 - a. Attached garages shall be separated from the residence and its attic area by not less than 1/2-inch gypsum board or equivalent applied to the garage side. Gypsum board shall be installed on walls with fastener spacing not to exceed 8 inches on center. Gypsum board installed on the ceilings shall be installed perpendicular to the framing with fastener spacing not to exceed 7 inches. (IRC 302.6, Table 302.6 & Table R702.3.5)
 - b. Habitable rooms above garages shall be separated by not less than 5/8-inch Type X gypsum board or equivalent applied to the garage ceiling, and fastened with minimum 1 7/8 inches 6d coated nails or equivalent drywall screws with spacing not to exceed 6 inches. All structure supporting the floor/ceiling separation assembly shall be protected by not less than 1/2-inch gypsum board or equivalent. (IRC 302.6, Table 302.6 & Table R702.3.5)
 - c. Fireblocking shall be provided at openings around vents, pipes, ducts, cables and wires at ceiling and floor level, with an approved material to resist the free passage of flame and products of combustion. The material filling this annular space shall not be required to meet the ASTM E 136 requirements. (IRC 302.5.3, 302.11 #4)
 - d. Detached garages located less than 3 feet from a dwelling unit on the same lot shall be protected with not less than 1/2-inch gypsum board applied to the interior side of the exterior walls that are within this area. (IRC Table R302.6)
19. **Garage floor.** Garage floor surfaces shall be of approved noncombustible material. The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway. (IRC 309.1)
20. **Carports.** Carports shall be open on at least two sides. Carport floor surfaces shall be of approved noncombustible material. Carports not open on at least two sides shall be considered a garage and shall comply with the provisions of the section for garages. (IRC 309.2)

SECTION III – FOOTINGS AND FOUNDATIONS

21. **Footings.** See Table R403.1(1) attached.

Footings shall be supported on firm undisturbed natural soil or engineered fill. (IRC 403.1)

Frost Protection. Foundation systems shall be protected from frost heave. Minimum frost depth for Grant County is 18” measured from the bottom of the footing/pier to finished grade. (IRC 403.1.4.1)

22. **Drainage.** Lots shall be graded so as to drain surface water away from foundation walls. The grade away from foundation walls shall fall a minimum of 6 inches within the first 10 feet. (IRC 401.3)
23. **Footing/Stemwall connections.** Footing to foundation wall connections to be made by either a substantial keyway in footing or the installation of #4 rebar verts at 48 inches on center.
24. **Foundation walls.** Foundation walls shall be centered on the footing within the following parameters: No foundation shall extend closer than 2 inches to the edge of a footing. (IRC 403.1.1)
25. **Basement reinforcement.** For minimum vertical reinforcement requirements see attached **Tables 404.1.2(2), 404.1.2(3) and 404.1.2(4)**. For minimum horizontal reinforcement requirements see attached **Table 404.1.2(1)**. Vertical reinforcement interrupted by wall openings shall have additional vertical reinforcement of the same size placed within 12" of each side of the opening. (IRC 404.1.3.3.7.3) A lintel or header shall be installed to carry any loads to the sides of the foundation wall opening. The foundation wall shall not act as the header. (IRC 404.1.2.3.7.3)
26. **Concrete requirements.** Grant County is rated as having Moderate Weathering potential. This requires that garage floor slabs, carport slabs and other concrete exposed to weather shall have a compressive strength of at least 3,000 lbs and shall be air entrained to not less than 5%, nor more than 7%. During cold weather ALL concrete shall be air entrained. Concrete walls that enclose habitable space shall be dampproofed with a bituminous coating or other approved process. (IRC 402.2 & IRC 406)
27. **Under floor access.** Crawl space access shall be provided to all under-floor spaces. Access openings through the floor shall be a minimum of 18 x 24 inches; where mechanical appliances are present, a minimum opening of 22 x 30 inches is required, and large enough to allow the removal of the largest appliance located in the crawl space per the Mechanical Code. (IMC 306.4 & IRC 408.4)
28. **Exterior Decks.** Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads as applicable. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be designed to be self-supporting (IRC 507.1)
- Deck ledgers and the rim joists they are connecting to shall be in accordance with IRC 507.2 and Table 507.2 – footnotes e, f & g. Deck ledger connections, including the lateral load connection, shall be in accordance with Table 507.2 and Figure 507.2.3(1) or (2) or be of an engineered design. **See Grant County's Basic Deck Handout for additional requirements.** Structures not built in accordance with these requirements shall be of an engineered design.
29. **Decay protection.** Wood joists or the bottom of wood structural flooring must have a minimum clearance of 18 inches to the ground. Wood girders/beams must have a minimum of 12 inches clearance. (IRC 317.1) Note: 6 mil black visqueen is required for ground cover in crawl spaces, lapped 12 inches at each joint.
30. **Sill plate.** Sill plates are required to be preservative treated. Exception: a non-pressure treated plate, grade #2 or better, may be used if the top of the foundation wall extends at least 8 inches above finish grade and a moisture barrier, such as sill sealer or 30# felt, is placed between the concrete or masonry and the wood plate. (IRC 317.1)
31. **Fasteners.** Fasteners, including nuts and washers, for preservative-treated wood shall be of hot-dipped zinc coated galvanized steel, stainless steel, silicon bronze or copper. Exception: 1/2-inch diameter or greater steel bolts. (IRC 317.3.1)

Fasteners, including nuts and washers, for fire-retardant-treated wood used in exterior applications or wet or damp locations shall be of hot-dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper. (IRC 317.3.3) Fasteners, including nuts and washers, for fire-retardant-treated wood in interior locations shall be in accordance with the manufacturer's recommendations. (IRC 317.3.4)

32. **Foundation anchorage.** The wood sole plate or sill plate shall be anchored to the foundation with anchor bolts spaced a maximum of 6 feet on center or approved anchors or anchor straps spaced as required to provide equivalent anchorage to ½ inch diameter anchor bolts. The bolts shall be located in the middle third of the width of the plate. There shall be a minimum of two bolts per plate section, with one bolt located not more than 12 inches or less than seven bolt diameters from each end of the plate section or splice. Bolts shall be at least 1/2-inch in diameter and shall extend a minimum of 7 inches into concrete or grouted cells of concrete masonry units. (IRC 403.1.6)

SECTION IV – FLOOR FRAMING

33. For typical floor, roof and wall framing examples, see attached **figures R602.3(1) and R602.3(2)**.
34. **Under-floor ventilation.** The under-floor space between the bottom of the floor joists and the earth under any building (except space occupied by a basement) shall have ventilation openings through foundation walls or exterior walls. The minimum net area of ventilation openings shall not be less than 1 square foot for each 300 square feet of under-floor space area. Required openings shall be evenly placed to provide cross ventilation of the space except one side of the building shall be permitted to have no ventilation openings. A ground cover of 6 mil black polyethylene or approved equal shall be laid over the ground within crawl spaces. The ground cover shall be overlapped six inches minimum at the joints and shall extend to the foundation wall. (IRC 408.1 & 408.2)
35. **Joist bearing.** The ends of each joist, beam or girder shall have not less than 1.5 inches of bearing on wood or metal and not less than 3 inches on masonry or concrete except where supported on a 1-inch-by-4-inch ribbon strip and nailed to the adjacent stud or supported by the use of approved joist hangers. The bearing on masonry or concrete shall be direct, or a sill plate of 2-inch-minimum nominal thickness shall be provided under the joist, beam or girder. The sill plate shall provide a minimum nominal bearing area of 48 square inches. (IRC 502.6)
36. **Floor systems.** Joists framing from opposite sides over a bearing support shall lap a minimum of 3 inches and shall be nailed together with a minimum three 10d face nails. A wood or metal splice with strength equal to or greater than that provided by the nailed lap is permitted. Install I-joists per manufacturer's specifications. (IRC 502.6.1)
37. **Joists under bearing partitions.** Joists under parallel bearing partitions shall be of adequate size to support the load. Double joists, sized to adequately support the load, that are separated to permit the installation of piping or vents shall be full depth solid blocked with lumber not less than 2 inches in nominal thickness spaced not more than 4 feet on center. Bearing partitions perpendicular to joists shall not be offset from supporting girders, walls or partitions more than the joist depth unless such joists are of sufficient size to carry the additional load. (IRC 502.4)
38. **Lateral restraint at supports.** Joists shall be supported laterally at the ends by full-depth solid blocking not less than 2 inches nominal in thickness; or by attachment to a full-depth header, band, or rim joist, or to an adjoining stud or shall be otherwise provided with lateral support to prevent rotation. (IRC 502.7)

39. **Drilling and notching – joists, rafters, beams.** Structural floor members shall not be cut, bored or notched in excess of the limitations specified in this section. (IRC 502.8) **See Figure R502.8**

Notches in solid lumber joists, rafters and beams shall not exceed in height one-sixth of the depth of the member, shall not be longer than one-third of the depth of the member and shall not be located in the middle one-third of the span. Notches at the ends of the member shall not exceed one-fourth the depth of the member. The tension (bottom) side of members 4 inches or greater in nominal thickness shall not be notched except at the ends of the members. The diameter of holes bored or cut into members shall not exceed one-third the depth of the member. Holes shall not be closer than 2 inches to the top or bottom of the member, or to any other hole located in the member. Where the member is also notched, the hole shall not be closer than 2 inches to the notch. (IRC 502.8.1) **See Figure R502.8**

40. **Engineered wood products.** Cuts, notches and holes bored in trusses, structural composite lumber, structural glue-laminated members, cross laminated timber members or I-joists are prohibited except where permitted by the manufacturer's recommendations or where the effects of such alterations are specifically considered in the design of the member by a registered design professional. (IRC 502.8.2)

SECTION V – WALL FRAMING

41. **Wall bracing.** Grant County is in Seismic Zone C. All exterior walls and interior braced wall lines shall be braced in accordance with the IRC 602.10.
- a. Walls at the exterior gable ends of rooms with vaulted ceilings shall be built as rake walls with studs continuous from the sole plate at the floor to the top plate at the ceiling diaphragm. The gable end truss, if applicable, shall be a scissor truss with the bottom chord matching the elevation of the interior scissor trusses. (IRC 602.3)
42. **Cripple Walls.** Foundation cripple walls shall be framed of studs not smaller than the studding above. When exceeding 4 feet in height, such walls shall be framed of studs having the size required for an additional story. Cripple walls supporting bearing walls or exterior walls or interior braced wall panels as required in Section R403.1.2 and R 602.10.9.1 with a stud height less than 14 inches shall be continuously sheathed on one side with wood structural panels fastened to both the top and bottom plates in accordance with Table R602.3(1), or the cripple walls shall be constructed of solid blocking. All cripple walls shall be supported on continuous footings or foundations. IRC 602.9
43. **Drilling and notching – studs.** (IRC 602.6) **See Figures IRC 602.6(1) and IRC 602.6(2)**
- a. Notching. Any stud in an exterior wall or bearing partition may be cut or notched to a depth not exceeding 25 percent of its width. Studs in nonbearing partitions may be notched to a depth not to exceed 40 percent of a single stud width.
 - b. Drilling. Any stud may be bored or drilled, provided that the diameter of the resulting hole is no more than 60 percent of the stud width, the edge of the hole is no more than 5/8 inch to the edge of the stud, and the hole is not located in the same section as a cut or notch. Studs located in exterior walls or bearing partitions drilled over 40 percent and up to 60 percent shall also be doubled with no more than two successive doubled studs bored.
- Exception: Approved stud shoes may be used when installed in accordance with the manufacturer's recommendations.

44. **Bearing Studs.** Where joists, trusses or rafters are spaced more than 16” on center and the bearing studs below are spaced 24” on center, such members shall bear within 5” of the studs beneath. Exception: Where the top plates are two 2 x 6’s. IRC 602.3.3
45. **Bearing Support.** Provide full width bearing support under beams, girder trusses and point loads. Bearing shall extend to the foundation. (IRC 301.1)
46. **Top Plates.**
- a. **Double Top Plates** - Wood stud walls shall be capped with a double top plate installed to provide overlapping at corners and intersections with bearing partitions. End joints in top plates shall be offset at least 24 inches. Plates shall be not less than 2-inches nominal thickness and have a width at least equal to the width of the studs. (IRC 602.3.2)
 - b. **Single top plates.** A single top plate used as an alternative to a double top plate shall comply with the following:
 - i. Single top plate shall be tied at corners, intersecting walls, and at in-line splices in straight wall lines in accordance with Table R602.3.2
 - ii. Rafters or joists shall be centered over the studs with a tolerance of not more than 1 inch
 - iii. Omission of the top plate is permitted over headers where the headers are adequately tied to adjacent wall sections in accordance with Table R602.3.2 (IRC 602.3.2)

Strapping:

- c. **Double Top Plates.** 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 inch thick (16 ga) and 1 ½ inches wide shall be fastened across and to the plate at each side of the opening with not less than eight 10d nails having a minimum length of 1 ½ inches at each side or equivalent. The metal tie must extend a minimum of 6 inches past the opening. (Exception: When the entire side of the wall with the notch or cut is covered by wood structural panel sheathing.) (IRC 602.6.1)
47. **Wall Bracing.** Buildings shall be braced in accordance with section R602.1.1 through R602.10.10.3. Where a building, or portion thereof, does not comply with one or more of the bracing requirements in this section, those portions shall be designed and constructed in accordance with Section R301.1 (IRC 602.10)
48. **Reserved**
- 49.
- a. **Weather & Installation.** Products sensitive to adverse weather shall not be installed until adequate weather protection for the installation is provided. Exterior sheathing shall be dry before applying exterior cover. (IRC 701.2)
 - b. **Water-resistive barrier.** Exterior walls shall provide the building with a weather-resistant exterior wall envelope. The exterior wall envelope shall include flashing as described in Section R703.4. (IRC 703.1)
 - c. **Water-resistive barrier.** Exterior walls shall provide the building with a weather-resistant exterior wall envelope. The exterior wall envelope shall include flashing as described in Section R703.4. (IRC 703.1)
 - d. **Flashing.** Windows and doors shall be installed and flashed in accordance with the manufacturer’s written installation instructions. Written installation instructions shall be provided by the manufacturer for each window or door. These documents must be provided to the inspector at framing inspection. (IRC 609.1)

SECTION VI – ROOF FRAMING

50. **Roof framing.** Rafters shall be framed not more than 1 1/2 inch offset from each other to a ridge board or shall be framed directly opposite each other with a gusset plate as a tie. Ridge board shall be not less than 1-inch nominal thickness and not less in depth than the cut end of the rafter. At valleys and hips there shall be a valley or hip rafter not less than 2-inch nominal thickness and not less in depth than the cut end of the rafter. Hip and valley rafters shall be supported at the ridge by a brace to a bearing partition or be designed to carry and distribute the specific load at that point. Where the roof pitch is less than 3 units vertical in 12 units horizontal (25-percent slope), structural members that support rafters and ceiling joists, such as ridge beams, hips and valleys, shall be designed as beams. (IRC 802.3)
51. **Roof framing.** Rafters or trusses shall be secured by a minimum of 3-16d toenails, 3-10d common, 4-10d box or 4-3" x 0.131" (Table 602.3(1)) and approved hurricane ties on each truss or rafter at each exterior wall end. (IRC 802.11 & Table 802.11)
52. **Engineered roof trusses.** Engineering proof of stress analysis and details with drawing(s) stamped by approved State of Washington registered professional engineer will be required to prove a 20 PSF roof live load or 30 PSF ground snow load and 110 MPH (ultimate speed) wind capability, and shall be included with the plans supplied for plan review and application approval. (IRC 802.10.1)
53. **Ceiling joist and rafter connections.** Where ceiling joists are not parallel to rafters, rafter ties shall be installed. Rafter ties shall be a minimum of 2-inch by 4-inch (nominal), installed in accordance with the connection requirements in Table R802.5.1(9), or connections of equivalent capacities shall be provided. Where ceiling joists or rafter ties are not provided, the ridge formed by these rafters shall be supported by a wall or girder designed in accordance with accepted engineering practice. (IRC 802.3.1)
- Collar ties or ridge straps to resist wind uplift shall be connected in the upper third of the attic space in accordance with Table R602.3(1). Collar ties shall be a minimum of 1-inch by 4-inch (nominal), spaced not more than 4 feet on center. (IRC 802.3.1)
54. **Attic access.** The rough framed opening shall not be less than 22 x 30 inches and shall be located in a hallway or other readily accessible location. Where located in a wall, the opening shall be not less than 22 inches wide x 30 inches high. Where the access is located in a ceiling, minimum unobstructed headroom in the attic space shall be 30 inches at some point above the access measured vertically from the bottom of ceiling framing members. (IRC 807.1)
- Attics with limited storage shall have a minimum bottom chord design live load of 20 pounds reflected in the truss design. Pull-down stairs located in the garage fire separation require ½" GWB on the face of the stairs with weather stripping to seal the edges and maintain a tight fit preventing the passage of smoke. (IRC Table R301.5, IRC Table R302.6)
55. **Attic ventilation.** The minimum net free ventilating area shall be 1/150 of the area of the vented space. Exception: The minimum net free ventilation area shall be 1/300 of the vented space provided at least 40 percent and not more than 50 percent of the required ventilating area is provided by ventilators located in the upper portion of the attic or rafter space located no more than 3 feet below the ridge or highest point of the space, with the balance of the required ventilation provided by eave or cornice vents. (IRC 806.2)

SECTION VII – STAIRS AND RAILINGS

56. **Stairways and handrails. Width.** Stairways shall not be less than 36 inches in clear width. Handrails shall not project more than 4.5 inches on either side of the stairway. **Headroom.** The headroom in stairways shall be not less than 6'8", measured vertically from the sloped line adjoining the tread nosing or from the floor surface of the landing or platform on that portion of the stairway. **Refer to Stairs, Handrails and Guardrails reference sheet** (IRC 311.7.1 & 311.7.2)
57. **Stair treads and risers. Riser height.** The riser height shall be not more than 7 3/4 inches. The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8-inch. **Tread depth.** The tread depth shall be not less than 10 inches. 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 greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8-inch. (IRC 311.7.5.1 & 311.7.5.2) **Refer to Stairs, Handrails and Guardrails reference sheet**
58. **Winder treads.** Winder treads shall have a tread depth of not less than 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 tread depth of not less than 6 inches at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8-inch. (IRC 311.7.5.2.1) **Refer to figures R311.7.5.2.1(1) and R311.7.5.2.1(2)**
- Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within 3/8 inch of rectangular tread depth.
59. **Tread profile.** A nosing projection is not required where the tread depth is not less than 11 inches. Where tread depth is less than 11 inches, a nosing projection not less than 3/4-inch and not more than 1 1/4-inches shall be provided on stairways with solid risers. For requirements about nosing profiles contact your architect/designer or our office. (IRC 311.7.5.3) **Refer to figure R311.7.5.3**
60. **Special stairways.** Circular stairways, spiral stairways, winders and bulkhead enclosure stairways shall comply with the requirements of Section R 311.7 except as specified below. (IRC 311.7.10)
61. **Spiral stairways.** Spiral stairways are permitted, provided that the clear width is not less than 26 inches and the walkline radius is not greater than 24 1/2 inches with each tread having a depth of not less than a 6 3/4 inches at the walkline. All treads shall be identical, and the rise shall be not more than 9 1/2 inches. Headroom shall be not less than 6'6". (IRC 311.7.10.1) **Refer to figure R311.7.10.1**
62. **Landings for stairways.** There shall be a floor or landing at the top and bottom of each stairway. Exception: A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided a door does not swing over the stairs. *A flight of stairs shall not have a vertical rise larger than 147 inches (12 feet 3 inches) between floor levels or landings.* The width of each landing shall not be less than the width of the stairway served. Every landing shall have a dimension of not less than 36 inches measured in the direction of travel. (IRC 311.7.6 & IRC 311.7.3) **Refer to figure R311.7.6(1)**
63. **Handrails.** Handrails shall be provided on not less than one side of each continuous run of treads or flight with four or more risers. **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-inches between the wall and the handrails. (IRC 311.7.8 & 311.7.8.2) **Refer to figure R311.7.8.2**

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

64. **Height of handrail.** Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finished surface of ramp slope, shall be not less than 34 inches and not more than 38 inches. (IRC 311.7.8.1) **See Stairs, Handrails and Guardrails reference sheet**

65. **Handrail grip size.** (IRC 311.7.8.3) Type I – Circular - Diameter not less than 1 1/4 inches and not greater than 2 inches. Type II: Non-Circular. Refer to **Stairs, Handrails and Guardrails reference sheet**

66. **Guardrails.** Guardrails are required where fall hazards exceed 30 inches. The guardrail height shall be not less than 36 inches. Guardrails shall have intermediate rails or other closures that do not allow the passage of a sphere 4 inches in diameter. (IRC 312.1.1 – 312.1.3) **Refer to Stairs, Handrails and Guardrails reference sheet**

67. **Stairway illumination.** Stairways shall be provided with illumination in accordance with Section R303.7. (IRC 311.7.9)

- a. Interior stairways shall be provided with an artificial light source to illuminate the landings and treads. Stairway illumination shall receive primary power from the building wiring. The light source shall be capable of illuminating treads and landings to levels not less than 1 foot-candle measured at the center of treads and landings. There shall be a wall switch at each floor level to control the light source where the stairway has six or more risers. (IRC 303.7)
- b. Exterior stairways shall be provided with an artificial light source located at the top landing of the stairway. Stairway illumination shall receive primary power from the building wiring. Exterior stairways providing access to a basement from the outdoor grade level shall be provided with an artificial light source located at the bottom landing of the stairway. (IRC 303.8)

68. **Light activation.** Where lighting outlets are installed in interior stairways, there shall be a wall switch at each floor level to control the lighting outlet where the stairway has six or more risers. The illumination of exterior stairways shall be controlled from inside the dwelling unit. Exception: Lights that are continuously illuminated or automatically controlled. (IRC 303.7.1)

SECTION VIII – PLUMBING

69. **Freezing.** No water, soil or waste pipe shall be installed or permitted outside of a building, in attics or crawl spaces, or in an exterior wall unless, where necessary, adequate provision is made to protect such pipe from freezing. All hot and cold water pipes installed outside the conditioned space shall be insulated to a minimum **R-3**. (UPC 312.6)

70. **Plumbing fixtures and installation requirements.**

- a. Water systems must be protected from backflow/cross contamination. (UPC Chapter 6)
- b. Plumbing systems shall be installed in a manner that is in accordance with this code, applicable standards and the manufacturer's installation instructions. (UPC 309.4)
- c. Showers shall have a minimum finished interior of 900 sq. inches and shall be capable of encompassing a 30-inch circle. Showerheads shall have a maximum flow rate of not more than 2.5 gpm at 80psi. (UPC 408.6 & 408.2)

- d. Water closet compartments must be a minimum of 30 inches wide, measured 15 inches from the floor flange center to closest side obstruction and requires 21 inches of clear space in front measured from front edge. (UPC 402.5)
- e. Kitchen sinks require a 2-inch minimum diameter drain with a readily accessible cleanout, preferably located in under-sink cabinet. (UPC Table 702.1)
- f. Dishwashers shall be provided with an air gap system on its drain to prevent sewage backflow. Listed air gaps shall be at or above the flood rim. (UPC 807.3)
- g. Clothes washers require a 2-inch drain, the standpipe of which shall not be more than 30 inches tall or less than 18 inches above its trap. (UPC 804)
- h. Water hammer arrestors are required for clothes washers. (UPC 609.10)
- i. Backwater valve required if the sewer system or septic tank system is higher than the lowest fixture or floor drain. This is recommended for basements, regardless of the plumbing heights. (UPC 602.3)
- j. The system vent pipes shall not be less than the aggregate cross-sectional of the building's main waste drain. (UPC 904.1)
- k. PVC, CPVC, ABS and PEX piping that runs the full length of a stud cavity must be supported at mid-point. (UPC Table 313.3)
- l. Hose bibs to be frost-proof type (UPC 603.5.7)

71. Hot water heaters.

- a. Must be anchored or strapped against seismic movement. (UPC 507.2)
- b. Must vent pressure relief to exterior or approved drain.
- c. Install expansion tank except when served by private well. (UPC 504.4)
- d. When placed on wood framing, install drip pan of not less than 1 ½ inches in depth and vent to exterior. (UPC 507.5)
- e. When placed on concrete, install minimum R-10 insulation under HWT. (WSEC 403.5.5)
- f. Size according to UPC Table 501.1.
- g. The minimum 1st hour rating for your HWT is _____ gallons.

SECTION IX – MECHANICAL

72. 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. Portable space heaters may not be used to comply with this requirement. (IRC 303.9) Primary heating shall not be dependent upon wood stoves. (IRC 303.9.2)

73. Appliances in attics. Attics containing appliances shall be provided with an opening and unobstructed passageway large enough to allow removal of the largest appliance. The passageway shall not be less than 30 inches high and 22 inches wide and not more than 20 feet in length measured along the centerline of the passageway from the opening to the appliance. The passageway shall have continuous solid flooring not less than 24 inches wide. A level service space not less than 30 inches deep and 30 inches wide shall be present at the front or service side of the appliance. The clear access opening dimensions shall be not less than 20 inches by 30 inches, and large enough to allow removal of the largest appliance. (IMC 306.3)

74. Appliances under floors. Underfloor spaces containing appliances shall be provided with an access opening and unobstructed passageway large enough to remove the largest appliance. The passageway shall not be less than 30 inches high and 22 inches wide, nor more than 20 feet in length measured along the centerline of the passageway from the opening to the appliance. A level service space not less than 30 inches deep and 30 inches wide shall be present at the front or service side of the appliance. If the

depth of the passageway or the service space exceeds 12 inches below the adjoining grade, the walls of the passageway shall be lined with concrete or masonry. Such concrete or masonry shall extend not less than 4 inches above the adjoining grade and shall have sufficient lateral-bearing capacity to resist collapse. The clear access opening dimensions shall be not less than 22 inches by 30 inches, and large enough to allow removal of the largest appliance. (IMC 306.4)

75. **Furnaces** shall not take circulating or combustion air from garage. (IMC 601.5)

76. **Condensate disposal, drain pipe, drain systems and traps.**

- a. Condensate from all cooling coils and evaporators shall be conveyed from the drain pan outlet to an approved place of disposal. Such piping shall maintain a minimum horizontal slope in the direction of discharge of not less than one-eighth unit vertical in 12 units horizontal (1-percent slope). Condensate shall not discharge into a street, alley or other areas so as to cause a nuisance. (IMC 307.2.1)
- b. Components of the condensate disposal system shall be cast iron, galvanized steel, copper, cross-linked polyethylene, polyethylene, ABS, CPVC, PVC or polypropylene pipe or tubing. Components shall be selected for the pressure and temperature rating of the installation. Joints and connections shall be made in accordance with the applicable provisions of Chapter 7 of the UPC relative to the material type. Condensate waste and drain line size shall be not less than 3/4-inch internal diameter and shall not decrease in size from the drain pan connection to the place of condensate disposal. Where the drainpipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with Table 307.2.2. (IMC 307.2.2)
- c. In addition to the requirements of Section 307.2.1, where damage to any building components could occur as a result of overflow from the equipment primary condensate removal system, **one of the following auxiliary protection methods shall be provided for each cooling coil or fuel-fired appliance that produces condensate:** (IMC 307.2.3)
 - i. An auxiliary drain pan with a separate drain shall be provided under the coils on which condensation will occur. The auxiliary pan drain shall discharge to a conspicuous point of disposal to alert occupants in the event of a stoppage of the primary drain. The pan shall have a minimum depth of 1.5 inches, shall not be less than 3 inches larger than the unit or the coil dimensions in width and length and shall be constructed of corrosion-resistant material. Galvanized sheet steel pans shall have a minimum thickness of not less than 0.0236 inch (No. 24 gauge). Nonmetallic pans shall have a minimum thickness of not less than 0.0625-inch.
 - ii. A separate overflow drain line shall be connected to the drain pan provided with the equipment. Such overflow drain shall discharge to a conspicuous point of disposal to alert occupants in the event of a stoppage of the primary drain. The overflow drain line shall connect to the drain pan at a higher level than the primary drain connection.
 - iii. An auxiliary drain pan without a separate drain line shall be provided under the coils on which condensate will occur. Such pan shall be equipped with a water-level detection device conforming to UL 508 that will shut off the equipment served prior to overflow of the pan. The auxiliary drain pan shall be constructed in accordance with Item (i) of this section.
 - iv. A water level detection device conforming to UL 508 shall be provided that will shut off the equipment served in the event that the primary drain is blocked. The device shall be installed in the primary drain line, the overflow drain line, or in the equipment-supplied drain pan, located at a point higher than the primary drain line connection and below the overflow rim of such pan.
- d. On down-flow units and all other coils that do not have a secondary drain or provisions to install an auxiliary drain pan, a water-level monitoring device shall be installed inside the primary drain

pan. This device shall shut off the equipment served in the event that the primary drain becomes restricted. Devices installed in the drain line shall not be permitted. (IMC 307.2.3.1)

- e. Condensate drains shall be trapped as required by the equipment or appliance manufacturer. (IMC 307.2.4)

- 77. **Air ducts** shall be installed with at least 4-inch separation from earth. (IMC 603.14)
- 78. **Ducts** penetrating fire separation walls shall be constructed of a minimum 26 gauge sheet steel or other approved material and shall not have openings into garage. (IRC 302.5.2)
- 79. **Round metallic ducts** shall be mechanically fastened by means of not less than three sheet metal screws or rivets spaced equally around the joint. IMC 603.4.1
- 80. **Clothes dryer.** (IMC 504 & IRC 1502.4.3) Vent to exterior. Flex duct may not exceed 8 feet in length. If duct is longer, use smooth wall metal pipe. Maximum length of the exhaust duct shall be either:
 - a. 35 feet from the connection to the transition duct from the dryer to the outlet terminal. Where fittings are used, the maximum length of the exhaust duct shall be reduced in accordance with Table 504.8.4.1. (IMC 504.8.4.1)
 - b. Determined by the dryer manufacturer's installation instructions, with a copy provided to the building official for the make and model of the dryer. (IMC 504.8.4.2)

Where the exhaust duct, equivalent length exceeds 35 feet, the equivalent length of the exhaust duct shall be identified on a permanent label or tag within 6 feet of the exhaust duct connection. (IMC 504.8.5)

- 81. **Wood, propane or fuel burning stove or insert.** Install fireplace per manufacturer's requirements. Remember to provide outside combustion air to firebox.
- 82. **Fireplaces and chimneys.** See **Table R1001.1** for summary of requirements for masonry fireplaces and chimneys. See **attached Figure R1001.1** for fireplace and chimney details.

SECTION X – MISCELLANEOUS

- 83. **Automatic garage door openers,** if provided, shall be listed in accordance with UL 325. (IRC 309.4)
- 84. **Electric service panel or sub-panel installed in a garage/residence fire separation wall** shall maintain the minimum firewall construction. (IRC 302.5.3)
- 85. **Appliances installed in garages** or other areas where they may be subjected to mechanical damage shall be suitably guarded against such damage by being installed behind protective barriers or by being elevated or located out of the normal path of vehicles. (IMC 304.7)
- 86. **Equipment and appliances** covered by this code located in a garage and which generates a hot surface, spark or flame capable of igniting flammable vapors shall be installed with sources of ignition not less than 18 inches above the floor level. (IMC 304.3)

87. **Use of Gypsum** in showers and water closets. When gypsum is used as a base for tile or wall panels for the tub, shower or water closet compartment walls, water resistant gypsum backing board shall be used. Use of water-resistant gypsum backing board shall be permitted on ceilings. Water resistant gypsum board shall not be used in the following locations: (IRC 702.3.7)
- a. Over a Class I or II vapor retarder.
 - b. In areas subject to continuous high humidity, such as saunas, steam rooms or gang shower rooms.