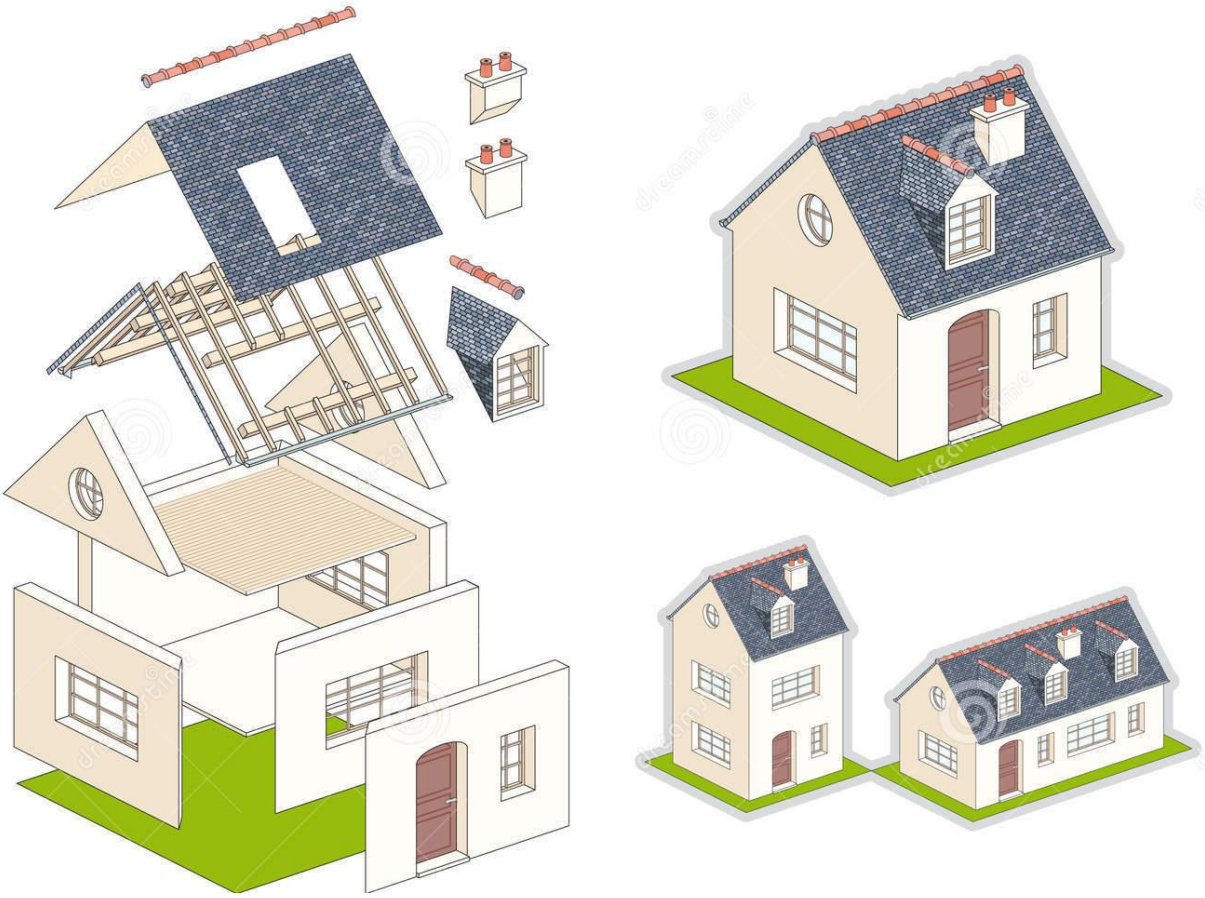
LARIMER COUNTY | COMMUNITY DEVELOPMENT

P.O. Box 1190, Fort Collins, Colorado 80522-1190, Planning (970) 498-7683, Building (970) 498-7700, Larimer.org

# RESIDENTIAL REQUIREMENTS

## A Guide for the General Contractor or Home Builder



Updated March 2022

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**Detailed Construction Drawing Examples**
(*All Plans Must Be Drawn to Architect's and/or Engineer's Scale*)

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# PERMIT APPLICATIONS AND PARCEL NUMBERS

All building permit applications submitted must have a current parcel number. **NO** building permits can be accepted without a parcel number.

If the application is for a lot in a recorded subdivision and the parcel number has not yet been established by the Assessor's Office, the Building Division will accept an application.

Parcel numbers are to be obtained from the Assessor's Office. The Building Division can also research for parcel numbers; however, we may refer you to the Assessor's Office if we cannot locate a current parcel number.

If you do not have a parcel number, you must first meet with the Planning Staff on Call to determine if this is a legal lot before you can submit for a building permit. Applicants must provide a copy of the recorded deed to the planner, who will determine if this is a legal lot. This research may take minutes or days depending on the situation. If the Planner determines the lot in question is legal, the Building Division will accept the application at that time.

It is highly recommended to bring a warranty deed for the parcel. This will help identify the location and ownership at time of submittal.

Community Development Division

Building Department
200 W. Oak Street
Suite 3100
P.O. Box 1190
Fort Collins, CO
(970) 498-7683

*Updated March 2022*

## Plan Submittal Checklist

# RESIDENTIAL CONSTRUCTION*

**The following items are required, along with a completed permit application and fees, to initiate a permit for a new structure. The applicant must be the homeowner or a County-licensed contractor. Plans will not be accepted that have been marked with a red marker or red pen (Plans Examiners use red ink to mark corrections on the plans). When in doubt, please call the Building Staff-on-Call at (970) 498-7660.**

For properties located within the Estes Valley Area, call the Larimer County Community Development Department at (970) 498-7679 to confirm submittal items required by the Larimer County Land Use Code.

For properties located in or around a floodplain, see separate checklist for additional submittal items required by the Larimer County Engineering Department pursuant to the County's Land Use Code.

**FOUR COPIES** of a **plot plan drawn to scale** (Scale 1″= 10' or Scale 1″ = 100). Show entire property, location of all existing and proposed structures, natural water features, distance to property lines, easements, setbacks, direction north, roadways, streets and access, owner's name, parcel number, address.

**TWO COPIES** of the following **stapled together** and **drawn to scale** (1/8", 3/16" or ¼" per foot) on maximum 24" x 36" paper:

____ **Foundation Plan** Engineered plans are usually required along the Front Range, and on steeply sloped lots in the foothills and mountains. Engineered plans must be wet-stamped and signed by a Colorado Registered Structural Engineer. All plans must show footing size and location, pad sizes and location, foundation wall details and beam sizes.

____ **Floor Framing Plan** Show size, spacing, species and grade of lumber to be used for floor joists. All beam and header sizes are to be noted on the plans. (For a simple one-floor house, these may be noted on the floor plan).

____ **Roof Framing Plan** Show size, spacing, species and grade of lumber to be used for the rafters. If using engineered trusses, truss layout plans from the truss manufacturer are required. These plans must show beam and header sizes. A full set of stamped, engineered truss plans must be on site for the framing inspection.

____ **Floor Plans** of all levels. Label use of each room and show window sizes, door swings and sizes, plumbing fixture placement, stairways, etc.

____ **Wall Bracing Plan** Identify the bracing method used, location/spacing of braced wall lines, location and length of braced wall panels on each braced wall line, wall and floor diaphragm connections details, continuous load path from top of wall to foundation, and return panels or hold-downs at ends of braced wall lines. **PLANS LACKING PROPER WALL BRACING INFORMATION WILL NOT BE ACCEPTED.**

_____ **Elevations** of all sides. Show roof pitch, roofing material, window and door placements, siding, any steps to grade.

____ **Slope Profile (required for non-engineered foundation plans)** An accurate slope profile drawing is required for all structures in the Class "B" roofing area lacking engineered foundation plans.

____ **Energy Conservation Package** Attach County Form to plans. Circle your choice of energy package. Specify additional energy efficiency package chosen and name of air leakage testing firm. Attach Manual J, S and D calculations. Show how you satisfy whole house mechanical ventilation requirements, specify system controls and efficiency of any fans or equipment that are part of this system. Show location of and details of air barrier, including sealing at penetrations, joints, and dissimilar materials.

____ **Frame Section** Identify cross-section submitted with plan. (Foundation section is not adequate.) Must show section from bottom of footing to top of roofline. Identify framing and insulation details. Identify typical framing insulation details and provide an air barrier and thermal envelope depiction (can be included with a typical wall section).

____ **Stair Section** Show cross-section, details including rise/run, stair openings, handrails, landings, etc.

____ **Detail Sections** of critical construction or special structural items like decks, porches, retaining walls over four feet, etc.

____ **Fire Sprinkler Plans** If you are installing an NFPA-13 system, submit plans and obtain a permit through your local fire department and bring verification of their approval to us. If you are installing a P2904 residential system, supply floor plans showing location of all sprinklers, size/type of pipe, sprinkler cut sheets, and hydraulic calculations for the two most hydraulically demanding heads.

**BUILDING PERMIT APPLICATION REQUIREMENTS:**
**SUBMITTING PLANS FOR ANY RESIDENTIAL STRUCTURE**

**TWO COMPLETE SETS OF PLANS, PLUS A MINIMUM OF FOUR PLOT PLANS** shall be submitted with each application for a permit that involves proposed new construction or additions to existing structures. One set of plans remains on file in the office. One set is returned to the customer to keep on the job for subcontractor's and inspector's use. **Plans for ALTERATION, REPAIRS OR RESUBMITTALS** need pertain only to work to be done or involved but must be complete enough to demonstrate they comply with zoning ordinances as well as the building code.

An initial plan review and plot plan review fee is collected at permit submittal. The remainder of the permit fees, which are based on square footage of the structure and estimated valuation, as well as all other applicable fees are collected at permit issuance. For further questions regarding fees please email building@larimer.gov.

It can take up to six weeks for initial plan review to take place. During busy times this may take longer. Incomplete submittals will not be accepted, except for delayed HVAC reports. Time frames begin from full plan submittal. Slow response to required corrections may also delay your project. Once all approving agencies have signed off and a thorough review has been done, an email will be sent to the applicant with payment and issuance instructions.

**PLANS WILL NOT BE ACCEPTED THAT HAVE BEEN MARKED WITH A RED MARKER OR RED PEN.**
Plans Examiners use red ink to mark corrections on the plans. **Following is a list of what is required to be submitted:**

**I** **Four (4) plot plans of total parcel DRAWN TO SCALE.** (See examples attachment D-F)

____ A. Show all dimensions of all property lines.
____ B. Identify scale used. Minimum scale is 1 inch = 20 feet or 1/16 inch = one foot (preferred). For large parcels, a vicinity map accompanied by an enlargement of the construction site will be acceptable (max. size paper that will be accepted is 24" x 36").
____ C. Identify north direction with arrow or compass.
____ D. Identify easements for utilities including overhead utilities (you are responsible for knowing where these are even if they are not on your plot plan).
____ E. Show name of all adjacent roads. Clearly show driveway location and access point.
____ F. Identify vehicle parking areas.
____ G. Show section, township, and range.
____H. Show subdivision name, lot, block, and filing number, if applicable.
____ I. Show property owner's name, address, and phone number.
____ J. Show and label all existing structures with their use and distance to the proposed structure. Include bay windows, window wells, and any structural appendages including their distance to property lines.
____ K. Show distance from the proposed structure to ALL property lines, building envelopes and to the centerline of all adjacent roads. If an existing structure straddles the property line, it must be shown on the plot plan.
____ L. Show location of any stream or stream bed (wet or dry), river, lake, or any other body of water within 100 feet of the structure. Note distance from structure to water.
____ M. If your property is in a Flood Plain, approval from Engineering is required. Applicants should contact Engineering as soon as possible at 498-5700. New structures cannot be built in floodways, and structures must be elevated in Flood Fringes.
_____N. Verify with Planning and Zoning the minimum setbacks for proposed structure(s) on your property. Failure to meet minimum setback requirements will result in delays in the review process

**II** **<u>Floor and Structural Plans</u> (see attachments J-K for examples).**

____ A. Provide floor plan for each floor, stating the use of each room. Preferred scale is 1/4 inch = 1 foot.
____ B. Provide footing/foundation plan including cross section. If your property is in a subdivision, list subdivision name, lot, block, and filing number. If an engineered foundation plan is required, the Engineer's seal must bear the words REGISTERED IN THE STATE OF COLORADO and must be an original, not a copy. These plans must be stamped and personally signed by the Structural Engineer.
____ C. Framing plan must show direction, size, type, span and spacing of floor joists, roof rafters, girders, beams, columns, piers, and header sizes. If using engineered trusses, truss layout map at a minimum is required at plan submittal. Full set of engineered/stamped truss drawings is required on site for framing inspection.
____ D. Show door and window sizes and location, and direction of all door swings.
____ E. Show location of all bathroom fixtures, kitchen cabinets, water heater, boiler or furnace, and fireplaces.

**III** **<u>Exterior Elevation all sides</u> (see attachments H-I for examples).**

____ A. Show front view, scale at 1/4 inch = 1 foot.
____ B. Show rear and both side views, preferred scale 1/8 inch = 1 foot.
____ C. Identify finished floor lines.
____ D. Identify finished grade line at building.
____ E. Show exterior wall finish and roof covering material.

**IV** **<u>Detail and Sections</u> (see attachment M-O for examples).**

____ A. Provide cross-section of exterior wall showing details from footings to roof, and listing materials used, including insulation R-values. Preferred scale is 3/8 inch = 1 foot.
____ B. Provide cross-section of structure at critical points, such as where floors are at various levels, fireplaces, finished attic space, etc. Preferred scale is 1/4 inch = 1 foot.
____ C. Provide cross-section through stairs, including rise/run, headroom clearance, landings, railings and surrounding framing. Preferred scale is 1/4 inch = 1 foot.

**V** **<u>Roof Details</u> (see attachment L for example).**
A. Provide truss or rafter layout and header sizes.

**VI** **<u>Topography Requirement</u> (See pages 7-9 for examples).**
If you are not providing an engineered footing and foundation plan, you must provide a slope profile to verify clearances to any slopes exceeding 1 unit vertical in 3 horizontal. There are two options you can use:

- Slope Profile Option: Show the slope profile for a distance of 50 feet on each side of the building.
- Corner Elevation Option: Include the elevations of all corners of your building on the plot plan.

**VII** **<u>Energy Conservation Prescriptive Package (see pages 10-11)</u>**
Show insulation R-values for ceiling, walls, floors, crawl spaces and basement walls, and U-value of windows on floor plans. Fill out Residential Energy Conservation form specifying which energy code compliance path you are using, additional energy efficiency package chosen, and air leakage testing firm.

LARIMER COUNTY BUILDING DEPARTMENT

# Plot Plan Requirements

## What is a Plot Plan?

A plot plan is an accurate, scaled drawing illustrating the following:

- Property's dimension and shape
- Location of roads
- The relationship and precise location of man-made features on the property (buildings, structures, driveways)
- Natural water features (creeks, streams, rivers, lakes)
- Architectural features (cornices, canopies, eaves, awnings, bay windows, window wells, cantilevered walls, chimneys)

Plot plans show what currently exists on the site **and** the physical changes you plan to make to the site.

**A Plot Plan** is required when submitting a building permit application for:

- Residential Buildings
- Accessory Buildings
- Decks, porches, gazebos & awnings
- Garages (attached and detached)
- Pole Barns
- Storage Buildings larger than 120 sq ft

**Note: Commercial Buildings**

Site Plan **approval** is required from the Planning Department ***before*** submitting a building permit application for a **commercial** building or alteration of an existing commercial building. Please contact the Planning Department at 970-498-7679.

## Plot Plan Basics

Note: Aerial photos will not be accepted

1. DRAWN TO SCALE
   Like a map that depicts a 10-mile stretch of highway with a 1 inch line, a scaled plot plan represents the relationship between the actual property and its size on paper.

   Common measures of scale for plot plans:
   Scale 1″= 10′ 0 ——— 10 ft
   Scale 1″ = 100′ 0 ——— 100 ft

   - Include an arrow showing **North**

2. PLOT PLAN PAPER
   - Minimum Size 8½″ x 11″
   - Maximum Size 24″ x 36″
   - Larger parcels of land may require multiple sheets of paper.

3. PROPERTY DIMENSIONS
   - Draw and label property lines and length
   - Indicate if property is a corner lot and label all roads

4. EASEMENTS and RIGHT of WAY
   - Show easements, e.g., utility, drainage landscape, access.
   - Structures cannot be built in, over or under ANY easement or right-of-way including architectural features such as eaves and window wells.

5. ROADS, STREETS, ACCESS
   - Named and unnamed roads (public, private, county roads & state highways)
   - Driveways, existing and proposed
   - Vehicle parking area

## 6. SETBACKS

Land Use Code Section 2.9.4

**Q.** What are setbacks?

**A.** The Larimer County Land Use Code defines setbacks as;

*"The distance, measured perpendicular or radial, from a property line or right-of-way centerline between a building and the property line or right-of-way centerline."*

***Q***. I'm getting ready to submit my building permit application. How can I find my setbacks?

**A.** Setbacks vary by Zoning District and a property's proximity to roads and highways. A planner can tell you what the setbacks are for your property. Contact the Planning at 970-498-7679.

### SETBACK CERTIFICATION

Larimer County Land Use Code Regulations require the property owner to clearly identify the boundary corners of the lot and/or building envelope.

Whenever the proposed building is less than five feet beyond the required setback or building envelope boundary, the owner will be required to certify the building location.

Certification, in the form of a letter, must be signed by and include the seal of a surveyor licensed to practice in the State of Colorado. The letter must include the building permit number issued for the site in question.

# Sample Plot Plan [8½ x 11]

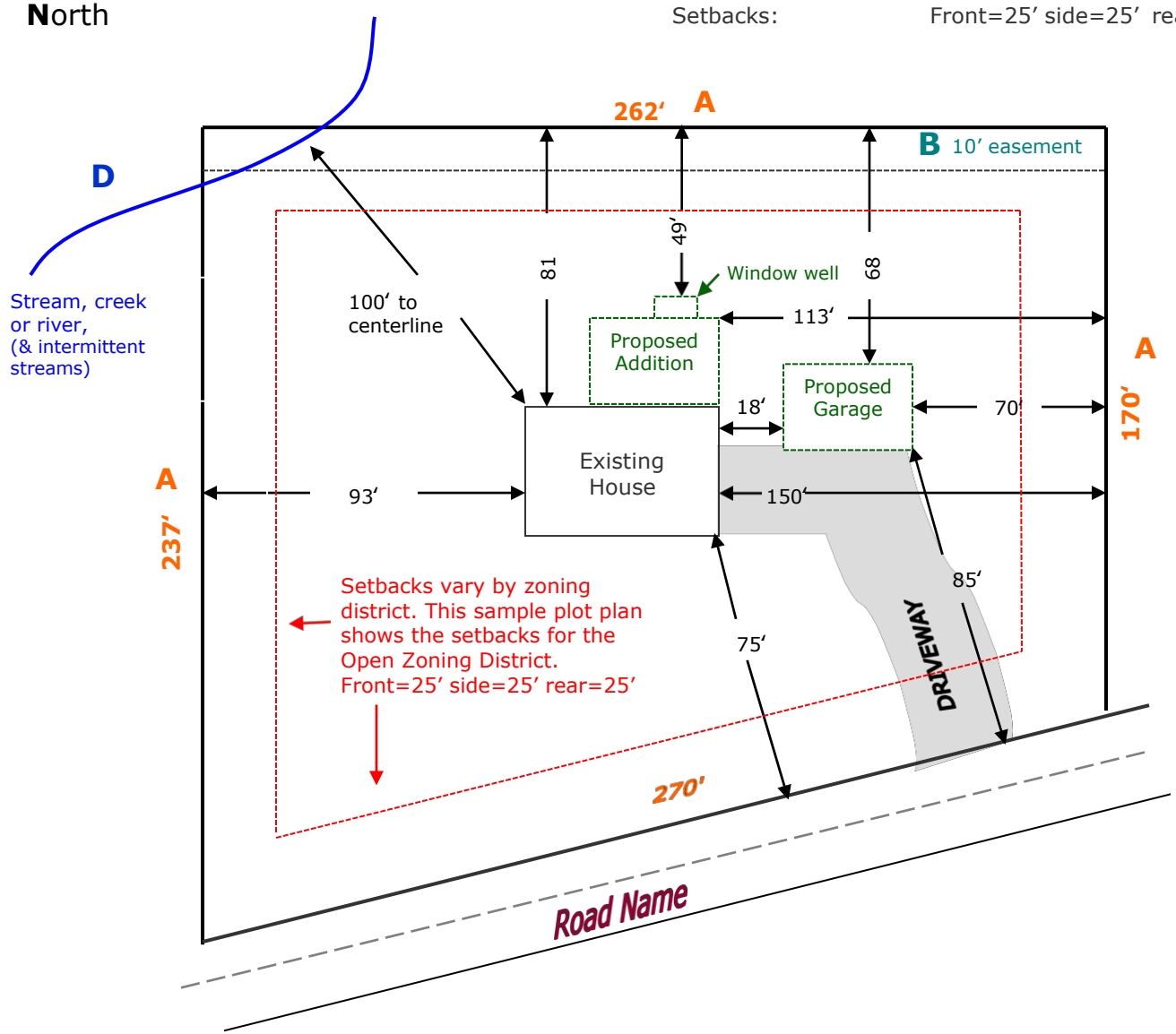
✓ North

✓ Scale 1 in = 50 ft

0' 10' 20' 50'

✓ Job Site Address: 123 Any Street, Fort Collins
Property Owner: John & Jane Doe
Owner's Phone: 970-555-5555

✓ Parcel No: 97114-13-901
Zoning District: Open
Setbacks: Front=25' side=25' rear=25'




## CHECKLIST

- ✓ North Arrow
- ✓ Plot Plan Scale
- ✓ Property Owner Info
- ✓ Parcel No. & Zoning

**A** Property Dimensions
**B** Easements
**C** Roads and Streets
**D** Stream, Creek or River (& intermittent streams)

Use arrows to show distance from buildings to setbacks.

Existing buildings
Use solid lines to indicate existing structures

Proposed buildings
Use dotted lines to indicate ***proposed*** structures

Note: This sample uses color. Your plot plan does not need to be in color.

# ENGINEERED FOOTING AND FOUNDATION REQUIREMENTS

Larimer County is divided into two areas (Area "B" & "C") by wildfire hazard area. Area "B" is the foothill and mountain areas, while area "C" is along the Front Range. Due to the prevalence of shrink/swell soils in Larimer County, especially along the Front Range, an engineered footing and foundation plan or a site-specific soils report indicating non-expansive soil will be required on all home sites in area "C".

New subdivisions already have soil reports done at the development stage and are flagged as to whether engineered footings and foundations are required. These prescriptive requirements apply to older subdivisions, metes and bounds parcels, and 35-acre subdivisions or tracts in area "C". If their soils report indicates that foundations can be poured on conventional spread footings, then the county's minimum footings/foundation standards may be used and engineered designs are not required. Otherwise, engineered footing and foundation plans will be required.

**Exceptions: Unenclosed patio covers and porches, decks, one-story agriculture pole buildings under 3,000 square feet in area, and accessory unheated detached one-story utility buildings less than 24 feet in depth (truss length) and 48 feet wide are exempt from engineered footing and foundation requirements when they meet Larimer County's Prescriptive Design Standards.**

**In area "B"** (foothills and mountains), where the subdivision approval requires an engineered footing and foundation, an engineered design will be required. (See below for other engineered foundation requirements.) If building on or near a steep slope or where the presence of shrink/swell soils is indicated, an engineered foundation system may be required. Slope profiles are required on non-engineered plans in area "B" to show the steepness of terrain 50 feet around the structure.

**Other Colorado Registered Engineered foundation requirements include:**

1. All steel buildings, throughout the county.
2. All foundation walls over 9'-0" and all retaining walls 4'-0" and more in height, throughout the county.
3. All commercial projects, throughout the county.
4. All unconventional building designs and foundation systems, throughout the county.
5. Utility buildings, depending on the size and type of construction (steel buildings with steel girders imposing point loads, for instance) throughout the county.
6. All habitable structures within 15 feet of the toe a slope or within 40 feet of the top of a slope when the slope exceeds 1 unit vertical in 3 units horizontal.

# SLOPE PROFILES

## CLASS "B" WILDFIRE AREAS

1. A slope profile drawing is required at the time of plan submittal for all structures in the Class "B" area. Exceptions are when fully engineered footing and foundation plans are submitted, or if it is an interior remodel.

2. The applicant is to provide an accurate slope profile drawing. A Colorado Registered Structural Engineer may be required to design the foundation system for the structure if no slope profile is provided or is inadequate.

This procedure is for all habitable structures within the Class B Wildfire Hazard area (see attachment A for map). Any building site found to have "sloping site" concerns throughout Larimer County may come under the above listed requirements at the determination of the Chief Building Official or his designee. If you are building within 15 feet of the toe or 40 feet of the top of a slope exceeding one unit vertical in three units horizontal, to avoid delays at the footing stage it is recommended to have an engineer visit the site and design foundations accordingly.

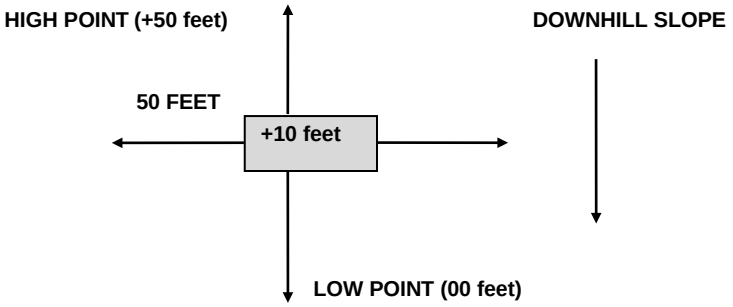
## SLOPE PROFILE INSTRUCTIONS

## FOR BUILDING PERMIT APPLICATIONS

Your contractor or engineer should be able to produce these for you. If not, here's some help.

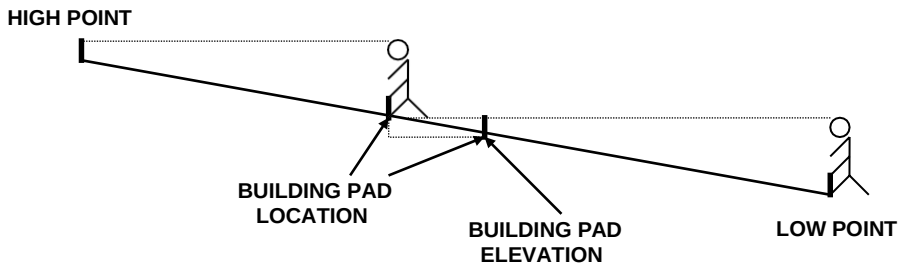
**Here's how to start:**

1. Stake the four corners of the proposed building site.
2. Measure 50 feet out from the center on each side and place a stake.
3. Go to the low point on the line - we'll call this elevation 00 feet.
4. Estimate the difference in elevation from this point to the other stake (high point).
    - Let's say the difference is 50 feet higher - call this elevation +50 feet.
5. Estimate the elevation of the pad and draw its location on the slope.
    - In the side profile example below the pad is 10 feet higher than the low point.
    - Call this elevation + 10 feet.
6. Repeat this procedure for the other profile.



**How to estimate elevations:**

- Measure the distance from the ground to your eye level - let's say it's 5½ feet.
- Stand at the stake at the low point - sight level along the line to a spot above you.
- Have your partner stand at this point so you are sighting on their feet.
    - This means that point is 5½ feet above the stake where you are standing.
- Repeat this procedure until you can sight level and see the upper stake or higher.




- Multiply the number of times you had to do this by 5½ feet.
    - Let's say you had to do it ten times - 10 X 5½ feet = 55 feet.

**So the upper stake is 55 feet higher than the lower stake!**

**Adjustments:** Let's say the last time you sighted you were looking at your partner's belt. Measure the distance from the ground to the beltline - say 3 feet - and subtract that from the 55 feet. In this case the true elevation difference is 52 feet.

***If you have questions or would like help on site, please call Larimer County Building at (970) 498-7660.***

# TOPOGRAPHY REQUIREMENTS FOR BUILDING PERMIT APPLICATIONS

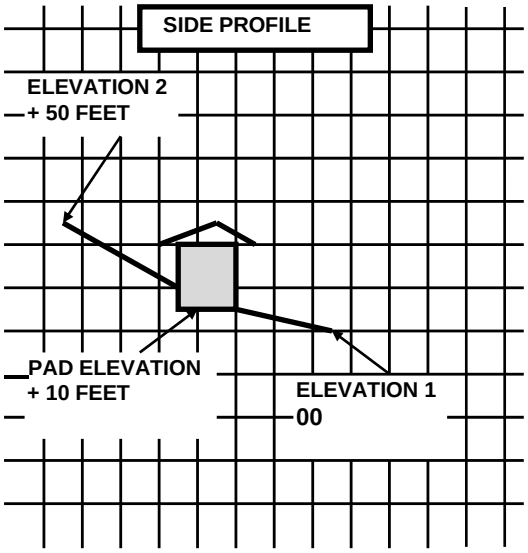
A review of the building site topography as it relates to your proposed building is required as part of the plan review process to assure that building code requirements for foundation design and/or setbacks are met. To properly assess these requirements, you must submit either:

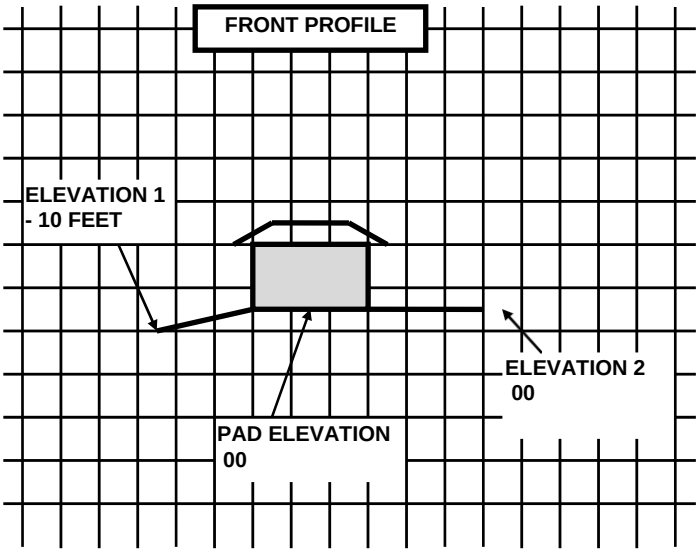
1) cross-section drawings of the slope profile of the building site from the front and side, or
2) elevations of the staked corners of the building site on the plot plan.

**The plan review process cannot be completed without this information.**

**1) SLOPE PROFILE OPTION:** Two sheets are provided to draw the slope profiles. Each side of the squares is 20 feet long. You are required to show the slope profile for a distance of 50 feet on either side of the building. To accurately represent the slope, you will have to find the difference in elevation between the low point on this line and the highest point. You may want to show some points in between if the slope varies from one end of this line to the other. The building should be drawn near the middle of the sheet with the slope profile drawn for 50 feet on either side. A minimum of three elevations must be shown - the end points of the profile line and the building pad elevation.

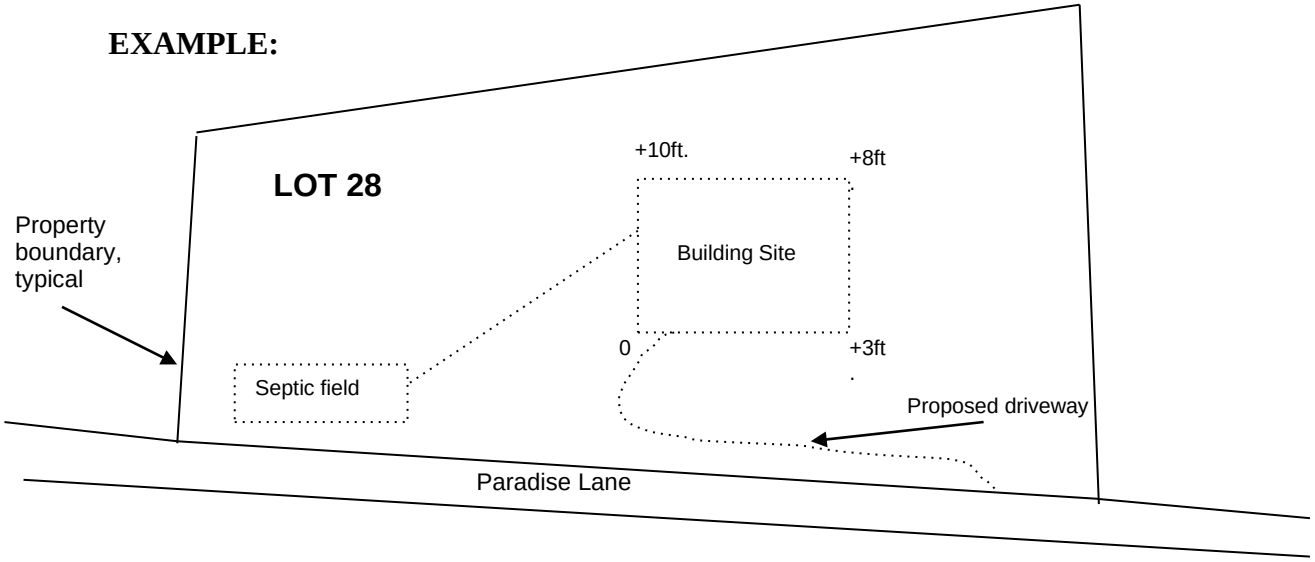
**EXAMPLE SLOPE PROFILE SHEETS**




**2) CORNER ELEVATION OPTION:** Use the techniques described on the accompanying page to find the elevations of the corners of the staked building site. Include the elevations on the plot plan included in your plans.

**EXAMPLE:**



# Residential Energy Efficiency Requirements

The HVAC contractor shall size heating/cooling equipment and appliances in accordance with ACCA Manual S, based on building loads calculated per ACCA Manual J, 8th Edition.

Manual J and S reports shall be submitted with plans for new residences. Heat loss calculations using approved software (Wrightsoft, Adtek, Elite, Carmelsoft, Avenir HeatCAD/LoopCAD, Cool Calc, or Florida Solar Energy Center's Energy Gauge) are required. Calculations shall show the size, make, model, and BTU's/SEER Rating (A/C) for furnaces, air conditioners and boilers. Electric baseboard heater manufacturer's specs must be provided. Duct systems for heating, cooling and ventilation shall be sized in accordance with ACCA Manual D.

***The following thermal design parameters shall be used for Larimer County:***

Winter Outdoor Design Dry-bulb ($4^0$F) Winter Indoor Design Dry-bulb ($72^0$F)
Summer Outdoor Design Dry-bulb ($91^0$F) Summer Indoor Design Dry-bulb ($75^0$F)
Summer Design Wet-bulb ($62^0$F) 6368 Degree Days Heating 479 Degree Days Cooling

## Please indicate which of the following four 2021 code options you are choosing:

1) **Prescriptive Package:** see chart on reverse side for insulation and glazing requirements. Decide if you will be installing 2x6 stud walls with R-30 insulation or using footnote (f), and make sure that detail is on your plans. All window NFRC (U-factor/SHGC) labels must be left on windows until the insulation inspection has been approved.

2) **Total UA Alternative (RESCheck)**: Provide REScheck Compliance Certification showing you passed the 2018 or 2021 IECC; an architect or HVAC contractor may be able to assist you. Heating/AC equipment to be sized per Manual J & S, to be provided with REScheck report. Input data must match both reports and building plans. Free software is at energycodes.gov (click on REScheck). The home must also comply with maximum Solar Heat Gain Coefficient requirements of Table N1102.1.2 and maximum fenestration U-factors of Section N1102.5.

3) **Total Building Performance (HERS)** done by a certified energy rater: go to resnet.us to find certified raters. Larimer County allows a $100 rebate on permit fees if a certified energy rater inspects and documents with a compliance report that the home passes the 2021 residential requirements. The home must also comply with Table N1105.2 requirements.

4) **Energy Rating Index (ERI):** The rated design shall have an ERI less than 55 compared to the *reference design*, using approved software tools in accordance with RESNET/ICC 301, with compliance verification documentation provided by an approved third party. In addition, the home must comply with IRC Table N1106.2 requirements.

**Additional Energy Efficiency Package Selected (see page 2): _____**
**Name of Air Leakage Tester/Testing Company (see page 2): _____**

**TABLE N1102.1.3 (R402.1.3) INSULATION MINIMUM R-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT[a]**

| Fenestration U-Factor[b,i] | Skylight[b] U-Factor | Glazed Fenestration SHGC [b,e] | Ceiling R-Value | *Wood Frame Wall R-Value[f,g]* | *Mass Wall R-Value[h]* | *Floor R-Value* | *Basement[c, f, g] Wall R-Value* | Slab[d] R-Value & Depth | Crawl Space[c, f, g] Wall R-Value |
|---|---|---|---|---|---|---|---|---|---|
| .32 | .55 | .40 | **R-60** | 30 or 23+3ci or 20+5ci or 13+10ci or 0+20ci | 13/17 | 30 | 19 or 13+5ci or 0+15ci | 10ci, 30" [e] | 19 or 13+5ci or 0+15ci |

**For SI: 1 foot = 304.8 mm. ci = continuous insulation**

## Residential Energy Efficiency Requirements

The HVAC contractor shall size heating/cooling equipment and appliances in accordance with ACCA Manual S, based on building loads calculated per ACCA Manual J, 8th Edition.

Manual J and S reports shall be submitted with plans for new residences. Heat loss calculations using approved software (Wrightsoft, Adtek, Elite, Carmelsoft, Avenir HeatCAD/LoopCAD, Cool Calc, or Florida Solar Energy Center's Energy Gauge) are required. Calculations shall show the size, make, model, and BTU's/SEER Rating (A/C) for furnaces, air conditioners and boilers. Electric baseboard heater manufacturer's specs must be provided. Duct systems for heating, cooling and ventilation shall be sized in accordance with ACCA Manual D.

***The following thermal design parameters shall be used for Larimer County:***

Winter Outdoor Design Dry-bulb ($4^0$F) Winter Indoor Design Dry-bulb ($72^0$F)
Summer Outdoor Design Dry-bulb ($91^0$F) Summer Indoor Design Dry-bulb ($75^0$F)
Summer Design Wet-bulb ($62^0$F) 6368 Degree Days Heating 479 Degree Days Cooling

**Please indicate which of the following four 2021 code options you are choosing:**

5) **Prescriptive Package:** see chart on reverse side for insulation and glazing requirements. Decide if you will be installing 2x6 stud walls with R-30 insulation or using footnote (f), and make sure that detail is on your plans. All window NFRC (U-factor/SHGC) labels must be left on windows until the insulation inspection has been approved.

6) **Total UA Alternative (RESCheck)**: Provide REScheck Compliance Certification showing you passed the 2018 or 2021 IECC; an architect or HVAC contractor may be able to assist you. Heating/AC equipment to be sized per Manual J & S, to be provided with REScheck report. Input data must match both reports and building plans. Free software is at energycodes.gov (click on REScheck). The home must also comply with maximum Solar Heat Gain Coefficient requirements of Table N1102.1.2 and maximum fenestration U-factors of Section N1102.5.

7) **Total Building Performance (HERS)** done by a certified energy rater: go to resnet.us to find certified raters. Larimer County allows a $100 rebate on permit fees if a certified energy rater inspects and documents with a compliance report that the home passes the 2021 residential requirements. The home must also comply with Table N1105.2 requirements.

8) **Energy Rating Index (ERI):** The rated design shall have an ERI less than 55 compared to the *reference design*, using approved software tools in accordance with RESNET/ICC 301, with compliance verification documentation provided by an approved third party. In addition, the home must comply with IRC Table N1106.2 requirements.

**Additional Energy Efficiency Package Selected (see page 2): _____**
**Name of Air Leakage Tester/Testing Company (see page 2): _____**

**TABLE N1102.1.3 (R402.1.3) INSULATION MINIMUM R-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT[a]**

| Fenestration U-Factor[b,~~i~~] | Skylight[b] U-Factor | Glazed Fenestra-tion SHGC [b,~~e~~] | Ceiling R-Value | *Wood Frame Wall R-Value[f,g]* | *Mass Wall R-Value[h]* | *Floor R-Value* | *Basement[c, f, g] Wall R-Value* | Slab[d] R-Value & Depth | Crawl Space[c, f, g] Wall R-Value |
|---|---|---|---|---|---|---|---|---|---|
| .32 | .55 | .40 | **R-60** | 30 or 23+3ci or 20+5ci or 13+10ci or 0+20ci | 13/17 | 30 | 19 or 13+5ci or 0+15ci | 10ci, 30" [e] | 19 or 13+5ci or 0+15ci |

**For SI: 1 foot = 304.8 mm. ci = continuous insulation**

a. R-values are minimums. U-factors and SHGC are maximums. Where insulation is installed in a cavity that is less than the label or design thickness of the insulation, the installed R-value of the insulation shall be not less than the R-value specified in the table.
b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestrations.
Exception: In Climate Zones 0 through 3, skylights shall be permitted to be excluded from glazed fenestration SHGC requirements provided that the SHGC for such skylights does not exceed 0.30.
c. "5ci or 13" means R-5 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall. "10ci or 13" means R-10 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall. "15ci or 19 or 13 + 5ci" means R-15 continuous insulation (ci) on the interior or exterior surface of the wall; or R-19 cavity insulation on the interior side of the wall; or R-13 cavity insulation on the interior of the wall in addition to R-5 continuous insulation on the interior or exterior surface of the wall.
d. R-5 insulation shall be provided under the full slab area of a heated slab in addition to the required slab-edge insulation R-value for slabs. as indicated in the table. The slab edge insulation for heated slabs shall not be required to extend below the slab.
e. 30" (762 mm) or top of footings or bottom of monolithic slab, whichever is greatest.
f. Class 1 vapor retarders shall not be installed on the interior of framed walls where exterior ci value is less than R-7.5
g. The first value is cavity insulation; the second value is continuous insulation. Therefore, as an example, "13 + 5" means R-13 cavity insulation plus R-5 continuous insulation.
h. Mass walls shall be in accordance with Section N1102.2.5. The second R-value applies where more than half of the insulation is on the interior of the mass wall.

## Other Noteworthy 2021 Residential Energy Code Requirements

- All applications must specify one **additional energy efficiency feature** per IRC Section N1108: enhanced envelope performance, more efficient HVAC equipment, more efficient water heater, more efficient ductwork, or maximum 3.0 ACH50 air leakage AND installation of a Heat Recovery Ventilator or Energy Recovery Ventilator.
- You must specify the **air leakage tester** you are hiring to inspect the air barrier prior to concealment and provide a report on any deficiencies and corrections at the framing or insulation inspection.
- All permanently installed **lighting fixtures shall contain only *high-efficacy* sources**, except kitchen appliance fixtures.
- Permanently installed lighting fixtures shall be controlled with a **dimmer, occupant sensor control or another control** installed or built into the fixture, except for bathrooms, hallways, exterior lighting, or safety/security lighting.
- All **heating and cooling equipment** shall be **sized** such that the total sensible capacity of the cooling equipment does not exceed the total sensible load by more than 25% for cooling-only applications, 40% for heating applications
- Manuals J & S are required for **ALL** methods. Manual D is required for **ALL** ducted heating/cooling systems.
- **A signed air leakage testing report** by an approved third party showing a maximum rate of three air changes per hour at 50 Pascals pressure must be provided to the building official. Testing must be conducted in accordance with RESNET/ICC 380, ASTM E779 or ASTM E1827.
- All ductwork must pass a **duct leakage test** with a report turned in to the building official by final inspection per IRC Section N1103.3.5. and N1103.3.6.

# Blower Door/Air Leakage Test Report Requirements

*Air leakage testing is required for all new Residential and Commercial Buildings under the 2021 International Residential (IRC) and Energy Conservation (IECC) Codes.*

**Residential** - Per 2021 International Energy Conservation Code (IECC) and 2021 International Residential Code (IRC), "testing shall be conducted in accordance with RESNET/ICC 380, ASTM E779 or ASTM E1827and reported at an air pressure of 0.2 inch w.g. (50 Pascals)." In our Climate Zone 5B, a passing test requires three or fewer (3.0) Air Changes per Hour (ACH). Testing shall be conducted by an approved third party with a written report provided to the building official showing the test results at ACH50. If the first test fails, the tester shall recommend corrective measures to improve air tightness, then perform a second test after corrections have been made. If the home still fails but has significantly improved its air tightness, the owner may request code modification approval by submitting both test results and an explanation of the corrective actions taken.

To be considered an "approved third party," an air leakage tester must demonstrate knowledge and experience of test procedures and protocols, through certification by a recognized organization such as RESNET (Residential Energy Services Network) or BPI (Building Performance Institute), or otherwise demonstrate their competence at air leakage testing to the satisfaction of the Chief Building Official. A partial list of approved third party testers is on the back of this handout. Some may no longer be in business.

Many Home Energy (HERS) Raters will perform air leakage testing as part of their overall energy ratings. Either a complete rating report including air leakage testing, or a report of a stand-alone test, will be acceptable to meet the testing requirement.

**Commercial** - The building thermal envelope shall be tested in accordance with ASTM E 779 at a pressure differential of .3 inch water gauge (75 Pa) or an equivalent method approved by the building official and deemed to comply with the provisions of this section when the tested air leakage rate of the building thermal envelope is not greater than 0.40 cfm/ft2 (2.0 L/s x m2). A note from the approved testing agent shall be placed upon the final report submitted for building division review indicating compliance with the 2021 IECC requirements. If the first test fails, the tester shall recommend corrections to pass the test. After corrective measures are taken, the building must be re-tested and the passing test turned in to the building official. If the building still fails but has significantly improved its air tightness, the owner may request code modification approval by submitting both test results and an explanation of the corrective actions taken.

**Exceptions:** 1. The building official may waive the air leakage testing requirement for buildings or portions thereof that are not fully enclosed and fully conditioned, such as warehouses and repair garages with overhead doors that are frequently open while in operation. Testing can be conducted with the overhead doors masked and taped. 2. Townhouses and condominiums may use the City of Fort Collins Protocol for New Multifamily Building Air Tightness Testing as an alternative test.

## Approved Air Leakage (Blower Door) Testers in Larimer County

Annadel Building Solutions, P.O. Box 741, Mancos CO 81328, (970) 533-1548
Architectural Energy Corporation, 2540 Frontier Ave. Ste 100 Boulder CO 80301 www.archenergy.com (303) 459-7405
Tim Burgess Construction, 9033 E. Easter Place, Ste. 200, Centennial, CO 80112 www.burgess-inc.com (303) 300-4527
Colorado Professional Inspections, 1780 Hyde Ct., Loveland CO 80538 www.coloradoprofessionalinspections.com (970) 430-1819
Deeper Green Consulting, 35 Wheeler Pl., Frisco CO 80443, www.deepergreenconsulting.com, (970) 389-2448
E3 Power, 1616 17th St. #383, Denver CO 80202, www.e3power.net, (303) 292-1233
Energy Logic, 309 Mountain Ave, Berthoud CO 80513, www.nrglogic.com, (800) 315-0459
Frostbusters & Coolth Co., 190 ½ Garfield Ave. Carbondale CO 81623, www.frostbusters.com, (970) 963-7325
Green Insight LLC, 917 E. Prospect Rd. Unit B, Fort Collins CO 80525, www.thegreeninsight.com, (833) 476-8326
Green Your Home, Colleen Locker, greenyourhomedenver@gmail.com (720) 628-7290
Greg Bowdish, Progressive Engineering, greg@progressiveengineering.bix, (970) 590-6059
Group 14 Engineering, Josh Marceau, jmarceau@group14eng.com, Sarah Hong, shong@group14eng.com (303) 861-2070
GS Services, Paul Higman, 2000 S. College Ave. Suite 308, Fort Collins CO 80525 phigman@gs-email.com (970) 219-6776 (Res. & Com.)
Home Energy Systems, 6124 Ouray Way, Aurora CO 80016, www.hescolorado.com, (303) 944-9627
Home Performance Solutions, 2342 Tavern Way, Castle Rock CO 80233, www.hpsenergy.com (720) 985-8445
John Henry and Associates, 3513 Costilla Ave., Centennial CO 80122, (720) 496-3520, andersonarch@aol.com
Lightly Treading, 4303 Brighton Blvd. Bldg. 3, Denver CO 80216, www.lightlytreading.com, (866) 973-9268
Justin Heldenbrand, L & L Insulation, 401 N. Link Lane, Fort Collins, CO 80521, www.ll-insulation.com, 970-817-4973
Mike Truitt, This Efficient House, 1600 Crescent Dr. Fort Collins CO 80526, www.thisefficienthouse.com, (970) 204-9931
Nate Gagliano, NoCo Energy Solutions, 4805 NCR 23E, Laporte CO 80535, www.nocoenergysolutions.com, 310-6240
PIE Consulting & Engineering, 6275 Joyce Drive, Suite 200, Arvada, CO 80403. www.pieglobal.com, (866) 552-5246
Richard Anderson, Anderson Associates, andersonarch@aol.com, 422 E. Oak St., Fort Collins CO 80524, (970) 484-0306
Scott Home Inspection, 3728 W County Road 10, Berthoud CO 80513, www.scotthomeinspection.com (970) 532-2424
Sustainably Built, 1720 15th St., Boulder CO 80302, www.sustainablybuilt.com, (303) 447-0237
Timberline Insulation Inc., 4109 Ziegler Rd., Ft Collins CO 80525, john.timerlineinsulation@gmail.com, (970) 888-1395

**List is not exclusive –Air Leakage Testers certified by Building Performance Institute, Air Barrier Association of America RESNET, or other approved agencies/local jurisdictions, can be added to this list by verifying credentials and experience**

# Whole House Mechanical Ventilation

January 27, 2022

The 2021 International Residential Code requires homes in our climate zone (5B) be tightly sealed with no more than 3 air changes per hour (ACH). In order to preserve indoor air quality and provide adequate air to occupants, a whole house mechanical ventilation system must be installed. System must be tested by an approved agency to verify that it meets the minimum net flow requirements listed in Table M1505.4.3.

***M1505.4.1 System Design.*** *The whole-house ventilation system shall consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls. Local exhaust or supply fans are permitted to serve such a system. Outdoor air ducts connected to the return side of an air handler shall be considered to provide supply ventilation.*

Kitchens and bathrooms require continuous local exhaust of at least 25 and 20 cubic feet per minute (cfm) respectively (100 and 50 cfm intermittent). These rates can be figured into the total ventilation. Range hoods, in-line fans and bath fans at or above 90 cfm must meet minimum efficiency requirements of 2.8 cfm/watt, with smaller bath fans at 1.4 cfm/watt. Outdoor air intakes require dampers that close when the air handler isn't running.

The ventilation system must have controls to enable manual over-ride. The system must operate continuously, unless the controls allow intermittent operation for at least 25% of each 4-hour period, and the net ventilation rate must meet the requirements of this table:

Table M1505.4.3 (1)
Continuous Whole-House Mechanical Ventilation System Airflow Rate Requirements
(Net Flow Rates)

| Dwelling Unit Floor Area (square feet) | Number of Bedrooms | | | | |
|---|---|---|---|---|---|
| | 0-1 | 2-3 | 4-5 | 6-7 | >7 |
| | Airflow in CFM | | | | |
| <1,500 | 30 | 45 | 60 | 75 | 90 |
| 1,501-3,000 | 45 | 60 | 75 | 90 | 105 |
| 3,001-4,500 | 60 | 75 | 90 | 105 | 120 |
| 4,501-6,000 | 75 | 90 | 105 | 120 | 135 |
| 6,001-7,500 | 90 | 105 | 120 | 135 | 150 |
| >7,500 | 105 | 120 | 135 | 150 | 165 |

Care must be taken with an exhaust-only system to avoid back drafting natural gas appliances like draft-hood water heaters and fireplaces.

# LARIMER COUNTY ENGINEERING INFORMATION

**ACCESS PERMITS**

A County Road Access permit is required if the driveway accesses a county road or if the roads are county maintained. An additional plot plan will be required with this application showing the proposed access location. The Access and Utility Coordinator will field check property access locations, therefore please post your address in the field. The Access and Utility Coordinator will also verify the contractor's insurance coverage requirements. This process may involve five working days. The Access and Utility Coordinator can be reached at 498-5709 or Engineering at 498- 5700. See page 26 for more information and permit application form.

**GRADING CERTIFICATION**

A grading certification may be required for your home on your lot to show compliance with a subdivision grading plan. Check with County Engineering at 498-5700.

**FLOOD HAZARD AREAS (FLOOD PLAIN)**

If your property is in a Flood Plain, review and approval from County Engineering is required. Applicants who may be in a Flood Plain should contact Engineering as soon as possible at 498-5700. New structures cannot be built in floodways, and new construction must be elevated in Flood Fringes.

# FIRE DEPARTMENT/FIRE SPRINKLER INFORMATION

**FIRE SPRINKLERS**

If your subdivision status sheet requires a fire sprinkler system be installed in the house, plans must be submitted to your local fire department for approval at the same time your building permit application is being made. If you are not in one of the fire districts below, you either need to get a permit from the State of Colorado, Division of Fire Prevention and Control (DFPC), OR through Larimer County by submitting two sets of sprinkler plans reviewed and approved by a state-certified Fire Suppression System Inspector. The list of state-certified fire suppression systems inspectors is located at colorado.gov/pacific/dfpc/suppression-systems

Berthoud Fire Protection District (970) 532-2264 * Estes Valley Fire Protection District (970) 577-0900
Loveland Fire and Rescue Authority (970) 962-2536 * Poudre Fire Authority (970) 221-6570
Windsor-Severance Fire Protection District (970) 686-2626

If allowed by the Fire Dept. and subdivision approval, a residential fire sprinkler system meeting the requirements of International Residential Code Section P2904 may be designed and installed by a Colorado Master Plumber (or homeowner). Submit two sets of plans to the Building Dept. including detailed floor plans drawn to scale, location and type of sprinklers, room sizes, ceiling configurations, distance to walls, heat sources, fans and obstructions, location of shutoff valves, pumps, cisterns and all other system equipment, water pipe material, size, spacing of supports, listing and manufacturer's cut sheets for each type of sprinkler, pressure/flow calculations for two most hydraulically demanding sprinkler heads, and freezing protection detail for sprinklers in non-conditioned spaces.

# LARIMER COUNTY PLANNING DIVISION INFORMATION

**ZONING**
New construction must meet minimum Land Use Code setback requirements. Setbacks are measured from all lot lines, adjacent roads, existing structure, streams, creeks and rivers, and must be shown on the plot plan. Please check with County Planning at 498-7669 prior to permit application for minimum setback and use requirements.

**RADON**
Many new subdivisions require radon tests be done on finished homes before a Certificate of Occupancy can be issued (see back of permit inspection card for radon requirements). Certain areas require a passive radon system be installed and inspected at time of under-slab and rough-in plumbing inspections. If you have questions concerning your area, please contact the Building Dept. at 498-7700. If you have questions regarding mitigation requirements, please contact the plans examiners at 498-7660. See attachments P-Q for examples of Passive Radon Systems.

# LARIMER COUNTY HEALTH DEPARTMENT INFORMATION

**HEALTH DEPARTMENT**
Septic permits are applied for at the Environmental Health Department AFTER applying for a building permit. See page 24 for septic permit information.

**SEWER AND WATER**
Proof that sewer and water service is available for your proposed building is required. A copy of your Colorado well permit will be required, or the verification form signed by your sewer and water services provider, which is provided when you apply for your building permit.

# COLORADO DEPARTMENT OF WATER RESOURCES

**WELLS**
For well information contact: 970-352-8712
Water Resources Division:
810 9th Street, Suite 200
Greeley, CO 80631
www.water.state.co.us

# BUILDING INSPECTIONS

## GENERAL INFORMATION

The yellow building permit card must be posted on the job site. The address number must be posted at the County road or street. The customer's copy of the approved plans must be on the job site for **inspector's review for the inspection to be performed**. A re-inspection fee of $51 is charged if the permit card and plans are not on site for the inspection, or in cases of repeated trips on correction notices or as deemed necessary by the inspector. This is for the inspector's time and extra trip required returning for inspection.

Most areas of Larimer County are inspected daily. Mountain areas have inspections on certain days. If you are not sure which area applies to your permit, call our offices at 498-7700. To request an inspection call 498-7697 or use our online Customer Access Portal. You must have the permit number and IVR number to schedule inspections. Requests confirmed before 11:59 pm can be done the next working day. Requests received at 12:00 am or later will be conducted no earlier than the day after the next working day.

**INSPECTION CANCELLATION—**The Building Official requires inspectors to charge a fee of $51 for an inspection that is not ready as requested. The fee will be waived if our office is contacted and the inspection canceled before the inspector goes to the site. Please call as early as possible to prevent assessing this fee.

## REQUIRED INSPECTIONS

The following is a list of required inspections in their normal order of completion. Although they all may not be applicable to your particular project, please use this list as a general guideline:

**Step 1 Inspections** (must be approved before scheduling Step 2 inspections)

1. **Setback and Footings**—this is the initial inspection. Property pins must be located. Concrete forms must be placed on undisturbed soil, installed as shown on approved building plans. Reinforcing steel, in place, supported and splices tied **(concrete cannot be placed before inspection approval).** Caissons must be inspected by the engineer of record, with a wet-stamped letter approving the caissons given to the inspector.

   1.a. If an open hole inspection is required by a design engineer or county plans examiner, contact that engineer or hire one to perform an inspection after the crawl space or basement is excavated and prior to forming footings, to make sure the soil and water table are per design perimeters.

   1.b. At the time of footing and setback inspection, if you are in a Wildfire Hazard Area, the initial Wildfire Inspection is required.

   1.c If a survey certification is required for the setback inspection, the surveyor's stamped letter must be provided to the building department at or before the foundation inspection showing the building is located per the approved plot plan. **Foundations may not be poured until setbacks are approved.**

2. **Foundation**—this is done after the foundation walls have been formed and the reinforcing steel is installed, but also prior to placement of concrete. Any prescribed below-grade insulation must also be in place.

   **2.a. Concrete slab—**inspections of interior slabs are only required when poured monolithically with the foundation wall; when the slab requires reinforcing in excess of 6x6 10/10 w.w.m.; or when building equipment, conduit, piping accessories, and other ancillary equipment items exist in-slab and under-slab. Exterior flatwork including driveways is exempt. All items to be placed in slab must be in place and soil compacted. **Concrete cannot be placed before inspection approval.**

3. **Rough-In Underground Plumbing**—this is done after the underground or under-slab/radiant heat plumbing is installed, prior to its being covered (DWV: 10' w.c. or 5 psi air test is required). The water supply lines are to be placed on test per the 2021 IPC. Wrap all plumbing lines where they will penetrate the slab.

   3.a. **Radon mitigation**—A passive radon mitigation system is required for all dwelling units. Sub-slab work must be ready at the time of underground plumbing inspection. The floor slab cannot be poured until this is completed. Radon pipe rough-in through the roof must be inspected prior to or concurrent with framing. Crawl space must have washed gravel placed under 6 mil poly vapor barrier or the vent piping must be installed around the entire perimeter of the crawl space.

   3.b. **Slab insulation**—if you have a walk-out basement, slab insulation is required by the Energy Code. The slab insulation must be ready at the time of underground plumbing inspection. The foundation cannot be backfilled until this is approved.

## Step 2 Inspections <u>(may only be scheduled after all applicable Step1 inspections have been approved)</u>

4. **Septic System**—call the Larimer County Department of Health & Environment at (970) 498-6775 for septic system inspection requirements.

5. **Public Sewer Hook-Up**—call the applicable sewer district for your area for sewer hookup inspection requirements.

6. **Well or Water Service**—call the Colorado Division of Water Resources at (970) 352-8712 for well information or the water district for your area for water hookup inspection requirements.

7. **Gas Line Air Test**—this is done after gas piping, fittings, unions, and valves authorized by the permit have been installed and before any such piping has been covered or concealed or any fixture or appliance has been attached thereto. (A 10 psi air test is required.) Provide 18" depth for copper, polyethylene pipe (PE requires an 18 ga. tracer wire or metal tape), and factory- wrapped black iron. (Field-wrapped pipe cannot be installed underground.) If using an elevated pressure system (2 psi or greater meter set), a 30# pressure test is required upstream of the regulator. Regulator will be checked at final.

8. **Rough plumbing and Air/Water Test**—this is done after the above ground plumbing (water and drainage piping) is installed and prior to or concurrent with the framing inspection. A 10' head of water test or 5 psi air test is required for the drain-waste-vent piping. Nails plates and stud shoes must be in place.

9. **Rough Heating & Vent**—this is done after the heating, vent, and duct work has been installed. This inspection should also precede or be concurrent with the framing inspection. Clearances and venting are required per the manufacturer's installation instructions, which must be at the job site for inspection. Heating and cooling equipment sized per Manual J and ducts sized properly.

10. **Electrical Rough-In—**A rough-in electrical inspection is done after the premises wiring system has been installed, and before or concurrent with the framing inspection.

11. **Fireplace/wood stoves—** this is done before or concurrently with the frame inspection. Wood- burning fireplaces must meet clean air emissions requirements (see page 23 for more information). Zero-clearance fireplace or wood stove chimney inspections are made during heat and vent inspection. Masonry fireplace inspections (a) firebox, throat and damper are in place, and the first flue tile is ready to be set; and (b)after all flue tile is in place before capping. The wood stove must be in place at time of final inspection or vent capped off in a finished manner. Listed wood stove installation instructions must be on site for final inspection so clearance to combustibles and venting can be verified.

12. **Fire Sprinkler**—if required, the fire sprinkler system is to be inspected and approved by the fire department having jurisdiction or the state-certified fire suppression system inspector (before frame inspection is called for). For a residential fire sprinkler when allowed (IRC P2904), the county inspector will need to do a rough and final sprinkler inspection. Check subdivision status sheet to see if sprinklers are required and whattype.

13. **Frame**—this is done after the structure's walls, floors, and other framing members are in place and after the exterior sheathing has been installed. The roof must be completed to the point where the building interior can be considered to be weather protected. Stamped truss engineer's drawings and truss layout must be on site with County-approved plans for inspector to check truss bracing. All sub-systems such as plumbing, mechanical, and electrical, must be inspected prior to the installation of insulation, interior sheathing and wallboard. Any engineer's letters on footings and foundation, and perimeter drain, damp proofing roof and wall sheathing certifications must be on site for inspector. Interior shear walls will be inspected later.

    13.a. **Narrow Wall Bracing—**required where less than two feet of structural wood sheathing is installed by garage or window openings as called out on plans. Inspection called for before weather barrier and siding installed, with certification on sheathing fasteners signed and on site. In addition, porch roof or deck partial framing (such as columns that may be wrapped or roofs that have soffits) must be inspected before being covered.

14. **Insulation** (after approval of the framing inspection and prior to the installation of wallboard) the insulation inspection will verify proper R values, air sealing, insulation fire blocking, and general workmanship as required by the Energy Code. Blown attic insulation is inspected at final inspection, as are exposed insulation blankets attached to unfinished concrete walls in basement and crawl spaces. Combustible insulation facings cannot be left exposed. The county inspector *may* allow framing corrections reinspection along with insulation at his/her discretion if corrections will be visible.

    The following shall be caulked, gasketed, weather stripped or otherwise sealed with an air barrier material, suitable film or solid material: all joints, seams & penetrations, site-built windows, doors, and skylights, openings between window and door assemblies and their respective jambs and framing, utility penetrations, dropped ceilings or chases adjacent to the thermal envelope, knee walls, walls and ceilings separating the garage from conditioned spaces, behind tubs and showers on exterior walls, common walls between dwelling units, attic access openings, rim joists junctions, and other sources of penetrations.

    Recessed lights must meet one of the following conditions: **Type IC** rated with no penetrations between the inside of the fixture and ceiling cavity; **Type IC or non-IC** rated and installed in a sealed box constructed with ½" gypsum wallboard or other approved assembly; or **Type IC** rated, tested and labeled as "airtight". See pages 10-11 for energy conservation insulation and window requirements.

15. **Gypsum board and plaster—**required ONLY where fire-resistive-rated construction is required: garage ceilings with habitable space above, between dwelling units, when exterior walls are within three feet of property line, or for gypsum shear walls required by the design engineer. Gypsum inspections when needed will be made after gypsum board is in place, but before plaster or gypsum board joints and fasteners are taped and finished.

16. **Roofing**—this is done after roofing completed; leave proof of Class A rating for all roof coverings and Class 4 impact resistance for asphalt shingles. Roofing contractor's certification letter on ice barrier countywide, and roof coverings and fastenings for site design wind speed, should be on site or already approved.

17. **EIFS "Synthetic Stucco"—**this is done by certification letter. All wood residential structures must have a weather-resistive barrier. The first certification letter certifies that the installer wrapped windows, doors, and wood sheathing according to ICC acceptance criteria and their manufacturer's installation requirements; the second certification letter certifies that the sealant is installed per ICC acceptance criteria and their manufacturer's installation requirements.

18. **Final Inspections**—these are done after all work shown on the approved plans has been completed. Final inspection approvals are typically required from the Building Division, County Health & Environment (if on septic) and possibly Fire Dept.

19. **Building Division**—this inspection is done after grading is finished, the building is completed and ready for occupancy, all plumbing fixtures set, heating equipment set and working, blower door test approval, and the final electric inspection signed off by County inspector. All applicable conditions of approval, such as drainage certification and fire-sprinkler approval by fire departments when required, must be provided for certificate of occupancy.

## CERTIFICATE OF OCCUPANCY (CO), TEMPORARY CERTIFICATE OF OCCUPANCY (TCO), AND LETTER OF COMPLETION

For new buildings, a CO is required prior to occupying the building. In certain cases, a Temporary Certificate of occupancy (TCO) can be issued pending minor remaining items awaiting completion or where only portions of the building are complete. For alterations to residences, outbuildings and projects which do not add significantly to the building space, a letter of completion is issued upon request.

**Temporary Certificates of Occupancy**—TCOs may be issued; **Only after an inspector verifies that all life-safety issues have been addressed and all agencies approve issuing a TCO**. There is a $600 fee for TCOs, which are valid for 180 days. If a full CO is issued within the first 30 days, all but $40 will be refunded. If a full CO is issued prior to the 180-day expiration, $100 shall be refunded for each full 30-day period remaining out of the original 180-day TCO period Life-safety issues include:

- One complete working bathroom, with shower or tub, sink and toilet
- Kitchen sink installed and working
- Heating system (furnace, boiler or other) and water heater installed and working
- Electrical final approved by County Electrical inspector
- Health Department final (if applicable) approved
- Engineering drainage, access, and flood finals (if applicable) approved
- Stairs, handrails, guardrails, smoke, and CO detectors at building inspector's discretion
- Wildfire final inspection approved
- Final approval from applicable Fire Department if required by conditions of approval

Once all final inspection approvals are obtained, a Certificate of Occupancy is issued for residential and commercial permits. A Letter of Completion is issued for cabins, accessory structures, such as barns, garages, or storage. Once a final inspection has been completed, the next day a Certificate of Occupancy or Letter of Completion will be available via the Online Customer Portal under your permit number and "Attachments".

## ALTERATIONS

For alterations, such as basement finishes, a floor plan drawn to scale is required showing walls to be constructed, as well as existing walls. Rooms must be labeled stating their use and show door, window, furnace, boiler/water heater and fireplace locations.

## ADDRESSING

If the property needs an address, it may take up to 3 or 4 weeks. The plot plan must be drawn to scale and show the driveway access. Any parcel not located in a subdivision must show legal distance from a section corner. **Please visit larimer.gov/addressing to obtain an address PRIOR to applying for a building permit.**

## RESUBMITTALS

A resubmittal is required for any changes to your plans that alter the structure, such as moving beams, changing beam or header size, enlarging windows or doors, changing floor joist type, size or direction. Two sets of plans are required. A resubmittal fee is collected as existing plans must be pulled and rechecked. Additional fees based on valuation may apply if you are adding to the footprint or finishing additional space. Minor changes, such as moving a same size door or window a few feet on the same wall, or moving a non-bearing wall, usually do not require a resubmittal. Your building inspector will help determine if you need to resubmit plans. If square footage is added, or if the structure is relocated on the property, five additional plot plans are also required with the resubmittal. Resubmittals on properties with septic systems that either add to the footprint or add bedrooms, will be reviewed by the County Dept. of Health and Environment. Adding to the footprint will also trigger review by Zoning.

To avoid these additional costs and possible delay of your project, it is best to have your structural issues and building placement resolved before submitting for a building permit. No resubmittal can be accepted after framing is approved. At that point, a new permit for the addition or alteration will be required.

## APPLICATIONS

Building permit applications can be obtained at the Community Development Department or on the County web page at: larimer.org/building. You are not able to submit online at this time. We are working to make electronic plan submittal possible at this time.

# Wildfire Safety
# Are you FireWise?

Wildfires are a major concern in the mountain areas of Larimer County. A study conducted by the Colorado State Forest service ranked Larimer County as the most hazardous county in Colorado for wildfire hazards. As more forested lands are developed and recreation uses increase, the potential for loss of life and property caused by wildfire is an ever-increasing problem.

Protecting your home and property from wildfire is **YOUR** responsibility. Do not assume firefighters can save your home or property. As much as they may want to, resources are limited, and conditions may make it impossible for emergency personnel to safely reach and protect your home

Planning and knowing how to protect structures in these areas can lessen the impacts of a wildfire. When designing or building your home, consider choosing a FireWise **location**, developing a **defensible space** around your structure, and selecting fire resistive **building materials.**

## FireWise Location

Choose the location of your home carefully. The chance that your home could survive a wildfire could depend on the decisions that you make.

Fire Protection

- Become familiar with your local fire department and see what fire protection is available in your area.

Building Site

- Evaluate the building site. Choose a site away from heavily vegetated areas (trees and shrubs). Build on the most level portion of the land.
- Avoid natural chimneys or draws, these act as natural pathways during a fire and could draw heat and flames to your home.
- Set your structure a minimum of 30 feet back from ridge or cliff; increase the distance to 75-100 feet ifhome will be higher than one story.

Access

- Provide easy access for emergency vehicles. A steep, narrow, or winding driveway can impede access of larger emergency vehicles.
- Try to place the driveway on the downhill side of your home or on the side that faces the wind. This makes a good fire break.
- A locked gate could stop firefighters from reaching your home. If you must have a locked gate, leave a spare key with your local fire agency.

Make Your Home Easy to Find

- Clearly mark your location so firefighters can find you.
- Addresses should be visible from both directions.
- Keep brush and trees cut back so that the address always stands out.

# Create and maintain a FireWise environment around your home.

Create a defensible space around your home and the major structures on your property by reducing the vegetation surrounding the structures. This does not mean that your landscape must be barren. Defensible space is an area where the vegetation is modified to slow the rate of spread and intensity of an advancing wildfire. This space also provides room for the firefighters to work and protect the forest should a structure fire occur. For further information regarding these issues please refer to larimer.org/wildfire or **contact Derek Rosenquist, Larimer County Wildfire Safety Coordinator at (970) 498-5301.**

## FireWise Construction

Roofing

- A structure's number one danger in wildfires is a combustible roof. Roofs usually have the largest surface areas that are exposed to airborne sparks. Use class A roofing materials, such as asphalt shingles, slate or clay tile, or metal panels.

Siding / Walls

Bottom 4 ft. of exterior walls are required to be clad with non-combustible materials or provide 5 ft. of defensible space around the perimeter of the structure

- Use construction materials that are fire-resistant or non-combustible whenever possible.
- Use a minimum of a Class III(C) flame spread siding material for the remainder of the structure. Stone, brick, and stucco are best.
- Shakes and shingles are required to be sawn and have a minimum Class A fire rating when used as siding material.

Foundation

- The foundation of a building is often the first area to encounter a spreading wildfire. Construct a closed foundation with concrete block, concrete poured walls, or use other fire resistive materials.

Windows

- Windows are often overlooked as fire hazards but can be a serious risk. Radiant heat can pass through them and set fire to curtains and furniture.
- Minimize the size and number of windows on the side of the house that would most likely be exposed to a wildland fire - the side facing downhill.
- Consider both size and materials for windows, double pane glass and tempered glass are more effective than single pane glass by reducing the amount of radiant heat; plastic skylights can melt.

Other Areas / Ideas

- To prevent sparks from entering your home through vents, cover attic, soffit and floor vents with wire mesh no larger than 1/8 of an inch, make sure eave and soffit vents are closer to the roof line than the wall. Box in eaves but provide adequate ventilation to prevent condensation.
- Prevent combustible materials and debris from accumulating beneath patio deck or elevated porches: screen under or box in areas below ground line with wire mesh no larger than 1/8 of an inch.
- Design decks so that they are not located at the top of a hill where they will be in direct line of a fire moving up slope.
- Place fire resistive landscaping-such as rocks, under decks. Keep areas under decks vegetation free by using a fabric weed barrier.
- Landscape with fire-resistive plants.
- Incorporate walkways and retaining walls as man-made fuel breaks.
- Clean gutters, eaves, and roofs regularly.
- Stack firewood uphill from or on the contour of your home.

## DEFINITIONS

**Fireplace –**
A wood-burning appliance intended to be used primarily for aesthetic enjoyment and not as a space heater.

**Factory-Built Fireplace –**
A listed assembly of a fire chamber, its chimney and related factory-made parts designed for unit assembly without requiring field construction. Factory-built fireplaces are not dependent on mortar-filled joints for continued safe use.

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**Fireplace Insert –**
A wood burning device designed to be installed in an existing fireplace.

**Wood Stove –**
An appliance designed for or capable of burning wood and capable of and intended for domestic space heating or domestic water heating.

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**Nonrestricted Area –**
That part of unincorporated Larimer County located west of Range 71, or north of the north half of Township 10, and east of Range 72, as shown on the Larimer County Fireplace Area Map (see reverse)

**Restricted Area –**
That part of unincorporated Larimer County located outside the Nonrestricted Area as shown on the Larimer County Fireplace Area Map (see reverse).

**NOTE: Wood-fired boilers are also subject to state and federal clean air requirements. Please see separate handout on boilers.**

## INSTALLATION REQUIREMENTS

All fireplaces installed **on or after January 1, 2002** in the Restricted Area shown on the **attached** map shall be one of the following:

(i) A gas fireplace or fireplace with a gas log installed and functioning at time of final inspection.
(ii) An electric device
(iii) A fireplace that meets the current emissions standards for a *Phase III Certified wood-burning stove* as set forth in Section II.A or other clean burning appliance that is approved by the commission set forth by Colorado Administrative Code Rule 5 CCR 1001-6

Within the Nonrestricted Area, fireplaces, including but not limited to masonry and factory-built fireplaces (such as metal and zero clearance fireplaces), are allowed and are not required to meet the standards above.

## EMISSIONS STANDARDS

All wood stoves and fireplace inserts installed on or after May 15, 2020, anywhere in unincorporated Larimer County shall meet the emissions standards for wood stoves established by the Colorado Air Quality Control Commission and EPA regulation 40 CFR Part 60, Section 60.532(b) or (c). Wood stoves and fireplace inserts installed on or after May 15th, 2020 must have a permanent attached label showing they meet the updated standards.

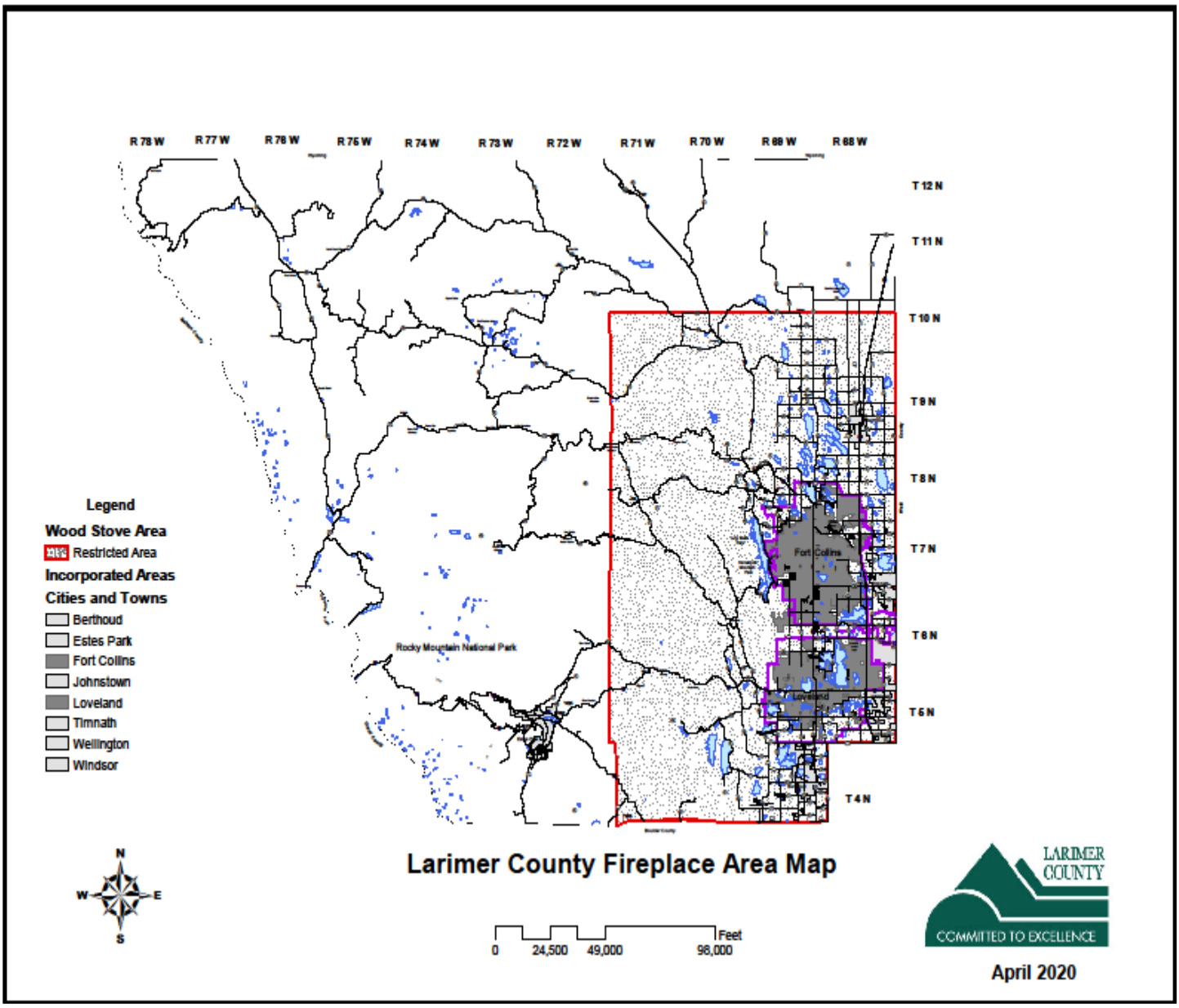
As of May 15, 2020, particulate matter emissions must be no more than:

2.0 g/hr (grams per hour) when tested with Crib Wood
2.5 g/hr (grams per hour) when tested with Cord Wood

Any fireplace in the Restricted Area, and any wood stove or fireplace insert throughout unincorporated Larimer County, installed prior to current regulations, may remain in use until the owner voluntarily replaces it. Upon replacement, equipment shall meet the current emission standards for wood stoves established by the Colorado Air Quality Control Commission.

## PERMITS & INSPECTIONS

A miscellaneous permit and inspection are required for factory-built fireplaces, fireplace inserts, and wood stoves. A masonry fireplace requires a residential permit to verify the building structure will support the weight. The manufacturer's installation instructions must be on site for inspections so that the inspector can verify that the installation, including clearances to combustible materials, comply with the manufacturer's published instructions.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Fort Collins
Loveland
Rocky Mountain National Park
Legend
Wood Stove Area
Restricted Area
Incorporated Areas
Cities and Towns
Berthoud
Estes Park
Fort Collins
Johnstown
Loveland
Timnath
Wellington
Windsor
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Larimer County Fireplace Area Map
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24,500
49,000
98,000
Feet
LARIMER COUNTY
COMMITTED TO EXCELLENCE
April 2020

## BUILDING-MOUNTED AND GROUND-MOUNTED SOLAR ENERGY PERMITS

A building permit (separate from a residential, commercial, or utility permit) is required to install solar systems/facilities, whether ground-, roof- or wall-mounted. Please refer to the Accessory Solar and Small Solar Facilities handout (page 22) for requirements for solar system permits. Solar permit fees are processed separately from building permits. All solar permits will be reviewed for compliance with zoning use, height, and setback requirements of the Land Use Code.

## MANUFACTURED AND MODULAR HOMES OUTSIDE MANUFACTURED HOME PARKS

A. Double wide manufactured and modular homes (DWMH) are allowed on legal lots if the structures have a HUD (Department of Housing and Urban Development) or Colorado Division of Housing Seal, Manufactured Housing Installation Program (MHIP) insignias, and are attached to a permanent foundation.

B. Any single wide manufactured home (SWMH) transportable over state highways as a single, complete dwelling unit, located outside a manufactured home park, must meet the following requirements of Section 18.2.1, Larimer County Land Use Code.

1. The manufactured home and any additions to it must be permanently anchored to a permanent foundation.
2. The manufactured home and any additions to it must have standard exterior siding.
3. The manufactured home and any additions to it must have a pitched roof structure with standard roofing materials.
4. The manufactured home must be incorporated into a larger structure that includes one or more of the following: additional bedrooms; recreation room; patio; carport or garage.
5. The requirements noted above must be completed within 18 months of the date that the building permit is issued. The Chief Building Official may grant an 18-month extension upon finding that significant progress has been made in the completion of the requirements or there have been other circumstances, beyond the control of the property owner, that have delayed completion.

C. Manufactured homes may be used to provide dwellings for farm, ranch or dairy help as part of a Farmstead Accessory Dwelling when meeting the requirements of Section 4.3.10.A of the Larimer County Land Use Code (Reference the Farmstead handout proved by the Planning Department).

A. Temporary manufactured homes are allowed for use as housing for up to 18 months during construction of a principal residential building when issued at the same time as the principal residential building. Temporary manufactured homes may be used as an Extended Family Dwelling when meeting the requirements of Section 4.3.10.I of the Larimer County Land Use Code (Reference the Extended Family Dwelling handout proved by the Planning Department).

B. Site, support-blocking, foundation, floor, elevations, and setup plans need to be submitted by the applicant at the time of building permit application. Foundation plans east of the foothills in Larimer County may have to be designed by a Colorado Registered Engineer. Manufactured homes in the foothills and mountains may have to be designed for a 40, 50 or 70 pound snow load, meet site design wind load requirements, and have a Class “B” roof covering and siding that meets class III flame spread requirements to satisfy Wildfire Hazard requirements . Call 498-7700 for clarification.

C. The permanent foundation may be a perimeter foundation of concrete, masonry, or all-weather wood foundation (AWWF) with dirt backfill against it. A permanent insulated perimeter skirting may be used when home is attached by rebar welded to each side of each chassis of manufactured home and embedded in 30-inch piers into the ground.

D. Any manufactured home placed on a basement must have foundation designed and wet stamped by a Colorado Registered Engineer.

E. Manufactured and modular homes need to comply with the State of Colorado’s Manufactured Home Installation Program (MHIP). The manufactured home set-up crew needs to be registered as a state-certified installer or be inspected by a state-certified inspector. For more information on state requirements, contact MHIP at (303) 864-7837.

# ACCESS PERMIT INFORMATION

**NOTE:** An access permit is separate from the Building Permit and requires separate submittals. The Engineering Department will be able to provide you with the Access Permit form. (To view the form visit the Larimer County Engineering Department website at *larimer.org/forms/access_permit.pdf* ). On the permit, please provide as much information as possible. Clearly mark the proposed access location in the field and note on your plan the type of marking material used. The easier it is to find your proposed location, the quicker your permit can be processed. If your proposed access location is not properly marked, issuance of your Access and Building permits may be delayed.

**County Road Access assessments apply to all new structures on vacant parcels and in any case where new access from a county road is being added or changed. Once application is made, review of your permit for applicable county road requirements will take place. Those permits that have county road access requirements, will be assessed a $50.00 fee that is due at issuance of the building permit.**

**Attach a sketch or plan showing the proposed location of the access and it's relationship to any landmarks on the property. The following shall be included on the sketch plan for access requirements:**

1. The property owner's name(s).
2. Identify the County Road number & supply any other name the road is commonly known by.
3. Give the property address as assigned by the Building Department. If no address has been assigned, provide an approximate distance from the nearest intersection, addressed property, or major easily identified landmark. Again, the easier it is to locate your proposed access point the more quickly your permit can beprocessed.
4. Provide the name of the nearest town or city to your property.
5. If applicable, give the name and filing of the subdivision in which your property is located.
6. Give the name of the closest intersecting street or county road.
7. Provide the section, township, and range where your property is located. You can get this information from the Larimer County road map, from your legal description, from the Building Department (498-7683) or the Engineering Department (498-5700).
8. Note which side of the road your access will be located on. Also note what type of access this will be: Residential (one single family residence), Multi- family (more than 1 single family residence, subdivision, apartments, etc.), Commercial, Other (field access, temporary, etc.).
9. Provide the name of the contractor who will be doing the work. Make sure your contractor has submitted their insurance information to the Risk Management Department and that the insurance has been approved. If you are doing the work yourself, you will be required to provide proof of insurance. You can get specific information regarding Larimer County's insurance requirements for work within the County road right-of-way by contacting the Risk Management Department at 498-5961.
10. Your estimated time frame for starting and completing the work. Extensions to your permit maybe requested by calling 498-5709.

DEPARMENT OF HEALTH AND ENVIRONMENT
1525 BLUE SPRUCE DRIVE
FORT COLLINS CO 80524-2004
(970) 498-6775
Larimer.gov/health

Building Permit #_____

INDIVIDUALS WHO MUST APPLY FOR A SEPTIC PERMIT SHOULD BE AWARE OF THE FOLLOWING:

1. Application for an Onsite Wastewater Treatment Systems (OWTS) permit should be made IMMEDIATELY at the Health Department, 1525 Blue Spruce Drive, Fort Collins, CO or the Estes Park office, 1601 Brodie Avenue, Estes Park, CO.

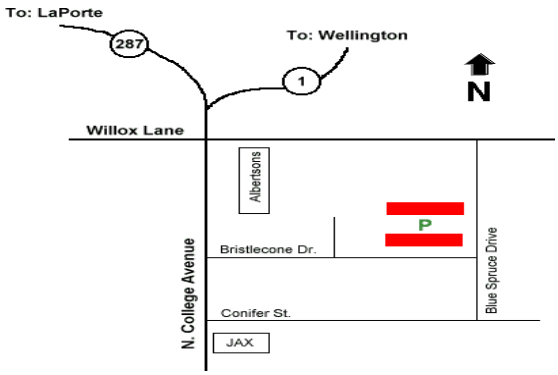
2. Prior to visiting the Health Department, the applicant must obtain a site and soil evaluation from a licensed Professional Engineer or Geologist which includes a percolation test and an eight foot test pit excavation in the area of the proposed septic absorption field. Also included with this information should be a site plan, showing locations of the building site, driveways, septic system, well and neighboring wells, property lines, etc.

3. A fee is collected at the time application is made. 2022 Fees are $1423.00.

4. Upon receipt of the above requested documentation and fee, a preliminary site inspection will be conducted by the Health Department within five business days to evaluate suitability for the proposed Onsite Waste Treatment System (OWTS)

5. Health Department phone numbers are: 498-6775 Fort Collins or 577-2050 Estes Park.

DIRECTIONS TO THE HEALTH DEPARTMENT IN FORT COLLINS



# EXAMPLE

**PLEASE EMAIL TO: BUILDING@LARIMER.ORG**

**To: LARIMER COUNTY BUILDING DIVISION**

Subject: Water and Sewer Approval

Date:
Permit Number: 21-RES
Parcel Number:

This is to verify that Owner(s): Mary, met the requirements and/or paid the applicable fees for:

Address of Building Site:
Subdivision Name:
Lot Number: Block Number:

**All requirements have been satisfied for this property and a building permit may be issued at this time. The owner/contractor has been informed that it is necessary to call the appropriate district for inspections.** By my signature and acting as an Authorized Approver for the identified water or sewer jurisdiction, I authorize the owner to commence construction:

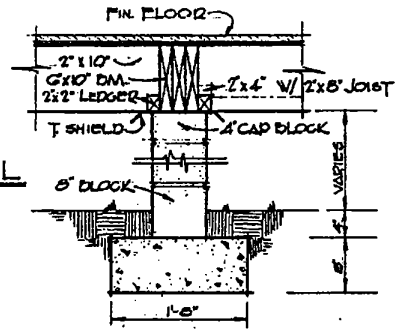
| Water District | Sewer District: NA |
|---|---|
| Full Structure | Full Structure |
| Print Name_____ | Print Name_____ |
| Signature _____ | Signature _____ |

Residential - Single Family Home

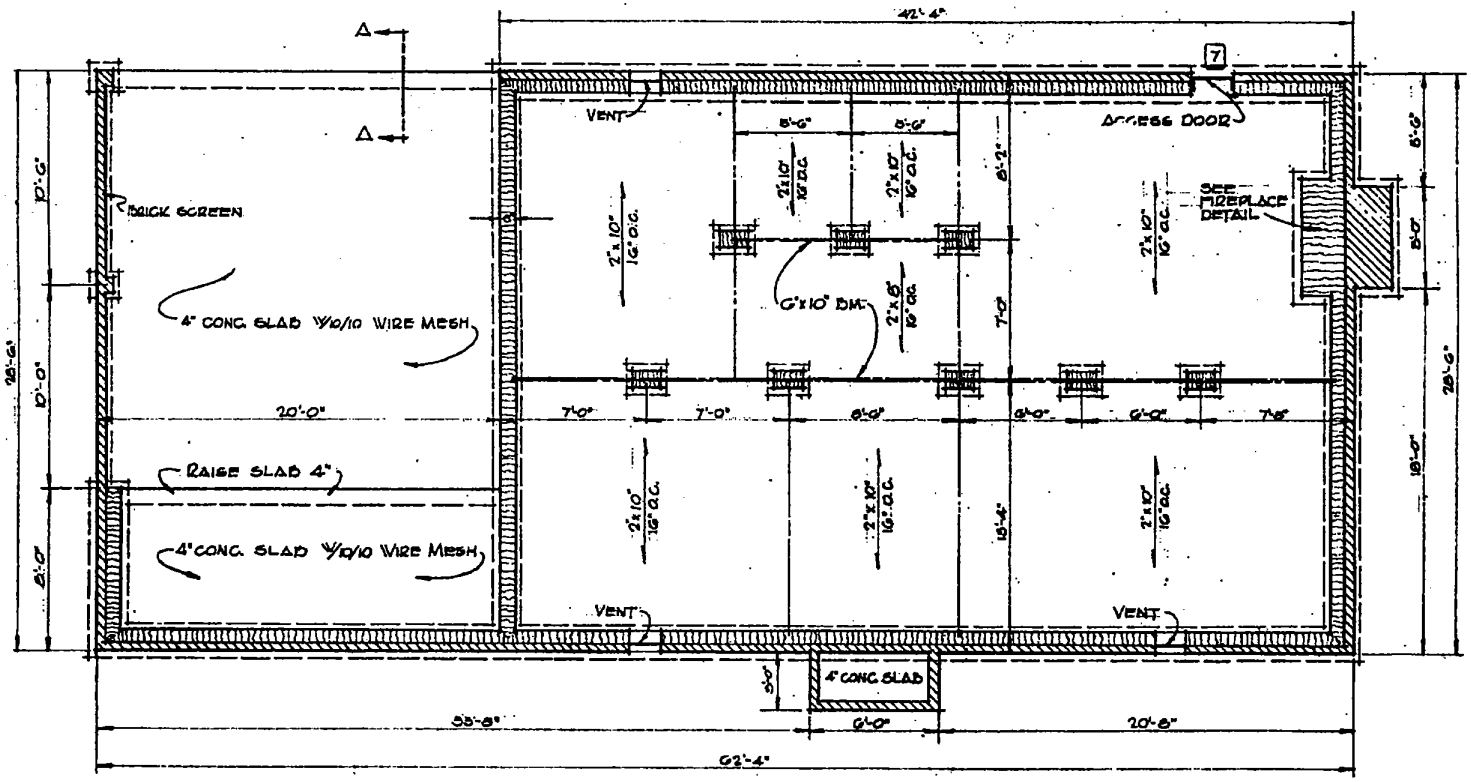
**OWNER: PLEASE EMAIL THIS SIGNED FORM TO LARIMER COUNTY BUILDING DIVISION BEFORE PICKING UP YOUR BUILDING PERMIT.**
**ISSUANCE OF THE BUILDING PERMIT REFUSED WITHOUT WATER/SEWER AUTHORIZATION HEREIN.**

***The Water and Sewer Districts are based upon our records and according to your Tax District as listed with the Larimer County Assessor's Office. If the information is inaccurate as listed, please advise the Larimer County Building Division. Thank you for your assistance.**

# SAMPLE ONLY
# ENGINEERED FOUNDATION REQUIRED

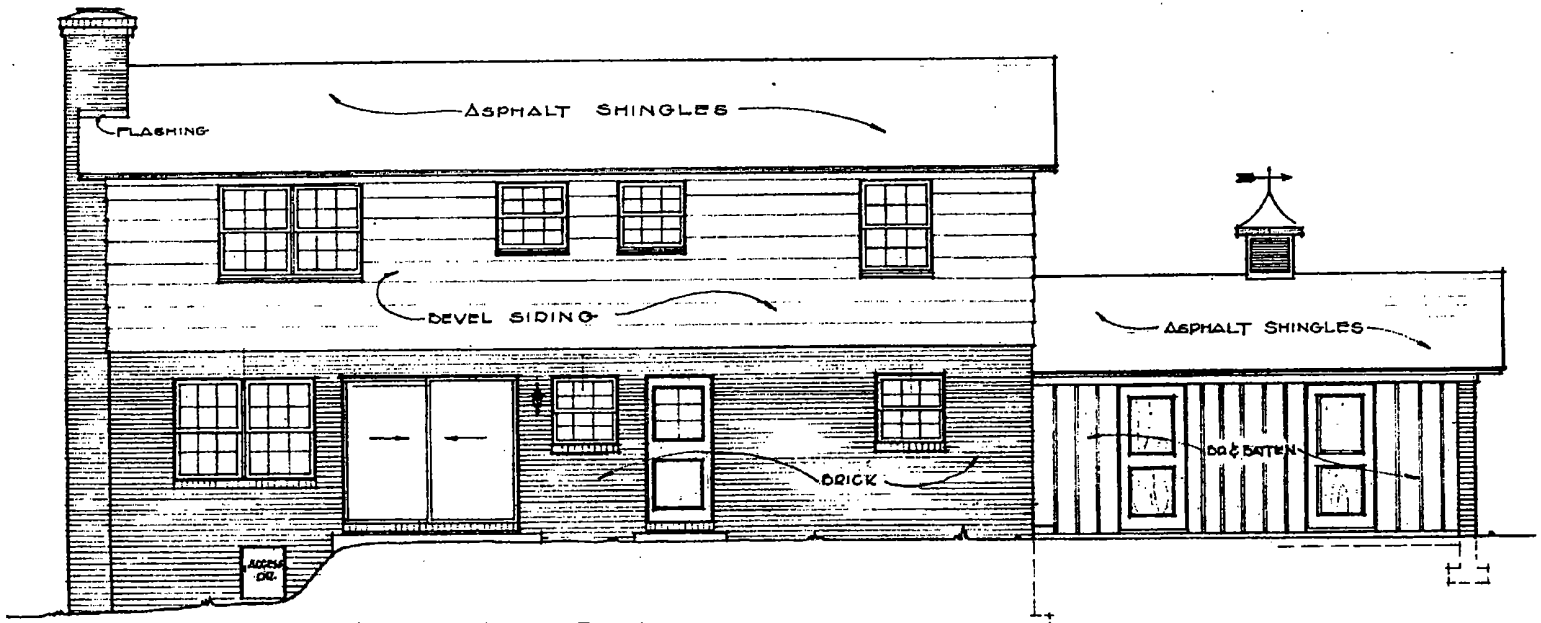



PIER DETAIL
SCALE: 1"=1'-0"



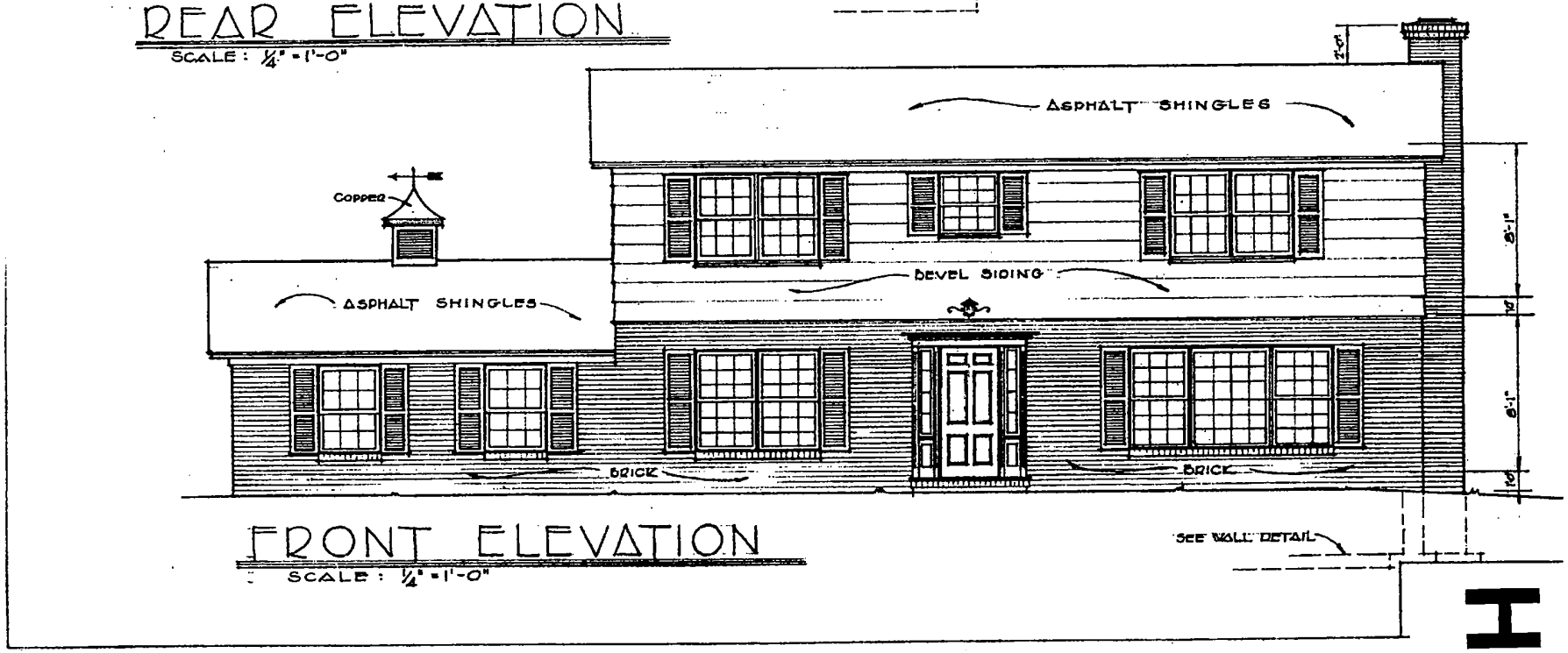

FOUNDATION PLAN
SCALE: 1/4"=1'-0"

SAMPLE ONLY



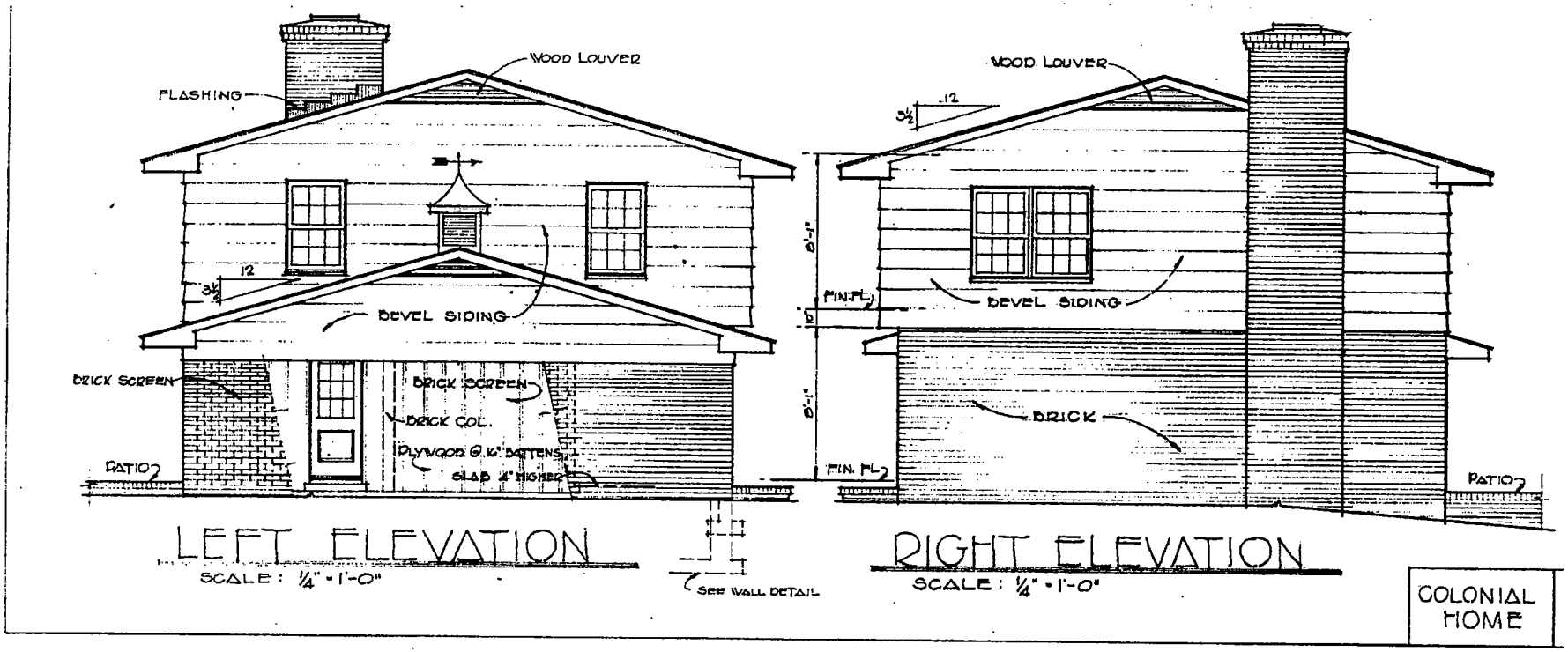

REAR ELEVATION

SCALE: 1/4" = 1'-0"




FRONT ELEVATION

SCALE: 1/4" = 1'-0"


WOOD LOUVER
FLASHING
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DEVEL SIDING
BRICK SCREEN
BRICK SCREEN
BRICK COL.
PLYWOOD @ 16" BATTENS
SLAB 4" HIGHER
PATIO
LEFT ELEVATION
SCALE: ¼" = 1'-0"
SEE WALL DETAIL
WOOD LOUVER
12
3½
8'-1"
FIN. FL.
10"
DEVEL SIDING
8'-1"
BRICK
FIN. FL.
PATIO
RIGHT ELEVATION
SCALE: ¼" = 1'-0"
COLONIAL HOME

SAMPLE ONLY

LIVING
FOYER
HALL
UTILITY
KITCHEN
DINING
CARPORT
STORAGE
PATIO
DOORS
DOORS
DOWN
UP
SECOND FLOOR
ROOF ABOVE
BRICK SCREEN
CONC. FL.
STEP
SLOPE
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OVEN
DISHWASHER
SINK
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WASH
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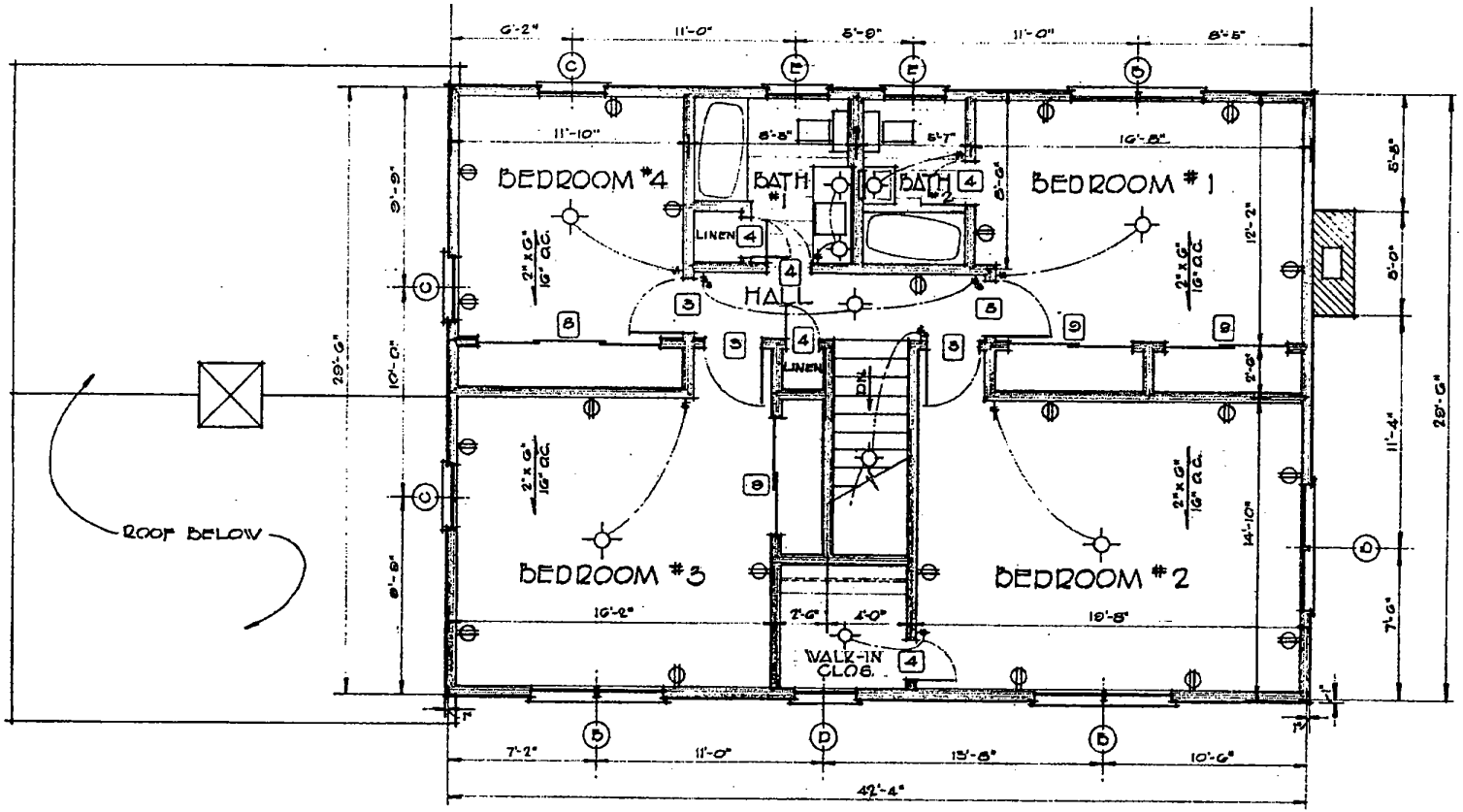
HEAT
CO




# SECOND-FLOOR PLAN

SCALE: 1/4" = 1'-0"

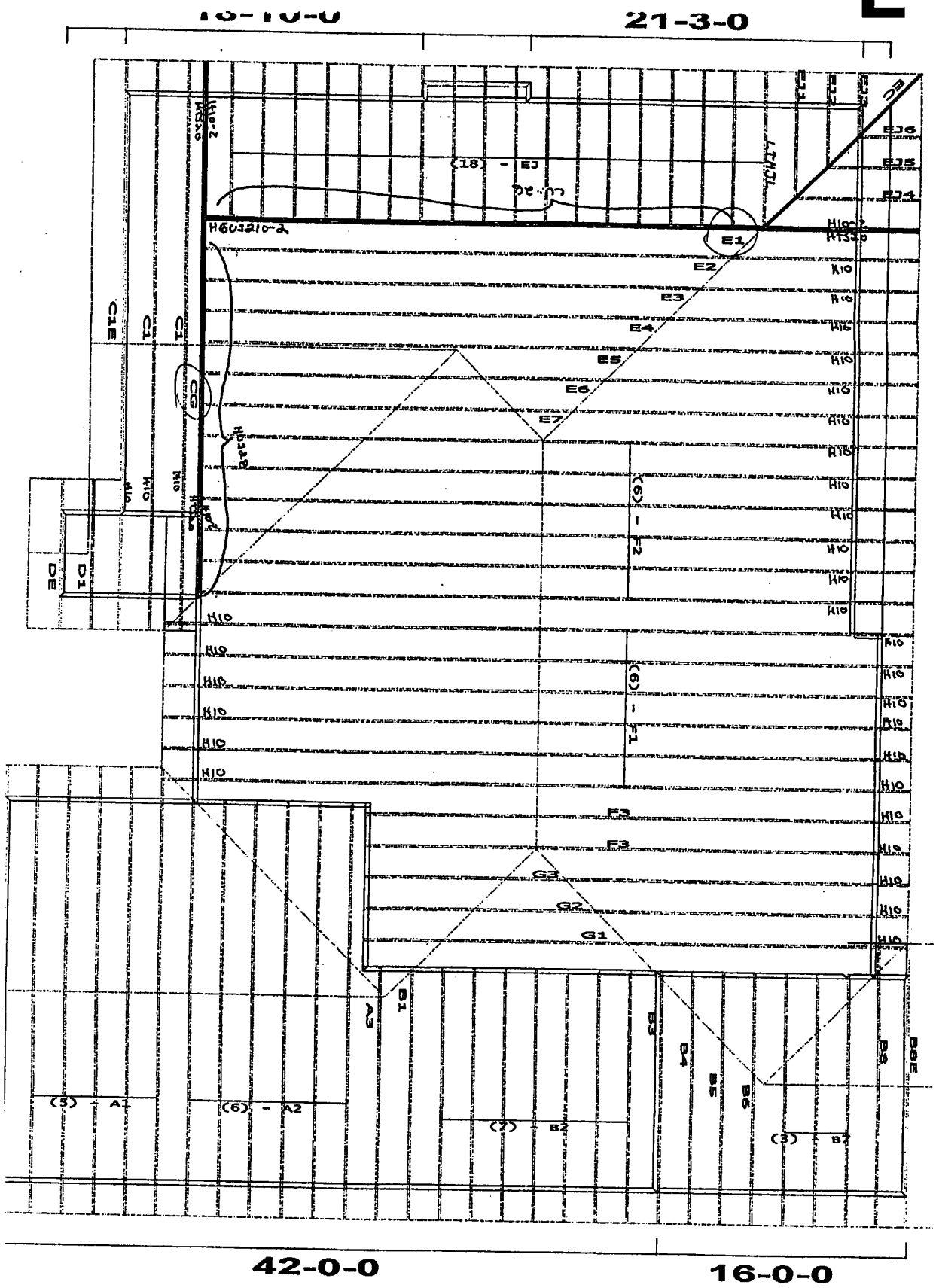
COLONIAL HOME 3

SAMPLE ONLY

SAMPLE ONLY

L

TYPICAL TRUSS LAYOUT



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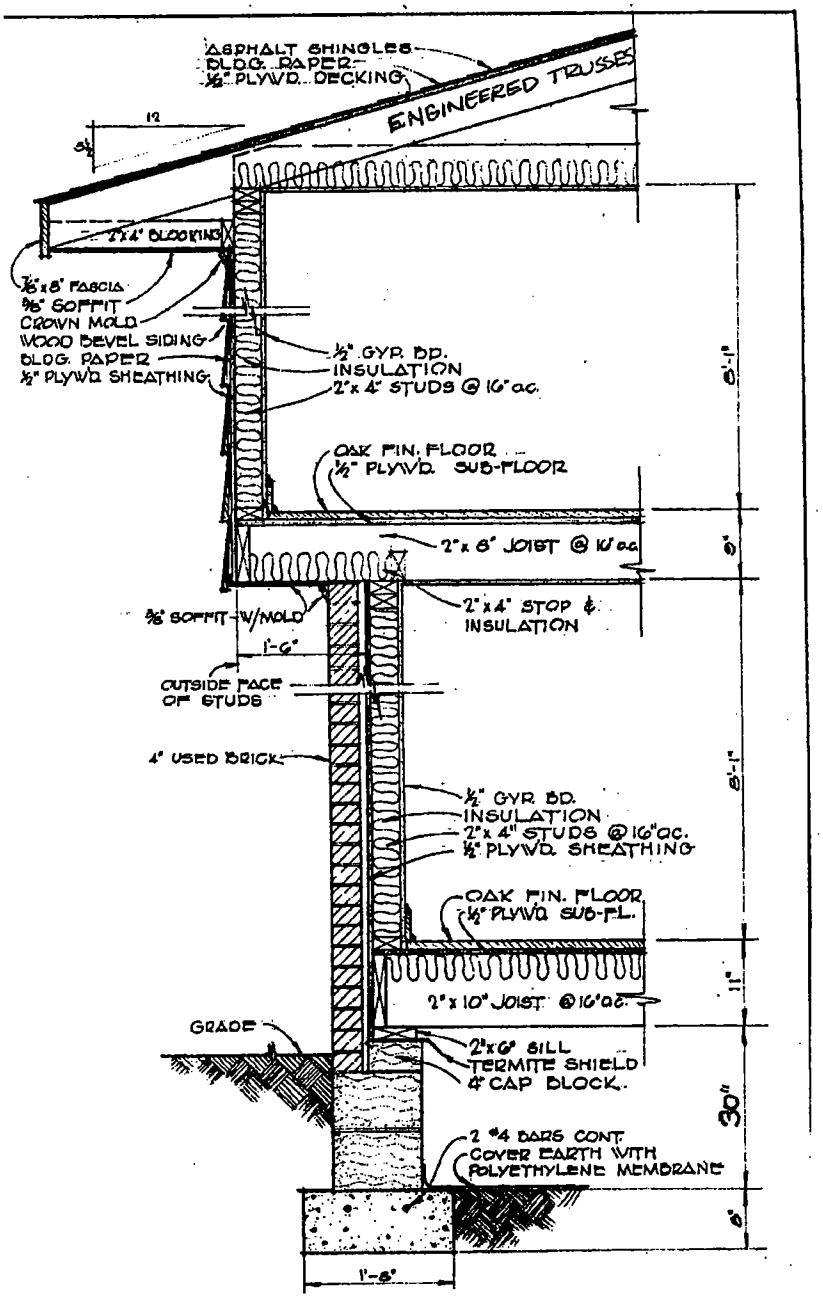



FRONT WALL DETAIL

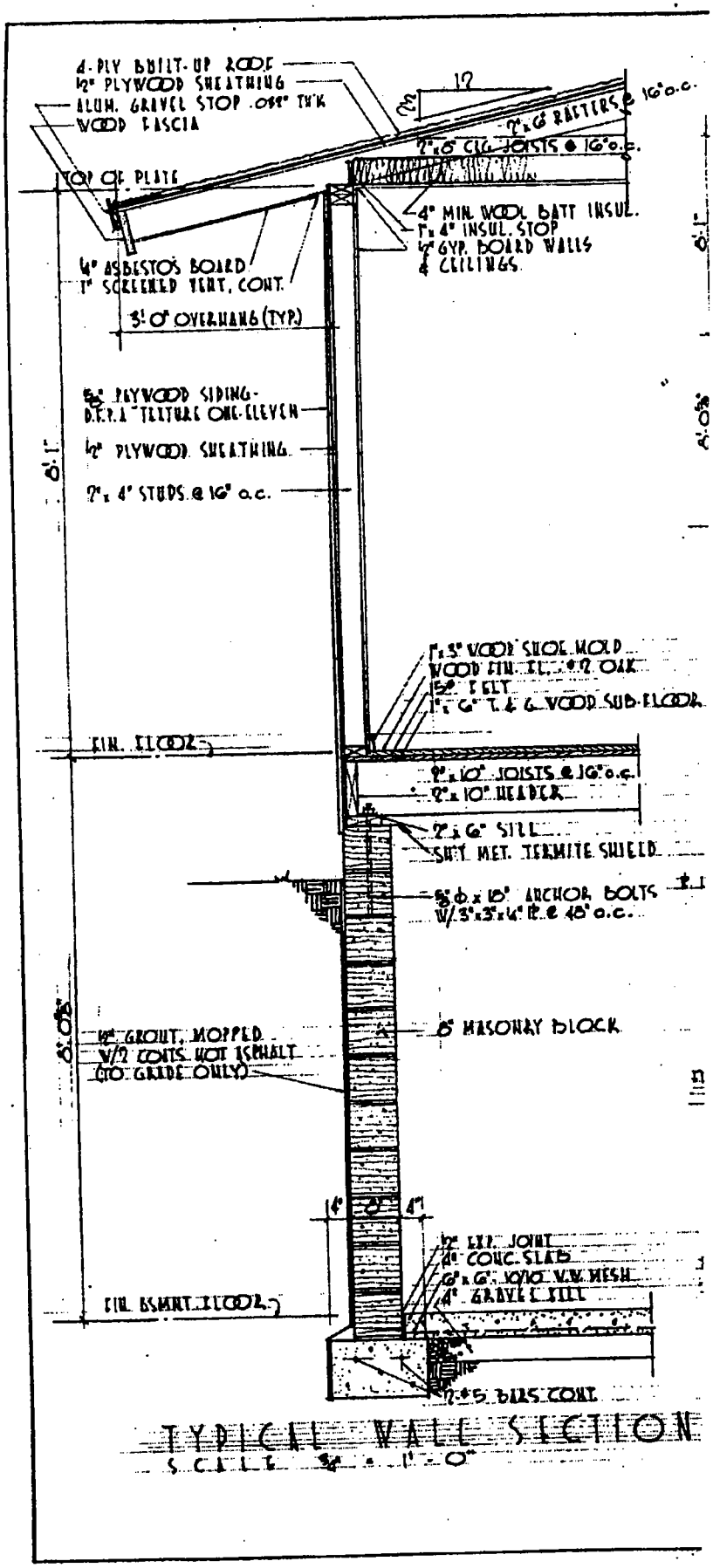
SCALE: 1" = 1'-0"

| COLONIAL HOME | 6 |
|---|---|

SAMPLE ONLY

N

# SAMPLE ONLY




TYPICAL WALL SECTION

SCALE ¾" = 1'-0"

P.O. Box 1190, Fort Collins, Colorado 80522-1190, Planning (970) 498-7683, Building (970) 498-7700, Larimer.org

# STAIRWAYS (RESIDENTIAL)

## STAIRS AND LANDINGS

Stairways must be at least 36” clear width above the handrail height. Handrails cannot project more than 4.5” into each side.

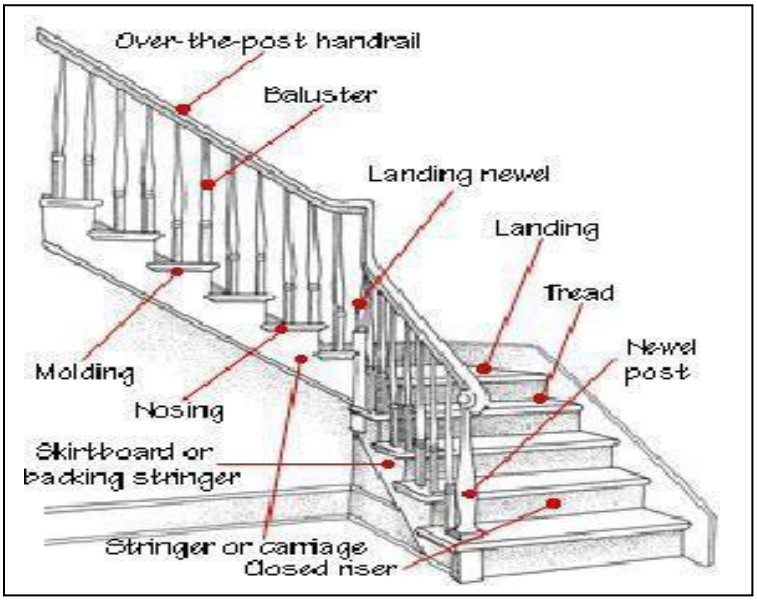
There must be at least 80” of headroom measured vertically from the sloped line of the nosing including landings throughout the stairway.

The maximum height of a riser is 7.75”. Treads have to be at least 10” deep measured from nosing to nosing and need to be a minimum of 4” tall. Treads and risers can vary 3/8” from smallest to largest as long as the maximum riser height and minimum tread depth are maintained.

If using winders, the treads cannot be shallower than 6” and need to be at least 10” deep when you are 12” into the winder at the walk line. The winder treads must also maintain uniform treads at the walk line with no tread depths varying more than 3/8” from largest to smallest.

The landings must be at least the width of the stairway and extend 36” in the direction of travel. Stairs cannot go up more than 12’-7” without a landing.

Landings are not required at the top of interior stairways, including garage stairs, as long as the door does not swing over the stairs.

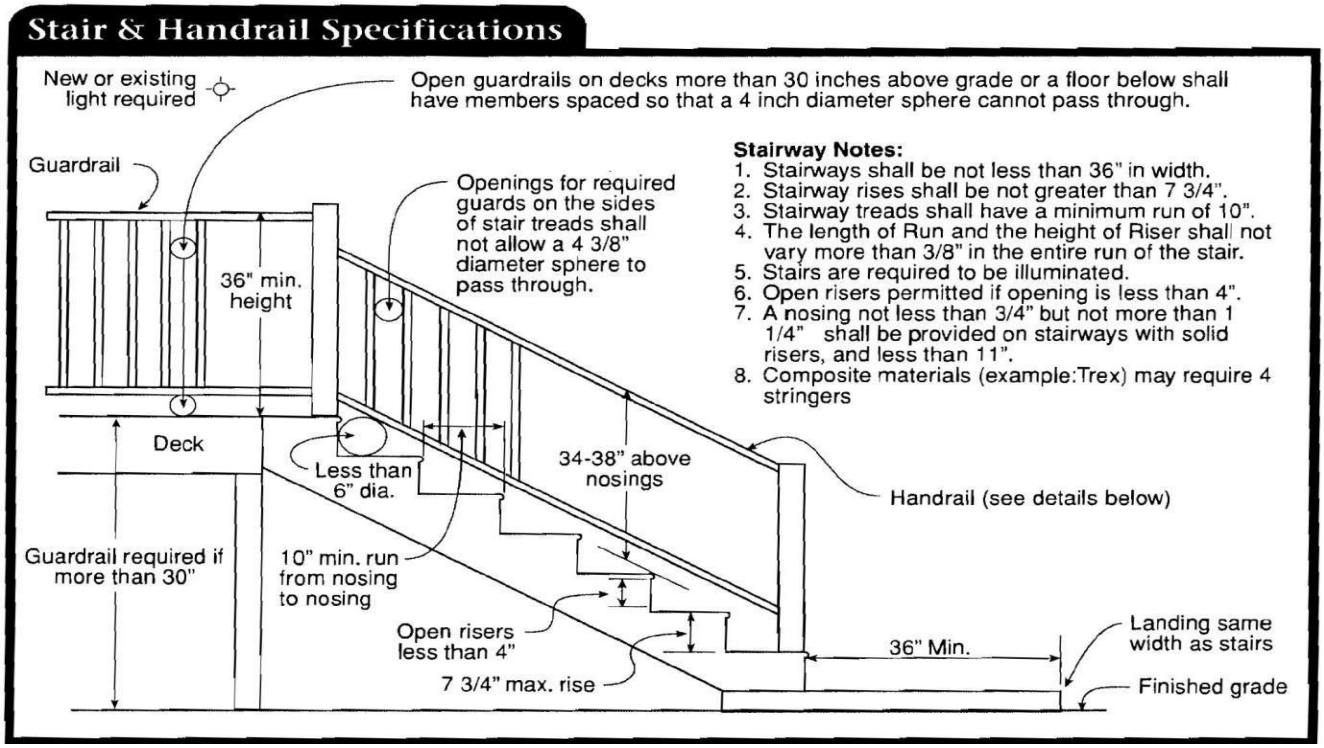



## GUARDRAILS

Guardrails are required when the walking surface is greater than 30” from the grade below and must be greater than 36” in height. When the top of the guardrail serves as the required handrail, the height can be reduced to 34” but no greater than 38”.

Openings in guardrails shall not allow passage of a sphere 4” in diameter with a couple of exceptions. Openings in guardrails on the open side of stairs cannot allow the passage of a sphere greater than 4 3/8”. The triangular opening created by a tread, riser, and guardrail cannot allow the passage of a sphere greater than 6”. Open riser design in stairs also requires the opening to be no greater than 4” when 30” or higher to the grade below.

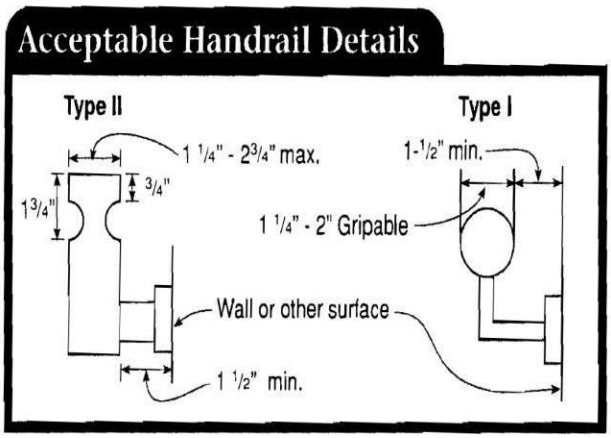
**See Stair and Handrail Specifications on page 2 for more details.**

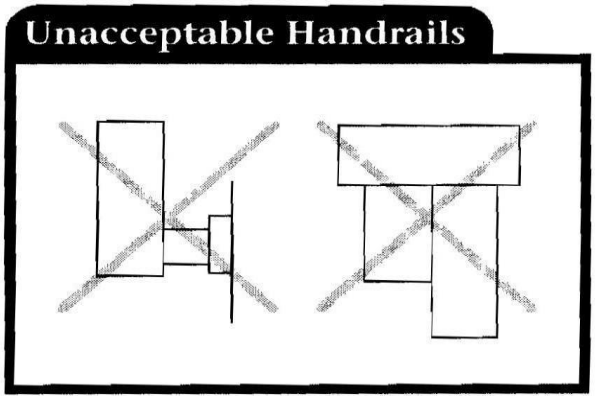



## HANDRAILS

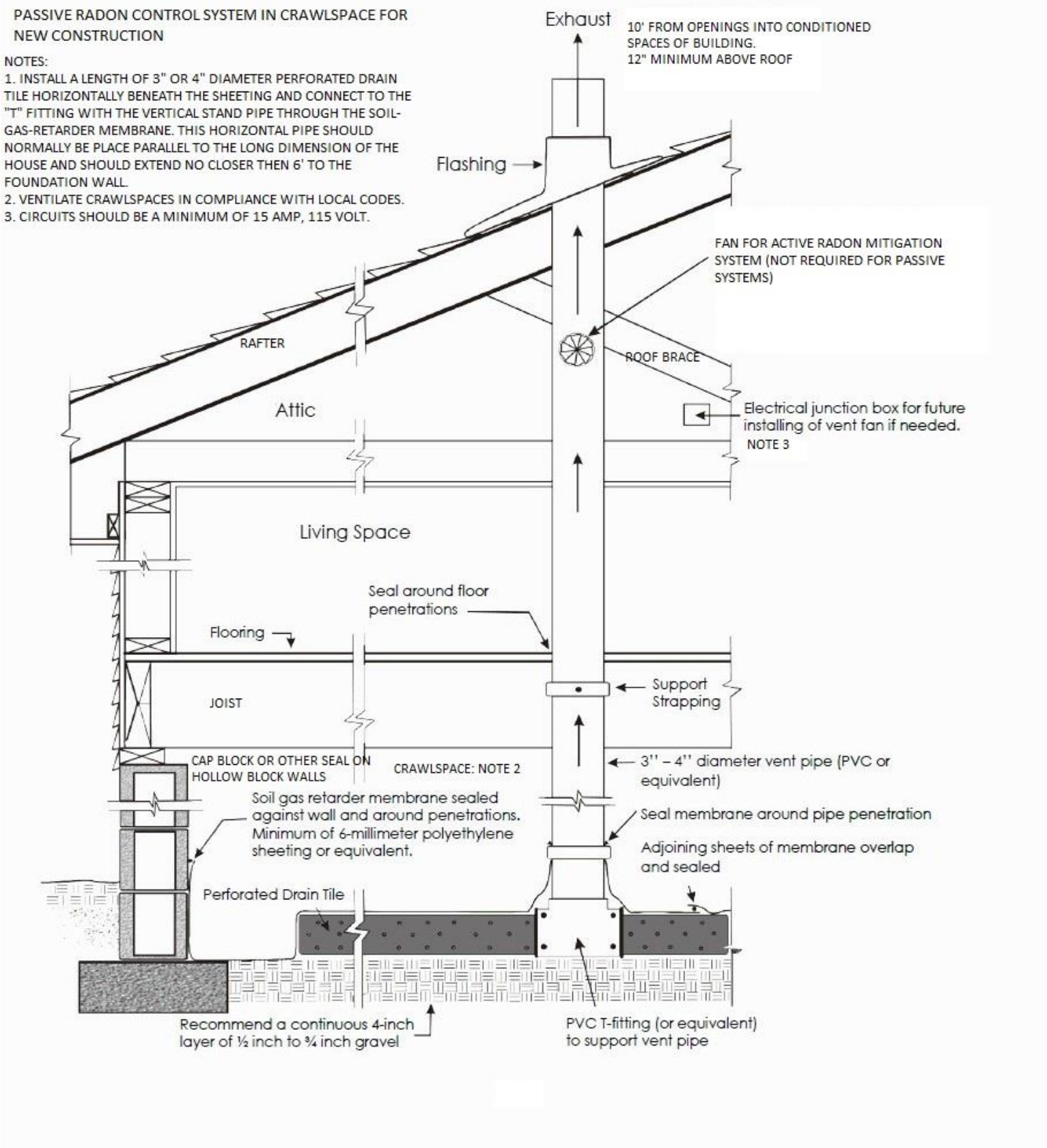
Handrails must be mounted between 34" and 38" above the tread nosing and must run the full length of the stairs. The handrails have to be at least 1.5" off the wall and where circular, need to be 1.25" to 2" in diameter. If the handrail is not circular, it must have a perimeter between 4" and 6.25" with a maximum cross section of 2.25". Other handrails may be acceptable as long as they are able to be grasped.

Handrails need to run continuously for the full flight of the stairs and return to the wall at the top and bottom. They can also stop and start at a newel post at landings. The use of a turnout, starting easing or volute, can also be used at the bottom tread.

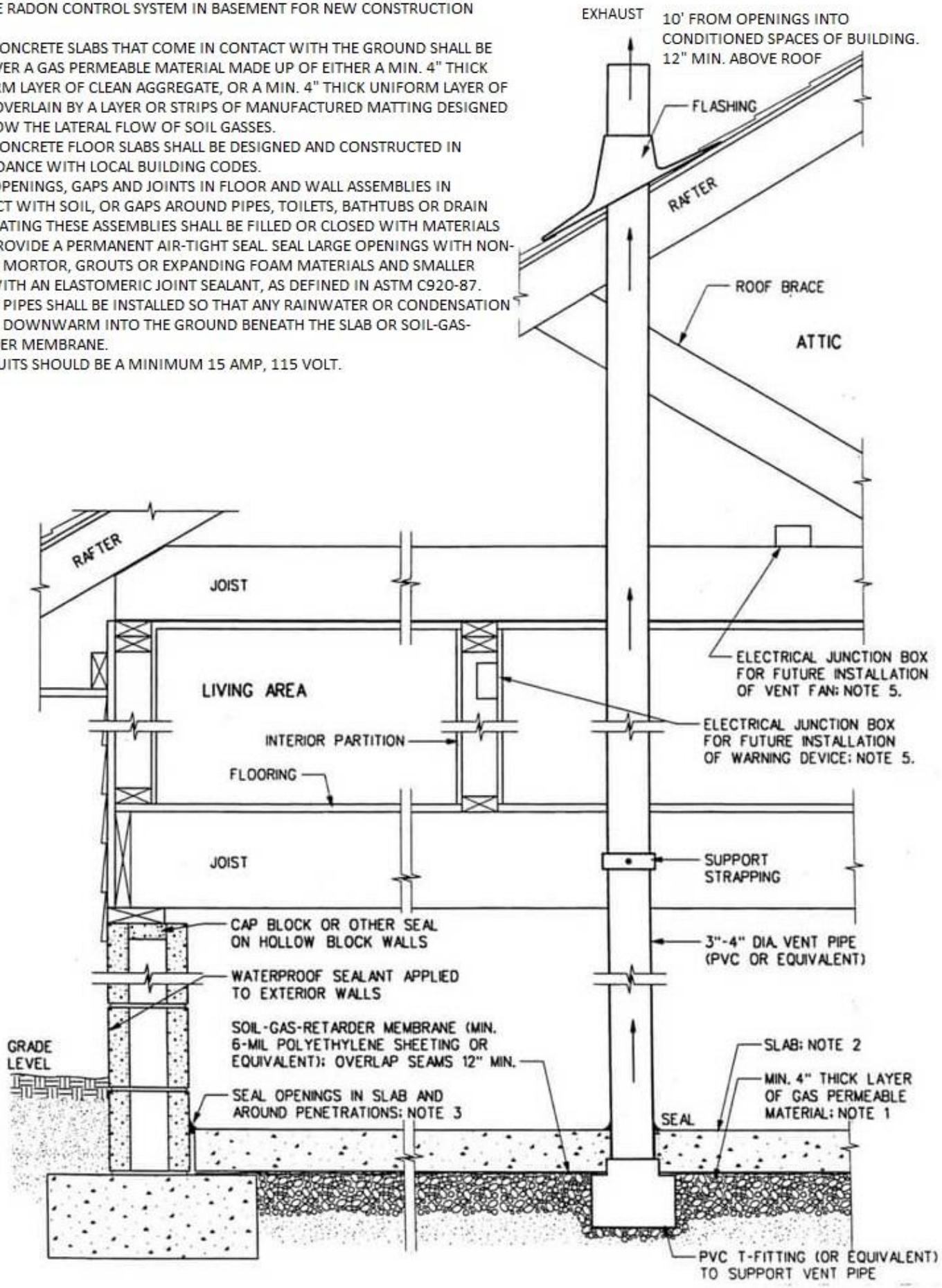


# Radon Mitigation



PASSIVE RADON CONTROL SYSTEM IN BASEMENT FOR NEW CONSTRUCTION

NOTES:

1. ALL CONCRETE SLABS THAT COME IN CONTACT WITH THE GROUND SHALL BE LAID OVER A GAS PERMEABLE MATERIAL MADE UP OF EITHER A MIN. 4" THICK UNIFORM LAYER OF CLEAN AGGREGATE, OR A MIN. 4" THICK UNIFORM LAYER OF SAND, OVERLAIN BY A LAYER OR STRIPS OF MANUFACTURED MATTING DESIGNED TO ALLOW THE LATERAL FLOW OF SOIL GASSES.
2. ALL CONCRETE FLOOR SLABS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH LOCAL BUILDING CODES.
3. ALL OPENINGS, GAPS AND JOINTS IN FLOOR AND WALL ASSEMBLIES IN CONTACT WITH SOIL, OR GAPS AROUND PIPES, TOILETS, BATHTUBS OR DRAIN PENETRATING THESE ASSEMBLIES SHALL BE FILLED OR CLOSED WITH MATERIALS THAT PROVIDE A PERMANENT AIR-TIGHT SEAL. SEAL LARGE OPENINGS WITH NON-SHRINK MORTOR, GROUTS OR EXPANDING FOAM MATERIALS AND SMALLER GAPS WITH AN ELASTOMERIC JOINT SEALANT, AS DEFINED IN ASTM C920-87.
4. VENT PIPES SHALL BE INSTALLED SO THAT ANY RAINWATER OR CONDENSATION DRAINS DOWNWARM INTO THE GROUND BENEATH THE SLAB OR SOIL-GAS-RETARDER MEMBRANE.
5. CIRCUITS SHOULD BE A MINIMUM 15 AMP, 115 VOLT.