

**DESIGN LOADS**  
The following are design loads for Harnett County, NC. For all other locations refer to the building code and any applicable local requirements.

1. Building Codes

1.1 2018 North Carolina Residential Code (2015 International Residential Code with North Carolina Amendments)

1.2 Minimum Design Loads for Building and Other Structures, ASCE 7-16B

2 Roof Dead Load 15 PSF

3 Roof Live Load 20 PSF

4 Typical Floor Dead Load 10 PSF

5 Floor Live Loads

5.1 Rooms other than sleeping rooms 40 PSF

5.2 Sleeping Rooms 30 PSF

5.3 Stairs 40 PSF

5.4 Decks 40 PSF

5.5 Exterior Balconies 60 PSF

6 Wind Loads / Data

6.1 Ultimate Design Wind Speeds 120 MPH

6.2 Wind Importance Factor,  $I_W$  1.00

6.3 Exposure B

6.4 Walls (Component and Cladding) 25 PSF

6.5 Roofs (Component and Cladding)

6.5.1 Roof Slopes 2.25/12 to 1/12 34.8 PSF

6.5.2 Roof Slopes 1/12 to 12/12 21 PSF

7 Seismic Loads / Data

7.1 Seismic Use Group 0.075

7.2 Spectral Response Coefficient,  $S_DS$  0.17g and <0.33g

7.3 Site Class D

7.4 Seismic Importance Factor,  $I_S$  1.00

7.5 Seismic Design Category B

**FOUNDATIONS & CRAWL SPACES**

1. Foundations shall conform to the requirements of the North Carolina Residential Building Code, Chapter 4. Should a conflict occur between these drawings and the aforementioned building code references the more stringent shall govern.

2. The architect has not received a subsurface investigation. The foundation is based upon an assumed soil bearing capacity of 2000 psf net bearing. Verification of this assumed value is the responsibility of the owner or contractor should any adverse soil condition be encountered the architect must be contacted before proceeding.

3. Foundations shall extend not less than 12 inches below the finished natural grade and in no case less than the frost line depth. Foundation walls are assumed to restrain earth pressures of 50 psf or less, unbalanced fill and foundation wall construction shall conform to tables 404.1 of the North Carolina Residential Building Code. Site topography has not been provided to TightLines Designs. Report any unusual site conditions to TightLines Designs before construction.

4. Any fill shall be placed under the direction or recommendation of a licensed professional engineer. The resulting soil shall be compacted to a minimum of 95 percent maximum dry density.

5. Excavation for footings shall be lined temporarily with a 6 mil polyethylene if placement of concrete does not occur within 24 hours of excavation.

6. No concrete shall be poured against any subgrade containing water, ice, frost, or loose material.

7. Enlarged perimeter footings are to be poured monolithically with wall footings. Reinforcement for wall footings, if any, shall run continuously through column footings.

8. Crawl space vents to be 8"x16" w/ min. 50% free air, and shall be located within 3' of each corner unless closed crawl space. Crawl space door may serve as vent.

9. Install 6 mil. vapor barrier below all slabs and on ground area within all crawlspaces.

10. Provide min. 18x24 access panel or larger as required by the NC Mechanical Code when mechanical equipment is located in the crawlspace.

11. Remove earth as required to achieve a minimum clearance from ground to underside of floor joists of 18".

12. Provide foundation drains at all foundation walls. Coordinate location to daylight with owner.

**CONCRETE**

1. Concrete shall have normal weight aggregate and a minimum compressive strength ( $f_c$ ) at 28 days as listed below.

1.1. Footings 3000 psi

1.2. Slabs-on-grade 4000 psi

1.3. Elevated Slabs 3500 psi

2. Concrete shall be proportioned, mixed, and placed in accordance with ACI 318 latest edition "Building Code Requirements for Reinforced Concrete" and ACI 301 latest edition "Specifications for Structural Concrete for Buildings"

3. Entrained air must be used in all concrete that will be exposed to freezing and thawing and deicing chemicals. Amount of air entrainment (percent) shall be in accordance with the following schedule with a range of +1 to +2 percentage points of the target value.

3.1. Footings 5%

3.2. Interior Slabs 0% see note below

3.3. Exterior Slabs 5%

3.4. Note: It is recommended that interior slabs to be given a smooth, dense, hard-traveled finish not contain entrained air since blistering or delamination may occur. If slab will be exposed to deicing or other aggressive chemicals contact TightLines Designs for proper air entrainment requirements.

4. No admixtures shall be added to any structural concrete without written permission of the architect.

**CONCRETE SLABS ON GRADE**

1. Concrete slabs on grade shall be constructed in accordance with ACI 302.1r-16 "guide for concrete slab and slab construction".

2. The architect is not responsible for differential settlement, slab cracking or other future defects resulting from unreported conditions.

3. Control joints shall be spaced in slabs on grade at a maximum of 20'-0" O.C. Unless noted otherwise.

4. Control joints shall be produced using conventional processes within 4 to 12 hours after the slab has been finished.

5. Reinforcing steel shall not extend through the control joint.

6. All welded wire fabric for concrete slab on grade shall be supplied in flat sheets

7. All welded wire fabric for concrete slab on grade shall be placed 2" from top of slab. The WVF shall be securely supported during the concrete pour.

**FOUNDATION & FLOOR FRAMING NOTES**

1. All dimensions stretched from the outside face of the foundation wall or the center line of piers.

2. Typical pier is 16"x16" w/ 24"x24"x10" footing, U.N.O.

3. Typical wall footing is 16" x 8" D, U.N.O.

4. All girders and joists to be SPF, U.N.O.

5. Typical floor joists to be 2x10s @ 16" o.c., U.N.O.

6. See sheet A1.1 for additional foundation & framing notes.

**FLOOR FRAMING NOTES**

1. Floors shall be constructed in accordance with the requirements listed in the North Carolina Residential Building Code Chapter 5.

2. Floors are designed for the uniformly distributed loads shown in the general structural notes. Special loading conditions must be reported to TightLines Designs; TightLines Designs is not responsible for floor defects resulting from unreported conditions.

3. P denotes a point load from above. Provide solid blocking to foundation w/ the same number of studs as above.

4. Install double joists or see truss manf. dvgs. for support under parallel non load bearing partitions above typ.

5. Floor sheathing shall be APA rated sheathing exposure 1 or 2, 5/4" T&G glued and attached to its supporting framing with 1-8d CC nail at 6" O.C. At panel edges and at 12" O.C. in panel field unless otherwise noted on the plans. Sheathing shall be applied perpendicular to framing. Panel end joints shall occur over framing.

6. Joists framing into the side of a girder shall be supported by a 2x2 ledger or by manuf. recommended hangers.

**FLOOR PLAN NOTES:**

1. All interior walls drawn @ 5 1/2" wide & exterior walls drawn w/ sheathing @ 4" wide. All dimensions are drawn to face of stud on interior walls and to exterior sheathing on exterior walls.

2. All windows to have screens.

3. Provide plastic coated wire shelving w/ clothes rod in coat closet & bedroom closets, one (1) shelf in laundry closet & four (4) shelves in pantry.

4. See above for additional framing notes.



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1370 TOTAL HEATED SF  
207 SF FRONT PORCH

**GENERAL STRUCTURAL NOTES:**

1. This structure is only stable in its completed form. The contractor shall provide all required temporary bracing during construction to stabilize the structure.

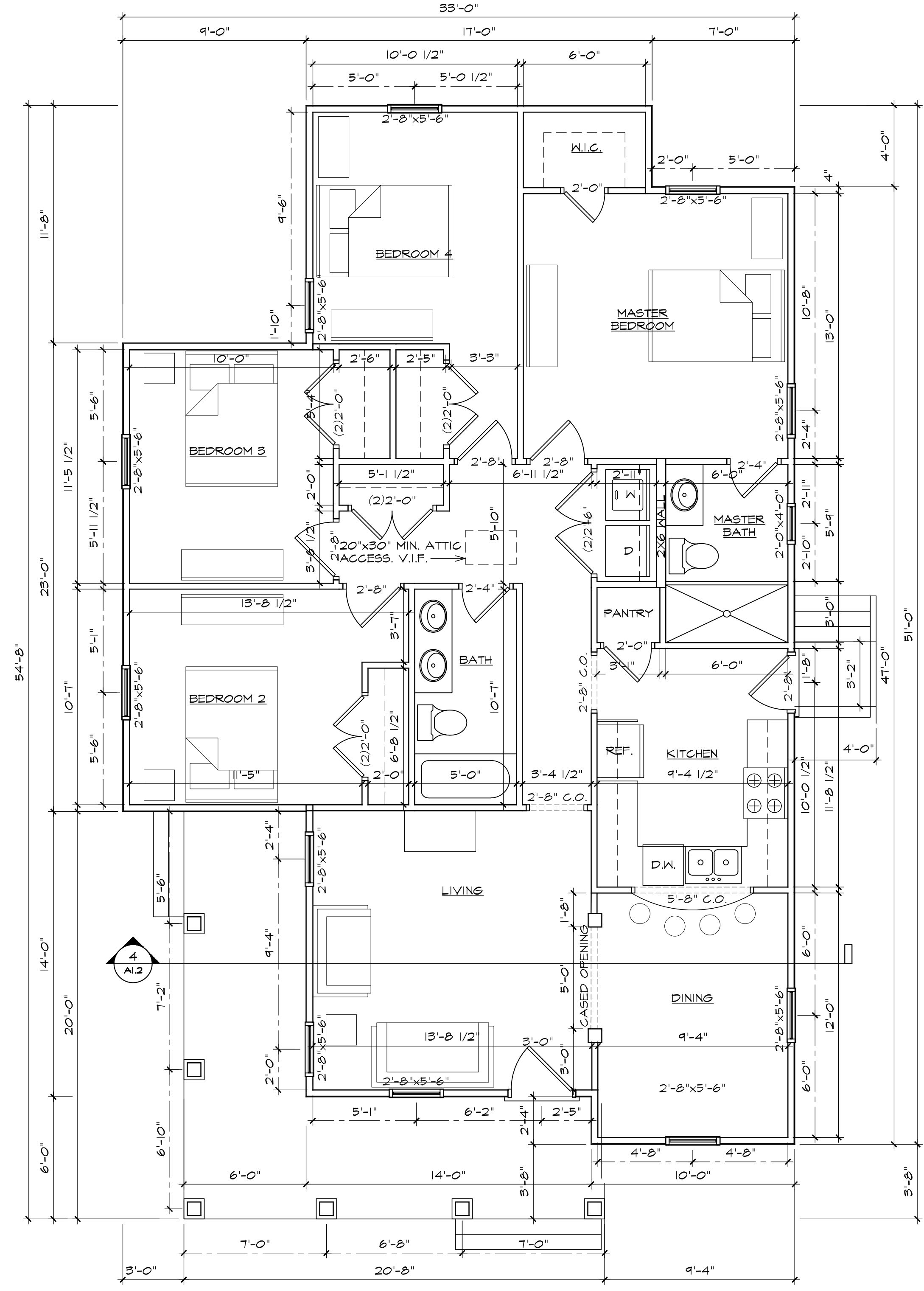
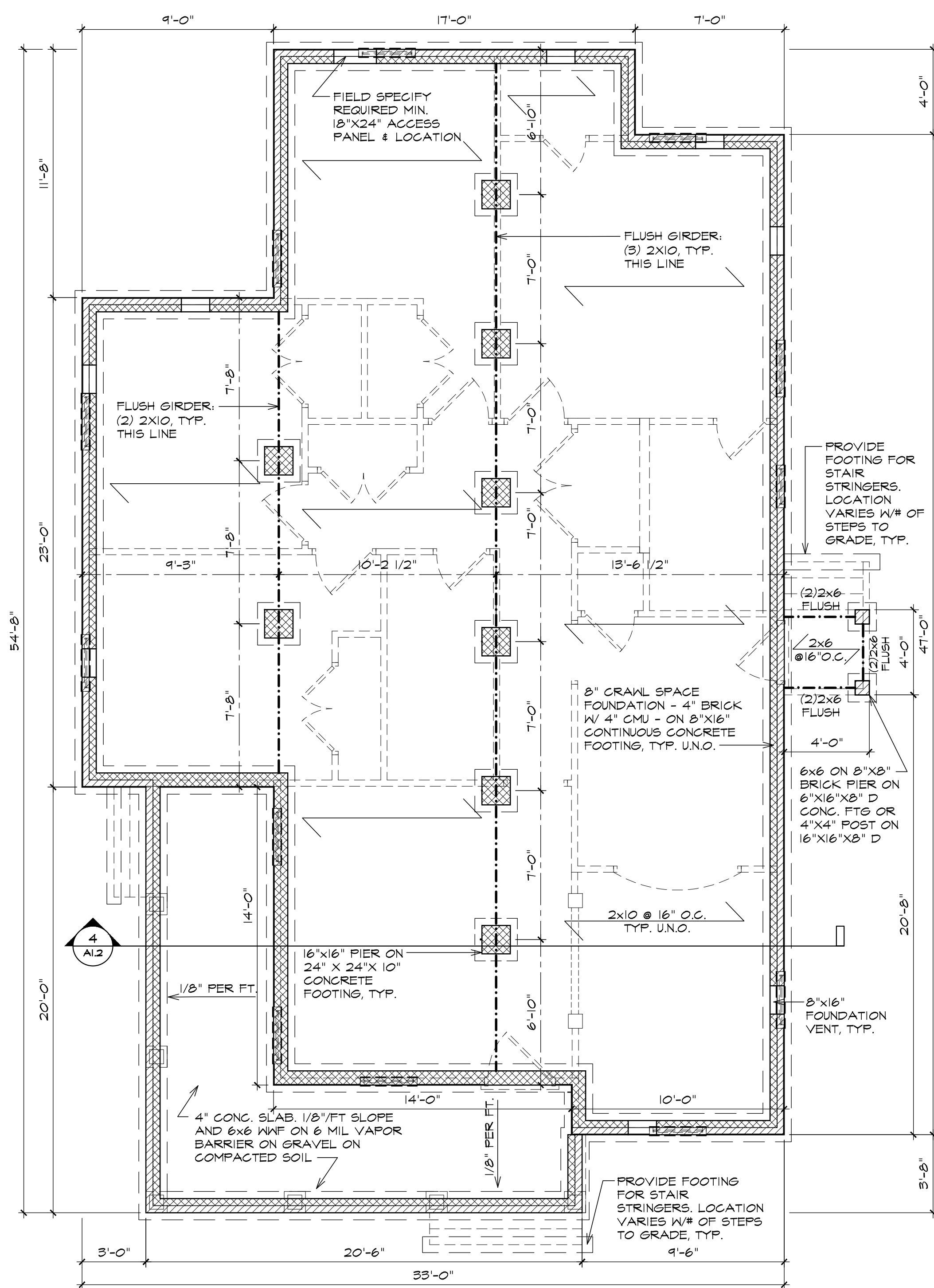
2. The architect is not responsible for construction sequences, methods, or techniques in connection with the construction of this structure. The architect will not be held responsible for the contractor's failure to conform to the construction documents, should any non-conformities occur.

3. Verification of assumed field conditions is not the responsibility of the architect. The contractor shall verify the field conditions for accuracy and report any discrepancies to TightLines Designs before construction begins.

4. This structure and all construction shall conform to all applicable sections of the North Carolina residential code and any local laws where the structure is to be constructed.

FIELD SPECIFY REQUIRED ACCESS PANEL & LOCATION - SEE NOTES ON A1.1 FOR ADDITIONAL CRAWL SPACE DETAILS

CRAWL SPACE VENT CALCS:  
CRAWL SPACE W/ VAPOR BARRIER REQUIRES 1 SF VENT AREA PER 1500 SF CRAWL SPACE AREA  
1370 SF CRAWL SPACE/1500 SF = .91 SF VENT AREA  
.91 SF x 144 Sq.in/SF = 132 Sq.in.  
8"x16" VENTS W/50% FREE AIR SPACE = 64 Sq.in. FREE AIR PER VENT  
132 Sq.in./64 Sq.in. = 2 VENTS REQUIRED  
4 VENTS PROVIDED



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date 08.19.20  
drafter D.A.S.  
checked by C.L.B.  
proj. no. T-19035.1  
revisions date

Floorplan, Foundation Plan, Notes

A1.1



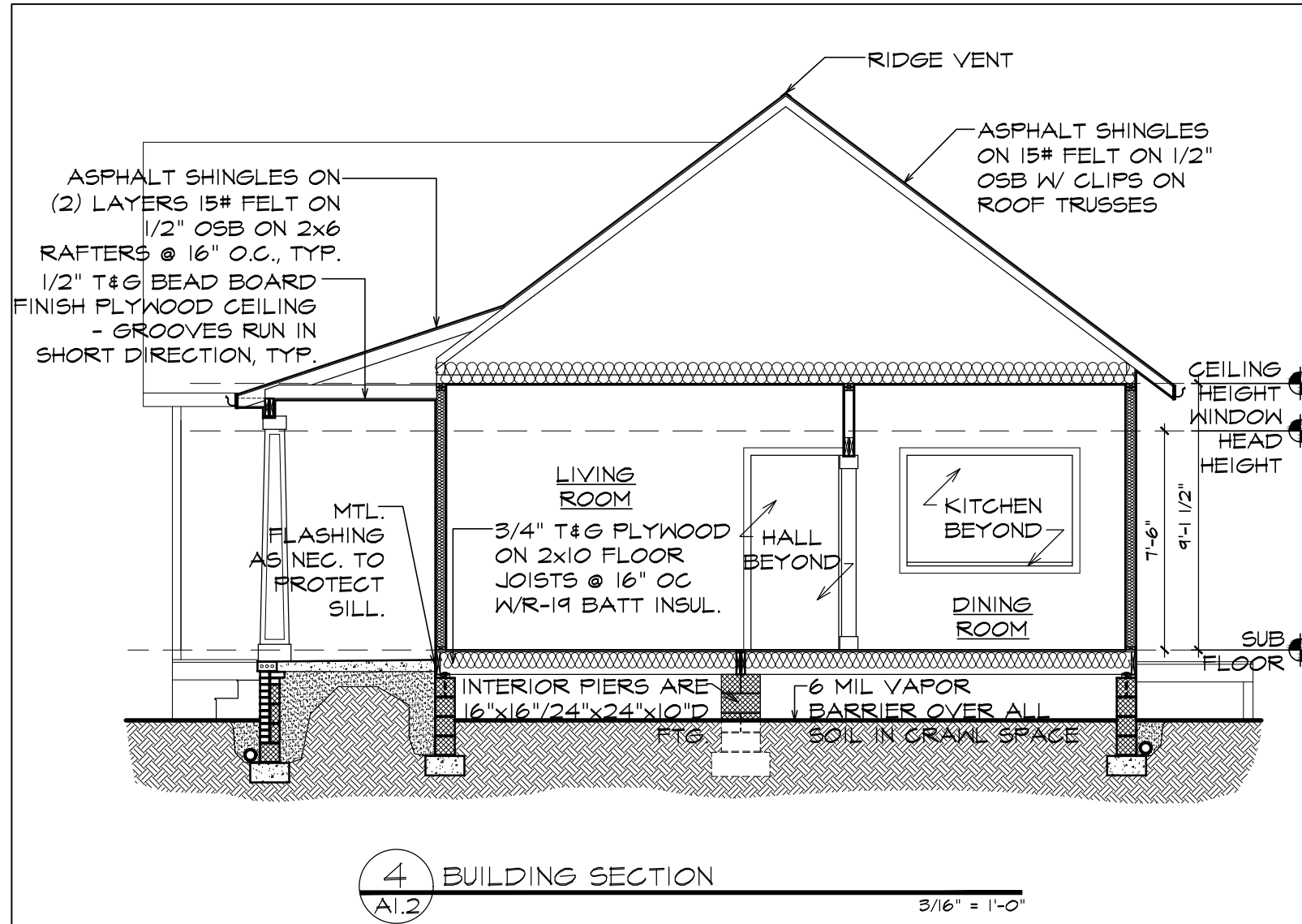


TABLE N102.1 (2012 EDITION NC RESIDENTIAL CODE) INSULATION AND PENETRATION REQUIREMENTS BY COMPONENT

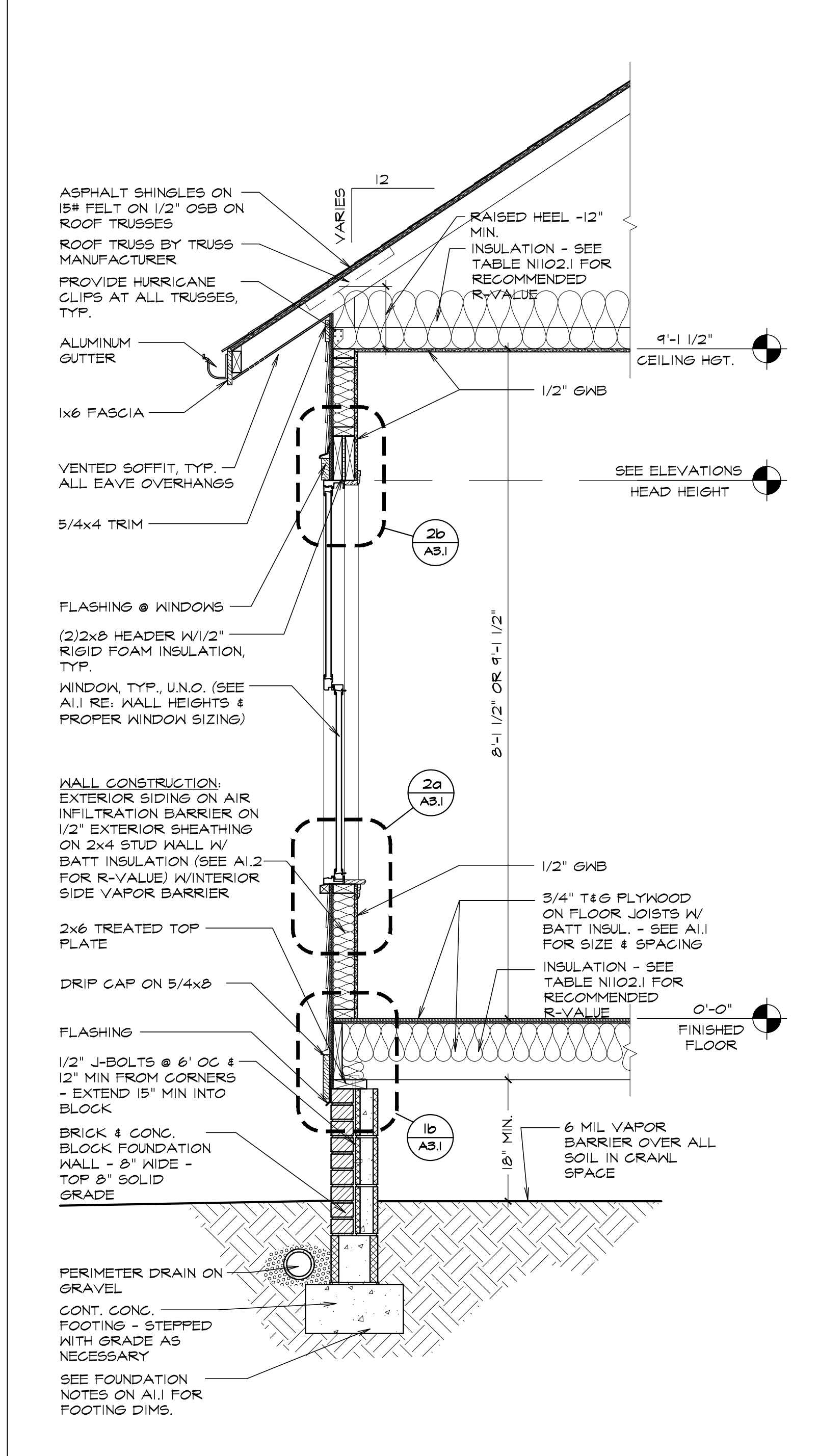
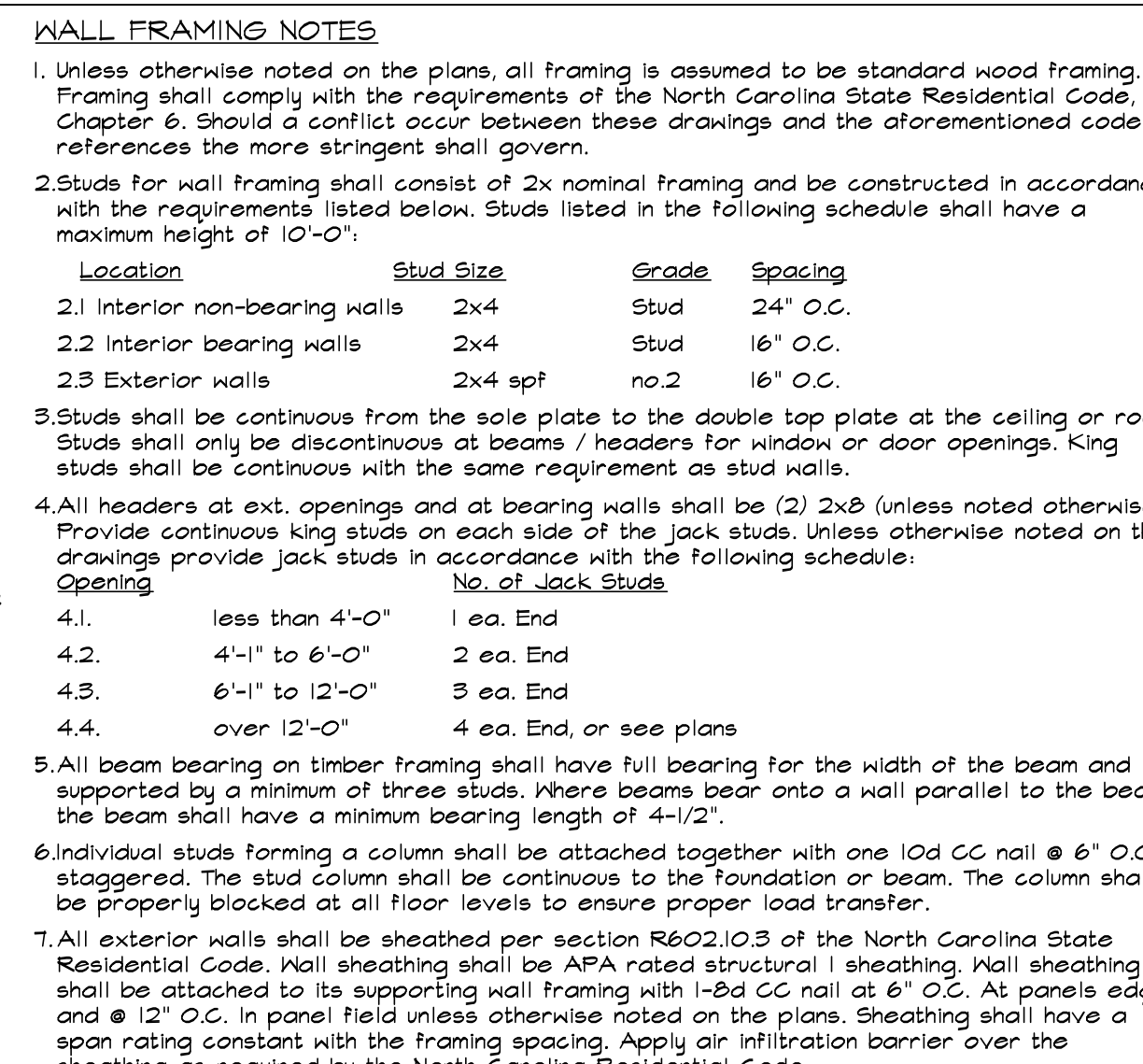
Climate Zone	Roofing	Walls	Floors	Basement Slab	Foundation Wall	Foundation Footing	Unfinished Attic	Finished Attic	Garage Ceiling	Garage Floor	Garage Foundation Wall
1	R-30	R-15	R-5	R-5	R-5	R-5	R-5	R-5	R-5	R-5	R-5
2	R-30	R-15	R-5	R-5	R-5	R-5	R-5	R-5	R-5	R-5	R-5
3	R-30	R-15	R-5	R-5	R-5	R-5	R-5	R-5	R-5	R-5	R-5
4	R-30	R-15	R-5	R-5	R-5	R-5	R-5	R-5	R-5	R-5	R-5

a. R-values are minimum. Unfinished attics and finished attics are maximums.  
 b. The fenestration U-factor column excludes skylights. The solar heat gain coefficient (SHGC) column applies to all glazed fenestration.  
 c. "100%" means R-10 continuous insulated sheathing on the interior or exterior of the home or R-5 cavity insulation on the interior of the basement wall or crawl space wall.  
 d. For monolithic slabs, insulation shall be applied from the inspection gap downward to the bottom of the footing or a minimum of 18 inches below grade whichever is less. For floating slabs, insulation shall extend to the bottom of the foundation wall or 24 inches, whichever is less. R-9 shall be added to the required slab edge R-values for heated slabs.  
 e. R-10 fiberglass batts compressed and installed in a normal 2x4 framing cavity is deemed to comply. Fiberglass batts rated R-10 or higher compressed and installed in 2x4 walls is not deemed to comply.  
 f. Basement wall insulation is not required in unarmored locations as defined by Table N102.1.  
 g. Or insulation sufficient to fill the framing cavity, R-10 minimum.  
 h. "15#" means R-15 cavity insulation plus R-9 insulated sheathing. "10-2" means R-10 cavity insulation plus R-2 insulated sheathing. If structural sheathing covers more than 25 percent of exterior, insulated sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2. "15-2.5" means R-15 cavity insulation plus R-2.5 sheathing.  
 i. For mass walls, the second R-value applies when more than half the insulation is on the interior of the wall.  
 j. R-5 shall be deemed to satisfy the ceiling insulation requirement whenever the full height of unconditioned R-5 insulation extends over the wall top plate at the eaves. Otherwise R-5 insulation is required there additional clearance exists or insulation must extend to either the head or within 1" of the attic floor deck.  
 k. Table values required except for roof edge where the space is limited by the pitch of the roof; there the insulation must fill the space up to the air space.  
 NOTE:  
 FOR ALL PROJECTS OUTSIDE NORTH CAROLINA, CONFIRM INSULATION REQUIREMENTS WITH ALL APPLICABLE CODES.

TABLE N102.2 (2012 EDITION NC RESIDENTIAL CODE) NORTH CAROLINA CLIMATE ZONES, MOISTURE REGIMES, AND HAZARD OBSERVATIONS BY COUNTY

County	Climate Zone	Moisture Regime	Hazard Observation
4A Alamance	4A	4A	4A
4A Alexander	4A	4A	4A
4A Allegheny	4A	4A	4A
4A Anson	4A	4A	4A
4A Ashe	4A	4A	4A
4A Avery	4A	4A	4A
4A Beaufort	4A	4A	4A
4A Bertie	4A	4A	4A
4A Bladen	4A	4A	4A
4A Brunswick	4A	4A	4A
4A Burke	4A	4A	4A
4A Cabarrus	4A	4A	4A
4A Caldwell	4A	4A	4A
4A Camden	4A	4A	4A
4A Carteret	4A	4A	4A
4A Caswell	4A	4A	4A
4A Catawba	4A	4A	4A
4A Chatham	4A	4A	4A
4A Cherokee	4A	4A	4A
4A Chowan	4A	4A	4A
4A Citrus	4A	4A	4A
4A Cleveland	4A	4A	4A
4A Colleton	4A	4A	4A
4A Croatan	4A	4A	4A
4A Cumberland	4A	4A	4A
4A Currituck	4A	4A	4A
4A Dare	4A	4A	4A
4A Davidson	4A	4A	4A
4A Davie	4A	4A	4A
4A DeWitt	4A	4A	4A
4A Duplin	4A	4A	4A
4A Durham	4A	4A	4A
4A Edgecombe	4A	4A	4A
4A Forsyth	4A	4A	4A

**WALL FRAMING NOTES**  
 1. Unless otherwise noted on the plans, all framing is assumed to be standard wood framing. Framing shall comply with the requirements of the North Carolina State Residential Code, Chapter 6. Should a conflict occur between these drawings and the aforementioned code references the more stringent shall govern.  
 2. Studs for wall framing shall consist of 2x nominal framing and be constructed in accordance with the requirements listed below. Studs listed in the following schedule shall have a maximum height of 10'-0".  
 Location Stud Size Grade Spacing  
 2.1 Interior non-bearing walls 2x4 Stud 24" O.C.  
 2.2 Interior bearing walls 2x4 Stud 16" O.C.  
 2.3 Exterior walls 2x4 spf no.2 16" O.C.  
 3. Studs shall be continuous from the sole plate to the double top plate at the ceiling or roof. Studs shall only be discontinuous at beams / headers for window or door openings. King studs shall be continuous with the same requirement as stud walls.  
 4. All headers at ext. openings and at bearing walls shall be (2) 2x8 (unless noted otherwise). Provide continuous king studs on each side of the jack studs. Unless otherwise noted on the drawings provide jack studs in accordance with the following schedule:  
 Opening No. of Jack Studs  
 4.1. less than 4'-0" 1 ea. End  
 4.2. 4'-1" to 6'-0" 2 ea. End  
 4.3. 6'-1" to 12'-0" 3 ea. End  
 4.4. over 12'-0" 4 ea. End, or see plans  
 5. All beam bearing on timber framing shall have full bearing for the width of the beam and supported by a minimum of three studs. Where beams bear onto a wall parallel to the beam the beam shall have a minimum bearing length of 4'-1/2".  
 6. Individual studs forming a column shall be attached together with one 10d GC nail @ 6" O.C. staggered. The stud column shall be continuous to the foundation or beam. The column shall be properly blocked at all floor levels to ensure proper load transfer.  
 7. All exterior walls shall be sheathed per section R602.10.5 of the North Carolina State Residential Code. Wall sheathing shall be APA rated structural I sheathing. Wall sheathing shall be attached to its supporting wall framing with 1-8d GC nail @ 6" O.C. At panels edges and @ 12" O.C. in panel field unless otherwise noted on the plans. Sheathing shall have a span rating constant with the framing spacing. Apply air infiltration barrier over the sheathing as required by the North Carolina Residential Code.



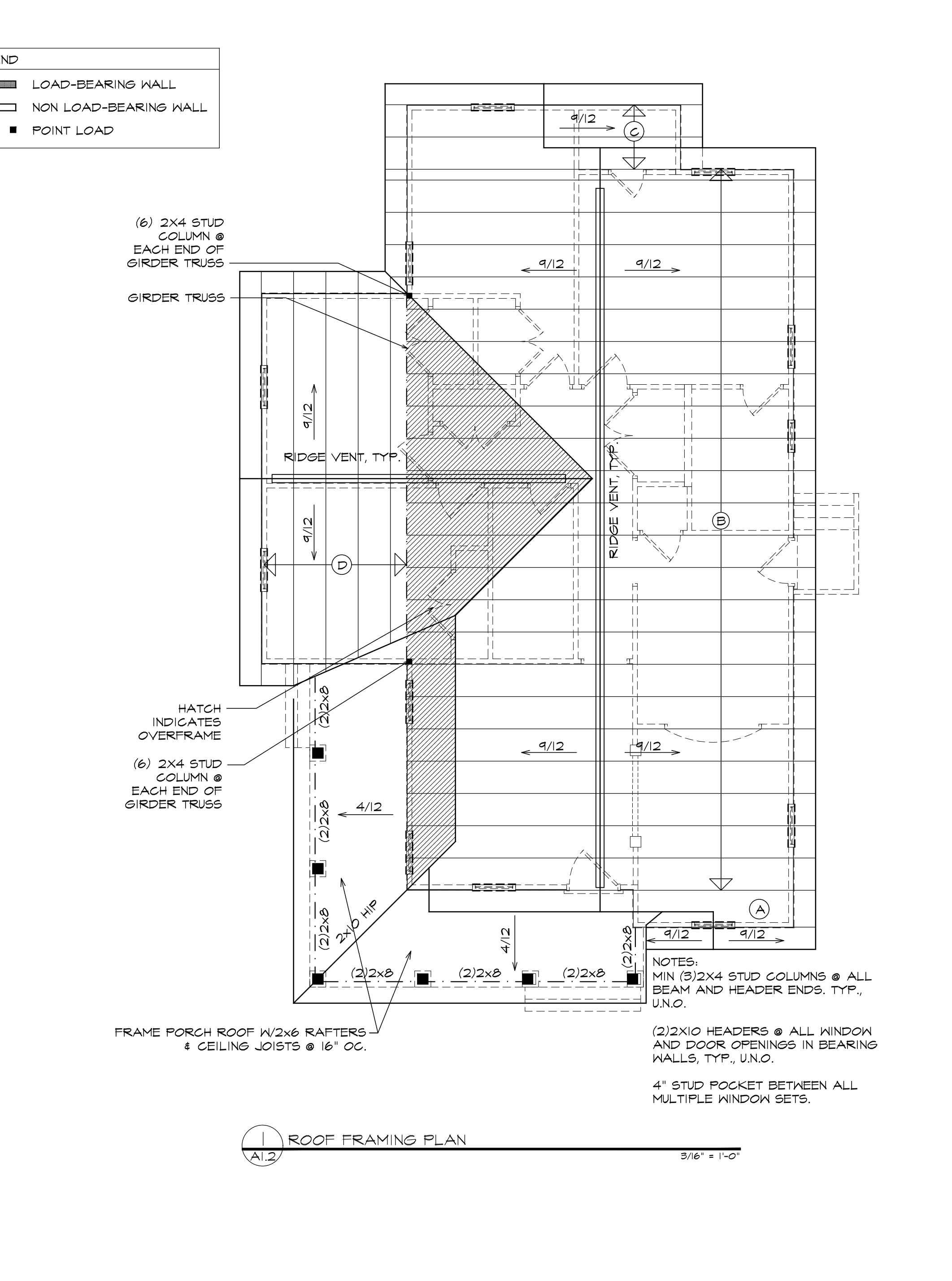
**WALL LEGEND**  
 LOAD-BEARING WALL  
 NON LOAD-BEARING WALL  
 POINT LOAD

**ROOF FRAMING NOTES**  
 1. Solid sawn wood framing shall conform to the specifications as listed in the National Forest Products Association "National Design Specification for Wood Construction" latest edition (NDS). The framing shall be of the species and grade as listed below:  
 1.1. Joists, Rafters, and Wood Girders and Beams: Spruce Pine Fir No. 2  
 1.2. Studs: Spruce Pine Fir No. 3 or Stud Grade  
 2. LVL or PSL shall the following minimum design stresses:  
 2.1. E = 1.9 x 10<sup>6</sup>  
 2.2. Fv = 2600 PSI  
 2.3. Fv = 285 PSI  
 2.4. Fc = 700 PSI  
 3. Lumber in contact with concrete, masonry, or earth shall be pressure treated in accordance with ANPA standard C-15. All other exposed timber shall be treated in accordance with ANPA standard C-2.  
 4. Nails shall be common wire nails unless otherwise noted.  
 5. Lag screws shall conform to ANSI / ASME standard B18.21.1-19B1. Lead holes for lag screws shall be in accordance with NDS specifications.  
 6. Beams containing multiple piles of lumber shall have each ply attached to its adjacent ply with 3 1/2d CC nails @ 12" O.C.  
 7. Flitch plate beams shall be attached w/ 1/2" through bolts at 24" O.C. staggered w/ (2) bolts 6" from each end.

**TRUSS NOTES:**  
 1) DIMENSIONS ARE OUTSIDE TO OUTSIDE OF STUDS.  
 2) THESE ARE DIAGRAMATIC TRUSS CONFIGURATIONS. REFER TO ENGINEERED TRUSS DRAWINGS FOR ALL FINAL TRUSS DIMENSIONS, LAYOUTS AND CONSTRUCTION NOTES.  
 3) ROOF TRUSSES TO BE DESIGNED & ENGINEERED BY A NC LICENSED ENGINEER.  
 4) ALL TRUSS LOADS TO BEAR ON OUTSIDE WALLS ONLY U.N.O.  
 5) COORDINATE TRUSS LAYOUT TO PROVIDE 20"x30" MIN ATTIC ACCESS PANEL OR FULL DOWN STAIR AT LOCATION INDICATED ON I/A.1

**OVERHANG NOTES:**  
 1) RECOMMENDED RAKE OVERHANG: 1'-0"  
 2) RECOMMENDED EAVE OVERHANG 1'-4"

**ROOF VENT CALCULATIONS:**  
 1970 SF ROOF AREA / 300 = 5 SF VENT REQUIRED  
 5 x 50% = 3 SF VENT REQ'D IN UPPER ROOF AREA  
 6" LF HORIZ. RIDGE VENT x .08 SF/LF = 5 SF VENT PROVIDED IN UPPER ROOF AREA



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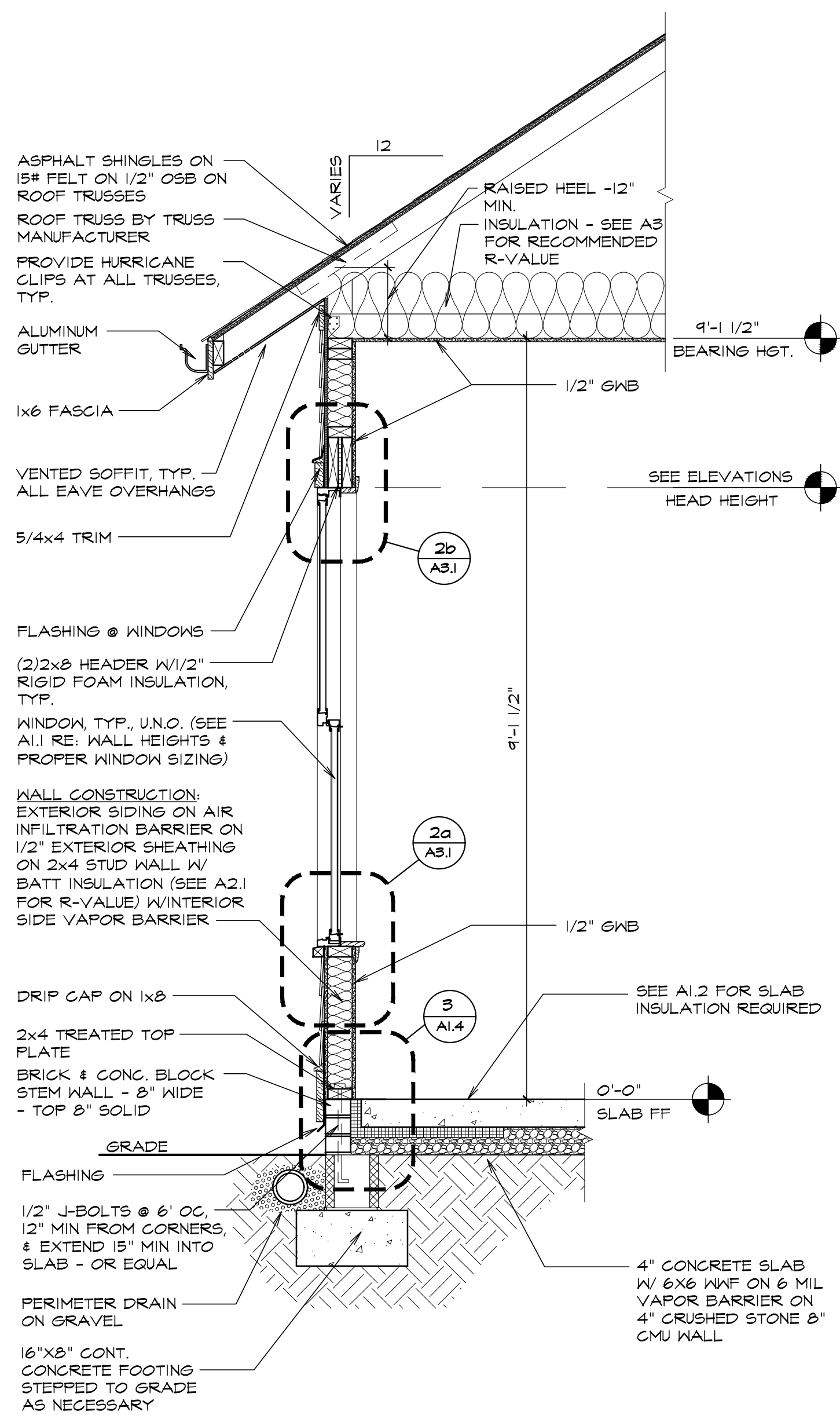
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 5131  
 08.19.20

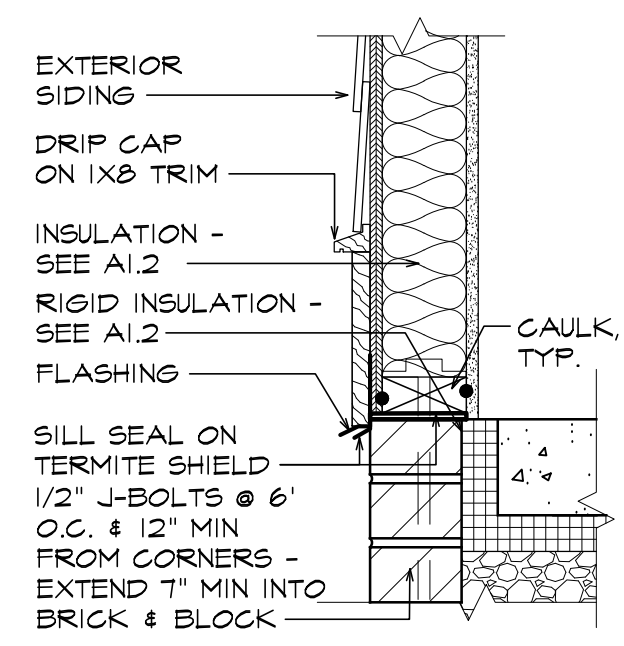
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 drafter D.A.S.  
 checked by C.L.B.  
 proj. no. T-19035.1  
 revisions date

Floor & Roof Framing, Trusses, Sections, & Insulation Notes  
**A1.2**

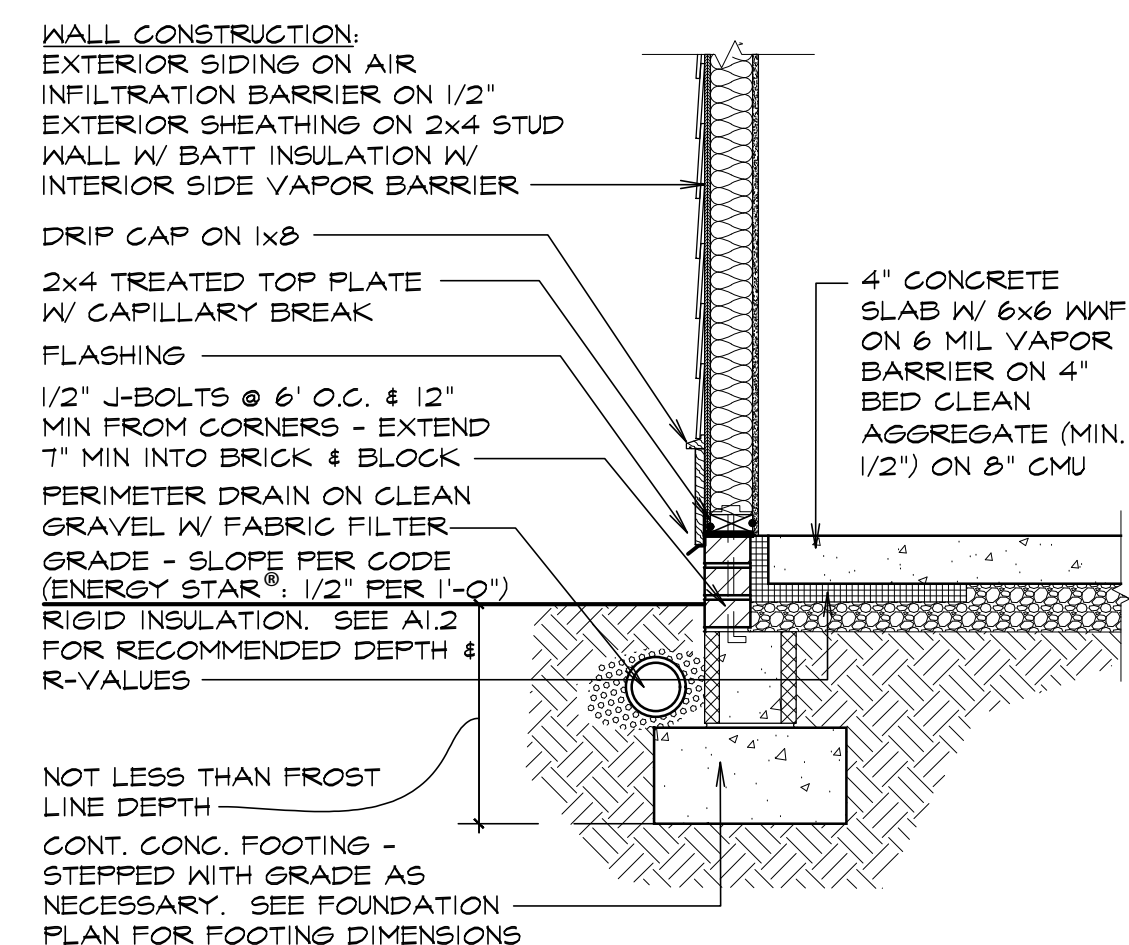




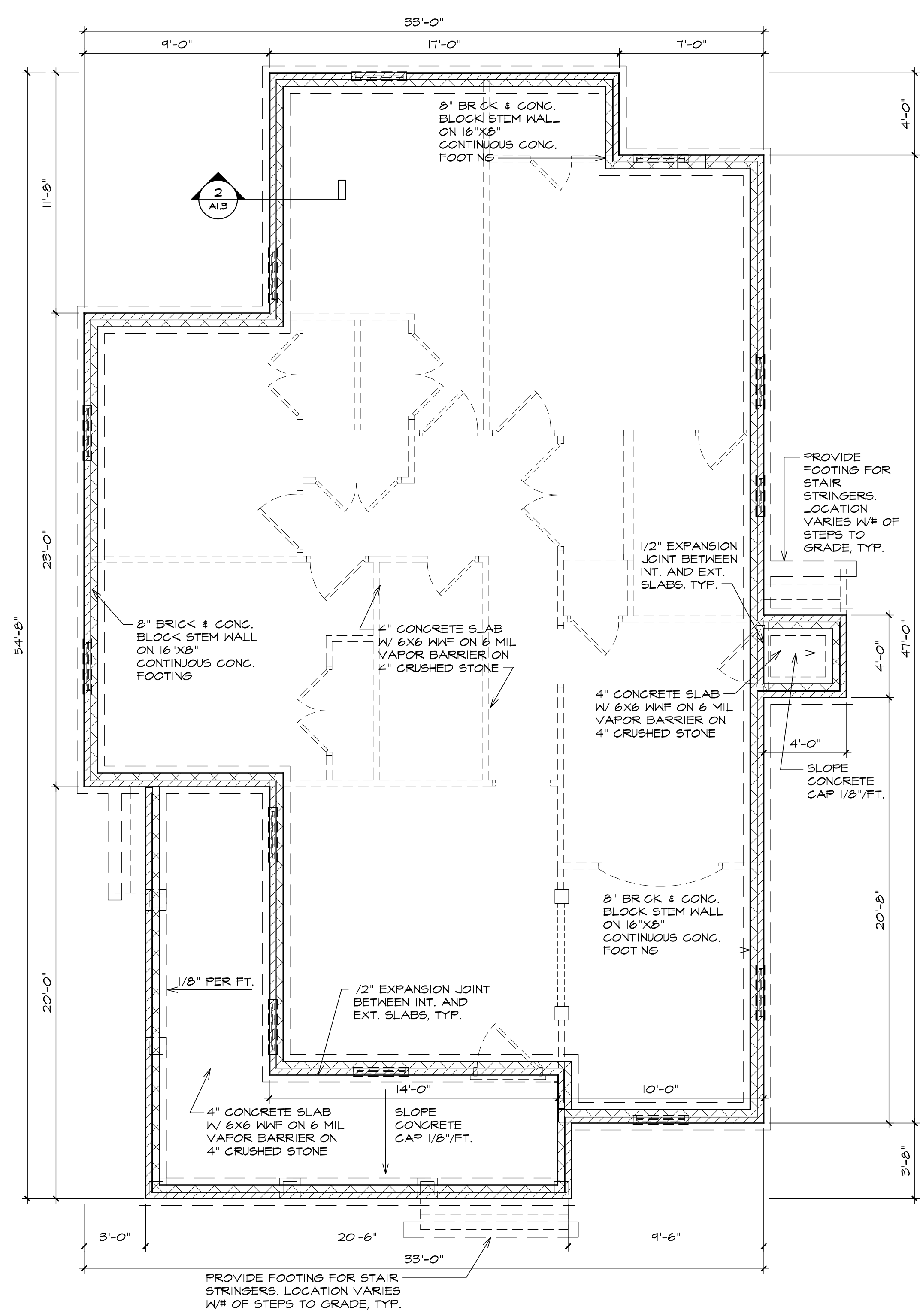
4 STEM WALL SLAB FOUNDATION WALL SECTION  
A1.3 3/4" = 1'-0"



3 STEM WALL SLAB DETAIL  
A1.3 1/2" = 1'-0"



2 STEM WALL (RAISED) SLAB FOUNDATION  
A1.3 3/4" = 1'-0"

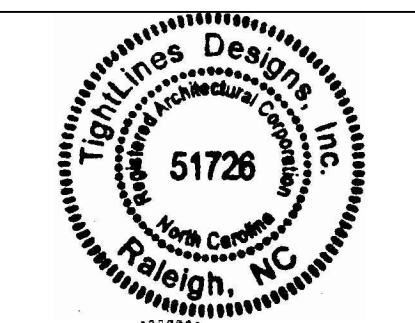


1 OPTIONAL SLAB FOUNDATION PLAN  
A1.3 1/4" = 1'-0"

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Optional Slab w/ Stem Wall Foundation Plan, Wall Section & Details

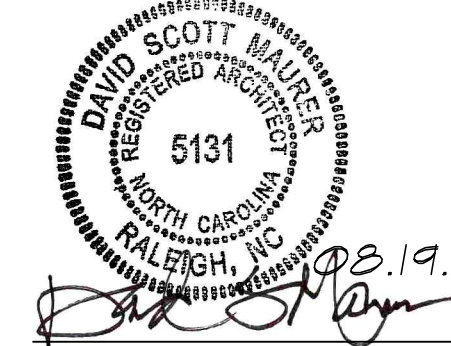
**A1.3**



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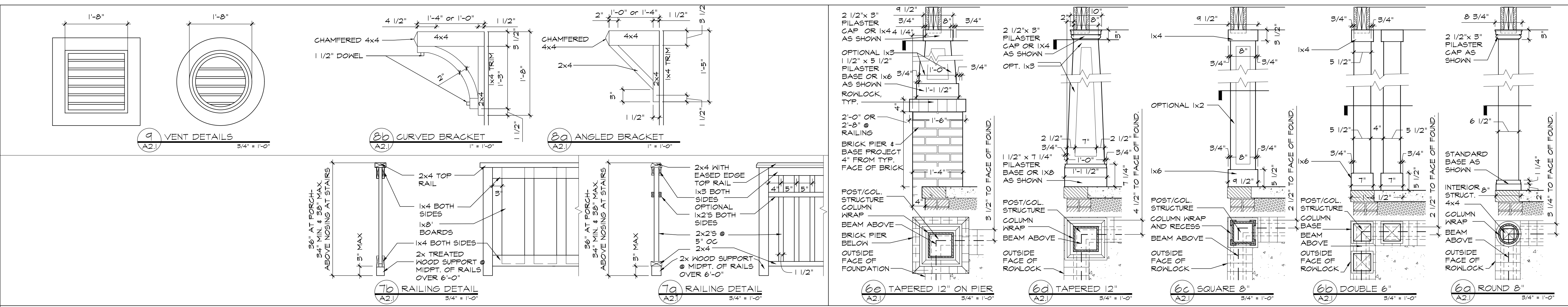
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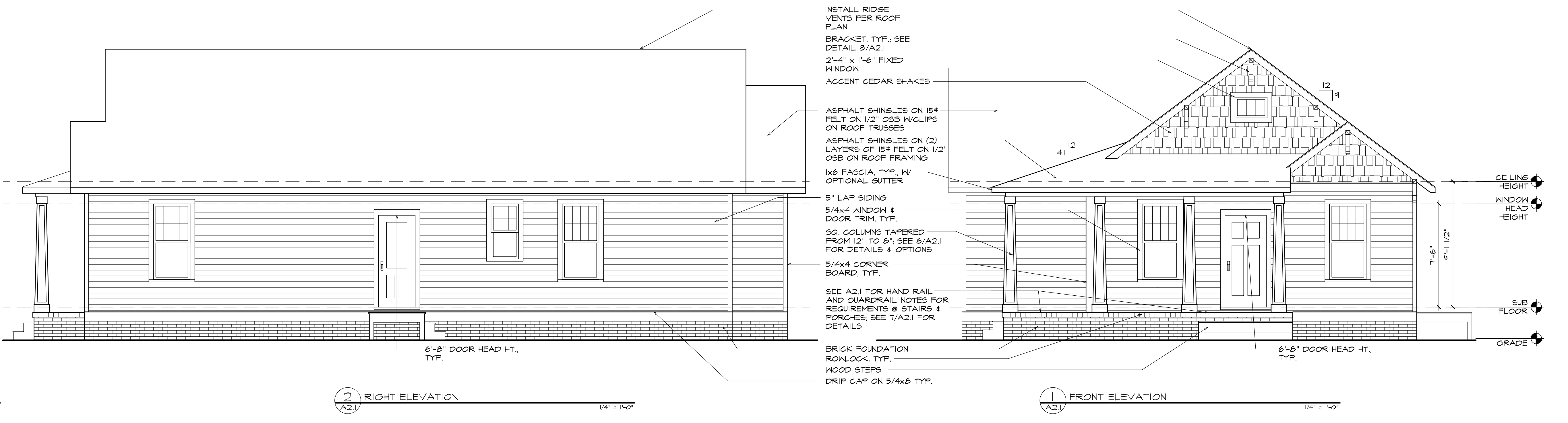
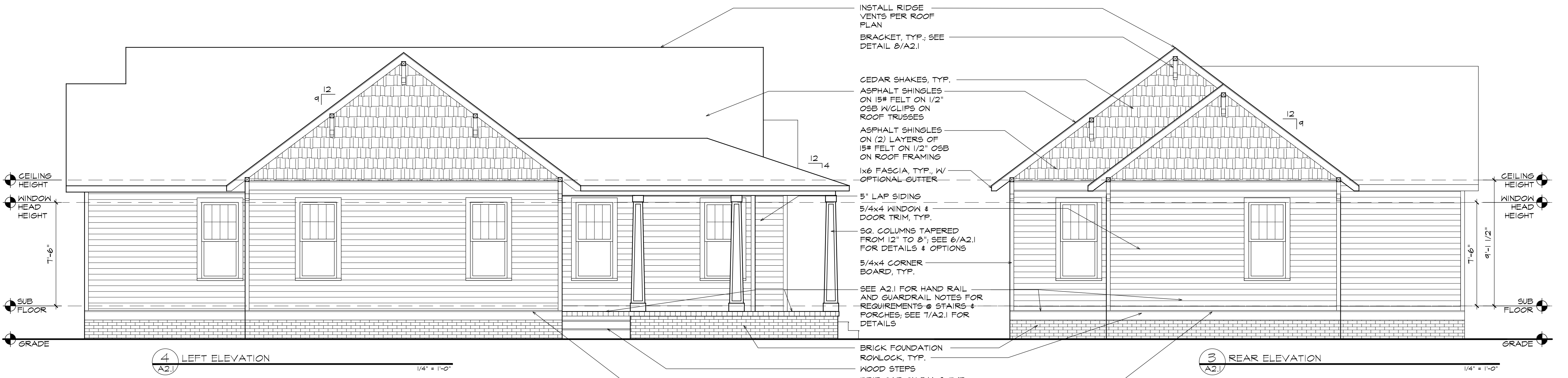
Elevations, Details, & Notes

**A2.1**



**GUARDRAIL AND HANDRAILS:**  
 1) INSTALL HANDRAILS AND GUARDS PER 2018 RESIDENTIAL BUILDING CODE SECTIONS R311.7.2 THROUGH R312.  
 PORCHES, BALCONIES, RAMPS OR RAISED FLOOR SURFACES LOCATED MORE THAN 30" ABOVE THE FLOOR OR GRADE BELOW SHALL HAVE GUARDS NOT LESS THAN 36" IN HEIGHT. OPEN SIDES OF STAIRS WITH A TOTAL RISE OF MORE THAN 30" ABOVE THE FLOOR OR GRADE BELOW SHALL HAVE GUARDS NOT LESS THAN 34" IN HEIGHT MEASURED VERTICALLY FROM THE NOSING OF THE TREADS. REQUIRED GUARDS ON OPEN SIDES OF STAIRWAYS, RAISED FLOOR AREAS, BALCONIES AND PORCHES SHALL HAVE INTERMEDIATE RAILS OR ORNAMENTAL CLOSURES WHICH DO NOT ALLOW PASSAGE OF AN OBJECT 4" OR MORE IN DIAMETER. HORIZONTAL SPACING BETWEEN THE VERTICAL MEMBERS IN REQUIRED GUARDRAILS SHALL BE A MAXIMUM OF 4" AT THE NEAREST POINT BETWEEN MEMBERS.  
 2) INSTALL HANDRAILS PER 2018 RESIDENTIAL BUILDING CODE SECTION R311.5.6 AT ALL PORCH STAIRS WITH MORE THAN 4 RISERS. HANDRAIL HEIGHT MEASURED VERTICALLY FROM THE SLOPED PLANE ADJOINING THE TREAD NOSING, OR FINISH SURFACE OF RAMP SLOPE, SHALL NOT BE LESS THAN 34" AND NOT MORE THAN 38".

**GLADDING VALUES**  
 PROVIDE POS. AND NEG. WALL & ROOF GLADDING DESIGN VALUES. PLANS MAY STATE THAT WALL GLADDING IS DESIGNED FOR 24.1 LBS/SF OR GREATER POS. OR NEG. PRESSURE FOR HOUSES W/ MEAN ROOF HGT. OF 30 FT. OR LESS. ROOF VALUES, BOTH POS. & NEG., SHALL BE DESIGNED AS FOLLOWS:  
 - 45.4 LBS/SF FOR ROOF PITCHES OF 0/12 TO 2.25/12  
 - 24.8 LBS/SF FOR ROOF PITCHES OF 2.25/12 TO 1/12  
 - 21 LBS/SF FOR ROOF PITCHES OF 1/12 TO 12/12  
 VALUES STATED ARE FOR ROOFS WITH A MEAN HGT. OF 30 FT. OR LESS. ROOFS W/ MEAN HGT. GREATER THAN 30 FT. MUST SHOW SPECIFIC INFORMATION FOR GLADDING.  
 MEAN ROOF HEIGHT: 16'-2"

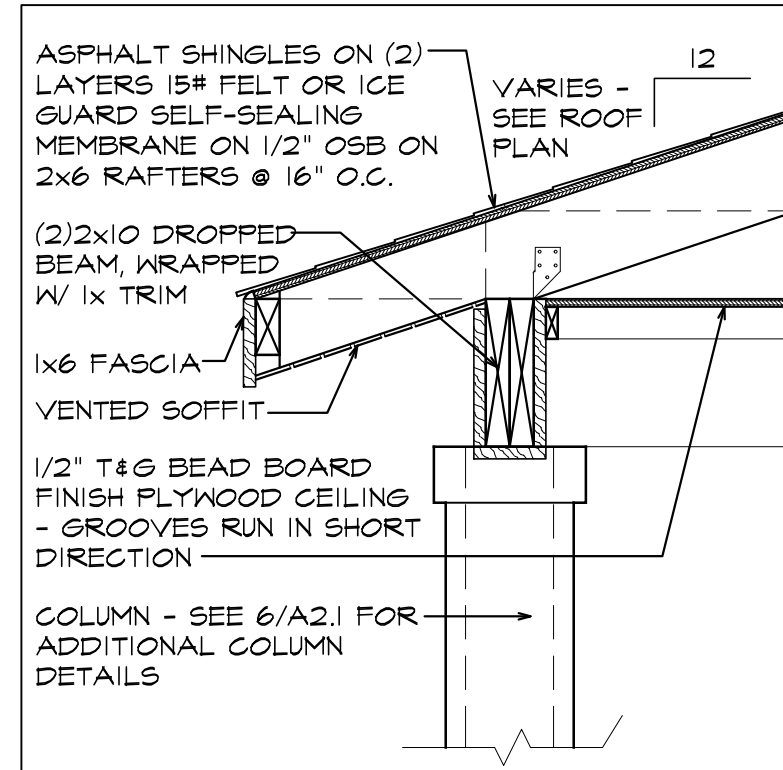


**5 NOTES**

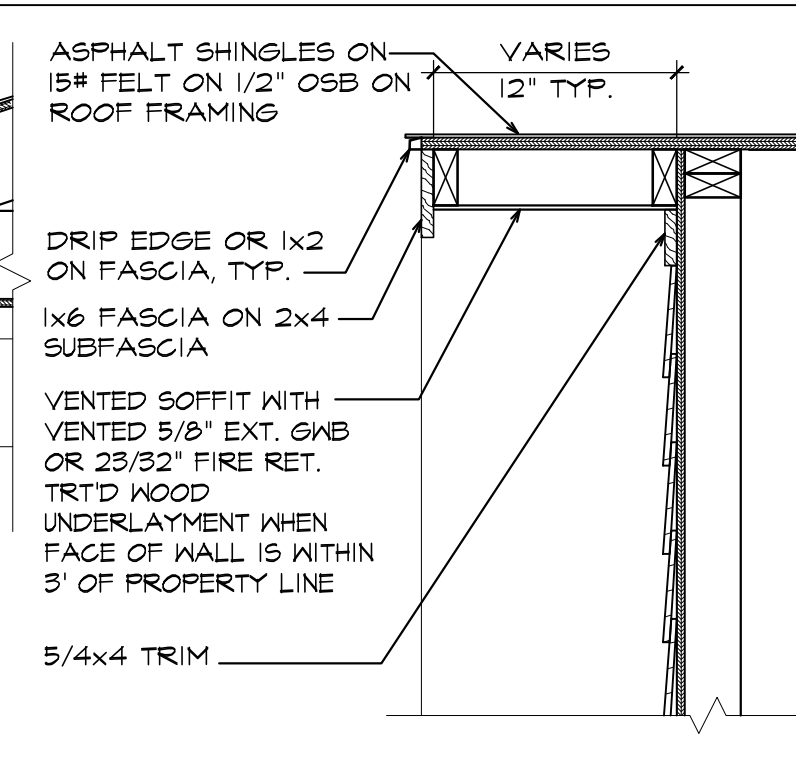
**2 RIGHT ELEVATION**

**1 FRONT ELEVATION**

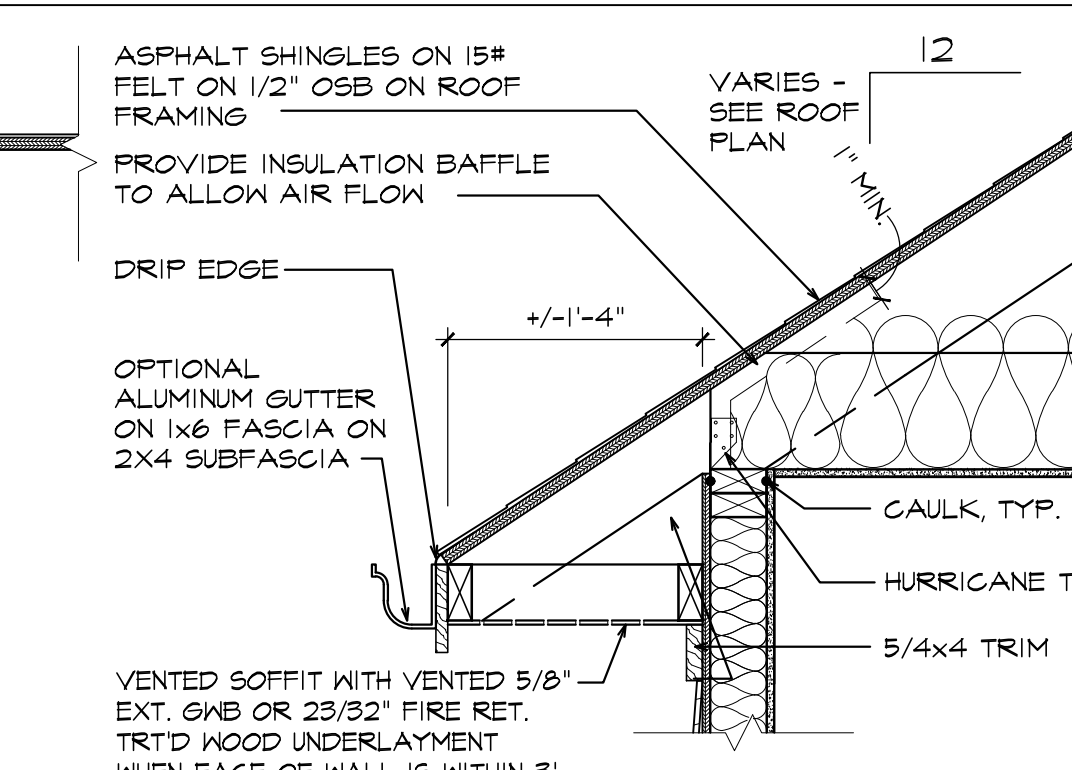




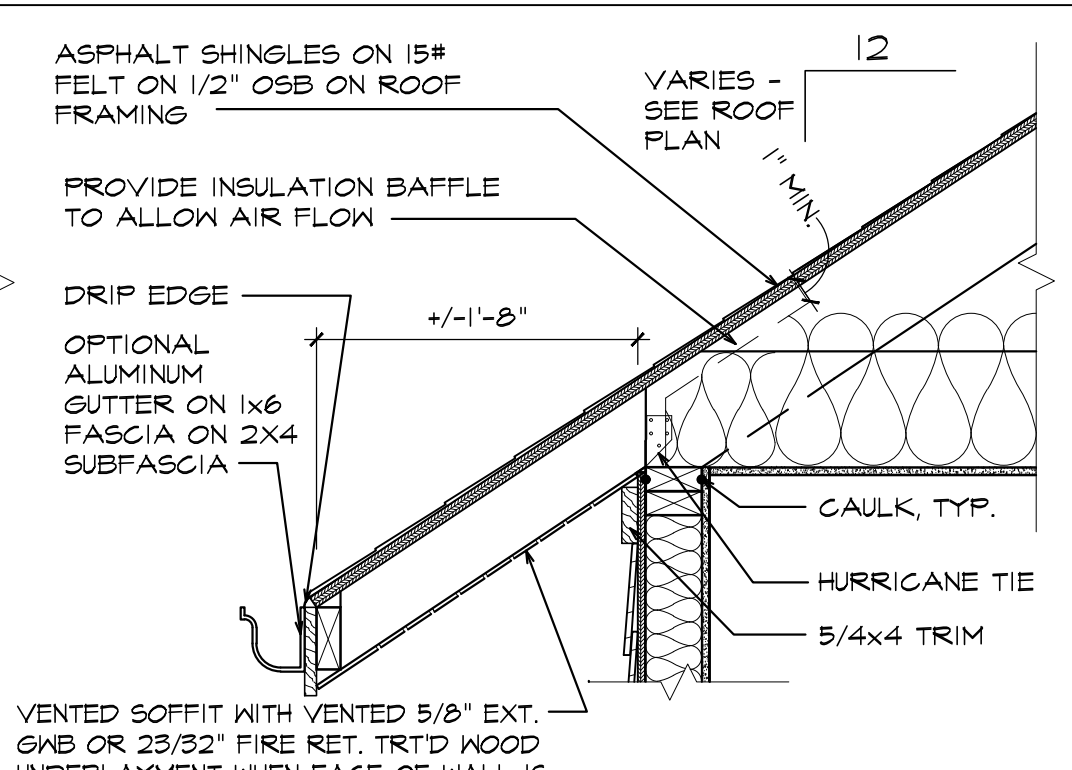
6 PORCH EAVE DETAIL  
AS.1 1" = 1'-0"



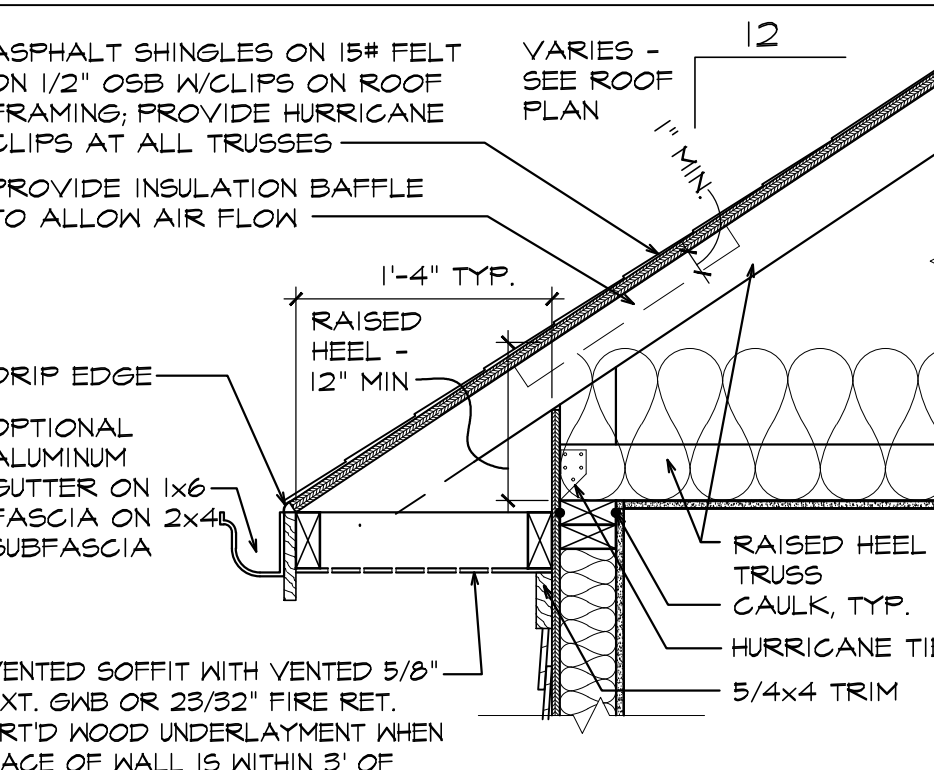
5 TYPICAL RAKE DETAIL  
AS.1 1" = 1'-0"



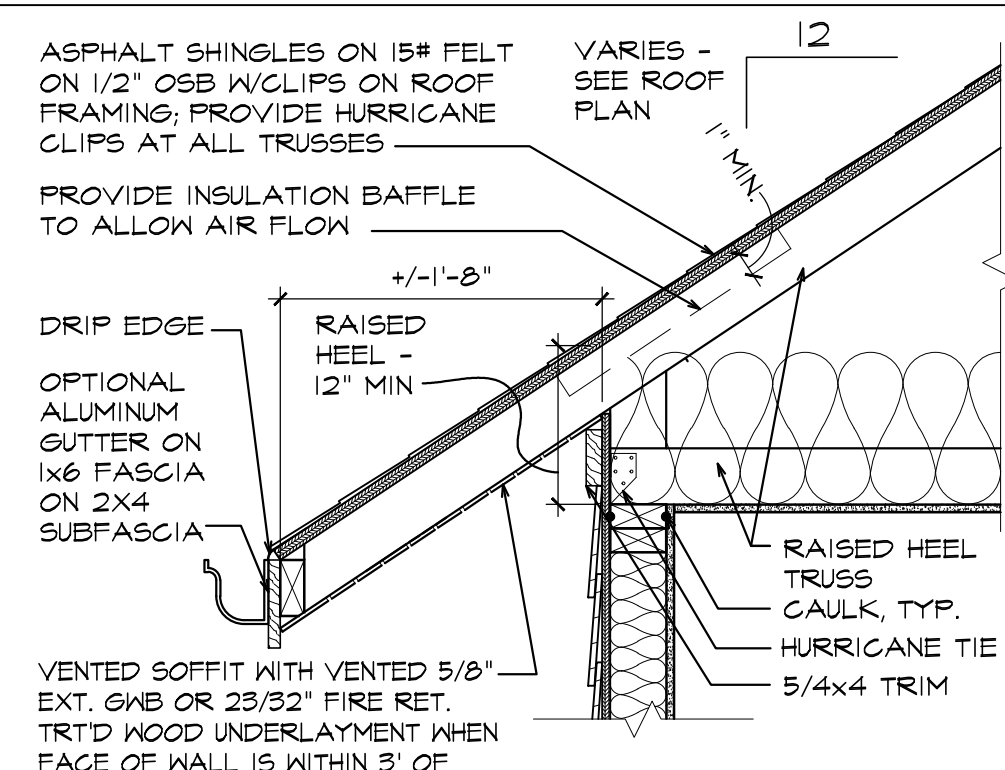
4a BOXED EAVE DETAIL  
AS.1 1" = 1'-0"



4c SLOPED EAVE DETAIL  
AS.1 1" = 1'-0"



4b BOXED EAVE DETAIL W/ TRUSS  
AS.1 1" = 1'-0"

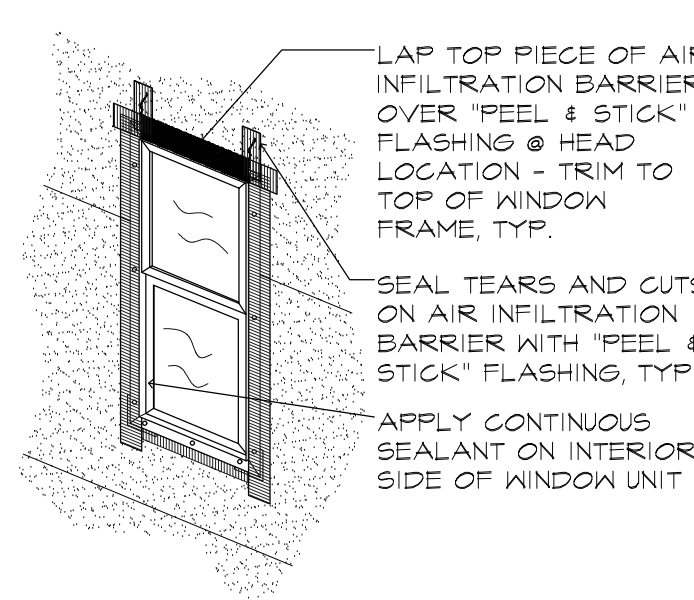


4d SLOPED EAVE DETAIL W/ TRUSS  
AS.1 1" = 1'-0"

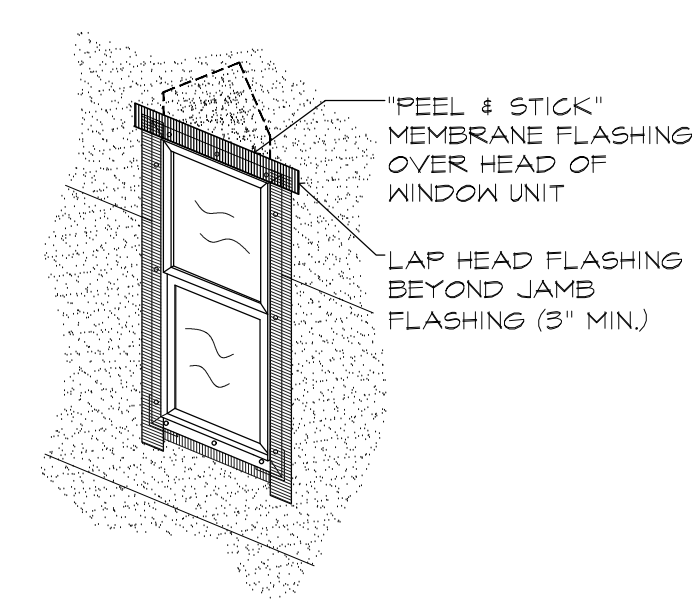
RAKE & EAVE DETAILS

THIS PLAN IS AUTHORIZED FOR THIS ADDRESS ONLY AND IS NOT TO BE USED FOR ANY ADDITIONAL ADDRESSES WITHOUT THE PURCHASE OF ADDITIONAL LICENSES OR WRITTEN AUTHORIZATION FROM TIGHTLINES:  
Unlimited Use License  
Harnett County  
Habitat for Humanity

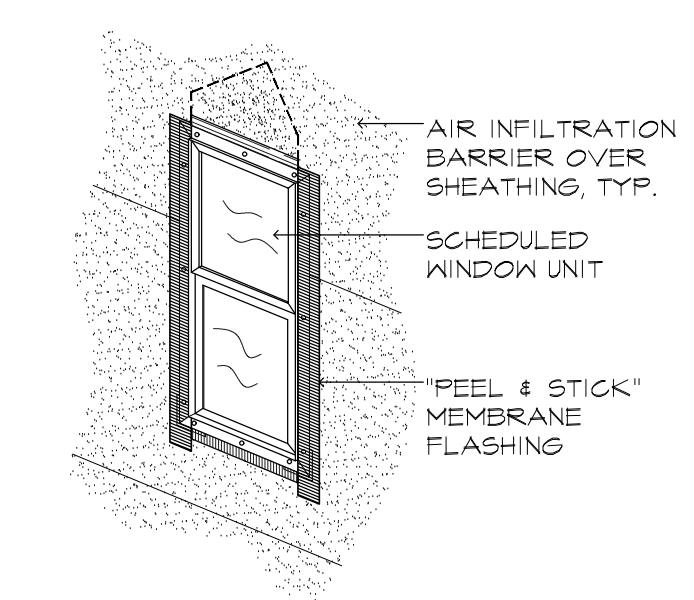
**TightLines Designs**  
creating great places to live  
19 W. Hargett St, Suite 501 • Raleigh, NC 27601  
919.834.3600 • www.tightlinesdesigns.com



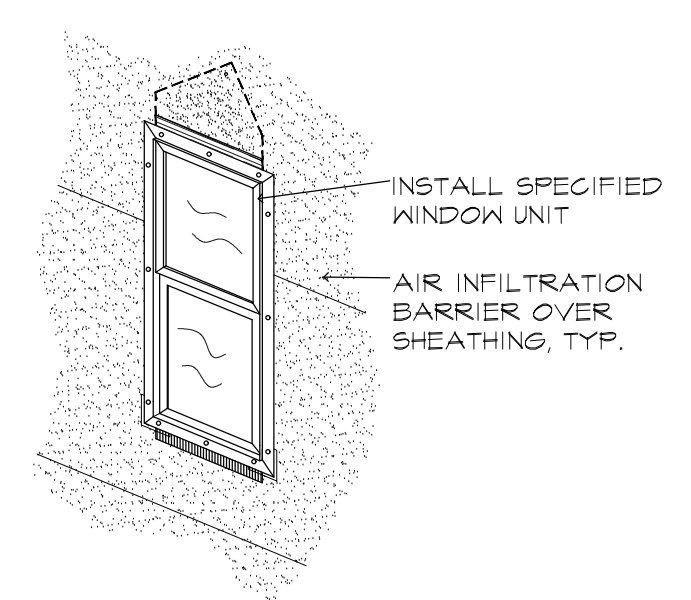
7 FINISHING  
a) LAP TOP PIECE OF AIR INFILTRATION BARRIER OVER "PEEL & STICK" FLASHING @ HEAD LOCATION - TRIM TO TOP OF WINDOW FRAME, TYP.  
b) SEAL TEARS AND CUTS ON AIR INFILTRATION BARRIER WITH "PEEL & STICK" FLASHING, TYP.  
c) APPLY CONTINUOUS BEAD OF POLYURETHANE SEALANT WHERE INTERIOR OF WINDOW UNIT MEETS R.O.



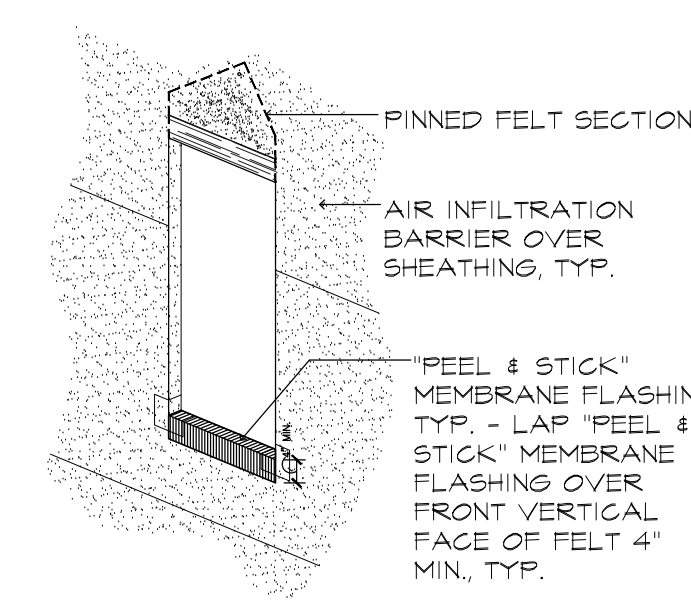
6 HEAD FLASHING  
INSTALL "PEEL & STICK" MEMBRANE FLASHING OVER NAILING FLANGE OF WINDOW UNIT AT HEAD LOCATIONS.



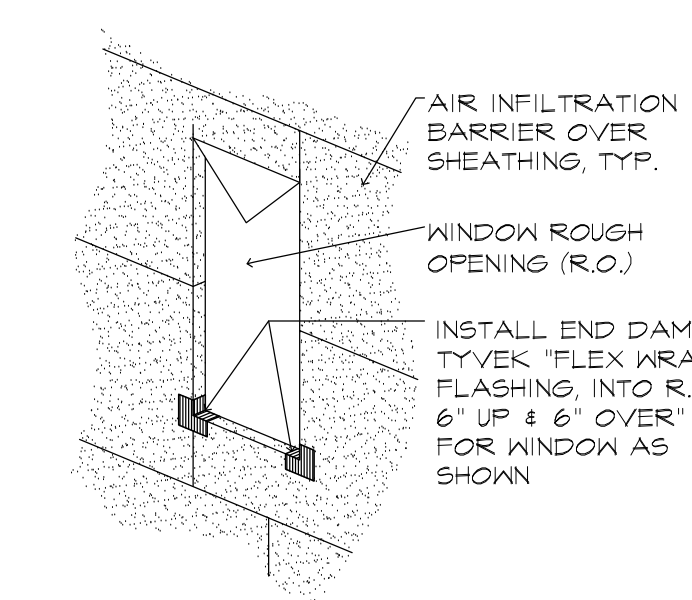
5 JAMB FLASHING  
INSTALL "PEEL & STICK" MEMBRANE FLASHING OVER NAILING FLANGE OF WINDOW UNIT AT JAMB LOCATIONS.



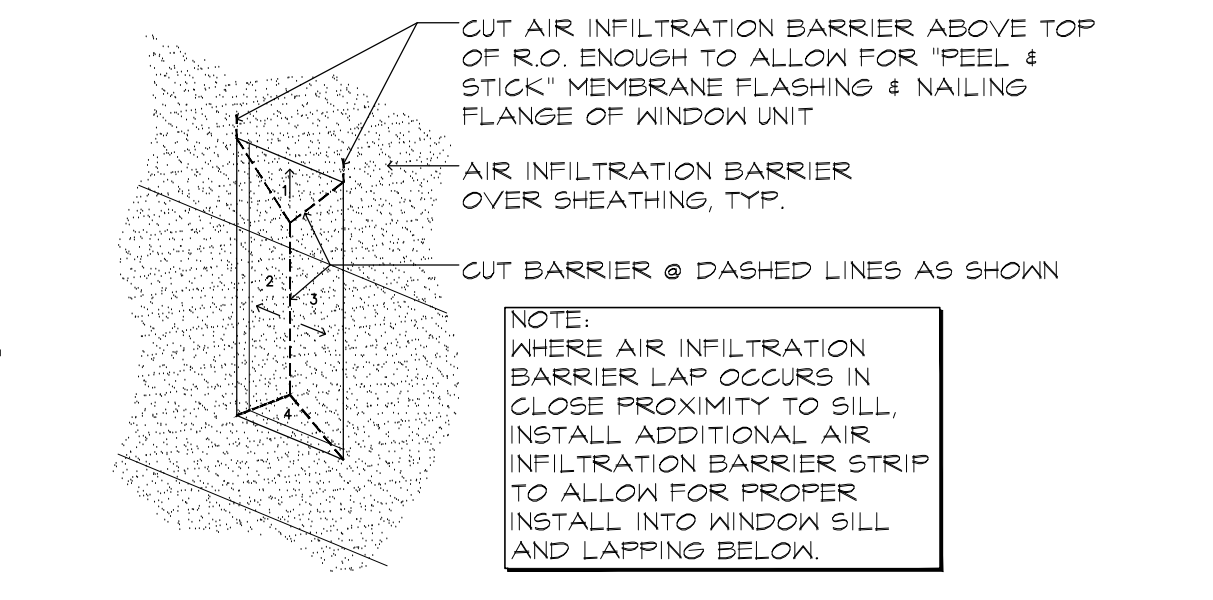
4 WINDOW INSTALLATION  
INSTALL SPECIFIED WINDOW UNIT - SEE MFG. RECOMMENDATIONS FOR INSTALLATION



3 SILL FLASHING  
INSTALL "PEEL & STICK" FLASHING AT SILL LOCATION BY ADHERING TO INSIDE SILL R.O. AND EXTENDING DOWN OVER AIR INFILTRATION BARRIER

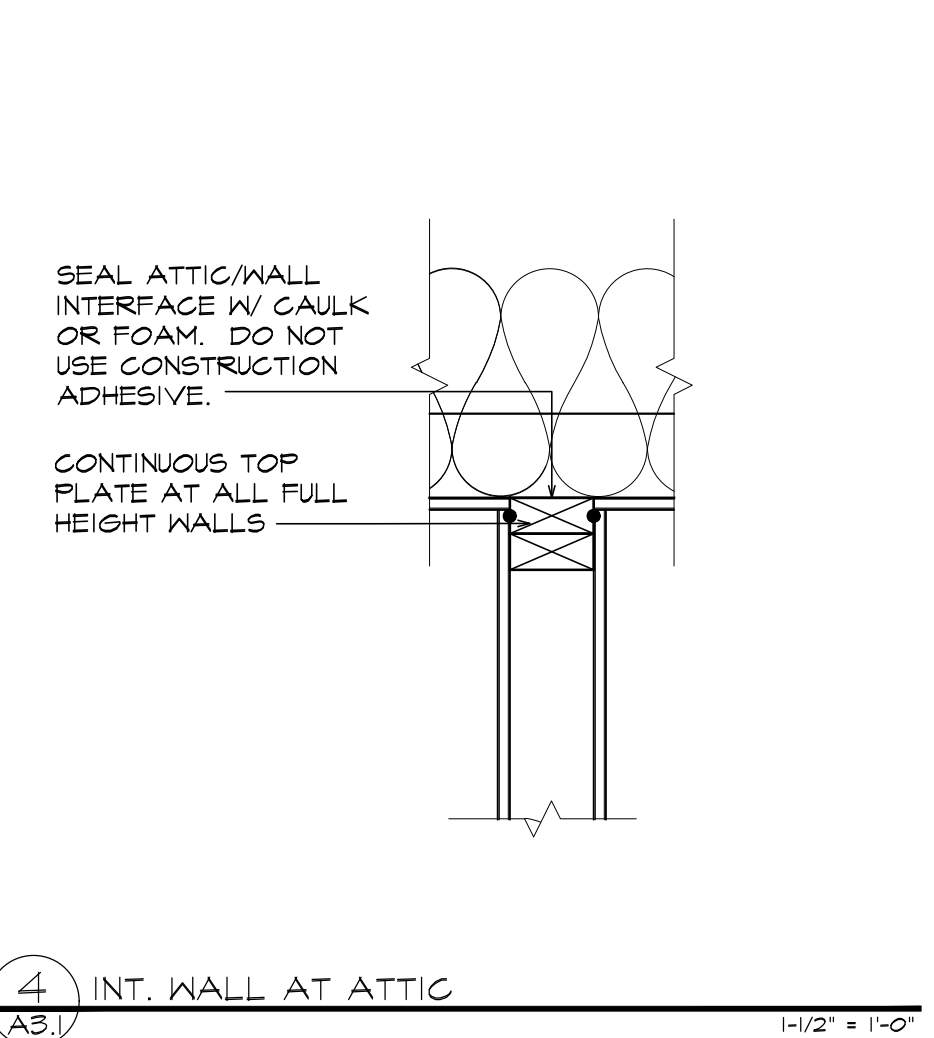


2 END DAM FLASHING  
INSTALL END DAM FLASHING IN ROUGH OPENING FOR WINDOW

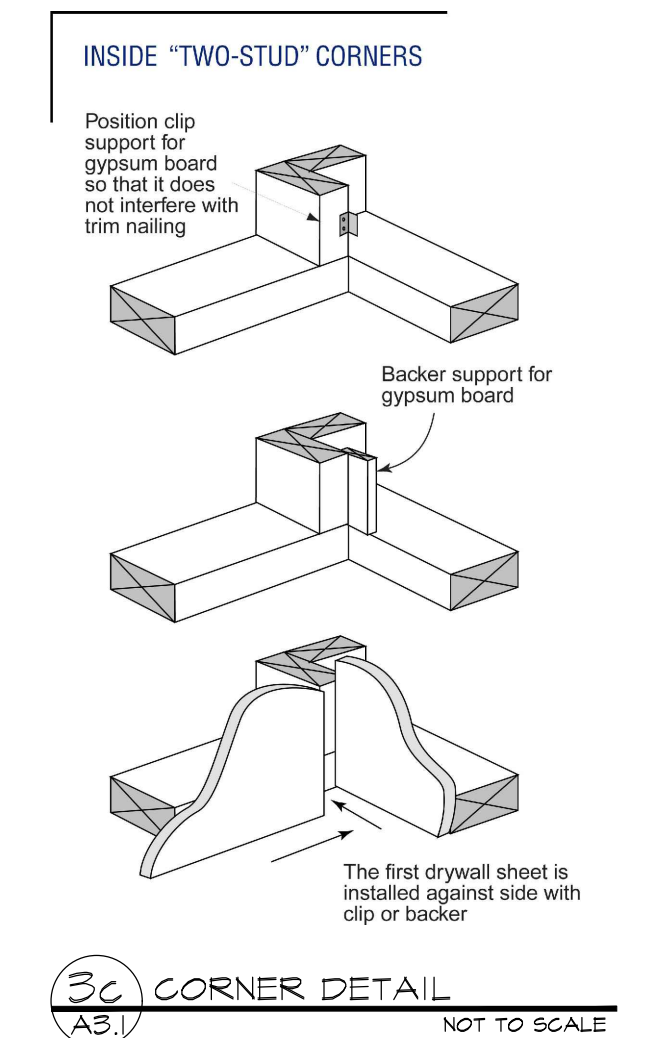


1 INSTALL AIR INFILTRATION BARRIER/CUT WINDOW R.O.  
a) INSTALL AIR INFILTRATION BARRIER ON SHEATHING & OVER R.O. FOR WINDOW.  
b) CUT AIR INFILTRATION BARRIER @ ALL R.O. LOCATIONS AS SHOWN.  
c) FULL HEAD SECTION OF BARRIER UP AND TEMPORARILY PIN TO SHEATHING - FOLD THE JAMB SECTIONS OF THE BARRIER INTO THE R.O.

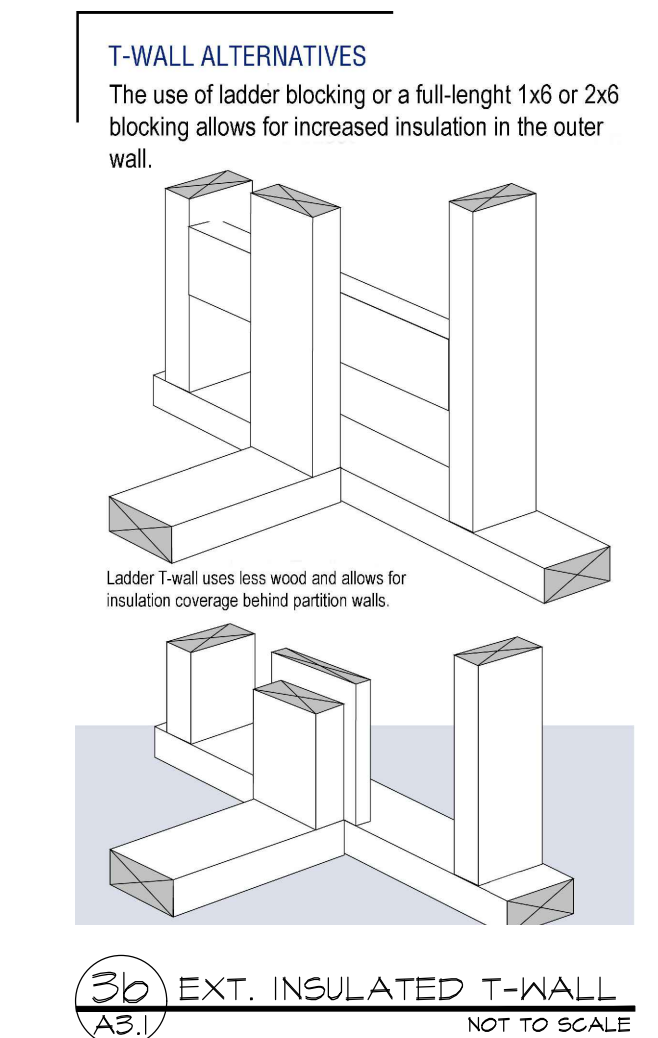
WINDOW INSTALLATION



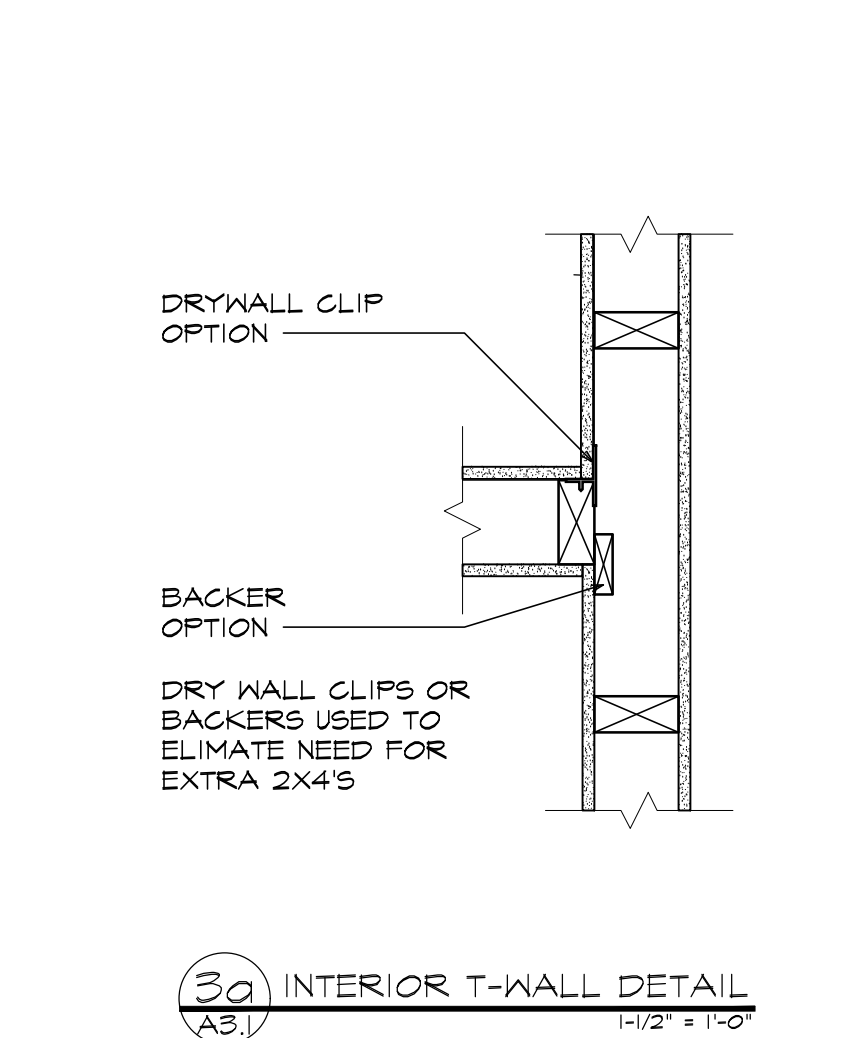
4 INT. WALL AT ATTIC  
AS.1 1-1/2" = 1'-0"



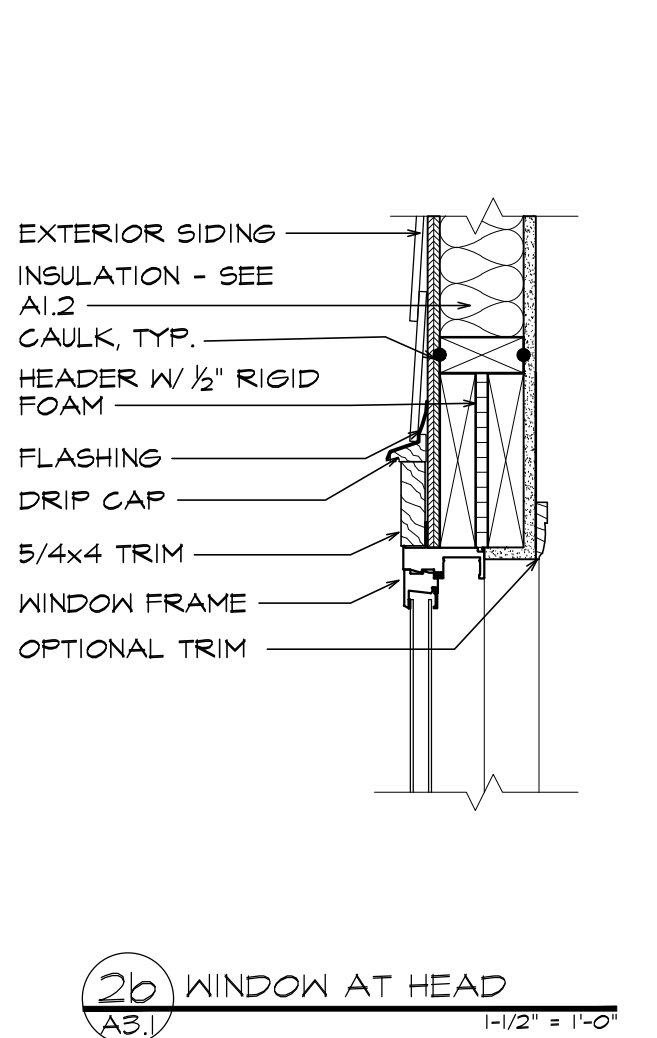
3c CORNER DETAIL  
AS.1 NOT TO SCALE



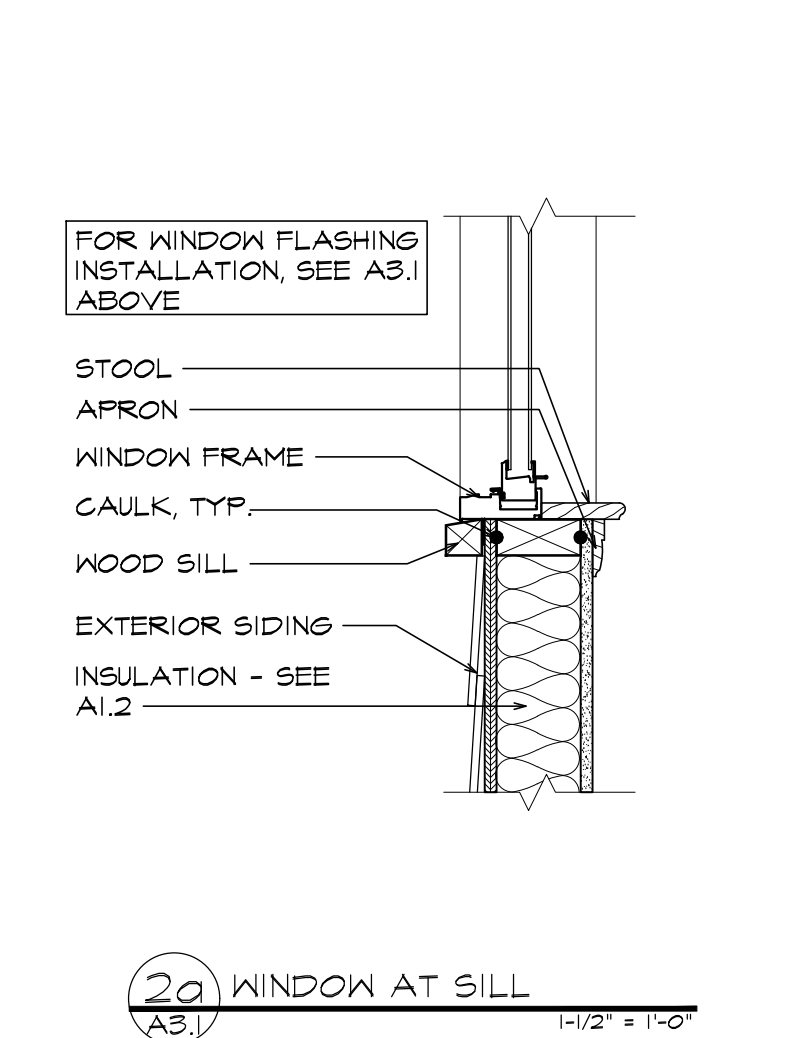
3b EXT. INSULATED T-WALL  
AS.1 NOT TO SCALE



3a INTERIOR T-WALL DETAIL  
AS.1 1-1/2" = 1'-0"

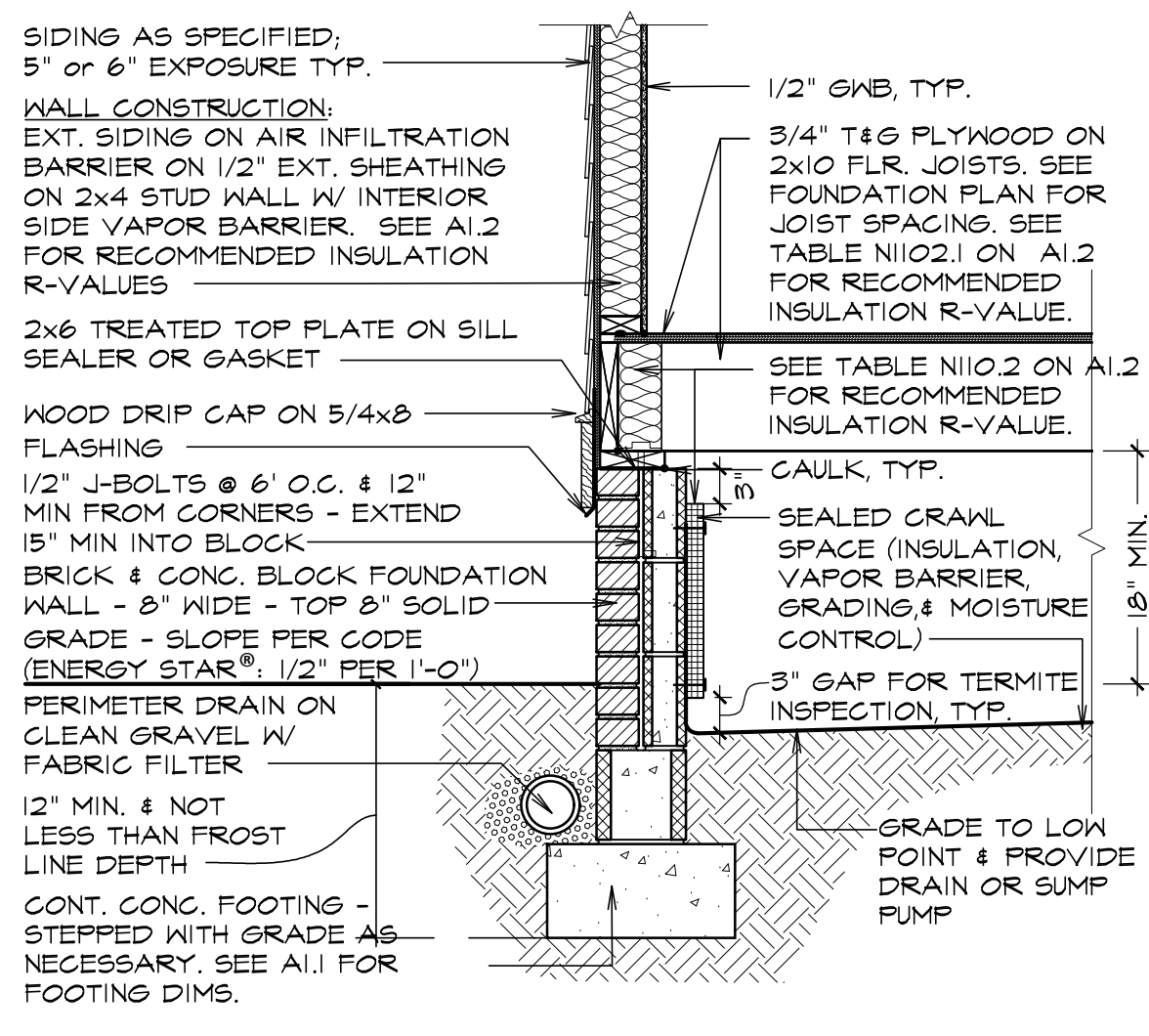


2b WINDOW AT HEAD  
AS.1 1-1/2" = 1'-0"

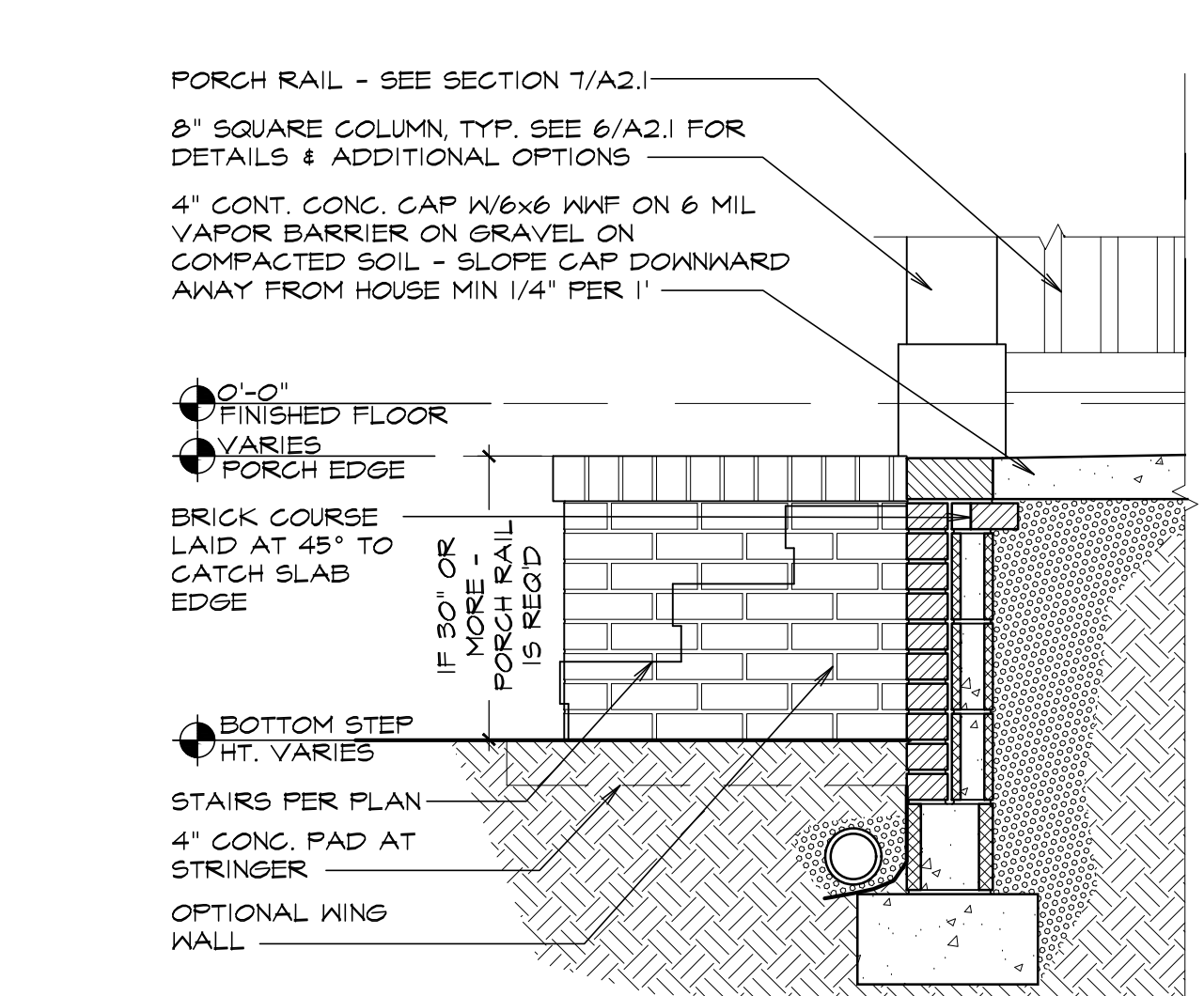


2a WINDOW AT SILL  
AS.1 1-1/2" = 1'-0"

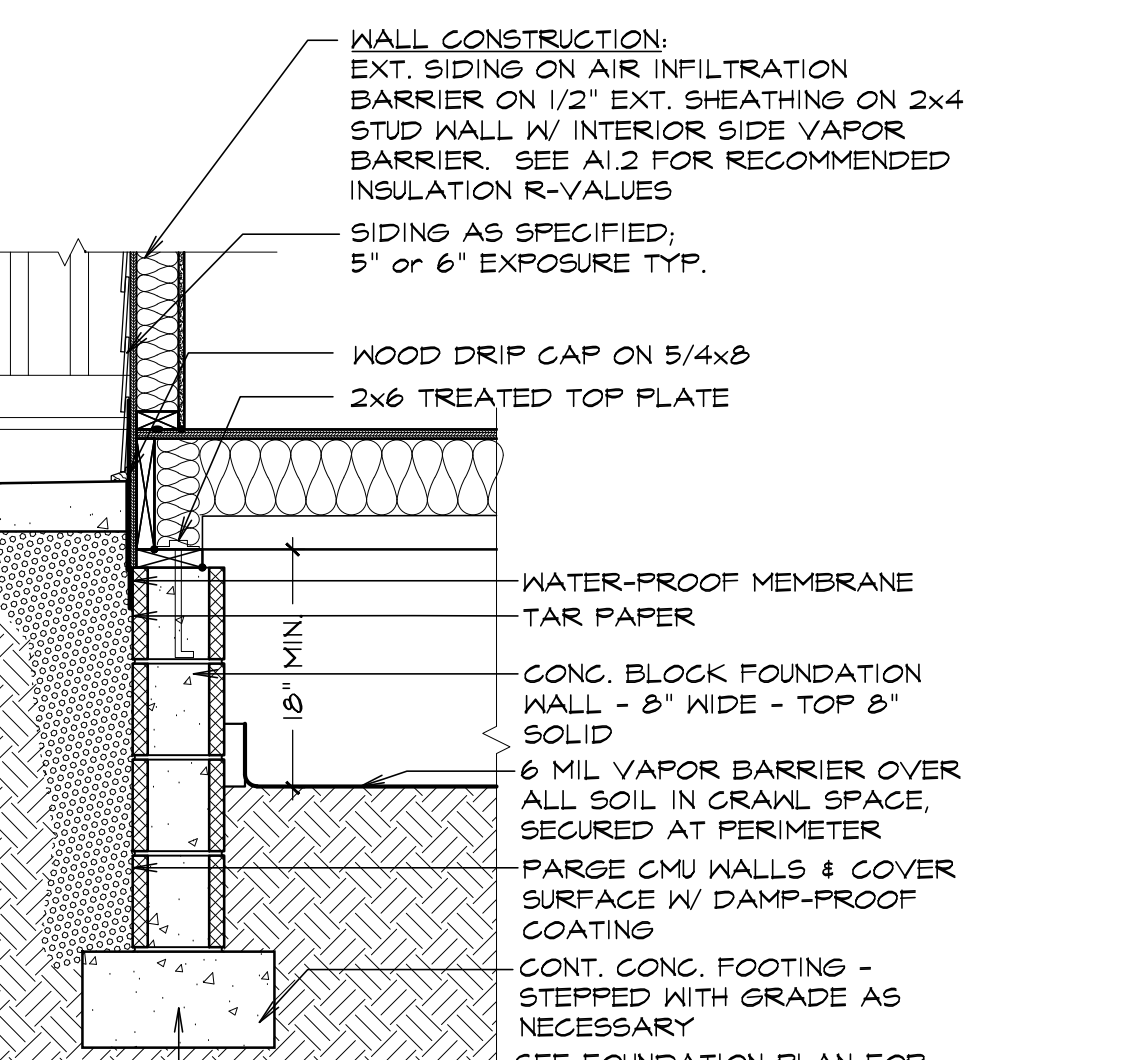
FRAMING DETAILS



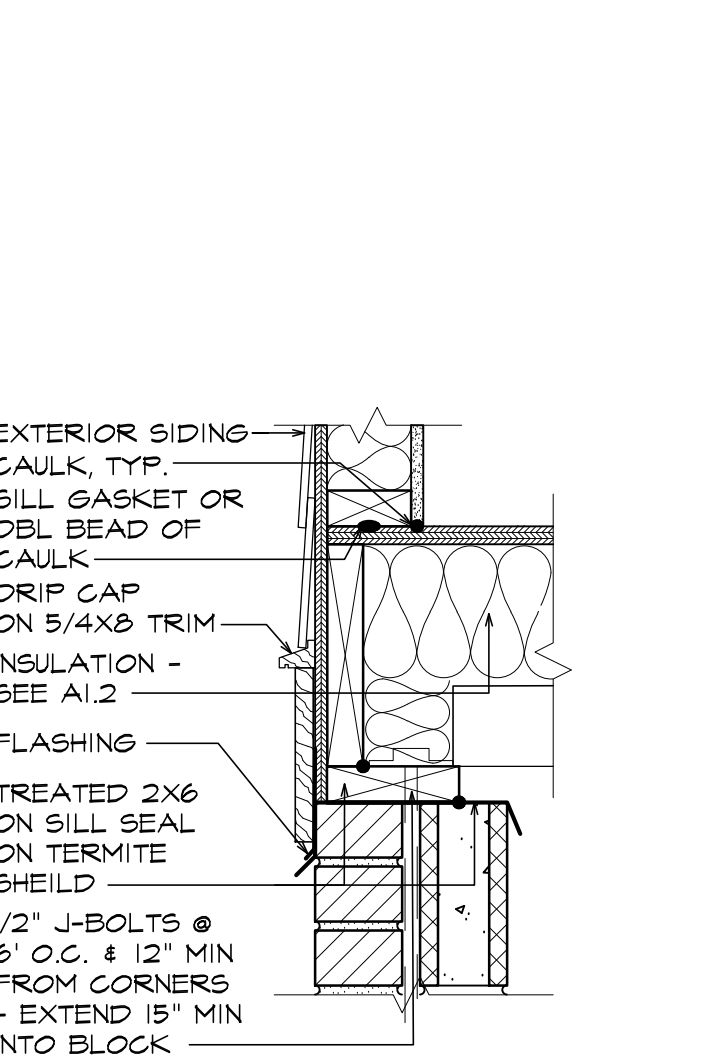
1d ALTERNATE SEALED CRAWL SPACE FOUNDATION  
AS.1 3/4" = 1'-0"



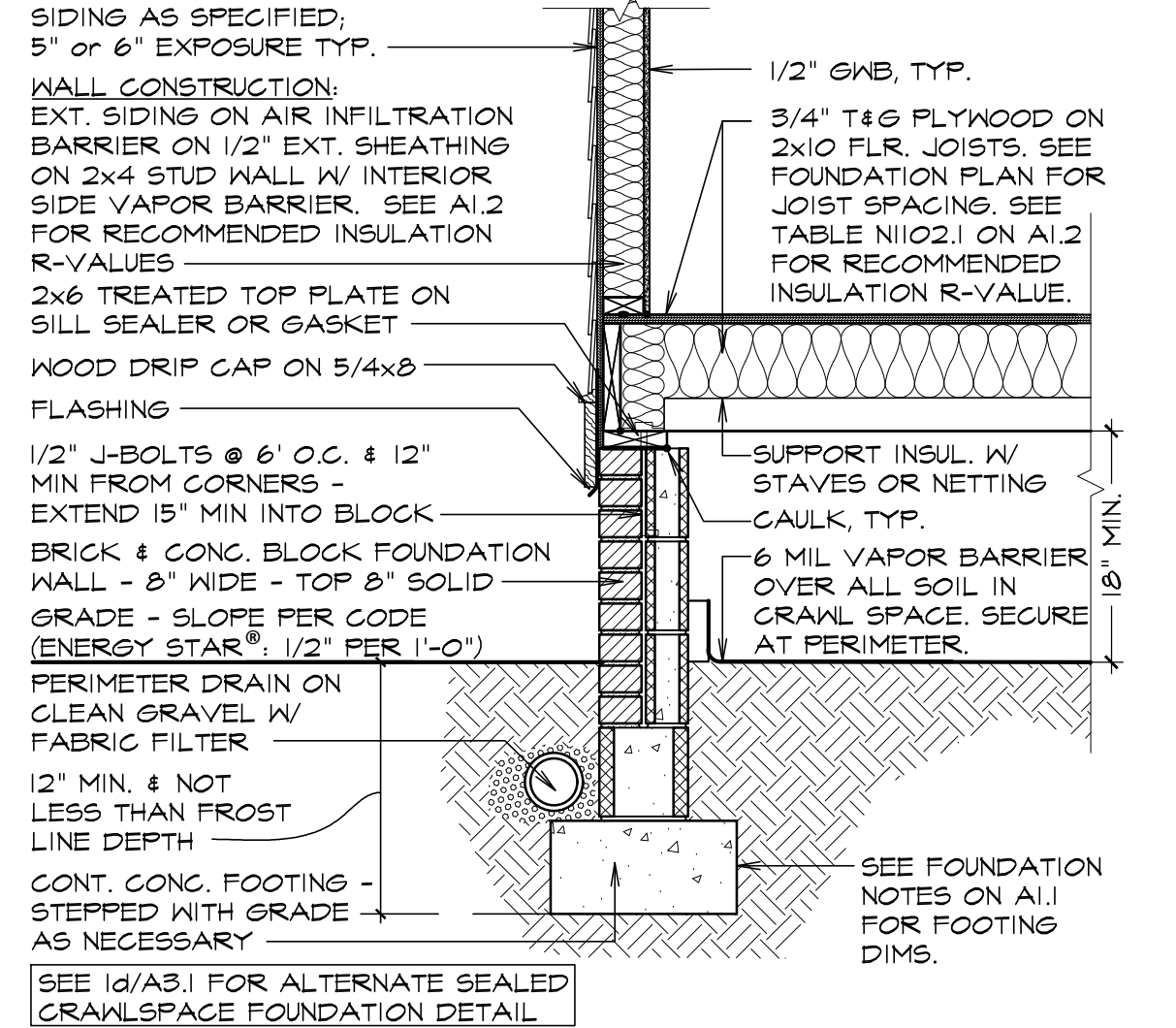
1c PORCH FOUNDATION  
AS.1 3/4" = 1'-0"



1b CRAWL SPACE  
AS.1 1-1/2" = 1'-0"

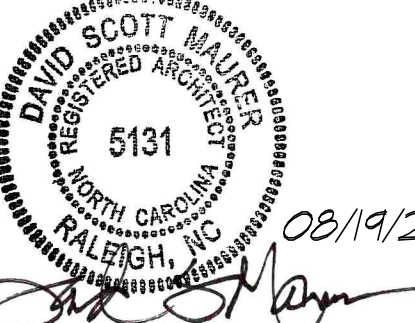


1a TYPICAL CRAWL SPACE FOUNDATION  
AS.1 3/4" = 1'-0"



1a TYPICAL CRAWL SPACE FOUNDATION  
AS.1 3/4" = 1'-0"

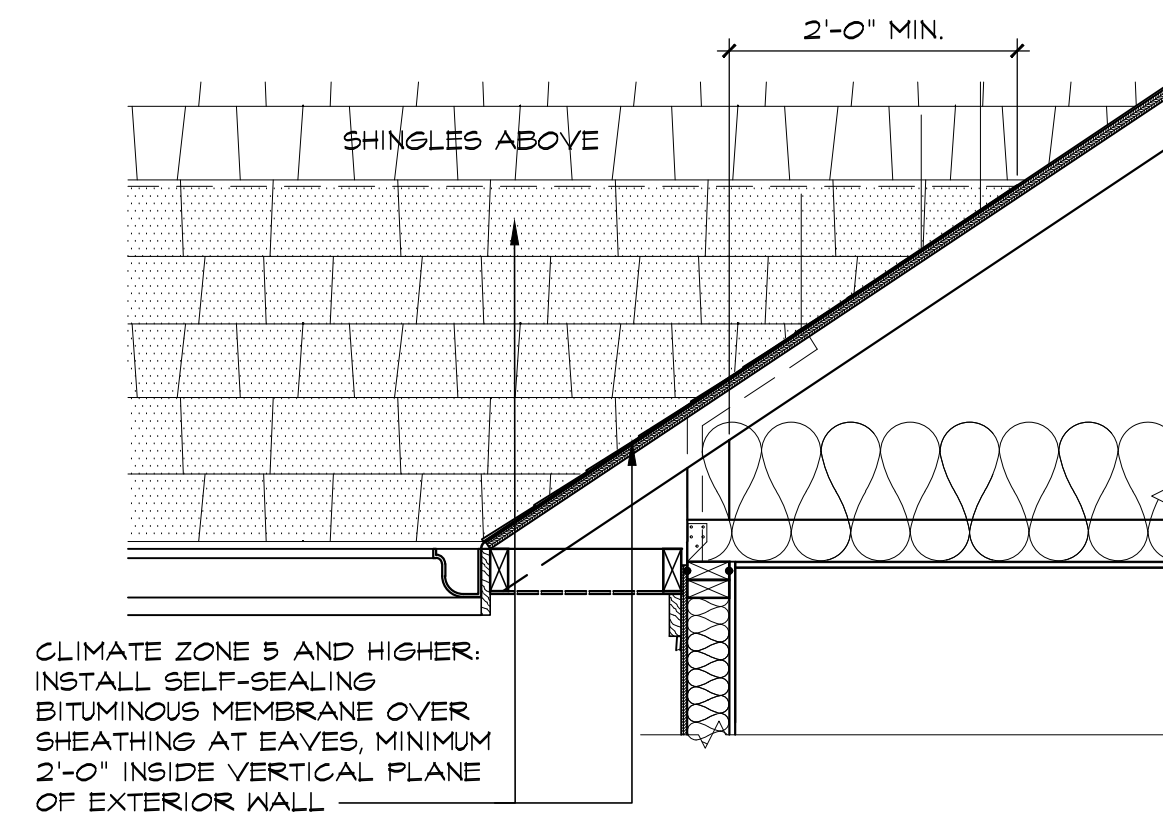
FOUNDATION DETAILS



date 08.19.20  
drafter D.A.S.  
checked by C.L.B.  
proj. no. T-19035.1

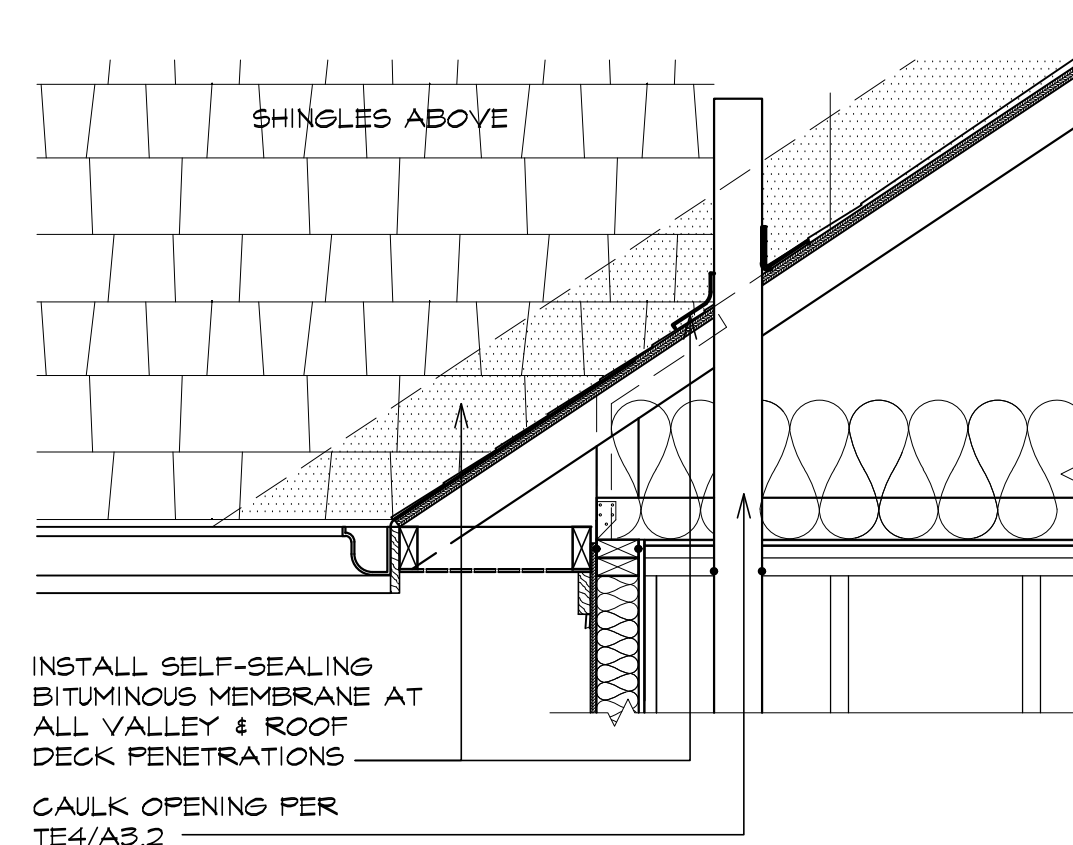
Foundation, Wall & Roof Framing Details  
**A3.1**





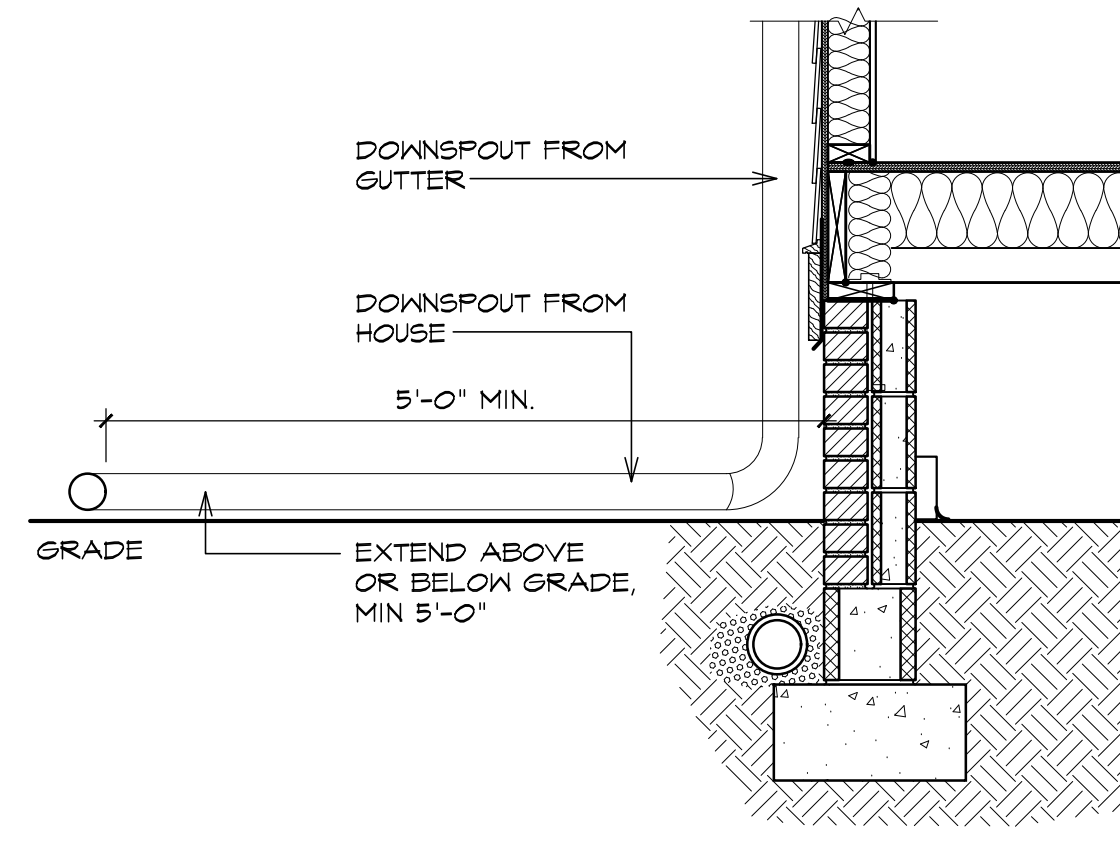
CLIMATE ZONE 5 AND HIGHER:  
INSTALL SELF-SEALING  
BITUMINOUS MEMBRANE OVER  
SHEATHING AT EAVES, MINIMUM  
2'-0" INSIDE VERTICAL PLANE  
OF EXTERIOR WALL

WM 4 BITUMINOUS MEMBRANE AT EAVES  
A3.2 \*SEE A3.1 FOR TYPICAL RAKE & EAVE DETAILS\* 3/4" = 1'-0"

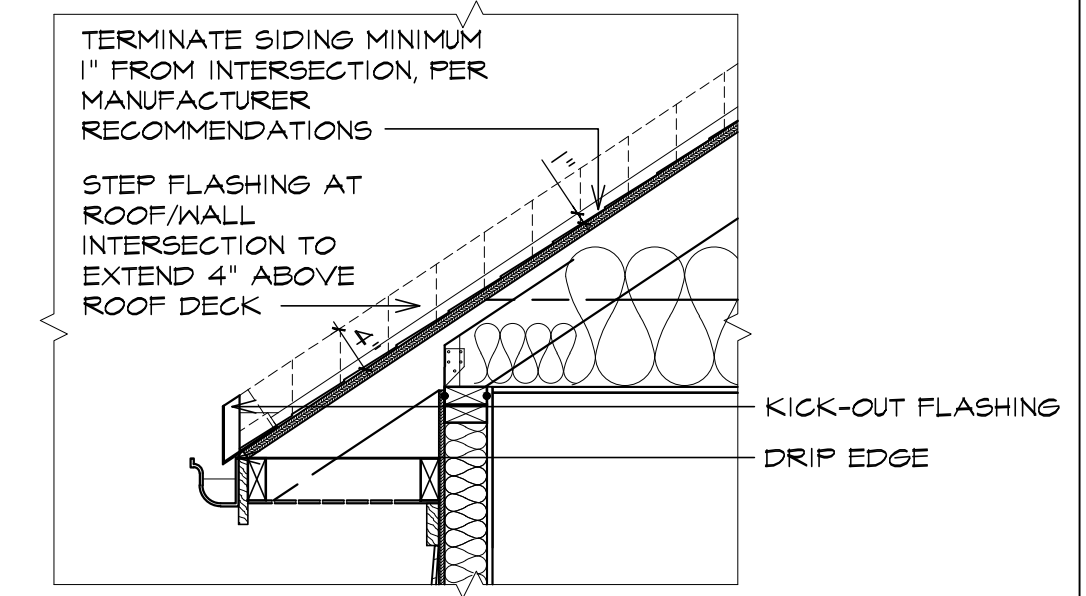


INSTALL SELF-SEALING  
BITUMINOUS MEMBRANE AT  
ALL VALLEY & ROOF  
DECK PENETRATIONS  
CAULK OPENING PER  
TE4/A3.2

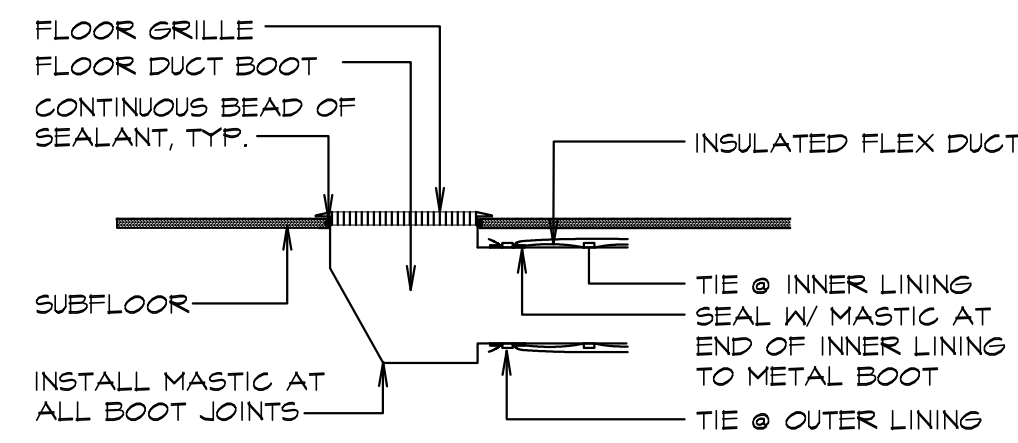
WM 3 ROOF DECK PENETRATIONS  
A3.2 \*SEE A3.1 FOR TYPICAL RAKE & EAVE DETAILS\* 3/4" = 1'-0"



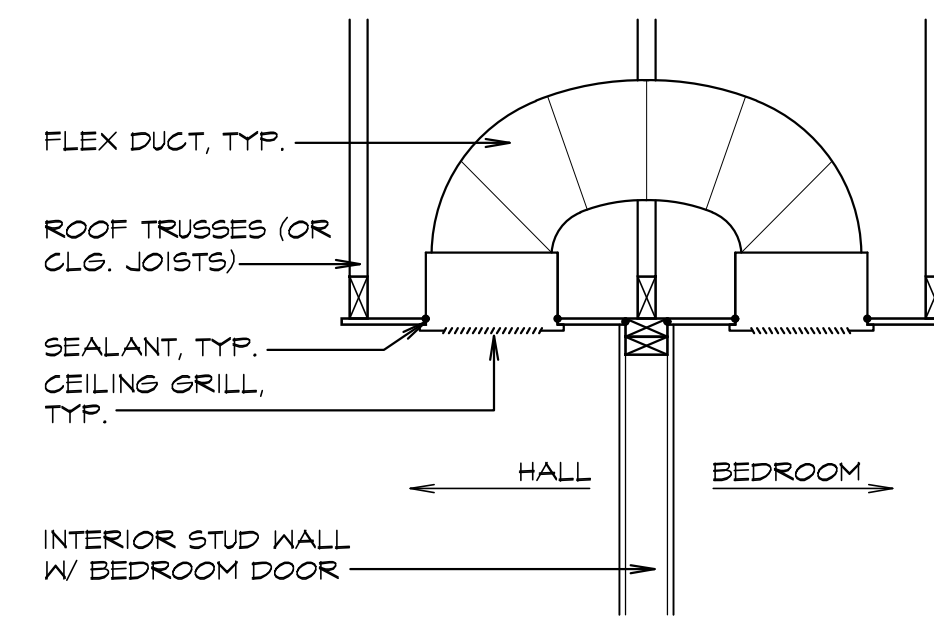
WM 2 GUTTERS & DOWNSPOUTS  
A3.2 \*SEE A3.1 FOR TYPICAL FOUNDATION DETAILS\* 3/4" = 1'-0"



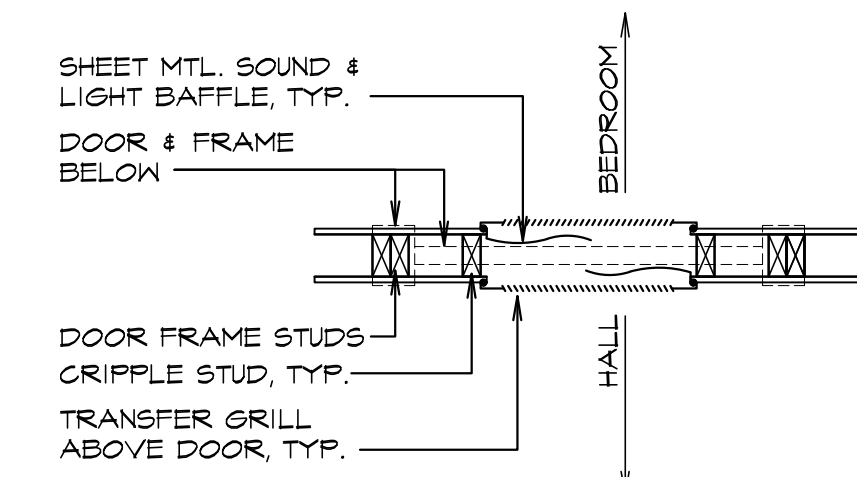
WM 1 KICK-OUT FLASHING AT ROOF/WALL INTERSECTION  
A3.2 \*SEE A3.1 FOR TYPICAL RAKE & EAVE DETAILS\* 3/4" = 1'-0"



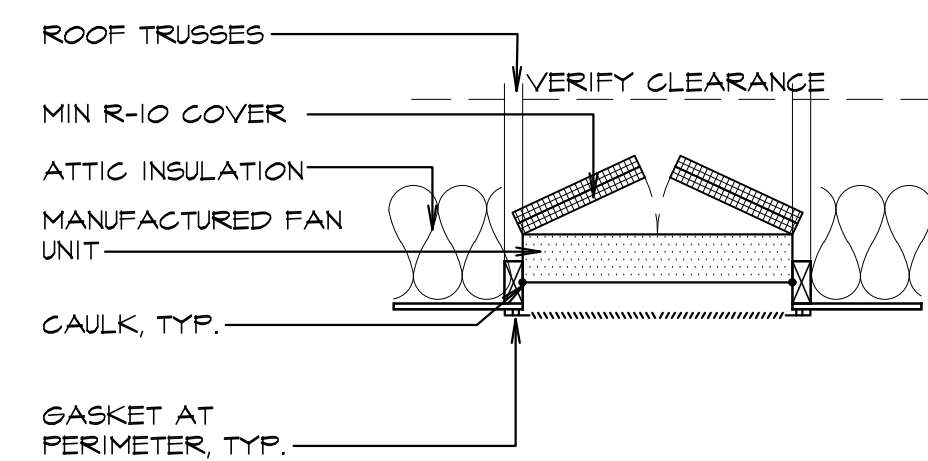
HC 1 TYPICAL DUCT BOOT SEAL  
A3.2 3/4" = 1'-0"



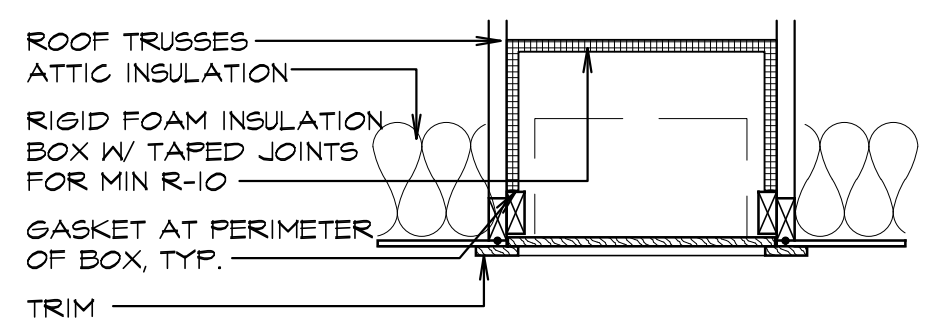
HC 2 BEDROOM PRESSURE BALANCE: JUMPER DUCT  
A3.2 3/4" = 1'-0"



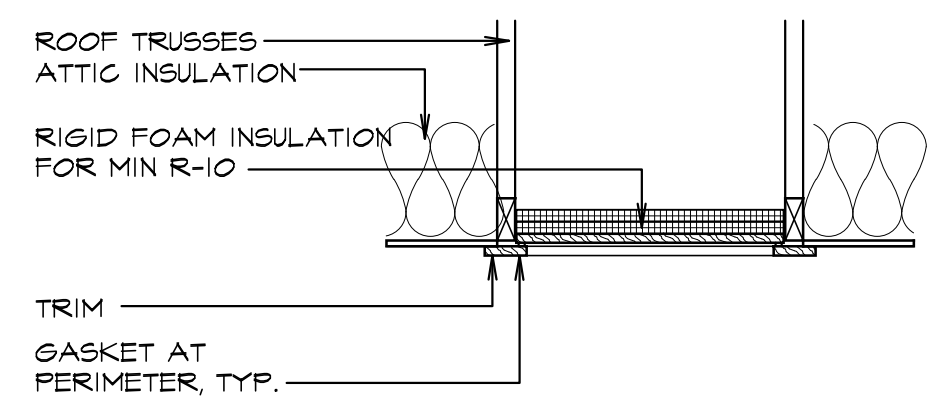
HC 1 BEDROOM PRESSURE BALANCE: TRANSFER GRILL  
A3.2 3/4" = 1'-0"



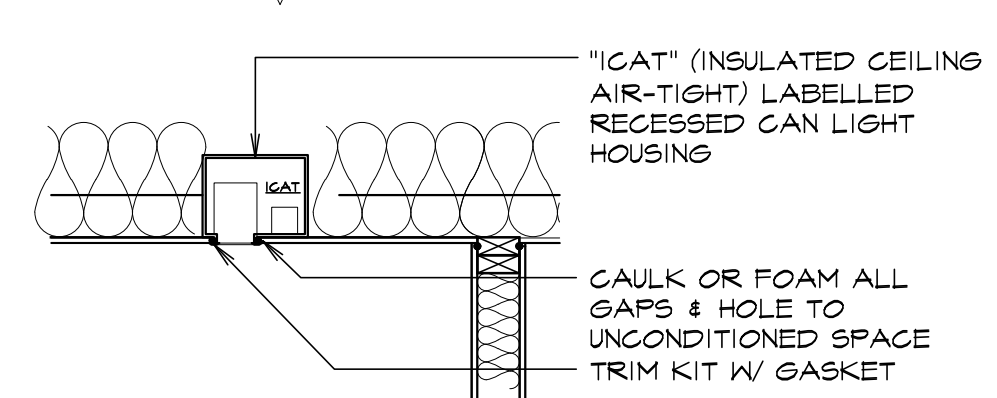
TE 9 TYPICAL WHOLE HOUSE FANS  
A3.2 3/4" = 1'-0"



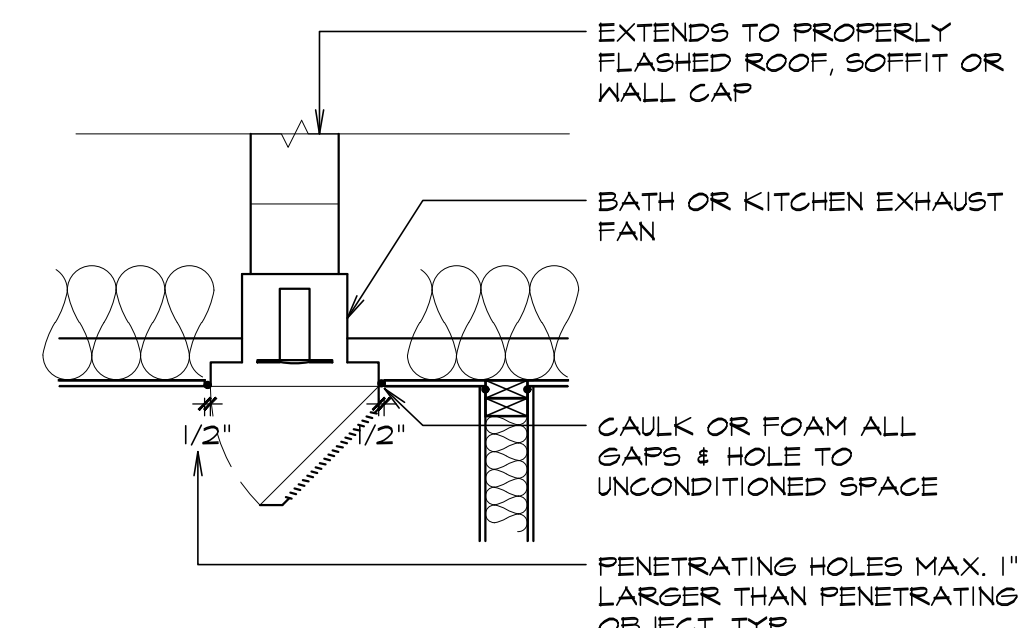
TE 8 TYPICAL ATTIC PULL-DOWN STAIRS  
A3.2 3/4" = 1'-0"



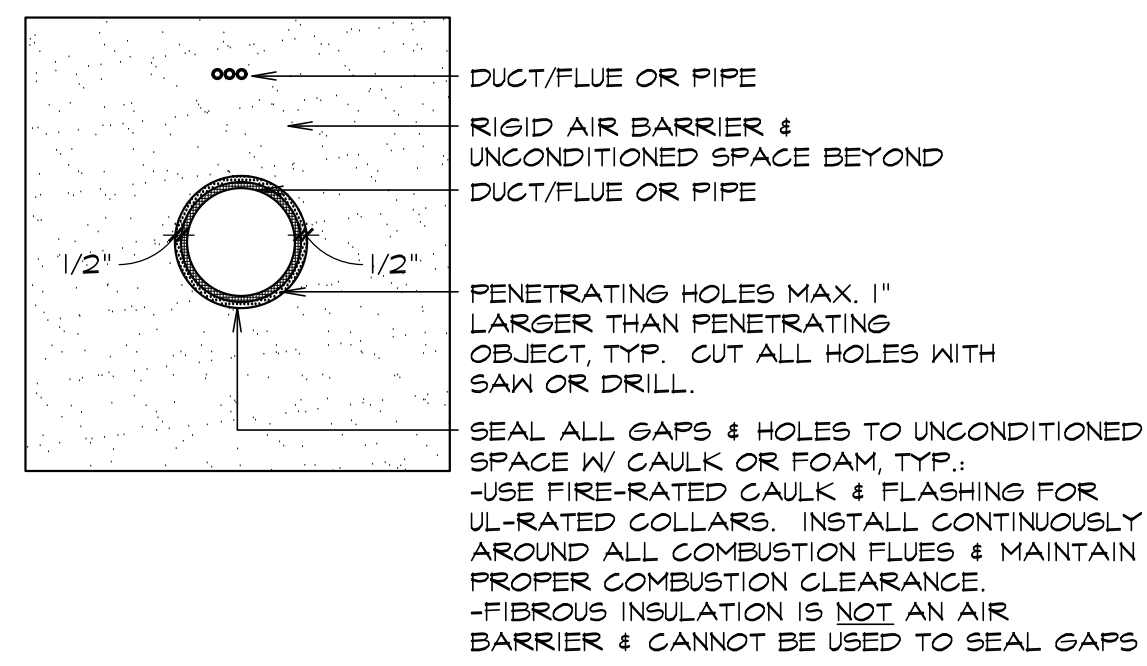
TE 7 TYPICAL ATTIC ACCESS PANEL  
A3.2 3/4" = 1'-0"



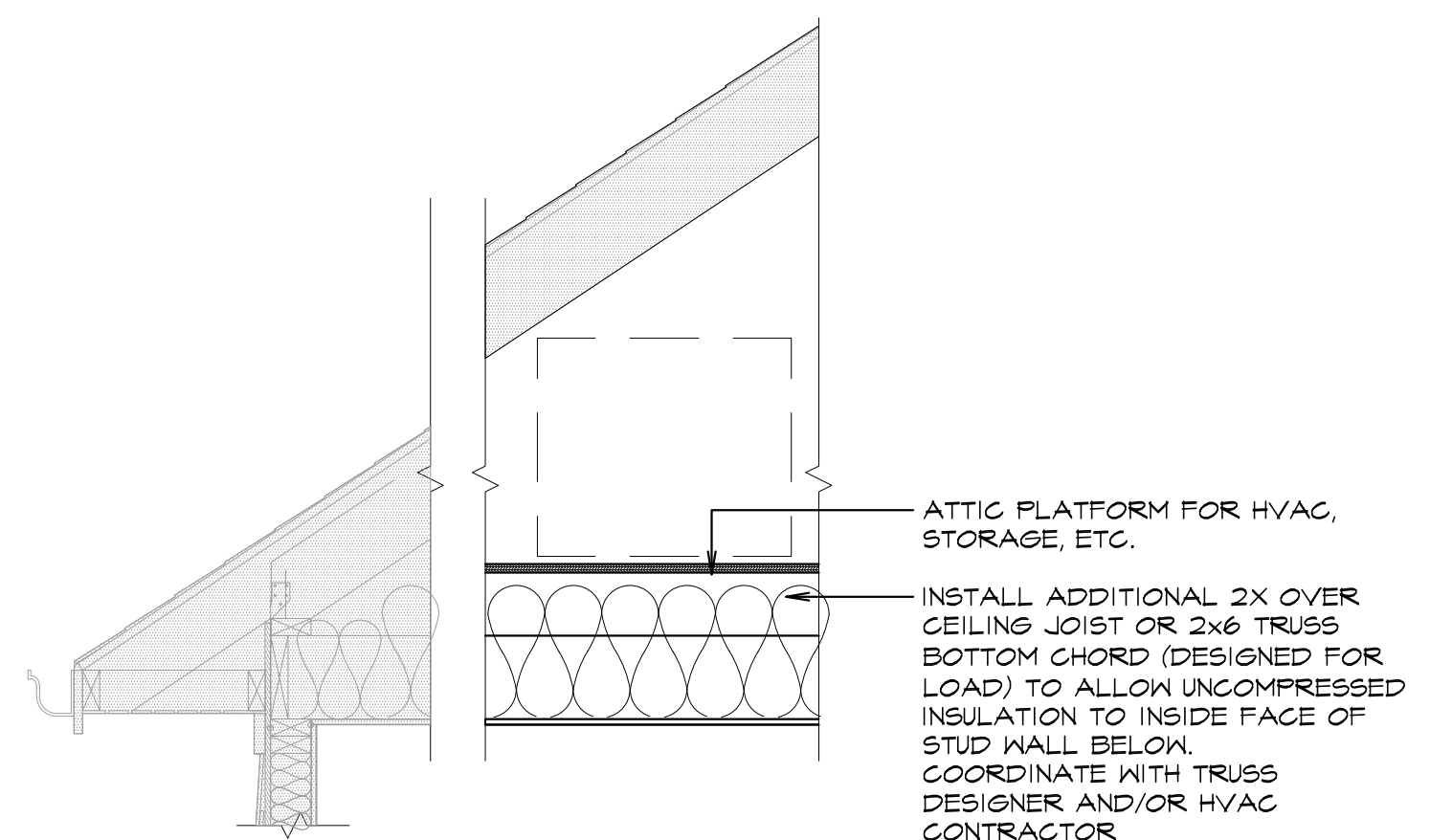
TE 6 TYPICAL ICAT RECESSED LIGHTING FIXTURES  
A3.2 3/4" = 1'-0"



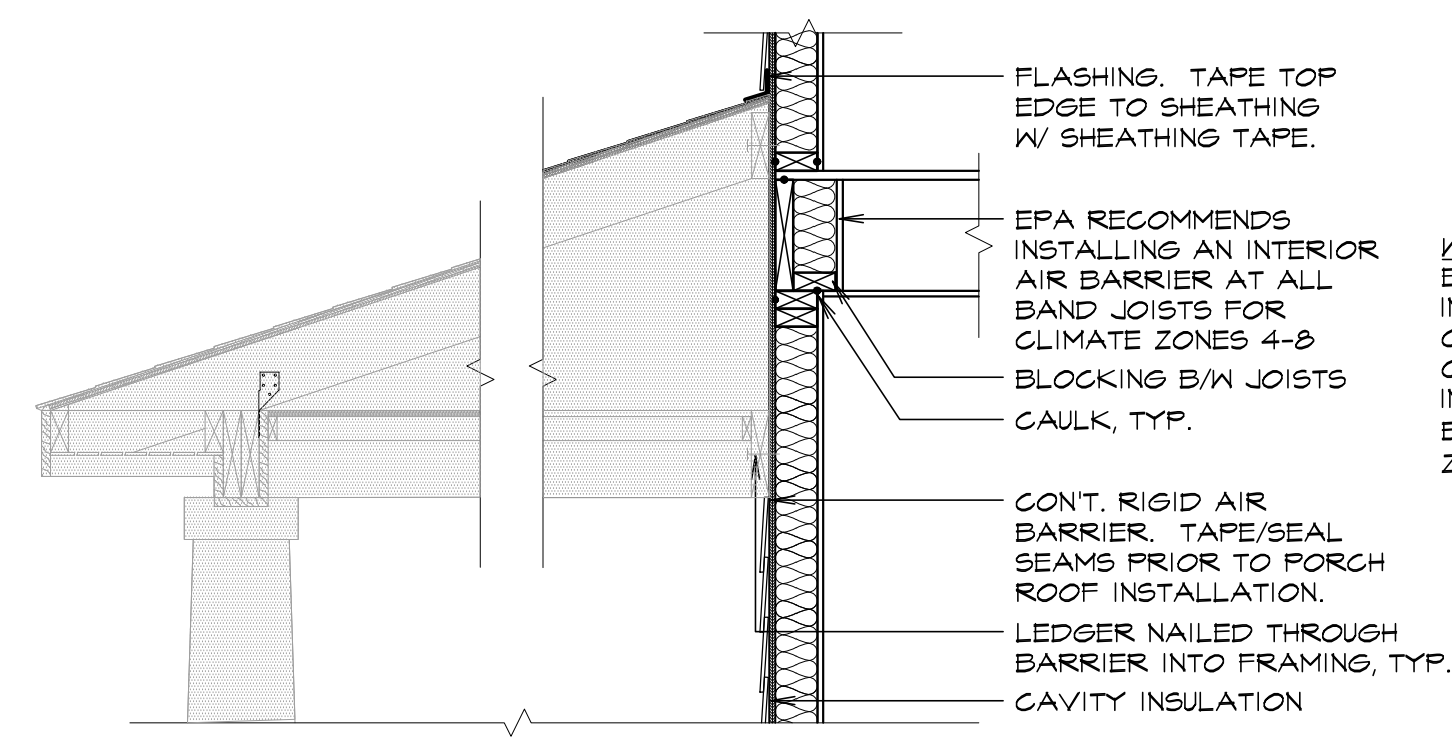
TE 5 TYPICAL BATH & KITCHEN EXHAUST FANS  
A3.2 3/4" = 1'-0"



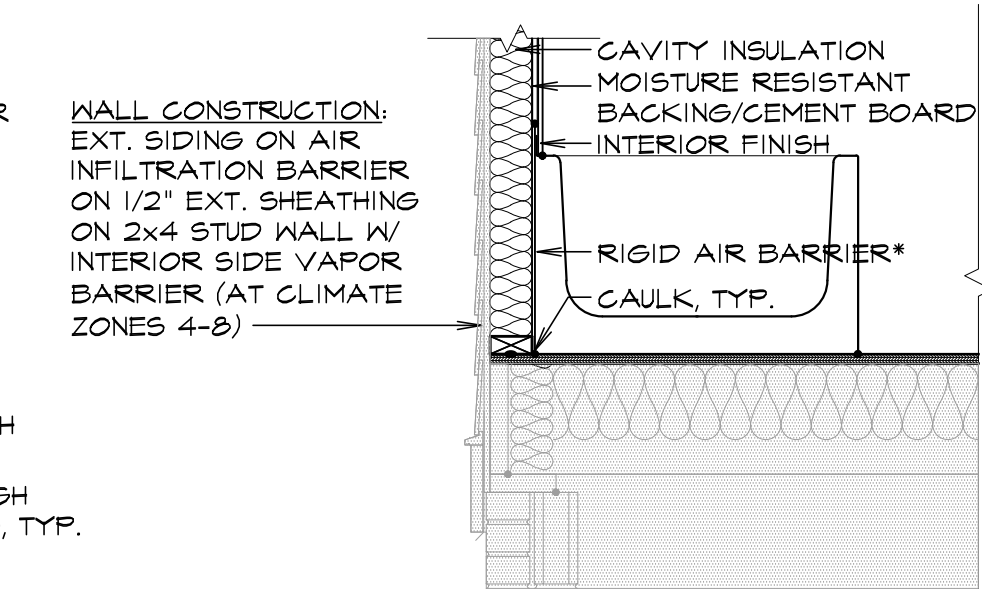
TE 4 TYPICAL PENETRATIONS TO UNCONDITIONED SPACE  
A3.2 3/4" = 1'-0"



TE 3 TYPICAL INSULATION AT ATTIC PLATFORM  
A3.2 3/4" = 1'-0"



TE 2 TYPICAL WALL ADJOINING PORCH ROOF  
A3.2 3/4" = 1'-0"



TE 1 TYPICAL TUB/SHOWER AT EXTERIOR WALL  
A3.2 \*RIGID AIR BARRIER MAY BE GYPSUM BOARD, PLYWOOD, OSB, OR RIGID FOAM BOARD 3/4" = 1'-0"

WATER MANAGEMENT

HVAC QUALITY

THERMAL ENCLOSURE

THIS PAGE CONTAINS ILLUSTRATED DETAILS THAT ARE REQUIRED FOR ENERGY STAR® CERTIFICATION AND ARE RECOMMENDED FOR THE CONSTRUCTION OF ANY TIGHTLINE HOUSE. THIS SHEET IS NOT A COMPREHENSIVE CHECKLIST FOR ANY CERTIFICATION PROCESS.

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**ENERGY STAR®**  
Details



08/19/20

date 08.19.20  
drafter D.A.S.  
checked by C.L.B.  
proj. no. T-19035.1

ENERGY STAR®  
Details  
**A3.2**



# Green Opportunities

Green Opportunities is a collection of ideas for achieving more sustainable construction habits and a greener home. *The italic text elaborates about the intent and its relationship to TightLines Designs.* We highly recommend participation in a green certification program to ensure that your home conserves energy, natural resources, and maintains optimal indoor air quality. Take a look at the resources below to get started finding a certification program that is right for you.

## Green Certification Programs

Program	Intent	Website
National Association of Home Builders LEED for Homes	National Rating System for Energy, Resources, & Indoor Air Quality	<a href="http://www.nahbgreen.org/Guidelines/ansistandard.aspx">http://www.nahbgreen.org/Guidelines/ansistandard.aspx</a>
Enterprise Green Communities	National Rating System for Energy, Resources, & Indoor Air Quality	<a href="http://www.greenhomeguide.org/">http://www.greenhomeguide.org/</a>
Earthcraft	Framework for developers to pursue green building in affordable multi- and single-family developments	<a href="http://www.greencommunitiesonline.org/">http://www.greencommunitiesonline.org/</a>
Greenbuilt North Carolina	Southeast Rating System for Energy, Resources, & Indoor Air Quality Statewide Rating System for Energy, Resources, & Indoor Air Quality	<a href="http://www.earthcrafthouse.com/">http://www.earthcrafthouse.com/</a> <a href="http://www.greenbuilt.org/">http://www.greenbuilt.org/</a>

## LOCATION

Site Selection	<ul style="list-style-type: none"> <li>Built above 100-year floodplain</li> <li>Not built on habitat for threatened or endangered species</li> <li>Not built within 100 ft of water, including wetlands</li> <li>Not built on land that was public parkland prior to acquisition</li> <li>Not built on land with prime soils, unique soils, or soils of state significance</li> </ul>	Selecting an appropriate site is the first step in building a green home. The intent is to minimize the home's impact on the environment and to preserve significant species, open space, soil, or community amenities.
Preferred Locations	<ul style="list-style-type: none"> <li>Edge Development</li> <li>Infill</li> <li>Previously Developed</li> <li>Greyfield/Brownfield Site</li> </ul>	
Infrastructure	<ul style="list-style-type: none"> <li>Existing Infrastructure</li> <li>Community Resources/Transit</li> </ul>	Minimize site disturbance on- and off-site.
Community Resources/Transit	<ul style="list-style-type: none"> <li>Community Resources/Transit</li> </ul>	Reduce the use of fossil fuels by building near shopping centers, parks/greenways, and mass transit systems.

## SUSTAINABLE SITES

Site Stewardship	<ul style="list-style-type: none"> <li>Stockpile and protect topsoil from erosion</li> <li>Control the path and velocity of runoff with silt fencing or equivalent</li> <li>Protect sewer inlets, streams, and lakes with straw bales, silt fencing, etc.</li> <li>Provide swales to divert surface water from hillsides</li> <li>Use tiers, erosion blankets, compost blankets, etc. on sloped areas</li> </ul>	Preventing erosion aids in maintaining soil quality and prevents soil runoff that pollutes lakes and streams.
Minimize Disturbed Area of Site	<ul style="list-style-type: none"> <li>Develop tree/plant preservation plan with "no-disturbance" zones</li> <li>Rehabilitate lot; undo soil compaction and remove invasive plants</li> <li>Maximize number of units per acre or build on smaller lot</li> </ul>	

## Landscaping

Basic Landscaping Design	<ul style="list-style-type: none"> <li>Use drought tolerant turf</li> <li>Do not use turf in densely shaded areas</li> <li>Do not use turf in areas with slope of 25%</li> <li>Add mulch or soil amendments as appropriate</li> <li>Till compacted soil to at least 6 inches</li> </ul>	Using water responsibly includes limiting the use of potable water for irrigation. This can be done by selecting drought- tolerant plants, limiting turf, and mulching.
Limit Conventional Turf		
Drought-Tolerant Plants		
Reduce Overall Irrigation Demand		
Group plants with similar water needs (hydrozoning)		
Reduce Local Heat Island Effects	<ul style="list-style-type: none"> <li>Locate trees/plantings to provide shade for hardscapes</li> <li>Install light colored hardscapes</li> <li>Do not use turf in areas with slope of 25%</li> </ul>	The heat island effect occurs when areas experience unnaturally elevated temperatures that are caused by increased heat retention in man-made materials such as dark roofs or asphalt. Heat islands affect human comfort and wildlife patterns. Heat islands can be avoided by selecting light colored building materials or shading heat retaining materials.

## Storm Water Management

Maximize Permeable Area of Lot	<ul style="list-style-type: none"> <li>Vegetative landscape</li> <li>Permeable paving</li> <li>Impermeable surfaces directed to infiltration features</li> </ul>	Runoff from hard surfaces washes pollutants directly into water systems that are used to yield food or drinking water to residents. Also, it is important that soils retain rainwater to naturally irrigate landscapes.
Permanent Erosion Control Options	<ul style="list-style-type: none"> <li>For portions of lot on steep slope, use terracing and retaining walls</li> <li>Plant trees, shrubs or groundcover</li> </ul>	
Management of Runoff From Roof	<ul style="list-style-type: none"> <li>Install permanent storm water controls to manage runoff from the home</li> <li>Install vegetated roof</li> </ul>	

## Nontoxic Pest Control

Pest Control Alternatives	<ul style="list-style-type: none"> <li>Keep all wood at least 12" above soil</li> <li>Seal external cracks, joints etc. with caulking and install pest-proof screens</li> <li>Include no wood-to-concrete connections, or separate connections with dividers</li> <li>Install landscaping so mature plants are 24" from home</li> </ul>	
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## WATER EFFICIENCY

Water Reuse	<ul style="list-style-type: none"> <li>Rainwater Harvesting System</li></ul>	Rain barrels are a simple and inexpensive way to collect rainwater from your home's roof for irrigation use.
Graywater Reuse System	For example: flushing your toilet or irrigating your lawn with bathtub, lavatory, or laundry water.	
Use of Municipal Recycled Water System	For example: using non-potable water for car washing or irrigation.	
Irrigation System	<ul style="list-style-type: none"> <li>High-Efficiency Irrigation System</li> </ul>	If irrigation is desired, installing an efficient system is the responsible solution.
Reduce Overall Irrigation Demand	<ul style="list-style-type: none"> <li>High-Efficiency Fixtures and Fittings</li> </ul>	Availability of drinking water is becoming a growing concern for communities across the United States. Do your part to reduce wasteful water use and ensure ample resources for future generations.

## ENERGY & ATMOSPHERE

Optimize Energy Performance	<ul style="list-style-type: none"> <li>Performance of ENERGY STAR® for Homes</li> <li>Exceptional Energy Performance</li> </ul>	See sheet A3.2 for ENERGY STAR® Details. Contact a Certified Energy Rater to learn more about the opportunities to increase energy performance. Often energy performance is an excellent investment due to a short pay-back period. Find a Certified Energy Rater at <a href="http://www.resnet.us/">http://www.resnet.us/</a>
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## Water Heating

Efficient Hot Water Distribution System options	<ul style="list-style-type: none"> <li>Structured plumbing system</li> <li>Central manifold distribution system</li> <li>Compact design of conventional system</li> </ul>	
Pipe Insulation		
Residential Refrigerant Management	<ul style="list-style-type: none"> <li>Refrigerant Charge Test</li> <li>Appropriate HVAC Refrigerant Options</li> </ul>	<ul style="list-style-type: none"> <li>Use no refrigerants</li> <li>Use non-HCFC refrigerants</li> <li>Use refrigerants that complies with global warming potential equation</li> </ul>

## MATERIALS & RESOURCES

Material Efficient Framing	<ul style="list-style-type: none"> <li>Framing Efficiency Options</li> </ul>	<ul style="list-style-type: none"> <li>Framing Efficiency refers to efficient use of materials and the ability to insulate properly to allow for energy efficiency within the home.</li> <li>TightLines Designs feature open web floor trusses (2-story homes) and roof trusses (all homes excluding 1.5-story). See sheet A3.1 for ladder blocking, drywall clips, and 2-stud corner diagrams.</li> </ul>
Environmentally Preferable Products	<ul style="list-style-type: none"> <li>Wood Products</li> </ul>	<ul style="list-style-type: none"> <li>Use non-tropical wood</li> <li>Use reclaimed wood</li> <li>FSC (Forest Stewardship Council) Certified Tropical Wood</li> </ul>
Waste Management	<ul style="list-style-type: none"> <li>Construction Waste Management Planning</li> <li>Construction Waste Reduction</li> <li>Designated cutting area</li> </ul>	<ul style="list-style-type: none"> <li>Determine where waste can be diverted for reuse or recycling</li> <li>Identify vendor that can sort and divert waste from landfill</li> <li>Document amount of waste diverted from landfill</li> <li>Having a designated cutting area discourages wasteful practices. Example: if blocking is needed, blocking can be gathered from the scraps in the cutting area, rather than cutting a long board into small pieces.</li> <li>On-site recycling for plastic and aluminum drink bottles keeps the project green throughout the construction phase.</li> </ul>

## INDOOR ENVIRONMENTAL QUALITY

ENERGY STAR with Indoor Air Plus	<ul style="list-style-type: none"> <li>ENERGY STAR with Indoor Air Plus</li> </ul>	Simple steps to ensure healthy indoor air can make a tremendous difference in the health of your family. Visit <a href="http://epa.gov/indoorairplus/">http://epa.gov/indoorairplus/</a> for more information.
Combustion Venting	<ul style="list-style-type: none"> <li>Basic Combustion Venting Measures</li> </ul>	Properly venting and monitoring combustion devices ensures the safety of homeowners from fire and carbon monoxide poisoning.
Moisture Control	<ul style="list-style-type: none"> <li>Moisture Load Control Options</li> </ul>	<ul style="list-style-type: none"> <li>Additional dehumidification system</li> <li>Central HVAC system equipped with additional dehumidification mode</li> </ul>
Outdoor Air Ventilation	<ul style="list-style-type: none"> <li>Outdoor Air Ventilation</li> </ul>	Provide additional fresh air into the home with enhanced outdoor air ventilation.
Local Exhaust	<ul style="list-style-type: none"> <li>Basic Local Exhaust</li> <li>Enhanced Local Exhaust Options</li> </ul>	Amplify exhausting damp kitchen and bath air from the home prevents the opportunity for mold and mildew growth.
Distribution of Space Heating and Cooling	<ul style="list-style-type: none"> <li>Room-by-Room Load Calculations</li> <li>Return Air Flow/Room-by-Room Controls Options</li> <li>Forced Air Systems</li> <li>Nonducted HVAC Systems</li> <li>Third Party Performance Test/Multiple Zones</li> <li>Forced Air Systems</li> <li>Nonducted HVAC Systems</li> </ul>	<ul style="list-style-type: none"> <li>Bathroom and kitchen exhaust meets ASHRAE Std. 62.2 air flow requirement</li> <li>Fans and ducts designed and installed to ASHRAE Std. 62.2</li> <li>Air exhausted to outdoors</li> <li>ENERGY STAR labeled bathroom exhaust fans</li> <li>Flow control valves on every radiator</li> <li>Have supply air flow rates in each room tested and confirmed</li> <li>Install at least two distinct zones with independent thermostat control</li> </ul>
Air Filtering	<ul style="list-style-type: none"> <li>Higher Quality Air Filters</li> </ul>	A simple option to remove dust and pollutants from indoor air.
Contaminant Control	<ul style="list-style-type: none"> <li>Indoor Contaminant Control during Construction</li> <li>Indoor Contaminant Control</li> <li>Pre-occupancy Flush</li> </ul>	Prevent dust from settling in ductwork.
Radon Protection	<ul style="list-style-type: none"> <li>Radon-Resistant Construction</li> <li>Radon Testing</li> </ul>	
Garage Pollutant Protection	<ul style="list-style-type: none"> <li>No HVAC in Garage</li> <li>Minimize Pollutants from Garage</li> <li>Exhaust Fan in Garage</li> <li>Detached Garage or No Garage</li> </ul>	<ul style="list-style-type: none"> <li>Seal all penetrations and connecting floor and ceiling joist bays</li> <li>Paint walls and ceilings of shared walls, including garage</li> <li>Weather-strip all doors leading into home</li> <li>Carbon monoxide detectors in rooms that share a door with garage</li> <li>Seal all penetrations and cracks at the base of walls</li> <li>Fan runs continuously</li> <li>Fan designed with automatic timer control</li> <li>With a TightLines Design, you can often receive green certification points for not having a garage.</li> </ul>

## AWARENESS & EDUCATION

Education of the Homeowner or Tenant	<ul style="list-style-type: none"> <li>Basic Operations Training</li> <li>Public Awareness</li> </ul>	<ul style="list-style-type: none"> <li>Operations and training manual</li> <li>One-hour walkthrough with occupant(s)</li> <li>Open House</li> <li>Website about features and benefits of green homes</li> <li>Newspaper article on the project</li> <li>Display signage on exterior of home designating green accolades</li> </ul>
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THIS PAGE CONTAINS A LIST OF SUGGESTIONS THAT TIGHTLINES DESIGNS BELIEVES WILL BE BENEFICIAL IN THE CONSTRUCTION OF A TIGHTLINES HOUSE. THIS IS NOT INTENDED AS A SPECIFICATION SHEET, NOR IS IT A COMPREHENSIVE CHECK LIST FOR ANY CERTIFICATION PROCESS.

**TightLines Designs**  
creating great places to live

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**Green Opportunities**



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"Green" Opportunities

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