



## HISTORIC PRESERVATION COMMISSION

Marc Elrich  
*County Executive*

Sandra I. Heiler  
*Chairman*

Date: February 1, 2021

### MEMORANDUM

TO: Mitra Pedoeem  
Department of Permitting Services

FROM: Dan Bruechert  
Historic Preservation Section  
Maryland-National Capital Park & Planning Commission

SUBJECT: Historic Area Work Permit # 925081 - Porch Replacement

---

The Montgomery County Historic Preservation Commission (HPC) has reviewed the attached application for a Historic Area Work Permit (HAWP). This application was **approved** at the December 16, 2020 HPC meeting.

The HPC staff has reviewed and stamped the attached construction drawings.

THE BUILDING PERMIT FOR THIS PROJECT SHALL BE ISSUED CONDITIONAL UPON ADHERENCE TO THE ABOVE APPROVED HAWP CONDITIONS AND MAY REQUIRE APPROVAL BY DPS OR ANOTHER LOCAL OFFICE BEFORE WORK CAN BEGIN.

Applicant: Benjamin and Jess Bregman  
Address: 7414 Baltimore Ave., Takoma Park

This HAWP approval is subject to the general condition that the applicant will obtain all other applicable Montgomery County or local government agency permits. After the issuance of these permits, the applicant must contact this Historic Preservation Office if any changes to the approved plan are made. Once work is complete the applicant will contact Dan Bruechert at 301.563.3400 or [dan.bruechert@montgomeryplanning.org](mailto:dan.bruechert@montgomeryplanning.org) to schedule a follow-up site visit.



**MACKAY CONSTRUCTION  
SERVICES, INC.**

11867 Ropp Lane  
Lovettsville, VA 20180  
540-336-6197 -- 307-742-6881

---

---

**Partial Gravity Analysis,  
for  
Rowles Residence**

**Location: 7417 Baltimore Ave; Takoma Park, MD 20912**

January 27, 2021



**INDEX:**

Design Sketches.

Pages A1.1 – A1.3

Standard Specifications.

Pages B – C

Calculations. Design and Analysis

Pages C1 – C17

Total Number of pages excluding cover sheet: 22.

**Notes, Disclaimers:**

- MacKay Construction Services, Inc. (MCS) takes no responsibility for items not specifically addressed within this report set.
- This report is valid only for the specific project shown above and herein. Further, this report is valid only if it is stapled or otherwise bound as it originally left this office, and contains all of the sheets as originally bound. Any sheets that are not bound to the original complete set are not valid and shall not be used (excluding authorized, stamped addendums).
- The calculations shown herein, if any, do not necessarily include all possible calculations that could be performed for this project. For example: certain items may be designed by inspection; only the worst case loading scenarios may be included; etc.

APPROVED

Montgomery County

Historic Preservation Commission

**REVIEWED**

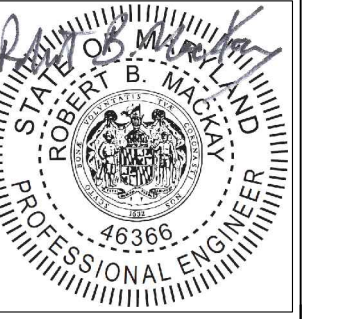
By Dan.Bruechert at 2:35 pm, Feb 01, 2021

*Sandra L. Heiler*

MACKAY  
CONSTRUCTION  
SERVICES, INC.

ENGINEER

ROBERT MACKAY



PROFESSIONAL CERTIFICATION:  
I HEREBY CERTIFY THAT THESE  
DOCUMENTS WERE PREPARED  
OR APPROVED BY ME, AND THAT I  
AM A DULY LICENSED  
PROFESSIONAL ENGINEER  
UNDER THE LAWS OF THE STATE  
OF MARYLAND.

LICENSE NUMBER 46396  
EXPIRATION DATE: 1/1/2023

PERMITTING DATA, SPECS,  
"ELEVATIONS," ROOF PLAN  
7417 BALTIMORE AVENUE  
TAKOMA PARK, MD 20912

**BREGMAN REPAIRS**

REVISIONS:

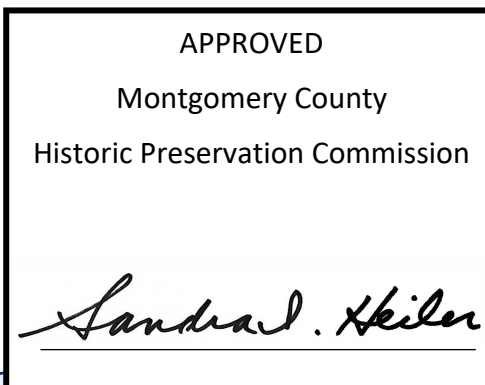
Permit: 1-26-2021

SHEET NUMBER:

**A1.1**

# BREGMAN REPAIRS

## 7417 BALTIMORE AVENUE, TAKOMA PARK, MD 20912



**REVIEWED**  
By Dan.Bruechert at 2:35 pm, Feb 01, 2021

MONTGOMERY COUNTY RESERVED SPACE

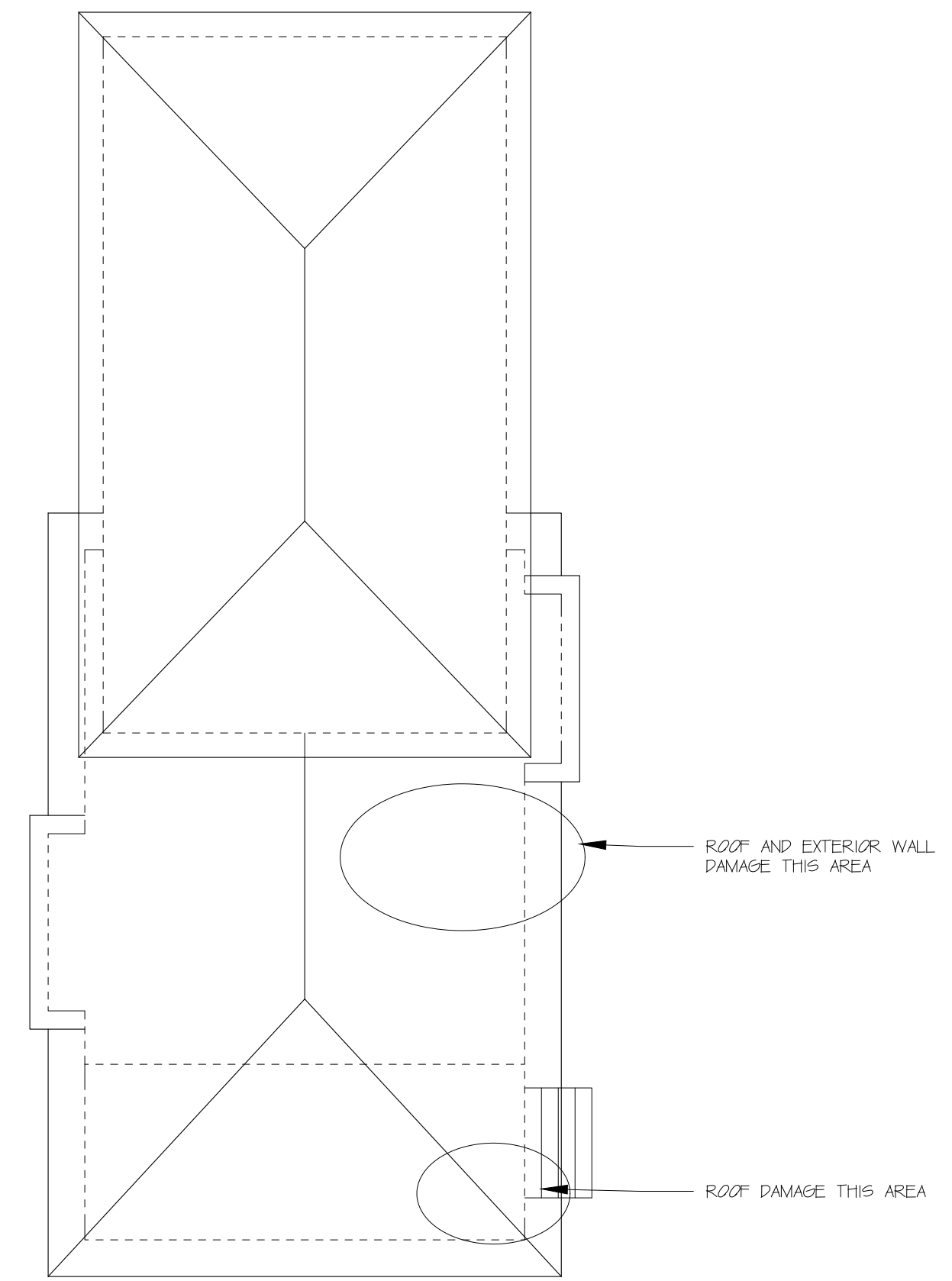
SPECIFICATIONS	SCOPE OF WORK	MONTGOMERY COUNTY RESIDENTIAL CONSTR. PARAMETERS	RESIDENTIAL CONSERVATION ENERGY CODE THERMAL ENVELOPE	EXTERIOR SPECS	INT. SPECS	GENERAL NOTES																									
<p><b>GENERAL NOTES:</b></p> <ul style="list-style-type: none"> <li>WORK SHOWN HEREIN IS NOT DIRECTION FROM DESIGNER TO DO WORK. SCOPE OF WORK AND QUANTITIES MUST BE APPROVED BY OWNER AND / OR INSURANCE COMPANY PAYING FOR EFFORT.</li> <li>ALL FRAMING TO BE SPF #1 / #2 UNLESS NOTED OTHERWISE.</li> <li>GLULAM BEAMS (GLB) TO BE 24F-V4 (DF/DF) OR APPROVED EQUAL.</li> <li>LVL BEAMS TO BE TRUS-JOIST MACMILLAN MICROLLAM 1.9E LVL OR APPROVED EQUAL.</li> <li>HARDWARE CALLED OUT IS ASSUMED TO BE SIMPSON STRONG TIE (OR APPROVED EQUAL).</li> <li>INDIVIDUAL PRODUCT SELECTIONS SHALL BE COMPATIBLE WITH PRESSURE TREATMENT WHERE APPLICABLE.</li> <li>MANUFACTURER-RECOMMENDED WOOD TREATMENT SHALL BE RE-APPLIED TO PRESSURE-TREATED MATERIALS ON ALL CUT SURFACES.</li> <li>MUDSILL MATERIALS SHALL BE WOOD PRESSURE-TREATED PER CODE AND 2X4 MINIMUM, UNLESS NOTED OTHERWISE. 1/2" DIA. ANCHOR BOLTS HAVING 6" MIN. EMBED. INTO CONCRETE OR MASONRY GROUT ARE REQUIRED AND MUST BE PLACED AT 48" O.C. UNLESS MORE STRINGENT CALLOUTS ARE NOTED HEREIN. THEY SHALL ALSO BE INSTALLED BETWEEN 3.5" AND 7" FROM THE END OF EACH MUDSILL MEMBER.</li> <li>GLAZING WITHIN 60" (HORIZ. AND VERT.) OF WET SURFACES (FROM TUB, SHOWER, SINK, ETC.) SHALL BE FULLY TEMPERED, OR STRENGTHENED BY OTHER CODE-APPROVED MEANS (PER IRC R308.4.5).</li> <li>ROOF SHEATHING TO BE RATED FOR SPAN AND CONNECTED WITH H-CLIPS, TYP.</li> <li>TYPICAL ROOF, UNBALANCED SNOW LOAD = 34 PSF, USE APA-RATED EXTERIOR SHEATHING WITH 24 / 16 SPAN RATING AND 7/16" MIN. THICKNESS (24" O.C. SUPPORTS MAX).</li> <li>LOW ROOF (OVER LIVING ROOM TRUSSES), SNOW LOAD = 64 PSF, USE APA-RATED EXTERIOR SHEATHING WITH 32 / 16 SPAN RATING AND 15/32" MIN. THICKNESS (24" O.C. SUPPORTS MAX).</li> <li>LONG-SPAN FLOOR SHEATHING TO BE TONGUE AND GROOVE, APA-RATED WITH 48/24 SPAN RATING AND 23/32" MIN. THICKNESS (24" O.C. SUPPORTS MAX.).</li> <li>ALL OTHER FLOOR SHEATHING TO BE TONGUE AND GROOVE, APA-RATED WITH 40/20 SPAN RATING AND 19/32" MIN. THICKNESS (20" O.C. SUPPORTS MAX.).</li> <li>ALL TRUSS HANGERS, CONNECTORS, AND BRACING PER TRUSS MANUFACTURER.</li> <li>UNLESS NOTED OTHERWISE, POINT LOADS DUE TO WINDOW TRIMMERS (TWO OR MORE), INTERNAL COLUMNS OF TIMBER OR BUILT-UP LUMBER, GIRDER TRUSSES, AND VERTICAL HOLD-DOWN ATTACHMENT MEMBERS SHALL BE SUPPORTED FOR THEIR ENTIRE CROSS SECTION ON STABILIZED BLOCKING IN A FLOOR BELOW, PLUS SUPPORTED WITH EQUIVALENT MEMBER SIZE TO THE FOUNDATION OR HORIZONTAL LOAD-CARRYING MEMBER BELOW THAT.</li> <li>WALL SHEATHING TO BE CONTINUOUS FROM MUDSILL TO ROOF SHEATHING, AND FULL LENGTH OF WALLS ALL SIDES. NAILING ABOVE AND BELOW HORIZONTAL JOINTS SHALL NOT BE INTO DIFFERENT MEMBERS, UNLESS THE MEMBERS ARE CONNECTED AS CALLED OUT OR DETAILED HEREIN. BLOCKING IS REQUIRED IN HORIZONTAL JOINTS OF ALL WALLS MARKED PRESCRIPTIVE WALL PANELS.</li> <li>ALL WALLS WITH NEW SHEATHING SHALL BE BLOCKED AT SHEATHING EDGES AND NAILED PER WALL ASSEMBLY SCHEDULE (WALL NAILING CALLOUTS) AS NOTED HEREIN, UNLESS OTHERWISE INDICATED.</li> <li>CONFIRM INSTALLATION SEQUENCE WITH INSPECTOR PRIOR TO INSPECTION OF MATERIALS THAT MIGHT CONCEAL OTHER SYSTEMS.</li> <li>WINDOW AND DOOR OPENINGS ARE APPROXIMATE. CONFIRM ALL DIMENSIONS PRIOR TO ORDERING.</li> <li>CONTRACTOR TO CONFIRM THAT ALL EGRESS REQUIREMENTS ARE MET PER IRC FOR ALL BEDROOM WINDOWS THAT ARE TO BE REPLACED OR NEWLY INSTALLED.</li> <li>CONTRACTOR TO CONFIRM THAT WINDOW OPENING CONTROL DEVICES (FALL PROTECTION) IS IN PLACE FOR ALL WINDOWS THAT ARE TO BE REPLACED AND MEETS IRC R312.2 (2018).</li> <li>VERIFY LOCATIONS OF ALL PLUMBING FIXTURES IN CONCRETE SLABS IN RELATION TO WALL MEASUREMENTS PRIOR TO INSTALLING NEW WALLS.</li> <li>THESE DRAWINGS REFER TO PRESCRIPTIVE IRC REQUIREMENTS.</li> <li>INSTALL HARDWARE, SHEATHING, AND ALL FASTENERS PER IRC.</li> <li>INSTALL FLASHING AND ALL BUILDING MOISTURE PROOFING PER IRC AND <a href="http://www.apawood.org/buildabetterhome">http://www.apawood.org/buildabetterhome</a> (SEE FOUNDATIONS - A520, MOLD AND MILDEW - A525, ROOFS - A535, AND WALLS - A530)</li> </ul>	<p>REPLACE DAMAGED FRAMING &amp; ROOFING OVER LOWER (FRONT) PORTION OF ROOF. REPAIR APPROX. 4' LF DAMAGED EXTERIOR WALL RIGHT ELEVATION. REPLACE UN-SUITABLE PORCH SUPPORT BELOW..</p> <p>MECHANICAL, ELECTRICAL, AND PLUMBING BY OTHER PROFESSIONALS UNDER SEPARATE PERMIT.</p>	<p>(SEE ADDITIONAL NOTES FROM MC PERMITTING SERVICES.)</p> <p>GROUND SNOW LOAD: 25 PSF WIND SPEED: 115 MPH SEISMIC DESIGN CATEGORY: B SUBJECT TO DAMAGE FROM: WEATHERING: SEVERE FROST LINE DEPTH: 30" TERMIT: MODERATE TO HEAVY DECAY: SLIGHT TO MODERATE</p> <p>WINTER DESIGN TEMP: 13 DEG. F ICE SHIELD UNDERLAYMENT REQ'D: YES FLOOD HAZARDS: JULY 2, 1979 AIR FREEZING INDEX: 300 MEAN ANNUAL TEMP: 55 DEG. F</p> <p><b>DESIGN LOADS</b></p> <table border="1"> <tr><th>LOAD</th><th>LIVE LOADS (PSF)</th></tr> <tr><td>ATTIC WITH STORAGE</td><td>20</td></tr> <tr><td>ATTIC WITHOUT STORAGE</td><td>10</td></tr> <tr><td>ATTIC STUDIO</td><td>30</td></tr> <tr><td>DECKS</td><td>40</td></tr> <tr><td>FIRE ESCAPES</td><td>40</td></tr> <tr><td>GUARDRAILS AND HANDRAILS</td><td>200 LB</td></tr> <tr><td>GUARDRAILS IN-FILL COMPONENTS</td><td>50</td></tr> <tr><td>PASSENGER VEHICLE GARAGES</td><td>50</td></tr> <tr><td>ROOMS OTHER THAN SLEEPING ROOMS</td><td>40</td></tr> <tr><td>SLEEPING ROOMS</td><td>30</td></tr> <tr><td>STAIRS</td><td>40</td></tr> </table> <p>ASSUMING NOT ON STATE REGISTER NOR ELIGIBLE FOR LISTING</p>	LOAD	LIVE LOADS (PSF)	ATTIC WITH STORAGE	20	ATTIC WITHOUT STORAGE	10	ATTIC STUDIO	30	DECKS	40	FIRE ESCAPES	40	GUARDRAILS AND HANDRAILS	200 LB	GUARDRAILS IN-FILL COMPONENTS	50	PASSENGER VEHICLE GARAGES	50	ROOMS OTHER THAN SLEEPING ROOMS	40	SLEEPING ROOMS	30	STAIRS	40	<p><b>M.E.P.</b></p> <p>MECHANICAL: GC AND GC SUBCONTRACTOR(S) SHALL PROVIDE AND BE RESPONSIBLE FOR COMPLETE DESIGN BUILD MECHANICAL SYSTEMS, SERVICE AND MAINTENANCE AS REQUIRED PER SCOPE OF PROJECT, AND MUST COMPLY WITH 2018 IRC, IMC AND IFSC AS AMENDED BY MONTGOMERY COUNTY.</p>	<p>2018 IRC R402.4 AIR LEAKAGE</p> <p>BUILDING THERMAL ENVELOPE. THE BUILDING THERMAL ENVELOPE SHALL BE DURABLY SEALED TO LIMIT INFILTRATION. THE SEALING METHODS BETWEEN DISSIMILAR MATERIALS SHALL ALLOW FOR DIFFERENTIAL EXPANSION AND CONTRACTION. THE FOLLOWING SHALL BE CAULKED, GASKETED, WEATHERSTRIPPED OR OTHERWISE SEALED WITH AN AIR BARRIER MATERIAL, SUITABLE FILM OR SOLID MATERIAL:</p> <ol style="list-style-type: none"> <li>ALL JOINTS, SEAMS AND PENETRATIONS</li> <li>SITE-BUILT WINDOWS, DOORS AND SKYLIGHTS</li> <li>OPENINGS BETWEEN WINDOW AND DOOR ASSEMBLIES AND THEIR RESPECTIVE JAMBS AND FRAMING.</li> <li>UTILITY PENETRATIONS.</li> <li>DROPPED CEILINGS OR CHASES ADJACENT TO THE THERMAL ENVELOPE.</li> <li>KNEE WALLS.</li> <li>WALLS AND CEILINGS SEPARATING A GARAGE FROM CONDITIONED SPACES.</li> <li>BEHIND TUBS AND SHOWERS ON EXTERIOR WALLS.</li> <li>COMMON WALLS BETWEEN DWELLING UNITS.</li> <li>ATTIC ACCESS OPENINGS.</li> <li>RRM JOIST JUNCTION.</li> <li>OTHER SOURCES OF INFILTRATION.</li> </ol> <p>NOTE: AIR PERMEABLE INSULATION (FIBERGLASS/ROCKWOOL/ETC.) SHALL NOT BE USED AS A SEALING MATERIAL. DUCT INSULATION VALUES, MIN. R-6, R-8 IN ATTICS. INSULATION IS NOT REQUIRED IF DUCTWORK IS COMPLETELY WITHIN THE BUILDING THERMAL ENVELOPE. DUCT SEALING METHOD IRC M1601.4.1.</p>	<p><b>WINDOWS:</b></p> <p>ALL WINDOW GLAZING TO BE PER IRC TABLE N1102.1.2. LOW E, ARGON FILLED, UNLESS NOTED OTHERWISE (WINDOWS WITH U-FACTOR OF 0.32, AND SHGC OF 0.40 OR BETTER.) PROVIDE TEMPERED GLASS AT WINDOWS THAT MEET THE IRC 2018 CODE FOR HAZARDOUS GLAZING. PROVIDE WINDOW OPENING LIMITING DEVICES PER CODE. ALIGN TOP OF WINDOWS, BULKHEADS, AND CASED OPENINGS TO ROUGH OPENING OF INTERIOR DOOR U.O.O.</p>	<p><b>WALLS AND CEILING</b></p> <p>1/2" GWB ALL FINISHED WALLS AND CEILING UNLESS NOTED OTHERWISE.</p>	<p>PRIOR TO STARTING CONSTRUCTION, ALL EXISTING CONDITIONS AND DIMENSIONS MUST BE VERIFIED IN THE FIELD.</p> <p>WRITTEN DIMENSIONS ON THESE PLANS SHALL HAVE PRECEDENCE OVER SCALED DIMENSIONS. CONTRACTOR SHALL VERIFY CONDITIONS IN THE FIELD AND NOTIFY ARCHITECT OF VARIATIONS IN DIMENSIONS PRIOR TO START OF CONSTRUCTION.</p> <p>IT IS THE CONTRACTOR'S RESPONSIBILITY TO THOROUGHLY REVIEW ALL PLANS FOR ACCURACY AND COMPLETENESS PRIOR TO THE START OF CONSTRUCTION AND TO REPORT ANY INCONSISTENCIES OR ERROR TO THE OWNER AND/OR ARCHITECT FOR CLARIFICATION OR CORRECTION.</p> <p>ALL APPLICABLE CODES TO BE VERIFIED AND USED ACCORDINGLY.</p> <p>2018 INTERNATIONAL RESIDENTIAL CODE - IRC (AS AMENDED BY MONTGOMERY COUNTY, MD.) AND 2018 INTERNATIONAL ENERGY CONSERVATION CODE - IECC.</p> <p>COORDINATE INSTALLATION OF NEW SMOKE DETECTORS/CARBON MONOXIDE DETECTORS AT EXISTING ROOMS PER IRC 2018 AS IT PERTAINS TO ADDITIONS AND ALTERATIONS TO EXISTING CONSTRUCTION. COORDINATE LOCATIONS WITH OWNER.</p> <p>MEMBERS WILL NOT BE OVERSTRESSED MORE THAN 5%.</p>
LOAD	LIVE LOADS (PSF)																														
ATTIC WITH STORAGE	20																														
ATTIC WITHOUT STORAGE	10																														
ATTIC STUDIO	30																														
DECKS	40																														
FIRE ESCAPES	40																														
GUARDRAILS AND HANDRAILS	200 LB																														
GUARDRAILS IN-FILL COMPONENTS	50																														
PASSENGER VEHICLE GARAGES	50																														
ROOMS OTHER THAN SLEEPING ROOMS	40																														
SLEEPING ROOMS	30																														
STAIRS	40																														
	<p><b>LIST OF DRAWINGS</b></p> <table border="1"> <tr><th>NO.</th><th>DESCRIPTION</th></tr> <tr><td>A1.1</td><td>PERMITTING DATA, NOTES, "ELEVATIONS," ROOF PLAN</td></tr> <tr><td>A1.2</td><td>FRAMING PLANS, SECTION, DETAILS</td></tr> <tr><td>A1.3</td><td>FLOOR PLANS, PORCH FRAMING PLAN, ELEVATION DETAILS</td></tr> </table>	NO.	DESCRIPTION	A1.1	PERMITTING DATA, NOTES, "ELEVATIONS," ROOF PLAN	A1.2	FRAMING PLANS, SECTION, DETAILS	A1.3	FLOOR PLANS, PORCH FRAMING PLAN, ELEVATION DETAILS																						
NO.	DESCRIPTION																														
A1.1	PERMITTING DATA, NOTES, "ELEVATIONS," ROOF PLAN																														
A1.2	FRAMING PLANS, SECTION, DETAILS																														
A1.3	FLOOR PLANS, PORCH FRAMING PLAN, ELEVATION DETAILS																														



1 FRONT "ELEVATION"  
SCALE: NA



2 RIGHT "ELEVATION"  
SCALE: NA



3 ROOF PLAN  
SCALE: 1/8" = 1'-0"

**MASONRY:**

- CONCRETE MASONRY UNITS (CMU) PLACED IN RUNNING BOND UNLESS OTHERWISE SHOWN.
- MINIMUM COMPRESSIVE STRENGTH OF CMU UNITS = 1,900 PSI., AND OVERALL FM NOT LESS THAN 1,500 PSI.
- MORTAR SHALL BE TYPE M OR TYPE S.
- GROUT MIN. COMPRESSIVE STRENGTH 2,000 PSI. IN 28 DAYS.
- MAXIMUM HEIGHT OF GROUT POUR SHALL BE FOUR FEET UNLESS CLEAN OUTS PROVIDED, AND SPECIAL PERMISSION BY THE ENGINEER HAS BEEN OBTAINED.

**MASONRY REINFORCING:**

- REINFORCING SHALL BE PER THE PLANS, HOWEVER IN NO CASE SHALL IT BE LESS THAN THE FOLLOWING:
- USE #4 HORIZONTAL REBAR AT 48 INCHES ON CENTER, AND #4 VERTICAL REBAR AT 48 INCHES ON CENTER. ALL VERTICAL BARS SHALL BE CONTINUOUS OR LAPPED 40 BAR DIAMETERS UNLESS OTHERWISE CALLED OUT.
- PROVIDE JAMB, SILL, MULLION, CORNER, AND LINTEL STEEL PER PLANS, HOWEVER NEVER LESS THAN ONE #4 EXTENDING 24 INCHES BEYOND ALL SIDES OF ALL OPENINGS AND #4 VERTICAL REBAR IN THE CORNERS AND AT ALL CMU INTERSECTIONS. (2) #4 REBAR REQUIRED IN BOND BEAM AT TOP OF WALLS.
- WHERE NOT SHOWN IN THE PLANS, PROVIDE MINIMUM REBAR IN ACCORDANCE WITH THE IRC.
- REBAR SHALL BE GRADE 40 (FY = 40 KSI) UNLESS NOTED OTHERWISE.
- DEVELOPMENT LENGTHS FOR REBARS SHALL BE 80 BAR DIAMETERS, OR AS SHOWN IN THE PLANS.
- LAP ALL SPLICE BARS 40 BAR DIAMETERS, OR AS SPECIFIED IN THE PLANS.
- BARS SHALL BE BENT WITH MINIMUM DIAMETER OF 6 BAR DIAMETERS FOR SIZES UP TO AND INCLUDING NO. 8, ASSUMING GR50 OR GR60. BARS SHALL BE BENT WITH MINIMUM DIAMETER OF 5 BAR DIAMETERS FOR SIZES UP TO AND INCLUDING NO. 7, ASSUMING GR40.
- REBAR SHALL BE PLACED IN THE CENTER OF ALL CELLS, UNLESS OTHERWISE SHOWN IN THE PLANS, AND SHALL BE SECURED AGAINST DISPLACEMENT PRIOR TO GROUTING BY SUITABLE DEVICE.
- ONLY CELLS CONTAINING REBAR NEED BE GROUTED, HOWEVER, ALL CELLS MAY BE GROUTED AT THE CONTRACTOR'S OPTION, AND WITH PERMISSION OF THE ENGINEER.
- ALL REINFORCING SHALL BE DETAILED, BOLSTERED AND SUPPORTED IN ACCORDANCE WITH THE IBC.

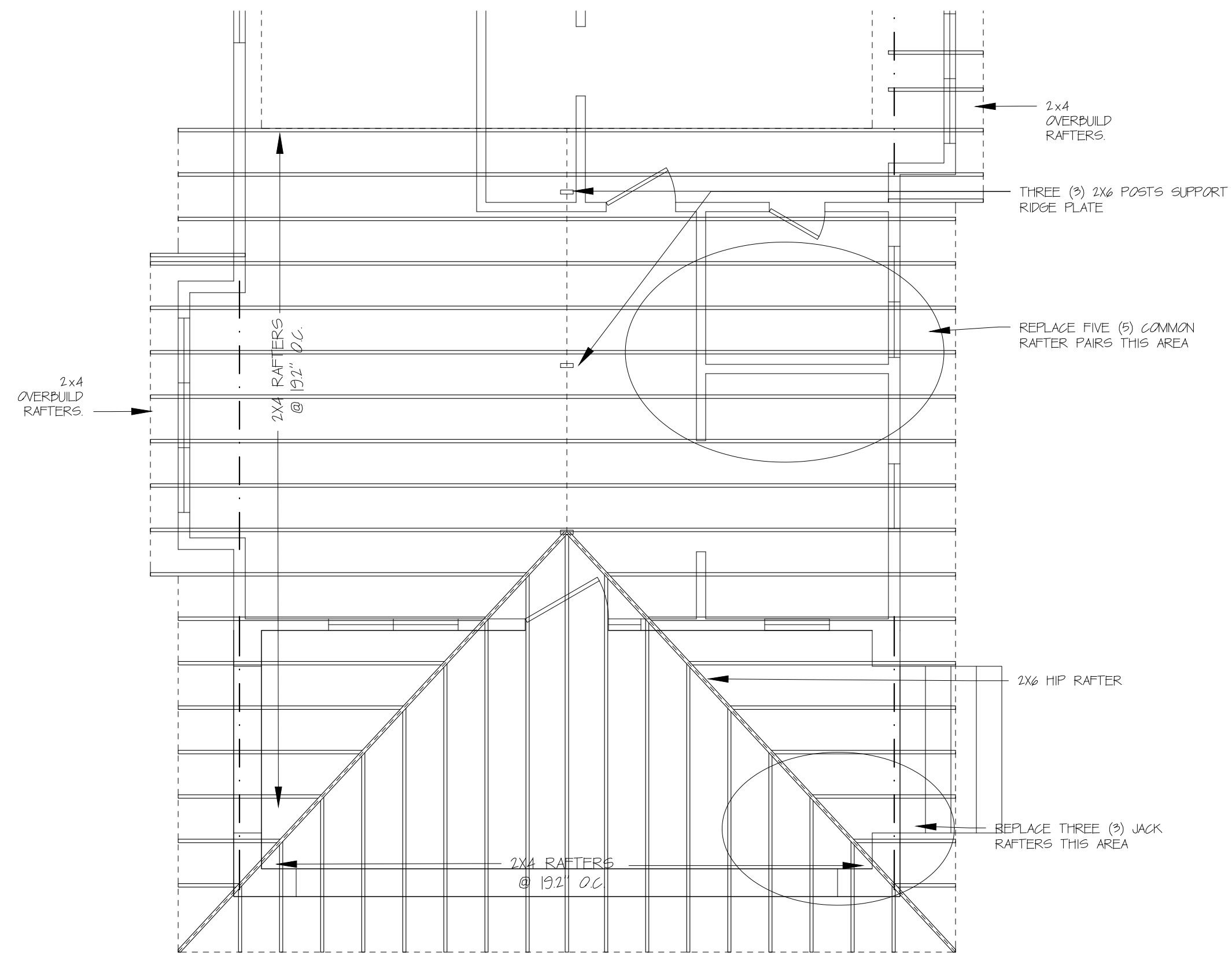
**CONCRETE:**

- ALL CONCRETE, SHALL ATTAIN A 28 DAY STRENGTH OF FC = 3,500 PSI, AND SHALL CONTAIN NOT LESS THAN 5-1/2 SACKS OF CEMENT PER CUBIC YARD. MAXIMUM WATER/CEMENT RATIO SHALL BE 0.45, AND MAXIMUM SLUMP = 4". MAX. AGGREGATE SIZE = 7/8". MIXING AND PLACING OF ALL CONCRETE AND SELECTION OF MATERIAL TO BE IN ACCORDANCE WITH IBC AND ACI 304 (LATEST EDITIONS). PROVIDE 5% AIR ENTRAINING IN ALL CONCRETE EXPOSED TO THE EARTH OR WEATHER. MECHANICAL CONSOLIDATION IS REQUIRED.
- CONCRETE ADMIXTURES. ALL ADMIXTURES ARE ENTIRELY AT THE DISCRETION OF THE CONTRACTOR AND / OR CONCRETE BATCH PLANT AND MUST NOT AFFECT THE MINIMUM REQUIREMENTS HEREIN.
- REINFORCING BARS (REBAR) SHALL BE PER DRAWINGS AND SKETCHES ATTACHED, AND SHALL BE GRADE 60 (FY = 60 KSI), UNLESS NOTED OTHERWISE. ALL REINFORCING SHALL BE DETAILED, BOLSTERED AND SUPPORTED IN ACCORDANCE WITH APPLICABLE ACI CODE. BARS SHALL BE BENT WITH MINIMUM INSIDE DIAMETER 6 DB FOR SIZES UP TO AND INCLUDING NO. 8, AND MINIMUM INSIDE DIAMETER 8 DB FOR BARS LARGER THAN NO.8. (WHERE DB = DIAMETER OF BAR.)
- PROVIDE THE FOLLOWING MINIMUM REBAR COVER:

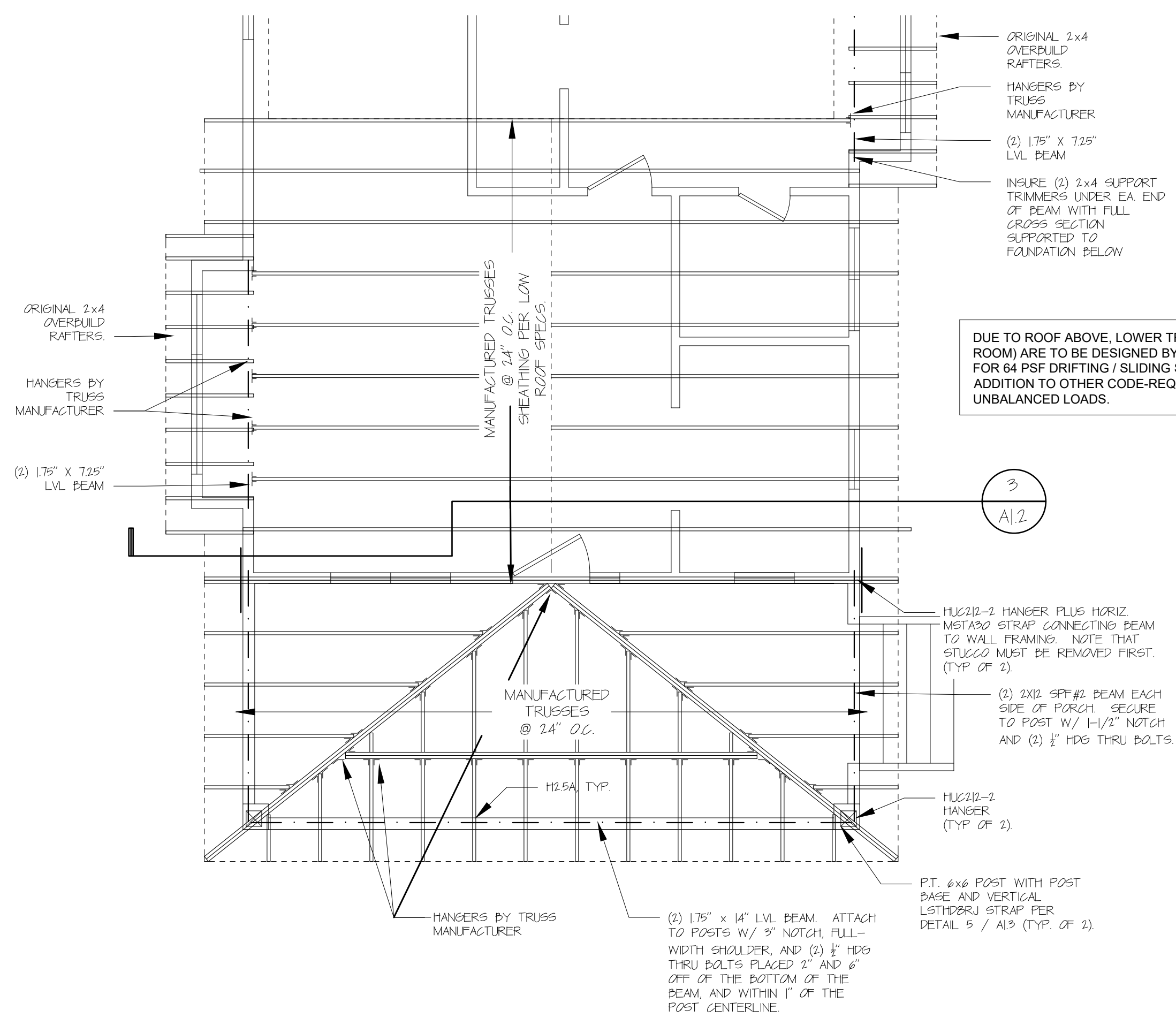
  - FOOTINGS AND OTHER UNFORMED SURFACES, DISTANCE FROM THE BAR TO EARTH FACE = 3"
  - FORMED SURFACES IN DIRECT CONTACT WITH EARTH = 2"
  - SURFACES EXPOSED TO WEATHER = 1-1/2"
  - SURFACES EXPOSED TO SALT WATER = 3"

- SPLICE, LAP, AND DEVELOPMENT LENGTHS SHALL BE 48 BAR DIAMETERS UNLESS NOTED OTHERWISE. ASSUMES GR60 UNCOATED REBAR AND 2500 PSI CONCRETE MIN. (I.E. #5 REBAR = 30" MIN.). SEE ACI 318, SECTION 12.2 FOR OTHER CONDITIONS.
- CONCRETE AND MASONRY MATERIALS SHALL BE PROTECTED DURING CURING AGAINST HOT AND COLD CONDITIONS PER ACI. FORM INSULATION, CURING COMPOUNDS, ADMIXTURES, AND TEMPERATURES OF MIX COMPONENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.

MONTGOMERY COUNTY RESERVED SPACE

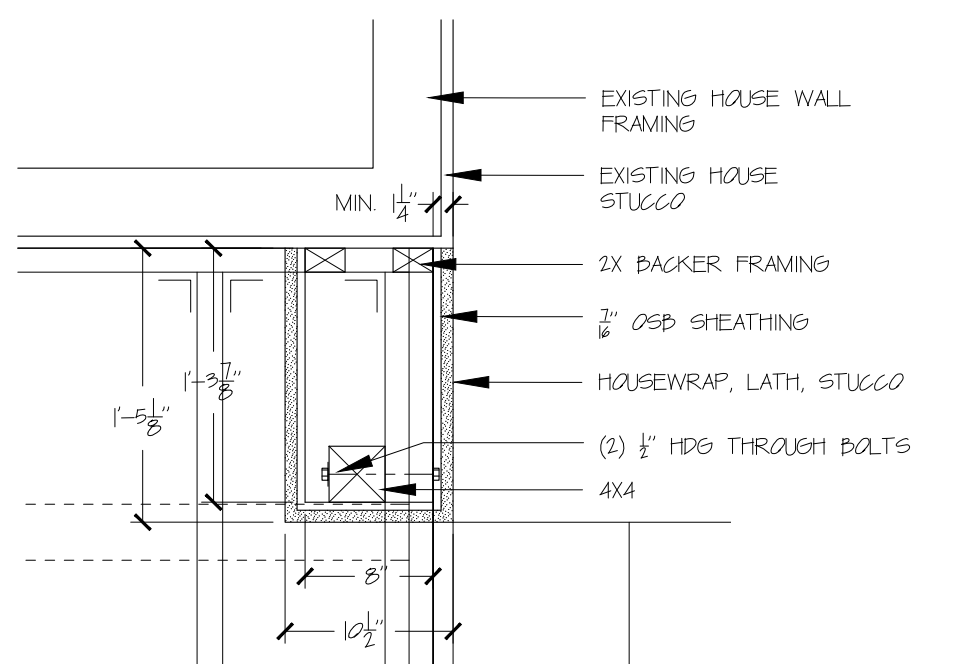


1 EXISTING ROOF FRAMING PLAN  
SCALE: 1/4" = 1'-0"

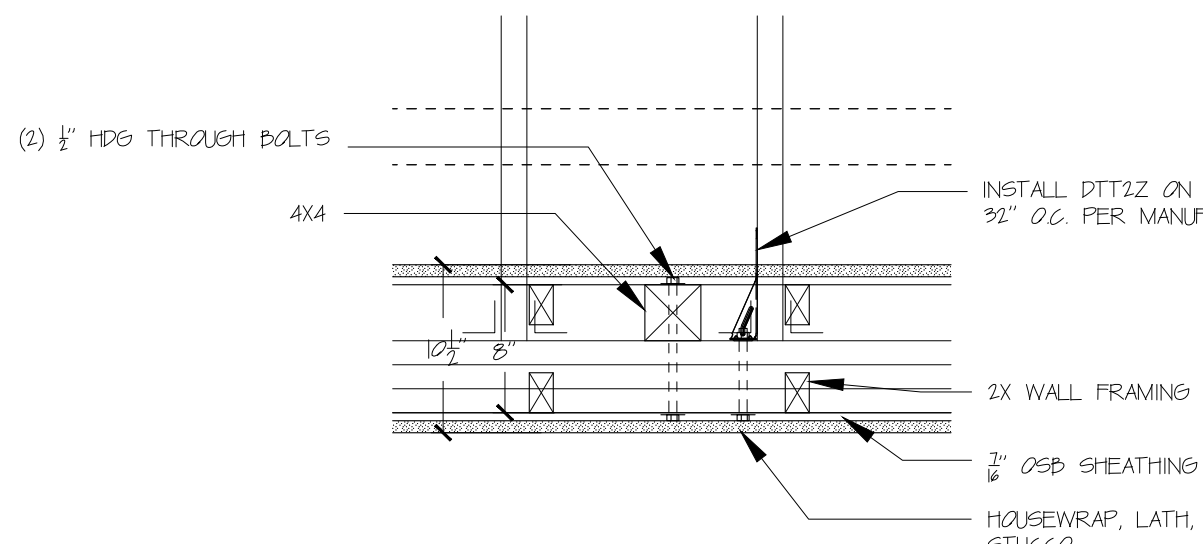


2 NEW ROOF FRAMING PLAN  
SCALE: 1/4" = 1'-0"

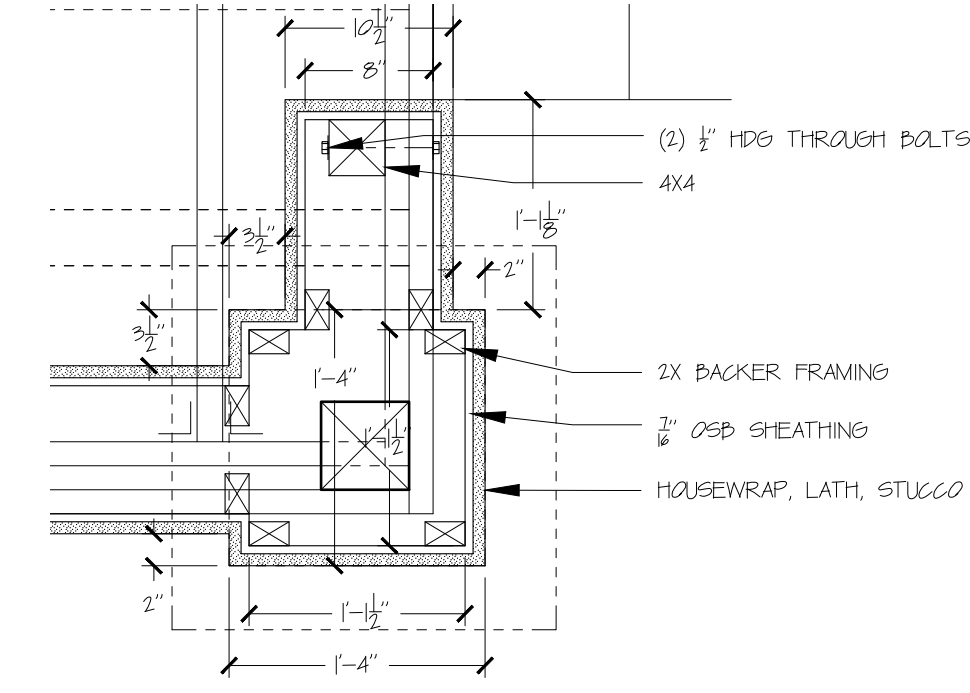
DUE TO ROOF ABOVE, LOWER TRUSSES (OVER LIVING ROOM) ARE TO BE DESIGNED BY LICENSED PROFESSIONAL FOR 64 PSF DRIFTING / SLIDING SNOW FROM ABOVE, IN ADDITION TO OTHER CODE-REQ'D BALANCED AND UNBALANCED LOADS.



4 SIDE STAIR PARAPET WALL DETAIL  
SCALE: 1/4" = 1'-0"

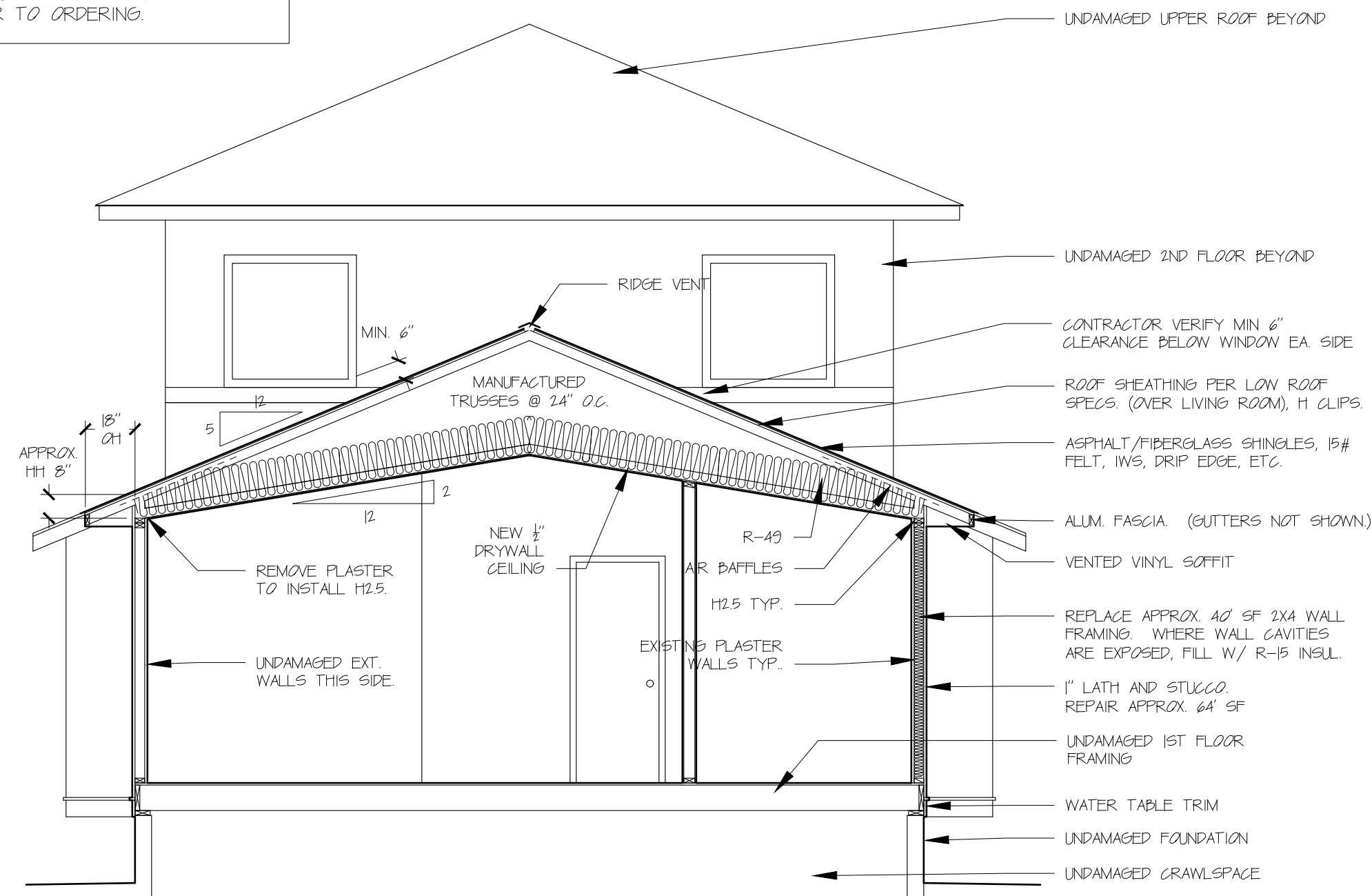


5 FRONT PARAPET PLAN DETAIL  
SCALE: 1" = 1'-0"



6 COLUMN PLAN DETAIL  
SCALE: 1/4" = 1'-0"

NOTE: TRUSSES SHOWN FOR PICTORIAL/ARCHITECTURAL PURPOSES. CONTRACTOR SHALL MEASURE AND VERIFY DIMENSIONS PRIOR TO ORDERING.



3 INTERIOR SECTION  
SCALE: 1/4" = 1'-0"

APPROVED  
Montgomery County  
Historic Preservation Commission  
*Sandra L. Heiler*

REVIEWED  
By Dan.Bruechert at 2:36 pm, Feb 01, 2021

MACKAY  
CONSTRUCTION  
SERVICES, INC.  
ENGINEER  
ROBERT MACKAY  
PROFESSIONAL CERTIFICATION  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.  
LICENSE NUMBER 46366  
EXPIRATION DATE: 1/11/2023

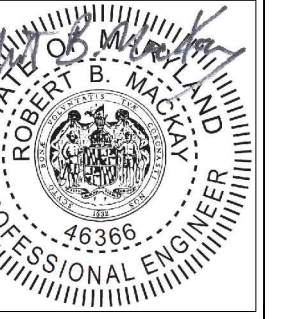
FRAMING PLANS, SECTION,  
DETAILS  
7417 BALTIMORE AVENUE  
TAKOMA PARK, MD 20912

BREGMAN REPAIRS

REVISIONS:  
Permit: 1-26-2021

SHEET NUMBER:

A1.2



PROFESSIONAL CERTIFICATION:  
I HEREBY CERTIFY THAT THESE  
DOCUMENTS WERE PREPARED  
OR APPROVED BY ME, AND THAT I  
AM A FULLY LICENSED  
PROFESSIONAL ENGINEER  
UNDER THE LAWS OF THE STATE  
OF MARYLAND.  
LICENSE NUMBER: 46386  
EXPIRATION DATE: 11/11/2023

FLOOR PLANS, PORCH FRAMING  
PLAN, ELEVATION DETAILS  
7417 BALTIMORE AVENUE  
TAKOMA PARK, MD 20912

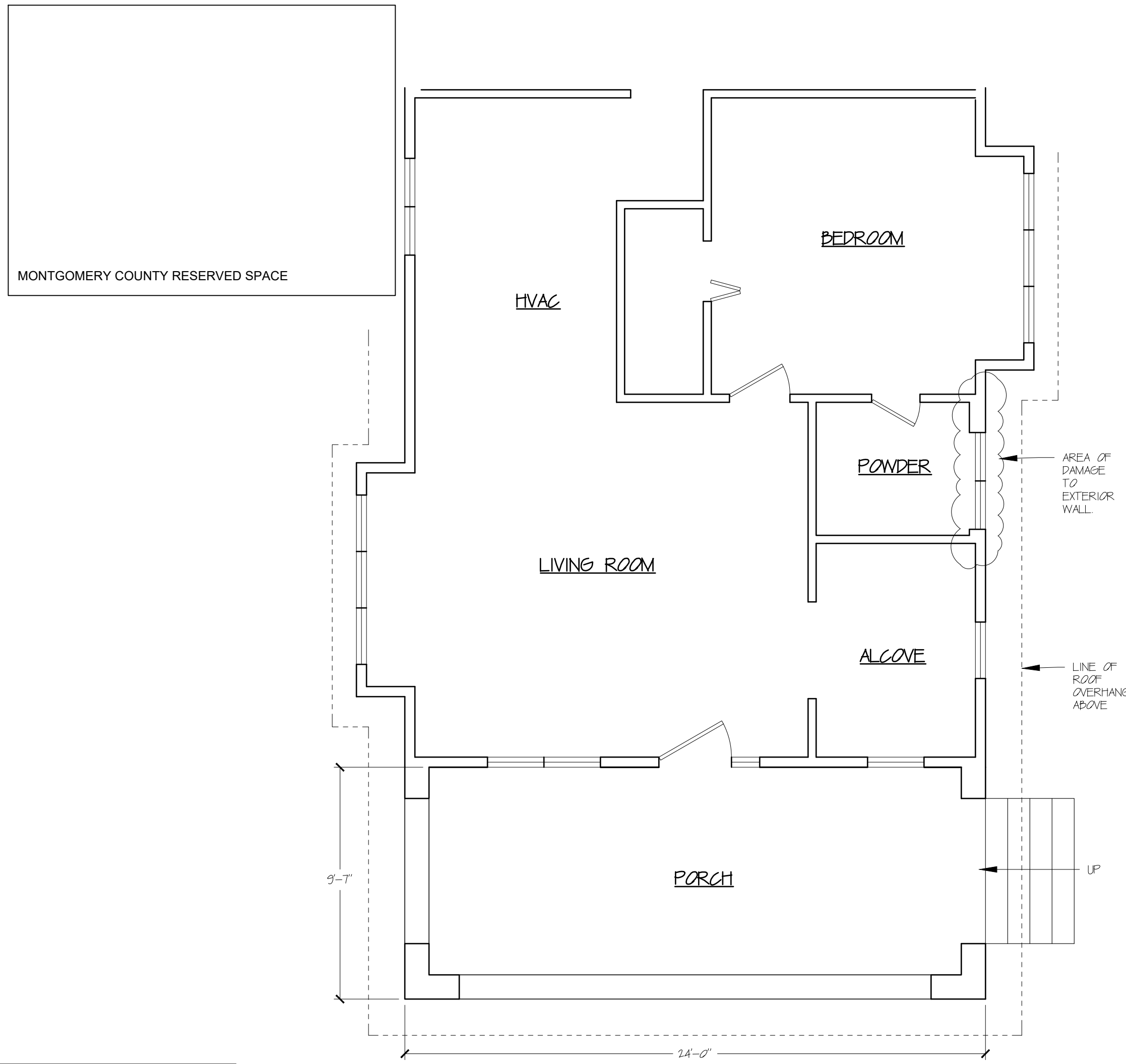
BREGMAN REPAIRS

REVISIONS:

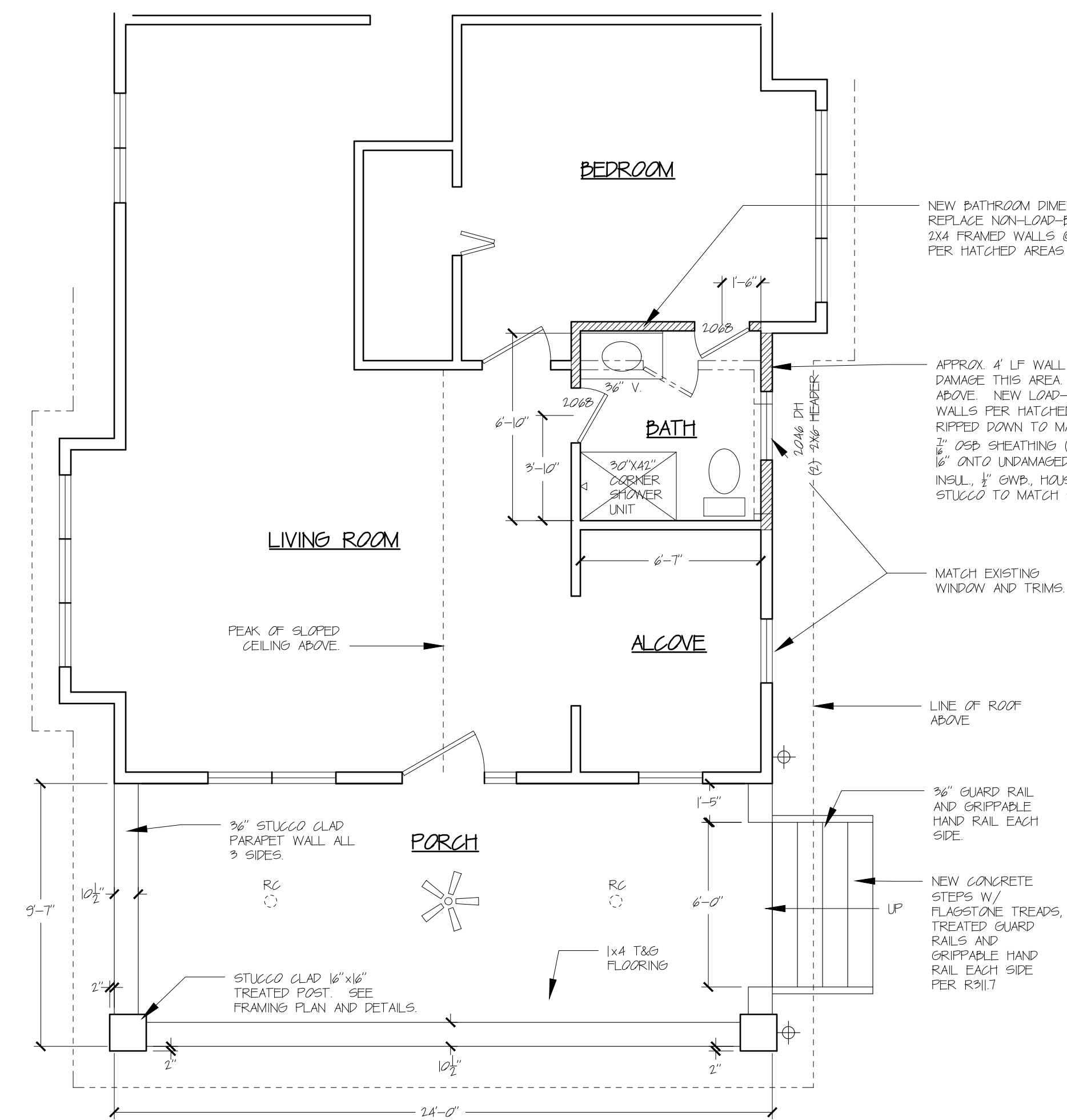
Permit: 1-26-2021

SHEET NUMBER:

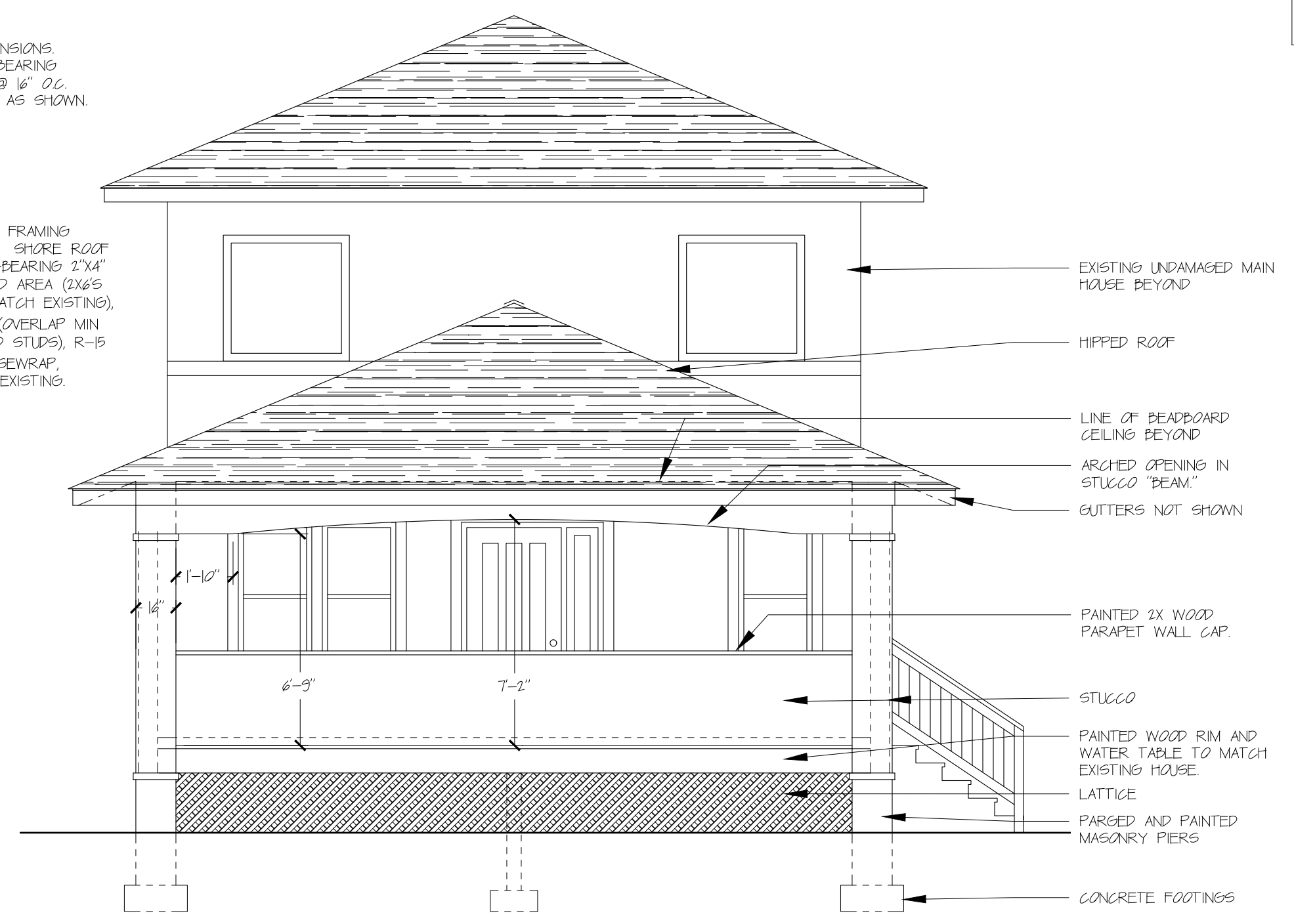
A1.3



1. EXISTING MAIN FLOOR PLAN  
A1.3 SCALE: 1/4" = 1'-0"



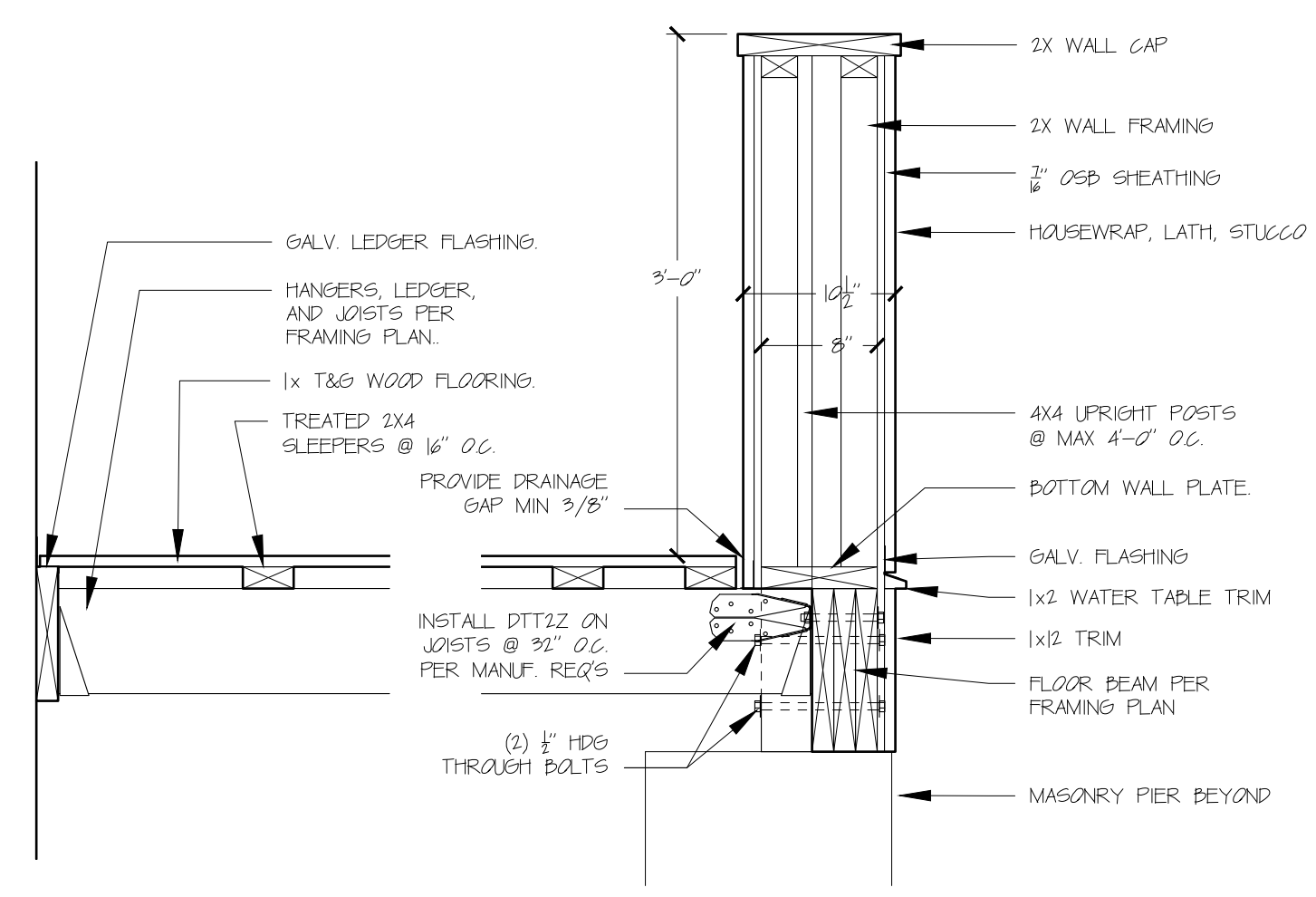
2. PROPOSED NEW FLOOR PLAN  
A1.3 SCALE: 1/4" = 1'-0"



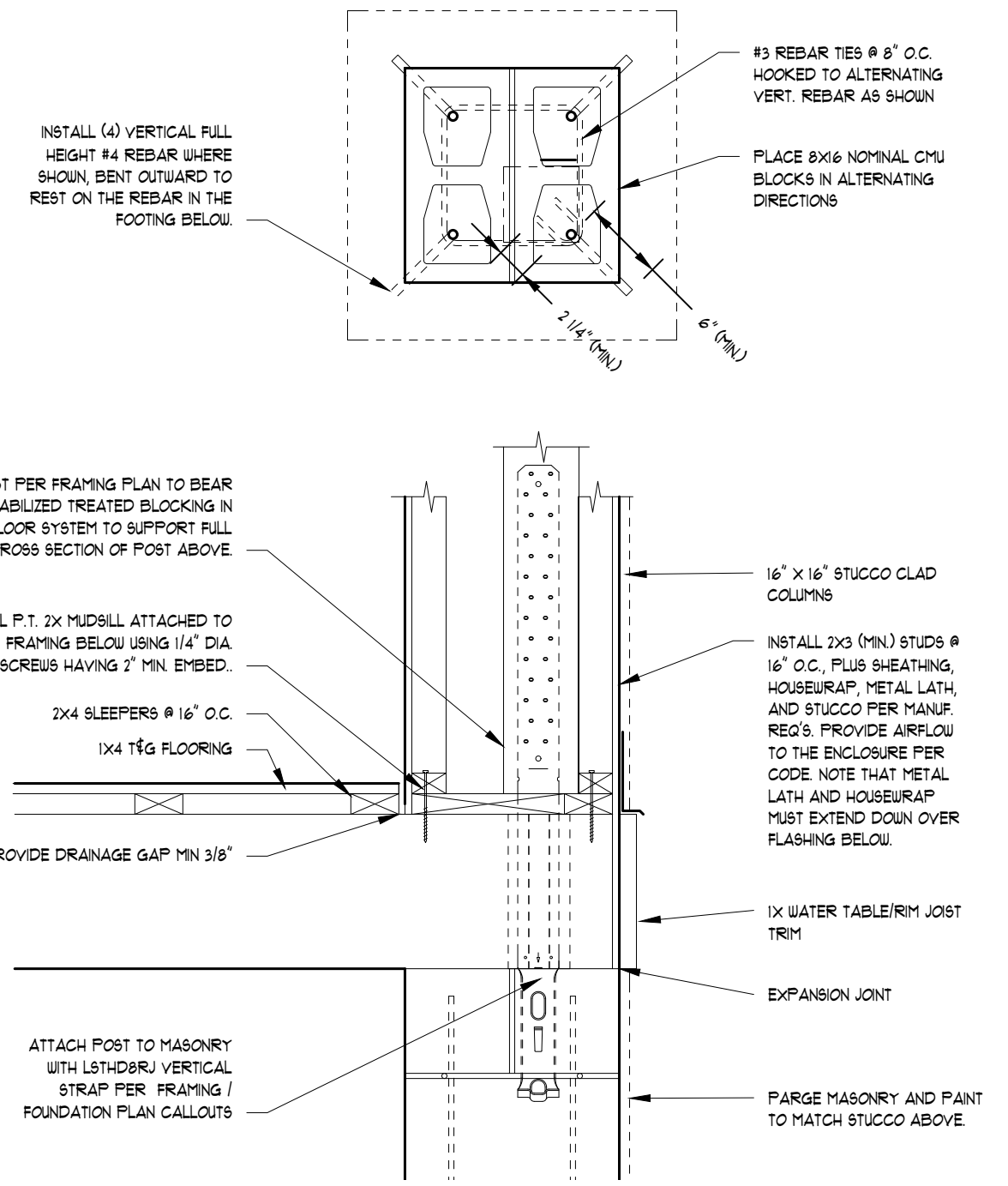
3. PROPOSED NEW PORCH ELEVATION  
A1.3 SCALE: 1/4" = 1'-0"

APPROVED  
Montgomery County  
Historic Preservation Commission  
*Sandra L. Heiler*

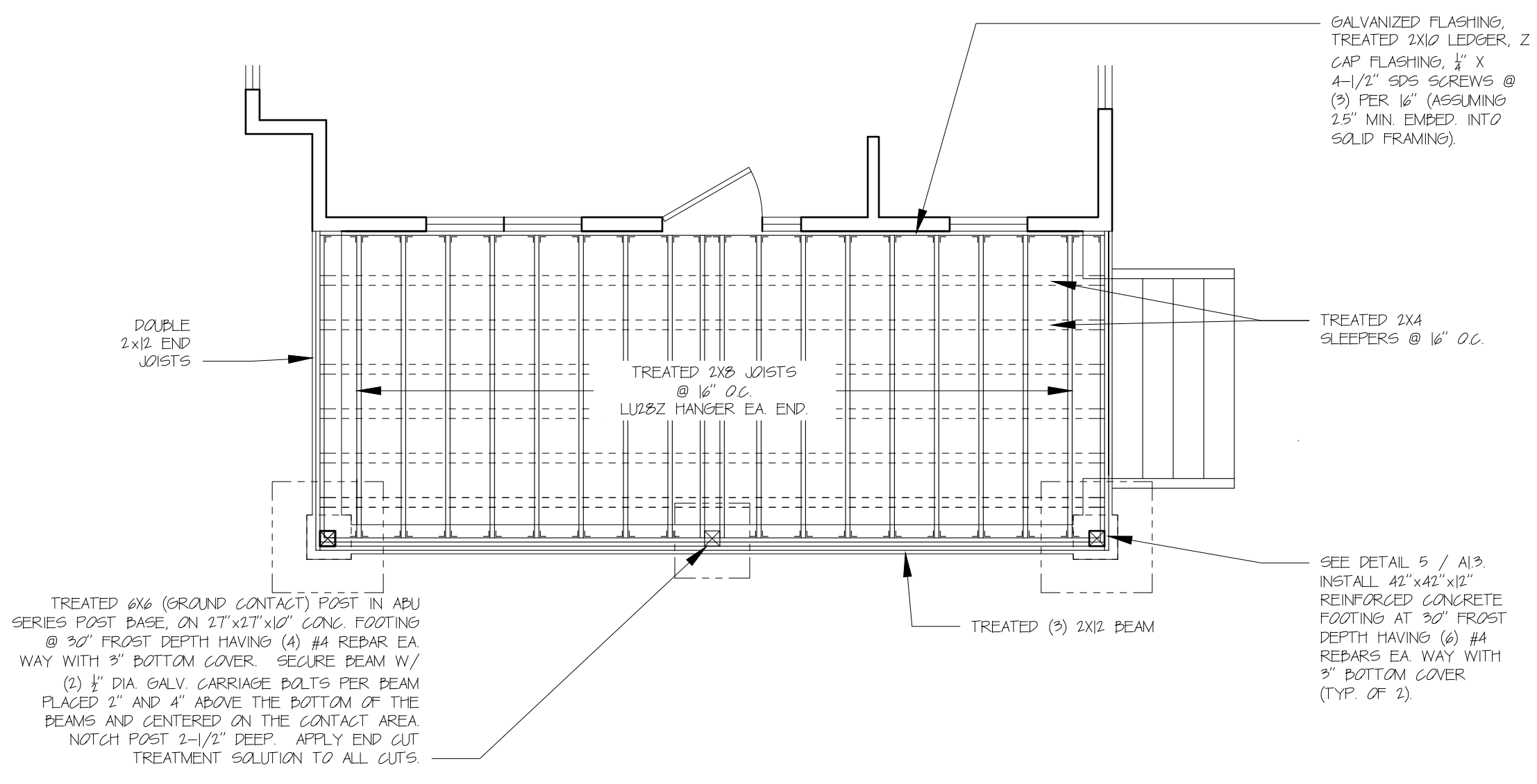
REVIEWED  
By Dan.Bruechert at 2:36 pm, Feb 01, 2021



6. FRONT PARAPET WALL DETAIL  
A1.3 SCALE: 1" = 1'-0"



5. PROPOSED PORCH PLINTH DETAIL  
A1.3 SCALE: 1" = 1'-0"



4. PROPOSED NEW PORCH FLOOR FRAMING PLAN  
A1.3 SCALE: 1/4" = 1'-0"

## **STANDARD STRUCTURAL SPECIFICATIONS:**

### **1) LOADS.**

a) Following are the loads used for the subject design / analysis:

- i) Ground Snow Load = 30 psf.
- ii) Wind: 115 mph 3-second gust wind speed, Exposure 'B'.
- iii) Roof Dead Load = 15 psf.
- iv) Floor Dead Load = 12 psf
- v) Deck Floor Dead Load = 10 psf

### **2) APPLICABILITY OF THESE SPECIFICATIONS:**

- a) These specifications shall be adhered to for all work addressed in this report.
- b) Some sections of these specifications may not apply to the scope of work of MacKay Construction Services. (MCS). Use of these specifications for work outside of MCS's scope shall be at the sole risk of the Contractor.

### **3) LIMITED SCOPE OF MCS'S WORK:**

- a) The scope of work of MacKay Construction Services (MCS) is limited to the partial gravity analysis of the roof and floor system near the front of the home per plan. MCS takes no responsibility or liability for items not specifically addressed in the calcs, sketches, or call-outs.
- b) MCS has not analyzed other portions of the existing building, including but not limited to: roof framing, floor framing, wall framing, foundations, etc. Such analyses are beyond the present scope of work assigned to MCS by the client.
- c) All structural and other matters not shown or addressed in the following calculations and sketches do not form part of the scope of work of MCS.
- d) Structural analysis, design and specifications apply for one structure at the location shown in this report only. MCS cannot be held liable for unauthorized reuse of this work at a different location(s).

### **4) OWNERSHIP OF THIS REPORT:**

- a) Ownership of this report, all calculations, sketches, and other intellectual information pertaining to the project shown herein shall remain the sole property of MCS. MCS will furnish copies of this information to others only with the express permission of the Client.
- b) These calculations, sketches, notes, and specifications are valid only for the project indicated herein. These documents are not valid, and shall not be used for any other project.

### **5) COMPLETION OF MCS'S CURRENT SCOPE OF WORK:**

- a) Submittal of this report to the Client completes the present scope of work and budget of MCS for this project. All other consultation, design, calculations, sketches, inspection, etc. after submittal of this report shall be billed on a time and materials basis at MCS's current fee schedule.

### **6) BASIS OF DESIGN – APPLICABLE CODES:**

- a) This design is based on the International Residential Code, 2018. All construction shall adhere to the minimum requirements of the 2018 International Building Code, unless shown otherwise in this report. Contractor shall be responsible to comply with all OSHA and State Labor and Industries Standards. Contractor assumes full responsibility as to construction methods used, safety provisions employed, and the finished as-built condition of the structure and related systems.

### **7) COMPETENT CONSTRUCTION PERSONNEL:**

- a) Only competent personnel familiar with construction and safety practices germane to the project shown herein should be employed to assemble and construct the work.

**8) TEMPORARY SUPPORT AND BRACING:**

- a) General. Provide adequate temporary support to all walls, roofs, beams, columns, and floors during construction. Design of same is not included herein, unless specifically shown. Contractor or owner should check all temporary-supporting devices with a qualified person. Contractor shall be responsible for the adequacy of all temporary and/or permanent support systems.

**9) CONFLICTS OR ERRORS IN PLANS:**

- a) Contractor shall verify all dimensions and 'fit' conditions in the field. Should the Contractor or fabricator note any conflicts or errors in the Plans and/or specifications, they shall be brought to the immediate attention of the Engineer. If any questions arise during construction pertaining to any structural matter, the Engineer shall be consulted immediately.

APPROVED

Montgomery County

Historic Preservation Commission

*Sandra L. Heiler*

**REVIEWED**

*By Dan.Bruechert at 2:36 pm, Feb 01, 2021*

# Gravity Roof Loads



**Assumptions.** The values shown are typical standards from published sources. The user shall confirm all materials and weights used.

**Disclaimer:** All users of this software shall comply with State Engineering Law, which specifies who may perform engineering, and defines the practice of engineering.

<b>Job Name</b>	Bregman Roof
<b>Other Info.</b>	
<b>Other Info.</b>	
<b>Other Info.</b>	
<b>Other Info.</b>	

Dead Loads: Roofing Materials				Width (If Needed)	Depth (If Needed)	Spacing, Layers, Or Thickness (If Needed)	Subtotals Dead Weight (psf)	
<input checked="" type="checkbox"/>	Conventionally Framed Trusses					24 in o.c.	2.67	
<input type="checkbox"/>	Wood Rafters or Purlins	0	in	0	in	0 in o.c.	-	
<input type="checkbox"/>	Wood Ceiling Joists	0	in	0	in	0 in o.c.	-	
<input type="checkbox"/>	Light Gauge Metal Roof (26 - 29 ga.)					0 layer(s)	-	
<input checked="" type="checkbox"/>	3-Tab Composition Shingle Roof					2 layer(s)	6.00	
<input type="checkbox"/>	Cement Concrete Tile (normal weight)						-	
<input type="checkbox"/>	Heavy Clay Tile w/ Mortar Setting Bed						-	
<input checked="" type="checkbox"/>	Roof Sheathing					1/2 in	1.50	
<input checked="" type="checkbox"/>	Insulation & Wiring						1.00	
<input checked="" type="checkbox"/>	Gypsum Ceiling Board					1/2 in	2.00	
<input type="checkbox"/>	Tongue & Groove Decking					0 in	-	
	Other:							0 psf
	Other:							0 psf
<b>Total Dead Weight Of Roof Components (Per Square Foot Over Sloped Roof)</b>							<b>13.2 psf</b>	
<b>Dead Load On Horizontal Projected Area:</b>								
Roof Slope 1	5.0	/	12	<b>15 psf</b>		Roof Slope 1		
Roof Slope 2		/	12	<b>14 psf</b>		Roof Slope 2		

<b>Roof Live Load:</b>	
Slope less than 12:12, but greater than 4:12	16.0 psf
Other Roof Live Load:	0 psf
<b>Total Roof Live Load:</b>	<b>16.0 psf</b>
(Description)	

<b>Snow Loads:</b>	
Snow Slope Reduction Method:	Standard UBC Ch. 16. (Recommended in most cases.)
Basic Roof Snow Load:	0.0 psf
Roof pitch (from above):	Slope 1 (5.0 / 12)      Slope2 (0.0 / 12)
<b>Slope Reduced, Balanced S.L.:</b>	<b>0 psf      0 psf</b>
<b>Slope Reduced, Unbalanced S.L.:</b>	<b>0 psf      0 psf</b>
Note: The gravity loads on this sheet are <b>not</b> electronically linked to other ConstructionCalc programs.	



# Gravity, Floor Loads

**Assumptions.** The values shown are typical standards from published sources. The user shall confirm all materials and weights used.



www.constructioncalc.com

Job Name: Bregman Roof  
 Other Info:  
 Other Info:  
 Other Info:  
 Other Info:

Dead Loads: Flooring Materials		Width (If Needed)	Unit Weight ('plf' load); or Depth (If Needed)	Spacing; Or Thickness (If Needed)	Subtotals Dead Weight (psf)
Type of Material					
<input type="checkbox"/> Engineered Floor Joists			0.0 plf	0 in o.c.	-
<input checked="" type="checkbox"/> Lumber Floor Joists		1 1/2 in	7 1/4 in	16 in o.c.	1.94
<input checked="" type="checkbox"/> Floor Sheathing				1 1/2 in	4.50
<input type="checkbox"/> 3/4" Quarry Tile					-
<input type="checkbox"/> Hardwood Flooring				0 in	-
<input type="checkbox"/> Gypcrete, Lightweight Concrete (120 pcf)				0 in	-
<input type="checkbox"/> Concrete (150 pcf)				0 in	-
<input type="checkbox"/> Carpet or Linoleum					-
<input type="checkbox"/> Wiring, Plumbing, & Duct Work					-
<input type="checkbox"/> Gypsum Ceiling Board				0 in	-
<input type="checkbox"/> Tongue & Groove Floor or Ceiling Boards				0 in	-
Other:					0 psf
Other:					0 psf
<b>Total Dead Load:</b>					<b>7 psf</b>

<b>Floor Live Load</b>	
Residential: floors, decks, and storage	40.0 psf
Other Floor Live Load:	0 psf (Description)
<b>Total Floor Live Load:</b>	<b>40.0 psf</b>

<b>Wall Dead Load</b>	
Stick framed, gyp inside, wood siding outside	10.0 psf
Other Wall Dead Load:	12 psf (Description) Add'l for Stucco
<b>Total Wall Dead Load:</b>	<b>22.0 psf</b>

# Structural Design Loads - ASCE 7-10

## Seismic Calculations - Per ASCE 7-10

Project: Bregman Roof

C3

Equivalent Lateral Force Procedure ASCE 7-10 (12.8)  
Earthquake Spectral Response Accelerations

Approx. Site Location  
USGS 0.2 Second Response  
USGS 1.0 Second Response

Takoma Park, MD  
S<sub>s</sub> = 14.0 % of gravity  
S<sub>1</sub> = 7.0 % of gravity

Note: Assuming 5% Critical Damping, Site Class B  
and 2% Probability Of Exceedance In 50 Years

I<sub>E</sub> = 1.00  
S<sub>MS</sub> = 14.000  
S<sub>M1</sub> = 10.500  
S<sub>DS</sub> = 9.333  
S<sub>D1</sub> = 7.000  
C<sub>Ts</sub> = 0.020  
T<sub>a</sub> = 0.237  
C<sub>U</sub> = 1.400  
T = 0.332  
C<sub>smax</sub> = 3.247  
C<sub>smin</sub> = 0.538  
C<sub>s</sub> = 1.436

Site Class

Occupancy Category (& Seismic Use)

Structural System

Long-period Transition Period (See Fig 22-15)  (Link)  
Elev. Of Top Of Building

Design Categories  
For Short Period Response A  
For 1 Second Period Response A  
Required Seismic Design Category **A** (Unless Higher Per Local Code)

Height Limit (feet)   
(NL - No Limit, NP - Not Permitted)

Max. Allowable Story Drift

Seismic Base Shear

## Wind Loads Per ASCE 7-10 - MWFRS (Directional Procedure), Part 1

Applicable for Main Force Resisting Systems of Rigid Buildings of All Heights

Building Wind Exposure

Enclosure Classification

GC<sub>pi</sub> (Max) = 0.18  
GC<sub>pi</sub> (Min) = -0.18

Wind Speed Type

3-Second Gust Wind Speed

I<sub>w</sub> = 1.00

Roof Pitch 1  /12

θ =

Roof Pitch 2  /12

θ =

Hill Shape

Downwind **no**

Building Width Perp. To Ridge

Building Length Parallel To Ridge

Mean Height Of Roof (ft)

z = 24.00 ft

Directionality Constant

K<sub>1</sub> = 0.000

K<sub>2</sub> = #DIV/0!

K<sub>3</sub> = #DIV/0!

Height of Hill or Escarpment

Narrowest Half-Width of Hill at Half-Height

Horiz. Distance From Crest To Bldg. Site

Topographic Factor

Gust Effect Factor

Velocity Press. Exposure Coefficient

ASCE7 Load Factor for ASD Wind - 2.4.1  (Applies To All Wind Pressures)

Velocity Pressure

### Windward Wall Pressures

Elev	Windward Wall
0-15 feet	6.69 psf
15-20 feet	7.28 psf
20-25 feet	7.75 psf
25-30 feet	8.22 psf
30-40 feet	8.92 psf
40-50 feet	9.51 psf
50-60 feet	9.98 psf
60-70 feet	10.45 psf
70-80 feet	10.92 psf

### Overhang Uplift

Elev	Pressure (On Worst Roof Slope)
0-15 feet	12.48 psf
15-20 feet	13.07 psf
20-25 feet	13.54 psf
25-30 feet	14.01 psf
30-40 feet	14.71 psf
40-50 feet	15.30 psf
50-60 feet	15.77 psf
60-70 feet	16.24 psf
70-80 feet	16.71 psf

### Internal Pressure

Internal Pressure
+/- 3.40 psf

C4

### Transverse (Perp. To Ridge)

Leeward Wall	Side Walls
-4.82 psf (Outward)	-6.75 psf (Outward)

Windward Roof - Slope 1 - 5.00 / 12	Windward Roof - Slope 2 - 5.00 / 12
-5.06 psf Option 1	-5.06 psf
-0.30 psf Option 2	-0.30 psf

Leeward Roof - Slope 1 - 5.00 / 12	Leeward Roof - Slope 2 - 5.00 / 12
-5.79 psf (Outward)	-5.79 psf (Outward)

### Longitudinal (Parallel To Ridge)

Leeward Wall	Side Walls
-2.67 psf (Outward)	-6.75 psf (Outward)

Roof Pressures - Based On Posn. Down Ridge	Pressure
0 to h/2	-8.68 psf
h/2 to h	-8.68 psf
h to 2h	-8.68 psf
> 2h	-8.68 psf

### Typical Elements

Mid-Wall Studs	24.21 psf	
Mid-Roof Rafters	20.43 psf	Slope 1
Mid-Roof Rafters	20.43 psf	Slope 2

## Snow Load Calculations Per ASCE 7-10

Roof Shelter Selection

Thermal Factor

Roofing Material

Calculation Method Choice

Input Ground Snow Load  $p_{in} = 30$  psf  $I_s = 1.00$   
 Horiz. Dist. From Eave To Ridge  $W_1 = 14$  ft (Max. For Slope 1)  $C_e = 1.00$   
 Horiz. Dist. From Eave To Ridge ( $I_u$ )  $W_2 = 14$  ft (Max. For Slope 2)  $C_t = 1.00$

Adjusted Flat Roof Snow Load  $p_f = 21.00$  psf  $C_{s1} = 1.00$   
 Calculated Ground Snow Load  $p_g = 30.00$  psf  $C_{s2} = 1.00$   
 Overhang / Ice Dam Load  $2 \times p_f = 42.00$  psf (Depends On Thermal Factor)  $\gamma = 17.90$  pcf

Reduced Snow Load For Slope 1  $p_{s1} = 21.00$  psf (On Horiz. Area)

Reduced Snow Load For Slope 2  $p_{s2} = 21.00$  psf (On Horiz. Area)

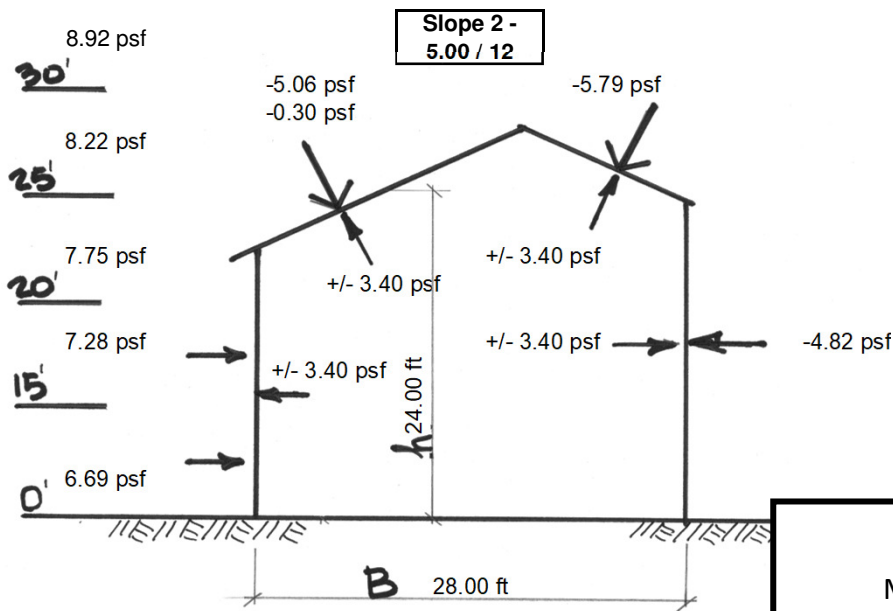
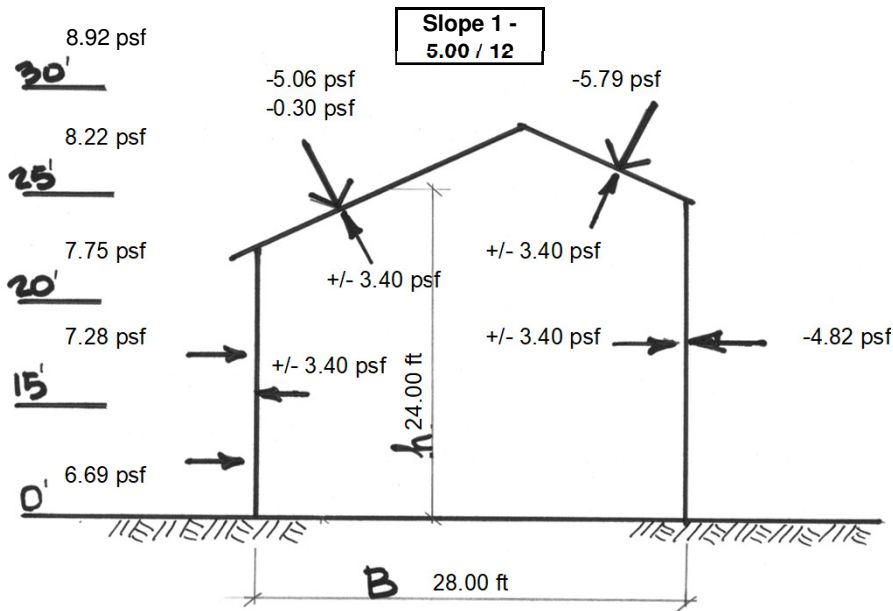
### Balanced / Unbalanced Snow Loads For Hip & Gable Roofs

Slope 1 - 5.00 / 12 Pitch

	Left Side	Right Side
Case 1 - Balanced	21.00 psf	21.00 psf
Case 2 - One Side Only	0.00 psf	30.00 psf
Case 3 - Unbalanced	6.30 psf	33.78 psf
Req'd Width	4.57 ft	

Slope 2 - 5.00 / 12 Pitch

	Left Side	Right Side
Case 1 - Balanced	21.00 psf	21.00 psf
Case 2 - One Side Only	0.00 psf	30.00 psf
Case 3 - Unbalanced	6.30 psf	33.78 psf
Req'd Width	4.57 ft	



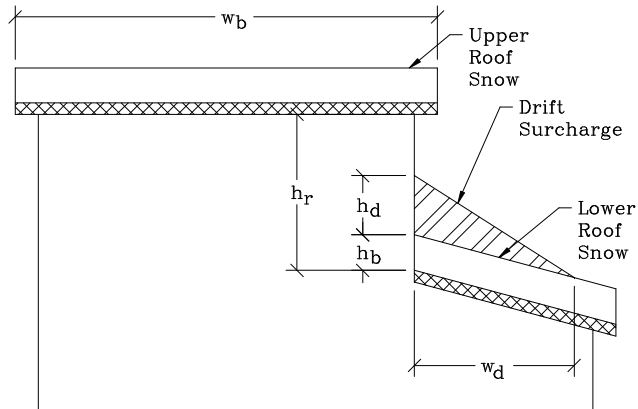
APPROVED

Montgomery County  
Historic Preservation Commission

*Sandra L. Heiler*

**REVIEWED**  
By Dan.Bruechert at 2:38 pm, Feb 01, 2021

## Drifting Analysis Worksheet



Roof Width  $w_b := 42\text{-ft}$

Roof Height  $h_r := 9\text{-ft}$

Upper Roof Snow Load  $P_{f1} := 21\text{-psf}$

Lower Roof Snow Load  $P_{f2} := 21\text{-psf}$

Exposure Coefficient  $C_e := 0.7$

Importance Factor  $I := 1.00$

Ground Snow Load  $P_g := \frac{P_{f2}}{I \cdot C_e}$   $P_g = 30\text{ psf}$

Snow Density  $D := \min\left(\left(\frac{0.13}{\text{ft}} \cdot P_g + 14.0 \cdot \text{pcf}\right), 35.0 \cdot \text{pcf}\right)$   $D = 17.9\text{ pcf}$

Basic Drift Depth  $h_d := 0.43 \cdot \text{ft} \cdot \sqrt[3]{\frac{w_b}{\text{ft}} \cdot \sqrt[4]{\frac{P_g}{\text{psf}} + 10}} - 1.5 \cdot \text{ft}$   $h_d = 2.26\text{ ft}$

Basic Snow Depth  $h_b := \frac{P_{f2}}{D}$   $h_b = 1.17\text{ ft}$

Total Snow Depth  $h_{\text{tot}} := h_d + h_b$   $h_{\text{tot}} = 3.43\text{ ft}$

Max. Drift & Sliding Pressure  $P_d := h_d \cdot D$   $P_d = 40.44\text{ psf}$

Total Snow Load  $P_{\text{max}} := D \cdot h_{\text{tot}}$   $P_{\text{max}} = 61.44\text{ psf}$

Drift Width  $w_d := \min\left[\left[4 \cdot h_d\right], \left[4 \cdot (h_r - h_b)\right]\right]$   $w_d = 9.04\text{ ft}$

Drift Equation  
(Does Not Include  
Basic Roof Load)

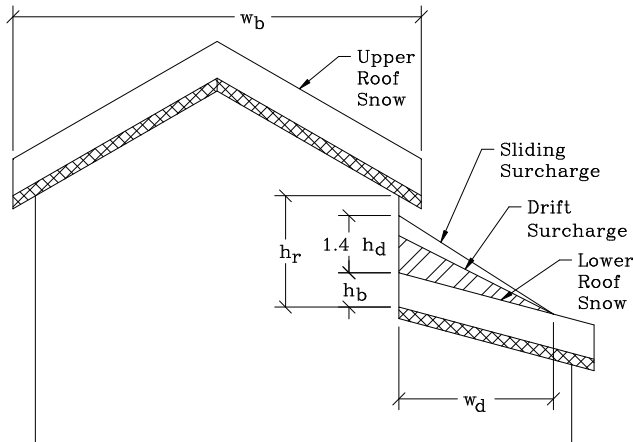
$$D_r(x) := P_d - \frac{P_d}{w_d} \cdot x$$

$x :=$

0-ft
4-ft
8-ft
9-ft

$D_r(x) =$	$\begin{pmatrix} 40.44 \\ 22.54 \\ 4.64 \\ 0.16 \end{pmatrix}$	psf
------------	--	-----

## Drifting & Sliding Analysis Worksheet



Roof Width	$w_b := 26 \cdot \text{ft}$
Roof Height	$h_r := 9 \cdot \text{ft}$
Upper Roof Snow Load	$P_{f1} := 21 \cdot \text{psf}$
Lower Roof Snow Load	$P_{f2} := 21 \cdot \text{psf}$
Exposure Coefficient	$C_e := 0.7$
Importance Factor	$I := 1.00$

Ground Snow Load  $P_g := \frac{P_{f1}}{I \cdot C_e}$   $P_g = 30 \text{ psf}$

Snow Density  $D := \min \left( \left( \frac{0.13}{\text{ft}} \cdot P_g + 14.0 \cdot \text{pcf} \right), 35.0 \cdot \text{pcf} \right)$   $D = 17.90 \text{ pcf}$

Basic Drift Depth  $h_d := 0.43 \cdot \text{ft} \cdot \sqrt[3]{\frac{w_b}{\text{ft}} \cdot \sqrt[4]{\frac{P_g}{\text{psf}} + 10}} - 1.5 \cdot \text{ft}$   $h_d = 1.70 \text{ ft}$

Basic Snow Depth  $h_b := \frac{P_{f2}}{D}$   $h_b = 1.17 \text{ ft}$

Total Snow Depth  $h_{\text{tot}} := 1.4 \cdot h_d + h_b$   $h_{\text{tot}} = 3.56 \text{ ft}$

Max. Drift & Sliding Pressure  $P_d := 1.4 \cdot h_d \cdot D$   $P_d = 42.69 \text{ psf}$

Total Snow Load  $P_{\text{max}} := D \cdot h_{\text{tot}}$   $P_{\text{max}} = 63.69 \text{ psf}$

Drift Width  $w_d := \min \left[ \left[ 4 \cdot h_d \right], \left[ 4 \cdot (h_r - h_b) \right] \right]$   $w_d = 6.81 \text{ ft}$

Drift Equation  
(Does Not Include  
Basic Roof Load)

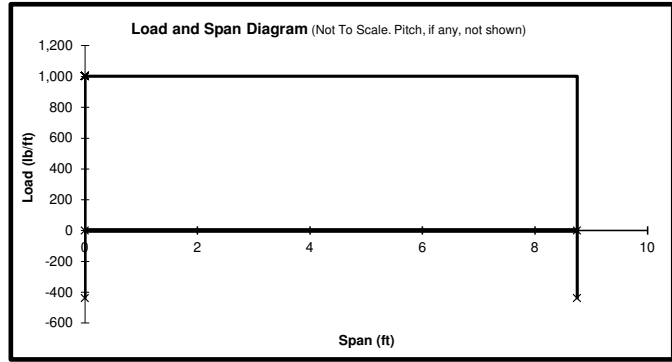
$$D_r(x) := P_d - \frac{P_d}{w_d} \cdot x$$

$x :=$	$\begin{pmatrix} 0 \cdot \text{ft} \\ 2 \cdot \text{ft} \\ 4 \cdot \text{ft} \\ 6.5 \cdot \text{ft} \end{pmatrix}$	$D_r(x) =$	$\begin{pmatrix} 42.69 \\ 30.16 \\ 17.63 \\ 1.97 \end{pmatrix} \text{ psf}$
--------	--	------------	---

**Assumptions:** Compliant with 2012 IBC and 2012 National Design Spec for Wood. Top and bottom must be laterally supported at 4-ft max. intervals. Full-depth blocking req'd at supports and cantilever end. Bending in strong axis only. No wet, high moisture, or high temperature use. No wane in Glulam laminations. Dynamic loading not considered.

Job Name:   
 Beam I.D.:   
 Other Info.:

Main Span, L =   
 Main Span Max. Allowed Live Defl: L /  = 0.29 in  
 Main Span Max. Allowed Total Defl: L /  = 0.44 in  
 Cantilever (Overhang) Exists?   
 Pitch if Sloped:   
 Load Duration   
 Add Self Wt.?  Yes  No  
 Loads Other Than Uniform Loads?



Uniform Loads Over Full Length of Member			Tributary Width, ft	Uniform Live Load, plf	Reduced Live Load, plf	Uniform Dead Load, plf
Roof Loads (not including snow)	Live, psf	Dead, psf	15.00 ft	-	-	225.0 lb/ft
Roof Snow (only)	21 psf		15.00 ft	315.0 lb/ft	315.0 lb/ft	
Floor 2 Loads	40 psf	12 psf	5.50 ft	220.0 lb/ft	220.0 lb/ft	66.0 lb/ft
Wall Dead Load		22 psf	8.00 ft			176.0 lb/ft
Total Uniform Loads			$W_L =$	535.0 lb/ft		$W_D =$ 467.0 lb/ft
Combined Total Uniform Load			$W_U =$	1,002.0 lb/ft		

**4x And Smaller (Lumber)**

Lumber Material:   
 Lumber Grade:

**Lumber Members**

Repetitive Member Use?	-	(4) 2 x 12
<input type="text" value="No"/>	(3) 2 x 14	4 x 16

**5x And Larger (Timbers)**

Timber Material:   
 Timber Grade:

**Timber Members**

-	-	-
6 x 12	-	-
8 x 12	-	-
10 x 10	-	-

**Glulam Members**

Glulam Grade:

2.5" x 10.5"	5.125" x 7.5"
3" x 10.5"	6.75" x 7.5"
3.125" x 9"	8.75" x 9"
5" x 7.5"	

**2.0E Parallam PSL**

-	5-1/4" x 9-1/4"
-	7" x 9-1/4"
3-1/2" x 9-1/4"	

**Truss-Joist MacMillan 1.9E LVL-Joists**

1-3/4" x 11-7/8"	(3) 1-3/4" x 7-1/4"
(2) 1-3/4" x 9-1/4"	

**Truss-Joist MacMillan I-Joists**

Web   
 Stiffeners?

-	-
-	-
-	-
-	-

**Truss-Joist MacMillan 1.3E LSL-Joists**

-
---

**Truss-Joist MacMillan 1.5E LSL-Joists**

-
-

Final Member:   
 Beam Library:   
 Final Size:   
 Min. Bearing Lengths: = 1.69 in. (Left) = 1.69 in. (Right)  
 Vert Diff (approx): 0.00 ft True Len (approx):  
 Actual Member Size: 3.50" x 9.25" 8.75 ft

**Final Member: (2) 1-3/4" x 9-1/4", Microllam 1.9E LVL**

**Final Member Results**

Bending Overdesign: 37.9%  
 Shear Overdesign: 201.6%  
 Deflection Overdesign: 43.3%  
 Bearing / Buckling Overdsgn: N/A

**Final member okay by: 37.9%**  
 Controlling criteria is: **Bending**

Reactions		
Maximums	R <sub>1</sub> - Left	R <sub>2</sub> - Right
Live Load:	2,341 lb	2,341 lb
Dead Load:	2,084 lb	2,084 lb
Total Load:	4,425 lb	4,425 lb
Live Case Causing Max	N/A	N/A
Minimums	R <sub>1</sub> - Left	R <sub>2</sub> - Right
Live Load:	0 lb	0 lb
0.6 or 1.0 Dead :	1,251 lb	1,251 lb
Net Reaction	1,226 lb	1,226 lb
Live Case Causing Min	N/A	N/A

Final Member Additional Information		
	Location	Live Case
Max. Positive Moment: 9,679 ft-lb	4.38 ft	Main Span
Max. Negative Moment: 0 ft-lb	0.00 ft	Main Span
Max Design Shear: 4,425 lb	0.00 ft	Main Span
Main Span Max. <u>Downward</u> Deflection (Live / Total)	0.161" / 0.305"	4.38' / 4.38' Main / Main
Main Span Max. <u>Upward</u> Deflection (Live / Total)	0.000" / 0.000"	0.00' / 0.00' Main / Main
Cant. <u>Down</u> Defl. (Live / Tot):	N/A	N/A N/A
Cant. <u>Up</u> Defl. (Live / Tot):	N/A	N/A N/A
Req'd EI, Not Incl. Self Wt.: 3.021E+08		Actual EI: 4.370E+08
Approx. Self Weight: 9.40 plf		Approx. Tot. Wt.: 82 lb
Min. Calc'd Bearing Lengths: = 1.69 in (Left) = 1.69 in (Right)		

# MacKay Construction Services, Inc.



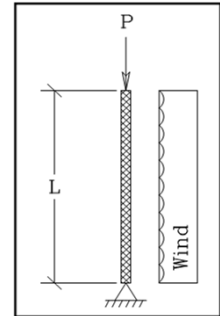
## Column v3.2

**Assumptions:** Compliant with 2012 IBC and 2012 National Design Spec for Wood. Top and bottom connections are considered 'pinned' (not 'fixed' or embedded). Bearing area at top and bottom is not checked. The column is assumed to be laterally supported at its top and bottom. No wet, high temp. or high moisture use.

Job Name:   
 Member I.D.:   
 Other Info:

### Post, Stud, or Column General Information:

Column, Post, or Stud Length, ft. L =   
 Max. Live Deflection L /  = 0.48 in  
 Type Of Column, Post, or Stud Col Sheathed On Narrow Face (Preventing Weak Axis Buckling)   
 Load Duration Factor Two Months (Snow, Cd = 1.15)   
 Off-Center (Eccentric) Compression Loads or Add'l Bending Loads (other than wind)? No



### Applied Gravity Loads

Other point load: all Live, all Dead, or some of each, lbs.	Live, psf	Dead, psf	x Length, ft	x Width, ft	Live Load, lbs	Reduced Live Load, lbs.	Dead Load, lbs
					2,341 lb		2,084 lb
Total Live and Dead Loads:					2,341 lb		2,084 lb
<b>Combined Total Load:</b>					<b>4,425 lb</b>		

#### 4x And Smaller (Lumber)

Lumber Material: Spruce-Pine-Fir  
 Lumber Grade: No. 1 / No. 2

2 x 6	3 x 5
(2) 2 x 4	4 x 4
(3) 2 x 4	

#### 5x And Larger (Timbers)

Timber Material: Spruce - Pine - Fir  
 Timber Grade: No. 1

5 x 5	-	-
-	-	-
-	-	-
-	-	-

#### Glued Laminated Columns

Glulam Combo. 3 - DF (Visually Graded)

2.5 x 6	5.125 x 5.125
3 x 6	6.75 x 7.5
3.125 x 6	8.75 x 9
5 x 6	

#### 1.8E Parallam PSL Columns

3-1/2" x 3-1/2"	5-1/4" x 5-1/4"
3-1/2" x 5-1/4"	5-1/4" x 7"
3-1/2" x 7"	7" x 7"

Final Member: Sawn Wood  
 Beam Library: Choose From Min. Sizes That Calc.  
 Final Size: (2) 2 x 4

**Final Member: (2) 2 x 4, Spruce-Pine-Fir, No. 1 / No. 2**

Final member okay by: 26.0%  
 Controlling Factor: **Combined Bending / Compressive Stresses**  
 Horiz. Force At Bottom (Strong Axis): 0 lb  
 Horiz. Force At Bottom (Weak Axis): 0 lb



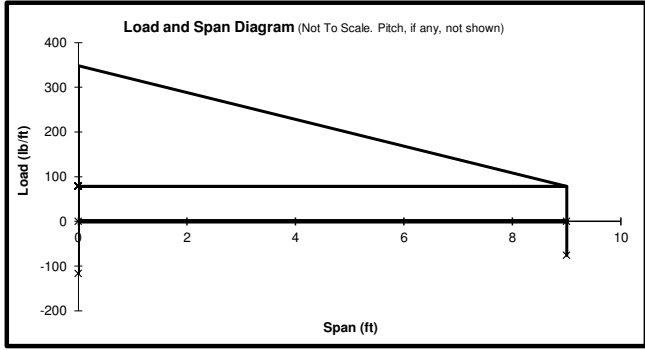
**Assumptions:** Compliant with 2018 IBC and 2018 National Design Spec for Wood. Top and bottom must be laterally supported at 4-ft max. intervals. Full-depth blocking req'd at supports and cantilever end. Bending in strong axis only. No wet, high moisture, or high temperature use. No wane in Glulam laminations. Dynamic loading not considered.

Job Name: \_\_\_\_\_  
 Beam I.D.: \_\_\_\_\_  
 Other Info.: \_\_\_\_\_

Main Span, L =   
 Main Span Max. Allowed Live Defl: L /  = 0.30 in  
 Main Span Max. Allowed Total Defl: L /  = 0.45 in

Cantilever (Overhang) Exists?    
 Pitch if Sloped:   
 Load Duration    
 Add Self Wt.?  Yes  No  
 Loads Other Than Uniform Loads?

Getting started. Hover cursor here



Uniform Loads Over Full Length of Member			Tributary Width, ft	Uniform Live Load, plf	Reduced Live Load, plf	Uniform Dead Load, plf
Live, psf	Dead, psf					
Roof Loads (not including snow)	15 psf		1.75 ft	-	-	26.3 lb/ft
Roof Snow (only)	30 psf		1.75 ft	52.5 lb/ft	52.5 lb/ft	-
Total Uniform Loads			$W_L =$	52.5 lb/ft		$W_D =$ 26.3 lb/ft
Combined Total Uniform Load			$W_U =$	78.8 lb/ft		

Wedge Loads On Main Span Only (Max at Left End, Zero at Right End)							
Live Load, psf	Dead Load, psf	Tributary width, ft	Live Load, plf	Dead Load, plf	Comb'd Load, plf	Total Wedge Load, lb	
Wedge Load A	30 psf	15 psf	6.00 ft	180.0 lb/ft	90.0 lb/ft	270.0 lb/ft	1,215 lb

4x And Smaller (Lumber)			5x And Larger (Timbers)		
Lumber Material	Spruce-Pine-Fir <input type="button" value="v"/>		Timber Material	Spruce - Pine - Fir <input type="button" value="v"/>	
Lumber Grade	No. 1 / No. 2 <input type="button" value="v"/>		Timber Grade	No. 1 <input type="button" value="v"/>	
<b>Lumber Members</b>			<b>Timber Members</b>		
Repetitive Member Use?	<input type="text" value="2 x 12"/> <input type="text" value="(4) 2 x 6"/>	<input type="text" value="(2) 2 x 8"/> <input type="text" value="3 x 10"/>	<input type="text" value="-"/>	<input type="text" value="-"/>	<input type="text" value="-"/>
<input type="text" value="No"/> <input type="button" value="v"/>	<input type="text" value="(3) 2 x 6"/> <input type="text" value="4 x 8"/>		<input type="text" value="-"/>	<input type="text" value="-"/>	<input type="text" value="-"/>

Glued Laminated Members		2.0E Parallam PSL	
Glulam Grade	24F-V4 (DF/DF) <input type="button" value="v"/>	<input type="text" value="-"/>	5-1/4" x 9-1/4"
<input 6"="" type="text" value="2.5" x=""/>	<input 6"="" type="text" value="5.125" x=""/>	<input type="text" value="-"/>	7" x 9-1/4"
<input 6"="" type="text" value="3" x=""/>	<input 7.5"="" type="text" value="6.75" x=""/>	<input 4"="" 9-1="" type="text" value="3-1/2" x=""/>	
<input 6"="" type="text" value="3.125" x=""/>	<input 9"="" type="text" value="8.75" x=""/>		
<input 6"="" type="text" value="5" x=""/>			

Truss-Joist MacMillan 1.9E LVL-Joists		Truss-Joist MacMillan I-Joists	
<input 4"="" 7-1="" type="text" value="1-3/4" x=""/>	<input 2"="" 5-1="" type="text" value="(3) 1-3/4" x=""/>	<input type="text" value="-"/>	<input type="text" value="-"/>
<input 2"="" 5-1="" type="text" value="(2) 1-3/4" x=""/>		<input 550"="" pro="" tji="" type="text" value="11-7/8"/>	<input 560"="" tji="" type="text" value="11-7/8"/>

Truss-Joist MacMillan 1.3E LSL-Joists	Truss-Joist MacMillan 1.5E LSL-Joists	
<input 4"="" 7-1="" type="text" value="3-1/2" x=""/>	<input type="text" value="-"/>	<input type="text" value="-"/>
	<input type="text" value="-"/>	<input type="text" value="-"/>

Final Member: <input type="text" value="Sawn Wood"/> <input type="button" value="v"/>	<b>Final Member: (2) 2 x 8, Spruce-Pine-Fir, No. 1 / No. 2</b>	<b>Final Member Results</b>
Beam Library: <input type="text" value="Choose From Min. Sizes That Calc."/> <input type="button" value="v"/>		Bending Overdesign: 18.4%
Final Size: <input type="text" value="(2) 2 x 8"/> <input type="button" value="v"/>		Shear Overdesign: 130.3%
Min. Bearing Lengths : = 1.50 in. (Left) : = 1.50 in. (Right)		Deflection Overdesign: 86.0%
Vert Diff (approx): 0.00 ft	True Len (approx): 9.00 ft	Bearing / Buckling Overdsgn: N/A
Actual Member Size: 3.00" x 7.25"		<b>Final member okay by: 18.4%</b>
		Controlling criteria is: <b>Bending</b>

Reactions			Final Member Additional Information		Location	Live Case
Maximums	R <sub>1</sub> - Left	R <sub>2</sub> - Right	Max. Positive Moment:	2,235 ft-lb	4.05 ft	Main Span
Live Load:	776 lb	506 lb	Max. Negative Moment:	0 ft-lb	0.00 ft	Main Span
Dead Load:	409 lb	274 lb	Max Design Shear:	977 lb	0.00 ft	Main Span
Total Load:	<b>1,185 lb</b>	<b>780 lb</b>	Main Span Max. <u>Downward</u> Deflection (Live / Total)	0.158" / 0.242"	4.41' / 4.41'	Main / Main
Live Case Causing Max	N/A	N/A	Main Span Max. <u>Upward</u> Deflection (Live / Total)	0.000" / 0.000"	0.00' / 0.00'	Main / Main
Minimums	R <sub>1</sub> - Left	R <sub>2</sub> - Right	Cant. <u>Down</u> Defl. (Live / Tot)	N/A	N/A	N/A
Live Load:	540 lb	270 lb	Cant. <u>Up</u> Defl. (Live / Tot)	N/A	N/A	N/A
0.6 or 1.0 Dead :	<u>245 lb</u>	<u>164 lb</u>	Req'd EI, Not Incl. Self Wt.:	7.017E+07	Actual EI:	1.334E+08
Net Reaction	<b>773 lb</b>	<b>422 lb</b>	Approx. Self Weight:	4.67 plf	Approx. Tot. Wt.:	42 lb
Live Case Causing Min	N/A	N/A	Min. Calc'd Bearing Lengths:	= 0.93 in (Left) = 0.61 in (Right)		

**Assumptions:** Compliant with 2018 IBC and 2018 National Design Spec for Wood. Top and bottom must be laterally supported at 4-ft max. intervals. Full-depth blocking req'd at supports and cantilever end. Bending in strong axis only. No wet, high moisture, or high temperature use. No wane in Glulam laminations. Dynamic loading not considered.

Job Name:   
 Beam I.D.:   
 Other Info.:

Main Span, L =   
 Main Span Max. Allowed Live Defl: L /  = 0.50 in  
 Main Span Max. Allowed Total Defl: L /  = 0.75 in

Cantilever (Overhang) Exists?

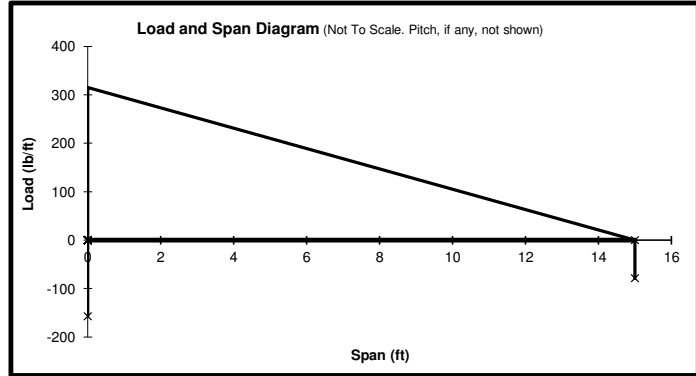
Pitch if Sloped:

Getting started. Hover cursor here

Load Duration

Add Self Wt.?  Yes  No

Loads Other Than Uniform Loads?



**Wedge Loads On Main Span Only (Max at Left End, Zero at Right End)**

	Live Load, psf	Dead Load, psf	Tributary width, ft	Live Load, plf	Dead Load, plf	Comb'd Load, plf	Total Wedge Load, lb
Wedge Load A	30 psf	15 psf	7.00 ft	210.0 lb/ft	105.0 lb/ft	315.0 lb/ft	2,363 lb

**4x And Smaller (Lumber)**

Lumber Material:   
 Lumber Grade:

**Lumber Members**

Repetitive Member Use?		(4) 2 x 8
<input type="text" value="No"/>	(2) 2 x 12	3 x 14
	(3) 2 x 10	4 x 10

**5x And Larger (Timbers)**

Timber Material:   
 Timber Grade:

**Timber Members**

-	-	-
6 x 10	-	-
-	-	-
-	-	-

**Glued Laminated Members**

Glulam Grade:

2.5" x 9"	5.125" x 7.5"
3" x 9"	6.75" x 7.5"
3.125" x 9"	8.75" x 9"
5" x 7.5"	

**2.0E Parallam PSL**

-	5-1/4" x 9-1/4"
-	7" x 9-1/4"
3-1/2" x 9-1/4"	

**Truss-Joist MacMillan I-Joists**

Web Stiffeners?

-	-
-	-
-	-
-	-

**Truss-Joist MacMillan 1.9E LVL-Joists**

1-3/4" x 11-1/4"	(3) 1-3/4" x 7-1/4"
(2) 1-3/4" x 9-1/4"	

**Truss-Joist MacMillan 1.3E LSL-Joists**

-

**Truss-Joist MacMillan 1.5E LSL-Joists**

-
-

Final Member:   
 Beam Library:   
 Final Size:   
 Min. Bearing Lengths : = 1.50 in. (Left) : = 1.50 in. (Right)  
 Vert Diff (approx): 0.00 ft True Len (approx): 15.00 ft  
 Actual Member Size: 1.75" x 11.25"

**Final Member: 1-3/4" x 11-1/4", Microllam 1.9E LVL**

**Final Member Results**

Bending Overdesign: 99.1%  
 Shear Overdesign: 478.7%  
 Deflection Overdesign: 59.2%  
 Bearing / Buckling Overdesign: N/A

Final member okay by: 59.2%  
 Controlling criteria is: Deflection

**Reactions**

	R <sub>1</sub> - Left	R <sub>2</sub> - Right
<b>Maximums</b>		
Live Load:	1,050 lb	525 lb
Dead Load:	568 lb	305 lb
Total Load:	1,618 lb	830 lb
Live Case Causing Max	N/A	N/A
<b>Minimums</b>		
Live Load:	1,050 lb	525 lb
0.6 or 1.0 Dead :	341 lb	183 lb
Net Reaction	1,365 lb	683 lb
Live Case Causing Min	N/A	N/A

**Final Member Additional Information**

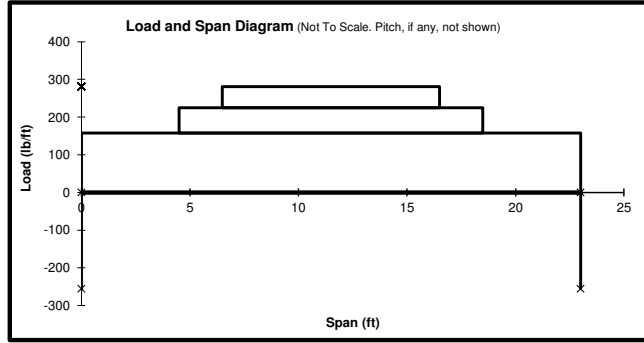
	Location	Live Case
Max. Positive Moment: 4,703 ft-lb	6.30 ft	Main Span
Max. Negative Moment: 0 ft-lb	0.00 ft	Main Span
Max Design Shear: 1,618 lb	0.00 ft	Main Span
Main Span Max. Downward Deflection (Live / Total)	0.303" / 0.471"	7.20' / 7.20'
Main Span Max. Upward Deflection (Live / Total)	0.000" / 0.000"	0.00' / 0.00'
Cant. Down. Defl. (Live / Tot):	N/A	N/A
Cant. Up. Defl. (Live / Tot):	N/A	N/A
Req'd EI, Not Incl. Self Wt.: 2.396E+08		Actual EI: 3.952E+08
Approx. Self Weight: 5.70 plf		Approx. Tot. Wt.: 86 lb
Min. Calc'd Bearing Lengths: = 1.23 in (Left) = 0.63 in (Right)		

**Assumptions:** Compliant with 2018 IBC and 2018 National Design Spec for Wood. Top and bottom must be laterally supported at 4-ft max. intervals. Full-depth blocking req'd at supports and cantilever end. Bending in strong axis only. No wet, high moisture, or high temperature use. No wane in Glulam laminations. Dynamic loading not considered.

Job Name:   
 Beam I.D.:   
 Other Info.:

Main Span, L =   
 Main Span Max. Allowed Live Defl: L /  = 0.77 in  
 Main Span Max. Allowed Total Defl: L /  = 1.15 in

Cantilever (Overhang) Exists?   
 Pitch if Sloped:   
 Load Duration   
 Add Self Wt.?  Yes  No  
 Loads Other Than Uniform Loads?



Uniform Loads Over Full Length of Member				Uniform Live Load, plf	Reduced Live Load, plf	Uniform Dead Load, plf
Roof Loads (not including snow)	<input type="text" value="15 psf"/>	<input type="text" value="3.50 ft"/>		-	-	52.5 lb/ft
Roof Snow (only)	<input type="text" value="30 psf"/>			105.0 lb/ft	105.0 lb/ft	
Total Uniform Loads			$w_L =$	<input type="text" value="105.0 lb/ft"/>	$w_D =$	<input type="text" value="52.5 lb/ft"/>
Combined Total Uniform Load			$w_U =$	<input type="text" value="157.5 lb/ft"/>		

Partial Uniform Loads On Main Span Only							
	Live Load, psf	Dead Load, psf	Tributary width, ft	Live Load, plf	Dead Load, plf	Comb'd Load, plf	Start Point, ft. End Point, ft.
Partial Load A	<input type="text" value="30 psf"/>	<input type="text" value="15 psf"/>	<input type="text" value="1.50 ft"/>	45.0 lb/ft	22.5 lb/ft	67.5 lb/ft	<input type="text" value="4.50 ft"/> <input type="text" value="18.50 ft"/>
Partial Load B	<input type="text" value="30 psf"/>	<input type="text" value="15 psf"/>	<input type="text" value="1.25 ft"/>	37.5 lb/ft	18.8 lb/ft	56.3 lb/ft	<input type="text" value="6.50 ft"/> <input type="text" value="16.50 ft"/>

Note: Start and End Points Measured From Left Support

4x And Smaller (Lumber)		5x And Larger (Timbers)													
Lumber Material	<input type="text" value="Spruce-Pine-Fir"/>	Timber Material	<input type="text" value="Spruce - Pine - Fir"/>												
Lumber Grade	<input type="text" value="No. 1 / No. 2"/>	Timber Grade	<input type="text" value="No. 1"/>												
<b>Lumber Members</b> Repetitive Member Use? <input type="text" value="No"/>		<b>Timber Members</b> <table border="1"> <tr><td>-</td><td>12 x 12</td><td>-</td></tr> <tr><td>6 x 18</td><td>14 x 14</td><td>-</td></tr> <tr><td>8 x 14</td><td>16 x 16</td><td>-</td></tr> <tr><td>10 x 14</td><td>-</td><td>-</td></tr> </table>		-	12 x 12	-	6 x 18	14 x 14	-	8 x 14	16 x 16	-	10 x 14	-	-
-	12 x 12	-													
6 x 18	14 x 14	-													
8 x 14	16 x 16	-													
10 x 14	-	-													

Glued Laminated Members		2.0E Parallam PSL													
Glulam Grade	<input type="text" value="24F-V4 (DF/DF)"/>														
<input 16.5\""="" type="text" value="2.5\" x=""/>	<input 13.5\""="" type="text" value="5.125\" x=""/>	<input 14\""="" type="text" value="5-1/4\" x=""/>													
<input 15\""="" type="text" value="3\" x=""/>	<input 12\""="" type="text" value="6.75\" x=""/>	<input 11-1="" 4\""="" type="text" value="7\" x=""/>													
<input 15\""="" type="text" value="3.125\" x=""/>	<input 10.5\""="" type="text" value="8.75\" x=""/>	<input 14\""="" type="text" value="3-1/2\" x=""/>													
<input 13.5\""="" type="text" value="5\" x=""/>															
<b>Truss-Joist MacMillan 1.9E LVL-Joists</b> <table border="1"> <tr><td>-</td><td>(3) 1-3/4\" x 14\"</td></tr> <tr><td>(2) 1-3/4\" x 14\"</td><td></td></tr> </table>		-	(3) 1-3/4\" x 14\"	(2) 1-3/4\" x 14\"		<b>Truss-Joist MacMillan I-Joists</b> Web Stiffeners? <input type="text" value="No"/> <table border="1"> <tr><td>-</td><td>-</td></tr> <tr><td>-</td><td>-</td></tr> <tr><td>-</td><td>-</td></tr> <tr><td>-</td><td>-</td></tr> </table>		-	-	-	-	-	-	-	-
-	(3) 1-3/4\" x 14\"														
(2) 1-3/4\" x 14\"															
-	-														
-	-														
-	-														
-	-														

Truss-Joist MacMillan 1.3E LSL-Joists		Truss-Joist MacMillan 1.5E LSL-Joists	
<input type="text" value="-"/>		<input type="text" value="-"/>	

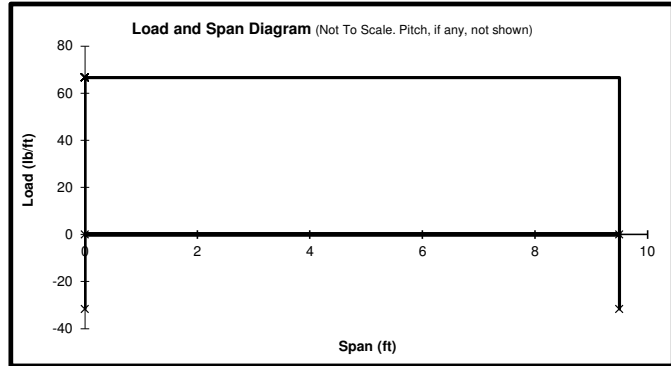
Final Member: <input type="text" value="Microllam 1.9E LVL"/>	<b>Final Member: (3) 1-3/4\" x 14\", Microllam 1.9E LVL</b>	<b>Final Member Results</b>
Beam Library: <input type="text" value="Choose From Min. Sizes That Calc."/>		Bending Overdesign: 126.0%
Final Size: <input 14\""="" type="text" value="(3) 1-3/4\" x=""/>		Shear Overdesign: 1358.4%
Min. Bearing Lengths : = 1.50 in. (Left) : = 1.50 in. (Right)		Deflection Overdesign: 54.2%
Vert Diff (approx): 0.00 ft True Len (approx):		Bearing / Buckling Overdsgr: N/A
Actual Member Size: 5.25\" x 14.00\" 23.00 ft	<b>Final member okay by: 54.2%</b>	Controlling criteria is: <b>Deflection</b>

Reactions			Final Member Additional Information		
Maximums	$R_1$ - Left	$R_2$ - Right	Max. Positive Moment: 18,134 ft-lb	Location	Live Case
Live Load:	1,710 lb	1,710 lb	Max. Negative Moment: 0 ft-lb	11.50 ft	Main Span
Dead Load:	1,100 lb	1,100 lb	Max Design Shear: 2,810 lb	0.00 ft	Main Span
Total Load:	2,810 lb	2,810 lb	Main Span Max. Downward Deflection (Live / Total)	0.458\" / 0.746\"	11.50' / 11.50'
Live Case Causing Max	N/A	N/A	Main Span Max. Upward Deflection (Live / Total)	0.000\" / 0.000\"	0.00' / 0.00'
Minimums	$R_1$ - Left	$R_2$ - Right	Cant. Down. Defl. (Live / Tot):	N/A	N/A
Live Load:	0 lb	0 lb	Cant. Up. Defl. (Live / Tot):	N/A	N/A
0.6 or 1.0 Dead :	660 lb	660 lb	Req'd EI, Not Incl. Self Wt.: 1.362E+09	Actual EI: 2.280E+09	
Net Reaction	513 lb	513 lb	Approx. Self Weight: 21.30 plf	Approx. Tot. Wt.: 490 lb	
Live Case Causing Min	N/A	N/A	Min. Calc'd Bearing Lengths: = 0.71 in (Left) = 0.71 in (Right)		

**Assumptions:** Compliant with 2018 IBC and 2018 National Design Spec for Wood. Top and bottom must be laterally supported at 4-ft max. intervals. Full-depth blocking req'd at supports and cantilever end. Bending in strong axis only. No wet, high moisture, or high temperature use. No wane in Glulam laminations. Dynamic loading not considered.

**Disclaimer:** All users of this software shall comply with State Engineering Law, which specifies who may perform engineering, and defines the practice of engineering.

Job Name:   
 Beam I.D.:   
 Other Info.:



Main Span, L =   
 Main Span Max. Allowed Live Defl: L /  = 0.32 in  
 Main Span Max. Allowed Total Defl: L /  = 0.48 in  
 Cantilever (Overhang) Exists?   
 Pitch if Sloped:   
 Load Duration   
 Add Self Wt.?  Yes  No  
 Loads Other Than Uniform Loads?

Uniform Loads Over Full Length of Member			Tributary	Uniform Live	Reduced Live	Uniform Dead
Live, psf	Dead, psf	Width, ft	Load, plf	Load, plf	Load, plf	Load, plf
Floor Loads	40 psf	10 psf	1.33 ft	53.3 lb/ft	53.3 lb/ft	13.3 lb/ft
Total Uniform Loads			$W_L =$	53.3 lb/ft	$W_D =$	13.3 lb/ft
Combined Total Uniform Load			$W_U =$	66.7 lb/ft		

**4x And Smaller (Lumber)**

Lumber Material:   
 Lumber Grade:

**Lumber Members**

Repetitive Member Use? <input type="text" value="Yes"/>	2 x 8	(4) 2 x 5
	(2) 2 x 5	3 x 6
	(3) 2 x 5	4 x 5

**5x And Larger (Timbers)**

Timber Material:   
 Timber Grade:

**Timber Members**

-	-	-
-	-	-
-	-	-
-	-	-

**Glued Laminated Members**

Glulam Grade:

2.5" x 6"	5.125" x 6"
3" x 6"	6.75" x 7.5"
3.125" x 6"	8.75" x 9"
5" x 6"	

**2.0E Parallam PSL**

-	5-1/4" x 9-1/4"
-	7" x 9-1/4"
3-1/2" x 9-1/4"	

**Truss-Joist MacMillan I-Joists**

Web	9-1/2" TJI / Pro 150	9-1/2" TJI 110
Stiffeners?	9-1/2" TJI / Pro 250	9-1/2" TJI 210
<input type="text" value="No"/>	11-7/8" TJI / Pro 350	9-1/2" TJI 230
	11-7/8" TJI / Pro 550	11-7/8" TJI 360
		-

**Truss-Joist MacMillan 1.9E LVL-Joists**

1-3/4" x 5-1/2"	(3) 1-3/4" x 5-1/2"
(2) 1-3/4" x 5-1/2"	

**Truss-Joist MacMillan 1.3E LSL-Joists**

3-1/2" x 4-3/8"
-----------------

**Truss-Joist MacMillan 1.5E LSL-Joists**

-	-
-	-

Final Member:   
 Beam Library:   
 Final Size:   
 Min. Bearing Lengths : = 1.50 in. (Left) : = 1.50 in. (Right)  
 Vert Diff (approx): 0.00 ft True Len (approx):  
 Actual Member Size: 1.50" x 7.25" 9.50 ft

**Final Member: 2 x 8, Southern Pine, No. 2**

**Final Member Results**

Bending Overdesign: 34.7%  
 Shear Overdesign: 359.0%  
 Deflection Overdesign: 116.1%  
 Bearing / Buckling Overdesign: N/A

**Final member okay by: 34.7%**  
 Controlling criteria is: **Bending**

**Reactions**

	$R_1$ - Left	$R_2$ - Right
<b>Maximums</b>		
Live Load:	253 lb	253 lb
Dead Load:	63 lb	63 lb
Total Load:	317 lb	317 lb
Live Case Causing Max	N/A	N/A
<b>Minimums</b>		
Live Load:	0 lb	0 lb
0.6 or 1.0 Dead :	38 lb	38 lb
Net Reaction	38 lb	38 lb
Live Case Causing Min	N/A	N/A

**Final Member Additional Information**

	Location	Live Case
Max. Positive Moment: 752 ft-lb	4.75 ft	Main Span
Max. Negative Moment: 0 ft-lb	0.00 ft	Main Span
Max Design Shear: 276 lb	0.00 ft	Main Span
Main Span Max. Downward Deflection (Live / Total)	0.147" / 0.183"	4.75' / 4.75' Main / Main
Main Span Max. Upward Deflection (Live / Total)	0.000" / 0.000"	0.00' / 0.00' Main / Main
Cant. Down Defl. (Live / Tot):	N/A	N/A
Cant. Up Defl. (Live / Tot):	N/A	N/A
Req'd EI, Not Incl. Self Wt.: 3.087E+07		Actual EI: 6.669E+07
Approx. Self Weight: N/A		Approx. Tot. Wt.: N/A
Min. Calc'd Bearing Lengths: = 0.37 in (Left) = 0.37 in (Right)		

4.75	L =	Trib Length	
40		Live Load	
10		Dead Load	
237.5		Total Load	
0.25		Fastener Diameter	
1.5		Side Member Thickness	
<b>138</b>		Basic Fastener Capacity	
1.00		Load Duration Factor	
1.00		Spacing Factor	= Min. Dist. Between Rows
2.50		Embed. Depth	
1.00		Embedment Factor	2.5 = Min. Embed.
1.00		Moisture Factor	
138.00		Adjusted Fastener Capacity	
3.00		Number of Rows	
20.92 in. o.c.		Spacing of Each Row	

**Assumptions:** Compliant with 2018 IBC and 2018 National Design Spec for Wood. Top and bottom must be laterally supported at 4-ft max. intervals. Full-depth blocking req'd at supports and cantilever end. Bending in strong axis only. No wet, high moisture, or high temperature use. No wane in Glulam laminations. Dynamic loading not considered.

Job Name:   
 Beam I.D.:   
 Other Info.:

Main Span, L =   
 Main Span Max. Allowed Live Defl: L /  = 0.33 in  
 Main Span Max. Allowed Total Defl: L /  = 0.50 in

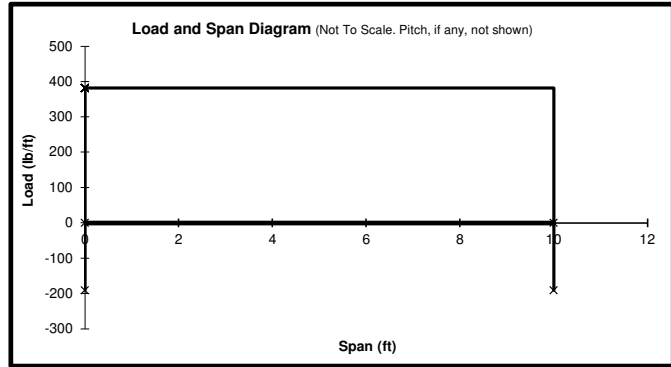
Cantilever (Overhang) Exists?

Pitch if Sloped:

Getting started. Hover cursor here  
 Load Duration Live, Cd = 1.00

Add Self Wt.?  Yes  No

Loads Other Than Uniform Loads?



Uniform Loads Over Full Length of Member			Tributary	Uniform Live	Reduced Live	Uniform Dead
	Live, psf	Dead, psf	Width, ft	Load, plf	Load, plf	Load, plf
Floor Loads	40 psf	10 psf	5.00 ft	200.0 lb/ft	200.0 lb/ft	50.0 lb/ft
Wall Dead Load		22 psf	6.00 ft			132.0 lb/ft
Total Uniform Loads			W <sub>L</sub> =	200.0 lb/ft		W <sub>D</sub> =
Combined Total Uniform Load			W <sub>U</sub> =	382.0 lb/ft		182.0 lb/ft

**4x And Smaller (Lumber)**

Lumber Material:   
 Lumber Grade:

**Lumber Members**

Repetitive Member Use?	-	(4) 2 x 10
<input type="text" value="No"/>	(2) 2 x 14	3 x 16
	(3) 2 x 12	4 x 12

**5x And Larger (Timbers)**

Timber Material:   
 Timber Grade:

**Timber Members**

-	-	-
6 x 8	-	-
-	-	-
-	-	-

**Glued Laminated Members**

Glulam Grade:

2.5" x 9"	5.125" x 7.5"
3" x 7.5"	6.75" x 7.5"
3.125" x 7.5"	8.75" x 9"
5" x 7.5"	

**2.0E Parallam PSL**

-	5-1/4" x 9-1/4"
-	7" x 9-1/4"
3-1/2" x 9-1/4"	

**Truss-Joist MacMillan 1.9E LVL-Joists**

1-3/4" x 9-1/4"	(3) 1-3/4" x 7-1/4"
(2) 1-3/4" x 7-1/4"	

**Truss-Joist MacMillan I-Joists**

Web Stiffeners?

-	-
-	-
-	-
-	-

**Truss-Joist MacMillan 1.3E LSL-Joists**

3-1/2" x 8-5/8"
-----------------

**Truss-Joist MacMillan 1.5E LSL-Joists**

-	-
-	-

Final Member:   
 Beam Library:   
 Final Size:   
 Min. Bearing Lengths : = 1.50 in. (Left) : = 1.50 in. (Right)  
 Vert Diff (approx): 0.00 ft True Len (approx):  
 Actual Member Size: 4.50" x 11.25" 10.00 ft

**Final Member: (3) 2 x 12, Southern Pine, No. 2**

**Final Member Results**

Bending Overdesign: 19.8%  
 Shear Overdesign: 266.9%  
 Deflection Overdesign: 319.2%  
 Bearing / Buckling Overdsgr: N/A

**Final member okay by: 19.8%**  
 Controlling criteria is: **Bending**

**Reactions**

	R <sub>1</sub> - Left	R <sub>2</sub> - Right
<b>Maximums</b>		
Live Load:	1,000 lb	1,000 lb
Dead Load:	981 lb	981 lb
Total Load:	1,981 lb	1,981 lb
Live Case Causing Max	N/A	N/A
<b>Minimums</b>		
Live Load:	0 lb	0 lb
0.6 or 1.0 Dead :	589 lb	589 lb
Net Reaction	546 lb	546 lb
Live Case Causing Min	N/A	N/A

**Final Member Additional Information**

	Location	Live Case
Max. Positive Moment: 4,953 ft-lb	5.00 ft	Main Span
Max. Negative Moment: 0 ft-lb	0.00 ft	Main Span
Max Design Shear: 1,610 lb	0.00 ft	Main Span
Main Span Max. Downward Deflection (Live / Total)	0.060" / 0.119"	5.00' / 5.00'
Main Span Max. Upward Deflection (Live / Total)	0.000" / 0.000"	0.00' / 0.00'
Cant. Down Defl. (Live / Tot):	N/A	N/A
Cant. Up Defl. (Live / Tot):	N/A	N/A
Req'd EI, Not Incl. Self Wt.:	1.719E+08	Actual EI: 7.475E+08
Approx. Self Weight:	14.24 plf	Approx. Tot. Wt.: 142 lb
Min. Calc'd Bearing Lengths:	= 0.78 in (Left)	= 0.78 in (Right)

# Square Footing Calculator



www.constructioncalc.com

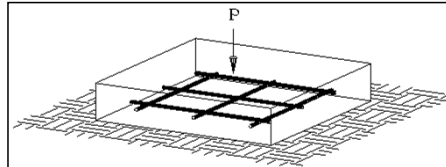
**Assumptions:** 1. Load is applied to the center of footing. 2. No uplift or moment (bending) loads are applied. 3. Soil over the footing is the only surcharge load applied. 4. Design based on 1999 ACI Code. 5. All rebar is properly spaced and not epoxy-coated

**Disclaimer:** All users of this software shall comply with State Engineering Law; which specifies who may perform engineering, and defines the practice of engineering.

Job Name:

Footing I.D.:

Other Info:



## Applied Footing Loads

	Live, psf	Dead, psf	Tributary Length, ft	Tributary Width, ft.	Live Load, lbs	Reduced Live Load,	Dead Load, lbs
Wall Dead Load		265 psf	4.00 ft	1.00 ft			1,061 lb
Other 'psf' load and trib. area.		22 psf	8.00 ft	10.00 ft	0 lb	0 lb	1,760 lb
Other point load: all Live, all Dead, or some of each, lbs.		Descrip'n, opt'l:	Porch Roof & Floor Beams		3,741 lb		2,660 lb
Subtotals:						3,741 lb	5,481 lb
Total service load: Pserv=						9,222 lb	

## Soil and Footing Input

Soil Bearing Capacity  $q_s =$

Permit Soil Bearing Capacity Increase For Size and Depth?  Yes  No

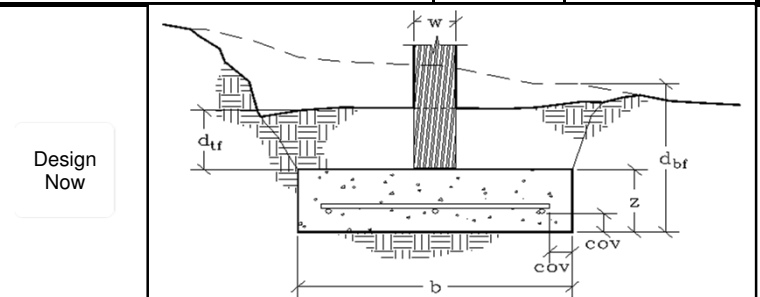
Depth to bottom of footing, ft.  $D_{bf} =$

Depth of soil over top of footing, ft.  $D_{tf} =$

Square Footing Width, ft.  $b =$

Footing Depth, inches  $z =$

Post or Bearing Plate Narrowest Dimension, inches  $w =$



## Concrete and Rebar Input

Concrete Strength, psi  $f'_c =$

Steel Yield Strength, psi  $F_y =$

Rebar Cover, inches  $cov =$

Rebar Size

No. of Bars (Each Direction)  $n =$

## RESULTS

Footing size based on allowable soil pressure:	<b>Footing Size Okay, 14% oversized for soil bearing</b>
Temp. & Shrinkage Rebar:	<b>Ok</b>
Rebar check for bending:	<b>Ok 253% extra flexural rebar provided</b>
One-Way Shear Check:	<b>Footing Thickness Ok</b>
Punching Shear:	<b>Footing Thickness Ok</b>
Rebar Development Length:	<b>Ok</b>
<b>Satisfactory Design</b>	

**FINAL DESIGN**

**Use 3 ft. x 3 ft. x 8 in. footing, with 3500 psi min. concrete strength, 3 in. min. concrete cover, and (5) #4 GR 40 rebar each way.**

## Miscellaneous Report Detail

Maximum applied soil pressure: 1,320 psf  
 Weight of footing only: 900 lb  
 Ultimate applied moment in footing: 3,777 ft-lb  
 Ultimate applied one-way shear in footing: 4,191 lb

Allowable soil pressure used for design: 1,500 psf  
 Weight of footing plus surcharge: 2,658 lb  
 Allowable moment in footing ( $\phi \cdot Mn$ ): 12,940 ft-lb  
 Allowable one-way shear ( $\phi \cdot Vn$ ): 16,293 lb

# Square Footing Calculator



www.constructioncalc.com

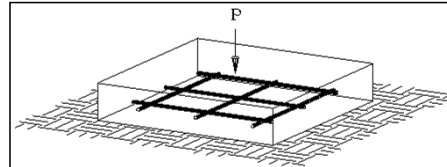
**Assumptions:** 1. Load is applied to the center of footing. 2. No uplift or moment (bending) loads are applied. 3. Soil over the footing is the only surcharge load applied. 4. Design based on 1999 ACI Code. 5. All rebar is properly spaced and not epoxy-coated

**Disclaimer:** All users of this software shall comply with State Engineering Law; which specifies who may perform engineering, and defines the practice of engineering.

Job Name:

Footing I.D.:

Other Info:



## Applied Footing Loads

	Live, psf	Dead, psf	Tributary Length, ft	Tributary Width, ft.	Live Load, lbs	Reduced Live Load,	Dead Load, lbs
Wall Dead Load		265 psf	4.00 ft	1.00 ft			1,061 lb
Other point load: all Live, all Dead, or some of each, lbs.		Descrip'n, opt'l:	Load From Floor Beam x2		2,000 lb		1,962 lb
Subtotals:						2,000 lb	3,023 lb
Total service load: P <sub>serv</sub> =						5,023 lb	

## Soil and Footing Input

Soil Bearing Capacity  $q_s =$

Permit Soil Bearing Capacity Increase For Size and Depth?  Yes  No

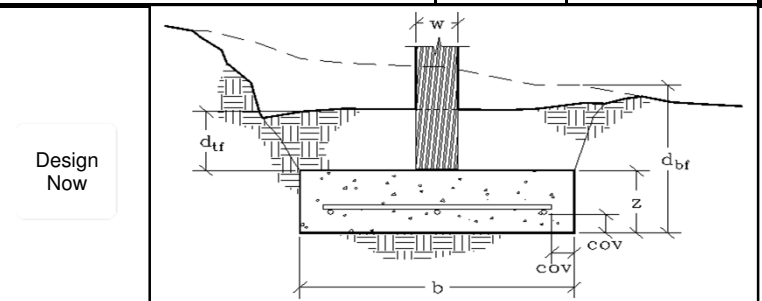
Depth to bottom of footing, ft.  $D_{bf} =$

Depth of soil over top of footing, ft.  $D_{tf} =$

Square Footing Width, ft.  $b =$

Footing Depth, inches  $z =$

Post or Bearing Plate Narrowest Dimension, inches  $w =$



## Concrete and Rebar Input

Concrete Strength, psi  $f'_c =$

Steel Yield Strength, psi  $F_y =$

Rebar Cover, inches  $cov =$

Rebar Size

No. of Bars (Each Direction)  $n =$

## RESULTS

Footing size based on allowable soil pressure:	<b>Footing Size Okay, 17% oversized for soil bearing</b>
Temp. & Shrinkage Rebar:	<b>Ok</b>
Rebar check for bending:	<b>Ok 689% extra flexural rebar provided</b>
One-Way Shear Check:	<b>Footing Thickness Ok</b>
Punching Shear:	<b>Footing Thickness Ok</b>
Rebar Development Length:	<b>Ok</b>
<b>Satisfactory Design</b>	

**FINAL DESIGN**

**Use 2.25 ft. x 2.25 ft. x 8 in. footing, with 3500 psi min. concrete strength, 3 in. min. concrete cover, and (4) #4 GR 40 rebar each way.**

## Miscellaneous Report Detail

Maximum applied soil pressure: 1,284 psf  
 Weight of footing only: 506 lb  
 Ultimate applied moment in footing: 1,361 ft-lb  
 Ultimate applied one-way shear in footing: 1,767 lb

Allowable soil pressure used for design: 1,500 psf  
 Weight of footing plus surcharge: 1,477 lb  
 Allowable moment in footing ( $\phi \cdot M_n$ ): 10,322 ft-lb  
 Allowable one-way shear ( $\phi \cdot V_n$ ): 12,220 lb