Design Loads

Building Code requirements: Conforms to 2021 MBC

Building Use Group (Mixed):	Occupant Load:
Storage, S-1 (Aircraft hangar storage and repair)	3 Occupants
Business, B (Office, Lounge, and planning area)	4 Occupants

**Note: Business area occupant loads may be increased to maximum 1 occupant per 7 net square feet, if requirements of code are met (see building official, 1004.5.1 MBC)

Construction Classification: VB

Building Allowed: 9,000 sq ft; 1 story; 40 ft height

Building Contains: 1,782 sq ft; 1 story; 18 ft height

Floor load

50 psf	Live load
10 psf	Dead Load
60 psf	Total Floor load

*Designed for a concentrated 2,000 lb point load

Floor designed to meet minimum deflection criteria of:

Live Load	L/480
Total Load	L/360

Total deflection not to exceed 1/2".

Roof load

Snow load		40 psf (Pg)
Exposure factor (Ce)	C	1.0
Thermal factor (Ct)	Insulated	1.1
Importance factor (I)	II	1.0

Wind load 115 MPH

Dead loads

Top chord	7 psf
Bottom chord	10 psf

Any drift loads to be added in addition to loads listed above are noted on roof structural plans.

Roof designed to meet minimum deflection criteria of:

Live Load	L/360
Total Load	L/240

All designs are in accordance with the current 2015 Michigan Building Code.
Engineering design is for structural information only. Engineer does not take responsibility for architectural errors, plumbing, mechanical, electrical, or any other part of the plan not relevant to the structural integrity of structure.

Foundations

Bearing for footings assumed to be 2,000 psf unless noted otherwise.

1. Concrete should have a minimum specified compressive strength of 2,500 psi at 28 days for footings and 3,000 psi for walls, unless otherwise specified. The bottom of all footings must be below the frost line depth at a minimum of 42", unless noted frost protected shallow footing.

2. Steel reinforcement shall comply with the requirements of ASTM A615, A706 or A996. ASTM A996 bars produced from rail steel shall be Type R. The minimum yield strength of reinforcing steel shall be 40,000 psi (or greater as specified) (Grade 40).

3. Vertical and horizontal reinforcement shall be the longest lengths practical and maintain a tolerance of +/- 2" for the spacing of vertical bars and +/- 1/2" from specified location on print of the rebar (both horizontal and vertical) to the face of the concrete. Where splices are necessary in reinforcement, the length should be a minimum of 30" unless noted otherwise.

4. Reinforcement support and cover and shall be secured in the proper location in the forms with tie wire or other bar support system such that displacement will not occur during the concrete placement operation. Minimum cover should be as follows:

   4.1. Steel reinforcement in concrete cast against the earth shall have a minimum cover of 3 inches .

   4.2. Minimum cover for reinforcement in concrete cast in removable forms that will be exposed to the earth or weather shall be 11/2 inches for No. 5 bars and smaller, and 2 inches for No. 6 bars and larger.

   4.3. For concrete cast in removable forms that will not be exposed to the earth or weather, and for concrete cast in stay-in-place forms, minimum cover shall be 3/4 inch. The minus tolerance for cover shall not exceed the smaller of one-third the required cover and 3/8 inch.

5. Construction joints in foundation walls shall be made and located that does not reduce the strength of the wall. Construction joints in plain concrete walls, including walls required to have not less than No. 4 bars at 48 inches (1219 mm) on center, shall be located at points of lateral support, and a minimum of one No. 4 bar shall extend across the construction joint at a spacing not to exceed 24 inches (610 mm) on center. Construction joint reinforcement shall have a minimum of 12 inches (305 mm) embedment on both sides of the joint. Construction joints in reinforced concrete walls shall be located in the middle third of the span between lateral supports, or located and constructed as required for joints in plain concrete walls.

   5.1. Exception: Use of vertical wall reinforcement is permitted in lieu of construction joint reinforcement provided the spacing does not exceed 24 inches (610 mm), or the combination of wall reinforcement and No.4 bars described above does not exceed 24 inches (610 mm).

6. Where full height Permanent Wood Foundation (PWF) (with over 48" of unbalanced backfill) walls run parallel to floor joists, provide joist as blocking at 24" o.c. in the first 3 bays (unless otherwise specified).

Lumber Specifications

Studs to be minimum No.3, standard, or stud grade lumber.
All structural members to have this minimum design criteria (unless otherwise specified):

	All design values in psi				
	Fb	Fv	Fc(perp)	Fc	E
SPF #1/#2	875	135	425	1,150	$1.4x10^6$
Southern Pine #1	1,500	175	565	1,650	$1.6x10^6$
Beams					
LVL 2.0E	3,100	285	850	3,000	$2.0x10^6$
Glu-Lam	2,400	250	600	2,300	$1.9x10^6$
Columns					
LVL 1.5E	2,250	200	560	1,950	$1.5x10^6$

All framing lumber to have 19% or less moisture.

All other lumber may be SPF #1/#2 unless otherwise specified.

Fastening Schedule For Structural Members

Unless otherwise specified follow the nailing schedule below.

Top loaded members (2 and 3-ply 1 3/4" wide EWP) maintain minimum 2" from edges of beams. 3-ply members to be nailed from both sides.

1. For 12" deep (or less) members, nail plies together with 2 rows of 16d x 3 1/2" common nails at 12" o.c. (add 1 row for 16d sinkers).

2. For 14", 16", or 18" deep members, nail plies together with 3 rows of 16d x 3 1/2" common nails at 12" o.c. (add 1 row for 16d sinkers).

3. For 20", 22", or 24" deep members, nail plies together with 4 rows of 16d x 3 1/2" common nails at 12" o.c. (add 1 row for 16d sinkers).

Top loaded 4-ply maintain minimum 2" from edges of beams

Connect members with Simpson Strong tie SDW or SDS screws (GRK RSS screws are also acceptable) (stagger fasteners from both sides unless screw embeds minimum of 75% in last ply)

4. For 16" deep (or less) members, fasten plies together with 2 rows at 24" o.c.

5. For 16" up to 24" deep members fasten 3 rows at 24" o.c.

Side loaded beams should be as follows (unless otherwise specified):

6. For 2 and 3-ply members, nail plies together with 3 rows of 16dx3 1/2" common nails at 12" o.c.

7. For 4-ply members, 1/2" diameter bolts with 3 rows at 12" o.c. (beam must be loaded from both sides)

8. Built stud packs as columns should be built as follows (unless otherwise specified):
   For 2x4 walls 1 row staggered from both sides:
   -3" Simpson SDW screws at 6" o.c. for 2-ply
   -4 3/8" Simpson SDW screws at 8" o.c. for 3-ply
   For 2x6 walls 2 rows staggered from both sides:
   -3" Simpson SDW screws at 6" o.c. for 2-ply
   -4 3/8" Simpson SDW screws at 8" o.c. for 3-ply
   -6" Simpson SDW screws at 8" o.c. for 4-ply

9. All steel columns should bear on concrete, masonry, or steel only. Beams that bear on steel columns should have a column cap and be welded on. Where columns bear on concrete or masonry (unless otherwise specified), 7"x7"x 5/8" steel base plate shall be used to spread load. Install 4 - 1/2" diameter anchor bolts to be used in concrete.

10. All wood columns bearing on concrete should use Simpson Strong Tie's CPTZ concealed column base unless otherwise specified. All wood columns should use Simpson Strong Tie's CC/ECC/ECCU column caps unless otherwise specified.

11. Wood columns designed to be continuous through floors, should have Simpson HST6 straps to maintain load transfer.

Floor and Wall Framing Construction

1. LVL Beams, Glu-Lam beams, and truss girders to have minimum of 3 - 2x4 studs under each supporting end unless otherwise specified.

2. All wood I-joists and wood floor trusses to be braced in accordance with manufacturer's directions in addition to details shown on plan.

3. Floor sheathing to be nailed and glued 3/4" APA Structural Rated sheathing tongue and groove.

4. All concentrated point loads must be solid blocked through floor to the beam or foundation below. Load must transfer properly to foundation through beams and solid blocking. If shims are used, must be the same material as beam or column (OSB and materials not of same grade or greater will likely crush) unless otherwise specified.

5. Stud walls (max 10' height) for supporting two floors, plus roof-ceiling assembly or habitable attic:

   5.1. Load bearing 2x6 at 16" o.c. (2x4 at 16" o.c. for 1 floor)

   5.2. Non-load bearing 2x4 at 16" o.c..

6. Headers in load bearing walls both (interior and exterior) should be sized as below unless otherwise specified:

   6.1. Spans up to 4' 2-2x6

   6.2. Spans up to 5' 2-2x6

   6.3. Spans greater than 5' See plan

7. Non bearing walls with roof trusses above should be connected using Simpson Strong Tie SDPW Deflector screw to avoid ceiling-wall cracking.

8. All exterior walls to be sheathed with minimum 7/16" APA Rated OSB and fully wrapped, unless otherwise specified.

9. All structural framing lumber directly exposed to weather or bearing on concrete or masonry to be pressure treated. Any lumber in contact with ground to be ground contact approved.

10. All structural members are to be attached per Fastening Schedule Table 2304.10.2 in 2015 Michigan Building Code. Note: engineered wood products to follow fastening schedule per this sheet (unless otherwise specified).

Roof Construction

1. All trusses to be built in accordance with truss manufacturer's requirements. All trusses to be designed by a Professional Engineer and provide stamped truss drawings.

2. Truss to truss bracing per truss manufacturer requirements. Permanent bracing per BCSI book section BCSI-B3 unless otherwise specified.

3. Roof sheathing to be minimum 7/16" APA Structural Rated OSB unless otherwise specified.

4. Solid blocking between trusses is required with heel heights less than 9 1/4".

5. Solid blocking or blocking panels required between trusses on heel heights 9 1/4" to 15 1/4", unless sheathing is extended above top plate and truss lines up with stud in wall.

6. Heel heights above 15 1/4" require vertical blocking panels installed or blocking panels supplied by truss manufacturer.

7. All trusses/rafters to be tied to the top plate of wall with either a Simpson H2.5A or 2-Simpson SDWC15600 screws, unless otherwise specified.

8. All girder trusses to be tied to the wall top plate using Simpson HGT heavy girder tie downs unless otherwise specified.

NOTE: ALL POINT LOADS MUST TRANSFER TO FOUNDATION WITH BLOCKING OF EQUIVALENT OR BETTER MATERIAL THAT IS SUPPORTING POINT LOAD. SHEATHING AND MATERIAL LESS THAN SUPPORT WILL NOT CARRY LOAD.

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No.	Revision/Issue	Date

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Project Name and Address
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4527 N Clare Ave
Harrison, MI 48625

Drawn by: JDJ	Sheet GN General Notes
Reviewed by: JDJ	
Date 1/7/2026	1 of 7
Scale AS NOTED	

Soil bearing capacity based on 2000 psf. Verification may be needed, see engineer if bearing capacity is lower.

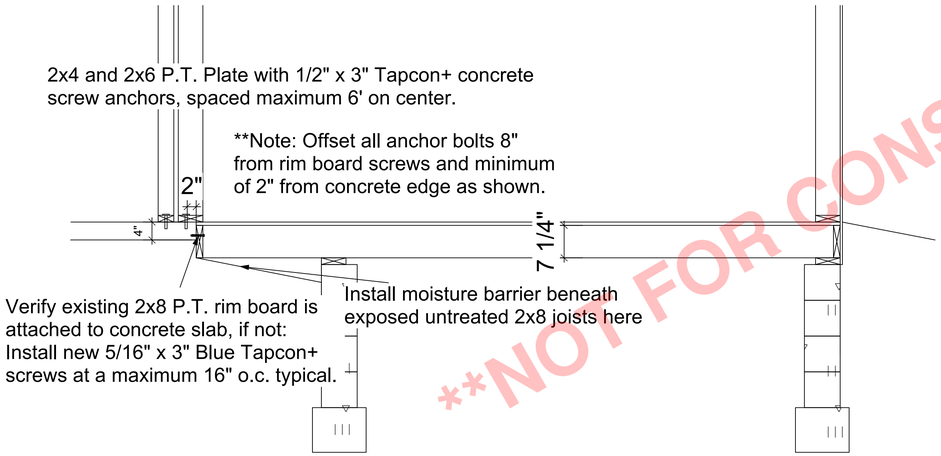
Provide solid blocking below all point loads through structure.

Openings may be installed in non-load bearing wall or follow guidelines on GN for additional header sizes

Grade shall slope away from building to direct water away from all footings.

Verify drainage conditions
if poor drainage, drain tile to be added with gravel per 2021 Michigan Building Code

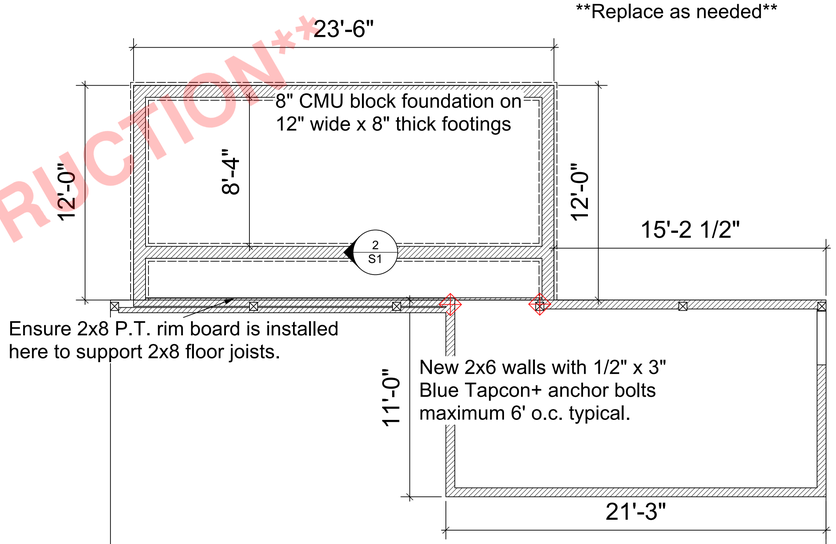
North



2 Foundation Section
Scale: 3/4" = 1'-0"

Existing footings and CMU foundation walls are structural sound.

All wood sheathing and floor joists will require pressure treated when in contact with ground. **Replace as needed**



Aircraft Hanger:
Existing concrete slab

1 Foundation
Scale: 1/4" = 1'-0"

Bearing Walls	
Non-Bearing Walls	
Point Loads From Above	

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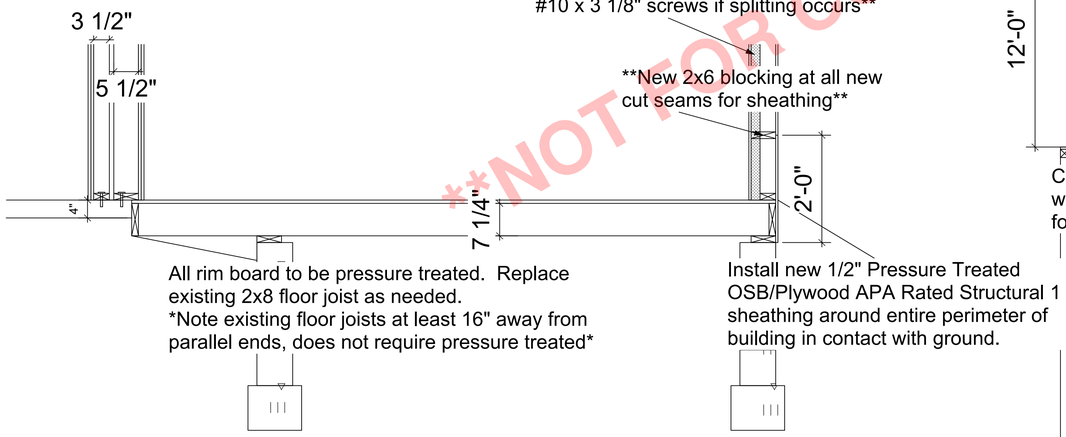
Drawn by: JDJ	Sheet: S1 Foundation
Reviewed by: JDJ	
Date: 1/7/2026	2 of 7
Scale: AS NOTED	

Any multi-ply beams to follow nailing schedule
called out on GN page, unless otherwise specified.

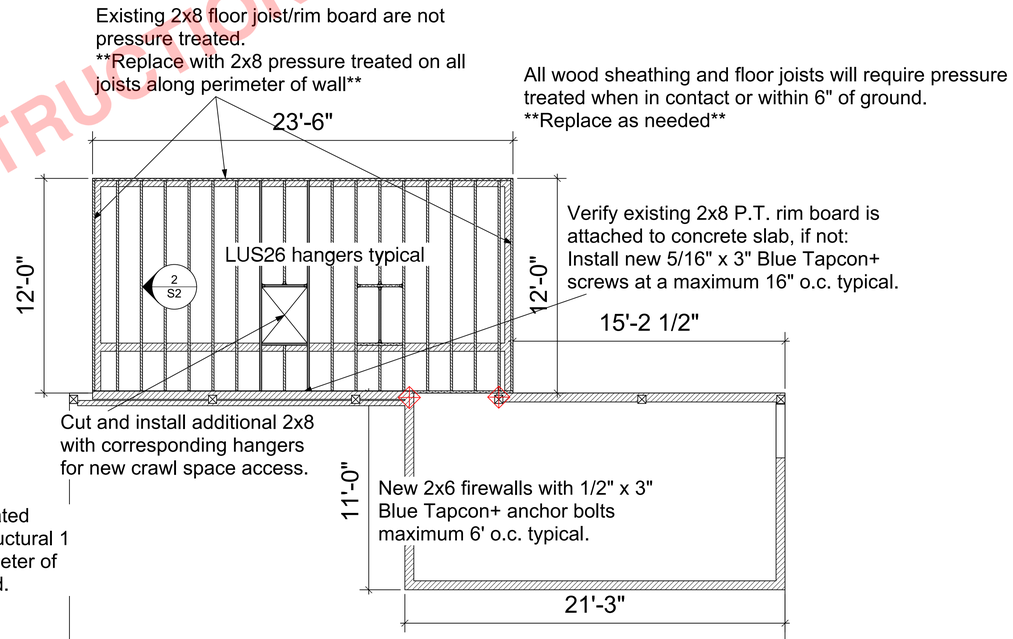
All untreated wood to be properly sealed (provide moisture barrier) when in contact with concrete or exposed to weather.

Majority of existing floor system was structurally sound. Only 2x8 rim board to be pressure treated along exterior perimeter and 2x8 rim board may require additional attachments to existing concrete slab.

Firewalls noted on S3. Ensure offset of anchor bolts and maintain minimum of 2" spacing from concrete edge on all concrete attachments.



2 Floor Section
Scale: 3/4" = 1'-0"



Aircraft Hanger:
Existing concrete slab

1 First Floor Framing Plan
Scale: 1/4" = 1'-0"

Bearing Walls	
Non-Bearing walls	
Joists	
Flush Beams	
Point Loads From Above	
Columns	

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Drawn by: JDJ	Sheet: S2 First Floor Framing
Reviewed by: JDJ	
Date: 1/7/2026	3 of 7
Scale: AS NOTED	

Any multi-ply beams to follow nailing schedule called out on GN page, unless otherwise specified.

All untreated wood to be properly sealed (provide moisture barrier) when in contact with concrete or exposed to weather.

All new wall framing to be 2x4 or 2x6 stud grade and framed at 24" o.c.

All ceiling joists must be framed within 5" of studs spaced at 24" o.c. to maintain proper load transfer

On all firewalls (post framed carrier wall to have 2x4 interior wall and 2x6 wall, see Figure below):

-2x6 Wall 24" o.c. studs with double top plates typical and single bottom plate.

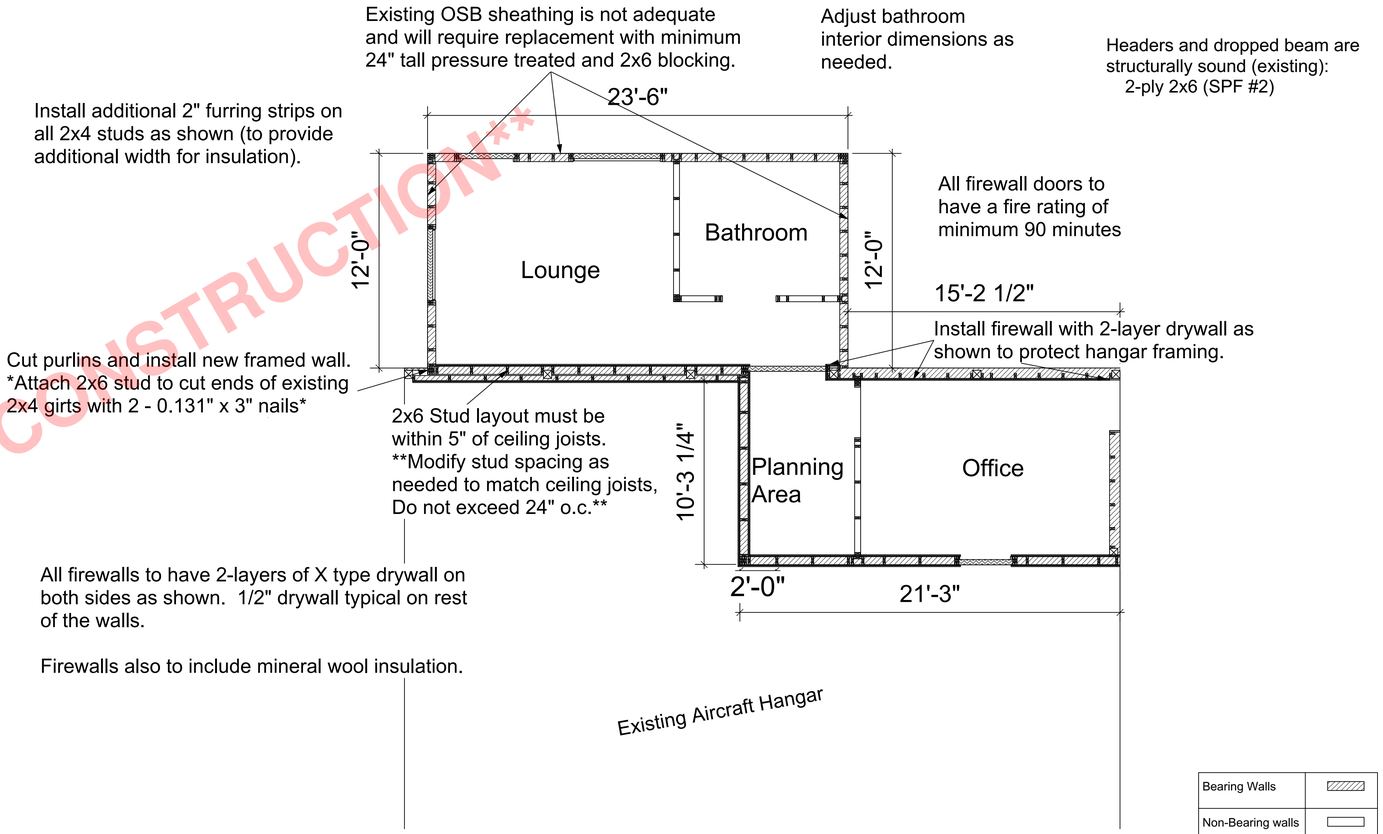
-Both sides 2-layers 5/8" Type X gypsum wallboard, 4' wide, installed horizontally with vertical joints over studs.

-Base layer fastened with 2 1/4" Type S drywall screws, spaced 24" o.c.

-Face layer fastened with Type S drywall screws at 8" o.c., wallboard joints covered with paper tape and joint compound, all fastener heads covered by joint compound. Cavity to be filled with 5 1/2" mineral wool insulation.

Item 15-1.16 (2021 MBC Table 721.1(2))

Firewalls are required to separate structural framing members between the hangar and business/office area (see SD1 and SD2).



1 Floor Layout/Wall Framing Plan
Scale: 1/4" = 1'-0"

Bearing Walls	
Non-Bearing walls	
Dropped Beams	
Flush Beams	
Point Loads From Above	
Columns	

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Drawn by: JDJ	Sheet S3 Wall Framing
Reviewed by: JDJ	
Date 1/7/2026	4 of 7
Scale AS NOTED	

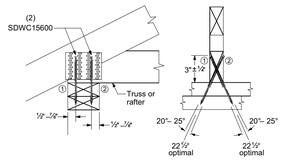
Any multi-ply beams to follow nailing schedule called out on GN page, unless otherwise specified.

2 - Simpson SDWC15600 screws to be installed in all rafter bearings and both top plates of walls to resist uplift.
See Simpson installation guide.

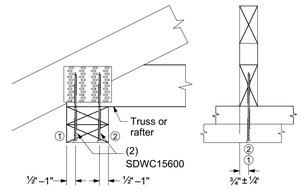
Existing rafters to be reinforced every other to create equivalent 12" o.c. spacing for load distribution.

Ceiling joists not to exceed 24" o.c., installed within 5" of studs, and attached to rafters (install new ceiling joists as needed to meet all 3 requirements).

Existing roof may require removal of existing steel roof sheathing and apply moisture barrier (such as Ice and water shield) to OSB sheathing to properly water proof. Extend 12" beyond slope change on existing trusses.

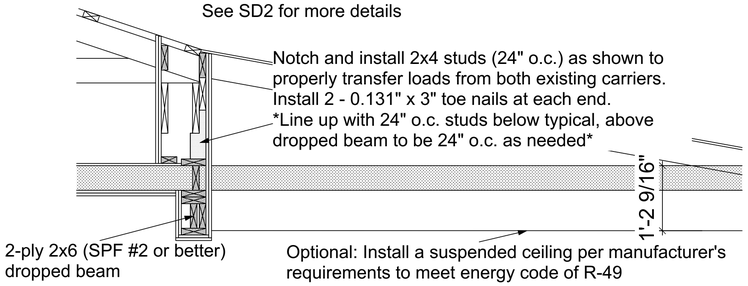


CONFIGURATION D
Install through Truss into Top Plate/Beam
Both screws installed at a 20°-25° angle with a ½" to ¾" offset from the opposite edges of top plate and 3" ± ½" above top plate.
Use metal installation guide included in screw kits for optimal 22.5° installation. To predrill through truss plates, use a ¼" drill bit.



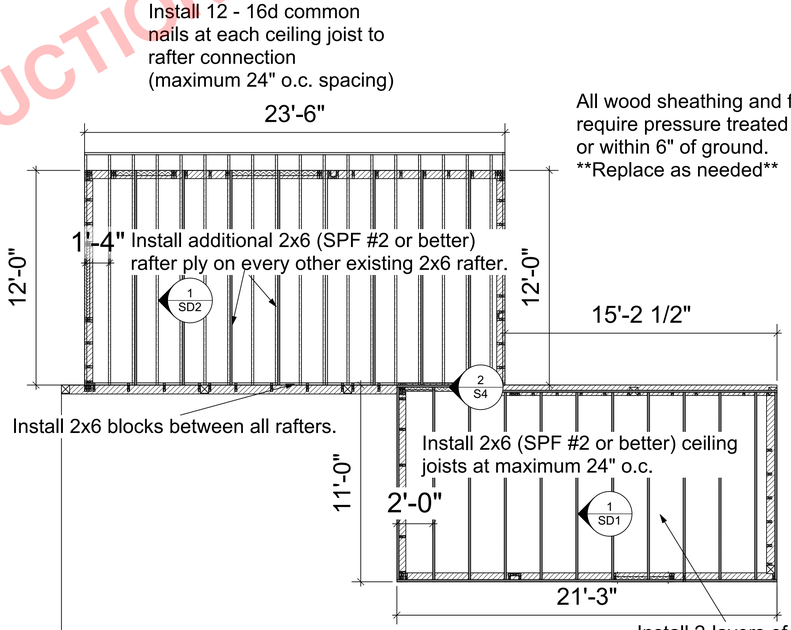
CONFIGURATION B
(Truss Offset from Stud)
Install through Top Plate into Truss
Both screws installed vertically ±5° into the center of the truss/rafter from the underside of the top plate, ½" to 1" from opposite edges of the top plate.

4 Hurricane Tie Options
Scale: 2" = 1'-0"



Extend 2-layers of 5/8" drywall firewall around dropped beam as shown.

2 Dropped Beam Detail
Scale: 3/4" = 1'-0"



All wood sheathing and floor joists will require pressure treated when in contact or within 6" of ground.
Replace as needed

Install 2-layers of 5/8" drywall on ceiling below hangar trusses and 1/2" OSB APA Rated Structural 1 floor sheathing.
See note top left
per 2021 MBC Item 21-1.1 Table 721.1(3)

Existing Aircraft Hangar

Bearing Walls	
Rafters	
Dropped Beams	
Flush Beams	
Point Loads From Above	
Columns	

1 First Floor Framing Plan
Scale: 1/4" = 1'-0"

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Drawn by: JDJ	Sheet S4 Roof Framing
Reviewed by: JDJ	
Date 1/7/2026	5 of 7
Scale AS NOTED	

On new 2x6 firewalls:

-2x6 Wall 24" o.c. studs with double top plates typical and single bottom plate.

-Both sides 2-layers 5/8" Type X gypsum wallboard, 4' wide, installed horizontally with vertical joints over studs.

-Base layer fastened with 2 1/4" Type S drywall screws, spaced 24" o.c.

-Face layer fastened with Type S drywall screws at 8" o.c., wallboard joints covered with paper tape and joint compound, all fastener heads covered by joint compound. Cavity to be filled with 5 1/2" mineral wool insulation.

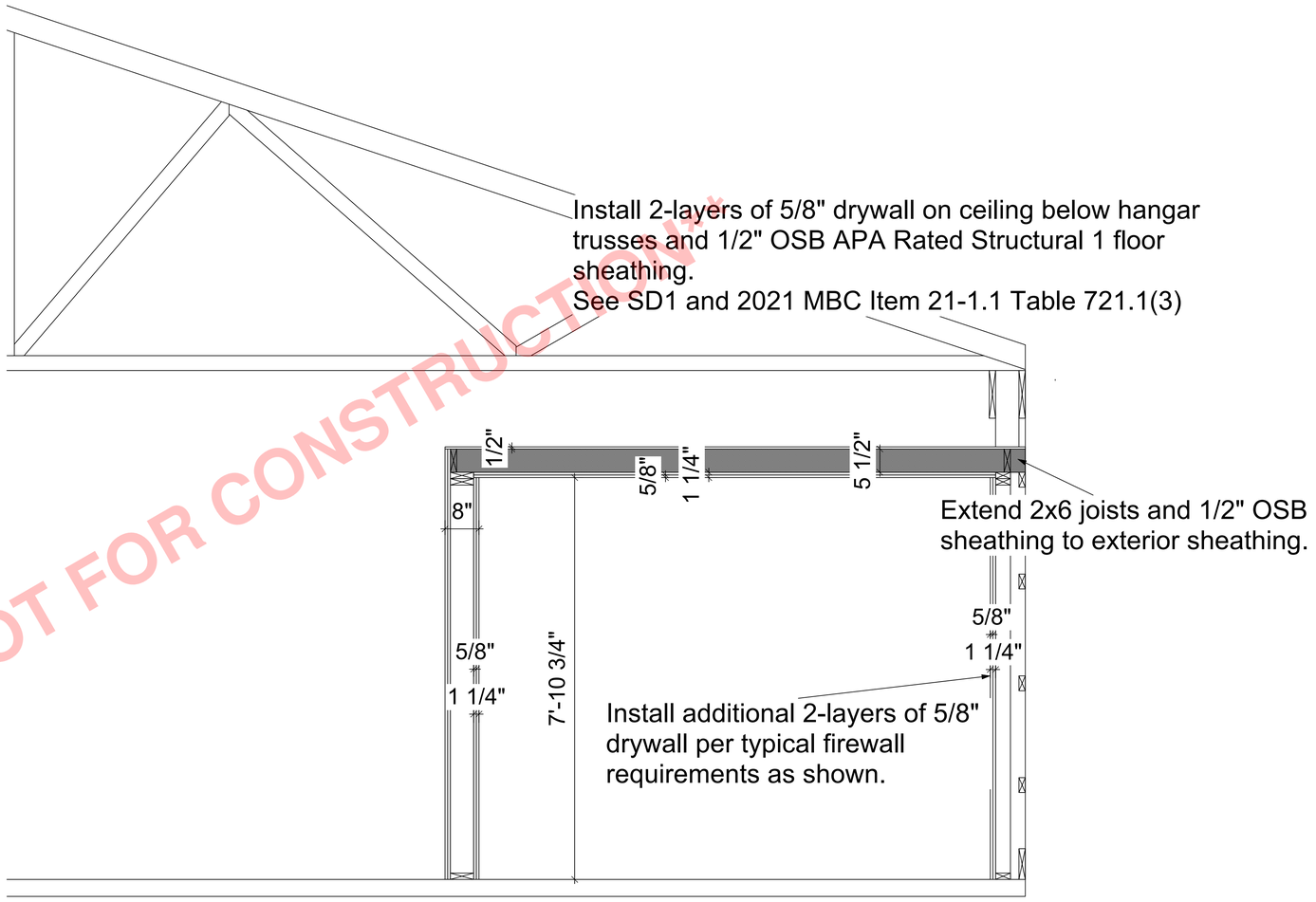
Item 15-1.16 (2021 MBC Table 721.1(2))

On new ceiling below hangar trusses (see Figure this page):

-2x6 joists 24" o.c. with 2-layers of 5/8" Type X gypsum wallboard on ceiling and 1/2" OSB APA Rated Structural 1 above attached with polyurethane construction adhesive at right angles to top of joist with 8d nails.

-Base layer 5/8" Type X gypsum wallboard applied at right angles to joist 24" o.c. with 1 1/4" Type S or Type W drywall screws 24" o.c.

-Face layer 5/8" Type X gypsum wallboard or veneer base applied at right angles to joist or truss through base layer with 17/8" Type S or Type W drywall screws 12" o.c. at joints and intermediate joist or truss. Face layer Type G drywall screws placed 2" back on either side of face layer end joints, 12" o.c.



1 Office Section Detail
Scale: 3/4" = 1'-0"

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Drawn by: JDJ
Reviewed by: JDJ
Date: 1/7/2026
Scale: 1/4" = 1'-0"
Sheet: SD1 Roof Framing
6 of 7

On all firewalls (post framed carrier wall to have 2x4 interior wall and 2x6 wall, see Figure below):

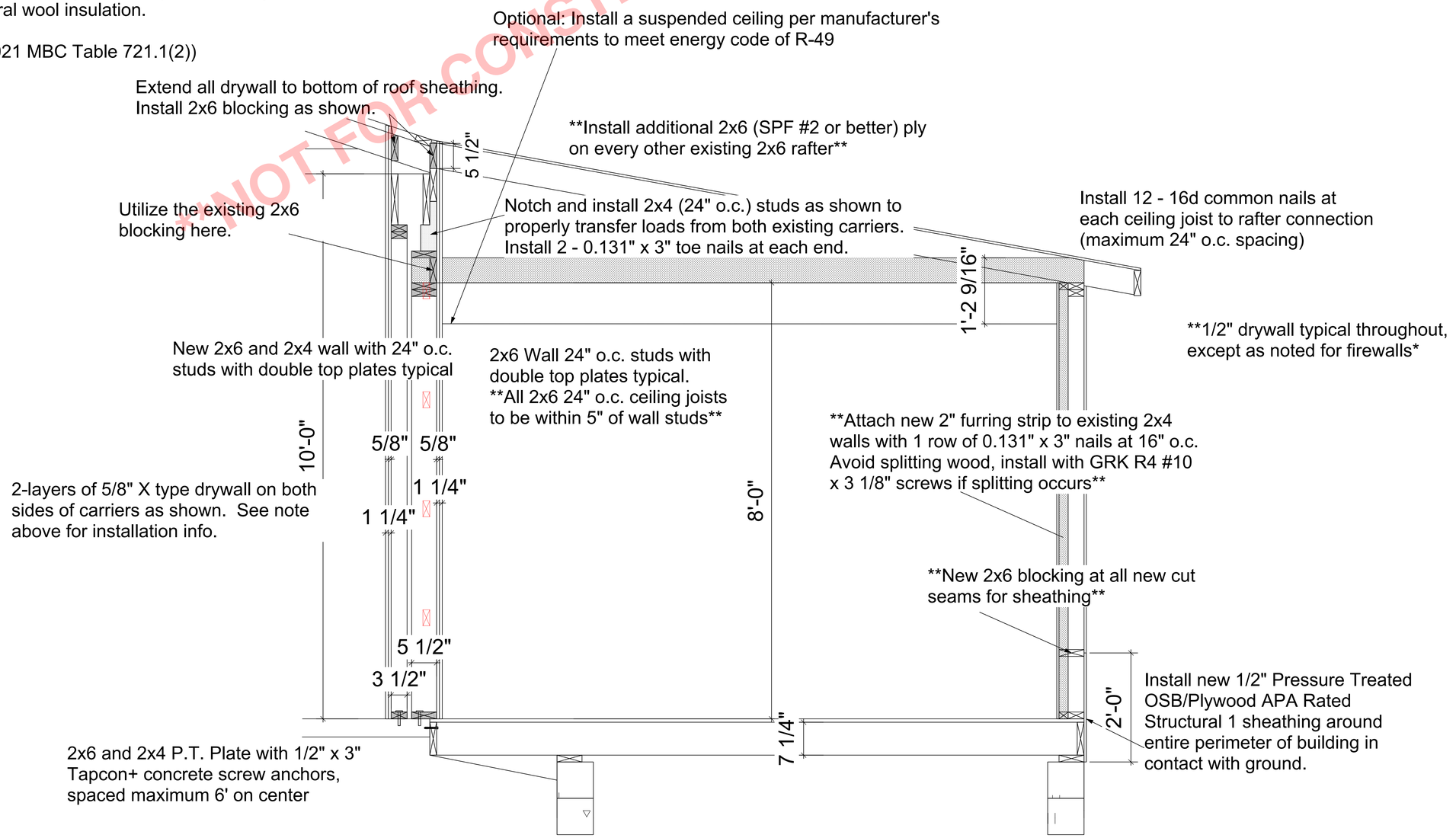
-2x6 Wall 24" o.c. studs with double top plates typical and single bottom plate.

-Both sides 2-layers 5/8" Type X gypsum wallboard, 4' wide, installed horizontally with vertical joints over studs.

-Base layer fastened with 2 1/4" Type S drywall screws, spaced 24" o.c.

-Face layer fastened with Type S drywall screws at 8" o.c., wallboard joints covered with paper tape and joint compound, all fastener heads covered by joint compound. Cavity to be filled with 5 1/2" mineral wool insulation.

Item 15-1.16 (2021 MBC Table 721.1(2))



2 Lounge Section Detail
Scale: 1" = 1'-0"

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Drawn by: JDJ
Reviewed by: JDJ
Date: 1/7/2026
Scale: 1/2" = 1'-0"
Sheet: SD2 Wall Framing Details
7 of 7