

CITY OF BILLINGS
ATTACHED/DETACHED GARAGE SUBMITTAL WORKBOOK



DETACHED OR ATTACHED GARAGE WORKSHEET

Instructions:

Fill out the garage details, items 1-5, on page 1 and 2.

Provide a site plan for the project. Draw the site plan on page 3. Include items 1-5 listed on the site plan page. All items listed on page 3 must be shown on the site plan.

Provide a plan view of the garage. Draw the plan view on page 4. Include locations of windows, doors, and garage doors. Label all windows, doors, and garage doors on the top-down view (this is important for step 5 and filling in header size).

Provide details of the foundation, wall section, and roof for the chosen foundation type. Not all foundation sheets need to be filled in - only the chosen foundation type. Please be aware of the limitations of a Monoslab.

1 . Garage will be: ☐ **Detached** ☐ ***Attached to dwelling** (*foundation must match the house foundation; fill in page 8)

a . An attached garage requires opening protection between the garage and house. If there is a door, fill in the check box for what type of door is to be used or NO OPENING FROM THE GARAGE TO THE HOUSE.

☐ **NO OPENING FROM THE GARAGE TO THE HOUSE**

or

☐ **SOLID WOOD DOOR NOT LESS THAN 1 3/8" THICKNESS, SELF-CLOSING**

or

☐ **SOLID OR HONEYCOMB-CORE STEEL DOOR NOT LESS THAN 1 3/8" THICK, SELF-CLOSING**

or

☐ **20-MIN FIRE-RATED DOOR, SELF-CLOSING**

2 . If the garage is a detached garage, fill in the total square footage for the garage.

Total square footage: _____

There are two different options for the foundation:

Option 1:

Monolithic-slab (monoslab). If this option is picked, go to page 6 for details on the construction of the monoslab. *A full geotechnical evaluation may be required in certain cases.

Option 2:

Concrete stem walls with concrete footings. If this option is picked, go to page 7 for details on the construction of the concrete stem walls with concrete footings. *A full geotechnical evaluation may be required in certain cases.

3 . Fill in the wall height for the garage. Wall height: _____

Wall heights greater than 12' on an attached or detached garage require structural engineering.

4 . Fill in the dimensions of the garage door(s).

(G1) Garage door 1 opening	
Width & Height	×
Make/Model #	

(G2) Garage door 2 opening	
Width & Height	×
Make/Model #	

(G3) Garage door 3 opening	
Width & Height	×
Make/Model #	

a . **The garage door must be labeled by the garage door manufacturer. The label shall identify the garage door manufacturer, the garage door model/serial number, the positive and negative design wind pressure rating, and the applicable test standard (R609.4.1).**

b . Fill in the portal framing method being used for the garage door(s).

☐ **R602.10.6.1 Method ABW: Alternate braced wall panels**

or *ABW requires 28" minimum wall length on each side of garage door.

☐ **R602.10.6.2 Method PFH: Portal frame with hold-downs**

or *PFH requires 16" minimum wall length on each side of garage door.

☐ **R602.10.6.3 Method PFG: Portal frame at garage door openings**

or *PFG requires 24" minimum wall length on each side of garage door.

☐ **R602.10.6.4 Method CS-PF: Continuously sheathed portal frame**

or *CS-PF requires 16" minimum wall length on each side of garage door.

☐ **4' long walls on both sides of the portal**

*This method can only be used with a maximum of 8' garage door height. Garage door openings exceeding 8' will need a structural engineer to provide design & stamp the plans.

5 . Fill in the dimensions of the headers for all window(s), door(s), and garage door(s). If an engineered wood header is used, fill in the type of engineered wood. Example, glulam or LVL. *Engineered wood headers may require an evaluation report, obtained from the supplier, to be attached to the permit application.

Write the LABEL next to each window(s), door(s), and garage door(s) drawn on the "Detached or Attached garage outline" page 4

Legend

(LABEL) DESCRIPTION		
Size (from table to the left)	1-2 × 6	← Example
Length from king stud to king stud	4-3	← Example

For this example, the opening span is 4-0

IRC 2021 Table R602.7(1)

GIRDERS AND HEADERS SUPPORTING	SIZE	GROUND SNOW LOAD (psf)					
		30					
		BUILDING WIDTH					
		12		24		36	
		SPAN	NJ	SPAN	NJ	SPAN	NJ
roof and ceiling	1-2 × 6	4-0	1	3-1	2	2-7	2
	1-2 × 8	5-1	2	3-11	2	3-3	2
	1-2 × 10	6-0	2	4-8	2	3-11	2
	1-2 × 12	7-1	2	5-5	2	4-7	3
	2-2 × 4	4-0	1	3-1	1	2-7	1
	2-2 × 6	6-0	1	4-7	1	3-10	1
roof and ceiling	2-2 × 8	7-7	1	5-9	1	4-10	2
	2-2 × 10	9-0	1	6-10	2	5-9	2
	2-2 × 12	10-7	2	8-1	2	6-10	2
	3-2 × 8	9-5	1	7-3	1	6-1	1
	3-2 × 10	11-3	1	8-7	1	7-3	2
	3-2 × 12	13-2	1	10-1	2	8-6	2
	4-2 × 8	10-11	1	8-4	1	7-0	1
	4-2 × 10	12-11	1	9-11	1	8-4	1
	4-2 × 12	15-3	1	11-8	1	9-10	2

(G1) Garage door 1 header	
Size:	×
Length:	
Engineered wood type:	

(G2) Garage door 2 header	
Size:	×
Length:	
Engineered wood type:	

(G3) Garage door 3 header	
Size:	×
Length:	
Engineered wood type:	

(D1) Door 1 header	
Size:	×
Length:	

(D2) Door 2 header	
Size:	×
Length:	

(W1) Window 1 header	
Size:	×
Length:	

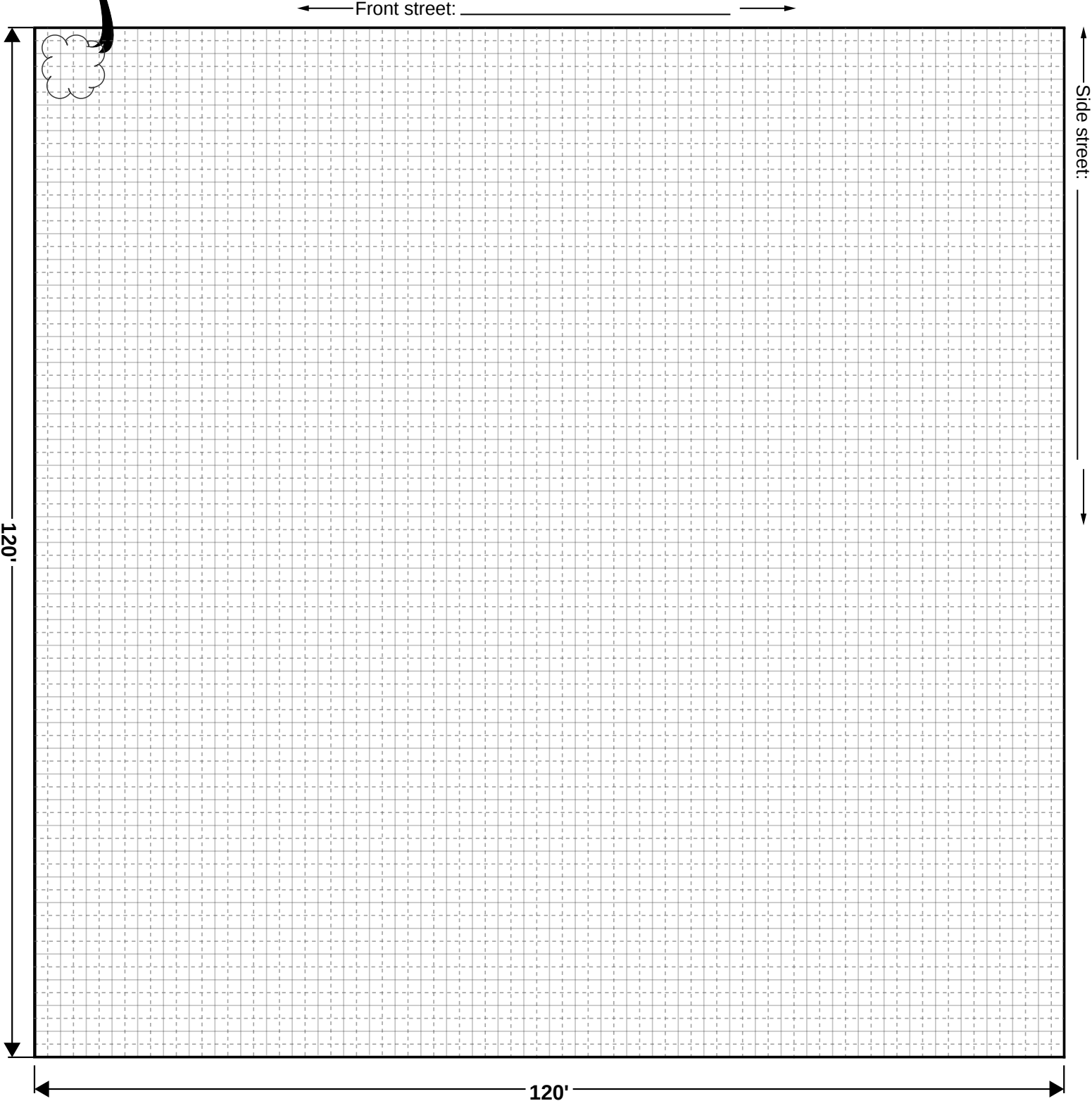
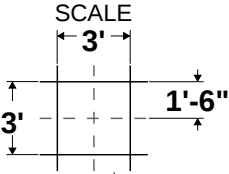
(W2) Window 2 header	
Size:	×
Length:	

(W3) Window 3 header	
Size:	×
Length:	

(W4) Window 4 header	
Size:	×
Length:	

SITE PLAN

1. Show lot lines.
2. Show setbacks from all property lines (5' is typical; check with Planning for other requirements on setbacks).
3. Show all structures - existing and proposed.
4. Show width and length of all structures; existing house and proposed garage.
5. Show distance between the existing house and proposed garage.
6. Show downspouts and direction of drainage.
7. Show drive approaches and size, if any (Engineering permit may be required).



DETACHED OR ATTACHED GARAGE PLAN VIEW

Using the grid below to provide a plan view of the garage (detached) or garage & house (attached).
For an attached garage, draw in the house and garage outline.

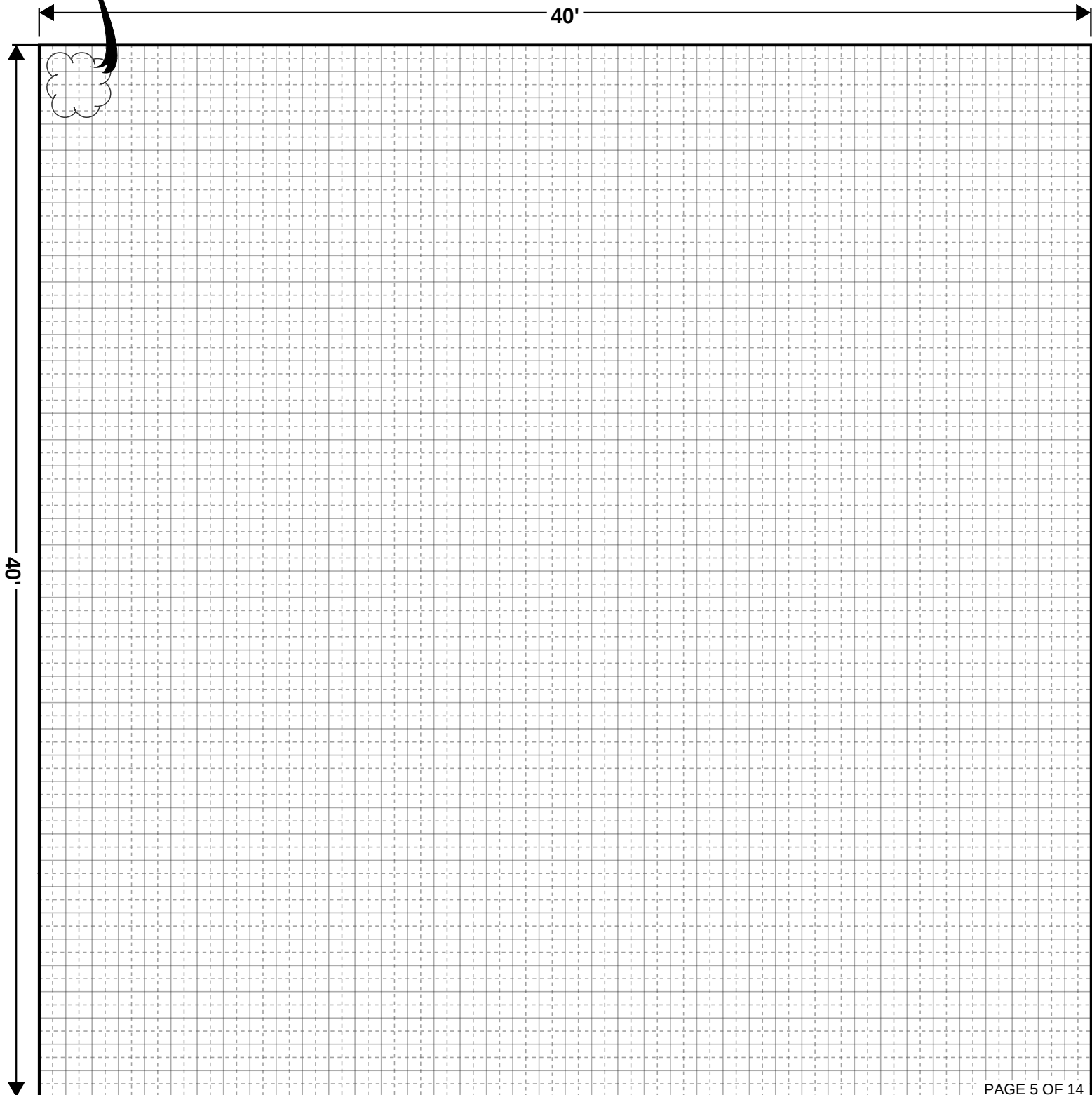
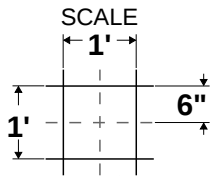
For a detached garage, draw the garage outline.

Include the location of windows, doors, and garage doors. Label all windows, doors, and garage doors (example: window 1 would be W1, door 1 would be D1, & garage door 1 would be labeled G1).

Egress doors require an exterior concrete landing 3'x3'.

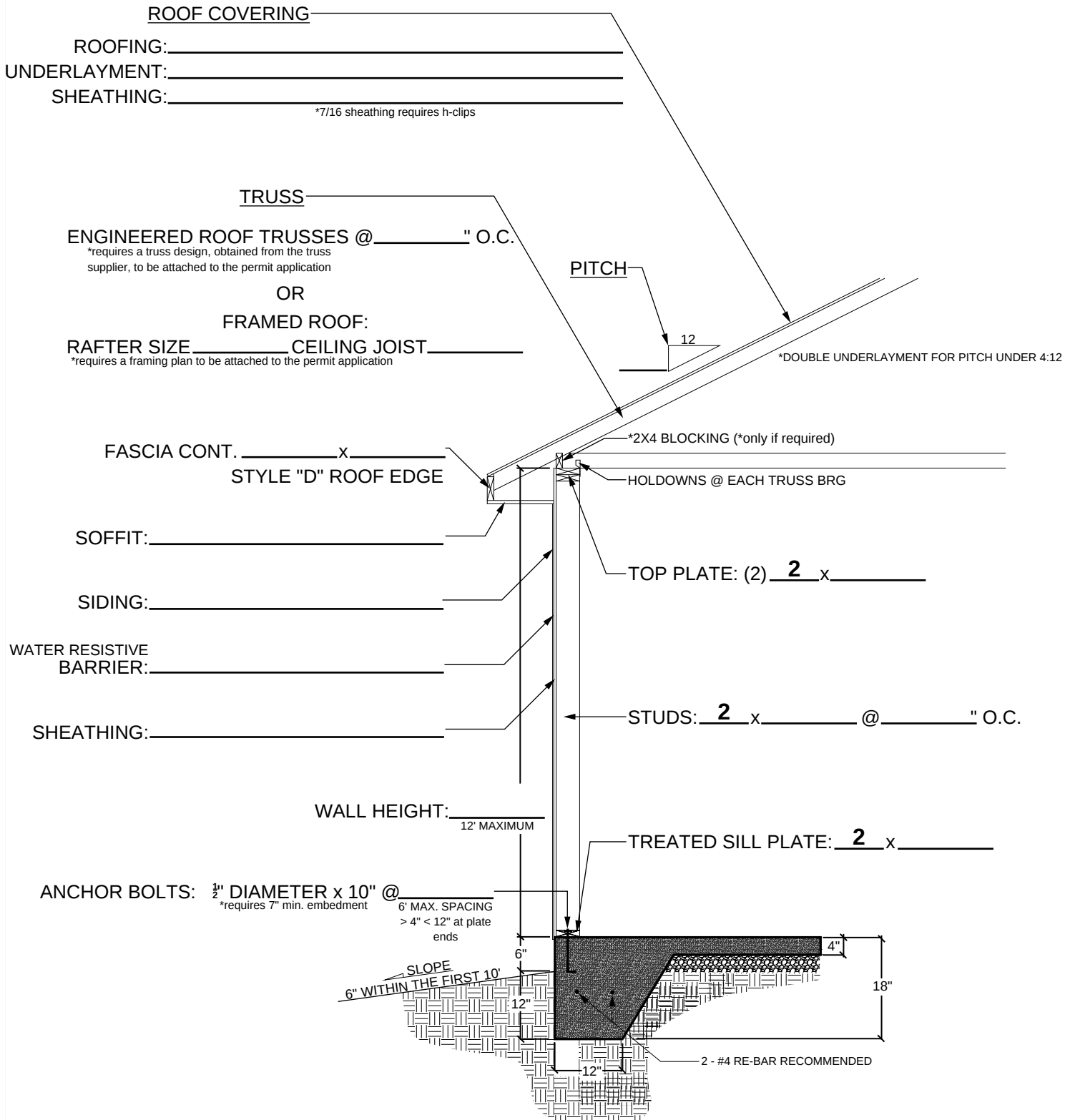
If there is a heater in the garage, show the location and note the mounting height. 6' minimum above floor.

Show attic access if space above ceiling is taller than 30" to roof deck. 22"x30" minimum opening size.



DETACHED GARAGE, MONOSLAB

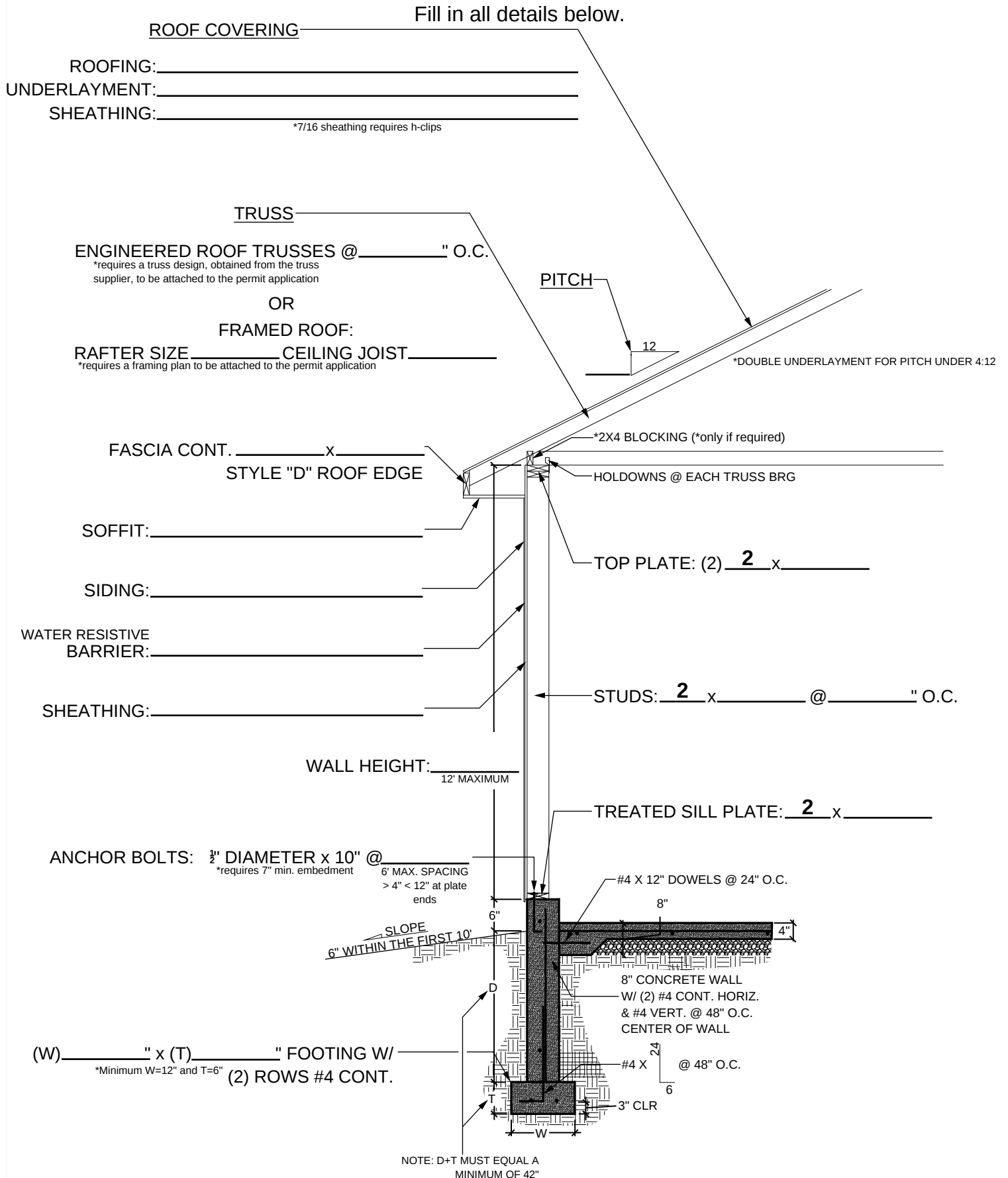
Fill in all details below.



MONOSLAB, WALL SECTION AND ROOF DETAIL

NOT TO SCALE

DETACHED GARAGE, CONCRETE STEM WALLS WITH CONCRETE FOOTINGS



CONCRETE STEM WALL WITH CONCRETE FOOTINGS, WALL SECTION, AND ROOF DETAILS

NOT TO SCALE

OPTIONAL: DETACHED GARAGE, FROST-PROTECTED SHALLOW FOUNDATION (MONOSLAB) INSULATED & HEATED

Fill in all details below.

ROOF COVERING

ROOFING: _____
ICE BARRIER: _____
UNDERLAYMENT: _____
SHEATHING: _____
*7/16 sheathing requires h-clips

TRUSS

ENGINEERED ROOF TRUSSES @ _____" O.C.
*requires a truss design, obtained from the truss supplier, to be attached to the permit application

OR

FRAMED ROOF:

RAFTER SIZE _____ CEILING JOIST _____
*requires a framing plan to be attached to the permit application

PITCH

12

*DOUBLE UNDERLAYMENT FOR PITCH UNDER 4:12

FASCIA CONT. _____x_____
STYLE "D" ROOF EDGE

SOFFIT: _____

SIDING: _____

WATER RESISTIVE BARRIER: _____

SHEATHING: _____

1" AIR GAP & EVE BAFFLE

*2X4 BLOCKING (*only if required)

ICE BARRIER EXTENDS 24" beyond interior wall face

R-49 BLOWN INSULATION
ATTIC VENTILATION 1:300

HOLDOWNS @ EACH TRUSS BRG

TOP PLATE: (2) 2 x _____

STUDS: 2 x _____ @ _____" O.C.
R-21 INSULATION IN ALL WALLS
4 MIL POLY VAPOR RETARDER (ON WARM SIDE OF WALL)
WATER RESISTIVE BARRIER (ON EXTERIOR SHEATHING)
R-6 INSULATED GARAGE DOOR(S)

WALL HEIGHT: _____
12' MAXIMUM

FLASHING PER SECTION R703.4

TREATED SILL PLATE: 2 x _____

ANCHOR BOLTS: $\frac{1}{2}$ " DIAMETER x 10" @ _____
*requires 7" min. embedment
6' MAX. SPACING
> 4" < 12" at plate ends

SLOPE

6" WITHIN THE FIRST 10'

VAPOR RETARDER
PER SECTION R506.2.3

R-10 EXPANDED POLYSTYRENE INSULATION
OR EXTRUDED POLYSTYRENE INSULATION

FOUNDATION
PERIMETER
FOUNDATION INSULATION DETAIL

26"

26"

2 - #4 RE-BAR RECOMMENDED

NOMINAL 4 IN. SCREENED AND WASHED GRAVEL OR
CRUSHED STONE DRAINED PER SECTION R403.3.3

FROST-PROTECTED MONOSLAB, WALL SECTION AND ROOF DETAIL

NOT TO SCALE

ATTACHED GARAGE WITH FOUNDATION MATCHING HOUSE

Fill in all details below.

ROOF COVERING

ROOFING: _____

UNDERLAYMENT: _____

SHEATHING: _____

*7/16 sheathing requires h-clips

TRUSS

ENGINEERED ROOF TRUSSES @ _____" O.C.

*requires a truss design, obtained from the truss supplier, to be attached to the permit application

OR

FRAMED ROOF:

RAFTER SIZE _____ CEILING JOIST _____

*requires a framing plan to be attached to the permit application

PITCH _____

*DOUBLE UNDERLAYMENT FOR PITCH UNDER 4:12

FASCIA CONT. _____ x _____

STYLE "D" ROOF EDGE

*2X4 BLOCKING (*only if required)

HOLDOWNS @ EACH TRUSS BRG

SOFFIT: _____

SIDING: _____

WATER RESISTIVE BARRIER: _____

SHEATHING: _____

TOP PLATE: (2) 2 x _____

STUDS: 2 x _____ @ _____" O.C.

WALL HEIGHT: _____

12' MAXIMUM

TREATED SILL PLATE: 2 x _____

ANCHOR BOLTS: $\frac{3}{4}$ " DIAMETER x 10" @ _____

*requires 7" min. embedment

6" MAX. SPACING > 4" < 12" at plate ends

SLOPE 6" WITHIN THE FIRST 10'

#4 X 12" DOWELS @ 24" O.C.

8"

4"

8" CONCRETE WALL W/ (2) #4 CONT. HORIZ. & #4 VERT. @ 48" O.C. CENTER OF WALL

#4 X _____ @ 48" O.C.

2'

6

3" CLR

W

D

T

NOTE: D+T MUST EQUAL A MINIMUM OF 42"

MATCH EXISTING HOUSE FOUNDATION

*Geotechnical observation at the time of excavation is required. A full geotechnical evaluation may be required.

(W) _____" x (T) _____" FOOTING W/ (2) ROWS #4 CONT.

*Minimum W=12" and T=6"

FOUNDATION MATCHES HOUSE, GARAGE WALL SECTION AND ROOF DETAIL

NOT TO SCALE

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Provide details of the foundation, wall section, and roof for the chosen foundation type. Not all foundation sheets need to be filled in - only the chosen foundation type. Please be aware of the limitations of a Monoslab.

1 . Garage will be:☒ **Detached**☐ ***Attached to dwelling** (*foundation must match the house foundation; fill in page 8)

a . An attached garage requires opening protection between the garage and house. If there is a door, fill in the check box for what type of door is to be used or NO OPENING FROM THE GARAGE TO THE HOUSE.

☒ **NO OPENING FROM THE GARAGE TO THE HOUSE**
or

☐ **SOLID WOOD DOOR NOT LESS THAN 1 3/8" THICKNESS, SELF-CLOSING**
or

☐ **SOLID OR HONEYCOMB-CORE STEEL DOOR NOT LESS THAN 1 3/8" THICK, SELF-CLOSING**
or

☐ **20-MIN FIRE-RATED DOOR, SELF-CLOSING**

2 . If the garage is a detached garage, fill in the total square footage for the garage.

Total square footage: 260' sq

There are two different options for the foundation:

Option 1:
Monolithic-slab (monoslab). If this option is picked, go to page 6 for details on the construction of the monoslab. *A full geotechnical evaluation may be required in certain cases.

Option 2:
Concrete stem walls with concrete footings. If this option is picked, go to page 7 for details on the construction of the concrete stem walls with concrete footings. *A full geotechnical evaluation may be required in certain cases.

3 . Fill in the wall height for the garage. Wall height: 10'

4 . Fill in the dimensions of the garage door(s).

(G1) Garage door 1 opening		
Width & Height	8	× 8
Make/Model #		

(G2) Garage door 2 opening		
Width & Height	×	
Make/Model #		

(G3) Garage door 3 opening		
Width & Height	×	
Make/Model #		

- a . **The garage door must be labeled by the garage door manufacturer. The label shall identify the garage door manufacturer, the garage door model/serial number, the positive and negative design wind pressure rating, and the applicable test standard (R609.4.1).**

- b . Fill in the portal framing method being used for the garage door(s).

☐ **R602.10.6.1 Method ABW: Alternate braced wall panels**

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☐ **4' long walls on both sides of the portal**

*This method can only be used with a maximum of 8' garage door height. Garage door openings exceeding 8' will need a structural engineer to provide design & stamp the plans.

5 . Fill in the dimensions of the headers for all window(s), door(s), and garage door(s). If an engineered wood header is used, fill in the type of engineered wood. Example, glulam or LVL. *Engineered wood headers may require an evaluation report, obtained from the supplier, to be attached to the permit application.

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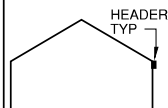
Legend

(LABEL) DESCRIPTION		
Size (from table to the left)	1-2	× 6 ← Example
Length from king stud to king stud	4-3 ← Example	

For this example, the opening span is 4-0

IRC 2021 Table R602.7(1)

GIRDERS AND HEADERS SUPPORTING	SIZE	GROUND SNOW LOAD (psf)					
		30					
		BUILDING WIDTH					
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roof and ceiling	1-2 × 6	4-0	1	3-1	2	2-7	2
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	3-2 × 8	9-5	1	7-3	1	6-1	1
	3-2 × 10	11-3	1	8-7	1	7-3	2
	3-2 × 12	13-2	1	10-1	2	8-6	2
roof and ceiling	4-2 × 8	10-11	1	8-4	1	7-0	1
	4-2 × 10	12-11	1	9-11	1	8-4	1
	4-2 × 12	15-3	1	11-8	1	9-10	2



(G1) Garage door 1 header

Size: **2** × **10**

Length: **8'-0"**

Engineered wood type:

(G2) Garage door 2 header

Size: ×

Length:

Engineered wood type:

(G3) Garage door 3 header

Size: ×

Length:

Engineered wood type:

(D1) Door 1 header

Size: **2** × **10**

Length: **3'-0"**

(D2) Door 2 header

Size: ×

Length:

(W1) Window 1 header

Size: **2** × **10**

Length: **3'-0"**

(W2) Window 2 header

Size: **2** × **10**

Length: **3'-0"**

(W3) Window 3 header

Size: **2** × **10**

Length: **3'-0"**

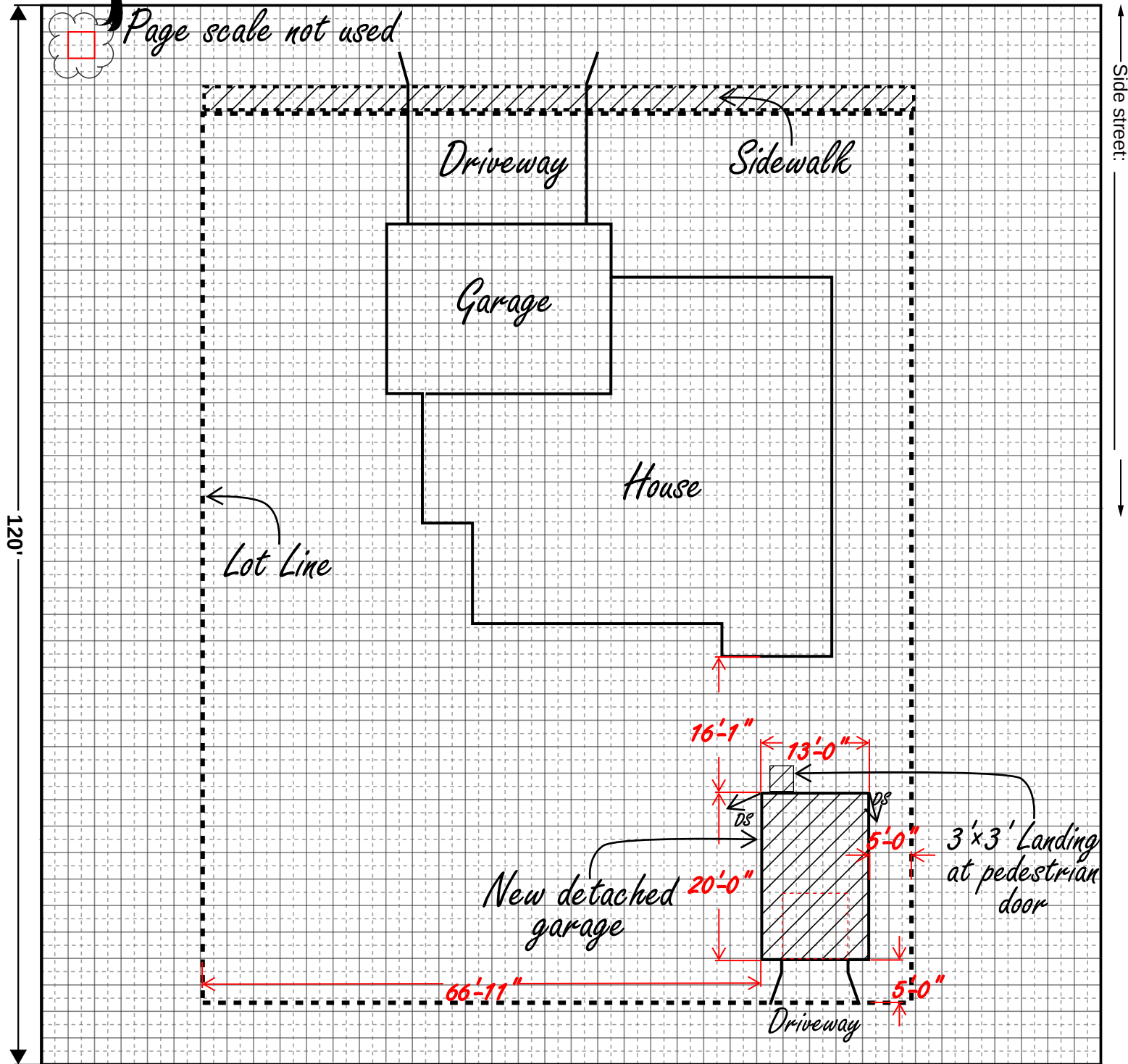
(W4) Window 4 header

Size: ×

Length:

SITE PLAN

- This will be a very broad view of the lot, house, and garage. Use the page 3 to draw a detailed plan view of the garage.



PLAN VIEW

Using the grid below to provide a plan view of the garage.

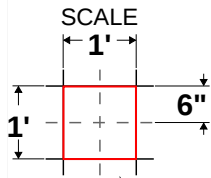
For a garage, draw the garage outline.

Include the location of windows, doors, and garage doors. Label all windows, doors, and garage doors (example: window 1 would be W1, door 1 would be D1, & garage door 1 would be labeled G1).

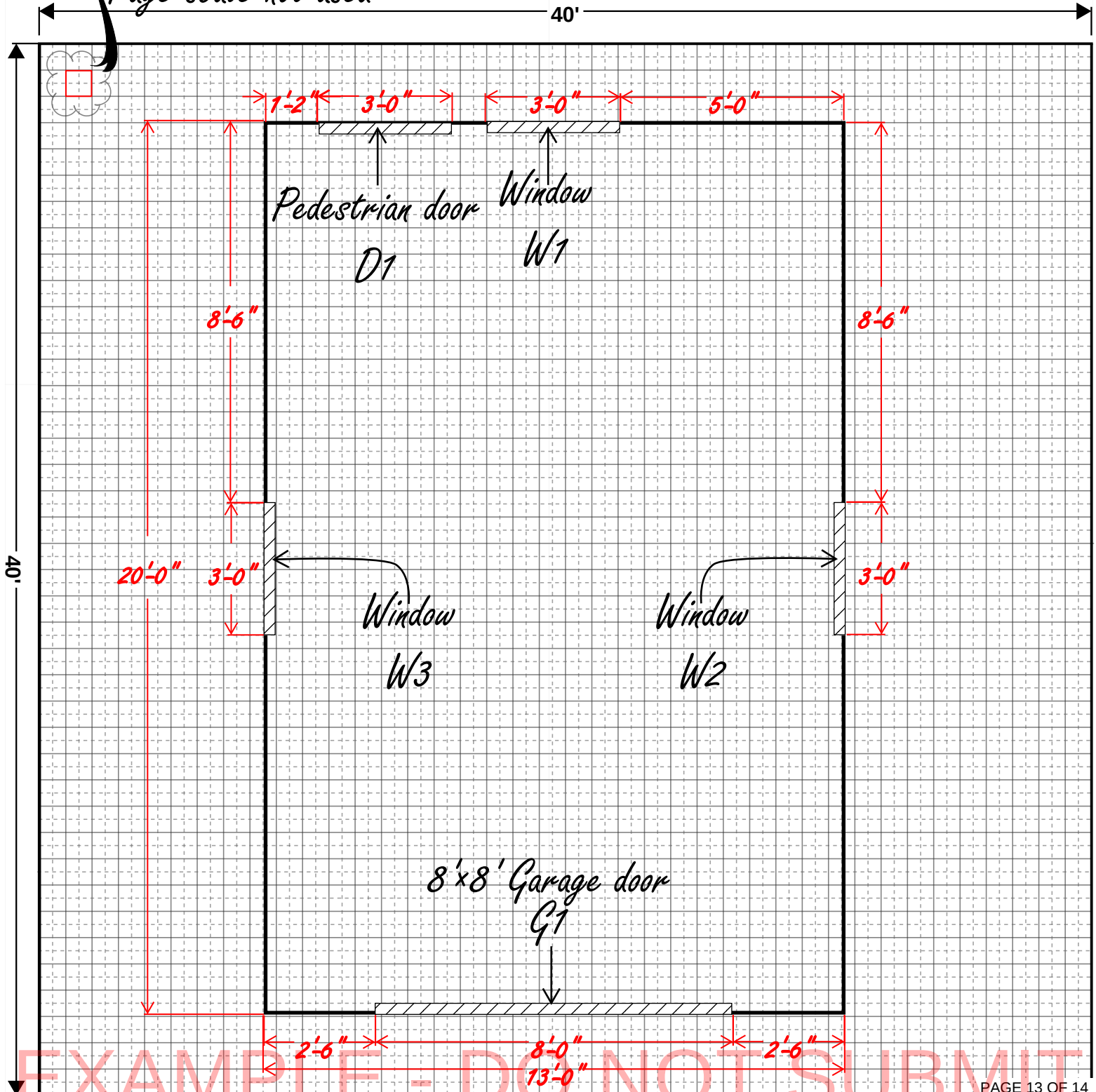
Egress doors require an exterior concrete landing 3'x3'.

If there is a heater in the shed, show the location and note the mounting height. 6' minimum above floor.

Show attic access if space above ceiling is taller than 30" to roof deck. 22"x30" minimum opening size.

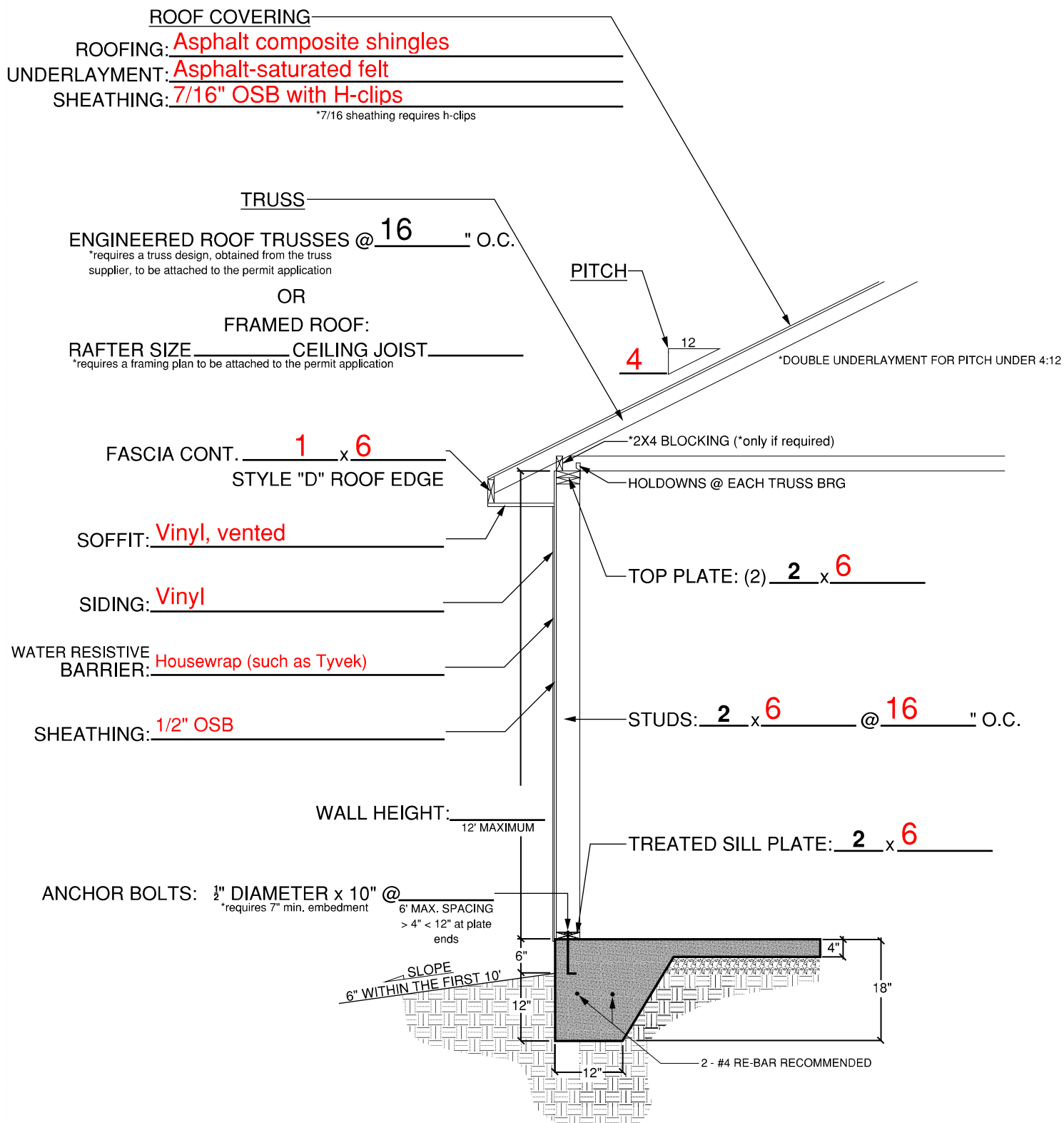


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DETACHED GARAGE, MONOSLAB

Fill in all details below.



MONOSLAB, WALL SECTION AND ROOF DETAIL

NOT TO SCALE