



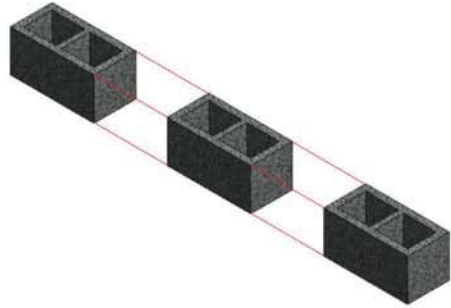
# Problem 2: Assembly

## *Story Board*

ARC/ID 242  
Building Tech 1: Wood

Group 5:  
Matt Ollmann  
Taylor Behl  
Michael Young  
Ava Andersson  
Nick Ouellette  
Dustin Thomason  
Sara Mauerman

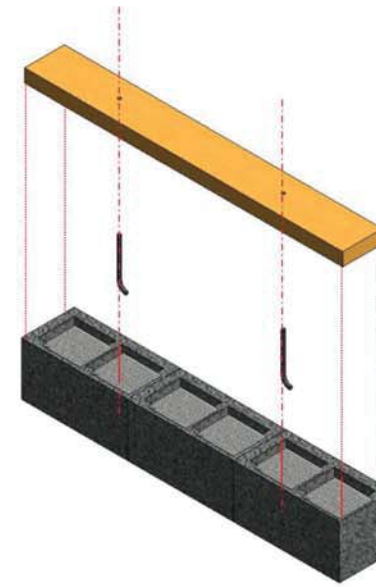
1



Layout CMU blocks to create a 4'-0" length foundation wall.

Mix concrete and fill cavities of CMU blocks.

2

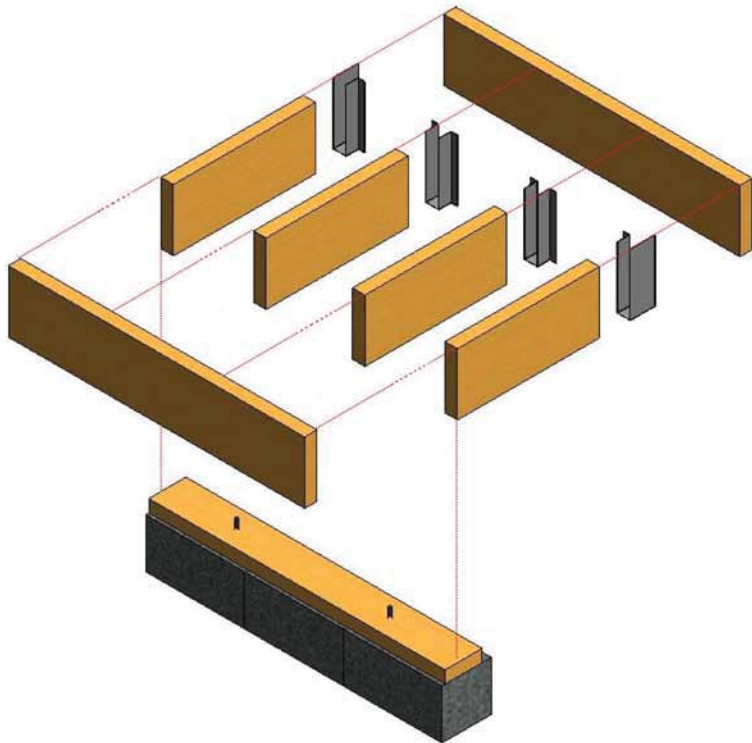


Set anchor bolts into still wet concrete approx. 12" from each end of wall.

After concrete has set, measure and mark sill plate for anchor bolts and drill holes for them to pass thru but be sure to allow for 1/2" set back from face of block.

Set sill plate on top of foundation wall and fasten nuts with washers to exposed portion of anchor bolts to secure sill plate.

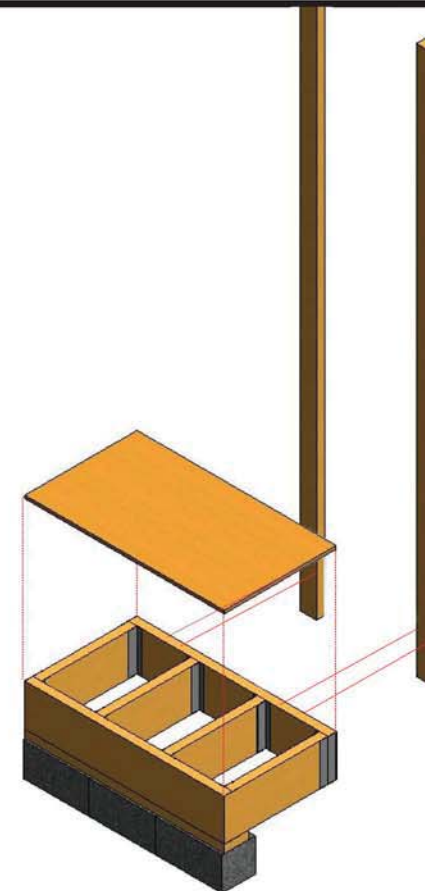
3



Position and fasten floor joists to rim joists using joist hangers.

Fasten floor joist system flush with the face of the sill plate toe nailing method.

4

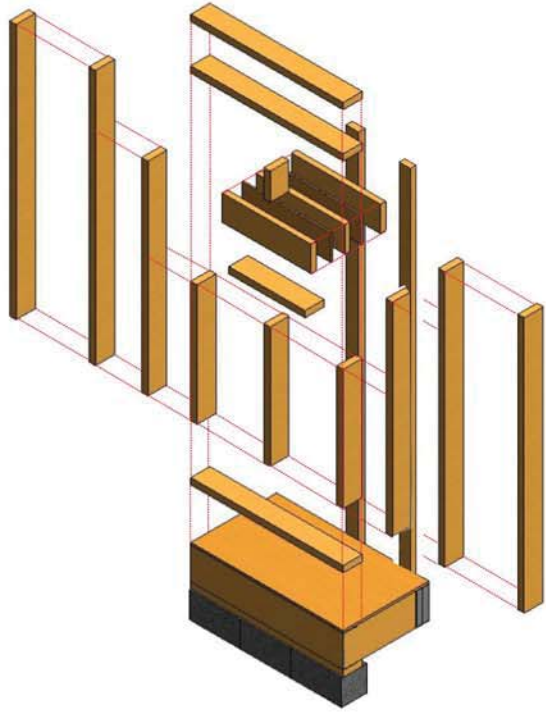


Position and set subfloor sheathing to floor joist platform.

Fasten rear support member to stabilize the floor system.



5

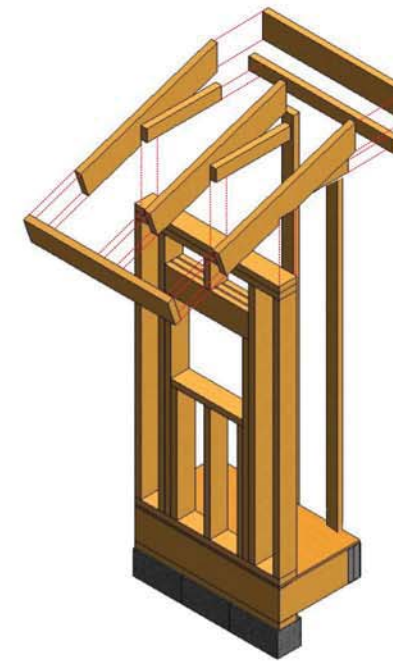


Construct wall system using studs on a flat horizontal surface allowing for a 2'-0" by 2'-0" opening for the window.

Create and position window header by using 3 2x8 members while placing 1/2" plywood in between each member.

Lift constructed wall into position and fasten to floor system.

6

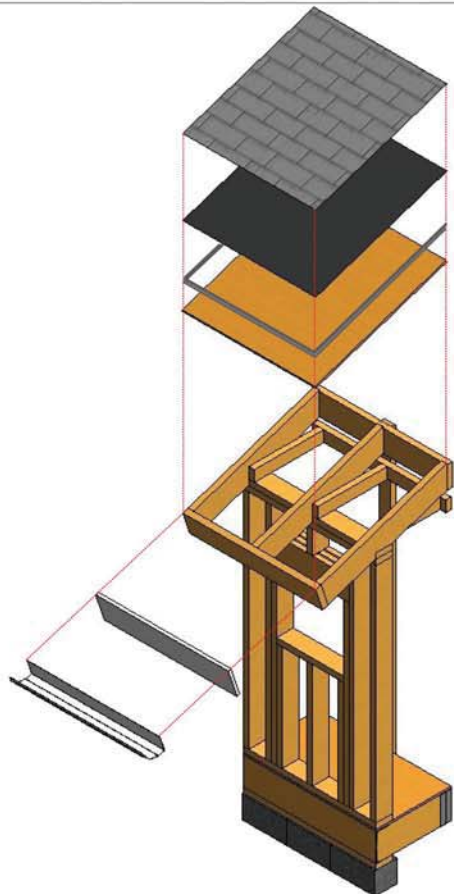


Create a birdmouth notch on the underside of each roof rafter to allow the top plate of the wall to join with the rafters creating a 4"/12" drop in the roof. (3" notch up to a 6" notch deep)

Fasten ceiling joists above birdmouth notches and fasten rim joist to rear.

Fasten rim joist to each end of the roof rafter system while fastening both rear rim joists to rear support.

7

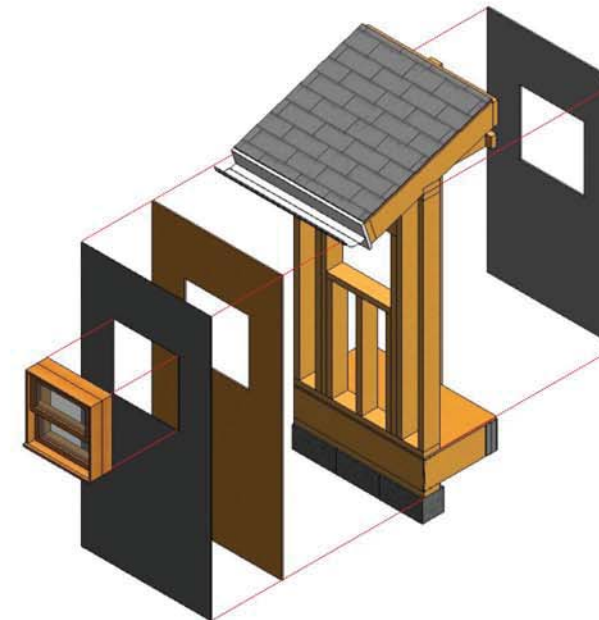


Place plywood roof sheathing onto roof rafter system.

Attach fascia, drip edge, and gutter to rim joist of the rafter system before felt and asphalt shingles are placed.

Place and fasten roofing felt and asphalt shingles to the roof sheathing being sure to offset each shingle so as to not have seams aligned.

8



Position and fasten gypsum wall board to inside of wall leaving a 2'-0" by 2'-0" opening for window.

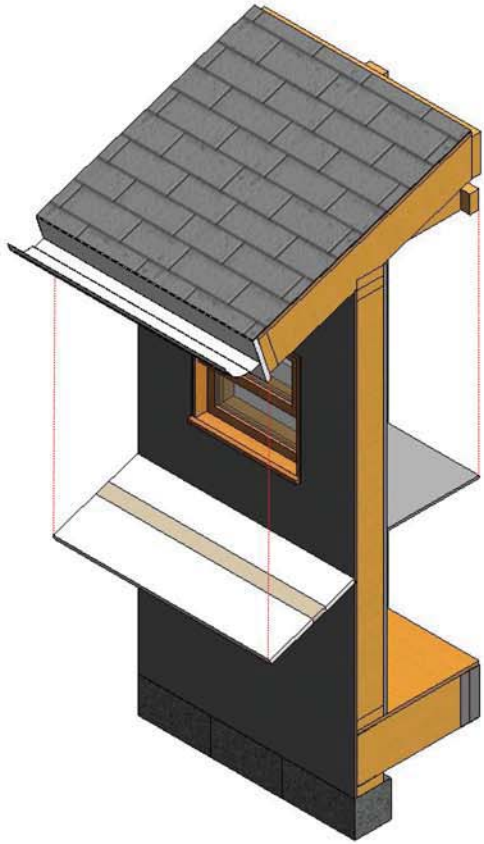
Position and fasten exterior plywood sheathing allowing for window opening. Bottom of sheathing should sit on top of CMU.

Place weather barrier over entire face of plywood sheathing.

Position and fasten window into wall opening.



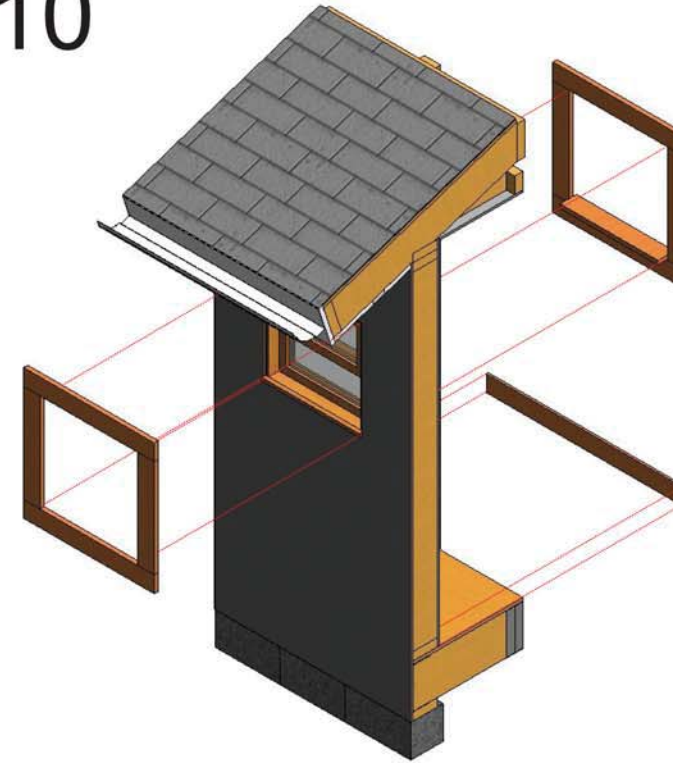
9



Position and fasten soffit and vent onto the underside of the roof overhang.

Position and fasten gypsum wall board to ceiling joists on the interior so that ceiling GWB sits on top of wall GWB.

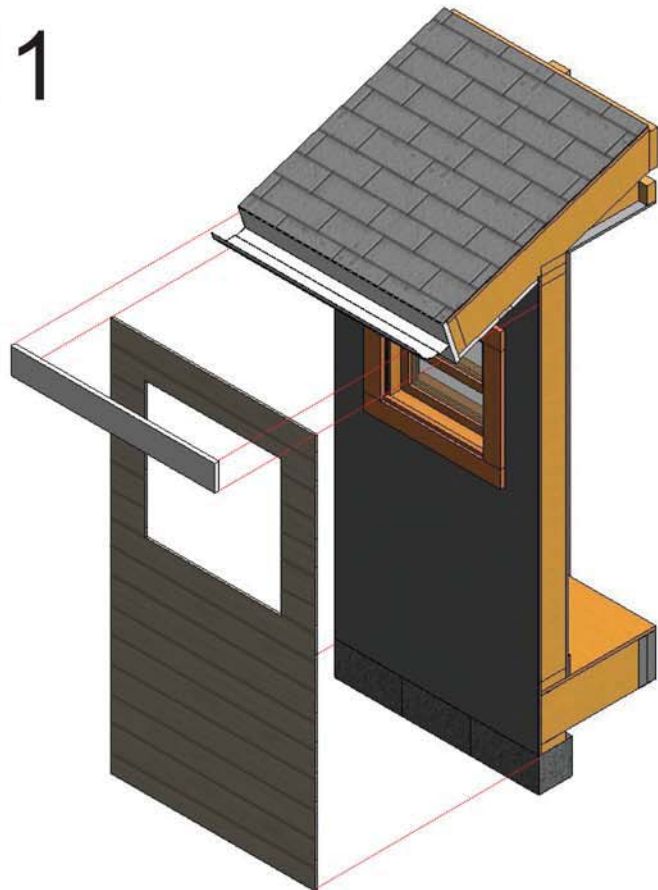
10



Position and fasten window trim and sill to the perimeter of the window opening both on the exterior and interior.

Position and fasten baseboard to gypsum wall board on the interior of the wall.

11



Position and fasten each length of clap board starting at the bottom with a starter strip and working up to the roof.

Fasten frieze board to top of wall above the lap board siding.

12



Position and fasten carpet pad to floor sheathing using construction grade staples.

Lay carpet overtop of carpet pad and secure with tack strips around the perimeter of the flooring system.

Problem 2 Materials List/Price Analysis

Wood					Finishes/Foundation/Etc.						Fasteners				
	Item	Quantity	Price per Unit	Total Price		Item	Area	Quantity	Price per Unit	Total Price		Item	Quantity	Price per Unit	Total Price
Studs	2x2-8'	2	\$1.38	\$2.76	Roof	3 Tab	~16 sq.ft	1	\$21.54	\$21.54	Nails	Roof/Side	1	\$8.97	\$8.97
	2x4-8'	2	\$1.97	\$3.94		Felt	~16 sq.ft	1	\$15.25	\$15.25		Framing	2	\$5.97	\$11.94
	2x4-10'	2	\$2.58	\$5.16	GWB	1/2"	n/a	2	\$9.10	\$18.20		Finish	1	\$1.18	\$1.18
	2x6-8'	11	\$3.14	\$34.54		Tyvec	~32 sq.ft	1	\$43.96	\$43.96		Joist	1	\$4.97	\$4.97
	2x6 treat-8'	1	\$3.99	\$3.99	Flooring	Carpet	~8 sq.ft	12	\$0.52	\$6.24	Floor	Tac Strip-8'	2	\$1.98	\$3.96
	2x8-8'	4	\$4.20	\$16.80		Pad	~8 sq.ft	12	\$0.63	\$7.56		J-Hangar	8	\$1.17	\$9.36
	2x10-10'	2	\$6.83	\$13.66	Foundation	CMU	n/a	3	\$1.54	\$4.62	Foundation	Anchor	2	\$1.52	\$3.04
Sheathing	3/4" Ply	1	\$19.97	\$19.97		Concrete	40lb.	2	\$2.68	\$5.36					
	1/2" Ply	1	\$14.49	\$14.49	Window	Aluminum	4 sq.ft	1	\$69.67	\$69.67					
Trim/Other	1x4-8'	6	\$1.99	\$11.94	Vent	Soffit-6'	n/a	3	\$1.60	\$4.80					
	1x6 t&g -8'	3	\$10.43	\$31.29	Eavestrough	Gutter- 10'	n/a	1	\$6.47	\$6.47					
	4" Base -8'	1	\$10.16	\$10.16											
	8"Lap-8'	8	\$7.22	\$57.76											
Total:				\$226.46	Total:				\$203.67		Total:				\$43.42

Gross Total: \$473.55

Final Cost Estimate: \$512.62

Group 5: Matt Ollmann    Ava Andersson    Sara Mauerman  
Taylor Behl            Nick Ouellette  
Michael Young        Dustin Thmason

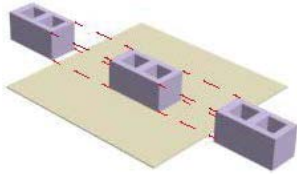
# ARC242| Building Tech I: Wood

## Project Two: Assembly

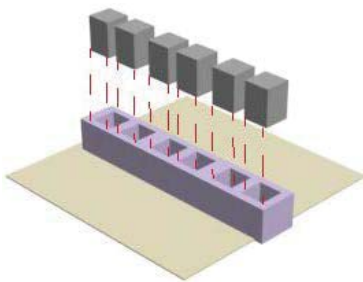
### Group Four

Drew Baldwin  
Eric Becherer  
Caitie Kilroy  
Abby Albers  
Robert Musial  
Stephen Tutka  
Alexandria Saieg

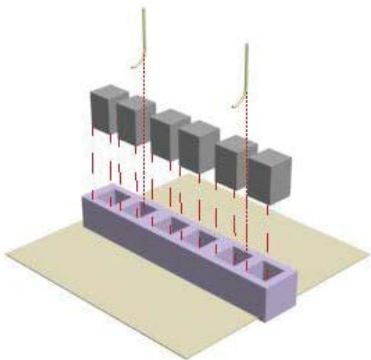
## Foundation



1a) Place (3) 8x8x16 CMU blocks together end to end, creating a straight line on scrap plywood.

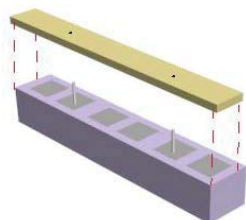


1b) Mix one bag of concrete to proper consistency and pour into each CMU core.



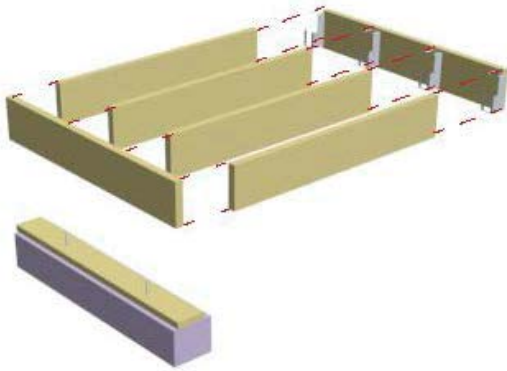
1c) Place 4' flashing/ termite shield (not shown in picture) on CMU blocks and drill holes for anchor bolts

1d) Insert (2)  $\frac{3}{4}$ " anchor bolts into wet concrete and let dry.



1e) Drill holes in treated 2x6 member to allow anchor bolts to pass through. 2x6 is offset  $\frac{1}{2}$ " from the exterior face of CMU blocks.

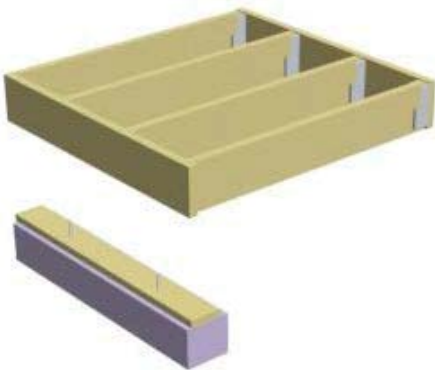




Flooring (assembled separately)

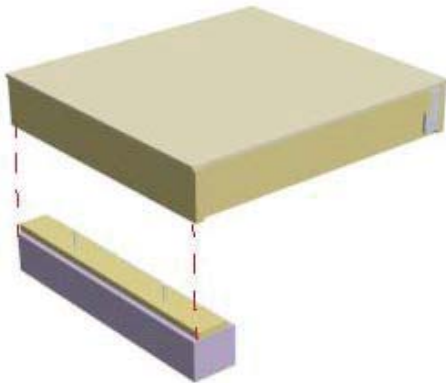
2a) Place (2) 4' long 2x10 member four feet apart on the ground.

2b) Position (4) 2' long 2x10 members perpendicular at 16" o.c.



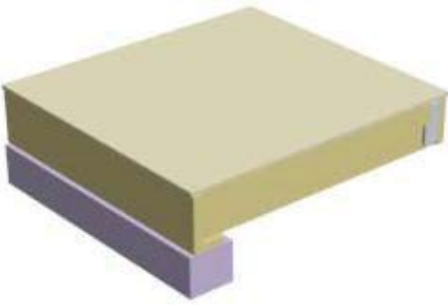
2c) Use the positioning of the joists to nail the (4) joist hangers in place. Use 3" framing nails

2d) Place joists in joist hangers and nail all joists in place.



2e) Place floor system and nail to rim joists, then place  $\frac{3}{4}$ " plywood sheathing on top of floor and nail down. Use 2" framing nails.



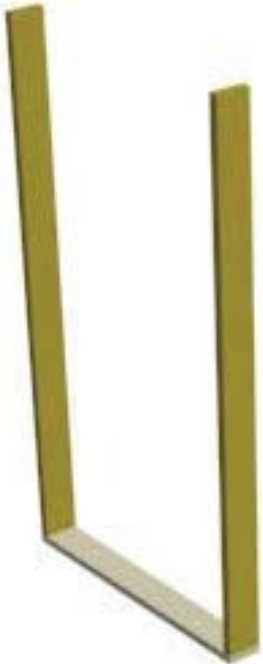


2f) Place floor on top of sill plate aligning the outside edge of rim joist with the exterior edge of the sill plate. Place CMU block with 2x member under the back rim joist for support.

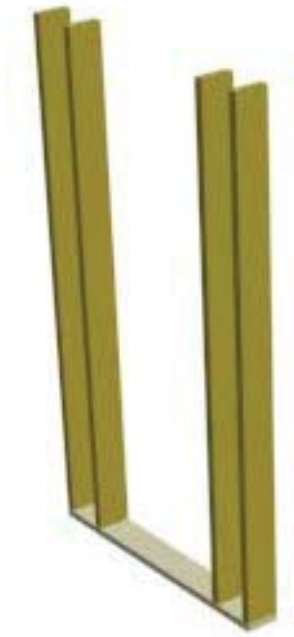


Walls (assembled separately)

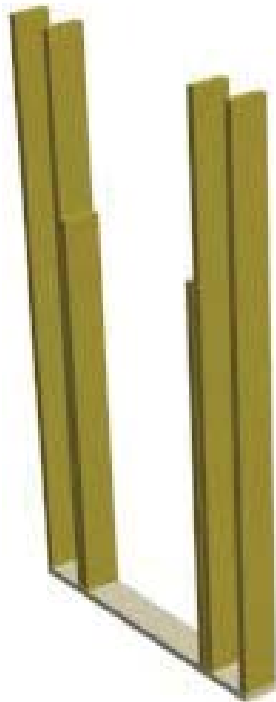
3a) Place 4' 2x6 sole plate on ground



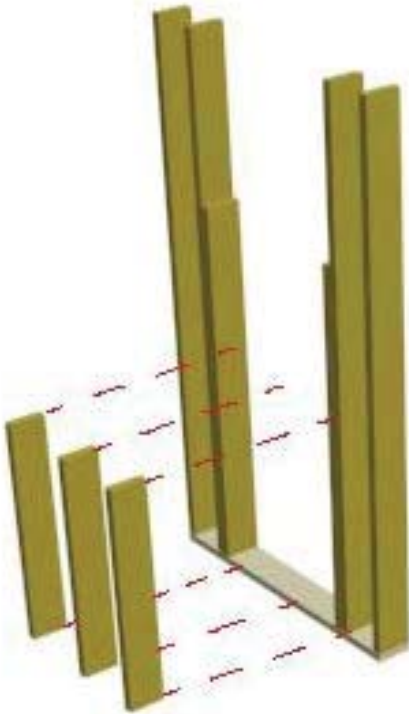
3b) Place and nail in (2) common studs on the outside edges of sole plate. Use 3" framing nails.



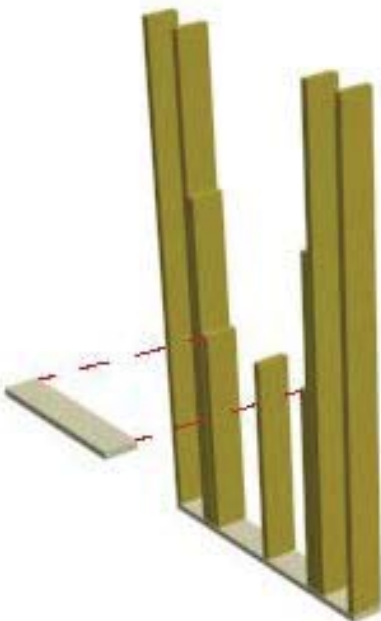
3c) Place and nail in (2) king studs 7 ½" inside of the common studs.



3d) Place and nail (2) 5'5 ½" jack studs directly to the inside edge of king studs



3e) place and nail (2) 3'3 ½" cripple studs directly to the inside edge of the jack studs then place and nail another directly centered between the 2 others.



3f) Lay 2' 2x6 sill plate for window along the top of the cripple studs and nail in place (3" framing nails)

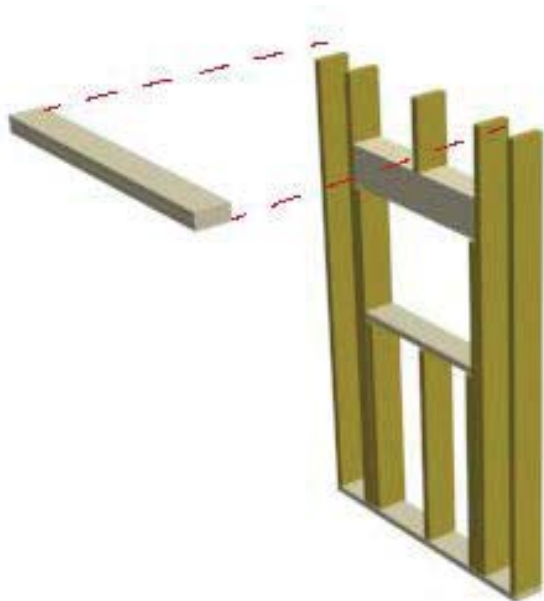




3g) Place (3) 2' 2x8 members together with ½" plywood/OSB separating each member and nail them together.

3h) Place joined 2x8 members on top of jack studs and nail them in place.

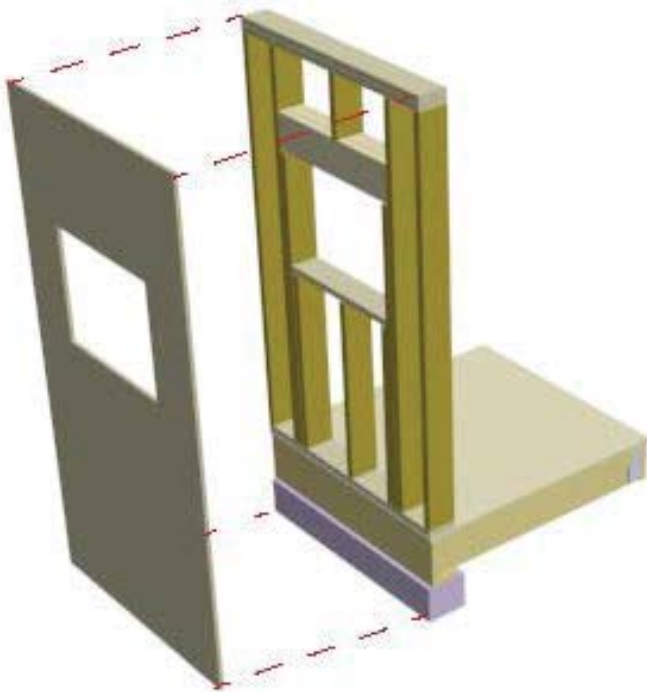
3i) Place 9" 2x6 cripple stud centered on header and nail in place.



3j) Place first 4' 2x6 member on top of studs and nail down, then repeat for the second top plate.



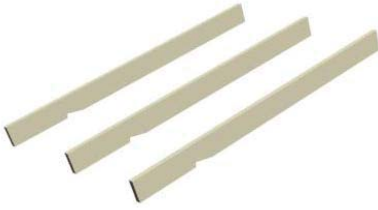
3k) Take wall assembly, place on top of subfloor and nail to plywood. Fashion temporary racing to hold the wall up for assembly of roof and finishes.



3l) Place  $\frac{3}{4}$ " plywood sheathing on exterior face of wall and nail to studs.

Roof (assembled separately)

4a) Notch the (3) 2x8 members to accommodate the frame wall

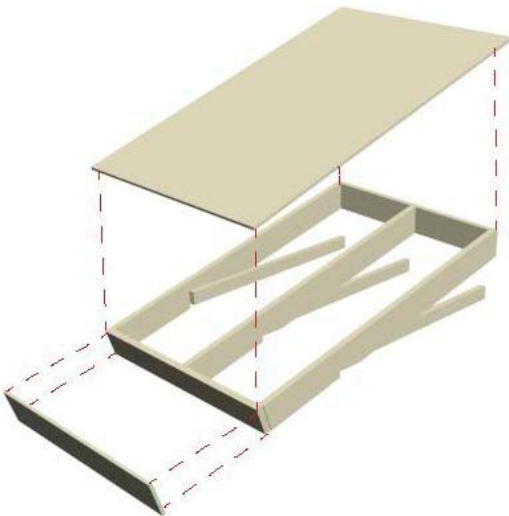
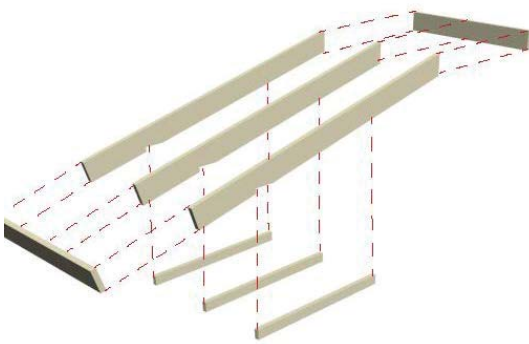


4b) Place (3) 2x8 members 2' o.c. on the ground, take another 4' 2x8 and nail it to the edge of the (3) members.

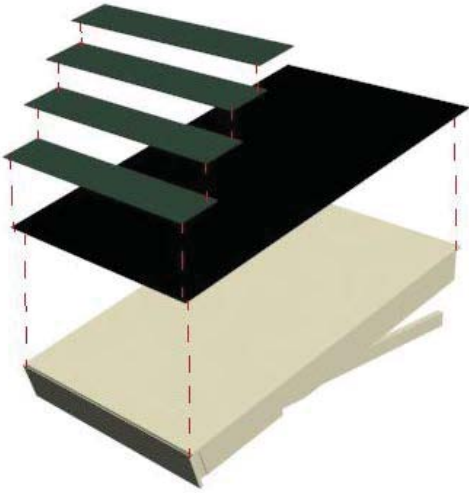
4c) Place and nail (3) 2' 2x4 members to the 2x8 to act as ceiling joists, then nail a 4' 2x4 to the back of the joists.

4d) Place  $\frac{3}{4}$ " plywood sheathing on top of joists and nail in place. Place roof felt on top of plywood and nail in place.

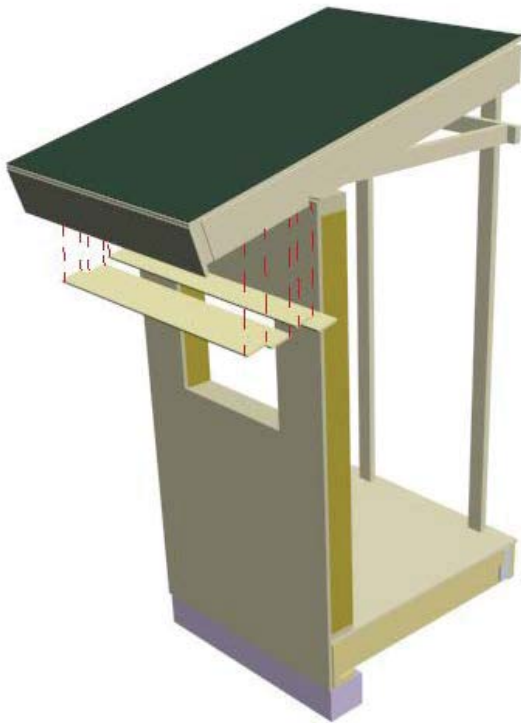
4e) Place and nail 4' long 1x10 fascia board to exterior face of roof joist.







4f) On top of roof felt nail down asphalt shingles starting from the bottom and working up, making sure to overlap the shingles.

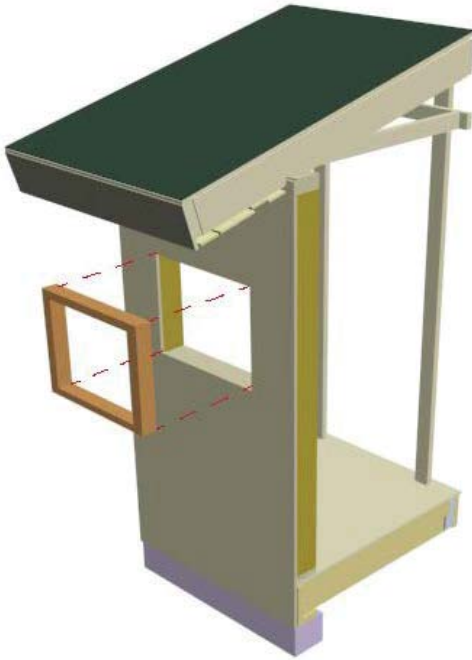


4g) Place roof of top of wall and nail the rear 2x4 supports in place.

4g) Nail in place a 4' drip edge along the exterior face of roof joist on top of roof felt and fascia board.

4h) Place 4' 1x4 soffit boards on the underside of the roof allowing space for a 4" soffit vent.

4i) Nail gutter to the 1x10 fascia board making sure the top is aligned with the top of the joist (no higher than the top of the plywood).

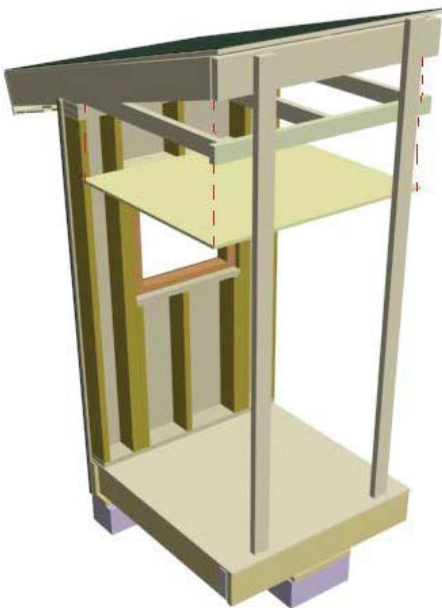


### Window

5a) Cut exterior plywood and gwb to opening of wall to allow window to be placed.

5b) Place and staple building wrap to exterior face of wall.

5c) Place the window in the opening and nail flanges to wall. Apply window tape to the edges of the window opening (not required).

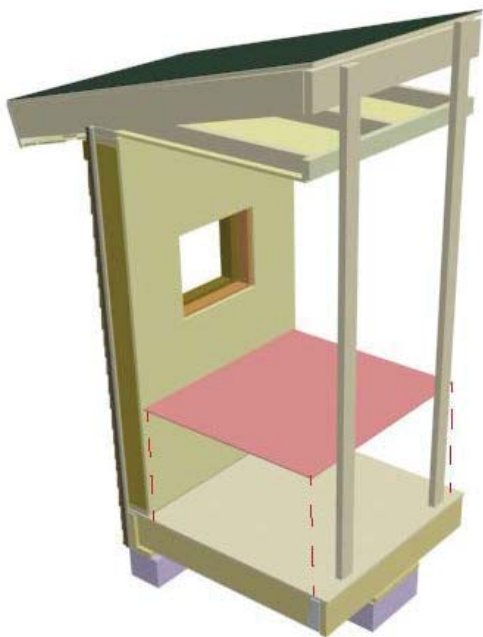


### Finishes (Interior)

6a) Nail GWB for ceiling to ceiling joists.



6b) Place and screw GWB to interior face of wall.

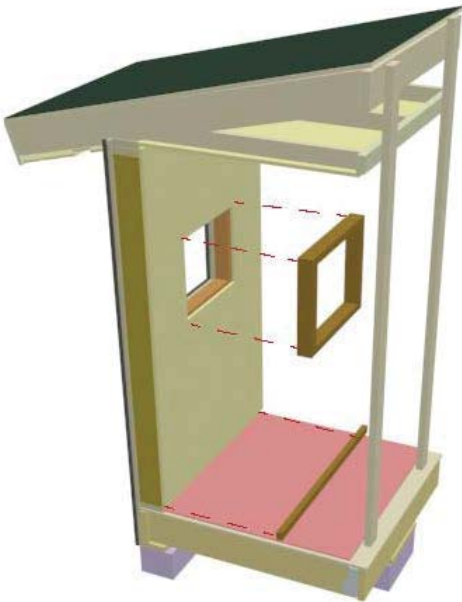


6b) Adhere nailing strips to subfloor, place carpet pad, then carpeting on top of that.



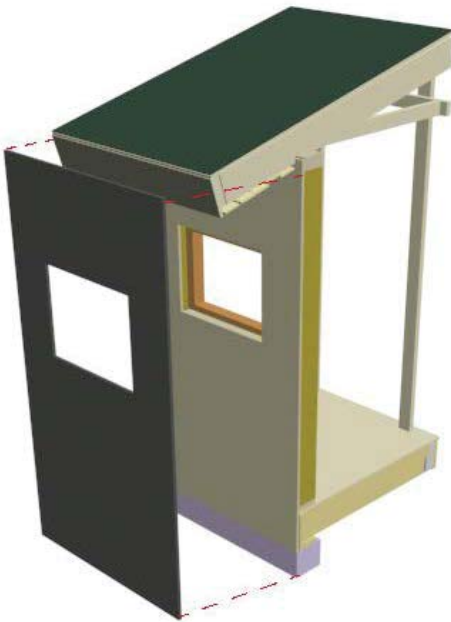
6c) Nail trim in around the window.

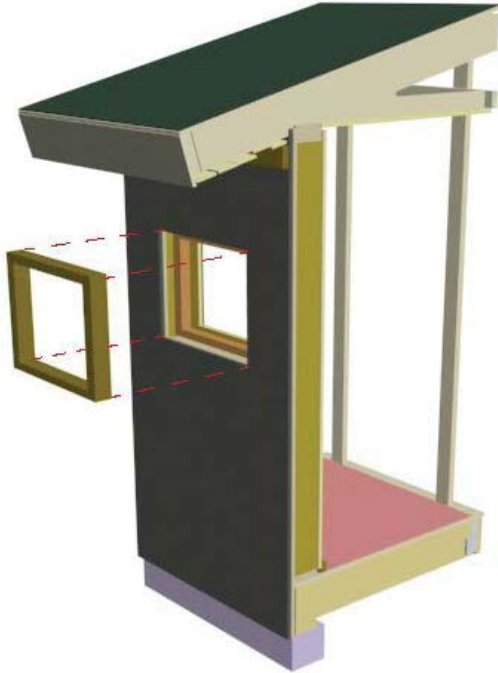
6d) Nail base boards to wall and plywood subfloor.



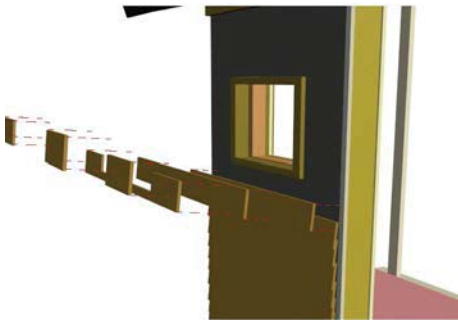
#### Finishes (Exterior)

7a) Place and nail clapboard siding to exterior face of wall, starting at the bottom and overlapping each piece. Add wood to bottom clapboard to support it and provide an angle.





7b) Place window trim on the rough opening.



7c) Place and nail in freeze board between the top clapboard and the soffit board.



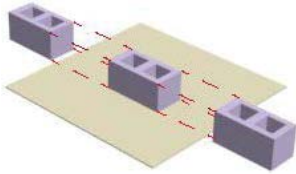
Finished Product



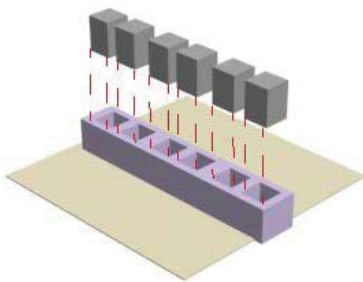
Material	Price	Quantity	Total Price
Concrete	\$3.00	1	\$3.00
1/2"x10" Anchor Bolts	\$1.44	2	\$2.88
8x8x16 cmu	\$1.54	3	\$4.62
Pressure Treated	\$3.92	1	\$3.92
4' Length of termite Shield	\$3.89	1	\$3.89
2x10x8' (all of floor framing)	\$5.42	3	\$16.26
2x10 Joist Hangers		4	\$4.00
3" Framing Nails	\$7.89	1	\$7.89
2x4x10'		2	\$2.00
4x8x3/4" Plywood		1	\$1.00
2" Framing nails	\$19.98	1	\$19.98
2x6x8 all framing except header	\$3.74	10	\$37.40
2x8x8' (header)	\$4.95	1	\$4.95
1/2" plywood filler	\$21.06	2	\$42.12
2x4x8 for bracing	\$1.95	2	\$3.90
2x8x8' (all of roof framing)	\$4.95	3	\$14.85
H2.5 holddows		4	\$4.00
2x8 joist hangars	\$0.94	4	\$3.76
2x4x8' (all of ceiling framing)	\$1.95	2	\$3.90
4x8x1/2" plywood (wall)	\$21.06	2	\$42.12
Window w/ nailing flange	\$76.00	1	\$76.00
1 roll of building wrap/weather barrier	\$44.42	1	\$44.42
starter strip	\$5.06	1	\$5.06
4' lengths clapboard Siding	\$7.62	2	\$15.24
1x4x8' window trim	\$6.48	2	\$12.96
large finish nails for trim, soffit		1	
1/2" nails for siding		1	\$1.00
4' lengths of 1x4 t&g soffit board	\$14.82	1	\$14.82
1x10x8' fascia	\$12.76	1	\$12.76
4' length of medal drip edge	\$3.96	1	\$3.96
roll of roofing uderlayment	\$14.20	1	\$14.20
roofing nails			\$0.00
asphalt 3 tab shinges	\$21.54	1	\$21.54
4' length gutter	\$6.67	1	\$6.67
down spout	\$8.87	1	\$8.87
fascia BRKT	\$9.59	1	\$9.59
End Cap	\$1.37	1	\$1.37
End Dtop	\$6.98	1	\$6.98
Coutlet	\$3.76	1	\$3.76
Elbow	\$3.54	1	\$3.54
Gutter Screws	\$0.87	1	\$0.87
Carpet sq ft	\$0.65	16	\$10.40
carpet pad sq ft	\$0.48	16	\$7.68
Tack strips as appropriate	\$1.98	1	\$1.98
4' length of wall base w/ appropriate fasteners	\$7.12	1	\$7.12
4x8x1/2" gwb (wall and ceiling)	\$5.65	1	\$5.65

Drywall Screws	\$9.99	1	\$9.99
trim around window @ interior	\$6.32	2	\$12.64
2' length of window sill @ interior	\$2.49	1	\$2.49
Total			\$548.00
Sales tax			8.25%
taxes			\$45.21
Total w/ Tax			\$593.21
Discount%			50.00%
Total w/ Discount			\$296.61

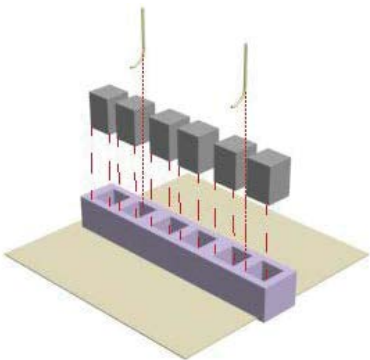
## Foundation



1a) Place (3) 8x8x16 CMU blocks together end to end, creating a straight line on scrap plywood.

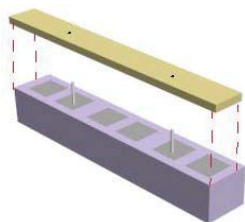


1b) Mix one bag of concrete to proper consistency and pour into each CMU core.

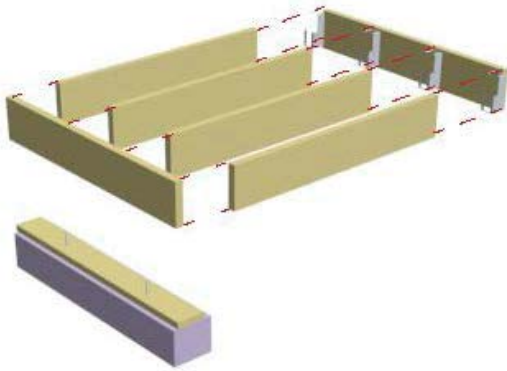


1c) Place 4' flashing/ termite shield (not shown in picture) on CMU blocks and drill holes for anchor bolts

1d) Insert (2)  $\frac{3}{4}$ " anchor bolts into wet concrete and let dry.



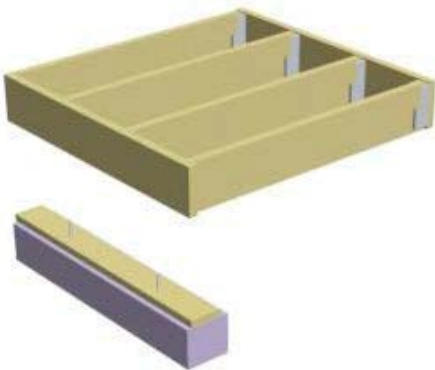
1e) Drill holes in treated 2x6 member to allow anchor bolts to pass through. 2x6 is offset  $\frac{1}{2}$ " from the exterior face of CMU blocks.



Flooring (assembled separately)

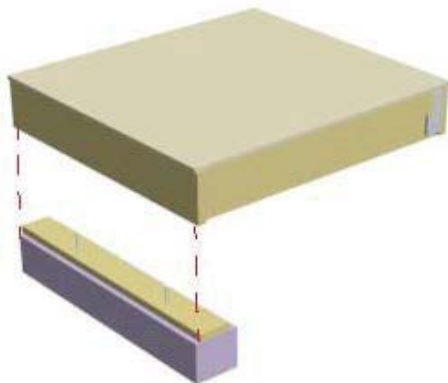
2a) Place (2) 4' long 2x10 member four feet apart on the ground.

2b) Position (4) 2' long 2x10 members perpendicular at 16" o.c.

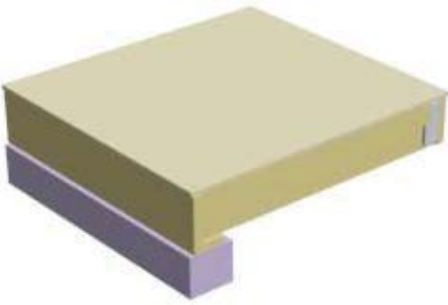


2c) Use the positioning of the joists to nail the (4) joist hangers in place. Use 3" framing nails

2d) Place joists in joist hangers and nail all joists in place.



2e) Place floor system and nail to rim joists, then place  $\frac{3}{4}$ " plywood sheathing on top of floor and nail down. Use 2" framing nails.

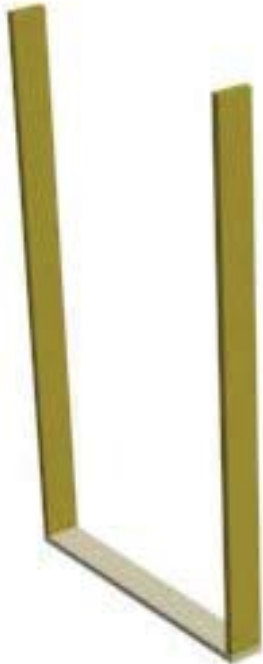


2f) Place floor on top of sill plate aligning the outside edge of rim joist with the exterior edge of the sill plate. Place CMU block with 2x member under the back rim joist for support.



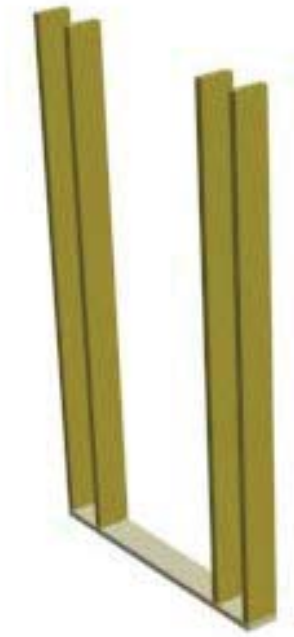
Walls (assembled separately)

3a) Place 4' 2x6 sole plate on ground

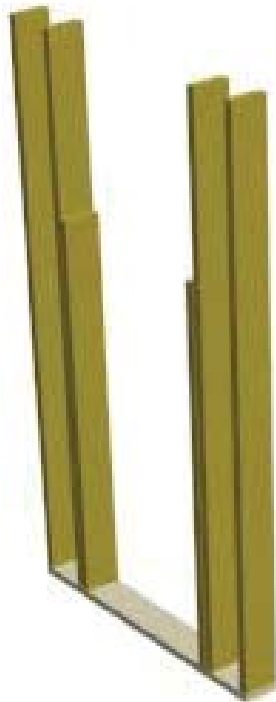


3b) Place and nail in (2) common studs on the outside edges of sole plate. Use 3" framing nails.

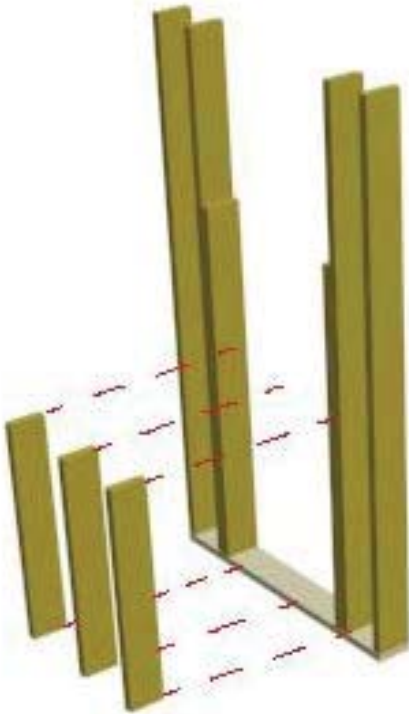




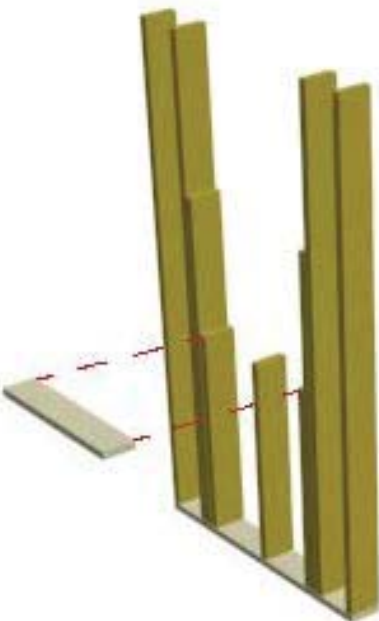
3c) Place and nail in (2) king studs 7 1/2" inside of the common studs.



3d) Place and nail (2) 5'5 1/2" jack studs directly to the inside edge of king studs



3e) place and nail (2) 3'3 1/2" cripple studs directly to the inside edge of the jack studs then place and nail another directly centered between the 2 others.



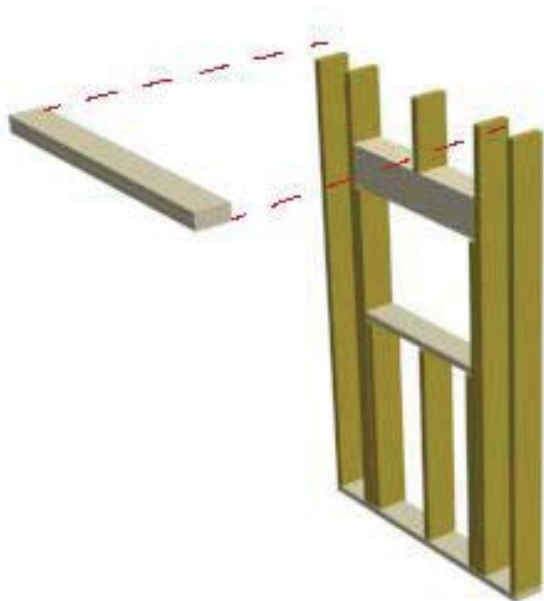
3f) Lay 2' 2x6 sill plate for window along the top of the cripple studs and nail in place (3" framing nails)



3g) Place (3) 2' 2x8 members together with ½" plywood/OSB separating each member and nail them together.

3h) Place joined 2x8 members on top of jack studs and nail them in place.

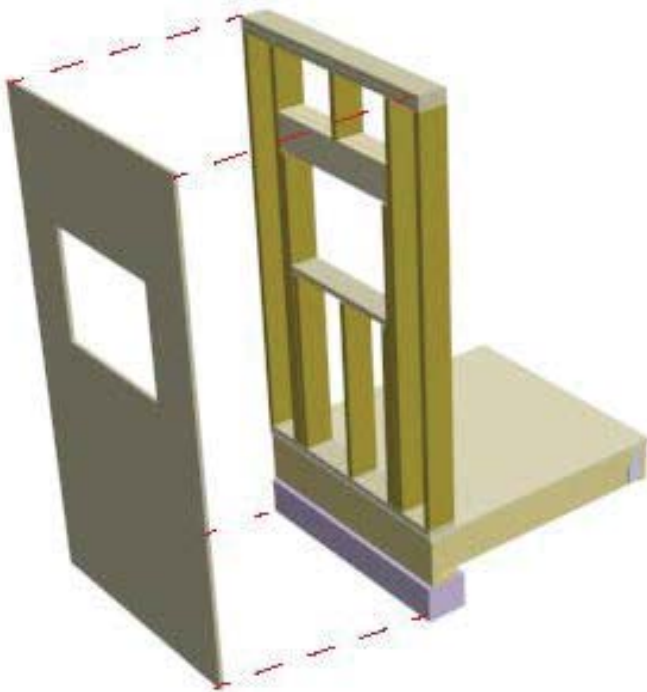
3i) Place 9" 2x6 cripple stud centered on header and nail in place.



3j) Place first 4' 2x6 member on top of studs and nail down, then repeat for the second top plate.



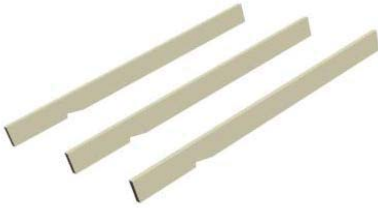
3k) Take wall assembly, place on top of subfloor and nail to plywood. Fashion temporary racing to hold the wall up for assembly of roof and finishes.



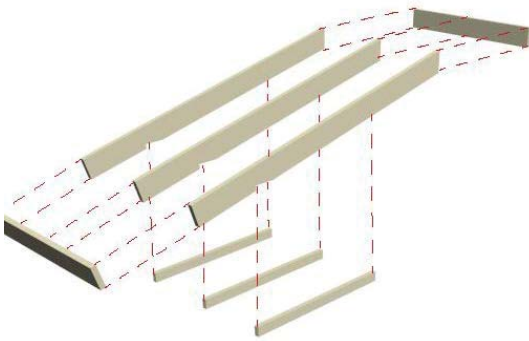
3l) Place  $\frac{3}{4}$ " plywood sheathing on exterior face of wall and nail to studs.

Roof (assembled separately)

4a) Notch the (3) 2x8 members to accommodate the frame wall



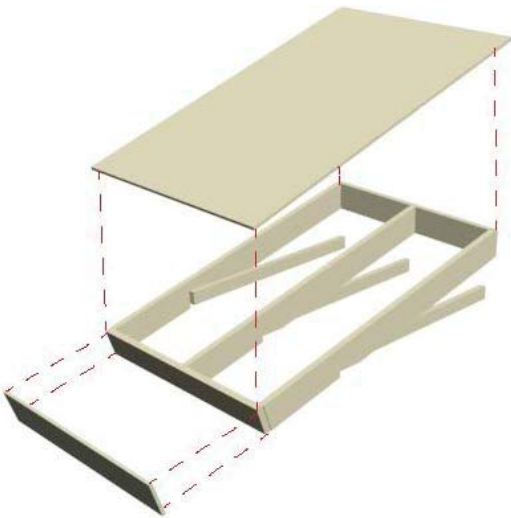
4b) Place (3) 2x8 members 2' o.c. on the ground, take another 4' 2x8 and nail it to the edge of the (3) members.



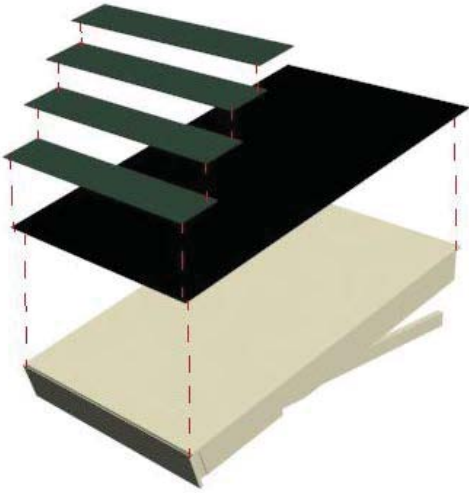
4c) Place and nail (3) 2' 2x4 members to the 2x8 to act as ceiling joists, then nail a 4' 2x4 to the back of the joists.

4d) Place  $\frac{3}{4}$ " plywood sheathing on top of joists and nail in place. Place roof felt on top of plywood and nail in place.

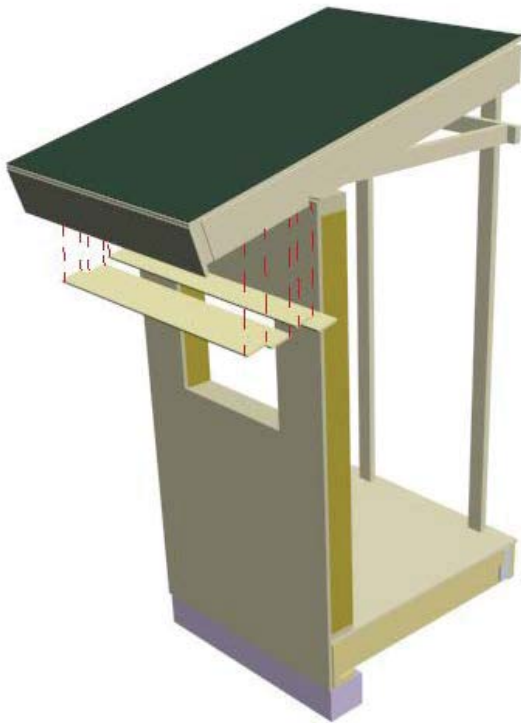
4e) Place and nail 4' long 1x10 fascia board to exterior face of roof joist.







4f) On top of roof felt nail down asphalt shingles starting from the bottom and working up, making sure to overlap the shingles.

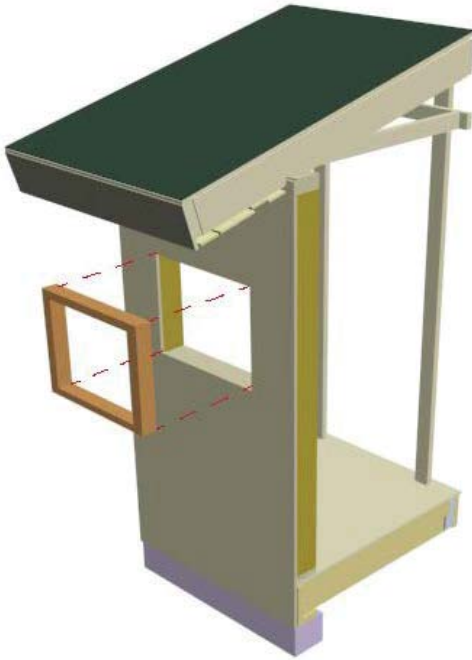


4g) Place roof of top of wall and nail the rear 2x4 supports in place.

4g) Nail in place a 4' drip edge along the exterior face of roof joist on top of roof felt and fascia board.

4h) Place 4' 1x4 soffit boards on the underside of the roof allowing space for a 4" soffit vent.

4i) Nail gutter to the 1x10 fascia board making sure the top is aligned with the top of the joist (no higher than the top of the plywood).

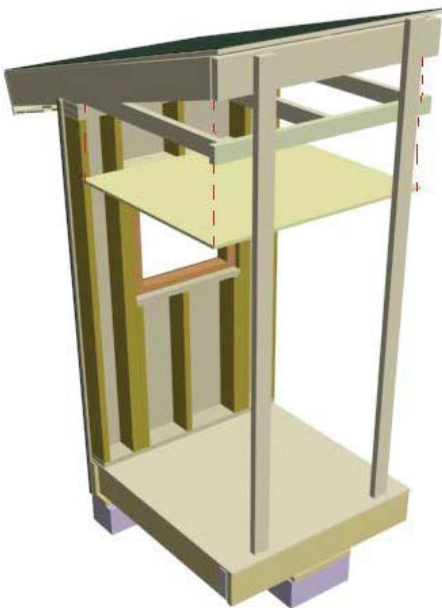


### Window

5a) Cut exterior plywood and gwb to opening of wall to allow window to be placed.

5b) Place and staple building wrap to exterior face of wall.

5c) Place the window in the opening and nail flanges to wall. Apply window tape to the edges of the window opening (not required).

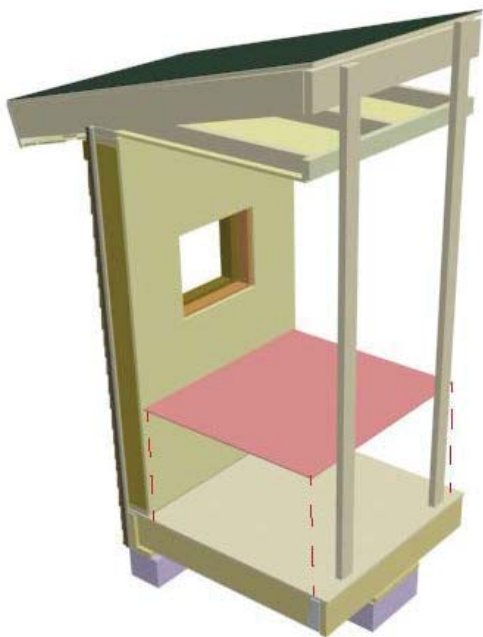


### Finishes (Interior)

6a) Nail GWB for ceiling to ceiling joists.



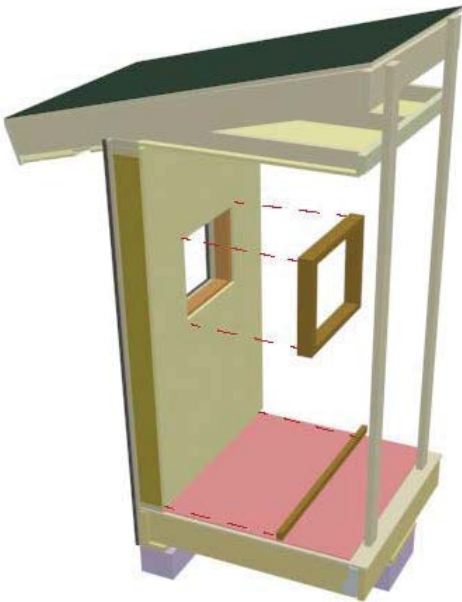
6b) Place and screw GWB to interior face of wall.



6b) Adhere nailing strips to subfloor, place carpet pad, then carpeting on top of that.

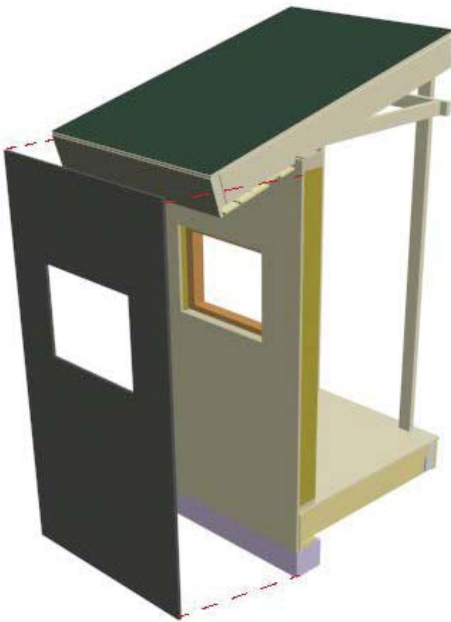
6c) Nail trim in around the window.

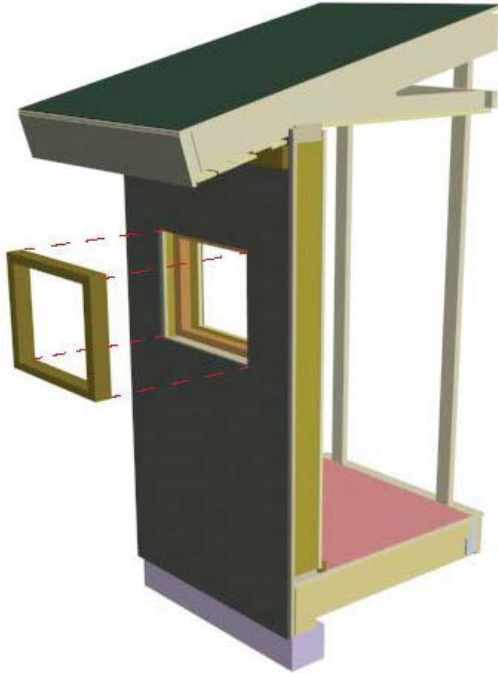
6d) Nail base boards to wall and plywood subfloor.



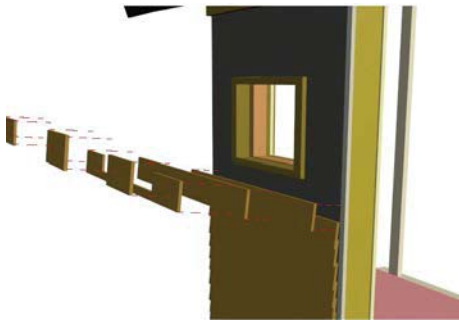
#### Finishes (Exterior)

7a) Place and nail clapboard siding to exterior face of wall, starting at the bottom and overlapping each piece. Add wood to bottom clapboard to support it and provide an angle.



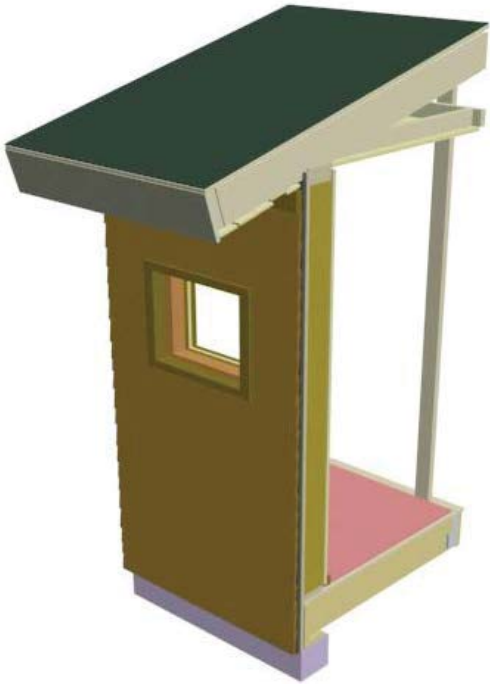


7b) Place window trim on the rough opening.



7c) Place and nail in freeze board between the top clapboard and the soffit board.





Finished Product

Material	Price	Quantity	Total Price
FLOOR			
Concrete	\$3.00	1	\$3.00
1/2"x10" Anchor Bolts	\$1.44	2	\$2.88
8x8x16 cmu	\$1.54	3	\$4.62
Pressure Treated	\$3.92	1	\$3.92
4' Length of termite Shield	\$3.89	1	\$3.89
2x10x8' (all of floor framing)	\$5.42	3	\$16.26
2x10 Joist Hangers	\$1.09	4	\$4.36
3" Framing Nails	\$7.89	1	\$7.89
2x4x10'	\$3.45	2	\$6.90
4x8x3/4" Plywood	\$14.97	1	\$14.97
Carpet sq ft	\$0.65	16	\$10.40
carpet pad sq ft	\$0.48	16	\$7.68
Tack strips as appropriate	\$1.98	1	\$1.98
WALL			
2" Framing nails	\$19.98	1	\$19.98
2x6x8 all framing except header	\$3.74	10	\$37.40
2x8x8' (header)	\$4.95	1	\$4.95
1/2" plywood filler	\$21.06	2	\$42.12
2x4x8 for bracing	\$1.95	2	\$3.90
2x8x8' (all of roof framing)	\$4.95	3	\$14.85
H2.5 holddows	\$0.58	4	\$2.32
2x8 joist hangars	\$0.94	4	\$3.76
2x4x8' (all of ceiling framing)	\$1.95	2	\$3.90
4x8x1/2" plywood (wall)	\$21.06	2	\$42.12
Window w/ nailing flange	\$76.00	1	\$76.00
1 roll of building wrap/weather barrier	\$44.42	1	\$44.42
starter strip	\$5.06	1	\$5.06
4' lengths clapboard Siding	\$7.62	2	\$15.24
1x4x8' window trim	\$6.48	2	\$12.96
large finish nails for trim, soffit	\$3.47	1	\$3.47
1/2" nails for siding	\$2.98	1	\$2.98
4' length of wall base w/ appropriate fasteners	\$7.12	1	\$7.12
4x8x1/2" gwb (wall and ceiling)	\$5.65	1	\$5.65
Drywall Screws	\$9.99	1	\$9.99
trim around window @ interior	\$6.32	2	\$12.64
2' length of window sill @ interior	\$2.49	1	\$2.49
ROOF			
4' lengths of 1x4 t&g soffit board	\$14.82	1	\$14.82
1x10x8' fascia	\$12.76	1	\$12.76
4' length of medal drip edge	\$3.96	1	\$3.96
roll of roofing uderlayment	\$14.20	1	\$14.20
roofing nails	\$2.98		\$2.98

asphalt 3 tab shingles	\$21.54	1	\$21.54
4' length gutter	\$6.67	1	\$6.67
down spout	\$8.87	1	\$8.87
fascia BRKT	\$9.59	1	\$9.59
End Cap	\$1.37	1	\$1.37
End Dtop	\$6.98	1	\$6.98
Coutlet	\$3.76	1	\$3.76
Elbow	\$3.54	1	\$3.54
Gutter Screws	\$0.87	1	\$0.87

Total	\$573.98
Sales tax	8.25%
taxes	\$47.35
Total w/ Tax	\$621.33
Discount%	50.00%
Total w/ Discount	\$310.67