

B.G.

D. H. Stoff
Int 36

**SPECIFICATIONS AND PLANS
FOR PRIMARY LOOKOUT HOUSES
AND TOWERS.**

(District 5 Pattern)

State College
of Washington

**UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE**

W. B. Greeley, Forester

PRILEY LOCKOUT HOUSE AND TOWERS

Standard for District 5

The lumber listed herewith is given in nearest mill lengths to required dimensions.

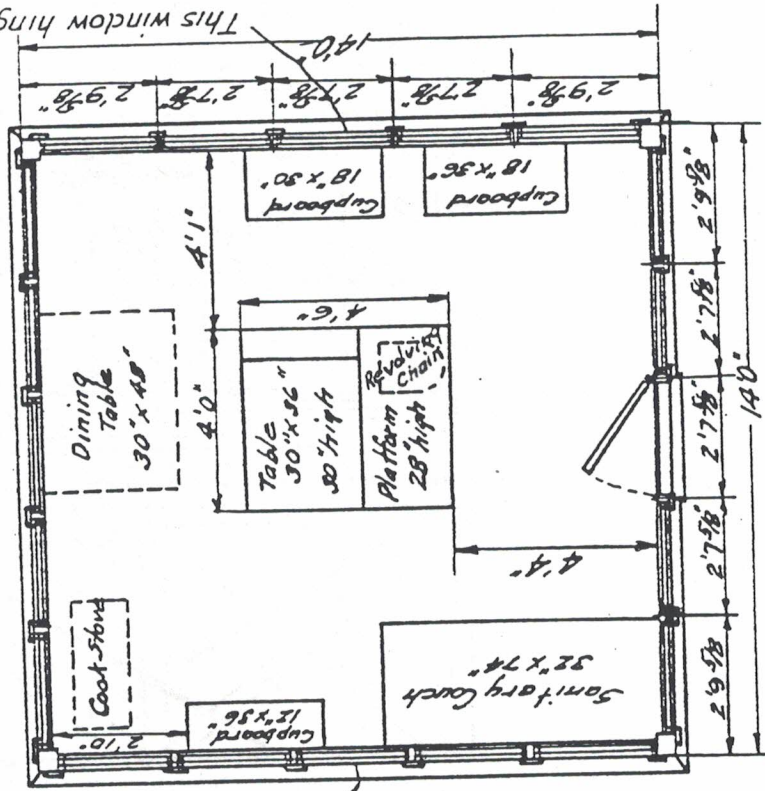
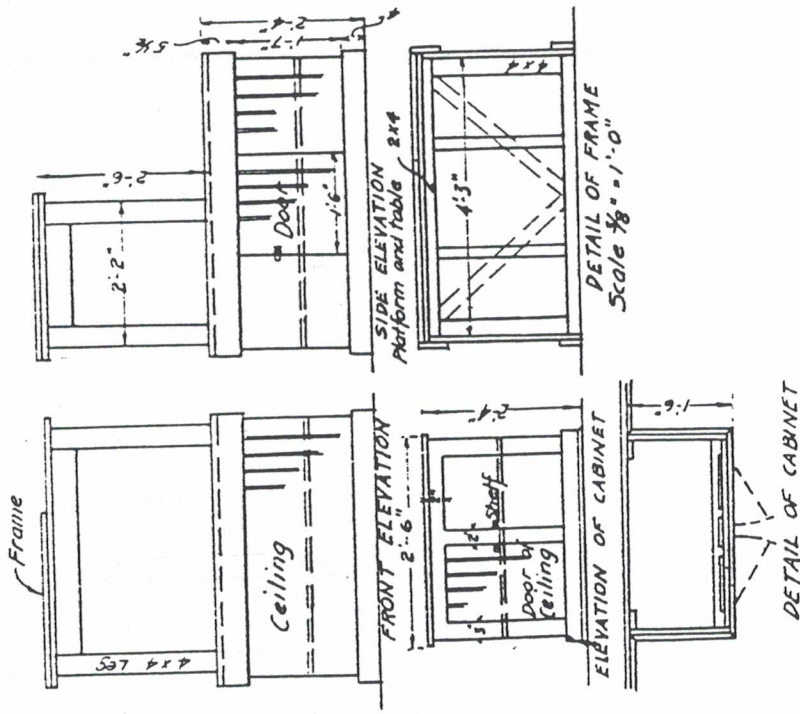
Material for foundation has not been included in this list since the amount of material for these purposes is dependant upon conditions and circumstances peculiar to each particular building site.

There are also included lists of material required for 5, 10, and 16 foot towers for lookout houses, depending on the topography of the country and the area of visibility required.

318704

1

This window hinged at bottom



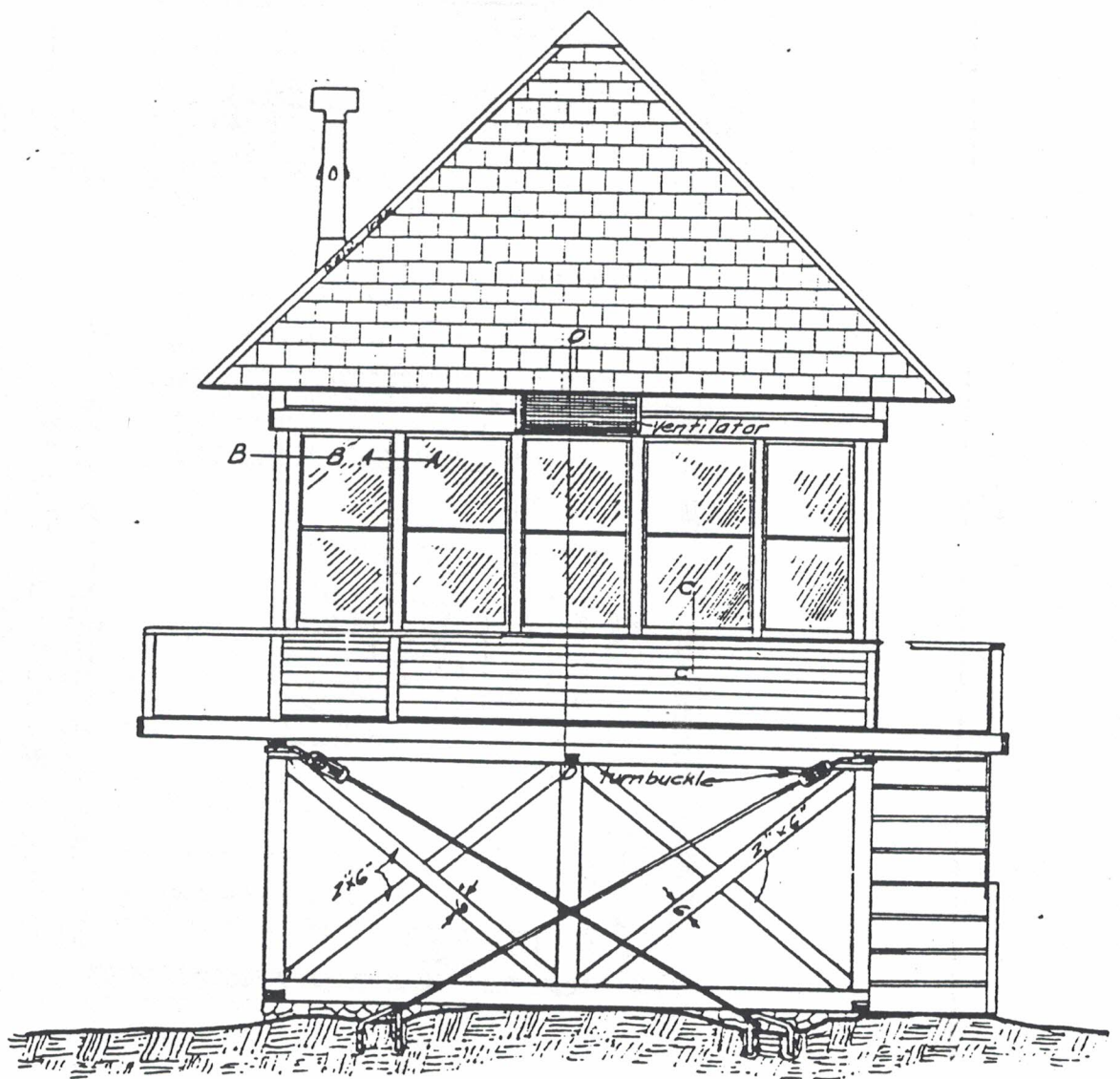
FLOOR PLAN

Scale 1/4" = 1'-0"

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FOREST SERVICE
DISTRICT 5
PRIMARY LOOKOUT HOUSE

J.H.L. 3/22/22

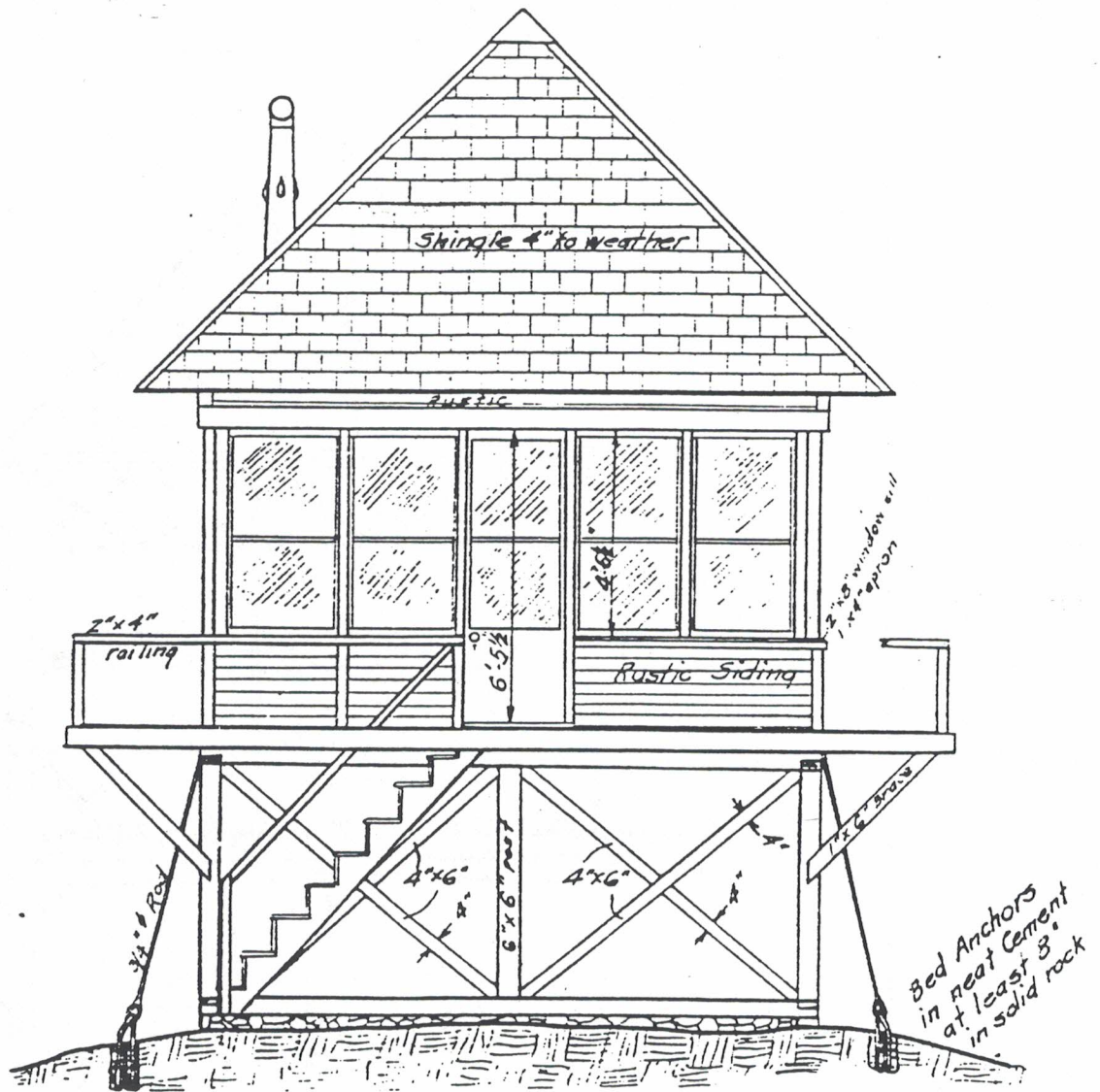
2



SIDE ELEVATION

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FOREST SERVICE
DISTRICT 5
PRIMARY LOOKOUT HOUSE
Scale 1/4" = 1 Foot
J.H.L. 5/10/28

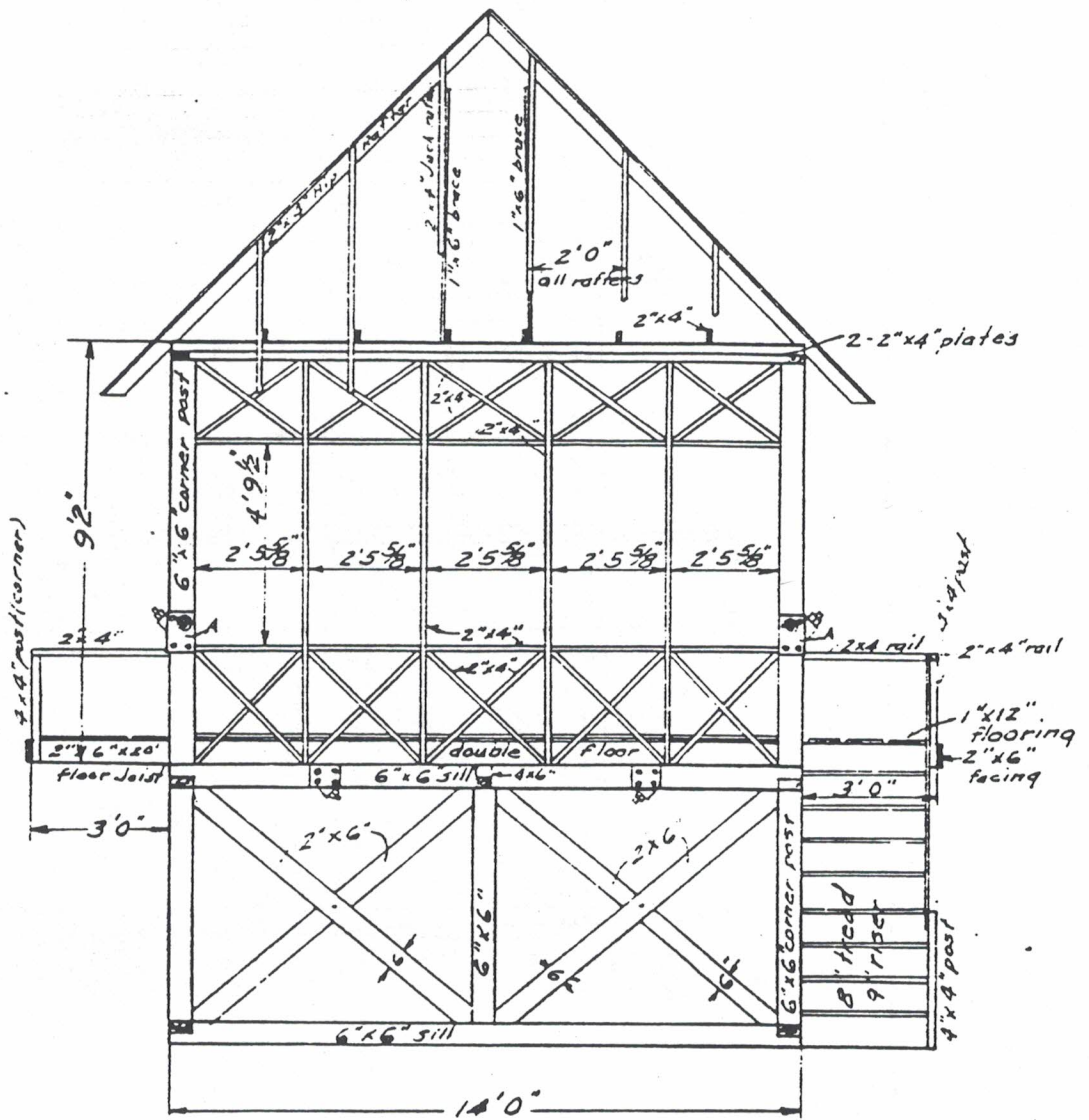
3



FRONT ELEVATION

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FOREST SERVICE
DISTRICT 5
PRIMARY LOOKOUT HOUSE
Scale 1/4" = 1 FOOT
J.M.L. 3/10/22

4

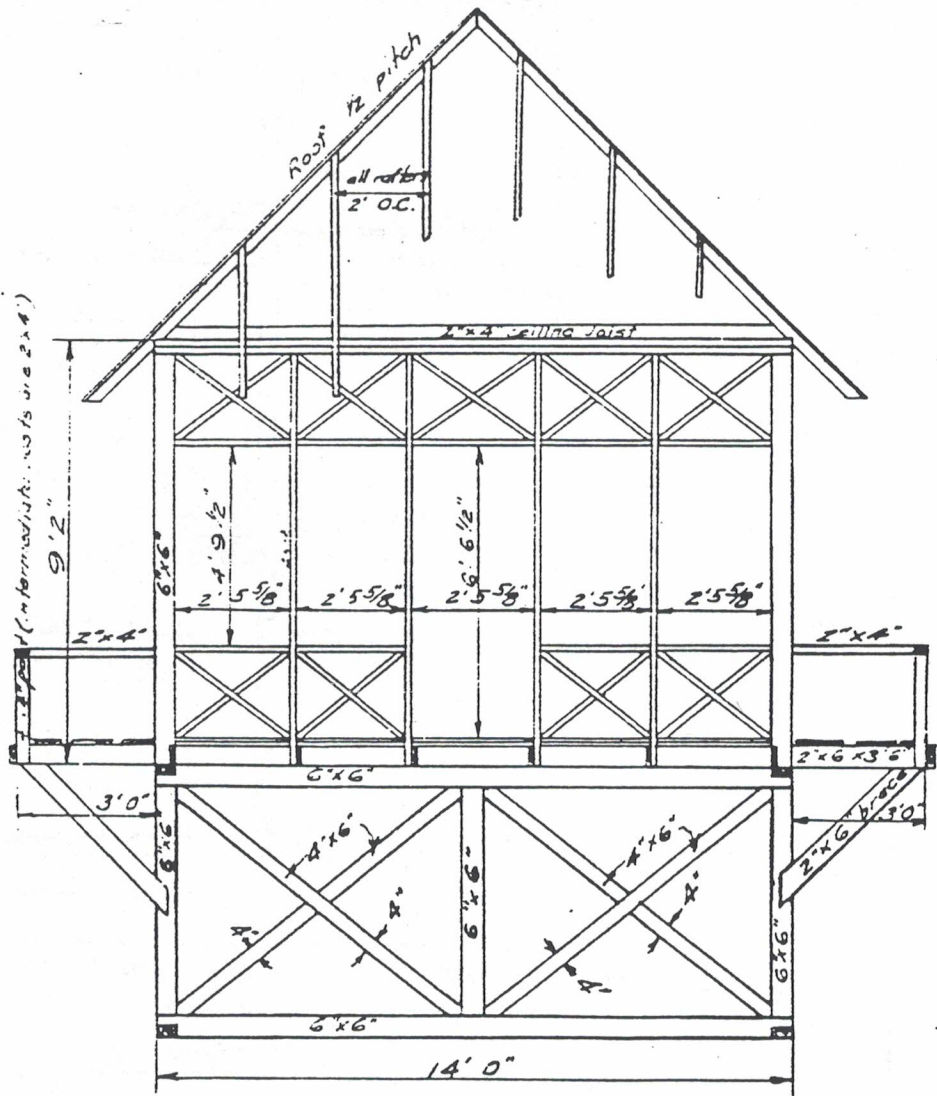


SIDE ELEVATION

For details of corner detail A, see sheet 10

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PRIMARY LOOKOUT HOUSE
Scale 1/4" = 1 Foot
J.N.L. 3/10/22

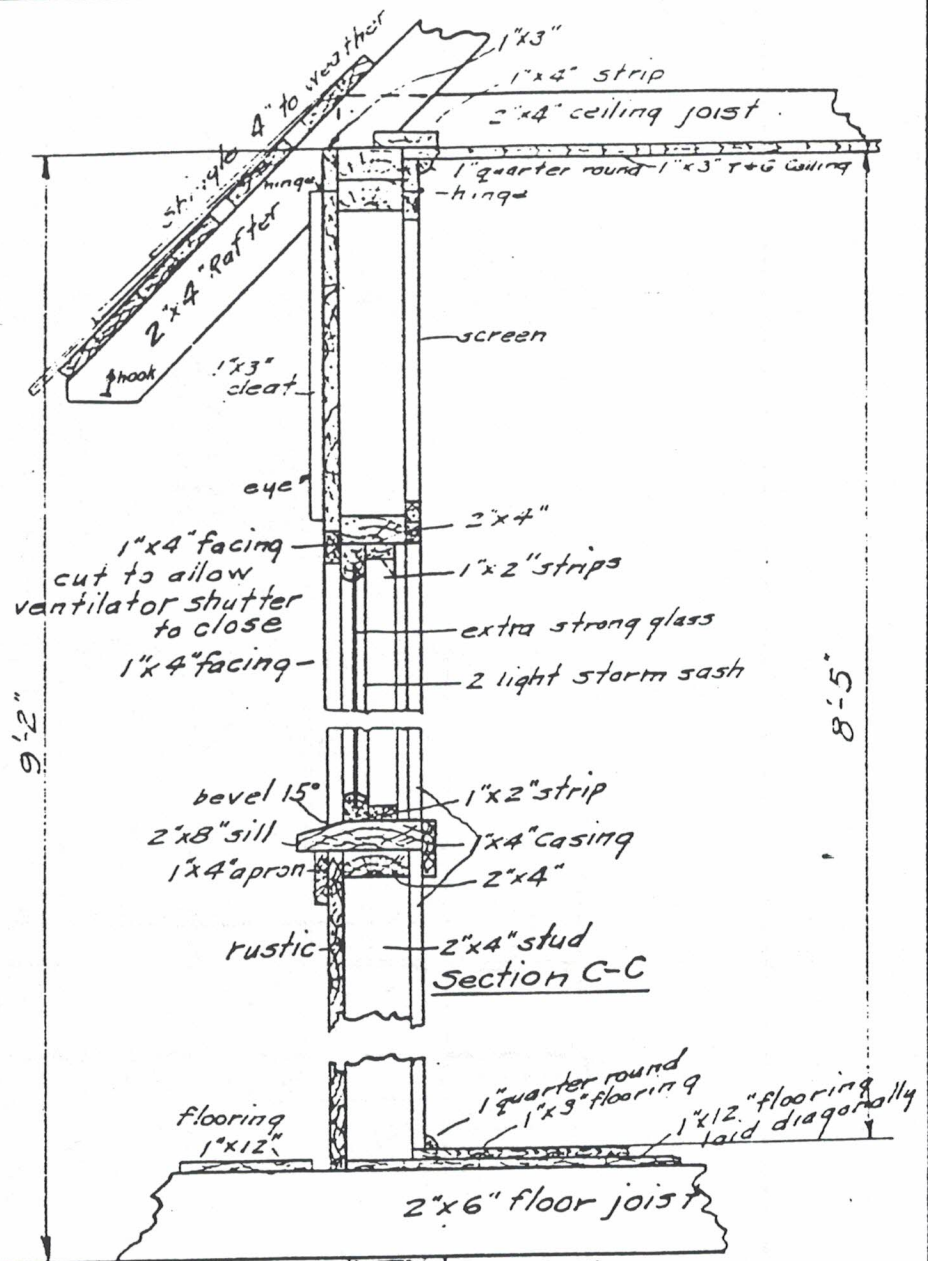
5



FRONT ELEVATION

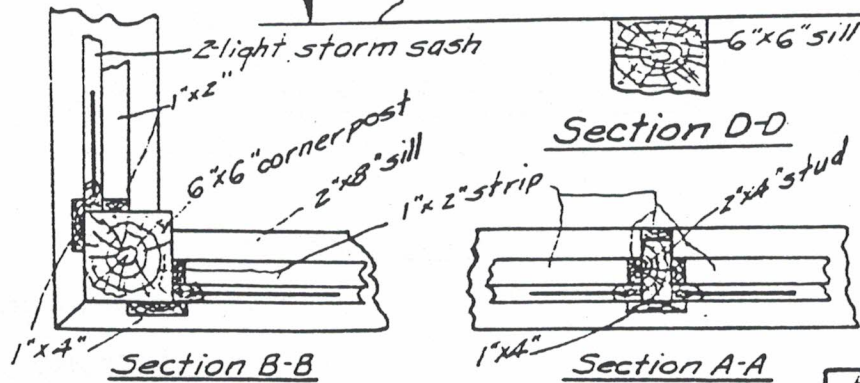
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FOREST SERVICE
DISTRICT 5
PRIMARY LOOKOUT HOUSE
Scale 1/8" = 1 Foot
J.H.L. 3/10/22

6



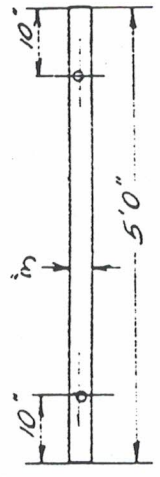
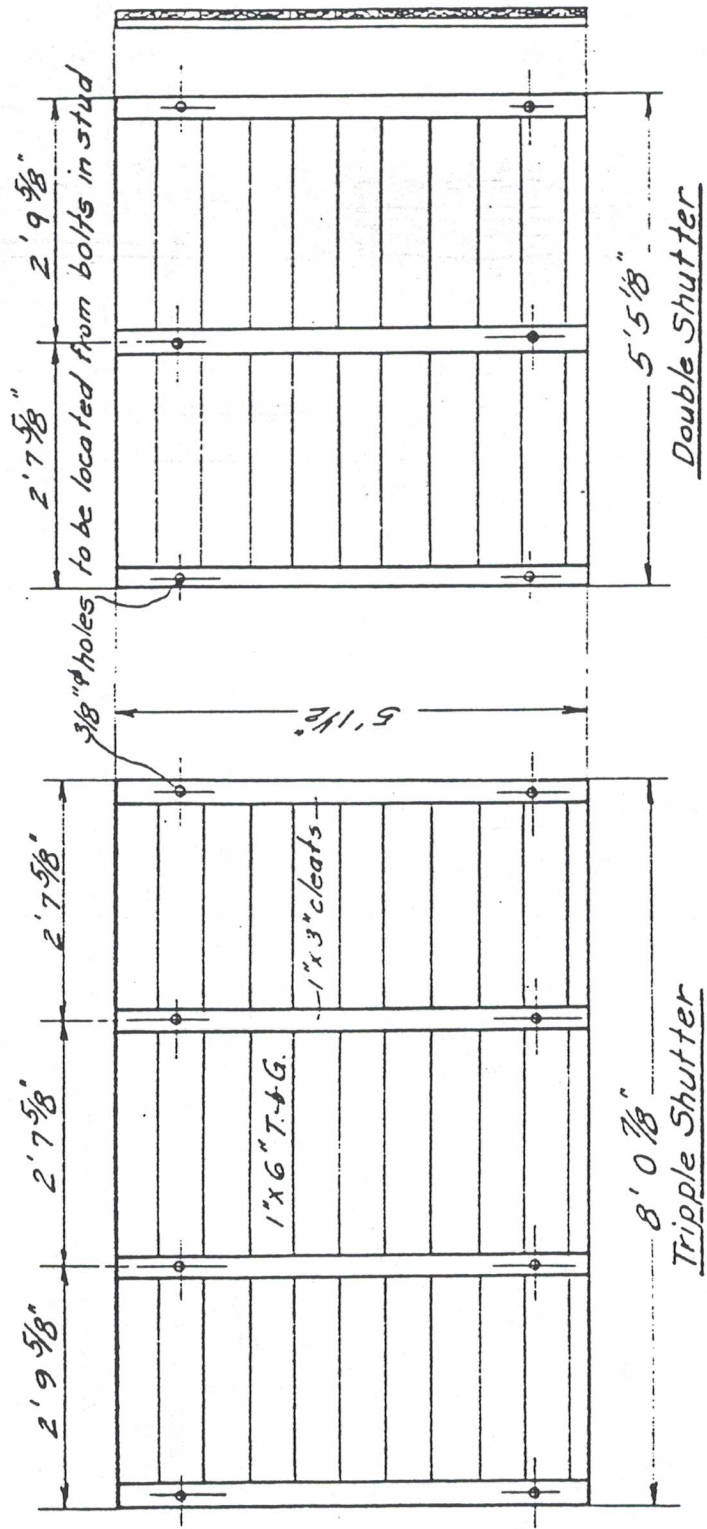
9'-2"

8'-5"



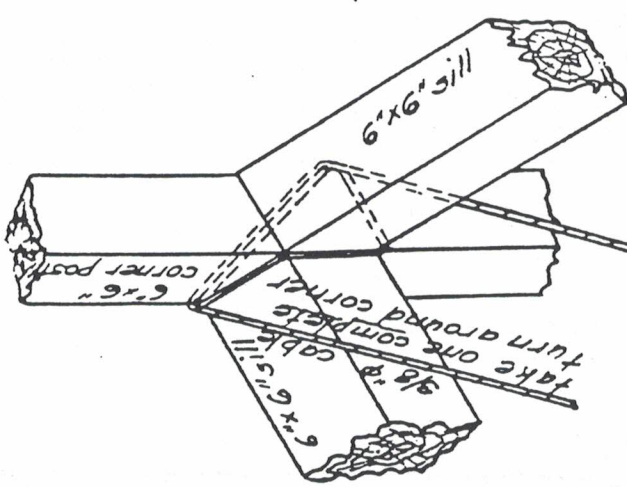
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PRIMARY LOOKOUT HOUSE
 Scale 1"=1 foot
 J.H.L. 3/10/22

7



Shutter Bar
5/16" steel plate

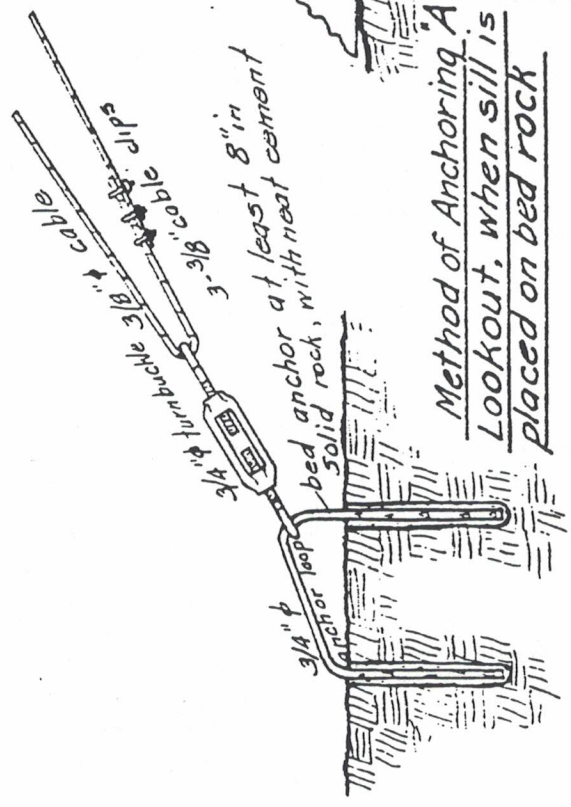
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DISTRICT 5
PRIMARY LOOKOUT HOUSE
SCALE 1" = 2 feet
J.H.L. 3/10/22



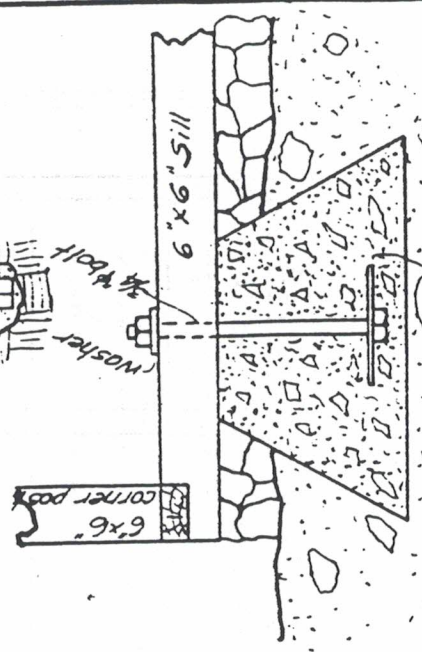
Cable to be applied to each corner at junction of sills and corner post and anchored under diagonally opposite corner by an anchor loop bedded in neat cement

Method of Anchoring Lookout
When Tower is over 10' High

For Method of Anchoring Lookout
when tower is up to 10' in height
see sheets 2 and 3



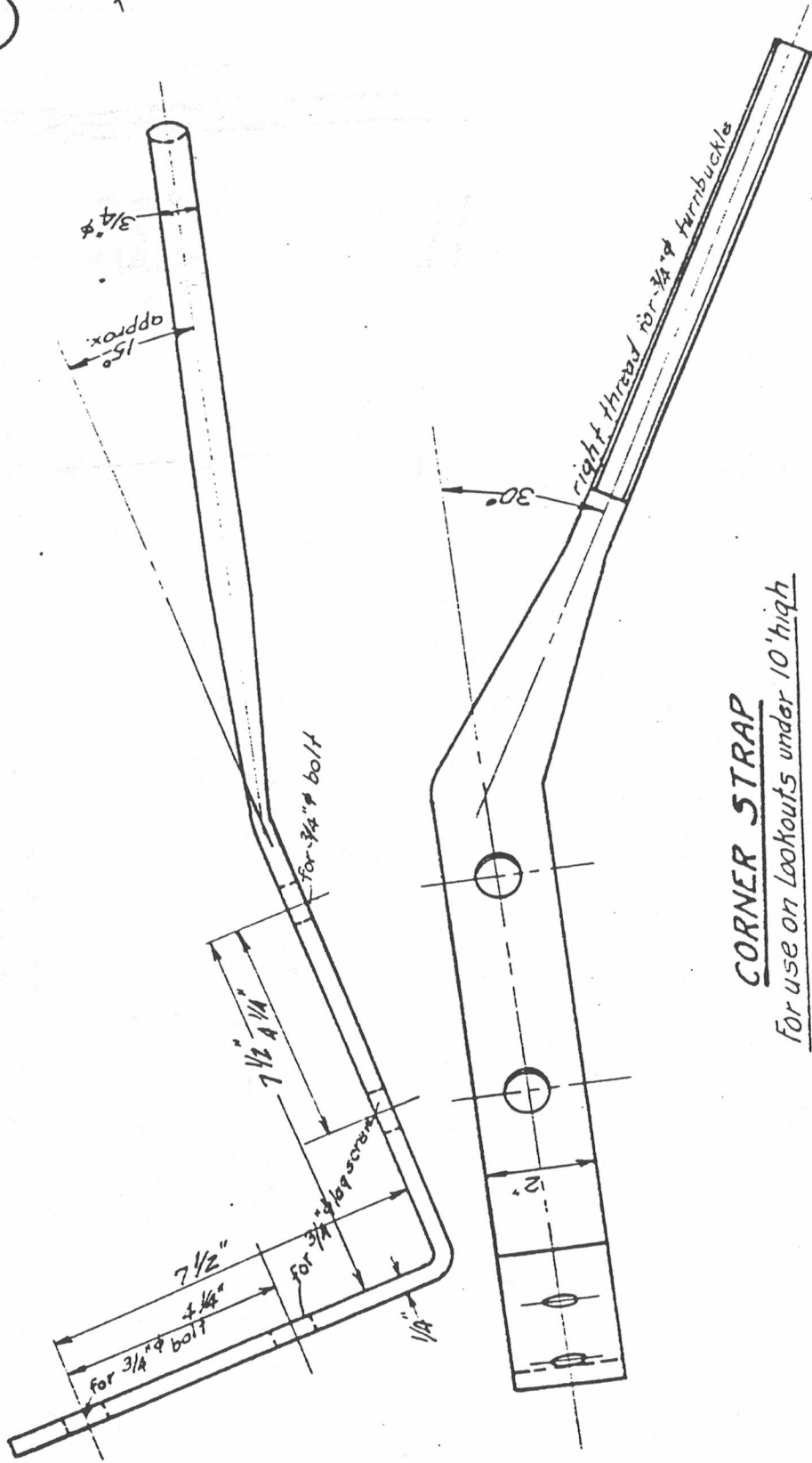
Method of Anchoring A
Lookout, when sill is
placed on bed rock



Method of Anchoring "B"
Lookout, when sill is placed
on loose rock foundation
on soft earth

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DISTRICT 5
PRIMARY LOOKOUT HOUSE
Scales 1" = 1 Foot 1 1/2 Feet
J.H.L. 3/10/22

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CORNER STRAP
for use on lookouts under 10' high

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DISTRICT 6
PRIMARY LOOKOUT HOUSE
Scale 1"=3"
J.H.L. 3/10/22

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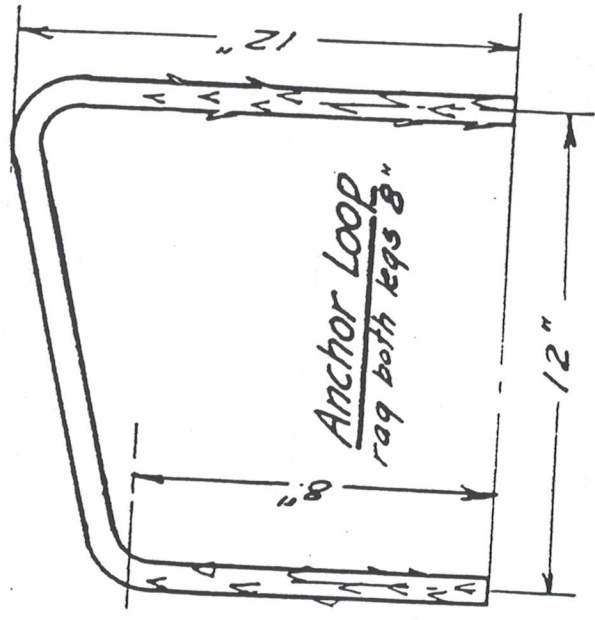
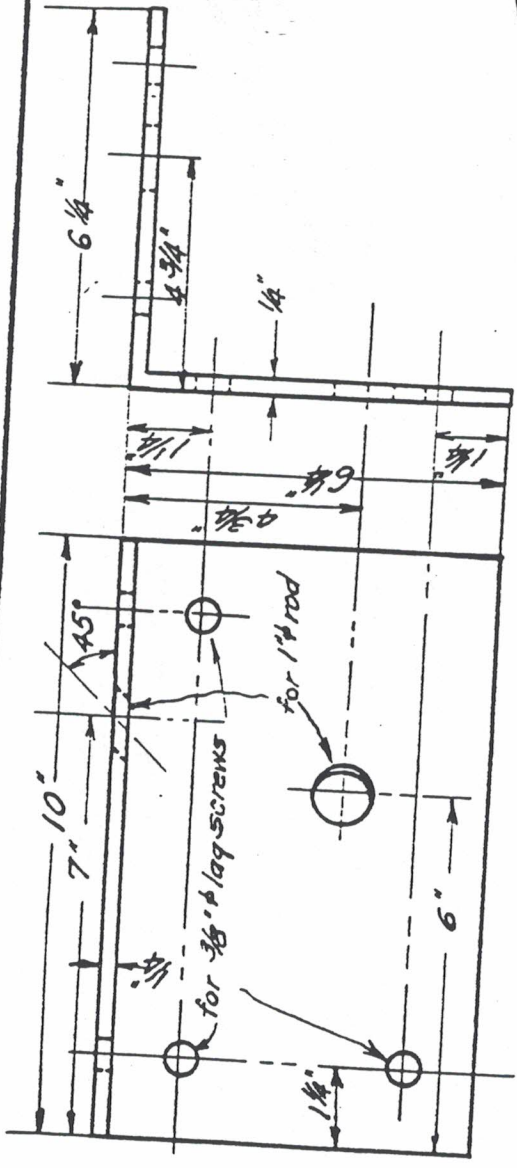
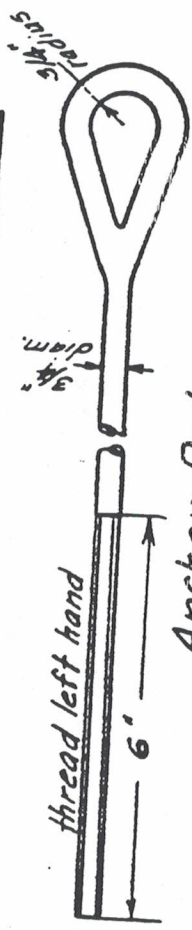
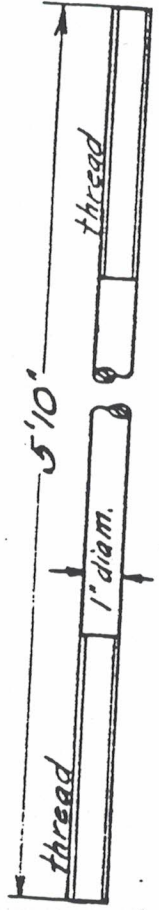


Plate A



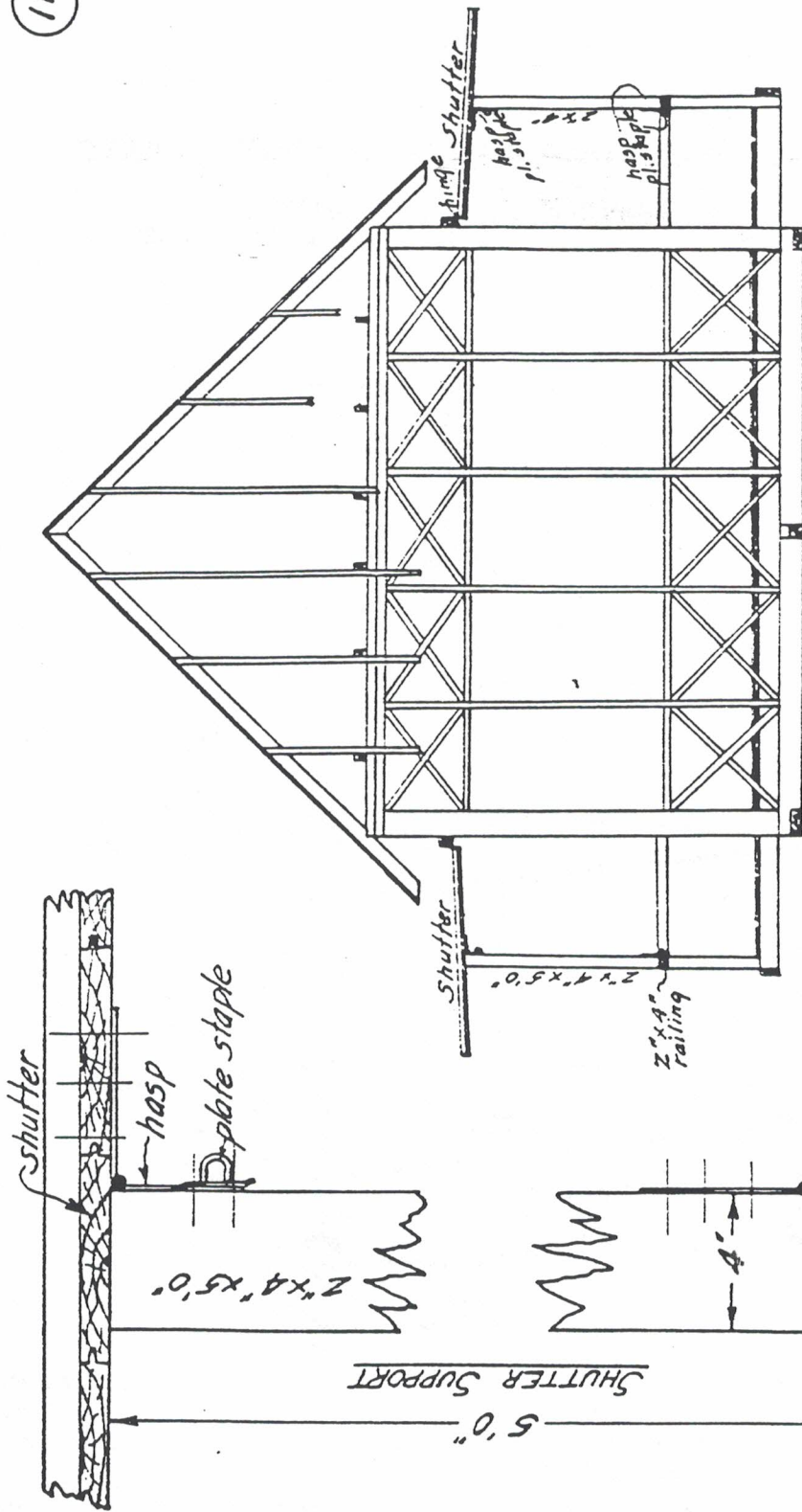
Anchor Rod



Corner Rod

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 PRIMARY LOOKOUT HOUSE
 Scale 1" = 3" - 1 1/2 1/4"
 J.H.L. 3/10/22

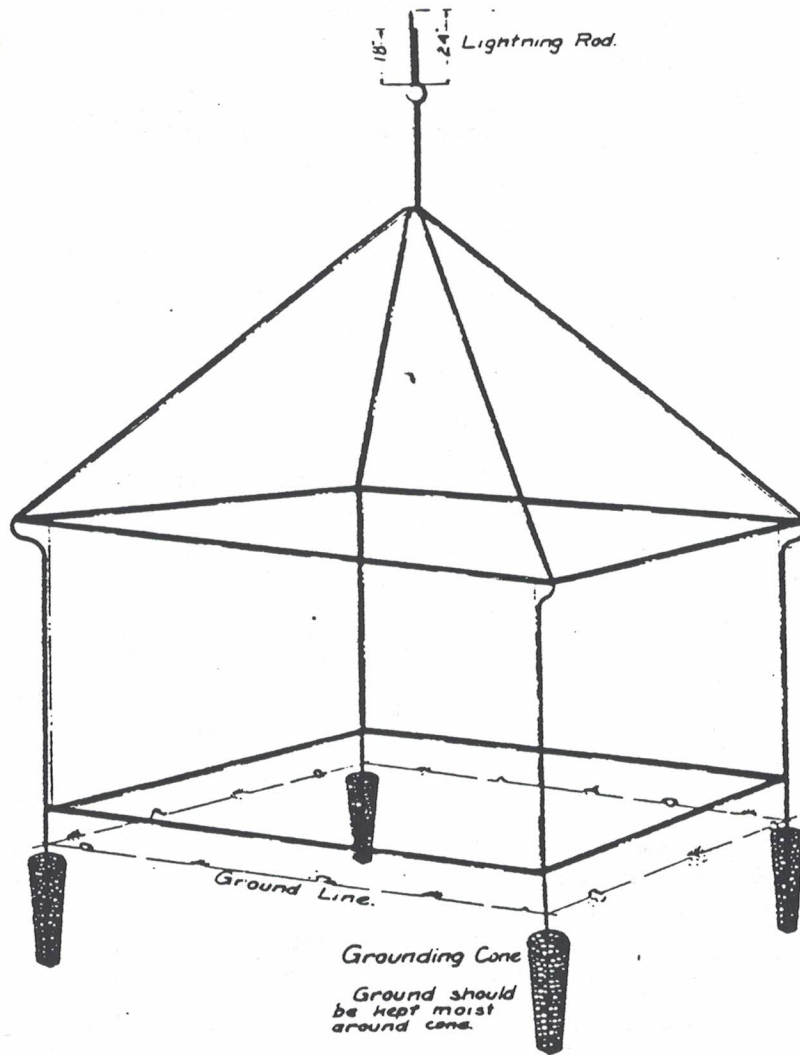
11



SIDE ELEVATION
 SHOWING SHUTTERS USED AS SUN SHADES
 Scale 1/4"=1'

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 FOREST SERVICE
 DISTRICT 5
PRIMARY LOOKOUT HOUSE
 Scales - 1/5"=1' - 1/4"=1'
 C.V. J.H.L. 1/24/23

METHOD OF INSULATING LOOKOUT HOUSE AGAINST LIGHTNING

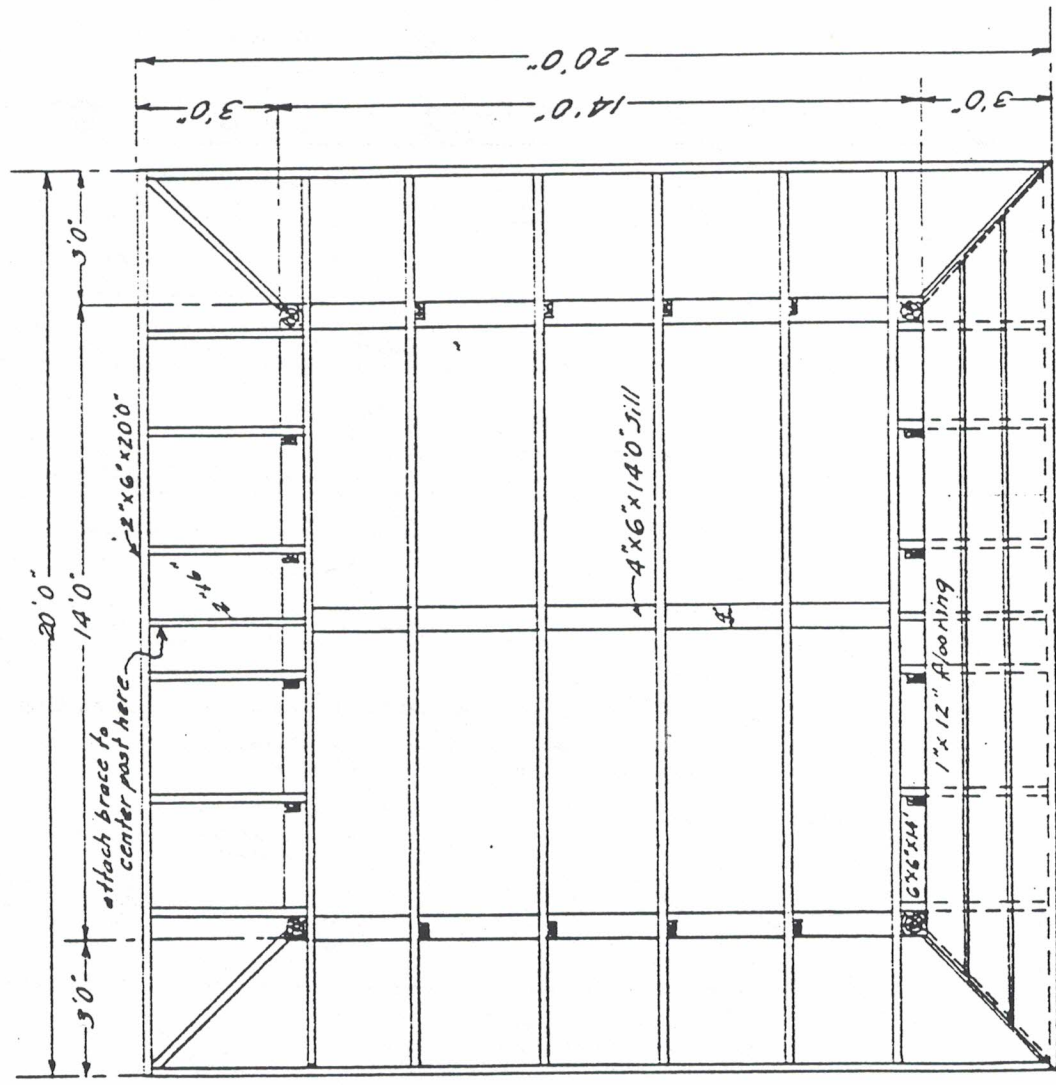


— Corner line of building.
— #4 Galvanized Wire.

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PRIMARY LOOKOUT HOUSE
Scale 1/24/23

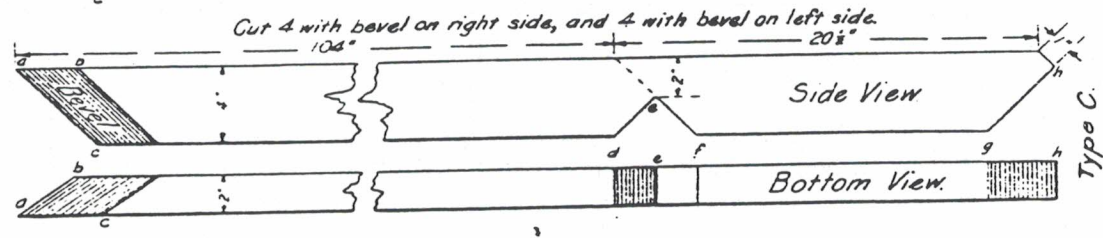
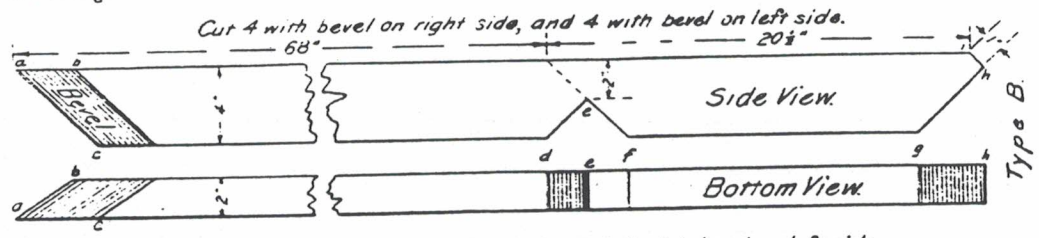
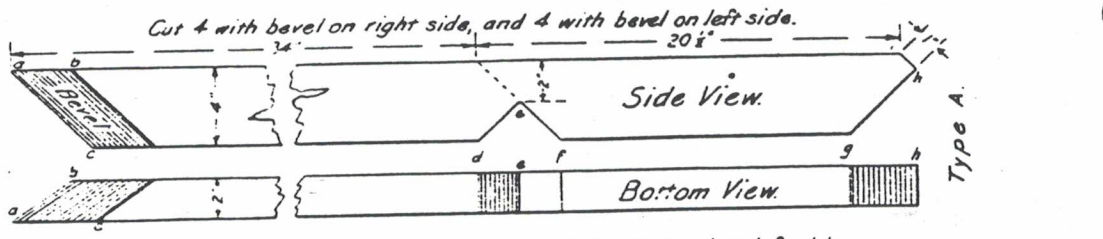
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DISTRICT 3
PRIMARY LOOKOUT HOUSE
Scale 1/8"=1'
C.J. J.H.L. 1/24/23

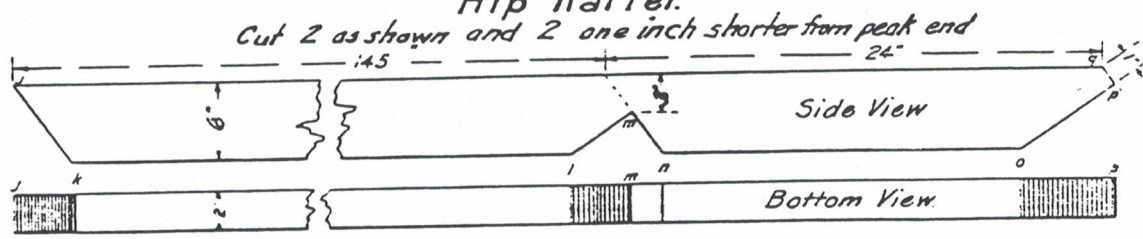


FLOOR FRAMING PLAN

Jack Rafter.

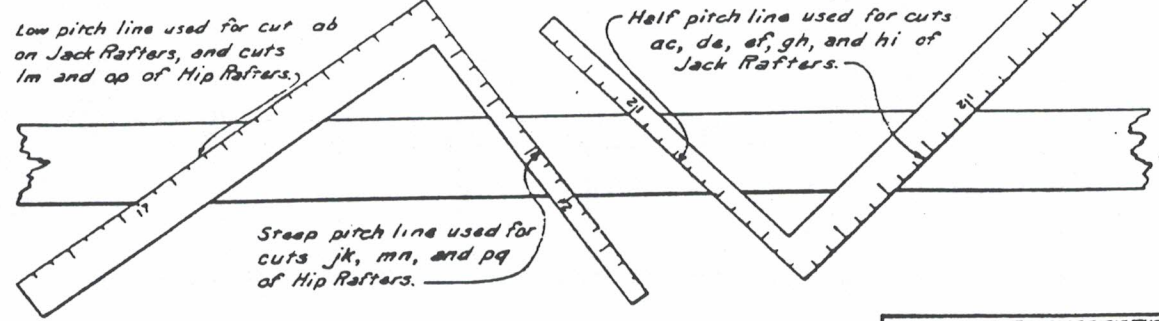


Hip Rafter.



Rafter Cut Lines made with Carpenter's Square.

Make the specified inch graduations coincide with edge of the 2"x4" timber and rule along outside edge of the steel square.



LIST OF MATERIALS (for Primary Lockout for D-5) - Standard

Item No.	Qty'd	Size	Purpose & Location	Grade & Species	Finish	Ed. ft.	Unit	dry	Weight
<u>Sills & Underpinning</u>									
1	4	6"x 6"x 14'0"	Sills	#1 Com. Douglas Fir	Rough	160	112	448	
1A	1	4"x 6"x 14'0"	Sills	#1 Com. Douglas Fir	Rough	28	75	75	
*2		6" x 6"	Underpinning bracing)						
*3		4" x 6"	Underpinning bracing)						
*4		2" x 6"	Underpinning bracing)	#1 Com. Douglas Fir	Rough				
<u>Floor Joists, Studding, Plates, etc.</u>									
5	10	2"x 6"x 20'0"	Floor joists and porch facing	#1 Com. Douglas Fir	Sized	200	53	530	
6	5	2"x 6"x 12'0"	Short porch joists-cornerdiagonal	#1 Com. Douglas Fir	Sized	60	32	160	
7	2	2"x 6"x 14'0"	Br idging	#1 Com. Douglas Fir	Sized	28	37	74	
8	4	6"x 6"x 10'0"	Corner posts	#1 Com. Douglas Fir	Sized	120	80	320	
9	16	2"x 4"x 10'0"	Studding	#1 Com. Douglas Fir	Sized	107	18	288	
10	20	2"x 4"x 14'0"	Bracing under windows	#1 Com. Douglas Fir	Sized	94	25	250	
11	10	2"x 4"x 12'0"	Bracing over windows	#1 Com. Douglas Fir	Sized	80	21	210	
12	8	2"x 4"x 14'0"	Plate B	#1 Com. Douglas Fir	Sized	75	25	200	
13	10	2"x 4"x 10'0"	Trimmers	#1 Com. Douglas Fir	Sized	67	18	180	
14	4	1"x 6"x 14'0"	Diagonal bracing under sills	#1 Com. Douglas Fir	Rough	28	19	76	
15	6	2"x 4"x 12'0"	Intermediate railing posts	#1 Com. Douglas Fir	Sized	48	21	126	
16	1	4"x 4"x 12'0"	Railing cor. posts	#1 Com. Douglas Fir	Sized	16	43	43	

Item No. :	Req'd. Size	Purpose & Location	Grade & Species	Finish :	Ed. ft. :	Unit :	Dry. Weight :
Roof Frame and Cover							
17	4 : 2"x 6"x 16'0"	Hip rafters	#2 Clear Douglas Fir	Rough :	44 :	29 :	116 :
18	12 : 2"x 4"x 16'0"	Jack rafters	#2 Clear Douglas Fir	Rough :	128 :	29 :	348 :
19	8 : 2"x 4"x 12'0"	Jack rafters	#2 Clear Douglas Fir	Rough :	64 :	21 :	168 :
20	6 : 2"x 4" x 14'0"	Ceiling joists	#1 Clear Douglas Fir	Sized :	56 :	25 :	150 :
21	1 : 1"x 6"x 16'0"	Braces hip rafters	#1 Clear Douglas Fir	Sized :	6 :	14 :	14 :
22	3 : 1"x 6"x 14'0"	Diagonal braces ceiling joists	#1 Clear Douglas Fir	Sized :	21 :	19 :	57 :
23	16 : 1"x 2"x 10'0"	Sheathing over eaves	#1 Com. Any Species	S 1S :	160 :	27 :	432 :
24	70 : 1"x 4" x 8'0"	Sheathing from plates up	#2 Com. Any Species	Rough :	190 :	7 :	498 :
25	4500 : 4" to weather	Shingles "A" cedar					900 :
Milled Lumber							
26	4 : 2"x 8" x 16'0"	Window sills	#1 Com. Pine S 2S to dress, full 2"		85 :	57 :	228 :
27	19 : 2' 5 5/8" x 4' 1 1/2"	Storm sash - 26 oz clear double strength glass				25 :	475 :
28	1 : 2' 5 5/8" x 5' 1 1/2" x 3/8"	Door 48" x 22" x 26 oz clear double strength glass				40 :	40 :
29	8 : 1" x 6" x 10'0"	Corner boards	#2 Clear Pine		40 :	13 :	106 :
30	1 : 1" x 2" x 16'0"	Door step	#2 Clear Pine		3 :	7 :	7 :
31	14 : 1"x 2"x 10'0"	Window stops	#2 Clear Pine	Sized :	24 :	4 :	56 :
32	4 : 1"x 6" x 16'0"	Outside head casing	#2 Clear Pine	Sized :	32 :	21 :	85 :
33	11 : 1"x 4" x 12'0"	Outside window casing	#1 Common	S 2S :	44 :	11 :	121 :
34	4 : 1"x 4" x 16'0"	Apron	#2 Clear Pine	Sized :	24 :	14 :	56 :
35	4 : 1"x 4" x 14'0"	Apron inside	#1 Common	S 2S :	20 :	12 :	50 :
36	2 : 1"x 4" x 14'0"	Ceiling strip	#2 Clear Pine	Sized :	10 :	12 :	25 :
37	1 : 2" 5/8 x 6' 5 1/2"	Screen door	#1 Common	S 2S :	1 :	20 :	20 :
38	1 : 5/8 x 2" x 6'0"	Orienting map board on table: Clear Hardwood		Sized :	1 :	3 :	3 :

Item	No.	Size	Purpose & Location	Grade & Species	Finish	Bd. ft.	Unit	Dry	Weight
<u>Walls, Ceiling and Flooring</u>									
39	19	1" x 12" x 12'0"	Sub floor	#2 Pine or Fir	S 1S	228	32		608
40	4	1" x 12" x 20'0"	Porch floor	Douglas Fir	Rough	80	53		212
41	4	1" x 12" x 18'0"	Porch floor	Douglas Fir	Rough	72	48		192
42	4	1" x 12" x 16'0"	Porch floor	Douglas Fir	Rough	64	43		172
43	50	5/8" x 4" x 14'0"	Flooring	T&G Vert. Grain Yel. Pine	Sized	235	8		152
44	50	5/8" x 4" x 14'0"	Ceiling	T&G Vert. Grain Yel. Pine	Sized	235	8		152
45	21	5/8" x 4" x 14'0"	Walls above windows	T&G Vert. Grain Yel. Pine	Sized	98	8		168
46	7	5/8" x 4" x 12'0"	Walls above windows	T&G Vert. Grain Yel. Pine	Sized	28	7		49
47	18	5/8" x 4" x 14'0"	Walls below windows	T&G Vert. Grain Yel. Pine	Sized	84	8		144
48	6	5/8" x 4" x 12'0"	Walls below windows	T&G Vert. Grain Yel. Pine	Sized	24	7		42
49	30	1" x 8" x 14'0"	Rustic	Clear Pine	Sized	280	25		750
50	6	1" x 8" x 12'0"	Rustic	Clear Pine	Sized	48	21		126

Cunboards

51	2	1" x 12" x 10'0"	Sides	#2 Clear Yellow Pine	Sized	20	27		54
52	1	1" x 12" x 12'0"	Top	#2 Clear Yellow Pine	Sized	12	32		32
53	2	1" x 12" x 8'0"	Miscellaneous use	#2 Clear Yellow Pine	Sized	16	21		42
54	1	1" x 6" x 6'0"	Top	#2 Clear Yellow Pine	Sized	3	8		8
55	1	1" x 3" x 14'0"	Top	#2 Clear Yellow Pine	Sized	4	9		9
56	1	1" x 2" x 16'0"	Front	#2 Clear Yellow Pine	Sized	3	7		7
57	7	1" x 4" x 14'0"	For doors	#2 Yellow Pine	Sized	35	7		51
58	2	1" x 4" x 12'0"	For doors	#2 Yellow Pine	Sized	6	6		12

Shutters

59	48	1" x 6" x 14'0"	T & G	#2 Yellow Pine	S 1S	336	8		448
60	14	1" x 2" x 12'0"	Cleats	#1 Common any species	S 1S	42	8		112

Item No. :	Req'd :	Size :	Purpose & Location :	Grade & Species :	Finish :	Bd. ft. :	Unit :	Dry Weight :
Platform								
61	1	4" x 4" x 8'0"	Frame	#1 Com.any species	Rough	11	28	28
62	3	2" x 4" x 10'0"	Frame	#1 Com.any species	Rough	20	18	54
63	1	2" x 4" x 12'0"	Frame	#1 Com.any species	Rough	8	21	21
64	4	2" x 4" x 8'0"	Frame	#1 Com.any species	Rough	22	14	56
65	24	1" x 4" x 10'0"	T&G Flooring Vertical Grain	#2 Yellow Pine	Sized	80	9	216
66	4	1" x 4" x 10'0"	Cap & baseboards	#2 Yellow Pine	Sized	14	9	36
Miscellaneous								
67	4	2" x 4" x 20'0"	Porch railing	#2 Clear Pine	Sized	54		
68	8	1" x 6" x 10'0"	Porch railing	#2 Clear Pine	Sized	40		
69	175	lin. ft. 1" $\frac{1}{4}$ round	Moulding					
70	4	1" x 4" x 14'0"	Strips above window	#2 Clear Pine	Sized	20	13	50
71	12	1" x 2" x 12'0"	Strips, fillers on studs	#2 Clear Pine	Sized	24	5	64
***72	6	2" x 6" x 12'0"	Braces- porch floor to un- derpinning	#1 Com.any species	Rough	36	16	96
**73	8	2" x 4" x 10'0"	Supports, shutters	#2 Clear Pine	Sized	50	20	160
74	4	2" x 6" x 20'0"	Joist facing	#2 Douglas Fir	Rough	80	53	210
75	4	1" x 6" x 14'0"	Facia-between rafters at eaves	#2 Clear Pine	Sized	28	21	84
76	4	1 $\frac{1}{2}$ " x 4" x 14'0"	Shutter hanger	#2 Clear Pine	Sized	38	21	84

*Amounts of these items to be estimated for each separate building.
 This estimate of lumber and mill work does not include material for underpinning,
 underpinning bracing, or stairway.

**This additional material will be required if shutters are to be used for each separate building.
 ***includes sufficient material for porch bracing around entire building if required.

Approximate total weight of all lumber and millwork ----- 11,700 lbs.

Hardware

(Primary Lookout Station - Standard D-5)

Wt
95
59
68
169
2
8

- 8 7/8" ϕ x 5'10" rods thread 6" each end
- 16 Beveled washers, c.i. for 7/8 ϕ rod bevel 45°
- 8 Copper plates see detail #10
- 16 Strutter bars " " #7
- 24 5/16" ϕ x 3" Lag screws
- 32 3/4" ϕ x 8" Carriage bolts with nuts
- 1 Galvanized iron hood 26 gauge for 1/2 pitch roof see diagram
- 60 Lf. ft. galv. iron 8" wide 30 gauge
- 1 Cross #9 flathead wood screws 1 1/2" long, blued
- 1 " #6 " " 1" " "
- 1 Pair wrought steel butts - 3 1/2" x 3 1/2" #160
- 11 " " " " 2" x 2"
- 3 " strap hinges
- 8 #850 AC. cupboard turns All of catalog numbers
quoted are from Pacific
- 1 #8052 knob latch Have & Steel catalog #55
- 1 #9211 door knob
- 1 #1903 Screen door set
- 6 Screen door knobs
- 12 lbs. 30d common wire nails
- 15 " " 20d " " "
- 20 " " 8d " " "
- 7 " " 6d finish " " "
- 10 " " 3d Shingle nails (cement coated or galvanized if possible)
- 5 " " 8d Box nails
- 5 " " 8d Finish nails
- 2 " " 1" staples fence
- 1 piece galv. barcon wire 2' x 7' #14 mesh
- 6 2" hooks and eyes
- 1 6" Terra cotta bottom joint
- 1 6" " " straight "
- 1 Galvanized iron 1/2 pitch roof plate
- 3 6" galvanized stovepipes
- 1 6" " " cap
- 32 5" straps
- 32 Plate staples for masks
- 16 6" strap hinges - singia

) This additional hardware will be required if
shutters are to be used as sunshades.

LIST OF MATERIALS (For Primary Lookout - Standard for D-5)

Lightning Insulation

- 250 ft. #4 galvanized wire
- 4 lbs. 1" galvanized staples
- 1 " Solder
- 1 " Paint aluminum
- 4 Western Electric #1 Paragon Ground Cones, filled with ground charcoal

Note: The items of wire and staples include a sufficient amount when building is directly on the ground.

The amount of material required must be estimated for each separate building.

Paint

- 4 gals. (1 gal can) Dark Red for roof
- 3 " (1 " ") Standard white paint - for outside walls
- 3 " (1 " ") flat olive green - for inside walls and ceiling
- 1 " Floor Paint - olive green color or as near as can be purchased to correspond with wall covering.
- 3 " Boiled linseed oil
- 2 " 4" Paint brushes
- 2 lbs. Putty
- 6 pos. Sandpaper No. 1

LIST OF ADDITIONAL MATERIAL REQUIRED

No. :	Req'd :	Size :	Purpose & Location :	Lumber :	Grade & Species :	Finish :	Bd. ft. :	unit :	Wt. per :	Total :
For Lookout Tower 5 feet high										
1 :	4 :	6" x 6" x 10'0" :	Corner & center posts :	#1 Com. Douglas Fir :	Rough :		120 :	80 :	320 :	
2 :	4 :	4" x 6" x 14'0" :	Sills :	#1 Com. Douglas Fir :	" :		112 :	75 :	300 :	
3 :	4 :	4" x 6" x 16'0" :	Bracing :	#1 Com. Douglas Fir :	" :		128 :	96 :	384 :	
4 :	4 :	2" x 6" x 16'0" :	" :	#1 Com. Douglas Fir :	" :		64 :	48 :	192 :	
5 :	2 :	2" x 12" x 10'0" :	Risers :	#1 Com. Douglas Fir :	" :		40 :	53 :	106 :	
6 :	2 :	1 1/2" x 12" x 12'0" :	Treads :	#1 Com. Pine :	S 1S :		48 :	48 :	96 :	
7 :	2 :	1" x 6" x 10'0" :	Railing :	#2 Com. Pine :	S 4S :		10 :	13 :	26 :	
8 :	1 :	4" x 4" x 4'0" :	Post :	#2 Com. Pine :	S 4S :		6 :	14 :	14 :	
9 :	7 :	2" x 6" x 14'0" :	Braces porch to underpinning :	#1 Com. Pine :	Rough :		49 :	19 :	133 :	
								Total :	577 :	1571 :
<u>Hardware</u>										
10 :	4 :	3/4" x 12'6" :	Steel rod thread end 6" left hand-eye on other end (See #10) :					24 :	96 :	
11 :	4 :	3/4" x 8" :	Anchor loops Rag both legs 8" (See #10) :					6 :	24 :	
12 :	4 :		Corner straps Thread end 6" right hand (See #9) :					1 :	4 :	
13 :	4 :		Turnbuckles for 3/4" rod (no eyes) :					2 :	8 :	
14 :	6 :	3/4" x 18" :	Drift pins :					1 :	6 :	
15 :		15 # - 40 d common wire nails :						1 :	15 :	
16 :		5 # - 20d " :						1 :	5 :	
<u>Lightning Insulation</u>										
17 :		300 ft. #4 Galv. wire (instead of 250 ft.) :						21 :	63 :	
								Total wt. :	1792 :	

*** Includes sufficient material for porch bracing around entire building if required.

LIST OF ADDITIONAL MATERIAL REQUIRED

For Lookout Tower 10 feet high

Item No. :	Req'd :	Size :	Purpose & Location :	Grade & Species :	Finish :	Ld. ft. :	Unit :	Wt. per unit :	Total :
1	8	6" x 6"	Corner & center posts	#1 Com. Douglas Fir	Rough	240	:	80	640
2	4	4" x 6" x 14'0"	Sills	"	"	112	:	75	300
3	8	4" x 6" x 12'0"	Bracing	"	"	192	:	72	576
4	8	2" x 6" x 12'0"	"	"	"	96	:	36	288
5	2	2" x 12" x 14'0"	Risers	"	"	56	:	75	150
6	4	1 1/2" x 12" x 12'0"	Treads	#1 Com. Pine	S 1S	96	:	48	96
7	2	1" x 6" x 14'0"	Railing	"	S 4S	14	:	19	38
8	1	4" x 4" x 8'0"	Post	"	S 4S	12	:	28	28
**9	10	2" x 6" x 12'0"	Braces	"	Rough	60	:	16	160
							Total		2276
<u>Hardware</u>									
10	4	3/4" x 20'0"	Steel rods - thread one end 6"	Left hand - eye on other end (See #10)				38	152
11	4	3/4" x 3/4"	Anchor loops - Ray both legs 8"	(See #10)				6	24
12	4		Corner straps Thread one 3"	Right hand (See #9)				1	4
13	4		Turnbuckles for 3/4" rod (no eyes)					2	8
14	6	3/4" x 18"	Drift pins					1	6
15	15		15 lbs. 40d common wire nails					1	15
16	5		5 " 20d "					1	5
<u>Lightning Insulation</u>									
17	325	ft.	#4 Galv. wire (instead of 250 ft.)						
18	5	lbs.	1" Galv. iron staples (instead of 4 lbs.)						
									60
									5
									2563

***Includes sufficient material for porch bracing around entire building if required.

LIST OF ADDITIONAL MATERIAL REQUIRED

Item	Qty. req'd	Size	Purpose & Location	Grade & Species	Lumber	Finish	Bq. ft. wall	Wt. per Total
For Lookout Tower 16 feet high								
1	8	6" x 6" x 16'0"	Corner & center posts	#1 Com. Douglas Fir		Kough	384	123
2	4	4" x 6" x 14'0"	Sills	"		"	112	75
3	16	4" x 6" x 18'0"	Bracing	"		"	576	108
4	2	2" x 12" x 22'0"	Risers	"		"	88	117
5	6	1 1/2" x 12" x 12'0"	Treads	#2 Com. Pine		S 15	144	48
6	2	1" x 6" x 22'0"	Knailings	"		S 4S	22	29
7	1	4" x 4" x 6'0"	Posts	"		S 4S	12	20
8	10	2" x 6" x 16'0"	Braces	"		Rough	90	24
***							1420	12,900

Hardware

9	4	3/4" φ	Anchor loops (Rag both legs 8")	See #10				6	24
10	4		Turnbuckles for 3/4" φ rods eye in each end					2	8
11	12		Cable clips for 3/8" φ cable					.4	4.8
12	192	ft.	Galv. cast steel Guy rope (Approximately 48' req'd for each anchor)					.22	42.24
13	6	3/4" x 18"	Drift pins					1	6
14	15	lbs.	40d common wire nails					1	15
15	5	"	20d "					1	5

Lightning Insulation

16	350	ft.	#4 Wire Galv. (instead of 250 ft.)					.21	74
17	5	lbs.	1" Galv. iron staples (instead of 4 lbs.)						5
Total weight									4084

***Includes sufficient material for porch bracing around entire building if required.

When Lookout is directly on bedrock and Type A Anchorage is used the following hardware is required.

- 1 : 8 : 3/4" x 18" bolts
- 2 : 8 : O. G. Washers 13/16" ϕ hole
- 3 : 8 : Washers 13/16" ϕ hole

When Lookout is built on loose rock foundation and Type B Anchorage is used the following hardware is required.

- 1 : 8 : 3/4" ϕ x 18" bolts
 - 2 : 8 : O. G. Washers 13/16" ϕ hole
 - 3 : 8 : 6" x 6" x 1/4" plate 13/16" hole
- Estimate for cement necessary for foundation.

S P E C I F I C A T I O N S

FOR

PRIMARY LOCKOUT HOUSE AND TOWERS

Standard for District 5

These specifications are intended to embrace all material necessary in the erection and furnishing of the building in all its parts and to furnish such instructions as appear necessary to give the builder a general idea of the plan. The plan is standardized and must be followed unless the District Forester's permission to deviate from it is secured.

LOCATION

The house should be set square with the cardinal directions, that is, squarely north and south and east and west.

EXCAVATION

Excavation for the foundation of the building shall be carried down to solid earth. If practicable to make the site level it is best to do so. If impracticable, at least provide a level footing 2' x 2' for each foundation block.

FOUNDATION

Concrete blocks can be used to place mud sill on, but if rocks are available lay a level foundation of them, using cement to fasten them together. A good way to lay them is to first set up the form the same as if a concrete foundation was to be laid, put in a layer of rock, then pouring in a soft mixture of concrete, proceeding in this way until you have raised the foundation to the desired height. Do not forget to insert anchor bolts inside form before pouring mixture. Foundation should be at least 12" wide at base. Never place mud sills directly on the earth. The reason for using rocks in the concrete mixture is to reduce the amount of material where packing is necessary.

MATERIALS

All structural material should conform as closely as possible to the specifications given in the builder's list.

SILLS

Sills at corners should be halved together. The plan calls for one sill in the center of the building and should also be halved into outside sills.

FLOOR JOISTS, STUDDING, BRIDGING, ETC.

All joists, girts and studs should be sized, that is, dressed down so that all sticks of respective dimensions are made of uniform size.

Floor joists should be straight grain Douglas fir, if it can be obtained, free from knots larger than one inch in diameter. Lay floor joists directly upon the sill. Toe nail them into place. 2" x 6" solid bridging shall be cut between joists. Studs should be extended from sill to plate and should be firmly nailed to the floor joist and toe nailed to the sill. At the top they should be nailed through plate with 2-30d nails driven directly through the plate into their ends. Corner studs should be of 6" x 6" sticks. Braces as shown in the drawing should be inserted. Great care should be taken when boring holes for rods to keep them in alignment. Top plate should be of 2" x 4" double with top joints over the corner studs. They should be securely nailed together throughout with 20d wire nails.

Headers over and under window openings shall be single. Floor joists should extend 3' beyond the sill on each side to allow for porch. Outside joist of main set should be set back 4" on sill to allow for studs. See plan No. 11 for laying joists and sills.

Ceiling joists should be placed directly over the plates, toe nailed to the plate with 2-20d nails and side nailed to the jack rafters with 2-20d nails.

ROOF

Rafters and other members of the roof frame should be of select, straight grained lumber; 1st choice Douglas fir, 2nd choice white fir, 3rd choice yellow pine, free from knots and other imperfections. Too much attention can not be given to the selection of the best sticks for rafters. Care should be taken to cut the rafters true in order that they will have a firm bearing on the plate and with respect to jack that they rest squarely against the hips. Hips should meet without opening at the top. The rafters should be braced as shown in Plan No. 4. Roof projections should be sheathed solid with 1" x 12" rough lumber, the rest of distance stay sheathed on 8" centers or, in other words, 8" from top to top. Rafter ends are to have no trim. Shingles should be laid 4" to weather. Lay the bottom courses of shingles double and project them $1\frac{1}{2}$ " from lower edge of the sheathing.

SIDING

Siding should be nailed at each stud with 2-8d nails. Care should be exercised to fit siding closely under window sills and at eaves.

INSIDE FINISH

Ceiling and walls shall be of 1" x 4", T & G milled ceiling. Floor shall be of 1 x 12 rough under floor and 1" x 4" vertical grain T & G for top floor. All corners should be finished with 1" quarter round molding. Provide a trapdoor 2' x 2' for entrance through the ceiling to the attic.

FLUES

When constructing a lookout, make provision for 6" terra cotta flue which will consist of terra cotta from roof plate to lower side of ceiling with iron pipe inside of terra cotta, galvanized roof plate and galvanized pipe to peak of roof with a cap on top. This pipe should be guyed to roof.

DOORS AND WINDOWS

Order the door and windows and hardware for them as listed. Install two sets of ventilators over the windows as shown on Plan No. 2. Do not cut away bracing at ventilator opening. Windows are to set tight against outside of studs. On the outside of the stud that the windows will set against, will be a 1 x 4 nailed to the stud which will form part of the window casing. The reason for setting the windows as far to the outside as possible is to prevent water from coming in around the windows and dripping inside the building. Plan No. 6 shows the framing in detail. Two windows should be hinged for opening inward.

CLOSETS, PLATFORM AND CUPBOARDS, ETC.

Plan No. 1 shows the furnishing of the house, the details of construction and floor plan arrangement of them. Cupboards should extend in height to level of window sill. The builder's list indicates the material to use. The sanitary couch with pad and cover for it and revolving chair are available upon requisition to the District Forester. Stoves of either oil or wood type may be requisitioned through the District Forester.

The dimensions of the platform are shown on Plan No. 1. The finish around the top of the platform should be made of 1" x 4" laid flat against the sides of the platform and extending 3/4" above the floor of the platform. This will give a finish and at the same time act as a block to keep the chair from slipping off. The table used on the platform, after being oriented, should be nailed or screwed firmly onto the platform floor. Since the house is always to be set square with the cardinal directions, the oriented table will be square with the walls. After this is done the hardwood strips should be very carefully set on the surface of the table in orientation and screwed down. It will be noted that the locator board will then have a play of 6 inches in any direction, which will facilitate getting around obstructions to view.

TELEPHONE WIRING

Telephone wire should not be anchored to the sides of the building. Establish a pole for anchoring or anchor to a nearby tree if one is available. Bring the wire to the building as shown in Cut No. 18 of the Telephone Circular. During the period of the year that the Lookout is unoccupied, the leading in wire should be disconnected at the Rahmstock clip and at the fuse and then taken into the building. Its replacement at the beginning of the fire season is a simple task. From the fuse, the wire should be brought down the side of the building on knobs, taken under the building on knobs along the floor joists to a point under the platform. There it should be brought up through the floor near one inside edge of the platform and up through the platform along one of the table legs to the ringer set which ordinarily should be fastened to a leg of the table. The protector should be placed on the inside wall of the platform at the point where the wire comes through the floor.

INSULATION

See Plan No. 12. Insulation should be considered as a part of construction. Material for it should be ordered with the hardware.

No. 4 galvanized wire should be used for all conductor material. The conductors should be run down all hips from the main wire or terminal, which should be extended from the peak up about 20 inches and filed to a sharp point. The hip conductors first mentioned should be continued over the points of the eaves and directly to the ground at the four corners of the house, care being taken to make no sharp turns in the wire. As an integral part of the system, there should be connected to the vertical conductors two horizontal conductors, one running clear around the house on the eaves, the other running clear around the house at the ground line. This arrangement with connections is shown by the attached sketch. All connections between conductors should be mechanically and electrically perfect. At the meeting or crossing points the wires should be soldered together carefully. All wires should be securely stapled directly to the building every 12 inches, and in addition the staples should be placed on each side of each soldered connection, so as to eliminate any strain on the joint. When the wiring is complete it should be given two coats of aluminum paint.

The stovepipe or other metal projection should be connected to the main system by a direct wire.

Probably the most important part of the system is the GROUND. While conditions on lookout points differ to such an extent that it will be necessary to use different types of ground, the standard ground rod or connection will be a perforated copper cone filled with ground charcoal, manufactured by the Western Electric Company and known as the "Paragon Ground Cone No. 1;" price \$1.65 each. These cones are 1 foot long and vary in diameter from $1\frac{1}{2}$ inches at the bottom to $4\frac{1}{2}$ inches at the top, and are provided with a wire cable connection so that the lightning rods can be attached and soldered without difficulty. One of these cones should be sunk in the ground at each corner of the building, standing out about 6 inches from the structure and to such a depth that the copper cable protrudes above the surface. This will admit of a convenient connection and inspection. The vertical rods on the four corners of the building should be given direct connection with these ground cones.

PAINTING

- Color - Outside, white 2 coats
- Roof, red 2 coats
- Inside, olive drab, 2 coats

If the lumber is dry, give the outside and roof a priming coat as soon as they are placed. Add the second coat as soon as the first is dry. Do not apply paint if the lumber or shingles are not seasoned or if their surfaces are damp from rains, fogs, dews, frosts, etc. Do not paint during damp weather. Before applying paint to knots, cover them with a light coat of shellac. Before applying paint to the interior, the surface should be carefully cleaned. To secure a real fine finish sandpaper the surface. Nail holes should be filled with putty after the first coat of paint is applied.

The floor should receive three coats of floor paint to match the wall paint.

ANCHOR RING

As shown on Plan 6, you will see the sills are to either be set on rock or concrete with anchor bolts. The building is so designed that if properly anchored to its foundation there will be no danger of a heavy storm moving it. It will, therefore, not be necessary to do any guying.

TOWERS

Building materials are included that cover 5, 10 and 16 foot towers. If higher towers are needed, it will be necessary to ask the District Forester to prepare plans. You will note that in the building material there are 4"x6" and 2"x6" for bracing in the 5 and 10 foot towers. The 4"x6" bracing should be used on the sides where the bracing will run in the opposite direction from the brace rods. The 4"x6" bracing should be put in by running one direct from the top corner of the outside post to the bottom of the middle post, this brace running full length. The one running in the opposite direction should be cut with a bevel to fit against the through brace and put in in two sections. Running with the anchor rod use the 2" x 6" material, putting it in edge ways and toe nailing both top and bottom and spiking it together at the center where they cross.

Great pains should be taken in the anchoring of towers. The sills of the tower should be anchored to the rock or concrete foundation with anchor bolts. The tower of the 5 or 10 foot type should be anchored with rods. If over 10 feet and not more than 16, cable should be used. Anchor loops should be used in fastening to foundation. See Plan 6 for the different types of anchorage. Plan 2 shows method of anchoring towers from 1 to 10 feet in height using rods, corner straps and anchor loops. The method of bracing is also shown.

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SHUTTERS

It is felt that all lookouts should be equipped with shutters where the danger is great of the windows being broken during the time of the year the lookout is unoccupied by either careless people or where lookouts are located on mountains where there are small, loose rocks which a heavy wind will pick up and blow against the windows, breaking the lights. The design of shutter is shown on Plan No. 7. It is planned to use flat steel bars over the ends of the shutters and where they connect in the middle, bolting them with carriage bolts through the studs. It is felt that on many of the high lookouts some sort of protection should be given the lookout man from the glaring sun against the window panes. This may be done by hinging the shutter to the shutter strip above the windows, using supporters from the top of the porch rail to the under side of the shutter, as shown on Plan No. 11. These shutter supporters should be detachable. Therefore, it is suggested to use an ordinary door hasp and plate staple for this purpose.

It will not be possible to use shades over the windows on all lookouts, because the shade would obstruct the vision of the lookout man if there are other points higher than the one the building is located on. It will be left optional with the Supervisor concerned as to whether the shutters should be put on hinges and used as shades.

FRAMING RAFTERS

A great many people who are not carpenters have great difficulty in framing rafters, especially hip and jack rafters. Plan No. 14 gives a detailed description for cutting such rafters. Another method which may be used for framing hip rafters is to lay out 2 of the hip rafters with a square, using figures 17 and 12, the same as you would for a common rafter, cutting the other 2 the same with the exception of making them 1" shorter. Nail up your first set and then the second set can be nailed into the first set at the peak. Cut rafters with an overhang of 20" on eaves.

DRILLING 45° HOLES

A good method for drilling holes in corner posts and sills for corner brace rods is as follows:

Take a piece of 6" x 6" or 4" x 6" timber cut 6" long. Drill a hole the size required (1" ϕ) - 4" from one face and 3" from one end. From this end cut the block on a 45° bevel, the bevel at 45° with the center line of the hole. Use the corner plate "A" (sheet 10) as a template and lay out the centers for the holes as needed.

Take the block and place the bevel face on the face of the member to be drilled so that the center of the hole in the block and the center as laid out coincide. The block can be toe nailed temporarily in this position. Put the bit in the hole in the block and the block will act as a guide while drilling the holes.

FOOTSTOOL

A movable footstool about 16" in height and of suitable length and breadth to assure rigidity for observation work from side of table opposite revolving chair, can be made of scrap lumber, and will facilitate making readings over territory not accessible from revolving chair.

ERECTION TIME

It will take 45 man days to erect this building after material is on the ground.