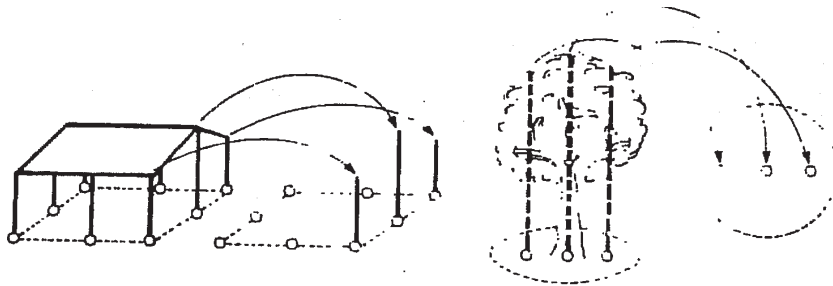


Part 8

Appendices

**Appendix 27-8-A
Determining Shadow Pattern**

The shadow pattern for a building (or tree) can be determined by treating the building as a number of poles:



The shadow lengths for each pole are laid out for the critical times of day. The composite of all shadows for all poles yields the pattern for the building.

For York County (40° North Latitude) the shadow lengths are laid out for 9 a.m., noon and 3 p.m. On short winter days this is when the most solar energy is available. For instance, on December 21, the shortest day of the year, 90 percent of the day's sunlight would fall during these 6 hours.

Use the following steps to determine the shadow length for December 21. An example is given as an illustration.

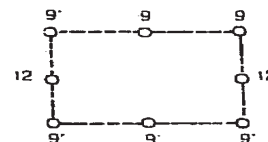
Determining Shadow Pattern

Step 1. Determining building height at the corners and the roof ridge.

Proposed building is 9 feet high at eaves and 12 feet at peak



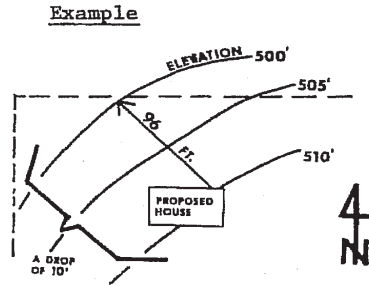
Step 2. Draw an overhead plan of the building using a series of poles.



GLEN ROCK CODE

Step 3. Figure the downhill slope of the yard on the north side of the proposed building.

Slope is the vertical distance divided by the horizontal distance ("rise over run").



Yard slopes downhill to the northwest. The topographical map shows that 96 feet away from the proposed house the land has dropped 10 feet.

$$\text{Slope} = \frac{\text{Vertical distance}}{\text{Horizontal distance}}$$

$$\text{Slope} = \frac{10'}{96'} = .104$$

Slope = about 10%

Step 4. From the Shadow Length Table find the shadow length values for a.m., noon, and p.m. Multiply these ratios times the height of the poles.

For 10% slope to the northwest:

		SHADOW LENGTH		
		a.m. (9.1)	noon (2.3)	p.m. (4.8)
9' pole		81.9'	20.7'	43.2'
12' pole		109.2'	27.6'	57.6'

SLOPE	N			NE			E			SE			S			SW			W			NW		
	AM	NOON	PM	AM	NOON	PM	AM	NOON	PM	AM	NOON	PM	AM	NOON	PM	AM	NOON	PM	AM	NOON	PM	AM	NOON	PM
0%	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8
5%	5.7	2.2	5.7	4.8	2.2	6.2	4.1	2.0	5.7	3.8	1.9	4.8	4.1	1.8	4.1	4.8	1.9	3.8	5.7	2.0	4.1	6.2	2.2	4.8
10%	7.2	2.5	7.2	4.8	2.3	9.1	3.6	2.0	7.2	3.2	1.8	4.8	3.6	1.7	3.6	4.8	1.8	3.2	7.2	2.0	3.6	9.1	2.3	4.8
15%	9.6	2.9	9.6	4.8	2.6	16.6	3.2	2.0	9.1	2.8	1.7	4.8	3.2	1.6	3.2	4.8	1.7	2.8	9.6	2.0	3.2	16.6	2.6	4.8
20%	14.5	3.4	14.5	4.8	2.8	97.5	2.8	2.0	14.5	2.4	1.6	4.8	2.8	1.5	2.8	4.8	1.6	2.4	14.5	2.0	2.8	97.5	2.8	4.8

Example

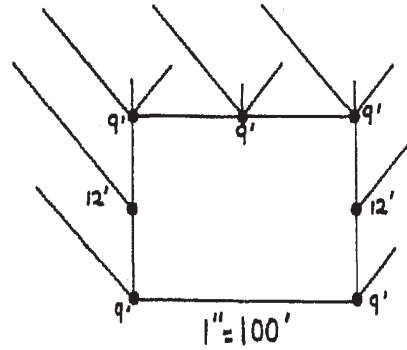
Step 5. Draw the shadow lengths to scale on the overhead view of the building.

- Draw a.m. shadows 45 degrees west of north.

- P.M. shadows should be laid out 45 degrees east of north.

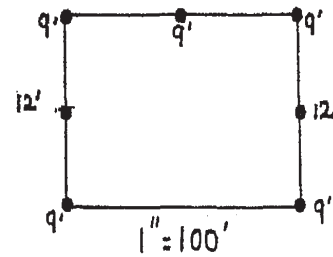
- Draw noon shadows due north.

Shadow lines



Step 6. Connect the end points of the shadow lines. This shows the approximate area of ground shaded by the building between 9 a.m. the 3 p.m. on December 21.

Building shadow pattern



If the diagram was accurately drawn to scale, it will now be easy to tell whether the proposed building will shade the south-facing wall of any nearby buildings.