The Detailed Estimate

Stages of the Detailed Estimate

1. Quantity Take-off: The project work is measured in accordance with standard rules of measurement
2. Recap Quantities: The quantities taken off are sorted and listed in a standard work breakdown format, usually the **CSI MasterFormat**
3. Price the Recap: Prices for the labor, equipment, and materials are entered against the quantities to estimate cost of contractor's work
4. Price Subcontractors' work: Prices are obtained from subcontractors, usually based on lowest bidder
5. Price General Expenses: Price project overhead
6. Summary and Bid: Summarize estimated prices and add contractor's markup (General overhead & Profit). Complete tender documents and submit bid.

Measuring Quantities Generally

The Quantity Takeoff

- Measuring the work of the project in terms of quantified work items
- A contractor would usually have a listing of standard work items for various types of projects. It is used as a checklist during the takeoff process
- The estimator uses the project drawings and specifications
- The project is broken down into work items by utilizing a work breakdown structure
- The estimators applies a uniform set of rules to measure the work items referred to collectively as "**Method of Measurement**". The use of a standard method of measuring work facilitates sharing of price information and review of work. Some of the rules of measurement will be discussed in the context of particular trades

What is Measured?

- In a quantity takeoff, what is measured is the quantity of work and not just the quantity of material to be purchased.
- Quantity takeoff differs from material takeoff in the following respects:
  - Measurement are made “net in place” as opposed to gross quantities in the case of material takeoff.
  - Material takeoff does not provide sufficient information for pricing. For example “100 m^3 of 3000 psi concrete” is sufficient for material takeoff but no so for quantity takeoff.
  - Some work items may not involve material (hand troweling; curing)

Use appropriate units of measurement

- Number: Number, Each, Ea
  - 2’x3’ mirrors - 6 No.
- Length: Lin. ft; m
  - 5”-Dia PVC pipe - 120 lin. ft
- Area: Sq. ft, m^2
  - Form footings - 400 sq. ft
- Volume: CY, m^3
  - 3000 psi concrete - 120 cy
- Weight: lbs, tons, kg
  - #3 rebar in footings - 500 lbs

Measuring “Net in Place”

- Quantities in a takeoff for a cost estimate are measured “net in place”
- “Net in place” means that quantities are determined based on the dimensions and sizes shown on the drawings.
- No adjustment is made for wastage or other such factors

Why “net in place”?

- Consistency: Without a rule estimators will measure differently. Assessment of different estimates becomes difficult.
- Objectivity: Measuring net is more objective because wastage is based on subjective judgment. Reviewing price would be easier if quantities are measured in an objective standard way (net rather than gross)
- Unit price contracts: Work done in unit price contracts must be measured net. Otherwise contractors would use high wastage factors to be paid more.
- Comparison of operation efficiency: Comparison of efficiency would be meaningless if not determined on the same basis.

A takeoff item has two components

- Dimensions: Define size or quantity in the required unit
  - Dimensions are entered in this order: length, width, height
- Description: Classifies the item in accordance to the standard method of measurement

Takeoff rules

- Dimensions not shown on the drawings must have supporting calculations
- Dimensions shown on the drawings or calculated are preferred to scaled dimensions
- Headings are inserted in the takeoff to show trade, location, phase ..etc.
- Description must contain enough description for the estimator to price the item
- Other: Other general rules (see pp. 39-41)

TAKEOFF NOTES SHEET No. 2 of 3

PROJECT: OFFICE / WAREHOUSE DATE:

ESTIMATOR: A B F

NOTES						TIMES	DIMENSIONS		
EXCAV. FOR OFFICE									
EXCAV. DEPTH		PADS F1	PADS F2	PADS F3	STRIP FTGS				
4'-8"		3'-6"	4'-0"	5'-0"	2'-0"				
LESS <1'-0">	ADD W/S	2'-0"	2'-0"	2'-0"	2'-0"				
3'-8"		5'-6"	6'-0"	7'-0"	4'-0"				
	EXCAV. TRE.				(F1)	5	5.50	5.50	3.67
					(F2)	6	6.00	6.00	3.67
					(F3)	2	7.00	7.00	3.67
	OFFICE PERIM.				(STRIP FTG)		219.83	4.00	3.67
2 x 100'	200'-0"								
2 x 50'	100'-0"								
	300'-0"								
LESS 4 x 8"	< 2'-8">								
	297'-4"								
LESS									
5 x 5'-6"	27'-6"								
6 x 6'-0"	36'-0"								
2 x 7'-0"	14'-0"	<77'-6">							
	219'-10"								
	EXCAV. PITS				(F3)	3	7.00	7.00	1.67
	GRADE & TRIM					3	7.00	7.00	
	B/FILL TRE.						AS	TRE. EXCAV.	
					DDT (F1)	< 5	3.50	3.50	0.67 >
STRIP FTG					" (F2)	< 6	4.00	4.00	0.67 >
	297'-4"				" (F3)	< 2	5.00	5.00	0.67 >
LESS					" (STRIP FTG)	<	245.83	2.00	0.67 >
6 x 3'-6"	17'-6"				" (WALL)	<	297.33	0.67	3.00 >
6 x 4'-0"	24'-0"				" (PILE. 1)	< 4	0.67	0.67	3.00 >
2 x 5'-0"	10'-0"	<51'-6">			" (PILS. 2)	< 9	1.53	0.67	3.00 >
	245'-10"								

Figure 4.7a continued

Accuracy of Measurement

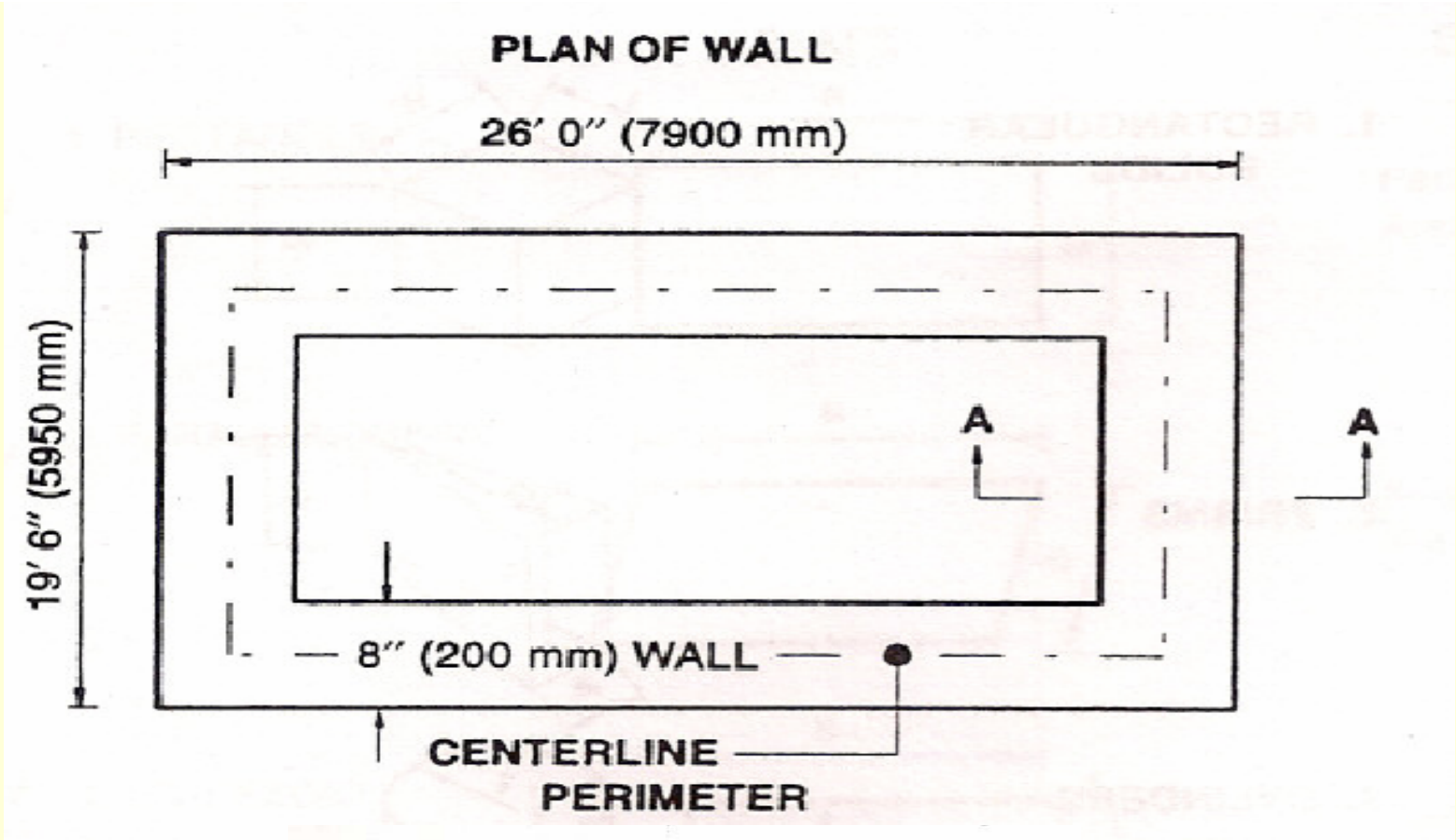
- There is a tradeoff between accuracy and cost (amount of effort). Rational judgment is required
- Some items are relatively costly and obtaining accuracy is not so difficult ➔ Go for more careful measurement
- Other item are relatively inexpensive and not easy to accurately measure ➔ Go for rough measurement

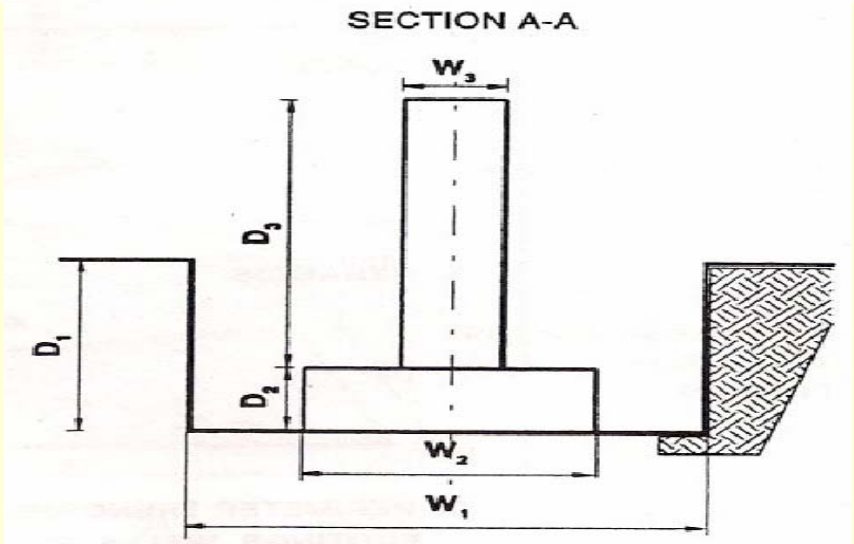
Organization of the Takeoff

- A project takeoff must be done according to a systematic project breakdown approach to facilitate the takeoff process and takeoff review
- Divide the project into smaller parts based on some parameter (by: building, floor, area)
- Breakdown the parts based on assemblies (floor, roof, walls)
- Breakdown assemblies into work items (concrete, formwork, finishing)
- Proceed from bottom up. Takeoff work items of an assembly then move to another assembly until all assemblies of a major component is done. The go to another component and do likewise.

Basic Formulas

- For basic formulas used in Estimating see Figures 3.5 & 3.6, pages 46,47.
- Of particular interest is formula 6 of Figure 3.6 because it is extensively used in takeoff. Volume = Centerline L x W x D
- Once the centerline dimensions are found they can be used to take off the volume of several associated work items.


PLAN OF WALL
26′ 0″ (7900 mm)
19′ 6″ (5950 mm)
A
A
8″ (200 mm) WALL
CENTERLINE
PERIMETER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W3
D3
D1
D2
W2
W1

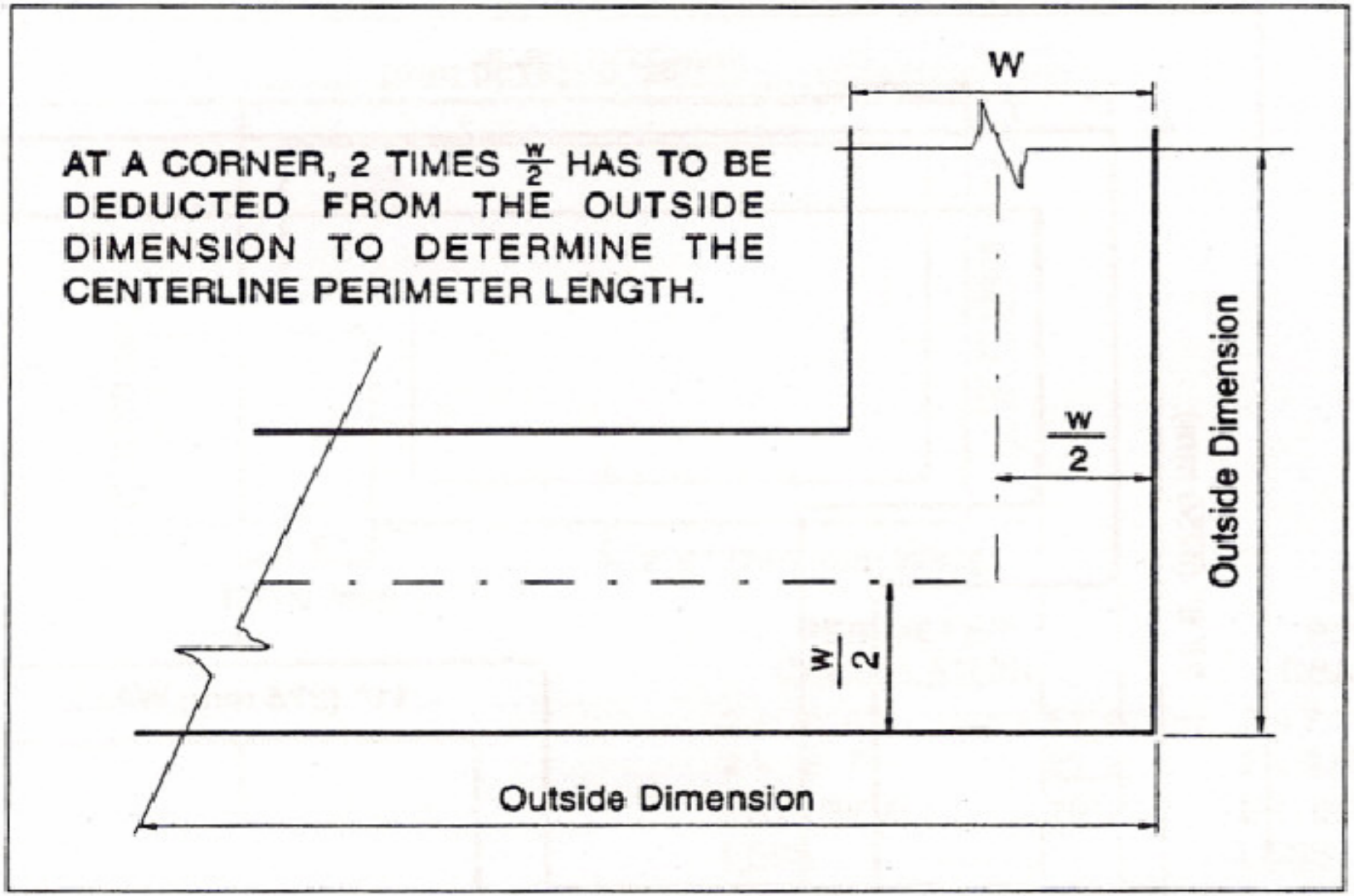


Figure 3.8 Plan of Corner of Wall

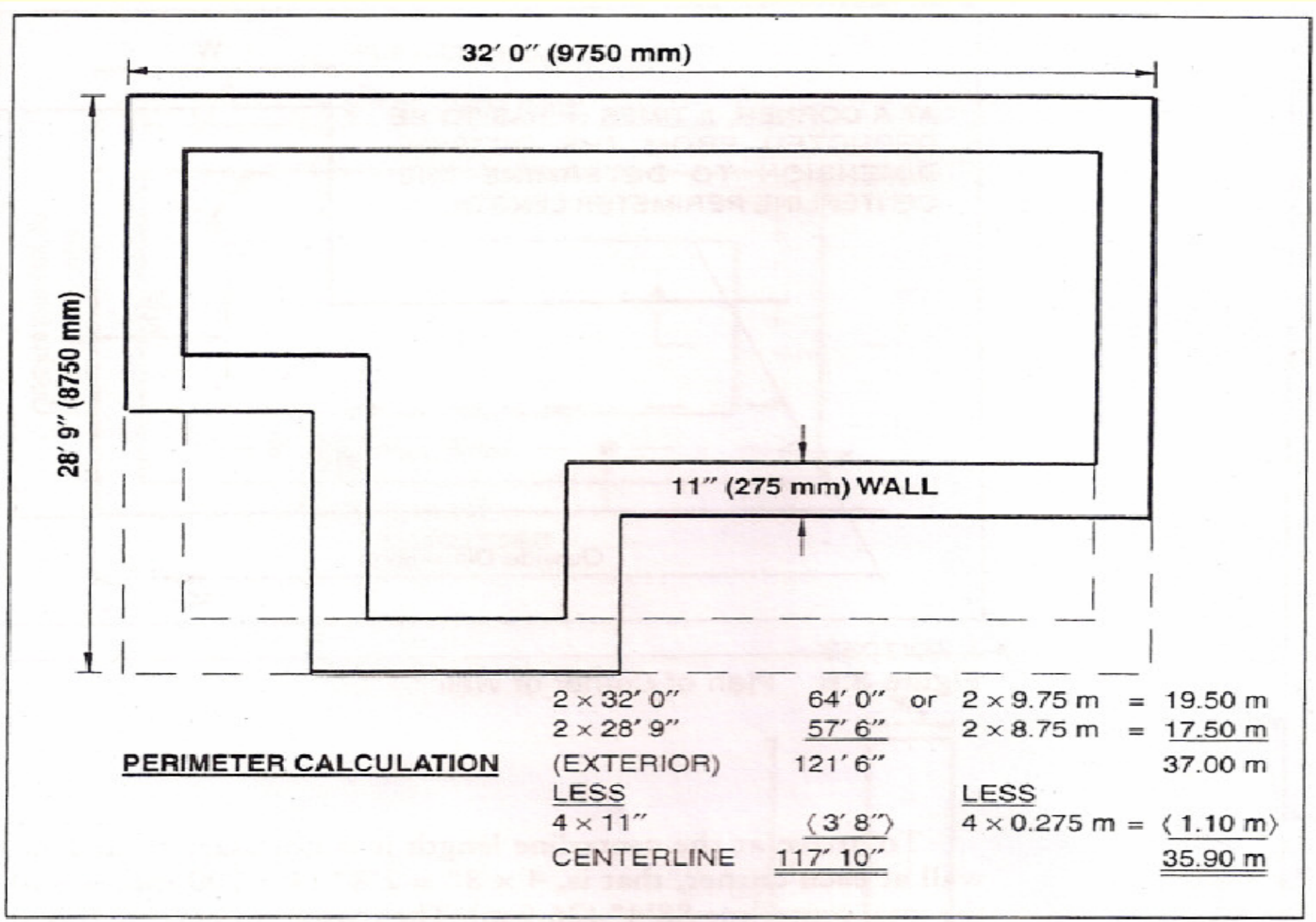


Figure 3.9 Plan and Perimeter Calculation of Wall

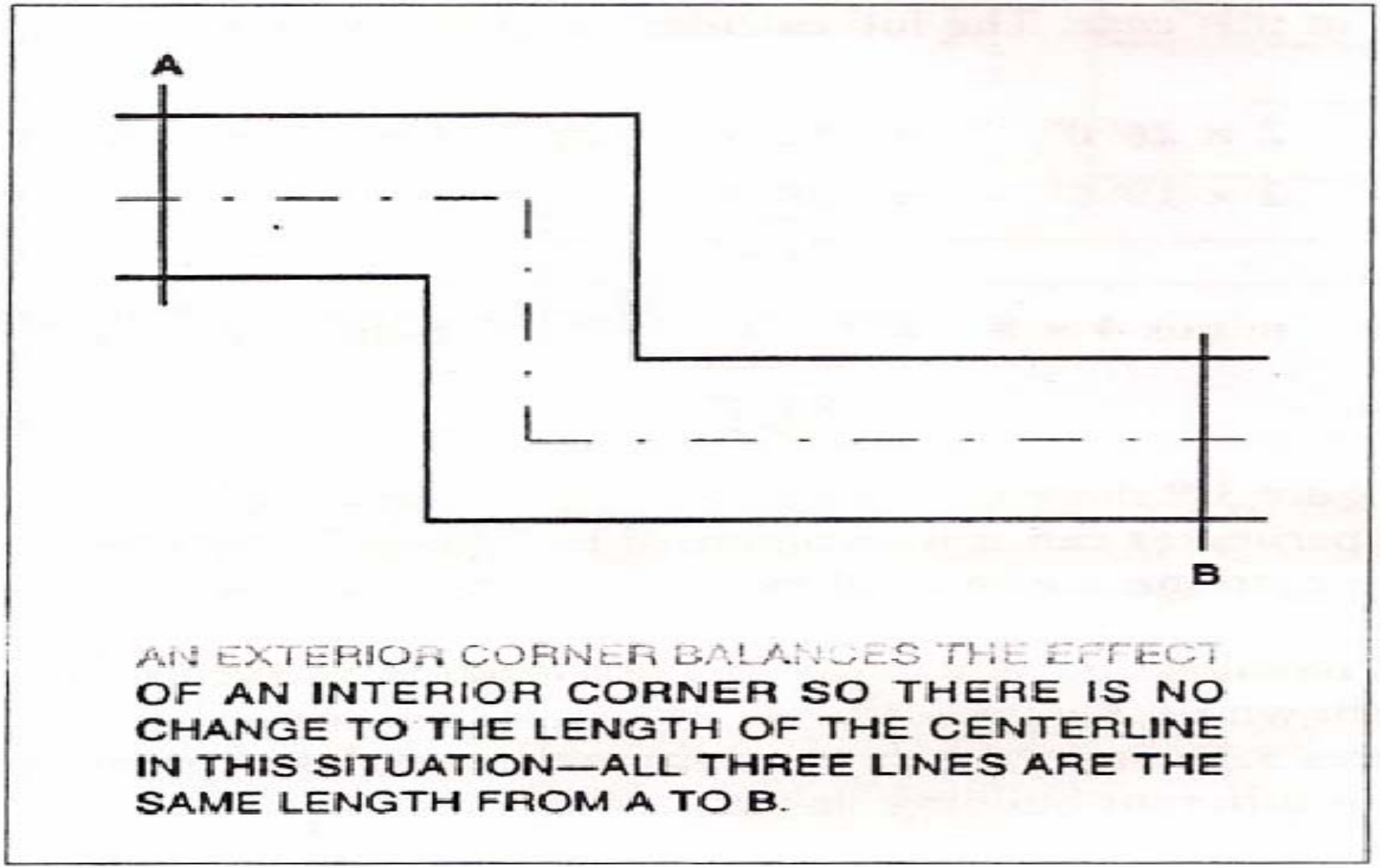


Figure 3.10 Plan of Exterior/Interior Corner

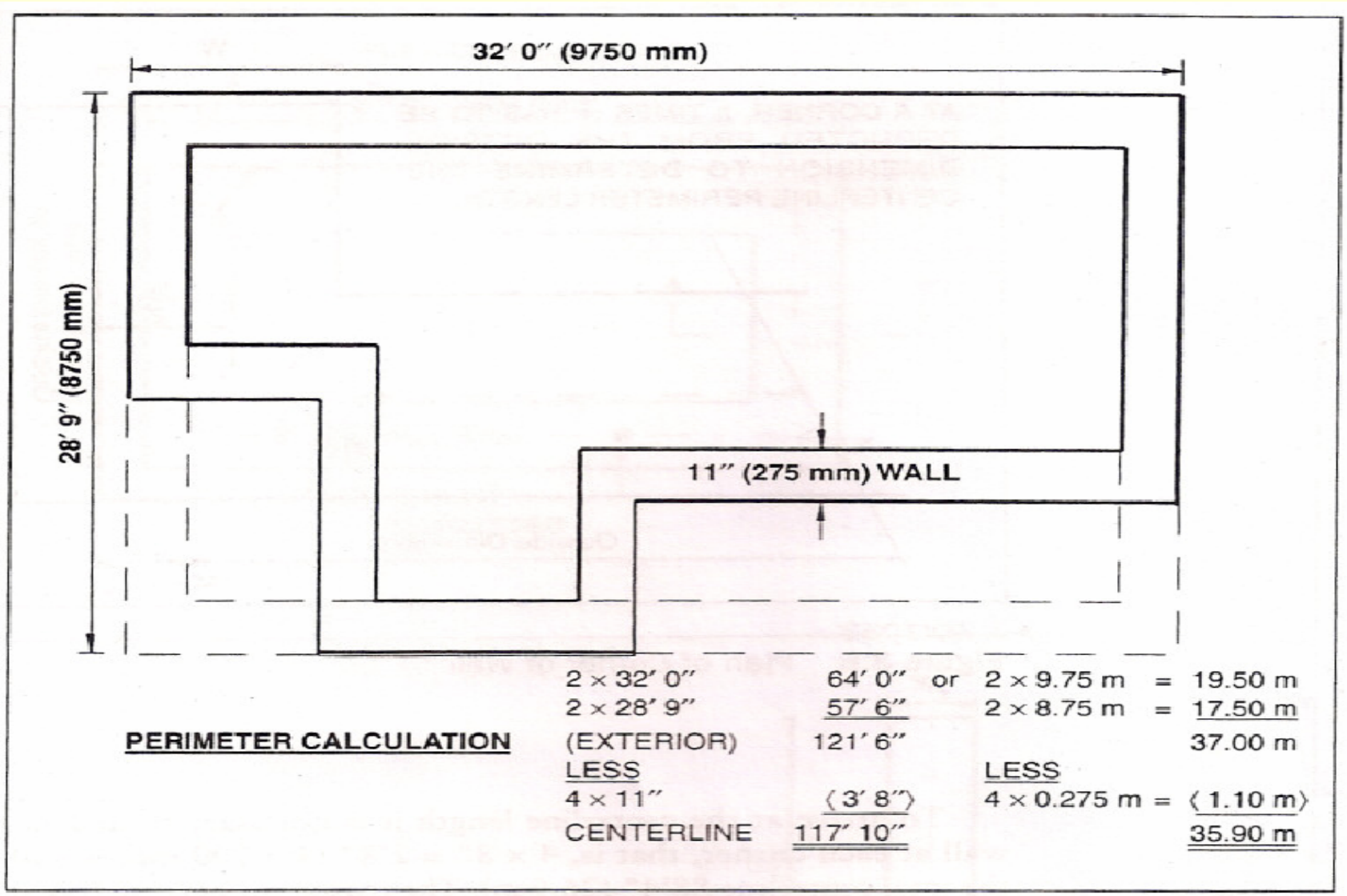
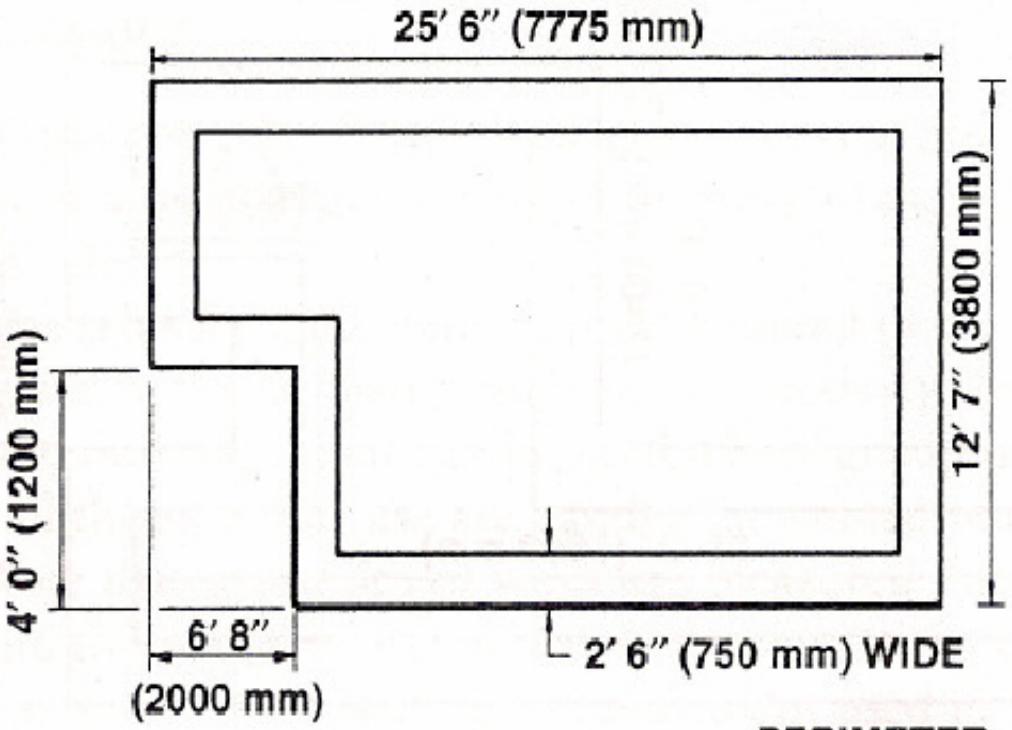
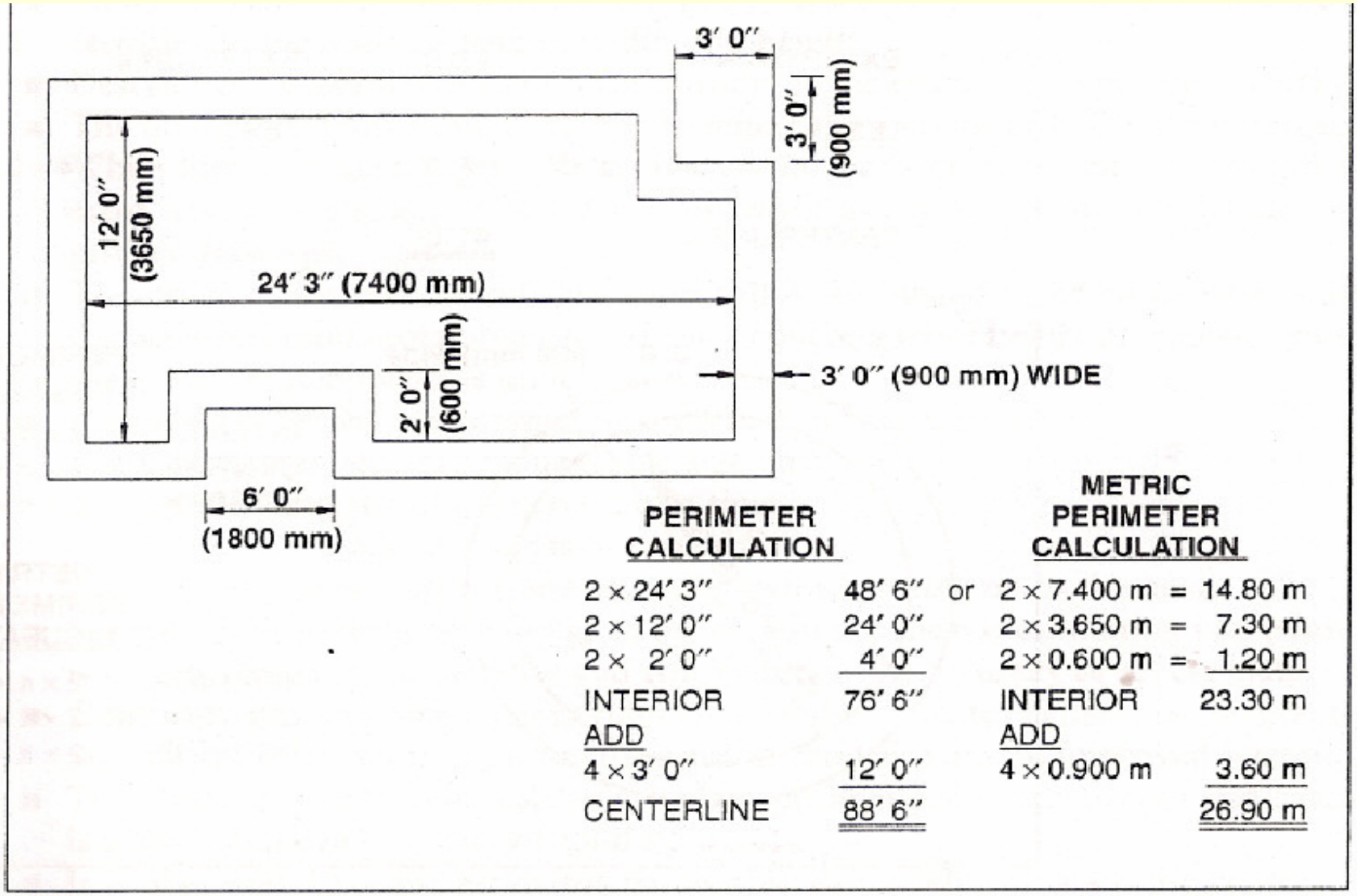


Figure 3.9 Plan and Perimeter Calculation of Wall

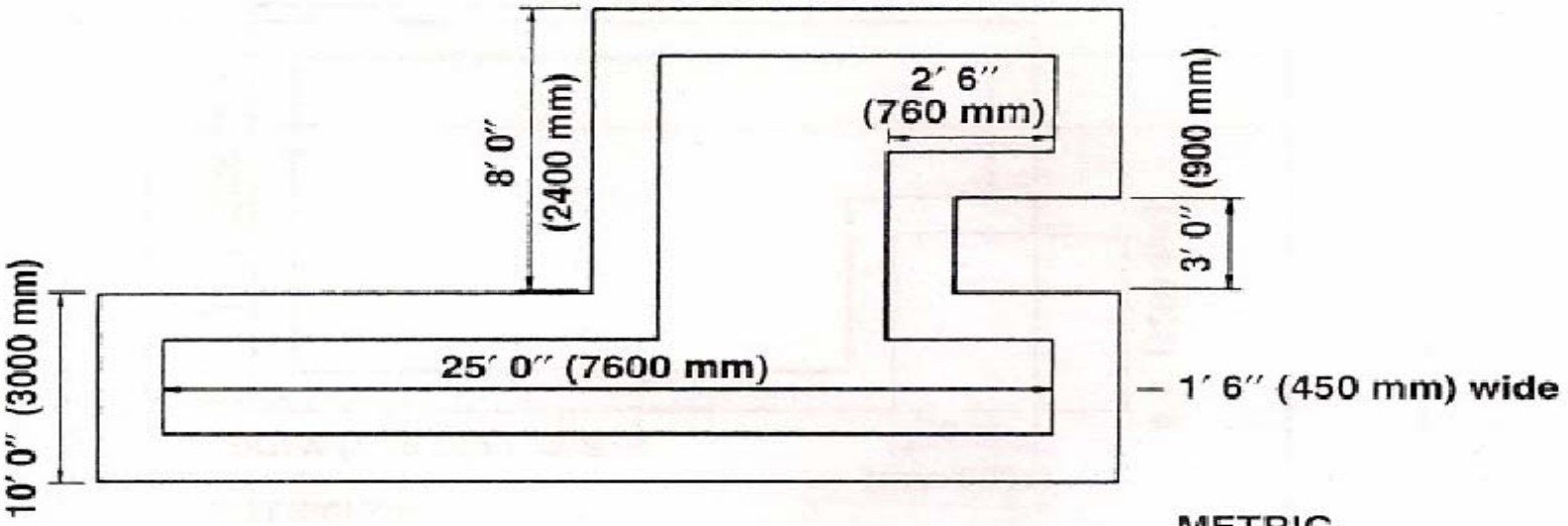


PERIMETER CALCULATION			METRIC PERIMETER CALCULATION	
2 × 25′ 6″	51′ 0″	or	2 × 7.775 m =	15.55 m
2 × 12′ 7″	25′ 2″		2 × 3.800 m =	7.60 m
EXTERIOR	76′ 2″		EXTERIOR	23.15 m
LESS			LESS	
4 × 2′ 6″	⟨10′ 0″⟩		4 × 0.750 m	⟨3.00 m⟩
CENTERLINE	66′ 2″			20.15 m



PERIMETER CALCULATION			METRIC PERIMETER CALCULATION	
2 × 24′ 3″	48′ 6″	or	2 × 7.400 m =	14.80 m
2 × 12′ 0″	24′ 0″		2 × 3.650 m =	7.30 m
2 × 2′ 0″	4′ 0″		2 × 0.600 m =	1.20 m
INTERIOR	76′ 6″		INTERIOR	23.30 m
ADD			ADD	
4 × 3′ 0″	12′ 0″		4 × 0.900 m	3.60 m
CENTERLINE	88′ 6″			26.90 m

Figure 3.11 Wall Plans and Perimeter Calculations



	PERIMETER CALCULATION			METRIC PERIMETER CALCULATION	
		25′ 0″			7.60 m
ADD	2 × 1′ 6″ =	3′ 0″	ADD	2 × 0.450 =	.90 m
		28′ 0″			8.50 m
	2 × 28′ 0″	56′ 0″		2 × 8.500	17.00 m
	2 × 18′ 0″	36′ 0″		2 × 5.400	10.80 m
	2 × 2′ 6″	5′ 0″		2 × 0.760	1.52 m
EXTERIOR =		97′ 0″	EXTERIOR =		29.32 m
LESS			LESS		
	4 × 1′ 6″	⟨ 6′ 0″⟩		4 × 0.450	⟨1.80 m⟩
CENTERLINE =		91′ 0″			27.52 m