RESOURCES/REFERENCES

Zillow.com

Trulia.com

Realtor.com

LoopNet Commercial real estate listings

IAAO – International Association of Assessing Officers

North Carolina Department of Revenue – Property Tax Division

Machinery Act of North Carolina

School of Government – UNC Chapel Hill

Marshall Valuation Service

NNN Exchange

Local realtors

Local appraisers

Uniform Standards of Professional Appraisal Practice (USPAP)

CONSTRUCTION TIME

The following table of average periods of constructions lists points on empirical curves, which have been developed from figures for actual construction jobs. The data was adjusted for time lost due to labor shutdowns and extreme cases were discarded. No adjustments were made for holidays, inspection delays, or other minor shutdowns. Figures are the number of contract days from ground breaking to completion of project.

DESIGNED OCCUPANCY	TOTAL COST OF PROJECT (in thousands of dollars)								
	50	100	200	500	1,000	2,000	3,000	5,000	10,000
Clubhouses	90	105	135	185	235	300	345	410	520
Multiple Res.	------	100	145	200	240	285	310	340	385
Res., single family, townhouses	90	95	125	180	240	315	------	------	------

PERCENT OF COMPLETION

The following is a guideline for estimating percent of completion for a typical Average Quality single family detached residence.:

	Percent of total	Cumulative percent of total
1. Plans, permits and survey	2	2
2. Excavation, forms, water/sewage hookup	4	6
3. Concrete	8	14
4. Rough framing	21	35
5. Windows and exterior doors	2	37
6. Roof cover	3	40
7. Rough-in plumbing	4	44
8. Insulation	1	45
9. Rough-in electrical and mechanical	11	56
10. Exterior cover	6	62
11. Interior drywall and ceiling finish	8	70
12. Built-in cabinets, interior doors, trim, etc.	13	83
13. Plumbing fixtures	5	88
14. Floor covers	3	91
15. Built-in appliances	3	94
16. Light fixtures and finish hardware	2	96
17. Painting and decorating	4	100
TOTAL =	100%	

MECHANICAL AND ELECTRICAL
Percentage of Total Cost

The following table records the results of studies of many completed buildings, by occupancy, giving the percentage of total contract cost spent on the mechanical and electrical items, exclusive of elevators and sprinklers. The average used is the median, and the high and low percentages which are given do not include extremes, but are computed to include approximately 90 percent of all cases within the given range (45% each side of the median).

OCCUPANCY		HEATING ONLY	HEATING & COOLING	PLUMBING	ELECTRICAL
Clubhouses	LOW	3.5	8.2	5.0	6.1
	MEDIAN	6.0	10.3	7.2	9.3
	HIGH	10.2	14.0	11.9	14.0
Multiple Residential	LOW	2.6	6.6	7.5	5.3
	MEDIAN	4.0	8.6	10.9	7.5
	HIGH	7.7	12.3	15.3	10.6
Single family residences	LOW	2.4	6.9	6.8	4.5
	MEDIAN	3.9	8.4	8.6	5.3
	HIGH	6.2	10.3	10.8	7.8

AIR CONDITIONING REQUIREMENTS

Air conditioning requirements are greatly dependent on the occupancy of the structure. The following figures give typical quantities by occupancy in square feet per ton of cooling capacity, except as otherwise stated. The range of areas includes approximately 80% of all cases.

OCCUPANCY	SQUARE FEET/TON
Residential occupancies	400 - 750
Clubhouses	225 - 400

RESIDENTIAL COST HANDBOOK
© 1991 - MARSHALL & SWIFT - PRINTED IN U.S.A.

Computations

Conversion Systems

1 cubic foot = .8036 bushels
1 bushel = 1.2444 cubic feet
1 gallon = .1337 cubic feet = .1074 bushels
1 barrel=31.5 gallons

To calculate a grain bin's bushel capacity according to eave height:

$$\left[\frac{\text{Diameter of Bin}}{2}\right]^2 \times 3.1416 \times .8036 \times \text{Height to Eave.}$$

To calculate the capacity of a grain bin's cone in bushels:

$$1/3 \left[\frac{\text{Diameter of Bin}}{2}\right]^2 \times 3.1416 \times .8036 \times \text{Height of Cone.}$$

ACCUMULATION COMPUTATIONS

MEASUREMENTS

1 Link - 7.92 Inches
1 Rod - 16½ Feet
5½ Yards - 25 Links
1 Chain - 66 feet - 4 Rods - 100 Links
1 Furlong - 660 Feet - 40 Rods
1 Mile - 8 Furlongs - 320 Rods - 80 Chains - 5280 Feet
1 Square Mile - 1 Section - 640 Acres
1 Township - 36 Sections or square miles
1 Sq. Rod - 272¼ Sq. Feet - 30¼ Sq. Yards
1 Acre - 43560 Square Feet
1 Acre - 160 Square Rods
1 Acre is about 208¾ Feet Square
1 Acre is 8 Rods x 20 Rods (or any two numbers of rods whose product is 160)

The Truth-In-Lending law demands that money-lending institutions fully disclose the annual interest rate on loans. The approximate rate can be found by the formula:

$$R = \frac{2NI}{P(n+1)}$$

where N = number of payments per year, I = finance charge in dollars, P = principal, and n = number of scheduled installment payments.

DISTANCE CONVERSIONS

Inches	Centimeters	Centimeters	Inches	Feet	Meters	Meters	Feet	Yards	Meters	Meters	Yards	Miles	Kilometers	Kilometers	Miles
1	2.54	1	.3937	1	.3048	1	3.281	1	.9144	1	1.094	1	1.609	1	.6214
2	5.08	2	.7874	2	.6096	2	6.562	2	1.829	2	2.188	2	3.218	2	1.243
3	7.62	3	1.181	3	.9144	3	9.843	3	2.743	3	3.282	3	4.828	3	1.864
4	10.16	4	1.575	4	1.219	4	13.12	4	3.658	4	4.376	4	6.437	4	2.486
5	12.70	5	1.969	5	1.524	5	16.40	5	4.572	5	5.470	5	8.047	5	3.107
6	15.24	6	2.362	6	1.829	6	19.69	6	5.486	6	6.564	6	9.656	6	3.728
7	17.78	7	2.756	7	2.133	7	22.97	7	6.401	7	7.658	7	11.27	7	4.350
8	20.32	8	3.150	8	2.438	8	26.25	8	7.315	8	8.752	8	12.87	8	4.971
9	22.86	9	3.543	9	2.743	9	29.53	9	8.230	9	9.846	9	14.48	9	5.592
10	25.40	10	3.937	10	3.048	10	32.81	10	9.144	10	10.94	10	16.09	10	6.214
20	50.80	20	7.874	20	6.096	20	65.62	20	18.29	20	21.88	20	32.18	20	12.43
30	76.20	30	11.81	30	9.144	30	98.43	30	27.43	30	32.82	30	48.28	30	18.64
40	101.6	40	15.75	40	12.19	40	131.2	40	36.58	40	43.76	40	64.37	40	24.86
50	127.0	50	19.69	50	15.24	50	164.0	50	45.72	50	54.70	50	80.47	50	31.07
60	152.4	60	23.62	60	18.29	60	196.9	60	54.86	60	65.64	60	96.56	60	37.28
70	177.8	70	27.56	70	21.33	70	229.7	70	64.01	70	76.58	70	112.7	70	43.50
80	203.2	80	31.50	80	24.38	80	262.5	80	73.15	80	87.52	80	128.7	80	49.71
90	228.6	90	35.43	90	27.43	90	295.3	90	82.30	90	98.46	90	144.8	90	55.92
100	254.0	100	39.37	100	30.48	100	328.1	100	91.44	100	109.4	100	160.9	100	62.14
200	508.0	200	78.74	200	60.96	200	656.2	200	182.9	200	218.8	200	321.8	200	124.3
300	762.0	300	118.1	300	91.44	300	984.3	300	274.3	300	328.2	300	482.8	300	186.4
400	1016	400	157.5	400	121.9	400	1312	400	365.8	400	437.6	400	643.7	400	248.6
500	1270	500	196.9	500	152.4	500	1640	500	457.2	500	547.0	500	804.7	500	310.7
600	1524	600	236.2	600	182.9	600	1969	600	548.6	600	656.4	600	965.6	600	372.8
700	1778	700	275.6	700	213.3	700	2297	700	640.1	700	765.8	700	1127	700	435.0
800	2032	800	315.0	800	243.8	800	2625	800	731.5	800	875.2	800	1287	800	497.1
900	2286	900	354.3	900	274.3	900	2953	900	823.0	900	984.6	900	1448	900	559.2
1000	2540	1000	393.7	1000	304.8	1000	3281	1000	914.4	1000	1094	1000	1609	1000	621.4

Price Per Acre Produced by Certain Prices Per Square Foot

CENTS PER SQ. FOOT	$ PER ACRE	CENTS PER SQ. FOOT	$ PER ACRE	CENTS PER SQ. FOOT	$ PER ACRE	CENTS PER SQ. FOOT	$ PER ACRE
1¢	435.60	9¢	3,920.40	30¢	13,068	70¢	30,492
2	871.20	10	4,356.00	35	15,246	75	32,670
3	1,306.80	12	5,227.20	40	17,424	80	34,848
4	1,742.40	14	6,098.40	45	19,602	85	37,026
5	2,178.00	15	6,969.60	50	21,780	90	39,204
6	2,613.60	16	7,840.80	55	23,958	95	41,382
7	3,049.20	20	8,712.00	60	26,136	100	43,560
8	3,484.80	25	10,890.00	65	28,314		

MULTIPLY BY TO OBTAIN

MULTIPLY	BY	TO OBTAIN
Acres	43560	Square feet
Acres	4047	Square meters
Acres	0.0016	Square miles
Acre feet	4840	Square yards
Acre feet	43560	Cubic feet
Feet	1233.48	Cubic meters
Feet	30.48	Centimeters
Feet	12	Inches
Feet	0.3048	Meters
Feet	0.3333	Yards
Square feet	2.2957×10^{-5}	Acres
Square feet	929.0	Square centimeters
Square feet	144	Square inches
Square feet	0.0929	Square meters
Square feet	3.5870×10^{-8}	Square miles
Square feet	0.1111	Square yards
Square yards	9	Square feet
Square yards	0.8361	Square meters
Square yards	3.2283×10^{-7}	Square miles
Yards	91.44	Centimeters
Yards	3	Feet
Yards	36	Inches
Yards	0.9144	Meters
Miles	5280	Feet
Miles	1.609	Kilometers
Miles	1760	Yards
Meters	3.281	Feet
Meters	39.37	Inches
Meters	0.001	Kilometers
Meters	1.094	Yards

Widths Times Depths Equaling One Acre

1 ACRE EQUALS		1 ACRE EQUALS		1 ACRE EQUALS	
Length	Width	Length	Width	Length	Width
16.5 ft.	2640. ft.	66. ft.	660. ft.	132. ft.	330. ft.
33.	1320.	75.	580.8	150.	290.4
90.	871.2	100.	435.6	208.71	208.71

DETERMINATION OF AREAS

a = area
b = base
h = height

① **SQUARES**

a = b x h

② **RECTANGLES**

a = b x h

③ **PARALLELOGRAMS**
(4-sided figure with parallel opposite sides)

a = b x h

④ **TRAPEZOID**
(4-sided figure with only 2 parallel sides)

$a = h \times \frac{b_1 + b_2}{2}$

⑤ **TRIANGLES WITH 90° ANGLE**

a = ½ (b x h)

⑥ **TRIANGLES WITHOUT 90° ANGLE**

a = ½ (b x h)

⑦ **CIRCLE**
R = radius

a = R² x 3.1416
If radius is 14 ft.,
a = 14 x 14 x 3.1416 = 615.75

⑧ **SEGMENT OF CIRCLE**

Since there are 360° in a circle, the area of a 60° section is $\frac{60}{360}$, or $\frac{1}{6}$ of the entire circle.

⑨ **SEGMENT OF CIRCLE**
If the radius and length of an arc are given:
a = length of arc x ½ radius