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Engineering Economic Analysis  
Amendments to Development Regulations  
Ordinance Colts Neck Twp.

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ENGINEERING ECONOMIC ANALYSIS  
AMENDMENTS TO DEVELOPMENT REGULATIONS ORDINANCE  
COLTS NECK TOWNSHIP  
MONMOUTH COUNTY, NEW JERSEY

Prepared By

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## I. INTRODUCTION

This report presents numerical information generated by a cash flow analysis model constructed to simulate payout/revenue streams for multi-family residential development within the Township of Colts Neck, Monmouth County, New Jersey. Specifically, the model has been utilized to furnish economic analyses of development alternatives provided within the "Amendments to [Colts Neck Township] Development Regulations Ordinance" drafted September, 1984.

The objective of these ordinance amendments has been to develop regulations which provide a realistic opportunity for construction of lower and moderate income housing within the Township while permitting developers to earn a reasonable return on capital invested in such development. Pursuant to this objective, the computer model referred to above has been developed to analyze costs, revenues and investment rates of return typical of those associated with multi-family residential development within Colts Neck Township.

## II. OVERVIEW OF METHODOLOGY

The Cash flow Analysis Model (hereinafter referred to as CAM) operates as follows:

1. Project parameters including site area, land cost, yield density, construction unit prices, percentage of Mt. Laurel housing units, etc. are input;
2. CAM develops a detailed cost projection for the proposed project;
3. CAM estimates project life based upon total housing units proposed and projects a payout/revenue schedule for the development;
4. CAM employs an iterative solution process to determine the Internal Rate of Return for the synthesized project cash flow stream obtained from the payout/revenue schedule generated above.

Detailed descriptions of the above described phases of analysis are presented in Section IV of this report accompanied by a SAMPLE PROJECT ANALYSIS (pages 12 through 15).

## III. GENERAL MODELLING CONSIDERATIONS

CAM is a deterministic, descriptive mathematical model and, as such, generates information which should be interpreted with the following in mind:

1. Mathematical modelling involves the structuring of a real life situation into a mathematical relationship represented by an equation or family of equations. Frequently, simplifications are necessary because of the complexity of the original problem.
2. CAM is a deterministic model, that is, a model in which the parameters are (or are assumed to be) known with certainty.
3. CAM is a descriptive model in that it represents a functional relationship but does not indicate a course of action to be taken.

CAM has been developed as a tool for use in evaluating the attractiveness of investment opportunities in multi-family residential development projects. Model solutions presented herein derive from general consideration of a broad range of developmental conditions existing within the Township of Colts Neck. The model will not, in general, furnish accurate information for a particular site unless "calibrated" using a definite developmental plan for the site.

#### IV. DETAILED DESCRIPTION OF SOLUTION PROCESS

Once model input parameters (eg. site area, land cost, yield density, percentage of lower income units and construction unit prices) have been entered, CAM projects a detailed cost breakdown for the project. Cost figures are tabulated in a "COST SCHEDULE" such as the one shown in the "SAMPLE PROJECT ANALYSIS" which begins on page 7 of this report. Cost category descriptions are as follows:

LAND COST - The cost of land for the project.

SOFT COSTS - Engineering, architectural and legal costs for the project.

OFF-TRACT IMPROVEMENT COSTS - Sanitary sewer extension costs and offsite road improvement costs are the predominant figures in this category. Cost figures are determined as a function of site road frontage which is approximated using the relationship:

$$\text{FRONTAGE} = \text{SQUARE ROOT OF TRACT AREA}$$

ON-TRACT SITE IMPROVEMENT COSTS - Include grading, drives, walks, curbs, lighting, landscaping, utilities and other costs associated with construction of the project site plan.

BUILDING COSTS (DWELLING UNIT CONSTRUCTION COSTS) - Construction of project dwelling units.

Upon completion of the project cost breakdown, CAM estimates a total project life (i.e. duration of project from conception through construction closeout). This period, in years, is equal to 1.5 plus the number of years required to sell the project "Market" units at a market absorption rate of 2.26 units per week, rounded to the nearest one-half year.

Using the estimated project life, a payout/revenue schedule for the project is derived in accordance with the tabulation on the following page.

The following assumptions are implicit in the tabulation:

1. The developer is a contract purchaser of the site.
2. Purchaser's contract is contingent upon receipt of approvals for the project at which time entire land cost is paid to seller (1 year).
3. Developer receives no revenue from unit sales during first 18 months of project.
4. Equally proportionate numbers of units are built and sold in all periods of project life beginning with the fourth 6-month period of the project.
5. Receipts and disbursements are treated as if they take place at end of period.

The payout/revenue schedule for the SAMPLE PROJECT ANALYSIS is shown on page 15 of this report.

Having generated a payout/revenue schedule for the project, CAM computes a net cash flow stream over the life of the project and determines the Internal Rate of Return for the project.

TABULATED FORM FOR PAYOUT/REVENUE SCHEDULE GENERATION

PERIOD (YRS.)	DESCRIPTION OF PAYOUTS AND REVENUES	
0	PAYOUT:	5% of contract purchase price of property
	REVENUE:	None
0.5	PAYOUT:	40% of project soft costs for preparation of engineering and architectural plans and legal work on project applications
	REVENUE:	None
1	PAYOUT:	Land cost, legal fees for preparation of condominium documents, 20% of project soft cost for additional engineering, architectural and legal work completed
	REVENUE:	None
1.5	PAYOUT:	50% of total offsite improvement costs, proportionate fraction of total project onsite construction costs, proportionate fraction of remainder of project soft costs
	REVENUE:	None
2	PAYOUT:	50 % of total offsite improvement costs, proportionate fraction of total project onsite construction costs, proportionate fraction of remainder of project soft costs
	REVENUE:	Revenue from sale of proportionate fraction of total project units where the ratio of lower income units sold this period to total units sold this period is equal to the proportion of lower income units for the entire project
2.5 - END	PAYOUT:	Proportionate fraction of total project onsite construction costs, proportionate fraction of remainder of project soft costs
	REVENUE:	Revenue from sale of proportionate fraction of total project units where the ratio of lower income units sold this period to total units sold this period is equal to the proportion of lower income units for the entire project

V. REMARKS CONCERNING PROJECT ANALYSES IN THIS REPORT

1. In order to gain a correct perspective of the tabulations presented herein, it must be noted that THE DEVELOPER'S INTERNAL COSTS, i.e., DIRECT COSTS TO THE DEVELOPER FOR ADMINISTRATION OF THE PROJECT, HAVE NOT BEEN FACTORED INTO THE NET CASHFLOW STREAM. This is so because different developers may project greatly varying internal costs when "costing out" the same project. For example, a large development corporation may realize economies of scale by "shopping" construction unit prices with greater success than a smaller competitor. On the other hand, the larger developer may not be able to efficiently administrate construction of a small project which would be profitable for a smaller competitor. Furthermore, a developer who is actually a building constructor may be able to erect the dwellings at a very low cost but may find himself paying premium unit prices for site improvements.

Therefore, in order to analyze a wide range of possible development projects existing within the Township of Colts Neck (which projects are likely to be under consideration by an even wider range of potential developers), all analyses presented in this report are concerned with determination of the Internal Rate of Return for estimated project costs unadjusted for the developer's internal costs.

2. Project costs are determined on the basis of the following:

PROJECT DWELLING UNIT TYPES

"Market" Units - Two story Townhouse type unit having  
G.F.A. = 1,350 S.F.

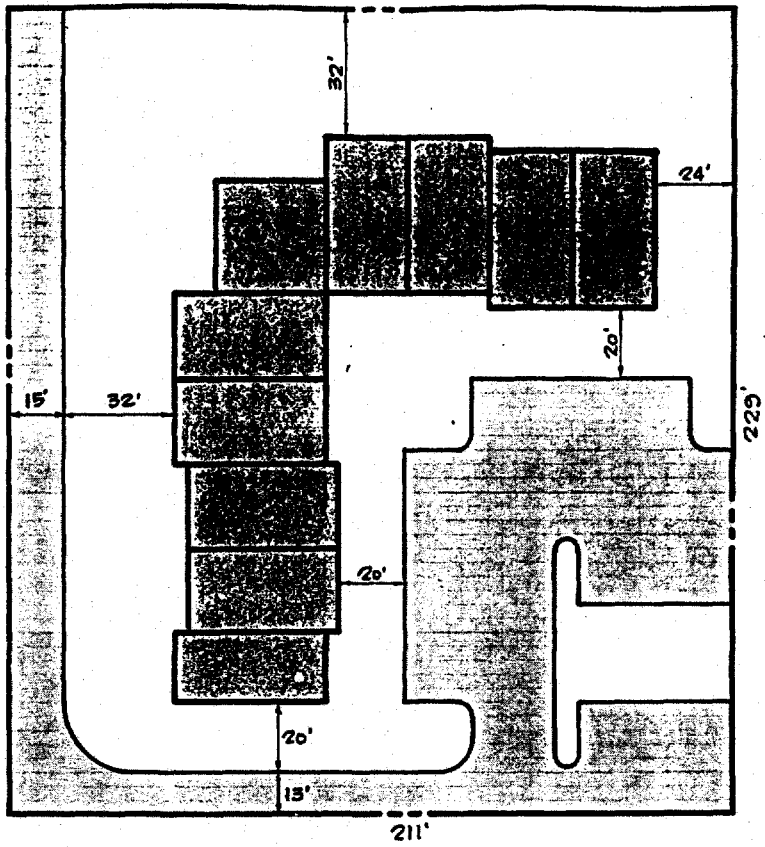
Moderate Income Unit - Garden apartment type flat having  
G.F.A. = 1,220 S.F.

Lower Income Unit - Garden apartment type flat having  
G.F.A. = 1,000 S.F.

SITE IMPROVEMENT COSTS

Average site improvement costs associated with each type of dwelling unit have been estimated utilizing a cluster "mosaic" concept. Mosaics for townhouse and garden flat construction, respectively, are illustrated on Pages and of this report. A detailed cost tabulation follows each mosaic. Average site improvement costs derived from these mosaics are input into the model along with allowances for additional necessary site improvements including landscaping, cluster connecting drives, storm water detention basin, channel improvements, etc.





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TOWNHOUSE CLUSTER "MOSAIC"  
 CONSTRUCTION DENSITY: 9 D.U.'s / ACRE  
 PARKING PROVIDED: 2.5 SPACES / D.U.  
 NOT TO SCALE

CLUSTER SITE CONST. COSTS - - TOWNHOUSE UNITS

SITE PREPARATION

Clearing	1.11 Acres	\$6,000.00	\$6,660.00
Earthwork / Rough Grade	1.11 Acres	\$15,000.00	\$16,650.00

SANITARY SEWERS

8" PVC (SDR 35) Main	200.00 Feet	\$14.50	\$2,900.00
8" Nye	10.00 Units	\$75.00	\$750.00
Precast Conc. Manhole	1.50 Units	\$1,000.00	\$1,500.00
Unit Service Lateral	420.00 Feet	\$9.00	\$3,780.00
Cleanout	10.00 Units	\$150.00	\$1,500.00

STORM SEWERS

Trunk Main	115.00 Feet	\$30.00	\$3,450.00
Precast Conc. Manhole	1.00 Units	\$1,000.00	\$1,000.00
Type "B" Inlet	2.00 Units	\$1,000.00	\$2,000.00
15" Dia. RCP	25.00 Feet	\$16.00	\$400.00

ROADWAYS AND PARKING

Spine Pavt Area	385.00 S.Y.	\$14.00	\$5,390.00
Cluster Pavt Area	1,170.00 S.Y.	\$12.60	\$14,742.00
6" x 3" x 18" Conc. Curb	800.00 L.F.	\$6.00	\$4,800.00
4" x 4" Concrete Walk	3,380.00 S.F.	\$1.75	\$5,915.00

LANDSCAPING

Fine Grading	1.11 Acres	\$900.00	\$999.00
4" Layer Topsoil	1,777.84 S.Y.	\$1.00	\$1,777.84
Seed	1,777.84 S.Y.	\$0.30	\$533.35
Buffer Plantings	200.00 L.F.	\$10.00	\$2,000.00
Shade Trees	12.00 Units	\$350.00	\$4,200.00
Ornamental Plantings	L.S.	\$1,000.00	\$1,000.00
Foundation Planting	10.00 BLDG.	\$100.00	\$1,000.00

WATER SERVICE

8" Dia. DIP Main	115.00 L.F.	\$20.00	\$2,300.00
8" X 4" Tee	0.50 Unit	400.00	200.00
4" Valve	1.50 Unit	450.00	675.00
4" Dia. DIP Main	90.00 L.F.	\$14.00	\$1,260.00
Hydrant	0.50 Unit	\$1,200.00	\$600.00
1" House Service	10.00 Units	\$1,000.00	\$10,000.00

ELECTRIC SERVICE

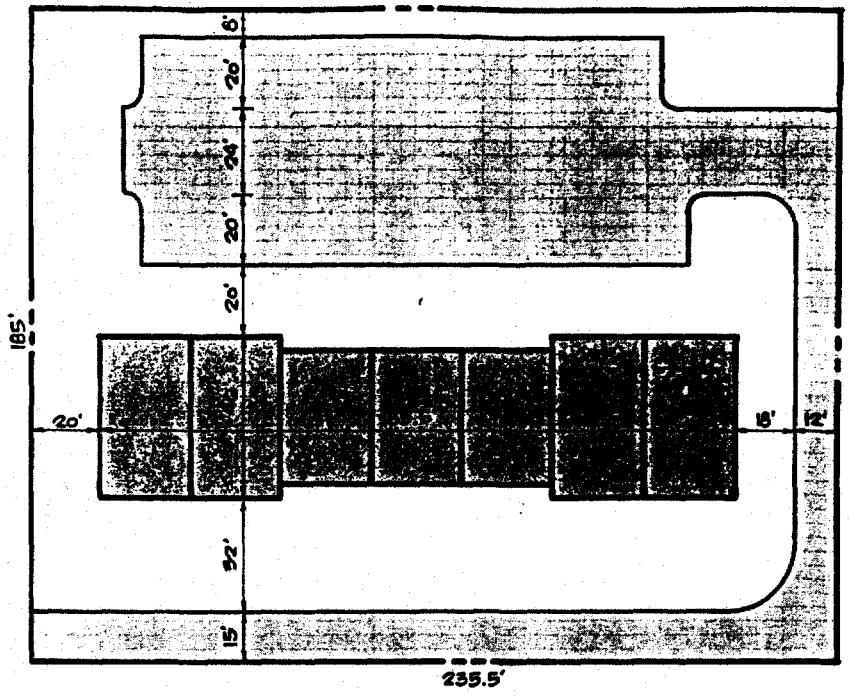
Unit Service & Meter	10.00 DU's	500.00	5000.00
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SITE LIGHTING

200W Pole Mtd. Lamp	5.00 Unit	1800.00	9000.00
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TOTAL CLUSTER SITE CONST. COSTS			<u>\$109,574</u>
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AVERAGE CLUSTER SITE CONST. COST PER D.U.			\$10,958
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GARDEN FLAT "MOSAIC"  
CONSTRUCTION DENSITY:  
14 D.U.'s/ ACRE  
PARKING PROVIDED: 2.5 SPACES/ D.U.  
NOT TO SCALE

CLUSTER SITE CONST. COSTS - - GARDEN APT. UNITS

SITE PREPARATION

Clearing	1.00 Acre	\$6,000.00	\$6,000.00
Earthwork / Rough Grade	1.00 Acre	\$15,000.00	\$15,000.00

SANITARY SEWERS

3" RVD (SDR 35) Main	118.00 Feet	\$14.50	\$1,711.00
3" Wye	1.00 Units	\$75.00	\$75.00
Precast Conc. Manhole	1.00 Units	\$1,000.00	\$1,000.00
Unit Service Lateral	36.00 Feet	\$9.00	\$324.00
Cleanout	1.00 Units	\$150.00	\$150.00

STORM SEWERS

Trunk Main	118.00 Feet	\$30.00	\$3,540.00
Precast Conc. Manhole	1.00 Units	\$1,000.00	\$1,000.00
Type "B" Inlet	2.00 Units	\$1,000.00	\$2,000.00
15" Dia. RCP	40.00 Feet	\$16.00	\$640.00

ROADWAYS AND PARKING

Spine Pavt Area	375.00 S.Y.	\$14.00	\$5,250.00
Cluster Pavt Area	1,845.00 S.Y.	\$12.40	\$22,878.00
6"x 9"x 18" Conc. Curb	840.00 L.F.	\$6.00	\$5,040.00
4" x 4' Concrete Walk	2,350.00 S.F.	\$1.75	\$4,112.50

LANDSCAPING

Fine Grading	1.00 Acres	\$900.00	\$900.00
4" Layer Topsoil	854.87 S.Y.	\$1.00	\$854.87
Seed	854.87 S.Y.	\$0.20	\$170.97
Suffer Plantings	200.00 L.F.	\$10.00	\$2,000.00
Shade Trees	12.00 Units	\$50.00	\$600.00
Ornamental Plantings	L.S.	\$1,000.00	\$1,000.00
Foundation Planting	7.00 BLDG.	\$100.00	\$700.00

WATER SERVICE

3" Dia. DIP Main	118.00 L.F.	\$20.00	\$2,360.00
Hydrant	0.50 Unit	\$1,200.00	\$1,200.00
1" House Service	1.00 Units	\$1,000.00	\$1,000.00

ELECTRIC SERVICE

Unit Service & Meter	14.00 DU's	175.00	2450.00
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SITE LIGHTING

200W Pole Mntd. Lamp	5.00 Unit	1800.00	9000.00
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TOTAL CLUSTER SITE CONSTRUCTION COSTS			11450.00
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AVERAGE CLUSTER SITE CONST. COST PER D.U.			56.389
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PROJECT ANALYSIS

MODEL INPUT PARAMETERS:

TRACT AREA =	75.00	(AREA)
PER ACRE LAND COST =	\$12,000	(ULC)
YIELD DENSITY =	6.50	(YDEN)
% L & M UNITS =	20.00%	(FLOW)
CONTRIB PER MKT. UNIT =	0.00%	OF SALES PRICE

PROPOSED DEVELOPMENT:

TOTAL "MARKET" UNITS =	390	(MU)
TOTAL L & M UNITS =	98	(LMU)
TOTAL DWELLING UNITS =	488	(TDU)

COST SCHEDULE:

(1) TOTAL LAND COST =	900,000	(LC)
(2) TOTAL SOFT COSTS (AE&L) =	742,000	(PFEEES)
(3) OFF-TRACT IMPRVMT. COST =	1,444,893	(OFF)
(4) SITE IMPROVEMENT COSTS =	5,921,538	(SIC)
(5) TOTAL BUILDING COST =	18,405,720	(TBC)
(6) ADDIT'L COSTS & OVERRUNS =	0	- Estim. at 0.00
	=====	of items 2 thru 5
TOTAL PROJECT COST =	\$27,414,151	

UNIT SALES PRICES

Average "Market" Unit Selling Price .....	\$86,500.0
Average "Lower Income" Unit Selling Price .....	\$22,000.0
Average "Moderate Income" Unit Selling Price .....	\$35,000.0

ESTIMATED PROJECT COST TABULATION

LAND COST

Total Site Acreage .....	75.00
Land Cost per Acre .....	\$12,000.00
<hr/>	
Total Land Cost (TLC) .....	\$900,000.00

OFF-TRACT IMPROVEMENT COSTS

Sanitary Sewer Extension Cost .....	\$500,000.00
Offsite Road Improvement Costs .....	\$49,705.82
Water Distribution Plant .....	\$850,000.00
Miscellaneous Off-Tract Costs .....	\$45,187.11
<hr/>	
Total Offsite Improvement Costs (TOC) .....	\$1,444,892.93

ON-TRACT SITE IMPROVEMENT COSTS

Entrance Drive Signage & Landscaping .....	\$10,000
Site Improvements (Average Per-Unit Costs)	
Townhouses (% tot. DU's = 80.00%)	
\$11,000 per unit X 390 units =	\$4,290,000
Garden Flats (% tot. DU's = 20.00%)	
\$6,400 per unit X 98 units =	\$627,200
Additional Site Improvement Costs	
Grading & Selective Landscaping .....	\$196,875
Link Drives .....	\$442,467
Bridges, Culverts & Channel Improvements .....	\$200,000
Detention Basin .....	\$155,000
<hr/>	
TOTAL ONSITE SITE IMPROVEMENT COSTS =	\$5,921,532



DWELLING UNIT CONSTRUCTION COSTS

390 Townhouse Units @	1,350 S.F. per DU		
Bldg. F.A. =	526,500 S.F. @	\$30.00	\$15,795,000
49 "A" Garden Flats @	1,220 S.F. per DU		
Bldg. F.A. =	59,780 S.F. @	\$24.00	\$1,434,720
49 "B" Garden Flats @	1,000 S.F. per DU		
Bldg. F.A. =	49,000 S.F. @	\$24.00	\$1,176,000
			=====
TOTAL BUILDING CONSTRUCTION COSTS =			\$18,405,720

PROJECT CASH FLOW ANALYSIS

PROJECT LIFE = 5.00 Years

INTERNAL RATE OF RETURN = 56.7788% Per Annum (Compounded Semi-Annually)

TABULATION OF DISCOUNTED NET CASH FLOW

YEAR	PAYOUT	REVENUES	NET CASHFLOW (R-P)	PRES. WORTH FACTOR	FW(R-P)
0.0	45,000	0	(45,000)	1.000000	(45,000)
0.5	292,800	0	(292,800)	0.778880	(228,056)
1.0	1,011,400	0	(1,011,400)	0.606655	(613,571)
1.5	3,799,954	0	(3,799,954)	0.472511	(1,795,522)
2.0	3,799,954	5,221,600	1,421,646	0.368030	523,208
2.5	3,077,507	5,221,600	2,144,093	0.286651	614,607
3.0	3,077,507	5,221,600	2,144,093	0.223267	478,708
3.5	3,077,507	5,221,600	2,144,093	0.173898	372,854
4.0	3,077,507	5,221,600	2,144,093	0.135446	290,405
4.5	3,077,507	5,221,600	2,144,093	0.105496	226,194
5.0	3,077,507	5,221,600	2,144,093	0.082169	176,172
5.50	0	0	0	0.064000	0
6.00	0	0	0	0.049848	0
6.50	0	0	0	0.038826	0
7.00	0	0	0	0.030241	0
7.50	0	0	0	0.023554	0
8.00	0	0	0	0.018346	0
8.50	0	0	0	0.014289	0
9.00	0	0	0	0.011129	0
9.50	0	0	0	0.008669	0
10.00	0	0	0	0.006752	0

DISCOUNTED NET CASHFLOW (DNC) = 6.775507

SENSITIVITY TABULATIONS

TABULATION OF IRR's FOR VARIOUS TRACT AREAS AND PROJECT COSTS

The following tabulation presents computed project IRR's for various project tract areas versus project cost overrun (or underrun) expressed as a percentage of TOTAL PROJECT COST:

		PROJECT COST OVERRUN (% of Tot. Proj. Cost)		
		-10.00%	0.00%	10.00%
TRACT	50	75.81%	55.80%	36.02%
AREA	75	72.66%	56.78%	40.91%
(Acres)	100	72.31%	57.75%	43.23%

TABULATION OF IRR's FOR VARIOUS TRACT AREAS AND LAND COSTS (PER ACRE)

The following tabulation presents computed project IRR's for various project tract areas versus land cost per acre:

		PER ACRE LAND COST		
		\$10,000	\$13,000	\$16,000
TRACT	50.00	59.24%	54.17%	49.61%
AREA	75.00	59.29%	55.58%	52.21%
(Acres)	100.00	59.84%	56.75%	53.91%