D R A F T

GENERAL PLANNING CONSULTANT

TECHNICAL MEMORANDUM 88.4.6:

TECHNICAL DOCUMENTATION FOR

JOINT DEVELOPMENT CASH FLOW MODEL

Prepared for:

Southern California Rapid Transit District

Prepared by:

Schimpeler Corradino Associates

in association with

Myra L. Frank & Associates
Cordoba Corporation
Manuel Padron & Associates
The Planning Group, Inc.

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1. INTRODUCTION

The SCRTD Joint Development Cash Flow Model is designed to assist SCRTD in the evaluation of joint development projects associated with the Metro Rail system. The model enables the SCRTD to conduct a complete financial feasibility analysis and to evaluate alternative scenarios for potential joint development at Metro Rail stations. The Joint Development Cash Flow Model can assist the SCRTD at several stages of the joint development planning process. Prior to developer solicitation, the model can test the financial viability of various joint development scenarios for inclusion in the Prospectus/RFP. After proposals are received, the model allows for the independent evaluation of a developer's proposed financial plan, estimation of the potential financial return of the project to SCRTD and thorough understanding of the financial structure of the proposed development project to support development agreement negotiations.

The purpose of this Technical Memorandum is to describe the internal structure and functions of the model and provide the user with a thorough understanding of the operations and calculations performed by the model. It is organized in two parts: (1) description of the internal organization and flow of control of the model and (2) description of the functions of the individual Modules in the model for the user's reference. This Manual supercedes the Technical Manual for the Joint Development Cash Flow Model (March, 1986). This version of the Technical Documentation for the model contains all updates which have been made to the model since the previous version. A detailed list of these updates is contained in Appendix A.

This Technical Memorandum is supplemented by a separate User's Manual (Technical Manual 88.4.2) which contains more detail concerning operation and commands in the model. Technical Memorandum 88.4.6 contains substantial technical detail and is written for the user who has a basic familiarity with the model. For the user who is completely unfamiliar with the Joint Development Cash Flow Model, it is recommended that the User's Manual be read first.

The model is programmed for the IBM Personal Computer and is programmed in LOTUS 1-2-3 (Version 2.01). The hardware requirements for the model are an IBM PC or compatible with 640K bytes of memory. The software requirements are LOTUS 1-2-3 and SQZ! Data Squeezer for LOTUS. It is not necessary for the user to know the LOTUS 1-2-3 program in order to operate the model. The model is designed to run automatically and interactively through its entire sequence. The model is run by a master program which controls the loading of additional macros and LOTUS worksheets. A macro is a stored sequence of keystrokes. However, it is also possible, if the user is sufficiently familiar with the LOTUS program, to operate the model manually by pressing [CTRL] [BREAK] and then proceeding with manual inputs and changes to formulas as desired (Note: Commands in brackets refer to keys on the IBM-PC keyboard). At any point, the user may return to automatic operation by pressing the [ALT] and [M] keys simultaneously (referred to throughout this Manual as [ALT]-[M]).

2. ORGANIZATION OF THE MODEL

The model consists of seven modules. Each module builds on the information and calculations performed in previous modules. Therefore, the modules must be executed in sequence. The seven modules are:

1. INPUT BASIC HARD COSTS
2. INPUT BASIC SOFT COSTS
3. EXPENDITURE SCHEDULE BY MID-YEAR
4. SHORT TERM LOAN CALCULATIONS
5. OPERATING COST & REVENUE ANALYSIS
6. FINANCIAL ANALYSIS
7. PRINT SUMMARY REPORT

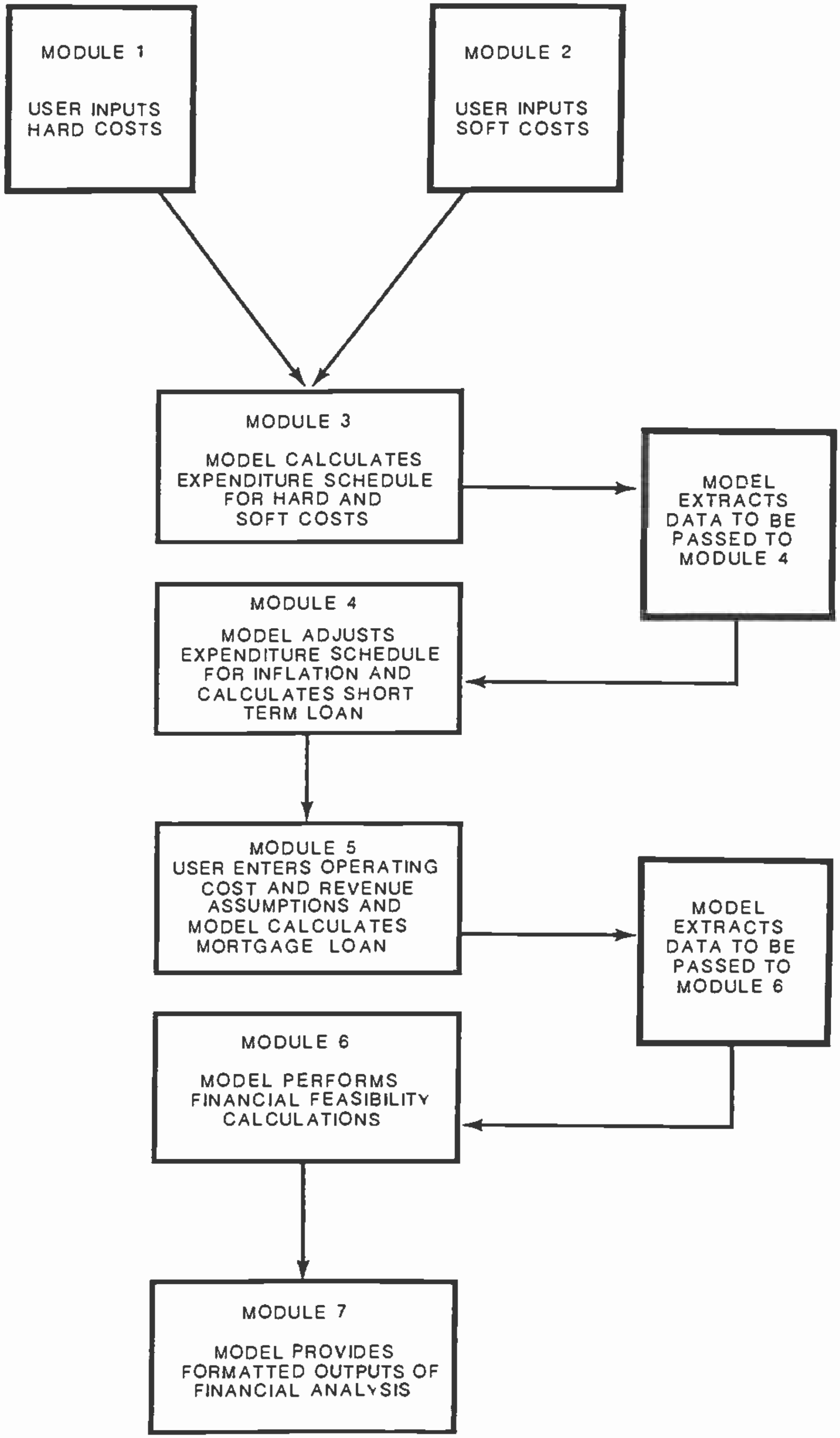
The model provides two additional functions for the user from the Main Menu. The Main Menu function 8. FINISH allows the user to end the operation of the model and return the computer to DOS. The Main Menu function 9. MANUAL allows the user to select the Manual Mode from the Main Menu.

Modules 1 through 7 each have a macro and one or more associated worksheets to perform the required calculations. Each of these components is contained in a separate LOTUS file. The master file that controls the program is AUTO. This file is loaded first and contains the main menu, all required subroutines, the macro for Module 1 and the worksheets for Modules 1 and 2. The macros for Modules 1 through 7 are stored in files A1 through A7. The remaining modules are supported by separate worksheets as follows:

	Associated Worksheet(s)
MODULE 3	AA31, AA32
MODULE 4	AA41
MODULE 5	AA51
MODULE 6	AA61
MODULE 7	AA71

The modules must be executed in the order specified in the Main Menu. The flow of information through the model is portrayed in Figure 1. When the user selects a module from the Main Menu, the associated macro (A1 through A7) and worksheets are loaded into AUTO (except for Modules 1 and 2 where the associated worksheets already reside in AUTO). When the user selects the next module, the macro for that module replaces the macro for the previous module and the worksheets for the new module are loaded into the model. At certain points in time, as the modules build up in the model, the capacity of the LOTUS 1-2-3 program is reached. At these points, the user will be prompted to provide file names to save relevant portions of the worksheet for carryover to the next module while the extraneous portions of the worksheet will be purged. These user-generated files are explained in more detail later in this manual. Detailed explanation of the interrelationships between all files in the model is provided in the following section.

JOINT DEVELOPMENT CASH FLOW MODEL INFORMATION FLOW



MODULE 8: LEAVE LOTUS 1-2-3 PROGRAM

MODULE 9: SWITCH TO MANUAL MODE

FIGURE 1

3. MEMORY ORGANIZATION AND FLOW OF CONTROL OF THE MODEL

The Joint Development Cash Flow Model is a LOTUS 1-2-3-based model. LOTUS 1-2-3 is a spreadsheet program which contains programming functions that allow the spreadsheet to operate automatically. In order to run the model, the LOTUS 1-2-3 and SQZ! Data Squeezer for LOTUS programs must be loaded first. The model can then be loaded by retrieving the worksheet AUTO.WK!. The procedures for loading the model are contained in the Joint Development Cash Flow Model User's Manual.

The Joint Development Cash Flow Model consists of seven modules which are executed sequentially. Each module has a number of associated components:

1. Subfunctions - each module is made up of subfunctions. A subfunction is an individual task within the module. The subfunctions primarily assist the user in inputting data. However, the subfunctions also are used to initiate calculations, provide output reports and load and store files at certain points in the execution of the model.
2. Submenu - each module has a submenu which lists the subfunctions in the module and allows the user to select execute each subfunction as desired. The submenu also allows the user to return to the Main Menu at any time.
3. Macro - each module has one macro associated with it. The macro contains the submenu for the module and the stored instructions for executing all subfunctions in the module.
4. Worksheets - each module has one or more worksheets associated with it. The worksheets are loaded into the main LOTUS 1-2-3 worksheet as each module is executed and contain the data formats for the module and the formulas and calculations to be performed by the model after the input data are provided by the user.

The basic flow of control to execute the modules is as follows:

1. The user selects the desired module from the Main Menu.
2. The model loads the macro for that module.
3. In Modules 1 and 2, the user then proceeds with the module.
4. In Modules 3 through 7, the BEGIN subfunction is used to load the worksheets for the module prior to proceeding with the remaining subfunctions of the module.

The worksheets associated with each module are loaded into a specified location in the main LOTUS 1-2-3 worksheet as the user proceeds with the model. The remainder of this section discusses the memory organization of the model. There are actually two structures for the memory in the model, one which is in effect during the execution of Modules 1, 2 and 3, and the other which is in effect during the execution of Modules 4, 5, 6 and 7.

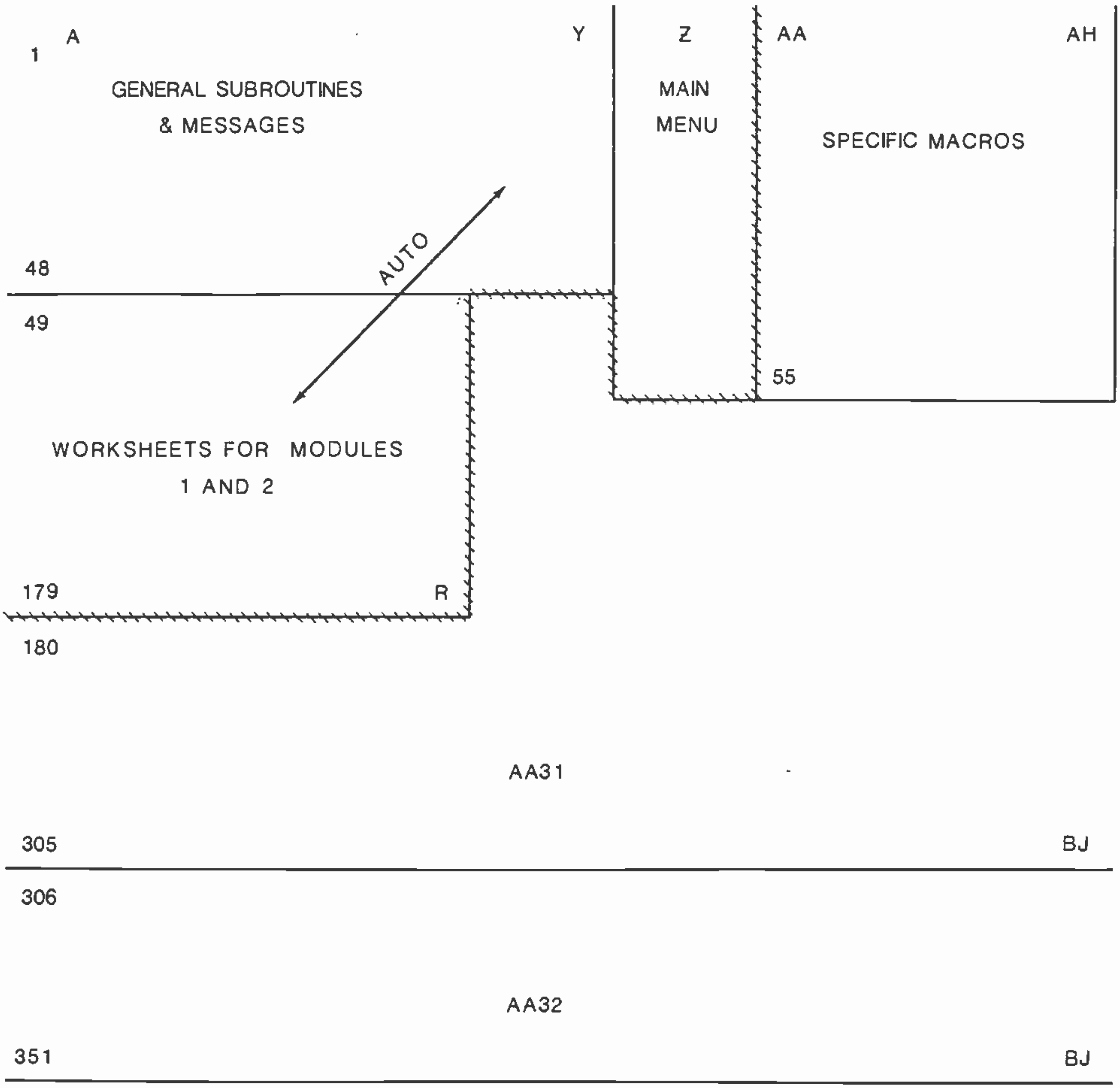
3.1 MEMORY ORGANIZATION - MODULES 1, 2 AND 3

The memory organization for Modules 1, 2 and 3 is shown in Figure 2. Module 1 is initiated by loading the file AUTO. The AUTO file contains three components: 1) General Subroutines and Messages, 2) the Main Menu and 3) worksheets containing the formats and calculations for Modules 1 and 2. Because components 1 and 2 are used by every module in the model, AUTO must always be loaded first and must always be located in the model. Because AUTO is always present, the

FIGURE 2

MEMORY ORGANIZATION

MODULES 1,2,3



NOT TO SCALE

Main Menu is always available. With the Main Menu always available, any module can be accessed at any time by returning to the Main Menu and selecting the desired module.

The memory location AA1.AH55 is reserved for the macro for the module which the user has selected. The actual amount of memory occupied by the different macros varies with the number of subfunctions in each module. [NOTE: A grid system is used to identify individual cells in the main LOTUS 1-2-3 worksheet. The grid consists of letters (A, B, C,..., etc.) across the top of the grid which identify the columns in the worksheet and numbers (1, 2, 3,...,etc.) down the side of the grid which identify the rows in the worksheet. An individual cell can be identified by combining the column and row identifiers (e.g., A1, B53, AJ208, etc.). The nomenclature AA1.AH55 describes the opposite corners of the location in the main LOTUS worksheet where the macro or worksheet is loaded. It is equivalent to a rectangle with corners located at cells AA1, AA55, AH55 and AH1 (see Figure 2).]

Memory location A1.Y48 is always reserved for subroutines and messages used throughout the model. Memory location Z1.AA55 is always reserved for the Main Menu.

The memory organization for the remainder of Modules 1, 2 and 3 is summarized in Table 1 and discussed in detail in the following sections.

TABLE 1

JOINT DEVELOPMENT CASH FLOW MODEL
MEMORY ORGANIZATION - MODULES 1, 2 AND 3

MODULE	WORKSHEET	LOCATION	MACRO	LOCATION
1.	AUTO	A49.R113	A1	AA1.AH55
2.	AUTO	A114.R180	A2	AA1.AH55
3A.	AA31	A180.BJ305	A3	AA1.AH55
3B.	AA32	A306.BJ351	A3	AA1.AH55

3.1.1 Module 1

When this module is selected, the model loads macro A1 to memory location AA1.AH55. The worksheet for Module 1 is contained in the AUTO file. When AUTO is loaded, this worksheet is loaded to memory location A49.R113. The operation and subfunctions of Module 1 are described in Chapter 4 of this document and Section 4.1 of the Joint Development Cash Flow Model User's Manual.

3.1.2 Module 2

When this module is selected, the model loads macro A2 to memory location AA1.AH55. The worksheet for Module 2 is contained in the AUTO file. When AUTO is loaded, this worksheet is loaded to memory location A114.R180. The operation and subfunctions of Module 2 are described in Chapter 4 of this document and Section 4.2 of the Joint Development Cash Flow Model User's Manual.

3.1.3 Module 3

When this module is selected, the model loads macro A3 to memory location AA1.AH55. The subfunction BEGIN must be executed to initiate Module 3. When the user selects BEGIN from the Module 3 Submenu, the model will load worksheet AA31 into memory location A180.BJ305. Worksheet AA31 contains the distribution tables and formulas for calculating the hard cost payment schedule. The operation of this worksheet is described in Section 4.3 of this document. The model will then initiate the hard cost payment calculations, which require 3 to 4 minutes processing time. After AA31 is executed, a temporary file is created automatically. This file is named ZTEMPZ and is used to extract the results of the hard cost payment calculations. The model then reenters the results (but not the formulas for the calculations) at the same memory location (A180.BJ305).

The model then loads worksheet AA32 to memory location A306.BJ351. Worksheet AA32 contains the formulas for calculating the soft cost payment schedule. The formulas use the same distribution tables as were used to calculate the hard cost payment schedule, which were loaded with worksheet AA31. The model will then initiate the soft cost payment calculations, which also require 3 to 4 minutes processing time. This two-step process is necessary in order to control the calculation time for this module. In order for the process to work properly, the file ZTEMPZ must always exist on disk. The entire process occurs automatically and takes approximately 10 minutes in its entirety.

The subfunction FINISH must be executed to conclude Module 3. When the user selects FINISH from the Module 3 Submenu, the model will extract specified sets of data from Module 3 to be carried forward to Module 4. This is necessary in order to keep from exceeding the capacity of the LOTUS 1-2-3 program. Only pertinent data is carried forward in this process. The distribution tables and formulas are purged as they are no longer necessary and occupy a large portion of the main LOTUS 1-2-3 worksheet. The model prompts the user to provide four file names and creates files to carry the data forward as follows: first file name - hard and soft costs (memory location A49.R177), second file name - header (memory location A258.AA260), third file name - hard cost semi-annual payment schedule (memory location A288.AA305), fourth file name - soft cost semi-annual payment schedule (memory location A338.AA354). As the user provides each file name, the specified data is stored under that file name on the hard disk. During this process, the model uses the LOTUS 'extract' command. This command extracts only the numbers in the cells and not the associated formulas. Without these formulas, cells which would ordinarily change in response to changed input data will not change. Therefore, input data in Modules 1, 2 and 3 cannot be changed in future modules after the FINISH subfunction has been used.

After the data has been extracted, the model will clear the entire LOTUS 1-2-3 main worksheet and re-enter the AUTO file (recall that AUTO must always be in memory when the model is operated). The user must select Module 4 from the Main Menu to continue with operation of the model.

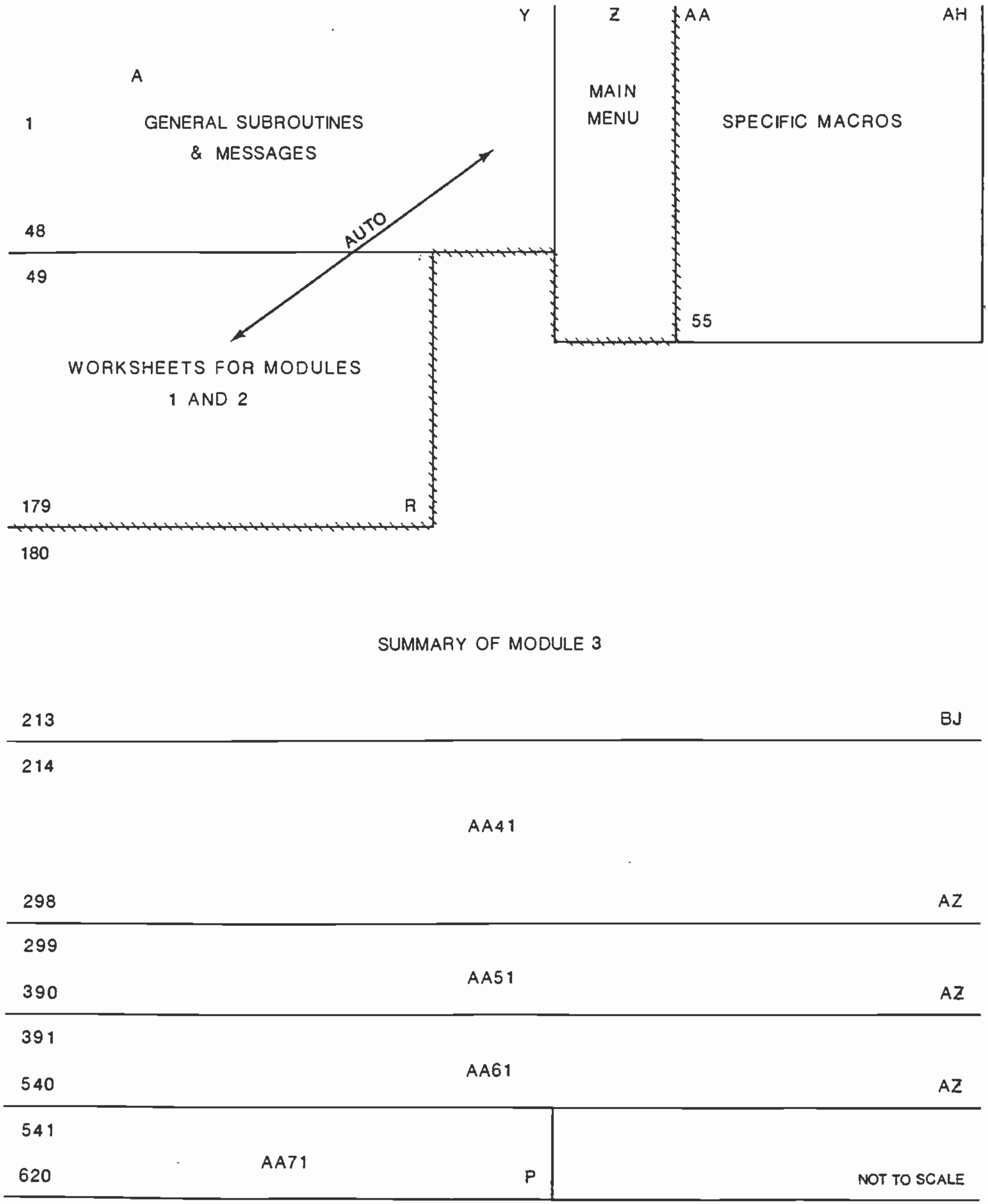
3.2 MEMORY ORGANIZATION - MODULES 4, 5, 6 AND 7

The memory organization for the model changes with the initiation of Module 4. The data extracted at the end of Module 3 is reentered in a different location to take up less space and make room for Modules 4 through 7. The memory organization for the remainder of the model's operation is shown in Figure 3.

FIGURE 3

MEMORY ORGANIZATION

MODULES 4, 5, 6, 7



This memory organization is summarized in Table 2 and discussed in detail in the following sections.

TABLE 2

JOINT DEVELOPMENT CASH FLOW MODEL
MEMORY ORGANIZATION - MODULES 4, 5, 6 AND 7

MODULE	WORKSHEET	LOCATION	MACRO	LOCATION
4.	AA41	A214.AZ298	A4	AA1.AH55
5.	AA51	A299.AZ390	A5	AA1.AH55
6.	AA61	A391.AZ540	A6	AA1.AH55
7.	AA71	A541.P620	A7	AA1.AH55

3.2.1 Module 4

When this module is selected, the model loads macro A4 to memory location AA1.AH55. The subfunction BEGIN must be executed to initiate Module 4. When the user selects BEGIN from the Module 4 Submenu, the user will be prompted to reenter the file names for the data extracted at the end of Module 3. These file names must be entered in the same order in which the data were extracted. The model will reenter the files in the following memory locations:

File Number	Contains	Memory Location
1	Hard and Soft Costs	A49.R177
2	Header	A178.BJ179
3	Hard Cost Payment Schedule	A180.BJ196
4	Soft Cost Payment Schedule	A197.BJ213

Overall, these files occupy memory location A49.BJ213, whereas Module 3, including the distribution tables, had previously occupied A49.BJ351. After the fourth file has been loaded, the model will load worksheet AA41 to memory location A214.AZ298. The operation and subfunctions of Module 4 are described in Chapter 4 of this document and Section 4.4 of the Joint Development Cash Flow Model User's Manual.

It is possible, because of this dual memory organization structure, to commence operation of the model with Module 4 using input data which has been previously entered and stored using the subfunctions of Modules 1, 2 and 3. To do this, the user should initiate the model as described in Chapter 3 of the Joint Development Cash Flow Model User's Manual. Instead of selecting Module 1 to begin using the model, as is normally the case, the user should select Module 4 and enter the file names of the data previously saved. It is important to remember, however, that the input data used in this manner cannot be changed because the formulas from Modules 1, 2 and 3 are not carried forward. Procedures for saving input data which allow for changes to Module 1, 2 and 3 data are described in Chapter 5 of the Joint Development Cash Flow Model User's Manual.

3.2.2 Module 5

When this module is selected, the model loads macro A5 to memory location AA1.AH55. The subfunction BEGIN must be executed to initiate Module 5. When the user selects BEGIN from the Module 5 Submenu, the model will load worksheet AA51 to memory location A299.AZ390. The operation and subfunctions of Module 5 are described in Chapter 4 of this document and Section 4.5 of the User's Manual.

The subfunction FINISH must be executed to conclude Module 5. When the user selects FINISH from the Module 5 submenu, the model will extract the results of the calculations performed in Modules 4 and 5 for reentry in Module 6. The purpose of this operation is to purge the formulas from Modules 4 and 5 in order to control the calculation time in Modules 6 and 7. The memory organization does not change as a result of this process. The model prompts the user to provide a file name and will extract the data from memory location A214.AZ390 and store it on the hard disk under the file name provided.

3.2.3 Module 6

When this module is selected, the model loads macro A6 to memory location AA1.AH55. The subfunction BEGIN must be executed to initiate Module 6. When the user selects BEGIN from the Module 6 Submenu, the model will prompt the user for the file name entered at the end of Module 5. The model will clear memory location A214.AZ700 and reenter that file (sans formulas) in memory location A214.AZ390. After the file has been loaded, the model will load worksheet AA61 to memory location A391.AZ540. The operation and subfunctions of Module 6 are described in Chapter 4 of this document and Section 4.6 of the User's Manual.

It is possible, because the model stores data at the end of Module 5, to commence operation of the model with Module 6 using input data which has been previously entered and stored using the subfunctions of Modules 1 through 5. To do this, the user should initiate the model as described in Chapter 3 of the Joint Development Cash Flow Model User's Manual. Instead of selecting Module 1 to begin using the model, as is normally the case, the user should select Module 4, execute the BEGIN subfunction and enter the four file names of the data previously saved at the end of Module 3. Then the user should select Module 6, execute the BEGIN subfunction and enter the file name for the data saved at the end of Module 5. It is important to remember, however, that the input data used in this manner cannot be changed because the formulas from Modules 1 through 5 are not carried forward. Procedures for saving input data which allow for changes to data in Modules 1 through 5 are described in Chapter 5 of the Joint Development Cash Flow Model User's Manual.

3.2.4 Module 7

When this module is selected, the model loads macro A7 to memory location AA1.AH55. The subfunction BEGIN must be executed to initiate Module 7. When the user selects BEGIN from the Module 7 Submenu, the model will load worksheet AA71 to memory location A541.P620. The operation and subfunctions of Module 7 are described in Chapter 4 of this document and Section 4.7 of the Joint Development Cash Flow Model User's Manual.

4. FUNCTIONS OF INDIVIDUAL MODULES

This chapter describes the functions performed in the individual modules of the model and the functional interrelationships between the modules. The discussion which follows assumes a basic understanding of the operation of the model on the part of the reader. If the reader is completely unfamiliar with the model, it is recommended that the Joint Development Cash Flow Model User's Manual be consulted prior to proceeding with this chapter.

4.1 MODULE 1 - INPUT BASIC HARD COSTS

The purpose of Module 1 is to enter hard cost data for the project. Hard costs are the costs of physical construction of facilities. Module 1 offers the user the option to enter data on any or all of the following cost items: building construction (up to three different types); parking facilities (on-site and off-site); off site construction (transit-related and non-transit related); land; easement; grading and demolition; site improvement and contingency. The user selects the desired cost item from the Module 1 Submenu.

4.1.1 Hard Cost Data Entry

Data is entered in one of three formats, depending on the individual cost item: 1) unit cost, 2) line item amount or 3) either a percentage of construction cost or an absolute amount.

4.1.1.1 Unit Cost Data

Data on construction costs (STRUCTURE A, B and C) and on-site and off-site parking are entered as unit costs. The model prompts the user to provide number of units (square footage or number of parking stalls, as appropriate) and unit costs (in millions of dollars) for these cost items. The model calculates the total cost of each of these cost items using the formula:

(4.1) Number of Units X Unit Cost = Cost of Cost Item (in $millions)

The model sums the calculated cost of these five lines and reflects the result on the line "CONSTRUCTION COSTS". The model also sums the number of units entered for STRUCTURE A, STRUCTURE B and STRUCTURE C and places the result in the cell labeled "GROSS BUILDING AREA". Finally, the model sums the number of units entered for ON SITE PARKING and OFF SITE PARKING and places the result in the cell labeled "PARKING STALLS".

4.1.1.2 Line Item Data

Data on off site construction costs (both transit related and non-transit related) are entered directly as line item costs (in $millions). The model sums the cost entered for these two lines and reflects the result on the line labeled "OFF SITE CONSTRUCTION". The line labeled "TOTAL CONSTRUCTION COSTS" is the sum of the values of CONSTRUCTION COSTS and OFF SITE CONSTRUCTION.

4.1.1.3 Data Entered as Either % of Construction Cost or Absolute Amount

Data on land, easement, grading and demolition, site improvement and contingency costs may be entered either as a percentage of construction costs or as an absolute amount, at the user's option. For this purpose, construction costs are defined as the sum of building construction costs and parking facilities costs (equivalent to the value on the line CONSTRUCTION COSTS as described above). For these cost items, if the user selects the percentage of construction costs option, the user will be prompted to provide the percentage of construction costs which the cost item represents. The model will calculate the cost of the cost item using the formula:

(4.2) Construction Cost X Percentage Entered by User = Cost of Cost Item (in $million)

If the user selects the absolute amount option, the user will be prompted to provide the absolute cost of the cost item. The model will calculate the percentage of construction cost which the cost item represents using the formula:

(4.3) Cost Entered by User - Construction Cost = Percentage of Construction Cost

The model will sum the cost of land, easement and grading & demolition and reflect the result on the line labeled "TOTAL LAND & SITE PREP. COSTS". This value will be added to the line TOTAL CONSTRUCTION COST and the result reflected on the line "TOTAL LAND AND CONSTRUCTION". The cost of SITE IMPROVEMENTS and CONTINGENCY will be added to TOTAL LAND AND CONSTRUCTION to yield "TOTAL HARD COSTS".

4.1.2 Payment Period Duration

The model allows the user to reflect varying periods of time in which expenditures for the cost items of the project will be made. The time frame within which these expenditures are made is referred to as the payment period. For each cost item, the user will be prompted to provide starting and ending year and month for payments on the cost item. The payment period may or may not be the same as the construction period. For instance, the payment period for a construction cost item would most likely coincide with the construction period, while the payment period for grading and demolition would most likely be completed before the commencement of construction. By reflecting the payment period accurately, the model allows the user to reflect the effects of inflation on a joint development project more precisely.

After the user enters the starting and ending year and month for the payment period on a cost item, the model will calculate the duration of the payment period for the cost item using the formula:

(4.4)

[(Ending Year X 12) + Ending Month] - [(Starting Year X 12) + Starting Month] = Duration of Payment Period

The model has two input constraints which are of significance when entering the payment period for a cost item: 1) the construction period for the project cannot exceed 10 years and 2) the payment period for any individual cost item cannot exceed 5 years. If either of these constraints are violated, an ERR message will be generated in Module 3 for the cost item. This is discussed further under Module 3.

4.1.3 Payment Schedule and Expenditure Patterns

In addition to specifying the time frame in which expenditures are to be made, the model also allows the user to specify the pattern in which the expenditures are expected to be made for each cost item. The model provides basically two options in this regard: 1) the user may specify that the expenditures are to be made in a uniform pattern, which means that the expenditures are expected to be essentially even throughout the payment period or 2) the user may specify that the expenditures are to be made in a bell-shaped pattern, which means that the expenditures are expected to begin at a low level, gradually rise over the course of the payment period, peak at the middle of the project and then gradually decline for the remainder of the payment period. The bell-shaped expenditure pattern is shown in Figure 4. The duration of the payment period for a cost item with a bell-shaped pattern must be at least 12 months. If a payment period of less than 12 months is used with this expenditure pattern, the model will display an ERR message in the printout for Module 3 for this cost item. This is discussed in detail under Module 3.

The model also provides the option of a lump sum payment, either at the beginning or at the end of the payment period. This option recognizes that, with some cost items, a proportion of the cost is concentrated at the beginning or end of the payment period. The lump sum may be any number from 0 to 100. If 0 is entered, no lump sum is calculated. If 100 is entered, the entire payment for the cost item will be reflected as one lump sum payment (the same result can be achieved by setting the payment period duration as one month and lump sum as zero).

The model prompts the user to provide the choice of one of the four combinations of these two factors for each cost item. One of these options must be selected for each cost item. The options provided by the model are:

1.^UNF 2.UNF^ 11.^BL 12.BL^

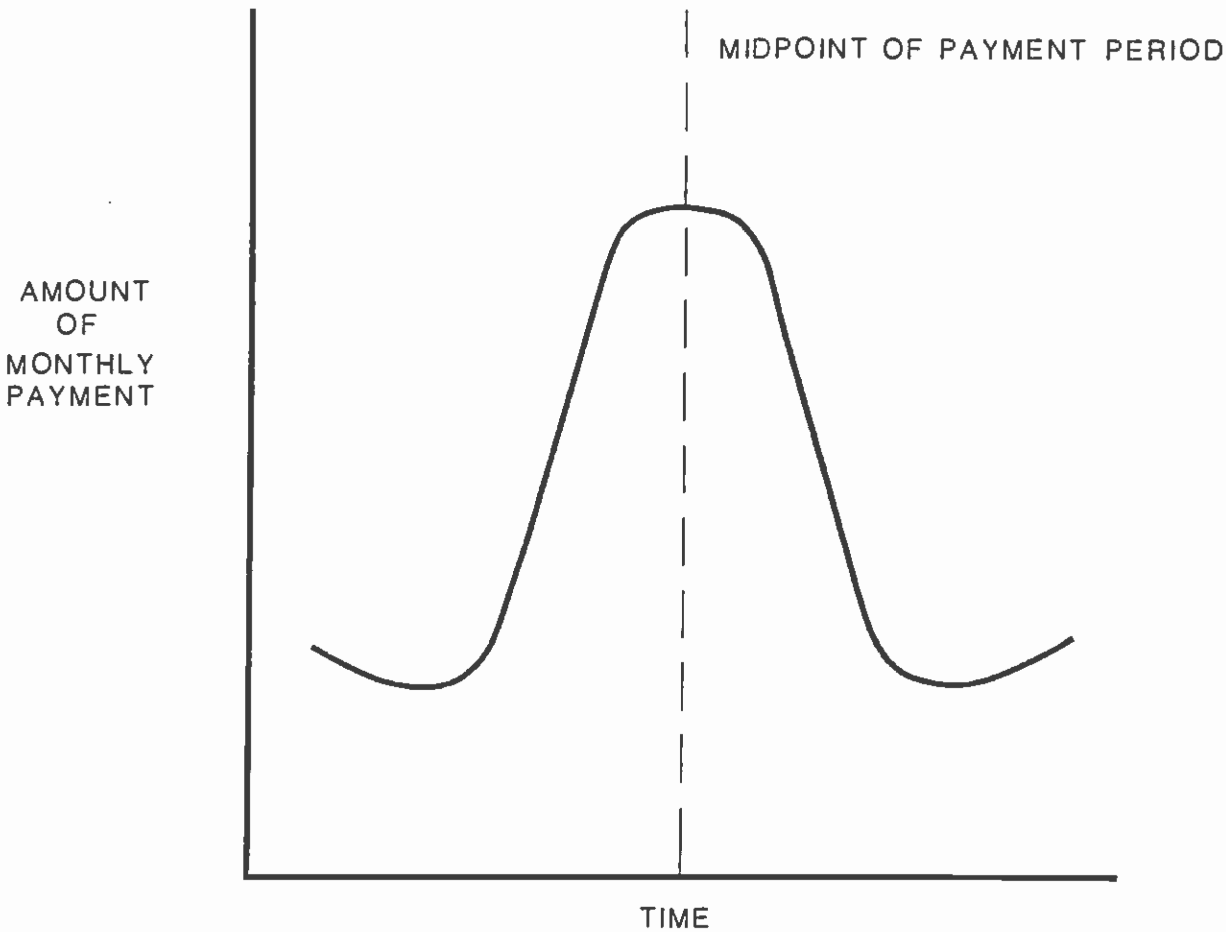
1.^UNF is the uniform distribution of payments with a lump sum payment at the beginning of the payment period.

2.UNF^ is the uniform distribution of payments with a lump sum payment at the end of the payment period.

11.^BL is the bell-shaped distribution of payments page with a lump sum payment at the beginning of the payment period.

12.BL^ is the bell-shaped distribution of payments with a lump sum payment at the end of the payment period.

BELL-SHAPED DISTRIBUTION OF PAYMENTS



NOT TO SCALE

FIGURE 4

4.1.4 Output

The user may print the inputs from Module 1 using the OUTPUT subfunction from the Module 1 submenu (see User's Manual for details of operation). An example of the output from Module 1 is contained in Figure 5.

4.1.5 Interrelationship with other Modules

In Module 3, the model translates the cost, starting and ending year/month, expenditure pattern and lump sum percentage inputs from Module 1 for each cost item into specific expenditures aggregated by six-month periods.

H A R D   C O S T S

PROJECT NAME: TEST   DATE: 11-06-87

						PAYMENTS				
		COST	COST	START		ENDIN		DURATION	EXPENDT.	%
COST ITEM	UNITS	PER UNIT	(MIL)	MONTH	YEAR	MONTH	YEAR	(MONTHS)	PATTERN	LUMPSUM
1.CONSTRUCTION NO. OF TYPES: 3										
STRUCTURE A	50000	50.00	2.50	5	1987	6	1988	14	12	25.00
STRUCTURE B	100000	35.00	3.50	5	1987	6	1988	14	12	10.00
STRUCTURE C	1000000	25.00	25.00	5	1987	6	1988	14	12	10.00
ON SITE PARKING (STALLS)	200	1000.00	0.20	5	1987	6	1988	14	12	10.00
OFF SITE PARKING(STALLS)	100	250.00	0.03	5	1987	6	1988	14	12	10.00
CONSTRUCTION COSTS			31.23							
2. OFF SITE CONSTRUCTION										
CONSTRUCTION FOR RTD			2.50	5	1987	6	1988	14	12	10.00
OTHER OFF SITE CONSTRCTION			0.75	5	1987	6	1988	14	12	10.00
OFF SITE CONSTRUCTION			3.25							
TOTAL CONSTUCTION COSTS			34.48							

	PERCENT OF	COST	START		ENDIN		DURATION	EXPENDT.	%
COST ITEM	CONSTRUCTION COSTS	(MIL)	MONTH	YEAR	MONTH	YEAR	(MONTHS)	PATTERN	LUMPSUM
3. LAND									
PARCEL COSTS	10.25	3.20	5	1987	6	1988	14	12	10.00
4. ADDITIONAL COSTS									
EASEMENT	25.00	7.81	5	1987	6	1988	14	12	10.00
GRADING & DEMOLITION	0.48	0.15	5	1987	6	1988	14	12	10.00
TOTAL LAND & SITE PREP. COSTS		11.16							
TOTAL LAND AND CONSTRUCTION		45.63							

				PAYMENTS					
	PERCENT OF	COST	START		ENDIN		DURATION	EXPENDT.	%
COST ITEM	CONSTRUCTION COSTS	(MIL)	MONTH	YEAR	MONTH	YEAR	(MONTHS)	PATTERN	LUMPSUM
5.SITE IMPROVEMENTS									
% OF CONSTRUCTION COSTS	5.00	1.56	5	1987	6	1988	14	12	10.00
6.CONTINGENCY									
% OF CONSTRUCTION COSTS	4.00	1.25	5	1987	6	1988	14	12	10.00

TOTAL H A R D C O S T S	48.44

FIGURE 5

4.2 MODULE 2 - INPUT BASIC SOFT COSTS

The purpose of Module 2 is to enter soft cost data for the project. Soft costs are the costs of services and fees required to support construction of the project. Module 2 offers the user the option to enter data on any or all of the following cost items: engineering & architectural fees, legal & accounting fees, marketing fees, permit costs, property taxes, construction management and administration & overhead. The user selects the desired cost item from the Module 2 Submenu.

4.2.1 Soft Cost Data Entry

All soft cost data are entered as either a percentage of construction cost or as an absolute amount at the user's option. For this purpose, construction costs are defined as the sum of building construction costs and parking facilities costs (equivalent to the value on the line CONSTRUCTION COST in Module 1). For all soft cost items, if the user selects the percentage of construction costs option, the user will be prompted to provide the percentage of construction costs which the cost item represents. The model will calculate the cost of the cost item using the formula:

(4.5) Construction Cost X Percentage Entered by User = Cost of Cost Item (in $million)

If the user selects the absolute amount option, the user will be prompted to provide the absolute cost of the cost item. The model will calculate the percentage of construction cost which the cost item represents using the formula:

(4.6) Cost Entered by User (in $ million) / Construction Cost = Percentage of Construction Cost

The model will sum the cost of legal/accounting fees (both pre-construction and during construction) and reflect the result on the line labeled "TOTAL LEGAL/ACCOUNTING FEES". The model will sum the cost of marketing fees (both pre-construction and during construction) and reflect the result on the line labeled "TOTAL MARKETING FEES". The model will sum the cost of permits (both pre-construction and during construction) and interim property tax (both pre-construction and during construction) and reflect the value on the line labeled "TOTAL PERMITS AND PROPERTY TAXES". The model will add the costs of ENG/ARCH FEES, TOTAL LEGAL/ACCOUNTING FEES, TOTAL MARKETING FEES and TOTAL PERMITS AND PROPERTY TAXES to calculate TOTAL COMMITTED SOFT COSTS. This value will be added to the cost of CONSTRUCTION MANAGEMENT and ADMINISTRATION & OVERHEAD and the result reflected on the line "TOTAL SOFT COSTS".

4.2.2 Payment Period Duration

The model allows the user to reflect varying periods of time in which expenditures for the cost items of the project will be made. The time frame within which these expenditures are made is referred to as the payment period. For each cost item, the user will be prompted to provide starting and ending year and month for payments on the cost item. The payment period may or may not be the same as the construction period. For instance, for soft cost items, the payment period for engineering/architectural services will most likely be completed prior to the commencement of construction while the payment period for construction management services will more closely align with the construction period. By reflecting the payment period accurately, the model allows the user to reflect the effects of inflation on a joint development project more precisely.

After the user enters the starting and ending year and month for the payment period on a cost item, the model will calculate the duration of the payment period for the cost item using the formula:

(4.7)

[(Ending Year X 12) + Ending Month] - [(Starting Year X 12) + Starting Month]
= Duration of Payment Period

The model has two input constraints which are of significance when entering the payment period for a cost item: 1) the construction period for the project cannot exceed 10 years and 2) the payment period for any individual cost item cannot exceed 5 years. If either of these constraints are violated, an ERR message will be generated in Module 3 for the cost item. This is discussed further under Module 3.

4.2.3 Payment Schedule and Expenditure Patterns

In addition to specifying the time frame in which expenditures are to be made, the model also allows the user to specify the pattern in which the expenditures are expected to be made for each cost item. The model provides basically two options in this regard: 1) the user may specify that the expenditures are to be made in a uniform pattern, which means that the expenditures are expected to be essentially even throughout the payment period or 2) the user may specify that the expenditures are to be made in a bell-shaped pattern, which means that the expenditures are expected to begin at a low level, gradually rise over the course of the payment period, peak at the middle of the project and then gradually decline for the remainder of the payment period. The bell-shaped expenditure pattern is shown in Figure 4. The duration of the payment period for a cost item with a bell-shaped pattern must be at least 12 months. If a payment period of less than 12 months is used with this expenditure pattern, the model will display an ERR message in the printout for Module 3 for this cost item. This is discussed in detail under Module 3.

The model also provides the option of a lump sum payment, either at the beginning or at the end of the payment period. This option recognizes that, with some cost items, a proportion of the cost is concentrated at the beginning or end of the payment period. The lump sum may be any number from 0 to 100. If 0 is entered, no lump sum is calculated. If 100 is entered, the entire payment for the cost item will be reflected as one lump sum payment (the same result can be achieved by setting the payment period duration as one month and lump sum as zero).

The model prompts the user to provide the choice of one of the four combinations of these two factors for each cost item. One of these options must be selected for each cost item. The options provided by the model are:

1.^UNF 2.UNF^ 11.^BL 12.BL^

1.^UNF is the uniform distribution of payments with a lump sum payment at the beginning of the payment period.

2.UNF^ is the uniform distribution of payments with a lump sum payment at the end of the payment period.

11.^BL is the bell-shaped distribution of payments page with a lump sum payment at the beginning of the payment period.

12.BL^ is the bell-shaped distribution of payments with a lump sum payment at the end of the payment period.

4.2.4 Output

The user may print the inputs from Module 2 using the OUTPUT subfunction from the Module 2 Submenu (see User's Manual for details of operation). An example of the output from Module 2 is contained in Figure 6.

4.2.5 Interrelationship with other Modules

In Module 3, the model translates the cost, starting and ending year/month, expenditure pattern and lump sum percentage inputs from Module 2 for each cost item into specific expenditures aggregated by six-month periods.

S O F T   C O S T S

PROJECT NAME: TEST

DATE: 11-06-87

COST ITEM	PERCENT OF CONSTRUCTION COSTS	COST (MIL)	PAYMENTS START MONTH	YEAR	ENDIN MONTH	YEAR	DURATION (MONTHS)	EXPENDT. PATTERN	% LUMPSUM
1.ENG/ARCH FEES									
% OF CONSTRUCTION COSTS	5.00	1.56	5	1987	6	1988	14	12	10.00
2.LEGAL/ACCOUNTING FEES									
% OF CONST.(PRE CONST.)	0.80	0.25	5	1987	6	1988	14	12	10.00
% OF CONST.(DURING CONST.)	2.00	0.62	5	1987	6	1958	14	12	10.00
TOTAL LEGAL/ACCOUNTING FEES		0.87							
3.MARKETING FEES									
% OF CONST.(PRE CONST.)	1.00	0.31	5	1987	6	1988	14	12	10.00
% OF CONST.(DURING CONST.)	0.80	0.25	5	1987	6	1988	14	12	10.00
TOTAL MARKETING FEES		0.56							
4.PERMITS AND PROP. TAXES									
A.PERMITS									
% OF CONST.(PRE CONST.)	0.50	0.16	5	1987	6	1968	14	12	10.00
% OF CONST.(DURING CONST.)	2.08	0.65	5	1987	6	1988	14	12	10.00
TOTAL PERMITS		0.81							
B.INTERIM PROPERTY TAX									
% OF CONST.(PRE CONST.)	0.48	0.15	5	1987	6	1988	14	12	10.00
% OF CONST.(DURING CONST.)	1.00	0.31	5	1987	6	1998	14	12	10.00
TOTAL INTERIM PROPERTY TAX		0.46							
TOTAL PERMITS AND PROP. TAXES		1.27							
TOTAL COMMITTED SOFT COSTS		4.27							
5.CONSTRUCTION MANAGEMENT									
% OF CONSTRUCTION COSTS	5.00	1.56	5	1987	6	1988	14	12	10.00
6.ADMINISTRATION & OVERHEAD									
% OF CONSTRUCTION COSTS	20.00	6.25	5	1987	6	1988	14	12	10.00
TOTAL S O F T C O S T S		12.07							

FIGURE 6

4.3 MODULE 3 - EXPENDITURE SCHEDULE BY MID-YEAR

The purpose of Module 3 is to convert the hard and soft cost inputs provided in Modules 1 and 2 to an expenditure schedule aggregated by six-month periods (referred to as semi-annual periods). A semi-annual period encompasses one of two time frames, either January-June or July-December of any given year. The model accomplishes this conversion by first calculating the number of payments in each semi-annual period. The model then determines the amount of the lump sum payment and when the lump sum payment is to be made and, in the final step, calculates the payment schedule by one of two methods, depending upon whether the uniform distribution (expenditure pattern 1 or 2) or the bell-shaped distribution (expenditure pattern 11 or 12) has been selected by the user.

4.3.1 Calculation of Monthly Payments per Semi-Annual Period

The model calculates the number of monthly payments to be made in each semi-annual period and constructs a table which displays the cumulative number of monthly payments which have been made at the end of each semi-annual period. The model will convert the starting month/year and ending month/year for each cost item into the number of monthly payments in each semi-annual period. In the following example, the model would calculate the number of monthly payments in each semi-annual period as follows:

Starting Month/Year	10	1988
Ending Month/Year	8	1989

Distribution of Monthly Payments

2nd Semi-Annual Period 1988	1st Semi-Annual Period 1989	2nd Semi-Annual Period 1989	Total
3 payments (Oct, Nov, Dec)	6 payments (Jan thru June)	2 payments (Jul, Aug)	11 payments

Cumulative Payments

The model then adds the number of payments made by the end of each period to give the cumulative total of payments for each semi-annual period. For instance, in the example above, cumulative payments would be calculated as:

2nd Semi-Annual Period 1988	1st Semi-Annual Period 1989	2nd Semi-Annual Period 1989
3 payments	9 payments	11 payments

The model places this cumulative total from the last semi-annual period of the payment period in the far right column of each cost item. The cumulative total should always equal the total number of payments for the cost item.

4.3.2 Calculation of Lump Sum Payment

The model will calculate the amount of the lump sum payment using the formula:

(4.8) Total Cost of Cost Item X Lump Sum Percentage = Amount of Lump Sum Payment

The model will then determine when the lump sum payment is to be made depending upon: (1) when payment period begins and ends and (2) whether the user has specified the lump sum at the beginning or end of the payment period. The model will construct a table and place a flag in the semi-annual period during which the lump sum payment is to be made for each cost item. For instance, in the example above, if the user had specified the lump sum at the beginning of the payment period, the flag would be placed in the 2nd semi-annual period of 1988. If the user had specified the lump sum at the end of the payment period, the flag would be placed in the 2nd semi-annual period of 1989. This is true even if the lump sum percentage is zero. In this case, the model will reflect a lump sum payment, with the lump sum amount equal to 0.

The model will sum the cells for each cost item and place the result in the far right column of the cost item. Because there is one and only one lump sum payment associated with each cost item, this result should always be 1.

4.3.3 Calculation of Payment Schedule for Uniform Expenditure Pattern

The model uses the calculation of payments by semi-annual period and the calculation of the lump sum payment to calculate the payment schedule for each cost item. To calculate the payment schedule for a uniform pattern (1 or 2), the model will calculate the amount of the cost item to be distributed among these payments by extracting the lump sum payment using the formula:

(4.9) Total cost for cost item - Lump Sum Amount = Cost to be distributed

The cost to be distributed is divided into monthly payments using the formula:

(4.10) Cost to be distributed / Total # of payments = Monthly payment

The model calculates the monthly payment expenditures for each semi-annual period by first determining the cumulative payments through the end of the semi-annual period as calculated above (see section 4.3.1). The model uses the formula:

(4.11) Monthly payment X Cumulative number of payments = Cumulative payment through semi-annual period

The model then determines the payment for the semi-annual period using the formula:

(4.12) Cumulative payment through semi annual period less Payments made in previous semi-annual periods = Expenditure in semi-annual period

The model will then add the lump sum payment to the monthly expenditures for the appropriate semi-annual period to reflect the total expenditure in that semi-annual period. For each semi-annual period, the model will determine whether the lump sum payment flag (calculated as described above, section 4.3.2) is located in the semi-annual period for the cost item. If it is not, the total payment for the semi-annual period is equal to the monthly payment expenditure for the semi-annual period (formula 4.12). If the flag is located in the semi-annual period, the amount of the lump sum payment calculated earlier (formula 4.8) will be added to the monthly payment expenditure for the semi-annual period (formula 4.12) to give the total payment for the semi-annual period.

This series of calculations is performed in Module 3 for each cost item in both hard and soft cost categories for which the uniform expenditure pattern option has been chosen. The model will sum the payments for each cost item and place the result in the far right column for the cost item. This total should equal the total cost for the cost item entered in Module 1 or 2.

4.3.4 Calculation of Payment Schedule for Bell-Shaped Expenditure Pattern

To calculate the payment schedule for a bell-shaped pattern (11 or 12), the model will calculate the amount of the cost item to be distributed among these payments by extracting the lump sum payment using the formula:

(4.13) Total cost for cost item - Lump Sum Amount = Cost to be distributed

The model will then distribute the remaining cost using a distribution table which is included in worksheet AA32. This distribution table reflects a normal distribution truncated at both ends (see Figure 4). Under this distribution table, expenditures begin at a low level, gradually rise over the course of the payment period, peak at the middle of the project and then gradually decline for the remainder of the payment period. The distribution table is contained in Appendix B. It contains the cumulative proportion of the cost item expended after X payments have been made.

Similar to the calculation of the uniform payment schedule, the model calculates the monthly payment expenditures for each semi-annual period by first determining the cumulative payments through the end of the semi-annual period. The model uses the total number of payments for the cost item and cumulative number of payments through the end of the semi-annual period as inputs to the distribution table. From the table, the model determines the proportion of the cost item which is expended through the end of the semi-annual period (see Figure 7). From this input, the model calculates the cumulative payments through the end of the semi-annual period using the formula:

(4.14) Proportion from distribution table X Total cost of Cost Item = Cumulative payment through semi-annual period

NOTE: The bell-shaped distribution table requires a minimum of 12 payments. With less than 12 payments, the distribution becomes virtually identical to the uniform distribution. For this reason, the distribution table input for total number of payments begins with 12 payments. If the user inputs a payment duration for a cost item of less than 12 payments, and the bell-shaped distribution pattern, the model will be unable to find the expenditure proportion from the distribution table and will return an ERR message for every cell in the cost item. If the payment period is to be less than 12 months, the user must select the uniform expenditure pattern (1 or 2).

	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	[illegible]	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	[illegible]	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	[illegible]	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0.926	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0.856	0.928	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0.831	0.858	0.929	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0.612	0.84	0.866	0.933	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0.787	0.816	0.643	0.867	0.934	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0.762	0.793	0.821	0.846	0.869	0.935	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0.738	0.769	0.798	0.824	0.849	0.871	0.935	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0.715	0.746	0.775	0.803	0.828	0.851	0.872	0.936	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0.692	0.724	0.753	0.781	0.807	0.831	0.853	0.873	0.937	1	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0.671	0.702	0.732	0.76	0.787	0.811	0.834	0.855	0.874	0.937	1	0	0	0	0	0	0	0	0	0	0	0	0
31	0.65	0.681	0.711	0.739	0.766	0.791	0.815	0.837	0.857	0.875	0.938	1	0	0	0	0	0	0	0	0	0	0	0
32	0.63	0.66	0.69	0.719	0.746	0.772	0.796	0.819	0.839	0.859	0.877	0.938	1	0	0	0	0	0	0	0	0	0	0
33	0.61	0.641	0.67	0.699	0.726	0.752	0.777	0.8	0.822	0.842	0.86	0.877	0.939	1	0	0	0	0	0	0	0	0	0
34	0.592	0.622	0.651	0.68	0.707	0.733	0.758	0.782	0.804	0.825	0.844	0.862	0.878	0.939	1	0	0	0	0	0	0	0	0
35	0.575	0.604	0.633	0.661	0.688	0.715	0.74	0.764	0.786	0.808	0.828	0.846	0.863	0.879	0.94	1	0	0	0	0	0	0	0
36	0.558	0.587	0.616	0.643	0.67	0.696	0.722	0.746	0.769	0.79	0.811	0.83	0.848	0.865	0.88	0.94	1	0	0	0	0	0	0
37	0.543	0.571	0.599	0.626	0.653	0.679	0.704	0.728	0.751	0.773	0.794	0.814	0.833	0.85	0.866	0.881	0.94	1	0	0	0	0	0
38	0.528	0.555	0.583	0.61	0.636	0.662	0.687	0.711	0.734	0.757	0.778	0.798	0.817	0.835	0.852	0.867	0.881	0.941	1	0	0	0	0
39	0.514	0.54	0.567	0.594	0.62	0.645	0.67	0.694	0.718	0.74	0.762	0.782	0.801	0.82	0.837	0.853	0.868	0.882	0.941	1	0	0	0
40	0.5	0.526	0.553	0.579	0.604	0.629	0.654	0.678	0.701	0.724	0.746	0.766	0.786	0.805	0.822	0.839	0.855	0.869	0.883	0.941	1	0	0
41	0.487	0.513	0.538	0.564	0.589	0.614	0.638	0.662	0.686	0.708	0.73	0.751	0.771	0.79	0.808	0.825	0.841	0.856	0.87	0.883	0.942	1	0
42	0.475	0.5	0.525	0.55	0.575	0.599	0.623	0.647	0.67	0.693	0.714	0.735	0.755	0.775	0.793	0.811	0.827	0.843	0.857	0.871	0.884	0.942	1
43	0.463	0.488	0.512	0.537	0.561	0.585	0.609	0.632	0.655	0.677	0.699	0.72	0.74	0.76	0.779	0.796	0.813	0.829	0.845	0.859	0.872	0.884	0.942
44	0.452	0.476	0.5	0.524	0.548	0.571	0.595	0.618	0.641	0.663	0.684	0.705	0.726	0.745	0.764	0.782	0.8	0.816	0.832	0.846	0.86	0.873	0.885
45	0.442	0.465	0.488	0.512	0.535	0.558	0.581	0.604	0.627	0.649	0.67	0.691	0.711	0.731	0.75	0.768	0.786	0.803	0.818	0.833	0.848	0.861	0.874
46	0.432	0.454	0.477	0.5	0.523	0.546	0.568	0.591	0.613	0.635	0.656	0.677	0.697	0.717	0.736	0.754	0.772	0.789	0.805	0.821	0.835	0.849	0.862
47	0.422	0.444	0.466	0.489	0.511	0.534	0.556	0.578	0.6	0.621	0.642	0.663	0.683	0.703	0.722	0.741	0.759	0.776	0.792	0.808	0.823	0.837	0.851
48	0.413	0.434	0.456	0.478	0.5	0.522	0.544	0.566	0.587	0.608	0.629	0.65	0.67	0.69	0.709	0.727	0.745	0.763	0.779	0.795	0.81	0.825	0.839
49	0.404	0.425	0.446	0.468	0.489	0.511	0.532	0.554	0.575	0.596	0.616	0.637	0.657	0.676	0.696	0.714	0.732	0.75	0.766	0.783	0.798	0.813	0.827
50	0.396	0.416	0.437	0.458	0.479	0.5	0.521	0.542	0.563	0.584	0.604	0.624	0.644	0.664	0.683	0.701	0.719	0.737	0.754	0.77	0.786	0.801	0.815
51	0.388	0.408	0.428	0.449	0.469	0.49	0.51	0.531	0.551	0.572	0.592	0.612	0.632	0.651	0.67	0.688	0.706	0.724	0.741	0.758	0.773	0.789	0.803
52	0.38	0.4	0.42	0.44	0.46	0.48	0.5	0.52	0.54	0.56	0.58	0.6	0.62	0.639	0.658	0.676	0.694	0.712	0.729	0.745	0.761	0.777	0.792
53	0.373	0.392	0.411	0.431	0.45	0.47	0.49	0.51	0.53	0.55	0.569	0.589	0.608	0.627	0.646	0.664	0.682	0.699	0.716	0.733	0.749	0.765	0.78
54	0.366	0.385	0.404	0.423	0.442	0.461	0.481	0.5	0.519	0.539	0.558	0.577	0.596	0.615	0.634	0.652	0.67	0.687	0.704	0.721	0.737	0.753	0.768
55	0.36	0.378	0.396	0.415	0.433	0.452	0.471	0.49	0.51	0.529	0.548	0.567	0.585	0.604	0.622	0.64	0.658	0.676	0.693	0.709	0.726	0.741	0.757
56	0.353	0.371	0.389	0.407	0.425	0.444	0.462	0.481	0.5	0.519	0.538	0.556	0.575	0.593	0.611	0.629	0.647	0.664	0.681	0.698	0.714	0.73	0.745
57	0.347	0.364	0.382	0.4	0.418	0.436	0.454	0.472	0.491	0.509	0.528	0.546	0.564	0.582	0.6	0.618	0.636	0.653	0.67	0.686	0.703	0.718	0.734
58	0.341	0.358	0.375	0.393	0.41	0.428	0.446	0.464	0.482	0.5	0.518	0.536	0.554	0.572	0.59	0.607	0.625	0.642	0.659	0.675	0.691	0.707	0.723
59	0.336	0.352	0.369	0.386	0.403	0.42	0.438	0.456	0.473	0.491	0.509	0.527	0.544	0.562	0.58	0.597	0.614	0.631	0.648	0.664	0.681	0.696	0.712
60	0.33	0.346	0.363	0.379	0.396	0.413	0.43	0.448	0.465	0.482	0.5	0.518	0.535	0.552	0.57	0.587	0.604	0.621	0.637	0.654	0.67	0.686	0.701

FIGURE 7

The model then determines the payment for the semi-annual period using the formula:

(4.15) Cumulative payment through semi annual period less
Payments made in previous semi-annual periods =
Expenditure in semi-annual period

The model will then add the lump sum payment to the monthly expenditures for the appropriate semi-annual period to reflect the total expenditure in that semi-annual period. For each semi-annual period, the model will determine whether the lump sum payment flag (calculated as described above, section 4.3.2) is located in the semi-annual period for the cost item. If it is not, the total payment for the semi-annual period is equal to the monthly payment expenditure for the semi-annual period (formula 4.15). If the flag is located in the semi-annual period, the amount of the lump sum payment calculated earlier (formula 4.8) will be added to the monthly payment expenditure for the semi-annual period (formula 4.15) to give the total payment for the semi-annual period.

This series of calculations is performed in Module 3 for each cost item in both hard and soft cost categories for which the bell-shaped expenditure pattern option has been chosen. The model will sum the payments for each cost item and place the result in the far right column for the cost item. This total should equal the total cost for the cost item entered in Module 1 or 2.

4.3.5 Output

The calculations described in the preceding sections are reflected in the output for Module 3. There are two outputs for Module 3, one for hard costs and one for soft costs. The user can obtain these outputs using the HARD OUTPUT and SOFT OUTPUT subfunctions, respectively, from the Module 3 submenu. Examples of these outputs are contained in Figures 8 and 9. For both hard and soft costs, the output contains three tables:

1) The first table is the cumulative payments table, which contains the cumulative number of payments which have been made by the end of each semi-annual period. This is the result of the calculation described in section 4.3.1 above.
2) The second table is the lump sum flag table. This table indicates whether there is a lump sum payment scheduled in a semi-annual period. If there is a lump sum payment in the semi-annual period, the table will reflect a 1. If there is no lump sum payment in the semi-annual period, the table will reflect a 0. This table contains the result of the calculations described in section 4.3.2.
3) The third table is the total payment amount for the semi-annual period (total of distributed payments and lump sum payments). This contains the results of the calculations described in sections 4.3.3 and 4.3.4.

4.3.6 Interrelationship with Other Modules

As noted throughout this section, Module 3 receives its inputs from Modules 1 and 2 and converts those inputs into a series of payments by semi-annual periods. The Module 1 and 2 inputs and the results of the calculations in Module 3 are carried forward to Module 4 using a series of four file names (described in detail in section 3.1.3). The distribution tables, which are no

SEMI-ANNUAL EXPEND. YEAR->	1986	1987	1987	1988	1988	1989	1989	1990	1990	1991	1991	1992	1992	1993	1993	1994	1994	1995	1995	1996
DISTRIBUTED PAYMENTS HALF->	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1
COST ITEMS: STRUCTURE A	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STRUCTURE B	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STRUCTURE C	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ON SITE PARKING	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OFF SITE PARKING	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSTR. FOR RTD	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OFF SITE CONSTR.	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAND COSTS	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EASEMENT	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRADING & DEMOL.	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SITE IMPROVEMENT	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONTINGENCY	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUMPSUM PAYMENTS																				
COST ITEMS: STRUCTURE A	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STRUCTURE B	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
STRUCTURE C	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ON SITE PARKING	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OFF SITE PARKING	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSTR. FOR RTD	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OFF SITE CONSTR.	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAND COSTS	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EASEMENT	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRADING & DEMOL.	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SITE IMPROVEMENT	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONTINGENCY	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL SEMI-ANNUAL PAYMENTS																				
COST ITEMS: STRUCTURE A	0.00	0.34	0.74	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STRUCTURE B	0.00	0.56	1.24	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STRUCTURE C	0.00	4.03	8.86	12.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ON SITE PARKING	0.00	0.03	0.07	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OFF SITE PARKING	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CONSTR. FOR RTD	0.00	0.40	0.89	1.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OFF SITE CONSTR.	0.00	0.12	0.27	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND COSTS	0.00	0.52	1.13	1.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EASEMENT	0.00	1.26	2.77	3.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRADING & DEMOL.	0.00	0.02	0.05	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SITE IMPROVEMENT	0.00	0.25	0.55	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CONTINGENCY	0.00	0.20	0.44	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL HARD COSTS	0.00	7.74	17.03	23.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FIGURE 8

SEMI-ANNUAL EXPEND. YEAR->	1986	1987	1987	1988	1988	1989	1989	1990	1990	1991	1991	1992	1992	1993	1993	1994	1994	1995	1995	1976
DISTRIBUTED PAYMENTS HALF->	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1
COST ITEM: ENG/ARCH	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEGAL/ACCOUNTING(PRE-CONS.)	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEGAL/ACCOUNTING(CONSTRUCTION)	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MARKETING(PRE-CONS.)	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MARKETING(CONS.)	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERMITS(PRE-CONSTRUCTION)	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERMITS(CONSTRUCTION)	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TAXES(PRE-CONSTRUCTION)	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TAXES(CONSTRUCTION)	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSTRUCTION MANAGEMENT	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADMINISTRATION & OVERHEAD	0	2	8	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LUMPSUM PAYMENTS																				
COST ITEM: ENG/ARCH	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEGAL/ACCOUNTING(PRE-CONS.)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEGAL/ACCOUNTING(CONSTRUCTION)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MARKETING(PRE-CONS.)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MARKETING(CONS.)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERMITS(PRE-CONSTRUCTION)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERMITS(CONSTRUCTION)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TAXES(PRE-CONSTRUCTION)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TAXES(CONSTRUCTION)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CONSTRUCTION MANAGEMENT	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADMINISTRATION & OVERHEAD	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL SEMI-ANNUAL PAYMENTS																				
COST ITEM: ENG/ARCH	0.00	0.25	0.55	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEGAL/ACCOUNTING(PRE-CONS.)	0.00	0.04	0.09	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEGAL/ACCOUNTING(CONSTRUCTION)	0.00	0.10	0.22	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MARKETING(PRE-CONS.)	0.00	0.05	0.11	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MARKETING(CONS.)	0.00	0.04	0.09	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERMITS(PRE-CONSTRUCTION)	0.00	0.03	0.06	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERMITS(CONSTRUCTION)	0.00	0.10	0.23	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TAXES(PRE-CONSTRUCTION)	0.00	0.02	0.05	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TAXES(CONSTRUCTION)	0.00	0.05	0.11	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CONSTRUCTION MANAGEMENT	0.00	0.25	0.55	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ADMINISTRATION & OVERHEAD	0.00	1.01	2.21	3.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL S-O-F-T C-O-S-T-S	0.00	1.94	4.28	5.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FIGURE 9

longer needed, are purged in this process. In Module 4, the model adjusts the payments for each semi-annual period for inflation and uses those results to calculate the construction loan for the project.

4.4 MODULE 4 - SHORT TERM LOAN CALCULATIONS

The purpose of Module 4 is to adjust the payment schedule calculated in Module 3 for inflation and to calculate the construction loan for the project. The model performs four distinct sets of calculations in Module 4: 1) inflation adjustments; 2) determination of eligibility for construction loan financing; 3) determination of costs included in construction loan; and 4) calculation of construction loan principal and interest.

4.4.1 Inflation Adjustments

To adjust the payments calculated in Module 3 for inflation, the model converts the annual inflation rates entered by the user for hard and soft costs to semi-annual inflation rates. This is necessary since payments are aggregated by semi-annual periods. The semi-annual inflation rate is calculated using the formula:

(4.16) $\quad SQRT\ [1 + (r/100)] - 1 = \text{Semi-annual inflation rate}$

where r = the annual inflation rate for either hard or soft costs.

These semi-annual inflation rates are used to calculate inflation coefficients for each semi-annual period for hard and soft costs. In the INFL subfunction, the model prompts the user to provide the date of "present" dollars. The model will adjust the total payment in each semi-annual period for inflation, beginning with the semi-annual period immediately following the semi-annual period defined as "present" dollars. For example, if the date of "present" dollars is 2/1988 (1st semi-annual period of 1988), the model will calculate the first inflation coefficient for the second semi-annual period of 1988.

The model calculates an inflation coefficient for each semi-annual period using the formula:

(4.17) $\quad (1 + \text{Semi-annual inflation rate})^n = \text{Inflation coefficient}$

where n = semi-annual period number (1 being the first period following the semi-annual period defined as "present" dollars).

The inflation coefficients for hard and soft costs for each semi-annual period are reflected in the output for Module 4 (see Figure 10). The inflation coefficient for each semi-annual period is applied to the total payment in that semi-annual period to provide the total payment adjusted for inflation. Each semi-annual payment calculated in Module 3 is adjusted using the formula:

(4.18) $\quad \text{Total payment} \ \ X \ \ \text{Inflation coefficient} \ = \ \text{Adjusted payment for the semi-annual period}$

The model vertically sums the adjusted payments for hard costs and soft costs for each semi-annual period. The model also horizontally sums the adjusted payments for each hard and soft cost item.

INFLATION AND LOAN ELIGIBILITY INFORMATION

DATE OF "PRESENT" DOLLARS 1987 1 1

INFLATION INFORMATION	RATE	SEMI-ANNUAL RATE
HARD COSTS	5.00	0.024695
SOFT COSTS	6.00	0.029563

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
INFLATION COEFFICIENTS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
HARD COSTS	1.000	1.025	1.050	1.075	1.103	1.130	1.158	1.186	1.216	1.246	1.276	1.308	1.340	1.373	1.407	1.442	1.477	1.514	1.551	1.590
SOFT COSTS	1.000	1.030	1.060	1.091	1.124	1.157	1.191	1.226	1.262	1.300	1.338	1.378	1.419	1.460	1.504	1.548	1.594	1.641	1.689	1.739
SEMI-ANNUAL EXPEND. YEAR->	1986	1987	1987	1988	1988	1989	1989	1990	1990	1991	1991	1992	1992	1993	1993	1994	1994	1995	1995	1996
DISTRIBUTED PAYMENTS HALF->	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1
TOTAL SEMI-ANNUAL PAYMENTS																				
COST-ITEMS: STRUCTURE A	0.00	0.64	1.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STRUCTURE B	0.00	0.36	3.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STRUCTURE C	0.00	2.56	23.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ON SITE PARKING	0.00	0.02	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OFF SITE PARKING	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CONSTR. FOR RTD	0.00	0.26	2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OFF-SITE CONSTR.	0.00	0.08	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND COSTS	0.00	0.33	3.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EASEMENT	0.00	0.80	7.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRADING & DEMOL.	0.00	0.02	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SITE IMPROVEMENT	0.00	0.16	1.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CONTINGENCY	0.00	0.13	1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL H A R D C O S T S	0.00	5.35	45.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL SEMI-ANNUAL PAYMENTS																				
COST ITEM: ENG/ARCH	0.00	0.16	1.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEGAL/ACCOUNTING(PRE-CONS.)	0.00	0.03	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEGAL/ACCOUNTING(CONSTRUCTION)	0.00	0.06	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MARKETING(PRE-CONS.)	0.00	0.03	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MARKETING(CONS.)	0.00	0.03	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERMITS(PRE-CONSTRUCTION)	0.00	0.02	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERMITS(CONSTRUCTION)	0.00	0.07	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TAXES(PRE-CONSTRUCTION)	0.00	0.02	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TAXES(CONSTRUCTION)	0.00	0.03	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CONSTRUCTION MANAGEMENT	0.00	0.16	1.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ADMINISTRATION & OVERHEAD	0.00	0.64	5.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL S O F T C O S T S	0.00	1.24	11.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FINANCIAL SUMMARY																				
AMOUNT ELIGIBLE FOR LOAN	0.00	5.35	45.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FIGURE 10

4.4.2 Determination of Eligibility for Construction Loan Financing

After adjusting the payments for inflation, the model then begins to calculate the construction loan for the project. Typically, development projects are financed in two phases. The first phase is the construction loan, which is essentially a line of credit for a specified time period against which the developer may draw as costs are incurred. The second phase is the "take-out" loan, or long term mortgage which is used to pay off the construction loan and provide long term (20 to 30 years) financing for the project.

Because all costs of the project may not be eligible for financing through the construction loan, the user can specify the proportion of each cost item which is eligible for construction loan financing in Module 4 (using the HARD-COSTS and SOFT-COSTS subfunctions). The user may specify that the entire cost item is eligible for loan, that none of the cost item is eligible for loan or any percentage in between. The model will calculate the costs eligible for construction loan financing for each semi-annual period by applying the following formula to each cost item:

(4.19) Adjusted payment for semi-annual period X % eligible for loan = Amount of payment eligible for loan

The amount eligible for loan is summed for every semi-annual period. The model sums the hard costs eligible for loan for each semi-annual period and places the result on the line labeled "HARD COSTS ELIGIBLE FOR LOAN". The model adds the sum of the soft costs eligible for loan to this total and places the result on the line labeled "TOTAL COSTS ELIGIBLE FOR LOAN". The model then subtracts the total costs eligible for loan from the sum of TOTAL HARD COSTS and TOTAL SOFT COSTS (which is the total cost for semi-annual period) to determine "COSTS NOT ELIGIBLE FOR LOAN" for each semi-annual period.

4.4.3 Determination of Costs Included in Construction Loan

Once the costs eligible for construction loan financing have been determined, the model will determine which costs are actually included in the construction loan. As noted earlier, the construction loan is essentially a line of credit for a specified period of time against which the developer can make withdrawals as costs are incurred. In order for a withdrawal to be made, the cost must be 1) eligible for construction loan financing and 2) fall within the construction loan period. In the calculations described in section 4.4.2, the model determines the costs which are eligible for construction loan financing. In this section, the calculations performed by the model to determine whether the cost falls within the construction loan period are described.

The user will be prompted to provide the starting month and year and the duration of the construction loan period. The model will calculate the ending year and month for the construction loan. The model defines the construction period using the lines CREDIT DUE (WHOLE PERIODS), CREDIT DUE (FIRST PERIOD) and CREDIT DUE (LAST PERIOD) to bracket the beginning, end and duration of the loan. The model checks each semi-annual period to determine whether it falls within the construction loan period. One of three results will be obtained: that the semi-annual period is entirely included in the construction loan period; that the semi-annual period is entirely outside the construction loan period: or that the semi-annual period is partially included in the construction loan period.

4.4.3.1 Semi-Annual Period is Entirely Included in Construction Loan Period

If the entire semi-annual period is within the construction loan period, the model will indicate 1 in the line CREDIT DUE (WHOLE PERIODS).

4.4.3.2 Semi-Annual Period is Entirely Outside Construction Loan Period

If none of the semi-annual period falls within the construction loan period or if there are no costs eligible for loan in the semi-annual period, the model will place a 0 in the line CREDIT DUE (WHOLE PERIODS) for that semi-annual period.

4.4.3.3 Semi-Annual Period is Partially Included in Construction Loan Period

If a semi-annual period is partially included in the construction loan period, the semi-annual period must be either the first or last period in the construction loan. If the CREDIT DUE (WHOLE PERIODS) line for a semi-annual period contains a 1, this indicates that the whole period is contained in the construction loan (i.e., it is not the first period or the last period) and the model will set the lines CREDIT DUE (FIRST PERIOD) and CREDIT DUE (LAST PERIOD) to 0 for that semi-annual period.

Calculations for First Semi-Annual Period of Construction Loan

If the CREDIT DUE (WHOLE PERIODS) line for a semi-annual period contains a 0, and the model determines that the semi-annual period is the first period in the construction loan, it will calculate the proportion of each cost item which falls within the construction loan period. This process is summarized in Figure 11. For each cost item, the model checks two conditions:

1. When the cost item starts: (a) before or when the loan starts or (b) after the loan starts.
2. When the cost item ends: (c) after or when the semi-annual period ends or (d) before the semi-annual period ends.

The combinations of these two conditions are summarized in the matrix shown in Figure 11. If the cost item payment period starts after the loan period has commenced (conditions 6 and 10 of the matrix in Figure 11), the entire amount of the payment for the semi-annual period which is eligible for construction loan financing is included in the construction loan.

If the cost item payment period starts before or when the loan period starts (conditions 5 and 9 of the matrix in Figure 11), the calculation becomes more complicated. The model performs additional calculations for each cost item:

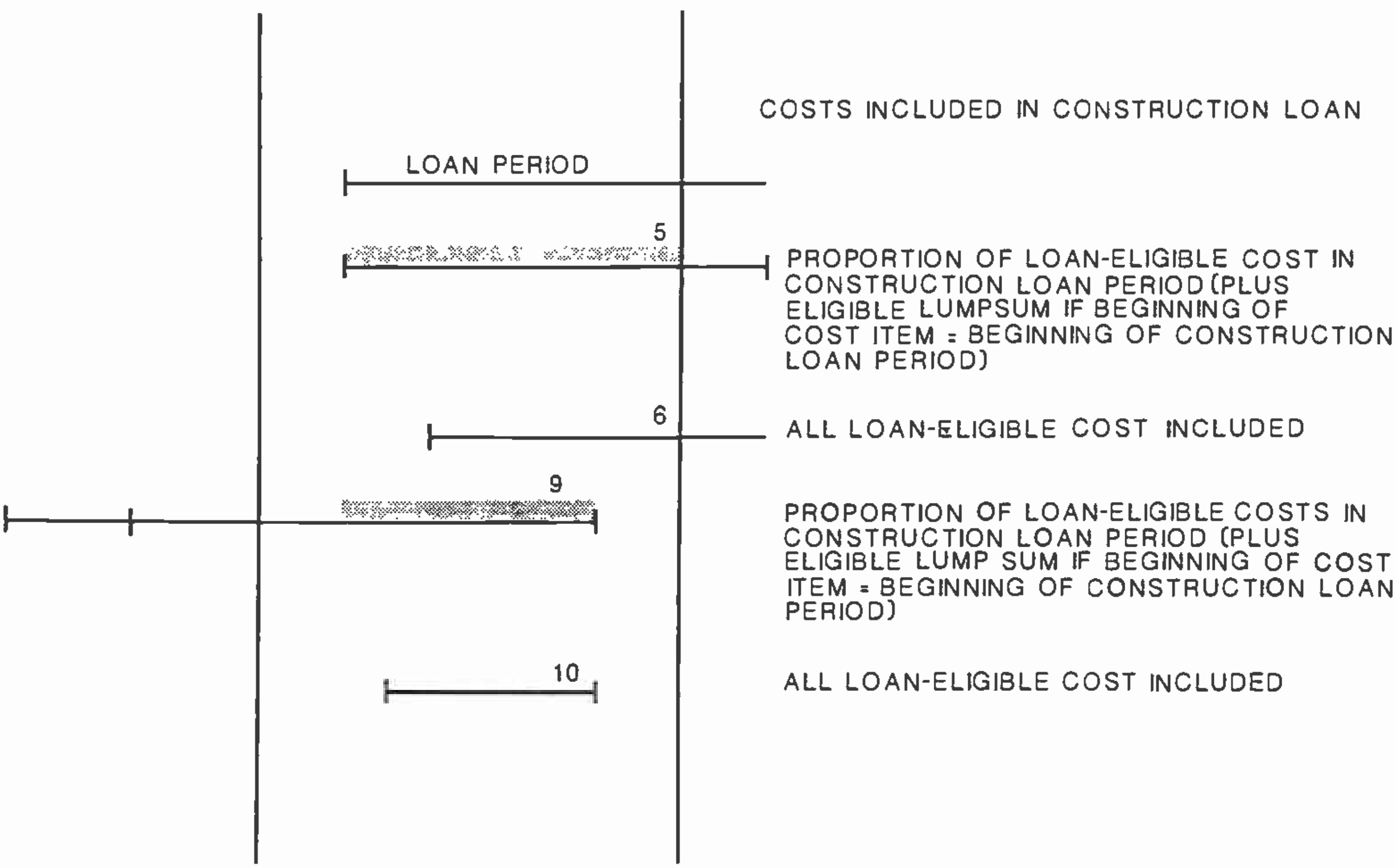
1. The model first determines the amount of the cost item in the first semi-annual period which is eligible for construction loan financing.

2. The model determines whether the lump sum payment is at the beginning or end of the payment period. If the lump sum payment is at the beginning of the payment period and the beginning of the payment period is the same as the beginning of the construction loan, the model will include the lump sum payment in the construction loan.

FIGURE 11

EVALUATION OF FIRST SEMI-ANNUAL PERIOD IN CONSTRUCTION LOAN

	1 ITEM STARTS BEFORE OR WHEN LOAN STARTS	2 ITEM STARTS AFTER LOAN
ITEM ENDS AFTER OR WHEN SEMI-ANNUAL PERIOD ENDS 4	5	6
ITEM ENDS BEFORE SEMI-ANNUAL PERIOD ENDS 8	9	10



3. If the lump sum payment is at the beginning of the payment period and the beginning of the payment period is before the beginning of the construction loan, then the lump sum payment falls outside the construction loan period and the model will exclude the lump sum payment from the construction loan.

4. If the lump sum payment is at the end of the payment period, the model makes no adjustment for the lump sum payment.

5. After adjusting for the lump sum payment, the model determines the amount of the remaining payment for the semi-annual period. The model will proportion the amount of the remaining payment to be included in the construction loan by dividing the number of months of the cost item which are included in the construction loan period by the number of months of the cost item included in the semi-annual period.

Examples:

a. The construction loan begins in month 3 of the semi-annual period while the cost item begins in month 2 of the semi-annual period (corresponds to condition 5 from the matrix in Figure 11). Four months of this cost item (3,4,5,6) are included in the construction loan period. Five months of the cost item are included in the semi-annual period (months 2,3,4,5,6). The model will include 80% (4/5) of the cost item eligible for loan (after adjustment for lump sum) in the construction loan amount.

b. The construction loan begins in month 3 of the semi-annual period. The cost item begins prior to the beginning of the semi-annual period and ends in month 5 of the semi-annual period (corresponds to condition 9 from the matrix in Figure 11). Three months of this cost item (3,4,5) are included in the construction loan period. Five months of this cost item are included in the semi-annual period (months 1,2,3,4,5). The model will include 60% (3/5) of the cost item eligible for loan (after adjustment for lump sum) in the construction loan amount.

After these calculations, the model sums the amount of each cost item included in the construction loan for the first semi-annual period of the construction loan. The model then calculates the proportion of cost included in the construction loan using the formula:

$$\frac{\text{Total included in construction loan}}{\text{Total cost eligible for loan in first semi-annual period}} = \text{Proportion of cost included in loan} \tag{4.20}$$

The model places this result in the line labeled "CREDIT DUE (FIRST PERIOD)" for the first semi-annual period of the construction loan.

Calculations for Last Semi-Annual Period of Construction Loan

If the CREDIT DUE (WHOLE PERIODS) line for a semi-annual period contains a 0, and the model determines that the semi-annual period is the last period in the construction loan, it will calculate the proportion of each cost item which falls within the construction loan period. This process is similar to the calculations for the first semi-annual period of the construction loan and is summarized in Figure 12. For each cost item, the model checks two conditions:

1. When the cost item ends: (a) before the loan ends or (b) when or after the loan ends.
2. When the cost item begins: (c) after the semi-annual period begins or (d) before or at the beginning of the semi-annual period.

The combinations of these two conditions are summarized in the matrix shown in Figure 12. If the cost item payment period ends before the loan period ends (conditions 5 and 6 of the matrix in Figure 12), the entire amount of the payment for the semi-annual period which is eligible for construction loan financing is included in the construction loan.

If the cost item payment period ends after or when the loan period ends (conditions 9 and 10 of the matrix in Figure 12), the calculation becomes more complicated. The model performs additional calculations for each cost item:

1. The model first determines the amount of the cost item in the last semi-annual period which is eligible for construction loan financing.

2. The model determines whether the lump sum payment is at the beginning or end of the payment period. If the lump sum payment is at the end of the payment period and the end of the payment period is <u>the same as</u> the end of the construction loan period, the model will include the lump sum payment in the construction loan.

3. If the lump sum payment is at the end of the payment period and the end of the payment period is <u>after</u> the end of the construction loan, then the lump sum payment falls outside the construction loan period and the model will exclude the lump sum payment from the construction loan.

4. If the lump sum payment is at the beginning of the payment period, the model makes no adjustment for the lump sum payment.

5. After adjusting for the lump sum payment, the model determines the amount of the remaining payment for the semi-annual period. The model will proportion the amount of the remaining payment to be included in the construction loan by dividing the number of months of the cost item which are included in the construction loan period by the number of months of the cost item included in the semi-annual period.

Examples:

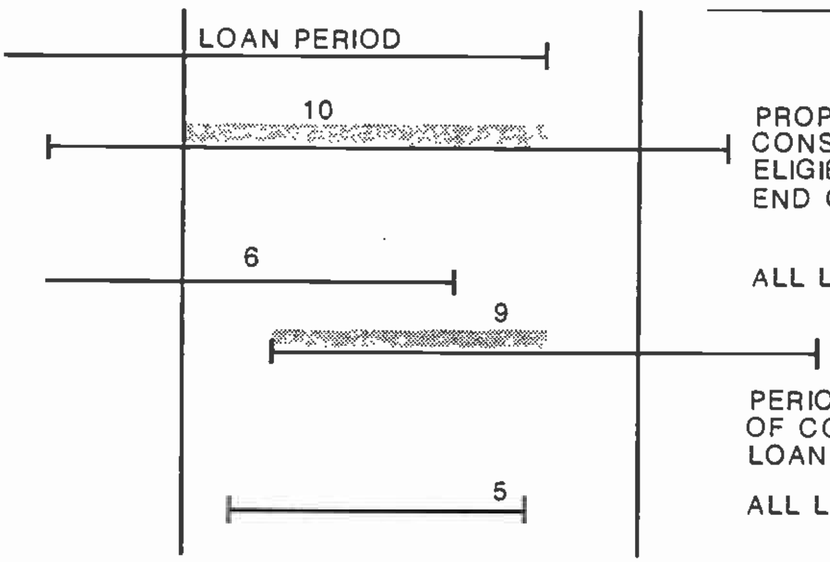
a. The construction loan ends in month 5 of the semi-annual period while the cost item ends in the next semi-annual period (corresponds to condition 10 from the matrix in Figure 12). Five months of this cost item (1,2,3,4,5) are included in the

FIGURE 12

EVALUATION OF LAST SEMI ANNUAL PERIOD IN CONSTRUCTION LOAN

	ITEM BEGINS AFTER SEMI-ANNUAL PERIOD BEGINS 1	ITEM BEGINS BEFORE OR AT BEGINNING OF SEMI ANNUAL PERIOD 2
ITEM ENDS BEFORE LOAN ENDS 4	5	6
ITEM ENDS WHEN LOAN ENDS OR AFTER 8	9	10

COST INCLUDED IN CONSTRUCTION LOAN



10: PROPORTION OF LOAN-ELIGIBLE COST IN CONSTRUCTION LOAN PERIOD (PLUS ELIGIBLE LUMP SUM IF END OF COST ITEM = END OF CONSTRUCTION LOAN PERIOD)

6: ALL LOAN-ELIGIBLE COST INCLUDED

9: PROPORTION OF LOAN-ELIGIBLE COST IN CONSTRUCTION LOAN PERIOD (PLUS ELIGIBLE LUMP SUM IF END OF COST ITEM = END OF CONSTRUCTION LOAN PERIOD)

5: ALL LOAN-ELIGIBLE COST INCUDED

construction loan period. Six months of the cost item are included in the semi-annual period (months 1,2,3,4,5,6). The model will include 83% (5/6) of the cost item eligible for loan (after adjustment for lump sum) in the construction loan amount.

b. The construction loan ends in month 5 of the semi-annual period. The cost item begins in month 2 of the semi-annual period and ends in the next semi-annual period (corresponds to condition 9 from the matrix in Figure 12). Four months of this cost item (2,3,4,5) are included in the construction loan period. Five months of this cost item are included in the semi-annual period (months 2,3,4,5,6). The model will include 80% (4/5) of the cost item eligible for loan (after adjustment for lump sum) in the construction loan amount.

After these calculations, the model sums the amount of each cost item included in the construction loan for the last semi-annual period of the construction loan. The model then calculates the proportion of cost included in the construction loan using the formula:

$$(4.21) \quad \frac{\text{Total included in construction loan}}{\text{Total cost eligible for loan in last semi-annual period}} = \text{Proportion of cost included in loan}$$

The model places this result in the line labeled "CREDIT DUE (LAST PERIOD)" for the last semi-annual period of the construction loan.

4.4.3.4 Summary

To summarize the manner in which the model defines the construction loan period: The first semi-annual period in the construction loan will contain the proportion of eligible costs which are included in the construction loan on the line CREDIT DUE (FIRST PERIOD). The last semi-annual period in the construction loan will contain the proportion of eligible costs which are included in the construction loan on the line CREDIT DUE (LAST PERIOD). All semi-annual periods in between will contain a 1 on the line CREDIT DUE (WHOLE PERIODS). All other semi-annual periods will contain zeros on the lines CREDIT DUE (FIRST PERIOD), CREDIT DUE (LAST PERIOD) and CREDIT DUE (WHOLE PERIODS).

4.4.3.5 Calculation of Credit Withdrawal

After the construction loan period has been defined, the model calculates the credit withdrawal for each semi-annual period in the construction loan using the formula:

(4.22) Costs eligible for loan in semi-annual period X Credit Due = Credit Withdrawal in semi-annual period

where Credit Due = sum of Credit Due (Whole Period), Credit Due (First Period) and Credit Due (Last Period) for the semi-annual period.

After the credit withdrawal is calculated, the model will calculate non-financed costs for each semi-annual period using the formula:

(4.23) Cost eligible for loan + Cost not eligible for loan - Credit withdrawal = Non-financed costs

The sum of the Credit Withdrawal and Non-Financed Cost lines for each semi-annual period should be equal to the sum of the Total Cost Eligible for Loan and Cost Not Eligible for Loan lines for that semi-annual period, which should in turn be equal to the sum of the Total Hard Costs and Total Soft Costs lines for that semi-annual period.

4.4.4 Calculation of Construction Loan Principal and Interest

The model calculates the principal and interest for each semi-annual period where a credit withdrawal occurs. The model prompts the user to provide the construction loan interest rate and the points (loan fees) for the loan. The model calculates the monthly loan interest rate for the loan using the formula:

(4.24) Annual interest rate / 12 = Monthly interest rate

The model determines the number of payments for each semi-annual period from the beginning of the semi-annual period to the end of the construction loan and places this result in the line labeled "PAYMENTS FROM BEGINNING PERIOD" for each semi-annual period in the construction loan.

The model assumes that the credit withdrawal for each semi-annual period is spread evenly throughout the semi-annual period and calculates the monthly withdrawal for each semi-annual period using the formula:

(4.25) Total withdrawal for semi-annual period/(Beginning month - End month) = Monthly withdrawal

The interest and principal for each monthly withdrawal is calculated using the formula for calculating compound interest on an outstanding balance:

(4.26) Monthly withdrawal X $(1 + i)^n$ = Interest and principal for monthly withdrawal

where
i = monthly interest rate (formula 4.24)
n = number of months from time of monthly withdrawal to end of construction loan period.

The model sums the interest and principal calculated for each monthly payment in a semi-annual period and places the result on the line labeled "PRINCIPAL+INTEREST".

The loan fees (points) for the construction loan are calculated as simple interest on the total principal and interest using the formula:

(4.27) Total Principal+Interest X Points(%) = Points Due

The model places this result on the line labeled "POINTS DUE" in the period which contains the beginning month/year of the construction loan period as specified by the user (e.g., if the construction loan begins in October, 1988, the model will reflect the loan points in the second period of 1988).

The model then sums PRINCIPAL+INTEREST and POINTS DUE for each semi-annual period and places the result on the line labeled "PRINCIPAL+INTEREST+POINTS DUE".

The values of PRINCIPAL+INTEREST, POINTS DUE AND PRINCIPAL+INTEREST+POINTS DUE are summed horizontally to provide project totals of these items.

4.4.5 Output

The user may print the results of the calculations performed in Module 4 using the PRINT subfunction from the Module 4 submenu (see User's Manual for details of operation). Examples of the output of Module 4 are contained in Figures 10 and 13.

4.4.6 Interrelationship with Other Modules

The input data for Module 4 is obtained primarily from Module 3, with some input parameters provided by the user. The calculation of the construction loan amount (including interest and points) in this Module is carried forward to Module 5 where it is used in the calculation of the long term mortgage for the project.

AMOUNT NOT ELIGIBLE FOR LOAN	0.00	1.24	11.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	BEGINNING YEAR	BEGINNING MONTH	DURATION(MONTH)	ENDING YEAR	ENDING MONTH	POINTS(%)	ANNUAL INTEREST	MONTHLY INTEREST	
CONSTRACTION FINANCING									
LINE-OF-CREDIT-INFORMATION	1987	1	24	1988	12	4.00	10.00	0.008333	1.008333
		1			2				

SEMI-ANNUAL YEAR->	1986	1987	1987	1988	1988	1989	1989	1990	1990	1991	1991	1992	1992	1993	1993	1994	1994	1995	1995	1996
CREDIT SCHEDULE HALF->	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1
CREDIT DUE (WHOLE PERIODS)	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CREDIT DUE (FIRST PERIOD)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CREDIT DUE (LAST PERIOD)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CREDIT WITHDRAWAL	0.00	5.35	45.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NON-FINANCED COSTS	0.00	1.24	11.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENTS FROM BEGINNING PERIOD	0	24	18	12	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRINCIPAL+INTEREST	0.00	6.39	51.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POINTS DUE	0.00	2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRINCIPAL+INTEREST+POINTS DUE	0.00	8.42	51.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FIGURE 13

4.5 MODULE 5 - OPERATING COST & REVENUE ANALYSIS

The purpose of Module 5 is to calculate the operating income and expenses for the project. The model will calculate income and expense streams for 40 years commencing with the first operating year of the project. The model then uses this information to calculate the mortgage and debt service payments for the project.

4.5.1 Calculation of 40-Year Operating Income Stream

The model prompts the user to provide operating income data: square footage and revenue per square foot for up to three land uses, projected occupancy for the first; second; third; and fourth and beyond years for each land use, inflation rate for income and five-year markup rate for each land use. The five-year markup rate is an estimate of the expected increase in income over inflation. It is assumed to occur every five years and would normally be expected to coincide with the signing of new tenant(s). Since it would not be realistically expected to have a 100% turnover of tenants every five years, this input should reflect an average of the expected turnover and increased income over the five year period. In addition, the user will be prompted to provide the annual fixed amount contributed to the project by the transit agency and the inflation rate to be applied to this income.

The model will use these inputs to calculate the 40-year income stream. The model initially defines the first operating year for the project. The first operating year may or may not coincide with the first calendar year during which the project is in operation. The model assumes that the project begins operations commencing with the month following the last month of the construction loan. The model will determine the length of the time period from the commencement of operations to the end of the calendar year. If this time period is less than six months, the model will assume that the second calendar year is the first operating year. If this time period is six months or greater, the model will assume that the first calendar year of operation coincides with the first operating year. Figure 14 is an example of the output of Module 5. The model will identify the first operating year by placing a 1 over the year. If the first calendar year of operation is not the first operating year, the model will place a 0 over that year.

This determination is significant because it establishes how the model applies the first year occupancy rate entered by the user. The basic principle is: the model uses the first year occupancy rate through the first operating year. Thus, if the first calendar year is less than six months (i.e., second calendar year = first operating year), the model will use the first year occupancy rate for both the first and second calendar years during which the project is in operation. If the first calendar year is greater than six months (i.e., first calendar year = first operating year), the model will use the first year occupancy rate for the first calendar year only.

The application of the inflation rate entered by the user does not vary with this distinction between calendar and operating years. The inflation rate is applied to the projected income beginning with the first calendar year and continues to be applied to the projected income every year thereafter as described in the following sections.

A. OPERATIONAL REVENUES

REVENUES	BASE INFLATION	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
LAND USE A	1.05	0.05	0.69	1.45	2.28	3.03	3.50	3.69	3.86	4.05	4.26	4.92	5.16	5.42	5.69	5.97	6.90	7.25	7.61
LAND USE B	1.10	0.09	1.21	4.39	9.81	14.49	15.94	17.54	19.29	21.22	23.34	25.68	28.25	31.07	34.18	37.60	41.35	45.49	50.04
LAND USE C	1.00	0.06	0.75	0.90	1.05	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
REVENUES FROM RTD	1.00	0.08	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ANNUAL REVENUES		0.21	2.65	6.74	13.14	18.73	20.65	22.41	24.35	26.47	28.80	31.39	34.41	37.69	41.07	44.77	49.46	53.94	58.25

B. OPERATIONAL COSTS

COSTS	BASE INFLATION	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
BUILDING MAINTENANCE	1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SECURITY	1.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PROPERTY TAX	1.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BENEFIT ASSESSMENT	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MANAGEMENT FEES	1.04	0.22	2.72	2.83	2.94	3.06	3.18	3.31	3.44	3.58	3.72	3.87	4.03	4.19	4.36	4.53	4.71	4.90	5.09
CONTINGENCY	1.00	0.10	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26
UTILITIES	1.05	0.04	0.55	0.58	0.61	0.64	0.67	0.70	0.74	0.78	0.81	0.86	0.90	0.94	0.99	1.04	1.09	1.15	1.20
OPERATIONAL COSTS BY LINE ITEM		0.37	4.53	4.67	4.81	4.95	5.11	5.27	5.44	5.61	5.79	5.98	6.18	6.39	6.60	6.83	7.06	7.30	7.56
LAND USE A		0.01	0.07	0.14	0.23	0.30	0.35	0.37	0.39	0.41	0.43	0.49	0.52	0.54	0.57	0.60	0.69	0.72	0.76
LAND USE B		0.02	0.20	1.10	2.45	3.62	3.99	4.39	4.82	5.31	5.84	6.42	7.06	7.77	8.54	9.40	10.34	11.37	12.51
LAND USE C		0.02	0.23	0.27	0.32	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
OPERATIONAL COSTS AS % OF REVENUES		0.05	0.60	1.51	3.00	4.29	4.70	5.11	5.57	6.07	6.62	7.27	7.94	8.67	9.47	10.36	11.29	12.46	13.63
NET OPERATIONAL REVENUES		-0.20	-2.49	-0.56	5.24	9.49	10.84	12.93	13.34	14.79	16.30	18.54	20.49	22.63	24.99	27.59	31.01	34.18	37.56
ANNUAL FIXED FEES TO RTD	1.04	0.02	0.27	0.28	0.29	0.30	0.32	0.33	0.34	0.36	0.37	0.38	0.40	0.42	0.43	0.45	0.47	0.49	0.51
ANNUAL VARIABLE FEES TO RTD		0.61	0.13	0.69	1.42	2.06	2.28	2.48	2.70	2.94	3.21	3.55	3.87	4.22	4.61	5.03	5.57	6.08	6.64
ANNUAL TOTAL FEES TO RTD		0.63	0.49	0.97	1.71	2.37	2.60	2.61	3.04	3.30	3.58	3.93	4.27	4.64	5.04	5.48	6.03	6.56	7.14
ANNUAL REVENUES		-0.24	-2.98	-0.41	3.62	7.12	8.24	9.22	10.30	11.49	12.81	14.60	16.22	17.99	19.95	22.11	24.97	27.61	30.12

MORTGAGE REQUIREMENTS DEBT COVERAGE RATIO 1.15 FOR YEAR 4

	DOWN PAYMENT(%)	DURATION(YEARS)	ENDING YEAR	ENDING MONTH	POINTS(%)	ANNUAL INTEREST	MONTHLY INTEREST	
MORTGAGE INFORMATION	0.00	30	2018	12	4	12.00	0.01	360

SEMI-ANNUAL CREDIT SCHEDULE																				
YEAR->	1986	1987	1987	1988	1988	1989	1989	1990	1990	1991	1991	1992	1992	1993	1993	1994	1994	1995	1995	1995
HALF->	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1

COSTS QUALIFIED FOR MORTGAGE 60.04 DEBT RATIO BASED QUALIFIED MORTGAGE 50.14 QUALIFIED FOR MORTGAGE 50.14 DOWN PAYMENT+POINT 11.91

FINAL MORTGAGE GRANTED 50.14

MONTHLY PAYMENT 0.52 = $515,721

TOTAL PAYMENT 185.66

ANNUAL NON-FINANCED COSTS	0.00	12.76	0.00	11.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FIGURE 14

However, because of the difference in application of the occupancy rate, the calculation of income in the initial years of the project varies depending upon whether or not the operating and calendar years are equivalent.

4.5.1.1 Calculation of Income Where Operating and Calendar Years are Equivalent

The model calculates the first calendar year income for each land use using the formula:

(4.28) Square footage for land use X Revenue per square foot X 1st year occupancy rate X (n/12) X Base inflation rate = Projected Income

where n = number of months from commencement of operations to end of calendar year
base inflation rate = (1 + inflation rate) for land use

When the first calendar year is equivalent to the first operating year, the model calculates the income for each land use for the second calendar year (i.e., second operating year) using the formula:

(4.29) Square footage for land use X Revenue per square foot X 2nd year occupancy rate X $(1 + \text{Inflation Rate})^2$ = Projected Income

For the third and fourth operating years, the model calculates the income for those years using the formula:

(4.30) Square footage for land use X Revenue per square foot X (3rd or 4th, as appropriate) year occupancy rate X $(1 + \text{Inflation Rate})^n$ = Projected Income

where n = number of operating/calendar year (3 or 4)

4.5.1.2 Calculation of Income Where Calendar and Operating Years Are Not Equivalent

The calculation of income for each land use for the first calendar year is the same, regardless of whether the calendar and operating years are equivalent. The model uses formula 4.28, reiterated here, to calculate the first calendar year income.

(4.28) Square footage for land use X Revenue per square foot X 1st year occupancy rate X (n/12) X Base inflation rate = Projected Income

where n = number of months from commencement of operations to end of calendar year
base inflation rate = (1 + inflation rate) for land use

However, where the second calendar year is equivalent to the first operating year, the model calculates the income for the second calendar year for each land use using the formula:

(4.31) Square footage for land use X Revenue per square foot X 1st year occupancy rate X $(1 + \text{Inflation Rate})^2$ = Projected Income

For the second, third and fourth operating years (i.e., third, fourth and fifth calendar years), the model calculates the income for those years using the formula:

(4.32) Square footage for land use X Revenue per square foot X (2nd, 3rd or 4th, as appropriate) year occupancy rate X $(1 + \text{Inflation Rate})^n$ = Projected Income

where n = number of calendar year (3, 4 or 5)

The difference between these two scenarios can be seen by comparing the formula used to calculate the projected income for the third operating year. In the first scenario, formula (4.30) is used:

(4.30) Square footage for land use X Revenue per square foot X 3rd year occupancy rate X $(1 + \text{Inflation Rate})^3$ = Projected Income

Whereas, in the second scenario, formula (4.32) is used:

(4.32) Square footage for land use X Revenue per square foot X 3rd year occupancy rate X $(1 + \text{Inflation Rate})^4$ = Projected Income

4.5.1.3 Calculation of Income in Fifth Operating Year and Beyond

Once the fifth operating year is reached, the calculation of income is the same, regardless of whether the calendar and operating years are equivalent. For operating years which are a multiple of five (fifth, tenth, etc.), the model applies the five year markup rate and calculates the projected income for those years using the formula:

(4.33) Previous year's income X (1 + Five-Year Markup Rate) X (1 + Inflation Rate) = Projected Income

For other operating years (non-multiples of five) beyond the fourth operating year, the model calculates the projected income for those years using the formula:

(4.34) Previous year's income X (1 + Inflation Rate) = Projected Income

4.5.1.4 Calculation of Income from RTD

The calculation of income from RTD is not affected by the distinction between calendar and operating years. The first year's income from RTD is calculated using the formula:

(4.35) Annual fixed amount X (n/12) X (1 + Inflation Rate) = Projected Income from RTD where n = number of months from commencement of operations to end of calendar year

The second year income from RTD is calculated using the formula:

(4.36) Annual fixed amount X $(1 + \text{Inflation Rate})^2$ = Projected Income from RTD

Subsequent years income from RTD are calculated using the formula:

(4.37) Previous year's income X (1 + Inflation Rate) = Projected Income

The process described in the preceding sections is performed out to the 40th calendar year of the project. The model will vertically sum projected income for each year and place the result on the line labeled "TOTAL GROSS INCOME".

4.5.2 Calculation of 40-Year Operating Expense Stream

The model will prompts the user to provide operating expense data which is used to calculate the 40-year operating expense stream for the project. Operating expense inputs fall into five categories: square footage-based expenses; % of stabilized annual income-based expenses; fixed annual expenses; % of gross income-based expenses; and lease expenses. The model then calculates a 40-year stream of estimated operating expenses, based on the input assumptions.

4.5.2.1 Square Footage-Based Expenses

Inputs for building maintenance, security, property tax and benefit assessment are entered as cost per square foot. The user also provides an annual inflation rate for each of these expense items. The model calculates the first year's expense for each of these items using the formula:

(4.38) Total square footage of building (from Module 1) X Cost per square foot X (n/12) X Base inflation rate = Estimated Expense

where n = number of months from commencement of operations to end of calendar year
base inflation rate = (1 + inflation rate) for cost item

The model calculates the second year's expense for each of these cost items using the formula:

(4.39) Total square footage of building X Cost per square foot X $(1 + \text{Inflation Rate})^2$ = Estimated Expense

The model calculates the remaining years' expense using the formula:

(4.40) Previous year's expense X (1 + Inflation Rate) = Estimated Expense

4.5.2.2 % of Stabilized Annual Income-Based Expenses

Inputs for <u>management fees and contingency</u> are entered as a percentage of stabilized annual income. The user also supplies an annual inflation rate for each of these items. The model will calculate the annual costs of these line items by multiplying the percentage entered by the total stabilized annual income for the project. Total stabilized annual income is calculated using the formula:

(4.41) The sum of: [Square footage of land use X Annual income per square foot X 4th year occupancy rate] for each of the three land uses (A, B and C). This result appears on the line labeled "STABILIZED ANNUAL INCOME (UNINFLATED)" on the Module 5 printout of input data (Figure 15).

The model calculates the first year's expense for the two cost items in this category using the formula:

(4.42) Total Stabilized Annual Income X Percentage of Stabilized Annual Income X (n/12) X Base Inflation Rate = Estimated Expense

where n = number of months from commencement of operations to end of calendar year
base inflation rate = (1 + inflation rate) for cost item

The model calculates the second year's expense for each cost item using the formula:

(4.43) Total Stabilized Annual Income X Percentage of Stabilized Annual Income X $(1 + \text{Inflation Rate})^2$ = Estimated Expense

The model calculates the remaining years' expense using the formula:

(4.44) Previous year's expense X (1 + Inflation Rate) = Estimated Expense

4.5.2.3 Fixed Annual Expenses

Inputs for utilities are entered as an annual fixed amount. The user also enters an annual inflation rate for this cost item. The model calculates the first year's expense for this cost item using the formula:

(4.45) Annual cost X (n/12) X Base Inflation Rate = Estimated Expense

where n = number of months from commencement of operations to end of calendar year
base inflation rate = (1 + inflation rate) for cost item

The model calculates the second year's cost using the formula:

(4.46) Annual Cost X $(1 + \text{Inflation Rate})^2$ = Estimated Expense

OPERATIONAL COST-REVENUE ANALYSIS($M)

A. OPERATIONAL REVENUES

REVENUE ITEM	Sqft	ANNUAL REVENUES PER Sqft	% OCCUPANCY-YEARS FIRST	SECOND	THIRD	FOURTH	STABILIZED ANNUAL REV.($M)	INFLATION RATE	5 YEAR MARKUP RATE		OP. COST AS % OF REVENUES
LAND USE A	100000	25.00	25.00	50.00	75.00	95.00	2.38	5.00	10.00	LAND USE A	10.00
LAND USE B	200000	50.00	10.00	33.00	67.00	90.00	9.00	10.00	0.00	LAND USE B	25.00
LAND USE C	50000	30.00	50.00	60.00	70.00	80.00	1.20	0.00	0.00	LAND USE C	30.00
	350000		TOTAL OPERATIONAL REVENUES				12.59				

B. OPERATIONAL COSTS

COST ITEM	COST PER Sqft	ANNUAL COSTS($M)	INFLATION RATE
BUILDING MAINTENANCE	2.50	0.00	3.00
SECURITY	5.00	0.00	5.00
PROPERTY TAX	1.60	0.00	2.00
BENEFIT ASSESSMENT	0.30	0.00	0.00

COST ITEM	% OF ANNUAL LEASE REVENUE	ANNUAL COSTS($M)	INFLATION RATE
MANAGEMENT FEES	20.00	2.51	4.00
CONTINGENCY	10.00	1.26	0.00
UTILITIES		0.50	5.00
TOTAL OPERATIONAL COSTS		4.27	

C. LEASE PAYMENTS TO RTD

COST ITEM	PERCENT	ANNUAL COSTS($M)	INFLATION RATE
ANNUAL FIXED AMOUNT		0.25	4.00
1ST PERIOD % OF REVENUES	5.00		
LENGTH OF 1ST PERIOD(YEARS)	2.00		
2ND PERIOD % OF REVENUES	10.00		
% OF NET OPERATION REVENUES	2.00		

D. REVENUES FROM RTD

COST ITEM	ANNUAL COSTS($M)	INFLATION RATE
ANNUAL FIXED AMOUNT	1.00	0.00

FIGURE 15

The model calculates the remaining years' expense using the formula:

(4.47) Previous year's expense X (1 + Inflation Rate) = Estimated Expense

The estimated expenses of the cost items calculated from inputs of square footage-based expenses, % of stabilized annual income expenses and fixed annual amounts are summed vertically for each year and the result appears on the line labeled "OPERATING EXPENSES-LINE ITEM".

4.5.2.4 % of Gross Income-Based Expenses

The user may input operating expenses as a percentage of income for each of the three land uses: A, B and C. The model calculates the estimated expense of each of these cost items using the formula:

(4.48) Total Gross Income X Percentage of Gross Income = Estimated Expense

The estimated expenses of these cost items are summed vertically for each year and the result appears on the line labeled "OPERATING EXPENSES % OF INCOME". The model calculates Adjusted Gross Income for each year using the formula:

(4.49) Total Gross Income - Operating Expenses-Line Item - Operating Expenses % of Income = Adjusted Gross Income

4.5.2.5 Lease Expenses

The model will prompt the user to provide the parameters of the ground or air rights lease associated with the project. The user may select any or all of the options described in the following sections to express lease expenses associated with the project.

These include: <u>(A)</u> ANNUAL FIXED AMOUNT which is a fixed amount paid each year by the developer. The user also may provide an annual inflation rate for this cost item. The model calculates the first year's expense for this item using the formula:

(4.50) Annual Fixed Amount X (n/12) X Base Inflation Rate = Estimated Expense

The model calculates the second year's expense using the formula:

(4.51) Annual Fixed Amount X $(1 + \text{Inflation Rate})^2$ = Estimated Expense

The model calculates the remaining years' expense using the formula:

(4.52) Previous year's expense X (1 + Inflation Rate) = Estimated Expense

This result appears for each year on the line labeled "LEASE PAYMENTS-FIXED TO RTD".

(B) Another potential lease arrangement is a VARIABLE LEASE PAYMENT based on a specified PERCENTAGE OF TOTAL GROSS INCOME. The model allows for a two-phased variable payment schedule. The user enters the percentage to be applied in the first time period of the lease and the duration of the first time period. The user then enters the percentage to be applied in the second time period. The model calculates the first year's expense using the formula:

(4.53) Total Gross Income X 1st Period Percentage X (n/12) = Estimated Expense

The model calculates the second year's expense using the formula:

(4.54) Total Gross Income X 1st Period Percentage = Estimated Expense

The model will continue to calculate the yearly cost using this formula until the duration of the first period is reached. From that point, the model will calculate the yearly lease expense using the formula:

(4.55) Total Gross Income X 2nd Period Percentage = Estimated Expense

(C) The final lease option is a VARIABLE LEASE PAYMENT based on a specified PERCENTAGE OF ADJUSTED GROSS INCOME. Adjusted gross income is equal to Total Gross Income less Operating Expenses (see section 4.5.2.4). The user inputs the percentage to be applied and the model will calculate each yearly expense using the formula:

(4.56) Adjusted Gross Income X Percentage = Estimated Expense

The model sums the results of the calculations for variable lease payments (both (B) % of total gross income and (C) % of adjusted gross income). The result is reflected in the line labeled "LEASE PAYMENTS-VARIABLE TO RTD".

The model calculates total lease payments by adding the fixed and variable lease payments. This result appears on the line labeled "LEASE PAYMENTS-TOTAL TO RTD". The model calculates NET OPERATING INCOME by subtracting LEASE PAYMENTS-TOTAL TO RTD from ADJUSTED GROSS INCOME.

4.5.3 Mortgage Calculations

After the net operating income for the project has been calculated, the model uses this information to calculate the long term mortgage for the project. The model will prompt the user to provide the down payment percentage, duration, loan fees percentage (points) and annual interest rate for the mortgage loan. The model calculates the ending year and month for the mortgage. The mortgage is assumed to begin in the first month following the last month of the construction loan period.

The model calculates the monthly interest for the mortgage using the formula:

(4.57) Annual Interest / 12 = Monthly Interest

The model calculates the number of monthly payments for the mortgage using the formula:

(4.58) Duration(Years) X 12 = Monthly Payments

The model determines two potential mortgage limits for the project. The first is the construction loan amount, including interest and points. As noted earlier, the purpose of the long-term mortgage is to pay off the construction loan and provide long-term (20 to 30 year) financing for the project. Ideally, therefore, the mortgage loan amount will be equal to the construction loan amount (including all associated costs). The model assumes this limit is equal to the total Principal+Interest+Points Due on the construction loan as calculated in Module 4. The model transfers this information from Module 4 and places it in the cell labeled "COSTS QUALIFIED FOR MORTGAGE".

The amount of the mortgage for the project is also limited by the income generated by the project. Mortgage lenders typically specify that the income from the project be a specified ratio of the mortgage payment. This ratio is called the debt coverage ratio. An example of a debt coverage ratio would be expressed as 1.15. This means that the mortgage lender will loan only an amount such that the net operating income generated by the project is 1.15 times the monthly mortgage payment. Since the net operating income is usually low in the initial years of the project and rises to a stable point several years into the project, the stabilized operating income year (typically operating year 4 or 5) is used as the point at which this debt coverage ratio is applied.

The second mortgage limit calculated by the model determines the maximum mortgage based on the income generated by the project and the debt coverage ratio. The model uses LOTUS commands to perform the calculations. The user specifies the debt coverage ratio and the year in which the debt coverage ratio is to be applied. The model calculates the maximum monthly mortgage payment using the formula:

(4.59) [Net Operating Income for Year Specified / Debt Coverage Ratio]
- 12 = Maximum Monthly Mortgage Payment

With the maximum monthly mortgage payment (formula 4.59), number of monthly payments (formula 4.58) and monthly interest rate (formula 4.57) as inputs, the model uses the LOTUS "PV" function to determine the maximum mortgage amount, as constrained by the debt coverage ratio. The model will reflect this result in the cell labeled "DEBT RATIO BASED QUALIFIED MORTGAGE".

The model selects the lower of these two calculated mortgage limits (construction loan-based and debt ratio-based) and places this result in the cell labeled "QUALIFIED FOR MORTGAGE". The model then calculates the down payment and points for the mortgage from this result. The model calculates the down payment using the formula:

(4.60) Qualified for Mortgage X Down Payment Percentage = Down Payment

The model calculates the loan fees (points) for the mortgage using the formula:

(4.61) Qualified for Mortgage X Points (%) = Mortgage points

The model also determines whether the mortgage amount is sufficient to pay off the construction loan in its entirety. If not, the model determines the amount of the construction loan remaining using the formula:

(4.62) Costs qualified for mortgage - Qualified for mortgage = Amount of Construction Loan Remaining to be Paid

This would be equivalent to the additional amount which the developer would be required to raise from other sources in order to pay off the construction loan.

The model adds the down payment amount, mortgage points and amount of construction loan remaining (if any) and reflects the result in the cell labeled "DOWN PAYMENT+POINT".

The model subtracts the down payment calculated in formula 4.60 from the total QUALIFIED FOR MORTGAGE to calculate the "FINAL MORTGAGE GRANTED". Using the amount of final mortgage granted, the number of monthly payments (formula 4.58) and the monthly interest rate (formula 4.57) as inputs, the model uses the LOTUS function "PMT" to calculate the monthly payment for the mortgage. This result is reflected in the cell labeled "MONTHLY PAYMENT". The model then multiplies this result by the number of monthly payments to calculate the "TOTAL PAYMENT".

Finally, the model will reflect the Developer's EQUITY INVESTMENT for each year of the project. The Equity Investment is reflected in the first semi-annual period of each year in which Developer's Equity is required by the project and consists of the total of NON-FINANCED COSTS in the two semi-annual periods for that year as calculated in Module 4 (see section 4.4.3.5). The total of DOWN PAYMENT+POINT for the mortgage will be added in the year in which the mortgage begins. The model adds the annual developer's equity requirement horizontally and reflects the total in the far right column of the EQUITY INVESTMENT line.

4.5.4 Output

The user may print two outputs from Module 5 using the OUTPUT subfunction from the Module 5 submenu. One of these outputs contains the 40-year income and expense streams and the results of the long-term mortgage calculations described in the preceding sections. The second output provides the input parameters for income and expense items entered by the user. Examples of these outputs are contained in Figures 14 and 15.

4.5.5 Interrelationship with Other Modules

Most of the input data for Module 5 is generated by the user in the course of executing Module 5. However, some data is brought forward from Module 4. The operating income and expense information calculated in Module 5 and developer's equity is carried forward to Module 6, where they are used for the final financial analysis for the project. Mortgage payment information is also carried forward to Module 6 where it is used to calculate annual debt service for the project.

4.6 MODULE 6 - FINANCIAL ANALYSIS

The purpose of Module 6 is to perform the final financial analysis for the project using the inputs and calculations conducted in previous modules. The model performs three sets of calculations in Module 6: financial analysis summary; financial analysis without tax considerations; and financial analysis with tax considerations.

4.6.1 Financial Analysis Summary

In Module 6, the model first develops a financial analysis summary. An example of this summary is contained in Figure 16. This output is obtained using the OUTPUT command in the Module 6 Submenu. The summary essentially consists of two parts: expenditure summary and income summary. The elements of these outputs are described in the following sections.

4.6.1.1 Expenditure Summary

1. The data on the line "EQUITY INVESTMENT" is taken from the EQUITY INVESTMENT line in Module 5.
2. To calculate "DEBT SERVICE", the model determines the number of payments to be made in each year and multiplies the number of payments by the MONTHLY PAYMENT calculated in Module 5.
3. "OPERATING EXPENSES" are equal to the sum of the OPERATING EXPENSES-LINE ITEM and OPERATING EXPENSES % OF INCOME lines in Module 5.
4. "LEASE PAYMENTS-TOTAL TO RTD" is taken from the LEASE PAYMENTS-TOTAL TO RTD line in Module 5.
5. "TOTAL EXPENDITURE" is the sum of Lines 1 through 4.
6. "ACCUMULATED EXPENDITURE" for any year is the sum of expenditures for that year and all preceding years.

4.6.1.2 Income Summary

1. "TOTAL GROSS INCOME" is taken from the TOTAL GROSS INCOME line in Module 5.
2. "ACCUMULATED INCOME" for any year is the sum of income for that year and all preceding years.

This summary is used in the calculation of the financial analysis for the two scenarios available to the user in Module 6: 1) financial analysis without tax considerations and 2) financial analysis with tax considerations.

4.6.2 Financial Analysis Without Tax Considerations

To conduct this analysis, the model prompts the user to provide the interest rate to be used for discounting the cash flow to present value, the project life span, the capitalization rate to be used to calculate the residual value of the project and an initial guess for calculating internal rate of return. The internal rate of return is calculated by trial-and-error and this initial guess provides the model with a starting point for this calculation. The model will return ERR if a solution for internal rate of return is not achieved within 20 iterations. The model will perform the financial analysis without tax considerations for a fifty-year period commencing with the beginning of

FINANCIAL ANALYSIS(MILLIONS $)

YEAR	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
NON FINANCED COSTS	0.00	12.76	11.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DEBT SERVICE	0.00	0.00	0.00	6.19	6.19	6.19	6.19	6.19	6.19	6.19
OPERATING COSTS	0.00	0.00	0.41	5.13	6.18	7.90	9.24	9.81	10.38	11.01
ANNUAL TOTAL FEES TO RTD	0.00	0.00	0.03	0.40	0.97	1.71	2.37	2.60	2.81	3.04
TOTAL EXPENDITURE	0.00	12.76	12.35	11.72	13.33	15.70	17.80	18.59	19.38	20.24
ACCUMMULATED EXPENDITURE	0.00	12.76	25.11	36.93	50.17	65.67	83.67	102.26	121.64	141.88
REVENUES	0.00	0.00	0.21	2.65	6.74	13.14	18.73	20.65	22.41	24.35
ACCUMMULATED REVENUES	0.00	0.00	0.21	2.86	9.60	22.74	41.46	62.11	84.52	108.87

YEAR	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
NON FINANCED COSTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DEBT SERVICE	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19
OPERATING COSTS	11.68	12.42	13.26	14.12	15.06	16.08	17.18	18.45	19.76	21.19
ANNUAL TOTAL FEES TO RTD	3.30	3.58	3.93	4.27	4.64	5.04	5.48	6.03	6.56	7.14
TOTAL EXPENDITURE	21.17	22.18	23.38	24.58	25.88	27.30	28.65	30.67	32.51	34.52
ACCUMMULATED EXPENDITURE	163.05	185.24	208.62	233.19	259.08	286.38	315.23	345.90	378.42	412.94
REVENUES	26.47	28.80	31.79	34.61	37.69	41.07	44.77	49.46	53.94	58.85
ACCUMMULATED REVENUES	135.35	164.15	195.94	230.55	268.24	309.30	354.07	403.53	457.46	516.31

FIGURE 16

construction. An example of the output for this analysis is contained in Figure 17. This output is obtained using the RESULTS subfunction in the Module 6 Submenu. The elements of this output are as follows:

1. "PRE-TAX CASH FLOW" is equal to the difference between the TOTAL GROSS INCOME and TOTAL EXPENDITURE lines as calculated in the financial analysis summary in Module 6.
2. "CASH FLOW (CUMULATIVE)" for any year is the sum of PRE-TAX CASH FLOW for that year and all preceding years.
3. "ACCUMULATED EQUITY" for any year is equal to the sum of EQUITY INVESTMENT and principal payments on the mortgage loan for that year and all preceding years. Calculation of the amount of principal payments on the mortgage loan is described in paragraph 9 below.
4. "PERCENT EQUITY" is calculated for each year using the following formula:

(4.63) Accumulated Equity / [Final Mortgage Granted + Equity Investment] = Percent Equity

When the mortgage loan has been completely repaid, PERCENT EQUITY will equal 100.00 for the remainder of the fifty year period.

5. "INCOME TO MORTGAGE RATIO" is calculated for each year using the following formula:

(4.64) [Total Gross Income - Equity Investment - Operating Expenses] / Debt Service = Income to Mortgage Ratio

6. "NET INCOME TO FULL OWNERSHIP" is calculated for each year using the formula:

(4.65) Pre-Tax Cash Flow / Final Mortgage Granted = Net Income to Full Ownership

7. "NET INCOME TO INVESTMENT RATIO" is calculated for each year using the formula:

(4.66) Pre-Tax Cash Flow / [Equity Investment - Down Payment+Point] = Net Income to Investment Ratio

8. The model will add the project life span entered by the user to the beginning construction year and display the result in the cell labeled "NET PRESENT VALUE TO THE YEAR".
9. The model assumes that the project will be turned over and the proceeds from the sale received in the year following the end of the project life span. In other words, if the user specifies the project life span to be 20 years, the model will reflect 20 years of operating cash flow plus the income from sale in the total cash flow for the project. The model calculates "INCOME FROM SALE" using the following formula:

(4.67) [Pre-Cash Tax Flow in Sale Year / Capitalization Rate] - Remaining Mortgage Principal = Income from Sale

FINAL FINANCIAL ANALYSIS WITHOUT TAX CONSIDERATIONS(MILLIONS)

INTER. RATE FOR PRESENT VALUE	10.00	0.1
PROJECT LIFE SPAN	30 YEARS	
PROJECT SALE PRICE	100.00	
GUESS OF RATE OF RETURN	5.00	0.05

ITEM YEAR->	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
NET ANNUAL INCOME	0.00	-12.76	-12.15	-9.07	-6.59	-2.57	0.93	2.05	3.03	4.11
NET ANNUAL INCOME (CUMULATIVE)	0.00	-12.76	-24.91	-33.97	-40.57	-43.13	-42.21	-40.15	-37.12	-33.01
ACCUMULATED EQUITY	0.00	12.76	24.67	25.20	25.75	26.32	26.92	27.54	28.20	28.89
PERCENT EQUITY	0.00	17.06	32.98	33.69	34.42	35.19	35.98	36.82	37.69	38.61
INCOME TO MORTGAGE RATIO	0.00	0.00	0.00	-0.40	0.09	0.86	1.53	1.75	1.94	2.16
NET INCOME TO FULL OWNERSHIP	0.00	-0.25	-0.24	-0.18	-0.13	-0.05	0.02	0.04	0.06	0.08
NET INCOME TO INVESTMENT RATIO	0.00	-1.00	-0.95	-0.71	-0.52	-0.20	0.07	0.16	0.24	0.32
NET PRESENT VALUE TO THE YEAR	2017									
INCOME FROM SALE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NET ANNUAL INCOME	0.00	-12.76	-12.15	-9.07	-6.59	-2.57	0.93	2.05	3.03	4.11
NET PRESENT VALUE DEVELOPER	55.9540									
NET PRESENT VALUE RTD	44.5891									
INTERNAL RATE OF RETURN TO	2017									

ITEM YEAR->	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
NET ANNUAL INCOME	5.30	6.62	8.41	10.03	11.81	13.76	15.92	18.78	21.42	24.33
NET ANNUAL INCOME (CUMULATIVE)	-27.71	-21.09	-12.68	-2.65	9.16	22.92	38.84	57.62	79.05	103.37
ACCUMULATED EQUITY	29.61	30.38	31.20	32.07	33.00	34.00	35.08	36.24	37.49	38.86
PERCENT EQUITY	39.58	40.61	41.71	42.87	44.12	45.46	46.89	48.44	50.12	51.94
INCOME TO MORTGAGE RATIO	2.39	2.65	3.00	3.31	3.66	4.04	4.45	5.01	5.52	6.09
NET INCOME TO FULL OWNERSHIP	0.11	0.13	0.17	0.20	0.24	0.27	0.32	0.37	0.43	0.49
NET INCOME TO INVESTMENT RATIO	0.42	0.52	0.66	0.79	0.93	1.08	1.25	1.47	1.68	1.91
INCOME FROM SALE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NET ANNUAL INCOME	5.30	6.62	8.41	10.03	11.81	13.76	15.92	18.78	21.42	24.33

FIGURE 17

Remaining Mortgage Principal is calculated using the formula (see Figure 18):

(4.68) FV_t(Final Mortgage Granted) - FV_t(Mortgage Payments) = Remaining Mortgage Principal

where FV_t(Final Mortgage Granted) is equal to the future value of the Final Mortgage at time t (sale year) from the time the mortgage is granted and FV_t(Mortgage Payments) is equal to the future value of the mortgage payments to time t (the sale year) from the time payments begin.

These expressions are calculated using the following formulas:

(4.69) FV_t(Final Mortgage Granted) = Final Mortgage Granted X $(1 + r)^t$

where r = Annual Interest Rate and t = Project Life Span

(4.70) FV_t(Mortgage Payments) = Monthly Payment X $[((1 + r)^t - 1) / r)]$

where r = Monthly Interest Rate and t = Cumulative Number of Monthly Payments made by the end of Project Life Span

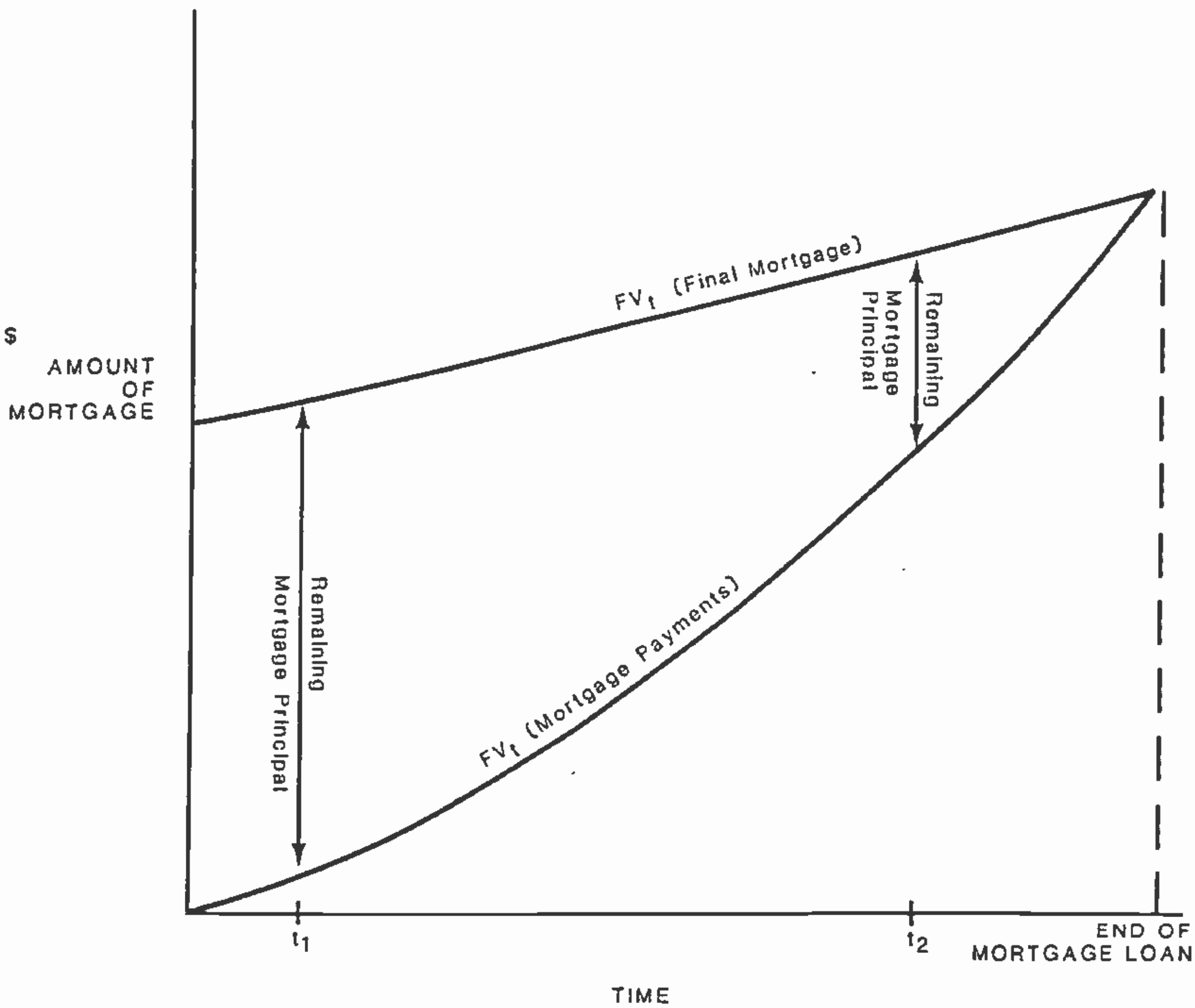
This is a standard technique for determining the remaining principal on a loan at any time during the course of the loan. The model calculates the remaining mortgage principal for each year of the mortgage. In the course of this calculation, the model splits total debt service into principal and interest components. The accumulated principal payments are used to calculate ACCUMULATED EQUITY as described in paragraph 3 above. The model will place the result of the calculation of income from sale in the column of the year following the end of the Project Life Span. The remainder of the cells in the INCOME FROM SALE line will be set to 0.

10. Under "CASH FLOW INCLUDING SALE", the model will reflect the PRE-TAX CASH FLOW for each year up to the end year calculated under "NET PRESENT VALUE TO THE YEAR". The model will reflect the INCOME FROM SALE in the year following the end of this cash flow stream and zero in all following years.
11. "NET PRESENT VALUE DEVELOPER" is calculated by discounting the CASH FLOW INCLUDING SALE line using the discount rate provided by the user. The model uses the LOTUS function "NPV" to perform this calculation.
12. "NET PRESENT VALUE RTD" is calculated by discounting the LEASE PAYMENTS-TOTAL TO RTD line in the financial analysis summary section of Module 6 using the discount rate provided by the user. The model uses the LOTUS function "NPV" to perform this calculation.
13. "INTERNAL RATE OF RETURN" is calculated for the CASH FLOW INCLUDING SALE line using the LOTUS function "IRR" and the initial guess provided by the user.

4.6.3 Financial Analysis With Tax Considerations

To conduct this analysis, the model prompts the user to provide the following information (subfunction TAX):

DETERMINATION OF REMAINING MORTGAGE PRINCIPAL
AT ANY TIME IN LOAN TERM



The theory behind the calculation of remaining principal is: The mortgage lender establishes the mortgage payments such that the value of the payments received over the life of the loan is equivalent to having invested the principal amount over the same time period at the same interest rate. Thus the curve FV_t (Final Mortgage) represents the value of the mortgage at any time t if it were invested. The curve FV_t (Mortgage Payments) represents the value of the total payments made to time t. At the end of the mortgage term, these two curves converge (i.e., the two values are equivalent). The difference between the two curves represents the remaining mortgage principal at any time. Thus, at the end of the mortgage, there is no principal remaining, the loan having been completely repaid. As more payments are made (e.g., t_1 to t_2 above), the amount of mortgage principal remaining decreases.

FIGURE 18

1. Whether the RTD facilities qualify for depreciation (1 = yes, 2 = no)
2. The length of the depreciation period
3. The developer's marginal tax rate

The user will be prompted to provide the initial guess for the internal rate of return in the CALC subfunction. The internal rate of return is calculated by trial-and-error and this initial guess provides the model with a starting point for the calculation. The model will return ERR if a solution for internal rate of return is not achieved within 20 iterations. The model will perform the financial analysis with tax considerations for a fifty-year period commencing with the beginning of construction. An example of the output for this analysis is contained in Figure 19. This output is obtained using the WITH-TAX-RESULTS subfunction in the Module 6 Submenu. The elements of this output are as follows:

1. "INTEREST TAX REFUND" is calculated using the formula:

(4.71) Mortgage interest paid X Marginal tax rate = Interest Tax Refund

The amount of mortgage interest paid for each year is calculated as described in section 4.6.2, paragraph 9 above.

2. "DEPRECIATION" is calculated using the formula:

(4.72) Structure value for depreciation / Depreciation period = Annual Depreciation

Depreciation expense begins with the beginning of the mortgage and runs for the duration of the depreciation period specified by the user.

Structure Value for Depreciation is calculated using the formula:

(4.73) Principal+Interest+Points Due (from Module 4) + Non-financed costs - Total Land Cost - [Construction for RTD + Off-site construction (if not eligible for depreciation)] = Depreciable Structure Value

3. "AFTER TAX CASH FLOW" is calculated by adding "INTEREST TAX REFUND" and "DEPRECIATION" to the "PRE TAX CASH FLOW" line contained in the Financial Analysis Without Tax Considerations section of Module 6.
4. "AFTER TAX CUM. CASH FLOW" for any year is the sum of AFTER TAX CASH FLOW for that year and all preceding years.
5. "ACCUMULATED EQUITY" for any year is equal to the sum of EQUITY INVESTMENT and principal payments on the mortgage loan for that year and all preceding years. Calculation of the amount of principal payments on the mortgage loan is described in section 4.6.2, paragraph 9 above. This calculation is unaffected by tax considerations and is the same result as reflected in the Financial Analysis Without Tax Considerations analysis of Module 6.
6. "PERCENT EQUITY" is calculated for each year using the formula:

(4.74) Accumulated Equity / [Final Mortgage Granted + Equity Investment] = Percent Equity

When the mortgage loan has been completely repaid, PERCENT EQUITY will equal 100.00 for the remainder of the fifty year period. This calculation is

FINAL FINANCIAL ANALYSIS WITH TAX.CONSIDERATIONS(MILLIONS)

INTER. RATE FOR PRESENT VALUE 10 0.1
PROJECT LIFE SPAN 30 YEARS
RTD FACILITIES QUAL FOR DEP 1 (1. YES;2. NO)
DEPRECIATION PERIOD STR. LINE 17 YEARS STRUCTURE VALUE FOR DEP. 66.05
MARGINAL TAX RATE(%) 35.00 0.35
GUESS OF RATE OF RETURN 20 0.2

ITEM YEAR->	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
INTEREST TAX REFUND	0.00	0.00	0.00	1.98	1.97	1.97	1.96	1.95	1.94	1.93	1.91	1.90	1.88	1.86	1.84	1.82	1.79	1.76	1.73	1.67
DEPRECIATION	0.00	0.00	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	3.89	0.00
AFTER TAX NET ANNUAL INCOME	0.00	-12.76	-8.26	-3.20	-0.74	3.28	6.77	7.89	8.85	9.92	11.10	12.40	14.18	15.77	17.53	19.46	21.59	24.43	27.03	26.02
AFTER TAX CUM. NET INCOME	0.00	-12.76	-21.02	-24.22	-24.96	-21.67	-14.90	-7.02	1.84	11.76	22.86	35.26	49.43	65.21	82.74	102.20	123.80	148.22	175.26	201.28
ACCUMULATED EQUITY	0.00	12.76	24.67	25.20	25.73	26.32	26.92	27.54	28.20	28.69	29.61	30.38	31.20	32.07	33.00	34.00	35.08	36.24	37.49	38.86
PERCENT EQUITY	0.00	17.06	32.98	33.69	34.42	35.19	35.98	36.82	37.69	38.61	39.58	40.61	41.71	42.87	44.12	45.46	46.89	48.44	50.12	51.94
AFTER TAX NET INCOME/MORTGAGE	0.00	0.00	0.09	-1.52	-1.12	-0.47	0.07	0.27	0.43	0.60	0.79	1.00	1.29	1.55	1.83	2.15	2.49	2.95	3.37	3.20
AFTER TAX NET INCOME/OWNERSHIP	0.00	-0.25	-0.16	-0.06	-0.01	0.07	0.14	0.16	0.18	0.20	0.22	0.25	0.28	0.31	0.35	0.39	0.43	0.49	0.54	0.52
AFTER TAX NET INCOME/INVEST.	0.00	-1.00	-0.65	-0.25	-0.06	0.26	0.53	0.62	0.69	0.78	0.87	0.97	1.11	1.24	1.37	1.53	1.69	1.91	2.12	2.04
NET PRESENT VALUE TO THE YEAR	2017																			
INCOME FROM SALE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AFTER TAX NET ANNUAL INCOME	0.00	-12.76	-8.26	-3.20	-0.74	3.28	6.77	7.89	8.85	9.92	11.10	12.40	14.18	15.77	17.53	19.46	21.59	24.43	27.63	26.07

NET PRESENT VALUE DEVELOPER 90.2815
NET PRESENT VALUE RTD 44.5891
INTERNAL RATE OF RETURN TO 2017

INTERNAL RATE OF RETURN ERR

FIGURE 19

unaffected by tax considerations and is the same result as reflected in the Financial Analysis Without Tax Considerations analysis of Module 6.

7. "AFTER TAX NET INCOME/MORTGAGE" is calculated for each year using the formula:

(4.75) [After Tax Cash Flow / Debt Service] - 1 = After Tax Income/Mortgage Ratio

8. "AFTER TAX NET INCOME/OWNERSHIP" is calculated for each year using the formula:

(4.76) After-Tax Cash Flow / Final Mortgage Granted = After Tax Net Income/Ownership Ratio

9. "AFTER TAX NET INCOME/INVESTMENT" is calculated for each year using the formula:

(4.77) After-Tax Cash Flow / [Equity Investment - Down Payment+Point] = After Tax Net Income/Investment Ratio

10. The model will add the project life span entered by the user to the beginning construction year and display the result in the cell labeled "NET PRESENT VALUE TO THE YEAR".
11. "INCOME FROM SALE" is calculated as described in section 4.6.2, paragraph 9 above.
12. Under "AFTER TAX CASH FLOW INCLUDING SALE", the model will reflect the AFTER-TAX CASH FLOW for each year up to the end year calculated under "NET PRESENT VALUE TO THE YEAR". The model will reflect the INCOME FROM SALE in the year following the end of this cash flow stream and zero in all following years.
13. "NET PRESENT VALUE DEVELOPER" is calculated by discounting the AFTER TAX CASH FLOW INCLUDING SALE line using the discount rate provided by the user. The model uses the LOTUS function "NPV" to perform this calculation.
14. "NET PRESENT VALUE RTD" is calculated by discounting the LEASE PAYMENTS-TOTAL TO RTD line in the financial analysis summary section of Module 6 using the discount rate provided by the user. The model uses the LOTUS function "NPV" to perform this calculation. This calculation is unaffected by tax considerations and is the same result as in the Financial Analysis without Tax Considerations analysis of Module 6.
15. "INTERNAL RATE OF RETURN" is calculated for the CASH FLOW INCLUDING SALE line using the LOTUS function "IRR" and the initial guess provided by the user.

4.6.4 Output

The outputs from Module 6 have been discussed throughout this section. The user may print three outputs from Module 6 using the OUTPUT, RESULTS, and WITH-TAX-RESULTS subfunctions from the Module 6 submenu. These outputs contain the results of the Financial Analysis Summary, Financial Analysis Without Tax Considerations and Financial Analysis With Tax Considerations analyses, respectively. Examples of these outputs are contained in Figures 16, 17 and 19.

4.6.5 Interrelationship with Other Modules

Module 6 obtains most of its inputs from Module 5, which the model then uses in summaries and to perform additional calculations. The results of these calculations are provided to Module 7 which produces a project financial summary.

4.7 MODULE 7 - PRINT SUMMARY REPORT

The purpose of Module 7 is to allow the user to print a summary of the development cost information and financial analysis calculations contained in the model. The summary report consists of two pages: 1) Project Cost Summary and 2) Income and Expense Summary. Using the BEGIN subfunction, the model transfers the inputs to Module 7 from other modules throughout the model.

4.7.1 Project Cost Summary

An example of this report is contained in Figure 20. The following items in this report are transferred directly from Module 1: Total Project Square Footage (in Millions); Nominal Costs for LAND, EASEMENT, DEMOLITION & GRADING, SITE IMPROVEMENTS, BUILDING A, B & C, ON SITE PARKING, OFF SITE PARKING, RTD FACILITIES, OFF SITE CONSTRUCTION, CONTINGENCY; Square Footage and Cost per Square Foot for Building A, B and C: Number of Stalls and Cost per Stall for On Site Parking and Off Site Parking.

The following items in this report are transferred directly from Module 2: Nominal Costs and Percentage of Construction Costs for ENG/ARCH, LEGAL/ACCOUNTING, MARKETING, PERMITS/FEES, PROPERTY TAX, CONSTRUCTION MANAGEMENT, ADMINISTRATION/OVERHEAD.

The following items in this report are transferred directly from Module 4: Actual Costs for LAND, EASEMENT, DEMOLITION & GRADING, SITE IMPROVEMENTS, BUILDING A, B & C, ON SITE PARKING, OFF SITE PARKING, ENG/ARCH, LEGAL/ACCOUNTING, MARKETING, PERMITS/FEES, PROPERTY TAX, CONSTRUCTION MANAGEMENT, ADMINISTRATION/OVERHEAD, CONTINGENCY, RTD FACILITIES, OFF SITE CONSTRUCTION; Construction Loan Interest Rate and Points; Construction Loan Amount; Costs Not Covered by Loan.

The model computes the Actual Amount of Construction Loan Interest/Points from data contained in Module 4 using the formula:

(4.78) Total Principal+Interest+Points Due - Total Credit Withdrawal = Construction Loan Interest/Points

The model will sum the Nominal and Actual values for LAND, EASEMENT, DEMOLITION & GRADING and SITE IMPROVEMENTS to provide Nominal and Actual values for TOTAL SITE COSTS. The model will sum the Nominal and Actual Values for BUILDING A, B and C, ON SITE PARKING and OFF SITE PARKING to provide Nominal and Actual values for TOTAL CONSTRUCTION COSTS. The model will sum the Nominal and Actual values for ENG/ARCH, LEGAL/ACCOUNTING, MARKETING, PERMITS/FEES, PROPERTY TAX, CONSTRUCTION MANAGEMENT, ADMINISTRATION/OVERHEAD, CONST. LOAN INTEREST/POINTS and CONTINGENCY to provide Nominal and Actual values for TOTAL SOFT COSTS. Finally the model will sum TOTAL SITE COSTS, TOTAL CONSTRUCTION COSTS, TOTAL SOFT COSTS, RTD FACILITIES and OFF SITE CONSTRUCTION to provide TOTAL PROJECT COSTS.

The model obtains CONSTRUCTION LOAN AMOUNT from the total PRINCIPAL+INTEREST+POINTS DUE from Module 4 and COSTS NOT COVERED BY LOAN from the total NON-FINANCED COSTS from Module 4.

DEVELOPMENT COST SUMMARY

1. HARD COSTS	NOMINAL	ACTUAL
LAND	3.20	3.35
EASMENT	7.81	8.18
DEMOLITION & GRADING	0.15	0.16
SITE IMPROVEMENTS	1.56	1.64
RID FACILITIES	2.50	2.62
OFF SITE CONSTRUCTION	0.75	0.79
BUILDING		
BUILDING A	2.50	2.61
BUILDING B	3.50	3.67
BUILDING C	25.00	26.19
ON SITE PARKING	0.20	0.21
OFF SITE PARKING	0.03	0.03
TOTAL HARD COSTS	47.19	49.42

2. SOFT COSTS	NOMINAL	ACTUAL
ENG/ARCH	1.56	1.56
LEGAL/ACCOUNTING	0.87	0.92
MARKETING	0.56	0.59
PERMITS/FEES	0.81	0.85
PROPERTY TAX	0.46	0.49
CONSTRUCTION MANAGMENT	1.56	1.65
ADMINISTRATION/OVERHEAD	6.25	5.60
CONST. LOAN INTEREST/POINTS		9.31
CONTENGENCY	1.25	1.31
TOTAL SOFT COSTS	13.32	23.29
TOTAL PROJECT COSTS	60.51	72.71

CONSTRUCTION LOAN AMOUNT 60.04 COSTS NOT COVERED BY LOAN 12.76

FIGURE 29

4.7.2 Income and Expense Summary

An example of this report is contained in Figure 21. The model obtains information from Module 5 as follows:

Module 7 Field	Module 5 Field
MORTGAGE AMOUNT	FINAL MORTGAGE GRANTED
INTEREST RATE	ANNUAL INTEREST
DOWN PAYMENT	DOWN PAYMENT+POINT
DEBT RATIO	DEBT RATIO BASED QUALIFIED MORTGAGE

The model provides a summary of income and expenses for the project for 15 years beginning with the start of construction. The information in the lines TOTAL GROSS INCOME, OPERATING EXPENSES, LEASE PAYMENTS-TOTAL TO RTD, EQUITY INVESTMENT and DEBT SERVICE is transferred directly from the corresponding lines from the Financial Analysis Summary of Module 6. "NET OPERATING INCOME" is calculated for each year using the formula:

(4.79) Total Gross Income - Operating Expenses - Lease Payments-Total to RTD = Net Operating Income

"PRE-TAX CASH FLOW" for each year is calculated using the formula:

(4.80) Net Operating Income - Equity Investment - Debt Service = Pre Tax Cash Flow

"CASH RETURN ON INVESTMENT" is calculated for each year using the formula:

(4.81) Pre Tax Cash Flow / [Non-financed Costs + Down Payment+Point] = Cash Return on Investment

"ASSUMED OCCUPANCY" is a weighted average of the occupancy rates for each of the land uses in the project for each of the four years for which occupancy rates were entered (1st, 2nd, 3rd and 4th and beyond).

"NET PRESENT VALUE DEVELOPER (PRE-TAX)" is transferred directly from the field NET PRESENT VALUE DEVELOPER in the Final Financial Analysis Without Tax Considerations analysis of Module 6.

"NET PRESENT VALUE RTD" is transferred directly from the field NET PRESENT VALUE RTD in the Final Financial Analysis Without Tax Considerations analysis of Module 6.

4.7.3 Output

The outputs from Module 7 have been discussed throughout this section. The user may print two outputs from Module 7 using the FIRST PAGE and PAGE TWO subfunctions from the Module 7 submenu. Examples of these outputs are contained in Figures 20 and 21.

DEVELOPMENT COST SUMMARY

MORTGAGE AMOUNT 50.14 at INTEREST RATE 12.00 DOWN PAYMENT 11.91 DEBT RATIO 0.00

YEAR	1986	1987	1988	1989	1990	1991	1992	1993
TOTAL GROSS INCOME	0.00	0.00	0.21	2.65	6.74	13.14	18.73	20.65
OPERATING EXPENSES	0.00	0.00	0.41	5.13	6.18	7.80	9.24	9.81
PAYMENTS TO RTD	0.00	0.00	0.03	0.40	0.97	1.71	2.37	2.60
NON_FINANCED COSTS	0.00	12.76	11.91	0.00	0.00	0.00	0.00	0.00
NET OPERATING INCOME	0.00	-12.76	-12.15	-2.88	-0.41	3.62	7.12	8.24
MORTGAGE PAYMENTS	0.00	0.00	0.00	6.19	6.19	6.19	6.19	6.19
PROJECT INCOME (LOSS)	0.00	-12.76	-12.15	-9.07	-6.59	-2.57	0.93	2.05
CASH RETURN ON INVESTMENT	0	-0.51725	-0.49235	-0.36758	-0.26729	-0.10401	0.037629	0.083209

YEAR	1994	1995	1996	1997	1998	1999	2000
TOTAL GROSS INCOME	22.41	24.35	26.47	28.80	31.79	34.61	37.69
OPERATING EXPENSES	10.38	11.01	11.68	12.42	13.26	14.12	15.06
PAYMENTS TO RTD	2.81	3.04	3.30	3.58	3.93	4.27	4.64
NON_FINANCED COSTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NET OPERATING INCOME	9.22	10.30	11.49	12.81	14.60	16.22	17.99
MORTGAGE PAYMENTS	6.19	6.19	6.19	6.19	6.19	6.19	6.19
PROJECT INCOME (LOSS)	3.03	4.11	5.30	6.62	8.41	10.03	11.81
CASH RETURN ON INVESTMENT	0.122859	0.166680	0.214966	0.268209	0.341072	0.406484	0.478539

ASSUMED OCCUPANCY 1ST YEAR 16.96 2ND YEAR 38.93 3RD YEAR 68.75 4TH YEAR AND ON 89.82

NET PRESENT VALUE DEVELOPER(PRE TAX) 56.0
NET PRESENT VALUE RTD(PRE TAX) 44.6
INTERNAL RATE OF RETURN 0.1641

FIGURE 21

4.7.4 Interrelationship with Other Modules

Module 7 obtains its inputs from Modules 1, 2, 4, 5 and 6. The results from the calculations of Module 7 are designed to provide the user with a summary of the financial calculations for the project. As the final module in the model, these results are "stand alone" and are not used elsewhere in the model.

APPENDIX A

CHANGES TO JOINT DEVELOPMENT CASH FLOW MODEL FROM PREVIOUS VERSION - FEBRUARY, 1986 - REFLECTED IN THIS DOCUMENT

1. Modules 5 and 6 from the previous version of the model have been reordered in order to more accurately calculate the long term mortgage cost. Module 6 in the previous version has now been merged into Module 5. Operating income and costs are now calculated prior to the calculation of the long term mortgage and the results are used to constrain the maximum amount of mortgage which a developer can obtain. The financial analysis previously conducted in Module 7 is now conducted in Module 6.

2. Module 1 now contains the option of reflecting contributions by a developer to station construction and other off-site construction.

3. Module 1 now contains the capability to reflect three different structure construction types and costs for grading and demolition.

4. Module 2 now contains the capability to reflect costs for administration and overhead.

5. In Module 2, costs may now be entered either as an absolute value or as a percentage of construction costs.

6. Module 5 now contains the capability of expressing operating costs as a percentage of gross revenues.

7. Module 5 now contains the capability to reflect ground lease or air rights lease payments by a developer. These payments may be expressed as fixed, as a percentage of gross income or as a percentage of net income.

8. Module 5 now contains the capability to reflect varying occupancy rates during the first four years of project operation.

9. Module 6 (Financial Analysis) now contains the capability to reflect some tax effects on project cash flow, including depreciation and deduction of mortgage interest.

10. Module 6 now contains the capability to reflect a variable project life span for purposes of calculating net present value and internal rate of return.

11. Module 6 now contains the capability to automatically calculate the resale value of the building at the end of the project life span, deduct the remaining mortgage principal and reflect the net sale price in the project cash flow.

12. A new Module 7 was added which allows the printout of a two-page Development Cost Summary.

13. In all modules, the model will now provide a message to the user as to the last subfunction which was executed.

APPENDIX B: DISTRIBUTION TABLES FOR BELL-SHAPED EXPENDITURE PATTERN

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
12	0	0.097	0.193	0.258	0.333	0.414	0.5	0.586	0.667	0.742	0.807	0.903	1	0	0	0	0	0	0	0
13	0	0.093	0.187	0.244	0.31	0.383	0.461	0.539	0.617	0.69	0.756	0.813	0.907	1	0	0	0	0	0	0
14	0	0.089	0.179	0.231	0.29	0.356	0.427	0.5	0.573	0.644	0.71	0.769	0.821	0.911	1	0	0	0	0	0
15	0	0.086	0.172	0.22	0.274	0.334	0.398	0.466	0.534	0.602	0.666	0.726	0.78	0.828	0.914	1	0	0	0	0
16	0	0.083	0.166	0.21	0.259	0.314	0.373	0.436	0.5	0.564	0.627	0.686	0.741	0.79	0.834	0.917	1	0	0	0
17	0	0.081	0.162	0.202	0.247	0.237	0.352	0.41	0.47	0.53	0.59	0.648	0.703	0.753	0.798	0.838	0.919	1	0	0
18	0	0.079	0.157	0.194	0.236	0.283	0.333	0.387	0.443	0.5	0.557	0.613	0.667	0.717	0.764	0.806	0.843	0.921	1	0
19	0	0.077	0.153	0.188	0.227	0.27	0.317	0.367	0.419	0.473	0.527	0.581	0.633	0.683	0.73	0.773	0.812	0.847	0.923	1
20	0	0.075	0.15	0.182	0.219	0.259	0.302	0.349	0.398	0.448	0.5	0.552	0.602	0.651	0.698	0.741	0.781	0.818	0.85	0.925
21	0	0.074	0.147	0.177	0.211	0.249	0.289	0.333	0.379	0.427	0.475	0.525	0.573	0.621	0.667	0.711	0.751	0.789	0.823	0.853
22	0	0.072	0.144	0.173	0.205	0.24	0.278	0.319	0.362	0.407	0.453	0.5	0.547	0.593	0.638	0.681	0.722	0.76	0.795	0.827
23	0	0.071	0.142	0.169	0.199	0.232	0.267	0.306	0.346	0.389	0.433	0.478	0.522	0.567	0.611	0.654	0.694	0.733	0.768	0.801
24	0	0.067	0.134	0.16	0.188	0.219	0.254	0.29	0.329	0.37	0.412	0.456	0.5	0.544	0.588	0.63	0.671	0.71	0.746	0.781
25	0	0.066	0.133	0.157	0.184	0.213	0.245	0.28	0.317	0.355	0.395	0.437	0.479	0.521	0.563	0.605	0.645	0.683	0.72	0.755
26	0	0.065	0.131	0.154	0.179	0.207	0.238	0.27	0.305	0.342	0.38	0.419	0.459	0.5	0.541	0.581	0.62	0.658	0.695	0.73
27	0	0.065	0.129	0.151	0.176	0.202	0.231	0.262	0.295	0.329	0.366	0.403	0.441	0.48	0.52	0.559	0.597	0.634	0.671	0.705
28	0	0.064	0.128	0.149	0.172	0.197	0.225	0.254	0.285	0.318	0.353	0.388	0.425	0.462	0.5	0.538	0.575	0.612	0.647	0.682
29	0	0.063	0.127	0.147	0.169	0.193	0.219	0.247	0.276	0.308	0.341	0.375	0.41	0.446	0.482	0.518	0.554	0.59	0.625	0.659
30	0	0.063	0.126	0.145	0.166	0.189	0.213	0.24	0.268	0.298	0.329	0.362	0.396	0.43	0.465	0.5	0.535	0.57	0.604	0.638
31	0	0.062	0.125	0.143	0.163	0.185	0.209	0.234	0.261	0.289	0.319	0.35	0.383	0.415	0.449	0.483	0.517	0.551	0.585	0.617
32	0	0.062	0.123	0.141	0.161	0.181	0.204	0.228	0.254	0.281	0.31	0.34	0.37	0.402	0.434	0.467	0.5	0.533	0.566	0.598
33	0	0.061	0.123	0.14	0.158	0.178	0.2	0.223	0.248	0.274	0.301	0.33	0.359	0.39	0.421	0.452	0.484	0.516	0.548	0.579
34	0	0.061	0.122	0.138	0.156	0.175	0.196	0.218	0.242	0.267	0.293	0.32	0.349	0.378	0.408	0.438	0.469	0.5	0.531	0.562
35	0	0.06	0.121	0.137	0.154	0.172	0.192	0.214	0.236	0.26	0.285	0.312	0.339	0.367	0.396	0.425	0.455	0.485	0.515	0.545
36	0	0.06	0.12	0.135	0.152	0.17	0.189	0.21	0.231	0.254	0.278	0.304	0.33	0.357	0.384	0.413	0.442	0.471	0.5	0.529
37	0	0.06	0.119	0.134	0.15	0.167	0.186	0.206	0.227	0.249	0.272	0.296	0.321	0.347	0.374	0.401	0.429	0.457	0.486	0.514
38	0	0.059	0.119	0.133	0.148	0.165	0.183	0.202	0.222	0.243	0.266	0.289	0.313	0.338	0.364	0.39	0.417	0.445	0.472	0.5
39	0	0.059	0.118	0.132	0.147	0.163	0.18	0.199	0.218	0.238	0.26	0.282	0.306	0.33	0.355	0.38	0.406	0.433	0.46	0.486
40	0	0.059	0.117	0.131	0.145	0.161	0.178	0.195	0.214	0.234	0.254	0.276	0.299	0.322	0.346	0.371	0.396	0.421	0.447	0.474
41	0	0.058	0.117	0.13	0.144	0.159	0.175	0.192	0.21	0.229	0.249	0.27	0.292	0.314	0.338	0.362	0.386	0.411	0.436	0.462
42	0	0.058	0.116	0.129	0.143	0.157	0.173	0.189	0.207	0.225	0.245	0.265	0.286	0.307	0.33	0.353	0.377	0.401	0.425	0.45
43	0	0.058	0.116	0.128	0.141	0.155	0.171	0.187	0.204	0.221	0.24	0.26	0.28	0.301	0.323	0.345	0.368	0.391	0.415	0.439
44	0	0.058	0.115	0.127	0.14	0.154	0.168	0.184	0.2	0.218	0.236	0.255	0.274	0.295	0.316	0.337	0.359	0.382	0.405	0.429
45	0	0.057	0.115	0.126	0.139	0.152	0.167	0.182	0.197	0.214	0.232	0.25	0.269	0.289	0.309	0.33	0.351	0.373	0.396	0.419
46	0	0.057	0.114	0.126	0.138	0.151	0.165	0.179	0.195	0.211	0.228	0.246	0.264	0.283	0.303	0.323	0.344	0.365	0.387	0.409
47	0	0.057	0.114	0.125	0.137	0.149	0.163	0.177	0.192	0.208	0.224	0.241	0.259	0.278	0.297	0.317	0.337	0.358	0.379	0.4
48	0	0.057	0.113	0.124	0.136	0.148	0.161	0.175	0.19	0.205	0.221	0.237	0.255	0.273	0.291	0.31	0.33	0.35	0.371	0.392
49	0	0.056	0.113	0.123	0.135	0.147	0.16	0.173	0.187	0.202	0.217	0.234	0.25	0.268	0.286	0.304	0.324	0.343	0.363	0.384
50	0	0.056	0.112	0.123	0.134	0.146	0.158	0.171	0.185	0.199	0.214	0.23	0.246	0.263	0.281	0.299	0.317	0.336	0.356	0.376
51	0	0.056	0.112	0.122	0.133	0.144	0.157	0.169	0.183	0.197	0.211	0.227	0.242	0.259	0.276	0.294	0.312	0.33	0.349	0.368
52	0	0.056	0.112	0.122	0.132	0.143	0.155	0.168	0.181	0.194	0.208	0.223	0.239	0.255	0.271	0.288	0.306	0.324	0.342	0.361
53	0	0.056	0.111	0.121	0.131	0.142	0.154	0.166	0.179	0.192	0.206	0.22	0.235	0.251	0.267	0.284	0.301	0.318	0.336	0.354
54	0	0.056	0.111	0.121	0.131	0.141	0.153	0.164	0.177	0.19	0.203	0.217	0.232	0.247	0.263	0.279	0.296	0.313	0.33	0.348
55	0	0.055	0.111	0.12	0.13	0.14	0.151	0.163	0.175	0.188	0.201	0.214	0.229	0.243	0.259	0.274	0.291	0.307	0.324	0.342
56	0	0.055	0.11	0.12	0.129	0.139	0.15	0.161	0.173	0.185	0.198	0.212	0.226	0.24	0.255	0.27	0.286	0.302	0.319	0.336
57	0	0.055	0.11	0.119	0.129	0.138	0.149	0.16	0.171	0.184	0.196	0.209	0.223	0.237	0.251	0.266	0.282	0.297	0.314	0.33
58	0	0.055	0.11	0.119	0.128	0.138	0.148	0.159	0.17	0.182	0.194	0.207	0.22	0.234	0.248	0.262	0.277	0.293	0.309	0.325
59	0	0.055	0.11	0.118	0.127	0.137	0.147	0.157	0.168	0.18	0.192	0.204	0.217	0.23	0.244	0.259	0.273	0.288	0.304	0.319
60	0	0.055	0.109	0.118	0.127	0.136	0.145	0.156	0.167	0.178	0.19	0.202	0.215	0.228	0.241	0.255	0.269	0.284	0.299	0.314

	20	21	22	23	24	25	26	27	28	29	30	31
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	1	0	0	0	0	0	0	0	0	0	0	0
21	0.926	1	0	0	0	0	0	0	0	0	0	0
22	0.856	0.928	1	0	0	0	0	0	0	0	0	0
23	0.831	0.858	0.929	1	0	0	0	0	0	0	0	0
24	0.812	0.84	0.866	0.933	1	0	0	0	0	0	0	0
25	0.787	0.816	0.843	0.867	0.934	1	0	0	0	0	0	0
26	0.762	0.793	0.821	0.846	0.869	0.935	1	0	0	0	0	0
27	0.738	0.769	0.798	0.824	0.849	0.871	0.935	1	0	0	0	0
28	0.715	0.746	0.775	0.803	0.828	0.851	0.872	0.936	1	0	0	0
29	0.692	0.724	0.753	0.781	0.807	0.831	0.853	0.873	0.937	1	0	0
30	0.671	0.702	0.732	0.76	0.787	0.811	0.834	0.855	0.874	0.937	1	0
31	0.65	0.681	0.711	0.739	0.766	0.791	0.815	0.837	0.857	0.875	0.938	1
32	0.63	0.66	0.69	0.719	0.746	0.772	0.796	0.819	0.839	0.859	0.877	0.938
33	0.61	0.641	0.67	0.699	0.726	0.752	0.777	0.8	0.822	0.842	0.86	0.877
34	0.592	0.622	0.651	0.68	0.707	0.733	0.758	0.782	0.804	0.825	0.844	0.862
35	0.575	0.604	0.633	0.661	0.688	0.715	0.74	0.764	0.786	0.808	0.828	0.846
36	0.558	0.587	0.616	0.643	0.67	0.696	0.722	0.746	0.769	0.79	0.811	0.83
37	0.543	0.571	0.599	0.626	0.653	0.679	0.704	0.728	0.751	0.773	0.794	0.814
38	0.528	0.555	0.583	0.61	0.636	0.662	0.687	0.711	0.734	0.757	0.778	0.798
39	0.514	0.54	0.567	0.594	0.62	0.645	0.67	0.694	0.718	0.74	0.762	0.782
40	0.5	0.526	0.553	0.579	0.604	0.629	0.654	0.678	0.701	0.724	0.746	0.766
41	0.487	0.513	0.538	0.564	0.589	0.614	0.638	0.662	0.686	0.708	0.73	0.751
42	0.475	0.5	0.525	0.55	0.575	0.599	0.623	0.647	0.67	0.693	0.714	0.735
43	0.463	0.488	0.512	0.537	0.561	0.585	0.609	0.632	0.655	0.677	0.699	0.72
44	0.452	0.476	0.5	0.524	0.548	0.571	0.595	0.618	0.641	0.663	0.684	0.705
45	0.442	0.465	0.488	0.512	0.535	0.558	0.581	0.604	0.627	0.649	0.67	0.691
46	0.432	0.454	0.477	0.5	0.523	0.546	0.568	0.591	0.613	0.635	0.656	0.677
47	0.422	0.444	0.466	0.489	0.511	0.534	0.556	0.578	0.6	0.621	0.642	0.663
48	0.413	0.434	0.456	0.478	0.5	0.522	0.544	0.566	0.587	0.608	0.629	0.65
49	0.404	0.425	0.446	0.468	0.489	0.511	0.532	0.554	0.575	0.596	0.616	0.637
50	0.396	0.416	0.437	0.458	0.479	0.5	0.521	0.542	0.563	0.584	0.604	0.624
51	0.388	0.408	0.428	0.449	0.469	0.49	0.51	0.531	0.551	0.572	0.592	0.612
52	0.38	0.4	0.42	0.44	0.46	0.48	0.5	0.52	0.54	0.56	0.58	0.6
53	0.373	0.392	0.411	0.431	0.45	0.47	0.49	0.51	0.53	0.55	0.569	0.589
54	0.366	0.385	0.404	0.423	0.442	0.461	0.481	0.5	0.519	0.539	0.558	0.577
55	0.36	0.378	0.396	0.415	0.433	0.452	0.471	0.49	0.51	0.529	0.548	0.567
56	0.353	0.371	0.389	0.407	0.425	0.444	0.462	0.481	0.5	0.519	0.538	0.556
57	0.347	0.364	0.382	0.4	0.418	0.436	0.454	0.472	0.491	0.509	0.528	0.546
58	0.341	0.358	0.375	0.393	0.41	0.428	0.446	0.464	0.482	0.5	0.518	0.536
59	0.336	0.352	0.369	0.386	0.403	0.42	0.438	0.456	0.473	0.491	0.509	0.527
60	0.33	0.346	0.363	0.379	0.396	0.413	0.43	0.448	0.465	0.482	0.5	0.518

	32	33	34	35	36	37	38	39	40	41	42
12	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	[illegible]	0
14	0	0	0	0	0	0	0	0	0	[illegible]	0
15	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0
32	1	0	0	0	0	0	0	0	0	0	0
33	0.939	1	0	0	0	0	0	0	0	0	0
34	0.878	0.939	1	0	0	0	0	0	0	0	0
35	0.863	0.879	0.94	1	0	0	0	0	0	0	0
36	0.848	0.865	0.88	0.94	1	0	0	0	0	0	0
37	0.833	0.85	0.866	0.881	0.94	1	0	0	0	0	0
38	0.817	0.835	0.852	0.867	0.881	0.941	1	0	0	0	0
39	0.801	0.82	0.837	0.853	0.868	0.882	0.941	1	0	0	0
40	0.786	0.805	0.822	0.839	0.855	0.869	0.883	0.941	1	0	0
41	0.771	0.79	0.808	0.825	0.841	0.856	0.87	0.883	0.942	1	0
42	0.755	0.775	0.793	0.811	0.827	0.843	0.857	0.871	0.884	0.942	1
43	0.74	0.76	0.779	0.796	0.813	0.829	0.845	0.859	0.872	0.884	0.942
44	0.726	0.745	0.764	0.782	0.8	0.816	0.832	0.846	0.86	0.873	0.885
45	0.711	0.731	0.75	0.768	0.786	0.803	0.818	0.833	0.848	0.861	0.874
46	0.697	0.717	0.736	0.754	0.772	0.789	0.805	0.821	0.835	0.849	0.862
47	0.683	0.703	0.722	0.741	0.759	0.776	0.792	0.808	0.823	0.837	0.851
48	0.67	0.69	0.709	0.727	0.745	0.763	0.779	0.795	0.81	0.825	0.839
49	0.657	0.676	0.696	0.714	0.732	0.75	0.766	0.783	0.798	0.813	0.827
50	0.644	0.664	0.683	0.701	0.719	0.737	0.754	0.77	0.786	0.801	0.815
51	0.632	0.651	0.67	0.688	0.706	0.724	0.741	0.758	0.773	0.789	0.803
52	0.62	0.639	0.658	0.676	0.694	0.712	0.729	0.745	0.761	0.777	0.792
53	0.608	0.627	0.646	0.664	0.682	0.699	0.716	0.733	0.749	0.765	0.78
54	0.596	0.615	0.634	0.652	0.67	0.687	0.704	0.721	0.737	0.753	0.768
55	0.585	0.604	0.622	0.64	0.658	0.676	0.693	0.709	0.726	0.741	0.757
56	0.575	0.593	0.611	0.629	0.647	0.664	0.681	0.698	0.714	0.73	0.745
57	0.564	0.582	0.6	0.618	0.636	0.653	0.67	0.686	0.703	0.718	0.734
58	0.554	0.572	0.59	0.607	0.625	0.642	0.659	0.675	0.691	0.707	0.723
59	0.544	0.562	0.58	0.597	0.614	0.631	0.648	0.664	0.681	0.696	0.712
60	0.535	0.552	0.57	0.587	0.604	0.621	0.637	0.654	0.67	0.686	0.701

	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	0.942	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	0.885	0.943	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	0.874	0.886	0.943	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	0.863	0.875	0.886	0.943	1	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0.852	0.864	0.876	0.887	0.943	1	0	0	0	0	0	0	0	0	0	0	0	0
49	0.84	0.853	0.865	0.877	0.887	0.944	1	0	0	0	0	0	0	0	0	0	0	0
50	0.829	0.842	0.854	0.866	0.877	0.888	0.944	1	0	0	0	0	0	0	0	0	0	0
51	0.817	0.831	0.843	0.856	0.867	0.878	0.888	0.944	1	0	0	0	0	0	0	0	0	0
52	0.806	0.819	0.832	0.845	0.857	0.868	0.878	0.888	0.944	1	0	0	0	0	0	0	0	0
53	0.794	0.808	0.821	0.834	0.846	0.858	0.869	0.879	0.889	0.944	1	0	0	0	0	0	0	0
54	0.783	0.797	0.81	0.823	0.836	0.847	0.859	0.869	0.879	0.889	0.944	1	0	0	0	0	0	0
55	0.771	0.786	0.799	0.812	0.825	0.837	0.849	0.86	0.87	0.88	0.889	0.945	1	0	0	0	0	0
56	0.76	0.774	0.788	0.802	0.815	0.827	0.839	0.85	0.861	0.871	0.88	0.89	0.945	1	0	0	0	0
57	0.749	0.763	0.777	0.791	0.804	0.816	0.829	0.84	0.851	0.862	0.871	0.881	0.89	0.945	1	0	0	0
58	0.738	0.752	0.766	0.78	0.793	0.806	0.818	0.83	0.841	0.852	0.862	0.872	0.881	0.89	0.945	1	0	0
59	0.727	0.741	0.756	0.77	0.783	0.796	0.808	0.82	0.832	0.843	0.853	0.863	0.873	0.882	0.89	0.945	1	0
														0.873	0			