DBC® Finance

Debt/Size Tutorial

2021 Edition
Current as of Version 8.800

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❖ PREFACE

This tutorial is intended to assist a public finance professional in using *DBC Finance Debt/Size* (hereinafter referred to as *Debt/Size*) to solve sizing and amortization problems. It will guide you through a basic sizing analysis and several advanced analyses that are variations of the first. In addition, there are several exercises which present information in an increasingly complex fashion. These are designed to teach you how to extract assumption information from a not-so-obvious source. Some background material has been added to assist newcomers to the process involved in quantitative analysis. The suggestions given do not apply at every investment bank or issuer but do represent a common sequence of events at most firms. We hope you find them useful. For the experienced user, we have included some variations on the initial sizing to show how simple it is to create multiple scenarios using the original series as the basis.

STOP RIGHT THERE -- PLEASE READ FIRST

Before you actually begin setting up any bond issues, it is very important that you read the following sections regarding the program's layout and the bond math primer. **DBC FINANCE MUST ALREADY BE INSTALLED**. Enter all data and perform all instructions as indicated Read each **paragraph** carefully **BEFORE YOU ENTER ANY DATA**, especially those below the sample dialog, and **do not jump ahead** unless you are sure of what you are doing. Unless instructed to do otherwise, accept system defaults. The sequence of commands has been planned to ensure a complete review of all relevant features.

DBC Finance is updated regularly. If your version is more current than the one used in this Tutorial (8.800), review the **Release Notes** (these are included with every mailed update or for downloaded files and can also be accessed via Help-Readme Notes from within the program). They describe all the revisions and are the only form of continuing education available for DBC users.

Please see page 154 for Product Support information including phone numbers.

❖ INTRODUCTION

Debt/Size was designed to be an easy-to-use tool for sizing bond issues and computing debt service and other relevant bond statistics. Some of *Debt/Size*'s key features are:

- Unlimited number of project funds, reserve funds, and expenses.
- Freeform description of fund requirements vs. usual predefined input approach.
- Ability to model current interest bonds, CABs, convertible CABs, variable rate debt, multi-mode debt, auction/inverse bonds, and overlapping maturities.
- Maximum flexibility in describing call provisions.
- Unlimited number of sources and uses of funds.
- Ability to import data from and export to a spreadsheet and to execute math functions on columns of data in the system.

There are several conventions in this tutorial:

HEADERS/DESCRIPTIONS:

On the first page of each new topic or dialog, there is the following header:

> ❖ **BOND MATH PRIMER**

In the case of dialogs, the header will describe which menu you are in, which item you are in within the menu, as well as which dialog within that item you are in. Each header is followed by a descriptive paragraph.

INPUT DIALOG:

The sample input dialogs appear as they should AFTER the required data inputs are entered.

REQUIRED INPUTS:

Whenever there is data for you to enter, it will usually appear above and/or below the sample dialog in bold typeface with an asterisk next to it. Note also, that it will not appear indented as it does below. Please, please, please read the paragraph BEFORE you start executing the commands.

> ***** **Press ENTER at the GENERAL option in the DATA menu. Type "7/1/20" (the last coupon before refunding delivery date) as the dated date.**

REQUIRED READING:

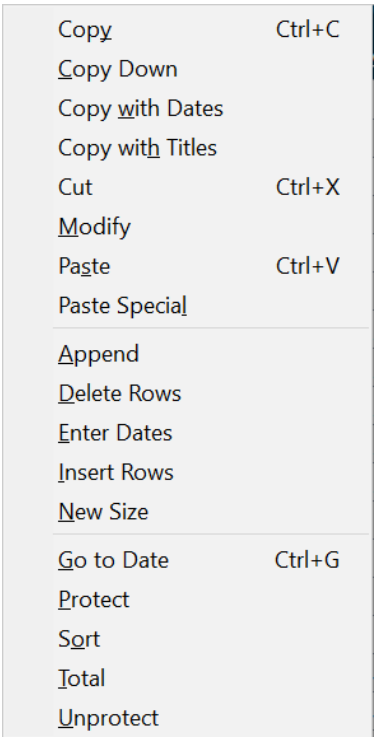
Whenever there are explanations that are critical to your understanding of what you have done, the hand will appear as below to warn you to stop and read.

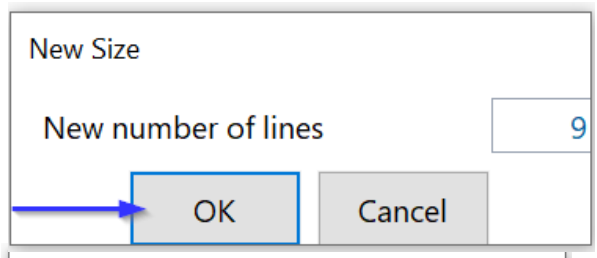
> **NOTE -** The delivery date must be entered correctly or the accrued interest will be wrong.

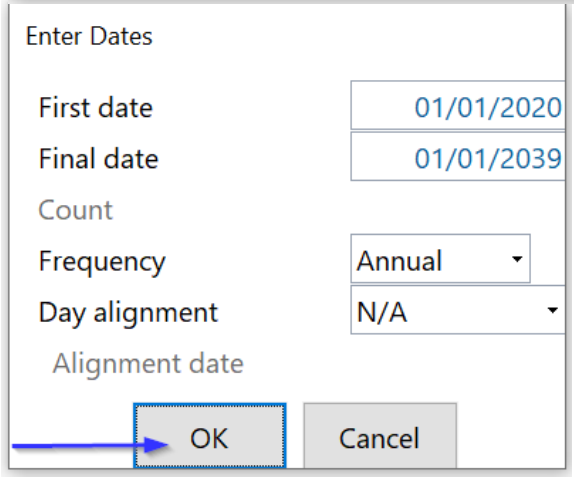
❖ SPECIAL DIALOGS

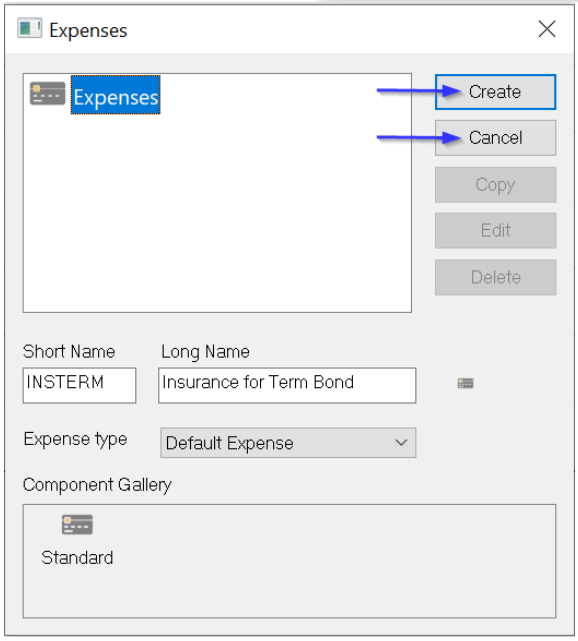
DIALOG BOX

The four graphics below are dialog boxes and are displayed when additional information is required from the user to continue running. The "New Size" and Enter Dates" windows can be accessed via the f5 key/right click window on the left while the "Expenses" window will appear when creating individual components. The buttons marked by the arrows require a user-response (one per dialog).



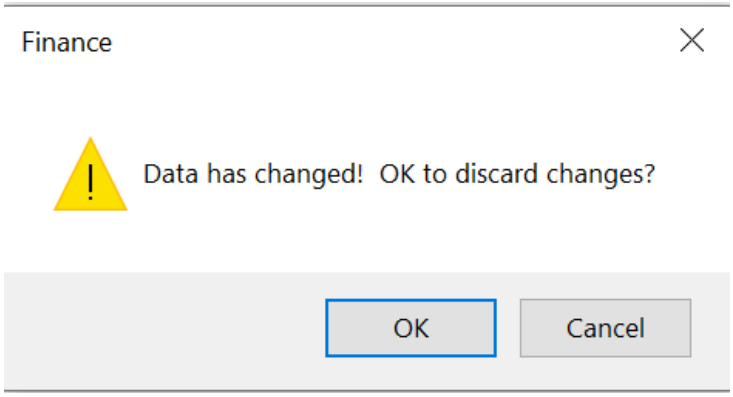






WARNINGS

The process of entering data in a dialog is completed by pressing the **OK** button on each dialog. If you press the **ESC** key while in a dialog you have just made changes to, you will be warned as shown below. The warning prompts you to **OK** to discard the changes or **CANCEL** to escape. Saying **CANCEL** will leave you where you are and **OK** will take you out of the dialog and erase any changes you just made. Entering data into a blank dialog constitutes a change as does entering new data over existing data.



FUNCTION KEYS

FUNCTION	
F1	Context-sensitive Help
F5	Edit Functions. Can also be accessed by **RIGHT MOUSE CLICK**
F7	Detailed information. Can also be accessed using ... button
F8	Advanced menu. Can also be accessed by clicking on **ADVANCED** button on input dialogs.
F9	Move to previous dialog. Can also be done using the < button on input dialogs
F10	Move to next dialog. Can also be done using the > button on input dialaogs
F11	Zoom Out. Can also be done using **Ctrl**+**Shift**+<
F12	Zoom In. Can also be done using **Ctrl**+**Shift**+>

❖ BOND MATH PRIMER

This section is intended to give you a brief review of present value calculations. If you are comfortable with these concepts, please feel free to skip to page 14. However, there is a sizing problem to do "by hand" which will give you insight into why you are learning to use *DBC Finance* instead of doing everything with a calculator. Send us your comments, as we would like to improve this section.

Present/Future Value

As you know, the most important concept in the financial industry is that of compounded interest, or the notion that you can earn interest not only on your original investment but on subsequent earnings as well.
The concept of present value revolves around the notion that a dollar today is worth more than a dollar tomorrow, next week, or a year from now. Why? - Because if you take that dollar today and invest it you will have interest earnings in the future and the value of that dollar will increase by that amount. The value in the future of that dollar is its **future value**. Its value today is its **present value**. In the compounded interest example above, the present value of the investment is $1,000 and its future value in three years is $1,259.71. The rate that equates these two values is the **yield**. When you compute the future value of an amount, you compound the interest at the **compounding rate**. When you have a future value amount and want to know what its value is today, you use a **discount rate (or present value rate)**. These two rates are the same number. How you refer to them is based on whether you are calculating from today to the future or vice versa.

For example:

If you invest $1,000 today at 8 percent **compounded annually** (this means that interest is computed once a year and added to the principal amount), at the end of the first year you will have the original $1,000 plus the $80 of interest earned. If you were to invest this same amount for two years, you would take the $1,080 you had at the end of the first year and earn interest on it for one more year. You would then earn interest not only on the principal but on the $80 earnings as well. Notice that as interest earnings are added to the previous principal amount, the new amount being reinvested gets larger and larger.

Fill in the blanks.

	Total New Principal	Rate	Interest Earnings	Ending Future Value
Today	$1,000.00	8%	$0.00	$1,000.00
Year 1	$1,000.00	8%	$80.00	$1,080.00
Year 2	$1,080.00	8%	$86.40	$1,166.40
Year 3	$1,166.40	8%	$93.31	$1,259.71
Year 4	$1,259.71	8%	____.__	_____.__
Year 5	_____.__	____	____.__	_____.__
Year 6	_____.__	____	____.__	_____.__

If you had simple interest, you would not receive interest on your earnings. An investment of $1,000 paying simple interest of 8% annually would look like this:

	Original Principal	Interest on Orig Princ	Interest on Interest	Total New Principal	Total Earnings	Cumulative Earnings
Today	$1,000.00	$0.00	$0.00	$1,000.00	$0.00	$0.00
Year 1		$80.00	$0.00	$1,000.00	$80.00	$80.00
Year 2		$80.00	$0.00	$1,000.00	$80.00	$160.00
Year 3		$80.00	$0.00	$1,000.00	$80.00	$240.00
Year 4		$80.00	____.__	_____.__	_____.__	_____.__
Year 5		____.__	____.__	_____.__	_____.__	_____.__

Which investment would you rather have at the end of five years?

Compounding Rate

Today	$1,000	
Year 1	$1,000 x 8% = $80.00	Total available = $1,080.00
Year 2	$1,080 x 8% = $86.40	Total available = $1,166.40

In this example, the investment is compounding annually (or growing) at a rate of 8%

The formula for computing future value is:

$$\text{Future Value} = \text{Principal} \times (1 + \text{annual rate}/m)^{Nm}$$

m = number of times interest is compounded per year
N = number of years

The problem shown above could be expressed as follows:

$$FV = \$1{,}000\ (1+.08/1)^{2x1}$$

If we took it step by step it would like this:

$$FV = \$1{,}000\ (1.08)(1.08)$$

Problem:

1. Compute the FV of $1,000 invested for five years at 6% compounded monthly.

2. Same as 1. but compound annually.

3. Compute and compare the FV of $5,000 invested for three years at 5% compounded monthly to 5.05% compounded annually. Which would you rather have?

Discount Rate

Let's say you want to have $5,000 in your account five years from now to put a down payment on a car. There are two banks down the street and their rates are 7% compounded monthly and 7.05% compounded semiannually, respectively. You are tight on cash this month and want to deposit the lowest amount that will compound or "grow" to exactly $5,000. You need to discount the $5,000 at each bank's interest rate to compute the present value then select the bank that will accept the lowest deposit.

The formula for present value is:

$$\text{Present Value} = \frac{\text{Future Value}}{(1 + \text{annual rate}/m)^{Nm}}$$

m = number of times interest is compounded per year
N = number of years

The problem above could be expressed as follows:

Bank 1 $$\text{Present Value} = \frac{\$5{,}000}{(1 + .07/12)^{5x12}} = \$3{,}527.03$$

Bank 2 $$\text{Present Value} = \frac{\$5{,}000}{(1 + .0705/2)^{5x2}} = \$3{,}536.04$$

Bank 1 offers a better deal because although their rate is lower, they compound interest more often than Bank 2 and this faster compounding rate over the five year “growth” period will close the gap between the interest rates.

If we ran this same problem assuming a one-year investment period, the lower interest rate would still be the better deal.

Bank 1 $$\text{Present Value} = \frac{\$5{,}000}{(1 + .07/12)^{1x12}} = \$4{,}662.92$$

Bank 2 $$\text{Present Value} = \frac{\$5{,}000}{(1 + .0705/2)^{1x2}} = \$4{,}665.30$$

Problem:

1. Discount $1,000 for five years assuming 6% compounded monthly.

2. Discount $10,000 for seven years assuming 12% compounded semiannually.

3. Discount $1.00 for three months assuming 4% compounded monthly.

Sizing Exercise 1

County ABC needs money to repair its roads. You have been assigned the task of coming up with the optimal dollar amount the County should borrow to fund this project. Optimal means no more than needed and no less within one bond denomination (for rounding purposes). These are the requirements you will have to consider for your analysis.

1. Project Draws

due in one month	$1,000,000
due in two months	$1,000,000
due in three months	$1,000,000
due in one year	$5,000,000

   The present value of these draws will be deposited in a fund earning 5% compounded monthly.

2. Costs of Issuance of $200,000 to pay the County's lawyers, the printers for the official statements, and the verification agent who reviewed the numbers for the deal.

3. Underwriter's discount of 1.50% of par (the actual amount borrowed before expenses). The discount is paid to the underwriting firms to compensate them for their participation in the transaction. It includes compensation for the bankers' time and expenses in structuring the transaction, the salesforce's time for selling the bonds, and for the risk taken by the firms. There is occasionally a risk that the price of the bonds could change after the firm pays the issuer for the bonds but before the firm has sold all the bonds. If the firm pays 100% for the bonds and cannot sell them for that price but only at a price of 98%, it would incur a loss of 2% of the par amount. This could be significant if many bonds remain unsold.

4. A reserve fund of 10% of par amount. This reserve fund is set aside and invested in case the County suffers a shortfall of revenues.

The par amount required can easily be computed using a calculator.

Hints for doing a sizing by hand - Determine which of your requirements are constants and which are variable or contingent upon some other number. The constants will serve as your foundation. Once you know what all your constants are, sort your variables by similar characteristics. For example, if you have two separate requirements contingent on the par amount, aggregate them.

Let's solve the problem

1. Discount the requirements of the project fund since the draws and discount rate are known.

2. Add the present value of the project fund to any other fixed costs (in this case, the costs of issuance).

3. Aggregate the costs which are a function of the par amount. In this example, the underwriter's discount and the reserve fund are based on the par amount.

4. Divide the constant amounts by 100%-(percentage of costs based on par).

$$\frac{\text{Fixed dollar requirements}}{100\% - \text{Total percentage of costs based on par}}$$

5. Prove to yourself that the par amount is sufficient to cover all your requirements.

6. Fill in the Sources & Uses table using the numbers you just computed:

	Based on Calculation
Sources of Funds:	
Par amount	$_____
TOTAL SOURCES	$_____
Uses of Funds:	
Project Fund	$_____
Costs of Issuance	$_____
Underwriter's Discount	$_____
Reserve Fund	$_____
TOTAL USES	$_____

The Sources & Uses table is basically an accounting statement which proves that the par amount of the bond issue is or is not sufficient to meet all the financial requirements of the financing. In an optimal sizing, your sources should never exceed your uses by more than one bond denomination (rounding). To prove that you have enough money, you must verify each of the uses you have listed. Once they have been verified, you should add them up and they should equal your sources.

Sizing Exercise 2

Given the information below, compute the optimal par amount as in Sizing Exercise 1.

1. Draws required - to be discounted at 12% compounded monthly.

due in 1 month	$1,000,000
due in 2 months	$5,000,000
due in 6 months	$5,000,000
due in one year	$9,000,000

2. Costs of Issuance of $150,000

3. Underwriter's discount of 2.0% of par

4. A reserve fund of 10% of par (less $25,000) **BE CAREFUL WITH THIS ONE**

❖ ANSWERS TO BOND MATH PROBLEMS

Present/Future Value Problem (Page 5)

	Total New Principal	Rate	Interest Earnings	Ending Future Value
Today	$1,000.00	8%	$0.00	$1,000.00
Year 1	$1,000.00	8%	$80.00	$1,080.00
Year 2	$1,080.00	8%	$86.40	$1,166.40
Year 3	$1,166.40	8%	$93.31	$1,259.71
Year 4	$1,259.71	8%	$100.78	$1,360.49
Year 5	$1,360.49	8%	$108.84	$1,469.33
Year 6	$1,469.33	8%	$117.55	$1,586.88

	Original Principal	Interest on Orig Princ	Interest on Interest	Total New Principal	Total Earnings	Cumulative Earnings
Today	$1,000.00	$0.00	$0.00	$1,000.00	$0.00	$0.00
Year 1		$80.00	$0.00	$1,000.00	$80.00	$80.00
Year 2		$80.00	$0.00	$1,000.00	$80.00	$160.00
Year 3		$80.00	$0.00	$1,000.00	$80.00	$240.00
Year 4		$80.00	$0.00	$1,000.00	$80.00	$320.00
Year 5		$80.00	$0.00	$1,000.00	$80.00	$400.00

The first investment is more desirable.

Compounding Rate (Page 6)

1. Compute the FV of $1,000 invested for five years at 6% compounded monthly.

   $1,348.85

2. Same as 2. but compound annually.

   $1,338.23

3. Compute and compare the FV of $5,000 invested for three years at 5% compounded monthly to 5.05% compounded annually. Which would you rather have?

   5% Monthly $5,807.36 This is preferable.

   5.05% Annually $5,796.40

Discount Rate (Page 7)

1. Discount $1,000 for five years assuming 6% compounded monthly.

   $741.37

2. Discount $10,000 for seven years assuming 12% compounded semiannually.

   $4423.01

3. Discount $1.00 for three months assuming 4% compounded monthly.

   $0. 99

Sizing Exercise 1 (Page 8)

1. Discount the requirements of the project fund since the discount rate is known.

in one month	$1,000,000	$ 995,850.62
in two months	$1,000,000	$ 991,718.46
in three months	$1,000,000	$ 987,603.45
in one year	$5,000,000	$4,756,641.21
		$7,731,813.74

2. Add the present value of the project fund to any other fixed costs (in this case, the costs of issuance).
   $7,731,813.74 + $200,000.00 = $7,931,813.74

3. Aggregate the costs which are a function of the par amount. In this example, the underwriter's discount and the reserve fund are based on the par amount.

   1.5% of par + 10% of par = 11.5% of par

4. Divide the constant amounts by 100%-(percentage of costs based on par).

   This is done because by grouping your fixed costs and your variable costs you now know that your par amount must be sufficient to cover:

   Par Amount = $7,731,813.74 + $200,000.00 + 1.5% of par + 10% of par

   Par Amount = $7,931,813.74 + 11.5% of par

   Let’s brush up on those algebra skills!

   Par Amount (this means 100% of par amount) - 11.5% of par = $7,931,813.74

88.5% of Par Amount = $7,931,813.74

Par Amount = $7,931,813.74 / 88.5%

Par Amount = $8,962,501.40

OR MORE SIMPLY STATED

$$\text{Par Amount} = \frac{\text{Fixed dollar requirements}}{\text{100\% - Total percentage of costs based on par}}$$

	Based on Calculation
Sources of Funds:	
Par amount	$ 8,962,501.40
TOTAL SOURCES	$ 8,962,501.40
Uses of Funds:	
Project Fund	$ 7,731,813.74
Costs of Issuance	$ 200,000.00
Underwriter's Discount	$ 134,437.52
Reserve Fund	$ 896,250.14
TOTAL USES	$ 8,962,501.40

Sizing Problem 2 (Page 9)

1. Discount the requirements of the project fund since the discount rate is known.

in 1 month	$1,000,000	$ 990,099.01
in 2 months	$5,000,000	$ 4,901,480.25
in 6 months	$5,000,000	$ 4,710,226.18
in one year	$9,000,000	$ 7,987,043.03
		$18,588,848.47

2. Add the present value of the project fund to any other fixed costs (in this case, the costs of issuance and the $25,000 reduction to the debt service reserve fund).

$18,588,848.47 + $150,000.00 - $25,000 = $18,713,848.47

3. Aggregate the costs which are a function of the par amount. In this example, the underwriter's discount and part of the reserve fund are based on the par amount.

2% of par + 10% of par = 12% of par

4. Divide the constant amounts by 100%-(percentage of costs based on par).

This is done by grouping the fixed costs and the variable costs. You now know that the par amount must be sufficient to cover the sum of these requirements.

Par Amount = $18,713,848.47 + 12% of par

Let's brush up on those algebra skills!

Par Amount (this means 100% of par amount) - 12% of par = $18,713,848.47

88% of Par Amount = $18,713,848.47

Par Amount = $18,713,848.47 / 88%

Par Amount = $21,265,736.90

Sources of Funds:		
Par amount	$	21,265,736.90
TOTAL SOURCES		$21,265,736.90
Uses of Funds:		
Project Fund	$	18,588,848.47
Costs of Issuance	$	150,000.00
Underwriter's Discount	$	425,314.74
Reserve Fund	$	2,101,573.69
TOTAL USES		$21,265,736.90

❖ DEFINITIONS OF TERMS

DBC Finance has context-sensitive Help which can be accessed by hitting **F1**. Access the **Glossary** from the **Help** menu.

Dated Date - This is the date as of which the bonds begin to accrue interest.

Delivery Date - This is the date on which the bonds are initially delivered to purchasers in exchange for the payment of the purchase price at closing.

Accrued Interest - This is interest due from the dated date on the bonds up to but not including the delivery date. Because the bondholder does not own the bonds until the delivery date and will receive the first interest payment computed from the dated date, the bondholder is not entitled to that amount. Consequently, s/he must pay accrued interest in addition to the purchase price when buying the bond. The bondholder is, in effect, returning ahead of time (at delivery) money which they will receive on the first interest payment date and are not entitled to.

Underwriter's Discount/Gross Spread - This is the income earned by the underwriting syndicate and it has four components: takedown (in effect, a commission to the sales force), management fee (paid to manager for overseeing financing), underwriting fee (compensation for market risk), and expenses (costs related to executing the financing).

Costs of Issuance - These are costs associated with the sale of a new issue of municipal securities paid by the issuer to entities other than the underwriters, for costs such as printing, rating agency fees, and bond counsel fees. These are comparable to costs associated with buying a house such as points on the mortgage, application fee, appraisal fee, and legal fees.

Debt Service - Principal and interest payments paid by the issuer to the bondholders as repayment. This is comparable to a monthly mortgage or car payment which consists of some amount of principal and interest on all outstanding principal (including the current amount being repaid). By purchasing a bond, you are, in effect, loaning money to the issuer. The bond is a sort of IOU with specific repayment terms including a rate of return. The sum of all the repayments of all the bonds issued in one issuance is the debt service.

Interest Rate Scale - This is a list of annual interest rates which shows what interest rates a municipal issuer would have to pay for principal amounts repaid over time (much like a yield curve). This list usually has rates for maturities ranging from one to thirty years in one-year intervals. The main factors affecting the scale are prevailing market rates, the issuer's credit rating, the tax-exempt status (federal, state, local, etc.), the issuer's credit history, and the sources of income pledged to secure the bonds, call protection, etc.

Bond Denomination - The face value of the bonds at issuance, typically $5,000.

Serial Bond - Municipal issuers frequently schedule principal repayments to occur each year over a number of years. Usually, the longer the maturity the higher the interest rate paid. Serial bonds provide an investor with a wide range of maturities to choose from to accomplish specific investment objectives. For example, someone saving money for their child's education would buy a bond with a long maturity.

Term Bond - A term bond is sold with a single maturity date and interest rate. Its final maturity date is usually 20 to 30 years from issuance. Term bonds have very large par amounts relative to the serial bonds in the same issue. However, term bonds are mostly prepaid over time from money set aside in a sinking fund

(a special redemption fund for term bonds only). For example, a $100,000,000 term bond due in 20 years might be cumbersome to repay "in one shot". It would be much easier if the issuer could set aside money every year to "sink" or repay some of the par amount which was "floated" or borrowed. Although this makes it seem very much like serial bonds, the key difference is that bonds are chosen on every sinking fund payment date by lottery to be redeemed from the sinking fund. The bondholder buys a term bond with the hopes that the bond will provide a high return until maturity but with the knowledge that their specific bond will probably be chosen by lottery to be redeemed from the sinking fund before maturity.

Capital Appreciation Bonds (CABs) - CABs are unique in that their issuance par amount equals their actual purchase price. A CAB pays no interest to the bondholder until maturity. The interest is, in effect, the difference between the par amount and the final maturity amount. Over time, the bond accretes (or grows) in value until it reaches its final maturity amount, usually $5,000 or a multiple of $5,000. The accretion occurs by compounding semiannually at the stated "yield" starting with the issuance par. For example, a CAB issued and purchased at $2,359.50 will pay the bondholder $5,000 at maturity. The $5,000 payment consists of $2,359.50 of principal and $2,640.50 of interest.

Convertible CABs - Convertible CABs accrue and compound interest like a CAB until the conversion date at which they reach their $5,000 value. On that date, they begin paying interest to bondholders like a current interest bond.

Capitalized Interest Fund - This is funded with bond proceeds and is usually created to pay for interest on the bond issue during the construction period of a project as the unfinished project cannot generate sufficient revenues required to pay interest. Capitalizing interest is very similar to having a credit card with a $1,000 balance, no money to pay next month's interest payment due, and borrowing another $100 from the card as a cash advance to make the payment. The end result is that you have made the payment due and the credit card balance is now $1,100 instead of $1,000.

Bond Insurance - This insures the repayment of principal and interest to the bondholder should the issuer be unable to do so. Premiums are usually a percentage of the total debt service of each insured maturity. This is like mortgage insurance - someone is insuring repayment on your behalf in return for a premium. The premium for bond insurance is usually paid at closing from bond proceeds, and is used to raise the arbitrage yield on the entire bond issue.

Debt Service Reserve - This is a reserve fund set aside for use in case revenues pledged to the bondholders are insufficient to pay debt service. The minimum balance requirement for this fund is dictated by the IRS. It is usually the lesser of 10% of proceeds, 100% of maximum annual debt service, or 125% of average annual debt service. This is usually funded from bond proceeds, and is, thus, usually limited in yield to the arbitrage yield on the bond issue.

Project Fund Draws - These are disbursements required at intervals to cover ongoing construction costs.

Arbitrage Yield - This yield is legally defined by the IRS and is the internal rate of return on the bonds for tax purposes. It is the single discount rate applied to each debt service payment so that the sum of the present value (to the delivery date) of the payments at this rate will be equal to:

Par Amount of the Bonds
\+ Accrued Interest
\- Original Issue Discount
\+ Original Issue Premium
\- Credit Enhancement Expenses

True Interest Cost - This is the semiannual discount rate which equates the purchase price (par plus accrued interest, less original issue discount, plus original issue premium, less underwriters' discount) of bonds to their respective debt service payments.

All-in TIC - This is the semiannual discount rate which equates the net proceeds of a bond issue to their respective debt service payments. This is considered to be the real cost of money to the issuer because it takes into account all costs related to the financing, not just those which fall into the legal definition of the arbitrage yield.

❖ ASSUMPTIONS FOR SIZING ANALYSIS

It is Winter 2019 and ABC County has decided the time has come to repave those potholes up and down Main Street and other major thoroughfares in the county. You have been asked to prepare a sizing analysis for a presentation to the Director of Finance for the County. The Director of Finance would like to see level debt service.

A sizing analysis answers the question "How many bonds do I need to issue to finance **all** my costs - no more, no less?". To do a sizing analysis, you need the following information from:

The banker/client:

timing for the financing (dated date, delivery date, etc.)

underwriter's discount and cost of issuance assumptions

project draw schedule(s) and investment rates

capitalized interest fund, if any, and investment rates

credit enhancement costs, if any

recoverability of credit enhancement (in arbitrage yield)

debt service reserve requirement, if any, and investment rates

The desk:

interest rate scale (provide the desk with the issuer name, its ratings, the term of the issue, and the purpose of the proposed financing, whether the issue/or part of issue is insured or not, potential insurer)

* **Photocopy this page for use later in the tutorial OR use a bookmark.**

For this financing, the input assumptions are as follows:

Dated Date	1/1/20			
Delivery Date	1/15/20			
First Interest Date	7/1/20			
Capitalized Interest	100% of bond interest through 7/1/21 Net fund at arbitrage yield			
Spread	$7.50 Average Takedown, $2.50 Expenses, $.50 Management Fee			
Costs of Issuance	$250,000			
Interest Rate/Yield	1/01/22	5/1.10%	1/01/30	5/1.47%
	1/01/23	5/1.11%	1/01/31	5/1.54%
	1/01/24	5/1.12%	1/01/32	CAB Yld 1.61%
	1/01/25	5/1.13%	1/01/33	CAB Yld 1.67%
	1/01/26	5/1.15%	1/01/34	CAB Yld 1.73%
	1/01/27	5/1.23%	1/01/35	CAB Yld 1.78%
	1/01/28	5/1.31%	1/01/36	CAB Yld 1.83%
	1/01/29	5/1.39%	1/01/41 Term Bond 5/2.04% Sinking Fund starts 1/1/37	
Project Fund Draws	Net fund draws at the arbitrage yield			
	2/01/20	$3,472,500	2/01/21	$1,772,560
	4/01/20	$2,953,000	5/01/21	$1,000,000
	6/01/20	$6,222,920	8/01/21	$1,000,000
	8/01/20	$4,991,000	11/01/21	$1,000,000
	11/01/20	$3,941,000	TOTAL DRAWS	$26,352,980
Debt Service Reserve Requirement	Lesser of 10% par, 100% maximum annual d/s, or 125% average annual adjusted d/s (invested at the arbitrage yield) Gross fund at arbitrage yield and flow earnings to project fund and debt service, thereafter.			
Insurance	0.50% of total debt service applied only to the term bond. Included in the Arb Yield, TIC, & All-In TIC calculations.			
Issuer Contribution	$150,000			

❖ INPUTS REQUIRED FOR NEW MONEY ISSUE

The following is a checklist of inputs usually required to do a new money sizing.

INPUTS	DESCRIPTION
FILE MENU	
Datafile	File in which data is stored
Issuer	Issuer name and description
Series	Series name, description, and status
DATA MENU	
Debt/Size Assumptions	Dated/delivery dates and general issue data, spread and issuance costs
Bond Components	Maturity dates and scale for each group of bonds (i.e. serials)
Project Funds	Investment assumptions and draw schedule for project fund
Reserve/Capitalized Interest Funds	Investment assumptions reserve requirement or interest draw schedule for debt service reserve fund and capitalized interest fund
Expenses	Insurance, LOC, cash inflows over time, complex spread and COI
Additional Information	Optional
Reporting Options	Permits entry of additional titles and label for general fund
Automatic Updates	Facilitates copying of common characteristics from one common series
Other Sources	Additional sources of funds
Other Uses	Additional uses of funds
Refund Escrows	Escrows funded by proceeds of the series defined in DBC as well as transferred proceeds escrows
Other D/S	For use in wraparound solutions, aggregate reserve funding, and aggregate debt reports
Series Variable Rate Table	Use if several bond components have same variable rate scale
Tax Levy	For calculation of tax levy based on user-defined assessed valuations and DBC computed debt service
Other Formulas	Permits entry of complex formulas for advanced solutions
CALCULATE MENU	
Solution Assumptions	Options related to the bond solution and amortization of principal
Calculate	Executes bond solution

❖ FILE ORGANIZATION

In *DBC Finance*, file names are given before the file is set up. The highest level of organization is the datafile. Datafiles in *DBC Finance* are designed to let you keep a "library" of all an issuer's debt to permit analyses over time. A way to think of a datafile is to think of it as a file cabinet. The issuers would be the drawers and the series are the file folders.

As mentioned, the highest level is the datafile. This is the level at which you name the group of issuers or the sole issuer saved in a datafile. The name given to a datafile is also the name used for saving the file. The next level is the issuer level. At this level, you define the entity issuing the series you wish to describe (ABC County, City of Utopia). The lowest level is the Series level. At this level, you name the series of bonds you are describing (2018A, 2020). You would ideally keep all the series pertaining to one issuer under that issuer's name. You can define an infinite number of series for an issuer (including proposed refunding scenarios).

WARNING

For hard disk management purposes, remember that the more issuers or "drawers" you need, the bigger the datafile or "file cabinet" will need to be. If you create a datafile with many issuers each containing many series, any corruption of the data could render the entire file unusable. In addition, a very large file will run slower than normal. We strongly recommend that you create separate datafiles for large issuers AND that you use the TOOLS-COMPACT DATAFILE feature after you delete a large number of series or issuers. When you delete any data in a datafile, DBC does not automatically shrink the file. You must compact the datafile to eliminate all these "holes" in the file and to reduce the size of the file.

There are several examples of how different types of users would organize their datafiles on the next page. When actually setting up a file, we enter the Datafile name first, then the issuer name, and finally the series as follows:

Datafile - this is used to create the name for the file
Issuer - name of the issuing entity
Series - series of bonds described

Below is an example of a datafile with one datafile, three issuers, each with three series.

One Datafile	Datafile								
Multiple Issuers	Issuer A			Issuer B			Issuer C		
Multiple Series per Issuer	2015	2019	2020	2012	2014	2021	2013	2016	2018

Naming Datafiles

You can have more than one issuer in a datafile and more than one series for an issuer. If you are only going to include the debt of one issuer in the datafile, you can name the datafile the same as the issuer. If, for example, you were doing various assignments with a particular banker or counsel, you could save the various issuers under that banker's or counsel's name. The datafile name, although a required input, simply lets you add an additional level of detail to your file structure. Below are examples of how different types of users might organize their datafiles.

DATAFILE EXAMPLES - The following are examples of datafiles for different situations. The bold faced text is what you would enter as the short name for each level in the structure. Notice that the datafile name reflects the common link between the issuers in that datafile.

This is an example of how an **underwriter or financial advisor** might structure their datafile. They would usually sort information according to their clients' (issuers) names. This is acceptable for issuers with a few bond issues outstanding.

Datafile	Alameda County **ALAMEDA**		
Issuer	General Obligations **GO**		Revenue Bonds **REVENUE**
Series	**2018**	**2020**	**2019**

They could also structure their datafiles so that each issuer has its own datafile. This is preferable when the issuer has many series outstanding. This is how an **issuer** would probably organize their debt.

Datafile	Alameda Cty General Obligations **ALAGO**		Alameda Cty Revenue Bonds **ALAREV**
Issuer	Alameda Cty General Obligations **ALAGO**		Alameda Cty Revenue Bonds **ALAREV**
Series	**2018**	**2020**	**2019**

If you run numbers for another professional, you might create a datafile for that person's clients.

Datafile	Pat Johnson, Vice President **JOHNSON**		
Issuer	NY Urban Renewal Authority **NYURBAN**	Maricopa County **MARICOPA**	
Series	**2020**	**2018**	**2019**

Special Consultants and **Counsel** have both underwriters and issuers as clients. If an underwriter is the client, the datafile could be named after the underwriter or its client.

Datafile	Magnus Investments **MAGNUS**					
Issuer	Utopia County **UTOPIA**		City of Sin **CITYSIN**		State of Happiness **STHAPPI**	
Series	**2018**	**2020**	**2016**	**2017**	**2019**	**2021**

❖ STARTING DBC FINANCE

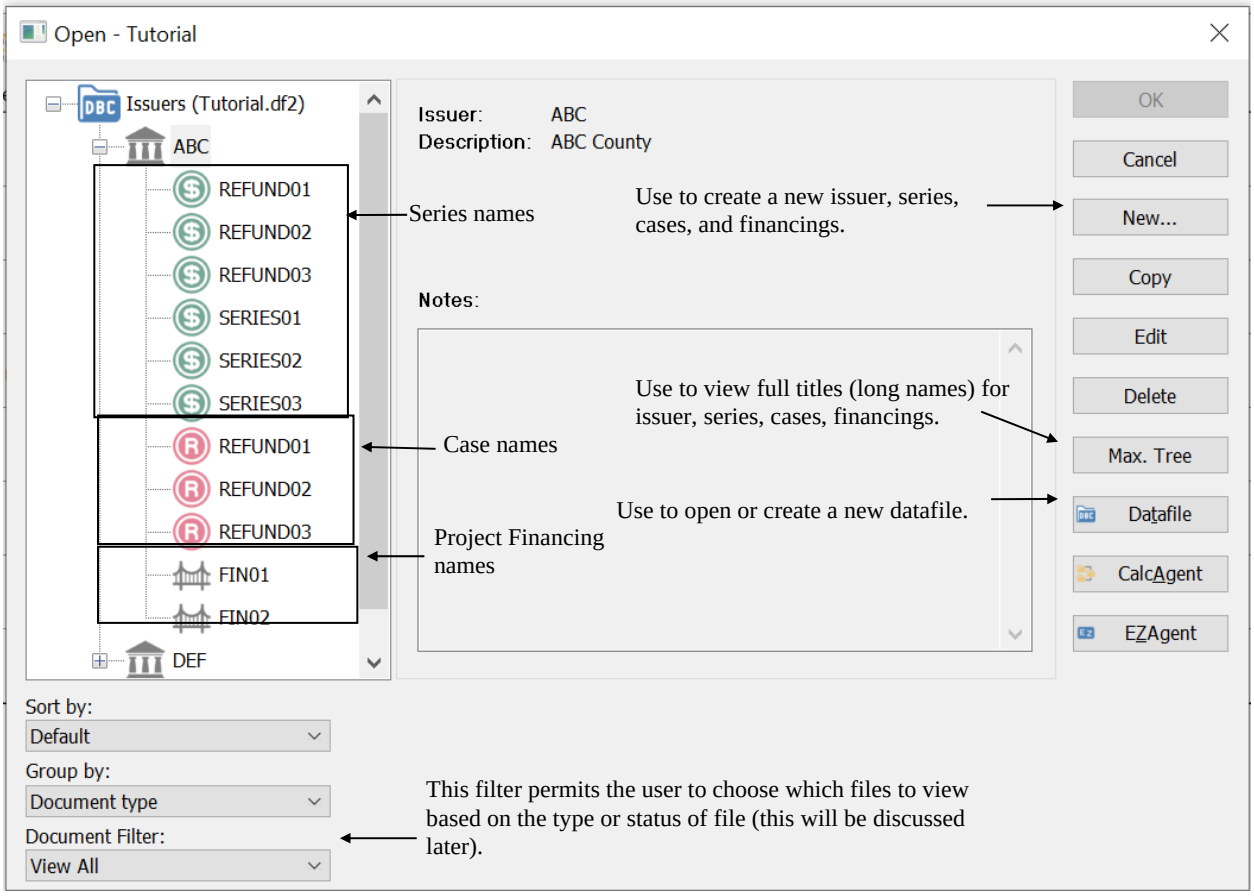
There are two ways to start *DBC Finance* . The simplest is to click on the DBC icon on your desktop. The alternate method is to use the START - PROGRAMS feature.

This icon usually appears on the desktop →

* **Click on the icon shown above to open DBC Finance.**

❖ OPEN DATAFILE

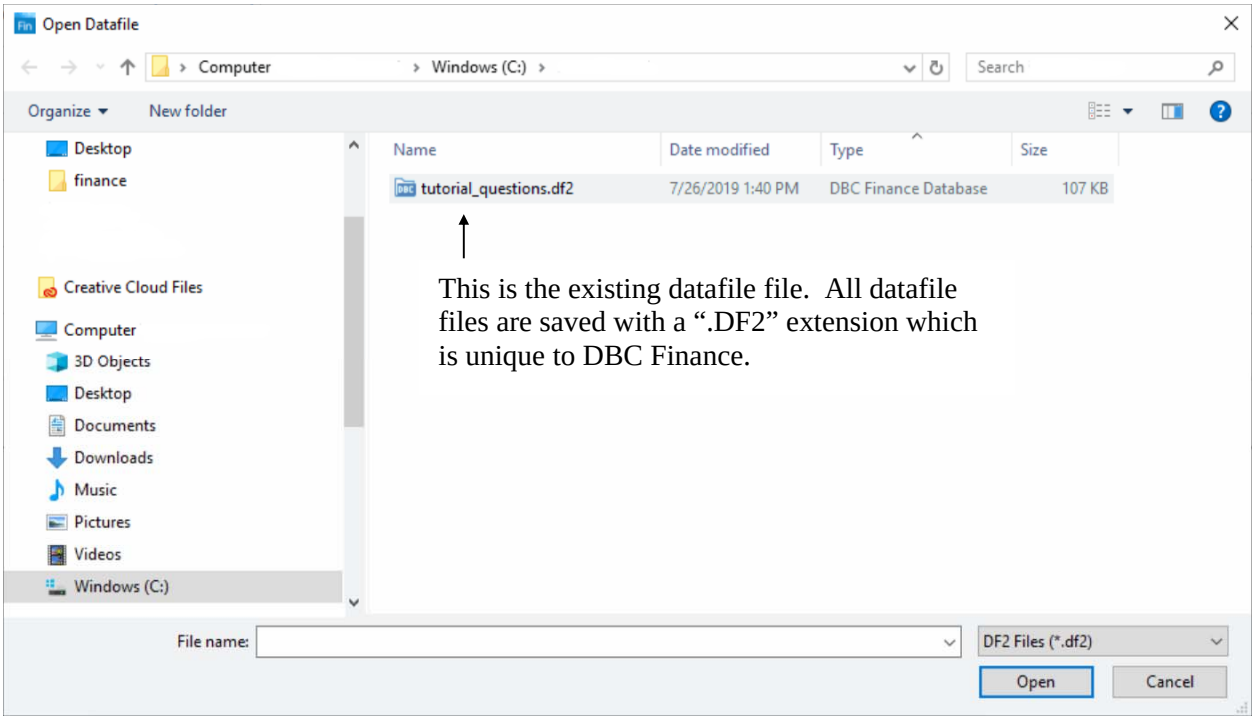
When you open DBC Finance, the dialog will show in outline form the issuer, series, cases, and project financing for the last datafile opened. If DBC was never used, the datafile will most likely be the datafile named DEMO (shown below). There is one issuer in the datafile named ANYWHERE. There are five bond series, three refunding cases and one project financing.



* **Click on DATAFILE in the above dialog.**

NOTE - It is important to create new datafiles whenever necessary. For example, to model all the existing debt of the State of New York, you should create a datafile for that specific issuer. Think of the file cabinet analogy - if you could have as many cabinets and drawers as you wanted, there would be no need to save everything in only one cabinet. By not creating new datafiles and continually adding more and more issuers to one datafile, you will create a huge file that will be extremely slow to work with and will also be more susceptible to data loss. A single glitch in a huge data file can make **all** of the data inaccessible.

Think of the datafile as a sort of folder for a specific issuer or a group of issuers under a common plan of finance. Once you have several datafiles and switch from one to the other - be sure to load the correct datafile every time you change projects otherwise you will save the current data in the wrong place.

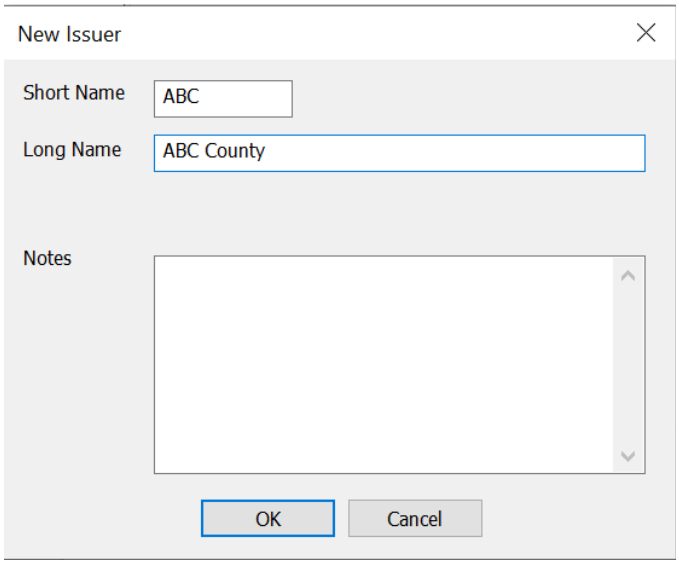


Type "TUTORIAL" in the FILE NAME prompt then click on OPEN or press ENTER. Click on NEW in the next dialog you see.

❖ OPEN ISSUER

Short/Long Name

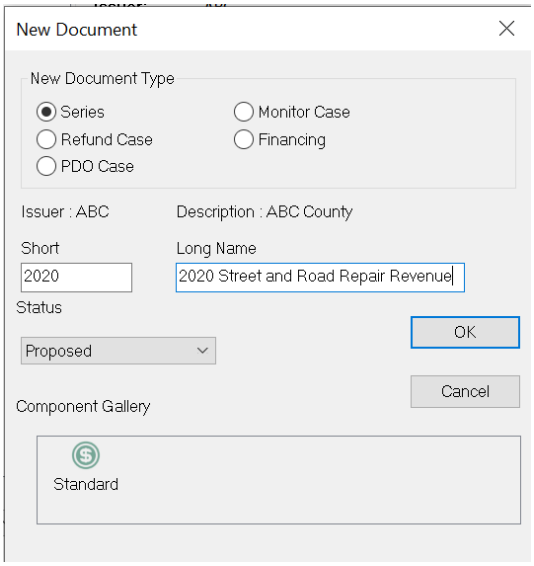
The issuer and series have both a short name and a long name. The short name is used for quick reference (like a nickname) while the long name is used for **reports only** to provide a more detailed description of the entry. The name you enter means nothing to the system as it is just a label. This convention applies throughout *DBC Finance* for items such as reserve funds, expenses, and escrow requirements. Notice that the Datafile only has a short name. Errors in any short/long named entries can be corrected using the **F5**-EDIT command.



∗ **Type "ABC" (short), press ENTER, and "ABC County" (long). Click on OK or press ENTER twice. Click on ABC-ABC County. Click on NEW in the next dialog you see.**

❖ OPEN SERIES

In this dialog you enter the series name. The series will be saved under the currently selected issuer in the open dialog. It too has a short and a long name. Remember that the long name will be used as the second line in the default report titles (can be turned off using the **DATA - ADDITIONAL INFORMATION - REPORTING OPTIONS**).



* **Put the cursor in the SHORT NAME field. Type the following names for this series - "2020" (short), press ENTER, and "2020 Street and Road Repair Revenue Bonds" (long) and press ENTER three times or click OK.**

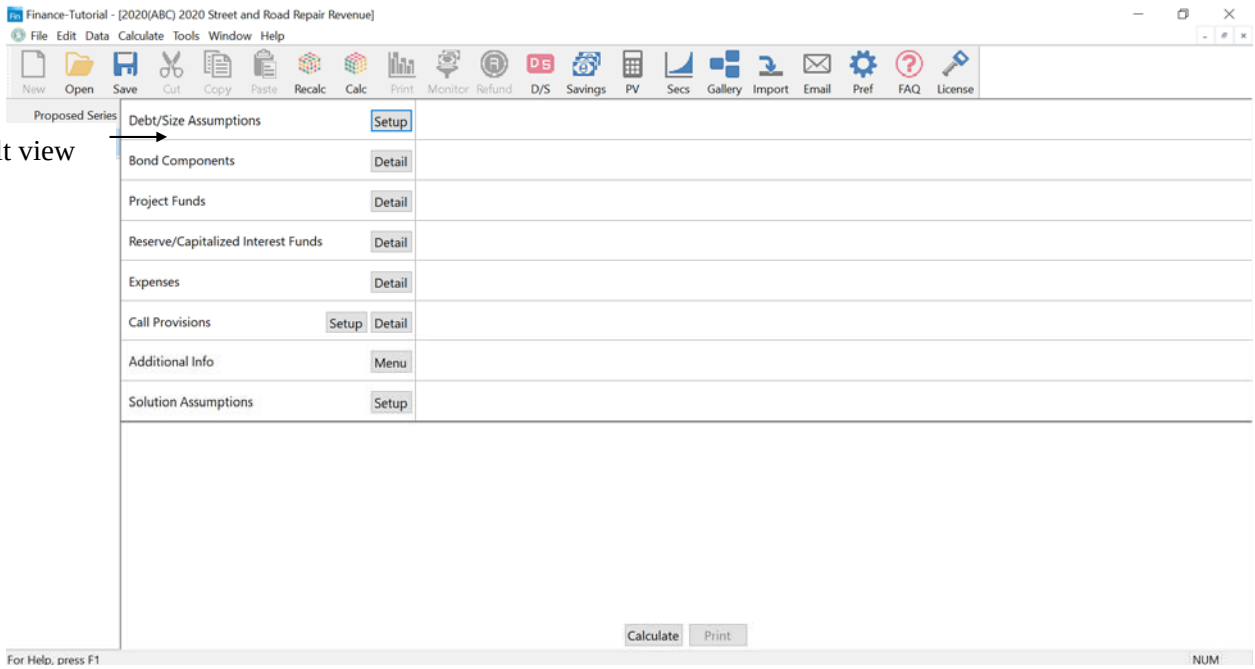
Editing Names If you make an error typing in the short or long names, simply put the cursor where the error is and correct it by pressing **F5-EDIT** or the **RIGHT MOUSE CLICK - EDIT** button.

Status is used to pre-sort and classify the series according to whether they have been issued yet and whether they are refunding bonds or not. The **STATUS** for all new series is **PROPOSED**. By sorting the series, the program shows you only what is relevant to the current input (i.e. when defining escrow requirements, the program will only show a list of files saved as Actual or Actual Refunding and would ignore all other series).

Status You can classify the series as Proposed (New Money), a Proposed Refunding, Actual (existing new money issue), or Actual Refunding (an existing refunding issue). A Template series is one from which General Assumptions and Bond Component and other information can be copied by other series (useful when many series all have the same scale). Master is for use in Project Finance only.

❖ DATA MENU

The **DATA** menu is where all the information regarding the bond issue is actually entered. Once a series is created, DBC will automatically present the dialog below to facilitate data entry. The user can simply work his or her way down the list entering all the relevant information. There are two ways to access the **DATA** input options. The first dialog shown is the default view of the **DATA** menu.

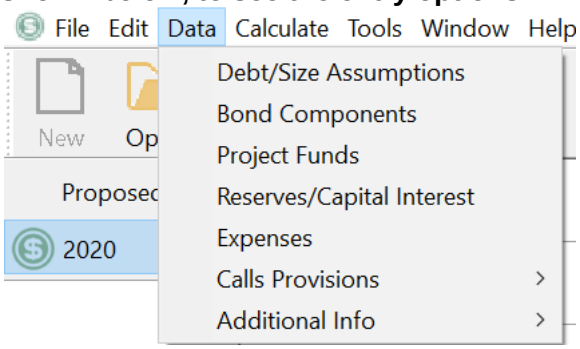


Default view

The **DATA** options are also available using the program menu as shown below.

* **Click on the DATA menu, as shown below, to see the entry options.**

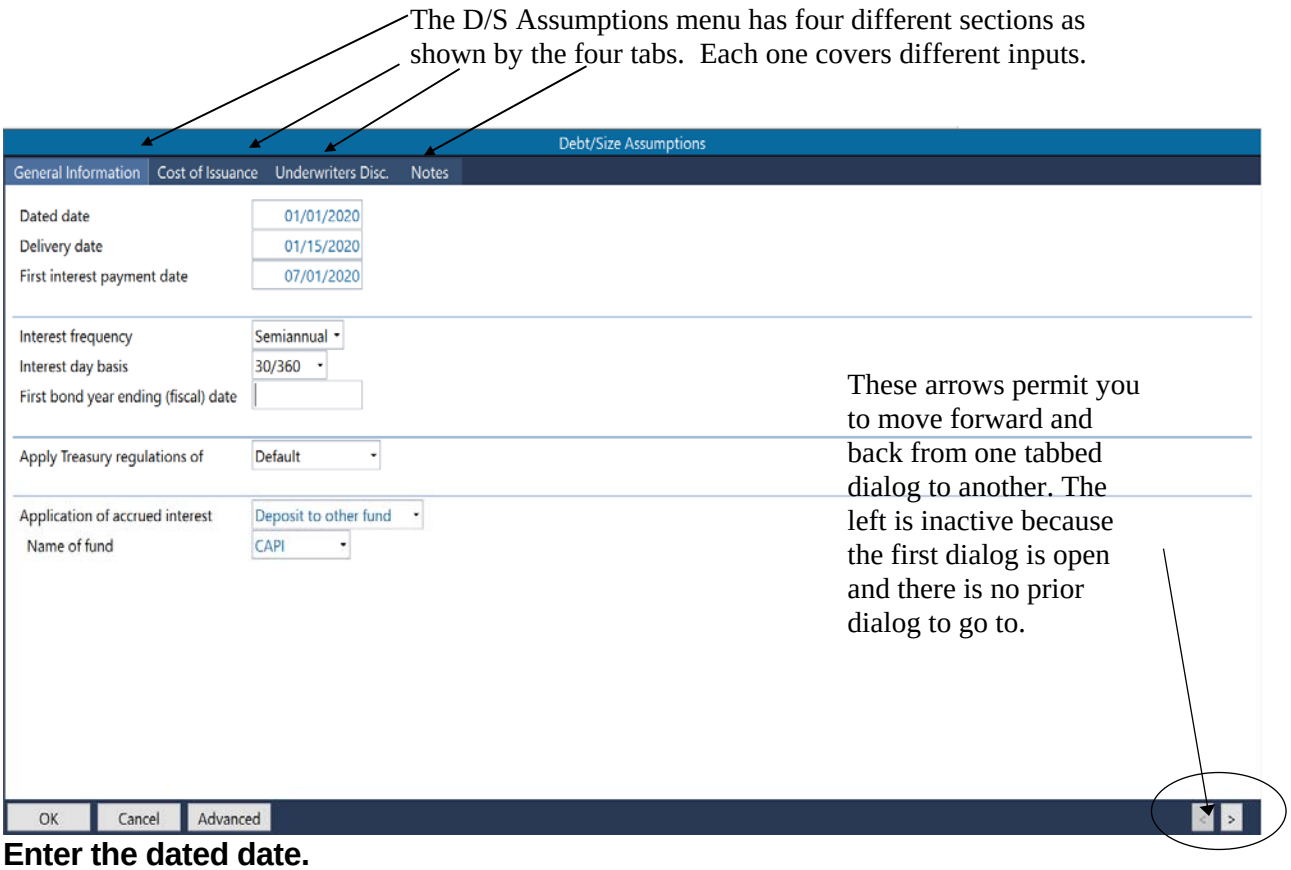
This requires you to go to the actual program menu and select the Data.



* **In either of the above dialogs, click on DEBT/SIZE ASSUMPTIONS - SETUP to enter the dated, delivery date, and other basic information regarding the issue.**

❖ DATA MENU - DEBT/SIZE ASSUMPTIONS - GENERAL INFORMATION

Here you enter dated and delivery date information as well as information such as first interest date and costs related to the issuance of the bonds.



* **Enter the dated date.**

Dates Dates can be entered using commas, slashes, dashes, periods, or spaces to separate the month-day-year.

NOTE - The delivery date defaults to the dated date until you change it. Also notice that the dated date is in blue and the delivery date, as defaulted by the system, is in black. The dated date is a protected entry (see below).

F5 Protect/ Unprotect Protected entries in DBC are very similar to data entered directly into a spreadsheet cell. By contrast, unprotected entries are like cell references since the data is a function of some other input in the system. When you enter data directly into a cell it is considered by the system to be a protected entry and is not affected by changes to the rest of the inputs. Changes to the entry are made simply be typing over the original entry. To change from one to the other, select **F5**, then "P" for **PROTECT** or "U" for **UNPROTECT**.

* **Now, enter the delivery date and the first interest payment date and notice they are also protected (appear in blue).**

* **Go to the INTEREST FREQUENCY line and click on the choice list button OR press SHIFT-? to see the options then press ESC (or click anywhere in the background).**

A pop-up menu will appear. Notice that *DBC Finance* supports 35 and 28 day interest frequency.

* **Go to the INTEREST DAY BASIS input and click on the choice list button OR press SHIFT-? to see the options.**

DBC supports four different methods of computing days of interest and defaults to 30/360 which is the industry convention for municipal bonds.

First bond year ending (fiscal) date represents the fiscal date, if any, on which the bonds must be solved. If left blank, this will internally default to the bond year which is based on the last maturity date (i.e. if the last maturity date is 2/15/2015, the bond years will be solved every 2/15).

DBC Finance has the ability to implement previous Treasury regulations. It selects which version of the regulations to use based on the delivery date of the bond issue. The default is to use the most current regulations.

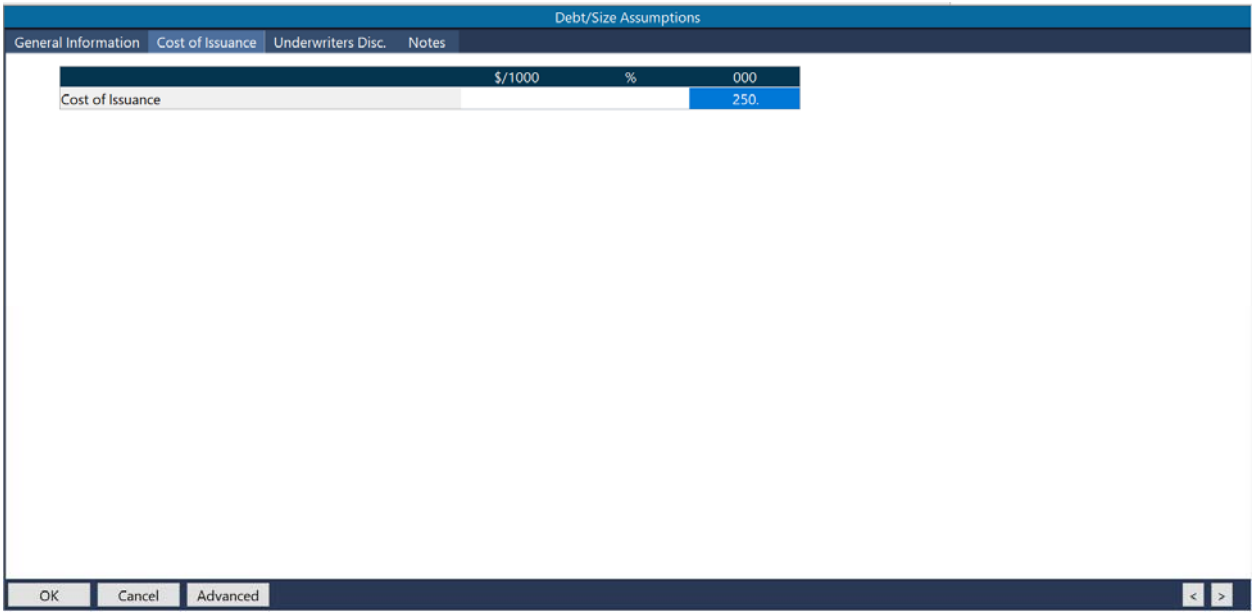
* **Go to APPLICATION OF ACCRUED INTEREST, click on the choice list button OR press SHIFT-? OR type the letter "D" and select "DEPOSIT TO OTHER FUND". Type "CAPI" for NAME OF FUND (appears below).**

Application of Accrued Interest describes how the accrued interest will be spent. It is usually sent to the General Fund by default. Amounts in the General Fund are usually used to pay debt service. In our analysis, the first interest payment is being paid from the Capitalized Interest fund. Therefore, the accrued interest dollars should be sent to the Capitalized Interest fund (to avoid double funding the accrued interest amount payable to the bondholders on the first interest payment date). You can deposit accrued interest in a fund not yet been modeled in the system by simply typing in the fund's name - just be sure to create that fund before you solve.

❖ DATA MENU - DEBT/SIZE ASSUMPTIONS - COSTS OF ISSUANCE

In the Costs of Issuance section, you have the option of entering information in dollars per thousand of par, a percentage of par, or actual dollar amounts.

* **Click on the COSTS OF ISSUANCE tab or press the right arrow in the lower right hand corner of the dialog.**



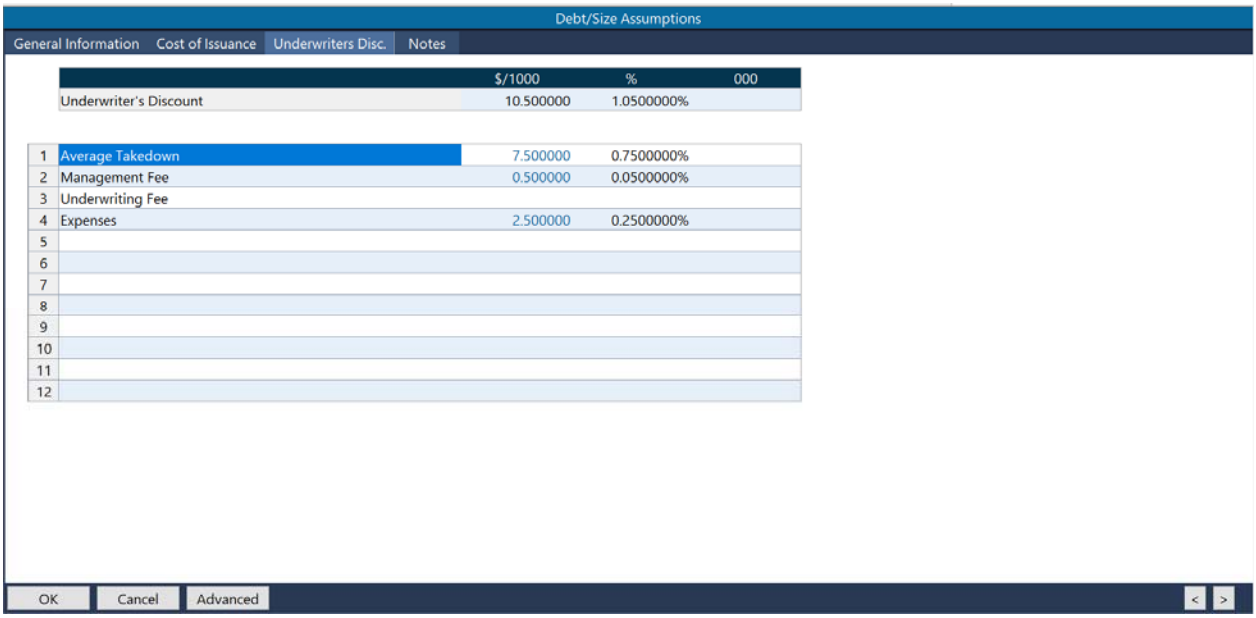
* **Enter the costs of issuance of $250,000 in thousands (type 250 in the third column).**

NOTE - You must only enter one input per line - i.e. You cannot have both a dollar amount and a percentage for costs of issuance**.** To clear the cell, press the **DELETE** key.

* **Click on the UNDERWRITERS DISCOUNT tab or press the right arrow in the lower right hand corner of the dialog.**

❖ DATA MENU - DEBT/SIZE ASSUMPTIONS - UNDERWRITERS DISCOUNT

In the Underwriters Discount section, you have the option of entering information in dollars per thousand of par, a percentage of par, or actual dollar amounts. You must either enter a gross number on the first line OR enter detailed spread information on the lines below.



* **Enter the underwriters discount components of AVERAGE TAKEDOWN of 7.50, MANAGEMENT FEE of .50, and EXPENSES of 2.50 in the $/1,000 column using lines 1-4.**

NOTE - You must only enter one input per item - i.e. You cannot have both a dollar amount and a percentage for costs of issuance**.** To clear the cell, press the **DELETE** key.

Detailed takedowns for each maturity are entered in the **BOND COMPONENT** dialog (to be discussed later). Notice that the total spread (in $/1,000 and %) is in black (unprotected) as it is a function of the amounts entered. The amount in the % column is in black. The actual dollar amount (based on percentage entries) and vice versa will be displayed only after a solution has been run and the program computes the amounts.

Protect/ Unprotect Go to the total **UNDERWRITER'S DISCOUNT** cell (in the $/1,000 column) and enter $11.00. Notice that the components of the discount are no longer displayed. By specifying the total, the system no longer allows you to specify the components. Be sure to unprotect the $11.00 entry (in blue) by using the **F5** key and **UNPROTECT** and the previous entries will be displayed again and the Underwriter's Discount will be recomputed using the detailed component spread.

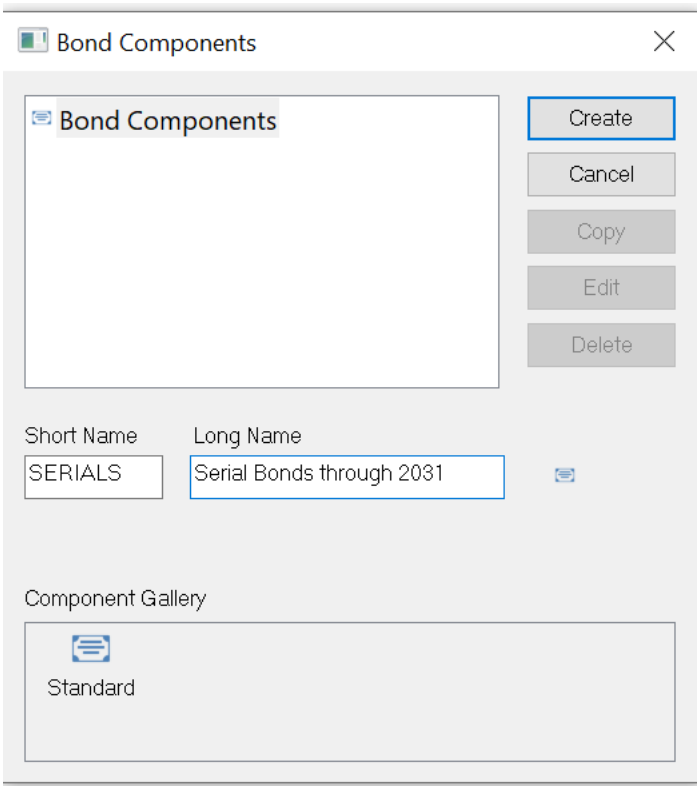
* **Be sure the spread amounts appear in blue in the $/1,000 column. Press OK.**

❖ DATA MENU - BOND COMPONENTS - SERIALS

DBC permits you to model the term structure of the issue as you would find it on the cover of the Official Statement. In this example, there are current interest serial bonds through 2031, CAB serials from 2032-2036, and a current interest term bond from 2037-2041. By permitting you to define each component on a stand-alone basis, you have maximum flexibility for structuring various types of bonds within one series including variable rate debt, CABs, convertible CABs, and overlapping maturities. This structure facilitates defining call provisions for each. In addition, these components can have completely unrelated payment schedules. There is no limit to the number of bond components you can define.

Serial vs. Term Bond In a serial bond, the issuer's repayment of debt is spread out over many years and a bond mature on each one of those years. A term bond matures on one date. However, the repayment of debt service is also spread out over many years through the operation of a sinking fund. A sinking fund refers to the periodic (usually annual) redemption of bonds before maturity. Sinking funds usually begin 5 to 10 years before the final term maturity.

* **Click on BOND COMPONENTS - DETAIL in the DATA menu.**

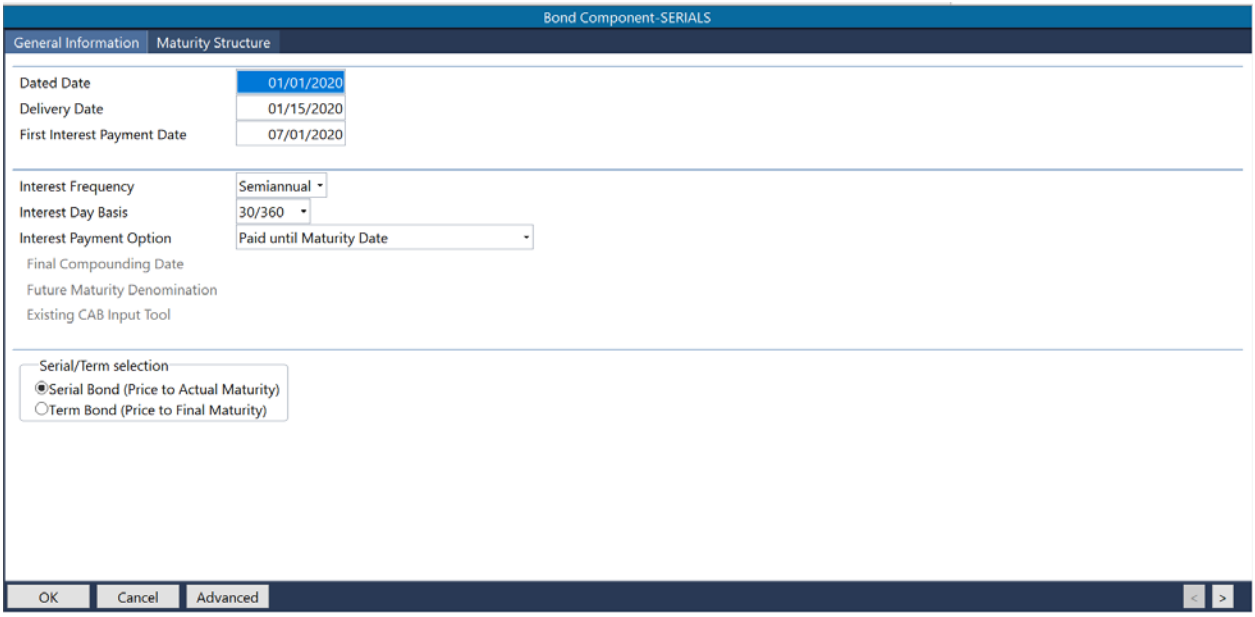


* **This issue has current interest serials, CAB serials, and a term bond. For the serial bonds type "SERIALS" in the short name prompt then press ENTER. Type "Serial bonds through 2031" for the long name (this IS case sensitive). Press ENTER twice or click on the CREATE button.**

❖ DATA MENU - BOND COMPONENT - GENERAL INFORMATION - SERIALS

The dated, delivery, and first interest dates are defaulted from your entries in the **GENERAL BOND INFORMATION** dialog. To make changes to this information that are particular to this component, simply type over the default information. DBC has four interest payment options: interest paid until maturity, compounded until maturity, compounded until a final compounding date (for convertible CABs), and at maturity (for notes). The program has certain industry standards entered as defaults. The inputs most likely to be changed are the first interest payment date, interest frequency, interest payment option, and Serial/Term selection.

Current Interest Bond A current interest bond pays interest periodically to the bondholder until maturity or redemption, whichever comes first.



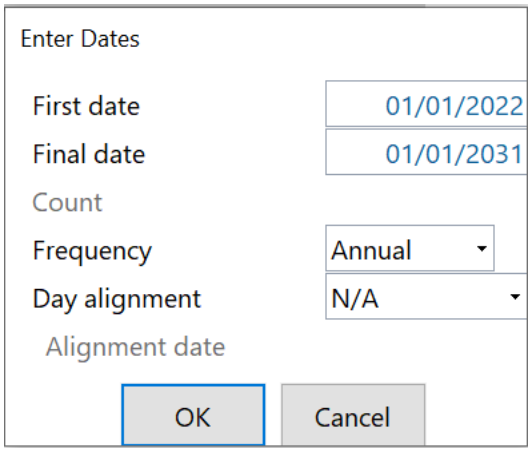
* **Make sure the INTEREST FREQUENCY is set to SEMIANNUAL and the INTEREST PAYMENT OPTION is set to PAID UNTIL MATURITY Date as we are modeling the current interest serial bonds in this component. In addition, be sure that the SERIAL/TERM SELECTION is set to SERIAL BOND. Click on the MATURITY STRUCTURE tab OR on the right arrow OR F10 when finished to go to the next input dialog.**

❖ DATA MENU - BOND COMPONENT - MATURITY DATA

The maturity information for bonds includes the maturity date, the interest rates and the price. The very first time you enter the **MATURITY STRUCTURE** tab, you see the dialog shown below where you enter the first and final dates, frequency of maturity and, if any, the day of the week on which maturities must occur. After the first time, it can be invoked in grids by using the **F5** key or the **RIGHT CLICK** of the mouse. There are several other ways to manipulate the dates: you can change the size of the grid and type the dates in directly, with or without using the **COPY DOWN** command; and you can insert and delete dates.

Serial Bonds For serial bonds, enter the first and final principal payment dates of the bond component in the dialog.

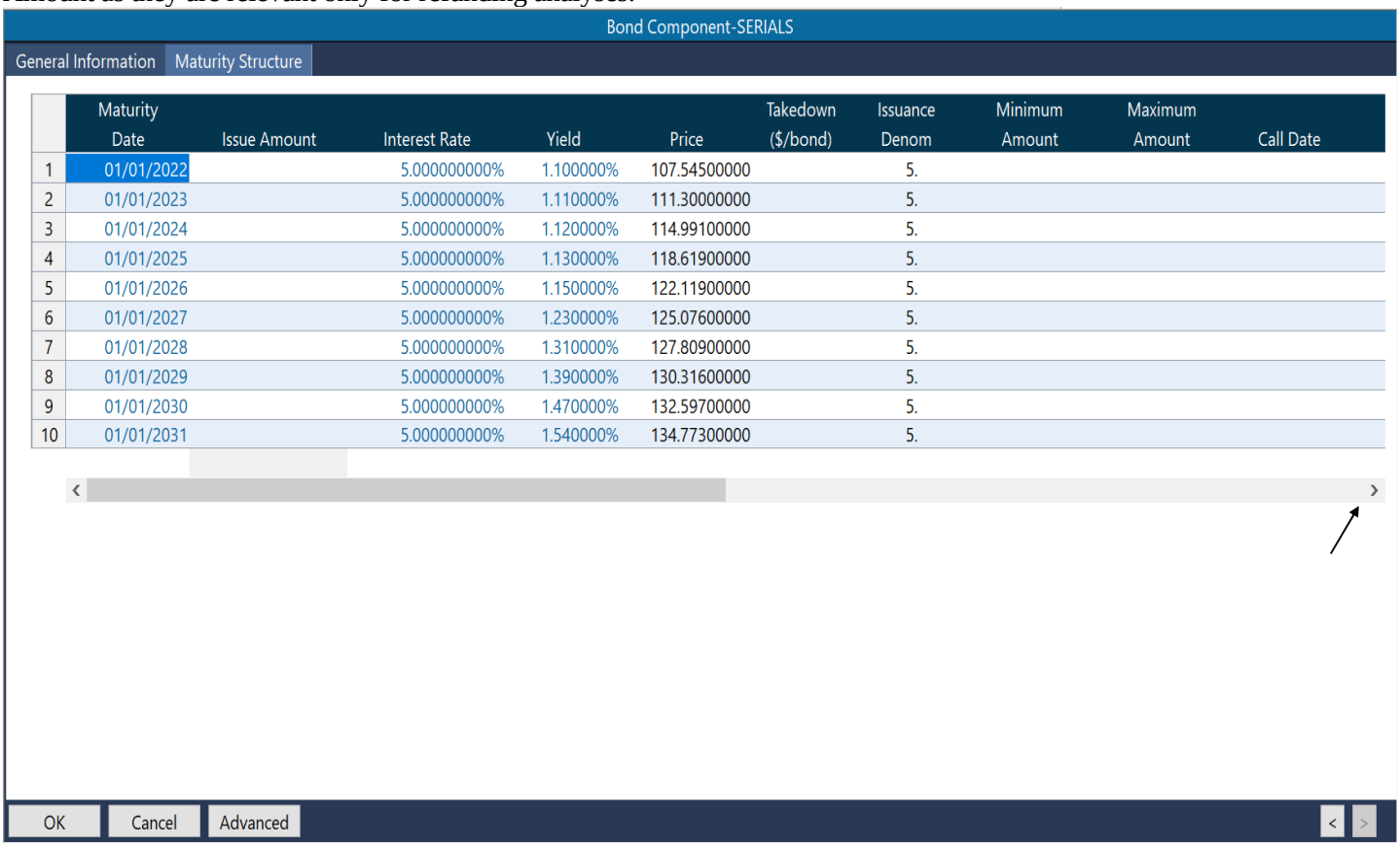
Day of Week Alignment The day of week alignment is used for principal periods that must occur regularly **and** on a specific day of the week - i.e. if 1st date is 11/1/20 and dates are to be aligned on the first Wednesday after the beginning of every month, the payment dates should be 11/4, 12/2, 1/6, etc. DBC will handle this automatically if you enter Wednesday.



* **In this dialog, enter the first and final maturity date of the serials (current interest bonds - not the CABs) as well as the frequency of principal. Click on the OK button.**

NOTE - If you accidentally press **ESC** or **ENTER** too many times and the date dialog disappears, simply press **F5** or **RIGHT CLICK** on the mouse and select **E** for **ENTER DATES**.

Notice that if you scroll to the right, there are per maturity inputs for entering the takedown, the issuance denomination, any minimum par amount, any pledged amounts, and the call date and premium. We usually recommend you enter call provisions in the call tables for maximum flexibility. Should you have predefined par amounts or amounts you want to hold constant in particular maturities, you can enter them in the Issue Amount column. Minimum par amount required for each maturity can be entered in the Minimum Amount column. Pledged amounts are principal amounts paid from a revenue source other than those used for the bond issue but whose interest is paid for by the same source as the bond issue. All entries made in these cells are considered "protected" by the system. For this exercise, ignore all columns to the right of Minimum Amount as they are relevant only for refunding analyses.



	Maturity Date	Issue Amount	Interest Rate	Yield	Price	Takedown ($/bond)	Issuance Denom	Minimum Amount	Maximum Amount	Call Date
1	01/01/2022		5.000000000%	1.100000%	107.54500000		5.			
2	01/01/2023		5.000000000%	1.110000%	111.30000000		5.			
3	01/01/2024		5.000000000%	1.120000%	114.99100000		5.			
4	01/01/2025		5.000000000%	1.130000%	118.61900000		5.			
5	01/01/2026		5.000000000%	1.150000%	122.11900000		5.			
6	01/01/2027		5.000000000%	1.230000%	125.07600000		5.			
7	01/01/2028		5.000000000%	1.310000%	127.80900000		5.			
8	01/01/2029		5.000000000%	1.390000%	130.31600000		5.			
9	01/01/2030		5.000000000%	1.470000%	132.59700000		5.			
10	01/01/2031		5.000000000%	1.540000%	134.77300000		5.			

* **Enter the interest rates in the INTEREST RATE column and the yield curve in the YIELD column for the serial bonds only.**

NOTE - The system will compute the yield and/or price and they will appear in black text (unprotected entries). You can enter detailed takedown information on this dialog **in lieu of** entering the average takedown entry in the **GENERAL BOND INFORMATION - UNDERWRITERS DISCOUNT**. If you enter the gross underwriting discount in the **GENERAL BOND INFORMATION - UNDERWRITERS DISCOUNT** dialog, the program will use the detailed takedown inputs to solve for total takedown but the sizing will be based upon the gross underwriting discount NOT the detailed takedowns.

********* SPECIAL INFORMATION *********

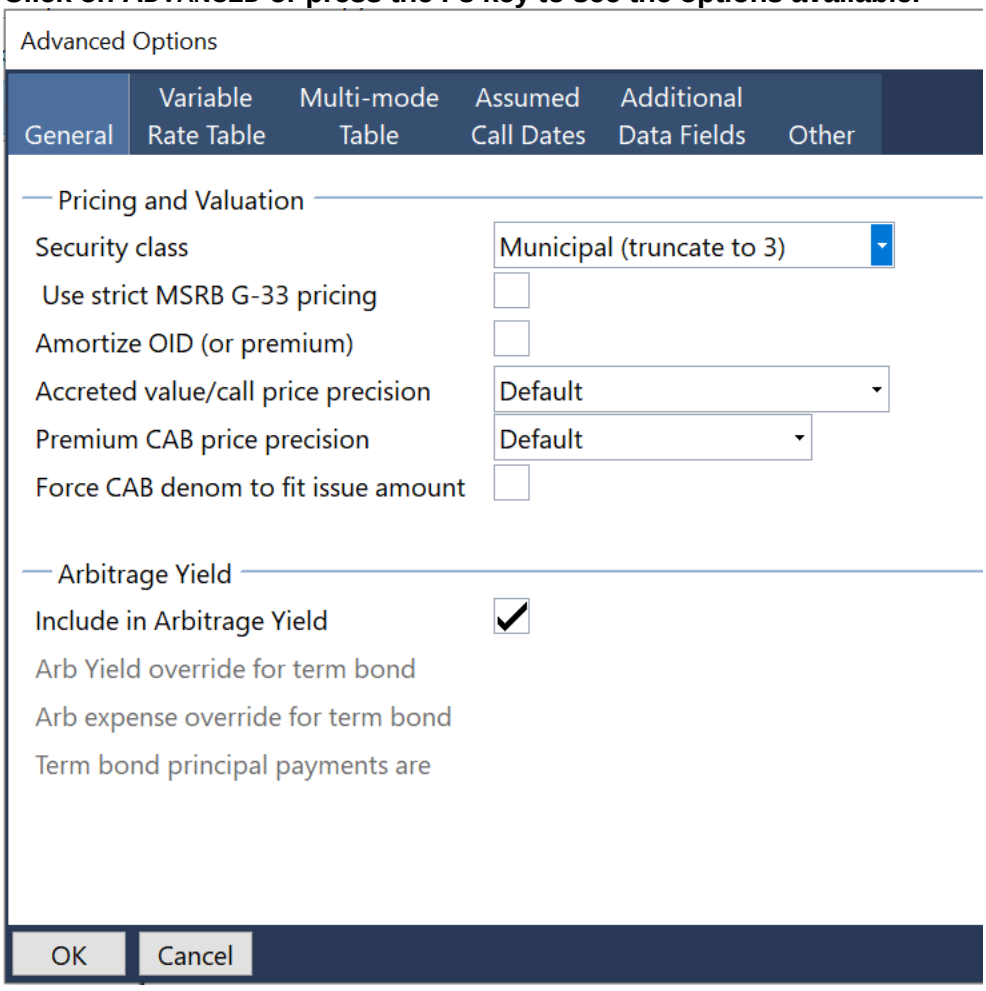
❖ ADVANCED DIALOG

In all *DBC Finance* applications, it is very common to have advanced dialogs. These dialogs permit the entry of information which is not part of everyday usage. It is put in the "background" to keep the user from having to read through countless options. In the **BOND COMPONENT** section, the advanced dialogs available permit entry of advanced amortization options, variable rate assumptions, and multi-mode assumptions.

Advanced Dialogs

Notice that there is an **ADVANCED** option at the bottom of the **BOND COMPONENT** dialog. This option appears wherever there are too many options for the main input dialog. The less frequently used options are likely to be found in these dialogs. This feature is also available by pressing the **F8** button.

* **Click on ADVANCED or press the F8 key to see the options available.**

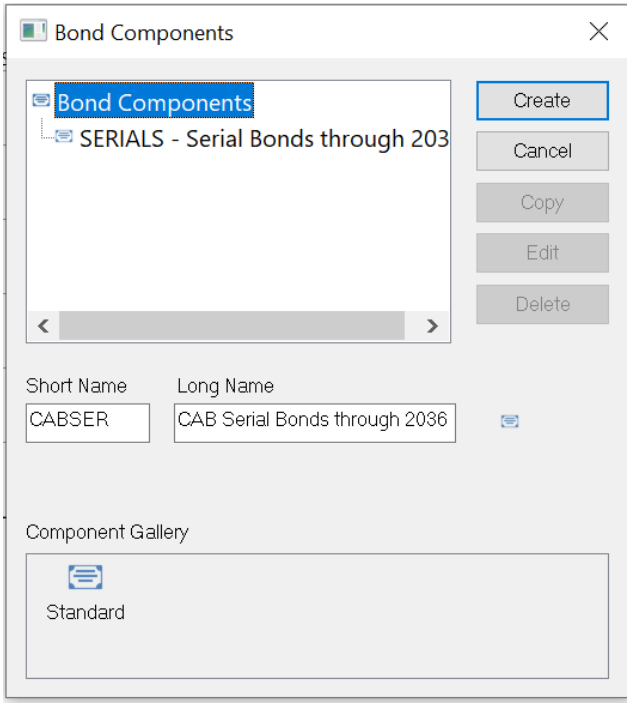


* **To browse through these entry dialogs, simply click on the different tabs. Press CANCEL to go back to the BOND COMPONENT. Once back in the BOND COMPONENT dialog, press OK to finish this entry.**

* **Click on the BOND COMPONENT - DETAIL button to begin the creation of the next bond component.**

❖ DATA MENU - BOND COMPONENTS - CABS

As you enter additional bond components, you will note an outline of the bond issue being displayed on the dialog below.



* **To define the parameters for the CAB serials, input the CABs as "CABSER" (short), press ENTER, and "CAB serial bonds through 2036" (long). Press ENTER twice or click on CREATE.**

Capital Appreciation Bonds (CABs) CABs are the municipal bond market's equivalent to corporate-type zero coupon bonds or Treasury STRIPS. CABs are unique in that the issuance par amount is defined as the actual purchase price at delivery, unlike zero-coupons and STRIPs which are quoted at a discount to par. CAB interest is not paid over time but compounded semiannually until maturity. For example, a CAB issued at $3,905.95 will pay the bondholder $5,000 at maturity - there are no interest payments in between (like a US Savings Bond). The difference between the issuance par and the maturity value is the return to the investor (interest). The bond's value accretes (grows) at some yield until it reaches its final maturity amount, usually $5,000. CABs are dated and delivered the same day and have no accrued interest.

Future Maturity Denomination This is the value of a CAB at maturity. Most CABs mature with a value of $5,000. Consequently, they are sold with a price well below the $5,000. However, there are some CABs that are sold at a price of $5,000 and accrete to a value at maturity which is higher than $5,000. The mathematics of the latter is identical to the CAB described above. The only difference is the dollar amount of the CABs when sold.

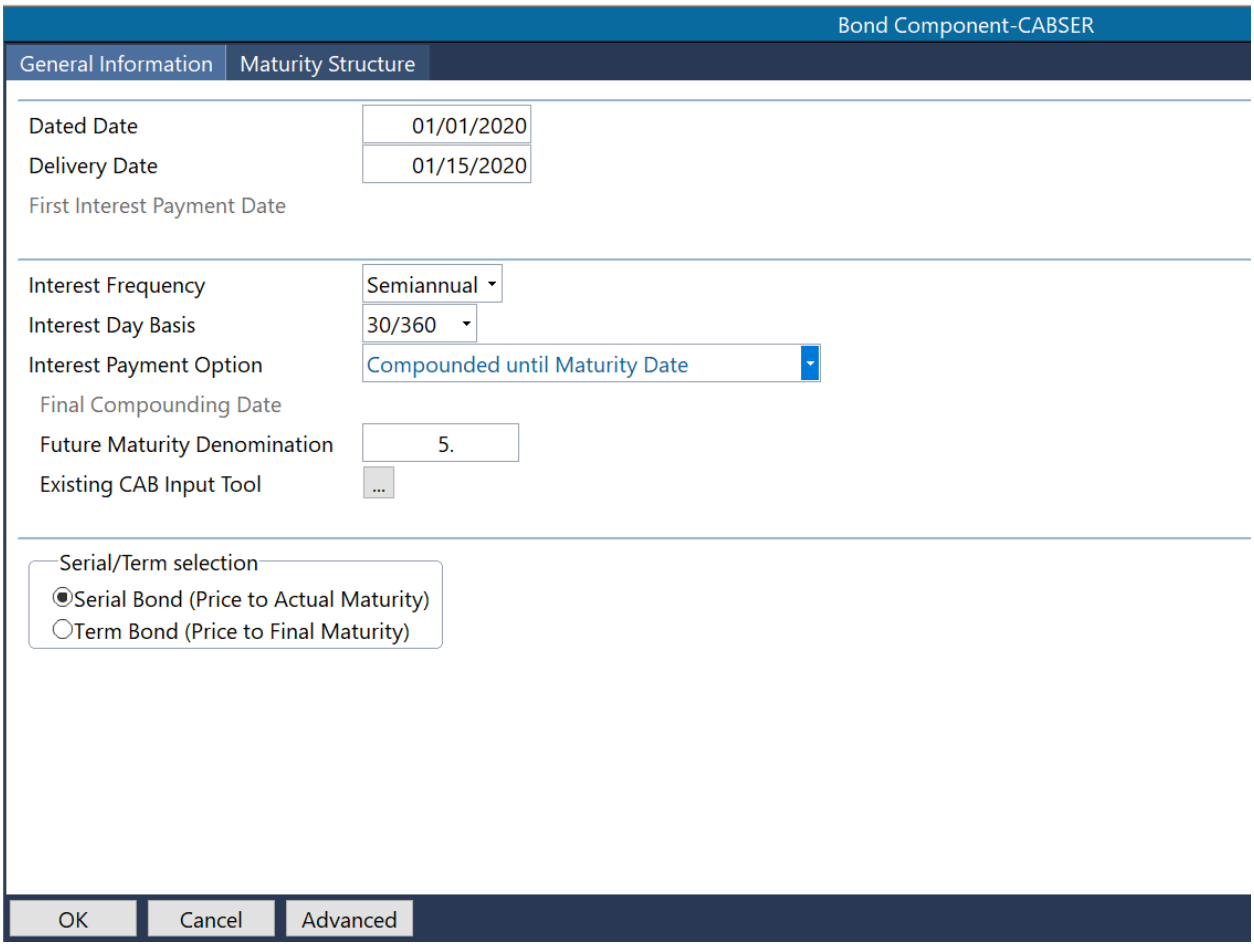
Convertible CABs

Convertible CABs act like CABs until a specific date on which they reach their $5,000 value. On that date, they convert to current interest bonds and begin paying interest to bondholders on a regular basis.

In the example below, we compare the cash flows of a CAB bond and a current interest bond. The CAB increases in value over time by compounding the interest earning while the current interest bond pays out its interest earnings to the bondholder directly.

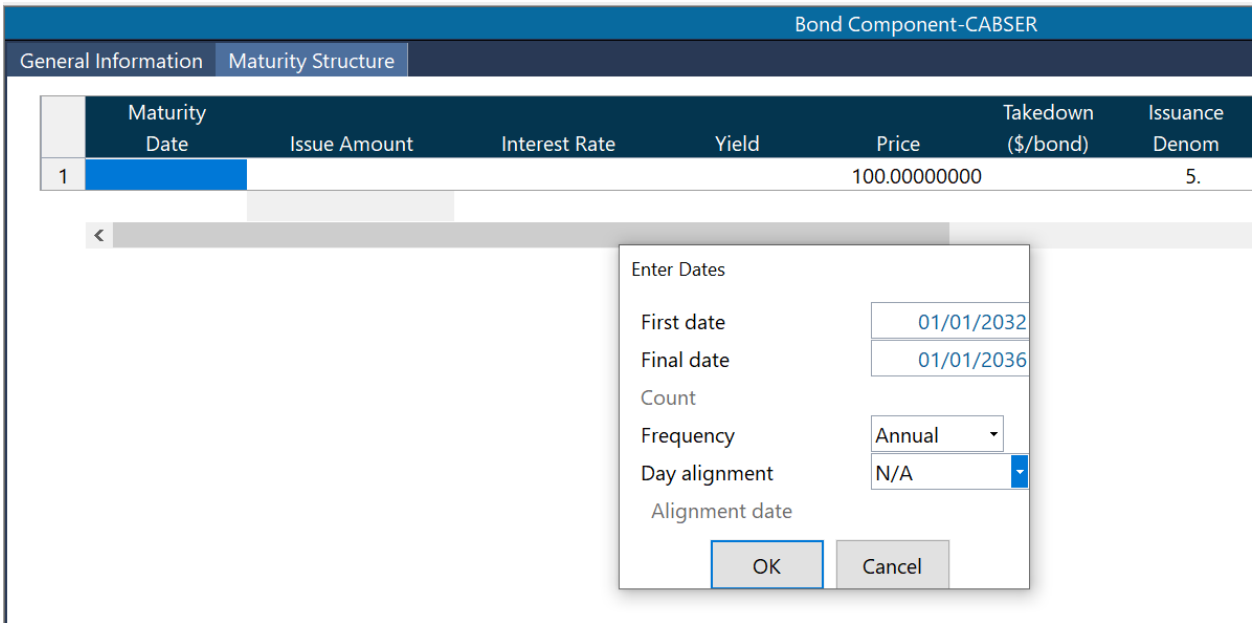
	Capital Appreciation Bond Yield = 5.00% Par Amount of $3,905.95 Price Paid is $3,905.95			Current Interest Bond Current Coupon = 5.00% Par Amount of $5,000.00 Price Paid is $5,000.00		
Closing Date	**Value of Bond**	**Accreted Interest**	**Payments to Bondholder**	**Value of Bond**	**Interest Paid**	**Payments to Bondholder**
6 months	3,905.95			5,000.00		
12 months	4,003.60	97.65		5,000.00	125.00	125.00
18 months	4,103.70	100.10		5,000.00	125.00	125.00
24 months	4,206.30	102.60		5,000.00	125.00	125.00
30 months	4,311.45	105.15		5,000.00	125.00	125.00
36 months	4,419.25	107.80		5,000.00	125.00	125.00
42 months	4,529.75	110.50		5,000.00	125.00	125.00
48 months	4,642.95	113.20		5,000.00	125.00	125.00
54 months	4,759.05	116.10		5,000.00	125.00	125.00
60 months	4,878.00	118.95		5,000.00	125.00	125.00
	5,000.00	121.00	5,000.00	5,000.00	125.00	5,125.00

The program has certain industry standards entered as defaults. The dated, delivery, and first interest dates are defaulted from your entries in the **GENERAL BOND INFORMATION** dialog.



* **For a CAB bond, change the INTEREST PAYMENT OPTION to COMPOUNDED UNTIL MATURITY DATE by pressing "C". Notice the default for the FUTURE MATURITY DENOMINATION is "5". Click on the MATURITY STRUCTURE tab OR the right arrow OR press F10.**

NOTE - The dated date of a CAB is its delivery date, therefore, the dated date above will be ignored.



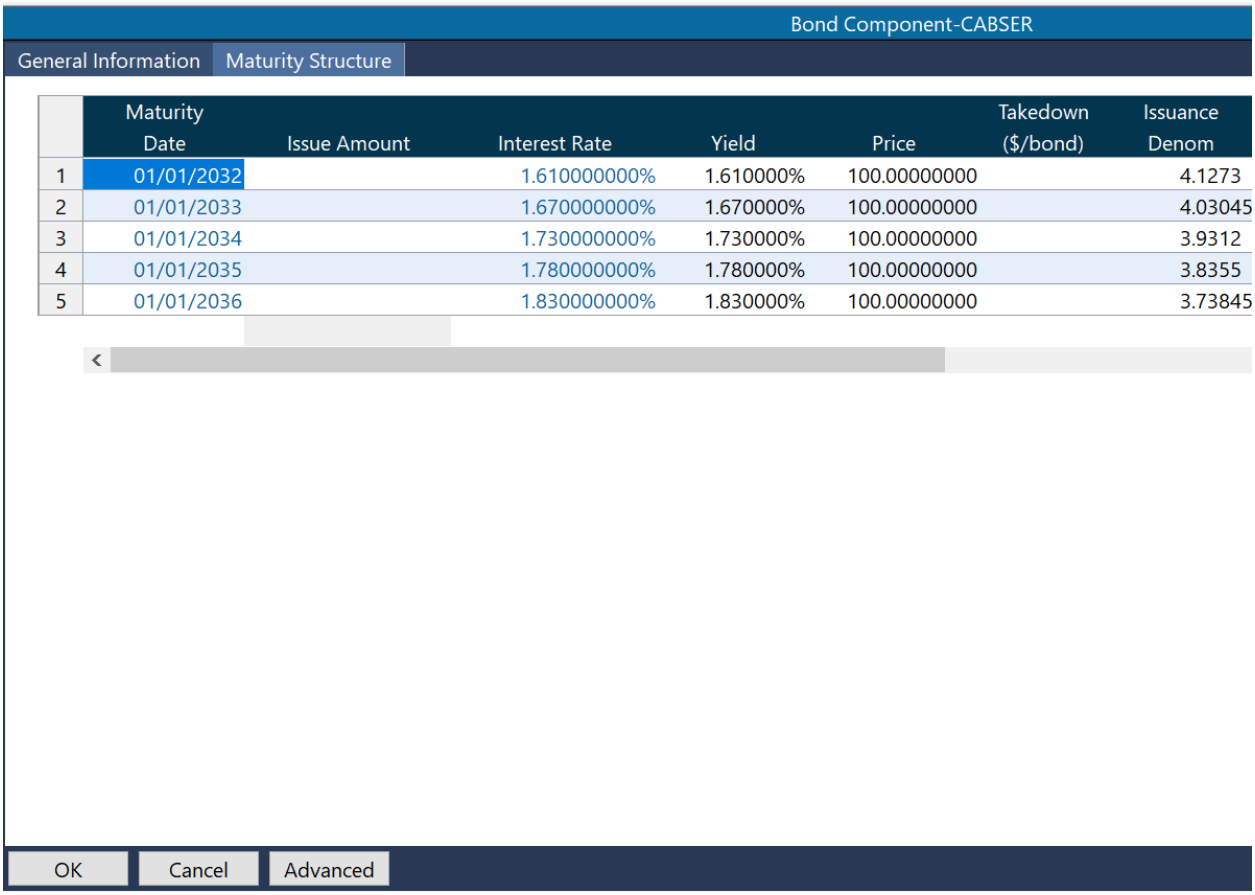
* **Enter the first and final maturity date of the serial CABs. Click OK or press F10.**

CAB Discount Rate

Usually, a CAB with no premium or discount has a discount rate which is approximately equal to the yield. This is the most common type of CAB. In this case, the yield entered in the interest rate column is the rate at which the CAB's maturity value will be discounted to compute its issuance par amount. That issuance par implies a price of 100%.

CAB Yield to Investor

This is the actual yield to the investor. If the CAB is priced at par, the accretion rate of the CAB (entered in the Interest Rate column) will approximately equal the yield to the investor. If the CAB is sold at a premium, the accretion rate (Interest Rate column) will be much higher than the yield to the investor (entered in Yield column). The CAB's maturity value will be discounted at the accretion rate, but the bond will be priced to the yield to the investor, thereby producing a premium.



* **Enter the CAB yield in the INTEREST RATE column NOT in the YIELD column. Click OK or press F10.**

Issuance Denomination

DBC Finance computes what the issuance par amount of a CAB bond is on the delivery date by discounting the future maturity denomination specified in the Bond Component Information dialog at the interest rate in Column (C) back to the delivery date. This reflects what one CAB is worth on the delivery date.

Premium and Discount CAB Yield

Premium/Discount CABs can be modeled by entering the market yield in the Yield column after entering the accretion rate in the Interest Rate column. CABs sold with a premium or discount are used in cases where there are debt issuance limitations (i.e. refunding par cannot exceed refunded par). By issuing a CAB with a premium, for example, the issuer can decrease the par amount of CABs issued and generate the additional proceeds required from the premium on the bonds. When using premium CABs, the maturity amount (usually $5,000) is discounted at a rate higher that the yield to the investor. The example below shows two CABs with the same yield to the investor. Notice that the purchase price is equal in both cases although the par amounts are not.

Interest Rate (discount)	Yield to Investor	Price	Issuance Par Amount	Purchase Price
7.00%	7.00%	100.000%	$1,266.20	$1,266.20
10.00%	7.00%	177.611%	$ 712.90	$1,266.20

CABs address the problems associated with selling deep discount bonds when there is a limit to how much par can be issued (sometimes referred to as volume cap). If, for example, you issued $100,000,000 of deep discount bonds with an interest rate of zero and they were priced at 60% of par, each $5,000 bond would be sold for $3,000 and you would only have $60,000,000 of proceeds. If you sold CABs, that by definition would have a par amount equal to their purchase price, you would sell bonds worth $3,000 at 100% of their face value and only have to issue $60,000,000 of bonds to collect $60,000,000 of proceeds.

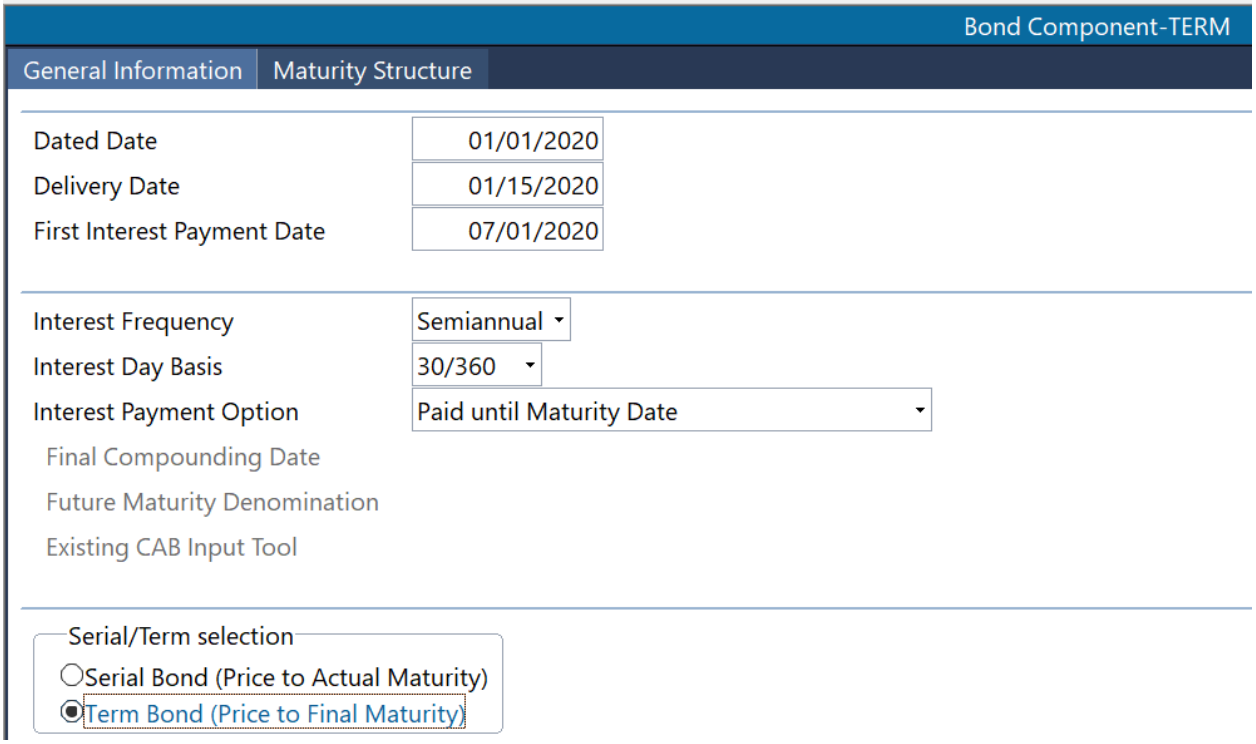
❖ DATA MENU - BOND COMPONENTS - TERM BONDS

1. In the **BOND COMPONENT** menu (see page 28 and 33):

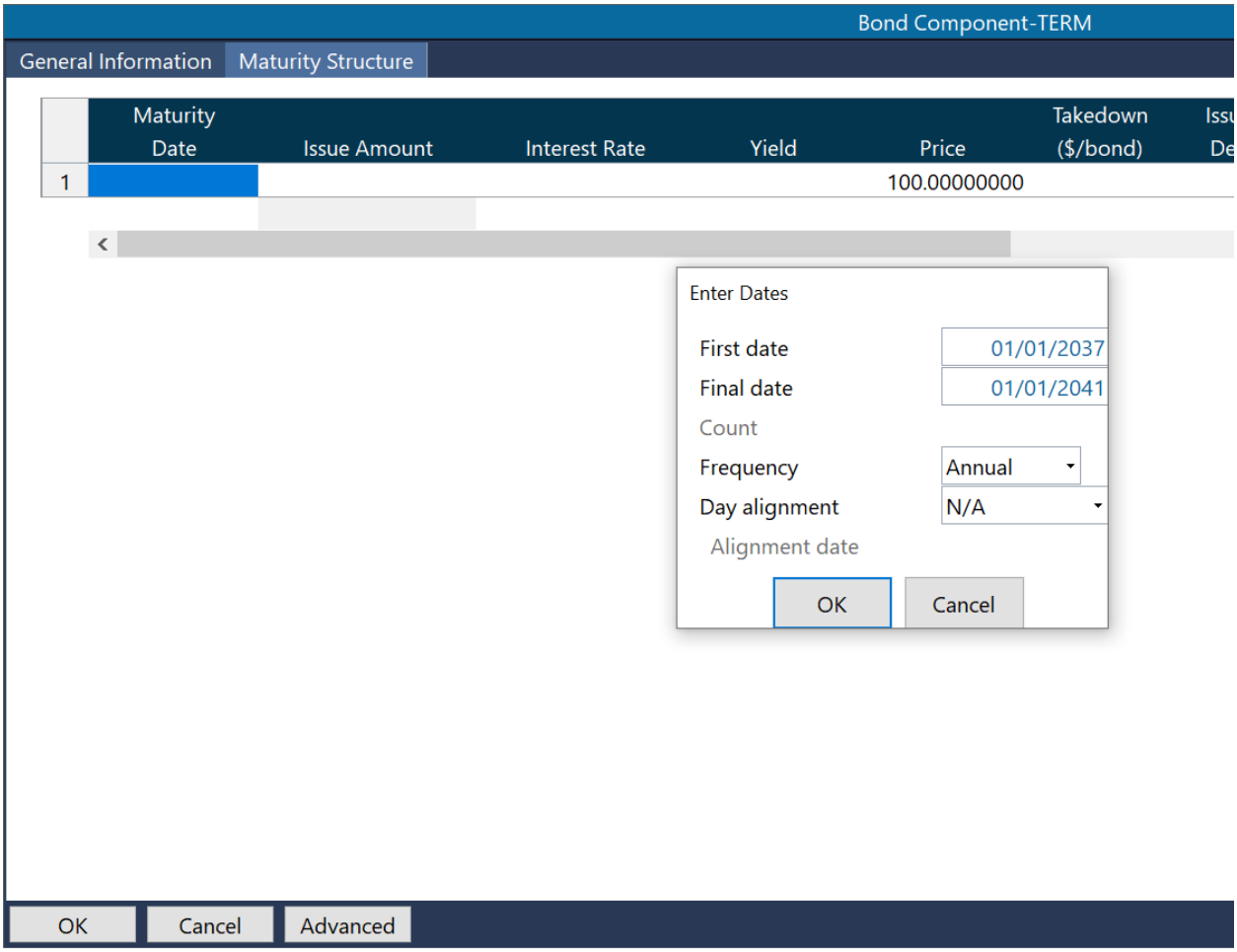
* **Click on DETAIL to create the term bond. Input "TERM" for the short name, press ENTER, and input "Term bond due 2041" for the long name. Click CREATE.**

2. In the **BOND COMPONENT - GENERAL INFORMATION** dialog (see page 34):

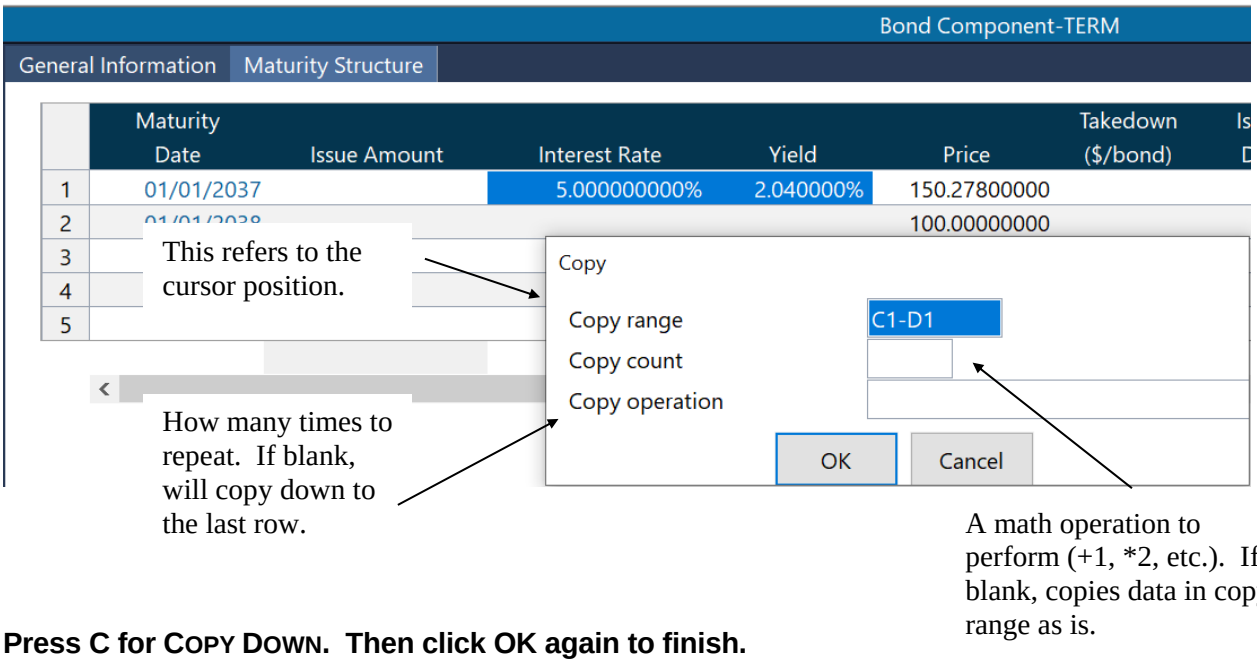
* **For a term bond, set the SERIAL/TERM SELECTION to "Term". Click the right arrow.**



3. In the **BOND COMPONENT - MATURITY STRUCTURE** dialog (see page 35):



* **Enter the first sinking fund payment date and the final maturity date of the term bond. Click OK. Type the term coupon and yield in the first cells of each column – highlight the two cells then right click on the mouse or press F5.**

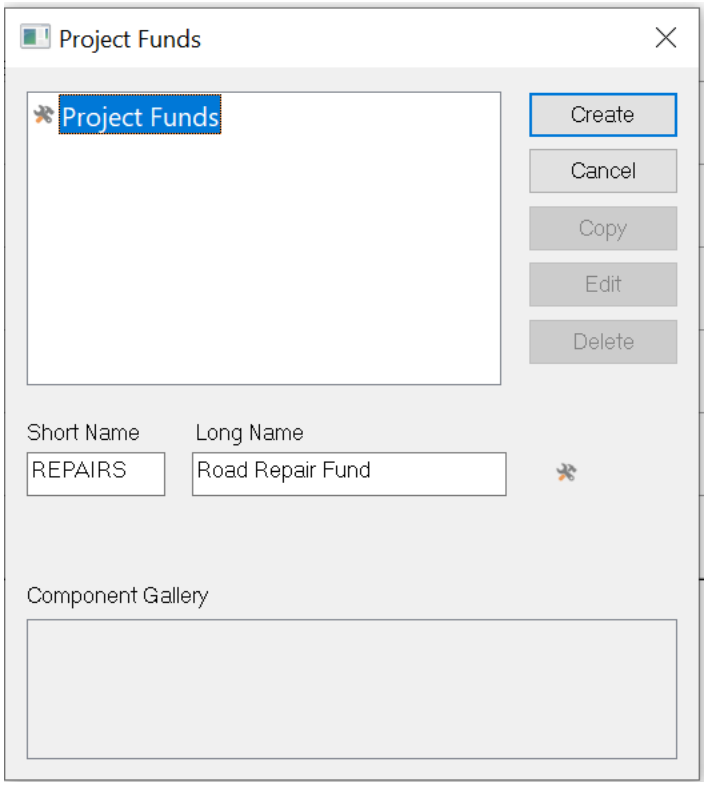


* **Press C for COPY DOWN. Then click OK again to finish.**

❖ DATA MENU - PROJECT FUNDS

DBC permits you to structure many project funds with complex draw schedules and multiple flow of funds. In addition, project draw schedules from a spreadsheet can easily be copied and pasted.

* **Go to PROJECT FUNDS in the DATA menu and click DETAIL.**



* **Give this fund the short name "REPAIRS", press ENTER, and the long name "Road Repair Fund". Click CREATE.**

Net Funded (PV)

A net funded account assumes all interest earnings on the initial deposit will be used to meet the fund's future requirements and to reduce how much has to be invested today. If, for example, you need $1,000 in a year and rates are at 8% compounded quarterly, you can deposit $923.85 today and let that amount "grow" or compound to the required amount. The net funded PV method discounts each of the draws at the investment interest rate(s) assuming semiannual frequency and 30/360 day-count. The deposit is the sum of the PV of the draws. To prove the deposit below, discount each of the draws at the investment interest rate of 5% using the following formula:

$$PVofDRAW = ProjectDraw \times \frac{1}{\left(1+\frac{Annual\,Rate}{No.ofCompoundingPeriodsperyear}\right)^{\frac{No.ofDaysofInterest}{No.ofDaysperPeriod}}}$$

EXAMPLE

Date	Deposit	Interest	Principal	Draws	Balance
Jan 15, 2020	4,948,225.76	-	-	-	4,948,225.76
Feb 1, 2020	-	10,872.78	989,127.22	1,000,000	3,959,098.54
Mar 1, 2020	-	16,326.99	983,673.01	1,000,000	2,975,425.53
Apr 1, 2020	-	12,270.40	987,729.60	1,000,000	1,987,695.93
May 1, 2020	-	8,197.09	991,802.91	1,000,000	995,893.02
Jun 1, 2020	-	4,106.98	995,893.02	1,000,000	-
	4,948,225.76	51,774.24	4,948,225.76	5,000,000	

Net Funded (GIC)

The GIC method uses simple interest instead of compound interest. If, for example, you need $1,000 in a year and the simple annual rate is 8%, you would deposit $925.93 today and add the $74.07 you would receive in a year to meet the required draw. In the GIC method, we multiply principal by the applicable interest rate. You can define the interest frequency and the day-count basis. The deposit is the sum of the draws less simple interest. To prove the interest amounts below, multiply the principal by the investment interest rate (5%) using the following formula:

$$INTEREST = Principal * \frac{AnnualRate}{No.ofPeriodsperyear} * \frac{No.ofDaysofInterest}{No.ofDaysperPeriod}$$

EXAMPLE

Date	Deposit	Interest	Principal	Draws	Balance
Jan 15, 2020	4,947,683.19	-	-	-	4,947,683.19
Feb 1, 2020	-	10,994.85	989,005.15	1,000,000	3,958,678.04
Mar 1, 2020	-	16,494.49	983,505.51	1,000,000	2,975,172.53
Apr 1, 2020	-	12,396.55	987,603.45	1,000,000	1,987,569.08
May 1, 2020	-	8,281.54	991,718.46	1,000,000	995,850.62
Jun 1, 2020	-	4,149.38	995,850.62	1,000,000	-
	4,947,683.19	52,316.81	4,947,683.19	5,000,000	

Gross Funded

Gross funding consists of depositing TODAY the total dollar amount required in the future. The interest earnings on the fund are spent for some other purpose. Interest is computed using simple interest (just like the GIC above). You can define the interest frequency and the daycount basis. If, for example, you need $1,000 in a year and the simple annual interest rate is 8%, you would deposit $1,000.00 today to meet the requirement and have $80 left over to spend elsewhere a year from now. The deposit is the sum of the draws. To prove the interest amounts below, multiply the principal by the investment interest rate (5%) using the following formula:

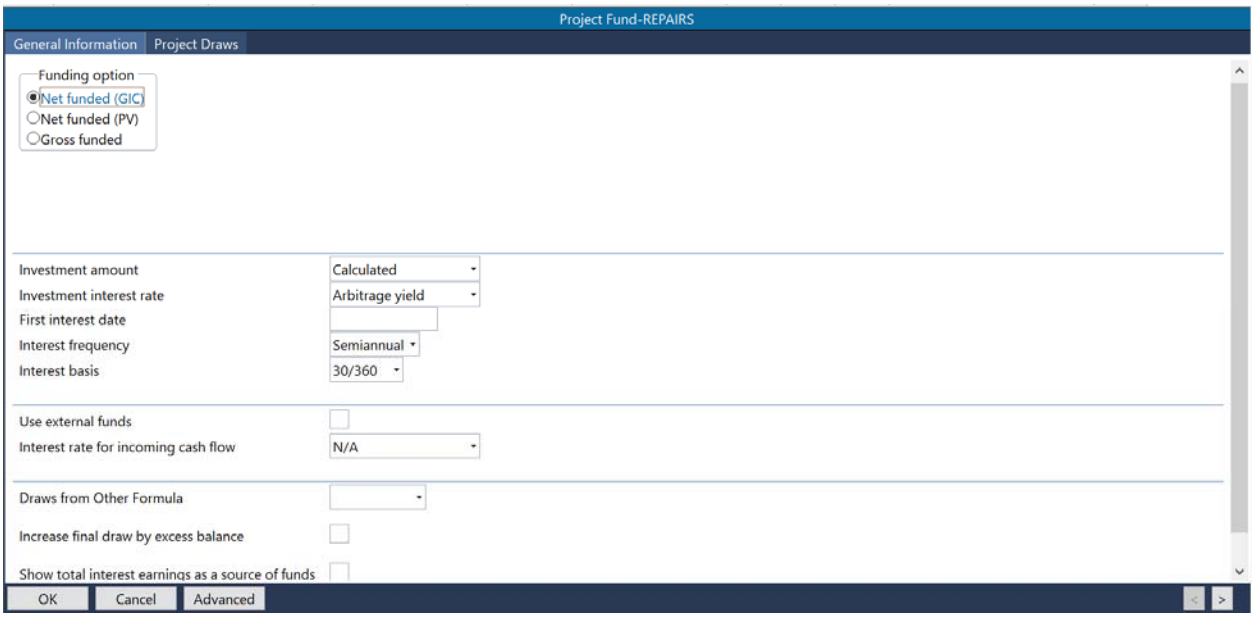
$$\text{INTEREST} = \text{Principal} * \frac{\text{AnnualRate}}{\text{No. of Periods per year}} * \frac{\text{No. of Days of Interest}}{\text{No. of Days per Period}}$$

EXAMPLE

Date	Deposit	Interest	Principal	From (to) Ext Source	Scheduled Draws	Balance
Jan 15, 2020	5,000,000	-	-	-	-	5,000,000
Feb 1, 2020	-	11,111.11	1,000,000	-11,111.11	1,000,000	4,000,000
Mar 1, 2020	-	16,666.67	1,000,000	-16,666.67	1,000,000	3,000,000
Apr 1, 2020	-	12,500.00	1,000,000	-12,500.00	1,000,000	2,000,000
May 1, 2020	-	8,333.33	1,000,000	-8,333.33	1,000,000	1,000,000
Jun 1, 2020	-	4,166.67	1,000,000	-4,166.67	1,000,000	-
	5,000,000	52,777.78	5,000,000	-52,777.78	5,000,000	

❖ DATA MENU - PROJECT FUND - GENERAL INFORMATION

If you had been directed to gross fund the project fund, you would deposit the future value amount of the draws into the fund and any earnings could flow out of the project fund to some specified fund such as the debt service fund, the capitalized interest fund, or even some other project fund.



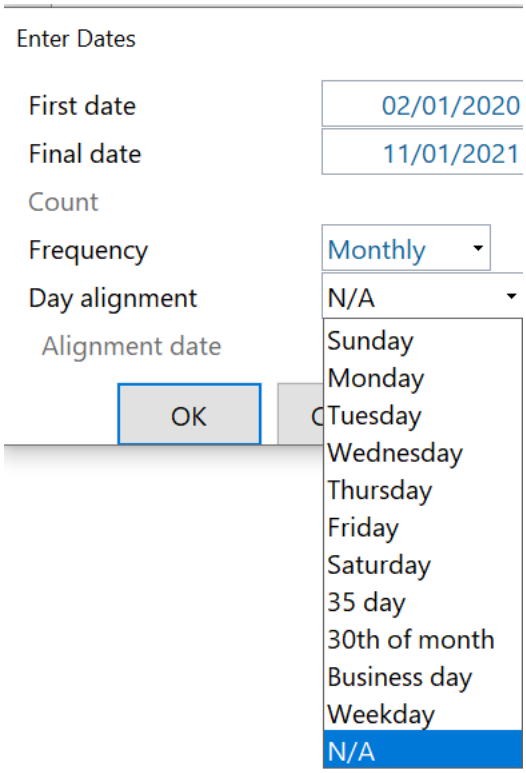
* **The draws are to be net funded at the arbitrage yield, therefore, future interest earnings will be used to reduce the deposit to project fund. Set the FUNDING OPTION to NET FUNDED (GIC). Be sure the investment rate is set to the arbitrage yield. Click on the right arrow or the PROJECT DRAWS tab.**

NOTE - You can use the **ADVANCED** button to select the **VARIABLE RATE INTEREST TABLE**. This will be used by the program as the rate at which to invest the balance in the project fund at different points in time. For example, you could have the fund earn the 2% from inception (as entered on the **PROJECT FUND DESCRIPTION** dialog) and then change the rate to 1.9% 6 months later, to 4.5% 18 months later, etc. (using the **VARIABLE RATE INTEREST TABLE**).

❖ DATA MENU - PROJECT FUND - PROJECT DRAWS

This dialog permits entry of basic date information in a grid format dialog. This dialog appears before any dialog in which you would enter bond principal/sinking funds or project draws. It provides a very simple format for modeling a regularly occurring schedule of payments. The very first time you enter this dialog, you see the dialog shown below, where you enter the first and final dates, frequency of maturity and, if any, the day of the week on which maturities must occur. There are several other ways to manipulate the dates: you can change the size of the grid and type the dates in directly, with or without using the **COPY** command; you can insert and delete dates. All these functions are available via the **F5** key).

Day Alignment The day of week alignment is used for dates that must occur regularly on a specific day of the week - i.e. if 1st date is 11/1/92 and dates are to be aligned on a Wednesday, the payment dates should be 11/4, 12/2, 1/6, etc. DBC will handle this automatically if you enter Wednesday.

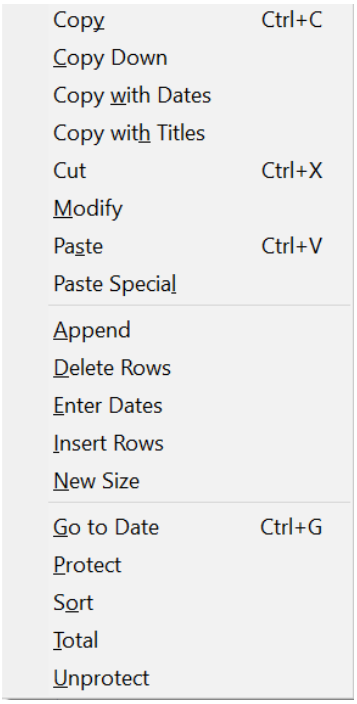


* **The first step is to look for any patterns in our draw schedule (on the Assumptions sheet). Notice that the first four draws occur bimonthly and the last five occur quarterly thereafter. Because the draw schedule is not regular throughout it will be easier to edit the grid size and enter the dates using the Copy Down feature. Click once on CANCEL or press ESC.**

********* SPECIAL INFORMATION *********

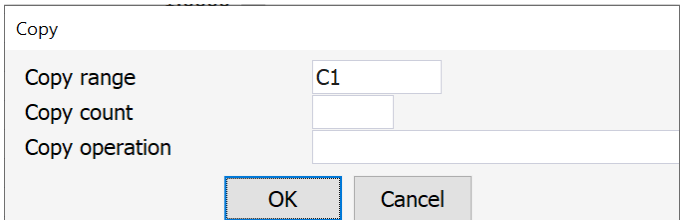
❖ F5 KEY

The **F5** key features change as the input dialog changes. For grid dialogs, there are quite a number of options available for maximum flexibility. Some key features are the ability to copy or alter data and execute math functions on that data, the ability to cut and paste data to and from a spreadsheet.

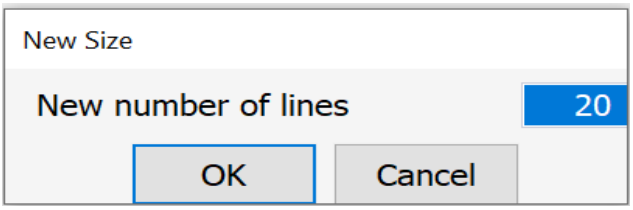


Frequently used **F5** commands in a grid dialog are as follows:

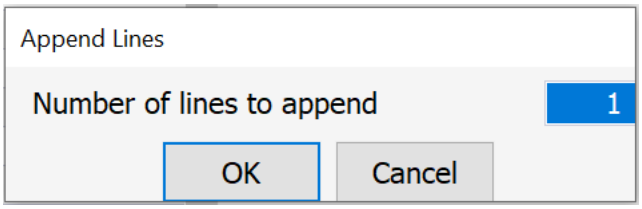
Protect	Locks in data as entered so it can only be changed by the user NOT by program defaults.
Unprotect	Enables program to make changes to data based on defaults.
Cut	Cuts data from selected cells.
Copy	Copies data from selected cells to Paste in another range.
Copy w/ Dates	Copies the column selected and copies the respective dates.
Copy w/ Titles	Copies selected data with titles for use in spreadsheets.
Paste	Pastes previously cut or copied data to area marked by cursor.
Copy Down	Copies data from the previous cell down to the last cell or for a specified number of cells in column.



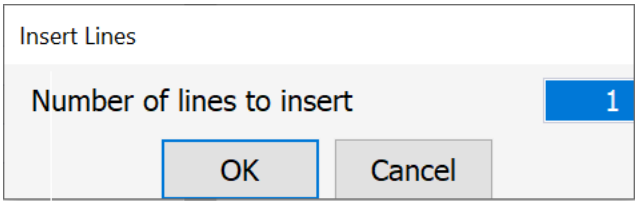
New Size Sets the number of rows in the grid dialog. If number entered is smaller than the current number of rows, the excess rows will be deleted from the bottom.



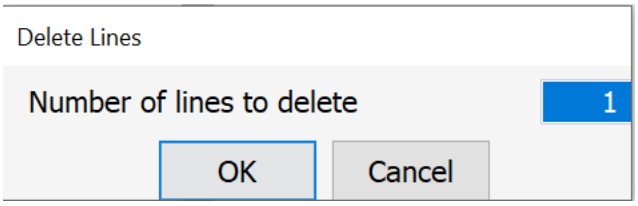
Append Adds a row to the bottom of the grid.



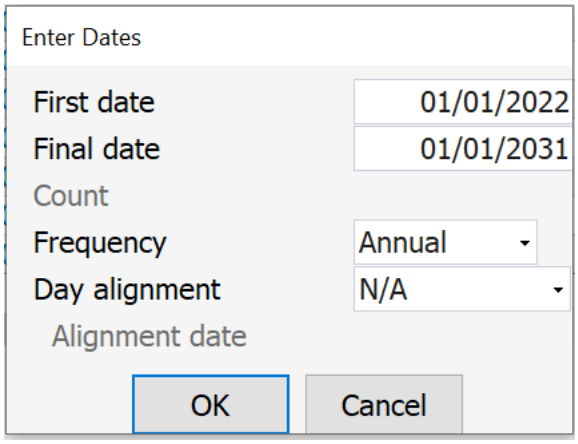
Insert Inserts number of rows specified between the cursor and the previous row.



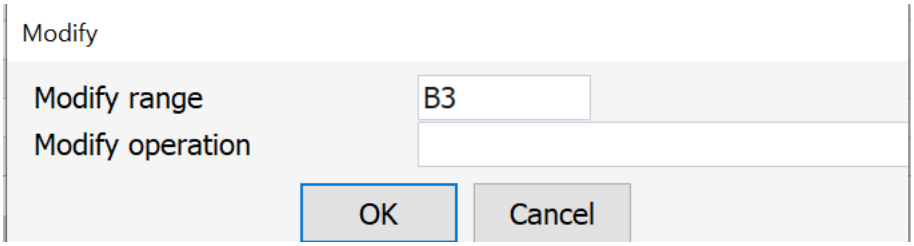
Delete Deletes the row where the cursor is.



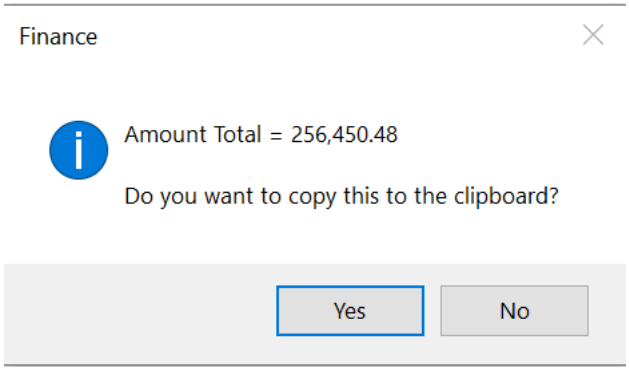
Enter Dates Permits entry of dates and frequency to build a grid with regularly occurring dates.



Modify Modifies the current selection of rates, dates, or cash flows.

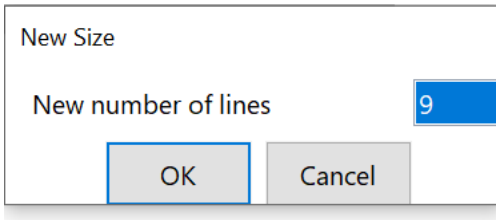


Total Calculates total for the values in the current column (marked by cursor).



❖ F5 KEY - NEW SIZE

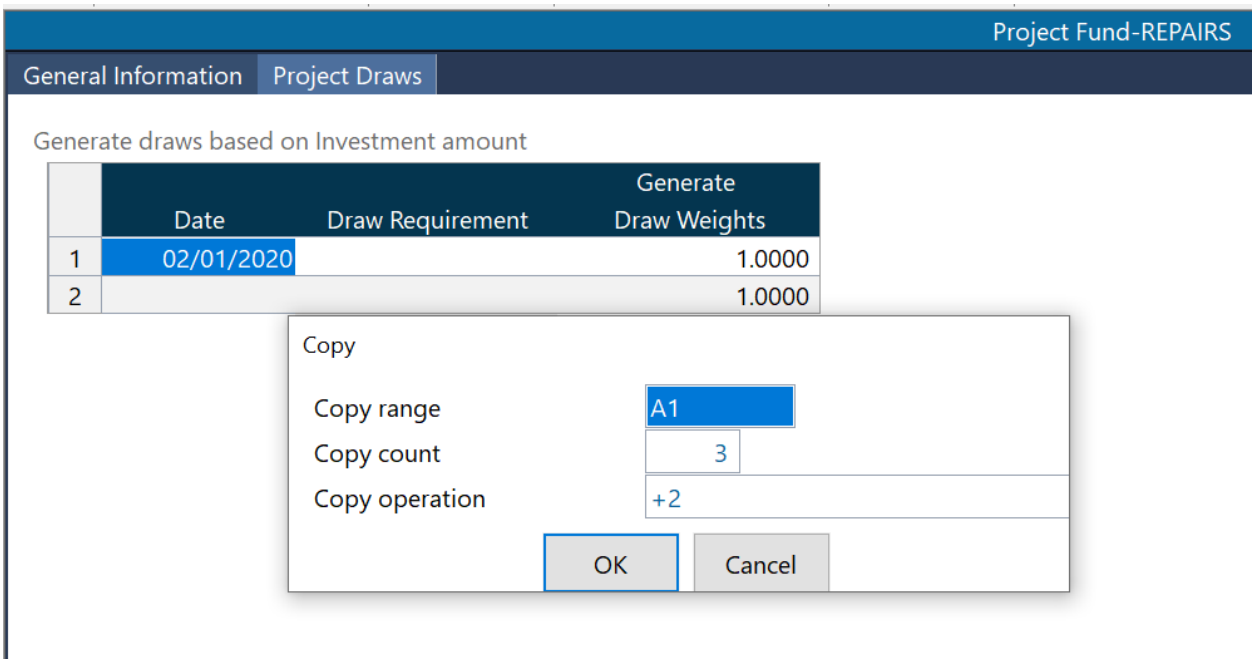
The **NEW SIZE** option permits you to increase the size of the existing grid by adding rows to the last row or decrease the size by deleting rows from the bottom up. This feature is commonly used when the user has a specific number of irregular dates which cannot be modeled using the grid dates dialog.



* **In the Project Fund-Project Draws window, click the right mouse button and select NEW SIZE or press F5 and type "N". Enter "9" for the 9 draws, press OK.**

❖ F5 KEY - COPY FUNCTION

The **COPY** function permits you to copy any cell entry in a grid dialog to cells below it. In addition, you can enter an initial date, amount, or percentage and execute some incremental math function on the initial entry. Examples of the math function are: multiply by a factor to generate a revenue projection; or, add an amount to generate a preliminary scale which increments in 15 basis point intervals.



* **Of the 9 draws, the first 4 are bimonthly and the last 5 are quarterly. Type the "base date" of 2/1/20 in cell A1. DO NOT press ENTER. Press F5 or right mouse click instead. Type C for COPY DOWN**

Copy Range This describes the cell range within the current column you wish to copy or repeat (like a spreadsheet).

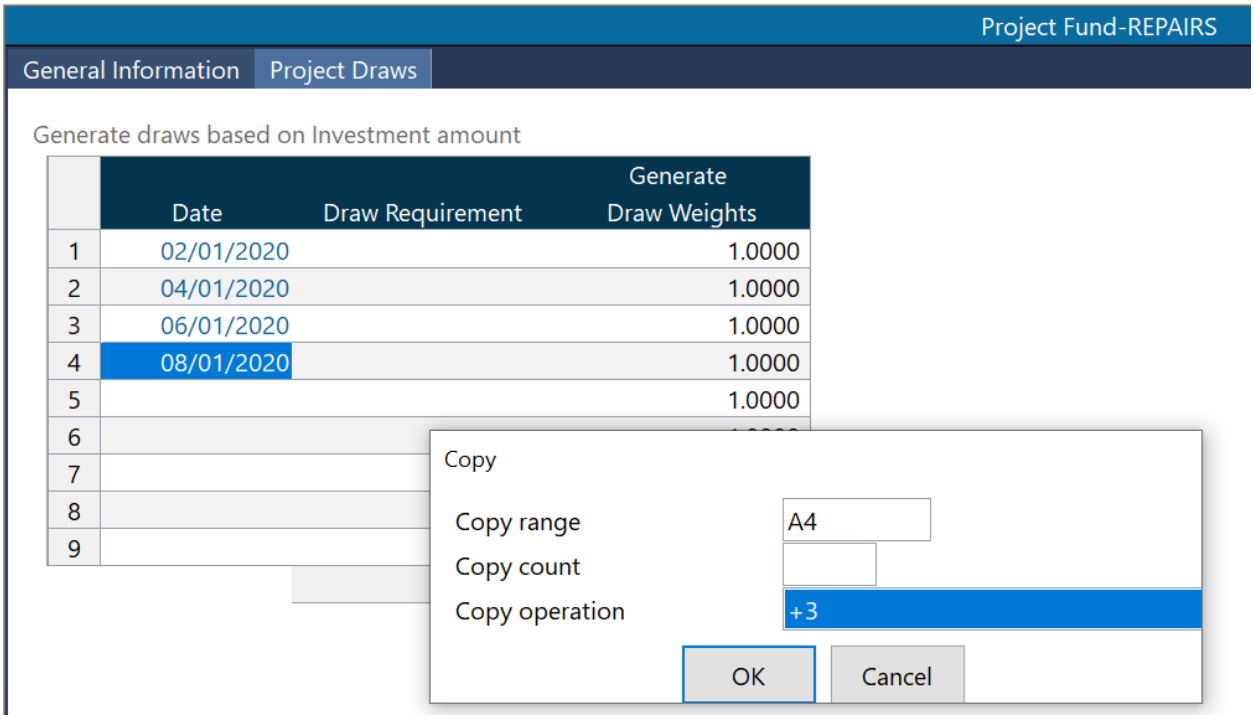
* **The default for COPY RANGE is where the cursor is, in this case, cell A1. Accept this entry by pressing ENTER.**

Copy Count This is the number of times you wish to repeat the range you have copied. If you wish to copy something all the way down the dialog, leave this entry blank.

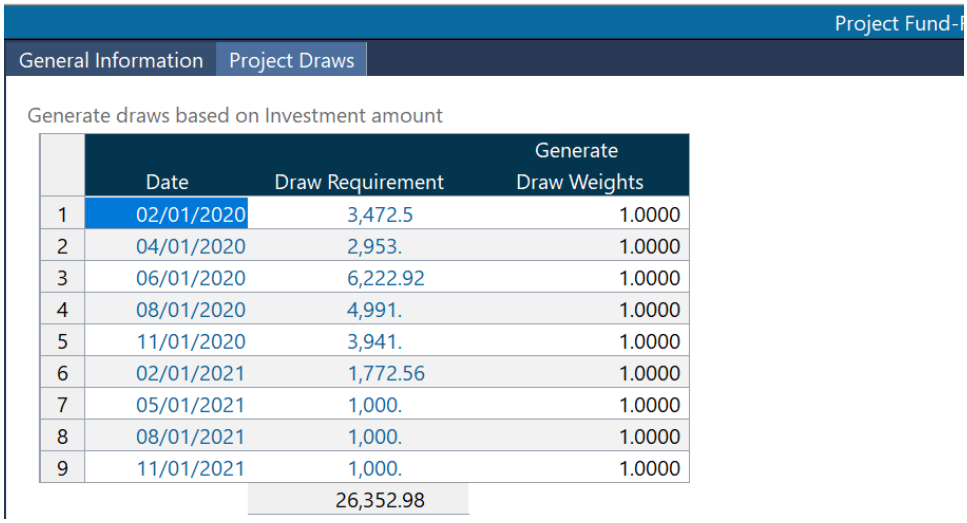
* **The date needs to be repeated 3 times. Enter "3" in COPY COUNT.**

Copy Opera. This is the formula (if any) that you wish to execute on the specified range.

* **The first 4 dates occur regularly on a bimonthly basis. Therefore, we want to add 2-month increments to the base date. Type "+2" in COPY OPERATION and OK.**



* **Move to cell A4 where the 08/01/20 date appears, press F5, "C" for COPY DOWN , go to the COPY OPERATION line, then enter "+3". Click OK or press ENTER twice.**

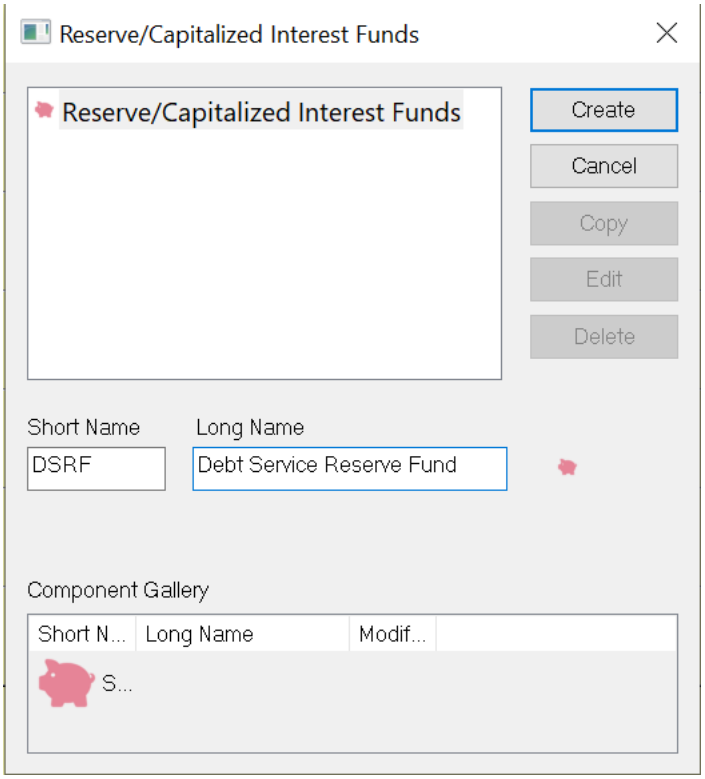


* **Go to the DRAW REQUIREMENTS Column and type the project draws through 2/01/21 <u>in thousands.</u> Type $1,000,000 (as 1,000) in row 7, DO NOT press ENTER, press F5, and select COPY DOWN. Once in the COPY DOWN dialog, click OK. Notice that it copied the numbers down to the end. Click OK when finished to exit the PROJECT dialog.**

❖ DATA MENU - RESERVE FUNDS - DSRF

In this section, you can model funds, other than project funds, that are based on a balance requirement or have a draw requirement. Examples of these are the debt service reserve fund and the capitalized interest fund, respectively. In DBC, the Capitalized interest fund is considered a reserve fund for the purposes of input and is modeled separately from the debt service reserve fund.

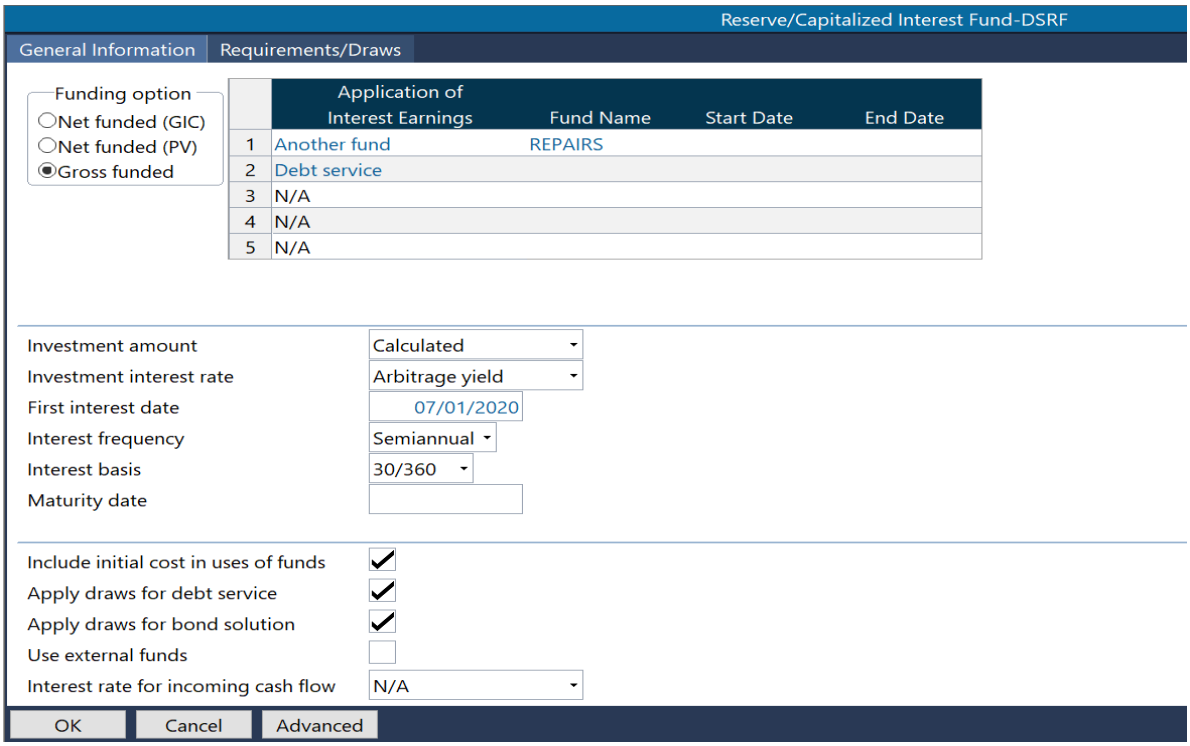
* **Click on DETAIL in the RESERVES/CAPITALIZED INTEREST FUNDS section of the DATA menu.**



* **Let's call this reserve "DSRF" (short) and "Debt Service Reserve Fund" (long). Click on CREATE when finished or press ENTER twice when finished.**

❖ DATA MENU - RESERVE FUNDS - DSRF - GENERAL INFORMATION

The system defaults to Gross funding for reserve funds. One of DBC's best features is the freeform approach of inputs for reserve funds and expenses. This permits maximum flexibility for modeling very specific requirements such as "25% of debt service of SERIALS through 1/1/28".



* **The DSRF is gross funded and earnings will flow to the project fund. In the first cell of APPLICATION OF INTEREST EARNINGS, click or press SHIFT-?. Select "ANOTHER FUND" then move to the second line and select "DEBT SERVICE". Go to the FUND NAME entry and click on the first cell and select REPAIRS. Go to the FIRST INTEREST DATE prompt and enter the first interest date (7/1/20).**

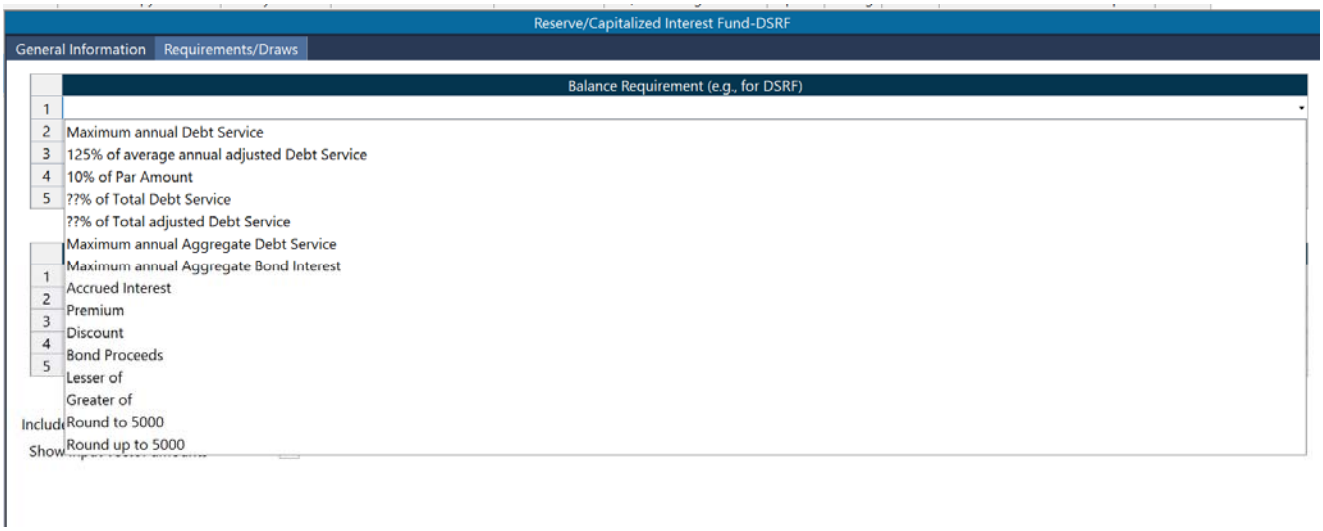
NOTE - Use the choice list button or the **SHIFT-?** keys to reduce the risk for errors (assuming you do not change the names after you begin). If you choose to type in the fund name, you must be absolutely sure that the spelling is correct. You have the flexibility to type in a fund name for a fund that you have not yet created. Be sure, however, that when you create the fund, it has the same short name as the reference you made in the **APPLICATION OF INTEREST EARNINGS**.

Start/End Fund Date **OPTIONAL** - If no dates are specified, interest earnings will flow to each fund specified through the life of each (i.e. once the first fund expires, earnings will flow to the second fund, etc.). The START DATE is the date on which interest earnings from the reserve/cap. int. fund will begin to flow to the fund specified. The END DATE is the date on which the interest earnings will stop flowing to the specified fund.

❖ DATA MENU - RESERVE FUNDS - DSRF- REQUIREMENTS/DRAWS

NOTE - You can use the **F8** key to select the **VARIABLE INTEREST RATE TABLE**. This will be used by the program as the rate at which to invest the balance in the reserve fund at different points in time. For example, you could have the fund earn the 5% from inception (as entered on the **RESERVE FUND SIZING REQUIREMENT** dialog) and then change the rate to 4.9% 6 months later, to 4.5% 18 months later, etc. (see the **VARIABLE RATE INTEREST TABLE**).

* **Press the right arrow or click on the REQUIREMENTS/DRAWS tab.**

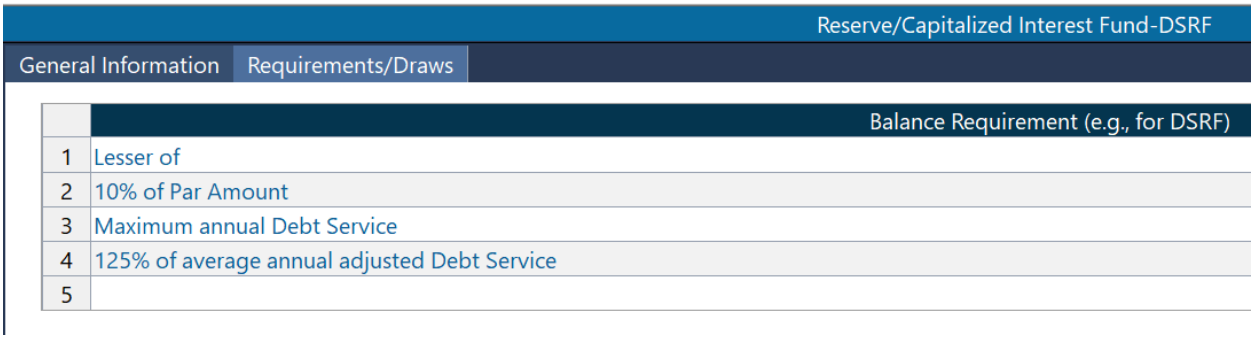


* **Go to the first line of the Balance Requirement section and double click on line 1.**

Parser Formulas

The freeform inputs are extremely useful for modeling complex reserve requirements and expenses. The options shown are the most frequently used and can be used as is or can be edited (examples are on page 158). These options are available by double clicking on any line of the inputs. Options can easily be edited using INS, DEL, SPACEBAR, BACKSPACE, and the arrow keys.

NOTE - You can add rows to the formulas, insert rows in between lines of the formulas, as well as copying them using the **F5** key.



* **Use the pointer in the list and select "Lesser of" for the first line, "10% of Par Amount " for the second, "Maximum annual debt service" for the third, and "125% average annual adjusted debt service" for the fourth. Click OK when finished.**

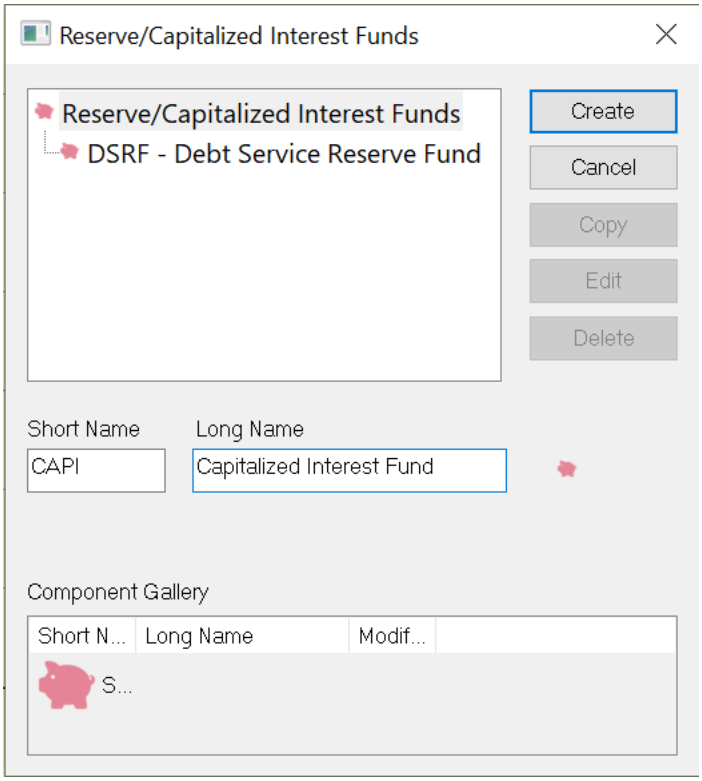
NOTES:

1. When capitalizing interest through a non-interest payment date (a date on which NO interest payment is due), it is CRITICAL that you use the term "accrued through" in your formula. This enables the program to compute the partial period accrued. Otherwise it will "round up" to the next interest payment date.
2. You can ONLY use slashes in the dates when working with these formulas.
3. Any errors made while entering or editing the formulas will result in an error message upon pressing the **ENTER** key. The system will tell you at what point in the formula the error lies. Frequent errors include using spaces in dates and using incorrect formula syntax. See **F1- HELP** for more information.
4. If you need more lines for your formulas, use the **F5 - NEW SIZE** option to add more rows.
5. The term "ADJUSTED" in a formula means that the cash flow used is net of accrued interest (begins accruing interest on the delivery date NOT the dated date).

❖ DATA MENU - RESERVE FUNDS - CAPITALIZED INTEREST

In this section, you would model funds other than project funds such as the debt service reserve fund and the capitalized interest fund. Please note that the Capitalized interest fund is considered a reserve fund for the purposes of input.

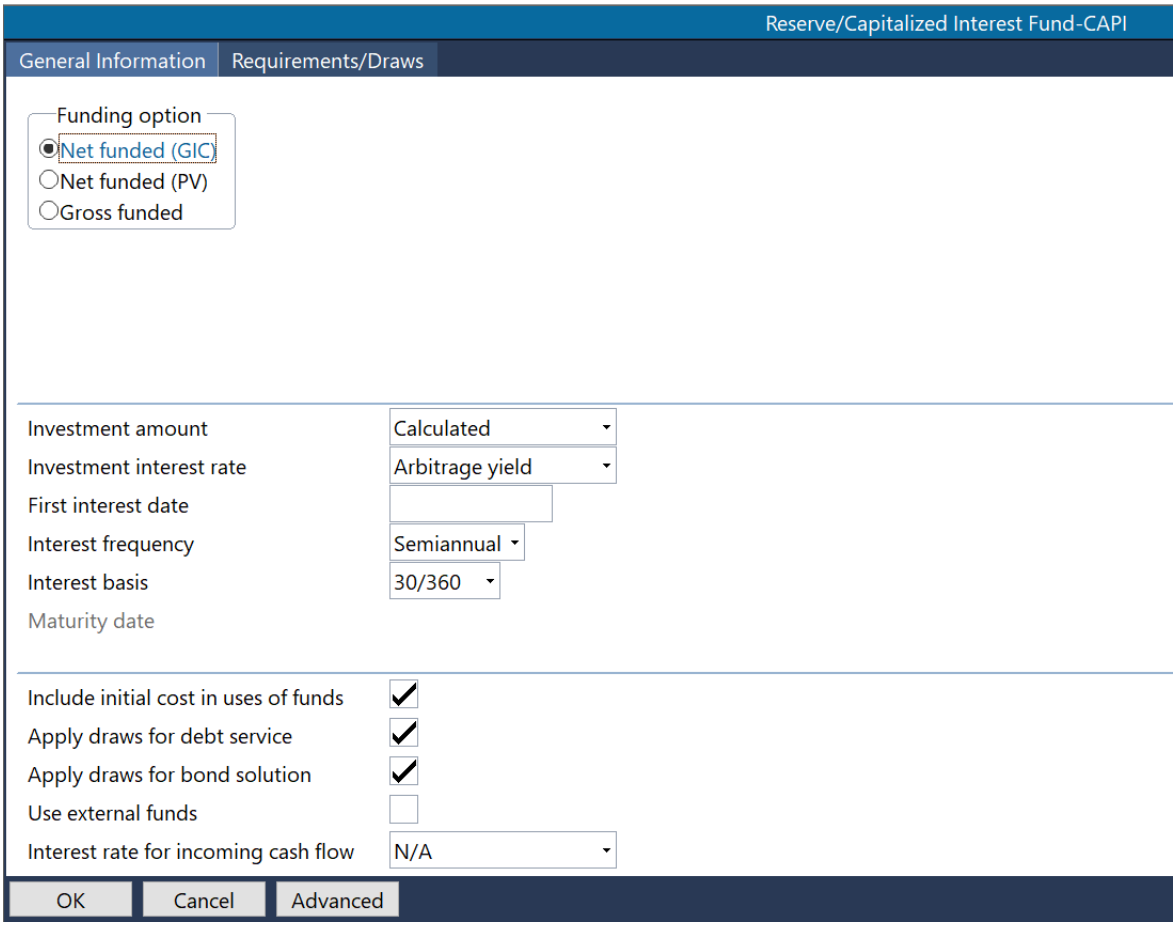
* **Click on DETAIL in the RESERVES/CAPITALIZED INTEREST FUNDS section of the DATA menu.**



* **Let's call this reserve "CAPI" (short) and "Capitalized Interest Fund" (long). Click on CREATE when finished.**

The system defaults to Gross funding for reserve funds. One of DBC's best features is the freeform approach of inputs for reserve funds and expenses. This permits maximum flexibility for modeling very specific requirements such as "25% of debt service of SERIALS through 1/1/28".

"Apply draws for debt service" refers to funds such as capitalized interest in which the draws are applied to reduce debt service. Applying the draws means that the gross debt service will be reduced by the capitalized interest draws in the Net Debt Service report. "Use external funds" refers to the application of incoming cash flows (modeled in the expense entry) towards payment of the fund requirements (i.e. draws). "Interest rate for incoming cash flow" is where you set the earnings rate for cash amounts flowing in from other funds (i.e. earnings on the DSRF flow to the project fund and will be invested at *x*% until the next draw date on the project fund - this earnings rate is separate from the earnings on the original project fund deposit).



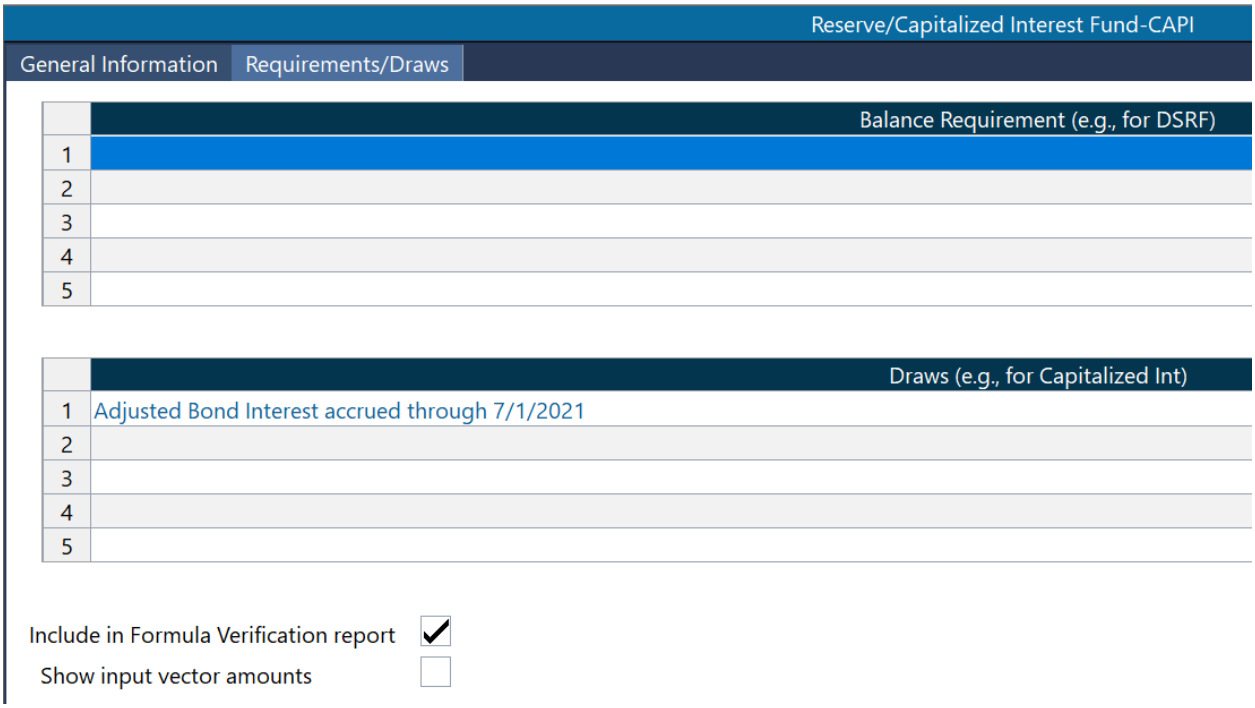
* **This capitalized interest fund is net funded (GIC) as interest earnings will be used to reduce the upfront deposit to the fund. When complete, click on the REQUIREMENTS/DRAWS tab.**

NOTE - You can use the **ADVANCED** button or the **F8** key to select the **VARIABLE INTEREST RATE TABLE**. This will be used by the program as the rate at which to invest the balance in the reserve fund at different points in time. For example, you could have the fund earn the 5% from inception (as entered on **THE RESERVE FUND SIZING REQUIREMENT** dialog) and then change the rate to 4.9% 6 months later, to 4.5% 18 months later, etc. (using the **VARIABLE RATE INTEREST TABLE**).

Capitalized interest funds typically have draw requirements. In other words, we set aside money today to be drawn out of an account in the future to pay interest on the bonds to the bondholders. In DBC, we model this requirement using formulas.

NOTES:

1. When capitalizing interest through a non-interest payment date (a date on which NO interest payment is due), it is CRITICAL that you use the term "accrued through" in your formula. This enables the program to compute the partial period accrued. Otherwise it will "round up" to the next interest payment date.
2. You can ONLY use slashes in the dates when working with these formulas.
3. Any errors made while entering or editing the formulas will result in an error message upon pressing the **ENTER** key. The system will tell you at what point in the formula the error lies. Frequent errors include using spaces in dates and using incorrect formula syntax. See **F1- HELP** for more information.
4. If you need more lines for your formulas, use the **F5 - NEW SIZE** option to add more rows.
5. The term "ADJUSTED" in a formula means that the cash flow used is net of accrued interest (begins accruing interest on the delivery date NOT the dated date).

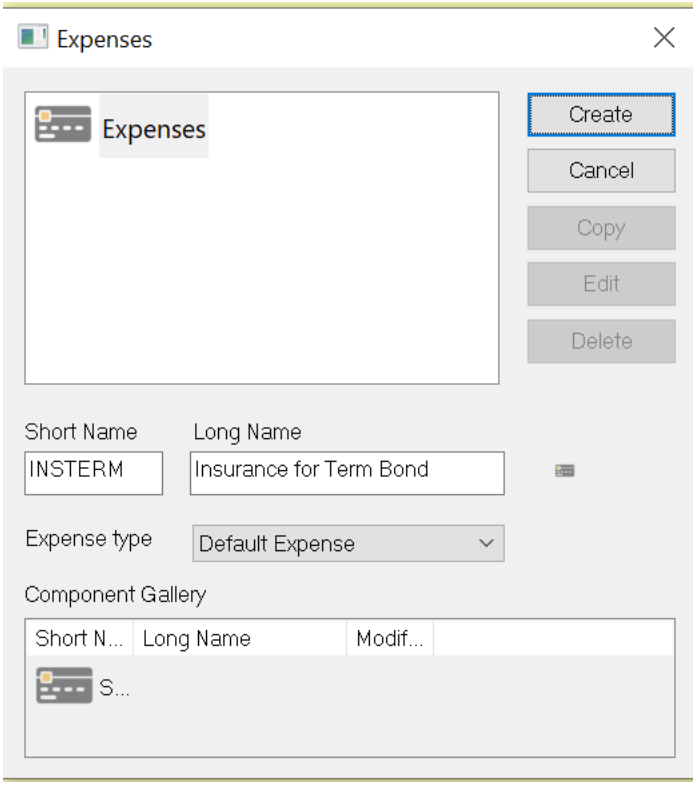


* **Double click on the first line of DRAWS. Notice the options are different than those offered on the BALANCE REQUIREMENT section just above. The capitalized interest draws are 100% of adjusted bond interest accrued through 7/1/21. On line one, select "Adjusted Bond Interest through ??" and type 7/1/21 at the flashing cursor then use the left arrow keys to insert the word "accrued" just before "through". Press ENTER then click OK when finished to exit the CAPI fund.**

❖ DATA MENU - EXPENSES

This section lets you model almost everything from a simple cash amount to a complex expense linked to individual components in the issue (i.e. insurance for 3 years on the serials for the first five years of debt service at 1.0% and at .9% thereafter). In addition, you can model cash amounts that will be deposited to offset other funds.

* **Go to EXPENSES - DETAIL in the DATA menu and click on DETAIL.**



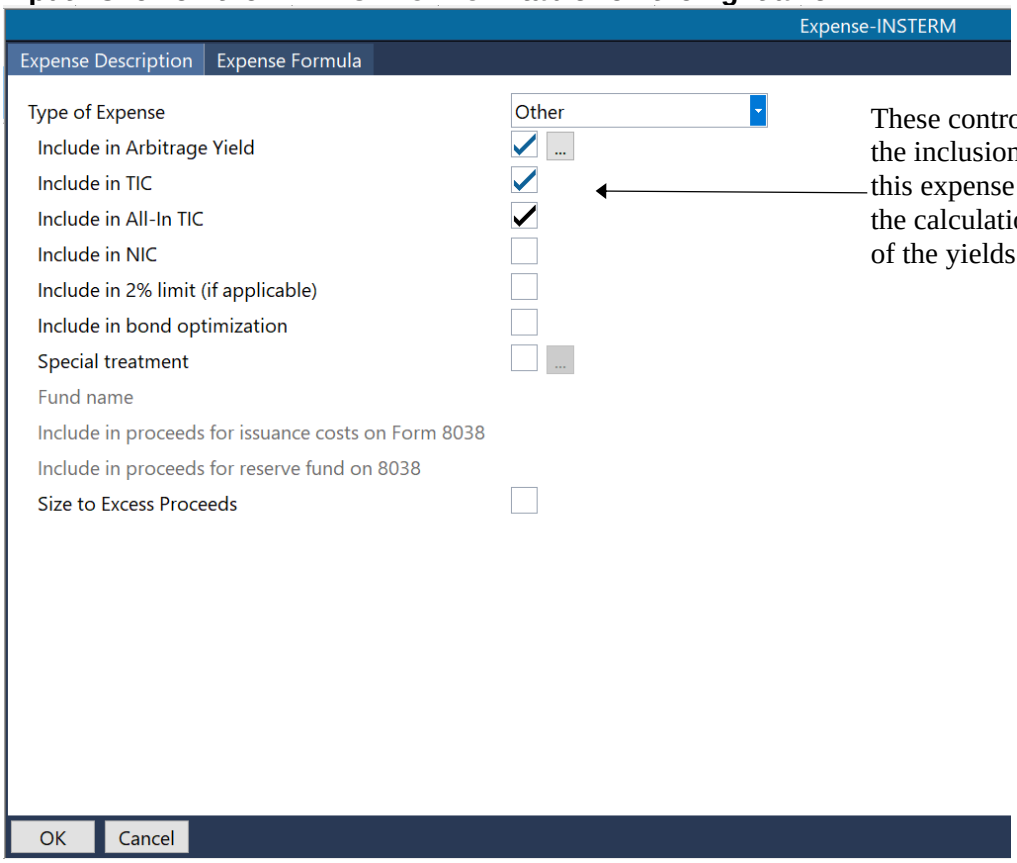
* **Aside from the gross spread and costs of issuance, which we modeled in the general assumptions dialog, there are insurance costs. Give the insurance the short name of "INSTERM", press ENTER, and the long name of "Insurance for Term Bond". Click CREATE.**

❖ DATA MENU - EXPENSE DESCRIPTION

Expenses can be defined using the same easy-to-use formulas available in the reserve funds. This is particularly useful for detailed spread and costs of issuance expenses. In addition, cash inflows that will reduce the funding requirements of the issue can be modeled here.

The Type of Expense refers to whether the expense modeled is to be included in the underwriter's discount, costs of issuance, a deposit to a fund or just an expense.

* **In our example, our insurance expense does not fit into any of the other categories and should, therefore, be set to "Other". Assume (for this example only) that the insurance cost is recoverable in three yields by setting the switches to YES in each "Include in..." input. Click on the EXPENSE FORMULA tab or on the right arrow.**



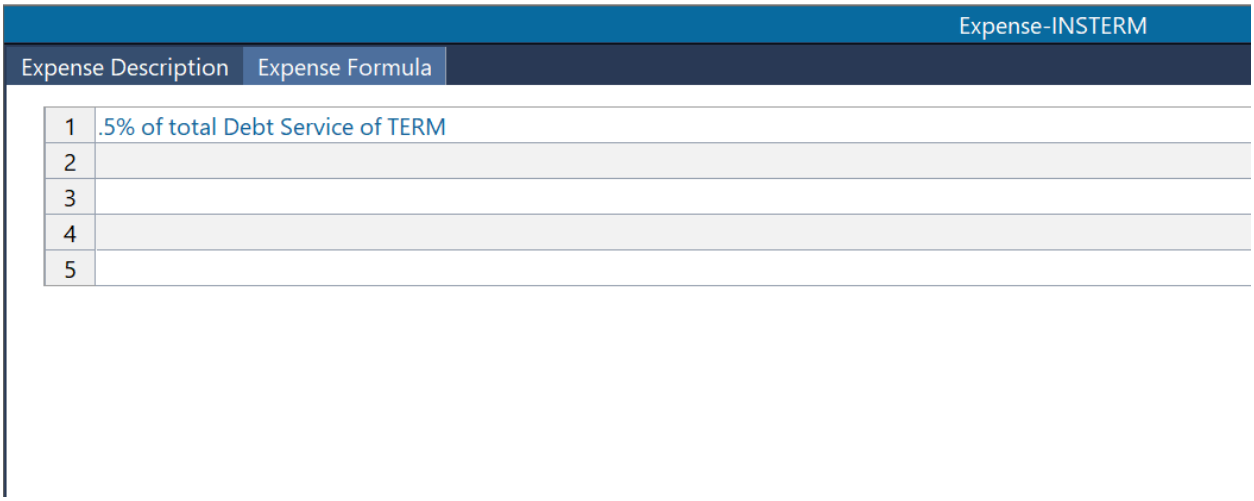
NOTE -

1. The ability to recover the cost of certain expenses associated with a bonds issue in the arbitrage yield is strictly defined by the IRS in the Tax Code.
2. The inclusion of an expense in the arbitrage yield present value target increases the yield and consequently the earning potential of all fund invested at the limit of the arbitrage yield.
3. This increase in yield would create a lower cost of funds by increasing the rate of return on accounts such as the project fund, the reserve funds, and in refundings, the cost of escrow.
4. This decrease in costs would create a lower bond issue size.
5. The impact of improperly including costs in the arbitrage yield can create an artificially lower bond issue size and should, therefore, be avoided at all costs.
6. Assume nothing - ask a fellow finance person or a bond attorney.

❖ DATA MENU - EXPENSE FORMULA

Parser Formulas

The freeform inputs are extremely useful for modeling complex reserve requirements and expenses. The options shown are the most frequently used and can be used as is or can be edited (examples are on page 157). These options are available by double clicking on any line of the inputs. Options can easily be edited using INS, DEL, SPACEBAR, BACKSPACE, HOME, END, and the arrow keys.



* **Go to line 1 and type ".5% of total d/s of term" and press ENTER. Notice that the system has interpreted your entry as a bond component name and converted it to upper case and has interpreted the abbreviation of D/S to mean debt service. Also notice that instead of typing the entire phrase, you could have made the selection from the formula list and edited it. Click OK to accept the entry and exit the EXPENSE dialog.**

NOTE -

1. You can also use the "SHIFT-?" to get the formulas and then edit.
2. Bond components must be referenced by their short names only in formulas, therefore, it is critical that all components have unique names and that these names are spelled properly in the formula.
3. You can refer to short names of Bond Components that have not yet been created. When the bond solution is run, the system will check that the components referenced actually exist. If you created TERMS and refer to it as TERM, the system will give you a message to this effect.

❖ DATA MENU - ADDITIONAL INFORMATION

The **ADDITIONAL INFORMATION** menu contains several input items relevant to new money sizings such as:

REPORTING OPTIONS - alternate or additional titles to be saved with the series, fiscal date for report purposes only, and title for general fund.

AUTOMATIC UPDATES allows for the series to refer to another series (with a status of Template) as a common source for **GENERAL ASSUMPTIONS** and **BOND COMPONENT INFORMATION** and other information. This is used when there are several series that share a common scale or dates.

OTHER SOURCES AND USES of funds.

REFUND ESCROWS are those escrows funded by proceeds of the series defined in DBC as well as transferred proceeds escrows.

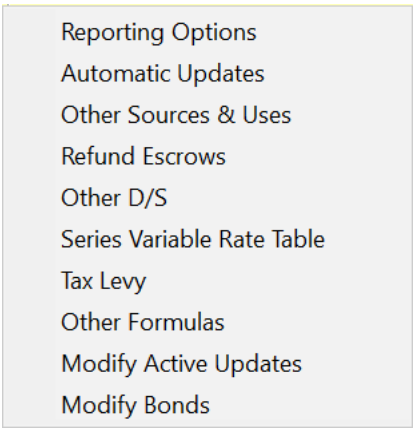
OTHER D/S for defining existing bond issues to be used in wraparound solutions, aggregate debt service reports or aggregate reserve fund requirements.

SERIES VARIABLE RATE TABLE provides a common source within a series for the variable rate schedule. This is used when there are several variable rate bond components that share the same variable rate assumptions.

TAX LEVY is used for the entry of assessed valuations and additional revenues and expenses. When a sizing is run, the resulting tax levy will also be computed based on these inputs.

OTHER FORMULAS is used for the entry of formulas that are a function of cash flows within the solution but are not included in the actual sizing solution,

MODIFY BONDS is used for checking and amending user-defined general bond and bond maturity structure information as well as applying MMD yield curves and additional spreads to bond components.

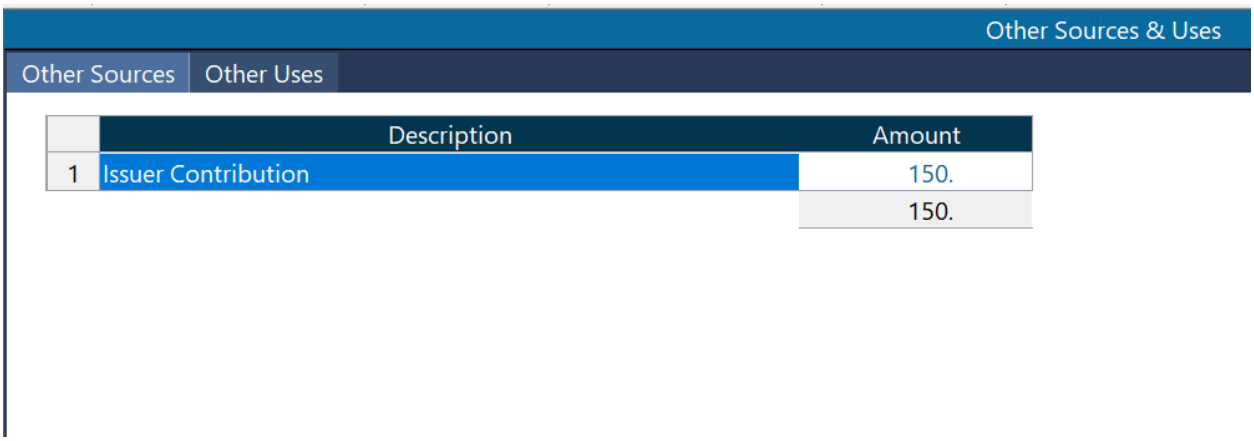


* **Click on ADDITIONAL INFO-OTHER SOURCES &USES.**

❖ DATA MENU - ADDITIONAL INFORMATION- OTHER SOURCES & USES

The **OTHER SOURCES** input permits the entry of any flat dollar amount of source funds to reduce the size of the bond issue or that must be shown as a source of funds on the Source & Uses report. The dialog initially shows only 1 row. If more are needed, use the **RIGHT MOUSE CLICK** or the **F5** key, and the **NEW SIZE** command.

The **OTHER USES** dialog permits the entry of any flat dollar amount of fund uses that are not or cannot be modeled as an expense, a project fund, or a reserve fund. Its input dialog's appearance is identical to the one shown below.

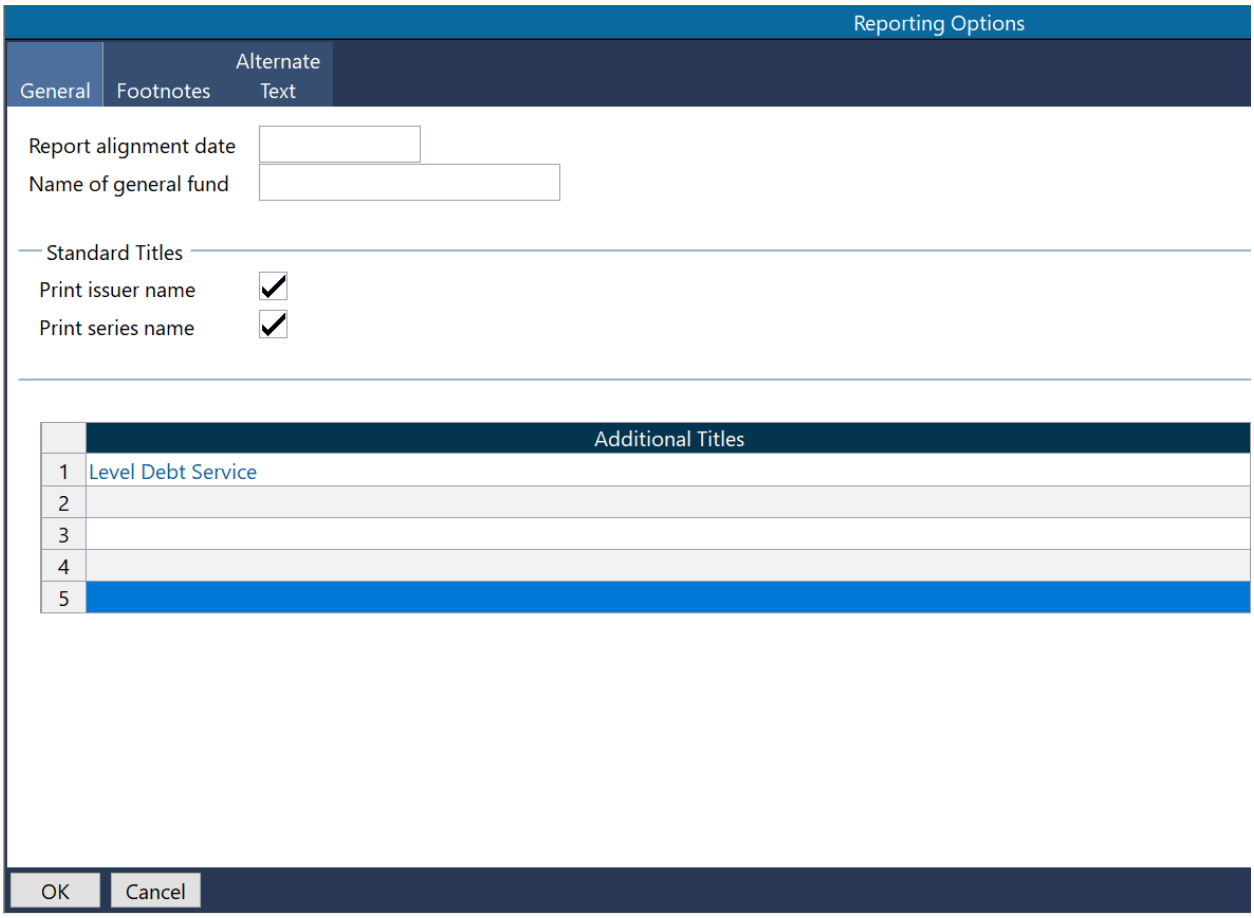


* **Enter "Issuer Contribution" in the DESCRIPTION column and the amount of $150,000 as "150" in the AMOUNT column. Click OK. This contribution can also be entered as a default type Expense with a negative formula entered in real dollar amounts: "-$150,000".**

❖ DATA MENU - ADDITIONAL INFORMATION - REPORTING OPTIONS

This dialog permits you to enter a date on which to align your cash flows (a fiscal date, for example) as well as specifying the legal name of the general fund. You can also choose to print the issuer and series names and additional title lines. Changes to this dialog are **saved as a part of the default title** saved with the series. One common usage of the additional titles is to write a description of the "particulars" of the series, especially when you run many variations of the same financing (i.e. "This analysis has .45% insurance and AAA 20 yr +.5 bp...").

* **Select REPORTING OPTIONS from the ADDITIONAL INFORMATION menu.**



* **Go to the first line under Additional Titles and enter "Level Debt Service." Click OK when finished to exit the Report Options Screen.**

❖ FILE MENU

We **highly** recommend that you save your file before calculating a solution. Should you not save and then attempt to close the file, you will be prompted to save the file if you have made changes.

Save/Save As The **SAVE** command will save the current series or case in the active datafile. **SAVE AS** permits you to save a series or case under a different name and/or issuer name.

There are three ways to save data to the hard drive:

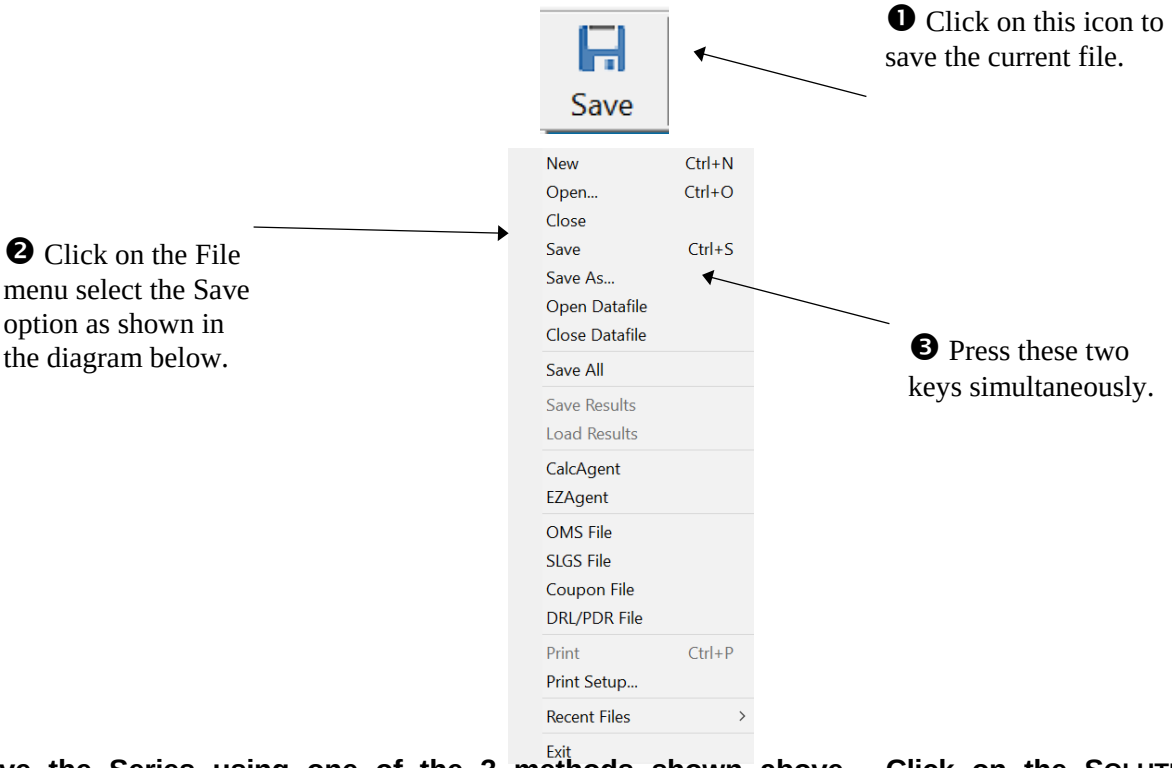
1. **Click on the DISK icon to automatically save.**

   or

2. **Go to the FILE menu and click on SAVE.**

   or

3. **Press CTRL and S simultaneously.**



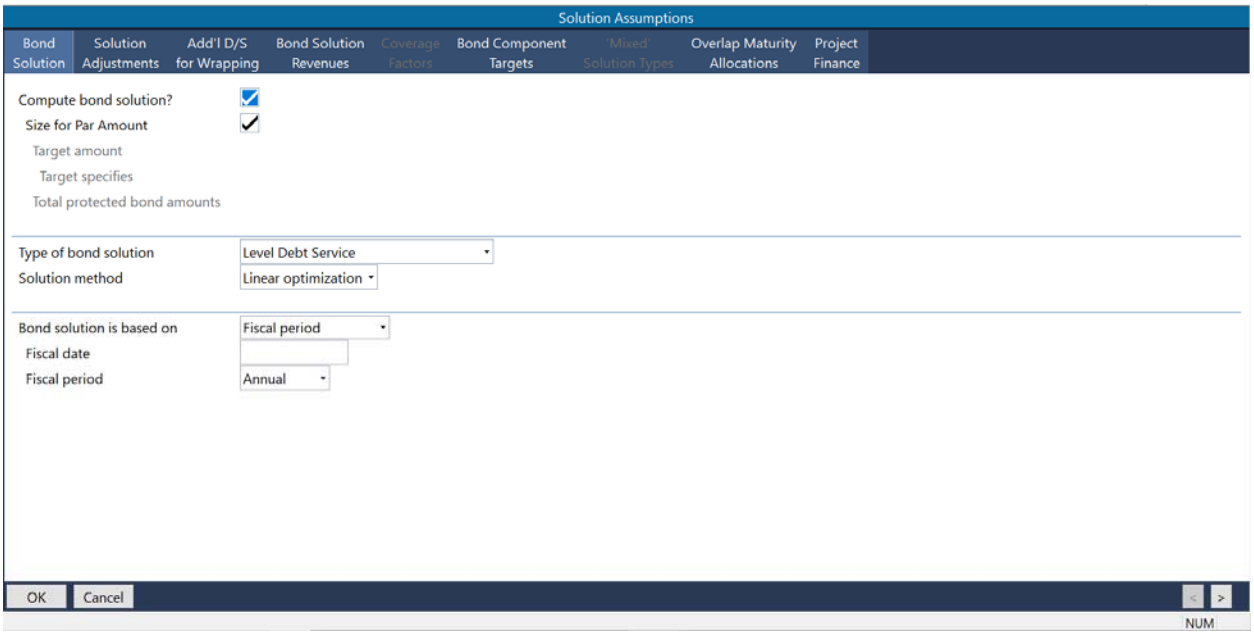
∗ **Save the Series using one of the 3 methods shown above. Click on the SOLUTION ASSUMPTIONS - SETUP button.**

❖ SOLUTION ASSUMPTIONS MENU

The **SOLUTION ASSUMPTIONS** menu includes options for solving bond size, optimal amortization given a total par, and computation of debt service for an existing amortization. The scenario required is one with level debt service on the new bonds only. This solution disregards any existing debt service when shaping the debt service of the new bonds.

Solution Method

DBC uses linear programming techniques to solve for an optimal debt service structure. Occasionally, users impose too many constraints for the linear optimization routine to run properly and the program will display an error message stating it cannot find a solution for the problem. Setting the **SOLUTION METHOD** to **BASIC** will usually eliminate the error message and will result in a solution which ignores the constraints.



* **In the BOND SOLUTION tab, make sure that the TYPE OF BOND SOLUTION to Level. Click OK then click the CALCULATE button to begin the solution process.**

❖ SOLUTION ASSUMPTIONS - AMORTIZATION OPTIONS

There are ten different types of bond solutions that can be executed. The following descriptions include the results as displayed in the Bond Solution report. The information that indicates that the solution has been successfully accomplished is highlighted

Level Debt service (p+i) is equal (+/- one bond denomination) every year.

Period Ending	Proposed Principal	Proposed Debt Service	Total Adj Debt Service
01/01/2021	-	934,750	934,750
01/01/2022	790,000	1,724,750	1,724,750
01/01/2023	830,000	1,725,250	1,725,250
01/01/2024	870,000	1,723,750	1,723,750
01/01/2025	915,000	1,725,250	1,725,250
01/01/2026	960,000	1,724,500	1,724,500
01/01/2027	1,010,000	1,726,500	1,726,500
01/01/2028	1,060,000	1,726,000	1,726,000
01/01/2029	1,110,000	1,723,000	1,723,000
01/01/2030	1,170,000	1,727,500	1,727,500
01/01/2031	1,225,000	1,724,000	1,724,000
01/01/2032	1,060,061	1,722,750	1,722,750
01/01/2033	1,035,157	1,722,750	1,722,750
01/01/2034	1,009,637	1,722,750	1,722,750
01/01/2035	985,042	1,722,750	1,722,750
01/01/2036	1,285,000	1,722,750	1,722,750
01/01/2037	1,350,000	1,723,500	1,723,500
01/01/2038	1,420,000	1,726,000	1,726,000
01/01/2039	1,490,000	1,725,000	1,725,000
01/01/2040	1,565,000	1,725,500	1,725,500
01/01/2041	1,645,000	1,727,250	1,727,250

Proportional Debt service is a proportional amount (level percentage) above or below the revenue constraint. This generates a level coverage ratio (revenue/debt service).

Period Ending	Proposed Principal	Proposed Debt Service	Total Adj Debt Service	Revenue Constraints	Unused Revenues	Debt Serv Coverage
01/01/2021	-	884,750	884,750	-	(884,750)	-
01/01/2022	580,000	1,464,750	1,464,750	2,000,000	535,250	136.54207%
01/01/2023	635,000	1,490,750	1,490,750	2,040,000	549,250	136.84387%
01/01/2024	695,000	1,519,000	1,519,000	2,080,800	561,800	136.98486%
01/01/2025	760,000	1,549,250	1,549,250	2,122,416	573,166	136.99635%
01/01/2026	830,000	1,581,250	1,581,250	2,164,864	583,614	136.90842%
01/01/2027	905,000	1,614,750	1,614,750	2,208,162	593,412	136.74944%
01/01/2028	980,000	1,644,500	1,644,500	2,252,325	607,825	136.96107%
01/01/2029	1,065,000	1,680,500	1,680,500	2,297,371	616,871	136.70761%
01/01/2030	1,150,000	1,712,250	1,712,250	2,343,319	631,069	136.85611%
01/01/2031	1,245,000	1,749,750	1,749,750	2,390,185	640,435	136.60152%
01/01/2032	1,105,433	1,782,500	1,782,500	2,437,989	655,489	136.77357%
01/01/2033	1,107,659	1,817,500	1,817,500	2,486,749	669,249	136.82248%
01/01/2034	1,107,851	1,852,500	1,852,500	2,536,484	683,984	136.92219%
01/01/2035	1,111,527	1,892,500	1,892,500	2,587,213	694,713	136.70876%
01/01/2036	1,109,533	1,927,500	1,927,500	2,638,958	711,458	136.91090%
01/01/2037	1,525,000	1,967,500	1,967,500	2,691,737	724,237	136.81000%
01/01/2038	1,640,000	2,006,250	2,006,250	2,745,571	739,321	136.85091%
01/01/2039	1,765,000	2,049,250	2,049,250	2,800,483	751,233	136.65892%
01/01/2040	1,890,000	2,086,000	2,086,000	2,856,493	770,493	136.93636%
01/01/2041	2,030,000	2,131,500	2,131,500	2,913,622	782,122	136.69352%

Uniform Debt service is a level amount above or below the revenue constraint.

Period Ending	Proposed Principal	Proposed Debt Service	Total Adj Debt Service	Revenue Constraints	Unused Revenues	Debt Serv Coverage
01/01/2021	-	877,500	877,500	-	(877,500)	-
01/01/2022	480,000	1,357,500	1,357,500	2,000,000	642,500	147.32965%
01/01/2023	545,000	1,398,500	1,398,500	2,040,000	641,500	145.87058%
01/01/2024	615,000	1,441,250	1,441,250	2,080,800	639,550	144.37467%
01/01/2025	685,000	1,480,500	1,480,500	2,122,416	641,916	143.35805%
01/01/2026	760,000	1,521,250	1,521,250	2,164,864	643,614	142.30825%
01/01/2027	845,000	1,568,250	1,568,250	2,208,162	639,912	140.80418%
01/01/2028	930,000	1,611,000	1,611,000	2,252,325	641,325	139.80911%
01/01/2029	1,020,000	1,654,500	1,654,500	2,297,371	642,871	138.85593%
01/01/2030	1,120,000	1,703,500	1,703,500	2,343,319	639,819	137.55907%
01/01/2031	1,220,000	1,747,500	1,747,500	2,390,185	642,685	136.77740%
01/01/2032	1,097,184	1,796,500	1,796,500	2,437,989	641,489	135.70770%
01/01/2033	1,111,687	1,846,500	1,846,500	2,486,749	640,249	134.67363%
01/01/2034	1,123,565	1,896,500	1,896,500	2,536,484	639,984	133.74551%
01/01/2035	1,134,524	1,946,500	1,946,500	2,587,213	640,713	132.91617%
01/01/2036	1,139,419	1,991,500	1,991,500	2,638,958	647,458	132.51105%
01/01/2037	1,585,000	2,051,500	2,051,500	2,691,737	640,237	131.20822%
01/01/2038	1,715,000	2,102,250	2,102,250	2,745,571	643,321	130.60157%
01/01/2039	1,860,000	2,161,500	2,161,500	2,800,483	638,983	129.56201%
01/01/2040	2,005,000	2,213,500	2,213,500	2,856,493	642,993	129.04868%
01/01/2041	2,165,000	2,273,250	2,273,250	2,913,622	640,372	128.16990%

Accelerated Principal is amortized as quickly as possible so that debt service does not exceed the revenue constraint in any year.

Period Ending	Proposed Principal	Proposed Debt Service	Total Adj Debt Service	Revenue Constraints	Unused Revenues	Debt Serv Coverage
01/01/2021	-	837,750	837,750	-	(837,750)	-
01/01/2022	1,160,000	1,997,750	1,997,750	2,000,000	2,250	100.11263%
01/01/2023	1,260,000	2,039,750	2,039,750	2,040,000	250	100.01226%
01/01/2024	1,360,000	2,076,750	2,076,750	2,080,800	4,050	100.19502%
01/01/2025	1,470,000	2,118,750	2,118,750	2,122,416	3,666	100.17303%
01/01/2026	1,585,000	2,160,250	2,160,250	2,164,864	4,614	100.21360%
01/01/2027	1,710,000	2,206,000	2,206,000	2,208,162	2,162	100.09799%
01/01/2028	1,840,000	2,250,500	2,250,500	2,252,325	1,825	100.08109%
01/01/2029	1,975,000	2,293,500	2,293,500	2,297,371	3,871	100.16880%
01/01/2030	2,120,000	2,339,750	2,339,750	2,343,319	3,569	100.15253%
01/01/2031	2,275,000	2,388,750	2,388,750	2,390,185	1,435	100.06008%
01/01/2032	2,008,753	2,435,000	2,435,000	2,437,989	2,989	100.12275%
01/01/2033	2,001,841	2,485,000	2,485,000	2,486,749	1,749	100.07037%
01/01/2034	1,991,775	2,535,000	2,535,000	2,536,484	1,484	100.05852%
01/01/2035	1,981,583	2,585,000	2,585,000	2,587,213	2,213	100.08562%
01/01/2036	1,400,925	1,875,000	1,875,000	2,638,958	763,958	140.74440%
01/01/2037	-	-	-	2,691,737	2,691,737	-
01/01/2038	-	-	-	2,745,571	2,745,571	-
01/01/2039	-	-	-	2,800,483	2,800,483	-
01/01/2040	-	-	-	2,856,493	2,856,493	-
01/01/2041	-	-	-	2,913,622	2,913,622	-

Deferred Principal is amortized as late as possible so that debt service does not exceed the revenue constraint in any year.

Period Ending	Proposed Principal	Proposed Debt Service	Total Adj Debt Service	Revenue Constraints	Unused Revenues	Debt Serv Coverage
01/01/2021	-	756,750	756,750	-	(756,750)	-
01/01/2022	-	756,750	756,750	2,000,000	1,243,250	264.28807%
01/01/2023	-	756,750	756,750	2,040,000	1,283,250	269.57384%
01/01/2024	-	756,750	756,750	2,080,800	1,324,050	274.96531%
01/01/2025	-	756,750	756,750	2,122,416	1,365,666	280.46462%
01/01/2026	-	756,750	756,750	2,164,864	1,408,114	286.07391%
01/01/2027	-	756,750	756,750	2,208,162	1,451,412	291.79539%
01/01/2028	-	756,750	756,750	2,252,325	1,495,575	297.63130%
01/01/2029	-	756,750	756,750	2,297,371	1,540,621	303.58392%
01/01/2030	1,340,000	2,096,750	2,096,750	2,343,319	246,569	111.75957%
01/01/2031	1,700,000	2,389,750	2,389,750	2,390,185	435	100.01821%
01/01/2032	1,509,659	2,434,750	2,434,750	2,437,989	3,239	100.13303%
01/01/2033	1,514,472	2,484,750	2,484,750	2,486,749	1,999	100.08044%
01/01/2034	1,516,420	2,534,750	2,534,750	2,536,484	1,734	100.06839%
01/01/2035	1,517,809	2,584,750	2,584,750	2,587,213	2,463	100.09530%
01/01/2036	1,512,999	2,629,750	2,629,750	2,638,958	9,208	100.35013%
01/01/2037	2,085,000	2,689,750	2,689,750	2,691,737	1,987	100.07386%
01/01/2038	2,245,000	2,745,500	2,745,500	2,745,571	71	100.00260%
01/01/2039	2,410,000	2,798,250	2,798,250	2,800,483	2,233	100.07979%
01/01/2040	2,585,000	2,852,750	2,852,750	2,856,493	3,743	100.13119%
01/01/2041	2,770,000	2,908,500	2,908,500	2,913,622	5,122	100.17612%

Fill Solves for bonding capacity (how much principal a revenue stream can support or "afford" at specific interest rates).

Period Ending	Proposed Principal	Proposed Debt Service	Total Adj Debt Service	Revenue Constraints	Unused Revenues	Debt Serv Coverage
01/01/2021	-	1,209,000	1,209,000	-	(1,209,000)	-
01/01/2022	790,000	1,999,000	1,999,000	2,000,000	1,000	100.05003%
01/01/2023	870,000	2,039,500	2,039,500	2,040,000	500	100.02452%
01/01/2024	950,000	2,076,000	2,076,000	2,080,800	4,800	100.23121%
01/01/2025	1,040,000	2,118,500	2,118,500	2,122,416	3,916	100.18485%
01/01/2026	1,135,000	2,161,500	2,161,500	2,164,864	3,364	100.15565%
01/01/2027	1,235,000	2,204,750	2,204,750	2,208,162	3,412	100.15474%
01/01/2028	1,340,000	2,248,000	2,248,000	2,252,325	4,325	100.19239%
01/01/2029	1,455,000	2,296,000	2,296,000	2,297,371	1,371	100.05973%
01/01/2030	1,570,000	2,338,250	2,338,250	2,343,319	5,069	100.21678%
01/01/2031	1,700,000	2,389,750	2,389,750	2,390,185	435	100.01821%
01/01/2032	1,509,659	2,434,750	2,434,750	2,437,989	3,239	100.13303%
01/01/2033	1,514,472	2,484,750	2,484,750	2,486,749	1,999	100.08044%
01/01/2034	1,516,420	2,534,750	2,534,750	2,536,484	1,734	100.06839%
01/01/2035	1,517,809	2,584,750	2,584,750	2,587,213	2,463	100.09530%
01/01/2036	1,516,735	2,634,750	2,634,750	2,638,958	4,208	100.15969%
01/01/2037	2,085,000	2,689,750	2,689,750	2,691,737	1,987	100.07386%
01/01/2038	2,245,000	2,745,500	2,745,500	2,745,571	71	100.00260%
01/01/2039	2,410,000	2,798,250	2,798,250	2,800,483	2,233	100.07979%
01/01/2040	2,585,000	2,852,750	2,852,750	2,856,493	3,743	100.13119%
01/01/2041	2,770,000	2,908,500	2,908,500	2,913,622	5,122	100.17612%

Equal Principal is equal (+/- one bond denomination) in every period. .

Period Ending	Proposed Principal	Proposed Debt Service	Total Adj Debt Service	Revenue Constraints	Unused Revenues	Debt Serv Coverage
01/01/2021	-	904,250	904,250	-	(904,250)	-
01/01/2022	1,210,000	2,114,250	2,114,250	2,000,000	(114,250)	94.59619%
01/01/2023	1,210,000	2,053,750	2,053,750	2,040,000	(13,750)	99.33049%
01/01/2024	1,205,000	1,988,250	1,988,250	2,080,800	92,550	104.65485%
01/01/2025	1,205,000	1,928,000	1,928,000	2,122,416	194,416	110.08382%
01/01/2026	1,205,000	1,867,750	1,867,750	2,164,864	297,114	115.90761%
01/01/2027	1,205,000	1,807,500	1,807,500	2,208,162	400,662	122.16662%
01/01/2028	1,205,000	1,747,250	1,747,250	2,252,325	505,075	128.90684%
01/01/2029	1,205,000	1,687,000	1,687,000	2,297,371	610,371	136.18087%
01/01/2030	1,205,000	1,626,750	1,626,750	2,343,319	716,569	144.04910%
01/01/2031	1,205,000	1,566,500	1,566,500	2,390,185	823,685	152.58124%
01/01/2032	1,208,552	1,766,250	1,766,250	2,437,989	671,739	138.03192%
01/01/2033	1,208,355	1,801,250	1,801,250	2,486,749	685,499	138.05683%
01/01/2034	1,206,065	1,836,250	1,836,250	2,536,484	700,234	138.13389%
01/01/2035	1,207,348	1,876,250	1,876,250	2,587,213	710,963	137.89278%
01/01/2036	1,206,663	1,916,250	1,916,250	2,638,958	722,708	137.71468%
01/01/2037	1,205,000	1,506,250	1,506,250	2,691,737	1,185,487	178.70451%
01/01/2038	1,205,000	1,446,000	1,446,000	2,745,571	1,299,571	189.87354%
01/01/2039	1,205,000	1,385,750	1,385,750	2,800,483	1,414,733	202.09149%
01/01/2040	1,205,000	1,325,500	1,325,500	2,856,493	1,530,993	215.50302%
01/01/2041	1,205,000	1,265,250	1,265,250	2,913,622	1,648,372	230.28037%

Solution w/Carry Maintains the solution type (accelerated/deferred/fill) but carries forward any unused revenues until it has sufficient to amortize another bond.

Mixed This is used mainly for two common problems. Bond components have specific targets for either dollar amounts or percentage of par **OR** the solution constraints change over time (i.e. level for first 5 years, then fill solution).

❖ BOND SOLUTION STATUS

This dialog gives you a summary of the results including par amount, arbitrage yield, and summarized sources and uses.

* **If you get the WARNINGS & ERRORS dialog, read the messages. If there are errors, you must fix them before you can complete the solution. Once you fix the error, click on CALCULATE again. If there are only WARNINGS, click on OK until you see the dialog below.**

* **Review results and compare them to the solution above. You must correct all problems before you move to the Advanced Analyses otherwise all your solutions will be wrong.**

If you get different results, there are several things you can check on this dialog that would indicate a different input.

1. Delivery Date - a different date will affect the accrued interest and also might indicate that the dated date was entered incorrectly. Also, it will affect the par amount of CABs (since this is based on discounting $5,000 at a the CAB's yield back to the delivery date).

2. Arbitrage Yield - this yield should be a reasonable number in the context of the scale you entered. For example, if your rates ranged from 4% to 6%, your arbitrage yield should NOT be 3% or 10%.

3. Par Amount - if you set “Size for Par Amount” to “Yes”, this number will simply be a function of the uses entered and cannot be verified until all the uses are verified.

4. Bond Adjustments - this is the sum of original issue discount and premiums as well as accrued interest. If this is blank, you may have not entered in the correct dated and delivery dates. You may have also not entered in the correct price for premium or discount bonds.

5. Other Sources - this amount should equal any amounts entered in the Other Sources dialog or equity contributions generated by the system. If it is blank, check your entry.

6. Cost of Projects - if this amount is too high or too low, you entered the project draws incorrectly or set the wrong gross/net option. Remember that the deposit to the project funds cannot be more than the total of the draws without earnings. Also, if any earnings from reserve funds that SHOULD be flowing to the project fund ARE NOT, this loss of "income" will increase the cost of the project fund. The opposite holds true if money is wrongfully sent to the project fund. In addition, changes to the dates of the draws will greatly affect the present value of the draws and, consequently, the total cost of the project fund.

7. Expenses - this should include costs of issuance, underwriters' discount, and any expenses (such as insurance). Be sure to include in the arbitrage yield those expenses which can be recovered.

8. Reserve Funds - this is the sum of the deposits to the reserve funds entered, including capitalized interest. If this amount is too low or too high, check that the formulas used to describe the reserve funds are correct.

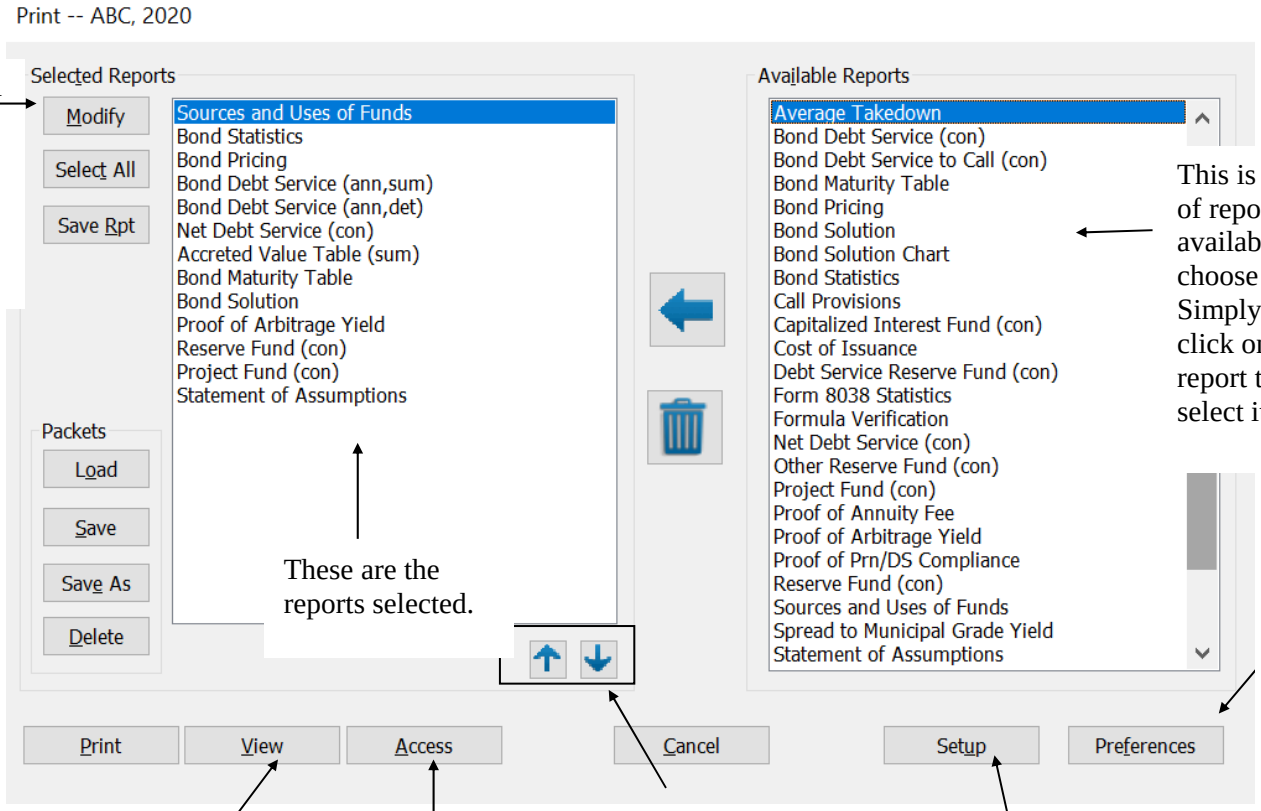
9. Other Uses - this should be blank as no other uses were specified.

10. Additional funds - this is a rounding amount used because bonds must be sold in multiples of their denomination. They cannot be divided to match the exact uses of funds (i.e. you cannot issue 1/3rd of a bond because you need an additional $1,778.07 in proceeds). This amount is also known as the contingency and should never exceed one multiple of the bond denomination (unless when using a Fill solution).

* **Click OK when your review of this dialog is complete. Click on the PRINT button.**

❖ FILE MENU - PRINT

Print options include changing the frequency in which amounts are shown and level of detail. In addition, you can add titles or replace the regular titles as well as change the page number. The reports available can be selected by double clicking on the report. You can select one report at a time or enter a sequence of reports to be printed. It is recommended to select the reports in the order in which you would like them printed, although they can easily be moved using the **MOVE UP** or **MOVE DOWN** command.



Modifies level of detail and frequency of one or multiple reports.

This is the list of reports available to choose from. Simply double click on the report to select it.

These are the reports selected.

Modifies content and appearance of report.

Displays all reports selected.

Displays reports in rows and columns to ease cut and paste.

Moves selected reports up to the top of the selection list or down to the bottom.

Select printer Options.

* **Select the following reports in the order listed by double clicking on each one (note that Bond Debt Service must be selected twice):**

1.	**Sources and Uses of Funds**	**8.**	**Bond Maturity Table**
2.	**Summary Statistics**	**9.**	**Bond Solution**
3.	**Bond Pricing**	**10.**	**Proof of Arbitrage Yield**
4&5.	**Bond Debt Service (ann,sum) (ann,det)**	**11.**	**Reserve Fund**
6.	**Net Debt Service**	**12.**	**Project Fund**
7.	**Accreted Value Table**	**13.**	**Statement of Assumptions**

* **Go to the SELECTED REPORTS column (on left), hold down the CRTL key and click on both of the Debt Service reports OR hold down the left mouse button and scroll down over the two Debt Service reports. Click on MODIFY, go to the FREQUENCY option and select ANNUAL and click on OK. Then click on the second Debt Service report. Click on the MODIFY button. Select "Detail" in the STYLE section. Click on OK.**

Notice that the default frequency for the Debt Service reports is CON for continuous. This frequency reflects every date on which there is a cash flow incident.

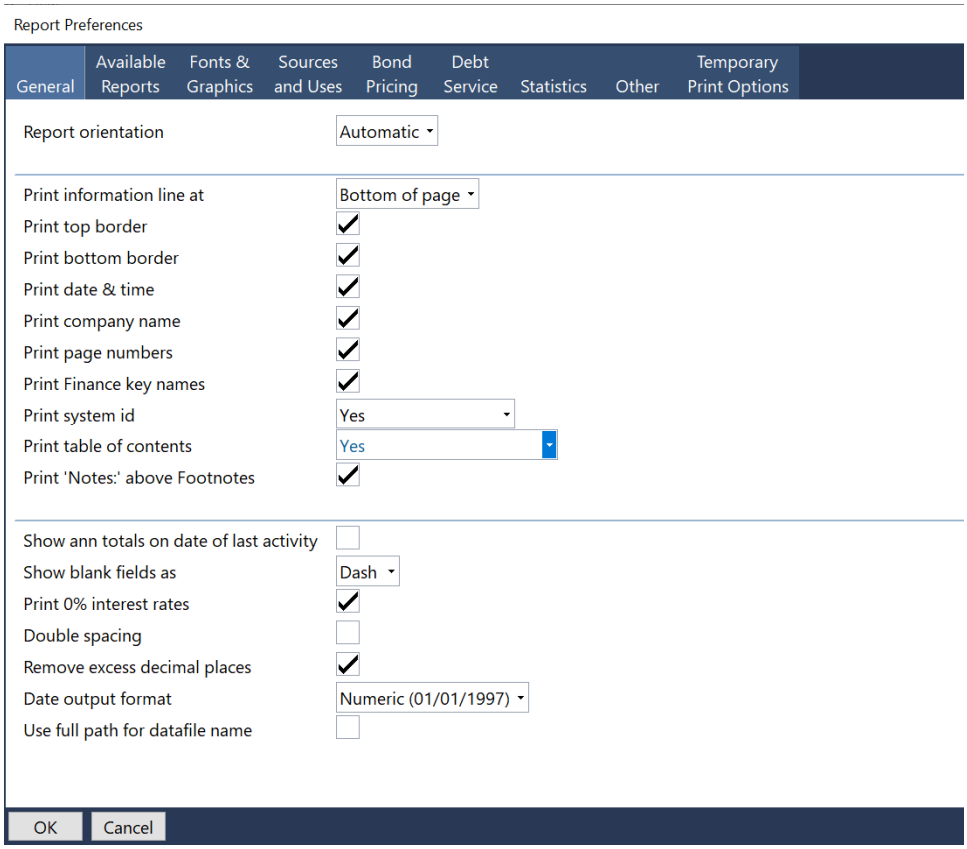
* **Click on VIEW. Click on the CLOSE button when finished.**

The reports appear as they would on paper. You can use the Page up/down keys to move around the reports. Should you decide after previewing the reports that you wish to print them, simply click on **PRINT**.

❖ FILE MENU - PRINT - PREFERENCES

This dialog provides the user with control of what and how information appears on a report. Differences between your settings and the author's at time of printing will account for the differences between the reports you print and those in this Tutorial.

* **Click on PRINT then select PREFERENCES.**

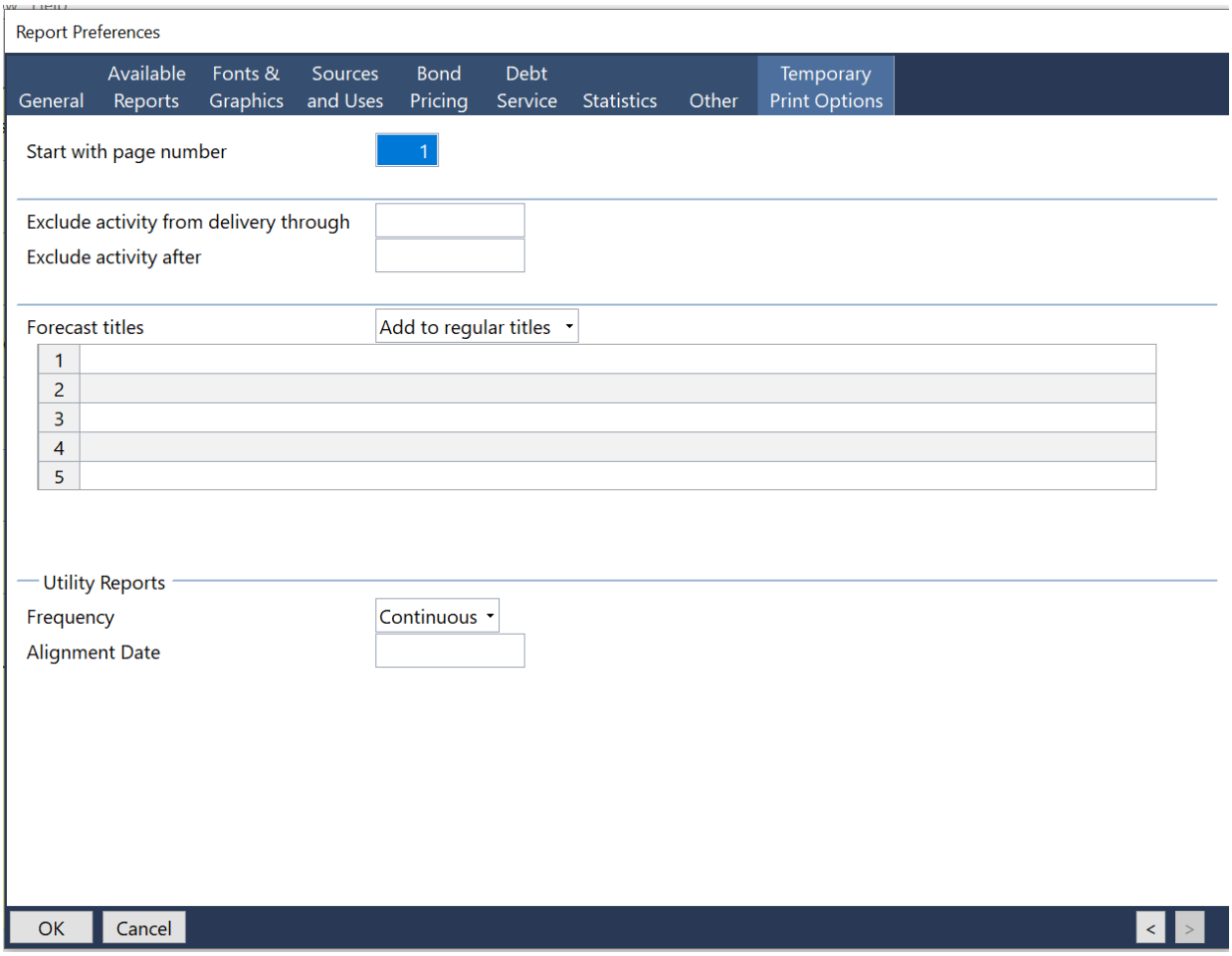


* **Read through the options carefully as these will be useful in many situations. Look for the PRINT TABLE OF CONTENTS prompt and respond "Yes".**

❖ FILE MENU - PRINT - PREFERENCES - TEMPORARY PRINT OPTIONS

This dialog permits you to change the page number of a report or beginning page for a string of reports and the start date for debt service. Also, you can change the titles on the reports or add to the existing titles (this includes the additional titles entered in **REPORTING OPTIONS**).

* **Click on the TEMPORARY PRINT OPTIONS tab.**



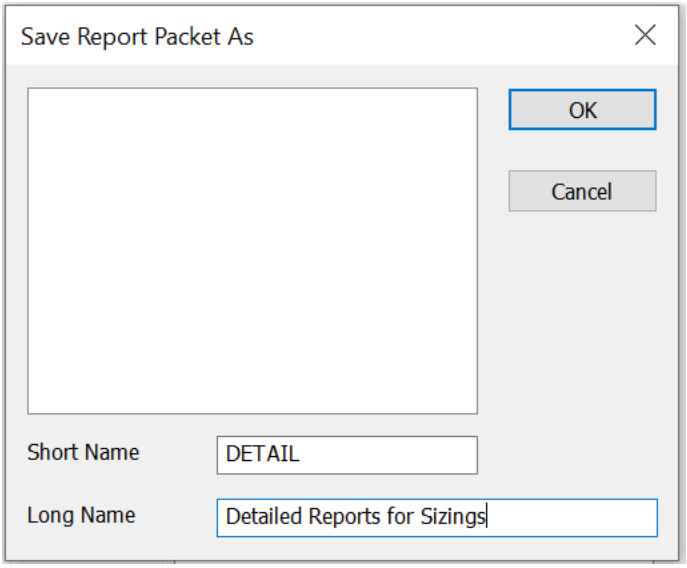
* **Review the options in this dialog. Click on the other tabs to see the versatile reporting options. When finished, click on OK.**

NOTE - Changes made here are only temporary unlike those made in **REPORTING OPTIONS** which are saved as part of the file. They will remain active until you change the inputs or exit the program.

❖ FILE MENU - PRINT - REPORT PACKETS

In all DBC applications, there is a **REPORT PACKETS** feature which lets you select individual reports and group them. This facilitates printing or viewing reports because instead of selecting each of the reports individually, you simply select the name of the report group or packet that you have defined and print or view them immediately. This makes it very easy to print several different sets of cash flows for different audiences again and again, i.e. one set for the client, a detailed set for yourself, another set for the verification consultants, etc. We will take the reports you already selected and save them as a report packet so that sequence of reports can be used again in the future.

* **Click on the PACKETS - SAVE button in the PRINT dialog.**



* **Type the short name as "DETAIL", press ENTER, then type the long name as "Detailed Reports for Sizing". Click OK. Click on the X in the upper right hand corner of the PRINT dialog to close it.**

❖ ANALYZING YOUR RESULTS

Once you have reviewed the summary of results on the dialog and have printed your reports, the report you must first review is the Sources and Uses of Funds report. This report is, in effect, a balance sheet reflecting all the assets and liabilities of this bond issue. The following is a checklist to use when verifying the Sources and Uses. It is critical that you understand the underlying calculations involved in computing each of the entries on this report. The level of detail on the report depends on whether the report is being presented in Simple or Expanded format. Changes can be made in **PRINT - PREFERENCES**.

SOURCES

Par

- Only check if "Size for par amount" is set to "No" and you are controlling the par amount of the whole issue or of specific bond component(s).

Original Issue Discount/Premium

- Check pricing report. Are coupons, yields, and prices entered correctly?

Price x Par = Purchase Price (paid by bondholder)
If price is <100% - the difference is a discount
If price is >100% - the difference is a premium

Accrued Interest

- Only exists if dated date does not equal delivery date.

$$\text{Accrued Interest} = \left(\frac{\#\,\text{days from Dated date to delivery date}}{\#\ \text{days from Dated to first coupon}} \right) \text{ x First Interest Payment}$$

Other Sources

- Can be found in Debt/Size in
    1. Entries in Miscellaneous - Other Sources
    2. General Assumptions - F8 - Advanced Options
        a. If "Contingency is negative" is set to "yes"
        b. If "2% limit...." is set to "generate equity contribution"
- Can be found in Refund in
    1. Prior Debt - entries in Funds on Hand

USES

Project Fund Deposit

- Appears as sum of deposits to all project funds created when Sources & Uses are in Expanded format
- Should be equal to or less than the sum of the draws
- Check interest
    if Net Funded (PV) - compound interest on the starting balance at specified rate
    if Net Funded (GIC) or Gross Funded - use simple interest at specified rate

Other Fund Deposits

Debt Service Reserve

- Check balance requirement by computing each formula
  % of par
  % of proceeds
  % of (Par less OID plus OIP less Accrued Interest)
  % of adjusted average annual debt service

$$\frac{\text{Total Debt Service plus Accrued Interest}}{\text{(\# days from Delivery date to Final Maturity) / 360}}$$

  % of maximum annual debt service
  look at debt service report
- Check interest earnings and flow of funds

Capitalized Interest Fund

- Check interest
  if Net Funded (PV) - compound interest on the starting balance at specified rate
  if Net Funded (GIC) or Gross Funded - use simple interest at specified rate
- Usually function of bond interest through a specific date. If date is NOT interest payment date, check that formula includes the term ".... bond interest accrued through ....."
- Compare draws with debt service
- ALWAYS check last draw if you capitalized a partial draw
- Check that earnings flow properly

Delivery Date Expenses

Costs of Issuance

- Usually flat dollar amount or $/1,000

$$\frac{\$x}{1{,}000} \times \text{Par Amount}$$

Underwriter's Discount

- Usually $/1,000

Insurance

- % of total debt service but can exclude accrued and even capitalized interest
  Debt Service = (accrued interest + capitalized interest net of accrued + remainder)

$$\frac{\%}{100} \times \text{Portion of debt service insures}$$

Other Uses of Funds

- Check Miscellaneous - Other Uses

Additional Proceeds

- Also called Rounding and Contingency
- This is a plug amount computed by program to make Total Sources equal to Total Uses
- Should be less than one bond denomination

SOURCES AND USES OF FUNDS

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Dated Date	01/01/2020
Delivery Date	01/15/2020

Sources:	
Bond Proceeds:	
Par Amount	23,213,983.00
Accrued Interest	34,815.28
Premium	6,231,341.05
	29,480,139.33
Other Sources of Funds:	
Issuer Contribution	150,000.00
	29,630,139.33

Uses:	
Project Fund Deposits:	
Road Repair Fund	26,047,650.54
Other Fund Deposits:	
Debt Service Reserve Fund	1,727,500.00
Capitalized Interest Fund	1,286,447.65
	3,013,947.65
Delivery Date Expenses:	
Cost of Issuance	250,000.00
Underwriter's Discount	243,746.82
Insurance for Term Bond	73,016.25
	566,763.07
Other Uses of Funds:	
Additional Proceeds	1,778.07
	29,630,139.33

Note: Capitalized Interest Fund includes deposit of 34,815.28 of bond accrued interest.

BOND SUMMARY STATISTICS

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Dated Date	01/01/2020
Delivery Date	01/15/2020
First Coupon	07/01/2020
Last Maturity	01/01/2041
Arbitrage Yield	1.719312%
True Interest Cost (TIC)	1.799302%
All-In TIC	1.882302%
Average Life (years)	12.399
Weighted Average Maturity (years)	12.870
Duration of Issue (years)	10.483
Par Amount	23,213,983.00
Bond Proceeds	29,480,139.33
Total Interest	10,733,500.00
Net Interest	4,745,905.77
Bond Years from Dated Date	288,733,146.50
Bond Years from Delivery Date	287,830,380.49
Total Debt Service	35,388,500.00
Maximum Annual Debt Service	1,727,500.00
Average Annual Debt Service	1,686,632.19
Underwriter's Fees (per $1000)	
Average Takedown	7.500000
Management Fee	0.500000
Other Fee	2.500000
Total Underwriter's Discount	10.500000
Bid Price	125.793050

Bond Component	*Par Value*	*Price*	*Average Coupon*	*Average Life*	*Average Maturity Date*	*Duration*	*PV of 1 bp change*
Serial Bonds through 2031	10,435,000.00	123.724	5.000%	6.861	11/25/2026	6.068	7,757.00
CAB Serial Bonds through 2036	5,308,983.00	100.000	-	13.912	12/13/2033	13.927	7,303.50
Term Bond due 2041	7,470,000.00	150.278	5.000%	19.060	02/05/2039	13.813	16,434.00
	23,213,983.00			12.399			31,494.50

	TIC	All-In TIC	Arbitrage Yield
Par Value	23,213,983.00	23,213,983.00	23,213,983.00
+ Accrued Interest	34,815.28	34,815.28	34,815.28
+ Premium (Discount)	6,231,341.05	6,231,341.05	6,231,341.05
- Underwriter's Discount	(243,746.82)	(243,746.82)	
- Cost of Issuance Expense		(250,000.00)	
- Other Amounts	(73,016.25)	(73,016.25)	(73,016.25)
Target Value	29,163,376.26	28,913,376.26	29,407,123.08
Target Date	01/15/2020	01/15/2020	01/15/2020
Yield	1.799302%	1.882302%	1.719312%

It is critical that you verify the TIC target value and how it was computed IF you are using this statistic for a NIC bid.

The arbitrage yield is the earnings rate limit for most, if not all, of your investments. You must be sure it is correctly computed.

Verify these rates.

BOND PRICING

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Bond Component	Maturity Date	Amount	Rate	Yield	Price	Principal per $5,000 at Maturity	Offer Price per $5,000 at Maturity	CAB Value at Maturity	Premium (-Discount)	Principal Cost
Serial Bonds through 2031:										
	01/01/2022	830,000.00	5.000%	1.100%	107.545	-	-	-	62,623.50	892,623.50
	01/01/2023	870,000.00	5.000%	1.110%	111.300	-	-	-	98,310.00	968,310.00
	01/01/2024	915,000.00	5.000%	1.120%	114.991	-	-	-	137,167.65	1,052,167.65
	01/01/2025	960,000.00	5.000%	1.130%	118.619	-	-	-	178,742.40	1,138,742.40
	01/01/2026	1,010,000.00	5.000%	1.150%	122.119	-	-	-	223,401.90	1,233,401.90
	01/01/2027	1,060,000.00	5.000%	1.230%	125.076	-	-	-	265,805.60	1,325,805.60
	01/01/2028	1,110,000.00	5.000%	1.310%	127.809	-	-	-	308,679.90	1,418,679.90
	01/01/2029	1,170,000.00	5.000%	1.390%	130.316	-	-	-	354,697.20	1,524,697.20
	01/01/2030	1,225,000.00	5.000%	1.470%	132.597	-	-	-	399,313.25	1,624,313.25
	01/01/2031	1,285,000.00	5.000%	1.540%	134.773	-	-	-	446,833.05	1,731,833.05
		10,435,000.00						-	2,475,574.45	12,910,574.45
CAB Serial Bonds through 2036:										
	01/01/2032	1,114,371.00	1.610%	1.610%	82.546	4,127.30	4,127.30	1,350,000	-	1,114,371.00
	01/01/2033	1,088,221.50	1.670%	1.670%	80.609	4,030.45	4,030.45	1,350,000	-	1,088,221.50
	01/01/2034	1,061,424.00	1.730%	1.730%	78.624	3,931.20	3,931.20	1,350,000	-	1,061,424.00
	01/01/2035	1,035,585.00	1.780%	1.780%	76.710	3,835.50	3,835.50	1,350,000	-	1,035,585.00
	01/01/2036	1,009,381.50	1.830%	1.830%	74.769	3,738.45	3,738.45	1,350,000	-	1,009,381.50
		5,308,983.00						6,750,000	-	5,308,983.00
Term Bond due 2041:										
	01/01/2037	1,350,000.00	5.000%	2.040%	150.278	-	-	-	678,753.00	2,028,753.00
	01/01/2038	1,420,000.00	5.000%	2.040%	150.278	-	-	-	713,947.60	2,133,947.60
	01/01/2039	1,490,000.00	5.000%	2.040%	150.278	-	-	-	749,142.20	2,239,142.20
	01/01/2040	1,565,000.00	5.000%	2.040%	150.278	-	-	-	786,850.70	2,351,850.70
	01/01/2041	1,645,000.00	5.000%	2.040%	150.278	-	-	-	827,073.10	2,472,073.10
		7,470,000.00						-	3,755,766.60	11,225,766.60
		23,213,983.00						6,750,000	6,231,341.05	29,445,324.05

Dated Date	01/01/2020	
Delivery Date	01/15/2020	
First Coupon	07/01/2020	
Par Amount	23,213,983.00	
Premium	6,231,341.05	
Production	29,445,324.05	126.843050%
Underwriter's Discount	(243,746.82)	(1.050000%)
Purchase Price	29,201,577.23	125.793050%
Accrued Interest	34,815.28	
Net Proceeds	29,236,392.51	

BOND DEBT SERVICE

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Dated Date 01/01/2020
Delivery Date 01/15/2020

These columns only appear in the Expanded format.

Period Ending	Principal	Coupon	Interest	Compounded Interest	Debt Service	Bond Balance	Accreted Interest	Total Bond Value
01/01/2021	-	-	895,250	-	895,250	23,213,983.00	88,195.50	23,302,178.50
01/01/2022	830,000.00	5.000%	895,250	-	1,725,250	22,383,983.00	181,494.00	22,565,477.00
01/01/2023	870,000.00	5.000%	853,750	-	1,723,750	21,513,983.00	276,412.50	21,790,395.50
01/01/2024	915,000.00	5.000%	810,250	-	1,725,250	20,598,983.00	372,978.00	20,971,961.00
01/01/2025	960,000.00	5.000%	764,500	-	1,724,500	19,638,983.00	471,217.50	20,110,200.50
01/01/2026	1,010,000.00	5.000%	716,500	-	1,726,500	18,628,983.00	571,158.00	19,200,141.00
01/01/2027	1,060,000.00	5.000%	666,000	-	1,726,000	17,568,983.00	672,840.00	18,241,823.00
01/01/2028	1,110,000.00	5.000%	613,000	-	1,723,000	16,458,983.00	776,263.50	17,235,246.50
01/01/2029	1,170,000.00	5.000%	557,500	-	1,727,500	15,288,983.00	881,496.00	16,170,479.00
01/01/2030	1,225,000.00	5.000%	499,000	-	1,724,000	14,063,983.00	988,537.50	15,052,520.50
01/01/2031	1,285,000.00	5.000%	437,750	-	1,722,750	12,778,983.00	1,097,442.00	13,876,425.00
01/01/2032	1,114,371.00	1.610%	373,500	235,629.00	1,723,500	11,664,612.00	972,607.50	12,637,219.50
01/01/2033	1,088,221.50	1.670%	373,500	261,778.50	1,723,500	10,576,390.50	801,724.50	11,378,115.00
01/01/2034	1,061,424.00	1.730%	373,500	288,576.00	1,723,500	9,514,966.50	583,011.00	10,097,977.50
01/01/2035	1,035,585.00	1.780%	373,500	314,415.00	1,723,500	8,479,381.50	316,237.50	8,795,619.00
01/01/2036	1,009,381.50	1.830%	373,500	340,618.50	1,723,500	7,470,000.00	-	7,470,000.00
01/01/2037	1,350,000.00	5.000%	373,500	-	1,723,500	6,120,000.00	-	6,120,000.00
01/01/2038	1,420,000.00	5.000%	306,000	-	1,726,000	4,700,000.00	-	4,700,000.00
01/01/2039	1,490,000.00	5.000%	235,000	-	1,725,000	3,210,000.00	-	3,210,000.00
01/01/2040	1,565,000.00	5.000%	160,500	-	1,725,500	1,645,000.00	-	1,645,000.00
01/01/2041	1,645,000.00	5.000%	82,250	-	1,727,250	-	-	-
	23,213,983.00		10,733,500	1,441,017.00	35,388,500			

The frequency of cash flows is changed using the F5-Modify command in the Select & Print dialog.

The Total Bond Value is useful for verifying letter of Credit calculations which are based on the value of bonds outstanding as of specific dates over time.

This is set using Modify for the Debt Service report. It shows each bond component's debt service.

DETAILED BOND DEBT SERVICE

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Dated Date	01/01/2020
Delivery Date	01/15/2020

Serial Bonds through 2031

Period Ending	Principal	Coupon	Interest	Debt Service	Bond Balance	Total Bond Value
01/01/2021	-	-	521,750	521,750	10,435,000	10,435,000
01/01/2022	830,000	5.000%	521,750	1,351,750	9,605,000	9,605,000
01/01/2023	870,000	5.000%	480,250	1,350,250	8,735,000	8,735,000
01/01/2024	915,000	5.000%	436,750	1,351,750	7,820,000	7,820,000
01/01/2025	960,000	5.000%	391,000	1,351,000	6,860,000	6,860,000
01/01/2026	1,010,000	5.000%	343,000	1,353,000	5,850,000	5,850,000
01/01/2027	1,060,000	5.000%	292,500	1,352,500	4,790,000	4,790,000
01/01/2028	1,110,000	5.000%	239,500	1,349,500	3,680,000	3,680,000
01/01/2029	1,170,000	5.000%	184,000	1,354,000	2,510,000	2,510,000
01/01/2030	1,225,000	5.000%	125,500	1,350,500	1,285,000	1,285,000
01/01/2031	1,285,000	5.000%	64,250	1,349,250	-	-
	10,435,000		3,600,250	14,035,250		

This column only appears when there are CABs and the report is in Expanded format.

DETAILED BOND DEBT SERVICE

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Dated Date 01/01/2020
Delivery Date 01/15/2020

CAB Serial Bonds through 2036

Period Ending	Principal	Coupon	Interest	Compounded Interest	Debt Service	Bond Balance	Accreted Interest	Total Bond Value
01/01/2021	-	-	-	-	-	5,308,983.00	88,195.50	5,397,178.50
01/01/2022	-	-	-	-	-	5,308,983.00	181,494.00	5,490,477.00
01/01/2023	-	-	-	-	-	5,308,983.00	276,412.50	5,585,395.50
01/01/2024	-	-	-	-	-	5,308,983.00	372,978.00	5,681,961.00
01/01/2025	-	-	-	-	-	5,308,983.00	471,217.50	5,780,200.50
01/01/2026	-	-	-	-	-	5,308,983.00	571,158.00	5,880,141.00
01/01/2027	-	-	-	-	-	5,308,983.00	672,840.00	5,981,823.00
01/01/2028	-	-	-	-	-	5,308,983.00	776,263.50	6,085,246.50
01/01/2029	-	-	-	-	-	5,308,983.00	881,496.00	6,190,479.00
01/01/2030	-	-	-	-	-	5,308,983.00	988,537.50	6,297,520.50
01/01/2031	-	-	-	-	-	5,308,983.00	1,097,442.00	6,406,425.00
01/01/2032	1,114,371.00	1.610%	-	235,629.00	1,350,000	4,194,612.00	972,607.50	5,167,219.50
01/01/2033	1,088,221.50	1.670%	-	261,778.50	1,350,000	3,106,390.50	801,724.50	3,908,115.00
01/01/2034	1,061,424.00	1.730%	-	288,576.00	1,350,000	2,044,966.50	583,011.00	2,627,977.50
01/01/2035	1,035,585.00	1.780%	-	314,415.00	1,350,000	1,009,381.50	316,237.50	1,325,619.00
01/01/2036	1,009,381.50	1.830%	-	340,618.50	1,350,000	-	-	-
	5,308,983.00		0	1,441,017.00	6,750,000			

DETAILED BOND DEBT SERVICE

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Dated Date	01/01/2020
Delivery Date	01/15/2020

Term Bond due 2041

Period Ending	Principal	Coupon	Interest	Debt Service	Bond Balance	Total Bond Value
01/01/2021	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2022	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2023	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2024	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2025	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2026	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2027	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2028	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2029	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2030	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2031	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2032	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2033	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2034	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2035	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2036	-	-	373,500	373,500	7,470,000	7,470,000
01/01/2037	1,350,000	5.000%	373,500	1,723,500	6,120,000	6,120,000
01/01/2038	1,420,000	5.000%	306,000	1,726,000	4,700,000	4,700,000
01/01/2039	1,490,000	5.000%	235,000	1,725,000	3,210,000	3,210,000
01/01/2040	1,565,000	5.000%	160,500	1,725,500	1,645,000	1,645,000
01/01/2041	1,645,000	5.000%	82,250	1,727,250	-	-
	7,470,000		7,133,250	14,603,250		

Can be annualized using Modify.

NET DEBT SERVICE

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Date	Principal	Coupon	Interest	Total Debt Service	Debt Service Reserve Fund	Capitalized Interest Fund	Net Debt Service	Annual Net D/S
07/01/2020	-	-	447,625.00	447,625	-	(412,809.72)	34,815.28	-
01/01/2021	-	-	447,625.00	447,625	-	(447,625.00)	-	34,815.28
07/01/2021	-	-	447,625.00	447,625	-	(447,625.00)	-	-
01/01/2022	830,000.00	5.000%	447,625.00	1,277,625	(14,850.55)	-	1,262,774.45	1,262,774.45
07/01/2022	-	-	426,875.00	426,875	(14,850.55)	-	412,024.45	-
01/01/2023	870,000.00	5.000%	426,875.00	1,296,875	(14,850.55)	-	1,282,024.45	1,694,048.90
07/01/2023	-	-	405,125.00	405,125	(14,850.55)	-	390,274.45	-
01/01/2024	915,000.00	5.000%	405,125.00	1,320,125	(14,850.55)	-	1,305,274.45	1,695,548.90
07/01/2024	-	-	382,250.00	382,250	(14,850.55)	-	367,399.45	-
01/01/2025	960,000.00	5.000%	382,250.00	1,342,250	(14,850.55)	-	1,327,399.45	1,694,798.90
07/01/2025	-	-	358,250.00	358,250	(14,850.55)	-	343,399.45	-
01/01/2026	1,010,000.00	5.000%	358,250.00	1,368,250	(14,850.55)	-	1,353,399.45	1,696,798.90
07/01/2026	-	-	333,000.00	333,000	(14,850.55)	-	318,149.45	-
01/01/2027	1,060,000.00	5.000%	333,000.00	1,393,000	(14,850.55)	-	1,378,149.45	1,696,298.90
07/01/2027	-	-	306,500.00	306,500	(14,850.55)	-	291,649.45	-
01/01/2028	1,110,000.00	5.000%	306,500.00	1,416,500	(14,850.55)	-	1,401,649.45	1,693,298.90
07/01/2028	-	-	278,750.00	278,750	(14,850.55)	-	263,899.45	-
01/01/2029	1,170,000.00	5.000%	278,750.00	1,448,750	(14,850.55)	-	1,433,899.45	1,697,798.90
07/01/2029	-	-	249,500.00	249,500	(14,850.55)	-	234,649.45	-
01/01/2030	1,225,000.00	5.000%	249,500.00	1,474,500	(14,850.55)	-	1,459,649.45	1,694,298.90
07/01/2030	-	-	218,875.00	218,875	(14,850.55)	-	204,024.45	-
01/01/2031	1,285,000.00	5.000%	218,875.00	1,503,875	(14,850.55)	-	1,489,024.45	1,693,048.90
07/01/2031	-	-	186,750.00	186,750	(14,850.55)	-	171,899.45	-
01/01/2032	1,114,371.00	1.610%	422,379.00	1,536,750	(14,850.55)	-	1,521,899.45	1,693,798.90
07/01/2032	-	-	186,750.00	186,750	(14,850.55)	-	171,899.45	-
01/01/2033	1,088,221.50	1.670%	448,528.50	1,536,750	(14,850.55)	-	1,521,899.45	1,693,798.90
07/01/2033	-	-	186,750.00	186,750	(14,850.55)	-	171,899.45	-
01/01/2034	1,061,424.00	1.730%	475,326.00	1,536,750	(14,850.55)	-	1,521,899.45	1,693,798.90
07/01/2034	-	-	186,750.00	186,750	(14,850.55)	-	171,899.45	-
01/01/2035	1,035,585.00	1.780%	501,165.00	1,536,750	(14,850.55)	-	1,521,899.45	1,693,798.90
07/01/2035	-	-	186,750.00	186,750	(14,850.55)	-	171,899.45	-
01/01/2036	1,009,381.50	1.830%	527,368.50	1,536,750	(14,850.55)	-	1,521,899.45	1,693,798.90
07/01/2036	-	-	186,750.00	186,750	(14,850.55)	-	171,899.45	-
01/01/2037	1,350,000.00	5.000%	186,750.00	1,536,750	(14,850.55)	-	1,521,899.45	1,693,798.90
07/01/2037	-	-	153,000.00	153,000	(14,850.55)	-	138,149.45	-
01/01/2038	1,420,000.00	5.000%	153,000.00	1,573,000	(14,850.55)	-	1,558,149.45	1,696,298.90
07/01/2038	-	-	117,500.00	117,500	(14,850.55)	-	102,649.45	-
01/01/2039	1,490,000.00	5.000%	117,500.00	1,607,500	(14,850.55)	-	1,592,649.45	1,695,298.90
07/01/2039	-	-	80,250.00	80,250	(14,850.55)	-	65,399.45	-
01/01/2040	1,565,000.00	5.000%	80,250.00	1,645,250	(14,850.55)	-	1,630,399.45	1,695,798.90
07/01/2040	-	-	41,125.00	41,125	(14,850.55)	-	26,274.45	-
01/01/2041	1,645,000.00	5.000%	41,125.00	1,686,125	(1,742,350.55)	-	(56,225.55)	(29,951.10)
	23,213,983.00		12,174,517.00	35,388,500	(2,306,671.45)	(1,308,059.72)	31,773,768.83	31,773,768.83

The Net Debt Service report shows all the cashflows from investment of bond proceeds that are used to pay debt service (i.e. debt service reserve fund, capitalized interest fund). It also shows any ongoing expenses such as letter of credit or trustee and remarketing fees.

This is the accretion rate for each maturity. If you discount the final maturity value back to delivery date using semiannual compounding, you will get the issuance denomination on 1/15/20.

BOND ACCRETED VALUE TABLE

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Date	CAB Serial Bonds through 2036 01/01/2032 1.61%	CAB Serial Bonds through 2036 01/01/2033 1.67%	CAB Serial Bonds through 2036 01/01/2034 1.73%	CAB Serial Bonds through 2036 01/01/2035 1.78%	CAB Serial Bonds through 2036 01/01/2036 1.83%
01/15/2020	4,127.30	4,030.45	3,931.20	3,835.50	3,738.45
07/01/2020	4,157.95	4,061.50	3,962.55	3,867.00	3,770.00
01/01/2021	4,191.45	4,095.40	3,996.80	3,901.40	3,804.50
07/01/2021	4,225.15	4,129.60	4,031.40	3,936.10	3,839.30
01/01/2022	4,259.20	4,164.10	4,066.25	3,971.15	3,874.40
07/01/2022	4,293.45	4,198.85	4,101.45	4,006.50	3,909.85
01/01/2023	4,328.05	4,233.90	4,136.90	4,042.15	3,945.65
07/01/2023	4,362.85	4,269.25	4,172.70	4,078.15	3,981.75
01/01/2024	4,398.00	4,304.90	4,208.80	4,114.40	4,018.20
07/01/2024	4,433.40	4,340.85	4,245.20	4,151.05	4,054.95
01/01/2025	4,469.10	4,377.10	4,281.90	4,188.00	4,092.05
07/01/2025	4,505.05	4,413.65	4,318.95	4,225.25	4,129.50
01/01/2026	4,541.35	4,450.50	4,356.30	4,262.85	4,167.30
07/01/2026	4,577.90	4,487.65	4,394.00	4,300.80	4,205.40
01/01/2027	4,614.75	4,525.15	4,432.00	4,339.10	4,243.90
07/01/2027	4,651.90	4,562.90	4,470.35	4,377.70	4,282.70
01/01/2028	4,689.35	4,601.05	4,509.00	4,416.65	4,321.90
07/01/2028	4,727.10	4,639.45	4,548.00	4,455.95	4,361.45
01/01/2029	4,765.15	4,678.20	4,587.35	4,495.65	4,401.35
07/01/2029	4,803.50	4,717.25	4,627.05	4,535.65	4,441.65
01/01/2030	4,842.15	4,756.65	4,667.05	4,576.00	4,482.30
07/01/2030	4,881.15	4,796.35	4,707.45	4,616.75	4,523.30
01/01/2031	4,920.45	4,836.40	4,748.15	4,657.80	4,564.70
07/01/2031	4,960.05	4,876.80	4,789.25	4,699.25	4,606.45
01/01/2032	5,000.00	4,917.50	4,830.65	4,741.10	4,648.60
07/01/2032	-	4,958.55	4,872.45	4,783.30	4,691.15
01/01/2033	-	5,000.00	4,914.60	4,825.85	4,734.05
07/01/2033	-	-	4,957.10	4,868.80	4,777.35
01/01/2034	-	-	5,000.00	4,912.15	4,821.10
07/01/2034	-	-	-	4,955.85	4,865.20
01/01/2035	-	-	-	5,000.00	4,909.70
07/01/2035	-	-	-	-	4,954.65
01/01/2036	-	-	-	-	5,000.00

This is the final maturity value of the CAB.

BOND MATURITY TABLE

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Maturity Date	Serial Bonds through 2031	CAB Serial Bonds through 2036	Term Bond due 2041	Total
01/01/2022	830,000	-	-	830,000.00
01/01/2023	870,000	-	-	870,000.00
01/01/2024	915,000	-	-	915,000.00
01/01/2025	960,000	-	-	960,000.00
01/01/2026	1,010,000	-	-	1,010,000.00
01/01/2027	1,060,000	-	-	1,060,000.00
01/01/2028	1,110,000	-	-	1,110,000.00
01/01/2029	1,170,000	-	-	1,170,000.00
01/01/2030	1,225,000	-	-	1,225,000.00
01/01/2031	1,285,000	-	-	1,285,000.00
01/01/2032	-	1,114,371.00	-	1,114,371.00
01/01/2033	-	1,088,221.50	-	1,088,221.50
01/01/2034	-	1,061,424.00	-	1,061,424.00
01/01/2035	-	1,035,585.00	-	1,035,585.00
01/01/2036	-	1,009,381.50	-	1,009,381.50
01/01/2037	-	-	1,350,000	1,350,000.00
01/01/2038	-	-	1,420,000	1,420,000.00
01/01/2039	-	-	1,490,000	1,490,000.00
01/01/2040	-	-	1,565,000	1,565,000.00
01/01/2041	-	-	1,645,000	1,645,000.00
	10,435,000	5,308,983.00	7,470,000	23,213,983.00

BOND SOLUTION

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Period Ending	Proposed Principal	Proposed Debt Service	Debt Service Adjustments	Total Adj Debt Service
01/01/2021	-	895,250	(34,815)	860,435
01/01/2022	830,000	1,725,250	-	1,725,250
01/01/2023	870,000	1,723,750	-	1,723,750
01/01/2024	915,000	1,725,250	-	1,725,250
01/01/2025	960,000	1,724,500	-	1,724,500
01/01/2026	1,010,000	1,726,500	-	1,726,500
01/01/2027	1,060,000	1,726,000	-	1,726,000
01/01/2028	1,110,000	1,723,000	-	1,723,000
01/01/2029	1,170,000	1,727,500	-	1,727,500
01/01/2030	1,225,000	1,724,000	-	1,724,000
01/01/2031	1,285,000	1,722,750	-	1,722,750
01/01/2032	1,114,371	1,723,500	-	1,723,500
01/01/2033	1,088,222	1,723,500	-	1,723,500
01/01/2034	1,061,424	1,723,500	-	1,723,500
01/01/2035	1,035,585	1,723,500	-	1,723,500
01/01/2036	1,009,382	1,723,500	-	1,723,500
01/01/2037	1,350,000	1,723,500	-	1,723,500
01/01/2038	1,420,000	1,726,000	-	1,726,000
01/01/2039	1,490,000	1,725,000	-	1,725,000
01/01/2040	1,565,000	1,725,500	-	1,725,500
01/01/2041	1,645,000	1,727,250	-	1,727,250
	23,213,983	35,388,500	(34,815)	35,353,685

PROOF OF ARBITRAGE YIELD

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Date	Debt Service	PV Factor	Present Value to 01/15/2020 @ 1.7193115290%
07/01/2020	447,625.00	0.992137022	444,105.33
01/01/2021	447,625.00	0.983680754	440,320.10
07/01/2021	447,625.00	0.975296561	436,567.12
01/01/2022	1,277,625.00	0.966983829	1,235,442.71
07/01/2022	426,875.00	0.958741948	409,262.97
01/01/2023	1,296,875.00	0.950570316	1,232,770.88
07/01/2023	405,125.00	0.942468332	381,817.48
01/01/2024	1,320,125.00	0.934435404	1,233,571.54
07/01/2024	382,250.00	0.926470944	354,143.52
01/01/2025	1,342,250.00	0.918574366	1,232,956.44
07/01/2025	358,250.00	0.910745093	326,274.43
01/01/2026	1,368,250.00	0.902982552	1,235,505.88
07/01/2026	333,000.00	0.895286173	298,130.30
01/01/2027	1,393,000.00	0.887655392	1,236,503.96
07/01/2027	306,500.00	0.880089650	269,747.48
01/01/2028	1,416,500.00	0.872588394	1,236,021.46
07/01/2028	278,750.00	0.865151073	241,160.86
01/01/2029	1,448,750.00	0.857777142	1,242,704.63
07/01/2029	249,500.00	0.850466062	212,191.28
01/01/2030	1,474,500.00	0.843217296	1,243,323.90
07/01/2030	218,875.00	0.836030313	182,986.13
01/01/2031	1,503,875.00	0.828904587	1,246,568.89
07/01/2031	186,750.00	0.821839595	153,478.54
01/01/2032	1,536,750.00	0.814834821	1,252,197.41
07/01/2032	186,750.00	0.807889750	150,873.41
01/01/2033	1,536,750.00	0.801003874	1,230,942.70
07/01/2033	186,750.00	0.794176688	148,312.50
01/01/2034	1,536,750.00	0.787407693	1,210,048.77
07/01/2034	186,750.00	0.780696391	145,795.05
01/01/2035	1,536,750.00	0.774042292	1,189,509.49
07/01/2035	186,750.00	0.767444908	143,320.34
01/01/2036	1,536,750.00	0.760903755	1,169,318.85
07/01/2036	186,750.00	0.754418354	140,887.63
01/01/2037	1,536,750.00	0.747988230	1,149,470.91
07/01/2037	153,000.00	0.741612912	113,466.78
01/01/2038	1,573,000.00	0.735291932	1,156,614.21
07/01/2038	117,500.00	0.729024828	85,660.42
01/01/2039	1,607,500.00	0.722811141	1,161,918.91
07/01/2039	80,250.00	0.716650414	57,511.20
01/01/2040	1,645,250.00	0.710542197	1,169,019.55
07/01/2040	41,125.00	0.704486042	28,971.99
01/01/2041	1,686,125.00	0.698481506	1,177,727.13
	35,388,500.00		29,407,123.08

Proceeds Summary

Delivery date	01/15/2020
Par Value	23,213,983.00
Accrued interest	34,815.28
Premium (Discount)	6,231,341.05
Arbitrage expenses	(73,016.25)
Target for yield calculation	29,407,123.08

The Proof of Arbitrage Yield shows that the arbitrage yield does, in fact, discount the debt service payments so that the total of PV of payments equals the arbitrage yield target. The arbitrage regulations dictate how this target is computed.
The formula to verify the Present Value factor is: $\frac{1}{(1+r/m)^{nm}}$
where r = the annual rate, m = the compounding periods per year, and n = number of years

The Debt Service Reserve fund is invested at the rate specified by the user in the DSRF input dialog.

DSRF earnings not designated to flow anywhere specific are used to reduce debt service payments (see New Debt Service).

DEBT SERVICE RESERVE FUND

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

This flows out to the project fund as specified by the user.

Date	Deposit	Interest @ 1.7193115%	Principal	Road Repair Fund	Debt Service	Balance
01/15/2020	1,727,500	-	-	-	-	1,727,500
07/01/2020	-	13,695.51	-	(13,695.51)	-	1,727,500
01/01/2021	-	14,850.55	-	(14,850.55)	-	1,727,500
07/01/2021	-	14,850.55	-	(14,850.55)	-	1,727,500
01/01/2022	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2022	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2023	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2023	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2024	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2024	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2025	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2025	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2026	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2026	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2027	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2027	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2028	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2028	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2029	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2029	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2030	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2030	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2031	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2031	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2032	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2032	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2033	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2033	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2034	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2034	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2035	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2035	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2036	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2036	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2037	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2037	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2038	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2038	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2039	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2039	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2040	-	14,850.55	-	-	(14,850.55)	1,727,500
07/01/2040	-	14,850.55	-	-	(14,850.55)	1,727,500
01/01/2041	-	14,850.55	1,727,500	-	(1,742,350.55)	-
	1,727,500	622,568.06	1,727,500	(43,396.61)	(2,306,671.45)	

Average Life (years):	20.9611
Yield To Receipt Date:	1.7193261%
Arbitrage Yield:	1.7193115%
Value of Positive Arbitrage:	4.42

CAPITALIZED INTEREST FUND

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Date	Deposit	Interest @ 1.7193115%	Principal	Scheduled Draws	Balance
01/15/2020	1,286,447.65	-	-	-	1,286,447.65
07/01/2020	-	10,198.88	402,610.84	412,809.72	883,836.81
01/01/2021	-	7,597.95	440,027.05	447,625.00	443,809.76
07/01/2021	-	3,815.24	443,809.76	447,625.00	-
	1,286,447.65	21,612.07	1,286,447.65	1,308,059.72	

Average Life (years):	0.9771
Yield To Receipt Date:	1.7195840%
Arbitrage Yield:	1.7193115%
Value of Positive Arbitrage:	3.38

The Scheduled Draws are usually a function of the bond interest payments. These should be verified by comparing them to the bond interest payments shown on the debt service report and as entered in the user-defined formula.

If the capitalized interest fund is net funded, the final balance should equal zero.

To verify interest calculation, use the following formulas:

If Net Funded (PV): Starting Balance * $[(1 + r/m)^{nm} - 1]$

If Net Funded (GIC) or Gross Funded Starting Balance * (r * n)

ROAD REPAIR FUND

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Date	Deposit	Interest @ 1.7193115%	Principal	Incoming Cashflow Principal	Debt Service Reserve Fund	Scheduled Draws	Balance
01/15/2020	26,047,650.54	-	-	-	-	-	26,047,650.54
02/01/2020	-	-	3,472,500.00	-	-	3,472,500	22,575,150.54
04/01/2020	-	-	2,953,000.00	-	-	2,953,000	19,622,150.54
05/01/2020	-	112,707.36	(112,707.36)	-	-	-	19,734,857.90
06/01/2020	-	-	6,222,920.00	-	-	6,222,920	13,511,937.90
07/01/2020	-	-	-	(13,695.51)	13,695.51	-	13,525,633.41
08/01/2020	-	-	4,977,304.49	13,695.51	-	4,991,000	8,534,633.41
11/01/2020	-	103,678.26	3,837,321.74	-	-	3,941,000	4,697,311.67
01/01/2021	-	-	-	(14,850.55)	14,850.55	-	4,712,162.22
02/01/2021	-	-	1,757,709.45	14,850.55	-	1,772,560	2,939,602.22
05/01/2021	-	32,825.59	967,174.41	-	-	1,000,000	1,972,427.81
07/01/2021	-	-	-	(14,850.55)	14,850.55	-	1,987,278.36
08/01/2021	-	-	985,149.45	14,850.55	-	1,000,000	987,278.36
11/01/2021	-	12,721.65	987,278.35	-	-	1,000,000	0.01
	26,047,650.54	261,932.86	26,047,650.53	0.00	43,396.61	26,352,980	

Average Life (years):	0.5849
Yield To Receipt Date:	1.7194585%
Arbitrage Yield:	1.7193115%
Value of Positive Arbitrage:	22.12

To verify interest calculation, use the following formulas:

If Net Funded (PV): Starting Balance * [$(1 + r/m)^{nm} - 1$]

If Net Funded (GIC) or Gross Funded Starting Balance * (r *n)

STATEMENT OF ASSUMPTIONS

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

General Bond Information

```
Series Date Information
  Dated date ................................. Jan  1, 2020
  Delivery date .............................. Jan 15, 2020
  First interest payment date ................ Jul  1, 2020
  Interest frequency ........................  Semiannual
  Interest day basis ........................  30/360
  First bond year ending (fiscal) date .......       -
Apply Treasury regulations of ...............  Default
Application of accrued interest .............  Deposit to other fund
  Name of fund ............................... CAPI
```

	$/1000	%	000
Cost of Issuance	10.769371	1.0769371%	250,000.00
Underwriters Discount	10.500000	1.0500000%	243,746.82
Average Takedown	7.500000	0.7500000%	174,104.87
Management Fee	0.500000	0.0500000%	11,606.99
Underwriting Fee	-	-	-
Expenses	2.500000	0.2500000%	58,034.96
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-

Advanced Options

```
  Fiscal date specifies first fiscal period ....  No
  First fiscal period begins after .............       -

  Apply 2% limitation on issuance costs ........  No

  Share revenues in excess of net d/s
    with external series .......................  No

  If contingency is negative ...................  N/A
  Name of Equity Contribution ..................

  Arbitrage Yield Calculation Method ...........  Fixed Yield Issue
  Arbitrage Expense Allocation Method ..........  By expense formula

  Name of DDL File ...................

  Expected Parameters for statistics calculations
    Day basis ..................................  30/360
    Compounding frequency ......................  Semiannual

  Bond rounding option .........................  Default

  Cost of issuance and UD applies to ...........  Par amount
```

The Statement of Input Assumptions is a long report that should not be used as part of presentation materials. Its primary purpose is to provide a printout of assumptions entered for your records or for troubleshooting your inputs.

STATEMENT OF ASSUMPTIONS

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Bond Component Information - Serial Bonds through 2031

```
Dated Date ..................... Jan  1, 2020
Delivery Date .................. Jan 15, 2020
First Interest Payment Date .... Jul  1, 2020
Interest Frequency ..............  Semiannual
Interest Day Basis ..............  30/360
Interest Payment Option .........  Paid until Maturity Date
Serial/Term selection ...........  Serial Bond (Price to Actual Maturity)
```

Bond Component Maturity Data

Maturity Date	Issue Amount	Interest Rate	Yield	Price	Issuance Denomination
01/01/2022	830,000.00	5.000%	1.100%	107.545	5,000.00
01/01/2023	870,000.00	5.000%	1.110%	111.300	5,000.00
01/01/2024	915,000.00	5.000%	1.120%	114.991	5,000.00
01/01/2025	960,000.00	5.000%	1.130%	118.619	5,000.00
01/01/2026	1,010,000.00	5.000%	1.150%	122.119	5,000.00
01/01/2027	1,060,000.00	5.000%	1.230%	125.076	5,000.00
01/01/2028	1,110,000.00	5.000%	1.310%	127.809	5,000.00
01/01/2029	1,170,000.00	5.000%	1.390%	130.316	5,000.00
01/01/2030	1,225,000.00	5.000%	1.470%	132.597	5,000.00
01/01/2031	1,285,000.00	5.000%	1.540%	134.773	5,000.00
	10,435,000.00				

Advanced Options

```
Actual Day Basis Interest Options:
  Observe full period rule ..............  No
  Determine interest year ...............  Backward from payment date

Pricing and Valuation Options:
  Security class ........................  Municipal (truncate to 3)
  Amortize OID (or premium) .............  No
  Accreted value/call price precision ....  Default
  Premium CAB price precision ............  Default
  Force CAB denom to fit issue amount ....  No

Variable rate bond options:
  Use Series Variable Rate Table .........  No

Arbitrage Yield:
  Include in Arbitrage Yield .............  Yes
  Arb Yield override for term bond .......        -
  Arb expense override for term bond .....          -

Other options:
  Auto EOM alignment for pmt dates .......  Yes
  Apply takedowns to .....................  Par Amount
```

STATEMENT OF ASSUMPTIONS

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Bond Component Information - CAB Serial Bonds through 2036

```
Dated Date ..................... Jan  1, 2020
Delivery Date .................. Jan 15, 2020
Interest Frequency ..............  Semiannual
Interest Day Basis ..............  30/360
Interest Payment Option .........  Compounded until Maturity Date
  Future Maturity Denomination ....    5,000.00
Serial/Term selection ...........  Serial Bond (Price to Actual Maturity)
```

Bond Component Maturity Data

Maturity Date	Issue Amount	Interest Rate	Yield	Price	Issuance Denomination
01/01/2032	1,114,371.00	1.610%	1.610%	100.000	4,127.30
01/01/2033	1,088,221.50	1.670%	1.670%	100.000	4,030.45
01/01/2034	1,061,424.00	1.730%	1.730%	100.000	3,931.20
01/01/2035	1,035,585.00	1.780%	1.780%	100.000	3,835.50
01/01/2036	1,009,381.50	1.830%	1.830%	100.000	3,738.45
	5,308,983.00				

Advanced Options

```
Actual Day Basis Interest Options:
  Observe full period rule ..............  No
  Determine interest year ...............  Backward from payment date

Pricing and Valuation Options:
  Security class ........................  Municipal (truncate to 3)
  Amortize OID (or premium) .............  No
  Accreted value/call price precision ....  Default
  Premium CAB price precision ...........  Default
  Force CAB denom to fit issue amount ....  No

Variable rate bond options:
  Use Series Variable Rate Table .........  No

Arbitrage Yield:
  Include in Arbitrage Yield .............  Yes
  Arb Yield override for term bond .......        -
  Arb expense override for term bond .....          -

Other options:
  Auto EOM alignment for pmt dates .......  Yes
  Apply takedowns to .....................  Par Amount
```

STATEMENT OF ASSUMPTIONS

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Bond Component Information - Term Bond due 2041

```
Dated Date ..................... Jan  1, 2020
Delivery Date .................. Jan 15, 2020
First Interest Payment Date ..... Jul  1, 2020
Interest Frequency .............  Semiannual
Interest Day Basis .............  30/360
Interest Payment Option ........  Paid until Maturity Date
Serial/Term selection ..........  Term Bond (Price to Final Maturity)
```

Bond Component Maturity Data

Maturity Date	Issue Amount	Interest Rate	Yield	Price	Issuance Denomination
01/01/2037	1,350,000.00	5.000%	2.040%	150.278	5,000.00
01/01/2038	1,420,000.00	5.000%	2.040%	150.278	5,000.00
01/01/2039	1,490,000.00	5.000%	2.040%	150.278	5,000.00
01/01/2040	1,565,000.00	5.000%	2.040%	150.278	5,000.00
01/01/2041	1,645,000.00	5.000%	2.040%	150.278	5,000.00
	7,470,000.00				

Advanced Options

```
Actual Day Basis Interest Options:
  Observe full period rule ..............  No
  Determine interest year ...............  Backward from payment date

Pricing and Valuation Options:
  Security class ........................  Municipal (truncate to 3)
  Amortize OID (or premium) .............  No
  Accreted value/call price precision ....  Default
  Premium CAB price precision ...........  Default
  Force CAB denom to fit issue amount ....  No

Variable rate bond options:
  Use Series Variable Rate Table .........  No

Arbitrage Yield:
  Include in Arbitrage Yield .............  Yes
  Arb Yield override for term bond .......        -
  Arb expense override for term bond .....          -

Other options:
  Auto EOM alignment for pmt dates .......  Yes
  Apply takedowns to .....................  Par Amount
```

STATEMENT OF ASSUMPTIONS

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Project Description - Road Repair Fund

Funding option	Net funded (GIC)
Investment interest rate	Arbitrage yield
First interest date	-
Interest frequency	Semiannual
Interest basis	30/360
Use external funds	No
Interest rate for incoming cash flow	N/A
Draws from Other Formula.....	

Project Draw Schedule

Date	Draw Requirement
02/01/2020	3,472,500.00
04/01/2020	2,953,000.00
06/01/2020	6,222,920.00
08/01/2020	4,991,000.00
11/01/2020	3,941,000.00
02/01/2021	1,772,560.00
05/01/2021	1,000,000.00
08/01/2021	1,000,000.00
11/01/2021	1,000,000.00
	26,352,980.00

STATEMENT OF ASSUMPTIONS

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Reserve Information - Debt Service Reserve Fund

```
Funding option ..........................  Gross funded

      Application of         Fund        Start        End
      Interest Earnings      Name        Date         Date
   1. Another fund        REPAIRS          -            -
   2. Debt service                         -            -
   3. N/A                                  -            -
   4. N/A                                  -            -
   5. N/A                                  -            -

Investment amount .......................  Calculated
Investment interest rate ................  Arbitrage yield
First interest date ..................... Jul  1, 2020
Interest frequency ......................  Semiannual
Interest basis ..........................  30/360
Maturity date ...........................       -

Balance Requirement (e.g., for DSRF)
   >Lesser of
   >10% of Par Amount
   >Maximum annual Debt Service
   >125% of average annual adjusted Debt Service
   >

Draws (e.g., for Capitalized Int)
   >
   >
   >
   >
   >

Apply draws for debt service ..............  Yes
Use external funds ......................  No
Interest rate for incoming cash flow ......  N/A
```

Reserve Information - Capitalized Interest Fund

```
Funding option ..........................  Net funded (GIC)


Investment amount .......................  Calculated
Investment interest rate ................  Arbitrage yield
First interest date .....................       -
Interest frequency ......................  Semiannual
Interest basis ..........................  30/360

Balance Requirement (e.g., for DSRF)
   >
   >
   >
   >
   >

Draws (e.g., for Capitalized Int)
   >Adjusted Bond Interest accrued through 7/1/2021
   >
   >
   >
   >

Apply draws for debt service ..............  Yes
Use external funds ......................  No
Interest rate for incoming cash flow ......  N/A
```

STATEMENT OF ASSUMPTIONS

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Expense Information - Insurance for Term Bond

```
Type of Expense ..........................  Other
  Include in Arbitrage Yield .............  Yes
  Include in TIC .........................  Yes
  Include in All-In TIC ..................  Yes
  Include in 2% limit (if applicable) ....  No
  Include in bond optimization ...........  No

Expense formula:
   >.5% of total Debt Service of TERM
   >
   >
   >
   >
```

STATEMENT OF ASSUMPTIONS

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Other Sources

Description	*Amount*
Issuer Contribution	150,000.00
	150,000.00

STATEMENT OF ASSUMPTIONS

ABC County
2020 Street and Road Repair Revenue Bonds
Level Debt Service

Reporting Options

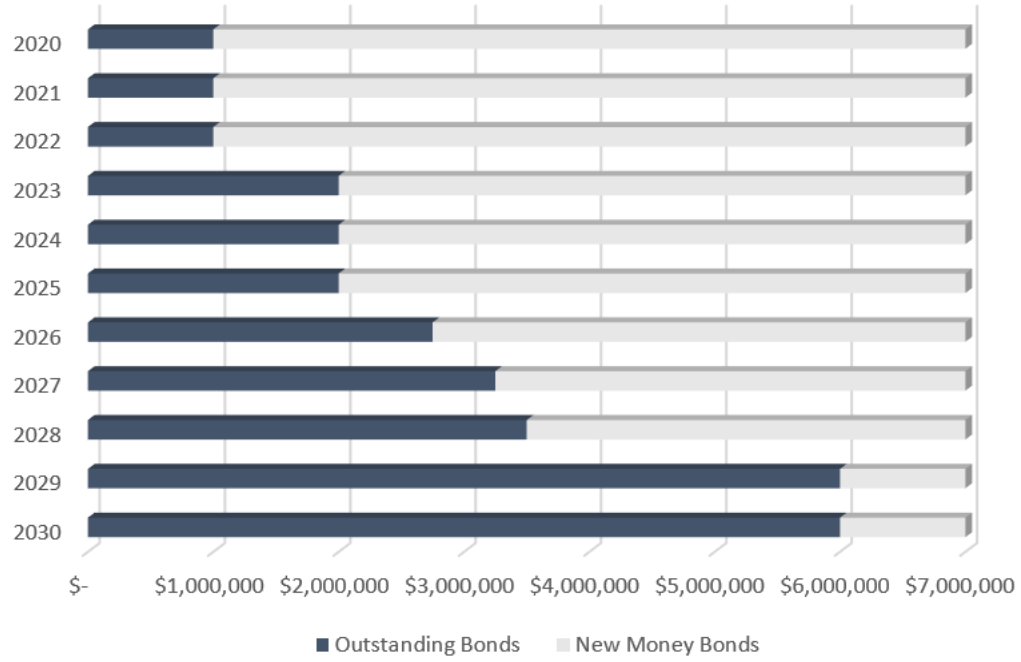
```
Report alignment date.....................       -
Name of general fund......................

Report Titles
  Print issuer name ......................  Yes
  Print series name ......................  Yes
  Additional titles:
   >Level Debt Service
   >
   >
   >
   >
```

********* ADVANCED ANALYSIS I *********

❖ WRAPAROUND SIZING

In this analysis, your goal is to **"wrap"** the debt service of the 2020 issue **around** all outstanding debt service. This analysis is very similar to the level debt service solution except that in a wraparound solution the sum of both the new money issue and any current outstanding debt is level. In essence, the debt service of the new money issue must complement the debt service of the outstanding debt so that the sum of these is as level as possible.

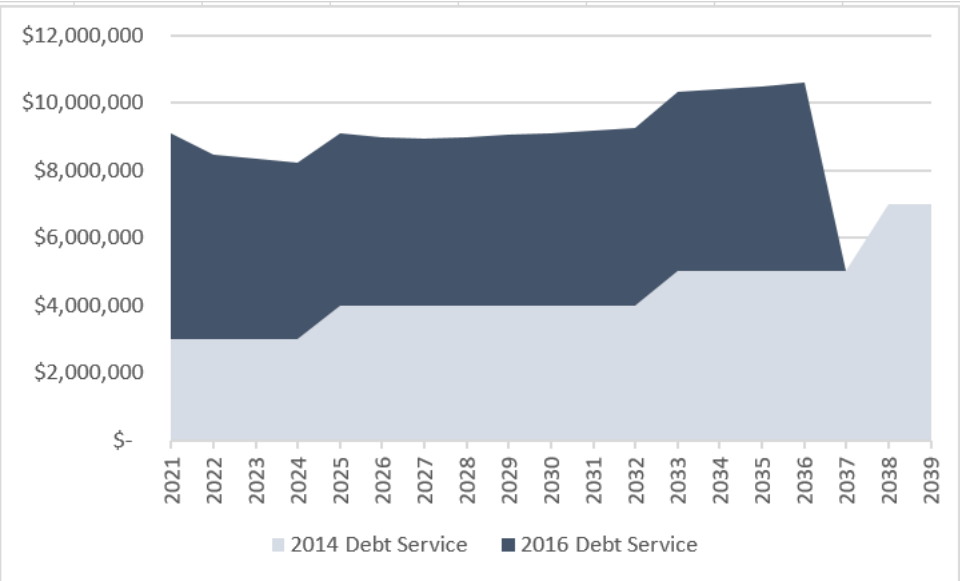
EXAMPLE



In the above example, notice that the total debt service is level while the new money debt service decreases over time.

❖ ASSUMPTIONS

You have to wrap the 2020 debt service around all the debt service outstanding at the time of the financing. There is not a single list of all the debt outstanding, therefore, you will have to piece together the TOTAL outstanding debt service from the two sources available. The outstanding cash flows in the chart below are quite "un-level" and must be "smoothed out" so the total debt service payable is as level as possible.



DBC Finance must know what these amounts are to compute the wraparound solution properly. The two sources of information are on the opposite page. The first is a list of **debt service** outstanding as of the 2014 issue. The second lists the par amounts, rates, and maturity dates for the 2016 bonds which must be converted into a debt service number to be used in this solution. You will later calculate the 2016 series debt service.

NOTE - the following is only a summary of the steps required - you will actually execute these commands once you get to page 113.

1. Create the 2016 series and save.
2. In **FILE - OPEN, COPY** series "2020" to "2020WRAP".
3. Go to **ADDITIONAL INFORMATION - OTHER D/S** in "2020WRAP", create the 2014 entry.
4. Use the **DEBT SERVICE CALCULATOR** to export the debt service of the series 2016 bonds.
5. Set the solution type to level and “Include Other D/S...” to “Yes”.
6. Be sure to print the Aggregate Debt Service Report (annual).

Below is the total debt service outstanding as of the 2014 financing (this includes the 2014 issue and all outstanding previous issues) from a 2014 official statement. As of 1/1/20 there are $126,000,000 of debt service payments remaining. In addition, there is an excerpt from the front page of the 2016 new money issue which lists the par amounts, maturity dates, and the interest rates thereby enabling you to recreate that cash flow. The sum of these two cash flows represents ALL the debt service outstanding for ABC County.

Outstanding Debt Service Amounts from the 2014 O.S.

Summary of Debt Service Outstanding
(as of January 1, 2020)

1/01/20	$3,000,000	1/01/27	$4,000,000	1/01/34	$5,000,000
1/01/21	$3,000,000	1/01/28	$4,000,000	1/01/35	$5,000,000
1/01/22	$3,000,000	1/01/29	$4,000,000	1/01/36	$5,000,000
1/01/23	$3,000,000	1/01/30	$4,000,000	1/01/37	$5,000,000
1/01/24	$3,000,000	1/01/31	$4,000,000	1/01/38	$7,000,000
1/01/25	$4,000,000	1/01/32	$4,000,000	1/01/39	$7,000,000
1/01/26	$4,000,000	1/01/33	$5,000,000		

Par amounts, maturity dates, and interest rates from 2016 O.S. front cover (bonds mature January 1st and have semiannual interest payments).

Series 2016 Bonds

$65,000,000 Serial Bonds

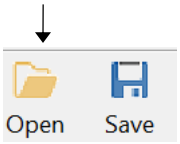
Maturity	Principal Amount	Interest Rate	Price or Yield	Maturity	Principal Amount	Interest Rate	Price or Yield
2017	3,000,000	3.95%	100%	2027	2,600,000	5.50%	100%
2018	3,000,000	4.10%	100%	2028	2,795,000	5.65%	100%
2019	3,000,000	4.30%	100%	2029	3,010,000	5.80%	100%
2020	3,000,000	4.40%	100%	2030	3,245,000	5.90%	100%
2021	3,000,000	4.55%	100%	2031	3,500,000	6.05%	100%
2022	2,500,000	4.70%	100%	2032	3,780,000	6.20%	100%
2023	2,500,000	4.80%	100%	2033	4,090,000	6.40%	100%
2024	2,500,000	5.00%	100%	2034	4,435,000	6.50%	100%
2025	2,500,000	5.10%	100%	2035	4,815,000	6.65%	100%
2026	2,500,000	5.30%	100%	2036	5,230,000	6.75%	100%

(Plus accrued interest from January 1, 2016)

❖ CREATING SERIES 2016

* **Before you go any further, recreate Series 2016 (YES, DO IT NOW). Follow the steps below. Once you are done, you will continue with the setup of the 2020 issue.**

1. CREATE THE SERIES

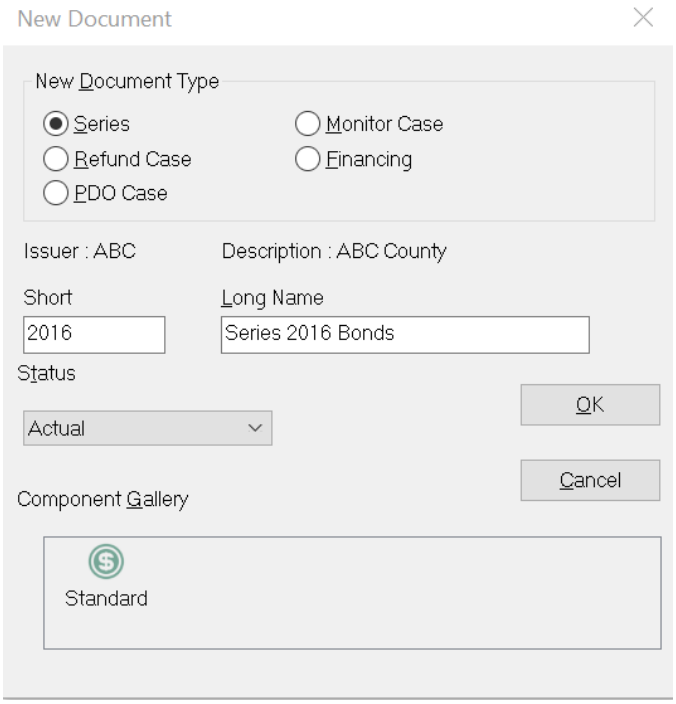


* **Click on the OPEN Button to create a new series.**

* **Click on ABC – ABC County.**

* **Click on the NEW Button.**

* **Enter "2016" as the short name and "Series 2016 Bonds" as the long name. Then set the "Status" to ACTUAL to reflect that this series has already been issued.**



2. ENTER THE DATED AND DELIVERY DATES

* **Click on SETUP in the DEBT/SIZE ASSUMPTIONS. In the GENERAL INFORMATION tab, enter 1/1/20 as dated and delivery dates and 7/1/20 as the first interest payment. Click OK.**

NOTE - The 2016 issue already exists, therefore, there is no need or benefit for this analysis to entering all the cost of issuance and spread information. The uses of funds including the project fund, capitalized interest funds and the debt service reserve fund are also all irrelevant to the wraparound analysis. Our only concern is with the dollar amount and timing of the outstanding debt service. This explains why only the dates, maturity dates, and coupons, and debt service schedules were provided for the analysis.

3. CREATE THE BOND COMPONENT

* **Click on BOND COMPONENTS - DETAIL. Enter SERIALS (short name) and Serial Bonds (long). Click on CREATE. In the GENERAL INFORMATION tab, review the defaults then click on the right arrow or press the tab button to go to the MATURITY STRUCTURE tab. Enter the first date as 1/1/21 and the final date of 1/1/36. Enter the principal amounts starting with the 2021 amount. For the 2022 maturity amount, which is repeated 4 times, type the principal (2,500), right click on the mouse, select COPY, highlight the 4 cells in the rows beneath to paste to. Right click and select PASTE. Complete data entry of the amounts (totals 53,000) and the interest rates. Click OK.**

NOTE - It is not necessary to enter any maturities that have matured as of the delivery date of the new issue which is 1/1/20. This is why the first date considered from the 2016 issue is the 2021 maturity. If you mistakenly clicked on **OK** in the **GENERAL INFORMATION** tab, you would have been returned to the **DATA MENU**. Click on SERIALS and then click on the **MATURITY STRUCTURE** tab. You will see that you only have one date. Right click and select **ENTER DATES** and continue as described above.

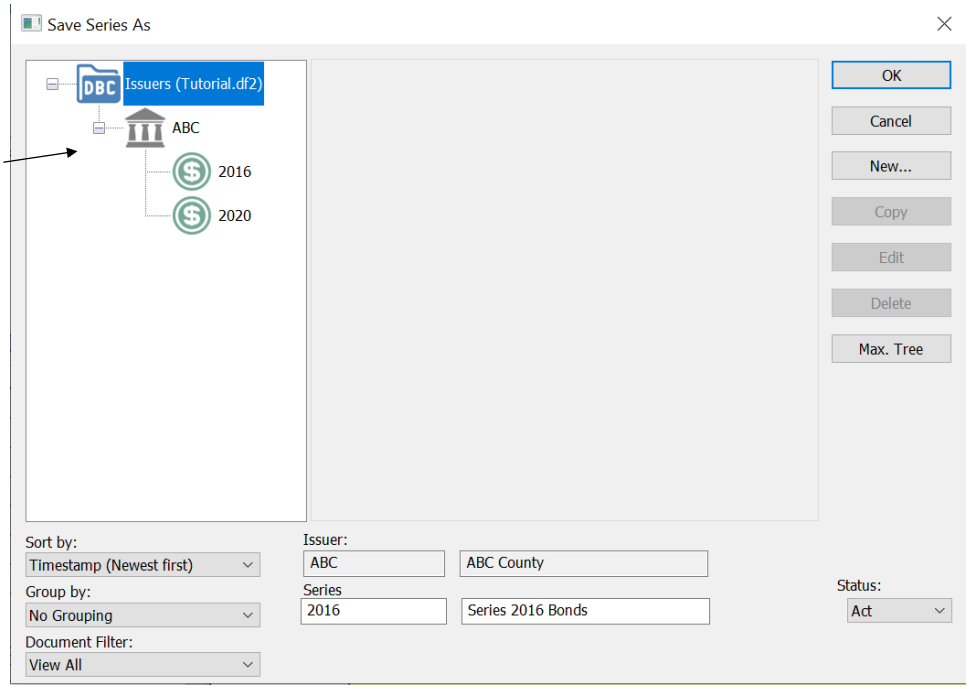
4. SAVE THE SERIES

* **Press CTRL-S or click on** 

to save the series.

* **Or go to FILE-SAVE AS**

Click here to select the issuer for the series being saved.



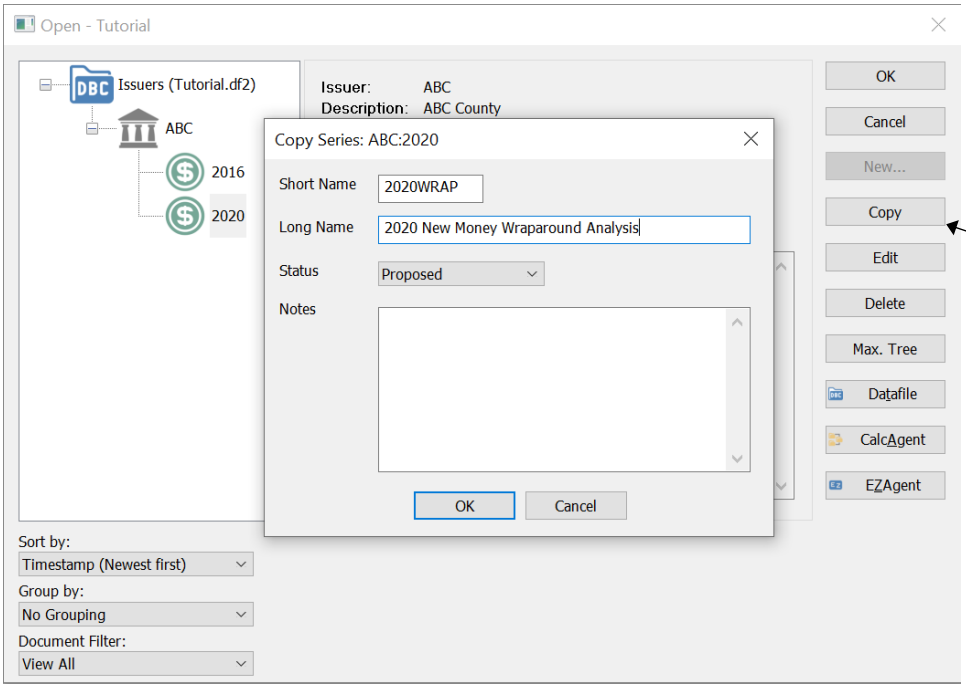
* **Click on ABC County in the ISSUER list. Go to the SERIES prompt and enter 2016 as the short name and Series 2016 Bonds as the long name Change the STATUS to ACTUAL. Click on OK.**

❖ CREATING WRAPAROUND VERSION OF SERIES 2020

It is very simple to create a series and then change different variables to create new scenarios without having to start from "scratch" every time. This tutorial is designed to show you how to use series 2020 as the basis for five new runs. You will load the original series, save it as a new one, then alter the inputs.

NOTE - *DBC Finance* offers the flexibility to work with multiple series at the same time. In this analysis, you will **COPY** the debt service computed in the 2016 solution to the 2020 wraparound using **PASTE**. To create the 2020 wraparound series, you must open a document.

* **Click on OPEN.**



Click here

* **Click once on series 2020 in ABC County. Click on COPY. Type "2020WRAP" (short name) and "2020 New Money Wraparound Analysis" (long name). This will save 2020 (the current series loaded as 2020WRAP). Specify that the STATUS is PROPOSED. Click OK.**

* **Double-click on the 2020WRAP series to open it. Notice the dialog's top line says 2020WRAP(ABC). Go to the REPAIRS project fund and change the Investment Amount to "Specified Amount" and set the amount to $75,000,000 (entered as $75,000). Then Go to the DATA menu and select ADDITIONAL INFORMATION - REPORTING OPTIONS. Go to the ADDITIONAL TITLES tab. Delete the previous title by pressing the DELETE key and enter "New Money Wrap" as the new title. Click OK.**

❖ DATA MENU - ADDITIONAL INFORMATION - OTHER D/S

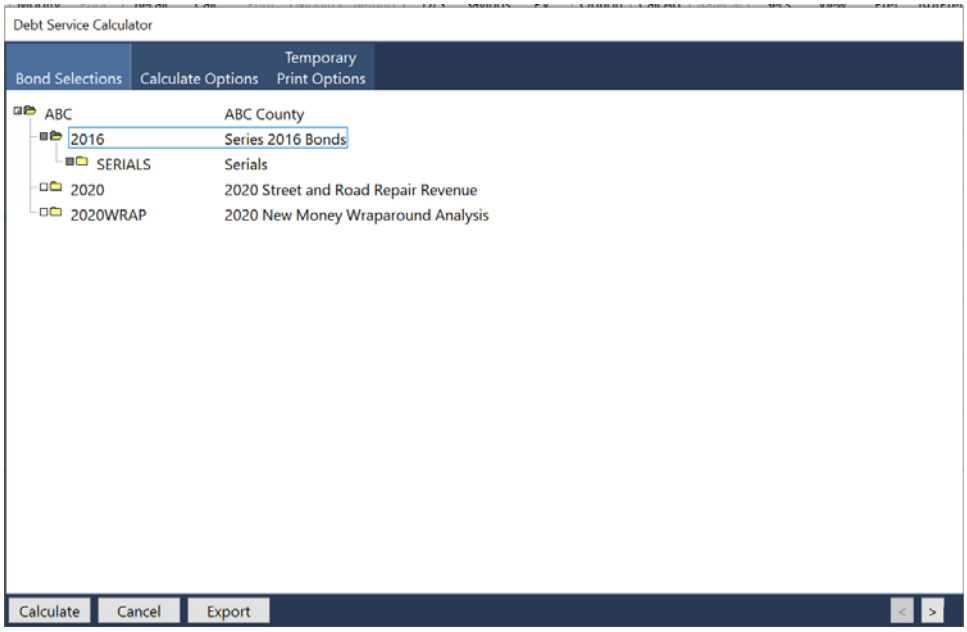
In this example, you must "wrap" or amortize the new bonds strategically so that the sum of all the existing debt and the new debt will be as level as possible. As such, you must enter the outstanding debt service in the appropriate inputs to be recognized in the wraparound solution. The **OTHER D/S** dialog is where we enter these debt service amounts. In our example, there are two cash flows that must be recognized by the program. We only have the principal and coupon information for the 2016 series and must compute the debt service in order to **EXPORT** the data into the **OTHER D/S** dialog. We have the debt service amounts for the 2014 issue and will simply type these in (although they could be **COPY & PASTED** if they were in a spreadsheet already). Cash flows entered in **OTHER D/S** will appear in the Aggregate Debt Service report. The cash flows in each entry will appear in a separate column on the report.

❖ DEBT SERVICE CALCULATOR

The Debt Service Calculator computes the debt service for the selection of any combination of maturities, bond components, and series. In addition, there are several temporary options available for printing reports. We will use this as a simple way to compute the debt service for the 2016 series and will then **EXPORT** it in the 2020 Wraparound series.

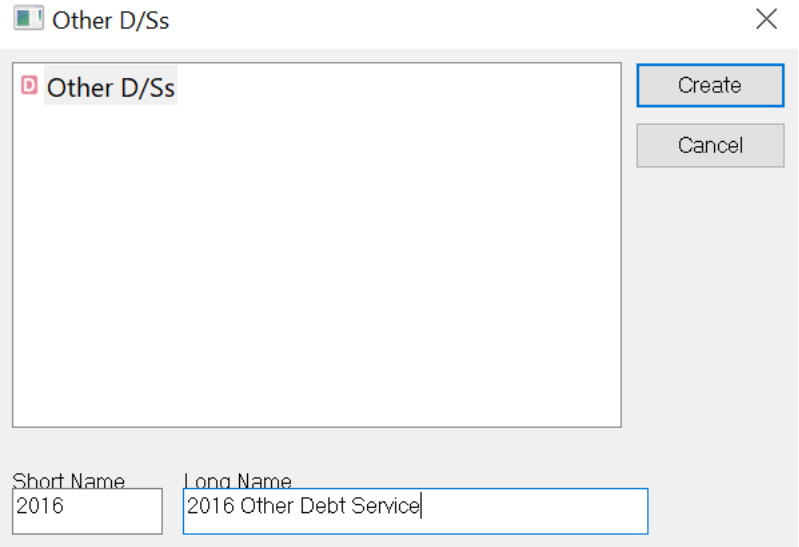
* **Click on the DEBT SERVICE CALCULATOR icon** 

or Tools-Debt Service Calculator.



* **Click on ABC's folder to open it then click on the white box next to 2016 until fully shaded. Click on CALCULATE. After calculating, close out of the Bond Debt Service report that is generated. Then re-access the Debt Service Calculator and click on Export**

❖ Other Debt Service



* **Once the 2016 data has been exported from the Debt Service Calculator, use the Other D/S window that appears and use 2016 for the Short Name and 2016 Other Debt Service for the Long Name. Notice how the Other D/S component that is created is filled with the 2016 debt service information that was calculated:**

Other D/S-2016

Debt Service Schedule

D/S from Other Formula

D/S from Screen Entry

	Date	Principal	Interest	Debt Service
1	07/01/2020		1,547.66	1,547.66
2	01/01/2021	3,000.	1,547.66	4,547.66
3	07/01/2021		1,479.41	1,479.41
4	01/01/2022	2,500.	1,479.41	3,979.41
5	07/01/2022		1,420.66	1,420.66
6	01/01/2023	2,500.	1,420.66	3,920.66
7	07/01/2023		1,360.66	1,360.66
8	01/01/2024	2,500.	1,360.66	3,860.66
9	07/01/2024		1,298.16	1,298.16
10	01/01/2025	2,500.	1,298.16	3,798.16
11	07/01/2025		1,234.41	1,234.41
12	01/01/2026	2,500.	1,234.41	3,734.41
13	07/01/2026		1,168.16	1,168.16
14	01/01/2027	2,600.	1,168.16	3,768.16
15	07/01/2027		1,096.66	1,096.66
16	01/01/2028	2,795.	1,096.66	3,891.66
17	07/01/2028		1,017.70125	1,017.70125
18	01/01/2029	3,010.	1,017.70125	4,027.70125
19	07/01/2029		930.41125	930.41125
20	01/01/2030	3,245.	930.41125	4,175.41125
		53,000.	31,445.7725	84,445.7725

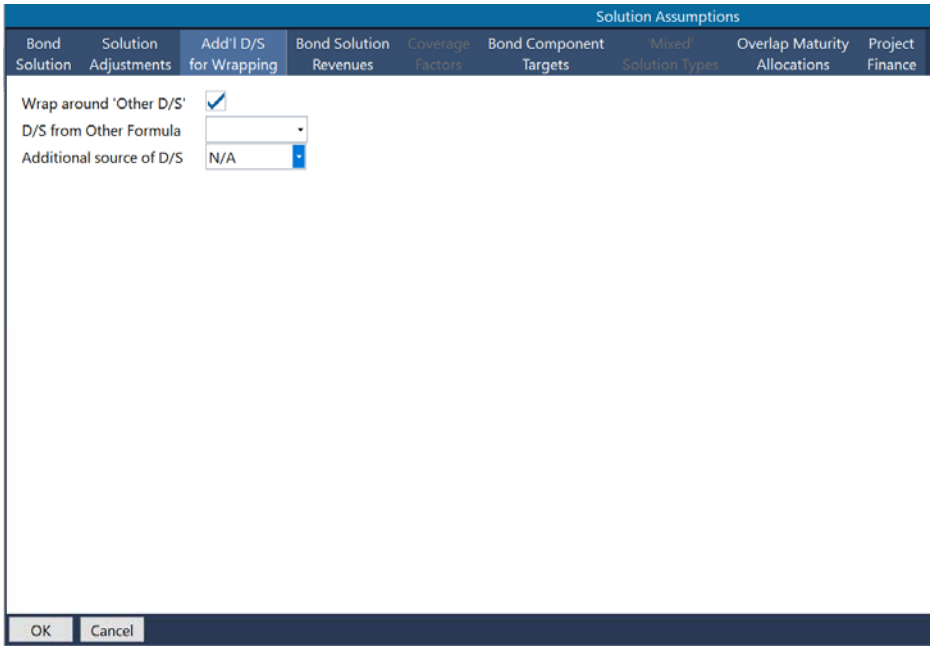
ENTERING THE 2014 SERIES

* **Create an Additional Info-OTHER D/S entry for the 2014 debt service amounts in 2020WRAP, and enter them (from page 112). This time use the F5 - ENTER DATES command to enter the debt service payment dates starting 2021 and also use F5 - COPY to enter the d/s amounts in the DEBT SERVICE column. The total for the amounts in the debt service column should equal $83,000,000. Click on OK to exit OTHER D/S.**

❖ BOND SOLUTION ASSUMPTIONS - FOR WRAPAROUND SOLUTION

In this example, you must "wrap" or amortize the new bonds "around" the Series 2016 and the other existing debt amounts so that the sum of the existing debt and the new debt will be as level as possible

* **In 2020WRAP, go to SOLUTION ASSUMPTIONS - SETUP. Go to the ADDITIONAL D/S FOR WRAPPING tab.**



* **Click on "Wrap around 'Other D/S'" to tell the program to look at the series entered in OTHER D/S components as part of the Level bond solution. Click OK.**

* **Save the series by clicking the SAVE icon.** 

Click CALCULATE to begin the solution. Go to the PRINT menu and select the following reports: Sources & Uses, Bond Statistics, Bond Debt Service (annual), Bond Solution, and Aggregate Debt Service (annual). Refer to page 79 for instructions.

NOTE - Pay special attention to the Bond Solution and the Aggregate Debt Service reports as they demonstrate that the problem has been solved to meet all your constraints.

SOURCES AND USES OF FUNDS

ABC County
2020 New Money Wraparound Analysis
New Money Wrap

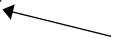
Dated Date	01/01/2020
Delivery Date	01/15/2020

Sources:

Bond Proceeds:	
Par Amount	62,250,764.90
Accrued Interest	113,448.61
Premium	24,198,881.45
	86,563,094.96
Other Sources of Funds:	
Issuer Contribution	150,000.00
	86,713,094.96

Uses:

Project Fund Deposits:	
Road Repair Fund	75,000,000.00
Other Fund Deposits:	
Debt Service Reserve Fund	6,225,076.49
Capitalized Interest Fund	4,186,557.68
	10,411,634.17
Delivery Date Expenses:	
Cost of Issuance	250,000.00
Underwriter's Discount	653,633.03
Insurance for Term Bond	394,072.50
	1,297,705.53
Other Uses of Funds:	
Additional Proceeds	3,755.26
	86,713,094.96



Make sure that you change the investment amount of the project fund as stated on page 117!

Note: Capitalized Interest Fund includes deposit of 113,448.61 of bond accrued interest.

BOND SUMMARY STATISTICS

ABC County
2020 New Money Wraparound Analysis
New Money Wrap

Dated Date	01/01/2020
Delivery Date	01/15/2020
First Coupon	07/01/2020
Last Maturity	01/01/2041
Arbitrage Yield	1.854224%
True Interest Cost (TIC)	1.918987%
All-In TIC	1.943936%
Average Life (years)	15.224
Weighted Average Maturity (years)	15.843
Duration of Issue (years)	11.854
Par Amount	62,250,764.90
Bond Proceeds	86,563,094.96
Total Interest	44,895,750.00
Net Interest	21,350,501.58
Bond Years from Dated Date	950,113,733.40
Bond Years from Delivery Date	947,692,870.32
Total Debt Service	108,135,750.00
Maximum Annual Debt Service	13,180,250.00
Average Annual Debt Service	5,153,462.56
Underwriter's Fees (per $1000)	
Average Takedown	7.500000
Management Fee	0.500000
Other Fee	2.500000
Total Underwriter's Discount	10.500000
Bid Price	137.823227

Bond Component	*Par Value*	*Price*	*Average Coupon*	*Average Life*	*Average Maturity Date*	*Duration*	*PV of 1 bp change*
Serial Bonds through 2031	18,445,000.00	122.434	5.000%	6.447	06/26/2026	5.753	12,862.15
CAB Serial Bonds through 2036	3,905,764.90	100.000	-	13.326	05/13/2033	13.341	5,138.70
Term Bond due 2041	39,900,000.00	150.278	5.000%	19.467	07/04/2039	14.018	87,780.00
	62,250,764.90			15.224			105,780.85

	TIC	All-In TIC	Arbitrage Yield
Par Value	62,250,764.90	62,250,764.90	62,250,764.90
+ Accrued Interest	113,448.61	113,448.61	113,448.61
+ Premium (Discount)	24,198,881.45	24,198,881.45	24,198,881.45
- Underwriter's Discount	(653,633.03)	(653,633.03)	
- Cost of Issuance Expense		(250,000.00)	
- Other Amounts	(394,072.50)	(394,072.50)	(394,072.50)
Target Value	85,515,389.43	85,265,389.43	86,169,022.46
Target Date	01/15/2020	01/15/2020	01/15/2020
Yield	1.918987%	1.943936%	1.854224%

BOND DEBT SERVICE

ABC County
2020 New Money Wraparound Analysis
New Money Wrap

Dated Date 01/01/2020
Delivery Date 01/15/2020

Period Ending	Principal	Coupon	Interest	Compounded Interest	Debt Service	Bond Balance	Accreted Interest	Total Bond Value
01/01/2021	-	-	2,917,250	-	2,917,250	62,250,764.90	63,640.95	62,314,405.85
01/01/2022	1,805,000.00	5.000%	2,917,250	-	4,722,250	60,445,764.90	130,936.40	60,576,701.30
01/01/2023	2,010,000.00	5.000%	2,827,000	-	4,837,000	58,435,764.90	199,375.30	58,635,140.20
01/01/2024	2,230,000.00	5.000%	2,726,500	-	4,956,500	56,205,764.90	268,976.90	56,474,741.80
01/01/2025	1,465,000.00	5.000%	2,615,000	-	4,080,000	54,740,764.90	339,766.70	55,080,531.60
01/01/2026	1,670,000.00	5.000%	2,541,750	-	4,211,750	53,070,764.90	411,758.50	53,482,523.40
01/01/2027	1,785,000.00	5.000%	2,458,250	-	4,243,250	51,285,764.90	484,975.85	51,770,740.75
01/01/2028	1,820,000.00	5.000%	2,369,000	-	4,189,000	49,465,764.90	559,430.30	50,025,195.20
01/01/2029	1,855,000.00	5.000%	2,278,000	-	4,133,000	47,610,764.90	635,156.55	48,245,921.45
01/01/2030	1,885,000.00	5.000%	2,185,250	-	4,070,250	45,725,764.90	712,155.40	46,437,920.30
01/01/2031	1,920,000.00	5.000%	2,091,000	-	4,011,000	43,805,764.90	790,481.50	44,596,246.40
01/01/2032	1,605,519.70	1.610%	1,995,000	339,480.30	3,940,000	42,200,245.20	530,656.75	42,730,901.95
01/01/2033	701,298.30	1.670%	1,995,000	168,701.70	2,865,000	41,498,946.90	411,524.45	41,910,471.35
01/01/2034	617,198.40	1.730%	1,995,000	167,801.60	2,780,000	40,881,748.50	279,572.35	41,161,320.85
01/01/2035	533,134.50	1.780%	1,995,000	161,865.50	2,690,000	40,348,614.00	140,550.00	40,489,164.00
01/01/2036	448,614.00	1.830%	1,995,000	151,386.00	2,595,000	39,900,000.00	-	39,900,000.00
01/01/2037	6,185,000.00	5.000%	1,995,000	-	8,180,000	33,715,000.00	-	33,715,000.00
01/01/2038	4,495,000.00	5.000%	1,685,750	-	6,180,750	29,220,000.00	-	29,220,000.00
01/01/2039	4,715,000.00	5.000%	1,461,000	-	6,176,000	24,505,000.00	-	24,505,000.00
01/01/2040	11,955,000.00	5.000%	1,225,250	-	13,180,250	12,550,000.00	-	12,550,000.00
01/01/2041	12,550,000.00	5.000%	627,500	-	13,177,500	-	-	-
	62,250,764.90		44,895,750	989,235.10	108,135,750			

BOND SOLUTION

ABC County
2020 New Money Wraparound Analysis
New Money Wrap

Period Ending	Proposed Principal	Proposed Debt Service	Debt Service Adjustments	Existing Debt Service	Total Adj Debt Service
01/01/2021	-	2,917,250	(113,449)	9,095,320	11,899,121
01/01/2022	1,805,000	4,722,250	-	8,458,820	13,181,070
01/01/2023	2,010,000	4,837,000	-	8,341,320	13,178,320
01/01/2024	2,230,000	4,956,500	-	8,221,320	13,177,820
01/01/2025	1,465,000	4,080,000	-	9,096,320	13,176,320
01/01/2026	1,670,000	4,211,750	-	8,968,820	13,180,570
01/01/2027	1,785,000	4,243,250	-	8,936,320	13,179,570
01/01/2028	1,820,000	4,189,000	-	8,988,320	13,177,320
01/01/2029	1,855,000	4,133,000	-	9,045,403	13,178,403
01/01/2030	1,885,000	4,070,250	-	9,105,823	13,176,073
01/01/2031	1,920,000	4,011,000	-	9,169,368	13,180,368
01/01/2032	1,605,520	3,940,000	-	9,237,618	13,177,618
01/01/2033	701,298	2,865,000	-	10,313,258	13,178,258
01/01/2034	617,198	2,780,000	-	10,396,498	13,176,498
01/01/2035	533,135	2,690,000	-	10,488,223	13,178,223
01/01/2036	448,614	2,595,000	-	10,583,025	13,178,025
01/01/2037	6,185,000	8,180,000	-	5,000,000	13,180,000
01/01/2038	4,495,000	6,180,750	-	7,000,000	13,180,750
01/01/2039	4,715,000	6,176,000	-	7,000,000	13,176,000
01/01/2040	11,955,000	13,180,250	-	-	13,180,250
01/01/2041	12,550,000	13,177,500	-	-	13,177,500
	62,250,765	108,135,750	(113,449)	167,445,773	275,468,074

Notice in the Total Adjusted Debt Service column that all amounts are level except the total for 2021. There is no principal in 2021 due to the construction period (facility is not yet built, therefore, no revenues). When DBC is structuring level debt service it only controls the placement of principal as interest cannot be changed (it is a function of the principal). This solution is correct because it meets the level requirement in all the years there is principal. Since there is no principal in 2021, it is not considered part of the solution.

AGGREGATE DEBT SERVICE

ABC County
2020 New Money Wraparound Analysis
New Money Wrap

Period Ending	2020 New Money Wraparound Analysis	2016 Other Debt Service	2014 Other Debt Service	Aggregate Debt Service
01/01/2021	2,917,250	6,095,320.00	3,000,000	12,012,570.00
01/01/2022	4,722,250	5,458,820.00	3,000,000	13,181,070.00
01/01/2023	4,837,000	5,341,320.00	3,000,000	13,178,320.00
01/01/2024	4,956,500	5,221,320.00	3,000,000	13,177,820.00
01/01/2025	4,080,000	5,096,320.00	4,000,000	13,176,320.00
01/01/2026	4,211,750	4,968,820.00	4,000,000	13,180,570.00
01/01/2027	4,243,250	4,936,320.00	4,000,000	13,179,570.00
01/01/2028	4,189,000	4,988,320.00	4,000,000	13,177,320.00
01/01/2029	4,133,000	5,045,402.50	4,000,000	13,178,402.50
01/01/2030	4,070,250	5,105,822.50	4,000,000	13,176,072.50
01/01/2031	4,011,000	5,169,367.50	4,000,000	13,180,367.50
01/01/2032	3,940,000	5,237,617.50	4,000,000	13,177,617.50
01/01/2033	2,865,000	5,313,257.50	5,000,000	13,178,257.50
01/01/2034	2,780,000	5,396,497.50	5,000,000	13,176,497.50
01/01/2035	2,690,000	5,488,222.50	5,000,000	13,178,222.50
01/01/2036	2,595,000	5,583,025.00	5,000,000	13,178,025.00
01/01/2037	8,180,000	-	5,000,000	13,180,000.00
01/01/2038	6,180,750	-	7,000,000	13,180,750.00
01/01/2039	6,176,000	-	7,000,000	13,176,000.00
01/01/2040	13,180,250	-	-	13,180,250.00
01/01/2041	13,177,500	-	-	13,177,500.00
	108,135,750	84,445,772.50	83,000,000	275,581,522.50

The Aggregate Debt Service report displays the new debt service and each of the entries made in the Other D/S menu. It is the best way to display the results of a wraparound solution or to simply show an issuer how much debt they have outstanding in addition to the issue currently being analyzed.

********* ADVANCED ANALYSIS II *********

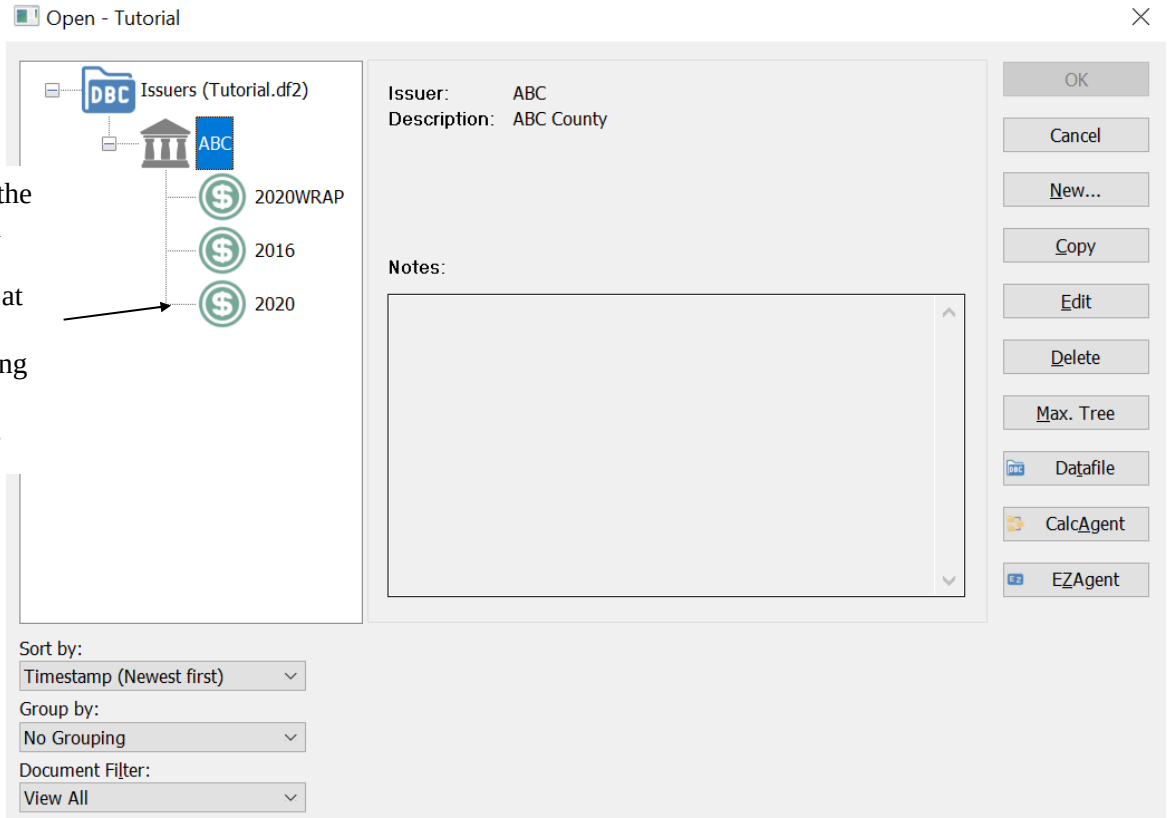
❖ BOND COMPONENT TARGETS

For this analysis, you have been told that the total par amount for all the serial bonds must be a fixed dollar amount. In addition, the serial bonds must have level debt service separate from the debt service of the term bond which must also be level.

ASSUMPTIONS

Serial bonds par amount (total for both current interest and CAB) must equal $25,000,000. Debt service for serials must be level as well as that for term bond.

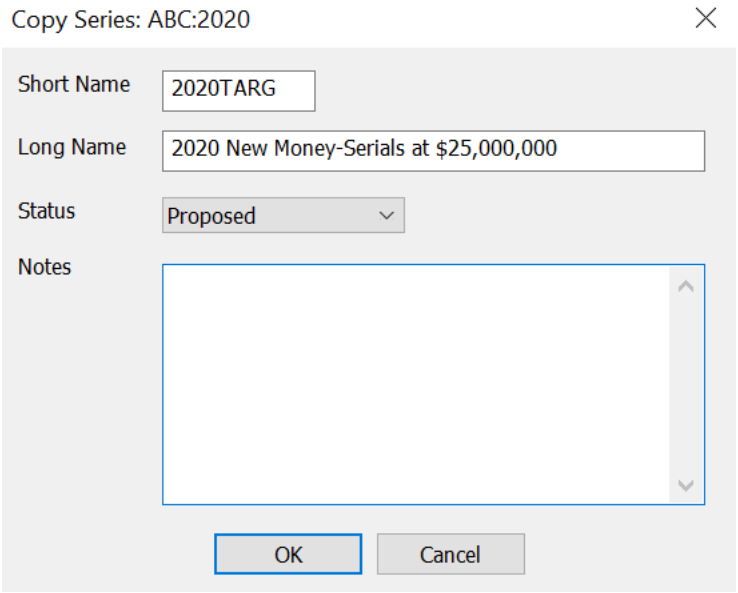
* **Click on the OPEN Button as shown above.**



This is the original series created at the beginning of the tutorial.

Click to Copy the series and save it with a new name.

* **Click once on series 2020 (the original one) and click on COPY.**



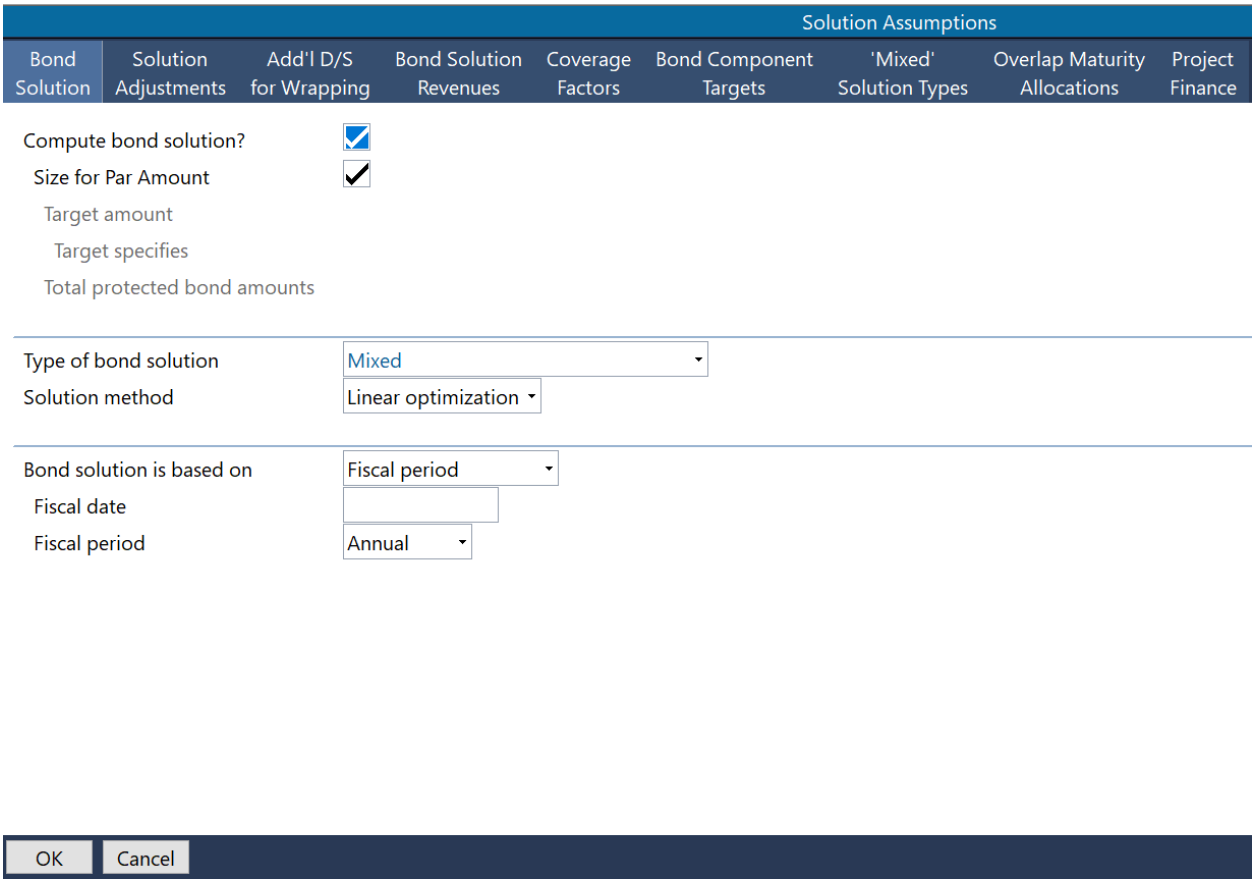
* **Type "2020TARG" (short name) and "2020 New Money - Serials at $25,000,000" (long name). Set the status to Proposed. This will save a copy of the 2020 series as 2020TARG. Click OK. Double click on 2020TARG from the series list to load the newly copied series.**

* **Go to the DATA menu and select ADDITIONAL INFORMATION - REPORTING OPTIONS. Go to the ADDITIONAL TITLES tab. Delete the title by pressing the DELETE key and add "Bond Component Target" as the new title. Click OK.**

❖ SOLUTION ASSUMPTIONS

In this example, the serial bonds must have a fixed par amount. The term will be sized according to the remaining par amount required.

* **Select SOLUTION ASSUMPTIONS - SETUP from the menu.**



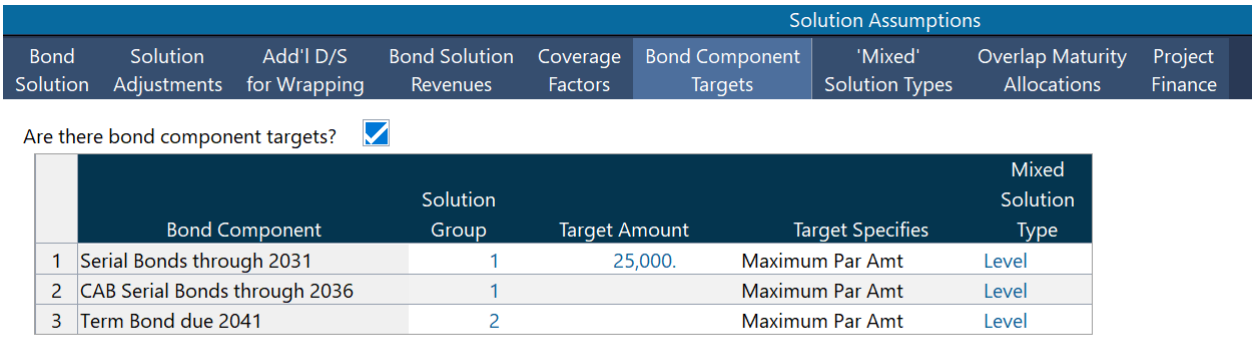
* **Set the TYPE OF BOND SOLUTION to MIXED.**

Mixed This solution structures cash flows with multiple constraints. You can define dollar or percentage targets for each of the bond components as well as define how the debt service of each should be amortized. Also, you can impose different constraints over time on the total debt service of the issue (i.e. debt service has to be level for the first ten years and then has to grow at a rate of 5% annually using the proportional solution).

❖ BOND COMPONENT TARGETS

This dialog permits the entry of either a dollar and/or percentage constraint on the size of each bond component or a group of components. If you are sizing for par, be sure to leave at least one component "unconstrained" to amortize any additional par required for the sizing to be correct. For example, if you are doing a sizing and you wish the serial bonds to be $10 million in par, any additional par required will be amortized in the remaining component. If each component must be a specific percentage, **be sure** that the sum of the percentages equals 100%.

* **Click on the BOND COMPONENT TARGETS tab.**



	Bond Component	Solution Group	Target Amount	Target Specifies	Mixed Solution Type
1	Serial Bonds through 2031	1	25,000.	Maximum Par Amt	Level
2	CAB Serial Bonds through 2036	1		Maximum Par Amt	Level
3	Term Bond due 2041	2		Maximum Par Amt	Level

* **Click in the box next to the "ARE THERE BOND COMPONENT TARGETS?" prompt. Set the SOLUTION GROUP to "1" for the Serial Bonds and CAB serials and to "2" for the Term. For the Serial bonds, set the TARGET VALUE at $25,000,000 (type 25,000) for Solution Group 1 and the SOLUTION TYPE to Level for all three. Note that the target amount should only be entered once per solution group. Click OK.**

Solution Group The solution group specifies that a component or a group of components (all with the same group number) are subject to one percentage or par value constraint.

* **Save the series then click on CALCULATE. Click OK on the WARNINGS & ERRORS dialog (if any). Click on the PRINT button. Select the following reports: Sources & Uses, Bond Pricing, Bond Debt Service (ann, sum), and Bond Debt Service (ann, det). See page 79.**

NOTE - The Bond Pricing and Detailed Debt Service reports show how your bond components were structured. Notice that the total debt service for the bond issue is not level. This is a correct solution based on our constraint that debt service for the serial bonds and for the term bond be level individually.

SOURCES AND USES OF FUNDS

ABC County
2020 New Money- Serials at $25,000,000
Bond Component Target

Dated Date	01/01/2020
Delivery Date	01/15/2020

Sources:

Bond Proceeds:	
Par Amount	25,490,384.10
Accrued Interest	33,162.50
Premium	4,177,659.40
	29,701,206.00
Other Sources of Funds:	
Issuer Contribution	150,000.00
	29,851,206.00

Uses:

Project Fund Deposits:	
Road Repair Fund	26,071,299.10
Other Fund Deposits:	
Debt Service Reserve Fund	2,023,574.00
Capitalized Interest Fund	1,227,412.60
	3,250,986.60
Delivery Date Expenses:	
Cost of Issuance	250,000.00
Underwriter's Discount	267,649.03
Insurance for Term Bond	4,837.50
	522,486.53
Other Uses of Funds:	
Additional Proceeds	6,433.77
	29,851,206.00

Note: Capitalized Interest Fund includes deposit of 33,162.50 of bond accrued interest.

BOND PRICING

ABC County
2020 New Money- Serials at $25,000,000
Bond Component Target

Bond Component	Maturity Date	Amount	Rate	Yield	Price	Principal per $5,000 at Maturity	Offer Price per $5,000 at Maturity	CAB Value at Maturity	Premium (-Discount)	Principal Cost
Serial Bonds through 2031:										
	01/01/2022	1,315,000.00	5.000%	1.100%	107.545	-	-	-	99,216.75	1,414,216.75
	01/01/2023	1,385,000.00	5.000%	1.110%	111.300	-	-	-	156,505.00	1,541,505.00
	01/01/2024	1,450,000.00	5.000%	1.120%	114.991	-	-	-	217,369.50	1,667,369.50
	01/01/2025	1,525,000.00	5.000%	1.130%	118.619	-	-	-	283,939.75	1,808,939.75
	01/01/2026	1,600,000.00	5.000%	1.150%	122.119	-	-	-	353,904.00	1,953,904.00
	01/01/2027	1,680,000.00	5.000%	1.230%	125.076	-	-	-	421,276.80	2,101,276.80
	01/01/2028	1,765,000.00	5.000%	1.310%	127.809	-	-	-	490,828.85	2,255,828.85
	01/01/2029	1,855,000.00	5.000%	1.390%	130.316	-	-	-	562,361.80	2,417,361.80
	01/01/2030	1,945,000.00	5.000%	1.470%	132.597	-	-	-	634,011.65	2,579,011.65
	01/01/2031	2,040,000.00	5.000%	1.540%	134.773	-	-	-	709,369.20	2,749,369.20
		16,560,000.00						-	3,928,783.30	20,488,783.30
CAB Serial Bonds through 2036:										
	01/01/2032	1,770,611.70	1.610%	1.610%	82.546	4,127.30	4,127.30	2,145,000	-	1,770,611.70
	01/01/2033	1,729,063.05	1.670%	1.670%	80.609	4,030.45	4,030.45	2,145,000	-	1,729,063.05
	01/01/2034	1,686,484.80	1.730%	1.730%	78.624	3,931.20	3,931.20	2,145,000	-	1,686,484.80
	01/01/2035	1,645,429.50	1.780%	1.780%	76.710	3,835.50	3,835.50	2,145,000	-	1,645,429.50
	01/01/2036	1,603,795.05	1.830%	1.830%	74.769	3,738.45	3,738.45	2,145,000	-	1,603,795.05
		8,435,384.10						10,725,000	-	8,435,384.10
Term Bond due 2041:										
	01/01/2037	90,000.00	5.000%	2.040%	150.278	-	-	-	45,250.20	135,250.20
	01/01/2038	95,000.00	5.000%	2.040%	150.278	-	-	-	47,764.10	142,764.10
	01/01/2039	100,000.00	5.000%	2.040%	150.278	-	-	-	50,278.00	150,278.00
	01/01/2040	100,000.00	5.000%	2.040%	150.278	-	-	-	50,278.00	150,278.00
	01/01/2041	110,000.00	5.000%	2.040%	150.278	-	-	-	55,305.80	165,305.80
		495,000.00						-	248,876.10	743,876.10
		25,490,384.10						10,725,000	4,177,659.40	29,668,043.50

Dated Date	01/01/2020	
Delivery Date	01/15/2020	
First Coupon	07/01/2020	
Par Amount	25,490,384.10	
Premium	4,177,659.40	
Production	29,668,043.50	116.389158%
Underwriter's Discount	(267,649.03)	(1.050000%)
Purchase Price	29,400,394.47	115.339158%
Accrued Interest	33,162.50	
Net Proceeds	29,433,556.97	

Notice how the total par of our SERIAL component ($16,560,000) plus the total par of our CABSER component ($8,435,384.10) combined is within a bond of our $25,000,000 target.

BOND DEBT SERVICE

ABC County
2020 New Money- Serials at $25,000,000
Bond Component Target

Dated Date 01/01/2020
Delivery Date 01/15/2020

Period Ending	Principal	Coupon	Interest	Compounded Interest	Debt Service	Bond Balance	Accreted Interest	Total Bond Value
01/01/2021	-	-	852,750	-	852,750	25,490,384.10	140,132.85	25,630,516.95
01/01/2022	1,315,000.00	5.000%	852,750	-	2,167,750	24,175,384.10	288,373.80	24,463,757.90
01/01/2023	1,385,000.00	5.000%	787,000	-	2,172,000	22,790,384.10	439,188.75	23,229,572.85
01/01/2024	1,450,000.00	5.000%	717,750	-	2,167,750	21,340,384.10	592,620.60	21,933,004.70
01/01/2025	1,525,000.00	5.000%	645,250	-	2,170,250	19,815,384.10	748,712.25	20,564,096.35
01/01/2026	1,600,000.00	5.000%	569,000	-	2,169,000	18,215,384.10	907,506.60	19,122,890.70
01/01/2027	1,680,000.00	5.000%	489,000	-	2,169,000	16,535,384.10	1,069,068.00	17,604,452.10
01/01/2028	1,765,000.00	5.000%	405,000	-	2,170,000	14,770,384.10	1,233,396.45	16,003,780.55
01/01/2029	1,855,000.00	5.000%	316,750	-	2,171,750	12,915,384.10	1,400,599.20	14,315,983.30
01/01/2030	1,945,000.00	5.000%	224,000	-	2,169,000	10,970,384.10	1,570,676.25	12,541,060.35
01/01/2031	2,040,000.00	5.000%	126,750	-	2,166,750	8,930,384.10	1,743,713.40	10,674,097.50
01/01/2032	1,770,611.70	1.610%	24,750	374,388.30	2,169,750	7,159,772.40	1,545,365.25	8,705,137.65
01/01/2033	1,729,063.05	1.670%	24,750	415,936.95	2,169,750	5,430,709.35	1,273,851.15	6,704,560.50
01/01/2034	1,686,484.80	1.730%	24,750	458,515.20	2,169,750	3,744,224.55	926,339.70	4,670,564.25
01/01/2035	1,645,429.50	1.780%	24,750	499,570.50	2,169,750	2,098,795.05	502,466.25	2,601,261.30
01/01/2036	1,603,795.05	1.830%	24,750	541,204.95	2,169,750	495,000.00	-	495,000.00
01/01/2037	90,000.00	5.000%	24,750	-	114,750	405,000.00	-	405,000.00
01/01/2038	95,000.00	5.000%	20,250	-	115,250	310,000.00	-	310,000.00
01/01/2039	100,000.00	5.000%	15,500	-	115,500	210,000.00	-	210,000.00
01/01/2040	100,000.00	5.000%	10,500	-	110,500	110,000.00	-	110,000.00
01/01/2041	110,000.00	5.000%	5,500	-	115,500	-	-	-
	25,490,384.10		6,186,250	2,289,615.90	33,966,250			

DETAILED BOND DEBT SERVICE

ABC County
2020 New Money- Serials at $25,000,000
Bond Component Target

Dated Date	01/01/2020
Delivery Date	01/15/2020

Serial Bonds through 2031

Period Ending	Principal	Coupon	Interest	Debt Service	Bond Balance	Total Bond Value
01/01/2021	-	-	828,000	828,000	16,560,000	16,560,000
01/01/2022	1,315,000	5.000%	828,000	2,143,000	15,245,000	15,245,000
01/01/2023	1,385,000	5.000%	762,250	2,147,250	13,860,000	13,860,000
01/01/2024	1,450,000	5.000%	693,000	2,143,000	12,410,000	12,410,000
01/01/2025	1,525,000	5.000%	620,500	2,145,500	10,885,000	10,885,000
01/01/2026	1,600,000	5.000%	544,250	2,144,250	9,285,000	9,285,000
01/01/2027	1,680,000	5.000%	464,250	2,144,250	7,605,000	7,605,000
01/01/2028	1,765,000	5.000%	380,250	2,145,250	5,840,000	5,840,000
01/01/2029	1,855,000	5.000%	292,000	2,147,000	3,985,000	3,985,000
01/01/2030	1,945,000	5.000%	199,250	2,144,250	2,040,000	2,040,000
01/01/2031	2,040,000	5.000%	102,000	2,142,000	-	-
	16,560,000		5,713,750	22,273,750		

DETAILED BOND DEBT SERVICE

ABC County
2020 New Money- Serials at $25,000,000
Bond Component Target

Dated Date 01/01/2020
Delivery Date 01/15/2020

CAB Serial Bonds through 2036

Period Ending	Principal	Coupon	Interest	Compounded Interest	Debt Service	Bond Balance	Accreted Interest	Total Bond Value
01/01/2021	-	-	-	-	-	8,435,384.10	140,132.85	8,575,516.95
01/01/2022	-	-	-	-	-	8,435,384.10	288,373.80	8,723,757.90
01/01/2023	-	-	-	-	-	8,435,384.10	439,188.75	8,874,572.85
01/01/2024	-	-	-	-	-	8,435,384.10	592,620.60	9,028,004.70
01/01/2025	-	-	-	-	-	8,435,384.10	748,712.25	9,184,096.35
01/01/2026	-	-	-	-	-	8,435,384.10	907,506.60	9,342,890.70
01/01/2027	-	-	-	-	-	8,435,384.10	1,069,068.00	9,504,452.10
01/01/2028	-	-	-	-	-	8,435,384.10	1,233,396.45	9,668,780.55
01/01/2029	-	-	-	-	-	8,435,384.10	1,400,599.20	9,835,983.30
01/01/2030	-	-	-	-	-	8,435,384.10	1,570,676.25	10,006,060.35
01/01/2031	-	-	-	-	-	8,435,384.10	1,743,713.40	10,179,097.50
01/01/2032	1,770,611.70	1.610%	-	374,388.30	2,145,000	6,664,772.40	1,545,365.25	8,210,137.65
01/01/2033	1,729,063.05	1.670%	-	415,936.95	2,145,000	4,935,709.35	1,273,851.15	6,209,560.50
01/01/2034	1,686,484.80	1.730%	-	458,515.20	2,145,000	3,249,224.55	926,339.70	4,175,564.25
01/01/2035	1,645,429.50	1.780%	-	499,570.50	2,145,000	1,603,795.05	502,466.25	2,106,261.30
01/01/2036	1,603,795.05	1.830%	-	541,204.95	2,145,000	-	-	-
	8,435,384.10		0	2,289,615.90	10,725,000			

DETAILED BOND DEBT SERVICE

ABC County
2020 New Money- Serials at $25,000,000
Bond Component Target

Dated Date	01/01/2020
Delivery Date	01/15/2020

Term Bond due 2041

Period Ending	Principal	Coupon	Interest	Debt Service	Bond Balance	Total Bond Value
01/01/2021	-	-	24,750	24,750	495,000	495,000
01/01/2022	-	-	24,750	24,750	495,000	495,000
01/01/2023	-	-	24,750	24,750	495,000	495,000
01/01/2024	-	-	24,750	24,750	495,000	495,000
01/01/2025	-	-	24,750	24,750	495,000	495,000
01/01/2026	-	-	24,750	24,750	495,000	495,000
01/01/2027	-	-	24,750	24,750	495,000	495,000
01/01/2028	-	-	24,750	24,750	495,000	495,000
01/01/2029	-	-	24,750	24,750	495,000	495,000
01/01/2030	-	-	24,750	24,750	495,000	495,000
01/01/2031	-	-	24,750	24,750	495,000	495,000
01/01/2032	-	-	24,750	24,750	495,000	495,000
01/01/2033	-	-	24,750	24,750	495,000	495,000
01/01/2034	-	-	24,750	24,750	495,000	495,000
01/01/2035	-	-	24,750	24,750	495,000	495,000
01/01/2036	-	-	24,750	24,750	495,000	495,000
01/01/2037	90,000	5.000%	24,750	114,750	405,000	405,000
01/01/2038	95,000	5.000%	20,250	115,250	310,000	310,000
01/01/2039	100,000	5.000%	15,500	115,500	210,000	210,000
01/01/2040	100,000	5.000%	10,500	110,500	110,000	110,000
01/01/2041	110,000	5.000%	5,500	115,500	-	-
	495,000		472,500	967,500		

********* ADVANCED ANALYSIS III *********

❖ FIXED BOND SIZE

For this analysis, you have been told that ABC County can only issue $20,000,000. The issuer is unable to issue premium bonds to generate additional proceeds. They have specific financing needs and will contribute in cash any amount necessary to make up any shortfall.

ASSUMPTIONS

Total par must equal $20,000,000
Debt service for issue must be level
The TUTORIAL datafile is loaded and the series 2020 is open

* **Create the new series using one of the following methods (read them first):**

1. **If series 2020 is currently open, click on WINDOW in the PROGRAM menu and select the series 2020 and click on SAVE AS in the FILE menu. Click on ABC County. Go to the SERIES name entry at the bottom of the dialog and type "202020ML" (short name) and "2020 New Money - $20,000,000 Total Par" (long name). Set the STATUS to PROPOSED. Click OK. This will save a copy of series 2020 as 202020ML and will automatically load 202020ML (newly created).**

OR

2. **If 2020 is not currently open, click on OPEN, select series 2020 from ABC County, and click on COPY. Go to the SERIES name entry at the bottom of the dialog and type "202020ML" (short name) and "2020 New Money - $20,000,000 Total Par" (long name). Set the STATUS to PROPOSED. Click OK. This will save a copy of series 2020 as 202020ML, however, you must open the new series by double clicking on the short name.**

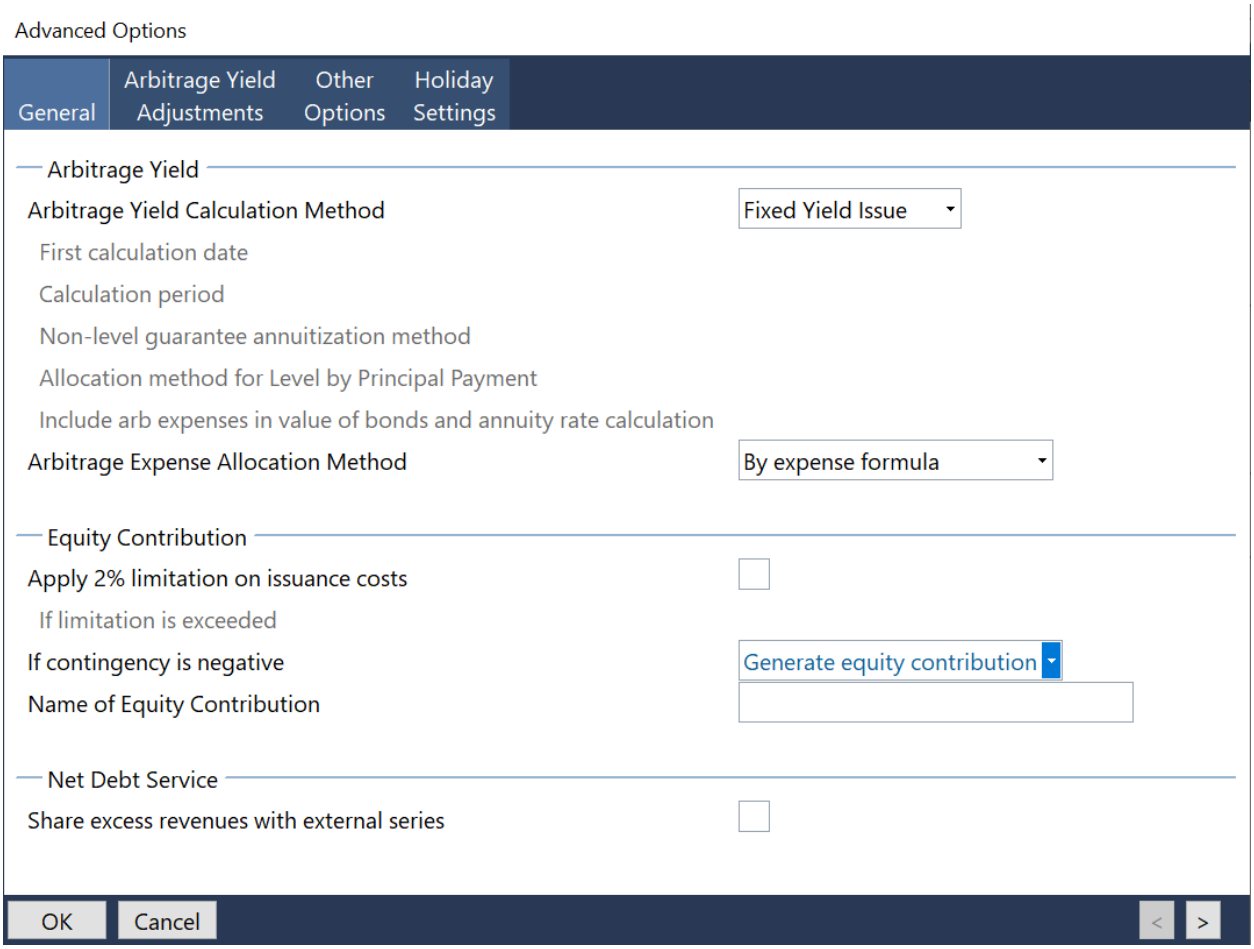
NOTE - The **SAVE AS** feature copies the selected series and creates and opens a new series which is a copy of the original. The **COPY** feature copies the selected series and only creates a new series. It does not open it automatically for you.

* **In series 202020ML, go to the DATA menu and select ADDITIONAL INFORMATION - REPORTING OPTIONS. Go to the ADDITIONAL TITLES tab. Delete the title by pressing the DELETE key. Add "Par Target" as the new title Click OK.**

❖ GENERAL ASSUMPTIONS - F8 MENU - ADVANCED OPTIONS

If the $20,000,000 is insufficient to pay for all the uses of fund you have specified, you will get a warning saying that "Additional Proceeds are negative". In our example, the issuer is willing to make up any cash shortfalls with cash. In the dialog below, we will specify that the program automatically generate a cash contribution in the Sources & Uses instead of showing a negative number.

* **Select DEBT/SIZE ASSUMPTIONS - SETUP from the DATA menu. Once in the GENERAL INFORMATION dialog, click on ADVANCED. Select ADVANCED OPTIONS.**

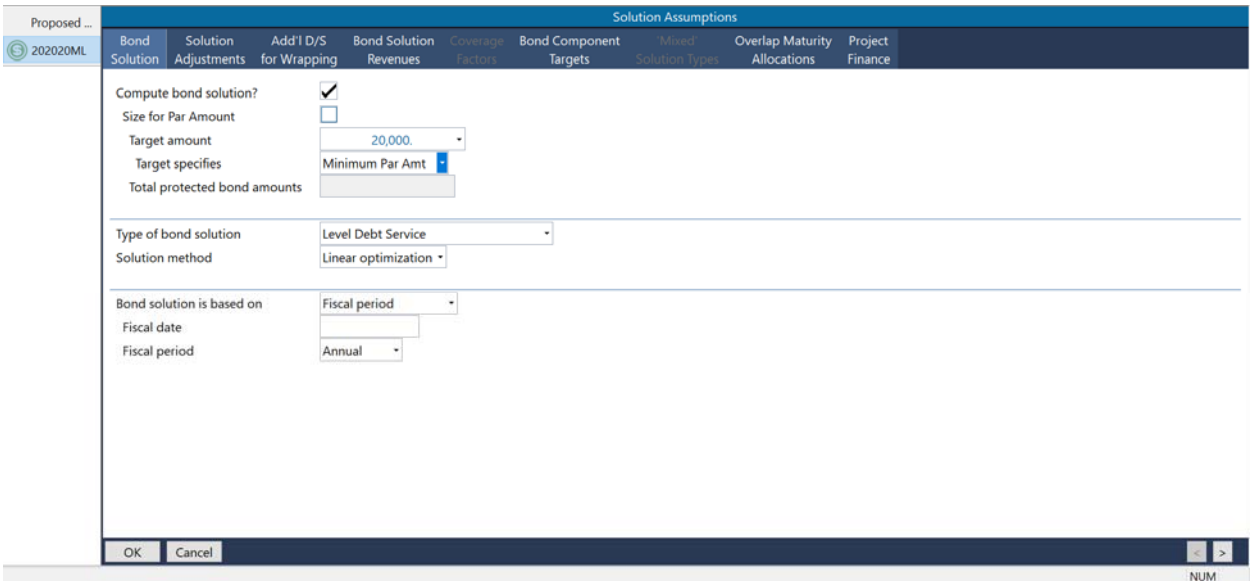


* **Set "IF CONTINGENCY IS NEGATIVE" to "Generate equity contribution". Click OK then OK again on the GENERAL INFORMATION dialog.**

❖ BOND SOLUTION ASSUMPTIONS - SIZE FOR PAR AMOUNT

In this example, the total par amount is limited to a specific amount and total debt service must be level. *DBC Finance* can take a target par amount and amortize it using any of the ten solution options available.

* **Click on SOLUTION ASSUMPTIONS - SETUP in the DATA menu.**



* **Set "SIZE FOR PAR AMOUNT" to NO by unchecking in the box. Type "20000" as the TARGET PAR AMOUNT. Click OK.**

* **Save the series then click on CALCULATE, click OK on any WARNINGS & ERRORS dialogs and click OK when the calculation is complete. Click PRINT and select the following reports: Sources & Uses, Bond Statistics, Bond Pricing, and Bond Debt Service (annual, summary). Refer to page 79 for instructions.**

NOTE

1. The par amount is slightly above $20,000,000 because of the CAB bonds. This is an acceptable answer because a CAB's par amount is rarely a round multiple of $5,000. In addition, it is higher than $20,000,000 instead of lower than because the **TARGET SPECIFIES** line is set to **MINIMUM PAR AMOUNT**. This means that the final solution par must be, at a minimum, $20,000,000.
2. The results show negative additional funds even though you set the program to generate an equity contribution if there was a negative contingency. If you look at the Sources & Uses report, you will note that there is, in fact, and equity contribution. This is for report purposes only. The fact still remains that the parameters you have entered produce a bond issue with a negative contingency. The system-generated equity contribution is an artificial number with no relation to your ability to provide the computed amount.

SOURCES AND USES OF FUNDS

ABC County
2020 New Money - $20,000,000 Total Par
Par Target

Dated Date	01/01/2020
Delivery Date	01/15/2020

Sources:	
Bond Proceeds:	
Par Amount	20,001,455.70
Accrued Interest	29,983.33
Premium	5,365,755.55
	25,397,194.58
Other Sources of Funds:	
Issuer Contribution	150,000.00
Equity Contribution	3,625,156.02
	3,775,156.02
	29,172,350.60
Uses:	
Project Fund Deposits:	
Road Repair Fund	26,053,581.10
Other Fund Deposits:	
Debt Service Reserve Fund	1,488,000.00
Capitalized Interest Fund	1,107,905.46
	2,595,905.46
Delivery Date Expenses:	
Cost of Issuance	250,000.00
Underwriter's Discount	210,015.29
Insurance for Term Bond	62,848.75
	522,864.04
	29,172,350.60

Should not exceed $20,000,000 by more than one bond.

Issuer must contribute this additional amount to the project.

Notice that there are no Additional Proceeds. They would have been negative. When you told the program to Generate Equity Contribution, you told it to take the amount of negative Additional Proceeds (shortfall) and account for this as an Equity Contribution assuming that the issuer could write a check for this amount at closing.

Note: C

BOND SUMMARY STATISTICS

ABC County
2020 New Money - $20,000,000 Total Par
Par Target

Dated Date	01/01/2020
Delivery Date	01/15/2020
First Coupon	07/01/2020
Last Maturity	01/01/2041
Arbitrage Yield	1.719184%
True Interest Cost (TIC)	1.799186%
All-In TIC	1.895622%
Average Life (years)	12.398
Weighted Average Maturity (years)	12.868
Duration of Issue (years)	10.483
Par Amount	20,001,455.70
Bond Proceeds	25,397,194.58
Total Interest	9,241,750.00
Net Interest	4,086,009.74
Bond Years from Dated Date	248,748,752.35
Bond Years from Delivery Date	247,970,917.96
Total Debt Service	30,486,750.00
Maximum Annual Debt Service	1,488,000.00
Average Annual Debt Service	1,453,012.99
Underwriter's Fees (per $1000)	
Average Takedown	7.500000
Management Fee	0.500000
Other Fee	2.500000
Total Underwriter's Discount	10.500000
Bid Price	125.776825

Bond Component	*Par Value*	*Price*	*Average Coupon*	*Average Life*	*Average Maturity Date*	*Duration*	*PV of 1 bp change*
Serial Bonds through 2031	8,990,000.00	123.725	5.000%	6.862	11/25/2026	6.068	6,683.50
CAB Serial Bonds through 2036	4,581,455.70	100.000	-	13.912	12/13/2033	13.927	6,302.65
Term Bond due 2041	6,430,000.00	150.278	5.000%	19.058	02/05/2039	13.813	14,146.00
	20,001,455.70			12.398			27,132.15

	TIC	All-In TIC	Arbitrage Yield
Par Value	20,001,455.70	20,001,455.70	20,001,455.70
+ Accrued Interest	29,983.33	29,983.33	29,983.33
+ Premium (Discount)	5,365,755.55	5,365,755.55	5,365,755.55
- Underwriter's Discount	(210,015.29)	(210,015.29)	
- Cost of Issuance Expense		(250,000.00)	
- Other Amounts	(62,848.75)	(62,848.75)	(62,848.75)
Target Value	25,124,330.54	24,874,330.54	25,334,345.83
Target Date	01/15/2020	01/15/2020	01/15/2020
Yield	1.799186%	1.895622%	1.719184%

BOND PRICING

ABC County
2020 New Money - $20,000,000 Total Par
Par Target

Bond Component	Maturity Date	Amount	Rate	Yield	Price	Principal per $5,000 at Maturity	Offer Price per $5,000 at Maturity	CAB Value at Maturity	Premium (-Discount)	Principal Cost
Serial Bonds through 2031:										
	01/01/2022	715,000.00	5.000%	1.100%	107.545	-	-	-	53,946.75	768,946.75
	01/01/2023	750,000.00	5.000%	1.110%	111.300	-	-	-	84,750.00	834,750.00
	01/01/2024	790,000.00	5.000%	1.120%	114.991	-	-	-	118,428.90	908,428.90
	01/01/2025	825,000.00	5.000%	1.130%	118.619	-	-	-	153,606.75	978,606.75
	01/01/2026	870,000.00	5.000%	1.150%	122.119	-	-	-	192,435.30	1,062,435.30
	01/01/2027	910,000.00	5.000%	1.230%	125.076	-	-	-	228,191.60	1,138,191.60
	01/01/2028	960,000.00	5.000%	1.310%	127.809	-	-	-	266,966.40	1,226,966.40
	01/01/2029	1,005,000.00	5.000%	1.390%	130.316	-	-	-	304,675.80	1,309,675.80
	01/01/2030	1,055,000.00	5.000%	1.470%	132.597	-	-	-	343,898.35	1,398,898.35
	01/01/2031	1,110,000.00	5.000%	1.540%	134.773	-	-	-	385,980.30	1,495,980.30
		8,990,000.00						-	2,132,880.15	11,122,880.15
CAB Serial Bonds through 2036:										
	01/01/2032	961,660.90	1.610%	1.610%	82.546	4,127.30	4,127.30	1,165,000	-	961,660.90
	01/01/2033	939,094.85	1.670%	1.670%	80.609	4,030.45	4,030.45	1,165,000	-	939,094.85
	01/01/2034	915,969.60	1.730%	1.730%	78.624	3,931.20	3,931.20	1,165,000	-	915,969.60
	01/01/2035	893,671.50	1.780%	1.780%	76.710	3,835.50	3,835.50	1,165,000	-	893,671.50
	01/01/2036	871,058.85	1.830%	1.830%	74.769	3,738.45	3,738.45	1,165,000	-	871,058.85
		4,581,455.70						5,825,000	-	4,581,455.70
Term Bond due 2041:										
	01/01/2037	1,165,000.00	5.000%	2.040%	150.278	-	-	-	585,738.70	1,750,738.70
	01/01/2038	1,220,000.00	5.000%	2.040%	150.278	-	-	-	613,391.60	1,833,391.60
	01/01/2039	1,285,000.00	5.000%	2.040%	150.278	-	-	-	646,072.30	1,931,072.30
	01/01/2040	1,345,000.00	5.000%	2.040%	150.278	-	-	-	676,239.10	2,021,239.10
	01/01/2041	1,415,000.00	5.000%	2.040%	150.278	-	-	-	711,433.70	2,126,433.70
		6,430,000.00						-	3,232,875.40	9,662,875.40
		20,001,455.70						5,825,000	5,365,755.55	25,367,211.25

Dated Date	01/01/2020	
Delivery Date	01/15/2020	
First Coupon	07/01/2020	
Par Amount	20,001,455.70	
Premium	5,365,755.55	
Production	25,367,211.25	126.826825%
Underwriter's Discount	(210,015.29)	(1.050000%)
Purchase Price	25,157,195.96	125.776825%
Accrued Interest	29,983.33	
Net Proceeds	25,187,179.29	

BOND DEBT SERVICE

ABC County
2020 New Money - $20,000,000 Total Par
Par Target

Dated Date 01/01/2020
Delivery Date 01/15/2020

Period Ending	Principal	Coupon	Interest	Compounded Interest	Debt Service	Bond Balance	Accreted Interest	Total Bond Value
01/01/2021	-	-	771,000	-	771,000	20,001,455.70	76,109.45	20,077,565.15
01/01/2022	715,000.00	5.000%	771,000	-	1,486,000	19,286,455.70	156,622.60	19,443,078.30
01/01/2023	750,000.00	5.000%	735,250	-	1,485,250	18,536,455.70	238,533.75	18,774,989.45
01/01/2024	790,000.00	5.000%	697,750	-	1,487,750	17,746,455.70	321,866.20	18,068,321.90
01/01/2025	825,000.00	5.000%	658,250	-	1,483,250	16,921,455.70	406,643.25	17,328,098.95
01/01/2026	870,000.00	5.000%	617,000	-	1,487,000	16,051,455.70	492,888.20	16,544,343.90
01/01/2027	910,000.00	5.000%	573,500	-	1,483,500	15,141,455.70	580,636.00	15,722,091.70
01/01/2028	960,000.00	5.000%	528,000	-	1,488,000	14,181,455.70	669,886.65	14,851,342.35
01/01/2029	1,005,000.00	5.000%	480,000	-	1,485,000	13,176,455.70	760,698.40	13,937,154.10
01/01/2030	1,055,000.00	5.000%	429,750	-	1,484,750	12,121,455.70	853,071.25	12,974,526.95
01/01/2031	1,110,000.00	5.000%	377,000	-	1,487,000	11,011,455.70	947,051.80	11,958,507.50
01/01/2032	961,660.90	1.610%	321,500	203,339.10	1,486,500	10,049,794.80	839,324.25	10,889,119.05
01/01/2033	939,094.85	1.670%	321,500	225,905.15	1,486,500	9,110,699.95	691,858.55	9,802,558.50
01/01/2034	915,969.60	1.730%	321,500	249,030.40	1,486,500	8,194,730.35	503,116.90	8,697,847.25
01/01/2035	893,671.50	1.780%	321,500	271,328.50	1,486,500	7,301,058.85	272,901.25	7,573,960.10
01/01/2036	871,058.85	1.830%	321,500	293,941.15	1,486,500	6,430,000.00	-	6,430,000.00
01/01/2037	1,165,000.00	5.000%	321,500	-	1,486,500	5,265,000.00	-	5,265,000.00
01/01/2038	1,220,000.00	5.000%	263,250	-	1,483,250	4,045,000.00	-	4,045,000.00
01/01/2039	1,285,000.00	5.000%	202,250	-	1,487,250	2,760,000.00	-	2,760,000.00
01/01/2040	1,345,000.00	5.000%	138,000	-	1,483,000	1,415,000.00	-	1,415,000.00
01/01/2041	1,415,000.00	5.000%	70,750	-	1,485,750	-	-	-
	20,001,455.70		9,241,750	1,243,544.30	30,486,750			

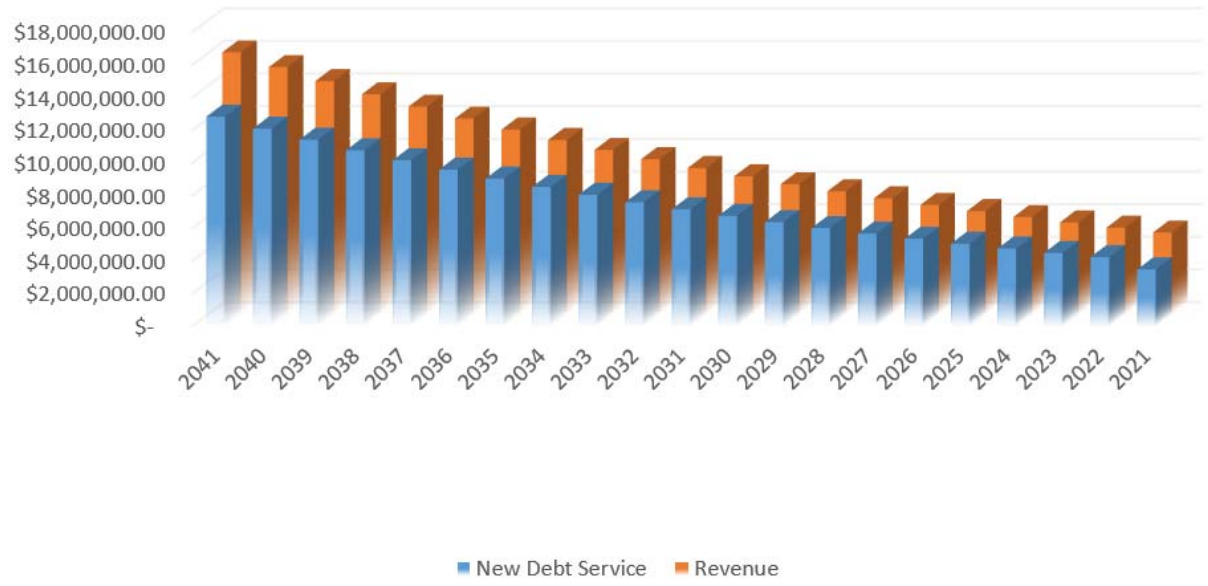
********* ADVANCED ANALYSIS IV *********

❖ BOND CAPACITY - COVERAGE RATIO

In previous analyses, you have gotten a "feel" (hopefully) for what the approximate bond issue size required to fund the project for ABC County will be. The county also has some projects which it would like to fund in addition to the current one. The analyses you have done have been reviewed by the county and the resulting debt service payments are well below their projected revenues. For this analysis, you have been given ABC County's revenue projections and told to find out how much it can borrow based on a specific coverage ratio requirement. Coverage refers to the ratio of revenues to debt service. For example, if annual revenues are $12,000,000 and annual debt service is $8,000,000, the coverage ratio is 1.50:1 (commonly referred to as "1.50 times" coverage).

In the example below, you can see that the debt service in a given year is always proportional to the total revenues projected for that year at an assumed ratio of 1.25:1 (1.25% coverage).

EXAMPLE



❖ ASSUMPTIONS

Revenues starting in Fiscal Year 2020 (12/31/20) are expected to be $5,000,000 and growth is projected to be 6% annually. Coverage must equal 1.25 as the issuer would like to maximize what they can borrow given their coverage requirement.

You must have the TUTORIAL datafile loaded and have series 2020 open.

* **Click on WINDOW in the PROGRAM menu and select the 2020 series and click on SAVE AS in the FILE menu. Type "2020FILL" (short name) and "2020 New Money - Bonding Capacity" (long name). Click OK. This will save a copy of series 2020 as 2020FILL.**

* **Go to the DATA menu and select ADDITIONAL INFORMATION - REPORTING OPTIONS. Go to the ADDITIONAL TITLES section. Delete the title by pressing the DELETE key. Add "Fill Solution" as the new title. Click OK.**

❖ FILL SOLUTION CALCULATION

Before you begin, let's do a simple fill solution by hand. Assume you have revenues of $1,000,000 every year for the next three years and would like to know how much you could borrow so that your coverage ratio (ratio of revenues to debt service) is always 125%. The current interest rate is 6%.

1. Compute the dollar amount actually available to pay debt service.

Year	Revenue	Maximum D/S Possible that doesn't exceed 125%	Actual D/S limit
2021	$1,000,000		$800,000
2022	$1,000,000	Revenue = Maximum D/S	$800,000
2023	$1,000,000	1.25	$800,000

2. "Fill" up the D/S limit by amortizing debt starting on the last date. Round to the nearest dollar.

Year	Actual D/S limit	Less Prior Cum. Int.	Net Avail. Rev.	Divided by rate	Par	x	Rate	Interest for this maturity	Cum. all Interest
2023	$800,000	-	$800,000	/1.06	$754,717		.06	$45,283	$45,283
2024	$800,000	$45,283	$754,717	/1.06	$711,997		.06	$42,720	$88,003
2025	$800,000	$88,003	$711,997	/1.06	$671,695		.06	$40,302	$128,305

3. The total of the par amounts above equal the amount you can borrow in this situation.

$754,717 + 711,997 + 671,695 = $2,183,409

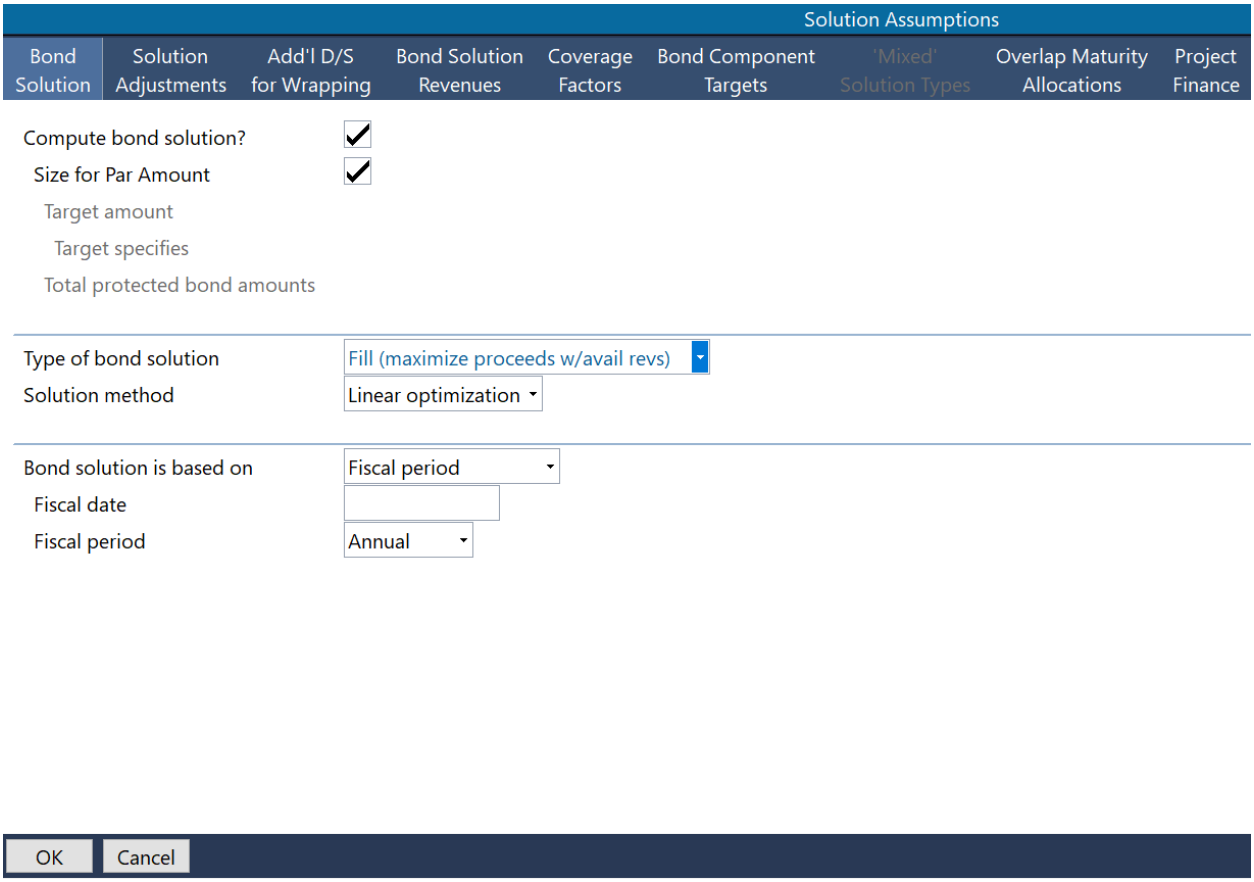
4. The debt service for this loan would look as follows:

Year	Par	2023 Bond Interest	2022 Bond Interest	2021 Bond Interest	Total Debt Service
2021	$671,695	$45,283	$88,003	$128,305	$800,000
2022	$711,997	$45,283	$88,003		$800,000
2023	$754,717	$45,283			$800,000

❖ BOND SOLUTION ASSUMPTIONS - FILL SOLUTION

In this example, the debt service in every year is constrained to not exceed 80% (inverse of 1.25/1) of the revenues available in that year. How much the issuer gets will be based on how much of the revenue available is used up by the interest portion of debt service (the higher rates are, the lower the par amount will be).

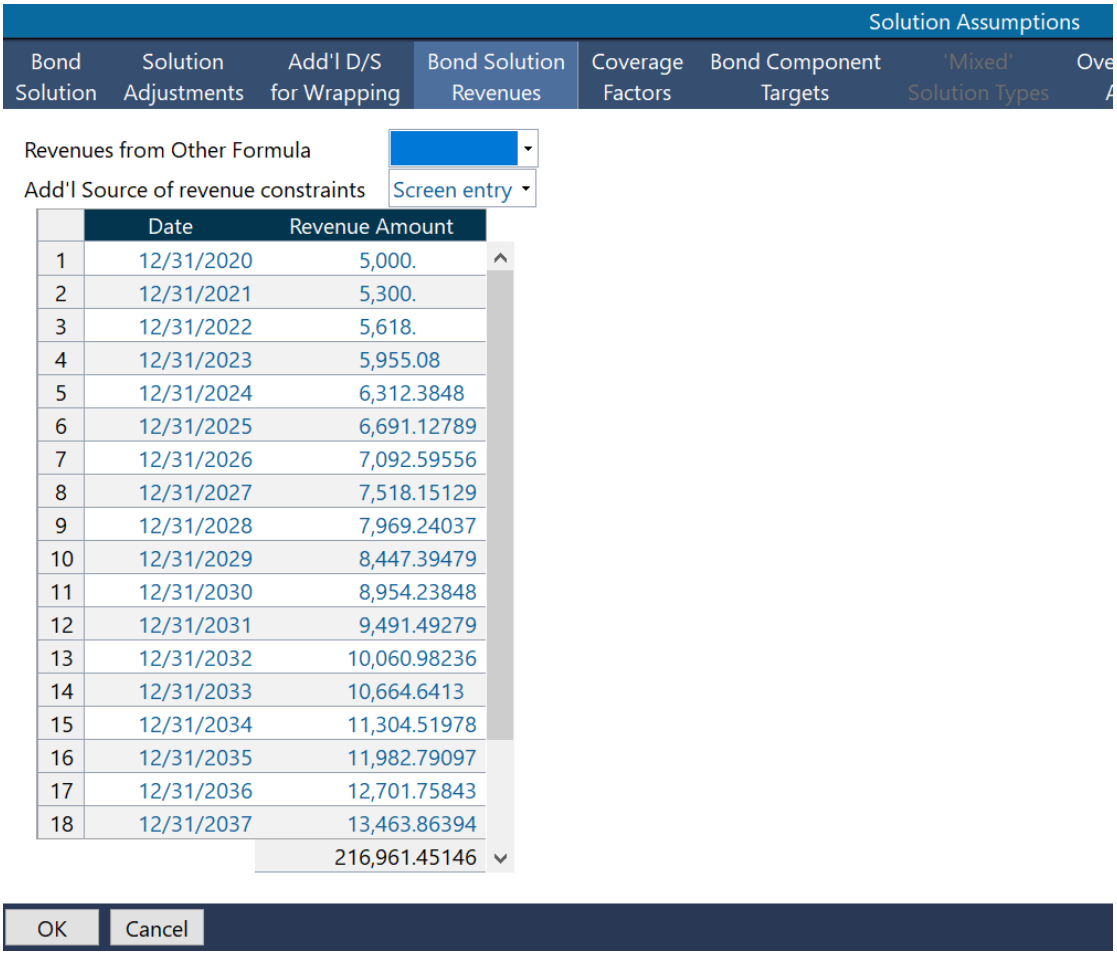
* **Go to SOLUTION ASSUMPTIONS - SETUP.**



* **In the BOND SOLUTION dialog, set TYPE OF BOND SOLUTION to FILL (MAXIMIZE PROCEEDS W/AVAIL REVS). Click on the BOND SOLUTION REVENUES tab.**

❖ BOND SOLUTION ASSUMPTIONS - REVENUE

This dialog permits manual entry of the revenue amounts as well as entry by **COPY** and **PASTE** command in the **F5** function.



* **Set the " Add'l SOURCE OF REVENUE CONSTRAINTS" to SCREEN ENTRY (you can type "S"). Enter the revenue constraints based on the Assumptions given on page 142.**

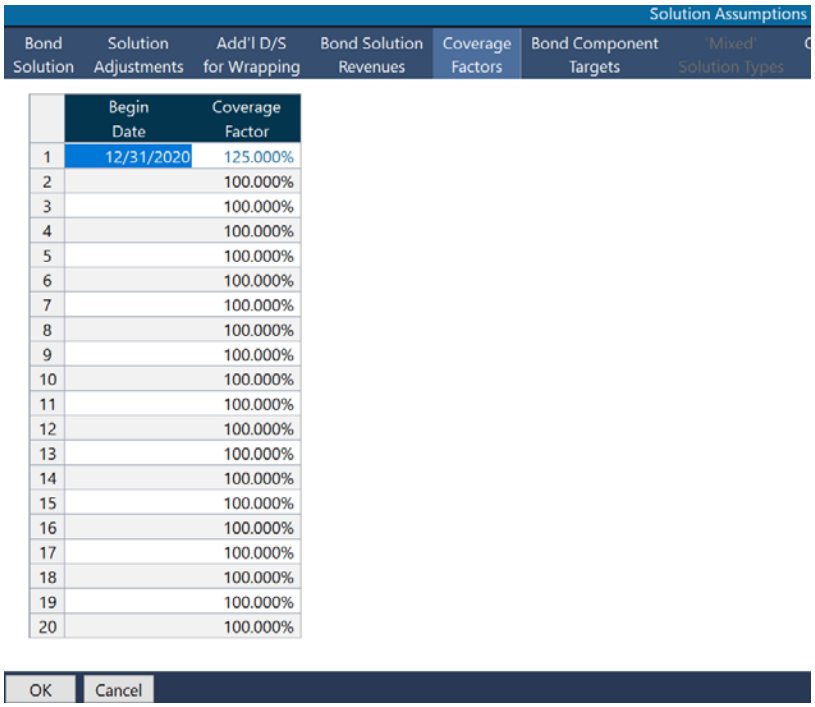
The following commands will save you time:

F5 - ENTER DATES - use this to enter the annual dates (there should be revenue entered for all the years in which you are potentially amortizing bonds - HINT - 2041 is the last year in which debt is amortized).

F5 - COPY DOWN - use to copy coverage ratio and increase revenue amount (multiply by 1.06). Remember that **COPY COUNT** should be left blank to execute the command all the way down the column.

❖ BOND SOLUTION ASSUMPTIONS - COVERAGE FACTORS

This dialog permits manual entry of the coverage factor required. The coverage factor is always defaulted to 100%. In all revenue constraint-driven solutions (Fill, Fill & Carry, Uniform, Proportional, Accelerated, Deferred and Deferred & Carry) DBC uses the coverage factor to compute the revenues actually available for use towards debt service. The Bond Solution report shows the actual coverage computed.



* **Click on the COVERAGE FACTOR tab. Go to the first cell in the DATE column and enter the first fiscal date (12/31/2020) and the coverage factor. You only need to enter additional fiscal dates if the coverage factor changes over time.**

* **Save the series then click on the CALCULATE button. When complete, print the following reports: Sources & Uses, Bond Debt Service (annual, summary) and Bond Solution. Refer to page 79 for instructions.**

NOTE

1. DBC will take the amounts in the revenue column and divide them by the coverage factor. The resulting amounts make up the revenue available for paying debt service. Depending on which solution type you have selected, the program will use the available revenue amounts accordingly.
2. Pay special attention to the Bond Solution report. Check that the solution does not violate the 1.25x coverage requirement. Notice that the coverage for fiscal 21 exceeds the 1.25x requirement. This is because there is no par amortized in fiscal 2021 due to the construction period and is acceptable for that reason.
3. You will have a positive amount for Additional Proceeds. This is because you are computing the bond size without giving consideration to the total dollar amount of your requirements. Remember that we are assuming that the issuer has other projects to fund. If you wish to eliminate the positive number, you can enter the additional amount of the proceeds as a use of funds (make up a name for the use) in the **OTHER USES** input (see page 70).

SOURCES AND USES OF FUNDS

ABC County
2020 New Money - Bond Capacity
Fill Solution

Dated Date	01/01/2020
Delivery Date	01/15/2020

Sources:

Bond Proceeds:	
Par Amount	96,269,245.60
Accrued Interest	140,787.50
Premium	31,046,681.15
	127,456,714.25
Other Sources of Funds:	
Issuer Contribution	150,000.00
	127,606,714.25

Uses:

Project Fund Deposits:	
Road Repair Fund	25,829,924.89
Other Fund Deposits:	
Debt Service Reserve Fund	9,505,725.96
Capitalized Interest Fund	5,197,647.37
	14,703,373.33
Delivery Date Expenses:	
Cost of Issuance	250,000.00
Underwriter's Discount	1,010,827.07
Insurance for Term Bond	483,595.00
	1,744,422.07
Other Uses of Funds:	
Additional Proceeds	85,328,993.96
	127,606,714.25

This number is what is left over after adding up all the uses and deducting them from the total sources. It is greater than $4,999.99 (maximum rounding given $5,000 denomination par bonds) because the solution does not take into account the uses of funds when computing the par amount. The number could just as easily have been a negative if you had entered in more uses than the revenue could support.

Note: Capitalized Interest Fund includes deposit of 140,787.50 of bond accrued interest.

BOND DEBT SERVICE

ABC County
2020 New Money - Bond Capacity
Fill Solution

Dated Date 01/01/2020
Delivery Date 01/15/2020

Period Ending	Principal	Coupon	Interest	Compounded Interest	Debt Service	Bond Balance	Accreted Interest	Total Bond Value
01/01/2021	-	-	3,620,250	-	3,620,250	96,269,245.60	398,524.45	96,667,770.05
01/01/2022	615,000.00	5.000%	3,620,250	-	4,235,250	95,654,245.60	820,139.10	96,474,384.70
01/01/2023	900,000.00	5.000%	3,589,500	-	4,489,500	94,754,245.60	1,249,130.60	96,003,376.20
01/01/2024	1,215,000.00	5.000%	3,544,500	-	4,759,500	93,539,245.60	1,685,600.00	95,224,845.60
01/01/2025	1,565,000.00	5.000%	3,483,750	-	5,048,750	91,974,245.60	2,129,669.40	94,103,915.00
01/01/2026	1,945,000.00	5.000%	3,405,500	-	5,350,500	90,029,245.60	2,581,471.00	92,610,716.60
01/01/2027	2,365,000.00	5.000%	3,308,250	-	5,673,250	87,664,245.60	3,041,186.65	90,705,432.25
01/01/2028	2,820,000.00	5.000%	3,190,000	-	6,010,000	84,844,245.60	3,508,807.30	88,353,052.90
01/01/2029	3,325,000.00	5.000%	3,049,000	-	6,374,000	81,519,245.60	3,984,662.05	85,503,907.65
01/01/2030	3,875,000.00	5.000%	2,882,750	-	6,757,750	77,644,245.60	4,468,746.40	82,112,992.00
01/01/2031	4,470,000.00	5.000%	2,689,000	-	7,159,000	73,174,245.60	4,961,283.80	78,135,529.40
01/01/2032	4,230,482.50	1.610%	2,465,500	894,517.50	7,590,500	68,943,763.10	4,567,898.25	73,511,661.35
01/01/2033	4,497,982.20	1.670%	2,465,500	1,082,017.80	8,045,500	64,445,780.90	3,912,908.85	68,358,689.75
01/01/2034	4,768,545.60	1.730%	2,465,500	1,296,454.40	8,530,500	59,677,235.30	2,957,488.35	62,634,723.65
01/01/2035	5,043,682.50	1.780%	2,465,500	1,531,317.50	9,040,500	54,633,552.80	1,667,860.00	56,301,412.80
01/01/2036	5,323,552.80	1.830%	2,465,500	1,796,447.20	9,585,500	49,310,000.00	-	49,310,000.00
01/01/2037	7,695,000.00	5.000%	2,465,500	-	10,160,500	41,615,000.00	-	41,615,000.00
01/01/2038	8,690,000.00	5.000%	2,080,750	-	10,770,750	32,925,000.00	-	32,925,000.00
01/01/2039	9,770,000.00	5.000%	1,646,250	-	11,416,250	23,155,000.00	-	23,155,000.00
01/01/2040	10,940,000.00	5.000%	1,157,750	-	12,097,750	12,215,000.00	-	12,215,000.00
01/01/2041	12,215,000.00	5.000%	610,750	-	12,825,750	-	-	-
	96,269,245.60		56,671,250	6,600,754.40	159,541,250			

BOND SOLUTION

ABC County
2020 New Money - Bond Capacity
Fill Solution

Period Ending	Proposed Principal	Proposed Debt Service	Debt Service Adjustments	Total Adj Debt Service	Revenue Constraints	Unused Revenues	Debt Serv Coverage
01/01/2021	-	3,620,250	(140,788)	3,479,463	5,000,000	1,520,538	143.70036%
01/01/2022	615,000	4,235,250	-	4,235,250	5,300,000	1,064,750	125.14019%
01/01/2023	900,000	4,489,500	-	4,489,500	5,618,000	1,128,500	125.13643%
01/01/2024	1,215,000	4,759,500	-	4,759,500	5,955,080	1,195,580	125.11987%
01/01/2025	1,565,000	5,048,750	-	5,048,750	6,312,385	1,263,635	125.02867%
01/01/2026	1,945,000	5,350,500	-	5,350,500	6,691,128	1,340,628	125.05612%
01/01/2027	2,365,000	5,673,250	-	5,673,250	7,092,596	1,419,346	125.01821%
01/01/2028	2,820,000	6,010,000	-	6,010,000	7,518,151	1,508,151	125.09403%
01/01/2029	3,325,000	6,374,000	-	6,374,000	7,969,240	1,595,240	125.02730%
01/01/2030	3,875,000	6,757,750	-	6,757,750	8,447,395	1,689,645	125.00307%
01/01/2031	4,470,000	7,159,000	-	7,159,000	8,954,238	1,795,238	125.07667%
01/01/2032	4,230,483	7,590,500	-	7,590,500	9,491,493	1,900,993	125.04437%
01/01/2033	4,497,982	8,045,500	-	8,045,500	10,060,982	2,015,482	125.05105%
01/01/2034	4,768,546	8,530,500	-	8,530,500	10,664,641	2,134,141	125.01778%
01/01/2035	5,043,683	9,040,500	-	9,040,500	11,304,520	2,264,020	125.04308%
01/01/2036	5,323,553	9,585,500	-	9,585,500	11,982,791	2,397,291	125.00956%
01/01/2037	7,695,000	10,160,500	-	10,160,500	12,701,758	2,541,258	125.01116%
01/01/2038	8,690,000	10,770,750	-	10,770,750	13,463,864	2,693,114	125.00396%
01/01/2039	9,770,000	11,416,250	-	11,416,250	14,271,696	2,855,446	125.01212%
01/01/2040	10,940,000	12,097,750	-	12,097,750	15,127,998	3,030,248	125.04803%
01/01/2041	12,215,000	12,825,750	-	12,825,750	16,035,677	3,209,927	125.02721%
	96,269,246	159,541,250	(140,788)	159,400,463	199,963,633	40,563,171	

Coverage is as close to 125% as it can get given that the bonds are sold in $5,000 chunks. It would only be able to match the 125% exactly IF the revenues were exactly 125% of debt service. This would only be possible if the bonds were in denominations of a penny.

The 2021 coverage amount is based on an interest-only period and is, therefore, not part of the solution.

********* ADVANCED ANALYSIS V *********

❖ BATCH RUNS

You have now run five variations of the same analysis. You have had to load each file, run each file, and print the results of each run - ONE BY ONE. The **BATCH RUNS** feature in the **CALCULATE MENU** facilitates this process by allowing you to save a written "command" to calculate specific series and print report packets for each. The batch runs are very much like a macro because they automate your tasks.

In doing the sizings for ABC County, we have done a total of five runs. Using the **BATCH RUNS**, we will define parameters such that the five sizings will be run automatically and the selected report packet will be printed for each of the analyses. The benefit to this is that it enables you to run a large number of series without loading, running, and printing them one by one. In addition, this is useful for ongoing transactions where you have to run the same analyses on a regular basis. You can update and save each individual series for things such as dated and delivery date, and scale then go to **BATCH RUNS** and execute all the series at once.

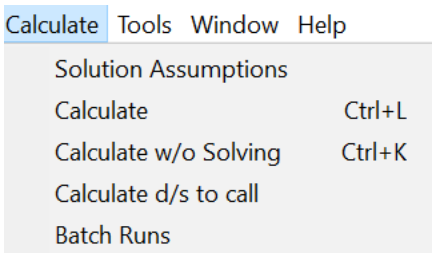
* **In 2020FILL, create a report packet called NEWMONEY (see page 83) with the following reports. Select the reports in the PRINT menu, click on PACKETS - SAVE. Enter the short name (NEWMONEY) and any long name. Click OK. Close the print menu by pressing ESC.**

Sources and Uses
Bond Solution

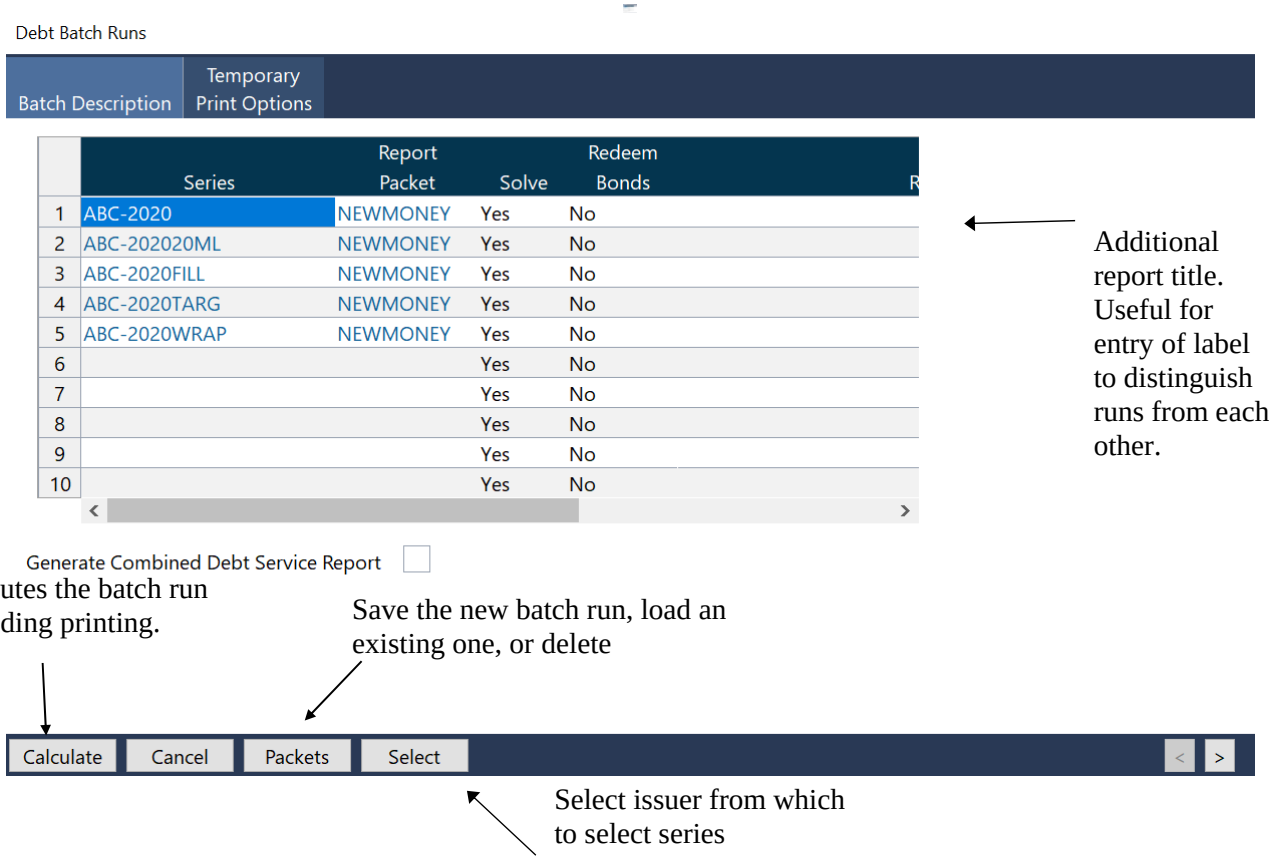
NOTE - DBC has advanced features which enable you to "link" multiple series to one template series for purposes of easily updating the dates, structure, scale, project, and reserve fund assumptions. This will not be reviewed here but can be found in **DATA - ADDITIONAL INFORMATION - AUTOMATIC UPDATES**. Once there, use **F1** to access **HELP** and also look in the **FAQ** tab for a **BOND QUESTIONS** topic called "How do I copy bond information using Template series?"

❖ CALCULATE MENU - BATCH RUNS

Batch runs give the system the commands to run cash flows for one or several series and print reports as well. This sequence of commands can, like a report packet, be named and saved for later use. Use a name for the batch runs that reflects the type of analysis you are doing or which issuer's debt you are analyzing.



* **Go to the CALCULATE menu and select BATCH RUNS.**

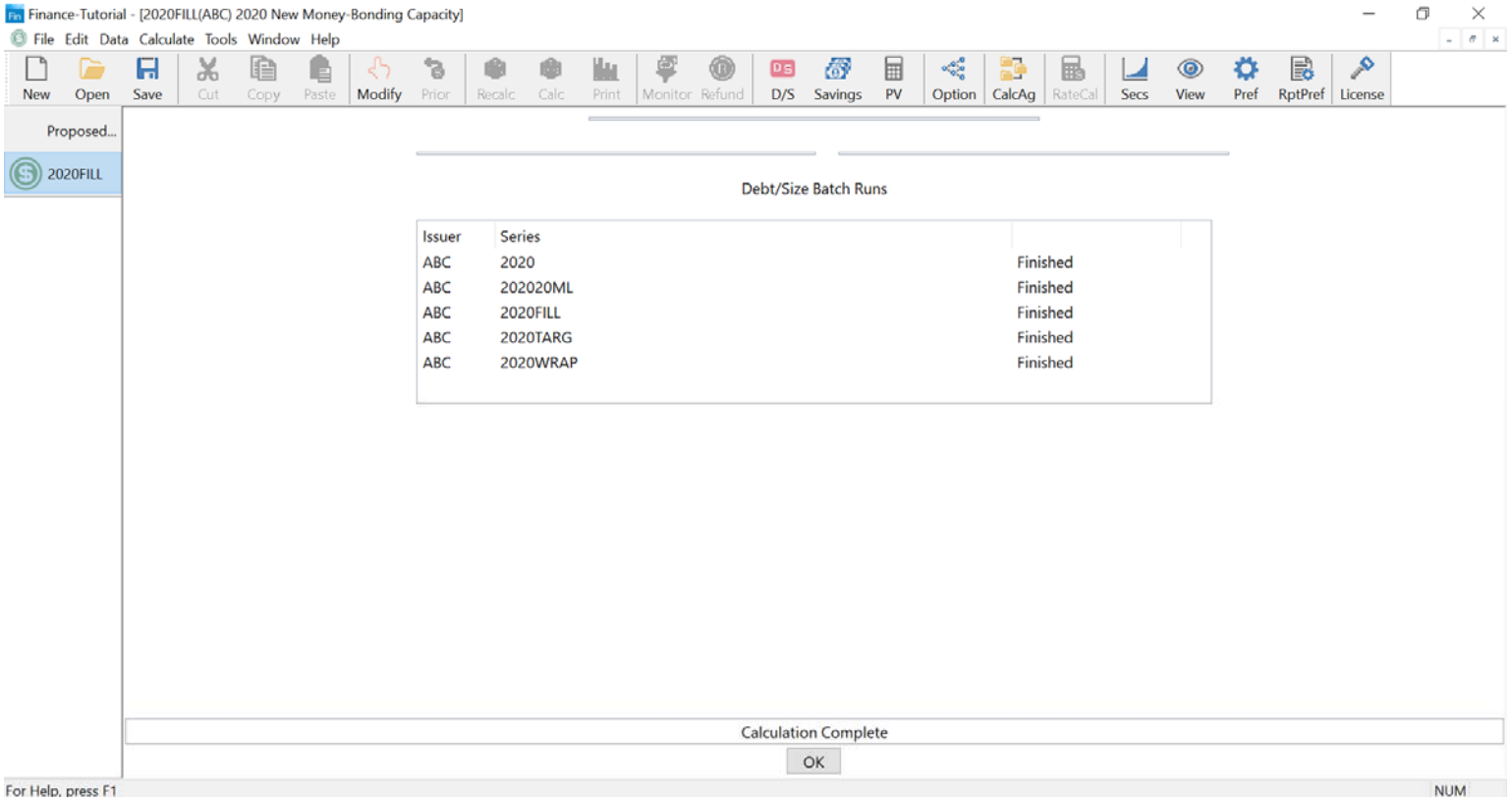


* **Double click on the first cell in the SERIES column. Select each of the new money series in a separate row (except 2016). The series list is a function of the current issuer when BATCH RUN was selected. Also select the report packet you created earlier (NEWMONEY) and use F5 to copy it to the next 4 rows.**

NOTE - To save paper by not printing these reports, do not include the report packet in the batch run. If you have already done so, delete the first report packet then copy the empty cell.

The runs will be computed in sequence and the report packets will print out after each series is computed. You will end up with a replica of the five analyses you just ran.

* **Click on the CALCULATE button to begin the calculation.**



* **Click on OK when complete.**

APPENDICES

The following appendices are useful for future reference. We strongly urge you to copy these pages and keep them handy. They are listed below.

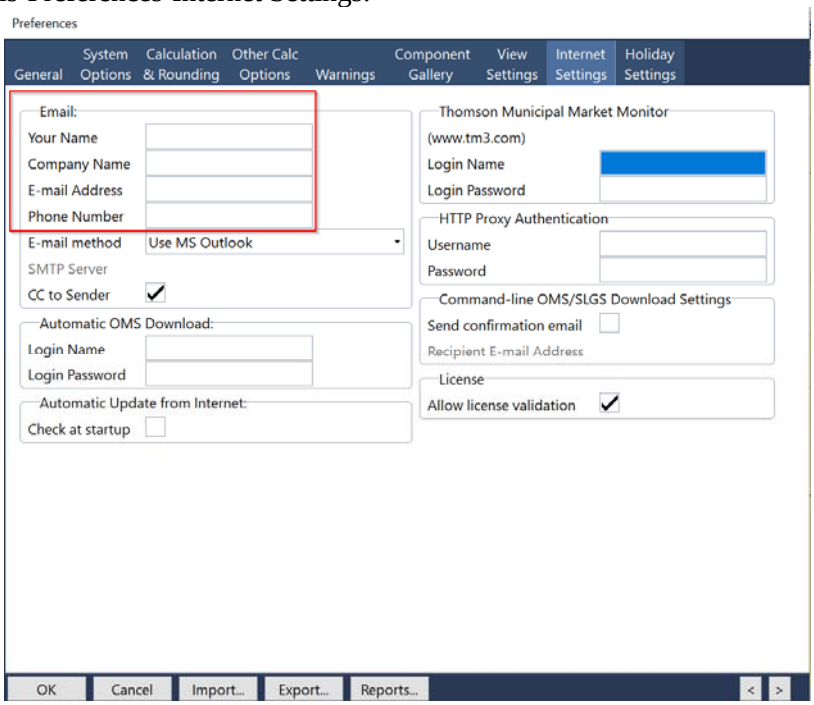
Product Support Numbers
DBC Finance Outline
Navigation Keys
Allowable Expense Terms
Allowable Reserve Fund Terms

❖ PRODUCT SUPPORT

At DBC, we are working hard to provide our clients with intuitive analytical products. Additionally, we try to provide superior online documentation and tutorials to enable you to work independently in structuring municipal bond issues. However, should you find yourself with a technical question that you cannot answer with the provided tools, please contact our Technical Support Group. Support is available from 9:00 am-6:00 pm ET, Monday to Friday.

Help-Email Data to DBC

The most efficient way of contacting DBC Finance support is to go to Help-Email Data to DBC from within the program. The support staff will receive a copy of your Issuer and will see exactly what you are seeing when you send the file. Response emails will be sent as quickly as possible at the e-mail address provided in Tools-Preferences-Internet Settings:



Telephone & General Email

For non-file specific questions or problems, you can also email dbcsupport@sscinc.com email or call the *DBC Finance* Technical Support line at 646.213.7198

WEB SITE

We post general support information as well as interim update information at are website at the link below:

http://www.dbcinc.com/support/

DBC Finance
Debt/Size Outline

File	Edit	Data	Calculate	Tools	Window	Help
New	**Cut**	**Debt/Size Assumptions** General Information Cost of Issuance Detail Underwriter's Discount Advanced General Arb Yield Adjustments Other Options	**Solution Assumptions** Bond Solution Solution Adjustments Additional D/S for Wrapping Bond Solution Revenues Coverage Factors Bond Solution Targets Mixed Solution Type Overlap Maturity Alloc Project Finance	**Preferences** General System Options Calculation & Rounding Other Calc Options Project Finance Component Gallery View Settings	**Cascade**	**Contents & Index**
Open	**Copy**	**Bond Components** General Information Maturity Structure Advanced General Variable Rate Int Table Multi-mode Table Assumed Call Dates Other	**Calculate**	**Import Data** Import DDL File Import Bonds (DDL)	**Tile**	**Tutorials**
Close	**Paste**	**Project Funds** General Information Project Draws Advanced Variable Rate Int Table	**Calculate w/o Solving**	**Export Data** Export DDL File	**Arrange Icons**	**Internet Resources**
Save		**Reserve/Cap Int** General Information Requirements/Draw Advanced Variable Rate Int Table	**Calculate D/S to Call**	**Merge Datafile**		**Email Data to DBC**
Save As		**Expenses** Expense Description Expense Formula	**Batch Runs** Batch Descriptions Temporary Print Options	**Compact Datafile**		**About DBC Finance**
Open Datafile		**Call Provisions** Call Tables Call Provisions		**Directory of Datafile**		
Close Datafile		**Additional Information** Reporting Options Automatic Updates Other Sources Other Uses Refund Escrows Other D/S Series Variable Rate Table Tax Levy Other Formulas		**PV Calculator**		
Save All				**Savings Calculator**		
CalcAgent				**Premium CAB Calculator**		
EZAgent				**Debt Service Calculator**		
OMS File				**Component Gallery**		
SLGS File				**Update Registry**		
Coupon File				**Install OMS Files**		
DRL File				**Create DFX File**		
Print						
Print Setup						
Exit						

❖ PRIMARY NAVIGATION KEYS

Escape	Escape key aborts all changes and returns to the previous dialog
ENTER	Chooses the highlighted selection, or stores inputs into a cell
Home or End	Move to top of column in a grid, or the beginning of an input cell or formula
Double Click or Shift -?	Brings up a list box of all choices for a multiple-choice prompt
Spacebar	Cycles through all choices for a multiple-choice prompt
a,b,c,d ...	In cells with dropdown options: goes to the first choice that begins with the letter or number that was typed
Insert	Begin "Edit" mode for the current cell; alternates between typeover and insert mode while editing data in a cell
Delete	Delete the current component or character
< or >	Moves to the previous dialog or the next dialog
F9	Accept the inputs/changes in the current dialog and move back to the previous input dialog
F10	Accept the inputs/changes in the current dialog and move on to the next input dialog
ADVANCED or F8	Display the Advanced dialog menu, if any
Right Mouse Click or F5	Cut, copy, and paste data, modify data, insert/delete/append lines Protect or Unprotect data (Unprotected=system can override with a calc'd value) Enter dates creates a grid with a start date, end date and frequency Total all the values in a column of a grid
F1	On Line Help utility and index--(context sensitive)
F11	Zoom In on input screens and in Access reports.
F12	Zoom out on input screens and in Access reports.

Alt-F	Go to File Menu
Alt-E	Go to Edit Menu
Alt-D	Go to Data Menu
Alt-C	Go to Calculate Menu
Alt-T	Go to Tools Menu
Alt-W	Go to Window Menu
Alt-H	Go to Help Menu

❖ ALLOWABLE EXPENSE TERMS

****Dollar amounts are entered in formulas in dollars and cents, NOT in thousands!**
Commas can separate digits in a dollar value: "1,000,000" is accepted.
Multiple formula lines are evaluated and ADDED together unless Lesser of|Greater of comes before them.
Comments can be entered by beginning line with "#"
Formulas can be up to 180 characters long [version 2.2] but system will not display all at one time.
The INSERT key starts the formula edit mode, and CONTROL+B blanks out a formula line.
Simplest expense is a date followed by a dollar amount:
"1/1/22 125,217.15"
Bond Insurance expenses
[Total] [Adjusted] Bond Interest at xxx% [from mm/dd/yy] [to mm/dd/yy]
(Adjusted means net of accrued interest--use only when accrued int is retained in gen fund)
[y% of] [Total] [Adjusted] Debt Service at xxx% [from mm/dd/yy] [to mm/dd/yy]
Partial Bond Insurance only on insured bond components using short name of component
X% of Total [adjusted] debt service [at Y%] [of SERIALS]
X% of Total [adjusted] debt service [at Z%] [of TERM2025]
Greater of and Lesser of for upfront or ongoing expenses
Lesser of|Greater of|Maximum of|Minimum of
.25% of bond value paid annual starting 1/1/21
10000 paid annual starting 1/1/24
20000 paid semiannual for XX months|days|years
End (optionally shows the end of choices so additional lines can be added after the conditional)
"Aggregate", "Series Aggregate", and "Related" can refer to Par, Discount, Premium, Accrued Interest, Proceeds, Principal, Debt Service, Bond Interest
"Related" refers to other Series in the same Bond Solution Group in Project Finance
"Aggregate" means current series value plus 'Other D/S'
"Series Aggregate" means the current series value plus 'Other D/S' only in the current series of a Project Finance component.
Refunding formulas: "Prior Bond Value", "Prior Par", "Escrow Cost", "Prior Debt Service"
"Adjusted" can be put in front of Debt Service to mean DS less Accrued Interest on the first Interest Payment Date.
Parenthesis can be used to clarify algebraic expressions
Several mathematical operators can be used in an expression
0.125 * (132/360) * par amount
par amount + accrued - discount
Expenses can be paid 'in advance', 'in arrears' or 'as of date'
Default is in arrears (which is defined as the average balance of the prior period)
Surety bond expense
X% of Maximum annual debt service [from mm/dd/yy] [to mm/dd/yy]
LOC fee definitions
.35% of bond value paid annual in advance
.35% of xxx days of interest at x.x% paid annual in advance
Frequencies allowed:
paid every xx (months, days, years)
paid when interest pays
paid (annual [ann], semiannual [sem], monthly [mon], quarterly [qtr], bimonthly [bim])
An expense can be computed as the PV of a future cash flow, paid at delivery from bond proceeds
PV at arbitrage yield of (put on 1st line, and the 2nd formula line will be PV'd to delivery date)
PV at X% of

You can change the expense and interest day count basis for computing periodic expenses:
    Basis Act/Act|30/360|Act/360|Act/365
You can round expense amounts to a dollar value
    Round [up|down] to 1,000
You can change the payment dates of an expense:
    Align to xx/xx/xx
    (Default is the fiscal date)
Expenses can be paid starting whenever and ending whenever, regardless of fiscal date, including expenses paid *before* the bond delivery date.
    10000 paid annual starting 6/15/21 through 6/15/27
    X% of bond value paid quarterly for XX months|days|years

❖ ALLOWABLE RESERVE FUND TERMS

Balance Requirements (such as for a debt service reserve fund)**:**

Simplest is a dollar amount
    10,000,000
Parity Reserve Funds: compute the amount to be added based on existing reserve fund and existing bonds specified in 'Other D/S'
    Maximum Annual Aggregate Debt Service - 5,000,000
Drawdown reserves
    add "Drawdown" on a separate line after the Balance Requirement formula
Comments can be entered by beginning line with "#"
"Aggregate", "Series Aggregate" and "Related" can refer to Par, Discount, Accrued Interest, Proceeds, Principal, D/S
Parenthesis can be used to clarify expressions
Several mathematical operators can be used in an expression
    0.125 * (132/360) * par amount
    par amount + accrued - discount
Reserve fund calculations can be based on other than the fiscal date
    max annual d/s after 5/31/25 (period would be 6/1 to 5/31)
    max annual d/s starting 6/1/25 (period would be 6/1 to 5/31)
Round [up/down] to <dollar amount>

Draw Requirements (such as for Capitalized Interest Funds)

Gross bond interest (all full interest payments) thru a date:
    Bond interest through 1/1/21
Gross bond interest (all full interest payments), less Accrued Interest thru a date:
    Adjusted Bond Interest through 1/1/21
Partial all full coupons thru a date PLUS accrued bond interest as of that date:
    [Adjusted] Bond Interest **accrued through** 3/15/22
Capitalizing a specified percentage of bond interest
    X% of [adjusted] Bond Interest [accrued] through 1/1/21
Capitalizing ongoing expenses through a certain date
    Expenses through 1/1/97
    100,000 paid semiannual through 1/1/25