City of Riverside

WASTEWATER COLLECTION AND TREATMENT FACILITIES INTEGRATED MASTER PLAN

VOLUME 11: FINANCIAL PLAN AND USER RATES AND FEES
CHAPTER 3: MASTER PLAN MANAGER™ HELP MENU

FINAL
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Engineers...Working Wonders With Water™

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City of Riverside

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Chapter 3

MASTER PLAN MANAGER™ HELP MENU

3.1 PURPOSE

The City of Riverside (City) is in the process of completing their Wastewater Collection and Treatment Facilities Integrated Master Plan (2006-2025) (Integrated Master Plan). One of the deliverables is the Master Plan Manager™ (MPM™) software application that has been used in the development of the Integrated Master Plan. MPM™ contains a Help Menu that can be used by staff in the future as questions arise about the operation of MPM™. In addition to a tutorial session, the purpose of this chapter is to provide some basic guidelines for using the Help Menu.

3.2 CONCLUSIONS

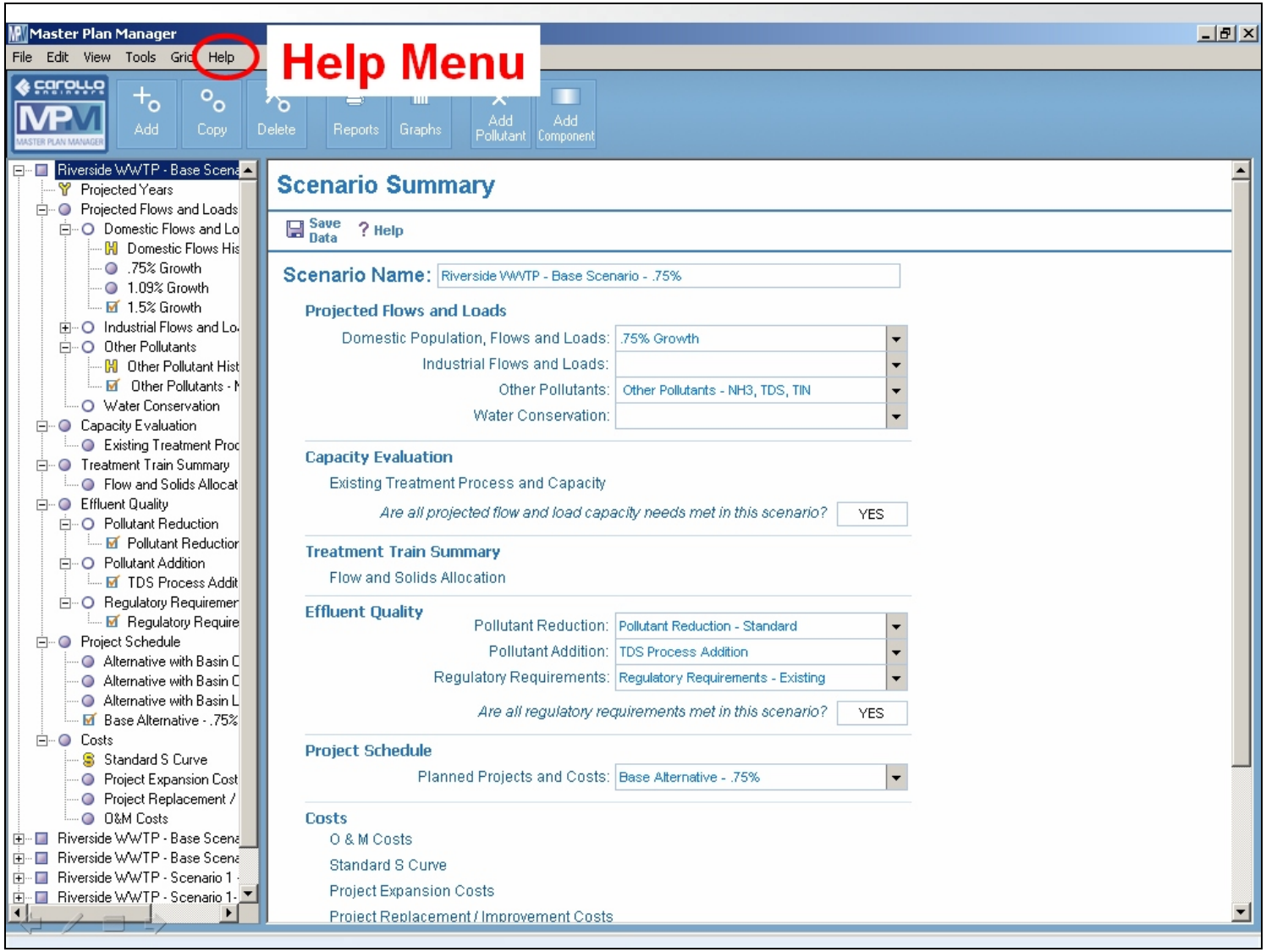
The MPM™ Help Menu will aid the City in the use of MPM™ and help provide information for questions that might arise. The complete Help Menu is provided in Appendix A for further detail.

3.3 GENERAL FUNCTIONALITY AND USE

MPM™'s Help Menu is located at the very top left-hand corner as part of the toolbar, as shown in Figure 3.1. When the user clicks on Help, they have three choices: About Master Plan Manager™, Contents, and Index. If the user clicks About Master Plan Manager™, the version number and logo are displayed as shown in Figure 3.2.

If the user clicks Content, the screen as shown in Figure 3.3 is displayed. There are three tabs on the Help Menu: Contents, Index, and Search. Under Contents, there are several options:

- Welcome to MPM™ 2.0.
- Getting Started.
- Overview.
- Data.
- Toolbars.
- Major Components.
- Pollutants.
- Database.
- Reports.
- Graphs.



MASTER PLAN MANAGER™ OVERVIEW

FIGURE 3.1

Welcome to MPM™ provides basic introductory and methodology information to the user. The Getting Started section provides specific information about how to install MPM™ and the requirements for the user's computer in order to support the MPM™ application. The Overview section discusses general data entry.

The Data section provides the detailed functionality information specific to each screen of the software and how data is connected, which data is required, and how the user can make modifications. The Data section has specific information listed for the screens:

- General Data Entry.
- Scenario Summary.
- Projected Years.
- Projected Flows and Loads:
  - Domestic Flows and Loads (projected and historical).
  - Industrial Flows and Loads (projected and historical).
  - Other Pollutants (projected and historical).
  - Water Conservation.
- Capacity Evaluation.
- Existing Treatment Process.
- Treatment Train Summary.
- Flow and Solids Allocation.
- Effluent Quality:
  - Pollutant Reduction.
  - Pollutant Addition.
  - Regulatory Requirements.
- Project Schedule.
- Planned Projects and Costs.
- Costs:
  - Standard S-Curve.
  - Project Expansion Costs.
  - Project Replacement/Improvement Costs.
  - O&M Costs.

The Toolbars section provides the user with information on the various toolbars in MPM™. The Major Components and Pollutants sections discuss those topics, respectively. The

Database portion provides database-specific information. The Reports and Graphs sections explain MPM™'s functionality for developing reports and graphs.

If the user selects the Index tab, a list of topics is displayed, and the user can display information by topic, as shown in Figure 3.4. The user can also select the Search tab, type in a word, and MPM™ will display the topics associated with that word that the user can then display, as shown in Figure 3.5.

Appendix A

MPM™ HELP MENU

WELCOME TO MPM 2.0 - INTRODUCTION AND METHODOLOGY

Introduction

The master planning process involves developing wastewater flow and pollutant load projections, often based on population, for the desired planning time frame. These projections are then compared with existing facilities or those that are in the midst of construction in order to determine where and when treatment capacity needs will be greater than the available capacity. Projections are also compared with existing and future regulatory requirements to determine when and for which constituents the projected effluent quality will exceed National Pollutant Discharge Elimination System (NPDES) permit limits. Once a complete scenario is developed, the impact to the Capital Improvement Program (CIP), in terms of costs and the implementation schedule, must be calculated. When multiple scenarios have been developed, their outputs and impacts can be compared against one another to determine the sensitivity of the system to a range of parameters. This sensitivity analysis allows an agency to understand a variety of options to ensure that they make intelligent, informed decisions.

The traditional approach to master planning is such that different projection options or combinations of options, for example, five percent residential growth or a new effluent limit for mercury, need to be evaluated for treatment capacity and effluent quality in individual scenarios. If a change is made to any of the inputs, the entire scenario must be reconfigured to correctly determine its impacts. Developing each scenario is a time and labor intensive process, as is performing a sensitivity analysis on the results.

By using a dynamic and analytical computer software model for the master planning process, instead of the "paper" approach, many more options, and thus scenarios, can be quickly and easily developed. The impacts from any changes or additions can be seen immediately, in real time, including the effects on the CIP implementation schedule. Sensitivity analyses can be developed in a fraction

of the time, putting the power to make well informed decisions in the agency's hands sooner, while at the same time increasing the number of potential scenarios the agency can effectively screen. Ultimately, this interactive modeling approach can help agencies make better strategic decisions.

Methodology

A software application called the Master Plan Manager™ (MPM) has been developed to more quickly and accurately model the master planning process. The MPM computerizes and automates the master plan process by incorporating historical and projected flows and loads for domestic, industrial, and nontraditional pollutants; water conservation measures; treatment processes and capacities; pollutant reduction; regulatory requirements; planned projects and costs; and operations and maintenance (O&M) costs. These data are used to develop flow and load projections, perform capacity evaluations, determine effluent quality, develop project schedules, and develop overall costs. The MPM can produce numerous "what-if" scenarios in order to develop a sensitivity analysis.

GETTING STARTED - INSTALLATION AND SYSTEM REQUIREMENTS

How to Install MPM

1. Insert the MPM CD-ROM into the CD-ROM drive.

2. The MPM installation program will start automatically. If it does not, press the Start button on the task bar, select Run, type **X:setup** (where **X** is the letter of your CD-ROM drive), and click the OK button.

3. Follow the instructions on each installation screen, allowing the computer to reboot as necessary during installation.

You must have Administrator privileges to install MPM on Windows NT, 2000, and XP.

Upgrading from a Previous Version

Upgrading to Version 2.0 from MPM Version 1.0 will not affect data you have entered into MPM. The existing data will remain unchanged; the data will be preserved as it existed just prior to the installation of MPM version 2.0.

After installation, start MPM as follows:

- Click the Start button on the task bar
- Click Programs
- Click Carollo Engineers > MPM 2.0 > MPM 2.0

System Requirements

- Intel® Pentium® 90 MHz or faster (or the minimum required by the operating system, whichever is higher)
- Microsoft® Windows 98 Second Edition, Windows Millennium Edition, Windows NT 4.0 with Service Pack 6.0a or later, Windows 2000, or Windows XP Professional or Home Edition
- 32MB of RAM (96MB or higher recommended, or the minimum required by the operating system, whichever is higher)
- 170MB of available hard-disk space (150MB for .NET Framework, plus 20MB for MPM)
- 800 x 600 or higher-resolution display with at least 256 colors
- Internet Explorer 5.01 or later (click to download Internet Explorer 7 from Microsoft)

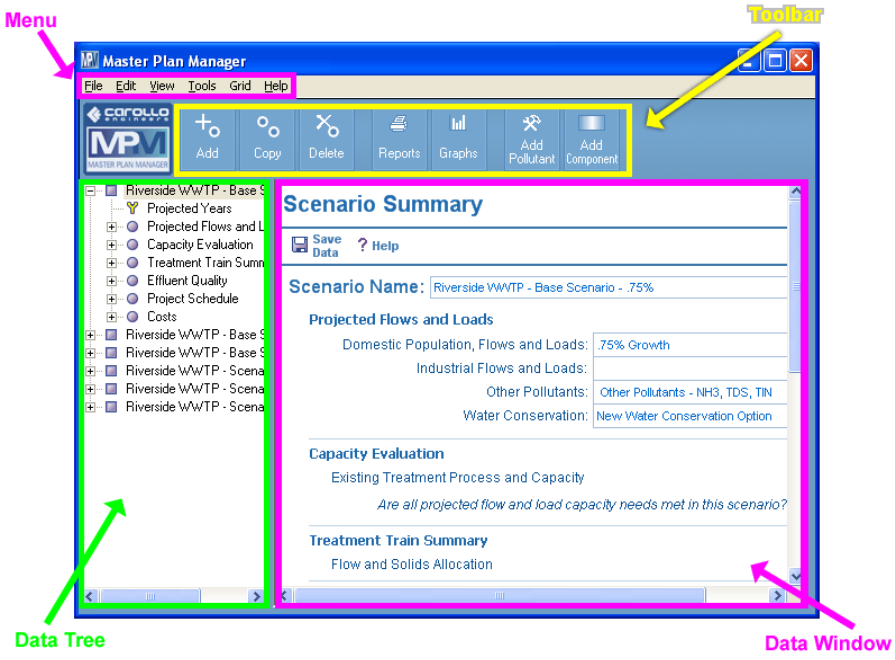
OVERVIEW OF MPM

The MPM screen is divided into three areas:

1. Menu and Toolbar. The Menu and Toolbar allow the user to add, copy, and delete Data Tree items, as well as creating reports and graphs.

2. Data Tree. The Data Tree is used to navigate through the application. Clicking on an item in the tree to displays the data associated with that item in the Data Window.

3. Data Window. The Data Window displays data for the currently selected item in the Data Tree.



General Data Entry Information

Adding Grid Rows

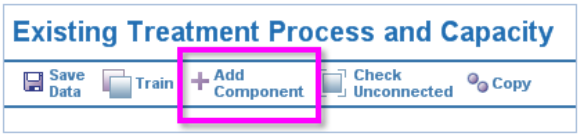
Rows can be manually added to grids by clicking the "Add Row" button at the top of the Data Window.

Rows can be added in this way to the following Data screens:

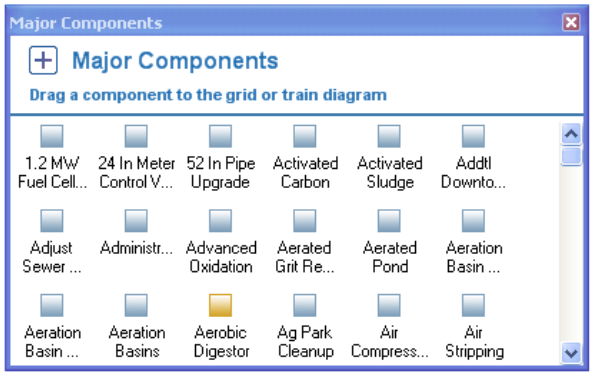
- Domestic Flows and Loads - Historical Data
- Industrial Flows and Loads - Historical Data
- Industrial Flows and Loads
- Other Pollutants - Historical Data
- Existing Treatment Process
- Planned Projects and Costs

Adding Grid Rows to Existing Treatment Process and Planned Projects Grids

To add a row to the Existing Treatment Process or Planned Projects grids, click the Add Component button in the toolbar at the top of the Data Window.



The Major Component box will become visible. Drag a component from the Major Component box and drop it into the grid, or into the train diagram. Both liquid and solid train components appear in the Major Component box. The solid train components are yellow. The liquid train components will appear blue in the Treatment Process train, and purple in the Planned Projects train.

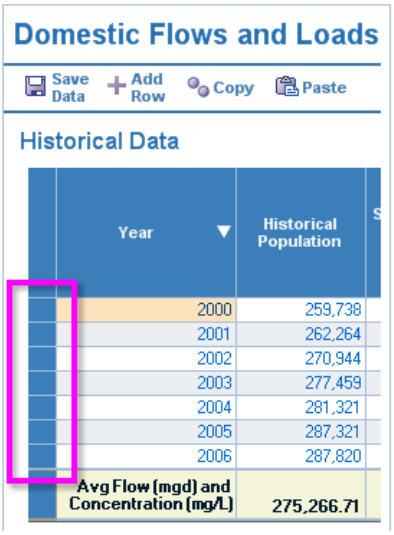


Dragging a component from the Major Components box creates a version of that component in the grid or train. The component itself remains in the Major Components box so that it can be added repeatedly to the grid or train.

A component can appear only once in any section of the Treatment Process train. For example, the "Filters" component can appear only once in section A of the train, once in section B, and so on. A component can appear multiple times in the same train section in the Planned Projects train, but the multiple versions will serve as added capacity to the original component. See Planned Projects for more information on added-capacity components.

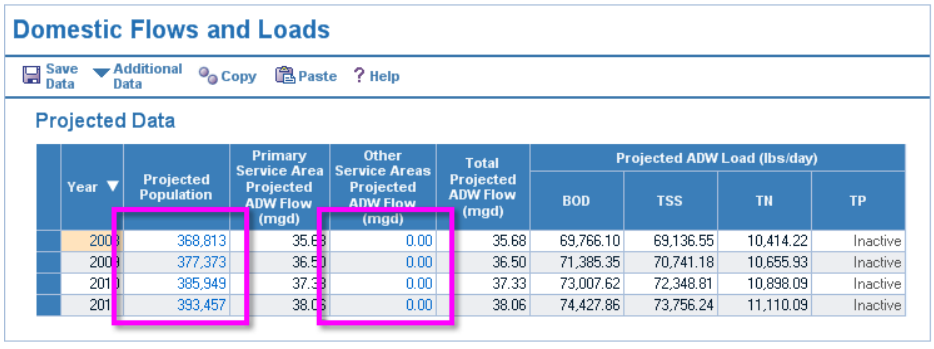
Deleting Grid Rows

To delete a grid row, use the mouse to click the left-most column in the grid (the blue column) of the row you wish to delete, and press the Delete key on the keyboard.

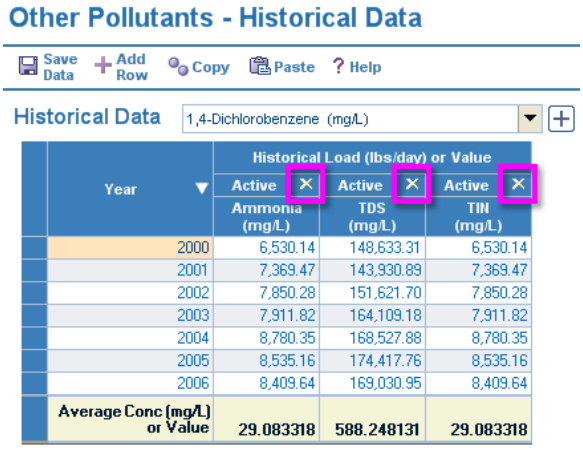


Editable Data

Data in blue text is editable, as shown in the image below. Data in black text is not editable.



Deleting Pollutants from Other Pollutant Grids

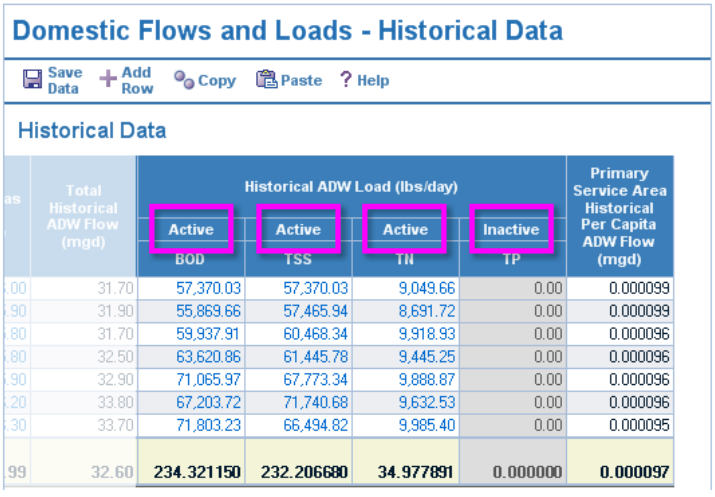


To delete a pollutant from the grid, click the "x" in the column heading of that pollutant.

Making Pollutants Active or Inactive

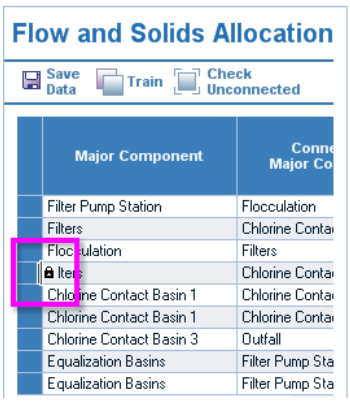
Click the word "Active" in the pollutant's column heading to make that pollutant inactive. The heading will change to "Inactive" and the column will be grayed out. Click the heading again to make the pollutant active. When a Domestic pollutant is inactive, it will not contribute to the values in the Projected Flows and Loads screen, and its values will not be used in any system calculations. Pollutants can be made active/inactive in the following screens:

- Domestic Flows and Loads - Historical Data
- Industrial Flows and Loads
- Other Pollutants - Historical Data
- Other Pollutants

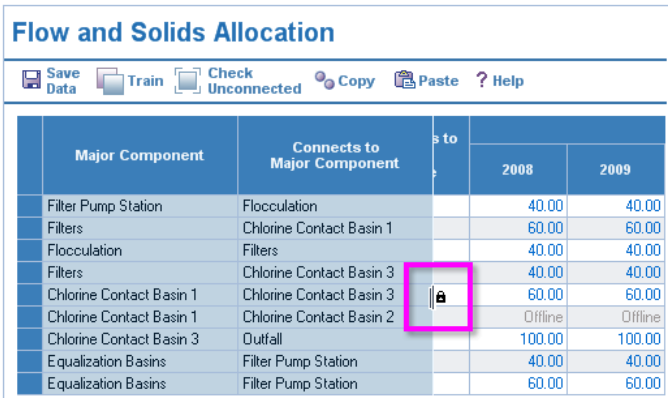


Setting a pollutant's values to zero will also effectively remove it from system calculations, since the pollutant's contribution will be zero. The advantage of making the pollutant inactive is that its values are retained (not set to zero) so that they will be available if the pollutant is again made active.

Locking Columns in Grids



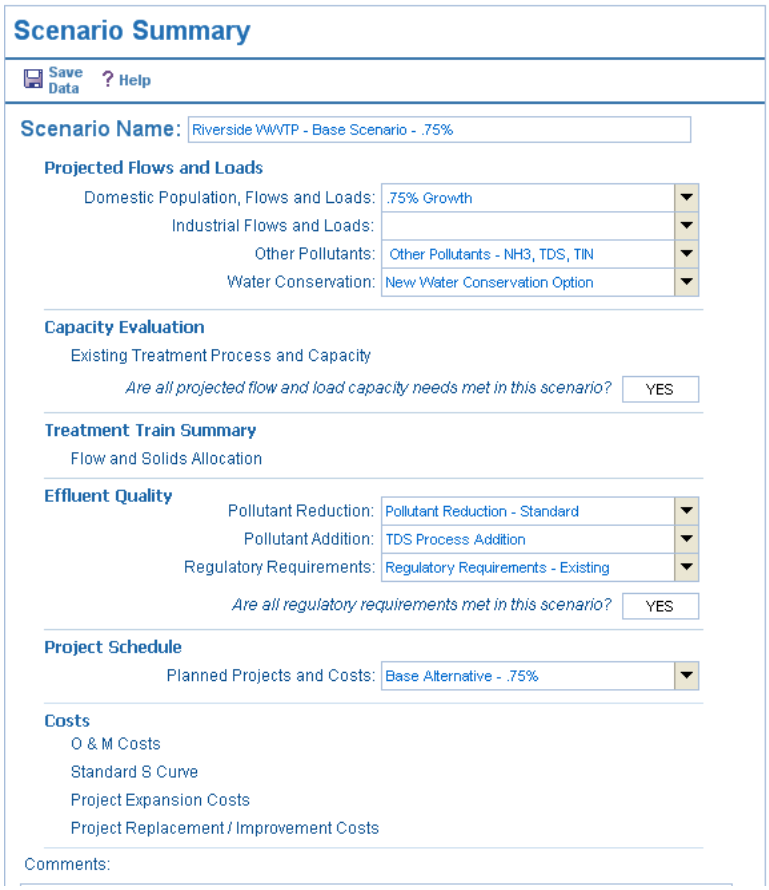
Columns in the grids can be locked so that when the grid data is scrolled, the locked columns remain visible and do not scroll out of view. Columns can be locked by holding the mouse over the left-most blue column until a small lock appears, as shown in the first image (right).



Once the lock appears, hold down the left mouse button and drag the lock to the right over the columns to be locked, as shown in the second image (left). Release the mouse button to lock the columns.

DATA

Scenario Summary



When MPM opens, the Scenario Summary screen is displayed. The Scenario Summary screen provides an overview of the system and allows users to make selections relating to the system.

System Selections

Calculations made by the system are based on the selections made in the Scenario Summary screen. For instance, the values in Projected Flows and Loads are calculated based on the selections made in the four drop-down boxes in that section. Capacity Evaluation uses Projected Flows and Loads, along with Flow and Solids Allocation, and the selected Planned Project to calculate whether capacity needs have been met. Effluent Quality uses those same values, along with Pollutant Reduction, Pollutant Addition, and Regulatory Requirements, to calculate whether regulatory requirements have been met.

The user can select items from the drop-down lists for Projected Flows and Loads, Effluent Quality, and Planned Projects and Costs. Whenever a new selection is made, that selection becomes the active selection for the system, and all values are recalculated. In this way, a user can test various combinations of selections to quickly determine whether requirements are met for the system.

Scenario Name

Edit the name of the Scenario Summary in the Scenario Name box. The new name will be displayed in the Data Tree when the data is saved.

Data Window Toolbar

Use the Save Data button in the toolbar at the top of the Scenario Summary screen to save any edited data, including drop-down list selections.

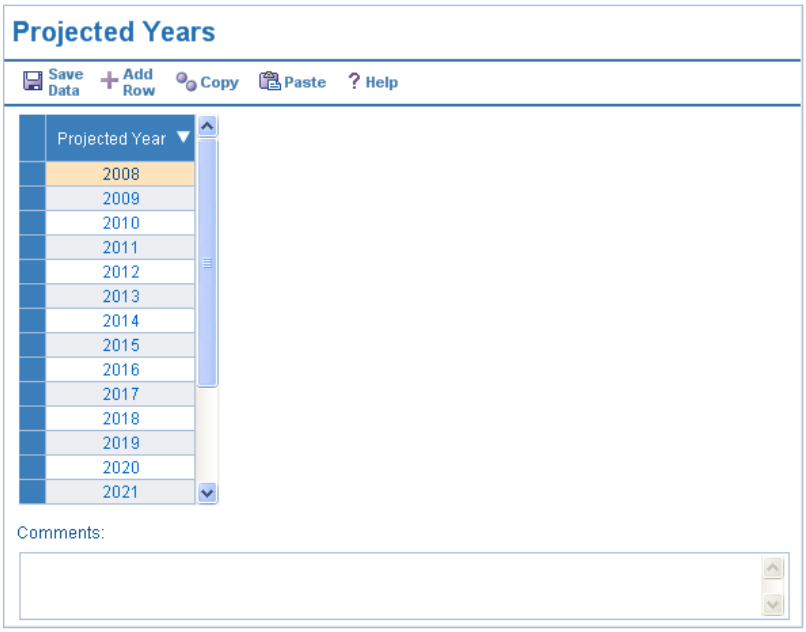
Links to Data Screens

Click on any item to display data for that item. For instance, click on Projected Flows and Loads to display the flows and loads data, or click on Pollutant Reduction to display the data for the selected Pollutant Reduction item.

Projected Years

The Projected Years screen displays the years for the planning period. The year values are editable, and rows can be added to and deleted from the grid.

Projected Years need not be consecutive.



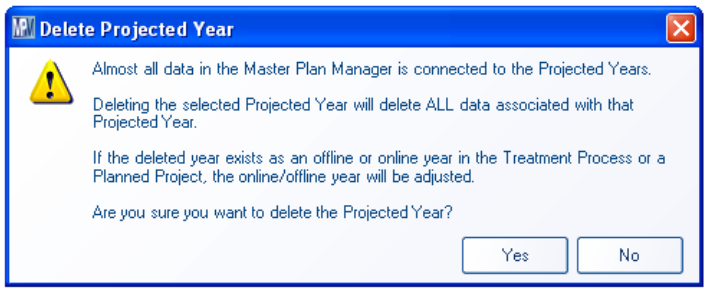
Projected Years as Basis for Data

Almost all data in MPM is connected to the Projected Years. Without Projected Years, many data screens will not be displayed.

Deleting Projected Years

Care should be taken when deleting years from the grid because all data for that year will also be deleted. The deleted year will no longer exist in the system. The message shown in the image below will be displayed whenever a Projected Year is to be deleted.

Also, when a year is deleted, data in the Treatment Process and Planned Projects grids will be modified so that all of the online and offline years in those grids fit within the range of the existing Projected Years. For instance, suppose a Treatment Process component goes offline in 2027, and the Projected Years grid contains years from 2008 to 2027. If the year 2027 is deleted from the Projected Years grid, the Treatment Process grid will be modified so that the component goes offline in 2026, rather than 2027, because 2027 no longer exists.



Editing Projected Years

The Treatment Process and Planned Projects grids will be modified if editing a year causes the overall year range to change. For instance, suppose the years 2010, 2015, and 2020 exist in the Projected Years grid, and a Planned Projects component comes online in 2010, which is the earliest Projected Year. If the year 2010 is changed to 2012 in the Projected Years grid, the Planned Projects grid will be modified so that the component comes online in 2012, because that is the now the earliest Projected Year.

Projected Flows and Loads

The Projected Flows and Loads screen displays the flows and loads for the system. The data in the grid is not directly editable, but is gathered from the supporting data screens that exist below the Projected Flows and Loads item in the Data Tree.

Options and Peaking Factors

The top portion of the screen contains the selected Projected Flows and Loads options and the Peaking Factors.

Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

Options

Calculated values in the Projected Flows and Loads grid are based on the selected Domestic, Industrial, Other Pollutant, and Water Conservation options. The user can change which of those options are used by the system by selecting items from the drop-down lists in the top portion of this screen.

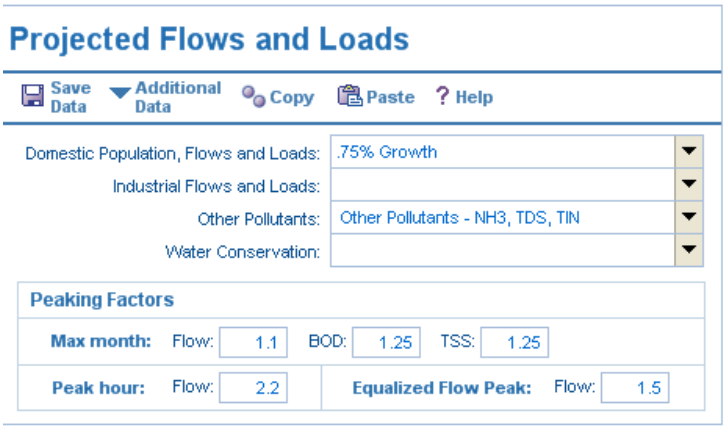
Whenever a new selection is made, that selection becomes the active selection for the entire system, and the values in the Projected Flows and Loads grid (as well as the entire system) are recalculated.

Peaking Factors

The user can enter the following peaking factors:

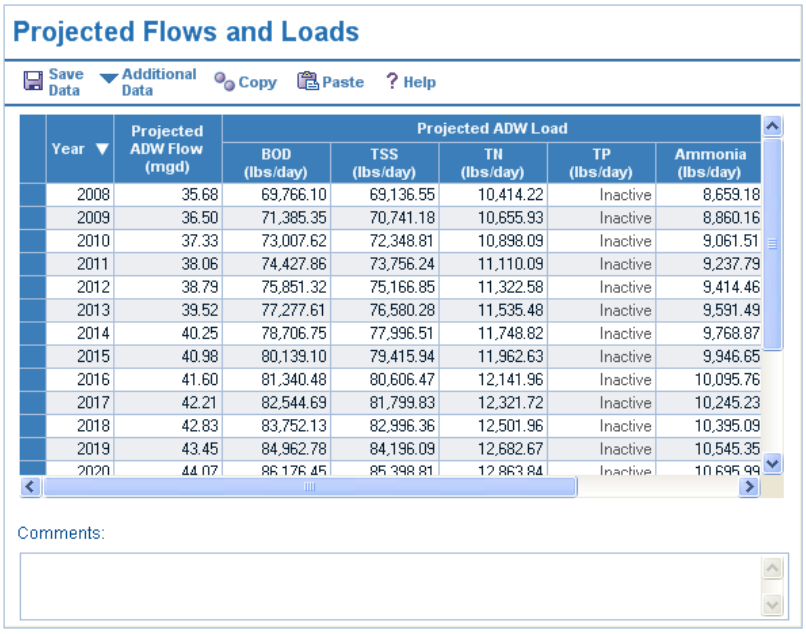
- Max month flow, max month BOD, and max month TSS
- Peak hour flow
- Equalized flow peak

The peaking factors are used in the Capacity Evaluation screen to calculate the peaking projected flows and loads values.



Projected Flows and Loads Data

The bottom portion of the screen contains the Projected Flows and Loads data.



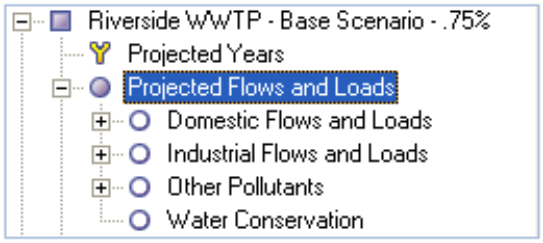
Year	Projected ADW Flow (mgd)	Projected ADW Load				
		BOD (lbs/day)	TSS (lbs/day)	TN (lbs/day)	TP (lbs/day)	Ammonia (lbs/day)
2008	35.68	69,766.10	69,136.55	10,414.22	Inactive	8,659.18
2009	36.50	71,385.35	70,741.18	10,655.93	Inactive	8,860.16
2010	37.33	73,007.62	72,348.81	10,898.09	Inactive	9,061.51
2011	38.06	74,427.86	73,756.24	11,110.09	Inactive	9,237.79
2012	38.79	75,851.32	75,166.85	11,322.58	Inactive	9,414.46
2013	39.52	77,277.61	76,580.28	11,535.48	Inactive	9,591.49
2014	40.25	78,706.75	77,996.51	11,748.82	Inactive	9,768.87
2015	40.98	80,139.10	79,415.94	11,962.63	Inactive	9,946.65
2016	41.60	81,340.48	80,606.47	12,141.96	Inactive	10,095.76
2017	42.21	82,544.69	81,799.83	12,321.72	Inactive	10,245.23
2018	42.83	83,752.13	82,996.36	12,501.96	Inactive	10,395.09
2019	43.45	84,962.78	84,196.09	12,682.67	Inactive	10,545.35
2020	44.07	86,176.45	85,398.81	12,863.84	Inactive	10,695.99

Year

The Year column contains the years that exist in the Projected Years screen.

Projected Average Dry Weather Flow

The Projected Average Dry Weather (ADW) Flow column is made up of values from the Domestic Flows and Loads, Industrial Flows and Loads, and Water Conservation screens, which appear beneath Projected Flows and Loads in the Data Tree.



Equation: The values in the Projected ADW Flow column are calculated by adding the Total Projected ADW Flow from the Domestic Flows and Loads screen to the Projected ADW Flow from the Industrial Flows and Loads screen, and multiplying the values by the Water Conservation percentage.

Projected ADW Load Columns

Equation: The Projected ADW Load values for BOD, TSS, TN, and TP are calculated by adding those columns from the Domestic Flows and Loads screen to the Industrial Flows and Loads screen, and modifying the result by the Water Conservation percentage (only when that percentage is 100%).

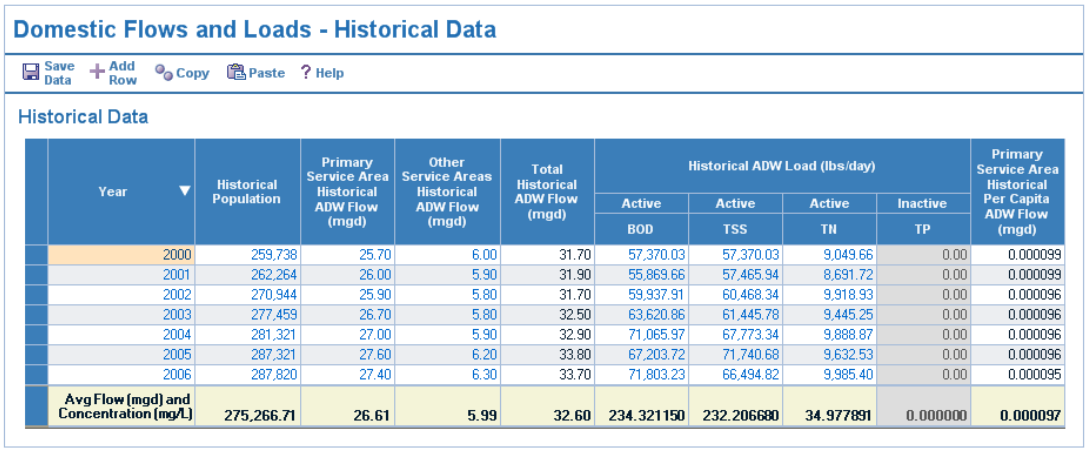
Equation: The Projected ADW Load values for all other pollutants are obtained from the pollutant columns in the Other Pollutants Projected Data screen, Pollutant TDS is multiplied by the TDS Conservation percentage on the Water Conservation screen. The load values are then modified by the Water Conservation percentage (only when that percentage is 100%).

The Load values are not modified by the water conservation percentage unless that percentage is 100%. When the water conservation percentage is 100%, the load becomes zero because there is no flow. If the Water Conservation is any percentage other than 100%, the load values are not modified by water conservation.

Domestic Flows and Loads - Historical Data

The Domestic Flows and Loads - Historical Data screen allows the user to enter values that will serve as the basis for the Domestic Projected Flows and Loads screen.

The pollutants in the grid are limited to BOD, TSS, TN, and TP. Additional pollutants can be added in the Other Pollutants and Other Pollutants - Historical Data screens.



Domestic Flows and Loads - Historical Data

Save Data | Add Row | Copy | Paste | Help

Historical Data

Year	Historical Population	Primary Service Area Historical ADW Flow (mgd)	Other Service Areas Historical ADW Flow (mgd)	Total Historical ADW Flow (mgd)	Historical ADW Load (lbs/day)				Primary Service Area Historical Per Capita ADW Flow (mgd)
					Active BOD	Active TSS	Active TN	Inactive TP	
2000	259,738	25.70	6.00	31.70	57,370.03	57,370.03	9,049.66	0.00	0.000099
2001	262,264	26.00	5.90	31.90	55,869.66	57,465.94	8,691.72	0.00	0.000099
2002	270,944	25.90	5.80	31.70	59,937.91	60,468.34	9,918.93	0.00	0.000096
2003	277,459	26.70	5.80	32.50	63,620.86	61,445.78	9,445.25	0.00	0.000096
2004	281,321	27.00	5.90	32.90	71,065.97	67,773.34	9,888.87	0.00	0.000096
2005	287,321	27.60	6.20	33.80	67,203.72	71,740.68	9,632.53	0.00	0.000096
2006	287,820	27.40	6.30	33.70	71,803.23	66,494.82	9,985.40	0.00	0.000095
Avg Flow (mgd) and Concentration (mg/L)	275,266.71	26.61	5.99	32.60	234.321150	232.206680	34.977891	0.000000	0.000097

Year

The user enters years into the Year column. The years must be historical; that is, each year must be less than the current calendar year.

Historical Population

The user enters the historical population for each year in the Historical Population column.

Primary Service Area Historical ADW Flow

The user enters values into the Primary Service Area (PSA) Historical ADW Flow column in millions of gallons per day.

Other Service Areas Historical ADW Flow

The Other Service Areas (OSA) Projected ADW Flow is entered by the user in millions of gallons per day.

Total Historical ADW Flow

The Total Historical ADW Flow column is calculated by adding the PSA Historical ADW Flow to the OSA Historical ADW Flow.

Historical ADW Load

Each Historical ADW Load value is calculated by multiplying the corresponding Historical ADW Concentration by the Total Historical ADW Flow by a conversion factor of 8.3454.

Primary Service Area Historical Per Capita ADW Flow

Each PSA Historical Per Capita ADW Flow value is calculated by dividing each PSA Historical ADW Flow value by the Historical Population value.

Average Flow and Concentration

The bottom row of the grid contains the average values for each column.

The average values for the Historical Population column, the PSA, OSA and Total Historical ADW Flow columns, and the PSA Historical Per Capita ADW Flow column are calculated by adding the values in each column and dividing by the number of years.

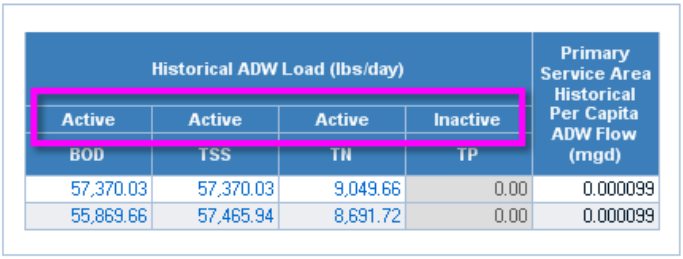
The average concentration values for the Historical ADW Load columns (BOD, TSS, TN, TP) are calculated by first dividing the Load value in each row by the Total Historical ADW Flow value in that row, and then summing the resulting

values for each row and dividing by the number of years. The result is also divided by a conversion factor of 8.3454.

Making Pollutants Active or Inactive

Click the word "Active" in the pollutant's column heading to make that pollutant inactive. The heading will change to "Inactive" and the column will be grayed out. Click the heading again to make the pollutant active. When a Domestic pollutant is inactive, it will not contribute to the values in the Projected Flows and Loads screen, and its values will not be used in any system calculations.

Setting a pollutant's values to zero will also effectively remove it from system calculations, since the pollutant's contribution will be zero. The advantage of making the pollutant inactive is that its values are retained (not set to zero) so that they will be available if the pollutant is again made active.



Historical ADW Load (lbs/day)				Primary Service Area Historical Per Capita ADW Flow (mgd)
Active	Active	Active	Inactive	
BOD	TSS	TN	TP	
57,370.03	57,370.03	9,049.66	0.00	0.000099
55,869.66	57,465.94	8,691.72	0.00	0.000099

Domestic Flows and Loads

The Domestic Flows and Loads screen displays the domestic flows and loads for the system. The values in the Total Projected ADW Flow column and the Projected ADW Load columns are added to the values in the Industrial Projected Flows and Loads screen to determine the values in the Projected Flows and Loads screen.

The pollutants in the grid are limited to BOD, TSS, TN, and TP. Additional pollutants can be added in the Other Pollutants and Other Pollutants - Historical Data screens.

Name, Selected, Historical Data

The top portion of the screen contains the Name, the Selected check box, and Historical data.

Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

Name

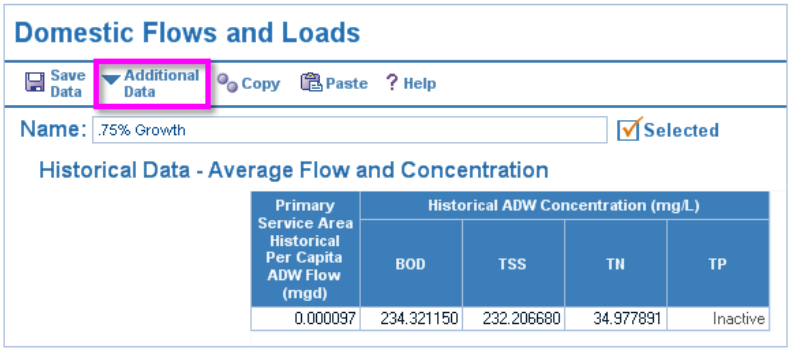
The user enters the name of the projected Domestic Flows and Loads option in the Name box. This name will be used in the Data Tree, in the selection drop-down lists in the Scenario Summary form, and in reports and graphs.

Selected Check Box

The Selected check box denotes whether the projected Domestic Flows and Loads option is the one that is currently used by the system in calculations. When the box is unchecked, checking it will make the Domestic Flows and Loads option the currently selected one. Once the data is saved, the check box cannot be unchecked. To make a different Domestic Flows and Loads option the selected one, click on that option in the Data Tree, and click its Selected box in the Data Window, or visit the Scenario Summary screen to set the selections.

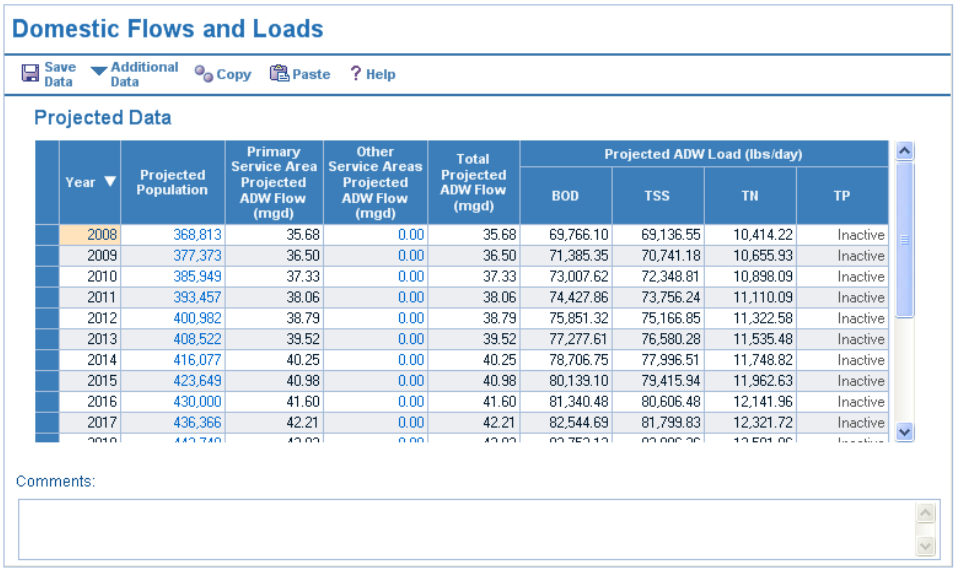
Historical Data

The average flow and concentration values from the Domestic Flows and Loads - Historical Data screen are displayed in the Historical Data grid.



Projected Data

The bottom portion of the screen contains the Domestic projected flows and loads data.



Year

The Year column contains the years that exist in the Projected Years screen.

Projected Population

The user enters the estimated population for each year in the Projected Population column.

Primary Service Area Projected ADW Flow

The Primary Service Area (PSA) Projected ADW Flow column is calculated by multiplying the Average PSA Historical Per Capita ADW Flow (from the Domestic historical data grid) by the Projected Population.

Other Service Areas Projected ADW Flow

The Other Service Areas (OSA) Projected ADW Flow is entered by the user in millions of gallons per day.

Total Projected ADW Flow

The Total Projected ADW Flow column is calculated by adding the PSA Projected ADW Flow to the OSA Projected ADW Flow.

Projected ADW Load

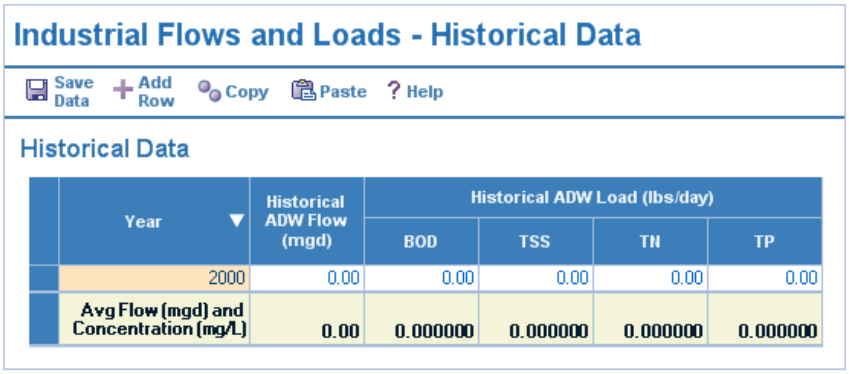
Each Projected ADW Load value is calculated by multiplying the corresponding Historical ADW Concentration (from the Domestic historical data grid) by the Total Projected ADW Flow by a conversion factor of 8.3454.

A pollutant is set to Active or Inactive in the Domestic Flows and Loads - Historical Data screen.

Industrial Flows and Loads - Historical Data

The Industrial Flows and Loads - Historical Data screen allows users to enter historical Industrial values. The historical values are for informational purposes only and are not used when calculating the projected Industrial Flows and Loads or any other values.

The pollutants in the grid are limited to BOD, TSS, TN, and TP. Additional pollutants can be added in the Other Pollutants and Other Pollutants - Historical Data screens.



Year

The user enters years into the Year column. The years must be historical; that is, each year must be less than the current calendar year.

Historical ADW Flow

The values in the Historical ADW Flow column are entered by the user in millions of gallons per day.

Historical ADW Load

The values in the Historical ADW Load columns are entered by the user in pounds per day.

Average Flow and Concentration

The bottom row of the grid contains the average values for each column.

The average value for the Historical ADW Flow column is calculated by adding the values in the column and dividing by the number of years.

The average concentration values for the Historical ADW Load columns (BOD, TSS, TN, TP) are calculated by first dividing the Load value in each row by the Historical ADW Flow value in that row, and then summing the resulting values for each row and dividing by the number of years. The result is also divided by a conversion factor of 8.3454.

Industrial Flows and Loads

The Industrial Flows and Loads screen displays the industrial flows and loads for the system. The values in the Projected ADW Flow column and the Projected ADW Load columns are added to the values in the Domestic Projected Flows and Loads screen to determine the values in the Projected Flows and Loads screen.

The pollutants in the grid are limited to BOD, TSS, TN, and TP. Additional pollutants can be added in the Other Pollutants and Other Pollutants - Historical Data screens.

Name, Selected, Historical Data

The top portion of the screen contains the Name, the Selected check box, and Historical data.

Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

Name

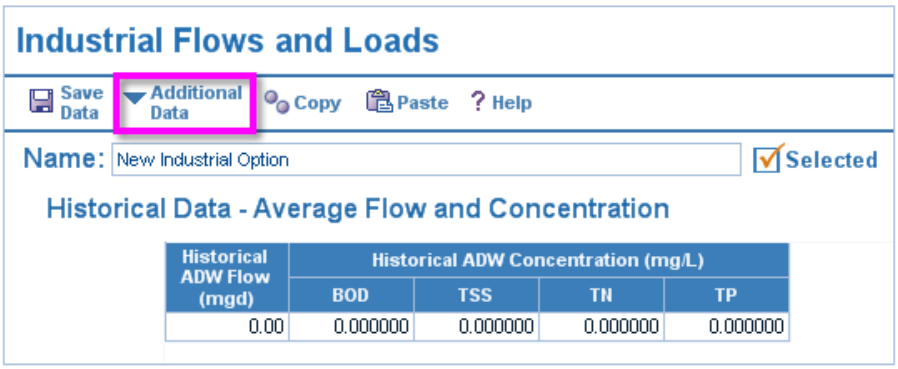
The user enters the name of the projected Industrial Flows and Loads option in the Name box. This name will be used in the Data Tree, in the selection drop-down lists in the Scenario Summary form, and in reports and graphs.

Selected Check Box

The Selected check box denotes whether the projected Industrial Flows and Loads option is the one that is currently used by the system in calculations. When the box is unchecked, checking it will make the Industrial Flows and Loads option the currently selected one. Once the data is saved, the check box cannot be unchecked. To make a different Industrial Flows and Loads option the selected one, click on that option in the Data Tree, and click its Selected box in the Data Window, or visit the Scenario Summary screen to set the selections.

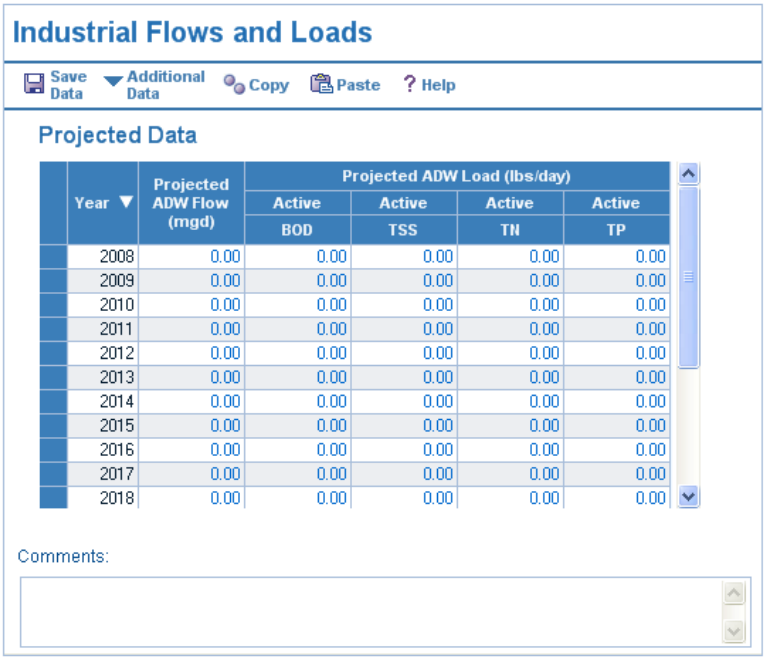
Historical Data

The average flow and concentration values from the Industrial Flows and Loads - Historical Data screen are displayed in the Historical Data grid.



Projected Data

The bottom portion of the screen contains the Industrial projected flows and loads data.



Year

The Year column contains the years that exist in the Projected Years screen.

Projected ADW Flow

The values in the Projected ADW Flow column are entered by the user in millions of gallons per day.

Projected ADW Load

The values in the Projected ADW Load columns are entered by the user in pounds per day.

Making Pollutants Active or Inactive

Click the word "Active" in the pollutant's column heading to make that pollutant inactive. The heading will change to "Inactive" and the column will be grayed out. Click the heading again to make the pollutant active. When an Industrial pollutant is inactive, it will not contribute to the values in the Projected Flows and Loads

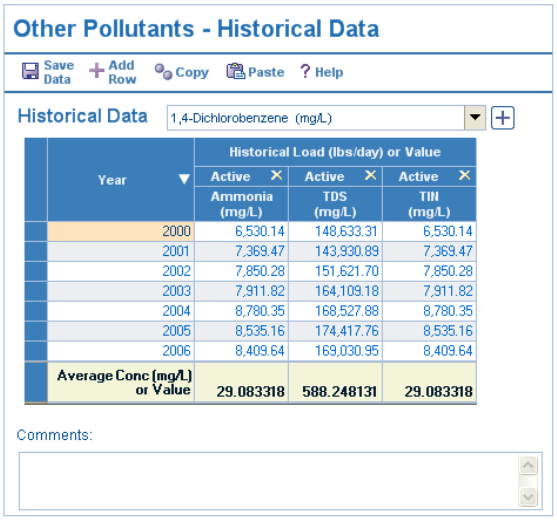
screen, and its values will not be used in any system calculations.

Setting a pollutant's values to zero will also effectively remove it from system calculations, since the pollutant's contribution will be zero. The advantage of making the pollutant inactive is that its values are retained (not set to zero) so that they will be available if the pollutant is again made active.

Other Pollutants - Historical Data

The Other Pollutants - Historical Data screen allows the user to create historical other pollutants and enter their values.

The historical values are for informational purposes only - they are not used in system calculations or to calculate projected Other Pollutants values.



Year

The user enters years into the Year column. The years must be historical; that is, each year must be less than the current calendar year.

Historical Load or Value

The values in the Historical Load columns are entered by the user in the units for that pollutant. For example, Ammonia would be entered in pounds per day, while Turbidity would be entered in NTU.

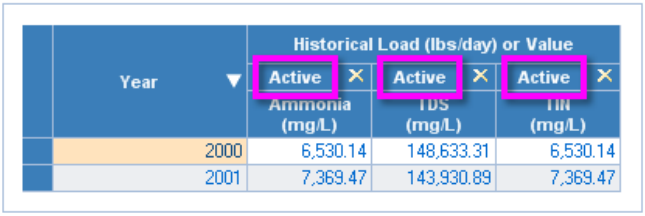
Average Concentration or Value

The bottom row of the grid contains the average values for each column.

The average concentration values for pollutants with units in pounds per day are calculated by first dividing the Load value in each row by a flow value, and then summing the resulting values for each row and dividing by the number of years. The result is also divided by a conversion factor of 8.3454. The flow that is used is the Average Flow value from the bottom row of the Total Historical ADW Flow value column in the Domestic Flows and Load - Historical Data and Industrial Flows and Load - Historical Data screen.
The average values for pollutants with units other than pounds per day are calculated by adding the values in each column and dividing by the number of years.

Making Pollutants Active or Inactive

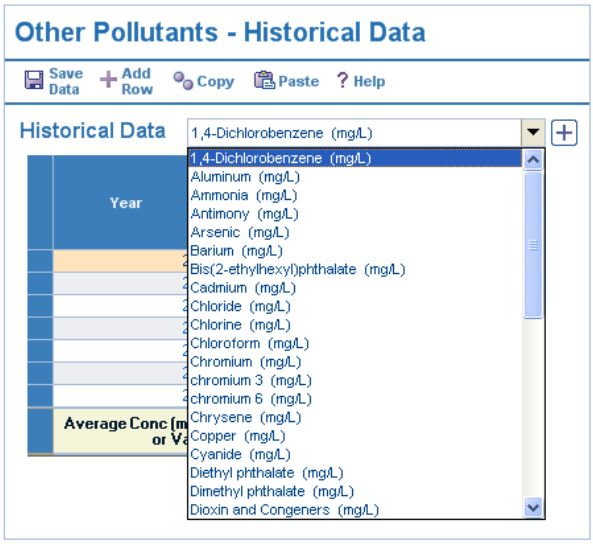
Click the word "Active" in the pollutant's column heading to make that pollutant inactive. The heading will change to "Inactive" and the column will be grayed out. Click the heading again to make the pollutant active.



	Year	Historical Load (lbs/day) or Value		
		Active ✕ Ammonia (mg/L)	Active ✕ TDS (mg/L)	Active ✕ TIN (mg/L)
	2000	6,530.14	148,633.31	6,530.14
	2001	7,369.47	143,930.89	7,369.47

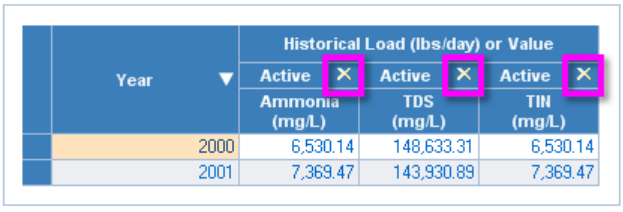
Adding a Pollutant to the Grid

To add a pollutant to the grid, select a pollutant from the drop-down list, and click the + button.



Deleting a Pollutant from the Grid

To delete a pollutant from the grid, click the "x" in the column heading of that pollutant.



Other Pollutants

The Other Pollutants screen displays the flows and loads for pollutants that are not BOD, TP, TN, or TP. The values that are calculated for the Projected Load or Value columns are also used in the Projected Flows and Loads screen.

Name, Selected, Historical Data

The top portion of the screen contains the Name, the Selected check box, and Historical data.

Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

Name

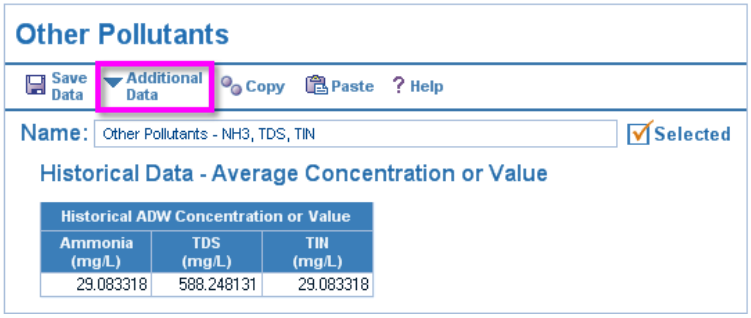
The user enters the name of the projected Other Pollutants option in the Name box. This name will be used in the Data Tree, in the selection drop-down lists in the Scenario Summary form, and in reports and graphs.

Selected Check Box

The Selected check box denotes whether the projected Other Pollutants option is the one that is currently used by the system in calculations. When the box is unchecked, checking it will make the Other Pollutants option the currently selected one. Once the data is saved, the check box cannot be unchecked. To make a different Other Pollutants option the selected one, click on that option in the Data Tree, and click its Selected box in the Data Window, or visit the Scenario Summary screen to set the selections.

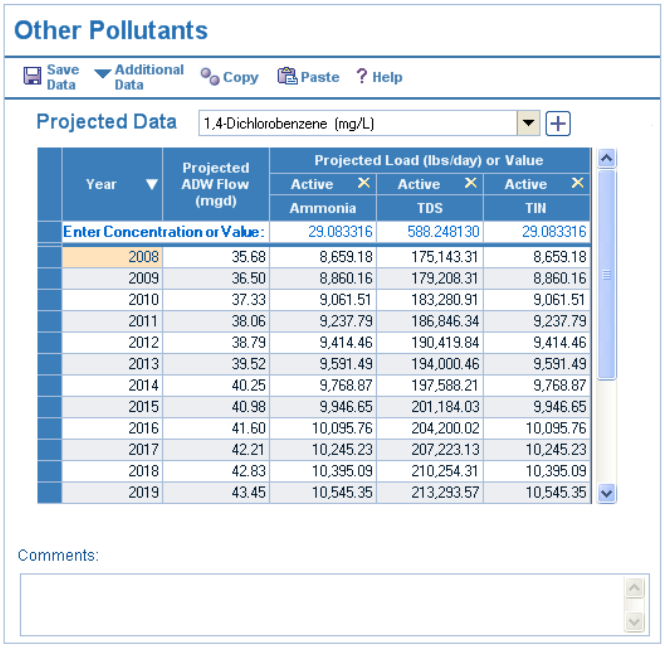
Historical Data

The average concentrations or values from the Other Pollutants - Historical Data screen are displayed in the Historical Data grid.



Projected Data

The bottom portion of the screen contains the Other Pollutants projected flows and loads data.



Enter Concentration or Value

The user enters values in the "Enter Concentration or Value" row in the units of the pollutant. Pollutants such as Ammonia are in milligrams per liter, so the value entered for Ammonia in this row is in milligrams per liter. Pollutants that use other units (such as Turbidity), would have their values entered in those units.

Year

The Year column contains the years that exist in the Projected Years screen.

Projected ADW Flow

The Projected ADW Flow column is made up of values from the Domestic Flows and Loads and Industrial Flows and Loads.

The values in the Projected ADW Flow column are calculated by adding the Total Projected ADW Flow from the Domestic Flows and Loads screen to the Projected ADW Flow from the Industrial Flows and Loads screen.

These are the same values found in the Projected Flows and Loads screen, except that here, in the Other Pollutants screen, the values are not modified by the Water Conservation percentages.

Projected Load or Value

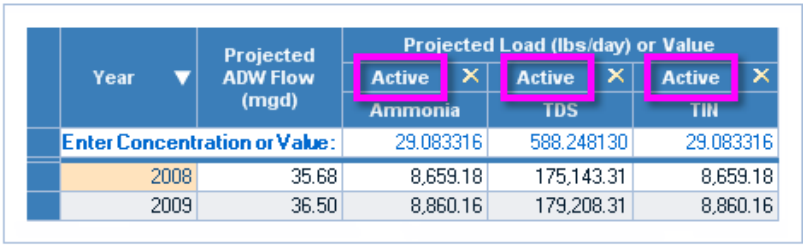
For pollutants with units of milligrams per liter (such as Ammonia), the Projected Load value is calculated by multiplying the user-entered Concentration by the Projected ADW Flow, and then by a conversion factor of 8.3454.

For pollutants with units other than milligrams per liter (such as Turbidity), each row in the Projected Value column contains the same value that is entered by the user in the "Enter Concentration or Value" row.

Making Pollutants Active or Inactive

Click the word "Active" in the pollutant's column heading to make that pollutant inactive. The heading will change to "Inactive" and the column will be grayed out. Click the heading again to make the pollutant active. When a pollutant is inactive, it will not contribute to the values in the Projected Flows and Loads screen, and its values will not be used in any system calculations.

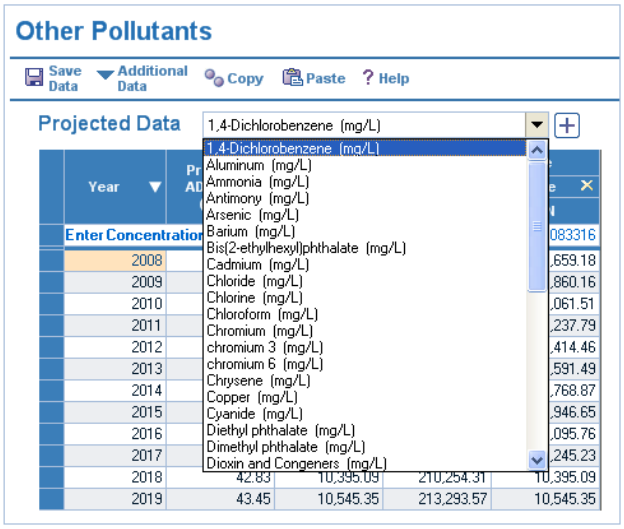
Setting a pollutant's values to zero will also effectively remove it from system calculations, since the pollutant's contribution will be zero. The advantage of making the pollutant inactive is that its values are retained (not set to zero) so that they will be available if the pollutant is again made active.



Year	Projected ADW Flow (mgd)	Projected Load (lbs/day) or Value		
		Active ✕ Ammonia	Active ✕ TDS	Active ✕ TIN
Enter Concentration or Value:		29.083316	588.248130	29.083316
2008	35.68	8,659.18	175,143.31	8,659.18
2009	36.50	8,860.16	179,208.31	8,860.16

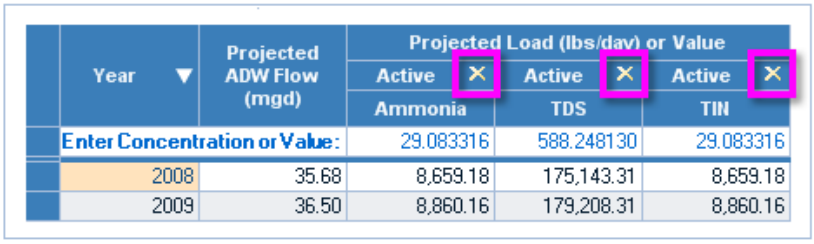
Adding a Pollutant to the Grid

To add a pollutant to the grid, select a pollutant from the drop-down list, and click the **+** button.



Deleting a Pollutant from the Grid

To delete a pollutant from the grid, click the "x" in the column heading of that pollutant.



Water Conservation

The Water Conservation screen displays the percentage of water and TDS that will be conserved. The values in the grid are in percentages, so that entering a value of 50.00 means 50.00 percent.

The percentages in the grid are used in calculations in the Projected Flows and Loads screen and the Effluent Quality screen.

Name, Selected

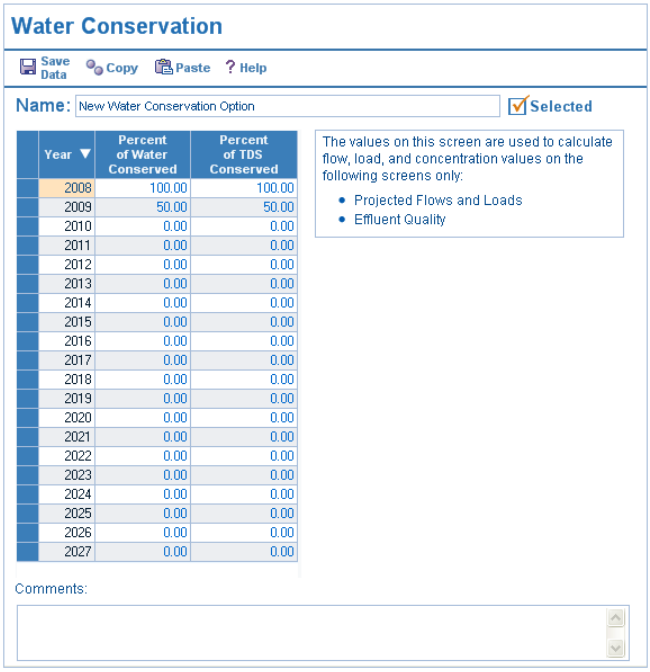
The top portion of the screen contains the Name, and the Selected check box.

Name

The user enters the name of the Water Conservation option in the Name box. This name will be used in the Data Tree, in the selection drop-down lists in the Scenario Summary form, and in reports and graphs.

Selected Check Box

The Selected check box denotes whether the Water Conservation option is the one that is currently used by the system in calculations. When the box is unchecked, checking it will make the Water Conservation option the currently selected one. Once the data is saved, the check box cannot be unchecked. To make a different Water Conservation option the selected one, click on that option in the Data Tree, and click its Selected box in the Data Window, or visit the Scenario Summary screen to set the selections.



Year

The Year column contains the years that exist in the Projected Years screen.

Effect of Conservation on Projected Flows and Loads

TDS Conservation

The Projected ADW Load values for TDS in the Projected Flows and Loads screen are reduced by the percentage in the "Percent of TDS Conserved" column. No other values in the Projected Flows and Loads screen are affected by the TDS Conservation percentage.

Water Conservation

The Projected ADW Flow values in the Projected Flows and Loads screen are reduced by the percentage in the "Percent of Water Conserved" column. The Projected ADW Load values are reduced only when the Water Conservation percentage is 100%.

The image below shows values from a portion of the Projected Flows and Loads screen when the Water Conservation values are all set to zero.

Year ▼	Projected ADW Flow (mgd)	Projected ADW Load				
		BOD (lbs/day)	TSS (lbs/day)	TN (lbs/day)	TP (lbs/day)	Ammonia (lbs/day)
2008	35.68	69,766.10	69,136.55	10,414.22	Inactive	8,659.18
2009	36.50	71,385.35	70,741.18	10,655.93	Inactive	8,860.16

The image below shows values from a portion of the Projected Flows and Loads screen when the Water Conservation values are 100.00% for 2008, and 50.00% for 2009. The Projected ADW Flow value for 2008 is zero because 100% of the water is conserved, while the value for 2009 is reduced by 50% because the Water Conservation value is 50.00% in 2009.

The Projected ADW Load columns in the Projected Flows and Loads grid are affected by the values in the Water Conservation grid only when water conservation is 100.00%. When all water is conserved, the load values are all

zero. However, when the water conservation percentage is anything other than 100.00%, the load values are unaffected.

Year ▼	Projected ADW Flow (mgd)	Projected ADW Load				
		BOD (lbs/day)	TSS (lbs/day)	TN (lbs/day)	TP (lbs/day)	Ammonia (lbs/day)
2008	0.00	0.00	0.00	0.00	Inactive	0.00
2009	18.25	71,385.35	70,741.18	10,655.93	Inactive	8,860.16

Effect of Conservation on Effluent Quality

The Effluent Quality screen uses the values from the Projected Flows and Load screen, including changes to flows and loads due to water and TDS conservation.

Capacity Evaluation

The Capacity Evaluation screen gathers data about the Major Components from the selected Planned Project, if one exists, and from the Existing Treatment Process. The Capacity Evaluation screen also uses Projected Flows and Loads data, as well as Flow and Solids Allocation data, to calculate whether capacity requirements are met for each Projected Year.

The Capacity Evaluation screen performs calculations based on information in the entire system. Each Planned Project contains both Major Components from the Existing Treatment Process, and Major Components added to the Planned Project in the planning process. The Planned Project therefore represents all of the Major Components in the system, and is used as the basis for Capacity Evaluation calculations. If no Planned Projects exist, the Existing Treatment Process represents the system and is used as the basis for Capacity Evaluation calculations.

The Capacity Evaluation grid is not editable.

Added Average Capacity

The top portion of the screen contains the Added Average Capacity values.

Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

Avg Added Flow Capacity

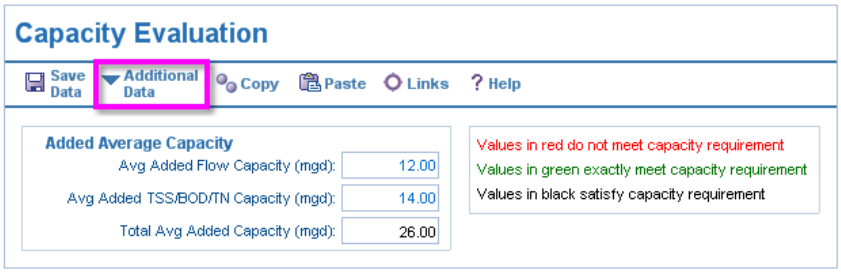
The user enters the average added flow capacity in million gallons per day.

Avg Added TSS/BOD/TN Capacity

The user enters the average added TSS/BOD/TN capacity in million gallons per day.

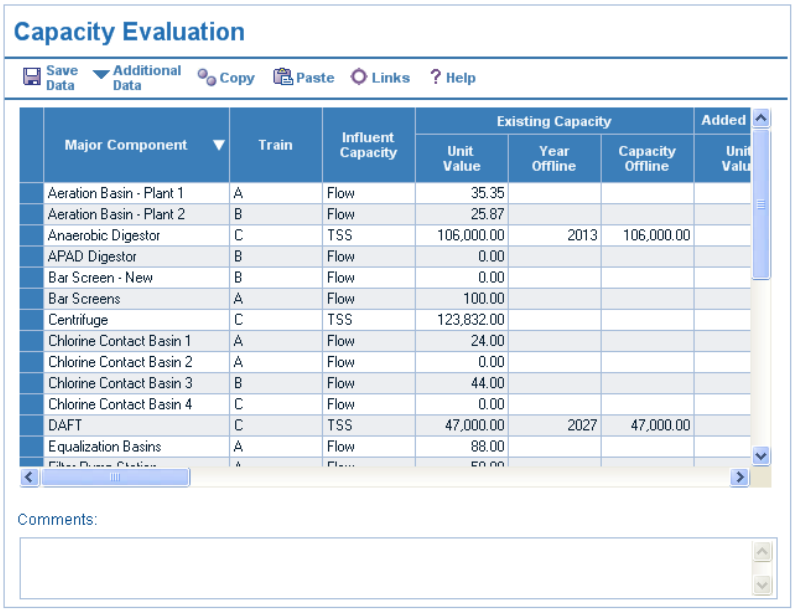
Total Avg Added Capacity

The Total Average Added Capacity is the total of the user-entered average added flow and TSS/BOD/TN capacity values.



Capacity Evaluation Data

The bottom portion of the screen contains the Capacity Evaluation data.



Major Component

The Major Components from the selected Planned Projects option are used to populate the Major Component column. If no Planned Projects exist, the Major Components from the Existing Treatment Process are used.

Train

The train that each Major Component is in (from the Planned Projects train, or the Existing Treatment Process train, if no Planned Projects exist).

Influent Capacity

The Capacity Type for each Major Component. The Capacity Type for all Major Components is displayed in the Major Component window.

Existing Capacity - Unit Value

The existing capacity of the Major Component. This value always comes from the Existing Treatment Process screen, regardless of whether or not Planned Projects exist.

Existing Capacity - Year Offline

The year the existing Major Component goes offline and is no longer available to the system. This value always comes from the Existing Treatment Process screen, regardless of whether or not Planned Projects exist.

Existing Capacity - Capacity Offline

The amount of capacity that goes offline in the year offline. Any portion (or all) of the capacity can go offline. This value always comes from the Existing Treatment Process screen, regardless of whether or not Planned Projects exist.

Added Capacity - Unit Value

The added capacity of the Major Component. This value always comes from the Planned Projects screen.

This value can act as additional capacity to an existing Treatment Process Major Component, or it can be additional capacity

Added Capacity - Capacity Units

The Capacity Unit for each Major Component. The Capacity Unit for each Major Component is displayed in the Major Component window.

Added Capacity - Unit Value

The added capacity for the Major Component from the "Added Capacity - Unit Value" column broken down by year. If the added capacity occurs in multiple years, each capacity will be listed separately in this column.

Added Capacity by Year - Year(s) Online

The years the added capacity comes online. This data always comes from the Planned Projects screen. If the added capacity comes online in multiple years, each year will be listed separately in this column.

Averaging Period

The Averaging Period for each Major Component is the Capacity Basis for that component as shown in the Major Component window.

Peaking Factor

The Peaking Factor value is a user-entered value that is entered into the top portion of the Projected Flows and Loads screen, specific to each Major Component.

The Peaking Factors are as follows:

- Max month flow, max month BOD, and max month TSS
- Peak hour flow
- Equalized flow peak

The projected flows and loads are multiplied by the peaking factor in the Capacity Evaluation screen.

Requirements Met

The capacity of each Major Component is compared with the values in the Peaking Projected Flows and Loads column for each year. If the capacity (both existing and added) of the Major Component is sufficient to handle the projected flow or load, the requirements have been met, and the Requirements Met column will contain "YES." If the projected flow or load exceeds the capacity of the Major Component, the Requirements Met column will contain "NO."

Peaking Projected Flows and Loads

The Peaking Projected Flows and Loads are displayed for each year and for each Major Component. The value is calculated as follows:

Equation: Projected Flow or Load x Peaking Factor x Major Component Flow Percentage.

The flow and load values, along with the peaking factor, come from the Projected Flows and Loads screen. The flow percentage for each Major Component comes from the Flow and Solids Allocation screen.

The values in the column are color-coded for ease in identifying whether the projected flow or load exceeds the capacity. A value displayed in red text indicates that the flow or load exceeds the capacity of the Major Component in that year. A value in green indicates that the flow or load is the same value as the available capacity, and a value in black indicates that the capacity is sufficient to handle the flow or load for that year.

If a Major Component is offline, the word "Offline" will appear in the column instead of a numerical value.

Existing Treatment Process

The Existing Treatment Process represents the Major Components as they currently exist. The existing treatment process is created by adding Major Components to the grid or train, entering data for those components, and creating connections in the train.

The Treatment Process stands on its own as the model for the existing system, but its real purpose is to serve as the basis for Planned Project options that can

be created to modify the system in future years. When a Planned Project is created, it starts off with all of the existing treatment process components and connections. The Planned Project can then be modified by adding Planned Project components to model the treatment processes in future years.

When there are no Planned Projects, the Existing Treatment Process serves as the treatment system upon which calculations are based. System calculations (such as those for Capacity Evaluation and Effluent Quality) are based on the components and data that appear in the Existing Treatment Process.

When Planned Projects exist, system calculations are no longer based on the Existing Treatment Process, but are based on the components and data in the selected Planned Project. Although the Existing Treatment Process is no longer used as the basis for those calculations, it is still used as the starting point for newly-created Planned Projects.

In addition, whenever a change is made to a component or connection in the Existing Treatment Process screen, that change is automatically included in all the Planned Projects in the Scenario. For example, if a connection is created between two components in the Treatment Process train, that connection will also be created automatically in all the Planned Projects in the Scenario. However, if a connection is deleted in the Treatment Process train, that connection will NOT be deleted from any of the Planned Projects. The Treatment Process only adds information to the Planned Projects; it never deletes it. Any changes made in the Planned Projects will have no effect on any data in the Treatment Process screen.

General Data Operations

Adding Grid Rows. Click the Add Component button to display a small major components box. A row is added to the grid by dragging a component from the major components box and dropping it into the grid or train. When a component

is dropped into the train, it is automatically added to the grid, and the "Included in Treatment" check box is checked. When a component is dropped into the grid, it is not automatically added to the train, and its "Included in Treatment" check box is not checked. Checking the "Included in Treatment" checkbox causes the component to appear in the train. Unchecking the checkbox removes the component from the train.

Deleting Grid Rows. When a row is deleted from the grid, that component is deleted from the train. The component and all of its data will be deleted when the data is saved.

Major Components. Components are added to the treatment process by clicking the Add Component button and dragging components from the major components box and dropping them into the grid or train.

Train. The components that are marked as "Included in Treatment" in the grid will appear in the treatment train. Click the Train button in the toolbar to display/hide the train diagram.

Component Connections. Creating connections between the components creates the flow through the treatment train. To create a connection, check the Connect check box, click a component, and then click another component. The connection will be created between the two components. If a third component is then clicked, a connection will be created from the second component to the third component. To then create a connection between two other components, four and five, click a blank spot on the train to remove the highlight from the third component, and click component four to highlight it, and then click component five to create the connection.

Removing or Deleting Components. To remove a component from the treatment train, click on it in the train and press the Delete button. The component will be removed from the train; it will remain in the grid, but its "Included in Treatment"

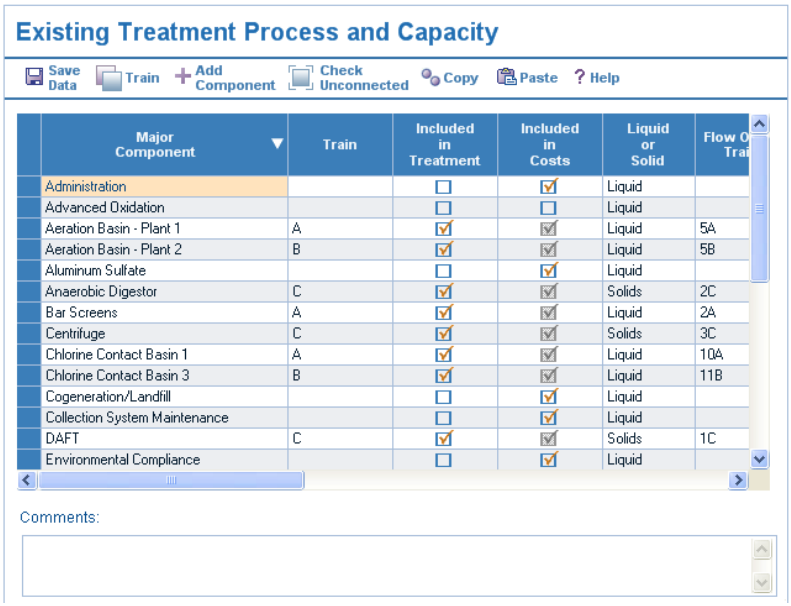
check box will be unchecked. A component can also be removed from the train by unchecking its "Included in Treatment" check box in the grid.

When a component is removed from treatment via the methods described above, that component, along with its data, remains in the grid. To delete the component completely, rather than just removing it from treatment, delete its row from the grid. Deleting the grid row will delete the component from the grid and the train, and all of its data will be deleted when the Treatment Process data is saved.

Liquids and Solids. The train is separated into a liquids train and a solids train. Click the Liquids button to view the liquids train, and the Solids button to view the solids train.

Check Unconnected. In order for the flow to travel through all components, the components must be connected to each other. If a component has no connections, it will not be included in the flow. Click the Check Unconnected button to display a list of the unconnected components.

If a Planned Project exists, it does not matter to the system whether or not unconnected Treatment Process components exist. Because the system performs calculations based on the selected Planned Project, if one exists, unconnected Treatment Process components will have no effect on those calculations, if a Planned Project exists.



Major Component

Each Major Component is added to the grid by dragging and dropping from the small major components box accessed by clicking the Add Component button. There can be only one component of the same type in each lettered section of the train. For example, there can be only one Filters component in train section A, one Filters component in train section B, and so on.

Train

The Train column displays the letter of the train section in which the Major Component appears.

Included in Treatment

Check the Included in Treatment check box to include the component in the treatment train. Uncheck the box to remove the components from the train. When the Included in Treatment box is checked the Included in Costs box is automatically checked.

Included in Costs

Some components, such as administration or maintenance, do not appear in the treatment train, but are included in the system because they have associated costs. To include a component only for cost purposes, leave the Included in Treatment box unchecked, and check the Included in Costs box. The component will not appear in the train, but will appear in the O&M Costs screen.

Liquid or Solid

The value in the Liquid or Solid column denotes the component as a Liquids or Solids component. Liquids components appear in the Liquids train, and Solids components appear in the Solids train. Click the Liquids button and the Solids button to view the train diagrams.

Flow Order Train

The Flow Order Train column contains the flow order of each component. The flow order is based on the connections between the components. Each component is numbered in succession based on the connection coming into it from the previous component. Components that have no connections have no Flow Order Train value.

Influent Capacity

The Capacity Type for all Major Components is displayed in the Major Component window.

Existing Capacity

The user enters the capacity of the component in the units that appear in the Capacity Units column.

Capacity Units

The capacity unit for each Major Component is displayed in the Major Component window.

Averaging Period

The Averaging Period for each Major Component is the Capacity Basis for that component as shown in the Major Component window.

Design Criteria

The user enters design criteria such as width, volume, or surface area.

Design Criteria Units

The user enters the units for the Design Criteria column.

Number of Units

The user enters the number of units that comprise the component. This is a numeric value only.

Year Offline

The user enters the year the existing Major Component goes offline and is no longer available to the system. A component may be scheduled to be retired in a certain year, or to go offline because it is being replaced by a Planned Project component.

The user must also enter a value in the Capacity Offline column. If the value in the Capacity Offline is less than the value in the Existing Capacity column, the component only partially goes offline, and still contributes to the system.

Capacity Offline

The amount of capacity that goes offline in the year offline. Any portion (or all) of the capacity can go offline.

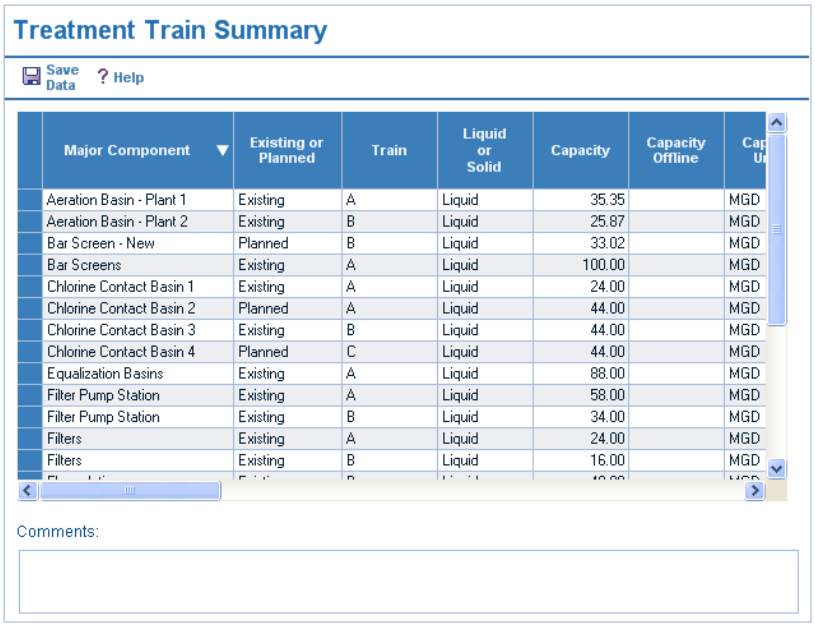
If there is no value in the Year Offline column, the component will be treated as being fully online. In order for the offline capacity value to have any effect, there must be a value in the Year Offline column. If a value exists in the Year Offline column, the Capacity Offline value must be greater than zero, and less than or equal to the value in the Existing Capacity column.

Treatment Train Summary

The Treatment Train Summary screen is a summary, by Major Component and projected year, of the flows through the system. The values in the Flows columns represent the flows through the Major Components (unlike the values in the Flow and Solids Allocation screen, which represent the percentage of the flows through the connections). A value of 40.00 means that 40% of the flow travels through that component.

Only the components in the liquid train are displayed in the Treatment Train Summary grid; the solids are not included.

The Treatment Train Summary grid is not editable.



Treatment Train Summary

Save Data | Help

Major Component	Existing or Planned	Train	Liquid or Solid	Capacity	Capacity Offline	Cap U
Aeration Basin - Plant 1	Existing	A	Liquid	35.35		MGD
Aeration Basin - Plant 2	Existing	B	Liquid	25.87		MGD
Bar Screen - New	Planned	B	Liquid	33.02		MGD
Bar Screens	Existing	A	Liquid	100.00		MGD
Chlorine Contact Basin 1	Existing	A	Liquid	24.00		MGD
Chlorine Contact Basin 2	Planned	A	Liquid	44.00		MGD
Chlorine Contact Basin 3	Existing	B	Liquid	44.00		MGD
Chlorine Contact Basin 4	Planned	C	Liquid	44.00		MGD
Equalization Basins	Existing	A	Liquid	88.00		MGD
Filter Pump Station	Existing	A	Liquid	58.00		MGD
Filter Pump Station	Existing	B	Liquid	34.00		MGD
Filters	Existing	A	Liquid	24.00		MGD
Filters	Existing	B	Liquid	16.00		MGD

Comments:

Major Component

The Major Components from the selected Planned Projects option are used to populate the Major Component column. If no Planned Projects exist, the Major Components from the Existing Treatment Process are used.

Existing or Planned

The "Existing or Planned" column displays whether the Major Component is an existing or planned component. The data comes entirely from the selected Planned Project option, if one exists. The term "Existing" refers to the existing components in the Planned Project, while the term "Planned" refers to the planned components in the Planned Project.

Each Planned Project contains both existing and planned Major Components. Although the "existing" components are originally derived from the Existing Treatment Process train diagram, each Planned Project has its own versions of those existing components, with its own connections, which may differ from the original connections in the Existing Treatment Process train diagram. The

connections between existing and planned components in the Planned Project train diagram are the ones used in this screen.

The connections in the Existing Treatment Process are not used in this screen unless there are no Planned Projects. If there are no Planned Projects, the data for this screen comes solely from the Existing Treatment Process, and there will be no planned components. So, the term "Existing" refers to existing components in the Planned Project diagram, unless there are no Planned Projects.

Train

The train that each Major Component is in (from the Planned Projects train, or the Existing Treatment Process train, if no Planned Projects exist).

Liquid or Solid

The Liquids train or the Solids train.

Capacity

The capacity of the existing or planned Major Component. The capacity for an existing component always comes from the Existing Treatment Process screen because that is the only screen where existing capacity is entered. That capacity is used in the Planned Projects screen, but it originates in the Existing Treatment Process screen.

Capacity Offline

The amount of capacity that goes offline in the year the component goes offline. This data always comes from the Existing Treatment Process screen because only existing components can go offline.

Capacity Units

The Capacity Unit for each Major Component. The Capacity Unit for all Major Components is displayed in the Major Component window.

Year Online

The year the planned component goes online. This data always comes from the Planned Project because only planned components can have a go online year value.

Year Offline

The year the component goes offline. This data always comes from the Existing Treatment Process screen because only existing components can go offline.

Flows

The values in the Flows columns represent the flows for each Major Component in each projected year. Unlike the flow percentages in the Flow and Solids Allocation screen, which represent the flows through the connections, the flows in the Treatment Train Summary grid represent the flows through the components.

A value of 40.00 means that 40% of the flow travels through the component.

If a connection is offline (or not yet online) for any year, the value in that grid cell will be "Offline."

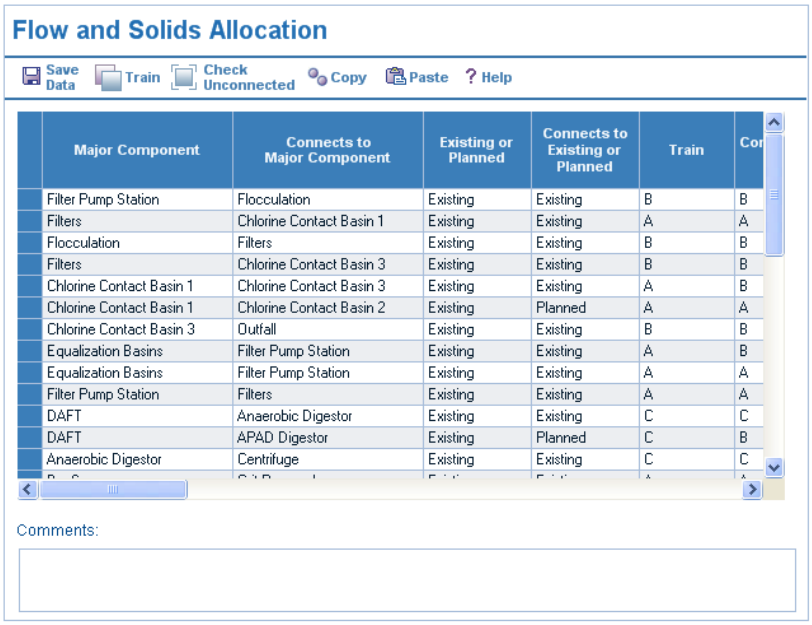
Flow and Solids Allocation

The Flow and Solids Allocation screen allows the user to enter the flow percentages for the connections between Major Components. A value in the Flow Allocation Percentage column represents the percentage of flow traveling through the connection between two components. The value is always entered for the connection, and not for the component itself. Although the percentage of

flow through the component may be the same as the percentage of flow through the connection, the value represents the percentage of flow through the connection, and not the percentage of flow through the component.

The percentage of flows in the train diagram are calculated based on the percentage of flows traveling through each connection. The Capacity Evaluation and Effluent Quality screens use the percentage of flows at the component to perform their calculations. If any component has a zero flow, the value for that component will be zero in the Capacity Evaluation screen. Also, that component will have no effect on the Effluent Quality calculations, as it will be unable to contribute to pollutant reduction or addition due to its zero flow.

Entering 40.00 means that 40% of the total projected flow for that projected year travels through that connection.



Major Component

The Major Components from the selected Planned Projects option are used to populate the Major Component column. If no Planned Projects exist, the Major Components from the Existing Treatment Process are used.

Connects to Major Component

Each Major Component must be connected to another Major Component in order to become part of the flow through the system. The "Connects to Major Components" column lists which component the Major Component is connected to. All of the components and their connections come from the selected Planned Projects option. If no Planned Projects exist, the Major Components from the Existing Treatment Process are used.

Existing or Planned

The "Existing or Planned" column displays whether the Major Component is an existing or planned component. The data comes entirely from the selected Planned Project option, if one exists. The term "Existing" refers to the existing components in the Planned Project, while the term "Planned" refers to the planned components in the Planned Project.

Each Planned Project contains both existing and planned Major Components. Although the "existing" components are originally derived from the Existing Treatment Process train diagram, each Planned Project has its own versions of those existing components, with its own connections, which may differ from the original connections in the Existing Treatment Process train diagram. The connections between the Planned Project's existing and planned components are the ones used in this screen.

The connections in the Existing Treatment Process are not used in this screen unless there are no Planned Projects. If there are no Planned Projects, the data for this screen comes solely from the Existing Treatment Process, and there will

be no planned components. In that case, the term "Existing" refers to the components in the Existing Treatment Process screen.

So, the term "Existing" refers to existing components in the Planned Project diagram, unless there are no Planned Projects.

Connects to Existing or Planned

The "Connects to Existing or Planned" column displays whether the component that the Major Component is connected to is an existing or planned component. The same logic applies for this column as for the "Existing or Planned" column, above, in that all of the data comes from the Planned Project option, if one exists.

Train

The train that each Major Component is in (from the Planned Projects train, or the Existing Treatment Process train, if no Planned Projects exist).

Connects to Train

The train that connected component is in (from the Planned Projects train, or the Existing Treatment Process train, if no Planned Projects exist).

Liquid or Solid

The Liquids train or the Solids train.

Capacity

The capacity of the existing or planned Major Component. The capacity for an existing component always comes from the Existing Treatment Process screen because that is the only screen where existing capacity is entered. That capacity is used in the Planned Projects screen, but it originates in the Existing Treatment Process screen.

Capacity Offline

The amount of capacity that goes offline in the year the component goes offline. This data always comes from the Existing Treatment Process screen because only existing components can go offline.

Capacity Units

The Capacity Unit for each Major Component. The Capacity Unit for all Major Components is displayed in the Major Component window.

Year Online

The year the Major Component goes online. This data always comes from the Planned Project because only Planned Project components can go online. Existing Treatment Process components are always online unless they go offline; they cannot go online in a certain year - they can only go offline.

Year Offline

The year the existing Major Component goes offline and is no longer available to the system. This value always comes from the Existing Treatment Process screen, regardless of whether or not Planned Projects exist. This is because only Existing Treatment Process components can go offline. Planned Project components can **be** offline, but that is only because they are not yet online - they cannot **go** offline once they are online.

Connects to Year Online

The year the connected planned component goes online. This data always comes from the Planned Project because only planned components can go online.

Connects to Year Offline

The year the connected component goes offline. This data always comes from the Existing Treatment Process screen because only existing components can go offline.

Flow Allocation Percentage

The Flow Allocation Percentage is entered by the user, and represents the percentage of flow traveling through the connection between the Major Component and the component it is connected to. Although the percentage of flow through the connection may be the same as the flow through the component, the value represents the percentage of flow through the connection, and not the percentage of flow through the component.

The percentage of flows in the train diagram are calculated based on the percentage of flows traveling through each connection. The Capacity Evaluation and Effluent Quality screens use the percentage of flows at the component to perform their calculations. If any component has a zero flow, the percentage of value for that component will be zero in the Capacity Evaluation screen. Also, that component will have no effect on the Effluent Quality calculations, as it will be unable to contribute to pollutant reduction or addition due to its zero flow.

Entering a value of 40.00 means that 40% of the flow travels through the connection.

If a connection is offline (or not yet online) for any year, the value in that grid cell will be automatically set to "Offline."

Effluent Quality

The Effluent Quality screen gathers data about the Major Components from the selected Planned Project, if one exists, or from the Existing Treatment Process, if no Planned Projects exist. The Effluent Quality screen also uses Projected Flows

and Loads data, Flow and Solids Allocation data, as well as Pollutant Reduction data, Pollutant Addition data, and Regulatory Requirements data, to calculate the effluent quality for each Projected Year.

The Effluent Quality grid is not editable.

Selected Pollutant Options

The top portion of the screen contains the selected options for Pollutant Reduction, Pollutant Addition, and Regulatory Requirements.

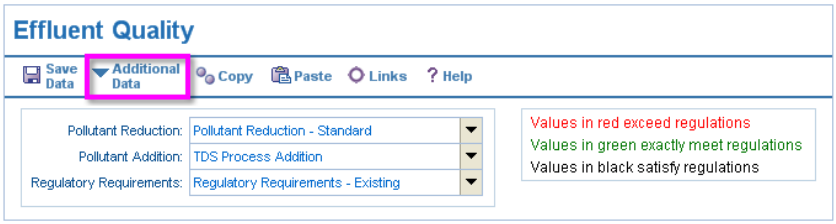
Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

Selected Options

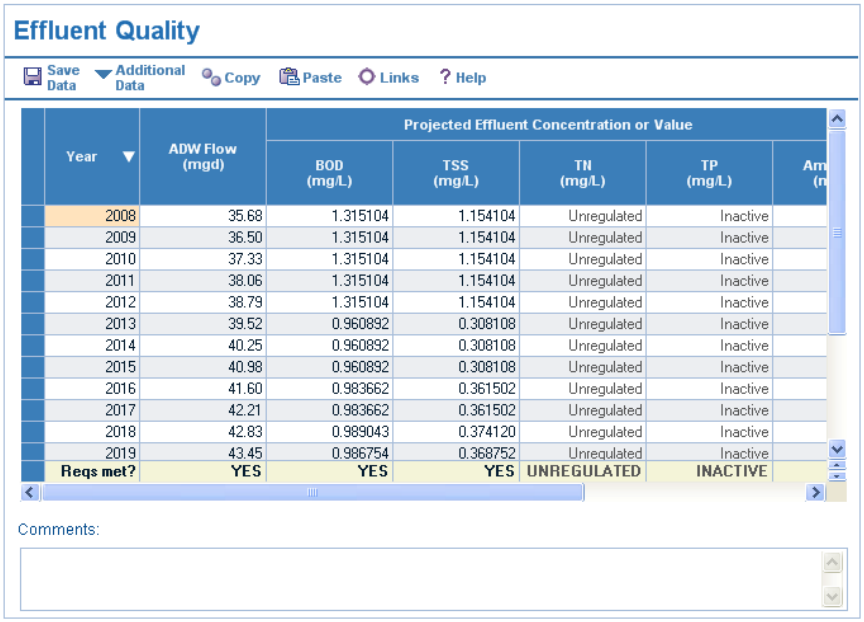
Calculated values in the Effluent Quality grid are based in part on the selected Pollutant Reduction, Pollutant Addition, and Regulatory Requirements options. The user can change which of those options are used in the Effluent Quality calculations by selecting items from the drop-down lists in the top portion of this screen.

Whenever a new selection is made, that selection becomes the active selection for the entire system, and the values in the Effluent Quality grid (as well as the entire system) are recalculated. The user can test various combinations of options to quickly determine whether Effluent Quality requirements are met for the system for those options.



Effluent Quality Data

The bottom portion of the screen contains the Effluent Quality data.



Year	ADW Flow (mgd)	Projected Effluent Concentration or Value				
		BOD (mg/L)	TSS (mg/L)	TN (mg/L)	TP (mg/L)	Am (n
2008	35.68	1.315104	1.154104	Unregulated	Inactive	
2009	36.50	1.315104	1.154104	Unregulated	Inactive	
2010	37.33	1.315104	1.154104	Unregulated	Inactive	
2011	38.06	1.315104	1.154104	Unregulated	Inactive	
2012	38.79	1.315104	1.154104	Unregulated	Inactive	
2013	39.52	0.960892	0.308108	Unregulated	Inactive	
2014	40.25	0.960892	0.308108	Unregulated	Inactive	
2015	40.98	0.960892	0.308108	Unregulated	Inactive	
2016	41.60	0.983662	0.361502	Unregulated	Inactive	
2017	42.21	0.983662	0.361502	Unregulated	Inactive	
2018	42.83	0.989043	0.374120	Unregulated	Inactive	
2019	43.45	0.986754	0.368752	Unregulated	Inactive	
Reqs met?	YES	YES	YES	UNREGULATED	INACTIVE	

Year

The Year column contains the years that exist in the Projected Years screen.

ADW Flow

The values in the ADW Flow column are the same values that appear in the Projected ADW Flow column in the Projected Flows and Loads screen.

Projected Effluent Concentration or Value

Effluent concentrations or values are calculated for each Major Component as follows:

Equation: Projected ADW Load x (100 - Pollutant Reduction Percentage) x Major Component Flow Percentage

The value is then combined with values from all other Major Components and converted from pounds per day to milligrams per liter by dividing by the Projected ADW Flow and dividing by 8.3454.

Finally, the Pollutant Addition values are added.

- The Projected ADW Load comes from the Projected ADW Load columns in the Projected Flows and Loads screen
- The Pollutant Reduction Percentage comes from the Major Component Pollutant Reduction Percentage columns in the Pollutant Reduction screen.
- The Major Component Flow Percentage values come from the Flow Allocation Percentage columns in the Flow and Solids Allocation screen
- The Projected ADW Flow comes from the Projected ADW Flow column in the Projected Flows and Loads screen
- The Pollutant Addition values come from the Major Component Pollutant Addition Increase column in the Pollutant Addition screen.

Each value in the "Projected Effluent Concentration or Value" columns is compared to the pollutant's regulatory requirement from the Regulatory Requirements screen. The value is displayed in red text if it exceeds the regulatory requirement, black text if it exactly meets the requirement, and green text if it satisfies the requirement.

Requirements Met

The Requirements Met row displays "YES" when every value in the column satisfies or exactly meets the regulatory requirement, and "NO" when any value in the column exceeds the requirement.

The Requirements Met row will display "INACTIVE" when BOD, TSS, TN, or TP is marked as inactive in both the Domestic Flows and Loads - Historical Data and the Industrial Flows and Loads screens, or when the pollutant is marked as inactive in the Other Pollutants screen.

The Requirements Met row will display "UNREGULATED" when the pollutant is unregulated in the Regulatory Requirements screen.

Pollutant Reduction

The Pollutant Reduction screen allows the user to enter pollutant reduction percentages for each Major Component and pollutant in the system. Those percentages are used in the Projected Effluent Concentration or Value columns in the Effluent Quality screen.

MPM does not allow pollutant reduction for components in the solids train, so only the liquid components are displayed in the Pollutant Reduction grid.

Name, Selected, Options

The top portion of the screen contains the Name, Selected check box, and the selected options.

Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

Name

The user enters the name of the Pollutant Reduction option in the Name box. This name will be used in the Data Tree, in the selection drop-down lists in the Scenario Summary form, and in reports and graphs.

Selected Check Box

The Selected check box denotes whether the Pollutant Reduction option is the one that is currently used by the system in calculations. When the box is unchecked, checking it will make the Pollutant Reduction option the currently selected one. Once the data is saved, the check box cannot be unchecked. To make a different Pollutant Reduction option the selected one, click on that option in the Data Tree, and click its Selected box in the Data Window, or visit the Scenario Summary screen to set the selections.

Selected Options

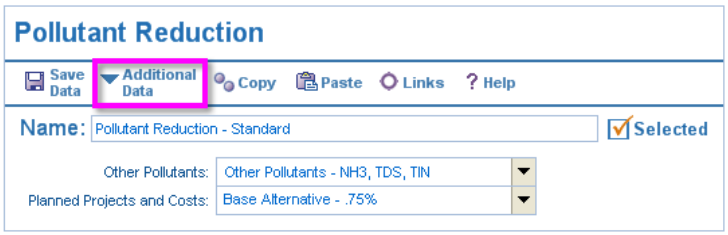
The BOD, TSS, TN, and TP will always appear in the Pollutant Reduction grid, but the additional pollutants come from the Other Pollutants screen. Changing the selected Other Pollutants option in the drop-down list will load the additional pollutants for that option into the grid.

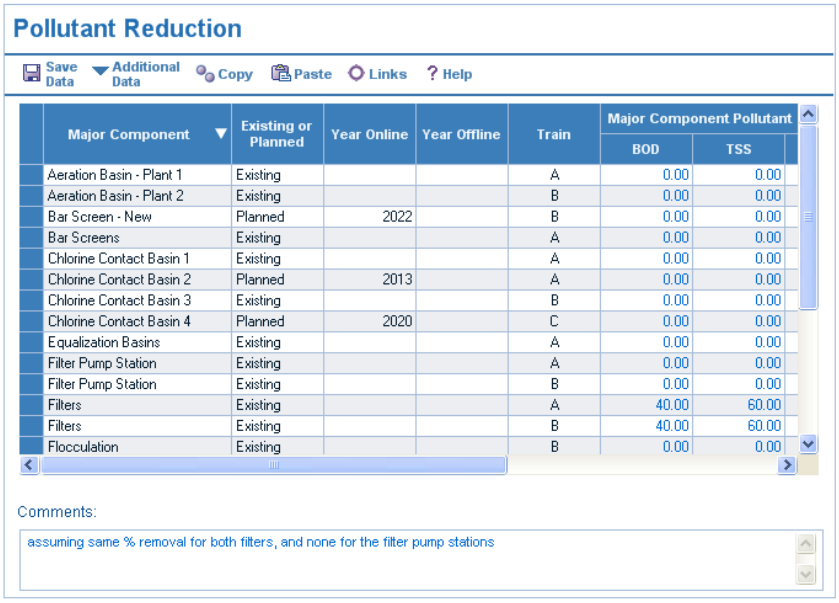
Each Other Pollutants option has its own values for the additional pollutants. This means that when changing the selected Other Pollutants option, the pollutant reduction values for the additional pollutants for that option will be loaded into the grid, but the BOD, TSS, TN and TP values will remain unchanged because they are shared by all of the Other Pollutants options.

The Major Components that are listed in the Pollutant Reduction grid come from the Planned Projects screen. Changing the selected Planned Projects option in the drop-down list will load the Major Components into the grid for that Planned Project.

Each Planned Project has its own pollutant reduction values for BOD, TSS, TN, and TP as well as all the additional pollutants. This means that changing the selected Planned Projects option will cause the entire grid to be reloaded with the pollutant reduction values from the selected Planned Project.

Whenever a new selection is made, that selection becomes the active selection for the entire system. The data for that option is loaded into the Pollutant Reduction grid, and the system values are recalculated.





Major Component

The Major Components from the selected Planned Projects option are used to populate the Major Component column. If no Planned Projects exist, the Major Components from the Existing Treatment Process are used.

Existing or Planned

The "Existing or Planned" column displays whether the Major Component is an existing or planned component. The data comes entirely from the selected Planned Project option, if one exists. The term "Existing" refers to the existing components in the Planned Project, while the term "Planned" refers to the planned components in the Planned Project.

Each Planned Project contains both existing and planned Major Components. Although the "existing" components are originally derived from the Existing Treatment Process train diagram, each Planned Project has its own versions of those existing components, with its own connections, which may differ from the original connections in the Existing Treatment Process train diagram. The connections between the Planned Project's existing and planned components are the ones used in this screen.

The connections in the Existing Treatment Process are not used in this screen unless there are no Planned Projects. If there are no Planned Projects, the data for this screen comes solely from the Existing Treatment Process, and there will be no planned components. In that case, the term "Existing" refers to the components in the Existing Treatment Process screen.

So, the term "Existing" refers to existing components in the Planned Project diagram, unless there are no Planned Projects.

Year Online

The year the Major Component goes online. This data always comes from the Planned Project because only Planned Project components can go online. Existing Treatment Process components are always online unless they go offline; they cannot go online in a certain year - they can only go offline.

Year Offline

The year the existing Major Component goes offline and is no longer available to the system. This value always comes from the Existing Treatment Process screen, regardless of whether or not Planned Projects exist. This is because only Existing Treatment Process components can go offline. Planned Project components can be offline, but that is only because they are not yet online - they cannot go offline once they are online.

Train

The train that each Major Component is in (from the Planned Projects train, or the Existing Treatment Process train, if no Planned Projects exist).

Major Component Pollutant Reduction Percentage

The percentage of the pollutant load that will be removed as flow travels through the Major Component.

Entering a value of 40.00 means that 40% of the pollutant load will be removed.

Pollutant Addition

The Pollutant Addition screen allows the user to enter pollutant addition values for each Major Component and pollutant in the system. Those concentrations are used in the Projected Effluent Concentration or Value columns in the Effluent Quality screen.

MPM does not allow pollutant addition for components in the solids train, so only the liquid components are displayed in the Pollutant Reduction grid.

Name, Selected, Options

The top portion of the screen contains the Name, Selected check box, and the selected options.

Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

Name

The user enters the name of the Pollutant Addition option in the Name box. This name will be used in the Data Tree, in the selection drop-down lists in the Scenario Summary form, and in reports and graphs.

Selected Check Box

The Selected check box denotes whether the Pollutant Addition option is the one that is currently used by the system in calculations. When the box is unchecked, checking it will make the Pollutant Addition option the currently selected one. Once the data is saved, the check box cannot be unchecked. To make a different Pollutant Addition option the selected one, click on that option in the Data Tree, and click its Selected box in the Data Window, or visit the Scenario Summary screen to set the selections.

Selected Options

The BOD, TSS, TN, and TP will always appear in the Pollutant Addition grid, but the additional pollutants come from the Other Pollutants screen. Changing the selected Other Pollutants option in the drop-down list will load the additional pollutants for that option into the grid.

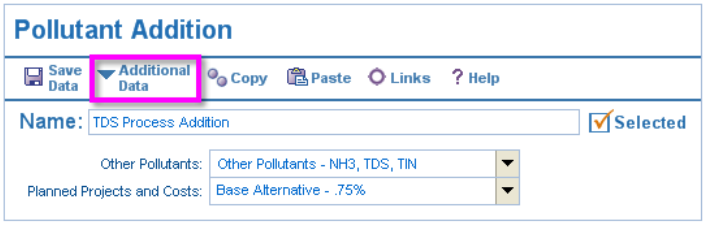
Each Other Pollutants option has its own values for the additional pollutants. This means that when changing the selected Other Pollutants option, the pollutant

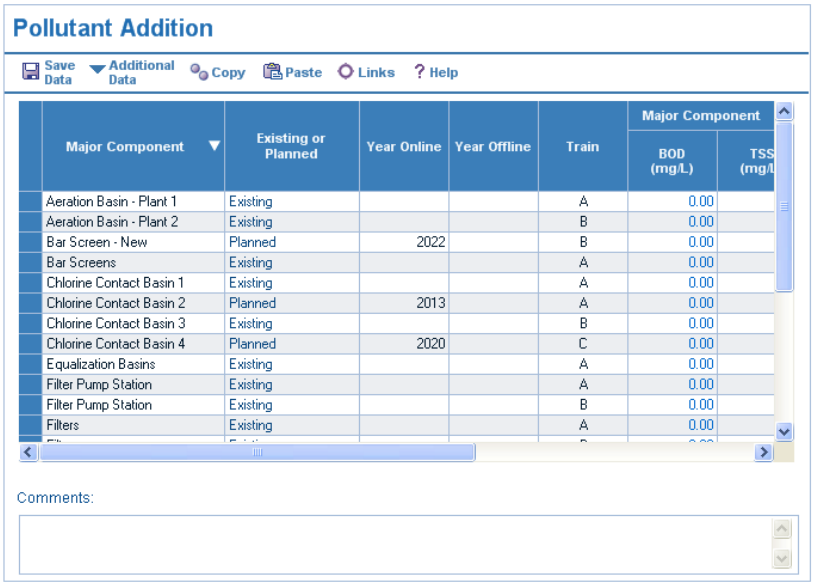
addition values for the additional pollutants for that option will be loaded into the grid, but the BOD, TSS, TN and TP values will remain unchanged because they are shared by all of the Other Pollutants options.

The Major Components that are listed in the Pollutant Addition grid come from the Planned Projects screen. Changing the selected Planned Projects option in the drop-down list will load the Major Components into the grid for that Planned Project.

Each Planned Project has its own pollutant addition values for BOD, TSS, TN, and TP as well as all the additional pollutants. This means that changing the selected Planned Projects option will cause the entire grid to be reloaded with the pollutant addition values from the selected Planned Project.

Whenever a new selection is made, that selection becomes the active selection for the entire system. The data for that option is loaded into the Pollutant Addition grid, and the system values are recalculated.





Major Component

The Major Components from the selected Planned Projects option are used to populate the Major Component column. If no Planned Projects exist, the Major Components from the Existing Treatment Process are used.

Existing or Planned

The "Existing or Planned" column displays whether the Major Component is an existing or planned component. The data comes entirely from the selected Planned Project option, if one exists. The term "Existing" refers to the existing components in the Planned Project, while the term "Planned" refers to the planned components in the Planned Project.

Each Planned Project contains both existing and planned Major Components. Although the "existing" components are originally derived from the Existing Treatment Process train diagram, each Planned Project has its own versions of those existing components, with its own connections, which may differ from the original connections in the Existing Treatment Process train diagram. The connections between the Planned Project's existing and planned components are

the ones used in this screen.

The connections in the Existing Treatment Process are not used in this screen unless there are no Planned Projects. If there are no Planned Projects, the data for this screen comes solely from the Existing Treatment Process, and there will be no planned components. In that case, the term "Existing" refers to the components in the Existing Treatment Process screen.

So, the term "Existing" refers to existing components in the Planned Project diagram, unless there are no Planned Projects.

Year Online

The year the Major Component goes online. This data always comes from the Planned Project because only Planned Project components can go online. Existing Treatment Process components are always online unless they go offline; they cannot go online in a certain year - they can only go offline.

Year Offline

The year the existing Major Component goes offline and is no longer available to the system. This value always comes from the Existing Treatment Process screen, regardless of whether or not Planned Projects exist. This is because only Existing Treatment Process components can go offline. Planned Project components can **be** offline, but that is only because they are not yet online - they cannot **go** offline once they are online.

Train

The train that each Major Component is in (from the Planned Projects train, or the Existing Treatment Process train, if no Planned Projects exist).

Major Component Pollutant Addition Increase

The amount or concentration that will be added to the BOD, TSS, TN, TP or additional pollutant in the Projected Effluent Concentration or Value column in the Effluent Quality screen.

Regulatory Requirements

The Regulatory Requirements screen allows the user to enter National Pollutant Discharge Elimination System (NPDES) effluent quality requirements for the pollutants in the system. These values will be used by the Effluent Quality screen when determining if the effluent concentration values satisfy regulatory requirements.

Name, Selected, Options

The top portion of the screen contains the Name, Selected check box, and the selected options.

Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

Name

The user enters the name of the Regulatory Requirements option in the Name box. This name will be used in the Data Tree, in the selection drop-down lists in the Scenario Summary form, and in reports and graphs.

Selected Check Box

The Selected check box denotes whether the Regulatory Requirements option is the one that is currently used by the system in calculations. When the box is unchecked, checking it will make the Regulatory Requirements option the currently selected one. Once the data is saved, the check box cannot be

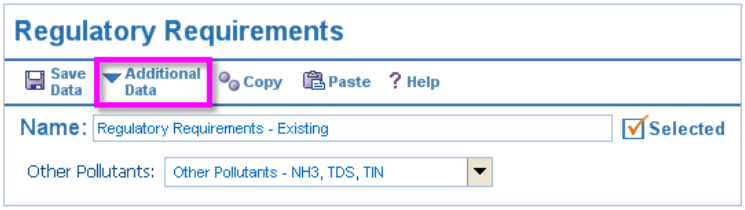
unchecked. To make a different Regulatory Requirements option the selected one, click on that option in the Data Tree, and click its Selected box in the Data Window, or visit the Scenario Summary screen to set the selections.

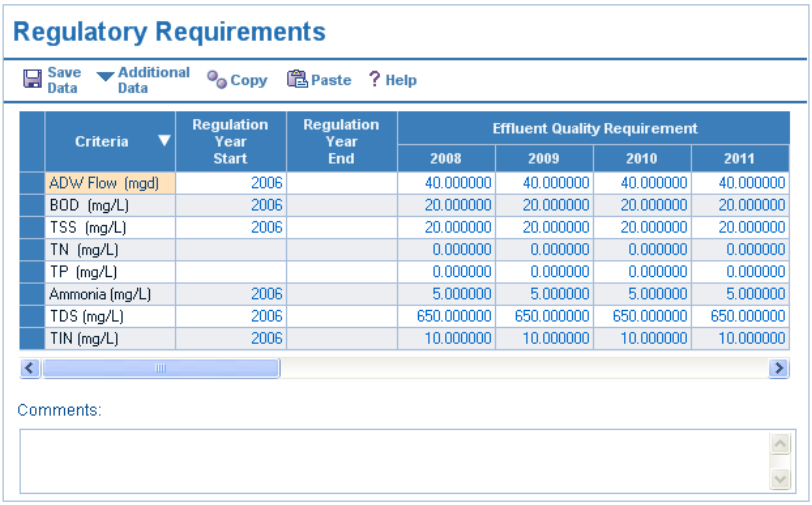
Selected Option

The BOD, TSS, TN, and TP will always appear in the Regulatory Requirements grid, but the additional pollutants come from the Other Pollutants screen. Changing the selected Other Pollutants option in the drop-down list will load the additional pollutants for that option into the grid.

Each Other Pollutants option has its own values for the additional pollutants. This means that when changing the selected Other Pollutants option, the regulatory requirement values for the additional pollutants for that option will be loaded into the grid, but the BOD, TSS, TN, and TP values will remain unchanged because they are shared by all of the Other Pollutants options.

Whenever a new selection is made, that selection becomes the active selection for the entire system. The data for that option is loaded into the Regulatory Requirements grid, and the system values are recalculated.





Regulatory Requirements

Save Data | Additional Data | Copy | Paste | Help

Criteria	Regulation Year Start	Regulation Year End	Effluent Quality Requirement			
			2008	2009	2010	2011
ADW Flow (mgd)	2006		40.000000	40.000000	40.000000	40.000000
BOD (mg/L)	2006		20.000000	20.000000	20.000000	20.000000
TSS (mg/L)	2006		20.000000	20.000000	20.000000	20.000000
TN (mg/L)			0.000000	0.000000	0.000000	0.000000
TP (mg/L)			0.000000	0.000000	0.000000	0.000000
Ammonia (mg/L)	2006		5.000000	5.000000	5.000000	5.000000
TDS (mg/L)	2006		650.000000	650.000000	650.000000	650.000000
TIN (mg/L)	2006		10.000000	10.000000	10.000000	10.000000

Comments:

Criteria

The Criteria column will always contain ADW Flow, BOD, TSS, TN, and TP. If an Other Pollutants option exists, the Criteria column will also contain the pollutants from the selected Other Pollutants option. Changing the selected Other Pollutants option in the drop-down list will cause the Regulatory Requirements grid to reload Major Components in the grid to change to match the components that exist in the Planned Projects screen.

Each Planned Project has its own pollutant addition values for BOD, TSS, TN, and TP as well as all the additional pollutants. This means that changing the selected Planned Projects option will cause the entire grid to be reloaded with the pollutant addition values from the selected Planned Project.

Whenever a new selection is made, that selection becomes the active selection for the entire system. The data for that option is loaded into the Pollutant Addition grid, and the system values are recalculated.

Regulation Year Start

The year in which the regulation of the pollutant will begin. If this value is left blank, the pollutant will be unregulated in the Effluent Quality screen.

The value must be a four-digit year.

Regulation Year End

The year in which the regulation of the pollutant will end. If a year is entered in this column, a year must also be entered in the Regulation Year Start column.

The value must be a four-digit year.

Effluent Quality Requirement

The NPDES regulatory requirement for the item in the Criteria column, in the units that appear in the Criteria column.

Project Schedule

The Project Schedule screen displays the scheduling information for the currently selected Planned Project. Each planned Major Component in the Planned Project that is included in treatment or included in costs (or both) will be displayed in the Project Schedule grid.

The Project Schedule grid is not editable.

Selected Option

The top portion of the screen contains the Planned Projects selected option.

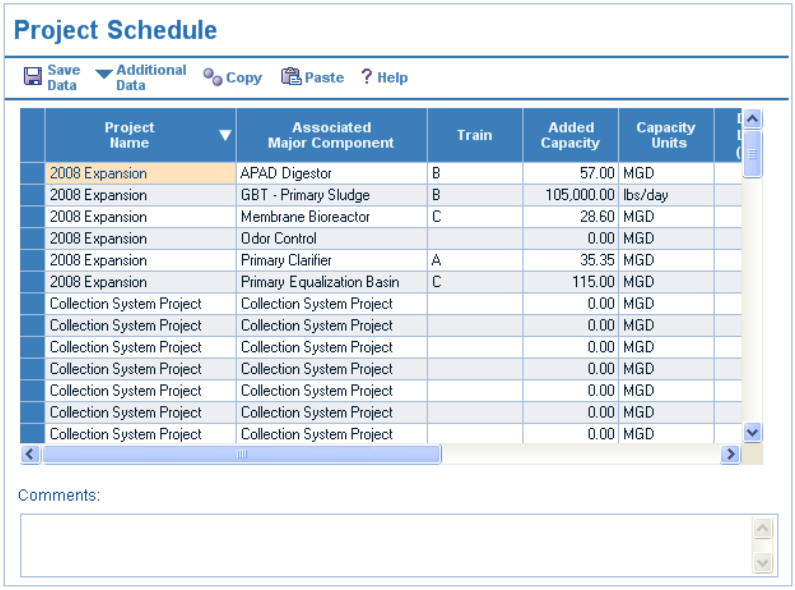
Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

Selected Planned Project Option

The Project Names and Associated Major Components that are listed in the Project Schedule grid come from the Planned Projects screen. Changing the selected Planned Projects option in the drop-down list will load the Project Names and Associated Major Components into the grid for that Planned Project.

Whenever a new selection is made, that selection becomes the active selection for the entire system. The data for that option is loaded into the Project Schedule grid, and the system values are recalculated.



Associated Major Component

The Associated Major Component comes from the selected Planned Projects grid. Only those planned Major Components that are included in treatment or included in costs (or both) will be included in the Project Schedule grid.

Train

Data for the Train data comes from the Train column in the selected Planned Projects grid.

Added Capacity

Data for the Added Capacity column comes from the Capacity column in the selected Planned Projects grid.

Capacity Units

Data for the Capacity Units column comes from the Capacity Units column in the selected Planned Projects grid.

Design Length

Data for the Design Length column comes from the Design Length column in the selected Planned Projects grid.

Construction Length

Data for the Construction Length column comes from the Construction Length column in the selected Planned Projects grid.

Year Design Starts

The Year Design Starts is the year during which the design process should begin so that the project will be completed by the scheduled year online.

The Year Design Starts is calculated as follows:

Equation: Year Online - Design Length - Construction length

Year Construction Starts

The Year Construction Starts is the year during which the construction process should begin so that the project will be completed by the scheduled year online.

The Year Construction Starts is calculated as follows:

Equation: Year Online - Construction Length

Year Online

Data for the Year Online column comes from the Year Online column in the selected Planned Projects grid.

Planned Projects and Costs

The Planned Projects and Costs screen represents the configuration of major components for the years in the planning period. The planned components are created by adding Major Components to the grid or train, entering data for those components, and creating connections in the train. Multiple Planned Project options can be created to determine the effects of various component configurations.

When a Planned Project is created, it starts off with all of the existing treatment process components and connections as a basis upon which to build. Whenever a change is made to a component or connection in the Existing Treatment Process screen, that change is automatically included in all the Planned Projects in the Scenario.

When there are no Planned Projects, the Existing Treatment Process serves as the treatment system upon which calculations are based. System calculations (such as those for Capacity Evaluation and Effluent Quality) are based on the components and data that appear in the Existing Treatment Process.

When Planned Projects exist, system calculations are no longer based on the Existing Treatment Process, but are based on the components and data in the selected Planned Project. Although the Existing Treatment Process is no longer used as the basis for those calculations, it is still used as the starting point for newly-created Planned Projects.

In addition, whenever a change is made to a component or connection in the Existing Treatment Process screen, that change is automatically included in all the Planned Projects in the Scenario. For example, if a connection is created between two components in the Treatment Process train, that connection will also be created automatically in all the Planned Projects in the Scenario. However, if a connection is deleted in the Treatment Process train, that connection will NOT be deleted from any of the Planned Projects. The Treatment Process only adds information to the Planned Projects; it never deletes it. Any changes made in the Planned Projects will have no effect on any data in the Treatment Process screen.

General Data Operations

Adding Grid Rows. Click the Add Component button to display a small major components box. A row is added to the grid by dragging a component from the major components box and dropping it into the grid or train. When a component is dropped into the train, it is automatically added to the grid, and the "Included in Treatment" check box is checked. When a component is dropped into the grid, it is not automatically added to the train, and its "Included in Treatment" check box is not checked. Checking the "Included in Treatment" checkbox causes the component to appear in the train. Unchecking the checkbox removes the component from the train. See the Adds Capacity column, below, for a description of added-capacity components

Deleting Grid Rows. When a row is deleted from the grid, that component is deleted from the train. The component and all of its data will be deleted when the data is saved.

Major Components. Components are added to the planned project by clicking the Add Component button and dragging components from the major components box and dropping them into the grid or train.

Train. The components that are marked as "Included in Treatment" in the grid will appear in the treatment train. Click the Train button in the toolbar to display/hide the train diagram. Click the year to the left of the Liquids button to display and select from the list of Projected Years. Years in blue indicate a change in component connection or Year Online for that year.

Component Connections. Creating connections between the components creates the flow through the treatment train. To create a connection, check the Connect check box, click a component, and then click another component. The connection will be created between the two components. If a third component is then clicked, a connection will be created from the second component to the third component. To then create a connection between two other components, four and five, click a blank spot on the train to remove the highlight from the third component, and click component four to highlight it, and then click component five to create the connection.

Removing or Deleting Components. To remove a component from the treatment train, click on it in the train and press the Delete button. The component will be removed from the train; it will remain in the grid, but its "Included in Treatment" check box will be unchecked. A component can also be removed from the train by unchecking its "Included in Treatment" check box in the grid.

When a component is removed from treatment via the methods described above, that component, along with its data, remains in the grid. To delete the component

complete, rather than just removing it from treatment, delete its row from the grid. Deleting the grid row will delete the component from the grid and the train, and all of its data will be deleted when the Planned Projects data is saved.

Liquids and Solids. The train is separated into a liquids train and a solids train. Click the Liquids button to view the liquids train, and the Solids button to view the solids train.

Check Unconnected. In order for the flow to travel through all components, the components must be connected to each other. If a component has no connections, it will not be included in the flow. Click the Check Unconnected button to display a list of the unconnected components. If there are any unconnected components, the Capacity Evaluation and Effluent Quality calculations cannot be performed, and the data for those screens will not be displayed.

Name, Selected, ELAC, ENR, Total Included Project Costs

The top portion of the screen contains the Name, the Selected check box, the ELAC factor, ENR values, and the Total Included Project Costs.

Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

Name

The user enters the name of the projected Planned Projects option in the Name box. This name will be used in the Data Tree, in the selection drop-down lists in the Scenario Summary form, and in reports and graphs.

Selected Check Box

The Selected check box denotes whether the projected Planned Projects option is the one that is currently used by the system in calculations. When the box is unchecked, checking it will make the Planned Projects option the currently selected one. Once the data is saved, the check box cannot be unchecked. To make a different Planned Projects option the selected one, click on that option in the Data Tree, and click its Selected box in the Data Window, or visit the Scenario Summary screen to set the selections.

ELAC Factor

The ELAC Factor modifies the Total Project Cost values by multiplying it by the value entered into the ELAC Factor box.

ENR Values

The Engineering News Record (ENR) index values allow costs estimated in previous years to be adjusted to the current year. The ENR index represents the costs of construction from year to year. The Original ENR Value represents the ENR index for the year in which the costs were determined. The Current ENR Value represents the ENR index for the current year. The equation for adjusting the costs to the current year is as follows:

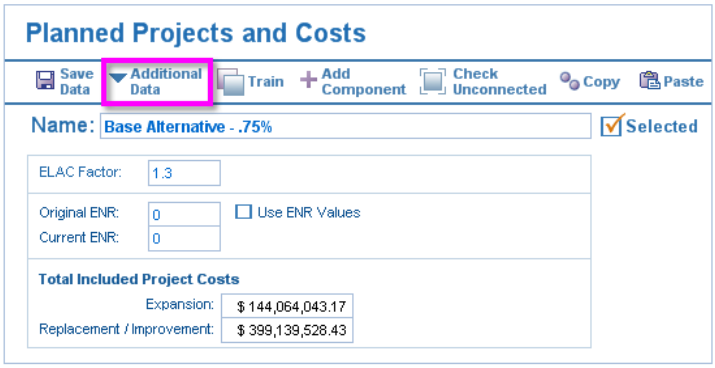
Equation: Current Cost = Original Cost x Current ENR Value / Original ENR Value

To apply the ENR values, check the "Use ENR Values" check box, and enter the Original ENR Value and the Current ENR Value.

When the "Use ENR Values" box is checked, the data in the Estimated Construction Cost column are not editable.

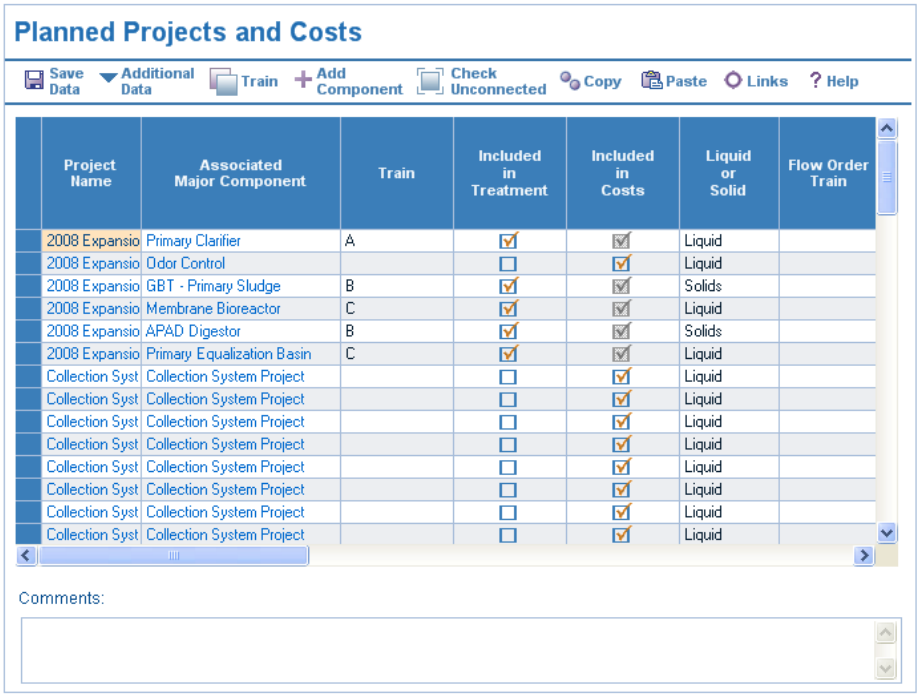
Total Included Project Costs

The Total Project Cost for all Major Components is split into Expansion and Replacement/Improvement portions based on the percentages in the "Percentage of Project Costs Allocated to Expansion" column and the "Percentage of Project Costs Allocated to Replacement or Improvement" column. The totals for each of those portions appears in the Expansion and Replacement/Improvement boxes.



Planned Projects Data

The bottom portion of the screen contains data for the Planned Projects.



Project Name

The user enters a Project Name for each row in the grid.

Associated Major Component

Each Major Component is added to the grid by dragging and dropping from the small major components box accessed by clicking the Add Component button.

There can be multiple components of the same type in each lettered section of the train, but only one of them will be visible in the train. The other components in the train will be invisible, and they will only contribute capacity to the visible component. For example, if a Membrane Bioreactor exists in train section C, and another Membrane Bioreactor is dropped into section C, the newly-dropped Membrane Bioreactor will become invisible, and will become a capacity contributor to the visible Membrane Bioreactor. Any other Membrane Bioreactors dropped into section C will also become invisible capacity contributors. The invisible component cannot have any connections, as it does not stand on its own, but is only a contributor to another component.

When a component is a capacity contributor, the word "Yes" will appear in the Adds Capacity column.

Train

The Train column displays the letter of the train section in which the Major Component appears.

Included in Treatment

Check the Included in Treatment check box to include the component in the treatment train. Uncheck the box to remove the components from the train. When

the Included in Treatment box is checked the Included in Costs box is automatically checked.

Included in Costs

Some components, such as administration or maintenance, do not appear in the treatment train, but are included in the system because they have associated costs. To include a component only for cost purposes, leave the Included in Treatment box unchecked, and check the Included in Costs box. The component will not appear in the train, but will appear in the O&M Costs screen.

Liquid or Solid

The value in the Liquid or Solid column denotes the component as a Liquids or Solids component. Liquids components appear in the Liquids train, and Solids components appear in the Solids train. Click the Liquids button and the Solids button to view the train diagrams.

Flow Order Train

The Flow Order Train column contains the flow order of each component. The flow order is based on the connections between the components. Each component is numbered in succession based on the connection coming into it from the previous component. Components that have no connections have no Flow Order Train value.

Reason

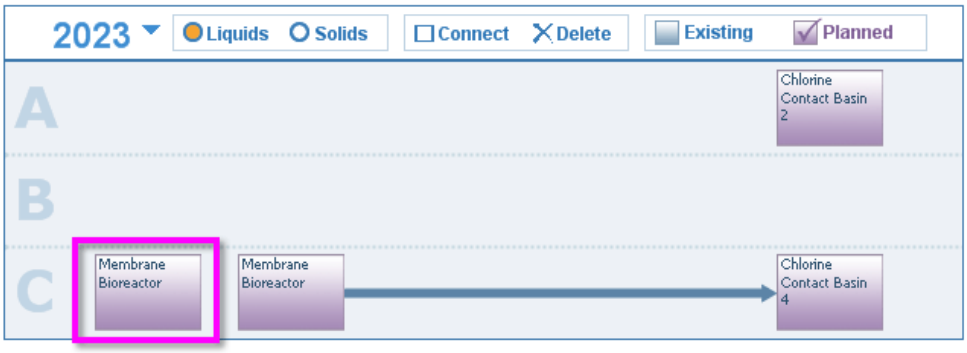
The user selects a reason for the existence of the project from a predefined list of reasons.

Adds Capacity

There can be multiple components of the same type in each lettered section of the train, but only one of them will be visible in the train. The other components in the train will be invisible, and they will only contribute capacity to the visible component. For example, if a Membrane Bioreactor exists in train section C, and another Membrane Bioreactor is dropped into section C, the newly-dropped Membrane Bioreactor will become invisible, and will become a capacity contributor to the visible Membrane Bioreactor. Any other Membrane Bioreactors dropped into section C will also become invisible capacity contributors. The invisible component cannot have any connections, as it does not stand on its own, but is only a contributor to another component.

When a component is a capacity contributor, the word "Yes" will appear in the Adds Capacity column.

The invisible components can be revealed by unchecking the Existing check box, so that only the Planned check box is checked. The Membrane Bioreactor circled in pink, below, is an added-capacity component. It contributes capacity to the other Membrane Bioreactor in section C of the train.



Capacity

The Capacity Type for each Major Component. The Capacity Type for all Major Components is displayed in the Major Component window.

Capacity Type

The Capacity Type for each Major Component. The Capacity Type for all Major Components is displayed in the Major Component window.

Capacity Units

The capacity unit for each Major Component. The capacity unit for each Major Component is displayed in the Major Component window.

Design Length

The user enters the length of time the design process will take, in whole years.

Construction Length

The user enters the length of time the construction process will take, in whole years.

Year Online

The user enters the year the major component will come online.

Estimated Construction Cost

The user enters the estimated cost of construction for the project. The Estimated Construction Cost column is not editable when the Use ENR Values check box is checked. To edit the values, uncheck the Use ENR Values check box.

Total Project Cost

The Total Project Cost is the Estimated Construction Cost modified by the ELAC Factor and the ENR values.

Percentage of Project Costs Allocated To Expansion

The user enters the percentage of the total costs that are applicable to expansion costs. Enter values as percentages, so that entering 50.00 represents 50%. The Expansion percentage plus the Replacement/Improvement percentage must total 100%.

Percentage of Project Costs Allocated To Replacement or Improvement

The user enters the percentage of the total costs that are applicable to replacement or improvement costs. Enter values as percentages, so that entering 50.00 represents 50%. The Expansion percentage plus the Replacement/Improvement percentage must total 100%.

Number of Units

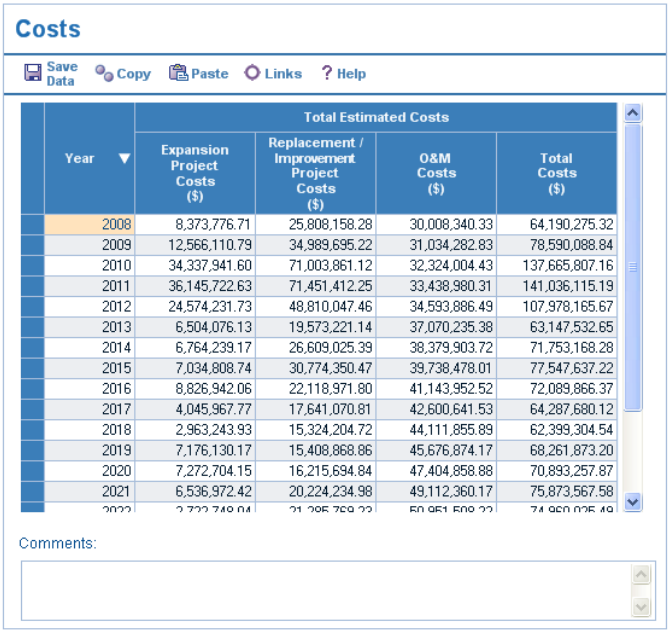
The user enters the number of units that comprise the component. This is a numeric value only.

Comments

The user enters comments for each project/major component row in the grid.

Costs

The Costs screen displays the total costs from the Project Expansion Costs, Project Replacement/Improvement Costs, and O&M Costs screens



Costs

Save Data | Copy | Paste | Links | Help

	Year	Total Estimated Costs			
		Expansion Project Costs ($)	Replacement / Improvement Project Costs ($)	O&M Costs ($)	Total Costs ($)
	2008	8,373,776.71	25,808,158.28	30,008,340.33	64,190,275.32
	2009	12,566,110.79	34,989,695.22	31,034,282.83	78,590,088.84
	2010	34,337,941.60	71,003,861.12	32,324,004.43	137,665,807.16
	2011	36,145,722.63	71,451,412.25	33,438,980.31	141,036,115.19
	2012	24,574,231.73	48,810,047.46	34,593,886.49	107,978,165.67
	2013	6,504,076.13	19,573,221.14	37,070,235.38	63,147,532.65
	2014	6,764,239.17	26,609,025.39	38,379,903.72	71,753,168.28
	2015	7,034,808.74	30,774,350.47	39,738,478.01	77,547,637.22
	2016	8,826,942.06	22,118,971.80	41,143,952.52	72,089,866.37
	2017	4,045,967.77	17,641,070.81	42,600,641.53	64,287,680.12
	2018	2,963,243.93	15,324,204.72	44,111,855.89	62,399,304.54
	2019	7,176,130.17	15,408,868.86	45,676,874.17	68,261,873.20
	2020	7,272,704.15	16,215,694.84	47,404,858.88	70,893,257.87
	2021	6,536,972.42	20,224,234.98	49,112,360.17	75,873,567.58
	2022	2,722,748.04	21,285,769.23	50,951,508.22	74,960,025.49

Comments:

Year

The Year column contains the years that exist in the Projected Years screen.

Expansion Project Costs

The costs for each year from the Project Expansion Costs screen.

Replacement/Improvement Project Costs

The costs for each year from the Project Replacement/Improvement Costs screen.

O&M Costs

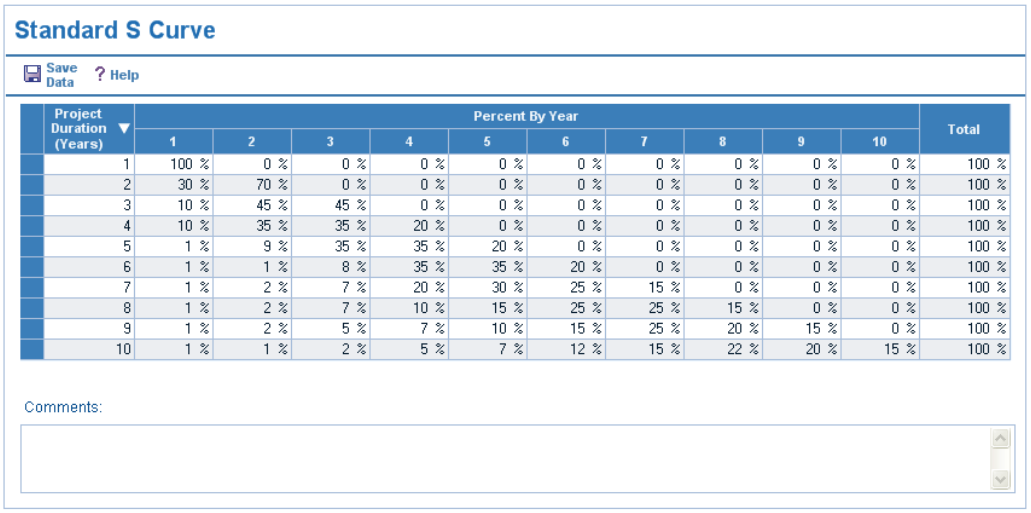
The costs for each year from the O&M Costs screen.

Total Costs

The total costs for each year.

Standard S Curve

The percentages in the Standard S Curve grid are used to calculate the yearly costs in the Project Expansion Costs and Project Replacement/Improvement Costs screens.



Standard S Curve

Save Data | Help

Project Duration (Years)	Percent By Year										Total
	1	2	3	4	5	6	7	8	9	10	
1	100 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	100 %
2	30 %	70 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	100 %
3	10 %	45 %	45 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	100 %
4	10 %	35 %	35 %	20 %	0 %	0 %	0 %	0 %	0 %	0 %	100 %
5	1 %	9 %	35 %	35 %	20 %	0 %	0 %	0 %	0 %	0 %	100 %
6	1 %	1 %	8 %	35 %	35 %	20 %	0 %	0 %	0 %	0 %	100 %
7	1 %	2 %	7 %	20 %	30 %	25 %	15 %	0 %	0 %	0 %	100 %
8	1 %	2 %	7 %	10 %	15 %	25 %	25 %	15 %	0 %	0 %	100 %
9	1 %	2 %	5 %	7 %	10 %	15 %	25 %	20 %	15 %	0 %	100 %
10	1 %	1 %	2 %	5 %	7 %	12 %	15 %	22 %	20 %	15 %	100 %

Comments:

Example Calculation

The image below shows a portion of the Project Expansion Costs grid. The cost for 2008 for a project with a total cost of $210,583.10 (the first row in the grid) is calculated as follows:

Find the percentages in the Project Duration column in the Standard S Curve grid for a project that lasts three years. The percentages are 10%, 45%, and 45%.

The total project cost is $210,583.10, so the cost for the first year is $210,583.10 x 10% = $21,058.31; the cost for the second year is $210,583.10 x 45% = $94,762.40; and the cost for the third year is $210,583.10 x 45% = $94,762.40.

The projects starts in 2006 and ends in 2008, making 2008 the third year. So the cost in 2008 is $94,762.40.

(For the purposes of determining project schedules and costs, a year starts in January and ends in December, so that the first year of the project is the entire

year of 2006, the second year is 2007, and the third year is 2008, so that the project is ready to go online at the beginning of 2009).

Project Name	Major Component Name	Start Date (Year)	Year Online	Project Duration (Years)	Total Expansion Project Cost ($)	Expansion Project Cost By Year	
						2008	2009
Misc CIP	Addtl Downtown Manholes	2006	2009	3	210,583.10	94,762.40	0.00
Misc CIP	Adjust Sewer Manholes on Bla	2006	2009	3	5,717.40	2,572.83	0.00
2008 Expansion	APAD Digestor	2008	2013	5	5,112,660.11	51,126.60	460,139.41

Project Duration

The length of the project, in years.

Percent by Year

The percentage of the total project cost that is applied to each year of the project.

Total

The total of the percentages in the "Percent by Year" column.

Project Expansion Costs

The Project Expansion Costs screen displays the expansion-related project cost data from the selected Planned Projects option. Each Major Component in the Planned Project that is included in treatment or included in costs (or both) will be displayed in the Project Expansion Costs grid.

The data in the Project Expansion Costs grid is not editable.

Project Cost Escalation

The top portion of the screen contains the Project Cost Escalation data.

Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

Project Cost Escalation

Project cost escalation allows inflation to be taken into account when calculating costs. By including the effects of inflation, cost escalation provides a more realistic estimate of future year costs.

The basis for the cost escalation is the year entered into the "Costs are in what year's dollars" box. The cost for each project year is escalated based on that cost year. The costs for the first five project year are escalated using the percentage entered into the "Escalation rate for first 5 years" box. Subsequent project year costs are escalated using the percentage entered into the "Escalation rate for subsequent years" box.

To escalate the existing costs, check the "Escalate Costs to Corresponding Year" check box, and enter the escalation year and the escalation percentages.

The equations for applying cost escalation are as follows:

For the case where the Escalation Cost Year + 5 <= Project Year:

Equation: Future Cost = Original Cost x (1 + Escalation PercentageA/100) (Project Year - Escalation Cost Year)

For the case where the Escalation Cost Year + 5 > Project Year:

Equation: Future Cost = Original Cost x (1 + Escalation PercentageA/100) ^{5} x (1 + Escalation PercentageB/100) (Project Year - Escalation Cost Year - 5)

Where

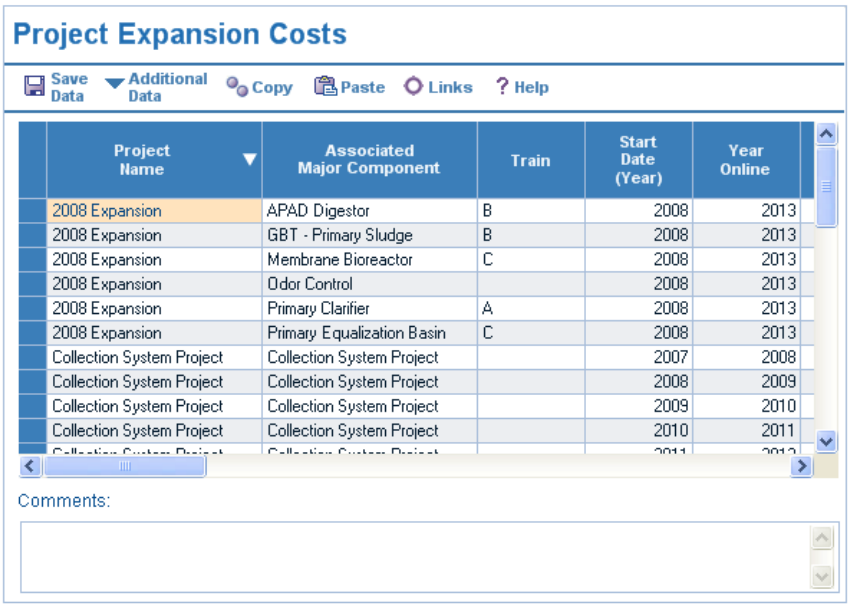
- the Escalation Cost Year is the year in the "Costs are in what year's dollars" box
- the Escalation PercentageA is the escalation rate for the first 5 years
- the Escalation PercentageB is the escalation rate for subsequent years

For example, a 2007 cost of $94,762.40 escalated to 2008 dollars would be $100,448.14:

$$\$94{,}762.40 \times (1 + 6/100)^{(2008 - 2007)} = \$100{,}448.14$$

while a 2007 cost of $4,673,292.35 escalated to 2014 dollars would be $6,764,239.17:

$$\$4{,}673{,}292.35 \times (1 + 6/100)^{5} \times (1 + 4/100)^{(2014 - 2007 - 5)} = \$6{,}764{,}239.17$$



Project Name

The Project Name comes from the Project Name column in the Planned Projects screen.

Associated Major Component

The Associated Major Component comes from the selected Planned Projects grid. Only those planned Major Components that are included in treatment or included in costs (or both) will be included in the Project Expansion Costs grid.

Train

Data for the Train column comes from the Train column in the selected Planned Projects grid.

Start Date

The Start Date is the year during which the design process should begin so that the project will be completed by the scheduled year online.

The Start Date is calculated as follows:

Equation: Year Online - Project Duration

Year Online

Data for the Year Online column comes from the Year Online column in the selected Planned Projects grid.

Project Duration

The Project Duration is the length of time it will take to complete the design and construction of the project.

The Project Duration is calculated as follows:

Equation: Design Length + Construction Length

(The Design Length and Construction Length come from the Planned Projects grid.)

Total Expansion Project Cost

The total of the expansion portion of the project cost, from the Planned Projects screen, modified by ENR and cost escalation, if used.

Expansion Project Cost by Year

The expansion project costs are broken down by year in the Expansion Project Cost by Year columns based on the percentages in the Standard S Curve screen.

For example, the cost for year 2008 for a project with a total cost of $210,583.10 (the first row in the grid below) is calculated as follows:

Find the percentages in the Standard S Curve grid (the second image, below) for a project that lasts three years. The percentages are 10%, 45%, and 45%.

The total project cost is $210,583.10, so the cost for the first year is $210,583.10 x 10% = $21,058.31;
the cost for the second year is $210,583.10 x 45% = $94,762.40; and
the cost for the third year is $210,583.10 x 45% = $94,762.40.

The project starts in 2006 and ends in 2008, making 2008 the third year. So the cost in 2008 is $94,762.40.

(For the purposes of determining project schedules and costs, a year starts in January and ends in December, so that the first year of the project is the entire year of 2006, the second year is 2007, and the third year is 2008, so that the project is ready to go online at the beginning of 2009).

Project Name	Major Component Name	Start Date (Year)	Year Online	Project Duration (Years)	Total Expansion Project Cost ($)	Expansion Project Cost By Year	
						2008	2009
Misc CIP	Addtl Downtown Manholes	2006	2009	3	210,583.10	94,762.40	0.00
Misc CIP	Adjust Sewer Manholes on Bla	2006	2009	3	5,717.40	2,572.83	0.00
2008 Expansion	APAD Digestor	2008	2013	5	5,112,660.11	51,126.60	460,139.41

The image below shows a portion of the Standard S Curve grid.

Project Duration (Years)	Percent By Year		
	1	2	3
1	100 %	0 %	0 %
2	30 %	70 %	0 %
3	10 %	45 %	45 %
4	10 %	35 %	35 %
5	1 %	9 %	35 %

Project Replacement/Improvement Costs

Project Cost Escalation

The top portion of the screen contains the Project Cost Escalation data.

Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

Project Cost Escalation

Project cost escalation allows inflation to be taken into account when calculating costs. By including the effects of inflation, cost escalation provides a more realistic estimate of future year costs.

The basis for the cost escalation is the year entered into the "Costs are in what year's dollars" box. The cost for each project year is escalated based on that cost year. The costs for the first five project year are escalated using the percentage entered into the "Escalation rate for first 5 years" box. Subsequent project year costs are escalated using the percentage entered into the "Escalation rate for subsequent years" box.

To escalate the existing costs, check the "Escalate Costs to Corresponding Year" check box, and enter the escalation year and the escalation percentages.

The equations for applying cost escalation are as follows:

For the case where the Escalation Cost Year + 5 <= Project Year:

Equation: Future Cost = Original Cost x (1 + Escalation PercentageA/100) (Project Year - Escalation Cost Year)

For the case where the Escalation Cost Year + 5 > Project Year:

Equation: Future Cost = Original Cost x $(1 + \text{Escalation PercentageA}/100)^{5}$ x $(1 + \text{Escalation PercentageB}/100)^{(\text{Project Year - Escalation Cost Year - 5})}$

Where

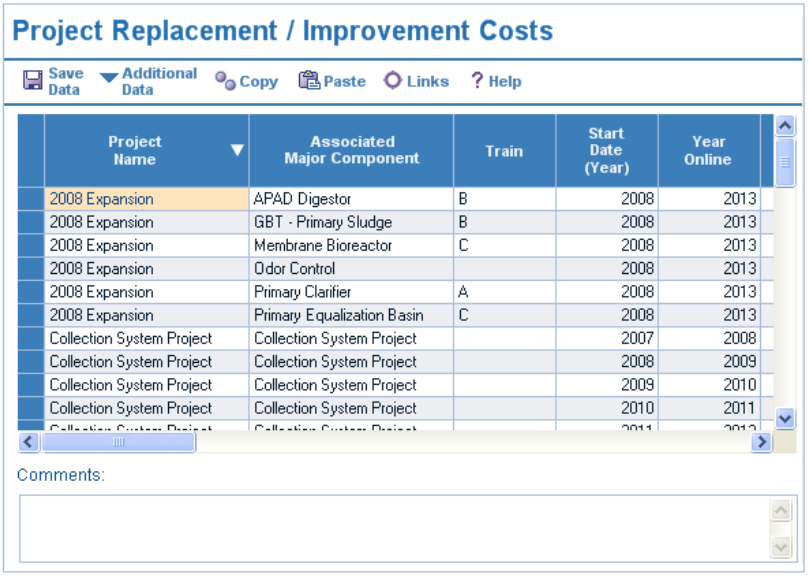
- the Escalation Cost Year is the year in the "Costs are in what year's dollars" box
- the Escalation PercentageA is the escalation rate for the first 5 years
- the Escalation PercentageB is the escalation rate for subsequent years

For example, a 2007 cost of $94,762.40 escalated to 2008 dollars would be $100,448.14:

$94,762.40 x $(1 + 6/100)^{(2008 - 2007)}$ = $100,448.14

while a 2007 cost of $4,673,292.35 escalated to 2014 dollars would be $6,764,239.17:

$4,673,292.35 x $(1 + 6/100)^{5}$ x $(1 + 4/100)^{(2014 - 2007 - 5)}$ = $6,764,239.17



Project Name	Associated Major Component	Train	Start Date (Year)	Year Online
2008 Expansion	APAD Digestor	B	2008	2013
2008 Expansion	GBT - Primary Sludge	B	2008	2013
2008 Expansion	Membrane Bioreactor	C	2008	2013
2008 Expansion	Odor Control		2008	2013
2008 Expansion	Primary Clarifier	A	2008	2013
2008 Expansion	Primary Equalization Basin	C	2008	2013
Collection System Project	Collection System Project		2007	2008
Collection System Project	Collection System Project		2008	2009
Collection System Project	Collection System Project		2009	2010
Collection System Project	Collection System Project		2010	2011

Project Name

The Project Name comes from the Project Name column in the Planned Projects screen.

Associated Major Component

The Associated Major Component comes from the selected Planned Projects grid. Only those planned Major Components that are included in treatment or included in costs (or both) will be included in the Project Replacement/Improvement Costs grid.

Train

Data for the Train column comes from the Train column in the selected Planned Projects grid.

Start Date

The Start Date is the year during which the design process should begin so that the project will be completed by the scheduled year online.

The Start Date is calculated as follows:

Equation: Year Online - Project Duration

Year Online

Data for the Year Online column comes from the Year Online column in the selected Planned Projects grid.

Project Duration

The Project Duration is the length of time it will take to complete the design and construction of the project.

The Project Duration is calculated as follows:

Equation: Design Length + Construction Length

(The Design Length and Construction Length come from the Planned Projects grid.)

Total Replacement/Improvement Project Cost

The total of the replacement/improvement portion of the project cost, from the Planned Projects screen, modified by ENR and cost escalation, if used.

Replacement/Improvement Project Cost by Year

The replacement/improvement project costs are broken down by year in the Replacement/Improvement Project Cost by Year columns based on the percentages in the Standard S Curve screen.

For example, the cost for year 2008 for a project with a total cost of $13,199,999.80 (the first row in the grid below is calculated as follows):

Find the percentages in the Standard S Curve grid (the second image, below) for a project that lasts four years. The percentages are 10%, 35%, 35%, and 20%.

The total project cost is $13,199,999.80, so the cost for the first year is $13,199,999.80 x 10% = $1,319,999.98;
the cost for the second year is $13,199,999.80 x 35% = $4,619,999.93;
the cost for the third year is $13,199,999.80 x 35% = $4,619,999.93; and
the cost for the fourth year is $13,199,999.80 x 20% = $2,639,999.96.

The project starts in 2008 and ends in 2011, making 2008 the first year. So the cost in 2008 is $1,319,999.98.

(For the purposes of determining project schedules and costs, a year starts in January and ends in December, so that the first year of the project is the entire year of 2008, the second year is 2009, the third year is 2010, and the fourth year is 2011, so that the project is ready to go online at the beginning of 2012).

	Project Name	Major Component Name	Start Date (Year)	Year Online	Project Duration (Years)	Total Replacement / Improvement Project Cost ($)	Replacement /Improvement Project Cost By Year ($)			
							2008	2009	2010	2011
	Rehab	1.2 MW Fuel Cell and Power S	2008	2012	4	13,199,999.80	1,319,999.98	4,619,999.93	4,619,999.93	2,639,9
	Rehab	24 In Meter Control Valve	2007	2009	2	499,999.50	349,999.65	0.00	0.00	
	Rehab	52 In Pipe Upgrade	2007	2009	2	99,999.90	69,999.93	0.00	0.00	

The image below shows a portion of the Standard S Curve grid.

	Project Duration (Years)				
		1	2	3	4
	1	100 %	0 %	0 %	0 %
	2	30 %	70 %	0 %	0 %
	3	10 %	45 %	45 %	0 %
	4	10 %	35 %	35 %	20 %
	5	1 %	9 %	35 %	35 %

O&M Costs

The O&M Costs screen allows the user to enter maintenance and operations costs for each Major Component, as well as labor and disposal costs, for each year in the planning period. Each Major Component appears in the grid only for those years when that component is online.

Editing the Data

The data in the left-hand grid is not editable. The data in the right-hand grid is editable only when both the ENR Values check box and the Project Cost Escalation check box are unchecked. When either of those check boxes is checked, the data is not editable.

ENR Values, Project Cost Escalation

The top portion of the screen contains the ENR Values and the Project Cost Escalation data.

Additional Data Button

Clicking the Additional Data button toggles between hiding and displaying the top portion of the form.

ENR Values

The Engineering News Record (ENR) index values allow costs estimated in previous years to be adjusted to the current year. The ENR index represents the costs of construction from year to year. The Original ENR Value represents the ENR index for the year in which the costs were determined. The Current ENR Value represents the ENR index for the current year. The equation for adjusting the costs to the current year is as follows:

Equation: Current Cost = Original Cost x Current ENR Value / Original ENR Value

To apply the ENR values, check the "Use ENR Values" check box, and enter the Original ENR Value and the Current ENR Value.

Project Cost Escalation

Project cost escalation allows inflation to be taken into account when calculating future costs. By including the effects of inflation, cost escalation provides a more realistic estimate of future year costs.

The basis for the cost escalation is the year entered into the "Costs are in what year's dollars" box. The cost for each project year is escalated based on that cost year. The costs for the first five project year are escalated using the percentage entered into the "Escalation rate for first 5 years" box. Subsequent project year costs are escalated using the percentage entered into the "Escalation rate for subsequent years" box.

To escalate the existing costs, check the "Escalate Costs to Corresponding Year" check box, and enter the escalation year and the escalation percentages.

The equations for applying cost escalation are as follows:

For the case where the Escalation Cost Year + 5 <= Project Year:

Equation: Future Cost = Original Cost x (1 + Escalation PercentageA/100) (Project Year - Escalation Cost Year)

For the case where the Escalation Cost Year + 5 > Project Year:

Equation: Future Cost = Original Cost x (1 + Escalation PercentageA/100) ^{5} x (1 + Escalation PercentageB/100) (Project Year - Escalation Cost Year - 5)

Where

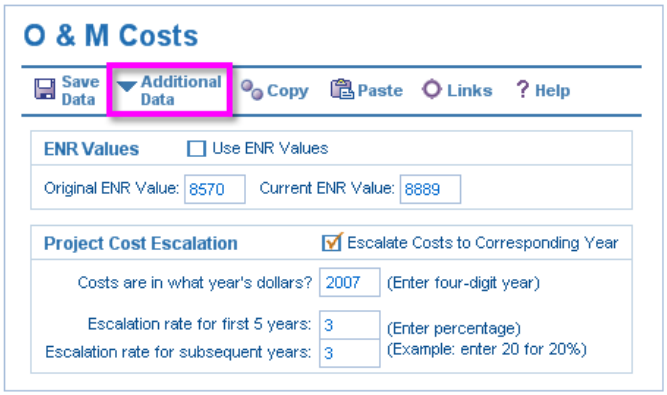
- the Escalation Cost Year is the year in the "Costs are in what year's dollars" box
- the Escalation PercentageA is the escalation rate for the first 5 years
- the Escalation PercentageB is the escalation rate for subsequent years

For example, a 2007 cost of $94,762.40 escalated to 2008 dollars would be $100,448.14:

$$\$94{,}762.40 \times (1 + 6/100)^{(2008 - 2007)} = \$100{,}448.14$$

while a 2007 cost of $4,673,292.35 escalated to 2014 dollars would be $6,764,239.17:

$$\$4{,}673{,}292.35 \times (1 + 6/100)^{5} \times (1 + 4/100)^{(2014 - 2007 - 5)} = \$6{,}764{,}239.17$$



Year

The Year column contains the years that exist in the Projected Years screen.

Total O&M Annual Costs

The total costs for each year, as detailed in the right-hand grid.

Major Component Name

The Major Component comes from the selected Planned Projects grid (or from the Existing Treatment Process grid if no Planned Projects exist). Only those Major Components that are included in treatment or included in costs (or both) will be included in the O&M Costs grid. Each component appears in the grid only for those years during which it is online. If the component is offline, it will not appear in the grid.

Train

Data for the Train column comes from the Train column in the selected Planned Projects grid (or from the Existing Treatment Process grid if no Planned Projects exist).

Operating Cost

The yearly cost of operations for the Major Component.

Maintenance Cost

The yearly cost of maintenance for the Major Component.

Total Estimated O&M Costs

The operating cost plus the maintenance cost.

Labor Cost

The labor cost for all Major Components during the year.

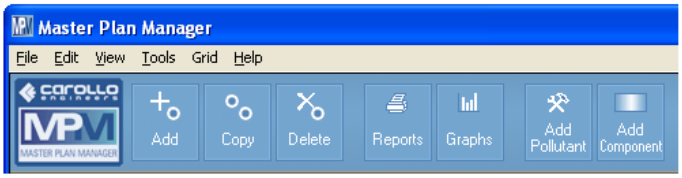
Disposal Cost

The disposal cost for all Major Components during the year.

TOOLBARS

Main Toolbar

The main toolbar for the MPM application appears at the top of the MPM window. The buttons in the main toolbar perform operations in the Data Tree, and allow access to other areas in the application, such as reports and graphs.

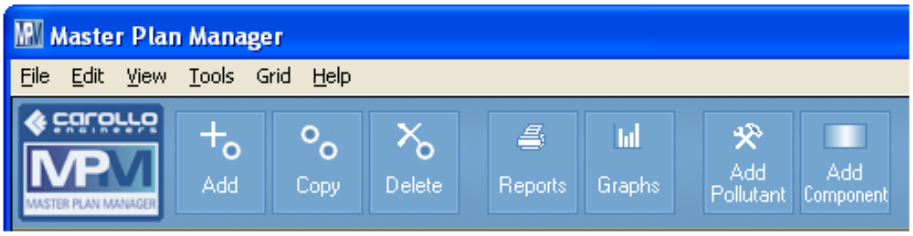


Data Window Toolbar

Each data window has a toolbar at the top. The buttons in the toolbar operate for that Data Window only.

Main Toolbar

The main toolbar for the MPM application appears at the top of the MPM window. The buttons in the main toolbar perform operations in the Data Tree, and allow access to other areas in the application, such as reports and graphs.



See Data Window toolbar for information on the toolbar that exists in each Data Window.

Add

The Add button adds a new item to the Data Tree. The type of item that is added is dependent upon which item is selected in the Data Tree. For instance, if a Scenario is the selected tree item, clicking the Add button will add a new Scenario to the tree. If one of the Other Pollutants items is selected, a new Other Pollutants option will be added to the tree. The types of items that can be added to the tree are as follows:

- Scenario
- Domestic, Industrial, Other Pollutant, and Water Conservation options
- Pollutant Reduction, Pollutant Addition, and Regulatory Requirements options
- Planned Projects options

The Add button is dimmed (inoperable) when the selected tree item cannot be added to the tree. When the Projected Years item is selected in the tree, for example, the Add button is inoperable because there can be only one Projected Years item in each Scenario.

Copy

The Copy button copies the currently selected Data Tree item. The Copy button will be dimmed (inoperable) when the selected tree item cannot be copied. For instance, because there can be only one Capacity Evaluation per Scenario, that item cannot be copied. The items in the tree that can be copied are as follows:

- Scenario
- Domestic, Industrial, Other Pollutant, and Water Conservation options
- Pollutant Reduction, Pollutant Addition, and Regulatory Requirements options
- Planned Projects options

Delete

The Delete button deletes the currently selected Data Tree item. The Delete button will be dimmed (inoperable) when the selected tree item cannot be deleted. For instance, because Capacity Evaluation must exist in every Scenario, it cannot be deleted. The items in the tree that can be deleted are as follows:

- Scenario
- Domestic, Industrial, Other Pollutant, and Water Conservation options
- Pollutant Reduction, Pollutant Addition, and Regulatory Requirements options
- Planned Projects options

Reports

Click the Reports button to display, print, and save reports.

Graphs

Click the Graphs button to display, print, and save graphs.

Add Pollutant

Click the Add Pollutant button to add, edit, or delete pollutants.

Add Component

Click the Add Component button to add, edit, or delete major components.

Data Window Toolbar

Each Data Window has a toolbar at the top. The buttons in the toolbar operate for that Data Window only. Each Data Windows contains only those toolbar buttons that are required for that Data Window. For instance, the Projected Years screen contains only the Save, Add Row, Copy, Paste, and Help buttons.

See the main toolbar for information on the toolbar that appears in MPM's main window.

Save Data

Saves the changes made to the data in the Data Window. (See Options for automatically saving data.)

Additional Data

Some Data Windows have information at the top of the screen that can be hidden to provide more viewing area for the data grid. Clicking the Additional Data button toggles between displaying and hiding that additional information.

Add Row

Click the Add Row button to add a row to the grid.

Train

The Existing Treatment Process and the Planned Projects and Costs screens each have a train diagram that displays the major components that are included in treatment. Clicking the Train button toggles between displaying and hiding the train diagram.

Add Component

The Existing Treatment Process and the Planned Projects and Costs screens each have a train diagram that displays the major components that are included in treatment. Clicking the Add Component button adds a Major Component to the grid or train diagram.

Check Unconnected

When the system calculations are performed, the Major Components in the train diagrams are examined to determine how the components are connected to each other. If any component exists that is not connected to another component, the Capacity Evaluation and Effluent Quality calculations cannot be performed.

To determine if unconnected components exist, the Check Unconnected button is available in the Existing Treatment Process, Planned Projects and Costs, and Flow and Solids Allocation screens.

Existing Treatment Process

When pressing the Check Unconnected component button in the Existing Treatment Process screen, MPM will display unconnected components for that Existing Treatment Process. If Planned Projects exist, then it doesn't matter if there are unconnected components in the Existing Treatment Process train diagram, because the system no longer uses the Treatment Process component connections as the basis for calculations in the system. Once a Planned Project exists, the system's calculations are based on the Planned Project components and connections.

Planned Projects

When pressing the Check Unconnected component button in the Planned Projects screen, MPM will display unconnected components for that Planned Project.

Flow and Solids Allocation

When pressing the Check Unconnected component button in the Flow and Solids Allocation screen, MPM will check the selected Planned Project for unconnected components. (The selected Planned Project is the one in the data tree with the check mark.) The components in the selected Planned Project serve as the basis for any system calculations involving components and connections, and its components are the ones that are used in other data grids that contain components (such as Capacity Evaluation, Flow and Solids Allocation, and Pollutant Reduction).

If there are no Planned Projects, then the components in the Existing Treatment Process are used as the basis for the system. In this case, pressing the Check Unconnected component button in the Flow and Solids Allocation screen checks the Existing Treatment Process for unconnected components.

Copy

The Copy button can be used to copy highlighted data from a grid or text box. To copy data, highlight it, and click the Copy button.

Data can also be copied using the keyboard keys by holding down the Ctrl key and pressing the C key.

Paste

The Copy button can be used to paste data into an editable grid or text box. To paste data, first copy it, as described above, and then highlight the area in the grid or text box that will receive the text, and click the paste button.

Data can also be pasted using the keyboard keys by holding down the Ctrl key and pressing the V key.

Links

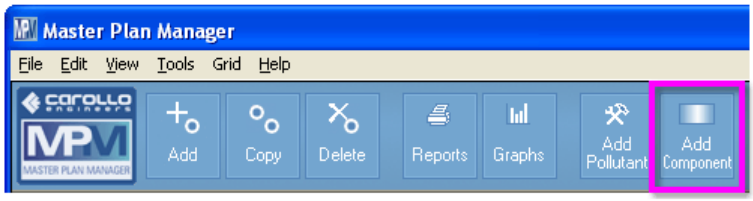
Some Data Windows (such as Effluent Quality) have a Links button. Hovering over the Links button with the mouse displays links to related Data Windows. This is an alternative to clicking on the items in the Data Tree.

Help

Click the Help button to open this help file.

MAJOR COMPONENTS

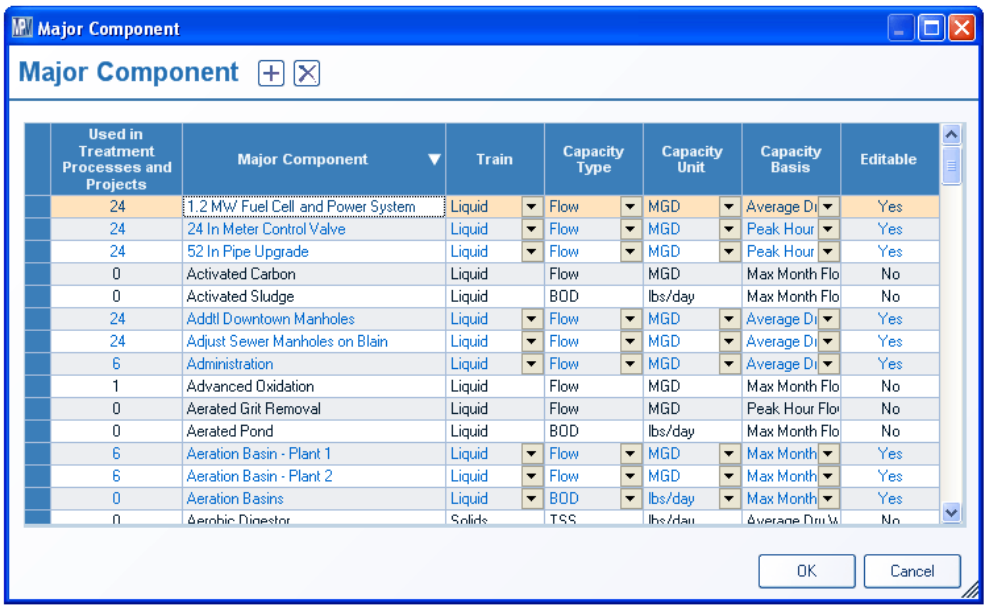
Open the Major Component window by clicking the Add Component button in the toolbar.



Major Components

The Major Components window is used to add, edit, and delete Major Components. The components that appear in the Major Components window are the same components that appear in the smaller major components box in the Existing Treatment Process and Planned Projects screens. Any changes made to the components in this larger Major Components window will show up in the smaller major components window. The difference between the two windows is that this one allows the user to add, edit, and delete components, which the smaller window is used only to add components to the Treatment Process and Planned Projects trains.

MPM contains both built-in major components and user-created major components that are used throughout the system. The built-in major components are part of the system and cannot be edited or deleted. New major components can be created for use in the system, and those major components can be edited and deleted. User-created major components are displayed in blue text and display "Yes" in the Editable column, while built-in major components are displayed in black text, and display "No" in the Editable column.



Used in Treatment Processes and Projects

The "Used in Treatment Processes and Projects" column displays the number of times the major component is used in Treatment Processes and Planned Projects in all Scenarios in the system.

Editable Column

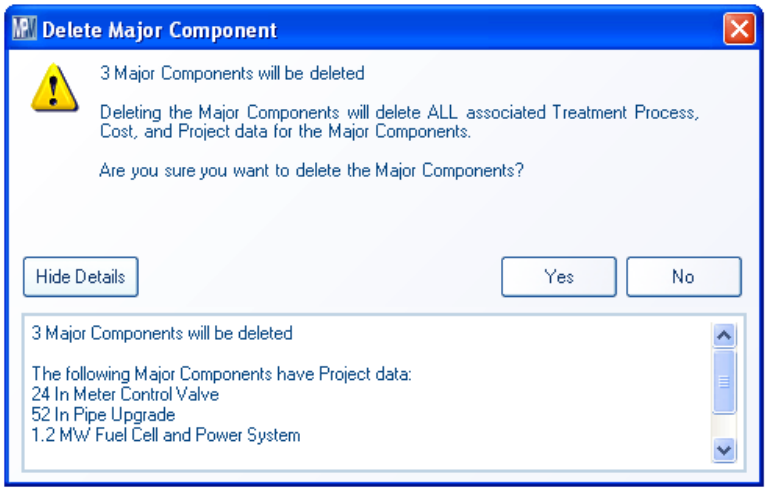
The Editable column displays whether or not the major component is editable by the user. Non-editable major components cannot be edited or deleted.

Adding a Major Component to the System

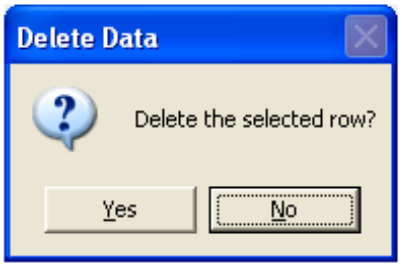
To add a Major Component to the system, click the **+** button to create a new row in the grid. Change the name of the new major component and make a selection in the Train, Capacity Type, Capacity Unit, and Capacity Basis columns. The Major Component is now available to be used in any Scenario by adding it to the Existing Treatment Process grid or the Planned Projects and Costs grid.

Deleting a Major Component from the System

To delete a major component from the system, highlight the major component(s) to be deleted by clicking on them in the grid, and click the X button at the top of the window. (The button will be visible only when user-created major components are highlighted.) If any of those major components are used in the Treatment Processes, Planned Projects, or Costs of any Scenario, a message box will be displayed that lists those major components, allowing the user to see which major components are currently being used, and to confirm that they should be deleted.



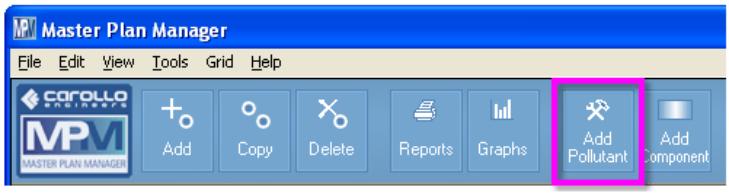
If the major component to be deleted is not currently used in any Scenario in the system, the following message box will be displayed:



POLLUTANTS

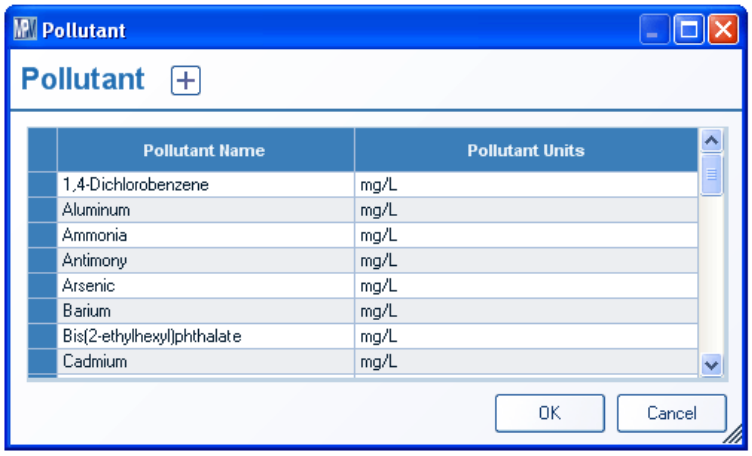
Opening the Pollutant Window

Open the Pollutant window by clicking the Add Pollutant button in the toolbar.



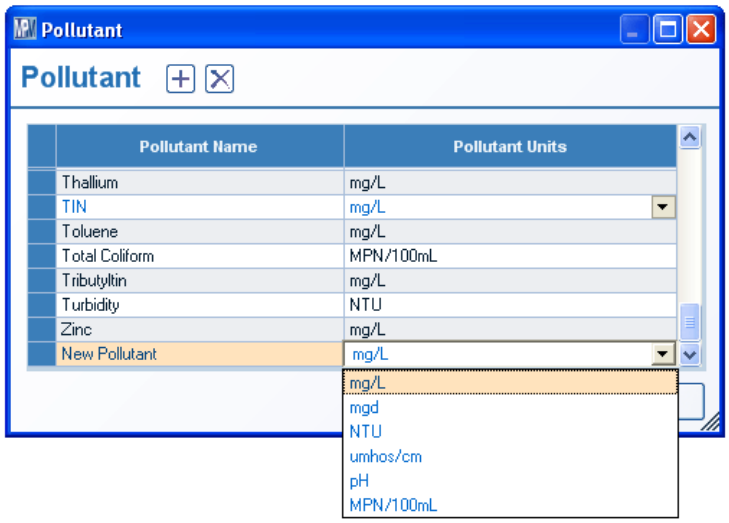
Pollutants

MPM contains both built-in pollutants and user-created pollutants that are used throughout the system. The built-in pollutants are part of the system and cannot be edited or deleted. New pollutants can be created for use in the system, and those pollutants can be edited and deleted. User-created pollutants are displayed in blue text, while built-in pollutants are displayed in black text.



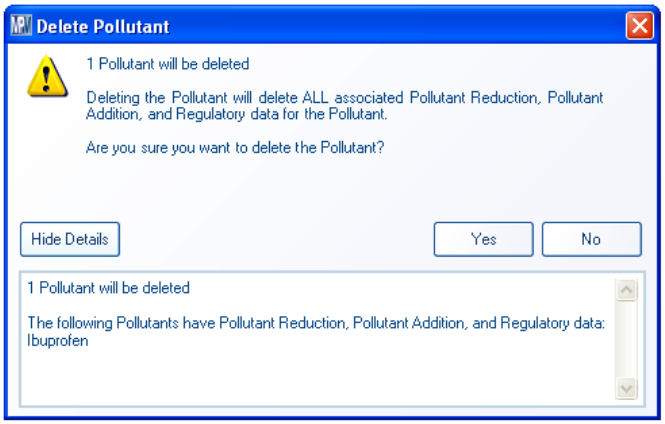
Adding a Pollutant to the System

To add a pollutant to the system, click the **+** button to create a new row in the grid. Change the name of the new pollutant and make a selection in the Pollutant Units column. The pollutant is now available to be used in any Scenario, by adding it to the Other Pollutants grid, or the Other Pollutants - Historical Data grid.

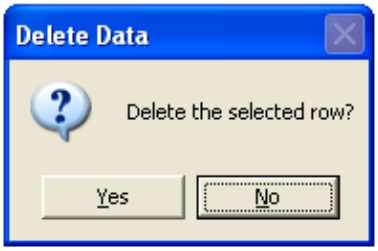


Deleting a Pollutant from the System

To delete a pollutant from the system, highlight the pollutant(s) to be deleted by clicking on them in the grid, and click the X button at the top of the window. (The button will be visible only when user-created pollutants are highlighted.) If any of those pollutants have Pollutant Reduction, Addition, or Regulatory data in any Scenario, a message box will be displayed that lists those pollutants. If any of the pollutants are used only in Other Pollutants Historical data, which will also be noted in the message. (Pollutants used only in Other Pollutants Historical data have no Pollutant Reduction, Addition, or Regulatory data.) Displaying the pollutants in the message box allows the user see which pollutants are currently being used, and to confirm that they should be deleted by the system.



If the pollutant to be deleted is not currently used in any Scenario in the system, the following message box will be displayed:



DATABASE

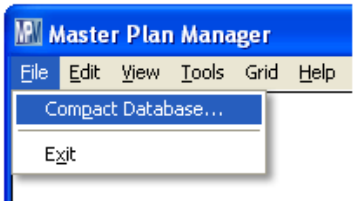
All data for MPM is stored in the database. The database file resides in the MPM folder and is named MPM.mdb. Every time data is added, deleted, or edited, that data is saved to the MPM database.

To protect data, the database should be compacted and backed up from time to time.

Compacting the Database

Opening the Compact Database Window

Open the Compact Database window by clicking File on the menu and selecting Compact Database.



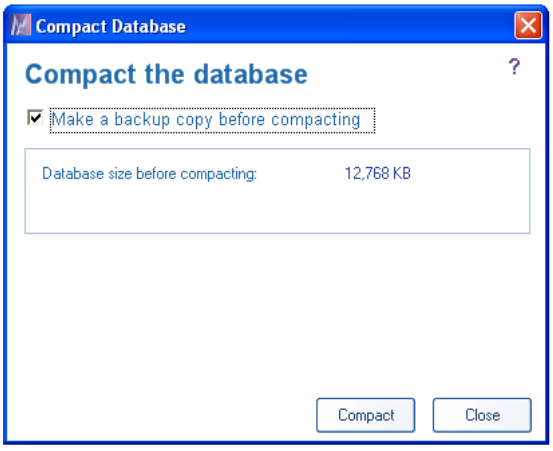
The Purpose of Compacting a Database

Over time, the database grows in size as data is created and modified. The database may become fragmented, leading to poor performance and possible

data loss. Compacting the database will decrease its size, eliminate fragmentation, improve performance, and reduce the chance for data loss. A database should be compacted from time to time, particularly after large amounts of data have been deleted from the database. Compacting after deleting large amounts of data is useful because the database does not automatically shrink in size when data is deleted from it, but retains the empty space where the data used to be. The empty space can be removed only by compacting the database.

Making a Backup of the Database File Before Compacting

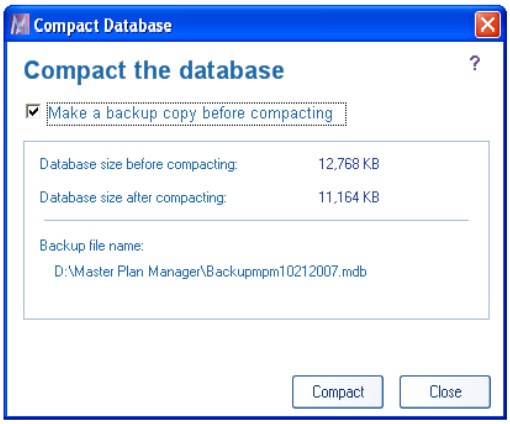
The "Make a backup copy before compacting" check box is checked by default whenever the Compact Database window is opened. When the box is checked, a copy of the database is made automatically before the compacting process begins. A backup copy should always be made because, although it is unlikely, the compacting process may fail, leaving the database unusable and all data in the database permanently lost. (Data loss is likely to occur if, for instance, a power failure occurs during the compacting process.) If compaction fails, the backup copy of the database can be renamed to "MPM.mdb" and opened in the MPM application.



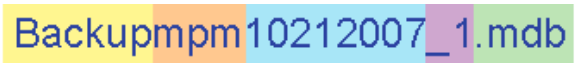
Compacting a Database

Click the **Compact** button to compact the database. Compacting will take as little as a few seconds for small databases, or up to a minute or more for very large databases.

After compacting, the window shows the database size before and after compacting, along with the name of the backup file.



The name of the backup file (Backupmpm10212007_1.mdb, in this example) takes the following form:



- the word "Backup"
- the compacted file name ("mpm")
- the date in the form mmddyyyy ("10212007")
- incremental number, if necessary ("_1")
- the file extension (".mdb")

Backing Up and Restoring Data

Why Backing Up Data is Important

The MPM database should be backed up regularly to storage medium (such as a CD-ROM or network drive) to minimize data loss in the event of a hard drive

failure or database corruption. The databases can be lost due to hard drive failure or unintentional deleting of a database or a folder that contains a database. A database can become corrupted due to a power failure during operation of MPM or, occasionally, simply through data entry and deletion. Once a database becomes corrupted, it is not always possible to retrieve its data and the data may be lost forever. Because of the possibility of corruption, it is important to back up the database at regular intervals. A backup copy of a database can be used to restore data as it existed at the time of the backup.

How to Back Up Data to a Storage Medium

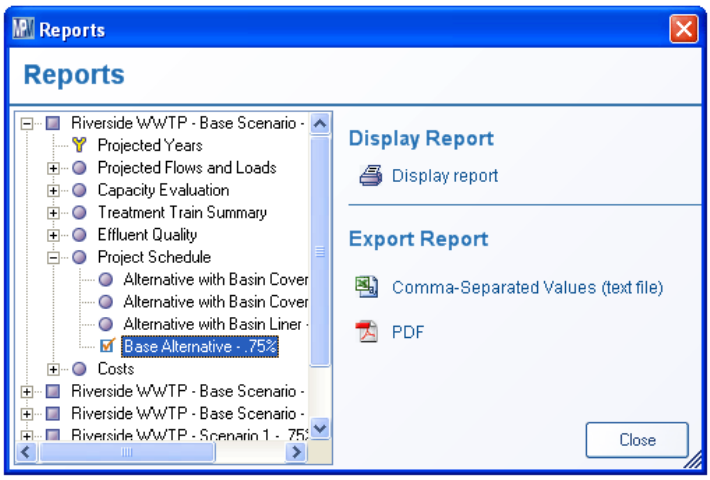
To transfer a database to a storage medium, copy the MPM.mdb file from the MPM application folder to the storage medium. The backup database can be renamed to signify the date and time it was backed up. For instance, the MPM.mdb file could be renamed MPM_Nov_2007_Backup.mdb.

Restoring Data from a Storage Medium

To restore a backed-up database into MPM, close MPM if it is open, and copy the database from the storage medium back into the MPM application folder, and rename it, if necessary, back to MPM.mdb. (If there is already a file named MPM.mdb in the MPM folder, rename it to something else, like MPM1.mdb, so that the backup file can then be named MPM.mdb.) Make sure that the database file is not read-only. Open MPM to view the data.

REPORTS

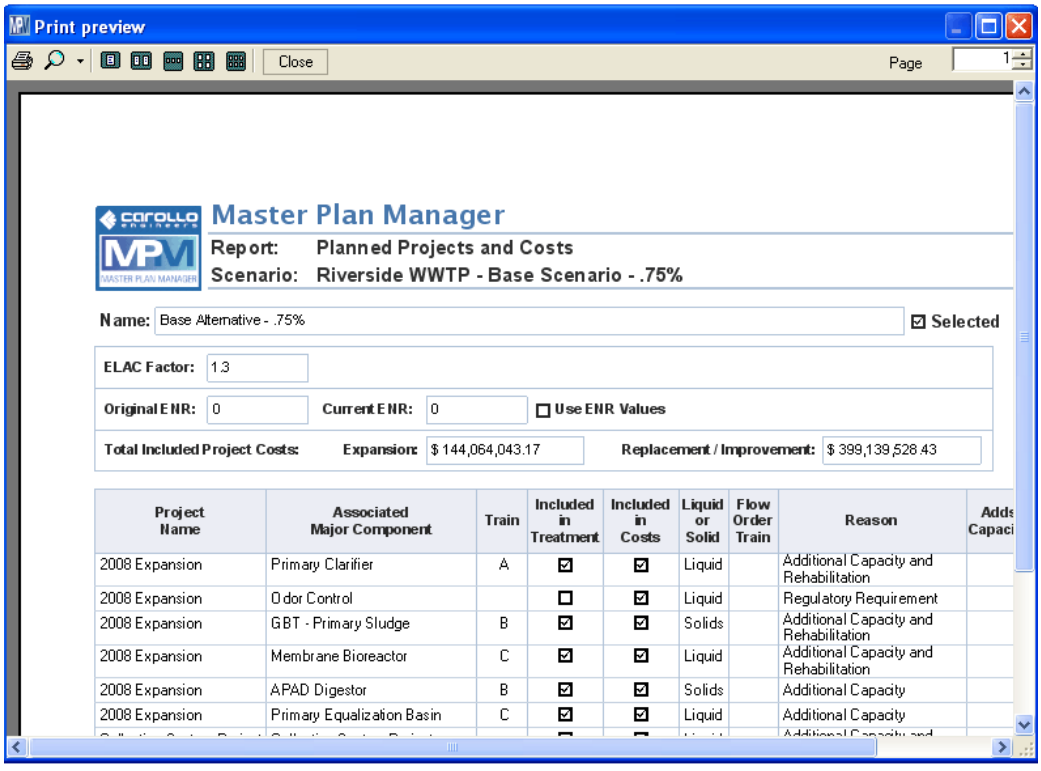
The Reports window provides the ability to display, save, and print reports.



Display and Print Reports

To display a "print preview" version of a report, click on an item in the list on the left, and then click the printer image under the Display Report heading.

Once the report is displayed it can be printed by clicking the printer image at the top of the "print preview" window.



Export Reports - Comma-Separated Values File

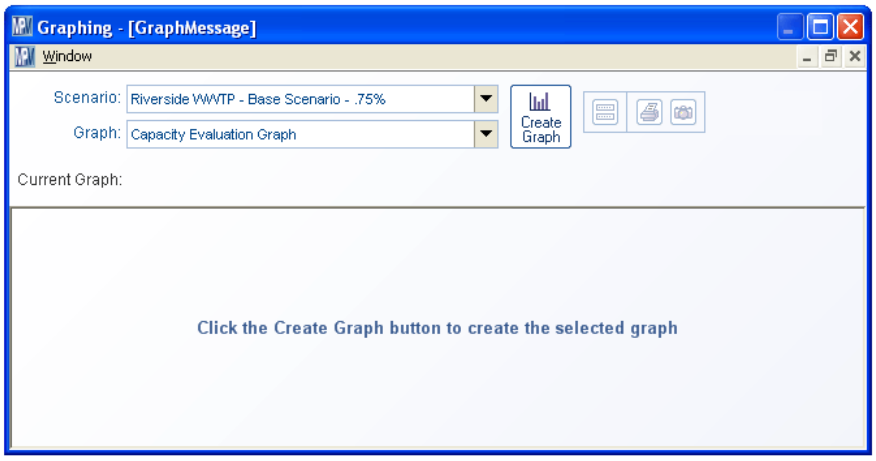
Data for each report can be exported to a file in Comma-Separated Values (CSV) format. CSV files can be opened in spreadsheet programs such as Excel or Calc.

Export Reports - PDF File

Data for each report can be exported to a file in Portable Document Format (PDF) format. PDF files can be opened in programs such as Adobe Reader.

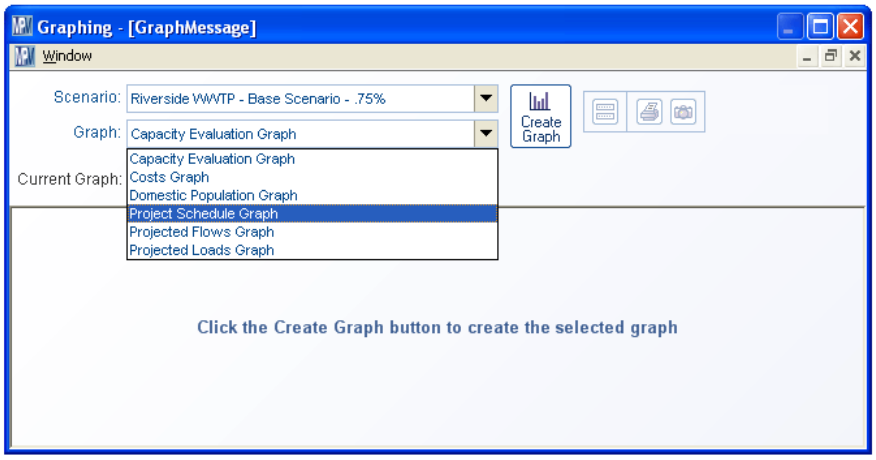
GRAPHS

The Graphs window provides the ability to display, save, and print graphs.



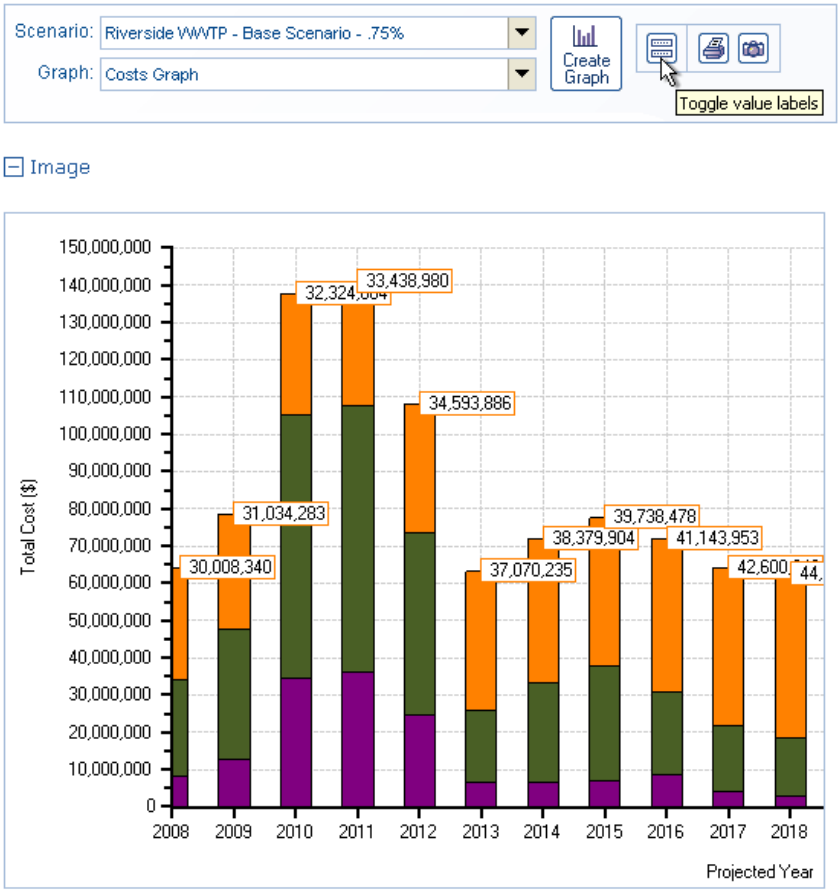
Display a Graph

To display a graph, select it from the drop-down list of available graphs and click the Create Graph button.



Display Labels

Click the labels button display labels on the graph, as shown below. Click the button again to hide the labels.



Print Graph

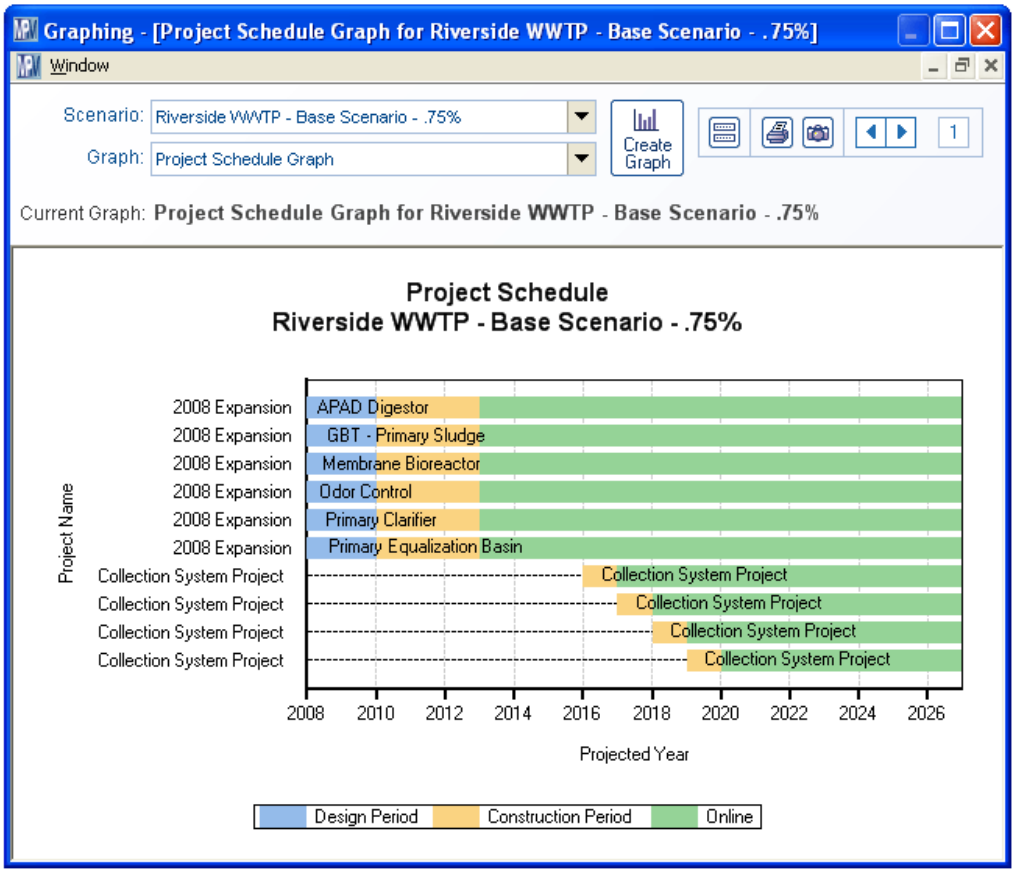
Click the printer button to print the graph

Save Graph Image

Click the camera button to save the graph to an image file.

Multi-Page Graphs

The Capacity Evaluation and Project Schedule graphs have multiple pages. To display each page, click the left and right page number arrows at the top of the graph window.


Graphing - [Project Schedule Graph for Riverside WWTP - Base Scenario - .75%]
Window
Scenario: Riverside WWTP - Base Scenario - .75%
Graph: Project Schedule Graph
Create Graph
Current Graph: Project Schedule Graph for Riverside WWTP - Base Scenario - .75%
Project Schedule
Riverside WWTP - Base Scenario - .75%
2008 Expansion APAD Digestor
2008 Expansion GBT - Primary Sludge
2008 Expansion Membrane Bioreactor
2008 Expansion Odor Control
2008 Expansion Primary Clarifier
2008 Expansion Primary Equalization Basin
Collection System Project Collection System Project
Collection System Project Collection System Project
Collection System Project Collection System Project
Collection System Project Collection System Project
Project Name
2008 2010 2012 2014 2016 2018 2020 2022 2024 2026
Projected Year
Design Period
Construction Period
Online