MFG500098

Customizing Vault Reports

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Material Handling Systems

Learning Objectives

- Learn how to identify and modify existing report templates based on user needs.
- Learn how to use graphs and charts to visually represent Vault metadata.
- Learn how to group and filter information in a clean and creative way
- Learn how to write coded expressions for filtering purposes.

Description

This course will examine how to create custom Vault reports from the user templates. Sometimes we need to modify existing Vault reports for user/company/customer needs. This modification may range from something as simple as jazzing the report up with the company header to the more complex task of specializing with multi-filtered tables and a detailed header with Vault metadata shown. All of this is possible with Vault reporting and Visual Studio 2015 software. You don't have to be a programmer to make these changes and to wow your company with professional report features with Vault Professional.

Speaker

My name is Tiffany Hayden, I'm an application developer from Arkansas who remotely works at Material Handling Systems (MHS) out of Louisville, Kentucky. I have a Bachelors of Science in Mechanical Engineering with a minor in Mathematics from Arkansas Tech University, in Russellville, Arkansas.

I have a passion for automation and simplifying complex systems. It's important to me to share my knowledge and to improve my skill set to enhance the end product. I am always learning how to improve upon existing knowledge, and being a mechanical engineer gives me greater insight into the mechanical aspect and how each component works together in a larger system.

This course is particularly special to me because when I first started at MHS I didn't know anything and I mean anything about the Vault API or editing Vault reports. Diving into forums and google rabbit holes I had experienced an oddity. Not very many people were editing Vault reports with Visual Studio and when they were there was very little documented on the subject. My hope with this class is that it helps someone not be afraid to try it, even though it's Visual Studio and its programming it's not an impossible venture.

On a personal note, I enjoy kayaking and fishing with my 16-year-old daughter and UTV riding with my husband. My 1-year-old German Shepherd keeps me company working from home. She brings a lot of joy to my life, she wanted to say Hi!

1.1 Prep Work

Microsoft Visual Studio 2015 is used to modify .rdlc (Report Definition Language Client-side) type reports for the Vault reporting feature.

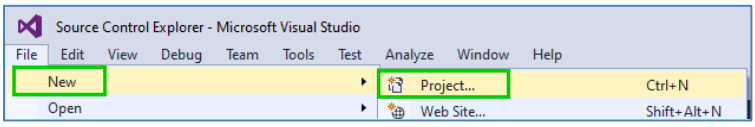
1.1.1 Microsoft Visual Studio 2015

Installing Microsoft Visual Studio 2015 may be needed before proceeding. If Microsoft Visual Studio 2015 is not installed, Microsoft has made it easy to install older versions of visual studio.

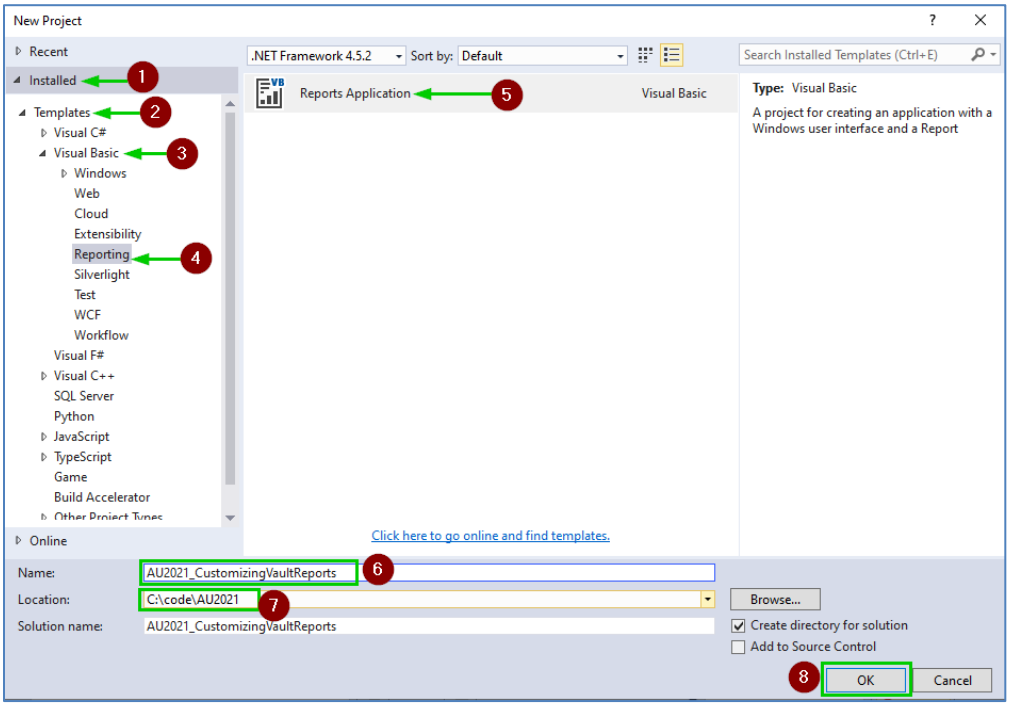
Follow the link below to install Microsoft Visual Studio 2015
https://visualstudio.microsoft.com/vs/older-downloads/

1.1.2 Create Project

Choosing the correct type of project is critical, for purposes of this handout, a Reports Application through Visual Basic will be used. To note, Other coding languages are available for “Reports Application”, such as C#.



NEW PROJECT

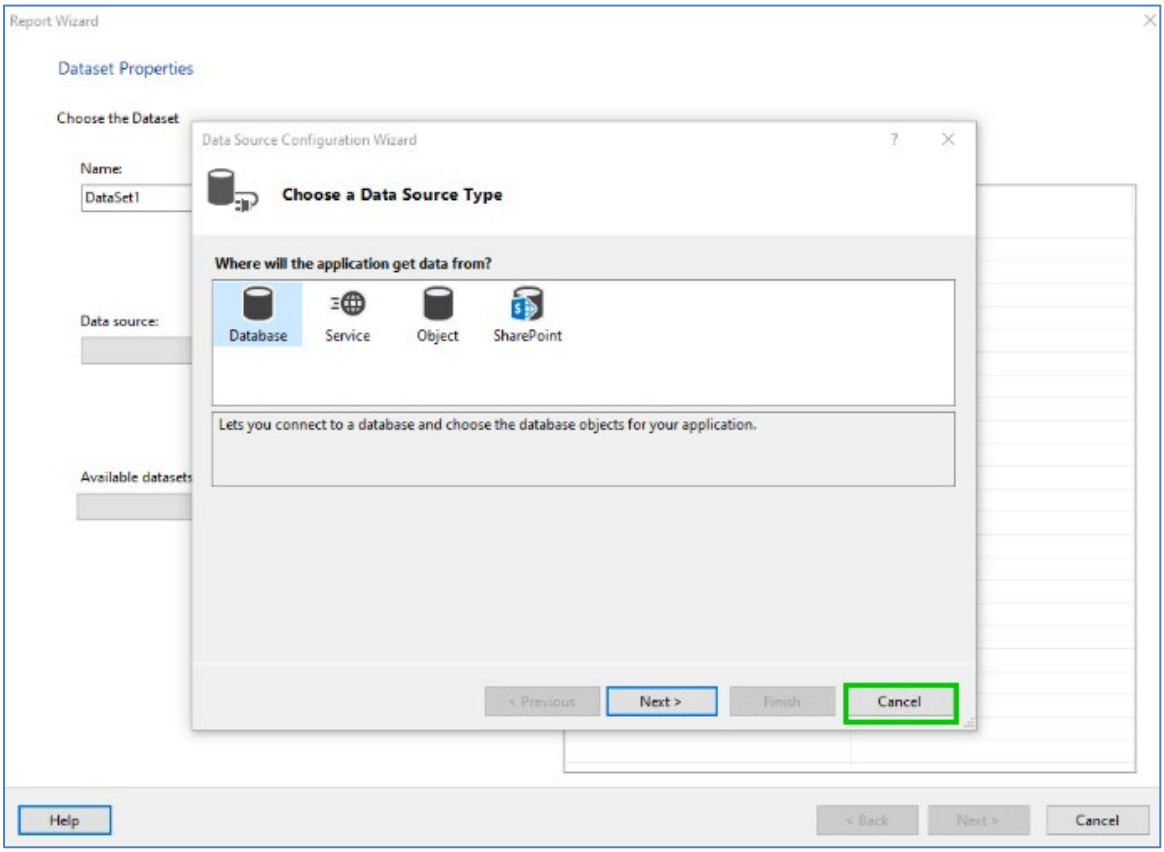


REPORT TYPE

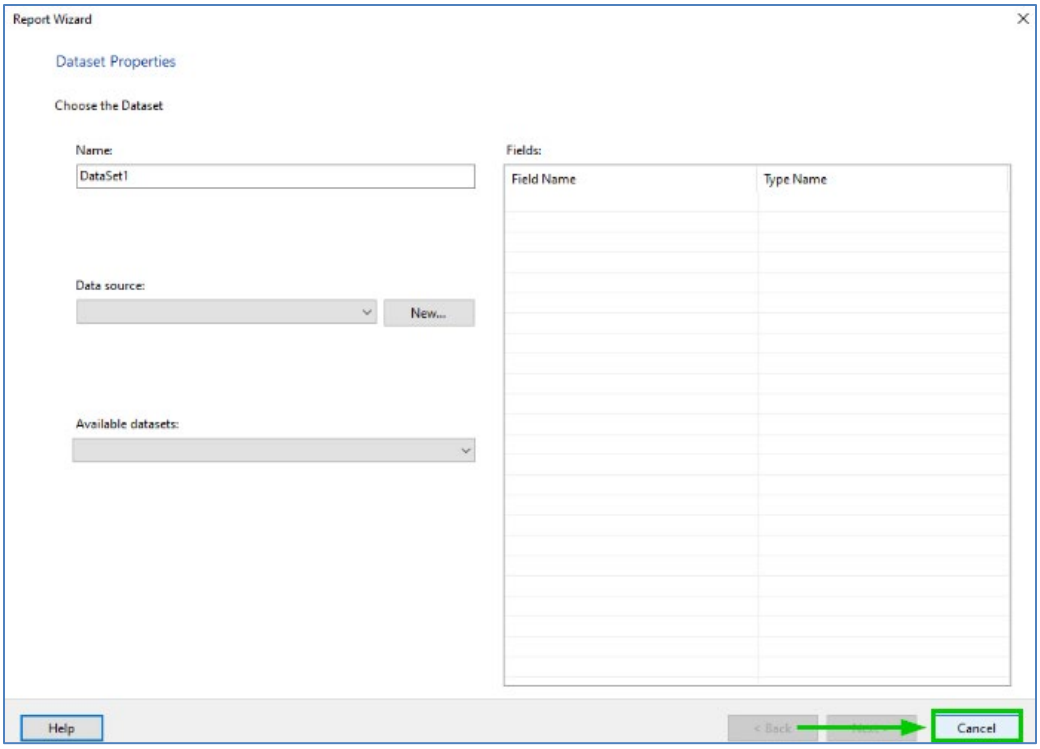
Navigate to the **Reporting** Visual Studio Template (Steps 1-4)
Select the **Reports Application** report type (Step 5)
Rename the project to **AU2021_CustomizingVaultReports** (Step 6)
Change location to any location, for this handout the location will be **C:\code\AU2021** (Step 7)
Choose OK to finalize the project (Step 8)

1.1.3 Cancel Dataset Properties

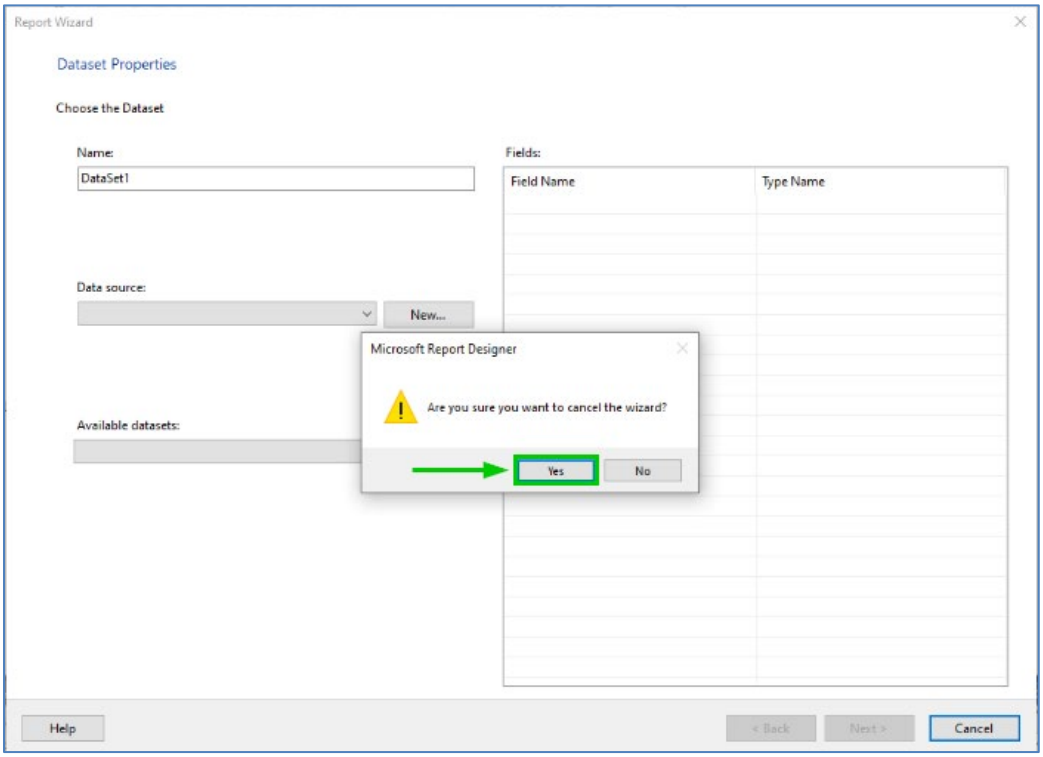
Creating custom reports for Vault, datasets are not needed, these come from the rdlc file created with the Report Template Authoring Utility, this application will be explained in detail later in this handout.



CANCEL DATA SOURCE



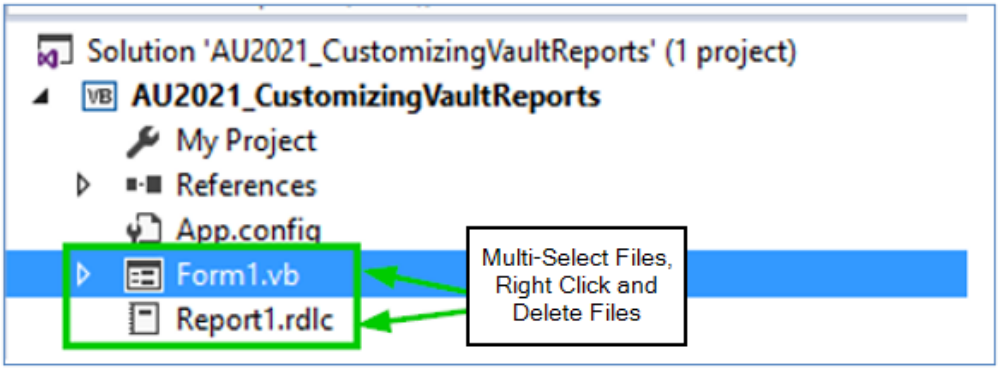
CANCEL DATASET PROPERTIES



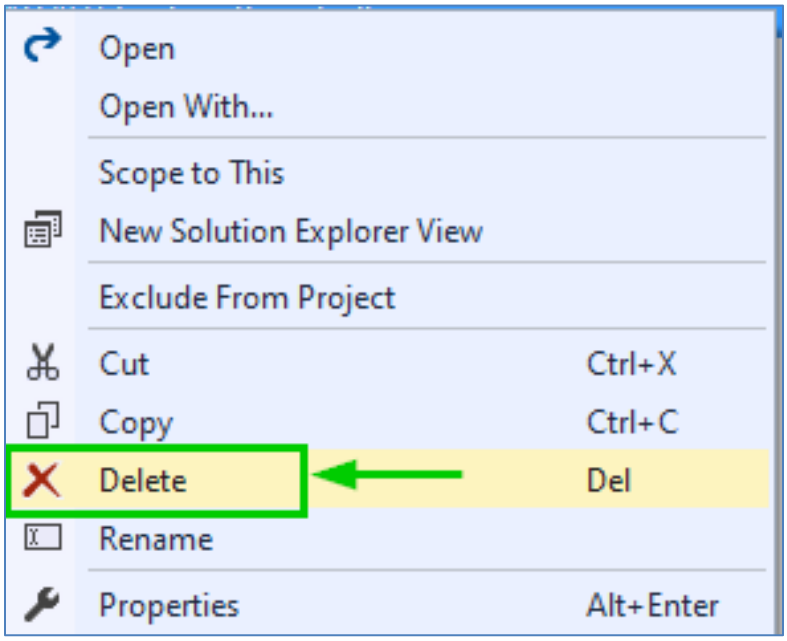
VALIDATE CANCEL

1.1.4 Cleanup Solution

For this handout, Form1.vb and Report1.rdlc are not needed. Please delete them now.



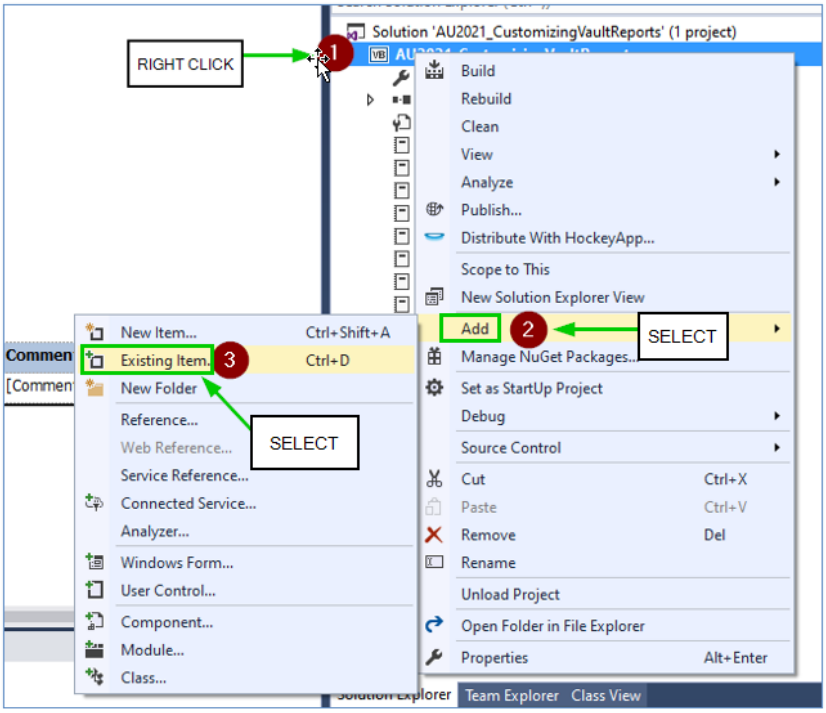
SELECT FILES



DELETE FILES

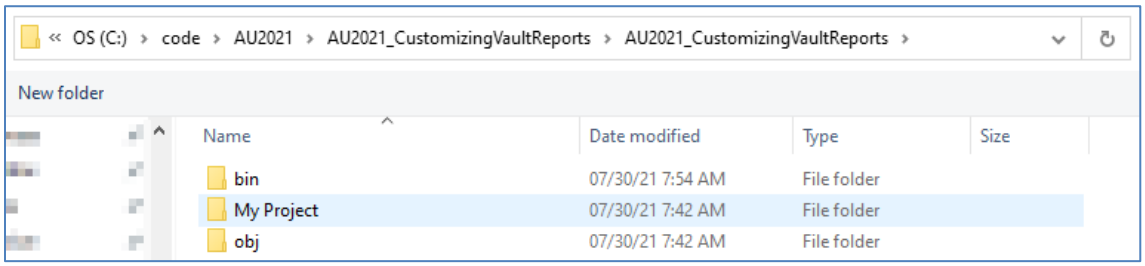
1.1.5 Import Existing Report Templates

The first step in being able to edit Vault rdlc reports is to import the existing templates that exist in the Vault folder structure. Autodesk has created some great templates that can be built on and customized.



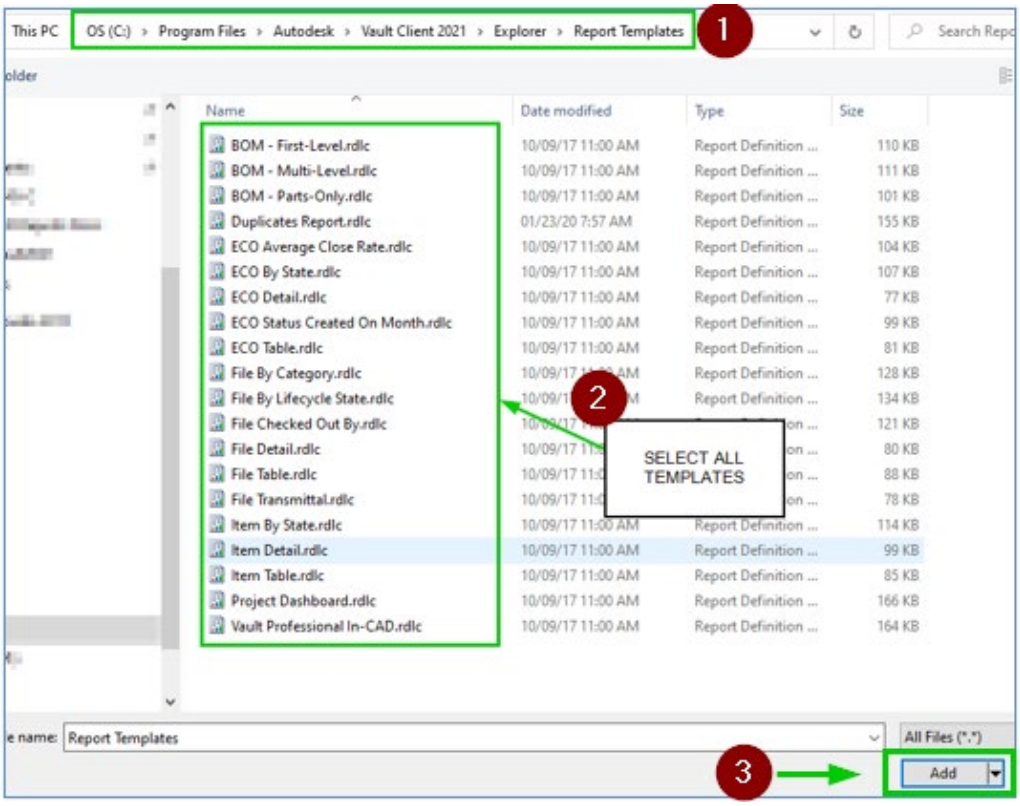
ADDING EXISTING ITEM

When adding an existing item, windows explorer should open to the Microsoft Visual Studio project location. For this handout that location is: **C:\code\AU2021\AU2021_CustomizingVaultReports\AU2021_CustomizingVaultReports**



DEFAULT LOCATION

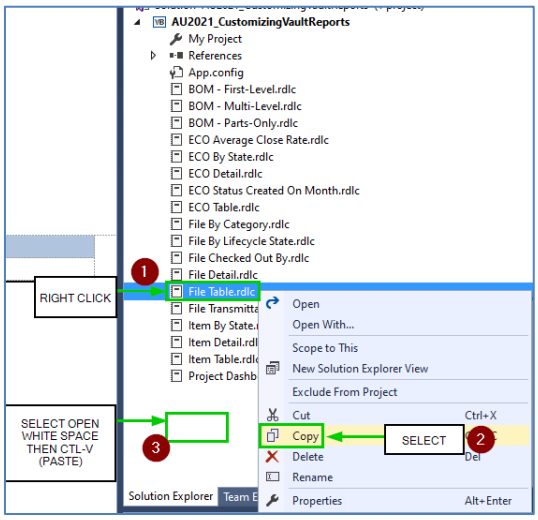
The Vault report templates are stored within a version-specific location. For this process, this class will show the 2021 location, located **C:\Program Files\Autodesk\Vault Client 2021\Explorer\Report Templates.**



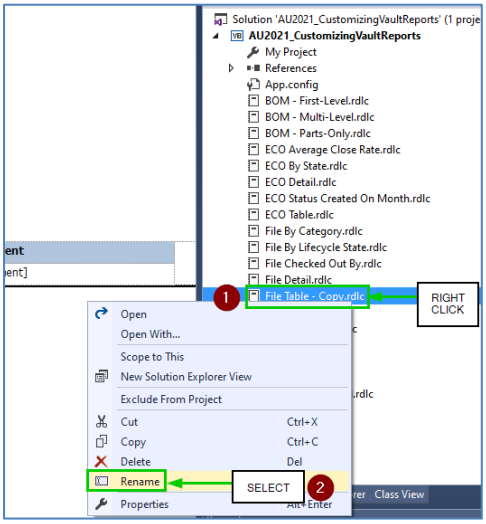
ADD SELECTED TEMPLATES

1.1.6 Create Copy and Rename Template

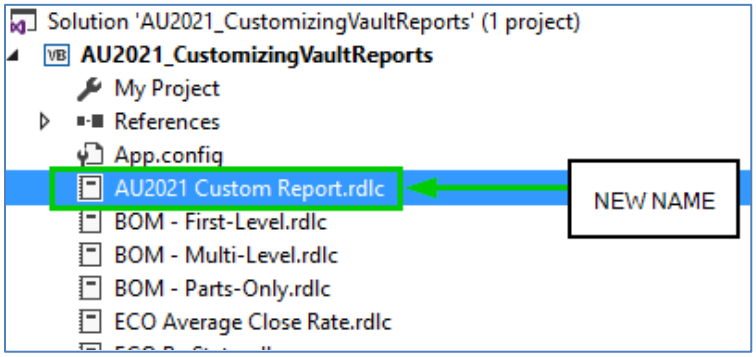
Creating a copy of an existing template is a good best practice. This makes it easy to reference or compare to the original as the development process is happening.



CREATE COPY



RENAME COPY

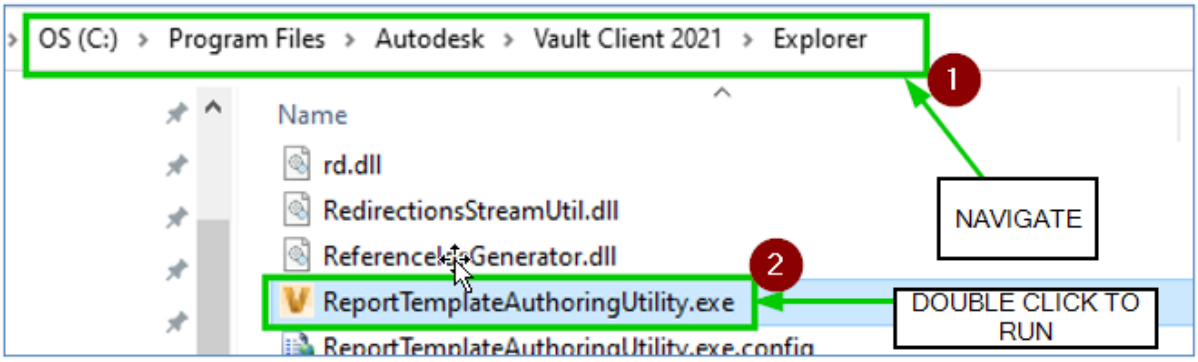


NEW NAME

1.2 Report Template Authoring Utility/[Autodesk Report Template Utility]

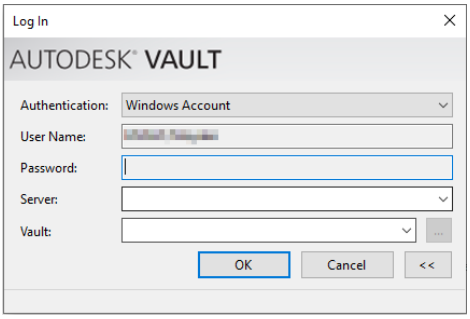
Report Template Authoring Utility can be found:
C:\Program Files\Autodesk\Vault Client 2021\Explorer\ReportTemplateAuthoringUtility.exe

For this handout 2021 will be the version shown.

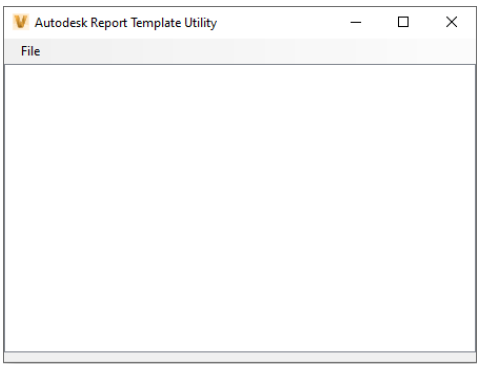


LOCATION

The Report Authoring Utility is a simple application that allows users to modify existing templates or create new templates from existing templates. This tool is simply a Vault report property editing tool, it gives access to adding or removing properties for report usage. When using this tool Vault login is required. Once successfully logged into Vault, the program will open.



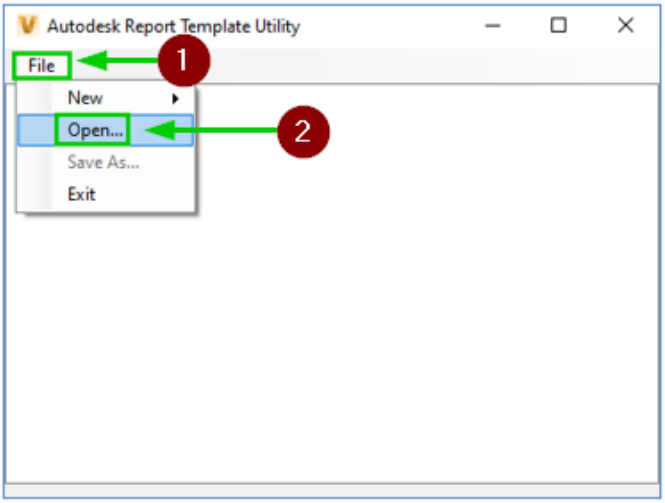
VAULT LOGIN



REPORT UTILITY

1.2.1 Open Existing

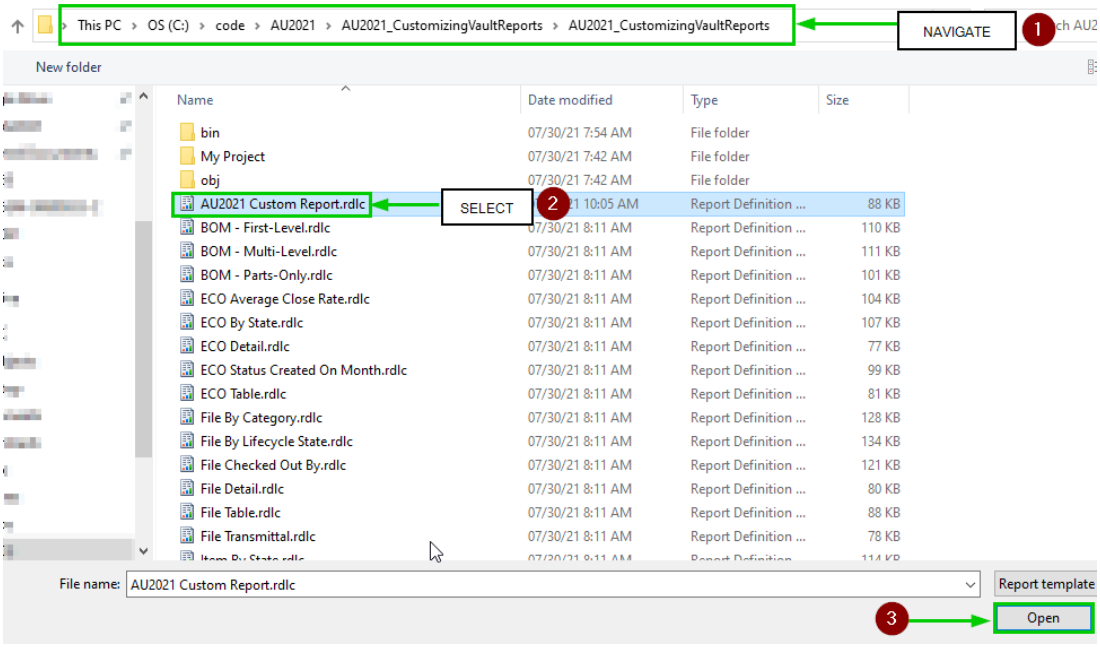
To open an existing template, simply go to (File→Open…). The new template that was created in the Microsoft Visual Studio 2015 Section, will be used in this situation.



OPEN

Navigate to the project location and select the “AU2021 Custom Report.rdlc” template.

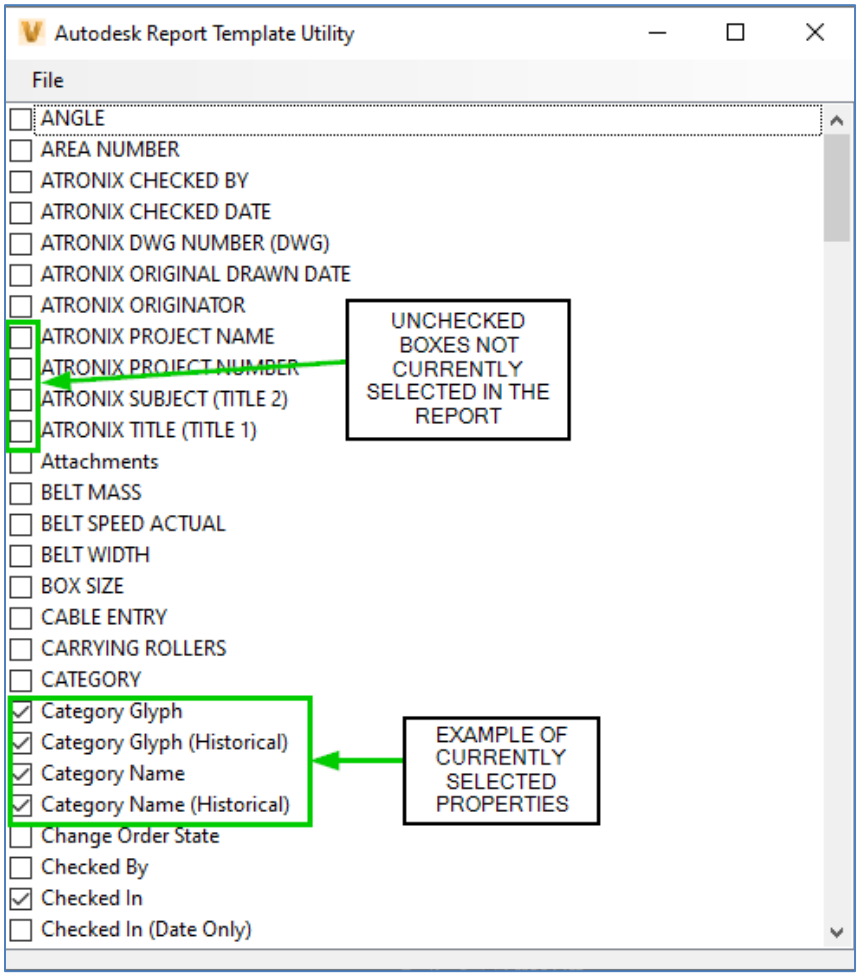
Note: Project Location
C:\code\AU2021\AU2021_CustomizingVaultReports\AU2021_CustomizingVaultReports



OPEN REPORT

1.2.2 Properties

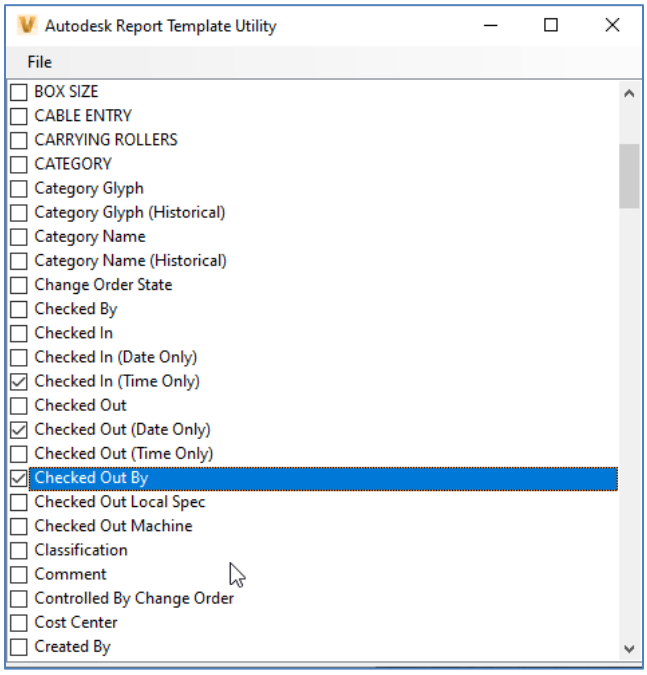
Once a report template is chosen all the available properties are shown. These properties should match all available properties in the users' Vault; both user-defined and system properties. The list is just an example and not intended to reflect exactly what will be shown.



IPROPERTY LIST

1.2.3 Modifying Properties in Utility

To modify which properties are available in a specific report is as easy as selecting or deselecting the check box next to the property name. There isn't a current way to mass select or multi-select, individually checking or unchecking each box is the only current way to add or remove properties.

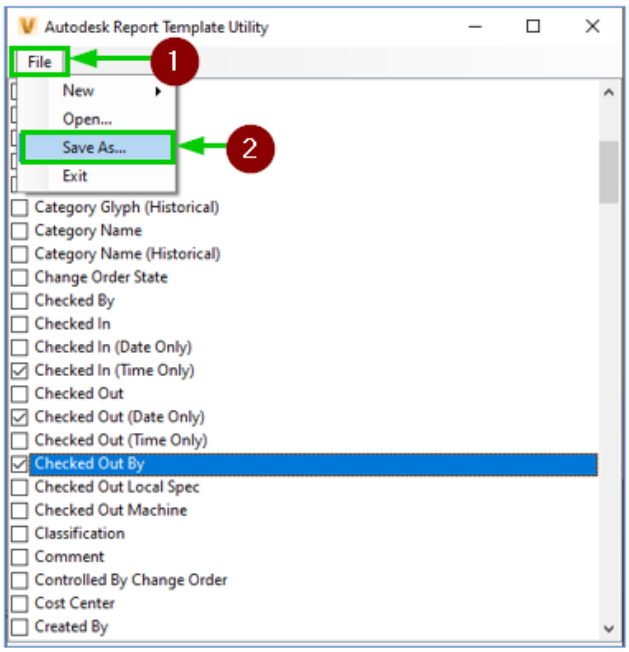


CHECK/ UNCHECK BOXES

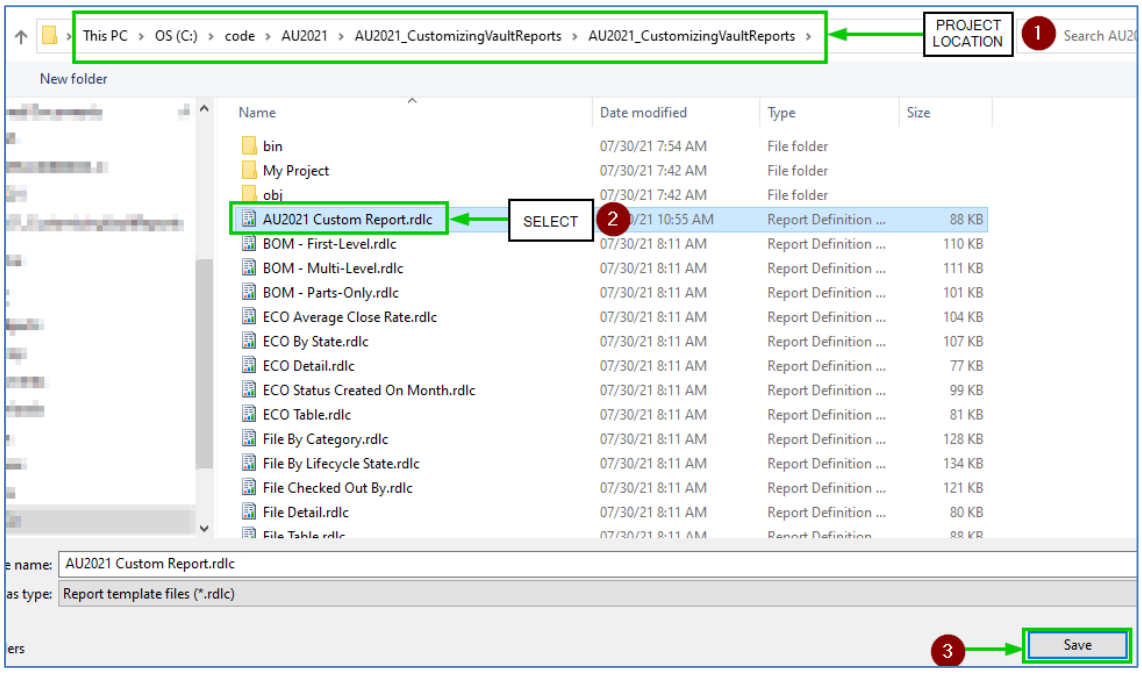
For this handout, please select the below properties, these will be additional properties selected. Do not **deselect** any properties during this process.

- Path
- Vault Status
- File Extension

1.2.4 Save As…

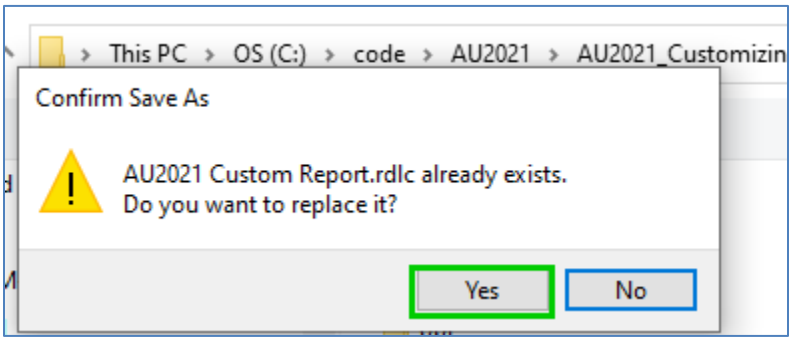


SAVE AS



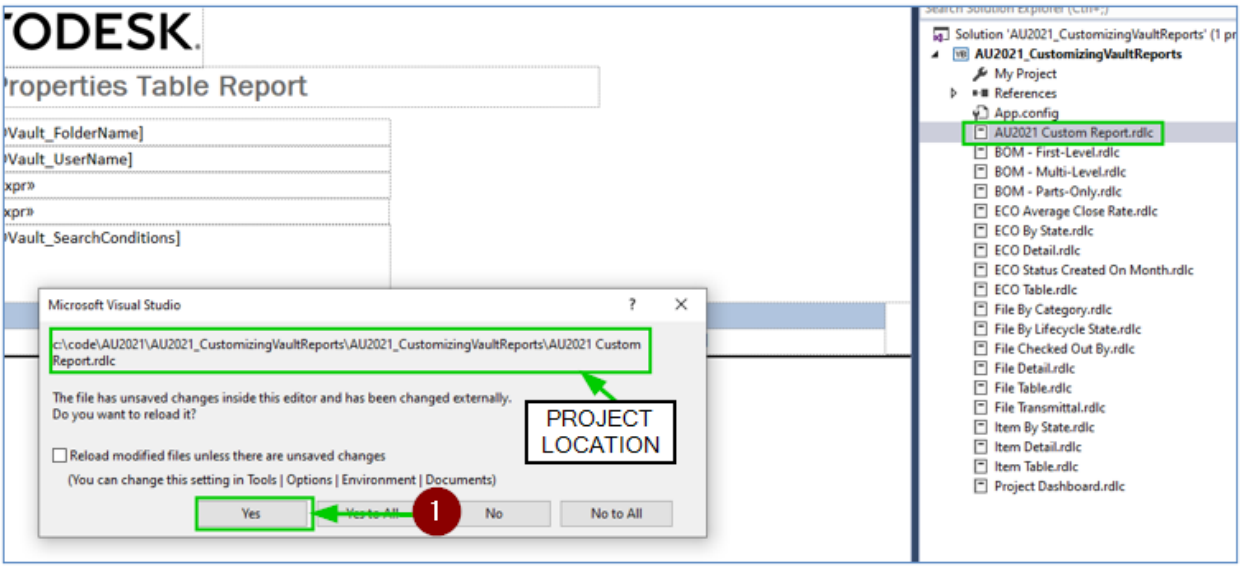
SAVE OVER TEMPLATE

Since this report already exists in this directory, a prompt to replace the report will be given. When prompted, select yes, doing this will overwrite the existing report. This new report will have the newly selected properties.



REPLACE

When the changes are saved and Microsoft Visual Studio 2015 is brought back into focus, an alert will occur asking to reload the report. Doing this will update the report in the Microsoft Visual Studio project.

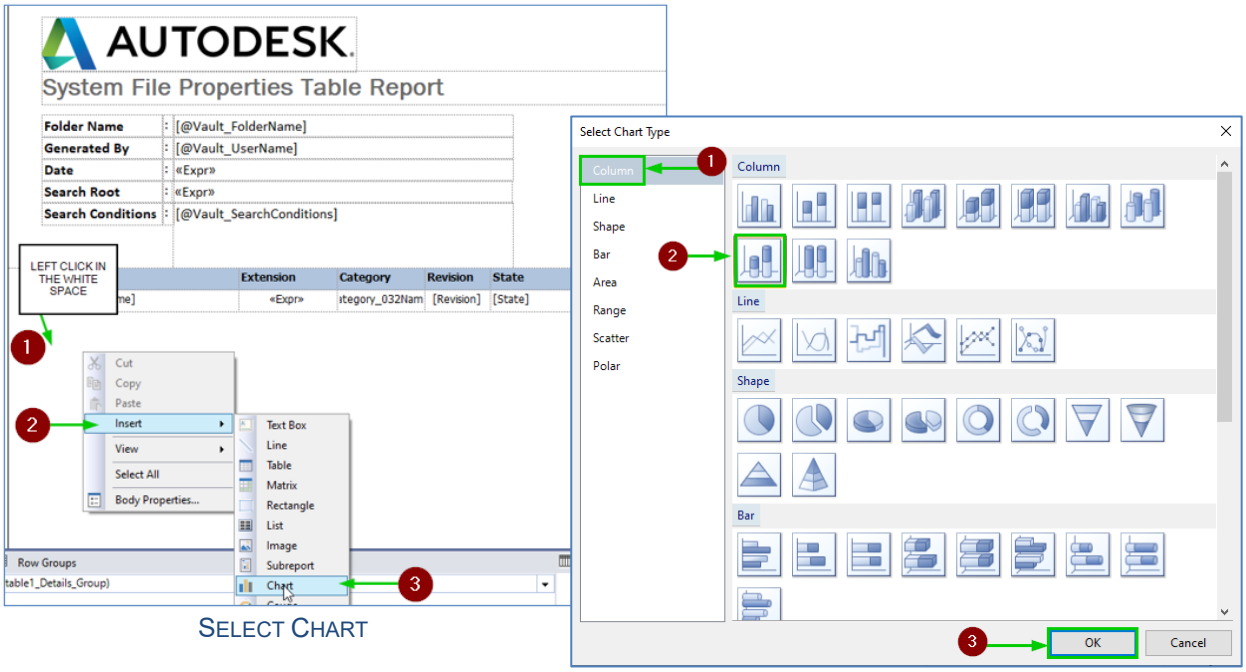


RELOAD REPORT

1.3 Charts and Graphs

1.3.1 Add Column Chart

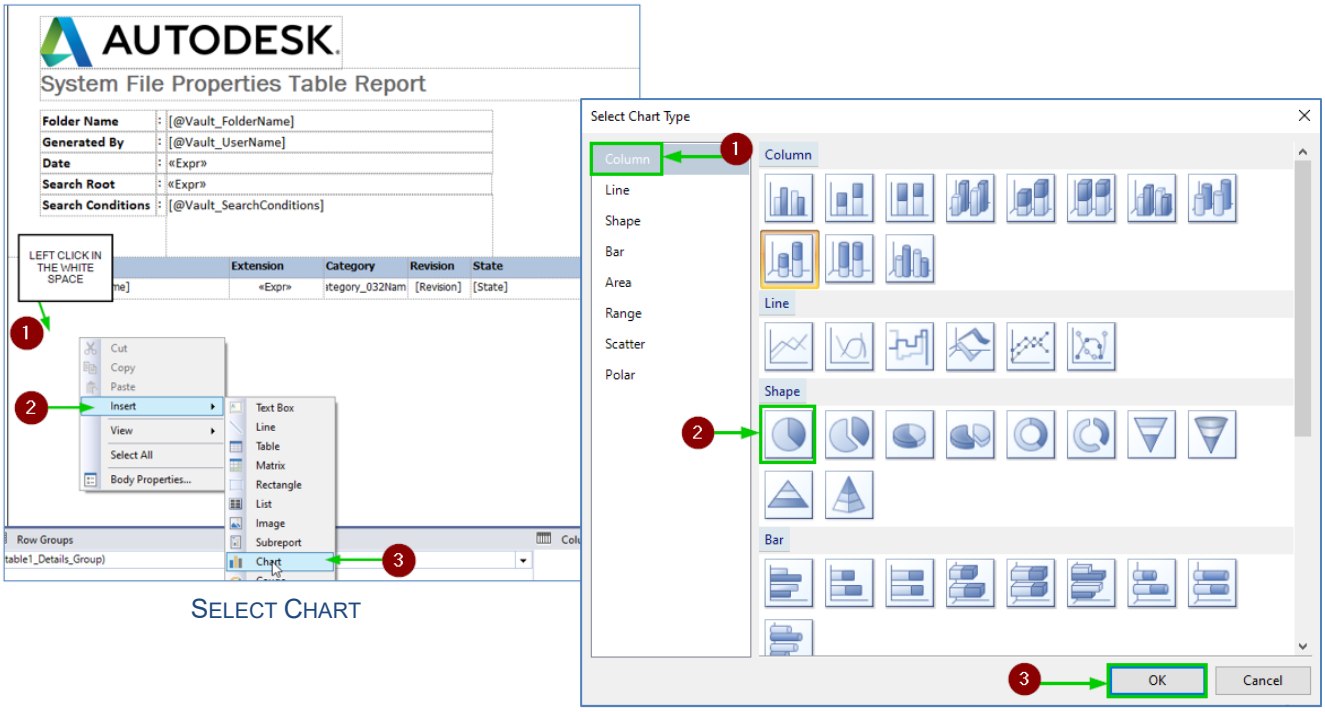
Adding charts and graphs is very easy with Microsoft Visual Studio, simply click anywhere in the white space and select Insert, then Chart.



SELECT CHART

PLACE CHART

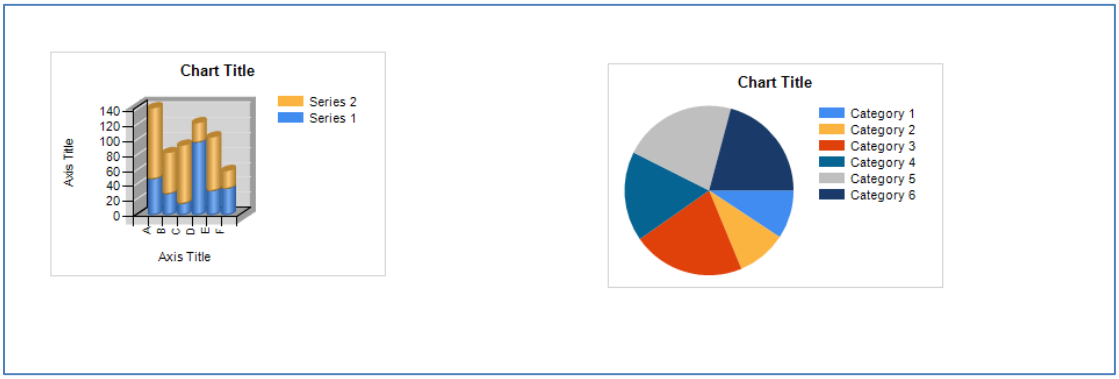
1.3.2 Add Pie Chart



SELECT CHART

PLACE CHART

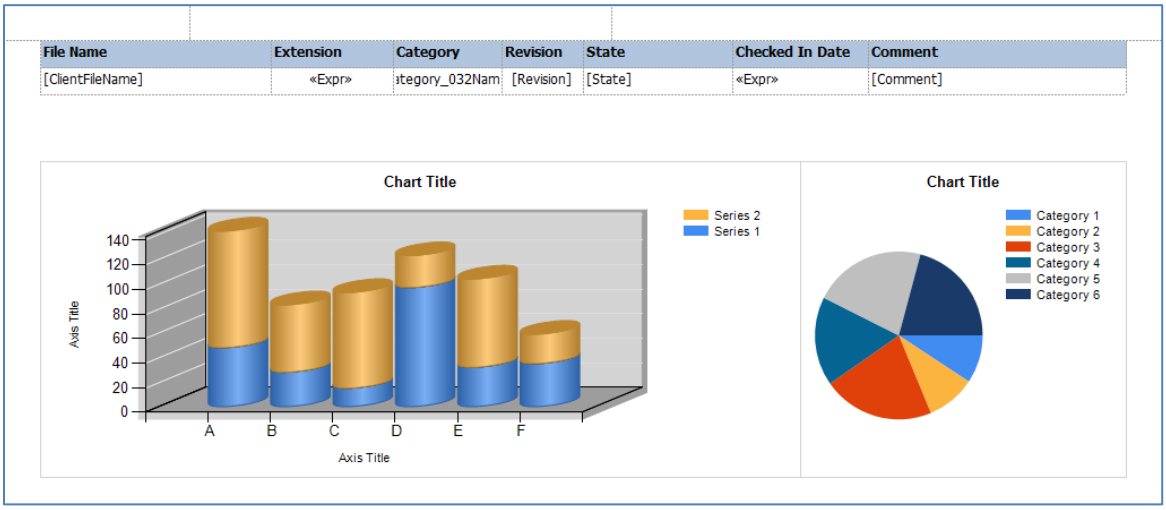
When complete, the sheet should look similar to the below picture. Sizing and positioning will come later. As an aside, there are many charts available, these are just two examples. After this handout, I would encourage experimentation with all the different options and see what looks best!



ADDING CHARTS

1.3.3 Resizing Charts

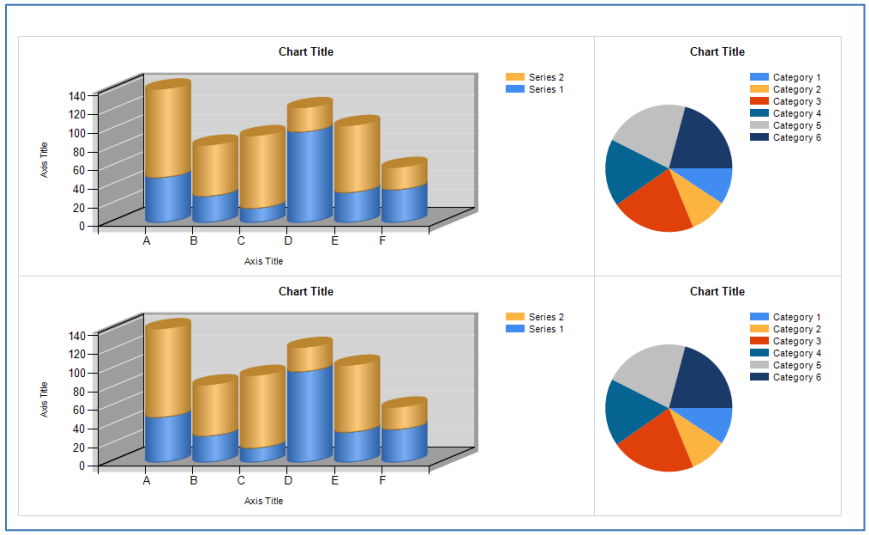
Next, organize the charts to make the left chart bigger than the right. Doing this by pulling and dragging the borders in each direction to size appropriately. This will allow for more information to be shown on the left chart. Once complete it should look similar to the below picture. It's important to make the charts as readable as possible.



SIZING CHARTS

1.3.4 Adding More Charts

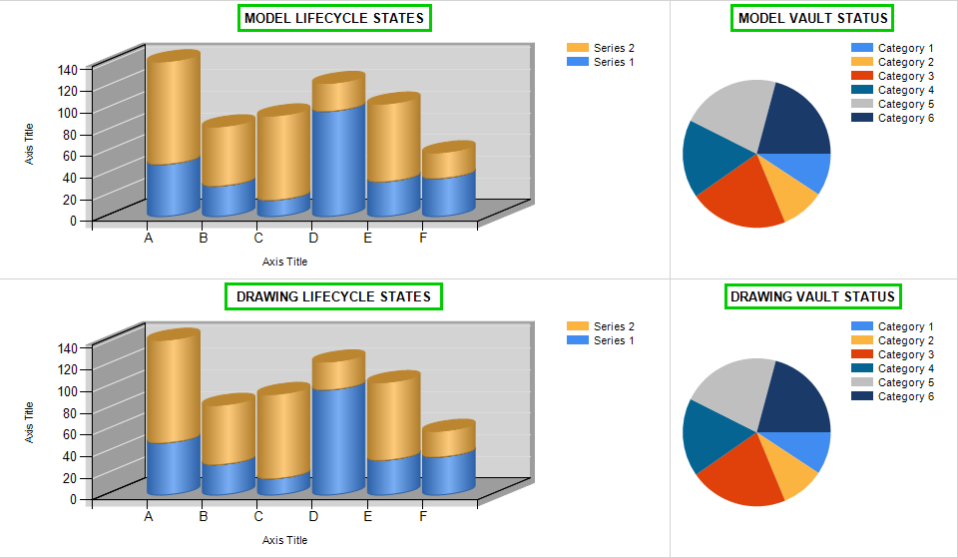
Now, let's add two more charts sized the same, the same type, right below these two charts. After completing, the charts should look like the below picture. The tip for this is to select both the charts and use the keyboard shortcut to copy and paste. If that is too complicated, process Section 1.3.1 through 1.3.3 again.



DUPLICATING CHARTS

1.3.5 Renaming Charts

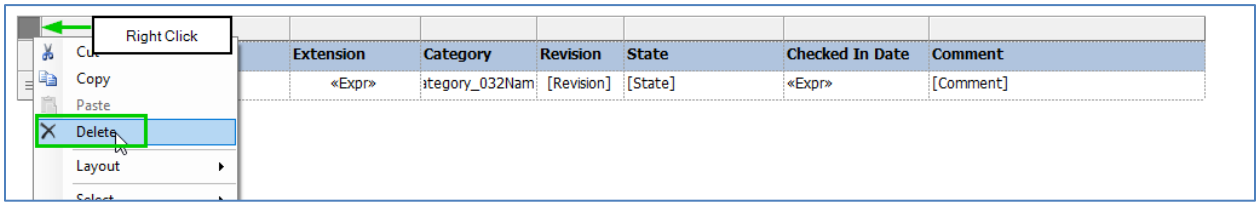
Rename each chart specific to what is going to be shown, the bar charts are going to show lifecycle states and the pie charts will show vault statuses. After completing this change, the charts should look like the below picture. To rename simple slow click a few times on the chart title, to allow editing. Do this for all four charts.



RENAMING CHARTS

1.3.6 Delete Table

For this exercise, the table will not be needed. Delete it now.



DELETE TABLIX TABLE

1.4 Grouping

1.4.1 Adding Groups to Charts

Adding groups to charts make the charts specific for the information that needs to be shown in the chart. To edit the chart data slow click twice in any white space on the chart and the pop-out box will show up to the right of the chart. For both the lifecycle states, changes are needed to only show lifecycle states.

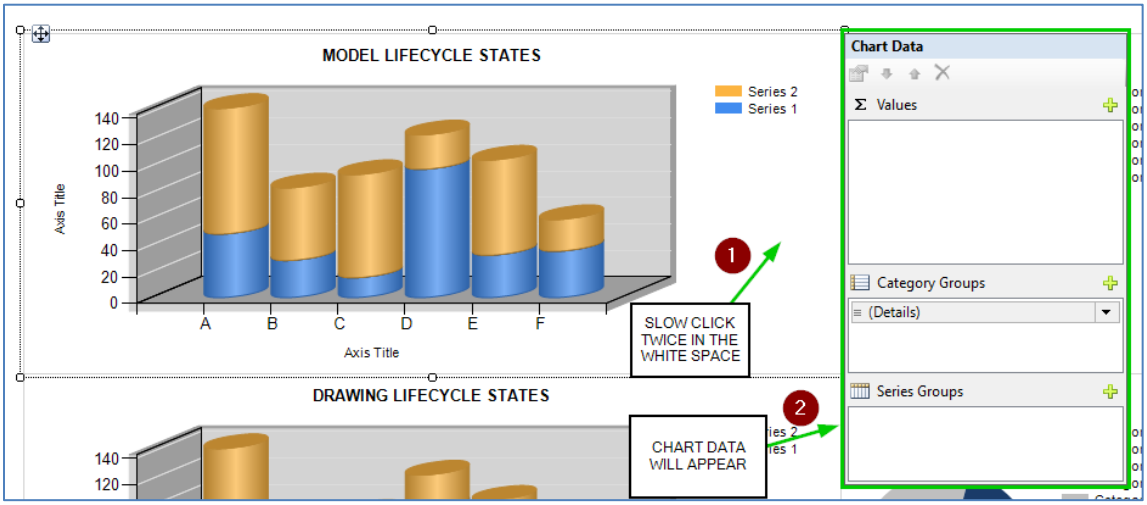
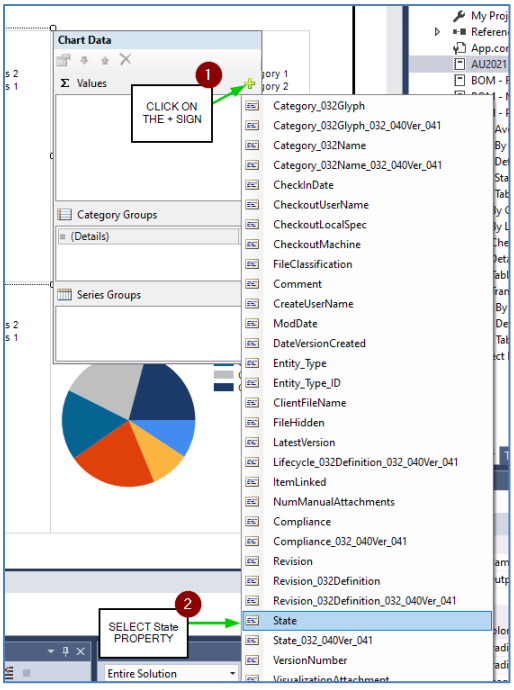
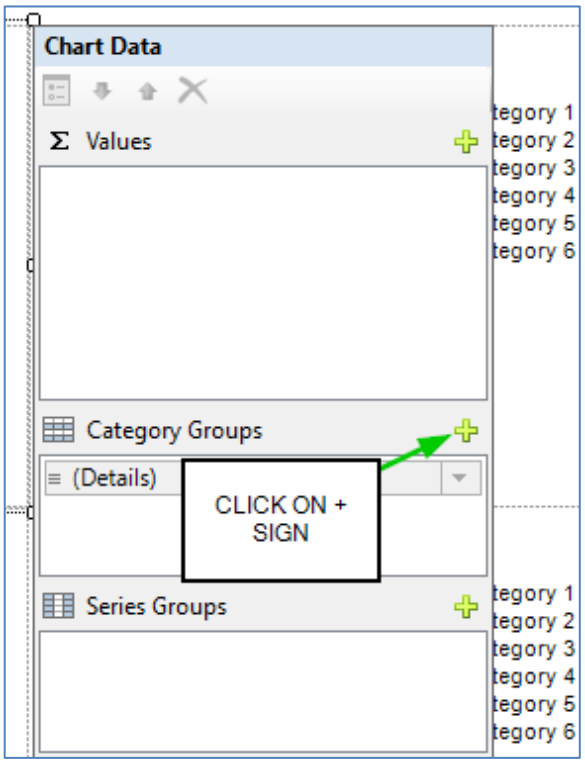


CHART DATA

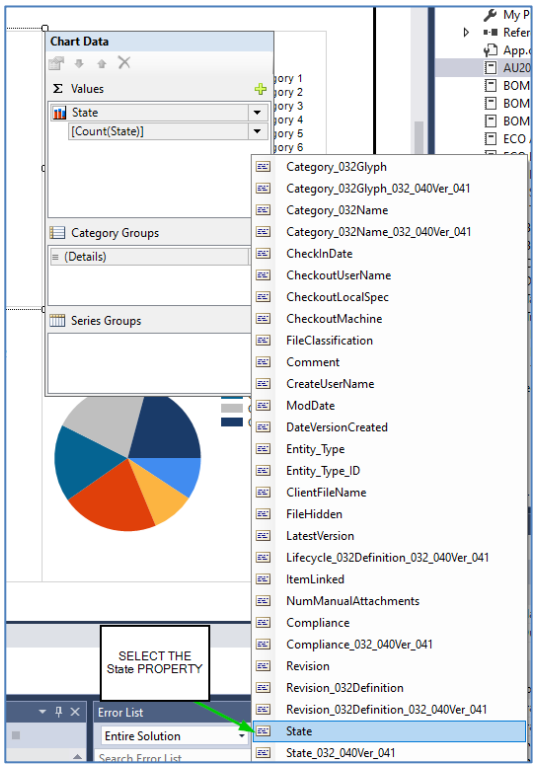


ADDING STATE

Now, add the “State” property to the Category Groups.



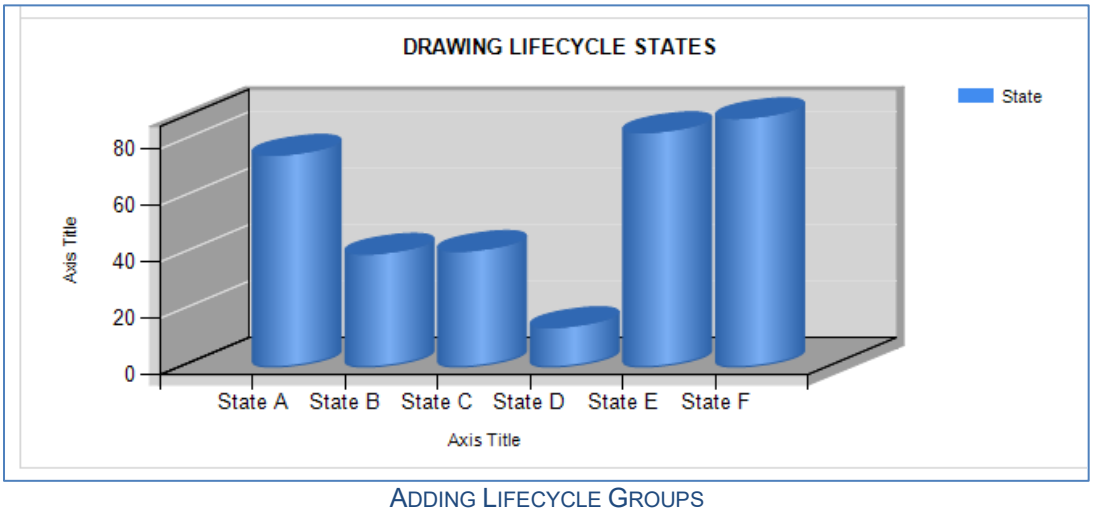
ADDING CATEGORY GROUP



ADD STATE

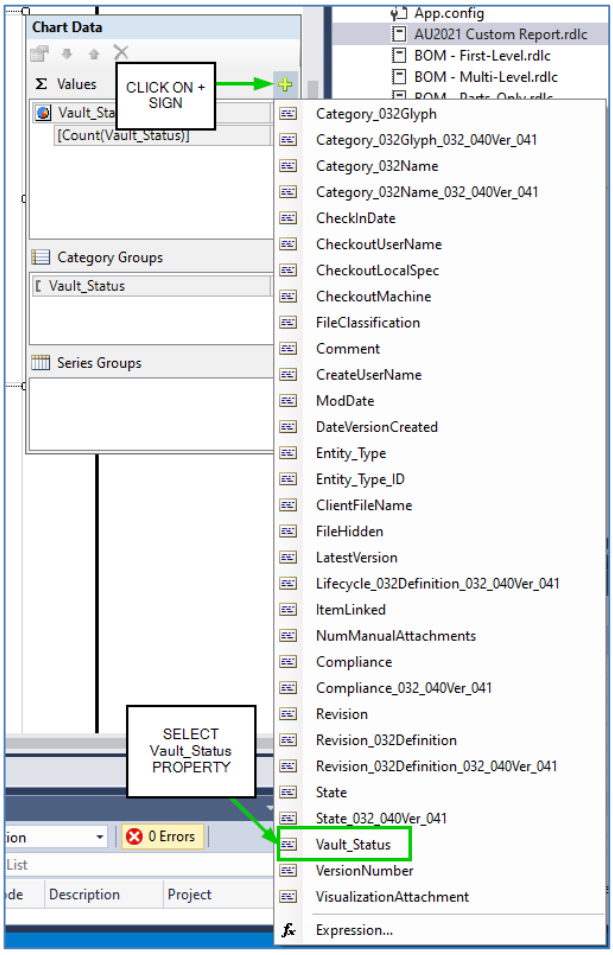
ADDING STATE

Once complete the LifeCycle State charts should look like the below picture. Do the above process for both charts. (Model LifeCycle States and the Drawing LifeCycle States)

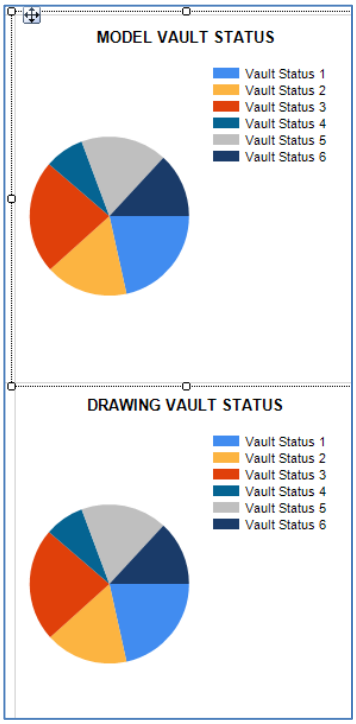


ADDING LIFECYCLE GROUPS

Now, let’s add grouping to the pie charts. Since these charts show Vault Status, the process will be the same as before but instead of choosing “State”, the choice will be “Vault_Status”. Select Vault_Status for both the Values and Category Groups. Do this for both the Model Drawing Status chart and the Drawing Vault Status Chart.



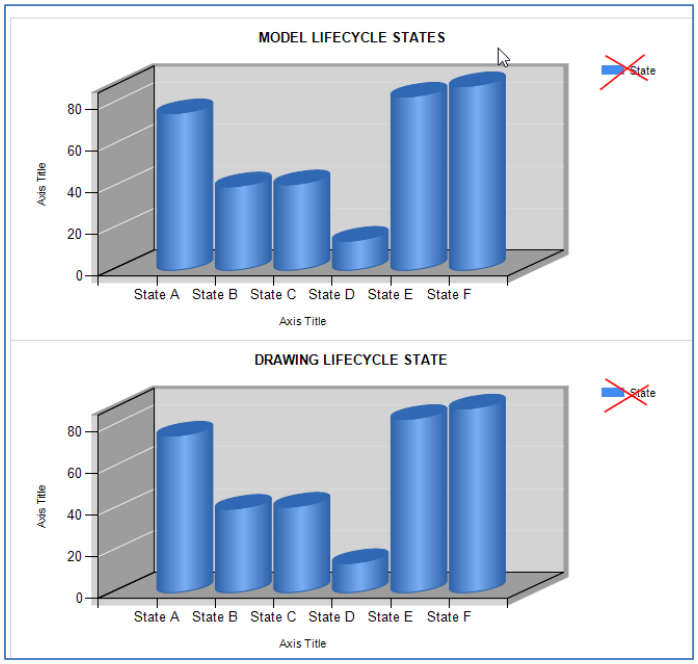
ADDING VALUE AND CATEGORY



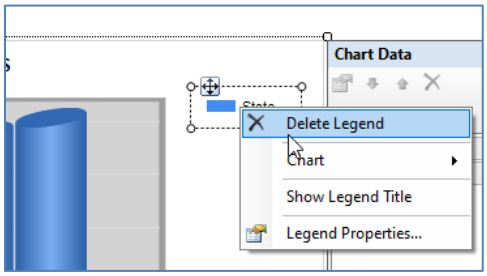
PIE CHARTS

1.4.2 Chart Cleanup

In this case, the legend can be deleted from the bar charts, since each State is identified on the horizontal axis. To delete the legend simply select the legend on the chart and hit the delete button on the keyboard or right-click on the legend and select “Delete Legend”. Deleting the legend makes the charts bigger in the process.

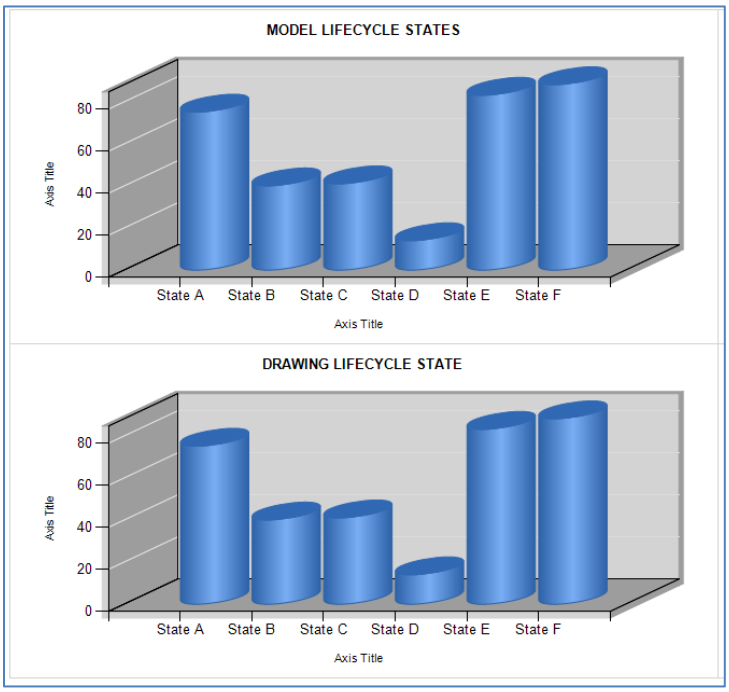


DELETE LEGEND



DELETE LEGEND

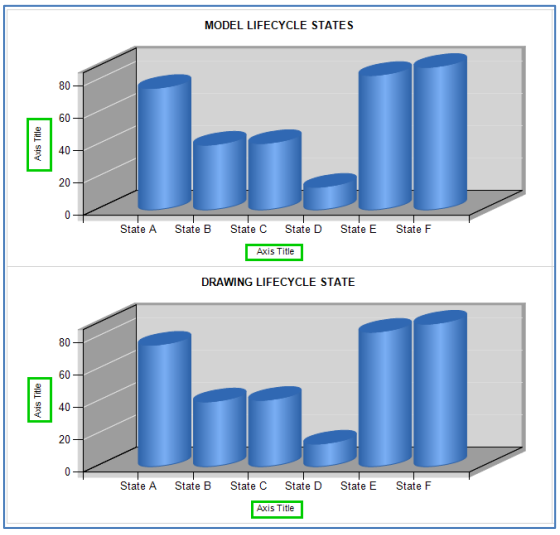
After deleting the legend the charts should look like the below picture.



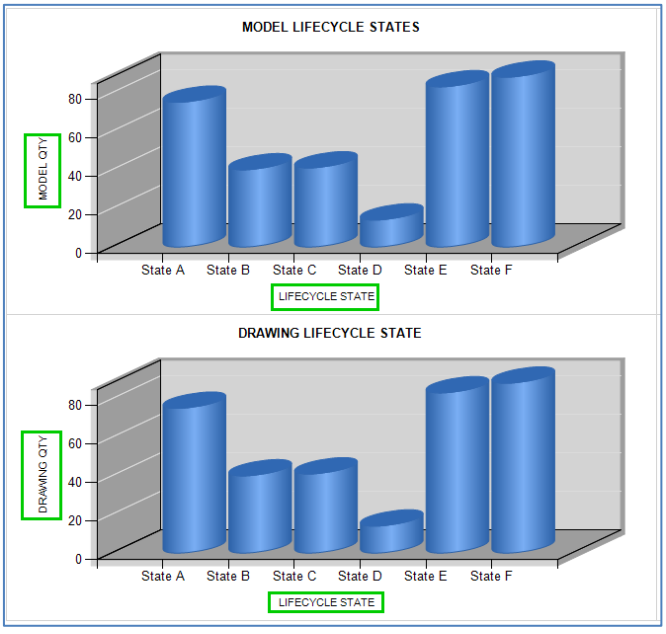
AFTER DELETION OF LEGEND

1.4.3 Rename Axis's

Slow click twice on each of the axis titles to change the name to be more specific. After changing each axis name the charts should look like the below picture on the right.



AXIS NAME BEFORE



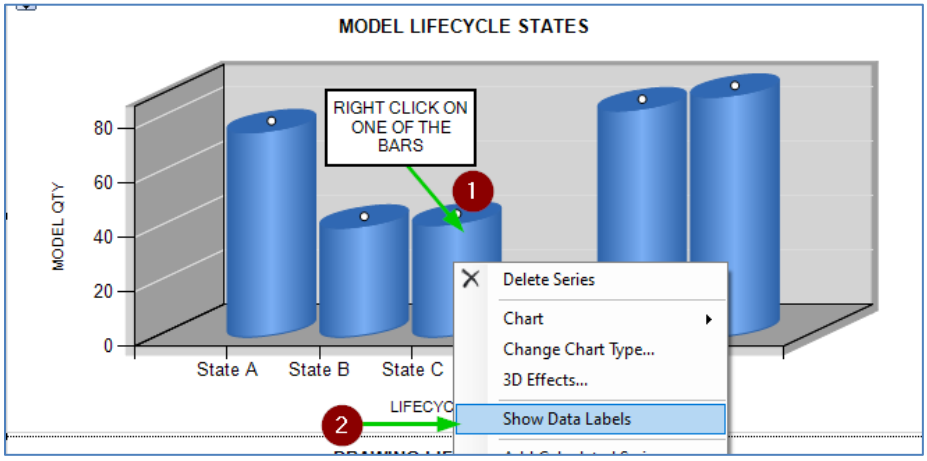
AXIS NAME AFTER

1.5 Adding Extras

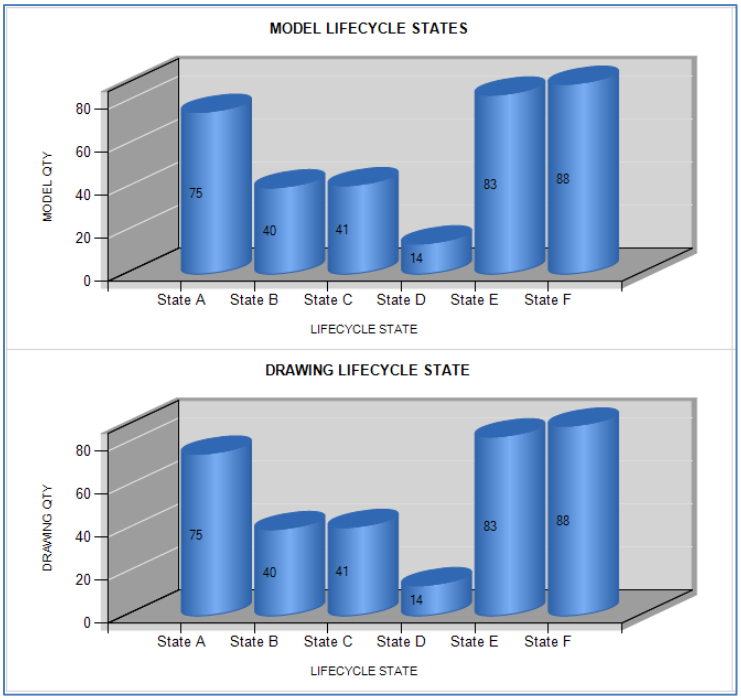
This portion of the handout will go through some of the extras that might be added to charts to make them more reader-friendly.

1.5.1 Bar Chart Labels

Adding Labels to a bar chart to show specific quantities of meta-data can be helpful. Do this for both Model LifeCycle States and Drawing LifeCycle States bar charts.



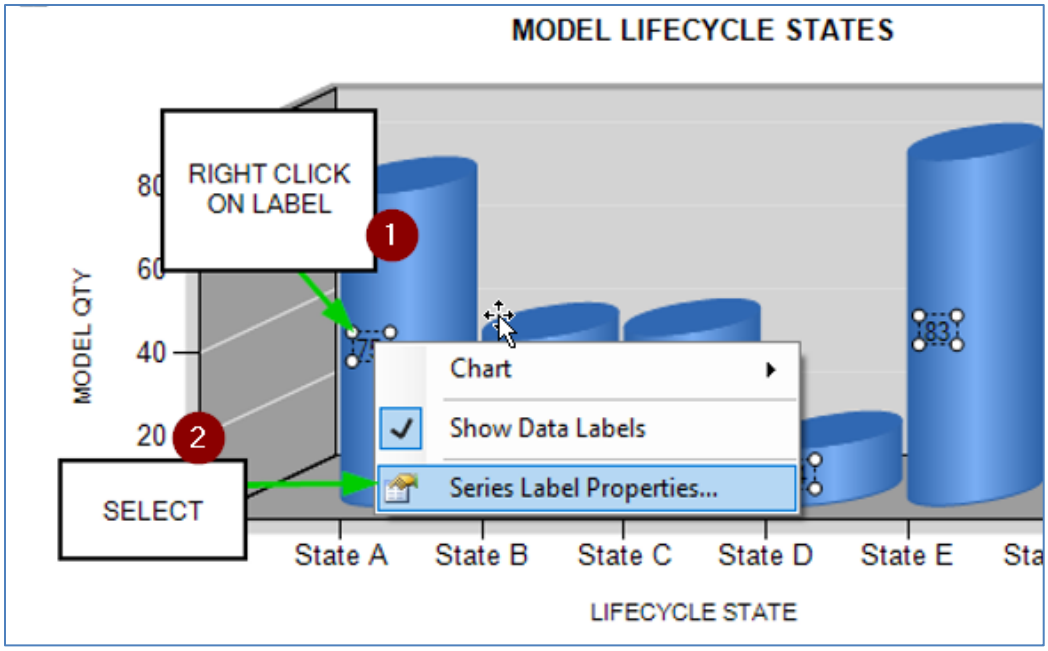
ADDING LABELS



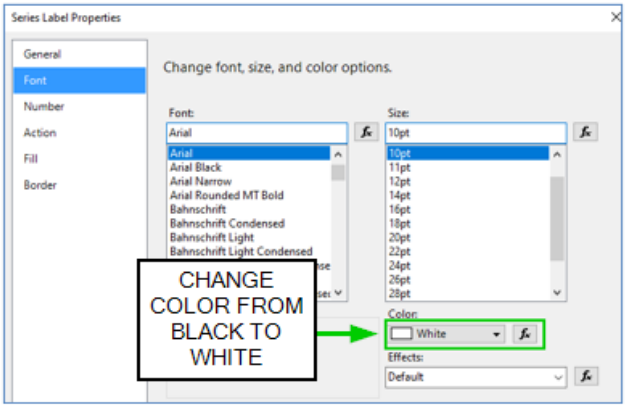
BAR CHART LABELS

1.5.2 Label Font

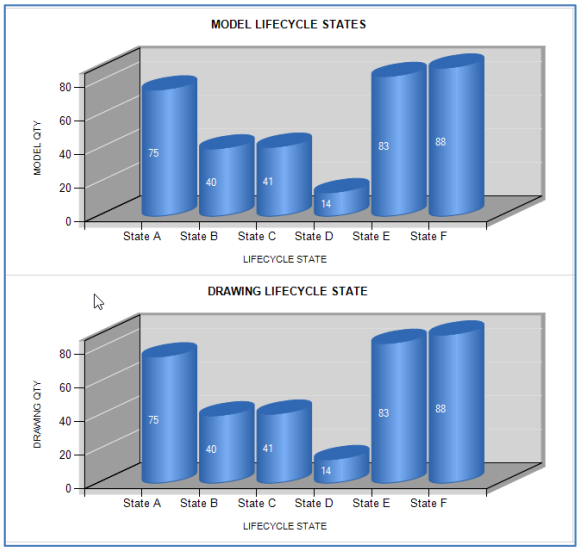
It's possible to specialize the label font and color. In this handout, for contrast, the font color will change to white.



LABEL PROPERTIES



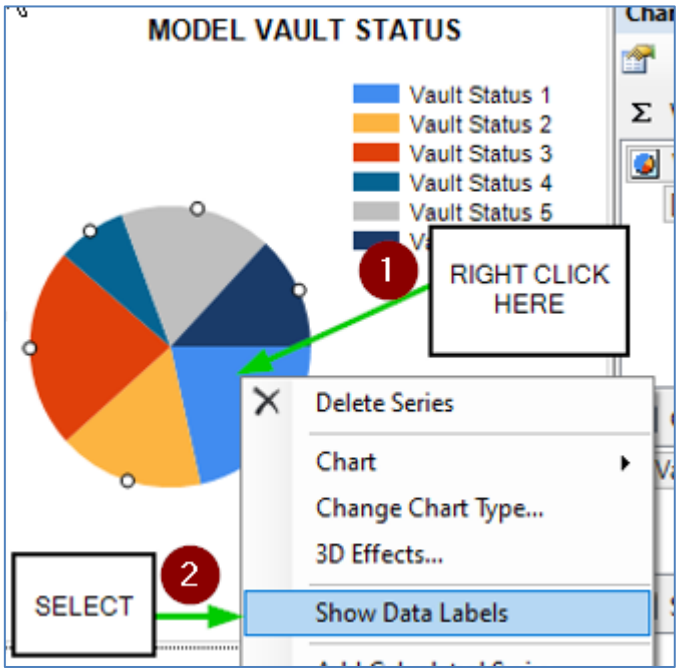
LABEL COLOR



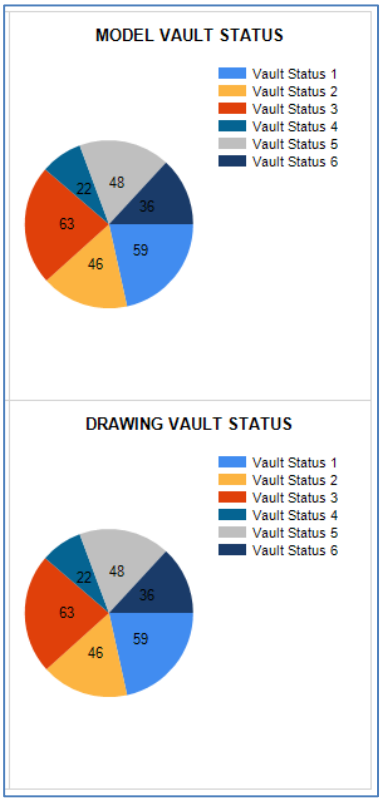
BOTH LABEL COLORS

1.5.3 Pie Chart Labels

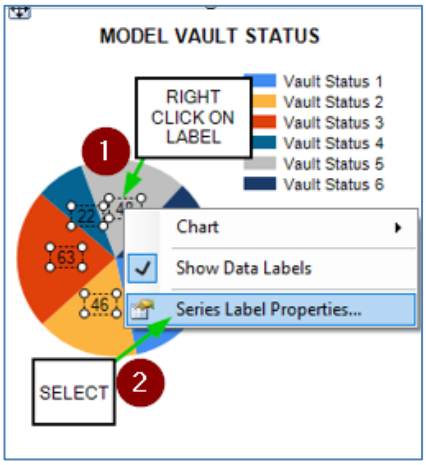
For the pie chart labels instead of displaying the quantity of the metadata, what will be displayed is the percent of quantity compared to the total. This chart will show the percent of files checked out and not checked out. Also, while changing the label, change the font to white!



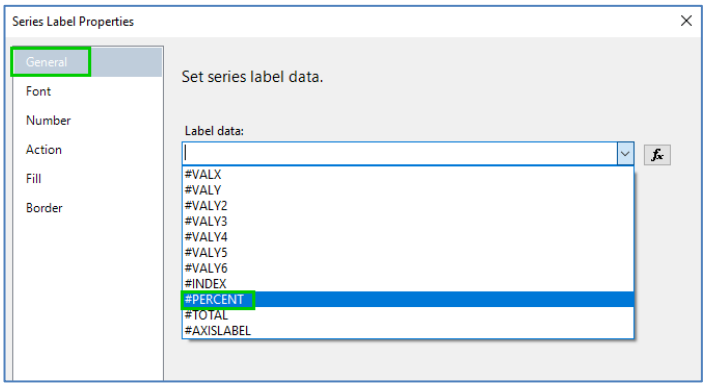
PIE CHART LABELS



ADD CHART LABELS

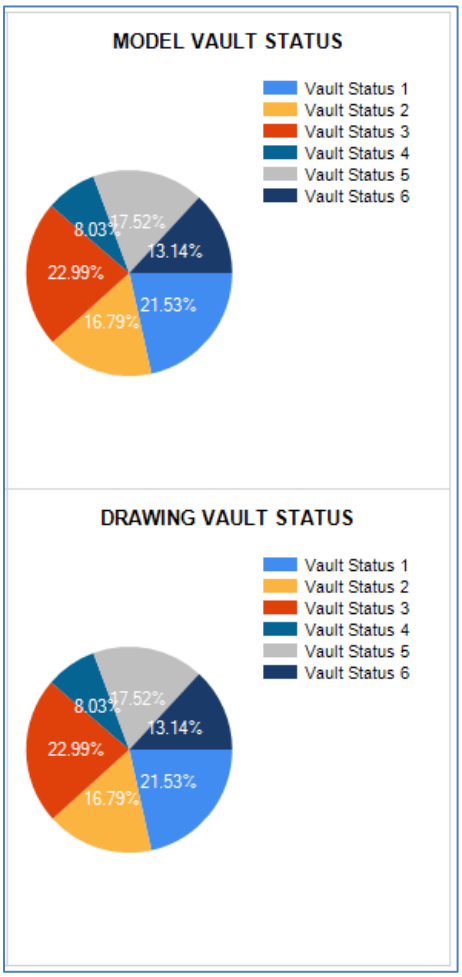


PIE CHART LABELS



CHANGE LABEL TYPE

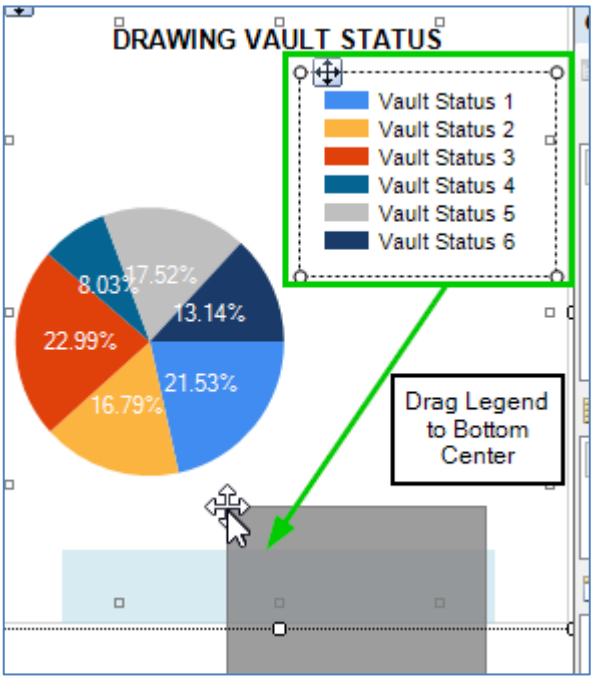
Once complete the pie charts should look like the below pictures.



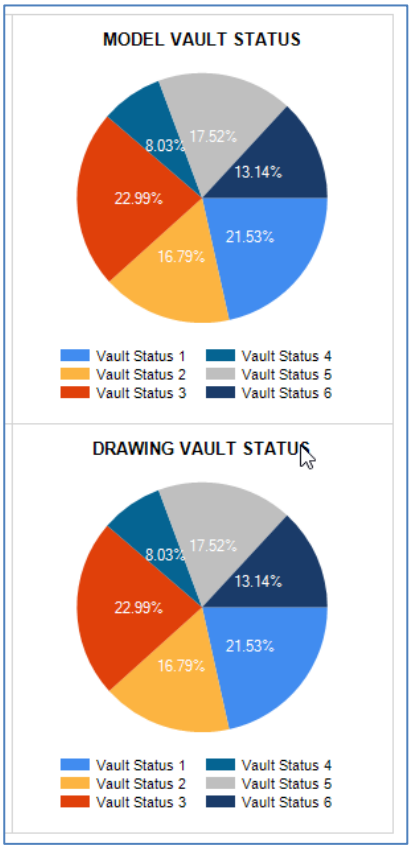
PIE CHART LABELS

1.5.4 Move Pie Chart Legends To Bottom Center

To clean up the legend space and to make the pie chart more readable, it's good to move the legend to the bottom center. This will give more space for the wording in the legend and also center the pie chart in the chart.



DRAG LEGEND



NEW LEGEND LOCATION

1.6 Chart Filters

Adding filters to charts helps to only show the metadata that is needed. Accessing the filters is always through chart properties. Multiple filters can be added to one chart.

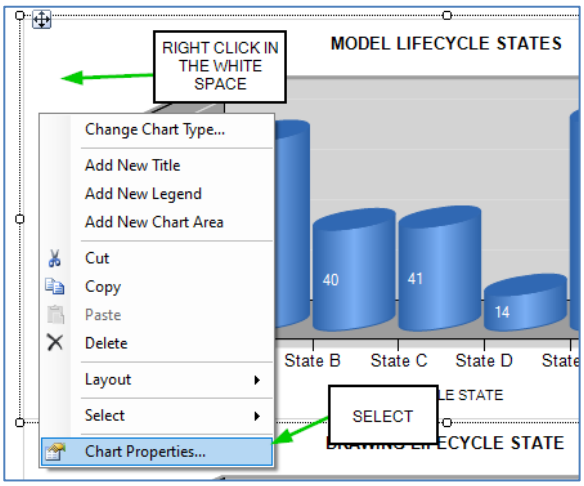
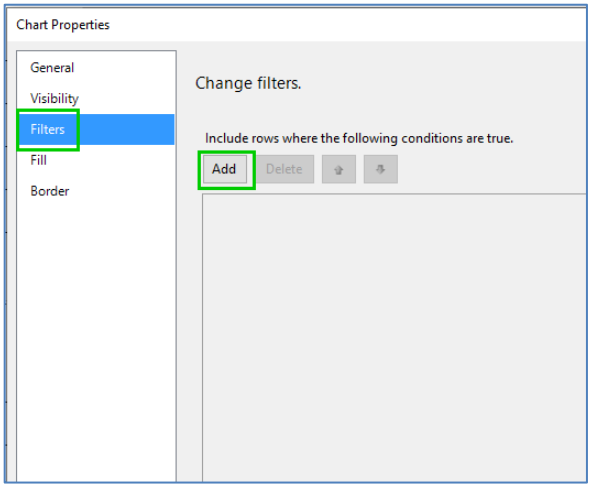


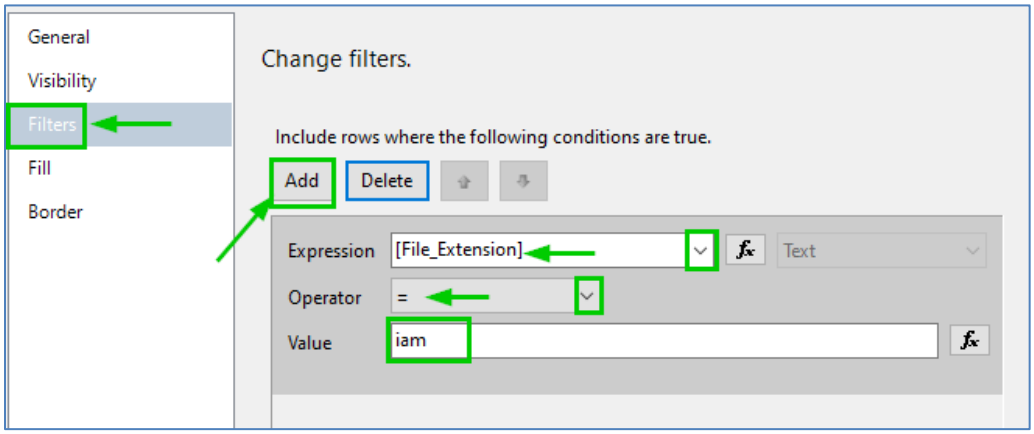
CHART PROPERTIES



ADDING FILTERS

1.6.1 Model Extension Filter

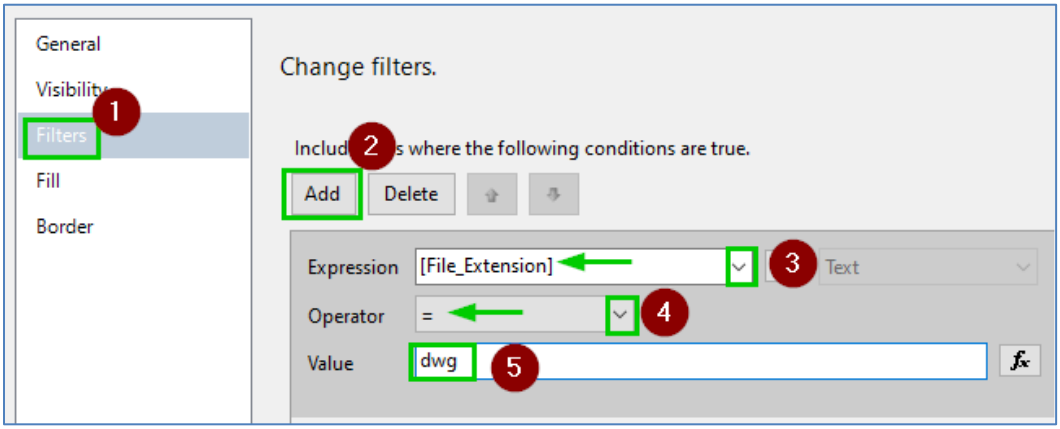
Adding an extension filter can make the charts specific to the file type that is needed to show in the chart. For both model charts adding a File_Extension = iam, will only show assembly model data in the chart. Add this filter to both the Model Lifecycle States bar chart and the Model Vault Status pie charts.



ADDING MODEL FILTER

1.6.2 Drawing Extension Filter

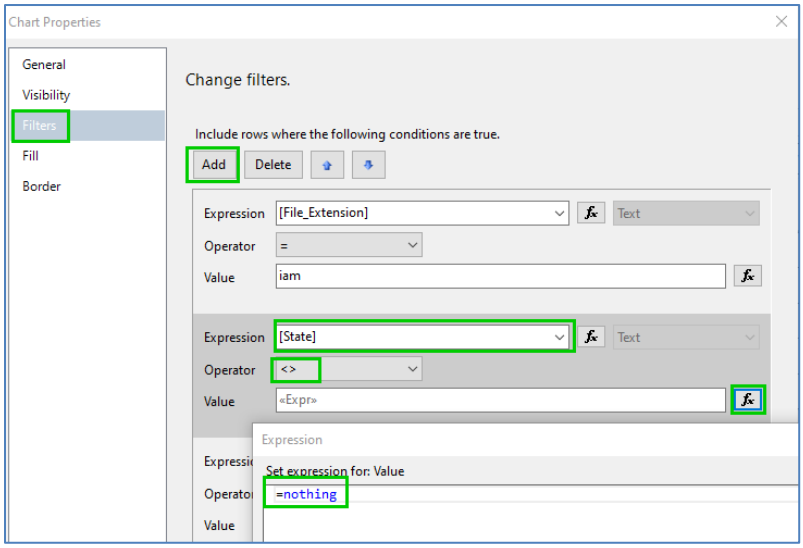
For both the Drawing Lifecycle States bar chart and Drawing Vault Status pie charts add a File_Extension = dwg filter. Reference images in 1.6 for reference.



ADDING DRAWING FILTER

1.6.3 Null State Filter

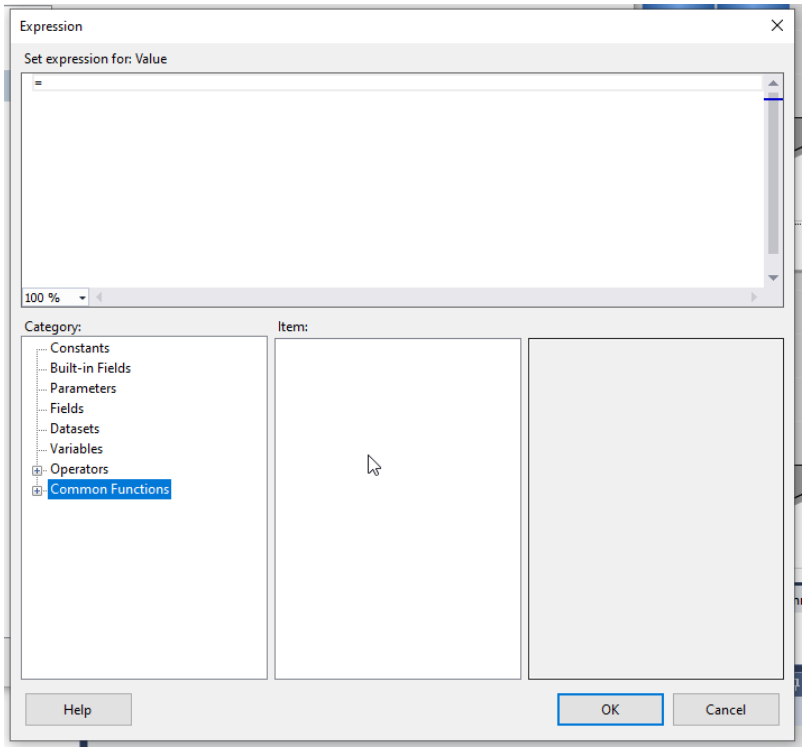
Adding a filter to only see valid State values is a good best practice. After adding expression in the expression window, press “OK”. Then the expression will show up as <<Expr>>. Please add this filter to all 4 charts. Reference images in 1.6 for reference on how to get to the filters in a chart.



ADDING FILTER

1.7 Writing Expressions and Common Expression

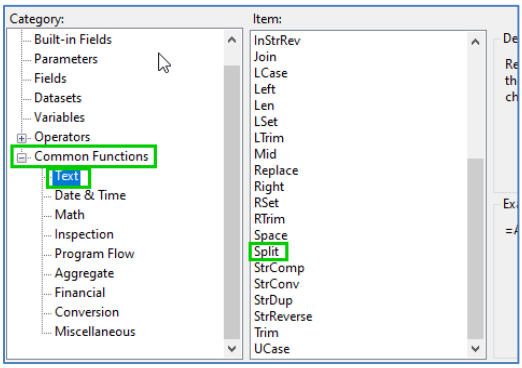
Sometimes it's useful to write special expressions to filter information out of charts and tables. The Expression Editor is an important piece to writing expressions. Exploring the different categories below is very helpful and there are many commonalities with other programs like Excel, VBA, and even SQL.



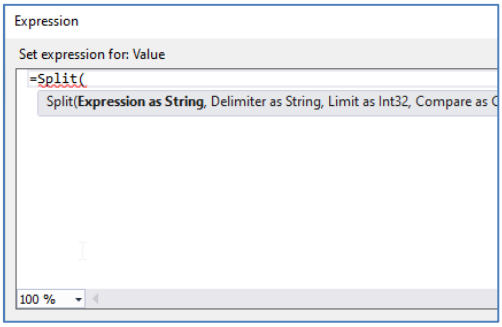
EXPRESSION EDITOR

1.7.1 Split Expression

The split function can be used in many ways, including splitting a filename or file path. After double-clicking on the category item, the item will show up in the Expression Editor.



SPLIT CATEGORY



SPLIT EXPRESSION

1.7.2 Split Expression Example

Let us use the split function to split a file path into its parts. This is helpful if there is important information that is in the file path. The split function creates a zero-based array.

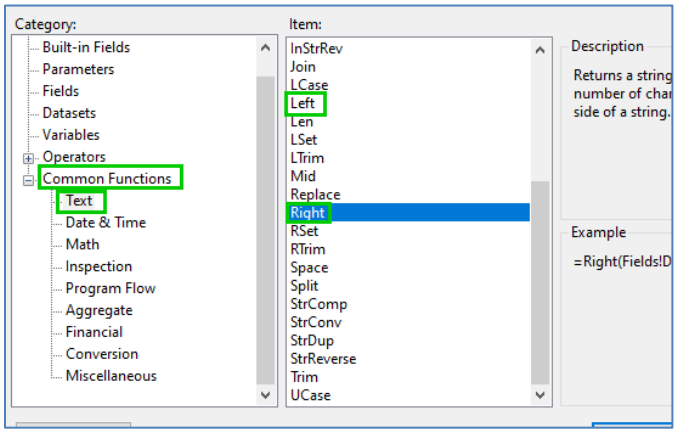
Example Vault Path = $/PROD/COMPANY/LOCATION/part.ipt

Expression = split(Fields!Path.Value, “/”)(Array Position)

Array Position	Expression	Return Output
0	=split(Fields!Path.Value, “/”)(0)	$
1	=split(Fields!Path.Value, “/”)(1)	PROD
2	=split(Fields!Path.Value, “/”)(2)	COMPANY
3	=split(Fields!Path.Value, “/”)(3)	LOCATION
4	=split(Fields!Path.Value, “/”)(4)	Part.ipt

1.7.3 Right/Left Expression

The Right or Left expression is useful if a string trim is needed.



SPLIT ITEM

1.7.4 Right/Left Expression Example

If the file naming structure is very standardized it may be possible that the “Left” and/or “Right” functions can help with flagging files that are needed to display in the report.

Definitions:

Right	Returns a string containing a specified number of characters from the right side of a string.
Left	Returns a string containing a specified number of characters from the left side of a string.

Let’s use an example part called AU2021Part.ipt. The year is always in the same location in the part filename, and this example will extracting that information using the function Right/Left.

Example 1:

Filename	Expression	Return Output
AU2021Part.ipt	Left(Fields!File_Name.Value, 6)	AU2021
AU2021Part.ipt	Left(Left(Fields!File_Name.Value, 6), 4)	2021

Example 2:

Filename	Expression	Return Output
AU2021Part.ipt	Right(Fields!File_Name.Value, 12)	2021Part.ipt
AU2021Part.ipt	Left(Right(Fields!File_Name.Value, 12),4)	2021

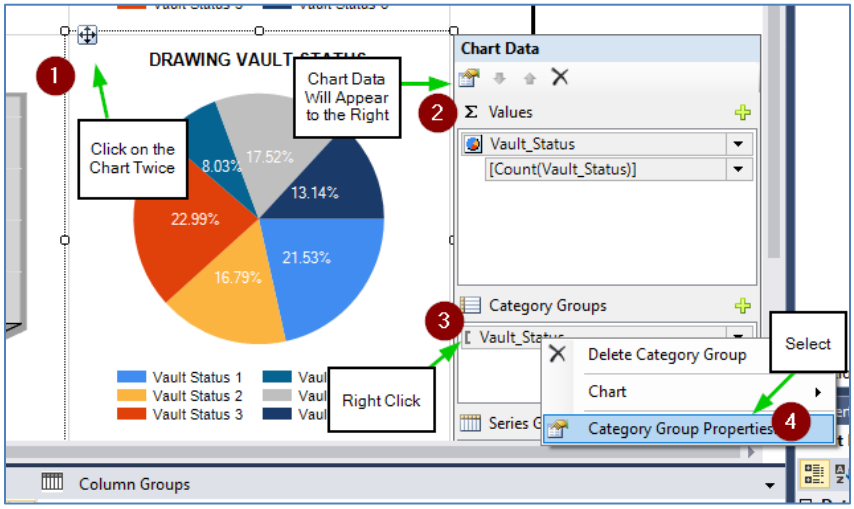
1.8 Chart Label

Now that this handout has covered expressions, let's write some!

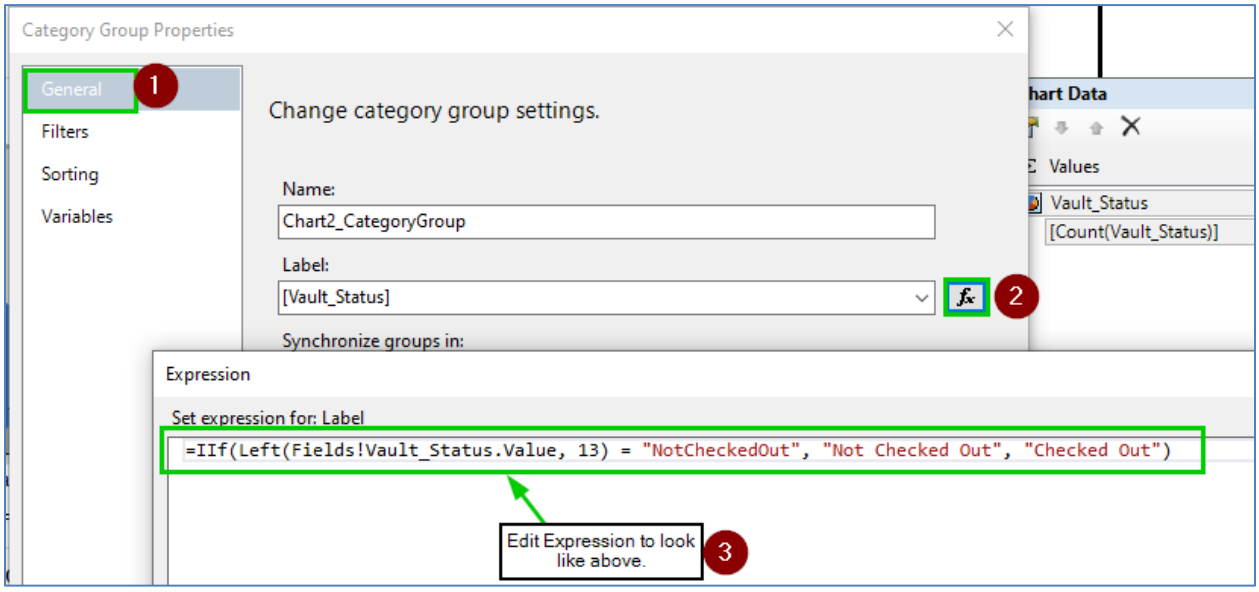
1.8.1 Label Expressions

Sometimes there is a need to clean up and show a more standardized legend within the chart. **This will be done for both the Model Vault Status and Drawing Vault Status.** The expression that will be used is…

=IIf(Left(Fields!Vault_Status.Value,13) = "NotCheckedOut", "Not Checked Out", "Checked Out")

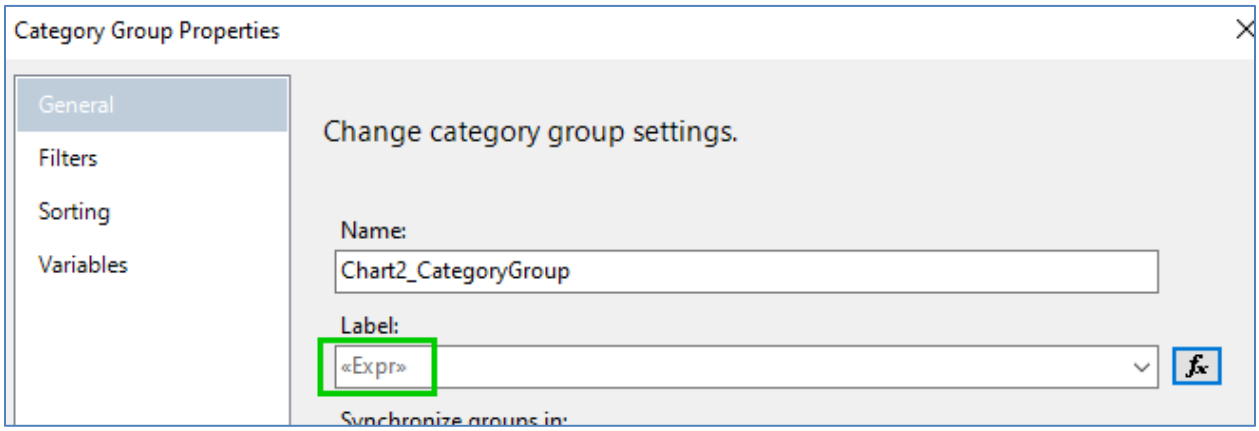


CATEGORY GROUP PROPERTIES



LABEL PROPERTY EXPRESSION

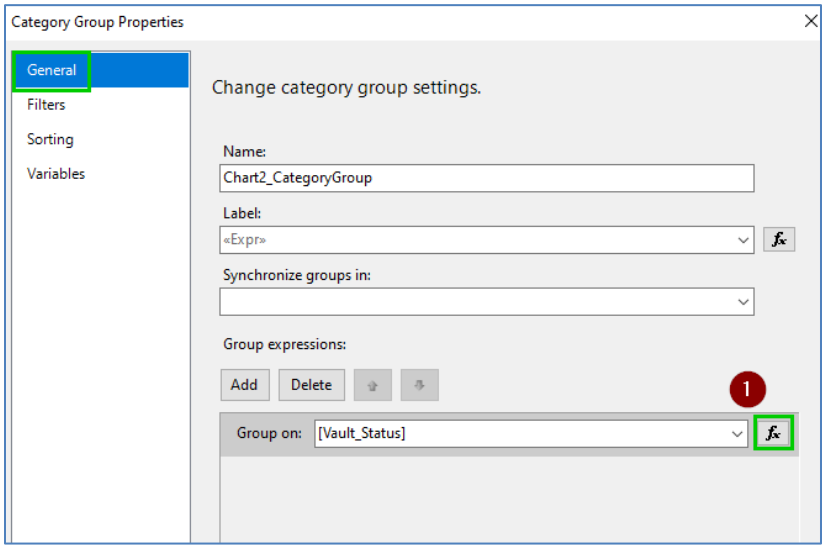
After editing the expression editor, click “OK” to finalize the label expression. There will now be a <<Expr>> value under the label. Do not exit out of the Category Group Properties window, there will be additional expressions added to this window.



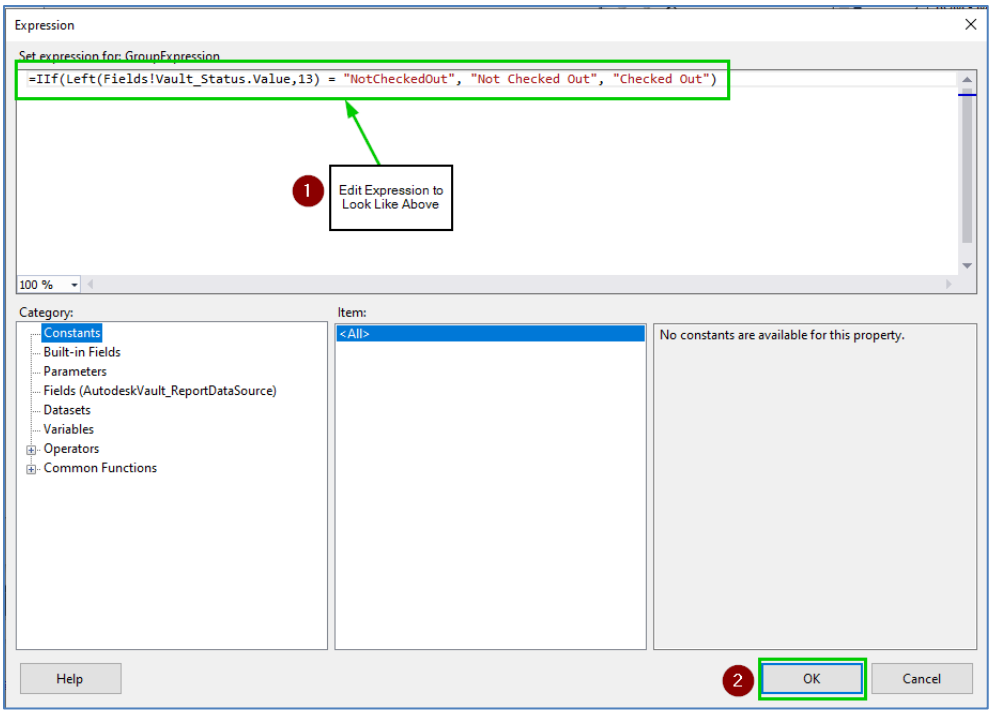
LABEL EXPRESSION

1.8.2 Group on – Expressions

Adding a Group on will clean up the pie chart to only show the data in the way that is the cleanest. After adding the label expression, the group expression will need to be edited the same way. Expression is….
=IIf(Left(Fields!Vault_Status.Value,13) = "NotCheckedOut", "Not Checked Out", "Checked Out")



GROUP ON EXPRESSION



GROUP ON EXPRESSION

1.8.3 Repeat Section 1.8 Model Pie Chart

****Both the Model and the Drawing pie chart will need to be edited for both the Label Expression and the Group on Expression.

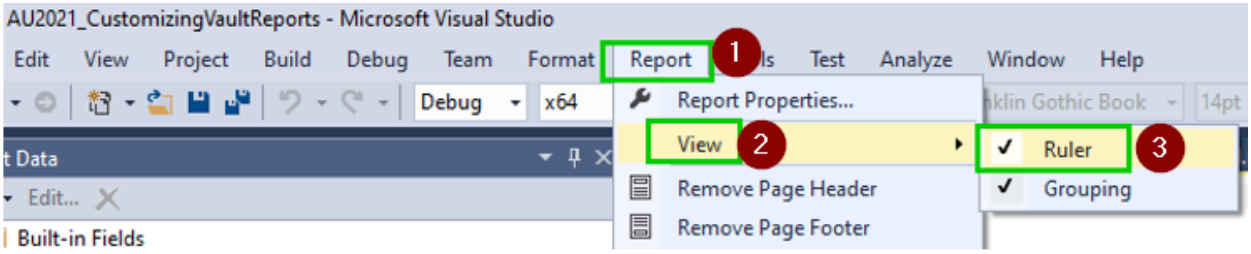
Go Back To *"Chart Label"*

1.9 Edit Report Sizing

1.9.1 Report Ruler

Adding the Report Ruler to the report is an important step in editing the report. This is because the report is too wide standardly. When the report is too wide, the pages will wrap and cause blank pages to appear when exporting to PDF or Word.

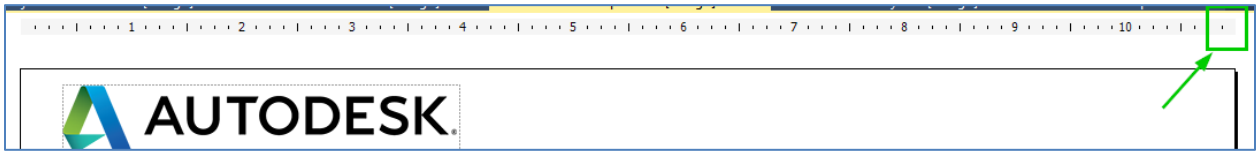
1.9.2 Adding Report Ruler



RULER

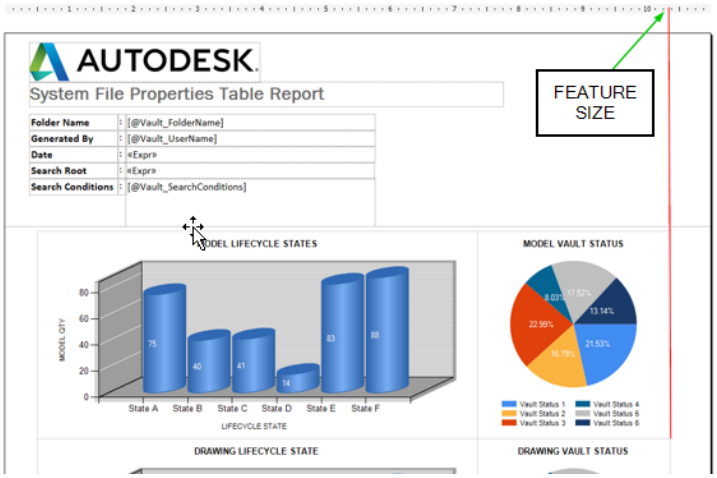
1.9.3 Adjusting Report Size

Once the Report Ruler is added to the report, the width of the report can be seen. Notice that the width is almost 11 inches. This will be far too wide for a vertical letter page.



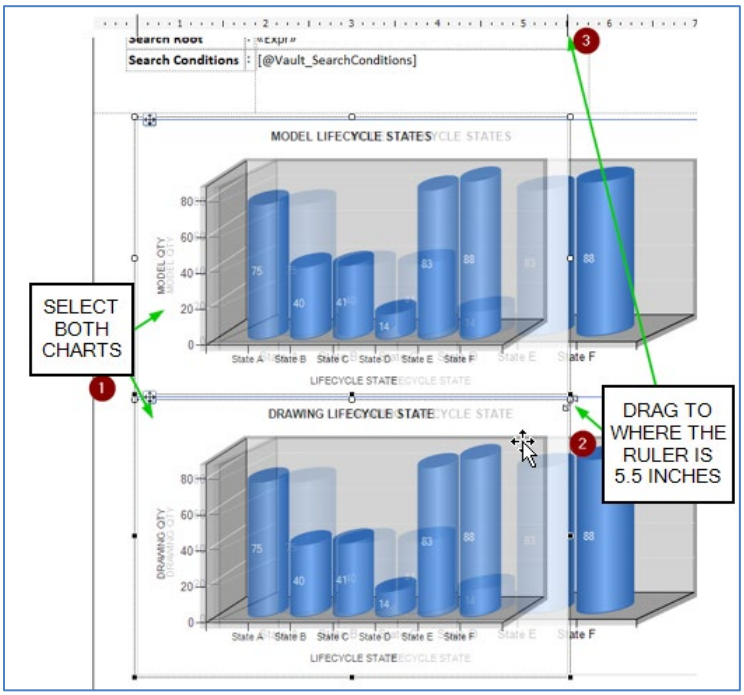
REPORT RULER

Before adjustment of the report size can happen, the features within the report will need to be resized to make it possible to reduce the size of the report. Currently, the features are too wide as well.



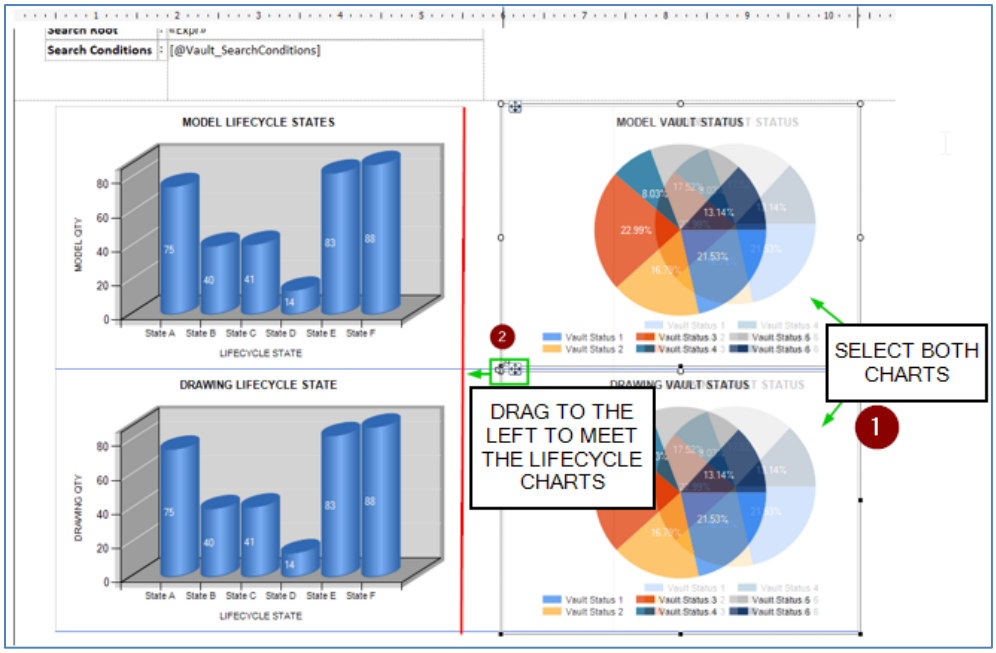
FEATURE SIZE

By multi-select both of the LifeCycle State bar charts and dragging the center to the left, editing multiple charts is possible.

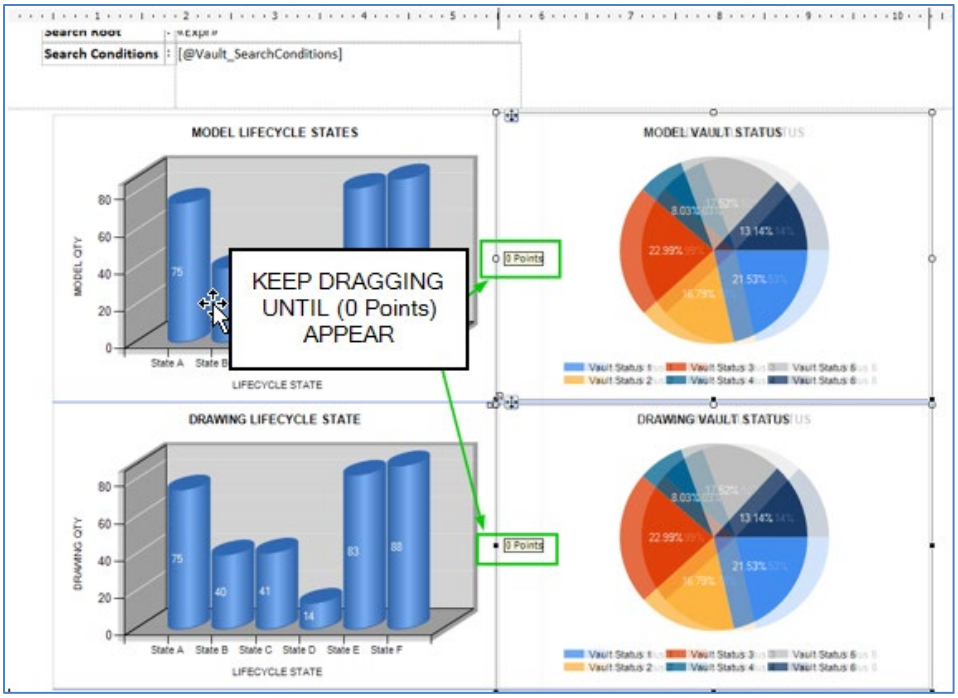


RESIZE LIFECYLCE STATE CHARTS

The same process will be done to resize the Vault Status Pie Charts. Multi-Select both the pie charts.

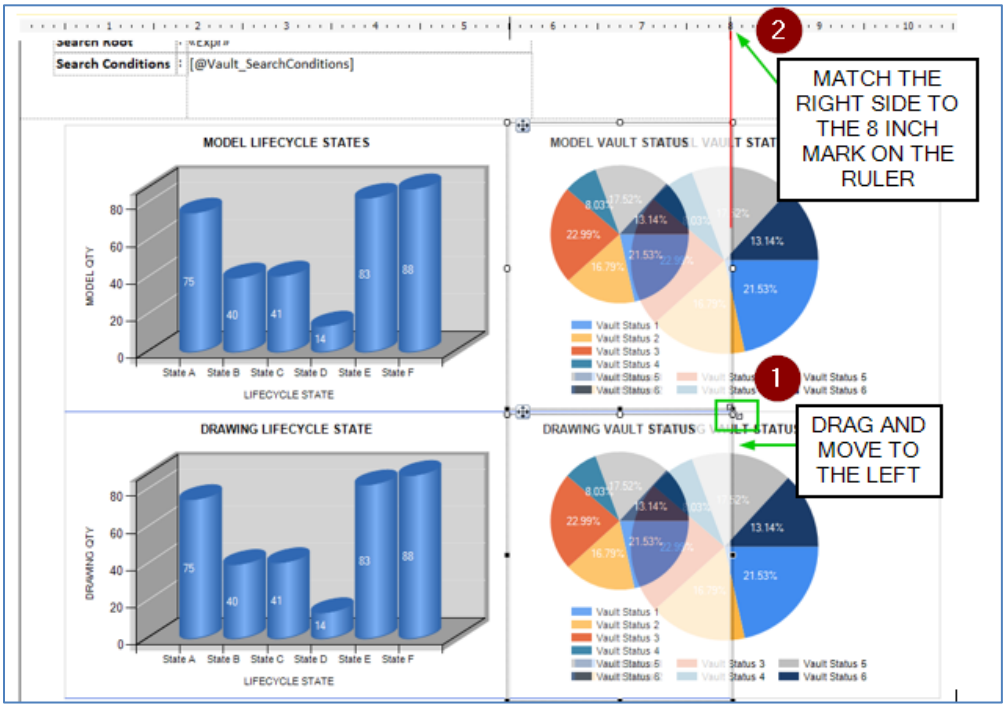


RESIZE CHARTS



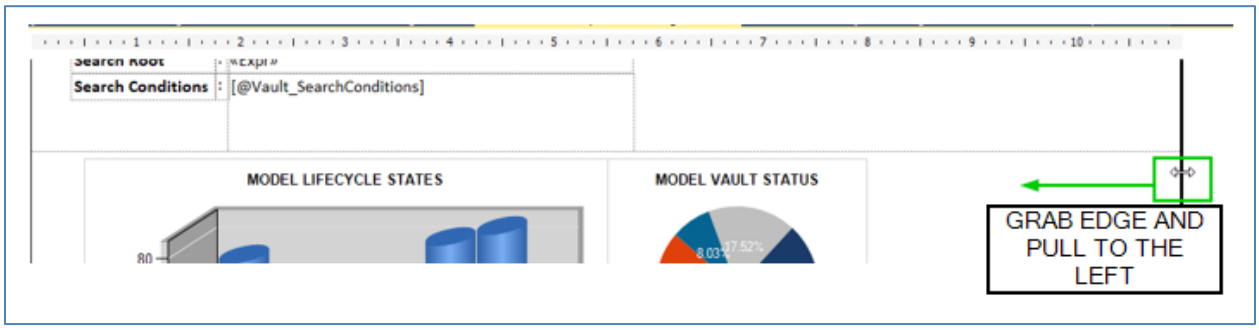
RESIZE CHARTS

Once the resizing to the left is complete, the right will need to be moved as well. The adjustment will match up to the 8-inch mark on the ruler. Again, multi-select both pie charts and drag the middle to the left to line up with the 8-inch mark on the ruler.

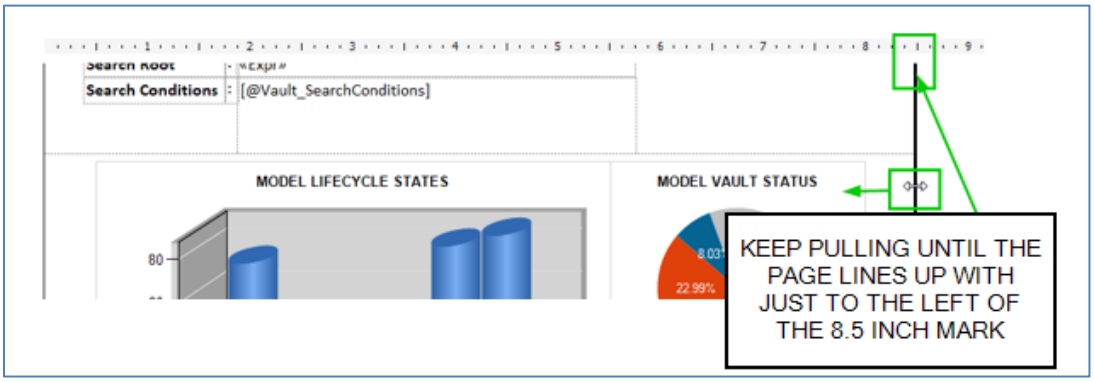


RESIZE CHARTS

Finally, Once all features are within the size of the 8.5-inch report size, the report itself can be resized.

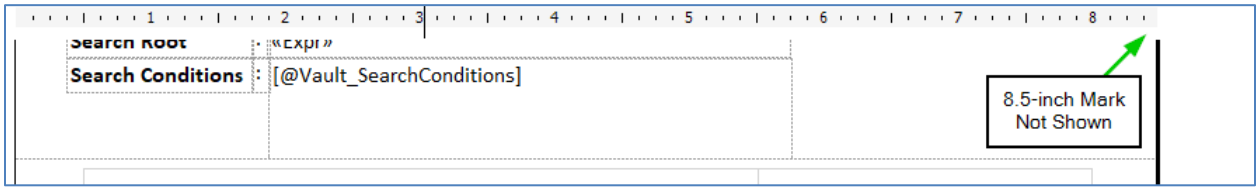


RESIZE REPORT PAGE



RESIZE REPORT PAGE

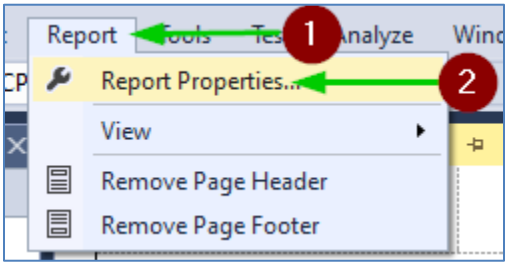
Once complete, the 8.5-inch mark should not be shown.

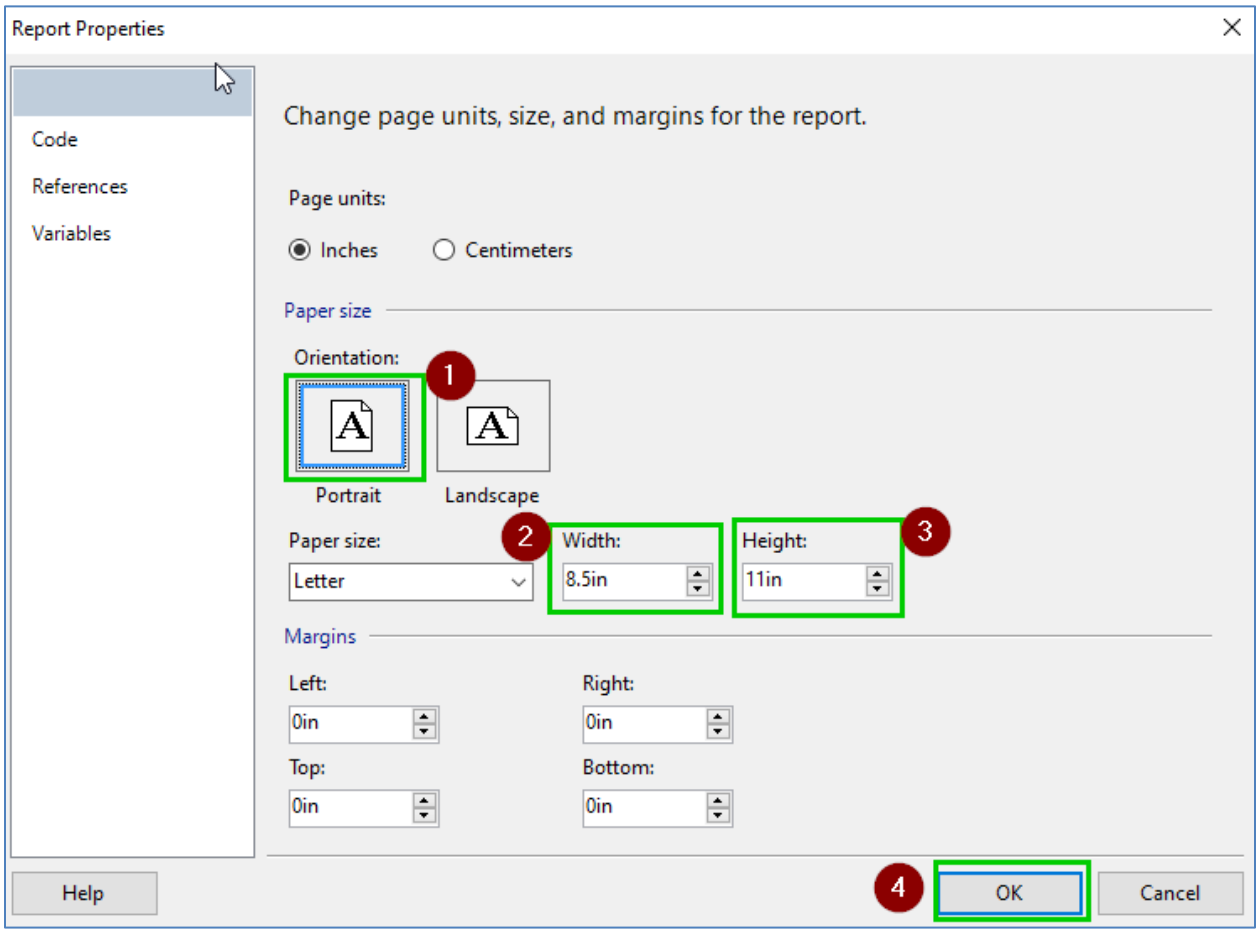


RESIZE REPORT PAGE

1.9.4 Report Properties

Changing the orientation and paper size of the report is an important step. This will help with the look of the report during the export process.





1.10 Export and Run Report

1.10.1 Export Report

Once all edits are complete, copy the “AU2021 Custom Report.rdlc” report…

From here

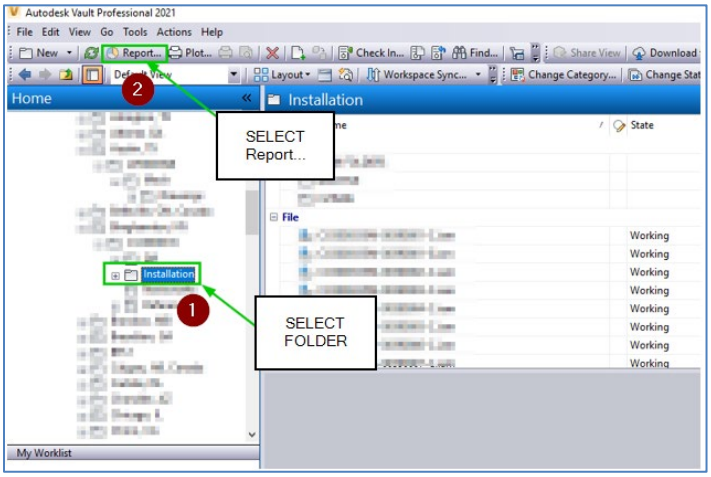
C:\code\AU2021\AU2021_CustomizingVaultReports\AU2021_CustomizingVaultReports

To Here

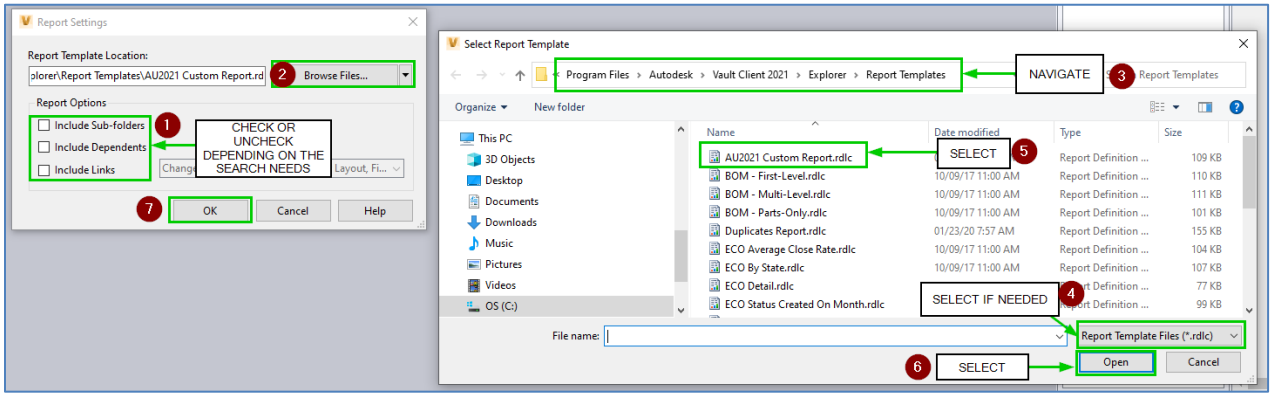
C:\Program Files\Autodesk\Vault Client 2021\Explorer\Report Templates

1.10.2 Run Report

Open Vault Professional and navigate to a folder that will have assembly models and/or drawings.

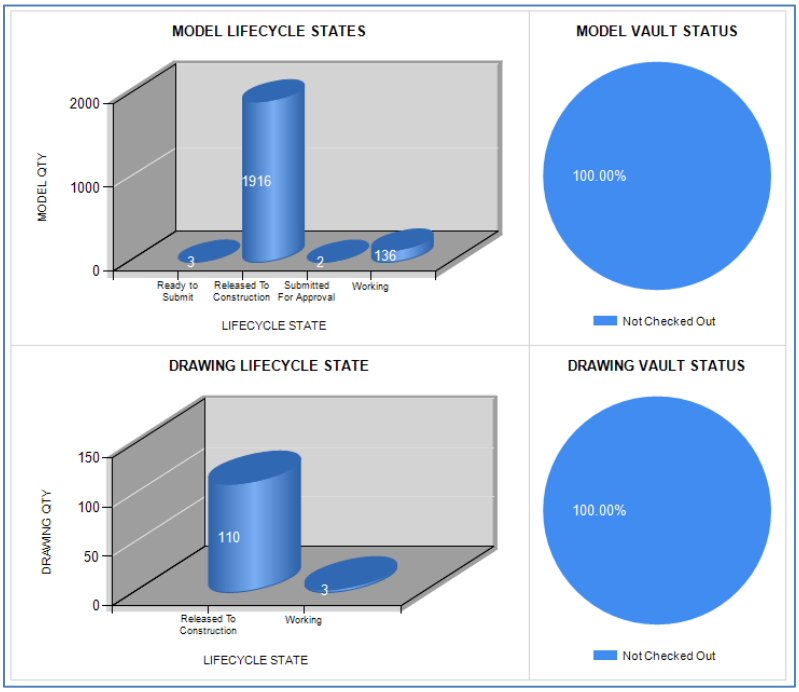


FOLDER

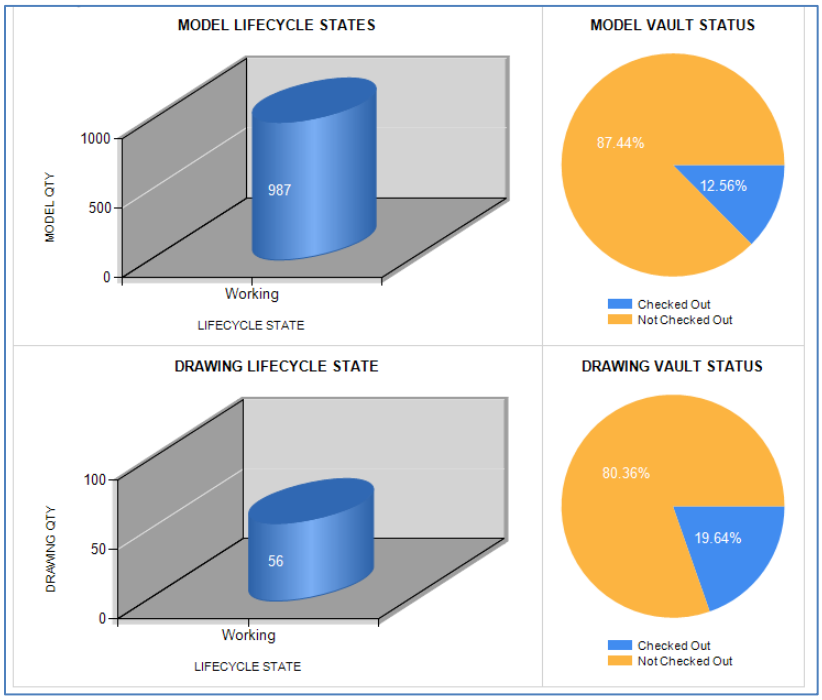


RUNNING REPORT

1.10.3 Example Report



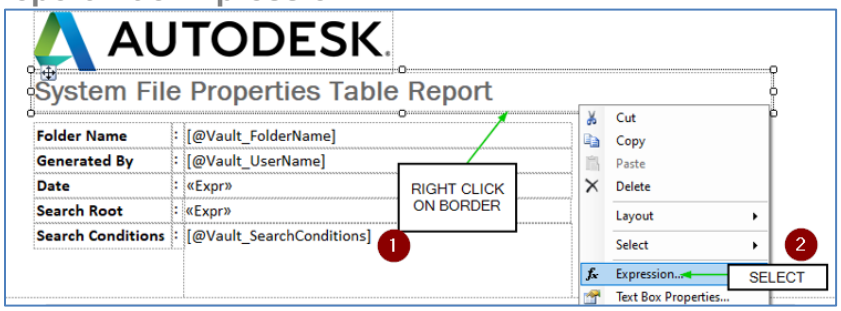
EXAMPLE 1



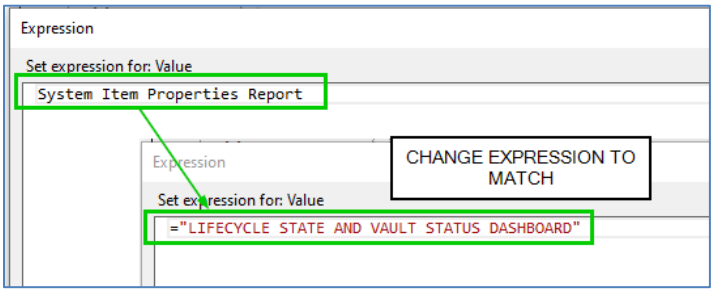
EXAMPLE 2

1.11 Bonus Content

1.11.1 Report Title Expression

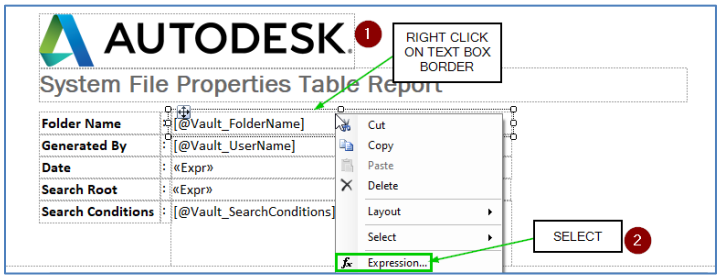


EDIT REPORT TITLE

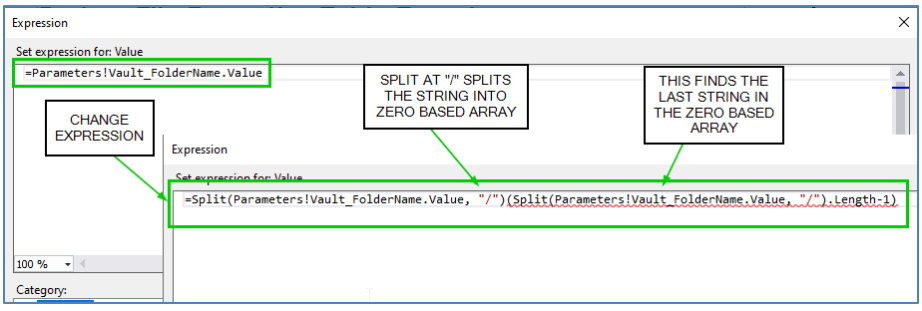


CHANGE TITLE EXPRESSION

1.11.2 Folder Name Expression

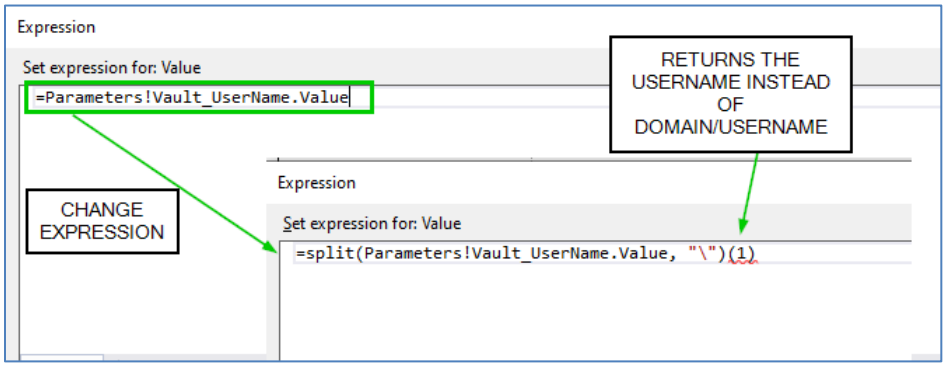


FOLDER NAME



LAST FOLDER

1.11.3 Generated By Expression



USERNAME

1.12 Common References

Inventor iLogic, API & VBA Forum

- https://forums.autodesk.com/t5/inventor-ilogic-api-vba-forum/bd-p/120

Vault Customization Forum

- https://forums.autodesk.com/t5/vault-customization/bd-p/301

Microsoft Report Design

- https://docs.microsoft.com/en-us/sql/reporting-services/report-design/expressions-report-builder-and-ssrs?view=sql-server-ver15