

Survalent.

Training Manual

SurvalentONE SCADA System Level 1

Module 2 – Map Preparation

Revision 01

September 1, 2022



Table of Contents

Module 2 – Map Preparation	4
Creating Elements in the Library	4
Importing Elements	14
Create Functional Colors	20
Creating Color Tables	23
Creating Fonts	26
Creating Views	28
Working with Layers	38
Drawing a Simple Symbol	43
Dynamic and Transparent Colors	45
Creating a Transformer Using the Polyline and Copy Tools	47

Document Control

Revision	Date of Issue	Author(s)	Reviewer(s)	Brief Description of Change
01	Sept 1, 2022	Duke Hoang		Updated with screenshots.

Statement of Copyright, Confidentiality & Non-Disclosure

Copyright © 2021 Survalent Technology Corporation. All rights reserved.

This document is copyrighted proprietary material of Survalent Technology Corporation ("Survalent"). No part of this work may be copied, reproduced, modified, published, uploaded, posted, transmitted, or distributed in any way, without Survalent's prior written permission.

Survalent respects copyright law and expects our users to do the same. Unauthorized copying, distribution, modification, public display, or public performance of copyrighted works is an infringement of the copyright holders' rights.

This work is classified as confidential information and is disclosed only to the recipient to whom this work is addressed. This confidential information is to be used solely for the recipient to evaluate if it should accept the technical solution proposed by Survalent.

The contents or subject matter of this work or part thereof must not be revealed to any third party without prior written permission from Survalent. The third-party to whom the communication is made includes an individual, firm, or company or an employee or employees of such a firm or company.

The recipient, by its receipt and non-rejection of this work, acknowledges that this work is confidential information and contains proprietary information belonging to Survalent and further acknowledges its obligation to comply with the provisions of this notice.

Module 2 – Map Preparation

In the first module, we:

- Looked at the Survalent software and how it fits in with a utility's SCADA needs.
- Installed the software.
- Looked inside STC Client and prepared to add points to the database.

We will continue the same path in module 2 only now the focus will be preparing SmartVU so we will be able to create a Single Line Diagram later in the course.

Creating Elements in the Library

If this is the first time we are logging into SmartVU since we added Reservations in the last module, we will see this message.

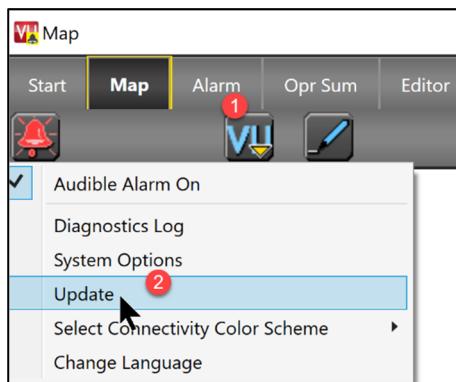
We will also see this message anytime the Shared Standard folder has been updated. The message means we should synchronize the Standard folder on our desktop with the shared Standard folder.



2.1 Synchronize Standard Folders

To perform the update, click the

- VU button (1) and select
- Update (2).



2.2 Performing the Update

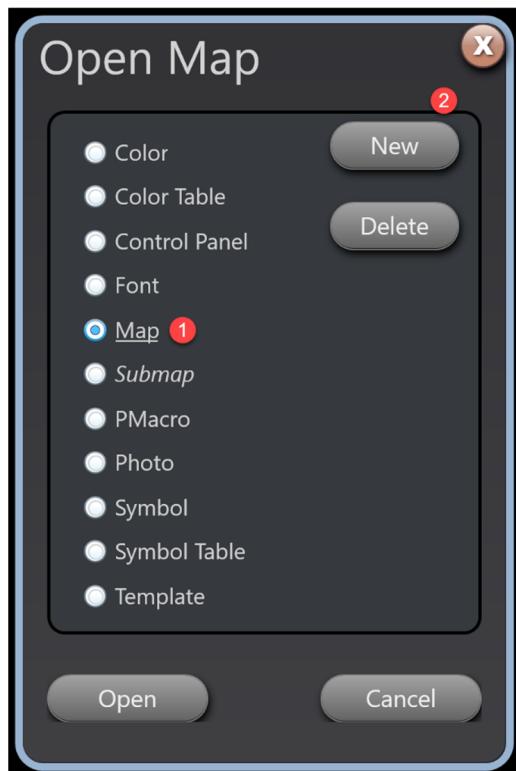
Upon completing the update, we are ready to create something new to add to the map.

Whenever we are creating something new to go into the map, we will be working in the library. Once you log into SmartVU, you would click on the (1) Editor tab and then click the icon that looks like a (2) building.



2.3 Accessing the Library

When you open the library, you have two choices. Either you are creating something new or editing something that has already been created. Please click (1) Map and then select (2) New.



2.4. Creating a New Map

Give the map a name and then click OK.



2.3 Naming the Map

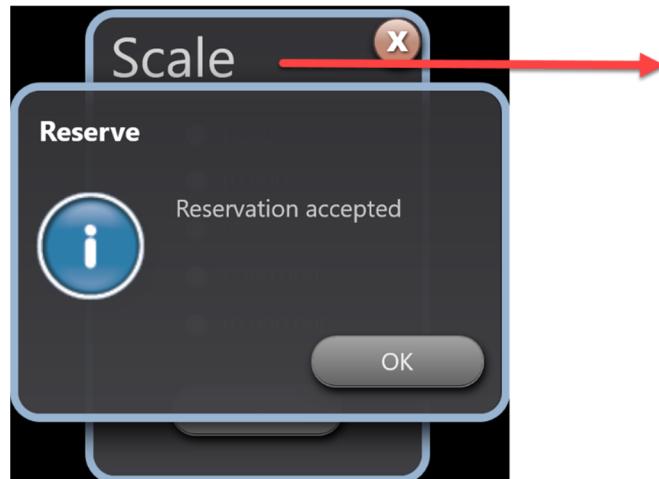
We are asked to Reserve the map. This will provide exclusive access to the element we are creating until we Release it.



2.4 Reserving the Map

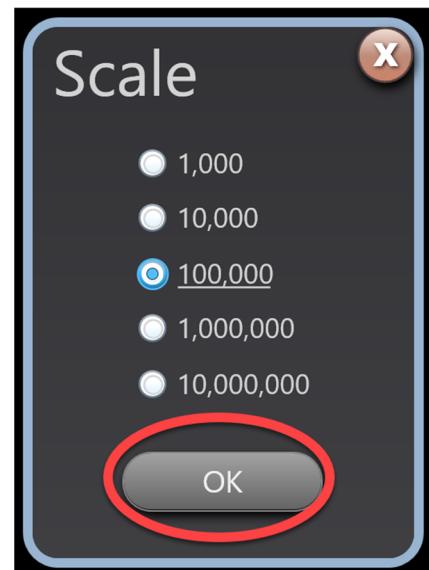
We will need to set the scale before the Reservation is accepted (see next page).

If the windows are on top of each other as shown, please **slide** the scale window to the right and proceed to next step below.



2.5 Moving the Scale Window

A scale of 100,000 is common. The 100,000 is measured in magnification. Click OK.



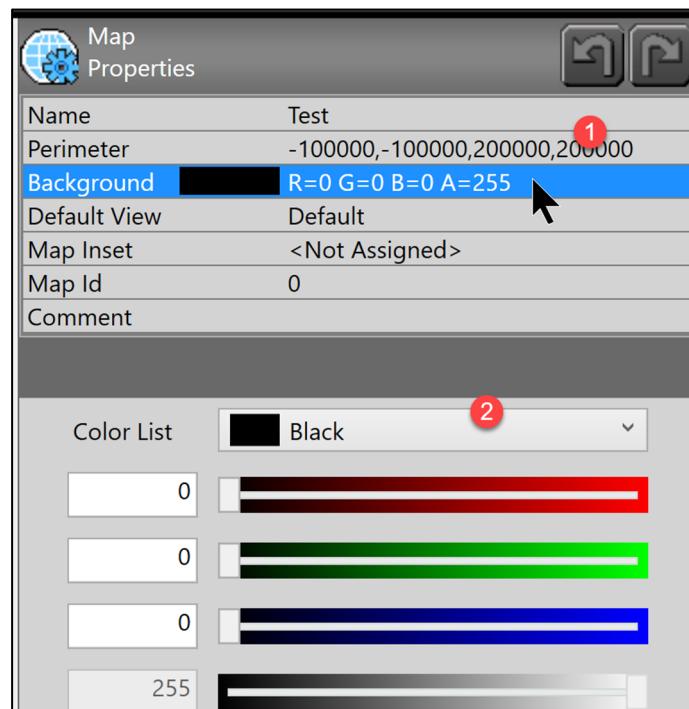
2.6 Setting the Scale

We now see a blank map with a black background. If you want to change the background color, click the Map Options button.



2.7 Map Properties

You can now change the background color by clicking Background and then selecting a different color (see next page). Typically, darker colors are used (e.g. Dark Gray, Black).



2.8 Changing Map Background Color

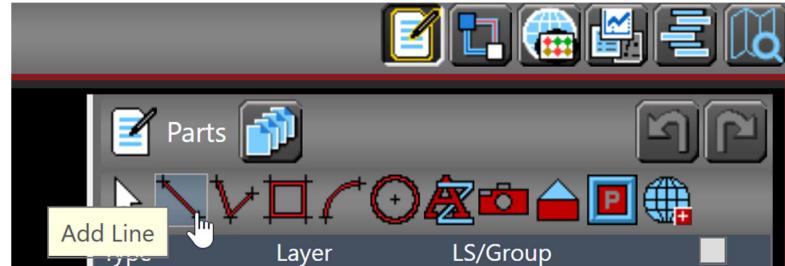
Returning to the map, we can now use the Edit Parts button.

Recall the Library is where we create new elements like our map. Edit Parts is the button we use to add elements to a map.



2.9 Edit Parts Adds Elements to Maps

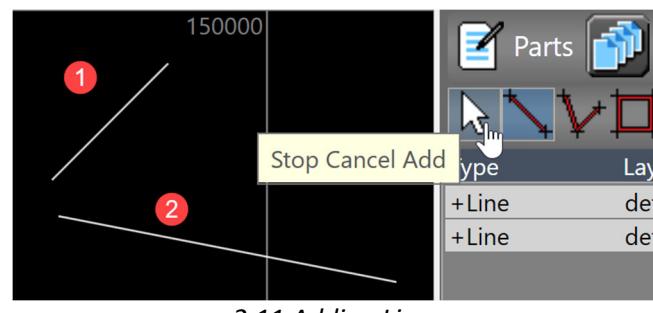
Click on the line to add a line to the map.



2.10 Adding a Line to the Map

The first line (1) was created by double-clicking on the map. The second line (2) was created by clicking once and then dragging the mouse along the map to size the line.

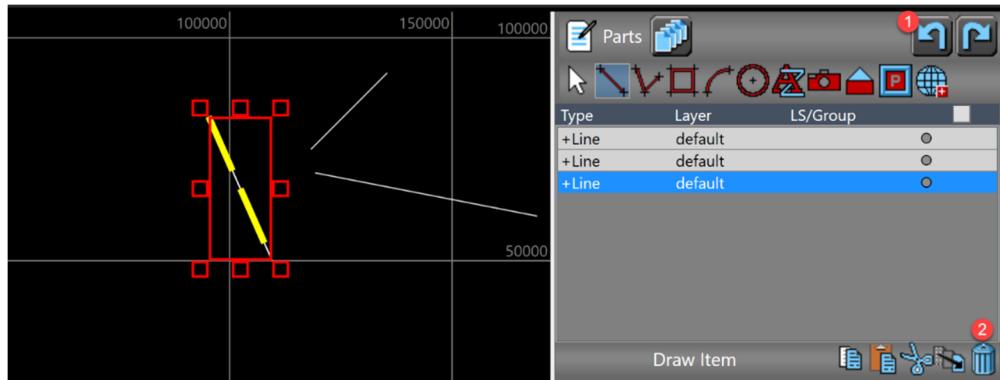
Every time you click on the map, more lines will appear until you click the Stop Cancel Add button or, alternatively, you can tap the ESC key on your computer to stop the lines from being added.



2.11 Adding Lines

In the example below, I forgot to Click the Stop Cancel Button and I ended up with an extra line. To correct this error, I can either:

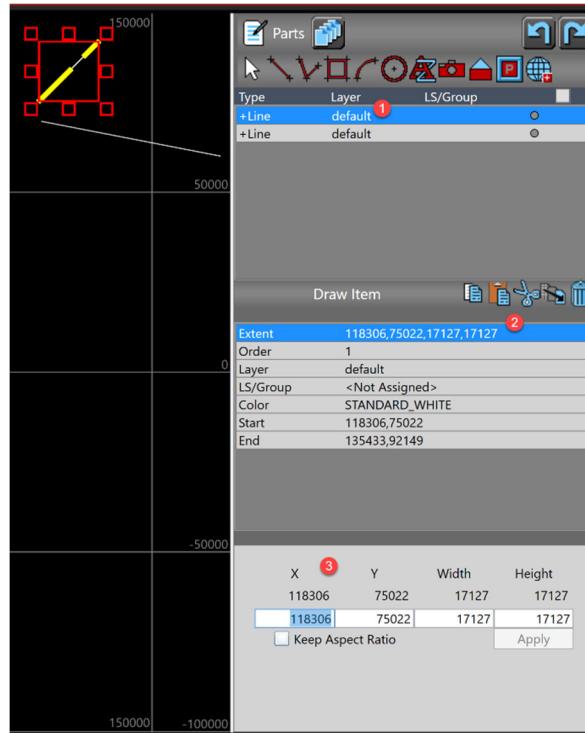
- Click the (1) Undo button.
- Highlight the line and click the (2) Trash icon or tap the Delete key on your computer.



2.12 Removing Extra Line

Note that, upon selecting one of the elements you create, you see:

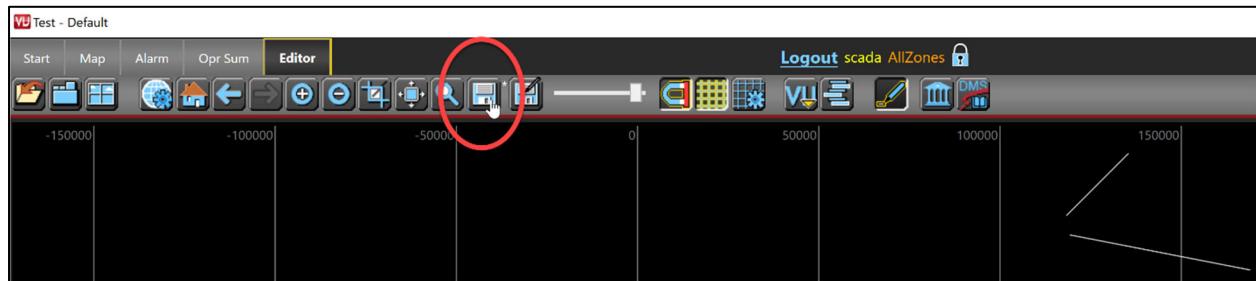
- The (1) type of element (the + sign means that it is new).
- Properties (2) of the object.
- Even more details (3).



2.13 Information About the Line

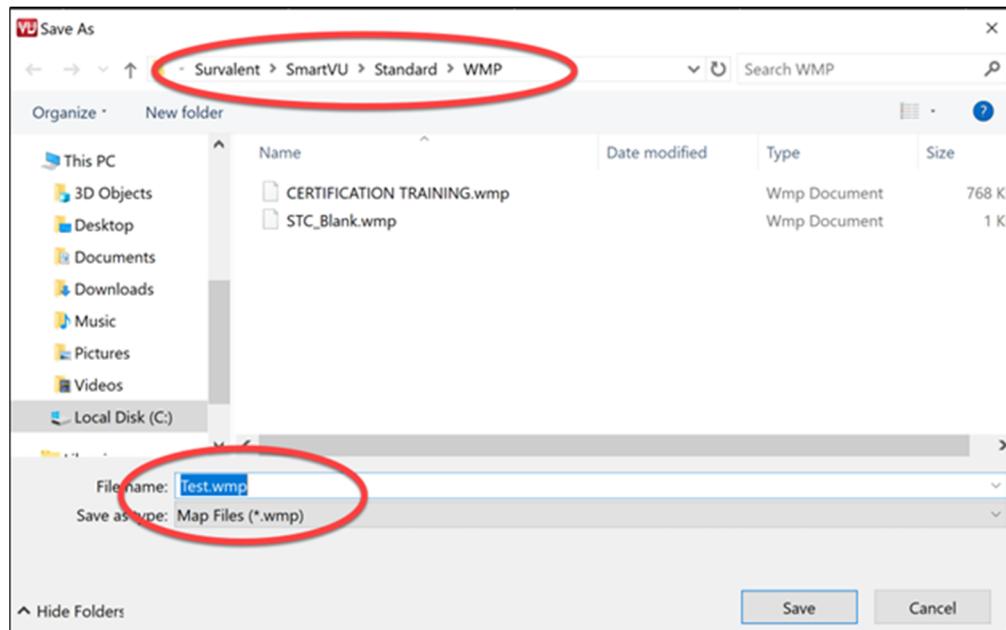
When you are ready to save your map, click the Save icon. If you try to close SmartVU without saving,

you will also be asked if you want to save the element.



2.14 Saving the Map

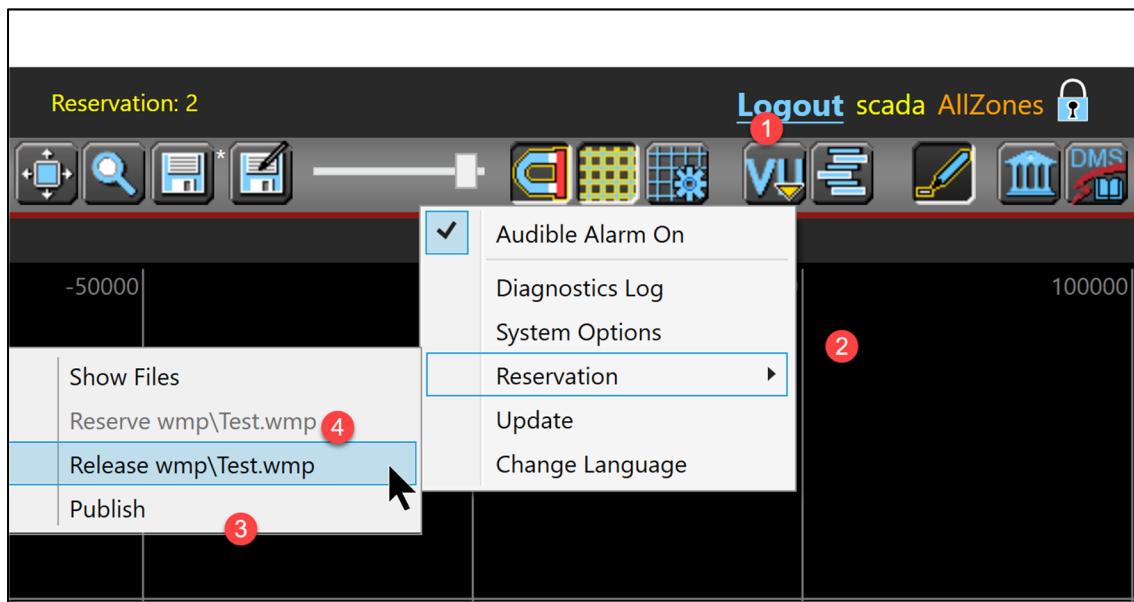
Note the path where the map will be saved. It's in the WMP folder under Standard.



2.15 Maps go to WMP

The steps we just followed will put a new map for us to access; however, in a utility setting, we would then Publish the map so that others can see it.

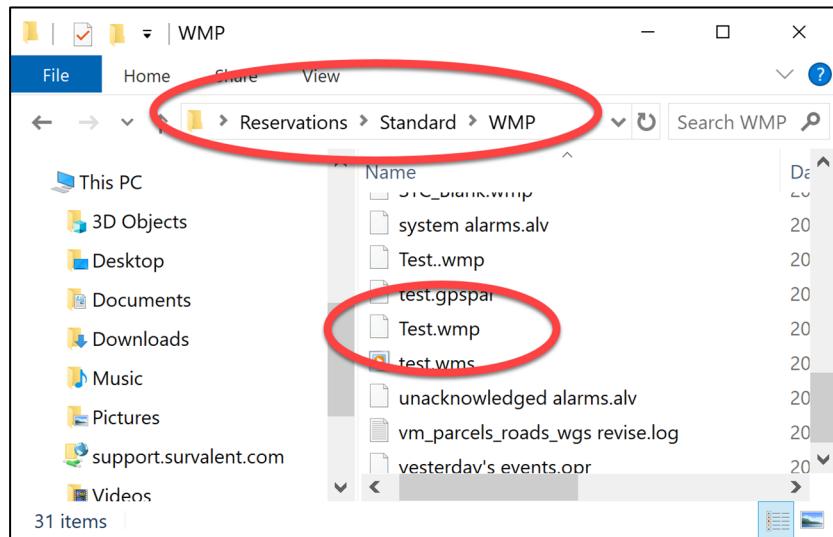
After Publishing, we should then Release the map so that others can edit it. These are shown in the 4 steps below in the next page.



2.16 Publishing and Releasing

- Click the (1) VU Menu button
- Hover to the Reservations (2) section in the menu
- Click on (3) Publish to push the updates to the map
- Release the map (4) so more edits can be made in the future

Note that the files below are from the shared Standard folder, and it now contains our new Test map.

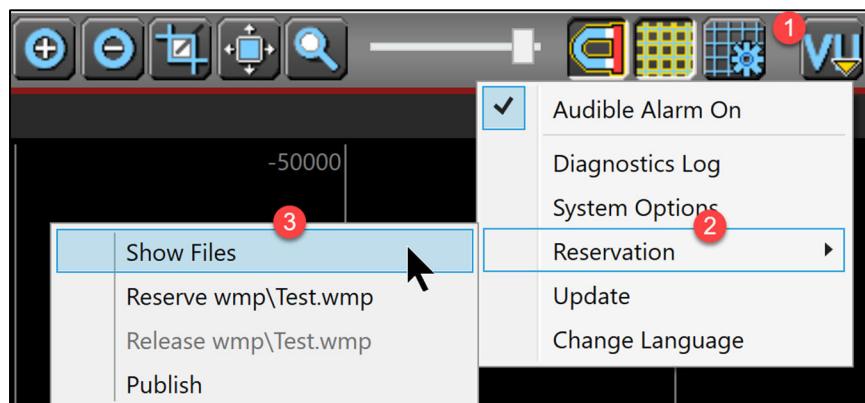


1.17 Shared Standard Folder

Before moving to the next section, we will finish off our discussion about reserving and creating elements with a note about what happens if someone has left your company but did not release their maps.

Maps can be released by other users if they have the ability to edit maps. Please see the images below and follow these instructions:

- On the Editor, click on the SmartVU Menu (1)
- Select the Reservation (2) option in the menu and click on Show Files (3)
- You will see a list of all the maps that have been reserved. In here you can select any map and release them as required.



2.18 Navigating to Element Release Function

Reserved Files							Not Reserved
Project	Reservation	User Id	Computer	Date/Time	Operation	File	X
1	SCADA	BRUCE-LAP	2019-12-05 13:32:20	Add		wmp\Test.wmp	

Buttons at the bottom: Release scada, Reassign, Release, Cancel.

2.19 Releasing and Reassigning Elements

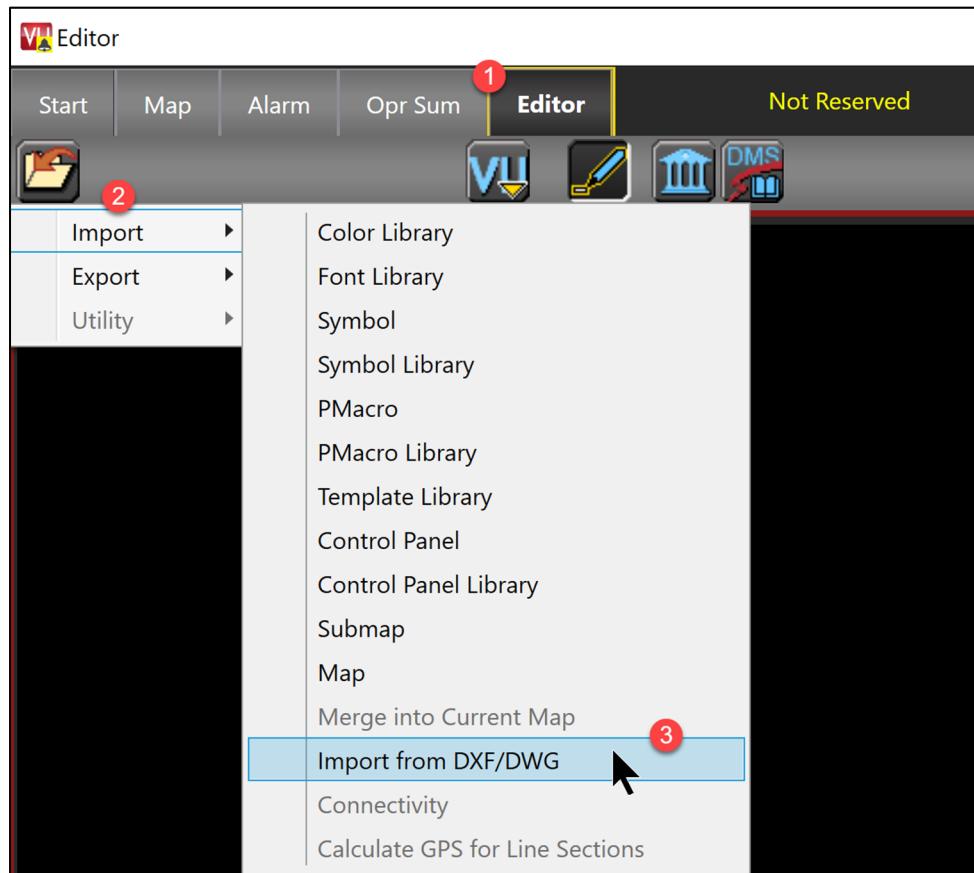
Importing Elements

Even though creating a new blank map and adding lines can get you started, many Survalent clients import CAD or GIS information to begin their map. In this section we will look at importing a CAD file.

To begin importing in SmartVU:

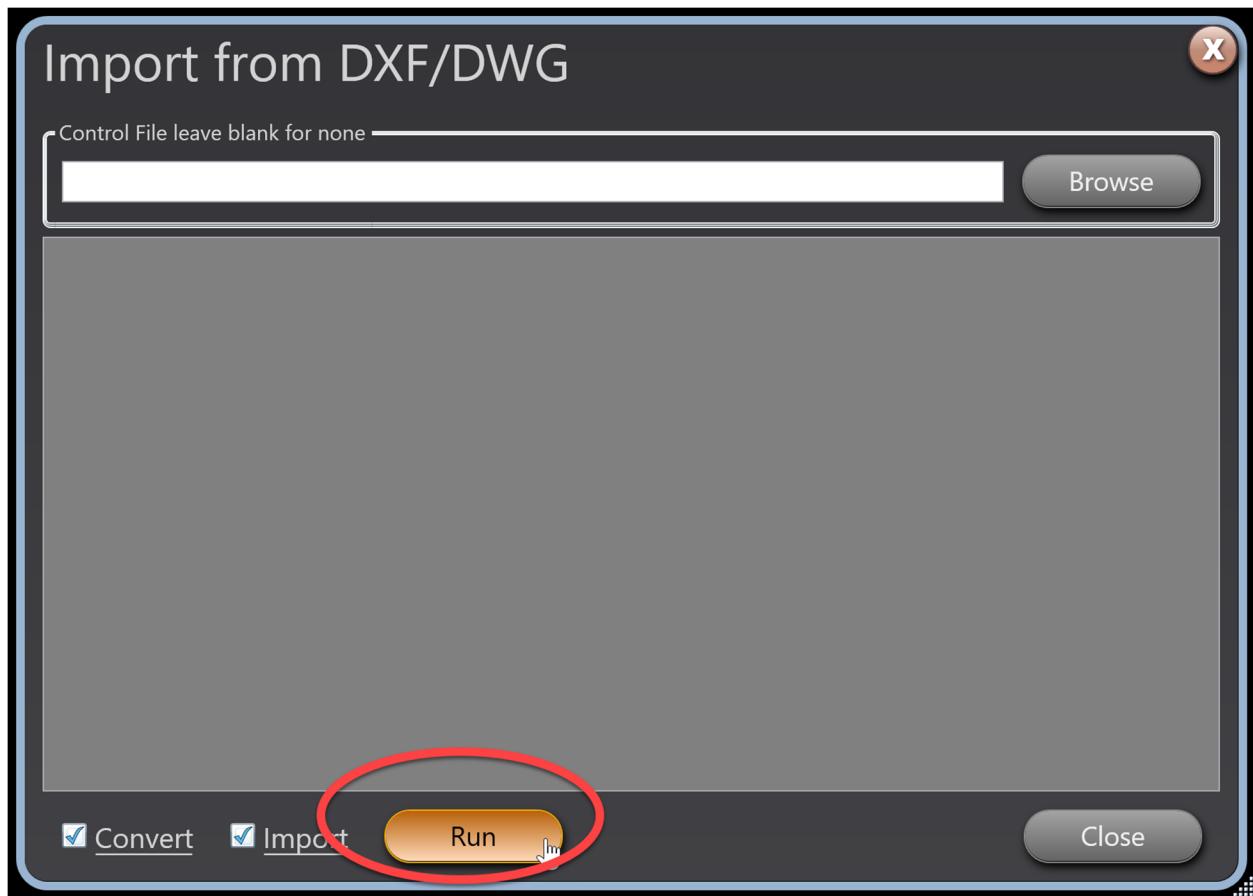
- Click the Editor (1).
- Select the Import option which appears under the Import/Export folder (2). Recall that we used the Library for new elements that we create.
- Select Import from DXF/DWG to import a CAD file (3).

As we go through the course, you will note that many of the elements we create also show up in this dropdown list (e.g. Fonts).



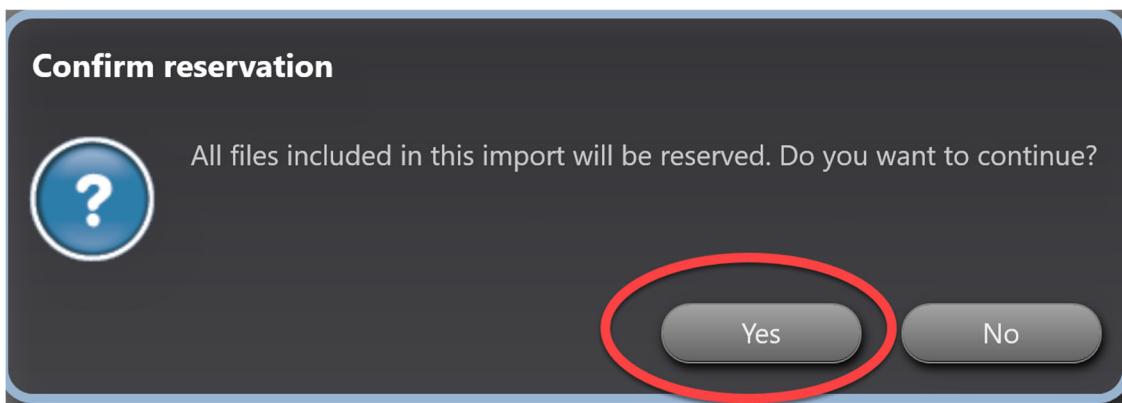
2.20 Import/Export Folder

Next, we are going to click Run on this routine.



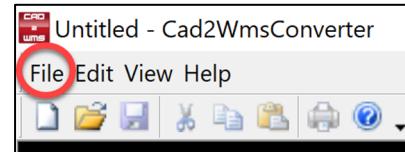
2.21 Running the CAD Import Tool

Click Yes to reserve all the files used in this process.



2.22 Reserving Files

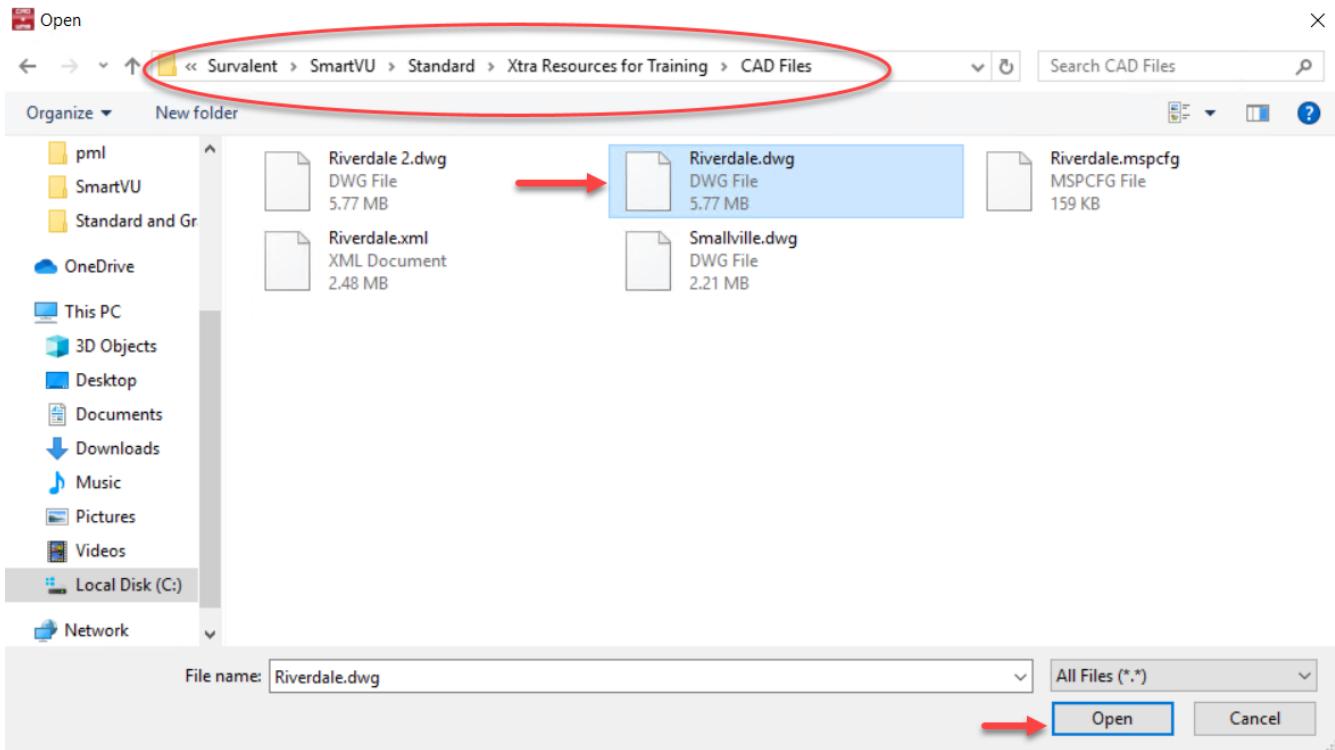
Upon agreeing to reserve all files, another program automatically launches. This program will convert a CAD file in a way that makes it compatible with a Survalent map (wms is an extension that will change to wmp when process has completed). Click File.



2.23 CAD2WMS Automatically Launches

The application called Cad2Wms will allow you to open a new file. Please point this application to the CAD file shown below.

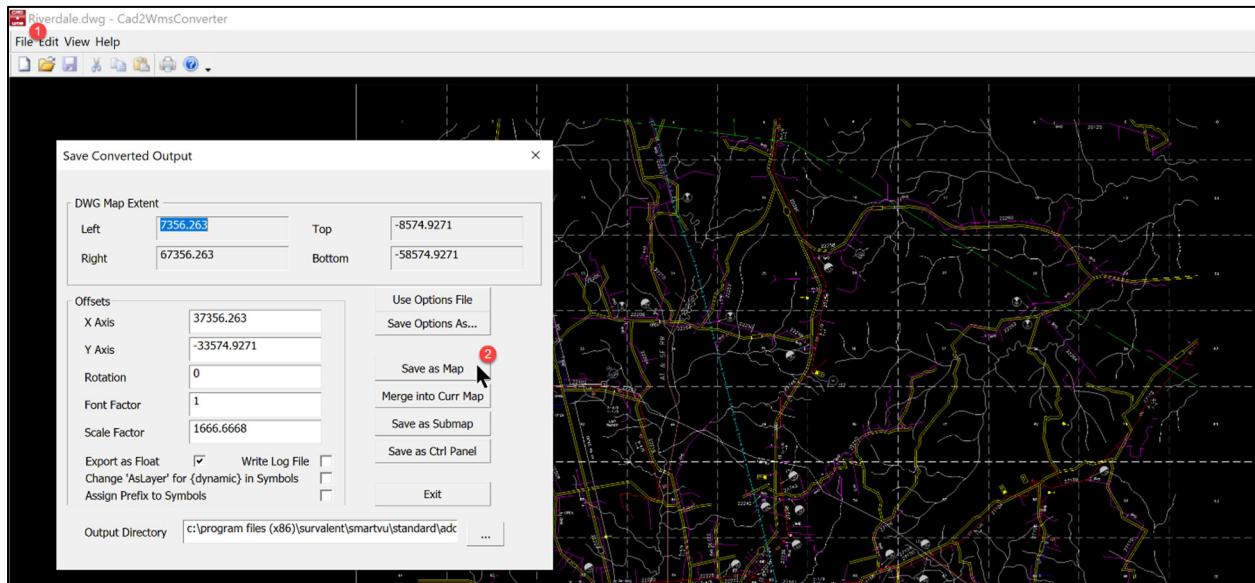
By default, our new map will match the file name Riverdale but this can be changed at any time in the Standard/WMP folder.



2.24 Locating the CAD File

The file loads up and now we will save it in a format that will allow it to be imported into SmartVU.

Click on File (1), Save As, and the Save As Map (2).



2.25 Converting the File for SmarVU

It may take up to 2 minutes but you will be prompted to click OK when the Export is Finished.



2.26 Export Complete Prompt

Next, close Cad2Wms Converter.



2.27 Closing CAD2WMS

Importing starts as soon as you close the converter in the last step. In the image below we see gcl files which are colors in SmartVU.



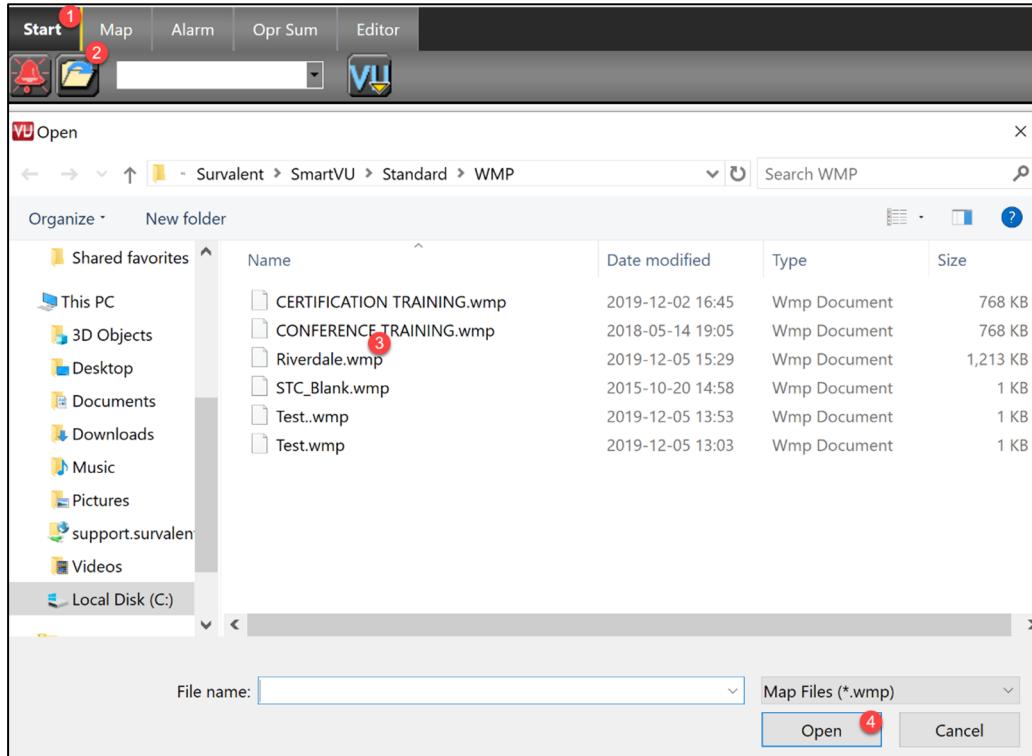
2.27 Importing



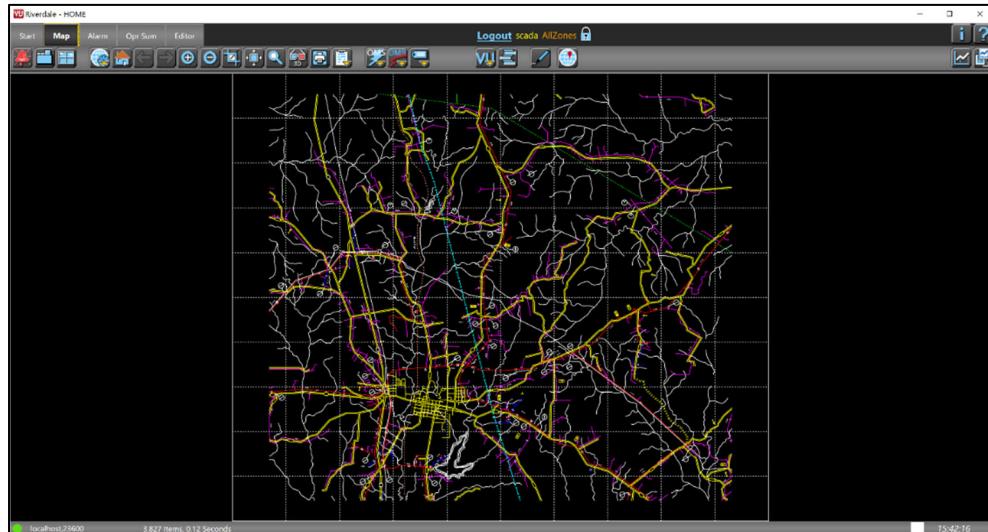
2.28 Import Complete

The last line in the import screen are the words Import Done. When the import is Done the window can be closed.

To see our new map, click Start (1). Next, open the map folder (2) and you will see the new Riverdale.wmp (3). Select and Open (4) it.



2.29 New Map



2.30 New Map in SmartVU

Don't forget to Publish and then Release your new map.

Create Functional Colors

We created a polyline and had the option to give it a color. We could color it with any conventional color, but the best practice is to name the colors after their function. Therefore, green becomes “open” (if you are in most U.S. States) or “closed” (if you are in Ontario, Canada).

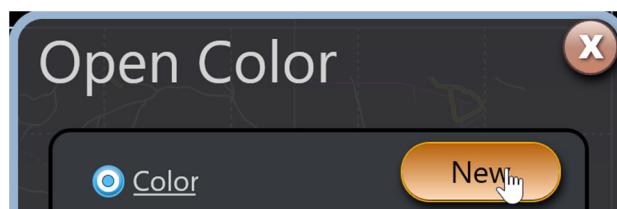
Naming elements based on function makes it easier for others to understand the element they need to use if they need to edit maps.

Let's create a color to show that a device is open.
Any time we create, we are starting in the Library.



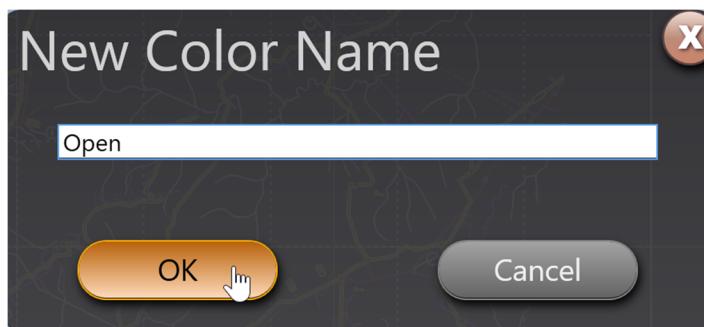
2.31 Library
Icon

Select Color and click New.



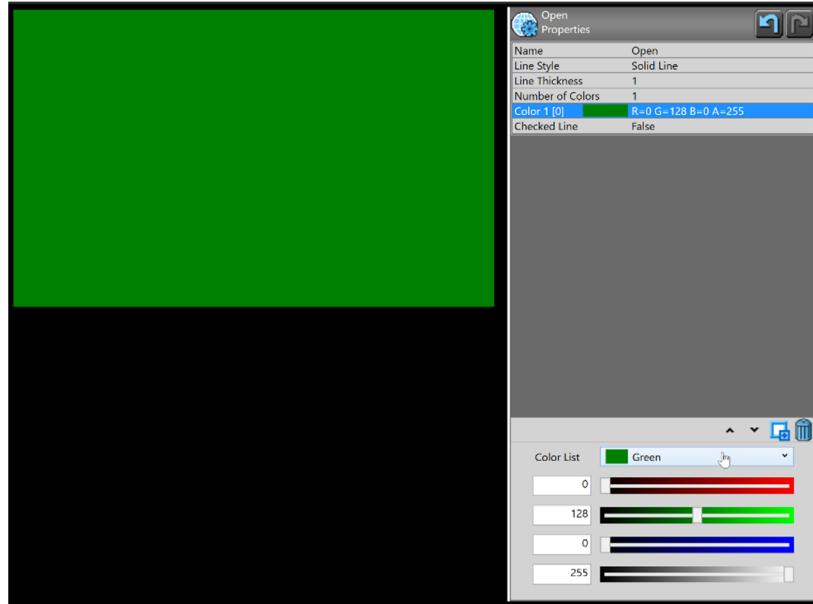
2.32 Creating a New Color

Let's give it the name Open. Click OK and accept the reservation.



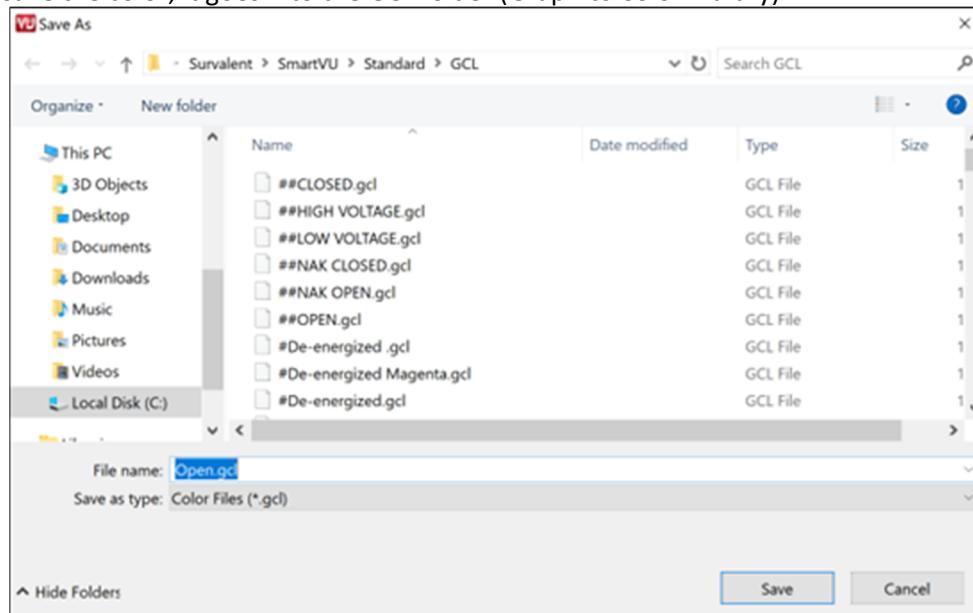
2.33 Naming the Color

The default color was white but we can click on color and select another color. We selected green for Open but you may prefer red. The good thing about naming colors after their functionality is that the new color (red or green) will be called Open. When we refer to the Open color, it will be red for some and green for others; however, it will be called Open for everyone.



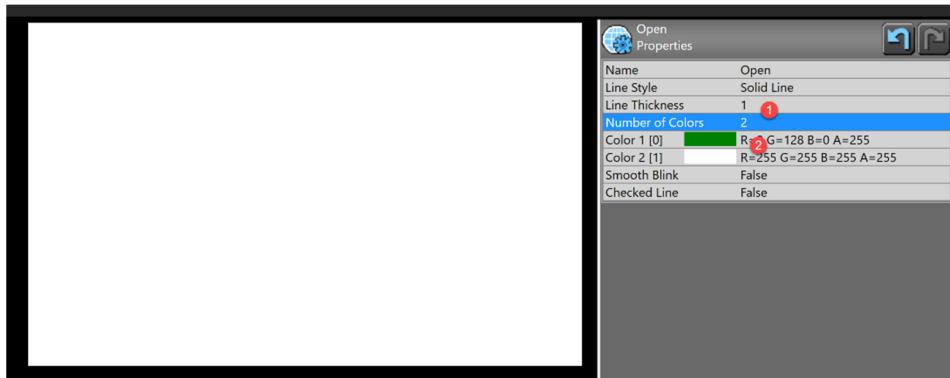
2.34 Assigning a real color to Open

When you save the color, it goes into the GCL folder (Graphics Color Library).



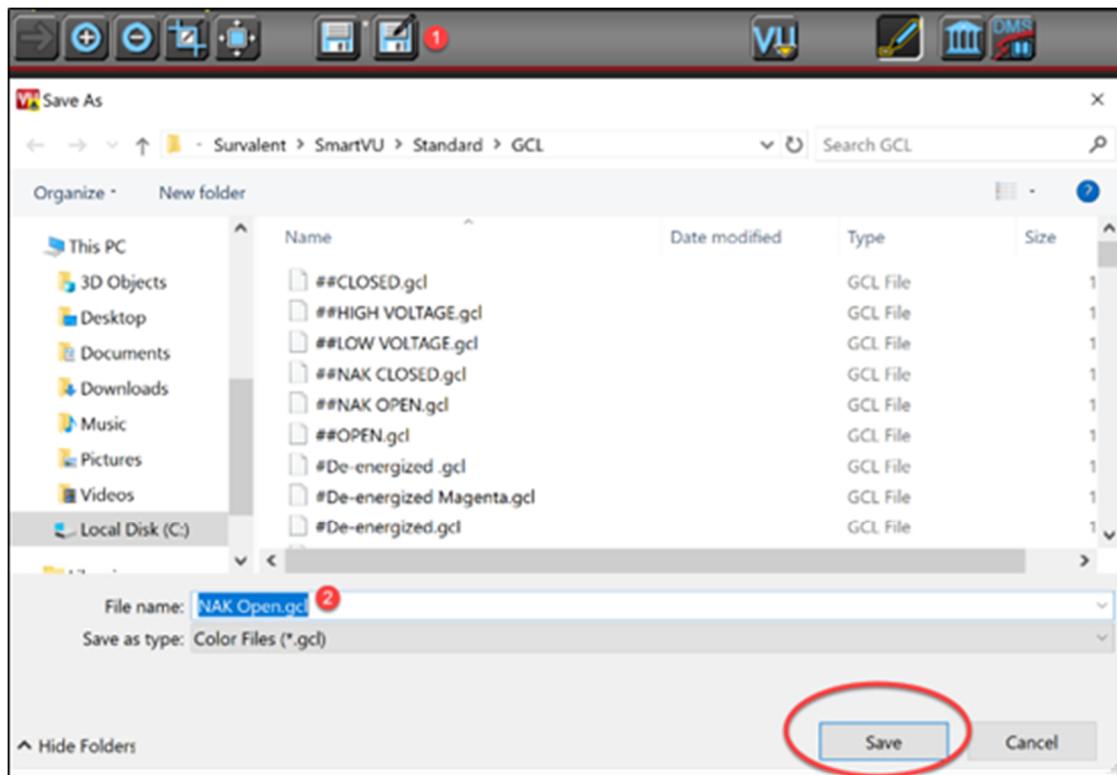
2.34A Colors Folder

Don't close Open yet (if you did close it, just re-open it from the Library). If we change the number of colors (1) from 1 to 2. We get both green and white (2) – these 2 colors will take turns appearing to keep a flashing effect which is great for NAK (Not Acknowledged Alarms).



2.35 Adding a color for flashing effects

Since we modified our Open color to make NAK Open, we **must use the SAVE AS** (1) button to create the file. Name the file NAK Open (2) and Save it. If we use Save (the button besides Save As), we will be overwriting the Open color we created.



2.36 Use SAVE AS to avoid overwriting Open



Exercise

In-class exercise:

1. Create Closed and NAK Closed colors.
2. Create colors for High Voltage and Low Voltage conductors. The colors can be called High Voltage and Low Voltage. Use orange for High Voltage and Yellow for Low Voltage. You will also see a setting for thickness. Give both colors a thickness of 3 to help them stand out

Creating Color Tables

You can probably guess we will use our colors when we draw breakers:

1. The open color will be applied to an open breaker.
2. The closed color will be applied to a closed breaker.
3. If a breaker opens unexpectedly, it must be acknowledged by an operator and, until it is acknowledged, we will give it the color NAK Open.
4. The same logic applies to a closed breaker that needs to be acknowledged which is why we have NAK Closed.

We will see that this method is effective.

Others prefer a method where we don't give the breaker Open or Closed colors. Instead, the breakers color will be dynamic. Instead of different colored breakers, one breaker will be assigned different colors based on a database.

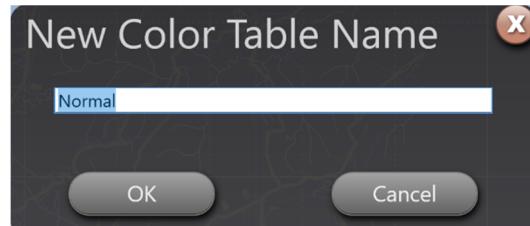
The database is also known as a Color Table. Let's create one for a breaker that can be either open or closed.

From the library, indicate that we are creating a new Color Table.



2.37 Creating a Color Table

Let's call it the Normal Color Table and accept Reservations.

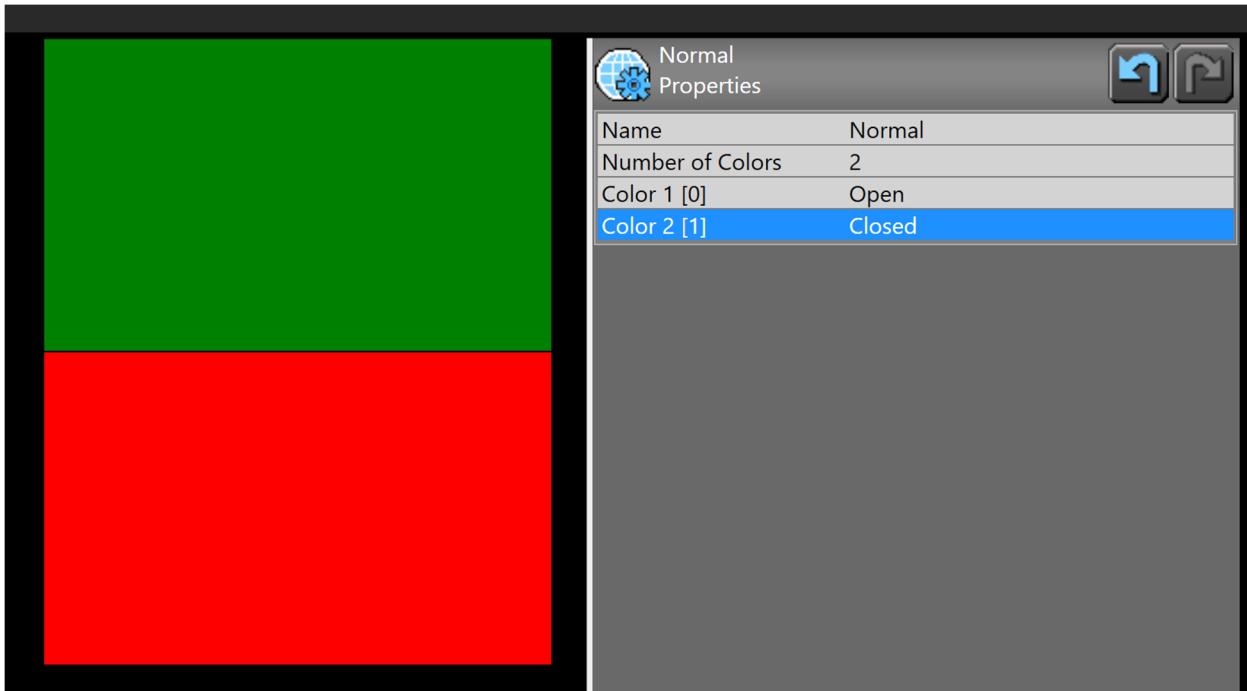


2.38 Naming a Color Table

When you add additional colors, the Color Table does not give a flashing effect. This is because the colors do not take turns displaying. They only appear when the logic in the programming dictates that they appear.

In the example below, I chose the color Open for Color 1 (0) and I chose Closed for Color 2 (1). I chose these colors because, as we will learn later (0) means Open and (1) means closed. (Remember – depending on your utility color scheme the red color may be the top color).

Later, we'll see some programming where (0) will call the Open color to display and (1) will call the Closed color to display.



2.29 Color Table for Open and Closed



Exercise

In-class exercise: Later in this course, we will come across some programming that will ask a Table to display colors for Open and Closed devices that have NOT been acknowledged (NAK). Create a color table called NAK which has colors for NAK Open and NAK Closed.

Creating Fonts.

SmartVU will already have some typefaces (e.g. Arial, Times New Roman) and fonts (e.g. Arial, bold, 20,000 units of magnification).

Again, it's best practice to take the existing fonts and define them using their function. This allows others, in the future, to know exactly what font to choose so they can keep the map congruent.

Let's go into the SmartVU library and choose to create a new font called Home Page Title.

As usual, accept the Reservations.



2-30 Creating a Font

On the right side, you will see a list of configurable settings.

On the left side, you will see a sample of the settings (not shown). **Note: The sample will disappear with extremely large font sizes such as the 10,000,000 we are using.**

Please use these settings and save them.

Home Page Title Properties	
Name	Home Page Title
Font Name	Arial
Horizontal Justify	Center
Vertical Justify	Bottom
Orientation	Horizontal
Height	10000000
Height in Pixels	False
Italic	False
Bold	False

2.31 Font Configuration Options

<u>Font Option</u>	<u>Description</u>
Name	This was determined when you created the font.
Font Name	Which typeface do you wish to use (e.g. Arial). Most operators would prefer simple font styles like Arial over the fancier font styles.
Horizontal Justify	If you add the font into an area that is wider than the font, do you want the font to be centered? Or maybe you would prefer it aligns to the left or to the right side.
Vertical Justify	If you add the font into an area that is higher than the font, do you want the font to be mid height? Or maybe you would prefer it aligns to the top or to the bottom.
Orientation	Do you want the text in this font to move from left to right (Horizontal)? Or do you want it run bottom to top (Vertical)?
Height	Measured in Magnification.
Height in Pixels	Not widely used with SmartVU release. Grandfathered from World View when height was often calculated using pixels or small addressable visual picture elements (pixels).
Italic	Text appears slanted.
Bold	Text appears heavier and stands out.



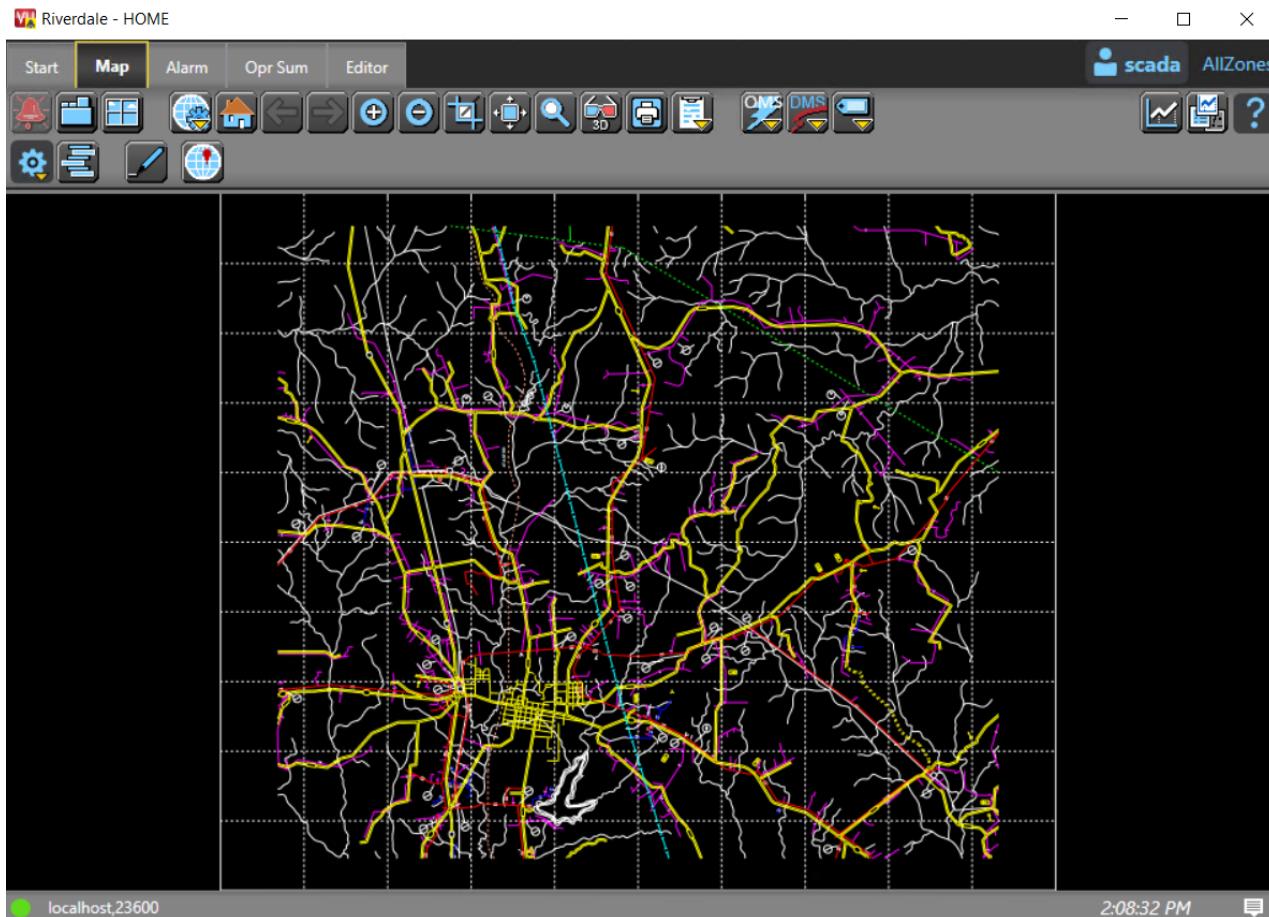
Exercise

In-class exercise: Create 3 more fonts. With the exception of height, all the other characteristics should be the same. The name and height of the other fonts are:

Home Page Labels	2,000,000
Substation Title	100,000
Substation Labels	30,000

Creating Views

When we first open our Riverdale map, we see that it's too large. There is no room for a title. To adjust this, we must look at its View.



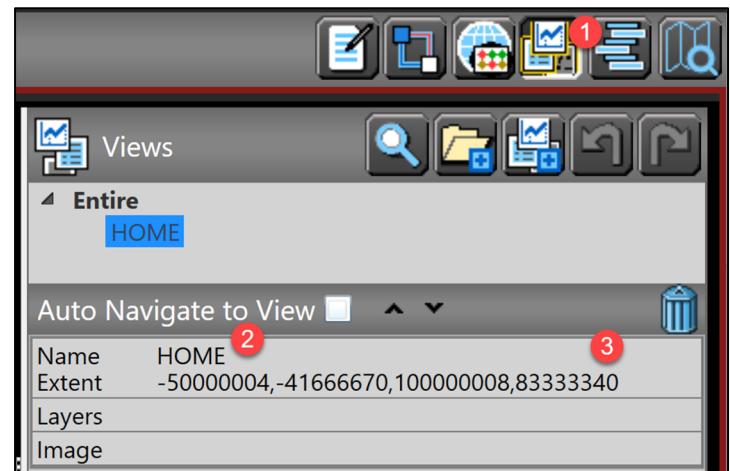
2.32 No Room for a Title

To access the map views, click Editor (1) and locate the Views (2) button. We see that there is one view in the map – the one we see when we open the map. The view is called HOME (3).



2.33 Launching Views

The name HOME (2) was assigned by the system. The issue with the size of the view can be addressed with the Extent option (3) within the view menu (1).
We will cover the other options in later modules.

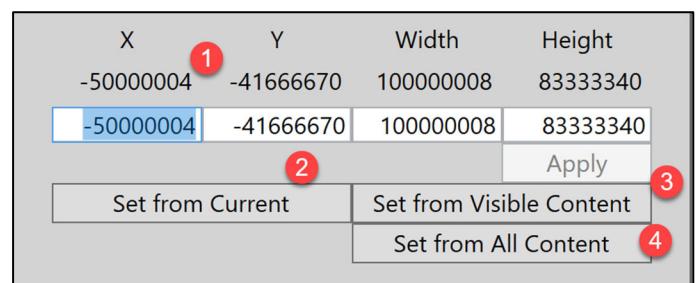


2.34 Map Extent

Once we click on the word Extent, we see that its settings include the starting X and Y co-ordinates (1) along with the width and height.

Also, upon clicking on Extent, you see a red boundary surrounding the map (not shown). This boundary represents the Extent.

The Extent can be manipulated in 4 ways.

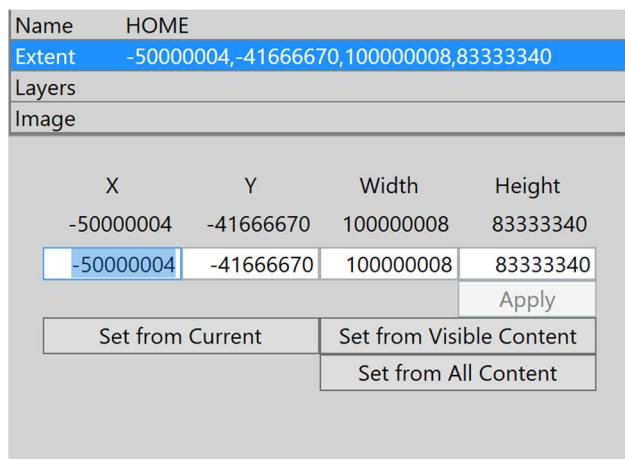


2.35 Extent Settings

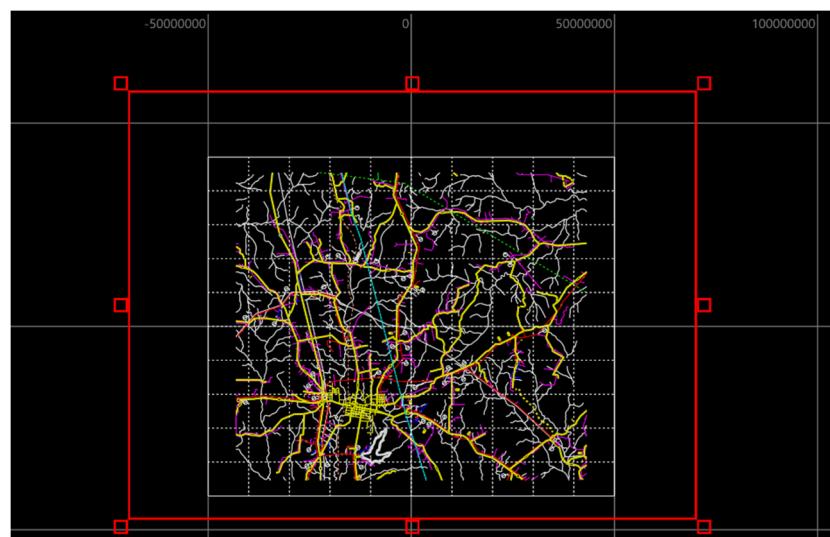
1. You can manually change the values. You also get the same effect by grabbing and re-sizing the red lines surrounding the map (not pictured).
2. Selecting Set From Current (2) expands the Extent and now the whole window becomes the View.
3. Set From Visible Content (3) is the default setting – the Extent tightly wraps around the map.

- For the time being, Set From All Content (4) would have the same effect as Set From Current. Later (we won't be using it), it will grab everything that is drawn including elements beyond the Window to the right.

Using the tools in Images 2.36 or 2.37, duplicate the coordinates as shown and see if you can get the Extent line to show blank space around the map.

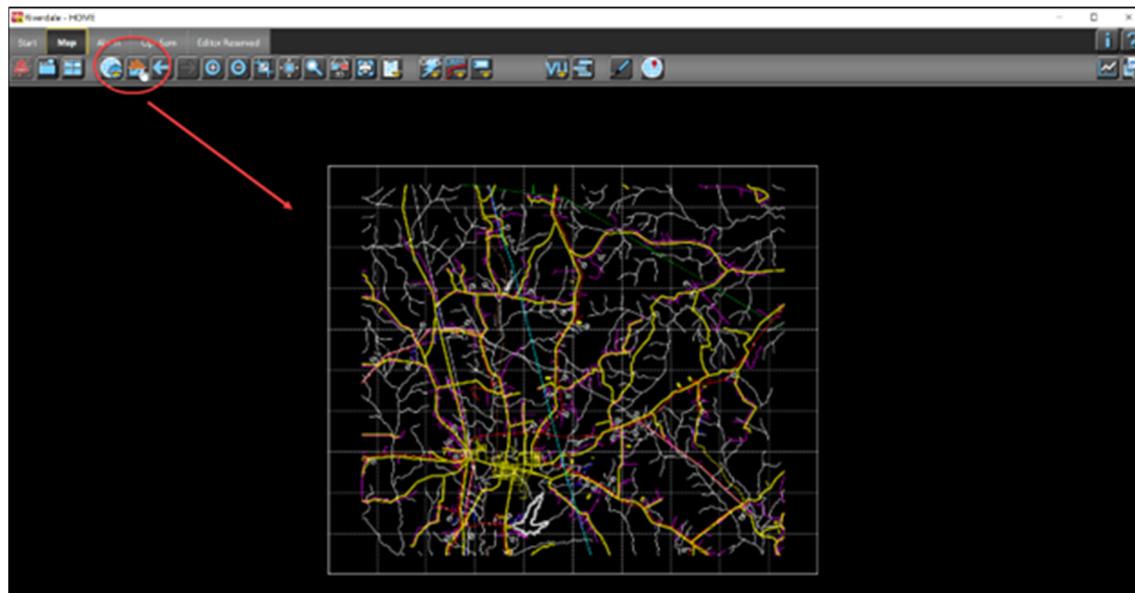


2.36 Changing the Extent



2.37 Creating a New Extent Boundary

Clicking on the Home button now gives us a better look at the map. This is also what appears when we first launch the map. You can click on the Home button highlighted on the next page in order to see your new view.



2.38 New View

Let's use one of the fonts we created, to put a title on the main view.

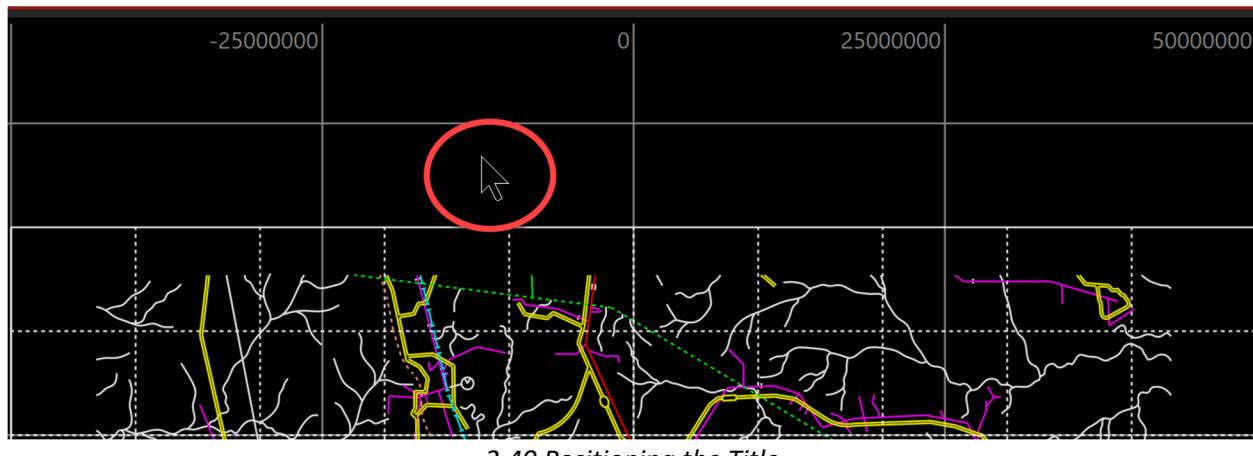
Recall that we don't use the Library when adding elements to the map. We still start off by clicking the Editor (1), but we next click the Edit Parts Button (2).

Even though we defined our Main Page Title as a font, it gets added to the map as a Character String (3). Select the Add String button.



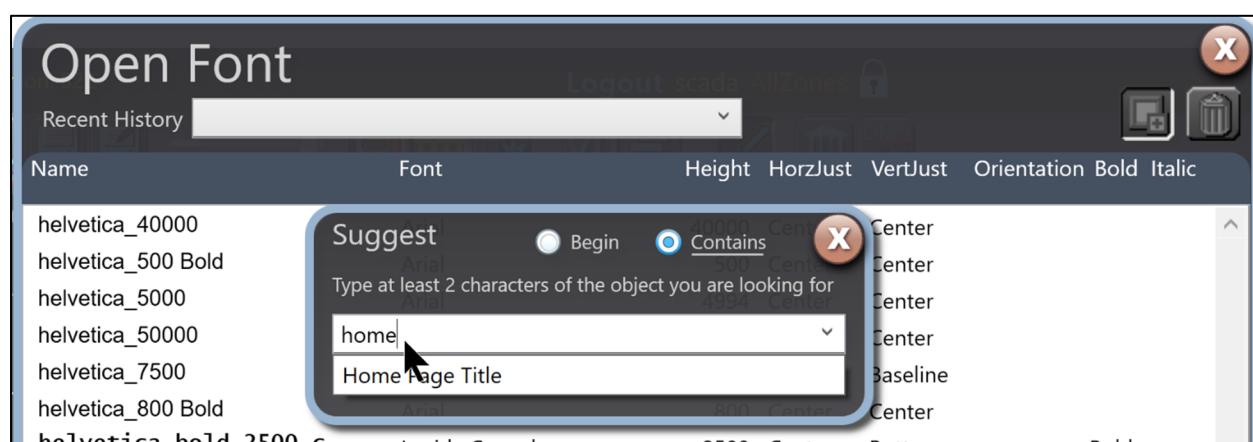
2.39 Adding a Title to the Map

Position your mouse just above the map and a little left of center (the location does not have to exact) and click.



Upon clicking, you will be asked to select the font. If you start typing in the name of the font – Home Page Title – the application will find it.

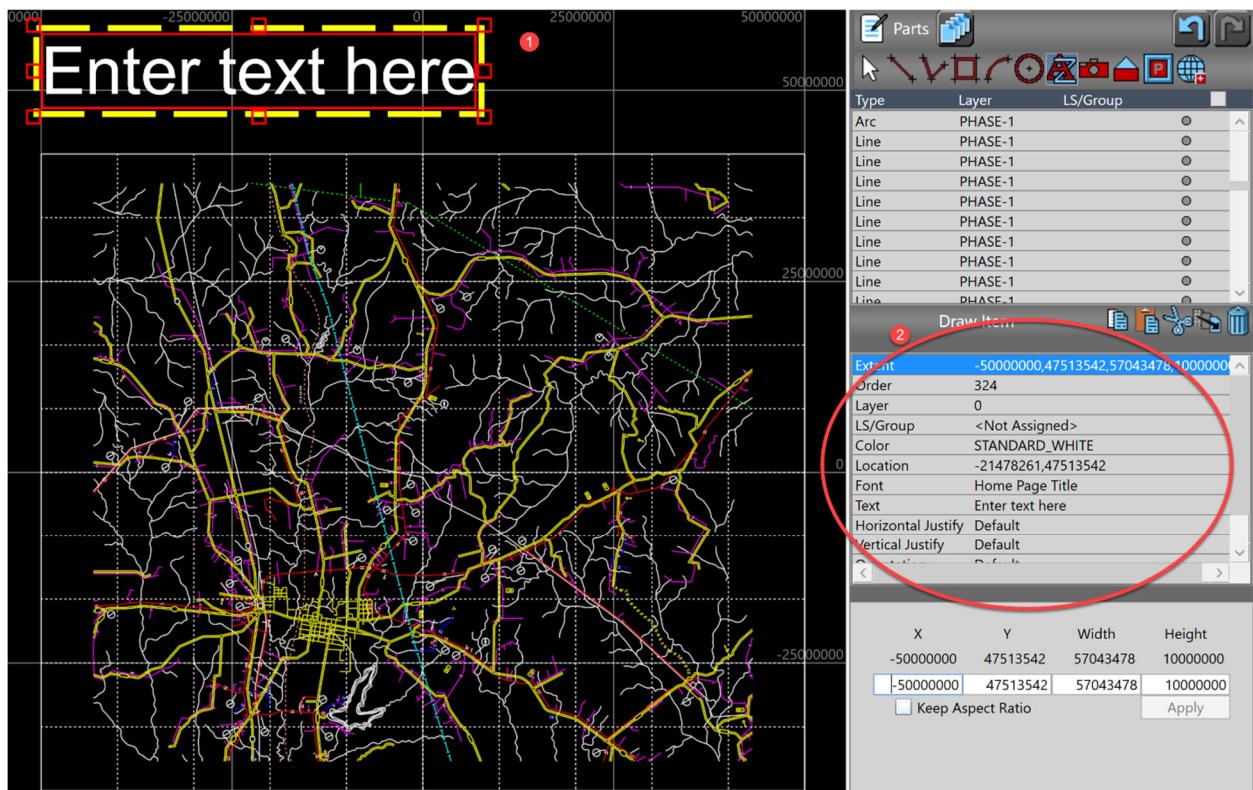
Let's continue with selecting our Home Page Font. When you locate it, click OK at the bottom left of the Open Font Box.



Once again, let's click on the location. This time you will be asked what layer to use. For now, click 0 and then OK. We will discuss layers in the next section.

We now see our string at the top of the map (1) and, to the right, we see details about the string (2).

Above the details, you will see a list of other elements in the map (e.g. Line, Arc). These came in during the CAD conversion.



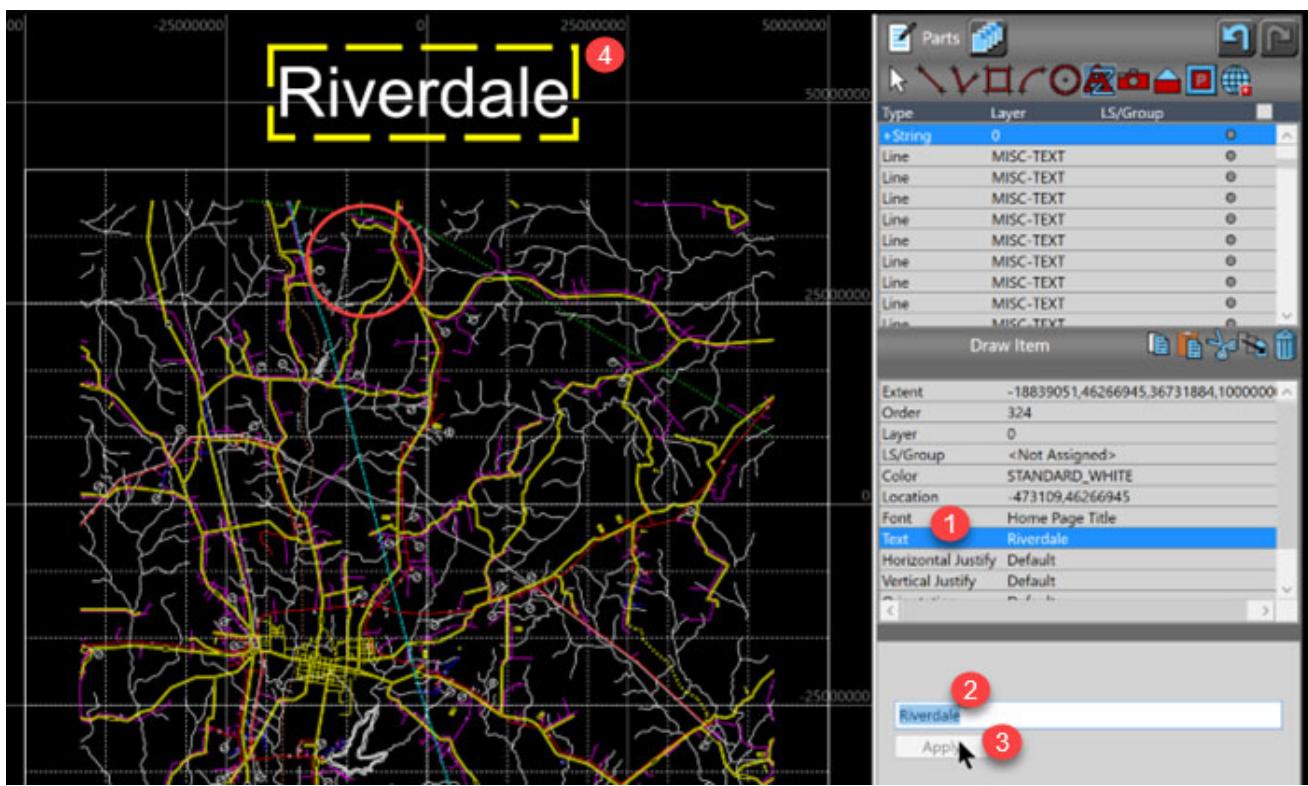
2.42 Font Now Placed on Map

Click inside the yellow box to center your title. Later, we will be using alignment tools.



2.43 Moving the Title

- Next, click on Text (1).
 - Enter the name of our town (2).
 - Click Apply (3).
 - Note the name appears at top now (4).



2.44 Entering the Title

Also, note the circle in 2.44. We are going to make this the location of our North Substation. To do this, we will need to create a North view.

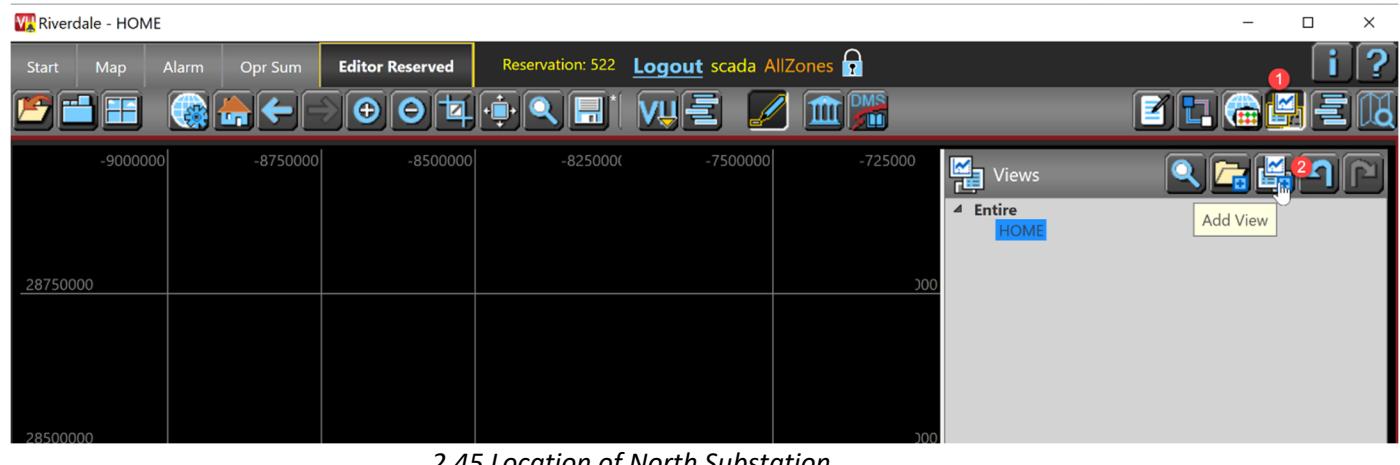
The North view can be created anywhere. Many utilities will place the North substation above, below, or to the side of the main map. Because of the popularity of GIS, it's becoming more common to zoom in on the exact location of the North substation. This makes a nice effect if GIS information is added later – the relationship between the substation and feeders can be clearly shown.

For our example then, assume the North substation is in the circle. Zoom into the circle until you see no more elements from the CAD file.

We have now zoomed into the location.

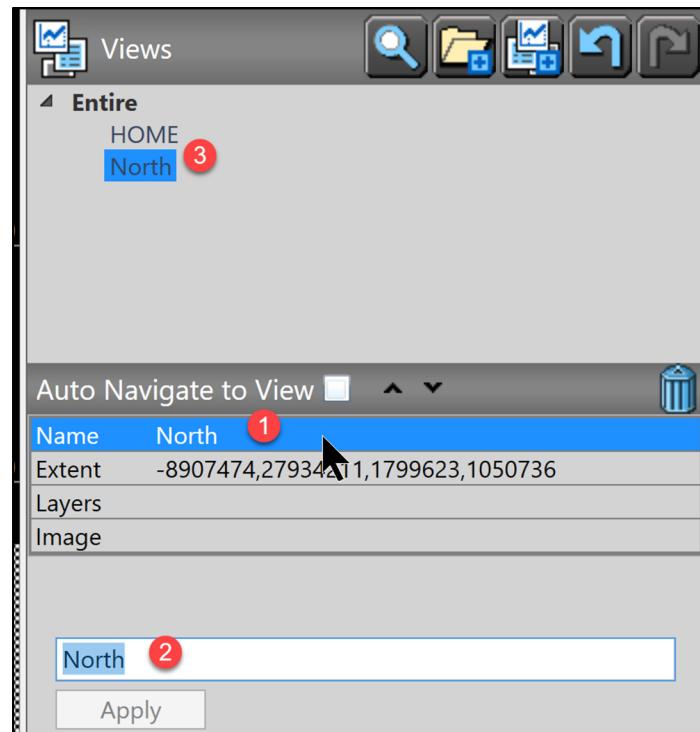
At this point, we should mark the location by making a North view. Recall the location of the Views button and click it (1).

Next, select the Add View button (2).



When we click on Name (1), we can change the default name for the new view (2).

After we hit the Apply button (just above label 2), the name for the new view is set (3).

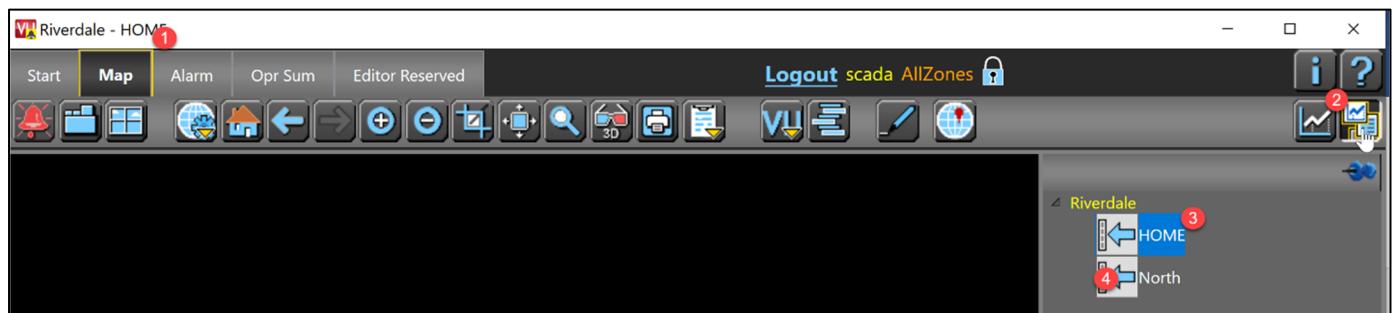


2.45A Renaming a View

From here, you can toggle between the Home and North views.

If you click on the names (Home and North) you will switch between the two views (3).

If you click on the Arrows beside the views (4), you will see one of the views in a big window with the other view pinned to the side in a smaller view.



2.46 Moving Between the Views

Add the title for the North view using the Substation Labels font we created.

Remember this is done in the Editor and we use Edit Parts to add elements to the map.

Image 2.47 shows the North label and some configuration settings.

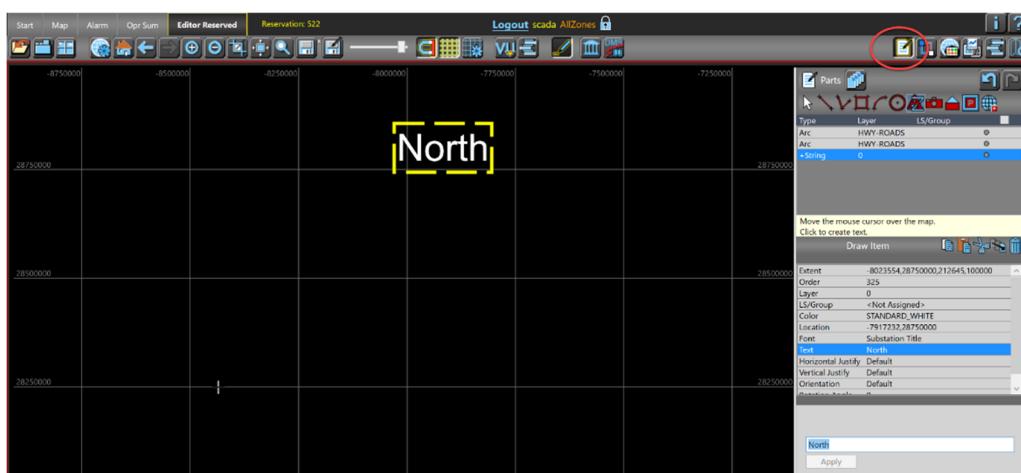


2.47 Settings and Result for Exercise

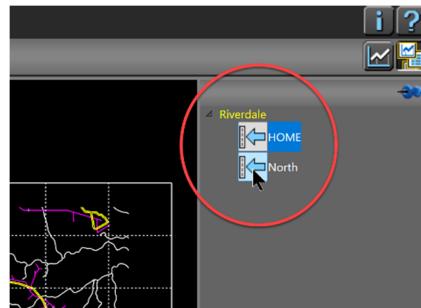
The choice of which View is the one people see upon opening the map, is set by clicking the map properties button. This is done by going to Editor (1) the Map Properties Icon (2) and then Click on Default View (3).

System managers can also allow people to have their own configurations.

In this scenario, an operator really likes to see the home page by default but they also like to have the North station pinned to the side so they can quickly monitor it.



2.48 Setting a Default View



2.49 Viewing Main Page with North Pinned

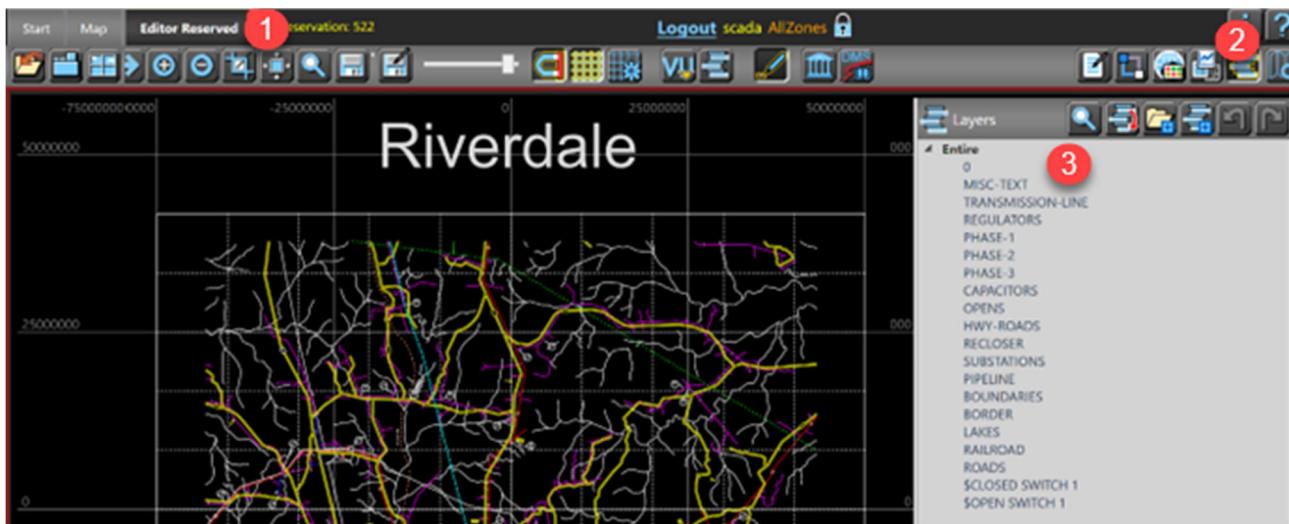
Depending on User Right settings, either the Operator or someone with more User Rights, can click the Map Menu button and choose Save Configuration. The next time they log into SmartVu they will see the configuration on image 2.59.

If they no longer want the configuration, note the Remove Configuration at the bottom.

Working with Layers

When we added titles to our map, we were asked to choose a layer for the title. We will now look at layers in detail.

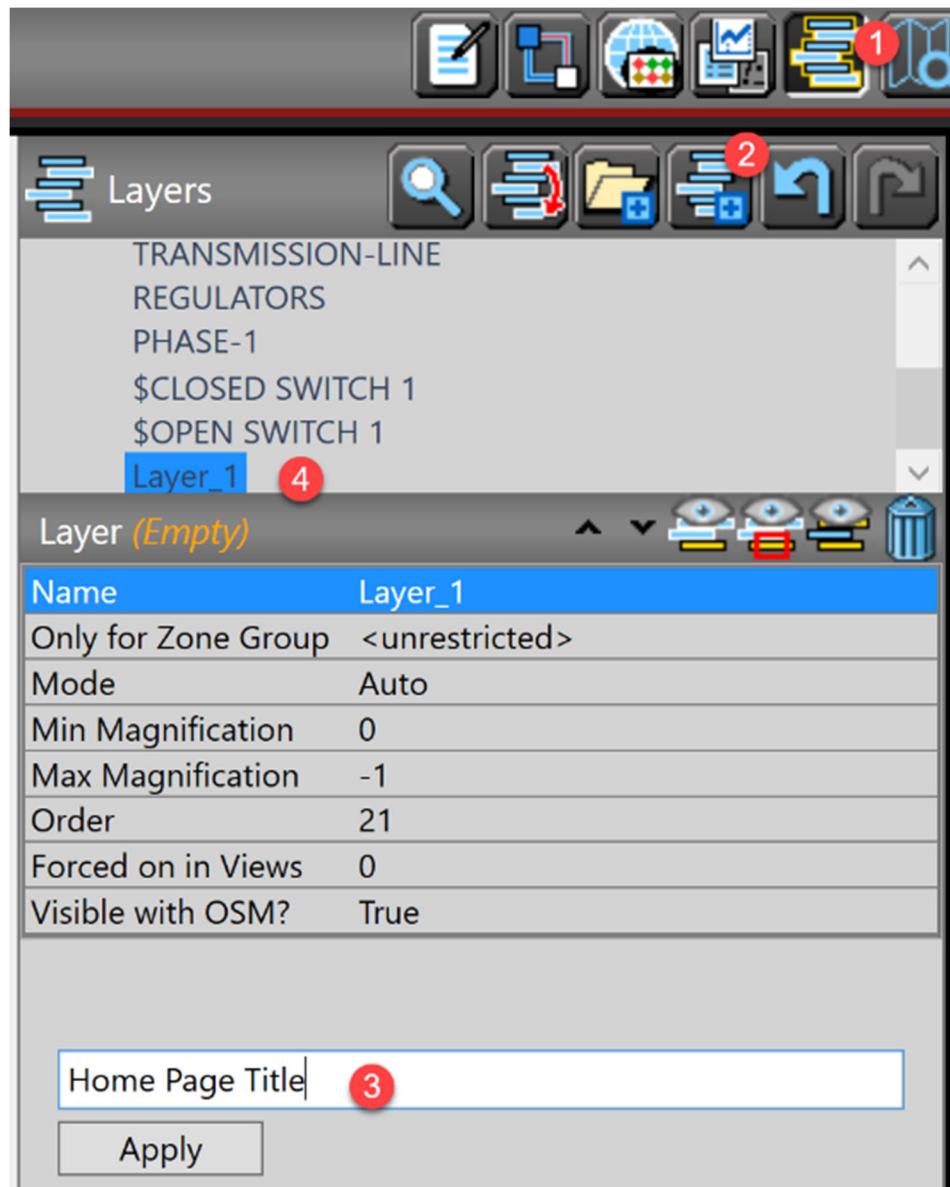
To access the layers, start in the Editor (1) and look for the Layers button (2) at the tip right. Here, you will find all the layers. Since we haven't created any layers, we know that these (3) came into the system as part of the CAD file conversion and import.



2.50 Looking at the Layers

To show how layers work, let's create a layer for the titles we will be placing on the home page.

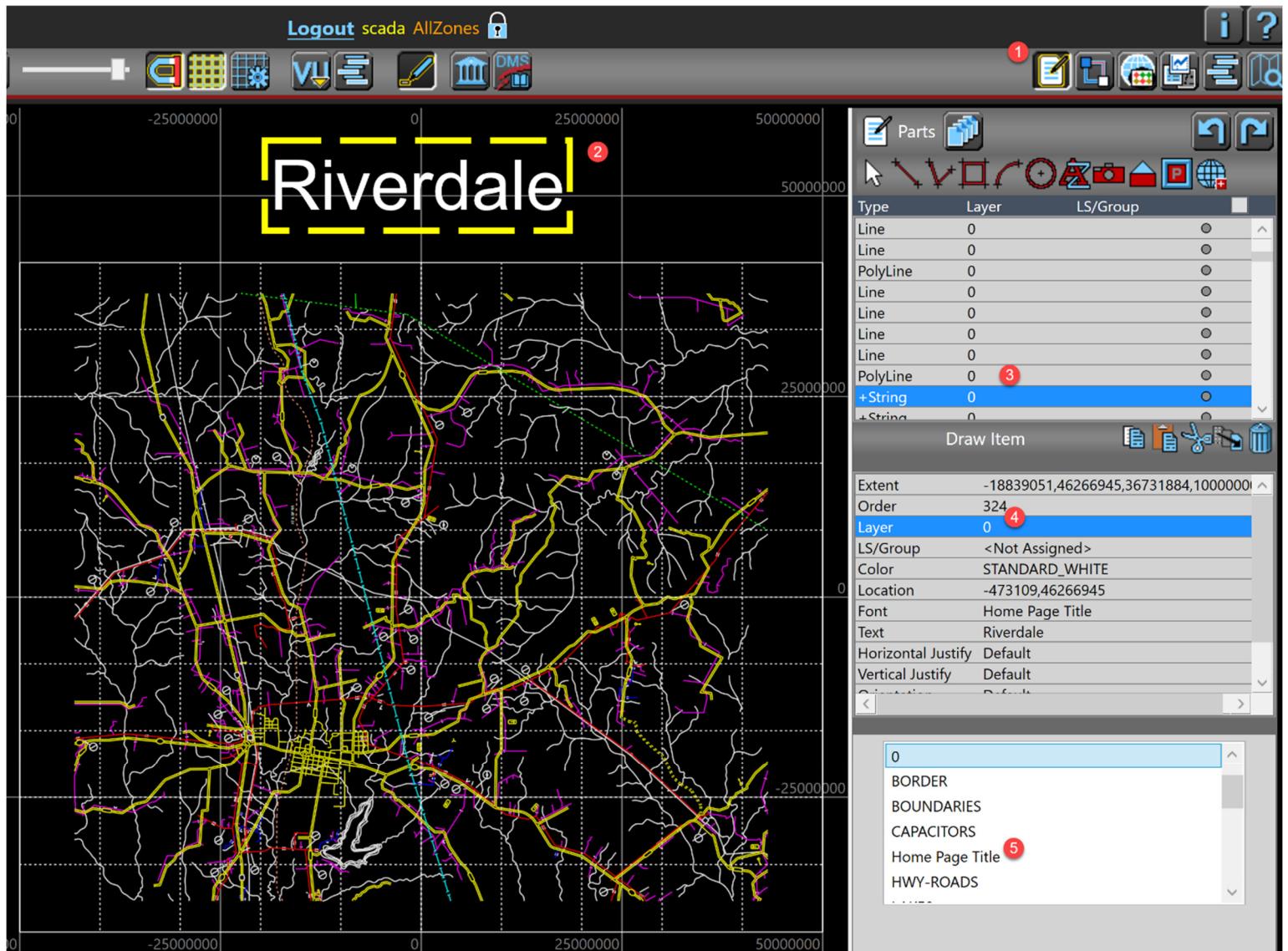
Remain in the Layers button (1).
Select Add Layer (2).
Enter the name of the layer and hit apply (3).
The new name will replace the default Layer_1 name (4).



2.61 Adding a New Layer

Recall that we chose Layer 0 for our title. We will now move the title to our new layer:

- Click Edit Parts (1).
- Select our title (2).
- Note that it shows that it's a string currently on Layer 0 (3).
- Click on Layer (4).
- Select the Home Page Title layer that we just created (5). The change occurs (no Save button).



2.52 Changing Layers

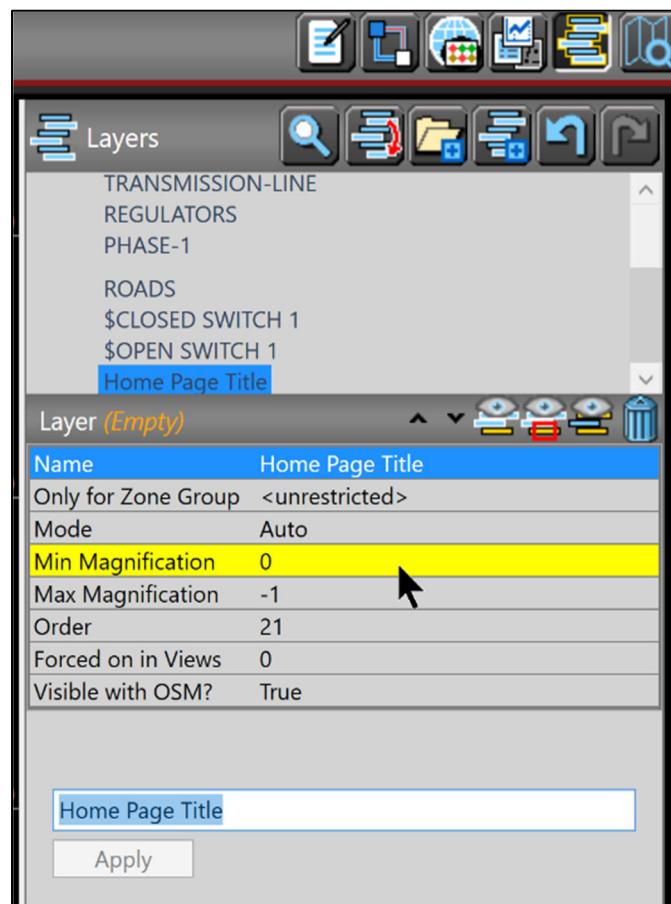
The value of layers is that, as CAD files and GIS make maps more complex, layers can make it easier for viewers.

Most people have used Google Maps. If you zoom out of a Google map, the area you see expands. You'll see highways, main streets, and rivers but it makes no sense to clutter up the map with little dots representing restaurants and stores. However, as you zoom in, you will lose sight of complete rivers and roads and now will see the location of McDonald's, Walmart, and other smaller points of interest.

Therefore, the map contains many elements but you only see the ones that the administrator wants you to see. The example just used was based on magnification but there are other examples such as login credentials. The process of hiding elements is called **decluttering**.

It makes map viewing easier for the user but it also has another helpful function. By reducing the number of elements drawn on the map, the map can load and respond faster.

In the image below, you'll see a minimum magnification and maximum magnification set at 0 and -1 respectively. These numbers are code for saying that this layer will never disappear in the decluttering process.



2.53 A layer that never is hidden.

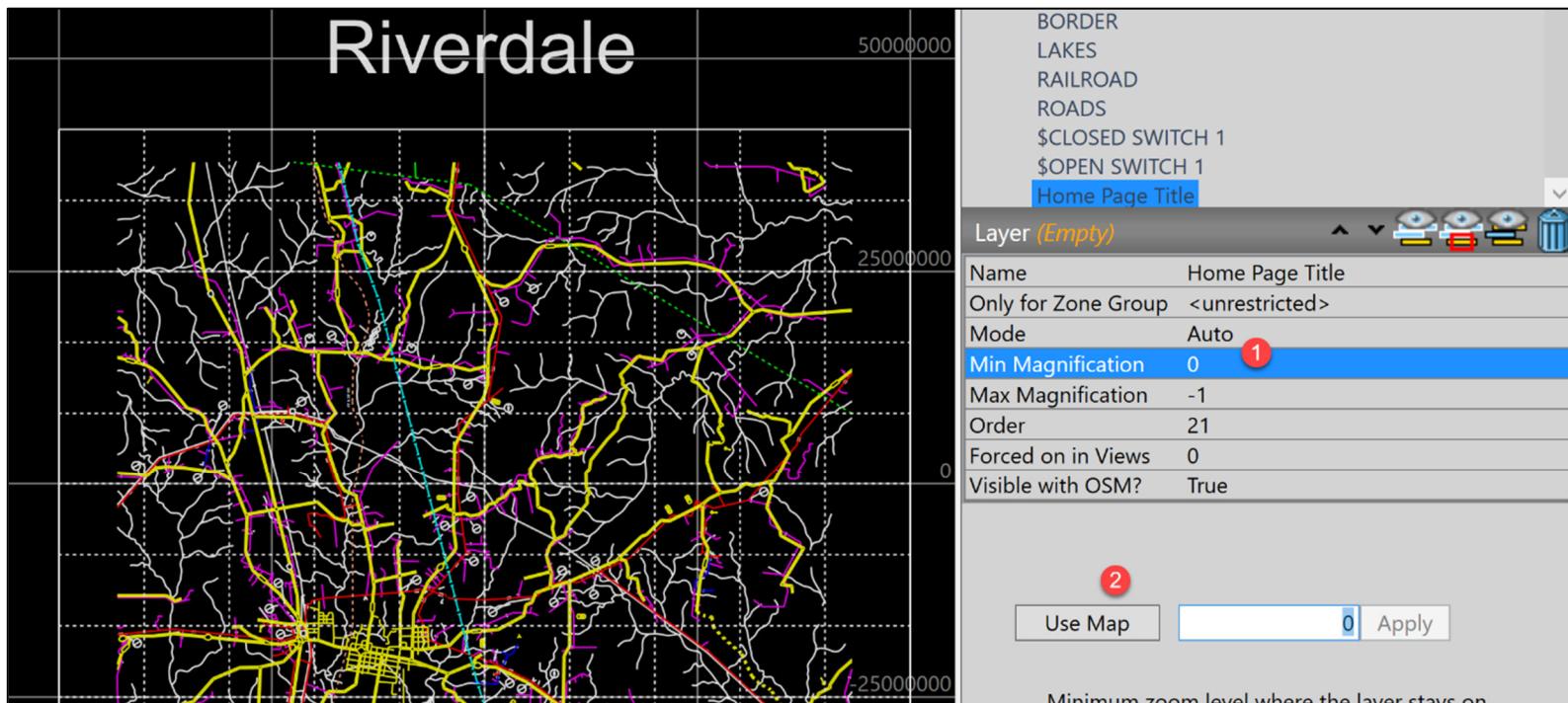
Let's test decluttering.

Click on Min Magnification (1) and note that you can enter in a magnification value that will make the layer disappear (2).

If you choose the Use Map option that means that current magnification of the map will be the point where the layer disappears.

Choose the Use Map option. As soon as you select it, the Riverdale title should disappear.

Go back into map mode and note how Riverdale appears and disappears based on magnification. In the Level 2 course, we will work with some more of the options such as using Zones to declutter.



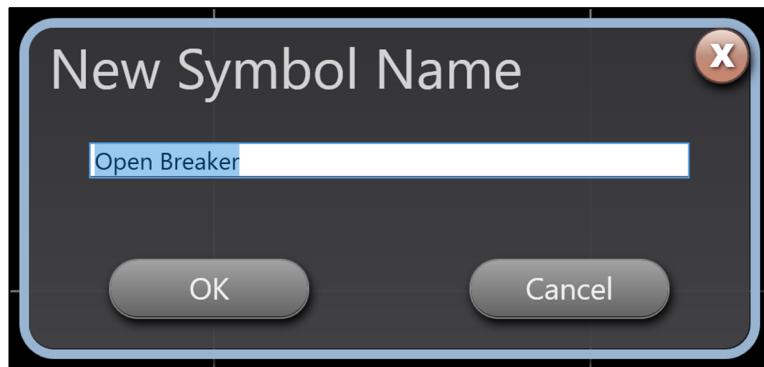
2.54 Setting a Magnification

Repeat the process at the top of this page but this time test out Max Magnification. Contrast the different behaviors between Min and Max Magnification.

Drawing a Simple Symbol

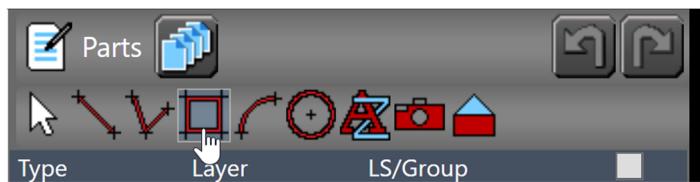
Survalent software will come with some default symbols but being able to draw your own items will, at some point, be necessary. In this section we will draw a simple circuit breaker. These can be made with great complexity but, for our purposes, we will just draw them as simple squares.

From the editor, we enter the Library and select to create a new symbol as shown below. Accept the Reservation request (If applicable).



2.55 Creating a New Symbol

In Edit Parts, select Add Rectangle.



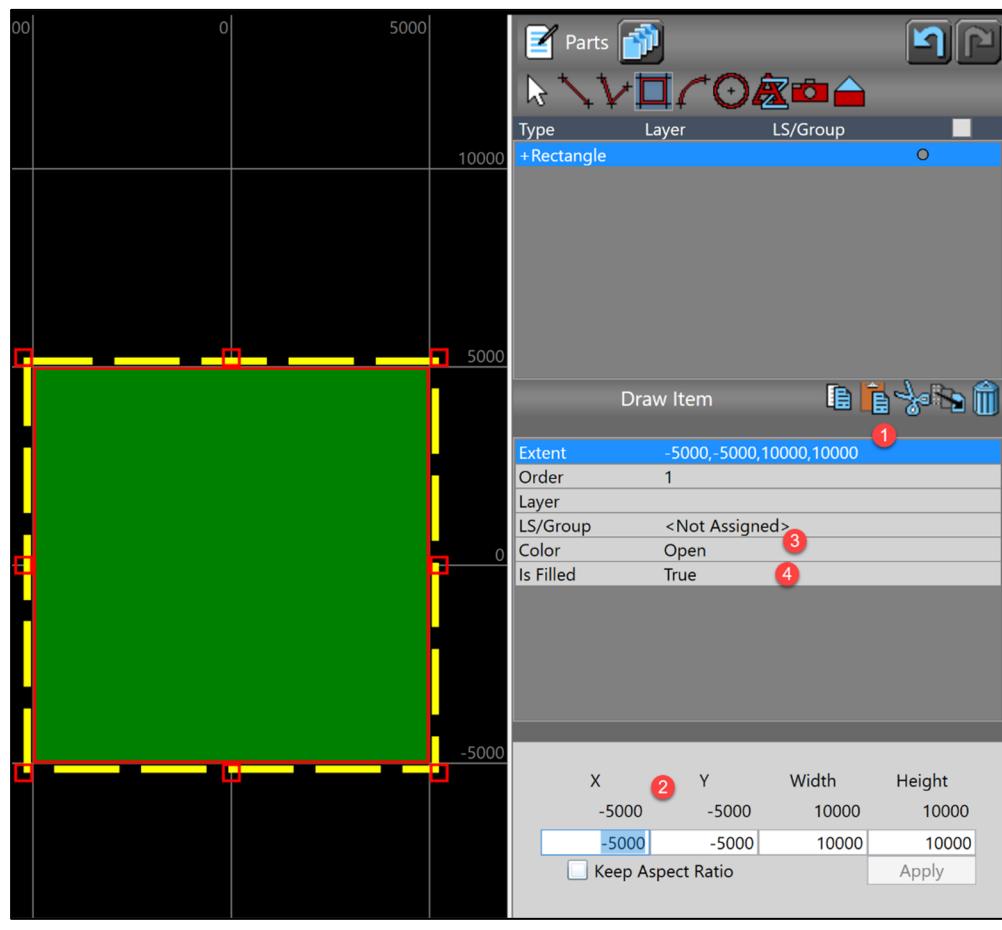
2.56 Choosing the Rectangle

Either click in the map to make a small rectangle or click and drag to customize the size (at this point the size of the rectangle is not important).

For consistency with other symbols, symbols should be equidistant across (0,0). Also, you will find that most symbols are between 10,000 and 20,000 in magnification dimensions.

With this in mind, let's draw this symbol by entering numerical values. As you become more comfortable with the software you will be able to draw without this extra guidance. If the breaker becomes very big during the process below, please **zoom out**.

1. Click on Extent and enter the values shown. The X and Y values is the starting point of the rectangle. These values will center the breaker at (0,0) and keep it at 10,000 in width and height.
2. Choose the Open color we created.
3. Select True to fill in the square with the color.

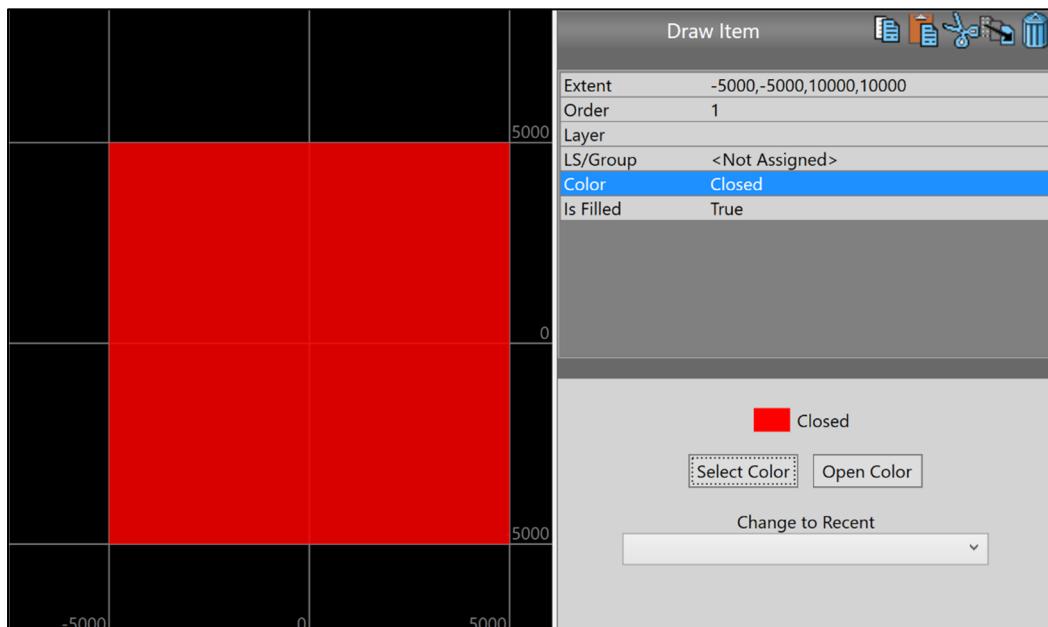


When you save the symbol, you will see that gets placed in the syl folder (not shown).

We will use our Open Breaker to create a:

1. Closed Breaker (see image 2.58 below)
2. Nak Closed Breaker
3. Nak Open Breaker

The only thing that changes between these breakers is the color. **Please remember to use SAVE AS instead of SAVE or else you will override an already Saved breaker.**



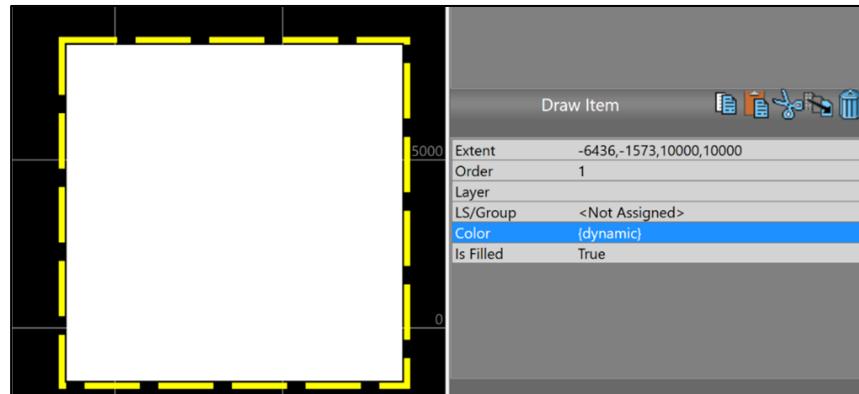
2.58 Closed Breaker

Dynamic and Transparent Colors

Earlier in this module we talked about two different strategies for using breakers in a map.

The first way was to create 4 different breakers that could represent the Open, Closed, NAK Open, and NAK Closed conditions. We have started down that path by creating the 4 colored breakers in the last section. This is still the most common method used.

The second method – which is catching up in popularity – is to create a breaker with a neutral color. The color the Operator's see will be dictated by a color table. The color used to create these breakers is called Dynamic. Let's use one of the breakers we just created and apply the Dynamic color.



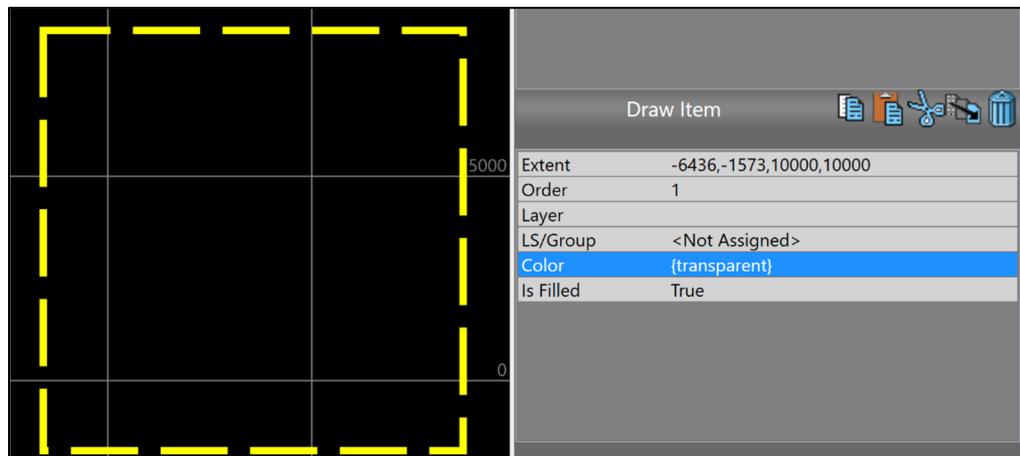
2.59 Breaker With Dynamic Color

Don't forget to use **SAVE AS**.
Let's name it Dynamic Breaker.

File name: **Dynamic Breaker.syl**
Save as type: Symbol Files (*.syl)

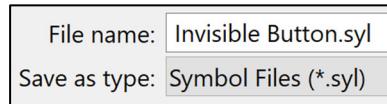
2.60 Dynamic Breaker

Let's create one more breaker using the Transparent color. As the name suggests, this color will let you look through the symbol. We will see the effectiveness of this type of Pmacro when we cover Control Panels in a later module.



2.61 Transparent Color

Use **SAVE AS** and name it - Invisible Button.



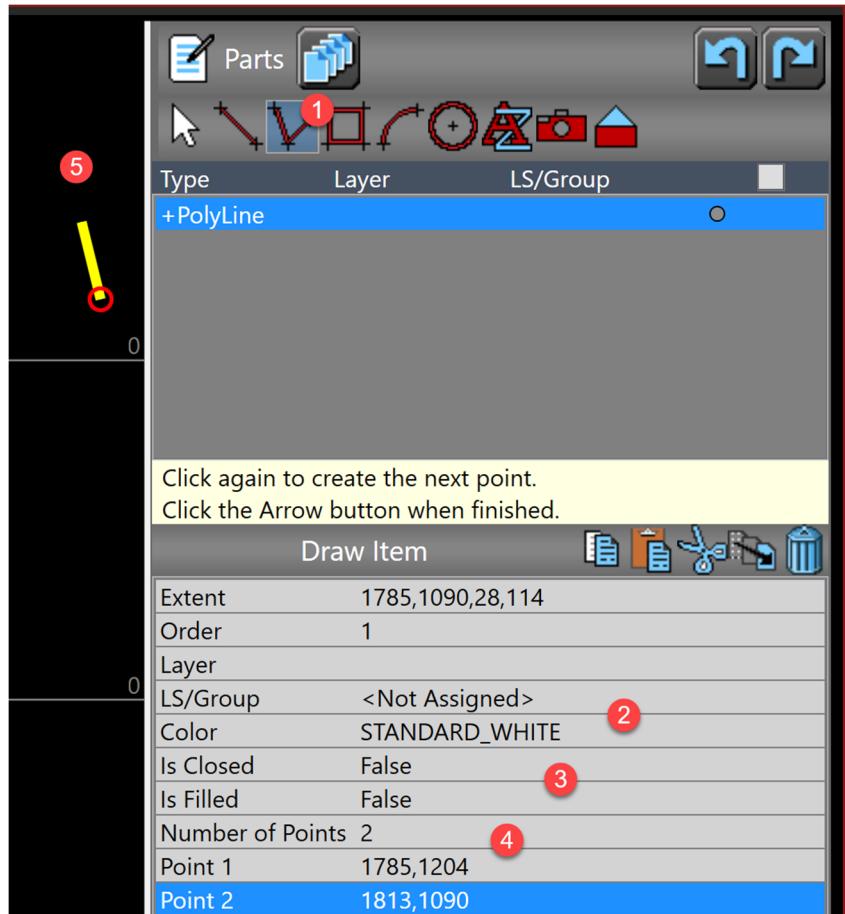
2.62 Invisible Button

Creating a Transformer Using the Polyline and Copy Tools.

The final section of this module has us drawing a more complex symbol with some additional tools.

As usual, it starts with us, in Edit view, opening the library and choosing to create a new symbol. Let's call it XFRMER (for transformer) and then accept Reservations.

- Click on the Polyline tool (1) and click twice in the map (two different spots).
- We will assign some colors (2) later in the process.
- Polyline shapes can be closed and filled with color but we don't want that for a transformer, so we have False beside both the Is Closed and Is Filled (3) options.
- We clicked twice so, at this time, our polyline has 2 points with 2 different co-ordinates (4).
- This is our polyline as shown in the map (5).



2.63 Using the Polyline Tool

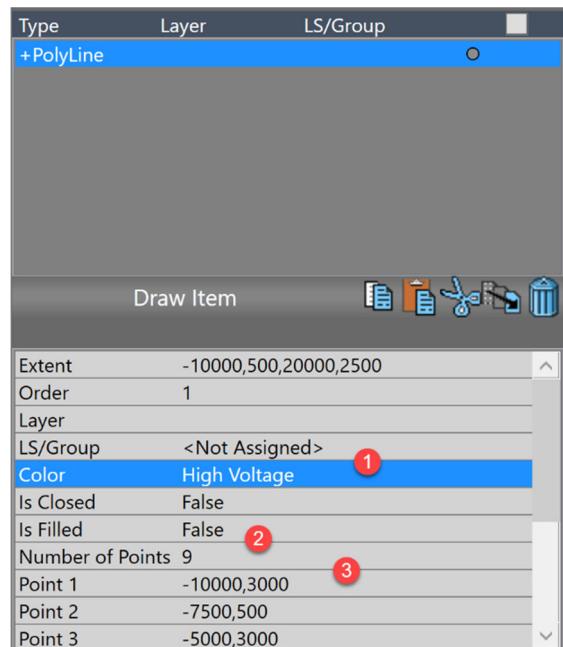
As with the breaker, you will soon be able to draw without entering in the extents. However, for now, enter in the values as shown in images 2.64 and 2.65 on the next page.

Point 4	-2500,500
Point 5	0,3000
Point 6	2500,500
Point 7	5000,3000
Point 8	7500,500
Point 9	10000,3000

2.64 Transformer Settings Part 1

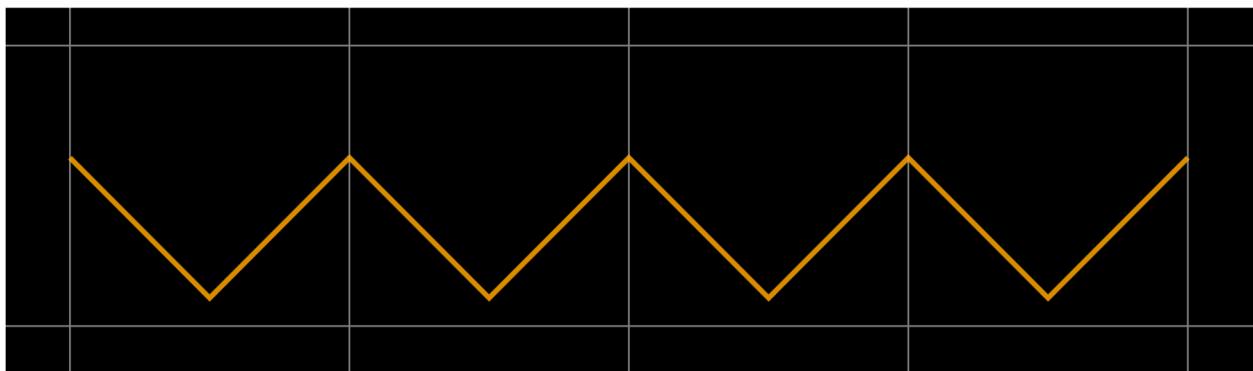
Note:

- We changed the color to High Voltage (1).
- We changed the number of points to 9 (2).
- We entered in the point co-ordinates (3).



2.65 Transformer Settings Part 2

This should be the result on the map.



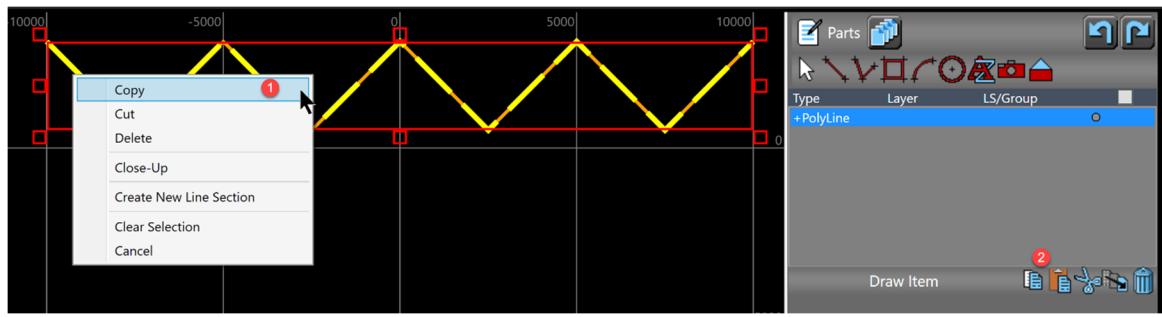
2.66 Our Transformer (So Far)

The symbol for a transformer is only half done. The convention is to have a second portion that represents the lower voltage. The second portion is like the first portion in image 2.66.

A quick way to duplicate the High Voltage is to use Copy and Paste. Two ways of copying are shown below:

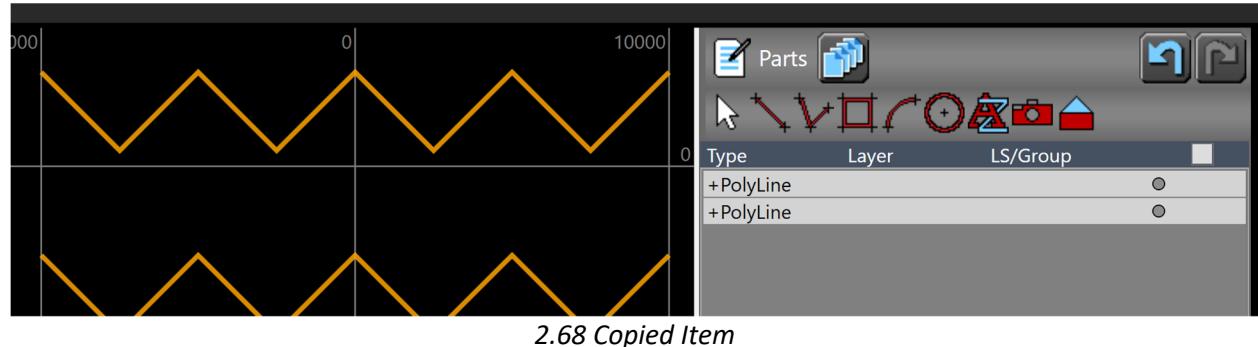
- Right-click on the portion we have drawn (1)
- or
- Use the copy and paste (2) icons - click the copy icon, click the paste icon, click on the map where you wish to place the copied item.

You can also do this using the conventional windows keyboard shortcuts CTRL-C and CTRL-V.



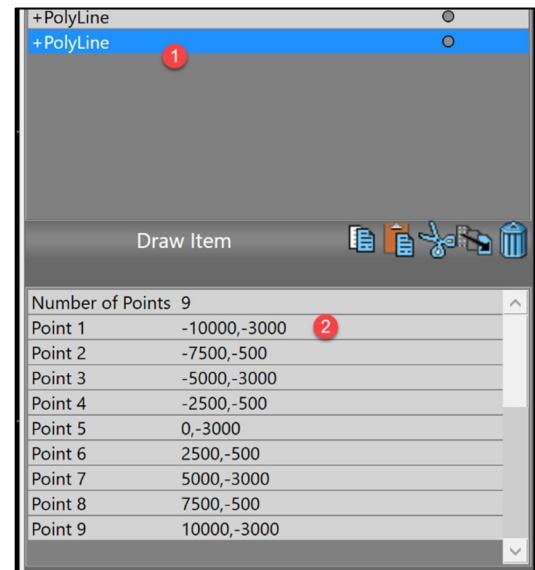
2.67 Copying Our Symbol

Let's copy and paste the top portion. Place the bottom portion just below the top portion.



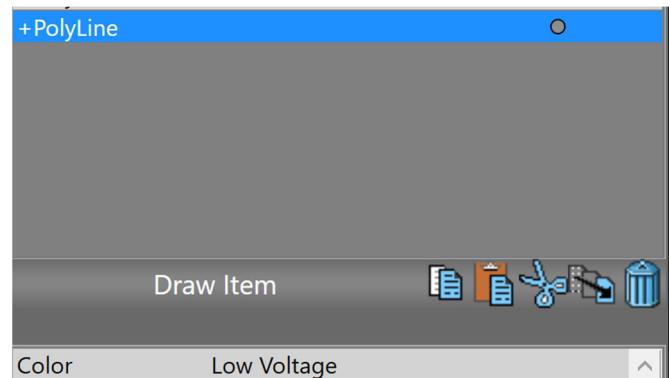
2.68 Copied Item

Click on the second Polyline (1) and adjust the points as shown. Type the values shown (2) on image 2.69 for each point.



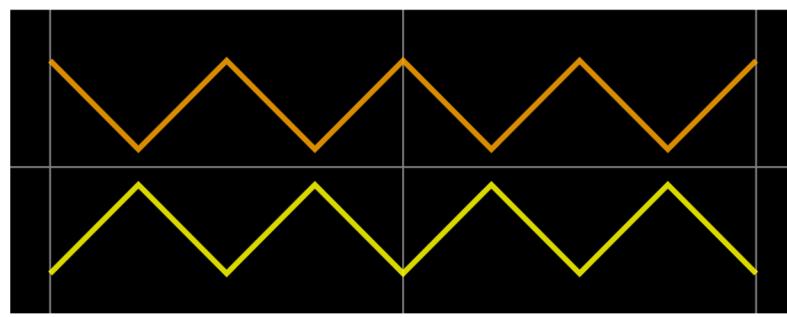
2.69 Values

Also set the color to Low Voltage.



2.70 Adjusting the Color

We now have a transformer we can use. Note they symmetry around (0,0). Save the symbol. This brings to conclusion Module 2.



2.71 Completed Transformer