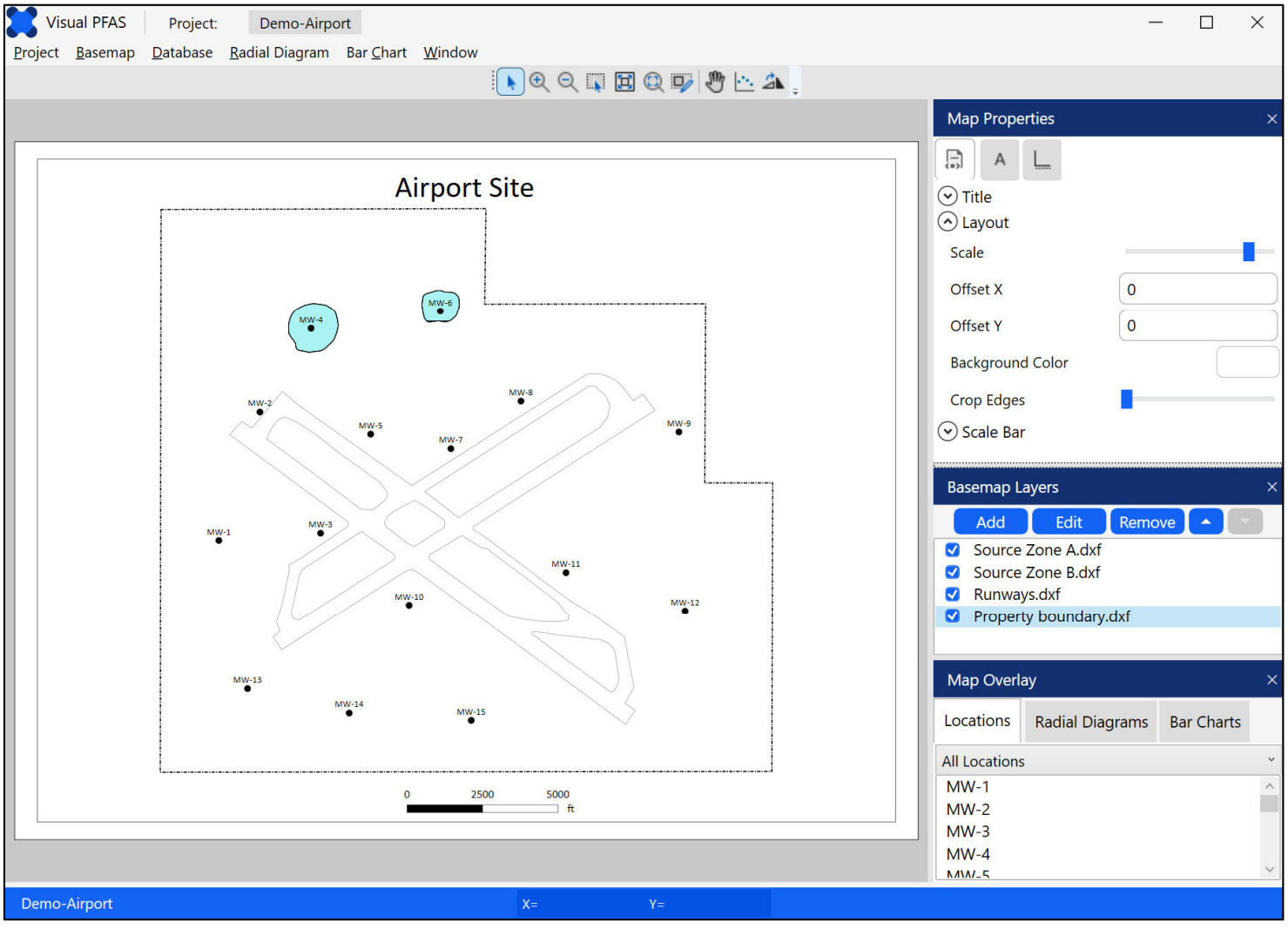
Visual PFAS™
Users Guide:

Creating A Basemap

Chapter 3



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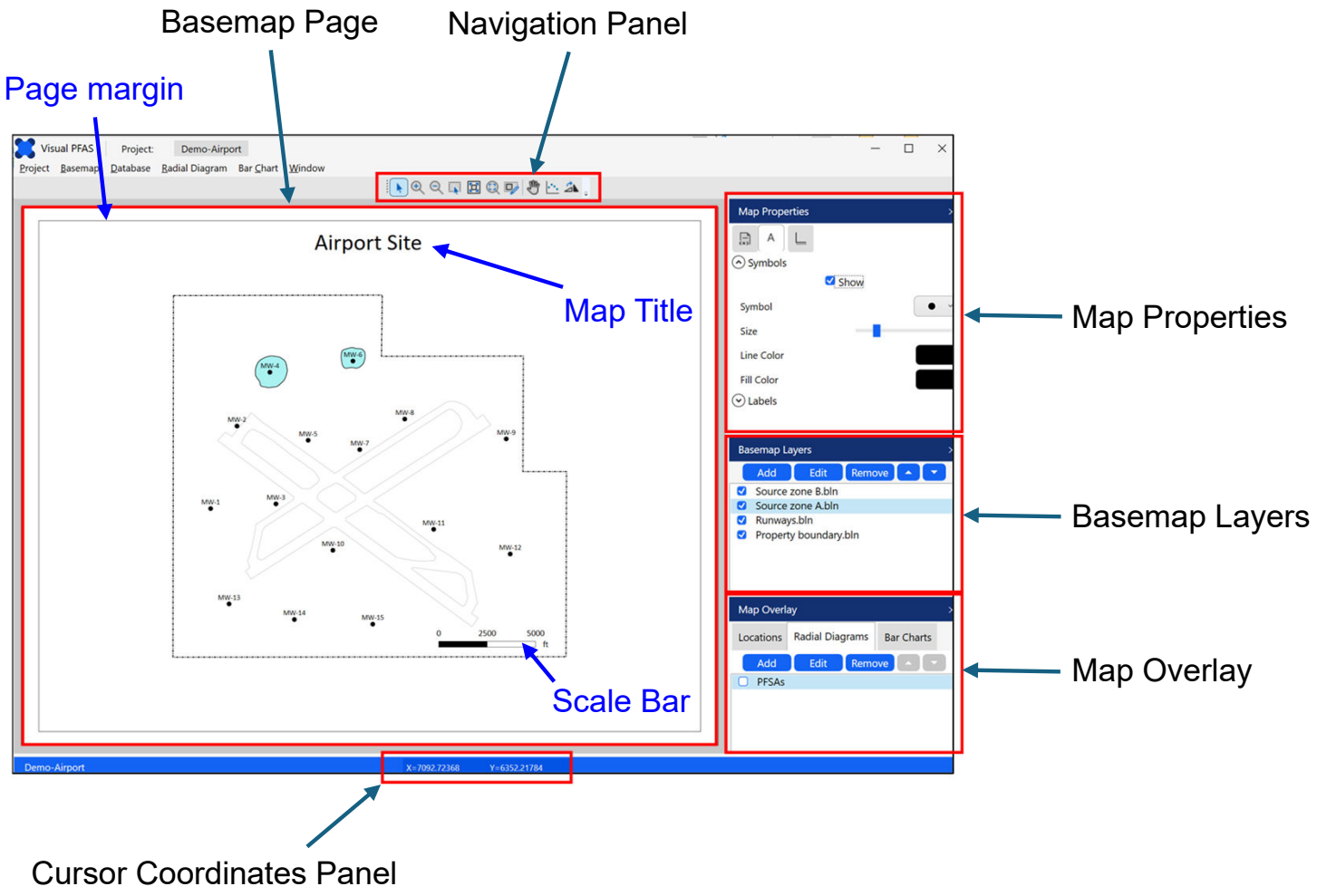
3.1 Introduction to Visual PFAS™ Basemaps

Visual PFAS™ basemaps allow users to import polyline or polygon layer files in shapefile, CAD dxf, or Surfer boundary line (bln) format. The main purpose of these basemaps is to provide a simple platform for determining which locations to include in radial diagram and stacked bar maps, and for viewing the final radial diagram and stacked bar maps.

A number of options are provided in Visual PFAS™ for adjusting the look of the basemap; however, Visual PFAS™ is not intended to replace more sophisticated programs for preparing basemaps and final report figures such as GIS, CAD, or Surfer. The final radial diagram and stacked bar figures may be exported as images for further editing in other software (e.g., PowerPoint for making presentations), and as vector files that can be imported to GIS, CAD, or Surfer for editing figures in specialized templates that most companies use for preparing reports.

The main components of the Visual PFAS™ **Basemap Window** are shown below, and include the Basemap Page (letter size in portrait or landscape), a Navigation Panel, Map Properties, Basemap Layers, Map Overlays, and a Cursor Coordinates Panel. These components are discussed further below.



The general functionality of each component in the Basemap window includes:

- **Basemap Page** – portrait or landscape view (letter size at 8.5” x 11”) of the basemap with options for including a basemap title, a scale bar, easting and northing coordinate axes, basemap layers, symbols to illustrate select locations (e.g., all locations in the dataset or only the locations in a specific location group), and eventually radial diagram and stacked bar maps.
- **Navigation Panel** – various buttons to facilitate zooming in and out, panning, entering custom basemap extents, toggling between portrait and landscape page views, and digitizing points.
- **Map Properties** – allows users to change a number of properties related to the basemap title, size (i.e., scale) of the basemap layers on the page, scale bar, location symbols and labels, and easting and northing coordinate axes around the edges of the basemap.
- **Basemap Layers** – Addition, editing, or removal of polyline and polygon layers (e.g., site property boundary, source areas, surface water tributaries, roads, etc.). Layers may be added in *.shp, *.dxf, and/or *.bln format.
- **Map Overlays** – Several tabs that facilitate selection of a location group for showing symbols on the basemap (or selecting all locations); adding radial diagram layers and editing key features such as the radial diagram axis lengths from the basemap window; and adding stacked bar layers and editing key features such as the height and width of the stacked bars from the basemap window.
- **Cursor Coordinates Panel** – illustration of easting and northing (i.e., X and Y) coordinates of the cursor location on the basemap.

The tutorial for creating and editing a basemap is based on the project started in Chapter 2 of this Users Guide. It is assumed that the project dataset has already been imported per the steps described in Chapter 2, although users have the option of importing the initial dataset (or a revised dataset) at any time while using Visual PFAS™.

The process for constructing radial diagram and stacked bar maps, or editing features related to these maps from the basemap window, are described in Chapters 4 and 5, respectively.

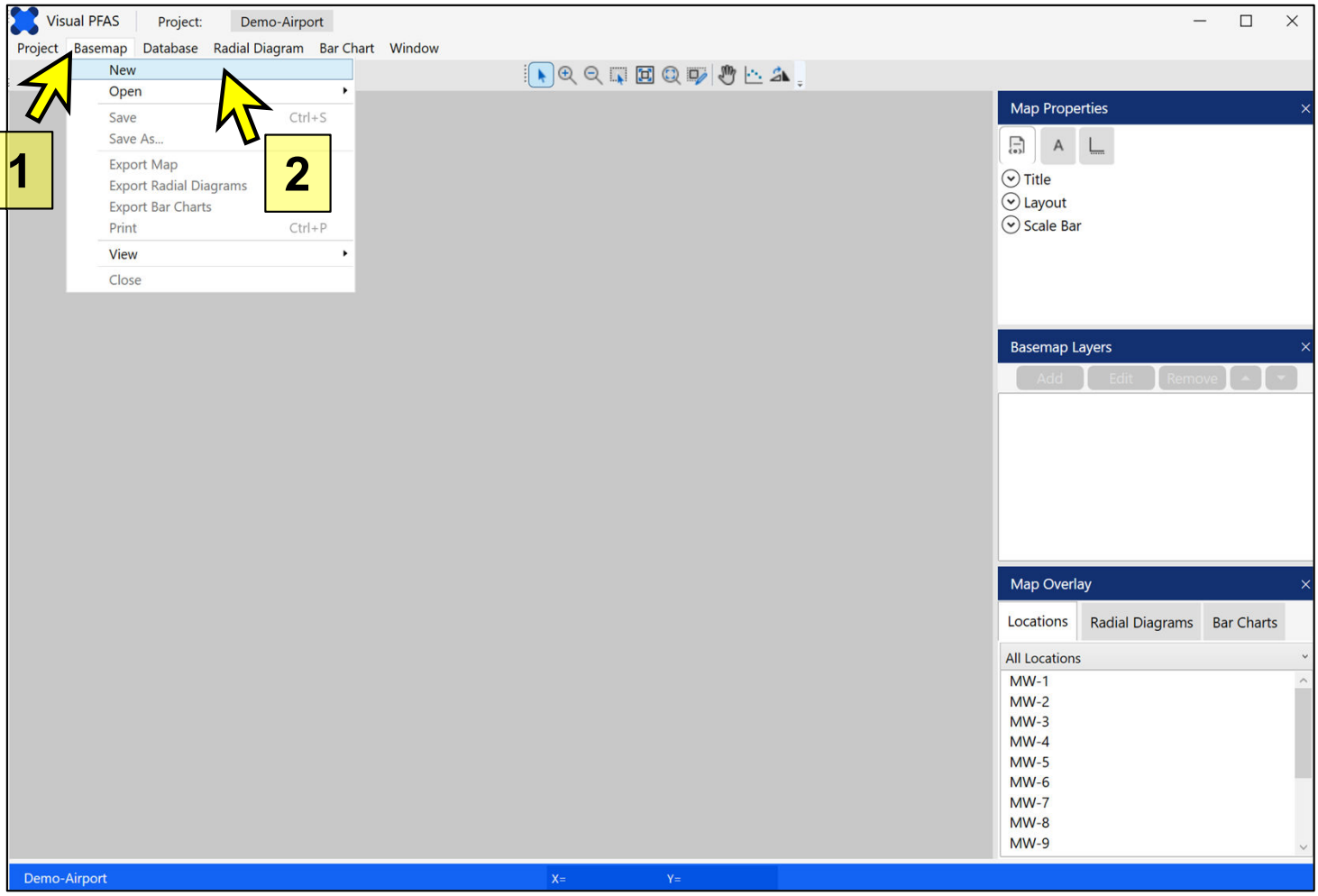
3.2 Creating A New Basemap

The window below shows where the tutorial left off at the end of Chapter 2, after importing the project dataset with location and chemical analytical data. The list of monitoring well locations is shown in the **Map Overlay** section at the bottom-right of the image below.

To start the creation of a new basemap, click the **Basemap** option from the main menu (see "1" below) and then select **New** (see "2" below).

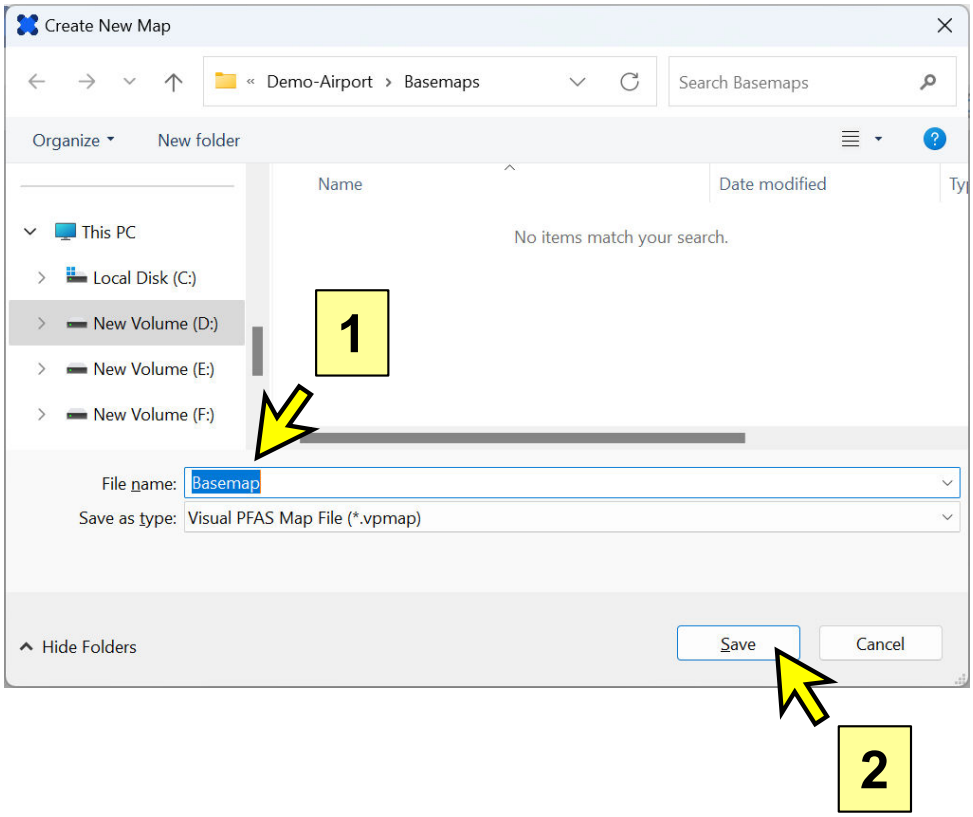
Notes:

1. As shown in the menu options below, users have the option to save a basemap, to Save As a new basemap file, export, print, toggle on/off the Map Properties, Basemap Layers and Map Overlay components on the right side of the window, and to close a basemap.
2. For large sites with many monitoring wells or soil borings, it may be beneficial to create one site-wide basemap, and then to create multiple basemaps with a more zoomed-in (i.e., local) scale of certain areas. Radial diagram and stacked bar maps can also be created either with all site locations, or a subset of locations from a specific area.



After selecting the **New** basemap option, the dialog box shown below will pop-up. Visual PFAS™ will automatically select the **Basemaps** sub-folder under the **Project** folder for the destination of the new basemap file to be created with a *.vpmap extension. This basemap file stores all of the properties that users select during the basemap editing process. Users should not attempt to open this file outside of Visual PFAS™.

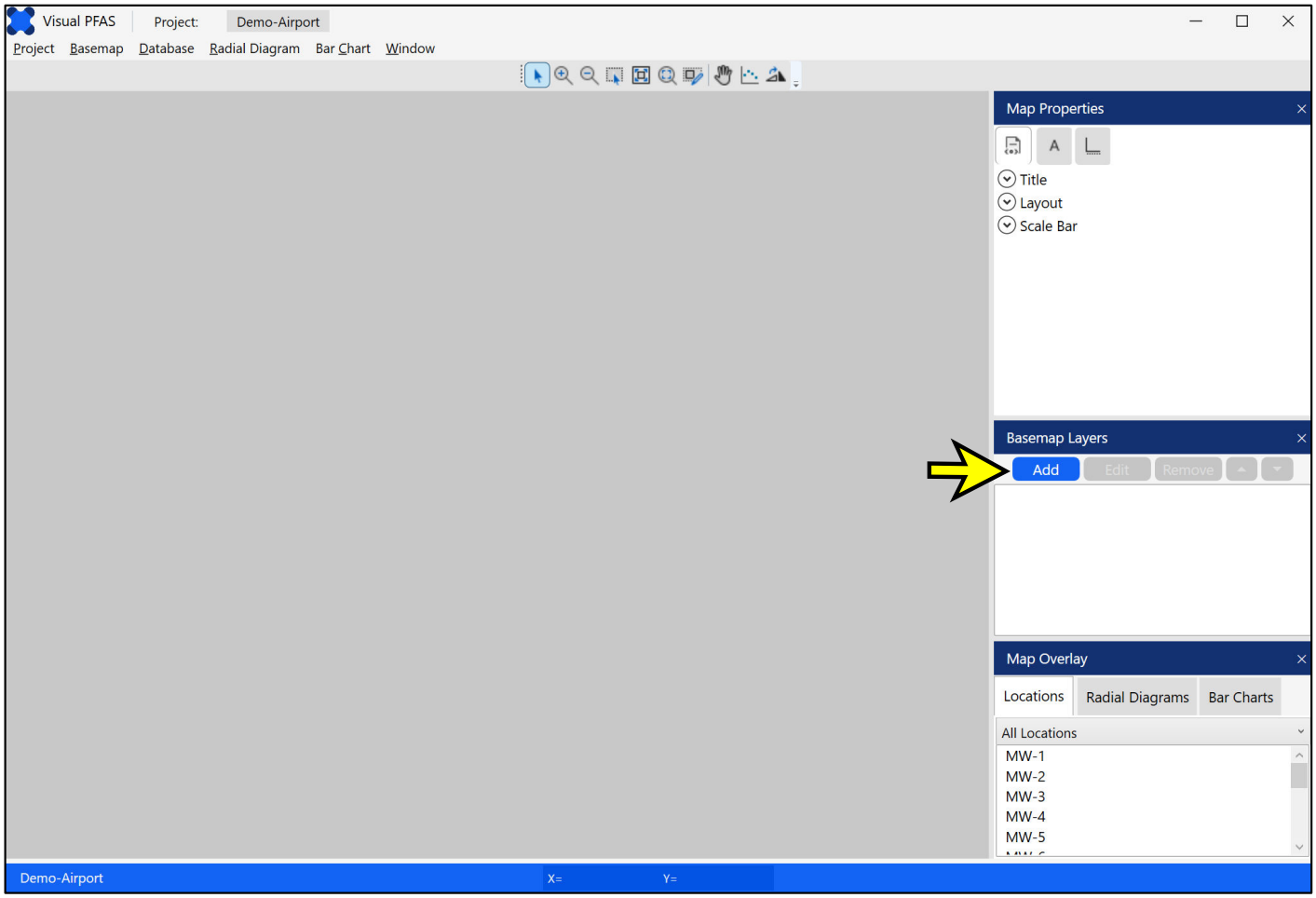
Enter the name of the basemap file to be created: *Basemap (*shown at "1" below). Then click the **Save** button (see "2" below) to return to the basemap window.



3.3 Adding Basemap Layers

After creating the new basemap properties file, the only change to the basemap window shown below is that now the **Add** button in the Basemap Layers component has changed to blue (see arrow below, which means that the Add basemap layers option has now been enabled.

Note: When a button in Visual PFAS™ changes from being grayed out to blue, it means that the button has been enabled so users can now click on the button to enact a function.

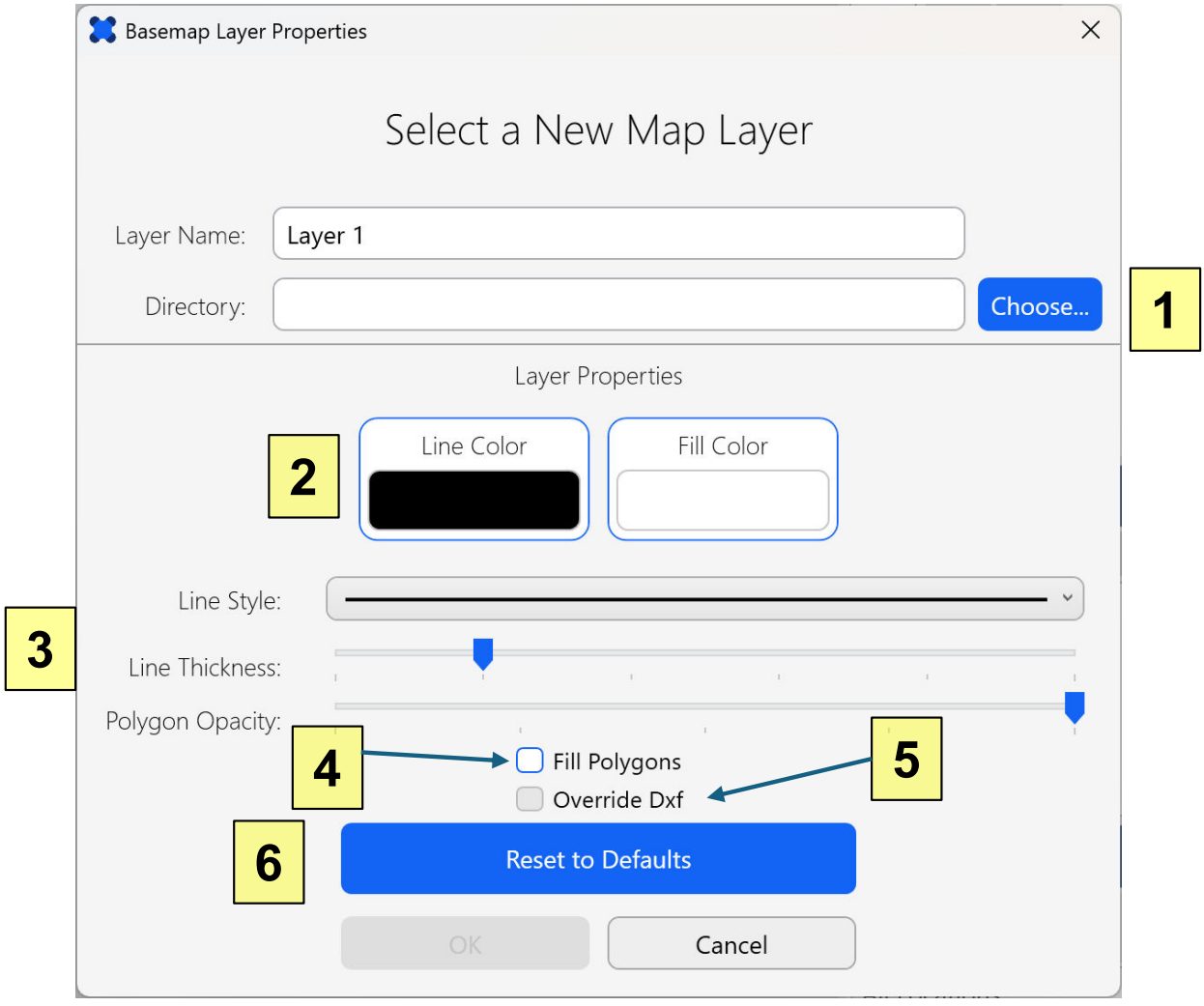


The next step in the tutorial is to add several map layers. The Visual PFAS™ installation package comes with a folder containing four *Demo-Airport* map layers in dxf format: Property boundary, runways, Source zone A, and Source zone B. Copy these map layer dxf files into the **Map Layers** sub-folder under the *Demo-Airport* **Project** folder.

Once you have copied over these four map layer dxf files to the **Map Layers** sub-folder (see the *Visual PFAS™ Quick Installation Guide* for more information), click the **Add** button to start adding layers to the basemap.

After clicking the Add button, the Basemap Layer Properties window will pop-up (see below). This is where users can specify the path and filename of a layer containing polylines and/or polygons to the basemap. Visual PFAS™ will automatically recognize polygons as polylines that start and end at the same coordinates. The additional feature associated with polygons relative to polylines is the option to add color fill to polygons contained in a layer. Properties which may be specified for a layer (with corresponding numeric labels in the image below) include:

1. Pathname and filename of layer to add (dxf, shapefile, or Surfer bln format);
2. Line color and optional fill color for polygons;
3. Line style, line thickness, and polygon opacity (100% opacity is solid and is equivalent to 0% transparency; using <100% opacity allows objects below a filled polygon to be visible);
4. Fill polygons checkbox (to toggle the fill option on/off);
5. Override dxf – enabled if a dxf file is added. This option allows users to overwrite line and fill properties contained in a layer dxf file; and
6. Reset to default line and fill properties.



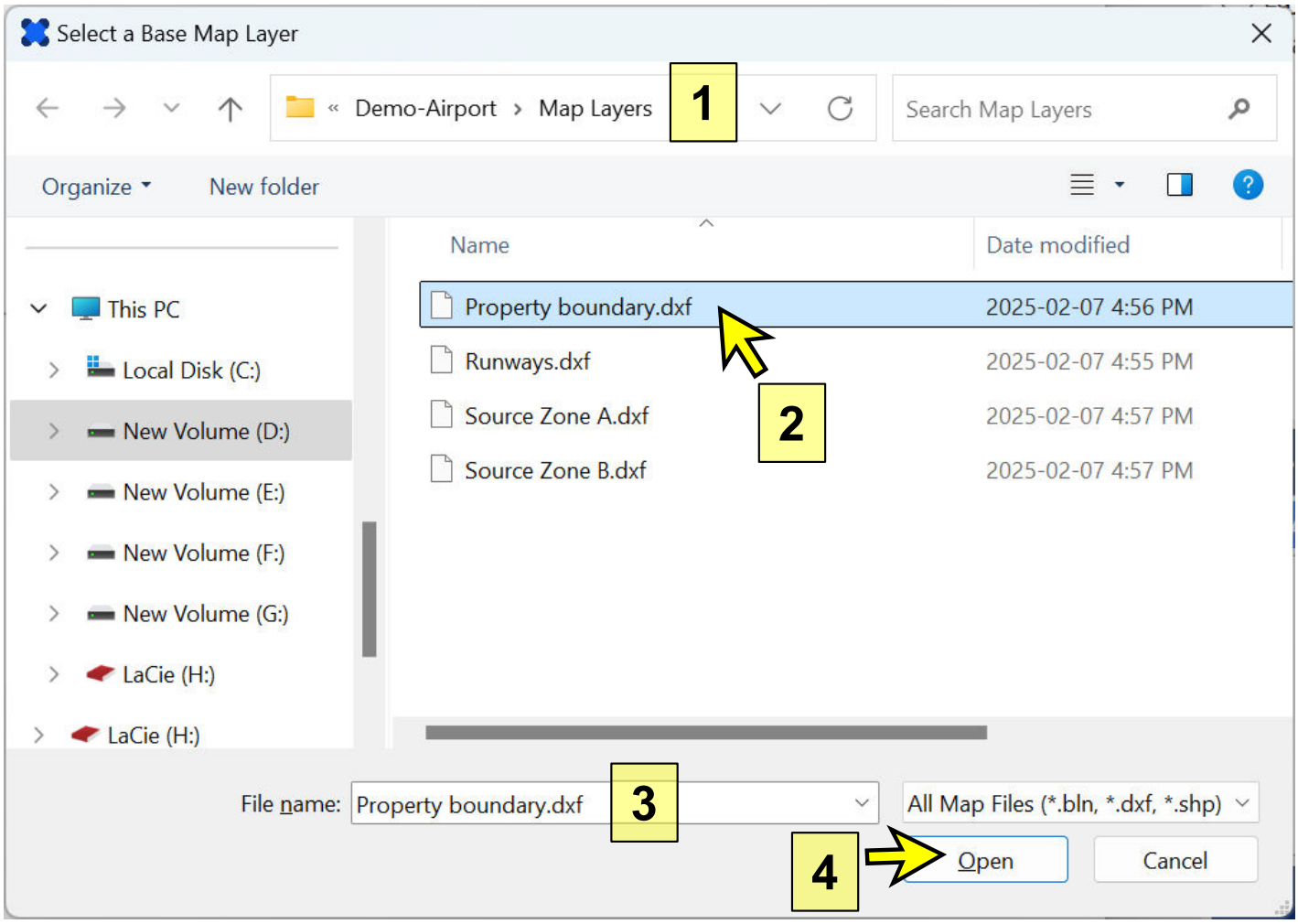
The next step in the tutorial is to add four basemap layers in dxf format. Start by clicking the **Choose** button in the **Basemap Layer Properties** window shown on the previous page. This will cause a file dialog box to appear. The default folder used by Visual PFAS™ is the **Map Layers** sub-folder in the **Project** folder (see "1" below).

Click once on the **Property boundary.dxf** shown in the list (see "2" below). The filename will be added in the textbox at "3" below.

Click the **Open** button to select this layer file to be added to the basemap and you will return to the Basemap Layer Properties window.

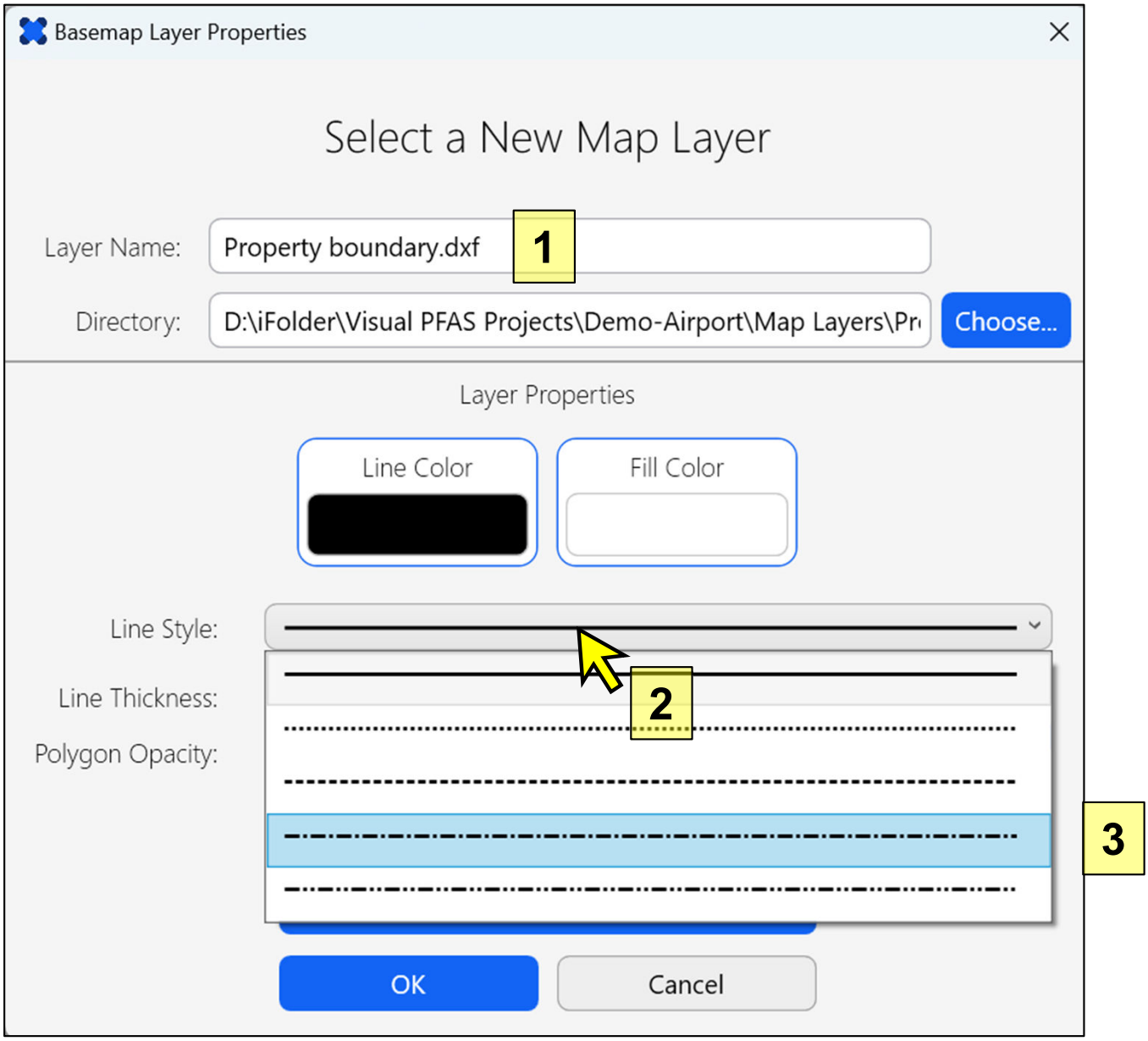
Notes:

1. If you don't see the four dxf files shown below in this folder, then you need to copy these layer files from the Demo-Airport files that came with the Visual PFAS™ installation files. See the instructions at the bottom of page 3.6 or in the *Quick Installation Guide*.
2. You can only select one layer file at a time to add to the basemap.



The layer name will be automatically populated with the filename (see "1" below). This layer name will appear in the list of layers associated with the basemap. You can change this layer name here – the name does not have to be the same as the filename.

Click on the line style dropdown box (see "2" below) and select the dash-dot style typically associated with property boundaries (see "3" below).



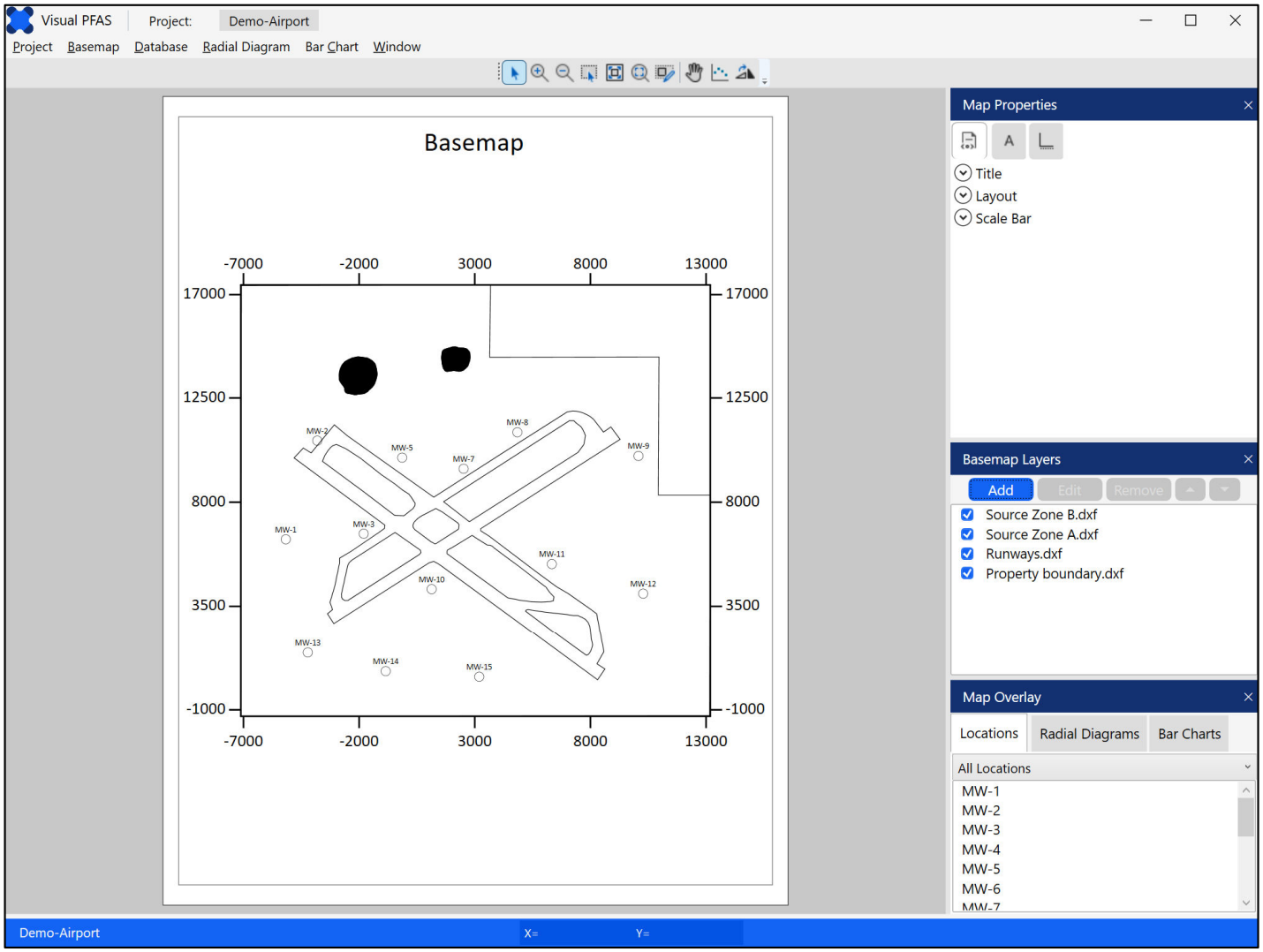
Change the line thickness by moving the scale to the middle as shown below.

Finally, click the **OK** button to save this layer to the basemap.

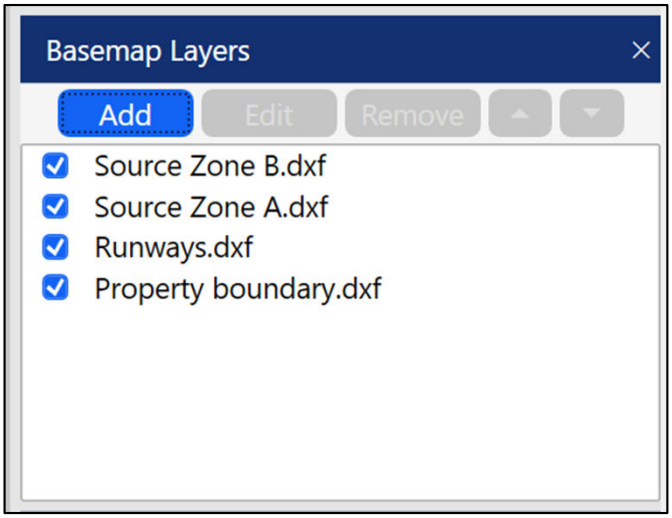
Repeat the steps to **Add** layers to the basemap three times, to add the remaining three dxf layer files (runways and source zones A and B). The basemap window should look like the image below after adding all four layers to the basemap. All four layers are now shown in the **Basemap Layers** section to the right of the basemap page.

Monitoring well locations are now shown on the basemap with symbols and labels. The easting and northing axes are added by default, and are currently covering a portion of the property boundary layer. We will toggle these axes off a little later in the tutorial.

You will also see that the two source area layers are shown with black fill. This is the default associated with the dxf files that we just added to the basemap. We will change this later in the tutorial as well.

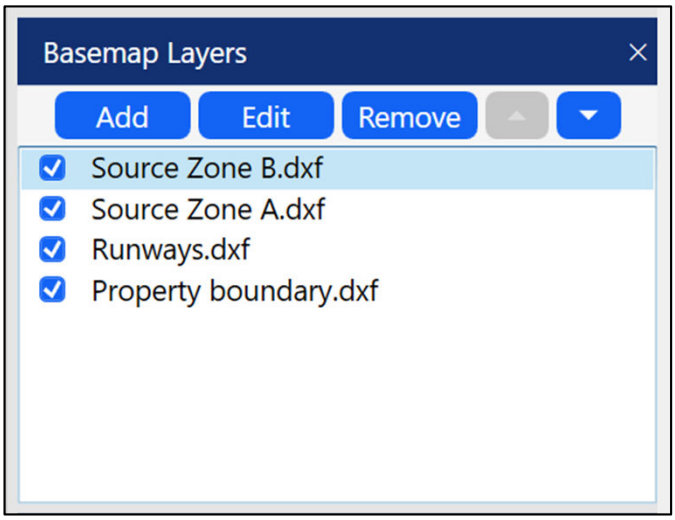


In the Basemap Layers section to the right of the basemap, you will see that the **Add** button is shown in blue at the top of this section, but the other buttons above the layers list are still grayed out (i.e., disabled).



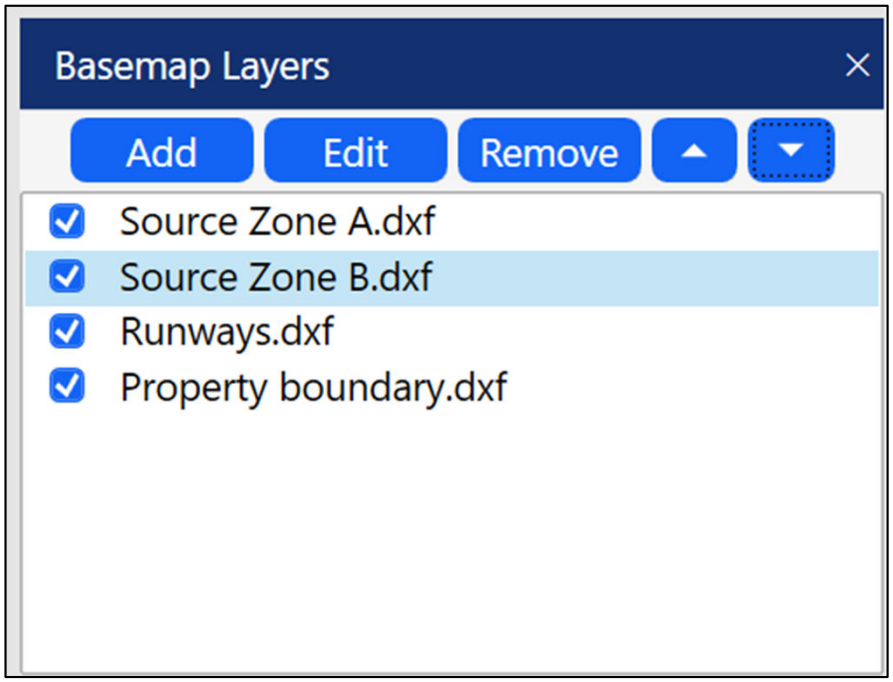
Click on the Source Zone B layer in the list; this will cause this layer to be highlighted in blue as the current layer, and the Edit, Remove, and down-arrow buttons will change to blue. (see image below)

The Edit button allows you to edit the properties for this layer (e.g., line and fill properties). The Remove button deletes this layer from the basemap. The directional arrow buttons (up or down) allow you to change the order of layers in the list. The up-arrow button is still disabled because you have selected the first item in the list, and thus cannot move this layer further up.

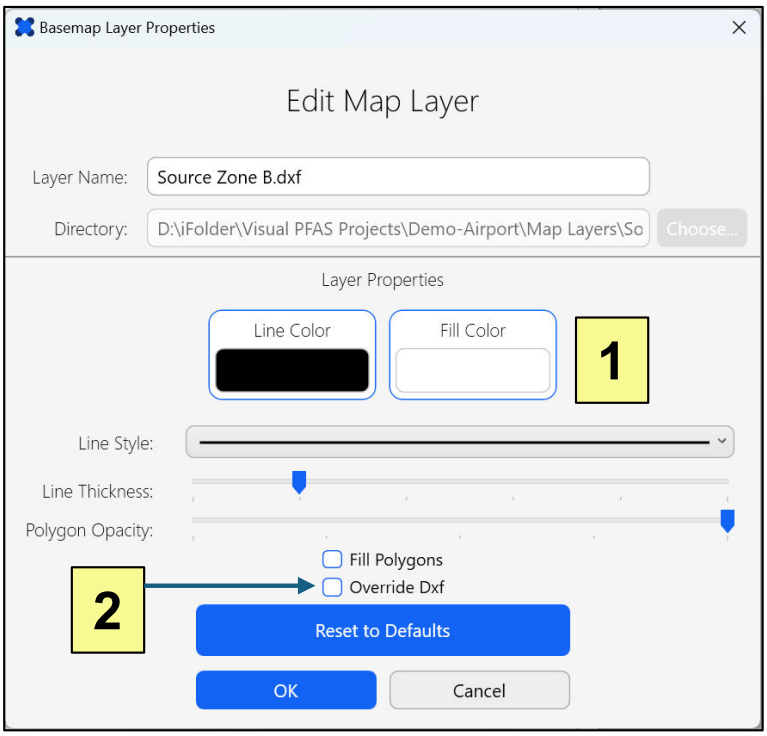


Click the  button to move the Source Zone B layer below Source Zone A in the basemap layers list.

The basemap layers list will now look like the image below.



Note: The order of basemap layers in this list will influence how layers are shown when they overlap on the basemap. The layer shown at the top of the list will be shown above all other layers which intersect with this layer on the basemap. You can change the priority for which layers are plotted where they intersect by moving layers up or down in the list.



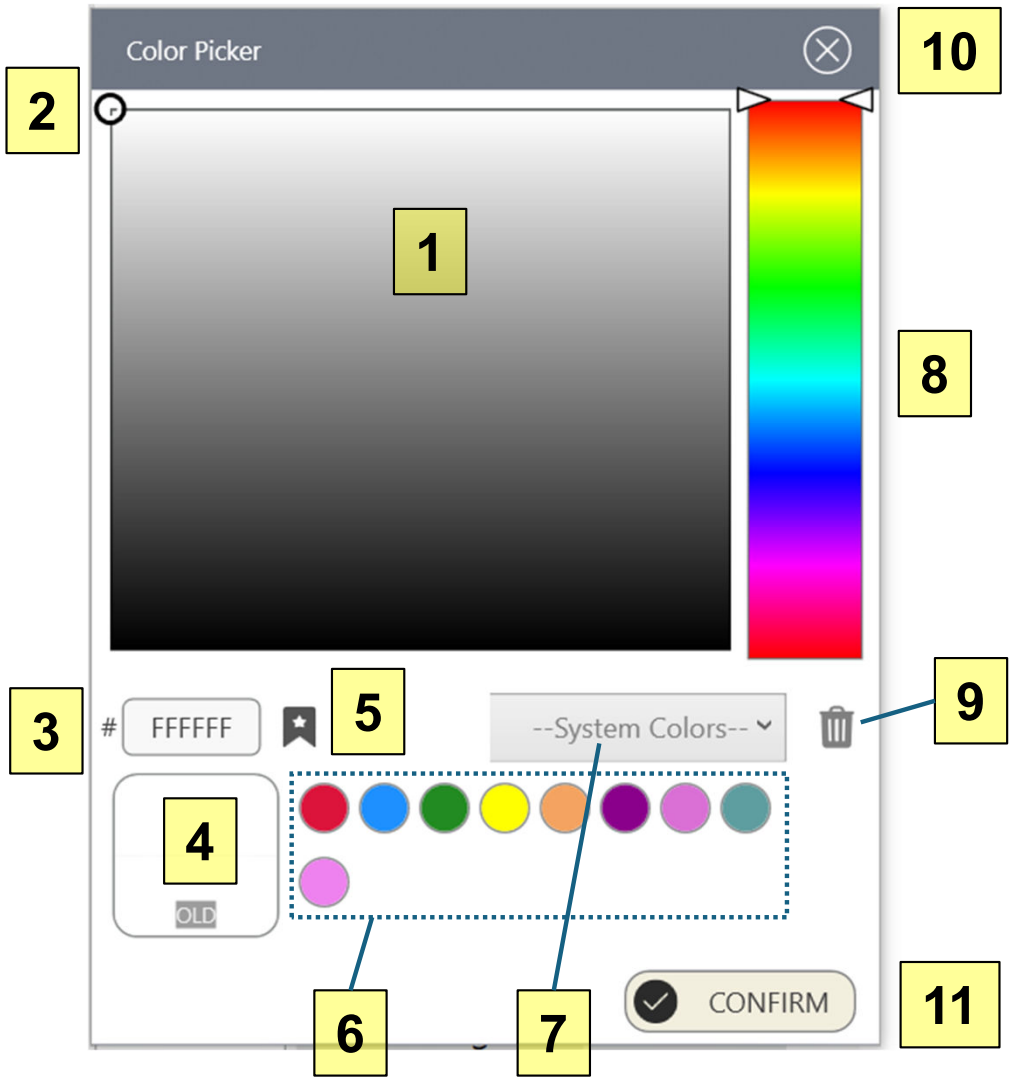
Click the **Edit** button to change the properties for Source Zone B which is highlighted as the current layer. As shown on page 3.10, the source zone layers currently both have black fill based on the properties in the imported dxf files. The fill color is shown in the image on the left as white (see "1"), but the Override DXF button (see "2") is unchecked so this white fill color is not plotted.

Click the fill color button to change the color of the Source Zone B fill. This will automatically override the DXF fill property.

3.3.1 Changing Color Properties

Components of the color dialog box that correspond to the numeric labels shown below:

1. Color palette – click anywhere in the palette to choose the new color.
2. Color selection – the old color (white) is in the top-left of the color palette.
3. The hexadecimal code for the current color selection.
4. Old color (shown in the lower half) and new color (shown in the upper half) – the upper half will change when a new color is selected.
5. Add currently selected color to the Favorites list for quick selection in the future.
6. Favorite colors – click on one to select the new color.
7. System Colors – pre-selected colors shown in a long dropdown list.
8. Color scale bar – click on this to change the color palette.
9. Delete last Favorite color selected.
10. Cancel the selection of a new color, keep the previous color.
11. Confirm saving the new color and close the color dialog box.

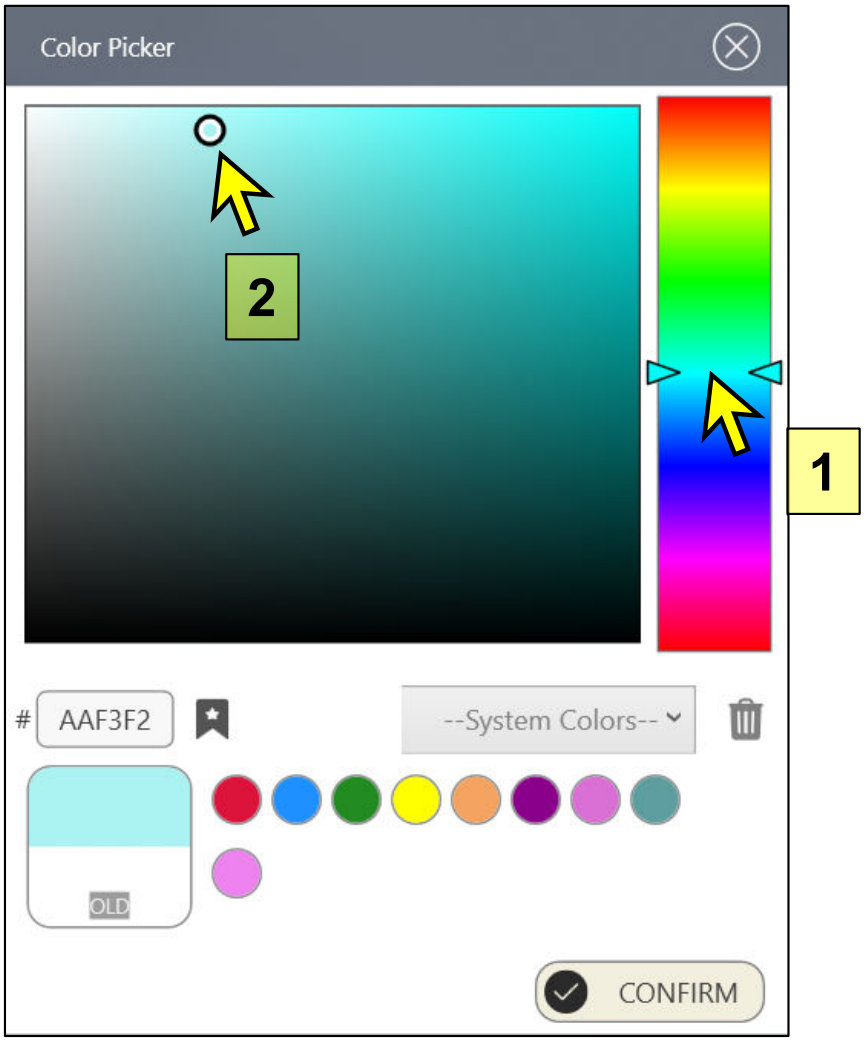


To select blue for the source zone fill color:

- Click on blue in the color scale bar (see “1” below);
- Click around the top left portion for a lighter blue (see “2” below). You don’t have to match the exact color shown below with the hexadecimal code of #AAF3F2.

Notes:

1. You cannot enter the hexadecimal code directly to change the color, this box only shows the code of the selected color. (“#” below for the hexadecimal code, or see “3” in the image on the previous page).
2. You can, however, enter the RGB code to specify an exact color using the step as shown on the next page.
3. There are a number of online color conversion utilities available to convert between hexadecimal and RGB colors. This allows you to calculate the RGB of a color selected using the palette or system colors, so you can specify this exact same color for other basemap layers.



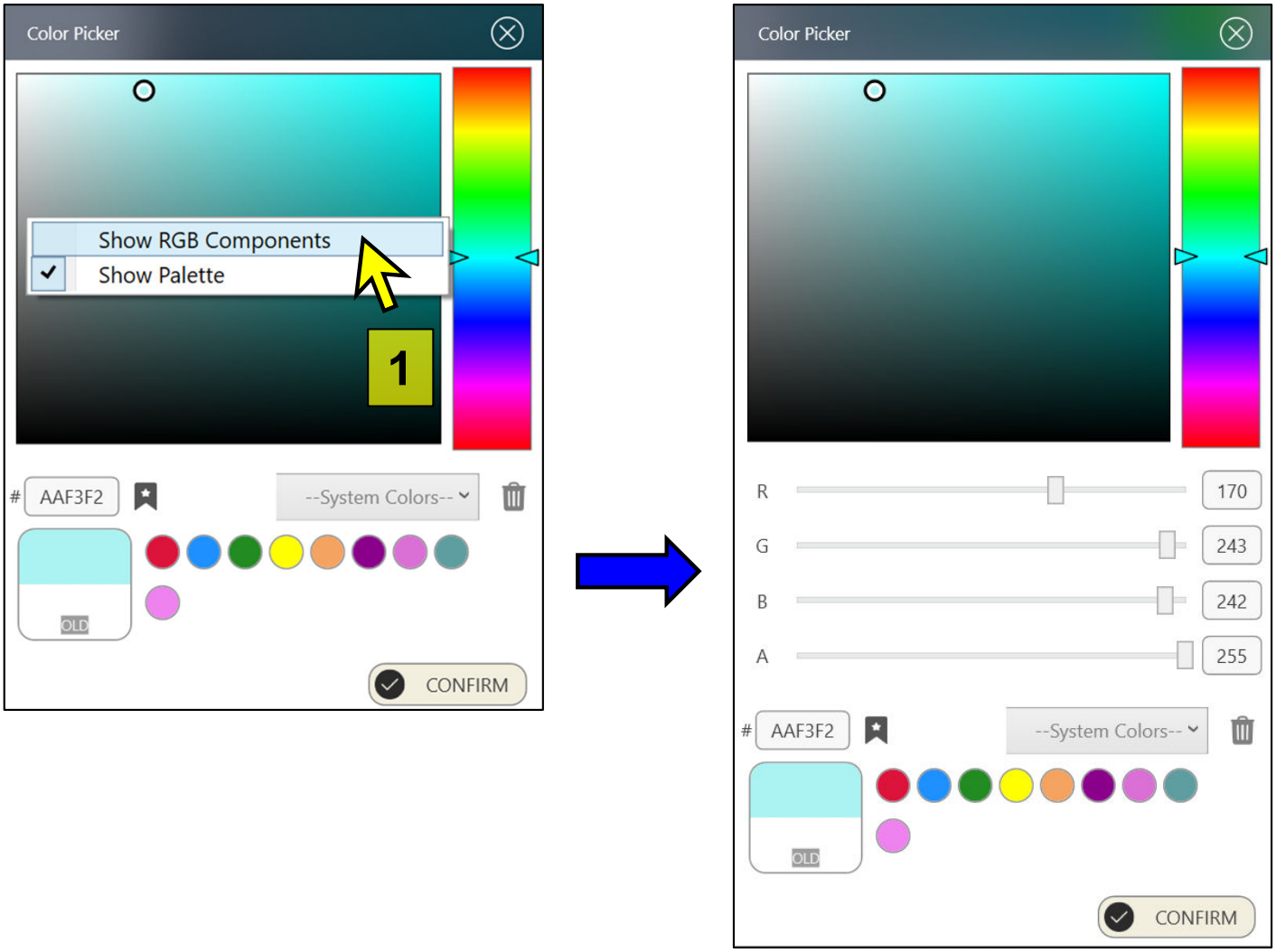
To view the RGB color that corresponds to the selected color with hexadecimal code #AAF3F2, right-click anywhere on the color palette and the pop-up menu shown in the image on the left below will appear.

Select **Show RGB Components** from the pop-up menu (see "1" below on the left). The color dialog box will change to the image shown on the right, where the selected RGB color is shown to have the RGB color code of 170, 243, 242. The **A** line shown in the image on the right (below RGB) represents opacity, which is currently shown as 100% (i.e., a value of 255 in a scale of 0 to 255). This is equivalent to a transparency of 0%. To add transparency to a line or polygon fill color, change the opacity to be below 255.

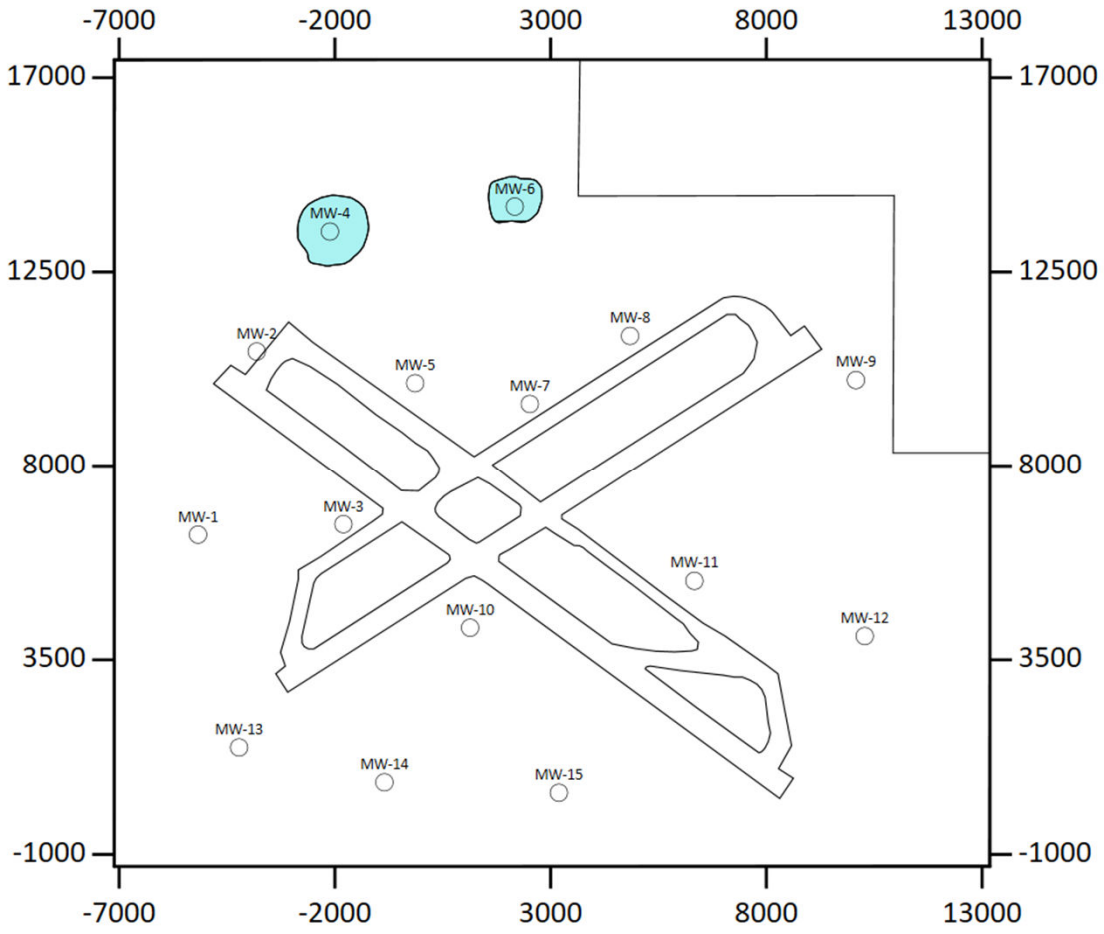
In the image on the right, you can change the R, G, B, or A (opacity) by either sliding the scroll bars to the left or right; or you can enter the values of R, G, B, and/or A in the text boxes shown to the right of the respective scroll bars.

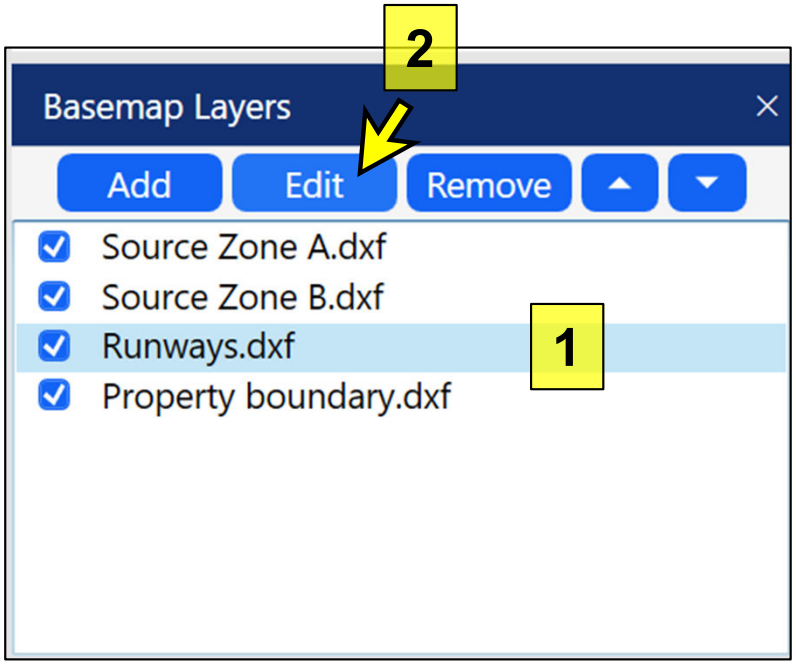
Press confirm to save the selected color for the fill at Source Zone B.

Then repeat these steps to enter the RGB code of 170, 243, 242 for the color fill in Source Zone A.



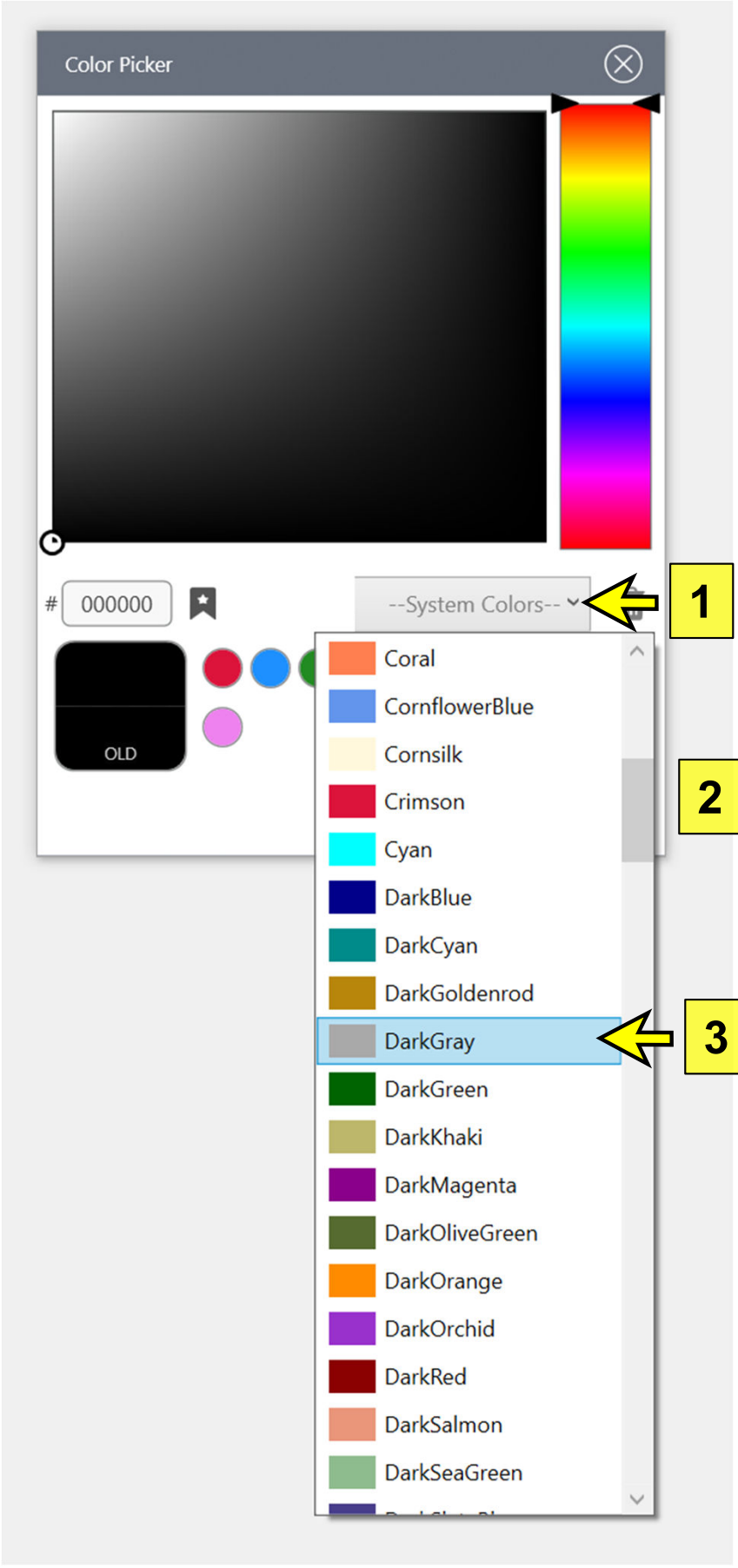
Once you've selected light blue to be the color fill for Source Zones A and B, your basemap should look like the one below. Now we can see that there are two locations shown in the center of each of these source zones (MW-4 is in Source Zone A and MW-6 is in Source Zone B).





Next we'll change the color for the runways so they are a little less prominent; we need the basemap as a reference, but we don't want the basemap layers to overwhelm the map when showing radial diagram and stacked bar maps later.

Click on the *Runways.dxf* layer in the **Basemap Layers** list as shown on the left (see "1", and click the **Edit** button (see "2").



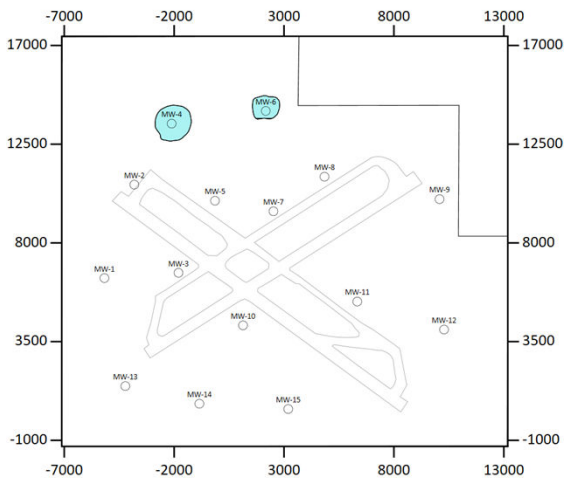
In the **Basemap Layer Properties** window, click on the **Line Color** which is currently shown as black.

In the **Color Dialog Box**, click on **System Colors** (see "1" at left), scroll down the list of colors using the scroll bar (see "2") or mouse wheel, and select *DarkGray* (see "3").

Click **Confirm** to save this color in the color dialog box.

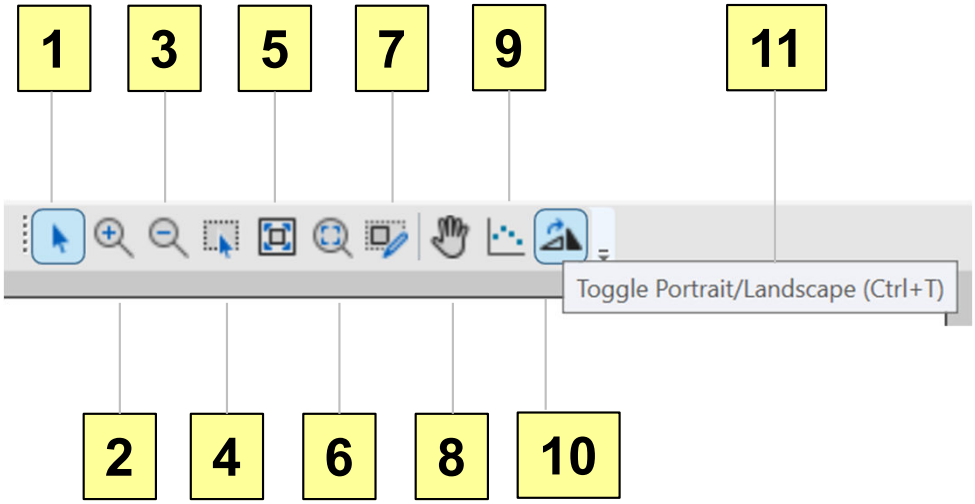
Then click **OK** from the **Basemap Layer Properties** window to save this change.

The basemap will now show the runways with a less intense color as shown below.



3.4 Navigation Panel

The Navigation Panel is positioned directly above the basemap (see page 3.2). Icons included in the Navigation Panel are shown in the image below.

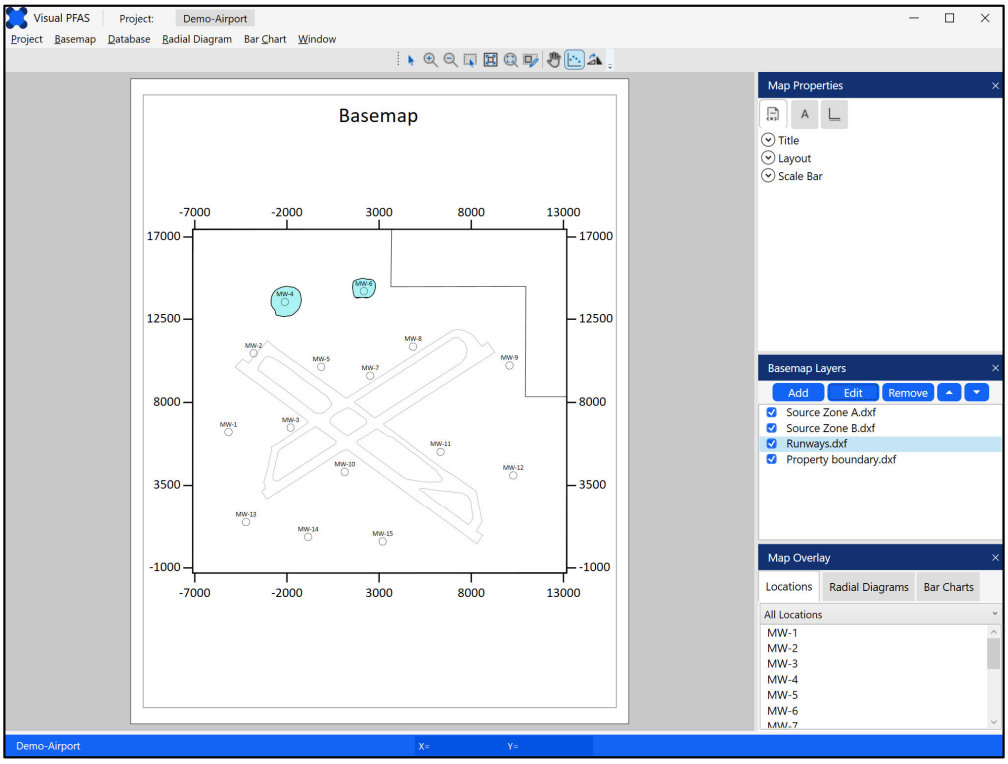


These icons are described below with numbering that corresponds to the labels in the image above.

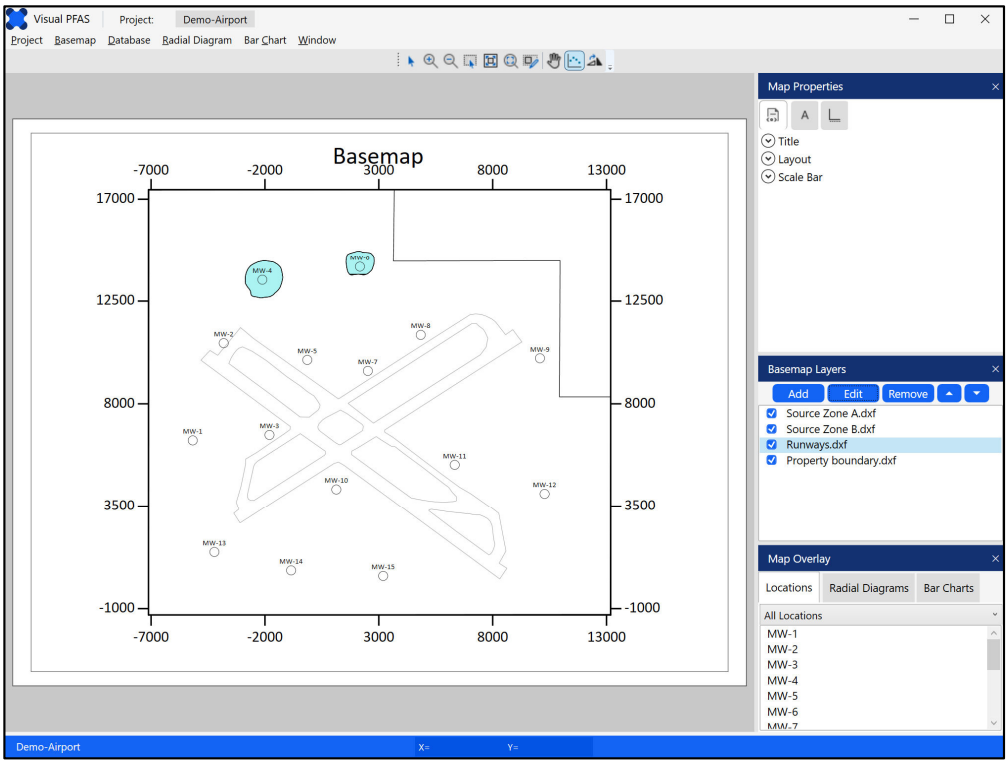
1. Return cursor to its normal function (e.g., after zooming in or out)
2. Zoom-in at the location clicked
3. Zoom-out at the location clicked
4. Zoom-in to rectangle drawn by user: left-click and hold the left mouse button down when the cursor is at one corner of the target rectangle, then drag the mouse to the opposite corner of the rectangle and release the left mouse button
5. Zoom to map extents (i.e., the outer extends of the basemap layers)
6. Zoom to page extents
7. Enter custom map extents
8. Pan: Click the pan icon to enter pan mode, move the cursor to the center of the location you want to view, click and hold the left mouse button down while dragging the map to the target location, then release the left mouse button.
9. Digitize easting and northing coordinates at select points on the basemap: Click the icon, then move the cursor to a target point and click and release the left mouse button to digitize the coordinates. The coordinates will be saved to the clipboard when you press the OK button after digitizing (one point at a time).
10. Toggle between portrait and landscape for the basemap page.
11. Example of an icon label that is shown when the cursor hovers over the icon.

Click the Portrait / Landscape toggle icon (see arrow at left).

Basemap Window: Page in Portrait

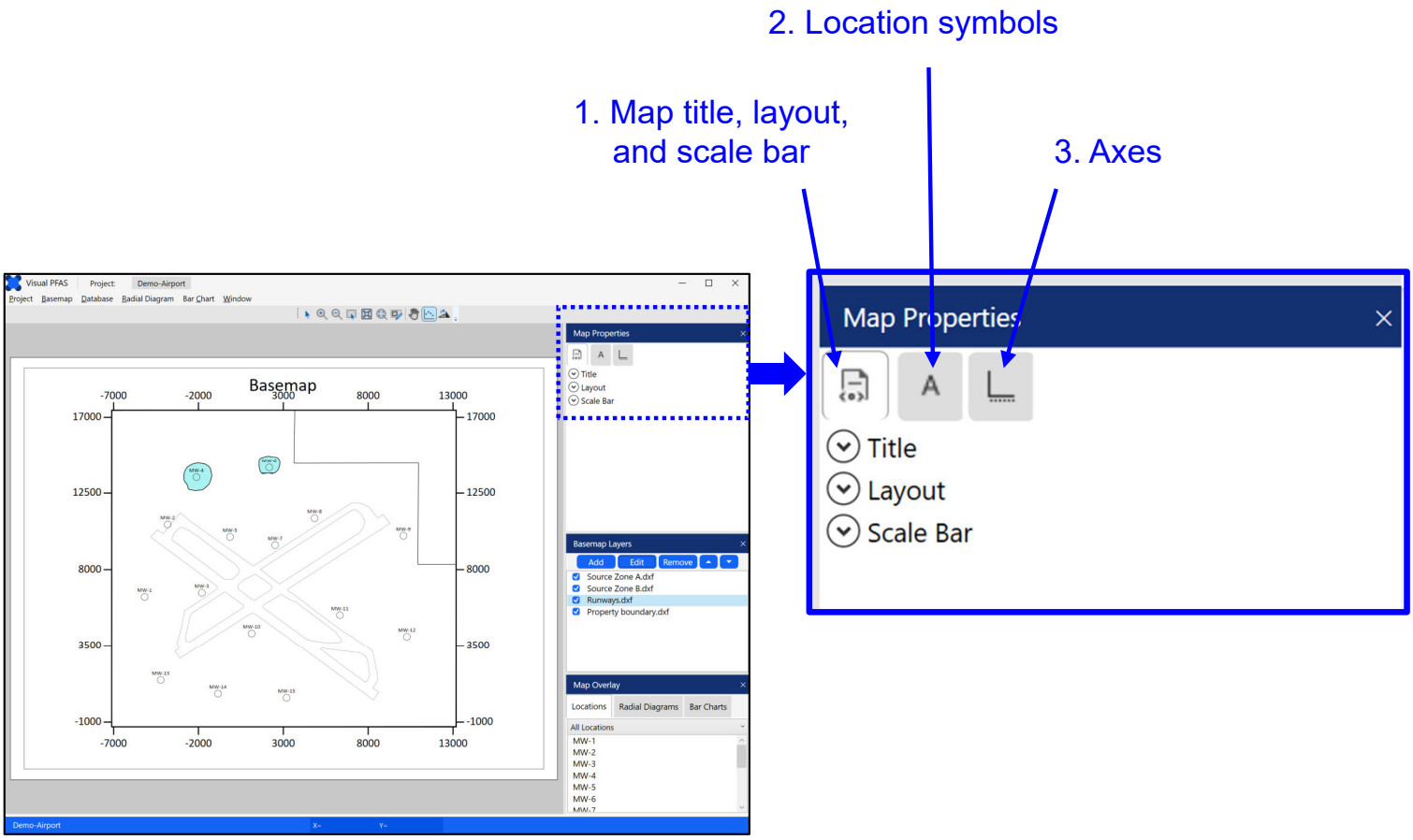


Basemap Window: Page in Landscape



3.5 Map Properties

The **Map Properties** section is positioned at the top-right of the **Basemap Window** (see below).



Components of the Map Properties section include:

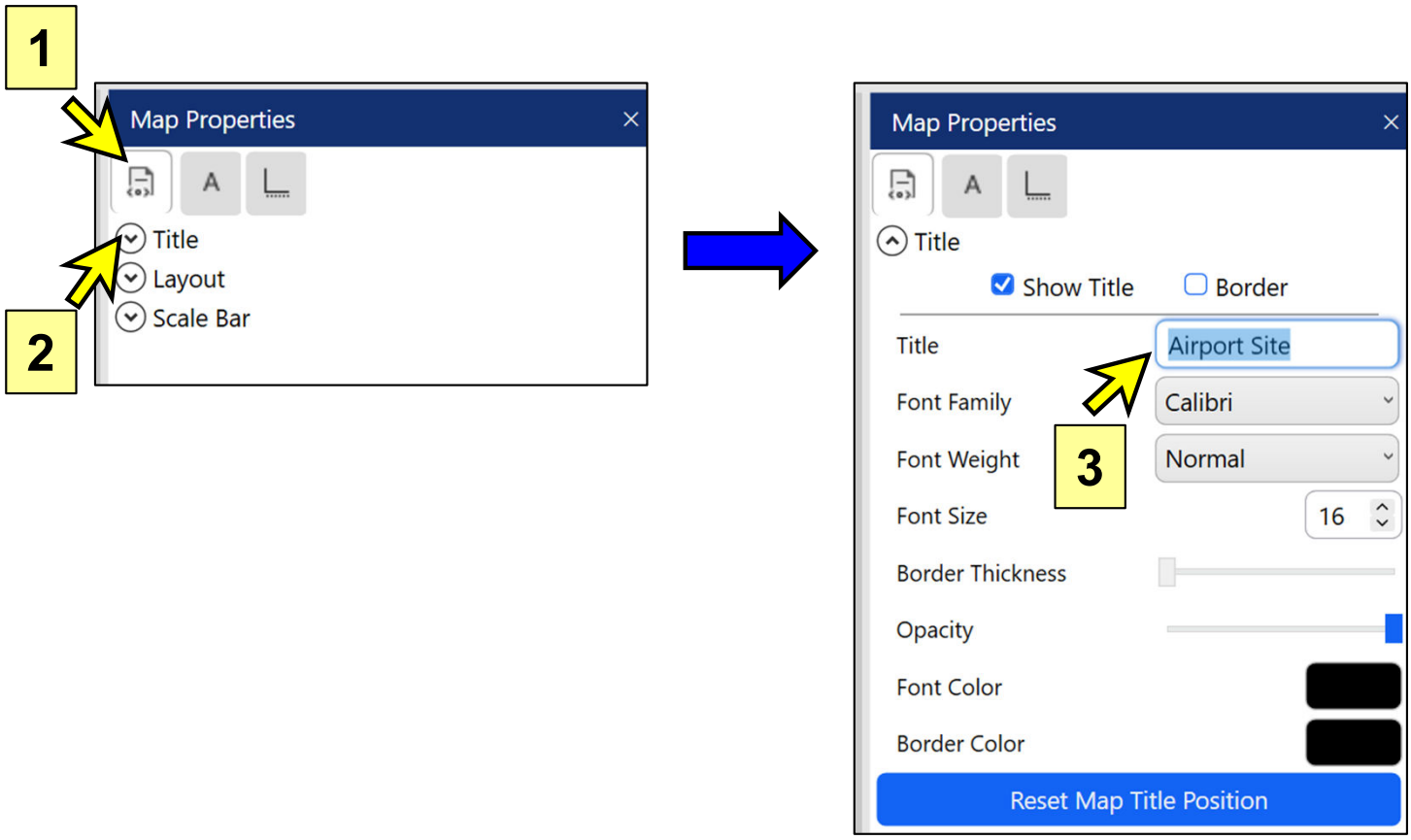
1. **Map title, layout, and scale bar properties** – including show/hide toggles for the map title and scale bar, font properties, and the layout of the map on the Basemap Page (e.g., change scale to make the map smaller or larger on the page), and style and properties of the scale bar.
2. **Location symbols** – change properties of location symbols and labels including show/hide options; symbol shape, size, line color, fill color; and location label font size, style, and color.
3. **Axes** – toggle axes on/off, change major and minor tick mark scales, and label fonts.

3.5.1 Map Title, Layout, and Scale Bar

Click on the **Map Properties** first tab at the left (see "1" below). This tab supports changes to properties for the map title, layout on the page, and the scale bar.

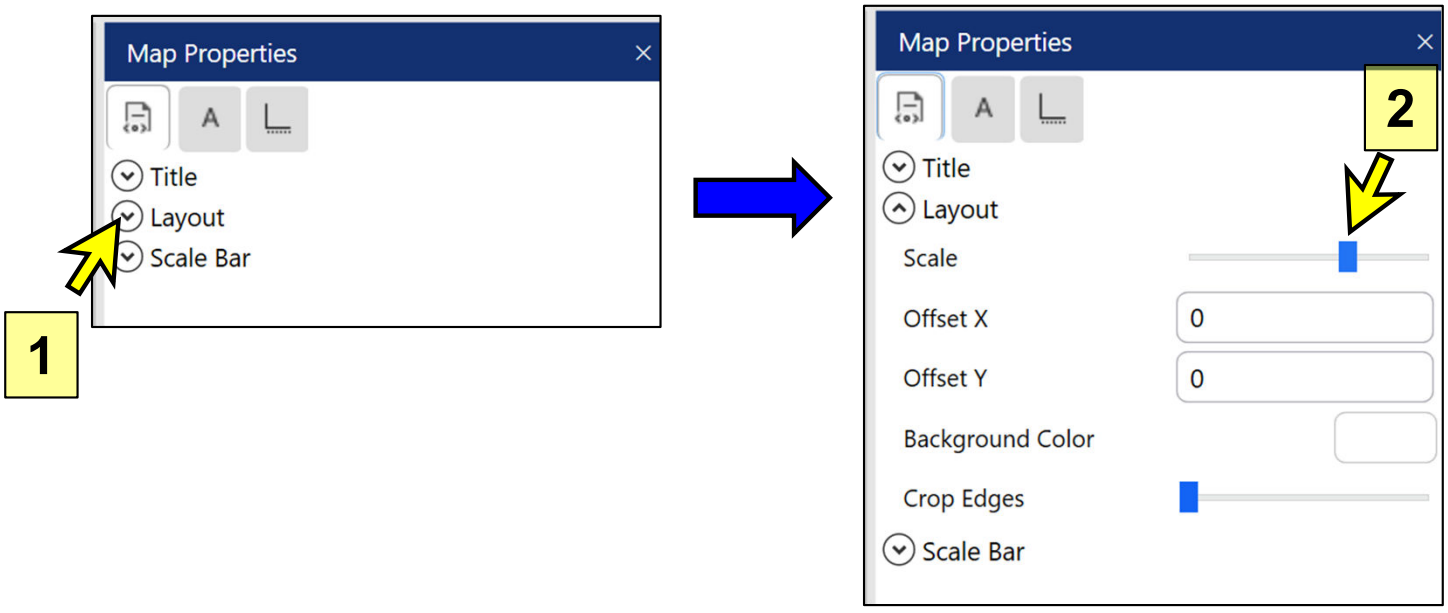
Click the down-arrow to the left of **Title** to expand the map title properties (see "2" below). The down-arrow next to **Title** will change to an up-arrow after it's clicked, and the title properties will now be visible as shown in the image on the right.

Change the map title from the default which is the same as the basemap filename to *Airport Site* (see "3" below).

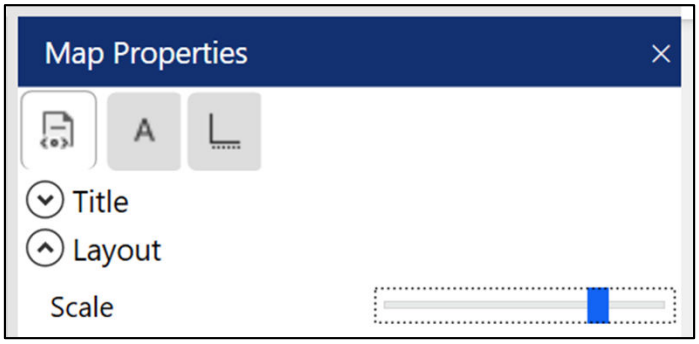


Click the up-arrow next to Title so it changes to a down-arrow and the title properties are no longer shown (similar to the left image above).

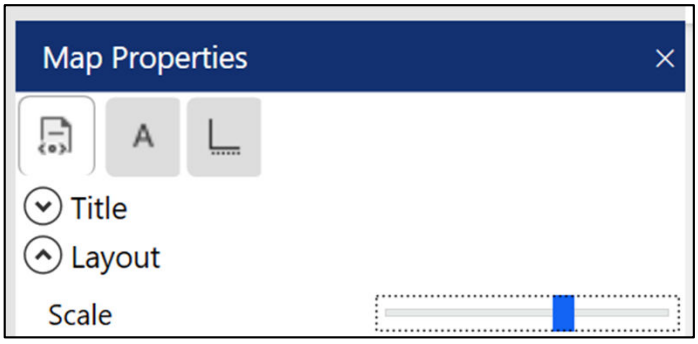
Click the down-arrow next to Layout to show the layout properties (see "1" below on the left). Move the scale scroll bar to the left, to make the basemap extents smaller on the Basemap Page (see "2" below on the right). The influence of this change in scale is shown in the respective Basemap Page images shown below.



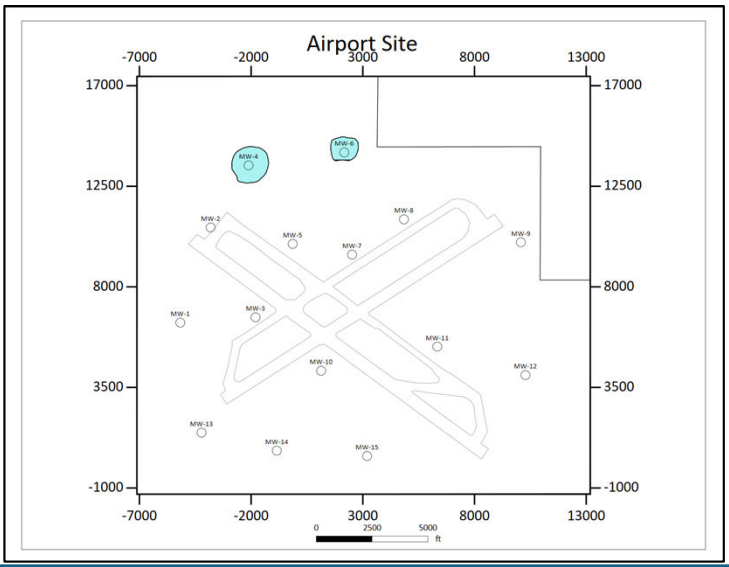
Initial Scale



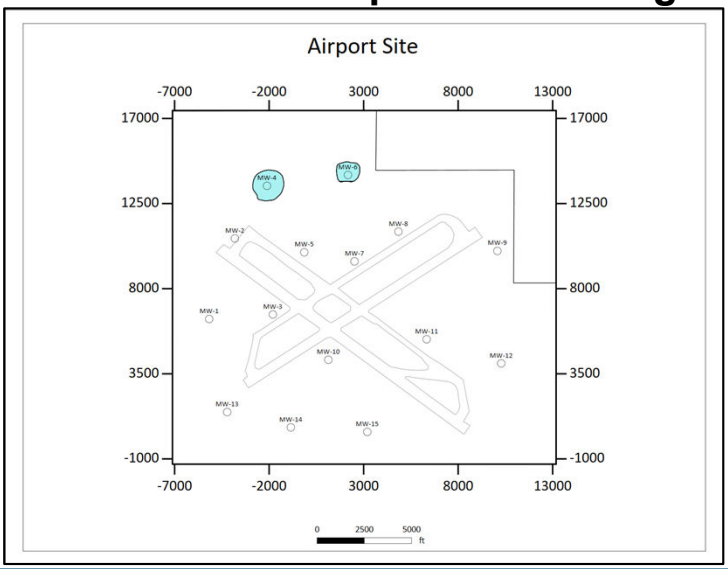
Reduced Scale



Initial Basemap Extent on Page



Reduced Basemap Extent on Page



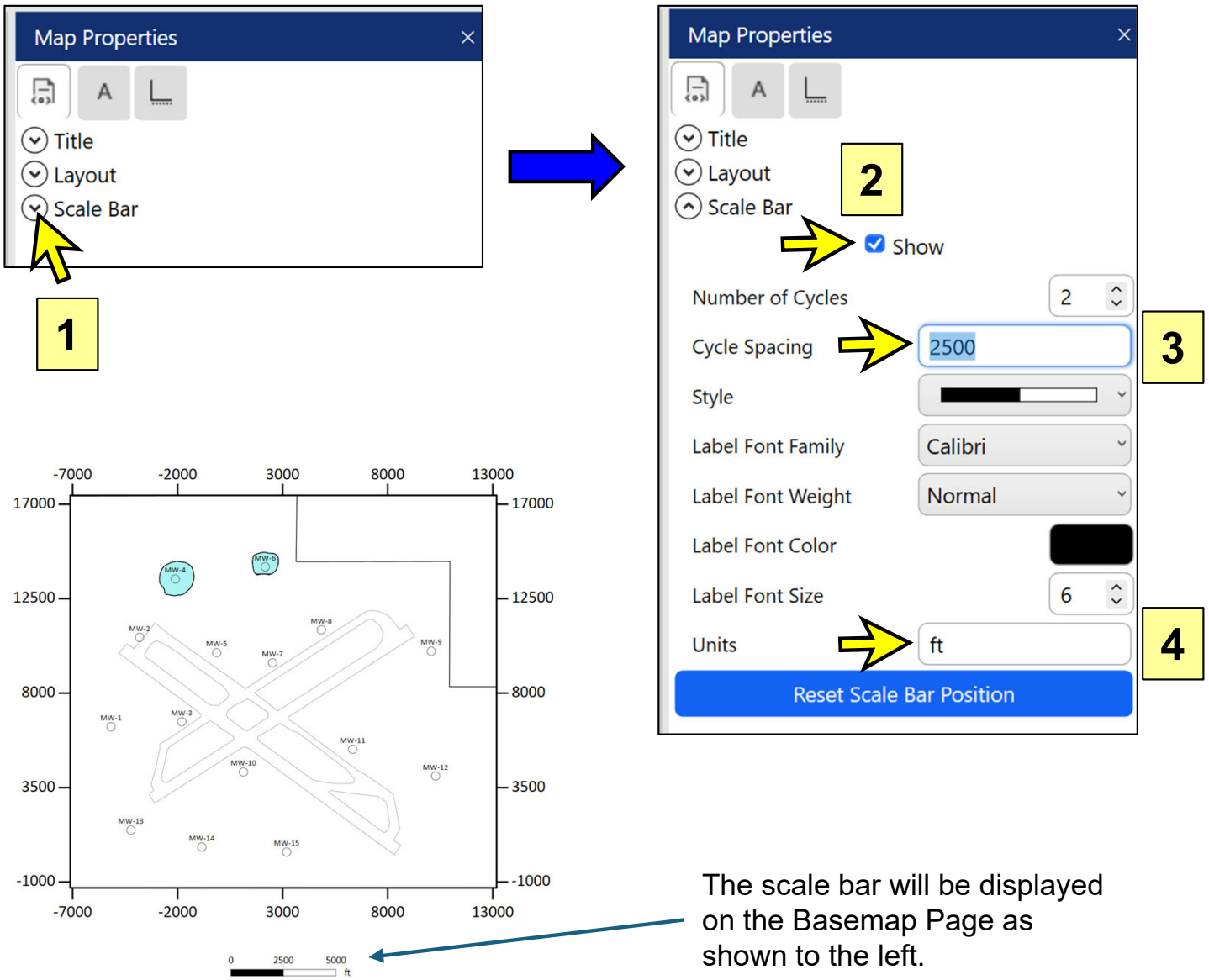
Click the up-arrow next to **Layout** to hide these properties, and then click the down-arrow next to **Scale Bar** to show these properties (see "1" below on the left).

The scale bar properties are shown in the image below on the right, including whether to show or hide the scale bar, number of cycles in the scale bar, style, label font properties including size, and the text to show for the units next to the scale bar.

Update the scale properties as follows:

- Click the **Show** checkbox to show the scale bar on the map (see "2" below on right)
- Change **Cycle Spacing** from the default of 1000 to 2500 (see "3" below)
- View **Style** options in the dropdown list and select the style that you prefer
- Insert the length **Units** "ft" in the textbox (see "4" below).

Then click the up-arrow next to **Scale Bar** to hide these properties.



The scale bar will be displayed on the Basemap Page as shown to the left.

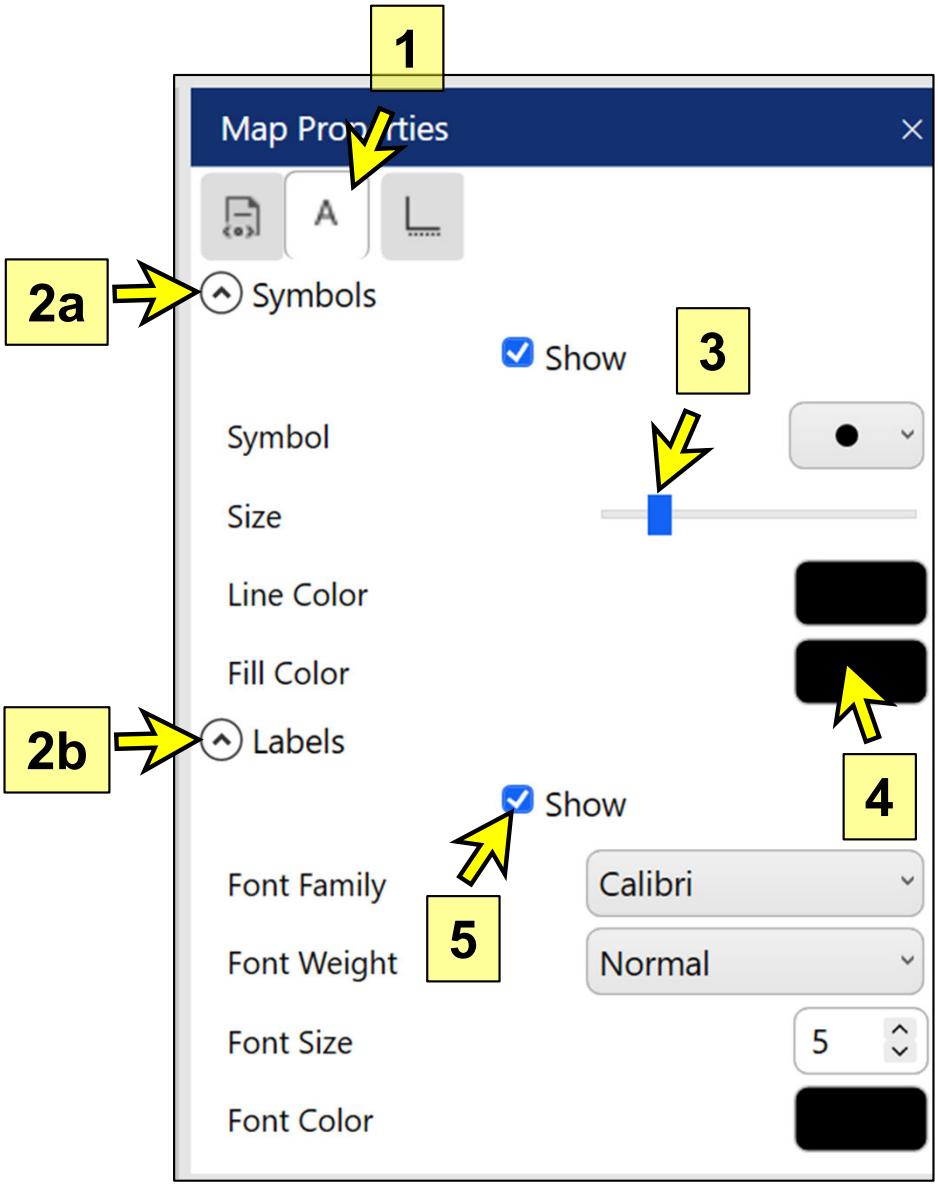
Click the **A** tab at the top of the **Map Properties** section (see "1" below) to select location symbol and label properties.

Click the **down-arrow** next to **Symbols** (see "2a") and then click the **down-arrow** next to **Labels** (see "2b") to show properties for both categories as shown below.

Make the following changes to the location symbol and label properties:

1. Move the symbol **Size** scroll bar to the left (see "3" below), similar to the magnitude shown below, to reduce the size of the location symbols on the basemap.
2. Click on the **Fill Color** box (see "4" below), select **System Colors** in the **Color Dialog Box**, and then select *Black* from the dropdown list of system colors. Click **Confirm** to close the Color Dialog Box.
3. Confirm that the **Labels Show** box is checked on (see "5") to show the location labels.

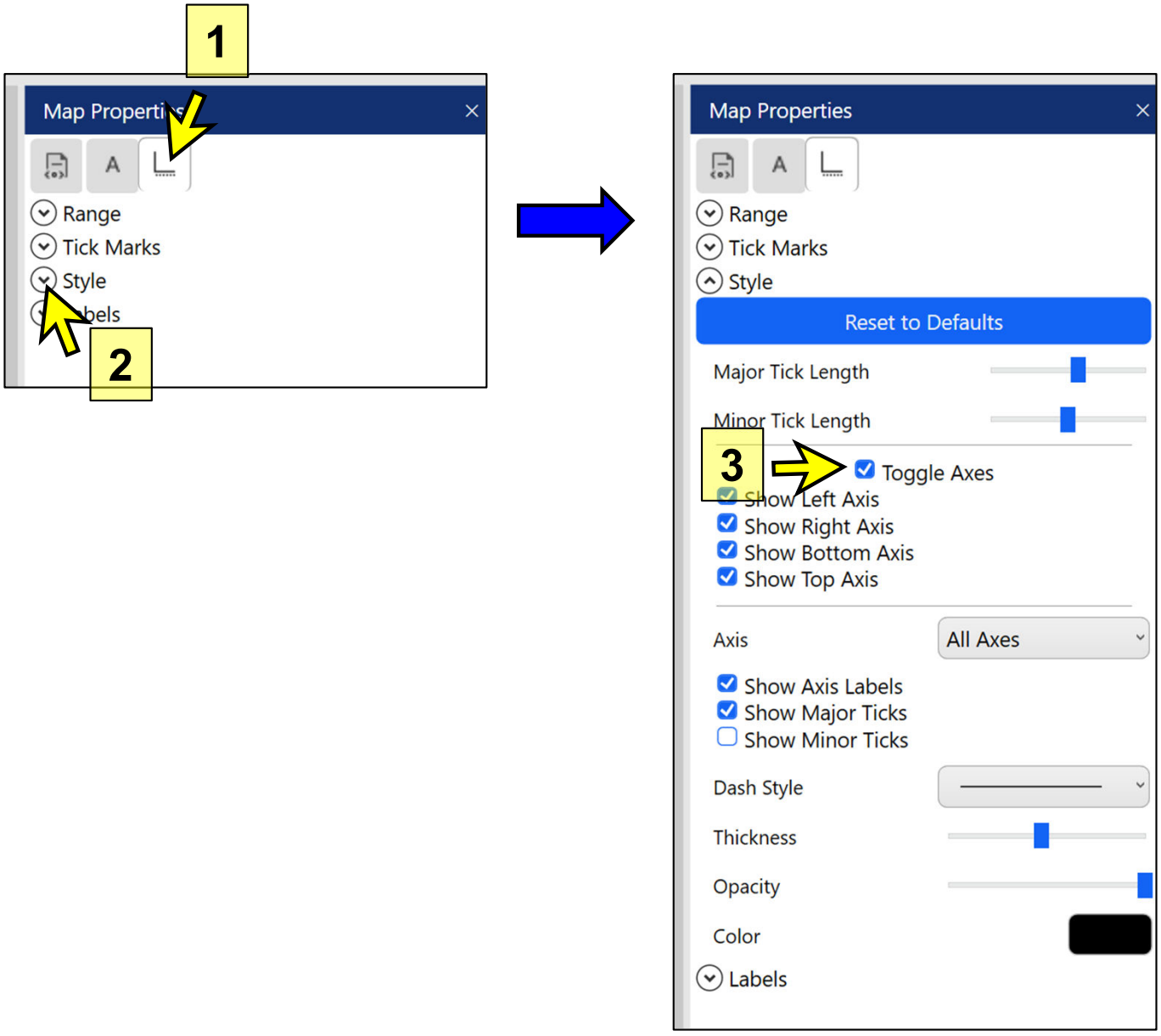
Click the **up-arrows** next to **Symbols** and **Labels** to hide both categories of properties.



Click the **Axis** tab (see "1" below) at the top of the Map Properties section to work on properties for the easting and northing coordinate axes.

Click the **down-arrow** next to **Style** (see "2" below) to show axis style properties.

Turn off the **Toggle Axes** checkbox (i.e., not checked) to hide all four easting and northing coordinate axes.



When you hide the coordinate axes, you will be able to view the entire extent of the property boundary (which was previously partially hidden under the coordinate axes).

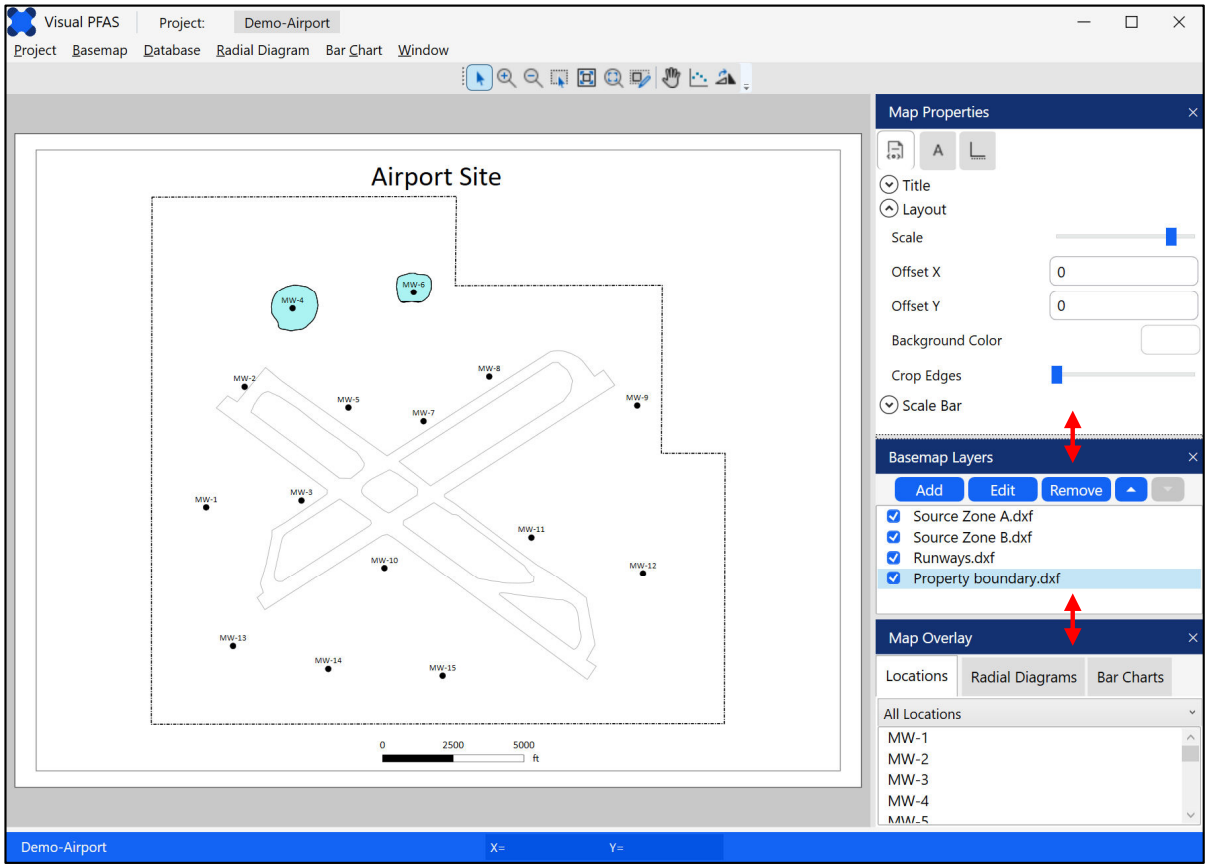
You can also now increase the scale of the map on the Basemap Page. Click the left tab under Map Properties, click the down-arrow next to Layout, and increase the scale of the map so that it is larger on the Basemap Page (similar to the scale shown on the next page).

The Basemap Window should now look like the image below.

Note: The horizontal dividing lines between the sections to the right of the Basemap Page can be moved up or down. This allows you to change the height of each of these three sections (i.e., Map Properties, Basemap Layers, and Map Overlay) to accommodate long lists if your screen resolution is sufficiently large. (The Visual PFAS™ default window size is relatively small to accommodate laptop display screens.)

To move these dividing lines up or down, hover the cursor directly over the dividing line so that it changes from a single arrowhead cursor to a vertical line with arrowheads on both sides (see red arrows below – the red color is used for illustrative purposes only, the actual cursor will be black when in the sliding mode).

When the cursor is in this double-arrowhead mode, click the left mouse button and hold it down, then drag the horizontal dividing line up or down. Release the left mouse button when you have completed moving the divider.

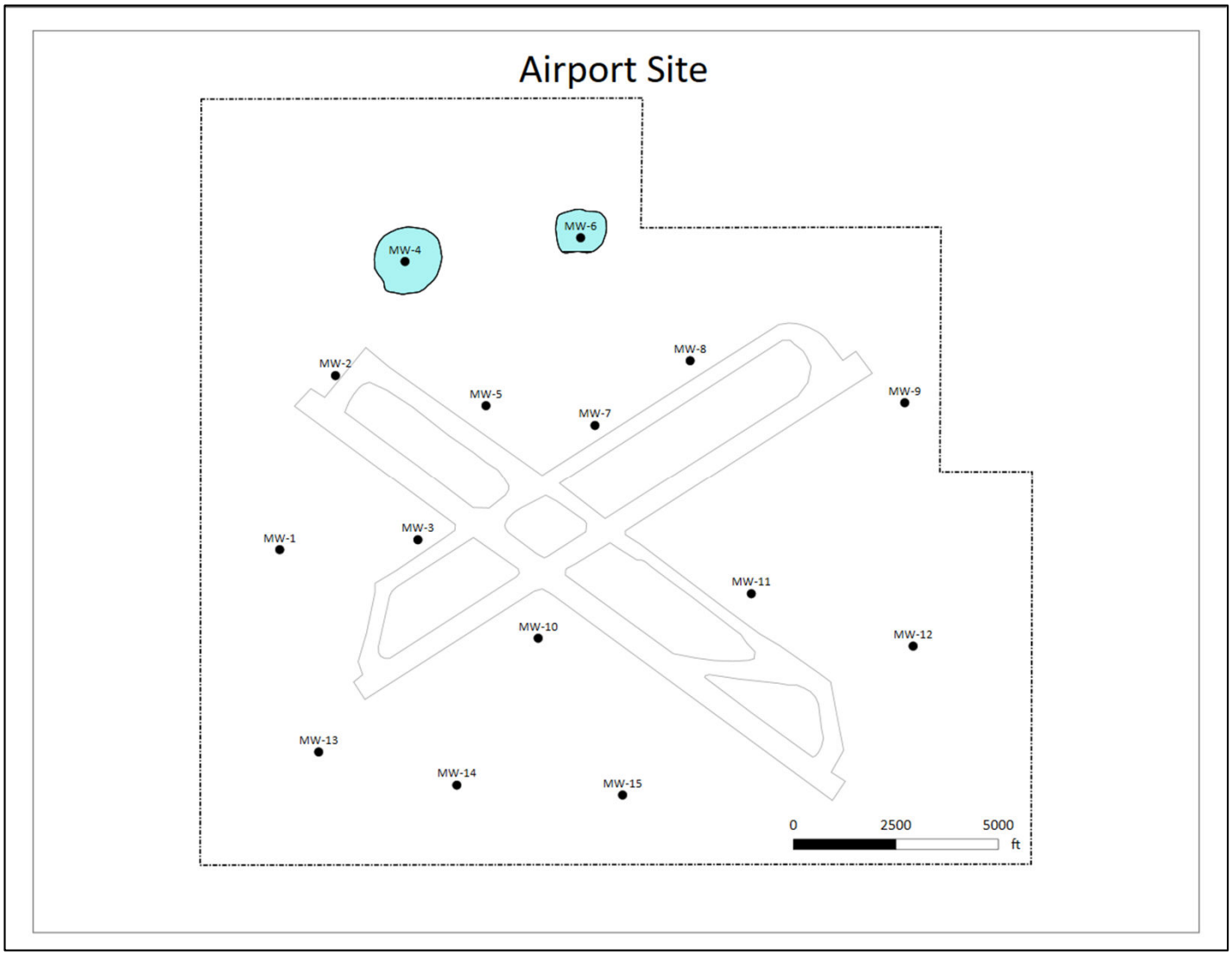


Dividers between property sections can be moved up or down.

3.5.2 Moving the Map Title and Scale Bar

Both the **Map Title** and **Scale Bar** are moveable. These may be moved at any time by double-clicking the left mouse button over one of these objects and holding the mouse button down on the 2nd click; then dragging the object until the object is in the desired position; and then releasing the left mouse button.

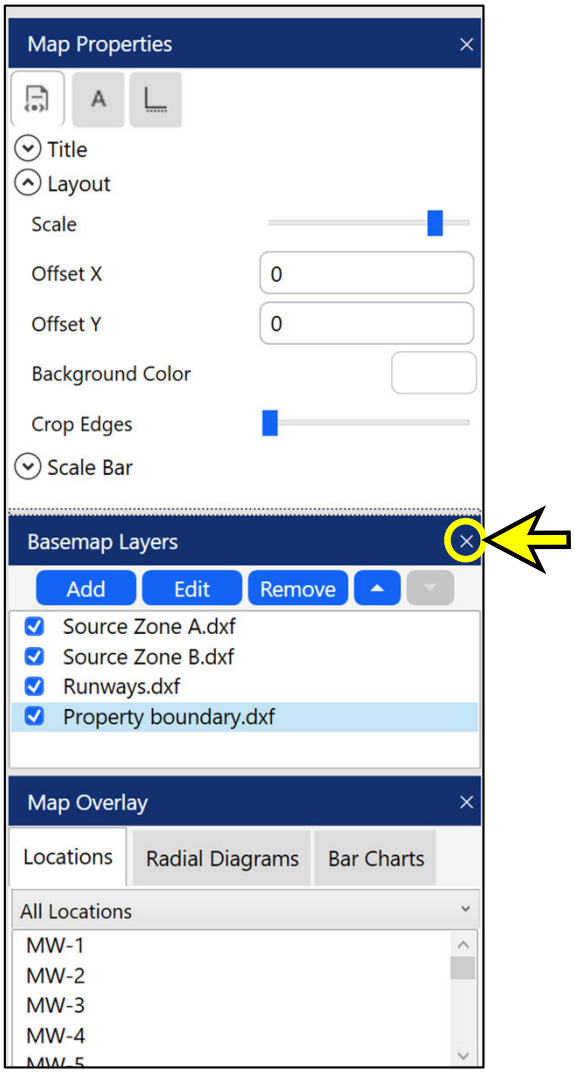
You can practise this by hovering the mouse cursor over the scale bar, double clicking and holding the left mouse button, and moving the scale bar to be inside the lower-right area of the site property line. (see example below for the moved scale bar)



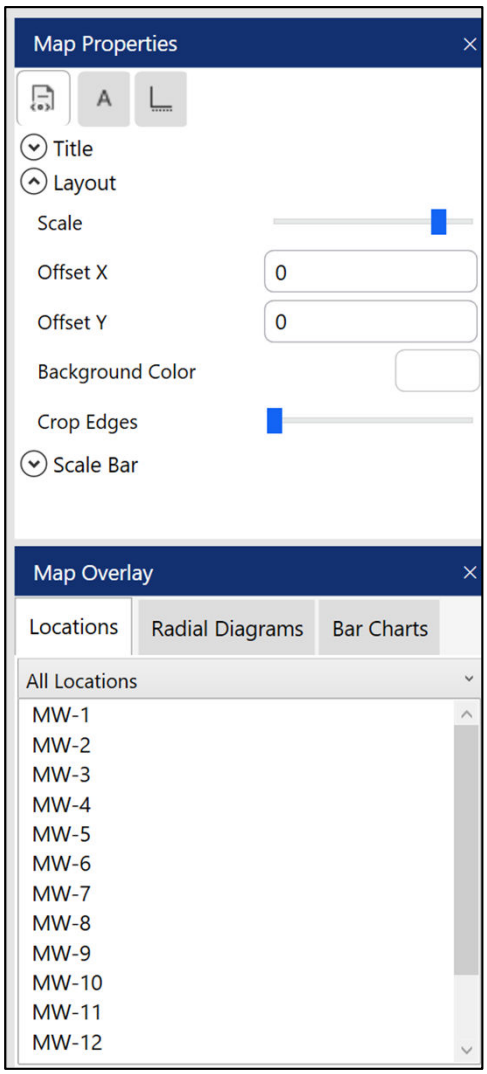
3.5.3 Viewing the Property Windows

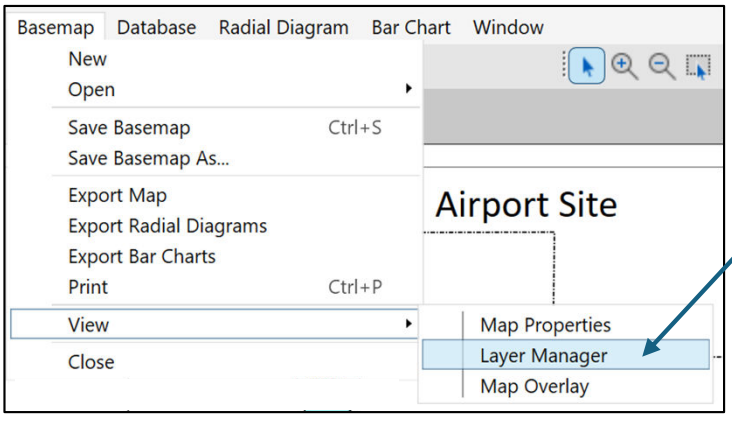
Any of the three property windows to the right of the **Basemap Page** may be closed by clicking on the **X** at the top right of the respective property windows. The example below on the left shows all three property windows just prior to closing the **Basemap Layers** window. The image on the right shows the effect of hiding the Basemap Layers window.

Show all 3 Property Windows



Show 2 Property Windows





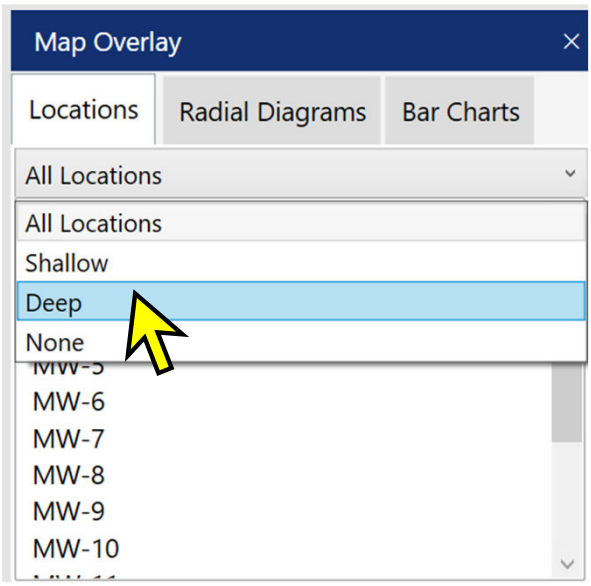
To show a previously closed property window, Click the **Basemap** main menu option, click **View**, and then click on the applicable property window to open it. The image on the left shows the Basemap Layers window being re-opened. The same layers list will be displayed as was shown previously before the Basemap Layers window had been closed.

3.6 Viewing Location Groups

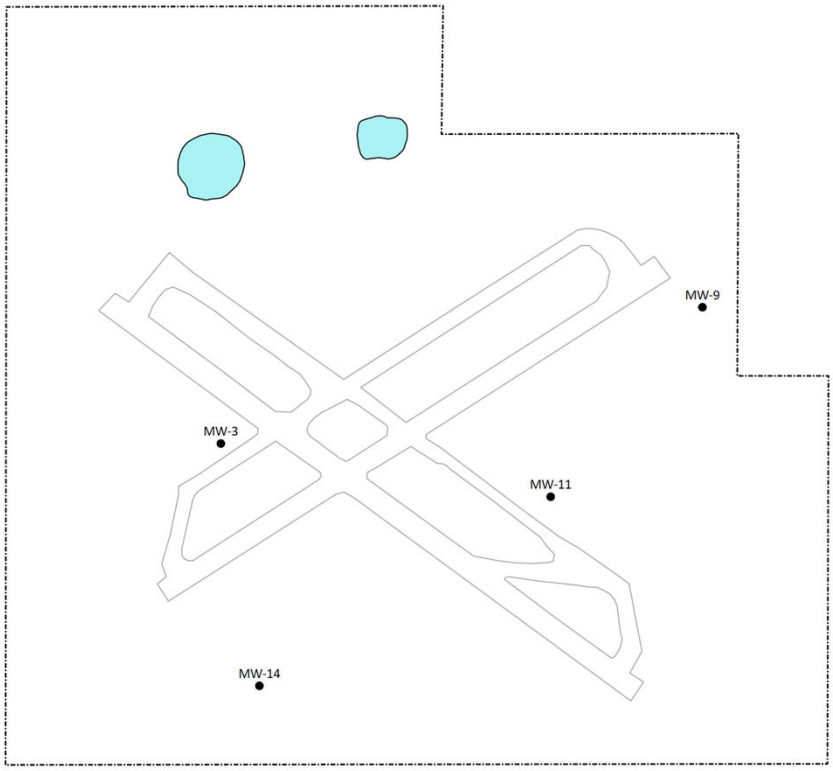
The **Map Overlay** section contains a location group dropdown box where either the user can select to see only locations from a specific location group identified in the imported dataset, or all locations if the location group selected is “None”.

As discussed in Chapter 2 (Sections 2.3 and 2.3.5 through 2.3.7), there are two location groups identified in the imported dataset for the *Demo-Airport* project: Shallow and Deep monitoring wells. If no location groups are selected, then all 15 monitoring well locations will be displayed on the basemap. If Shallow wells are selected, then 11 well locations will be displayed. If Deep wells are selected as the location group (e.g., see image on left below), then four well locations will be shown as demonstrated below (MW-3, MW-9, MW-11, and MW-14) as demonstrated in the image on the right below.

Selection of Deep location group



Basemap showing Deep monitoring wells



Update the basemap to show all monitoring wells by selecting None as the location group before proceeding.

3.7 Print or Export Basemap

Users have the option to export the basemap to a pdf file, or an image file format such as png, jpeg, tiff, or giff. Basemaps can also be exported as combined polylines and polygons to a single file in dxf or Surfer bln format. To export a basemap, click on the Basemap main menu option, click Export Map, enter the filename into the file dialog box and select the type that the file should be saved as. (see example below)

To print a basemap to a physical printer, select the Print option from the Basemap main menu and then choose the printer the same way you would for printing any other type of document. For basemaps ploted in landscape in Visual PFAS™, select the Landscape option for the physical printer.