

4.0 Transforming Images

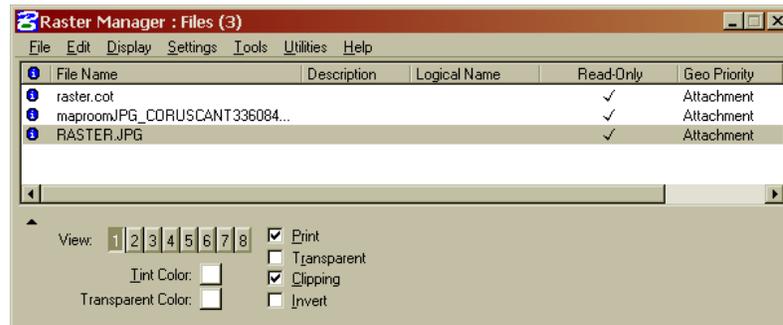
This chapter shows how you can use the Descartes Raster Control tool box for quick transformations of raster objects, of image files or parts of image files in different geometric spaces.



Raster Manager tool



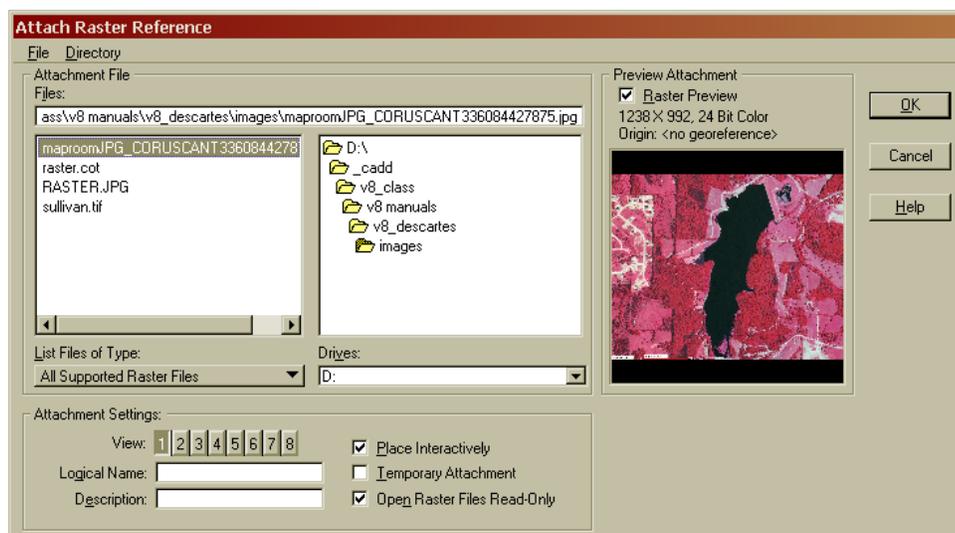
Used to open the Raster Manager Dialog Box.



Attach tool



Used to open the Attach Raster References Dialog Box.



4.1 Raster Selection tool

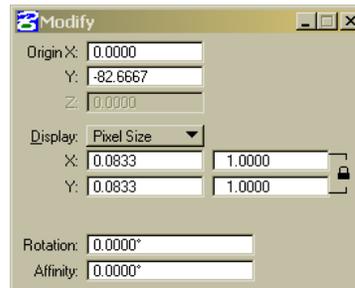


Used to select a Raster file.

4.2 Modify Image tool



The Modify Image Tool allows the user to interactively change the shape of an image (location, scale, rotation, and affinity). This tool will affect the selected images. Multiple selections are allowed.



| Tool Setting | Effect |
|-------------------|--|
| Origin X, Y and Z | Sets the location, in working units, of the lower left corner of the selected raster file attachment. The Z field is grayed out when working with 2D images. |
| Display | When more than one image is selected, the Display will be based on the average pixel size of the selection set. |
| Rotation | Sets the rotation angle of the selected attached raster image. |
| Affinity | Sets the affinity angle for the selected attached raster image. |

To Modify an image with the Modify Image Tool

1. From the Raster Control toolbox, select *Modify Image* tool.
2. Using the pointer, enter a data point on the image to modify.
3. Use the handles to move, scale, and rotate the image, as well as to modify the affinity angle.



The data point also identifies the location of the Origin handle.



When using the Modify tool to edit more than one image that are not all on the same z-axis, the images are surrounded by an imaginary cube, in order to visualize the relocated images. The imaginary cube displays in all views, except the Top View.

4.3 Move Raster tool



Used to move an image to a new location. Move adjusts the origin or placement of the image. The pixel size, dimensions, and number of pixels remain unchanged. Multiple selections are allowed. All the selected images are moved.

 When using the Move Raster tool, you are able to snap to tentative points on an element. The AccuSnap mode is enabled when MicroStation Descartes is installed.

To move a raster:

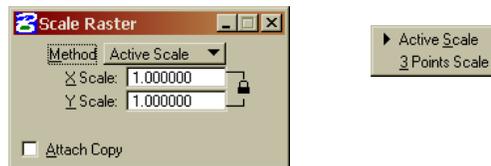
1. From the Raster Control toolbox, select *Move Raster* tool. The tool settings window opens.
2. By default, the *Attach Copy* toggle is turned OFF in the tool settings window. If you wish to create a new attachment of the image, select *Attach Copy*.
3. Enter a data point at a known location on the image. A rectangle outlining the image appears.
4. Move the cursor (the image outline follows) to the new location and enter a data point. This data point can be entered in any open view.

4.4 Scale Raster tool



Used to change the proportionate dimensions of an image. To scale an image, use an Active Scale or 3 Points Scale method. The Scale tool adjusts the origin, pixel size, and dimensions of the image. However, the number of lines and pixels remain unchanged. Multiple selections are allowed. All the selected images are scaled.

 When using the Scale Raster tool, you are able to snap to tentative points on an element. The AccuSnap mode is enabled when MicroStation Descartes is installed.



| Tool Setting | Effect |
|--------------|---|
| Method | <p>Sets the method.</p> <ul style="list-style-type: none"> • Active Scale — Scale by the active scale factors (X Scale and Y Scale). If a scale factor is 0-1 (for example, 0.25), size in that direction is decreased; if a scale factor is greater than 1, size in that direction is increased. • 3 Points Scale — Scale graphically, through the entry of three data points. The scale factors are computed by dividing the distance between the first and third points by the distance between the first and second points. |
| X Scale | Scale factor along view x-axis (horizontal), when Method is Active Scale. |
| Y Scale | Scale factor along view y-axis (vertical), when Method is Active Scale. |
| Attach Copy | Toggle ON to create a new attachment. |

To scale an image using Active Scale:

1. From the Raster Control toolbox, select *Scale Raster* tool.
2. Choose Active Scale from the Method option menu.
3. Specify the scale by entering a factor in the Scale input box.
4. Enter a data point that remains at the same location, whatever the scale. All views where the image is displayed update to reflect your scale adjustments.

To scale an image using 3 Points Scale:

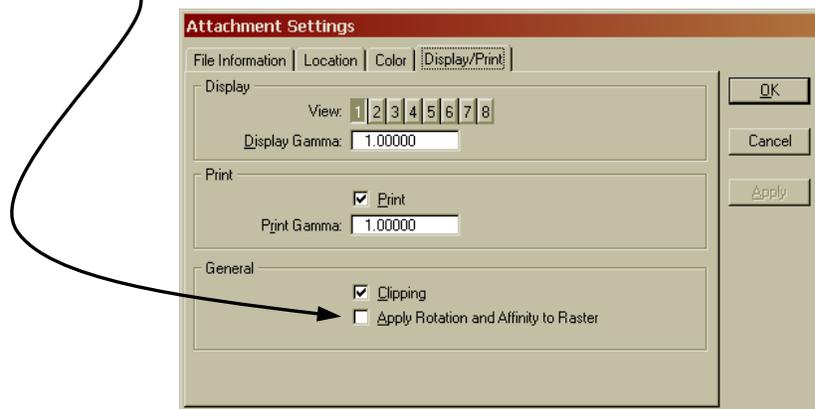
1. From the Raster Control toolbox, select *Scale Raster* tool.
2. Choose 3 Points Scale from the Method option menu.
3. Enter a data point that remains at the same location, whatever the scale.
4. Enter a second data point at a known location on the image. A cursor is placed where the data point was entered and a dynamic rectangle outlining the image appears.
5. Move the cursor so that the image outline increases or decreases to reflect the scale factor. Enter a data point to confirm/accept the new scale. This data point can be entered in any open view. When you move the cursor, observe that the image outline decreases until it reaches a minimum size and then increases again.

4.5 Rotate Raster tool

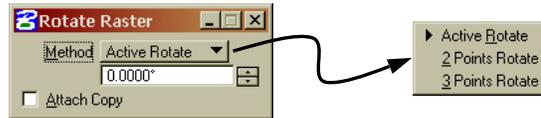


Used to rotate an image. Multiple selections are allowed. All the selected images are rotated

 The Rotate Raster tool cannot be used on rasters which have their "Apply Rotation and Affinity to Raster" toggle set to OFF.



 When using the Rotate Raster tool, you are able to snap to tentative points on an element. The AccuSnap mode is enabled when MicroStation Descartes is installed.



| Tool Setting | Effect |
|--------------|--|
| Method | <p>Sets the method used to rotate.</p> <ul style="list-style-type: none"> Active Raster — the raster is rotated by the angle value, which can be keyed in or selected. 2 Points Rotate — the angle of rotation is defined by entering two data points. 3 Points Rotate — the angle of rotation is defined by three data points. |
| Attach Copy | Toggle ON to create a new attachment. |

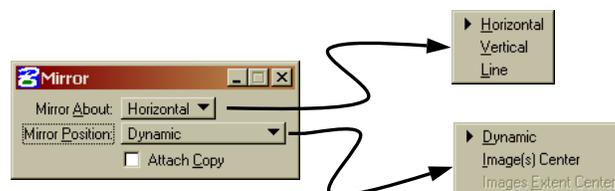
To rotate an image to a specified angle:

1. From the Raster Control toolbox, select *Rotate Raster* tool.
2. Enter a data point to define the pivot point.
3. If Method is set to Active Rotate, enter the wanted angle value. The arrows will increase or decrease by 90 degrees at a time. Otherwise, continue with step 4.
4. If Method is set to 2 Points Rotate, enter a data point to define the angle of the rotation. Or if Method is set to 3 Points Rotate, enter a data point to define the start of the rotation. If Method is set to 2 Points Rotate, the raster is rotated; repeat to rotate the raster again. Otherwise, continue with step 5.
5. Enter a data point to define the angle of the rotation.

4.6 Mirror Image tool



Use the *Mirror Image* tool to flip the source image using a horizontal, vertical, or diagonal mirror. The image is transformed and can either replace the current file or is copied to a new file. Multiple selections are allowed. All the selected images are mirrored.



| Tool Setting | Effect |
|-----------------|--|
| Mirror About | <p>Lets you choose, via an option menu, how to mirror the raster image.</p> <ul style="list-style-type: none"> • Horizontal — Mirrors the selected image about a horizontal axis. • Vertical — Mirrors the image about a vertical axis. • Line — Mirrors the image about a user-defined line. |
| Mirror Position | <p>Lets you define the mirror position, via an option menu.</p> <ul style="list-style-type: none"> • Dynamic • Image(s) Center • Images Extent Center |
| Attach Copy | Toggle ON to create a new attachment. |

To mirror an image using the transformation matrix

1. From the Descartes Raster Control tool box, select *Mirror Image*.
2. By default, the *Attach Copy* toggle is turned OFF in the tool settings window. This allows you to take advantage of the speed of the transformation matrix. If you wish to create a new attachment of the image, select *Attach Copy*.
3. Choose a data point on the image to mirror.



To reverse an image using a mirror creating a new output image

1. Select *Mirror Image* tool.
2. In the tool settings window, turn ON *Attach Copy* and select the appropriate options for the mirroring direction and position.
3. Position the image outline in the view.
4. Enter a data point.

4.7 Square Image tool



Select *Square Image* to rotate a raster image by squaring a horizontal, vertical, or diagonal axis. Multiple selections are allowed.

The default settings assumes you will use the transformation matrix, but it is possible to resample the image by checking the “Attach Copy” toggle box which appears in the *Square* tool setting.



To square an image

1. From the Raster Control tool box, select *Square Image*. The tool settings window opens.
2. By default, the *Attach Copy* toggle is turned OFF in the tool settings window. This allows you to take advantage of the speed of the transformation matrix. If you wish to create a new attachment of the image, select *Attach Copy*.
3. Select a data point on your image.
4. Choose two points on the appropriate axis and the image will be squared.



4.8 Merge/Crop Image tool



Use the *Merge/Crop Image* tool to merge or crop one or more images contained within a defined area. Multiple selections are allowed.

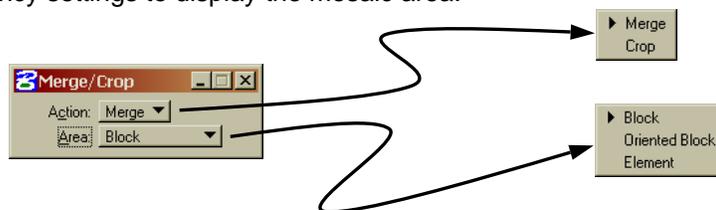
The Merge function applies to all the displayed rasters while the Crop function applies only to the selected rasters.

A new raster file is created when using the Merge tool only.

The Crop tool modifies the original raster file by removing the data outside the specified area on the selected rasters. With multiple selections, the Crop action will be applied on each selected image that is touched by the specified area.

The Merge function is WYSIWYG, meaning that contrast, brightness, gamma correction and more will be applied before the new image is created.

If images included in the input area are displayed in a mosaic where Transparency has been used, the output file contains all pixels visible in the input area. Therefore, the output file will be one uniform file that no longer requires the Transparency settings to display the mosaic area.



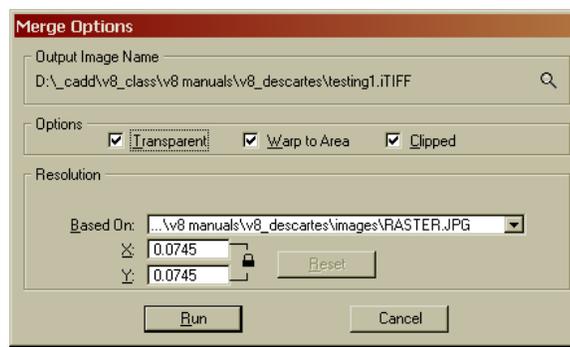
To merge images contained within a block

1. Select *Merge/Crop Image* tool. The tool settings window displays.
2. Select *Merge* from the Action option menu and *Block* from the Area option menu.
3. Enter a data point to fix the origin of the input area (block). As you move the cursor, a dynamic rectangle appears.

4. Enter a data point to fix the opposite corner.
When the *Warp to Area* toggle is enabled, no matter in which order the data points are entered, the lower left corner of the block will always be considered as the origin and the lower right corner of the block will define the angle. If the view as no rotation, the `Block` area will always have an angle of zero.
You can enter the data point in any view. If there is no image in the area defined by the rectangle, an error message displays. Otherwise, the Merge Options dialog box displays.
5. In the Merge Options dialog box, enter the Output Image Name and select the resampling options and resolution parameters, then click Run.
The output image is added to the list of the view in which the origin was entered. The view then updates.



When an output file is created with the Raster Control tools, the background color displays in all areas not occupied by the target input region. If you do not wish the background color to be displayed in a given view, turn on the Transparent and/or the Clipping toggle in the Merge Options dialog box.

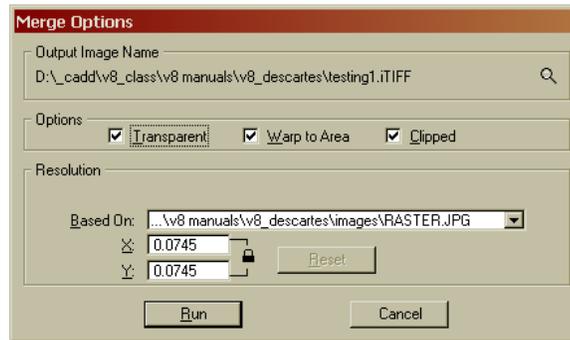


To merge images contained within an oriented block

1. Select *Merge/Crop Image* tool.
2. Select *Merge* from the Action option menu and *Oriented Block* from the Area option menu.
3. Enter a data point to fix the origin of the area (block).
A rubber band appears as you move the cursor. Enter a second data point to set the angle of the oriented block.
4. As you move the cursor, a dynamic rectangle appears. Set the resampling rectangle by entering a third data point in the appropriate direction to fix the opposite corner.
When the *Warp to Area* toggle is enabled, no matter in which order the data points are entered, the lower left corner of the block will always be considered as the origin and the lower right corner of the block will define the angle. If the view as no rotation, the `Block` area will always have an angle of zero.
You can enter the data point in any view. The orientation is defined by an angle calculated from the design plane positive x-axis. If there is no image in the area defined by the rectangle, an error message displays. Otherwise, the Merge Options dialog box displays.
5. In the Merge Options dialog box, enter the Output Image Name and select the resampling options and resolution parameters, then click Run.
The output image is added to the list of the view in which the origin was entered. The view then updates.



When an output file is created with the Raster Control tools, the background color displays in all areas not occupied by the target input region. If you do not wish the background color to be displayed in a given view, turn on the Transparent and/or the Clipping toggle in the Merge Options dialog box.



To crop images contained within a block

1. Select *Merge/Crop Image* tool.
The tool settings window displays.
2. Select *Crop* from the Action option menu and *Block* from the Area option menu.
The tool settings box expands to allow you to enable or disable the *Transparent* and *Clipped* toggles. When the *Transparent* toggle is enabled (default), transparency will automatically be applied to the output image. When the *Clipped* toggle is enabled (the default) the clipping will be applied to the output image.
3. Enter a data point to fix the origin of the input area (block).
As you move the cursor, a dynamic rectangle appears.
4. Enter a data point to fix the opposite corner.
The original raster file is modified by removing the data outside the specified area.

To crop images contained within an oriented block

1. Select *Merge/Crop Image* tool.
The tool settings window displays.
2. Select *Crop* from the Action option menu and *Block* from the Area option menu.
The tool settings box expands to allow you to enable or disable the *Transparent* and *Clipped* toggles. When the *Transparent* toggle is enabled (default), transparency will automatically be applied to the output image. When the *Clipped* toggle is enabled (the default) the clipping will be applied to the output image.
3. Enter a data point to fix the origin of the area (block).
A rubber band appears as you move the cursor. Enter a second data point to set the angle of the oriented block.
4. As you move the cursor, a dynamic rectangle appears. Set the resampling rectangle by entering a third data point in the appropriate direction to fix the opposite corner.
The original raster file is modified by removing the data outside the specified area.

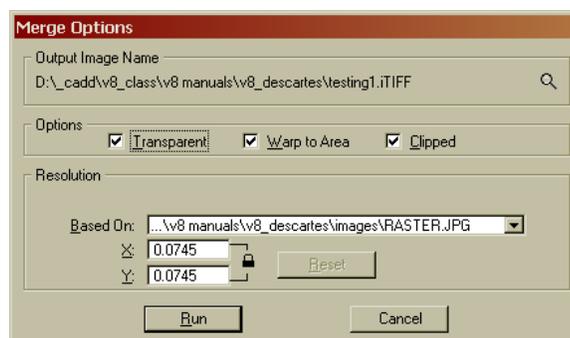
To crop images inside an element

1. Select *Merge/Crop Image* tool.
The tool settings window displays.
2. Select *Crop* from the Action option menu and *Block* from the Area option menu.
The tool settings box expands to allow you to enable or disable the *Transparent* and *Clipped* toggles. When the *Transparent* toggle is enabled (default), transparency will automatically be applied to the output image. When the *Clipped* toggle is enabled (the default) the clipping will be applied to the output image.
3. Click on the target polygon. Enter a data point to accept the element.
When the *Warp to Area* toggle is enabled, the first two points of the shape that defines the area will determine the angle of the area.
You can enter the data point in any view. If there is no image in the area defined by the rectangle, an error message displays. Otherwise, the Crop Options dialog box displays to permit you to set the resampling parameters.
4. In the Crop Options dialog box's Options field, choose the crop options, then click Run to resample the image.
The original raster file is modified by removing the data outside the specified area.

 The Crop function is not allowed on images with the Apply Rotation and Affinity option turned OFF. For Merge operations, the backfill is set to the MicroStation view's background color. For Crop operations, each raster will keep its backfill color. The Fence mode is not supported. The Crop function is not supported with References or with read-only images.

4.8a Merge Options dialog box

Used to determine the characteristics of the output file created with the Merge Images tool.



Output File Name

Used to specify the name for the output file. A default file name will be generated following the same rules as in the old versions of Bentley Descartes. The *magnifying glass* opens the Select Raster File dialog. It now accepts all the supported file types. The compression and the file type are selected in this dialog.

Options

Use these toggles to preset features in the output image.

| | |
|--------------|---|
| Transparent | When enabled (default), transparency will automatically be applied to the output image. |
| Warp to Area | When enabled, the raster's header or sister file will be modified to match the source element's origin and rotation. When disabled (the default), this option will invoke the Merge function without resampling the rotation. The image will not have any transformation (rotation affinity) stored in its header or sister files. |
| Clipped | When enabled (the default) the clipping will be applied to the output image. |

Resolution

The Resolution parameters are used to adjust the output image. Each field and option is described below.

| | |
|----------|--|
| Based On | The user can select the default output pixel size. The available options in the "Based On" option button are: <ul style="list-style-type: none"> • One entry with the name of each touched image: The output pixel size can be set to the pixel size of any of the input images. • Average: The output pixel size can be set to the average pixel size (or scale factor) of the selected images. |
| X and Y | The "X" and "Y" fields can be edited. |
| Reset | If the Reset button is used, the X and Y values will be reset to their original values. The original values are determined by the "Based On" option. |

Run

Click Run to create the output image. While the image is being created, a Progress indicator displays.

If there is not enough space on the destination disk to contain a file that will be compressed, you are warned and permitted to cancel the process. If you chose not to compress the output file and if there is not enough space on the destination disk, you are warned that the process cannot be performed.

Cancel

If you decide not to use the present parameters, click Cancel. The dialog box then closes.

4.9 Corridor Image tool



Use the *Corridor Image* tool to copy the regions of one or more images contained within a polygon to an output polygon of the same shape. The copied regions of the source images are merged into a new image and then copied to the output space defined by the polygon. Design elements (from the design file and associated reference files) that occupy the region contained within the polygon can also be copied to the output polygon. Multiple selections are allowed.

The Corridor Image function is now WYSIWYG, meaning that transparency, contrast, brightness, gamma correction and more will be applied before to new image is created.

When you use Corridor Image, both the input (source) and output (destination) polygons must be the same shape (usually a copy of the same element). However, the output polygon can be rotated, scaled, and moved to reflect the desired output result.

If the images in the input area are displayed with transparency to make a mosaic, the output file will contain all of the pixels that you can see, not the transparent parts. Therefore, the output file will be one uniform file that no longer requires the transparency settings in order to display the mosaicked area.



The Corridor Image tool creates an image using other images

To use Corridor Image

1. Create a source and destination polygon.
2. Place the source polygon on the target region that you want to copy.
3. Select the *Corridor Image* tool.
4. Click on the source polygon and enter a data point to accept the element.
5. Click on the destination polygon. Enter a data point to accept the element.
The *Corridor Option dialog box* displays to allow you to set the resampling parameters and to select the name of the output file.
The output image is added to the file list for the view where you selected the output destination polygon. The view then updates.



The polygon must be a shape or complex shape, which contains only lines, and line strings. If a complex shape is used and it contains more than 100 points, then the Copy Design Elements feature is disabled.



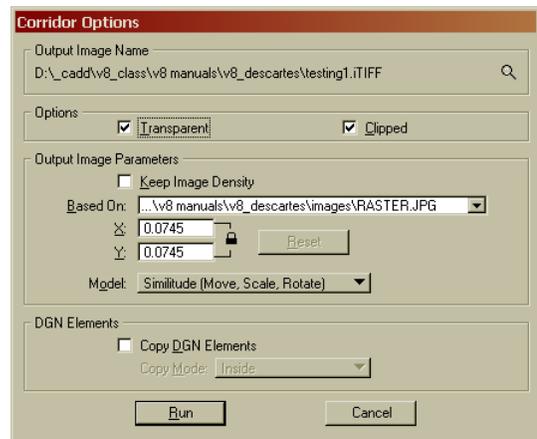
When an output file is created with the Raster Control tools, the background color displays in all areas not occupied by the target input region. If you do not wish the background color to be displayed in a given view, turn on the Transparent toggle in the Output Settings dialog box and the Transparency toggle in the View Image Attributes dialog box for this view.

4.9a Corridor Options dialog box

Used to determine the characteristics of the output file created with the Corridor Image tool.

Output File Name

Use to specify the name for the output file. A default file name will be generated following the same rules as in the old versions of Bentley Descartes. The *magnifying glass* opens the Select Raster File dialog. It now accepts all the supported file types. The compression and the file type are selected in this dialog.



Options

The *Transparent* and *Clipped* toggles can be turned ON to preset these features in the output image. Upon completion of the corridor operation, Raster Manager will automatically attach the new image and, if turned on, the display options will automatically be applied.

Output Image Parameters

These parameters are used to adjust the output image. Each field and option is described below.

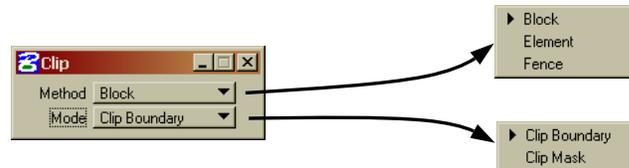
| | |
|--------------------|---|
| Keep Image Density | Conserve the source image's density in the output image. |
| Based On | <p>The user can select the default output pixel size. The available options in the “Based On” option button are:</p> <ul style="list-style-type: none"> • One entry with the name of each touched image: The output pixel size can be set to the pixel size of any of the input images. • Average: The output pixel size can be set to the average pixel size (or scale factor) of the selected images. |
| X and Y | The “X” and “Y” fields can be edited. |
| Reset | If the Reset button is used, the X and Y values will be reset to their original values. The original values are determined by the “Based On” option. |
| Model | <p>Select the model to use for the Corridor operation. The available models are:</p> <ul style="list-style-type: none"> • Align (Move, Scale) • Helmert (Move, Rotate) • Similitude (Move, Scale, Rotate) • Affine (Move, Scale, Rotate, Skew) |

4.10 Clip tool



Used to clip a raster image (Clip Boundary), or to define a masked area (Clip Mask). An image can have one clipping boundary, but may have a number of clipping masks. Thus, when you create a new clipping boundary, any existing clipping boundary is cleared. When you create a clipping mask, however, it is added to any existing clipping masks for the selected image.

Multiple selections are allowed when using the Clip tool. However, when more than one image is selected, the clipping will not create one single polygon, but as many different clipping polygons as there are images. If the Modify Clip tool is subsequently used, and only one image is selected, only the clipping polygon associated to this single image will be modified and not all the clipping polygons as a whole.



| Tool Setting | Effect |
|--------------|--|
| Method | <p>This option menu lets you choose the type of Method to be used to clip the raster image.</p> <ul style="list-style-type: none"> • Element — Lets you specify an existing (closed) element in the design file to use as a clipping polygon. • Fence — Lets you use an existing fence as a clipping polygon. • Block — Lets you interactively draw a block to be used as a clipping polygon. |
| Mode | <p>This option menu lets you choose the clipping mode that is used to clip the raster image.</p> <ul style="list-style-type: none"> • Clip Boundary — Used when cropping images. The image is cropped back to the limits of the clipping object. • Clip Mask — Used to mask a section within a raster image. This option lets you place a text box, for example, within a raster image file. |

To clip a raster image using an element to define the boundary

1. Draw the element to define the clipping boundary.
2. Select the *Clip* tool.
3. In the tool settings window, set *Method* to Element and *Mode* to Clip Boundary.
4. If more than one raster image is attached to the design file, identify the raster image to be clipped.
5. Identify the clipping element.
6. Accept the element as the clipping polygon to clip the image.



To clip a raster image using a fence to define the boundary

1. Place a fence to define the clipping boundary.
2. Select the *Clip* tool.
3. In the tool settings window, set *Method* to Fence and *Mode* to Clip Boundary.
4. If more than one raster image is attached to the design file, identify the raster image to be clipped.
5. Accept the fence as the clipping polygon to clip the image.



To clip a raster image using a block to define the boundary

1. Select the *Clip* tool.
2. In the tool settings window, set *Method* to Block and *Mode* to Clip Boundary.
3. If more than one raster image is attached to the design file, identify the raster image to be clipped.
4. Enter a data point to define the first point of the block.
5. Enter a data point to define the opposite corner of the block.
6. Accept the block as the clipping polygon to clip the image.



To mask an area of a raster image using an element to define the boundary

1. Draw the element to define the mask boundary.
2. Select the *Clip* tool.
3. In the tool settings window, set *Method* to Element and *Mode* to Clip Mask.
4. If more than one raster image is attached to the design file, identify the raster image to be clipped.
5. Identify the clipping element.
6. Accept the element as the clipping polygon to mask part of the image.



To mask part of a raster image using a fence to define the boundary

1. Place a fence to define the clipping boundary.
2. Select the *Clip* tool.
3. In the tool settings window, set *Method* to Fence and *Mode* to Clip Mask.
4. If more than one raster image is attached to the design file, identify the raster image to be clipped.
5. Accept the fence as the clipping polygon to mask the image.



To mask part of a raster image using a block to define the boundary



1. Select the *Clip* tool.
2. In the tool settings window, set *Method* to Block and *Mode* to Clip Mask.
3. If more than one raster image is attached to the design file, identify the raster image to be clipped.
4. Enter a data point to define the first point of the block.
5. Enter a data point to define the opposite corner of the block.
6. Accept the block as the clipping polygon to mask the image.

4.11 Modify Clip tool



Used to modify the clipping polygon for a clipped raster image.

Multiple selections are allowed when using the Clip tool. However, when more than one image is selected, the clipping will not create one single element, but different clip elements. If the Modify Clip tool is subsequently used, and only one image is selected, only the clip element associated to this single image will be modified and not all clip elements as a whole.



| Tool Setting | Effect |
|--------------------------------|--|
| Update After Each Modification | <p>If ON, the raster image updates after each modification to the clipping polygon.</p> <p>If OFF, no modification is made to the display of the raster image until modifications to the clipping polygon are completed and you enter a Reset.</p> |

To modify a clipping polygon without automatic updating



1. Select the *Modify Clip* tool.
2. In the tool settings window, turn **off** Update After Each Modification.
3. Identify the raster image.
4. Identify the clipping polygon to modify at the point to be modified.
5. Make the modification.
6. (Optional) Repeat steps 4 and 5 for any further modifications that are required.
7. Enter a Reset to complete.
The raster image updates to reflect the modifications to the clipping polygon.

To modify a clipping polygon with automatic updating

1. Select the *Modify Clip* tool.
2. In the tool settings window, turn **on** Update After Each Modification.
3. Identify the raster image.
4. Identify the clipping polygon to modify, then drag the polygon's outline to modify it.
5. Make the modification.
The raster image updates to reflect the modification to the clipping polygon.
6. (Optional) Repeat steps 4 and 5 for further modifications.



4.12 Unclip tool



Used to remove one or more clipping polygons from a raster image. You can select the raster image graphically after selecting the *Unclip* tool. Alternatively, you may select the raster image first, via the Raster Manager dialog box or with the *Select Rasters* tool.



| Tool Setting | Effect |
|--------------|---|
| Delete | <p>Lets you choose between deleting all polygons in one step, or selected polygons.</p> <ul style="list-style-type: none"> • All Polygons — Lets you delete all clipping polygons associated with a raster image. • Selected Polygon — Lets you choose the clipping polygons that you want to delete from a raster image. |

To delete all clipping polygons from a raster image

1. Select the *Unclip* tool.
2. In the tool settings window, set *Delete* to All Polygons.
3. Identify the raster image from which the clipping polygons are to be removed.
The clipping polygons for the selected raster image are highlighted.
4. Accept to delete all the clipping polygons.

To delete selected clipping polygons from a raster image

1. Select the *Unclip* tool.
2. In the tool settings window, set *Delete* to Selected Polygon.

3. Identify the raster image from which the clipping polygons are to be removed.
The clipping polygons for the selected raster image are highlighted.
4. Identify a clipping polygon to delete.
The selected clipping polygon highlights in a different color.
5. Accept to delete the clipping polygon.
6. (Optional) Repeat steps 4 and 5 to remove other clipping polygons from the selected image.