Chapter 1

Introduction to AutoCAD Raster Design 2017

Learning Objectives

After completing this chapter, you will be able to:

- *Understand raster data*
- *Understand features of AutoCAD Raster Design*
- *Understand applications of AutoCAD Raster Design in various industries*
- *Configure settings in AutoCAD Raster Design*

INTRODUCTION

AutoCAD Raster Design is the solution for working with raster data within the Autodesk product family. AutoCAD Raster Design is an add-on product and can be used along with Autodesk products such as AutoCAD Civil 3D and AutoCAD Map 3D which are based on AutoCAD platform. It has powerful tools for sizing, cleaning up, and processing your raster images into your drawing.

AutoCAD Raster Design, a stand-alone package helps you to insert, manipulate, and edit raster image into your drawing. This package has various image correction techniques to georeference the raster image. You can also apply various image enhancement techniques that will aid in better data interpretation. The software provides manipulation and vectorization tools which helps to convert raster entities of scanned drawings into vector entities. One such set of tools are the Raster Entity Manipulation (REM) tools. The software provides another set of tools such as Optical Character Recognition (OCR) tools which can convert your image text directly to editable AutoCAD text entities. Also, you can manipulate and edit any CAD drawings saved in *.pdf* format. This package allows to convert raster geometries into vector geometries, which can be saved and used for further references.

UNDERSTANDING RASTER DATA

Raster data consists of spatially coherent and digitally stored numerical data; which are collected from satellite sensors, aerial cameras, and scanners. A digital image can be represented in a computer as arrays of pixels (picture element), with each pixel corresponding to a digital number, representing the brightness level of that pixel. This type of digital images are referred to as raster data in which pixels (cells) are organized into rows and columns. Figure 1-1 shows a raster data acquired from a remote sensing satellite.

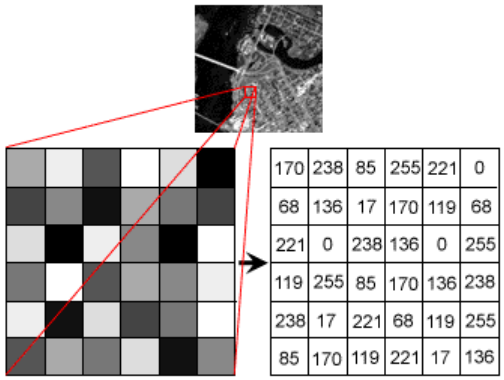

Figure 1-1 *Raster data acquired from a remote sensing satellite*

Raster data, such as aerial photographs and satellite images, are source of data, which are commonly used to collect information in various remote sensing applications. Rasters are also used to collect, store, and display information of the spatial entities in a digital format. A raster data may be source of continuous or discrete information. For example, a thematic map is used to represent discrete data such as vegetation type or complete land use/land cover. Similarly, rasters are also used to represent continuous data such as elevation and temperature. Raster data are the source of information which complement vector data in many GIS applications. Figure 1-2 shows a thematic map of the land use/land cover classification for a geographical region representing the correlation of satellite images with GIS applications.

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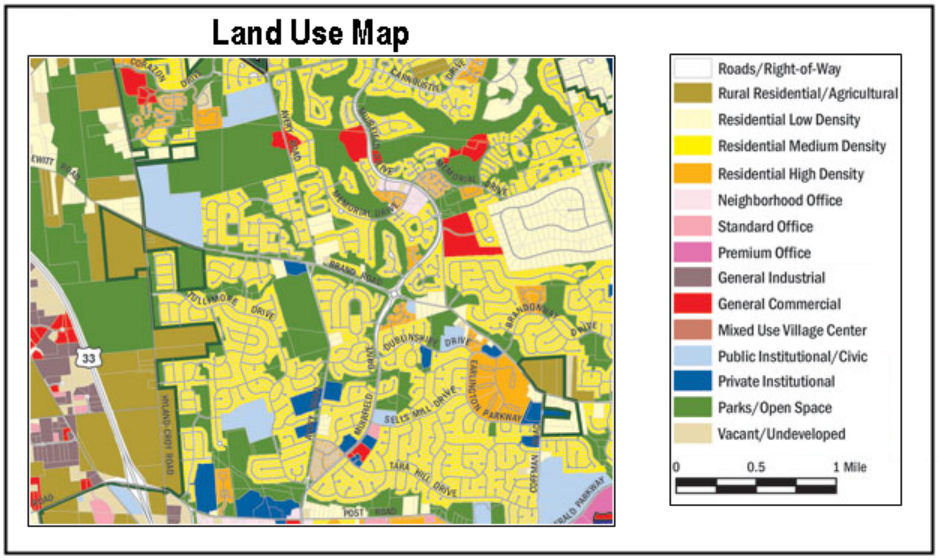

Figure 1-2 *The Land Use/Land cover map*

Properties of a Raster Data

A raster image has various properties such as number of pixels, band (layer), cell size, data type and so on. Some rasters, such as the digital elevation models, and satellite images also have geographic properties that defines the correlation parameters of the image. These properties of raster image govern its behavior and information. Some of the raster properties are briefly discussed next.

Cell Size

Cell size is the level of detail of features represented by a raster. Raster data divides the scene into grid cells or pixels. Each grid cell is composed of cell attributes which is represented by certain values, also referred to as pixel values or grid values or DN (Digital Numbers) values and arranged in a grid (matrix). The size of the raster is determined by its cell size. Smaller cell sizes result in larger raster datasets, and higher resolution whereas larger cell size results in lower resolution, refer to Figure 1-3.

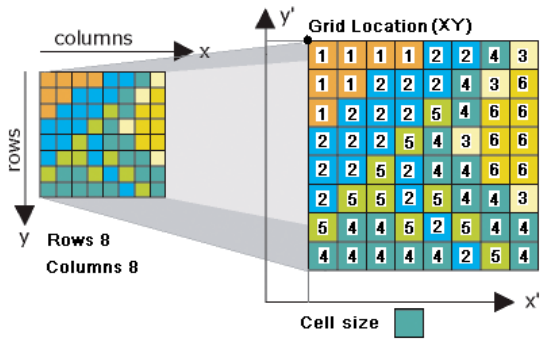

Figure 1-3 *Height and width of a raster*

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Data Type

Every cell in the raster contains a value that represents information. For example, in an elevation map, the value of a cell represents the height of the terrain. The value stored in the raster cell is mostly numeric and can have a data type such as 1 bit integer, 2 bit integer, 4 bit integer, 8 bit integer, 16 bit integer, 32 bit integer, and more. Depending on the intensity values, rasters can be classified into three types: bitonal (mono color), grayscale and multispectral.

Note

Owing to the simple data structure, arithmetic operations can be easily performed on a raster data. As a result, raster datasets are often used in Geographical Information System (GIS) as a data source for performing spatial analysis.

Bitonal Rasters

Bitonal rasters are also called as mono color or binary images. In this type of image, cells are represented as black or white, as a result, you can store the value of the cell using a single bit. If the cell value is 0 it is rendered black while it is rendered white if the value in the cell is 1.

Grayscale Rasters

A gray scale color model is used to display the raster in different shades of gray. A grayscale image is the one in which Red, Green and Blue have equal intensity in RGB space .

Multispectral Rasters

A color raster contains pixels rendered in multiple colors such as a colored photograph. Figure 1-4 shows a Bitonal, grayscale and a colored image.

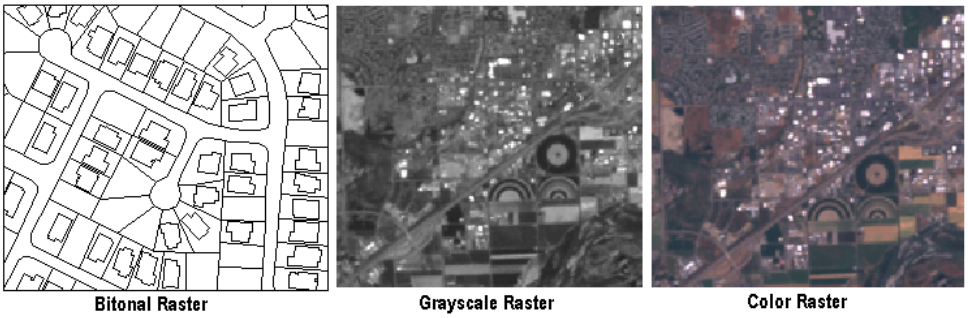

Figure 1-4 *Bitonal, grayscale and a colored image*

Bands

A raster dataset contains one or more layers called bands. A band is represented by a single matrix of cell values. Some rasters are composed of single band, for example digital elevation model. Rasters may also contain multiple bands, such as, multispectral, hyperspectral, and ultraspectral images. In case of a multiband raster, the matrix of cells in every band spatially coincide the matrix in other band.

Geographical Properties

The geographic properties of a raster defines its correlation parameters. These correlation parameters are particularly important when the rasters are used as data sources in GIS. Using these correlation parameters you can georeference a raster. The geographic properties of a

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raster include information such as the X and Y coordinates of the origin of raster, cell size, and number of rows and columns in the raster.

The origin of the raster is usually defined by the coordinates of its upper left or the lower left corner. The cell size also represents the spatial resolution of the raster. This parameter defines the actual area on the ground that is represented by one cell (pixel) in the raster.

FEATURES OF AutoCAD RASTER DESIGN

AutoCAD Raster Design is an add-on product developed by Autodesk for the professionals who intend to use raster data in their project. This application enables the user to manage, convert, analyze, and edit raster data in various types and formats.

Note

AutoCAD Raster Design is an add-on product and therefore installing this software prerequisites an AutoCAD based Autodesk software, such as AutoCAD Map 3D, or AutoCAD Civil 3D installed on your computer.

Some of the basic features of AutoCAD Raster Design are discussed next.

Raster Management

Along with the basic tools, AutoCAD Raster Design provides enhanced tools for image management. These image management tools enable the user to work with raster data of variant file formats, such as Digital Elevation Model (DEM) and multispectral satellite images. AutoCAD Raster design also provides rubbersheeting and transformation tools for georeferencing and transforming coordinate system of the raster images.

Image Enhancement and Display

AutoCAD Raster Design can improve the appearance of the image by adjusting tone, brightness and contrast, equalize histogram, and by applying filters. The image processing tools provide various options for performing such adjustments. The image enhancements feature is particularly useful for performing image interpretation such as feature identification and data convention.

This software also comes with a palette manager that provides the user with the flexibility of choosing the color palette for displaying image. Using this palette manager, the user can combine, change and remove colors in the image.

Image Cleanup and Editing

AutoCAD Raster Design is equipped with a set of image cleanup tools. Using these image cleanup tools in AutoCAD Raster Design application, you can rectify errors such as the skew and speckles in an image. Furthermore, with AutoCAD Raster Design, you can edit the raster entities in the image. The **Touchup** tool is used to clean scanned drawings and maps. The Raster Entity Manipulation (REM) tools are effective raster editing tools. Using the REM tools you can perform editing tasks such as creating, deleting, trimming and extending raster entities. The usage of the REM tools for editing raster is similar to that of the vector tool in AutoCAD.

This software also provides the raster snapping options. These options provide various snapping modes that can be used to carry out precise raster editing operations.

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Raster to Vector Conversion Tools

Using the vectorization tools in AutoCAD Raster design, you can convert the raster data into vector. AutoCAD Raster Design uses **SmartCorrect Settings** option to increase the precision with which the vectors are created. These tools provide advance features such as dynamic dimensioning and grip editing. While converting data from raster to vector, the Optical Character Recognition (OCR) feature of AutoCAD Raster design, identifies the text in the raster and converts it into vector. This eliminates the need of retyping the text thereby saving considerable amount of time and effort. The OCR feature of AutoCAD Raster design can identify text that is hand written or machine typed and is optimized for images with a resolution of 300 dpi (dots per inch).

Note

The OCR is optimized for images with a resolution of 300 dpi. Undesirable results may be produced if used with images having resolution below 150 dpi or above 400 dpi.

Data Analysis

AutoCAD Raster Design can work with raster data such as multispectral satellite imagery. Using this software, you can combine data from different bands of a multispectral image to compose a false color image. This data can be further used to analyze information such as land use and land cover. You can also use the AutoCAD Raster Design to perform the elevation, slope, and aspect analysis using the Digital Elevation Models. Raster query tools also help to find the unique values from raster datasets.

These features make AutoCAD Raster Design a versatile tool with applications in various fields.

APPLICATIONS OF AutoCAD RASTER DESIGN

Professionals such as GIS analyst, Civil engineer, Utility engineer, Architects, Town planner, and CAD draftsman extensively work with raster data in their day to day activities. AutoCAD Raster Design has been developed considering the needs of these professionals who frequently use raster data. The applications of AutoCAD Raster Design in various industries are discussed next.

GIS and Mapping Industry

GIS project often use aerial photographs, satellite images, and scanned copies of old maps as datsets for creating base maps. These data sets can be acquired from different sources and may have different coordinate system. These data also come in a wide variety of file formats. AutoCAD Raster Design supports a wide range of file formats including GRID, ASCII, DEM, TIFF (QuickBird, Landsat). It is also capable of transforming the coordinate system of the images to match the current coordinate system of the drawing. In AutoCAD Raster Design, image mosaic tools helps to manage large amount of data to the mapping professionals. This software can be used to combine various bands of a multispectral satellite imagery to compose a false color image. Figure 1-5 shows a Landsat ETM+ image in various band combinations. These false color images can be used to analyze data such as vegetation cover, land use and many more.

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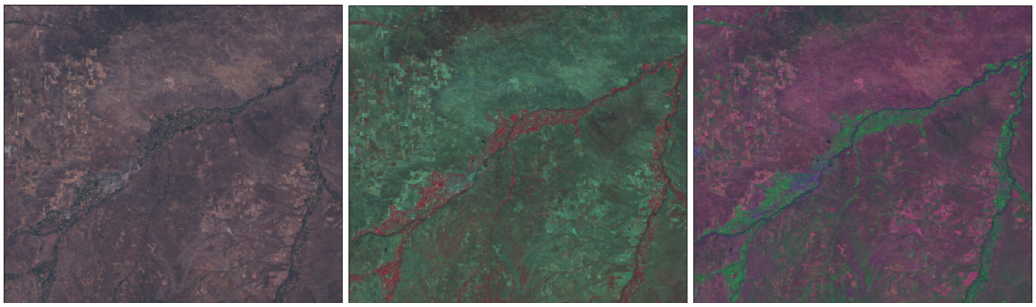

Figure 1-5 *A multispectral satellite image in various band combinations*

Architecture, Engineering, & Construction (AEC) Industry

The Architecture, Engineering & Construction (AEC) Industry is another stream of professionals that work with huge volumes of raster data. This industry is primarily involved in the design, construction and maintenance (operation) of various infrastructure projects. The design and construction of engineering projects such as roads, dams, and canals are governed by topographical characteristics of the terrain. As a result, the study of the topography is the first step towards designing these types of infrastructure projects.

AutoCAD Raster Design not only supports the raster data in Digital Elevation Model (DEM) format but using it you can analyze the DEM data to study the slope, aspect and elevation of the terrain. This feature of AutoCAD Raster Design is also useful for conducting watershed studies, land suitability analysis, design, and management for a region. Figure 1-6 shows a Digital Elevation Model of a region.

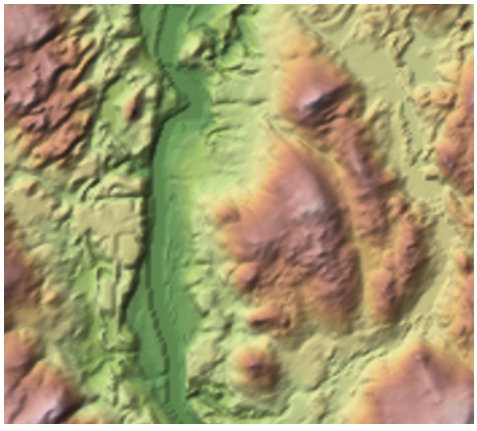

Figure 1-6 *A Digital Elevation Model*

Mechanical, Utility, and Other Industries

In the past, all engineering products including the mechanical, civil, and other utilities were designed manually and these products were stored as engineering drawings on paper. Any modification to the existing design require engineers to undertake a careful study of these drawings making it a tedious and time consuming task.

Now-a-days, engineers use computers for planning and designing of almost every engineering system. For calculating the design parameters using computer, engineers are required to input

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data to the computer. Almost all designing software packages use input data in vector format. As a result, for the task of modifying the existing design, you are required to convert the existing paper drawings into vector data format. AutoCAD Raster Design provides a set of vectorization tools for easy and efficient conversion of the raster data to vector.

In addition, the REM tools in AutoCAD Raster Design allow you to edit raster entities. This software also provides the drawing cleanup tools that can be used to rectify any errors that may be induced while scanning the paper copies. AutoCAD Raster Design is an useful tool in the Town and Planning, City councils and other similar departments that require to archive raster maps for preserving historical datasets.

GETTING STARTED WITH AutoCAD RASTER DESIGN

As discussed earlier, AutoCAD Raster Design is an add-on product that can be installed on an AutoCAD based platform. On installing this product, the **Raster Tools** tab is added to the ribbon interface of the AutoCAD based host application.

To initialize the start the AutoCAD Raster Design application; the host application will start and the ribbon interface of the host application will display the **Raster Tools** tab. Figure 1-7 shows the partial view of the **Raster Tools** tab.

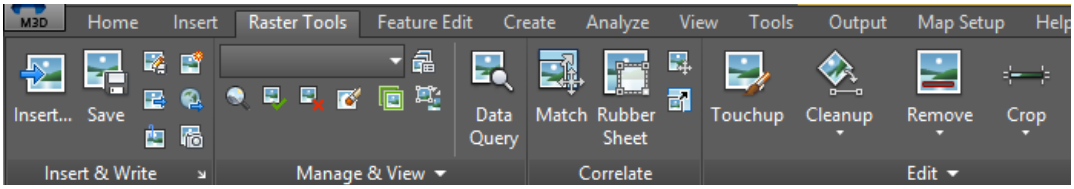

Figure 1-7 *Partial view of the* ***Raster Tools*** *tab*

Note

For demonstration purposes, in this textbook the author has used AutoCAD Map 3D as the host application for installing AutoCAD Raster Design.

To exit AutoCAD Raster Design, close the host application; you will be prompted to save any unsaved work in your drawing. Choose the required action for saving the drawing file; the host application will be closed. The method of saving the image file is discussed in detail in further chapters.

Before you start using AutoCAD Raster Design, it is advised that you configure the general settings.

CONFIGURING SETTINGS IN AutoCAD RASTER DESIGN

Similar to customizing the program settings in the host software (AutoCAD platform), you can configure AutoCAD Raster Design using the options in the **AutoCAD Raster Design Options** dialog box. Configuring AutoCAD Raster Design using the various options this dialog box is briefly discussed next.

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AutoCAD Raster Design Options Dialog Box

As discussed earlier, you can specify the settings in the AutoCAD Raster Design such as the default parameters for image insertion or settings for raster entity detection using the **AutoCAD Raster Design Options** dialog box. To invoke this dialog box, choose the **Options-Image Default** button from the **Insert & Write** panel of the **Raster Tools** tab.

The **AutoCAD Raster Design Options** dialog box contains various tabs. The options for configuring AutoCAD Raster Design is organized into these tabs. The various tabs in this dialog box are discussed next.

User Preferences Tab

The options in this tab are used to specify various global settings. These options are categorized into various areas, as shown in Figure 1-8.

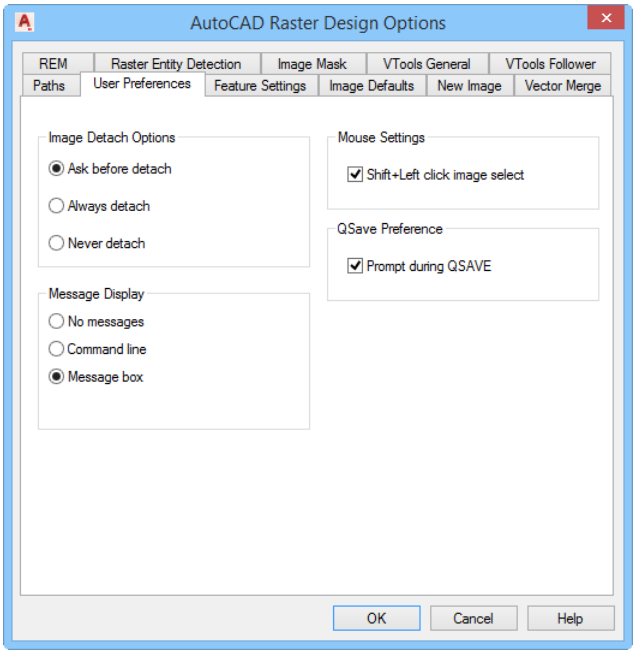

Figure 1-8 *The* ***User Preferences*** *tab of the* ***AutoCAD Raster Design Options*** *dialog box*

In the **Image Detach Options** area of this tab, you can specify the option for detaching the raster image by selecting the required radio button. Selecting the **Always detach** radio button will detach the image from the drawing if its frame is erased. Select the **Never detach** radio button to retain the attached image after its frame is erased. If you want to be prompted for your option for detaching or retaining the image after its frame is erased, select the **Ask before detach** radio button.

In the **Message Display** area of this tab, you can select the **No messages** radio button to restrict AutoCAD Raster Design from displaying messages. To display messages only in the command line, select the **Command line** radio button. Else, select the **Message box** radio button to display messages in a message box.

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Selecting the **Shift+Left click image select** check box enables you to select an image by clicking on it holding the SHIFT key. This feature is useful when you are zoomed into the image and the image frame is not visible.

On selecting the **Prompt during QSAVE** check box, AutoCAD Raster Design will prompt you to save images when you quick save the drawing file.

Paths Tab

Using the options in this tab, you can define the settings for the image correlation files and the **AutoPaste** feature. The options in this tab are organized in two areas.

In the **Correlation Search Paths** area, you can specify the path of correlation source. Whenever you insert an image into the drawing, AutoCAD Raster Design will search the specified location for the correlation file. To specify the path, choose the **Browse** button corresponding to the **Read path** edit box; a menu will be displayed, as shown in Figure 1-9. Next, to specify the location on your computer, choose the **Local** option from the displayed menu; the **Choose a Resource File Directory** dialog box will be displayed. In this dialog box, select the required folder containing the correlation file and choose the **Open** button; the dialog box will be closed and the path of the selected folder will be displayed in the **Read path** edit box. Alternatively, you can directly type the location path of the correlation source in the **Read path** edit box.

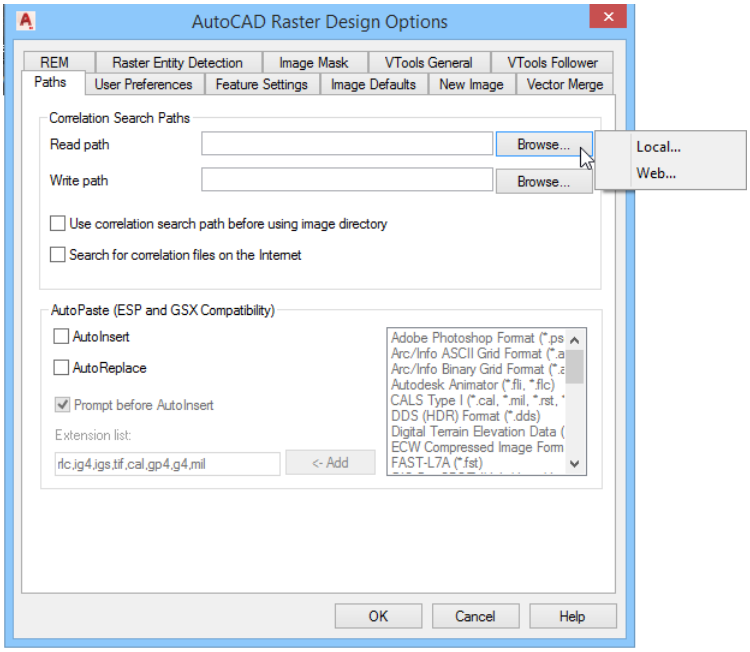

Figure 1-9 *The menu displayed on choosing the* ***Browse*** *button*

Note

You can also specify a web address as correlation source location. To do so, specify the web address in the ***Read path*** *edit box.*

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You can also specify the default path for saving or exporting correlation files. To do so, specify the location of the folder in the **Write path** edit box using the methods explained above.

You can select the **Use correlation search path before using image directory** check box to instruct AutoCAD Raster Design to search for the image correlation file from the specified default (**Read path**) before searching the image path stored in the drawing **Read path**. Similarly, you can select the **Search for correlation files on the Internet** to search for correlation sources on the internet.

The options in the **AutoPaste (ESP and GSX Compatibility)** area are cleared by default and are only to be used when you are upgrading from CAD Overlay ESP or GSX. Select the **AutoInsert** check box to automatically insert images into the drawing that has been created with ESP or GSX.

Note

*On selecting the **AutoInsert** check box, the **Prompt before AutoInsert** check box, **Extension list** edit box, and the **Add** button will be activated.*

Next, you can select the **AutoReplace** check box to automatically search and insert images having same name. AutoCAD Raster Design will insert the new image using the insertion parameters of the old image.

Feature Settings Tab

You can use the options in this tab to create image thumbnails, specify the file locking settings, the width of the rub or crop line, and options for removing raster objects beneath the vector. Figure 1-10 shows the various options in the **Feature Settings** tab.

You can create a thumbnail of the raster image while saving them. To do so, select the **Save thumbnail with image** check box from the **Feature Settings** tab of the **AutoCAD Raster Design Options** dialog box.

You can use the options in the **Locking Settings** area of the **Feature Settings** tab to lock a file that you are editing. When a file is locked, it will deny write access to other users that are simultaneously using the same file. Select the **Lock file** radio button to enable file locking while you are using a network that does not support DOS File Sharing. If your network supports DOS file sharing, select the **OS/Network locking** radio button to enable file locking. Selecting the **No locking** radio button will not lock the file and should only be used in situation where you are sure that only one user will be using the file at any given time.

Note

*The **Lock file directory** edit box will be activated on selecting the **Lock file** or **OS/Network locking** radio button.*

In the **Removal Method** area, you can select the **REM** radio button to delete the raster object beneath the vector. To rub the raster below the vector, select the **Rub** radio button. On selecting this radio button, AutoCAD Raster Design will rub the raster features along the vector using the width specified in the **Rub/Crop Line Width** text box. To specify the width of the rub or crop line specify the required value in the **Rub/Crop Line Width** text box. You can also specify the value in this edit box by picking two points in your drawing. To do so, choose the Pick button that is displayed to the right of the **Rub/Crop Line Width** text box; the **AutoCAD Raster Design**

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Options dialog box will be closed. Next, specify two points in your drawing; the distance between the two specified points is specified as the value in the **Rub/Crop Line Width** text box.

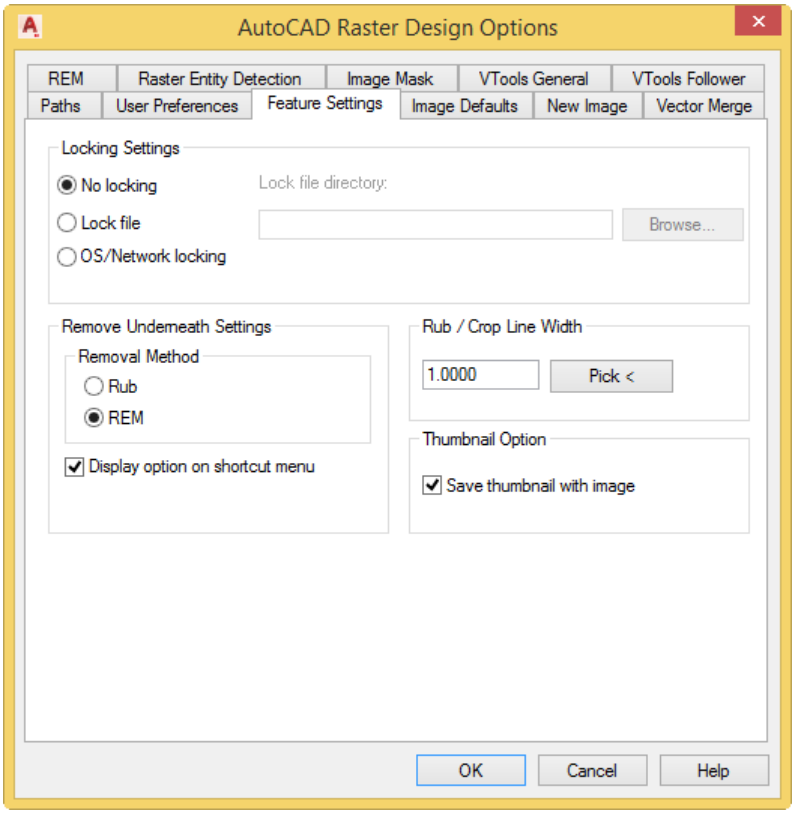

*Figure 1-10 The **Feature Settings** tab of the **AutoCAD Raster Design Options** dialog box*

Image Defaults Tab

In the **Image Defaults** tab of the **AutoCAD Raster Design Options** dialog box, you can set the default image correlation parameters. Figure 1-11 shows various options in this tab. To set the default insertion point (lower left corner) of the raster, you can specify the values for the x, y and z coordinates in the **X**, **Y**, and **Z** edit boxes, respectively. You can specify the scale factor and angle of rotation of the raster in the **Scale** and the **Rotation** edit boxes, respectively. Next, you will be required to specify the units for measuring in vertical axis. To do so, select the required unit from the **Vertical Units** drop-down list. To specify the density of pixel in the image enter the value in the **Value** edit box of the **Density** area. Next, select the units for the density by selecting the required option from the **Units** drop-down list.

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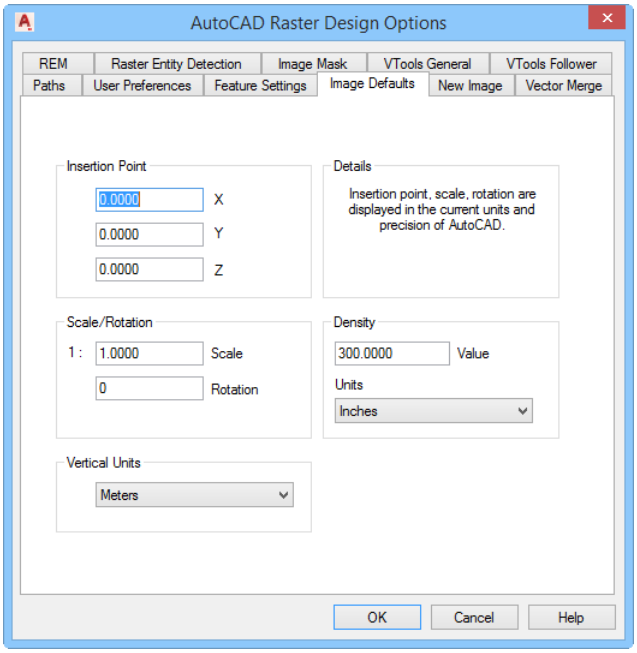

Figure 1-11 *The* ***Image Defaults*** *tab of the* ***AutoCAD Raster Design Options*** *dialog box*

New Image Tab

The options in the **New Image** tab are used to specify the default parameters for creating a new image. You can specify the parameters of image size in the **Default Image Properties** area of this tab. To specify the image size, enter the density of pixels in the **Density** edit box. Next, set unit for pixel density by selecting an option from the **Units** drop-down list corresponding to the **Density** edit box, refer to Figure 1-12.

Note

1. The value specified in the ***Density*** *edit box should be the value at which your images are scanned.*
2. On specifying the width of image in the ***Width*** *edit box, AutoCAD Raster Design will calculate and display the length of the image in the* ***Units*** *edit box corresponding to the* ***Width*** *edit box and vice-versa.*

Next, enter the width of the image in number of pixels in the **Width** edit box. Also, you can specify the image width in units which will be selected from the **Units** drop-down list corresponding to the **Density** edit box. You can also enter the required value in the **Units** edit box corresponding to the **Width** edit box, refer to Figure 1-12. Similarly, specify the height of the image.

In the **Default Color Type** area of this tab, you can specify the default color type of your image by selecting the radio button corresponding to the required color type.

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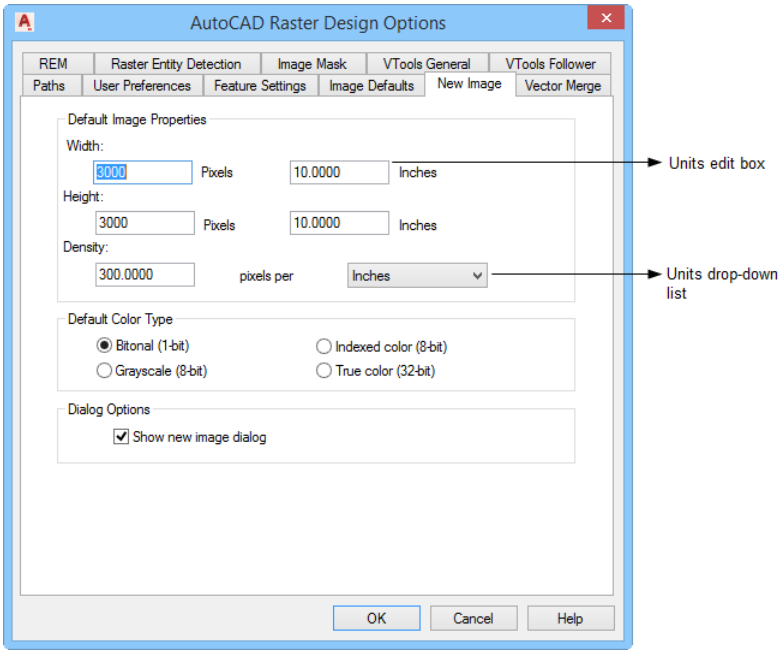

Figure 1-12 *The* ***New Image*** *tab of the* ***AutoCAD Raster Design Options*** *dialog box*

The **Show new image dialog** check box is selected by default. On clearing the **Show new image dialog** check box from the **Dialog Options** area will set the command line of your host AutoCAD platform as the default interface for creating new image. As a result, the **New Image** dialog box will not be invoked on choosing the **New** button from the **Insert & Write** panel of the **Raster Tools** tab.

Image Mask Tab

Using the options in the **Image Mask** tab, you can set the properties of image mask. Figure 1-13 shows the **Image Mask** tab in the **AutoCAD Raster Design Options** dialog box.

Select the **Enable Mask** check box in this tab to enable the existing mask in the drawing. To hide the images that fall outside the boundary of the mask, select the **Hide Image(s)** radio button from the **Image(s) outside the Image Mask** area. To unload images outside the mask boundary, select the **Unload Image(s)** radio button. You can select the **Do not affect** radio button to ignore the affects of masking on the images that fall outside the mask boundary. To display the boundary of the hidden or unloaded images in the drawing, select the **Show image frame(s)** check box. Note that this check box will be disabled if you choose the **Do not affect** radio button.

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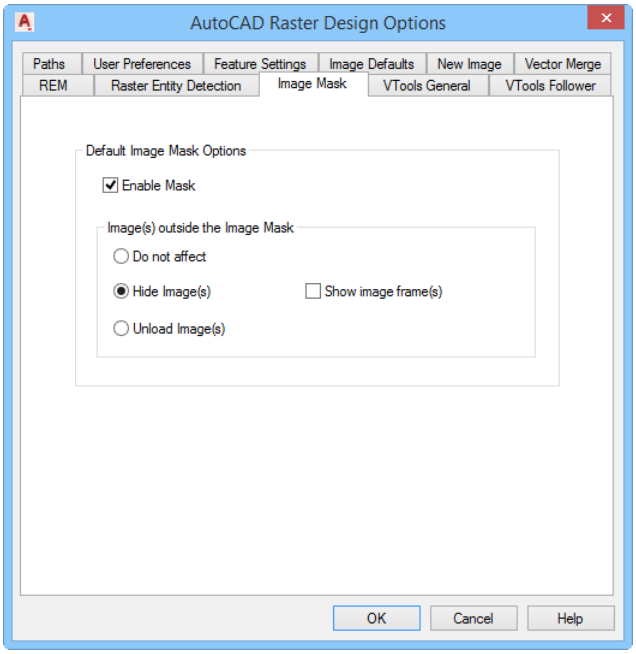

Figure 1-13 *The* ***Image Mask*** *tab of the* ***AutoCAD Raster Design Options*** *dialog box*

REM Tab

Using the options in the **REM** tab, you can specify the color and the clipboard settings for the REM objects. Figure 1-14 shows the **REM** tab in the **AutoCAD Raster Design Options** dialog box.

By default, the REM objects are colored in red. To specify a different color for the REM objects, choose the **Select** button in the **Display** area of the **REM** tab; the **Select Color** dialog box will be displayed. Select the required color in this dialog box and then choose the **OK** button; the **Select Color** dialog box will be closed and the selected color will be displayed in the **Display** area of the **REM** tab.

In the **Clipboard Settings** area of this tab, you can select the **Display capture** radio button to maintain the display scale and rotation of the REM objects that are copied to the clipboard using the **icopyss** command. To copy the REM object to the clipboard disregarding the display scale and rotation, select the **Native Capture** radio button.

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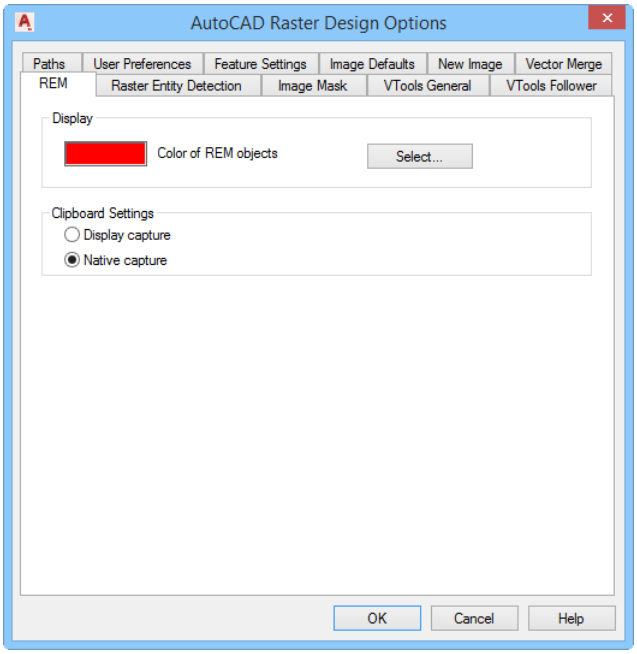

Figure 1-14 *The* ***REM*** *tab of the* ***AutoCAD Raster Design Options*** *dialog box*

Raster Entity Detection Tab

In the **Raster Entity Detection** tab, you can specify the various settings that will be used by AutoCAD Raster Design for detecting and following the raster entities while working with the REM and vectorization tools. Figure 1-15 shows the various options in this tab. These options are categorized into three areas that are discussed next.

Single Pick Options Area

Using the options in this area you can specify the parameters for detecting the raster entity in the image. You can specify a jump value in the **Max jump length (pixels)** edit box to ignore a discontinuity (break) in a raster entity. While detecting a raster feature, if AutoCAD Raster Design encounters a break in the feature, it will calculate the length of the gap. If this length is less or equal to the value specified in the **Max jump length (pixels)** edit box, AutoCAD Raster Design will ignore this break and continue detecting the raster feature.

You can also specify the jump value by picking points in the drawing. To do so, choose the **Pick <** button from the **Single Pick Options** area; the **AutoCAD Raster Design Options** dialog box will be closed and you will be prompted to specify the first end of the gap. Click in the required location to specify the point; you will be prompted to specify the other end. Click at the required location; the **AutoCAD Raster Design Options** dialog box will be displayed with the gap value specified in the **Max jump length (pixels)** edit box.

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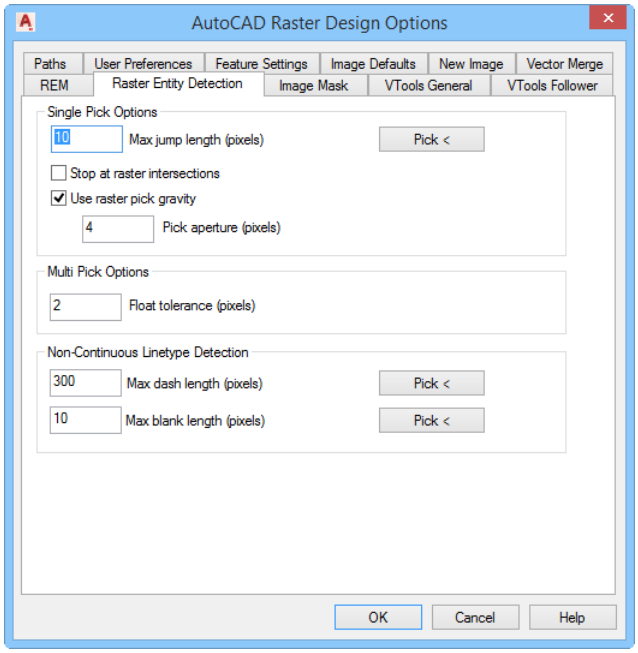

Figure 1-15 *The* ***Raster Entity Detection*** *tab of the* ***AutoCAD Raster Design Options*** *dialog box*

You can instruct AutoCAD Raster design to stop detecting the raster feature beyond at points of intersections of raster features. To do so, select the **Stop at raster intersections** check box. To select the raster feature within defined tolerance of the clicked point, select the **Use raster pick gravity** check box. Note that on selecting this check box the **Pick aperture (pixels)** edit box will be activated. You can specify the selection tolerance (radius of selection) as pixels in this edit box.

Multi Pick Options Area

In the **Float tolerance (pixels)** edit box of this area, you can specify the tolerance value in pixels. AutoCAD Raster Design will ensure that the selected raster entity is within the specified tolerance along the vector.

Non-Continuous Linetype Detection Area

Using the options in this area, you can specify the parameters for detecting a dashed line. To specify the maximum length of a dash, enter a value in the **Max dash length (pixels)** edit box. Alternatively, to specify the dash length graphically, choose the **Pick** button corresponding to the **Max dash length (pixels)** edit box; the **AutoCAD Raster Design Options** dialog box will be closed and you will be prompted to specify one end of the dash. Click on the required location; you will be prompted to specify the other end of the dash. Click to specify the other end of the dash; the **AutoCAD Raster Design Options** dialog box will be displayed and the graphically specified value will be displayed in the **Max dash length (pixels)** edit box. Next, you can specify the maximum value of the gap between two consecutive dash in the **Max blank length (pixels)** edit box. Alternatively, specify the gap value graphically as explained above.

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VTools General

You can use the options in the **VTools General** tab, to set the general behavior of the vectorization tools. The various areas in this tab are discussed next.

Removal Method Area

In this area, you can select the required radio button to specify the method of removing the raster entity. You can select the **REM** radio button to delete the underlying raster entity. To rub the raster, select the **Rub** radio button. On choosing this radio button, AutoCAD Raster Design will rub (erase) the underlying raster equivalent to the width specified in the **Rub/Crop Line Width** edit box of the **Feature Settings** edit box. To retain the raster feature, select the **None** radio button.

To specify the parameters for assigning layers and width to the vectors created using the vectorization tools, invoke the **Vector Separation Options** dialog box. To invoke this dialog box, choose the **Vector Separation** button in the **VTools General** tab, refer to Figure 1-16. The options in the **Vector Separation Options** dialog box are discussed further in the chapter.

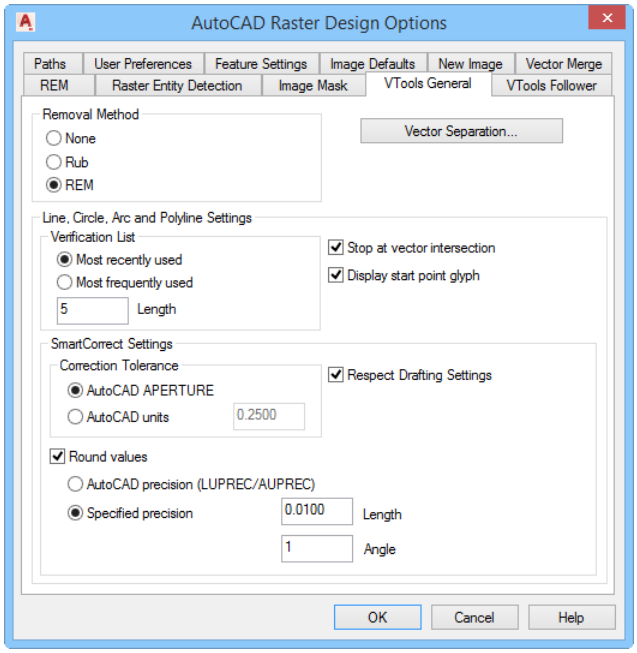

*Figure 1-16 The **VTools General** tab of the **AutoCAD Raster Design Options** dialog box*

Line, Circle, Arc and Polyline Settings Area

The options in this area are further categorized and displayed in various areas, refer to Figure 1-16. These areas are discussed next.

In the **Verification List** area you can select the required radio button to specify the type of value that will appear in the verification list. Next, specify the number of records to include in the verification list by entering a value in the **Length** edit box.

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In this area, you can select the **Stop at vector intersection** check box to stop the vectorization tool, such as **Line** and **Polyline**, at vector intersection when using the one-pick selection. To display a glyph to specify the start point, select the **Display start point glyph** check box.

In the **SmartCorrect Settings** area, you can instruct AutoCAD Raster Design to adhere to the current AutoCAD drafting settings, such as Osnap and Ortho. To do so, select the **Respect Drafting Settings** check box in this area. To specify the allowed shift in vector so as to respect AutoCAD drafting setting, select the required radio button in the **Correction Tolerance** area.

To specify this allowable distance in pixels, select the **AutoCAD APERTURE** radio button. Else, you can select the **AutoCAD units** radio button to specify the value in AutoCAD units.

Next, you can select the **Round values** check box to enable rounding of the length, angle, and radii of lines, polylines, and arcs. Select the **AutoCAD precision (LUPREC/AUPREC)** specifies the precision value that you set in the **Drawing Setup** dialog box. To custom specify precision select the **Specified Precision** radio button. On doing so, the **Length** and **Angle** text boxes will be activated. Enter the required precision values in these edit boxes.

VTools Follower

You will use the options in this tab to specify the parameters for the follower tools used for vectorization. Figure 1-17 shows the various options in the **VTools Follower** tab.

In this tab, the **Follower color** box displays the color of the vector. To change the color, choose the **Select** button; the **Select Color** dialog box will be displayed. Select the desired color in this dialog box and then choose the **OK** button; the **Select Color** dialog box will be closed and the selected color will be displayed in the **Follower color** box of the **Vtools Follower** tab. The **Pan to decision point** check box is selected by default. As a result, the drawing pans automatically to display the current decision point while using the **Followers** tools.

Next, you can select the **End current polyline if closed loop detected** check box for closing polylines and contour. On selecting this check box, the **Close tolerance in pixels** edit box will be activated. Specify the value of tolerance in this edit box. AutoCAD Raster Design will close the polyline if it finds the start and end node of a polyline within tolerance specified in this edit box. You can also specify the value of tolerance graphically by choosing the **Pick** button as explained in previous sections.

You can select the **Post process points** check box to specify the degree of precision for drawing the lines and contours using the **Followers** tools. On selecting this check box, the **Polyline deviation** slider control will be activated. Setting the slider control to **Low**, will create polylines with more vertices. This will result in producing vectors that closely match to the raster entity. Note that, a polyline feature with more vertices will require more storage space.

In the **Contour Settings** area of this tab, you can specify settings for creating contours using the **Contour Follower** tool. To choose the object type of the contour, select an option from the **Contour creates** drop-down list. Select an option from the **Elevation** drop-down list to specify the method for specifying contour elevation. You can set the default elevation and the contour interval by specifying the values in the **Preset elevation** and **Elevation interval** edit boxes,

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respectively. Note that the display of these edit boxes will depend on the option selected from the **Elevation** drop-down list.

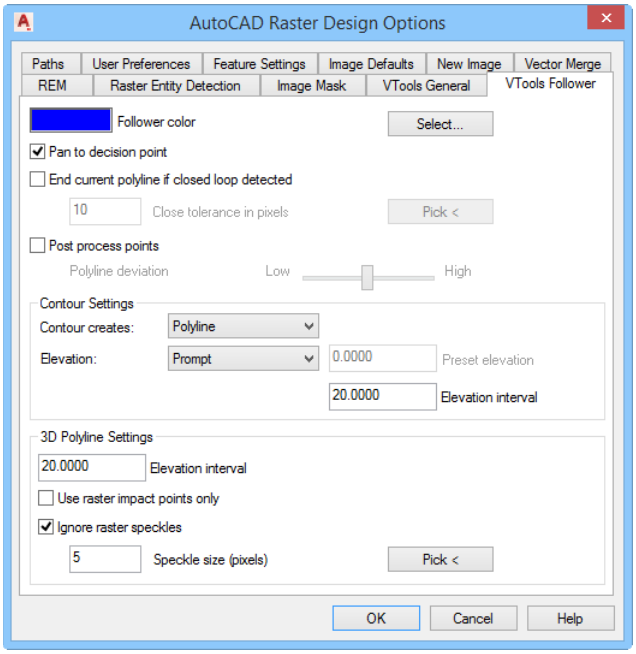

Figure 1-17 *The* ***VTools Follower*** *tab of the* ***AutoCAD Raster Design Options*** *dialog box*

Note

You can select the ***Contour Object*** *option from the* ***Contour creates*** *drop-down list only if you are using AutoCAD Raster Design with AutoCAD Land Devlopment Desktop.*

In the **3D Polyline Settings** area, enter the contour interval in the **Elevation interval** edit box. Next, you can select the **Use raster impact points only** check box if you want the **Followers** tools to pause only at locations where a polyline intersects a raster entity, ignoring other vertices. To prevent the **Followers** tools from pausing at raster intersection points resulting due to the presence of speckles in the image, select the **Ignore raster speckles** check box. On selecting this check box, the **Speckle size (pixels)** edit box will be activated. Specify the speckle size in this edit box. You can also specify the speckle size on the screen by choosing the **Pick** button. On doing so, you will be prompted to pick a speckle or window from the bitonal image. After defining the window for the speckle size; the **AutoCAD Raster Design Options** dialog box will be displayed with the specified speckle size in the **Speckle size (pixels)** edit box. Note that, the value of the speckle size should between 1 to 50 otherwise some necessary information will be deleted from the image considering it as speckle.

Vector Merge

You can use the options in this tab to specify settings for the vector merge operations. Figure 1-18 shows the **Vector Merge** tab in the **AutoCAD Raster Design Options** dialog box.

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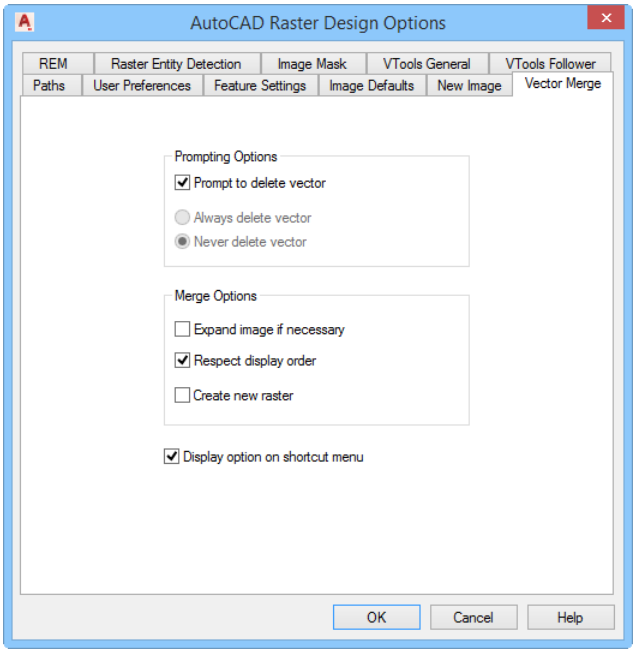

Figure 1-18 *The* ***Vector Merge*** *tab of the* ***AutoCAD Raster Design Options*** *dialog box*

In the **Prompting Options** area of this dialog box, you can select the **Prompt to delete vector** check box. As a result, you will be prompted to delete all selected vectors after the completion of the vector merge operation. If you do not want the prompt, ensure that this check box is cleared. If this check box is cleared, the radio buttons below this check box will be activated. Select the **Always delete vector** radio button to delete all the selected vectors after the vector merge operation. To retain all the selected vectors after the vector merge operation, select the **Never delete vector radio button**.

In the **Merge Options** area of this tab, you can select the **Expand image if necessary** check box to expand the extend of the image to include the vector. To maintain the current display order on performing the vector merge, select the **Respect display order** check box. Next, you can select the **Create new raster** check box to create a new image rather than merging the vectors into the existing raster.

On specifying the required options, choose the **OK** button in the **AutoCAD Raster Design Options** dialog box; the dialog box will be closed and AutoCAD Raster Design will be configured as per the settings specified in this dialog box.

Vector Separation Options dialog box

You can use the options in the **Vector Separation Options** dialog box to specify the parameters such as line width and layers for the vectors features that are created using the vectorization tools (VTools). To invoke this dialog box, choose the **Vector Separation** button, refer to Figure 1-16, from the **VTools General** tab of the **AutoCAD Raster Design Options** dialog box. On doing so, the **Vector Separation Options** dialog box will be displayed, as shown in Figure 1-19.

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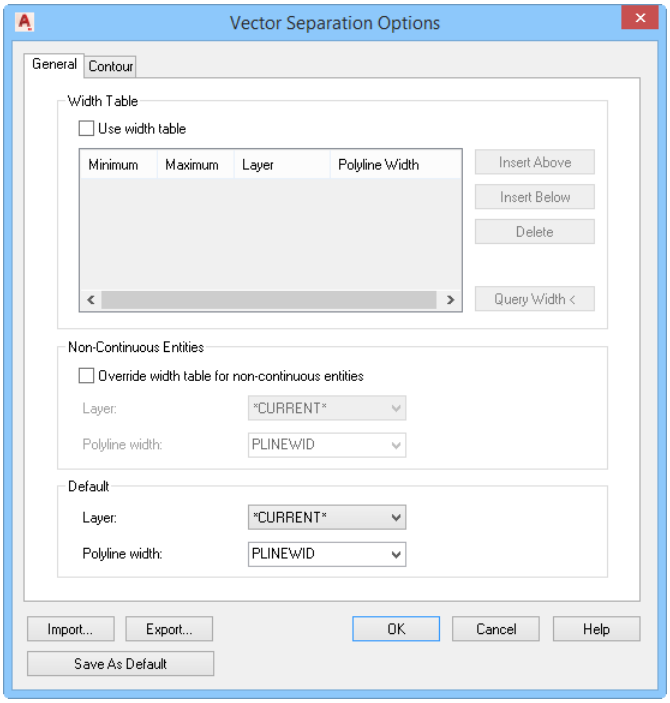

Figure 1-19 *The* ***Vector Separation Options*** *dialog box*

This dialog box is composed of two tabs. The options in these tabs are discussed next.

General Tab

Using the options in the **General** tab of the **Vector Separation Options** dialog box, you can specify the settings for assigning line width and layer to the vectors created using VTools. In this tab, you can also specify the method for handling noncontinuous (dashed) lines. The options in this tab are organized into three areas, refer to Figure 1-19. These areas of the **General** tab are discussed next.

Width Table Area

You can select the **Use width table** check box to specify the layer of the created vectors based on the width of the raster feature from which they are created. The parameters for assigning layers to the vectors are defined in the table displayed in the **Width Table** area.

Note

On selecting the ***Use width table*** *check box, the various options in the* ***Width Table*** *area will be activated.*

Next, choose the **Insert Below** button; a new row will be added in the width table, as shown in Figure 1-20.

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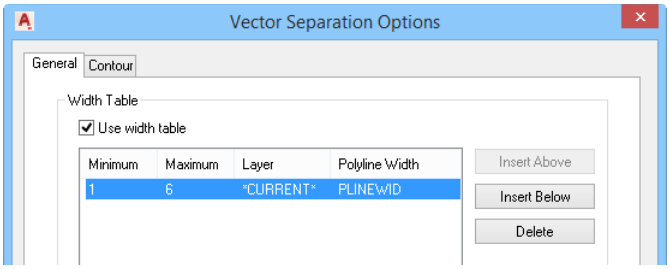

Figure 1-20 *A new row added to the* ***Width Table*** *area*

To specify the minimum width of the raster entity in pixels, click in the **Minimum** cell of the created row; an edit box will be displayed. Specify the required value in the edit box and then press ENTER; the minimum width is set. Similarly, specify the maximum width in the **Maximum** cell.

If you are unsure of the width of the raster entity, you can use the query tool to find it. To do so, choose the **Query Width** button in the **Width Table** area; the dialog box will be closed and you will be prompted to choose the required raster entity in the drawing. Click on the raster entity of which you want to know the width; the **Entity Width Information** dialog box will be displayed, as shown in Figure 1-21. This dialog box shows the width of the selected raster entity in pixels and AutoCAD units.

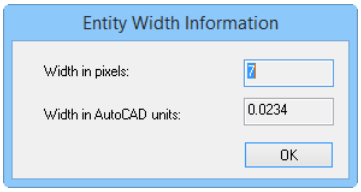

Figure 1-21 *The* ***Entity Width Information*** *dialog box*

Next, to specify the layer on which the vector is to be created, click on the **Layer** cell of the created row; a drop-down list will be displayed showing the layers in the drawing. Choose the required option from the drop-down list to set the layer. To set the width for the vector to be created, click in the **Polyline Width** cell of the row; a drop-down list will be displayed, as shown in Figure 1-22.

In this drop-down list, you can select the **Actual** option for creating vectors with line width equal to the width of raster entity (from which it has been created). To create vectors with width equal to the line width defined in the layer property definition, select the **PLINEWID** option from the drop-down list. Else, you can select the **Zero** option to create a vectors with zero width.

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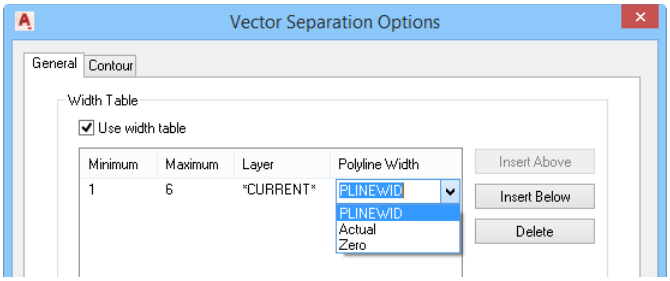

Figure 1-22 *The drop-down list displayed in the* ***Polyline Width*** *cell*

Non-Continuous Entities

In this area, you can override the width and layer settings specified in the **Width Table** area while creating vectors from the non-continuous lines. To do so, select the **Override width table for non-continuous entities** check box in this area. On doing so, the **Layer** and **Polyline width** drop-down lists will be activated. Next, choose the required options from this drop-down list to specify the override parameters.

Default Area

You can specify the default width and layer parameters for the vector entities that do not fall in any defined range. To do so, select the required options from the **Layer** and **Polyline width** drop-down lists as explained earlier.

Contour Tab

The options in this tab are used to specify the line width and layers parameters for the contours created using the VTools. The line weight and the layers can be assigned based on the contour elevation interval. To do so, select the **Separate contours by elevation** check box; all the options in this tab will be activated, as shown in Figure 1-23.

In the **Minor** area, specify the required contour interval for minor contours in the **Interval** edit box. Next, to set the contour layer and width, select an option from the **Layer** and **Polyline width** drop-down lists, respectively. Similarly, specify settings for the major contours in the **Major** area of this dialog box.

Tip

You can use the settings defined in the AutoCAD Land Developer Desktop for specifying the layer and interval for the contours created using the VTools. To do so, select the ***Use AutoCAD Land Development Desktop's settings*** *check box in the* ***Contour*** *tab of the* ***Vector Separation Options*** *dialog box.*

You can also specify the settings for the vector line width and layer in the **Vector Separation Options** dialog box by importing them from an external file. To do so, choose the **Import** button in this dialog box; the **Import Data** dialog box will be displayed. Next, in this dialog box select file to be imported and then choose the **Open** button; the **Import Data** dialog box will be closed and vector settings will be imported in the **AutoCAD Raster Design Options** dialog box.

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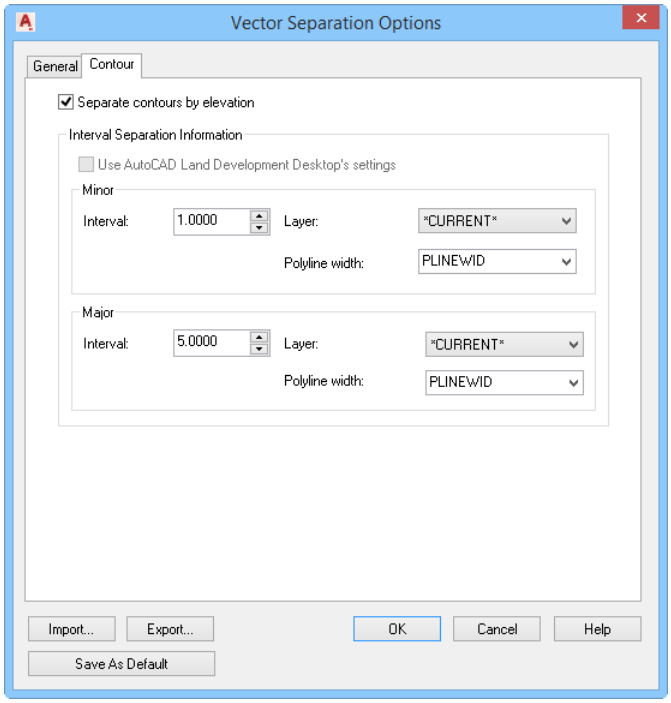

Figure 1-23 *The* ***Vector Separation Options*** *dialog box*

You can also export the line width and layer settings specified in the **Vector Separation Options** dialog box. To do so, choose the **Export** button in the dialog box; the **Export Data** dialog box will be displayed. Specify the name and location of the file to be exported in the **Export Data** dialog box and then choose the **Export** button; the **Export Data** dialog box will be closed and the settings specified in the **Vector Separation Options** dialog box will be saved to the file in the specified location.

To make the current vector separation settings default, choose the **Save As Default** button. The current settings are saved to the default settings file. To close the **Vector Separation Options** dialog box without saving the settings, choose the **Cancel** button; the dialog box is closed without applying the specified settings.

On specifying the required settings in the **Vector Separation Options** dialog box, choose the **OK** button; the vector separation settings will be set and the dialog box will be closed.

Self-Evaluation Test

Answer the following questions and then compare them to those given at the end of this chapter:

1. Which of the following tabs in the **AutoCAD Raster Design Options** dialog box is used to specify the settings for detecting raster entities while using the REM and vectorization tools?

   (a) **REM** (b) **Raster Entity Detection**
   (c) **User Preferences** (d) None of these

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2. The options in the _____ tab of the **AutoCAD Raster Design Options** dialog box is used to specify the settings for detecting the non-continuous line type.

3. You can specify the options for detaching a raster image in the _____ tab of the **AutoCAD Raster Design Options** dialog box.

4. You can specify the vector separation settings in the **Vector Separation Options** dialog box by importing the settings file. (T/F)

5. The **Pick** button in the **AutoCAD Raster Design Options** dialog box is used to graphically specify the distance. (T/F)

Review Questions

Answer the following questions:

1. Which of the following options in the **Vtools General** tab of the **AutoCAD Raster Design Options** dialog box is used to specify the layer for the vector created using the VTools?

   (a) **Vector Separation** button (b) **Respect Drafting Settings** check box
   (c) **REM radio** button (d) None of these

2. Which of the following options in the **AutoCAD Raster Design Options** dialog box is used to specify the entity type for the contour vectors created using the VTools?

   (a) **Elevation drop-down** list (b) **Pick** button
   (c) **Contours creates** drop-down list (d) None of these

3. The options in the _____ tab of the **AutoCAD Raster Design Options** dialog box is used to specify the settings for viewing the image as defined by the mask boundary.

4. The **Polyline deviation** slider is used to specify the degree of precision for drawing the lines and contours using the **Followers** tools. (T/F)

5. Selecting the **Lock file** radio button will enable to restrict the write access to other users that are simultaneously using the image file. (T/F)

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Answers to Self-Evaluation Test

1. b, **2. Raster Entity Detection**, **3. User Preferences**, **4.** T, **5.** T