

# Creating a Map for Point of Attack 2

## Using the Transparent Square Grid Symbol Set

### Introduction

The purpose of this tutorial is to introduce users of HPS Simulations Point of Attack II (POA2) to the craft of creating a scanmap for use in that program. This is done using map and symbol editor components of the HPS Simulations Aide de Camp II program. There are several types of scanmaps that can be made and used by POA2, but this tutorial will focus only on one – the type used in the Albuquerque map using the Transparent Square Grid Symbol set provided with POA2.

The signature feature of maps created using the Transparent Square Grid Symbol Set is that they use the scanned image of the actual map or photograph (i.e., the topographic map or aerial photos used as the base) in all zoom levels with almost no “hand painted” artwork. As with the example POA2 Albuquerque map, you see the same image at increasing degrees of magnification as you increase the zoom level.

In contrast, other symbol sets contain varying degrees of artwork that depict the map instead. The Horizontal Hex Summer Symbol Set also included with POA2 shows the scanned map image at zoom levels 1 and 2 and then switched to a painted artwork mode in zoom 3. The Alternate Symbol Set created by Don Maddox uses “hand-painted” artwork at all zoom levels.

Each symbol set has its own advantages and disadvantages, and not only to the user of POA2, but also to the mapmaker. Creating maps with the Transparent Square Grid Symbol Set is a cost effective method of crafting accurate scanned image maps with the minimum amount of time and effort. But do not be mistaken – creating any map for use in POA is an extremely demanding task requiring focus, attention to detail, determination, patience, and many hours of hard work. These are needed because the maps contain a great deal of data necessary for a program as sophisticated as POA2 to realistically simulate real world events.

### Tools of the Trade

#### **Graphic Editors**

You must have an installed third party image/graphic/paint/photo editing utility program published by, or similar to those published by Corel, JASC, or Adobe. The utilities provided by Microsoft Windows such as Paint, Photo Edit, or those included in MS Word, for example, are inferior programs and do not have the capabilities needed to accomplish the editing required.

Furthermore, you must be familiar with the functions and use of the graphic program you have installed. If you do not use it regularly, take the time to read the manual and experiment with all aspects of the program. This tutorial assumes you understand the common functions involved with image editing. Understand how to select, copy, paste, and crop. Get very familiar with the resizing function and the various types of resampling methods available in your graphic editor, as this will have a major impact on the quality of your map image. If you are splicing several scans into single map, you will need to be adept with the use of the selection and/or layer deformation, painting and cloning functions. You will also need to completely understand how to adjust gamma, saturation, brightness, contrast, and sharpness level.

## **HPS Aide de Camp II**

You will be using two components of Aide de Camp 2 (ADC2), the map and the symbol editors. This tutorial will walk you through the various functions of each of these utilities as they are needed. Please do take the time to thoroughly read the ADC2 documentation on the use of these tools. While it may not make a lot of sense immediately, having at least familiarized yourself in this manner will make understanding the tutorial that much faster and easier.

## **HPS Point of Attack II**

The maps you make, and the symbol set they are based on, are linked to the POA2 database. This tutorial will explain how to ensure your map will work properly in POA2 using the POA2 Editor. Be sure to read Appendix B in the Point of Attack Manual, which is an excellent starting point for understanding the map-making process.

## **Scanner**

Obviously, you need a scanner to create the scanned image if you are copying from a paper source. Given the hundreds of models available and the wide range of pricing, it is impossible for me to say much about scanners. However, if you not happy with the look of your scanmap, your hardware may be the culprit. In essence, scanners are commodities – you basically get what you pay for. Inexpensive (and older technology) scanners may create irreparable distortion in both image shape and color. This usually isn't noticeable when scanning photos or paperwork, but can result in an inferior map image with a color shift from one end of the map to the other. It can be maddeningly critical when you are attempting to stitch images together or when rescaling the image to work in POA2.

## **The Map**

The map you see on your POA screen is not a unitary entity. While there is a single \*.map file for every map created in ADC2, it contains little data which is actually displayed. The map is composed of many different elements which the \*.map file pulls together and organizes so that ADC2 and POA2 can use the data and display the components in the correct location and in the proper order.

The map you see displayed is composed of layers containing the following elements, in the normal order in which you see them if you were looking down through each:

- Placename Text
- Grid Overlay
- Attribute Symbols
- Placename Symbols
- Hexlines
- Hexsides
- Secondary Symbols
- Primary Symbols
- Elevation Datum
- Scanmap Image

(Note that you can change the display order of these elements (except for the scanmap image), so that they displayed in different orders, but this is unnecessary when creating a scanmap using the Transparent Square Grid Symbol Set).

Consider the \*.map file to be a structure on which these elements are attached. The ADC2 and POA2 programs take this structure and its elements and creates a matrix – either square, offset

square, or hexagonal – which POA2 uses to provide useable graphic display for the player and useable data for the movement, line of sight, combat effect and other routines.

### **Description of Map Elements:**

Scanmap Image is ADC2/POA readable graphic. ADC2 is limited to using Windows BMP files, while POA2 can use either BMP or JPEG format files. ADC2/POA2 does not enlarge or reduce images on the fly and instead displays the map at three different levels of magnification, described as Zoom 1, 2, and 3, with Zoom 3 being the highest level of magnification. It is important to note that each Zoom Level has its own Scanmap image. In practical terms this means that you will be doing several things 3 times when you are crafting your map. The scanmap images are stored in files \*-L1.BMP, \*-L2.BMP, and \*-L3.BMP.

Primary, Secondary, Attribute, and Placename Symbols. Symbols are square sections of a BMP file. ADC2 and POA2 take these sections and create tiles used to populate the map matrix. Each symbol tile can be used as many times as called for by the map file. This means you can create one symbol to represent multiple instances of the same feature on the map.

Symbols are not only important in regards to what they display graphically (which isn't much in the type of scanmap we're discussing, as the symbols are transparent, after all) but that they *also define the type of natural and man-made features located in the square*, which the POA2 engine uses. This is accomplished in POA2 by linking the map's symbol set to POA2's Terrain Effects Chart (TEC).

The terms Primary, Secondary, etc are the legacy of the HPS Aide de Camp I program from the mid-1990's. With the ability to change the display order of the map elements, the names have less importance than they did then. One interesting legacy is the Placename Symbol is that you could attach a symbol to a hex or square when placing text on the map, which was important because the number of attribute symbols was limited. That limitation is now gone.

In any case, the symbols could just as easily now be named 1,2 and 3. What is important to remember is that in POA2:

1. The Primary Symbol is reserved for displaying the symbols used to show the elevation in POA2.
2. The Secondary Symbol is reserved to define the majority type of ground terrain in the square (e.g. open field, meadow, sand, swamp, etc)
3. Attribute Symbols are used to define additional natural and man-made features that are located on the terrain defined by the Secondary Symbol. Attribute Symbols include woods, orchards, buildings, permanent fortifications, etc.

Symbols are maintained in a Symbol Set, which is composed of several different types of files. The \*.set file contains critical data which brings the other file data into proper sequence and maintains the actual text names of the various symbols located within the larger symbol BMP files.

Terrain symbols are maintained in three BMP files labeled \*-t1.bmp, \*-t2.bmp, and \*-t3.bmp with each 't' number referring to the zoom level of the symbols contained in the file.

Unit/Piece symbols are maintained in three BMP files labeled \*-u1.bmp, \*-u2.bmp, and \*-u3.bmp with each 'u' number referring to the zoom level of the symbols contained in the file.

Mask symbols are maintained in three BMP files labeled \*-m1.bmp, \*-m2.bmp, and \*-u3.bmp with each 'm' number referring to the zoom level of the symbols contained in the file. The mask symbol files contain the images necessary to create transparent symbols for both terrain and unit/piece symbols.

Hexsides: A line of definable width and color stored in the .map file, which is drawn between the boundary edges of the map's tiles. A square grid map can also have a 'hex' side, despite the fact it has four, not six sides to each tile. Hexsides can be linked to the POA2 Terrain Effect Chart (TEC) so that unit movement, sighting, and fire are affected in the simulation. Typical examples include a stream, narrow ditch, or wall. Note that in simulation terms hexsides only affect movement, sighting, or fire that occurs across the line. For example, a unit can move across a stream hexside from one side to the other (which will probably slow down it's rate of movement), but it cannot sit in the middle of a stream or move in the stream. Hexside data is maintained in the actual \*.map file.

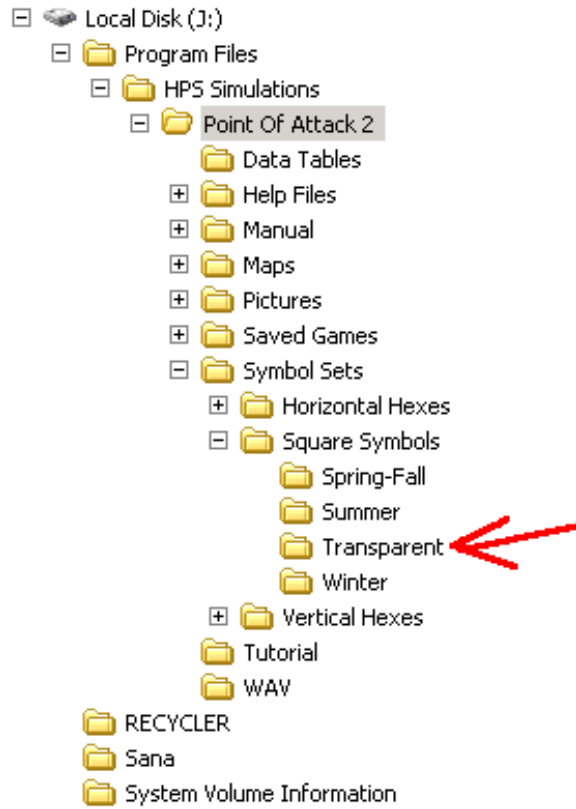
Hexlines: A line of definable width and color stored in the .map file that is drawn between the geometric center of the map's tiles. A square grid map can also have a 'hex' line, despite the fact it has four, not six sides to each tile. Hexlines can be linked to the POA2 Terrain Effect Chart (TEC) so that there is a special relationship between two adjacent squares. This is normally used to depict roads, trails and other terrain features that affect movement. Hexlines only affect units moving along them from one square to the next, and do not affect sighting or fire. Hexline data is maintained in the actual \*.map file.

Grid Overlay: The visible tracing of the map matrix that POA2 uses to define the location of terrain and unit symbols. The Grid Overlay is a one pixel wide edge around a transparent symbol. When crafting a scanmap with the Transparent Square Grid symbol set it will of course be square, but it can also be a hexagon when using other symbol sets.

Placename Text: Text used to describe a specific location, limited to 24 characters. This data is stored in the actual map file. Placenames have no effect in the POA2 simulation engine.

## **Symbol Sets**

You will need to download the Working Transparent Square Grid Symbol Set file from the HPS Simulations website ([www.hpssims.com](http://www.hpssims.com)) in order to create a scanmap.



Unzip the Working Transparent Square Grid Symbol Set into the Transparent Folder. Doing so will not affect other maps.



The Transparent Square Grid Symbol Set that comes with POA2 does not display the terrain – the terrain symbols are transparent to allow the scanned map image to be displayed.



Terrain types are invisible.



The Working Transparent Square Grid Symbol Set is not totally transparent so that you can visually identify the terrain in each square when creating the map.



Terrain types are coded with small colored symbols.

When the map is completed, it will be linked back to the normal transparent square grid symbol set.

### **The Basics of Scaling**

One of the more difficult concepts for many people to understand is the relationship between the scale of the paper map, the scale of the scanned image of that map, and the scale of the scanmap image used on POA2.

First you have to understand and be able to differentiate between the different uses of the word "scale." The common definition of a map and scale is:

*A map is a scaled graphic representation of a portion of the earth's surface. The scale of the map permits the user to convert distance on the map to distance on the ground or vice versa. The ability to determine distance on a map, as well as on the earth's surface, is an important factor in planning and executing military missions.*

*The numerical scale of a map indicates the relationship of distance measured on a map and the corresponding distance on the ground. This scale is usually written as a fraction and is called the representative fraction (RF). The RF is always written with the map distance as 1 and is independent of any unit of measure. (It could be yards, meters, inches, and so forth) An RF of 1/50,000 or 1:50,000 means that one unit of measure on the map is equal to 50,000 units of the same measure on the ground.*

In POA2, scale is defined differently – 100 meters per square or hexagon. The scale can be changed in the game, 10 meters, 500 meters, 1000 meters – whatever. But this will always be in relation to the game map grid (square or hex), not a real world unit of measurement. This is further complicated by the fact that ADC2/POA2 uses three levels of magnification – Zoom Levels 1-3. While the scale remains the same for all zoom levels (one grid equals 100 meters across, for example), the actual size of the grid displayed on the monitor changes depending on the zoom level. The size of each grid at each zoom level is set when the symbol set linked to the map is created, and is dimensioned in pixels across the symbol tile. Graphically the computer displays images on the monitor using colored dots called pixels. Pixels are not uniform in dimension –

their size is determined by the monitor resolution set by the user of the computer, but can also varied based on the monitor manufacturer specifications. The sizes of the grid in the POA2 symbol sets by Zoom Level, in pixels are:

Zoom 1	10 Pixels
Zoom 2	20 Pixels
Zoom 3	70 Pixels

These are important to know when you do the math to calculate the image size for each zoom level when you resample (resize) the scanned images.

Note that you always create the initial image in Zoom 3 and resize down to the other zoom level. You should never resize larger because the image quality will be terrible. For the most part this eliminates the possibility of using images downloaded off the Internet, as they will not be large enough to use as zoom 2 or 3 images and will usually result in blurry, indistinct, and amateur-looking maps.

In order to scale the scanned map to match the map scale in POA2, it is necessary to have known distances on the map. Just knowing the map scale is not enough – you have to be able to determine the number of pixels for a given distance on the map.

Obviously, using a military topographic map with a grid is the best, as it provides both a horizontal and vertical reference when resizing the image. Many civilian maps also are printed with some sort of a grid, but be sure you check to see if it matches the scale of the map. Often the grid printed on the map is only there to help readers locate streets and locales, and has nothing to do with the scale of the map.

In this case, or in the case of maps without a grid, you will need to use the graphic scale (A graphic scale is the ruler printed on the map and is used to convert distances on the map to actual ground distances) – not the greatest second choice. You only get a horizontal reference if you use a graphic scale – there's no way to check the vertical aspect of your image, leaving you with some vertical distortion of scale. So, don't forget to scan the scale bars even if that portion of the map that has the graphic scale isn't part of the final scanmap image you want. And of course be sure to scan it at the same resolution as the rest of the map – and keep it in the middle of the scanner window to keep distortion to a minimum.

#### Basic Scanning Procedures and Tips

Warm up your scanner by performing a full scan. If you compare your very first and second scan of the same map you will often see a distinct difference in hue, saturation, and brightness. Performing a warm-up scan should eliminate this.

You need to scan at a high resolution. The map tutorial was scanned at 200 pixels per inch – it's a 1:10,000 scale map. If you are using a 1:50,000 scale map you will need to scan at a minimum of 450 dpi. This will give you enough pixel material to work with when enhancing the image and resizing it to match the POA2 scales.



Sample of 1:50,000 scale map scanned at 450 dpi.

It is better for you to control the resizing of the image than attempt to determine the exact resolution to set the scanner, as there is almost always a little variation in the scanner. If you check the properties of your scanned image using your image editor you may see resolutions up to plus or minus 1.5%. This distortion could have a big effect on your map if you attempt to simply set the resolution to match the scale – which is why I will not explain how to use that method!

All but the most expensive scanners will introduce distortion along the edges of the scan – the truest scan is right down the middle of the scanner's glass window. You will want to crop off at least an inch off the sides of the image, so plan ahead when determining the area of the map you are scanning. If you have a larger map area than your scanner, then you'll have to scan individual areas of the map and stitch them together. Be sure to be generous in the overlap when you scan these pieces to allow for cropping off the distorted edges while still having enough map image to overlap onto the adjacent scan.

If you end up with an image with severe color shift, even after the scanner has been warmed up, try shutting your scanner down completely and starting over. If the problem persists, try scanning at the higher resolution. Make sure your map is held very firmly against the scanner window. Remove the scanner lid and use books to flatten the map. Try placing a white sheet of paper on top of the back of the map before you place the books. This can eliminate shadowing and will result in a brighter image.

Select the slowest scan mode available in your scanner software by selecting what is usually named "Printed Material" "Magazine" or "Color Art Magazine" in the type of original material/media option of the program. Do not select the Photograph mode. Using the slower scan mode eliminates Moiré Pattern Noise and will produce a clear image with vibrant color.

Of course you want to select your scanner's True Color mode, but leave all adjustable settings like brightness, hue, saturation, etc set to zero. If these need to be adjusted to create the best image, then it is best for you to decide (rather than the scanner program) what adjustments should be made – adjustments made when using your image editor.

Save your image as a Windows BMP file, not an OS/2 BMP file if your scanner software has that option. While POA2 can now use JPEG images, ADC2 cannot. So until the map is completed, you must work with BMP files. You will want to experiment with improving the quality of your image – sharpening is given, but you may also want to adjust gamma and/or brightness levels. Just be sure to do it initially to your zoom 3 whole image scan before you create the scanmap.



## **Scanmap Creation Walk Thru**

In this section I will go through the actual steps used in crafting a scanmap, and will be explaining in more detail the application of the basic information provided above.

### **The Map.**

I have selected a Soviet military topographic map of Sana'a, the capital of Yemen. In addition to the potential offered by the ability to simulate combat in a typical Middle-Eastern urban environment it is a map which will provide plenty of detail for use in POA2.



Note the map has grid lines, which will help greatly when resizing the map image to the proper scale.

The scale of the map is 1:10,000. Examining the graphic scale and map, I note that grid printed on the map is 500 meter squares. The contour interval is 20 meters – important to know when editing the map elevations.



Given the physical size of the map, I plan on scanning only the main part of the city. This is primarily due to the fact that my scanner has only 8.5"x 14" scanning capability. If I did the entire map, I would end up stitching over 20 images together. Stitching is demanding work, and the more images you are working with, the more difficult it becomes to get them all to fit together.

Unlike me, ADC2 and POA2 could handle making a map this size. The entire map would be about 7600 squares. The Fort Irwin map in POA2 has over 11,000 hexes. The Albuquerque map has over 33,000. Each square or hex contains at a minimum, elevation and secondary symbol data that you will have to manually input. If the square contains a lot of varying terrain – buildings with trees, roads, ditches, etc – you will also have to enter each one of these elements. It takes a lot of time; so unless you got a lot of spare time, select the smallest map, or area on a map, which enables you to simulate what you want. Force size and weapon range will play a part in determining how large a map you should make.

### Scan, stitch, and modify the map image

Using the basic scanning procedures listed above, I scan the center part of the map in five sections.



Note that I've named the BMP files sequentially C1-C5. Use whatever works for you, but make easy to keep the images in sequence. Of course if your map is small enough, you may only have one image.

You can see that I overlapped the areas I scanned a good deal so that I could trim off the edges to eliminate potential distortion. Despite my best efforts to align the map while scanning, it's impossible to scan multiple images and have them all perfectly square. I used the

Deform/straighten tool in Paint Shop Pro 8 to easily rotate the images so the grid lines were square. I then stitched the pieces together by copying each individual image into it's own layer on a large canvas. Some of the layers still required additional skewing distortion to match the adjacent images – more evidence that scanning inherently introduces distortion. Once all the images were aligned, I merged the layers and saved the image as a large single BMP file:



Note the uneven lower edge of the stitched image resulting from aligning, rotating, and distorting process need to match up the individual images.

On the image above, it is hard to see some of the image irregularities introduced during scanning. I used the Cloning Tool in my graphic editor, along with some cutting and pasting from similar but better looking parts of the map, to clean up the map image. It doesn't need to be absolutely perfect since the image is going to be resized anyway. Plus, the eye often doesn't catch minor imperfections in a large, busy image.

Raw Image



Repaired Image



I held off doing any other touch up on the map image because I knew I was going to be resampling it to a smaller size, following which additional touch up would be required. It is best to perform touch-up and other adjustments as few times as possible. In other words, attempt to keep your image as close to the original scan as possible. Every time you adjust the sharpness, brightness, or gamma of your image, the more your graphic utility is interpreting and changing the image. Do this too much and you will lose clarity as the program anti-aliases away the fine detail of your map.

I then cropped the map image to even up the edges:



## Resize the Image to work with POA2

The next step is resizing the image so that scale of the image matches the scale of the POA2 square grid.

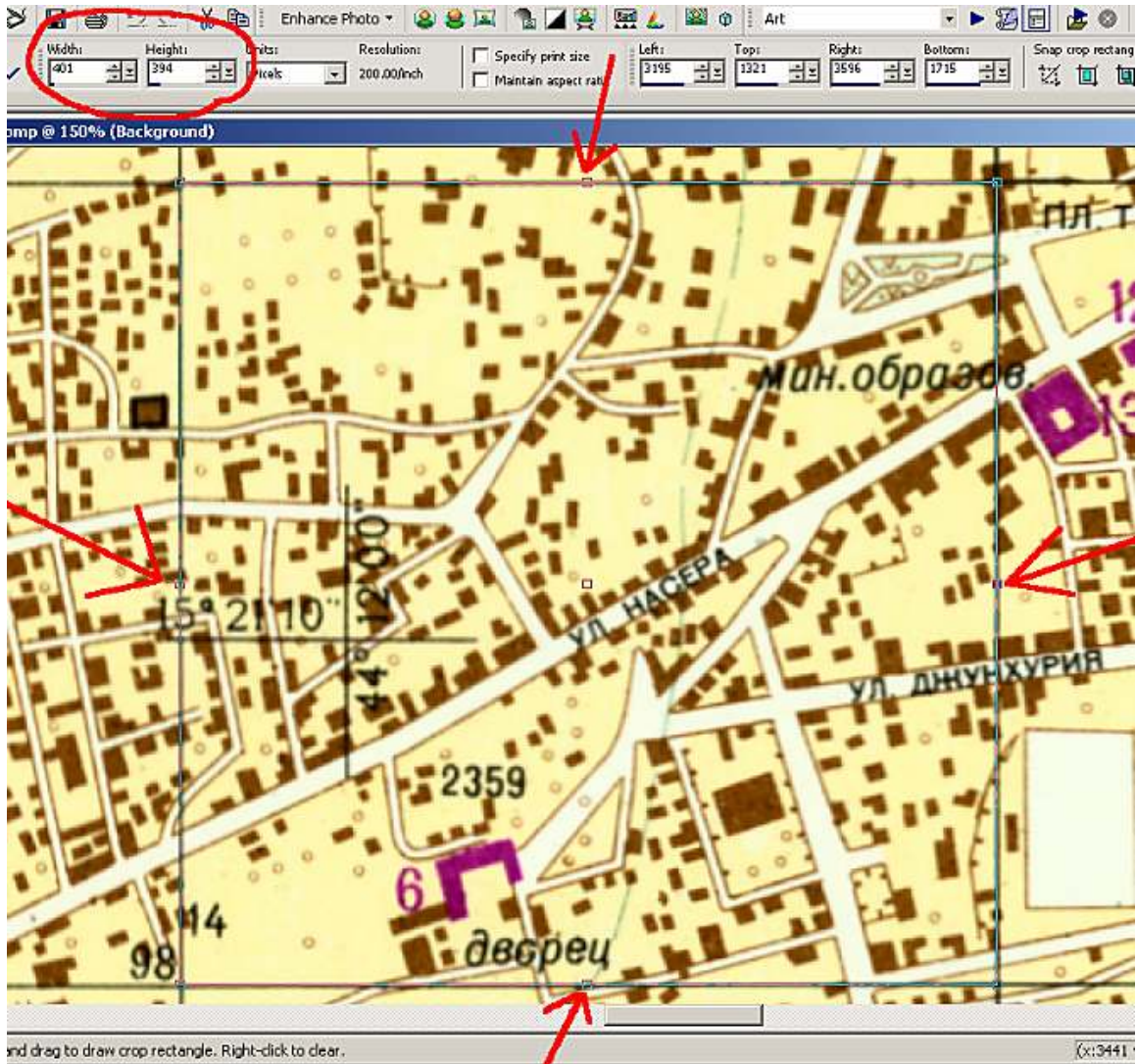
If you've been following along, you know that:

1. The POA2 scanmap is made using the Zoom 3 image, resampling down in size to Zoom levels 2 and 1.
2. The Zoom 3 grid is 70 pixels across.
3. The POA2 scale is 100 meters across each grid.
4. The grid on the Sana'a map is 500 meters across (and up, too)

Therefore:

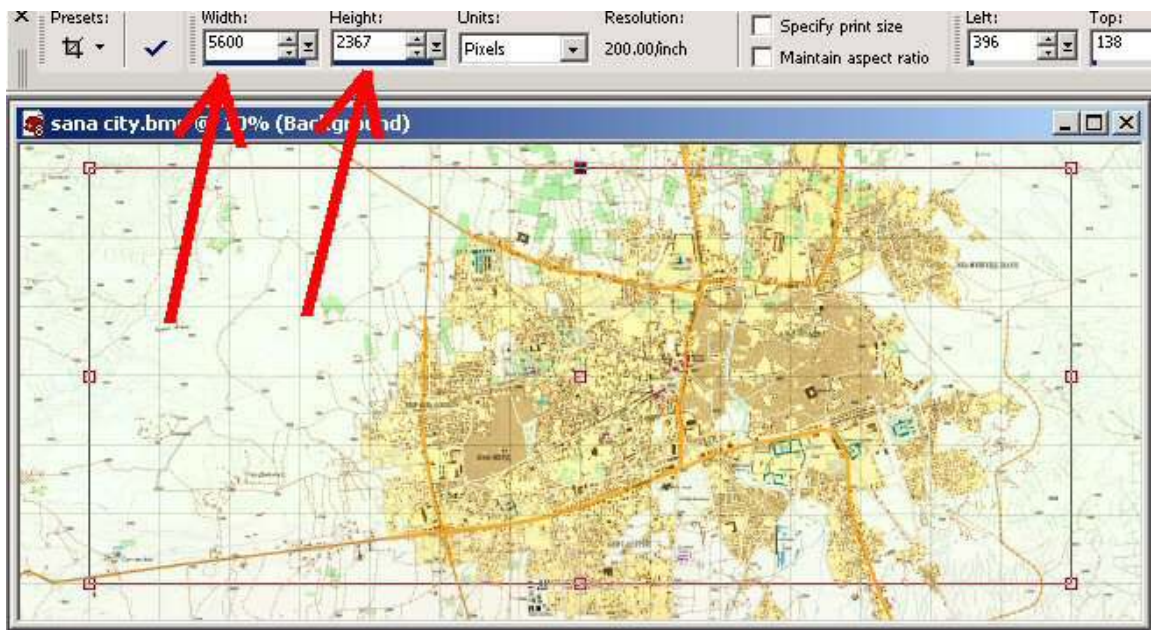
1. Each 500 meter grid square on the map will be five 100 meter squares across in POA2.
2. Since each square grid in POA2 has 70 pixels across, and you have 5 POA2 squares for every one map grid square, one grid square on the map should measure 350 pixels across (from side to side *and* top to bottom) since 70 pixels X 5 squares equals 350.

Well let's see how close the image is to 350 pixels per square. I like using the Crop Tool in the graphic editors I have to measure because I can drag and relocate the crop box lines multiple times without ill effect, and the program gives me a constant readout in pixels of the crop box dimensions. (*Note that you never actually crop the image!*)



You can see the width and the height of the grid are 401 pixels across and 394 pixels high. I checked this on several grid squares and the majority matched these dimensions. A few were off by one pixel – mostly in the vertical dimension.

Double-check your work by selecting a larger area to measure:



There are 14 grid squares across, and  $5600 / 14 = 400$   
There are 6 grid squares vertically, and  $2367 / 6 = 394.5$   
So the measurement of the single grid square was apparently close enough.

To determine what size I needed to resize the map, I simply determine the ratio of what the image is (410 x 394) to what I want it to be (350 x 350).

Width:  $350 / 401 = .8728179$   
Height:  $350 / 394 = .8883248$

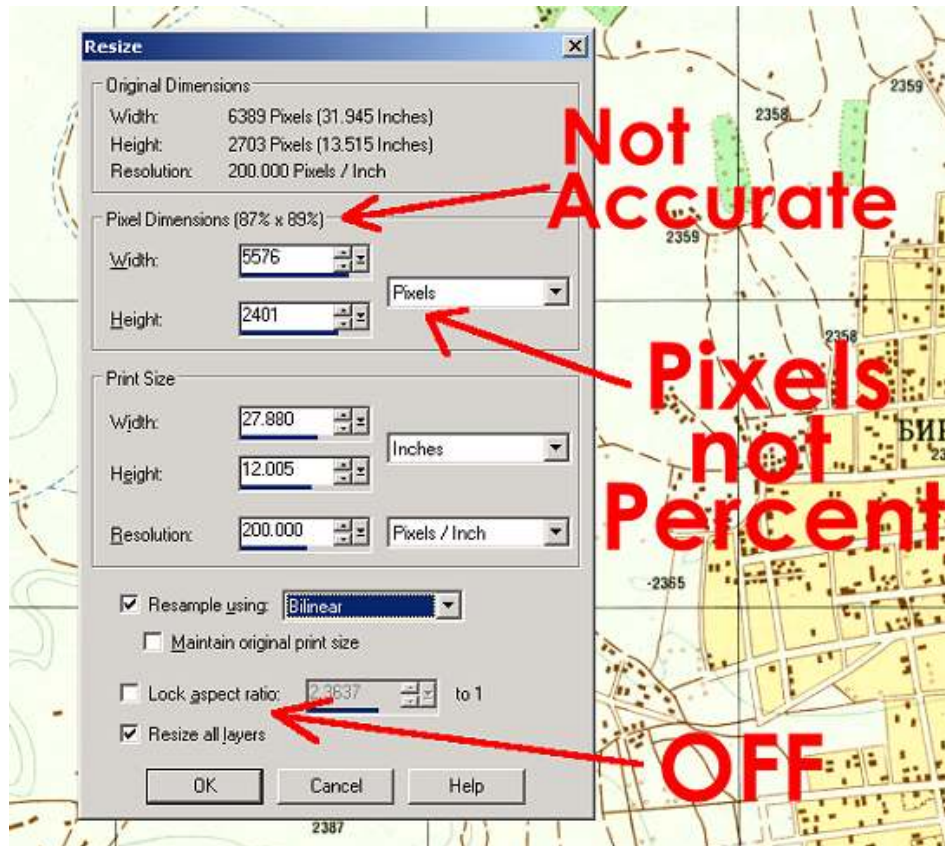
Use these ratios to resize the entire image. Your graphic editor resize tool probably has the option of decreasing the size of images using a percent – don't use it. Instead, do the math yourself and enter the new image size in pixels.

Image Width 6389 pixels X  $.8728179 = 5576.43$   
Image Height 2703 pixels X  $.8883248 = 2401.14$

If you use the percent tool which rounds to 87% and 89% in this case, the width of the dimension would be 18 pixels too small. The height would be 4 pixels too large.

Note that you must turn off the tool's "lock aspect ratio" - or whatever it might be called in your utility. If the tool is set to maintain the aspect ratio, when you change one dimension of the

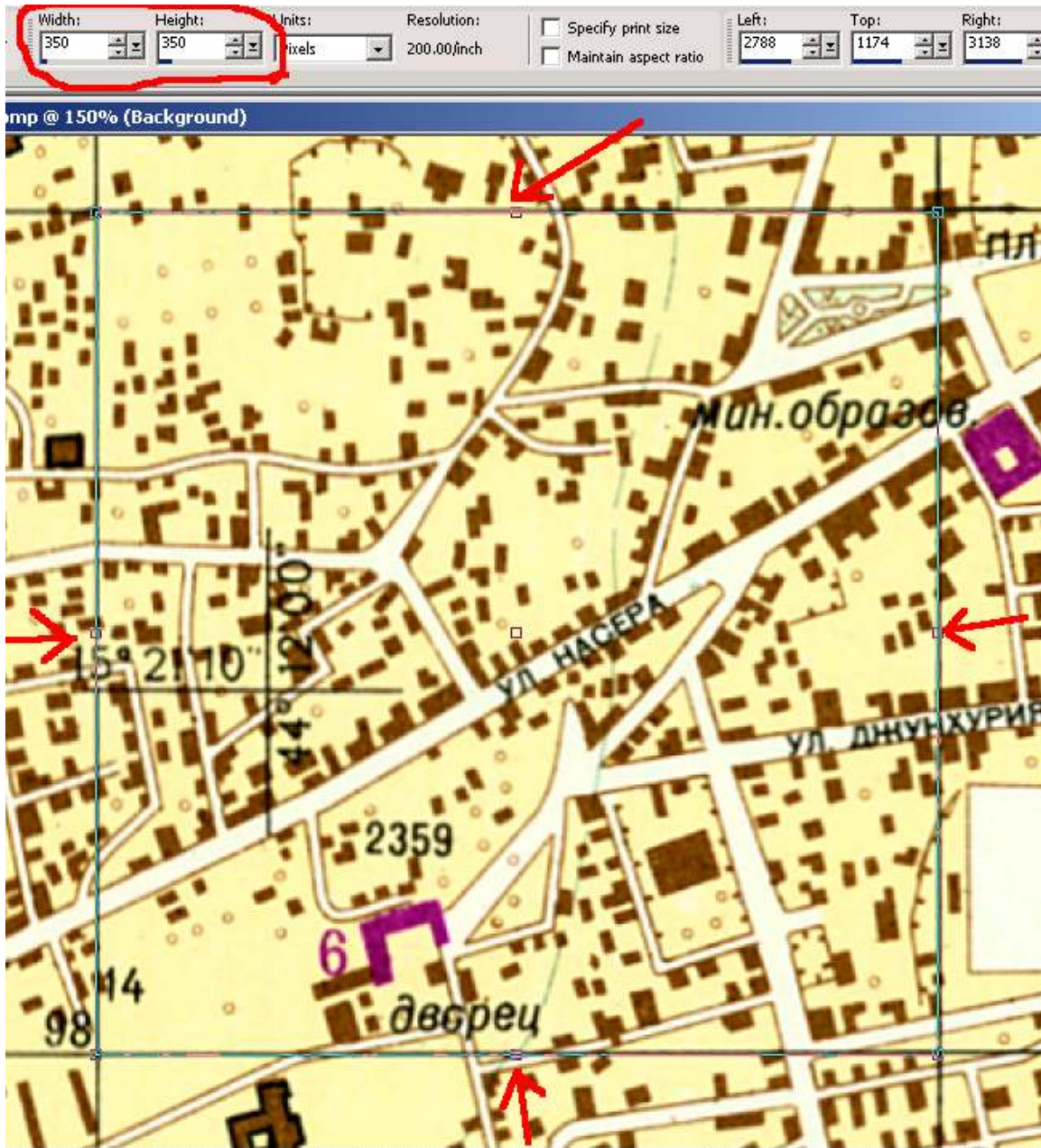
image, the other will automatically change at the same ratio (1:1) in order to prevent distortion. In our case though, we must decrease the width relatively more.



Your graphic utility should have some “Resample” option – or at least an option to anti-alias the image when it is resized. If you don’t have an anti-alias option, the image will be resized by shifting pixels rather than blending the pixels. This frequently results in a damaging loss of detail, especially with thin, narrow lines, which can simply disappear in the process as the pixels composing them are lost in the resizing process. Considering all the data on a map that is composed of lines – roads, contour lines, streams, fence lines, etc, this is definitely not an option. If your image editor has resampling options, read the program documentation and experiment to find which provides the cleanest anti-aliasing algorithms. In Paint Shop Pro 8, either Bilinear or Weighted Average work best. Your program may have others or have different names for these resample options.



Having completed the resizing of the entire image, it's a good idea to double-check your work. The grid square is now 350 x 350 pixels, and your image is what it will look like in Zoom 3 in POA2.



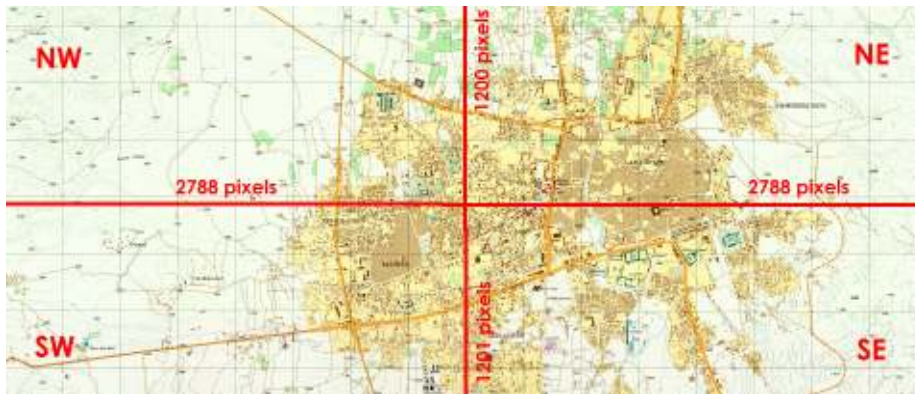
Finally, you will want to make any adjustments to the image quality at this point, as this image will serve as a basis for the Zoom 1 and 2 images. You may want to adjust gamma or brightness. I definitely recommend using the 'Sharpen' or 'Clarify' tool of your image editor. I used the 'Unsharp Mask' tool in PSP8, which despite its name is a great tool for making the map less blurry without a loss of color or detail. Once you are satisfied, be sure to backup your image.

## Slicing the Map





Now that I've got my map image put together, resized and looking good, I'm going to slice it into pieces again. This may sound ridiculous, especially since the scanmap included with POA2 are single images, but there's a good reason. The maps created for POA2 were made long before the program was completed and they worked fine – and still do. But POA2 is a huge, complicated program with heavy demands on your computer system, and these large single BMP scanmaps don't help. And, while it is true that POA2 now has the ability to use JPEG format files (I'll discuss when to convert them), they don't help as much as one might think. Consider the JPG image photo of the entire map at the beginning of this section. It has a file size of 608 KB. However, when read and in memory, it uses 7860 KB of RAM.

Therefore, in order to make POA2 run faster and smoother, especially for those without bleeding edge computers, the best thing to do is to cut the scanmap into smaller chunks that POA2 (and ADC2) can 'digest' more easily. How small should these pieces be? There is no definite answer, other than smaller is better. However, in general, pieces sized 4-9 MB in size as BMP files work great. Slices 10-15 MB in size are okay, but not as helpful. It all really depends on the computer processor, operating system, type of video card, and how much RAM the system has.

For this tutorial, I will take my Zoom 3 image, which is 5576 pixels wide and 2401 pixels high, sized at 38.3 MB, and cut it into 4 almost equal pieces. I use the Crop Tool because I can specify the exact size of the final image. After I crop a section, I save it to another name (in this case NW, NE, SW, and SE), then 'Undo' the crop until I am back at the original full image, and then repeat the process for another quadrant.



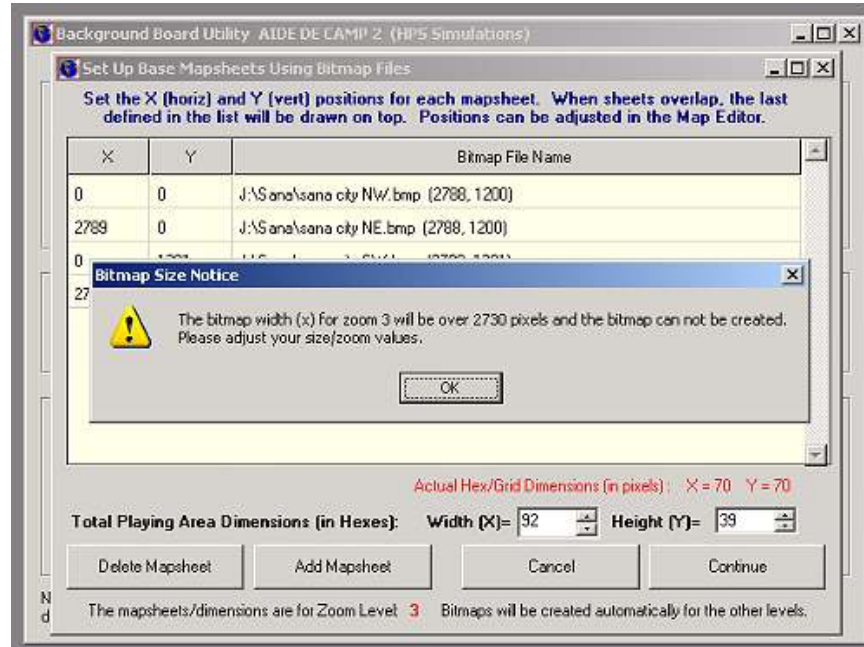
Resulting in:

Name ▲	Size	Type
 sana city NE.bmp	9,802 KB	Bitmap Image
 sana city NW.bmp	9,802 KB	Bitmap Image
 sana city SE.bmp	9,810 KB	Bitmap Image
 sana city SW.bmp	9,810 KB	Bitmap Image

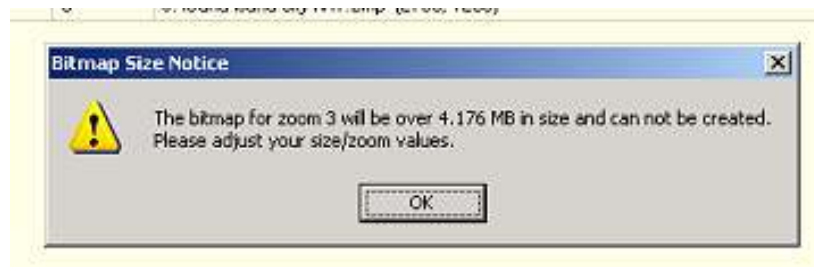
## Creating the Scanmap using ADC2 Mappeditor

As mentioned above, it is a good idea to slice up the scanmap into smaller pieces, even though POA2 can handle large single BMP scanmaps. The ADC2 Mappeditor, however, is designed to require the user to make scanmaps with numerous very small BMP files. This is because ADC2 was designed in 1996 for use on much less capable computers using Windows 95.

If I were to attempt to create a scanmap using the sliced Sana images, ADC2 would give me this error message, and would prevent me from continuing.



In addition to the dimensional limitation of ADC2, it also has a file size limitation. If I play by the old ADC2 rules, would need to slice up my scanmap image into 10 pieces instead of four.



While I certainly could cut up the Sana image into 10 pieces, it's a lot more work. You have to figure out what dimensions to use and keep the file size under 4 MB, as the 2730 pixel limit on the dimension is only the maximum. If I were to use a 2730 x 2730 pixel slice the file would be over 7 MB in size. There is additional work in positioning the pieces back together in the map.

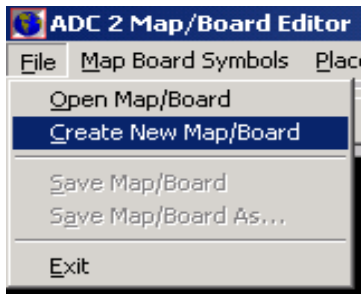
Fortunately, there's a pretty easy work around. I'll create a false scanmap using BMP files the Mappeditor can handle and then replace the BMP files with the actual Sana BMP images.

First, I zip the Sana BMP files. You can backup them up as you desire or relocate them to another folder.

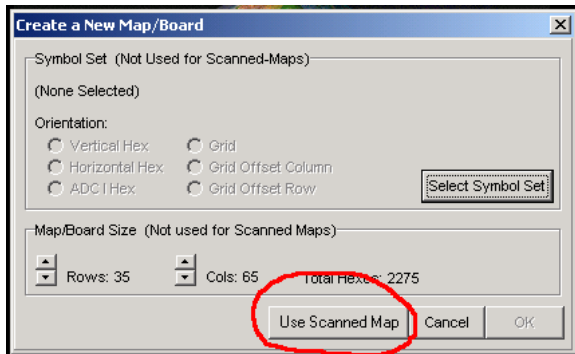
Name	Size	Type
sana city NE.bmp	9,802 KB	Bitmap Image
sana city NW.bmp	9,802 KB	Bitmap Image
sana city SE.bmp	9,810 KB	Bitmap Image
sana city SW.bmp	9,810 KB	Bitmap Image
sana slices.zip	23,687 KB	WinZip File

Next I open each of the BMP files using my image editor and resize all of them to 1% of original size.

Name	Size	Type
sana city NE.bmp	2 KB	Bitmap Image
sana city NW.bmp	2 KB	Bitmap Image
sana city SE.bmp	2 KB	Bitmap Image
sana city SW.bmp	2 KB	Bitmap Image
sana slices.zip	23,687 KB	WinZip File



Now I begin the actual process of creating the scanmap, opening the ADC2 Mapboard Editor and selecting Create New Mapboard.



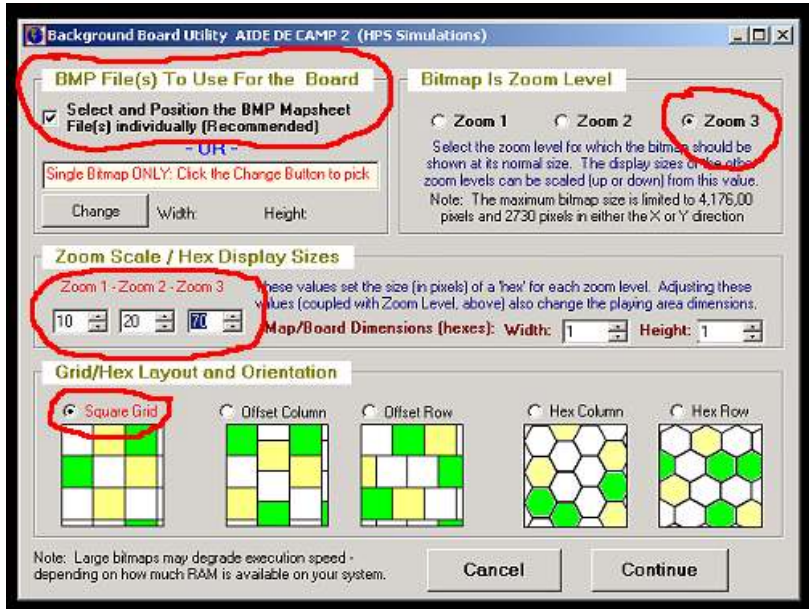
Select 'Use Scanned Map'. No need to worry about the mapboard size at the moment.

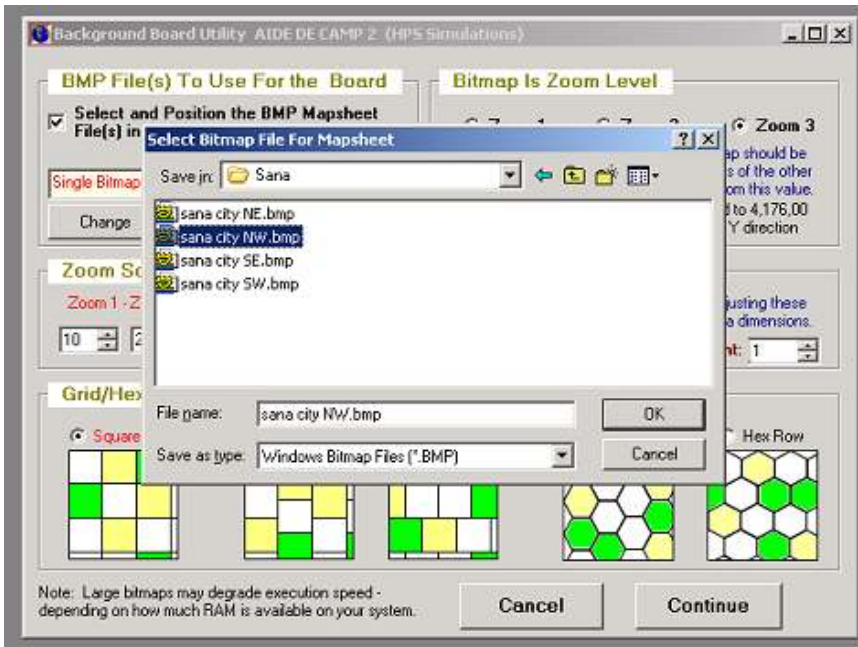
The Background Board Utility establishes the size and type of matrix the map will be composed of.

Select and Position the BMP Mapsheet Files Individually should be checked by default.

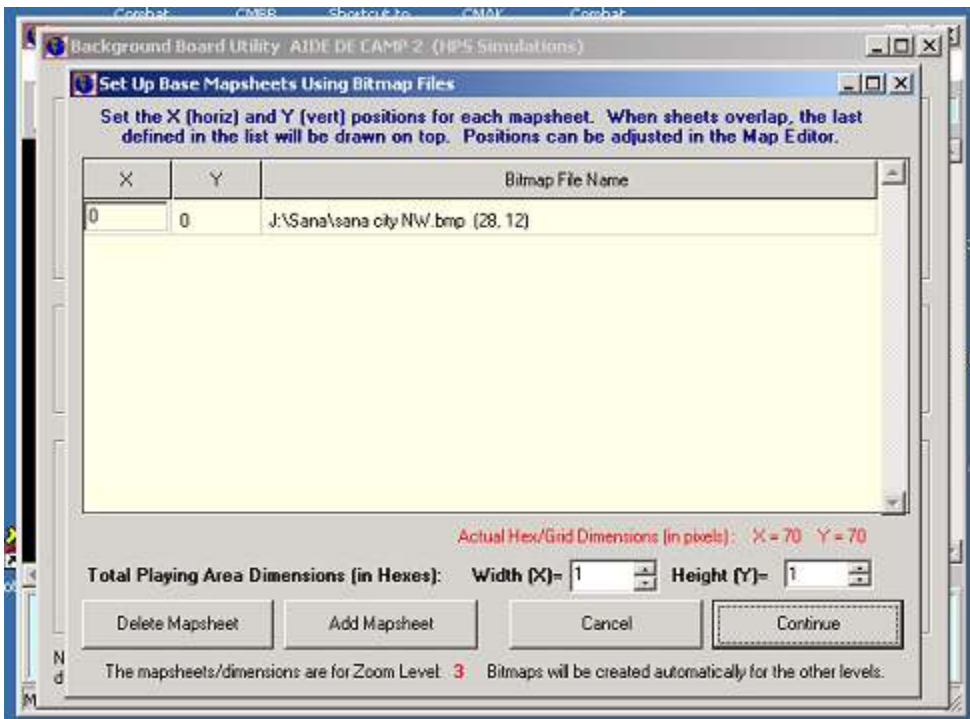
As mentioned when constructing the Sana scanmap image, it is best to work from a Zoom 3 image and resize downward.

Set the size of the 'hex' – this case, a square grid really. It must be 10-20-70 or the Transparent Square Grid Symbol set will not work. Do not bother with the Mapboard Dimensions at this point because the data will have to be reentered. Check Square Grid so that the map matrix matches the Transparent Symbol Set.



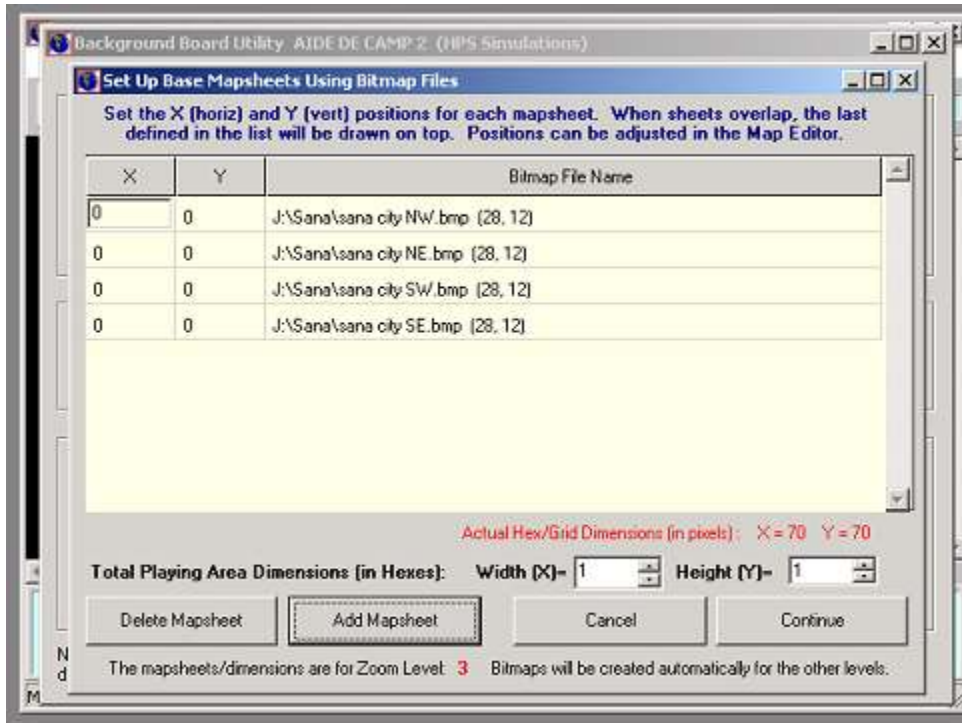


When you click Continue you will be prompted to select a BMP File. Select the file that will be in the upper left hand corner of the map first. This makes positioning the map slices easier later.

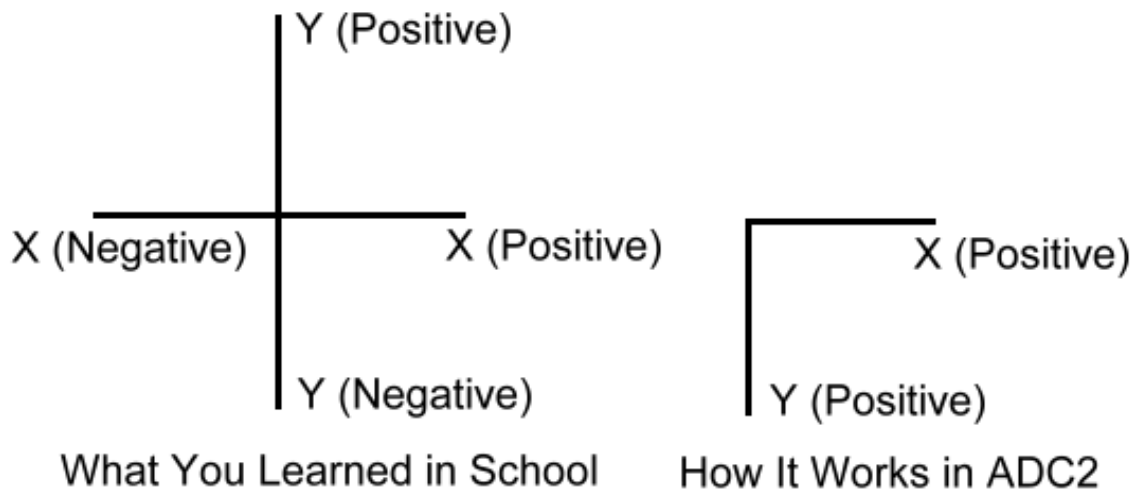


Now use the Add Mapsheet Button, and continue selecting. Add map slice BMP files in the order from upper left corner to upper right corner, and then from lower left to lower right. If you have a large base map image, which you slice up into multiple rows, always select from left to right from

top row down to the bottom row. After entering each of the four Sana mapsheet images I am viewing:

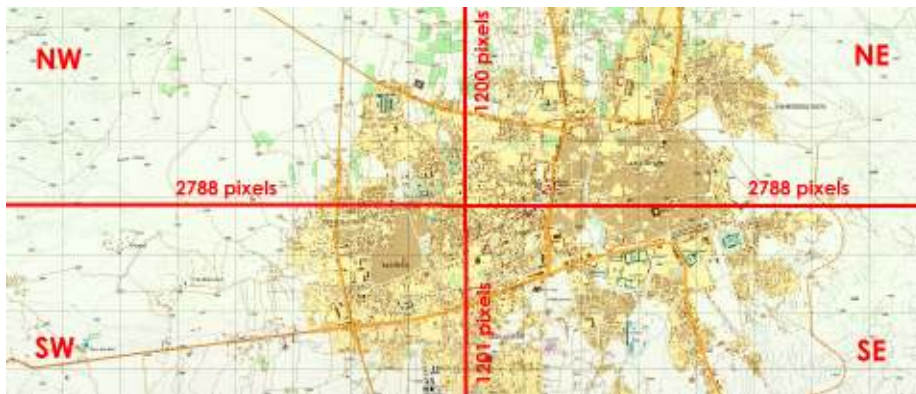


The next step is to enter the horizontal and vertical positions of each map slice, putting the map back together again when viewed in ADC2 and POA2. But first it's necessary to understand how the X,Y coordinate position works in ADC2. The X,Y coordinate locations are measured in pixels.





Taking another look at how I sliced up the Sana mapscan image, I am reminded that the NW and NE BMP files are 2788 x 1200 pixels in dimension. The SW and SE are 2788 x 1201 pixels.



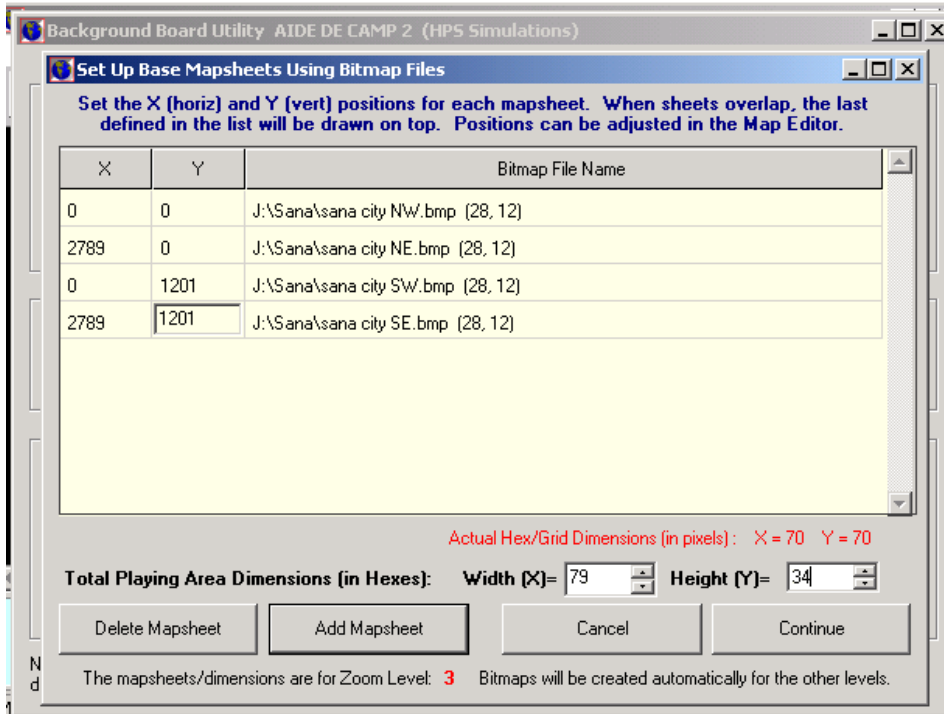
The X, Y position used in the Mapboard Editor locates the image based on the upper left corner of the image. Knowing this and the dimensions of each BMP file I determine that:

The NW section position can be left at 0,0 because the upper left corner is also the upper left corner of the entire map.

The NE section upper left corner is the next pixel after the NW section ends. The NW section is 2788 pixels wide, so the NE section starts at pixel 2789. The vertical position remains 0, since the BMP file is in the same vertical position as the NW one – at the top, which is 0.

The SW section is positioned horizontally like the NW, so the X value remains zero. In the horizontal position, we know the NW section is 1200 pixels in height, so the SW section starts at pixel 1201. The height of the SW (1201 pixels) section is immaterial.

The SE section is positioned horizontally the same as the NW section, so the X value is 2789 pixels. Vertically it is positioned like the SW section, so the Y value is 1201.



Before continuing it is time to calculate and enter the dimension of the mapboard in hexes (squares). Recall the overall image of Sana after resizing to the proper scale was:

Image Width 6389 pixels X .8728179 = 5576.43

Image Height 2703 pixels X .8883248 = 2401.14

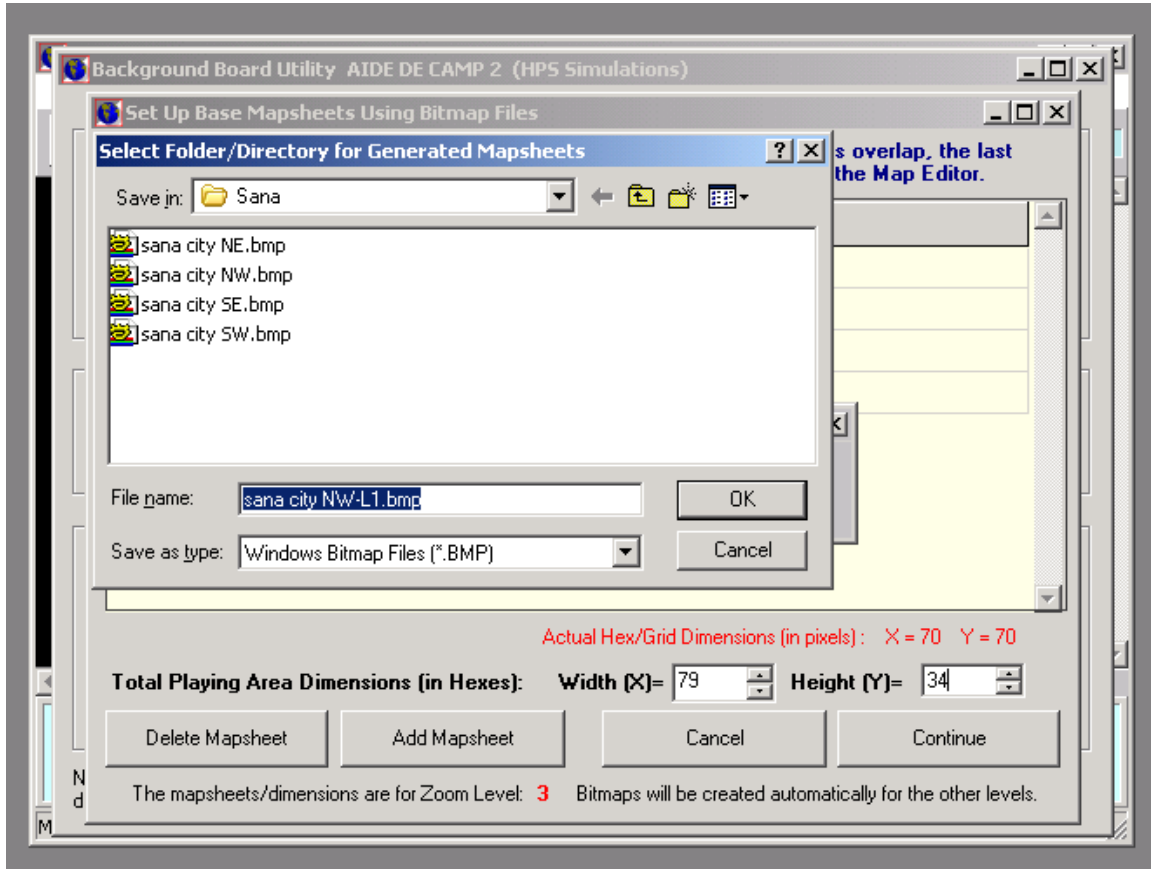
To calculate the number of squares, simply divide by the size of the grid square, 70 pixels. (Remember everything is being done in Zoom 3 at this point)

Mapboard width =  $5576 / 70 = 79.65$

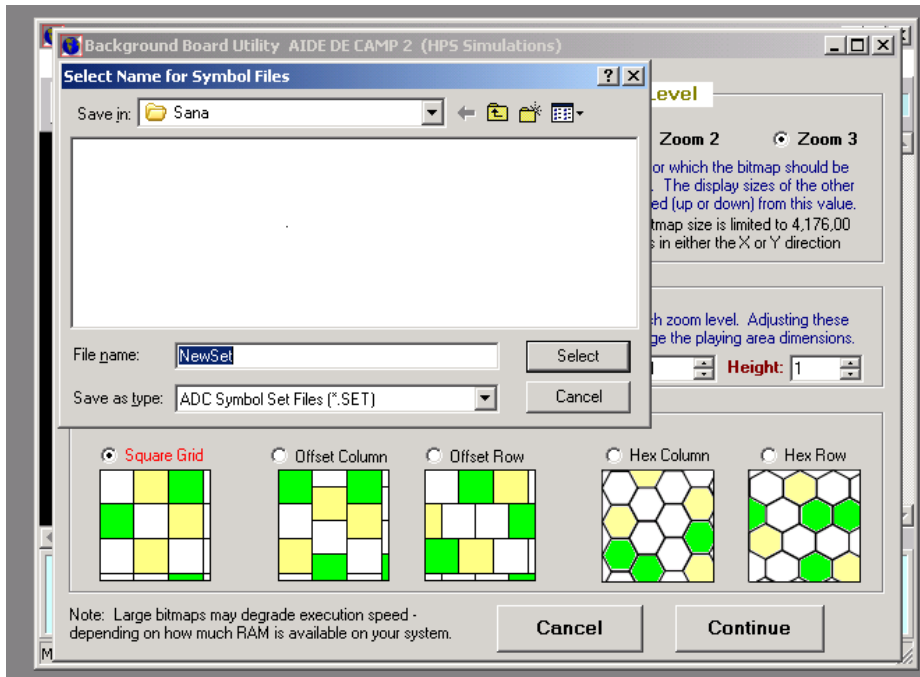
Mapboard height =  $2401 / 70 = 34.3$

I round down in order to trim off partial squares and enter the dimensions (79 and 34) in the Mappeditor.

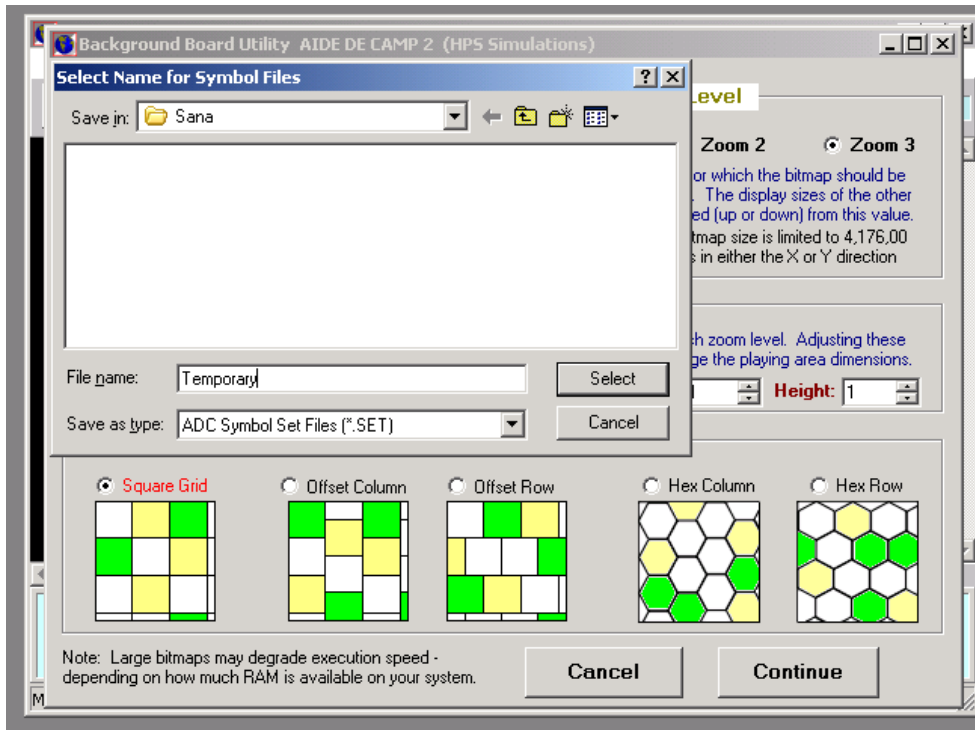
Clicking Continue, I am presented with this screen. Notice that the Mapeditor is changing the name of my BMP file to work with ADC2 and defaults to keeping the mapboard files in current folder.



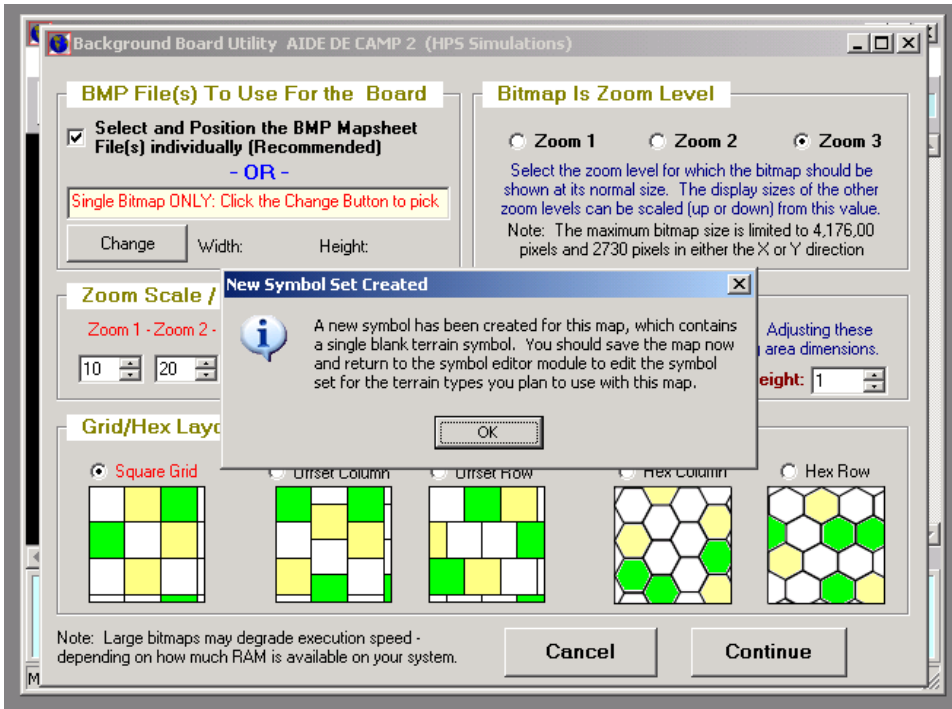
The Mapeditor then processes all four images creating files for all three zoom levels along with a new symbol set, leaving you with this window:



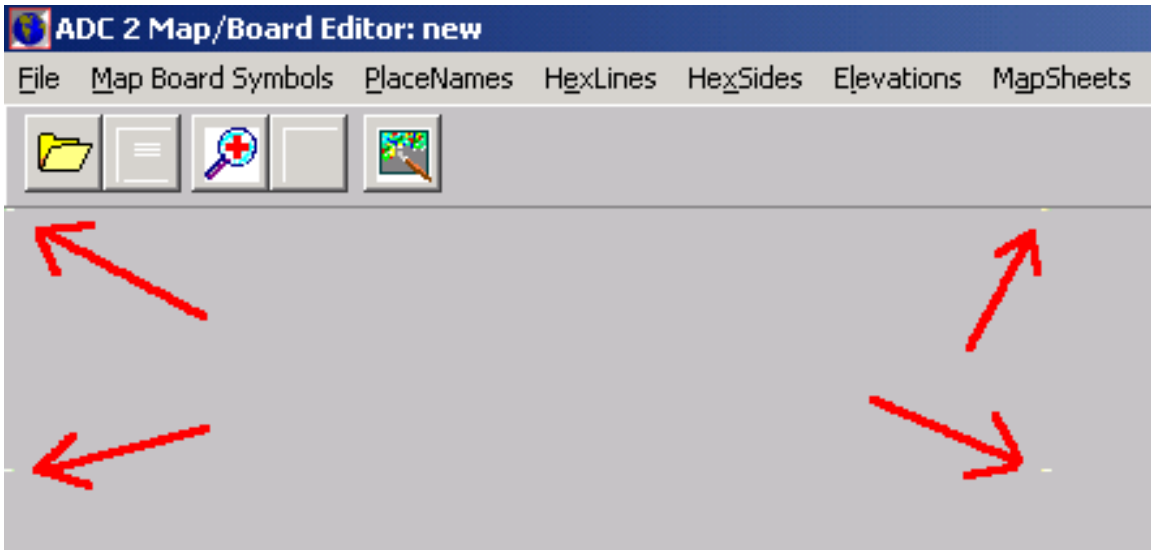
The file name NewSet is the default, but I recommend changing it to something else. I use 'Temporary' because this symbol set is in fact only a placeholder and will shortly be eliminated.

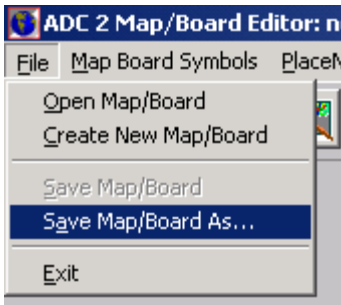


After entering the symbol set name and 'selecting' see this message appears. No action necessary so I click OK.

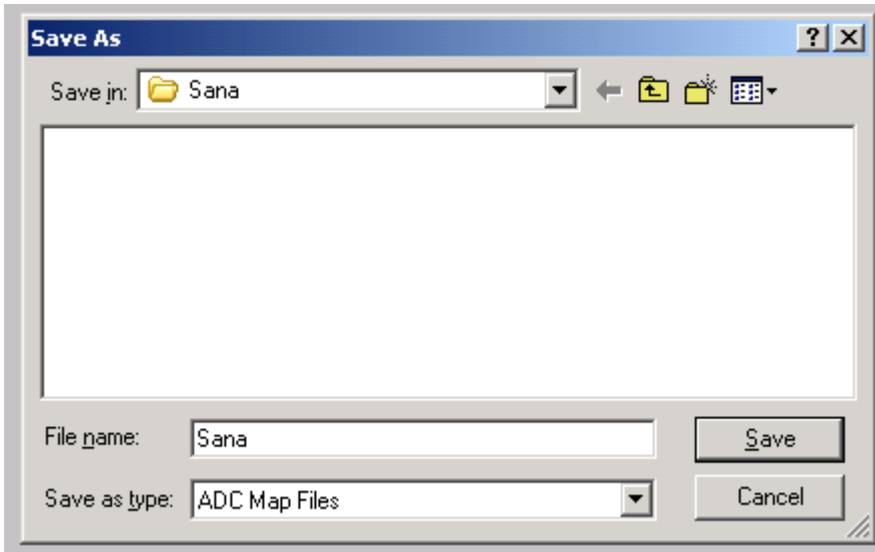


The Mapeditor then opens up, totally blank except for the four white images which are the reduced size place-holder BMP files I used to create the scanmap.





Before we convert them to real images, save the mapboard.



I call the map Sana

By opening the Sana folder, you can see the Temporary Symbol Set and all the components of the map described earlier.

I'll now replace the replace the tiny, false scanmap images with the actual files.

Name	Size	Type
Sana.SML	1 KB	SML File
Temporary.SET	1 KB	SET File
Sana.map	16 KB	MAP File
symvals.lst	1 KB	LST File
Temporary-U3.BMP	1 KB	Bitmap Image
Temporary-U2.BMP	1 KB	Bitmap Image
Temporary-U1.BMP	1 KB	Bitmap Image
Temporary-T3.BMP	10 KB	Bitmap Image
Temporary-T2.BMP	1 KB	Bitmap Image
Temporary-T1.BMP	1 KB	Bitmap Image
Temporary-M3.BMP	3 KB	Bitmap Image
Temporary-M2.BMP	1 KB	Bitmap Image
Temporary-M1.BMP	1 KB	Bitmap Image
sana city SW-L3.BMP	2 KB	Bitmap Image
sana city SW-L2.BMP	1 KB	Bitmap Image
sana city SW-L1.BMP	1 KB	Bitmap Image
sana city SW.bmp	2 KB	Bitmap Image
sana city SE-L3.BMP	2 KB	Bitmap Image
sana city SE-L2.BMP	1 KB	Bitmap Image
sana city SE-L1.BMP	1 KB	Bitmap Image
sana city SE.bmp	2 KB	Bitmap Image
sana city NW-L3.BMP	2 KB	Bitmap Image
sana city NW-L2.BMP	1 KB	Bitmap Image
sana city NW-L1.BMP	1 KB	Bitmap Image
sana city NW.bmp	2 KB	Bitmap Image
sana city NE-L3.BMP	2 KB	Bitmap Image
sana city NE-L2.BMP	1 KB	Bitmap Image
sana city NE-L1.BMP	1 KB	Bitmap Image
sana city NE.bmp	2 KB	Bitmap Image

First I unzip the original four Sana image slices.

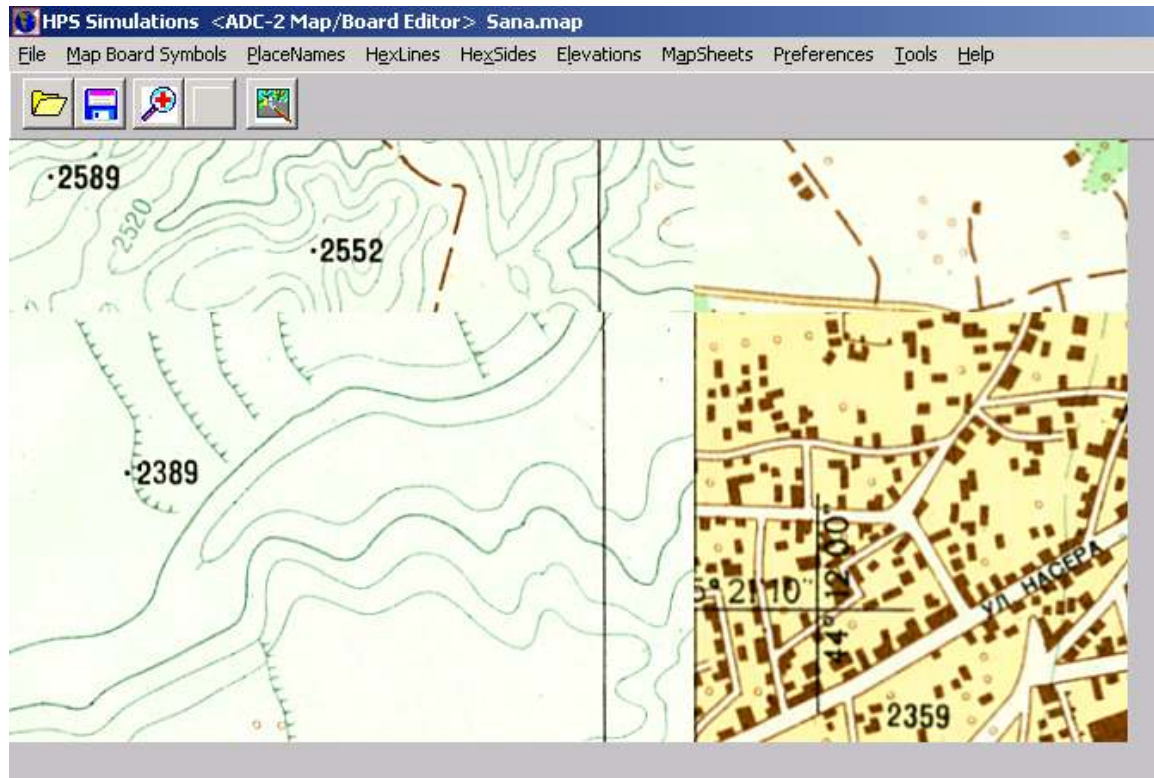


Name	Size	Type
Sana.SML	1 KB	SML File
Temporary.SET	1 KB	SET File
Sana.map	16 KB	MAP File
symvals.lst	1 KB	LST File
Temporary-U3.BMP	1 KB	Bitmap Image
Temporary-U2.BMP	1 KB	Bitmap Image
Temporary-U1.BMP	1 KB	Bitmap Image
Temporary-T3.BMP	10 KB	Bitmap Image
Temporary-T2.BMP	1 KB	Bitmap Image
Temporary-T1.BMP	1 KB	Bitmap Image
Temporary-M3.BMP	3 KB	Bitmap Image
Temporary-M2.BMP	1 KB	Bitmap Image
Temporary-M1.BMP	1 KB	Bitmap Image
sana city SW-L3.BMP	2 KB	Bitmap Image
sana city SW-L2.BMP	1 KB	Bitmap Image
sana city SW-L1.BMP	1 KB	Bitmap Image
sana city SW.bmp	9,810 KB	Bitmap Image
sana city SE-L3.BMP	2 KB	Bitmap Image
sana city SE-L2.BMP	1 KB	Bitmap Image
sana city SE-L1.BMP	1 KB	Bitmap Image
sana city SE.bmp	9,810 KB	Bitmap Image
sana city NW-L3.BMP	2 KB	Bitmap Image
sana city NW-L2.BMP	1 KB	Bitmap Image
sana city NW-L1.BMP	1 KB	Bitmap Image
sana city NW.bmp	9,802 KB	Bitmap Image
sana city NE-L3.BMP	2 KB	Bitmap Image
sana city NE-L2.BMP	1 KB	Bitmap Image
sana city NE-L1.BMP	1 KB	Bitmap Image
sana city NE.bmp	9,802 KB	Bitmap Image

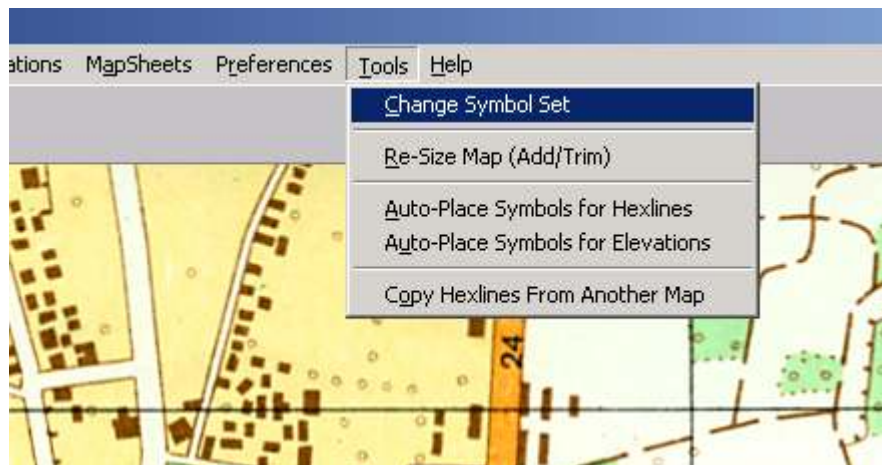
Next, using my image editor to avoid typing, I 'save as' the original Sana slice as the appropriate L1, L2 and L3 files. For example, I save the 'sana city SW.bmp' file as 'sana city SW-L1.BMP', 'sana city SW-L2.BMP', and 'sana city SW-L3.BMP'. I do the same for each quadrant image.

Name	Size	Type
Sana.SML	1 KB	SML File
Temporary.SET	1 KB	SET File
Sana.map	16 KB	MAP File
symvals.lst	1 KB	LST File
Temporary-U3.BMP	1 KB	Bitmap Image
Temporary-U2.BMP	1 KB	Bitmap Image
Temporary-U1.BMP	1 KB	Bitmap Image
Temporary-T3.BMP	10 KB	Bitmap Image
Temporary-T2.BMP	1 KB	Bitmap Image
Temporary-T1.BMP	1 KB	Bitmap Image
Temporary-M3.BMP	3 KB	Bitmap Image
Temporary-M2.BMP	1 KB	Bitmap Image
Temporary-M1.BMP	1 KB	Bitmap Image
sana city SW-L3.BMP	9,810 KB	Bitmap Image
sana city SW-L2.BMP	9,810 KB	Bitmap Image
sana city SW-L1.BMP	9,810 KB	Bitmap Image
sana city SW.bmp	9,810 KB	Bitmap Image
sana city SE-L3.BMP	9,810 KB	Bitmap Image
sana city SE-L2.BMP	9,810 KB	Bitmap Image
sana city SE-L1.BMP	9,810 KB	Bitmap Image
sana city SE.bmp	9,810 KB	Bitmap Image
sana city NW-L3.BMP	9,802 KB	Bitmap Image
sana city NW-L2.BMP	9,802 KB	Bitmap Image
sana city NW-L1.BMP	9,802 KB	Bitmap Image
sana city NW.bmp	9,802 KB	Bitmap Image
sana city NE-L3.BMP	9,802 KB	Bitmap Image
sana city NE-L2.BMP	9,802 KB	Bitmap Image
sana city NE-L1.BMP	9,802 KB	Bitmap Image
sana city NE.bmp	9,802 KB	Bitmap Image

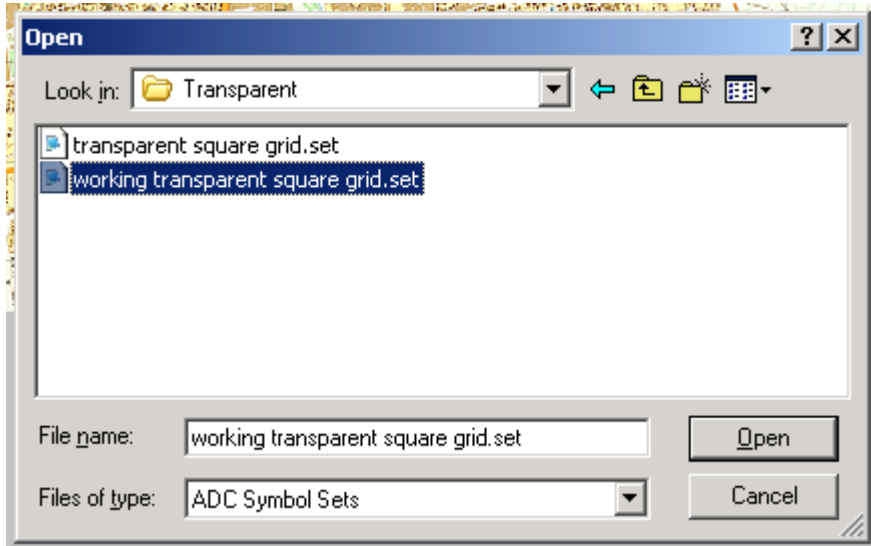
This results in the zoom 1 and zoom 2 images being identical to the zoom 3 one, and creates a messed-up map if you reopen the mapeditor at this point.



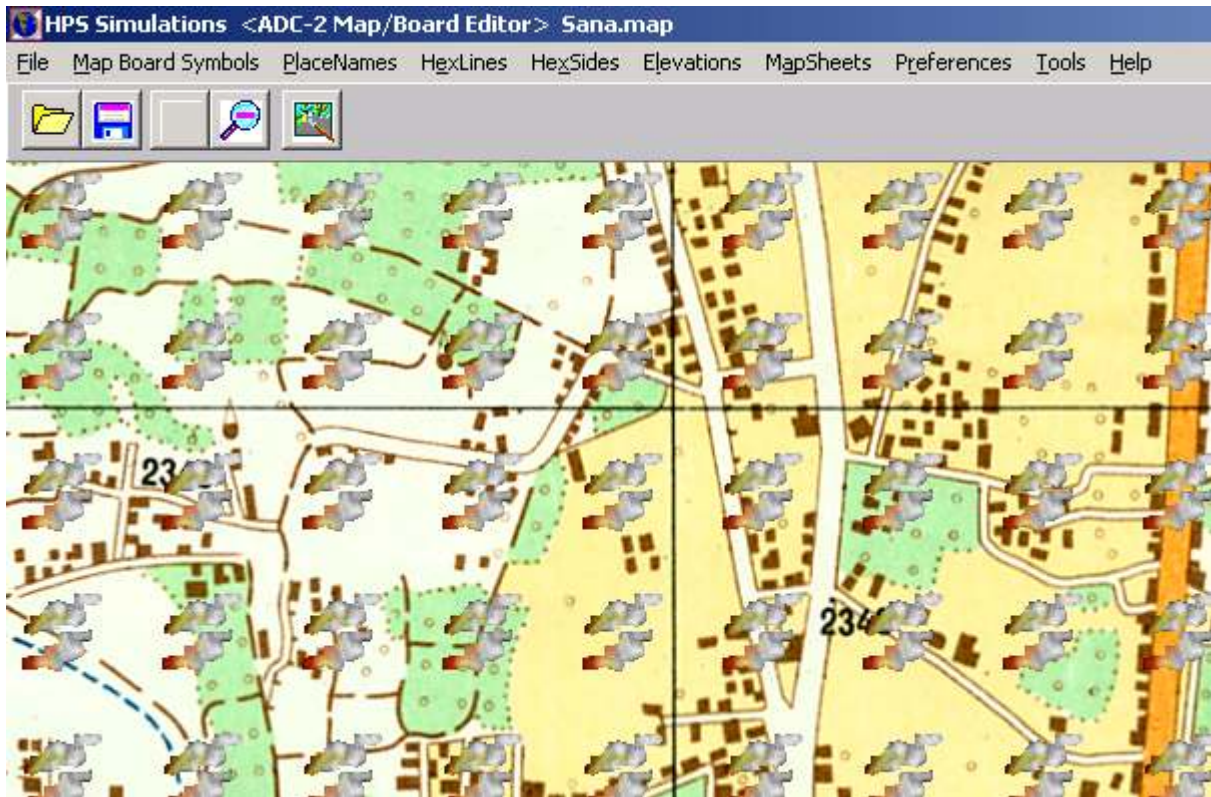
Before I fix that, though, I want to change the symbol set from the temporary one to the working transparent square grid symbol set. This is accomplished using the Tools Menu in the Mapeditor.



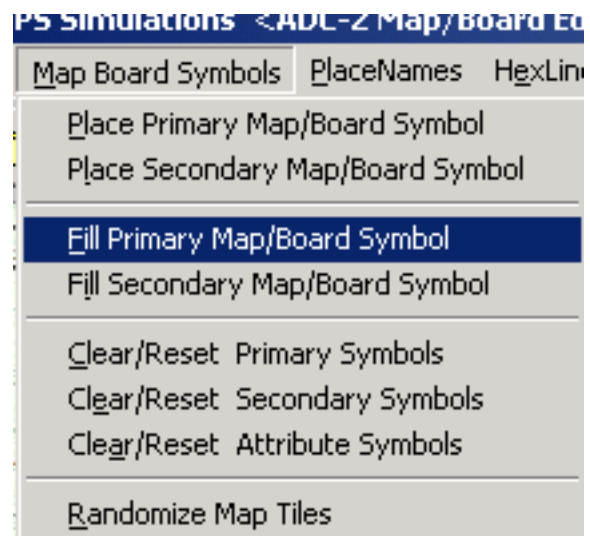
I locate the working transparent square grid symbol set and select it.



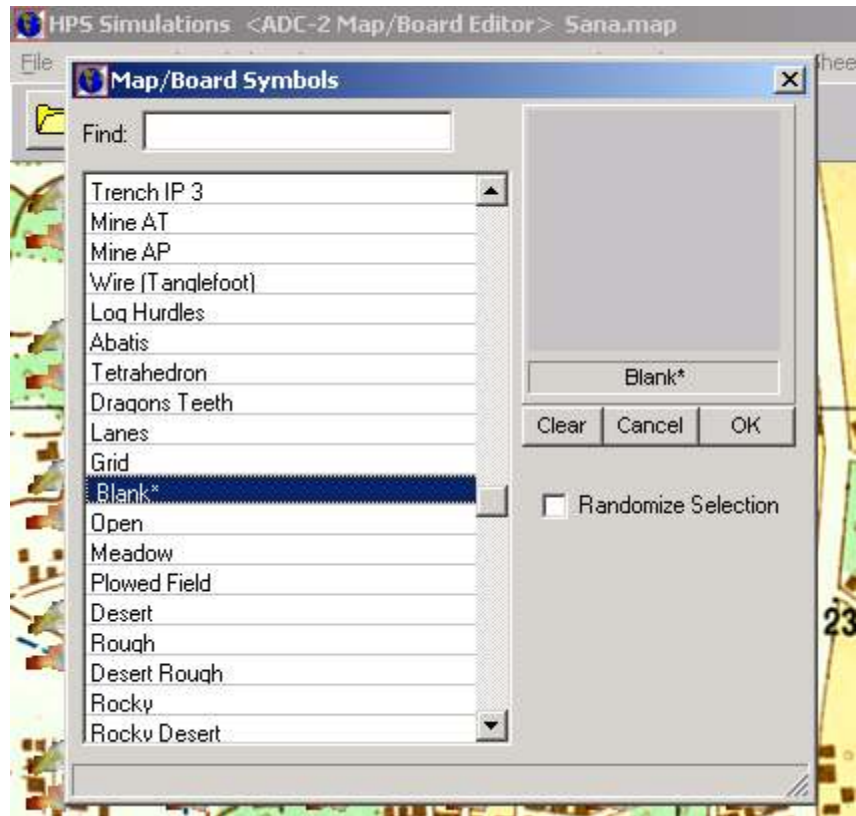
Now the map is covered with 'Fire 1' symbols. This is because the first symbol (symbol number 0) in the transparent square grid symbol set is 'Fire 1'. The first symbol in the symbol set created by the Mappeditor (the one I named "Temporary") is always a blank symbol. Replacing the symbol sets replaces the symbols in the same order, thus the fiery looking map.



This is easily fixed by using the Map Board Symbol Tool, Fill Primary Mapboard Symbol.



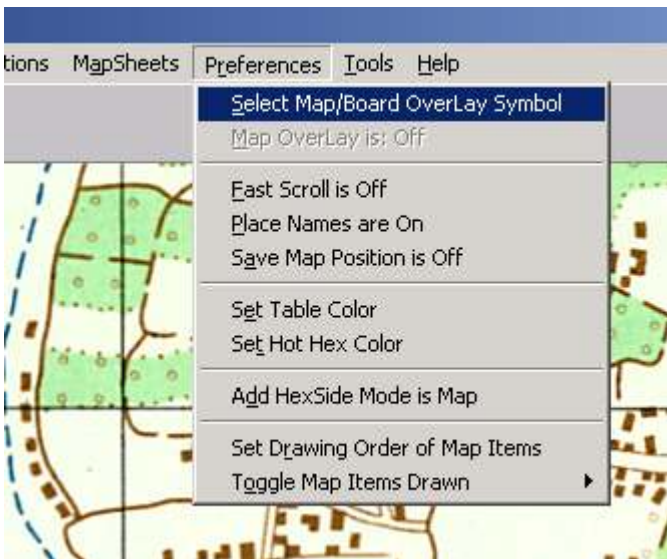
Scroll down and select the Blank\* symbol and click OK.

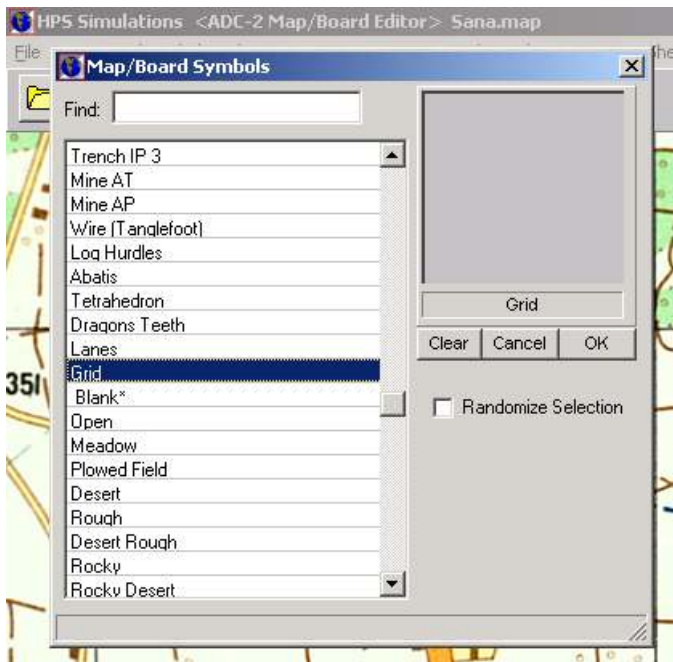


Confirm the change by clicking YES.



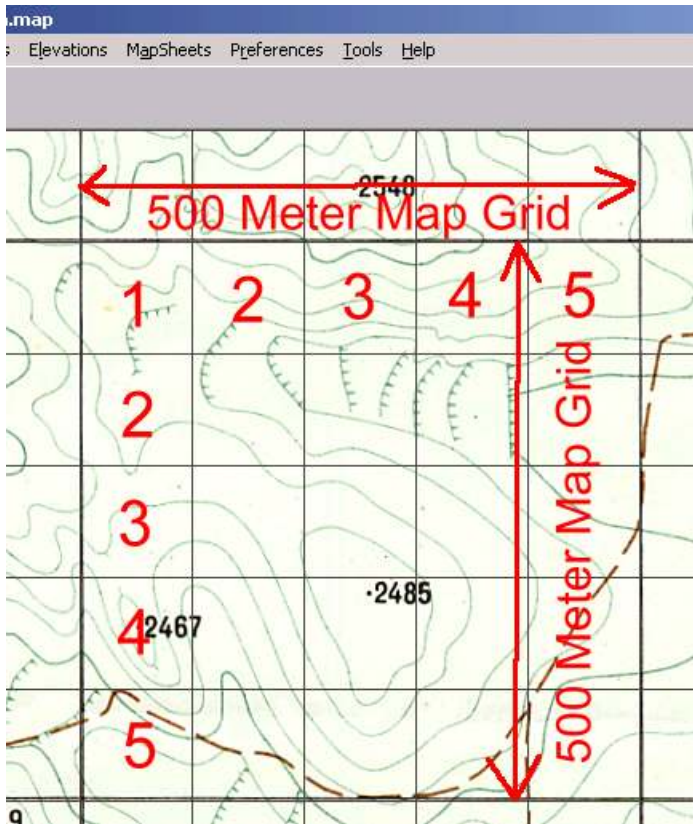
Next I select link the “Overlay Symbol,” i.e., the Grid Symbol which can be turned on or off in POA2. It is needed during construction so that one can locate where symbols, hexsides and hexlines are added.





I locate and select "Grid" and click OK.





Observing the map in zoom 3 because the images have been scaled to work in zoom 3, it is clear that 500 meter grid square on the image of the paper map is scaled properly because it has five 100 meter POA2 squares both horizontally and vertically.

Now it's time to resize all the L2 and L1 BMP files so they are the correct size, instead of being the same as the L3 zoom 3 BMP files. Recall again that the transparent square grid symbol set has a grid size of:

Zoom 1	10 Pixels
Zoom 2	20 Pixels
Zoom 3	70 Pixels

Doing the math I will resize the zoom 1 and 2 BMP files in accordance with their relationship to the zoom 3 BMP files.

So for Zoom 1  $10 \text{ Pixels} / 70 \text{ Pixels} = .1428571$  x L3 BMP file dimensions  
 And for Zoom 2  $20 \text{ Pixels} / 70 \text{ Pixels} = .2857142$  x L3 BMP file dimensions

Using my graphics editor and these ratios I resize L1 and L2 BMPs for all four quadrants (NW, NE, SW, SE) resulting in the following. Note that when resizing the L1 and L2 BMPs it is acceptable to turn on the maintain aspect ratio function in the resize tool. Use the same

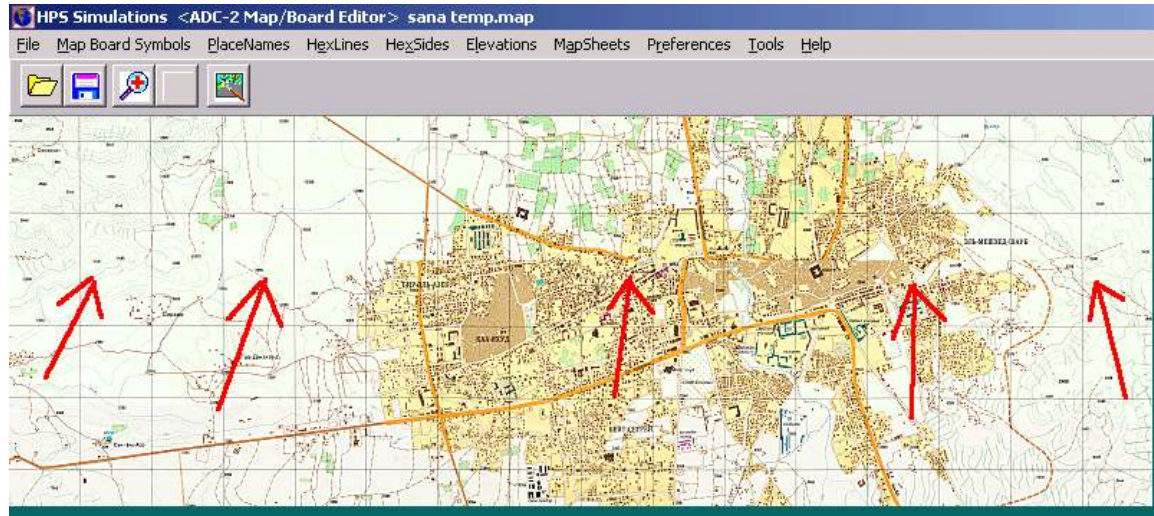
resampling method used when you resized the original scanned image to zoom 3 scale at the start.

File Name	Current Dimension	Ratio	Resized
sana city NW-L1.BMP	2788 X 1200	.1428571	398 X 171
sana city NW-L2.BMP	2788 X 1200	.2857142	796 X 343
sana city NW-L3.BMP	2788 X 1200	1	2788 X 1200
sana city NE-L1.BMP	2788 X 1200	.1428571	398 X 171
sana city NE-L2.BMP	2788 X 1200	.2857142	796 X 343
sana city NE-L3.BMP	2788 X 1200	1	2788 X 1200
sana city SW-L1.BMP	2788 X 1201	.1428571	398 X 171
sana city SW-L2.BMP	2788 X 1201	.2857142	796 X 343
sana city SW-L3.BMP	2788 X 1201	1	2788 X 1201
sana city SE-L1.BMP	2788 X 1201	.1428571	398 X 171
sana city SE-L2.BMP	2788 X 1201	.2857142	796 X 343
sana city SE-L3.BMP	2788 X 1201	1	2788 X 1201

Upon completion of resizing I edit all the images with an Unsharpen Mask. You should edit and adjust the images as needed to make them as clear and readable as possible. The zoom 1 can be a challenge given the magnitude of the reduction, and you may need to try a different resampling algorithm if the results are unacceptable.

When you reopen the map, it will look close, but not quite right.

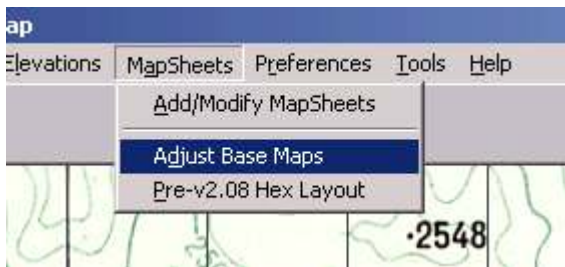
### Zoom 1



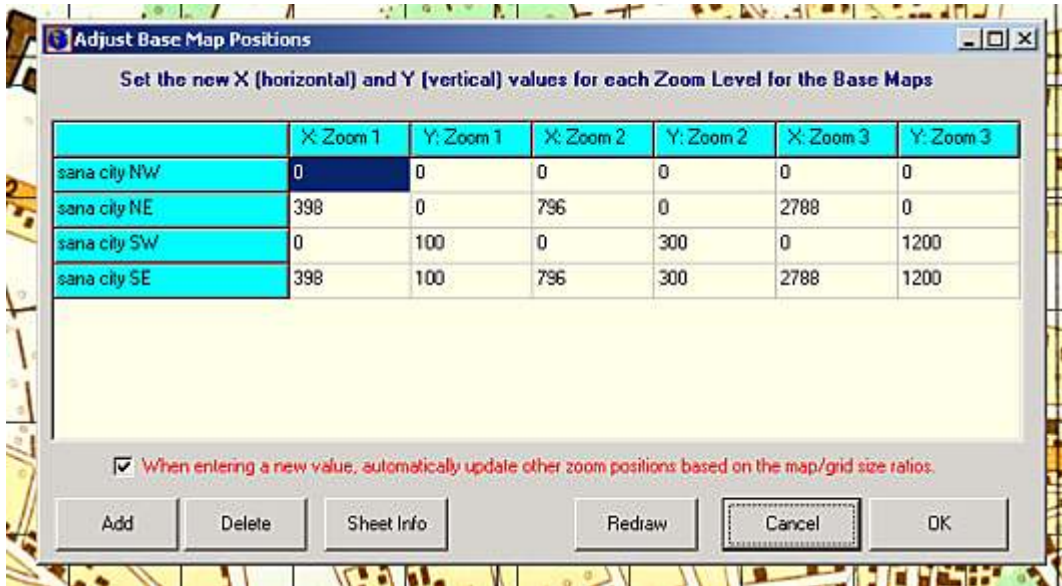
## Zoom 2



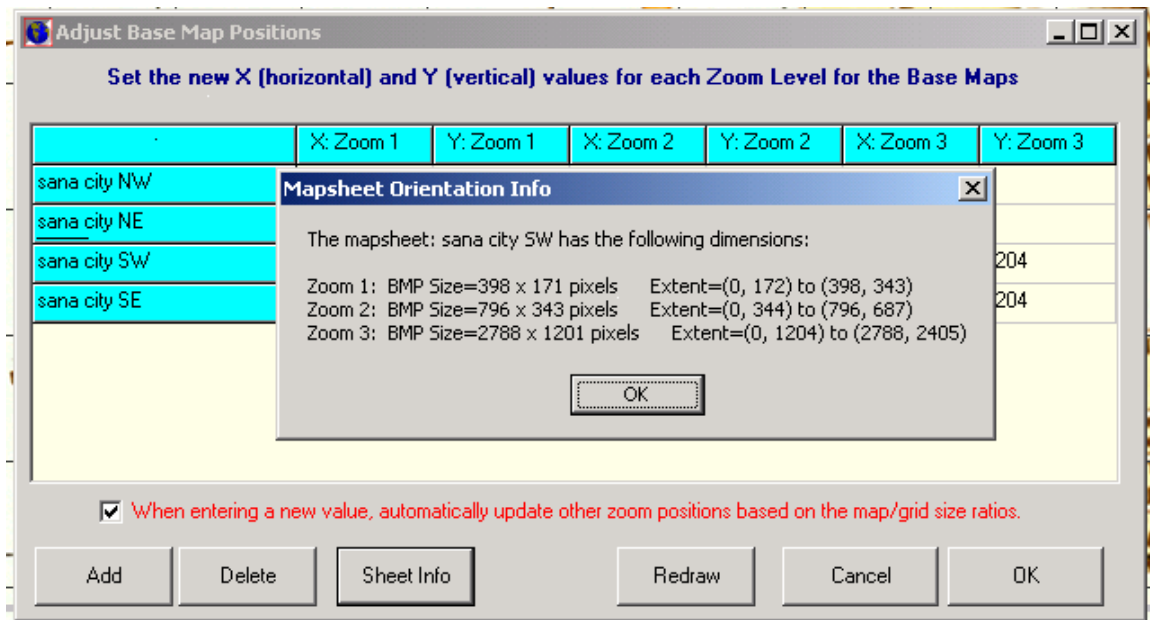
These irregularities are the seams of where the quadrant slices of the maps are overlapping each other because they are not correctly positioned. To begin correcting this, open the Adjust Base Maps tool.



The Adjust Base Map Positions allows for the repositioning of my map quadrant slices in all three zoom levels. You need to do this manually because the Mapeditor does the best job it can in positioning the map sheets, but often does not get it quite right. Note that the X and Y values are in pixels.



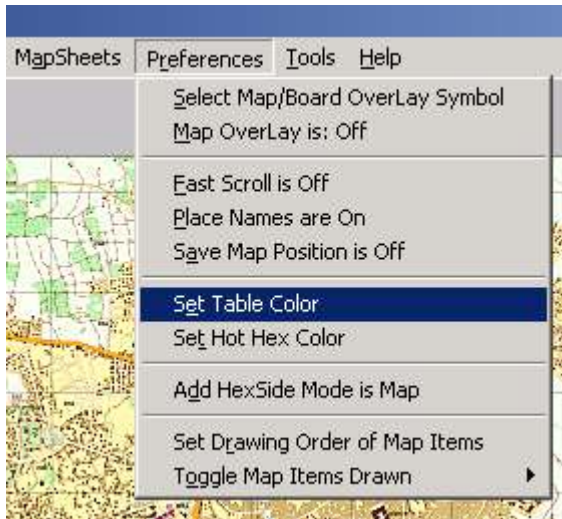
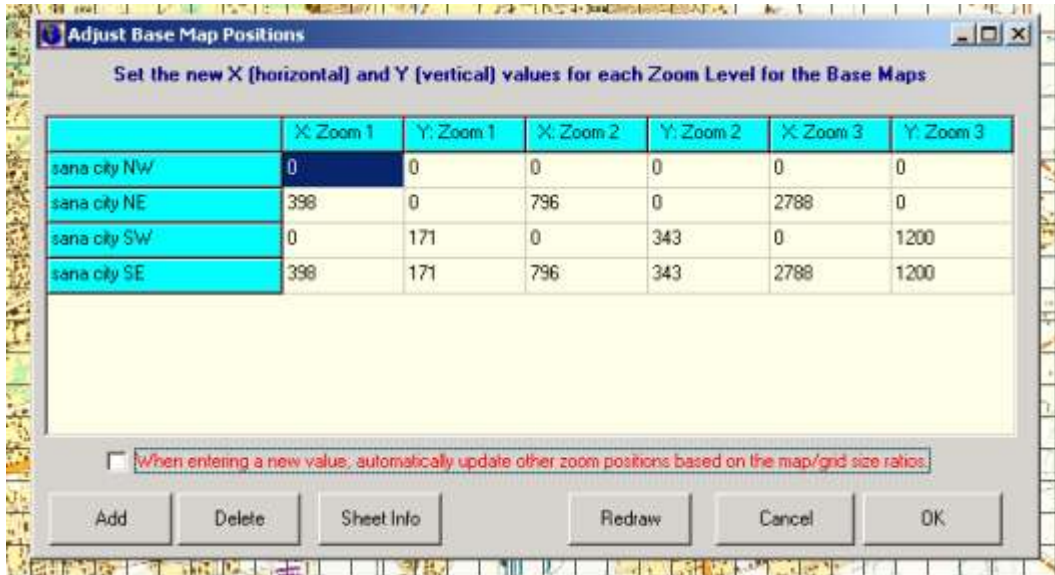
By highlighting any of the data boxes in a row and clicking on 'Sheet Info' the size of the image and its location on the map can be easily ascertained.



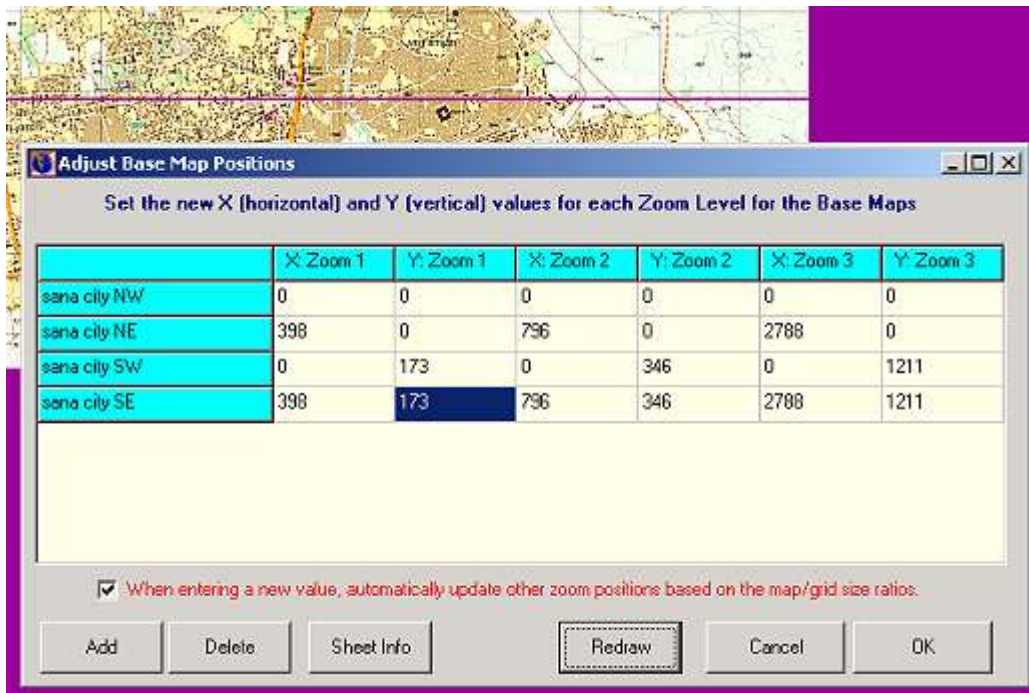
Before entering any values, uncheck the Auto Update of Other Zoom Positions option.

Knowing the width of the NW and SW images, 398 pixels in zoom 1 and 796 pixels in zoom 2 enables me to locate the NE and SE sections to the left of them starting at pixel 398 and 796 respectively. This is a bit counterintuitive as it is logical that one would start them at pixels 399

and 797 – the next pixel beyond the NW and SW map images. But the first X and Y pixels on the map are not 1 and 1 - they are 0 and 0. While it may be a bit confusing, it actually is easier since you simply place the mapsheet images using the adjacent images dimensions ascertained using the sheet info or the by remembering the dimensions used when you resized the images to zoom 1 and 2. By checking the Sheet Info on all the images I enter the values as shown.

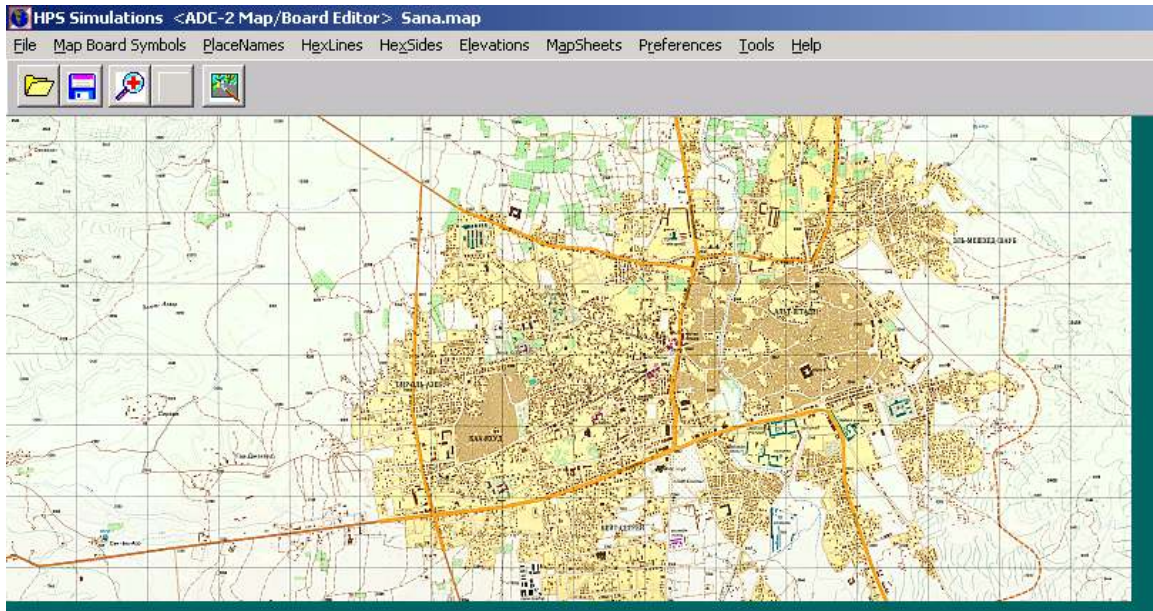


To better understand the positioning process you might want to experiment by entering incorrect values into the Adjust Base Map Positions matrix. To make it easy to spot the gaps between the map images, change the Table Color to something which will contrast the map images,



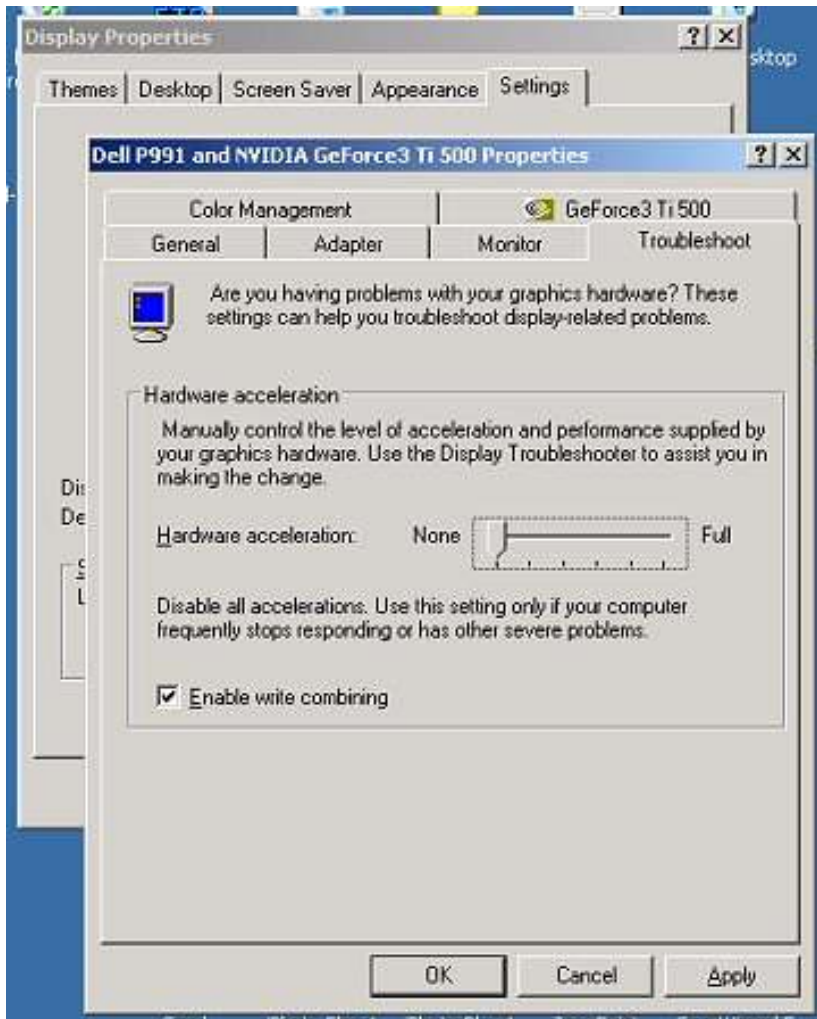
By entering an incorrect Y Value (346 instead of 343) for the Zoom 2 positions of the SW and SE images, I've opened up a 3 pixel wide gap between the map images. When repositioning the images, use the Redraw button to apply the changes in the positions. You may need to experiment with scrolling the map around before opening Adjust Base Maps and repositioning the Adjust Base Map Positions Window when it is open to see the changes.

I now have a completed scanmap ready to accept elevation and terrain data.



Before doing this I delete all the "Temporary" Symbol Set files from the Sana folder, which were created when, I made the scanmap. I zip the entire folder, rename it with a date, and back it up on my external hard drive. I recommend saving and backing up your work frequently – it's no fun doing this stuff twice.

Isana city BW.bmp	9,810 KB	Bitmap Image
symvals.lst	1 KB	LST File
Temporary.SET	1 KB	SET File
Temporary-M1.BMP	1 KB	Bitmap Image
Temporary-M2.BMP	1 KB	Bitmap Image
Temporary-M3.BMP	3 KB	Bitmap Image
Temporary-T1.BMP	1 KB	Bitmap Image
Temporary-T2.BMP	1 KB	Bitmap Image
Temporary-T3.BMP	10 KB	Bitmap Image
Temporary-U1.BMP	1 KB	Bitmap Image
Temporary-U2.BMP	1 KB	Bitmap Image
Temporary-U3.BMP	1 KB	Bitmap Image
Isana city NE-L3.BMP	9,802 KB	Bitmap Image
Isana city NW-L3.BMP	9,802 KB	Bitmap Image



TIP: When placing elevation, terrain symbols, hexsides, and hexlines, it is necessary to work in zoom level 3 in order to be able to see the map symbols, contour lines, etc. easily. This will require a lot of scrolling around. If scrolling around is in the least bit slow or choppy, turn off the Hardware Acceleration on your system. This works wonders.

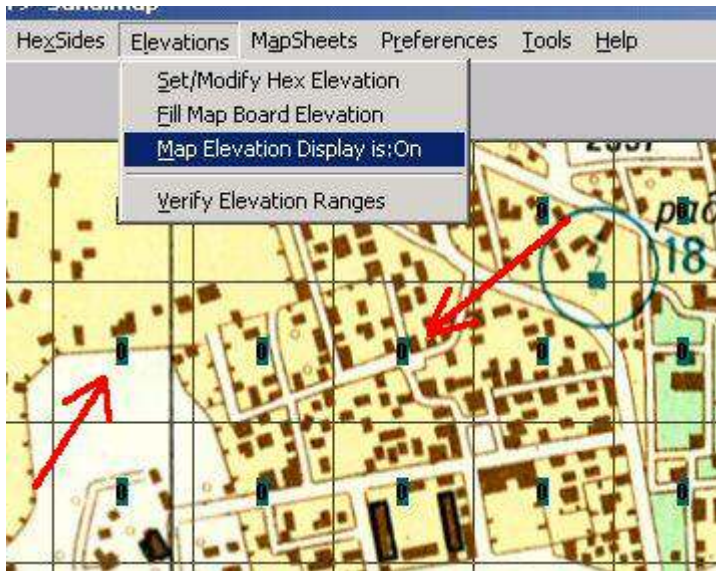
## Elevations

At this point, I am ready to begin entering data for all of the locations (the hexes or squares). I enter the elevation data before placing terrain symbols. The reason is that the terrain symbols, while small, are not totally transparent and therefore hide some of the map image once placed.



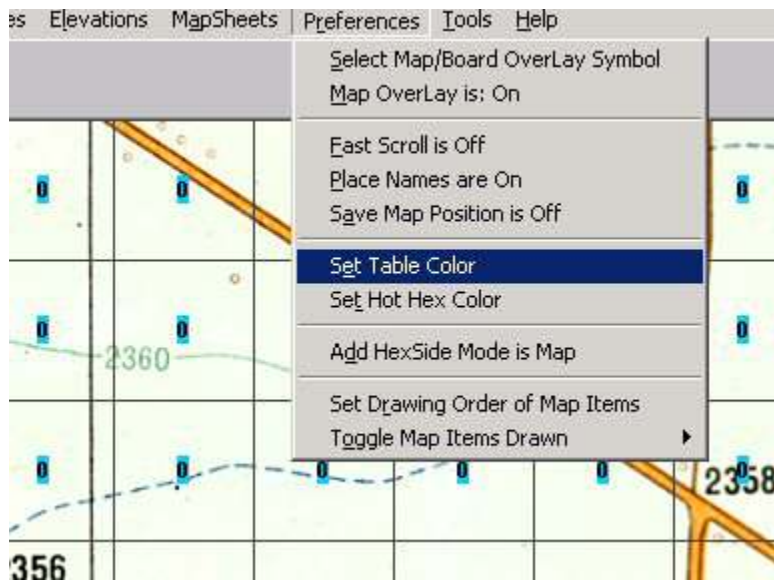
Select Elevations.





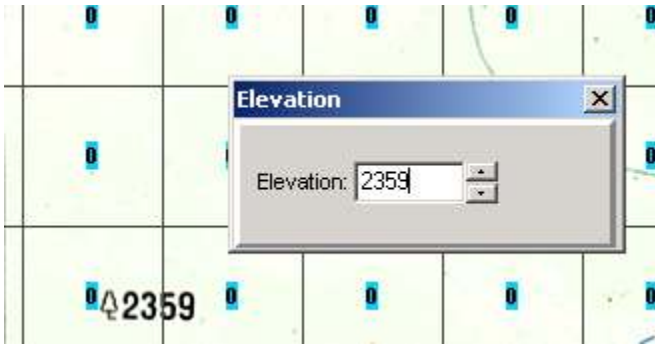
Click Map Elevation Display on. Boxes with '0' will appear on the map. These are the elevation values.

In this case they are very difficult to read because of the color scheme.



Change the Table Color to a color that will contrast the black elevation number and stand out against the map colors.





Enter the elevation value.



Then click on the square you want to apply the elevation. You can continue clicking and the same elevation will be placed in the square. You can even 'X' the Elevation box to get it out of the way and continue entering elevations on the map. You will stay in this mode until you change the Mapeditor tool – so be careful about inadvertently clicking on the map.

If you make an error simple enter the correct elevation in the elevation box and click the incorrect square. There is no erase or undo ability.

At first, enter all spot elevations, benchmarks and other known elevations on the map.



Then start filling in the contour lines. Selecting a single contour line and following it is quick and you don't have to constantly reenter the elevation value in the Elevation Box. Note you will often have to think about exactly what elevation you want to place in a square-no matter what the contour line. Do you use the highest elevation or the lowest elevation in a single hex? Often terrain features like draws, valleys and saddles can easily be "lost" on the map if you do not adjust the elevations. So think about what you want to achieve before place an elevation. If you move too quickly and are not thoughtful you will end up with a bland map without all the elevation nuances of actual terrain, creating an unrealistic table top arena where there is little cover and LOS are unrealistically long.



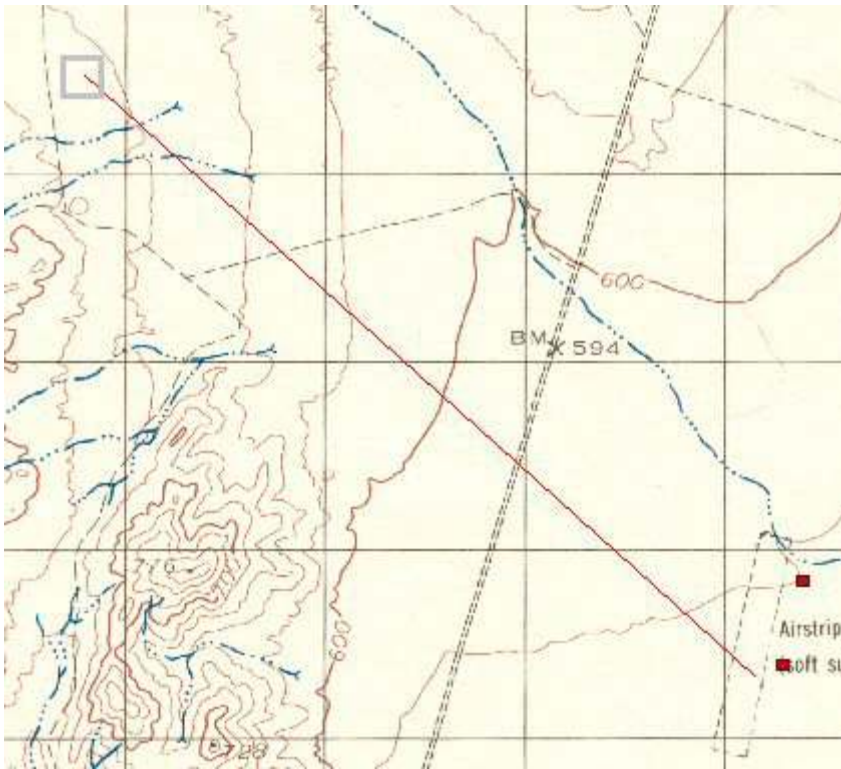
Interpolate elevations to create more natural and smooth terrain. Do NOT simply fill in the same elevations or you will create unrealistic plateaus where there are none.



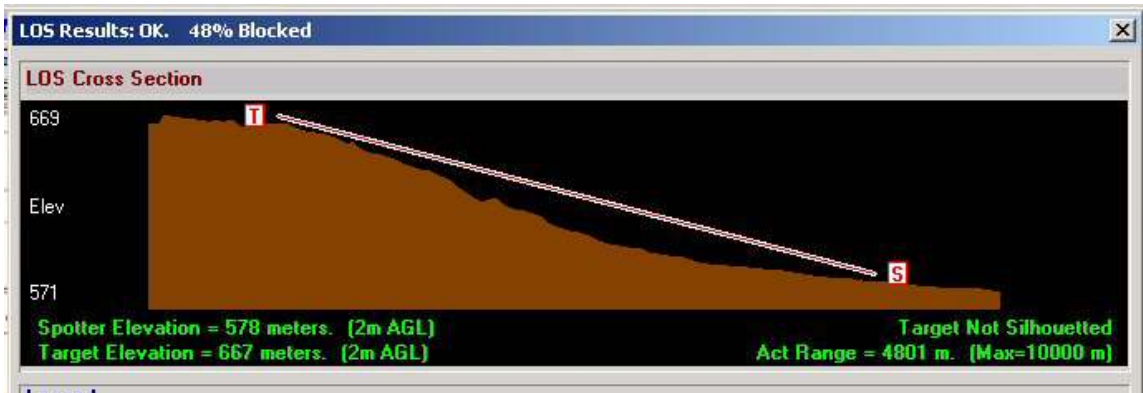
In this example from the Albuquerque map included in POA2, you can see there is very little totally level terrain, even on an airfield.



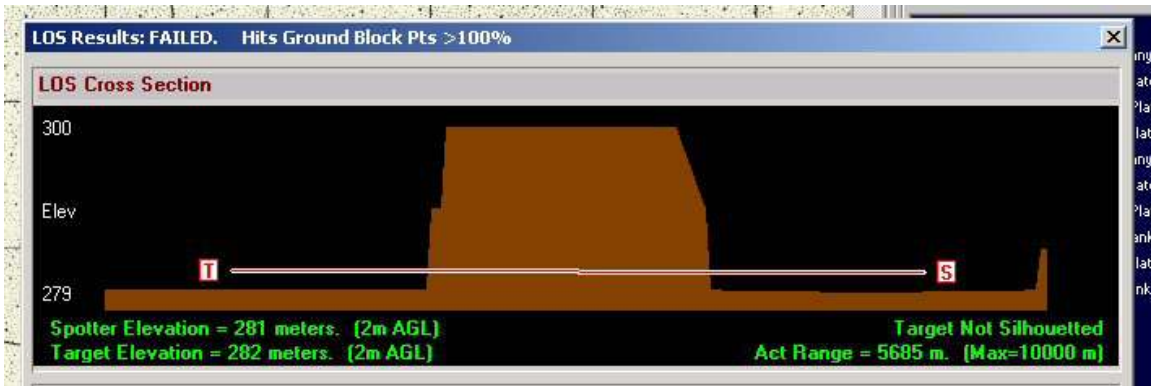
Interpolating elevations is critical. This LOS check crosses 6 contour lines with an elevation change of 89 meters.



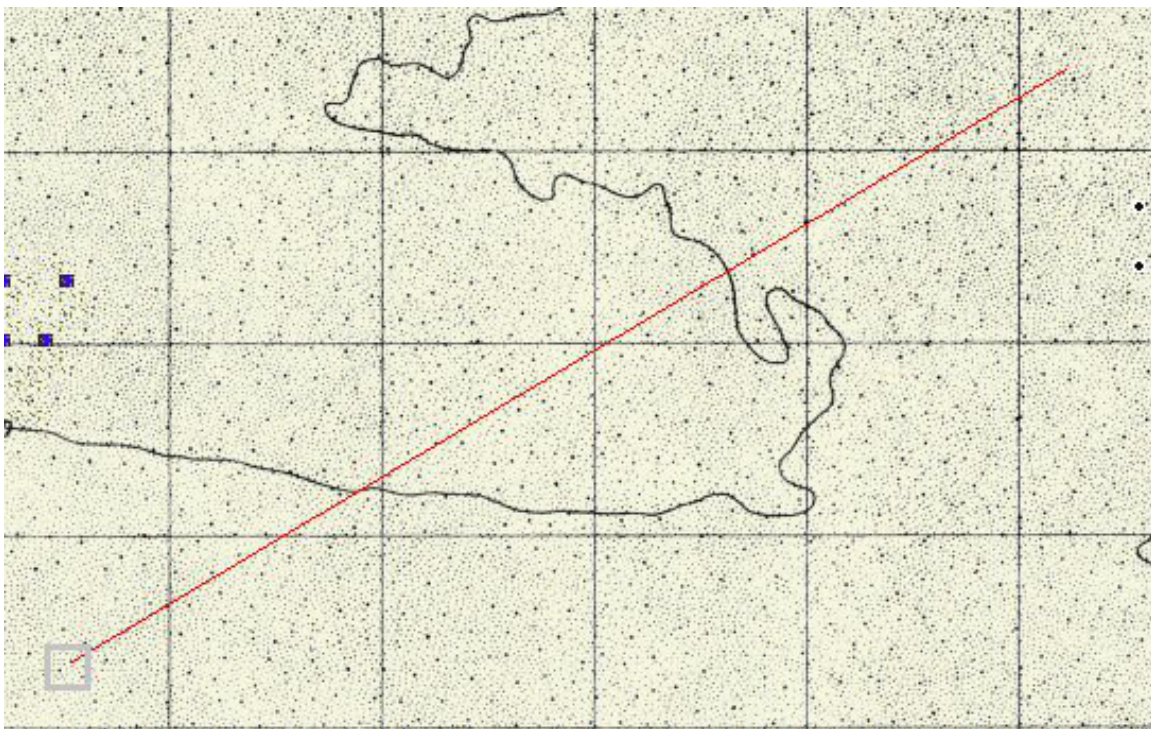
And looks like this in a line of sight check because of elevation interpolation.



As opposed to this example of a map that did not use interpolated elevations.

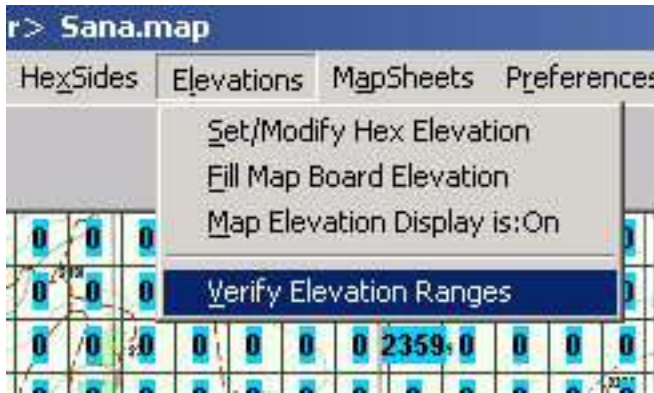


Looking at the map you can see that the actual terrain is a very low ridge with a gentle slope. Not a butte.



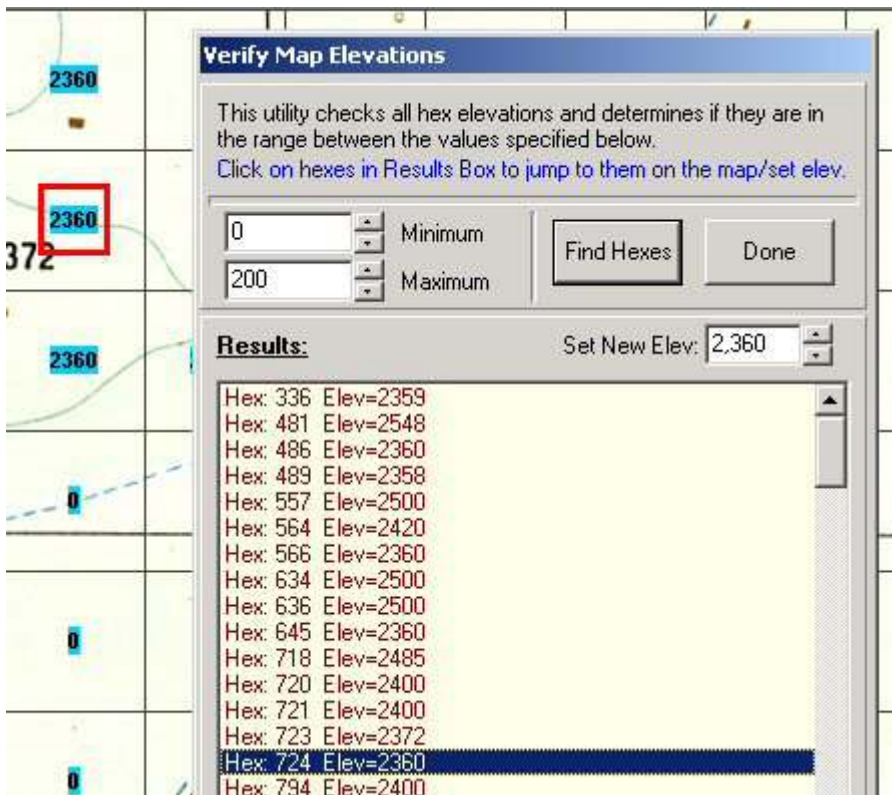
From the above example you can see that, unless you are filling in an area of water, swamp, or dry salt lake, there is little use for this tool.





Verify Elevation Ranges is a useful error-checking tool.

All elevations outside the minimum and maximum elevation you enter will be listed. If you click on a listed elevation the specific hex or square will have a red box. You can set a different elevation without having to leave the tool.

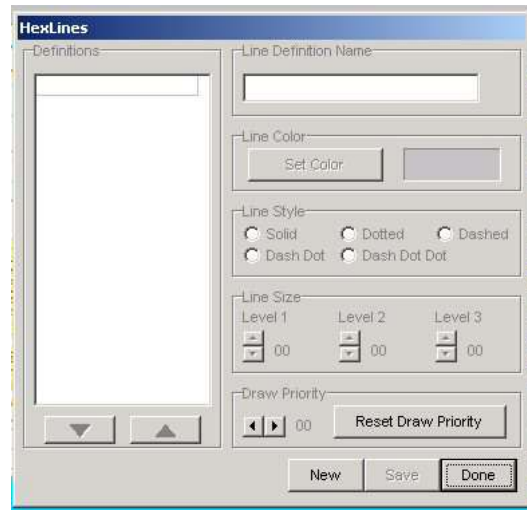
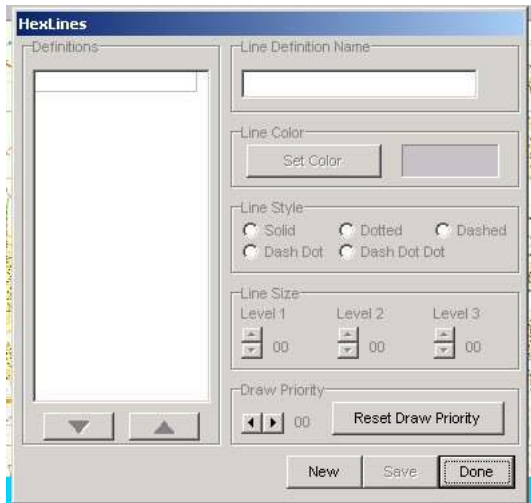


## Hexsides and Hexlines

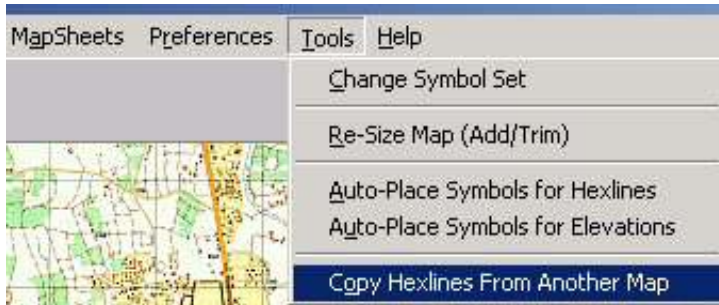
Adding hexlines and hexsides is the next process in completing the map.

**Important!:** Because these map features are linked to the POA2 TEC, it is necessary to ensure the type and order of the features in the map match what POA2 is expecting. This is made simple by using the 'Copy Hexlines From Another Map' tool, which imports the features from another map. If you do not do this, and your line definitions do not match what the TEC "expects", it can result in unexpected movement and combat effects, and even program access errors.

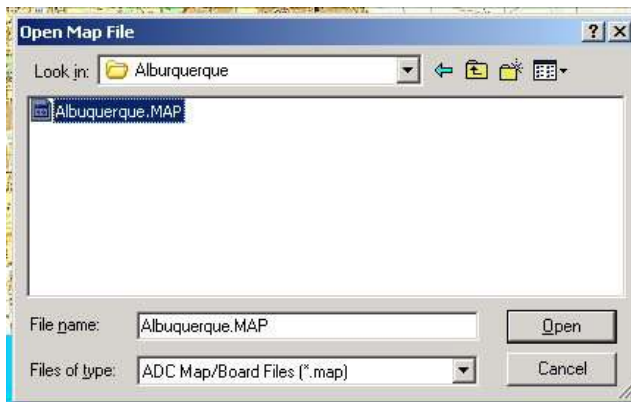
Before you import the hexlines you can see that there is no data in the hexline or hexside tools.



Select the tool.



You can select any map included with POA2.

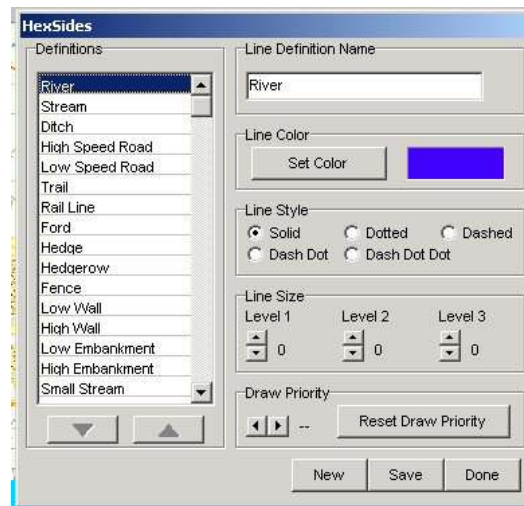
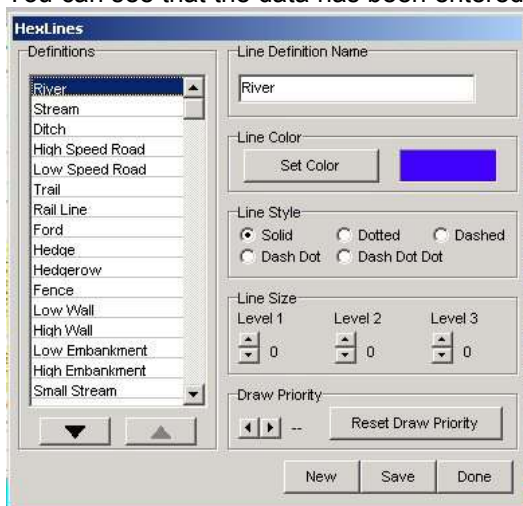


Continue the process by clicking yes.

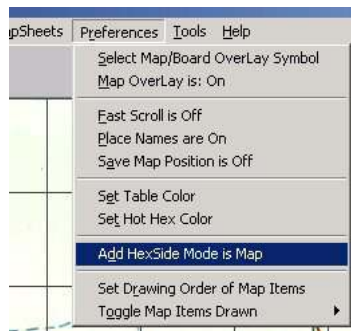


Save the map.

You can see that the data has been entered.



Before entering any hexsides or hexlines check to make sure you are in the map entry mode.



Hexsides and hexlines use the same list and one could be mistakenly used for another. If you are not sure use the POA2 Dataview program to determine the correct type.

Item	Type	Max	Yes
Wire (Concertina)	HexSide / Narrow	Add	No
Wire (Apron)	HexSide / Narrow	Add	No
Trail	HexLine / Narrow	Max	Yes
Low Speed Road	HexLine / Narrow	Max	Yes
High Speed Road	HexLine / Wide	Max	Yes
Railroad	HexLine / Narrow	Max	Yes
River Ford	HexLine / Narrow	Add	No
River	HexSide / Wide	Add	No
Stream	HexSide / Narrow	Add	No
Small Stream	HexSide / Narrow	Add	No
Ditch	HexSide / Narrow	Add	No
Hedge	HexSide / Narrow	Add	No
Hedgerow	HexSide / Narrow	Add	No
Fence	HexSide / Narrow	Add	No

Open the Hexline tool and select the type you want to add to the map. The line size on the imported lines is going to be 0 for all zoom levels as we don't want them to be visible when the map is used by POA2. However, we need to see them while we are editing, so change the width to whatever works best for you (1 or greater). Then click save and done.



Hexlines are entered by clicking on adjacent squares/hexes. If you click on a non-adjacent square no line will be drawn. This is a useful method of temporarily stopping the process if you need to zoom, scroll, or start an unconnected hexline on another part of the map. A box will appear on the map wherever you click.



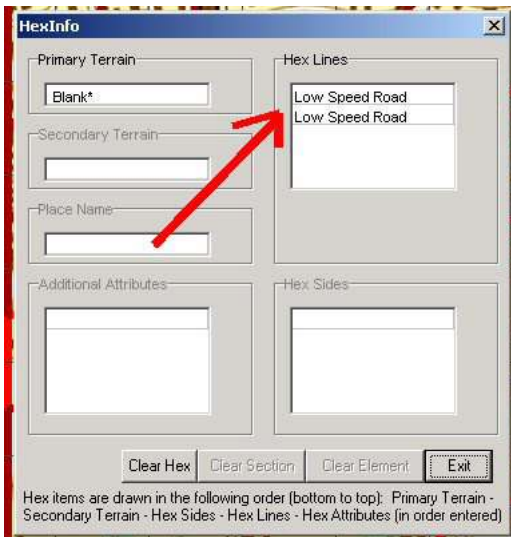
Even though roads may look wide, consider their path and make them low speed roads if they are not relatively straight thoroughfares.



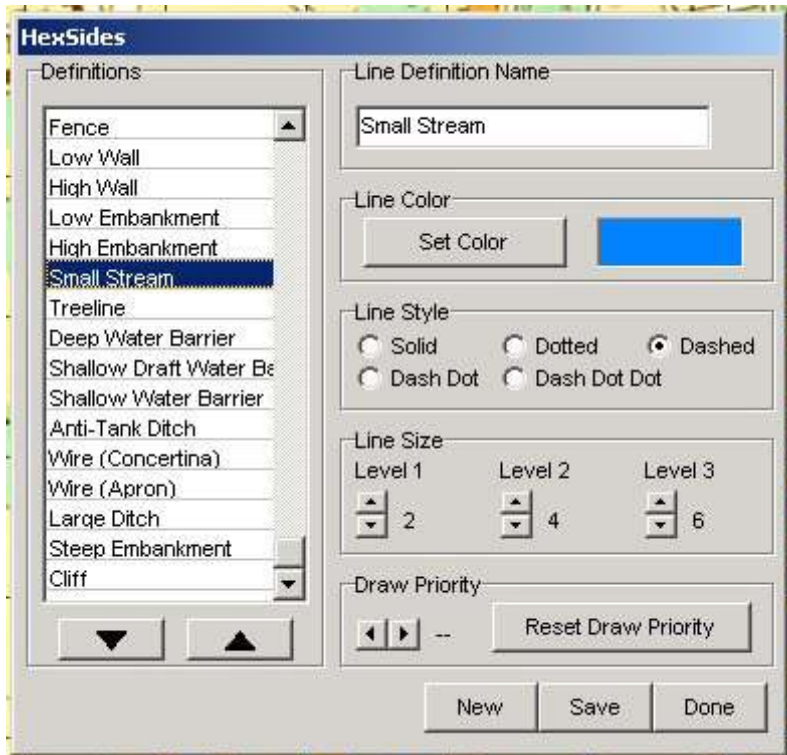
When drawing roads the important thing is to attempt to match the possible paths from one square to another. Single lines can represent multiple roads in a single square. No need to worry about what it looks like, since the lines will not be visible. Given the restraints of working within a grid, you will have to make decisions on how to use roads (and other hexlines/hexsides also) to best represent in simulation terms the map terrain. Note this is a very incomplete example, but it is representative of what needs to be done.



If you make an error, right click on the square containing the error. You can delete individual lines or simply clear the entire square of hexlines. Note the order of the hexlines is the first line added to the square is at the top of the list.



Adding Hexsides is similar to Hexlines. Select the line type you want to place on the map, increase the line width, and 'Save' then 'Done' to start adding.



Use place the mouse cursor in a square slightly toward an edge and shadow band will appear. Clicking then places the terrain feature on that side of the square. If you make a mistake, simply place the shadow band over the hexside you want to remove and left click.



Even more than hexlines, you will have to think about the end effect in POA2 of where you place the hexlines on the map. As in the case of these High Wall features most will not follow the POA2 mapgrid lines. But by careful placement you can create the desired compartmentalization, which will create the overall effect of the hexlines.

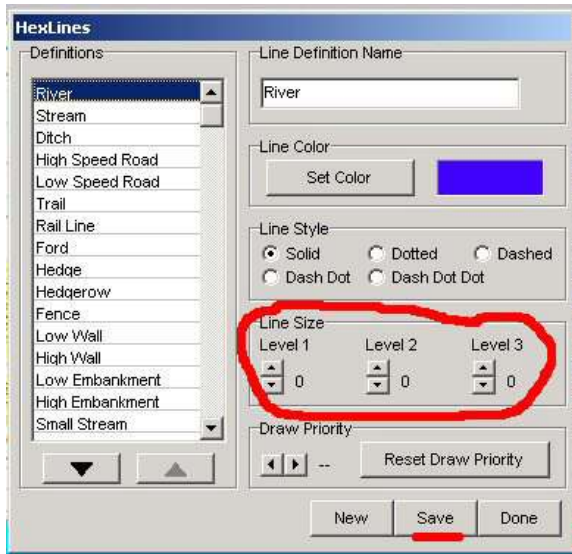




You can turn the Map elevation display on to assist in placing both hexlines and hexsides.



Following placement of all hexlines and hexsides, change all the line sizes to 0 to make them invisible on the final map, click 'Save' and 'Done.'



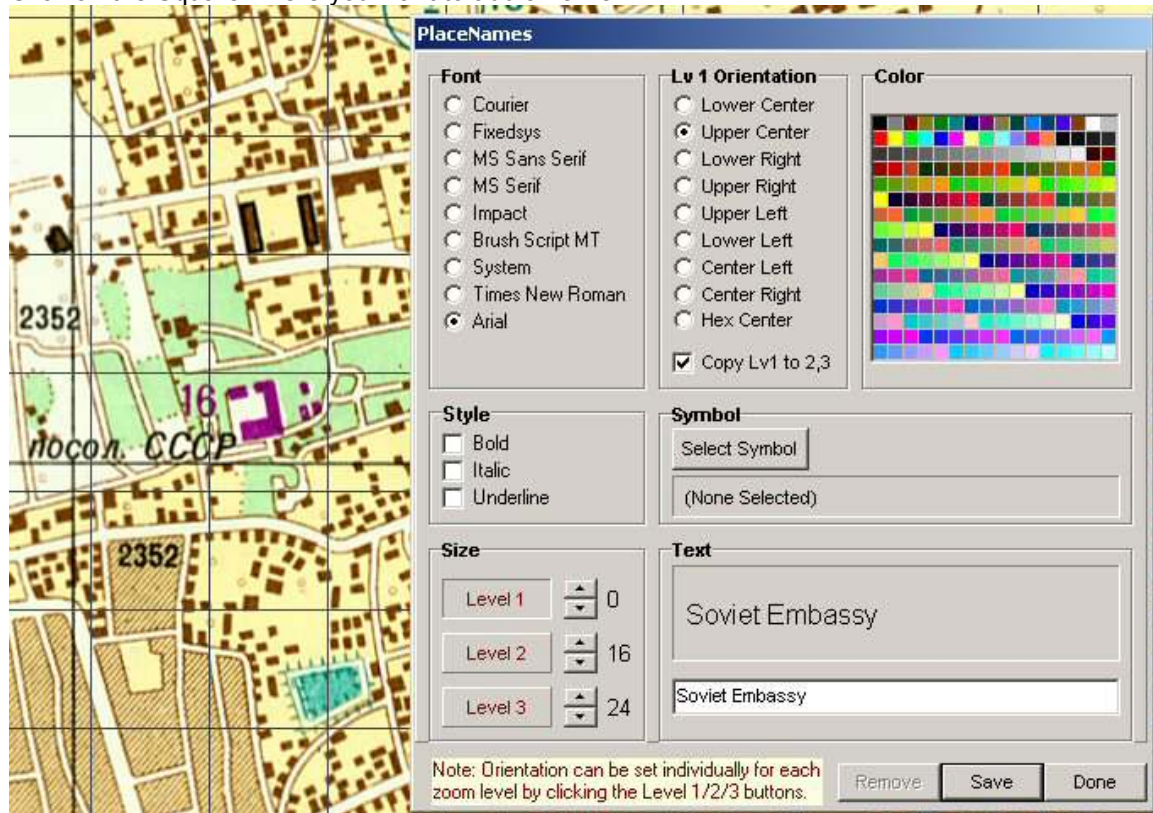
## **Placenames**

Placenames are text strings up to 24 characters long, which are visible on the map. These can be used to identify terrain or other man-made features. When creating a scanmap using the transparent square grid symbol set much of the important terrain will already be noted on the printed map image, so there may not be need to use this feature.

### Select Placenames Tool



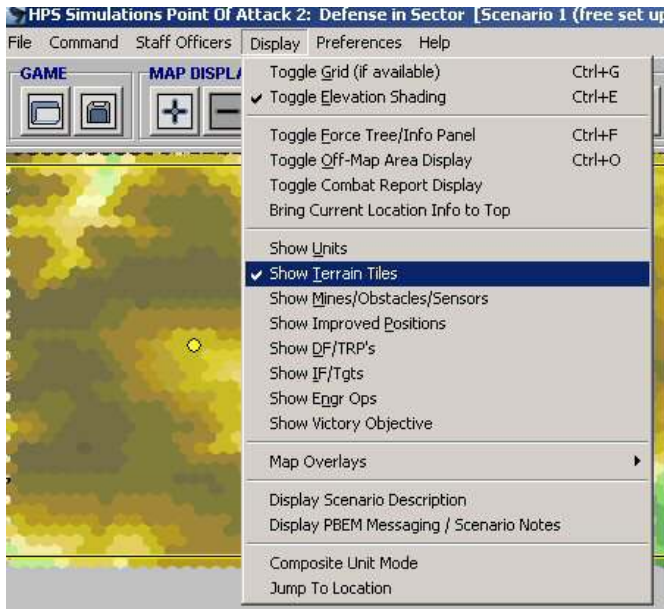
Click on the Square where you want to add a name



The Placename tool is pretty self-explanatory. The size is the height in pixels and is zoom level dependent. In this case I've made the zoom 1 level text invisible. The color, font, and style apply to all zoom levels, but the orientation form is zoom level dependent. You control which zoom level the orientation form is at by clicking the size box, as is noted on the form. Click 'Save' before clicking 'Done.' You can edit or remove a placename by clicking on the square and editing as desired or clicking 'Remove'. If you are trying to edit and the Text Box comes up blank, you've clicked on the wrong square.



## Terrain Symbols

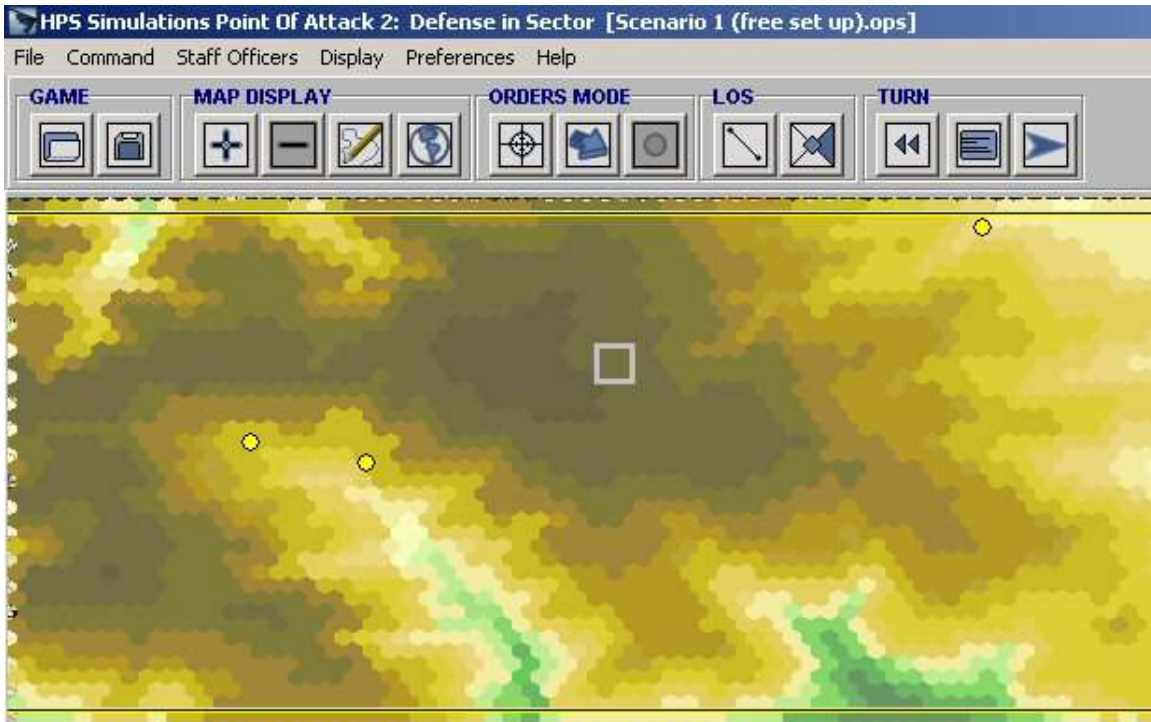


The first step is to set the Primary Terrain to the proper elevation color (shading) symbol. In this set, there are twenty levels ranging from green to brown.

If you recall, POA reserves the Primary Symbol for elevation shading. If you use "real" symbols instead, the user will have to turn the elevation Shading option on to see them.

If you recall, in POA2 you can also turn the terrain tiles on or off.

Setting the Primary terrain to elevation shading symbols results in the elevations being color coded in zoom 1 and 2, with the lowest elevations in dark green and the highest in dark brown.



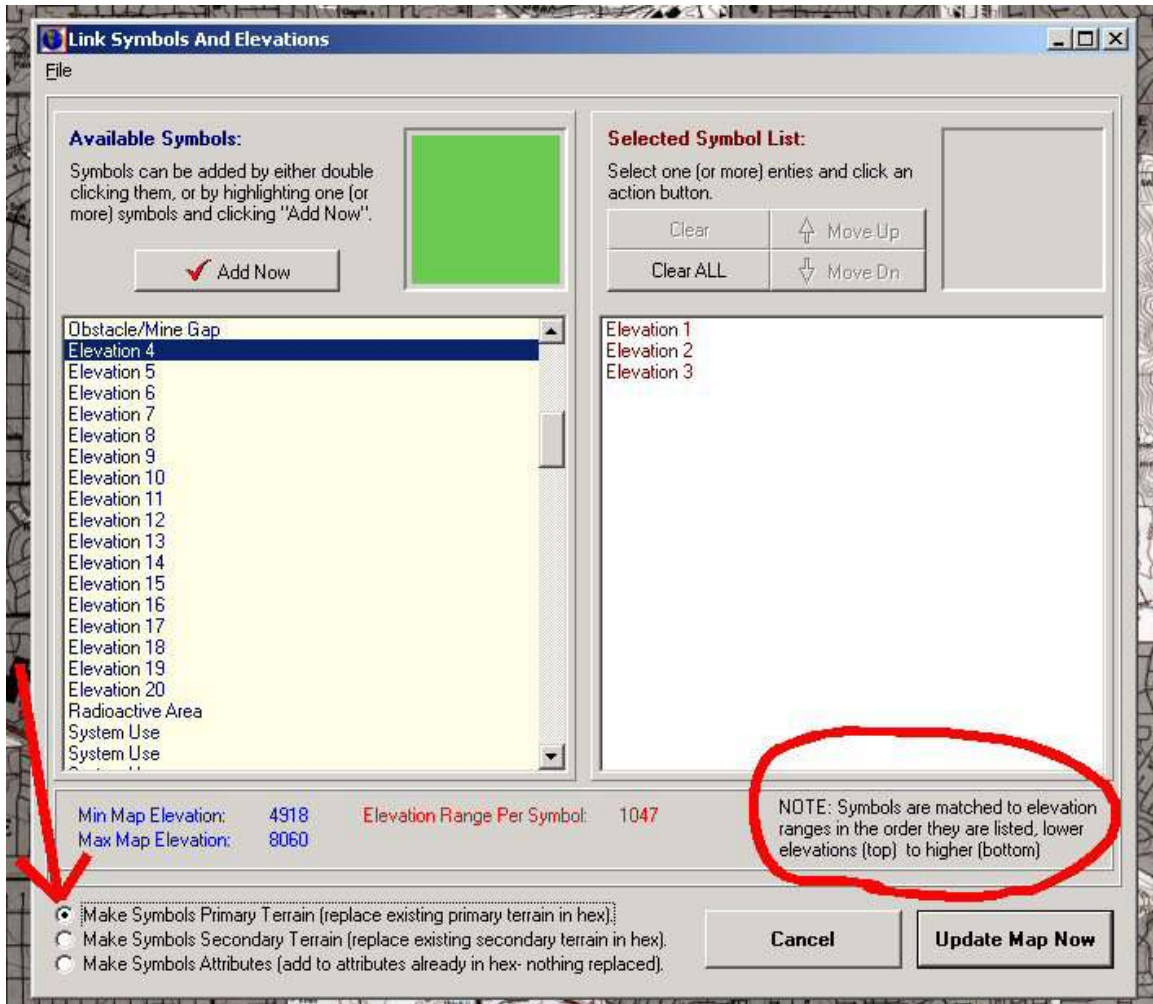
This depiction of elevation is not produced by POA2, but is an integral part of the map. The elevations are keyed to terrain symbols in the symbol, and these symbols use the Primary Terrain layer in the map.



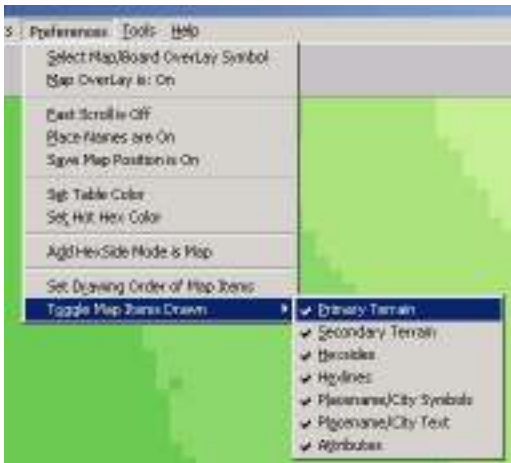
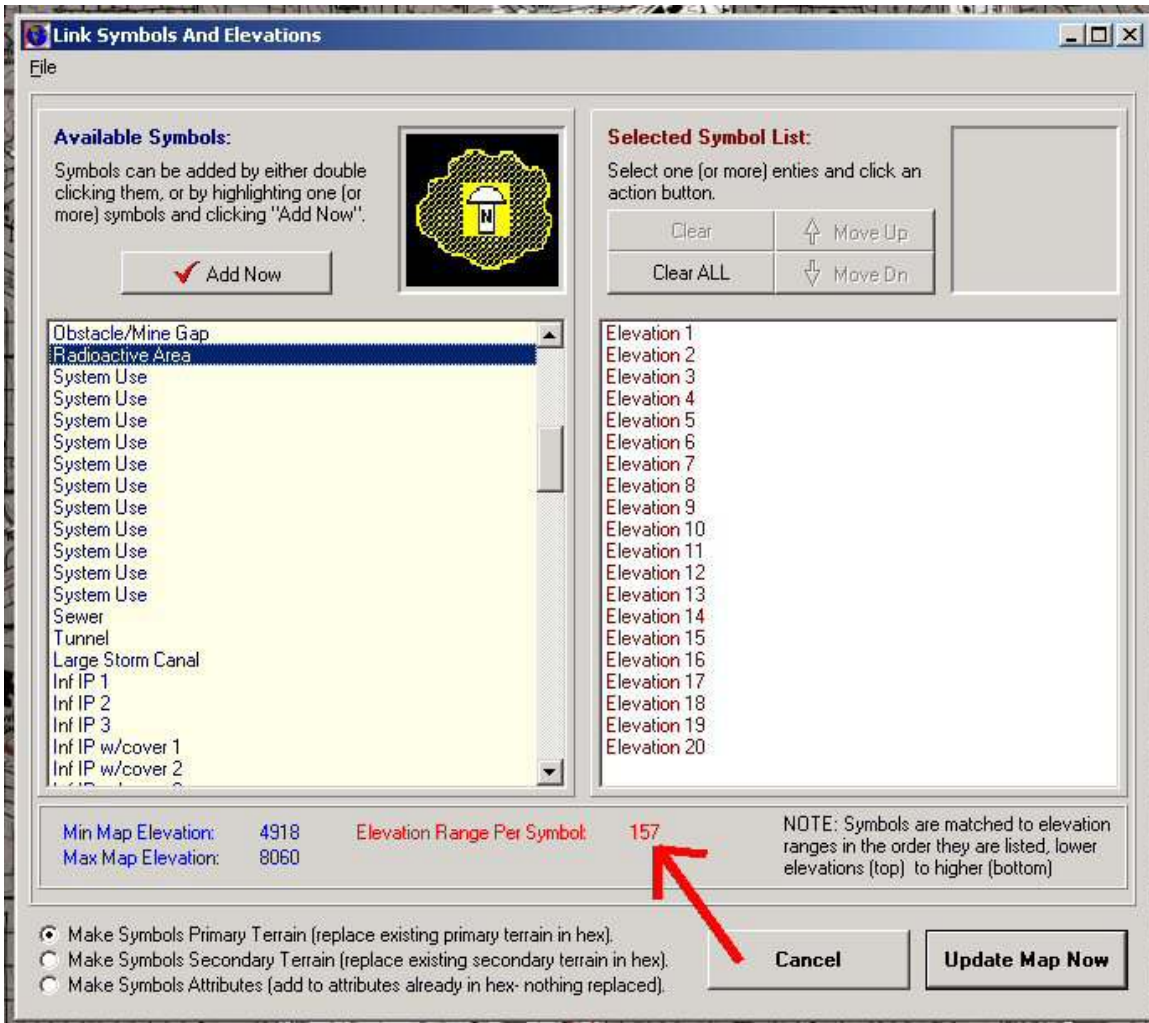
The Mapeditor does the work. Open the Auto-Place Symbols for Elevations tool.

Note these examples are from the Albuquerque map, which has all the elevations already entered.

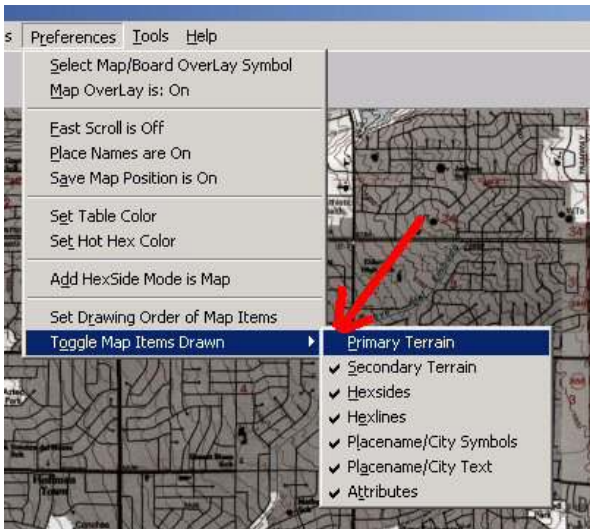
Ensure you are placing the elevation symbols in the Primary Terrain layer, and then add the elevation symbols to the right window in low to high order.



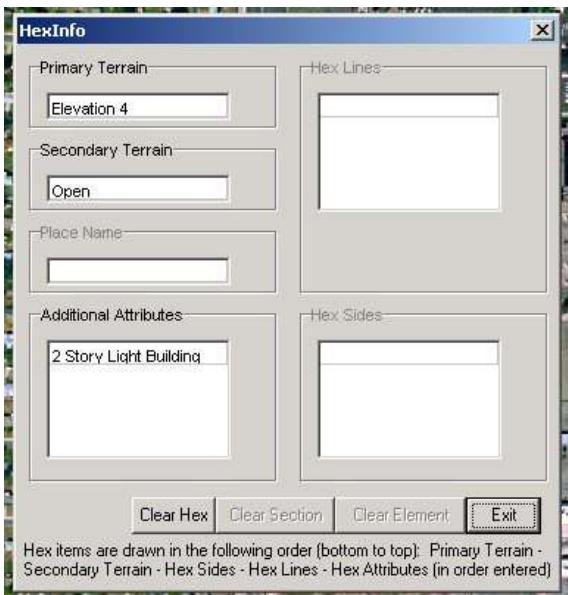
The tool reads the elevations you already placed on the map and does the calculations of how many elevations levels are included in each symbol range. When all 20 elevations are listed in the correct order in the right window click 'Update Map Now.'



The map will then be automatically filled with the elevation symbol colors. Select the 'Toggle Map Items Drawn' and uncheck Primary Terrain.



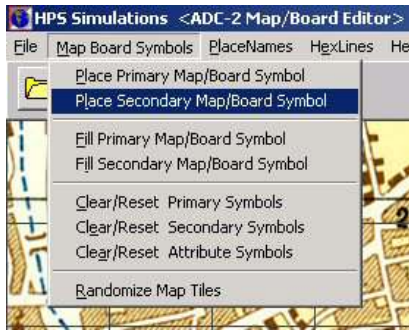
With the Primary Terrain not drawn, the scanmap is visible again.



Right Clicking on the map shows the all the layers.

Hex items are drawn in the following order (bottom to top): Primary Terrain - Secondary Terrain - Hex Sides - Hex Lines - Hex Attributes (in order entered)



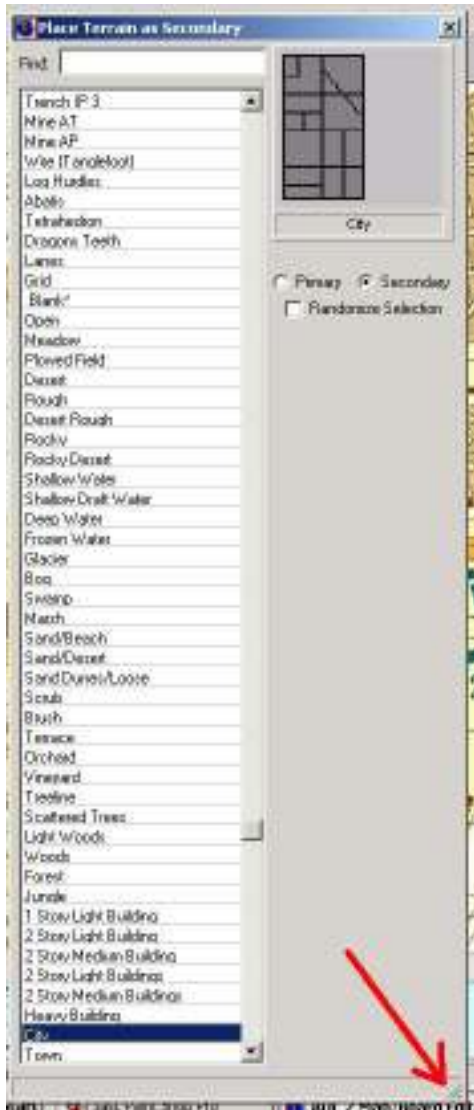


Next, the Secondary Terrain Symbols are placed.

Note that there is no 'Place Attribute Mapboard Symbol' listed – if you add more than one secondary symbol, any addition symbols are automatically placed in the Attribute Symbol Layer.

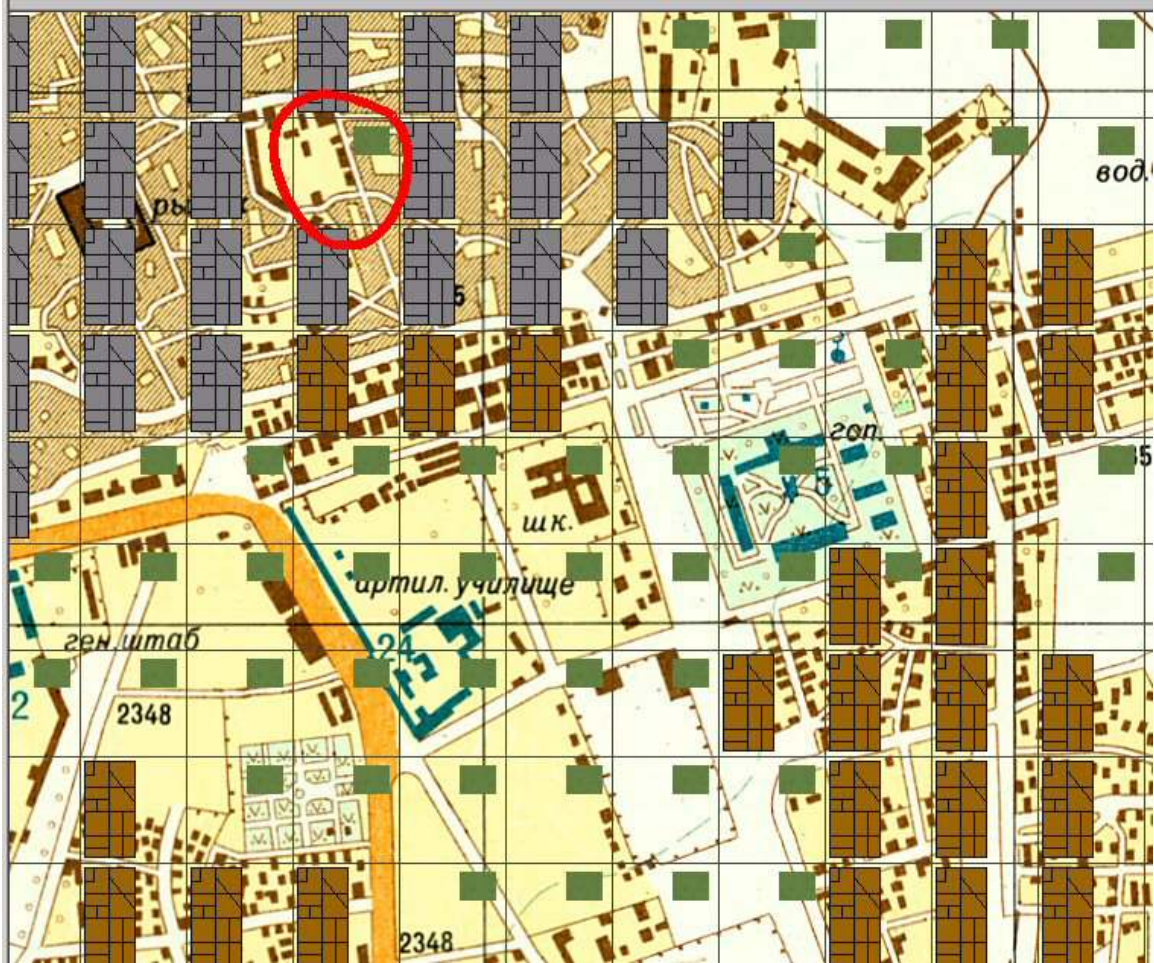
The first Secondary Terrain symbol you place in a square should represent the majority type of “ground” which fills the square. These include types such as: Open, Meadow, Plowed Field, Desert, Rough, Rocky, Rocky Desert, Shallow Water, Shallow Draft Water, Deep Water, Frozen Water, Glacier, Bog, Swamp, Marsh, Sand/Beach, Sand/Desert, Sand Dunes/Loose, Scrub, Terraces, City, Town, Village, Crops, and Rice Paddy.

Note that these are purely ground or surface types of terrain. Things such as trees and small buildings are not included, since they could be cut down, burned, or otherwise removed from the location, or could be influenced by seasonal effects.



TIP: Stretch the Place Terrain as Secondary Window as long as you can and place it on one side of the Mappeditor. This makes finding the terrain symbol you want easier and eliminates a lot of scrolling.

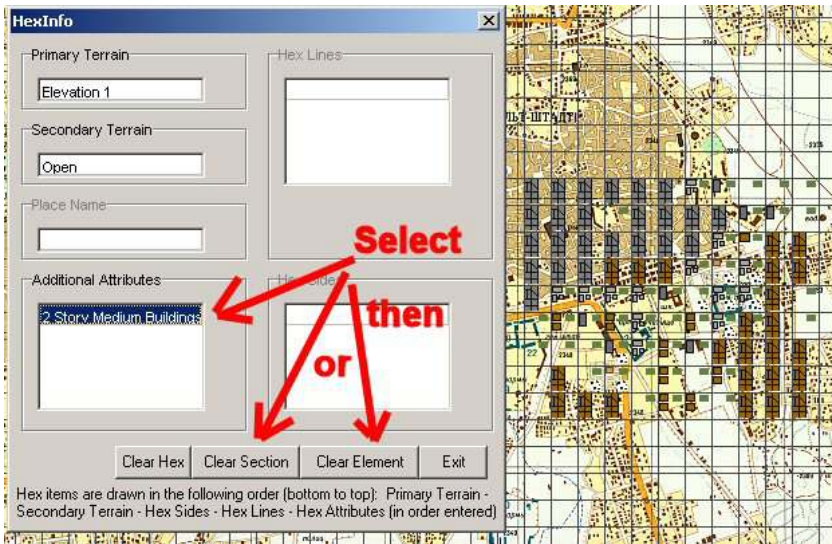
After selecting which terrain symbol type you want to work with, it's simply a matter of making a determination of whether that type is appropriate for the square and then clicking on it. It's up to you to analyze the map and select the correct terrain symbol. In some cases it might be necessary to abstract/modify the terrain a bit because the square grid does not align with the reality depicted on the map image. For example, I've circled a square I have made open terrain, even though there is City terrain in the square too, in order to create the open square which overlaps 2 squares. Making the open area 2 squares wide would make it larger in POA2 than it is in reality. My version abstracts the open area by shifting it on my map.



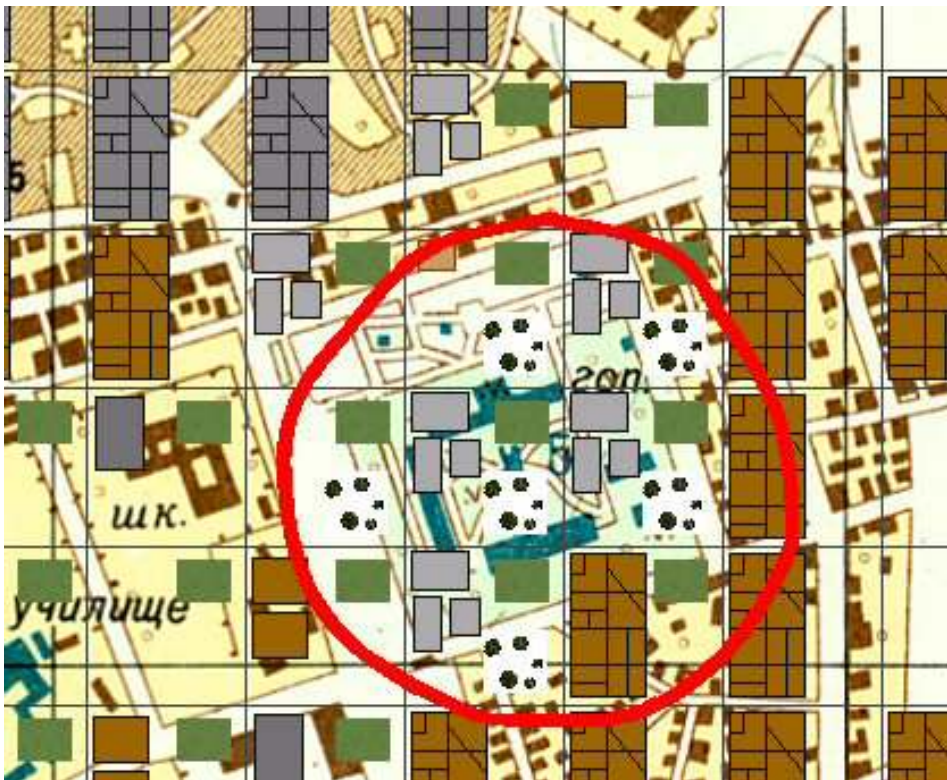
Once the secondary terrain has been entered, place the other terrain types in the square. These will be placed in the maps Attribute Symbol Layer.

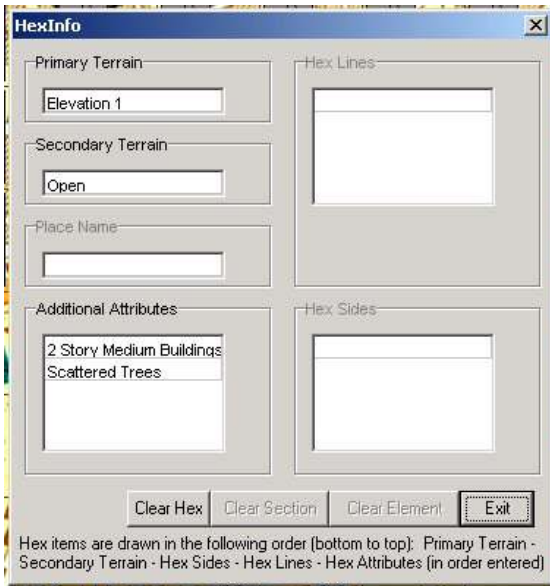


Attribute Terrain Symbols include Large Storm Canal, Scrub, Orchard, Vineyard, Scattered Trees, Light Woods, Forest, Jungle, all the various Building Types, and Storage Tanks



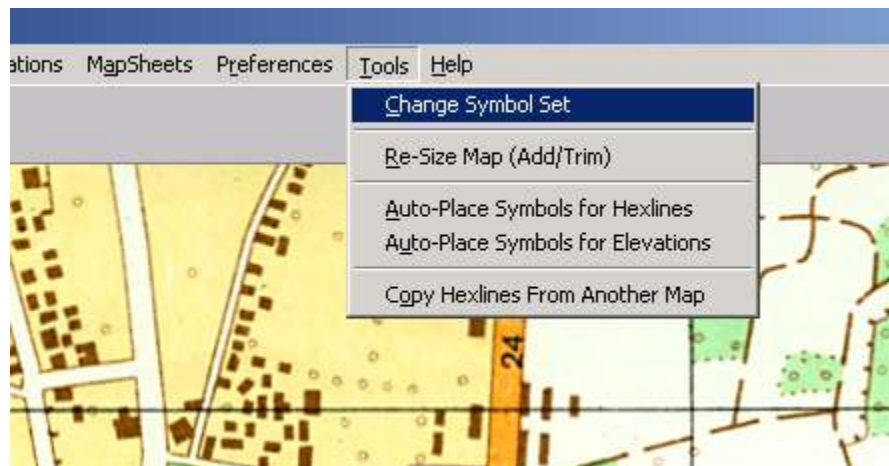
To correct errors, right click on the symbol you want to change and click 'Clear Element'. If you have more than one incorrect symbol in the Additional Attributes Box, you can delete them all by clicking 'Clear Section'.



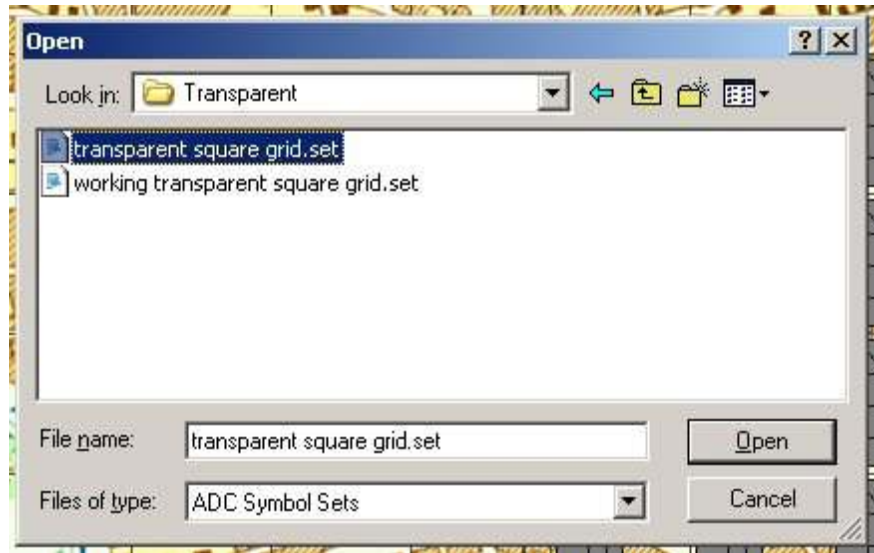


When you place more secondary terrain in a square, the terrain symbol simple gets added to the Attributes list.

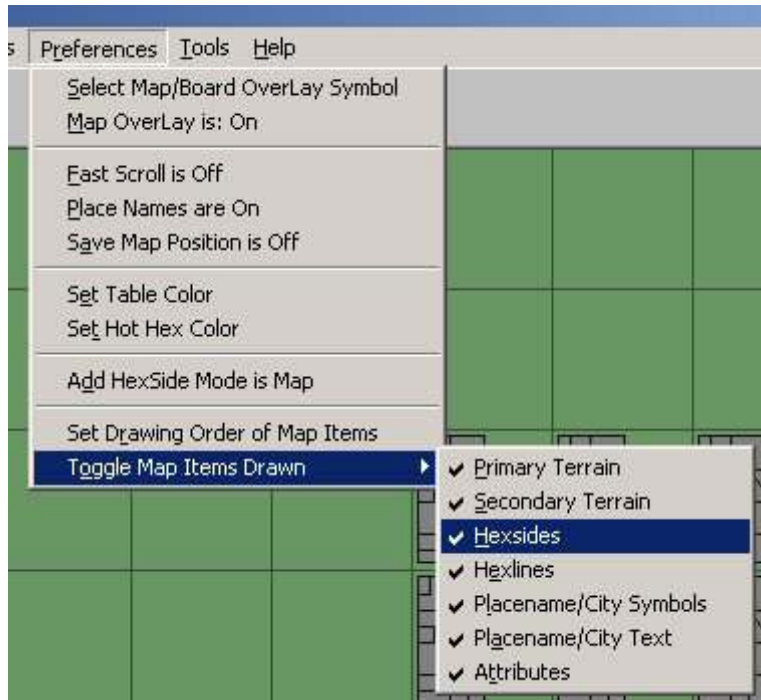
Once all the terrain symbols are added, all that is left to do is to change the symbol set since we don't want users to see all of our working symbols.



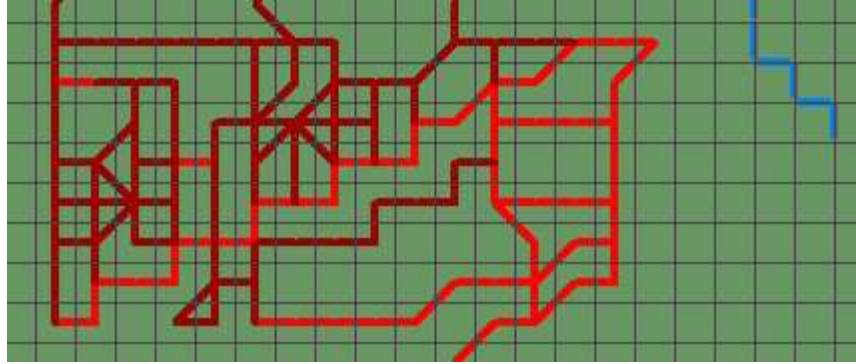
Relink the map back to the Transparent Square Grid.



Finally, make sure all the Map Item toggles are checked, so they are visible in POA2.



Review the map in all zoom levels to ensure you so you **DO NOT** see this. Remember to set all hexline and hexsides to a size of zero.



## Linking the Map to POA2

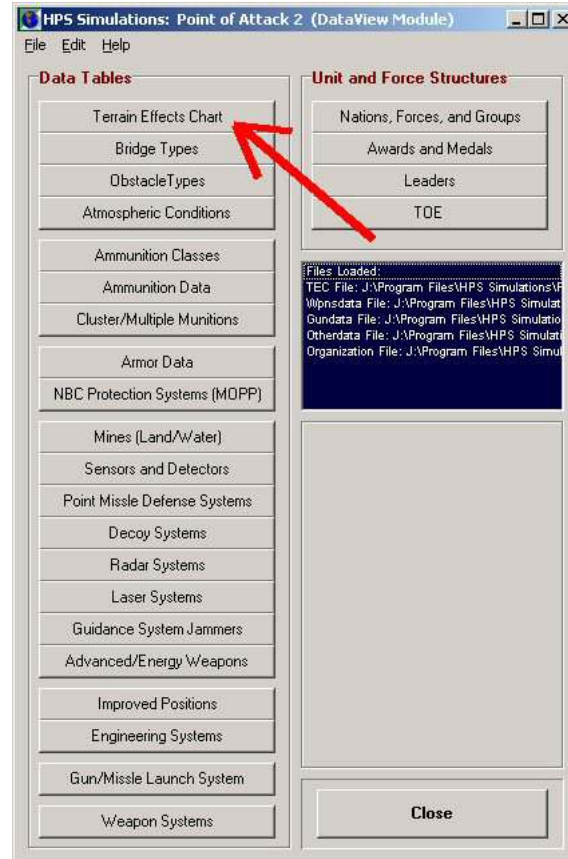
In order for POA2 to use a map, the map, symbol set, and the POA2 Terrain Effects Charts must be linked. This link data is stored in an \*.ECX file maintained in the map's folder. Because the Transparent Square Grid Symbol Set is included with POA2, the more time-consuming aspects have already been completed.

Open the POA DataView Program.

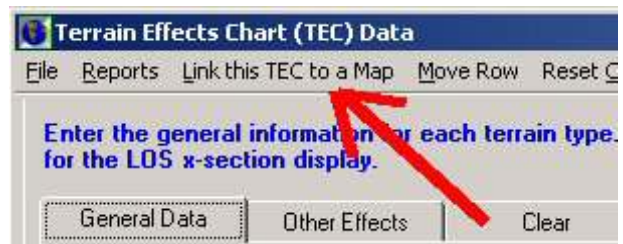




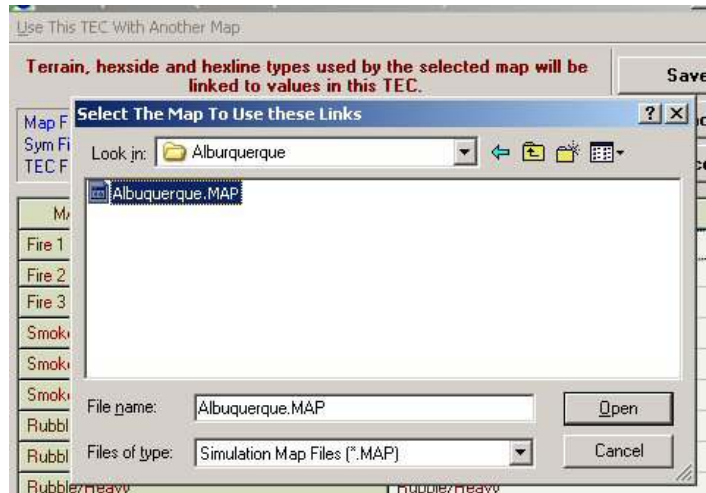
Open the Terrain Effects Chart.



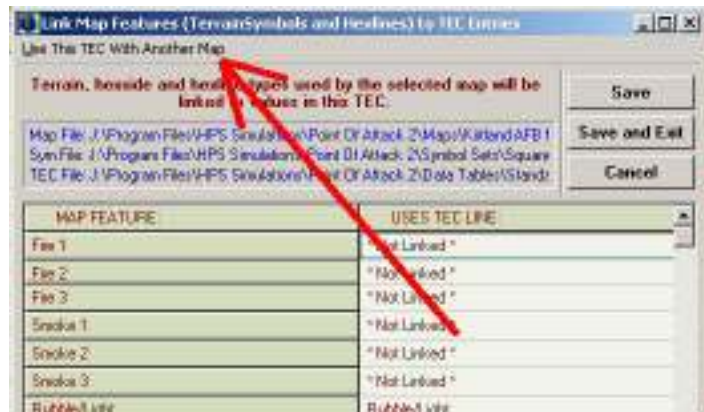
Use the 'Link this TEC to a Map' tool.



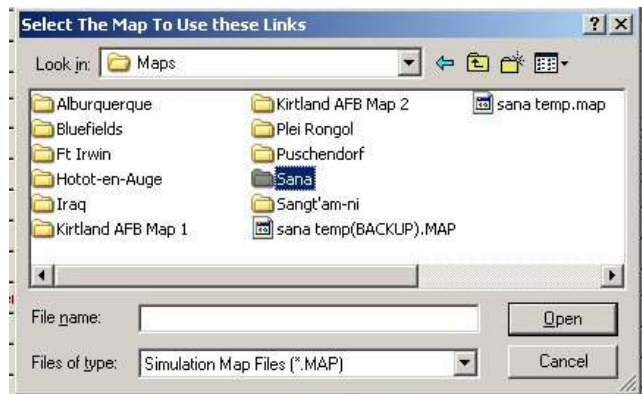
Select a map that uses the Transparent Square Grid Symbol Set.



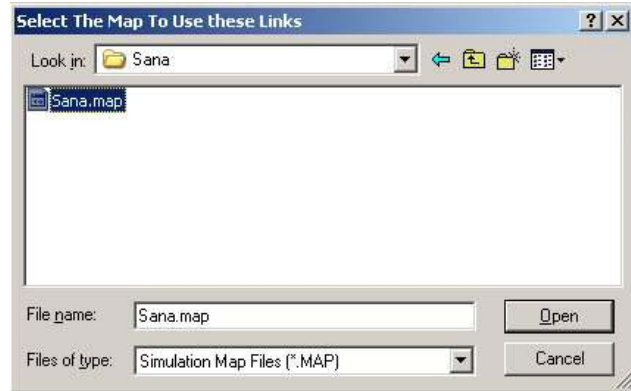
Now open the 'Use This TEC with Another Map' tool.



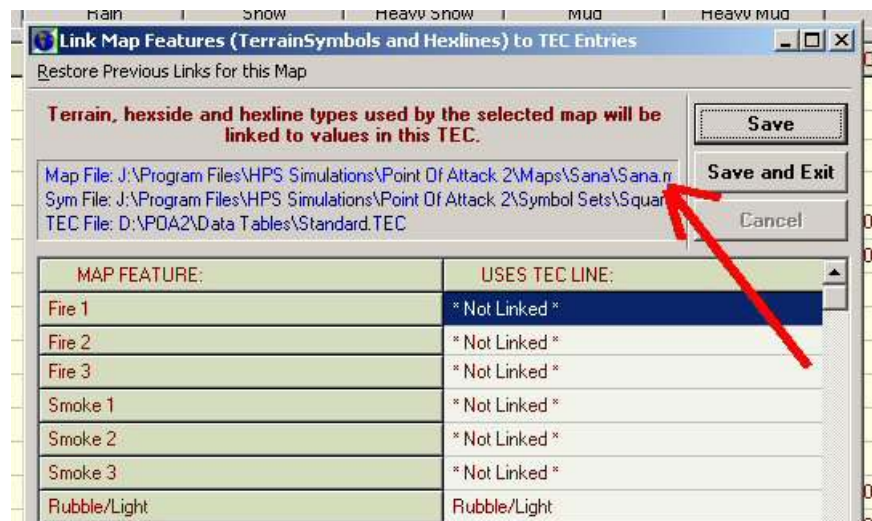
Select the new, unlinked map folder...



...and select the map.



You can see that the correct map, symbol set, and TEC file are linked.



The .ECX file has been created in the Sana Map folder.



## **Congratulations, you're Done!**

It's been a long road, but when this last step is complete, the map is ready for use in POA2!

