Satellite Takeoff Tutorial--Flat Roof

A RoofLogic Digitizer license upgrades RoofCAD so that you have the ability to digitize paper plans, electronic plans and satellite images. We think of satellite images as blue prints from outer space!

This tutorial will show you how to use a satellite image as a template from which you can create a drawing and produce takeoff quantities.

Here are some of the things you can do:

- Generate takeoff quantities for reroof bids and budgets. If you need more accuracy, though, you've got to visit the roof. Accuracy is dependent on several factors including image quality.
- Pre-draw the roof so that when you do your inspection you're not starting with a blank page. Then, on site, verify dimensions and roof top objects. Then update your drawing.
- Create professional CAD drawings for proposals. Digitizer is an upgrade to RoofCAD, so you have all the great RoofCAD tools to fine tune and polish the drawing.

This tutorial will work both for people who already own a Digitizer license and those who are evaluating drawing from satellite images. Keep in mind, however, it was written from the perspective of someone who does not yet own a Digitizer license. The trial version of Digitizer has certain restrictions which we will point out along the way.

So let's see how this thing works.

Acquire Image from Satellite Service

The first thing you need to do is log onto a satellite image service like Google Earth or Microsoft's Virtual Earth. Each service handles the steps for saving an image differently. You need to acquire the skills to complete these steps.

In your Satellite service complete the following:

- Find the building.
- Get one linear measurement. Most services let you do this. The easiest thing to do is measure one of the perimeter walls of the roof. Measure the longest one you can.
- Rotate the image so that it is oriented properly for your drawing.
- Save the image to your hard drive.

Having done all these things you can now load the satellite image in RoofCAD.

Load the Satellite Image

Trial Version Restriction: You can only load the sample satellite images that came with RoofCAD.

1. From the menu choose File|New|Empty. An empty page appears.
2. Choose the Digitizer/Satellite Trial|Load Eplan/Satellite Image menu option.
3. Navigate to the RoofCAD|Eplans folder and open the "Satellite-Commercial Flat.JPG" file. The image is now displayed on the drawing page.
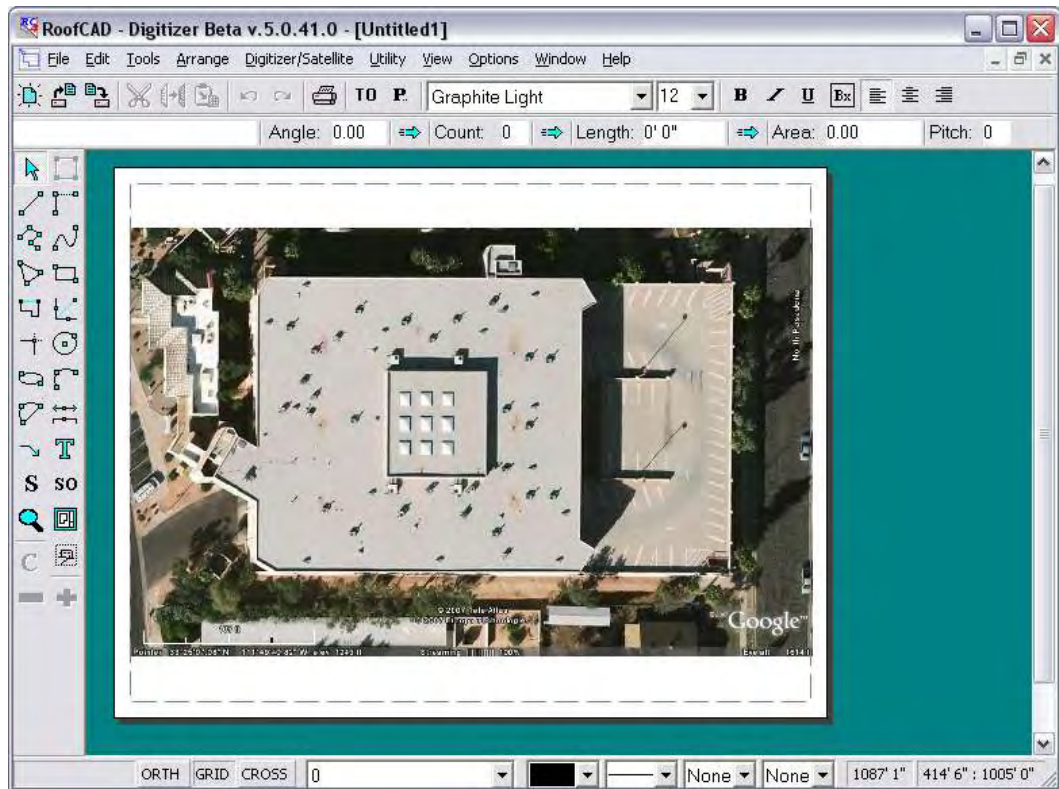
Satellite Tools

In order to work effectively with the drawing you need to learn these tools.

Zoom In/Out

By far the easiest way to zoom in and out on the image is to use your mouse wheel. Roll toward you to zoom in. Roll away from you to zoom out. Give it a try!

One important thing to know is that the system orients itself based on your mouse pointer location. If you want to zoom in on an object, keep your mouse pointer on the object as you roll the wheel. This takes a little practice but you will quickly get used to it.

If you get into trouble press F on your keyboard to reset the zoom level to full page view.

Mouse Wheel   Zooms in and out.

Pan

While zoomed in you will want to pan around the image. This works somewhat like a PDF document. To pan, simply hold down the P key on your keyboard and you will notice the cursor turns into a hand symbol.

With the P button held down, press and hold down your mouse button. You can now move your mouse to pan the page. When you're done release the P key and the mouse button.

P   Hold down to pan.

Fit to Window

As mentioned above pressing the F key on your keyboard will reset the zoom level to full page view.

F   Resets zoom level to full page view.

Refresh

As you pan, zoom and draw the screen may get a little messy with false lines. Just hit F5 at anytime to clean them up.

F5   Refreshes the screen.

Large Cross Hair

The normal RoofCAD drawing cursors display a small cross hair. Turning on the large cross hair expands the lines of the cross hair to stretch edge to edge on the screen. This is really useful when drawing roof outlines because the longer cross hair line is easier to line up over a wall.

For most other drawing operations you will probably want the large cross hair off because it tends to get in the way and can sometimes leave false lines on the screen. If you get false lines, press F5 to clear them up.

To turn the large cross hair on and off press the C key on your keyboard. Try it now!

C   Turns large Crosshair on and off.

Ortho Mode

Ortho mode is extremely useful because it keeps the lines you draw straight.

Ortho Mode locks your lines to predefined angles, thus making it easier to keep lines straight. RoofCAD ships with the Ortho angle set to 15-degree increments. Our experience has shown that most buildings have angles divisible by 15 degrees, so you should be able to keep Ortho on much of the time.

If the system won't let you draw a line at the angle you want, simply turn Ortho off, draw the line then turn it on again.

When Ortho Mode is on, the ORTH button on the status line is depressed. You can click this button to turn Ortho on or off. Pressing the "O" key on the keyboard also toggles Ortho Mode on and off.

O   **Turns Ortho mode on and off.**

Those are the core tools you need to know to start drawing with satellite images.

Align the Image

This step will help you square the building to the drawing page. You may have already rotated the image in your satellite service software but, often, it's hard to get the image exactly square.

1. If Ortho mode is on, turn it off. To do this, press the O key on your keyboard.

2. From the menu choose Digitizer/Satellite Trial|Align Eplan. A message appears.
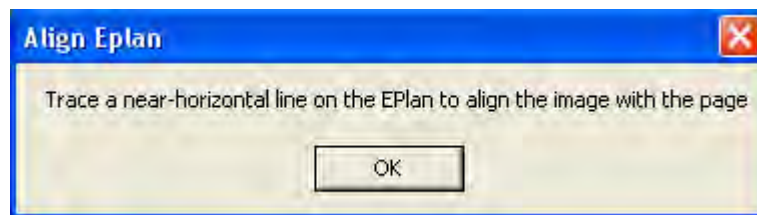
3. Click OK.
4. Now find a line that should run parallel to the bottom of the page. Click your mouse at the start and again at the end point of that line, as we did with the red line in the next image.
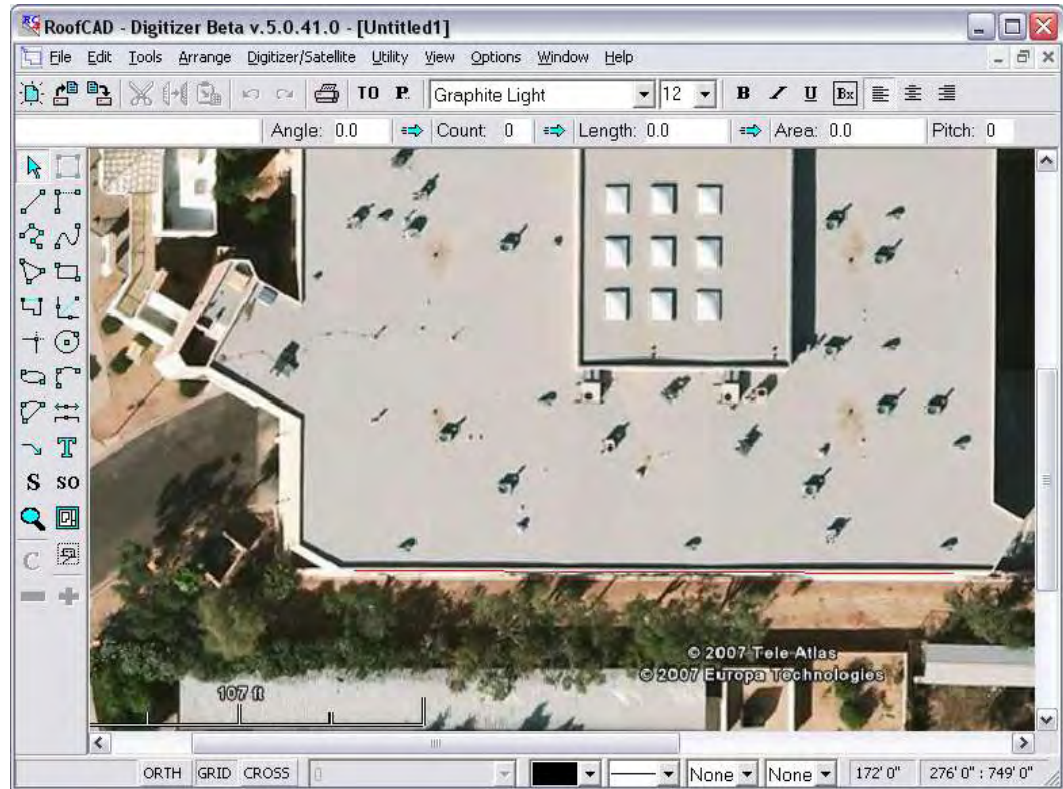
Your image is now square with the page.

Hint: **As shown in our image it can help to zoom in.**

You can do a quick check to see how square your drawing is with the page, by turning on the large crosshair.

The large cross hair is turned on by pressing the C key on your keyboard or clicking the CROSS button at the bottom of the page.

Now, move your mouse over the horizontal and vertical perimeter walls of the roof. The red crosshair line should run right along the wall. If it is skewed, run the Align ePlan option again. Having the image square to the page makes it much, much easier to draw.

C   **Turns on the large crosshair.**

Set Scale

Trial Version Restriction: You cannot enter a scale. You can only use the preset scale provided by RoofCAD.

RoofCAD needs to know the length of something on the image in order to calculate the scale. The length of one of the perimeter walls is usually the easiest.
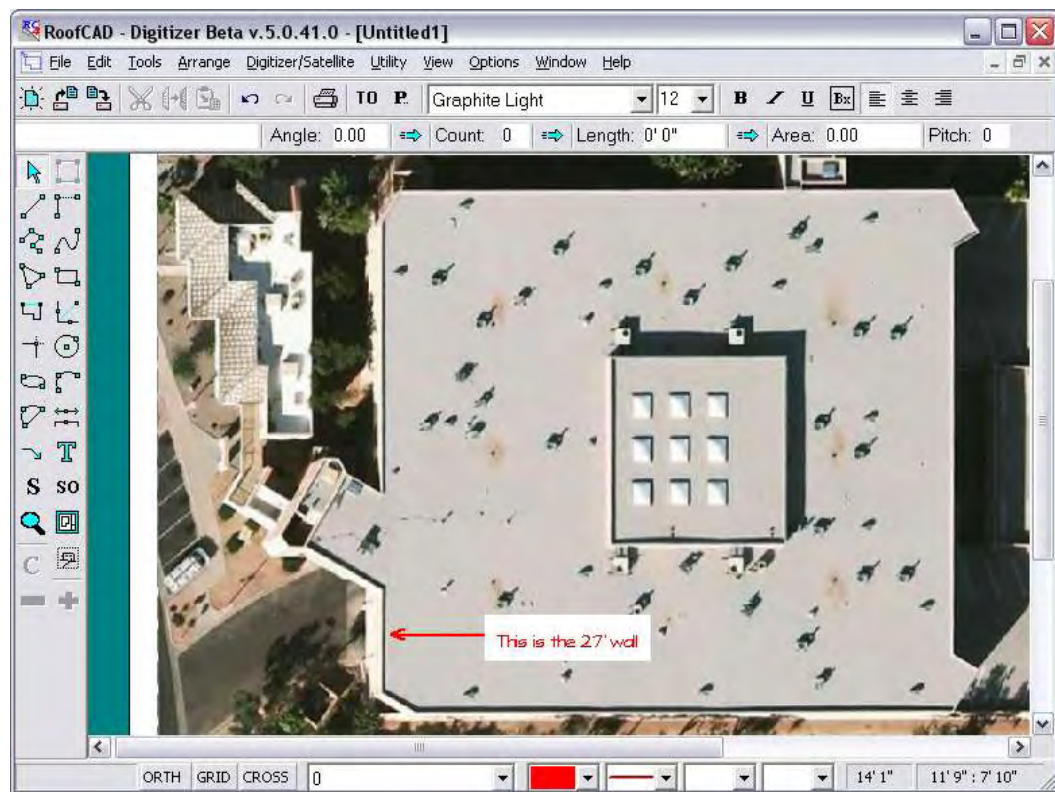
From the menu choose Digitizer/Satellite Trial | Set Eplan Scale. The Set Eplan Scale window appears.
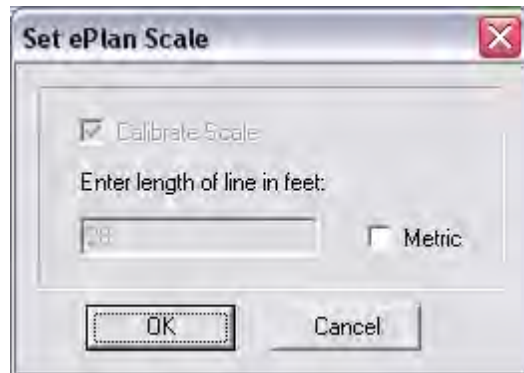
This is where you type in the length of one of the perimeter walls. In the trial version you cannot type in the length.

Now you will tell RoofCAD which wall is 28' long.

Don't click on the drawing yet or you will start the drawing process. You first need to set focus to the main program window. The easiest way is to click anywhere in the title bar of the RoofCAD window. It looks like this.

1. Now zoom in a bit on the wall. If you have trouble, use the Pan tool. If you get all messed up, hit F on the keyboard and try again.
2. Click the mouse at one end of the wall.
3. Now click the other end of the wall.

You will end up with a red line that looks like this.
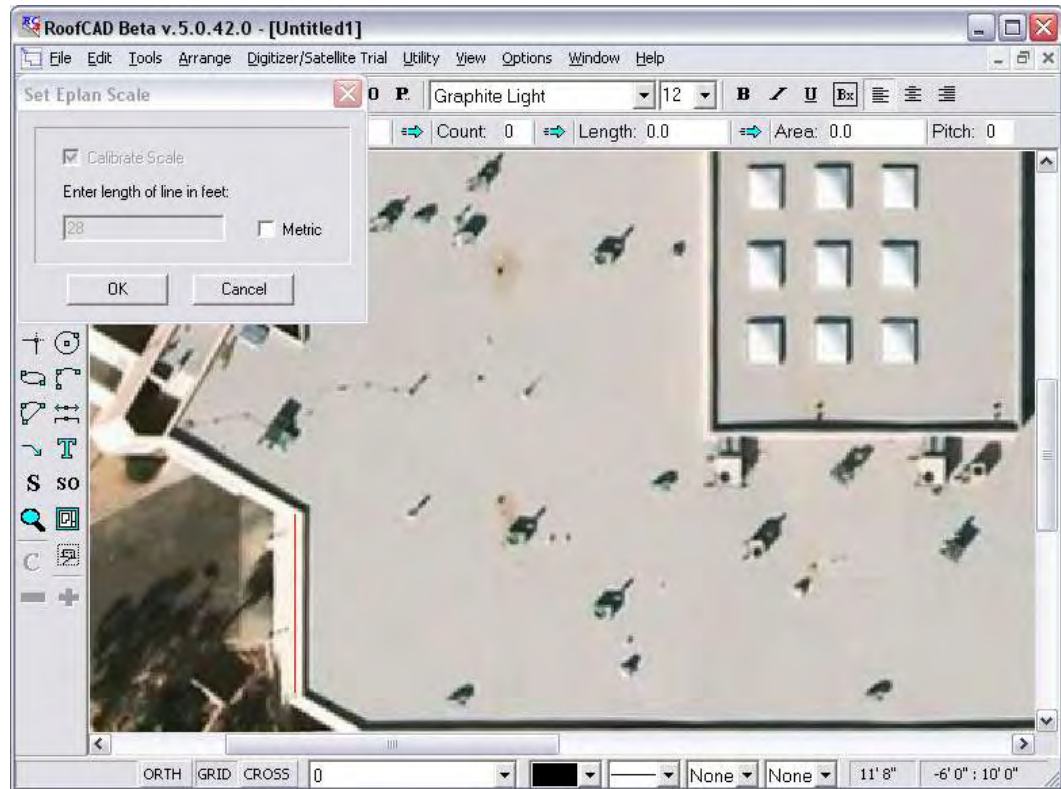
Now click the OK button on the Set Eplan Scale window. The scale has now been established.

Hint: **You do not *have* to set a scale. RoofLogic Digitizer will use a default scale if you do not set one. However, keep in mind the quantities calculated will not be accurate until you get a wall measurement from the site.**

Draw Roof Outlines

Now we will draw the roof outlines.

1. Click the SO button on the left hand tool bar. The Smart Object Browser will appear.

SO

The Smart Object Browser button.

Usually it is best to position the Smart Object Brower in the upper right of the window. This will keep it out of the way. You can also resize the Smart Object browser. Making it taller is helpful.

2. Expand the ***Flat Roof*** node and click the Flat Roof (Dig) smart object. It prompts you for a roof name; click OK to accept the default.

Hint:	**Where you have a choice use the (Dig) smart objects. They are made for digitizing.**

We are now ready to draw the lower roof outline. However, let's make life easier by turning on the large Crosshair and making sure Grid Snap is off.

3. Press the C key on your keyboard. This turns on the large cross hair, which makes it easier to line things up.

C   **Turns large Crosshair on and off.**

4. Press G on your keyboard until Grid Snap is off.

Grid snap forces your cursor to "snap" to one foot increments by default. When Grid Snap is off, the GRID button at the bottom of the screen is NOT pushed in.

G   **Turns grid snap on and off.**

Next we need to make sure Ortho mode is on.

When Ortho Mode is on, the ORTH button on the status line is depressed. Pressing the "O" key on the keyboard toggles Ortho Mode on and off.
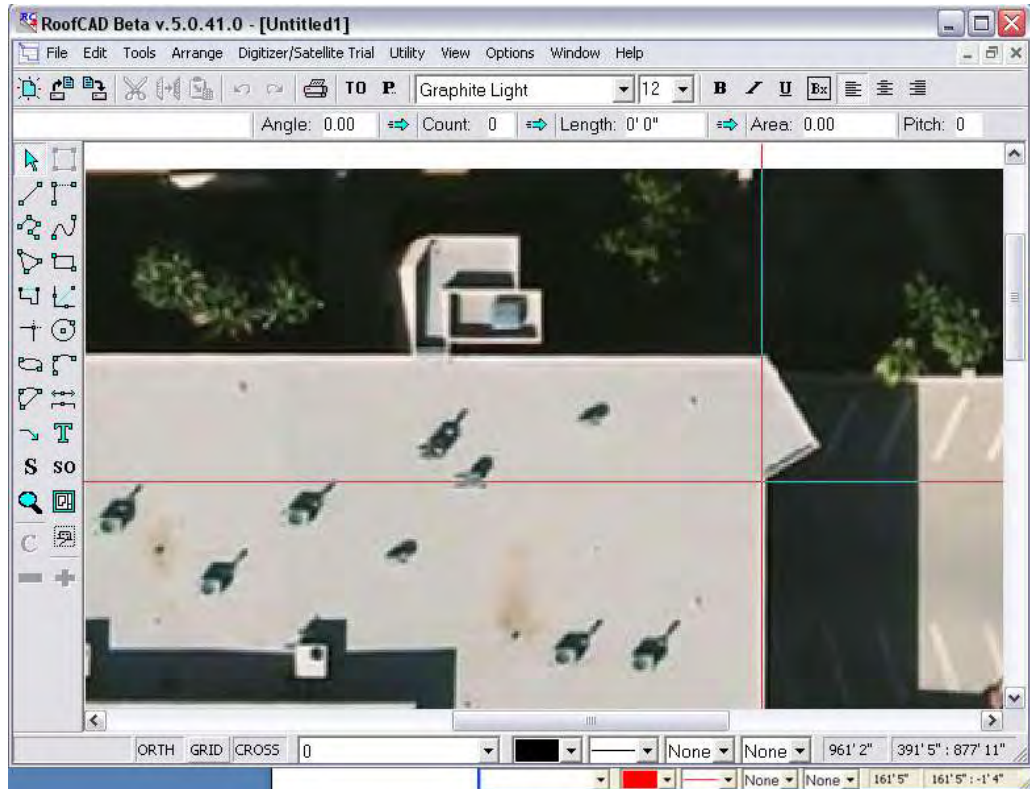
O   **Turns Ortho mode on and off.**

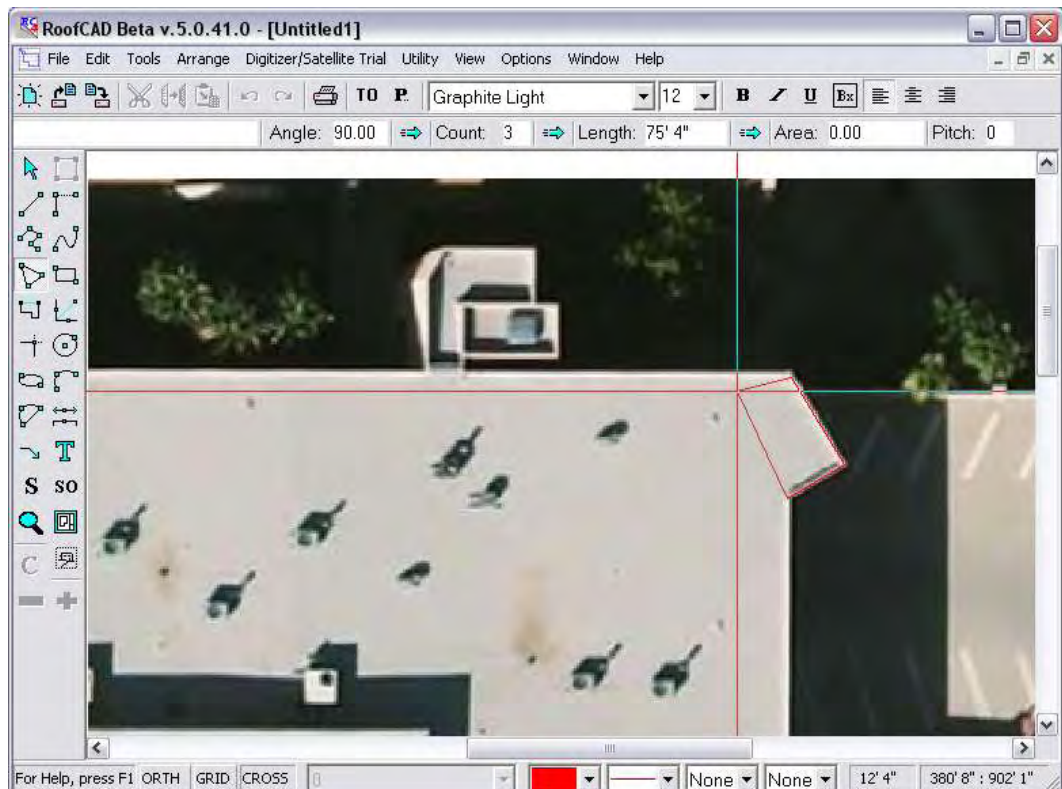5. Press F on your key board to reset the zoom level.

Now zoom in as shown next.

1. Click your mouse on the corner shown above.
2. Now click the next 2 corners. Your screen will look like this:

Notice that the first two wall angles were indeed divisible by 15, so you were able to leave Ortho on. If the system won't let you draw a line at the angle you want, simply turn Ortho off, draw the line then turn it on again.

3. Now pan over and click the other end of the horizontal wall. Hold down the P key on your keyboard and drag the satellite image. Release the P key when you are done panning.

4. Click the corner, then finish clicking the rest of the corners, working counter clockwise, using pan and zoom as required.

**Hint:**   **If at any time you want to start over, press Esc on your keyboard.**

The screen may get "messy". When it does, press F5 on your keyboard to clear it up.

Hint: **While drawing an outline, if you ever need to undo a mistake, press Backspace and the last point you clicked will be undone.**

If you have trouble positioning the mouse, use the keyboard. You can draw by moving the mouse with the arrow keys. Pressing the space bar is the same as clicking the mouse.
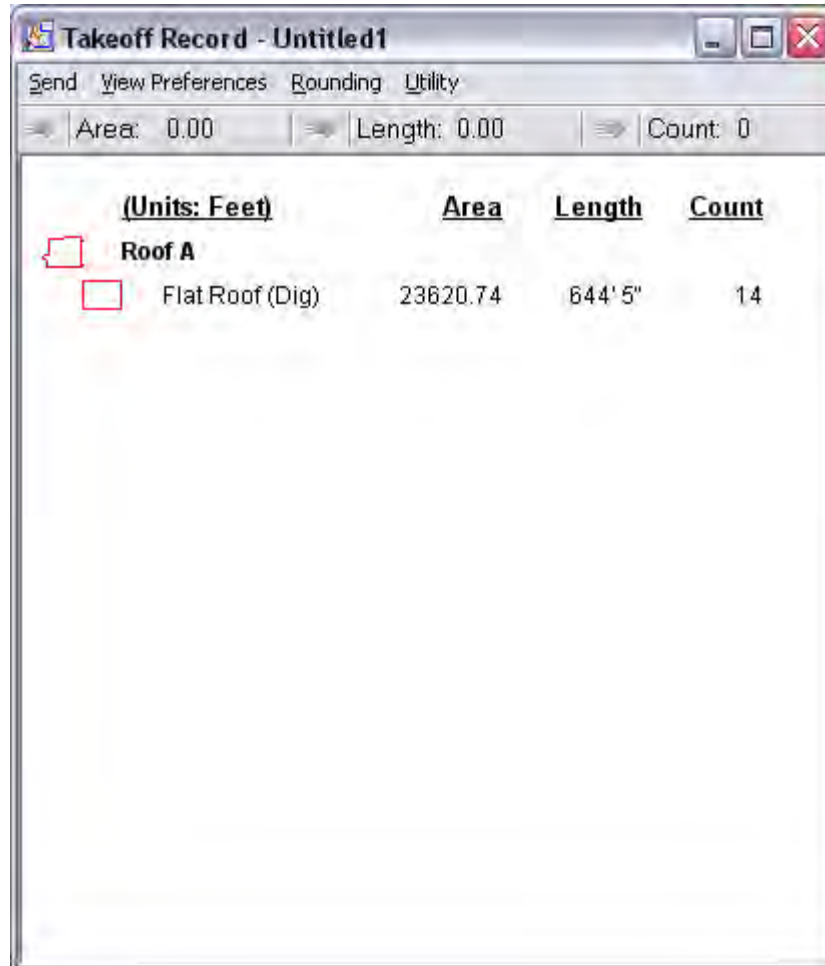
---

5. Once you have made it all the way around the roof, right click to finish. Your screen should now look like this.
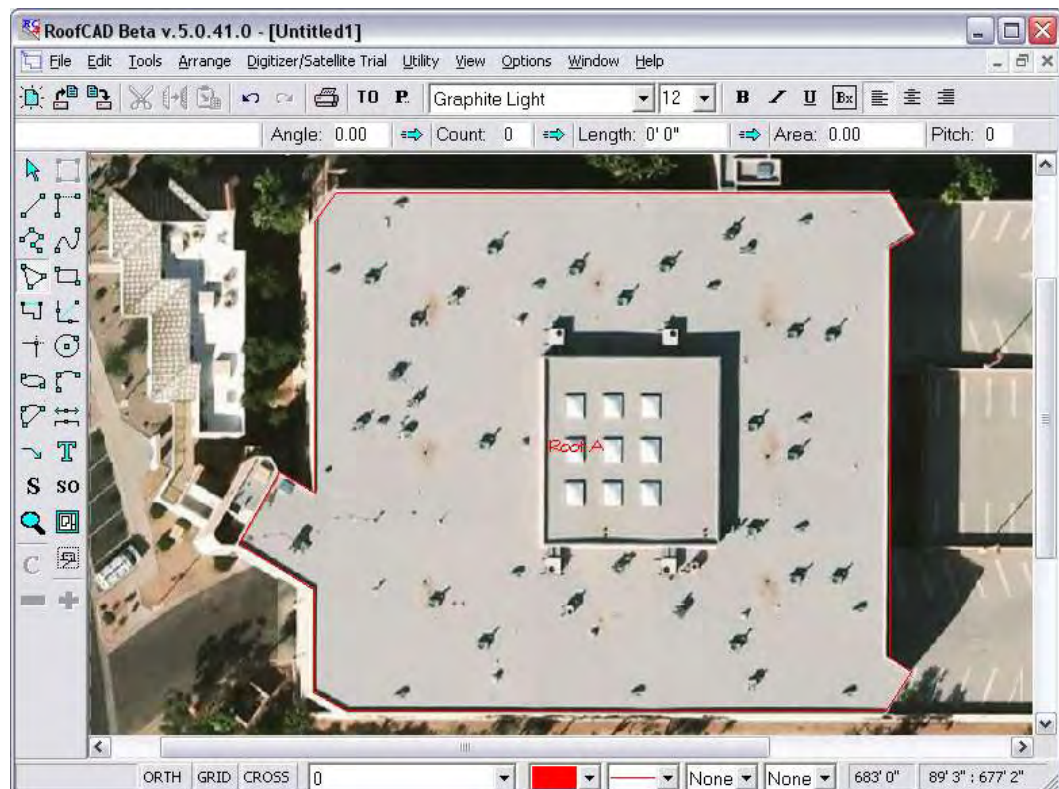
6. Click the TO button on the top button bar. The Takeoff record is displayed.

TO

Opens and closes the Takeoff Record.

The Takeoff Record is a summary of all your takeoff quantities.

Close the takeoff record.

7. Now draw the upper roof by clicking its four corners.
8. Right click to finish the upper roof.

The system asks you whether you want an opening under the upper roof.

9. Click Yes to do this.
10. Press C on the keyboard to turn the large Crosshair off. We won't need it anymore.

You now have two roofs drawn. Their areas are on the Takeoff Record.
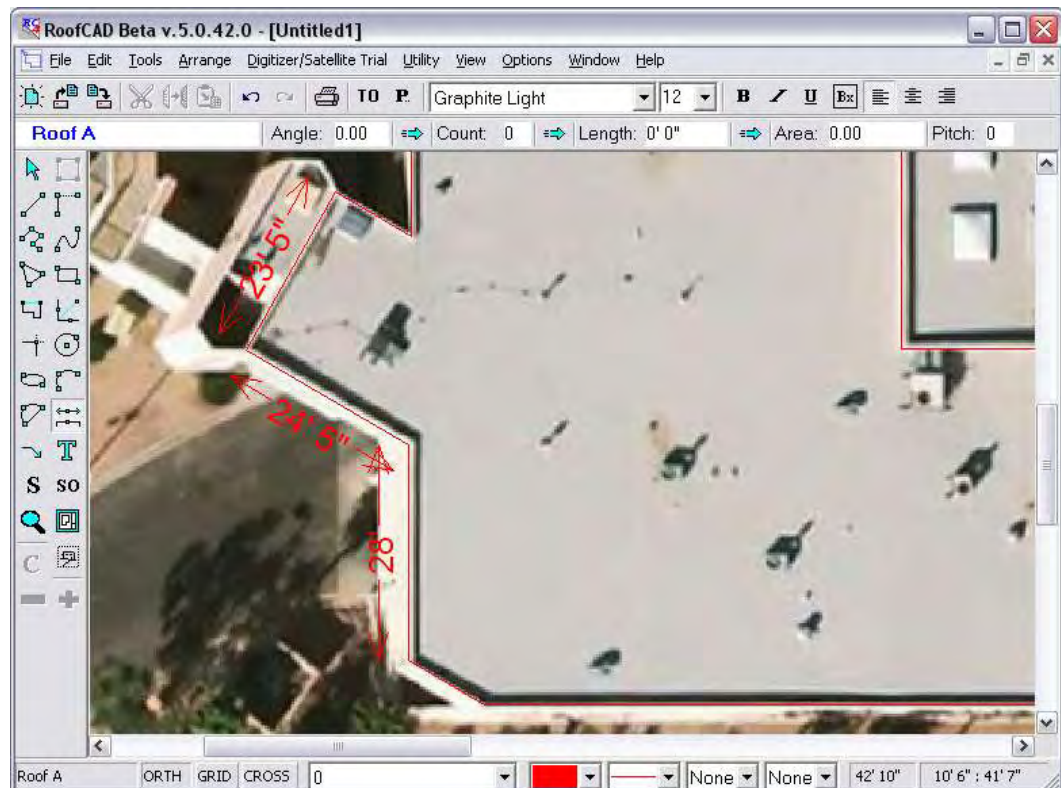
Add Dimensions

You can add dimensions at any time to your roof outlines.

1. Choose the dimensions tool from the left hand toolbar.

The Dimension Tool.

2. To add a dimension to a wall, click the wall. This highlights the wall.
3. Now click on the inside or outside of the wall and the system will place the dimension line where you clicked.

Feel free to add as many dimension lines as you like.

Hint: **For some jobs the roof outlines may be all that you want. If that is the case you would print the drawing now and take it on site or you could download it to a RoofCAD Mobile device. More on printing in a minute.**

Move the Roof Labels

Zoom in on Roof B and you will see the two roof labels are in an awkward spot. Let's move them.

1. On the left hand toolbar click the pointer tool.

The pointer tool.

2. Now click the tip of the cursor on the Roof A label. The text becomes selected.

3. Now drag the Roof A label off of Roof B. Find a spot on Roof A where it will not be in the way and drop it there.

4. Press Esc on the keyboard to deselect the roof label.

That's how you move things in RoofCAD. Now move the Roof B label so that it's not on the skylights.

Add Roof Top Objects

If the satellite image is good enough you can identify some roof top objects. However, in some cases the objects will be too blurry.

| Tip:	The satellite image in this tutorial is from a newly launched satellite. The company says all images will soon look like these. This one is from Phoenix, AZ.

On our sample drawing there are skylights on Roof B. Let's draw them.

1. In the Smart Object Browser, expand the Curbs & Sleepers section.

2. Click on Skylight. The system prompts you for the dimensions. This is a bit of a guess. Enter 4 for the length and 4 for the width. Leave Height at 1'6". This is the flashing height.

3. Click OK.

4. Zoom in on one of the skylights and hover (don't click yet) your mouse over one of them. In our example below you can see that 4x4 is too small, because the ghosted outline is smaller than the skylight on the image.
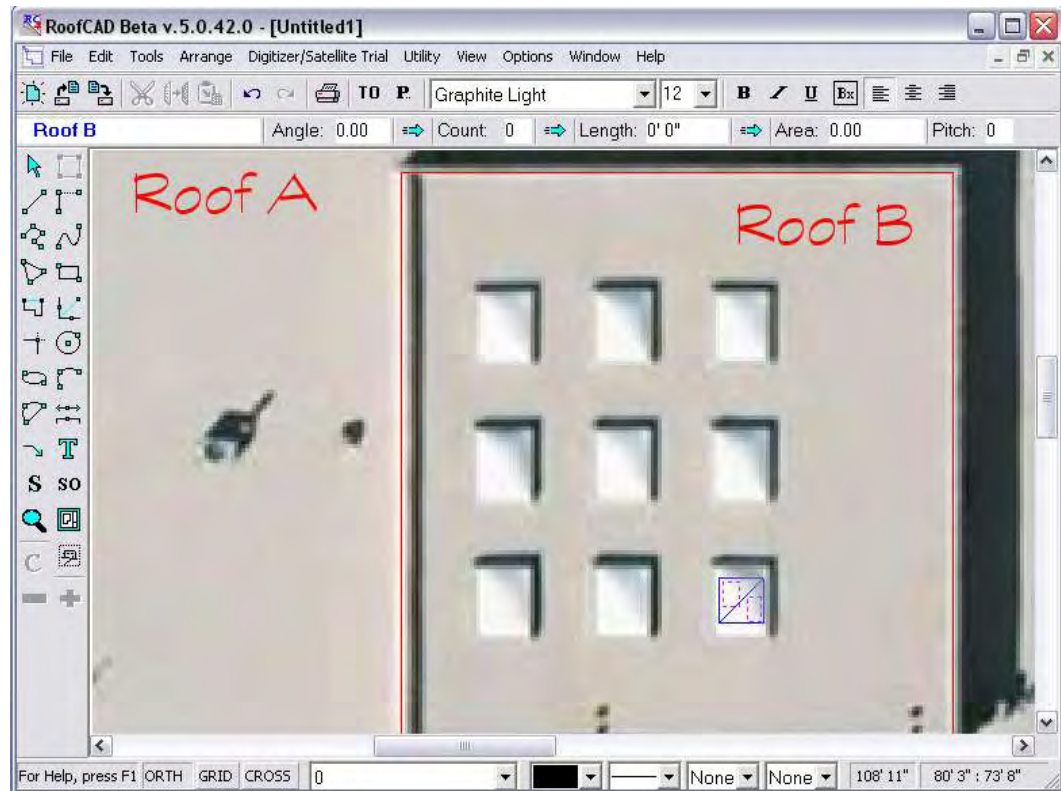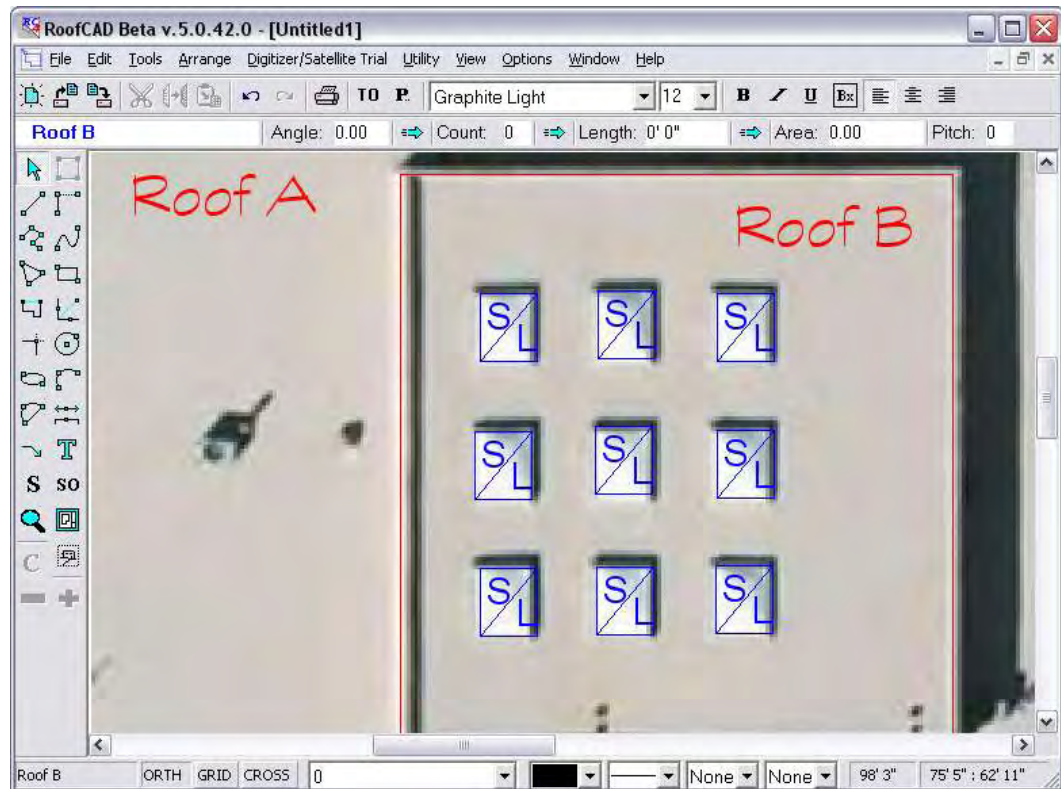
1. So go back to the Smart Object Browser and click Skylight again. This time enter 5 for the length, 6 for the width and try again.

This time it's a pretty good fit. It doesn't have to be exact since you'll eventually verify the dimensions with a site visit anyway.

2. Click the mouse on each skylight on Roof B. Your drawing will look like the next image.

1. If you mistakenly add a skylight and now want to delete it. Choose the pointer tool from the left hand toolbar.


The Pointer tool.

2. Now click a skylight to select it. Press Delete on your keyboard.

Drains

On Roof A I can clearly make out where the drains are because of the staining around them. So let's add drains.

1. In the Smart Object Browser expand the Drainage section and click on Drain (Existing). The properties window appears.
2. Click OK to accept the default diameter. The diameter can be verified on site.
3. The following shows what a drain looks like on the image. Click on each of these to insert the drains.
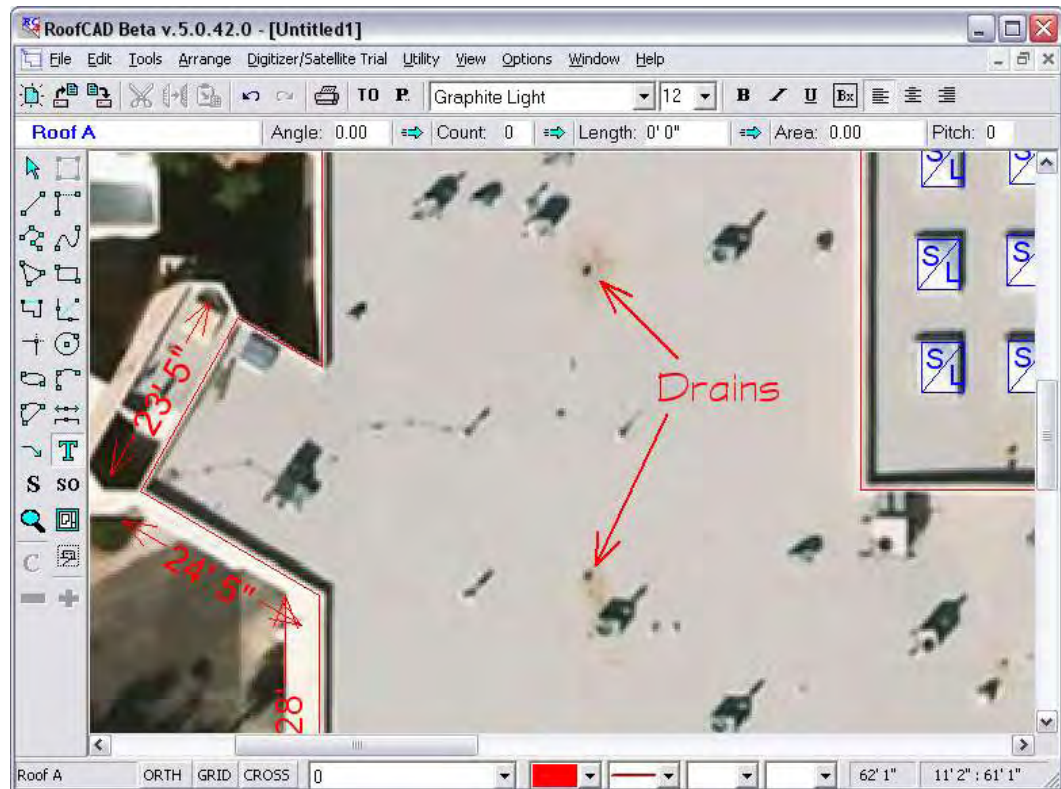
Any other object you can recognize, you can add. Try experimenting with a few other objects if you like.

Fuzzy Curb Objects

In many cases you can tell there is something on the roof that is likely a curb but the image is not clear enough for you to identify it.

In these cases you can mark the objects with the "? TBD Curb" Smart Object. In the next image we will mark the rectangular object.

1. In the Smart Object Browser expand the Misc section. Click on the "? TBD Curb" Smart Object. Enter 3 for length and 3 for width then click OK.

2. Now position your mouse cross hair in the center of the rectangle object and click once.
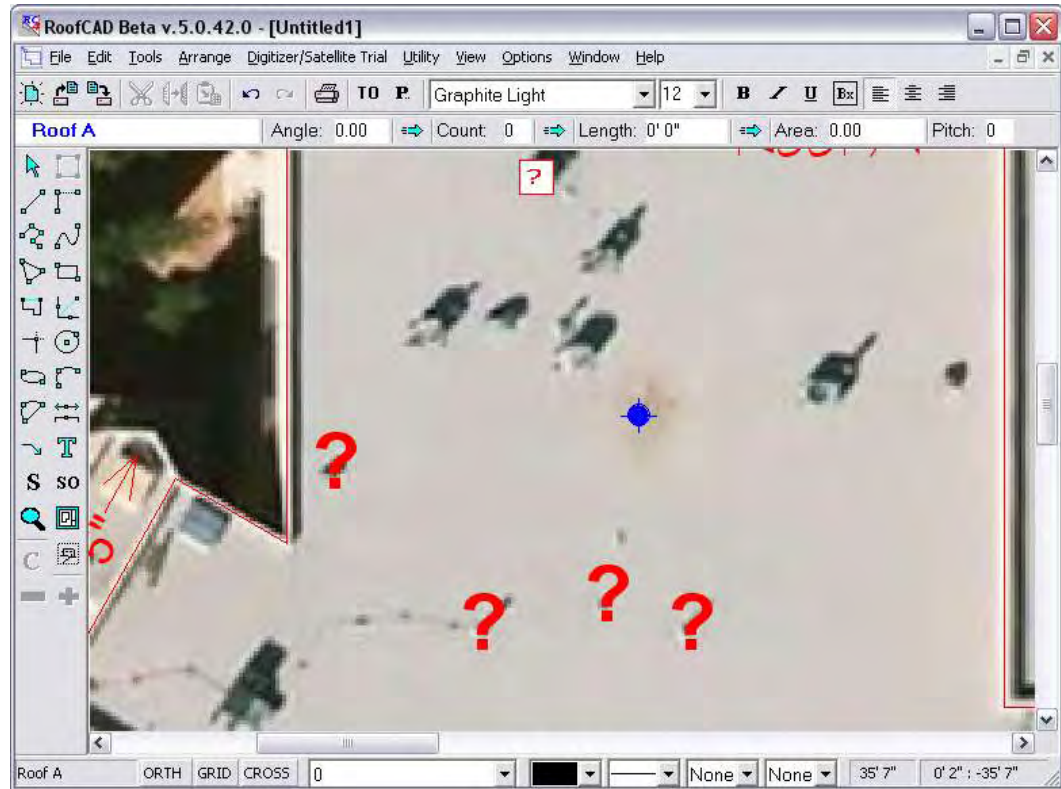
Note: **Notice how precisely you can place objects. Zooming in will give you even more accuracy.**

Other Fuzzy Objects

In cases where you are unsure that the object is a curb you should use the "? To Be Determined" Smart Object, like in the next image.

Hint: **By marking the "? TBD Curb" object you will have an easier time orienting yourself on the roof top. It is easy to use curbs as landmarks on the roof.**

Fuzzy Lines

You will also run into line type objects that you cannot identify on the image. In that case you use the "? TBD Polyline" or "? TBD Line" Smart Object. Polylines are lines that consist of multiple segments.

Our Drawing is Complete

There are many other objects you can draw. It is up to you how much you want to do. In some cases just the roof outlines may be good enough.

Click the Takeoff Record button to see the quantities that have been generated so far.

TO

Opens and closes the Takeoff Record.

The next image shows how our Takeoff Record turned out.

Print or Download to RoofCAD Mobile Device and Head to the Site

Note: Printing is not allowed in the free trial version.

Print

Before you print, you need to decide whether to leave the satellite image on the drawing or not. To hide it, choose the menu option Digitizer/Satellite Trial|Hide Eplan.

Now all you have to do is click the print button or choose File|Print|Print Drawing.

Note: Some people like to take two drawings to the site; one with the satellite image displayed, and one without.

RoofCAD or RoofLogic Mobile

This option allows you to take your drawing with you on a small handheld device. The advantage to this is that you will make corrections to the drawing right on the roof top, so when you get back to the office your work is done.

For a demonstration of how this works please contact us at (416) 778-0843.

On Site

On site you will verify the dimensions and identify the type of each perimeter wall. For example is the wall a 24" Parapet or a gravel stop edge?

RoofLogic has a unique Rescale feature that allows you to correct the entire drawing by updating just one wall length on the drawing. So check a few walls to see if there is a consistent difference between the satellite image walls and the real walls. Mark on your drawing the type and real length of the walls.

Hint:	**You don't have to measure every wall. It depends on how confident you are with your drawing. If you measure a few walls and they seem to be accurate or proportionally off by the same amount, that may be all you need to measure. If in doubt, we recommend you measure every wall.**

Next you need to identify the "To Be Determined (TBS)" objects as well as add objects that were missed on the satellite image. Mark them on your drawing.

Hint:	**With our Mobile applications you update the drawing live, right on the roof top.**

Back at the Office

Now we will apply the finish touches.

Rescale

The rescale feature corrects every line on the drawing and recalculates all quantities. To use the feature you enter the true length of a single line that you measured on site.

Before we begin, click the Takeoff Record button on the top button bar. This is so you can see the roof quantities before the rescale. You don't need to do this on real drawings.

TO

Opens the Takeoff Record

Now choose a line on the drawing to correct. We will use the same one we used to set the scale in the first place, as indicated in the next image. Notice also in the image, how we have the Takeoff Record open and off to the upper right. This is so we can see the effect of the rescale on our quantities.
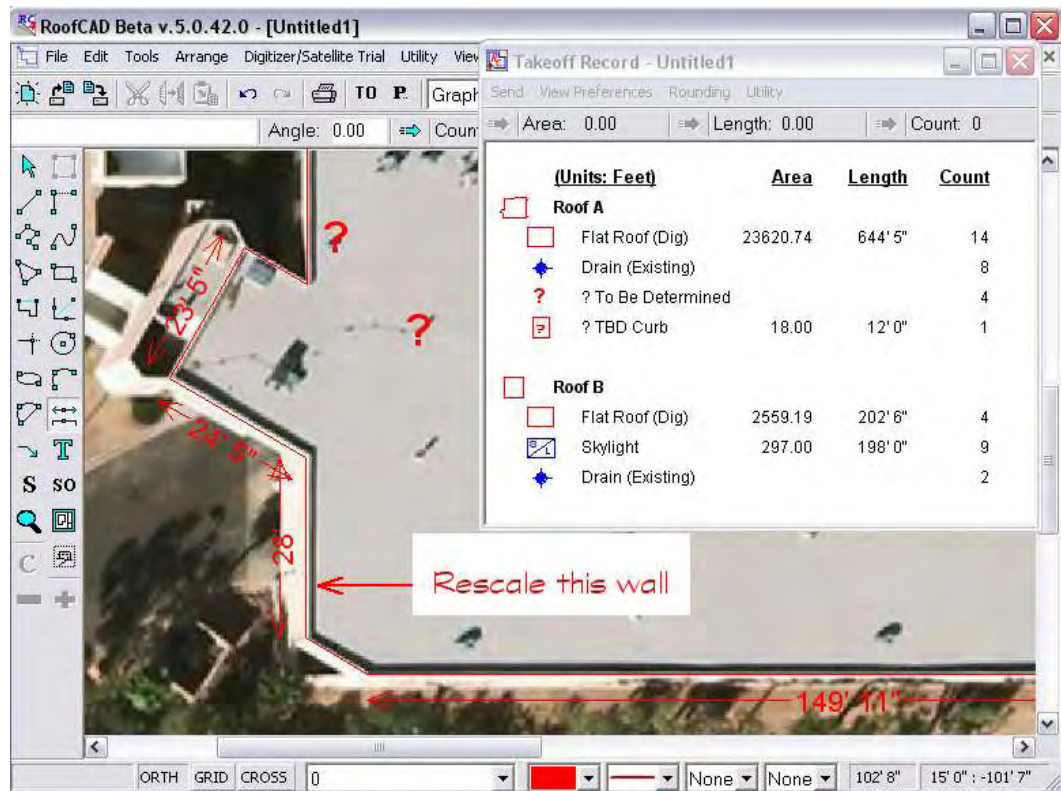
Click the pointer tool.

The Pointer tool.

1. Now click the tip of the pointer tool right on the line. You must do this accurately or more than one wall will be selected. If you need to try again, right click to deselect all, then try again.

2. With the target wall selected choose the menu option Digitizer/Satellite Trial|Rescale Drawing.

In the demo version you cannot enter the line length. You have to accept the hard coded value. We are telling the system that the 28' long wall from the satellite image is really 52' long. Your satellite drawings will normally be nowhere near this far off but we are doing it so the effect is more dramatic.

3. Click OK.

The system has redrawn every line in proportion to the one you changed. Notice that all the dimensions have been updated as have the quantities in the takeoff record.

Hint: **You don't have to use rescale. You can update each wall manually with the layout wizard but rescale is much faster.**

Define the Perimeter Walls of the Roof Section

We will now define each of the walls of the outline. This involves assigning one or more Smart Objects to each wall. By this we mean tell the system whether the wall is a 24" parapet with a coping cap, or that it's a gravel stop, etc.

If you do not still have the Smart Object Browser on screen click the Smart Object button on the toolbar.

SO

The Smart Object Browser button.

Expand the Perimeter section. It looks like the following image.

We have supplied the common perimeter wall definitions (Smart Objects) with RoofCAD. However you can change, delete or add to these with the Smart Object Editor. (If you're curious, see Section 20, The Smart Object Editor, in your RoofCAD manual.

Get ready to use the Pointer tool.

1. The next step is to select a wall. Click on the Pointer tool button on the left side tool bar.
2. Then, with the mouse, position the tip of the pointer, directly on the wall indicated in the following illustration (the dotted line) and click. The wall will turn magenta in color.
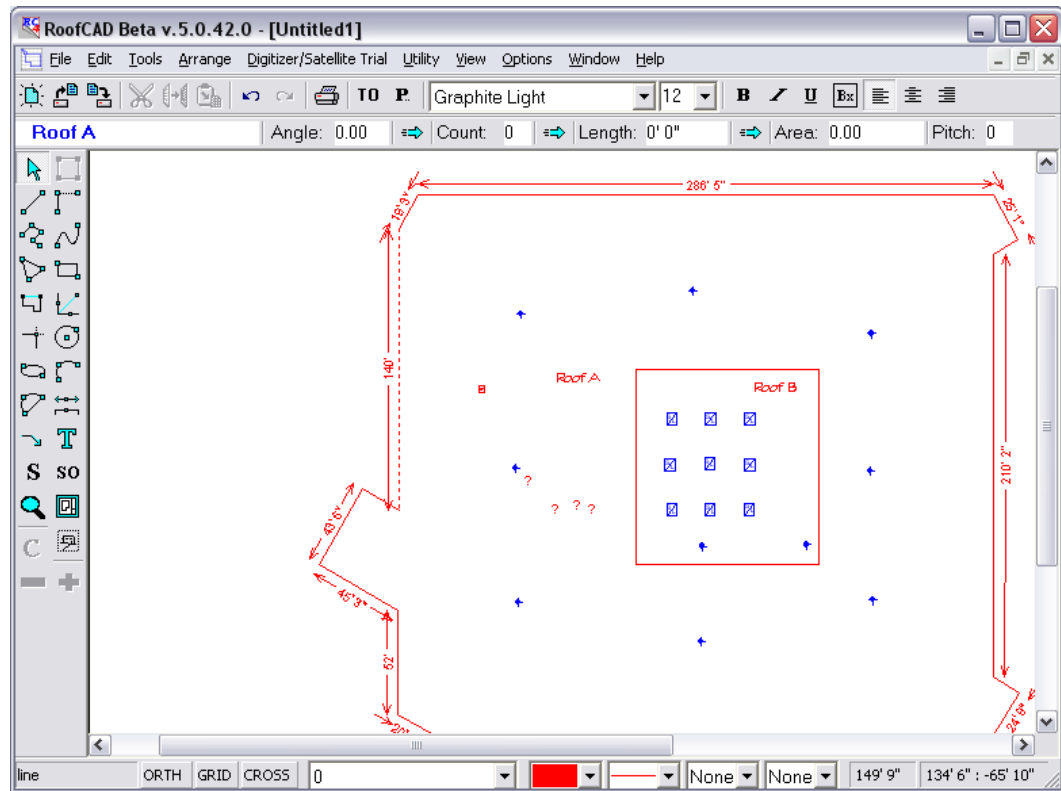
Hint: **If all the walls become selected (magenta in color) instead of just the target wall, then you didn't have the tip of the cursor right on the wall. To correct this, press Esc to deselect and try again, this time putting the tip of the arrow right on the wall.**

Some of the lines are pretty small, so you may need to zoom in to select them.

3. Now in the Smart Object Browser click Parapet 24". The Properties dialog appears.
4. Click OK to accept the defaults.

RoofCAD now knows this wall is a 24" Parapet that is 1' wide. It has also applied a double line to that wall and changed the color to black. This tells you that a perimeter object has been applied.

1. Lets also add an 18" Metal Coping. Expand the Terminations section of the Smart Object Browser and click ' Coping. The properties window appears.
2. For the Height enter .18 for an 18" stretch out and Click the OK button.
3. Now press Esc to deselect the wall.

Hint: **Right clicking the mouse on the drawing will also deselect everything.**

4. Take a quick look at the Takeoff Record to see what we have
    accomplished so far. Click the Takeoff Record button.

TO

The Takeoff Record button.

Notice Parapet 24" and 1'6" Coping are now listed under Roof A with their
associated quantities.

If you have several walls that are to be defined with the same Smart Objects
you can define them all at one time. For example if three of the walls were
gravel stop, you would select all three then click Gravel Stop in the Smart
Object Browser. Go ahead and try defining a few more perimeter walls.

Hint: **You can tell which walls are left to do, because they will be red until a
Smart Object is applied to them.**

Change the Color of your Dimensions

If your dimensions are red and you want to change them to black (or any
color), do this.

1. With the pointer tool select all the dimensions.
2. Click the color pallet button at the bottom of the window as show in the
    next image.
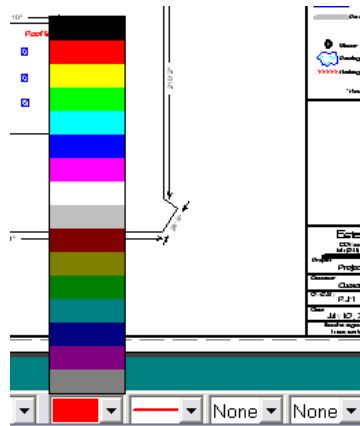
3. Choose a color.
4. Press Esc on your keyboard. The dimensions are now the new color.

Identify TBD Objects

Net you need to tell RoofCAD what the "TBD (To be determined)" objects
turned out to be.

You can change them one at a time or you can change a group of them in
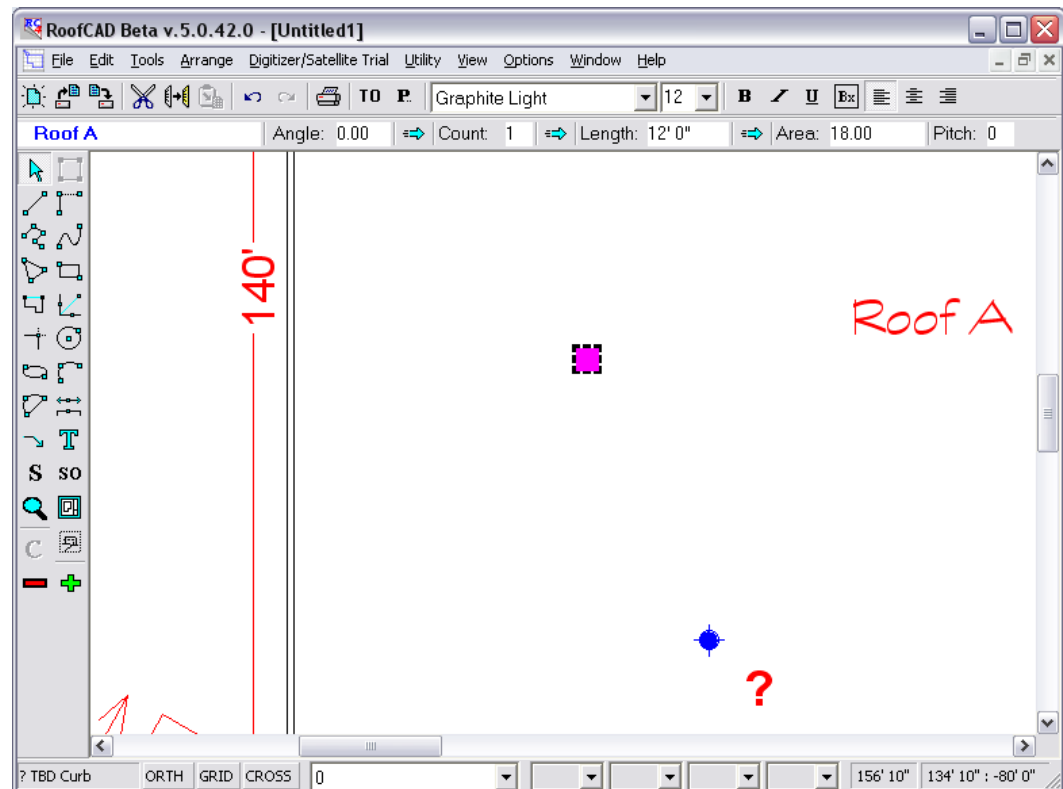one shot.

Click the pointer tool.

The Pointer tool.

Hint: **Pressing the Esc key on your keyboard will also get you the pointer tool. You may have to press it a few times because the Esc key does other things, like deselect.**

---

1. Select the "? TBD Curb" you added earlier, as shown in the following image.


Let's say after visiting the roof you now know that it is really a Roof Hatch.

2. Expand the Curbs & Sleepers section of the Smart Object Browser.
3. Click Roof Hatch. The properties window appears.
4. Now enter the actual dimensions of the curb that you got on site. Enter 3 for the length, 3 for the width and leave the height as is.
5. Click OK.
6. Press Esc to deselect and you now have a roof hatch on your drawing.

All the TDB objects are handled the same way. You can select more than one at a time. For example if three of them turned out to be plumbing stacks, you would select all three and click Plumbing Stack in the Smart Object Browser.

Tip: **TBD lines work a bit differently. After selecting the line you must click the Replace Existing Smart Objects check box at the bottom of the Smart Object Browser. Then click the Smart Object you want to apply.**

Drawing Tool: Symbol ▼

Current Roof: <Auto> ▼

☐ Replace Existing Smart Object(s)
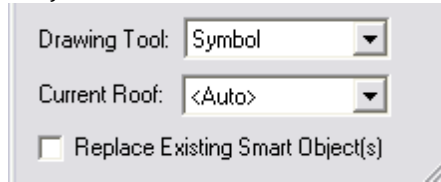
You are also free to add other Smart Objects to the drawing that were not drawn from the satellite image just as we added the skylights earlier.

Update the Skylight Size

On site you measured the skylights on Roof B and discovered that they are actually 6x6 instead of 5x6. You can update any Smart Object by using the Properties window.

1. Get the pointer tool and select all the skylights on Roof B.
2. Click the Properties button on the top tool bar.

P.

Opens and closes the Properties Window.

3. Click Properties.
4. Update the length and width to 6x6.
5. Click OK.

All of the skylights are now the new 6x6 size.

Apply a Template

Now we're almost done. You can make your drawing complete by applying a template.

1. First hide the satellite image by choosing Digitizer/Satellite Trial|Hide ePlan from the menu.
2. Now, from the menu choose File|Apply Template. Navigate to the RoofCAD\Templates folder. The system displays the available templates.

3. Select the T11x17L.rcg template and click Open.

Applying a template means choosing a paper size, in this case 11x17, and adding a legend to your drawing.

The legend and title block can be customized for your company. For example you will want to get your company name or logo on every template.

Hint: **The templates shipped with RoofCAD can be modified. See Section 40;**
            Template Setup in the User Guide.

To improve the look of your drawing you will probably need to change the drawing scale and center the roof on the page.

Center Drawing on Page

1. From the menu choose Edit|Select Layer.
2. Drag the roofs to the center of the page so that they look right.

Hint: **You can also select by choosing the pointer tool, then dragging a rectangle**
            around everything you want selected. If you make a mistake, hit Esc and
            try again.

Change Scale

1. From the menu Choose Options|Drawing Settings
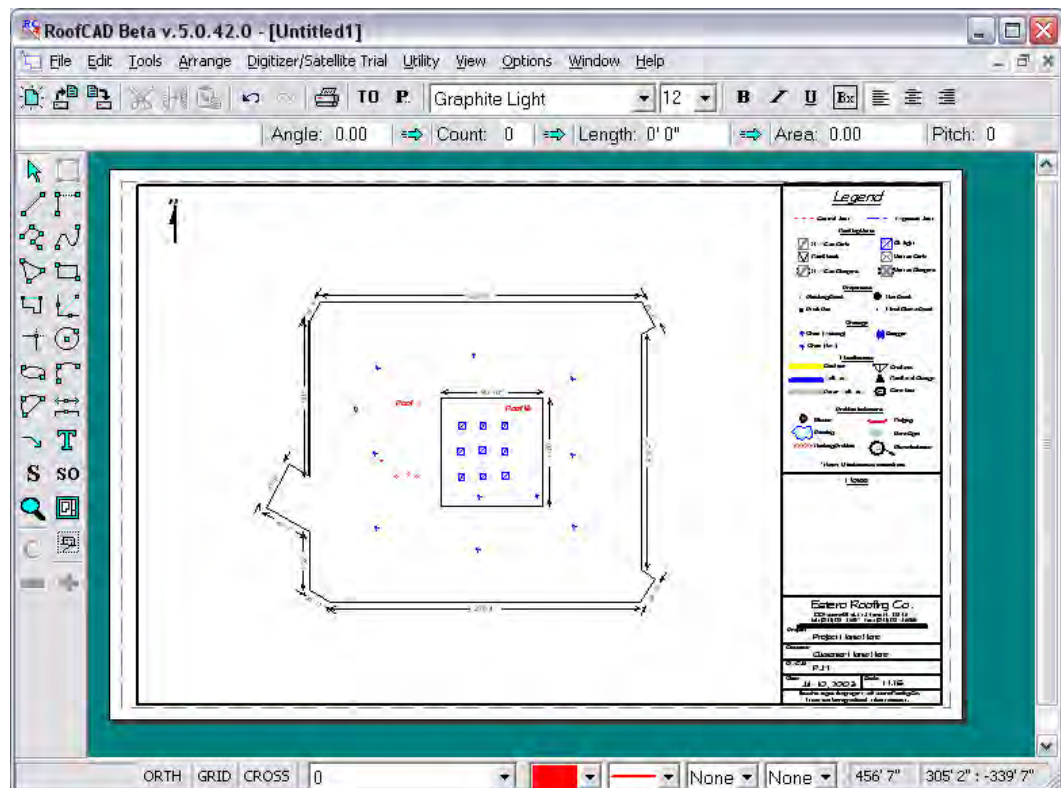2. In the Scale area change the feet side of the scale.

Hint: **A higher number decreases the size of your roofs on the page and a lower number does the opposite.**

You're done!

Here is an example of a completed drawing.

This completes our tour, for more information or a live presentation over the Internet please call us at (416) 778-0843.