



BEST PRACTICES COURSE – WEEK 12 – PART 2

Program Planning – Areas and Lists of Spaces

Hello, this is Eric Bobrow. And in this lesson, we'll take a look at how you can create a site survey drawing in ArchiCAD using a paper document of a land survey or possibly a PDF version.

Here you see a PDF file provided by a course member, Mark Moscrip, a course member in Atlanta, Georgia. Thank you Mark. This has a property that is nestled between two streets in the corner. Let me zoom in on this area and we'll read the survey information. You can see that the distances are indicated as though - let's say , for example, 132.60 feet, so they're in decimal feet. And the angular bearings are indicated in survey measurements. S 6°, 19 minutes, 33 seconds W. [0:00:57]

So we're going to need to set up ArchiCAD to use that system, and then we can recreate very quickly and easily the property boundaries that are indicated here. You can print out a copy of this particular survey from the PDF file that is provided on this page. And I suggest you do that so that you can follow along more easily.

So in ArchiCAD, we're going to go to the Project Map and right click on the worksheets folder and say New Independent Worksheet. Because this is a great place to do some 2D drawing, for example, of a survey or importing a survey as a PDF or DWG. So I'll create this new worksheet, it gives me a blank area to work with. And I'll use the Line tool. And let's say that I wanted to do the back property line. And I started to draw this going up in this direction here. [0:01:50]

You will see that the distance is being reflected in the tracker in feet and fractional inches. And it needs to be in decimal feet instead. And the angle is in the usual polar coordinates rather than degrees and minutes seconds. So I'm going to cancel out of this and go to the Options menu, Project Preferences, Working Units and adjust this for our purposes. So the working units do not affect your dimensions on the plan, anything that will print out. It only affects how you type things into ArchiCAD and what you see in the tracker and in the Measure tool. [0:02:27]

So I'm going to switch from feet and fractional inches to decimal feet. If you were working metrically, you would probably pick meters. And then I'm going to pick the number of decimal points that are appropriate to match the survey. I'll use two decimals. Now I don't need to worry about the layout unit. That only affects layout sheets and the placement of drawings on the sheet, so we don't need to worry about that. [0:02:50]

Now the angle unit we're going to switch from decimal degrees, the usual one in ArchiCAD. Now we won't use degrees, minutes, seconds, because that won't have the north and south and east and west.

We're going to use surveyor's units in this particular case. And I'll leave the accuracy at full level, degrees, minutes, seconds, rather than a lower level of accuracy that you can see. And I'll click OK. Now when I start to draw the line, now you can see that the distance is being reflected in decimal feet properly, but the angle it says is north 77 or north some degrees. [0:03:26]

So I actually need to follow the bearing that is on that sheet, and so I will go in the opposite direction, and then now it's showing the south reference properly. So I'll go in and type in the distance that's highlighted in the tracker. So I can simply type in the number, 76.64, and then hit the Tab key, which will take me to the angle. Or I can type the letter "A". Now to put in the angular bearing, I'll just type the letter "S" to indicate south, then 85. And I don't need to do a degree symbol. I can simply do a space, and then type 34 for the minutes, a space, and then 19 for the seconds, and then E for east. And I don't need to do a capital, I can simply do it lowercase, and then hit Enter. [0:04:12]

It's drawn the line, and I'm going to drag it back onto the screen so we can see it more easily. To verify the measurement, I'll use the Measure tool and click on one end, go to the other end, and you can see that the distance and angular bearing match precisely. So I've done it just the way it needs to be done. Now when I'm drawing this around, I generally whatever direction we have for one line, you are going to follow along in that direction. So I could do this line and then follow along down. But I realize that I should actually probably start at one end of the arc. [0:04:50]

The arc is just a little bit more complex to put in, and so I'd rather do the straight segments. And so I can go around either from the left around clockwise or right around counterclockwise. Given that I'm going - the very first measurement had to be input going from left to right, sort of clockwise on this particular boundary, I'm going to assume that it will work best if I start at the lower left corner here, just at the end of the arc. So let me go and put that line in. so I'll zoom out and draw the line. Now I don't know exactly where to start it, because it has to end on this point. [0:05:27]

But I'll simply draw it and then move it into position. So I'll simply draw a line in the general orientation I need, type in the distance, 132.75. Hit a Tab, and then type in the n7. I don't need to do 07. I can just do 7 space 51 space 41e. So that's very quick to put in that measurement. And I can drag it into position like that. And then perhaps draw the next one down here, and simply type in the distance and hit Tab and then hit the again the bearing. And finally, we have one more down here. Now I could have done it with the Poly Line tool. But I chose to do it with the Line tool so that I could do it in separate little pieces more easily. [0:06:23]

But Poly Line tool certainly would be very effective for these sort of things. So now I've done all of the boundary except for the curve very quickly. Now if we switch back to the drawing here, and we zoom in on this area, you can see that the curve is indicated with a bearing. Synced as everything else. And a distance, the 48.73 you'll see. That's the length of the cord. And then that boundary actually has an arc reference that is the perimeter, which will be the length based on following the actual curve, and a radius. [0:07:06]

And what we'll pay attention to mainly is the radius as we work with this. And then we can double check that the arc length is what it should be to make sure that we did it correctly. So let's go back and put that in. so the simplest way to do this is to draw a line across and verify that this distance is correct. You can see that the distance matches what is on the drawing, but the angle is slightly off. So in fact, rather than just close this, let me just draw it exactly like I did everything else. So I'll type in the 48.73 and then the angle, which I'll type in directly from the survey. [0:07:45]

And it looks like it closed. Now let me zoom in on this. It still looks like it closed. But let's zoom in real tight, and we can see that it's just slightly off. How much is it off? I'll draw a line connecting the two points that aren't quite on top of each other. You can see the distance is 0.01 feet, which would be 1/100 of a foot or an 1/8 of an inch. That would be about 3 mm. so very tiny amount for a property like this. So I'm going to not draw a little connecting line. What instead I'll do is select this line and just stretch the end of it. So I'll stretch this line and stretch the end to connect that. [0:08:33]

And let's just see what that measurement is. We can verify again by using the Measure tool. And if I go from one end to the other, we'll see that the distance is correct, but the angle is just a few seconds of angular displacement off. So I think that's just perfect for our purposes. Now I'm going to select this line, and I want to curve it down. And of course some segments you might curve up, and some you might curve down. I'll just use the pet palette to choose curvature and go in the proper direction. And you can see the arc radius is showing in the tracker. So I can easily just type in the arc radius, 27.23, and I'm done. [0:09:17]

Now in earlier versions of ArchiCAD, I'm not sure when this changed, but certainly in version 10 and 11, maybe 12, you couldn't input it that easily, because if I selected this and I was moving it around, I would get the distance that it was being displaced. In other words, right now I've only moved it a tiny bit. It would show a distance of 1 or 2 feet. It would not show the arc radius, which right now I am showing at 28 feet. So you couldn't use the tracker as a way to input this information. [0:09:48]

So let me show you a way that you can do it if you're in one of those versions of ArchiCAD. We'll draw a line exactly the same as we did before from the end of one survey point to another. So this is the cord. And then I'll go and draw a circle this time, centered on the center point of the cord with the correct radius. Now in all versions of ArchiCAD, we can type in a circles radius in the Tracker and hit Enter, and hit Enter again to make a complete circle. So now what I need to do is move this circle into position, because it's got the correct radius. [0:10:25]

And the best way to do that is to find the line perpendicular to this point that intersects this. So in other words, I want to find the intersection point of the perpendicular and then grab the circle from that point. Now to draw a perpendicular line, I can't use this snap, because that's actually at a 45°. That's not actually perpendicular to this boundary line. So I'll go along this boundary line and move the mouse without clicking. In versions of ArchiCAD before 15, it would create a guideline immediately. In version 15, I need to click on the orange dot. [0:11:03]

Once you've got the guideline, you can then draw your line and snap to it. Of course, we don't really want to snap to this, we want to snap to the perpendicular. And you'll notice that there is a guideline that appears when we get close to the perpendicular. In ArchiCAD 15, there's a little icon that indicates where perpendicular is. In earlier versions, it'll just be a guideline, and you'll have to verify that it is the correct location. [0:11:29]

Once I've drawn that line, I can then simply select this circle and then move this from the intersection point. So I simply hover over the intersection, get the intersection snap. You can see the little X with a dot on it. Click on that and move this into position for the arc here or to the end of the cord. And now you can see how this beautifully aligns. You can see if I zoom in on it, it is exactly the same curve as what I had before. So geometrically - let me just undo this back, the steps that I did. I drew a cord. I drew the arc or the circle centered around that, and then I drew the perpendicular, and then I moved it from the intersection point to where it was at the end of the cord. [0:12:20]

And now I can get rid of these two lines here, and can trim this arc. So I hold down the Command or CTRL key to get the scissors, or I can click on the scissors icon in the toolbar and click to trim this. Now that looks beautiful, and many times that would be perfect. But I have noticed when I was practicing this lesson that there actually is an extra little piece of arc, because this arc here, if we look at it closely, goes just outside that line. And it comes back. And here's the line in space. So what I actually need to do is trim off this extra piece. So I can grab the arc and tell it to change its endpoint of curvature. [0:13:05]

So you can see I can move this until it snaps to this point, and that's now a clean intersection of these two. Or perhaps I can select, if I want to, I can just select the line and the arc and use the Intersect command, and that will then make the line of the arc shorten or lengthen until they touch each other. Now let's go ahead and put in some dimensions here. So I want to do that for two reasons: to verify that I've got my property lines put in properly, and also for actual output. So I'll go to the Dimension tool, and I'll click on the corner here and the corner there. And then make sure that I'm actually set up for doing an angular measurement, rather than vertical or horizontal. [0:14:00]

And then double click to say I'm done. And you see as I move around it, it proposes different orientations. So I'll make sure that it's along the angle and zoom in on it. And you can see that it says 47'3", which is probably correct here, but I need to actually get it into decimal feet. So let's see, how do we do that? We go back to the Options menu, Project Preferences, not Working Units, which we had been working with but Dimensions. And we'll look at the dimension preferences. So the dimension preferences here, we're set for the current view to be building scale and showing dimensions to be feet and fractional inches. [0:14:41]

Now let's switch to Site and Survey, the one that is preset here. Of course, if you were working in metric, you might switch to plain mm or one of the other ones. And let's just see what happens when I say OK. You can see that now it says 47.24, so that's now working perfectly. Now I'm going to come back to that, because they'll be some other adjustments I need to do, but for now that will actually work just fine. Now you notice how small the text is as I zoom out. That's because currently we're set at a scale of 1/4

inch to a foot or 1:48. This is not appropriate for a drawing like this. You can see that it would be a very small reduction of this that we would need. [0:15:22]

So let's take a look at the scale that was set up on this sheet. And so we'll zoom out, and then zoom in on the lower area. And we'll see that this sheet was designed to be one inch equals 30 feet or 1:360. So let me go back here and set the scale to that measurement. If you were working metrically, of course you'd pick a different number that might be more appropriate. And I say OK. Having done that, when we zoom in, we'll see that the text is now a nice, legible size. You might want to adjust it a little bit, but it's certainly in the ballpark of what it should be. [0:15:57]

Now I want to get the angle here. I can type it in, I could put the Text tool and type it in, but then I wouldn't really know if I had it correct. So let me go and use the Angle Measurement tool. So normally we have the Design tool, the Document tool, and then the More tool here. I will reveal in the More tool the Angle Dimension tool. Now to be able to do an angled dimension, we have to have two lines. So I need to go and put a line. In this case, I might draw a line from this point horizontally and then find the angle between them. So now I'll go and select the Angle Measurement, click on one line. You can see the two handles or the two bull's eyes. Click on the other one, and then click to place that measurement. [0:16:49]

So here we can see the bearing, the angle being shown, the 60.32.6 which is correct. However, it's showing north rather than south. So what we would need to do is select this and flip it to the other side using the option in construction method. And now you can see it is showing it properly. Now there are two problems with this. One is that I had to create some extra things. I had to draw an extra line. And I am getting an arc line with arrowheads, and I don't really want all of that. All I want is the text. [0:17:23]

So what can I do with it? I can take this text and I can drag a copy of it. And when I drag a copy, this text here is just a normal piece of text. So I could actually select this text, drag a copy to create an independent one. Then when I delete this dimension, that goes away, and of course I can delete the line. And now I'm left with a text, which I can rotate into position. So that works, but it's a little bit tedious. And there is a faster way. So let me just undo back all of these steps and use the Measure tool. [0:18:00]

So I'm going to go to the Measure tool and measure from this point up to here. Oops, it's going north, so I want to cancel out of that. I'll use the Measure tool by hitting M and go in this direction. And you can see here the distance is matching what I expect, but the angle is showing the way I would like it. Now if I hit the Tab key, it highlights the distance, and then I hit Tab again, it highlights the angle. And now I'm not going to type in an angle, I'm going to copy it. I'll hit Command+C or CTRL+C which copies it. Then I can go hit the Esc key a couple of times to cancel out of the measure operation. [0:18:44]

And if I have the Text tool active at this point, I can just simply double click on the Text tool and paste. So now instead of typing text, I'm just going to hit Command+V or CTRL+V, and you can see the text comes in. click outside to confirm it. So it's actually quite a bit quicker to do it with the Measure tool than to use that angle one that we had. And we can now just simply select this text and rotate it into

position. So while you could do it a variety of ways, I'll say Rotate, and I'll click on the bottom left, the bottom right, and now I could sort of eyeball it here, but if I want to make sure that it's going on the right angle precisely, I can go along this edge of the property line. [0:19:34]

Now, with versions of ArchiCAD before 15, just simply moving the mouse along there would create a guideline. In 15, I have to click on the little orange dot. Now there's a guideline. And now, when I get close to it out here, I can get the angle correct. And then I can simply drag this into position whichever way I want. And of course resize these. And if I wanted to put them side by side, then I could select the dimension text and drag it. I'm just doing Command+D or CTRL+D to move that. And then perhaps select this text and drag that into position. [0:20:12]

And they are different sizes, so let me make this a little bit smaller. And now they're matching a little bit better here. Okay, so I'll use the eyedropper to pick up the settings of the text, and that way, the next one will be at that same size. So let's see how we can do this more quickly, or let's say do the next one without explaining it and just show you how quickly it can be done. I'll go to the Dimension tool, click, click, double click to say I'm done, and rotate around until I get it parallel. And you can see it's 132.6, which is the correct distance. [0:20:52]

Now I want to get it to be 132.60, just wait a moment and I'll fix that. Let me just get the measurement here, the bearing. So I'll use the Measure tool to measure from let's say going this direction is what we want, hit the Tab key, it'll highlight - hit the Tab key to - okay, actually, I see. When I get to the corner point here, hitting the Tab key is cycling through the different lines that it's potentially measuring. So instead what I'll do is type the A, and that will highlight the angle. [0:21:33]

So I don't have to use the Tab key, I can just use the A. And then Command+C or CTRL+C will copy. Hit Esc a couple of times, and that takes me out of the measure. And then I use the text tool here, double click and paste, and I've now got my measurement. And let me just rotate that into position. So I'll just hit Command+E to say I want to rotate it, and then simply move along here, get the guideline, and snap it into position and drag this into whatever relationship I want. [0:22:13]

So let's do one more, and just get this as fast as possible. So this is the Dimension tool, click, click, double click there, and then activate the Text tool. Go to the Measure, hit M, click, and then be poised over here, and hit A to highlight the angle, Command+C for copy, hit Esc a couple of times, and then double click the Text tool and paste. And we now have the text here, and let me just rotate this around in line with this, use the guideline. And so now I can get it parallel and drag that into position. [0:23:04]

So that allows us to get all of these, and of course I will allow you to do the 4th side on your own. But let's go and do the perimeter measurement. So I'll go to the Dimension tool and switch to perimeter measurement as a construction method. And I'll just click on the arc, and you can see how it gives me the handles at the end of the arc automatically. Double click to say I'm done and take this out. Perhaps I ended up with this point. And you can see how it's showing. Now this should be 60.34' if we want to match the level of accuracy from the survey. [0:23:49]

So let's just tweak the dimension preferences to show that. So what I'll do is say that I want to change it to two decimal places, but I don't want to hide zero decimal. So it would show 132.60 rather than 132.6. Now this is a custom dimension preference, I can go ahead and once I've verified it's the way I want, I can just say store it and create my own preference. Or if I want, I could overwrite the site survey. Now if you ever have a dimension preference and you need to update it, in ArchiCAD 15 and perhaps 14, if we make any change - let me just make a change and then undo the change. [0:24:37]

When I say Store As, and I say "Survey", here it's going to overwrite that. It'll ask me if I want to and allow me to overwrite it. But in ArchiCAD 13 and earlier, it would say you can't do that because it already exists. So what you would have to do is take this one, rename it perhaps "Survey 2", then you could go and make a change. So I've made a couple of changes, and I'll say Store As, and now I can rename it or store the new custom copy with the name that I want. So now you see that there's Survey and Survey 2. So I can simply get rid of the one that I don't want and leave this one. [0:25:22]

So that would be the workaround when you can't overwrite, is you can rename the original one, then in the modified copy name it what you want and say OK. So you can see now this is reading just perfectly here. We'll conclude this segment of the lesson here so that the video is not overly long, and continue on in the next video to show how you bring in the PDF file and scale it properly to use as an underlay for your design and modeling work. This has been Eric Bobrow; please share your comments and questions on the page down below. Thanks for watching.

[END OF AUDIO 0:26:01]