JERRY BARTELS: All right, we're going to go ahead and get started. We've been told this is going to be a very full flight, so we've got a few folks standing in the back. There are still a handful of seats left. This is a 90 minute session, so. It's 8:00 AM in Las Vegas in the morning, so don't push yourself too hard.

JEFF BARTELS: You may have to go a little louder.

JERRY BARTELS: OK. My name is Jerry Bartels. This is Jeff Bartels. It is true, we're related-- but we're not twins. We're actually two-thirds of a set of triplets. I'm actually--

JEFF BARTELS: Our dad believed in redundancy.

[LAUGHTER]

JERRY BARTELS: That's-- so I'm five minutes older than Jeff, but I always believed that mom liked him best, so. We're going to go through. We're very happy that you are able to join us this morning at 8:00 AM. This is one of the tougher times to attend a class, so we're very happy that you were all able to make it.

Just a little bit about ourselves, we've been involved in the civil industry for roughly between the two of us almost 50 years. So we started when we were about 15 years old. We've been involved in both working in actually producing at a civil engineering and a land surveying firm. We've both been involved in consulting. We're both currently working at Autodesk right now.

We've also had the opportunity to do some different things in our career. I was an elected official-- mayor of the community where I lived-- for a while. Jeff has been involved with linda.com, making training resources and things like that. So we've got an experience that comes at it from a lot of different angles, both from using the tools being somebody that's instructed or taught people how to use the tools to the point where we've actually received the product of some of the tools that have been used.

So we come at it from a lot of different directions. We have a lot of experience with that, we'd like to share some of that experience with you today. We do a blog, it's civilimmersion.typepad.com. Has anybody been to the blog before? All right, fantastic.

So what we want to do is take not only some of the things that we've done there, but some

new things that we've put together and put them together in a 90-minute class. We'll see how much of it we're able to get through today. But just if you have the opportunity to visit the blog, these are the types of things that we've put out throughout the year. OK?

For our session today, the learning objectives are as what you saw in the handout when you were-- not the handout, but for the advertisement for the class. So we'll kind of walk through that as we get there. As we go through, we try and do everything from a problem-solving approach.

Sometimes our approach to solving the problem is-- I don't even say out of the box-- maybe a little disruptive in going through in how to do that. But rather than showing things feature-by-feature tool-by-tool, we want to give you some perspective of the why behind that. Here are some ways we can maybe leverage some things in a different way than what you've maybe thought of before.

We're also big proponents of the PowerPoint free zone. We don't do videos. We don't do PowerPoint, with the exception of this one. We're going to go in and do everything live within the software, because what's the fun in that? I mean, everybody-- you guys are doing it live at work. We're going to do it live here. And we'll deal with the consequences as we go.

If you have questions, please feel free to stop us along the way. We'll be happy to take those. If, for some reason, this starts to go a little long, we may push the questions on to the end. We do have a couple of giveaways that we'll get to at the end. It won't be a true giveaway. It'll be a competitive nature. So, everybody will have an opportunity to win. But we'll get to that as we go. All right?

So, let's go ahead, and we'll get started.

I'm going to drop out of my PowerPoint here. And what I want to do-- I'm in Civil 3D right now. The other point that I would bring up is that the bulk of the things that we're showing are Civil 3D related, and they're not necessarily specific to 2017. All right? So, if you're on 2015, 2016, 2017-- even if you're on 2014, maybe even 2009. Most people probably wouldn't want to put their hands up for that. But, even if you're there, some of these things will still work as well. If that situation were to change, we'll be sure to point that out.

Now, in Civil 3D we have a lot of tools to generate sheets-- plan and profile, cross section

sheets. There are times we might have a project like this, we'd like to tile it up into pieces such that we can do a grading plan sheet. So we'd tile it up into more of a grid pattern. It's not necessarily obvious, but that functionality does exist in Civil 3D. We'd leverage a tool within Civil 3D that's called a Map Book. All right? The way I'm going to do that-- we'll open up a template so that you can see that. So, we'll open up my DWT, and I'm going to drill down into my folder here for grading sheets.

And this is my template, just a standard sheet. I've got a couple view ports in here already. Just so that there's no magic involved, I'll take those out. I've got a primary viewport, and I've got another one here that'll reference as a key map-- something that's going to show me where I am in the context of the entire project. If we're in Civil 3D, we assign properties to a view port called Section or Profile. All right? Because this is a different tool, we'll do it a little bit different.

I'm going to bring up my map workspace. There's actually a little icon up here on the top that'll let me do that quickly. One other thing I would note for those typists-- any of these things at the bottom where I would hit O for On, to turn something on, I can now click-- there's a hyperlink to get that. And we'll go to Map Book. I'm going to go to Tools, and I'm going to identify my placeholders. All right?

Now, because I deleted my two, let's go ahead and recreate those. I'm going to use the Command M view to build those. And I have a couple of nodes on the screen that I'll use to help me with my picking. Some commands I like to type in, because as the interface changes-- we all know, when we type-- the interface is never any different. So we'll go ahead and go from the node of here. We'll use this as my key map. So those are my two view ports.

We'll go into Tools. Identify Placeholders. There are a number of things that we can set. I'm going to do the main viewport. We'll click on Select Placeholders. Grab the viewport. I've got another one here that's going to reference my key view, or my key map. Select that one. We're ready to go. I can also do some adjacent arrows, things like that. We won't worry about that for right now. But after they're done, we can highlight this and it automatically shows us that they've been assigned. All right? We'll go ahead and save our template. And we'll close out of that guy, which will bring us back to our map.

From there, within the map workspace, I'm going to go to the map book. We're going to go to New. We'll create a new map book. And it's a pretty simple process, it's just a wizard. We're

going to walk through the different options. We'll give it a name. My sheets we'll call Grading. I'll come down into Settings. Which template are we going to use? Well, we're going to use the one that we just created.

There's a layout in there. If there was more than one, we would tell it which one. There's just one. The title block we would like to use-- there's a block that's already in there that we saw was our title block. Not going to do adjacent arrows right now. And this is where I would set my scale. I'd like my grading plan sheets to be 20 scale. We'll come down next to how we're going to lay them out. Well, I'm going to pick the upper left corner. We'll start laying out sheets from right there. I don't want any overlap on the sheets, so I'm going to set that to zero.

We'll start with three rows, three columns. I'm going to preview my tiles. And it automatically shows me how that's breaking it out. I'm going to roll my wheel to back up a little bit. If we do that, I can still refresh my display. I can see, I'm not currently getting everything. So we'll come back and we'll set that, maybe, to three by four.

From there, we'll come down. I can name these sheets. We'll just start with one in the upper left corner. We'll number by one as we go through. And the last thing that I'm going to do is, I'm going to define my key map-- that area in the corner where I can see myself in context. I've got some layers within my drawing that outline the property, outline the building-- the things that I would want to see in the key map. I'll select those layers. Those would be the only things that'll display in that viewport.

And we'll go ahead and generate the map. Since I've already got a sheet set-- if not, we'll go ahead and create it. And we'll throw that on my desktop for right now. There are my sheets. If we come down to the bottom, and I now click on grading-- there's grading sheet number one, number two, number three. You'll notice, as I advance from sheet to sheet, it's maintaining where I am in the project. All right? And I'm able to go from there. All right? So very quickly, I'm able to take a process that I would have done probably manually, without a tool like this, and break them out automatically. All right?

OK. Let's shift gears, look at the next item here. Next thing I want to look at-- we'll come down-- for my projects, we're going to look at associating files. There are times when I have geometry in my model, maybe within my DWG file, that has information. I may have additional information about those objects someplace else-- maybe in a database. The easiest way to

think about this is with parcels, but it could be with information that was collected in the field. It could be blocks, it could be trees, it could be a number of different things.

The example I'm going to use here-- we'll go with parcels. Parcels have a parcel index number, as far as what number it is. From there, you could go look at a table and pull up all the information about that parcel. Like I said, a lot of time-- these worlds-- these things live in different places. I'd like to look at a way that I can bring those together.

I'm going to use a tool. We'll bring in-- the information I've got is in a shape file. So I'm going to use Map Import. All right? Typically we'd use FDO for a lot of this. But in this case, I physically want to take my geospatial information and convert it into objects I can use in Civil 3D. So, we'll come out to Associate Files here. We're going to go to my parcel objects.

Any data that is associated with those objects, I can drill down and grab a hold of. We'll select Fields here. We can see that I've got an attribute in here already that is the parcel index number. So let's say that's OK. And I'll import my polygons as closed polylines. We'll say, OK. It inserted 59 of them. If we Zoom Extents, there's our information converted into just DWG polyline type entities. If I highlight this and I go to Properties, we see that there is the parcel index number of the attribute that was brought in. All right?

Now, I'm starting to chew up a lot of real estate with these tools. Couple things-- with the tools, like on properties, I've already got set to auto hide. All right? To free up some real estate. I'm going to do that with my task pane as well. We'll set that to auto hide. Those now appear on the side. If you really are tight for space, one other thing that we can do is, if I right click on this, I can convert all of those to icons only. If I convert them to icons, now I can just hover over the thing and I'd have all the tools down the side. All right?

So if you're not fortunate enough to have multiple monitors-- I've seen two, three, four, whatever-- if you're dealing with one, it's a quick way that we can organize those. All right? So I've got that available to me. Let's go ahead-- I'm going to bring out my task pane here. Many things in Civil 3D are drag and drop. All right?

Now, I said I've got information someplace else that's in the database. It has that parcel index number with additional information. Let's drill down and take a look at that. We'll go into My Project. I've got my database. It's a Microsoft Access database. I'm going to drag that in. Drop it in my tool space, and it automatically attaches it for me. I'm going to go ahead and highlight that. And if we say, View Table, here's all the information that I have, all right, one of which is

the parcel index number.

So now I've got the data and I've got the geometry. I just need to find a way to hook the two together. The way that we'll do it-- we create what's called a link template. I'm going to right click on that, and we'll define it. It's actually pretty simple. We'll just tell it the two things we're going to do. I'm going to take the table. I'm going to build a new link template. We'll call it AU 2016. And we'll tie that to my key, which is my parcel index number. I've now got a hook into the database. I now need to hook it to my geometry, and I'll be able to access or go back and forth.

So with the link template, what we're going to do is, we'll say that we're going to generate the links. We have a number of ways that we can do this. We can link to blocks that have attributes. All right? The attribute would be what we would tie into the table. We have text-- would be what we tie into the table. We could have an enclosed block, a block with a line around the outside of it, a polygon. It would do it to that or an enclosed text. All right?

Well, I've got geometry I want to tie it to. I don't have blocks or text to work with. So, let's go ahead and create some. I brought this in, and this attribute exists within my file. So, I'd like to create what's called a map annotation, which is a kind of block. I'm going to bring up my map tool space here. We're going to go to Annotate, and I'm going to say, Define Template. All right?

We'll give this a new template name. We'll just call it Parcel Index Number. I'm brought into an area now where I would build a block. All right? What I need is a block that's going to read something from an attribute. All right? And I really wish that they gave us that option here in the ribbon, but they did not. All right? So, it's kind of this super secret thing. All right? How do you know? You just have to know. All right?

AUDIENCE: [LAUGHING]

JERRY BARTELS: So, the command that we're going to put in is Map A N Text. All right? I heard somebody say it, so somebody's been with me on that. Select Annotation. We'll press Enter to enter the new annotation. The tag that we're going to use-- we'll call it just PIN. The value that we're going to tie that to is, we're going to go out to my object data. We're going to drill down and we're going to grab the value that we pulled in from the shape file.

We'll say, OK. What text font do we want? How tall do you want it to be? We'll say five.

Justification, we'll say that it's middle center. That's good. We'll say, OK. I'm going to put that on the screen at zero, zero. And we'll Zoom Extents. There is my annotation, or my custom block, now. We'll close the block editor. Save My Changes-- notice, it gives it a really cool name on the front of it too. So we'll say, Save Changes.

When it gets placed in my objects, I can give it some additional information by default. It should be placed at the centroid. Find the middle of that object, and put it there. All right? I can also alter the scale and maybe the layer-- some other things like that. We'll say, OK.

With that built, we'll come up and we'll say, Insert. What would you like to insert? Well, we'll do the parcel numbers. What would I like to insert them on? We'll attach our objects. When I right click, it's now read all the attribute values, and it's placed it on the geometry. All right? I've now created blocks inside my line work.

We'll do one last thing. The cool thing about this type of annotation is, it's tied back to the attributes. So if we come back to Properties and I were to change this to zero, and we'll hit Enter-- all right. It didn't update this guy, but there is a tool right here that I can say, Refresh the Annotation. Parcel index-- we'll say, OK. And we'll do Full Annotation, and the values update. All right?

It gives us a great way that I can either go to a database table or I can go to just attributes within the file-- update my annotation. All right?

Now, to make the link and wrap this guy up-- I said what I had to have in closed blocks. Unfortunately, these are custom map blocks. So, the tool is not going to allow me to do that just like a regular block. So, what I'm going to do is, I need to turn these into text. All right? To turn them into text, I'm going to use a command called Burst What burst will allow me to do is explode my blocks that have attributes, but maintain the attribute values. It doesn't convert them all to tags. So we'll say, Burst. Objects-- I'm going to type in All. Grabs everybody-- we hit Enter. They've exploded them. Now, they're individual pieces of text. All right?

Let's do my linkage here. I'm going to flip back to my Civil 3D workspace. We're going to come back up. I've closed my tool space here. We'll bring this guy back up. And we're going to say, Generate Links. We're going to say, Enclosed Text. All right? It already knows the hook into the database table. It knows that it's going to look for text in my file. It's going to fan out from around that till it finds the line work, and I'm ready to go.

So we'll say, Create Database Links, and OK. Objects-- we'll say, All. It's made 59 links how do we know that it worked? If I bring up my parcel index information now, and I view the table, I'll toggle some values to auto highlight, auto zoom, and select. And now when I pick in my database, I've successfully tied that to information within my file. All right?

Now, last thing that we're going to do to look at this is cool. I've got information in this database. It's an external database. Other people could be modifying it as well. I've got some cool stuff in here with respect to a photo for that particular object, or a legal description, or any other information I'd like to tie in the database. No reason to have it all tied up in the DWG file if I can reference it from someplace else. All right? A lot of people have wanted to select objects within the file and see a photograph of the head wall or something that was created in the field or the tree or the specific culvert.

Let's do this. Two commands to do that. I'm going to say, ADE, D DEF for define, and Doc View. We'll just give it a name. We'll call it Photo. I'm going to drill down Expression. Where does that information live? Well, if I go to my link template and I go down, there is the value that's in the database for the photo. Directory-- Browse-- where do I have those guys? I've got those guys in my GIS folder. Oops-- I've got those in my Photos folder. We'll say, OK. They've got a JPG extension.

And then all I need to do is tell my system what file I'd like to view that with. So I'm going to go to Internet Explorer. I'm going to right click on that. I'm going to go to Properties. And I'm just going to copy that target. That's the program I want to use. That's how it finds it, so that's how I want my Civil 3D to find it. So I'm going to paste that in here. I'll add that to my list. And I'm ready to go. All right?

To make it work, I want to see the photo. I'm going to type in ADE Doc View. Select Object-- I touch this guy. That's what that guy's house looks like. We'll right click, Doc View, touch that. That's what that one looks like. If I defined multiple ones, I would get a whole list of things I'd like to pull. Like I said, the great thing about this is, instead of embedding everything in the drawing, I can reference it from someplace else. Other people can edit it. If they make changes to the database, I have access to it here. All right?

OK. Let's shift gears. Next thing I want to take a look at-- when we're in a drawing file, there's a lot of information we'd maybe like to have access to when we're outside the drawing file. So, for example, if we come back into this guy-- I'm going to go to Drawing Properties and I'm

going to open up my Earthwork file here. All right. Some people may have seen this, some may not. It was actually kind of new to me when I saw it the other day. The quick way to generate Earthwork-- we've got the volume dashboard and all that now.

We can access what I think was the old fashioned way of doing it. If we type in Report Surface Volume-- all right? I just tell it that I want my existing compared to proposed. And I'm done. I've got my Earthwork. I don't need to go any further than that. So if I need something quick, I can do it that way. All right? Since this is a file that I can do Earthwork, I thought I'd throw that in.

The information I want to get access to-- if we come down and look at Drawing Utilities. There's an option for Drawing Properties. If we go into Properties, I can come down to Custom, and I can assign values that will live with the file. The cool thing about these values is, I can start to put things in it like projection or the client name or the project number. All right? And the great part about it is, if I navigate out into my Windows Explorer, and we go grab a file, we'll take a look at Properties just by highlighting it. Look at custom, all right? And I would be able to see those from the outside.

So anybody that's ever wondered, well, what's the projection on this file? What the project name, project number? All right, now I can just highlight the file. I can right click, and I can see it. All right? I can't change it from the outside, but I have the ability that I can see it, which is nice. So how we would take and create it-- I'm going to say, Add. We'll say, Project Number. I can give it a value. We'll say, OK, and I'll start adding that to the list. All right?

Now, the great part about that-- well, that's good for this file, but how would I add that to a bunch of files? And I don't want somebody to have to keep reinventing the wheel. All right? There is a command that will allow us to do that that's called Propulate. P-R-O-P-ulate. All right?

So let's take a quick look at this. We'll say Propulate. I can attach a template, I can edit a template, I can list what's there, I can remove it. Let's take and set an active template. I've got one in my folder already that maybe is the default for this project. We'll go ahead and say, Open. I'm going to use that, now that it's attached, to update what's in my file. We'll update either the current drawing or other files. If I look at the current drawing, now if I come down and look at Drawing Utilities, and we look at Properties, and we look at Custom, I've got all the values ready to go that people can start filling those out.

So, I can have a template set up for a particular project. And then, now is-- like I said-- if

people want to drill in, they're able to find that. If I'd like to create other ones-- that same command-- I can open it up, save it for another project, and then go from there. All right?

Last thing that I would show with these guys-- I would really like to be able to search on these values, but I can't. It's metadata for the drawing. But the custom things we can't search for. But I can search for other values. So, for example, this projection-- I'm going to copy that to my clipboard. I'm going to come back and look at Summary, and I'm going to put that in here for keywords. And we'll say, OK. And I'm going to go ahead and close this file. All right?

So, now I've got one file that has Illinois state plane east zone-- whatever value I put in for those keywords. The way that I would find that, if I get in the habit of putting keywords into those areas-- I'm going to launch Design Center. Anybody use Design Center? All right. I'm going to type, ADC to get into Design Center. There is a tool here at the top for search. And what I can do is, I can come down. And I want to search for IL asterisk. And I want to search for-- and like I said, it would be great if they had the custom stuff at the bottom, but we don't. But I do have the other ones. We'll say, keywords. I'll tell it the folder that I'm going to go to, which is where I've got my 2016 files. We'll say, Search Now. It goes through and searches for all that information, and it finds my Earthwork drawing. All right?

So, if you get in the habit-- the custom mode of operation in your office is to add values to these things, then you can search and find all the stuff that has to do with a particular client, all the stuff that has a particular projection. All right? If we select a file, we can use drawing properties to access other information. All right? So, the cool thing is, we don't need to get into the file to actually be able to see it.

All right. We're going to shift gears. Let's go into the next one here.

We'll say, Open. I'm going to look at a site data table. All right? We can create parcel area tables in Civil 3D, but it doesn't always give us all the information we're looking for. Jeff and I worked at a place that, we would have to take and put in-- what's the growth site density? How many lots are there? What's the percentage of open space compared to detention area? Things like that. The tables that come within Civil 3D don't do that for us. But we can work a little bit with magic, a little magic with Excel, to tie those things together and make it make a table for us that we can update for our design. All right?

So let's start by bringing in a little bit of geometry. I'm going to do the same thing as before.

We'll say, Import. We'll come down into that same folder here. We'll say, GIS data [INAUDIBLE] lots. Attribute Values-- I don't know if I have any in there, but we'll take a look. I've got area. That's fine. We'll go ahead and bring those in. Import the polygons as closed polylines. We'll Zoom Extents. There is my geometry. All right?

I'm going to turn these into Civil 3D parcels. All right? I probably want to clean it up. Right now, I just want some parcels to work with. So we'll just create parcels from objects. I'm going to Window these guys. We'll right click. I'm going to put them on the site, and I'm going to associate a parcel style. The style is the key that will use the intelligence within Excel to put these things into different categories and make a more intelligent table.

So I'm going to call these single family. We'll erase the existing entities, and I've got all my single family lots. All right? Now, I would do the same thing and define parcels for things like open space, detention area, the overall property. Because I don't have that in here right now, we'll just take and make a couple of things to work with. Let's say this was the overarching property for everything that's there.

We'll make another rectangle. Maybe this area's going to be my open space. I'll make one more that's the area that's going to be defined by my detention area. I'm just going with rough things now, to have parcels to work with. Let's define these. I'm going to hit the up arrow to go back to my Create Parcels From Objects. We'll say that I'd like to select this guy. This is my open space. So I've got a style already set in here for open space. All right? These are just the defaults that we get out of the box. Create From Objects-- this guy.

This one is going to be detention. I don't have one for detention, so I'm just going to use basic for right now, just to have something different. And then the last one that I'm going to do-- this is my overarching boundary for the entire project. We'll build that one. I am going to put this on a different site, so that it doesn't conflict with my other parcels-- doesn't want to try and start subdividing it. So we'll just call that Project for right now. And the style that we'll associate with that, we'll call it Property. We'll say, OK.

With that done, we're going to go ahead and come down to-- we'll roll up my task pane here, and my Properties. We'll come down to Reports Manager under Parcel. And I'm going to double click to Create an Area Report. I want to export this information so that I can use it in Excel. We're going to export it. We'll leave it to default-- Civil Report. We'll say, Save.

Generates my report, pops up Excel. This is what we're used to seeing. Or, we could have dumped that into Civil 3D-- we would have seen the same thing. I want to do a little bit more of that. So I'm going to highlight all the values that it gave us. All right? We'll come down to the end.

I'm going to copy that. And what I've created is just a simple site data table. We'll pull this up. We'll say Desktop, 2016, My Project. And we'll bring up my template.

All I have to do is click in the box here and Paste. Those values come in, and it automatically populates my site data table. All right? I'll give you a copy of this. I'll post it. You'll be able to download that, if you'd like to experiment with it. I've got For Entertainment Purposes only. All right? If somebody finds a math error or whatever, whatever.

So I also set it up that, if you wanted to tweak it-- maybe you don't call your lots Single Family, maybe you call them based on zoning or something like that. You can change the values in here, and it will update the formulas. I've also created some things in here with respect to conditional formatting. So if my limit is, I need at least a minimum 12,000 square foot lot, it'll start coloring those items red to identify where I've got problems. All right?

Now, I want to bring this back into Civil 3D and be able to use that. All right? Very cool-- I can use the command table. Table, we're going to come out-- we're going to create a link template. And I'm going to create a new Excel link template. We'll call this Site Info.

We're going to browse for my file. You know what? Let's save that file. And we'll come back to Civil here. We'll browse for that in my folder, Site Data Table. The-- template we'll grab that guy. Wants to know what we want to link to. I want to link to a range. If we look in Excel, it's from L1 to O11 is what we're looking for. So we'll put that in here-- L1 to O11. We'll click on OK. Sometimes it will give you the preview. Sometimes it will give an excuse-- it's too large. If you get it, that's great.

We'll go ahead and bring that in. We'll say that we'll create that, and I'm going to drop it right here. All right? I'd like to be able to see that, because that's kind of microscopic right now. So I'm going to come over here up at the top. I've got-- anybody who's used viewports before-- I can click on the viewport control right here in the window. Let's take and do the configuration. We'll do two vertical. We'll zoom up and take a quick look at this guy. There is my table. All right. So there's the information that we pulled.

And the great part about this, like I said, is, if we come in and make changes to any of this data, I export that back out, paste it into Excel. I'll get a balloon notification in the bottom that it's been updated. I'll refresh it, and my table will update to reflect that. All right? So linking to Excel-- we can do that for a lot of different things. We can generate those tables. I can come in here and I can tweak formatting and that, directly within this environment to either eliminate lines or center justify-- make it look exactly like I'd like it to. OK?

All right. Let's take a look at-- I'm going to take a look at Google Earth here for a moment. Anytime we work on projects, it's always nice to know what other projects we've done in the same vicinity. All right? And if anybody's like our office, we used to keep all of that on paper tax maps with post-it notes and all types of things to be able to determine that. It's like, hey. I think we did a job close by there. What job number was it? I don't know. Then, we'd spend more time than we should trying to figure that out. All right? There's a cool way that we can use Google Earth to do a lot of the heavy lifting for us to do that, because we've got the ability to export geometry out of Civil 3D to a KMZ file. All right?

What I mean by this-- I'm going to go out to Google Earth here for a moment.

We'll fire up Google Earth. Jeff and I did a presentation yesterday on a fictitious project here. It was our chicken and waffles restaurant. So let's say that we were going to go to that particular site. We'll go to that site, and we want to see other things that maybe we've worked on around it. All right? So that's our utopia, if you will. I'm going to back up. All right? I knew maybe I did something out west, but I don't see it. It would be great if those things would light up on the map here. All right, well I can do that.

The way that I'm going to do it is, I'm in Civil 3D. I've got a job here that maybe I've finished. And I've got some parcel information around that particular job. Let's go to geolocation. I'm going to take and turn off the map. All right. The only thing that I need to do this is just some boundary of what I'd like to reflect. And you can put information on it. For most people, project name is enough. Then they can go in their own internal system and look up what they need. But if you'd like, you could add additional text, and you could use that as well.

To make this work, we're going to close my task pane. I'm going to come down to my Utilities here, under the tool box. And I'm going to double click on Export to KML. I'm going to give this a name. We'll call it Project Y. Next, Objects-- we'll say Select. I'm going to grab the polylines

that I have, as well as the text. I'm going to tell the system that I'd like to export text. I'm also going to export object information. If you had a horizontal alignment or something like that in there, you would actually be able to drill down and see some of the civil data in there as well. All right?

We'll just keep it simple for right now. Georeference-- it's already on a coordinate system, so it'll be able to project itself nicely in Earth. I'll drape those objects on the ground. And I'll export that out to a file. We'll just call it the default there. We'll say export. We'll hit View. And if we look over at my list here, now here is my Project Y. Here is my polyline.

So if I click on that, we zoom very quickly in, and we see now that that project exists. All right? So once again, if we were to go back to our chicken and waffles thing, I would see that I had a job here. If I had done other jobs, I would see those pop up as well. Those are currently sitting in my temporary places. So I would need to move them up to My Places to be able to see it beyond that.

Let me throw out my last thing on that. Hey. I could have a whole bunch of these. I want other people to have access to them on their machine as well. How would I migrate this for machine to machine? Very, very easy way to do that-- I can highlight these. And they've got a tool in here for email. All right? Whatever level I put it at, as far as the folder, I can go all the way up to temporary places, email that-- type in an email name. It would send them a file. Once they get the file, I open that in their Earth. It would give them all of those different values.

So let's do this. I'm going to remove this. So that guy's gone. And I'm going to come up here to the top, and we're going to say File, Open. Here's my export. All right. I've already e-mailed it, saved it on my machine. I'm going to grab my custom objects here. We'll go ahead and say Open. It automatically brings those in and highlights those on my machine. All right? Those are my custom projects. I could say that I'd like to migrate those up to my main spaces, so I would have access to those. All right?

Last thing that I'll show you on this, if we look at Project Y, this gives me information. Like I said, most people-- that's really all the information that they need. But if you'd like to add additional information to this, we can tie and link to this data as well. Maybe to a network drive. Maybe I've got additional information I'd like to give folks access to.

The way that I would do that-- same thing, we'll add a place mark. Those are things we can export as well. We'll give that a name. I'll call that Project Y. I'm going to say Add Link, and

then I'm going to give it the link to where it is on my machine. It doesn't have to be a URL out to a website. So right now, I've got these in a folder called C colon Test. This is the cool thing-- you have to put the backslash in the wrong way. I don't know. You just have to know. All right.

So we'll say C colon wrong slash. We'll say Test. We'll go the other way with that one, and I've got Project Y dot TXT is the file that I have in there. We'll go ahead and click OK. It builds my little HTML code for that. I can give it a name. We'll just call this Project Info. We'll say OK. So if I incorporate these into what I export and what I move around,

I can now highlight on that. I've got my link here. And when I click, it'll automatically bring up and read from that text file. So I can start to pull information from the project name, a description, the address, who the contractor was, surveyor, benchmark status, whatever the case may be. All right? So now I've taken sticky notes and colored pencils or markers or whatever, and a tax map, and I've created a tool that I'm able to use to gather that information more quickly. All right?

So with that, I'm going to get a drink of water, and I'm going to flip it over to Jeff. And then, he's going to take it from there.

JEFF BARTELS: All right. Switch that over. Good. Fantastic. This has been like I've been sitting on the sideline waiting to get in the game.

AUDIENCE: [LAUGHING]

JEFF BARTELS: So I'm glad he's going to sit down and let me have the ball for a little while.

What we're going to look at here is some site grading. I have got my screen split currently. I've got a drawing here that represents a site plan for a small site. I'm going to select the surface here for a minute, and we'll go to Object Viewer. I just want to show you that that service has been modeled. Part of doing the site grading is creating the lowerings for the sidewalk. And historically, there isn't a nice button to do that. So I wanted to show you a workflow that-- a lot of people have different techniques, different strategies for doing this, so I thought I'd show you my strategy.

This parking lot was built using feature lines. OK? I've got I've got one more lowering here of the sidewalk to do. We'll just take a quick tour. I've got a surface. This is called P Lot. And then, here are my feature lines. If I select these, you can see this view on the right is the same

area, just from a 3D perspective. I've got a feature a line that represents my back of curb, face of curb, flow line of gutter, and my edge of pavement.

Let me select one of these just for a second, and I'll come over to properties. I just want to show you that all of them are in the same site. They're in a site called P Lot Curb Gutter. So what I'd like to do is create my sidewalk lowerings now. I've got some geometry here that-- this is just from the initial conceptual plan. These are polylines, they're at no elevation. They're just zero right now. So we're going to start with these. I'm going to join-- I'll just grab the little flange there in the straight segment. And I'll join those together. I've got two nice polylines now to represent the edge of my sidewalk.

I will convert these into feature lines. I'll say Create Feature Lines From Objects. And I'm going to call these P dash Walk South. And since I'm going to have more than one here, we'll bring up the name template and we'll insert a counter. And then, I'm going to erase the existing entities. We'll assign elevations. I'd like to pull the elevations from that proposed lot surface. I just want to project these up, because the proposed lot surface is good. I'd also like to insert intermediate grade break points.

And when I click OK, you can see that those feature lines were projected up such that they were like spray painted on the ground. So I'm going to use these now to lock those edges of my surface so I can push that end piece down. All right?

Let me show you one more thing here. I didn't touch on the straight segment. We'll talk about this. The area that crosses the curb, you can see that geometry terminates here at the lowest edge. All right? That's what I'm going down to. And the flange-- the flange terminates at the top front of curb, which is the very highest point right before we drop off.

So I've got these two feature lines now. I am going to put these in the same site as the others. P Lot Curb Gutter. By doing that, it's going to create some calculated points for me. Just as an example-- if I select this feature line and go to the elevation editor, you can see that it's created a calculated point. It's saying, the elevation at this intersection is being driven by that other feature line. All right? And that's consistent with both sides.

Let's do one more thing. Now that I've put it in that site, I am going to add these as break lines to my P Lot surface. So now it's triangulating to those edges as well. So surface really hasn't changed. It's maybe triangulating to a couple more points along that edge, but I've essentially locked those edges down. Now, I will take my lowerings-- we'll say Feature Line, Create

Feature Line From Objects. I will select both of these, and we'll call these P Walk South Lowering. And, since I have more than one here, I'll use the template. We'll insert a counter.

Going to keep the same style. This will be the walk style. We'll erase the entities, assign elevations. I'm going to pull the elevations from that same top surface. Except this time, I don't want to insert any intermediate grade breakpoints. Let me click OK. By doing that, it's only going to sample an elevation at the ends, which is perfect, because this end is as the low side. You can see it right there. And this end is up here at the high side. That's consistent for both.

Let me select both of these feature lines now, and I will add these to that same site, P Lot Curb Gutter. And I'll click OK. And that's essentially it. I can now take and rebuild my surface. And you can see how the lowering came down there. Now, just to show you a little bit of what's going on-- I'm going to take the surface and I will hide it. Let me change my style here to No Display.

So there's my feature lines. I'm going to select all of these. And just for a second, let's move them into a different site. I'm just going to move them into the None site. And when I click OK, watch what happens to the curb. The curb pops up. There's no interaction anymore. They're not in the same site. So they don't even know that they exist.

Once again, still selected. We're going to move to site. I'm going to move these back into the P Lot Curb and Gutter. And when I click OK-- now, oh, hey. They're in the same site. They interact. Therefore, the sidewalk is going to be pushing the curb and gutter down. Now, the way this works-- if the feature lines have the exact same style-- whichever one is edited last wins. In this case, they've got different styles. So you may be wondering, is there any way I can essentially establish a hierarchy? And the answer is yes, you can.

If I come over here to my site, I'm going to open up Sites and I go to P Lot Curb Gutter. If I expand that out, you can see there's a Feature Lines category. I'm going to right click and choose Properties. And in here, there's an options tab where I can determine who's more important than anybody else. And right now, the walk is more important than my curb gutter.

If I take the curb gutter, for instance, and I make him more important, push that to the top and click OK. Watch what happens. All right? Has anybody seen that before? No. All right. Well, today's the day.

AUDIENCE: [LAUGHING]

JEFF BARTELS: Today's the day. Now, we can-- it's a little bit easier now. I mean, now I can say Curb Gutter. OK. That's priority low. Sidewalk? That's going to drive everything. It makes it a little bit easier to make adjustments here. Let me go to Properties, and I'll take the walk here. We'll shove the walk to the top. He's the most important. Let me click OK. And you can see that pops back down again. All right? That's the trick. Interaction in the same site, and then which one has priority.

Fantastic. Let me jump out of this. And I'm going to open another drawing here. Let's talk for a second about property set data. One of the things that-- I mean, Civil 3D does a nice job holding data on objects, so long as the data was created by Civil 3D. If you want to add some of your own data to the Civil 3D objects, that can be a bit of a challenge. And with a BIM workflow-- you know, the I means information-- that's what we want. We want to be able to put our own information on these objects.

So Civil 3D is built on top of AutoCAD. It's built on top of Map. It's also built on top of AutoCAD architecture. There's a lot of AutoCAD architecture code in here. It's not exposed in the ribbon, but if you know what the commands are, you can get to them. So something that the development team has been experimenting with lately is leveraging one of those AutoCAD architecture tools. It's called a property set. It gives you the ability to add data to any object in your drawing.

How many Civil 3D 2017 people do we have here? OK. We've got a few. How many 2016? OK. This works in '16 or '17. In '17, we've got a button for it now. If I go to the Manage tab, I can say Define Property Sets. And when I click that, you can see it just runs this command called Property Set Define. If you're in '16, you just got to type that out-- Property Set Define.

So let's say-- I've got some sanitary structures here-- let's say that this was collected in the field. I'm building a model that represents my existing utilities, and I'd like to add some additional information on here. Maybe the owner, maybe I'd like to add to the condition, something like that-- things, historically, we just can't get with a pipe network. So I do my Property Set Define, and then I want to create a new property set definitions. So I'll just right click here, and I'll say New. And I'll call this San Data. So that's the name of my table. That's the table that's going to hold the attribution.

Once I create the table, I can then use these tabs to configure how that's going to interact with

my drawing; general tabs where I give it a name and a description; definition, this is where I can create my attributes. To create one, I'll just click this icon in the upper right corner. And I'm going to call this Owner. Now click OK. So there's my attribute, Owner. I can also give this a description. Owner's pretty descriptive. I could say Owner of Utility.

What type of attribute is that? I've got integer, real, tax, true, false. There's also some autoincrement stuff in here. I'm going to choose text-- it's just a text string. And then, for right now, we'll assign a default value. I'm just going to use the word Owner. I know that's obviously wrong, and that shows me what it's meant to be. So if somebody chooses not to answer it, or if it's not entered, it'll just say Owner.

Let's create one more attribute. I'll just click that button again and we'll call this Condition. And for description, we'll just go with condition. That's going to be a text string, default here. We'll just say Description. So that'll be the value it has if it's not assigned a value. All right. So I've made my table, I've defined my attributes. You can make as many as you want.

Finally, I'll go to Applies To. And here, you can see a listing of everything that can exist in a Civil 3D drawing. You can apply Property Set Data to Civil 3D objects. You can assign it the line work, solids, anything. OK? It doesn't have to be Civil 3D entities. Let me slide this over, and I'll find structure. That's what this table is associated with. And I'll go ahead and click OK.

So now, I've made the table. Let's assign the table to the objects. I'll go ahead and grab a couple of these as a sample, and I'll right click and say Select Similar. And you can see, it selected all of my sanitary structures. We'll just go over to the Properties palette, go to Extended Data tab, and then I'll click this little obscure button in the corner that says Add Property Sets. That's why nobody's ever found it in the past. It's that little obscure button in the corner.

And when I pick that, it says, OK. Based on what you selected, this is the table or tables that are associated with that object type. So that's the one there. Let me just go ahead and click OK. And that's it. Now, if I select this object, I can see that there's the table name and these are my attributes. So, Condition, I can say Abandoned Owner City of Elgin.

OK. If you want to assign attribution to multiple objects, this works kind of like object data, if you're a Map person. Very similar. Let me do a select similar. I could grab all those structures, and I could change the owner here to city of Elgin. All right? The nice thing about this data is,

unlike object data, if I pass this to Navisworks, it'll be there. All right? So the data goes with the drawing. If I pass it to the large model viewer and BIM 360 team, it'll be there as well.

So that's where they're going now. This is something that's already in the application that they can leverage to allow you to add your own data that it'll then propagate with the file.

Next question comes up-- how do I label it? If you're using '16, you can't. All right? Not yet. '17, you can. OK? '17, we can now. The way these are labeled-- I'm going to go ahead and put a label on this. Let me go to Annotate here, and I'm going to choose Pipe Network. We'll do Single Part, Plan, and for my structure label style I'll just choose this one called Name Only Sanitary. And then, I will select both of these just to use that particular style. Then we'll pull these out to make them a little easier to see. So that's my name only style.

I'd like to add that attribution. If I edit the style-- or I could create my own style if I want to. I'm going to just be lazy here and edit this style. I'll just right click and say Edit Label Style. In the label style, I have one component. That's just called Structure Text there. On the Layout tab here, under Contents, I can click the field. So this is where I can go through and create my components. Let me go ahead and hit Enter.

Notice there's a tab here now called Property Sets. This will display only if you have a property set definition in the drawing that's associated with that object type. So if you don't see it, it's because you don't have a property set associated with that type of object. All right?

Let me go to Property Sets. And I'll say I want to do Owner. I'll just type Owner. And then here's where I want to extract the attribute, so I can pull it from the sand data table. I want to send the Owner over. Let me also mention, in 2017, this is one of the V1 enhancements. There is a way to label this prior to the V1 enhancements, you just have to write that little code that you see there manually. And I've got a video that will walk you through that, but I think everybody can get access to the V1 enhancements.

Let me go ahead and hit Enter here, and then we'll do Condition.

And we'll grab that property and we'll send that over. Let me click OK. OK. OK. So now, I've got-- those Civic 3D objects are holding my own data. If I were to edit that data, I could come over here and we could make this the village of Oswego. You can see how that updates. So that is property set data.

AUDIENCE MEMBER 1: Does that carry through to data references? If your data reference [INAUDIBLE] this information into another drawing, [INAUDIBLE]?

JEFF BARTELS: Yeah. The question was, would that propagate through if I data referenced the pipe network. I'm guessing no. In the interest of full disclosure, I'm guessing. I'm going to say no. I'm going to say no. Most people would say yes, and then we'd forget and go home. But I'm going to say no, just because we're associating it to this object. It's not actually in the network. So you might have to data reference it and apply it in that drawing. That would be my recommendation. Unless, of course, it works. In which case, pay no mind to me. OK?

AUDIENCE: [LAUGHTER]

JEFF BARTELS: So, Property Set Data. That's something that you can explore to take and add the attribution and labels to your objects.

Now, let me show you something. We've taken this concept a little bit further here. I'm going to show you something that you-- in fact, I'm going to jump into a different version of Civil 3D here, momentarily. I'm going to show you something that you haven't seen here yet at AU. This code is so new, it still has the shrink wrap on it. In fact, I probably have to be careful saying too much, lest the black helicopters will start circling.

But I want to show you something that-- it's brand new-- that you can experiment with today, should you choose to. I'm going to start by creating a new drawing. And I'll just grab a template here.

And let me give just a little bit of background, why this came about. The Civil 3D development team has been working with a large DOT in the area of survey. There's stuff going on with respect to survey-- improvements being made. Can't talk about it.

But, this DOT approached the development team and said, you know what? We've been using the survey database. We've been using the field books. We've been using all that stuff. And, you know what? We've got hardware that we like using that does a lot of that stuff already. We've got hardware, where we're out in the field, we can use our own codes. We can take and connect the line work, and we can see the line work connecting on our field equipment. We can add our attribution. But, you know what, when we're done, we even want to do our own reduction and everything. We just want to take the line works that we created with our equipment and get that into Civil 3D with our attribution. That's what we want to do. Can you

help us do that?

So, like I said, there's another side effort going on with survey, but to help the DOT out, this is an intermediate measure. They said, OK. Well, let's-- what can we do to help them out and possibly open this up for additional workflows? So, what they're doing-- and what I'm going to do here-- they are taking the survey data that's collected in the field, and they're exporting that out as a shape file, or shape files, for points and lines, such that when you import that into Civil 3D, it'll create feature lines and COGO points.

And the data that comes along with it is going to be property set data. That way, you can use your own codes. You can use your own lines. You can take and put your own attributes on it. And the shape file, for right now, is being the vehicle to move that data into Civil 3D. OK?

So let me just show you quickly how this works. I'm in a template file here. The command is called Import SHP Survey Data. Anybody use Map import? Map import-- moving GIS data is beautiful. But you get 3D polylines and you get blocks. Wouldn't it be nice if you could insert that and get COGO points and feature lines? That's what this will do now.

So let me-- I'm going to go to Settings here. I'm just going to run through this quickly. I'm just going to call this Company Standards. Basically, what I'm doing here is I'm creating a name for all the stuff that I can fill out in this dialog box, so that way I can reload it again in the future. Feature line settings-- let me go ahead and click to load one of these. The feature line settings-- this is an XML file. If you've ever made a figure prefix database, essentially, that's what this is. Let me go ahead and click Open. You can see that there. We'll talk about that more in just a little bit.

Point Settings-- this is like your description keys. Also an XML file. I'm going to click OK. So I grab both of those. And essentially what this says is, when you bring the data in, I want you to match it against these files. If it doesn't match, then you're going to use these settings down below. Let me go ahead and click OK.

So I've identified how I want to bring the data in. Now I'm going to identify what I'm going to bring in. Let me give this an import event. Today's Wednesday, right? All my days run together. Now I can click the Add button, and I can select the shape files that were collected in the field. These shape files that are exported from the collector-- that's going to be an individual shape file for each class of object, essentially. So we'll have several. You can see there's some sample ones here I'm going to grab. Lines and-- we'll do Points as well.

There we go. So I've established how I'm going to bring it in, what I'm going to bring in. And then I've got this area over here that establishes where I want to insert this data. Do I want to bring it all in? Do I want to base it on the display? Do I want to bring it in based on a rectangle? I can create a buffer from an alignment. I could-- maybe 50 foot buffer from an existing alignment, and only bring in the data between certain stations. So, much more granular control over the data that we bring in now.

I'm going to go ahead and click OK, and we'll let that run through. So the important thing to note is, right now, I'm bringing in survey data, but it doesn't have to be. It can be any GIS data that was saved as an SHP file. So anything you'd like to insert-- you know, if you've ever tried to put a line type on a 3D polyline, that doesn't work so well. But now we can bring in that data as a feature line. We can take and put nice line types on it. We can have COGO points with a symbology that will rescale. Even if we don't want to use it for survey, we can take it and use it for that. Let me do a Zoom Extents.

So here's that survey data. And I'll zoom in. If I select this tree and come over to Properties, go to Extended Data. You can see it's got a property set table. And this is the data that was collected out in the field. It also has a universal property set, so I can see the date that it was imported, what the event name is. OK? What shape file it came from, and some of the information around that. If I select this feature line, for instance, and come over to extended data, same thing. I've got access to all that attribution. Now currently, I'm using this in 2016. Like I said, this is brand new. There is a version of this available for 2017. So now that unlocks labels too. I can take and create my drawing. I could bring it in and label all that survey data, if I want to. OK?

This is available through the Civil 3D Futures. If you go to beta.autodesk.com and sign up for that, you can take and download this thing. This is today. OK? You can run this today if you want to. And they're wanting people to experiment with this, give them some additional ideas. They've got other places that they want to go with this, but this is something that's going on to try and alleviate some of the workflow things people have been asking for for a while. OK?

Let me do one more thing here. I'm going to-- let me run that command again. Import shape survey data. And I'll open up my Settings file here. And then I'll go under points here for a second. Let me just click the Edit. Historically in Civil 3D, when we brought the data in from the field, it was stylized based on the description. We don't have to do that anymore. We can now

stylize it and label it based on the attribution.

So using this workflow here just for a second, let me click Add. I'm going to add a row. You can see, this is one that was made by the DOT for testing. I'm going to add a row here, and then I'll go ahead and click in here and I'll say-- well, let me choose a shape file. I'm going to do trees. So I'll just come down here and grab one of these tree files. And then-- I'll explain why I grabbed that in just a second. Let's do tree EUC asterisk dot SHP.

So when the shape files are brought in, essentially what it's saying is, when the data comes in, you see that shape file. I want you to look into it, and I can create a query from that. I want you to essentially-- any tree that has a diameter greater than or equal to a particular value-- I want you to take and put this style on it-- this object style and this label style.

And we can go through and create complex queries on this now. So we could have one code for fence. And we could use this to say, if it's got this attribute, it's chain link. If it's got this attribute, it's wood fence. All right? That's essentially where this is going? Or that's what this unlocks for you today. Opinion? Thumbs up, thumbs down? Take it or leave it. OK. I'm seeing thumbs. Since nobody can see the audience, we're seeing 700 thumbs in the air right now saying this is good. OK. So even if you're not using it for survey, please download this and give it a shot for just your GIS. To be able to bring that in as Civil 3D objects and put labels on them is just fantastic.

I'm going to do one more thing. This is going to qualify as the unnatural act, I suppose, here-- since we have to have at least one of those there. I'm going to-- let me jump into my project here. We'll go to XREF's. And I'll go to proposed conditions here. Oh, I don't want to do that from 16. Yes, yes. Understood. Understood! Yes, yes.

AUDIENCE: [LAUGHING]

JEFF BARTELS: Yes. Just let it go.

OK. Let's see if we can-- can we minimize? Oh, thank you. All right. It was like one of those Lost in Space moments-- warning, Will Robinson. OK.

Fantastic. I'm going to open up a Civil 3D drawing here, as soon as I get access to the interface.

Sometimes it can be the longest 15 seconds of your life. Let's go to Civil 3D Projects. OK. Final Engineering-- we'll go with this. All of that just to show you that. OK.

So that is my proposed site plan. This was built in Civil 3D. We touched on this a little bit ago. I've got my three dimensional grading. I've got my utilities in there. Maybe I've gone through and finalized my site. So all of this was built in Civil 3D. I would like to create a VR-- virtual reality-- experience from this. They've talked about VR a lot here at AU this session.

Now, when you first think of VR, you may think, time consuming. Steep learning curve, and quite possibly expensive. We can take and create a virtual reality experience from a Civil 3D drawing with virtually no learning curve, and we can do it with our smartphone. And we can take-- if we have a Google Cardboard, or some other device-- let me show you how we can do it. Like I said, unnatural act. We're just going to move this data through a couple of different applications.

I'm going to jump into InfraWorks here for a minute. So, I took that Civil 3D data. I created a land XML file, and I moved that surface over. I created some boundaries from my daylight, moved that over as a coverage. I created a boundary for my parking lot-- moved that over as a coverage. And I took and colorized these things. And then, I added some accoutrements to this to create my proposed site plan.

And we talked about this earlier-- the chicken and waffles site. I like to think of it as a retirement opportunity or an investment, if anybody wants in. So this is that site in InfraWorks. So, to create my virtual reality experience, I'm just going to export this. I'll come up here and I'll say Export 3D Model. And I'll export that using a bounding box. Let me go ahead and double click here. And then-- where do I want to save this? I'm exporting as an FBX file. And that boundary represents how much of that do I want in my virtual reality world here?

Let's go to the C drive here, and I'll-- I saved one from yesterday there. We'll just overwrite this other one. So I just window that model, export as FBX. I'm going to export the materials, and I'm going to merge the objects with the same textures. Let me just click Export, and we'll replace that previous one.

So, that takes just a second to process. So that's step one of the VR experience. That's done. Let me jump out of this. Now, I'm going to jump into Navisworks. Navisworks does a lot of fantastic things. What we're going to use it for is just creating a stereo panorama. There is an

option that we can do some cloud based rendering. So let me open Navisworks. And I am going to open that site plan file. And when this comes up, it will have the-- since it was exploited with the materials-- all the materials will be there. It's going to be the same as we started with. Now, it does come in with a wee bit of a tilt to it, there. Let me just orbit this around.

OK? So I can position myself where I'd like to be in the virtual reality environment. And step three, just come up and click Render in Cloud. I'll choose Render in Cloud. I want to render the current view. I want to render it as a stereo panorama, and then-- you can see-- no Cloud Credits for that, if I go with the basic settings. If I want to bump this baby up to final, advanced in the largest pixels-- it's going to render in the cloud. I can say, email me when it's complete. And I can click Start Rendering.

Now, I've already rendered one of these. Let me go to the render gallery.

And I'll click Sign In here. We'll sign in with my credentials.

And here's the chicken and waffles site here. Let me show the renderings that I've created. So here's one. If I hover over that, you can see 15 minutes it took to render that. If I select this, it will open it up and show a 360 degree panorama. Notice that it has a QR code in the corner. So if we were to a public meeting, we're trying to get support for this, I mean, I could take and show this 360 panorama. But with that QR code, I could pop up my QR reader and I could scan that. And when I scan it-- when I scan it-- like everybody in the room can see my phone.

JERRY BARTELS: If you want to flip it over, we'll put the QR code up.

JEFF BARTELS: Oh, yeah. Let me flip it over. Jerry will put the QR code up on screen. Basically, no software to load or anything. It just comes up on your phone. And all you've got to do is turn your phone into landscape mode, and then you've got the stereo pair. And you can put that into Google Cardboard. Or, if you want to pay about $3 more, you can get one of these view-master VR's-- it's like 17 bucks-- to do virtual reality. And everybody's used a view-master, right? Yeah. No learning curve. I'd like to say, view-master has been doing VR for 50 years.

So I wish I could wish I could pass it around everybody, but let's let a couple of people. This is the benefit of sitting in the front, if you want to look in there. But that will give you a 3D

perspective. It's like you're standing in the model. You can see it in 3D. You can take a look around. You can't walk around-- you're not going to-- you probably don't want to do that anyway, because your reality is different than the model.

Oh. There is a-- that's right. There's a little lever. Just like the old view-master. There is a lever in there. Now, that since it is a cell phone, the phone will want to go to sleep. So it's a real high tech thing. When you pull the lever down, a little rubber finger comes out and just touches the glass, so it doesn't go to sleep on you. OK?

AUDIENCE: [LAUGHING]

JEFF BARTELS: So, you can very, very quick-- virtual reality, very inexpensive. And you could print that QR code in the newspaper. We've got a couple here, if you want to try and scan one. If anybody got one of the Google Cardboards or Autodesk Cardboards they were giving away, and you want to experiment with those. If anybody sends me an email-- like I said, if they have a device, they want to look at one of these-- in my auto reply, just Jeff.Bartels@autodesk.com. It will-- the auto reply will contain hyperlinks, so you can just tap it with your phone and see those.

If folks are interested, like I said, we've got the competitive nature. We want to reward folks for being out here at 8:00 a.m. We have one of those view-master VR's we want to use as a giveaway. But instead of names in a hat or something like that, we thought we'd do something a little bit different. So, we're going have a MENSA quiz.

AUDIENCE: [LAUGHING]

JEFF BARTELS: All right? So, if you look at it this way, no matter how the week goes, somebody is going to leave here winning a MENSA award, all right? So if you go to-- on your smartphone, you just go to website, for Those who want to participate. It's Kahoot.it. That It'll ask you for a number. I'll show the number in just a second. But instead of doing trivia based on Civil 3D or Autodesk-- people's learning experience-- this is going to be, like I said, MENSA.

So it'll be wide ranging questions around a lot of different things. You'll have roughly 10, 15 seconds to answer. And we'll tally up the results at the end here. Please, no wagering. Let me-- everybody have Kahoot.it, for those folks who want to get in? It's going to ask you for your name. Everybody's going to be able to see your name. All right?

AUDIENCE: [LAUGHING]

JEFF BARTELS: So-- yes, please. Please. Yeah. All right. So, let's go ahead. We'll click on Play. We're going to go with classic for the MENSA quiz. And the number that everybody is waiting for here is that. All right? Now, because second and third place are also important, we've got a couple of Autodesk chargers for your phone. So when you're out later than 2:00 in the morning and your spouse is calling, wondering where you're at, your battery's dead-- all right? We're going to give you a charge that you'll be able to get back in again.

All right? Kablam! All right!

Let's give that a couple other seconds to populate. What we'll do too for those-- whoever gets the VR-- we can bring that code up. If you want to take your phone, we'll scan that with a QR reader so you can test it if you want to do that. Or you can-- it comes with a cool disc, I think Batman or something like that. So I don't know if you want to do that later.

AUDIENCE: [LAUGHING]

JEFF BARTELS: Hey. It's Vegas. You can do whatever you want to do. All right? All right. We'll give another couple of seconds to get folks in. It says it can handle 4,000 people. So we'll find out. All right. Are we good? Everybody's in that's going to be participating? All right.

And where's my mouse? There's my mouse. Ready? And, we're up.

How much do 10 pieces of candy cost if 1000 pieces cost $10? Find the appropriate color that matches on your phone. Log in your response. You have three seconds. People, we can't pull a calculator out. All right? We've got 10 seconds to respond. All right? All right.

Let's try-- you're ready? You got-- you've got five seconds to read it. You've got 10 seconds to respond. We lose the room in an hour. All right. Are you ready? Next.

All right. Sally G's up in front. You do get rewarded if you get multiple in a row. Emily is taller than Anne and shorter than Dolores. Who is the tallest of the three? You have six seconds. And as a hint, it is not Not enough info. All right?

AUDIENCE: [LAUGHING]

JEFF BARTELS: So you've got-- all right. Nice. Nice. Sally G, tearing it up. All right. Next.

A clock takes five seconds when striking six. How long will it take when striking 12? There's a lot of our millennials out there that have only ever had a digital clock. That will be a little harder for them. You folks that have had analog for all these years-- ooh. All right, DKJ. Ready?

If 1.5 dozen sardines costs $9.5, how much do 18 sardines cost? And please, it is not Not enough information. All right. One second. All right. Fantastic. JP Moore.

If a brick weighs 3.5-- or three pounds plus one half a brick, what's the weight of 1.5 bricks?

The answer is nine pounds. I actually debated that. I sat down with a calculator. And I had to look it up on the internet. It is-- what is it? 9 pounds. So, if you want to do that as homework, you can work on that. But anyway-- JP Moore.

A sign maker is ordered to number 100 buildings from 1 to 100. How many nines will he need?

The answer is 20. Can't forget about the 99 and the 98 and-- Andrew L.

OK. Down to the last few questions here. What has more value, one pound of $10 gold coins or half a pound of $20 gold coins?

One pound of $10 gold coins. They're the same, if it was monetary, but gold is heavy. Gold is worth about $1,300 an ounce right now. So-- I'm not MENSA. I looked it up myself. So-- just trying to provide a little color. Let's-- Andrew L.

On a clock, how many times does the minute hand pass the hour hand between noon and midnight?

10. All right. We'll take our last one.

JERRY BARTELS: Oh. You got two-- this one and another one.

JEFF BARTELS: Oh. I got one more after that. How many times can you subtract six from 30?

AUDIENCE: [APPLAUSE]

JEFF BARTELS: You can subtract it once, because after that, it's no longer 30.

AUDIENCE: [LAUGHING]

JEFF BARTELS: All right?

All / Tim C was all over that. All right? Last one.

What is the longest word you can type with the left hand, not crossing to the right side of the keyboard?

Oh, fantastic! All right.

And our top three. We have Tim C, we have Alex, and we have Matt. Fantastic. I will leave those up. If those folks can come see us at the end-- let me flip back over here to the PowerPoint before they grab the hook and pull us out.

Thank you very much for coming. We appreciate that. If you have an opportunity to fill out the reviews, that would be helpful for us as well as we put together other things for future AU's. Thank you very much.

AUDIENCE: [APPLAUSE]