JOSEPH DUFF: OK, guys. It's almost right at 1:00 right now. We're going to ahead and get started. There's probably going to be some people trickling in at a slower pace. I'd like to welcome you guys to the BIM Workflows for Transportation Instructional Demonstration.

My name is Joseph Duff. And I am the civil infrastructure technical specialist and Autodesk certified instructor for Applied Technology Group. OK. Today, we're going to walk through the new collection AEC collections that Autodesk offers and look at some of the things, some of the BIM workflows that are available within the collection.

Just real quick, I asked this earlier. But how many users are currently using InfraWorks 360. Very small. OK. Civil 3D I know. What about Navisworks? OK. We got a little more Navisworks users than InfraWorks 360.

We're going to talk about InfraWorks 360 kind of at the very beginning of the presentation, how to create a transportation design in InfraWorks 360. And then we're going to bring that over, show the workflow to bring that over in the Civil 3D, use some of the newer enhancements in 2017 Civil 3D, and push it out to Navisworks Manage maybe for some pre-con or collaboration type scenarios that you might want to do, and also bring in kind of full circle back into even InfraWorks for any kind of viewing or presentation purposes that you might want to have. We've got 90 minutes. And I've got a lot to show you.

So if we don't get all of it, they will be posting this video online. As well as later this evening, I'll be uploading a walk workflow document that will detail every workflow that I either mention or show. OK. And I'm also going to be adding my data sets as well. So you can practice this if you decide to implement the software and use these workflows. So let's get to it.

Let me get everything switched over real fast. All right. As you begin your project in the InfraWorks 360 software, the typical workflow is to use Model Builder. And for those of you who don't know what Model Builder is, it's essentially an aggregating portion of the software that combines base data for roads, buildings, imagery, and elevation.

A lot of this information or GIS data comes from openstreetmaps.org. And you can either go there yourselves or look at it here. And the newest enhancement in 2017 allows you to actually hit a hyperlink and go actually look at the original data that it was downloaded.

The buildings come from the same data set, the OpenStreetMaps data set. The imagery is coming from Bing maps. And the elevation data is coming from the USGS National DEM. OK.

You have the option to select the viewport area. It has to be less than 200 square kilometers. You can also pick a rectangular area, a polygonal area, or import a shape file that has some coordinate information that will define the boundary of your model.

You can zoom in real easily. I'm from Arkansas, so I'm going to kind of look at that area. And if you look at it now with my zoom level, I can just nearly capture the entire capital of Arkansas, which is a Little Rock, right? So 200 square kilometers is actually a pretty large area. I don't know very many people that are actually capturing an area that large for most projects.

But as soon as you do that, you enter the name of the model. Put it in whatever group that you decide to use if you're going to share it with people that are in your company or other companies that may be collaborating. And then you hit Create Model. And within like 15 minutes, roughly, it will have all of that data aggregated.

And this model that we're going to look at today, that's how all of this came about. Let me kind of zoom out and let you look at it a little bit. I did a kind of a polygonal area. And it's actually over in Mississippi. And I drew in this design road real quick to kind of-- demonstration purposes of the software. OK.

If you've ever been inside of InfraWorks, especially in the older InfraWorks releases, creating a design road is fairly easy. OK. There's been a lot of enhancements, however, to the design road process. Inside of InfraWorks 360, for example, if I want to come in here and just create a normal design road, I'm going to select it as a local road.

I'm going to select the sidewalk and green space. And I'm just going to hit real close to where these flags are that you see here I kind of gave myself. As you can see as I'm beginning to create this, based off of my design speed, it defines that radius of that curve for that PI that I just hit there.

If I were to increase that design speed, it would begin to increase my radius parameters, minimum curve tables. And that's all based off of the AASHTO design standards that are embedded within Civil 3D. OK. And it's that easy.

It's as easy as clicking just a few places where the PI might occur for your alignment. And then InfraWorks will input a 3D model of your design roadway here. And as you can see, it

automatically connected to the already existing design row that's in my model here.

And if you'll look closely, once it comes across a water source, it detects that and usually will not do any grading. And it automatically will put a bridge in there. Because my profile of my road essentially is draped over the existing surface, you obviously can't see that bridge.

But that's how easy and quick it is to create a design road in InfraWorks 360. OK. You also have some new features. If you kind of look at it from a profile perspective, you have some new grips that give you the ability to edit your profile graphically if you choose. I'll let it catch up.

Then you also have the ability to look at a profile view kind of similar to what you're used to and grabbing those PIs, and making those modifications, and then even adding additional PIs if you want to and stretching those vertical curves across up and down like that. And as you can see, where I'm moving this PI in this profile of view if you'll look in the model space, you can kind of see that PI moving up and down also. OK.

I'm going to take that one out. And then if you actually click out in the model, it will implement whatever changes you made to your profile view. OK. That's way too high. I didn't realize I was getting that high. Let me bring that down just a little bit.

The new thing though, however, with InfraWorks 360 is-- well, before I jump into that, I want to talk to you guys about stylizing these roads. A lot of people have asked me that have purchased InfraWorks 360, well, how do I make this more realistic? Because a lot of people will either do, like, divided highways, or they'll have five lane highways, things like that.

And they wanted to know if there was a way to stylize the roadways inside of InfraWorks that would make it look a little more realistic. And so I started kind of playing around with some ideas that I had. And I came up with a few workflows that I wanted to show you guys today.

OK. My first one is I made a divided highway. I took the conventional divided highway style inside of InfraWorks 360. And I modified it so that it would look more real, I guess, realistic, have some more striking characteristics, things like that you're not used to seeing. As you can see here, you have a yellow stripe for the inside of your corridor and the white stripes on the outside.

I created those two as just essentially emergency lanes that are about four inches wide. And

then I colorized them and things like that. So that was kind of the creative way to produce striping. The dash skips that you see in the middle, those are produced by InfraWorks automatically, because I've told it that I have two lanes forward and two lanes backwards. OK.

And I added those two to me median group there along with my shoulder and grassy areas to produce a divided highway style that looks fairly accurate. The dimensions are dimensions that I'm used to using on several projects that I've used in the past for my roadway. But as you can see, it's just basically width dimensions, right?

I don't have a whole lot of slopes or anything like that. I can add some three-dimensional characteristics to it. But for now, I'm just going to leave it the way it is now. I can then take that style once it's created and just drag and drop it on my roadway. And it'll instantly change that style into that divided highway.

Another style that I'm used to using that I wanted to show you guys also is similar to the divided highway, but it's a four lane highway with a median turn lane. I was able to produce the same striping methods for the solid stripe there as well as the solid white stripe, solid yellow, solid white stripe, in the same way that I made that divided highway. However, the skips in the center was a little bit more challenging I guess you could say.

So I made the two striping groups here in the median group.

And I played around with a lot of ideas, and I found one that seemed to work for me. What I actually ended up doing was I came over here to decorations. I grabbed a 3D cube, and I placed it into my median bucket for my striping.

And then I just basically spaced it, offset it, and then down here at the bottom, scaled it. So that flattened it, and stretched it out, and made it a stripe essentially. And all it is is just a 3D model that I just squished until it was almost perfectly flat and a stripe. OK.

So that was another style that I created myself to kind of help some customers that were beginning to adopt this software. And I wanted to kind of show that to you guys. And if you've ever struggled with wanted to create stripes, there's at least two creative ways to do that if you're already using the software or if you've looked at the software and you didn't think it was realistic enough for your conceptual design needs.

And then it's the same way. I can grab that and throw it on this road design here. And it'll stylize it. What's really awesome is that the striping works really well with each other in that it

transitions.

And then also any additional lanes-- for example, if I hit this intersection, and I used the new feature to add a center turn lane, it'll react with this striping as well and begin to push it out. And if it works, we'll change it. It's not perfect 100% of the time. But it's a lot better than just having nothing there.

So this is also a new feature right here, adding these center turn lanes. If you guys are use to using Civil 3D in creating your own subassemblies or even creating some custom subassemblies, things like that, this style editor is kind of similar to that in creating your own assemblies, like whole assemblies already prepackaged. The difference is there's a new feature that's come out that's called a component roadway, which we're fixing to get into, that actually is very, very similar to creating your own subassemblies inside of Civil 3D.

Move down here. All right. So I'm going to convert this new road that I put in here into a component roadway. And if you've never used a component roadway, essentially you have the options over here. I'll just show you these contacts cards to grab your own assemblies and apply them along your alignment at certain station ranges or from one end of the alignment to the other.

OK. You can piece together whatever kind of assembly you want. And in certain portions, I'm going to grab just the regular two lane assembly and convert it. And if I zoom in here, you can see it's just two lanes of asphalt.

I have the ability to select each lane. And I also have the ability to make modifications to its width as well as it's slope. If I look over here, it also is about 8 inches in depth for that asphalt. And if I want to add any additional components to this, I just simply right click the main alignment, and hit Insert Components.

I also have the same ability to place decorations, things of that nature, along it. And then I have now a new ability to create my own assemblies or groupings of different parts of the roadway. And we're going to kind of look at that.

First, I'm going to turn on some of these options over here. And then I'm going to show you guys an assembly that I made earlier. So this is a full road assembly here that I made on a previous job.

I'm just going to replace that along that portion of the roadway. As you can see here, it looks very similar to what I created. I tried to do the striping thing similarly to what I did with just the regular design roads by just placing an assembly in there that is 4 inches wide with a yellow material, the same thing.

It looks kind of similar. It had some issues right there trying to tie into that basic design road being a component roadway. But as you can see here, I have the option to change my widths and my slopes of all of these different subassembly type parts in InfraWorks 360 now OK. And I also was able to place these decorations as well. OK.

Some other new functionality as a part of road design inside of InfraWorks 360 is the ability to super elevate your roadways. If I come over here and I turn on the super elevation under Attributes, it looks at my design speed and uses my design standards to determine the super elevation attainment stations along my corridor. OK. I have also the ability to set a max super elevation rate as well as my run off for my tangent.

Right now, it's set at 70%. I'm just going to leave it there for now. But then I also have the ability to look at these in kind of a cross-sectional view, which is something that was kind of just released.

I got my profile a little wild on this design road here. And as you can see here, it shows me the assembly. And if I look at that attainment station right there, it's showing me what each of link in the subassemblies that make up that whole assembly are doing.

And if I kind of grab this and I kind of drag it along my alignment, you can kind of see it following the attainment of the super elevation right here, which is something that I thought was really neat that's brand new. This just was released a couple of months ago as a part of InfraWorks 360. You can also see the cut and fill areas.

And then if you come over here to this far right portion, you can kind of see it gives you a kind of a fill square foot. OK. So the cross-sectional view is kind of making it more similar to what we're used to seeing inside a Civil 3D. And to do a little bit more detailed design work for our corridors inside of InfraWorks 360.

Next, I wanted to show you guys some cut and fill scenarios. And I'm going to kind of switch over real quick to a completed portion of this where I did a lot of work on this, what it looked like. Keep that engineering [INAUDIBLE].

If I select on this component roadway, I have this right over here at the bottom. It says Cut and Fill. If I hit that and I hit the Play button, it'll calculate some quantities for the entire roadway. OK. And then I can give some basic earthwork quantities for cut and fill. In this particular roads case, I got a net fill of quite a few cubic yards.

I can also produce a cut and fill report that's in the CSV. And it gives me, at frequency of my choosing, a cumulative volume along my roadway at each station. And then also I can set that. And right now, I have it set at every 50 feet.

And I can kind of get some preliminary cut and fill volumetrics for my roadway. OK. And right now I've just got it on a 3 to 1 tie for a cut and fill slope, which is very basic. You can't really do any benching or creating a whole lot of ditches and things like that inside of InfraWorks yet.

For preliminary purposes, it gives you some pretty awesome amounts of information now for you corridor. As you can see here, I've also pieced together a bridge portion for this component roadway. They've added some enhancements to that.

Not only can you see it also with a cross-sectional viewer, you can piece together your roadway along your bridge in the same way you do your main highway. OK. I've elected to do just a normal bridge and accepted all the defaults that I got and added this Jersey wall here on the side. And there's some new things that have come inside of InfraWorks 360 for bridges as well. OK.

The first one being that you can send these directly to Revit. And what that will do is that will essentially create all the Revit families for the bridge itself. So you can do some detailed structural design work for your bridge work.

You also can get some preliminary quantities of your bridge. So if right click and I hit those quantities, it will show me some information for my pre-cast, CIP, my steel in tons for the structural and if there was any for reinforcing for the bridge, the superstructure, substructure, and anything that I may have selected. Also, some additional things for those of you that have never really been inside of InfraWorks.

They've opened up and advanced over this last year, this the last several quarters of releases, a lot of the ability to modify the geometry of your bridge in a lot of aspects. How many of you guys have used bridge model inside of Civil 3D? Used that some? OK.

It's very similar to that. Or, it reminds me a lot of that anyway. And then we also have the option of bringing these bridges that we created in InfraWorks over into Civil 3D. So if you have to do some collaboration with a structural engineer, I know I realize a lot of you guys are probably just doing corridor engineering. You're not doing a whole lot of structural design.

But if you have to collaborate, this is a good place for both of you to kind of get started on what the bridge might look like. It'll give you an object instead of just either not having cross-sections or just having a big X there. I've seen some people do that. You'd actually have an object that looks very similar to maybe what you might end up with unless you do something really custom or awesome inside of Revit or whatever.

You have also the ability to modify the piers, their caps, and the other associated geometry. You have some new ability to modify the foundations and to add piling or take it away. I had one customer that they said out in Oklahoma they don't actually put any piling down for a lot of the bridges that they design. And they wanted to know if there's a way to get rid of that.

And at first, there wasn't. There wasn't a whole lot of really editing capabilities to the bridges. And now, they've enhanced it a lot here recently, giving you a lot of ability to make some pretty awesome bridge designs as well.

Another awesome thing that they've added or enhanced inside of InfraWorks 360 was-- let me go to my water shed here. You've been having the ability-- I have my watershed turned off with my streams to automatically add a lot of drainage structures to your corridor designs. OK. That happens by just selecting your corridor, coming over to drainage.

And you either size your drainage network after you've created a watershed analysis or add culverts. OK. So I'm going to turn my watershed on real fast. Oh, it is on. I wonder why I can't see it. Maybe I got rid of it by accident. Let me see if its this proposal. Yeah.

So this is the watershed analysis that InfraWorks 360 did. To get to it, you come over here to the drainage module. You hit this first button right here. And you hit Create Watershed.

The first thing it's going to tell you is that it's a cloud service. You have the option to select a design road or to select an outlet point. What I did was just select an outlet point after doing like a terrain analysis.

And then it created that. It does require, in some cases, using Cloud Credits. I haven't ran into very many of those. But it did also create these little black streams that you see here. Those

little black streams that it's calling streams that are part of the watershed is what InfraWorks 360 uses to create your culverts and automatically size them according to your CFS data and your watershed information.

I'm going to select on this triple barrel one here that I made. When you select a culvert in InfraWorks 360, it produces like this hologram projected up of the culvert itself showing you the head water and tail water condition of the culvert as well as kind of give you a profile of the water itself. And on the right hand side here, you can see show analysis.

My flow, I kind of set it at about 90 CFS, just putting a number in there. And then what's also awesome is the ability to create a quick culvert report kind of looking at the geometry behind this analysis that was created here. So you hydrology engineers that have to do a lot of culvert analysis, this could be handy for preliminary purposes.

And the same thing occurred here for my double barrel culvert as well. I think I put just 75 in here just to display the water and to show an analysis. All I essentially did, it came in as just a circular singular box.

All I essentially did was modified and said, I wanted two barrels. I want it to be a box culvert. And then it was already set to concrete. You have some corrugated metal that you make. Can actually set the Mannings in yourself as well as set the inlet configuration for your culverts. And also, you have a crown critical normal and user defined for your tail water conditions.

They've also added the ability to-- I showed you earlier-- create pipe networks, do a sides drainage networks and add those to your road design. And they also enhanced it by adding offsides pipe networks going away from a road design. That was about it for hydrology.

Let me go to this real quick. And let's look at some of the new functionality. How many of you guys have used vehicle tracking inside of Civil 3D. OK. If you've used vehicle tracking, you're familiar with the roundabout functionality and feature that's inside of it.

What most people love about the roundabout inside of vehicle tracking is that it also produces a Civil 3D corridor as a part of that design. Well, the same design standards that are created and used inside a vehicle tracking for your roundabout is also used inside of InfraWorks 360 here. As you can see, it's the Federal Highway Administration 2010 roll on urban single, double, and even triple lane roundabouts. And there's even, I think, a roundabout mini.

That stuff's been fairly recent. I think last year, maybe the first part of this year, that stuff had first implemented. What is new is the ability to graphically manipulate some of these radii out of the center circles of the roundabout or even the junctions of the legs themselves, dragging where they blend with your actual corridor design. If you kind of rotate your view inside of InfraWorks, you can also see that you can tilt the tilting plane of the center of your roundabout and everything and how it's going to tie into your roadway as well. So that was the new feature enhancement with this latest release.

And with that, this is essentially the final design. I had a couple of bridges that I've put in here over these water features that this engineer had wanted. And we kind of went back and forth sizing those. And then I stylized them for him.

The only thing is is I have yet to see a way to create two separate bridges for a divided highway. So my solution to that was just to put this asphalt piece here, and then make the rest of it try to look as close to the original design as possible. And with 2017, InfraWorks 360 2017.2 and then Civil 3D, you have the ability to exchange the information back and forth.

I hit that wrong button. If I come over here to Data Sources, I can come in and bring an actual Civil 3D drawing into InfraWorks. But before I get into doing that, I'm going to show you guys what it looks like bringing that inside of Civil 3D.

I believe it was back in 2015. In your tool box, if you had a subscription, you were able to import IMX files and InfraWorks models. Well, now as of 2016, you've been able to actually open the model directly from inside of Civil 3D.

If I click on this and I select the actual SQL file itself, hit Open, it will recognize the coordinate system that my InfraWorks model is and that my current drawing is not set to any coordinates. So if I hit, just set one, I can use the one that's coming from the InfraWorks model. I guess I didn't set one. Hang on. Let me do that real fast.

Also, another thing to note, whatever proposal you end up with inside of your model and you close InfraWorks, that's the one that's going to open inside of Civil 3D. I thought I had one set here. And typically, I have to usually close it to get it to open that up. OK.

You have the ability also to kind of look at your objects and decide how you want those objects stylized when they are brought over. So if you bring a terrain surface, what kind of tin surface do you want it to look like when it comes over? The planning utilities and planning roads, those

are the GIS roads, essentially, that came over from Model Builder or ones that you brought in with your GIS data originally.

The design roads was that first road that I showed you guys, the divided highway and the four lane with a center turn lane. It'll also bring over the intersections, like Civil 3D intersections, for all the intersections inside of InfraWorks. It'll bring the drainage networks over as pipe networks.

And you can decide what catalog for the pipes, how they're going to be stylized, the manholes, and the inlets for the storm drainage. The water areas will come over and the coverages will come over as 3D polylines. The bridges are going to come over as 3D solids or 3D polymesh.

And then the roundabout's, again, going to come over very similar to the vehicle tracking roundabout. OK. If you hit Refined Selection Set-- this might take it a second. Within the Refined Selection Set, you have the choice of selecting any information that's in your InfraWorks 360 model.

So, for example, if you maybe don't want these two design roads or some of the, maybe, planning roads come over, you can decide that. In this particular case, I'm just going to select everything. And I'm going hit Open Model.

As you can see, it brought my alignments over for my design corridors. If I look right here, I can see that this is an actual Civil 3D intersection. And I can modify the intersection in the same way as any corridor.

The bridges came over as 3D solids. So I'm going to hit Object Viewer and kind of show you guys what those look like. And it's the abutments, the piers, the foundations, and the piling. OK. The only thing that did not come over with the decking and any information on the top portion of the roadway.

The surfaces that came over is my proposed surface, which is my corridor surfaces. Also, my existing ground surface as well as my existing transportation surfaces came over. So if there was any existing roadways and their surfaces, it came over as well.

Here is the vehicle tracking junction. I have vehicle tracking installed. So I'm able to see this as a vehicle tracking junction here. And for those of you not familiar with it, essentially this is what it looks like. You can create roundabouts and stylize them however you want to, adding any kind of geometry and design criteria for basically every part of the roundabout as well as

selecting 3D corridor, creating your alignments. And that's how you get your Civil 3D model.

A new enhancement-- if I come over here the Home tab inside of 2017 Civil 3D-- is under Intersections. When you hit Create Roundabout, it's the exact same functionality that's under the vehicle tracking. So you no longer have to have vehicle tracking necessarily to create a roundabout.

OK. But it's this same exact menus and options that you were used to if you've used vehicle tracking to create a roundabout in Civil 3D now. And again, it also created that corridor. Now, we'll note that the corridor-- that the roundabout corridor-- you'll have to go in and rename that.

But here are the assemblies. Generally, sometimes I'll get them to put it in. They'll put it in the far northeast most corner. Often, it doesn't. And so I'll just right click Remove, right click Insert, so I can look at the assemblies. And you are going to have to basically modify this to whatever your corridor design is.

But once you add your own subassemblies to it, and then you rebuild your corridor, then your roundabout's essentially done. You will also, however, if you do modify those subassemblies, have to go back, of course, and retarget everything for horizontal and vertical profiles inside of your corridor for your roundabout. But, essentially, it's a pretty easy process creating a roundabout in Civil 3D now, a lot easier than it used to be anyway.

AUDIENCE: [INAUDIBLE]

JOSEPH DUFF: No. They are not the same.

AUDIENCE: OK. So [INAUDIBLE]

JOSEPH DUFF: Yeah. That's right. Yeah. So if you create a certain type of roadway inside of InfraWorks, that does not necessarily mean you're going to be able to do the same thing inside of Civil 3D. Creating those 3D structures and assemblies inside of InfraWorks is a lot easier than creating the custom subassemblies in Civil 3D.

But that's all you'd have to essentially do is create your own custom subassembly that would match that same set of assemblies and assembly set inside of InfraWorks, which is what I've done for this particular project. OK. Now I've got some buns in the oven that I've pre-baked. I'm going to open up, if you will, kind of the project. There's still a little bit of work that needed

to be done on it, some

AUDIENCE: [INAUDIBLE]

JOSEPH DUFF: Yeah. So yeah, this object-- like, are you talking about the alignment?

AUDIENCE: Yeah, alignment.

JOSEPH DUFF: Yeah, the alignments, they are Civil 3D objects. When they come over here into Civil 3D, they're the same. And they behave in the exact same way that they've always had.

AUDIENCE: [INAUDIBLE] but you can customize it so that [INAUDIBLE] can put that [INAUDIBLE].

JOSEPH DUFF: In InfraWorks?

AUDIENCE: Yeah.

JOSEPH DUFF: It takes a little bit of effort to get the style absolutely correct on what you want. Creating those assemblies like what I showed you earlier where I had my own assembly and I applied it helps in that regard as far as being able to apply the same style to your corridor. InfraWorks essentially just was a conceptual design tool. Now, it's slowly moving over to becoming a detail designs tool. You just can't quite do the exact same detail design that you can do in Civil.

AUDIENCE: [INAUDIBLE]

JOSEPH DUFF: There's not a direct translation. You'll have to manually make those. So in this particular case, I created these. I had to manually create these corridors and add these regions and baselines as well as assemblies here. If I go over here to where my assemblies are, all it was is I just pieced together the assemblies I wanted that matched very closely to what I had inside of InfraWorks.

For example, I made a custom subassembly here with a barrier wall that had two layers of asphalt and a bridge deck under it and the same thing for this subassembly as well, so that I can match my InfraWorks model. Let me get that opened up here in just a second right here. Let me get to it.

Yeah. This right here has just basically my lane on top a bridge deck with just two barrier walls on both sides. And that's essentially what I was able to do inside of Civil 3D. Took me about, I'd say, about an hour, maybe hour and a half just to do that custom subassembly and get it

applied along my corridors correctly and everything like that.

What was really awesome, however, having this bridge in here, now when I go and I make some sample lines, I'm able to actually sample that 3D solid that's a part of my bridge and show that on my cross-sections. And I don't know if you guys know now as another enhancement to transportation inside of Civil 3D is you can now data shortcut corridors in the same way you have everything else, which allows me to essentially create a new drawing.

I can data shortcut my corridors and stylize them however I want to over there, which can be totally different than this original drawing as well as produce my cross-sections or sample line groups and all that stuff in a separate drawing, doesn't bog it down. If you've had to create a lot of corridors in one drawing and then also create cross-sections, that can get cumbersome. This as a workflow that now gives us the ability to separate that a little bit, so that our file size doesn't get quite so large.

I was going to show you guys that over here I created a quick profile view of that main roadway. county Road 8 right here is what I've been calling it. And it came over it right over the InfraWorks existing profile as well as my design profile that I actually designed inside of InfraWorks 360. And because I chose the styles that I'd already selected, when it came over here and I produced this profile view, it automatically added the labels and everything for me that I'd already had my label sets and everything from a profile.

It was already set up for me and everything automatically. So that really cuts down a lot of time, especially if you're using InfraWorks on the conceptual side to communicate with a customer or DOT. And then when you get ready to actually do detailed design work, you can quickly start applying those styles inside of Civil 3D. OK.

AUDIENCE: What type of drainage information would you bring in?

JOSEPH DUFF: The only thing-- I didn't create anything box culverts or any drainage structures and pipes. I didn't do a pipe network. That would come over.

However, if I had made one inside of InfraWorks, it would come over directly as a Civil 3D pipe network. I think. Maybe it wasn't this [INAUDIBLE]. Yeah, it shows me here though, however, where my pipes are. I could see it as part of the surface.

And I could begin to model that in the same way that I usually do that for Civil 3D. So I at least have my locations. And I have all that information that I did in that culvert analysis in

InfraWorks that I can just transfer essentially over and put that into Hydraflow Express inside of Civil 3D.

Some newer enhancements and additions to the Civil 3D 2017 that I wanted to also show you guys was if you come over here to Manage tab, you can reference styles from other drawings, which basically gives you the ability-- if I select this, I can add a template. Let me go grab one of my custom templates here. If I select this template, I can bring some of its styles over here.

And now that I've done that-- this is a company SWA-- I can use those same styles in there without actually having to directly import them into this drawing. OK. So now if I go to Surface Properties, I can see-- hang on. I've got to add them. It says loaded.

I don't know why those didn't come in. Basically, you would see them listed here. In this case, it would say SWA in front of it. And I could use that.

If you're a CAD manager or you have a CAD manager in your office, this gives them kind of easier control over your CAD standards, where they can basically directly make changes to the template itself. And then your users can just basically reference those in as opposed to having them directly in their drawing, especially if you don't want them to create those or have any kind of way to modify those styles.

Then you also have defined property datasets. This is kind of a fairly new thing. I believe in 2016, it was over here in the tool box. And now, it's been fully added to the [? riven. ?]

What this gives you the ability to do is to define, specifically, corridor property information. This is what I was wanting to talk to you guys about. You can define certain properties to certain types of corridor solids that you can produce. So I'm going to go ahead and quickly open up my corridor solids drawing that I made.

Once you have a corridor created, you just basically select it. And you can extract those solids out. What was really awesome about them is adding these custom properties. What I like to do is I added a custom property for volumetric purposes, and then also even pay out on purchases if I was wanting to do some construction management or basically some quantity take off for construction.

So [INAUDIBLE] pan here. Select this little shoulder solid that I created. And if I right click and I go to the AutoCAD properties of it, and then I go down here to extended data, I can see that it

added my custom property data set, my user-defined one. I showed it as asphalt times, construction phase, cubic yards, and gravel tons.

OK. The volumes that was already there, I believe that's cubic feet. And I created a property dataset, a formula, that basically defined that information for me. And then if I wanted to come over here, say, and add it to a different solid-- for example, this one right here-- under extended data, if you look right here, hit Add Property Data Sets. OK. And then it shows me that volumetric information, which can be useful in construction management.

You also have the ability when you create these custom property data sets to go over here to the style managers and create these as an automatic, which is what this volume means right here. And it's really easy. You just hit Add Automatic Property Definitions and things like that. And then you can define all this stuff and have it applied to your corridors as well as your corridor solids.

OK. I don't know if you guys make very many corridor solids. But these are great to take over to Navisworks manage. which is what I want to go look at it right now. Let me close my Civil 3D drawing [INAUDIBLE].

And as many of you know, Navisworks Manage is a good software to do construction phasing, coordination, and collaboration for civil projects. So I'm going to pin this drawing and bring it in.

AUDIENCE: [INAUDIBLE].

JOSEPH DUFF: IFC? Yeah.

AUDIENCE: [INAUDIBLE].

JOSEPH DUFF: Yes. IFC is a--

AUDIENCE: [INAUDIBLE].

JOSEPH DUFF: Yeah. That's a pretty standard format, I believe, in the building or architectural space. And I think Revit, InfraWorks, Civil 3D, and I'm pretty Navisworks will except all IFC, FBX, or you know. Looks like it was there.

AUDIENCE: [INAUDIBLE]

JOSEPH DUFF: Do what?

AUDIENCE: [INAUDIBLE]

JOSEPH DUFF: OK. And this is the shoulder that I added some user defined property data to. I sometimes forget which. I have to hold Shift and my mouse to orbit in the different softwares. So if I look at the User Defined tab over here, you can see that it's populated that over here in Navisworks.

OK. This was an AutoCAD architecture functionality that they added to Civil 3D giving you the ability to add these not just to civil objects. You can actually apply these to basic AutoCAD objects as well and not just corridors. And you can also decide in Civil 3D, you know, whether to apply it automatically or not.

OK. But as you can see here, opening it up inside of Navisworks main edge, I see that I have my volumetric information as well. OK. From there, I can go back to InfraWorks and begin to-- now, that I have my roadway completed, I can bring it all back in here and kind of use this as a means to kind of stage either collaborative projects with people. This is what the InfraWorks finish is.

I was able to bring it back in. Now, I will caution you. When you bring your Civil 3D design over and it's the same alignment, typically, I've had to just remove what's been there previously, and then just add this one back. So if I come over here to Data Sources and I hit this Drop Down menu and I select my Civil 3D drawing, I'm going to hit Open. And just look at what is available to come over back into InfraWorks 360 from Civil.

OK. Now, I have the ability to bring my roadways, which are more corridors over here, alignments, as well as my existing and proposed grounds. And then I can also bring what are called corridor coverages, which is essentially just the top portions, the top links, of your corridor design. And a coverage inside of InfraWorks 360, typically, it's just an area of land where you can do some terrain modification, things like that.

But it comes back over. If you choose just to bring these in as opposed to bringing your actual corridors in, it comes over as a coverage. And you can actually just stylize them by adding different materials to each individual portion, kind of similar in the same way that you would this component roadway. I just usually elect to bring my alignment over.

And We'll either apply my component roadway where I have created my own custom subassemblies as you can see right here. It says component custom, both of these. Or, if it's

just a regular design road that I've not pieced together and certainly not wanting to super elevate, I just grab that style I created that I showed you guys at the beginning. And

So this is kind of the completed design. I've used it. I've made some storyboards. I think I have one in this one maybe, yeah, where I just basically drove along the roadway at about 65 miles an hour, just so they could kind of see the design in context. For those of you who haven't seen InfraWorks 360 much, I've also put some lights in there, what it might look like once the project had actually gotten completed.

And I believe that it's going to end here in about 20 seconds right there at the roundabout. I kind of wish I'd have offset it a little more. I'm going to show you guys how to create these. It's really easy and real fast to create these. You just hit this little down arrow. And you hit Create From Design Road.

As soon as you select it, it asks you for a horizontal and vertical offset as well as if you want a target or look at something at a specific horizontal and vertical offset. You can set the design speed. If you put in 65, you could follow a path in reverse and also hit Preview.

I can export this. I can send it to the web. People can view. How many of you guys have iPads? I have an iPad. I like to go around and show people. Like, I'll put this model on there. And we can view them on iPads, things like that, and collaborate with others whether it's people trying to buy into the project, or you're trying to get buy in on the project, or it's an actual project owner.

So that pretty much wraps up most of my presentation, guys. After this is over, they're going to post this video online. And I'm also going to have detailed walk-throughs available in a PDF that you can download for the InfraWorks and the Civil 3D and the Navisworks workflows that I just kind of briefly showed you guys. Do you have any questions currently?

AUDIENCE: How are you dealing with [INAUDIBLE]?

JOSEPH DUFF: Say again?

AUDIENCE: [INAUDIBLE] is everything that gets downloaded is [INAUDIBLE] based, so it's all on a grid. But then construction [INAUDIBLE] and all that's on the ground.

JOSEPH DUFF: Yeah.

AUDIENCE: Can you [INAUDIBLE]?

JOSEPH DUFF: Typically, when you establish your state planning coordinate zone inside of Civil 3D and you bring that stuff over, that typically is an automatic conversion process. It should be converting it from grid to ground. If it's not, however, you can do a transformation of that data yourself if you wish.

AUDIENCE: Yeah. It's funky with elevations, though. [INAUDIBLE]

JOSEPH DUFF: Really?

AUDIENCE: Because grid to ground's easy, but that's y.

JOSEPH DUFF: Yeah. The z is what's causing issues? Typically, just establishing that coordinate zone in Civil has not been an issue for any of the projects that I've worked on in my regional area. I don't know if in other state plane coordinate zones that might actually be an issue or not. But in ours, it's not. I mean, the conversion process is seamless.

AUDIENCE: [INAUDIBLE].

JOSEPH DUFF: Rail? Yes. I don't typically show a whole lot of rail stuff. Because I don't know anybody that's actually doing all the design. And we don't have a lot of active projects in my area.

But, yes, they actually enhanced rail a lot, giving you the ability to create intersections, things like that, with rail. And also, tunnels for rail as well can be created. And the tunnel essentially will just poke straight through the terrain. You decide the profile of the tunnel and come out the other side, you know?

And you can design what the entrance and exit of that tunnel would look like. So, yeah, it'll do rail. It'll do spiral curves, things like that, for your alignments as well as circular curves.

AUDIENCE: [INAUDIBLE].

JOSEPH DUFF: Yeah.

AUDIENCE: [INAUDIBLE]

JOSEPH DUFF: Yes. It accounts for the real cant as well vertically.

AUDIENCE: [INAUDIBLE]?

JOSEPH DUFF: Yeah.

AUDIENCE: [INAUDIBLE]

JOSEPH DUFF: I don't know if-- are you talking about how many cross-ties and linear feet of rail? I don't think there's any quantity information like that coming from InfraWorks yet.

AUDIENCE: We have project [INAUDIBLE] using Civil 3D for making the [INAUDIBLE]. And we have a main [INAUDIBLE] building [INAUDIBLE]. So we bring in the [INAUDIBLE] section, which is made into a 3D [INAUDIBLE]. Do you have any recommendations how I can [INAUDIBLE]? Because the object that comes in is a solid. [INAUDIBLE] split into different sections, because it's a solid.

JOSEPH DUFF: Yeah.

AUDIENCE: So if possible, can you [INAUDIBLE] [? analysis ?] [INAUDIBLE]?

JOSEPH DUFF: Yeah.

AUDIENCE: Because the [INAUDIBLE].

JOSEPH DUFF: Say again?

AUDIENCE: The selection [? tree ?] in Navisworks Manage [INAUDIBLE] to see if the [INAUDIBLE] is split into all its different [INAUDIBLE].

JOSEPH DUFF: Are you talking about the shoulder of the lanes, the base, subgrade?

AUDIENCE: Yes.

JOSEPH DUFF: Yeah. It splits it up from the corridor based off of that subassembly information. Let me zoom, so you can see it. And they are separate solids themselves for the shoulders and the actual lanes for each layer of your subassembly.

And then, something else. If this solid were to have been created and put in the same drawing that my corridors existed in, then if I updated my corridor, it would update my solids, which if I had these appended here, would update Navisworks. So that might be an answer to your workflow of you have somebody using Revit, and then you're using Civil 3D. So you might create some solids and put them on a layer or something that you can turn on and off.

Because they're going to be created right exactly where your corridor exists. OK. And either turn your corridor off. Or, turn your solids off and on, you know, whatever. But if you make modifications to the corridor itself, it should modify your solids. That can be a dynamic link between the actual 3D solids and your Civil 3D corridor. Does that make sense?

AUDIENCE: Yeah.

JOSEPH DUFF: So that'll give you the intelligence on the Civil 3D side. It It's still a solid. But it's just dynamically linked to that corridor.

AUDIENCE: [INAUDIBLE] I think it's going to break it down to the level of subassembly used to create that [INAUDIBLE].

JOSEPH DUFF: Even smaller, it's using just the individual shapes within each subassembly.

AUDIENCE: [INAUDIBLE].

JOSEPH DUFF: Does that makes sense, everybody? So for example, in this road here, this was an entire subassembly what the subgrade, asphalt, and an asphalt shape. OK. That was one whole subassembly. And it broke it down into each individual shape, each becoming its own individual 3D solid.

AUDIENCE: [INAUDIBLE] selection [? here? ?]

JOSEPH DUFF: Where?

AUDIENCE: The [? selection ?] [INAUDIBLE].

JOSEPH DUFF: Do what now?

AUDIENCE: See the selection [INAUDIBLE] like a solid [INAUDIBLE]. So that's the highest level, and then next level.

JOSEPH DUFF: Yeah, that says zero. And then there are some barriers. Like, I told you guys I created a custom subassembly for my bridges and barriers here. And then the base is basically the gravel, the bridge deck that's underneath here. The datum and subbase, that's the subgrade pave one.

In some cases, it's called pave one top, and then pave two, which is the second layer of asphalt. It's each individual shape, though, that exists within those subassemblies. OK. If I go

back to Civil 3D, I'll show you.

OK. So as you can see here, this is a whole subassembly itself for the lane. And each of these shapes that are in here becomes its own solid that's being displayed. And you can select inside of Navisworks. Does that answer your question?

AUDIENCE: Is there any [INAUDIBLE]?

JOSEPH DUFF: No. There's no conditional [INAUDIBLE]. It's just either select a fixed slope or a fixed width.

AUDIENCE: [INAUDIBLE].

JOSEPH DUFF: Yeah. No. You just do a fixed slope or a fixed width. OK. Fixed width, you just go out so many feet. And then it tries to tie the surface. Fixed slope, you just pick like a 3 to 1 or a 4 to 1 cut and fill. And that's it. It's just a straight--

AUDIENCE: [INAUDIBLE]

JOSEPH DUFF: I'm not sure. I'm not sure-- because I don't actually work directly for Autodesk-- if I could comment on that. But it looks like they're heading that way. I mean, with that cross-sectional ability to look at a roadway inside of InfraWorks like what I showed you all here. Yeah. Right here, this right here, this is brand new. Like, it came out in August, you know, towards the end of August.

AUDIENCE: [INAUDIBLE].

JOSEPH DUFF: Yeah. Yeah. You're exactly right. We're already piecing them together similar to the ways we make subassemblies. And then this right here is giving us the ability to view every square centimeter of the project.

This is the actual road design that I ended up with right here. It looks a lot better. It's not quite as in the sky. It shows also the cut and fill areas, you know, and the super elevation.

So I don't know if they're heading that way or not for certain. But I have a feeling they are. They're headed towards a very [? BIM ?] product for Civil engineering.

So if you're not using InfraWorks 360, you should be talk yourself [? good ?] or talk to your bosses. Because it's getting extremely popular. There's a lot of people purchasing it and beginning to adopt it.

I've got about an even 50-50 split on the classes that I teach for Civil 3D. And I teach everything from beginning to advanced Civil. And I'm starting to do 50-50 now all my Civil classes, and now InfraWorks 360. And that's just been within the last like four months. Go ahead.

AUDIENCE: It's cool. What's the advantage of using [INAUDIBLE] and using it for [INAUDIBLE], instead of just doing it all in Civil 3D?

JOSEPH DUFF: That's right. Civil 3D, first of all, takes an expert CADs technician to either create the styles or create the models for your corridors. InfraWorks 360, you don't necessarily have to be super awesome. As you can see, it's--

AUDIENCE: Say you got all the stuff set up in Civil 3D already?

JOSEPH DUFF: Yeah.

AUDIENCE: [INAUDIBLE]

JOSEPH DUFF: Well, even then, for example, creating intersections or things like that, you have to understand and know the advanced abilities to target correctly. Because if you go through the intersection wizard and it messes up or it mistargets the profiles and alignments that it creates, you're going to have to have somebody that knows how to dig into that corridor and correct that.

With InfraWorks 360, you don't have that problem. Also, I mean, you click on something, and you want to change it. Hang on. It's just with a click of a button, I can go from a four way intersection into a roundabout, you know?

And then I can also produce multiple proposals for a project, for example, if I haven't quite settled on the design. So creating these proposals right here is just a matter of hitting Add, naming it, And I'm just going to call it PR2 whatever, and then just hitting OK.

And then everything that was in that proposal that I've already made is in this one. And now, all I got to do is grab it, select it, make the change. And it's different. And then I have the ability to switch back and forth pretty rapidly for a customer or a client of mine that's trying to make a decision.

I don't remember which one it was. I think it was this one. And then show them roundabout four way. See what I'm saying? So there's that.

And the ability to make changes to this geometry quickly and adapt to design changes is what makes InfraWorks a lot better, in my opinion, than creating and spending all those man hours up front especially in the conceptual stage of the project. A lot of people like to use this, create these conceptual designs, and try to win work. They're either bidding. Or, they're saying, hey, here's our ideas for all this stuff. And I mean, the amount of time is like what you can do for five minutes in InfraWorks might take you a whole day in Civil to produce. Go ahead.

AUDIENCE: That was going to be my comment that I ran a [INAUDIBLE] situation where we had intersection. And we had clients are [INAUDIBLE] he asked us to create two different options. So what I had to do is to design it on Civil 3D two different ways.

JOSEPH DUFF: Yup.

AUDIENCE: Then you have to put all the information into InfraWorks. Whereas, it took me a week to create both scenarios.

JOSEPH DUFF: And that was before you knew whether or not he was actually going to do the--

AUDIENCE: Right.

JOSEPH DUFF: Yeah. That's kind of my point is with InfraWorks, you don't have to spend quite as much man hours up on the front end of it. It's quick and efficient. And then now it's becoming extremely, extremely accurate in regards to you're actually creating these 3D models with the design criteria embedded inside of InfraWorks. So it's creating them based off the AASTHO 2011 design standards. Go ahead.

AUDIENCE: [INAUDIBLE] bridge, bridge [INAUDIBLE] [? search your ?] design. Can [INAUDIBLE] bridge [INAUDIBLE] design [INAUDIBLE] construction [INAUDIBLE].

JOSEPH DUFF: I'm not sure. Are you able to interact with Revit?

AUDIENCE: What?

JOSEPH DUFF: Can you interact with Revit with that software, the structural bridge design software?

AUDIENCE: [INAUDIBLE]

JOSEPH DUFF: If it's able to import a Revit model, then yes. I mean, it's kind of an indirect path. You might try to go to Revit first, and then see if it'll go into that Autodesk structural bridge design. That's

some fairly new software, isn't it, that just came out?

AUDIENCE: What?

JOSEPH DUFF: Autodesk's structural bridge design is fairly new.

AUDIENCE: [INAUDIBLE]

JOSEPH DUFF: Yeah.

AUDIENCE: I don't know [INAUDIBLE]

JOSEPH DUFF: I used it. Or, I looked at it. I don't even think we've got-- I work for an Autodesk reseller. And I don't even think we've got access or an entitlement to it yet. I looked at it. And it's very similar to that bridge model inside of Civil 3D. But I think you have some load calculations, things like that, that you can do in the structural bridge design.

AUDIENCE: [INAUDIBLE] you said that InfraWorks can do the cross-sections. When you transfer over [INAUDIBLE] Civil 3D, we need to create cross-sections there. How does that handle, say, bridges and, you know, the [? subsections ?] within the [INAUDIBLE] within a solid?

JOSEPH DUFF: So these aren't going over to Civil 3D. For example, this road's not going to be-- essentially, the only thing of part of this roadway that's going over to Civil 3D from InfraWorks is its alignment and the 3D solids that you saw. I had to actually model these corridors in the same way that I model my Civil 3D corridors.

But a lot of the design process was done when I got over here. The alignment was settled. The design profile was settled. All I had to do was create the assemblies, build the model, right?

AUDIENCE: Based on [INAUDIBLE]?

JOSEPH DUFF: Exactly.

AUDIENCE: OK.

JOSEPH DUFF: So that's what I'm saying. Yeah, I came over here. And I created-- for example, this assembly here is just, again, bridge deck with a custom subassembly that I made for this barrier wall to look just like, if not almost identical, to the bridge decking right here.

AUDIENCE: OK.

JOSEPH DUFF: You see what I'm saying?

AUDIENCE: Yeah.

JOSEPH DUFF: The only thing is is I don't think I put this green space in there, which I think I wanted to get rid of that out of here anyway. But yeah, I just basically created my own barrier subassembly. And then I created just a basic plane.

So that way when I modeled these in Civil 3D, I was able to actually put a bridge deck and roadway on top of the 3D solids that came from InfraWorks. So this came from InfraWorks. But the only thing is is it's not capturing that deck that was on top of these girders right here as well as whatever pavement structure I decided to do. So it just brings the girders, the piers, and the foundations and steel piling over as opposed to--

AUDIENCE: [INAUDIBLE] cross-section in Civil 3D in that section, what's it going to show?

JOSEPH DUFF: The 3D solid. Let me show you.

AUDIENCE: [INAUDIBLE] solid.

JOSEPH DUFF: Yeah. Let me sample it real quick.

AUDIENCE: Yeah.

JOSEPH DUFF: Oh, I can't remember the name of this road. It's this one. OK. I definitely want the existing surface, that roadway. I'm just going to create one. Hang on just a second. Let me create a cross-section real fast.

OK. So that's my assembly. But then what I have to do now is I have to come over here, and I can select that and hit Project Objects to View.

AUDIENCE: Oh, OK.

JOSEPH DUFF: And it says Select Objects to Add. And then I can add these--

AUDIENCE: Solid.

JOSEPH DUFF: --3D solid. OK. And I'm just going to keep everything selected accepting what shows up there. And it should slice that 3D solid most cases and show it like that. You see what I'm saying?

Now, you can go through there and just pick certain things to show. But it's basically projecting that 3D solid onto this cross-sectional view right here.

AUDIENCE: Like, right now, it's showing every--

JOSEPH DUFF: Every single girder. Yeah. The entire bridge, right.

AUDIENCE: [INAUDIBLE].

JOSEPH DUFF: Yeah. You can find tune it and only put them at certain caps or piers, if you will, and just show that cross-section there and that's. But it is a 3D object in your cross-section view. Does that make sense?

AUDIENCE: Yeah.

JOSEPH DUFF: Go ahead.

AUDIENCE: If I have a more accurate existing surface, can I import that [INAUDIBLE] certain place [INAUDIBLE]?

JOSEPH DUFF: Yeah.

AUDIENCE: [INAUDIBLE]

JOSEPH DUFF: Yeah. Everything will change. Everything will update intelligently. You just come over here to your data sources. And you add that either from a Civil 3D drawing if you have it over there. Or, you can bring in a LandXML, shape file, however you have the data. I typically will just do it directly from my drawing.

Because what's awesome about doing it from your drawing is-- I don't think I have anything over here right now. Nope. Once it's placed over here in your data sources, it creates a dynamic link to that actual DWG. Meaning, if I bring this roadway over here from my Civil 3D drawing itself-- so I just pressed OK, accepted everything that was going to come over. OK.

For this right here where it says Roads, that's basically my alignments inside my Civil-- if I modify that alignment in Civil 3D, and then I come over here and I refresh this data source, it changes it in InfraWorks. It keeps that dynamic relationship. The same with the trains. If I modify the train in Civil 3D, and then I come over here and refresh my data source, it modifies

it in InfraWorks 360.

So yeah, they're pretty married to each other. That's why I'm saying you can bring them full circle. It originally was used when it was Infrastructure Remodeler, and then first became InfraWorks. It was just basically marketed as a conceptual design tool.

And now, what I tell people is is it's becoming more and more detailed design. But you can actually use it throughout the entire life cycle of every project. Another thing that I use it for, these data sources over here, there's a lot over here in InfraWorks 360, for example, a .img file that might contain a large surface, say up to a gigabyte worth of surface.

InfraWorks does an awesome job bringing a .img file over as well as processing it and creating a terrain surface for me. I can then cut out just a very small piece, portion, of that almost 2 gigabyte surface that I've done before and export that and send it to a Civil. OK. First thing, Civil won't open an IMG file. There's no way to import that into Civil 3D.

Second, think about trying to process a 3 gigabyte surface in Civil 3D. It'd be a nightmare, right? Well, with InfraWorks, I just dropped it in there. An about 3 minutes later, I had an entire terrain. So it's a good data processor as well for things. I use it as a filter before I send it over. Go ahead.

AUDIENCE: So in the beginning you used a [? to create ?] a model running USGS data [INAUDIBLE]. How does it handle, say, the existing bridges and thoroughfares, like overhangs and that kind of thing? We use [INAUDIBLE]. We have [INAUDIBLE]. But it's [INAUDIBLE] so if it's 5' 3", a bridge is [INAUDIBLE] it's jagged. [INAUDIBLE] some sections where it dips. So [? I'm wondering ?] how InfraWorks imports the USGS that [? way? ?]

JOSEPH DUFF: So the USGS data is just simply at a [? 10 ?] or a DEM. Any objects like a bridge or anything going over like you're talking about would come from another data source of GIS types. OK. Generally, for bridges though, which you spoke to that's coming in from a GIS source, sometimes you have to go in there and modify the existing profiles or get it to snap to the correct elevations. Because they kind of come in flat and draped over the existing terrain.

OK. You basically have to go in there and tell it to stop doing that and pop it up to the existing elevations. OK. But it's either a an InfraWorks module bridge that's similar to the city furniture, like you'd create over here. Or, you can convert it over to design road, and it becomes an InfraWorks 360 design bridge. OK. Yeah. And then just stylize it essentially however you want.

Go ahead.

AUDIENCE: [INAUDIBLE] flood extensions [INAUDIBLE].

JOSEPH DUFF: Flood extension?

AUDIENCE: Water [INAUDIBLE]

JOSEPH DUFF: Yeah. There is a river simulation--

AUDIENCE: [INAUDIBLE]

JOSEPH DUFF: --that you can get for InfraWorks 360. I don't think it's been fully implemented yet. But it's kind of like a third party labs or a beta thing that you can do basically a 3D visualization of a--

AUDIENCE: Can we export-- [INAUDIBLE]

JOSEPH DUFF: As a terrain surface?

AUDIENCE: Yes. Because it uses uses in cross-sections [INAUDIBLE].

JOSEPH DUFF: Right. I'm not sure. I don't think it can export. If you were going to be doing that, I would imagine it would be a HEC-RAS model. Like, this right here is the river and flood module within Civil 3D. Is that what you use?

AUDIENCE: [INAUDIBLE] easy you can see [INAUDIBLE] modules hard to use actually.

JOSEPH DUFF: Yeah.

AUDIENCE: [INAUDIBLE].

JOSEPH DUFF: Right. I don't know if it'll create those for that flood, if it'll create any 50, 100, 500 year flood plain maps if those will actually be surfaces. I don't think it does that. But the river and flood module in Civil 3D makes those pretty easily and efficiently. Are using just the HEC-RAS software?

AUDIENCE: I use the [INAUDIBLE] I use.

JOSEPH DUFF: Oh, OK.

AUDIENCE: [INAUDIBLE] but if I [? write ?] these [INAUDIBLE] solution [INAUDIBLE] solutions [INAUDIBLE]

organize [INAUDIBLE].

JOSEPH DUFF: Yeah. It's a 3D--

AUDIENCE: No, not 3D.

JOSEPH DUFF: --simulation.

AUDIENCE: [INAUDIBLE] can go [INAUDIBLE].

JOSEPH DUFF: Oh, yeah.

AUDIENCE: [INAUDIBLE] cross-section my cross-section and [INAUDIBLE].

JOSEPH DUFF: That's right.

AUDIENCE: But OK, we can use this. But OK, I [INAUDIBLE] if I export it as a [INAUDIBLE], OK. I can create a cross-section [INAUDIBLE] I will [INAUDIBLE]--

JOSEPH DUFF: Right. The water areas?

AUDIENCE: Yes.

JOSEPH DUFF: I mean, that's something you may-- I mean, there's opportunity here, obviously, at AU to talk to the development team and things like that. If you go to the InfraWorks booth, there's [? John ?] [? Sayer, ?] James Wedding, the [? Bartle ?] brothers in the exhibit halls out there. Those guys are pretty awesome guys with InfraWorks 360.

I know them all personally. They're really, really amazing. If you're not already on the civilemersion.typepad.com, things like that, they have a lot of InfraWorks 360 workflows as well as Civil 3D workflows that they do once a week.

That's about it, guys. We only have like 9 minutes left in the class. OK. They wanted us to kind of talk to you guys about giving some feedback. The survey helps me as an instructor.

I told some of you guys before the class started, this is my first time to AU. This is my first time to teach at AU. And it's also my first time to Vegas. So I'm kind of loving it.

I do this a lot. I do a lot of demos. I do a lot of instructing in front of people. OK. And I love reading feedback. Sometimes I've gotten awesome feedback. Sometimes I've gotten really terrible feedback. But it's helped me grow as an instructor and ACI.

And then also the Answer Bar, if some of the questions didn't quite get answered to your liking or you end up having more, those are available. OK. There's developers, testers, and support engineers that are over there from Autodesk. OK. And these guys handle the software directly. So thanks for coming.

[APPLAUSE]