MATT DILLON: All right, so we'll go ahead and get started. Thank you for coming. I'm Matt Dillon. And I am the AETG Western Team Leader with Applied Software. So let me explain that title a little bit. What that actually stands for is-- I got to take a big breath here-- Architecture and Engineering Technology Group Western Team Leader.

Has anybody been in any of my classes in the past? So I used to be with a company called D.C. CADD, which we renamed ourselves to Inceptia. And I was the Vice President of Technical Services for several years. And about a little over a year ago, we merged with Applied Software. They were bigger than us, so I couldn't be a vice president anymore. And I guess they thought by giving me a longer title, it would make up for it. I really didn't care as long they don't mess with my salary. So that's fine.

I've been doing this for a while, for almost 30 years now. And I'm a certified instructor. Does anybody remember a program called Architectural Desktop? Yes, I know you do. So I coauthored a book on that with Paul Aubin several years ago. And we're still good friends. Been presenting out here at AU since 2000. Of course, I don't do much with Architectural Desktop anymore. Nobody does. Is anybody here still using it? OK. That's fine.

But I've been primarily working with Revit since about 2004, 2005 was when I started transitioning over along with my customers. How many people in here are brand new to Revit? OK. How many have you been using Revit for three years or more? So most of you. OK. All right, good.

So this is not an advanced class. I wouldn't consider detailing to be an advanced topic, although I do know people that have been using Revit for quite some time that don't do their detailing in Revit for various reasons. Which hopefully, if you're one of those, I'll convince you to start doing your detailing in Revit today. I guess you would call this an intermediate. I think that's what I listed it as in the class summary or whatever. It's always kind of hard for me to judge, is it beginner or is it intermediate. Because if you're a beginner, and you've never touched it before, well then it's intermediate, but if you already have done it, it's kind of neither here nor there.

But basically what this class is going to focus on is the process of doing a hybrid Revit detail. Now, I'm gonna throw some other stuff in there as well. So we're going to talk about standard

detail libraries on the back end of this, what do you do with all those AutoCAD details that you have that you might still want to use. But the main thing I want to be talking about is how do you utilize the model to the best of your ability, and what's good about the model to build a detail that is kind of part 3D and part 2D. OK? And there's quite a bit that goes with that.

Main things we're gonna talk about is, first off what do you want to model, what do you not want to model. That's a big part of this, is what's important to model and what can you kind of represent some other way.

And then once you've determined that, then how do you get that detail view to look the way you want? Both the view itself, and then the model geometry that's in the view. Because something that might look OK at 1/8 of an inch equals a foot, when you get it to an inch equals a foot, or inch and a 1/2 equals a foot, you start seeing all kinds of warts in the model, right? And how do you fix those, how do you make them look correct without spending all kinds of time on it?

And then we're going to talk about a lot of the 2D drafting tools that you're going to use to fill out the detail, and add the embellishments you need to make it a viable mechanism for communicating your design. We'll talk about keynotes, we'll talk about detail components, detail lines, fill regions, all kinds of stuff. And then what's not listed on here, again I am going to talk about how do you build a library of just plain standard 2D details. There's still a place for that in Revit. You don't have to do everything on the model. I mean, how many different ways are there to detail a doorjamb, for example? So you still have a need for those standard details, and how do you build those libraries and manage them? So we'll talk about that as well.

So there's really several different options for doing details in Revit. The first one is 2D only. I mean, you can pull up a drafting view and just start drawing in 2D, right? A lot of people do that. That's fine.

How many people do this? Yeah, don't do that. We'll talk more about this later. So if I can convince those of you that are doing this now to stop doing this, then I've accomplished my mission, OK? We'll talk about how you get those AutoCAD details converted to Revit on the back end here, but I really cannot stress enough how important it is to try to avoid doing that. OK, that just gives me hives to think about it.

There's a couple of things wrong with importing AutoCAD geometry into Revit. First off, it's not

native Revit geometry and Revit has to expend more resources to manage and display that geometry than it does with regular Revit geometry. And if you've ever noticed, if you start importing a lot of drawing files into your Revit project, it starts to slow down, and that's why. The other thing is, how many here have used AutoCAD for more than a week? Have you never had a corrupt drawing file? Right? So DWG is really not the most stable file format. It's been around for years, but we get corruption all the time.

And there's a variety of reasons for that. Some of them are our fault, the way we use it, but some of it just happens. And so if you've got corruption in a drawing file, you may not know it, but it's there. And if you're importing it into Revit, you're bringing that corruption into Revit it as well. It's just not considered a good practice. And there's actually a model performance technical note that Autodesk puts out-- you can do a Google search on it-- and one of the things it says that you shouldn't do is import AutoCAD geometry into a Rivet project. So it's not me, Autodesk will tell you the same thing.

What we're going to talk about is this one here. We re gonna about a hybrid model in 2-D based detail, and we'll come back and revisit the other two. So the hybrid detailed process-- you can kind of break it down like this, and you don't necessarily have to go in this order. But the first thing you want to do is again determine what are you going to model, and you're going to base that on the scale of your overall floor plan. It's kind of the first litmus test I use. We'll talk more about this in a second. And then after that, we look at a kind of return on investment type of thing. You don't have to go into a real deep analysis, but that's kind of what it amounts to.

The next step is to then modify the view property, say for this call out here, to turn off unwanted geometry. And by that I mean geometry that, while it may be correct, doesn't really lend itself to communicating the detail, and might actually confuse the issue a little bit. OK? That's fairly simple. We'll talk about that.

The third one is the one that usually trips people up. This is why people wind up importing things from AutoCAD, at least in my experiences. They get to this point where, OK there are things in this model that just aren't right. I mean, what's that? What's that brick behind that soldier course? So how do I get things like that to display Correctly. in this view? So we're gonna talk about that. And then finally add the 2D geometry and other types of embellishments to finish out the detail.

So a lot of these tools that I'm gonna be showing you admittedly are a little bit kludgy. I remember when I first started teaching AutoCAD, and there was this guy that I had worked with years before. He was one of these guys that could just detail all day long, just beautiful hand-drawn details. And when he had to learn AutoCAD, you know he was like, oh God I could do this 10 times faster by hand, I could just detail so much better. And you know, eventually he learned. And it was about 10 or 15 years later, he came to take a Revit class. And there we were, I was teaching him how to detail in Revit, and his comment then was, God if I could just do this in AutoCAD, It'd be so much faster.

They are a little bit kludgy The thing you need to remember is, if you're using this method to do your details, once you figure out how to use these tools, your detail is half drawn for you. Right, once you learn how to use these tools, yes some of them are a little bit kludgy, but your details are already half drawn for you for using it off the model. Just takes a little discipline, and a little getting used to, some practice.

So let's talk about how to determine what to model, and what not to model. So level of detail. The first thing again I look at is what is the scale of my overall plan. So if my overall plan is, say, 1/8 equals a foot, if I would see it at 1/8 inch equals a foot, I'm going to model it, for the most part. I mean, there's a few exceptions, like I might not model floor drains on a floor plan. But most things, if I see them at 1/8 inch equals a foot they're going to be modeled.

But then we get beyond that, then I kind of need to do that return on investment analysis. So the first question is, do you need to visualize it? Do you need to render it? So if you want to show it in a rendering, either in Revit or in Max, it's got to be modeled. If it's not modeled, you can't render it, right? So that's your first criteria.

Second criteria is if you need to have it in a schedule. There are a few exceptions, there are some things that we can schedule in Revit that don't have to exist, like door hardware. You can do a key schedule that will schedule hardware that doesn't really exist in the model. But by and large, most things have to exist in the model in order to be in a schedule, right, so if you have to quantify it, you're probably going to have to model it.

But once you get beyond those then you start looking at, well OK, do I have the skills to model this? How hard is it going to be to model? What's it gonna do to my model? Is it going to make the file size go up, is it gonna impact performance? And then how many views am I gonna see it in? I mean, if it's gonna take me an hour to model this thing, and I'm only gonna see it in one

view, do I really need to model it? So again, do that return on investment.

That's a decision that will constantly be changing as your ability to model with Revit grow. And has the software's capabilities get better, that decision will change. Give you an example, I used to not model brick lugs until I saw that little trick about how to edit a wall type to have the-- the base offset, and then you had the-- I forget what the term is, but you can pull parts of the wall even down even further, so you can actually model a brick lug. It took me a little while to figure that out, so until I figure that out, I didn't model it. I represented it another way.

Once you've figured out what to model, then we start the actual process. So the first step is relatively simple. It really involves just a couple of tools, visibility graphic overrides, and then this one, which is to change the far clip settings. This is real simple, this is a standard that I just do. Anytime I set up a call out view, especially a section call out, I'm going to change the far clip settings. So here, and I'll do this in a second. By default, when you create a call out view of a section, the far clip settings, the depth that that view is looking into the model, is the exact same depth as the section, its parent view that it came from.

So if we do a call out in a building section that might be looking 100 feet into the building, well your resulting detail view is going to be looking 100 feet into the building as well. And so you wind up with things like, well that I could turn off by turning off plumbing fixtures. But that right there is actually a suite that represents a lentil. And so I don't want to turn off suites because then I'm gonna lose this. But this is kind of beyond, it doesn't lend itself to the detail at all. So by just changing my far clip settings to only look like 6 inches into the model away from the cut plane, I lose all that.

So let me show you an example. So to create a couple of call out views. Oh, and just a minor thing, it's not a huge deal but try to remember. One of the things, whenever I teach Revit to brand new users, I always tell them there's three places to look whenever you're creating or modifying geometry in Revit, the ribbon, the Options bar, and the properties pallet. And I keep repeating that, and it takes about three or four days for people to really get it.

But in this case, when I go to create this call out, notice right here it's going to want to do it as a building section. Now it a perfectly valid call out, I can still do my detail in it, but it's going to not be really where I want it to be over here in the project browser. So if I simply change the type of it on the fly here to detail, it's still a section, but it's a detail section. So I'll go ahead and place my first call out there, and I'll do another one, again it's got to be a detail view, I'll do

another one over here, pull it down a little bit.

So if we go to this detail, which is now showing up over here instead of under sections. It's now showing up under detail views. If I go to that one, go ahead and change the scale. So here's an issue, I don't really need to see this parapet cap beyond, right? Doesn't lend itself to the detail at all, might even be a little bit confusing. But I certainly can't hide that object in the view, which I really don't like hiding elements in view, but I don't use visibility graphic overrides either, because I'm going to lose this piece here as well.

But instead, if I go over here to view properties, and simply change the far clip settings to independent, and then again I usually start at 6 inches, that usually works. I can make it less if I want to. Then I'll lose that piece of geometry. I'll do the same thing in the other detail. This is really the one I'm gonna do most of my work in here, so go ahead and change this to inch equals a foot, and the same thing is just standard practice for me. Right after I change my scale, I always come over and change this to independent, and again start with 6 inches or something along those lines. OK pretty simple, nothing real complicated about that.

AUDIENCE: Can that be done as default?

MATT DILLON: Can that be a default? About the only way I can think of that could be a default is if he made it part of a template, and then apply the template, but it couldn't be a default when you create the view. You can do a view type. Now I've noticed that some things don't automatically get applied to call outs when you assign it to a type, but you might try that. Create a view type that automatically uses a template, and see what happens. So instead of saying detail call out, you can just modify the detail call out type and see what happens. Does that makes sense?

OK, so that's the second step-- third step. This is the one that really kind of tends to trip people up. Because again you wind up with stuff in the model like this, a real common scenario. This isn't right, how do you show that?

Well you've got a couple of tools available to you. You've got a masking region here, it's going to be on the annotate ribbon. You can use a masking region with invisible edges to just blank it out, and then just draw on top of it. That's kind of a last ditch resort. There's another way usually that'll work, but you can do this, that's kind of cheating, though.

This is the one I like, cut profile. This one is one of my favorite tools in Revit for doing details, because using the cut profile tool, I can modify the way faces of layers and objects-- so walls,

floors, ceilings, roofs-- those are all layered construction. Using this tool, I can modify the way those faces display themselves when they're being cut through, and you can do this in section or in plan.

And so here, where I've got this type of condition, using in the cut profile tool, I can actually do this. And I'm not editing the model, so it's real important to understand that everything that I'm doing from this point forward is only happening in this view. It may look like I'm editing the model, but the only extent to which I'm editing the model is the way these elements are displaying themselves in the current view.

OK so I'll show you how this tool works, couple of three different examples. So first off, I'm got another project pulled up that shows that same condition we were just looking at, a real common situation. I need to show a bird's mouth here, and of course the brick would probably course out. It's not going all the way up to the rafter, it'd course out to somewhere here.

So I'm going to go to the View ribbon. So the cut profile tool is actually on the View tab, it's a view command. I guess, technically, they consider you're editing the view. I'm gonna to click on the cut profile tool. And you'll notice there's two options here, face and boundary between faces. So in this case, face will work for all of these. We'll see this one here in a minute. But for now I'm gonna stay with face, and I'm just going to click on the brick face here. So this is a sketch object, so a lot of things in Revit are based on a sketch, and you can edit a sketch anytime just by picking that sketch and editing its boundary.

So I'm just gonna draw a line across there like so. The blue arrow indicates the side of this face that's going to remain, and if you get the wrong side, if you draw it the wrong direction, you can just flip the arrow. No big deal. And I'll go ahead and finish, so that cut that off. Now again if I go back to the model, that brick's still running up to the roof, again it's only happening in this view.

So now I've got this air gap here. We can't see air, right? I don't want to see that. So I'm gonna go back to cut profile again, we'll pick the air gap, and I'll just cut it off here outside of the crop boundary. It's only cheating if you get caught, right?

OK and then the bird's mouth here. So we'll go ahead and do the cut profile tool again. By the way, in Revit now you can hit Enter to do the same command again. You know, this always bothers me. Autodesk is putting more and more AutoCAD like stuff in Revit, and that kind of worries me when I see that happening. When they start adding system variables, I quit. But I

kind of like the entire thing. So I'm going to go ahead and pick the stud there and just draw a line across like so, and I'll finish it off. There you go. I could go on, but I think you get the idea.

So it doesn't take but a few little clicks of the mouse to get that fixed. Now if I go to this other file, we've got a few things happening here. So in this scenario, and you can attack this a whole lot of different ways, we're not even modeling the structure. This layer right here of the floor it's just kind reserved for a 14K1 bar joist, but we're not modeling the bar joist. Now, If you're working with a structural engineer who's using Revit, you're probably going to have a structural model linked in, and you've got the bar joist there. That layer wouldn't even be there.

Myself, I would probably go ahead and model the bar joist. It's not that hard to do, but you may choose not to do that. But now you need to represent it in this detail view, so I need to hide this and replace it with something else that looks like a bar joist. Likewise, this gyp board here, it wouldn't go all the way up to this structure. It's gonna stop somewhere here, or maybe even at the bottom of the ceiling. In this case, I'd probably just run it up a little bit beyond, it's however you want to detail it. By the way, detailing was never my strong suit as an architect. So if you see something like, I would do it that way, that's fine. I surrendered my architectural license about five years ago because I suck so bad at being an architect.

So this guy right here, even my limited knowledge I know that we don't have brick behind a soldier course, right. So how do we get rid of that? I mean, in a building section, at 1/4 inch equals a foot, or even 3/8 of an inch equals a foot, you probably wouldn't notice that. But now, here we are at an inch equals a foot, that's got to go, right? So I need to fix that.

So again, back to cut profile. I'll go ahead and pick our layer there, and again just outside the cropped boundary, we'll will draw a line just like I did on the air gap, and that'll disappear. I'll go ahead and take care of the gyp board. Now, I'm also gonna have to adjust this stud later. But I don't have enough information here yet to do that, so I'll come back to that.

But I'm gonna go ahead and grab the gyp board here, and I'm just gonna cut it off right there. And again, if this changed, at some point somebody came along said, no no no you idiot, that's got to go somewhere else, I can just click on that, edit the sketch, and modify it. So these are all editable after the fact, you can delete them, whatever you need to do.

So here, I don't want to edit face. I've got two faces, and anywhere you have two faces right next to each other that need to be modified, don't edit face. I need to edit that, and this needs to go away. That's a perfect situation for edit cut boundary, the boundary between the faces,

right here.

And I'm also gonna do something here that contradicts something that I usually tell people when I teach them how to use Revit. I'll go ahead and pick this boundary line, so again I'm not editing the faces, I'm editing the boundary between the faces. And my sketch, I'm actually going to be kind of sloppy here. And then I'm going to use another one of my favorite tools, the align tool, to line these up and lock it. I'm gonna lock that one, and I'm gonna lock that one.

And that same model performance technical note that I mentioned earlier, will tell you don't put too many constraints in your model, because it's going to increase file size. Plus, you're putting a lot of rules in your model that later on you're going to conflict with probably. How many people have never gotten the constraints not satisfied message? Don't you love that? And what do you always do when you get the message, remove constraints. You only got two options, cancel or remove constraints. So I always tell people, in a project I don't like to see a whole lot of constraints. As a matter of fact, as a rule I don't constrain things in the project. Now we constrain the heck out of things in a family, but that's a whole different story. But in a project, no.

I will use equality constraints. You know, I'll use the EQ thing to make things equal, but then I'll turn that constraint off. I don't leave it set. And so here I just contradicted myself. Well, this is a pretty lightweight constraint. It's only in this view, and I'm not going to accidentally edit the model by editing the sketch. Revit won't let me do that. It knows that the model has precedence over the sketch. If I try to edit that sketch without unlocking it, I'll get constraints not satisfied, and I got to remove the constraints.

But the reason I do this, is one of the complaints I get from people about detailing in Revit is, yeah we do all the stuff with our details, and then somebody comes along and moves this wall two inches. Now, I've got to go chase all those changes through all the details that show that wall, and make the same changes. But if I've locked this, if someone moves that wall, that cut line is gonna go right with it. If someone moves that soldier course, that cut line is gonna go right with it. So again, it's a lightweight constraint, really doesn't really do anything to the file size to speak of, it's not going to conflict with anything else, it's in this view only.

So that's cut profile. There's a couple other things I'll want to edit here later, but we're not quite ready for them yet. Any questions on this? There's been some firms where I've gone to where this was the log jam, that once they figured out how to use this, that was all they needed to

start detailing in Revit. Question?

AUDIENCE: What do you do when-- how do you feel about [INAUDIBLE]?

MATT DILLON: So instead of doing what I did there, doing a masking region instead?

AUDIENCE: I just do it in my definition from a log revealed, and then I go to reveal first so then it cust back.

MATT DILLON: Oh OK, all right. So the question is, what about doing a reveal in the model first, and then putting the sweep on there for the soldier course, right? There's nothing wrong with that. That's part of that decision, do you model it or not model it. And you chose to model it, and it's working for you, fine. Not a problem. There's more than one way to do this. Yes, sir.

AUDIENCE: Let's say you have a [INAUDIBLE].

MATT DILLON: You can apply it multiple times. So the question is, what if I had this condition here-- and actually I do in this model. What if I had this condition there and somewhere else, can I apply it multiple times in the wall, right? This condition right here, yeah it's not a problem. Yes ma'am?

AUDIENCE: So [INAUDIBLE].

MATT DILLON: Well, because if I was doing a masking region, I'd probably in a lot of cases have to blank out entire areas of the detail, and then come back and redraw it. And this way I'm more surgical. I'm still leaving what's correct. I'm only changing what's not correct.

AUDIENCE: Is there a way to communicate this so all team member [? know? ?]

MATT DILLON: So is there a way to communicate what has been done with other teams? Other than educating them on what to cut profile is, no. Yeah There's no way to say show all cut profiles red or something. It'd be nice if there was.

AUDIENCE: Does this work only in the link model? I mean, if we link it in the structural, can you modify it like this?

MATT DILLON: Oh so can you do this on link models? You know, I really wish you hadn't asked me that. Because, no, you can't. There's where you're gonna have to use the masking region. A linked model, you can't do a cut profile on, unfortunately. Yes,sir?

AUDIENCE: The big part [INAUDIBLE].

MATT DILLON: Well that's more view management, in general. So I think it's a great idea. If you're gonna have 3,000 details, break them up into different detail types. That way, over here in the project browser-- whoops, I think I just advanced my PowerPoint-- but over here in the project browser, it'll sort a little bit better. I wouldn't consider that a detailing topic, but more of a view management topic in general, but it certainly is valid.

OK let me go ahead and move on. I'll be around for questions after the class, too, but I don't want to run out of time here.

So once you've got that, once you've done that, it's just a matter of adding 2D geometry. So this is not anything complicated or hard, it's just understanding the tools that are available to you. I use detail components a lot. These are customizable, there's a pretty extensive library that comes with Revit, but you can also create your own. And if you've never done a custom family before, don't be afraid to do it. They don't have to be parametric. It's is as simple as doing a block in AutoCAD, frankly. So parametrics is good, but if you're not ready for that yet, go ahead and just do static detail components.

We're also gonna do, I'm gonna show you repeating detail components. And that's what we used to do things like the brick, and I'm gonna show you a little trick on the decking here, to show that correctly. Fill regions, I don't really have an example in this project of where I'm going to be doing a fill region.

But essentially, if you've never done them in Revit, all they are hatch patterns in Revit. You sketch them out, so you have a boundary, and the field region type will determine what the hatch pattern is that's going to be used. They are relatively straightforward, easy to create. If you've got some nice AutoCAD hatch patterns that you like to use, those AutoCAD hatch patterns can be imported into Revit to create a custom Revit hatch pattern.

There's a couple of things you need to do to edit them. There's a couple of pieces of text that you have to put at the beginning. But if you just do a Google search on converting AutoCAD hatch patterns to Revit, the information is out there. It's not hard to do.

The only caveat is the hatch pattern can't be more than 128 lines of code. There are some out there. I've seen some really intricate AutoCAD hatch patterns that are like 300 lines. Well, that's not going to work in Revit. It's got to be 128 lines or less. But other than that, it's pretty

straightforward.

But Revit comes with a fairly good library to start with anyway. And also Insulation-- it actually has its own Insulation tool here. You can use that in Plan or Section, doesn't matter.

AUDIENCE: You'll walk me through this one?

MATT DILLON: Yes, I'll show you that, actually. And then, of course, Detail Lines and Linework Overrides. Now some of this, I would hold off toward the end of your project. Detail Lines are handy for just doing simple things like coping and flashing and sheet roofing, that kind of thing. Something not worth creating a component for, but you've got to represent it somehow. And it's just. Drafting it's just 2D drafting.

This tool here, the Linework Override tool-- this actually allows you to-- many of y'all are picky about your graphics? Yeah, of course. We're architects, or at least y'all are. So we don't want that, we want something more like that. Well, you accomplish that with this Linework Override tool. However, I wouldn't do that initially. I'd wait till you're pretty far along in the project. Maybe that's one of the last things you do in your project is make a pass through all the details and clean up the Linework.

The reason for that is if you later came back and modified something in this model that affected some of this Linework that you adjusted, you lose those Linework Overrides. You got to go back and do it again. So hold off till the end.

One of the things that in this process-- in Revit in general, which most of you have probably learned, is you have to change some of the things that you do in a project. You have to rearrange some of the things and some of the scheduling that you do. So this is one of those things. Hold off till the end on the Linework Overrides. But I'll go ahead and show all this to you.

First, I want to put in some detail components. And a lot of times, when you're putting in these detail components, when you first start putting them in you really don't know where to put them. There's no frame of reference. So I like to draw a little analogy here.

How many of you are familiar with Ikea? So every now and then, my wife-- I live in San Antonio, Texas. The closest Ikea store is in a northern suburb of Austin called Round Rock. And every so often, on a weekend, my wife will say, I'm going to Austin. And I know why she's

going to Austin. She's really going to Round Rock, and she's going to come back with a project for me to do. Which I really don't mind, it's kind of fun. It's like putting together a model or something.

And the instructions are usually pretty well laid out. And the way the instructions work, for those of you that have never done an Ikea project, is you've got this box of pieces, and there's hundreds of these little pieces in there. You look at this and it's like, what the heck is this supposed to be? You open the instructions, and every page will show you all of the pieces you need for that step, that little sub-assembly of the project. And so you get all those pieces out, and you lay them out, and then you just start putting them together. And you've got that little sub-assembly done, you set it aside. And you do another little sub-assembly over here, and eventually the thing just kind of comes together.

That's kind of the way I approach these detail components. I need a bar joist and I need a beam. And again I need detail components, not three dimensional structural components. So I'm going to go to-- not this tool, not the Component Tool, that's for 3D components. I'm going to go to the Annotate ribbon.

So again, most of what I'm doing is right here on this Annotate ribbon. And over here, I'm going to click on Detail Component. And then I'm going to go ahead and load a Family, because the one I want-- I don't want that one, I want a different one. That's a 12 by 26, I want a 10 by 30. So I'm going to click on Load Family.

Don't go here. Don't go down here to Structural Framing. Those are three dimensional structural components. So if you're going to model the structure, you want to go there. But we're doing detail components. And the library of detail components that comes with Revit is in its own folder here, Detail Items.

And this one is divided up into the Master Spec Format. So I'll go to Division 5 Metals, and I'll go to-- I'll bring in the joist first. I'll go to Steel Joist Framing. And I'll grab the side view of a K-series bar joist.

Is everybody here familiar with this? What this is? Anybody not know what this is? Don't be afraid to raise your hand. I'll explain it. OK. So this is one Family that could have any of these types. So there's a bunch of parameters in there that are defining all these dimensions, and you can have any of these types in here. Now, a lot of times when you load a Family, all of the types just come in with it. Well, you wouldn't want hundreds of types of bar joists in your

project. So this is called a Type Catalog. And what it allows you to do is simply choose the types that you want Revit to bring into your project. I only want one.

So I'm going to choose this 14K1 bar joist and click OK. And instead of creating all those types, that I'd later want to have to purge out of here, it just creates the one that I needed. Murphy's Law says it's always going to be the wrong orientation. So that's OK, I'm not going to worry about it. Again, I'm just getting my pieces out right now.

So I'm going to use that bar joist, and I also need a beam. So we're go ahead and load another Family. We'll go to Detail Items. We'll go to Metals and Structural Steel Framing. And this one, I'm going to grab an AISC wide flange shape. Section View this time. And I said I wanted a 10 by 30. Same thing, you don't want to bring in the whole AISC steel manual, so we're just going to go grab a 10 by 30. 10 comes before 12, right? And I'll just stick that guy there.

Now I also need some stuff for the ceiling. This is just the ceiling object that I have in the Revit model. I want to replace that with something a little bit more detailed. So again, I'm going to go out here and load some more Families. I'm going to go to Detail Component, Detail Items, and then Finishes, and then I'll click Ceilings. How convenient. Everything I need is in one folder. You think I planned that?

So I'm going to use this Tegular Edge section, the T, the wall angle, and the wire section. We can go ahead and load all those at once. And I know I'm going to need a wall angle. I want to use a 15/16 inch wall angle. Again, wrong orientation, of course. We'll do the suspension T. I'll probably need one of those. A couple of these panels. This is a two by two ceiling tile system. So I'll put a couple of those in there, and the wires.

So I've got all my little pieces here, for my assembly, and now it's just a matter of putting it all together. So first off, this bar joist will kind of start at the top. The bar joist here, I need to mirror that, and that's pretty simple. Just want to make sure I turn off Copy. And then I'll start putting it where it needs to go.

So again, I'm going use the Align tool here. It's going to tuck right up underneath that deck. Oops, let's try picking them in the right order. How many of y'all still do this? I've been using Revit now for over 10 years and I still pick-- why doesn't Autodesk fix this? This is not the way our brain wants to think about this, right? You want to pick what you want to. Align first. Drives me nuts. OK, so let me just hit Cancel.

So I want to pick that first-- oops, got the wrong one. That one, and that. And again, I'm gonna lock it. And we'll pick the edge of that guy, lock that. And then I can go ahead and move this beam into position.

Now, if you're going to use this bar joist here, and you want to grab this bearing plate and pull it over so that it sits on top of a beam, there's two reference planes here. You don't want to use this one. So I want to align the bearing plate with the front of this bar joist, or this beam. So I'm going to click that first. Don't use that little reference plane there. That's put there to fool you. If you use that, you're going to get a Constraints Not Satisfied message. There's another one back here that's longer. Use that one, and it will work. I don't know why that other one is there. It serves a purpose. If I open the [? Fam, ?] I could probably figure it out, but I don't care.

The other thing I've learned with Revit is sometimes it's best just don't ask why, just--

AUDIENCE: [LAUGHTER]

MATT DILLON: Right? Just keep moving. How many of y'all have heard the saying, That's a Revit thing. OK.

AUDIENCE: What Revit wants.

MATT DILLON: What Revit wants, exactly. Humor-- it's like a two-year-old. If you've ever dealt with a two-year-old, don't argue with it, just humor it.

So I'm going to go ahead and-- I need to flip this guy around. So again, we'll do the same thing here. We'll mirror that. And I missed it. Let's try that again. I'll learned how to use the Mirror command eventually. There we go.

So we'll go ahead and align this to the edge of the wall, like so, and then lock it to the ceiling. So now it's locked to the ceiling. So if my ceiling moves, everything that's going to be based on that ceiling is going to move as well. But I don't need the ceiling visible in the View anymore. So now that I'm done with that, I'll just hide that Category in the View.

How many of you guys hide Element in View a lot? OK. Just curious. You may want to reconsider that, but that's just me.

All right, so I'm again-- I'm going to use the Align tool. And if you're building your own custom

Revit Families, these Detail Families, think about how they're going to be used with other components. And this is a really good example, you see that reference plane right there? If I pick that, then I can grab that and it lines this thing up perfectly the way I want it to be lined up with that guy. And then I'll go ahead and lock it. Same thing here, and you'll notice there's a reference plane right there.

And this one's a really good example. I need this T here to not be right up against this tile but just over here to the left of it a little bit. And there's this invisible reference plane there that I can line that T up with. So if you're creating your own Revit components, even if they're not parametric, think about how they might be used with other components and build in some reference planes to help you position elements.

I'll go and open this tile up so you can see what they did here. I'll just click on Edit Family. And if we turn on Annotation Categories, we'll see. So there's a reference plane there, and there's a reference plane there. That's all you got to do. Go ahead and put those reference planes in there and they will be there for you to dimension to, align to, snap to, whatever we need to do.

By the way, little side topic here. How many of you notice-- have you noticed that when you double click on a Family you're editing the Family? Does anybody notice that? That drive anybody crazy?

AUDIENCE: Yes.

MATT DILLON: You want to know how to fix it?

AUDIENCE: Yes.

MATT DILLON: Do you want the history lesson on this?

AUDIENCE: Yes.

MATT DILLON: Is anybody from Autodesk in here?

AUDIENCE: [LAUGHTER]

MATT DILLON: So it's my theory, OK. I don't know for sure, because I wasn't in the room, but-- there are certain customers Autodesk pays a lot of attention to. And I suspect that somewhere along the way, they were talking to one of these customers and somebody at one of these customers, that probably needed some training, said, you know, it really would be a good idea if when we

just double clicked on a Family it would edit it. And Autodesk-- whoever was there from Autodesk went running back, talked to the development team. They put it in there.

This happened in 2013. This feature came out where if you double click on an element, you're editing it. You're editing the Family. The entire user community went, are you out of your freaking minds? What do you thinking? So in 2014, Autodesk came out and said, we listen to the users. We fixed it. It's now an option, except you have to opt out. So it's still the default.

So here's how you fix it. Because what is so hard-- what is so hard about picking an object and then clicking Edit Family up there? At least then you know what you're doing. How many of you have had new users double click on a Family, and they get in there and they don't know what the heck they're doing, right? Dangerous.

So all you have to do is go to your Options. Go to your User Interface Settings and then you've got your Double Click Options right here, and you can customize those. So this is in 2014 and later. And simply, I just set the Family to-- everything else, I don't have a problem with that. But Families, I always just set it to Do Nothing. Nothing to do with Detailing, but I thought I'd throw that out there.

So I've got my ceiling tiles in here. I'm just going to pull my Crop boundary in a little bit closer, like so. That's enough. And then I'll go in and put the wire-- now unfortunately, this guy here, I can't lock. So if things change, this is something I will have to modify. So we'll go ahead and get this into position, like so.

How's that? Y'all like that? Y'all are not picky enough.

AUDIENCE: We want to hide the wire.

MATT DILLON: Yeah, right? You want to hide the wire. So excuse the mask-- this is a perfect example of where you can use a Masking Region. So I'm just going to snug that up a little bit more, like so. I'm going to up here to the Annotate ribbon and click on Masking Region. And I'll just do a little rectangle shape, like so.

And I'll set the two sides here, that one and that one, to be invisible lines. Didn't work. Masking Regions automatically mask model geometry. They don't auto-magically-- they don't auto-magically mask annotation geometry, which these detail components really are. You kind of have to control the order. So now I'll pick the wire here. Tell it to go to the back. And that's masked. Little details like that.

So those are Detail Components. While I'm at it, I'll go ahead and use my Cut Profile Tool to fix that stud now. We just pull that guy up, like so. So far, so good.

So now, what about the brick? Would everybody agree that it would just be asinine to model all those bricks? So this is where we use a Repeating Detail Component. [LAUGHS] There's one in here already, by the way. Comes in the Default Template. I love this. So if I go here to Component. Click on Repeating Detail Component. There's one in here already called Brick. This comes with Revit. It's exactly the opposite of what I need. I've got the brick. What I need are the mortar joints. What were they thinking?

So we won't use that. So I'm going to insert a Component. I'm just going to go to the Insert tab and click on Load Family. And we'll go to-- I'm just going to go to my Class folder here. I've got one that I customized here, and I'll go ahead and show you what it looks like. So let me go ahead and add that as a Detail Component first.

So there's the mortar joint. And all that is, is two masking regions. It's not even parametric. It's just two masking regions to mask out the brick hatch and also the profile line of the wall there, to show the routed mortar joint.

How many of y'all have downloaded the handout for this class? Did you notice-- you may not have noticed if you downloaded it early. The other day, I also uploaded some additional materials. Did anybody download those? So you may want to go back up. Both the PowerPoint are now uploaded, as well as a .zip file that contains the dataset and the handout for the lab I taught on this class last year. So if you want to go through some of this and have step by step instructions, all that's uploaded. It's the same detail. In addition, if you want this mortar joint detail, it's in that dataset. So that the RFA file is there, if you want to use it.

So, but I don't want to use it like this, because now I've got to use an array. And chances are, any time I use that mortar joint, I'm going to need it more than once, and it's going to be regular spacing. So that's a perfect opportunity for again, a Repeating Detail.

So I'm going to go to Repeating Detail. I'm going to go to Edit Type and I'm going to just duplicate the one that's here. And I'll call this one Mortar Joints Running Bond, whatever.

The first step is simply tell it what Detail Component I want to use in this Repeating Detail. So there's my standard mortar joint. Going to be a Fixed Distance as opposed to a Maximum

Spacing, etc. So a Fixed Distance, and I'll set the spacing-- I'm just going to set it at 3 inches. You'll get the idea. And pick a point. We can hit the space bar to flip it over.

And it just goes-- kind of your question on the insulation-- yes, I can lock that. So I lock the endpoint of that as well as I locked it to the face of the wall. OK. So that's better. So now I've got brick in there.

Now here's an issue with the deck. I love this. Several releases ago, they added some functionality to Floors. And if I go and edit this Floor Type, I can actually edit this structure here, in section. And change the function of this middle layer here, that's currently this 1/8 inch flat metal deck, which is not the way metal decks look. I can change that to Structural Deck. And look, it will actually do that. And I can control whether the deck is bound in the layer above or standalone. That's cool.

Oh yeah. It's because the constraint is the bar joist going up to the deck. I'm removing that line, so I've got to remove the constraints. But I'm not going to use this anyway because look at the Line Weights. And I'm going to show you the Linework Override tool here, in a minute. But the problem with this is if I go to the Linework Override tool, it doesn't work on the structural deck. It can't make that a lighter line. So I'm going to find some other way to do this anyway.

So I'm going to undo that. I've got another Repeating Detail Component. I'm just going to go ahead and load another one. Actually, just go to Insert, Load Family, and there it is.

So this is actually an existing Detail Component that I've modified and added a little masking region underneath it. You'll see it here in a second. Go ahead and go to the Annotate ribbon, click on Repeating Detail Component. I'll create another new one. And I'll just call this one, Structural Deck. And the Detail Component I'm going to use is that Deck Component. And I'll set the spacing to six inches. And I'll just start right here. Oops. It's OK. It's parametric. I can change it. Edit Type and change the rotation here to 90 degrees clockwise and there you go. You have total control over the line weight.

Yes sir.

AUDIENCE: Why does Revit have--

MATT DILLON: I hate those questions. Why does Revit-- I'm sorry go ahead.

AUDIENCE: Well, I had the [INAUDIBLE] have to make a room over and over again in each project.

MATT DILLON: OK, good question.

AUDIENCE: But you can also do the same thing with a Align-based Family.

MATT DILLON: Right, you can.

AUDIENCE: Why does it not have those right out of the box.

MATT DILLON: Well, I couldn't tell you why it doesn't have those right out of the box, because I can't get into their heads. But you don't have to create these Repeating Detail Components in every project. If this is a component that I know I'm going to use a lot, or if that's a component that I know I'm going to use a lot, the brick or the deck, there's a tool on the Manage ribbon called Transfer Project Standards. Right here. So if you put this in a project, and you decide, I'm really going to need that and other projects. Pull up your template-- your Project Template-- and in your Project Template use Transfer Project Standards to transfer Repeating Detail Components into your template. And from that point forward, you'll have it.

AUDIENCE: Can you explain the value of the a Line-based Family?

MATT DILLON: So a Line-based Family allows you to create a family that you can pick a start point, and you can draw a line out and it'll place geometry along that line. And it's a very elegant way of doing the exact same thing I just did, except you have to have a much higher knowledge of creating custom families and so forth for a Line-based Family to work. Repeating Details are simple.

A brand new user, if they understand a couple little things, they can do it. Whereas a Line-based Family might be a little bit more difficult to put together. Both of them work, so if you've already got a Line-based Family set up, then go for it. Yes, that's another good point. You can tag a Line-based Family. You can't tag a Repeating Detail Component. Yes, sir.

AUDIENCE: Do you have something in the template [INAUDIBLE]?

MATT DILLON: Well, this is a case where it wasn't in the template already. So, a lot of times you do something in a project that you don't already have in a template. It's like, you know what, I should put that in my template. That's where you use Transfer Project Standards.

AUDIENCE: Is there a reason you think that you use a repeating [? performance ?] for the ceiling tiles?

MATT DILLON: Yeah, because I only needed two of them. So the question was, is there a reason why I didn't do it for the ceiling tiles? Because I needed two of them. But if I was going to do a ceiling like-- if I was doing a really detailed building section, and I wanted to show that ceiling pattern going all the way across the room, then that would have been another opportunity for a Repeating Detail Component, sure.

Finally, Insulation. Real simple tool. It's on the Annotate ribbon. It's right there. And what's cool about this is it'll actually snap to the centers of a wall layer. So I'll just set the width here to six inches and just go right up the center of that stud. And to answer the question from earlier, I can lock that Insulation component to the wall as well. And let's start down here and drag it up. Again, you can use that in Plan or Section. So far, so good?

OK. So, how many of you use Keynotes? How many of you use Note Blocks? So this isn't about Note Blocks. And I've got no problem with Note Blocks, but I'm going to go ahead and show you Keynotes and Keynote tags.

Some people find these very, very useful. Some people find them limiting. I don't argue either side of that. As long as you're aware of what they are, play with them. See what you think. If you don't like them, don't use them. Note Blocks or another alternative. They're a little bit lower tech, but they're also a little bit more flexible. So you may find one useful over the other.

But the way Keynotes work is first off, we have to have a couple of things set up. The main thing is, with Keynotes, you want to be tied to a Keynote file. Now, I'm just going to be showing you the one that comes with Revit, by default, but these are very customizable. And in the handout, it does give you instructions on how to customize a Keynote file.

And to give you an example of how one of my customers use it, they do a lot of work in Mexico. I live in San Antonio, so we're pretty close. And so they do work actually in Mexico, China, all over the world. They actually have Keynote files, the same notes, in different languages.

So they'll have a project that they might do their annotation in English, but if they have to send it to Mexico, they'll just swap out the Keynote file for the Mexican Keynote file, and everything switches to Spanish, same Keynotes. They don't use the Keynote number, they use the actual Keynote text in the tag. So they're not really using Keynotes for keynoting, they're using Keynotes to translate all of their annotation from one language to another. Something I had never thought of before they did it, and it works pretty well.

But anyway, you'll have this Keynote file that has all your Keynotes defined. And Keynotes have two components. They have the Keynote number, and then what is the text that goes with that number. The tag that you use can show either.

Also, you can set your numbering method to either by Keynote, where the Keynote number never changes no matter what sheet it's on. If you're familiar with national CAD Standards, what we call a reference Keynote, or a sheet Keynote, where the same note could be Note number one on one sheet and Note number 12 on another. It'll do it both ways. You can switch back and forth in midstream.

But there's basically what you get with the Keynote file. When you're placing a Keynote, if an object doesn't already have a Keynote assigned to it, then it'll ask you to pick a Keynote from the file. And what you're actually doing is editing the Type Definition of whatever it is you're trying to Keynote. So in this case, I'm trying to Keynote a wall. The wall type didn't have a Keynote assigned to it, so I selected this. That now gets assigned as the Keynote that goes with that wall type. Same thing with Detail Components. Materials also. So when you're editing a material definition, you can assign a Keynote to a material. And the end result is that. Again though, the tag here-- the tag could reference either the number or just the text. Either one, or both, I guess.

Then we have Keynote Legends. So going along with these. Basically, a Keynote Legend is just like creating a schedule except for a couple of things. First off, you go to Legends to create it. And second, Revit does most of the work for you. You'll notice when you go to create a Keynote Legend, it's already giving you a title. It's already put the two fields in there. The only thing you need to do, unless you want to do something a little bit different, is turn this on here. And I'll explain what that does once we get going here.

The cool thing about Keno Legends is because it's a legend, one Keynote Legend can handle your entire project, because you can place that Keynote Legend on multiple sheets. Legend Views are the only type of view in Revit that can be placed on multiple sheets. And this Filter by Sheet basically tells Revit, only show the Keynotes that are actually on the sheet in that instance of the Keynote legend. So in this case, here's my Keynote Legend. It's got all those Keynotes. But when I place it on the sheet that only has this detail, it's only showing the Keynotes that are on that sheet. Does that makes sense?

AUDIENCE: Can you add a quantity? Do you have any with those Keynotes that there are? [INAUDIBLE]. Do you know what that is?

MATT DILLON: I don't know. The question is, can you add a quantity as to how many of that Keynote there, there are? I don't know. I've never tried. Be fairly easy to test, but I'm not going to do it in here. [LAUGHS] Maybe later.

And again, the Keynote Numbering, we can do it By Number or By Sheet. So here's what happens when you go By Sheet. When you're looking at the detail, you'll see question marks for the numbers. Because until it's on a sheet, the numbers don't mean anything. As soon as you put it on a sheet, then it assigns numbers to the actual Keynotes.

And you can customize them. But-- I'm going to leave that to the handout, but it's fairly straightforward. It's not as confusing as some of this looks. Basically, again, it's just controlling the order of where things are shown here. So here's the keynote number. Here's the text. This third column over here basically indicates this, right here, that 024100 is what this Keynote should fall underneath. So this kind of indicates the Header section for that Keynote. And again, the handout gets into that in a little bit more detail. And you edit this-- it's a text file that you can edit it in Excel. That's the easiest way to do it, because it's easier to see the formatting that way.

So let me just go through a real quick example of Keynotes. So these are tags. So it's going to be on the Annotate ribbon. Here's the Keynote Settings here. And I've already set to go with the default Revit Keynotes file that comes with Revit. And right now, I'm going to start off by doing By Keynote. And I'm just going to do a few here. I don't want to get crazy because we'll will run out of time, but you'll get the idea.

First off, you've got three choices. The Element Keynote Tool allows me to select this element, that wall. And, of course, I'm going to choose the Tag that I want. So I want the Keynote Number Tag. And right away this question mark basically tells me it doesn't have a Keynote assigned to it. That wall-- that wall type has no Keynote assigned to it. So it puts me in the Keynote file, I'll scroll down to Masonry. Clay Unit Masonry, and I'll just do Standard Brick 3/8 inch joint.

Now, again, when I did that, what actually happened was-- if I can get to the Wall Type. There we go. I actually added that Keynote definition there, to the wall type. So I'm actually editing the wall type when I do that, so be aware that. You have another option which is called an

User Keynote, which I'll show you here in a second, which doesn't do that.

So I'll go ahead and put a Keynote here on the floor. We'll just go here to Structural Concrete. Scroll down to-- I think there's something here for Structural Decks. And again, this is all customizable. You can add the Keynotes to the existing Keynote text file or create your own. It will also work with Detail Components. Most of these Detail Components that come with Revit already have Keynotes assigned to them. If you're going to use Keynotes, you might want to be religious about adding Keynote definitions to the types that you're. Defining.

This little error here-- do y'all know what that means? Y'all know what's causing that? Why I can't see those notes? Yeah, there's this little guy here, this Annotation Crop, right there. It's checked on. If you check that off, you don't have it. But you can also just drag this crop boundary out a little bit to show the Keynote.

OK, that's enough. I could go a little bit further. But we have the Element Keynote. We also have Material Keynotes. So if I click on the Material Keynote Tool, and I grab, say, this guy right here, that's the gyp-board on that wall. So I'm not picking the wall type now, it's actually looking at that material. And again, when I assign the Keynote to it-- so I'll just go here to Finishes, Gypsum Board. I'll just call that 5/8 inch Gypsum Wallboard. I just signed that Keynote to that gypsum board material. So if you have different thicknesses of gypsum board, and you want them Keynoted that way, you're going to have to have a Material for each one of those thicknesses.

Or you can use a User Keynote. Again, back on the Annotate ribbon. If I click on User Keynote, I can pick anything that can be keynoted, like that guy-- it ignores the Keynote definition that's already assigned to it. It'll always take you to the Keynote file and ask you to choose a Keynote. And I'm just going to go to Steel Decking here, close enough. And that did not modify anything.

User Keynote does not edit any type definitions. It ignores what's assigned to it. So it allows you to override what's there for a unique condition, or if you just don't like having to assign these things to your type definitions. Like in the case of gyp-board, I could have 5/8 inch gyp-board, 1/2 inch gyp-board, whatever. I just want one material called gyp-board, then I can use the User Keynote to define all those different thicknesses.

Now, I want to go this other detail that I didn't really do much in. I just put a few more Keynotes on there, just to show you a couple of things here. So again, I'll use the Element Keynote. I'll

grab the wall. Same Keynote number, it's already on there. I'll use the Material Keynote to do the gyp-board here. And then I'll do another one. I'll do another Material Keynote on this guy. And that's going to be Thermal and Moisture Insulation. Let's see-- is it Roofing? Do I care? Here it is. Always call it Tapered Rigid Insulation. So just get some different notes on there.

So again, get your Keynotes done. When you're ready to do a Keynote Legend, you can come up here to the View ribbon. Click on Legends, Keynote Legend. And quite frankly, if you're doing Keynotes a lot, have your Keynote Legend in your template. You don't have to worry about it. It's just already there.

But notice, it already fills in the Title for me. It already puts in the Key Value in the Keynote Text. Here's the answer to your question, can you do a quantity? I don't see a way to do a quantity here. I don't have a Quantity field. So the answer would there would initially, at least, would be, no, unless I explore that a little bit more.

So Key Value, Keynote Text-- here's the thing you want to do, though. On the Filter tab, turn on Filter By Sheet. That's real important. So there's my Keynote Legend, such that it is now. Now if I come down here and put a detail on a sheet-- so I'll create a new sheet here.

And we'll drag one of our details over here onto that sheet. Detail 0 which is the Parapet Cap. And then I'll put on our Detail Legend on it-- our or Keynote Legend. And again, the Keynote Legend is only going to show those Keynotes that actually exist on this sheet. So there's only, what, three of them on that detail-- there's only three on the legend. As soon as I drag the other detail over onto the sheet, then it puts those Keynotes on there as well. So it's fairly intelligent in that regard.

So I'm going to go do something a little different here. I'm going to take that detail off the sheet, and I'm going to switch to Sheet Keynotes. So right now, I've just been going with Keynotes. We'll go back to our Keynote Settings, and I'll just click on By Sheet. And this one, since it's on a sheet already, they've been assigned Detail Numbers. If I go to this detail here, Detail 1, those are question marks because right now that detail is not on a sheet. I took it off. I'm going to put it on a different sheet.

So I will create another new sheet and I'll take Detail 1, put it on that sheet. Put our Keynote Legend on there. And again, because these are Sheet Keynotes, the same note can be different numbers on different sheets. So if we look at these, for example, Gypsum Wallboard

is Keynote Number 5 on this sheet. But if I go to the other sheet, Gypsum Wallboard is Keynote Number 2 on that one. So again, it's just-- flip back and forth.

AUDIENCE: So that's for the whole project?

MATT DILLON: Sorry?

AUDIENCE: That setting affects the whole project?

MATT DILLON: Correct. Yeah. The question is, is that setting for the whole project? And the answer is, yes. You can't do it on a sheet by sheet basis. It's all or nothing. And that's one of the things that people sometimes find too restrictive and so they don't use it. Again, it's up to you. Yeah.

AUDIENCE: Is there a way to do a simple [INAUDIBLE]?

MATT DILLON: I'm sorry. Is there a way to do what?

AUDIENCE: A file to 1,2,3 instead of long settings-- instead of [INAUDIBLE].

MATT DILLON: I just did.

AUDIENCE: No, but to have like, [INAUDIBLE].

MATT DILLON: Oh, no. If you go to Sheet Keynotes then Revit controls that. You can't force that to be always be 2. And that's why some people use Note Blocks instead, because Note Blocks give you total control over that, but it's a more manual process.

AUDIENCE: In your custom file, you go from [INAUDIBLE] Revit with all those numbers [INAUDIBLE] 1,2, 3,4,5?

MATT DILLON: Right. So if-- yeah. So the comment here is, if you go to a custom file and just number your Keynotes 1,2,3,4,5 instead of the CSI numbering, then, yeah. So in that case, you wouldn't be using Sheet Keynotes, you'd be using the other option. But you'd be using a custom Keynote file, 1,2,3,4,5, and then they would be the same.

So again, we could go on and on Keynotes. I don't want to run out of time here. I want to show you a few more things. So there is some stuff in the handout about Creating a Custom Keynote File. Play with it. It's really not that hard. If you just kind of play with it a little bit, you'll get the hang of it pretty quick.

This is not in the handout. I just, for some reason, totally spaced and just realized it yesterday and thought I need to put something in here about Detail Groups, because this is huge. You got a lot of things, these little assemblies, that might repeat themselves throughout the model. You don't want to model them, but again, they might repeat themselves. So you can do Detail Groups that can include annotation. Now how many of y'all have worked with Groups in Revit before?

So Groups are kind of-- they're good until they're bad, right? Sometimes you start off using Groups, and the further you get into a project, the less effective they become, depending on how you've got them set up, and you start ungrouping things. Detail Groups are actually pretty simple. The only problem I have here-- and I'm for-- and this is a little bit unfortunate-- is if I want to do a Detail Group out of, say, this assembly here, I've got to unlock everything. Anything that is constrained can't be part of a Detail Group.

So for that reason, I'm going to go ahead and just unlock a few things here. I'm using this-- by the way, this is a relatively new feature in Revit. Reveal Constraints. It's really handy. It shows me everywhere I have constraints, and I can just pick those things and start unlocking. And those little lines-- whenever those disappear, that means those constraints are gone. So I'll pick up here to start unlocking some of this stuff.

So that should give me what I want. So I just want to take some of this geometry here and turn it into a Detail Group. So I'm going to grab-- as a matter of fact, I'm going to remove my Keynotes.

So I'm going to grab the bar joist, the beam, the wire, all this stuff here. So all of that, I'm going to make part of a Detail Group. So I'll go up here to Create Group. Revit's going to complain here because it sees a constraint, I think, over here where I locked the cut profile to something. That's not even part of what I've selected, so I'm just going to ignore this. And I'll just call this, Floor Wall Structure.

And this guy here is the Insertion Point for it. I'll just stick it up here in the corner, like so. So let's say that I had that same condition over here on the roof. I don't, but just for argument's sake, let's just pretend that I do. I can now go down here to Groups, grab that Detail Group, and just drag it into my view here, and place it where I need it. And if I decide I need to edit that, I can edit it in either place. So if I pick it here, Edit Group-- I'm going to add just a piece of text here. I'll put a note here. And maybe put a totally meaningless dimension, just to throw

one on here.

But because that's all part of the group, was it? Oh, did I get out of the group? I did. OK. Well, so the dimension isn't part of the group. I can edit the group to add it, but we'll-- ah, I'll go ahead and do it. Edit Group. I will add the dimension to it. But the cool thing is, because I'm editing the group, if I go back to this other detail-- same note, same dimension are now added to that detail as well. So just another little tool in your arsenal.

So, does all of this make sense so far? We've got about 20 minutes, so I've got a little bit of time to show you some other stuff. How many of you need to have Standard Details in Revit? Or, how many of you don't already have Standard Details in Revit, but need to? Is everybody already good? So some of you still-- OK.

So it's actually relatively simple. There's a nice little trick. Now, we're talking about Drafting Views here. I'm not talking-- I'm moving away from Hybrid Details now because Hybrid Details are based, at least in part, on the model. So a Hybrid Detail can't be a Standard Detail. It's only going to be in that project where your model is.

Here's a little tip. You can export your Hybrid Detail View out to AutoCAD. Now it's a 2D drawing. Then you can link it back into Revit, trace over it with 2D Linework, and now you've got a 2D Detail, and then unlink the AutoCAD geometry. So if you need to do that, just trace on top of it with 2D Linework. That's, by the way, how I recommend converting your existing AutoCAD Standard Details to Revit.

Bring up a bogus Revit project-- don't do this in your real project. You don't want to mess it up. But just bring up a bogus Revit project, create a Drafting View, and then simply import or link your AutoCAD geometry, your AutoCAD detail, into that drafting view-- I prefer linking-- and then trace it. Now that may sound like a lot of work to trace it, but it really isn't. If you know how to use the Tab key to trace continuous line segments, it doesn't take that long to trace them. And that way, because the detail is linked, when you're done, you just remove it. It's gone. And now you've got that drafting view set up as a Revit Detail.

Now, other people will tell you, well, just go ahead and import it, and explode it, and then you can go in and change all the lines and everything to Revit lines. Well, the problem there is, yeah, you can do that, but you better make sure you grab them all because if you miss something, you still got some little AutoCAD bit out there. And now you've got a bunch of stuff, once you get it converted, now you've got a bunch of stuff you got to go purge out of there.

And it's not just going to be under Purge Unused.

You've also got to go to your Line Styles and delete those AutoCAD Line Styles that were brought in, and then you've got Filled Regions, so those AutoCAD hatch patterns, they get converted AutoCAD Filled Regions. Those are things that are probably going to want to get purged out as well. It's a lot of cleanup involved I find, frankly, tracing usually works quicker, better, cleaner, even though it may sound like it wouldn't.

So how we do it, whether you've brought in a AutoCAD Detail, and you've traced over to convert it to a Revit Detail, or you've just drawn it from scratch again in a Drafting View-- once you have that Drafting View created-- which is not based on anything in the model-- you can actually save that Drafting View to a new file. You simply click on the view, save it to a new file, and it's now a Revit project with two views in it. It's got the Drafting View and a blank empty 3-D View. I don't know why they give you a blank, empty 3-D View, but it's there. You can ignore it.

And then, from that point forward, it's all this tool right here. Using this Insert Views From File tool, you can transfer other Detail Views into that Standard Detail Library. And you use the same tool to pull those Standard Details into your Revit project. So I'll go through that pretty quick here. I've got a file here where I've already got it set up, ready to go.

So I'm going to close this guy and open this guy. So in this one, I've just got a couple of Detail Views. We can pretend there's a project here. And now I want to establish my Revit Standard Detail Library. Doesn't matter which one I pick. I'll go to the Parapet Detail first. Does that look familiar? I created these-- I don't use AutoCAD. I get hives when I have to go into AutoCAD. So I don't have any AutoCAD details. So I did exactly what I just told you to do. I exported those Revit Details to AutoCAD, brought them into Revit, and then just traced over them in 2D and blew away the AutoCAD. Now I've got 2D AutoCAD Details-- or 2D Revit details, excuse me.

So I'm just going to take this guy here and Duplicate the View-- I'm sorry, not Duplicate-- it's getting late in the day already. Save to New File. So again, Drafting View, you can save it to a new file. I only do this once. This is just to establish my Standard Detail Library. So I'm going to click on Save to New File. And I'll put this in the folder I got for the class here, and I just call this Standard Details. And it's done.

So now I'm going to open up Standard Details. And again, in this file, there are two views.

There is the mysterious empty 3D view, and there is the Drafting View that I just used to create this file. And I don't worry about the goofed up line styles here. I don't know where the blue comes from. I don't care, because when I bring this into a real project, it's going to take on those definitions anyway. The critical thing is-- is the details in here.

Now to get the other Detail in here, all I have to do is go to Insert, Insert from File, Insert Views from a File. So here's my project-- that one there. That's the one I'm actually in, in the other project. So here's the other Drafting View, right here. The typical floor and walls. So I could have a whole bunch of these. I could just check them all on, and suck them all in at one time.

Save that. I've just added a Detail to my Standard Detail Library. So the next time I'm in a project, and I need one of those details, all I've got to do is go to the same tool, Insert Views from File, open up the Standard Detail Library, check off the Details that I need in my project, and it brings them in as Drafting Views. Does that makes sense?

So this is something-- obviously, if you've got hundreds of Details that you need to do from AutoCAD-- how of y'all have literally hundreds of AutoCAD Standard Details? So it's going to take a while to get them into Revit. So there's two approaches you can take. How many of y'all hire summer interns?

AUDIENCE: [LAUGHTER]

MATT DILLON: That's a perfect job for a summer intern. When I was a summer intern-- this was back before AutoCAD-- they had me sitting at a drafting table with an electric eraser-- this is no lie. We did apartment complexes. Well, we cranked out apartment complexes like you wouldn't believe. I swear, my job for a month, was to erase bathrooms. That's all I did. (Zzzzz) I think they paid me on the amount of eraser dust that was on the edge of my desk at the end of every day, or whatever, but-- but that's what-- what do you do with an intern? They don't know enough to really do meaningful work on a project, so you can teach an intern to trace AutoCAD Details and save them to a Detail Library, pretty quick. Doesn't take that long.

So that's one option. If you don't hire summer interns, then why don't you just convert them as you need them. OK, I need this Detail, it hasn't been converted yet. I'll bring it into a project. I'll go ahead and convert it, go ahead and take the time to do it. Now I've got it. I'll check it off on a log somewhere. That one's been done. And I would argue, after a year or two, any Details that haven't been converted in that time, you probably haven't been using it for a while

anyway. It's just over time, you're building up your library.

I think, unless I forgot something, yeah, so we're pretty much done. So just a few key points and then I'll open up more questions. Again, don't over model. This is a really common mistake for new users, just modeling the entire universe. You know, modelling every little detail on the walls, every little detail on the doors, just everything. Do that return on investment. What's the scale of your drawing? Your primary floor plan? And then after that, that return on investment. And then just know how to work with View Properties. The clip depth is a real big one.

Whoops. Come back here. Use that Cut Profile tool. Again, if you've never used that before, start playing with it. I think you'll find that that's a huge help in getting your Detail prepared for the next step, which is to embellish with those 2D Detail Components, and Linework, etc. And then again, start converting your AutoCAD Details to Standard Details, so you're not any longer importing AutoCAD Details into Revit. Because I've got to tell you, that's really not a good thing to do. I know a lot of people do it. It seems expeditious, at first, but if you can get them converted to Revit, you're going to be a lot better off in the long run.

So with that, I'll open it up for questions. Just so you know, my office is offering a special chance to win a free online, live lab, learning class. We have online training that we do. It's live, instructor-led, through go to training. You can register to win a free class, but-- I'll just go ahead and open it up for questions at this point. And if there's no questions, thank you for coming.

[APPLAUSE]

MATT DILLON: Thank you.

[APPLAUSE]

MATT DILLON: Any questions? Yes, sir.

AUDIENCE: One challenge I've known with Revit is not just filling to preserve your work all sections, do you feel?

MATT DILLON: OK, I'm sorry.

AUDIENCE: When you're putting walls, and you're solving your wall sections--

MATT DILLON: Right.

AUDIENCE: --having to redo that, again. Do you feel [INAUDIBLE]? Can you talk a little bit about how to overcome that?

MATT DILLON: So you're solving-- when you say solving your wall sections, would you describe what you mean by that?

AUDIENCE: In wall section, creates-- have your scale--

MATT DILLON: Right.

AUDIENCE: I will create a Detail Group. Or sometimes create a Family, and I'll apply to the wall sections, then use that same Group or Family, in Detail Form. So a lot of the work that I use--

MATT DILLON: Right. You're redoing it. You're reusing it.

AUDIENCE: [INAUDIBLE] and everything's changed.

MATT DILLON: Right. You only have to do it once.

AUDIENCE: So, exactly. So it's just the value that--

MATT DILLON: Right. I mean, you just answered the question. Detail Groups.

AUDIENCE: I'm just not sure everybody here understands that well.

MATT DILLON: Yeah. Well, hopefully, that's-- the comment was made was that's a good use for Detail Groups is-- when changes happen, you only have to edit it in one place. And maybe I wasn't clear when I was showing that, but-- You edit it in one place, and they're all done, If you had it duplicated multiple times.

AUDIENCE: You mentioned that when you take your [INAUDIBLE] constrained in the detail, it's not the heavy footprint constraining in 3D.

MATT DILLON: Right.

AUDIENCE: I didn't know that. Is it the same way with Detail Groups, where you have to-- [INAUDIBLE] problems down the road.

MATT DILLON: Right.

AUDIENCE: Is it the same training different [? positions. ?]

MATT DILLON: Well, yeah. Because they're 2D. They're view-specific. So the overhead is not the same as with the 3D geometry and the problems, because it's only in the views that they exist in. There is some footprint, and there is some overhead, but the differences between that and the 3-D is fairly significant. Yeah.

AUDIENCE: [INAUDIBLE] profile, a lot of the changes used to create [INAUDIBLE] That Lineweight sometimes is an issue.

MATT DILLON: In what way?

AUDIENCE: It's not-- Like, if I have two, I was joining--

MATT DILLON: Yeah, you know what, and I didn't show that. That's where you use your Detail Lines and your Linework Overrides to fix it. And I didn't show that because--

AUDIENCE: So a line on top of it?

MATT DILLON: What I was going to show-- and I totally zoned on it-- was the soldier course, where they got that thick line behind it-- I wouldn't want that. So what I do in those cases is I'll come in with the Linework Override tool, and say, OK Linework Override, in this case, thin lines, and just pick that line, and it'll go to thin.

AUDIENCE: But you can't do that on the line that you created--

MATT DILLON: Right. So on the Cut Profile-- if it doesn't work, then I just come on top of it with a Detail line. Yeah. And quite frankly, on a soldier course, what happens is-- because of the way the lines are overlapping, on some of the geometry, you wind up-- to get the thin lines, everything goes thin. And you need to come back with a wide line in a couple of spots where you still need that heavy profile. So sometimes it's a couple of passes. Yes.

AUDIENCE: It'd be nice if you can--

MATT DILLON: Yeah. Just like on the Structural Deck, it'd be-- I don't know why I can't just say, you know what, make that a thin line, and--

AUDIENCE: One question, [INAUDIBLE].

MATT DILLON: You can't. And there is a tool in the Visibility Graphic Overrides to edit the Cut Layers. The Line Weights or the-- I don't remember the actual terminology. It's in the lower right corner. And just as a general rule, I don't do that, because that will screw up a view quicker than-- so I just don't use that tool, unfortunately.

AUDIENCE: It's all in the family line.

MATT DILLON: Yeah. Yeah.

AUDIENCE: You mentioned a handout [INAUDIBLE], a version of handout that [INAUDIBLE].

AUDIENCE: It's not here, is it?

MATT DILLON: No, you've got to go online to get it. So if you go to the-- yeah, if you've got your app, I think you can download it through the app. So there's a handout, the PowerPoint is up there, as well as-- last year, I taught this class as a hands-on lab. So the data set for the lab and the handout for the lab, with step-by-step instructions on what to do to create the Detail, is up there, as well.

AUDIENCE: [INAUDIBLE]

MATT DILLON: The mortar joint, the roof deck, I think it's just those two, but those are in there. Yeah.

AUDIENCE: Thank you.

MATT DILLON: OK.