

RYAN NOYES: This is, Using InfraWorks to Generate and Evaluate Our Designs in Context. So, what I'm going to try do here just to set expectations is I'm going to give an overview of some of the key features of the tool. I'm going to touch on some of the vertical applications that work within InfraWorks 360.

I'm going to also show some of the tools that we use at VHB to make working with the data a little more realistic. A couple of things, who in here does programming? HTML5, JavaScript, any of that stuff? All right, so I'm not teaching to you guys.

But what I'm showing, I'm going to show a little bit of HTML coding, and a little bit of JavaScript just to do things like vary building heights and roof slopes. I'm going to go through some of the tools built into the app itself to show how we can apply different styles to buildings based on a rule set and on some of the data behind that. And give a few hints of things we found that are useful as we're trying to present our models.

So I'm going to start with a little bit of background of how VHB got to the point of moving towards InfraWorks instead of working in the 2D world for presentations that we had for forever, and why we move that way. And then hopefully get into the tool and show everybody here some of the things we can do with InfraWorks.

So as I said, we're going to learn how to build a contextual model, we're going to know a little bit more about how to visualize that and understand and analyze some of the proposals as we're building them. So looking at things like site distance, clearances on bridges, changing our slope limits on a road doing some of that kind of basic functionality within the vertical applications. And then we're going to go through using the model itself.

Why are we doing this? VHB has produced plans for the last 30 years as I'm sure all of us have. Whenever we needed to communicate with the public, we would build a pretty board that had red and yellow and green and circles and stuff on it that we as engineers were like, hey this is crystal clear. Who doesn't know what we're putting that here? Public, other stakeholders who weren't necessarily looking at the plans didn't necessarily find that data quite as valuable.

So what we're trying to do too as part of this is move communicating the design into the hands of the engineers. Because the engineers, planners, know what the content is within their

design, the rules that they used in order to create the design, and the reasons that they made certain design decisions. But then to give it to a graphics group in a larger company and say, we need to make this pretty so the public can understand it when the graphics team doesn't necessarily know what message the design group is trying to communicate really made for a disconnect, and a lot of back and forth, and a lot of wasted time in VHB's opinion, with how to show our designs effectively.

So what we've been trying to do is-- this is not 3D Studio Max. When you see the videos that I generate when you see the model, it is not that high fidelity, movie production-ready model that you would get in 3D Studio. But what we've done is given the ability to visualize a model and to create a video out of a model that any engineer on VHB's team should be able to do generate to use for communicating on a project.

So again. This is why we're doing this. This isn't enough. Anybody in this room probably understands what this plan shows. I've got to signalize. This is a streetscape project where we're adding some cross walks. We're doing a little bit of signal work. Changing lane configuration without adding pavement. So talk about confusing to a lay person.

What do you mean you're not making the road wider. But you're changing the lanes. How does that work? How can we accomplish that?

So you know, our strategy for the last 25 years has been, well here's our hearing plan. That's not quite going to sell it. So if you're looking in the upper right, here's our sketch of an intersection so that people can see, OK there's the crosswalk treatments. Here's some new planting, new landscaping going on.

And then that's still not going to be enough. So let's go talk to the LA see if we can get them to do a hand rendering. That has been the process we've used for forever in this industry.

Does it communicate clearly? I don't mean to state that this doesn't. If you're an engineer or designer, architect, someone who looks at plans all the time? This is valuable. However, what we found is that communicating design this way is not nearly as clear to project stakeholders as generating a model and communicating our design like this.

This shows the context of your design. And what I mean by that is, I think all of you can look at that and we might have some architects in here. So you can see the lane changes that we're proposing, even though we're changing our pavement weights..

You can see, is that red circle a new traffic signal? Or is that a removal of a traffic signal? Well, you don't have to worry about that here. When you see here, hey look. There are traffic signal mast arms. That means we're adding signals at this intersection. Really kind of clearly communicates, and adding that extra context of cars and people allows you to understand what's going on in a design.

Does anybody in here know what the golden arches in the bottom right corner repre-- thank you. There's no work in that. You know, golden arches? That's McDonald's. That gives you context of where you are in the plan versus that previous sheet where I don't know what that parking lot area looks like. I don't know what that means.

This is sometimes enough. And we use them InfraWorks to generate these stills very quickly, very easily. And I'm going to show you how to do that. There are some things we're probably not going to get to touch on during this because of time limitations. But I'm going to go through as much of generating that kind of model as I can in the hour.

And then there are other times that what we want to do is the next step. Where we actually don't want to just show you a still. But we want to generate the video. And I don't know how smoothly this is going to play through the projector. So I apologize. If it's really choppy and we'll stop it part way through.

What you should be able to see-- yeah that's pretty choppy through the projector. But what you should be seeing here is zooming into the road, going along the road. And now as you go up the street, you can see the crosswalk treatments. You can see the landscaping changes. You can see where we're adding bus stops. Again really clearly communicating to project stakeholders what's going on on this route.

For us, giving this to the engineer and not having this be a separate person generating this, or a sub or another team generating this information is really shifting the power of communicating to the engineers. So now it's starting to pick up and play a little better. This is where we're headed with InfraWorks and showing our designs in context.

Existing conditions probably for visualization has been one of the biggest pains that VHB has encountered. Existing conditions are important to show to give that context. But the time you have to invest to generate a 3D model of existing conditions is painful

And we're going to go through, some scripting and some other things to really kind of minimize

that time. And InfraWorks 360-- and just show of hands here so I can make sure I'm being clear on this. Is there anyone here who doesn't understand the difference between InfraWorks 360 and InfraWorks?

OK for what we're covering today, the vertical applications are part of InfraWorks 360 which is a desktop subscription app. I'm also going to start covering Model Builder. That's an InfraWorks 360 tool. When I go through all of the video generation, all of the importing of GIS data, all of that information? That is part of the core program that you can do.

So if you don't own InfraWorks 360 but you own InfraWorks, there's going to be some of this when I get into the vertical stuff-- checking bridge clearances, checking intersection details-- you're not going to be able to do with the tool. But it's important to see what we do with the tool and what we found out of it too. So it is InfraWorks 360 that I'm talking to throughout this session.

I'm happy to answer questions at the end about, well could I have done that with InfraWorks? And hopefully I'll remember. And if not, I see an Autodesk rep here who could probably correctly when I misspeak to it as well.

AUDIENCE: It's now called--

RYAN NOYES: InfraWorks LP, Yes. Sorry.

AUDIENCE: [INAUDIBLE]

RYAN NOYES: Yep, LT is light technology, whatever you want to use. So back to the point, existing conditions. I'm going to go through the model builder, which is a great tool provided as part of InfraWorks 360 to build existing conditions in a snap. You pick a project area, you get existing conditions as far as roads, railroads, waterways, terrain and image data.

So I'm going to go through that. And hopefully you'll find that starting off for our getting existing context in place is something now that isn't a budget breaker, as it has been when you start doing it in 3D Studios among other things. So generating those designs in context, how do we build existing detail with InfraWorks 360?

We build it through Model Builder. And the sources of data in Model Builder are Open Street Map for our roads, railroads, and waterways. And then we access Bing Maps for aerial

imagery. And we can use that aerial imagery. And we also access USGS DEM data as well.

International folks in the crowd, there is international surface data available that was released as part of a program from NASA. So, if you're outside of the US, that's the data you get as part of Model Builder. Inside the US, you get USGS DEM data, all right?

Beyond that, GIS. The amount of data available through GIS sources at the state, local, and county level is amazing. You can quickly go out and build the model that you see on the screen here as far as existing detail goes by making a few phone calls. Or by knowing what the state offers for GIS data.

CAD sources. If you have a CAD plan, where someone went out and already surveyed and gave you building footprints, you can bring all that information in to generate your model. You can bring in your surfaces from Civil 3D, from InRoads, from GeoPak to build your existing ground model. You can bring in DEM data that you have that's of a higher quality.

You can bring in point clouds. You can bring in all kinds of data. InfraWorks is a consumer of information.

And then when you get into the building layouts and some of the, if you're looking at the screen now we can see the bus stop hidden underneath the trees, that's information we generated in SketchUp to add that existing context. It comes right in. Revit data I was talking to someone who works with architects. You can bring in a Revit model using the cloud. It is a transfer in where you can update the data later on. It is not a dynamic link like an xref for CAD folks.

So now just to give a Model Builder overview, I want to do a quick video on how Model Builder works. So again, we're going to get roads We're going to get highways. We're going to get railroads. We're going to get buildings we're going to get surface information. And we're going to get imagery.

And this will hopefully run much smoother than the last video. So what you can see here, If I want to build a model, I go to the Model Builder button in the upper right. It opens up essentially a Bing Maps map for you.

You zoom in, type in an area of interest. I can't see what I'm typing here, but I think it was Park City. So I'm going to zoom into Utah. As a guy who skis once in awhile. And then zoom into the ski area to refine the area that I want to generate this model for. Because you're limited to 200

square kilometers as far as what model builder will spit out at once.

Once I have my area defined, in the bottom right, I'm going to give a name to my project. So this is the name that my model is going to have as I access and work throughout the [? life ?]. And then below that you're going to see a group

What that group does is that defines who has access to this model within VHB. I can invite people outside of VHB to view my proposals and my scenarios as I published them to the web. This is how I do that. I can invite people from outside of VHB to access my model through InfraWorks. But we found this actually collaborated on projects with Autodesk using groups in the cloud to upload and download models.

So now you can see the end. I hit the create model button. And it says, hey, we'll send you an email in a minute when we build this model. Literally the return time on this, I've seen less than five minutes. Other than when it was broken, I haven't seen it be more than an hour at any point. So really quick turnaround.

And then I'm going to show you a model that we've started with Model Builder.

AUDIENCE: Does this use cloud credit?

RYAN NOYES: Model building does not, no. Model building is-- this is part of paying for that InfraWorks 360, not LT, is access to model building. So when you're using that to when you get into optimization and some of the other features-- reporting in the bridge component-- is a cloud credit service. But everything that I'm showing today is InfraWorks 360. If you own it, you can do it without needing to worry about if I just burned 50 Cloud Credits to build a model of my backyard.

This is the end of PowerPoint for a while. I'm just going to come back to keep me on target, because I easily am distracted. So what I would like to do now is start by showing how we can add Bing Map data to a project that we already have surface information for. The example here is that a typical project for VHB, we might have detailed survey or aerial mapping. But we don't have aerial imagery that covers the limits of our aerial mapping.

So we either have a strip of aerial mapping, and then gray. So you'll have a strip of aerial mapping with your photos draped on that, and then nothing outside of it. Which really isn't that good if you're trying to show the overall context of your project.

Built into InfraWorks 360 is a way to link to the Bing Map web map service and download that imagery directly into your project. So end the slide show and pop open InfraWorks. So as everybody can see here, I've got a model.

I've got a road. I've got some buildings in it. But I don't have any imagery. That's no fun. Don't like that at all.

So what I'm going to do is go to my Build and Manage my infrastructure model. Then go to the first button, which is Create Manager Model. And at the top, open up data sources. That'll open up this panel over here.

When you open up the data sources panel, everyone's used to living on this first button on the left. This is where you import specific data types. So I import a 3D model. I import a shape file, an sdf file, a Revit model you'll see on there, point clouds. We're going to go to some of those in a little bit.

But what I want to start with now is actually connecting to a database data source. So when we do that, you can see we can connect to Oracle. We can connect to MySQL or a variety of different databases.

In addition there's this Bing Maps section. What's that do? Well I'm going to click on Bing Maps. It understands I'm going to bring in image data. And it lets me define the resolution for this image data that I bring in. I want to point this out because this is something you can configure again.

The reason it's important to know you can configure it again is that if I was to import this at the highest resolution, we could go to the beer bash and come back and I could finish the presentation. It really does take a long time. But you're getting a third of a meter, so you're getting a one foot pixel resolution. So you're getting a really high quality image that it's got to drape to your model.

So I'm going to go with a nine-meter just to get this over with so that we can keep presenting, say OK.

As that data source and as you can see it doesn't come in. The reason it doesn't come in is because I then need to just go in, double-click on-- sorry hit ground imagery. I now just need to hit close and refresh.

It doesn't automatically close and refresh when you attach it. I wish I could I could tell you why. But It's just the way the tool's been designed. Now what it's doing is going out to Bing Maps, taking that image, which you can start to see appear in places.

And this is going to be really fuzzy. I brought it in at a nine meter resolution, so I expect to be really fuzzy. But you can bring it in again at that one-foot resolution if you want. And what you'll see is I now have surface data, image data, and my proposed design coming in.

So Bing Maps is high quality as you can get when you're zooming in on your Bing Maps through web browsing. And I'm not going to wait for the tiles to all load up. But hopefully you all believe me that I really do have that data in there. So Useful tool, we found it's useful because a lot of times, again, we have surface data I want to use, but I want some aerial imagery because I don't have-- it's either I don't have aerial imagery for the entire project, or I have aerial imagery that was from 1980 whatever. And I want more recent imagery.

And yes it will drape all my stuff on top of that image. It's just layering and loading it now.

AUDIENCE: Is there a coordinate [? machine? ?]

RYAN NOYES: You have to be mindful of coordinates anytime you're dealing with InfraWorks. But InfraWorks is a geospatial tool. It is coordinate aware. With things like the Bing Maps system, it reads the data in the web map service and re projects it based on what your model projections set up to. So it's pretty good. A lot of times when you'll start to get into the problems is with things like Revit, which is not spatially aware. SketchUp is another one that when you're coming in an arbitrary coordinates. But you have the ability within the tool to manually place items as well and transform them.

AUDIENCE: Could you run that ground overview twice, and have one lower resolution over most of your model, and

RYAN NOYES: And have a higher?

AUDIENCE: and have a higher resolution one?

RYAN NOYES: I've never tried it. But yes, we've got multiple imagery on other projects not from the WMS twice, but from different sources twice, absolutely. And it will, based on the order they're loaded in, it'll display in the specific order. The best example I can give you for that is a project you'll see a couple screenshots of here.

There is a roundabout that we built the project prior to it InfraWorks 360 having the roundabout tools in it. So to design the roundabout was a pain. And it was an existing roundabout. So I had a really high quality aerial image of the roundabout. I cheated and said, hey there's my roundabout. But since it was existing are just trying to communicate design, it worked fine.

So we'll go back and see still piling. and I will open this. Any questions on that? That was a good question over there on that.

And if you choose to use a database as a source, that doesn't mean you can't use imagery as a regular source as well from that next tab over as a data source. So you can mix and match. It doesn't all have to be the same type.

You'll see on some of these projects we'll have buildings that are shape files, buildings that are SketchUp files, buildings that you can tile that data appropriately. So next adding GIS data. Oh, sorry. Sir?

AUDIENCE: I live kind of in kind of in a rural area. It's probable that it doesn't turn into buildings [INAUDIBLE]

RYAN NOYES: That's where we're headed next. So what I'm going to show is using GIS data. When I say GIS data, it could be CAD data. To your point, I've gone in when the aerial photo shows the buildings but open street map doesn't have them and digitized them in CAD. Because in CAD, you can load that same being imagery in Civil 3D, sketch the buildings out, exported them as an sdf file and then imported them into what we're going to show here as building footprints. So excellent question and thank you for the lead in.

GIS data. What I'm hoping to go over now is we're going to show an sdf file, Which is just an AutoCAD shapefile-- actually I think is may even be a shape file, GIS shape file. Going to show importing that information as buildings.

When we import it as buildings, the next thing we're going to do is we're going to go over getting it so that every building isn't at the same roof height and then randomizing some roof slopes and showing how we do styles to the building facades.

Here is a slow loading project. Which I hoped would be loaded by now. There we go. You can see, I've got a nice crisp aerial image. I've got roads. I've got waterways. I got nothing for

buildings. This is the scenario you're talking about exactly. All right.

So we go back to that Data Sources tab. This time instead of a data connection, what I'm going to do is I'm going to go in and I'm going to import a shape file. So I'm going to access my shape file.

Again, I could have digitized these in AutoCAD and exported it using the map export as a shape file. I could have got it from town, city GIS. I could've paid an intern to go out and survey those buildings with a GPS. Any way you want to get those outlines, you can get them

So when you do that, I establish a connection. It doesn't bring that data in. I then have to go back to the Data Sources tab, double-click on it and configure this data. When we configure the buildings, first thing you have to do is identify what type of data you're bringing.

Because I'm bringing in a shape file, it doesn't know that it's a surface. It doesn't know what it is. So I go to the Type and set my types to buildings. When I do that, notice the bottom of the Data Source dialogue changed.

By default, we have a roof height of 33. We have a roof slope of nothing. It's always good habit to go here and check whether you want to drape or not drape your buildings to your surface. You also have the ability to clip them.

So if you were bringing in a city-wide GIS of your buildings. But you only had a three acre lot you were worried about, you can clip it to those limits so that you're not getting stuff you don't care about. And hit close and refresh.

When I do this, you're going to see a green screen. No, you're hopefully going to see a whole bunch of building footprints that are all 33 feet high. Now this is where we start to get into a little bit of scripting.

Does anybody here live in a city or a town where every building is 33 feet high? Perfect, Charlie I know that you did. This isn't the real world. This isn't that context we were talking about in trying to build an existing model. And everybody's building isn't flat-roofed.

So what we're going to do is go back into that file and I'm going to show you guys in notepad. What we can do is use JavaScripting to just use a math function to vary roof heights and and roof slopes. This is GIS data. So before I do that I should say, if you happen to work in a town where you've got GIS data-- or if your intern that you sent out to survey those buildings

surveyed them and put them on layers that were three floors, two floors-- you can actually mine that data out of the shape file.

And you can define either a transform on the data. Or you can actually pull directly from a field. If you had a field that was roof height, you could use roof height for that field. And it would build your buildings at that height. Same thing with roof slope. If they put slope in. I can tell you in all of the times we've used this, I think I've had one project where they had roof height in the GIS data set.

It's just not that common. I don't expect it. What are we left with? 33 feet is what typically people put it at. So within that what I would like to show, is there are a few scripts. And these are in the handouts, so you don't need to write anything down.

But you can see, that's just a JavaScript math function to do a random number and I'm doing a multiplier with it. So then what I'm going to do I'm going to go to my roof height field. I'm going to take that math function and put it into my roof height field.

I'm then going to go to my roof slope and just all I've done is change the numbers that I use in that function. Because I didn't want to 60 percent slope in my roof. And what this is going to do is give me building heights that are between one floor and six floors. And it's going to give me a roof slope that's between flat and 30 percent.

What do I need to do next to make this work? Because I've applied these. If I just hit OK it's not going to do it. You've got to close and refresh on everything you do here.

And as I point this out too, for those of you who are programmers in the room. I saw a few of you. You can actually write a script and paste that script right into here. If you do a lot of this, you can have a script pre-defined.

I'm going to go to notepad grab that script, paste it in. It'll do my building heights, do my facades, randomized just like that. Or if you're like me, and you like to use Notepad, Notepad++, you can keep them in there and access them there when you need to.

Going to hit close and refresh. And hopefully we'll see buildings that don't all look like little boxes stacked up in a model. There we go. We're seeing random building heights. We're seeing sloped roofs. Again starting to give a little more context to that model. It's a little more real.

So you can go and select individual buildings at this point, change the properties. If you have three buildings that are key your site, change them to be just what you want. If you have three buildings you want to delete and bring in SketchUp models, you made a village you can do that as well.

But we found that's kind of a useful way to really communicate a typical workflow for VHB is along the strip or around the site we're developing, we'll SketchUp model those buildings. And then outside of that just to provide context, we'll do just what you see here. Oh I'm not a big fan of just white or tan buildings. So the next thing I want to talk about is style rules.

So style rules are just that, rules that apply to how styles are used on objects. So when you open Style Rule palette, again off of this InfraWorks detail model, what you're going to see is a bajillion tabs here on the left. Each one of these tabs relates to a data type. Second one down is Buildings.

What I've done is created a building style. That building style rule will apply a variety of building styles to my building facades based on a probability set that I've determined. So there are going to be three times as many of this building as rundown. Because nobody wants to be by the rundown building.

So if I just want completely random, this is what I can do. I can also write an expression based on the information stored within that GIS shape file, so that if I had facade types-- and I have seen a lot of GIS data that will have facade types. So it'll have clapboard for siding, or it will have vinyl. Or it will have brick in the GIS data because assessors, I guess, use that information in assessing properties.

When I say a lot it's all relative. I would say 30 percent is probably close to what I've seen. So I could build that expression and apply the rules based on that expression. In this case, where I really don't have any data within my shape file that's of any value on this, I'm just going to assign some random styles.

And to do that, I can go in here go Add since Charlie's in the front row, I'll pick Charles and we'll say let's bring him in at because Charlie's really popular four times. Say OK and now what do I have to do? Run the rule and it will go through my buildings and apply those building styles randomized based on that rule style that I built up. Again building context so that when you're looking at your design, it's more than just plain, tannish buildings.

Any questions? And those styles can be applied to the road networks that you import. So you could set up a style rule for highway classification versus a local road classification that display the different road style based on that. But again, just a way of adding more context to your model that we found of value. Any questions? Yes sir.

AUDIENCE: Why does it appear that the river's moving?

RYAN NOYES: That's just a setting in InfraWorks. You can have it look like the water moves. Probably for this presentation, I should have turned that stuff off, to be honest with you.

AUDIENCE: It kind of looks like the road's down in the river.

RYAN NOYES: Hindsight's 20/20. And this is a model I grabbed out of Model Builder. Because I wanted to show that the situation that the gentleman over there against the exit door it's very valid that Open Street Map will have 70 percent of your buildings or 50 percent of your buildings. And when you get it-- I live in Northeastern Vermont. There are buildings up there, believe it or not. But Open Street Map doesn't think there are. So you have to come up with a way to build those buildings. Yes sir?

AUDIENCE: You wrote [? list ?] wrote a variable height to determine the script?

RYAN NOYES: A list? It's JavaScript. It's just a math function.

AUDIENCE: Does it come with it?

RYAN NOYES: Nope, it doesn't come with it. But it's in the handout. You can find it on-- there are a bunch of different ones. Like I've seen some really nice ones that do rounding too. I don't care about the rounding because it bases it off of the point that your building touches the surface. So one side of the building might be at 30 feet. One side if you measured it would be at 29 to the ground because of the way the ground slopes.

AUDIENCE: You were talking about a [? cheat. ?] You were saying there are ones that you've seen where it's just [? scripts ?] like online?

RYAN NOYES: What's that? Oh, scripts. Yeah, I'm sorry [LAUGHS] Yes, the discussion boards actually will have those scripts usually published in them. That's a great place to go if you go to the Google and type InfraWorks 360 building height script, you'll find it. If you put in JavaScript and InfraWorks you will get bombarded with scripts. Yes sir?

AUDIENCE: Question for you. If I understand right, so the heights right now and colors and roof forms are pretty much just random at this point.

RYAN NOYES: Absolutely.

AUDIENCE: Plan needed though, they're pretty much dead on, based on--

RYAN NOYES: Yep.

AUDIENCE: So, for instance, if you have an iconic building that's right near your property--

RYAN NOYES: Absolutely yep.

AUDIENCE: You could come in and just that one building. How do you modify just that one building to be-- maybe it is a five-story building with a blue roof that's so iconic, everybody knows that it's not a flat roof.

RYAN NOYES: Well so let's select this building and go to the properties of that building. When I go to the properties of this building and edit and select that building. Let's say that building is 100 feet high and has a flat roof. And I have the ability in here to set a manual style do that override.

And then what do I have to hit? I have to hit update. Because all of this stuff, you put it in. You close the dialog. No, not going to happen. So now you can see that building grew, the roof got flat.

I would say probably even more realistic, what you're going to do if you have an iconic building like that is you're going to go to SketchUp. I'm not going to open this model because it's kind of big. But I have Pittsburgh modeling here where that's absolutely what I did. I went and grabbed-- you can see it in the preview-- some of the iconic buildings in the area.

I went to Trimble warehouse and said, give me these buildings, downloaded them individually, placed them, off and running.

AUDIENCE: Can you export a known model from one [INAUDIBLE] to another?

RYAN NOYES: From one?

AUDIENCE: From one [? log ?] to another project.

RYAN NOYES: Sure, you can bring data from one project to another. You can do it. If you want all the

buildings, you can use IMX. If you had it already as an individual building because it was a data source. It's just a data source.

It lives wherever you had it. I mean, you saw me grab the shape file I could just as easily grab the single building and done that as well. You can copy. So the other thing we haven't gotten into is you can do proposals, too. So you can have your existing conditions be part of your overall master proposal. And then it will show up in every other proposal that you do.

So that typically within a project is how we manage it, as the gentleman in the back that said, well what you do with those buildings? You build your existing conditions. You customize it as much as you want. Then you start doing your design work in a new proposal.

Any other questions on that? Oh Yeah, I'm not going to make it through everything. So if there aren't any other questions on that, we went through some of the building heights. We went through the style rules.

Proposed layout into CAD. I think this one is probably kind of important to people because this is that first step into really using it InfraWorks. Because none of you are believers yet. I can tell that looking at your faces. But you're doing your hearing plan anyway.

And what I'm going to tell you is if you're doing your hearing plan anyway, then this is how we started using it at VHB. Someone gave me a hearing plan and I said, I'm going to have that as a 3D model by the end of this week. And so what we can do is everybody loves AutoCAD. So here's AutoCAD. I'm going to open up my model while we're going through this. And in AutoCAD, I've got my striping for that project that you saw at the start.

So I've got some pavement markings here. I could have my all of my stuff. So I could have my crosswalks, I could have all the stuff you put on a hearing plan. My pavement limits. What are all those things that we use colors for in CAD? They're all closed shapes, right?

If they're closed shapes, we can bring them into InfraWorks as coverages. And we can layerize them so that when we bring them in, they show like a hearing plan. But they're a model. They show the intent of that hearing plan, but at a much higher level of detail.

So if we go back to InfraWorks. We're going to go to another proposal so this is another concept that I'm working on. For those of you who are trying to understand what proposals are. And this proposal is named-- I need pavement markings.

So another thing I'm going to show you here is bookmarks. Does anybody here know what a bookmark is? OK, so this is like a favorite. So what I'm going to do is I'm going to go to my pavement markings bookmark. It's going to zoom into an intersection.

This intersection is this intersection in CAD where I've started to lay out my pavement markings. I've got this as line work in CAD. I want to bring it into InfraWorks. I'm going to use GIS to do that.

And what I'm going to do is I'm going to build a topology using Map. I'm going to apply a buffer to that topology so that I give it a width. Then I'm going to export that data as a sdf file and import it into InfraWorks. I see a few confused looks on faces. But those people are VHB people. They can grab me anytime.

So, here's my pavement markings, my line work. What I'm going to do is I'm going to go to the Map ribbon, which you can access through whatever workspace you work in. This is how I get to it. And I'm going to make a topology.

And I'm going to make a network topology. And I'm going to call it AU lines. I'm going to select it by layer because all my pavement markings are on one layer. I am then going to just say Finish. And I just made a topology.

Anybody here not think they can handle that? All right. So now we're going to go to buffer. I've got an AU lines network topology. I'm going to select that.

Now what I'm going to do is I'm going to say, well, my lines are six inches wide. So I'm going to add a 0.25 buffer to those lines. I'm going to make a new topology called AU shapes. And I'm going to put it on a layer called yellow lines.

I'm going to say Finish. Now notice we've got purple on the screen. What's up with that? I now have polylines that are offset from my pavement markings. Final step with this now? Map export.

So I'm going to make a file. I'm going to put it right here into the pavement markings folder. And I'm going to call it yellow lines. I am going to say select it by the yellow lines layer. And I'm just going to make sure that we treat closed polylines as polygons. And then I'm going to say Export.

Now we go back InfraWorks. And InfraWorks are back on this Create and Manage my model

data, back to data sources. And what I'm going to do is import sdf. Helps if you have Civil 3D, but you could do that same thing in Map 3D just as easily.

You could create a shape file-- plug your ears-- out of Bentley tools as well. So you could create it out of ESRI tools. I mean there's a variety of ways to get to-- yes sir.

AUDIENCE: It has to be a closed polygon, correct?

RYAN NOYES: Well. So no. You can also do this with any kind of GIS data. You can apply a buffer to a coverage area when you bring it in. I'm showing it this way because typically what you're going to end up doing is you're going to end up manipulating your line work a lot of times in CAD. And there are things when you get into detailed striping, like painted islands, that you really can't do by applying a one size fits all rule to the import.

So anytime you make a closed polygon a polyline, you could import it as a coverage area into InfraWorks. And that's the best example I can think of is pavement markings. When you get into the painted islands and stuff where you have to have holes, if you import with coverages and buffers, you're not going to get those holes the way you want them, typically is what I found.

So pavement markings, yellow lines. I'm going to double click, because I've got to configure it. In here, I'm going to find this as a coverage area. And the next thing I'm going to do is I'm going to go and say, I want it to be yellow.

I'm going to go back to my source, make sure it's draped. I'm going to clip it to my model extents. If I had striping for the entire city and I didn't want all, I don't know if they are going to have that, I'm going to say [? pline it ?] OK. And what it's doing now is it's draping those pavement markings onto my surface. Yes sir?

AUDIENCE: Are you going to go over how you can free standing road names?

RYAN NOYES: The standing?

AUDIENCE: Oh just the road names [INTERPOSING VOICES]

RYAN NOYES: Oh. I'm going to tell you the fastest way to do that. And then I'm going to tell you that there's an AutoCAD write up on the most difficult way in the world to do that, OK? So the easiest way to do that is there's a tool that rhymes with ketchup.

SketchUp has 3D text built into it. Download the free SketchUp write your 3D text and export it as an OBJ. That is the way to do it. And you can write the text, you can rotate it. You can get it however you want.

You can do it by creating text in AutoCAD, exploding the text in AutoCAD, creating regions out of the text in AutoCAD then extruding them. And then exporting it. If you just followed all those steps and you choose to do that versus doing in SketchUp, I'd like to have a conversation with you about how big your budgets are. Yes sir?

AUDIENCE: I'll stick up for AutoCAD. If you have the subscription, you can do it in Inventor

RYAN NOYES: You can what?

AUDIENCE: Do it in Invento.r

RYAN NOYES: Inventor? OK. Yes sir?

AUDIENCE: Also Revit will have it too.

RYAN NOYES: OK Revit does too? All right. I don't have Revit, I'm a civil guy. But yeah, SketchUp does it like that. You go to I think it's Tools, 3D text. And you build it.

So you can see our striping is in. There is that's a little bit of context to we're not going to get through everything. So I want to make sure I just at least show one more.

You can see I've broken out some other ones here. So turn arrows goes back to the irregular buffer really won't work well with the turn arrow. I'm going to go to my turn arrows. I just exploded them made sure they were closed polygons. Not barrier, coverage area. And color, white.

Now notice here, it's giving me a yellow, hey something's not right. I was lazy and I didn't define a coordinate system when I created that file. So I'm pretty sure it's going to be CT83F-- sorry. Feet, F-T. And close and refresh. And now I'll have my pavement markings for my arrows as well.

So I can take your hearing plan, turn it into a 3D model, pretty straightforward process. Surfaces? I would import my Civil 3D surfaces so that I had my right elevations for my objects that I draped to it, my coverage areas. And I would go from there. That's how we typically will do it.

I could spend all day on existing-- well, all hour-- on existing content I don't want to do that. So existing content, Trimble warehouse, great resource for existing content. GIS great sources for existing content. I know Autodesk is also working on better existing content through, you mentioned, Cloud Credits.

There's been discussions about trying to come up with a way to give us better content somehow. Because there's data out there. Pictometry, I don't know if you've heard of them. They generate beautiful 3D models that we've used on projects where all the building facades are applied, all the roof heights are right. And you've got a beautiful image in the background.

So there are sources out there for that data. Yes sir?

AUDIENCE: Is there some interaction with Formit and InfraWorks? Because Formit is huge for modeling and in drone. It's from Autodesk.

RYAN NOYES: I don't know anything direct. Yeah, if Formit can go to FBX, that would probably be your route around that. So.

AUDIENCE: Or you could go to Revit.

RYAN NOYES: You could go to Revit, too. So I will say this, I do want to put this one little bit out there about the direct import to Revit and the direct import in SketchUp that are supported by InfraWorks. The reason I have not highlighted those is that those actually use the Autodesk engine in the cloud to do that, which is sometimes version-specific.

So I didn't want to show those tools and have too new of a SketchUp model or too new of a Revit model. So that's one thing to think about when you're doing that is you may still need to have that tool on your PC to save back to the right version to do some of that.

So I would like to go into the vertical apps. But I have eight minutes left and I've got a bunch of different categories. I'm happy to take a quick poll. Do people want to see some of the vertical application roadway layout, bridge clearance, and analysis stuff? Or would you prefer to see how to create a storyboard and do things like apply your logo to it so that when you generate a video it says who you are and where it came from?

Roadway? I heard one vote. Storyboards we can do roadway after. You can come get me after, all right? Because I think storyboards are cool.

So the storyboards. Couple of things you've noticed. I've been navigating through bookmarks. The reason that I've been navigating through bookmarks is as we publish these models to the web, we can use bookmarks now to actually generate 3D panoramas. So you can give someone a link to a web page, say, go here look at my model. And you can have for every bookmark location, a 3D panorama will be generated in the cloud for you.

So on the wow factor, it's pretty cool to be able to send someone a link and say hey, look at these bookmarks. They click on the bookmark it opens up a little 360 viewer. And your client from the five points you wanted them to see your project at, they can see that project at.

So that's why you've been seeing me try to use bookmarks. I encourage you all to get more comfortable with bookmarks. Currently, any bookmark you do you publish that panorama for is only for your master model. It's not for your other proposals.

But you can see if they've already got it for our master, at some point, I would expect it to be in our proposals as well, that same ability. So what you end up doing is you do kind of a workaround. And you merge an empty master with your proposal in order to get those panoramas in the cloud. There's tip not written down a book for you.

So I'm going to go to my storyboard. And what I'm going to do is go to an intersection here. And to get to our storyboard creator, I'm going to go to Create and Communicate our content.

First thing I'm going to do is show you how to add a watermark. Because this watermark will show up in your web viewer as well if you give people access to your model. So watermarks are really easy. Go to the watermark tab, hit on the plus button. Then go to wherever you have your logo.

If you grab-- a little bit of file format. PNG will be transparent, so you can see through it. JPEG is going to give you a white block around it. I recommend PNG. I'm going to insert my VHB watermark.

So I can now say where do I want it. I can say I want it bottom left. I don't want bottom left. I want it top left. And now as I move around my model, everybody always knows I made that. And it was pretty cool.

So really easy to add that watermark. That will be available on the website when you send someone a link to that model. Took me what? 10 seconds?

The next one is so I want to generate a video. And let's say in my video, for the HTML folks here, I want to add a little bit HTML script that may be-- as I go by my building it shows my building rendered out really high at a high quality. Because the one I have in my InfraWorks model isn't that.

Because we haven't gotten that far with the design yet. But somebody did a sketch that we want to show in Photoshop or something like that. All right, but I want to show that.

So what I want to do is I've got a storyboard creator. And in my storyboard creator, what we do is we set up key frames. Key frames say I want to show from here to here to here throughout my model.

You can do it and you can transfer by-- you can go by speed throughout my model. So if I have a design road, my design speed's 50. I can browse it at 50. I can slow it down. I can speed it up.

You also have the ability to do crane animation. So I go to a spot, do a 360. Look up, look down, pan around. You also when you're doing defining camera pads, you can create a camera path from a design road.

So I can say, along this road run my camera. Or I could define a fake road and define the eight points that I wanted to show and fly along and import that fake road as my camera path. Tip in the tip drawer for you.

But now I want to show something cool on my video. Whether it's my logo, whether it's like I said, as I go by this bridge, we haven't designed the bridge yet. but we've got a rendering with lights at night or whatever. Or I want to show something cool. Or hey, this road is the access road to whatever I want to show whatever that is.

What I do? I want to add a caption. Everybody thinks caption is text. Notice down here. HTML. We love HTML.

So again, really simple HTML script. I copy this HTML script so what this HTML script says, here's the body my script. This is my line of code. This line of code says, what's the height and width I want to show for this image?

So what I'm going to do. I'm going to take that caption and I'm going to slide it from 0. And if I would've been paying attention to where I placed it to let's say that's in the first 20 seconds I

want to show that image.

I paste my script in. I again, just like with the watermark I have the ability to say, OK I want to move it a little bit this way, a little bit that way. Now play at my storyboard. And you're going to see I can move it and place it. And when I generate my video, that HTML content.

Someone has asked me this. I haven't tried it yet. Since it's HTML, I assume anything you can embed in HTML, you can embed in here. So you should be able to do a video within a video in here, I would think, without any problem.

AUDIENCE: Can you do a bookmark inside the video?

RYAN NOYES: A bookmark?

AUDIENCE: A bookmark that you created. Like a 3D panorama that you just said.

RYAN NOYES: Oh no I haven't tried. I don't know how I would do that. I would have to have a viewer embedded, somehow. I don't know of a way to do that-- post processing? I would expect yes you could do it in like a Adobe Premiere or something like that. But I don't know how you do it in the core.

AUDIENCE: My question is is your settings from the [INAUDIBLE]

RYAN NOYES: And so to generate the video. Because I didn't get to that, sorry. I wanted to hit on that.

Generate video with a variety of compression formats. You can set a resolution. Also another thing that's important to do within this is set your bit rate to keep it from being choppy. Higher bit rate, bigger video file, better quality.

AUDIENCE: Since you're writing the HTML code in there for the captions, would you be able to make that clickable so that you could take them to a different theme?

RYAN NOYES: Not within the player. When you click within the player, the player stops. So I have run to the end. I apologize I didn't get to go through everything. I've got to tell you, I was hoping for 90 minutes and got 60, so. I was happy to get as much of this as I could in.

The handout covered some of the stuff on the roadway stuff that I didn't get to about doing site distance and doing clearance checks. So I apologize I didn't get to all that. But hopefully this was valuable to you all. And go to beer bash.