JEFFREY LYONS: OK I guess we'll get started. My name is Jeff Lyons I'm from AEC Solutions and my presentation today is called Show Me the Money! We're going to review AutoCAD Civil 3D and its potential as a cost estimating system in combination with a third party system built by myself and my partner. So I guess the good news about this stuff is it's something that you can implement today. It's not something that's futuristic or all of the great stuff that you see on the big stage. This is something you can actually use today. So what you're seeing isn't future-type stuff, you can get your projects configured and actually start doing this as soon as you can.

A class summary, if you're not aware of that. I'll just skip that. And these are the learning objectives. So it's not going to be a CAD standards course. I assume everybody that's here is probably a CAD manager already, possibly a design manager. CAD standards is coming back now. In other words, we talk about BIM, wonderful model-based design, wonderful, but the root of the system that's being shown today is based on good CAD standards. So I've been a CAD person for 20 years and CAD standards was a big thing until BIM came out. So using these processes, you can now recognize why they've become important again. In other words, we're back to our basics, right? Layers, blocks, Civil 3D objects with styles etc.

So we will look at some of the Civil 3D product offering. In other words, what's in there today. I won't be showing any video on it because we'll go through why it has some gaps in it. We'll look at the property set. So when I saw property sets, as a programmer for most of my career as well, we used to use x data to define properties on objects if you're a map 3D user, we use class feature classes. So finally they've made attribution of any object available to the masses. And the funny thing is, I think it's been available in the product for 10 years, but now it's finally exposed. I found that out during the presentation preparation.

And then we'll look at AEC Design Estimator, it's our product. I didn't necessarily want to show a third party, but I think that when you see it, you'll see why I'm so passionate about why we built the product. In other words, I'm from the business and we just weren't getting what we needed out of the current product, and I used to work for Autodesk a few years ago, and they kind of gave me the thumbs up that it's appropriate. So I hope you guys are patient enough and understanding enough to see what we've done, and hopefully Autodesk will take note as well.

OK so, like I said, I've been in this business for a long time, and I used to be in the concept design, detail design field. In other words, a CAD manager, designer, programmer. And the data for us always stopped right there, at detailed design-- And my point doesn't work. So what I noticed is all of the great Civil 3D stuff, all the layering all of the counting, always ended at design, and the contract administration in Canada, we call it contract administration, those guys, in some cases, would put a scale on a piece of paper after we just did a pipe network, because they don't trust it. So I found that hilarious because they think that the labels on the drawings are like typed. I mean, some companies think that's still the case. So when they're like, oh we got to check the link, make sure it wasn't typed in wrong. OK well, you know, 2001 called, right? They want MText Editor back.

So contract administration was a big area where I saw the downfall of BIM in civil engineering. It ends there, and then all of the other stuff became a cost extra to companies. In other words, when you're dealing with asbuilt reporting or asset management, essentially, this was a cost to a company, because the data stopped at contract administration. In other words, the beautiful Autodesk world of GIS couldn't get past construction, at least in civil infrastructure, that's what I noticed. And so the products we designed pushed that data through, finally, and in an easy way. And you'll see that in a second.

So this is what I call BIM beyond design. All the stuff, the oculus, the wonderful 3D stuff, even the 3D on tablet, that's great stuff, right? But this is very much the 2D, it's all about the data, this is about information. So when we get into cost estimating, you'll see why it's important to have good standards and good data. Bid preparation, the mobile construction, in other words, each one leads to the next, right? And this is what my partner and I have succeeded in doing over the last three years.

OK so I love those cartoons. You guys probably all love them too. And so that reminded me-- when, I first started doing the presentation, that was us right? We all used to talk about CAD standards-- Whoop, I think we're effected there. It's OK. So in other words, we are going to talk a little bit about that. And because, especially with property sets, we really want to be standardized in this information.

OK so I guess that was the point I was just trying to make is I don't know how long you guys have been doing AutoCAD for, but for me, even the recent meetings I've had, people are just like, well you know how can we trust the CAD guy? Oh, come on. I don't know how to answer

that anymore. So let's pretend that everybody does CAD standards. First of all, they have one. Blocks are blocks, you know, a catch basin could either be an object, or even a block, called a [? CV. ?] Not four lines. Not a polygon.

So anyway CAD standards leads to predictable workflow. So as a CAD manager, I was what we call a benevolent dictator. So basically, I was rewarding everybody. Some of my guys are here today, they can attest to that. And others, we had a lot of fun with standardization and making sure everybody knew the rules. And when people broke the rules, it wrecked the workflows, right? As a programmer, I was dependent on conventions, not necessarily a system that was all debugged, right? In other words, people had to do things properly.

So once you have a predictable workflow, you can get into accurate quantities, and of course, cost estimating. That's what we're talking about today. OK so, oldie but a goodie, that was my old icon editor. So, anyway, the central network access, OK, CAD standards, of course, layer management, block management, a CAD standards manual, God forbid we should have one of those, and a workflow manual. So, oh, I'm going to trip on that today. The workflow manual was actually very important because CAD standards were one thing, but how to do things step by step was a huge part of the process, right? So you really need to think about that when you're doing cost estimating preparation.

This is something I came across doing the presentation. You might find it interesting. It was the Autodesk Screencast free download. As a CAD manager, people would come to me and say, how do you do this? You know, and it's not in the manual. So I used to used [? Jing, ?] I believe, but this looks pretty good. So the Screencast allows you to do, you know, these 30 second, one minute videos showing process, and then you post them on your corporate site or wherever. So that's just a little helpful reminder.

OK and that's kind of what the interface looks like. So I posted one for property sets when I was doing the demo, so it's a nice little embedded interface. For everybody over the age of 50, you might actually recognize that. So, again, as a CAD manager, I used to make these layered navigator menus like all the time so people, junior people, could actually pick and choose, you know, how to actually do the drafting without knowing the layer convention. Why do I go back to this? It's because when we get into cost estimating we want to make sure fencing, curbing, all the 2D non-BIM objects are layered properly. In other words, the beauty of what we're going to show here is Civil 3D is great for object-based design, but there's a heck of a lot of stuff that we have to count that's totally 2D and will never be 3D.

At least, if you talk to the Infoworks guys it might be different, but for us on a day-to-day basis, like even the catch basin leads, I use lines or polylines some. I don't actually model those. So if it's for a municipal job, I'll model them for clash, but for a subdivision, not really. So I'm not exactly pushing the Civil 3D to the max here on some of these object types. So you can create a nice little layer navigator through the CUI if you don't want to write code.

OK so this was sort of the defacto out of the box tool that people use for block counting. I was going to try and do some live demo and show the value but honestly, it was good for block counting. It'll do [? P-line, ?] and counting, and lengths, and stuff like that. You see the word alignment and structure, but it doesn't actually do anything. All it pulls is the layer name and some, basically information you don't really, can't use for cost estimating, but this was sort of out of the box counting. If you guys have another out of the box counting system, because you know I don't do this every day now, maybe you should let me know. But this is the one I used to use and before Lisp came along and VBA, so most of you may have downloaded extensions and there is just so much available on the net around this.

So you can download some $20 extension that will produce spreadsheets, and you might even go back and forth, but the reality is that these routines extract data. They don't do cost estimating. They don't pull properties. All they do is counting, and if you want it customized, you have to code it yourself. And that's fine for your company, but what if you have multiple offices throughout the country? You know, there's no real standard there, especially when it gets to contract administration. Remember that we were talking about that? In other words, designers love this stuff. But contract admin? Give them a spreadsheet, they're going to double check it, and they're going to wonder where you got it from, and all this other business, so--

OK so that was the CAD-- that was Part A. So that was the CAD standards kind of recap. Last year we did a thing on QTO, in other words, the Civil CD product. And in preparation for QTO, I saw that it was close. In fact, our product, we built a plug-in for it and found out nobody uses QTO. Or some people do, but it wasn't in demos we've done. I always hate that when the presenter asks, how many people use QTO? But does anybody use QTO here? A couple of people? OK. So that's good. That's better than what we were doing before.

So QTO is actually so close, and I'll go through the issues here. This is great. You've standardized your catalog, your pay item catalogs. You've got a description field. You've got a

pay item code, units, things like that. In other words, it's thinking in the right track, for sure. Problem is, look at this, it's got an item code 30401, you know, and then it's got a long description, keep that in mind, the word long description, I'll be coming back to that. In other words, it's importing aggregating c. OK, well, from my view as a programmer, I see properties getting pulled over there.

The idea of querying just the item code for a cost means you're in dangerous territory. You don't know if somebody's actually got the right material type, or the right code. In other words, you've got an awful lot of pressure on these long digit codes. A lot of responsibility for the CAD person who probably doesn't know anything about the codes, but they do know it's [? agrating ?] c. OK? Or some other pipe class. That's their job, right? So why not do cost estimating based on properties? And that's what we're going to talk about.

So it'll do both Civil 3D and the AutoCAD objects, so that's great. Of course, your CAD standards are very important for this as well. And it'll do all of your pipes and essentially-- Just a second here. So when you get into counting, I believe, maybe you can correct me, but it doesn't really do layer filters or queries, it does supply selection sets that are saved to the object. So if you create new objects, you have to reattach. Probably you guys know more about it than I do. But it was a little clunky. In other words, it didn't feel right, for me anyway, and--

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: Yeah.

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: That's right.

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: That's a good point. That's true. So that's what I noticed when I did the demo last year was the pipe networks, if you preassign the pay code, then it's all good, right? But after the fact, if you didn't preassign the pay code, you have to go and attach them all. Yeah, that's a good point. And it produces, again a flat file, which is item code, description, quantity, and unit type. So you're still back into that whole kind of thing where what really information is giving me? Does it give you depth? No. Does it give you-- I think it does do station offset in some cases, but it doesn't really come up with material types and properties that you can really use, right?

So there's your assignment there. So if you're looking to assign these pay codes to the actual parts, you would do it through the parts list. And, of course, you have to be super organized on that. Make sure all your templates are up to speed. This obviously works really well, all of your road corridor materials. So the compute materials option in Civil 3D is still used by everybody. It does average end sections and does your materials and your XML exports. So last year we had built extensions to suck in these XML files into the product, and so this was actually a pretty good one. That's very much used by everybody I would think if you're doing corridors. And because we can grab material types, it makes it valuable, right?

So Part C, I don't know how I'm doing for-- I'm well ahead of schedule, but some of the videos I'm going to show coming up, there's a bit of a slow pace, so we're ahead of schedule, I think right now. If I'm going too fast, maybe one of my friends can let me know.

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: What I'm going to do is, I'm going to post the PowerPoint in the videos, and sorry I didn't get that up sooner, but if everything was embedded and then it wouldn't upload. So now I got to pull it all out and put screen captures in. So, yeah. Any questions so far? No? OK.

So Part C is about the property sets. So this is-- I had helped Autodesk do some 2017 launch material in the Spring, and when I saw the property sets I thought, wow, OK, this-- You know, my mind started swimming. And I thought, this means we can start actually putting in real data without having to go through Map 3D. They sort of did an automatic property set thing for the corridors which was nice, so that gave everybody the ability to look at property set data, or attributes, in Navisworks, and pull from that, if you needed to, in Navisworks.

So, like I said, the property set styles are very easily created by any CAD manager. You can ship them through your template, and it attaches to any type of object. Anything at all, like every object. So when we get into enhancing the object for labels, in construction info, asbuilt records, these are the three samples I'm going to look at, and they were just things that I came across that we can start using today. So that's what it looks like in the properties tool space. So that's the corridor information from your extract solids routine in Civil 3D, and the demo will show that.

Before we get into it, I don't know if you are in charge of your updates, but these were the two updates that are required for the property sets to be displayed in the Civil 3D labels. Again, in

preparing for this session, I found it kind of interesting that the out of the box download doesn't have it embedded already, but that's the way that life is, right? So it's very important that you get those. You can't do it otherwise. You can still attach property sets, but you can't use them in your dynamic labels. It's specifically the enhancements one.

OK so we're going to look at four examples of property sets which have a bright future. OK? So simple bounded volumes. The watermain alignment and profile, interesting idea. Watermain could be swapped out for the word utility. So part of my work is a lot of utility coordination. So this is a big idea. Asbuilt pipe networks and, of course, corridor solids. So this is our first video and for those that do what we call [? subsite ?] or bounded volume calculations, I thought it was an interesting idea that we could attach the properties of the bounded volume. So, for example, topsoil stripping. This is the easiest example here. This means we can have a topsoil stripping property set style. You can attach it to any object, so the sky's the limit. Of course, it would mostly just be a 2D polyline. And then you can start adding your attributes, or your properties. So pretty simple, just like a block attribute. In other words, think about block attributes for anything. And the good news is, you can attach not just the string field, say for a property, but you can attach what they call an automatic feature property. So in this case, the area of the polyline. So that would be automatic.

The third step we have here, is to set up a real number, so you can text, automatic, and real. You can set up a feature property function. So you can now type in the volume, and double click, and then put in a little bit of math. So you can say area times depth. So there's your volume. So now as you're creating the bounding areas, at least you're getting an automatic volume calcque for topsoil. That's a pretty simple example, but it kind of introduces you to the idea of property sets. And using select similar, if everything's layered properly, you can attach the different depths of topsoil, or pregrade above the cut fill. So in Canada, we use a lot of what we call subsite bounding volume calculation, where the earth calque is lowered by the topsoil depth, and then lowered also by the pregrade.

So I'm not sure if anybody knows my background, but I had a product that would process this stuff, but I had to have a whole interface for tracking pregrades and topsoil. Now I'm thinking, let's just use property sets and hit a button. So that's another bright idea. But it's a really great way to do this stuff. Now, if anybody in the room has found a way to export that, maybe you can let me know. Anybody? So again during the session, Chris and I are going to provide a property set export, probably on the app store as part of our regular deliverable, because I

phoned them up and I said, OK, what the heck? In other words, let's get this data exported. So we'll provide two forms of export. Right, Chris? Chris is my partner here. So we'll probably do an Excel export of all property sets just a dumb export with tabs.

And the second thing I'd like to do is do an export SDF for infowork. So because I'm in the utility business, I can see this being huge in the utility business for exporting the SDF because then you get in properties for what you need for utilities, right? So at the end of the session, get, all my contact info, and then you should be able to download something useful next month.

Right. So the second one I found interesting, and maybe I should get everybody to put their hand again, eh? Does anybody use pressure pipes? Some people. OK, well that's good. Awesome. So you can use pressure pipes if you want, and ignore me and check your email. If you don't want to use pressure pipes, this is the other kind of interesting example. And when I saw this I was like, all right now we're in business. So this demo shows me creating a watermain alignment because-- Or it could be, if you want to call it watermain, you could call it a utility, [? valve, ?] you know cable, whatever. So this is showing, obviously, first principles. I do have a bad habit of, from my old days of training people, my videos get very granular. I can't seem to cut anything out because, I don't know, bad personality type. So what I do is I speed them up. So here's the deal, is you can create these alignments the way you normally do. And because you can use property sets on anything, you can use them on alignments, you can use them on profiles.

So if you can imagine you're creating a profile now of your watermain, and if you have a change in pipe size, just make another profile. Potentially. So that means you can have a common alignment with different sized pipes. And then in the profile view, you would make a style. And we'll show that in a second. So when you go to label these things-- Oh, we're actually going to go back and make the property set. Sorry, got kind of screwed up there. So this is really like you're faking in a pipe network, and this, like I said, you can use this for service connections that are 2D, utilities, watermains, basically any linear structure that you want to give properties to.

So I think this is one of the longer videos, so diameter and material type would be two pay item type properties that you'd want to do cost estimating on. So if we've forgotten, remember all of this is in CAD standardization mode to do cost estimating. Because we don't want just a dumb polyline that says it's a watermain, we want to know what size it is and what material it is. What

class it is. Right? So a lot of CAD people won't actually do that work unless there's a side benefit. In this case, we can label it. We can attach that property to the labeling dynamic labels and we'll get there in a second.

Here's me doing all this hard work. So just bear with me.

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: Good question. No.

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: Project it? Oh, like a feature line? OK. Good idea.

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: Yeah. That would be an interesting test. I didn't try it, but that would be good. Yes? OK. Do you have a question?

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: Well, you know, if you get the properties in there-- Let me just stop the video for a second. So once you get these properties sets rolling-- Oh, sorry about that. OK. So this is the thing is, if we can get an extract out of this thing, we're back in business, right? We've got all this great Excel data now that actually has things in it, and all of those properties can be labeled in dynamic labels. So like, I don't know, I mean, I guess I'm a geek, but I get excited about that, right? Because there hasn't been a good way to do it. Remember like trying to label a pipe [? class ?] on a pipe network was like, oh, I have the description field. That's it. So, I mean, God forbid you should say it was in [? rock ?] or something, or some other property. Yeah?

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: Yeah, we're still fairly early on with this stuff, but I mean we're trying to-- I wouldn't say we're racing against the clock at Autodesk, but I don't know what their plans are. I honestly don't. Yes?

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: Yeah. Well-- OK. Then I think, you know something, I don't mind pressure pipes. I like them. But some people like to use just profile. Some people use a polyline. You know?

AUDIENCE: It drives me nuts.

JEFFREY LYONS: Yeah, that's right. So at your company, you could put in extra information on the pressure pipe, right? Yep.

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: Are they? OK. That's right. Yeah. This is just an alternative, like an example, of a dumb 2D alignment or profile.

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: Yeah, so the only way you could do this through SDF into InfraWorks Because then InfraWorks you'd get the properties and you could just apply a diameter size to the style of the InfraWorks model, right? So InfraWorks? No problem. Navisworks? Again, we'll have to-- We've got routines that we use on our projects, like Chris and I both work on real jobs too, and so we've got a utility management thing that will project solid on a profile, right? So for us, we like this, right? And we'll probably release stuff like that in the coming months, right? But I see totally where you're going.

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: Yeah.

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: Yes, that's right. Yep. All the utilities, like on these big jobs, 10, 15 kilometers a utility, you're looking at all the utilities: gas, bell, cable, electrical, all these things need to be projected in 3D. So I use alignments and profiles, and we have a routine that projects them, right, in 3D for Navis. So, you know, pressure pipes? I think they have-- a lot of people do use them, some people don't. This is just an example of the using the label style all right so...

Anyway, let's go back to that. So you guys all know how to create a style anyway, but the great news is up here they have, I missed it again, but they have a property set tab now. So if you've associated a property set style with an alignment and profile, it tells Civil 3D, oh, they must-- maybe they want to label it. So you can actually apply the label properties. So when we label the alignment here, or the profile, it's-- I think I'm going to create the style here again. Yeah,

just give it a second. So even a pressure pipe that doesn't label right now, you could attach a property set to it and just bypass the pressure pipe system. So that you can apply that property set now of diameter here.

Now one thing you can't do, which is a little disappointing, is some of the automatic feature properties for a pipe don't come out in the property sets. So that's bothersome because why would we want to label the length if we know the length already? So I'm sure they're going to fix all that. But this is-- In Canada for municipal jobs, we'll use a profile too because the municipalities want to see the obvert of the pipe every 20 meters or something, so we'll use a profile for all our watermains, and then we get our banding for free.

Anyway, this is just some basic examples. This is the other one I really liked. It has a long-term feature functionality. Again, we're going to set up a real easy asbuilt. A long time ago, people would explode, or maybe even today, they would explode their pipe labels when the asbuilt data came in, and they would strike out the design information and just type in the asbuilt stuff, and they wouldn't update the Civil 3D network or anything, even if it was off. So this property set system could be used actually as a way to do those asbuilt labels, those very specific style of striking out the design information. So if you're really good with setting up styles, you can just attach the asbuilt slope and the asbuilt length.

So the funny thing is, with this example, I actually tried to put in the start invert and the ending invert, and put in a length, and it would calculate the slope. You could do it, right? Problem is I think the guys at Autodesk they didn't-- You can't label function. I couldn't get it to work. So if you want, maybe we'll put that on the bug list or something, but it didn't understand what I wanted it to do. It just gave-- The formula got labeled in the label, so maybe that was me. Yeah, instead of the result, it labeled the formula that I built. So they have some work to do on that.

So the great part is you can label your pipe and if you go ahead and add the property set data here, just give it a second. So think about all the asbuilt labels that you want to add, but you don't want to adjust the pipe. You know, because for whatever reason, right? The job is three years old and you don't want to break anything. You know? Anyway, I shouldn't be like that, but it happens right, people explode things and then the data is gone. You don't get any asset management. Nothing. So there's Jeff doing the full stylization demo. OK. So we can go ahead and throw in the asbuilt labels now and you get the point. OK. Oh boy, that took a while. And that's our result right there.

So what's happening is I changed the label style here. And now I'm going to attach the asbuilt property sets to the object using the lower properties button. And soon as I do that, it changes, right? Dynamically. So you could get pretty inventive with asbuilt labels on anything. Could be a structure, right? So this is awesome because now we have an ability to tie that pipe to some real data. Potentially going to SDF, going to Shapefile, Excel, whatever you want. So that's an output, imagine if you had an input. Just put that in the back of your mind. In other words, you send the crew out to do survey, they're giving you a spreadsheet, you could update your asbuilts. So there's all of a sudden this whole world of interesting stuff that was only GIS capable, right? In other words, finally. OK?

The corridor stuff. This is important for the cost-estimating system because-- 8:37, doing OK. Because Navis and all these other guys, they want to see the solids. If you haven't touched this corridor, it's a solid thing, it's really amazing. It's been part of the product for a couple of years now. I just put in the simple layer name. So again, you might want to come up with something a little more elaborate for your layer name. Like maybe street name dash code. Something, I was thinking about it later but... So the cool thing is you can very quickly export this stuff to your standard layering system, and the result means that you've got all these 3D solids that represent the actual corridor. So you can get area and volume directly. So it's automatically assigning the property sets, you didn't have to do anything there. And of course we're going to send it to a new drawing, like a solids drawing, and that can be put into Navisworks. OK?

So imagine if you have your road solids, and all your nice utilities, and pipe networks, Navisworks can be a real part of what you do every day. I know I was sort of lukewarm on the thing for years and then the last couple of years, I love it. Just for looking at stuff, you know, and doing clash. It's easier than you think. So there's your 3D solids all ready to go and it's all layered properly, so the sidewalks, the pavements, the granulars, they're all on their separate layers. So when we're looking at cost estimating we thought, why not just use the solids instead of using the QTO and the reporting and there's all these different methods. Why not just use solids? And of course, they all have the property sets already embedded, so you don't want to do anything there. So there they are.

So this is sort of what you can do quickly if you haven't seen it. Navisworks you just attach, or pen the drawings. You can put all of your civil objects-- I notice 2017 likes pipe networks, I don't know if you've noticed that. Maybe '16 did, but I didn't check it. But I was pleasantly

surprised to know that I could attach directly the pipe network. And of course when you're in Navisworks you're getting all of the Civil3D stuff appear here, including the new property sets. So I haven't tried exporting and doing a whole session on 4d and 5D, but probably next year we'll talk about that. But the concept is if you can get the data in Navisworks, you have some potential for actual BIM-related activity, right?

All right, so it's breaking up all of the solids here. OK? And you're getting your volumes for free. And so everything's layered beautifully. No work. Even the corridors are much easier in 2017. Like I'm not just trying to promote it it's-- I think there-- It's easier now to model an intersection than ever before. And I think, easier in future versions as well. So I've attached the watermain there, so if we actually can do a projection of the watermain and utilities, you can really see the benefit here. And so there's your pipe networks and the profiles are just, they look like 3D polylines in space, but so if we have a nice little routine that rides along and projects the shape over it, that will be great.

And so now you're seeing that whatever object you pick, including the asbuilt here, here's the asbuilt information we put in, right? So I mean, that's amazing. That's something we can use. Everybody convinced? Property sets?

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: I haven't found it. Like I Googled it, and I tried, and I looked and I talked to my partner I said, I hope I don't get to AU and find out there's a way to do it, because I couldn't find it. I thought, as a developer, why would you build the tool that does all that wonderful property set management and then not put an export method? I think they're coming up with stuff. Oh, sorry. Yeah, anyway, we'll probably come up with a way because it's important to us in our own business. So we're going to do it just for ourselves and you guys will get the benefit because, like I said, Chris I do a lot of project work as well when we're not doing programming and other things.

So this is the exciting part. Now that you sort of you're getting in tune with my thinking it means that, if we're attaching all this great stuff, it means we can actually break through the contract administration wall of dumb data. It means that we can attach any type of property we want to these objects that's meaningful to contract administration. You know, it could be anything, as you know, that's important to them. Including cost data. So the cost data is important to designers because they want to be able to quickly come up with a cost scenario, estimates,

actual full blown bid tender.

So there's all kinds of opportunity now to go from a quality quantity takeoff, to an active bid. So how are we doing that? We use the product. It's a subscription product. Don't walk out of the room just yet. In other words, I was mentioning it to Chris. I mean, people are selling drones with add ons, so this is-- Picture this is your drone. In other words, this is what you need, and Autodesk doesn't have it, we have it. And they like the idea of me showing it.

Auto Tender-- AEC Tender, Auto Tender was a long time ago. So this is what your contract administrator would do. They would set up a project online, they would select a tender template. So this is like copying a spreadsheet. If you're using spreadsheets for master lists of items to do a tender, then-- And let me slow that down a bit. So what you're seeing is on the left hand side, all your projects online. They're available if you're a huge corporation, the entire country, you can have all your projects there. It's a cloud-based product using Microsoft du jour. All of the section data here, if you're familiar with estimating bid preparation, this is all configured by you. In other words, it's just like QTO where you have a template for all of the items, all of the section tables, we have the same system. You build it online. It means a subdivision site plan municipal, you know, any road reconstruction you can have all your own templates to match whatever type of project it is.

So very much like the QTO idea of a catalog, [? payum ?] catalog. And so this is an online system so if you have staff, this is the interface. In other words, that you would pick something and that tells you the short items here. So it says, OK site preparation, this is a manual entry of units and quantity pretty rudimentary.

But it does slow that down. So what's happening is it's everything from insurance, to bonding, plus all the quantity stuff. So this isn't just a quantity take off to get numbers, this is the bit. This is the tender. This is the cost estimate. So all of those items are managed by project management or contract administrators. So when they set up this stuff, they're going to say, hey, I just set up a project. I'll put in all the other stuff that's not CAD-related, I need all of my quantities from you. So we knew that was happening and they were putting scales on drawings and we were getting tired of it. So what's happening is to back up the value for them, we put in automatic cost-estimating, which means for every tender that goes out and back again through Excel you have an upload feature that you can upload all the unit prices from every single project you do.

So, over time, you'll have a history of jobs, local jobs, your projects. This is all the pricing from the contractors, right? And this is the actual building price. OK? And so when you drag and drop, or import from CSV, or QTO, or Excel, that was what we used to do, people still do it. They can import all of this stuff, import the selected items.

When they select-- Just a little tidbit here. Right there. OK so this is important. Because a lot of bids still require what we call that long description item code long description quantity you know we knew that producing attender with all these columns and data people love this long description. So this is just like Civil3D.

We stole that. In other words, it's a style for that template. In other words, this is a subdivision job we want to label the name of the structure, the diameters, the type, and the depth as per street or whatever, or standard, so these are just properties that get filled in, just like Civil 3D styles. So that was a total rip off and there it is right there. So when you actually see it in the tender, it looks very familiar. In other words, these are all your properties now being used. So that's the difference between QTO and this stuff. It means when you change the size of a pipe and lower it and put it on a different alignment, you're not looking for a different item code to where this pipe is from and this depth of this depth, so it's a different item code.

This is all property based stuff. So when it does a cost estimate, it's actually looking for a 250 PVC as per this class, right? It's--

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: This is, yeah. This is coming out of Civil 3D. Yep. Because you can get that kind of good stuff with pipe networks, but the thing with property sets now is you can get this from like if it's your water main that's a polyline you can also get the diameter in the class now. So that's kind of where we are going with this, right? So there's your cost estimate right there for-- So as you're-- Imagine that you're in the office, somebody has a quick estimate they need. You just set up a project, import the template, go to CAD, extract everything you need, you've got a cost estimate with good data.

So that's the gap that we're filling here. So these are just the three different ways to import. And the beautiful part is, everything-- This is all a single interface. And you can check how it's getting cost estimating, we'll get into that in a second. And the wonderful part is that the product always produces Excel. And this is all configured by you. So this spreadsheet is what the bidders see, this is what your client sees, your project managers. In other words, they're

like, wow last week I asked for a cost estimate and it looked kind of funky, it didn't match the other guys.

Now all of a sudden everybody's doing it the same way, standardized, the data capture's the same, so everybody in the office is now standardized through using Excel here. And you see the yellow fields? This is a password protected spreadsheet, and the yellow fields represent the unit cost. So you can give it to your bidders, they can type in the unit costs, email it back to you, you submit it back to the system, you've got all their costs. So if you ask for six bids you'll get six different prices for the same item.

So therefore we know that a 250 PVC SDR35 at 2.7 meters is this much money. That's how we're doing it, right? This is like an intelligent system. And it's all built through Excel. So your bidders don't see a difference. So we had a meeting with a construction company recently, and we told them about the system, and I said that engineers that they work for will know not just the cost estimate but they'll know how much you're going to bid on it because there's other things we can do with the system. So we can actually isolate it to the bidder, the location, and all that other stuff. So you're getting the point of where properties can really benefit. Yeah?

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: Yeah. Yes. So you suck in all the bids, we'll do graphics, high lows and all of the spreadsheet you normally deal with does all the comparisons, we put it all together and produce the Excel report. Yep. Good question. It does a lot. Like we don't want to go down that road necessarily just now. But so this is kind of where this is what the session was about and I think that's why the guys at Autodesk let me do it is because we identified that there's only a couple of systems on the market and they all do this. They do weak.

In other words, item coding description, like [? Ashtaware. ?] I don't know if anybody is from DOTs here, but we looked into Infotech's [? Ashtaware ?] and it does item coding description. It's like you can't get anything good out of that data. This is what we need. We need the actual properties and this is where you go from good to great, or very good, and this is where you can tell the system because everything was [INAUDIBLE] located so you can say, this job in Las Vegas compare only projects within 200 miles for the same thing. You know, it's a public private, which means your project based estimating system.

So these are your three levels of costs estimating right here. And that's what BIMs about. So BIM processes supports property based cost estimating. In other words, we tried to do this

with Infoworks last year and it just wasn't there as far as the back end database, but Civil 3D is there now. It's ready to go. And Infoworks I'm sure will follow along. And we'll just do a time check. OK, so we'll have to kind of blast through this a little bit because I talk too much. So the standards catalog, this is just a bit of a background into how we're doing it, so you understand when we get into the CAD--

And let's just talk about the screen. So, like insurance, nothing to do with CAD. But it's got a catalog item, it's got some properties, basic properties, it's got options. So when you're dragging and dropping insurance, it's prefab. You can drag that in and be done with it, right? So this looks a lot like the pay item manager in Civil 3D. Right? So site preparation. Again it's still just got item code and description because the descriptions are pretty specific.

OK, so when you get into this-- Hopefully that will be it there. So like curb type, now you're getting into actual property base. So instead of in QTO you're setting up a string field and an item code, in this system you're setting up the actual properties that you want to pull out. And some of those properties have nothing to do with the tender or the bid but they help you do cost estimating, or asbuilts, built or something else. So the pay item manager, again, it's the same idea with our system.

This is what I call-- Let me just bump that font a bit. OK and we'll pause that. So in the catalog, you use what you call fixed properties. These are things that don't change per different projects. The second piece of the puzzle is to say, OK well this is a project-based tender. We know we want to see start manhole, and manhole, the length the street name, the average depth. So those are what you call flexible pay items. So what we do is we combine fixed and flexible and then we are a long description. So that's what the bidder sees down below.

So it's sort of like two pieces instead of just one. So it means that if you have a site plan, you can share the same catalog items, show it differently in a site plan tender versus a subdivision. Or if you have a city standard, you can show it the way they like it so very much a style-based system, right? And so I think you understand that. So the cost estimating system is the value here. This is the query system.

And this is done by the CAD, manager or the project design engineer manager. So what they do is you have one or more different cost estimate definitions. And so now this is where you can say, OK well we we want to only compare other pipes with the same diameter, the same material types. In other words, this is how the brains behind the system. And as you're building

the query here it's actually looking at previous data and telling you if the queries OK.

So the sample is just an indication of the query. So let's go there. And right there. And there. OK. Right, so once you have the item cost estimate property set up, then you can due a project query. This is where you get to say, only compare jobs within 200 miles, only look at public versus private. So this is where you would actually define the different project-based properties. And this is where we pull away from other people like even [? AshaWare, ?] I don't think does that. It might but-- So, all of a sudden, you're getting into more of a GIS feel, right? And this is where we want to be. OK? So don't compare a small little job with a big huge job, you know, things like that.

So I think you're getting the point. And, of course, this is how we put it together. You merge the two definitions together and then you actually specify, how is the spreadsheet going to look. So this is your configurator for the spreadsheet. OK? In other words, this is going to look an awful lot like your tender. In fact, it'll be-- This is where you get to specify how it's all-- So there's three parts to the system. If you send us a project's master list and a sample tender, we can do this in a week and have it set up. So, basically, this is how the actual spreadsheet will look. You get opportunities to start new worksheets and grouping and sorting and all that stuff. So when you're done, this is what the end user will pick. Right? And how we're doing here? We're right on time.

So creating a new project is the first step. Notice how we're always geolocating everything, it's part of what we do. So because it's a civil infrastructure system, we do everything on our inspection to tendering. That's how it knows where in the world it is and how to compare it with other jobs. Right? When you create the tender, this is where-- So when you say, template, I just showed you three slides, that's the template. So that's where I can say, this is the kind of job it is, this is how I want it to look. And so it's just like copying old school the spreadsheet. And that's what you get when you start. Of course everything is zero because there's nothing in there. And this is the cost of spending interface. So this is what your project managers your CAA guys will use to build it. So as CAD people, you'll be focused on the quantities in the model. OK?

So last year we had the CSV import, the QTU import, but it still didn't address the property issue that I've been talking about. So this year, we built this. This is an extension for Civil 3D now. So this is coming full circle back. We did CA, we're coming back now, and now we're able to load the project in the tender, the selected tender into a dockable container and query the

objects directly. So this means we're not passing files back and forth and things are out of date. It's going to connect directly to the objects now and it'll get the data from all the historic data we're getting from old tenders or bidders.

OK and I hate, you know, old school CAD manager here. Basically I just go through each section table and the tender because this is the getting started tender, this is the one that's been configured. And I add a new configuration system to it. So the first thing we added was the significant digits and contingency, that was one thing that our customers asked for. It means that we can round up on the numbers, we don't have to show granular to the decimal point.

Same as the contingency, we can add to 15% to all values, so we get a conservative number. The object types, what you can do is build multiple selection sets for that particular tender section. So if you have a water main again, I use that example, of lines, arcs, and polylines, you don't have to worry that you're not going to capture it. You can have multiple selection sets for each tender section. So if your CAD guy explodes all the water mains, we're still good. OK? They can add some-- In this case, you're using a simple 3D circular pipe as a flexion set on that layer. So you can even filter it on style, ignore all the existing, just take proposed. Stuff like that. So it's very much a point and click, and once it's configured, you're done. So it means you can have a brand new job. The CAD people don't care about anything, they just do their work and then everything's connected. So this is a real CAD management system. Right? And so let me just quickly show this.

So it is an online system. So we're logging into the internet, capturing the projects, and so your CAD manager would do this, or design engineering manager. So they would pick the tendering template that they're interested in and then assign the layer control right here. So I think you're getting the point on that. And so far, with objects, I haven't been able-- I don't need property sets necessarily. So these are just inherent properties with those objects. OK? And-- Right, so this is just-- This is me doing the road corridor. So I know that my sub-bases-- Maybe we can put them in the same granular section and scoop the layers off. OK? OK so actually, yeah, we'll go back to that. So the property sets are introduced here as well. Wherever there's a property set introduction, you can query that and attach it to the line work. So the PS designation means it's from a property set. That's where we're leveraging property sets here. And so I think you're getting that. I'm going to skip that just for time.

So when we do a cost estimate for a sewer pipe network, if you've done your work, you've set

up your template for your tender. You've set up your configuration. So now your users can just log in, open the drawings, they can go ahead and assign the property sets that they need to if they have to, and they basically just start querying layers.

So it's not like you're selecting objects and doing all that business. So when you actually start building your pipe networks, you just hit the Refresh button and it'll give you your cost. So you can have different drawings, like option A, option B, two separate networks, and have a cost estimate generated in a few minutes. So what's happening is it's querying the layer. The objects. It's getting everything it needs for the tender.

So this is like, this is the real deal when it comes to contract administration, because the data's going up to the site, it's being mixed with all the other contract items, and it's using the historic data. So once it gets pushed up, design estimator communicates, and you're getting pricing from historic bid. So as you're designing-- This is not like a one number thing, like Infoworks or whatever, where you know one size fits all. This is how much that pipe's going to cost at that depth in that area. Right? So you're getting the idea here. So very quickly we can run through the easy stuff like pipe networks. We can run through all the servicing 2D line work. I skipped that just for time, I don't want to run out of time.

This is the watermain stuff. So, keep in mind, these are alignments. These are alignments that we attach data to, these are not lines or polylines. So because we're using the long description right here, this long description means that I can use a polyline, a line, an alignment, a profile, and a long description code, always formats it the same way. So it doesn't care what type of object it is. It knows how to describe it as a style, put out the right quantities. So this is the corridor materials that you saw us generate. And so when you get the tender-- So I open up a different model. I open up my corridor model. I can query for road granulars, and I didn't group or sort this, but would be-- I just thought I'd show-- You know it's pulling out every region. I mean, it's pretty crazy. You wouldn't show everything, you'd do what you call a sum. So, you see granule a, this is the total sum. This is just an example.

AUDIENCE: [INAUDIBLE]

JEFFERY LYONS: There you go. So good question. So we're populating a different section of the tender from a different drawing. So say you're in a rush and the client's coming in at noon, right? We need this tender done. You can have six CAD guys, open up six base plans, and populate the tender, same time, as long as you're not on the same section, right? Because it's a database,

and because it's online, all of that data is available to the entire team. Good question.

Yeah, so what it means is now you'll get your pricing for your road, so if you're redesigning your granulars and your best [? base ?] and all that, I mean you can multiply it by an average factor, but this is the real price for those granulars here, and you'd probably sum it, like I said.

AUDIENCE: [INAUDIBLE]

JEFFERY LYONS: Yep.

Yep.

AUDIENCE: [INAUDIBLE]

JEFFREY LYONS: It's a good question. So they all have their own unique login with their email and their password, and then their-- We have different levels of connection rites. So if you want to come by and ask later about the pricing, it's super cheap by the way. Everything you're seeing, this is not BIM Glue or whatever. This is like, this is so cheap that you wouldn't want to use Excel again. That's how we're pricing it.

So not that I'm trying to sell that, but it's very affordable because we know that the designers are going to want to do this type of work, and the contract administrators are doing their own thing, right? So this is where within the product itself, you can click on the Excel button and I noticed yesterday at the Civil event, everybody went hog wild when they saw Infoworks produced a spreadsheet with quantities.

Well, we're doing the same work, less work, detail design. It's producing a formatted spreadsheet in the configuration that you desire all summed up in total. So this is probably very familiar for people who are doing schedule unit prices. So this is how we do it in Canada. And so now, imagine giving this to your client, right? Directly from your model. So all of the grouping and sorting, the enumeration, is all configurable through that tender template style.

So everything you're seeing is completely customizable. So we're not tracking item codes here. You can put the item code if you want in, if you're desperate for that, but it's all about properties. Everything you're seeing is automatically generated, it's not typed in. Even though it looks typed. And so when your bidders see this they're like, wow somebody's getting organized here. Right? They type in their unit price, without knowing it, they send it back to

you and you go, thank you very much for your pricing.

It goes into the database with just the click of a button and, essentially, what they don't know is they're populating your costs. So then you're gathering intelligence on all the bidders and like two years from now they're going to wonder why their priced for everything. You're going to see their trends and their little tricks. Right? 'Cause they do a lot of tricks, you know, like they'll bid a penny on something and then overcharge on another thing.

So anyway, so that's what Chris and I have done is we've built something that the contract administrators are going, oh, well this helps me out, I want you to do it. And we kind of went and did an end game on that right and said, oh look at this wonderful tool. Now we're going to get back to basics with CAD and it benefits everybody because, essentially, what we've done is we've created an information system through the use of generic tools like Excel and basic CAD and, of course, you wouldn't present your granulars like that, but it's kind of fun to see that. So beyond cost estimating. Sorry for the graphic, I was desperate for something that looked cool and the resolution wasn't great. Yep?

AUDIENCE: [INAUDIBLE]

JEFFERY LYONS: Like in your tender? In your-- Well, so a couple of things. There's two-- I don't know how to read the question, but if you're looking for layout surveying and say test pitting it's like a service right? CCTV? You just put that into your tender document under say CCTV, and you add what the lump sum cost is or by length. So if you wanted to, you could, I'm just thinking on the fly here, you could take your pipe networks, you have all your lengths, and it can be called CCTV, and now you've got all the lengths of your CCTV. Nothing to do with granulars, or any of this. So all of a sudden your mind starts to bend around, wow OK we can actually do quantity take off on CCTV services. Right? If you wanted to. So you can attach any property you want to something in AutoCAD.

For geotechnical, if it's just a reporting thing, it would be a lump sum cost. You would just put in a geotechnical section in the tender and then you'd use our web site to drag and drop what you wanted. The other thing is if it's cost estimating around geotechnical soils and stuff, if you're really aggressive, you could highlight the manholes that are in shale and rock and you could just have a rock property and the cost estimating, it's hidden to the bidder, but they could say, hey this cost is so expensive because it's in rock. You know? So there's all of a sudden all these ideas they're popping up about how we can better our data, right? And run it

through. Yeah?

AUDIENCE: [INAUDIBLE]

JEFFERY LYONS: What it is is, this is all your data. So if you work with half a dozen or a dozen contractors in your city. Right? So in Canada, the engineer does the bid, or the tender, we call it a tender, schedule unit prices, and they'll send it out to six construction companies. And they get a spreadsheet, oh, OK, we'll put in our number. Right?

So they handle what they think it's going to cost. If it's lump sum, it's not-- Like if you're doing a bridge and it's a whole lump sum, it's a little harder to quantify. But for a lot of these single item costs, they can put it all and send it back to you, you're going to get six spreadsheets back with all different pricing. You just check it in, you submit the prices back, because the spreadsheet is coded, it knows what's going on, right? It's all password protected, so they can't change it. You'll check the prices back in, so your very first bid, you're going to get six prices now of that job for that city. So all the pricing is your pricing. Your company pricing.

AUDIENCE: [INAUDIBLE]

JEFFERY LYONS: Yes so the bid analysis when it comes in, we have a little charting system when it closes and doesn't get exposed anybody until it's closed, but then you'll get graphs and you can drill down in the tender. If you come by the booth, we can show you what that looks like. But it's really good.

AUDIENCE: [INAUDIBLE]

JEFFERY LYONS: That's right, you can. So the property set manager and you can add whatever properties you want and then maybe half them you don't care about. But, like, the rock example is a good one where if you're putting a pipe in shale, it's going to be expensive. Right? You know?

AUDIENCE: [INAUDIBLE]

JEFFERY LYONS: Yeah.

AUDIENCE: [INAUDIBLE]

JEFFERY LYONS: That's right. Because the templates, the payitem properties like your manhole isn't the same as somebody else's manhole. Even though they're called manhole, it doesn't know-- It's not a common catalog. Right? So the trick about that is we sold to a municipality in Canada, where

they've done the standard catalog, they're thinking about exposing it to customers, or their engineers, so they want to get pricing and do the tendering through-- Like the municipalities can control the tendering catalog, right? So they have an option to actually share their prices if they wanted to on their template.

AUDIENCE: [INAUDIBLE]

JEFFERY LYONS: Waterloo Yep.

AUDIENCE: [INAUDIBLE]

JEFFERY LYONS: What is that? OK, nice. OK, well, that's a different story. OK we'll have to talk. So Waterloo is our big pilot area, trust me. We've been-- Waterloo's very aggressive. So the cool thing is it's generating cost estimate. We're going to go beyond CAD. So this is where the money starts happening. In other words, everybody is like, oh, I'm doing all this work for a cost estimate. What's happening is on your iPad we've exposed the tender objects here. So once this project has been awarded, this is where Chris and I this Spring, we introduced this new feature and it's where contract administration basically say, oh my God, OK, now we're talking. Right?

It's not just about cost estimating. You can expose the contract on your iPad, as well as other daily report details, pick it up in the field, it's the same interface. So you get all of your information for your daily inspection. In other words, again, you've got to keep it simple for these contract administrators. They get what they want. They get a daily report and they're happy that items are coming from the contract itself online in the cloud. In other words, you're not retyping this stuff, right? You're not giving the guy a spreadsheet and saying, keep track of your quantities, right? This is all integrated.

So this is what everybody's buying it for. Because now once you award the tender, it flips to an awarded interface. It flips. Now you're getting into the contract award value and then everything that's been inspected dashboard plus everything that's been approved for payment. So this is where the contract administrators are going to be bugging you for data, because they're going to be in the knowing that this is a money maker. They lose money all the time on producing payment certificates. So we can now query the data and say between the first of the month and the last of the month this was what was built. So can you imagine your in Civil 3D, you populate the tender with all these items, you award the tender, you send it out to the field, and they start doing contract in BIN, it comes back, and you start to do a PC? This is the real data stream. Right? And so far we haven't seen a whole lot of 3D. So I'm sorry

for that. But all of this data can come back ultimately for asbuilt.

So because we have a form entry system you can say, well we've got property sets that respect asbuilt properties, why not configure a form for the guys in the field? You can do it online. You pick up your asbuilts and you push it back to a Civil 3D. So all of a sudden it's full circle data. There it is. So, if you have any questions, you can ask me, or come by the booth. I didn't want to completely make it a sales job, but I'm telling you this doesn't exist in the market today. And it's been a real product, we've been working on it for three years. The last year, it's just exploded into-- It is the workflow. Trust me. Because we're from the industry we get everybody asks for stuff and we just keep putting it in.

So if you have any questions or you want to come by the booth, I can give you a demo. Yes?

AUDIENCE: Is there an ability for offline?

JEFFERY LYONS: For what?

AUDIENCE: Offline mode.

JEFFERY LYONS: Offline mode on the mobile? Yes. Well, yes and no. If you want to get the contract items, you have to have a mobile hotspot-- Or what do you call it? A tether or whatever. But for us it's like $5 a month to hook your iPad up. Yep. If you're taking a lot of photos, you can take them all, save them as a draft in the inspection form, and then when you're at a WIFI, it'll just all upload. Yeah, so we have a lot of people-- Because those iPads if you take 20 photos, it's like a real drain. Right? Yeah.

The other thing is we do a lot of AutoCAD customization now for the inspection app. Like if you're doing any kind of like outdoor inspection, we now communicate directly with AutoCAD. So you can take-- MY big thing is test pits man holes and anything infrastructure related where you're taking a shot with the survey and then you're filling in from form data, you can merge the survey data and then import it later back into AutoCAD. Right? So it's nice. We, again, we were I think we're the only mobile app that actually imports direct to AutoCAD. So we've got a lot of innovation going on. We don't sleep. Yeah?

AUDIENCE: [INAUDIBLE]

JEFFERY LYONS: Yeah I'll upload the presentation and please email me. We're open to setting up accounts for people and getting you started. We're not mercenary about the money yet. So we want people

to give us-- Especially if you're American. We really don't get the American market just yet. So we get Canada, but Americans, we don't even know if you tender these things out the same way. I mean I would love to talk to engineers about that. So I hope you enjoyed the presentation. Yep?

AUDIENCE: [INAUDIBLE]

JEFFERY LYONS: Everything that you can download is in Excel, PDF, Word. So you can just batch download everything and put it on your file server. You can do that now anyway during the week. Yeah?

AUDIENCE: [INAUDIBLE]

JEFFERY LYONS: We don't we don't sell it or any of that stuff, no. We're not like that. We have a user agreement that says that too. Like a service agreement. Yeah. Yep. So come get some information if you want or my card. Here's my card. Well we're in, I'm in Toronto, but we've had a lot of good luck with Waterloo.

AUDIENCE: I'm from Toronto too.

JEFFERY LYONS: Are you? Oh, it's John. Hey, John. Yeah. Yeah. Yeah. Well, we just sold to [? Akon ?] and [? Dufferin ?] for the test fitting stuff. We're big in the utilities.

[SIDE CONVERSATION]