Interview with Cheryl Paston, Deputy Director of Public Works

May 9th, 2018 at Sammamish City Hall

Participants by color code:

- Cheryl Paston, Deputy Director of Public Works
- Kellie Stickney, MPA, Communications Manager
- Miki Mullor, Deputy Editor, Sammamish Comment

Cheryl, we're here with Miki and Kelly and we're recording this everybody knows it. So, what is this model I mean everybody says model, model, model. What is this? Is this a piece of software? Is it a spreadsheet? I mean, why do you guys do that? What is it?

So we have basically two types of traffic models. One is a traffic demand model and the other is an intersection operations model and I will talk a little bit about why we need two of them. The first one is the traffic demand model that we call VISUM, that's the name of the software.

Okay.

This is a model that used worldwide, it's been vetted out. I don't know how long it's been around, but it's been vetted out by scientists, planners, engineers, state federal highway administration. They use it, they acknowledge that it is a very well documented model that people use to design projects to planning and all of that and it is; so, it's one that we use. The city's first traffic model was developed somewhere around I think it's around 2006 roughly give or take several years. I can confirm that actual date, but we've been using David Evans and Associates so D.E.A. They've been running our model; our current lead with D.E.A has been doing modeling for eleven years or so. He says there's hardly a day goes by that he doesn't look at some model you know, for some client. So, his skills in doing the modeling is very high, he keeps them up to date all the time and plus he just loves data, he loves detail, as you know as an engineer you need folks that love detail.

I'll tell you this one more story. So, I hired to my second start up I heard the girl who's one of the world-renowned data scientists. She was the Chief Data Officer for Microsoft, there's no way in the world I could pay her enough.

Right, right, right.

But you know what? She came to work for us because of the data.

Big data.

She just fell in love with data we were doing analysis of people applying for jobs because we were doing phone interviews automatically for blue collar people and she wanted to find a way to figure out from the way you speak what kind of emotions you inflict on others.

Interesting.

And we had a very unique data set. She came a work for us for peanuts because of the data. So, side story, sorry about that.

That is true, that people after you meet their basic needs, you know, maybe a little more for salary benefits. It's really; they crave being able to meet their interests and what they're good at and what they love.

Passion.

And what they are passionate about. Yes, that's a great story.

It's missionaries versus mercenaries I always say.

That or, you know, trying to make your application in vocation the same and get paid for it.

So the VISUM model, so we updated, create a baseline model.

But what is that? To make sure I understand, it's what takes the land use and say, ok, from all these lots here, we're going to create this much traffic at this point in time.

So, yes, I'll talk about what the three key pieces of data that go into this model, and we update that model regularly, every I don't know, eight or ten years.

Is it okay if I interrupt you with questions?

Absolutely, absolutely interrupt.

Uh so we've got what I'll call three versions of VISUM and they're different in their time frame, that's what it means. So, the first version is what we call our existing conditions model that is based on the 2016 traffic counts. And we've had questions from council; why aren't we using 2017? Why we're using this year's traffic counts and really at some point you gotta put a stake in the currency. This is the year that we're updating our baseline model on.

At some point you're never going to be done.

The counts are these tubes on the ground that that count volume.

Two kinds. There's the tubes and then there's the turning movements in the intersections and those are done manually, right now they are done manually.

So, no one has figured out a way to do this automatically ?

There are ways, it takes more time you put cameras on, then you have to mount the cameras and it takes a lot longer to do that but there are technologies to do that. So, I'm not sure if we'll be able to get that in the ground this year because now what we're kind of trying to navigate is, as you know, snake hill or 212th is being paved as we speak, well actually I think it's paved.

Don't Jinx it.

Yeah right, so it's paved. We're finishing the curd, were just putting the finishing touches on it. We want to try to get the traffic counts in before schools out but after Snake Hill opens and is open for a couple weeks. Just to get people to go back to their normal.

See the impact of that on the flow.

So we actually just have a really narrow window now to do our traffic counts. So, trying to find somebody that can bring in cameras do it in that short window between after Snake Hill opens and before schools out, it's getting a little dicey. So, we may end up doing manually again this year.

Yeah, yeah, you have four weeks, maybe.

Maybe. Maybe that. If we stay on schedule with Snake Hill.

Which we will, I'm pretty sure we will.

Barring any landslides.

(Laughs) Don't say things like that. We're not doing landslides anymore.

So the model we have all this zoning in the city. Does it take zoning or does it take what actually was built?

Both? It takes both, so let me jump to what's in the model and then I'll maybe describe the three versions. So, the three key data points that we put in, our types of data land use, roadway network characteristics and traffic counts. So, the land use; the city is divided it about

over two hundred eighty, but we call it traffic analysis zones. So TAZs. If you look at the city it's all a patchwork two hundred eighty plus, each of those zones is assigned certain information. Land use type, dwelling; is a commercial or residential? If it's commercial, how many square feet? What kind of commercial? There's lots of information that's in that model of each of those TAZs and the TAZs are not equal size. I'm not exactly sure how they determined, but they're not equal size. I think it... actually I won't speculate, I can find out, but anyways, that helps make the model even more accurate and precise because you can really drill down. So, one of the things that we did a couple of years ago, this was with other staff were here at the city. The consultant and our city staff looked at every single TAZ. Sat down and said okay, and went over the data that's assigned to that TAZ. Because one of the things that the ITE, which is the Institute of Transportation Engineers, one of their guidelines says with this kind of land uses, this kind of commercial space, this is the expected number of trips. So that's how that relates to this land use model.

You're talking to a proud owner of the HCM, just so you know how bad it is.

I have never looked at it…

Two hundred twenty dollars' worth.

It's not cheap. And then they just updated it. I think so.

Well, I bought the last one. Yeah, you don't get it. You get access to PDF. So I was trying to educate myself as much as I can. So I read about ITE, I read about HCM and I could tell you if you ever have trouble going to sleep at night, I think chapter eight will get you.

That's great you made it that far man. More than I have.

One thing, as you know, is to remember what that was actually intended for. Just like models, models are only intended for certain things and if you push the limit on the surface, you can push the limit of a model, push the application of a guiding document, but at some point, things start breaking down because it wasn't intended for that kind of thing. Highway capacity manual is labeled that because it was for highways and they're trying to revise it so that it fits more local; what we would consider local conditions. But again they are limits to that.

And I think, you know, Sammamish is unique. I don't think, you can apply the normal rules to Sammamish because first of all, our geography, everything funnels into this, you know, a couple of rural roads that are between the bluffs, that all funneled one choking point, right? And all these people come to live here all go to work in the same place.

They go out.

But in the same place, it's either Microsoft or Amazon. So there is no diversity of randomness of

people going all kinds of places and it's like everything goes into one place which I think is probably the exception in most cities, where you have all kinds of roads and all kinds of employers and everything flows around. So I hear you. You cannot just take what's in the books and boom it works.

Right, no we don't and so we try to tailor our model to fit local conditions but again at some point you can't push the model way beyond the boundaries of what it was intended for. I guess just a point on that if you pull up high enough thou in the Puget Sound region, when you look at Seattle it's an hourglass. Some of the similarities with geographic challenges here you'll see that in Seattle because you have Elliott bay and Lake Washington it's an hourglass. There are only [Highway] 99 and I-5, that's it. East-west of 99 is not even - you can't even count that, that just funnels into Seattle and it basically truncates into I-5, so in some ways again if you pull up high enough there's definitely challenges and in just the greater Seattle area just because of the two water bodies.

Totally.

But you're right, Sammamish, because of the geography and only one principal arterial and the schools, the fact that the school district cuts the city in half presents really unique challenges. We would not have, I don't think we would have the number of high schools this close together if the city wasn't cut in half by the school districts and there's absolutely nothing we can do about trying to get this school district, I mean, they will build on their boundaries. They can't cross boundaries

And then, like it's not enough they want build more on...

Because the demand is there, just like traffic,

But they are putting all this up in the same place, you know? Issaquah wants to put one where the church is, right off 228, then the choice school here, you know, it's like how many more schools are you going to put here.

Yes, so I know that this relates to traffic in regards to the schools. If you put them too far out, then people are traveling out there, if you put him out in the hinterlands, you don't want that. You want to put him where the schools are, where people are so you can encourage walking. That means then it creates a magnet. We have other issues and challenges to encourage people to walk, get their kids to ride their bikes and all that impacts drivers.

If they put the schools more inside the neighborhood I think you'd see a lot more walking, but my kid will take the bike to discovery went a nice day, but I got to tell you he's going down 24, you know, the sidewalk path...

It's concerning.

I don't like it, but I like him biking.

Yeah, so what do you do as a parent?

Well in the winter I'm not going to let him do that. But as a parent, you know, I try my best, and he knows where to go, and at some point, you got to live life, you can't be worrying all the time.

It's tough as a parent. So on the land use, so those are the traffic analysis zones or TAZs. In terms of the growth projection what the model has done is we've taken the 2030 office of financial management, that's the state department that's responsible for projecting the growth in the region. It is what it is and so the OFM takes those numbers they give it to the counties, of course in our case, it's King County. King County distributes the growth in the region based on the growth management act, based on a lot of a lot of different things. So we've taken the 2030 growth projections and then extrapolated out five years to get to 2035, which is our planning horizon for our comp plan.

We took those growth figures and applied them, assign them to Redmond, Issaquah, Sammamish and the whole surrounding region. And OFM's model, I don't know what kind of model they use or who their modelers but their growth projection ...so they've done growth projections for at least thirty years and they've been within a single percentage points of actual growth, so their models are very, very accurate.

So you can have a debate about how much does the past predict the future.

It depends do you have a black swan coming at you're or not. I think the amazon is a black swan right now that nobody could predict a company that just skyrockets like that.

Right but OFM has at least a track record they've been very, very accurate, so that fact and the fact that we have to take their numbers you can't come up with their own growth targets. So that's part of the grown model.

You got to take something right.

Yes so for our own land use we actually refine our land use and growth assumptions based on, partly based on approved certificates of concurrency. So Issaquah, Redmond and the surrounding areas basically straight line from OFMs numbers, we start with that number and then we adjust our model or we update our model with certificates of concurrency coming in in the traffic projections from those projects. Other things that we've done in our land use, why actually I need to go back to the three types of model because I'll talk about the pipeline concurrency model.

So you try to do this in front council, good luck with that...

Right, right that's why I think we're turning because we try to simplify it but then it gets over simplified and then yeah you have to go well there's three models not two models

It's hard to go from fifty thousand to five hundred feet.

And frankly one of our former council members was a rocket scientist and he loved data. He actually wanted to know the equation that used, he wanted it. And then you have other people, like, you know what I don't want to know, I don't need to know. Don't tell me that, don't bring to me in council and it's really difficult when we're being told, I want this kind of information and the other person is saying I want this. So you try to find that sweet spot, which most time you miss.

But so the three traffic models, the three versions of VISUM that traffic demand models so it's the existing condition, which are based on the 2016 traffic counts. Then we have what's called the pipeline model, or it's sometimes called the six-year TIP, the concurrency model. I don't know why it's called pipeline where that word came from, but anyways. That looks out six years and says you have this many projects that are permitted, they might not be constructed , but they're permitted. these are the projects that the city is going to build, you assume that they're done they're built within that six years because again, even though that might not actually happen, you have to set the stakes in the ground as far as your data that goes into a model, right? I mean, you're aware you know that your assumptions, you're lucky if half of them come true, you got to make something. You gotta make some assumptions so that's part of the six year.

What for baseline, which is just life as it is today, right now based on counts?

Well, yeah, and then we verify the model, we calibrate the model as best we can so that your baseline and they start building different scenarios.

How do you calibrate a model like that. So when I told a story about my ACD project (basically it is “Automatic Call Distributor”) we would take forecast and then we'd monitor to see what's happening and then figure out the differences. How do you do it here?

So that's essentially that's what we do? So we put all this information land use, the roadway network and the traffic counts into the model it predicts it goes through its calculations it'll predict traffic volumes at certain points in the system. We take those outputs and we compare with actual traffic counts

Got it.

That’s basically what we do.

So you would take like an old model like from 2014 or 2012 and run it at 2016.

With a 2016 traffic counts, with the new land use assumptions, all that.

So it's a model itself has a calibration built into it? It's got some kind of calibration verification functionality; you don't have to do it manually.

No, no, no, no, it's automated, to the extent that we can its automated. But you know model will produce results and sometimes you got to go in and pull this lever change this a little bit because it either isn't calibrating or you go out into the field or you look in google maps and realize this is the intersection is actually a four way not a three way like the one that was on council the other day, the driveway to northeast water district was offset a little bit and those are the kinds of professional engineering judgment you have to make because it's just as justifiable to say that's not an intersection, as it is a four way.

Yeah, but nobody's actually going to use it as a four way.

You're not using that, but the highway capacity manual it looks at it as a guide because even though it's an offset it, is a four way even though most people would say it doesn't really function as a four way.

Okay, so three models, one is today's life where it is, six years - which is permits, applications or something that we know it's coming it's,

It's the city capital list of projects

But not necessarily the ones that got funded. We don't know if they're going to get built or not.

Oh, right, but we have to assume that they are. That's our plan that the council has said even though they only fund the first two years. I mean, have a biennial budget. Their intention is to is to fund the whole six years CIP, and we do put some assumptions in there that, you know, we'll go for grant application so hopefully we'll get some grants to help pay for projects

And then there's the twenty years out, if you build up the city in twenty years here's what it's going to look like and you know it's kind of give us a long range planning of what needs to be done, a bridge to Redman or something like that.

That's right. That's the one we call our future forecast. So those are what I'll call the three versions of VISUM

Today. Near term. Long term.

That's right.

Okay.

So that near term, that pipe, very similar looking at like the weather, right? It's pretty easy to look outside and be one hundred percent accurate about what's going on. If you're looking at like you know, the next few days your forecast can be pretty accurate, right? If you start looking at the 10-day then, which is the 20-year, you know you're still going to be fairly accurate but that starts to slip you know,

I think people can understand that methodology. Makes sense.

Because of sort of having a crystal ball, you must use models. There is no other way and as you know, they're not perfect. There are not even, you know, we can everybody can debate about how actually precise they are.

So Cheryl you're new to the city but I'm sure you can understand the frustration of the residents because I lived since 06 and we are always told everything's fine, don't worry about it. We've got it down, a great comp plan and beautiful pictures and to be honest when you just glance through it looks really well done. So people got caught by surprise when the economy picked up and I mean in terms of day to day life almost overnight you couldn't drive from the city to Redmond in the morning. It like became congested almost overnight. Not literally overnight but you know very quickly so people are like wait a minute we were told everything was fine right? What happened? It's not like we got high rises in Sammamish now. The growth of came but he wasn't the growth was not unexpected. I'll put it this way, the growth is still - it's not like we exceeded our growth targets or growth goals everything in the model it's seen from our vantage point we look at this as well they use is very similar to what the model said was going to happen but the output in terms of traffic is way off because obviously we're stuck in traffic. How could that be and I think that's where the frustration and disconnect come.

Sure, I can see that definitely.

It's not like the city said listen in three years we're going to have congestion. The city always said we're going to be fine. We are going to continue building, don't worry about it we got the facilities for it, but we don't.

I can certainly understand that. I can definitely understand.

So I think it's really important to remember that.

That's good.

You guys here you know you don't see the residents; you're not on the road in the morning with us. It's very important to understand that sentiment.

Sure.

and knowing when you go do your things think about that lens.

That's good, that's a good reminder,

I think that you know you're right I'm not on the road heading to but I'm headed the opposite way watching what's happening every morning when I come in here and you know, I've only lived in Seattle region for fifteen years, but I would say that it's drastically different in the last five like as you know, I feel it as well the change and I also find myself having the same frustrations that I hear from folks who live here.

I think the difference Kelly is that a lot of people came to live here were told very different things and it wasn't like we were told listen, you got invest in a bridge, you got invest in roads, we were told that things fine don't worry about it. that's you know it's a different it's not like you came here and you were told listen there's problems here you may get stuck in traffic, but, you know, your house is going to be cheaper and, you know, it's worth the school's, okay, fine, it wasn't like that.

Right, so there are similar regional frustrations that a lot of us are in the Puget Sound are feeling, but you're saying you feel like those are exacerbated because people didn't - expectations weren't set.

They were set differently.

Yes, they weren't maybe set accurately or they were unanticipated some of those but either way, I see what you're saying.

I don't know the reason, but right from the eye of a resident who doesn't understand all the details. You know, for them, anything that comes from this building is assumed, trusted and correct. Okay, we got these guys covering us. We don't know anything about traffic. They say it's going to be fine, then it's going to be fine and then why am I stuck in Sahalee and why am I stuck in East Lake Sammamish. If you understand that you get to the root of the problem of why there is friction.

Every community has its - like we talked about communication earlier, I think trying to be, you know, as accurate as we can, and but making sure that what we're saying is being received in the way that we want it to be received. It, you know, not being manipulative or anything. It's just how do we help our residents. Like Kelly's said everybody is just so busy, how you get that slice of literally a few minutes to convey a very important issue and this isn't the only one I mean, housing, we have...

Stormwater

Stormwater

and ultimately, we have to think about like, why? So when you're talking about these models, why do we have these models? It's because we have to make decisions, right? Ideally, you know, as a government agency, we want to make decisions based on data and based on what our community wants, because the community should be driving what the city is doing. So how do we use these models moving forward and working with the community to invest in the right capital improvement projects to take us where we want to be as a city because we can't go in the past and change that?

I mean, we're stuck here right now literally.

We want to do better going forward, we want to try to put information out there for the public and you know, I feel like my job is to present information to the decision makers. they may be sitting on the dais, they may be out here but present information and make it as accurate as I can and try to use words and phrases and things that the audience can understand.

Let me see if I can help with that.

That would be really great honestly because

We're doing true generation based on ITE, have we tested those assumptions? I know ITE is well known and well used everywhere but again I think that we're a little bit different, our mix of residents is different, and it's very unique 80-90% of people here drive out in the morning which is not national standard. We have a larger population of kids here than normal standard for example if you look at ITE apartments usually don't generate school kids without - I put that the wrong way apartments don't generate kids but in some Sammamish they do. So, have we ever challenged that assumption? Do you know?

Challenge in terms of?

Whether we should use ITE or whether you know we should calibrate a little bit more for some Sammamish data because it is different everybody drives out in the morning.

That is definitely one of the defining characteristics of a bedroom community is that everybody drives out, I don't know where that phrase came from but that's definitely characteristic of all bedroom communities. Actually the issue the question about the demographics of apartment dwellers came up yesterday and so we talked about early about pushing the model too far if we ... yes, we should be looking at how Sammamish is different and how granular do you get before you're really in uncharted waters and now you could be challenged by developers by others that are saying wait a minute that's not standard to create your own version of the ITE manual. so there's a balance, there's all kinds of balances that we as professionals have to make we have to make judgment calls and you can be criticized and you could be challenged

about how much do you go outside the boundaries of nationally, locally, state recognized manuals. But having said that the flip side of your comment was we have investors that have bought Ichijo you know, like the whole, I'm not sure how many units are in each of the buildings maybe four or two, they're just leaving them empty. They've said wait hold on for two, three years. So while the model has said

Why?

For investing.

They are investors who brought the units?

They are international investors, so they are not going to sell them at all.

So you have that. So what do we do? Do we change the model and say ok, they've told us that they're not going to sell them they're totally empty, so they're not generating any trips, but the model is assuming they are because of the certificate, the concurrency...

Well you assume a house is going to be used for people living in

At some point, sure, but they've told us that it's going to sit empty for two to four years they're not going there not going sell. They expect the market to just get even hotter.

Flippers.

Well, ok, but I think, I get your point if you stick to a national standard then its defensible and nobody can argue.

It's defensible which we really have to really consider box as well.

On the other hand, it may skew results and create conditions that don't meet what we are. My gut feel is as long as you follow that data, some kind of data set and you say, listen national is good, but we're Sammamish, we're not national you know, I think will be very defensible and this is the lawyer in me speaking.

Again there's leeway, there's always a gray area, right?

But you err on the side of well, you're going to make an error so on what side do you err on. And in my mind, you err on the side under forecasting over over forecasting.

So that's where the calibration comes in with actual tube counts. So again we put these three key pieces of data into the model, it generates what the predicted volumes are, and you compare that to the traffic counts. So is that our proxy for how many families are actually living

in those apartments versus single people versus nobody. So that that's our that's our proxy for accounting for those variables and we can go on everybody's door and knock how many people are living in your you know even the census which is coming up in a couple of years they try their hardest to get everybody to fill that out and that's another data point though that we can take a look at to confirmed what's the population under eighteen? is it's still about a third of our population.

That's something the school districts have

Sure, sure.

I do agree you forecast and the trick is to calibrate as often as possible and then because of the growth rate change is happening quickly that usual, that's, you know, you reiterate quickly and you're right at the end of the day traffic drives, you don't care where it's coming from.

In terms of just the narrow here's the tube counts here's the... right. Right.

Okay, so that's the trip generation, totally get it. Who does it? Is that DEA?

Yea, DEA, there are our modelers.

And then you said there's another.

So then the roadway network characteristics which are just your physical characters, number of lanes? How many legs coming into an intersection? What kind of intersection; stop controlled, un-signalized, roundabout, two way stop control? So those kinds of physical characteristics are in the model, including the posted speed limit, because that has a lot to do with capacity. So we've, I think it was last year, our staff working with another consultant at the time when either did some field verification for those roadway characteristics or we google mapped it just to kind of make sure and I'm sure there are some intersections or some roadways that's not exactly correct in the model, but we did ground truth at least, you know, our primary, our principal arterial, minor collectors, those kinds of things, the smaller and I should say, not every single road is in the model either.

Yeah, sure, I mean, at the end of the day it doesn't matter. What matters is that everybody is stuck.

And the TAZs have the houses, the dwelling units in each of those little areas, so that's also a proxy for how much traffic is coming out of each of those TAZs so you don't actually have to have every single road in the model,

But you need timing to right?

The signals coming, or...?

Yeah, signal timing.

That's an area, I don't know how that is accommodated in the model yet so I need to,

So that's a different model it's not the trip generation. This is if I need to paraphrase it, one is creating if I compare this to a network of pipes the first model forecasts how much water is going to go through this and when. The second model is the actual structure of the network of pipes and how the water will flow through that putting analogy for traffic basically.

No, so the traffic models we use VISUM, VISUM is the model for those three variations. The three variations different just in terms of the time frame. What I'm talking about now is on the land use, the roadway characteristics.

I know you remember I am not traffic modeler,

You've got the three again the three versions of VISUM and they just differ by the time, the look ahead, the time frame and then into the VISUM are three buckets of data. One is the land use data. The other is the roadway characteristics bucket and then traffic counts, so that all gets fed into each of those VISUMs models. So the roadway characteristics again it's just the physical characteristics, and then the traffic count data so that again the models calibrated models based on the 2016 data. We update that model with each approved concurrently certificate, so the model is always current, but we don't always calibrate it and go through this process we're doing now. We don't do that every year, but it is kept up to date, and I think that differentiation gets a little lost in the translation also with council.

So what determines how often you calibrate the model.

What I've been told is some, you know, it's not unusual for some jurisdictions to go ten years, easily in between calibrations.

True, but where we're in a unique situation of hyper growth right now.

And we are again, I want to emphasize that we are keeping the model updated by all certificates. When we get a project that comes in. see single families, we don't run the model every time a single family comes and wait till there's at least - we collect them and I think when we would get about fifty trips we have the model run again, so they're single family, you know that we're not going to we're going to have a consultant, but big ones come in. We have run the model that's what we based the application.

See if I compare it again to my software engineering world we build code. We put it out there. We have, we think it's going to go fine. Then when it starts crashing and we see smoke coming

that's when we stop and say okay something we did wasn't working right, and we pay more attention. Analogy to Sammamish or the region for that matter. Let's say plans were made ten years ago. Everything should have been fine. Well, it's not. then I guess residents who are especially professionals would say, well, you know, in that case, you should calibrate every three months now until we know that we got it right, because obviously something is not working.

And what I'll say, what we do do with every year, every time we collect the traffic counts is we look at the model outputs again and verify that the model is predicting and is close to what actual counts are. So we do that every year, but we don't go in,

You don't adjust the model

If that traffic count and if the model is off then we go in and look at it but if it's within industry standards of accuracy then we assume that it continues to predict what we're seeing in the ground. So I know it's not a full calibration but its verification and that terminology you know

I get, verification is telling me if something is wrong. Calibration is I'm thinking that something is wrong and I'm readjusting to make it right

All the inputs, you are looking at all the inputs and verifying it.

Yeah verifications are really just you looking at a couple of KPIs and seeing if there's something off.

There you go, so we do that every year.

So you do the traffic counts and the turn moving movement ?

Turning movement counts every year

But what about the, see the way I think about counts when I look at these or when I am stuck in morning traffic, those counts are going down because less cars are getting through. How do we how do we measure that impact?

Less cars, so that's a time. I think what you're referring to is the time based. So eventually the cars go over the tube count, right?

Eventually

Unless they go somewhere else where there are tubes.

If you are in Sahalee way in the morning you're not going anywhere else.

There are tubes in all, you can't escape the city without going through a tube.

But let's assume the all stuck there. Congestion means less counts in a period of time. Let's say you're looking at....

So the key is a period of time

7-8 in the morning, counts will go down if there's congestion right because the volume of cars getting through

That time, yes.

I mean there is saturation, how does the city measure that factor, that congestion?

So that's a modeled output and so whenever you can't directly measure things now you're getting into the world of well you do have to make some assumptions, there are limitations on the model, there's limitations of the human portion of it which is traffic turning movements where they're sitting there with a counter and that's obviously following the quality of interns. So the congestion is a model output.

Based on what?

So I'll talk about our...

You know the one thing everybody cares about is the congestion.

That's right, that's right. Even google which does show you congestion there's models that are running behind there to show is the road red, is a green, is a yellow. What's there taking how many pings are going up. They say ok from this, they know the distance and they're clocking the time. When your car passes this point its pinging and it knows when it pings up here.

They estimate time to travel.

So that's a model that they are.

But they're using the pings of time and location.

time, distance and location

and we are currently doing counts in one location and we're doing the clickers but we're missing that: ok well how long did it take you to get to that point.

So that goes into the model. So the other model that we use is traffic intersection operations model because VISUM is a demand model and we need an operational model. One of the things that we use to help reduce human error is the data that comes out of the demand model it automatically gets put into the synchro and the sidra, which are two interception operation

that's another software.

There are two other sidra is for a roundabout and synchro is for all other kinds, so signal, un-signalized, two-way, four way. We just have to use those because synchro is not designed to model roundabouts.

So you have one model that creates the volume of travelers that are going to the city and you say, ok, we're going to have this many cars on the road, we have only intersections, we're going to take the counts from that one model put it into this this other model that's going to predict how this intersection will work?

How long it takes people to get through? Because in the intersection models, it includes, for example, what the turn pocket length is, so it assumes, okay, if your turn pocket is one hundred feet that's about four cars roughly, I think our modeler said about twenty five feet per car, so you know, the car lane, the space, so it's about four cars, So it knows, okay, first car coming in, this is the posted speed, this is, you know, you've got assume the speed is of the car coming in. it knows the volume is going through that intersection, it takes into consideration a lot of things, which I'm not really qualified. I don't know how...

Sure, a bunch of parameters.

Well, I'm not in traffic engineer and I'm not a modeler, but the operational model

So some kind of levers, basically,

yeah, and it knows again it's signalized. It knows what the timing is on the signals, how many cars can get through a green, if it starts here and it goes through

It is a simulation.

There are a couple of challenges though with both the synchro and the sidra. If traffic is at a standstill it doesn't know how to manage that, so that's a limitation of the model. They don't know how to handle stand still

So the model assumes free flow, meaning there's no congestion,

Not free flow but that traffic is moving, it's a least moving.it does not assume free flow at. It assumes that traffic is moving.

Okay so, so let's go to the famous 37th Way, which everybody is stuck in the morning.

Right, right.

Sometimes there's green I can't go forward because the cars from Sahalee are still waiting to evacuate, that is like a condition that's going to throw them off basically.

That's another challenge for the model is if the congestion at the intersection is actually caused by downstream. so that's where the modeler does have to go in and start I'm saying ok it looks like the congestion at this intersection is not because there's not enough capacity it's because of the other intersection and then what kinds of things can we do? How do you....

So even if you put six lanes it's not going to matter.

No it's the it's the other intersection which it could actually compound down to Sahalee and 202 or Redmond Way.

Totally, it's a proxy and that makes sense to people because that people understand because they live it every day. I'll give another example, when you go down towards Pine Lake Middle School and you try to cross forward then you split it up, it's a lot easier. This here I can tell you this morning if you try to make a left no problem, if you want to continue down which is what people want to do to get out of the city, it goes all the way some of this morning all the way to Highcroft, it takes a while. I stopped going through that one because...

it does take a while.

And what do you do? Well if I put two lanes here it's still probably because here it becomes one lane. And to make everything worse there's a crosswalk with a bunch of kids, my kids go to that school too but even if you fix that problem and say put a bridge whatever it's one lane all the way down. you want to fix just one problem

You're just pushing it somewhere else

You got you got to fix this here, you have to make two lanes here. Then let's say here its two lanes that go to one lane. Well, that problem is going to be here. May the point is to push it.

We're going to put two schools in there

School is going to be here, right?

That's the plan high school and in elementary which are probably...

Elementary too. so, actually what you are tell me right now, is that called spill back? Because I read something in the HCM and I couldn't figure out what it is.

I can look that up.

It sounds like if you get congestion coming at you into an intersection then your intersection is not going to work. Everything we're telling you about intersections is not going to work. so I think your model, is it's not the model is faulty I think the methodology is faulty at that point, you know, measuring intersection where you can't get through because the intersection assumes i'm going to optimize everything, you know, timing lanes everything to get through but if they can't get through because of another problem then everything I'm doing doesn't make sense

Well, what it tells you is go find the intersection that's actually causing the problems and fix that. If you fix that you run your model then are you meeting your level of service?

Well, guess what? The intersection is outside of city boundary. So not much you can do about it,

Right, so this is a good example. If you have like if you have an inexperienced modeler and they look at that just the intersection in isolation and they don't understand this dynamic of really, it's the downstream intersection, so he'd try to keep tweaking this intersection to make the model work; you just exacerbating you're not solving anything the problem is down here. It it's exhibiting itself here and that's what people will complain about but that's not really the problem. The problem is down here and if you fix that intersection and you could use the model either sidra or synchro to say okay if you add a lane, if you make a slip lane, if we put a signal because there might be it might be a four way stop maybe you put signal maybe that fixes it. So we use these intersection models to also do some scenario kind of playing if we if we change the configuration or change the signalization maybe that'll fix. So that's what we do

Can synchro work if there is that congestion or at that point can you just something in it. You know I'll check this checkbox. There is downstream congestion or is it looking at every intersection, is it looking at a network or looking at one intersection of a time.

The network

So it could say the congestion in this and that they should be able to tell you it impacts the rest and if you fix this intersection now you really fix it.

Then it looks like yes

Who does all that modeling?

DEA

DEA, and they don't live here

They’re in Portland

My point is they're not on a road in the morning

No and that's where the value of having a team is so incredibly important. We need so our traffic engineers here he's worked for the city for almost since incorporation 16 years, I think. So when DEA gives us the model results then our traffic engineer looks at it says this doesn't represent what I know to be true it, as far as operations how the system is operating. So he'll call DEA and say you know this just doesn't seem to be reflecting what I know to be; what his experience is having worked for the city for all these years. So DEA will go back they'll take a look at their inputs again verify the raw field data, are the traffic counts correct? Maybe there's a roadway configuration that wasn't quite right for example 36 in Sahalee when we looked at that frankly the traffic counts were wrong and we think that you know they're there where the clicker we think it's there's a ten digit and a single and they probably we're hitting the ten digits and that caused the intersection to fail in the model and so we went back looked at the data said oh, you know it was probably an intern sitting there

You have too many, if I go back to my software engineer background if there's a software project I would tell you, you have too much manual work and too much manual testing.

We are

And when I built, I'm building in my third company now, what you do in software engineering, you have something called regression testing. You automate all the tests.

We are...

so there's no human error. The problem Cheryl is when you have human errors in a so contested situation right now where people are actually suffering from these errors, people will immediately go to this was done intentionally.

Which is really unfortunate.

But can you see that? Why they go there?

On the one hand, that is people's tendencies. I don't...

I think they are pissed off because I’m stuck in traffic and I'm going to blame someone for this. Who can I blame? you look around, oh that traffic engineer who manually puts in the input he's to blame, they have to blame someone.

I would say...

It's human nature

if I could go off the record

[OFF THE RECORD COMMENTS]

So one thing is the congestion itself is not really being measured today, when we don't really have people on the ground saying, ok, this is how many cars are getting through or this is how long the queue is on Sahalee for example.

So the congestion itself is not directly measured because it's a time based, distance based, volume base which we can't have enough people out there with their stopwatches. And but then again, that incorporates more human error. But the congestion at Sahalee and 202, what we did was because we weren't getting the results that reflected what people were actually experiencing. So we did what's called a micro simulation, which you really drill down into the model and we find it to replicate, to try to refine even more the inputs that are put in there. For example the turn pocket, there is a turn there are two turn pockets and there are of a defined length based on the striping. We all know that latent demand goes up the hill and around that. So what we did was we took a look at kind of what the average latent delay was, how far back up the hill it went and put that into the model. We looked at the signal timing because WSDOT, that's a WSDOT symbol had re-timed that a couple of years ago and that actually did help. So we talked with them they gave more green time to Sahalee than on 202 so that that definitely, it helped for a little while there. People started on Sahalee instead of the parkway

The problem is Sahalee way is a bigger problem

It is a bigger problem.

It's going to take 10-15 years to really fix that entire network and a lot of money, a lot of agencies. This is why people have anxiety about growing Sammamish, there's light at the end of the tunnel maybe there's a tunnel, maybe that’s the solution. How do we use INRIX? I know about the data how do we use it?

So INRIX is this not volumetric it's only speed so we can use it to highlight where the hot spots are in the city and verify the hotspots that we know of, we can take our traffic operations model to show how congested is that intersection and we can overlay the INRIX data just to confirm, yep that's where the hot spots are. But we can't use it for predicting the future because it's all past.

Is it being used today?

Right now we're trying to refine our model and then we'll overlay

because I think some

we have used it

can your kind of guestimate congestion length around where the queue is?

Yea by color, kind of the same thing that google does just that they have are they have more analytics available. You just look at it, you can't actually say, well, I want to go between this point and this point

So if you have that data let's say the length of the queue is like two thousand feet, so that could be plugged into synchro and give a better projection.

It could be. one of the decisions we have to make though is do you put the worst case into synchro because like Kendra made a great analogy, we don't want it to design your mall parking lot based on Christmas eve because then you're completely over designing for a one time maybe two times thing. So I would say no you don't want to put the absolute worst case that you've ever seen in the city, it's snowing it's icing that roads are all icy, there's accidents all over - you don't want to obviously put that condition in synchro but you also don't want to be unrealistic when you know you know the queue length is ten cars, but you put a four car queue length in your model. So the answer is somewhere in between and that you can't one hundred percent automate, you have to use best professional judgment, but we can use INRIX to kind of see is this about right.

From the public perspective everybody would accept that. I mean, if it snows on Christmas Eve, it's like okay I'm just going to stay home but where are all these assumptions written down? I mean is there a file you guys give DEA because Kendra is not doing modelling.

No DEA is, so what we've asked a in this current exercise is keep tabs of all the assumptions because I want a tech memo sure at the end that says here are the major assumptions that we've made into this model. That way when we changed we know what we're changing from instead of well hopefully the modeler will remember what they did two three years ago, so we will have a documentation.

In software engineering we actually have a system that every time you change code actually records a change, you put a little comment and you know who made the change and can go back figure it out. You guys trying to do the same thing.

We will do the same thing.

So is this a new thing for us to do? Have we done this in the past when we have manipulated the model

Updated the model, you mean?

To my knowledge, I am not aware

I don't think they have.

So this is an improvement because there's this will result in better process

It's good practice to document because you don't know, a mean person quit when they don't say you really need to have it.

But there's also control of, for example, again back to my world when we push code to production no single person could do that, there's always two or three reviewers that have to agree before it gets out to production. Who does it here? Is it Kendra, staff, DEA? who gives the blessing okay, changed assumption let's see what happens.

So in this current round because I wasn't involved before it is our team, so Kendra looks at the results, DEA within their company has their qa/qc process, Steven having been here for a long time looks at the data. Sometimes and we've been on a pretty break neck speed in doing all this and looking at the data getting the packet information ready for council, getting it to council, so there are some things that have slipped by and I totally own that and we need to tighten that up. But that right now that's how we're doing a kind of a global qa/qc but DEA definitely has their own processes within the company that they...

I took a lot of time; one last question and we could probably talk to you forever about this. This is a very helpful dialogue, I have to tell you.

For me too.

If you think about a way to build a bridge with citizens, this is a phenomenal way to do it.

I'm glad to help. And again Miki it helps on our end to hear how is the public receiving our information.

And perception is reality.

Perception is reality, even though here's what the model does this is what we put in but how it's received that's what matters and if we're not presenting information in a way that's easily digestible then what else could do?

Well, I'll tell you one thing. Visualizing it is much better than talking or text. And you guys were not really good at that. Ok, I'll give you one tip from my world, if you make slides with lots of text on them and you read them out loud, that's really bad.

This is one area that I'm hoping, since you know I'm so very new here to work with these folks.

And just to make you feel good, all engineers do that. It is not unique. What I've done in my career really successfully is be able to communicate effectively. it's such a hard skill

They do not teach it in college.

It's very hard to do, so don't feel bad that you guys are missing the point, but council has to sit there and listen, by the time you get to them asking questions, they are bored because they're reading these slides ahead of time, they don't want you and Kendra to read it out loud to them, they already know how to read.

So last question and then I'm going to let you go to lunch. What has changed in concurrency that we had before other than table T8, what has really changed in the new model versus the old model? Bringing new people in or sure. So, you know, I can see fixing problems, but what fundamentally has changed?

The old model, measured segments, corridors and interceptions, the level of service, so we've

Got rid of

Yea, we have gotten rid of the road segments and now we're just looking at that intersection. So that's the major change. The level of service standard is the same it's still C, D or E depending on the type of road, depending on the number of legs coming into an intersection. So that piece has not changed. We of course changed the table T8 we've taken part of table T8 not the whole thing just a non-motorized piece that has to do with the width of the shoulder whether there's a regional trail nearby so that's sort of the non, that's what we call the non-motorized piece of table T8. The concurrency does not accommodate or measure non-motorized travel, the transportation master plan will eventually break with a list...

You bring standards not concurrency, but it is what we want to do

Yes that's right and it doesn't provide more flexibility

But from the public perspective and again council last year said something's not working, said we were going to do something new, we spent a lot of money on it,

We have.

We have and but the modeling actually is done by DEA not by Kendra. What is Fehr & Peers doing in this project? I mean because if we have the same intersection on the west that has not really changed. I'm looking for the delta, what is new? Basically when you have a new software product it says what's new. What's new?

So what we've done since last year, when Kendra came on board, we did a lot of public outreach trying to establish or get consensus I guess I'd say on what the goals, the visions, the objectives were of TMP. So we did a lot of public outreach, asked people what's really bugging you. Where are your sore spots in the whole transportation network and what do you want the city to do about it, what do you think the city to do about it. so it could be more transit

That was for the TMP piece but then we switched to concurrency and we put it on concurrency

Yea we because Victor was working on the update to the transportation element which included certain just tweaking the concurrency section because there were some things that we had to update.

So from October until today when we present the new concurrency. I'm trying to pinpoint what is new.

It is policy, just the fact that the council has said we're not doing segments and quarters were only doing intersection, so that's new. Since last fall really what we've been, what Kendra has been doing a lot of is presenting information, educating the council about what other ways that they can monitor the operations of the whole system. What other concurrency approaches are out there. We spent a lot of time on that. A lot of time on how do you measure different levels of service, non-motorized levels of service, how do other agencies do it? For example Bellevue, I think it's Bellevue, they use intersections, but they don't measure intersection by intersection, they actually have zones. So they say all intersections within the zone have to operate at a certain level. Redmond doesn't measure vehicular congestion their measurement is moving people. so if you have a lot of transit because they're clearly moving towards transit, if you could move a certain number of people that's a success not number of cars

So why's Kendra presenting all these details why not bring DEA and have them talk about the model. It feels like me like some of the frustration is because there's three degrees of separation between people actually doing the work and whoever is presenting and then well the answer I need to get back to you on that creates frustration. Why not bring the modeler from DEA and put it on their pay, know you we will pay for day out and see how...

We so we have had our modelers here at council.

You did?

Not every time partly because they are from Portland

I never saw them speak was saw either Kendra or Victor

So victor was our modeler for a while, so one of his employees was here one time it was really helpful. The 2-four-hour work sessions that we have with counsel October and November Victor was at the time, he was working on our AM, he was working with DEA to produce our AM model and so he was there but I don't remember many questions at that time coming up specifically about the model because we're talking about the various concurrency approaches that the council could consider. The council has sent us a lot of questions, so when you see us presenting in front of council it may be 45 minutes it represents hours and hours of research and trying to answer the council's questions, making sure we understand the council's questions. so it may look like well it's only a half hour or 45 minute presentation it's actually taken quite a significant amount of time and again speaking back your initial points of how we communicate accurately and precisely so that the information is translated correctly. We clearly are struggling, we need more work and certainly Kelly's experience in using more than just text on a slide that will definitely help. And then we had a major turnover of council members then we kind of had to start all over to educate them and bring them up to speed.

There's a lot of that.

And we needed to do that; they needed to understand because obviously these are very critical decisions that they have to make. So we had to pound that ground again and then they had questions that there were already asked but they were legitimate cause they didn't understand so we had to revisit those again. So there's been a lot of that kind of behind the scenes that isn't apparent when you look at our presentations. but the model itself like I said our modeler is coming up Tuesday for another project he's got some meetings in Bellevue, so I've asked him to come up the day before we're going to go and visit as many intersections as we can, you know, in the morning just observe just get his perspective on what he's seeing in the field versus what he's seeing out of the model and seeing, are the other things that we can do to true up or calibrate, make sure that that model is calibrated to the best of our ability. I've also got a meeting with him in the afternoon and with Kendra to make sure we're on the same page about the assumptions that are going into the model, so that will be that will be another activity that we're going. We're also collecting more information to offer to the council to help build the trust in the model.

Is Steve, a traffic engineer? Your boss.

No.

So, really, throughout our leadership chain, we don't have domain subject expert on traffic, you really rely on DEA and Kendra

Well, our traffic,

You got Stephen,

Stephen and then my associate traffic engineer, she's a professional traffic, she has a license as a traffic engineer.

Is she a staff member?

Yes, she came on board a couple years ago. It certainly gives us it was more capacity because they last year they responded, like two hundred requests that's just about traffic. My storm group, they probably respond to almost as many. Every single one of them takes, you at least have to respond, some of them take weeks, that we don't have anybody that can regularly monitor traffic conditions because we're doing so many other things, one of the things that we are going to construct next year, it's a traffic management center. All this all cities of our size have one, in cities larger than ours so we do have it in our capital budget to build, basically it's a wall full of monitors and all of our intersections that are in cameras they will be displayed 24 hours a day. I've got a budget request for another staff member to be able to monitor that. Right now my associate does that part time, she has a laptop at home she looks at it in the morning because she has to get kids off to work, and I don't expect her to come in the morning while her kids are at home. So she monitors it in the morning. One of the challenges we have is that we're contracting with king county signal technicians to actually come in and repair our signals, reprogram them if we need to. actually our vendor that supplied are intelligent transportation system they can do some reprogramming from their office but to have king county tech come from Renton and when a signal goes down at four o'clock in the afternoon, they're about the same traffic to get up here. So we're putting in some requests for more staff so we could be more responsive on the operation side and hopefully those kinds of things will help communicate with our community that we're trying to be responsive, trying to optimize the system.

I want to stop because I want to be respectful of your time. I really enjoyed this conversation.