RED HILL VALLEY PARKWAY INQUIRY

TRANSCRIPT OF PROCEEDINGS
HEARD BEFORE THE HONOURABLE J. WILTON-SIEGEL
held via Arbitration Place Virtual
on Wednesday, June 1, 2022 at 9:35 a.m.

VOLUME 22

940-100 Queen Street
Ottawa, Ontario K1P 1J9
(613) 564-2727

900-333 Bay Street
Toronto, Ontario M5H 2R2
(416) 861-8720

APPEARANCES:

Emily C. Lawrence Shawna Leclair	For Red Hill Valley Parkway
Eli Lederman Delna Contractor Samantha Hale	For City of Hamilton
Heather McIvor Colin Bourrier	For Province of Ontario
Chris Buck	For Dufferin Construction
Jennifer Roberts Nivi Ramaswamy	For Golder Associates Inc.

ALSO PRESENT:

Fady Toban

INDEX

Arbitration Place Virtual

--- Upon resuming on Wednesday, June 1, 2022 at 9:52 a.m.

MS. LAWRENCE: Good morning, Commissioner. We're starting a little late this morning due to some technical issues, but I understand that we are ready to proceed this morning.

JUSTICE WILTON-SIEGEL: Okay. Then I will begin by reading the ruling that I have come to after considering the issue that was raised yesterday by Mr. Lederman.

The City's position effectively reverses the implicit assumption that all of the witnesses appearing before -- I'm sorry.

By way of background, the City has asserted that the existence of any joint defence agreement, tolling agreement, cooperation agreement or agreement of similar nature is privileged and therefore not admissible and has declined to answer any questions put by commission counsel about the existence of such agreements. Commission counsel is of the view that any such agreements are not entitled to the benefit of a

claim of privilege. The City wishes to have this issue determined in a formal motion before me under the rules of the inquiry. Yesterday, however, the City raised the issue in a different context. Commission counsel asked Mr. Malone, the witness employed by CIMA, whether he or CIMA was a party to any such agreement. The City objected to Mr. Malone answering those questions on the basis of privilege and requested that these questions be deferred until the City's proposed motion is determined.

However, Mr. Malone and CIMA do not assert privilege or object to answering these questions for any reason. The witness is not only prepared to answer the question on his own behalf and on behalf of his employer, CIMA, but wishes to do so to provide the Commissioner with a full appreciation of his credibility and its independence from the participants in this inquiry. Commission counsel advised me in submissions that they intend to put the same questions to a number of other witnesses before the inquiry.

As mentioned, the City says that its motion about the privilege it asserts

should be heard before any of the witnesses, including this one, answers the questions. It says that otherwise the Commissioner will be able to deduce who has signed such an agreement. The City's position is effectively that both the existence and the non-existence of any of the agreements in question is privileged, even if a party is prepared to confirm that it is not a party to any such agreement.

For Mr. Malone and CIMA, I do not see any factual basis for a valid litigation privilege on the part of the City in respect of the subject matter of the questions. However, the City says that it can assert a common interest privilege in respect of such subject matter. However, the City does not assert a factual basis for any such privilege, nor are there any facts before me from this witness or otherwise that would support the City's assertion of privilege in relation to Mr. Malone or CIMA, particularly in view of the absence of objection by them. In particular, neither the City nor the witness suggest that there is any such agreement grounding any such privilege or that a confidentiality agreement would be breached in answering the

question.

More generally, neither the City nor CIMA suggests that the parties have any common interest in any litigation or that they have exchanged any confidential information in furtherance of any common interest in any litigation. The City's position effectively reverses the implicit assumption that all of the witnesses appearing before the inquiry are truly independent. Absent a factual basis for a claim of privilege or confidentiality, a witness should be able to address all relevant questions put to the witness without awaiting a determination of a question of privilege that might be asserted in respect of one or more agreements to which there is no evidence or suggestion that the witness or his employer is a party.

For all these reasons, Mr. Malone may answer the questions posed by commission counsel as to whether he or his employer CIMA is a party to any such agreement. However, I have considered the City's request for a motion. Assuming for the moment that the City and one or more other participants may assert a privilege in respect of either or both of the

existence of one or more such agreements and their contents, I agree with the City that where a witness does object to answering questions about such agreements posed by commission counsel on the basis of privilege, that issue should be addressed in a motion which involves such parties.

Such motion should respect the confidentiality of any such arrangements pending a determination under the rules of the inquiry. I ask that counsel for the City and any participants who intend to assert privilege of this nature should address the issue of a proper procedure with commission counsel with a view to having the matter determined expeditiously.

That said, Ms. Lawrence should put the questions to the witness.

MS. LAWRENCE: Thank you, Commissioner.

BRIAN MALONE; RESUMED

EXAMINATION BY MS. LAWRENCE:

Q. Mr. Malone, good morning.

A. Good morning.

Q. I have two questions for you. Are you personally a party to any joint defence agreement, cooperation agreement or

tolling agreement with the City of Hamilton?

A. To the best of my understanding of the definition of the terms you used, no.

Q. To your knowledge, is CIMA party to such agreements?

A. To the best of my understanding of the definition of the terms you used, no.

Q. Thank you. Those are my questions of this witness, Commissioner.

JUSTICE WILTON-SIEGEL: Thank you.

MS. LAWRENCE: I understand that Ms. Roberts is going to examine next and that she will be close to an hour.

JUSTICE WILTON-SIEGEL: Okay. Ms. Roberts.

MS. JENNIFER ROBERTS: Thank you.

EXAMINATION BY MS. JENNIFER ROBERTS:

Q. Mr. Malone, I'm Jennifer Roberts. I'm counsel for Golder. How do you do?

A. Good. Good morning.

Q. Commissioner, may I begin?

JUSTICE WILTON-SIEGEL: Yes, please.

BY MS. JENNIFER ROBERTS:

Q. Okay. Mr. Malone, I'm going to go back over some of the evidence from yesterday and I'm going to jump around a little bit and I will hopefully stay on track here, but if there's any confusion about what I'm referring to, just raise it with me and I can make sure that I've got the right document up and we're on track. Okay.

I want to go back, if we could, please, to the first engagement, which goes back to March of 2013. And I take it, sir, that when you put forward your proposal, you requested design documents from the City of Hamilton?

A. We did. That request was listed in the proposal, yes.

Q. I saw that, so you asked for CAD drawings and I take it you weren't provided with drawings?

A. That's correct, yes.

Q. Could we please go to

your notes of March 11, 2013. Registrar, I believe that's CIMA 22409. I think this is the first reference we have to this engagement. It's a discussion that you note on March 11. I just want to ask you about a question.

Let me see. Yeah. Right. So, on the right column, one, two, three, four, the fourth item down, I think it says "horizontal alignment on main." Do you see that?

A. I do, yes.

Q. Am I transcribing it correctly?

A. Yeah. I think that's accurate.

Q. And there's a note over top, "accept minimal." What does that mean?

A. I'm not sure. I don't know if it refers to the horizontal alignment on main or not. Approximate to it, so it potentially does. It may refer to design --

Q. Okay.

A. I'm not sure.

Q. So, let's, then, go to your proposal, which is Hamilton 426. Registrar, can you please turn that document up?

THE REGISTRAR: Sorry, counsel, did you say HAM246 or HAM --

MS. JENNIFER ROBERTS: No, sorry, 426. There we go.

THE REGISTRAR: Thank you.

MS. JENNIFER ROBERTS: Thank you. Okay.

BY MS. JENNIFER ROBERTS:

Q. So, you're setting out the assignment here and you've got a focus on three elements: Lighting, signs and markings, and geometry. Do I understand that as the focus of this engagement?

A. They were aspects that were going to be examined, yes.

Q. Okay. And, again, can we turn to image 4. So, these are elements of your investigation?

A. Correct.

Q. Collision information, the visibility, sight distance, perception of alignment to drivers. Am I right in understanding this item that this is about a driver expectation?

A. Yes. It would be linked to that.

Q. Okay. In other words, that drivers can see and have an expectation of what's in front of them so that they can react. Do I have that right?

A. That would be one aspect of it, yes, and there's -- yes.

Q. Okay. And I've got -- so, in the design review, there's some specific elements that you identify here in task 7. In addition to collision and field reviews, you were going to undertake a review of basic design elements, road and lane width, length of speed change lanes, curve radii, superelevation, barriers. Do you see that?

A. Yes.

Q. Okay. All right. And am I understanding that absent having design drawings, you're actually not going to be able to assess what the superelevations are for the road?

A. At this stage, in writing the proposal, the expectation was that that information would be able to come from CAD drawings, formal drawings of the facility. You can assess it in the field with a -- measuring it in the field, if need be.

Q. Right, so the actuals could have been assessed, but absent having a design, you can't tell what the superelevations were intended to be?

A. We didn't have the design drawings, correct.

Q. Okay. Let's go forward to June 6, 2014. Registrar, can you please return to CIMA 22409 and image 5 this time. So, this is your note and Ms. Lawrence took you to it yesterday. So, there are a couple of elements here.

The bottom references a discussion I think you testified about with Gary Moore, and I'll come to that, but there's a note above. We've got Red Hill/Hamilton and it says:

"Reduce emphasis on signing issues."

Am I reading that correctly?

A. Yes.

Q. What does that mean?

A. I'm not fully sure, to tell you the truth. This was internal discussion at CIMA. Sorry, no. This is the meeting between CIMA and the City. I don't have a recollection of

what it means.

Q. Okay. But one of the key aspects is you're examining signs and markings in your proposal?

A. Correct, and they were reviewed, yes.

Q. So, we don't know what this reference means?

A. I don't have a recollection of what it means.

Q. Okay. And then we have a discussion with Gary Moore and you testified about that. He talked to you about the reasons why the design is as it is, and I think you discussed that yesterday in the context of lighting in particular, but it also says, I think, "through valley"?

A. Yes.

Q. And does that mean that he's explaining why the geometry is as it is, because it's following this creek valley?

A. I do think that was part of the conversation, the overall constraints that were on design, because the environmental assessment approvals didn't deal only with

lighting. They dealt with a whole range of issues.

Q. Okay. So, just to note it, I think after this point, you've got both consideration of the three key aspects, lighting, geometry and signs, and you've got at least two of three where you've been told that you can't make changes. Do I have that right?

A. No. I don't read that. I don't know what the reduce emphasis on signing issues means in the context of that. I can't recall it. There certainly was inclusion of assessment of signing in the report. The note from Mr. Moore or during the conversation with Mr. Moore was asking the question about illumination and his response with illumination X and being prohibited through the valley.

Q. Right, but isn't it true that as a consequence of that conversation, you reached the conclusion that you cannot make recommendations to provide or in relation to lighting through the alignment and you cannot make recommendations for changes to geometry?

A. The primary conversation with respect to lighting and the conclusion from

the discussion with Mr. Moore was that inclusion of (audio interruption) freeway, that the scope was clarified to not included lighting on the main line, and that issue was -- has been raised in some of the other discussion.

The geometry was not being reviewed in terms of being checked. It was reviewed to see what it was and make determinations about potential impacts that the assessment and the geometry would have on safety through the roadway. And so, there was curvilinear alignment, significant curves, for example, at the ramps, so all that geometry was absolutely considered in the assessment.

But I agree that changes to the roadway alignment and therefore its geometry, my understanding was that that was not part of our scope either.

Q. Thank you. Can we please turn to the July 3 PowerPoint that you prepared. I think that's Hamilton 51990.

And just so I'm understanding it, so you're not making changes, but just as you said, you're still considering geometry in reference to safety, and I think in this that's

pretty clear.

So, can we please go to image 8. So, here, am I understanding this correctly that this is an assessment of the ramps through Dartnall, that you're looking at the length of the speed change lanes as they come on and off the main line?

A. Correct, yes.

Q. Okay. And here, there's a number where you identify that they're shorter than a typical length?

A. Correct, yes.

Q. Okay. And when you're identifying the typical length, and here it's 400 metres, where are you taking that from?

A. I would have to go back and double check the reference. I don't have it off the top of my head. It would come from design guidance that exists, particularly the TAC, the MTO geometric design guide.

Q. So, there's two. You'd either be reassessing it in reference to the TAC guidance, and I think at that point it's TAC 1999. Do I have that right?

A. That would be correct,

yes.

Q. And/or the MTO 1985 guide?

A. Correct.

Q. Okay. Can we please go to the next image. So, here, it's again Dartnall 3, 4 and 5 continued. There's an alignment discontinuity identified in the field that's not shown in the design drawings.

When you say not shown in the design drawings, what are you referring to? Because there aren't any design drawings. Or do you have some at this point?

A. No, I don't think we have design drawings. We have aerial photos.

Q. Perhaps could we turn to image 11. Is this the kink that you referred to?

A. Yes. There's a small section of piece at the apex of the curve on the most southerly portion of the roadway between the two curves where the road runs tangent, and that was observed to be a fairly short section of tangent road between two very large curves.

Q. So, instead of making the curve continuous, they straightened what should be

the apex of the turn?

A. It appeared to be that way based on the field investigation and the review of the aerial photos.

Q. Okay. And that would be -- so, instead of a driver being able to follow a turn around, you've effectively got it straightened in the middle of what should be a curve section, so that would be a violation of driver expectation, wouldn't it?

A. It has the potential to be, yes.

Q. Okay. Can we please go back to 9 again?

A. Can I just request that the image be reduced again? It's just being blocked by the video.

Q. Okay.

A. That's good. That's fine.

Q. Okay. You're identifying potential countermeasures and this is install warning signs for atypical geometry for ramps. What do you mean there?

A. The ramps in some cases,

as noted, were identified as being shorter than would ideally be preferred, and so additional information provided to motorists of the warning of the presence of on-ramps would be beneficial. It was one of the recommendations we included.

Q. Okay. Can we please turn up image 10. So, again, this is Dartnall. So, you identified the signage in the prior image. Here, are you proposing to extend the speed lane changes?

A. I think what was done in this case was an analysis of what potentially could occur if you were to do that.

Q. I see.

A. I don't think this should have been included in the presentation personally, but I'm not sure how it got into it, but we wouldn't normally have recommended a change to the extension of the on-ramps because physically that's not possible on the highway.

Q. Okay. And image 13, please. So, again, this is Mud and, again, I think you're identifying -- wait a second. Yes, speed change lane, extend speed change lane from 210 to 400.

A. If I could comment on the content.

Q. Yes.

A. At this stage, these are potential countermeasures, so it's essentially a shopping list of possible items that theoretically could be applied, with an extension of the discussion relating to them, examining what the potential cost and benefit might be. So, it's a theoretical discussion about a range of countermeasures.

So, for the issues identified, here are a number of things that have some theoretical potential for improvement and some, like installing PRPMs, have a benefit-cost ratio exceeding one, so they would potentially be viable. Others, like extending a speed change lane, would have a benefit-cost ratio which is in below one, and therefore not as viable. But the exercise is to review them all, put them all on the table and have that discussion, so it's a -- I won't say -- I will say academic exercise. It's to go through the overall review so you can contemplate what could be considered and then exclude ones that don't make logical sense.

Q. So, let me just stay on that point, I understand that. Later in 2015, though, you identified driver behaviour as being, this is my word, not yours, being aggressive coming on to the main line because of a perception that merging lanes are short. And isn't what you're finding here that, at least in these locations, the merging lanes, the acceleration lanes, are short?

A. Well, I'm not sure we defined it as being aggressive. I think our --

Q. No, my word. I agree. But people were forcing their way on the main line because there was a perception that the acceleration lanes were short. And what I'm suggesting to you here, sir, is that in fact your finding is that at least in these Mud and the Dartnall interchanges, and we'll come to the others later, that they are short?

A. They're shorter than an ideal dimension, yes. The interchanges overall on both the LINC and the Red Hill are relatively closely spaced, and some of that is partly respecting the posted speed on the roadway at the time, which was 90 kilometres an hour instead of a

higher operating speed.

Q. Right. Can we please turn to image 19. So, this is one of the ramps on Mud Street. You've defined it as ramp 6, which, as you're going -- how does this work? So, this is a ramp to go on to the southbound lane?

A. Correct.

Q. Main line?

A. Yeah, towards the LINC.

Q. Okay. And in your analysis, collisions that occur on this ramp represent 65 percent of all ramp collisions?

A. That was correct. Sorry, at the interchange. Yes, I believe at the interchange.

Q. So, the accidents are happening as people are coming out of the ramp. Is that what you mean?

A. No, no. What I'm saying is that it's 65 percent of all the ramp collisions at the Mud Street interchange. That was my understanding.

Q. Okay. And we talked about this yesterday. All you're dealing with is some -- is in this section is, I guess, Mud and

Dartnall?

A. Yes. And there are other ramps approximate to this. There's the ramp that goes northbound, for example.

Q. Sorry, 65 percent of all ramps collisions, is what it says. Are you saying 65 percent of ramp collisions only on the Mud Street interchange?

A. I thought that was the case, yes.

Q. Okay. And you're going on what you remember? Because you can't see that from what you've written.

A. I would have to review the document to verify.

Q. Okay. And you describe this as a curve radius below typical design depending on the existing superelevation. Can you explain what you mean by that?

A. Well, we didn't have the detail on the superelevation, and so we were able to determine a radius based on the aerial photos. The relationship -- there is a relationship between the radius of the curve and superelevation, which is provided in the curve, in

order to determine what its design parameters should be.

So, we knew that the radius was below the typical design, but it would depend on what superelevation had been applied to the ramp as to whether or not that was within an appropriate range.

Q. Right. So, this is part of the Stantec design, so that is 6 percent, that ramp, is its design superelevation. Would that be correct for a ramp of that tight radius?

A. I wouldn't be able to offer an opinion on that at this moment. I would have to review it and properly assess it.

Q. Fair enough. Later on you describe the geometry for ramp 6 as atypical and, in other instances, you say ramp 6 is unique in characteristics. Do you want to explain a little bit about ramp 6 and why it is unique, atypical?

A. Well, the most unique feature of it is the amount that it turns, so it's a 270-degree turn. 360 degree would be a full circle, so you're turning 270 degrees of a circle. So, most ramps, as you can see on the photo, don't

require that total amount of turning. Many ramps don't. So, in this location, this is the ramp with the greatest amount of curvature.

Q. And was it the extreme curvature that you considered as contributing or correlative to the high number of accidents?

A. Well, the extended amount of curvature that is there is one of the factors that likely contributes to crashes on the ramp, because drivers may not anticipate that the ramp is going to continue to curve for that entire distance and lose their way as they travel through it.

Q. Okay. And I'm anticipating that, you know, in darkness and in wet conditions, that the challenge of that tight radius turn becomes even more acute?

A. Yeah. I think that's a fair assessment.

Q. Okay. I want to go to overview document 3.1. And, Mr. Malone, in preparing for today, did you have an opportunity to look at overview chapter 3.1?

A. Briefly, but not in much detail, no.

Q. And did you have an opportunity to look at any of the drawings?

A. As part of my preparation for this testimony?

Q. Yes.

A. No.

Q. Okay. It's surprising, sir. I rarely run into an engineer who can't wait to get to drawings. Sorry.

A. A lot of material to review.

Q. No, no, absolutely. Fair enough, totally. Then I won't belabour them.

Could we please turn to image 7. And this is summarized here in paragraph -- sorry, 6, I guess I need first.

So, we were able in production, both Hamilton and Dufferin produced documents and Hamilton ultimately found its preliminary design report, which was initially prepared 1990 and then revised 2003 and it looks as though there's a further revision in 2006.

But I just want to point out in paragraph 12 that the November 2003 preliminary design report provided that the Red Hill would

have a design speed of 100 kilometres per hour, and I think your assumption in your analysis was that the design speed would have been 110 kilometres per hour?

A. I'm not sure we made that assumption fully or not. We didn't have the design drawings or the details as to what the design parameters were. I think we were able to make some inferences of what design speeds may have been or would be for the roadway based on the ability to measure radiuses of curves from aerial photos. But, as I said, as has been noted, we didn't have full information with respect to superelevation as a factor in determining what the design speed might have been.

Q. Right. So, if you read the quotation here, it says:

> "The design speed of the north-south section is 100 kilometres per hour. This speed has been set based on the topography and spacing of interchanges. The posted speed is 90 kilometres

per hour and while a reduction of the posted speed would likely raise traffic operational concerns, strict enforcement of speed limit for trucks is recommended for safety reasons in view of the curvilinear alignment and the current practice of any truck drivers to exceed the posted speeds, consistent rate of enforcement may be considered."

I was interested by this because it looks to me that there's an appreciation from the beginning here of the safety concern arising from the curvilinear alignment. I take it that you agree with the fact that a curvilinear alignment raises challenges that has implications for the safety of the roadway?

A. Any curvilinear alignment requires greater input from drivers as they travel

on the road, and therefore it has the potential to have more safety concerns. It's not automatically the case, but it just becomes the reality, that a curve in the road requires a driver to turn the steering wheel and, therefore, there's greater input from the driver and potential for error.

Q. Can we please turn to the next image, 14. I'm going to take you to it just so that I think it probably fills in some gaps for you.

So, the geometry for the Red Hill was described in a table in the preliminary design report of 2003 and it provided for a maximum superelevation of 0.06, maximum grades of 4 percent and a minimum radius turn of 420 metres, posted speed, 90 kilometres per hour. I take it it's obvious, sir, that that information would have been of help to you when you were doing your analysis in 2013 and 2015?

A. It would have been helpful to have it, certainly.

Q. And later, in your 2015 report, you identify the tightest turn as 525 metres in radius. And that's not correct and we know now that's not correct. When you estimated

that 525, how did you do that?

A. My recollection is that it was from two potential sources. One was aerial photos and the other was we had received some drawings that showed the overall alignment of the roadway and we attempted to determine radius based on those.

Q. Okay. Can we please turn to image 13. Can you please, Registrar, call up the drawing at the top. A little smaller than that. Mr. Malone, can you see that okay?

A. I can, yes.

Q. So, this is section or part B to the Red Hill Valley Parkway and the evidence is that this section was designed by Philips. As your 2015 report focuses on, my understanding is that this is the area of the parkway with the greatest number of accidents along the alignment?

A. That's my recollection, yes.

Q. Okay. And I just want to point out a number of things. So, if you're assuming we're driving northbound, you've got this fairly long almost tangent section as you come

down from the escarpment and then the first turn you hit before King is a 420-metre radius turn?

A. Yes.

Q. Do you see that?

A. Yes.

Q. Okay. And then as you go past King, you've got another one, 450, which is also very tight, and then you go into 690 and 525, so you've got four turns in a row that are fairly tight. Would you agree with that?

A. Quite tight, I assume you mean in close proximity to each other?

Q. No, I mean the radiuses are -- well, both. Close proximity but also each of those radius turns is quite a tight turn in and of itself?

A. The term is relative. They're curves, not straight alignment, and they would require driver input and, in the orientation you described, the first curve is the most severe of the four, the radius being the minimum amount, the smallest amount.

Q. So, Tom Klement of the MTO, when he testified, described that a sequence of turns is broken-back turns. Is that a phrase

that you're familiar with?

A. I've heard it. I don't use that term. I use reverse curves. There's a series of reverse curves, two pairs of reverse curves.

Q. Is my rudimentary understanding of safety issues, is it true -- let me rephrase this.

The first turn, as you come from northbound and you're going down that long tangent and then you come to the 420-metre radius turn, does that create challenges for driver expectation?

A. The presence of a curve means, as I noted, that there's a requirement for driver input, which is a change from what they were doing on a straight tangent section of roadway. And so, if the driver is not expecting the curve, then yes, it could present challenges for driver expectation.

Maybe a better way to word it is driver workload. And from a safety perspective, what we tend to identify are locations where driver workload changes, so on a straight, flat tangent section of roadway, the

workload is relatively light. You don't need to do very much to maintain your position in the lane, your speed, your alignment, because you don't need to steer. As roadway alignment changes with curves, as the roadway alignment changes with vertical curves as well as horizontal curves and as the environment changes with on-ramps or off-ramps, merging traffic, that increases the overall workload in the location that would be required for motorists, and where driver workload is elevated, there's a potential for safety issues to be a greater concern.

Q. Okay. Thank you. And just on that issue of workload, not only do we have those four turns, but we also have interchanges that are quite close to one another. So, if you see King Street and Queenston, there is not much distance between them. I think it's 800 meters or something?

A. Yeah. They're relatively close to each other.

Q. Okay. And then Queenston to Barton, a little bit longer. Okay.

I want to go to Dufferin 2535, image 26. Actually, let me just ask a question.

Sorry, can you just stay there for two seconds?

We talked about driver workload. Do you take into account the cumulative effect of these geometric features in your safety evaluation?

A. If you mean cumulative being that there's multiple curves, four curves in a row, is that what you're referring to or --

Q. Four curves and we'll get to it in detail, and the tight interchanges so that you're going to have people coming on and coming off in those areas, so not only do you have turns, but you've got incoming and outgoing traffic along there at the same point as you're navigating the turns?

A. Yeah. Workload isn't a, you know, a binary measure on or off. It has a relative -- would have a relative amount to it. So, workload for proceeding through a curve is increased from proceeding on a tangent, but if you compound that by adding in merging traffic and the necessity to maintain your speed because you're proceeding in a downhill direction and you may need to manage your speed, monitor your speed differently because of that condition, then yes,

the overall workload would have been increased.

But keep in mind or consider that driver workload is constantly fluctuating. It's moving. If the person in front of you brakes, your workload increases, and so if you have congestion conditions, that also is a feature that can alter workload. It has nothing to do directly with geometric design, but is one of the workload inputs that needs to be considered.

So, a process that's sort of thought about or utilized is to consider what workload is as you move through an environment, as you proceed through the roadway. Lower, increasing, decreasing, increasing again and so on and so forth, and multiple things would increase workload, more at some spots, multiple factors, I guess I would say, would increase workload more at some locations than others.

Q. Got it. Okay. Thank you. Can we turn, please, Registrar, to Dufferin 2535, image 26.

So, Dufferin, who is a participant in this inquiry, was able to locate their issued-for-tender drawings and then Hamilton subsequently identified and found the

issued-for-construction drawings. For the purposes of the analysis, I'm going to stay with the issued-for-tender drawings, and the evidence is that there's not -- there are not materials changes between the two versions, just to give you that explanation, sir.

So, here we are -- Registrar, can you just go to the small map at the top briefly and call that out. There we go. Can you bring that down. Smaller than that. Smaller than that. Okay.

So, this in the corner just identifies where this drawing is on the longer alignment. Do you see that, sir?

A. Yes, I do.

Q. Okay. Okay. You can put that -- take that callout away. Thank you. Okay.

So, this is the first turn going into the sequence of four, where we've got the tightest geometry?

A. Depending which direction you're going in, yeah. If you're southbound --

Q. Fair enough. I'm making the assumption for the purposes of this and I'm trying to stay consistent in the same direction,

Mr. Malone, but if I move to the other, I'll tell you.

So, this is the first turn and, as you come, you've got to turn to the -- if you're going northbound, you're turning to the right, you've got the tightest radius turn and you've got a ramp going off and that's King Street?

A. Yeah. You're just coming out of the curve that you identified, the first curve after the -- proceeding down the hill.

Q. Right. Can we please go to the next image. Okay. And now I am going to take you to the southbound.

So, one of the points you raised is the challenge of the on-ramps on the turns. We can go back to it, but you identified it -- well, you identify it in the 2013 and we'll go to it in a minute.

But can you just take me through some of the challenges of this ramp on to the main line? So, this is King Street ramp on to the main line in the southbound direction?

A. Okay. I'm not sure I understand what you're asking.

Q. So, we'll go to it. I just thought it would be easier for you to look at it from the drawings, is that if you're coming off this ramp at King Street on to the main line, you're coming on to the main line on a curvature?

A. Correct, yes.

Q. Okay. And can you explain what the effect of that is for a driver?

A. Well, in the description I provided earlier, you're entering the highway, so there's a necessity to adjust your speed of the vehicle to bring it up to the highway speed from the local road speed and/or whatever speed you had to traverse the ramp at. There is a necessity to merge into the highway, into the main lines of the roadway, from the entrance lane, the ramp lane, from the on-ramp. And there's also necessity to maintain your alignment in the overall alignment of the highway, which is, in this case, southbound turning to the right.

So, there's a right-hand curve, southbound, there's an on-ramp, which would require a speed adjustment, and there's a merge manoeuvre because the ramp ends at some point downstream that you must then find an opportunity

to merge into traffic. So, all of those elements combine to create a driver workload at the location.

Q. And the fact that it's on the curve, that would affect the sight distance that a driver would have coming off the ramp, would it not?

A. Because of the alignment of this particular curve --

Q. Yes.

A. -- southbound, we're talking?

Q. Yes.

A. Yes. The view to, as you reach the end of the ramp, the bullnose of the ramp, and you start to make your decision-making process to enter, your visibility is slightly more challenging than if the ramp, the highway, was straight. So, yes, it's slightly elevated.

Q. Okay. And turning your attention to the north side of the alignment now, we've got, again, the ramp onto, from King Street, onto the main line. Do you see that?

A. We're talking northbound lanes now?

Q. Northbound now.

A. Okay, yes.

Q. Okay. Can we please go to the next image. So, this is just one down. So, in this instance, we've got -- this is the main line just north of the King Street interchange and we've got three lanes on the northbound direction because one of them is a weaving lane. Am I calling that the correct -- have I got that correct?

A. Well, yes, it's a weaving lane. It's an on-ramp on the left side of this image and an off-ramp on the right side of this image, and they're crossing into each other. The lane has simply been continued, essentially merging the on-ramp and the off-ramp. Some traffic may use that lane all the way through, so never have to actually weave or merge into traffic. Other motorists would be going further to the north, and therefore would need to weave, merge into traffic, and similarly northbound traffic that had not come from King Street would also have to weave or merge into the exit lane in order to get off, potentially. It's a dual exit, as I recall, at Queenston as well.

Q. Just to complete the thought, if we go to the next image, you can see the exit ramp to Queenston. There we go.

A. Yeah.

Q. So, that weaving lane, then, goes into part of the two lanes that are provided for exiting on Queenston. Do I have that right?

A. The lane that was on the bottom of the previous image is -- becomes an exit lane.

Q. Right.

A. If you stay in it, then you will exit the highway. The middle of the three lanes is an optional lane. One of them would be you can select to go exit on to the dual exit ramp or you continue northbound.

Q. And I want to go next to your 2013 report, but I take it -- I'll leave it. So, sorry, we'll come to it in the 2015 report.

So, I take it that the compression of the entrance and the exit between these two interchanges puts significant demand on drivers who are trying to get off or trying to get on the main line?

A. It puts an increased demand from an ultimate design that wouldn't have it or a different layout of a different highway, so it's different and I would agree that it's an elevated workload for drivers based on the number of elements that are present.

Q. Okay. Thank you, Registrar. You can take that down. I want to go to your 2013 report, which deals with the more southerly portion, that Mud Street and Dartnall.

Registrar, can you please turn up Hamilton 41871. There we go.

And, just to confirm, sir, I believe this is the final version. This is your -- we've got it coded, B325?

A. B is the project number and I believe it says E05 on the bottom, underneath the date.

Q. Okay. And so, do I have that right that this is the final report?

A. This is the last one that was sent to the City for (indiscernible), yes.

Q. Okay. And so, jumping around a little bit, Registrar, can you please turn up page -- sorry, image 38. This is not the

right one. Sorry, bear with me. I've got the wrong page here.

It's page 27, so I think that's 11. Sorry to do this to you, Registrar. It's page 27. I thought that it was 38, but it's not. Image 39. I apologize for being such a dinosaur that I actually use paper and the source of the confusion. Forgive me.

Okay. So, I just want to go to this point because in here you make a specific -- you talk about restricted sight lines for merging traffic on Dartnall 4 and you say:

> "On-ramp merge is located within a horizontal curve in the main line and vehicles northbound on the main line and upstream may not be easily visible from the vantage point of a merging driver given the curvature of the road and the angle of approach, which creates a large blind spot."

So, when I took you to the drawings of the King Street interchange as an example, I take it, am I right in understanding this report that this is an example in the 2013 report of exactly the challenge of an exit on to a curvature?

A. Yeah. Yes. I think that that's what it's identifying. I would use the terminology I did before, which is that it's a location where there is some elevated workload for drivers and I think I would supplement it a little bit by saying if a driver's habit is to enter the highway at the very beginning, the very initial opportunity that occurs at the end of the ramp and not utilize the full acceleration lane, that's a location where the visibility may be more difficult than it would be in other circumstances that they would experience and, therefore, an elevated driver workload and potential issue to pay attention to from a safety perspective.

Q. Okay. And just to complete the thought on that, drivers who will have a sense of trying to merge as quickly as they can if they have a perception that the acceleration lanes are short. Is that not true?

A. Not necessarily.

Q. Okay.

A. The driver may not know how long the acceleration lane is when they enter the facility, so it's not posted or defined for them as they arrive. They may know it based on experience and, therefore, that may influence their behaviour. They may also have a behavioural pattern themselves of entering at the very beginning or utilizing the full length of the acceleration lane. So, there's a wide range in variation of driver behaviour, so I'm not sure I agree that it automatically means it's problematic. There's a significant variation as to how drivers will interact with it. The overall conditions has elevated driver workload because of the components that we described, and that combination means that, you know, some drivers may experience conditions that are different than what they normally experience. Higher driver workload, greater potential for error.

Q. Okay. Can we please turn to image 28. Page 17, image 28. There we go.

So, you gave evidence on this yesterday just about using the tool, a predictive

tool of a safety analysis using enhanced interchange safety analyst tool, ISATe. Do you remember that?

A. Yes.

Q. You've got two tables in the 2013 report that I think are important and I want to get your explanation on.

So, we've got a predictive number for accidents and expected. If I understand, predictive is, like, how many collisions would happen on each segment if it were to perform at a normal safety level?

A. That's not exactly correct. It's if it were -- it's in comparison to the peers, to the entire group. So, what we're looking at is the overall expectation or the overall prediction of what would occur and then comparing what we would normally expect to see in numbers of collisions in the individual sections.

Q. Okay. And so, it's exactly that that I want to dig into. Because when I look at the predicted, you've got fairly high rates in a number of instances of predicted collisions, and so I want to understand better and get your evidence about what goes into a predicted

number.

When you contemplate a predicted number, are you contemplating -- well, let me ask this differently. What factors do you take into account in developing a predicted number?

A. This methodology uses a mathematical analysis called empirical Bayes analysis and what it attempts to do is to determine numbers of collisions that could occur on a roadway based on both what's actually happening and the long-term performance, the long-term history, that's there.

The purpose of it is to try to eliminate any short-term deviations, regressions, away from the mean, the norm, that tend to occur. Collisions have a relatively random component to them, and so you have to be careful to not just look at a short-term period of time, two years, five years' worth of data. You want to look at a long-term history and make sure you factor that in. Just because there's been a blip in number of collisions, an increase in number of collisions over a fairly short period of time, doesn't mean that the location is necessarily problematic. You

want to look at the long-term performance.

Q. Okay. I understand over time, but are you not also taking into account factors such as a geometry in your predicted number?

A. And the length of roadway itself, yes.

Q. Okay. And so, for instance here, if you look at -- these are freeway, so this is intended to be an assessment of tangent sections. What's the freeway segments?

A. They're the main line segments --

Q. Main line segments, okay. So, you've got a number for Mud 6 of 51 predicted collisions, for instance. How do you come up with that number?

A. I should double check. I'm not sure if this is including the ramps and the main lines or not.

Q. Well, the second one is just the ramps.

A. It's the second --

Q. If we turn to the next page, the next image.

A. This is the main line sections adjacent to or in proximity to Mud 6.

Q. Right, so this is the ramps. Let's go back to the prior image.

A. Yeah.

Q. Okay. Can you give us some understanding as to what you take into account in identifying the predicted number?

A. Well, as you said, proximity to -- it defines a location and what is proximate to is it considered. So, the amount of collisions that are occurring would be expected to be higher in a location where there's an on-ramp or an off-ramp present because there's merging activity that occurs at those locations.

The other factor which comes into play, however, is also simply the history of the location. So, if there have been -- if it's a location where congestion occurs, then there would be collisions resulting from rear-end crashes into standing queues of traffic, then that results in a higher value.

Q. So, isn't it the expected number that gives you the history, because that's part of the equation that gives you the historical

crash records at that location?

A. Yes, correct.

Q. Okay. And so, when you're coming up with predicted, you're looking at location in anticipation because of the challenge of that location, which takes into account lanes and curvature and other geometrical factors. Is that not correct?

A. It is, and, again, how that location has actually performed.

Q. And maybe I'm being too simple here, but do I take from this analysis of predicted numbers that Hamilton should realistically have an expectation that on this segment, they would have fairly high collision rates?

A. Correct, yes.

Q. Okay.

A. Well, I'm not sure that's a fair way to term it. It's an analysis to understand what is occurring at the location and provide appropriate context to it so that you don't simply look at the pure numbers of the pure frequency of collisions. So, it's not as though there's a plan to have collisions at the location.

So, I just want to clarify that term because --

Q. No, I understand that. But in terms of your anticipation of what would likely occur in a location, the predicted number indicates that at these locations, you are more likely than not to have a higher number of accidents?

A. Correct.

Q. Is that correct?

A. Yes.

Q. Okay. Can we go to the next image, please. Am I reading this table 7 is just focused on collisions for ramp segments?

A. Correct, yes.

Q. Okay. And so, if we look at the infamous ramp 6, where is it? There it is. So, that has a predicted number of 23.3 collisions and an expected of 37, so historically, you have more accidents here than you would have predicted. Do I understand that correctly?

A. I'm sorry, could you reword that again or restate it, please?

Q. I'll do exactly that. So, you've got predicted of 23.3 and expected collisions of 37.1, and do I interpret that to

mean that you have got in fact a higher number of actual collisions than you would have predicted at the location?

A. Correct.

Q. Okay. And then your analysis is to try and figure out why that would be and what you can do to reduce that number?

A. Yes, but I would add the context to it is the purpose of this exercise, which is a mathematical exercise of looking at the collision information is to flag locations that are statistically anomalies, that are not what you would expect as opposed to just looking at pure numbers of collisions. So, it's a better way of digging through the collision records and the quantity of collisions and it's a more robust way of ensuring that in fact there is a problem here that is different and verified from a statistical perspective.

Q. And once you identify a problem, then I take it, Mr. Malone, that CIMA would engage in the question of what steps can you take, can you as owner, I mean, take in order to reduce that number of collisions?

A. Yes, and I would sort of,

again, add the context to it that the purpose of this exercise is to identify locations that have the potential for improvement. So, the goal of the whole report, the exercise, is to examine, look for, potential safety issues, identify where there might be opportunities for improvement and with those identified using more robust mathematical and statistical techniques, then your potential for success is greater.

And I will emphasize that, you know, the historical focus of traffic safety was just to look at numbers of collisions, but if a high number of collisions are occurring for reasons that cannot necessarily be rectified or whatever, there was some unusual event, an environmental condition that led to a series of conditions, they're not necessarily things that can be resolved. So, the purpose of the exercise is to look for places where you're most likely going to have success in improving, reducing numbers of collisions, as opposed to locations where there may just have been a high frequency for some unknown or some random occurrence and then unable to actually provide a solution or potential solution.

Q. So, you're trying to get rid of the anomalies. Right?

A. You're trying to identify the anomalies and you're trying to quantify the variation from what is statistically will be expected, and then that assists in flagging which locations have the greatest potential for improvement. And it serves two purposes. It identifies specific locations but it also potentially identifies types of locations, so there may be similarities between locations that are red flagged if you look at the list as opposed to just, you know, location A location B. All locations of a certain type may have a feature, an element, from which benefit could be found if you were to be able to apply it.

Q. Okay. That's very helpful. Thank you. Can we please turn to image 2. This is the second page of the report. It identifies the project team and this particular report does not have signing lines. And, Mr. Malone, is it sometimes CIMA's practice to deliver final reports that do not have the signatures of the authors?

A. Our practice changed over

time. I'm not exactly sure if we were not signing reports at this time, but our standard, our approach, has been to return to that or to provide that.

Q. Sorry, I didn't understand what you just said. So, in this instance, I take it you agree with me that this is a final report, notwithstanding its not signed?

A. This was consistent with what was being done at the time, yes.

Q. That is, CIMA was delivering final reports that were not necessarily signed?

A. Correct.

Q. Okay. Can we please turn up overview document 6, image 33. So, this refers to minutes of a progress meeting of July 3 in relation to the report that we just looked at, and I just want to ask you a question on one element here.

It records the following discussion about friction:

"Implementation of high-friction pavement countermeasures should

not be considered on the main line due to specialized nature of existing pavement and ongoing monitoring, but can be recommended for ramps, if required."

And I know Ms. Lawrence took you to this. What was the source of the information that you couldn't use a pavement countermeasure on the main line?

A. My recollection was that it would have come from somebody at the City as opposed to CIMA. I don't recall who would have been the person to state it, but I would note that we were focusing on issues on the ramps, ramp 6 in particular, as opposed to the main line itself at this point in the study.

Q. Okay. And I think that -- okay. Thank you.

Can we please go to Hamilton 4660. I'm going to take you to the 2015 report. There we go.

So, I take it this is your proposal for the work for the 2015 report? I

think you identify it. Is that true?

A. I believe so, yes.

Q. Okay. And if we turn to image 4, and again -- I don't have the right one. Sorry, can you go back to image 3. There we go. That's what I'm looking for.

So, again, you're taking data from accidents and you've got historical volume, you've got data about traffic and you're identifying you expect to receive the design drawings.

And I take it, sir, that still in 2015 you don't receive the design drawings?

A. Well, I think it's worded the way it is. We asked for design drawings and we included the expectation or the anticipation that we might use aerial photography as an alternate and, correct, we did not receive design drawings.

Q. Thank you. Can we please -- sorry, you can take out that callout. I just want to address the issue of friction testing, separate direction.

In your 2013 report, you, CIMA, recommended that friction testing be

conducted. That's the case, sir?

A. That's correct, yes.

Q. And I've got -- and I want to go to overview document 7, image 35. This is an extract from your notebook, August 5, 2015?

A. Correct, yes.

Q. And I think this records a conversation with Gary Moore. Do I have that right?

A. The first part of the note records the internal conversation with project staff, discussing the status, where we were with the report, and discussing our recommendations. And the bottom part is, as I highlighted yesterday, part of the notes that I had completed in conjunction with the discussion with Mr. Moore, which occurred on August 6, which, in my diary, this is the bottom of one page and August 6 starts at the top of the next page and I had used the space below the, the open space on the August 5 page, for part of that notation, so it's a hybrid, is what I'm getting at.

Q. Got it. That's great. And, as I understood your evidence yesterday, you're recording a conversation with Gary Moore in

which he's telling you about the asphalt surface of the Red Hill?

A. Correct, yes.

Q. And I think in that meeting he identifies that skid testing has been conducted?

A. I believe he does state that, because the follow-on, the day after, a couple days after, is when he provides me with the e-mail with some attachments.

Q. Okay. And let's go to that. That's CIMA 10018.

So, after that discussion in which he identifies the fact that friction testing has been done, he then sends you testing done by MTO in 2007 and this e-mail, which has additional information. That's correct?

A. He sent me the -- forwarded the e-mail from Dr. Uzarowski.

Q. Right. And I just want to identify here. And I know Ms. Lawrence took you to this, but if we go through where we've got a chart and below it and it says below:

"In 2013, the friction numbers were measured on

the Red Hill Valley Parkway in both directions by Tradewind Scientific using a grip tester. The average FN numbers are as follows."

And they're listed: 35, 34, 36, 39. And I was puzzled by your evidence. When I read this, it looks as though that Hamilton has in fact exactly done as CIMA recommended and obtained the friction testing that CIMA recommended?

A. I didn't interpret it that way. I asked Mr. Moore for some clarification about the content and he provided me with a clear indication that, I think his words were, both times testing was done by MTO. Tradewind Scientific did not mean anything to me at the time.

Q. So, but here, you'll agree with me that you've got an e-mail from a consultant in Ontario. He's forwarded it to you, Dr. Uzarowski's e-mail?

A. Yes.

Q. And you've got contact

information for that expert?

A. Yes.

Q. And I take it, sir, that you didn't make any effort to contact Dr. Uzarowski for an explanation of the Tradewind data?

A. No. I received clarification from Mr. Moore that both of the testing, both the testing groups that were done, in 2007 and 2013, were done by the Ministry of Transportation. And our recommendation to the City is that the City should consider friction testing, undertaking friction testing, that the City should undertake it, and Mr. Moore confirmed for me that the Ministry had -- these were results from Ministry testing. And so, in my view, the action that we had included in our report had not been undertaken by the City, which was for the City to do friction testing.

Q. So, notwithstanding that Dr. Uzarowski writes there's friction testing done by Tradewind, you're relying on Mr. Moore's assertion that that's not true and that it's MTO testing that was done in 2013. Do I have that right?

A. I had no reason not to rely on his input.

Q. Yesterday you were asked were you able to understand the data, and you said you didn't attempt to. So, why is that, sir? Why did you not attempt to understand the data that's set forth in this e-mail?

A. Well, I guess two reasons. The first one is the data was not -- had not been done by the City, so it was not a completion of the activity that had been included in our 2013 report that the City undertake friction testing. It was friction testing done by another party. Mr. Moore's response in the e-mails that follow this and with some red text were clear that the City, Mr. Moore himself, to me, did not have an interpretation of this data.

So, I didn't go further because I wasn't being shown data that was, A, consistent or following on what had been identified by CIMA, that the City undertake friction testing, and B, there didn't appear to be an understanding or an interpretation of the data by the City themselves.

And so, my interpretation of

this data would not be of assistance to the City in that it wasn't fulfilling the suggestion, the action, that we had recommended to the City for them to undertake friction testing of their road.

Q. Literally, you're not suggesting that the City had its own resources to undertake friction testing?

A. I had -- I did not know.

Q. You didn't know?

A. No, I did not know. We recommended friction testing be done by the City. How and when and by whom, internally or externally, they achieve that would be for the City to determine.

Q. So, and let me just ask on that. So, you said you were expecting the City to get data and assess it themselves. Who were you thinking at the City was going to be able to assess friction data?

A. I assumed Mr. Moore or his group, given they were responsible for the design of the roadway and, through his previous explanation identified in the notes, his description of the pavement surface and such.

Q. And later, and I'm not

going to go to it because it's later in this chronology, but later you do assess the Tradewind data, don't you?

A. Once it's been identified to me that it was data undertaken for the City.

Q. Sorry, Ms. Lawrence. I'm not going further.

MS. LAWRENCE: I have popped on the screen to object to the form of the question because it does appear to me, Mr. Commissioner, that Ms. Roberts' question does seek to elicit an answer that extends beyond the period of time that we're talking about now.

MS. JENNIFER ROBERTS: Sorry, Commissioner. Forgive me.

JUSTICE WILTON-SIEGEL: No, go ahead. Are you going to ask further questions about his actions in 2019?

MS. JENNIFER ROBERTS: No, I'm not.

JUSTICE WILTON-SIEGEL: So this is the only question on this issue?

MS. JENNIFER ROBERTS: No, I have another question, but I'm going to stay within the timeline.

JUSTICE WILTON-SIEGEL: All right. Let's hear the question. Go ahead.

BY MS. JENNIFER ROBERTS:

Q. So, you didn't attempt, in 2015, to understand the Tradewind friction data?

A. No. My view was that that was for the City to undertake.

Q. And you said yesterday in your testimony that you didn't expect to incorporate friction data in the CIMA analysis in 2015. Do I understand that correctly?

A. Well, there was none to incorporate.

Q. And that's because of your understanding that it was MTO data and somehow proprietary?

A. It was not the City's data set. It was identified to me as having been testing that was undertaken by the MTO, and so it had not fulfilled what I was trying to understand as to whether or not the City had done testing following on the recommendation in 2013, and the context of where we are at this moment is trying to make a determination as to whether we're going

to include friction testing in the 2015 report.

Q. How was it that you were intending that friction testing could have been incorporated in your analysis, in your safety analysis?

A. We were looking -- I'm trying to make sure I understand your question properly.

Q. Well, you've asked for friction testing to be done, you've gotten it, but you're telling me that you didn't think that you could use it because it wasn't in a form that you were expecting it, and so my question is: What was it that you expected to get and how did you intend to incorporate it in your analysis?

A. We didn't intend to get friction analysis results. What we intended was for the City to undertake friction testing and make their own determination as to whether the results of that testing, if they had it conducted, was to their satisfaction or not.

Q. And is that because friction testing wasn't a necessary component to a safety analysis?

A. Well, the friction

testing is not part of a normal -- it's not very common in terms of safety assessments.

The other issue with the friction measurements is that there are a range of means by which friction can be measured, and so the critically important part in terms of friction is understanding what your baseline is so that you can determine where you are at the current time.

Friction testing, friction measurement, is most often utilized in terms of looking for a change. The typical issue which occurs on pavements is that they become polished over time and the friction will change, reducing it, if the surface was to become polished, or to in some way other degrade.

So, knowing your initial friction condition and monitoring your friction change over time is one of the ways that it's done. It's not done very often, but it is a process that that's the way it's usually undertaken.

So, the context of the CIMA recommendation in 2013 had been for the City to undertake friction testing so that the City could make determinations as to whether or not they were

satisfied with the friction that was available on their road surface to whatever standards and conditions and decision-making processes they were going to use themselves. It's an internal design parameter and operating parameter that the City needs to decide how to utilize, not the external consultant, at least not CIMA from a safety perspective.

Q. So, in the long and short, though, the friction data is not necessary to your safety analysis?

A. It could be useful in the safety analysis, but not in the strict sense of the number being this, that or something else. What would be useful is if the client, the City, had identified that, well, we have a section of this roadway which has more or less friction than is typically provided on our other roadways or in relation to whatever standard that we have. That information would be useful in the same way that a design parameter such as a curve radius and other would be utilized from a safety analysis. It would be a factor which could be incorporated into the interpretation as to whether or not a location -- whether or not friction is a factor in

the outcome.

The challenge with this assignment was we had a preponderance of wet road crashes. We also had data that showed high speeds, some relatively high speeds, and we had geometric conditions, overall layout of the roadway that, in some locations, presented higher workloads for motorists. What we had were contributing factors to collisions potentially, but not necessarily confirmation of causal factors.

And so, the request for friction assessment by the City of their roads was an attempt for the City to gather information that would help them determine if friction was a causal factor or not.

Q. Okay. So, just am I understanding that explanation -- I'm going to summarize this in a way that does justice to the many thoughts that you have provided to us.

Is that if friction were low, that that might be a factor that you should incorporate in your analysis, determining why particularly you've got wet surface collisions?

A. If the City had

identified -- was able to determine that they have friction performance at a given location that is different than the normally expected friction performance that they have on their other roadway network, that could be included in the analysis. However, our challenge was we did not know what friction was. We recommended that the City undertake friction testing so that they could make some determinations. If they had that output, then they would potentially have provided information to us. They had not done that yet, so we were still absent any information from the City of assessment of friction on this particular piece of road and I was not or did not know what they had for other portions of their roadway network.

Q. Okay.

A. We had speed data, for example, and that is a potential contributing factor to collisions. Friction could be a contributing factor but we didn't know. We didn't have data and we were recommending the City undertake some assessment of that so that they could inform themselves and assist in that determination.

Q. Okay. I'm recognizing

that its 11:30 and I think I've blown my estimate. I figure I've got another ten or 15 minutes, Commissioner. Would you wish to take a morning break or do you want me to finish?

JUSTICE WILTON-SIEGEL: Why don't you finish. We'll take a slightly later break this morning.

MS. JENNIFER ROBERTS: Thank you.

JUSTICE WILTON-SIEGEL: Yes.

BY MS. JENNIFER ROBERTS:

Q. Mr. Malone, and I recognize that this is a tiring process and I will try and keep it tight. Okay.

So, I would like, please, to go to that 2015 report, and I think that's Hamilton 702.

Mr. Malone, do I have this document identified correctly as the final version of this report?

A. I believe so, yes.

Q. Okay. Thank you. Now, one of the things that I just want to understand is in the 2013, you used the ISATe analysis to identify areas of higher collision rates within or

above a predicted number. You don't do that here. Why not?

A. We didn't use that software in this process. We had internal software in-house that we utilized.

Q. Okay. So, you did the same thing using a different software?

A. Essentially, yes.

Q. Okay. Can we please go to image 24. Okay.

So, this is a summary of collision review and you've got in the bottom of this page, it identifies what you're calling critical locations. Do you see that?

A. Yes.

Q. Can we please turn to the next image. Okay.

And I take it -- I think this is exactly the same general location that I took you through in the Philips drawings. Do you remember that?

A. Yes.

Q. Okay. So, this is the area where you identified the most collisions and you've got critical locations for median-related

collisions here?

A. Yes.

Q. Sorry. So, if I'm reading from the bottom, I've got northbound direction. There's a 600-metre section around King Street interchange, 40 percent at the northbound collisions are over 7.5 percent of the Red Hill length.

Now, do I understand that to mean that 40 percent of the collisions over the whole length of the Red Hill are in this location?

A. Of the northbound -- of the collisions in the northbound lanes, yes.

Q. And, again, the next bullet is southbound direction. There's a 1,100-metre section around King and Queen Street, which are 38 percent of southbound collisions. Do I have that right? That's 38 percent of all the southbound?

A. I didn't realize it was a question. Yes.

Q. Sorry. Okay. So, I take it overwhelmingly that the abundance -- sorry. The majority of collisions on Red Hill are on this segment, which has these four tight radius turns

and the two interchanges, which are close to one another?

A. Yeah. The numbers are as described in the -- correlated with the locations, yes.

Q. And can we please turn to the next page, image 26. And you talk here about potential contributing factors, and I think you were going to this topic in our last topic here. You've got three identified as potential contributing factors: Inadequate skid resistance, polishing, bleeding, contamination. Can I just address those?

I take it, sir, you did not see any evidence of bleeding or contamination on the Red Hill Valley Parkway?

A. No. This list, just these three bullets, are from a technical document. They're not necessarily specifically referring to the Red Hill Valley Parkway.

Q. Okay. And when you identify the polishing, that's a theory as to why there might be a lesser skid resistance?

A. The line is a quote from the document and it's a -- it attributes

inadequate skid resistance to those three elements or things occurring, so it's not all-inclusive of what could potentially impact skid resistance.

Q. Okay. This is an example from a textbook and not indicative of any findings on the part of CIMA?

A. Correct. It's a quotation from the text.

Q. Okay. And you've identified excessive speed in the third of the bullets and you've given evidence on that that I don't intend to focus on.

The hazardous manoeuvres in the second bullet here may be related to avoidance manoeuvres. I take it the sorts of manoeuvres that are identified as hazardous might also be manoeuvres that one would need in a circumstance where you've got, I think, high driver demand that you described earlier?

A. I think the text which is quoted is more referring to the word you used earlier, aggressive driving behaviours. But I would agree with you that the elevated driver workload would potentially be a contributing factor in wet road conditions.

Q. Okay. And, again, in the body of this, you then go into and talk about the curves in the -- can we just call it out, please. Another indication at the paragraph here. There we go. You talk about speed and the curvilinear alignment here.

And I take it that the conjunction of the speed and the curvilinear alignment you're identifying as potential likely contributing factors to the high number of collisions in the area?

A. Well, the presence of a curve means there's a requirement for driver input and, therefore, it's potentially a contributing factor to a crash that's occurring at that location.

Q. Right. Here, you're trying to give an explanation for a factual finding of a high number of accidents, and I take it I'm understanding you correctly that the contributing factors you're identifying are the speed and the turns?

A. Correct. We're listing potential contributing factors to the existence of the collisions and the curvilinear alignment is

certainly part of that. The alignment in general and, in this case, it has a number of curves on it.

Q. Registrar, could you please turn up image 20. I hope I've got that right. I think it's page 23. Sorry, image 30. Forgive me. My math is clearly failing. There we go. Okay.

So, this is -- you testified yesterday about this -- the ball-bank analysis that you did. Do I understand this exercise to be, at least in part, to try and assess the -- to assess the superelevations as actually constructed on the Red Hill?

A. It's not trying to assess the superelevation. What I tried to articulate was that when you do a ball-bank test, the superelevation that may be present on the roadway is included. It becomes a factor in determining the result from the ball-bank test. So, it's an empirical test. You drive through the curve and because you're driving a location, you're driving at whatever the superelevation may be, and so it is a component of the result --

Q. Okay. And it's a

component in that if the superelevation is correct, that that's going to help you, help the driver, navigate the turn?

A. Well, the superelevation is an embankment of the pavement surface and it will link to the capability of a vehicle to travel through the curve at a higher or lower speed. So, if the curve is, to use the example, if a curve was perfectly flat with no superelevation, it would get, result, in a higher ball-bank reading than if the curve was superelevated, the ball-bank reading would go down. So, it becomes a factor in the determination of the ball-bank output based on what the superelevation is or is not at the location.

Q. So, a superelevation that's correct for the speed would then end up with a lower ball-bank result? Do I have that right or have I got it backwards?

A. No. You're -- I'm concerned that you're defining superelevation as being correct or incorrect. Superelevation correlates with the radius of the curve, so it's not a fixed number as being correct or incorrect for a given speed. There are design guidelines

that describe superelevation correlating with a radius of a curve in order to achieve a design speed and the ball-bank test would give you some output that factors in the superelevation.

I'm just cautious in what I'm understanding the question to maybe be suggesting, that superelevation, determination of a correct or incorrect superelevation, is done by the ball-bank test. It's not.

Q. Okay. And you're right in that. Right now we have a superelevation that we can't see from the design documents and I'm trying to assess one of the objectives of this ball-bank testing. And if I'm understanding that it would give you a indication on superelevation, although I understand it's not a test for it?

A. It's not a test for it. You cannot make a determination of what superelevation is by doing a ball-bank test.

Q. Got it. Okay.

A. That said, the ball-bank test, by definition and by default, because you're travelling the road, is including the existing superelevation in the result that appears.

I realize it's confusing, but

it's -- I just want to be clear that you can't measure superelevation using a ball-bank test.

Q. I understand that. I'm not suggesting you could. Okay. Because one of -- I'm not going to go to it, but some of the recommendations here are in terms of adding in barriers.

And was consideration given to whether the superelevations were appropriate for the radius and design speed in consideration of whether it was appropriate and necessary to add barriers?

A. Not directly. Indirectly, as you can see from table 6, the ball-bank test passes, so the threshold value of 12 is not breached when you travel through the curve at 100 kilometres per hour, and therefore the curve does not require supplementary warning.

So, I would say that, again, we did not measure superelevation with the ball-bank test, but the ball-bank test validated that there was not a necessity for the advisory speed at the 100 kilometres an hour speed. The posted speed for the roadway was 90, so there was no requirement for an advisory speed, and that

result was determined driving through the superelevation as it was when we drove through.

Q. Okay. Can we please go to the next image, 31. Sorry, I referenced this earlier and I just want to come to it. This is paragraph 5.2.2, Merging Behaviour. And, here, it is that CIMA comments on the somewhat aggressive fashion observed of drivers merging on to the main line as soon as they reach the dashed line at the acceleration lane. Can you please call out, Registrar, this paragraph. A little bit larger.

A. I see it, but okay.

Q. A little smaller than that, please. Thank you.

So, this is a finding. We have the evidence that in the 2013 report, you've identified some of the short acceleration lanes and we've got evidence of the turns of the ramps on to the main line on different points of curvature, and here it is you're observing a behaviour of people merging on to the main line?

A. Well, this is a different location for the most part than the 2013 report, so the four curves between King and Queenston were not part of the 2013 study.

Q. No, I understand that. But when we talked earlier in this cross-examination about the compressed weaving lane between King and Queenston, is that an example of a location where you observed this aggressive driving technique?

A. I think we observed it at a number of different on-ramp locations. I note that the text says it was occasionally observed and I think that's consistent with my description previously that there's a range of behaviours by drivers. So, some drivers, either by habit or by their potentially aggressive manner, merge immediately upon coming into the ending of the ramp and having the first opportunity at the highway. And that may be, while it was identified, the visibility present at some of these locations was flagged.

Several of the sites had, as noted in the bottom part of the first paragraph, high vegetation, growth of foliage and such, and part of the recommendation was to enhance visibility by maintaining that material.

Q. So, that's an easy recommendation to effect on. My proposition to

you, sir, is that because the weaving lanes are short, because the acceleration lanes are short, as you've identified, that that will encourage the driver behaviour identified in this paragraph. Do you agree?

A. No, I'm not sure I fully agree that that motivates the driver behaviour, not the driver behaviour described here as entering immediately or aggressive, at least as we were describing it. I'm not disagreeing with the description of the length of the on-ramps, but I'm not sure that that's the motivating factor in the driver behaviour.

Q. Okay. And in this, you say -- let me just read it -- that drivers entering the Red Hill from the on-ramp tend to do so in a somewhat aggressive fashion, merging on to the main line as soon as they reach the dashed line at the acceleration lane. This may be due to a potential perception by drivers that some acceleration lanes along the Red Hill Valley Parkway are too short?

A. Yeah. The first word before the paragraph or the portion you read, again, says occasionally. So, there are a range

of behaviours, I'm not disputing, and some, you know, potentially do exactly what you're describing, but I don't think it's a consistent applied to all motorists, is perhaps where I'm going.

Q. Okay. I see what you mean. Okay. And you're not agreeing that it's necessarily causal; that is, the short lanes are necessarily encouraging the behaviour?

A. It may be the element that encourages some drivers' behaviours, but I guess where I'm being obstructionist is that there's a wide range of driver behaviours and I don't think it's fair to characterize that element of the design as the reason for driver behaviour, nor to describe the behaviour as being consistent by all drivers. As described, it was occasional, so we're identifying these elements that could be sources of problems. And certainly a shorter on-ramp, you know, could be a factor in a potential collision occurring.

Q. Okay. Thank you. I'll wrap up. Just one last series of questions.

Can we please go to the second image here. So, this is -- so, we identified that

the final version of the 2015 Red Hill Valley Parkway Detailed Safety Analysis.

Can we please go to the next image. There we go. And this version does have signing lines. I take it, sir, that it remains CIMA's final report, notwithstanding that it wasn't signed?

A. I would have to verify the version, but obviously it's unsigned, yes.

Q. I want to go to one last document. It's CIMA 2606.

THE REGISTRAR: Sorry, counsel. Do you mind just repeating the call out for me?

MS. JENNIFER ROBERTS: I think it's CIMA 9606.

BY MS. JENNIFER ROBERTS:

Q. So, I think that Ms. Lawrence took you to this and I won't dwell on it. So, could we please call out the, one, two, three, four, the fourth paragraph, Playing the Statistical Argument. So, this e-mail is about the speed on the Red Hill and you're talking about the discrepancy in the data between Pyramid.

But I just want to call up

just a different point. It's agreed that the sentence beginning:

> "Also agreed by all is that a large number of users exceed the posted speed limit."

Approximately 90 percent you've identified here:

> "It's also clear there are at least some vehicles with very high excessive speeds on a daily basis. That particular behaviour, given the geometric limitations of the highway, is a recipe for disaster."

What geometric limitations are you referring to?

A. Well, the geometric limitations of the curves, for the most part. At some point, if the speed of a vehicle is high enough, the limitations of the physics will be exceeded and the vehicle will not be able to

traverse a curve.

On a straight, flat piece of road, you can travel at virtually an infinite speed, but on a curvilinear road, there are limits as to what you would be capable of travelling through. So, the sentence is essentially relating that situation. If speeds increase and speeds become excessive, there are geometric limitations that will be hit and that becomes the situation in which a collision can occur.

Q. Physics?

A. I would add that there is quite a bit of leeway in the design of a curve of roadway and the speed through which a vehicle is physically capable of travelling through it, and that speed also varies from vehicle to vehicle. I mean, the example we use in training is that it's different if you're travelling around a curve with a large truck with a high-mounted load versus a Ferrari. So, there are definite wide variations as to what speed becomes the limitation and sub-elements, such as the tires on the car and so on and so forth and the driver's capabilities will also --

Q. But this is a general

observation?

A. Exactly. In the general sense, high speeds on curves and higher and higher speeds or extremely high speeds is a recipe for disaster. That's where crashes will occur.

Q. Okay. And then can we just go to the next paragraph. Can you call that up, please, Registrar.

So, you made the generalization that people -- you made the empirical observation that people are driving high and that that on the curvilinear section is problematic. And then you make the observation here, is that you've got an expectation, I think if I'm reading this correctly:

> "We concluded that some drivers are unaware of the potential consequences of their behaviour since they likely perceive the road as just another 400-series highway. It is not, particularly on the Red Hill section."

Do you mean by that that people driving between the QEW and the 403 who choose to use the Red Hill and LINC have the expectation that you can travel the road as you would on a straight 400-series highway? Am I understanding you correctly?

A. The comment was made, I think, trying to reflect our view that the roadway looks like a 400-series highway. It has divided lanes, centre median, shoulders on each side, overhead guide signs, and so the overall tone and feel of the roadway is consistent with what you would experience on 400-series highways elsewhere in the province.

And so, because of that, using your word from earlier, drivers' expectations may be driven by that pre-informed knowledge of what they experience elsewhere on 400-series highways and not necessarily recognize the differences that are present here.

There certainly was a variance, multiple variances, from a 400-series highway. Posted speed limits of 90 kilometres an hour an hour, for example, is one those. But drivers have competing information. They have a

view of the roadway as they travel it and they may make their decisions based on that previous expectation of what they're going to -- how they can and what they're going to experience as they travel the roadway as opposed to paying full attention to every aspect that's in front of them.

Q. And a driver with an expectation of a 400-series highway might be surprised by the curvilinear alignment of the Red Hill. That's the case, sir, is it not?

A. Well, drivers experience curvilinear alignment regularly and there are many 400-series highways that have curvilinear alignment. This particular highway does have some tighter curves and some closer proximity interchanges than are commonly found on 400-series highways and that element may not be as clearly aware to or clearly visible and drivers may not, some drivers may not be fully aware of it when they encounter it.

Q. And therefore surprised?

A. It could occur, yes.

Q. Thank you. Those are my questions, sir. And thank you for your patience, Mr. Malone. I've taken you quite long.

Commissioner, I apologize for going over my estimated time.

JUSTICE WILTON-SIEGEL: We'll take a five-minute break. Let's come back seven minutes past noon. We've got to try to stay close to the timetable here. We're running quite far behind, so let's take our break until that point.

--- Recess taken at 11:58 a.m.

--- Upon resuming at 12:07 p.m.

JUSTICE WILTON-SIEGEL: Ms. Lawrence.

MS. LAWRENCE: Commissioner, the City had questions in examination and was anticipated to go about an hour.

EXAMINATION BY MS. CONTRACTOR:

Q. Good afternoon, Mr. Malone. My name is Delna Contractor. I'm counsel to the City. I'm going to ask you a few questions today about some of the topics that you covered with my friends and some others as well. I'm going to jump around a little bit to try to be as efficient as possible, so if you have questions or you want me to give you a bit more context, just let me know. Okay?

A. Okay. Thank you.

Q. I want to start by understanding a bit more about your friction expertise and background. And I understood from your evidence yesterday that in 2015, you had some knowledge and experience with pavement friction design, and I believe you also stated that friction measurement and evaluation and performance specification for friction was not part of your standard work as a road safety professional. Is that right?

A. Correct, yes.

Q. And I think earlier today as well you mentioned that friction is not common in terms of safety assessments. That's not commonly done?

A. Correct.

Q. Okay. So, fair to say that in 2015, you did not have expertise in pavement friction beyond pavement friction design?

A. Correct, yes.

Q. And I gathered that, based on your experience working with City staff in 2013 and in 2015 on the Red Hill, you didn't understand the staff members to have expertise in pavement friction perhaps beyond pavement design?

A. I'm not sure I understand your question fully. You're asking me did I know which or who or what the expertise was of individual staff members of the City?

Q. Sure. So, you worked with a few staff members at the City in the context of the 2013 and 2015 CIMA report and I would like to know what your understanding was of whether any of those staff members appeared to have any particular expertise in pavement friction, not related to pavement friction design?

A. I think I understand your question. No, I didn't have specific knowledge of the understanding, knowledge, of individual City of Hamilton employees.

Q. Right. So, that's a bit of a different question. I want to know whether you understood that they did not have any expertise in pavement friction. There was nothing, based on your discussions with them or their correspondence, that suggested to you that any of the staff members that you worked with in the context of the 2013 and 2015 report had an expertise in pavement friction, again, other than design?

A. Maybe I'm misunderstanding the way you're wording it, but I did not know that they did have, nor did I know whether they did not have expertise.

Q. Okay. And nothing based on your communications with them suggested that they did have an expertise. Is that right?

A. I think that is correct, yes. Nothing specifically identified what their expertise was.

Q. Okay. Thanks very much. I would like to now chat about collision data, particularly in the 2013 CIMA report.

And so, Registrar, if we could please go to CIM8082.0001 and to image 16 particularly. Thanks very much. And if you could please call out section 4.1. All right.

So, this section or, actually, as part of the 2013 CIMA report, and we know that your team conducted a collision analysis at the study area, and this section lays out the purpose of that collision analysis and it states that the purpose is to identify locations that have a higher than average number of collisions and locations where the proportion of different types

of collisions are unusually high. Do you see that?

A. I do.

Q. Okay. And I understand that CIMA used two different types of analysis to meet that objective. The first was strictly through historical observed number of collisions, and the second was the enhanced interchange safety analysis tool, which I'm just going to refer to as the tool, if that's clear enough for you.

A. Yes.

Q. Okay. And you see that the section lays out those two separate types of analysis?

A. Yes.

Q. Okay. So, I want to understand both of these methods a little bit more and I want to go through the report, which provides a helpful description of them.

And so, if we could now, please, Mr. Registrar, go to image 26. Okay.

And the tool, as I understand it, is automated and it's used to assess the safety of freeway facilities, and there are three different types of analysis that can be done, and

you see them on the screen under 4.2.2 with the little plus signs.

And am I correct that the analysis that was done here was the safety system management analysis, which looks at the safety performance of several facilities and determine what countermeasures and where to implement them so that the greatest impact on safety is achieved?

A. Yes, that's what it states.

Q. Right. And that is the analysis that was done here. You didn't do an economic analysis or a reconstruction project prioritization. Correct?

A. Correct, yes. Yes.

Q. Okay. And if we can go back to 4.2.1, so I think just the page before, Mr. Registrar. Perfect. Thanks very much.

Based on my understanding of this section, the way that this tool completes its analysis is by looking at three distinct values. The first value is observed collisions, which are the number of collisions that occur at a location or segment. That's correct?

A. For the time period that

you have data available, yes.

Q. Right. And the predicted number of collisions is the average number of collisions that the tool expects a location to have, and this is expectation is based on a mathematical equation that describes the best fit relationship between the number of collisions on a road and the characteristics of the road, such as volume or environmental type?

A. Correct. You're reading from the document, yes.

Q. I'm reading from the document, yes. And the expected number of collisions basically combines the observed and the predicted using an empirical method?

A. Again, correct.

Q. Okay. And, generally speaking, when the observed number of collisions is greater than the predicted number, the indication is that the location is performing worse than average, and where the observed number is lower than the predictions, the indication is that the location is performing better than average. Do I have that right?

A. I believe so, yes.

Q. Okay. So, going back to the objective of the collision analysis, which was to identify the locations where collisions are unusually high, I take it that the way to do that with this particular tool is to compare the observed with reference to the predicted to figure out whether it's unusually high or not, with the predicted being a baseline. Is that right?

A. Yes. The graphic on the next page may be of assistance as well.

Q. Sure. Mr. Registrar, please.

A. Yeah.

Q. There's a section, 4.2.3, that speaks to this as well. And, if it would be helpful, we could go to that.

A. Sure. Sorry, would you like me to proceed?

Q. Well, why don't I take you to that and then we can go back to the chart as well.

A. Okay.

Q. So, if we can go to image 28. And under the Tool Results, you'll see that it says:

"In general, when the observed number of collisions is less than the predicted, this is an indication that the location is performing better than average."

And so, if our objective is to understand whether the collisions are unusually high, we're using the predicted value as a comparator, as the comparator, I think is the best way to put that. Is that right?

A. I would use slightly different wording. I'd say we're using the observed to modify the determination of the predicted.

Q. Right. And what it states here is that when the observed number of collisions is less than the predicted, so if the number of collisions are five and the predicted is ten, then that means that five collisions are not unusually high for that segment. Is that a fair -- am I understanding that correctly?

A. Just if you can repeat your explanation again, that would make sure I've

got it right and understand what you're saying correctly.

Q. Sure. So, just based off that second sentence in this paragraph, right, which says:

> "If your observed number of collisions is less than the predicted, then this is an indication that the location is performing better than average."

And so, what I'm asking, essentially what that means to me is that when we're looking at whether collisions are unusually high, which, again, is the objective of this analysis, we can do that by comparing the observed to the predicted.

So, for example, if the observed number of collisions is five and the predicted is ten, five is less than ten, which would mean that that was an indication that that segment is performing better than average or is not unusually high?

A. Correct.

Q. Okay. Thanks. Okay. So, on Monday commission counsel asked you about this tool and you were asked about it again today, specifically about what it is that it tells you about the Red Hill and how it's performing. And I believe that you said that it tells us that some sections, as you break into segments or ramp, are performing better than you would expect for that type of facility and some were performing worse. Essentially, it's a statistical tool that could help flat locations in comparison to what their expected performance would be. Is that correct?

A. I think that's accurate, yes.

Q. Okay. And, again, this is based on the idea that we just spoke about, that when the observed number of collisions is less than the predicted number, the indication is that location is performing worse, so it allows you to compare facilities using the predicted number as a comparator?

A. I'm sorry to interrupt. I think you might have just flipped them around there.

Q. Okay. And it allows you

to compare the collision rate of different facilities based on the delta between the observed or, sorry, using the predicted value as a comparator?

A. Okay. Yes. Yeah.

Q. Okay. And there's one section in this report with respect to the tool that you haven't been taken to and I want to spend a few minutes on that, because I do think that it's quite important.

If we can go to image 27 and call out the section The Limitations of ISATe. I don't know if you can call out the entire section. Beautiful. Okay.

A. Okay. Yeah. Thanks.

Q. Okay. And so, based on this section, my understanding is that using this tool to conduct a safety analysis on the Red Hill has a significant limitation in that the mathematical equation that's used to design the predicted number, the comparator, the mathematical number that's used to determine that is not calibrated for Hamilton; it's only calibrated for the U.S.?

A. Yes, that's correct. The

tool is not -- was not built using Hamilton data. It's U.S. based. It's a U.S.-based tool, but it still gives a means to examine the data and try to eliminate some of biases that may exist with pure collision frequency data.

Q. Right. And I understand that it was not calibrated for Hamilton because there just simply wasn't sufficient collision data.

A. Well, it hadn't been done. Hamilton has sufficient data to calibrate the safety performance functions for use in a tool like this. At the time, in 2013, Hamilton had not done it. It was pretty rare for municipalities in Canada to do it. It's become much more common and more municipalities do, but it's not a matter of there not being enough data. It simply had not been done.

Q. Okay. I was just citing the third paragraph, which says:

"There is insufficient data in the current study to calibrate the SPFs -- "

Which is the value tied to the

predictive number:

> " -- in ISATe for Hamilton. The user manual states that for each site type there should be at least 100 collisions per year. For the Red Hill corridor, there were only 160 total collisions for all site types spread over five years. In addition, generally many locations are needed for recalibration whereas this project covers only one highway."

So, perhaps I misspoke and the question should have been that there's insufficient data for the Red Hill, to calibrate the Red Hill. Is that fair?

A. Yeah. I mean, the safety performance function is a curve that has been fitted to some data, you need sufficient amounts of data in order to have a good fit of a curve.

It had not been done for Hamilton, so the tool has built in defaults to it and that's what was used. And that's exactly what's being highlighted in the report.

Q. Right. And it states that calibration is important because it ensures that the evaluations of the results are meaningful and accurate for a specific jurisdiction?

A. It will --

Q. Do you see that?

A. It will improve accuracy if the safety performance functions which are used in the tool are adapted, modified, in conjunction with the specific jurisdiction, yes.

Q. Okay. And it goes on to say that without proper calibration, it's not suitable to compare the observed number of collisions on the Red Hill to the predicted number, that it's only suitable for relative rankings and not for absolute collision values.

And so, what I understood from that is that you can use this tool to create a ranking of the segments of the Red Hill, but that it's not suitable for absolute collision values. It's not suitable to be compared to other

facilities.

A. Yes. I think that's a correct interpretation. The -- I'm just trying to think if I need to supplement the description you gave. I highlighted earlier that we used it in that manner. What you -- the value of the tool is to help understand the potential for safety improvement, and I mean that in a magnitude sense as opposed to an absolute number. Perhaps that's the addition that's needed.

Q. Right. But that magnitude is only with respect to the various segments of the Red Hill and not with respect to the reference to what's expected at other facilities?

A. Yes. I would agree. That's correct.

Q. Okay. And if I could put this in very simple terms for those of us that are not safety professionals, is it fair to say that we cannot here use or it's not suitable to use the predicted number because it would be a little bit like comparing apples to oranges because the tool is not calibrated for the Red Hill?

A. Sorry, when you say

"use," can you define what you mean by use?

Q. For the purposes of the collision analysis, which again was to identify whether there are spots on the Red Hill or that collisions on the Red Hill that are unusually high, and I'm suggesting to you that the predicted value cannot be used to establish whether the collisions are unusually high using this tool to compare to other facilities. It can only be used to rank the relative locations of the Red Hill?

A. Yes. The latter part of your description being the most important. It's a relative ranking on the facility that you're looking at, not comparison to other facilities elsewhere.

Q. Okay. All right. And if we can go, please, to image 30, Mr. Registrar.

So, this table, table 7, lists the observed, predicted and expected number of collisions for the ramp segments. And my friend took you to this earlier today as well, but I want to clarify my understanding of it based on what we just discussed.

And so, if we look at, for example, ramp 6, that has an observed collision of

40, I believe, and a predicted value of 23.3. And because of the lack of calibration that we just discussed, we cannot rely on this to mean that the number of collisions on ramp 6 are twice as high as you would expect at other facilities. Is that right?

A. Oh, I see what you're saying. Yes. Yeah. The last two columns give you input that allows a relative comparison between each of the rows, but not an absolute determination of the number that it should be at, and I think confirming what you stated, and that's because the safety performance function that things are used to compare against is not calibrated for Hamilton or the Red Hill in particular.

Q. Okay. And I take it that of course the segments of the Red Hill that formed part of the study area in 2013, they have different characteristics. Right? Some areas have greater curvature and some are more linear, and so in that sense, comparing that relative ranking may have some limitations as well in terms of a comparison of what you would expect, but might assist in determining where the greatest

potential for -- which area has the greatest potential benefit of improving safety?

A. It is one of the limitations of the methodology, of the approach. It's not perfect by any means. How finely you divide, you segment, the roadway that you're looking at becomes -- if you take it too far, then you're just looking at individual locations and you're losing the whole value of the comparative analysis.

Q. Right.

A. So, typically ramps would be grouped together, curvilinear sections of highway grouped together, straight portions of highway grouped together, if there is a safety performance function that relates to each of those types of conditions.

But, you know, if you're suggesting should you continue to break down further and further and further into ramps that are one configuration as compared to ramps of another configuration, it's potentially possible but it begins to degrade into meaningless information.

Q. Understood. So, we can

take that down, Mr. Registrar.

I want to now turn to the other kind of safety analysis that CIMA undertook in the 2013 CIMA report, and that was to look at the historical observed number of collisions and compare it to the provincial and municipal averages, again, to determine, you know, are the number of collisions unusually high, so let's compare them to the province, let's compare them to what's happening in the rest of Hamilton.

And we know, based on our discussion, and I think you've confirmed this before, that when we're comparing collision rates, it's important that we're comparing the rates of like roads. Right?

And so, for instance, you just indicated that linear sections of the main line should be compared to each other and the ramps should be compared to each other, or a straight road should not be compared to a curvy road, for example, because they're different average expected -- the expected number of average collisions is different for those two types of roads. Is that right?

A. You would expect

different outcomes of collisions based on different types of roads.

I would throw a caution in a little bit. You said collision rates and collision rates imply a direct correlation with volume of traffic, and so collision frequency and collision rate are two different things. They shouldn't be merged together.

But I think -- I agree with your point or your description that collisions would be different on a ramp than would be on a main line, and collisions would potentially be different on a certain type of ramp than another type of ramp in that example.

Q. Right. And I think on Monday your evidence was that you would generally expect a straight road to have fewer collisions than a curvy road. That makes sense to me. That's right?

A. Well, remember there are contributing factors to collisions, and so certainly some of those would be the geometric elements that we're talking about, ramps, curves, main lines, straight, but other elements would be more generic, daytime, nighttime, wet road, dry

road.

So, there are elements which are linked to the geometry, causal factors of collisions, and there are would be elements which are linked to other factors which are not unique to the geometry. They may be consistent, like the weather condition.

Q. Right. And those factors that aren't linked to the geometry, they still have a disproportionate impact on curvy roads, for example. So, again, I think on Monday you stated the roadway that has a curvy alignment is more likely to have wet weather collisions. That's correct?

A. I don't recall the exact quote, but I guess I would add to it that the factors can indeed compound, if that's what you're suggesting.

Q. Yes, that's my question. Thank you.

Okay. So, if we can go to image 23, Registrar, of the report that we just had up. Okay. So, we're still in the 2013 CIMA report and here the report is providing a breakdown of collisions on the Red Hill for the

study area, broken down by dry, snow, ice, wet and other.

And at the bottom of that, I wonder, Mr. Registrar, if you could pull up the next page as well and call out the bottom paragraph of this page and the top paragraph of the next page, as you did so effectively before. Okay.

And so, here, this paragraph states that:

> "The overall average of collisions that occurred under wet road surface condition is 46 percent, when compared to the provincial average of 17.4 percent and the City of Hamilton average of 13 percent."

And if we look at the footnote, which is footnote 9, for the provincial average, for example, that takes us to the Ontario Road Safety Annual Report, which is a report prepared by the Ministry of Transportation.

And I take it that you're

generally familiar with this report if it's done annually?

A. Yes.

Q. And my review of the report is that it provides the collision data for all roads in Ontario that they have data for. Is that right?

A. Correct, yes.

Q. And it provides breakdowns by environmental condition and collision type and all kinds of other factors?

A. Correct.

Q. And this step is based on the number of collisions that occur on wet weather -- occur in wet weather conditions for all roadways, again in Ontario, that they have data for and not specifically with respect to curvy roadways, for example?

A. Correct, yes.

Q. Okay. And so, for example, I believe yesterday you stated that comparing the Red Hill collision stats to the 400, Highway 400, would not be an accurate comparator because the 400 is long and straight and it's not a direct comparison?

A. You need to be aware of the differences in doing a comparison, yes.

Q. Right. Because otherwise, it would -- it could suggest that one roadway that has curves, when compared to a collection of other roadways that has straight roads and curves, has a lower collision rate because of the number of straight roads, for example, for the comparator group.

A. Again, you brought collision rate into it, but --

Q. Sorry. Thank you. I meant the number of collisions.

A. Yes. Again, I understand what you're stating is that the provincial or -- the provincial average that you highlighted is for all roads in Ontario. The section of roadway being discussed in the report is not equivalent to all roads in Ontario.

Q. Thank you. And we can take that down, Mr. Registrar.

Am I correct that -- and you alluded to this earlier -- a more accurate way to analyze that collision data would be to break it down into segments, not into too many segments,

but into segments based on their curvature and then compare the collision data that way, so segments with similar curvature would be compared to each other. Is that fair?

A. Ideally, you would provide an apples-to-apples comparison, yes.

Q. All right. And I know that this will be discussed later on in your testimony, but I believe CIMA does eventually provide such analysis in 2018 and 2019?

A. We did further analysis in 2018 and 2019, yes.

Q. Okay. And, Mr. Registrar, sorry, can we bring that report back up and go to image 21. And we can call out figure 5, so just the table there. Perfect.

I just wanted to clarify a small point here. And so, this figure provides a pie chart breakdown of collision types on the study area and the blue, we can see in the top left-hand corner, represents SMVs. And am I correct that the numbers in the circle represent the actual number of collisions?

A. That's my understanding, yes.

Q. Okay. So, for example, if we look at ramp 5, it has two SMVs and two rear-ends and one side-swipe, so about 40 percent of the collisions on ramp 5 are SMV?

A. Correct, yes.

Q. Okay. And similarly for ramp 8 and 10 and 3, there's only one collision which is an SMV, so 100 percent of the collisions are SMV?

A. That would be correct, yes.

Q. And if we look at ramp 6, that's about 92 percent?

A. I don't know what the total is in front of us, but --

Q. Sorry, you don't know what the total -- so, the total would be 40, so it would be just a percentage of 37 out of 40, which I won't make you do the math, but it is cited at the bottom paragraph, so we can take a look at that?

A. Yeah. Whatever the calculation is from the total, yes.

Q. Right. Okay. And so, if we could go back, Mr. Registrar, to the bottom, to

the next paragraph or the next page, rather.

You'll see that the report states that the proportion of SMV collisions on ramp 6 is significantly higher than all other locations, with more than 92 percent of collisions being SMVs.

And we know that there are three locations, for instance, that do have a higher proportion of SMV collisions. Right? We just saw that with ramps 3, 8 and 10, so that's not precise?

A. Agreed.

Q. And again, it goes on to state that the percentage of SMVs on ramp 6 are notable when compared to the provincial average of SMV collisions, and so the same issue that we discussed earlier about comparing apples to apples would apply here. Correct?

A. Yeah. There are some deficiencies in the approach for sure.

Q. And so, you would agree with me that to understand whether or not the number of collisions on ramp 6 are unusually high, it would be more accurate to compare the number on that ramp to a roadway or a ramp with similar

curvature. Is that fair to say?

A. Yes. It would be -- ideally you would want to compare it to ramps of similar configuration. The ramp 3, for example, in this image and ramp 6 have somewhat similar configurations, 270-degree ramps, tighter geometry on the ramp 6 and whatever other features are present. And so, there's some about to provide comparison when looking at gross numbers of collisions, collision frequency, but there are limitations to it for sure.

Q. And I think we can take that down. I'm going to now just ask you a few general questions about CIMA's process with respect to working with clients and then preparing draft reports and reports generally.

And I take it, Mr. Malone, that it's common practice for CIMA to have meetings with the client on a particular engagement to provide your preliminary views to the client?

A. We usually build in progress meetings, a project kickoff meeting and then progress meetings as may be appropriate throughout. Sometimes the client will demand that

in their request for proposal. Sometimes we'll propose it. The quantity will vary depending on the project.

Q. Understood. And as part of the discussions you had in those meetings and, you know, common to include your preliminary BC analysis or the specific potential measures that you may be considering at the time?

A. Sorry, you asked if it is common to include that?

Q. Yeah.

A. It's not uncommon. Not every project includes a benefit-cost analysis, for example, so obviously it would not be included in that. It can and could be included. It's a useful piece of information as you're making decisions as to where the report will end up.

Q. Right. And I take it, again, not uncommon for CIMA to receive feedback from the client, including additional information that CIMA may need to be aware of that are relevant to potential recommendations, costing information that may impact the cost benefit analysis and generally factors like that. Is that fair?

A. Yes. I think the communication and discussion with the client as the project progresses is useful. It avoids getting to the end of the, the completion of the project, and then finding out you've missed some piece of information or misinterpreted something, so it's a way to maintain efficiency in the project.

They also served, the meetings served the function of keeping the client informed as to what progress is being made, and so they're confident that the things are proceeding in accordance with plan, again, rather than getting surprised at the end of the day that we're behind schedule or something like that.

Q. Right. And I think you mentioned on Monday that these types of meetings are important to ensure that any ideas that are ultimately recommended or measures that are ultimately recommended are reasonable and viable for potential implementation?

A. Yeah. The view we take is that it's important to ensure the client has an understanding of what's transpiring. If the client has an intimate knowledge of the locations

that are being assessed in the project and they can provide valuable input, things that may not be clearly aware to the consultant, so they can improve our knowledge and raise points and, as occurred in this case, clarified things like scope for us.

To a certain extent, it's even, I won't say more important, but it is important for roster assignments because the formulation of the RFP process or the request for proposal process is fast-tracked, so there's not necessarily a long detailed assessment or completion of a formal written document for the consultant to respond to with a roster assignment. I mean, that's part of the advantage of it, is that it moves things quickly, but it, by necessity, then, calls for or should -- can benefit from ongoing communication.

Q. And, Mr. Malone, you would agree with me that ultimately the report that CIMA submits to the client, the final report, it's of course important that that report reflect CIMA's opinion on what recommendations could or should be recommended in the study area?

A. That's why the client has

hired us. They're seeking our input and our opinion. It's a professional opinion relating to a particular matter.

Q. Right. And important that the report include your opinion on timelines by which those measures can be implemented as well?

A. I do agree that it's important that we give our input with respect to timelines, but I would also -- I think it's important to recognize that the client also has an important involvement in timelines, particularly given that the consultant may not have sufficient knowledge of the inner workings of the organization to be able to know timelines. And, of course, as a consultant, we don't control the timelines either, so we're aware of that in writing our reports and we try to make sure that we communicate to clients things like timelines so they can be reasonable when they're included in the report.

Q. Right. I understand that you cannot control the timeline by which the City implements any measures that are listed in the report, but it is important that CIMA's

recommendation with respect to timeline reflect CIMA's opinion?

A. Yes. I think we certainly provide an opinion with respect to timeline when we provide it, but part of that opinion may require input from the client in order to ensure that it is reasonable. And the example I gave yesterday was if an item requires capital budgeting, if we misinterpret or don't understand that something requires an extensive capital budgeting or other, you know, form of process that must be followed through in order to achieve it, that's a deficiency on our part and the client can help inform us as to what steps may be required, you know, to get to implementation of item number X instead of the consultant's interpretation that it was one step, two step complete, they say no, there's three or four other steps in between. You weren't aware of that. That potentially impacts timeline.

So, that's a long way around. I won't say it's iterative. Certainly the client provides input about it, but it is informed and should be by the client as well. Otherwise, you're acting in a vacuum.

Q. Right, but we've seen one example at least in the context of the 2015 report where a CIMA staff member understands the City to be requesting a change in the timeline for one of the recommendations. You know, we've seen a comment on one of the drafts saying I don't agree with this and ultimately CIMA maintained its original recommendation of a short timeline for that particular measure.

So, you know, what I'm hearing you to say is that certainly the client has the opportunity to provide feedback and give CIMA information that it may not have so that CIMA can make an informed recommendation with respect to timeline, but ultimately CIMA would not recommend a timeline that it did not agree with. Is that fair to say?

A. Yeah. We would not recommend a timeline that we don't agree with, but we would want to make sure we've been informed as much as we can be to make a reasonably informed recommendation regarding a timeline. We recognize fully that the client will determine at the end of the day the timelines themselves, and we're trying to make sure that we haven't made an error or

misunderstanding, so we're trying to incorporate that. But certainly we will agree to disagree in some circumstances.

Q. Right. And the same would go for recommendations. CIMA would not include any recommendations or omit any recommendations that it does not agree with?

A. Yes. We make the recommendations based on our professional opinions. In a similar manner, we'll make sure that we're fully informed by the municipality.

One of the challenges with road safety assessments, as I highlighted yesterday, is that we're dealing with an existing facility and that concept of, sort of, backing up or changing something that's already in place is always a little bit unclear as to where it resides.

In some circumstances, it is fully appropriate to do that and in others it's not possible, so we try to make sure we understand that context.

Q. Okay. Understood.

Mr. Commissioner, I'm about to move on to another section and I note that we're

approaching lunchtime. I'm happy to continue or I'm happy to break for lunch now. I'm in your hands.

JUSTICE WILTON-SIEGEL: Let's take our break now. I'm going to suggest we take a one hour break and we return at 2:00.

--- Luncheon recess taken at 12:57 p.m.

--- Upon resuming at 1:59 p.m.

MS. CONTRACTOR: Mr. Commissioner, before I continue with my questions, I wanted to note what I relayed to Ms. Lawrence. Unfortunately, although I did estimate an hour, I think I will be a bit longer, but I will do my best to try to wrap up in the next hour.

JUSTICE WILTON-SIEGEL: Okay. Well, I would ask you to do that. I note that Golder also went over, but they were a little less than an hour and a half. You've already had pretty close to an hour. I am, as you may expect, also very sensitive to two things relating to scheduling. One is that Mr. Applebee has been here for some time and he's scheduled to be examined this afternoon or to give his evidence this afternoon, and also that we only have half a

day tomorrow to wind up with Mr. Applebee, so we have to make sure that we keep to that schedule.

So, I would ask that you limit your questions to the hour between now and 3:00.

MS. CONTRACTOR: Understood. Thank you.

JUSTICE WILTON-SIEGEL: Thank you.

BY MS. CONTRACTOR:

Q. Mr. Malone, I'm going to try to speed through a couple of things and jump around a little bit, but if you need any clarification, do let me know.

And, Mr. Registrar, if we could go to CIM8082, image 13.

While we do that, I'll start with my questions. So, I understand that the objective of the 2013 safety report, as is described in the language that we'll see shortly, was to review a portion of the Red Hill to determine the safety and performance of the roadway, and that's just at the bottom under Study Objectives, now that we have that page up, and determine the safety and performance of the roadway and recommend viable potential

measurements that could be implemented to increase safety performance or driver sense of security.

And from that, I understand that their mandate was to provide CIMA's opinion on the safety performance of the area, so collision data, and identify any measures that the City could implement and a timeline by which they could implement those measures. Do you agree with that?

A. Yes. I think that's consistent with a road safety audit or road safety review that was undertaken. I mean, road safety reviews are, to be clear, it's not an engineering design process. It's an assessment of an existing condition, looking for opportunities to make it a more safe condition than what might otherwise be present.

But I would highlight that we do a lot of road safety assessments in our work, it's my profession, and one of the things that happens with it is the client sometimes comes to us with a request, as a patient may go to a doctor, saying I have a problem, I need a certain thing, I need a certain pill, I want you to prescribe this for me to make me better. But,

like a good doctor, the first thing you do is you go back and start to look at the symptoms, you complete a diagnosis of what's going on, you come to some conclusion as to what issues are present, and then you would make some determination as to what, if any, prescription, to use that analogy, would be necessary.

So, you know, in a nutshell, that's the approach of the study and that's why we talk about trying to implement increased safety performance. Nobody can make a road safe. You make a road more safe and you try to determine how much less safe it might be than similar types of facilities. So, the short answer is, yeah, that's our intent.

Q. Understood. And yesterday in the context of the 2015 report and specifically in the context of revisions that CIMA made to the 2015 report from "recommendations" to "should be considered," your evidence was that you specifically used that term. It was intentionally selected because it has a very specific meaning in traffic and transportation engineering. The word indicates that the action should be done, unless there's a reason not to, and that was part of the

reason for the change from "recommendation' to "should be considered."

And so, CIMA, I gather, is intentional about its use of the word "should," as it has a specific meaning?

A. In the years I've been practicing, there's certainly been clarification about the use of that word. I think it had been somewhat casual in that past as implying optional by some interpretations, and that interpretation has become much more clear in things like design guidelines and, in the traffic engineering world, the guidelines relating to traffic control and signs and markings and such.

And so, yes, the choice of the word is specific. It's different than the previous version. I commented yesterday but I take the same position today, which is that I was not concerned by the title change from recommendations to options for consideration because, first of all, the entire content is exactly the same, so all the ten items that were listed in the version that said recommendations were the same ten items that were listed in the subsequent version, and the wording was enhanced,

in my view, and the traffic engineering professionals that we were delivering the report to would understand that.

Q. Understood. And so, if "should," as you stated, has a specific meaning, that the action should be done unless there's a reason not to, it follows, then, "could be considered" has a different meaning and it suggests that an action could be done but is not required. Is that fair?

A. I would agree with that, yes.

Q. Okay. And we can go to the page if we need to, but I understand that short term, medium term and long term in the 2013 report were defined as short term was zero to five years, medium term was five to ten years, and long term was ten plus years.

And so, what that would mean is that for short-term measures, CIMA recommends that the City consider implementing short-term measures at some point between zero and five years. Am I reading that correctly?

A. Yes. And, again, you know, I think with the appropriate input from the

municipality, from the City, with respect to whether that is viable for them from a variety of perspectives, budgeting and such. But yes, the intent -- and I think it is a reflection, as was discussed yesterday, of the practical realities. Installing a sign is a simpler process than installing a, you know, much more significant capital expenditure, so part of it is simply related to that reality and another is it implies, you know, a timeline that we think would be reasonable to be achieved.

Q. Right. And so, I take it that the same definition applies to the 2015 report?

A. Yes.

Q. Okay. And could we please, Mr. Registrar, go to image 50 of the report that you have up. I would like to chat now about the friction testing recommendation in both the 2013 and the 2015 report.

And I gather that at this point, CIMA had not come to any conclusion about whether the City had inadequate skid resistance and whether this was related to the number of wet weather collisions on the Red Hill?

A. Yes. I think that's --
Q. Right?
A. We did not have sufficient information to understand it and the recommendation was for the City to gather that information, to obtain it and to assess it within the context of what their parameters would be for acceptable friction for the City of Hamilton.
Q. Right. And friction testing was included here as a way for the City to assess the frictional characteristics of the roadway?
A. Correct.
Q. And that was your evidence yesterday. And, again, I'm not going to take you to it, but I think yesterday and today you've advised that the reference in the 2015 report to potential contributing factors, which were listed as speed, inadequate skid resistance and hazardous manoeuvres, those were general factors that, you know, one would consider with respect to wet weather and not specific factors related to the Red Hill based on your assessment?
A. You're referring to the three bullets that were noted into the document?

Q. That's right?

A. Yeah. First of all, as stated, they were quoted from the reference document, but they also serve as a support for the recommendation for friction testing. Friction is considered in accordance with the reference document to be one of the elements that could be a contributing factor in wet weather collisions.

Q. Right. And so, friction testing would assist in understanding which of these factors may be more relevant or might help understanding whether inadequate skid resistance would be a contributing factor?

A. Well, it would give you some understanding of what the friction capability capacity is of the roadway if you assess it, so we basically have a blank in understanding of what friction is.

Q. Right.

A. I should back up. There's an assumption in fundamental design and there's an assumption in road safety assessment that a certain amount of friction will be available on the road surface, so the design incorporates a friction value in various ways that

have been discussed and there's a built-in assumption that that is present. And road designs, as I know from listening to some testimony and from my knowledge in the subject area, is that are intended to provide a certain amount of friction, but it's not common for friction levels to be measured to give the check mark that the road is okay. It's assumed that it is present and we go from there. In this case, we were questioning that assumption.

Q. And, to be clear, you were questioning the assumption as to whether they met the design values?

A. We were questioning the assumption that friction, at some value, was present. We didn't know. We couldn't confirm the element as a component of the diagnosis, to go back to my analogy. So, we knew speed, we understood some information about speed and we could make some determinations as to how that could be a contributing factor in outcome of events, but what we did not know was friction values.

Q. Okay. And if we look at the last line of 6.1.1, it states:

"Because of the high proportion of wet surface conditions in SMV collisions, the City could consider undertaking pavement friction testing on the asphalt to get a baseline friction coefficient for which to compare to design specifications."

So, you would agree with me that here it does not state that based on the design specifications, the City should develop its own baseline or threshold or come to its own conclusion regarding whether the friction testing results were acceptable?

A. I would agree it doesn't say that explicitly and I would also agree that the wording is "could consider" instead of "should consider," and I think it's important to put the timing -- the context of the timing of this report into the response.

This is in 2013. We're dealing with a smaller section of the roadway.

The location where wet road cashes is of greatest concern is a ramp, ramp 6, which has a significant geometric design, the tight curve through the on-ramp configuration and there's evidence of high operating speeds on the roadway, so friction is an unknown and our recommendation to the City was to learn more about that unknown piece of information in order to try to assist in the diagnosis.

Our report ends at that point, but that's part of what we're trying to assist the City with, is telling them where to go to make their roadways more safe.

Q. Right. But what's lacking in this report is any sense of how to do that. So, it does not say, for example, that the City should do friction testing multiple times so it could monitor the change in result. The only comparator that's put forward in this report is design specifications. Putting aside whether that comparison between design values and SN is accurate, it was the only method by which to compare or assess the friction results based on what was included in the report.

And so, would it be reasonable for City staff members on this project, who, like

you, are not friction experts, to read this to mean that the design specifications can be used as a baseline standard to evaluate friction testing results?

A. That potentially could be one interpretation. I would go back to the wording in the sentence, which is:

"Undertake friction testing to get a baseline friction coefficient for which to compare -- "

And then it says:

" -- to design specifications."

But it's for which to compare and the baseline which is the important part. Again, in our understanding, there's an absence of any information with regards to friction. That wasn't a surprise. I mean, it's not common in my experience that a road authority has a defined and organized program to measure and monitor friction. I don't know of any municipalities that had that, you know, at least publicly clearly articulated and made known.

What we were suggesting to the

City was that that is something that should be, could be, opened and undertaken to begin that process of getting the baseline from which you can compare.

Q. Compared to design specification. Right? It's quite clear about that.

A. Well, once you have a baseline, you also have a comparator to begin subsequent comparisons to. So, in the initial action, the very first time, if you haven't done it before, your comparator would be potentially to design specifications. Once you've initiated a baseline information, you also now have the ability to go back and compare to that baseline in subsequent tests if you choose to do so.

And my experience with friction testing, minimal as it was, was that when it is used, it is used in that comparative fashion, monitoring over some period of time, but I wasn't about to presume to tell the City how to initiate or even whether or not to undertake such a program.

Q. Right. So, if the guidance was get a baseline and then compare it

with subsequent testing results, you would agree with me that it could recommend friction testing annually, quarterly, in order to make that comparison, but this does not do that?

A. Well, I would disagree to some extent. I think the use of the word "baseline" does imply just that, literally the beginning point or a baseline to which future comparisons can be made, but --

Q. Finish that sentence, Mr. Malone. It's to compare to design specifications?

A. No. I was going to continue by saying my understanding was there was no friction testing available or done by the City; therefore, a baseline had not been established, nor had anything been compared to anything else. So, if there's a design specification that potentially becomes a comparator that this baseline, if and when achieved, can be compared to.

Q. So, you would agree with me it would have been important to note that after the City obtains that baseline, that they obtain additional testing to compare the baseline to?

A. In 2022, I would agree with you that may be something that's more clear. In 2013, the importance of friction in the diagnosis, in the determination of factors that may be causal factors in collisions was not clear at all. In fact, there were other factors that were much more clearly identified, including speed, and potentially driver behaviour.

And so, I won't say this was trivialized in the report. It was a significant recommendation to include, but it was not nearly as clearly understood as to be a potentially contributing factor as it may be today. But I'll have to add I still haven't really seen any conclusion that friction was deemed to be a causal factor.

Q. I understand. And, you know, when we look at cost-benefit ratio underneath, we see that it says:

> "Based on the results, the City may be in a better position to determine if further action is required."

And so, you know, it certainly

suggests that it was not a significant recommendation, and particularly combined with the use of the word "could," and so CIMA was not intentionally or had intentionally used the word "could," had confirmed that, you know, the City may be in a better position to determine if further action is required and did not require this recommendation or did not make this recommendation as a should but left it as a could?

A. Well, I understand your description, but I disagree that it was not a significant recommendation. The wording obviously could have been more strict, more direct, more definitive, but this was a significant recommendation in the report. I mean, we've done -- I don't know the number -- many, many road safety reports prior to this, not for the City of Hamilton but for clients across multiple jurisdictions, and I don't recall having recommended friction testing to have been done, so it was a very significant recommendation. Again, with the benefit of hindsight, there might have been a different wording, and our 2015 report adjusts that to some extent in modification of the wording and the inclusion of the recommendation in

that report as well.

Q. If you look at the rest of this report, you'll note that the phrase "the City may be in a better position to determine if further action is required" is only included for the friction testing measure.

And is it your practice to leave significant recommendations as optional, particularly when compared to other recommendations that you characterize as required or that they should be done?

A. Well, I think my view is that the recommendation was significant. We had an absence of information regarding friction and I wasn't -- I don't think we were clear as to where the City, how the City, would address this issue or what, if anything, they had already in place regarding friction.

And so, the recommendation is for the City to essentially look at friction, but, I mean, we're also cognizant of the potential ramification of a recommendation like this. It's one thing to recommend testing in conjunction with a study; it's another to provide a recommendation that would theoretically have suggested that the

City should set up a friction monitoring program and assess every road in their network and do it on such and such a schedule.

You know, that's a policy decision, not an actionable item on a single assessment. And I believe that's beyond the scope of a project that CIMA would undertake or was engaged to undertake for this particular assignment. Policy decisions are managed and determined by the client, the road authority, and this is a nudge in the direction to look at friction.

Hindsight, you know, may provide another view of that, but in the context of 2013 when we were doing the study, I still maintain this was a very significant position and I understand your comment.

Q. Okay. Let's move on. The friction countermeasure here was listed as a short-term measure. So, again, the guidance in the report, I want to be clear, is that the City could consider doing friction testing at some point between 2013 and 2018, but that it was best left to the City to determine.

And based on the language of

the report, do you agree with that?

A. I think it could be interpreted that way, yes.

Q. Well, it's not -- those are exactly the words that are used. Right? The word "could" is used, short-term is defined from 2013 to 2018 in that under cost-benefit ratio it expressly states that the City may be in a better position. So, I appreciate that you may have a different interpretation, but those are the words that are used?

A. The words are there. I'm not changing them. We perhaps have different interpretations as to what they could be and with, as with any text, I'm sure they can be interpreted differently.

Q. Understood. Let's move on to August of 2015. Mr. Registrar, could you please turn up OD7, page 37 or image 37, and paragraph 107. Great. Thanks very much.

So, we talked a little bit -- we heard from you a little bit about this e-mail exchange and I have a few more questions and I'm going to try not to be repetitive of the questions my friends asked you.

But I take it that when you received this e-mail from Gary in August, you would have reviewed the e-mail in its entirety?

A. Yes. I would have pulled it up and read the content, yes.

Q. Right. And underneath the table on image 37, you'll see that it states:

"In 2013, friction numbers were measured on the Red Hill in both directions by Tradewind Scientific."

And I appreciate your evidence yesterday that Tradewind Scientific didn't mean anything to you, but certainly you didn't understand it to mean the MTO?

A. I asked questions about the content and received explicit responses that stated it was MTO. The subsequent pages of this document or at least the e-mail documents that I've reviewed, and I recall very distinctly getting the e-mail with responses to my questions, and it's even paragraph 109, I asked a series of questions and Mr. Moore provided a series of responses to those.

Q. And you didn't seek to clarify the inconsistency between what the e-mail said and a response that Mr. Moore may have provided?

A. No. I did seek clarification and I got clarification.

Q. So, why don't we go to that e-mail. Sorry, commission counsel -- okay. Why don't we just scroll down or go to the next page, Mr. Registrar, and then the one after that.

And so, the last question states that:

> "2013 test values look higher. Are they done using the same methodology and tool as the MTO work and, thus, could be directly compared?"

So, not quite asking whether the MTO did the testing, but Mr. Moore responds and says:

> "The testing was done by the MTO both times, and so I would say they are

comparable."

And given the inconsistency between his statement and the e-mail that you have from 2013 or 2014, I believe, early 2014, you didn't follow up with Mr. Moore to clarify the inconsistency?

A. I'm sorry, I'm not sure what inconsistency you're referring to.

Q. So, the e-mail that you received initially from Gary says that the report was completed in 2013 by Tradewind Scientific. Here, you ask him whether the methods that were done, that were used, in the 2013 testing were the same as 2007. And Mr. Moore responds saying that the testing was done by the MTO both times, so that information is inconsistent with the e-mail, the original e-mail, you got from him, which says in 2013, testing was done by Tradewind.

And I want to understand or confirm that you didn't follow up with Mr. Moore to resolve the inconsistency in the information you were provided?

A. I'm a little confused by your question. I'll give my understanding of it, an answer to my understanding of it.

I thought the clarification was provided in his response, that there were two tests, 2007 and 2013, listed in the e-mail, and I asked questions regarding them and he confirms for me that the testing was done by MTO both times.

So, the question was: Was the testing methodology, the method that was carried out, the same? And his answer was: Yes, they are comparable, in the last half of the sentence, but the first half was that it was done by MTO both times. So, it provided two-pieces of information: That there was comparable testing, 2007, 2013, and that the testing was done by MTO during both of those times.

And so, for me, it answered two questions, one which was whether the testing was comparable. The original intent of the question was whether there could be any comparison between numbers in the context of baseline and subsequent comparisons that we just talked about. But the other, which was the more critical piece for me in terms of response, was that it was done by MTO. And his previous response in the e-mail, the two paragraphs before that ends with "don't know" indicates an inability of the City to

interpret the MTO tests.

Q. Okay. I want to be really clear. Is your evidence that when you asked Gary or when you stated:

"The 2013 testing values certainly look higher. Are they --"

The 2013 testing:

"-- done using the same methodology and tool as the MTO work and, thus, could be directly compared?"

Is your evidence that that was you asking Gary whether MTO did the testing in 2013?

A. No. I was asking if the methodology was the same.

Q. Right. So, you weren't asking whether the MTO did it, because the e-mail stated that Tradewind did that friction testing in 2013?

A. I didn't know. I think you're twisting my words or putting words into my mouth. I didn't know what Tradewind was. I saw

two lists of numbers and my question was whether the two numbers were -- the methodologies used to achieve the two numbers were the same.

So, the first number was MTO. Tradewind didn't register with me. It does now but it didn't then. And the confirmation that came back in short order was MTO both times, and so that crystallized my understanding of the two tests.

Q. We'll move on. And, Mr. Registrar, if you can go back to paragraph 106. And, actually, the next page, image 37. That would work well. Thank you.

And so, Mr. Malone, regardless of whether you understood the MTO to have completed the 2013 results, you did understand that friction testing was completed twice on the Red Hill: Once in 2007 and once in 2013?

A. Correct.

Q. And going back to what you said earlier about the comparative value of that information, you've now had two sets of data and, you know, based on what you told me earlier about how to use that information, and certainly you could have compared that information, so the

2000 testing results and the 2013 testing results, and if you had any concerns with that, let the City know?

A. Could have or should have?

Q. You could have.

A. Could have. I don't think it was in the scope of my work. I mean, I looked at the numbers. I can see the numbers displayed. There's an increase in the averages, if you were to accumulate them all, between 2007 and 2013. But the point of the issue in 2013 was for the City to undertake friction testing and the City to make interpretation, so I don't think it is appropriate, nor did I think it was appropriate, for me to make that interpretation. The intent of the request for friction testing had been to ask the City to do that gathering of the information and interpretation of subsequent results.

There are some results, but my understanding concurrently, as it was received, was that it was not done by the City; it was done by MTO. And there's a negative response with respect to interpretation of the results.

Q. If the MTO had concerns with the testing results of 2007 and -- although we know that they do not do testing in 2013. If they had concerns with the results, you would have expected them to have raised any concerns with the data?

A. Yes.

Q. And Gary did not share in his response any concerns that the MTO had expressed about the data?

A. The extent of the communication with Mr. Moore is in the e-mail threads we just looked at.

Q. Understood. Can we please go to HAM24709 and specifically image 41, please.

And so, if we look at -- pardon me, I'm just going to find my reference -- the first line of the second paragraph under 7.1.2.1, so this is the friction testing, the guidance provided with respect to friction testing, in the 2015 report. And you'll note that from that first sentence that it is exactly the same as what was included in the 2013 testing?

A. I do.

Q. In your discussions with commission counsel yesterday, your evidence was that the purpose of the friction testing in 2013 was for the City to come to the conclusion as to their own assessment and that it wasn't CIMA's task to measure friction and that that's something the City needed to do using whatever technique and method they elected.

And so, it was your expectation that the City would select a baseline, assess the friction testing results in a way that would have ruled out inadequate skid resistance. Is that right?

A. I believe so. I don't have the testimony in front of me, but yes.

Q. Right. And at no point did you send an e-mail detailing that expectation to the City?

A. I'm sorry, I want to make sure I understand the context. Between 2013 and 2015?

Q. At any point in 2013 or 2015, did you tell the City that they needed to select their own baseline and assess the friction testing in a way that could have ruled out

inadequate skid testing, that they need to come up with their own methodology or threshold to do that?

A. I think the recommendation in the 2013 report did articulate the action.

Q. But did it detail the way in which to do that?

A. I think I answered that question already. It stated it a certain way. In the context of 2013, I think it was appropriate.

Q. The 2015 report that we see here does not contain any further details on what you expected the City to do with respect to friction testing. Wouldn't you agree with me, Mr. Malone, that it was important for you to tell your client clearly and in more detail that they needed to select a baseline or assess the friction testing results in a way that could rule out inadequate skid resistance, other than the only guidance that was provided in these reports, which was to compare it to the design value?

A. There's a couple of things there. First of all, the 2015 report has several sections. I can't remember the title of

the section 7, but I think that's important to review, because I know friction testing is also listed in section 9. The wording in section 9 is the inclusion of actions that are being brought forward to the City, and I think that should be reviewed as well. I accept --

Q. Sorry. I didn't mean to cut you off. Please proceed.

A. I accept that this is similar to what was in the 2013, but we're overlapping several items here, but your question was the same, that should CIMA have defined the City's friction testing program to attempt to summarize it, and I still take the position that, no, it would not be CIMA's position to do that.

Any more than an example would be for the City to -- for CIMA to recommend that the City use MTO geometric design guide for their roads as opposed to TAC geometric design guide. There are two options to select. The road authority can make their own choice and they should have the professional capability to do that.

My view was that the recommendations for friction testing in 2013 and

again in 2015 were in a similar vein. We were recommending that they undertake some action, but we were not telling them how to undertake that action nor precisely how to interpret it.

Q. Mr. Malone, if we use your analogy from earlier, that, you know, consultants acting as medical professionals that review the health of the roadway, wouldn't it make sense for a consultant to say, here is the testing that you should do, here is the bloodwork, and here is how you know if it is a problem or not, here is how you know whether it is fine and it's not contributing to your symptoms, how is the City expected to implement this recommendation without further information about how to do that?

A. Well, I think the City is fully capable of making determinations as to how to receive information on technical matters. If they have the expertise in-house, which I was not aware whether they did or did not, then that would be potentially how they would achieve it.

If they didn't have that information -- that capability in-house, then they were perfectly capable of hiring external consultants to assist them with the process. They

hired CIMA to assist with safety assessments. Sometimes you hire external consultants because you don't have the capacity in-house, even though you may have the technical capability, but you need capacity assistance to get it done. And in other cases, you don't have the technical expertise, so you hire an external consultant.

The direction from CIMA in the recommendation in 2013 was to perform friction testing, and the City can make that determination as to how to do that, and I don't think it's up to CIMA to tell them how exactly to achieve it.

Q. And I take it that at no point did you recommend to the City that they engage a consultant or provide suggestions for consultants with friction testing expertise?

A. That would get me in trouble with the purchasing department, so no.

Q. Making a recommendation?

A. Well, we would not recommend specific consultants. If I was asked, I have been asked in the past on different subject matters, you know, I could potentially offer a name or names of multiple consultants in a subject area, but the initiation of that engagement would

be from the client as opposed to from the consultant because it would be perceived as me -- inappropriate action on behalf of an external consultant. There are purchasing processes within the City that I'm well familiar with. Hamilton is similar to others, and so, you know, we don't delve into that matter as to how to do it.

Q. I would like to move on just in the interest of time. Mr. Registrar, if you could please go to image 56. And I would like to discuss illumination, and particularly in the context of the 2015 report.

A few times during your evidence so far you've stated that the fact that a countermeasure meets a warrant doesn't mean that it's warranted; that is to say, it doesn't mean that it should be implemented and that additional analysis is required to form your recommendation.

And I take it that the BC analysis is an important part of that additional analysis. Is that correct?

A. It could be. As was noted, the Ministry warrant included a benefit-cost analysis component. The TAC warrant does not.

I think the point I was trying to make was simply that achieving meeting a warrant as defined or as worded in this context doesn't mean that it must be done. The warrant is an analysis tool and it gives you an assessment, which is information that then goes into a decision-making process.

Q. I understand. And here, the -- sorry. I take it that it's important for a BC analysis to have an accurate sense of the cost, whether that's part of the MTO warrant or just a standard BC analysis. Is that fair to say?

A. It's the denominator in the calculation, which doesn't mean much without a cost. So, yes, cost should be accurate; therefore, the benefit-cost ratio will be more accurate.

Q. Right. And, here, the estimated installation or the estimated cost, rather, for installing continuous illumination is $810,000. And I understand that in 2019, when CIMA does its illumination review, and I'm not going to ask you about it, but the cost that it estimated ultimately was much more significant than $810,000. Is that right?

A. That's my recollection, yes.

Q. And so, that would impact the BC analysis that we see here?

A. Certainly if costs change, the benefit-cost ratio will change.

Q. Okay. And if we could go to image -- sorry, I see Ms. Lawrence is on the screen. I'm happy to --

MS. LAWRENCE: I'll interrupt if I need to.

MS. CONTRACTOR: Okay.

BY MS. CONTRACTOR:

Q. If we could go to 57, image 57, please. And if we could zoom in or call out the install continuous illumination recommendation at the bottom of the chart, the last one. Thank you very much.

And so, I want to understand what CIMA's recommendation was in 2015 with respect to continuous illumination, because here I see the countermeasures listed as install continuous illumination, the cost is $810,000, it's a long-term timeline. And then the comment states that:

"This requires sound evaluation in the context of the surrounding network and environment and that an environmental assessment will be required."

And so, is CIMA's recommendation here for the City to conduct a sound evaluation in the context of the surrounding network and environment in assessing continuous illumination? Is that what the recommendation is here?

A. I think the recommendation is begin the process to install continuous illumination, and the process will include a sound evaluation, consideration of the network, an environmental assessment, design, construction, installation and so on and so forth, so there are a series of steps. In the most simplistic manner, that's all in the realm of install the continuous illumination, because they're all steps towards installation, but I accept your point.

Q. Right. And by that, you

mean it may be that through the required sound evaluation, it may not ultimately be feasible for whatever reason to install continuous illumination. Right? The recommendation here is analyze this in the context of surrounding network and environment, and noting that an EA will be required?

A. Every one of the recommendations on the page, on the table, are in that same context. There needs to be some consideration of the realities and the road authority needs to determine how to go down the path towards dealing with them.

Clearly with install continuous illumination, there are many more steps and it's much more complicated than something like trim the vegetation or install a sign. But regardless, there are steps to be achieved towards the completion of concluding each of these countermeasures and fully recognizing along that process in any individual countermeasures, the steps may result in termination of the process, including things as simple as budgets.

Q. So, fair to say that the recommendation here is to take the first step

towards continuous illumination, which is described in the comment there?

A. Well, I believe it implies that. I don't think that lengthy a description of the countermeasure is appropriate for the column. The countermeasure is install continuous illumination and it can only be achieved by beginning the process. And I agree there are multiple steps and, in fact, that's why it's partly identified as a long-term item.

Q. Okay. Let's move on and perhaps we'll revisit this as your next attendance.

JUSTICE WILTON-SIEGEL: I want to mention for your own benefit so you can organize, if necessary, that you have ten minutes left.

MS. CONTRACTOR: Thank you, Mr. Commissioner. I think the last set of questions -- I'm on my last set of questions.

BY MS. CONTRACTOR:

Q. And, Mr. Malone, your evidence yesterday was that you understood continuous illumination of the main line to be part of the City's scope for the 2013 CIMA report

until your call with Mr. Moore. Is that correct? On June 3. Sorry, June 6.

A. No. I'm not sure I would word it that way. There was, to me, a vague description of what the scope was. It simply said illumination. I do accept and agree that our internal process at CIMA, as we began to work on the assignment, was to go in the direction of doing assessment of both main line, ramp and interchange lighting, but I'm not sure that the scope had been clarified for us, so I don't agree that we changed the scope. I think there was lack of clarity in the scope that was provided as we were proceeding, actions were running in parallel, we were doing analysis and continuing to gather information that assisted us in confirming scope. And when scope was clarified, the work was either terminated or not included.

Q. Let me put it another way. Before your call -- your evidence is before your call with Mr. Moore, you had no reason to believe that continuous illumination was not in scope and, after the call, you took it to mean that continuous illumination was not in scope?

A. Well, no. It's slightly

different. Before the call -- the call was generated, initiated, because of commentary that came out of the meeting with the project staff. So, the project staff pointed CIMA at Mr. Moore as a source of information to assist in getting clarification, so the reason for the call to Mr. Moore was because there had been question regarding scope that surfaced at that meeting, and that was the origin. They're literally hours apart, but the sequence of events is clear to me. We didn't call Mr. Moore out of the blue, you know, asking him to define scope for a project for another office. We were directed to speak to him by the project team, which we did, and given that he was indicated to be the authority on the subject, the clarification became clear.

I mean, I have since read the 2013 motion from council and, you know, the motion says upgrade lighting in the vicinity of the Mud interchange. It doesn't say main line lighting and I wasn't aware of the motion at that time, but I'm sure that the City staff were and perhaps that's what motivated the need for a question and the subsequent discussion.

Q. Okay. And I understand

that you did not interpret Mr. Moore's comments regarding the environmental assessment and the illumination as Mr. Moore directing you on what to put in CIMA's report. Rather, he was simply highlighting that main line lighting had not been provided in the original design and construction of the Red Hill in compliance with the EA approvals?

A. Yes. I think that's a correct interpretation.

Q. And no one else from the City that was involved with the 2013 staff report similarly made any direction telling CIMA that continuous illumination was not in scope?

A. No, that's not correct. Mike Field provided an e-mail in August, I think it was, where he was commenting on the draft of the report and he confirmed, and I believe this is an internal e-mail to the City but I've read it since preparing for the testimony, that the City provided CIMA information with respect to the scope and the main line lighting not being in scope. I don't have the exact wording, but --

Q. So, why don't we go to that. Mr. Registrar, please, we'll need

chapter 6, paragraph 98, which doesn't help you. There's a page number. Let me try to find that quickly. Image 43, please. Thank you. And so, it's the last two paragraphs, if we could call that out. I'm sorry, the last two paragraphs of paragraph 98. The last two bullet points. Thank you.

So, this is the e-mail that you're referring to, Mr. Malone?

A. Yeah.

Q. Okay. And here, Mr. Field states:

> "The illumination of the main line has been excluded. This decision is based upon information that we provided to CIMA. The exclusion is not well explained. Considering that illumination of the main line is the first request in the council motion, I think that there should be far more explanation as to why

it's excluded."

And here, Mr. Field is referring to an exclusion that was made based upon information that the City provided to CIMA. He does not state that the City changed it's view regarding continuous illumination being part of the scope of the 2013 report, which he notes was part of the motion?

A. Well, it was not part of the motion.

Q. I understand, but --

A. Well, so it's a misunderstanding or misinterpretation of the motion, and I would disagree with you. I think the first line is clear:

"Illumination of the main line has been excluded."

Which is correct. It was based on information provided that we, the City, provided to CIMA, which, to my understanding, is correct. The exclusion is not well explained, was the comment. We accepted -- ended up receiving that input and provided additional explanation of the context of exclusion, being the environmental assessment and other approvals, but I think the

last sentence is an error, illumination of the main line is the first request. Illumination, the wording, was in the request, but it specifically states upgrade lighting in the vicinity of the Mud interchange. It doesn't say main line lighting in any way.

Q. Am I correct, Mr. Malone, that the only basis on which you understood illumination was excluded in the 2013 report were the design constraints?

A. Well, approval constraints, environmental assessment approvals particularly.

Q. Sure. Yeah. And that's correct?

A. The initial discussion was that, yes. That's where the clarification of scope came from, but other input, including such as this, confirmed for me that it was in fact excluded. So, the scope clarified, became clear over some period of time, and was perfectly clear in my mind prior to issuing the version of the report, the first version that we issued to the City --

Q. And that clarity was

based on the environmental approvals or the design approvals?

A. And, sorry, I was just going to say that as early as the very first draft that CIMA began to prepare, E00V01, when Dr. Hadayeghi and myself review the content, we asked the question about in scope, not in scope, and there clearly was a difference of view within CIMA, and I would clarify that as a lack of understanding, as to what we took to be the scope. But by the time the first report is issued to the City, that misunderstanding, lack of understanding, has been perfectly clarified.

And certainly the information came from the project team, speak to Mr. Moore. We spoke to Mr. Moore. He is very clear and provides good information that indicates that there are constraints on lighting in the valley that had been put in by a very, very rigorous process that had taken years, if not decades, to complete, and so that became a hard stop for the inclusion of that component.

Q. And those constraints didn't change between the 2013 and the 2015 report. Correct?

A. To my knowledge, the constraints defined or described did not change, no. The direction to adhere to the constraints or not or ignore the constraints was what changed.

Q. So, you've told me that your discussion from Mr. Moore, your interpretation of that was not that -- you didn't interpret that as Mr. Moore telling you what to include in the report. And so, is your understanding of the scope solely based on Mr. Field's e-mail? I just want to understand the base of your understanding. Is it solely Mr. Field's e-mail?

A. No. I think Mr. Moore's input provided clarity, began to clear the fog with respect to what the scope was, and I think I've explained the process that we went through and it was clear in our minds when we completed the first version of the report issued.

Q. Mr. Commissioner, I note that it's 3:02. I do have a number of other questions, but I appreciate your direction, so I'll call it a day.

JUSTICE WILTON-SIEGEL: Okay. Thank you.

MS. CONTRACTOR: Thank you for your time, Mr. Malone.

THE WITNESS: Thank you.

JUSTICE WILTON-SIEGEL: Ms. Lawrence.

MS. LAWRENCE: Thank you. I understand that counsel for Dufferin may have a very short examination.

JUSTICE WILTON-SIEGEL: Okay.

MS. LAWRENCE: That was based on some dated information, so I would ask Mr. Buck just to confirm.

MR. BUCK: That's correct. It shouldn't be longer than five or ten minutes.

JUSTICE WILTON-SIEGEL: Okay. Mr. Buck.

MR. BUCK: Thank you, Mr. Commissioner and commission counsel.

EXAMINATION BY MR. BUCK:

Q. Good afternoon, Mr. Malone. I just want to ask a couple of very short questions, hopefully, about the study limits of the 2013 and 2015 CIMA reports.

Can I ask the registrar to pull up OD6, image 25, and if you can call out the

bottom diagram, please, Mr. Registrar.

So, Mr. Malone, this is an extract taken from the 2013 CIMA report. Does this accurately reflect the study limits of that report?

A. No, not precisely. I think it extends too far to the north, beyond Greenhill, and too far to the west, past the Dartnall interchange. It's, you know, approximate, but the limits were more clearly defined, I think, in the overall scope.

Q. So, where would you say on this diagram, where would the limits, is it the limits in green to the far west? Is that too far?

A. The scope, I'm going by recollection, I don't have it in front of me, the scope was from the Dartnall interchange to the Greenhill interchange. There's a line somewhere west of the Dartnall interchange where the LINC ends and the Red Hill Valley Parkway begins. I think it's just after or just -- where the on and off-ramps are located, so that would be slightly closer to the interchange in the green area.

Q. In the green?

A. Yeah. And on the

Greenhill interchange, again, the line is showing it all the way up past. My recollection was that it ended at Greenhill, but it probably did include the on and off-ramps on the north side as well.

Q. Okay. Can I ask the registrar to pull up Hamilton 702 and if you can go to image 9.

So, this is the 2015 CIMA report. Is that a better description of the study area?

Mr. Registrar, can you call out the diagram again, the figure 1 study area.

So, this is taken from the 2015 CIMA report and you can see that the study area is highlighted again. If we just concentrate on the western portion here, we can see Dartnall Road. Underneath that, we can see Pritchard Road. I don't know whether you can read that. It's quite small. And it proceeds almost all the way to the QEW to the north.

Does that accurately reflect the study area of the 2015?

A. Yes, it more accurately reflects it. The very initial communication about the 2015 study was that it would begin where the

2013 study had ended, roughly the Greenhill interchange, and proceed north towards the QEW and end at approximately the point shown there, which is the railway bridge, over the Red Hill Valley Parkway.

And then further discussion, I believe with Mr. Worron, there were some e-mails reflected, he wanted the limits of this study to, I think his word was, to touch on the limits of the LINC study which was already underway. So, we were studying the Lincoln Alexander Parkway, the LINC, from the 403 up to the end of the LINC, which is approximately where this mauve line begins. That became the beginning and end on the left side of the diagram, that point is the end of the LINC and the beginning of the Red Hill, so the two would meet at that point.

And then the 2015 study would overlap the physical area that was reviewed in 2013 and continue further to the north past Barton up to the limits where the roadway began in the Ministry of Transportation.

Q. Understood. And the limits of where the LINC ends and the Red Hill Valley Parkway begins, what's that based on? Is

that based on the study limits that the City of Hamilton expressed to you first to report or is it based on something else?

A. There's actually a sign on the road. The LINC was constructed first and completed and there's a line on the roadway somewhere where there's a distinction between the two. So, what we wanted to make sure from CIMA's perspective was that we would gather information, all the information, and then parse that information appropriately into the LINC group or the Red Hill group depending on what we were analyzing in terms of conditions and such. The fact that it's in the middle of the main line, it's not at the interchange, makes the division relatively straightforward. Collisions could be assigned and there weren't very many collisions on the main line for which confusion would occur, but there's a sign roadway if you drive out there and that's the line that we used for our demarcation.

Q. Thank you. That's very helpful. And to your knowledge, that sign is not related to the project limits of the construction that took place in 2007?

A. No, I don't think so,

because in 2007 the LINC existed -- prior to 2007, I should say, the LINC existed and it connected to Dartnall Road, and that was the exit, the terminus point. And then the construction of the Red Hill picked up from that point and eventually the two were connected. But this demarcation point I'm talking about is somewhere between, on this diagram, Pritchard Road or Dartnall Road and Upper Ottawa, so there was actually an overlap in the pavement in the construction piece. I'm not familiar with exactly who constructed what, where --

Q. No, that's fine. I don't expect you to. If you can take down the call out, Mr. Registrar, and if you can bring up Hamilton 51990. You'll recognize this document as the progress meeting number 2 from July 3, 2013. And if we can go to image 9? No. Image 4, I believe.

So, this is possibly a more accurate representation of the segments that were split up for the 2013 CIMA study, and we can see that there's main line sections numbered Dartnall 1 through 5 and a ramp 3, all of which are to the west in the end of the main line. And I think we can see that the Mud Street interchange begins at

the bottom right, which is the kind of southernmost end of the parkway before it turns towards Dartnall Road. Is that correct?

A. I can see ramp 6, so yes. I think this is an accurate description of the segmentation that was done for our purposes and graphically shows the area.

Q. And you would agree that all of Dartnall 1 through 4 and ramp 3 are all west of Mud Street?

A. Yes, they are.

Q. And Dartnall 5, I believe, may -- I think Dartnall 5 is also west of Mud Street, but it partially, on this diagram, appears to cross Pritchard Road, which is that line coming through?

A. Yeah. It's the piece between the two interchanges.

Q. In the lighter blue colour?

A. Correct, yeah.

Q. Let me just check my notes, but I think I do not have any further questions.

JUSTICE WILTON-SIEGEL: Okay.

Thank you.

MR. BUCK: Thank you.

JUSTICE WILTON-SIEGEL:

Ms. Lawrence.

MS. LAWRENCE: I'm noting the time, Commissioner. It's 3:12. Recognizing we're trying to stay on a tighter schedule today, I would ask that we take our break now so that my re-examination can be as targeted as possible.

JUSTICE WILTON-SIEGEL: Okay. Let's take our break. We'll return at 3:20.

--- Recess taken at 3:12 p.m.

--- Upon resuming at 3:21 p.m.

FURTHER EXAMINATION BY MS. LAWRENCE:

Q. Thank you, Mr. Malone. I just have a few questions in re-exam. Ms. Roberts asked you today a question about the 2015 CIMA report which has signature lines but had no signatures.

In 2015, was it CIMA's practice to send hard copies as well as electronic copies?

A. If the client requested it, yes.

Q. Do you have a

recollection of whether that happened in this case?

A. To be honest, I don't. Our process currently is if we sent a hard copy, we do a scan of the hard copy. I suspect that what occurred in 2015 was we created the PDF document from the Word document and then signed, potentially signed, the hard copies but didn't have a scan of the signatures. It's possible it went unsigned, but if it was hard copy, it would have been likely a signed version and I don't know why we don't have a copy document that indicates a signature if in fact we did sign it.

Q. Thank you. Ms. Contractor asked you some questions near the beginning of her examination in respect of your understanding of City staff members and their expertise in friction testing, and you said you didn't know whether City staff members had expertise in friction testing or did not have such expertise. Do you remember that exchange with Ms. Contractor?

A. I do, yes.

Q. Ms. Contractor didn't define staff members, City staff members, when she

asked you those questions. Did you view Mr. Moore as an engineer with expertise in friction and friction testing in 2013?

A. I think my interpretation would be he would be someone who would have expertise in it, given his intimate knowledge of the design of roadways for the City, but my answer would be the same. I didn't know whether he did or did not explicitly have that knowledge.

Q. And I was asking specifically about your understanding in 2015, pardon me, in 2013. What about in 2015 in respect of Mr. Moore's expertise, do you have the same answer or a different answer?

A. I think it would be the same answer.

Q. Okay. You were taken to the 2015 CIMA report by Ms. Contractor, section 7, and in that exchange, it was about friction testing, and you said I think there is additional information in section 9.

Registrar, could you bring up HAM24709, please, and if you could go to internal page 46 of the report. Apologies, Registrar, you don't have the image handy. I suspect it's

image 52. So, close. Can you go one more image up. Thank you. And if you could call out 9.1.3, please.

Was this the section that you were referring to when Ms. Contractor took you to section 7?

A. Yes.

Q. So, here, you say in the second -- well, I'll just read out the whole thing:

"In order to determine whether low pavement friction may be contributing to collisions, especially wet surface, the City should consider conducting pavement friction testing under normal circumstances as well as under typical wet pavement conditions encountered on the RHVP. Special focus should be given to King Street and

the Queen Street interchanges."

You give an estimated cost. And then it says:

"Depending on the test results, the City will be able to determine if further action is required."

Here, you use the phrase "should consider," quote, unquote, and you gave some evidence about, in your profession, what should consider means. Do you remember those questions and those answers?

A. I do, yes.

Q. You said in response to Ms. Contractor's questions:

"Traffic professionals understand the different meanings between should consider and could consider."

Do you remember that?

A. Yes.

Q. Did you view Mr. Cooper,

Mr. Ferguson and Mr. White as traffic professionals with whom you would have the shared understanding of that language?

A. I believe so, yes.

Q. Ms. Contractor asked -- this was in respect of friction testing -- would it be reasonable for City staff members on this project who, like you, are not friction experts, to read -- and I'm just going to -- she said "this," that was in reference to the friction testing recommendations, she said:

> "To mean design specifications to be used as a baseline standard to evaluate friction testing results."

Do you remember Ms. Contractor asking that question?

A. I do, yes.

Q. Did you understand Mr. Cooper, Mr. Ferguson and Mr. White to be road safety experts, like you are, even if they were not friction experts?

A. I don't know if they have ever been qualified as experts in court, for

example, but they certainly had extensive knowledge about road safety, so the application of the term "expert" is --

Q. That was poorly worded. You understood them to have expertise in road safety?

A. Yes, yes.

Q. What assumptions, if any, did you make about the level of knowledge that those three individuals would have when it came to the potential effect of pavement surface friction on collisions?

A. I think they -- I want to word it correctly for you. I think my understanding is that they would have a similar understanding to what my intention had been and the way we had described the connection of friction to road safety, so I don't think the concept would have been foreign to them in any way. I know that they're all engineering technologists and I believe they're all certified engineering technologists with their professional association and would have been through design engineering training that would have discussed road friction, so they would have a fundamental

knowledge consistent with what I've described.

Q. So, not friction experts, but an understanding of friction, the effect of friction, on collisions in the same manner that you do?

A. Yeah. As I stated, I don't know who would have been friction experts, if anyone, at the City, "experts" in quotes, but I believe they would have knowledge and understanding of the concept of friction in regards to its importance in road safety.

Q. Thank you. When issuing this report with the last phrase:

"Depending on the test results, the City will be able to determine if further action is required."

What further action did CIMA have in mind?

A. Reading it now, I'm not sure we -- well, clearly we didn't define anything for them. I would still take the view that it would be up to the City to determine what further action to undertake, whether that might mean

additional friction testing, determination of what would be considered an acceptable or an appropriate or the friction levels and values the City was going to use, and I think it would also go into the realm of determining what additional resources, whether that's internal or external, might be needed to assist in evaluating and acting upon results that would have been achieved.

Q. Thank you.

Ms. Contractor asked you some questions about the use of timelines in CIMA reports and, in particular, she suggested to you that it was important to include timelines in CIMA's consultant reports, and there was a number of exchanges about that.

Do you remember those exchanges with Ms. Contractor?

A. Not word for word.

Q. Sure, but you remember them just from an hour ago?

A. I recall the discussion, yes.

Q. Okay. Taking a hypothetical, if in a road safety report CIMA came to the professional conclusion that there was a

significant and urgent safety issue, in your view, would you have a professional obligation to provide a timeline to move quickly to a client?

A. Our practice, if we identified -- and I just want to use your wording exactly as you provided it, so tell me if I have it wrong. Urgent and immediate safety issue, is that what you said?

Q. I think I said significant and urgent.

A. So, if we identify something that would be called a significant and urgent issue, we would typically communicate immediately with the client. And I'll give a trivial but a relevant example.

If we're investigating an intersection and we identify that the traffic signal is not operating, then we communicate with the client immediately. We don't wait to write the report and say, when we visited, the light was not operating.

So, it doesn't come into play if there's an immediate element to be identified into the report in terms of timeline because it would already have been communicated to the road

authority for action that we would assume could take place as soon as possible.

Q. Okay. Apart from those circumstances where you address something that appears urgent in your view, what is the purpose of CIMA providing timelines or prioritization in their reports in terms of countermeasures?

A. Oftentimes the provision of timelines is at the request of the client, because they're trying to coordinate it with their internal planning procedures. And there's also, as we've talked about previously, a connection to the reality of the action, whether it can be done in a short timeframe based on the nature of the work or would necessitate a longer, more detailed process.

And so, in some cases, including timelines is valuable, useful for the client, because it clarifies for readers, particularly readers that may not be fully particular with the subject matter but are interested in the recommendations, that what a potential timeline would be.

An example here being illumination could not be done in a short period

of time, would more likely be a long period of time, so that's part of why it's provided.

Q. Thank you. I didn't mean to -- sorry, were you finished?

A. No. I was just trying to confirm that I've answered your question.

Q. Yes. Thank you Ms. Contractor took you to the summary table and the long-term recommendation of install continuous illumination.

Registrar, can you pull that up. It's the same document and it is page 50. And perhaps you can just go image by image. It is likely image 58. There we go. Thank you. Just at the bottom.

And, in your response, you characterized this countermeasure as partly identified as a long-term item, and I'm quoting from you. Just to clarify, what did you mean by partially identified, because it looks to me like it's identified entirely as a long-term countermeasure?

A. I don't recall my exact wording, but I think what I was intending to say is it is a long-term timeline for the completion

of the action. Some of those would take place sooner than later. So, a review or an extended further review, as described, of the evaluation in the context of the surrounding network, and then something like an environmental assessment, would be steps towards completion. So, some parts of the activity will take place sooner than others will.

The overall expectation before completion of installation of continuous illumination would be in the long term, but whether you start tomorrow or you start next year or you start in five years, there's still multiple steps to go through.

Q. Thank you. Commissioner, just give me a moment to check my notes, please.

Thank you. Commissioner, those are my questions.

JUSTICE WILTON-SIEGEL: Thank you. Perhaps, Mr. Registrar, you can take that down.

Mr. Malone, thank you very much for appearing before the inquiry. You're excused.

THE WITNESS: Thank you,

Mr. Commissioner.

JUSTICE WILTON-SIEGEL: Our next witness is Mr. Applebee, I gather. Is he available to start immediately or do we need any time for set up?

MS. LAWRENCE: I believe he is available. I need just less than five minutes to reorient my own station, so if we could take a very brief break so we can get Mr. Applebee.

JUSTICE WILTON-SIEGEL: Let's start again at a quarter to 4:00.

--- Recess taken at 3:39 p.m.

--- Upon resuming at 3:46 p.m.

MS. LAWRENCE: Commissioner, may I proceed?

+JUSTICE WILTON-SIEGEL: Please proceed.

BRIAN APPLEBEE; AFFIRMED

EXAMINATION BY MS. LAWRENCE:

Q. Good afternoon. My name is Emily Lawrence and I'm co-lead commission counsel in this inquiry. Thank you for your patience today. I'm going to ask you some questions starting with questions about your personal background.

I understand that since 2015, you have been the manager of transportation in the City of St. Catharines. Is that right?

A. That's correct.

Q. And you were project manager of transportation at CIMA from 2009 to 2015?

A. That's correct.

Q. I understand that while at CIMA, you worked primarily with municipal clients?

A. That's correct, yeah.

Q. And frequently on projects involving road and traffic operations?

A. That's correct, yes.

Q. Thank you. So, I'm going to ask you some questions about what we call the 2013 CIMA report. Registrar, could you bring up CIM9209, please. Thank you.

Mr. Applebee, the registrar will be sharing documents with us today. Can you see the entirety of the screen right now?

A. Yes.

Q. Great. So, Registrar, can you go to image 3 first, please.

So, this is an e-mail -- in fact, could you call out the e-mail. It's in the middle of the page, please. Thank you. Just so it's a little bigger for all of us.

This is an e-mail from Ron Gallo to you on February 27, 2013 with an invitation to a meeting with City staff, including Mr. Gallo, and the subject line of this e-mail is Red Hill Safety Improvements.

Do you remember the initial back and forth that led to the CIMA report in February 2013?

A. Vaguely. I remember it mostly from reviewing material for this.

Q. Prior to this exchange in February of 2013, did you know Mr. Gallo?

A. I did, yes.

Q. In what context?

A. I worked for -- not for directly, but I worked with Ron when I worked at the City of Hamilton in 2005. He was a supervisor in the section that I worked in. He was not my direct supervisor, but I did work with him.

Q. What department did you work in?

A. I worked in -- I forget the exact name, but it was the traffic operations section.

Q. Okay. Is that the department that Hart Solomon oversaw for a period of time?

A. Correct. Hart Solomon was my boss, yes.

Q. And what about Mr. Cooper, who is also copied on this e-mail? Did you work with him?

A. I did not work directly with Steve, although I think he may have been a student at the City when I worked there full time, but I don't believe I worked with him beyond that, but I did know Steve from that time.

Q. Okay. So, I'm dropping you actually in the middle of an e-mail exchange, but I think it is the one that might refresh your memory the most about these initial discussions.

Mr. Gallo has asked for a proposal and you say:

"Shouldn't have any trouble getting you one. Can you provide us even a

bullet list in an e-mail of your expected scope?"

And then you ask:

"Is it an RSA-type review only or is it a larger safety review?"

And then you list a number of things that appear to be part of a larger safety review.

What is an RSA review?

A. So, an RSA is a road safety audit and typically a road safety audit review would be done by effectively working through a checklist with a group of people, a team of people, that would go out to a site and review based on items that are identified on the checklist. So, it's pretty -- it's meant to be a reasonably quick review that's done generally for smaller facilities and the scope of those are limited to, you know, a smaller degree than a larger safety review, so it doesn't include things like the geometrics, signing and lighting and items of that nature. It's a higher-level, more simple process.

Q. Okay. And a larger

safety review, does that include a collision review?

A. It can and it did in this case, yes.

Q. And what about an RSA? Do they typically include collision histories or collision review?

A. In my experience, typically no, they do not.

Q. Thank you. Registrar, can you close that call out and go to image 2, please. And if you could call out Mr. Cooper's e-mail at the bottom.

And you'll see Mr. Cooper in the third paragraph says:

"It will be a larger safety review."

And sets out the types of things to be considered in that review and also review of changes we have made in recent years and their effectiveness and any gaps identified with suggested improvements and a cost-benefit analysis for the addition of lighting, if recommended.

At this time, did you understand the reason why the City was contacting

you to do this safety review?

A. No, I didn't have a good appreciation for why this would happen.

Q. And at this point, you understood that it was going to be a large review and could include lighting. Is that fair?

A. Yes. Based on this e-mail, absolutely.

Q. Registrar, can you close that call out and go up to image 1 and 2. Thank you.

So, you'll see in the middle of image 2, which is on the right-hand side, you say:

"My most basic question is what is the impetuous for this assignment?"

And Mr. Cooper responds in the bottom of image 1 and the top of image 2:

"It's due to a motion put forward by councillors to include lighting upgrades on the RHVP in the area of Mud/Stone Church interchange, investigate

better reflective signage and lane markings and 'other' initiatives."

And then he says at the top in response to a question that you had:

"We are not aware of a significant collision issue on the main line."

And then notes one of the ramps, there's been some improvements.

Did you ever receive a copy of the motion passed by Public Works or by a councillor, it says? Did you ever receive copy of that motion that Mr. Cooper was referring to?

A. No, I did not.

Q. Did you rely on City staff to provide information about the nature of that motion to CIMA?

A. Yes, I did.

Q. Registrar, can you close this and go to OD 6, page 18, paragraph 35, please.

So, we have an e-mail that you send after a March 11 teleconference with the City. Pardon me, it was before that

teleconference with the City to finalize the proposal. Do you recall participating in a call with City staff to discuss the project?

A. Not specifically, I don't, no.

Q. Okay. Do you recall if they provided any additional information to you during this call, besides what's here?

A. Yeah. I mean, I don't specifically recall, so I don't know.

Q. Okay. Registrar, can you bring up HAM426, please.

Do you recognize this as the front page of a request for quotation that CIMA prepared in respect of the safety review that Mr. Cooper had sought from you?

A. Yes. That's what that appears to be for sure, yes.

Q. Did you draft this request for quotation?

A. I probably did or had a significant input into it, I would think. That was typical at the time.

Q. Okay. You'll see at the bottom third of this page there is the

Understanding of the Assignment.

Registrar, can you call out the paragraph from "the purposes of this review" until figure 1. There we go.

So, looking at this today, it says:

> "The key aspects that will be examined include but may not be limited to lighting, signs and markings and geometry."

And then also that you would do a detailed cost-benefit assessment for each recommendation. Is that a fair description of the assignment as you understood it when you were putting this request for quotation together?

A. Yeah. At the time, I believe this was based on the information that we had received, which is effectively those three items.

Q. And at this time, having had a call with the City, were you content that you were all on the same page about the scope of the assignment?

A. I would expect that we

were. If we hadn't been, I would have expected that there would have been some modification made at this point to reflect that.

Q. Okay. Registrar, can you close that call out and go to the next image, please.

So, two things. Figure 1 is the study area, so you'll agree with me that this was a portion of the Red Hill that was going to be the study area?

A. That's correct, yes.

Q. And the selection of the study area was done at -- the City selected the study area or did CIMA?

A. That would have been something that the City would have selected. We wouldn't have arbitrarily selected this.

Q. Okay. The request for quotations goes through a work plan where CIMA lists a number of tasks. I'm just going to take you through them very quickly.

So, there's a startup meeting. Is that standard?

A. Generally standard, yes.

Q. And the second is data

collection. Again, is that general for the larger safety review that the City has sought?

A. Yes.

Q. Registrar, can you go to the next image, please.

Task three is the initial data review and gap analysis, so is that assessing whether there's anything missing from the information the City has provided?

A. Correct, yes.

Q. And then the next three tasks, collision coding, collision review and field review, are those all fairly standard for this type of safety review?

A. I would say tasks five and six are standard. The collision coding or the GIS would be somewhat unique for this type of review, but likely was something that was asked for or requested by the client at the time.

Q. Registrar, can you call out task six, please.

So, here, the field investigation is expected to take place through a full day to cover peak and off-peak times and a nighttime visit to assess headlight glare,

retro-reflectivity of signage and lighting.

Is it common to do a nighttime visit in this kind of safety review?

A. It's common, depending on what the nature of the review is and if information was provided that there was concerns with items that may occur during the night, for example, the retro-reflectivity of signage can't be tested during the day, neither can lighting, then absolutely a nighttime visit would be something that would be included in order to properly evaluate the situation.

Q. Do you recall if the reference to a nighttime visit was included in this request because you had received information that there was concerns that would warrant such a field review?

A. It's probably likely because there was the investigation of lighting, so that was probably why it was included or one of the main reasons why it was included.

Q. Okay. You said probably and likely. Does that mean you don't have a clear recollection either way?

A. I don't have a clear

recollection, but that would make sense to me that that would be why we would do that.

Q. Okay. Can you close out that call out and go to the next image.

There's also a design review. Is that common, a design review?

A. In a safety review, no, I don't think a design review would be considered common.

Q. Okay. Registrar, can you go to the next image, please.

And then I'm going to paraphrase these next few tasks. In a safety review like this, is it common that CIMA identifies the key issues from the data analysis, identifies potential solutions, evaluates those solutions and then meets with the client to discuss the analysis and the potential solutions?

A. I would say that would be common of a study like this, yes.

Q. Okay. And the next image, please. Thank you.

And then finally, in advance of drafting, in this case, the City had asked for a cost-benefit analysis as well. Is that right?

A. Correct, yes.

Q. Okay. Registrar, can you go to the next image, please.

There's a list of individuals who were going to be involved and at that top it has Stephen Cooper and Ron Gallo. Are those listed because they're the people who are going to give instructions to CIMA?

A. Correct. They were -- from our understanding at the time, they would have been the project managers at the City, yes.

Q. Okay. And what was your role going to be in this project?

A. According to this, I was going to oversee the operations and safety aspects of the review. That was what was put forward at the time of this proposal.

Q. Okay. And Maurice Masliah --

A. Yeah.

Q. -- he is listed there as doing human factors?

A. Correct.

Q. Can you describe the difference between what your role and what his

role was going to be?

A. So, my role would likely have over seen the review of the -- the field review with respect to signage and markings and other items like this, perhaps the lighting, and then the safety aspects, including probably overseeing the collision review.

The human factors is a specialty that Maurice has and it's a specialty that I do not have, and that involves looking at the interaction between drivers and the road itself and the environment, so it's a specialty thing that he was able to do that I was not and it's the softer side as opposed to the harder side, which is, you know, the signs, are they legible, are they in the correct spots, do the pavement markings make sense and stuff like that. Human factors is how do we interact with the road and are there items on the road that could cause driver expectancy to be thrown off and items like that. That's what human factor would look like.

Q. Okay. So, you spoke about markings and you spoke about signs and I think you referenced lighting, so lighting was under your portfolio here. Is that right?

A. It would be common between human factors and the operations and safety. The pure reviewing and justification of warrants would be under operations and safety and reviewing how lighting or no lighting and people interacting with the road and how that might affect that, that would be a human factor.

Q. Okay. Just going back to your interactions with City staff, Stephen Cooper and Ron Gallo are listed. As the project progressed, who was your primary contact?

A. So, this changed from what's shown here, what is also typical, as projects within the company changed as well, but I ended up acting more in a role of the project manager on this and less overseeing the other stuff. And my interactions, I think primarily from recollections and from review here, is Stephen Cooper would have been my main contact at the City, not so much Ron Gallo.

Q. Okay. And what about Gary Kirchknopf?

A. I believe Gary was involved at a very high level on just a couple of minor occasions. Generally, I don't believe I was

taking any or I was interacting with Gary on a regular basis.

Q. You don't think you were interacting with him on a regular basis?

A. From my recollection, I wasn't interacting with him on a regular basis.

Q. Okay. Did you have any interactions with Gary Moore while you were working on this project?

A. No.

Q. So, you said you moved into a project manager role. Dr. Hadayeghi is listed as the project manager. Over time, what did you understand his role to be?

A. He was sort of -- he was acting as more of a reviewer, as somebody similar to what Brian Malone's role here is as a project director, and I believe over time Brian and Ali actually ended up sharing that project director role rather than Ali acting as the project manager on a day-to-day basis.

Q. Okay. Registrar, can you go to HAM426, please.

THE REGISTRAR: Sorry, counsel. This is HAM426.

MS. LAWRENCE: You're right. Thank you. I will come back to that. Can you go to CIM9020.0001. If you could call out the section before the table, at the top.

BY MS. LAWRENCE:

Q. So, are these the minutes of an internal CIMA meeting to kick off this project?

A. Yes, they appear to be, yes.

Q. Registrar, can you close that out. Under roles, we can call it out if you can't read it, but right at the beginning, that would be helpful, Registrar, thank you. You're listed here as the ISRSR lead and liaison. Can you describe what those two terms mean?

A. The ISRSR, that's what would have been referred to as an inservice road safety review, so that was the review that was being undertaken. That's more of a common term that's used in the industry or at least at the time it was. So, I was, again, overseeing that, the field review and the collision review and the lighting and things like that. City liaison effectively would have been acting as that project

manager and the liaison back and forth through the City's project managers, as the, you know, typical day-to-day contact with the City on that level.

Q. Okay. Registrar, can you close that call out and call out the second to last paragraph within the table that is Night Review.

So, here, it does say:

"Night review to follow on a rainy night during the week of the field investigation."

I have a couple questions on this. One, do you recall whether or not CIMA ultimately performed a rainy night review?

A. I don't recall, no.

Q. Do you recall why a rainy night review was listed on this internal kickoff meeting agenda?

A. I would have to assume that we had received information at that time that there was concerns with collisions occurring during wet weather and during the night, perhaps a combination of those or maybe separately but I don't recall specifically, but that was a theme of

this report for sure.

Q. Okay. You can close that for a moment. You can close this image and you can pull up, Registrar, CIM9115.0001. Thank you.

So, I'm just going back in time. We were looking at the internal meeting on May 10. This is project initiation meeting minutes and am I correct that was the kickoff meeting with City staff to kick off this project?

A. Yes. That appears to be what this is.

Q. Okay. Registrar, can you call out the paragraph at the bottom of this page that starts, "Project came out of." Thank you. It says:

"Project came out of a request by City council to review the lighting."

Coming out of this meeting, did you understand that one of the important things that CIMA would do was to assess lighting in the study area?

A. Yes.

Q. You can close that call out, Registrar, and if you can go to image 2 and

if you can go to the top of this page and call out Safety Concerns Noted and the four bullet points, please. Thank you.

So, the last two are also referencing the safety concerns that were noted, lack of lighting at most locations and driver inability to detect lanes. Does that assist you with the information that CIMA received that would have led to the rainy night review?

A. Absolutely, yes.

Q. Okay. You can close that and, Registrar, you can take that document down.

So, that was in late April and then in May you have the internal meeting. Is it fair to say that for the next several weeks your team worked to collect the data, which was that task we went through, and started to analyze it?

A. I would say that's fair, yes.

Q. And to do the field review?

A. Correct, yeah.

Q. Okay. Is it common practice for CIMA to build in one or more progress meetings with clients?

A. Depending on the size and scope of the project, yes, absolutely. Typically there would be at least one and on a larger project there could be more. Two was not unusual.

Q. Okay. Registrar, can you turn up CIM8423, please. Apologies, Registrar, I think what I want to be looking for is CIM8423.0001. Thank you.

So, this is a document entitled "Meeting Number 2, Progress Meeting Number 1," from June 6, 2013, and it lists a number of individuals from CIMA and from the City in attendance at CIMA's office in Burlington.

Do you remember attending this meeting?

A. I don't specifically remember attending it, but the meeting minutes show I was there.

Q. And what is the purpose of progress meetings?

A. Effectively to bring the client up to speed on the progress of the project and to discuss any elements that may need to be discussed at that time perhaps to provide some initial feedback, perhaps to get additional

clarification that we're on the right path or if more time is spent on something, so it's basically just to get everybody on the same page and to share ideas and any recommendations and findings or questions that we might have at what given point we're at.

Q. Okay. Going into this meeting, did you understand that lighting was part of the scope of this project?

A. Yes, absolutely.

Q. And, in particular, did you understand that an assessment of the full illumination of the study area was part of the scope?

A. That was -- at the time, the belief, all we had -- the information that was available I believe at the time was that lighting was to be included. It wasn't very specific as to where, so I believe that at the time the thought was that lighting through the study area, which would include main line and ramps and interchange.

Q. Okay. Registrar, can you pull out the fifth paragraph, which is "CIMA to use TAC Illumination."

A TAC illumination warrant,

what is that?

A. So, it's a warrant that's been put out by the Transportation Association of Canada to review the potential need for lighting, similar to the MTO one but slightly different.

Q. Okay. And here it says:

"CIMA to use TAC illumination warrant. CIMA to rely on outcome of warrant, but recognize outcome of MTO warrant."

Reading this, is it more likely or not that this is a direction from the City on what CIMA should do?

A. This is for sure, almost for sure, a direction from the City to CIMA to use the TAC warrant, yes.

Q. Okay. You can close that, please. Registrar, can you bring up CIM103.

Is this a PowerPoint presentation that was prepared for this meeting?

A. It appears to be, yes.

Q. Okay. Did you present this PowerPoint presentation at the meeting?

A. I don't believe so. I'm

not sure if the minutes state otherwise, but I don't -- I think I presented one of them and I think Maurice presented one of them as well, so I'm not sure on the dates.

Q. Okay. So, maybe I should put it differently. Did CIMA present this PowerPoint presentation to the City at the meeting?

A. Yes, CIMA would have. Someone from CIMA would have presented that, absolutely.

Q. Okay. Registrar, can you turn to page 26, please. Thank you.

Is it fair to say by this point CIMA had conducted a preliminary collision analysis?

A. Yes.

Q. And the results are listed in that top box on this page?

A. Yes, correct.

Q. And CIMA was at the point of starting to put together potential countermeasures. Is that also fair?

A. Yes, it looks like a preliminary list had been developed at that point.

Q. Okay. Registrar, can you turn to image 12 of this, please. Thank you.

By this point, CIMA had also done some analysis on illumination?

A. Yes. It appears that way, yes.

Q. Okay. You said there is the TAC warrant tool and then you also mention the MTO warrant tool. How are those different?

A. I can't say specifically without having them in front of me, but the MTO one from my recollection is designed more for MTO-type facilities, so usually higher order highways, whereas the TAC warrants tend to be more focused on a municipal level, on a lower order roads. That's typical of TAC versus the MTO guidance and their illumination warrant, from my recollection, is similar. They get to the same point but they do it slightly differently and TAC is, again, more sort of geared towards municipal level roadways rather than the MTO 400-series highways.

Q. Okay. Registrar, can you go to image 17, please. Could you minimize that just a little bit, make it a bit smaller. I don't

know if there's an option to make it a bit smaller. Thank you.

So, looking at this, Mr. Applebee, it says here:

> "Illumination warrant analysis based on MTO warrant."

So, in the lead-up to this June 6 meeting, had CIMA completed an MTO warrant analysis?

A. It appears that we had, yes.

Q. What does this slide demonstrate in terms of the outcome of that warrant analysis?

A. This slide appears to show that full interchange illumination is suggested for, I believe that's Dartnall and Mud Street interchanges, and that partial illumination is suggested for the Greenhill interchange.

Q. Okay. And the space between the two interchanges at the bottom, that's a main line ramp. Is that right? Pardon me, I misspoke. That's the main line.

A. Yes, it is a short

section of the main line that I believe may be overlapped by some ramp coming to and from Mud and Dartnall. One runs almost right into the other, I believe, in both north and southbound directions. I think there may be a very short section of main line separate and apart from the ramps in there.

Q. And at this point, given the way that the study area was constructed, would you agree that full illumination for the part in red would effectively be continuous illumination for the part in red?

A. Yes. Because of the proximity, full illumination, they would effectively touch and create what could be considered continuous illumination. Although they are defined differently, the nature of this area, I would agree with you.

Q. Okay. Registrar, you can close that and if you can go back to the prior image, which was -- pardon me. The prior document, which was 8423.00. Thank you. Just back to the minutes, on to image 2, please, and if you can call out, Registrar, the section under item 4.

So, it says here:

"CIMA needs to be cautious with illumination. BC is critical for this assignment. Due to political and other design and cost constraints, site specific locations are probably better than full illumination. CIMA to make sure that illumination, if recommended, would actually assist in reducing the types of crashes on the facility and/or improve conditions, i.e., geometric. The following treatments would similarly result. Consider those before illumination if possible."

To your recollection, who provided the statements that I've just read out at the meeting?

A. I don't recall who specifically would have said that.

Q. Would it be someone from the City or someone from CIMA? Can you remember that?

A. Well, this information would have come from the City, not from CIMA, definitely. A caution to CIMA would have come from somebody at the City for sure.

Q. Is Mr. Cooper, Mike Field, Ron Gallo, and Gary Kirchknopf, who were in attendance from the City, does that assist with your recollection of who gave you, CIMA, direction on lighting-related matters?

A. I mean, if I had to guess, it would probably be Mike Field, as he was the lighting expert at the City. The other gentlemen were not, so I assume if somebody was speaking about lighting, it would have likely been him, but I don't have that specific recollection, but it would make sense that Mike Field would be commenting on lighting rather than the other

gentlemen.

Q. Okay. Do you recall anything further about the discussion about design constraints?

A. I don't recall specifics, but I know there was discussion about constraints that were put on the design through the approvals process for the parkway itself, but also due to the nature of the area for which it traverses. You know, there's some specific topography that it has to get through in order to go from top to bottom, and so there were design constraints but also some of it was related to approvals required in order to actually get this actual highway built in the first place. I don't recall anything more specific than that.

Q. What do you recall about any discussion around cost constraints?

A. I don't frankly recall that discussion at all. It doesn't stand out in my mind.

Q. Okay. And what about political constraints?

A. I don't know for sure. I can only guess it was probably related to the

motion from the council or councillor, sorry, that we hadn't actually seen but had been discussed on a couple of occasions previous to this.

Q. Okay. So, you don't know for sure but you can guess. Do you have a recollection of a discussion about the motion from the councillor?

A. No. Not specifically, no.

Q. Okay. Coming out of this meeting, what was your understanding about CIMA's next steps as it related to illumination?

A. Well, that we needed to ensure that the benefit-cost was completed of course and that before recommending illumination, that a further study would need to be completed to ensure that there would have been a positive or potentially a positive outcome to improve or reduce the number of crashes based on putting luminaires in, because it doesn't automatically -- because something is justified or warranted doesn't automatically mean it would have a positive effect on any specific type of collision.

Q. Okay. So, you understood coming out of this meeting that assessment of the

lighting, partial, full, continuous, was within CIMA's scope?

A. Yes, correct. Although they had noted that, you know, site specific probably better than full, so that would have been the understanding, I believe, coming out of this meeting.

Q. The understanding would have been that the City had a preference about what your eventual recommendation would be?

A. It certainly appears that way, based on this wording.

Q. Okay. Do you recall if there was any discussion about gathering more information from the City about lighting?

A. I don't recall anything of that nature, no.

Q. Do you recall any discussion about CIMA contacting Gary Moore for more information about design constraints?

A. No. I was -- I only learned about that through prep for this.

Q. Okay. Coming out of this meeting, did Brian Malone, I think you've already answered this, but did Mr. Malone tell you about a

call that he had with Mr. Moore about design constraints?

A. I don't recall Brian ever mentioning a call with Gary Moore, no.

Q. Thank you. I see the time. It's 4:32 and I know that some counsel have a hard stop at 4:30 today, so I've ended this line of questioning, Commissioner, and I suggest that we adjourn for the day.

JUSTICE WILTON-SIEGEL: That's fine. We'll adjourn until 9:30 tomorrow morning. And I understand that we have a hard stop at 1:00 tomorrow as well.

MS. LAWRENCE: That's correct. And perhaps the registrar can put counsel into a breakout room and so that we can discuss tomorrow's schedule and hopefully come in the morning to you, Commissioner, with a clear path to get to that hard stop.

JUSTICE WILTON-SIEGEL: Thank you. We'll stand adjourned until 9:30 tomorrow morning.

--- Whereupon the proceedings adjourned at 4:33 p.m. until Thursday, June 2, 2022 at 9:30 a.m.