MANITOBA CLEAN ENVIRONMENT COMMISSION

MANITOBA-MINNESOTA TRANSMISSION PROJECT

WORKSHOP HELD AT MANITOBA HYDRO

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Transcript of Proceedings
Held at Hydro Building
Winnipeg, Manitoba
THURSDAY, JANUARY 19, 2017

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Thursday, January 19, 2017

Upon commencing at 9:00 a.m.

THE CHAIRMAN: Welcome everyone to our technical workshop on the routing method, and thanks to Hydro for hosting it. I would ask, you know, we always have to do this at the start of these events, but I would ask you all to silence your cell phones so that we don't interrupt the presentation.

The Commission had requested it, so Hydro is doing this workshop at our request. I think some of you have been part of workshops before. It's been maybe not regular events, but fairly frequently the CEC will hold these when there is an issue that requires further explanation for the average person, and that's where I put myself, trying to understand this method. I, like probably some of you here, have read the chapters that deal with this, and it takes a fair bit of work to understand. So thanks again to Hydro for leading us through it.

Now, what I wanted to stress here is the workshop is technical, it is about the method used by Hydro, it is about their model and the techniques used to get to route selection. It is

not about the results or the details of what came out of it. There will be plenty of time, of course, to deal with that, and I know that's of a lot of interest to people in this room. There will be many opportunities to deal with that through the information requests and, of course, at the hearings themselves. So I would ask, and we are going to have to insist actually that we reserve those kind of questions for the processes that are set up to deal with them.

This workshop is for us all to understand, as well as we can, of course, the method used by Hydro to reach the various decisions that they made about routing.

There certainly can be questions, and I just -- I should have asked this earlier, do you want questions reserved for after portions of the presentations?

MR. MATTHEWSON: We have two places at which we'll stop and take questions.

THE CHAIRMAN: Okay. So I think in fairness, to get through it, it's probably, because it is not easy to get through it, it's probably better to let the presenters get through it, and then at the times that have been set aside

for questions, we will entertain questions. Again, questions about the method, not about the result.

Yes, Gaile?

MS. WHELAN ENNS: I would just like to make sure that the slides are numbered so it is easier to keep track of where questions are -- thank you, I got a head nod.

THE CHAIRMAN: Okay, thanks. So let's get on with this. And before we actually get into the presentation, I'm going to pass the mic around so people can introduce themselves. I'll start here and we'll work our way around, and I'll pick up the mic at the end. All right. We'll start with the Hydro staff then. This is all to help so we can get an accurate record of the meeting.

MR. MATTHEWSON: My name is James Matthewson, I'm with the licensing environmental assessment department and involved in the route -- part of the routing team on this project.

MR. BLOCK: My name is Dave Block, also with licensing environmental assessment at Manitoba Hydro, and I was also involved with routing for this transmission project.

MS. WHELAN ENNS: We have a wind storm

at the back of the room, so it's hard to hear.

MS. S. JOHNSON: Shannon Johnson. Manager of licensing and environmental assessment.

MS. MAYOR: Janet Mayor, Manitoba Hydro law division.

MR. BEDFORD: Doug Bedford, Manitoba Hydro legal department.

MR. NEPINAK: Reg Nepinak, commissioner with the CEC.

MS. STREICH: Laurie Streich, commissioner with the CEC.

MR. GILLIES: Ian Gillies, commissioner with the CEC.

MS. JOHNSON: Cathy Johnson, secretary to the CEC.

MR. McARDLE: Steve McArdle, working on behalf of the CEC.

MR. SHANTZ: Phil Shantz, Arcadis, the technical advisors to the Commission.

MR. HARRIS: I'm Al Harris, I'm a consultant working with Phil and Steve.

MR. WHELAN: Jared Whelan with Peguis First Nation.

MR. VALDRON: Den Valdron for Peguis First Nation, legal counsel.

MS. LANGHAN: Jasmine Langhan of the Manitoba Metis Federation.

MS. RIEL: Good morning, I am Marci Riel, Manitoba Metis Federation.

MR. LAYE: I'm Evan Laye, Manitoba Metis Federation.

MS. PASTORA SALE: Good morning, Joelle Pastora Sale, legal counsel for the Consumer Association of Canada, Manitoba branch.

MS. WHELAN ENNS: Gaile Whelan Enns, Manitoba Wildlands.

MR. WOODFORD: Dennis Woodford with Gaile.

MR. MCLAREN: Chris McLaren working for Dakota Plains First Nations.

MR. STOCKWELL: John Stockwell, working for Dakota Plains First Nation.

MR. NEUFELD: Jamie Neufeld, environmental advisor to Grand Chief Jerry Daniels.

MR. BEDFORD: James Beddome, legal counsel for the Southern Chiefs Association.

THE CHAIRMAN: Thank you all. At this point I guess we'll turn it over to Hydro.

MR. MATTHEWSON: Thank you. We'll

just get to Mr. Berrien. Are you on the phone?

MR. BERRIEN: Yes, sir, I am. Bob Berrien, I'm the routing consultant for the Southeast Coalition. And I would just ask that the presenter have the microphone, or whatever it is that is picking up the voice, just a little bit closer. I can hear, but it's distorted, especially with some background noise. I appreciate your indulgence in having me at the conference. Thank you.

MR. MATTHEWSON: Okay. Just a couple of -- okay, we are going to -- in front of you there will be -- sorry, there's more introductions.

MS. FLETT: Good morning. My name is Roberta Flett. I'm with Peguis First Nation.

MS. SOLDIER: Joanne Soldier, Southern Chiefs Organization.

MR. MATTHEWSON: Okay. So we're going to be going through the transmission line routing process for the Manitoba-Minnesota Transmission Project.

Mr. Berrien, can you hear me okay?

MR. BERRIEN: Yes, that's much better, thank you for helping me out there.

MR. MATTHEWSON: And you can -- we do have a WebEx, so you can see the screen, but I'm not sure if you --

MR. BERRIEN: Yeah, I've got that up on my computer. Thank you very much.

MR. MATTHEWSON: Okay. Okay. So the outline, we are going to discuss the process and methodology overview, and we will go through the -- describe the major steps in the transmission line routing process and review the models used that guide those decisions throughout that process.

We have, for the agenda, there should be an agenda in front of you, but we have five parts that we will be covering; methodology overview, the planning, the feedback analysis, evaluation and selection, and the review of the outputs for rounds 1 through 3.

So just to give an overview of the landscape that we're in, and the project's components, this is Winnipeg, Manitoba in the top left corner. We have the Dorsey converter station, which is a component of this project, where the 500kV transmission line will start. And we have the end point, the ultimate end point of

the entire project, both the Manitoba-Minnesota Transmission Project and the Great Northern Transmission Project with Minnesota Power. The end point is down here at the Iron Range Station near Duluth, Minnesota, so down in Northern Minnesota.

We also have, as part of the project, modifications at the Riel converter station. There's a transformer bank that's being added to that station to allow for increased system -- increased system adjustments. So as far as moving load around, if there's a change in one of the other lines that needs an outage, we can enhance the electrical system by adding this transformer. It gives our system planners or system operations folks more flexibility in managing the electrical system in Southern Manitoba.

There's also a phase shifter down in Glenboro station, down in the southwest portion of the province, just south of Sprucewoods Provincial Park. And that component has to do -- it is a phase shifter, which is a very large transformer that starts to, or adjusts or handles the extra load that is potentially coming back up through the system. So because Manitoba Hydro has

multiple points of injection of power into the United States, when we inject power through one transmission line, because of the path of the flow of electricity, it has the potential to flow back up through other international power lines. And at the Glenboro station there is another international power line that goes to Harvey, North Dakota, and that phase shifter simply is a way to reduce that feedback of power flowing back into Manitoba.

So that's a very simplistic explanation of what the phase shifter does. There's a long technical engineering description of it in the environmental assessment.

Actually, I'm going to just go back. So just to understand where we are trying to start from, Dorsey converter station, and we are trying to get to the Iron Range station in Duluth, Minnesota, so you can understand why the study areas that we'll talk about in the future have to concern ourselves with the southeastern part of Manitoba.

So scope; coverage during today's workshop we are going to be delving deep into the routing methodology and all of the models and

workshops and stakeholder feedback and public engagement process that feeds into the routing, transmission line routing process. We'll talk about how the weightings and the criteria were determined in each one of those different models that we used during different steps, and then how the feedback through our public engagement process, our three rounds of public engagement, was incorporated into those models and into the routing decisions and routes themselves.

Some of the topics that we're going to cover much more in depth, as Serge pointed out in the hearing, is the results and reasons for the decisions that were made as a result of the models, as well as the route comparisons why one route was selected over another route, those type of details, we'll go into great detail during the hearing.

So, the goal of transmission line routing is determining the best, or the preferred route for a high voltage transmission line. It's a complex iterative process designed to combine the multiple perspectives and limit the overall effect of the transmission line development on all of the different environments, whether it be the

natural environment, or the built environment, the engineering environment. We'll talk a little bit about those environments and perspectives as we go through the presentation.

While the methodology can be very complex in the detailed applications, the concepts that kind of overarch and surround the routing methodology are fairly straightforward. We are trying to determine the route for a transmission line, we're trying to limit that overall effect, and we're trying to balance all of these multiple perspectives and sometimes competing interests on where this transmission line should be placed.

So the purpose of this methodology that we've used on the Manitoba-Minnesota project is to develop a transparent model that we use for the decision-making process with the ultimate goal of reducing the effects of the transmission line on people. That's kind of the ultimate goal and that's what all these models are designed to do is lead us toward finding a transmission line that has the least amount of effects.

So our approached routing is very similar to a land use planning exercise. So at its core, selecting a location of a transmission

line is very similar to a land use planning exercise that's driven by the need to meet an energy requirement. So we're trying to incorporate the consideration of the environment, existing and future land uses, opportunities and constraints for transmission line development, and the interests and concerns that influence the use of the land that could be affected by the route. So the key function of the transmission routing methodology is to provide that structure process for incorporating many, sometimes competing perspectives of use of that land, and the related potential effects, in order to frame, balance, and balance a decision-making process.

So our approach is, we're trying to be very objective and trying to remove some of the biases that get introduced from a variety of different influences. Myself, as a route designer, there are certain biases that I may inherently have that I may not be aware of. There is biases that we receive from our public feedback engagement process and our First Nations and Metis engagement process. Everybody has different interests, so we needed a methodology and approach that tries to make things objective and not be

influenced by those biases.

Balance; again we are trying to balance all of those different competing interests, trying to be transparent. That's why these models that we have and how these weights are calculated and the criteria used, we've been very open and public with all of our materials during all of our rounds on engagement on how the route decisions are being made and where these weights and criteria come from and what they are trying to achieve.

We've done lots of -- expended lots of efforts trying to incorporate that local, as well as traditional knowledge into the process. Because models are just one thing, they are ultimately numbers and values of information, but you really need the local knowledge of the people that live in the area, traditional knowledge holders from the First Nations and Metis that may have traditionally used and currently use the area. So there's a lot of knowledge that isn't captured in numbers and maps and graphs and that sort of thing, inherently in data that we get when we start a routing process, but that's what our public engagement and our First Nations and Metis

engagement program is intended to do, is to gather all of that information. And some of the methodologies that we will talk about here is how that information gets fed into the route decision process.

We're there to mitigate concerns, wherever possible we try to adjust our routes, provide mitigated route segments, do different things to try to mitigate concerns. Transmission line routing is Manitoba's Hydro's number one method for mitigating its effects on the environment, trying to avoid things that need to be avoided and trying to balance the different perspectives.

Before we get into the litany of environmental protection measures and other measures that are going on, moving the line off an important feature is one method that is easy to do in the early rounds of transmission line routing.

So the methodology that Manitoba Hydro modified or enhanced was based on, it is called the EPRI-GTC. So EPRI stands for the Electric Power Research Institute, and GTC stands for the Georgia Transmission Corporation. So this was a methodology developed probably around 2005, I

believe, and with a whole bunch of -- to meet a need of transmission line routing in the Southern United States, and a whole bunch of groups, researchers and academics and the Georgia Transmission folks came up with and developed this methodology.

So Manitoba Hydro investigated this methodology starting -- probably in 2012 we started looking into it. And so we started with the principles and the tools that that EPRI-GTC methodology created, and calibrated it to suit our landscape of Manitoba, and context, and then enhanced it for additional options for feedback.

So one of the things that the EPRI-GTC, it has stakeholder feedback incorporated into it, but we felt that we needed much more opportunities for stakeholder feedback into the process. And I may use the term stakeholders often, and when I use that term I am including public, First Nations and Metis when I use that terminology, if I don't say it all out. The tools used in the methodology provide that structure and transparent way to represent the trade-offs between the competing interests and land uses, along with the decisions made in the transmission

line process.

So looking at the funnel, each step in this funnel is informed by criteria, weightings and spatial information as we go through the funnel. So we'll talk about these different perspectives, also called considerations. There's the community perspective, also we will interchangeably use the term built perspective; the natural environment perspective, geographic information, so this is all of the spacial information that we need to utilize the models. And then we have engineering considerations that are considered in the transmission line routing process, about length and location of angle towers and proximity to other high voltage lines. So there's a variety of different perspectives of information going into this funnel.

The first step of the funnel is called macro corridors. We're going to go in-depth on all of these steps. As we go through the presentation, we're just going to give you a high level overview. The macro corridors allow us to define route planning area, so that's their intent, or study area as it's called in this slide. From there we start to have more

geographic information brought into the analysis, because we are slowly narrowing, hence the funnel, we are slowly narrowing our scope of where the route ultimately ends up. So as we narrow and go through the funnel, the level of detail and information that we gather ramps up, increases as we go through this.

So as the alternative corridors, there is extensive more information that has gone on to the landscape. But each one of these different macro corridors, alternative corridors, they start to narrow the landscape down into areas that route planning can take place in. So that's what the alternate routes are, the route planning side of things is, we develop these corridors, narrows down landscape, and we start to develop routes within those corridors. And then public engagement and First Nations engagement processes begin, and we start to go through and gather more information from the users of the land and other stakeholders. And ultimately coming down to a final preferred route, and then the right-of-way.

So due to the complexity of the Manitoba-Minnesota Transmission Project, we had to select multiple different routes because we had

multiple different border crossings to choose from. We went into the border crossing selection process, which I will talk about further on, it was -- we ultimately ended up with four different border crossings which we could match up with Minnesota power, with the GNTL, the Great Northern Transmission Line. We had to go through this funnel process multiple times. We had to go through it once to select individual routes to each one of the border crossings so that we could figure out which was the most optimal border crossing. And then once we had our border crossing, then we would go through and revisit different routes going to that border crossing, and then we would go through the funnel again.

So we went through the funnel multiple times, and by going through it multiple times, whereas the EPRI methodology just goes through it once, we allowed much more stakeholder feedback and much more opportunities for the stakeholder feedback during that process, because we went through the funnel multiple times.

Steps of each stage of routing: So the EPRI methodology was where we started from and we, Manitoba Hydro, kind of morphed it into this

type of graphic. So here we have a planning stage, a feedback and analysis stage, a comparative evaluation stage, and a selection.

So during the planning process, this is where we start -- we have to come up with our start and end points. We start using the macro corridors and the alternate corridors are all involved in the whole planning stage of the project, as well as the route development. Then once we have some routes, we start going into our first round, we call it round 1 of routes. We went to the feedback and analysis stage and we presented that through our public engagement program and our First Nations and Metis engagement program. We started having more field studies. And as a result of all of those engagement and feedback, we started to develop mitigated segments that are just alternate options for some of the routings that Manitoba Hydro presented initially.

Then we would go through -- and then we'd start to evaluate all of the routes that all of those segments combine into, and we would evaluate those and we would determine a preference. So there are two models that help us in that process for what our preference is, and

then we select something. Then we would go through this -- that was kind of round 1 we would do this, and round 2 we did it again, and round 3 we went through all of these same steps.

So what we'll walk you through is each -- in the upper left corner of all of the slides moving forward here, you'll see what stage we are at when we are talking about each one of the steps. So this -- there's a handout in front of you, it looks like this one here, and it shows the three stages here.

So we have the -- we have our preliminary planning that was started back in February of 2012, where we had a need to identify the need, the start and end points, our potential border crossing points. We developed macro corridors in the planning area to help us narrow down a route planning area. So that was kind of happening in our preliminary planning stages, in February 2012 kind of time period.

Then during each round the objective; so round 1, the objective of round 1 was to determine a border crossing for the transmission line. So using the steps of methodology, we presented alternate corridors. We presented

alternate routes within those corridors that we got through the feedback, you know, through the community engagements. Analysis of new data was collected from the field. Studies, we did extensive -- in addition to our public engagement program, we did have field studies going on looking at the natural environment, as well as built environment. Developing; also was happening at that stage is the development of mitigated segments. We will go into much more detail on all of these different pieces. But this was kind of an overview of what happened in round 1. And what we were ultimately trying to do was select a preferred border crossing and a preferred alternate route to one of those border crossings.

And once we had the preferred border crossing selected, we came back out to the public in round 2 and we presented with more information. So as part of the planning, we did more studies on knowing what new developments have occurred, because there is a time lag here, from fall to spring, new homes are built, new businesses are built, new areas cleared for development. So we were continuously going into the field to update the information. These geospacial models rely on

lots of data and we wanted to make sure we had the most accurate data to put into the models.

Alternated route developments: Alternate route development to the selected border crossing is developed. So routes that we may not have had in round 1, once we had a preferred border crossing we introduced some new route options and segments for the public to consider and gather more feedback on those options. Some of those options were driven by feedback from the public on round 1, some of them were driven by engineering studies and system planning studies that happened at the same time.

And then we used again the comparative evaluation process in round 2, and our purpose there was to define a preferred route for, or to a preferred border crossing.

We would go back to -- back out to the public in round 3, and the objective of round 3 was to find the final preferred route.

So initially we were looking at, rather typically we would look at rather small mitigative changes to the preferred route based on feedback that we received from the public. But in round 3, which we will talk about further on, we

actually introduced quite a few other segments much larger than typical for Manitoba Hydro. We typically look at adjustments within a mile or two of the preferred route, but we introduced quite a few other larger segments that were quite a bit further away from the preferred route, because of the public feedback that we got and the First Nations feedback that we were receiving all the way along through the process. So we wanted to make sure we were continuing to test and evaluate route options that the public was asking us to look at.

So start and ends points; so how we came up with our start and end points, the system planning report developed by Manitoba Hydro system planning department determines the starting point based on a transmission facility study. So they have to study the entire electrical system within Manitoba and understand the implications of another major transmission line on that system. And looking at the other 500kV lines that we have in the system, we have Bipole I and II that come into the Dorsey converter station. We have Bipole III and the Riel to Forbes, 500 AC transmission line, that's the existing one, coming into Riel.

So we have two points of injection of power into our grid from, one from -- two of them from the north with our Bipole I, II and III, that's three of them, and then one from the south with our M602F line, which is an import/export line.

So with that process, it was decided that it would be in the best interest to have another 500 kV AC import line to be geographically separated from the one at Riel. So that's why it was chosen that the termination of point for it would be in the Dorsey converter station.

So early in the planning process Manitoba Hydro and Minnesota Power both understood the need to be congruent in their approach to selecting a border crossing, even though the route selection process on each side of the border would be different. So whereas Manitoba Hydro uses an enhanced EPRI-GTC methodology, Minnesota Power has their own methodology that use. But we wanted to make sure when we come up with the border crossing and how we come up with the border crossing zones for our discussion that we are congruent in that approach.

We looked at the key constraints along the border and reviewed things like -- some high

level things like where the communication towers are, where are federally and provincially protected lands, where are established private and public recreational areas, where species at risk habitat locations are, where there's water bodies, where there's identified areas of special interest by the province, and high value wetlands and biologically diverse areas.

So that's how we came up with these four border crossings, and there's more detail in the EIS that describes the full list of things that we were looking at. So whether it was on the Manitoba side of the border or on the Minnesota side of the border, that's what we ended up with these approximately ten kilometre wide border crossing zones as our start and end points for both -- or sorry, as our end points for both projects. So Minnesota Power; is trying to get to these border crossings and we are trying to get to the border crossings, and trying to determine which is the optimum for each separate transmission line.

So the route planning area: So the route planning area, what we have on the screen here, and this is -- there is EIS references on

all of the pages here that reference different sections of the EIS that you'll find these graphics, or tables and maps. So the route planning area is the area outlined in black, and the border crossing zones are the ones across the bottom. Within the route planning area and outside of it, these are what are called the macro corridors. So the macro corridors represent the top 5 per cent of the most suitable or optimal paths between the start and end points. So we have chosen a point near South Loop Riel converter station as our start point. And I guess I should back up and explain the South Loop Corridor and the Riel Vivian Corridor, just so you have a context.

From Dorsey converter station to Riel converter station there is a designated Manitoba Hydro utility corridor. It's made up of owned and eased land that was designed and acquired over the past decades to accommodate multiple transmission lines to connect the Dorsey converter station with other stations along its path, such as the LaVerendrye station and St. Vital station. So the LaVerendrye station is over here, and St. Vital station is just inside the Perimeter, as well as

Riel station. So it houses a couple of transmission lines from Dorsey to LaVerendrye and the LaVerendrye station to the Riel station, it's currently unoccupied.

The plan is for it to be occupied by the St. Vital transmission project, which is a multiple, it's complex, it contains multiple transmission lines. One of the transmission lines connects St. Vital to LaVerendrye station. And the other components or planned infrastructure to be in this corridor was a 500 kV AC transmission line.

So that is the South Loop corridor, so that's where we kind of started our planning. We were going to utilize that South Loop corridor to circumnavigate from Dorsey converter station around the City of Winnipeg, and from that point we would go look into a southeasterly direction towards the Iron Range station in Minnesota. So that's the South Loop -- sorry, it goes like this. It is a corridor approximately 300 metres wide, it varies in width, but it's there to contain multiple transmission lines.

So our macro corridor starting point; we started within that corridor near the Riel

station and then we used the corridor process to go to each one of the border crossings. We also looked at the start point from the end of the Riel Vivian corridor. So there is also a transmission corridor designed in 1978/79. When the original 500 line here was developed there was -- this corridor is again several hundred metres wide. Bipole III makes use of it, or a portion of it. It's designed to house multiple transmission lines in it. So we looked at a potential start point at the end of that corridor to look at options as far east as we could, using their methodology.

So the outside limits of the macro corridors, and I will get into how those corridors are developed in the next few slides, but I'll just show you first; the macro corridors developed by the model are intended to give a starting place for the routing team to make informed decisions with respect to the development of the route planning area. So you can see this is the route planning area and it does not follow the full extent of the macro corridors. So the colours that we have here, they don't represent any priority, they're just showing you the different corridors that were developed at each border

crossing.

And what this developed was over a 7,000 kilometre area, square area, planning area enlarged, so we made it larger. So if you took the outline and said, okay, the model says just start planning in here -- and I will get into the parameters of the model in the next slides on why it said that -- but Manitoba Hydro had to -- it's just there to inform us. And so we did a couple of things that was different than the model. So we didn't look at this area here. So this is the area along highway 75, so we excluded that from the macro, from the route planning area because of its intensive urban/rural residential developments along that corridor, and there simply was very limited options to put a 500 kV transmission line in that corridor because of the proximity of buildings and homes all the way along that highway. The wind farm is down in the south here.

So that's where -- so we moved the route planning area to the western edge of the macro corridors. The northern one was delineated by the Riel Vivian corridor in the northern edge of the macro corridor. So the southern one, of course, is delineated by the Provincial border,

Canada/U.S. border. And the eastern one was expanded.

So typically people like to shrink their planning areas, but we knew we had to expand this planning area because of interests to be on both sides of this existing 500. So this is the existing 500 AC line. And during the initial planning studies with our electrical engineers and system planning, they requested a 10 kilometre separation between this new 500 kV line and any existing 500 kV lines where possible. So if we had just followed the edge of the macro corridors here, that would not have provided any opportunities for Manitoba Hydro to route on the other side of the 500 line there. So we enhanced this out 20 kilometres further than the macro corridors were suggesting so that we could provide routing opportunities further to the east of the existing 500 line, into also a more undeveloped part of Manitoba.

This boundary was delineated by or guided by the Whitemouth Lake. We didn't -- we felt that was a pretty big barrier to coming across and getting on the outside of it. And the border crossings, there was no point in coming

back around there. And this edge was delineated by some of the deep wetlands that exist in that area.

So from a geotechnical perspective, those are much more challenging to construct in, as well as the accessibility of those areas is restricted from an all season perspective from both a construction and an operation and maintenance perspective.

MS. JOHNSON: Apparently there's no audio on the web link.

MS. WHELAN ENNS: I need to message an expert.

MS. JOHNSON: There's no wifi in here, you are going to have to use your cell phone.

MR. MATTHEWSON: No, we don't have any wifi set up in this room. And yeah, the only way to talk to Mr. Berrien is using --

MS. WHELAN ENNS: Are you using WebEx on that?

MR. MATTHEWSON: Yes, we're using WebEx, but the audio is through a conference call.

MS. WHELAN ENNS: You don't have a computer mic though, that he can hear through your computer mic?

MR. MATTHEWSON: He is hearing through our conference. So he can hear us. Gaile, I guess, is trying to talk to him.

MS. WHELAN ENNS: I am talking about a different expert, so I will use my cell phone and see if there is a connection.

MR. BERRIEN: This is Bob Berrien speaking, I can hear you quite clearly. The only time there's any issue is when you're talking about something specific and hitting it with a laser pointer, and it is not showing up.

MR. MATTHEWSON: He can't see the laser pointer. Okay, maybe I'll go back to the mouse.

MR. BERRIEN: I don't want to disadvantage the audience there. It's only if you have one specific point. Generally I'm following quite nicely, but every once in a while you are pointing out something very specific, and that's the only time using the cursor would be helpful. Thank you. You carry on.

MR. MATTHEWSON: Okay.

So the route planning area, so we talked about the extensive -- so the deep wetlands is really where we were constrained on the eastern

side and the Whitemouth Lake.

So macro corridors; so we saw what they look like, now I'll tell you how they get built. So they make use of regional land cover, spatial data. So it's very high level land cover data at this stage of our routing process. It considers, and it is -- the macro corridors and how they are developed is following the EPRI methodology for macro corridors. We didn't deviate from their methodology. We calibrated it for the Manitoba Environment. There are certain things that don't exist in Southern United States that exist in Manitoba here as far as land cover.

So we considered all of the major constraints and opportunities that exist on the landscape. We start to delineate things we call areas of least preference, which we'll get into a little bit later in the alternate corridor discussion about what all of those are. But examples of those are runways, towns, areas protected by legislation against development, those type of high level constraints that exist. And then the corridors themselves that you saw in the graphic were those optimal paths that follow one of three broad routing options.

So in paralleling roads, paralleling transmission lines across country. So paralleling roads, when we look at the optimum paths, what the model is trying to do is trying to look for routes to put a transmission line that follow roads, highways, Provincial roads and highways, as well as secondary roads. So it's trying to look at it and say, hey, most people from a broad perspective understand that transmission lines paralleling roads are probably a very good place to locate a transmission line. Paralleling an existing transmission line is another good opportunity. Then the other option is the cross country. Cross country is simply trying to create the shortest route from those start points, from the Riel Vivian corridor and the South Loop to each one of those border crossings. That's the shortest route as the crow flies type of analysis, because there's a lot of value in making a transmission line as short as possible. Because obviously from an environmental perspective, the less landscape we're on and potentially affected, the better; the less number of people or proximity to residences, the better; lower the cost of the transmission line, the better. So that's why we looked at

these three options in developing the macro corridors.

So these corridors are delineated by a model. So we have to put a weight on to each one of the different land features. So just going from the top and just pointing some out, you'll see that -- and pointing out the differences in the model -- is that in the cross country it's looking at -- so this is a scale of 1 to 9, 1 being most suitable for a transmission line and 9 being the least suitable. So from a cross country perspective, the rank was 6 for agriculture, so that's kind of a little bit more towards least suitable than more suitable. Coniferous forests, broadleaf forests, those were in the 3. We're getting to more suitable for a transmission line. Barren and unvegetated grounds, you know, that was 1, most suitable for a transmission line. It's bare ground, no vegetation on it. Urban -- shrub lands, tall shrubs -- so all of these categories here are the different types of land cover as delineated by the Manitoba Land Cover Data Centre, that's where these categories come from. So whereas Georgia transmission and EPRI process, they had similar land cover, but not exactly the

same, so we did have to calibrate the model to the Manitoba land cover. You can see, you know, if there's bare rock, it's suitable for a transmission line.

If there is a transmission corridor, from a cross country perspective we gave it a 5, as in it's kind of middle of the road. Then exposed land is 9, so urban land, so a town or city is a 9, that's the least suitable for a transmission line. And then wetlands are 6 and sixes from a cross country perspective. So the road is very similar.

Where things start to deviate for the different perspectives is you'll notice that for a named road it is a 5 in the cross country, so it's kind of a neutral on it when the model runs. And when it is roads, when we are running the road portion of the model, where the preference is for roads, it gives it a 1. So the system tries to parallel roads as much as it can. Then on the cross country -- but for transmission lines they are given a 5, but now when we're saying parallel transmission lines, it's given a 1. So the model tries to parallel those transmission lines.

So what essentially ends up is you end

up with these macro corridors, three different sets of macro corridors to each one of the border crossings, with all the different perspectives. So when you lay them all on top of each other, because we have to show them all at once, it forms what's called a composite macro corridor, which is all of those things on top. So this is where you see some of the holes in the corridors, trying to avoid certain things, this is, Tom -- sorry, I'm pointing on the screen, on the screen instead of the computer, so give that back to Mr. Berrien there.

This is the Tom Lamb Wildlife Management Area. It is legally protected against any developments for transmission lines. So it is a hole in the macro corridors. And you will see here, this is the tall grass prairie reserve, and other areas of special interest all the way along here as far as other things on the landscape, it starts to kind of guide and mold. You'll see some of these little threads.

This is it following the highway, this is an example of if the corridor follows a highway or existing road. You won't see -- there's very few transmission lines in the study area, so the

model didn't have an inherent following of transmission lines. So it's kind of -- that's at a high level how those macro corridors were developed.

So while computational models generate all of this data and these surfaces, once we take that data and we lay it on to a surface to make a map of what those values mean on to the landscape, it still has to be considered by professionals in a process of route selection and information pertaining to those features and land uses and perspectives that's more difficult to quantify geospatially that must be considered as well.

So we are going to talk a lot about models, but don't get the impression that these models drive the route decision processes. They are one piece of information, that when combined with a multitude of professionals on a variety of disciplines, those two in combination is what makes decisions on transmission line routing.

Alternate corridors; so the alternate corridors, so those macro corridors, they were just used to delineate that route planning area and then they are done. We don't use them again in any of the other processes, they're just there.

Their sole purpose is to delineate a route planning area. So once we have that route planning area, we started going in and doing a much more intensive survey, a windshield survey, driving around, mapping all of the homes, mapping all of the buildings. Because up until the macro stage, or up until the alternate corridor stage, everything was relying on existing aerial photography and existing land cover information.

So now we have gone out, we've collected much more information from stakeholders and technical data knowledge holders about landscapes that are on the land, and we've started to influence now where -- and starting to narrow down some planning areas. And that's what the alternate corridors process is. It's the map -- the suitability of areas within the route planning area for locating a transmission line. So it's another level of information by which we're starting to figure out where the most suitable land is to put a transmission line. And we're going to talk about, or Dave will talk about the alternate corridor model and how that informs that suitability, through the consideration of those competing perspectives on land use and how those

pass from A to B.

So these corridors that Dave is going to tell you about how they are getting built, they again take into account those areas of least preference, which were all these. There's black areas and white areas that combine together to form the areas of least preference, and those are buildings, those are airports, those are protected areas, those are areas of other legislation protective, they're towns, they're multiple different components, and Dave will talk about what those are in the model.

You can see we also, when we developed these alternate corridors, we did it from two starting locations. One was at the end of the South Loop corridor and the other was at the end of the Riel Vivian corridor. And we ran those alternate corridor models from -- we ran those alternate corridors from those locations to the subsequent border crossings. So they're called Gardenton west, Gardenton east, Piney west and Piney east. So here we ran the border crossing to these three and then from -- sorry, actually, yeah -- and then from Riel Vivian we ran it just to the Piney east and Piney west to look at the

optimum corridors.

So Dave is going to tell you a little bit more about how these, what values create these colours, create these surfaces. And again, the colours don't mean anything, it's just to separate the different perspectives and runs so the people can see all of the different things. One isn't more natural environment, being green or anything like that. It's just to illustrate uniqueness amongst the different alternate corridor runs.

So I will pass it over to Dave and he's going to go into the model that develops these surfaces, and then we'll move in to actually drawing segments and route planning within this. So we are still building up here, we haven't even drawn route segments yet, this is all just still collecting more information to help us inform that route planning process.

MR. BLOCK: Okay. We're going to take a break in about half an hour, I think we're going to aim for, so I will hopefully maybe get through this by then. So I'm going to go through basically how we -- so when I'm talking about the alternate corridor, that's this big handout that we gave you guys, that's our alternate corridor

model.

Okay. So I think it was 2012, 2013, we started this process. And so we decided to try this process, we started with St. Vital, St. Vital to Letellier was our first project that we used this on. So we needed to develop this model. We had, again, we had the Georgia model, but not very applicable for what we do here.

So the model is designed to represent the suitability of features on the landscape for routing a transmission line. And with this model and the other model I'm going to talk about today, it's always grouped into -- there's three perspectives and then a fourth which we call the simple average.

So the built perspective is kind of a socio-economic perspective that looks at agriculture and urban development and proposed developments and industry, and that sort of thing. The natural looks at wildlife, vegetation, wetlands. Engineering looks at cost, system reliability, design, construction and maintenance. And then with each of the models -- so when we are looking at say the built perspective, you consider everything, but the built features are weighted

more heavily. Same with natural and engineering, the simple average is strictly one-third each. And I will go into that in a little more detail later.

So when we were looking to develop this model we were looking to develop it for routing transmission lines in Southern Manitoba, and we considered that kind of anywhere where there was a potential for agriculture. So if we're looking up north, most of these features wouldn't exist, so there is no use considering it. So when we had the workshops and the people involved, we emphasized that this was to cover Southern Manitoba.

Now, one of the main things with most of the models that we use is that it requires data, we need to be able to put this into the GIS system and create maps. So when we were having these workshops and talking with the people involved, we said, you know, there may be some good ideas for routing transmission lines, but if there's no data to back that up, that's something that we need to consider with the expert opinions later on, but the models need geospatial data.

So we held what we called the Southern

Manitoba transmission routing suitability Workshops. So we had groups for each perspective, and each perspective was done on its own day. And what we were looking for from each perspective is what they would consider their areas of least preference. We were looking for factors. I will go into detail on what each of these terms means in a second, but we needed the factors and their associated weightings, features, which are kind of the nuts and bolts within each factor, and their suitability, so that's suitability for routing a line. Then I will go into detail on how the -- how that was done.

So we used -- for suitability values we used a Delphi process, which is basically consensus building. You talk with the group and you try to come to consensus so that the people understand everyone else's perspective. So you try to get to agreement on your perspective as well as the others in the room.

And the weightings for the factors was done by an analytical hierarchy process. Which is you look at each factor and you compare each factor individually, so A versus B, A is from 1 to 9, either more or less suitable -- or not

suitable, you should consider it more highly for routing a transmission line. So we do each comparison, and then the program spits out weights based on your suitabilities.

So this is a list of the stakeholders that were at each of the sessions. So we had the engineering group, which was -- we had some representatives from Manitoba Infrastructure and Transportation, we had some Manitoba Hydro, we had design, construction, we had system planning in there as well as line maintenance and geotechnical engineering. For the natural we had quite a large group of people. We had Fisheries and Oceans, we had members from the Provincial Government, Wildlife, we had the Manitoba Lodge and Outfitters Association, some Manitoba Hydro people as well.

And then also we had a separate day for the built perspective, which we had agriculture representatives, Aboriginal and Northern Affairs, some local government planners and their various groups to talk about the built perspective.

So that was held over three days in I think 2013. And again, this is what we came up with.

So the one that you have in front of you is the original model that was developed for Southern Manitoba. So go to the next slide here because you probably can't read that. So when you're looking at the model there's what we call sub models, so there's the engineering sub model, natural and built. So, again, those are treated differently, depending on what perspective you are looking at. Then in the bottom left is your areas of least preference.

So the light green represents a factor. The kind of light yellow below that are the features within that factor. Then there is the per cent, so that's the per cent, the per cent weight of that factor, and that's within each sub model. So within engineering it looks like there's five or six factors, those percentages will add up to 100 per cent.

And then these numbers, the darker yellow are the suitability values. So that refers to the suitability for routing a transmission line. And with the other model, 1 is preferred and 9 is less preferred. And at this stage the areas of least preference are basically, they get a zero, which means that the model, when the model

runs it won't route through an area of least preference.

So that's -- the model that you have was the -- sorry, the model that you have is the MMTP one it looks like. So the model was designed for Southern Manitoba, and I think when we originally did it, it was geared towards 115 or 230 kV transmission lines, or that was also part of the possibility. So when you look at some of these features, we have to calibrate the model to suit the specific transmission line. So in some cases, if you look at something like rebuilding, one of the features is rebuilding a transmission line. This was 500 kV, and we weren't -- it wasn't possible to rebuild say the existing 500 kV to be double circuit, or sometimes, you know, if it's a 66 you can overbuild it to 115 or 230. But in the case of a 500 kV that wasn't an option. So in that case that's just removed. There's no data set. We just ignore it.

In some cases, if you look at expandable water bodies; so each factor needs to have a 1 and it needs to have a 9. So if one of those features is not an option, then we have to give a 1 or a 9. So in this case, expandable

water bodies, this bottom one was the one that we considered the least preferable for a new transmission line that didn't exist on the landscape. So the next highest gets the 9, and if there's numbers in between, they are evenly redistributed.

The same thing happens in Southern Manitoba. There's no slopes greater than 15 per cent, so that entire factor didn't exist. So in that case we take that weight and we proportionally redistribute it through the rest of that sub model.

MR. BERRIEN: Can I just ask a question? It's Bob Berrien.

MR. BLOCK: Okay.

MR. BERRIEN: How were the dark green numbers, the percentage attributed, for example, under engineering in the case you have got up there where it says 37.7 per cent, can you just give me a better explanation of where that number comes from?

MR. BLOCK: That comes from the analytical hierarchy process. So what we did with the people at the workshop, we gave them sheets, and on the sheet it would say, when routing a

transmission line is it more important to consider linear structure or spannable water bodies? So, if it's considerably more important to consider linear infrastructure, linear infrastructure gets, or you mark a 9 on that sheet. If they're equally weighted, then you would give it a 5. And everyone did that. And then we would agree on -- again, that's where the Delphi comes in where you kind of agree on a number between 1 and 9, and then you put those numbers into the program and the program spits out the percentages basically.

I think there's more detail if you go into the -- I can't remember, I think we actually have those in the EIS. If you go to the appendix on where the models were created, it actually has the numbers that were put in there, where we said linear infrastructure, obviously that one was 37 per cent, so considering that against proximity to wind farms, which is 5 per cent, obviously the linear infrastructure got a 9 when you were comparing it against proximity to future wind farms. So the numbers are created by the program.

MR. BERRIEN: Okay. We'll leave it at that for now. Thank you for the answer.

MR. BLOCK: Okay.

So if you look at the bottom left of the slide, here is this table here, and that appendix 5A describes how this whole model was created, so that information on how the percentages were created is in there as well.

Okay. Are we wanting to break?

MS. S. JOHNSON: Okay. I think we have got a natural break in this. I was going to have us go to 10:30, but I think it's probably going to make more sense if we break right now. My apologies, before we got started, I probably should have told you where the bathrooms were and all of the safety stuff. If there is a fire alarm, we will all exit the doors over here and we will go to the front of the Electrical Museum, which is just over there to my left. So if there's a fire alarm, that's where we head. As far as the bathrooms go, which you are probably more interested in, ladies bathroom is right here. And if you go out to where the elevator bank is, the men's bathroom is right across the way. I think what we will do is we are going to take a ten minute break, and given the amount of information we need to get through, that's going to be a hard break. So we are going to start back

here, according to that clock, at 22 after.

MR. McARDLE: A question for you; when do you want to ask questions about some of the information that's being presented?

MS. JOHNSON: I think James is -- if you look at the agenda which was sent out, there is a question spot, and I think James is probably going to go in about six slides and then we're going to do some questions. But the slides take long enough that I don't think I want to wait. If you have to go to the bathroom, you have to go. That's on the transcript too, isn't it?

(Recess taken)

MR. BLOCK: So the presentation that we are providing here today will be distributed, after the presentation. I think it's going through Cathy.

MS. S. JOHNSON: No, I have the list.

MR. BLOCK: Okay. So Shannon will distribute the presentation electronically.

Okay. So, Dave told you about the models and I'm going to refer to them now. And now I'm going to show you what those models, what all of these numbers and weights translate into on the ground, on a map.

So as noted, each factor in the alternative, so each one of the yellow lines in the model here must be represented by a geospatial layer. There has to be GIS, geographic information that represents each one of these things in the study area for it to be considered.

The layer gets broken into a grid that's 5 metres by 5 metres. So when we look at the surface, it's a whole bunch of 5 metre by 5 metre pixels or cells that cover this whole thing, and based on their weight, determines their colour. So the lower weight ones are zero, going towards the yellow in the middle of the 5's, and then anything that is red is low suitability from that perspective at the top of the screen. The black and the white within here are the areas of least preference, so those are the areas the model does not consider routing a transmission line through or across at all.

So each surface, as David mentioned, so the surface that I'm showing you here right now is the engineering surface. And so it is the graphical representation of the values in the first column of the spreadsheet.

So when we look at things that are red

on the screen here, we're looking at wetlands. So geotechnical considerations, you will see wetlands are 9, a lot of this area is wetlands. So that's why it's red from the engineering perspective.

You will see this yellow band, there's kind of a yellow band that's right here and right here, this is the reliability consideration, which is covered under one of these things here -- existing transmission lines greater than 500 kV within the buffer. It's an 8.5, it's the second one from the bottom on the first column, it's called greater than or equal to 300 kV transmission line within buffer, it's given an 8.5.

Now, this is the Bipole III, so that's the 500, that explains this yellow band here. And in the middle of this one is the 500 line that goes -- the current international power line that goes to Forbes, Minnesota, from Riel. And it is yellow. It's a 10 kilometre buffer.

THE CHAIRMAN: Very small question, I just missed what you said. The first one, the light green on the top left, what line is that?

MR. BLOCK: Bipole III is right in here, yeah. Bipole III comes up from the north

around, south of the city, up around, into the Riel Vivian corridor and into Riel station. So that's representing these two buffers. The buffers were only applied if the lines were greater than 300 kV. And the only two that exist are the Bipole III line, currently under construction, and the transmission line to Forbes.

MR. BERRIEN: Bob Berrien. A question; I thought it was a 10 metre buffer distance? That yellow zone certainly appears to be wider than 10 metres on either side of the 500.

MR. BLOCK: It's 10 kilometres.

MR. BERRIEN: It's wider than 10 kilometres. That's only six miles. And that yellow band is certainly wider than six miles, isn't it?

MR. BLOCK: No, it is 10 kilometres on each side.

MR. BERRIEN: Okay. Thank you.

MR. BLOCK: Okay. It's probably not to scale on this, but the original map is in chapter 5-5. You can put a scale bar on there, and you can check.

MR. BERRIEN: Thank you.

MR. BLOCK: So when we look at the

engineer perspective, we can see that green is more suitable from an engineering perspective. And as you move towards, from the yellows to the reds, it becomes less suitable. And taking into account these white areas and the black areas, there are areas of least preference.

So this is the surface, this is what the model looks like. When you lay it on the ground knowing the existing land cover and what's on the landscape, that's kind of where it looks.

So now when we look at the natural perspective, so now I'm using the middle column, so when we map the middle column we can see a little bit different representation of high suitability versus low suitability from the natural perspective. So from the natural perspective, of course they would like to see -- that perspective likes to see development happen where there is development. So that's why you will see green in lots of agricultural Manitoba, where it's a highly developed landscape. And then as you get into the more natural landscape, it turns into the yellows. And then the reds represented here are wetlands, as well as areas of special interest, which are areas designated by

the province and they're around 7.8, so with them you start to see more of an orangy tinge. But you can kind of see how the landscape looks from a natural perspective on suitability for transmission routing. So from a natural perspective they felt, you know, keep the development where the development is as much as you can, and stay away from the natural environment as much as possible, represented by the darker reds.

So the reds here are -- the tall grass prairie is the black existing protected area of tall grass prairies, and this is future or other landholdings that are of biological importance for tall grass prairie. Same thing with down in here, you can see this is starting to help illustrate our border crossing delineations are these spiritual areas of interest, these areas here that were -- some of them were recently converted to ecological protected areas legally. And then these other larger red splotches in the middle here are Caliento bog and the Sundown bog, again high value wetlands. When you look at the model you can see wetlands have fairly high rankings in the scores, and then also the weight in the green

box. That's why you are seeing the reds represented as more orange. So that's kind of a landscape from the natural perspective.

So from the built perspective, again, this is the last column on the chart here, and it's starting to -- a little bit opposite of the natural perspective, which is intuitive. You've got a lot more red where existing developments are, and you have a lot more green into the more natural areas. But also when you look at these surfaces, it's giving emphasis, and so that's what Dave was talking about, about five times emphasis on to each one of these, but it's also considering the other two at the same time. So it's not just -- so that's why you will see some of the colours which you think would be red from a built perspective, they're more of an orangy colour because the model is taking into account the natural and the engineering perspectives in its analysis. So that's why things aren't as deeply red as you think in the built environment, because the engineering environment may have had it really red, like as an example right here, these wetlands. So from the built perspective, there is no kind of category for wetlands, but from the

engineering perspective and the natural perspective, they were red. They were very, very -- or low suitability for a transmission line routing. So that emphasis of those other two perspectives still comes through slightly in each perspective.

So I just want to go back, we want to -- when we show you these surfaces, they're considering five times more weight on to each perspective, but it's still considering the other two in its modeling of the landscape and suitability.

So when you look at the last one here, it is called simple average, so instead of five times emphasis on the built or natural, now we are just equal. So it's 33 per cent, 33 per cent, 33 per cent, so simple to natural, built and engineering. And so when you take all of those things equally -- so in theory this is what we call the simple average, it's balancing all of the different perspectives equally.

So this is what the landscape starts to look like, when you look at it through all of the lenses equally, which from a land use planning exercise, you know, those are some goals as to try

and balance things from everybody's perspective, because there's all kinds of competing interests on the landscape.

So in this you still see that because of the high importance of the natural features and the wetlands they're still -- they're still red, they're still -- in areas of special interest, they're still, they are in the orange and we still have the slight tinge of yellow near the reliability corridor. And then you have what used to be very green from a natural perspective has become a much lighter green in the simple average, because it's considering the built perspective at the same time. So you have a lot more kind of green surfaces, but not a really dark green like you saw in those other slides. It is a lighter green because it's balancing all of the competing interests of the natural environment versus the built environment.

So that's kind of where these suitability surfaces and how they lay out on to the landscape from this model, and how the model, the landscape gets painted by this information which was developed through those workshops with the technical data holders, and the pairwise

comparison and the analytical hierarchy that provides the weighting to each of these things. And it's by having all of those technical stakeholders informing this.

So Manitoba Hydro was involved in the workshops and was involved in the pairwise comparison, but we had, as David illustrated, we had people from, in the natural respect, experts from Ducks Unlimited and Nature Conservancy on natural perspective. And the farmers, Keystone Agriculture Producers from the farming perspective. All of these different key stakeholders came up with these values. So these are not Manitoba Hydro's understanding of the suitability for the transmission line routing, this is a stakeholder consensus building that came up with these numbers and these weights on what is more or less suitable for running a transmission line.

So it's with this informed knowledge that we start to develop the alternate corridors. So, if those surfaces -- we run what's called a optimal path analysis. And what it does is it tries to find the best paths across those surfaces. So each one of those square cells, the

5 by 5 metre square cells that I talked about that cover the landscape that make these colours, they give it a value 1 through 9. So when you try to route a transmission line that stays in the green, it's adding up -- as it draws a route across those greens, it adds those up. So those are worth a 1 or a 2 or a 3 as it goes across. If it tries to go across red, all of a sudden it adds 9 to each one of the red cells it goes through, or 8 and a half or 8, whatever the ranking is.

So once you add up the values of all those cells, when you run a route from here to each one of these border crossings, you create the alternate corridors. And there's hundreds of thousands of ways to get through all these 5 metre by 5 metre cells from point A to point B.

So what the alternate corridor does is it takes the top 3 per cent of those routes generated. So the ones that have the lowest score when it goes across all those pixels, going from here down to here, or down to there, it's adding up all of those pixels. And that's why you'll see those white areas, because those are areas that maybe have red in them or orange in them, so when we filtered them out, we only took the top 3 per

cent of the best ways to get from here to here, when connecting all of those 5 metre by 5 metre pixels together, that's what the alternate corridors are.

Of course we have done that on each one of the surfaces and that's why there's these different colours. But as we do it five times emphasis on built, five times emphasis on natural, we see where the top 3 per cent of ways to get from A to B are from each one of those perspectives.

But from a route planning perspective, we want to consider everybody's perspective equally. So we take all of those different perspectives and we put them all on one map, and they come out and they look like this, and it's called a composite. It's all of those different top 3 per cent. So the top 3 per cent natural, the top 3 per cent engineering, the top 3 per cent built, and the top 3 per cent simple average. And we lay them all on there. And this is what guides the development of routes. The routes are to follow the spirit of the workshop and the specifics of the workshop. The routes are to be initiated and drawn, where possible, within the

bounds of these coloured areas.

So we'll explain when we get to route planning how that's not always technically feasible to do that. But this is kind of where we start. And we start to draw segments which form into routes. So it's the top 3 per cent of ways to get from this point down to each one of these border crossings. And you'll see little threads. This one was a thread following a highway all the way down to Gardenton. You'll see much more continuous areas, but typically these little threads that you see around here is just -- that's the engineering or the built models coming through with paralleling those roads as the option. So that's why you see these little threads.

And the holes are sometimes -- well, the black ones are the areas of least preference. The other holes here are just -- those were routes that were, when you laid all of those surfaces on, they were just probably a lot of red in those areas. And I think if we look back, you can see, when I toggle them back and forth here from the simple average, where the red is compared to where the whites are.

So again, a lot of this is described

in chapter, or this is map 5-10 in chapter 5, along with the alternate corridor model in appendix 5-A goes into more detail about this model and how it was developed and answers the questions that Mr. Berrien was asking about the analytical hierarchy process for determining the weights.

So what everybody has been waiting for; questions.

MR. BERRIEN: This is Bob Berrien. Can you go back to the suitability surface map for engineering, please?

MR. BLOCK: Yes.

MR. BERRIEN: Thank you very much. The question I have for you is, it seems a little unusual that engineering would have such high objections and show up as bright, bright red, and yet there is a 500 kV line going right through it. Can you just explain a little bit what the factors were that engineering used to rate so negatively the areas where that existing 500 line goes?

MR. BLOCK: Well, the existing 500 line was routed probably 1970 -- it was built in 1979, 1980, so it probably would have routed 1977'ish. When that planning exercise was

undertaken, it would have been a totally different exercise than today. I'm not exactly sure what other factors influenced the route decision and selection, but certainly maintenance of that. So in today's world with today's engineers and some of the concerns with -- the heightened concern of reliability, where the reds start to come into play a lot is that separation, so that is driving the reds, the separation from the existing 500. So our planners had a strong desire to separate the two international power lines that had import capabilities as well as the Bipole III 500 line. Separation from those two was a system planning reliability perspective that was weighted heavily in the model. It was given an 8.5.

The other red areas are wetlands. And certainly the routing decision made in 1975 to go through those wetlands and those areas of special interest, certainly the other thing that's driving these areas of -- these areas of special interest are rather recent delineations by the Province of Manitoba identifying the ecological importance of those areas. So that didn't exist back in the 1970s and '80s.

MR. BERRIEN: Wouldn't it show up in

the natural as opposed to engineering?

MR. BLOCK: Yes, it shows up in both. There is the red of these areas of special interest in the natural. And the other, the deep red there is really deep wetlands and peat lands, and the geotechnical considerations around that. The existing 500 line has had in its history some challenges with accessibility and foundations and those types of issues that were things that -- certainly where that current 500 line is, accessibility is extremely limited. In the event of the, and during the summer season and in the event of any type of outage on that line, Manitoba Hydro does have specialized crews or equipment to get in to there for small repairs, but any type of major event that would occur in those wetlands today in the summertime, with an additional 500 line potentially adjacent to it or paralleling it, certainly increases and causes great angst to our line maintenance department on being able to restore that power in an efficient and effective manner.

MR. BERRIEN: Thank you.

MR. BLOCK: I think Cathy is going to bring around the microphone. We're going to have

the commissioners ask some questions.

MR. GILLIES: Hi, it's Ian Gillies from the Clean Environment Commission. I just had a question on the -- as you narrow down the 3 per cent best routes, the way I understand it is every time a potential line goes through a pixel you look at a value from 1 through 9 and add up the values. So are the top 3 per cent the quantitative total of all of the pixels that it's run through?

MR. BLOCK: Yes, sir.

MR. GILLIES: I think I read somewhere there's 720,000 potential --

MR. BLOCK: That's actually once we have routes drawn. So that's not looking at these top 3 per cent paths. This is once we have -- we actually draw segments of the routes within those corridors, the combination of connecting all of those different segments together equals 700,000 different possible combinations. Like, when we are drawing routes ourselves.

MR. GILLIES: So, follow-up question then; the top 3 per cent is a quantitative number?

MR. BLOCK: Yep.

MR. GILLIES: Is there one route that

has the top number and would -- maybe I don't need to know which route that is, but is there one route that has the highest number and then you go down sort of on an ordinal ranking that will tell you the 3 per cent?

MR. BLOCK: Yes, there is one that we call the least cost path, not cost as in dollars, but as in the smallest sum of all of those values. There is one that is the smallest sum, yes. And I don't know where that one is. We typically just look at the top 3 per cent and look at it as a collective. These are simply there to guide because these corridors, and as I talk about the routing after the question period after lunch will explain how it is just a guide and there is so much more things on the landscape that need to be taken into account. These computational models and geospacial data you have, that's where you start to see the limitations, and that's where you need a human to actually draw segments and routes and take things into consideration on the computer can, so we do it for you.

MR. GILLIES: So just one last question, just so I'm very confident in my understanding, the top 3 per cent really make up

the four alternative corridors that are defined there?

MR. BLOCK: Yes.

MR. GILLIES: Okay.

MR. BLOCK: The top 3 per cent of each perspective combined together make up the composite.

MR. GILLIES: Yes, I understand.

MR. WHELAN: Good morning, this is Jared Whelan for Peguis First Nation. Could you go to the slide under the section for corridor evaluation model that lists the participants in the workshop? Yes. Thank you.

Where is the representation from Indigenous peoples and organizations?

MR. BLOCK: So, Manitoba Hydro, when we were developing the workshop process and determining invitations, one of the key criteria that we were looking at is the technical, looking for technical knowledge data holders, so knowing which technical, which people on the landscape had technical knowledge. And because this wasn't connected to a single project, we were talking about all of Southern Manitoba at the time, we were looking for -- so we looked at Manitoba

Aboriginal and Northern Affairs as a group that could provide some information from the Indigenous perspective. And we felt that inviting individual bands to a workshop wasn't feasible because of the sheer number, when we are talking about Southern Manitoba, the sheer number of folks that would be interested. And the need to have technical data, like geospatial data at the ready for any future routing processes was important and a key consideration.

The First Nations and Metis input into the process, while not directly in this workshop, has been injected at every other stage of the planning process. And we talk about that further on once we get into the discussions on round one, round two, round three, on how those traditional knowledge studies were informing the routing process, how the workshops and discussions with Indigenous communities were informing mitigative segments, and when we move from one round to the next and the feedback.

MR. WHELAN: Can we look at table 5-3, the one with the engineering, natural, and built?

MR. BLOCK: Yes.

MR. WHELAN: So this is again a

question about Aboriginal traditional knowledge or land use and occupancy. Where is the cultural land use on this table? I know you stated that the concerns and issues and traditional knowledge of First Nations communities has been injected at several other points, but there's nothing on there about cultural use of the landscape.

MR. BLOCK: Just --

MR. WHELAN: I have spent all morning looking at it. They is no cultural there. No. From the cultural perspective there isn't, at a broad level. There is the cultural and historic information in the workshop for the built. We had Heritage and Resources Branch involved. So any existing archeological or cultural or heritage sites are identified and stored in that data base. Certainly informed the built perspective as far as known locations of archeological and historic importance that are currently held by the Historic Resources branch.

So those are given a 9 -- sorry, designated historic sites are a 9, and actually the archeological sites and Indian reserves, as well as TLE selections from Indigenous communities were all considered areas of least preference, in

the pink column there on the box, as well as known archeological sites or religious and worship sites, national historic sites, were all considered areas of least preference. That was one portion. That was one way that we did incorporate some of the cultural use, was through existing land use or selections, TLE selections.

MR. SHANTZ: James, on the suitability surfaces, surface maps, there is white areas being shown that seem to indicate cities.

MR. BLOCK: No, there is a graphical error in the map. Both the white and the black are areas of least preference.

MR. SHANTZ: That answers that, okay, good.

MR. BLOCK: So there are cities and towns and airports and a couple of other features that are colour coded white.

MR. SHANTZ: Good. Second question is, on table 53 under engineering there's a reference to proximity to future wind farms as a consideration?

MR. BLOCK: Yes.

MR. SHANTZ: My understanding of the need for the undertaking is the export of power,

and then for reliability purposes for Manitoba to import power during drought or emergency conditions. Does this suggest there was other alternatives considered for the line in terms of its location?

MR. BLOCK: No, it was simply that there are wind farms, proposed wind farm developments within the area, route planning area, that we wanted to consider from a -- so being greater than 10 kilometres away was a 9, being within 500 to 10 kilometres away was just -- if that future wind farm -- there may be a point, inter-connection tie between that wind farm, potentially. But there was no intention to route a 500 line next to a wind farm, because we knew that a wind farm was being built, there was just a bunch of proposals that had various things. So it was also part of the model. In St. Vital, it was a carry forward on the St. Vital project as well because that transmission line was in close proximity to those wind farms as well. And this is where the model was originally built, and because the wind farms existed within the study area, we didn't remove that component from the model. If there were no wind farms in the study

area, then it would be zero, as David illustrated before.

MR. SHANTZ: Okay. Just one other question. And I don't know if this is the right time. My understanding is that at one point the initial planning was that this was to be a 230 kV line, and at some point along the way the decision was made to move it to a 500 kV, but that routing had already started. Was the timing, and did that affect anything in terms of route planning, or did that pre-date all of the modeling work?

MS. S. JOHNSON: In fairness, I don't think that we have got the right people here to give you the right detailed answer on that. So I think probably the best way to manage that one, so that we can answer it comprehensively, is to do it as an IR, just to make sure we give the proper answer on that one.

MR. McARDLE: James, thanks for the presentation. I've got a few questions on the routing process. It's Steve McArdle speaking. I wondered on a couple of things. I want to first go back to one of the initial questions that was asked around the routing and the 3 per cent, just so I have a clear understanding on how that was

done.

You had -- to develop these macro corridors, you'd used the line suitability index from that point A to point B for your routing process. In that process you used the least cost path, is that correct, to generate the lines there?

MR. BLOCK: Just to clarify, you had mentioned the macro corridors. The macro corridors weren't used in the routing process, they were used to determine the route planning area. So that model wasn't used, and that was the top 5 per cent.

The top 3 per cent of the alternate corridor model, which is the graphic here, the composite of all of them is what guided the drawing of route segments from the route planning team.

MR. McARDLE: So in that calculation, when you create the routes, you took 3 per cent of that. Is it 3 per cent along the line itself, or is the 3 per cent in the composite corridor, is the 3 per cent based on the suitability surface? So you know how you can have a line routed through the suitability index, and you can account for 3

per cent from that line, is that what that's representing, or is it all the different scenarios that are run that are within 3 per cent?

MR. BLOCK: It's all the different scenarios of when you run the least cost path analysis in the GIS system, that comes up. And when you graphically show all of those top 3 per cents, that's what's represented by the composite corridor here.

MR. McARDLE: I've got a few more questions. I wonder if we could roll back to the presentation around the macro corridor areas?

MR. BLOCK: Okay. Yes.

MR. McARDLE: So I'm particularly interested in terms of, maybe you could further explain or cover in terms of the changing in the planning area? So one of the maps, I believe it's map 5.2 or 5-2, shows an initial preliminary planning area, and then gradually that planning area changed and it reduced sort of the western side of the province. Can you maybe explain some thinking about how that change may have taken place?

MR. BLOCK: So just to be clear, I'm trying to remember what map 5-2 looked like. So

this was, so the map in the IS didn't have any macro corridors on it. It had a planning area that was much wider over here.

MR. McARDLE: Yes, it went down part of the western side and then cut across towards the east.

MR. BLOCK: So that planning area was just -- that was initially developed for the purposes of -- so way before the routing process started and the EPRI methodology was being used, this was a planning area for use in identifying the border crossing constraints. So it identified the border crossing constraints in there. Also at one time, you'll see -- so it's the black-out line on there is where it was used. There was a white-out line that also looked at areas of a transmission line that would perhaps come from Dorsey further south and then across. So when there was a decision made -- and we can handle that through an IR on exactly the timing of the decision, because I'm not exactly sure -- is when the decision was used to use the Southern Loop transmission corridor as a way to get from Dorsey to the east side of the Red River, and avoiding an area of intensive agricultural development and

rural residential development. So that is why, the decision for the South Loop -- to utilize the South Loop happened after this. So that's why the route planning area changed over to as you see it in this area, the macro corridors were run from near the end of the Southern Loop transmission corridor.

MR. McARDLE: Thanks, James. Another question on that: Was there any consideration, you are routing down through the Southern Loop portion, was there any consideration going through the northern part to follow the existing corridor down towards Riel? In your decision process were you looking at that as a potential route to get across to Riel?

MR. BLOCK: I think that one I'll have to defer to an IR. That's a system planning decision. So our system planning engineers are the best ones to answer that question.

MR. McARDLE: Sure. I did have a couple of other questions on that.

In terms of going now towards those macro corridors, I just want to make sure I have a clear understanding on it in terms of how they were created. So there is a table that

referenced -- that you had showing up in terms of the cross country, the transmission and the roads. Could you go into a little bit more detail in terms of how you created that macro corridor process? My understanding is you took the geospatial data that you had for the area and you used a ranking process. Can you explain a little bit more? Was that a ranking process that involved a number of individuals coming up with that ranking? Was it using the Delphi process, or was it just expert judgment in terms of what those significants were?

MR. BLOCK: So the macro corridor -- so similar to our explanation on the suitability surfaces, that these numbers get put into a 5 by 5 metre grid, and then it is the top 5 per cent of routes -- it's top 5 per cent of the routes that go through and that form the macro corridors. So similar in design in that we take -- we allocate these numbers to cells on a landscape level map so that we can run a least cost path and create the macro corridors. The values that were in here were guided heavily by the EPRI-GTC methodology on how those were developed, and we simply, using professional judgment, recalibrated them, Manitoba

Hydro recalibrated them to the landscape values contained in the Manitoba land cover classification for Manitoba.

So it was informed by the EPRI methodology, and the stakeholders and all the groups that created that, but when it came to customizing it and tailoring it to Manitoba Hydro, Manitoba Hydro and its other professionals were involved in kind of reconnecting them with our land cover.

MR. McARDLE: Okay. It did involve a least cost path analysis in order to generate that?

MR. BLOCK: Yes.

MR. McARDLE: Okay. Great, thanks.

MR. BERRIEN: Can I ask a follow up question?

MR. BLOCK: Go ahead.

MR. BERRIEN: Sorry, it jumped out at me as you were discussing and answering the 3 per cent question that was asked by one of the Commission members, I'm sorry, I forget who it was. Am I correct that later in the process the 10 kilometre separation from the existing 500 line, it was decided that it could be less and

that wouldn't significantly degrade the reliability component? Let's just ask that first, was that in fact the case?

MR. BLOCK: Yes. So from the initial -- from at the initial start of the project there was a 10 K separation reliability buffer requested by system planning. But as we progressed through the project, other planning studies were developed or came to completion which allowed that buffer to be adjusted.

MR. BERRIEN: The question I've got is, did you loop back to then rerun the 3 per cent, if you deleted or changed or amended the separation distance for this particular element of engineering reliability, and would that have made, you know, what we call opportunities for new or different or more higher rank potential corridors that were basically excluded early on but never got put back in? Or did they get put back in, I guess is the question.

MR. BLOCK: Okay. So to answer your question, when the reliability buffer was adjusted as we gathered new information through wind studies and other system planning studies, did we go back to the alternate corridor and readjust and

rerun them? No, we did not. Each one of these corridors is a snapshot in time. So when we run the macro corridor, it's that snapshot in time of our process, and we don't go back and run the macro corridors when we get new information. When we progress the ultimate corridor analysis, we've run that, that's a snapshot in time with the data that we have, and then we move forward. We're always moving forward, we don't go back and rerun any of the alternate models or the macro corridor models during the process.

So as the reliability constraint around the buffer was adjusted, the route planning team introduced new mitigative segments throughout rounds 1, 2 and 3 that start to test the suitability of other routes that were in closer proximity to the existing 500 lines. And so that's how the -- that's how, when we got a new piece of information like that was handled, it was handled through adding additional routes for consideration and evaluation using the alternate route evaluation model, which we are going to talk about after lunch.

MR. BERRIEN: Okay. So based on what you're saying, we can reasonably conclude that

there may have been a number of more suitable routes, but they got lost in the process simply because it was a progressive iteration as opposed to a looping?

MR. BLOCK: Not necessarily. Certainly the ones that the alternate corridor suggested were lost, but because Manitoba Hydro was aware of the change, we introduced new routes that even -- that fell outside of those corridors that were in closer proximity to the existing transmission lines but outside of the alternate route corridor model. So in theory, if the corridor model was run again, perhaps some of the routes that we had developed would have fallen within that corridor model. So that's why, when I get into the rooting exercise, I'll explain how we were outside of the corridor model and some of the rationale why we were outside, and going forward how the corridor model was there just to guide the initial route development, and then we would continually add new routes as we get new information, which is continuous over the multi year project that this took.

MR. BERRIEN: Thank you very much.

MR. RIEL: Marci Riel for the Manitoba

Metis Federation. So James, I'm on table 5-3.

MR. BLOCK: 5-3, is that --

MR. RIEL: The one that's all yellow and pink on the bottom left.

MR. BLOCK: Okay.

MR. RIEL: Right. So my question is, I note that the list on the bottom left, areas of least preference, has a variety of areas, including heritage sites, national parks, TLE and Indian reserves, et cetera. I notice that the Metis harvesting zone is not identified as an area of least preference.

MR. BLOCK: Correct.

MR. RIEL: Okay. So given the fact that we talked earlier about the idea that traditional land use and knowledge studies, land use and occupancy, et cetera, is not included in the engineering, natural or built segments, and the Metis harvesting area is not included in the area of least preference, can you give me a sense of how Metis specific interests were calibrated in the model?

MR. BLOCK: The Metis specific interests were not calibrated in the alternate corridor model specifically. They were

incorporated in future -- in the iterative feedback and analysis process as we entered into rounds 1, 2 and 3. So you'll have to remember that the ultimate corridor model was still part of our initial planning stages, and as we get into and discuss rounds 1, 2 and 3, that's where feedback from Indigenous communities played a major role in the route selection, decision making, and mitigative segment creation.

MS. RIEL: I understand, and I take your point. We will deal with some of that later. I guess what I'm trying to understand, though, is on that list of areas of least preferences, you've got things like golf courses, but you don't have the Metis harvesting area.

MR. BLOCK: So areas -- we also don't have other areas of traditional use by other Indigenous communities as well on that area, as the areas of least preference. I don't have a crystal clear recollection of the Metis area of harvest area, but it's my understanding it covers a large portion of Manitoba.

MS. RIEL: I agree. I guess my point only being, and I think we've had this conversation before, but it is a Provincially and

Federally recognized area, and so certainly very similar to a number of areas that you listed as areas of least preference. So I think on a go forward basis, it would be helpful if we included those areas as we go along.

MR. BLOCK: I think we can take that under consideration moving forward.

MR. RIEL: Thank you.

MS. WHELAN ENNS: Checking to make sure this is on.

Some of us have been identifying ourselves by name and some haven't. It's Gaile Whelan Enns from Manitoba Wildlands here, noting that some of the questions -- trying again. The problem was the computer, my apologies to everyone.

Realizing that we are going to resume this afternoon and that some of the questions will have content forwards to the afternoon, I'm at the very beginning of the slide set, I think I'm in scope slide, and you made a comment about removing biases. Okay, in terms of being able to have an effective exercise in terms of identifying -- trying again -- so you made a comment about removing biases in your route options, early stage

and planning. And you actually referred to removing biases that might be from the general public or pertain to the concerns of the general public, the MMF, or First Nations, in what you said. So, this I presume means that there's a lot of knowledge that went into the final route decision that is then not part of the exercise with the algorithm and the scoping information we've had so far this morning; correct?

MR. BLOCK: Yep, that is correct. There is substantial information that is -- where the feedback goes into the system that has not been presented yet.

MS. WHELAN ENNS: Okay, thank you.

MR. BLOCK: Sorry, we're going to be talking about, and when I said this is how feedback was incorporated in the decision, not what the feedback was. I mean, we are not going to be discussing some public engagement, and the First Nation and Indigenous public engagement program and the feedback they received from that program. It was how it was incorporated into the decision making process.

MS. WHELAN ENNS: I quite understand. I just wanted to establish what I thought I was

hearing.

We've also heard from you then that section 5, or appendices to section 5 in the EIS has a thorough description then of the methodology and how the workshops were used in terms of your 1 through 9, or 1 through zero ranking. Are we understanding that one correctly?

MR. BLOCK: Yes, it's appendix -- so the workshops I think are covered in appendix 5-C. It's covered in the appendix, there's chapter 5, I believe there is numerous appendixes, not just chapter --

MS. WHELAN ENNS: Yes. You told us that key stakeholders came up with these values. Okay. So could we see the same slide that we looked at before, in terms of who was in those workshops? Okay.

MR. BLOCK: These are the people that, Dave may correct me, these are the people that attended, not who were invited?

MR. MATTHEWSON: Attended, right.

MR. BLOCK: There is a greater list of who was invited, but these are the attendees.

MS. WHELAN ENNS: Okay. You keep me from getting into that question. Okay. So not

everything is readable from back here, but my working assumption is that there are no environmental advocacy or technical organizations on the chart, on the slide?

MR. BLOCK: Environmental organizations? So Ducks Unlimited, Nature Conservancy, the Bird Atlas, Seine, Red River Conservation District, and there were other non-government organizations that were invited.

MS. WHELAN ENNS: Thank you. Got that.

The definition of non-government organization, outside of Crowns and government is sometimes quite different. So that's part of why I was asking that question. What I would like to know is whether or not you are aware that there's two people in this room today who were not part of your workshops, who spent six years working with a variety of entities and multiple government agencies and industry establishing all of the special interests, special interest areas in the province?

MR. BLOCK: One of the other key considerations was that the people, or the organizations here had to hold or be technical

data holders, had to hold that data. So we think a lot of the organizations here were the ones that hold those pieces of information, such as areas of special interest or tall grass prairie preservation areas.

MS. WHELAN ENNS: So I'm going to take that as a no to my question.

MR. BLOCK: Can you please repeat the question actually?

MS. WHELAN ENNS: My question is whether or not you're aware that there's two people in this room --

MR. BLOCK: I'm not aware.

MS. WHELAN ENNS: Thank you. So the second part of the question is whether you, and I think the answer must be no also, gave any consideration as to whether there would be any other environmental organizations, other than those listed, that hold the data that you're talking about?

MR. BLOCK: We did an extensive review of organizations that potentially could house data, and we did a campaign by which to reach out to those organizations to see if they would share any of their data. We can take it as an IR on

exactly which communities we reached out to, because there was quite a bit more than what are on the list, but I cannot name them off the top of my head, what they are.

MS. WHELAN ENNS: Thank you, I will pass on the second part of my question because I think you've answered it.

And you made a reference, and I'm sorry, you were talking about -- I'm not sure which question you were answering, but you made a reference to graphical error on a map in the EIS. So would you please tell us exactly which map and where it is in the EIS?

MR. BLOCK: Yes. It's maps 5-5, 5-6, 5-7, 5-8 and 5-10 I guess. It's underrepresenting the areas of least preference. So all of these white areas are all areas of least preference.

MS. WHELAN ENNS: So will you be making those maps available to the participants, the corrected version?

MR. BLOCK: Yes, it will be listed, we are submitting it, so it will be in our errata with the adjustment.

MS. WHELAN ENNS: Okay. I think that the remaining question that I have probably

pertains to this afternoon, but thank you, Steve, for opening the door. Can you give us a general answer then at this point how much proportionally the final route actually deviates from your 3 per cent, or is that for this afternoon?

MR. BLOCK: We won't be presenting that today, how much the final preferred route deviates from the top 3 per cent of the alternate corridors.

MS. WHELAN ENNS: Will you be able to show us where it deviates this afternoon, as we will have a comparative?

MR. BLOCK: No, I do not have a map that shows the alternate corridors and the final preferred route on the same map search.

MS. WHELAN ENNS: Thank you.

MR. WHELAN: This is specific to the alternate corridor evaluation model. It's a mathematical model put into a computer system, correct, general description?

MR. BLOCK: Sorry, just to clarify, do you mean -- you called it the alternate corridor evaluation model, we do have another model called that, and it's not this model, so I just want to make sure. This is the alternate corridor, sorry,

that's right. We have another one called the alternate route evaluation corridor.

MR. WHELAN: I'm talking about the one we've seen already. So if someone had the model and the GIS and the computing power and the same data that you put into it, it is reproducible?

MR. BLOCK: Yes.

MR. WHELAN: Thank you.

MR. McARDLE: James, I've got a few follow-up questions on the model I wondered if we can go through? The names for the models, the alternative corridor evaluation model, if I'm understanding you correctly it's a composite of these different perspectives in terms of the engineering, natural and built environment, and it involves using the suitability index or the preference surface as created, and you use the least cost path to actually generate them to evaluate -- to come up with these alternative corridors. Is that a correct understanding at a high level?

MR. BLOCK: Yes.

MR. McARDLE: Okay. A couple of questions on that, I am wondering if you can explain to me. The model is very subjective in

the sense that you can per fate (ph) the model by the way you change your criterias that are used, and the weightings and the factors that you give it. And that's the strength of the model, because it allows you to look at scenario planning, ask questions and come up with different route perspectives. But it's also imperative in terms of how you select some of these parameters. So I'm just wondering in terms of when selecting the certain factors and criteria, the process you mentioned was through the stakeholder engagement and they helped drive that process. I'm wondering if you can explain a little bit more about that? Because one of the questions I have is, are there any ones of these criterias that were presented that were rejected, not included in any of these builts? Did you run into any criteria that you felt wasn't included, and then how did you decide to do that? The other part of the question is, if you have too many criterias in here, you dilute the importance of those values, because the analytical hierarchy process is a weighted process, and so depending on how you organize the structure, the number you have influences the weight on those. So was there thought around how

many you have associated with that?

MR. MATTHEWSON: Hello. Okay, I will have a go at trying to answer that, or the six or eight pieces within that.

So, I think the first question I got was, did we reject certain features? So I can't recall specifically but, again, one of the biggest things is that you need data, so often they would say, hey, this would be a great thing to consider when you're routing a transmission line, and we would say we totally agree, but can you supply us the data set that we can plunk into the machine that spits out the data? If they said no, we'd say, okay, we'll take note of that and when we are drawing routes or later on, we'll consider that. But if there's no data along with it, we can't use it at this stage. I would say that we were probably more inclusive than exclusive. And, you know, there was a lot of things on here where we thought, again, we may or may not be able to get the data, this is maybe specific to a certain area, but we'll include it because there is a mechanism for later saying this isn't relevant material, we'll just click that out and the model still works. So, it's better -- we were probably

more inclusive in the fact that it was easier to cut it out later than to just not have that as part of the model. If the data doesn't exist, we cut it out. Otherwise I would suggest that we kept all of the other ideas, as long as there was data available or they were able to produce it at a later date, we would have kept those features in the model.

MR. McARDLE: Thank you, David. In regards to follow up on that -- in regards to follow up on that, so that's in terms of the process to decide, you know, which criteria or factors are included in it. Was there also discussions around how many factors to include from a modeling perspective? Because the art of this process is a balance between how many you use in terms of the factors to run the model and what you use to do the evaluation. If you put too many factors into the model, again, as I mentioned, it dilutes the weightings of it. So there's no right answer to it, you have to find that balance. So was there a decision process around determining the number of factors that were included, or were they driven just by the stakeholders, the significant input from the stakeholders to include

those in?

MR. MATTHEWSON: Okay. So when we created this model we actually had the creators of the EPRI-GTC process with us from Georgia, and they were the ones guiding the process. This was, at that stage they were running the process because this was brand new to us. So they would have guided that process, and there's no, like as you said, there's no magic number. You can't say 5 is good, 3 is bad and 7 is terrible. I think the only thing I can say to that is we would, as you said, you know, these are great, these are all great, but each one you add waters down maybe the more important ones. So that would have been something that was suggested to the participants, but again we never said, okay, you're at 6, we've got to stop here because that's the magic number.

Again, it was guided by the people who created this and had used this hundreds of times, so we trusted that they would guide it in the way it should be done.

MR. McARDLE: Thanks, David. I've got a follow-up question in terms of the modeling again from a quality control perspective. Sorry, before we get into the quality control

perspective, as you are aware, when you do this questionnaire for the analytical hierarchy process, you ask the questionnaire to do the pairwise comparison between the values. You put that together, every individual puts that together in a table, and then you compile that table in terms of a matrix, and you do some mathematics to come up with the out-coming weights that are applied. But part of that process involves doing a consistency ratio. Did you guys -- I didn't see anywhere in the report, anything about the consistency ratio to determine if there was any bias in the sampling. Did you guys --

MR. MATTHEWSON: That was there, absolutely. I'm not sure if we actually put the number in there, but we always considered that. That was definitely part of it.

MR. McARDLE: Do you know what that value was for the consistency ratio?

MR. MATTHEWSON: There's a number that is recommended not to go over. So we were always within the reasonable bounds of the process based on that number. I have no idea what they are.

MR. McARDLE: Typically best practice is point 1, 10 per cent.

MR. MATTHEWSON: Point 1 -- I was going to say 10 per cent, so we were always under 10 per cent.

MR. McARDLE: But you do have reference that you have done that?

MR. MATTHEWSON: That was done, absolutely.

MR. BLOCK: And the pairwise comparison was run multiple times to get that, to get that consensus. So we actually -- people filled in their sheets, did their analysis. They did it once and then -- they did the pairwise once, and if it didn't meet that 10 per cent, then there was discussion around the table so that everybody had a better understanding of the different perspectives again, because we would have known where people were dramatically different in their perspectives on ranking, and so there was a discussion about that. So if it was about the importance of bird nest habitat, and the other person on the natural environment, who was an aquatic biologist, just didn't understand why it was so important, there was discussion around that, so that everybody got a better understanding of that, and then the pairwise would run again.

In some instances we ran twice or three times to get that. And just having discussions amongst the professionals -- because the professionals in the workshops were of diverse backgrounds, even within the natural environments.

MR. McARDLE: James, just a question on that. What sort of stakeholder numbers are we talking about here? Are we talking 10, 20, 50 people that were involved in it on average?

MR. MATTHEWSON: Based on the list there it would have been one -- I think it was one person per that list there, so 10 to 15 I would guess.

MR. McARDLE: I don't want to soak up all of the time in questions, but I do have a couple more on the modeling part, particularly on a quality control perspective. Can you talk a little bit about how you managed and how you dealt with quality control? I'll give you a very specific example. We are talking about creating land suitability index preference surfaces, and on a 5 metre by 5 metre grid, based on taking the various mapping data, convert them into discrete surfaces, then doing the cumulation of that value. So you know the whole calculated process. But on

a 5 metre by 5 metre grill, you will have artifacts in the data, because you will have some pixels that will be anomalous. So I'm wondering about how did you deal with quality control in the terms of land suitability index? Was there any process in place to handle that?

MR. BLOCK: I think we'll have to take that as an IR. We do have -- like our consultant had numerous steps in the quality control process, but they're the best ones to give the exact answers on the exact things they did to that question -- the best answers to that question. I wouldn't do it justice. But there certainly were multi steps in the QAQC process. They actually ran all models in two separate environments, two separate people as quality control checks so that there was no error by human data entry.

MR. McARDLE: On the modeling part, you mentioned about the various perspectives using five times for the engineering, five times for the natural environment, five times for the built environment. The strength of this modeling allows for a lot more flexibility around that. I'm wondering, was there any other scenarios that you created in terms of this modeling process, beyond

just using -- I assume these five times, are these based on the EPRI recommendation or were these decisions that you made? And were there other scenarios that you used for these perspectives in terms of different weighting categories?

MR. MATTHEWSON: So we didn't -- we followed EPRI and the EPRI recommendation was five times, so I'm not sure we went into enough detail on that. So basically, as James was saying, for the suitability surfaces, every pixel has a value for each of the different layers. So when you're talking about the built perspective, those pixels are multiplied by 5, and the natural ones that are in the same place are just the value. So that's how you get your weight. So the built is 5 times natural and then one-third each. And it was never even suggested that we -- like are you suggesting that we could go 6 times, 10 times, 20 times?

MR. McARDLE: Oh yeah, with this modeling process you can apply different perspectives and organize it in different ways to explore how the route might change. It's not rigid to necessarily follow this process exactly. It's a methodology. So it does give you that flexibility to change it. So if you wanted to try

it at 10 per cent and 20 per cent, you can run it through that way. And you can certainly do it through a computer process to generate those routes. So it does give you that flexibility.

Just one other question on some of the modeling parts of it. Maybe I'm not understanding it correctly in the EIS. There is reference towards running this 750,000 times and then narrowing it down to 6,000 times, and then gradually working it down. Can you explain where that comes into this? I wasn't quite clear on where that process took place?

MR. BLOCK: That comes into the alternate route valuation model.

MR. McARDLE: Okay.

MR. MATTHEWSON: That's this afternoon, that will be covered.

MR. McARDLE: Okay, great. I think that's it for my questions. Thank you.

THE CHAIRMAN: Do we have more to do before we break?

I wonder if I can make a suggestion; we've two requests for questions here, so if we can make those short questions, and hopefully fairly short answers, and then we'll get on to the

next. We don't want to end up missing some section.

MR. MATTHEWSON: I am not sure if you heard that, but if you can keep it short, the answer is yes.

MR. BERRIEN: Okay. I will keep it very short. The question is simply, as we talked about earlier, this whole process, the model was customized for Southern Manitoba. I was wondering whether there was any consideration given to altering the one-third, one-third, one-third simple average process to more particularly emphasize the features of Southern Manitoba?

MR. BLOCK: No, there was not.

MS. WHELAN ENNS: Gaile Whelan Enns, again. Just a quick question about EPRI. And that is, given that they ran various of these processes and that there's a lot of content here, and questions about them, will Manitoba Hydro be bringing EPRI experts to the hearings to answer questions?

MR. BLOCK: So the consultants that were used in developing MMTP have changed the organizations that they work for, so we haven't made any decisions about their involvement in this

hearing.

MS. PASTORA SALE: I just have a quick question -- sorry, Joelle Pastora Sale from CAC Manitoba. I was just wondering when you were talking about how the criterias were identified or rejected, you indicated that how you identified the criterias were, if you were suggested any, you based yourself on whether or not you could find data. I'm wondering if you could explain how you defined data?

MR. BLOCK: Well, it had to be, so data had to be geospatial, so it had to be connected to places in Manitoba, it couldn't be tabular data, it had to be spatial in nature. So that's how we defined data, is it had to be geospatial in nature, and it had to have complete coverage of the study area. So if it was to be utilized, it had to have complete coverage of the study area.

Okay. Route planning. So now we're actually drawing -- I've been using some terminology, routes and segments. So when we draw initial planning of areas and it was highlighted in round 1, those are segments, so we draw segments. And so a segment, as an example, is

anything between one junction and another. So this would be a segment from here to here, that would be one segment and it would get a number on it. And there would be numbers on the maps. And a lot of our public engagement feedback was we don't like segment 100 or 101, and we have concerns with something on 95. So that's how the feedback was organized and broken up by segments. Because there are getting into things, hundreds of thousands of ways to get from over here, maybe the first segment here from Dorsey, down to each one of these crossings, when you think of there are logical ways to do that and there are illogical ways. So that's why you come up with the 700,000, because that includes every possible way.

So that would include going like this, and back, and then going like this and then down, and routing to the border crossing. So that's an example of an illogical one, when you backtrack on things. But when you come up with a number like 700,000, it is looking at every possible way to connect those segments together, and then we narrow things down. We have steps by which we narrow that 700,000 down to get rid of some of these illogical routes.

So the composite corridors to all three of the border crossings, and so now we're, sorry, we're down to three border crossings. So I'll explain a little bit there. So the route planning area has shrunk from what was previously over here down to -- the western side has shrunk and moved into one border crossing.

So there was a border crossing over here. It's called Gardenton west. It's referenced in the EIS. There is an entire section on Gardenton west and why that border crossing was removed from future consideration. It was a joint decision between Manitoba Hydro and Minnesota Power. And it involved information pertaining to the intensive development going on in this area, both recreational development, rural residential development, agricultural development; the cumulative effects on agricultural, high quality or high value agricultural land that had been going on in the landscape in the recent year, or month, with the introduction of Bipole III on that landscape; as well as the introduction of the St. Vital transmission complex, which also ran from St. Vital station, out here, down through this area and over to the west around highway 75,

Letellier.

So those considerations were put into play on just the overarching cumulative effects on agricultural being imposed through transmission line development in the recent history.

Minnesota Power also had similar feedback on industry, high quality agricultural land in that Gardenton west border crossing area, as well as some of the challenges they would have to route around, I believe it was Red Lake, in order to achieve, to connect up to that border crossing. So it was a joint decision by Manitoba Hydro and Minnesota Power to remove that border crossing from any future consideration.

So with the resulting border crossing eliminated, the route planning area was shifted to follow alignments of the rural municipality boundary here, as well as to get on to the western -- sorry, the eastern side of the City of Steinbach. And the intense -- you can see the intense rural development going on in here with the many areas of route preference, so the route planning area was contracted.

Then route segments, which are these blue lines, were drawn. So with these are drawn,

we developed alternative route segments instead of complete alternative routes, because this provides the maximum number of routing possibilities that are not constrained by preconceived biases.

So when a routing technician draws -- if we're routing an entire route and we are starting from here, and we have biases about what direction, how long and how many turns and where it should go, so instead of that process of drawing complete routes from start to finish, we actually drew segments within key bottlenecks, as illustrated in the route planning corridor. We started in these bottleneck areas where we knew it was going to be challenging to get through, okay, we'll try and find routes through there, and then we would spread out from there looking at ways to connect those bottlenecks together.

And you will see some of these bottlenecks, or some of these route segments do go outside of the alternate corridor. So one of the things that the alternate corridor model can't take into consideration that the route planning team has to is the -- it may have multiple routes, or sorry, multiple areas of least preference like homes in this area here. From my recollection of

this whole area, there was a lot of homes. So to get through this area with a transmission line with as little turns and bends in it as possible was very constrictive. It just wasn't feasible at the time.

But we did have a good route from here down to the border crossing. So we looked for a logical connector to other segments that provided opportunities that were as far away from residences as possible. That is our primary routing goal, is to be as removed from personal residences as possible. It's not always feasible but it is a goal that we try to achieve when drawing the segments initially.

What isn't illustrated on this map here, we have the corridors and we have the segments, is the sheer intensity of the amount of areas of least preference and all of the other considerations that go into the drawing of the segments.

So the drawing of the segments, we talked about the alternate corridors and it has this list of data that it looks at and draws the top 3 per cent. Well, there's large amounts of professional judgment as well as other pieces of

information and feedback that we may have received since the stakeholder workshop was conducted, because it was conducted a year or two before routes were developed. So all of that information, or things that were not considered or included in this model but we felt were important considerations in routing, were all turned on in the geographic information system by which these segments were drawn.

So the route planners have the intelligence of what the values are of the stakeholders and what is important based on their rankings and suitabilities, as well as how those graphically are represented on the landscape, those values. As well as all of the other values and experience that we've gained over the past 5 to 10 to sometimes 30 to 40 years of transmission line routing experience, in consideration of drawing these segments.

So this is where some of the professional experience starts to be combined with outputs of models, as well as some of the logistical constraints of too many homes in a row. You know, a lot of people build, you know, it's a good idea to parallel a highway, but a lot of

people build, in rural Manitoba, build off the highway. There's a lot of residences that back on to the highway, their driveways go to the highway. So it starts to be very constraining just trying to follow all of the roads. So you have to look at alternate possibilities.

So, as I discussed, you know, in the geospatial information, all of the data that is created for these layers, that is converted into these surfaces, we looked at all of the individual layers too in the GIS, and what they have and our proximity to them, and we're trying to balance, splitting the difference between being too close to a home on a segment, or being too close to a wetland, you know, where do we -- we kind of tried to draw these segments.

So with that, some of the preferences of Manitoba Hydro and biases of each design engineer started to encompass into how close should we be to that attribute or that feature versus that feature. So we draw segments, we take our best guess. Sometimes we are compromising between two homes and we're trying to go in the middle instead of in between one or the other.

We introduce segments for

consideration by the public. Like these are the segments that go to round 1one for public feedback. We introduce segments that start to test some of the biases that we may have about, well, we think we should stay out of these farm units because it looks like they may aerially spray that area, and if we put a transmission line through the middle of it, that could be rather detrimental to the management of those farm management units from an aerial spray perspective. We think that's what's happening. You know, we know the landscape, we were looking at it, we've driven it, we've seen what's going on, we know about farming practices, but we still are doing our best guess of what we think the public would prefer, the public or First Nations and Metis, whether they would be, prefer us to be in this location or further south, or closer to one feature than another?

So we draw some lines on the map for feedback, because we aren't the experts on where exactly these lines should go. We have some ideas on where they could go from a Manitoba Hydro perspective, informed by the stakeholders, but now we are going to go and meet with the people that

actually live right there, the people that live there, the Indigenous and Metis communities that utilize that area. And now we are getting feedback on some routes, these are some ideas on where we can put this, and we want feedback on whether these are good ideas or there's other ideas. We call those mitigative segments, and those get introduced in the process that we will talk about after lunch. Because we aren't the experts on this. This is other people's backyards. I do happen to have some knowledge of the area because I'm from Manitoba and I've grown up in this area, but I'm not the expert.

So that's why we go and have a very thorough public and First Nations and Metis engagement program to try and gather all that local and traditional knowledge of use to help inform and make these routes and refinements a lot more reactive to the concerns that we are hearing on the landscape.

So I think that's a logical space for our break.

MS. S. JOHNSON: Okay. We've got lunch in the back. One thing I'm going to ask is, given that we have got a transcriber here, there's

probably going to be a desire or temptation to come and ask some questions or clarification. But in fairness to the process, and given that we are transcribing this today, I'm going to ask that we refrain from that, and certainly it can come up this afternoon. Are you good with that, Cathy?

MS. JOHNSON: Okay. Yes.

MS. S. JOHNSON: We will break for lunch until -- what did the agenda say -- 12:45? You know what, in fairness of getting everything done today, I'm going to ask everybody to be back for 12:30, so that we can keep this moving, if that works for everyone? All right. Jared.

MR. WHELAN: Shannon and to Cathy, if we leave questions to the very end, like can we have questions somewhere in the afternoon before the end? Because I mean there's going to be questions about what we just saw, there's going to be questions about feedback.

MS. S. JOHNSON: I'll have a look at the agenda with Cathy, and I think that anything you don't ask today, you send as an IR. So I don't think, you know, in fairness to get everything done and to get the information out, we'll look at it, but I don't think -- this is to

talk about the methodology. We would like to get as much of the information out as we can today. But I'll have look at the agenda with Cathy and see where we go. But right now we're on schedule.

(Adjourned at 12:00 p.m. and reconvened at 12:30 p.m.)

MR. MATTHEWSON: Okay. I think we're going to get started again. So this afternoon we're going to move through feedback analysis, comparative evaluation, and then selection of the preferred route and how we go about that.

So after we've drawn the routes that James talked about just before the break, we go and put those all out there. And so for MMTP, we had somewhere around four rounds of engagement, or three, and we're calling it three and a half, something like that, and it was over three years. And we had over 1500 participants, and we talked to 13 First Nations.

MS. WHELAN ENNS: Speak up, please?

MR. MATTHEWSON: So we talked to 13 First Nations, the MMF, and four Aboriginal organizations as well. We had -- let's see -- we had emails, telephone calls, we had of course our email address and phone number on everything that

we sent out. And we had open houses and the whole works. So we got a lot of feedback on the routes that we put out there.

So, as James said, the first step is to provide the segments. And when people commented, it was generally on a segment basis, I like this, I don't like this, here is why I do or don't like this. And we would take that feedback and look at the segments that they were talking about and the comments and concerns. We got feedback that was in reference to the criteria or the weightings, sometimes it was segment location or sometimes it was routing decisions. And we take all of that information, and we take a look at our segments that we had originally created, and see how we can modify those to maybe better represent what's better options for routing on the landscape.

So, one of the big things we do is, we call them mitigative segments. So that can either be based on general input, saying, you know, generally routing near roads is better than routing near, or avoid homes, and then we will adjust our segments, we'll take a look at our segments and see if we have enough segments

representing those concerns. And if we don't, then we may either adjust segments or just add new segments.

So paralleling transmission lines came across as a really good routing opportunity. If we didn't have enough segments in our original set of routes, we would draw more than that parallel, more transmission lines, or roads, or avoiding wetlands, or whatever the feedback is. We'll look at that.

And the other thing we look at is direct recommendations. So if someone says, I live here, this is my land, I farm here and this segment goes through my land, would you consider routing here, there or otherwise? So the first thing we do with that is we make sure that any adjustment we make doesn't increase the overall potential effects of the project. We're not going to move it from one home to the neighbour's home just because this guy came out to the open house and the neighbour didn't. So we're not going to stick it in his backyard because he didn't show up to the open house. If there is a logical reason to move it, if it's within his property and he says I'd rather have it on this side or that side,

or I farm here, so move it here, or in the future this is going here, I would like it over there. As long as it's still within this person's property, or it is not increasing the impact on someone or something else, we will consider that.

So then we pass it through the routing team. So we send it to design and construction, can we build this and would we build this, are there any -- often, you know, the birds and the bees don't talk to us, so we will send it to our natural team and say, you know, we want to move this here, are we increasing our impact to a species at risk or a certain habitat type that we don't want to affect.

So we look at all of the segments that are drawn by us, or by others, and if they're reasonable routes, we can build them, if they're not increasing impacts to other entities, then we'll basically consider that at the next stage. And this is probably the best way to have an impact on where that final route is going. Because up until now we have gone from, you know, here's our route planning area, we got the macro -- we're getting narrower and narrower, but now we're actually drawing lines on a map and

those are, you know, you can relate those to the landscape and where they're going. So this is a good place to get, we felt, this is how we changed EPRI too, they never had this built into their process, they drew the lines, they narrowed it down, they collected more data, they picked a route and that was it. We said we need more opportunities to get feedback. So this is where we go out, we put the routes out there, we get comments. We make changes. And then the viable segments that come out of that go into what we call the evaluation process. So those are the evaluation routes.

I have got a few examples here of some mitigative segments. So this is Trans-Canada Highway, just east of Winnipeg. The purple was -- I don't know which round this is, I can't remember, so the purple route was presented. And there's a few homes here, and they all look northeast. And they came out and said, hey, we're looking northeast, we're going to see these towers. You cross the Trans-Canada Highway twice, that's not always ideal. And because this was the same property owners, they said why don't you go on this side of our property instead, and then

we're not looking out our picture window at the tower, and you're avoiding two crossings of the Trans-Canada, which from a technical perspective is good. So we looked at that and said, hey, that's a great idea, we will give it a try.

So in some cases we will keep both segments, I don't recall what we did specifically, but we may keep both segments and run them both through the process, or we may get rid of this one and try this one.

So this is, again, the purple was presented. This is Quintro Road. There's a lot of development here. There's also a new development over here. So, you know, they said, can you increase the separation from our houses? So, we drew this route here, kind of splitting the difference between the people on Quintro Road and the new development that's to the east, make it equidistant. Again, we drew this route here, it becomes a new segment, it's something you can build and it doesn't increase the impact to any other vectors. So draw that route, it seems to work, so then that one would move on.

There's another example of purple is what was presented to landowners in the area, and

we also talked to the municipality, and they actually drew something similar to these segments. And they said, you know, can you go over here? So we adjusted them to something that we can build and, again, it wouldn't increase impacts to something else. So we modified their suggestion and came up with these segments. Again, we looked at them, passed them around and everyone said, yeah, these are reasonable segments, let's consider them, so they would move on.

The last example is -- so there was a landowner, I can't remember exactly, there's two quarter sections here, privately held land, and it was a First Nations traditional and cultural land use site. There was medicinal plants on those quarter sections. So I think it crossed right through the middle, so we didn't move entirely off of the property. Because, again, we didn't want to transfer that to somebody else. But we, working with the person, we figured out this is a good place to do it. It minimizes potential impacts to their property and what they use it for, and it doesn't increase impacts to anyone else. So again, draw the segments, check with various people and make sure it doesn't increase

impacts, and see if it's something that we can build. So that moves on in the process.

So, I'm not sure if you can see this here, but this is -- the pink, pinkish red, is the original set of routes that went out, and the blue hatch is what we call the evaluation route. So in many cases they're the same, a lot of things didn't change, most of them don't change. But in some cases, if you see there's two, three segments here, those were adjusted. There was a few segments added again paralleling, so this is paralleling, this is a transmission line. So the blue routes are what move on to the evaluation process and what are evaluated in our workshop.

MR. BLOCK: I just want to add something to that, Dave. Just connect this back to where we had a few questions about, well, why don't you go back to the top 3 per cent and check that? We always -- as we moved through the progress, it's the alternate corridors, it's a step, it's a point in time, it's done. If we were using those alternate or the top 3 per cent as a criteria, it's like, well, we won't allow any mitigative segments if they don't fall within our top 3 percent of our routes. We can be -- you

know, showing where these are, there's quite a few of them that were proposed by the public that fell out of the top 3, above and beyond the top 3 per cent. But we included them, because we don't go back to those decisions and start to retest new things. It's new decisions as we progress, as we get new information. But we didn't want to restrict.

Also there was another question previously about Indigenous and Metis information into the alternate route corridor model and how it was limited in that model. It's an introduction. So where we conducted all of those workshops and traditional knowledge studies were in the process of being conducted, and field visits happened with Indigenous communities, and they drew mitigative segments, and they suggested generally in areas of Crown land is something they prefer heavily over private land. They value an intact habitat, wildlife habitat and natural habitat. They started to share with us a lot of their values, and those values started to influence the design of mitigative segments, as well as started to be incorporated into the evaluation process, both in the professional judgment, in the professional

judgment side of the decision making process.

MR. MATTHEWSON: Okay. So after we've received the feedback, we looked at all of the segments, we decided on what our set of evaluation segments are, we move into the comparative evaluation. So there's two more models that we use to do that.

So the alternate route evaluation model, which I will get to next, the goal of that -- so this is where we talk about, if you look at this, there's 700 and whatever it is, 750,000 ways to get from A to B, and we need to get to one at some point. So the design of the evaluation route, the alternate route evaluation model is to pare that down. So, I mean, you can't look at a set of data and say, wow, this route is good, bad or otherwise. So this way it does a lot of the work for you. So we collect information on all of those segments, and it goes into the model, and that gives us, again, it's one of the tools we use to pare down the routes from 750,000 to one.

So actually, sorry, the first part is to get a subset, so we aim for 3 to 5 routes, the best of 3 to 5 routes. And then those go into the preference determination model, and that's a

fairly simplified model. Again, I will get into the details of that in a minute. That will help us select a preferred route out of those best 5 or whatever we come down with.

So this is the alternate route evaluation model. And again, it's divided up into the perspectives, so you've built, natural and engineering, and the percentages within each sub model add up to 100 per cent again. And it's used in the same way where, if you're talking about the built perspective, these are multiplied by 5, these are -- so they're still considered, but they're just the straight values.

And so these were -- so this model is created by the routing team. So that's where, again, the features come from. And the weights are done in a similar measure where, you know, we look for consensus on what we think is the most important and come up with weights again in a similar fashion that we did for the corridor model.

So, I don't know if you can see this, so data is collected and each -- for each route there's a value for each of these features. So the number of relocated residents on this route,

on each of the 750,000 routes is determined for each of these features. So there's a dataset that has just the raw data, but because you're talking about counts and acres and length, and things that you can't easily compare, the first step we do is we normalize all of that data between zero and one. So whatever the lowest, whatever the minimum value for that feature is gets a zero. Whatever the maximum for that feature is gets a one. And then data is normalized in between. So everything now is based on a score. So you've got your raw data, you have got 14 relocated residents, and your normalized data is .43. You've got 239 acres of natural forest on that route, the normalized score is -- it should not be zero -- but it might be zero because that's the route with the least amount of natural forest on it. For all the features, with each of the models, we calculate that.

So what that gives you is now you can compare scores, you can rank the routes. So you can sum all of those values, and because they're all comparable now, you can actually get a total for each route, and then you can rank those routes for each of the perspectives.

So what we can look at is, so this is the sum of the weighted scores. So this route AQK has a score of .51 from the built perspective. So now we can look at these visually, and it's a better way -- so what we're trying to do here is pick five routes out of 750,000. So what we can do is rank them and say, let's look at the top five or top ten routes from each perspective. We'll stick them in a histogram and now you can start to see some trends. You can see red is engineering. So these are pretty poor from an engineering perspective, but pretty good from a built perspective.

So what we will do is, from this, pick three to five routes that have good scores from a couple of perspectives. So, we look at engineering, natural symbol, let's pull one route from each, depending on again where these fall out, pick three to five routes.

So those three to five routes go into the preference determination model. So this is the model, so we've got the criteria, cost, community, schedule, natural environment, built environment and system reliability. So those criteria, as well as the associated percentages,

were decided by a senior management team at Manitoba Hydro.

So cost in this, at this point is an estimate of construction cost. It doesn't include all of the extra stuff because it's more based on construction length, you know, would affect the cost, as well as we look at angle towers and clearing and there's a few features that go into that, but it's not like a total project cost at this point. That was scored 40 per cent.

Community is input received from the public and First Nation and Metis engagement processes.

Schedule risks are things like constructability. Again, we showed the wetlands in that one example. If your route goes through the middle of a wetland, you're not going to be able to build that in the summer, it's going to be in the winter. So certain choices will lead us to winter construction, it could be sensitive habitat areas where you've got timing windows, nesting periods, that sort of thing, or licensing risks, or anything like that that could affect the route. Natural environment is just the biophysical environment, that's the natural team, to look at

wildlife, habitat, wetlands. Built environment again is the same, look at the socio-economic environment. And system reliability, that has to do with the, again as we said, the separation from the 500 kV. So length is often a consideration. The longer a route is, the more potential that it will be impacted by a weather event. They looked at the patterns. They have certain data on wind or ice or whatever, and certain routes will potentially have more or less effect on the overall system reliability.

Okay. So, we've our evaluation routes now, and I've got our two models. So, the next step is to have an evaluation, route evaluation workshop. And that involves kind of the extensive project routing team. So we have usually a biophysical specialist, either from Manitoba Hydro, or in this case it was Stantec, who is a consultant. Socio-economic specialists, engineering staff, that will be the project managers, someone from design and construction and maintenance. And we also have members from the engagement staff, both public and First Nations and Metis.

So each of those people are

responsible in that workshop for their perspective. So if you are the wildlife person, you are speaking on behalf of wildlife. If you are the public engagement specialist, you are there talking on behalf of what you heard from the public.

So, after we've headed down our 750,000 routes to the top 5 or 3, those are given to each of the groups, and their job is to rate those -- to rank those routes from 1 to 3, 1 being preferred. And you have to score something a 1, you don't necessarily have to score something a 3.

So the routes -- the biophysical team, they will have a breakout session, they will go and they will look at the biophysical environment, and they will rank the routes giving a score from 1 to 3. You can have all ones, if you want, if they're all equally good or bad. I guess in that case you can have a 1, 2 or 3. So that's done for each of the -- that's done for each of the criteria in the model. So cost is generally just a calculation scaling factor again from the least expensive to the most expensive, and it's scaled that way.

System reliability, the engineering

group discusses system reliability and cost and they give scores from 1 to 3.

Again environment, built, community, in their breakout groups they score each. And then risk of schedule is usually discussed as a group, because each component can potentially have an effect on the schedule of the project.

So those numbers are plunked into the model. The scores are multiplied by the weight for that criteria. They are summed and they are ranked. So in this case route TC had the lowest score. Now this isn't necessarily where we go, great, route TC is perfect, let's go ahead. We will take a look at the other scores, and also just look at how close are they? If they're close, we will take a closer look at why, what's affecting these scores? And also does it seem to meet what we're thinking and how the workshop is going and what we've heard through the process? And if everyone can agree that route TC is a reasonable route, then that is now our preferred route.

MR. BERRIEN: Is it okay to ask a question before you move on to the next section?

MS. S. JOHNSON: Actually, you know

what, we are getting -- this section is -- we are going to be done probably in about 40 minutes, half an hour. And then I think there's going to be a bucket questions that are going to be coming forward. So at this point in time, just so that we can get all the way through to how we get to the final route, I would rather if we waited, because I think there's going to be lots of time and I think some of the information brought forward might bring on other questions, if that's okay.

MR. BERRIEN: It's your show. I'll say it's okay if you say it's okay.

MR. MATTHEWSON: So, I'm just going to add a little bit to Dave's section here. I just want to talk about the alternate route evaluation model.

So Dave talked about how this model was dealt by the project team. But another key thing that happened is we took this model and we validated it, and enhanced it, and changed it, based on workshops, meetings, and feedback with agencies, organizations charged with the management of the natural features, as well as the public through workshops. We reviewed and

informed the definition of these criteria, as well as the weightings. So they were developed by the project team, but then we went through our public engagement process, validated whether these weightings were congruent with other experts and other stakeholders, public and First Nations and Metis and other stakeholders, whether these were values that seemed to align with their different perspectives. And some of them were adjusted based on that feedback.

The AREM models and outputs, Dave talked about this and how there was a ranking. The AREM outputs, these models, they give us the best built, the best natural, the best simple average and the best engineering routes. But those aren't necessarily the routes that go into and move forward in preference determination all of the time.

So those routes, the statistics and the AREM outputs are here for the participants in that workshop, and I think there's 30 to 40 people in that workshop with all different backgrounds and experience from the project team, that go through the top built, the top natural. And then they bring in, especially the community and First

Nations engagement folks, they bring in what they've heard from the community, and the open houses, and what they heard from discussions with the First Nations and Metis, they bring that into the discussion here now. Because those things, there's not a metric for that. But there is a gauge based on the feedback that we received, and that's why our whole feedback process, why we tried so many times and so thoroughly to get as much feedback as we could, because that really starts to influence route selection and which routes start to move forward to the preference determination model.

So they aren't always the top built and the top natural, because there are other factors, qualitative factors, that are introduced in that workshop that help -- because sometimes the model will build the best number one built route, and the community folks or the built for sector will say, well, that's not quite exactly what we think is the best. And so then we start looking at other options, and maybe we might take forward the 50th ranked built route out of some statistics, but because we're adding all this professional judgment and knowledge and

information that's garnered through all the rounds of engagement, that's what's moving that route forward into the preference determination model. It isn't a bunch of numbers.

This chart that David was explaining, it's just a way to organize and view those metrics.

In chapter 5 there are several other steps that are taken to narrow down from the 750,000 down to smaller amounts for consideration. And so that's further described in there. We talk about pairwise comparison of segments and reduction of the routes, any routes greater that 120 per cent of the shortest route length. Things that start to narrow down that 150,000, they're presented in much more detail in examples in the chapter.

So all those steps that Dave talked about, that's going through the process once. So we did that for each border crossing, independently of each other, and we selected the preferred route to each border crossing. And then amongst the best routes that were selected for the border crossing, they were brought together to come up with the best routes -- sorry, we selected

the best route to each one of the border crossings, and then we analyzed the routes, the best of those routes against each other to come up with the border crossing selection, which was the best border crossing. And so we ran through this workshop and these rankings and these models multiple times. Once for each one of the border crossings in round 1, after round 1's evaluation. And we would have ran it again after round 2, and we ran it again after round 3 to come up with our final preferred route.

So that's -- we kind of laid it out for you, but it happened many times, and it happened -- feedback on all of those routes kept getting injected through each one of those rounds, and routes adjusted.

So to give an example, so this was the alternatives presented in round 1 of both east and west of the export lines, you can see there's routes on both east and west of it, all within the study area. These were presented to the public for consideration. As they talked about the mitigative segments, you can see here now is what was all evaluated through those two models, are all of these combination of segments. So we went

from this, what Hydro presented to the public, to this for evaluation, based on public feedback, based on other changes, environmental studies that Manitoba Hydro had been conducting with its consultants, as well as engineering studies and changes. So you can see there has been some routes that have been introduced in closer proximity to the 500 kV line, and other mitigative segments, examples that Dave had given in the presentation there.

And then round 1, and this is an example, this is just showing the routes to the one border crossing here. These are the three routes and there is three separate routes. The only difference between these two is a section here. Those are the ones that went through to the preference determination model. We would have done that for each one of the border crossings, and then compared them across to choose the border crossing that we had developed, that was ultimately selected, the preferred border crossing from Manitoba Hydro's perspective.

There was -- so then round 2, so we had at that point -- sorry, going back to round 1, we had selected a preferred border crossing from

Manitoba Hydro's perspective, and then we had to talk with our partner. So Minnesota Power, where is your preferred border crossing? And they ended up being different. So there was a meeting with representatives from Minnesota Power and Manitoba Hydro, and we both illustrated the different, or how we came up with our preferred routes, and with the values they had, and why the other routes weren't preferred, or sorry, the other border crossings, the other routes to those border crossings weren't preferred. And there was a discussion and negotiation on ultimately what the border crossing was.

So then Manitoba Hydro went out with round 2, to determine -- and the objective of round 2 was to determine a preferred route to the preferred border crossing. So the output of the negotiation was that this border crossing was chosen as the preferred border crossing. So we presented new alternatives.

So you can see on the screen here we have routes that have been added that weren't in round 1, but they were -- we took the best route of the round 1 negotiations, we incorporated the mitigative segments and feedback from round 1

about that, in around that route area. And we incorporated other routes, like this one that went more into the Crown land and lesser developed areas than this route did. And we brought that back into the process for continued feedback and analysis from the public and our First Nations and Metis engagement processes, as well as the environmental studies and engineering studies that were still ongoing. We continued to bring that back in.

So then we, during that process in round 2, it was public engagement, we got more feedback and more mitigative segments, and that's where all of this purple is. You can see there is more mitigative segments up in here, and this is where we introduced another one that went out in here. That was one of the examples that David provided. We provided other examples down in here, some other route options here.

Also at this time the border crossing with Minnesota Power, because of new developments on the Minnesota Power side with respect to an airport that is on the border, it is called the Piney border, Piney airport. It literally is on the border of Manitoba and Canada, the runway goes

right across the border. They had discussions with the border, and there was challenges with the way their route came up into that border crossing and its intersection with the approach angles of the runway. Manitoba Hydro didn't have that same challenge, because of the approach we were coming in. We weren't in the, I guess, the flight path of incoming aircraft because of the angle of the runway. But we agreed that that was a challenge for them. That's something that was a show stopper. They couldn't adjust their routing to accommodate that.

So we looked at alternative options on the other side of highway 12, I believe, to Piney there. We looked at that, which was on the opposite side, still within the same border crossing zone, but we investigated alternative options within there. And a lot of these alternatives were developed with the landowner in that area.

So the evaluation went through. We selected Manitoba Hydro's preferred route through a workshop, and everybody's -- the sum total of all of the information gathered through all of the public engagement, First Nation and Metis

engagement processes, which included traditional knowledge studies, and workshops and field visits, all of that was incorporated into that workshop, influencing the decision and the choice as this being the preferred route, was selected for round 2.

So the start of round 3, we presented the preferred route, got some more feedback. Once everybody knew -- you tend to get more, as you narrow down your routes, you get a lot more people interested in the project when they realize that the project may be in very close proximity to their land or on their land. Somebody that may not have been thinking about the project in round 1, starts to come in and we get more and more feedback. It gave us more information and more mitigative segments to further evaluate the choice that Manitoba Hydro made in its preferred route.

So Manitoba Hydro brought more mitigative segments to continually test that choice that was made of the preferred route and see if it was ultimately the final preferred route of the project. So we incorporated more segments to the east back into the process again, because there was ongoing feedback about that area, down

in here and also some mitigative segments down in there. And that was a result of an example that Dave had given with feedback from a landowner that did lots of traditional medicine gathering on their property.

And so that's where we kind of moved, evaluated, and then ultimately ended up selecting a final preferred route developed for the project, represents a culmination of years of public engagement and data gathering and analysis and multiple rounds of public and First Nations and Metis engagement, route evaluation and decision-making. Finding a route that balanced multiple perspectives and points of view, and limited the overall effect was the objective of all of this work.

To do this Manitoba Hydro used this methodology, as we described it to you today, to do this in a transparent and comprehensive routing process, based on this EPRI-GTC methodology that had been used on hundreds of linear infrastructure projects around the world. And it used criteria based on models to evaluate and compare all of those alternatives and explicitly support the decision-making process. But again, the decisions

weren't solely based on data from models. It is a lot of qualitative data collected through our engagement processes that had a very large weight in the decision-making process.

That is the last slide. So we are at ten after 1:00. Do we want to take a little bit -- a five minute break there, and then start the questions?

(Recess taken)

MR. MATTHEWSON: Okay. I guess Cathy will circulate, I think Mr. Berrien is first in the queue of questions.

MR. BERRIEN: Thank you very much. First question I've got is, when we were talking about that process, we were taking data, and then we talked about normalized. Can you give us a very quick explanation of that?

MR. MATTHEWSON: The normalizing of the data. I'm just going to wait for Dave to come back. He is the data guy.

MR. BERRIEN: I will give you another second question.

MS. S. JOHNSON: He's here.

MR. BERRIEN: Go ahead.

MR. BLOCK: It's basically scaling it,

so if you have one -- so you have zero houses on one route, and you have ten houses on another route, you convert that to zero to one, so if there is five houses on a route that gets a .5. Like it's just scaling it evenly between zero and 1 so that you can compare acres to number of houses, to number of proposed developments, to length through agricultural cropland, because you can't easily compare those. So this is just a way to scale it so you are comparing apples to apples. Is that close?

MR. BERRIEN: Yes, that helps.

The second quick question is, I reviewed GTC, GTC actual original report paper, and there was nothing about a preference determination model in there. Can you tell me where that preference determination model comes from?

MR. BLOCK: We just changed the names, they also don't have areas of least preference. I don't know what the actual name is, but it should be there, just under a different name. I think it's called expert judgment, yeah. So their expert judgment model is the one we call preference determination. We are finicky about

language.

MR. BERRIEN: Okay. But I guess the question is, from my understanding the preference determination model was done by Manitoba Hydro senior executives as opposed to specialists in the field, as you distinguished and discussed them.

MR. MATTHEWSON: No. The preference determination model, a component of that, it was Manitoba Hydro transmission business unit executives that determined the weight of the model. And it is the workshop of all of the experts that determined the ranking of the routes in the preference determination model. So it was just the weights that were determined by the executive, as well as the categories. And then it was the experts that decided how the route ranked amongst each other in each one of those categories.

MR. BERRIEN: Okay. I'll get you to back up a couple of your slides to where that was showing up?

The question that follows from that is, when cost is 40 per cent, and that was determined by this senior management, does that mean that the experts only could work on 60

per cent of the input? Just looking for the way the math worked?

MR. BLOCK: So the way the math works is when you give a score, you give a score of 1, so route A gets a score of 1. When you're adding that up with the other criteria, it's actually .4. And if community gets a 1, because it is 30 per cent, that gets a .3. So you add up your .4, your .3, so the score you give it is multiplied by the weight. And then those are summed to get your total.

So if you look at slide 48, so route TC is the cheapest route, so it gets a score of 1. You multiply that by the weight, so the actual value is .4. So the total for route TC is 1.05, so that's .3, plus .075, .075, .1, .1, .4. So the score that you give it is multiplied by the weight for that criteria.

MR. BERRIEN: Following through on that particular calculation you just highlighted, .65 out of 1.05 comes from the judgment of the expert, the balance, the cost component came from the executive. Do I have the split correct?

MR. MATTHEWSON: But the cost is still, like the 40 per cent is determined by the

executive, that's how much weight they want to give cost, with 30 per cent to community. The ranking of the weight is -- it is proportional to the value of the shortest route.

The other things that are also taken into consideration after they've done the math on the cost is other things that may not be included in the cost calculation that we have, because it is a total project -- sorry, it is a construction cost number that is generated through the AREM. You'll notice in the Alternate Route Evaluation Model there's a cost, and it gives a rank and a value for that. But there are other things that, once you are looking at individual routes, that the engineers start looking at more detailed potential increases in costs, such as geotechnical considerations, that may be more on one route than another. So it is also influenced by the experts, being the engineers in the room. It's not just a simple -- well, it starts off as a simple, as Dave described it, taking the cheapest route and proportionally adjusting it for the other routes, but it's also checked against all of the other concerns those engineers may have about the operations or maintenance of that onwards.

MR. BERRIEN: But still that goes into that 40 per cent weight; isn't that correct?

MR. MATTHEWSON: Yes, that's correct.

MR. BERRIEN: Okay. That's good for me now. I don't want to monopolize this. Thank you very much.

MR. McARDLE: This is Steve McArdle. Dave, I have got a few questions, if we could go through some of the routing process.

I wondered if we could go back towards the routing process, particularly around to the narrowing of the routing process from the 750,000 to the actual ten segments. I wonder if you can give a little bit more of a background in terms of how that process worked? Because when I was reading through the EIS, I noticed there was some methodology that was applied, and I'm wondering if you could give some background around it. Like, you used a shortest route and eliminated anything above 120 per cent. Can you give me some background on that?

MR. BLOCK: Yeah. So the first thing that happened before the workshop was they took the shortest route and looked at eliminating any route that was longer than 120 per cent of the

shortest route. So, various reasons for that, but the one thing I want to say about that is, so they would do that, remove all of those routes and look at what's left. And assuming that didn't get -- like, basically we've done that a few times and that never removes any options. All that really removes is, as James said, you go here and around and back and forth and up and down, we're not going to build that. That's just the way the system works, that's in the system, but we want to get rid of those easily because we are never going to consider building those. So that's why we did that ahead of the route. And again, none of the segments were lost by doing that.

And we also look at the ranks, and none of the top 50 per cent of any of the perspectives are lost. So at that point we're fairly comfortable we are not losing anything by doing that. So we did that there.

So some of the other things we do in the workshop, usually one of the first things we do is look at some pairwise comparisons, you know, two segments that are parallel, maybe one goes up a highway and the other one goes up the mile road, we look at those. And if we can get full

consensus that one is definitely better than the other, if we can get full agreement, we will pull one segment off. And again, the way it works, if you pull one segment off you will lose thousands of routes. So we will do that where there is kind of obvious dichotomies.

Where these are parallel, they are a mile apart, can we all agree? Again, if we do this and one group says, no, we like this segment, and the other three or four say we like this segment, we'll say, okay, we'll keep them both, everything moves on. But if we can agree that one is better than the other, we will pull one off, a bunch of routes drop.

So, usually once we get down to there, we're into the thousands to ten or 15,000 routes at most, and then that's when we move to let's look at the top 10 from each perspective, and let's strategically pick a few routes from each of the categories.

MR. McARDLE: Some of those routes, when you were building, if I am understanding you correctly, you had different start and end points, or maybe the end points were the same, but there were multiple start points, if I understand

correctly, that there was points along the southern route that you were starting from to generate these 750,000, or were they all starting from the same location?

MR. MATTHEWSON: There would have been the three border crossings, so the same start point at the south loop, but three border crossings. So I'm predicting your next question -- the 120 per cent was to each border crossing. Because Gardenton is considered shorter than Piney East, so the 120 percent was on the shortest route to Piney East.

MR. McARDLE: For each one of those border crossings, yes, that's what I thought.

MR. MATTHEWSON: Yes.

MR. McARDLE: Okay. Just another question in terms of the -- okay, when it came to generating the segments of the route, it requires, as you talked about, a lot of expert judgment in that. And I understand that. But was the actual shortest path that was generated from the model runs from Riel to let's say that border crossing, how was that used in the decision process? Were you using that as a guide to actually draw out the segments that you created to straighten out the

line, or was it more the fact that this shortest path between Riel and the border crossing, the alternative macro corridor area, was used as the guidance for that? Do you understand what I mean?

MR. BLOCK: Yes. So the only thing the least cost path gets us is the corridors. We don't then go back and find out what that least cost path route is and tweak it to make a route or a segment.

MR. McARDLE: Yeah. So, as you know, you will get that path, a line going from one --

MR. BLOCK: You can get one line from A to B.

MR. McARDLE: That's right.

MR. BLOCK: Based on the data that's in there, that is the least cost path route.

MR. McARDLE: And the question is, do you use that, to generalize it, do you segment off that?

MR. BLOCK: No, we don't even actually -- I would say we don't even know what it is.

MR. McARDLE: Okay.

MR. BLOCK: That goes into the GIS system, they pop out the corridors. We use the

corridors as our guide.

MR. McARDLE: Okay. Great. I just wanted to ask that.

One of the things around this modeling process is the balance, as I talked about earlier, between running the model in terms of the Delphi process, the hierarchy process, and evaluating the model. You have got your evaluation model process. What I wanted to ask a question about is some of the criteria you used or factors you used to evaluate the model. You mentioned how there was a workshop to discuss in terms of the weightings of it, but in terms of how you determine that certain values are in here, like intactness and various factors, how did you come up with those decisions that got included, and how did you decide not to include others?

MR. MATTHEWSON: Well, we certainly started at the alternate corridor evaluation model and what was important here. So you are going to see that there are nines in this that end up in here. So there was -- what got included was, we started off with this, we looked -- we talked with our discipline experts, so we talked with our biologists, we talked with the public engagement

folks, we talked with the engineers on what parameters are going to help them aid in their decision-making process. So from -- and what is -- so total project costs, so an engineering one, they wanted to know -- so when it comes to ranking, they gave 33 per cent of the rank to total project costs, but also very close behind, a 29 is that index approximating the existing 500. So they felt that cost and reliability were very close in knowing what, when it comes to ranking the lines from their perspective.

So all of the groups were conducted, so different perspectives were discussed with them in another kind of meetings, that came up with what they are and what they felt was the relative importance of those things across. Engineering is an easy one for a bunch of engineers to come up with, what they think is more important or less important than others.

So, if we go into the natural, this would have been informed by just the general information in the stakeholder workshops. The feedback that we got from the First Nations, the Metis, and Indigenous process, that they highly valued that intact wilderness, wildlife habitat

that was on the landscape. So that started to play some value when we started to pick these numbers. We wanted to increase the percentages to represent some of the concerns that we heard from all of the various stakeholders and First Nations and Metis feedback.

And then the designated conservation lands, again, was another really high. Everybody felt that if this place has been designated as a very important conservation area, or designated -- but it still didn't prohibit transmission development, but it was still highly valued, then it got a lot more weight.

There was an equal concern among wetlands and stream crossings.

The other thing that this evaluation model was, it was based on the EPRI, and when they developed the EPRI model, what categories they had in their modeling process too. And ours closely aligned with what the EPRI process had developed, which was a huge multi-year process just to develop the model and what they felt were different stakeholder concerns.

MR. McARDLE: James, thanks. I was more thinking on, and you might have just answered

the question, not so much on the weightings, but why certain factors weren't in there or not included, such as, for instance, soils. How much does the route go over soils, certain classes of soils?

MR. MATTHEWSON: Actually that one was introduced by the public. That was one of the feedbacks that we went -- I believe, we went with agricultural land use, and then when we started having discussions with farmers and agricultural groups about our proximity and our ranking system, they said, well, we really want you to also evaluate the capability of land. It may not be used currently for a high value agriculture, but it has that capability. So they introduced that whole land capability. So that was the result of direct stakeholder feedback on why that one got added into the mix.

MR. SHANTZ: This is Phil Shantz, consultant to the Commission.

So, James, I wanted to follow up on that specific question on those -- the criteria that you just mentioned, the current agricultural use and the land capability for agriculture. I'm not concerned about the weight here, but when you

report on the route statistics, there are some route statistics that are really clear, like proximity, number of houses in the right of way, or proximity calculation. But for those -- there's a certain number of criteria where a numeric value comes out, but it's not clear exactly what that numeric value represents. I'm assuming it is some sort of computed value.

MR. MATTHEWSON: Yeah. So land capability for agriculture, this is explained in --

MR. BLOCK: There should be an appendix with the definitions.

MR. SHANTZ: Okay.

MR. MATTHEWSON: But it has, so land capability, basically there was different values given to different soil classes.

MR. SHANTZ: Right.

MR. MATTHEWSON: So they got a different -- so instead of just measuring how many class 1A soils and how many acres of that, we looked at class 1A and 2, and other classes, and they got a different portion of the weight. So it was more important to them for us to be off class 1 soils, and less important to be on class 2, but

when you start taking a proportion of each one, you can't just add up the acres, that had to be converted into a value.

MR. SHANTZ: Okay. I guess one question that goes I guess back to the very first slide within this component of the presentation, is that you've identified the corridors, and then you started drawing possible routes or possible route segments. So did it largely become a manual exercise at that point, or was least cost path used again at a later point? I'm trying to understand how that --

MR. MATTHEWSON: No, the segments were all drawn through a manual process.

MR. McARDLE: Steve McArdle again.

James, I just wanted to go back to that table again for a second on the route statistics. In that table you have there is reference to the right-of-way. Are all of the values listed in here calculated based on the right-of-way?

MR. MATTHEWSON: Correct.

MR. McARDLE: Okay. It's just that some of them you don't list it, it's just not included, but we should assume that they are all

right-of-way values that are being calculated here. So, intactness is the amount that's in the of right-of-way. Okay.

MR. BLOCK: Yes, length times the width of the -- I think it was an average width based on tower type.

MR. McARDLE: Okay. Great. Thank you.

MR. NEPINAK: Reg, with the Commission.

A question was asked earlier about Aboriginal content in this. And I see under land use on the right-hand side, biggest area there, going down it says hunting, trapping. Is that just non-aboriginal use of hunting and trapping or is that Aboriginal use as well? I was just sitting here gazing and I saw -- just sitting here gazing and I saw this as questions were being asked.

MR. MATTHEWSON: I think we will have to take that one as an IR to know exactly what the right answer is. I would have to dig into what geospatial area we used for that, and I can't remember off the top of my head.

MS. WHELAN ENNS: Gaile Whelan Enns,

Manitoba Wildlands. Just a couple of quick questions.

You made a reference to a specific change in segment because a landowner indicated to you -- I'm going to start again, just in case. So, you made a reference to an instance in change in segment where a private landowner indicated to you that there was Aboriginal or Indigenous use of his lands. I think you mentioned medicinal plants.

MR. MATTHEWSON: Yes.

MS. WHELAN ENNS: Okay. I would like to know whether or not you waited for information in this kind of regard, and that is Indigenous or Aboriginal use, exercise of rights on private land, whether you waited until you heard about it, or whether there was anything in your criteria early on? And I would also like to know whether or not you included in your criteria Aboriginal traditional use of lands, exercise of rights in road allowances?

MR. MATTHEWSON: Okay. We didn't directly assess Aboriginal treaty rights or use of occupied or unoccupied or private land or Crown land, or use of a road allowance, directly in the

modeling of our criteria. Where that information, if there was use of that, it came through in some of the Aboriginal and First Nations and Metis engagement processes where we had discussions with those folks in the field, we had field tours, as well as their traditional knowledge reports that would have illustrated that use. And it would have been taken into account as part of the qualitative decision-making process that the professional made in the workshop. So, it was not measured quantitatively.

MS. WHELAN ENNS: Thank you. Am I on? It is very hard to see. It's a trifocal problem. Thank you for everybody's patience.

The reason for the question, if I may, is because there's a dramatic amount of Indigenous or Aboriginal use of both private land and road allowances in terms of land use and traditional activities and exercise of rights. So thank you, you waited until it came in, I got that. I wanted to --

MR. MATTHEWSON: Actually, just to add to that, we didn't just wait for it to come in. Because we had been conducting routing and transmission projects for the last few years

leading up to this one, we had an understanding of some of those concerns from the start, which influenced even the route segment drawing, all the way back to that, based on our previous experiences.

MS. WHELAN ENNS: Thank you. I have one remaining question and it's about the final preferred route. And that is, which of your 5, SU, SY, TC, UC, UM, is closest to your final route?

MR. MATTHEWSON: I think it is -- I don't know which one is closest to the final preferred route off the top of my head. It would be written in the Environmental Impact Statement. It would be in chapter 5. It would be contained in there.

MS. WHELAN ENNS: I was looking for it on your maps today, so that's why the question.

MR. MATTHEWSON: I'm not sure. Dave, what is the TC, and those ones that you chose there --

MR. BLOCK: The ones that I chose here were just at random. I flipped through, saw this table and plopped it in. That could have been from round 1.

MR. MATTHEWSON: It was preference determination to Gardenton.

MR. BLOCK: So, route TC was to Gardenton, so it would have nothing to do with the preferred route which goes to Piney West.

MS. WHELAN ENNS: Samples only, got it.

MR. BLOCK: Yes.

MR. STOCKWELL: John Stockwell from Dakota Plains. I just needed some clarification. This afternoon's presentation was basically to do with step 5 in the route planning? Is that correct?

MR. MATTHEWSON: No, it was -- sorry, I will go back to the first slide there. It was in the afternoon we covered -- step 3, 4 and 5.

MR. STOCKWELL: Step 3, 4 and 5, okay. Thank you.

Then I have a couple of other questions. You mentioned that in the early stages, I imagine that would be 1, 2 and 3, that the stakeholder workshop, as far as Aboriginal content was concerned, that all came from INAC or AANDC, the experts that you had in the stakeholder workshops?

MR. MATTHEWSON: Yes, there was the technical data holders there, yes.

MR. STOCKWELL: And previous to step 4, was there any First Nation representation in those workshops, other than AANDC?

MR. MATTHEWSON: So the workshop only happened as part of part 2 there in the slide. So the First Nation and Metis engagement process was part 3 all the way through to part 5.

MR. STOCKWELL: But part 3 through?

MR. MATTHEWSON: Yes. It would have been initiated right at part 3. The public engagement and First Nations and Metis engagement was initiated at the exact same time.

MR. STOCKWELL: Okay. Where in this process does conservation, Aboriginal consultation come into the process?

MR. MATTHEWSON: Consultation does not enter into the process.

MR. STOCKWELL: It doesn't enter into it at all?

MR. MATTHEWSON: No. Manitoba Hydro has not delegated consultation.

MR. STOCKWELL: Okay. So, none of the information that's gathered in the parallel

investigations comes into these discussions at all?

MR. MATTHEWSON: Sorry, any of the discussions between an Indigenous community and the Crown?

MR. STOCKWELL: Yes?

MR. MATTHEWSON: Correct, none of that information is shared with Manitoba Hydro.

MR. STOCKWELL: Not at this point but it is eventually?

MR. MATTHEWSON: No, it is never shared.

MR. STOCKWELL: Never, okay.

MR. MATTHEWSON: So our information that we receive is solely received from Manitoba Hydro's First Nation and Metis engagement program.

MR. STOCKWELL: Okay. And you mentioned that there were 13 First Nations involved?

MR. BLOCK: Yes.

MR. STOCKWELL: The slide that you have, did that have the First Nations listed?

MR. MATTHEWSON: No, it did not. It's in the chapter in the EIS.

MR. STOCKWELL: In the EIS?

MR. MATTHEWSON: It is in the EIS, in the public and First Nations engagement chapter.

MR. STOCKWELL: Okay. Thank you. I think that's all.

MR. BEDFORD: James Beddome, SCO. I just had a quick question. You mentioned, sort of the follow-up here on the 13 First Nation communities, as well as the four Aboriginal organizations and the ATK studies done. I'm just curious, out of the other 1500 people that you engaged with, how many of them were individual harvesters or rights users? Like I understand that you just count on the First Nation communities and the Aboriginal organizations to determine information from individual rights users, or in conjunction with those 1500 people were you hearing from individual rights users? Is that clear what I'm asking?

MR. MATTHEWSON: If there was -- certainly through the engagement program there was people that self-identified as individual resource harvesters. But we approached -- our First Nation engagement process is described in that chapter about our approach to engaging with individuals and collectives, Indigenous, First Nations and

Indigenous groups.

MR. BEDDOME: Would you know roughly how many of the 1500 would have self-identified?

MR. MATTHEWSON: No, I do not.

MR. BEDDOME: Okay. There wasn't any approach then to also reach out concomitantly, not only with the First Nations communities directly or the organizations themselves, but with the individuals as well?

MR. MATTHEWSON: Well, as part of the engagement process, we sent out thousands and thousands of postcards and newsletters to everybody in the study area, so they would have been covered by that process.

MR. BEDDOME: Thank you very much.

MR. WHELAN: Good afternoon. Jared Whelan for Peguis First Nation.

I want to go back to, I guess the alternate corridor evaluation modeling. I think I'm correct in saying that there was no data layer for the entire study area of Aboriginal traditional knowledge? I think that's what you guys said?

MR. MATTHEWSON: Correct.

MR. WHELAN: So my question on that

is, if you had a data layer from all First Nations who identified members who use Southeastern Manitoba, would you have put it into the model that early? If you had the data -- you have been clear that if you did not have the data layer that covered the entire study area, you wouldn't use it. But if you had a study area for every First Nation who says they use Southeastern Ontario, wouldn't you have put it into the corridor segment modeling?

MR. MATTHEWSON: Would we have put it in? We certainly would have considered it. I don't know one way or the other whether we would have done it for sure or not, but it certainly would have been considered. An understanding of that information, and I guess I'm envisioning a variety -- a geospatial layer of all of the disparate traditional land use areas. Would that be correct?

MR. WHELAN: Yes. You don't have to go into details, I just want to know if you had a data layer, if you could have used it earlier on in the modeling process?

MR. MATTHEWSON: I think we could have considered it, but --

MR. WHELAN: So this is your chart, alternate corridor evaluation, all your engineering, natural and built criteria? What about the ones that didn't make it on to the list? Is there a description in the EIS about the ones that were dropped and never made it into this evaluation? It's similar to the question that the contractors working for the CEC asked about, the ones that may have been dropped off the alternate route evaluation.

MR. BLOCK: Yes, the same thing applies. If there was a data layer that could be provided, we included it in this model. So the only thing that got dropped was someone made a recommendation to include a certain feature, and either we weren't able to confidently determine we could find that data, or they said they couldn't provide it, then that would have been dropped. Otherwise that feature made it into the model.

MR. WHELAN: So, this is a question about the route development modeling. The question is, the slide earlier, and several people have referred to this slide in terms of the number of Indigenous communities that were engaged with by Manitoba Hydro. I did look at the appendix

that has those First Nations who completed land use studies. I think it was seven communities out of the 13 that you engaged with. Again, all of those First Nations had their own process with Hydro. All of those First Nations submitted their data and studies at various and different times to Manitoba Hydro. But was all of that data that was provided to Hydro under those agreements and those studies in the route development modeling? And if you received something after you ran the first 100 models, and you got information from another First Nation who was later in the process, then you would rerun the models again with the additional data?

MR. MATTHEWSON: So, we didn't rerun models. So, once a model is run and a decision is made, such as a border crossing, if information came later in the process, round 3, if there was a challenge, then we may have considered going back. But it's very hard, once you are in the EPRI methodology, once there is a decision made at a discrete point in time, to go back and re-introduce things, because obviously we have progressed in our engagement process and have new routes and are presenting new information to the

public.

MR. WHELAN: So the following stage after route development is feedback and analysis?

MR. MATTHEWSON: Correct.

MR. WHELAN: And what I'm understanding from your description this afternoon is that when you were doing the feedback analysis in the alternate, or mitigation routes, is that the staff inside of Manitoba Hydro who were working on the engagement programs with Metis First Nations and public brought what they had heard and recorded from I guess going to communities, or going to town halls, and meetings and such, and they brought that into the room?

MR. MATTHEWSON: Yes, that is correct. Unless at that time, in addition to that, if we happen to have a draft TK study, then the results of that draft study would have been incorporated into the decision-making process as well.

MR. WHELAN: Did Manitoba Hydro consider specifically meeting with each individual First Nation they had engagement agreements with and showing them all of the various models, and going through them, instead of relying on the data and whatever you had written in notes from

meetings?

MR. MATTHEWSON: I think the people to best answer that question are First Nation and Metis engagement people. And they currently aren't here to answer that question, so we can take that as an IR.

MR. WHELAN: Okay. Thank you.

MS. WHELAN ENNS: I'm told this is on, sorry.

This is a Manitoba Wildlands question that is an assumption that I realize I have been making, particularly again in terms of the criteria. So, I've been assuming, particularly looking at aquatics -- I'm under natural, aquatics and important features in the wildlife habitat areas -- I have been assuming any information that you had, any data you had, any contributions in terms of specific species and specific locations for specific species, that that data is rolled in and used under these criteria. Am I making an accurate assumption?

MR. BLOCK: Do you have specific criteria you want to discuss or is that just a general --

MS. WHELAN ENNS: I'm asking you

whether I am interpreting what I've heard today and what's on your chart correctly, that when I look at aquatics, and you talk about riparian, flood plains or streams that are fish bearing, okay, or when I'm looking at wildlife habitat and there's specific reference to waterfowl habitat or ungulate habitat, that in your data collection and running the models, that you incorporated any data that you held then about the species that relate to your criteria. Am I correct?

MR. BLOCK: So, I think the question is, I will take ungulate habitat, or we will take, since my background is fish, so I'll answer the fish.

So there was a study done by Dave Mullaney, it is Fisheries and Oceans Canada information, and he classified the majority of streams in Southern Manitoba as either fish bearing, et cetera, et cetera. That was the data set we used. If our fish biologist on the project went and gathered new information, that wouldn't have entered into this model, that would be handled later when we're evaluating the routes. That would come into the professional judgment, when that person is sitting in the workshop they

would say, I know that this data that you used here says this, but I know this. So that's where that would be incorporated.

Same with ungulate habitat, that's a specific dataset that the Province provides and that's what we used for this model. Again, if our wildlife guy went out and collected additional information -- and that's why we do the narrowing, because at this scale we're talking the entire area, we don't collect detailed information on the entire area. By the time we get to the detailed information that you're talking about, we're way past this point. So I think the answer in general would be, no, we don't include site specific information at this stage. This is general province-wide datasets.

MS. WHELAN ENNS: Thank you. Your answer is also what I was assuming, that at this stage the answer is no, but later on you are able to include it. Right?

MR. BLOCK: Later on it is incorporated when -- we are potentially at the route, so when we get to the AREM, again we are refining the datasets. We may have more specific datasets at that point, so then that would either

go into that model and be used to generate those numbers, or at a minimum if it came after that, they would bring that to the workshop. And that's generally what happened is the wildlife guy would say, hey, I was standing on that corner and I know this is great, whatever, it's not captured in the dataset but I know it is there, I was standing there, I don't want you routing here. So he would argue that point. That's probably where that kind of specific data would be used.

MS. WHELAN ENNS: Thank you.

MR. WHELAN: Manitoba Hydro is a corporation, Manitoba Hydro is a Crown corporation. We've just talked about the collection of data by consultants, field biologists, et cetera. Is Manitoba Hydro giving Manitoba Government back data to add to their datasets, say on ungulates or habitat or fish species or endangered species, et cetera?

MR. MATTHEWSON: I'm not sure. It doesn't fall in the scope of the routing methodology. So I think you can ask that through an IR process.

MR. WHELAN: Okay. So you might have the same answer to this: Is Manitoba Hydro going

to make their datasets public, that they used for Southeastern Manitoba for corridors and routing and mitigation?

MR. MATTHEWSON: We can't answer that today. There is certainly data sharing agreements that are in place, that has to be considered.

MR. McARDLE: It's Steve McArdle again. James, I have a really quick question. I just wasn't sure of the definition of this and maybe you could explain. What's this index of proximity to existing 500 kV lines? What kind of calculated value is that? What does that represent?

MR. MATTHEWSON: It's a distance, so there's a couple of variables that are in that -- it is described in the chapter -- so index of proximity to existing 500 kV lines. So it is simply a measurement of how close and for how long a particular route is to an existing 500 kV line.

MR. McARDLE: Is it a category, like a grouping? So if you're in 100 to 200 metres, it's a scaled value going further out? Like it's a preference to be away from the 500kV line; correct?

MR. MATTHEWSON: Yes, correct.

THE CHAIRMAN: I think then we're going to move on to the next section; right?

MS. S. JOHNSON: We're done.

THE CHAIRMAN: Ian and I have obviously been paying very close attention. We agreed that you still had part 5 to do. Okay. Well, then we probably do have time for a few more questions, if there are any. This is -- you're done with your presentation?

MR. MATTHEWSON: Yes, we are.

THE CHAIRMAN: Okay. More questions?

MR. SHANTZ: Phil Shantz again, it might save writing an IR.

All of the questions that Steve and I had with respect to the calculated values, like he just said the indexed proximity to the existing values, and those other, intactness, seasonal construction and maintenance restrictions, I couldn't find those in chapter 5. Are they in a technical data report?

MR. MATTHEWSON: Yes, I guess, sorry, I guess the exact method by which we calculated them is probably not, or is not in the environmental assessment. But if you wanted to give us an IR, we can give you a description and

the calculation on how they were calculated. Like accessibility has to do with the proximity of the route, proposed route to an existing road, and the landscape around and the wetlands, and there's a bunch of factors taken into consideration to model the surface by which the value is calculated.

THE CHAIRMAN: Is that it then? Okay. Well, I guess I would like to start by thanking Manitoba Hydro. This was for me, and I think for all of us, very informative. And every time I look at this it's a little clearer. Some maybe are all the way there, some of us have a little further to go, but it is getting clearer each time we get a chance to look at this and read it. And, of course, having it explained is certainly a great benefit to us. So thank you.

MR. STOCKWELL: Sorry, I had a couple of brief questions. John Stockwell from Dakota Plains.

I just want to go back to this one here, in the zero, or the areas of least preference, at the very bottom you have religious and worship site parcels. Does that include Aboriginal ceremonial grounds?

MR. MATTHEWSON: If we knew of them at

the time.

MR. STOCKWELL: If you knew of them at the time. And your source of that would be from INAC?

MR. MATTHEWSON: Well, the religious worship site parcels came from a variety of sources, as well as a windshield survey where they were driving around looking, okay, there's a church, there is a mosque, because there isn't a real good --

MR. STOCKWELL: There's the Sundance area.

MR. MATTHEWSON: Yeah, Sundance area. If we could visibly see it during windshield survey, it was identified. If it was identified, if we knew of that information prior to the corridor modeling, then we would have incorporated it. Yeah.

MR. STOCKWELL: At that time would you be aware that Aboriginal groups were keeping ceremonial grounds and things like that secret from INAC?

MR. MATTHEWSON: We know that that information is highly protected and held close to Indigenous communities. So, yeah, we did not

expect that any other dataset would have a full or complete source of that information.

MR. STOCKWELL: Okay. So at that time your only source was from INAC, only source of expertise in that area was from INAC?

MR. MATTHEWSON: Yes, at that time, to incorporate that.

MR. STOCKWELL: Thank you.

MR. MATTHEWSON: At that very broad scale level -- and as we moved through the routing and the engagement process with First Nations, if they identified those things, then instantly they became an area of least preference in any future route development.

MR. STOCKWELL: Thank you. Where can we get more details on the actual make-up of the workshops and the --

MR. MATTHEWSON: It is appendix 5C, Dave -- 5B, sorry, has the complete meeting minutes.

MR. STOCKWELL: And I just had a general question. The main process, or the main goal for the establishment of the matrix is to remove personal bias; is that correct?

MR. MATTHEWSON: Yeah, it's to help

reduce the biases and help guide the transmission line route segment designer to follow what a variety of stakeholders have expressed as an area more or less suitable for transmission line development.

MR. STOCKWELL: Okay. Thank you.

MR. BERRIEN: Can I ask one more question? It's Bob Berrien.

MR. MATTHEWSON: Go ahead, Mr. Berrien.

MR. BERRIEN: Thank you. I was looking at the very last pages of chapter 5, which is the route determination section, and there appears to have been five final, and I will call them B series routes, BMX, BWZ, et cetera. The question that I have got is, when I look at the map that is depicted, map 521 I think it is, it's hard to tell whether those are actually fully, I'll call them independent routes, or whether there's a significant overlap, and then the individual route is defined by a sub segment or something like that that differs. Is there some way to understand whether the route is completely independent from top to bottom, or whether there's significant overlap?

MR. MATTHEWSON: Sorry, we don't have that map in front of us, so I can't see exactly what you're looking at, but there likely is overlap. But we can provide some -- we can take that as an IR and give a clearer understanding of that.

MR. BERRIEN: Sure, sure. I just thought you were going to carry on a little further into the route analysis section, chapter 5, but I can get that from an IR. I don't want to hold you up.

MR. MATTHEWSON: The whole analysis side thing, we'll be going into great detail in the hearing process.

MS. S. JOHNSON: It's Shannon Johnson. Just as clarification, if we said we will take that as an IR, the expectation is you will send it to us, not that we have written it down and that we'll answer it. So if we've said we'll take that as an IR, the expectation is that you will put it forward in the round 1 of IRs. So I just wanted to make sure that nobody thought we were providing anything after this.

MR. BERRIEN: There was no question in my mind about the process.

MS. S. JOHNSON: No, no, no. I just wanted to make sure everybody else was good on it. Thank you.

MR. WHELAN: Good afternoon. Jared, for Peguis again.

First of all, thank you to Manitoba Hydro for hosting and putting on the technical workshop, and Cathy for organizing it with you guys. You have probably two or three days at the beginning of the hearing process to explain your entire EA. I'm presuming, because it is a public event, that you are also going to include some explanation of the routing methodologies. Is that correct?

MS. S. JOHNSON: I'm certainly going to chat with Cathy after this, but I think the transcript of this is going to be available. So the idea is to facilitate some of the understanding for the groups here such that when we do the presentation starting the hearing, we probably will not repeat this. We might at a very, very high level go over it, but I think the crux of what we will do will be more of the why and not the what. So this will not be repeated, as to what you are seeing here, as part of the

hearing.

MR. BERRIEN: This is Bob again. Just a quick question in terms of the hearing process, to follow up on that other gentleman's question. Does Manitoba Hydro go through an actual presentation, or is it just, I'll call it, formal, here's our application, we are ready to answer questions. Which of those two formats do you use?

MS. S. JOHNSON: A bit of both. Certainly the EIS is put forward and we will expect that most of the participants will use that for the IRs and understanding the application. But in certain instances we will put forth some presentations to articulate some areas in a bit more detail. But we certainly will not be presenting the entire EIS as part of the hearing.

MR. BERRIEN: Thank you.

THE CHAIRMAN: So once again, thank you, Hydro, and thank you all for attending. We have heard several references today to the IR process, so I would urge you to begin getting those information requests in, including the ones, of course, that were raised today. So thanks all for attending. I believe our next get together of all of the participants will be in the next

pre-hearing, which is likely some time late this winter, early spring. All right. Thank you all.

(Concluded at 2:10 p.m.)

OFFICIAL EXAMINER'S CERTIFICATE

I, CECELIA J. REID, a duly appointed Official Examiner in the Province of Manitoba, do hereby certify the foregoing pages are a true and correct transcript of my Stenotype notes, to the best of my skill and ability, as taken by me at the time and place hereinbefore stated.

Cecelia J. Reid

Official Examiner, Q.B.

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