

MEETING DETAILS	BC Hydro Metro North Transmission Study Anmore Community Information Open House 5:00-8:00 PM – June 23, 2016 Anmore Elementary School (30 Elementary Road)
FACILITATOR	Judy Kirk, Kirk & Co. Consulting Ltd.
PROJECT TEAM ATTENDEES	Antigone Dixon-Warren, Project Manager Judy Dobrowolski, Stakeholder Engagement Helen Liu, Project Engineer Johnson Lee, Stakeholder Engagement (Electromagnetic Fields) Mona Shum, Consultant – Electromagnetic Fields, Aura Health and Safety Caillin Katnich, Meeting Recorder, Kirk & Co. Consulting

KEY THEMES

1. Participants requested that the new transmission line be routed underground, with some participants requesting that the existing transmission lines also be routed underground.
2. Participants expressed concerns about the health effects of electric and magnetic fields emitted from transmission lines.
3. Some participants expressed frustration at the costs of addressing wear and tear on Anmore’s road’s resulting from the increasing number of visitors accessing BC Hydro’s Buntzen Lake Recreation Area, noting that these costs are largely borne by the municipality.

DISCUSSION

The following are notes from the 1-hour question-and-answer session at the Anmore Community Information Open House, held at Anmore Elementary School on June 23, 2016 and attended by approximately 60 people.

The notes have been edited for clarity, however an audio recording of the meeting was taken to ensure accuracy. Abbreviations will be used and mean – Q: Question, A: Answer, C: Comment.

Meeting facilitator Judy Kirk provided an introduction and explained the format of the question and answer session. Judy then asked the four BC Hydro representatives to introduce themselves.

- Q: Mario: How much effort has BC Hydro put into studies regarding the health impacts of electromagnetic fields (EMF)?

- A: Johnson Lee: BC Hydro, as a Crown corporation, relies on the expertise of health authorities – for example, Health Canada and the World Health Organization – and we follow their guidelines regarding EMF. With regard to this study the addition of the new line will actually reduce the overall magnetic field.
- Q: Randy: (To the room) Who would like to see the lines go underground versus overhead?
 - (All attendees raised their hands; approximately 60 people).
- C: Peter: I would like to hear from each of you why the underground option can happen.
 - A: Antigone Dixon-Warren: We did look at the feasibility of undergrounding the line and there are significant technical challenges that would have to be overcome, at a significant cost. We're seeking and requesting feedback at this time.
- Q: Peter: You've told us why it can't happen. I'd like to hear how and why the underground option can happen. What would need to happen for the line to go underground?
 - A: Judy Dobrowolski: We did look at going underground and there are significant technical challenges. We would need to go underground in city streets to connect with the right-of-way further down in Port Moody. We have not pursued this option, as we already have an existing overhead right-of-way, and undergrounding the line would be at a significant additional cost.
- Q: Peter: If it will cost more, how will you raise the funds to pay for that?
 - A: Judy Dobrowolski: Costs for all of our capital projects, including additional infrastructure such as this, are borne by the ratepayers of the province. We are required to go to the BC Utilities Commission, who determines if the costs associated with a project are fair to ratepayers because, as a public utility, we have to ensure the rates are as competitive as they can be for our customers.
- Q: Gordon: What cost studies have you done related to burying these cables in Anmore? What's the estimated cost of going underground?
 - A: Helen Liu: We would have to replace about three kilometres of overhead line. If we went underground, it would be most cost-efficient to use existing city streets. However, the cost would still be much higher at \$35 million, versus \$9 million to go overhead.
- Q: Gordon: Where is the study?
 - A: Helen Liu: The study is summarized on the display board titled 'Underground cable versus overhead line'. The engineering team that I worked with conducted a high-level assessment at this point.
- Q: Gordon: This is an estimate at this point, not a full study?
 - A: Helen Liu: It is an estimate. We're in the study phase. To further refine the study, we'll have to do further engineering work.
- C: Teresa: For years, residents of Anmore have been impacted by BC Hydro and are being impacted here again. Any work overhead will affect trees, soil and plant life and I am opposed to

that; losing trees from 12 to 75 feet to service people in Great Vancouver. I think it's about time you consider that the right-of-way doesn't give you the right to affect peoples' lives in this manner. If you need to go underground in a roadway and it costs \$35 million, I suggest you do it.

- C: Mario: Charge cars who drive through Anmore and park at Buntzen Lake. If BC Hydro charged \$10 per vehicle, they could easily make \$1 million dollars per year to pay for this project.
- C: Randy: Regarding the height of the poles, the existing poles are roughly 39 metres, while the new proposed poles would be 47 metres, which is substantially taller than what we see there right now. Another reason to put them underground.
 - C: Helen Liu: All designs are very conceptual and will be refined as we move along, so the structure height is not something that would be finalized at this point.
- Q: Randy: What if, in an earthquake, one of these super high poles topples and falls on my house and electrocutes my family? What is going to make me sleep better at night to know that a pole is not going to tip over and hit my house?
 - A: Helen Liu: In terms of design, we do design for a very significant seismic event. There's a point in the pole where it's slightly weaker, a collapse point, so if anything were to happen to it, the pole would basically fold in half within the right-of-way. The bottom is designed stronger than the middle point of the pole to prevent it from tipping. Again, that would be an extreme seismic event.
- Q: Nancy: If this is just a study, how can you guarantee that I won't be getting a pole in my yard?
 - A: Helen Liu: Everything is very preliminary because we are in the study phase but one of our design principles is to place any potential new poles as close as possible to existing poles.
- Q: Nancy: You can't guarantee me that there won't be a pole in my yard, can you?
 - A: Helen Liu: As we're in the conceptual phase right now, no we cannot.
- C: Nancy: BC Hydro shouldn't have come to my house to tell me that I won't get a pole if they don't really know yet.
- Q: Henry: There's a study in Denmark titled 'Review on Environmental Health, Vol. 10, No. 3-4, 1994: Assessment of Exposure to EMF in a Danish Case-Control Study of Childhood Cancer, pages 187-195' that proved, if you bury a cable, there's zero risk within 25 metres. The information that you have given to us isn't detailed enough; using seasonal averages, for example. How much does it cost to put the cable underground here? It's well worth the cost. It should be done everywhere in the province, start here.
 - A: Helen Liu: The reason we use seasonal averages is because in the winter, there is more electricity going through the lines, however, the line isn't going to have as big of a sag because of the weather. Sag is the distance from the bottom of the line to the ground that we use to calculate magnetic field. In the summer, when electricity use is

lighter, the lines drop lower. In general, we do an average, which is a very conservative calculation for the overall EMF.

- A: Johnson Lee: BC Hydro relies on the expertise of local and international health authorities, with regard to EMF. Recent studies take into account the studies that are out there on the effects of EMF, and weigh them according to the quality of the study and come to a conclusion. Any time you draw electricity, it will emit magnetic field as a result; it's a byproduct of electricity draw.
- C: Henry: The answer hasn't really been given. This Danish study was done over a number of years – it's well done and hasn't been subject to any real criticism. You should look at this and some of the references they use.
 - C: Mona Shum: I work on exposure and have seen the study you're referring to. We look at the body of evidence as a whole and rely on these health authorities and organizations, such as the World Health Authority and BC Centre for Disease Control. BC Hydro is not a health agency, they don't come up with guidelines, but we can put you in touch with these health agencies to discuss the evidence that you have, for their consideration.
- C: Lynn: The World Health Organization has upped its classification of powerline radiation to possibly carcinogenic and cancer causing to humans. To me, it seems to be a matter of cost. Why not put lines underground like in Burnaby and Vancouver? It's only 1.5 kilometres – that's a very small distance. In a number of places around the world, they're not allowing any new overhead lines anywhere; they're putting new high-voltage lines underground. Certainly there are challenges but, to me, the bottom line is cost. If there's a chance whatsoever of a child getting leukemia or an adult getting cancer – there are lots of studies out there that are indicative of problems – we can't stand to have that in Anmore.
 - C: Mona Shum: Yes, with the International Agency for Research on Cancer, it's a class 2B carcinogen, which is a possible carcinogen. All that's saying is there is some evidence for that association but they don't say anything about how risky it is. When you look at the literature, there's been a decrease over time regarding an association with leukemia, so that evidence is becoming weaker.
- C: Kim: I would like to ask BC Hydro be called to excellence. If there is a reasonable alternative, why would we not take it. When you're looking at this study, consider both sets of poles – the existing and proposed – not just the one that's under consideration. Also, an additional six lines takes up the entire sky for these residents, including myself and my family. There's a very significant visual impact for the residents.
- Q: Mike: My son died 2.5 years ago from leukemia and we are living directly behind the powerlines. My question is about running these lines "hot". Is there any evidence that these

lines do not get run “hot” and would it happen with these new lines if the demand increased in Vancouver?

- A: Helen Liu: The question is whether or not we run to the maximum rating of the current line and potentially the new line. We do have a line rating and in cases of emergency – if one of the lines is down for some reason, there is a possibility of the current going up to a certain limit. It would be difficult to calculate the EMF in a scenario like this because it depends on the time of year that it happens; the lines are generally higher off the ground in the winter and lower to the ground in the summer. If we do run to the maximum line rating, it’s often for a short period of time, which depends on when the peak usage comes and goes throughout the day.
- Q: Mike: Are you currently running these lines “hot” because of the demand in Vancouver?
 - A: Helen Liu: Unless there’s an outage on one of the lines, they shouldn’t be running on their maximum line rating. However, in order to keep up with growing demand and looking at future forecasts, we do need to build an additional line to meet that capacity requirement.
- Q: Teresa: Should there be a decision to put the new line underground, would you remove the existing power lines?
 - A: Helen Liu: If we were to place the line underground in city streets, we would not touch the existing wooden structures. The cost estimate assumes that. The existing lines would have the same power going through them.
- Q: Teresa: I would assume more residents would be affected by alternatives 1 and 3 than there are in alternative 2 in Anmore?
 - A: Helen Liu: Yes.
- C: Teresa: Through the grants that Anmore receives from TransLink and others, maybe the City of Vancouver could assist with this process for the underground cost because it’s servicing the Vancouver area. Put the thing underground, improve our roads, everyone’s happy – we’re happy, you’re happy.
- Q: Nancy: How much does it cost to go underground in Burnaby, per kilometre?
 - A: Helen Liu: Usually, when we build an underground cable, it’s done along a road corridor. One of the reasons for that is the evenness, and the road is already there. That’s why we looked at burying the cable with the roads here because that would be the most technically-feasible option. Overhead and underground terrain requirements are very, very different.
- Q: Nancy: How much per kilometre in the Burnaby section?
 - A: Helen Liu: We don’t have that number right now.
- Q: Mario: How many customers does BC Hydro have in BC?
 - A: Johnson Lee: We have roughly 2 million customers.

- C: Mario: You're willing to spend \$6 billion on the Site C dam, no problem. If you nickle and dime us for this \$25 million, at 2 million people, that's \$25 each.
- Q: Randy: Can you explain how going along the road here would be more technically feasible than going through my yard, where it's just dirt and grass and you could dig a small trench to have the lines go straight through? Has a study been done on the difference?
 - A: Helen Liu: We did do a study. As to a cost estimate, there wasn't one done because we didn't consider this option technically-feasible, due to the rocky terrain, and the fact that we don't have the underground rights there. If we were to go in city streets, we don't require right-of-way.
- Q: John: The existing lines are going to have to be replaced at some point, correct?
 - A: Helen Liu: Yes.
- C: John: The technical aspect doesn't hold a lot of value. To run the whole line underground along the right-of-way, if you amortize it around everyone, the price wouldn't be so significant.
 - C: Helen Liu: We did not look at undergrounding the existing lines, in addition to the new line.
- Q: Greg: In Burnaby and Vancouver, it's mandated that new transmission lines be routed underground. What's the difference here?
 - A: Helen Liu: We don't have capacity left in our overhead right of way in Burnaby and Vancouver, which is why we need to go underground through those municipalities.
- Q: Trisha: How would you get underground right of way in Anmore?
 - A: Antigone Dixon-Warren: We would have to negotiate the rights, with all of the property owners. There are other challenges: the terrain, crossing the creek and building terminal stations. The construction impacts would be very significant.
- C: Trisha: It seems like the wooden structures will need to be replaced anyway, so we should do all of the work at once.
- Q: Peter: The federal government ran on platform of support for infrastructure development. Did BC Hydro go to the federal government to request infrastructure support for going underground in Anmore? Why not?
 - A: Antigone Dixon-Warren: No, we haven't. We're a utility regulated through the BC Utilities Commission and, as a Crown Corporation, infrastructure costs are borne by the ratepayer.
 - A: Judy Dobrowolski: We don't go to the federal government for funding for our projects. All of our project infrastructure costs such as this are borne by us, the ratepayers – BC Hydro customers.

- Q: Henry: Do you use symmetrical phase sequencing?
 - A: Helen Liu: We do. We position the lines to decrease the EMF. The way that we do it is to have current in the lines are changing direction, working like waves to cancel each other. It's only when you have two sets of lines that you're able to create that cancellation effect.
- C: Henry: The World Health Organization's results shouldn't be counted here either. Bury the cables so there's no risk. Have you even done a study to see if there's rock in there? Because it used to be a field all the way down to the base of the mountain. Our lives are more important than the dollars you're talking about here, and we should set a precedent.
 - C: Helen Liu: With the addition of this new line, we are using symmetrical phase sequencing to lower the electric and magnetic field at the edge of the right-of-way.
- Q: Unnamed: If you lived here, would you support an overhead or underground line?
 - A: Helen Liu: If your aim is to lower the magnetic field, for this study I would choose the overhead option. By adding an additional line we're lowering the magnetic field. With the underground option, there is still a magnetic field– it's higher in the middle and it drops off a lot faster, but it doesn't get rid of magnetic field.
- C: Paul: I hope you're listening to everyone in this room. This is a very good turnout for Anmore. I want you to take everything people say here seriously, look at the other option, and consider the overall impact. This is an impact and we want to be good partners with you but we're starting to feel it's a one-way street.

Judy Kirk wrapped up the question-and-answer session and thanked participants for their attendance and their questions, comments, and feedback.