

**This statement adds materials and updates my evidence. My original statement was dated February 7, 2014. The supplementary statement covers the following areas:**

- 1. Site visit to groundwater features in area of Sumac Ridge project**
- 2. Construction of an electrical transmission line along Gray Road**
- 3. Site visit to Wild Turkey Road**
- 4. Review of report by staff of the Ministry of the Environment (MOE) on surface water and the project.**
- 5. Significance of “high aquifer vulnerability.” A report of a previous spill in vicinity of project. Proponent’s resources for spills cleanup operations.**
- 6. Emergency response plan**

#### ITEM ONE – SITE VISIT AND GROUNDWATER FEATURES

##### **Background**

A site visit to two unopened municipal road allowances to be used for the project, Wild Turkey Road and Gray Road, was not possible (both roads were closed by winter snow drifts) at the time of my original statement, dated February 7, 2014.

A site visit on foot, on April 21, 2014, led by Councillor Stauble and two residents, took the route marked on wpd’s Project Location Map (“Route of Site Visit re Water Features”). The visit covered the full length of the unopened road allowances on Gray Road and Wild Turkey Road, 4km in total. A visit was also made to a few other cold water spring outflows on the Moraine.

The proponent had stated in the Sumac Water Report that:

##### *5.5.1 Seepage Areas*

*Groundwater seepages and upwellings are fundamental parts of the water cycle, returning sub-surface water above ground to contribute to the water quantity and quality of local water features. Groundwater seepages are especially important to temperature-and turbidity sensitive species by providing cool, clear water habitat.*

*A comprehensive records review of available resources provided no information relating to specific seepage areas within the project area; however, seepage and/or springs are expected in any area where the coarse-textured surficial deposits meet less permeable deposits, (Chapman and Putnam 1984) as noted earlier. Extensive seepage areas are located outside of the project area to the east and southeast through the Fleetwood Kames system.*

##### **Observations**

Observations included the following:

- Time of day: 9:00 -12:00. Good, sunny weather. Gray Road clear of snow. Snow left on Wild Turkey Road.

- On Gray Road close to Highway 35, some groundwater discharge springs were noted that formed standing pools of water in a woodlot (approx. 1000 sq, m in total water surface area were observed however the actual area of the pools could have been greater due to the limited visibility within the woodlot do to the dense undergrowth). According to Jane Zednik who accompanied me on the walk these pools were permanent water features and even present in years of drought. The pools contained eggs, later identified by a specialist as wood frog eggs.
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- On Gray Road, close to Highway 35, two seeps formed pools, one larger than the other. Both are permanent water features and present in years of drought. (Information from Jane Zednik who has documented these seeps at periodic intervals since 2012.) The seeps were not identified in the wpd Water Report
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- Approximately one kilometre further east, additional spring discharges were noted on the hillside and at the base of the hill on the south side . The water flowed northwards across the road, created further pools of standing water and into adjacent woodlands to the north. The spring had been identified as a “seep” in the wpd Water Report.
- The geodetic altitude of Gray Road is at 313m at the intersection with Highway 35 and along the first kilometre of the Road. This is well below the geodetic elevation of the grade at the proposed turbine sites which are as follows: T1 370m; T2 380m; T3 370m; T4 360m; T5 350m.
- The outflow of water and the presence of ponding as noted suggest the water table is at or near the surface in sections of Gray Road. The cold water spring on the south side can be explained as an outflow of cold water from groundwater aquifers in the area. (See paras. 7 and 8 in statement of February 7, 2014.) In the case of Gray Road, these discharges are slightly outside the formal limit of the Moraine.
- I am not aware of any report by the proponent on geodetically measured water table levels along the route proposed as a transmission corridor. Accurate water table elevations are needed in this area in order to relate the noted discharge springs to the aquifers in the moraine complex and whether or not there will be an impact to these areas from the proposed turbines.
- Two further hillside springs were observed on the Moraine, at the south-east and south-west corners of the junction of Pit Road and Highway 7A (Project Location Map). Residents have reported several other springs in the area. The observed springs were at a lower altitude than the estimated grades at the proposed turbines. The properties where the springs appeared to emanate from were owned by Warren Preston and Darryl Irwin according to Jane Zednik.
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- Walking east along the Gray Road road allowance, the woodlands to the north of the hillside spring (on the south side) appeared to be wetlands. Water flowed across the road into the woodlands (below the level of the road) and ran northwards along a watercourse, approximately one foot in depth. There appeared to be a good growth of flora in this area likely as a result of the water flow. It is not noted as wetland in wpd's reports (See Sumac Water Report, Figure 1). I am informed that the spring flows permanently and that the wetlands are permanent feature within the woodlands as a result of the water recharge in this area. This wetland is to the east of the wetlands marked on wpd's Project Location Map.
- The water table is high and close to the surface along the first two kilometres of Gray Road that was walked. Excavation and filling activity for buried electrical transmission or even creating holes for transmission poles could have a serious and irreversible impact on the shallow groundwater flow, natural seeps, and recharge to the wetlands and woodlands.
- Based on the approval holder's Construction Report, the outflow of water from the spring is proposed to be re-routed via a culvert. Where is not stated. Re-routing flows may affect the natural recharge pattern to the wetlands and woodlands causing an impact to them and to the muddy road that provides habitat for amphibians.
- The water from the spring ultimately discharges into the Pigeon River, a trout-bearing stream. Proposed road work and construction along 1.75 km of Gray Road for a transmission line may affect the water quality in the stream. For instance suspended solids and turbidity could rise as a result of sediment displacement from construction activities getting into the water. If this were the case then the woodlands and wetlands which receive the water would be impacted
- Two other Pigeon River tributaries flow each side of Gray Road and meet near Highway 35 (Project Location Map). Road work, as a result of necessary widening, filling and compacting to provide truck access to Gray Road, may impact these tributaries and the trout populations in Pigeon River streams as the fish are susceptible to subtle changes in water quality. This issue was raised but not answered by the MOE's surface water expert, Bruce Metcalfe (see comments on his report below).
- In order to turn the Gray Road laneway into a transmission corridor, the proponent proposes to fill in the groundwater seeps (which discharge into the laneway near Highway 35), to widen the laneway for access. The road bed will be levelled and compacted to form a permanent access road. The seeps will be destroyed and potential recharge to surface water may be diverted or changed. No plan has been provided for preserving the water features (that I know of) or for protecting habitat that has relied on this water feature.
- Compacting the road surface - to allow snow clearing and entry in winter - will require drainage ditches as well as sanding and or de-icing chemicals. The resulting water flow will

need to be directed. No information has been provided on how this will be directed and what the consequences could be and or what the contingencies would be.

## ITEM TWO – CONSTRUCTION OF A TRANSMISSION CORRIDOR

- According to wpd's application to the OEB to use Gray Road as a transmission corridor, hedgerow and tree destruction will be necessary to clear 1.75 km of the laneway (from Project Location Map) for a transmission corridor. Excavations will be required along the full length of the cleared portion to erect Hydro poles (or a similar transmission system). See image "Telecom Road Hydro Pole Replacement."
- Any excavations along an unopened road allowance with a shallow water table means that some bore holes will fill with water. The proponent has repeatedly stated that no water taking permits will be required. The need for dewatering bore holes on Gray Road and trenches leading from the road should have been determined in advance of any approval (at the application stage) and have included MOE involvement.
- A Geotechnical Report carried out by Terraprobe Inc. (March 2012) was briefly reviewed. The report showed no subsurface investigations along Gray Road where the transmission line is to be constructed. Therefore there is little known about sensitive zones, shallow groundwater flow , water table etc. in this area
- Bore holes (or trenches to be used for certain sections of the transmission system) are back-filled. Boring and filling can re-direct groundwater flow vertically. Potential groundwater impacts have not been reported for Gray Road by the proponent or for any other part of the project. A groundwater monitoring plan should have been put in place and incorporated into a dewatering plan for Gray Road and for any other parts of the project in wetland areas where there would be potential groundwater discharge re-routing or takings (such as might be associated with the construction of Turbine 1).
- If poles are erected in a shallow saturated groundwater zone, boring to the required depth can cause hydraulic connection to another permeable zone or buried aquifer. This would have the effect of linking the two. Depending on hydraulic characteristics (i.e. upward or downward), flow discharge can be reduced i.e shallow groundwater or surface water is introduced to a deeper depth in the system and cutoff from recharging a wetland area, or flow of a different chemistry may be introduced in the wetland area from a deeper aquifer disrupting the natural chemistry of the surface water regime. Either scenario could have deleterious impacts to the wetland area.
- In my opinion, specification sheets for the transmission corridor should have been provided at an early stage for the Sumac project by the proponent's contractor on the depth of excavation, quantity of backfill, with a cross-section or schematic showing how the base of

the pole will be stabilized and what materials will be used for backfill. (Have added this because they have provided some drawings now in a recent disclosure but may not be what you think was needed and we don't want to get into this)

### ITEM THREE – SITE VISIT TO WILD TURKEY ROAD

- The April 21 walk followed a steep climb along a narrow track at the east end of Gray Road and a descent to the junction at the north end of Wild Turkey Road. The visit continued south along Wild Turkey Road.
- The sites of proposed turbines 2, 5, and 4 were observed from the road. The site for turbine 2 was at a distance on a high ridge to the west. Turbine 5 was about 60m east of Wild Turkey Road. I was told there is a piezometer marking the site of the base of Turbine 5.
- It was evident from the road that a significantly steep slope occurs at the site for Turbine 5. This is consistent with a valley leading down to the river of the Fleetwood Creek Conservation Area. (See Slopes Map) The existence of steep slopes at a turbine site requiring a 4.6m by 18m foundation (twice as deep as for other sites in the project) and other excavations at the edge of a valley, raise serious issues. There is the danger of an unstable slope face, given the sandy soils of the Moraine. In addition there are concerns about stormwater run-off from the construction site resulting in pollution of the trout-bearing Fleetwood Creek.
- Two streambeds termed FCH(A) and FCH(B) by the proponents, run across the T5 site and could be seen from the road. These carry water east and downhill into Fleetwood Creek. In addition, a culvert under Wild Turkey Road conveys water flowing in FCH(B). Again there is a concern and potential impact from pollution of these streambeds from widening and other major road works on Wild Turkey Road. The area is designated High Aquifer Vulnerability.
- The site for Turbine 4 could be seen on farmland to the west of Wild Turkey Road. The entrance to the valley of the Fleetwood Creek Conservation Area was at the end of the walk, along a turning to the east of Wild Turkey Road that is a non-maintained portion of Ballyduff Road.
- It must be pointed out that compacting ground throughout the project area for roads, access routes, laydown areas, storage areas and so forth, will reduce water infiltration to the Moraine. While specific sites for turbines may be relatively small, larger compacted areas of roads, access routes, and laydown areas will **not return to normal** once the project is built. Infiltration on the Moraine and as a consequence, the outflows of water through streams, springs, and seeps will be permanently affected.

#### ITEM FOUR THE MOE'S "WATER REVIEW REPORT"

Report title: REA Application - Sumac Ridge Wind Project Water Report

(See *MOE Water Review B.Metcalf*, dated 24 September, 2013, disclosed by MOE on January 17, 2014.)

I have reviewed this desktop report. The topic was surface water issues. In practice the report raises significant groundwater issues. The conclusion calls for reappraisal of groundwater issues by "an MOE Regional Hydrogeologist." There is no evidence this was done.

1. On nearby trout streams, as referred to in the Site Visit section of my report (above), the water report comments: *Both the Pigeon River and Fleetwood Creek support "cold-water" habitat fisheries via relatively constant supplies of groundwater fed by the coarse-textured deposits within the **Oak Ridge Moraine** complex* (p.1)

2. *The presence of brook trout at relatively high densities just down slope in Fleetwood Creek, indicates prevalent groundwater discharge nearby, which may be fed through infiltration in this area of the Oak Ridges Moraine. The project site is within an area identified by MNR as "High Aquifer Vulnerability." Therefore, these areas are important to maintaining groundwater quality and quantity, which is essential to brook trout survival in the recipient surface watercourses* (p.7)

3. The reviewer noted in the conclusions (p.8)

*No formal stormwater management plan has been provided or referred to in the report for the proposed project and this should be provided by the applicant.*

4. And added:

*The applicant has stated that construction activities types of impact can be fully mitigated (ref. Section 9, Water Report and EIS). Current construction best management practices (BMPs) are required to be adhered to by the applicant for the purpose of protecting the water quality of the area susceptible water quality regime. These mitigations and BMPs must be put in place as necessary and confirmed to be functioning as required well before the project construction activities commence.*

Best Management Practices and required mitigations should be in place "well before construction activities commence." As well, a Stormwater Management Plan should be developed and provided for review.

5. Groundwater issues re water takings, previously raised above, are repeated in the MOE reviewer's report. The MOE reviewer stated:

*There was no mention by the applicant made relative to groundwater takings associated with the construction activities associated with the project. This potential groundwater taking should be verified/confirmed prior to the commencement of construction activities (e.g. , construction, excavations of footings, pads etc.)* (p. 8)

6. The reviewer also stated:

*The proposed project is located in the Oakridges Moraine and there have been a number of groundwater/hydrogeological concerns that have been identified by the applicant*

*associated with the project construction. The reviewer recommends the proposed project should be reviewed by an MOE Regional Hydrogeologist to address any potential groundwater impact concerns associated with the project construction activities.*

In summary the MOE reviewer sees serious concerns with the project that need to be addressed. Those issues are as follows:

- There are issues with run-off and pollution of the multiple cold water trout streams near to the project.
- There was and is no Stormwater Management Plan and no indication of how stormflow will be dealt with on the Moraine
- There has been no review by an MOE Regional Hydrogeologist

#### ITEM FIVE – AQUIFER VULNERABILITY

##### **The significance of “high aquifer vulnerability;” evidence from a previous spill in vicinity of project; and the proponent’s resources for spills cleanup operations**

My statement of February 7 raised the issue of spills on the Moraine - on sandy soils where spills are rapidly absorbed. Materials on the Moraine frequently refer to areas of “high” and “low aquifer vulnerability.” These are discussed in the Ontario guide to Moraine vulnerability mapping as follows: (“Oak Ridges Moraine Aquifer Vulnerability Mapping - Accompanying Document to the Reference Map for Ontario Regulation 140/02, March 2004”)

“An understanding of regional groundwater conditions and their inherent vulnerability to contamination is critical to maintaining ecological and sustainable use functions. Aquifer vulnerability mapping is a tool that can be used to protect groundwater resources and their ultimate use. Aquifer vulnerability maps identify areas where contamination of surface water is more or less likely to result in the contamination of groundwater.....

It is anticipated that land managers, municipal planners, and facility owners and operators will be able to use the maps showing the areas of high and low vulnerability at specific locations.”

The facts, summarized in my first statement at paragraphs 15 and 16, are that the City of Kawartha Lakes is deeply concerned about the possibility of spills on the Moraine. The Municipality’s position is set out in paragraphs 17 to 30.

A spill occurred in the 1970s very near to the Sumac Ridge location, at the junction of Gray Road and Wild Turkey Road. Evidence from the owner of the property is attached. (Margaret Everding statement.)

The moraine is a complicated grouping of different permeability sediments and as such groundwater and spills can migrate in ways which are not fully understood without detailed site hydrogeological information. How spills ultimately migrate and discharge will affect their

impact on the environment . Therefore potential impacts cannot be properly assessed until these detailed investigations are undertaken.

Spills on the Moraine will occur from machinery and equipment, or from turbines, or from transformers at the base of each turbine. The figures for the quantities of oils in a Repower MM92 model turbine are large. A published list for the model gives a figure of over 500 litres of oil in the gearbox and hydraulic system. (See Lubricants and Oils in Single Repower MM92). The exact content of the oils and lubricants is proprietary. The City does not know how hazardous the materials are and we have not been informed how often the oils and lubricants have to be changed.

If a spill occurred, the proponent states that they would rely on “spills clean-up” equipment. The content of a “spills clean-up kit” has not been disclosed by wpd. Therefore the proponent has not addressed how they would specifically remediate a spill without causing significant harm to the environment. The Sumac Ridge project will be remotely monitored. The reaction time to a spill is not known.

#### ITEM SIX – AN EMERGENCY RESPONSE PLAN

In response to the Tribunal’s Order dated October 22 which stated that the content of an Emergency Response Plan was relevant and should be disclosed, the proponent responded: *“Have not yet completed such a plan as they are to be completed prior to construction.”* This is not a responsible approach to what the City of Kawartha Lakes regards as a very serious issue.

Signed

Date