North Kent Wind 1

Well Interference Protocol

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Revision History

Revision #	Date	Revised By:	Revision Description
1	2/7/2017	AECOM	MOECC review

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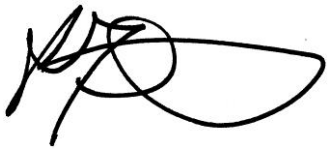
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1. Introduction

1.1 Project Description

North Kent Wind 1 LP (North Kent Wind 1), a joint venture limited partnership owned by affiliates of Pattern Renewable Holdings Canada ULC (Pattern Development) and Samsung Renewable Energy Inc. (Samsung Renewable Energy), is constructing a Class 4 wind facility called the North Kent Wind 1 Project (the "Project") in the Municipality of Chatham-Kent, Ontario. The Project will be located on both public and private lands and is generally bounded by Oldfield Line to the north, Bear Line road to the west, Pioneer Line and Pine Line/Darrell Line to the south and Centre Side road and Caledonia Road to the east (**Figure 1**).

The Project will use wind to generate energy through the use of commercial wind turbine technology capable of producing up to 100 MW. Approximately 45 turbine locations are currently being assessed for the Project. The total number of turbines will depend on the nominal rating of each turbine. To facilitate the construction of the proposed Project, a number of permanent and temporary construction components are required, which include:

- Wind Turbine Generators;
- Pad-mounted Transformers;
- Wind Turbine Access Roads;
- Collector Lines;
- Collector Substation;
- Microwave Tower;
- Meteorological Towers;
- Interconnection Station;
- Operation and Maintenance Building; and
- Temporary Crane Pads and Construction Staging Area

1.2 Project Boundary

This *Protocol for Management and Resolution of Claims Related to Private Well Interference* is to be followed for any wells or well water from an owner of an active water well (i) within the Project Study Area; or (ii) outside of the Project Study area and located within 1 km from each individual Equipment and meteorological tower, the microwave tower, and the operations & maintenance building, referred herein as the Project Boundary (**Figure 1)**.

2. Purpose

In accordance with the Environmental Protection Act (Section 47.4), Renewable Energy Approval (REA) No. 5272-A9FHRL was received for the Project from the Ministry of Environment and Climate Change (MOECC) on June 29, 2016. Pursuant to Condition G7 of the REA, a Project specific contingency plan detailing the procedure and protocol to manage private well interference claims due to construction, operation and decommissioning of the Project is required. The contingency plan shall at a minimum include a sequence of remedial measures to be undertaken by North Kent Wind 1 to resolve any impacts to wells or well water resulting from the construction, operation or decommissioning of the Project.

The following is an excerpt from the REA that provides general conditions for well interference:

G5. Should the Company receive a complaint about wells or well water from an owner of an active water well (i) within the Project Study Area; or (ii) outside of the Project Study area and located within 1 km from each individual Equipment and meteorological tower, the microwave tower, and the operations & maintenance building, the Company shall retain a qualified expert (P.Eng or P.Geo) to immediately undertake the following:

- *(1) collect a water well sample at the complainant's water well, prior to any treatment systems ("raw"), after allowing the distribution system to flow for approximately 5 minutes and submit the water sample to a qualified laboratory for an analysis of the general chemistry suite of water quality parameters identified in Condition G3;*
- *(2) compare the results of the analysis of the water sample noted in Condition G5(1) to the pre-construction water sampling analysis results noted in Condition G3 for the subject well (if a pre-construction water sample at the subject well was taken); and*
- *(3) Provide a detailed written opinion as to whether the water sampling analysis results demonstrate that the construction, operation or decommissioning of the Facility caused or may have caused an adverse effect to the well's water supply.*

G6. Pursuant to Condition G5(3), if the qualified expert (P.Eng or P.Geo) determines that the construction, operation or decommissioning of the Facility caused or may have caused an adverse effect to a complainant's well or well water, the Company shall undertake the following measures, at the Company's expense:

- *(1) immediately provide an adequate quantity of bottled water to the impacted party until such time that the issue has been resolved;*
- *(2) immediately retain a qualified expert (P.Eng or P.Geo) to investigate and provide an opinion regarding the specific cause of the impact to the well or well water. The qualified expert shall consider the results of the ground-borne vibration monitoring described in Condition H1 in developing his/her opinion; and*
- *(3) immediately implement the contingency plan described in Condition G7.*

G7. Prior to the commencement of the construction of the Facility, the Company shall retain a qualified expert (P.Eng. or P.Geo.) to establish a contingency plan. The contingency plan shall, at a minimum, include a sequence of remedial measures to be undertaken by the Company, at the Company's expense, to resolve any impacts to wells or well water resulting from the construction, operation, or decommissioning of the Facility.

G8. The Company shall notify the District Manager, in writing, within one (1) business day of receiving a complaint pursuant to Condition G5. The written notification shall include a description of actions to be undertaken by the Company to resolve the complaint received.

G9. The Company shall create written records of all pre-construction water sampling activities and analyses of results undertaken in accordance with Conditions G1 to G3, all complaints received pursuant to Condition G5, and all investigative and remedial actions undertaken in accordance with Conditions G5 to G7 to resolve complaints regarding wells or well water. The Company shall retain these records for the life of the Facility, and shall make them available for inspection by the Ministry, upon request.

G10. The Company shall consult with and follow any directions provided by the Director and/or District Manager in respect of measures to be implemented by the Company to investigate and resolve public complaints received by the Ministry or the Company regarding potential impacts of the construction, operation or decommissioning of the Facility to wells or well water.

North Kent Wind 1 is responsible to ensure all well interference confirmed to be caused by construction, operation or decommissioning of the Facility within the defined Project boundaries is fairly and consistently remedied. This document has been prepared to provide a Project procedure and protocol to manage private well interference claims within the defined project area due to construction, operation and decommissioning of the Project.

3. Well Complaint Process and Remediation Procedure

The following well complaint process and remediation procedure was developed to ensure that property owners within the Project Boundary are not deprived of a potable supply of water as a result of Project activities. The Well Complaint Process and Remediation Procedure is summarized in the following sections below.

3.1 Notification Protocol

Property owners within the defined Project Boundary have been instructed to contact North Kent Wind 1 LP should they have questions or complaints regarding the Project at the following Primary Contact:

North Kent Wind 1 LP
c/o Samsung Renewable Energy Inc.
2050 Derry Road West 2nd Floor
Mississauga, ON L5N 0B9

Phone: Toll Free: (855) 780-3859
Email: *info@northkentwind.com*

The above phone and email address shall be monitored during regular business hours (Monday to Friday, 8:00 am to 5:00 pm).

In the event a complaint is received, the following procedure shall be implemented in a timely manner:

1. Upon receipt of a well complaint, either via a phone call to the Primary Contact, or in person to a staff member in the field, all information is to be collected in accordance with the *Complaint Response Procedure for Phone Calls* (**Form A**, **Attachment 1**).
2. North Kent Wind 1 shall retain a qualified expert (P.Geo or P.Eng) within two (2) business days of receiving a well complaint to complete an investigation in accordance with the *Well Complaint Procedure for Site Investigation* (**Form B**, **Attachment 2**).
3. North Kent Wind 1 shall notify the MOECC District Manager, in writing, within one (1) business day of receiving a complaint. The written notification shall include a description of actions to be undertaken by the Company to resolve the complaint received.

3.2 Well Complaint Response Procedure

The reactive well mitigation procedure shall be implemented for any well complaints that may arise within the Project Boundary during construction, operation and decommissioning of the Project. All property owners with active water wells within the Project Boundary and who report well issues (quality and/or quantity impacts) will be included in the following well complaint response sequence:

- A well complaint investigation will be conducted as per the *Well Complaint Procedure for Site Investigation* (**Form B**, **Attachment 2**) and a qualified expert (P.Geo or P.Eng) will undertake and/or oversee the following:

    1. collect a water well sample at the complainant's water well, prior to any treatment systems ("raw"), after allowing the distribution system to flow for approximately 5 minutes and submit the water sample to a qualified laboratory for an analysis of the general chemistry suite of water quality parameters, including the following:

        - Escherichia coli
        - Total Coliforms
        - Electrical Conductivity
        - pH
        - Total Hardness (as CaCO3)
        - Total Dissolved Solids
        - Total Suspended Solids
        - Alkalinity (as CaCO3)
        - Fluoride
        - Chloride
        - Nitrate as N
        - Nitrite as N
        - Bromide
        - Sulphate
        - Ammonia as N
        - Dissolved Organic Carbon
        - Turbidity
        - Calcium
        - Magnesium
        - Sodium
        - Potassium
        - Iron
        - Manganese
        - Colour

    2. compare the results of the analysis of the water sample to the pre-construction water sampling analysis results for the subject well (if a pre-construction water sample at the subject well was taken);

    3. investigate and provide a professional opinion regarding the claimed impact to the well or well water. The qualified expert shall consider the results of the ground-borne vibration monitoring described in Condition H1 in developing his/her opinion; and

    4. Provide a detailed written opinion as to whether the water sampling analysis results demonstrate that the construction, operation or decommissioning of the Facility caused or may have caused an adverse effect to the well's water supply.

- If the well issue is confirmed to be a result of Project activities, North Kent Wind 1 will provide a letter to the property owner explaining the outcome of the well investigation and detail the recommended remediation measures for the property owner's approval. A temporary water supply will be provided within 24-hours of receiving the recommendation and sustained for the duration of the proceeding remediation measures.

- If the well issue is found not to be a result of Project activities, North Kent Wind 1 will provide a letter to the property owner explaining the outcome of the well investigation and the rationale for the decision.

3.3 Remediation Procedure

In the event a well complaint is confirmed to be a result of Project activities, the recommended remediation measures will be implemented in a timely manner at the expense of North Kent Wind 1. The temporary water supply will be provided directly to the affected property and will be sustained at the expense of North Kent Wind 1 until the remediation efforts return the property owners water supply to a condition similar (or better than) baseline conditions. If the property owner did not participate in the pre-construction sampling program, and baseline conditions are unknown, the remediation measures shall provide the property owner with a water supply that meets Ontario Drinking Water Standards (ODWS) for those general chemical parameters listed in Condition G3 of the REA.

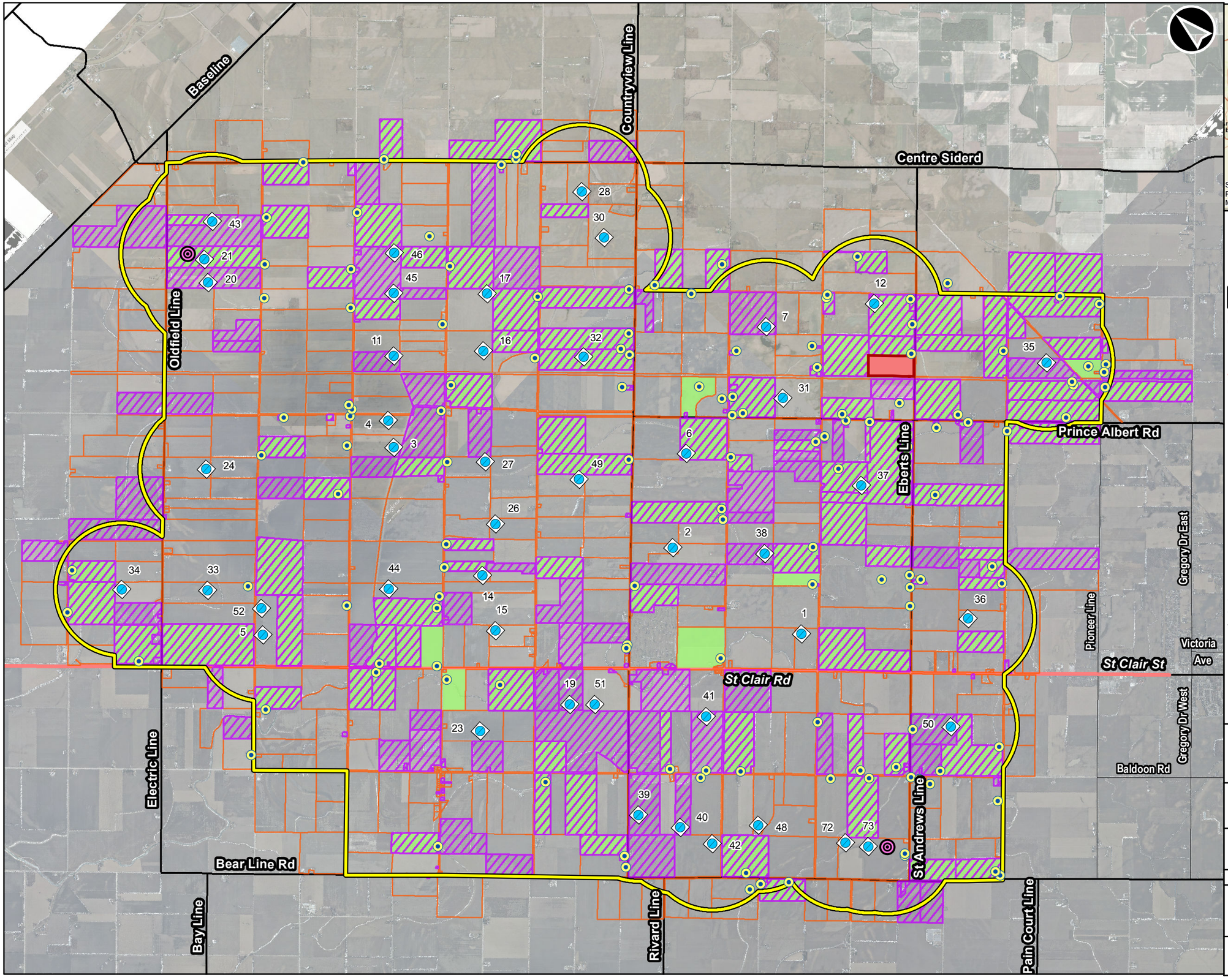
Remedial option will be evaluated by a qualified expert (P.Geo or P.Eng) with consultation with North Kent Wind 1, and will be dependent on the type of complaint received and private well and Project-specific information available

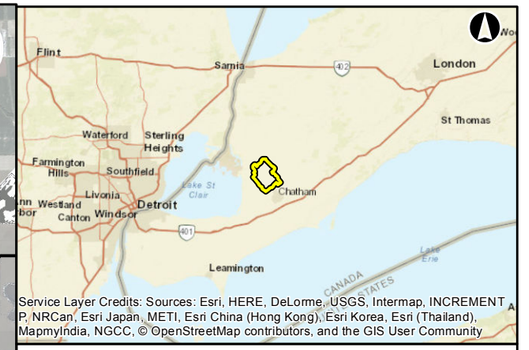
at the time of the well complaint investigation. Remedial measures that may be implemented could include one or a combination of the following:

- Lowering / replacement of the pump inlet within the property's existing well;
- Well and/or well system flushing / rehabilitation (chemical and/or mechanical methods) conducted by an MOECC licenced water well contractor;
- Installation of a well water treatment system by a licenced contractor;
- Construction of a new drilled well by a licenced well contractor; or
- Connection to a local watermain (where feasible).

3.4 Monitoring

Subsequent to the implementation of remediation measures, a follow-up water well sample shall be collected at the complainant's water well, both prior to any treatment systems ("raw") and after the installed treatment system ("treated"), if present, after allowing the distribution system to flow for approximately 5 minutes. The water sample will be submitted to a CALA-accredited environmental analytical laboratory for an analysis of the general chemistry suite of water quality parameters identified in Condition G3 of the REA and listed herein as part of Section 3.2(1). The results of the analysis of the water sample shall be compared to the pre-construction water sampling analysis results for the subject well, if a pre-construction water sample at the subject well was taken. North Kent Wind 1 will prepare a written record documenting the results of the well complaint investigation, remediation measures implemented and the results of the post-remediation monitoring. These records shall be retained for the life of the Facility, and will be made available for inspection by the MOECC upon request.





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Legend

- Turbine
- Meteorological Tower
- Project Boundary
- Substation/O&M Building

Roads

- Highway
- Arterial
- Collector

Well Survey Response*

- Well Survey Form Recieved
- Participants in Baseline Detailed Well Sampling Program
- Property Parcel Limit Included in Baseline Well Survey
- Private Water Wells Where a Water Quality Sample was Obtained**

*Well survey responses current as of Februrary 3, 2017.
**Location of private water wells on properties not participating in the Baseline Well Survey are not shown.

0 0.5 1 2 3 4
Kilometres

North Kent Wind 1

Baseline Water Well
Survey / Assessment Participation

Feb 2017	1:55,000 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: AECOM, MNRF
P#: 60339893	V#:	

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Figure: 1

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Date Saved: 2/6/2017 11:16:34 AM User Name: michael.vc.collins

Attachment 1

Form A: Complaint Response Procedure for Phone Calls

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Office Use Only

Property Identification Number:

Form A: Complaint Response Procedure for Phone Calls

Date: _____ **Time:** _____

Name of Employee Receiving Call/Complaint: _____

Contact Information

"Please Confirm you contact Information"	**Name:**	
	Address:	
	Phone Number (Home):	
	Phone Number (Other):	
	Email:	

Problem/Complaint

"Please explain the type of problem you are having."	
"When did you first notice the problem?" (Date & Time):	
"Is the problem still occurring?"	
"Do you have an alternate source of potable water (i.e., municipal water)?"	
"Would you like someone to come look at your well?"	
"Would you like someone to provide you with a temporary supply of water?" If yes, request to refrain from using the well to avoid possible plumbing and/or equipment issues.	

Next Steps: Communication Protocol

1. Upon receipt of a well complaint, either via a phone call to the Primary Contact, or in person to a staff member in the field, all information is to be collected in accordance with the *Complaint Response Procedure for Phone Calls* (**Form A**, **Attachment 1**).
2. North Kent Wind 1 shall retain a qualified expert (P.Geo or P.Eng) within two (2) business day of receiving a well complaint to complete an investigation in accordance with the *Well Complaint Procedure for Site Investigation* (**Form B**, **Attachment 2**).
3. North Kent Wind 1 shall notify the MOECC District Manager, in writing, within one (1) business day of receiving a complaint. The written notification shall include a description of actions to be undertaken by the Company to resolve the complaint received.

Attachment 2

Form B: Well Complaint Procedure for Site Investigation

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Office Use Only

Property Identification Number:

Form B: Well Complaint Procedure for Site Investigation

Date: _____ **Time:** _____

Name of Investigator(s): _____

Property Address: _____ **PIN:** _____

Name of Property Owner Present: _____

Problem/Complaint Interview

"Please explain the type of problem you are having."	
"What do you think is the cause?"	
"When did you first notice the problem?" (Date & Time):	
"Is the problem still occurring?"	
"Do you have an alternate source of potable water (i.e municipal water)?"	
"Were you provided a temporary supply of potable water?"	
"Did you participate in the Detailed Well Assessment program prior to construction?"	

Well Condition Assessment

Well Location (GPS): _____ N / _____ E _____ Elev.

Well Type (Drilled/Dug): _____ **Well Diameter:** _____

Well Complies with Reg. 903 (Y/N): _____ **If no, Why?:** _____

Well Stick up (m): _____ **Well Construction Details:** _____

Sampling Location: _____

Water Level (mBTOP): _____

Water Quality Sampling

Located Water Tap for Sampling Prior to Filtration (filter, UV filter, water softener, etc.)	☐
Record and Photograph Sampling Location	☐
Clean Nitrile Gloves Used During Sample Collection and Handling	☐
Removed Tap Attachments (screens, aerators, etc.)	☐
Disinfect Faucet for 15 seconds by Submerging in Disinfection Solution	☐
Allow Cold Water Tap to Run for More Than 5 Minutes	☐
Label Sample Bottles with PIN and Property Address, Project Number, Date, and Time of Sampling	☐
Bottle NOT overfilled or Preservative Spilled	☐
Bottle Cap NOT Touched or Placed on Ground	☐
Samples Packed in Cooler with Ice	☐
Field Parameters Recorded (pH, TDS, Turbidity, Temperature, Conductivity)	☐
Photograph of Sample Water from Clear Container	☐
Chain of Custody Record Completed	☐
Samples to Licensed Lab within 24-hours	☐

Field Parameter Record

pH: _____ **Temperature:** _____

TDS: _____ **Turbidity:** _____

Conductivity: _____ **Colour:** _____

Clarity: _____ **Sample Duplicate :** _____

Comments:

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