

# APPENDIX C

Groundwater and Surface Water Monitoring Plan and Approvals



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June 13, 2014  
File: 160900764

**Attention: Mr. Paul Dalmazzi**

HydroOne  
Environmental Engineering and Project Support  
483 Bay Street, 6<sup>th</sup> Floor, South Tower  
Toronto, ON M5G 2P5

Dear Mr. Dalmazzi,

**Reference: Groundwater and Surface Water Monitoring Program, Clarington Transformer Station**

Stantec Consulting Ltd. (Stantec) is pleased to submit to Hydro One Networks Inc. (Hydro One) our Groundwater and Surface Water Monitoring Program for the Clarington Transformer Station. The transformer station is to be located on Hydro One property ('Project Area') located in the Regional Municipality of Durham, in the Municipality of Clarington, on Part Lots 33, 34, and 35, Concession Road #7. The *Project Area* and the extents of the transformer station itself, hereinafter referred to as the '*Site*', are shown on Figure 1.

**BACKGROUND**

In their Class EA Project Environmental Study Report (Project ESR), Hydro One has committed to undertake a groundwater and surface water monitoring program that includes monitoring wells and surface water monitoring locations within its property boundaries (*Project Area*), and offering private well monitoring to well owners on properties immediately adjacent to the *Site*. This commitment is to cover pre, during, and post transformer station construction periods, and will include monitoring of water levels and water quality.

Stantec compiled available geotechnical and hydrogeological information as well as reviewed Ontario Ministry of the Environment (MOE) water well records, Ontario Geological Survey mapping, Oak Ridges Moraine Conservation Plan, and Ministry of Affairs and Housing Greenbelt Plan. Stratigraphy beneath the *Site* is found to consist of silt till overburden which is known as the Newmarket Till, with pockets of Halton Till at surface. The till contains occasional isolated sand to silty sand lenses, with several nearby private wells reportedly installed within these lenses. The MOE water well record database indicates the presence of a deep (greater than 75 m below ground surface) silty sand aquifer consisting of medium to fine sand and gravel which is regionally recognized as the Thorncliffe Aquifer.

**OBJECTIVES**

The following Groundwater and Surface Water Monitoring Program has three primary objectives: to fulfill Hydro One's commitment to implement a pre, during, and post transformer station construction groundwater and surface water monitoring program; to refine our understanding of the physical and chemical characteristics of the shallow and intermediate depth groundwater systems at the *Site*; and to establish a pre-construction baseline of groundwater conditions, including seasonal variations of groundwater quality, quantity, and surface water / groundwater interaction. The monitoring data collected will provide the technical foundation on which to assess whether adverse impacts occurred during or post construction.



**Reference: Groundwater and Surface Water Monitoring Program, Clarington Transformer Station**

## **MONITORING PROGRAM SCOPE**

The Groundwater and Surface Water Monitoring Program includes several key tasks, including installing new groundwater monitoring wells (completed in Fall 2013), implementing a private well monitoring program, surface water monitoring, decommissioning of geotechnical monitoring wells (completed Fall 2013), water level and water quality monitoring, and preparing annual monitoring summary reports through the duration of the monitoring program.

Complementing the groundwater monitoring program, surface water features located on the north (wetland), west (creek), and south (drainage swale) sides of the *Site* will be monitored. Background water levels within three newly installed shallow piezometers (mini shallow wells) will be recorded prior to construction of the transformer station, and compared to monitoring results recorded during and post construction. The monitoring data collected will provide the technical foundation on which to further characterize our understanding of the shallow groundwater system, to assess whether adverse impacts occurred during or post construction, and to provide guidance for appropriate mitigation, if needed.

Owners of private wells on properties immediately adjacent to the east and south of the *Site* will be able to have the water level and water quality in their wells monitored prior to, during, and post construction of the transformer station. A baseline of seasonal normal groundwater levels and groundwater quality will be established prior to construction of the transformer station. Once construction of the transformer station begins, the well monitoring program will continue with observations compared to baseline conditions, allowing for an assessment of potential impacts on the natural environment and of the efficacy of the engineered containment structures and water treatment systems to be installed.

Groundwater and surface water data collected prior to construction of the transformer station will help define the relationship between the shallow and intermediate depth groundwater systems at the *Site* and how they interact with each other; providing a baseline to which monitoring data collected during construction and post construction will be compared. Specifically, the Groundwater and Surface Water Monitoring Program will allow for quantification of the following hydrogeological characteristics of the site:

- Refinement of *Site* geologic stratigraphy;
- Seasonal shallow and intermediate groundwater water levels across the site;
- Seasonal shallow and intermediate groundwater chemistry;
- Vertical groundwater gradients (identify areas of upward, neutral, or downward groundwater movement) between surface water and shallow groundwater system, and shallow and intermediate depth groundwater systems;
- Shallow and intermediate depth hydraulic conductivity, including variations in hydraulic conductivity associated with the different geologic materials identified during previous and recent drilling programs;
- Continuous (hourly) groundwater level monitoring to allow for observation and calculation of seasonal variations in surface water, groundwater, and private wells; and,
- Potential changes in shallow groundwater elevation associated with the cut portion (east side) of the grading area, including the potential radius of groundwater influence, and potential for private well interference.



**Reference: Groundwater and Surface Water Monitoring Program, Clarington Transformer Station**

The hydrogeologic conditions presented in the Project ESR will be confirmed through the analyses and interpretation of groundwater and surface water data collected prior to construction of the transformer station. The monitoring program will continue during and post construction of the transformer station in order to confirm that the mitigation measures and engineered containment structures designed to protect the natural form and function of the surface water system, shallow and intermediate groundwater systems, and the adjacent private water wells are functioning as designed.

**MONITORING INSTALLATIONS**

The Groundwater and Surface Water Monitoring Program takes into consideration potential adverse impacts of the project on the natural environment in the absence of implementing any mitigations measures (containment structures, water treatment, etc.). These include the introduction of chemical substances and changes to the natural form and function of the shallow and intermediate depth groundwater and surface water systems. As a result, the depths of the monitoring wells, monitoring frequency, and selected water quality analyses of the entire monitoring program have been selected with detection of potential changes to these receptors as their primary objective.

**Site Monitoring Wells**

The groundwater monitoring wells installed at the *Site* during the previous geotechnical investigations were all installed at an intermediate depth (screened between approximately 11 m and 15 m depth). These monitoring wells were located where excavations for footings or foundations are planned, and as a result, needed to be decommissioned prior to construction of these foundations.

In the Fall of 2013, this monitoring program was initiated by installing pairs of new monitoring wells on each side of the *Site* (Figure 1). The new intermediate depth (approximately 10 m to 15 m depth) wells have been paired with shallow depth wells (approximately 1 m to 3 m depth) intended to intersect the elevation of the shallow water table. By installing pairs of shallow and intermediate depth wells, changes in groundwater levels, groundwater chemistry and vertical hydraulic gradients (upward or downward movement of groundwater) will be able to be measured and monitored seasonally prior to, during, and post construction of the transformer station.

Drive point piezometers (shallow mini wells) have also been installed within the *Site's* surface water features in order to monitor seasonal shallow groundwater and surface water levels within the wetland (north side), creek (west side) and drainage swale (south side) features found on-*Site*.



**Reference: Groundwater and Surface Water Monitoring Program, Clarington Transformer Station**

The new groundwater monitoring wells were installed according to the MOE Water Resource Act (O. Reg. 903). A licensed well drilling contractor was retained and has completed the following:

- Installation of three (3) stream/wetland drive-point piezometers;
- Drilling and installation of four (4) shallow and intermediate depth pairs of groundwater monitoring wells (8 wells in total); advanced to depth of approximately 1 to 3 m and 10 to 15 m, respectively;
- Complete grouting (sealing) of outer well annulus;
- Installation of protective and lockable well casing; and,
- Decommissioning of former geotechnical wells according to the MOE Water Resource Act (O. Reg. 903).

Upon completing installation of the new monitoring wells in December 2013, the water level in several wells were observed to have recovered slowly, with some not recovering sufficiently after several days to allow for a collection of water quality samples. Monitoring of the new wells will continue with the completion of a water level monitoring event in Winter 2014, noting if any wells are frozen.

In Spring 2014, the new wells will be developed, hydraulically tested (slug tests) to confirm estimates presented in the Project ESR, and sampled for groundwater quality. Selected representative soil samples obtained and preserved during drilling will be submitted for laboratory sieve grain size analyses.

**Private Well Monitoring**

The private well monitoring program will include providing notification to all potential groundwater users within 1,200 m of the *Site*, informing the property and/or well owners of the transformer station construction schedule, and the parameters of the private well monitoring program.

The distributed notification information will provide the details of the monitoring program, and include appropriate project contact information for Hydro One regarding construction concerns. During the door-to-door site visits, Stantec will also make note of and attempt to contact well owners that may not appear in the MOE's records for the purpose of offering participation in the private well monitoring program.

Participation in the private well monitoring program will only be completed with the owner's authorization, and will include water quality sampling and water level monitoring, depending on well accessibility. Water level monitoring involves installing an automated well water level logger (pressure transducer), which can only be completed at accessible wells by a licensed well contractor. The automated loggers will monitor 'continuous' water levels (at 5 to 60 minute intervals) from Spring 2014 until two years following completion of construction. The loggers would be removed at the end of the monitoring program.



**Reference: Groundwater and Surface Water Monitoring Program, Clarington Transformer Station**

Private well water quality samples will be collected from a raw water tap (prior to any treatment or filtration), where available. If no raw water tap is present, a sample may be collected directly from the well, depending on well accessibility and well owner authorization. After purging water from the well, the samples will be collected directly into laboratory supplied sample containers. The samples will not be field filtered and will be submitted for general chemistry, turbidity, metals, hydrocarbons (F1-F4 and BTEX), and bacteriological analyses. To supplement and provide quality assurance, temperature, conductivity, and pH data will be collected in the field at the time of sampling.

Individual private well analytical results will be presented in a letter to each resident following each sampling event along with the available water level data. Private well data will remain confidential, and is not permitted to be shared with the general public. However, monitoring reports for data collected on-*Site* will be prepared annually and made available to the public by Hydro One.

### **SURFACE WATER MONITORING**

A Stantec terrestrial ecologist will monitor the *Site* prior to transformer station construction to confirm the presence or absence of groundwater seeps within the *Project Area*, identifying notable indicator parameters and plant species. Ecological monitoring will continue annually during construction of the transformer station, and for two years following completion of construction. Surface water levels and water quality samples will be collected from three (3) surface water monitoring locations (at piezometer installation locations) and submitted for laboratory analyses following the monitoring schedule discussed below.

### **WATER QUALITY ANALYSES**

Groundwater water quality samples from each of the new on-*Site* monitoring wells and participating private wells will be collected according to laboratory protocols, preserved, and submitted for laboratory analyses (general chemistry, metals, and hydrocarbons (F1-F4 and BTEX)) to Maxxam Analytics, an accredited laboratory. Well water quality parameter analyses will be compared to Ontario Drinking Water Quality Standards (ODWQS).

Surface water quality samples will be collected from each of the three new surface water monitoring locations adjacent to the new piezometer installations (when surface water is present) according to laboratory protocols, preserved, and submitted for laboratory analyses (general chemistry, metals, and hydrocarbons (F1-F4 and BTEX)) to Maxxam Analytics. Surface water quality parameter analyses will be compared to Provincial Water Quality Objectives (PWQO).

A water quality parameter list is included in the attached Tables 1 and 2.

### **MONITORING SCHEDULE**

The Groundwater and Surface Water Monitoring Program schedule frequency is designed to record groundwater levels continuously with the use of automated pressure transducers, and to seasonally (quarterly) collect groundwater and surface water quality samples for laboratory analyses for the first year of monitoring in order to establish potential seasonal variations in groundwater levels and chemistry. Table 1 presents the program water quality sampling schedule.



**Reference: Groundwater and Surface Water Monitoring Program, Clarington Transformer Station**

Following the first year of quarterly (seasonal) monitoring, the schedule will change to semi-annual monitoring (spring and fall). Upon completion of construction, monitoring of groundwater, surface water, and private wells will continue semi-annually for two years.

For scheduling purposes, it is anticipated that quarterly seasonal monitoring will take place from Fall 2013 to Summer 2014; semi-annual (construction) monitoring will continue from Fall 2014 through to Fall 2017; and semi-annual post-construction monitoring will extend for 2 years following completion of construction. Presently, construction is anticipated to be completed in Fall 2017, with this monitoring program continuing until Fall 2019.

**Table 1 - Monitoring Schedule**

| <b>Pre-Construction and Construction Monitoring Schedule</b> |        |        |      |             |        |        |      |             |        |        |      |
|--|--------|--------|------|-------------|--------|--------|------|-------------|--------|--------|------|
| <b>2013</b>  |        |        |      | <b>2014</b> |        |        |      | <b>2015</b> |        |        |      |
| Winter   | Spring | Summer | Fall | Winter      | Spring | Summer | Fall | Winter      | Spring | Summer | Fall |
|  |        |        | X    | X           | X      | X      | X    |             | X      |        | X    |
| <b>2016</b>  |        |        |      | <b>2017</b> |        |        |      |             |        |        |      |
| Winter   | Spring | Summer | Fall | Winter      | Spring | Summer | Fall |             |        |        |      |
|  | X      |        | X    |             | X      |        | X    |             |        |        |      |
| <b>Post-Construction Monitoring Schedule</b>                 |        |        |      |             |        |        |      |             |        |        |      |
| <b>2018</b>  |        |        |      | <b>2019</b> |        |        |      |             |        |        |      |
| Winter   | Spring | Summer | Fall | Winter      | Spring | Summer | Fall |             |        |        |      |
|  | X      |        | X    |             | X      |        | X    |             |        |        |      |

**REPORTING**

A *Baseline Conditions Report* will be prepared following the Fall 2014 monitoring event presenting the *Site* baseline groundwater and surface water data collected prior to construction of the transformer station (Fall 2013 through Fall 2014).

Subsequent annual monitoring program summary reports will be prepared following the annual Fall monitoring and sampling events. The reports will present continuous records of all on-Site groundwater and surface water monitoring data and a general summary of private well water level and water quality data. Private well owners will be provided with the data (water level and water quality) from their own individual well(s) only. In the event private water quality laboratory results indicate an exceedence of the ODWQS, the private well owner will be advised of the exceedence immediately upon receipt and review of the data.



**Reference: Groundwater and Surface Water Monitoring Program, Clarington Transformer Station**

**IMPLEMENTATION**

A Community Liaison Committee (CLC) was formed on May 29, 2014 and conducted its first meeting on June 5, 2014. The committee consists of representatives from HydroOne, local environmental organizations, local area residents and three First Nations. CLC meetings are also open to any other organizations and/or members of the public to observe, and observers are also given the opportunity to ask questions or to comment at the conclusion of each meeting. The CLC provides a forum for the exchange and dissemination of project information between Hydro One and the local community, as per Condition 5.1 of the Minister of the Environment's decision to deny the Part II Order Requests received for the Clarington TS Class Environmental Assessment.

CLC meetings will be the primary avenue for Hydro One to disseminate monitoring information and results to community members. A presentation was made at the initial CLC meeting on June 5, 2014 introducing the Monitoring Program, and questions and comments were received from CLC members and observers. The next CLC meeting is planned for late Fall 2014, in advance of the start of site grading and construction of the Clarington Transformer Station itself. The *Baseline Conditions Report* will be provided to the MOE, CLOCA, and CLC stakeholders in advance of the Fall 2014 meeting for review.

Hydro One will also actively disseminate information and engage in dialogue with members of the community through avenues other than the CLC. Hydro One will share information and interact with the community through newspaper ads, Project newsletters, personal communications with interested stakeholders, a dedicated project hotline and email inbox, and a project website: (<http://www.hydroone.com/Projects/Clarington/Pages/default.aspx>).

Hydro One will also be employing a dedicated Community Liaison Officer to be on-site during the construction phase of the project. All of the above-mentioned avenues for communication with the community will be used to share information about the Monitoring Program progress and results, where necessary.

The Monitoring Program will be adaptive. Changes to the monitoring program and/or laboratory analyses may be implemented, as determined by Hydro One and its environmental consultant, subject to approval of the MOE Central Region Director, with consideration of the monitoring results and professional interpretations derived from them. HydroOne will continue to encourage input from regulatory agencies, CLC stakeholders, and individual well owners as this project progresses from pre-construction through to completion and on to post-construction monitoring.





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**Reference: Groundwater and Surface Water Monitoring Program, Clarington Transformer Station**

## **CLOSURE**

This Groundwater and Surface Water Monitoring Program will fulfill the environmental monitoring commitments made by Hydro One in the Project's ESR by establishing background hydrogeological conditions and by providing a monitoring program that will identify and monitor the natural form and function of the shallow and intermediate depth groundwater system during and post construction.

Regards,

**STANTEC CONSULTING LTD.**

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





Attachment: Figure 1 – Groundwater and Surface Water Monitoring Locations  
Figure 2 – Private Well Monitoring Program Area  
Table 1 – General Chemistry and Hydrocarbon Water Quality Parameters  
Table 2 – Semi-VOC and VOC Water Quality Parameters

c. Dan Eusebi - Stantec

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**Legend**

-  Monitoring Well (Stantec, 2013)
-  Piezometer (Stantec, 2013)
-  Existing Power Feature
-  New Infrastructure
-  Topographic Contour (mAMSL)
-  Watercourse
-  Project Area
-  Clarington TS Site

**Notes**

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Orthoimagery © First Base Solutions, 2012.



**Stantec**







February 2014  
160960745

Client/Project  
Hydro One Networks Inc.  
Groundwater and Surface Water Monitoring Program  
Clarington, Ontario

Figure No.  
1

Title  
**Groundwater & Surface Water  
Monitoring Locations**



- Legend**
-  Clarington Transformer Station
  -  Private Well Monitoring Area
  -  MOE Water Well Record
  -  Topographic Contour (mAMSL)
  -  Watercourse
  -  Waterbody

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
  2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.
  3. Orthoimagery © First Base Solutions, 2012.
  4. MOE Water well locations are approximate and have been positioned based on published UTM coordinates © Queen's Printer for Ontario, 2012.

June 2014  
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Client/Project  
Hydro One Networks Inc.  
Hydrogeologic & Hydrologic Assessment Report  
Clarington, Ontario

Figure No.  
**2**

Title  
**Private Well Monitoring**

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 Revised: 2014-06-13 By: searles

**Table 1 - General Chemistry and Hydrocarbon Groundwater Parameters**

| <b>General Chemistry</b>                         |          |           | <b>Limit</b> | <b>Dissolved Metals</b>           |      |        | <b>Limit</b> |
|--|----------|-----------|--------------|-----------------------------------|------|--------|--------------|
| Acidity (as CaCO <sub>3</sub> )                  | mg/L     | n/v       |              | Dissolved Aluminum (Al)           | mg/L | 0.075  |              |
| Alkalinity - Bicarbonate (as CaCO <sub>3</sub> ) | mg/L     | n/v       |              | Dissolved Mercury (Hg)            | mg/L | 0.0002 |              |
| Alkalinity - Carbonate (as CaCO <sub>3</sub> )   | mg/L     | n/v       |              |                                   |      |        |              |
| Alkalinity - Total (as CaCO <sub>3</sub> )       | mg/L     | 25%       |              | <b>Total Metals</b>               |      |        |              |
| Anion Sum  | meq/L    | n/v       |              | Total Antimony (Sb)               | mg/L | 0.020  |              |
| Cation Sum                                       | meq/L    | n/v       |              | Total Arsenic (As)                | mg/L | 0.020  |              |
| Chloride (Dissolved)                             | mg/L     | n/v       |              | Total Barium (Ba)                 | mg/L | 0.210  |              |
| Cyanide (Free)                                   | mg/L     | 0.005     |              | Total Beryllium (Be)              | mg/L | 0.011  |              |
| Dissolved Organic Carbon (DOC)                   | mg/L     | n/v       |              | Total Boron (B)                   | mg/L | 0.200  |              |
| Electrical Conductivity                          | µmhos/cm | n/v       |              | Total Cadmium (Cd)                | mg/L | 0.008  |              |
| Fluoride   | mg/L     | n/v       |              | Total Chromium VI                 | mg/L | 0.08   |              |
| Total Hardness (CaCO <sub>3</sub> )              | mg/L     | n/v       |              | Total Cobalt (Co)                 | mg/L | 0.0009 |              |
| Ion Balance                                      | %        | n/v       |              | Total Copper (Cu)                 | mg/L | 0.05   |              |
| Nitrate (as N)                                   | mg/L     | n/v       |              | Total Iron (Fe)                   | mg/L | 0.300  |              |
| Nitrate + Nitrite (as N)                         | mg/L     | n/v       |              | Total Lead (Pb)                   | mg/L | 0.12   |              |
| Nitrite (as N)                                   | mg/L     | n/v       |              | Total Molybdenum (Mo)             | mg/L | 0.040  |              |
| Orthophosphate (as P)                            | mg/L     | n/v       |              | Total Nickel (Ni)                 | mg/L | 0.15   |              |
| pH   | S.U.     | 6.5 - 8.5 |              | Total Phosphorus (P)              | mg/L | 0.02   |              |
| Phosphorus, Total                                | mg/L     | 0.02      |              | Total Selenium (Se)               | mg/L | 0.020  |              |
| Sulfate (Dissolved)                              | mg/L     | n/v       |              | Total Thallium (Tl)               | mg/L | 0.0003 |              |
| Total Dissolved Solids                           | mg/L     | n/v       |              | Total Vanadium (V)                | mg/L | 0.006  |              |
| Total Dissolved Solids (Calculated)              | mg/L     | n/v       |              | Total Zinc (Zn)                   | mg/L | 0.040  |              |
| Total Organic Carbon                             | mg/L     | n/v       |              | Total Zirconium (Zr)              | mg/L | 0.004  |              |
| Total Suspended Sediment                         | mg/L     | CCME*     |              |                                   |      |        |              |
| Turbidity, Lab                                   | ntu      | CCME*     |              | <b>BTEX &amp; F1 Hydrocarbons</b> |      |        |              |
|  |          |           |              | F1 (C6-C10)                       | mg/L | 0.025  |              |
|  |          |           |              | F1 (C6-C10) - BTEX                | mg/L | 0.025  |              |
|  |          |           |              | <b>F2-F4 Hydrocarbons</b>         |      |        |              |
|  |          |           |              | F2 (C10-C16 Hydrocarbons)         | mg/L | 0.010  |              |
|  |          |           |              | F3 (C16-C34 Hydrocarbons)         | mg/L | 0.240  |              |
|  |          |           |              | F4 (C34-C50 Hydrocarbons)         | mg/L | 0.120  |              |

**Table 2 - Semivolatile and Volatile Organics**

| Semivolatile Organics       |      |          | Volatile Organics                   |      |         |
|-----------------------------|------|----------|-------------------------------------|------|---------|
|                             |      |          |                                     |      | Limit   |
| 1,2,4-Trichlorobenzene      | mg/L | 0.00005  | Acetone (2-Propanone)               | mg/L | 0.00050 |
| 1-Methylnaphthalene         | mg/L | 0.00005  | Benzene                             | mg/L | 0.00002 |
| 2,4,5-Trichlorophenol       | mg/L | 0.0001   | Bromodichloromethane                | mg/L | 0.00005 |
| 2,4,6-Trichlorophenol       | mg/L | 0.0001   | Bromoform                           | mg/L | 0.00005 |
| 2,4-Dichlorophenol          | mg/L | 0.0001   | Bromomethane                        | mg/L | 0.00005 |
| 2,4-Dimethylphenol          | mg/L | 0.0002   | Carbon Tetrachloride                | mg/L | 0.00005 |
| 2,4-Dinitrophenol           | mg/L | 0.002    | Chlorobenzene                       | mg/L | 0.00005 |
| 2,4-Dinitrotoluene          | mg/L | 0.0005   | Chloroform                          | mg/L | 0.00005 |
| 2,6-Dinitrotoluene          | mg/L | 0.0005   | Dibromochloromethane                | mg/L | 0.00005 |
| 2-Chlorophenol              | mg/L | 0.0001   | 1,2-Dichlorobenzene                 | mg/L | 0.00005 |
| 2-Methylnaphthalene         | mg/L | 0.00005  | 1,3-Dichlorobenzene                 | mg/L | 0.00005 |
| 3,3'-Dichlorobenzidine      | mg/L | 0.001    | 1,4-Dichlorobenzene                 | mg/L | 0.00005 |
| Acenaphthene                | mg/L | 0.00005  | Dichlorodifluoromethane (FREON 12)  | mg/L | 0.00005 |
| Acenaphthylene              | mg/L | 0.000093 | 1,1-Dichloroethane                  | mg/L | 0.00005 |
| Anthracene                  | mg/L | 0.00005  | 1,2-Dichloroethane                  | mg/L | 0.00005 |
| Benzo(a)anthracene          | mg/L | 0.000095 | 1,1-Dichloroethylene                | mg/L | 0.00005 |
| Benzo(a)pyrene              | mg/L | 0.00005  | cis-1,2-Dichloroethylene            | mg/L | 0.00005 |
| Benzo(b/j)fluoranthene      | mg/L | 0.0003   | trans-1,2-Dichloroethylene          | mg/L | 0.00005 |
| Benzo(g,h,i)perylene        | mg/L | 0.0002   | 1,2-Dichloropropane                 | mg/L | 0.00005 |
| Benzo(k)fluoranthene        | mg/L | 0.00005  | cis-1,3-Dichloropropene             | mg/L | 0.00005 |
| Biphenyl                    | mg/L | 0.00005  | trans-1,3-Dichloropropene           | mg/L | 0.00005 |
| Bis(2-chloroethyl)ether     | mg/L | 0.0005   | Ethylbenzene                        | mg/L | 0.00005 |
| Bis(2-chloroisopropyl)ether | mg/L | 0.0005   | Ethylene Dibromide                  | mg/L | 0.00005 |
| Bis(2-ethylhexyl)phthalate  | mg/L | 0.005    | Hexane                              | mg/L | 0.00005 |
| Chrysene                    | mg/L | 0.00018  | Methylene Chloride(Dichloromethane) | mg/L | 0.00005 |
| Dibenz(a,h)anthracene       | mg/L | 0.0001   | Methyl Isobutyl Ketone              | mg/L | 0.0005  |
| Diethyl phthalate           | mg/L | 0.0005   | Methyl Ethyl Ketone (2-Butanone)    | mg/L | 0.0005  |
| Dimethyl phthalate          | mg/L | 0.0005   | Methyl t-butyl ether (MTBE)         | mg/L | 0.00005 |
| Fluoranthene                | mg/L | 0.00024  | Styrene                             | mg/L | 0.00005 |
| Fluorene                    | mg/L | 0.00005  | 1,1,1,2-Tetrachloroethane           | mg/L | 0.00005 |
| Indeno(1,2,3-cd)pyrene      | mg/L | 0.00011  | 1,1,2,2-Tetrachloroethane           | mg/L | 0.00005 |
| Naphthalene                 | mg/L | 0.00005  | Tetrachloroethylene                 | mg/L | 0.00005 |
| p-Chloroaniline             | mg/L | 0.0005   | Toluene                             | mg/L | 0.0002  |
| Pentachlorophenol           | mg/L | 0.0001   | 1,1,1-Trichloroethane               | mg/L | 0.00005 |
| Phenanthrene                | mg/L | 0.00019  | 1,1,2-Trichloroethane               | mg/L | 0.00005 |
| Phenol                      | mg/L | 0.0005   | Trichloroethylene                   | mg/L | 0.00005 |
| Pyrene                      | mg/L | 0.00019  | Vinyl Chloride                      | mg/L | 0.00002 |
|                             |      |          | p+m-Xylene                          | mg/L | -       |
| <b>PCBs</b>                 |      |          | o-Xylene                            | mg/L | -       |
| Total PCBs                  | mg/L | 0.0003   | Xylene (Total)                      | mg/L | 0.00005 |
|                             |      |          | Trichlorofluoromethane (Freon 11)   | mg/L | 0.00005 |



**Stantec Consulting Ltd.**  
300 - 675 Cochrane Drive West Tower  
Markham ON L3R 0B8  
Tel: (905) 944-7777  
Fax: (905) 474-9889

June 13, 2014  
File: 160900764

Dear Property / Well Owner,

**Reference: Private Well Monitoring Program  
HydroOne Networks Inc. – Clarington Transformer Station**

HydroOne Networks Inc. (Hydro One) is preparing to begin construction of the Clarington Transformer Station (Project). The Project includes the construction of a new transformer station, to be located north of Concession Rd. 7 and west of Langmaid Rd. within the Town of Clarington, Ontario in the Regional Municipality of Durham.

On behalf of HydroOne, Stantec Consulting Ltd. (Stantec) is conducting a door-to-door groundwater / well monitoring program in support of the proposed construction. The program is being completed to establish groundwater conditions prior to, during, and following Hydro One's construction activities. If interested, well owners within 1,200 metres of the transformer station may request to participate in the well monitoring program, which includes water quality sampling and water level monitoring of private water wells. Participation is not mandatory and is at the sole discretion of the well/property owner. Well owner's will be required to grant permission to HydroOne's environmental consultant Stantec to access individual wells in order to participate in the monitoring program.

As part of the monitoring program, Stantec will undertake the following activities at accessible wells prior to, during, and for two years following completion of the Clarington Transformer Station:

- Collect seasonal / semi-annual water quality samples from a raw water tap and submit them for laboratory analyses for metals, general chemistry, and bacteriological analyses (one sample prior to construction, one following site grading and installation of drainage, and semi-annually for two years following completion of the Project);
- Measure the water level within your private well, if accessible, under static conditions and during operation of your residential pump; and,
- Administer a voluntary well questionnaire to collect any relevant information about your private well.

Stantec will be completing baseline sampling, including a door-to-door survey in June 2014, with the next rounds of sampling occurring in Summer and Fall 2014.



June 13, 2014

**Error! Reference source not found.**

Page 2 of 2

**Reference: Private Well Monitoring Program  
HydroOne Networks Inc. – Clarington Transformer Station**

### **Contact Information**

If you have any questions or concerns regarding the private well monitoring program, please feel free to contact me directly using the contact information below.

Should you have any questions or concerns regarding HydroOne's construction activity, please contact Paul Dalmazzi from HydroOne at (416) 345-6145, or email at Paul.Dalmazzi@HydroOne.com.

Regards,

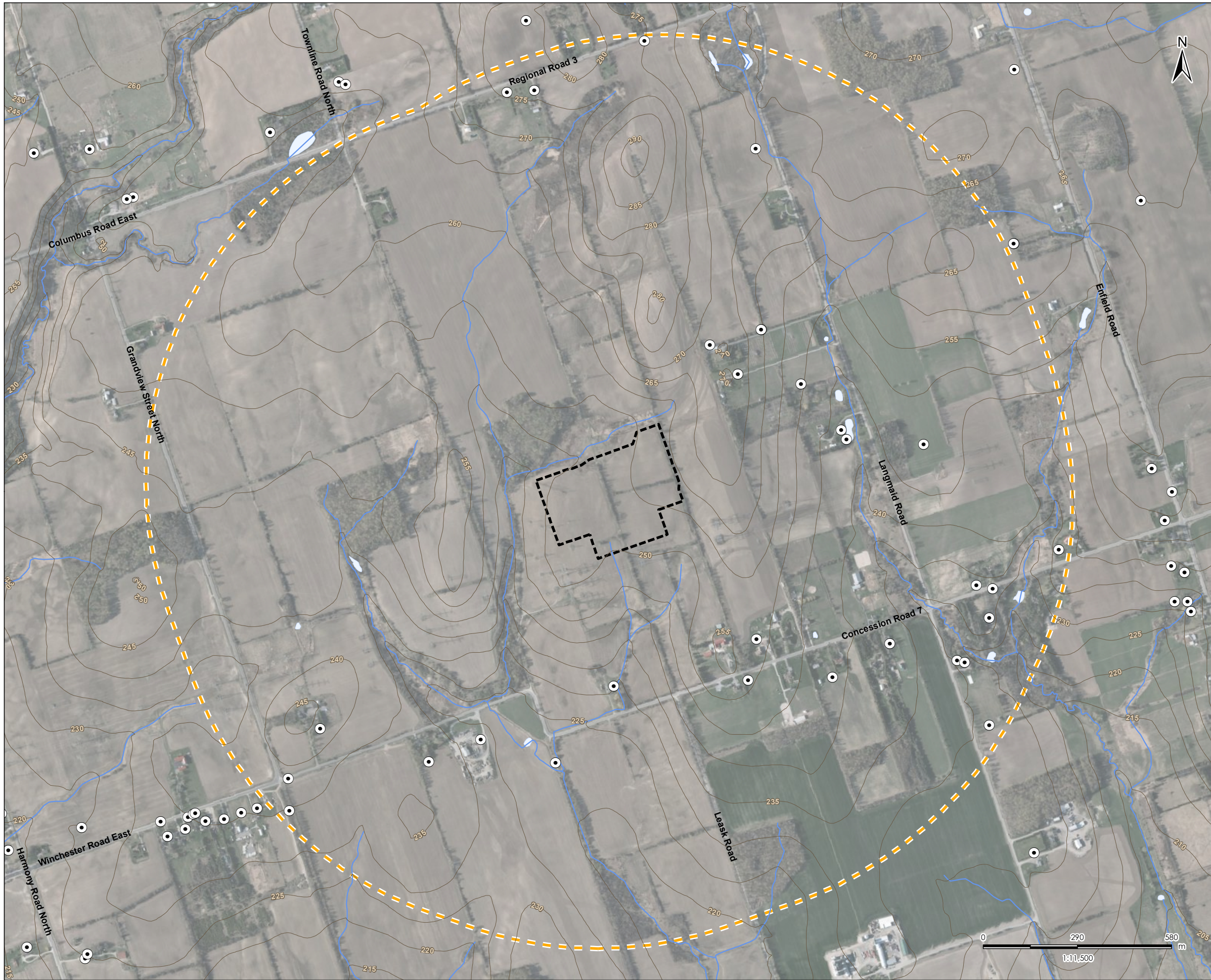
**STANTEC CONSULTING LTD.**







A handwritten signature in blue ink, appearing to read "J. Brant Gill".

J. Brant Gill, H.B.Sc., P.Geo.  
Senior Hydrogeologist, Environmental Management  
Phone: (905) 415-6330  
Fax: (905) 474-9889  
brant.gill@stantec.com

Attachment: Private Well Monitoring Area Figure

jbg let\_Private Well Monitoring Program\_CTS\_13Jun2014\_JBG.docx



- Legend**
-  Clarington Transformer Station
  -  Private Well Monitoring Area
  -  MOE Water Well Record
  -  Topographic Contour (mAMSLS)
  -  Watercourse
  -  Waterbody

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
  2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.
  3. Orthoimagery © First Base Solutions, 2012.
  4. MOE Water well locations are approximate and have been positioned based on published UTM coordinates © Queen's Printer for Ontario, 2012.

June 2014  
160960745

Client/Project  
Hydro One Networks Inc.  
Hydrogeologic & Hydrologic Assessment Report  
Clarington, Ontario

Figure No.  
**1**

Title  
**Private Well Monitoring**

G:\active\60960745\drawing\WXD\Hydrogeology\GW\_SW\_Monitoring\160960745\_GWSWM\_Fig01\_GW\_SW\_PrivateWellMon.mxd  
 Revised: 2014-06-13 By: searles



**CONSENT FORM for PRIVATE WELL MONITORING PROGRAM**

**Re: Clarington Transformer Station Project of Hydro One Networks Inc.**

Hydro One Networks Inc. (“Hydro One”) hereby offers to arrange for monitoring of private wells within 1,200 metres (m) of Hydro One’s Clarington Transformer Station, as part of its Groundwater and Surface Water Monitoring Program.

The well monitoring, which will be conducted by a third party environmental consultant in conjunction with a licensed well contractor retained by Hydro One, will occur prior to, during, and for two years following completion of construction. The program will include monitoring well water levels and completing periodic sampling of well water quality, including laboratory analyses for selected metals, general chemistry, and bacteriological parameters.

The monitoring results will be analyzed and used to determine whether the transformer station and its development have adversely affected the well water levels and/or water quality.

Signing of this consent form will allow for this monitoring program to be undertaken on the signatory’s well by licensed contractors retained by Hydro One. Hydro One or the contractor will inform the signatory when the monitoring program will be undertaken. All results will be provided to the signatory by the contractor, with a copy going to Hydro One. Private well data will not be released to the public by Hydro One or its contractors.

I, \_\_\_\_\_, of \_\_\_\_\_  
Full Legal Name Address

agree to allow Hydro One’s contractor to perform the activities described above on the terms described above.

Signed and dated at \_\_\_\_\_ on \_\_\_\_\_ 2014.

Landowner:

\_\_\_\_\_  
Signature

Please submit the signed consent by mailing it to:

Hydro One Networks Inc.  
Att’n: Paul Dalmazzi  
483 Bay St., South Tower, 6th Floor  
Toronto, Ontario M5G 2P5

or by e-mailing the scanned signed consent to: Paul.Dalmazzi@HydroOne.com

Ministry of the Environment

Central Region

5775 Yonge Street  
8<sup>th</sup> Floor  
Toronto, ON, M2M 4J1  
Tel.: 416-325-6966  
Fax: 416-325-6347

Ministère de l'Environnement

Région du Centre

5775, rue Yonge 12<sup>e</sup> étage  
8<sup>e</sup> étage  
Toronto, ON, M2M 4J1  
Tél.: 416-325-6966  
Télééc: 416-325-6347



June 24, 2014

File: EA01-05

Brian J. McCormick  
Manager, Environmental Engineering and Project Support  
Hydro One  
483 Bay Street, 6<sup>th</sup> Floor, South Tower  
Toronto, ON M5G 2P5

**RE: Clarington Transformer Station  
Groundwater and Surface Water Monitoring Program  
Version dated June 13, 2014  
Condition 1 of Minister's Decision**

Dear Mr. McCormick,

The revised Groundwater and Surface Water Monitoring Program (the program) for the Clarington Transformer Station, as prepared by Stantec Consulting Ltd. and dated June 13, 2014, has been received and reviewed. It is my understanding that the program was submitted to address Condition 1 contained within the decision of the Minister of the Environment ("the Minister") dated January 2, 2014, on the Part II Order requests for the proposed Clarington Transformer Station Class Environmental Assessment.

Condition 1 states:

***Prior to construction the Proponent shall submit a Groundwater Monitoring Plan to the Regional Director in Central Region for review and approval. The Plan shall be in accordance with the Hydrogeological and Hydrologic Assessment Report prepared for the Project by Stantec (2013) and shall include water level and quality sampling from on-site wells and adjacent private wells in order to document pre and post construction conditions to confirm no impacts. Once approved, the final report shall be posted on the Proponent's website.***

Based on discussions with Hydro One, the following points are noted:

- The Ministry of the Environment (ministry) will be notified in advance of groundwater sampling in order for the ministry to have the opportunity to observe sampling on the site.
- Hydro One has agreed that the program will be adaptive, and changes may be implemented at the advice of Hydro One's expert consultant hydrogeologist, subsequent to approval by the ministry's Central Region Director and technical staff.

- Hydro One has committed to providing funding to the Municipality of Clarington for the hiring of a third-party consultant for the purpose of supporting the residents in their review and interpretation of the data and results of the Monitoring Program.
- Hydro One will expand the private well monitoring program to include residential water wells within 1200 m of the Clarington Transformer Station.

Given the points above, I am writing to approve the revised Groundwater and Surface Water Monitoring Program dated June 13, 2014 as it has been submitted in accordance with Condition 1 of the Minister's decision on the Part II Order requests for this project.

Sincerely,



Dolly Goyette  
Director, Central Region

- c. Dorothy Moszynski, Project Evaluator, Environmental Approvals Branch, MOE  
Dan Delaquis, Supervisor (A), Air, Pesticides and Environmental Planning, MOE  
Dan Orr, Manager, Technical Support Section, MOE  
Dave Fumerton, Manager, York Durham District, MOE

**Ministry of the Environment**

Office of the Minister

77 Wellesley Street West  
11th Floor, Ferguson Block  
Toronto ON M7A 2T5  
Tel.: 416-314-6790  
Fax: 416-314-6748

**Ministère de l'Environnement**

Bureau du ministre

77, rue Wellesley Ouest  
11<sup>e</sup> étage, edifice Ferguson  
Toronto ON M7A 2T5  
Tél.: 416-314-6790  
Télééc: 416-314-6748



**JAN 02 2014**

ENV1283MC2013-2616

Mr. Doug Magee  
Environmental Planner  
Hydro One Networks Inc.  
483 Bay Street, South Tower, 6<sup>th</sup> Floor  
Toronto ON M5G 2P5

Dear Mr. Magee:

Between November 15 and December 17, 2012, I received 56 Part II Order requests from local residents, local environmental groups, 18 school children from a local school and two Members of Provincial Parliament that Hydro one Network Incorporated (Proponent) be required to prepare an individual environmental assessment for the proposed Clarington Transformer Station Class Environment Assessment (Project), located in the Municipality of Clarington.

I am taking this opportunity to inform you that I have decided that an individual environmental assessment is not required. This decision was made after giving careful consideration to the issues raised in the request, the Project documentation, the provisions of the Class Environmental Assessment for Minor Transmission Facilities (Class Environmental Assessment), and other relevant matters required to be considered under subsection 16(4) of the Environmental Assessment Act. The reasons for my decision may be found in the attached letters to the requesters.

Despite my not requiring an individual EA be prepared, in reviewing the requests I noted that there are concerns with respect to this project which do warrant that further studies and consultation be undertaken as the Project proceeds into detail design and construction. Therefore, to ensure that the environment is protected, I am imposing the following conditions on the project:

1. Prior to construction the Proponent shall submit a Groundwater Monitoring Plan to the Regional Director in Central Region for review and approval. The Plan shall be in accordance with the Hydrogeological & Hydrologic Assessment Report prepared for the Project by Stantec (2013) and shall include water level and quality sampling from on-site wells and adjacent private wells in order to document pre and post construction conditions to confirm no impacts. Once approved, the final report shall be posted on the Proponent's website.

2. As part of the Ontario Water Resources Act Application for Sewage Works, the Proponent must submit to the Director of the Environmental Approvals Branch a Contingency and Pollution Prevention Plan for the Project in accordance with the ministry's requirements.
3. As part of the Environmental Compliance Approval for noise, the Proponent shall prepare a detailed Acoustic Assessment Report and submit it to the Director of the Environmental Approvals Branch for review as part of the application. The Acoustic Assessment Report must document all sources of noise at the facility, as well as any proposed noise control measures, and demonstrate that the Project is capable of operating in compliance with the applicable sound level limits at all affected Points of Reception.
4. For information purposes, the final Acoustic Assessment Report and Contingency and Pollution Prevention Plan shall be posted on the Proponent's website upon submission of the Environmental Compliance Approval application.
- 5.1 The Proponent shall be responsible for the formation of a Community Liaison Committee, should members of the public or other parties be interested in participating. The CLC shall be established by the Proponent within 6 months of the Minister's decision on the Part II Order requests for the Project. The CLC shall be established for the purposes of disseminating and exchanging information and monitoring results relevant to the project during detailed design and construction, and discussing any issues or concerns raised by CLC members.
- 5.2 The Proponents shall invite representative(s) of the Enniskillen Environmental Association and members of the public that expressed interest in the Project. Meetings shall be held as may be required or on an annual basis until Project operation. A notice of the CLC meeting shall be posted on the Proponent's website two weeks prior to the meeting, and sent to all CLC members.
6. Once Conditions 1-5 have been satisfied, the Proponent shall notify the Director of the Environmental Approvals Branch.

With this decision having been made, the Proponent can now proceed with the Project, subject to the conditions I have imposed and any other permits or approvals required. The Proponent must ensure the Project is implemented in the manner it was developed and designed, as set out in the Project documentation, inclusive of all mitigating measures, and environmental and other provisions therein.

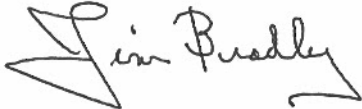
Lastly, I would like to ensure that the Proponent understands that failure to comply with the Act, the provisions of the Class Environmental Assessment, and failure to implement the Project in

Mr. Doug Magee  
Page 3.

the manner described in the planning documents, are contraventions of the Act and may result in prosecution under section 38 of the Act.

I am confident that the Proponent recognizes the importance and value of the Act and will ensure that its requirements and those of the Class Environmental Assessment are satisfied.

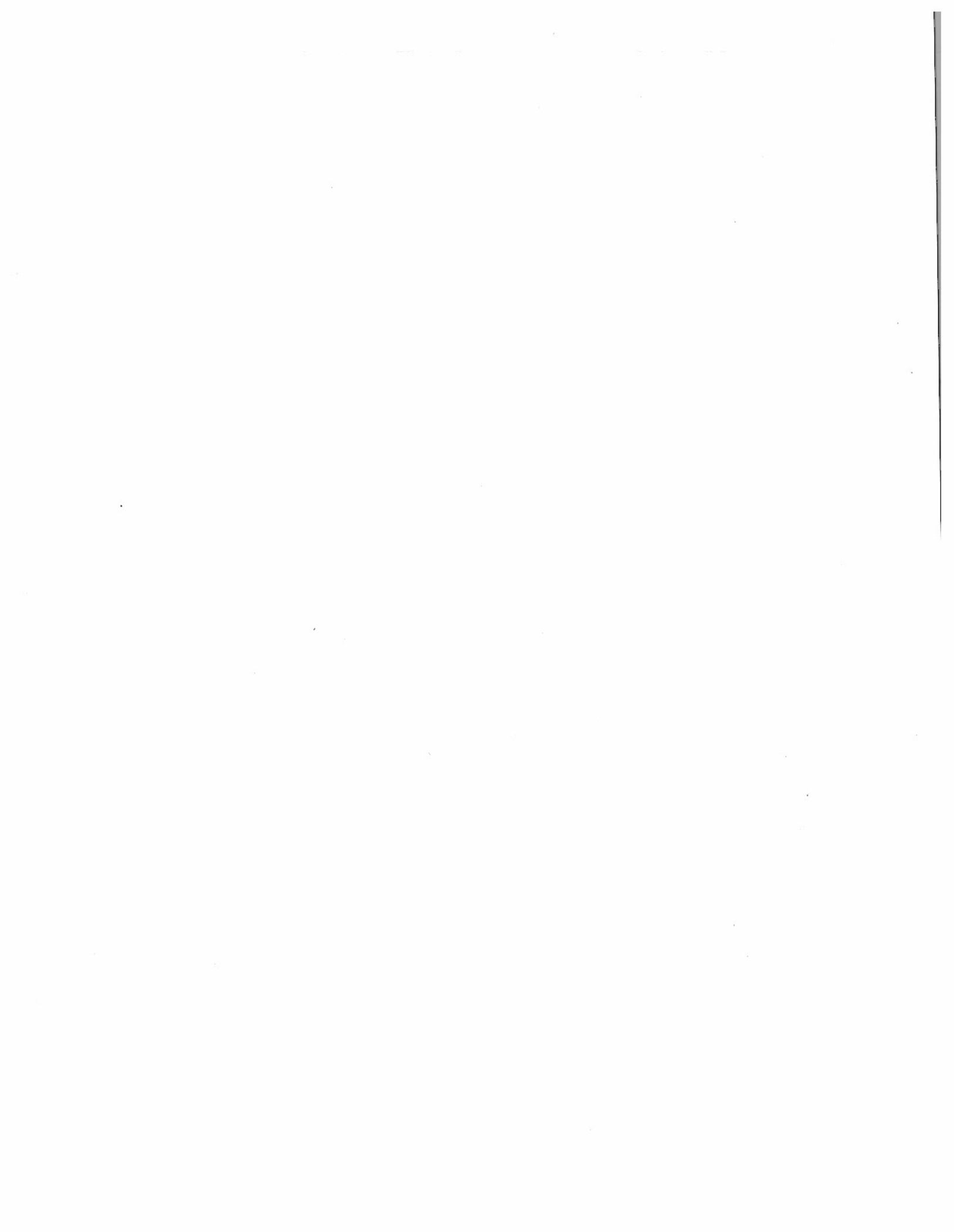
Yours sincerely,

A handwritten signature in cursive script that reads "Jim Bradley". The signature is written in black ink and is positioned above the printed name and title.

Jim Bradley  
Minister of the Environment

Attachment(s)

c: Requestors  
MPP J. O'Toole (Durham)  
MPP M. Harris (Kitchener-Conestoga)  
EA File EA02-06



**Hydro One Networks Inc.**

483 Bay Street  
South Tower, 6<sup>th</sup> Floor  
Toronto, ON M5G 2P5  
www.HydroOne.com

Tel: 416 345-6597  
Email: [Brian.McCormick@HydroOne.com](mailto:Brian.McCormick@HydroOne.com)



**Brian J. McCormick**

Manager, Environmental Engineering and Project Support

October 16, 2014

Dolly Goyette  
Director, Central Region  
Ministry of the Environment and Climate Change  
5775 Yonge St., 8<sup>th</sup> Floor  
Toronto, ON  
M2M 4J1

**Re: Clarington TS – Municipality of Clarington Council Resolution D15.GE L04.HY**

Dear Ms. Goyette,

On March 7, 2014, Hydro One submitted to the Director of the Ministry of Environment and Climate Change (MOECC) Central Region a Groundwater and Surface Water Monitoring Program (“the Monitoring Program”) for the Clarington Transformer Station (TS) Project, as per the Minister of the Environment’s decision dated January 2, 2014 to deny the Part II Order requests received for the Project. The Monitoring Program is meant to be adaptive in nature, such that data collected can be used to further refine the Monitoring Program if there is clear scientific rationale. On June 24, 2014, Hydro One received your written approval of the Monitoring Program, which agreed that the Program should be adaptive and that changes may be implemented at the advice of Hydro One’s environmental consultant (Stantec) subsequent to approval by the Director, Central Region MOECC.

On October 2, 2014, the Municipality of Clarington issued a resolution (File No. D15.GE L04.HY) stating that a condition is being imposed on an easement to grant access via the Townline Road allowance (identified during the Class Environmental Assessment as the preferred access route by a number of stakeholders, including Central Lake Ontario Conservation Authority and the Municipality of Clarington Department of Planning) that requires installation of a monitoring well “drilled down to at least the Thorncliffe formation”. Although neither Stantec nor Hydro One are of the opinion that there is scientific basis for a monitoring well to this depth given the planned use of the site as a transformer station, Hydro One intends to install this new well to the Thorncliffe formation in order to secure the preferred access route. Hydro One also intends to conduct groundwater quality and water level monitoring of this Thorncliffe depth well, and to include these data in subsequent Monitoring Program reports for the sole purpose of advancing public confidence that the construction and operation of the Clarington TS will not result in adverse effects on the Thorncliffe aquifer.

As per the resolution issued by the Clarington Council, Hydro One has reached out to Dr. Rick Gerber and Dr. John Cherry and has held an initial meeting to discuss the location of this new Thorncliffe depth well. When the well location has been chosen, Hydro One will inform the MOE Central Region and York/Durham District staff. Consistent with other potential amendments to the Monitoring Program, Hydro One will implement well monitoring on a forward-looking basis but without affecting the station construction schedule.

I trust that this letter provides sufficient information on Hydro One’s position regarding the planned new borehole and monitoring well to the Thorncliffe aquifer. If you wish to further discuss this matter, please contact Paul Dalmazzi, Environmental Planner at (416) 345-6145 or [Paul.Dalmazzi@HydroOne.com](mailto:Paul.Dalmazzi@HydroOne.com).



Sincerely,



Brian J. McCormick, Manager  
Environmental Engineering and Project Support  
Hydro One Networks

CC: Dan Orr, Manager, Technical Support Section, Central Region, MOECC  
Dave Fumerton, Manager, York/Durham District, MOECC  
Sandra Thomas, Issues Project Coordinator, York/Durham District, MOECC  
Brad Bowness, Director, Project Management, Hydro One Networks  
Denise Jamal, Manager, Public Affairs, Hydro One Networks  
David Crome, Director, Department of Planning, Municipality of Clarington