

**WITNESS STATEMENT
OF DAVID A. MACGILLIVRAY**

**ONTARIO MUNICIPAL BOARD HEARING
IN THE MATTER OF
PROPOSED RESIDENTIAL DEVELOPMENT
PART LOT 14 AND 15ND, CONCESSION 7
CITY OF BRAMPTON
OMB CASE NO.: PL081113**

WITNESS STATEMENT - DAVID A. MACGILLIVRAY

1. INTRODUCTION:

This Witness Statement has been prepared by David A. MacGillivray, P.Geo., P.Eng., of Terraprobe Limited. This Witness Statement is prepared with respect to matters before the Board on behalf of my client 1281216 Ontario Inc. (Intracorp).

2. QUALIFICATION AND EXPERIENCE:

- a) I am an Associate of the firm of Terraprobe Limited. Terraprobe Limited is a Canadian-based engineering consulting firm which provides consulting services in the fields of hydrogeology, geoenvironmental engineering, and geotechnical engineering.
- b) I am a licensed Professional Engineer, in the Province of Ontario. I also hold a license to practice engineering in the Province of Alberta. I am a registered Professional Geoscientist in the Province of Ontario I have been practicing in the field of consulting engineering and geoscience continuously since 1997.
- c) I have extensive experience in the investigation of geologic and hydrogeologic conditions for a wide range of public and private sector projects. I have conducted numerous investigations to assess the hydrogeologic aspects of servicing and development of residential, commercial and industrial subdivisions.
- d) My curriculum vitae and summary of project experience is attached as Appendix A to this Witness Statement.

3. PURPOSE OF RETAINER:

- a) I was retained by 1281216 Ontario Inc. (Intracorp) to conduct a hydrogeologic assessment with respect to a proposed residential development located at Part Lot 14 and 15ND, Concession 7 in the City of Brampton, Ontario. The purpose of my retainer was complete a detailed hydrogeologic investigation to identify any potential impacts associated with the proposed development and to provide details regarding applicable mitigation measures which could be used to preserve the existing ground water conditions.
- b) In completing this witness statement I have prepared the following document:
 - Hydrogeologic Investigation, Proposed Residential Development, Vales of Castlemore East, Phases 5 and 6, Part of Lot 15, Concession 7, N.D. (21 T-05-0418), City of Brampton. Terraprobe Limited, March 27, 2009, File No.:1-09-4022

4. FINDINGS:

- a) The results of my review and analysis indicate the following:
 - The principal drainage features on or adjacent to the site are: The West Branch of the West Humber River to the west of the subdivision; two small intermittent tributaries within the subdivision; and golf course irrigation ponds throughout the property.

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- A subsurface investigation was conducted in conjunction with the geotechnical investigation. This consisted of drilling of 24 boreholes, installation of 14 monitoring wells, ground water monitoring and insitu permeability testing.
 - Generally, the stratigraphy consists of surficial topsoil and a thin layer of earth fill material above the native glacial till deposit which is underlain by shale (Bedrock of Georgian Bay Formation). The earth fill material extended to depths of about 0.8 m to 2.6 m below grade and consisted primarily of clayey silt with trace sand. The glacial till deposit extended to depths of about 3.0 m to 9.5 m below grade and consisted of clayey silt to silt and clay with trace amounts of sand and gravel.
 - Generally the boreholes were noted to be dry upon completion of drilling. Ground water was monitored in the monitoring wells about 2 weeks after drilling, and was noted to be at depths of about 0.1 m to 2.8 m below ground surface.
 - Permeabilities of the native soils (based on grain size) were estimated to be on the order of 10^{-11} m/sec. Permeabilities were determined from the insitu tests on three of the monitoring wells and ranged from 9.8×10^{-9} to 4.7×10^{-10} m/sec.
 - A site inspection was conducted to identify any areas of the site which would be considered sensitive from a hydrogeologic perspective. No areas of ground water discharge, seepage or springs were noted at the site or in the vicinity of the on-site water courses. The ground water/surface water interaction within the vicinity of the existing golf course irrigation ponds is not significant. The ponds represent areas in which the stored water may provide for recharge or infiltration during the year. The ponds may receive a minor component of ground water during wetter periods such as during the spring when ground water levels are higher. However, the infiltration or exfiltration rates and volumes from these features are not significant due to the very low permeability of the native soils.
 - The site is located in an area of ground water recharge. However, the site is characterized by very low permeability soils which provide limited recharge capability. As such, there is no significant shallow ground water flow contributing to baseflow to the tributaries.
 - Notwithstanding that the native soils will provide limited recharge, one of the goals during development is the provision of ground water recharge maintaining pre-development infiltration rates. Ground water infiltration rates at the site can generally be maintained by use of appropriate infiltration systems and available storm water management techniques. Roof leaders and foundation drains from the houses could be discharged to overland flow or to infiltration facilities.
 - Given the low permeability soils at the site, there is limited natural opportunity for infiltration of collected rain water at the site. A Best Management Practice Approach is recommended. Implementing Low Impact Development (LID) measures at the site will ensure that recharge rates are maintained or enhanced at the site. These LID measures may include the following:

- Extended overland flow/dry swales.
- Soak-away pits or gravel filled trenches to capture and store runoff to allow infiltration.
- An underground perforated pipe system (leaky pipe).

5. OPINION REGARDING ISSUES WITH RESPECT TO HYDROGEOLOGY OF THE PROPOSED RESIDENTIAL DEVELOPMENT:

Issue 1: What are the appropriate limits of development having regard to the environmental features and constraints on the subject lands which may include the natural heritage systems, features, functions, and areas, and to the site biodiversity consisting of fish, endangered and threatened species and other wildlife?

In my opinion, the limits of development have been appropriately addressed given the results of the hydrogeologic investigation. This is because the site is situated in an area that is not considered significant with respect to ground water function. No sensitive hydrogeologic features were identified.

Issue 9: Can the water balance measures that are proposed achieve the objectives of the TRCA and City of Brampton? To the extent that these measures are proposed to be located on lands outside of the subject lands, can these measures be effectively maintained on private properties?

In my opinion, the water balance measures prepared will meet the objectives of the TRCA and City of Brampton. The measures proposed are consistent with those identified in the "Low Impact Development Stormwater Management Manual" prepared by the TRCA and are commonly implemented at similar developments in Ontario.

Issue 11: Will the proposed development give rise to negative impacts to the Salt Creek and West Humber River Tributaries as a result of the proposed foundation drain collectors that are designed to redirect water to the West Humber River? Are these impacts consistent with the policies and objectives in the City's applicable Official Plan and those of the TRCA?

In my opinion, no negative impacts to the Salt Creek and West Humber Tributaries will arise as a result of the proposed foundation drain collectors. This is a result of the very low permeability of the native soils encountered at the site and the implementation of the proposed LID measures.

Sub-Issue 6: How will the filling of ponds achieve a no net loss of wetland features and functions? How will the filling of ponds maintain current ground water standards and hydrology of the site?

It is my opinion that the filling of the ponds will not affect the existing shallow ground water conditions. This is because the infiltration/exfiltration rates and volumes from the ponds are not significant due to the very low permeability of the soils.

Based on the above, it is my opinion that the proposed servicing and development of the subject site as a residential development will not adversely impact the local ground water regime.

Signed:



David A. MacGillivray, P.Geo., P.Eng.

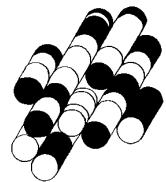
at Brampton, Ontario

30 March 2009

(date)

APPENDIX A

TERRAPROBE LIMITED



David A. MacGillivray, M.A.Sc., P.Geo., P.Eng.

PROFESSIONAL EXPERTISE

- Peer Review & Expert Consultations
- Environmental Engineering
- Geotechnical Engineering
- Hydrogeology
- Environmental Site Assessment
- Site Remediation & Risk Assessment

EDUCATION

Honours B.Sc., Queen's University, Kingston, Ontario, 1994
Department of Geological Engineering
Environmental & Geotechnical Engineering

M.A.Sc., University of Waterloo, Waterloo, Ontario, 1997
Department of Civil Engineering
Hydrogeology & Geomechanics

AFFILIATIONS

Registered Professional Geoscientist, Province of Ontario
Registered Professional Engineer, Province of Ontario
Registered Professional Engineer, Association of Professional Engineers, Geologists, and Geophysicists of Alberta
Qualified Person, Ontario Regulation 153/04 (Record of Site Condition Regulation)
Member, Canadian Geotechnical Society
Member, International Association of Hydrogeologists
Member, Canadian Society for Civil Engineering

PRESENT RESPONSIBILITIES

Responsible for review and technical control and administration of environmental, hydrogeologic and geotechnical projects.

PROFESSIONAL HISTORY

1999	Terraprobe Limited - Brampton, Ontario Associate
1998	SIMS Limited, Cambridge, Ontario Geological Engineer
1997	Terraprobe Limited - Brampton, Ontario Project Engineer
1995	University of Waterloo - Waterloo, Ontario Teaching/Research Assistant

Risk Assessment, Site Characterization, and Remediation - Former Collingwood Shipyards Site, Collingwood, Ontario

Complete site investigation and remediation for 25 ha former Collingwood Shipyards site in Collingwood, Ontario. Work included detailed site investigation and characterization, and development of site remediation plan, to permit residential redevelopment of the site. The project includes a risk assessment and provision of a Record of Site Condition under O.Reg.153/04. Services include on-site supervision and contract management for site remediation services, and certification as Qualified Person under O.Reg.153/04. Acted as manager for the project on behalf of the owner (CSL Equity Investments) for the site decommissioning and remediation program. Included detailed liaison with planning and legal staff to develop Official Plan amendment and Master Development Agreement requirements. Included development of innovative techniques to identify and classify impacted soil materials in the field during remediation using x-ray diffraction apparatus.

Hydrogeology Peer Review - Town of Markham

Currently acting as peer review hydrogeologist for the Town of Markham. A review of the 16th Avenue trunk sewer dewatering and associated impacts on rural wells has been conducted. Water well interference investigations, and investigations of rural well water loss complaints from residents within the Town of Markham, are conducted. Also act as peer review consultant for hydrogeological investigations conducted as part of applications of new developments within the Town of Markham.

Water and Sewage Supply Studies, Ontario

Water and sewage servicing studies have been completed for rural locations being considered for development. A water supply study and hydrogeological impact study was performed for a large commercial rendering operation in Southern Ontario. A servicing options study was prepared for the Region of Peel for a rural commercial development north of Brampton, Ontario. Numerous water well studies have been performed including peer review for water loss complaints from rural water wells and for rural sewage servicing.

Ground Water Remediation and Monitoring, Solvent Manufacturer, Ontario

The development and implementation of a ground water treatment system for soil contaminated with volatile organics was performed for a solvent manufacturer near Barrie, Ontario.

Rural Water Well Supply Studies

Investigations have been conducted for water servicing by on-site water wells. Studies and analysis include aquifer performance testing, water well construction and abandonment, and analysis for recommended water well supply options. Projects have included private subdivision development, gold courses, and quarries. Key studies include the assessment of existing on-site wells and the recommendations for drilling new wells to meet water supply.

Land Development Engineering, Ontario

Detailed hydrogeological assessments for the development of residential subdivisions, sports parks, cemeteries, and golf courses were carried out. Both well water supply and water balance studies have been performed. Several of these projects have been associated with development within the Oak Ridges Moraine north of Toronto.

Environmental Assessment (EA) Process, Ontario

Core team member in the peer review process for the development of two municipal waste landfills in the Province of Ontario. Technical review includes hydrogeology, surface water quality, storm water design, landfill design, leachate management, and landfill operations.

Design and Engineering, Industrial Landfill, Ontario

The preparation of design and operations documents for a private industrial waste landfill situated in Whitby, Ontario has been conducted. Engineering work included detailed design of landfill and leachate collection system including landfill drain, cutoff trench, and the associated structures and appurtenances.

Peer Review of Landfill Operations and Monitoring, Ontario

A peer review was performed for the monitoring, development, and operation of a municipal solid waste landfill in Eastern Ontario. Engineering work related to this project includes the analysis of: fractured rock hydrogeology, contaminant pathways, landfill leachate production, landfill design and operation, storm water features, surface water features, and financial assurance. The development of a new monitoring network for the fractured rock environment, including angled boreholes and packer testing was performed.

Monitoring of Commercial Water Supply System, Ontario

The monitoring of a water supply system for a commercial retail outlet in Southern Ontario. This project involved analysis of the current well supply and water distribution system and recommendations for compliance with the recently implemented Ontario Drinking Water Standards. Monitoring of the facility is performed quarterly for compliance with the new regulations.

Design and Monitoring of Septic Lagoon and Spray System, Ontario

A facultative septic lagoon and spray system was designed. The system is monitored on an ongoing basis for compliance with Ontario regulations. Responsibilities include the supervision of the yearly monitoring and preparation of annual monitoring reports. The system services an outlet mall located south of Barrie, Ontario.

Environmental Assessments, Ontario

Phase I & II environmental assessments for commercial, industrial, and vacant properties within the Greater Toronto Area and Ontario.