Infrastructure and Engineering
Services Department

Hydrogeological Study Requirements

A Hydrogeological Report must be completed by a licensed professional geoscientist or exempted engineer as set out in the Professional Geoscientist Act of Ontario and Professional Engineers of Ontario. All reports and drawings must be stamped, signed and dated by a qualified professional, licensed in the Province of Ontario.

The study area shall encompass the land area covering the largest possible zone of influence that could result from the proposed groundwater taking and/or source of contamination. A Hydrogeological Report should at a minimum contain:

Introduction

- Address of the property
- General site location of the subject property
- Project Name (if applicable)
- Applicant and owner's contact information
- Author name, title, qualifications, company name and appropriate stamp
- Brief description of the proposed development
- Overview of the study area
- Purpose of the study
- Location and context map

Proposal Description and Context

- A description of the proposal, type of development proposed, proposed phasing
- A description of the existing hydrogeological conditions on the site as well as natural areas, buildings, parking areas in proximity to the site
- Concept Plan for the development, including building location, parking, access, amenity areas, grading and natural features and any natural hazards

Investigation/Evaluation

- Existing Regional and Local Geology and Hydrogeology, including surficial geology, lithology and hydrostratigraphic units
- Description of Topography and Drainage (surface water features and functions), existing land use and soils
- Boreholes / Monitoring Wells
- Single well response tests for formations to be impacted by dewatering activities
- Private Well Surveys (as required)
- Hydrogeology: Aquifer properties, groundwater levels, groundwater flow direction(s) for groundwater units and hydraulic conductivity
- Ecologically Significant Recharge Areas
- Pre-development groundwater quality

- Water Taking Permit Details: Water quantity and quality test results, in compliance with municipal and/or regional Sewer Use By-law (as required)
- Water balance for sites as required by source water protection plans
- Infiltration testing for locations where Low Impact Developments are being considered and rely on design guidance for LIDs (as required)

Any development sites located within the Richmond Hill Urban Master Environmental Servicing Plan (MESP) study area need to be completed in conformance with recommendations outlined in Sub-section 3.3.7 “Recommendations” of Section 3.3 “Groundwater and Subsurface Conditions” (TMIG, May 2014). The City of Richmond Hill will provide a copy of the Urban MESP upon request.

Impact and Potential Short/Long Term Impact Assessment

- Potential impacts to groundwater levels/groundwater flow
    - Seasonally/Historically high groundwater levels
    - Four season monitoring
- Potential impacts to water supply wells (as required)
- Potential impacts to settlement assessment of existing structures (as required)
- Pre- and post-development water balance with and without mitigation
- Pre-development groundwater quality
- Temporary and permanent dewatering, if required
- Contaminant migration flowing conditions, if required

Mitigation Measures and Monitoring Plan

- Mitigate impacts to infiltration / recharge
- Mitigate impacts associated with groundwater quality
- Conduct a Groundwater Quantity Monitoring Program, for discharge evaluation
- Assess temporary dewatering needs
- Eliminate or reduce permanent dewatering needs
- Design and implement Contingency Plans for dewatering, quantity and quality concerns
- Carry out a settlement monitoring program during dewatering (as required)
- Monitor groundwater and/or surface water level fluctuations associated with dewatering activities
- Monitor groundwater dewatering volumes (for compliance with EASR/PTTW or requirements from Conservation Authority and MECP)
- Use engineering measures to reduce/eliminate dewatering volumes (e.g., water tight design, etc.)
- Plan for pre-treating water before discharge in the storm sewer system (as required)

If a proposed mitigation plan is recommended, subsequently, a follow-up report is required confirming that the affected zone has been returned to its pre-development/existing conditions prior to the groundwater taking and discharge.

Recommendations

- Proposal of actions to support the development and any special considerations or conditions that should be imposed
- Any recommendations or conditions that should form part of the development approval.

Drawings and Supporting Information

- Figures supporting the narrative in a report
- Results of MECP water well records' search
- Results of water well surveys (as required)
- Test pits / borehole logs
- Groundwater monitoring results
- Datalogger plots (as required)
- Results of single-well response test analysis
- Laboratory certificates of analysis
- Dewatering spreadsheets
- Drawings supporting the application
- Infiltration test analysis (as required)

Additional Resources

Ontario Ministry of Environment: Guide to Permit to Take Water Application Form, n.d.: https://www.ontario.ca/page/guide-permit-take-water-application-form

Regional Municipality of York, Region of York Sewer Use Bylaw #2021-102, n.d.: https://www.york.ca/yorkregion/bylaws/sewer-use-bylaw

Notes

If the proposed development is revised, the study/report shall reflect the revisions by an updated report or letter from the author indicating the changes and whether the recommendations and conclusions are the same.

If the submitted study is incomplete, is authored by an unqualified individual or does not contain adequate analysis, the applications will be considered incomplete and returned to the applicant