

# Discussion Summary: WATER TECHNICAL GROUP

Aggregate Resources Act Review

## Participants:

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## Mandate

The Water Technical group, comprised of surface and groundwater technical experts from provincial ministries, conservation authorities and municipalities, was asked to:

- provide advice on:
  - the potential changes needed to the hydrogeological assessment requirements for ARA applications and amendments to ensure that potential impacts to water sources are appropriately addressed;
  - the assessment of potential cumulative impacts on water resources, including when and where these assessments should be required, and the challenges and opportunities associated with cumulative impact assessments;
- explore opportunities to align technical requirements for hydrogeological assessments required in other approval processes; and
- provide advice on the need for changes to our existing framework for approved operations to ensure adequate protection of our water resources, including municipal drinking water sources

This technical group is a part of an engagement process that is an open-ended search for ideas that are fair, equitable and constructive. The purpose of this process is not to seek a consensus, but rather to explore all viewpoints that need to be considered in the eventual development of proposals for change.

These notes represent a summary of the perspectives around the table, but do not mean that all participants necessarily agreed with each one of the points. These notes should not be cited or quoted outside the context of the working group discussions.

The following pages set out the advice and key considerations recommended by the members of the Water Technical Group for consideration in the development of future policy proposals under the *Aggregate Resources Act* framework, as they related to the protection of water resources

Potential changes needed to the hydrogeological assessment requirements for ARA applications and amendments to ensure that potential impacts to water sources are appropriately addressed.

- Potential impacts to water resources need to be considered for all sites, based on an assessment of risks
- Screening risk assessment could be undertaken/documentated through some form of standardized checklist (possibly similar to the one used for a Permit to Take Water).
- A checklist should be like MOECC's Permit to Take Water categories. Preliminary examples of items that would be considered through a checklist may include: groundwater level and extraction depth, location/proximity of other water users and uses, past well interference complaints, surface water feature interaction with groundwater, significant wetlands, geology, springs, seeps, proposed operational activities (pit or quarry, below water extraction, storage and processing of recycled aggregate materials, fuel storage, rock type, extraction method (e.g., cutting blocks rather than blasting, scale of operation, etc.).
- Sites that fall on the lowest end of the risk scale may not require an impact assessment (if an approach like this is adopted, adequate buffer would need to be built into the risk screening mechanism to ensure that only the sites with acceptably low risk fall into this category). The highest risk sites would require the most detailed assessment, possible modelling, etc.
- The screening risk assessment approach would result in scalable reports.
- The initial screening risk assessment must be completed by a qualified person with appropriate training/expertise in this field (i.e., Professional Geoscientist or a Professional Engineer).
- The scope of the current standards is fairly inclusive; however, guidelines are needed to provide direction on the level of detail and type of information that needs to be addressed under each of these headings. For example, there should be an entire section of the report for each of these headings.

- Hydrology (e.g. surficial flow system, interaction with groundwater system, sensitive surface features, quality/quantity of surface water features, seasonality) needs to be more fully addressed.
- Reports should establish a study area that is comprehensive enough to understand impacts on all sensitive water users or sensitive features reliant on water within the hydrological/hydrogeological regime, putting it into the regional context. Where available, include information from the Regional and Local Municipality or Conservation Authority. The study area should be developed with consideration for:
  - area of influence;
  - features that can be affected by the water taking and/or discharge, e.g. significant wetlands, springs, seeps, waterwells, groundwater aquifers, buildings, rail lines;
  - any known contaminated sites or landfills;
  - other water takings;
  - current and future municipal drinking water sources;
  - anticipated developments with planning approval (e.g. approved Secondary Plan);
  - other relevant hydrogeologic features; and
  - other items identified during risk screening process
- Need better description of the existing conditions - exploration of the hydrogeologic regime, particularly in quarries (e.g. need to drill to base of units to see what lies below, need to figure out how groundwater behaves in local/regional context, address potential for pop-ups or breaching confining layers, and the difference between aquifer/aquitard layers)
- Reports need to address the potential hydrological/hydrogeological impacts that could result from the proposed operation throughout its lifecycle and post-rehabilitation site conditions. For example, if the planned operation includes the pumping/taking of water for aggregate washing or to maintain a dry operation, those impacts need to be addressed in the ARA application impact assessment reports.
- Reports must also assess impacts on downstream surface water features (e.g. assimilative capacity, instream flow requirements, flooding and erosion).
- Monitoring and adaptation and contingency plans for higher risk sites should include climate change considerations.
- There are many sources of information to support these reports, for example, source water Assessment Reports as resource for reporting on vulnerability and assessment of quantity stresses (e.g. Tier 2/Tier 3 water budgets). Guidance documentation for the development of impact assessments for ARA could point to potential information resources. Guidance

documentation should recognize that information resources will vary across the province, and should recognize this by using terminology 'where available'.

- Higher risk sites could be required to file a work plan for the investigation and assessment of potential impacts for approval (to ensure that review/approval agencies, public and qualified persons support the methodology) before the assessment is undertaken. This is the type of discussion that would occur through mandatory pre-submission consultation.
- Use a recommended application reporting format for consistency. This is beneficial for reviewing agencies and the public. MOECC and other municipalities/agencies have developed standardized formats. A standardized format for ARA should look to these for examples.
- Need to ensure clarity in findings/conclusions of the reports, particularly for some of the smaller scale reports (those currently captured as a letter of opinion to support the identification of the established water table and preliminary assessment reports).
- Need to further explore the level of review undertaken when ARA applications are declared 'complete'. The current review is an administrative evaluation, but need consider if there is a need to broaden evaluation to determine if it meets the technical requirements of guidance material.
- With respect to how hydrogeological investigations are carried out:
  - This should be left to the qualified person to determine, providing the investigations will meet the minimum information requirements and address the standardized reporting format.
  - Establish standards in the context of outcomes (e.g., need to put down enough wells and monitor for long enough to get an understanding of the hydrologic cycle confidently, account for seasonal and daily variation in groundwater flow, understand the deposit, and accurately predict and monitor the potential for impacts).
  - The qualified person needs to describe and defend the methodology within a report.
  - Guidance documents should suggest resources (e.g., Association of Professional Geoscientists of Ontario or MOECC reference documents) to establish the expectations.
  - For quarries in the Canadian Shield, allow a qualified person to opt to treat the entire site as if it were below the water table without actually establishing the water table (due to the difficulty of determining the exact elevation of the water table in Canadian Shield).
  - A site visit must be conducted by the qualified person in completing this type of screening risk assessment checklist. An exception to a field visit may be if the site has recently been visited and assessed by a qualified person.

## The assessment of potential cumulative impacts on water resources, including when and where these assessments should be required, and the challenges and opportunities associated with cumulative impact assessments.

- For the purpose of this group's discussion, cumulative effects means the combined environmental impacts or potential environmental impact of more than one development activity, including natural resource utilization or extraction, in a defined area over a particular time period. Cumulative effects may occur simultaneously, sequentially, or in an interactive manner.
- Cumulative impacts should be considered in a landscape/regional setting, the assessment would be equivalent to a subwatershed study.
- Areas in need of study should be identified via higher level of planning. In some areas of the south there is good information already. We can already say that in some areas there is a potential for cumulative impacts. The need for a cumulative impact assessment outside of these areas would need to be determined on a case by case basis.
- Difficult to tag a cumulative impact study to just one operator.
- There is information that could be provided as a part of every application that proposes to extract below water that would help to support understanding of the impacts of an application in the context of other uses/users – for example, determine zone of influence hydrologically and hydrogeologically, identify other uses/users, and address how they will interact within the catchment area of other users. This would inform the determination of whether a cumulative impact assessment is required.
- In addition to assessing the impacts associated with pumping the potential impacts of cumulative discharge should also be assessed (with respect to ecological sensitivity, flooding, etc.).
- Outside of areas where pre-consultation has identified a higher level planning need for cumulative impacts, the qualified professional should be the one to determine whether or not there is a need to consider/assess cumulative impacts as a part of the original hydrological/hydrogeological risk screening. If the assessment of cumulative impacts is required, the qualified person would prepare a terms of reference for the assessment that would be confirmed with hydrogeologists/technical staff within review agencies prior to the work being undertaken.
- Cumulative impact assessment looks at multiple water takers and the impacts that may be generated from the water taking or water discharge over a time period(s). Need to look at other significant water takings as well, not just aggregate sites in the vicinity.
- Existing sites contribute to cumulative impacts and can be a part of the solution. Older sites may need to be re-evaluated. There would be a need to require existing operations/other water takers, as well as new applicants in the area to conduct/participate in a study.

- One of the challenges is determining how cumulative impact assessments should be developed and funded. We recommend that this be further explored. Some examples of questions that need to be addressed:
  - Where existing significant water takers are undertaking a cumulative impact study, new development coming in needs to be required to participate.
  - Facilitating information sharing between parties.
  - In concentrations of aggregate operations, there may be situations where the last operation in triggers the need for a study. Need a way to require existing operations to participate. Also need to identify who will lead the process (i.e., government, industry, joint effort).
  - Funding approaches. May be worthwhile to consider looking at a pooled fund that could be used to cover cumulative impact assessments for multiple parties. (e.g., could establish a fund in the Aggregate Resources Trust that operators could apply to use in specific situations).
- Need to look at other agency's approaches to assessing cumulative impacts, and Carden Plain study.
- The Carden Plain study was simpler from the perspective that it was aggregate operation focussed (no other significant water takers in the area). In situations where there are other significant water takers in the area that need to participate in the study, the ARA may not be the best instrument to implement the study.
- Cumulative impact assessment needs would be best discussed/identified as a part of pre-consultation with agencies. Pre-consultation would really be helpful to scope out potential assessment needs and how they could be addressed.

The need for changes to our existing framework for approved operations to ensure adequate protection of our water resources, including municipal drinking water sources.

- Current framework is not adequately protective. There is a need to have the ability to re-evaluate sites based on changes in science or changes in landscape.
  - Reason for re-evaluation is to make sure that things haven't changed (science hasn't changed, baseline hasn't changed, understanding of geology or hydrogeology hasn't changed, etc. Timeframe for review: if not much going on, longer time period; if there are big changes, needs to be shorter. Permit to Take Water review period is a maximum of 10 years.

- It is in everyone's best interest to know whether there is a potential impact before it happens rather than waiting until there is an interference.
- Consider a specified review period (e.g.,10 or 15 year review) or trigger criteria based on:
  - reactive (e.g., complaint of interference, well interference, unpredicted drawdown, change in water table elevation, impacts to wetland features, spills, fuel storage, handling of contaminant materials (recycling),).
  - highest risk, using similar criteria that would be used the approach recommended for new sites
- In addition to the current provisions requiring ARA sites to conform with source protection policies, for municipal drinking water protection:
  - For new sites (including the expansion of existing sites), need to prohibit any extraction within 2 year time of travel (Wellhead Protection Area A & Wellhead Protection Area B)for a municipal well.
  - For existing sites (above and below water) within 2 year time of travel
    - If below water, requiring monitoring – add spill monitoring/contingency plans, possibly revisit rehabilitation plan to minimize future land use concerns.
    - Explore the need to minimize potential impacts associated with ancillary activities such as recycling, asphalt crushing, batch asphalt processing, importing off site materials and soils.
    - May be a need for existing sites to align with a risk management plan (source protection Risk Management Plan).
    - Need a greater guarantee that rehabilitation will occur in accordance with the site plan.
    - May need to revisit existing monitoring programs – could be under ARA as well as Permit to Take Water.
  - The review agency for determining the adequacy of protection of municipal drinking water would be the municipality or, where delegated by the municipality, the source protection authority.



## Opportunities to align technical requirements for hydrogeological assessments required in other approval processes

- Recommendations have been made above that would incorporate key Permit to Take Water and Environmental Compliance Approval discharge approvals requirements into ARA reports, and allow for harmonization of provincial and municipal requirements through pre-consultation.
- In developing ARA guidance materials, incorporating references to known requirements/guidelines would be beneficial.

## Other input and advice from the water technical group members

- Financial assurance
  - For the higher risk sites, financial assurance should be considered to address potential compensation to another water user for lost use. For example, Woods Quarry (1980s) – within 2-3 days, the water supply was eliminated for months.
  - Consider whether financial assurance is required for sites that are importing fill.
  - For sites where long-term water management is required post-licence or where risks continue after operations/rehabilitation are completed and the ARA approval is surrendered.
    - For some sites, financial assurance could be released when site is rehabilitated and has transitioned into the future land use (subject to municipal agreement / rezoning).
  - Old abandoned (unlicensed) sites can be a hazard (unauthorized dumping of garbage, fill, spills, etc.). Funds should be allocated to rehabilitate these sites to minimize the risk, or to provide compensation where damages are caused.
    - Municipalities should be asked to provide input on priority sites in their areas.

## Appendix 1: Risk Factors

**Table 1: Examples of the types of factors that should be considered in determining the potential need for cumulative impact assessment.**

- a. Stressed watershed (based on Tier 2 assessment)
- b. Multiple developments currently exist, or significant anticipated future development
- c. Number of water takers (any type of significant water taker, not limited to aggregate operations)
- d. Located in Well Head Protection Zone (WHPA) A or B or has the potential to increase the lateral extent of a nearby WHPA-A or WHPA-B
- e. Degree of environmental degradation that presently exists in subwatershed

**Table 2: Examples of the types of factors that should be considered in hydrogeological impact risk screenings for new aggregate applications**

- a. Stressed watershed (based on Tier 2 assessment)
- b. Multiple developments currently exist, or significant anticipated future development
- c. Number of water takers (any type of significant water taker, not limited to aggregate operations)
- d. Potential increase in vulnerability to municipal water supplies
- e. Degree of environmental degradation that presently exists in subwatershed
- f. Groundwater level and extraction depth
- g. Location/proximity of other water users and uses
- h. Past well interference complaints

**Table 2: Examples of the types of factors that should be considered in hydrogeological impact risk screenings for new aggregate applications**

- i. Surface water feature interaction with groundwater
- j. Significant wetlands
- k. Springs & seeps
- l. Proposed operational activities (pit or quarry, below water extraction, etc.)
- m. Storage and processing of recycled aggregate materials
- n. Fuel storage
- o. Geology, rock type
- p. Extraction method (e.g., cutting blocks vs. blasting)
- q. Scale of operation
- r. The location of contaminated lands and land uses (i.e. landfilling) within proximity of the site
- s. Table 1: Potential Aggregate Extraction Impacts, in *Draft Regional Municipality of Waterloo Guidelines for Hydrogeological Assessments for Proposed Mineral Aggregate Resource Extraction Projects* (August 2008)

## Appendix 2: Recommended Reference Documents

**Table 3: Recommended Reference Documents**

| Document Title:  | Description:  |
|--|---|
| <p>Golder Associates: Report on Cumulative Impacts Assessment for Groundwater Takings in the Carden Plain Area, September 2012</p>                                   | <p>This report, commissioned by the Ontario Stone, Sand, and Gravel Association, outlines a multidisciplinary study and impact assessment to evaluate the potential cumulative impacts of quarry dewatering at twelve quarries on groundwater, surface water and ecological receptors on the Carden Plain. .</p>  |
| <p>Golder Associates Ltd.: Draft Report on Mill Creek Annual Cumulative Impact Assessment – 2004. Township of Puslinch Ontario.</p>                                  | <p>This report was prepared with the purpose of assessing the extent of impacts associated with current extraction operations in the Mill Creek area and to rationalize the monitoring program.</p>   |
| <p>Ministry of the Environment: Permit To Take Water (PTTW) Manual, April 2005</p>   | <p>This manual sets out the decision making process generally followed by the Ministry and it is intended to explain to applicants, proponents, and the public the requirements and considerations that are generally taken into account when a S. 34 Director and Ministry reviewers are evaluating a proposed or existing water taking.</p>   |
| <p>Ministry of the Environment: Technical Guidance Document For Surface Water Studies In Support of Category 3 Applications for Permit to Take Water, April 2008</p> | <p>This document provides guidance and a consistent, structured approach for a surface water study (hydrological and or ecological) study in support of a category 3 Permit to Take Water (PTTW) applications (or for Category 2 applications, where applicable).</p> <p>Part C of this document (Selected References and On-line Information Sources) includes further recommended references.</p> |

**Table 3: Recommended Reference Documents**

| Document Title:  | Description:  |
|--|---|
| Ministry of the Environment:<br>Technical Guidance Document For Hydrogeological Studies In Support of Category 3 Applications for Permit to Take Water, April 2008                                   | This document provides guidance and a consistent, structured approach for a hydrogeological study in support of category 3 Permit to Take Water (PTTW) applications (or for Category 2 applications, where applicable).<br><br>Part C of this document (References and Appendices) includes further recommended references. |
| Ministry of the Environment: Permit to take Water Regional Screening Checklists (Category 1-3)   |   |
| The following documents are from the Association of Professional Geoscientists of Ontario Website at:<br><br><a href="http://www.apgo.net/pro-practice.htm">http://www.apgo.net/pro-practice.htm</a> |   |
| <a href="#">Final Report - QP Task Force for the Environmental Geosciences</a>   | Provides recommendations and criteria to be declared a QP in the practise of environmental geoscience.  |
| <a href="#">APGO adopted General Professional Practice Guidelines for Environmental Geoscience September 2003</a><br>(PDF size 46 KB)  | A professional technical guidance document for reference by APGO members in conducting their professional geoscience work.  |
| <a href="#">APGO adopted Professional Practice Guidelines for Groundwater Resources Evaluation, Development, Management and Protection Programs in Ontario October 2004</a><br>(PDF size 196 KB)     | A professional guidance document prepared by the Groundwater Resources Sub-Committee of the Professional Practice Committee for reference by APGO members and C of A holders conducting all geoscientific work concerning groundwater resources.  |

**Table 3: Recommended Reference Documents**

| Document Title:   | Description:  |
|---|---|
| <p><a href="#">General Professional Practice Guidelines for Geophysicists May 2012</a><br/>(PDF size 46 KB)</p> | <p>These guidelines have been prepared by the Association of Professional Geoscientists of Ontario (APGO) to assist Professional Geoscientists (P.Geo.) in the planning and execution of geophysical programs. These guidelines have also been prepared to assist Professional Engineers (P.Eng.) who are qualified to practice professional geoscience in accordance with The Professional Geoscientist's Act, 2000.</p> |
| <p><a href="#">APGO Guidance on Document Authentication May 2013</a><br/>(PDF size 97 KB)</p>                   | <p>A professional guidance document prepared in accordance with the Professional Geoscientists Act (2000). This guidance document provides direction on document authentication, which can also be referred to as either "sealing and signing" or "stamping and signing".</p>   |