

## TECHNICAL MEMORANDUM

**DATE** October 12, 2021

**Project No.** 1791470

**TO**

CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada)

**FROM** Heather Melcher

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### **TERMS OF REFERENCE FOR NATURAL ENVIRONMENT AND WATER RESOURCES TECHNICAL STUDIES FOR THE CBM ABERFOYLE SOUTH PIT EXPANSION, TOWNSHIP OF PUSLINCH, ONTARIO**

Golder Associates Ltd. (Golder) has been retained by CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) to carry out technical studies in support of Planning Act applications to the Township of Puslinch and the County of Wellington and an application to the Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNR) for a Class "A" licence (Pit Below Water) under the *Aggregate Resources Act* (ARA) for the property located at 6947 Concession Road 2, Township of Puslinch, Wellington County, Ontario (the site). The site will be an expansion to CBM's existing Aberfoyle South Pit.

The technical studies for the ARA licence application and *Planning Act* applications will include a number of disciplines, including hydrogeology, surface water and natural environment.

The technical requirements of these supporting studies are outlined in the County of Wellington Official Plan (2021) and the Aggregate Resources of Ontario Provincial Standards: A Compilation of the Four Standards Adopted by Ontario Regulation 244/97 Under the *Aggregate Resources Act* (2020). Golder's proposed approach to the project has been developed to meet these requirements.

The above studies will be integrated to ensure that any key linkages between the hydrogeological and hydrological components, and the receiving natural environment features, are holistically evaluated to support the completion of the potential impact assessments for the proposed expansion of the pit and the development of appropriate mitigation measures, if required.

### **Integrated Water Resource Assessment**

The following provides the proposed scope of the water resources program consisting of hydrogeology (groundwater) and hydrology (surface water) components.

#### **Hydrogeology**

The program for hydrogeology consists of the following:

- A review of publicly available data and reports relevant to the Site and subwatershed.

- A review of the Grand River Source Protection Plan (GRCA 2021) and any other applicable policies.
- A field investigation program that includes:
  - Borehole drilling, grain size analysis and monitoring well installation
  - Baseline groundwater quality monitoring (general water quality parameters including major ions, metals, and petroleum hydrocarbons)
  - Hydraulic conductivity testing (single well response tests) of the monitoring wells installed as part of the field program
  - Groundwater level and temperature monitoring (dataloggers to record water level and temperature hourly and downloaded quarterly)
- A review of local groundwater users based on the Ministry of the Environment, Conservation and Parks (MECP) Water Well Information System (WWIS) and Permit To Take Water (PTTW) databases.
- A private well survey of properties surrounding the site was originally planned for 2020 or 2021. The purpose of such a survey was to supplement the MECP WWIS information and “ground truth” the current condition of neighbouring resident’s water supply wells. Activities would have included door-to-door visits and subsequent interactions between field staff and residents. Participation would be entirely voluntary. However, as a result of ongoing COVID-19 concerns this task has been postponed for the time being. It is proposed that this activity be completed at later date prior to any aggregate extraction taking place on the site.
- In conjunction with surface water studies, the development of a Site water budget for Existing, Operations and Rehabilitated Scenarios to determine pre-and post-development surplus, runoff, and infiltration rates.
- The construction and calibration of a 3D numerical groundwater flow model based on the “Tier 3 Model” with high resolution refinement of the model mesh within the immediate area of the site, and subsequent predictive simulations to estimate potential water flow impacts of the proposed below-water extraction on surrounding groundwater and surface water receptors.
- The development of a groundwater analytical model to predict the potential for thermal impacts to local watercourses, including Mill Creek, taking into account the Grand River Conservation Authority (GRCA) Cumulative Effects Assessment Best Practices Paper (GRCA 2010).
- Analysis and qualitative hydrogeologic impact assessment.
- An assessment of groundwater vulnerability and potential changes to water chemistry.
- An analysis of potential cumulative effects in light of the presence of other nearby aggregate operations, taking into account the GRCA Cumulative Effects Assessment Best Practices Paper (GRCA 2010)..
- Development of a monitoring plan for groundwater.
- The results of the hydrogeological assessment will be summarized in a Maximum Predicted Water Table Report and a Level 1 and 2 Water Report that fulfills the current County of Wellington Official Plan policies and ARA requirements.

## Surface Water Resources

An assessment of surface water resources in the area of the site, as well as adjoining areas that may be affected by proposed expansion, will be completed to allow for quantification of potential effects. The surface water resources assessment consists of the following:

- Background review of the available information pertaining to within approximately 500 metres of the site. the information reviewed will consist of:
  - i) Aerial photographs and topographic, physiographic, and geologic mapping
  - ii) Published water resources reports
  - iii) Any existing permits or monitoring reports from the site, and nearby lands (e.g., Mill Creek Pit)
- Review of GRCA floodplain data for the site, and assessment of potential impacts of extraction on flood elevations on-site and both upstream and downstream.
- Site reconnaissance to identify and confirm drainage features and catchment boundaries adjacent to the pit. The site reconnaissance is also used to corroborate the findings of the information review and identify local features that were not apparent from the background review.
- A water budget and pit water balance using a Thornthwaite water budget tool, developed for the existing pit footprint area (footprint) and the proposed expansion lands. The Thornthwaite water budget information will be used to develop an annual pit water balance for the existing operation. A future pit water balance will be estimated by including future footprint and land-use information.
- The in-stream water level, temperature and flow monitoring in Mill Creek and associated tributaries in the vicinity of the site will allow Golder to characterise the creek reaches and therefore better understand potential effect of the proposed extraction on site. The in-stream water level monitors will be paired with stream piezometer monitoring stations and visited quarterly.
- An effects assessment on features within the catchment of the site that documents the magnitude and significance of expected changes in the water budget of the site.
- Development of a monitoring plan for surface water.
- A report that describes the surface water assessments, including a description of existing and proposed conditions and expected effects, and will ultimately be included as an appendix to the Level 1 and 2 Water Report.

## Natural Environment Assessment

Golder is undertaking a work program for a natural environment assessment to evaluate the natural features in the vicinity of the site. Golder will assess the potential impacts of the proposed below water extraction on those features and their ecological functions and, if necessary, recommend measures to prevent or mitigate negative impacts on any significant features. The proposed program consists of the following:

- Background data compilation and review of existing documents and information sources which will be focused on designated features in the vicinity of the site. This will include a review of relevant County of Wellington and Provincial policies.
- Review of the water balance completed as part of the surface water assessment, as described above, and assessment of the potential impacts of that water balance on natural features on, and in the vicinity of, the site.
- Species at Risk screening focussing on those species listed under the Ontario *Endangered Species Act* (ESA) and federal *Species at Risk Act* (SARA). First completed at a desktop exercise using up to date air photos, and then updated based on the results of the field surveys.
- Field surveys including:
  - i) Plant community assessment using the Ecological Land Classification (ELC) system for southern Ontario (Lee et al. 1998). As part of this assessment, the boundaries of natural heritage features including wetlands and woodlands were delineated/confirmed using a handheld GPS. Note that wetlands were delineated using ELC and not delineated using the Ontario Wetland Evaluation System (OWES).
  - ii) Three season botanical inventory
  - iii) Three rounds of anuran call count surveys following protocols from the Marsh Monitoring Program method for vocalizing frog surveys (BSC 2008)
  - iv) Two rounds of amphibian habitat assessment and egg mass surveys following protocols from the Sampling Protocol for Determining the Presence of Jefferson Salamanders (*Ambystoma jeffersonianum*) in Ontario (JSRT 2013)
  - v) Assessment of the site and vicinity as habitat for Blanding's turtle.
  - vi) Three rounds of breeding bird surveys following protocols from the Canadian Breeding Bird Survey (Downes and Collins 2003), and the Ontario Breeding Bird Atlas (Cadman et al. 2007)
  - vii) Bat habitat and acoustic surveys based on guidance from the MNRF document Survey Protocol for Species at Risk Bats within Treed Habitats (MNRF 2017) and Bat and Bat Habitat: Guidelines for Wind Power Projects (MNR 2011).
  - viii) Wildlife habitat assessment and general wildlife surveys (Visual Encounter Surveys) following provincially accepted methods (Bookhout 1994; McDiarmid 2012; MNRF 2016; MNRF 2017; Pyle 1994).
  - ix) A qualitative fish habitat assessment in Mill Creek and tributaries on the site and in the vicinity, using MTO Fisheries Assessment Protocols and Golder's Technical Procedures (unpublished file information). These protocols include a description of aquatic habitat (e.g., permanence, stage, confinement), habitat mapping of key habitat features (e.g., riffles, pools, woody debris) and characteristics (e.g., wetted and bankfull width/depth, substrate types, cover, seepage areas), a description of riparian and/or aquatic vegetation, identifying locations of any critical fish habitat areas or barriers to fish movement and observations of any fish and aquatic species.
- Analysis of the data collected in conjunction with the background data compilation and integration with the hydrogeological and surface water studies to complete a potential impact assessment.

- Development of the final rehabilitation, including appropriate setbacks, upland and wetland plantings, creation of wetlands and wildlife habitat.
- One single natural environment report that includes a description of existing conditions through the desktop review and results of the field surveys, an assessment of impacts on all natural features, as outlined in the Provincial Policy Statement (MMAH 2014), the rehabilitation plan, a description of any mitigation and monitoring, and will meet the requirements of:
  - Natural Environment Report (NER), based on ARA standards (Ontario 2020).
  - Environmental Impact Assessment (EIA) for the County of Wellington (Wellington 2021).

## Closing

We trust this Terms of Reference meets with your approval. If you have any questions or comments, please do not hesitate to contact the undersigned.

### Golder Associates Ltd.

  
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[https://golderassociates.sharepoint.com/sites/21291g/deliverables/terms of reference/1791470-tm-rev0-cbm aberfoyle south pit expansion terms of reference-mhbc comments-12oct2021.docx](https://golderassociates.sharepoint.com/sites/21291g/deliverables/terms%20of%20reference/1791470-tm-rev0-cbm%20aberfoyle%20south%20pit%20expansion%20terms%20of%20reference-mhbc%20comments-12oct2021.docx)

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