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August 9, 2019

Client Services and Permissions Branch
Ministry of the Environment, Conservation and Parks
135 St Clair Ave West, 1st Floor
Toronto, ON M4V 1P5

Re: PTTW Application (Reference Number: 0821-BCSLAK)
Lafarge Canada Inc.
7501 Wellington Rd 124, Guelph-Eramosa Township, Wellington County

The Grand River Conservation Authority (GRCA) has received notification of the above-noted PTTW application to renew and amend permit number 2718-7S3RM7.

The following comments are based on the information provided in the notification of the permit application and the application report entitled "Lafarge Wellington County Site: Quarry Dewatering and Water Use Investigation" by Golder Associates Ltd., June 2019.

The requested amendment to the permit includes two new sources: the on-site Supply Well and the Quarry Sump. This letter contains comments pertaining to potential impacts of the Quarry Sump taking on the Speed River and adjacent Provincially Significant wetland, including potential impacts resulting from discharging pumped water into these natural features. Specific comments on the application and recommendations for monitoring and permit conditions are included in the following sections.

Dewatering

Dewatering is predicted to lower the water table to approximately 285 masl (base of proposed bedrock extraction), which is approximately 9m lower than the bed of the Speed River in the adjacent reach. Lowering of the water table will change groundwater gradients in the local area, potentially resulting in a reversal of gradients along the river reach and change the reach from a groundwater discharge zone to a groundwater recharge zone. Monitoring data provided with the application agrees with an upward gradient near the river.

Additional information regarding monitoring and mitigation measures should a reversal in groundwater gradient occur at the south end of the site should be provided. The application states that should a

reversal in gradient occur, water pumped from the quarry will be returned to the Speed River. Additional information should be provided regarding thermal mitigation, water quality, and potential impacts to adjacent provincially significant wetlands.

Baseflow and Impacts to the Speed River

The Grand River Integrated Water Budget (AquaResource 2009) mapped the adjacent reach of the Speed River as receiving greater than 30 L/s/km of groundwater discharge based on a regional numerical groundwater flow model. Assuming a reach length of 1 km along the quarry taking, the river would lose up to approximately 0.03m^3/s of groundwater discharge, by the reversal of gradient. Add to that the amount that is predicted to be pulled into the quarry from the river 0.016m^3/s (Section 11.3) and the already permitted Speed River taking of 0.015m^3/s, the resulting cumulative taking from the Speed River is 0.06m^3/s or 5,184,000 L/day. This value should be considered when evaluating the effects of the proposed taking on the Speed River instead of only the amount considered in the application of 1400m^3/day (0.016m^3/s).

The application discusses the potential to grout bedrock fractures if a reversal in groundwater gradient is observed. Additional information should be providing regarding the existing fractures encountered in the core holes, especially along the southern extends of this site. Additional mitigation information should be provided with regard to monitoring and grouting.

Baseflow calculations in the application are not representative of impacts to the river system. The calculations provided in the application are based on annual flows and on a gauge station that is a large distance downstream. The Speed River is highly regulated. Discharge from Guelph Dam is used to augment river flows during dry periods to ensure sufficient water is in the river for wastewater assimilation and ecological flows. The proposed taking is located downstream of the Guelph waste water treatment plant (WWTP) effluent discharge and upstream of the Hespeler WWTP discharge. The river is most stressed in the summer period when high temperatures lower the assimilative capacity. The low flow target during this period is 1.7 m^3/s at the Speed River Below Guelph gauge located approximately 8.5km upstream.

The GRCA operates a water flow station at monitoring site SW1, Speed River at Road 32, which is located at the site. The gauge station used in the application is a large distance downstream. There are differences in the watershed between the locations including urban drainage, groundwater discharge and a WWTP outlet. The GRCA recommends using the local gauge station rather than pro-rate the flow from the gauge downstream.

Summer low flow at this site is estimated to be 2.0 m^3/s which is less than half of the estimated baseflow value provided in the application of 4.3 m^3/s. The GRCA water flow station is likely a better predictor of the impact of the taking on the local reach of the Speed River during the highest stress time of the year. Based on a cumulative taking of 0.06m^3/s (see above) and a summer low flow of 2.0m^3/s using GRCA water flow station data, the taking from this permit application is approximately 3% of summer low flows. This value represents a much higher value than provided in the application.

The GRCA recommends that baseflow be recalculated by the applicant on a monthly basis to reflect seasonal affects. It is also recommended that instead of pro-rating flow from the downstream gauge

based on drainage area, that local flow data from the GRCA flow station be used for the calculation. This data is available for download via the GRCA website.

The application states that impacts to the Speed River will be mitigated by discharge from the Quarry Sump to the river. Although this application is primarily for the water taking and not the discharge of the water, the GRCA is concerned regarding erosion, thermal impacts and water quality of the discharge water to the river. A discharge of 6000m^3/day (0.25m^3/s) represents 12.5% of the total normal summer flow along the reach and could result in changes to water chemistry and have thermal implications.

The GRCA recommends that the applicant completes a more comprehensive cumulative impact assessment on the impact of the taking on the Speed River by accounting for all of the takings on seasonal baseflow and including effects to water quality and from the discharge from the Quarry Sump.

The development of a numerical groundwater-surface water flow model would assist in providing information as to how groundwater flow gradients and surface water will be impacted by the presence of the quarry, during both active dewatering and post quarry operation.

Natural Heritage

The Speed River Wetland Complex was designated a Provincially Significant Wetland by the Ministry of Natural Resources and Forestry (MNRF) in 1987. The wetland comprises, or is closely associated with or supports, other areas of local or provincial significance, including Significant Woodland, Significant Valleyland, and Significant Wildlife Habitat (i.e. amphibian breeding habitat, candidate bat maternity habitat, deer wintering areas, habitat for species of conservation concern, and wildlife movement corridors). An adverse impact on the form or function of the Speed River Wetland could also negatively affect one or more of these significant natural heritage features.

Both pairs of wetland piezometers show a continual upward gradient with no seasonal reversals, indicating that the wetland is supported, at least in part, by groundwater discharge. A reversal in these local groundwater gradients as a result of quarry pumping has the potential to affect the sustainability of the wetland. The alteration of groundwater discharge to the wetland complex and Speed River can affect water temperature, quality, and hydroperiod, potentially resulting in the degradation or loss of wetland habitat.

Monitoring

With respect to the monitoring program, temperature and water level monitoring within the wetland is recommended to assess the impacts of discharging quarry water on direct and indirect fish habitat. The application does not make clear whether vegetation monitoring will occur in both marsh and swamp areas. It is recommended that monitoring be done in both communities and that there is more than one sampling event to properly monitor and assess any changes on vegetation community composition and structure, particularly within marsh areas. Broad characterizations of vegetation communities using terms such as “mixed herbs, grasses, and sedges” (see Table 8 in the application) are not particularly useful. The GRCA recommends application of the Floristic Quality Assessment System (see Oldham et al. 1995) to verify baseline conditions and to facilitate detection of any shifts in vegetation community composition and/or structure.

Section 12.3 of the report notes that a Request for Review will be submitted to Department of Fisheries and Oceans (DFO) prior to any new or modification of existing discharge to the Speed River. The GRCA is in agreement with this approach and defers to DFO for further input on this aspect of fisheries mitigation and monitoring plan.

Source Water Protection

The permit application is within the Well Head Protection Area for quantity (WHPA-Q) for the City of Guelph and Township of Guelph/Eramosa. This WHPA-Q has been assigned a significant risk level as a result of the completed Tier 3 Water Budget and Risk Assessment, undertaken as part of assessments under the *Clean Water Act, 2006*. Water quantity source protection policies are required in areas with a significant risk level, and are currently in development. The WHPA-Q identifies an area where more detailed study and investigations are warranted when assessing Permits To Take Water to protect sources of municipal drinking water within this area.

Of particular concern is that the quarry excavation remains above the Vinemount Member and not breach or compromise this aquitard. The City of Guelph's municipal drinking water is sourced from the aquifer located in the bedrock formation beneath the Vinemount Member. The Vinemount is a significant aquitard, providing protection from surficial activities and contaminants from entering the City of Guelph's drinking water supply. When this aquitard is breached or compromised, it reduces the protection to the City's drinking water supply.

This is a relevant concern as another quarry operation within the WHPA-Q has breached the Vinemount aquitard in recent years. The GRCA encourages the Ministry to ensure appropriate measures and safe guards are in place with the PTTW approval and aggregate license to ensure the proponent does not breach or compromise the Vinemount Member aquitard.

The Ministry is encouraged to consult with the City of Guelph, Guelph-Eramosa Township and the County of Wellington in regard to how the proposed taking may affect their municipal water systems. The GRCA is further supportive of collaborative efforts between the City of Guelph, Township of Guelph-Eramosa, and Puslinch Township to ensure water taking concerns from this application are addressed.

Should you have any further questions, please do not hesitate to contact the undersigned at (519) 621-2763 ext. 2306.

Yours truly,

Stephanie Shifflett, P. Eng.
Water Resources Engineer
Grand River Conservation Authority

SS/

cc:
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