

To: Kevin Brousseau
1614 Waterloo Office

From: Sean Geddes
1609 Waterloo Office

Project/File: 161413338

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Reference: 220 Arkell Addendum Memo - Natural Environment Response to Comments on Second Submission

Further to the meeting held with City of Guelph staff on November 9, 2023 to discuss second submission comments, this memo is intended to address a few remaining natural heritage items in the context of the most recent draft plan and water balance information that was presented at the November 9th meeting.

Stormwater Management Infrastructure and Buffers

A comment was provided regarding the location of stormwater management (SWM) infrastructure related specifically to the proposed spreader swale being located within the inner 15 m of the typical 30 m Provincially Significant Wetland (PSW) buffer. City of Guelph Official Plan policy 4.1.3.4.6 indicates that SWM facilities and structures and their normal maintenance may be permitted, where low impact development measures have been implemented to the extent possible outside of the buffer and provided they are not located within 15 metres of the PSW (i.e., within the "no-touch" zone).

The revised draft plan has reconfigured some SWM elements such that the spreader swale is no longer proposed to encroach within the 15 m zone adjacent to the PSW. All elements of the SWM facility will be established beyond the minimum 15 m "no-touch" zone and will become part of the buffering system. While SWM facilities are constructed features, their function is to provide stormwater treatment as well as moderate water balance. These water quality and quantity "buffering" functions are further complemented by the establishment of vegetation in and around the SWM facility through a planting plan. The end result is that the SWM facility becomes part of the physical buffer as naturalization matures, with the facility also providing functions typically attributed to buffers as a whole (e.g., water quality pre-treatment, established distancing from development, etc.).

Stormwater Management Infrastructure and Ecological Linkage

During previous submissions, comments were raised regarding the surplus of runoff that would be discharged ultimately to the PSW following treatment by the SWM facility. Comments raised included the amount of surplus reaching the wetland and potential impacts that may occur such as shifts in vegetation composition and species presence as a result of excess water beyond pre-development conditions.

To reduce runoff surplus, additional opportunities for infiltration were examined. Given the relatively small size of the site, it was determined that if an encroachment into the designated Ecological Linkage were permitted to allow for increased SWM facility sizing, sufficient additional infiltration could occur that would contribute to reducing runoff surplus to more acceptable levels.

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The revised draft plan will include an updated SWM pond layout that would place an infiltration cell into the Ecological Linkage area. The infiltration cell would be a vegetated area that will normally be dry on a day-to-day basis and function to infiltrate event-driven runoff. As there are no steep slopes and standing water associated with the proposed feature, fencing, which would normally impede wildlife movement, will not be required. Side slopes of the cell will be graded to 5:1 or shallower, thus reducing steepness normally associated with the typical 3:1 slope configuration. The shallow slopes will, when constructed, be planted with native species and allowed to vegetate to a mature state. Combining the reduced side slopes with planted vegetation, the facility will not be noticeable as infrastructure, but will blend into the Ecological Linkage as a slight topographic feature permitting free movement of wildlife and perhaps use of the vegetation associated with the cell.

Revisions to SWM, Water Balance and Influence on Wetland Ecology

The 220 Arkell Road Environmental Impact Study Addendum that was submitted in April 2023 included an assessment of potential wetland impacts based on the draft plan at that time and the findings of a feature-based water balance assessment that was completed based on its corresponding SWM layout and design. At the time, the water balance assessment modelled a mitigated post-development annual runoff surplus to the Torrance Creek Swamp PSW of **6,075 m³**. This volume of discharge theoretically predicted an increase in surface water levels within the primary basin of the wetland of less than **5 mm**, which also assumed a flat-bottomed basin where no infiltration was occurring within the wetland. The Addendum discussed wetland impacts following the Toronto and Region Conservation Authority (TRCA) *Wetland Water Balance Risk Evaluation* (TRCA 2017) to predict the risk of potential impacts to the Torrance Creek Swamp wetland. Unfortunately, the TRCA Risk Evaluation document assumes a direct impact due to catchment or water input loss only, and does not allow for an adjusted assessment after the application of mitigation such as SWM approaches. The Addendum further examined potential impacts in the context of potential ponding of runoff surplus in the wetland and the fluctuating nature of the water table during different seasons. An examination of potential impacts to vegetation and wildlife was also completed, taking into account the modelled surplus and how it would interact with the actual ground conditions observed in the wetland during a spring water pooling survey that was conducted as part of the 2023 Addendum.

The 2023 Addendum concluded that the runoff surplus that would have been delivered to the wetland based on the 2023 water balance would have been unlikely to impact the depth and frequency of ponding that occurs under existing conditions, particularly during the summer growing months when wetland infiltration and plant evapotranspiration is at its greatest. The influx of post-development runoff to the wetland was not expected to detrimentally impact the long-term ecological form of the wetland feature, given the following:

- Wetland vegetation is adaptable and is exposed to changing hydroperiods throughout a typical year (e.g., flooding in spring, dry in summer) which can also change from year to year. Plants exhibit remarkable adaptations to deal with these stressors which allow wetland plants to remain productive under variable and otherwise stressful conditions.
- Vegetation is dormant in the winter months, when plant cells cease activity (i.e., photosynthesis) and oxygen is not required. Therefore, flooding during this time would be the least impactful to a wetland. The timing of discharge surplus peaks and lows worked with the natural cycle of wetland dormancy and growth such that impacts are reduced through temporal mitigation.

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- Ponding in the summer months is not expected as the recharge function of the wetland is high at that time and, subsequently, runoff is expected to infiltrate quickly.

Stantec recently recalculated the water balance following adjustments to the design of the SWM facility, that included an increase in infiltrative capacity that will increase the amount of infiltration that will occur. Details of the revised water balance are contained in the letter *Revised Water Balance Calculations in Response to First and Second Submission Comments, Draft Plan Application - 220 Arkell Road, City of Guelph, Ontario (Third Submission)* dated February 7, 2024. With revisions to the SWM approach of the Draft Plan the predicted post-development annual runoff surplus to the Torrance Creek Swamp will be further reduced to **2,640 m³**, with the greatest monthly surpluses occurring during the winter/spring season when vegetation is dormant and not susceptible to water levels, and when water is abundant on the landscape (during spring freshet and early spring precipitation) to which local vegetation has adapted over time.

A revised assessment of the potential increase in ponding depth within the Torrance Creek Swamp due to the maximum monthly surplus was completed using the reduced annual runoff surplus and is documented in the 2024 Stantec water balance letter. Presuming the portion of the Torrance Creek Swamp basin located downstream of the Site is relatively flat over a 24.3-hectare (ha) area, the greatest summer monthly surplus (August – see Figure 7 of water balance letter) discharged would result in surface water levels in the hypothetically flat-bottomed basin now increasing by less than **3 mm** (0.003 m). As with the previous analysis, this is a conservative assumption because it does not account for infiltration beneath the basin, nor does it consider evapotranspiration losses following discharge during the growing season. Although post-development runoff will be directed to the Torrance Creek Swamp during those months when runoff under the pre-development condition is low to absent (e.g., May to October), the groundwater table is typically at its lowest elevations during these months and infiltration will be maximized. Coupled with this is the uptake of water by trees and plants during the summer growing period and evaporative losses during the warmest months of the year.

In summary, it was predicted that no wetland impacts were anticipated with a previous surplus resulting in slightly less than 5 mm increase in water levels given the factors of the seasonality of surpluses and wetland infiltration capacity. With the predicted annual surplus reducing from 6,075 m³ to 2,640 m³, the prediction of no anticipated impacts to the wetland is still valid.

Recommended Environmental Implementation Report Content

The 2019 EIS contained discussions on potential impacts to the natural environment and provided mitigation recommendations for items to be considered at detailed design. Some components, such as vegetation removal, general construction practices and associated mitigation approaches were outlined. An overview of restoration/enhancement measures including trail development, invasive species and hazard tree management and wildlife passage (culvert) were also raised. During and post-construction monitoring were also touched upon in a conceptual fashion.

At the time of detailed design, an Environmental Implementation Report (EIR) will be developed that discusses prescriptive approaches to various mitigation items in more detail and in relation to specific site features and construction activities. It is expected that the EIR will contain more fulsome discussion on the following items, as applicable:

- Development considerations and mitigation approaches associated with SWM design and function, pedestrian trail locations

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- Conservation, protection and mitigation measures such as:
 - Grading control, access control fencing, erosion and sediment control
 - Tree Inventory and Preservation Plan
 - Vegetation Compensation Plan
 - Landscape Plan and associated planting plans for SWM and neighbourhood
 - Wildlife culvert location and design elements
 - Invasive species management
 - Development design for wildlife considerations, such as lighting, bird-friendly guidelines, etc.

- Monitoring Program components, such as:
 - During construction monitoring
 - Post-construction monitoring
 - SWM facility monitoring
 - Wetland monitoring
 - Vegetation plantings
 - Invasive species monitoring

The content and topics of discussion to be covered in the EIR will be determined through consultation with City staff during detailed design.

STANTEC CONSULTING LTD.

Sean Geddes
Senior Aquatic Biologist
Phone: (519) 400-9837
sean.geddes@stantec.com