patersongroup **memorandum**

consulting engineers

re:	**Geotechnical Recommendations - Dual Cell Storm Water Management Pond** **Claridge / Uniform Developments Inc. (KNUEA)** **March Road - Ottawa (Kanata)**
to:	Novatech Engineering - **Mr. John Riddell** - j.riddell@novatech-eng.com
cc:	Novatech Engineering - **Mr. Marc St. Pierre** - m.stpierre@novatech-eng.com
date:	May 17, 2019
file:	PG4258-MEMO.03

Further to your request and authorization, Paterson Group (Paterson) as prepared this a response to City of Ottawa review comments issued November 30, 2018 to present the geotechnical consideration in building a dual cell storm water management facility (SWMF) at the aforementioned site. This memo should be read in conjunction with Paterson Report PG4258-1 Revision 3 dated May 17, 2019.

Storm Water Management Ponds

It is understood that consideration have been given to design a dual cell SWMF to serve the proposed residential development. Refer to drawing, Stormwater Management Pond - Plan and Profile, by Novatech project number 116132, drawing 116132-SWM1 and drawing 116132-SWM2 revision 2 dated May 1,2019. A SWMF is an engineered structure designed to temporarily store rainfall and runoff water and then releasing at a control rate. By controlling the flow the SWMF protects downstream lands from erosion and flooding. In addition, they allow sediments and contaminant to settle before releasing the runoff into a natural watercourse. SWMF can be composed of multiple cells or/and bay and be shaped to accommodate various geometries or site restrictions as long as water stagnation areas aren't created.

Site Considerations

Geotechnical considerations are to be noted during the design of the proposed SWMF.

Bedrock

As presented in Paterson Report PG4258-1 - Revision 3 dated May 17, 2019, the overburden thickness in the proposed area of the SWMF varies from 0.4 m to 2.5 m. To accommodate the required volume of runoff water and allow sufficient retention time for settlement, the pond would require bedrock excavation. Which can be completed using hoe ramming, grinding or controlled blasting.

Hydrology

The hydrological investigation completed by Paterson shows the presence of artesian pressure and a long-term groundwater elevation of 81.5 m at the proposed SWMF location. Resistance to uplift pressure due to hydrostatic pressures will have to be considered during the design and construction of the SWMF. As noted in Paterson Report PG4258-1 - Revision 3 dated May 17, 2019, water infiltration rate within the overburden are expected to be low to moderate and the infiltration rate is expected to be high through bedrock.

A temporary Ministry of the Environment, Conservation and Parks (MECP) permit to take water (PTTW) may be required for this project if more than 400,000 L/day of ground and/or surface water is to be pumped during the construction phase. A minimum of 4 to 5 months should be allowed for completion of the PTTW application package and issuance of the permit by the MECP.

The ground water infiltration should be controllable by over-excavating a sump pump pit within the SWMF to dewater the site during construction. Alternatively, a series of dewatering wells can be install around the proposed SWMF.

Based on the shallow bedrock encountered across the subject site, the neighbouring buildings are expected to be founded on glacial till or bedrock. Therefore, temporary dewatering of the area during construction is not expected to adversely affect the neighbouring structures.

Conclusions

Based on the site consideration described above, a dual cell SWMF offers a good option to limit the amount of bedrock to be excavated. While a multi cell SWMF requires a larger surface area, it allows for shallower ponds by increasing the travel time of the runoff water. A dual SWMF design will also need to account for maintenance and sediment management. Control structure may be required to isolate the cells for maintenance and different sediment management zone may be required depending on the geometry of the cells. Note that the sediment management zone will need to reflect the size of each cell's forebay. Space may be an issue in design dual or multi cell SWMF, however, the use of properly designed retaining walls withing the SWMF can help maximising the use of the available area. Retaining walls properly design for SWMF are not only a elegant part of the system but can also be used to direct and control flow at inlet and outlets or around bends.

The proposed dual cell SWMF will minimise the liner thickness require to counteract the uplift pressure from the elevated groundwater levels. Which in consequence also minimise the potential water infiltration to manage during construction.

In Paterson's opinion, a dual cell SWMF is an economically feasible proposition that would facilitate the design and construction of the SWMF without affecting the control or the quality of the effluent.

We trust that this information satisfies your requirements.

Best Regards,

Paterson Group Inc.

May 17, 2019

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