STORMWATER MANAGEMENT

IN ASSOCIATION WITH: CLEARFLOW Group Inc.

Life Cycle / Asset Management

A "Low Maintenance" Stormwater Pond Retrofit Design Using Validated Performance Metrics

The **Laurelwood Basin B (Pond #53)** is located in the **City of Waterloo** and discharges to Laurel Creek upstream of the Laurel Creek Reservoir. Since construction in 2003, Pond #53 had accumulated a large amount of sediment from general construction and upstream development activities, which threaten the facility's original designed function. As a result, the City of Waterloo decided to explore innovative solutions to: 1) improve efficiencies for the facility's sediment clean out and disposal; 2) integrate cumulative effects watershed modeling (using CANWET™) into the retrofit design process and to optimize sediment removal and improve downstream water quality; and, 3) provide better and more cost-effective sediment disposal options for future implementation.

In the spring of 2017, the project was initiated by the City in partnership with GREENLAND® International - Consulting Engineers and Clearflow Group. Third-party consultant review services was also provided under separate contract to the City, and with a focus on products developed by the Clearflow Group that were incorporated into the "low maintenance" retrofit design and construction phases. This review validated claims about the products' performance related to sediment management. In the summer 2017, a $350,000 grant was also approved by the Federation of Canadian Municipalities (FCM) to help offset the total project cost of over $1,000,000. Therefore, the anticipated (positive) post-construction monitoring results will then be shared with other municipalities to identify a scalable and cost-effective approach using proven life cycle friendly products for similar pond clean-out and retrofit design projects.

The retrofitted facility will help reduce annual costs associated with regular maintenance once completed. Additionally, as per a recent study identifying small ponds that may account for about 15% of global CO^2 emissions and over 40% of global diffusive CH^4 emissions, GREENLAND® is exploring other ways in which GHG reductions are achieved through other science-based / life cycle design and performance methods.

This unique project approach will also be considered by the City to rehabilitate other municipally owned waterbody assets. In addition to cost savings from a life cycle perspective, this retrofit project will also reduce & remove sediment released from the pond and improve downstream water quality – including, more efficient reductions in total suspended solids and phosphorus. These performance metrics will also provide further ecosystem benefits to the Laurel Creek Reservoir, Silver Lake, Grand River and ultimately Lake Erie.
The project was completed in the fall 2019. The City's letter of acknowledement is attached for reference.

October 24, 2019

Greenland International Consulting Ltd.
120 Hume St.
Collingwood, ON L9Y 1V5

Attention: Jim Hartman, P. Eng.

Re: Pond #53 Sediment Removal, Reuse and Retrofit Project Services for the City of Waterloo

Dear Jim:

As a Senior Project Engineer (Water Resources) for the City of Waterloo, I would like to extend my appreciation to Greenland Consulting Engineers for providing exemplary EA planning, design, contract administration and construction inspection services for the Pond #53 Sediment Removal/Reuse and Retrofit Project.

This project was an important undertaking for the City which consisted of: the removal of 360m^3 of sediment for reuse in a City owned boulevard area; removal of all additional sediment (approx. 3,000m^3) from the SWMF permanent pool and forebay area to improve its operation, implementation of the retrofit design including improved maintenance access and proactive management of many unforeseen conditions throughout the duration of the project. This project also included significant logistical challenges with respect to the coordination of public access for area residents and businesses, and providing workable solutions to implementing the design as intended due to challenging unforseen site constraints.

As the Design Consultant, Contract Administrator and on-site Construction Inspector, Greenland always maintained open lines of communication between the City, Contractor and the affected residents, and promptly responded to all questions and issues raised by the Contractor, the City and the public. Greenland's attention to detail throughout the entire duration of this assignment helped ensure the project was completed as required.

It has been a pleasure to do business with your team and the City looks forward to working with Greenland again in the future.

On a personal note, I would be pleased to serve as a professional reference when your firm bids on other municipal projects in the future.

Sincerely,

Jessica Kellerman

Jessica Kellerman, P.Eng.
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Engineering Services, Design & Construction
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STORM FACILITY RETROFIT PROJECT PROFILE

Dewatering-Erosion Control-Sediment Binding

CLEARFLOW Group Inc.

www.clearflowgroup.com

TSS REDUCTION

STORM POND SEDIMENTATION

LOCATION:

Storm Pond #53, City of Waterloo, Ontario, Canada

CLIENT NEEDS:

The municipal client was searching for an innovative method to safely dewater and transport sediment sludge from a Stormwater Management Facility (SMWF). One of the core objectives was to remove many years of accumulated sediment from the storm pond (approx. 3,000 cu. metres) and to reinstate the original design capacity plus functional design effectiveness.

CHALLENGE:

Provide an environmentally safe, effective and efficient operational treatment methodology to dewater, and bind the sludge to reduce transportation costs.

SOLUTION:

The City of Waterloo required an integrated design & solution team, and engaged the "Greenland - Clearflow Team" to develop the optimum solution. The storm pond was dewatered and treated for safe release using Clearflow's Patented Water Lynx™ flocculation treatment system. The Water Lynx™ Reactors were strategically located to treat the sediment laden water (high TSS – Total Suspended Solids) to accelerate colloidal sedimentation. The flow then passively travelled over Clearflow's Treated GeoJute™ for final water polishing, capturing and removing the TSS for fish safe water release to the environment. This innovative process significantly highlighted the effectiveness and benefits using Water Lynx™ and Lynx Ultrabind™ for SWMF retrofits/cleanouts.

EQUIPMENT:

Soil Lynx™ – stabilization and erosion control
Lynx Ultrabind™ – sediment binding
Water Lynx™ Pipe Reactor - dewatering

DEWATERING AND TSS CAPTURE

SEDIMENT BINDING

UNIT 140, 134 PEMBINA ROAD
SHERWOOD PARK, ALBERTA
T8H 0M2 CANADA | 780.410.1403

Revised March 2019

STORM POND TREATMENT PROJECT PROFILE

Dewatering-Treating-Sediment Binding

GREENLAND 1994 25th ANNIVERSARY 2019 CONSULTING ENGINEERS

CLEARFLOW Group Inc.

www.clearflowgroup.com

NOTES:

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