

Phytoremediation of a Former Urban Sewage Lagoon

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Background/Objectives. Conventional remediation strategies for urban sewage lagoons historically have been an expensive proposition for cities and municipalities around the world. Conventional excavation or cap and cover strategies may run into the tens of millions of dollars and often employ equipment and remediation approaches with significant associated carbon footprints. Furthermore, commonly employed conventional remediation strategies require copious quantities of imported fill and cover material, resulting in measurable environmental impact associated with cover and fill borrow sites. Phytoremediation has the potential to effectively manage the environmental impacts associated with decommissioned lagoon facilities while performing better from a triple bottom line sustainability perspective.

Approach/Activities. Geosyntec, working collectively with researchers and faculty from the Northern Alberta Institute of Technology (NAIT), was able to compare conventional remediation approaches for the City of Edmonton's former Bremner Lagoon cells versus a novel phytoremediation approach. The selected plant-based remediation strategy was designed to manage soil and groundwater impacts commonly observed in historical sewage lagoons (nitrates, various metals) and included components that will make the site conducive to future research and teaching activities over the duration of the multi-year remediation effort. Future research anticipated at this site will focus on developing sustainable and effective phytoremediation approaches for municipal infrastructure projects, mine tailings stabilization and reforestation.

Results/Lessons Learned. This presentation compares the selected phytoremediation approach to other commonly employed conventional remediation strategies. The comparison of remediation approaches was based on each technology's ability to effectively manage and remediate the environmental issues associated with the Site, as well as triple bottom line based sustainability metrics. Geosyntec concluded that a phytoremediation strategy outperformed conventional remediation approaches and facilitated the ability to incorporate remediation plan research attributes that will allow for phytoremediation science to further advance in coming years. Phytoremediation also had the added benefit of concurrently creating a forested landscape that potentially could be enjoyed by city residents. Over the next two decades, this project will serve as a living laboratory and will help determine if phytoremediation approaches can be developed to sustainably solve other classes of contaminated sites that have similar physical and chemical attributes to former lagoon sites.