



Introduction



Wastewater Regionalization Concept

Summary:

- The Darwell Lagoon Commission Wastewater Regionalization effort is a concept to establish a regional utility model for handling wastewater within Lac Ste. Ann County and surrounding areas

Core Objectives:

- Provide a means of safe, efficient, and financially viable wastewater collection, treatment, and disposal
- Meet CCME standards for ammonia in treated wastewater
- Protect the health of Alberta's lakes by promoting environmental stewardship within the Sturgeon River Watershed
- Utilize new and existing infrastructure and provide affordable solutions to all participants
- Strengthen community collaboration across the region.



Regional Wastewater Phasing Strategy

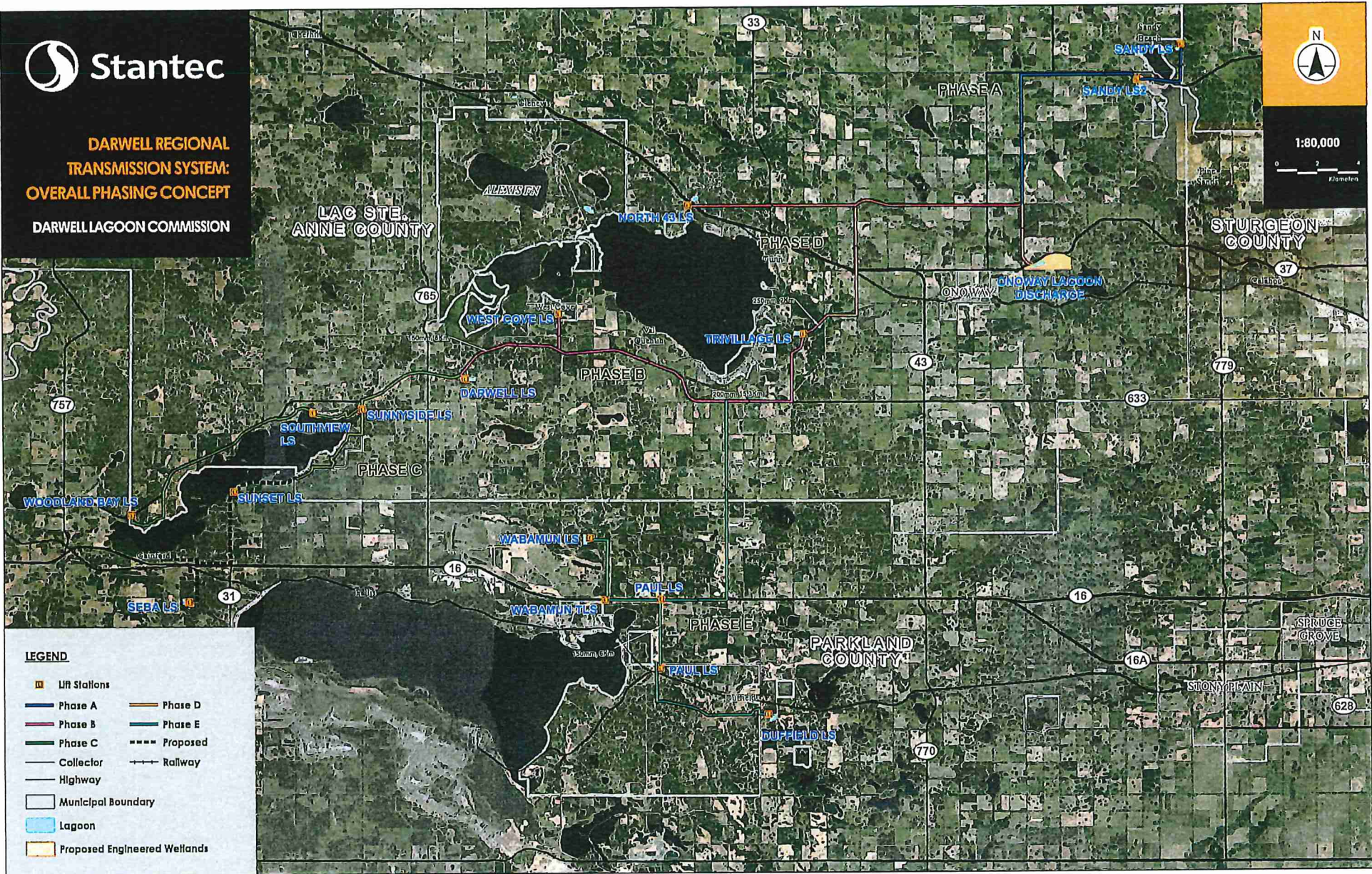
The Wastewater Regionalization Concept is a utility system that leverages local collections infrastructure and treatment lagoons as part of the region's greater wastewater servicing strategy. The Commission would implement regional transmission lift stations and piping to connect local communities to centralized treatment.

Planned system phasing splits the region into manageable construction contracts based on a ranking matrix prioritizing aging systems.

- Phase A – Sandy Beach, Sunrise Beach: Out for bid in April 2023
- Phase B – The Darwell Lagoon Commission: Construction completion expected Q4 2023
- Phase C – Isle Lake Communities: Currently in preliminary design
- Engineered Wetlands – Future
- Phase D – North 43 Lagoon Commission and the Tri-Village Lagoon Commission: Future
- Phase E – Wabamun Lake Communities: Future



**DARWELL REGIONAL
TRANSMISSION SYSTEM:
OVERALL PHASING CONCEPT**
DARWELL LAGOON COMMISSION



LEGEND

UR Stations	Phase D
Phase A	Phase E
Phase B	Proposed
Phase C	Railway
Collector	Highway
Municipal Boundary	
Lagoon	
Proposed Engineered Wetlands	

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Serviceable Communities

The Wastewater Regionalization Concept study has considered extending wastewater service opportunities to both actively participating and potential future community partners including:

Summer Villages:

- Alberta Beach
- Castle Island
- Gunn
- Kapasiwin
- Point Allison
- Ross Haven
- Sandy Beach
- Seba Beach
- Silver Sands
- Southview
- Sunrise Beach
- Sunset Point
- Val Quentin
- West Cove
- Yellowstone

First Nation:

- Alexander
- Alexis
- Paul Band

Towns / Hamlets

- Duffield
- Gainford
- Onoway
- Wabamun

Wastewater Commissions:

- Darwell
- Tri-Village
- North 43



Regional Wastewater Transmission Concept



Wastewater Regionalization Methodology

The Wastewater Regionalization Concept study utilizes existing community infrastructure and constructed regional components, forming a regional wastewater utility.

Community Infrastructure:

- Local wastewater collection
- Local treatment lagoons

Regional Infrastructure:

- Community wastewater lift stations
- Conveyance piping
- Final wastewater treatment facilities
- Final wastewater outfall



Wastewater Regionalization Study Findings

Key Findings:

- Many existing wastewater treatment lagoons throughout the County are already at or nearing full capacity triggering potential non-compliance.
- The capital cost of upgrading existing lagoons may be unattainable by many study participants if undertaken alone.
- Regional wastewater conveyance forcemain is recognized as grant fundable
- A new stand-alone conventional wastewater treatment plant is cost prohibitive
- Utilization of the Town of Onoway's wastewater treatment lagoons is of comparable cost to regional conveyance to the ACRWC system and are likely to have a much lower utility treatment cost for system users
- Tertiary engineered wetlands are a feasible natural systems alternative to increase treatment capacity at Onoway as part of the regional utility model



Wastewater Regionalization: Current Direction

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Darwell Engineered Wetlands

The Wastewater Regionalization steering committee has developed an engineered wetlands concept to retain water within the Sturgeon River Watershed.

- The Town of Onoway lagoons have been selected as the regional wastewater system termination point
- Engineered wetlands may be implemented to increase treatment capacity at Onoway to handle future regional utility wastewater volumes
- The Alberta Conservation Association (ACA) is assisting to determine future sustainability of the project
- Natural systems combine many environmental benefits with treatment functionality





Engineered Wetlands Introduction

Wetlands are natural systems that use a combination of physical, chemical and biological treatment mechanisms to degrade, transform and sequester contaminants. Discharge from stormwater and wastewater systems have traditionally demonstrated water quality improvements for over a century. Providing tertiary polishing for final effluent.

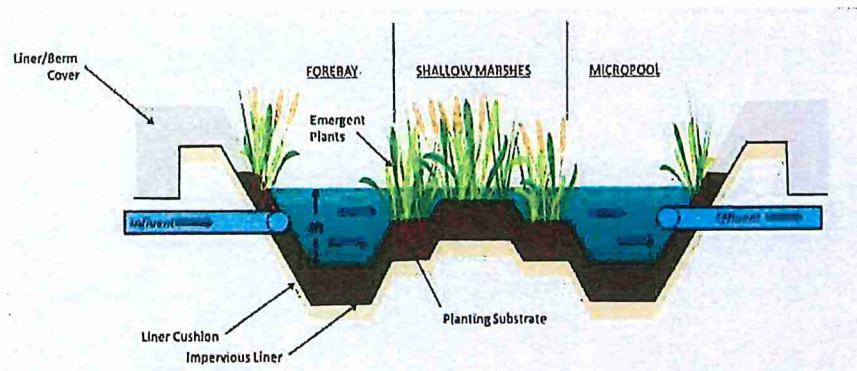
The DLC is targeting the implementation of an Engineered Wastewater Wetland system as an integral component of conventional lagoon treatment under the regional transmission main strategy, which has never been completed in Alberta. Recent advances in wetland technology have overcome traditional hurdles such as solids clogging, odor mitigation, temperature-related seasonality in treatment performance, expanding the application to include secondary wastewater treatment.



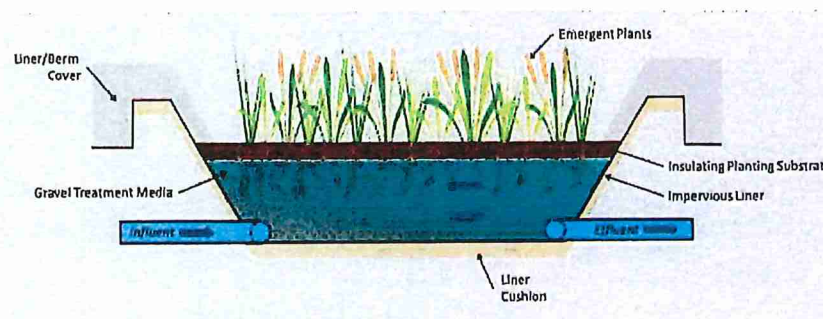
Engineered Wetlands Benefits

The simplicity of operation, low maintenance requirements, sustainability, and cost-efficiency offered by Engineered Wastewater Wetlands collectively constitute an attractive alternative to conventional treatment methods. These systems facilitate:

- Sedimentation, filtration, and accretion/burial for the removal of TSS and phosphorus
- Microbial degradation for the removal of TSS, BOD and nitrogen
- Microbial destruction of pathogens



Free Water Surface Engineered Wetland Flow Diagram



Subsurface Engineered Wetland Flow Diagram

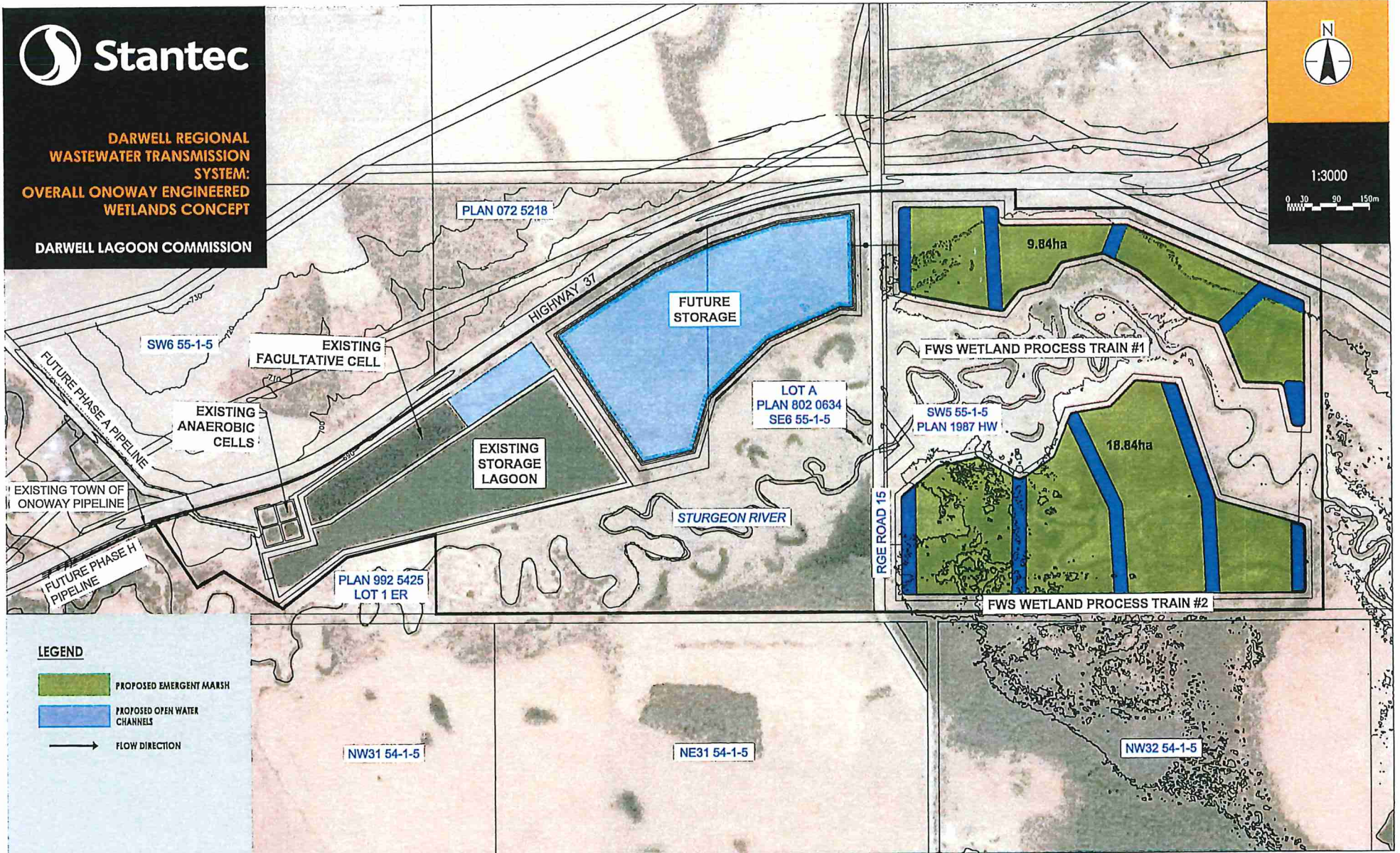
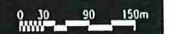


**DARWELL REGIONAL
WASTEWATER TRANSMISSION
SYSTEM:
OVERALL ONWAY ENGINEERED
WETLANDS CONCEPT**

DARWELL LAGOON COMMISSION



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LEGEND

- PROPOSED EMERGENT MARSH
- PROPOSED OPEN WATER CHANNELS
- FLOW DIRECTION