



1

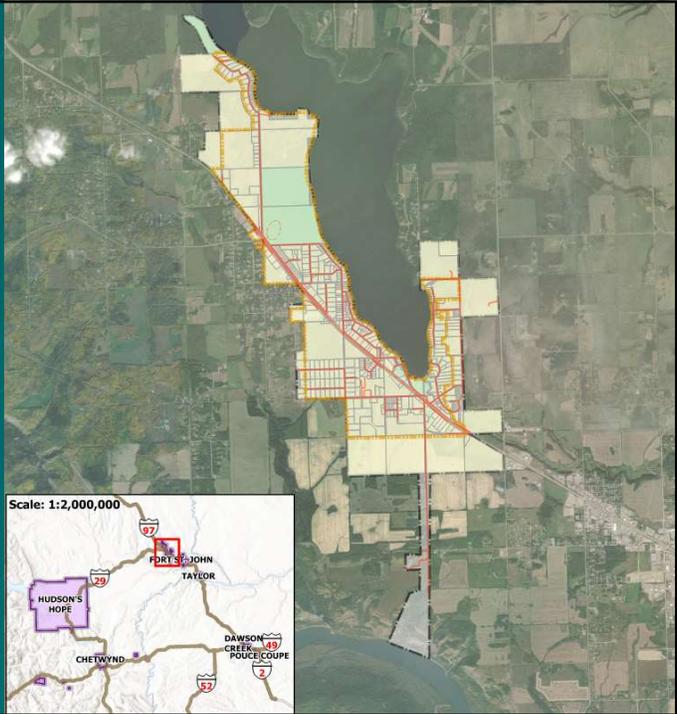
Today's Presentation

- PROJECT BACKGROUND/SCOPE
- OVERVIEW OF COLLECTION SYSTEM MODEL
 - CAPACITY ASSESSMENT TOOL – OLD VS. NEW
 - WHY PCSWMM?
 - DESIGNS AND ASSUMPTIONS
 - HOW PRRD IS USING THIS MODEL
- CAPITAL IMPROVEMENT PLAN - CIP
 - PROCESS ANALYSIS OVERVIEW
 - SUMMARY OF FINDINGS
 - RECOMMENDATIONS, BENEFITS, AND COST
 - PRIORITIES

2

Project Background & Scope

- EVALUATE EXISTING SEWER SYSTEM
 - PHYSICAL INFRASTRUCTURE & CAPACITY TOOL
- UPDATE CAPACITY TOOL
 - CREATED A NEW TOOL
- CAPITAL IMPROVEMENT PLAN
 - CORRECT DEFICIENCIES
 - PREPARE FOR EXPANSION

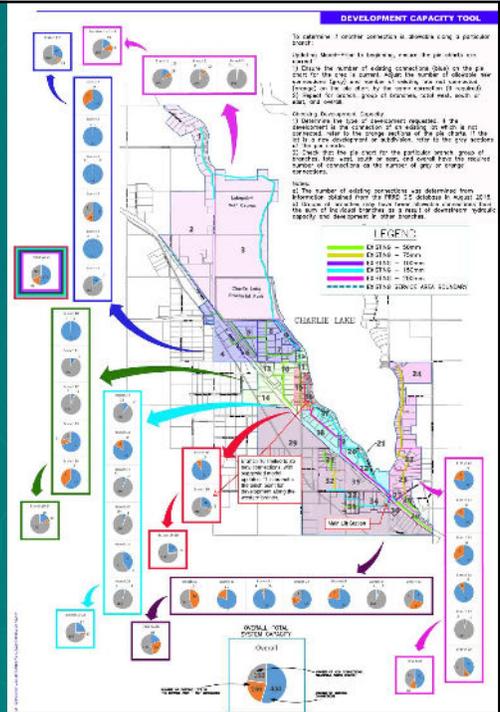


3

PCSWMM Model

The Old Capacity Tool

- BASED ON FULL FLOW OF PIPES
 - OVERLY CONSERVATIVE
- USES A SPREADSHEET
 - NOT GEOSPATIALLY REFERENCED
- USES CAD
 - DOES NOT AUTOMATICALLY UPDATE



4

PCSWMM Model

The New Capacity Tool

- BASED ON SYSTEM PRESSURE AND TYPICAL FLOW RATE
 - LESS CONSERVATIVE
- SPATIALLY ORIENTED
 - VISUALIZATION
- MULTI-USE SOFTWARE
 - MAPPING, DATA, GIS, ENGINEERING
 - USER MANUAL HAS BEEN PROVIDED TO PRRD

5

PCSWMM Model

Using the New Capacity Tool

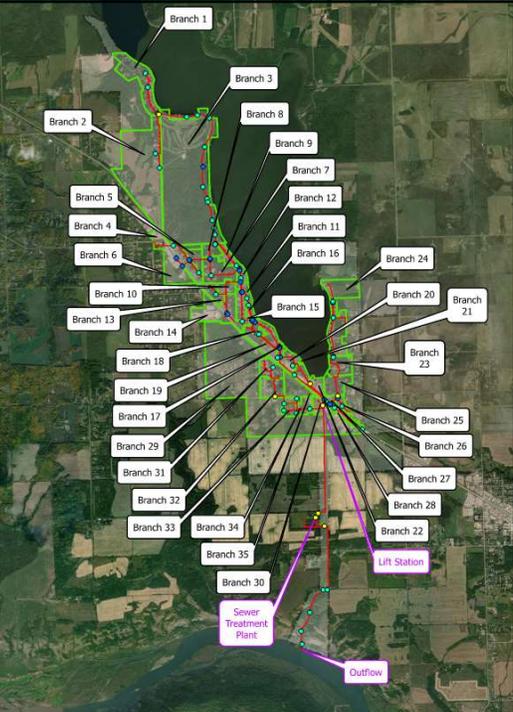
- VISUAL TOOLS
 - PARCELS, BRANCHES, AERIAL MAP
 - PROFILES AND PLAN VIEW
 - TALKS WITH HOMEOWNERS AND DEVELOPERS
- STORED DATA
 - ATTRIBUTES AND TABLES
- QUESTIONS RE: MODEL?

PCSWMM MODEL – LAKESHORE DRIVE EXAMPLE

6

Collection System

- 1991 CONSTRUCTION BEGAN
 - STEP SYSTEM
 - GRADUAL EXPANSION
- VALVES
 - CLOSED BLOW OFF VALVES
 - SEIZED GATE VALVES
- FLOW MONITORING STATIONS
 - MOSTLY INOPERABLE



7

Collection System

- FLOW MONITORING STATIONS
 - IMPORTANT FOR:
 - SYSTEM OPERATIONS
 - LEAK DETECTION
 - MODEL CALIBRATION
 - COMMUNICATIONS → ON-GOING ISSUE

Station	2011	2020	2023
Station 1			
Station 2			
Station 3			
Station 4			
Station 5			
Station 6			
Station 7			
Station 8			

No Communication / Not Transmitting Data

Flow values are transmitting but appear to be incorrect

Station is operating properly



8

Lift Station

1992 → ORIGINAL RECORD DRAWINGS

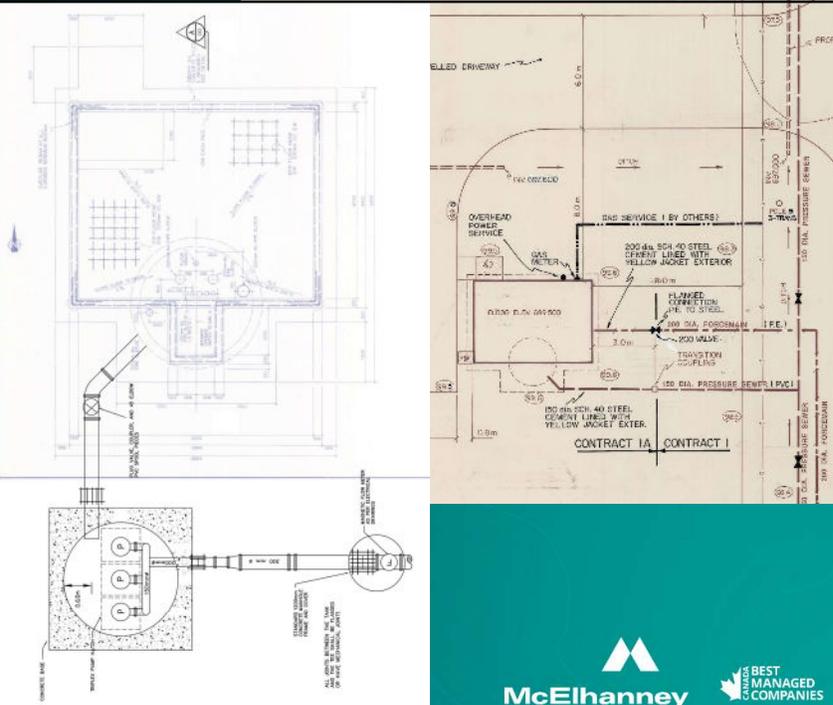
2005 → UPGRADE

- NEW WET WELL

2015 → REPAIRS

- NEW VALVES & PUMPS
- ULTRASONIC LEVEL SENSOR

POST 2015 → 3 LEAKS



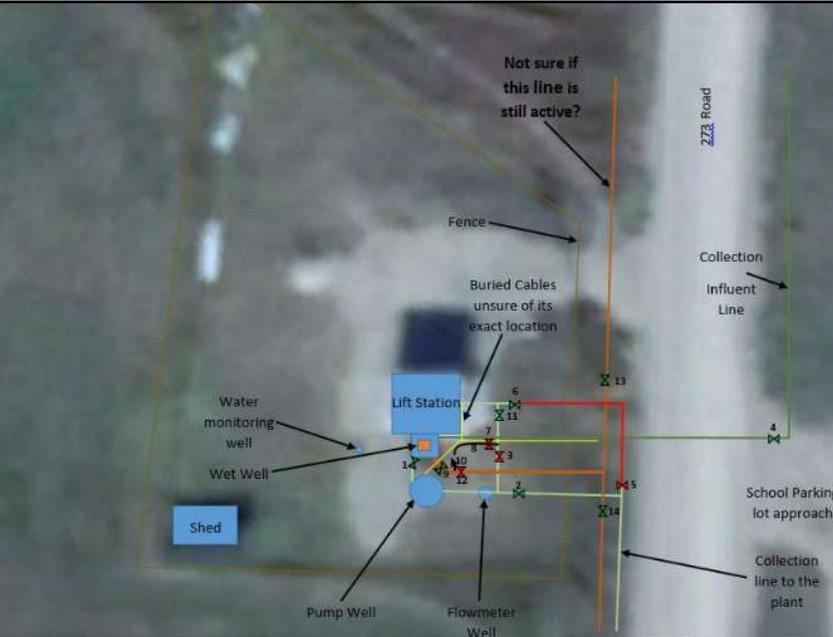



9

Lift Station

OPERATOR'S SYSTEM SKETCH:

- VALVES
- PIPES
- UNKNOWN





PEACE RIVER
REGIONAL DISTRICT



All lines and points are an estimation

10

Lift Station

CURRENT CONDITION:

- CAPACITY OK
- CORROSION 😞
- PUMP CONTROL & SCADA 😞

2024 – RECOMMEND FIXING ISSUES

ULTRASONIC LEVEL TRANSMITTER
HATCH (3 REQ'D) C/W FALL PROTECTION HINGED GRATING
ELEV 699.60
LIFT OUT RAILS
2.438 m DIA. FIBERGLASS REINFORCED PLASTIC TANK
PLATFORM
STEEL X PVC
25mm AIR RELEASE VALVE
PLUG VALVE
CHECK VALVE
0.5m
HWL 697.1
PUMP 3 ON 697.0
PUMP 2 ON 696.7
PUMP 1 ON 696.5
PUMP 2&3 OFF ELEV 695.20
PUMP 1 OFF ELEV 695.10
LWL 695.00
3.0m
ROBAR COUPLER - STEEL X PVC, PLUG VALVE, SPOOL PIECES
INV 695.60
300# PVC DR18
TOP FLOOR REINF ISM # 225mm G.C. ISW
81M FLOOR REINF ISM # 300mm G.C. ISW
STEAM OUT EXISTING WET WELL TRUCK SEWER TO LAGOONS DURING TIE INS (2.5 km SOUTH) OR USE NEW PUMPING STATION
TOP OF BENCHING
FLOOR ELEV 695.100
ELEV 694.85
950
50mm 500g LEVELING COURSE
500
CONNECTION DETAILS AS PER TANK SUPPLIER
20MP TYPE 50 CONTRACTOR TO PROVIDE DETAILED DESIGN BY PROFESSIONAL ENGINEER

11

Sewage Treatment Plant

2014 → Upgrade: Limited Data
only 16 Trucked Waste samples

2023 → Step 1: Design Basis vs. Actual Data

- Are values in agreement?
- How well is the process working?
- Are effluent targets being met?

```

graph TD
    A[TRUCKED WASTE RECEIVING FACILITY (TWRF)  
Interface with Haulers] --> B[ANAEROBIC CELL  
Solids settled and returned to TWRF for dewatering  
Decant flows to Facultative Cell]
    B --> C[FACULTATIVE CELL  
Pre-treatment of trucked waste  
Pumped to the CMT via Facultative Lift Station]
    D[COLLECTION SYSTEM INFLUENT  
Pumped to the CMT via Main Lift Station] --> E[COMPLETE MIX TANK (CMT)]
    C --> E
    E --> F[AERATED LAGOONS]
    F --> G[PEACE RIVER]
    
```

12

Sewage Treatment Plant

Step 2:

- Data to make better decisions?
- How to extend equipment life?
- How to improve treatment?
- How to meet ammonia targets?
- What about the future ?

- 1. SAMPLING PROGRAM
- 2. MAINTENANCE COSTS
- 3. PROCESS OPTIMIZATION
- 4. COLD WEATHER AMMONIA REDUCTION: ATTACHED GROWTH SYSTEMS
- 5. OTHER ENHANCEMENTS
- 6. SUSTAINABILITY / ENERGY RE-USE

Step 3: Timeline and Cost?

- 10-YEAR CIP AND SCHEDULE




13

Sewage Treatment Plant

7 Sampling Programs

A. CHARACTERIZE INFLUENT STREAM 

B. OPTIMIZE PROCESS & MEET TARGETS 

C.  FOR DESLUDGING & FUTURE DESIGNS

SAMPLING PROGRAMS		
2024	A	TWRF – Influent Stream Characterization
2024	A	Industrial Discharges Audit and Potential Sampling
2024	B	Confirm Aeration Efficiency in Lagoons During Freshet
2024	B	Data Collection in treatment system - optimization
2024/2025	C	Anaerobic & Facultative Cell Sludge Profiles
2024	C	UV System Design Parameters – <i>currently not tested</i>




14

Sewage Treatment Plant

Maintenance



MAINTENANCE		
2024	T4	Clean / Inspect CMTs
2024 - 2025	T5	Facultative Cell Sludge Removal - Geotubes
2024	T6	Aerzen Blower Servicing




15

Sewage Treatment Plant

Process Optimization



PROCESS OPTIMIZATION		
2023-2034	T7.a	Anaerobic Cell – Trash Pump to Mix Cell
2024	T7.b	Anaerobic Cell – Dewatering, Inspecting
2025	T7.c	Anaerobic Cell – 3rd Pty Desludging
2024	T8	Optimize Lagoon Cell Recycling Discharge – <i>Improve Mixing in Facultative Cell, Summer Denitrification</i>
2024	T9	Install Cover Over CMT <i>Reduce Freezing</i>
2024	T10	Spring Treatment Issues - <i>Data Analysis & Optimize Recirculation / Aeration</i>



16

Sewage Treatment Plant

Other Enhancements

- Confirm Book-Ends & Update Model
- ↗ Reliability

OTHER ENHANCEMENTS		
2024	T.12	Update Plant Design Parameters <i>Sampling program</i>
2026	T.13	Additional Shop <i>Concurrent w/ Another Project</i>
2026	T.14	Back-Up Power Supply
2025 – 2027??	T.15	Upgrades Specific to New Permit Requirements – <i>TBA???</i>




17

Sewage Treatment Plant

Sustainability / Energy Re-Use

- **SHORT-TERM**
- **LONG-TERM**

SUSTAINABILITY / ENERGY RE-USE		
2025	T.16	Add VFDs to Lagoon Blowers
2030	T.17	Reclaim Rainwater – <i>Allowance to Investigate</i>
2030	T.18	Centrifuge Cake Upcycling - <i>Allowance to Investigate</i>
2030	T.19	Add In-Line Hydro Turbine - <i>Allowance to Investigate</i>




18

Recommendations

- COLLECTION SYSTEM
- RECOMMENDED PROJECT LOCATIONS

No.	Description	Benefits
C.8.1	System Redundancy - Regional Pump Stations	System redundancy, emergency response, and reduced system pressures
C.8.3	System Redundancy - Highlevel Crescent	System rerouting and emergency response
C.8.4	System Redundancy - Charlie Lake Crescent	System rerouting and emergency response
C.8.5	System Redundancy - Beach Street	System rerouting and emergency response
C.8.6	System Redundancy - Jackfish Frontage Road	System rerouting and emergency response
C.8.7	System Redundancy - Lakeshore Drive	System rerouting and emergency response
C.8.8	System Redundancy - Lakeshore Drive & Alaska Hwy	System rerouting and emergency response
C.9	Seven Industrial Connections	Expansion and add existing facilities to system
C.10	Ten Residential Connections on Golf Course Road	Expansion and add existing residents to system
C.11	Nine Residential Connections South of Old Hope Road	Expansion and add existing residents to system
C.12	49 Residential Connections in Branch 14	Expansion and add existing residents to system
C.13	3 Residential Connections along Sunnyside Drive	Expansion and add existing residents to system

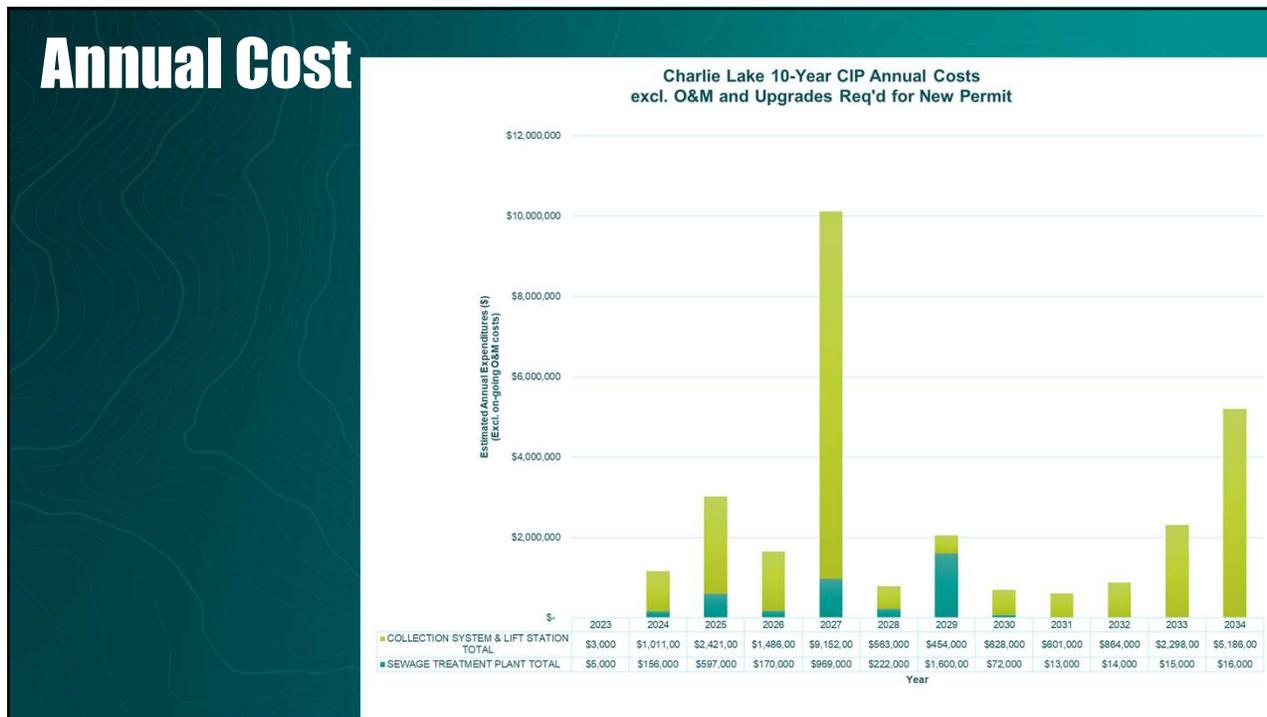
21

Recommendations

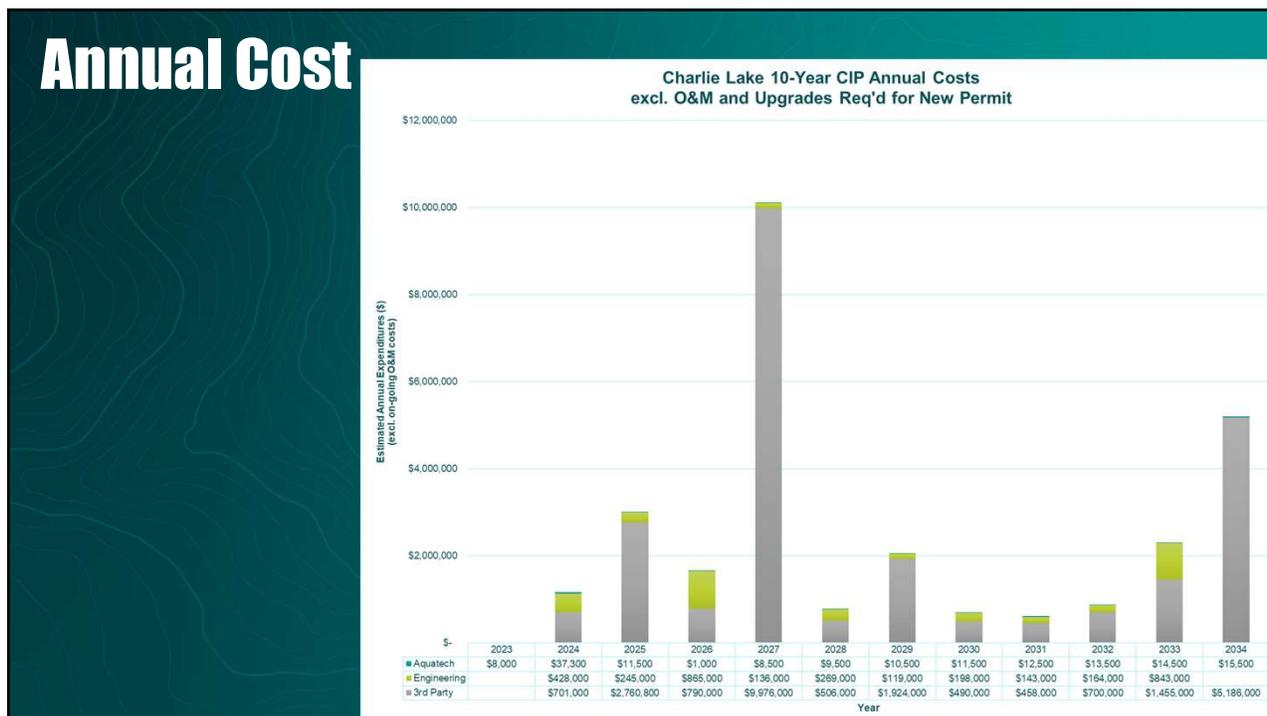
Charlie Lake Engineering Services
Sewer Capital Infrastructure Plan

NO.	TASK DESCRIPTION	CONTRACT	Estimated Cost	2023-2034																			
				2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034								
SEWAGE TREATMENT PLANT																							
SAMPLING PROGRAMS																							
T.3a	TWRP - Stream Characterization	Aquatech	\$ 6,000																				
T.3b	Confirm Aeration Efficiency in Lagoons During Freshet	Aquatech	\$ 300																				
T.3c	Collect Data in treatment system - process optimization	Aquatech	\$ 10,000																				
T.3d	Facultative Cell Sludge Profile	Aquatech	\$ 2,000																				
T.3e	Anaerobic Cell Sludge Profile	Aquatech	\$ 3,000																				
T.3f	Sampling for UV Design Parameters	Aquatech	\$ 3,000																				
T.3g	Industrial Discharges Audit and Potential Sampling	Aquatech	\$ 4,500																				
MAINTENANCE																							
T.4	Clean CMTs in the Fall	Aquatech	\$ 5,000																				
T.5	Facultative Cell Sludge Removal - Gactubes	Engineering & 3rd Party	\$ 483,000																				
T.6	Aerzan Blower Servicing	3rd Party	\$ 34,000																				
PROCESS OPTIMIZATION																							
T.7a	Anaerobic Cell - Use Fire Pump to Mix Cell Contents	Aquatech	\$ 110,000																				
T.7b	Anaerobic Cell - Dewatering, Inspecting	Aquatech	\$ 2,000																				
T.7c	Anaerobic Cell - 3rd Pty Dewatering	Engineering & 3rd Party	\$ 177,000																				
T.8	Optimize Lagoon Cell Recycling Discharge to Improve Mixing in Facultative Cell and Summer Denitrification; on-going operation cost after year 1	Aquatech & 3rd Pty	\$ 13,000																				
T.9	Install Cover Over CMT	Engineering & 3rd Party	\$ 112,000																				
T.10	Spring Treatment Issues - Analyze data, optimize recirculation ratios and potentially aeration settings.	Engineering & Aquatech	\$ 4,000																				
T.11	Attached Growth for Nitrification	Engineering & 3rd Party	\$ 1,801,000																				
OTHER ENHANCEMENTS																							
T.12	Confirm Plant design parameters and update model - use sampling program data	Engineering	\$ 50,000																				
T.13	Additional Shop	Engineering & 3rd Party	\$ 683,000																				
T.14	Prioritized Back-Up Power Supply	Engineering & 3rd Party	\$ 227,000																				
T.15	Upgrades Specific to New Permit Requirements - TBA??	Engineering & 3rd Party	\$ -																				
SUSTAINABILITY / ENERGY RE-USE																							
T.16	Add VFDs to Lagoon Blowers	Engineering & 3rd Party	\$ 49,000																				
T.17	Reclaiming Rainwater - Allowance to Investigate	Engineering	\$ 20,000																				
T.18	Centrifuge Cake Upcycling - Allowance to Investigate	Engineering	\$ 20,000																				
T.19	In-Line Hydro Turbine - Allowance to Investigate	Engineering	\$ 20,000																				
SEWAGE TREATMENT PLANT TOTAL			\$ 3,649,000																				

22



23



24

