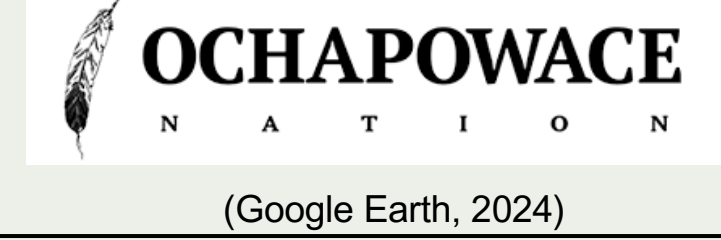
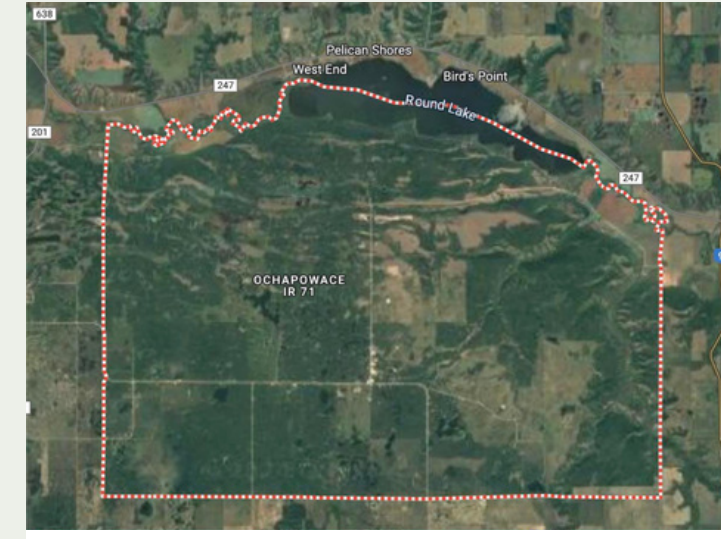


Lanzer EJ Cruz, Trisha Mae S. Junco, Ruth Samara Mamani, Marianne Cadenas Manaois
 Faculty Supervisor: Dr. Stephanie Young
 External Supervisor: Mr. Deon Hassler

Background

- Located 175 km east of Regina.
- Aim to design three alternatives/retrofits that will meet the objectives communicated by the community.



(Google Earth, 2024)

Problem Statement

- Current septic systems faces downfall in maintenance and efficiency.
- Risks of leakage
- Lack of funding

Objectives

- Low cost
- Low maintenance
- Clean effluent
- Operator-friendly
- Support autonomy

Recommended Design

Alternative 1: Vermicomposting Toilet and Greywater System

**Note: Keeps the current Lagoon*

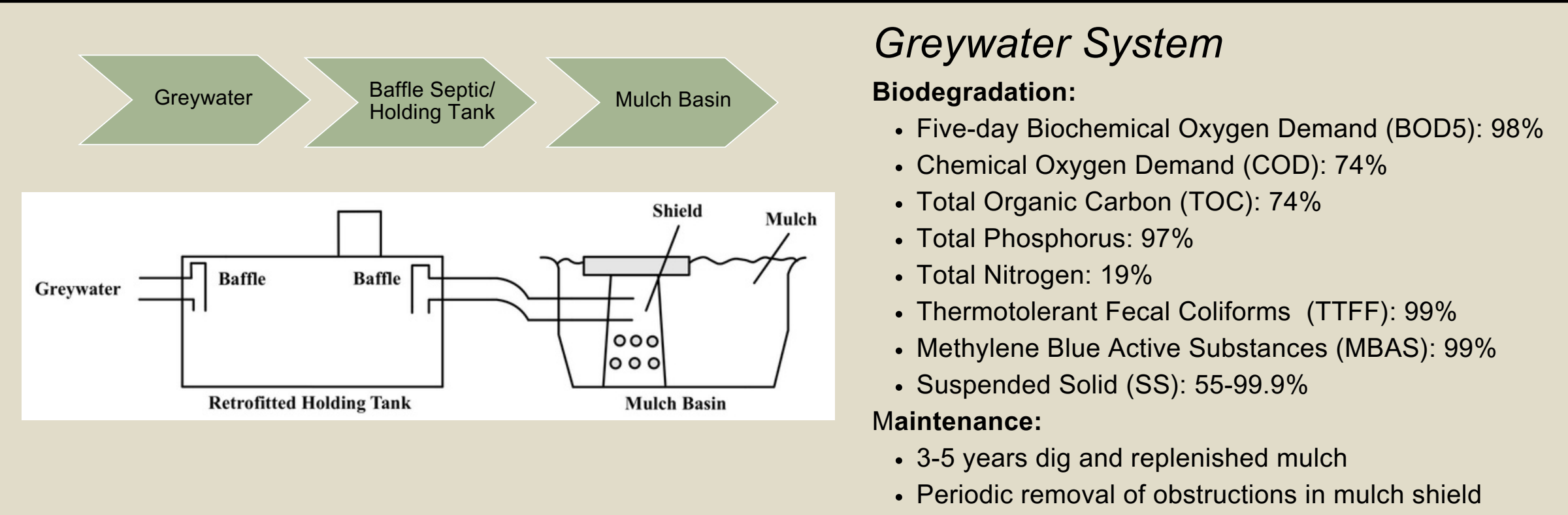
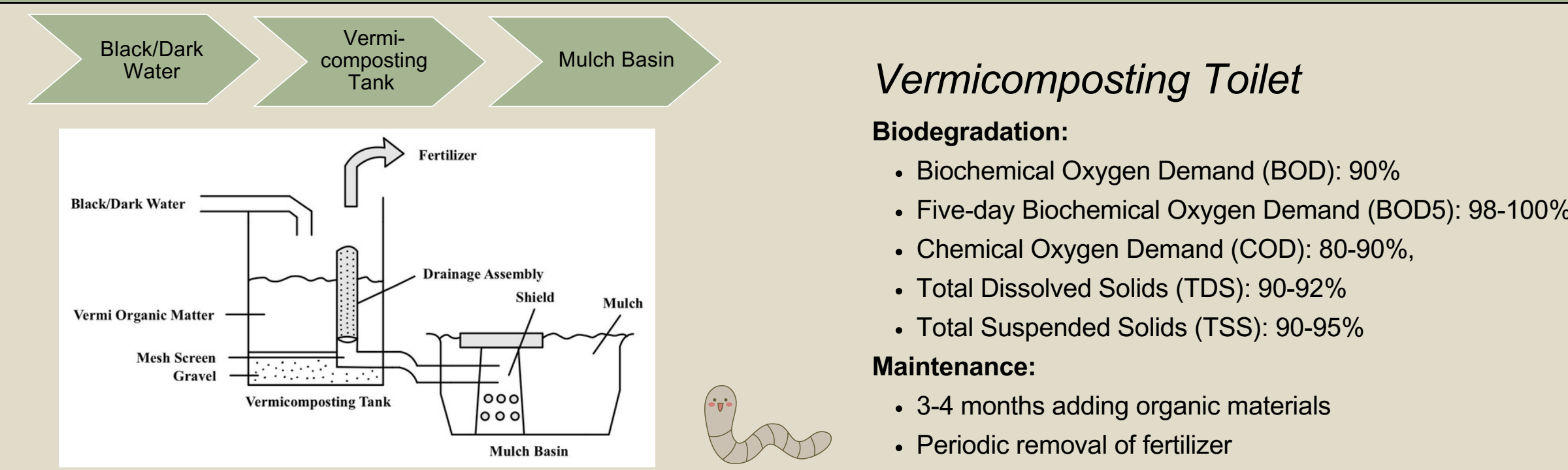
- Produces clean effluent
- Low Maintenance and maintenance cost
- Operator friendly
- Produces useful by-product
- Supports autonomy

Weighted Matrix

Criteria	Weight	Alternative 1	Alternative 2	Alternative 3
Cost	8	8*8=64	3*8=24	6*8=48
Maintenance	10	9*10=90	6*10=60	7*10=70
Operator Friendly	8	8*8=64	8*8=64	6*8=48
Removal Efficiency	9	10*9=90	10*9=90	10*9=90
Time (or HRT)	6	7*6=42	5*6=30	9*6=54
Environmental Impact	7	9.5*7=66.5	5*7=35	7*7=49
Foot Print & Sizing	4	9*4=36	5*4=20	6*4=24
Support for Autonomy	7	6*7=42	4*7=28	3*7=21
Total		494.5	351	404

Design Alternatives

- Alternative 1:** Vermicomposting Toilet and Greywater System
- Alternative 2:** Vermicomposting Toilets and Sewage Collection System
- Alternative 3:** Aerobic Treatment Unit Retrofit

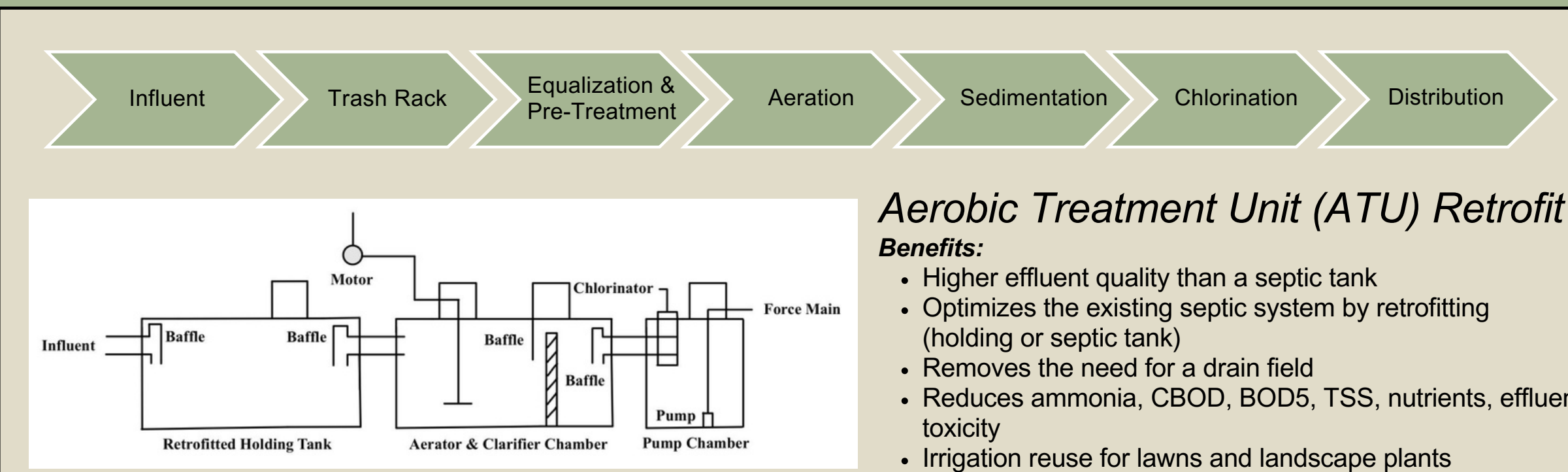


Lagoon Sewage Collection System Expansion

- A piping system: 5.82 km piping to service 19 additional buildings
- CSA-Certified IPEX HDPE Material
- 6" piping size based on Hazen-Williams Friction Loss and IPEX "Pipe-with-the-stripe" Size Determination Calculation.
- Reduce trucking to individual homes, utilize the lagoon capacity, and slowly integrate centralized systems into the community.

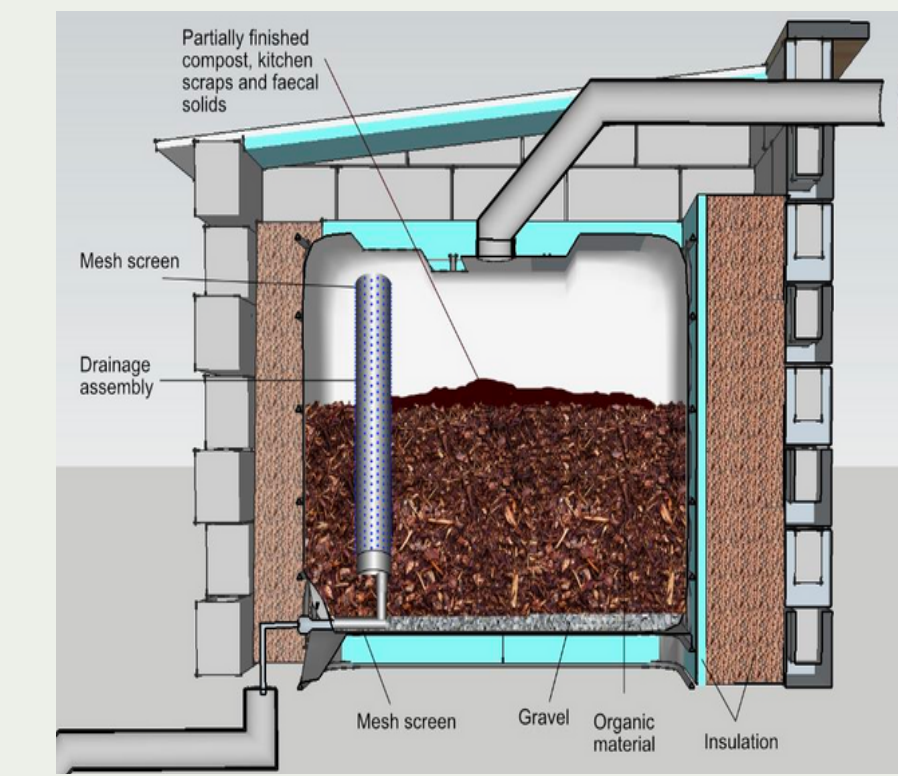


(RONA, 2024)



Final Design

Alternative 1: Vermicomposting Toilet and Greywater System



(Vermicomposting Toilet, n.d.)



(Greywater Landscape Design, n.d.)

Cost Estimation: ± 20%

ALT.	Capital Cost	Annual Maintenance and Operation
ALT. 1	CAD 5,991.9 per household	CAD 340 per year
ALT. 2	CAD 1,775,100 + CAD 5,991.9 per household	CAD 23,216.40 + CAD 340 per year
ALT. 3	CAD 11,749 per household	CAD 957 per year

Conclusion

- Promising results based on *Vermicomposting Toilet Literature Review*
- Reduction of Wastewater contaminants is guaranteed
- Stated objectives are met

Acknowledgements

Special thanks to our Internal and External Supervisors, Dr. Stephanie Young and Mr. Deon Hassler for their full support and to Ochapowace Nation for being part of this Capstone Project