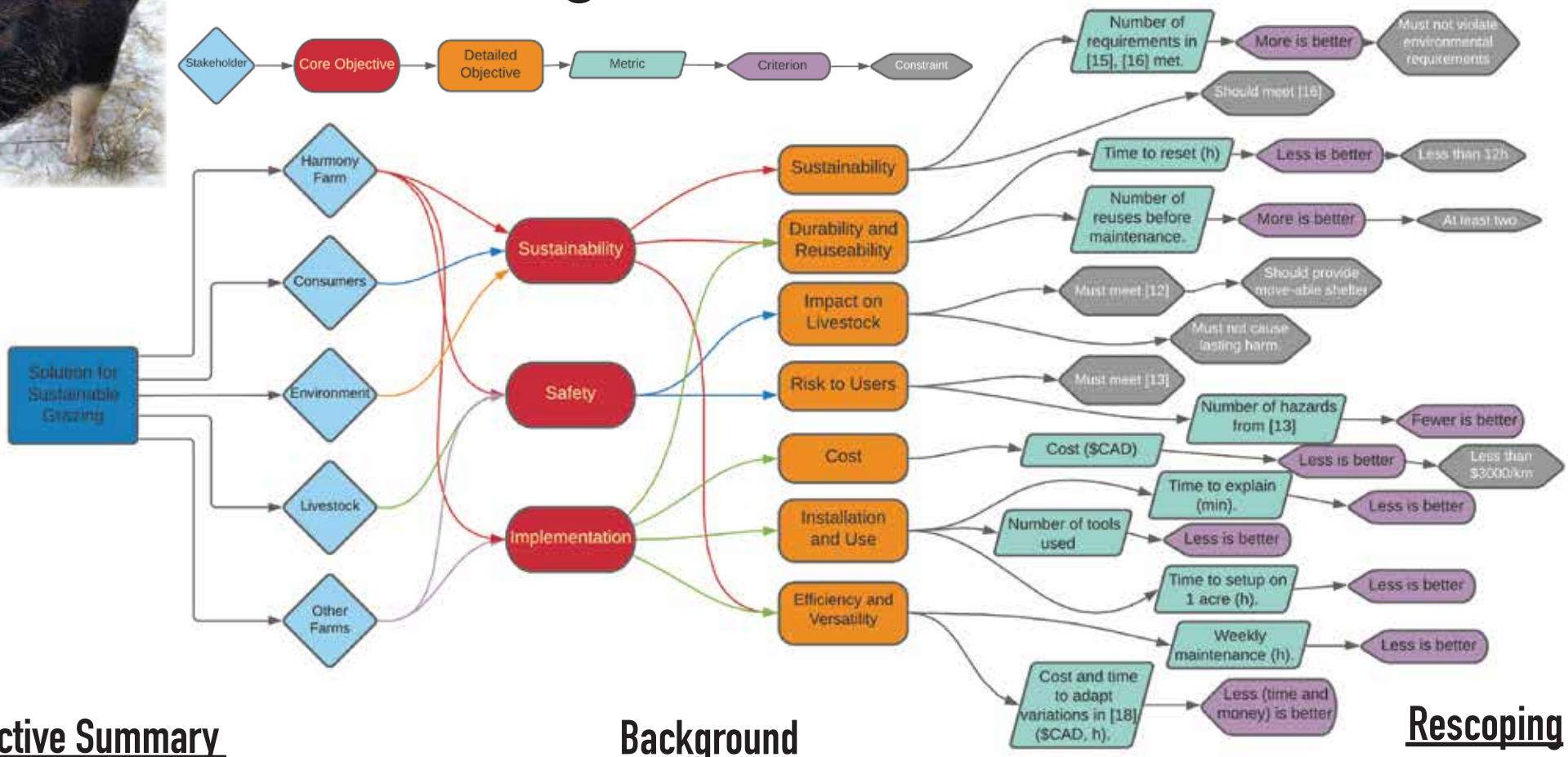
Grazing Containment



Core Objective Summary

Sustainability: solutions should adhere to principles of sustainability

Safety: solution should be safe for farmers and livestock

Implementation: solution should be easy and quick to assemble, install, and use

Background

Harmony Farm: small-scale sustainable farm in Brockville, ON

Sustainable Farming: farming using minimal equipment and resources

Rotational Grazing: containing livestock to small sub-pastures so their grazing replenishes soil

The Opportunity: develop an improved containment method for rotational grazing using pigs

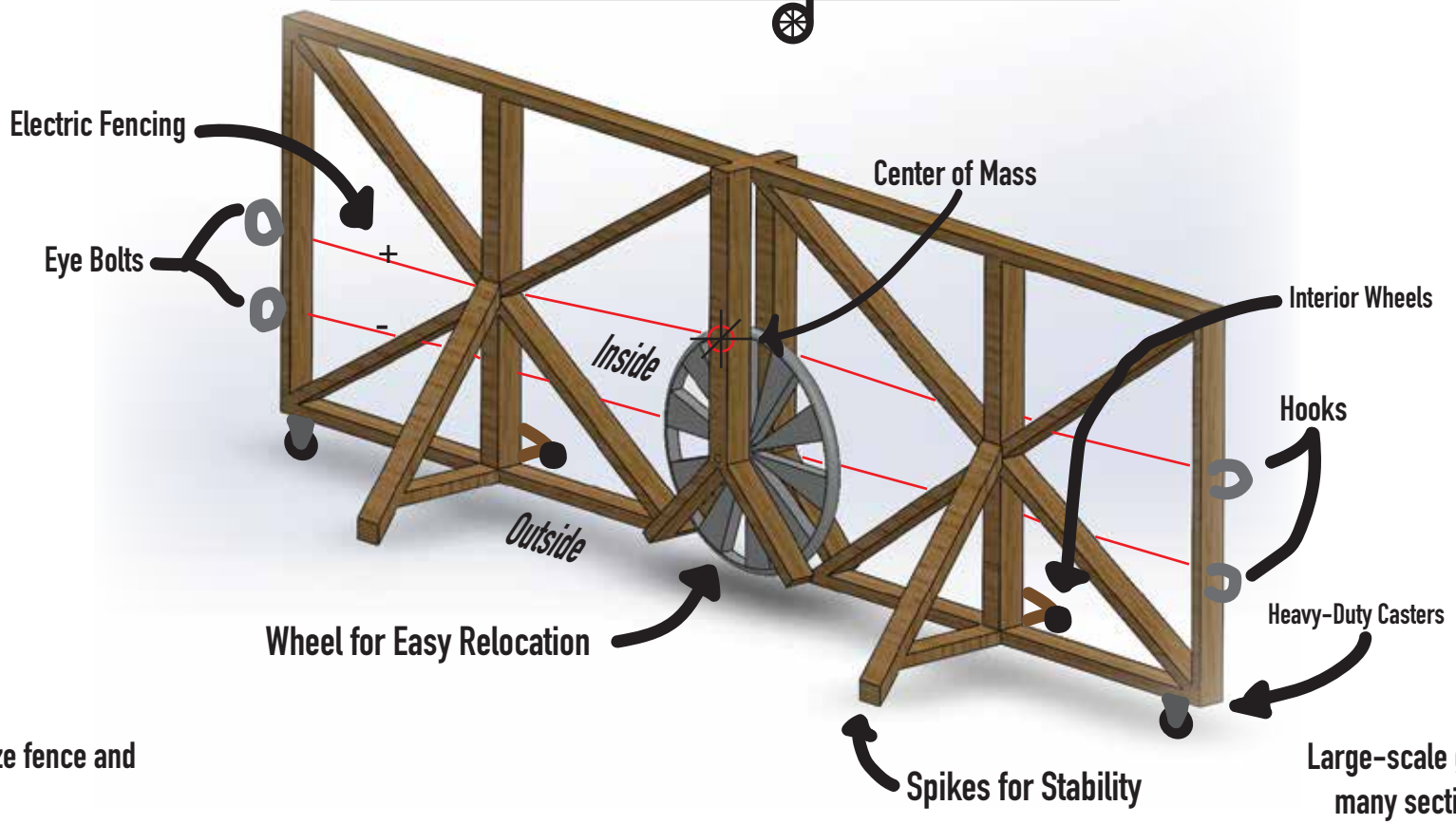
Rescoping

Shifted focus to containment

Prioritized implementation and feasibility metrics

Shifted weight away from metrics that are difficult to evaluate (reuseability, time to adapt)

The Rolling Fence



Key Features

Outer supports stabilize fence and prevent rolling

Truss Design for rigidity

Center wheel allows the fence to be rolled to contain different pastures

Made from lightweight, cheap and sustainable materials to minimize cost and weight

Features integrated electric fencing

Hooks and eye bolts connect sections and carry electric current, even around corners

Verification and Validation

Solidworks simulation: verifies strength and determines weight (~40kg) - helps to choose type of wood (cedar)

1:50 scale 3D-Printed Model: confirms rolling capability and simple stability - helps to confirm relative dimensions

Full Size Prototype: verifies feasibility of construction - helps to choose wheel size/type (27.5" Mountain Bike), reveals flaws - difficult to roll on a single wheel (solved by casters)

Stakeholder Validation: "I really like the rolling Idea"

Limitations

Large-scale grazing would require many sections (relocation could be time consuming)

Construction time is long and many sections must be built

Existing problems with electric fencing are not completely solved