# FARM DESIGN:
# Functional Architecture
# in a
# Family Farming Enterprise

by

Mindy Gudzinski

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**DALHOUSIE UNIVERSITY**

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The undersigned hereby certify that they have read and recommend to the Faculty of Graduate Studies for acceptance a thesis entitled “Farm Design: Functional Architecture in a Family Farming Enterprise” by Mindy Gudzinski in partial fulfilment of the requirements for the degree of Master of Architecture.

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## DEDICATION

In loving memory of my father and youngest brother, Nick and Jonathan Gudzinski.

Dad, you were pure of heart and a farmer through and through. I remember asking you once if you won the lottery and could do anything what would you do? And your response was... “to farm, like the good old days”.

For your love, your optimism, your incredibly positive attitude towards life and for always believing in me and my ability to become an architect...thank you.

Jonathan, some of my fondest memories are of you on the farm and your amazing ability to connect with and care for animals of all kinds. From pet turkeys and roosters to dogs and cats, you could tame even the wildest of beasts. Your kindness, calm demeaner, love and respect for animals has been of great inspiration to me. I hope that I have done you proud with the homes and lifestyles I’ve proposed for the animals on this farm.

You both continue to be of huge inspiration to me and are dearly missed.

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# ABSTRACT

This thesis challenges the argument that farms must grow larger and more specialized in order to survive. The root of this thesis stems from my disdain towards current mainstream industrial methods of farming, attempting to compete in the world market. In theory, current government farm policies are meant to assist and protect farmers on the global market but typically result in protecting the large companies responsible for manifesting the problems in the first place. These key factors have changed the face of the agricultural landscape of North America and have lead to a lost connection between society and their food.

These factors have lead me to build upon more sustainable and value-added farm philosophies. Such practices highlight the benefits of small farm enterprises for the farmer, the animals, the environment and society as a whole. The design is in combination a response to the landscape and the local economic niche it functions within. Through physical connection, the architecture highlights the cycles of individual farm elements working together to strengthen the whole farm as system.



**KEY WORDS**

farm design, farm vernacular, detail, connection, traditional farm methods, value added farming, industrial farming, farm waste, sustainable farms, co-operatives, hybrid and transformable structures, slow food movement, social sustainability

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# CHAPTER 1

## THESIS QUESTION

What role should architecture take in facilitating a new model for small family farm enterprises?

## INTRODUCTION

Farming is often viewed as a romantic notion grasping the curiosity of folks from all walks of life. It has a powerful lure to those who dream of making a comfortable full-time living as their own boss, breathing fresh air, being surrounded by vast country side, waking up to deer grazing outside of the bedroom window, learning to live at one with the land and so on and so forth. All too often however, these fantasies are kept silent as they seem absurd or utopian but not actually attainable.

After all, most of the news we hear of today is of farmers selling out and moving to the city, or that it takes too much capital to enter into farming now, land is too expensive, farmers are constantly in debt and the working conditions are smelly and unfavorable. For most farmers this and more is a reality.

For farm entrepreneurs, however, this is the perfect opportunity for a family farm business to flourish. Many of the remaining farmers are baby boomers whose hopes of passing on the farm to the next generation have been crushed as their children see no sound future in current farming practices. But for those creative visionaries this is the perfect niche waiting to be filled. As environmental and health risks are exposed to the public and the foundations of industrial agriculture are shaken, profitable farming opportunities are born.[1]

I am not alone in this realization. The best lessons are those learned from other farmers previously and currently running

1 Joel Salatin, *You Can Farm*, (White River Jct, VT: Chelsea Green Publishing, 1998), x-xi.

successful farms operations in the above mentioned niches. My research has connected me to farmers with similar beliefs and philosophies to my own such as Joel Salatin of Polyface Inc. in Swoop, VI, Tom Douglas and Jackie Cross in Prosser, WA with famous restaurants in Seattle, WA, Kirstin Kotelko of Springcreek Farms in Vegreville, AB, and Paul and Karen Harmer of The Saskatoon Farm in Okotoks, AB who provide great models of a better way of farming for the future.

As a forth-generation farmer, I also have the privilege of lifetimes of wisdom passed down to me through a practical method of teaching and learning. I believe that this knowledge, combined with my architectural education has set the tone for an alternative way of thinking about farm design. A way of thinking necessary to demonstrate a better alternative to the depopulated and dehumanized country side created by industrial farming.[2]

## HISTORY

### Government Involvement in Farming

The government's involvement in farming is a tricky one. I believe it is necessary but not in the way that we see it in today's market. There is no denying that the government IS involved in farming but most people never take the time to understand the complexity of farm economics, which are very different from those of other products used in our everyday life. Until you understand it you will be like every other non-farmer in the world misled to believe that farmers are rich based on the fact that the government provides them with more subsidies than any other industry. It is a

2 Salatin, *You can Farm*, xi.

false illusion I promise you. Now bare with me here for a crash course attempt at the economics of farming which will hopefully allow you to better understand why we are in the misconstrued position we are in today with our food production.

Government involvement in farming truly began during the depression. When the thirties arrived in just one season, “cows purchased for sixty dollars each were worth six dollars, and the Fordson tractor purchased for two hundred dollars was traded for twenty-five dollars worth of seed wheat”.[3] As a result, farm policy started by a group of new farm spokespersons who were advocates of the family farm.

> They organized the direct-membership Farmer’s Unions around a core of policies comprising primarily of (a) publicly administered but voluntary crop insurance for protection against natural disasters, (b) producer-controlled commodity marketing boards giving farmers collective power in the marketplace, (c) cash advance payments on farm stored grain to alleviate the cash crunch when grain was harvested but could not be sold, and (d) a system of parity prices for farm goods to provide prices commensurate with the cost of production, but with limits to favour the smaller farmer and discourage gigantism.[4]

Contrary to what we might like to think, farming doesn’t follow the same economic rules as other products on the market. Weather is highly unpredictable and it drastically affects the outcome of crop yields from one year to the next. Bountiful years lead to crop surpluses, which cause a collapse in grain prices and bankrupt many farmers. If a drought occurs the next year, then a scarcity in grain occurs. This problem could be lessened had all of the farmers from the previous year not gone bankrupt. During years of surplus we as humans cannot consume more food than we can

3 Herbert Schulz, *Betrayal: Prairie Agricultural Politics in the Fifties*, (Calgary: University of Calgary Press, 2004), 9.

4 Schulz, *Betrayal*, 1-2.

physically eat, yet at the same time when food is scarce, we cannot survive starvation. So where is the middle ground? This is where the government initially stepped in with farm programs to set up a grain reserve to help balance out the extreme conditions. There would still be food to eat when there was a drought and when there was an abundance of food some of it would be taken off of the market so that the farmers could still afford to produce new crops next season. The government established a target price for storable commodities such as corn and wheat, based on the cost of production. This allowed farmers a choice whenever the market price dropped below that target. Dumping grain onto an already weak market would only make the situation worse. Instead the government would offer farmers a loan, using their crop as collateral, that allowed them to store grain until prices recovered. When the farmer sold his grain he would then repay the loan. Farmers also had the option to keep the money from the loan and give the government his crop if grain prices stayed low. In this case the grain went into a common granary held by the government. Conversely, when bad weather and lack of yields drove the prices of grain up, the government was able to sell from it's granary to help pay for farm programs and smooth out the large fluctuations in grain prices.

The problem is that supporting prices and limiting production in farming had enemies from the beginning. Supporters of laissez-faire economics didn't understand why farming should be treated differently than any other economic sector. In the 1950s, food processors and grain exporters [the large corporations] who profited from overproduction and low crop prices allied with political business leaders who felt there were too many farmers for the countries own

good, and began dismantling the farm programs in place. Up to that point the many small farmers joined together in co-operatives had a voice that could work together to check the power of corporations, but advances in technology meant that machines could help fewer farmers take over more land and reduce their power in numbers. In order to force market prices down, pushing farmers off the land, all the corporations needed were for the floor to fall out of the farm programs.

A string of bad weather equaling scarce crops, and the right men in politics to completely re-engineer the food system was all it took to set the dismantling in motion. They drove down prices and encouraged a vast increase in the output of farm: ”get big or get out” became the new farm motto. A new system of direct payment to farmers was also set in place instead of the ‘New Deal’ farm system of supporting grain prices through loans, government grain purchases and land idling. In this new system the government pledged to make sure the farmer would receive some target price for a bushel of grain when prices are weak. The problem is the government had removed the floor under the price of grain and instead of keeping grain out of a falling market as the old program had done, the new program encouraged farmers to sell grain at any price. Why? Because the government said they would make up the difference…but what they really meant was make up ‘some’ of the difference. Just about every farm bill since then has moved to lower that target price of grain. This means that the farmers are selling their grain for less than they can produce it for and the government subsidies that are supposed to make up for that loss are written to now only make up part of it. So farmers AND the government are constantly going into

debt to produce grain. So why do the farmers continue to produce more and more grain when the prices keep falling? Many people have studied this and one man who was able to make particular clarity of the situation coined the term the 'Naylor Curve' as an explanation. Basically it explains why falling farm prices force farmers to increase production in defiance of all rational economic behavior. "Farmers facing lower prices have one option if they want to be able to maintain their standard of living, pay their bills, and service their debt, and that is to produce more." A family needs a certain amount of cash flow every year to support itself and if the price of grain falls, the only way to stay even is to sell more grain. Production is the name of the game, and at whatever the cost. Farmland is degraded and pumped full of nitrogen in desperation to produce higher yields, but the more the farmer produces, the lower the prices go and the evils of overproduction gather strength. Do you see why the free market doesn't work in agriculture? "The economics of a family farm are very different from that of a firm's. When prices fall a firm can lay off people, idle factories and make fewer products until the market finds a new balance between supply and demand."[5] But food is different. People don't eat more because food is cheap and laying off farmers doesn't help to reduce supply. You can fire a farmer [or make him go bankrupt] but you can't fire his land. Some other farmer in need of cash flow or that thinks he is more efficient will always farm that land…it will always continue to produce.

So next you might ask, well why do farmers keep producing the same crops and not something else? Remember how I mentioned that the large corporations had a hand in setting

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5 Michael Pollan, *The Omnivore's Dilemma: a natural history of our meals,* (New York: The Penguin Press, 2006), 54.

current farm policies in place? Well guess whose the only buyer in every town in Canada and the USA? You guessed it…the large corporations. And they own the elevators and they pay for wheat, barley, canola, soybeans and corn so that is what you grow. So the plague continues, keeping farmers poor, degrading the land, polluting the water and bleeding the federal government of billions of dollars per year subsidizing cheap crops. But even though the subsidy cheques go to the farmer, what the government is really subsidizing are the buyers of all those cheap crops. If we consider corn, for example, then the government is helping to make companies like Cargill and Coca-Cola very rich not the farmer. Then we also have to consider the crop itself. Corn in particular has been exempted from the usual rules of nature and economics. In nature when a species explodes and exhausts the supply of food, it then crashes. Overproduction of a commodity causes the prices to drop in the market until the surplus is consumed or it no longer makes sense to produce more of it. Corn has been relieved of these constraints by our ability to develop limitless uses for it. We consume it as fast as possible, even if it means going broke growing it.

Let's keep examining the path of corn specifically for a moment as it highlights some of the most critical problems with farming practices and policies today. After being harvested and sold corn passes through a very tiny number of corporate hands. Though the companies won't say, it has been estimated that Cargill and ADM together probably buy a third of the corn grown in the USA. These 2 companies guide the corn's path every step of the way. Pesticide and fertilizer are provided to the farmers; they operate most of the grain elevators; broker and ship most of the exports;

perform the wet and dry milling; feed the livestock and then slaughter the corn fattened animals; distill the ethanol; and manufacture the high-fructose corn syrup and the numberless other fractions derived from the corn. They also help write many of the rules that govern this whole game by exerting their influence over agricultural policies. These companies are the true beneficiaries of the 'farm' subsidies that keep the river of cheap corn (and other grains) flowing. Cargill is the biggest privately held corporation in the world. Neither company sells products directly to consumers so they have little to gain from co-operating with journalists and seldom do.[6] As a result the majority of the population has no idea how deep this coruption of the agriculture system actually goes. Until we as consumers decide to re-connect with our food and demand locally grown, chemical free, high quality, fresh food and lessen our reliance on these large corporations, our our grocery stores will continue to be laced with processed alternatives that compromise our health and wellness. Don't worry though, when you get sick, Cargill has a whole division of it's company dedicated to pharmaceuticals to help develop drugs that try to fix the health problems created from eating the food they've produced and sold to you in the first place. Freaked out yet? You should be. Every which way you turn these large corporations have their fingers in your wallet. This thesis proposes a solution by attacking the problem at the root but I also encourage you to investigate the issue of food and food production further. By doing so you'll learn that the way to break this chain of control is for you to take back control of your food. We can begin this process by examining farm philosophy.

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6 The ideas in the previous five paragraphs are based on the book Pollan, *The Omnivore's Dilemma*, 48-54.

## THE RIGHT FARM PHILOSOPHY

Having the right philosophy is an essential starting point in any successful venture. My concepts about how farming should be conducted are not new but in fact shared and inspired by many other visionary farmers. A little at a time these farm models and individuals are all contributing awareness and knowledge of sustainable farm practices and re-connecting society with their food. My goal is to contribute to these same just causes through an examination of farm design. But first I must enlighten you as to these philosophical concepts, which guide my reasoning and design decisions.

### Diversity is Prosperity

Above all, I believe in balance. Too much or too little of any one particular thing is never good in the long run. Diversity is key in nature and any business operation including farming. Enhancing diversity among species of plants AND animals strengthens the environment and enables it to heal itself and correct any imbalances just as it was designed to do.

This means we want to see the soil on farms stronger every year, able to retain more moisture and in turn produce stronger plants and require less inputs. We want to encourage wildlife and plants to flourish and manage a variety of animals on farms. This can be achieved through management of water, land and forest to stimulate the formation of ecosystems. For example avoiding the use of chemicals and artificial fertilizers which kill soil growth and fencing off some areas to encourage forest growth. In turn rodents such as squirrels and mice can populate which feed the coyotes and foxes that inhabit the forests so that they

don't prey on farm animals such as chickens. We must also use the natural cycles of farm animals to work together and thus to our advantage. Closing the loop to all of the natural systems at work is seeing the benefit in the whole rather than the sum of the parts.[7]

## Environmentally Invigorating Agriculture

Agriculture that degrades the environment is simply unacceptable. We as a society have wrongfully come to believe that the sacrificial animal necessary for us to enjoy the pleasures of a full belly is the environment. It's time to ditch the "trade-off mentality"[8] and make environmental quality a primary concern. This includes smell. Any food production system robbing your nostrils of the promise of fresh country air is unacceptable. The only excusable odor on a farm should be that of one's sweaty feet after a hard days work. As Virginia farmer Joel Salatin says, "If you ever smell manure, you're smelling mismanagement."[9]

Have you ever heard your mother say that you should always leave a place better than when you found it? Agriculture alike should enhance rather than detract from the environment. What we want is more fertile soil which in turn leads to healthier forests and a more diverse landscape where the wildlife flourish.

We need to wake up and start seeing the food we eat for what it really is. A carton full of same sized, perfectly white eggs is an indication of genetically modified, industrially produced hybrid chickens laying eggs. Whereas a carton

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7 Salatin, *You Can Farm,* 35-36.

8 Salatin, *You Can Farm,* 27.

9 Salatin, *You Can Farm,* 27.

full of variable eggs, some spotted, others light brown or dark brown, some more pointed or more round than others is not a defect but rather a sign of non-hybrid hens exhibiting more genetic diversity than the others. Many people claim to be concerned for the welfare of the environment but until our thoughts turn into actions, the only one they're fooling is themselves.[10]

## Support Your Local Farmer and Yourself

We all want to live in a community with a thriving economy that boasts longevity and job security. The best way to achieve that is by supporting one another. Local production, processing and marketing "stimulates the economy and keeps all of the value-added money at home."[11]

Transportation has become a huge issue in food production and the environment. Studies have calculated that individual food items travel an average of 1500 miles (2400 km) from farm to your plate.[12] In all likelihood your dinner has travelled farther than you have on vacation or otherwise. Skyrocketing carbon dioxide emissions are a huge and unnecessary burden on the environment that can be drastically reduced by getting your food locally and living more sensibly.

## Seasonal Meals Are the Real Deal

Eating food that is in season has a direct relationship with eating local. In order for these philosophies to work, we

10 Salatin, You Can Farm, 27

11 Salatin, You Can Farm, 28

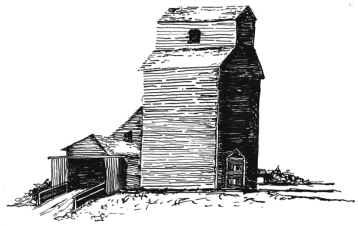
12 Marla MacLeod, and Jen Scott. "Food Miles Project: Preliminary Results." Ecology Action Centre. http://www.ecologyaction.ca/files/images/file/Food/PreliminaryFoodMiles-April2009.pdf

must learn to follow the natural production cycles of nature rather than try to control them.

For example, as the days grow longer in the spring, the extra light stimulates egg production in chickens. Rather than the extra eggs going to waste they can be hatched and raised for their meat. In 6-8 weeks, broilers have reached optimal weight for butchering, just before the hot summer months are upon us. Chicken, along with fish grown in warm water are considered cooling meats for two reasons. They take less calories of energy to produce a calorie of meat and as such take less calories of energy for humans to digest them. Digestion burns calories and heats our bodies as a result, so the harder your body has to work to digest food the more heat is produced. Beef and pork are considered heating meats. After grazing on rich healthy grass all summer and fall their meat is at optimum quality just before winter. This is when they should be butchered and enjoyed all winter long when our bodies need a heating meat.[13]

Growing up on the farm I can recall spending countless hours in the spring, summer and fall helping my mother and grandmother plant, monitor, harvest and preserve food for the cold winter months ahead. Through careful planning we harvested fruits and vegetables throughout the season. First came the strawberries, then the raspberries, next the blueberries and saskatoons along with peas, radishes and beans, then apples, cucumbers, tomatoes and finally onions, cabbage, potatoes, carrots, beats, corn, zucchini and squash. It's like the story of the grasshopper and the ant. All summer long we busied ourselves preparing food for winter, while the people living in town went off on their

13 Salatin, *You Can Farm*, 29.



Drawing of a typical wood grain elevator built in the 1950's along the railroad in a small farm community. [pen and ink on paper]

Typical grain truck used for hauling grain from a farm to the local elevator.

Cargill Inland Terminal in Vegreville, AB. From Canadian Mosaic, A drive in the Alberta Countryside.

month long camping trips and came back bragging about how they laid around in the sunshine.

Then winter came along and the delicious fresh produce disappeared. The produce trucked in from thousands of miles away was practically rotten by the time it reached our rural community leaving the 'townies' with not much more than their suntans. As a result they were left with little or no choice than to reach for the over processed, highly preserved and modified food in the supermarket trying to act as a stunt double for the real thing.

Looking back on this experience is really quite infuriating. It's not as if such families have never had fresh corn on the cob at the town's fall corn roast or stopped by the farmers market at least once during the summer to feast on some fresh fruit and vegetables. They knew how great the food tasted then so why on earth would they settle for the other garbage the rest of the year? Ignorance is dismissible in this case and for the rest of society in most cases as well. It's time for everyone to face reality and recognize the stresses they put on the farms and environment by demanding unseasonable production. Why should Albertans import fresh blueberries from Chile in February when they hang by the bucketful off bushes in June? They can then be frozen, jellied or dried in the summer for much less and eaten and sold during the winter. The extra demand for such fruits depreciates the locally economy and strains the small countries that can produce them. In addition, the transportation to get the fruit to us thousands of miles away requires huge amounts of petroleum.[14]

14 Salatin, *You Can Farm*, 29.

## De-Centralization

Centralized food production and processing disables the natural cycles of healthy agriculture systems. In Western Canada there are currently 3 firms - Viterra, Cargill and JRI (Richardson Pioneer Ltd.) that together own 68% of the licensed storage capacity of grain production.[15] This means that small communities (such as the one I grew up in) that used to have several competing grain elevators now maybe have one (owned by one of these multinational companies) or none at all.

In my hometown, for example, there used to be 3 operating grain elevators right along the railroad. Farmers could sell and deliver grain by the truckload to the elevator where it was sorted, cleaned, stored if necessary and then loaded onto grain cars and shipped to a more centralized terminal for export. Now all but one of these elevators have been shut down and even torn down. The one elevator that is still technically 'open' no longer brings in grain cars on a regular basis and is practically inoperable. This leaves farmers with the chore of hauling their grain by truck an hour and a half away to a large, more 'centralized' grain terminal to sell. The worst part of the situation is that these grain terminals will not accept anything less than a 'Super-B' truck load which is about 44 tons of grain. Most small family farms don't produce that much grain in total not to mention of one variety. So they are left to organize amongst themselves opportunities to share trucks with other farmers. If one farmers grain happens to be of lower quality however, the other farmer will also have to sell his grain for less as a

15 Murray Fulton, and Kathy Lang. "The Illative Blog: Grain Industry Structure in Western Canada", Knowledge Impact in Society (KIS) Project, http://www.illativeblog.ca/2007/12/grain-industry-structure-in-we.html.

result of the mixture. The farmers and the environment lose in these situations, while the already in place grain elevators and the cheap and efficient rail lines sit unused and rot. The winners are the multinational grain companies sitting back on their padded wallets at the expense of the environment and hard working farmers.

To everyone's disadvantage, the beef, poultry and swine industries have also become highly centralized. These animals are so concentrated in one area that they cannot utilize all of the manure produced through consumption. This excess supply of manure is desperately needed in areas of grain production to replenish the nutrients in the soil but these operations are so far away from one another that the only result is soil erosion, groundwater contamination, smelly farms and unhealthy animals.[16]

Despite all of this many of you will still advocate for centralization or mass production because it is efficient and efficiency increases profits. The problem with this argument is "that putting a million birds through a processing facility is not the same as putting a million copper fittings through a factory press"[17]. Tolerances are an important factor in assembly line production which, is why our supermarkets are now filled with fruits and vegetables all of similar shape and size according to species. We are all familiar with Charles Darwin's "natural selection" theory of evolution. Yet everyday millions of consumers sacrifice nutritional value, diversity, and taste in their food for standardization.

Standardization has brought about other evils in the food production industry as well. Pasteurizing, hydrogenating,

16 Salatin, *You Can Farm,* 30.

17 Salatin, *You Can Farm,* 30.

addition of synthetic ingredients, and many other 'processes' are performed to turn leftover junk into food no species was ever intended to ingest. Processing food has become a million times more lucrative than producing the real thing. Farmers are not encouraged to diversify and strengthen their herds of cattle to survive without hormones and antibiotics, or grow grain that chokes out weeds without herbicides and pesticides. Rather they have practically been reduced to peasants working to meet the industry demands on the terms of multinational corporations.

We as individuals need to change our demands to encourage a better method of food production. Government regulations need to be re-evaluated to loosen the rope around small farmers necks and allow freedom of choice and the true entrepreneurial spirit of farming to come alive once again.[18]

## The Business of a Small Family Farm

The social and environmental issues surrounding the farming industry that are plastered across the media do not come from small, private family run farms. It is the large, centralized, technically advanced complexes answering to the large multinational corporations that are responsible. The production and processing of food in these set-ups are rotten at the core and they rely on sly marketing tactics and misinterpretations to pull the veil over the eyes of the consumers. When chemical companies such as Viterra claim that the herbicides and pesticides used on crops will break down naturally in the soil they aren't lying but they aren't telling you the whole truth either. Soil that is extremely

18 Some of the ideas expressed in the previous 3 paragraphs are based on Salatin, *You Can Farm,* 30-31.

rich in minerals and nutrients through live and dead organic matter will indeed break down these harsh chemicals. The problem is that most of our soils have been stripped of their organic matter through the use of chemical fertilizers so the breaking down of these compounds cannot occur. You also have to consider that Viterra isn't just selling farmers the chemicals for their fields but they own elevators so they have a hand in purchasing grain and they also own manufacturing companies which turns the grain into products you see on supermarket shelves. So it is in the interest of their own pocket book that they get you as consumers on board in whatever method possible, even if it is at the expense of your well being.[19]

This 'misleading' of the truth is evident in the latest organic food craze as well. Just because a food product contains the certified USDA organic stamp does not mean that the chickens, for example, weren't raised in battery cages 14" x 22" alongside 8 other chickens who were all de-beaked to prevent cannibalism. It hasn't forced these industrial farmers to clean up the dead birds in these cages left trampled and stomped on until they decay to a point that their carcass falls through the wire onto a conveyer belt for manure below. No this stamp simply means that these chickens weren't injected with hormones or antibiotics and that's all. It's a start in the right direction but it's not nearly where we need to be.

Small, family run businesses created and run by entrepreneurs are constantly at the front lines of the market and as a result have far more to lose by running shoddy operations and misleading their customers from the truth.

19 Salatin, *You Can Farm,* 31

As a society we need to help preserve these types of operations through exposure to a wider range of markets which in turn will provide consumers with more choices and small family farms more creative freedom.

At present one cannot butcher a steer in their backyard or milk a cow and sell the meat or milk to a neighbour. If we continue on this dark path the only thing consumers will be left to choose from will be genetically modified plants and animals and fake food dipped in high fructose corn syrup to make it sweet and addictive. I'm not proposing that we attempt to regulate the large multinational corporations any more than we already do. Rather if the marketplace is opened up to the small, family run businesses who will lift the veil over the eyes of the consumers and show them a world where fresh food tastes amazing, is so nutritional they never get sick and re-connects them to where their food comes from then I believe there will be no contest.[20]

## Humane Animal Husbandry

I have no more patience or tolerance for people in this world who abuse animals than husbands who abuse their wives and children. It is absolutely inexcusable. I am not an animal worshiper but just because we sit at the top of the food chain doesn't give us the right to torture our breakfast. These animals give up their lives for our nourishment, the least we can do is show them some respect and decency while they are alive in exchange for that gift.

I've walked through feedlots where steers spend their lives in pens standing in 2 feet of their own manure eating corn

20 Some of the ideas in the previous 4 paragraphs are based on Salatin, *You Can Farm,* 32.

based diets to fatten them up more quickly. Cows are ruminants. This means their stomachs and body systems are designed to digest grass not corn. As a result of eating corn, the animals are malnourished and susceptible to illness so in turn we have to pump them full of antibiotics. Once the steers reach finishing weight they are herded into large trucks where they are transported to the slaughterhouse. This journey can take up to 4 days in some cases and the cattle are not fed or watered during transport. How would you like to be crammed into a cage for 4 days and not given any food or water to drink?

Poultry suffer from some of the worst cases of animal abuse, living in battery cages and never seeing natural sunlight in order to control egg production. Broilers suffer just as much being genetically modified in favor of larger breast meat and then pumped full of feed to the point that their legs cannot withstand the weight of their own bodies. In either situation the chickens can be found rubbing their chests raw on the cages in response to the harsh conditions. Are you really comfortable with purchasing meat knowing it was produced under such conditions? I should hope not.

Industrial egg production in a battery cage operation. Photograph taken undercover by Chicken Out! http://www.chickenout.ca/tour.html.

The solution to this problem lies within the power of the consumer not government regulations in any more capacity than they already stand. You as a consumer have to say no this debauchery and quit buying those eggs and massive chicken breasts. Your vote is in your pocketbook. Ask questions, tour farms, know where your food is coming from and support your local producers. As producers and future farmers take a vow to let your chickens be chickens, your cows be cows and express themselves through their natural tendencies. Stress-free animals produce better quality products. Pledge to treat your animals with respect.[21]

## Bridging the Gap Between Rural and Urban

Can you look back and imagine the days before supermarkets when farmers used to peddle their goods on the main street of town? Today, farmers have basically removed themselves from the marketplace. The only exception is the local farmers market which typically occurs once per week and only reaches a small percentage of consumers. This has resulted in a largely "agriculturally illiterate consuming populace".[22]

There are so many misconceptions and barriers between city folks and country folks built into modern agriculture. City folks see documentaries on soil erosion of farmland, industrial feedlots and poultry production facilities and automatically think all farms are the same and that they are out to destroy the environment. Country folks think city folks are trying to destroy their property rights and freedoms through regulations to correct the horrors they see on TV

21 Some of the ideas in the previous 3 paragraphs are based on: Salatin, *You Can Farm,* 33.

22 Salatin, *You Can Farm,* 34.

and that they don't have a clue as to how their food gets on their plate.

Rather than mistrusting each other so much we need to learn to work together. Those who truly care about their food need to understand that the best way to ensure the quality and safety of what they are eating is to go to the source - the farmer. By the same right, if farmers don't want to be regulated out of business they need to start building relationships with the consumers so that they can begin to understand their needs as a producer. [23]

## Economic Development in Rural Communities

The Peace Country, in northern Alberta where I'm from is very rural, yet it seems as though every time I go home for a visit the local political talk is of some bigwig wanting to put in a nuclear power plant or a pulp mill or some other form of industrial expansion as an answer to economic development in the area.

The problem with industrial expansion is not that it brings new people to the community but that they typically live in the town and don't contribute to it. Rather they take their salaries from the privately owned industrial facilities and additionally require the community to provide them with utilities, schools, hospitals, police and fire departments. They pay taxes but we all know it is never enough to cover the additional tax burden suffered upon the community to fund the additional amenities required. So if this conventional idea of 'growth' is the answer why then is the provincial and federal government in provinces such as Ontario, currently

23 The ideas in the previous two paragraphs are based on: Salatin, *You Can Farm,* 34.

having to financially bail out companies such as Bruce Power to build, repair and maintain these so called brilliant, efficient nuclear power plants? Furthermore, knowing this why in our right minds would we want to put one of these power plants in our community and further increase this burden on the Canadian government not to mention the environment? Clearly, this vision of economic development is more devastating than helpful. I believe we need to look to the food industry for solutions.[24]

Canada has always been a major food exporter. The problem is that most of the food we see on the grocery store shelves is imported. "In 2009 Agri-Food trade exports totalled $35.169 billion dollars. The top 5 items exported were raw products [non-durum wheat, canola seeds, durum wheat, live cattle and dried shelled lentils]. That same year Agri-Food trade imports totalled $28 billion dollars. The top 5 items imported were value-added or processed products [bread, pastry, cakes, biscuits; food preparations; grape wine; beer; dog and cat food]."[25] So even though we are statistically running at a trade surplus we are missing out on billions of dollars worth of income by adding value to our raw food products. For example, the bread, pastries, cakes and biscuits noted above account for $755 million worth of our imports. Imagine what that money could do for our rural economies if farmers started using the grain they grow to make and sell their own baked goods to local supermarkets instead!

Rural towns and villages were originally built on thriving

24 Salatin, *You Can Farm,* 34.

25 Agri-Food Trade Service. "Fact Sheets, Canada-At a Glance." Agriculture and Agri-Food Canada. http://www.ats.agr.gc.ca/stats/4679-eng.htm.

little sawmills, canneries, butchers and other such small local industries. We need to focus our energies on bringing them back. Farmers and craftsmen have given up jobs to huge factories in large city centers. Plenty of these jobs could still coexist in the countryside if we encourage them. Rural economies are always under pressure from industrial development authorities offering jobs, roads, and tax concessions in order to get their way. We have to consider the implications of these large industries moving in.

For example,

> "...in Canada the last two decades (1981 to 2001) alone have witnessed the loss of over 60,000 farms, a 22% decline (Statistics Canada, n.d.). During the same period, over 40,000 farms have ceased raising hogs, a whopping 72% loss of hog producers. Several Canadian provinces are experiencing the same dramatic disappearance of hog producers as large-scale factory hog operations become entrenched. For example, in Saskatchewan, the total volume of hogs produced nearly doubled between 1981 and 2001. At the same time, the number of farms producing hogs declined over 80%, from nearly 9,200 to 1,700. [26]

Jobs are available if we work together to allow the farmers produce and process our food, local mills produce lumber to build our homes, and local canneries to turn our excess summer berries into delicious jams and pie fillings.[27]

## Strong Family Values Build Strong Farms

I believe in farms modelled around families where everyone young and old are included and actively participate in one way or another. Farms that are completely mechanized,

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26 Alexander M. Ervin, Cathy Holtslander, Darrin Qualman and Rick Sawa, ed., *Beyond Factory Farming, (*Saskatoon: Canadian Centre for Policy Alternatives–Saskatchewan, 2003), 14-15.

27 The ideas in the previous two paragraphs except those otherwise quoted are based on, Salatin, *You Can Farm,* 35.

standardized and industrialized provide little opportunity to incorporate children into daily routine as everything is automated and often dangerous. I'm not saying that machines aren't necessary on farms but the degree to which they are used can vary drastically and they aren't always necessary. The earlier we involve children in the processes of the farm the more committed they will be and will develop the common sense necessary to do other jobs as they grow older. I love taking my little 3 year old nephew out with me to feed the horses and chickens on our farm. He is thrilled to turn on the tap and help fill the water bucket as well as scoop oats out of the sack to give to the animals. He has also learned how to respect and care for the animals at an early age. If we do not create opportunities for our children on our farms they very quickly become video game junkies and mall rats. Then as they come of age where they can be truly helpful they have no desire or interest to participate and this is of great loss to the farm.

In addition, grandparents should be encouraged to participate in farming in whatever capacity they are able. They may not be able to provide help shoveling grain but they can enchant the children with stories of the olden days of farming and assist with assessing the market and developing new methods of farming based on past experiences. Just as it is a tragedy to lose a child's interest in the farm it is equally as bad to lose the wisdom of our elders without first passing it on to our children.

Farms, like any other businesses have busy seasons and slower seasons where people can break from routine rather than suffer from performing the same tasks day after day. Winter typically provides an opportunity for a slow down

period on the farm. This change of pace keeps everyone involved invigorated and enthusiastic and helps to ensure the continuation of the family farm.[28]

## Taking Control of Your Food

Canadian food trends today demand foods that can be prepared in a short period of time. This is due to the fact that people have less time to dedicate to food preparation, fewer domestic skills and more money to purchase easy solutions.

> At the same time, "numerous Canadian polls indicate that consumers are concerned about food safety and consider safe food to be an important food quality (Environics, 1999; Ispos Reid, 2001a). Research (Environics, 1999; McCann 2002; Ispos Reid, in Karman 2003) shows Canadians are specifically concerned about the following food safety issues:
>
> - farming practices - antibiotic and growth hormone use in livestock;
> - pesticide residues in crops
> - bacteria contamination
> - food additives and preservatives
> - perishable/freshness concerns
> - problems arising from poor food handling/improper preparation
> - animal disease.
>
> Research specific to Albertans had similar findings to the Canadian research. Consumers were asked, "When you think of food safety issues - that is, production, handling, and storage of foods - which one do you consider to be the most important?" and, "What other food safety issues are important to you?" (Compas Research, 2003, p.25). Overwhelmingly, 44% of Alberta consumers identified safe food handling as the number one concern (Compas Research, 2003). This was followed by cleanliness (17%), proper storage (13%), production (8%), and freshness (3%)."[29]

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28 The previous three paragraphs contain ideas from: Salatin, *You Can Farm, 36*-37.

29 Agriculture and Rural Development. "Consumer Trends in Food Safety 2002-2011." Government of Alberta. http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/sis8437.

With this increasing concern for food safety isn't it odd that more of the production and preparation of our food is being entrusted to companies and people we don't know? We need to encourage that people get involved with their food rather than leaving food safety responsibility in the hands of government institutions known to mess it up and create massive recalls and health scares.

Consumer inspected facilities and business' are always going to be the cleanest and most nutritious. Why? When the entire operation is scrutinized by the patron no one in their right mind is going to risk doing something crooked. Large corporations backed with lawyers, millions of dollars in liability insurance and only partially visible facilities on the other hand can pull a fast one over any consumer's eyes.

I believe in encouraging consumers to become more active in the production of their food, learn where it comes from, buy it fresh and cook it themselves. Although ready to eat, one dish, custom quick food may be convenient, it is expensive and lacks quality. The ultimate sacrifice is the health of the consumer. Food lacking quality and freshness and that is processed is deficient in nutrients therefore the consumers eating it will be deficient. When our bodies aren't receiving the nutrition they need we get sick as a result adding to health care burdens already alarmingly high in our country. [30]

## Because Farmers Are Worth It

There is no reason for a farmer's salary to be less than that of an average white collar business person in the city. Just

30 The previous three paragraphs contain ideas from: Salatin, *You Can Farm,* 37-39.

because they don't wear a suit but rather get their hands dirty for a living does not make them any less important. If farms are managed correctly I believe they can earn a living just fine on their own without heavy government involvement. Taking this into consideration it would be inappropriate for a farmer to make his time worth any less than $25-$30 an hour. We are only as valuable as we perceive ourselves to be and I believe that farmers should start to see more in their self-worth rather than living like peasants and working themselves to death.

To ask a farmer how they are doing financially typically warrants an answer along the lines of 'just barely making the payments'. Life is too short to be enslaved to a dead-end job. When a farmer is reduced to repetitive chores without enthusiasm, vision or creativity, producing the best milk, or the best eggs or the best vegetables are not on the priority list.

If a farmer is to have the drive, enthusiasm and desire to produce better food year after year they must be rewarded. Although money isn't everything in life, it is certainly a motivator. Farmers should not feel guilty about charging patrons enough money to hold their head high for top quality farm products. Any consumer not willing to pay such a price as a sign of respect and acknowledgement for the value of the food they are putting in their stomach clearly has no concern or value for their own health.

The kind of farming outlined in the philosophies described above provides enthusiasm and excitement of discovering new and better ways to farm and produce high quality goods to be proud of. It incorporates strong family values

and commitment with embedded ideas of succession and leaving our children with a legacy to build upon after we are gone. By following natural cycles of animals and seasons it allows for a change of pace and well deserved breaks.

What variety of tomatoes a farmer chooses to grow or brand of electric fencing used is not the point of this discussion. The philosophies outlined here are the basis for success of a farm model more so than a cut and dry how-to-guide of farming. Having a clear understanding of one's beliefs will prevent deviation from the path outlined here due to the pressures from agribusiness' and peers.[31]

## CREATING A MARKET

I can still remember a time around the age of 13 as a dinner guest at a family friend's place during the winter months. As we sat down to eat I can only imagine the horror of seeing the disgusted look on my face when a fork full of oddly yellow kernels hit my mouth and I began to chew. Some may consider me sheltered but at that point in my life I had never before tasted canned corn bought from a store. Even worse than the taste was the realization that the rest of this family was sitting there eating it as if nothing was wrong! Truthfully, it was 'normal' to them and this was disturbing to me.

By that age I was already capable of cooking full meals on my own so I asked my mother if we could have this family over to dinner at our house and serve them the exact same meal they served to us. The only difference was that all of our food was organic and grown in our back yard, including

31 The previous four paragraphs contain ideas from: Salatin, *You Can Farm,* 39-42.

the meat. Their moans and groans of delight and requests for seconds was like music to my ears. Especially when they specifically asked what ‘brand’ the corn was and commented on its tenderness, sweetness and how moist it was. It was my pleasure to enlighten them that food that tastes that good in the dead of winter doesn’t come from a supermarket.

I realize that I cannot run around cooking a meal for every Canadian family to enlighten them about good food and where it comes from. But similar principals can be applied to local markets to have other people help to make a difference on your behalf. By handing out samples of farm fresh products to restaurant owners/chefs for example they can appreciate the difference in quality. Serving quality food that tastes incredible helps them to develop a reputation and more profits so it is in their best interest to do so. Once they demand to use your products in their restaurants then you have a market.

Rural communities can be really great at supporting local businesses as long as the products provided are of good quality and a fair price. There used to be 2 grocery stores in Manning until recently the owner of the IGA bought out his competition. He also owns other IGA stores in almost all of the other communities in the Peace region. Since this monopoly over the retail food industry in Manning has taken place there have been many complaints from locals about the quality of the food being sold, the price and the lack of quantity at times. This wreaks of opportunity for a farm enterprise!

In addition, several years ago the local butcher/bakery in

town shut down as the owners retired/passed on and had no one to succeed their business to. Prior to closing, the bakery was always busy, especially during lunch with their fresh made soups, sandwiches and deserts. If you hadn't come in to purchase bread before lunch you were typically out of luck. In light of this the IGA grocery store has a small bakery built within it and sells 300 loaves of whole wheat bread/week as opposed to just 120 loaves of foreign produced whole wheat bread off the shelf.

I also happen to know of several people in the community with allergies to wheat or are celiac who travel 2.5 hrs to Grande Prairie to a health food store that sells alternative breads made from grains safe for them to eat. Along with their bread purchase, the community of Manning loses countless other purchases that get transferred to the larger city center as a result of this bread run. Another opportunity that is right under the nose of a farmer looking to add value to their farm.

## ECONOMICS

Because there are so many variables that affect farm profits it is very difficult to and timely to perform an in depth financial analysis and business plan for this proposed farm. This analysis is starting with the basics to demonstrate a rough estimate for the financial aspects of running a successful farm enterprise of this nature. It is very much a work in progress, please accept it as such.

The most basic analysis in business and economics is the break-even analysis. The Break Even point (BEP) is defined as the point at which total cost or expenses and total revenue are equal. At the BEP there is no net loss or

gain. The break-even analysis focuses on the relationship between fixed cost, variable cost and selling price (price per unit). Fixed costs are production expenses that do not change as sales level change, for example rent/mortgage payments, property taxes or interest expense. Variable cost can also be seen as a per unit cost, and are directly related to production cost. These costs can include labour and materials required for production of one-unit and total variable costs can be calculated by multiplying the number of units sold by the variable unit cost.

A linear equation for the break-even point show below:

TR= TC [Total Revenue = Total Cost]

Price x Units sold = Total Fixed Cost + Total Variable Cost

When Total REVENUE equals Total Cost, we have reached our break-even point.

This analysis can be applied to the farm on a very basic level, as not all items sold will have the same unit cost or the same variable cost. By using this analysis, however, we will be able to calculate the required Total Revenue, and use this figure as a goal in terms of sales.

We will thus begin by calculating the Farms variable and fixed cost on a monthly basis.

- Loan repayment; An initial loan of $700,000.00 to build the farm will have a monthly payment of $3,876.68 based on an amortization period of 20 years and an interest rate of 3.00%

- Electricity: An monthly average has been taken from a example farm, similar is size and production to the proposed farm $228.01

- Natural Gas: An monthly average has been taken from a example farm, similar is size and production to the proposed farm $98.07

- Property Tax: Allocation of $1,400.00 has been taken from a example farm, similar in size and production to the proposed farm $116.66 per month

- Labour: As most farms in the region of this size are run and operated by the family that lives on the land, labour cost are minimal.

- Materials: LIST OF MATERIALS $2000.00/month

Total Fixed Cost : $3876,68 + $116.66 = $3,993.34

Total Variable Cost: 228.01 + 98.07 + 2000.00 = $2,326.08

Total Cost: TFC + TVC = $6,319.42

Using the BEP analysis, where TR= TC, we can conclude that the Farm's break-even point is where Total Revenue is $6,319.42.

The spreadsheet on the next 3 pages is a collection of brands and retail prices of goods sold in the local grocery store in Manning that are similar to the products that will be produced on the proposed farm. The columns in grey to the far right is the beginnings of a balance sheet of goods to be sold on a monthly basis at an estimated price. The retail costs of cuts of meat and whole chickens are not yet included in this spreadsheet but as you can see the BEP is attainable with the right marketing skills and tactics.

| ITEM | BRAND NAME | PRICE | QUANTITY eg) 500 grams, 250 mL | FARM PRICE | Units required for break-even point | |
|---|---|---|---|---|---|---|
| Eggs | Compliments (large) | $2.27 | 1 dozen | | | $0.00 |
| | | $2.49 | 1 dozen | | | $0.00 |
| Organic, free range | not available | | 1 dozen | $3.99 | 100 | $399.00 |
| eggs | | | 1 dozen | | | $0.00 |
| Marble Cheese | Kraft | $12.99 | 750g | $15.00 | 12 | $180.00 |
| | Black Diamond | $9.99 | 500g | | | $0.00 |
| | | | | | | $0.00 |
| Aged Cheddar | Kraft | $12.99 | 750g | $15.00 | 12 | $180.00 |
| | Black Diamond | $9.99 | 500g | | | $0.00 |
| | | | | | | $0.00 |
| Brie Cheese | Compliments | $6.99 | 200g | $8.99 | 12 | $107.88 |
| | | | | | | $0.00 |
| | | | | | | $0.00 |
| Goat Cheese | Sensations | $5.39 | 125g | $7.39 | 12 | $88.68 |
| | | | | | | $0.00 |
| | | | | | | $0.00 |
| Gouda Cheese | Anco Latose free | $10.11 | 338g | $12.11 | 12 | $145.32 |
| | | | | | | $0.00 |
| | | | | | | $0.00 |
| Swiss Cheese | Emmental-Gryuers | $5.66 | | $6.66 | 12 | $79.92 |
| | | | | | | $0.00 |
| Cottage Cheese | Dairyland 2% | $3.89 | 500ml | | | $0.00 |
| | | | | $4.00 | 12 | $48.00 |
| *Any other cheese | Tre Stelle (Parmassen) | $11.38 | 125g | | | $0.00 |
| that is local or farm | | | | $12.38 | 12 | $148.56 |
| fresh. | | | | | | $0.00 |
| Butter | Foothills | $3.99 | | $5.49 | 50 | $274.50 |
| | Dairyland | $4.99 | | | | $0.00 |
| Milk Skim | Dairyland | $3.35 | 2 L | $4.89 | 20 | $97.80 |
| | | | | | | $0.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2% Milk | Dairyland | $3.85 | 2 L | $4.99 | 20 | $99.80 |
| | Dairyland | $5.79 | 4 L | $8.99 | 0 | $0.00 |
| Homo Milk | Dairyland | $3.89 | 2 L | $4.99 | 20 | $99.80 |
| | Dairyland | $5.99 | 4 L | | | $0.00 |
| Cream - heavy | Old Fashion 36% | $3.49 | 500mL | $3.99 | 12 | $47.88 |
| | | | | | | $0.00 |
| Cream - whipping | Dairyland 33% | $3.49 | 500mL | $3.99 | 12 | $47.88 |
| | | | | | | $0.00 |
| Cream - light | Dairyland half n half 10% | $2.29 | 500mL | $3.69 | 12 | $44.28 |
| | | | | | | $0.00 |
| Bread - made in IGA | 80% whole wheat | $1.84 ea | or 3/$5.00 | $6.49 | 50 | $324.50 |
| bakery (whole wheat) | | | | | | $0.00 |
| Bread - from regular | McGavins | $2.59 | 570g | | | $0.00 |
| shelf (whole wheat) | Dempsters | $3.69 | 675g | | | $0.00 |
| Bread - from regular | Silverhills | $4.99 | 615g | | | $0.00 |
| shelf (multi-grain) | Dempsters 12 grain | $3.99 | 600g | | | $0.00 |
| Buns - from bakery | Freson | $2.99 | 1 dozen | $4.49 | 24 | $107.76 |
| (whole wheat) | | | | | | $0.00 |
| Buns - from regular | Dempsters | $3.99 | 1 dozen | | | $0.00 |
| shelf (whole wheat) | | | | | | $0.00 |
| Blueberry muffins-frm | | | 1 dozen | $8.99 | 50 | $449.50 |
| Pies from IGA bakery | | | | $10.00 | 7 | $70.00 |
| any flavor (fruit pref.) | | | | | | $0.00 |
| Cakes from IGA | 1/4 slab cake | $21.99 | | $26.99 | 6 | $161.94 |
| bakery-chiffons? | chiffons n/a | | | $18.00 | 20 | $360.00 |
| Raspberry jam | Smuckers | $5.77 | 500g | $7.25 | 12 | $87.00 |
| Raspberry jelly | Ed smith | $3.99 | 250mL | | | $0.00 |
| Strawberry jam | Ed Smith | $5.49 | 500g | $7.25 | 12 | $87.00 |
| Strawberry jelly | Ed Smith | $3.99 | 250g | | | $0.00 |
| Blueberry jam | Compliments | $4.47 | 500g | $7.25 | 12 | $87.00 |
| Whole wheat flour | Robin Hood | $9.99 | 5kg | $50.00 | 50 | $2,500.00 |
| | | | | | | **$6,324.00** |

| GRAIN | LOW $/bushel | YEAR | HIGH $/bushel | YEAR | | |
|---|---|---|---|---|---|---|
| Canola | $1.95 | 1973 | $9.45 | 1996 | 0 | $0.00 |
| Barley | $1.25 | 1972 | $3.50 | 2002 | 0 | $0.00 |
| Wheat | $1.95 | 1970 | $5.50 | 1996 | 0 | $0.00 |
| Flax | $7.00 | 1999 | $11.00 | 2010 | 0 | $0.00 |
| Alfalfa | $0.55/lb | 1994 | $2.60/lb | 1988 | 0 | $0.00 |
| Clover | $0.03/lb | 1968 | $1.10/lb | 2001 | 0 | $0.00 |
| | | | | | | **$0.00** |

| GRAIN | POOR YEAR bushels/acre | AVERAGE YEAR bushels/acre | GOOD YEAR bushels/acre |
|---|---|---|---|
| Canola | 15 | 35 | 45 |
| Barley | 25 | 60 | 80 |
| Wheat | 20 | 40 | 60 |
| Flax | 10 | 30 | 42 |
| Alfalfa | 30 lbs | 60 lbs | 80 lbs |
| Clover | 850 lbs | 1200 lbs | 2000 lbs |

**Monthly Revenue: $6,324.00**

*The above 2 charts of information pertains to the land being used as my site for the farm

# CHAPTER 2: DESIGN

## SITE

The site for this farm is located 6 1/2 miles east and a 1/2 mile south of secondary highway 691 near the community of Manning, Alberta. This small, rural community has a population of approximately 1400 people with around 5000 people living in the surrounding countryside. The primary industries in the area are farming, logging and oil and gas.

Manning is located at a latitude of 56.92° and a longitude of -117.63°. As a result at the summer solstice the sun rises at 03:56 hrs and sets at 24:00 hrs for a total of 20 hrs of daylight. At winter solstice the sun rises at 08:38 hrs and sets at 17:00 hrs for a total of only 8 hrs of sunlight. The prevailing winds are primarily from north to south except between March and May where they blow from southeast to northwest. The average wind speed is approximately 8 km/hr. The length of the growing season in Manning is 165-170 days on average. The last spring frost occurs between May 21-31 and the first fall frost occurs between Sept 11-20.[32]

The site is very flat except for the southern portion which borders a deep valley where Bear Creek (about 150 feet below) flows east towards the Peace River. This valley is heavily wooded with primarily Spruce, Pine, Birch and Poplar tress and is home to many species of wildlife. It is also rich with wild Mushrooms, Raspberries, Blueberries and Saskatoons during the growing season.

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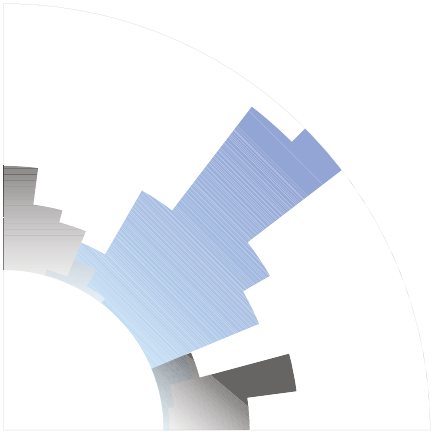
32 Statistical weather data information taken from the following website: Agriculture and Rural Development. "Agroclimatic Atlas of Alberta: Agricultural Climate Elements." Government of Alberta. http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/sag6301.

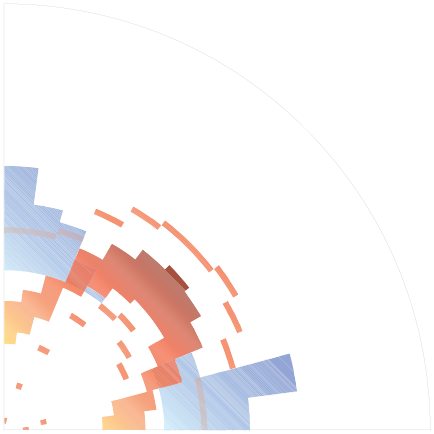
View from the site looking southwest towards the Bear Creek Valley in mid summer.

View of Bear Creek Valley in late summer/early fall.



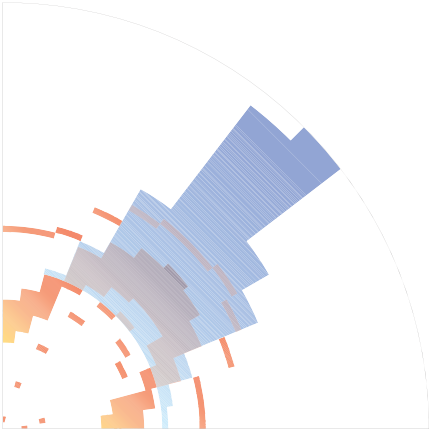
MONTHLY SNOWFALL (GREY) AND RAINFALL (BLUE)

January to December [left to right]. Snowfall range 0-44 cm, rainfall range 0-86 mm. Total annual precipitation May 1-Aug 31 is 250-275mm; Sept 1 - April 30 is 175-200 mm.



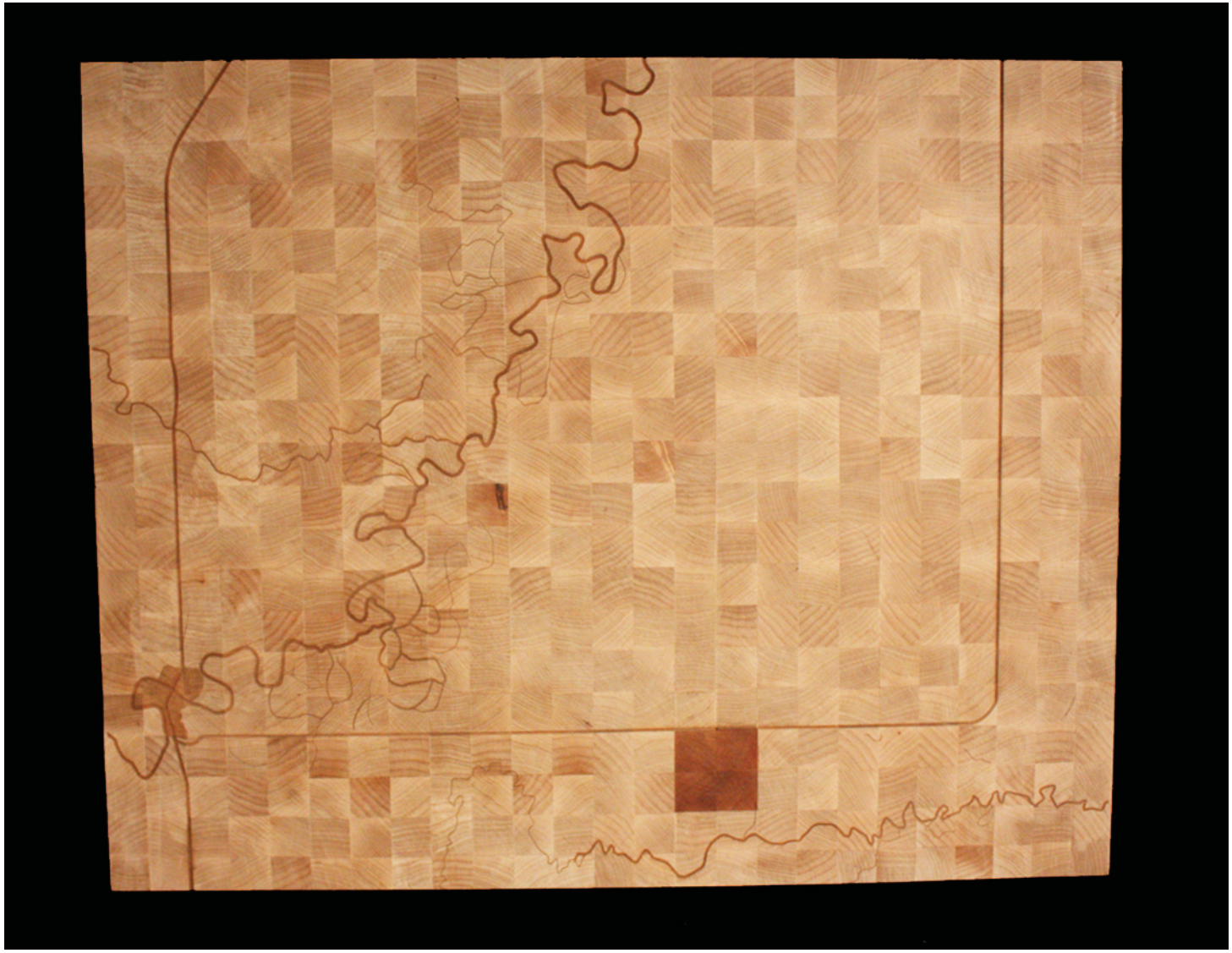
MONTHLY TEMP (RED) AND SNOWFALL (BLUE)

January to December [left to right]. Snowfall range 0-44 cm, temp range -8°C to -50°C during snowfall months [Sept-May].



MONTHLY TEMP (RED) AND RAINFALL (BLUE)

January to December [left to right]. Rainfall range 0-86 mm, temp range 0°C to 36°C.



Abstract, arial model of farmland around the community of Manning, AB, main highways, rivers tributaries, and the design site.

# OPPORTUNITIES FOR AGRICULTURE AND DESIGN

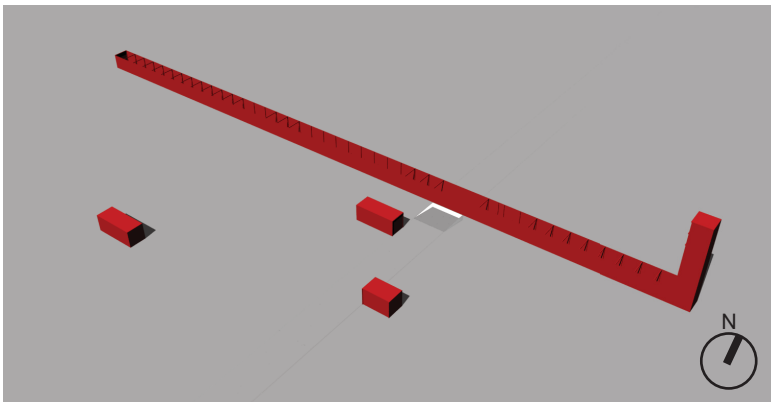
No one knows everything about all viable agriculture sectors but there are some that I have specifically chosen to include on my proposed farm. As you may recall in the list of farm philosophies, the importance of diversity was expressed along with the idea that the whole is worth more than the sum of the parts. The design challenge therefore, became finding a way to connect the many separate elements of the farm that all work together to strengthen the operation as a whole. I wil begin by describing the overalll design concept of the farm and then for the sake of simplicity break it down and describe each element in parts. This will highlight the agricultural opportunities of each element, and explain how value can be added to make a finished product in the end that can sell for higher profits. I will finish with images to describe the farm design in its entirety.

## Concept

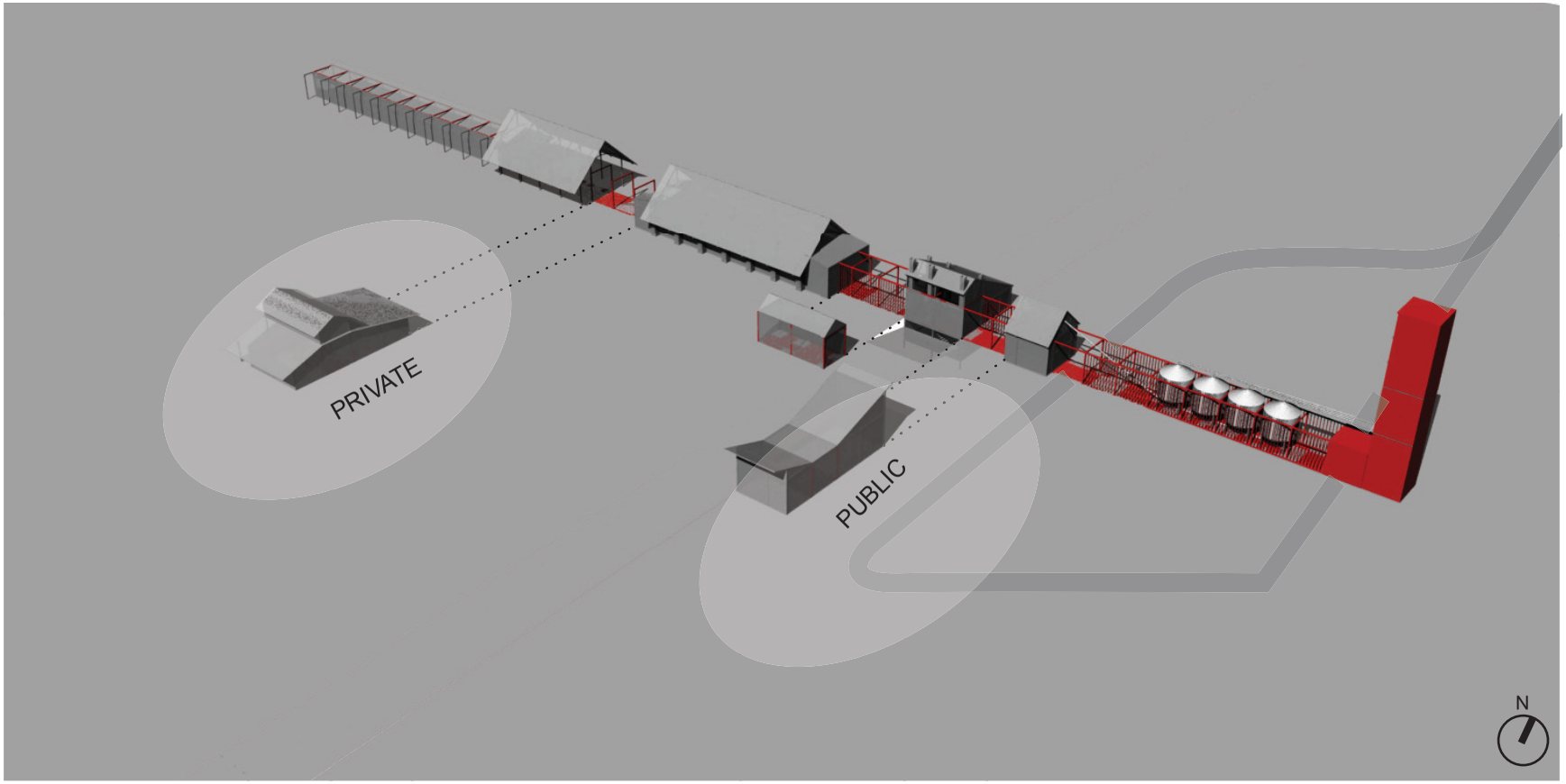
A deep and heavily wooded valley is located on the south side of the site and protection from the cold north wind is essential. Organizing the separate buildings in a line north of the valley created the farmyard proper inbetween. The concept then became a tube based on a 15’ x 15’ grid which connects all of the elements of the farm. The grid structure is expressed inside of the buildings by pulling the exterior walls away from the structure. The use of columns and screens in between the buildings continues to emphasize the connecting tube. Conceptually the tower is an extension of the tube bent to form an ‘L’ shape. The three buildings pulled away from the linear tube equal the spaces between the primary or industrial elements of the farm. These three

buildings create the micro-climates of public and private space within the farm. These concepts are demonstrated further in the images on the following three pages.

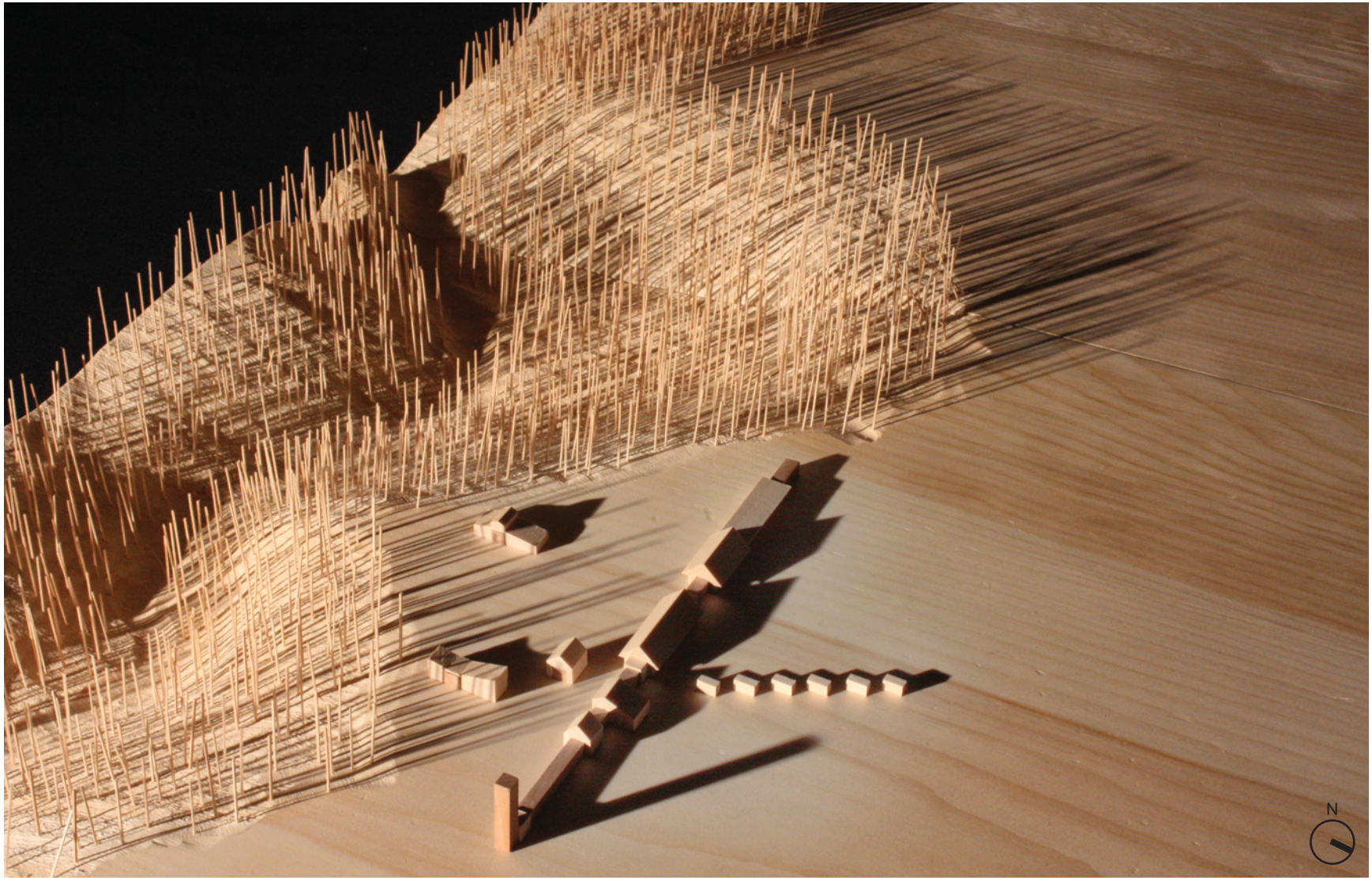
This proposed farm is a closed-loop system where each element works together to minimize waste and maximize value, nutrition and ultimately profits. The farm cycles around the idea of rotational grazing of the animals on the pastureland. This means moving the fences and animals within them every 1-2 days in order to more effectively enhance the grassland. This will ultimately increase the ability of the farm to sustain more animals which equals more profit for the farmer.




Connection tube with 'L' shaped tower at the end and the core of the three buildings pulled away from the tube to create micro-climates within the farmyard.




Concept rendering demonstrating building placement along connection tube and the spaces inbetween buildings pulled away to create the secondary and tertiary building elements of the farm. These buildings also create public and private micro-climates within the farmyard.




Site model showing building placement and valley to the south.

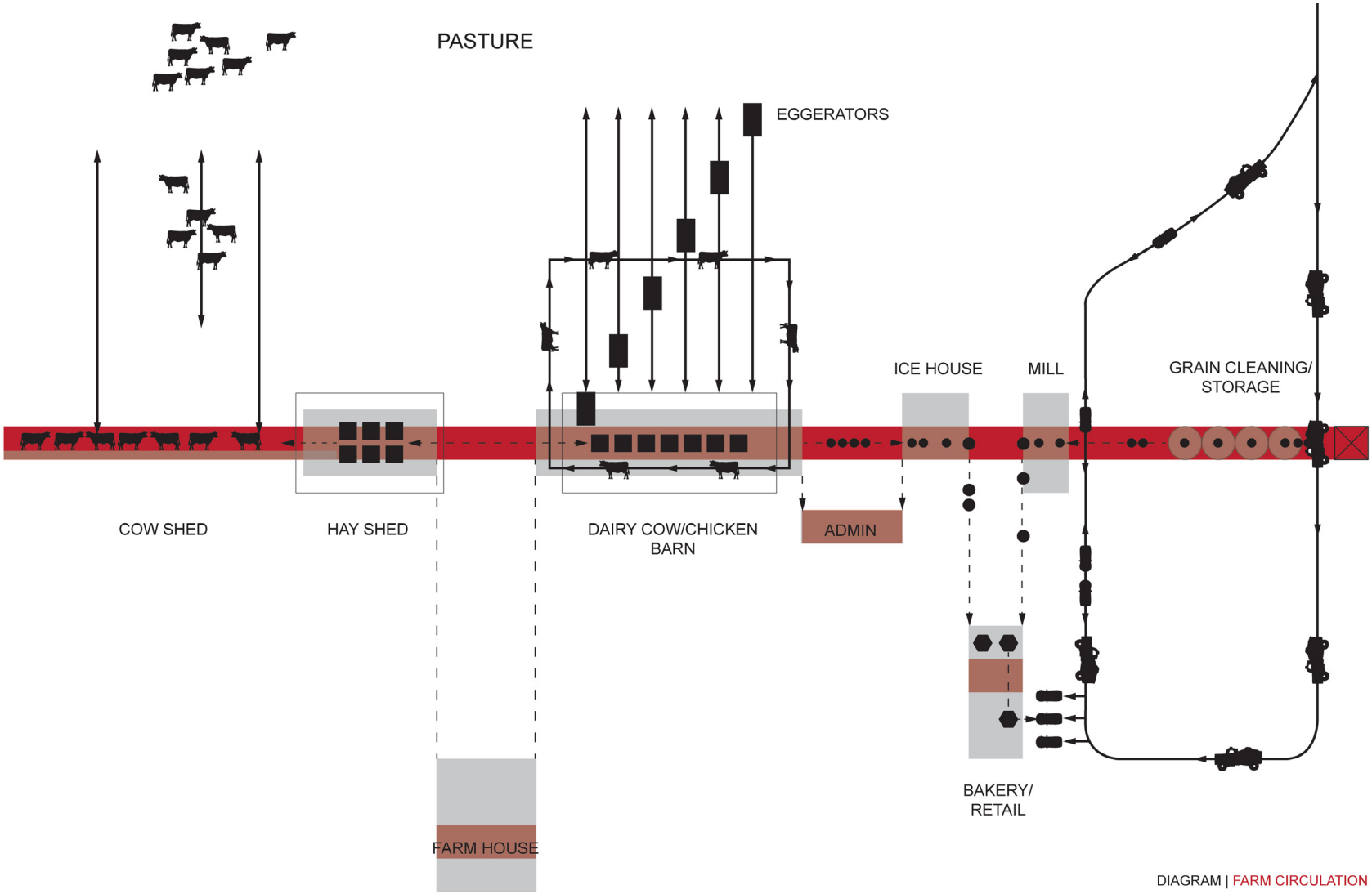



DIAGRAM | FARM CIRCULATION

## VISION MEETS DESIGN

### *Broilers*

Let's begin with chickens. This farm will have two types of chickens. Laying hens for eggs and broilers for meat. Extra daylight hours in the spring stimulates egg production in laying hens and these extra eggs can be hatched and raised as broilers. If, however, you wish to use the extra eggs day old chicks can be purchased for very little from a local hatchery. Children love to take care of the fuzzy little yellow babies so incorporating them into the business at a young age is easy.

Broilers take just 8 weeks to reach finishing weight so the farm receive's a quick return on its investment. Grazing chickens in natural pastureland will save 80% of the normally required amount of chicken feed and will also produce happier, healthier chickens and better tasting meat. By moving the chickens daily to fresh grass the chicken manure is also spread around to effectively nourish the soil and encourage faster, richer re-growth. Start-up costs are low and if there is a need to re-locate the moveable structures are easily transferable. The other beauty about pasteurized broilers is that they can be implemented pretty much anywhere there is a patch of grass and these operations will not compete with other uses of land.

Costs can also be saved by butchering and selling the broilers right on the farm. Poultry production is one of the few industries exempt from federal inspection to a certain degree. Some provinces are more restrictive than others so those farmers interested in butchering and selling poultry should look into their province's regulations in more detail.

Almost everyone loves to eat chicken. Unfortunately, chickens are one of the most widely abused animals and with more and more frequent news leaks about the horrors of battery cage poultry production, people are looking for alternatives. Marketing this product gets easier and easier with every negative publication regarding industrial poultry operations.

***Laying Hens***

Laying hens will produce an egg typically everyday until they get older and production starts to decrease to an egg every other day. Hens stop laying all together after about 18 months. When egg production has ceased laying hens make wonderful soup and chicken pot pie meat.

Layers are much smarter and more mobile and hearty than broilers. They do not require fenced in areas for grazing and are more aggressive about finding something other than just grass to eat. Not only do they provide the farm with delicious fresh eggs to eat, for retail sale and use within the bakery [which will be discussed later], they also play a valuable role in the cattle cycle as well. By allowing access

Photograph by Eco Films. "New Study Proves Free Range Chicken Eggs are Better." http://www.ecofilms.com.au/2010/07/28/new-study-proves-free-range-chicken-eggs-are-better/.

to the patches of pasture grazed by the cattle 3-4 days prior, the hens will happily eat developing fly larvae from the cow pies. If not dealt with these larvae can otherwise cause illness and even death if the cattle were to ingest them on their next cycle over that same patch of grass weeks later. Enough undigested grain also passes through to cow pies such that every cow supplies enough grain to feed 2-4 hens. In addition to acting as antibiotics for the cattle, the hens also disperse the manure when pecking out the larvae and grain. Combined with their own manure they work together to fertilize the soil naturally and make for stronger, healthier grassland.[33]

***Eggerators***

There are many factors which affect the health and well being of chickens and ultimately egg production. The main factors are maintaining body temperature, access to food and water, air quality and light management.

Birds show more variability in internal body temperature than mammals so there is no absolute body temperature but rather a range to consider. Adult chickens safe internal body temperature range is between 40.6° and 41.7°C (105° and 107°F). There are variations to this range to be mindful of. For example roosters have slightly higher body temperatures than hens and larger breeds have higher body temperatures than smaller breeds of chickens. Activity also increases body temperature of chickens. Therefore free-range chickens will have a higher body temperature than those kept in cages. Feeding also causes variations in a

33 Some of the ideas expressed in the previous 6 paragraphs are based on: Salatin, *You Can Farm,* 99-105.

chickens body temperature.[34]

Think of chicken behavior as you would yourself as a human. We eat and try to move around more or add more layers to insulate ourselves and generate heat when we're cold. Chickens fluff their feathers and increase food intake. In the summer when we are hot we wear less clothes, move around less, sit in the shade and typically eat less and drink more water to cool ourselves. Chickens behave in a similar manner.

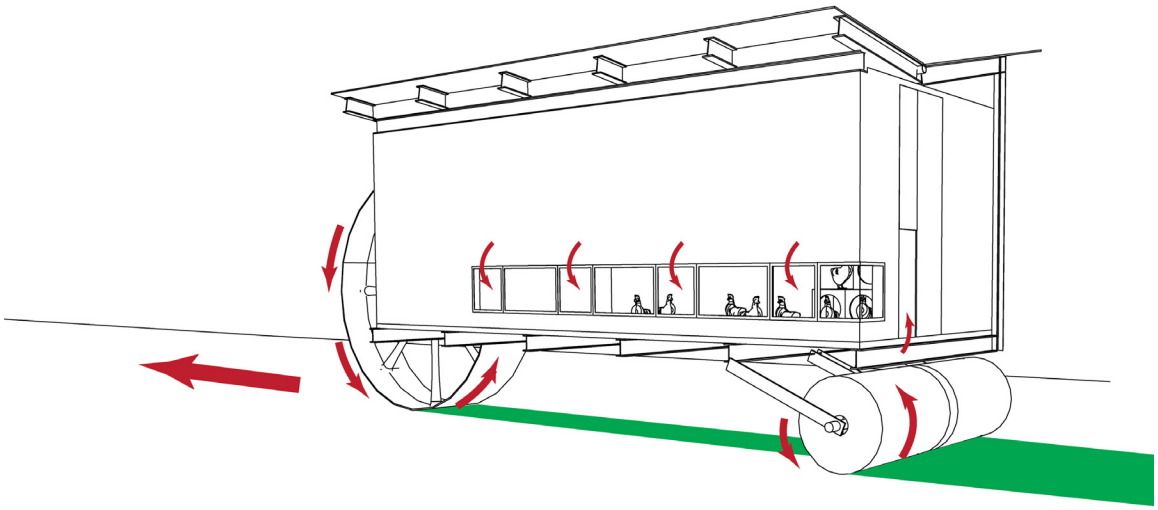
As far as providing adequate food water and ventilation in poultry and egg production is concerned there are minimal standards an operation must adhere to. This farm however, is about going above and beyond to optimize the health and well being of the birds and ultimately increase the quality of the meat and eggs we consume from these birds. The best way to do this is to provide an environment where the chickens can exude their natural behavioral characteristics and use these behaviors to your advantage. Chickens are healthiest when they are allowed to roam free pecking and scrounging for food that consists primarily of worms and fresh green grass. As described in the above paragraphs, the best way to achieve this is through mobile chicken houses or 'chicken tractors' as they are commonly referred to.

Machines are a valuable and time saving element in farm life. Industrial farms today have come to an over-reliance on big, expensive equipment to do the work that animals often can for the price of simply maintaining the grass that

34 Donald D. Bell (emeritus) and William D. Weaver Jr., ed., *Commercial Chicken Meat and Egg Production 5th ed* (New York, NY, 2002) 101-102.

already grows in the field naturally. This farm proposes to use animals to do the work of machines whenever possible but the idea of the chicken tractor naturally lends itself to be machine-like in nature and hence a design opportunity.

This new machine I call the ‘Eggerator’ meaning a generator of eggs, functions to house and protect the laying hens, provide them with water and additional feed in the evenings when they retire inside of the structure, provides areas for nesting and egg collection, uses passive ventilation to access fresh air, is solar powered to move the structure to fresh grass each day and has tires which aerate and pack down the ground as it moves. The Eggerators are modular in nature so that more or less of them can be built or parked to accommodate the egg production needs of the market the farm is supplying. By regulation, for a chicken to be considered ‘free-range’ they must each have 2 square feet of space. Each Eggerator is designed to hold 32 chickens. There is 8’ x 16’ of space for the chickens with a 4’ addition at one end for solar power and mechanical equipment. These dimensions adhere to typical building materials and the machines take on a rusted, old quality as I imagine many of the moveable parts to be harvested off of old, retired equipment. During winter months the Eggerator’s will dock into the north side of the main barn and allow the chickens access to space to run around freely while staying warm. Both the barn and the Eggerator’s themselves are insulated to provide the chickens with an environment where they can still maintain their required internal body temperature.

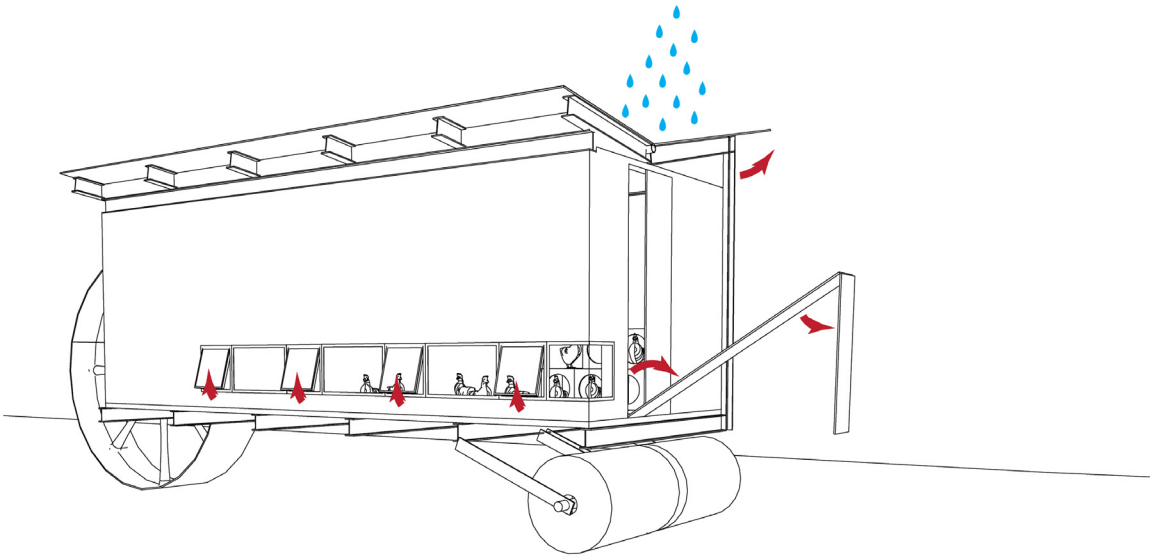


FIRST LIGHT |

BUILDING KINETICS

LAND MANIPULATION

Stage 1 - Eggerator moves to fresh grass. Ground is aerated by the pegs on the large wheel and manure and seeds are packed into ground by the small wheels during movement. The windows and doors are still closed from the previous night.

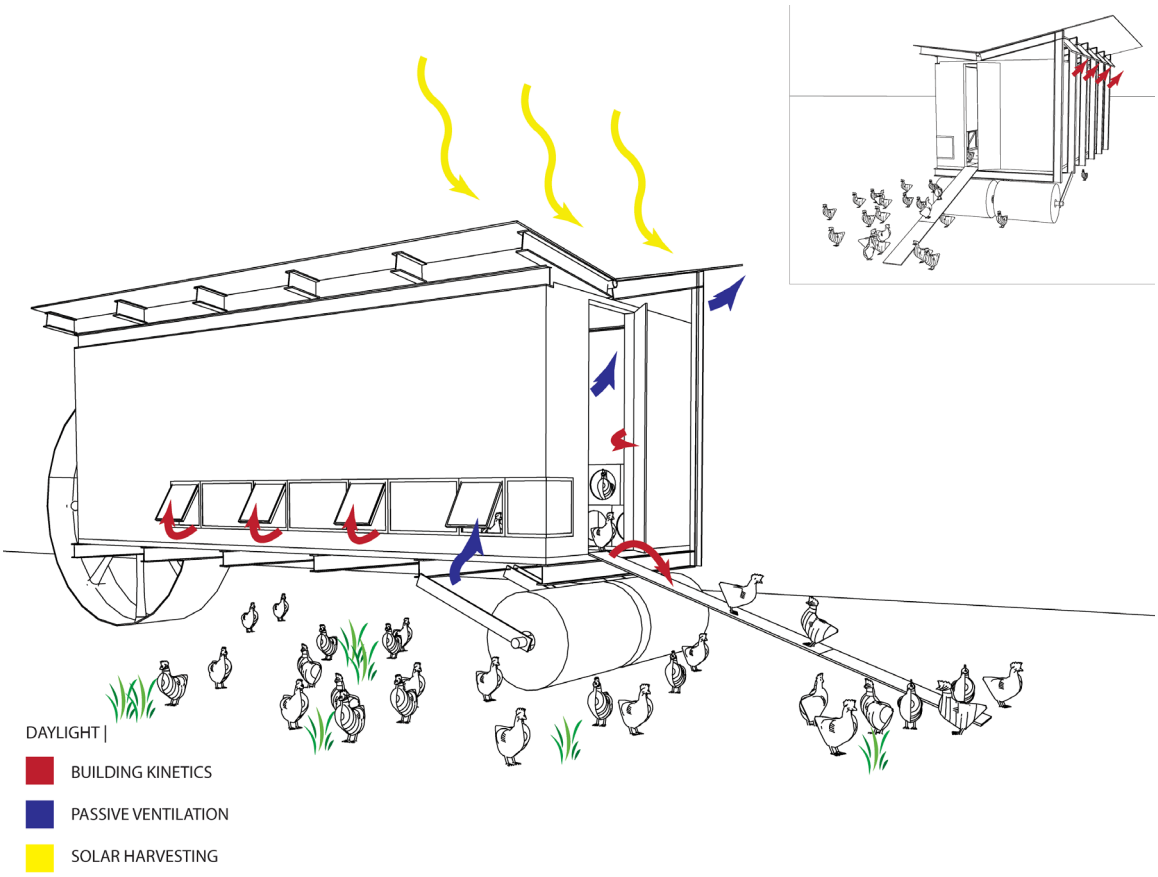


DAYLIGHT |

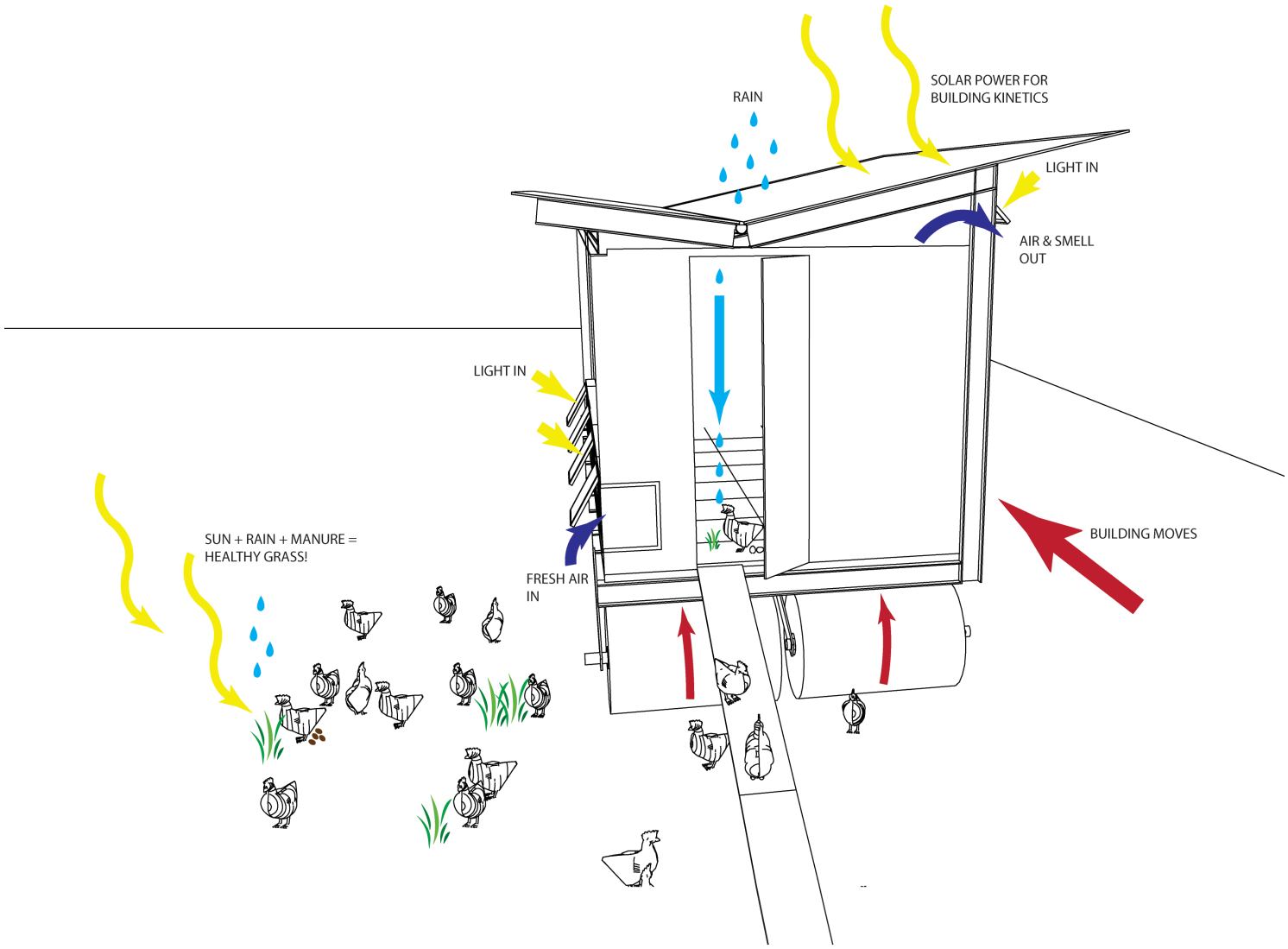
BUILDING KINETICS

RAINWATER HARVESTING

Stage 2 - Windows and doors begin to open to allow passive ventilation and to allow chickens access to fresh grass and cow patties. Rainwater collection system in effect during storms to be filtered and used to water chickens.




Stage 3 - Chickens wander in and out of eggerator at will to graze on fresh grass. They have access to water and shade underneath and inside of the machine. Nests are provided for laying eggs inside. Solar collection takes place during daylight hours and is stored to prepare to move the machine again at first light the next day.




Building Metabolism Diagram - demonstrating all of the Eggerator systems at work.

Rendering of the Eggerator design.

***Grass Fed Beef***

Cattle not only provide retail beef but also play an important roll in grassland pasture management. They chomp down the tops of their favorite plants in the pasture first, which stimulates re-growth all the while fertilizing the fresh new buds with their manure. In the winter, the cattle play an important role in the production of manure which is turned into valuable, all natural fertilizer for the grassland and grain fields in the spring. During the winter months, the cattle are fed hay under an open air building with a roof over their heads. As they feed they deposit 50-60 lbs of manure per cow. In order to suspend the nutrients in the manure we must maintain a carbon:nitrogen [C:N] ratio of 30:1. Once this ratio drops below 25:1 the material begins to release nitrogen which needs to be preserved until it is ready to be spread on the fields in the spring to enhance plant growth. Cattle manure has a C:N ratio of 18:1 so in order to get it to a level of 30:1 different forms of biomass must be added to achieve the right formula.

> Some examples of C:N ratios of biomass materials taken from Joel Salatin's book titled *Salad Bar Beef, [*pg 221] are:
>
> poultry manure 7:1
>
> leaves 50:1
>
> straw 100:1
>
> sawdust 500:1
>
> wood chips 250:1
>
> grass hay 80:1[35]

Biomass will need to be added every 3 days or so to stabilize the material but the overall rule of thumb is if you smell ammonia, add carbon.

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35 Salatin, *Salad Bar Beef,* 221.

Cattle tramp out the oxygen in their deep bedding putting it into an anaerobic state which is toxic to aerobic soil life. During the winter however, this is okay as it begins to ferment which produces heat to help keep the cattle warm. If they are warm they require less calories during cold weather meaning the farm saves money on feeding hay. In the spring the bedding must undergo aerobic composting before being spread on the field and become truly useful as fertilizer. Many farmers use a manure spreading machine to do this powered by a tractor. But why use up your time and costly fuel for a tractor to do what pigs can do?

The trick is to lay down corn and small grain over the manure before adding a fresh layer of bedding or carbon material during the hay-feeding period for the cattle. As these layers build up over the winter months the grain and corn ferment within them. In the spring when the cattle return to the pasture to graze, pigs can be purchased and let loose in the bedding patch. By simply adding a water trough to one of the poles of the shed the pigs will root their way through the bedding like an eggbeater in search of the fermented grain and corn. If you purchase the hogs around 150lbs and have added about 500lbs of grain and corn per hog to the bedding patch over the winter, it will supply them with enough feed to get to a finishing weight of around 300 lbs. Pigs don't break down like machinery will and don't require a wage either. After the pigs are done rooting, you have light, fluffy nutrient rich fertilizer to spread on your land and enhance growth, healthy cattle feeding on the grass and delicious pork meat to sell to customers or to feed the farm family.[36]

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36 The ideas from the previous three paragraphs are based on: Salatin, *Salad Bar Beef,* 219-236.

***Cow Shed | Greenhouse***

The design of the cow shed has a skeletal quality expressing the 15'x15' grid mentioned in the conceptual description of the farm. The grid allows for a modular quality to the design in the sense that more bays can be added as the cattle heard grows. The south side of the grid in this portion of the farm becomes a solid 1' thick concrete wall which supports the traditional timber frame structure of the cow shed as well as the feeding trough for the cattle. This feeding trough contains a conveyor belt which travels the length of the building beginning in the hay shed. Here hay bales can easily be loaded onto the conveyor belt to be distributed along the length of the open-air structure where the cattle feed.

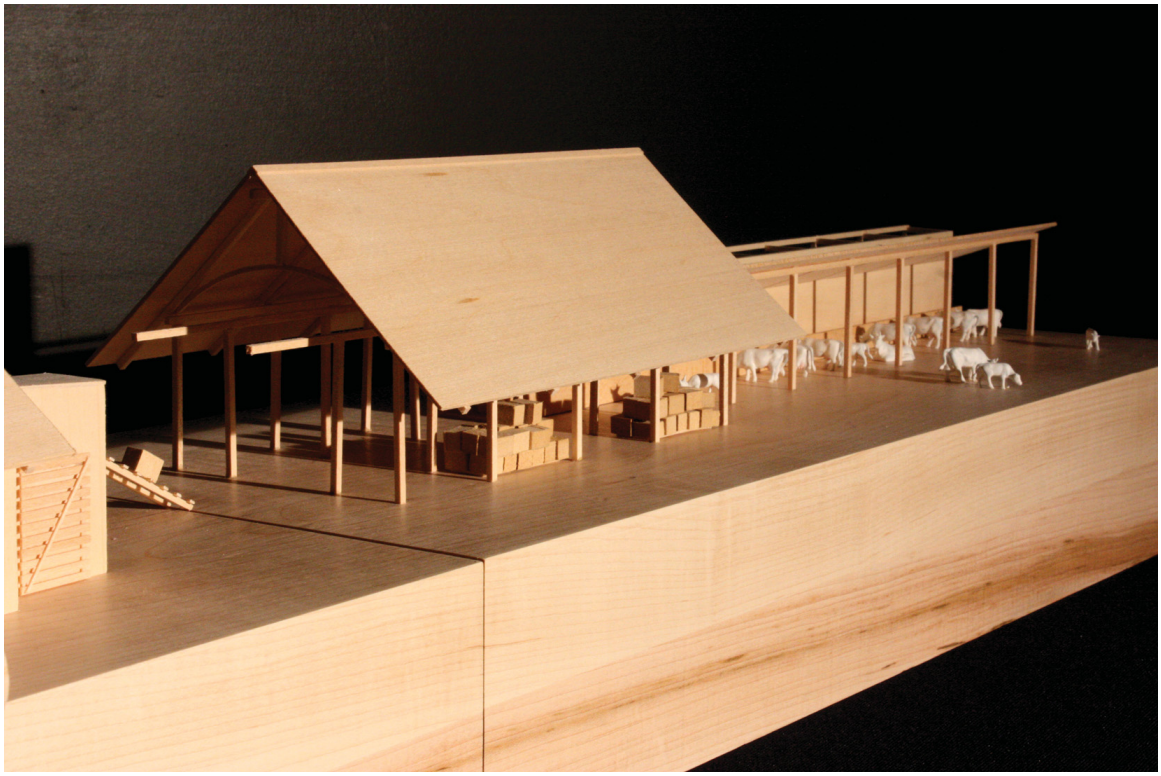
The south side of the concrete wall contains the greenhouse. The thickness of the concrete wall functions as a thermal mass in the greenhouse absorbing heat from the sun during the day and releasing it into the greenhouse at night when the air cools off. This is perfect for vine like plants such as tomatoes to grow against. The wall also functions as support for the structure of the glass box of the greenhouse, and the structure for the soil troughs along the length of the building. A greenhouse with south exposure and access to fresh manure for fertilizer can add fresh fruits and vegetables to the plates of the farm family year round. Any surplus can be sold at retail value to the community in place of the poor quality produce trucked in from thousands of miles away.

***Hay shed***

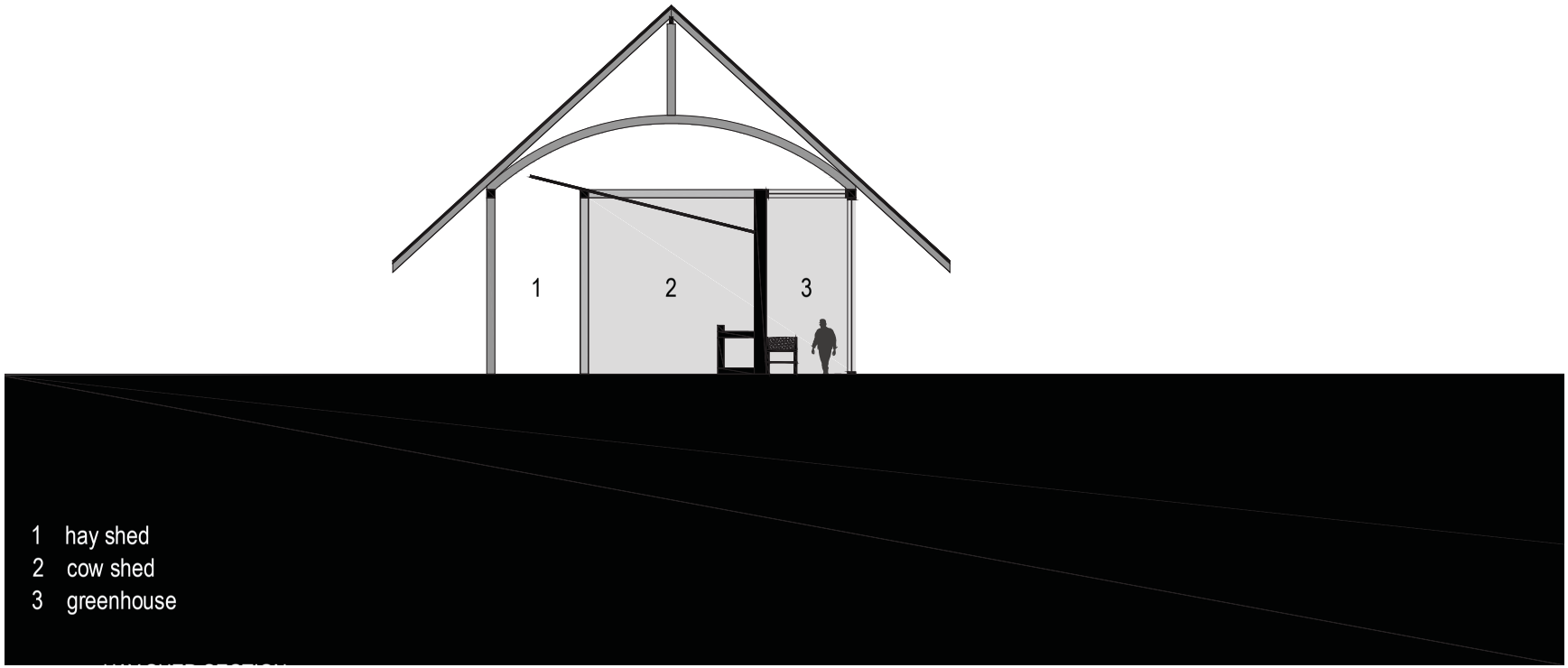
The hay shed is also an open air structure used for storing square hay bales during the fall and winter months that are

then fed to the cattle. By stacking the bales under the roof of the structure in the fall they are protected from the rain and snow and can dry out naturally to prevent rotting. The location of the hay shed is key as it provides quick and easy access of the bales to the cow shed and the main barn where the horses, dairy cows and chickens are housed. The structure of the hay shed mimics that of the barn and showcases the traditional timber frame joinery. The height of the building allows bales to be stacked vertically and the gable roof draws the heat from the drying hay upwards where it is released back into the air through the ridge.

During the summer months when the open air shed is not being used to store hay it can function as a place to set up the proper stations to butcher chickens safely and effectively.



Physical model. Hay shed [front], cow shed [back].




Hay shed/Green transverse section.

### *Dairy Cows*

Aside from working around government regulations with selling unpasteurized milk, dairy farming provides wonderful opportunities for a farm. A jersey cow will produce about 3020 litres of milk/year. The local grocery store in Manning sells a 2L carton of pasteurized Homo milk for $3.89. At that price alone this means potential gross earnings of $5,890/cow/yr. Since there is additional value in hormone and antibiotic free, organic dairy cows the farm can ask for slightly more money/litre of milk from it's customers. To add even more value to the dairy cattle business this farm will also produce it's own cheese, butter and ice-cream for retail sale and use within the bakery.

### *Barn*

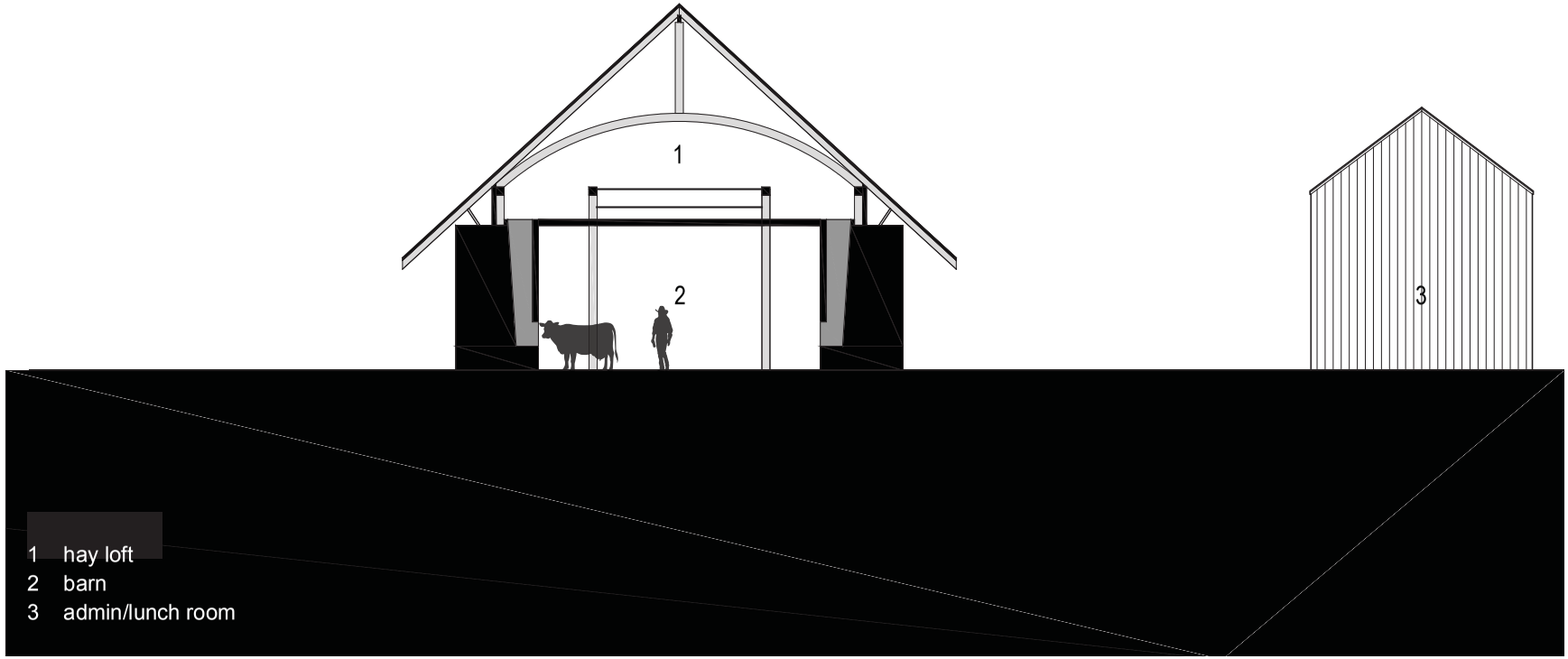
The barn is the largest building on the farm consisting of six bays of open space for the dairy cows, horses and chickens to be housed, fed and watered. The primary function of the barn is to house and milk the dairy cows twice per day. On each end of the barn the is an additional bay which function as washing and milking stations for the cows. These 'wedges' also function as the entrance/exits of the barn for animals, humans and equipment. During the summer months the dairy cows would be milked in the morning then circulate out of the barn to graze on fresh grass, then circulate back into the barn on the side of the washing station to be cleaned if necessary and then proceed through the barn back to the milking station in the late afternoon.

The timber frame structure of the barn is the same as that of the hay shed. This is meant to highlight the similar functions of the buildings and strengthen the idea of modularity within

the design. It is meant to appear as though the hay shed was part of the barn and broke apart leaving a space in-between for equipment access and passage through to the farmyard. The loft of the barn is used to store additional hay, which feeds the animals and also insulates the roof of the barn. There is a bale elevator located at the end of the barn closest to the hay shed, which transports the bales up to the loft where they are then carried by conveyor to the other end of the barn. From here a farmer can easily move the bales around and stack them in an organized manner.

The timber frame structure is tied into large concrete columns offset to the midpoint of the 15'x15' grid. These columns not only provide structural stability to the barn but also function as feeding troughs for the cows and horses. Through a hole in the top of the column which opens to the barn loft, a bale can be slid down to the animals below. An opening in the bottom of the column allows the cows and horses to eat away at the hay. If it becomes necessary to set up corals within the barn for certain animals, the concrete columns and timber columns of the grid provide the structure to do so.

On the north side of the barn in-between the concrete columns are the docking stations for the Eggerators used during the winter months. These stations protrude from the barn allowing the Eggerators to back up to them and form a seal using a gasket type mechanism. These insulated docking stations allow the ramp of the Eggerators to stay open so that the chickens may pass freely between their nesting/sleeping areas and the free-range space of the barn.




Barn transverse section.

Barn physical model.

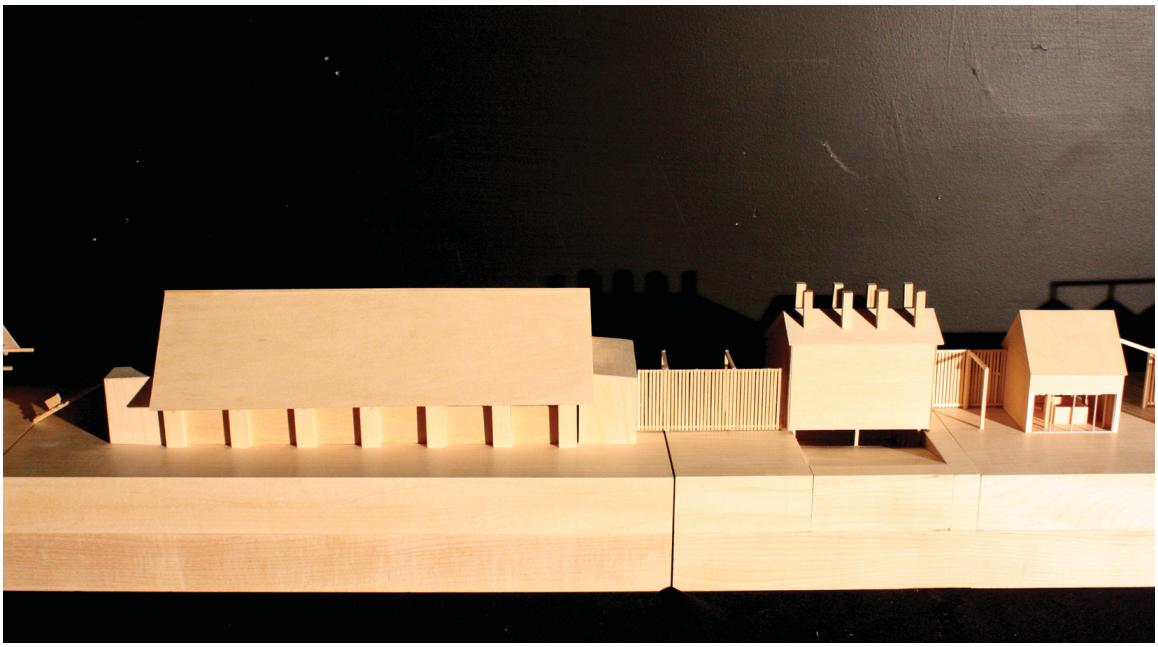
***Ice House***

Farm fresh eggs and milk are the two products being extracted from the barn and need to be kept chilled. The fresh milk from the dairy cows can be churned into butter and also used to make a variety of delicious cheeses which can be sold to people in the community or used in making fresh baked goods. In the spirit of using passive building systems whenever possible to save energy and money this building had unique potential.

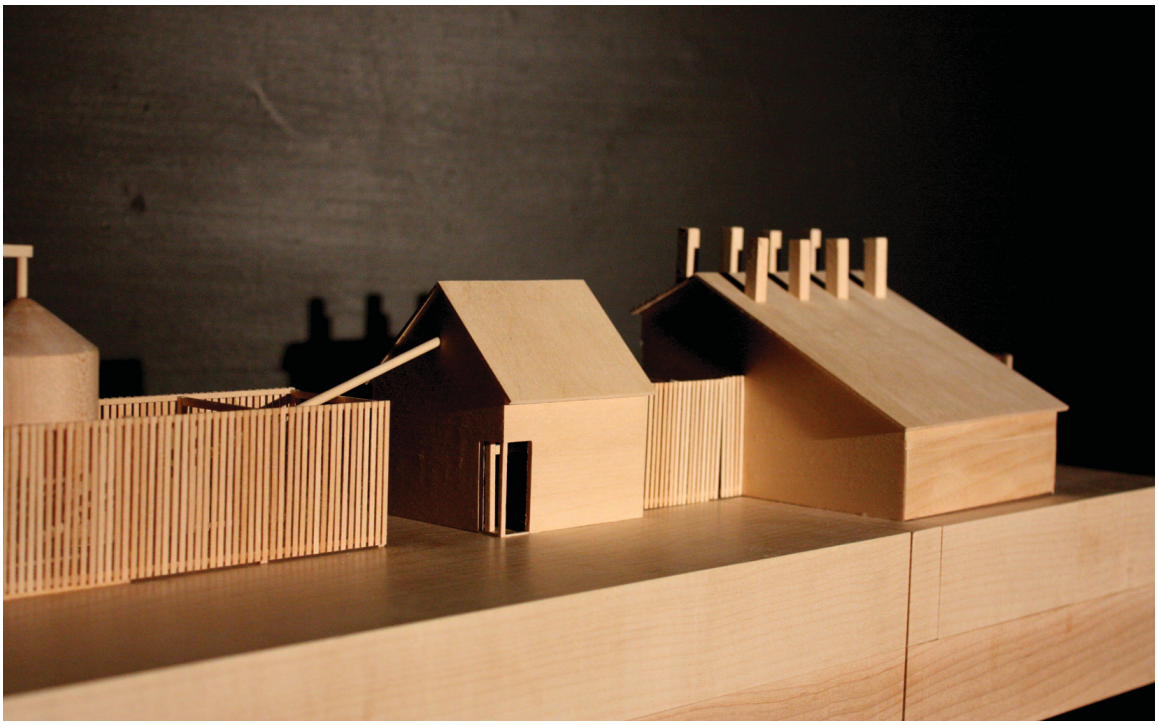
Manning is located in the northern region of Alberta where heavy snowfall and long, cold winters are typical. Rather than simply plowing the snow from the farmyard into large piles it is harvested within the ice-house for its cooling power. The snow is plowed into the north end of the building as this is the side that will stay coolest away from direct south sun access. Water is then poured over the snow pile and left to freeze, turning it into a giant ice-cube. Adjacent to the ice room is the cool room which is on axis with the connection tube or 15'x15' grid of the farm. This room allows the passage of goods and people through the building and downstairs to the basement. It also acts as a buffer between the southern sunlight and the ice room. It is also here that the hot and cold air stacks protrude from the basement up through the roof to the open air outside.

The basement is where the chilled goods are stored and where the butter is churned and the cheese is made. The ground surrounding the basement insulates the walls and ice house above cools air as it passes through the air stacks. This cold air sinks down to the basement where it is allowed to escape through vents near the floor into the room. The

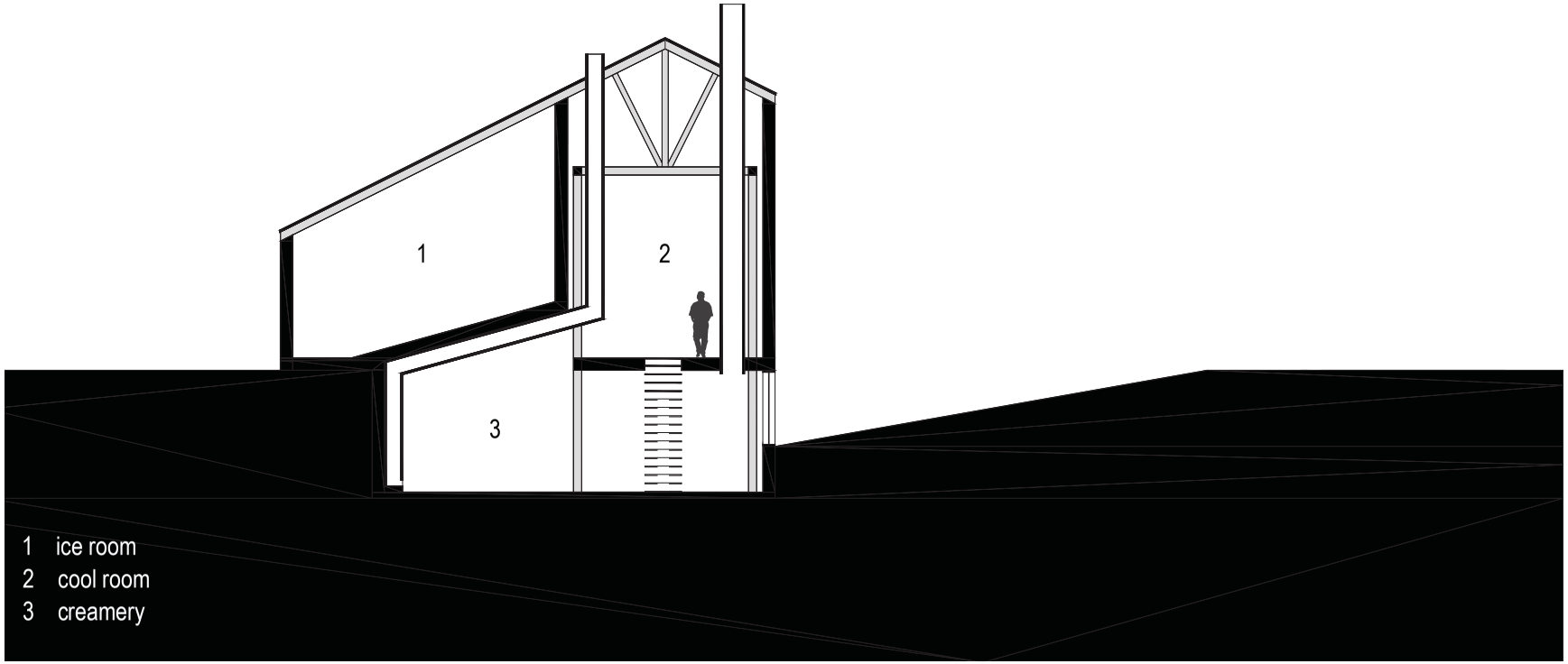
warm air rises and is drawn upwards through the hot air stacks at the ceiling of the basement where it continues up and out of the building.



Physical model.  Barn [left], ice-house [middle], mill [right].



Ice House model [far right].




Ice House transverse section.

***Ancient Grains***

Due to the many processes and preservatives our food suffers many folks have developed allergies to wheat and wheat products or in severe cases have been diagnosed with celiac disease which is an allergy to gluten. I myself as well as 4 other people in my family and many other members of the community are sensitive to wheat. Since the small bakery in the grocery store in town is already making regular wheat bread and there is clearly a demand for non-wheat products I smell an opportunity sweeter than a fresh baked loaf of bread! Ancient grains such as Spelt and Kamut which are original derivatives of wheat are most often able to be safely digested by people suffering from wheat sensitivities. Despite it's name, for those suffering from gluten allergies buckwheat is a safe alternative as it is not actually a derivative of wheat. Oats are another grain great for animals and humans alike and can be a great way to add variety to a selection of baked goods. Taking into consideration the growing season, extended daylight hours, precipitation and so on, these grains are all suitable for growing in the Manning area and thus on this proposed farm.

Based on the land's previous yields of wheat and oats, seeding 160 acres to these four grains will yield an estimated 6400 bushels of grain total. This is approximately 60 lbs/ bushel of the ancient wheat varieties which will produce around 60 lbs of whole Spelt, whole Kamut or Buckwheat flour/bushel. There are roughly 4 cups/lb of flour for an estimated 25,600 cups of flour produced on average each year. Most recipes call for 2-6 cups of flour which equals a whole lot of baking to sell!

***Seed Cleaning Tower | Mill***

No grain grown on this farm shall be sold on the world market but rather will be cleaned, stored and ground into flour on site for retail sale and use within the bakery. All of the excess chaff and waste from the seed cleaning process makes excellent chicken feed for the winter months so it is in fact not waste at all.

The process begins by transferring the freshly harvested grain from the field by truck, to the tube right next to the tower. As the truck pulls up one bay of the tube slides open to reveal a space for the truck to drive through on axis with the grid of the farm. Once on the concrete pad of the tube, the truck is weighed and can then dump its load of grain into a grate in the floor containing a large hopper below. There is an office adjacent to this concrete pad where the scale equipment, sliding wall controls and an office are located.

Once in the hopper below, the grain is transferred to the top of the tower using a mechanism called a leg. At the top of the tower the grain is dumped into a hopper connected to the first of four seed cleaning mechanisms. These seed cleaning machines consist of many different screens and are all carefully monitored by the farmer. The first step in the seed cleaning process is the ‘de-bearrer’ which removes the hulls and white caps from the grain. Once the grain passes through the first set of screens, using gravity it is transferred to the floor below for the next step which is ‘rough aspiration’. This removes the chaff and light weed seeds from the grain. From here the grain falls into a hopper in the floor below and goes through the ‘indent separator’ which removes any cracked grain or off types of grain such as barley. Again the grain is transferred down to the floor below where the

final cleaning stage occurs, called the ‘screen sizer’ which removes any small grain kernels.

After it is all cleaned the grain is then transferred to one of the steel storage bins located next to the office. Here the grain is kept clean and dry until it is ready to be milled into flour. All of the waste from the seed cleaning process is stored in a bin on the main floor of the tower where it is used to mix up chaff to feed to the chickens during the winter months.

When flour is needed in the bakery, the selected grain type is transferred from the steel bins by auger to the second floor of the mill where it is stone ground. Again using gravity, the ground flour drops to the floor below and is run through a sifter and then bagged and ready to be sold or turned into baked goods.

The tower and the tube throughout the design are meant to look like screens with varied openings and reveals between the boards to allow light into spaces or enable specific degrees of transparency. The tower functions much like a traditional wood grain elevator of the prairies except that rather than store the grain it cleans it. Growing up on the farm I also noticed how every farmyard has a distinct and identifiable yard light that not only assists with night-time visibility for the farmer but acts as a beacon for the farm. The top floor of the tower has every other board removed to give it a lantern effect at night acting as the beacon for this farm. It also serves as a viewing tower for the farmer and tour groups.


Mill transverse section.

***Bakery | Retail Store***

This is the where the culmination of all of the products produced on the farm occurs. The bakery is the public front of the farm where customers have access to all of the nutritious and delicious products for sale. It is also the final step to adding the most value to the products produced on the farm. The bakery is able to take the flour ground from the grain grown on the farm, the eggs, the milk, the butter and cheese made from the milk, the vegetables from the greenhouse, the berries from the creek valley and the meat from the pigs, cattle and broilers and turn it into a wide variety of fresh baked goods for retail sale in the store. These products may include bread, buns, pies, muffins, cakes, meat pies and so on and so forth.

As described in the concept of the farm, the bakery/retail store is removed from the linear tube of the farm and the building width is equal to the space between the mill and the ice-house. Rather than a gable roof to accentuate the linear nature of the connection tube this building has a butterfly roof as an expression of opening up to the landscape. This building acts as the public front of the farm and forms the east edge of the farm yard. As in all of the other buildings on the farm, the timber frame structure is exposed and the portion of the building representing the connection tube from which the building was removed is left primarily as an open space.

I believe that education and building relationships with people is an important aspect of farming, therefore giving tours to those interested in becoming re-connected with their food is also an important part of this farm. Tours would begin at this public face and work through all of the indi-

vidual elements that ultimately make the farm successful. This connection tying all of the elements together to work as a whole is where the architecture will express the concept.

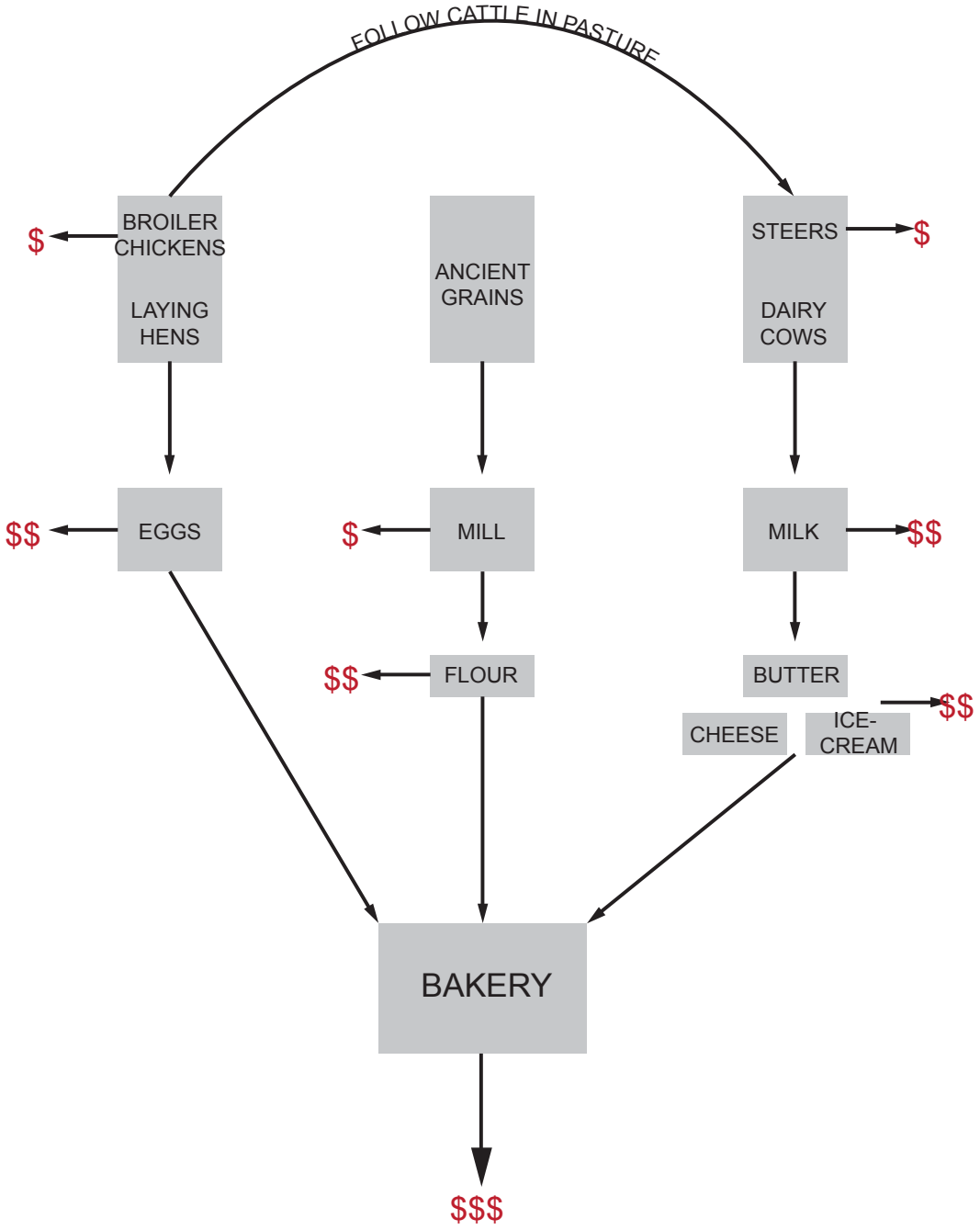
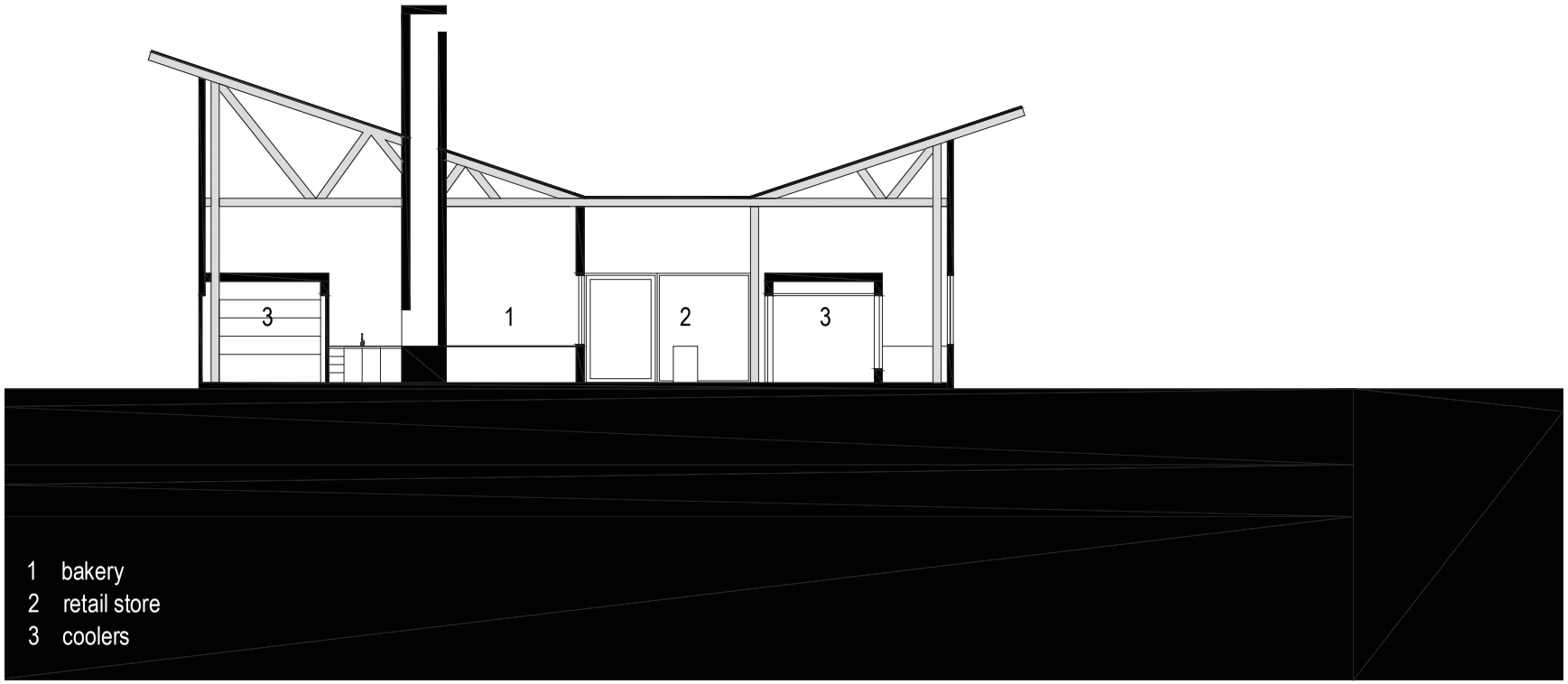



Diagram | Value-Added Products



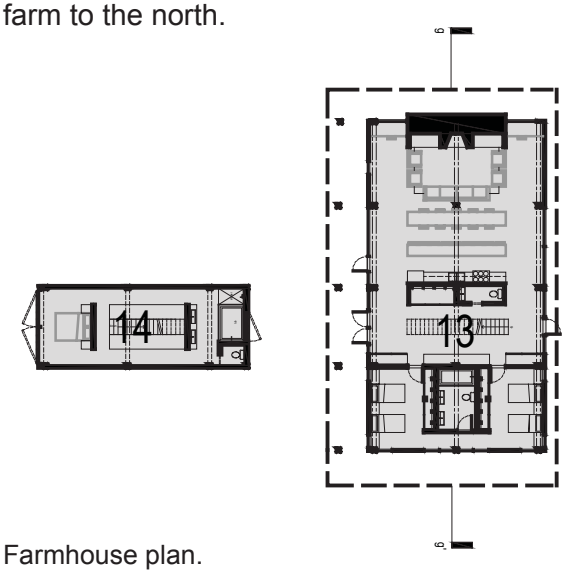

Bakery/Retail store transverse section.

***Admin | Lunch Room***

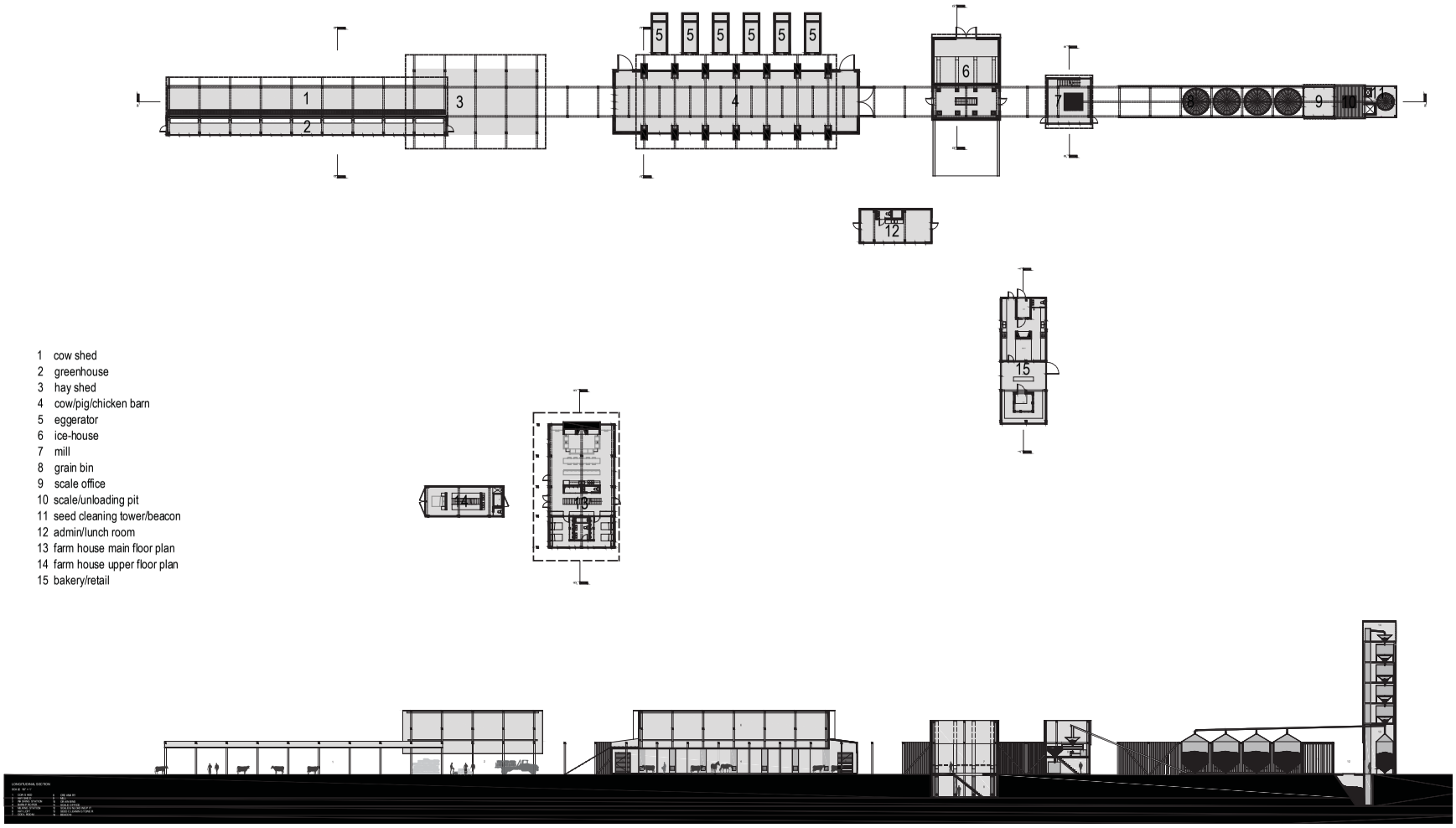
This simple little shed building is pulled off of the main grid or connection tube of the farm design as it is a subsidiary building to the primary elements of the farm. It functions as an office space for farm administration and also a lunch room for guests and employees of the farm.

***Farmhouse***

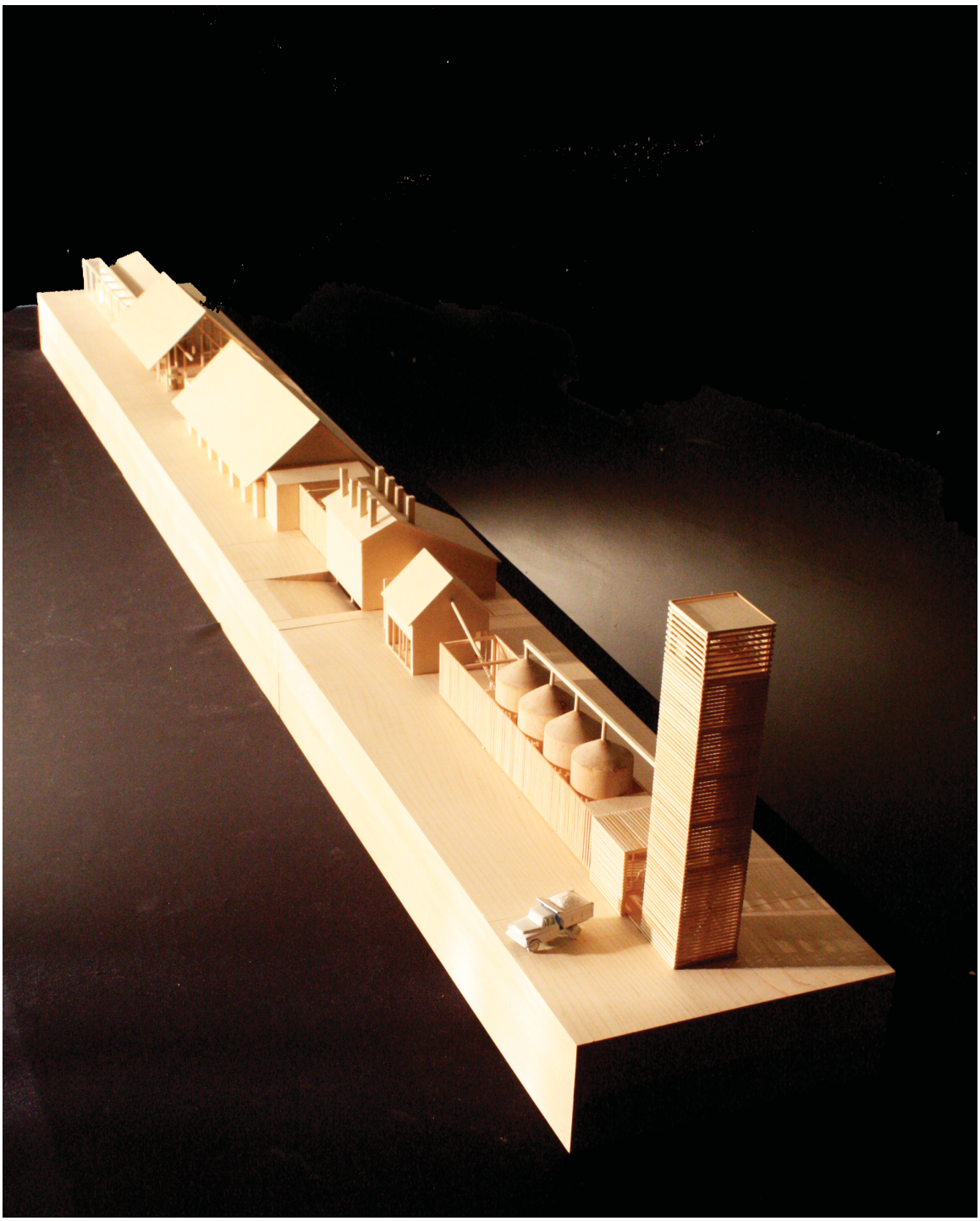
This building also pulled off of the main grid of the farm has many similar design qualities as the bakery/ retail store but functions as the most private area of the farm to house the farm family. The butterfly roof is a gesture to the landscape and also allows the beautiful southern light to penetrate the building. The veranda faces west to take advantage of the evening sunset and the building is tucked in closer to the valley to capture the beautiful views to the south. The connection tube where the house was pulled from is extruded upwards and the upper portion becomes the sleeping quarters for the masters or parents of the household. The children's sleeping quarters face to the south and the public realm of the house faces towards the farm to the north.




Farmhouse plan.




Building Plan [above] | Longitudinal Building Section [below].

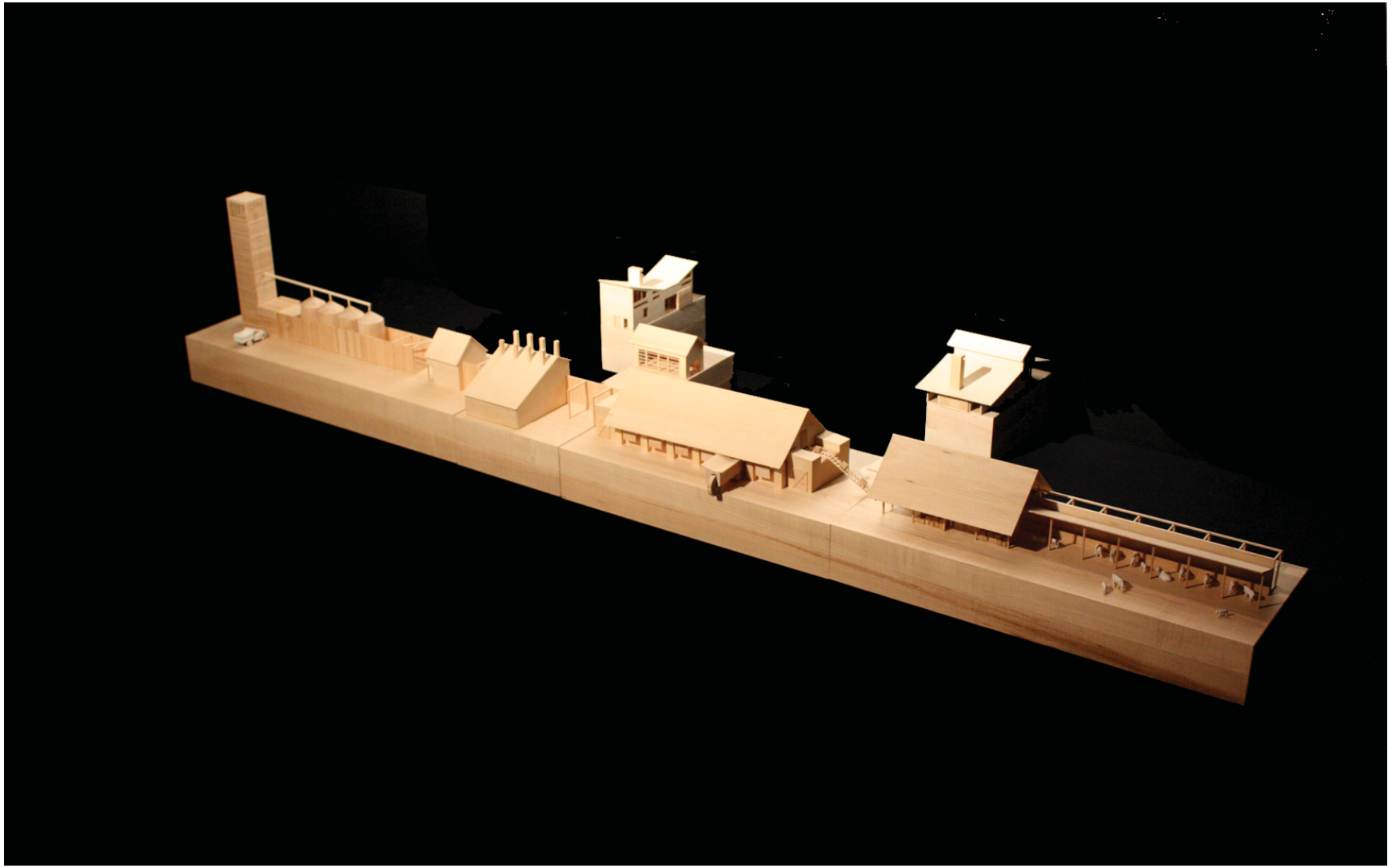


Farm model [i].

# CHAPTER 3: CONCLUSION

Agriculture is an important issue in society today. The increasing desire to be reconnected with our food has begun an evaluation of current farming practices and set the wheels of change in motion. It is time for all of us to take more responsibility for what we eat as it effects not only our health but the health of our environment.

This thesis is the beginning of what I hope to be a lifelong contribution to agriculture and the role architecture can take in strengthening a more sustainable and healthy farm model. I would never encourage anyone to copycat this exact farm design and plunk it down on some other piece of land in another place as a sort of kit of parts and try to make it work. No market or piece of land is the same so why would the design for each situation be? Rather the intention is that the philosophies and lessons embedded in this proposed farm design be translated to other sites. These lessons are built into the stories, building functions, organization of the plan, and architectural language as a response to the market, landscape, and climate of this particular place. Farm design should be vernacular not simply as an aesthetic but vernacular in the way things are built. Farm buildings and machines are designed and built to serve a particular function and within that simplicity and purpose is beauty and architecture.



Farm model [ii].

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Chicken Out! *(photograph) taken undercover at LEL Farms near Guelph, ON.* Vancouver Humane Society. http://www.chickenout.ca/tour.html

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# APPENDIX A

## Farm Vernacular Image Catalogue

The following image collection was photographed over the past couple of years on some of the farms I have had the privilege of either touring or growing up on. The collection is divided into categories and the images in each category are then organized in chronological order where applicable. This method of organization is meant to give a sense of the development of prairie farm architecture over time.

### BUILDING EXTERIORS

Farm in Manning, AB. Left: Chicken Coop: built 1940s. Right: Steel Grain Bin: built 1997.


Farm in Penhold, AB. Left: Steel Grain Bin: built 1980s. Middle: Chicken Coop: built 1960s. Right: Fuel tanks

Barn: built 1940. Detail highlights extension of roof structure which held a large sling used to lift hay bails into loft prior to mechanical bale augers and bucket tractors. Steel hopper bin: built 2004, Manning, AB.

Seed cleaning shop: built 1962, Penhold, AB.

Wood grain bins: built in the 1950s, Manning, AB.

Wood grain bins staggered to allow multiple grain augers simultaneous front and rear access.

Wood grain bins [front view], Manning, AB.

Machine Shop: built 1976, Manning, AB.

Seed cleaning shed: built 1995, Manning, AB.

Grain Dryer

## BUILDING DETAILS

### *Roof and Eave*

Chicken coop: built 1940, Manning, AB.

Chicken coop: wood chips as roof insulation.

Chicken coop eave [alternate view].

Barn eave detail: built 1940, Manning, AB

First wood granary built on my grandfathers farm in the 1950s, Manning, AB. *Note: no eave.

No eave causing water damage and wood rot at corners.

Second wood granary built on my grandfathers farm in the 1950s, Manning, AB. *Note: minimal eave.

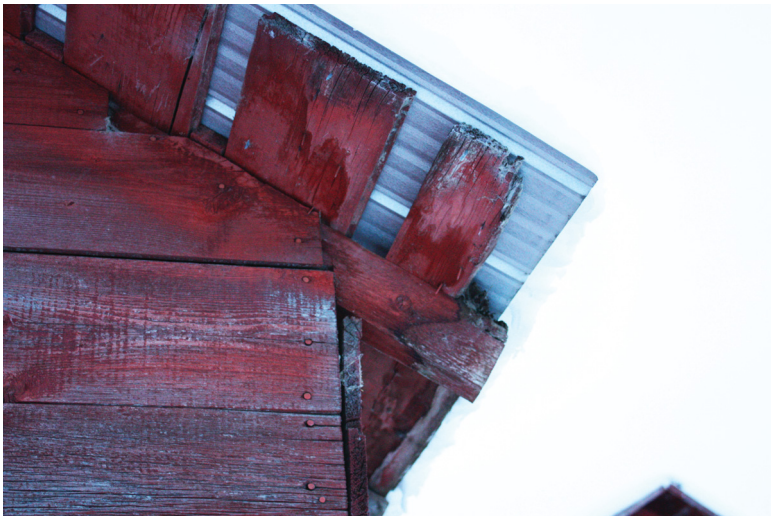
Granary with minimal eave still noted water damage and wood rot at corners but not as significant as granary with no eave.

Third wood granary built on my grandfathers farm in the 1950s, Manning, AB. *Note: there is an eave.

Granary with eave, Manning, AB. *Note: no significant water damage or wood rot at corners.

Forth wood granary with eave built on my grandfathers farm in the 1950s, Manning, AB. *Note: alternate eave design.

Forth wood granary with eave built on my grandfathers farm in the 1950s, Manning, AB. *Note: alternate eave design [close-up 1].



Forth wood granary with eave built on my grandfathers farm in the 1950s, Manning, AB. *Note: alternate eave design [close-up 2].

Machine shed 1 roof/eave detail, Manning, AB.

Machine shed 2 roof/eave detail, Manning, AB.

Round steel bin: built 1995, Manning, AB.

***Doors and Windows***

Chicken coop interior door detail, Manning, AB.

Chicken coop window detail, Manning, AB.

Barn door detail, Manning, AB [image 1].

Barn door detail, Manning, AB [image 2].

A bevel cut out of the sill of door opening of a wood granary ensures any grain that falls on the sill automatically slides back into the granary floor as opposed to spilling onto the ground outside, Appalachian region. Photograph by Paul Rocheleau, *Barn: The Art of a Working Building.*

"Abbreviated threshold". Slotted door jamb allows insertion of a board to prevent grain from spilling out of the doorway during threshing, Lancaster County, PA. Photograph by Paul Rocheleau, *Barn: The Art of a Working Building.*

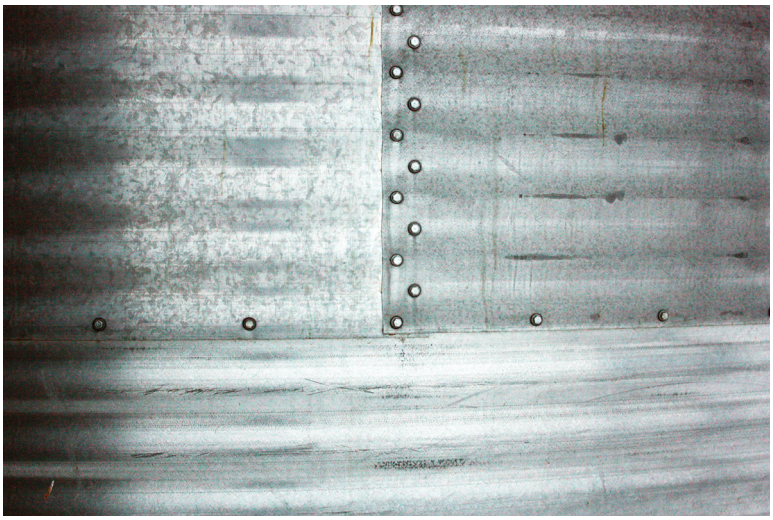
"Abbreviated threshold board" in place to prevent grain spillage during threshing, Lancaster County, PA. Photograph by Paul Rocheleau, *Barn: The Art of a Working Building.*

Large barn door to allow wagon access to threshing floor. A smaller access door within the large door helps to prevent heat loss from opening larger door during winter months while still allowing farmer daily access to the barn, Pennsylvania. Photograph by Paul Rocheleau, *Barn: The Art of a Working Building.*

An alternative to previous image, Pennsylvania barn. Small door allows farmer daily access to barn without having to open larger barn door. Heat loss prevention in winter. Photograph by Paul Rocheleau, *Barn: The Art of a Working Building.*

Steel bin door.

### *Connections*



Steel bin bolt connections.

Steel bin to wood floor connection.

Wood granary nail patterns.

Machine shed: zip lock connection, Manning, AB.

## BUILDING INTERIORS

Barn interior: Hay chute from loft used to feed cattle during winter months, Manning, AB.

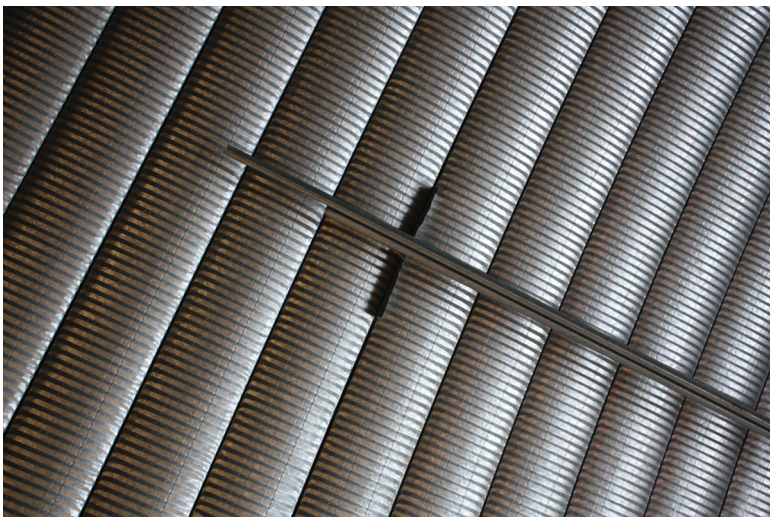
Barn interior: Hay chute [alternate view].

Barn interior: Cut-out in loft used for dropping whole straw bales to the level below. Straw is used for insulation as well as to layer over manure for odor management and animal/barn cleanliness, Manning, AB.

Barn loft interior structure, Manning, AB.

Chicken coop: venting/ lighting, Manning, AB.

Chicken coop: electrical wiring encased and located on interior wall surface, Manning, AB.



Zip-lock construction machine shed, Manning, AB.

## CLOSING MECHANISMS

Seed cleaning shed door handle detail, Manning, AB.

Seed cleaning shed door latch detail, Manning, AB.

Grain truck box handle detail

Lift handle to release grain

## FUEL TANKS

Wood vs Steel structural support systems for fuel tank: built 1950s, Manning, AB.

Wood structure support system for fuel tank: built 1950s. *Note: this structure was built for a cost of about $75 and was structurally stable until ~2005. The tank is still usable but the structure needs to be replaced in order to withstand the weight, Manning, AB.

Close up of wood structure.

Steel structure support system for fuel tanks: built 1950s. *Note: this structure was purchased by farm for ~$200 around the same time as the previous wood structure was built. This tank is still in use today, Manning, AB.

Steel structure [alternate view].

## MACHINES

### *Retired farm equipment*

McCormick Deering threshing machine: built ~1938.

McCormick Deering threshing machine [alternate view].

McCormick Deering threshing machine [alternate view - closeup].


New Steel Cockshutt pull-type combine: built between 1952-58.

New Steel Cockshutt pull-type combine [view of header].

John Deer Model ‘M’ tractor: built 1947-52.

Case IH tractor: built 1940s.

Old combine header.

Old disk for tilling soil.


New Holland TR85 combine: built 1981.

International Swather :built 1983 [still in use].

Grain auger [still in use].

Multiple grain augers: built 1982-95 [still in use].

## *Trucks*

Chevrolet grain truck (nicknamed: the sow): built 1943.

Chevrolet 1430 truck (1 tonne): built 1952 [side view].

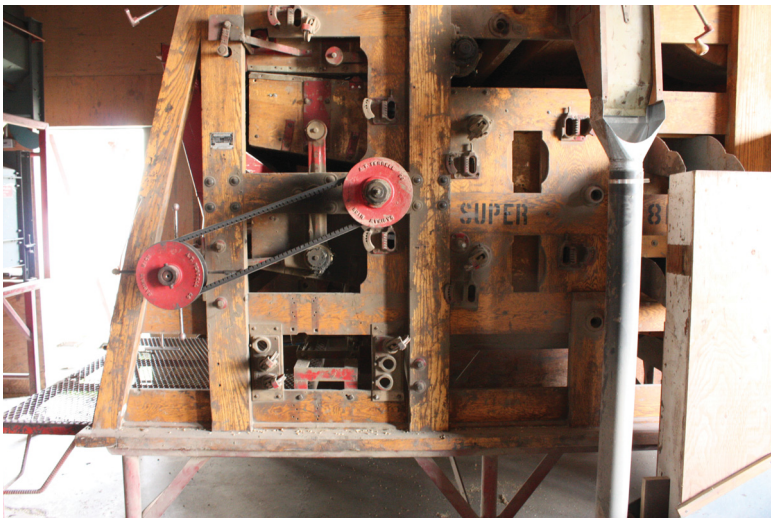

Chevrolet 1430 truck (1 tonne): built 1952 [rear view].


Chevrolet 1430 truck (1 tonne): built 1952 [front view].

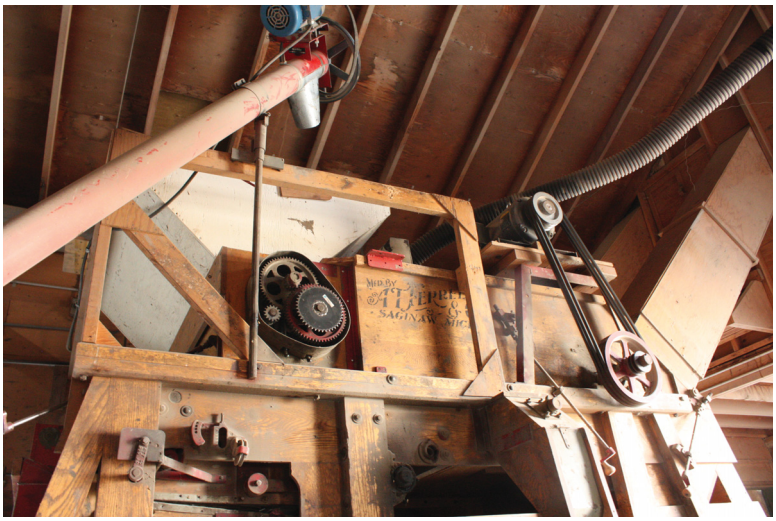
International grain truck with steel grain box: built 1968

Chevrolet grain truck with wooden grain box: built 1975

***Gears, belts, scales, and everything in-between***




Seed Cleaning equipment still in use today, Penhold, AB [image 1].



Seed Cleaning equipment still in use today [image 2].

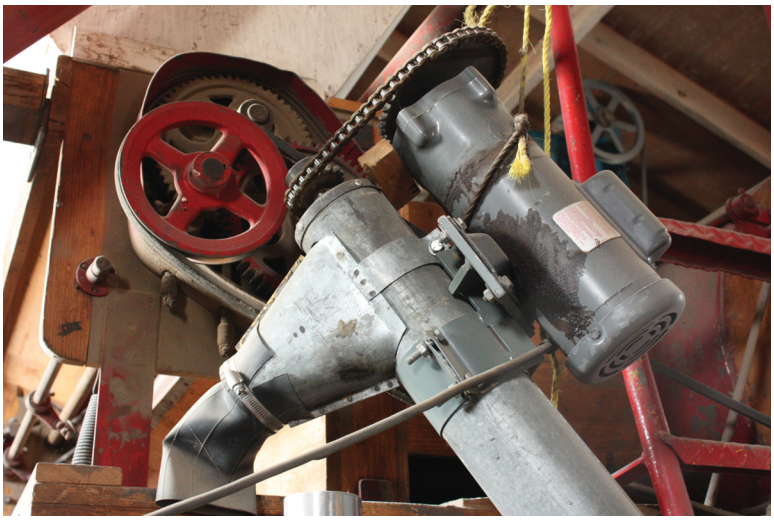
Seed Cleaning equipment still in use today [image 3].

Seed Cleaning equipment still in use today [image 4].

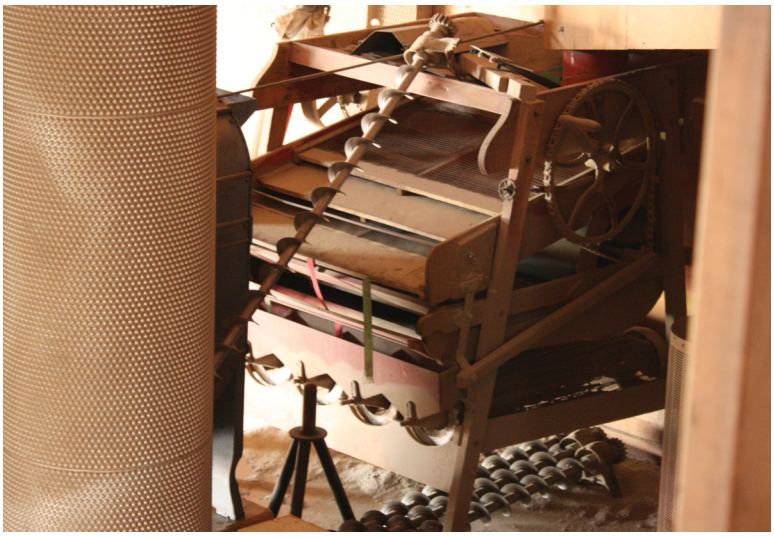

Seed Cleaning equipment still in use today [image 5].

Seed Cleaning equipment still in use today [image 6].

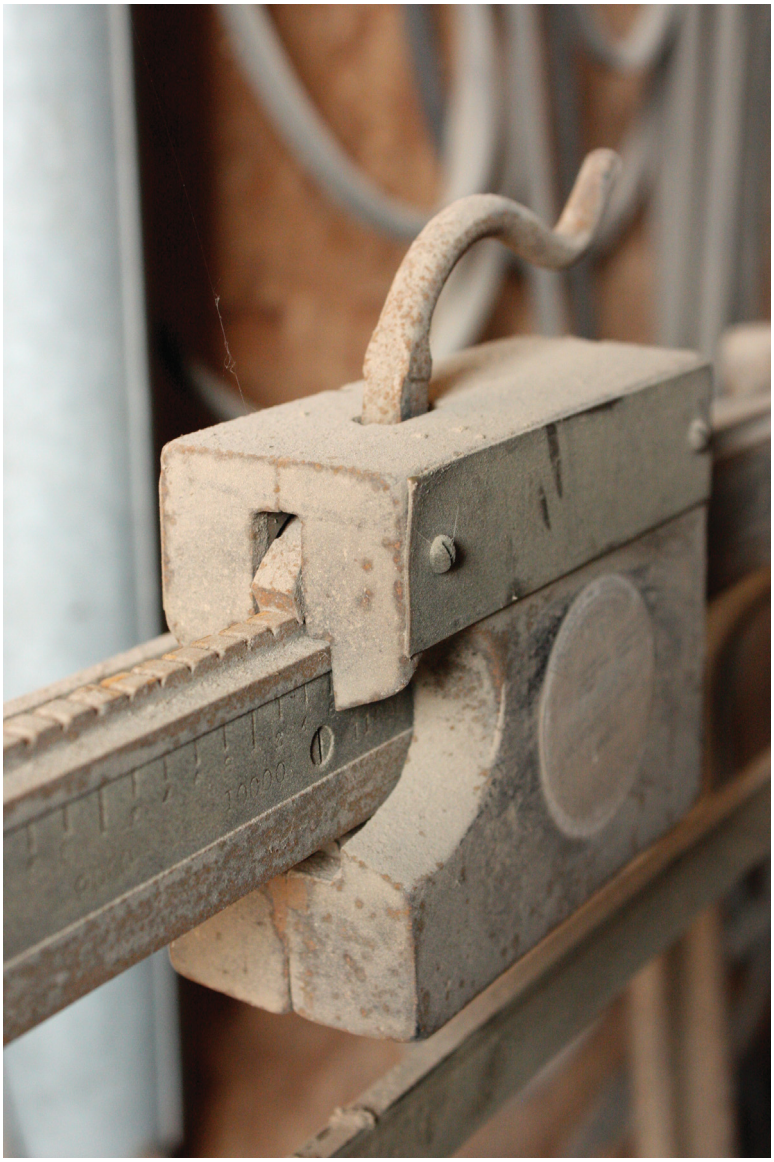
Seed Cleaning equipment still in use today [image 7].



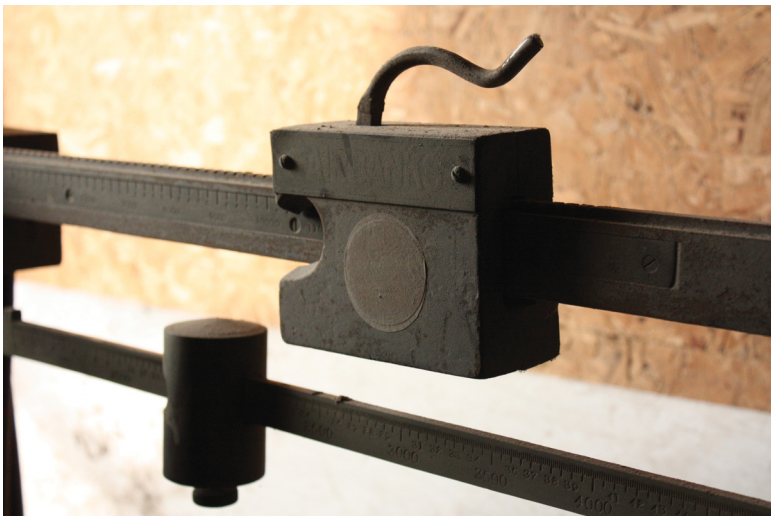
Seed Cleaning equipment still in use today [image 8].



Old [retired] seed cleaning equipment.



Grain scale [image 1].



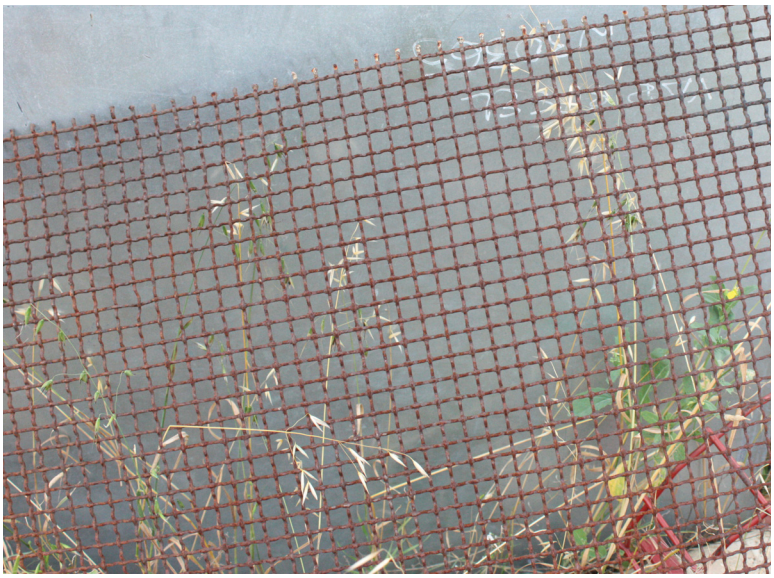
Grain scale [image 2].


Grain scale [image 3].


Grain scale [image 4].

Grain scale [image 5].

Grain scale [image 6].



Steel mesh.

Steel grate 2.

Marker from an old seed drill.

Handle from a John Deer mower that was pulled by a tractor, Penhold, AB.

Close-up from John Deer mower above.