

NIAGARA SHARE

Site Assessment and Master Plan

1100 North Davis Road, East Aurora, NY 14052

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Fall 2015



Existing Site Analysis

- Historic Property Maps
- Existing Site Plan
- Existing Site Features Map
- Existing Circulation Map
- Existing Hydrology Map
- Existing Site Vegetation
- Zones of Interest
- Plant Information Sheets

Three Scenarios

- Scenario Strategy Introduction
- Scenario I: The Watershed Steward
- Scenario II: The Self-Sustaining Homestead
- Scenario III: The Entrepreneur

Masterplan + Implementation

- Masterplan
- Upper Greenhouse Plan + Lower Field Plan
- Lower Field Perspective
- Implementation Phasing 1, 2, 3
- Key Site Elements, Details, and Diagrams

Existing Site Analysis



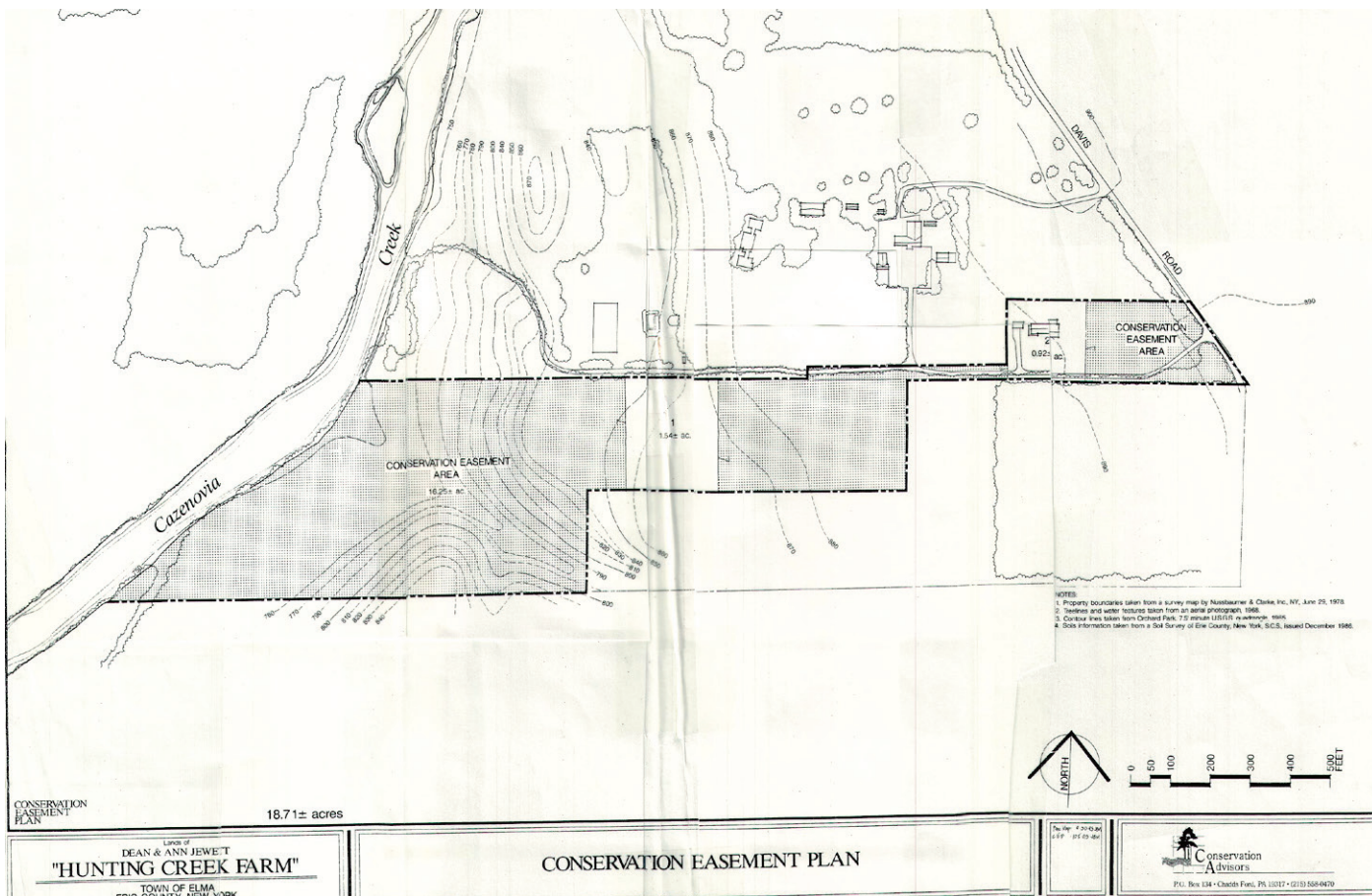
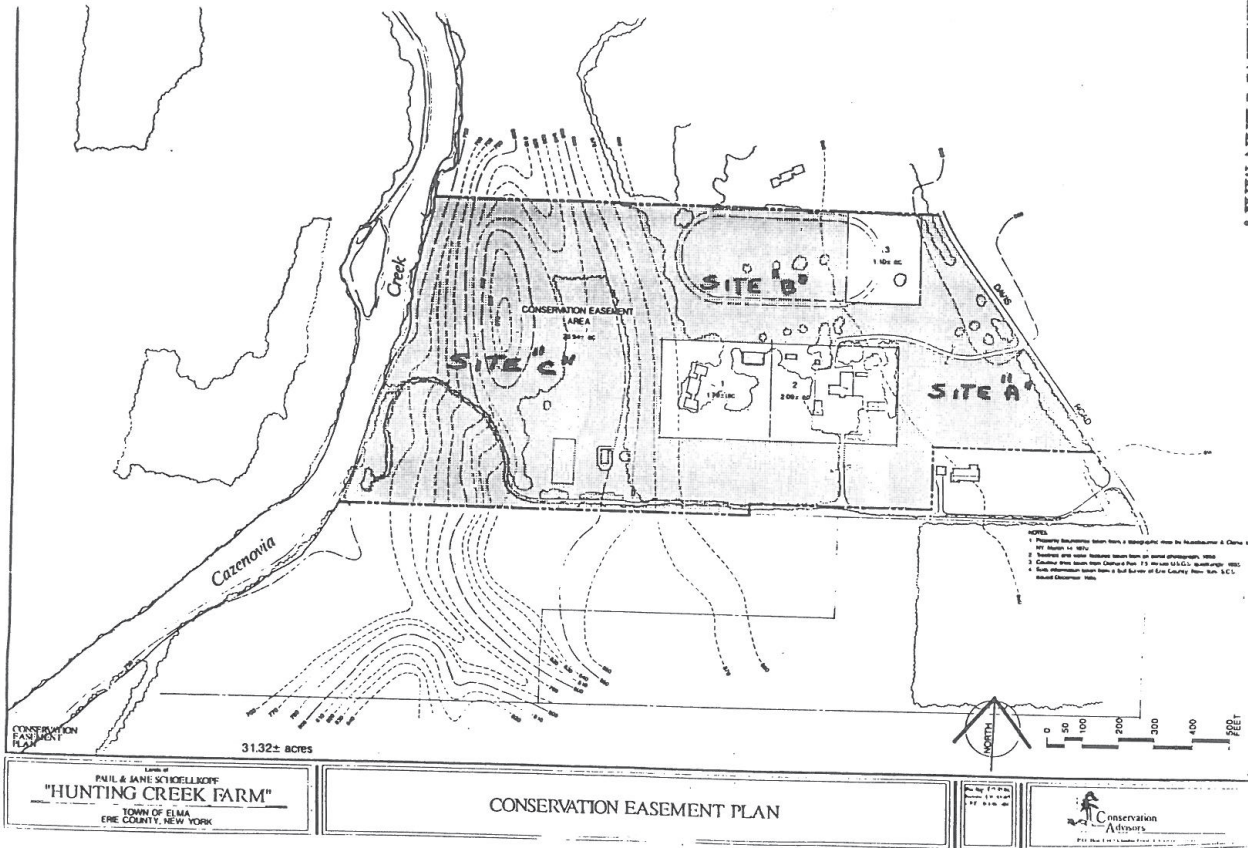
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Historic Property Surveys

EASEMENT PLAN MAP:

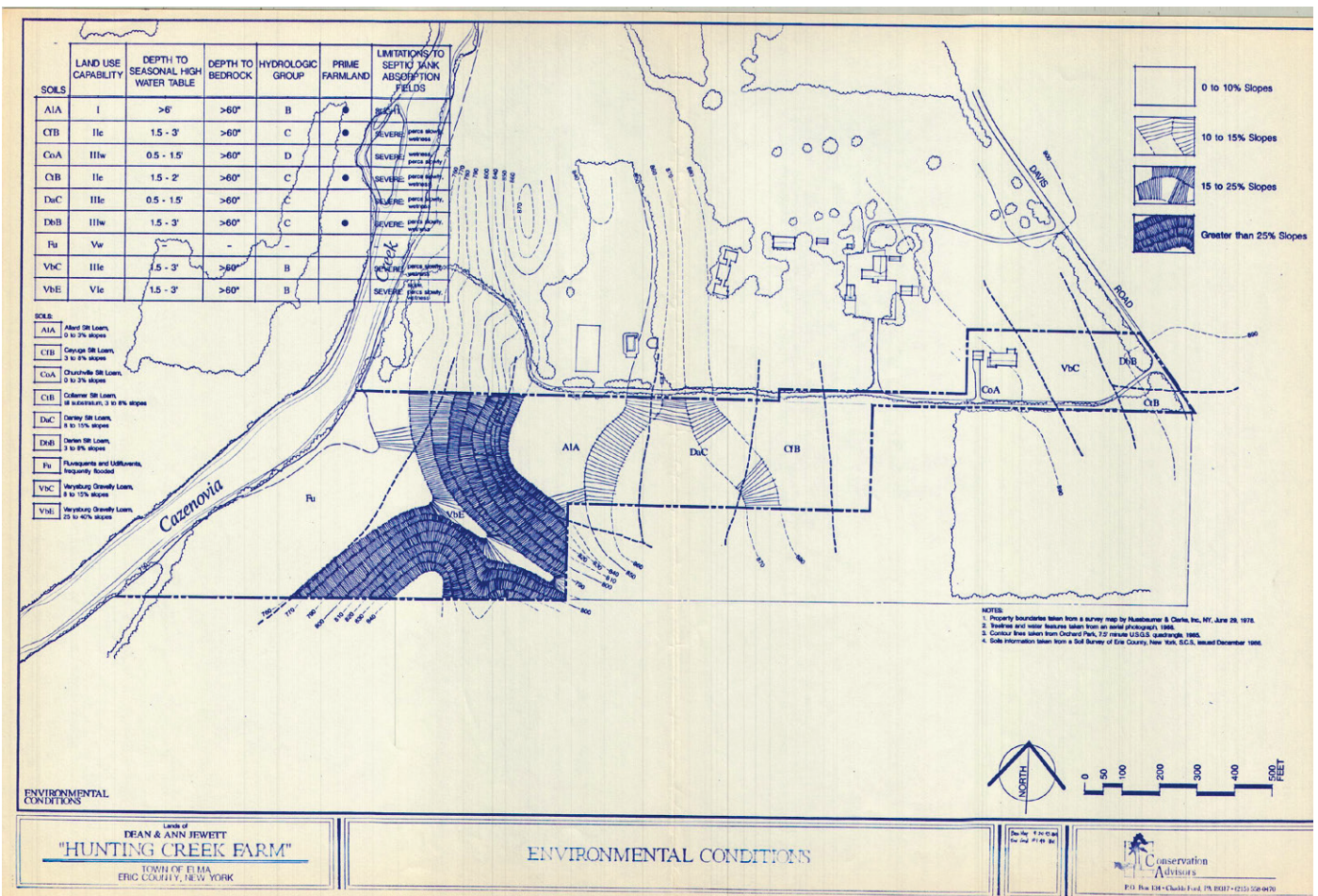
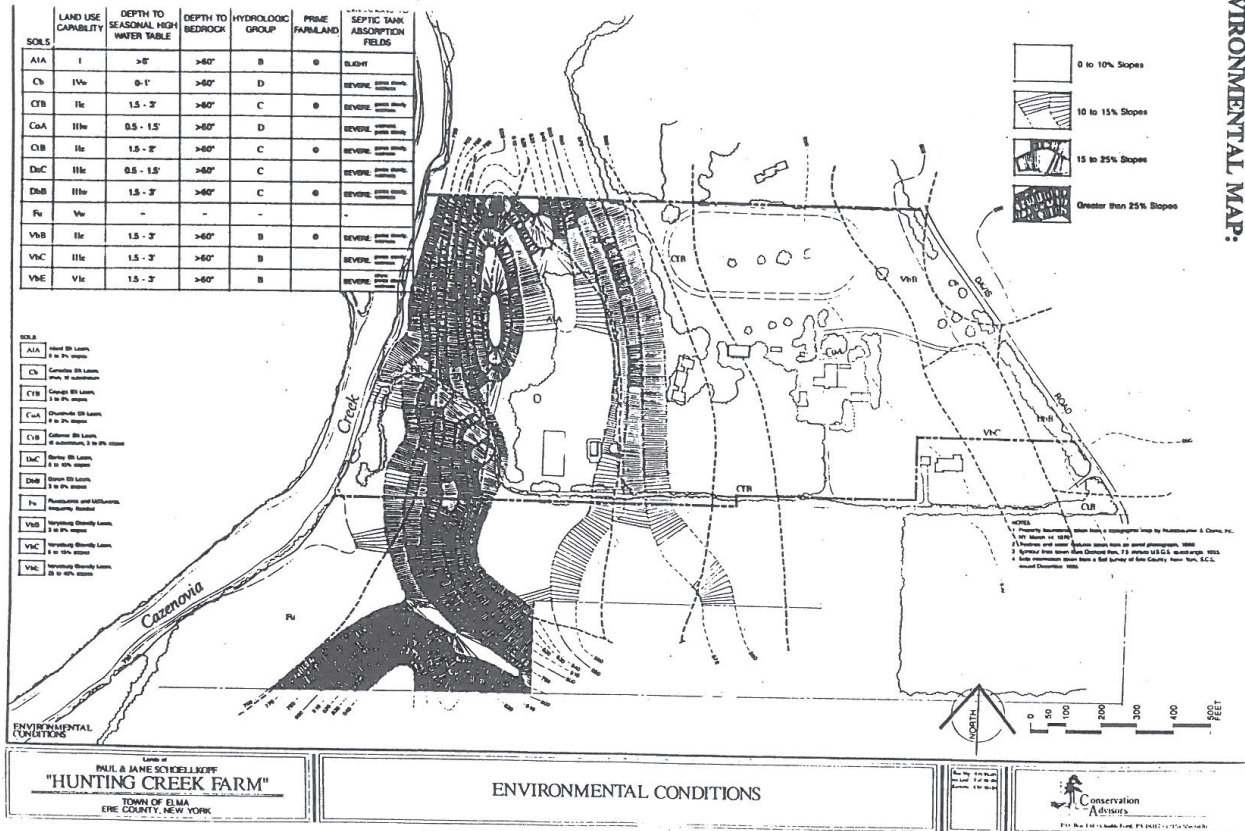
1100 North Davis Road
Town of Elma, New York



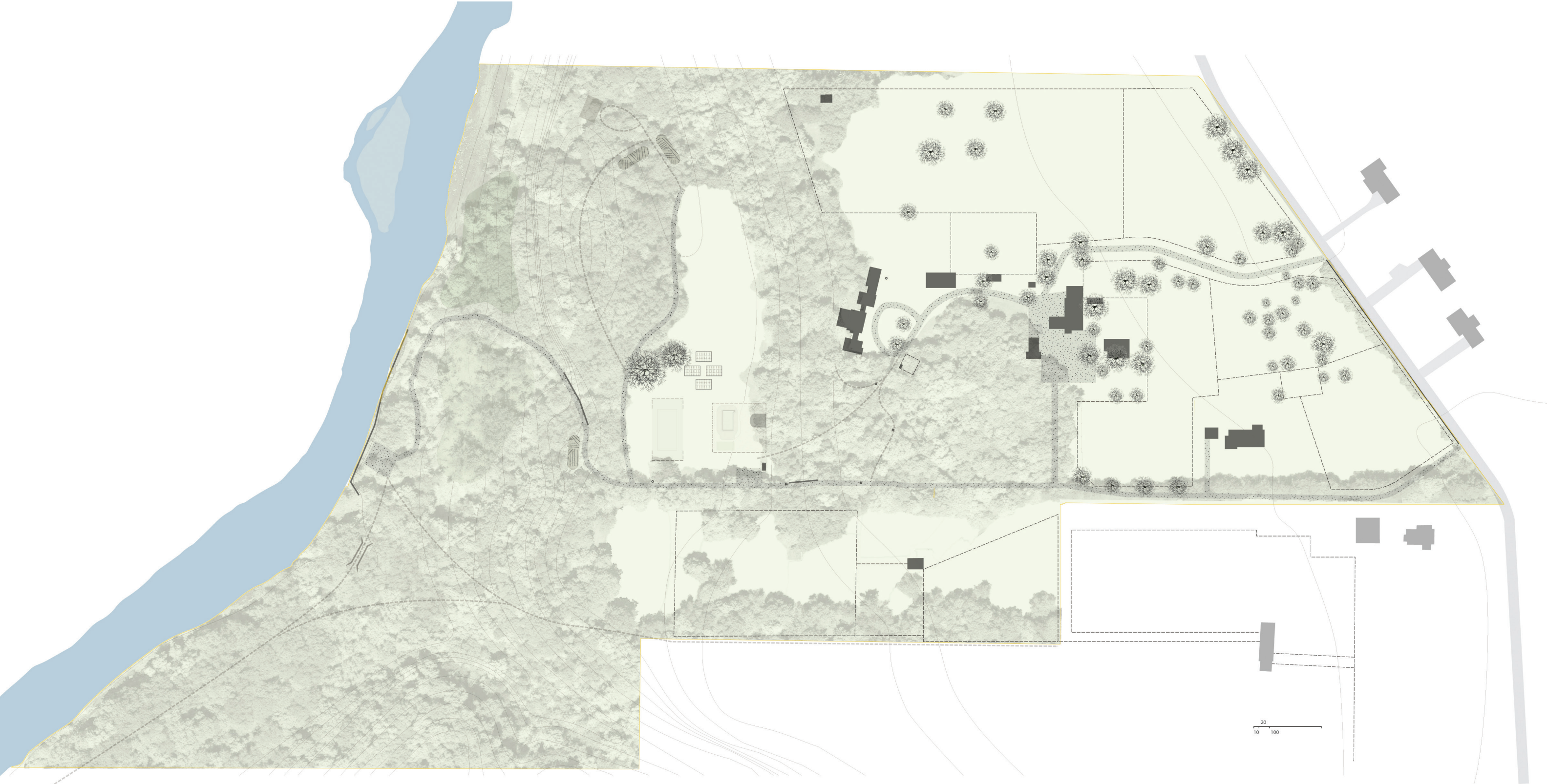
Historic Property Surveys

ENVIRONMENTAL MAP:

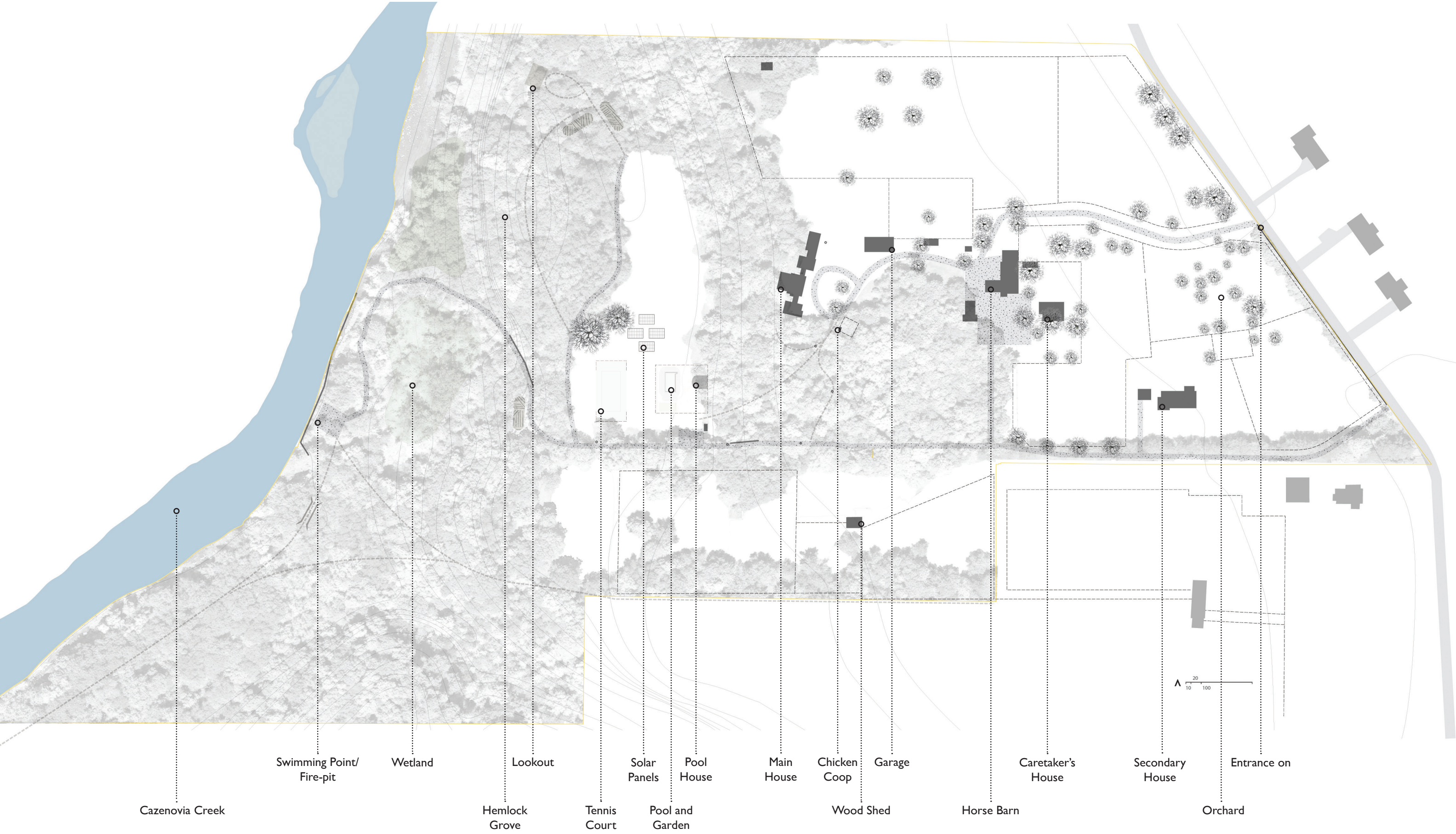
1100 North Davis Road
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Existing Site Plan



Existing Site Features Plan



Existing Site Features

Entrance



Orchard



Horse Structures



Horse Barn



Garage



Main House



Chicken Coop



Solar Panels



Existing Site Features

Pool House



Pool and Garden



Tennis Court



Hemlock Grove



Lookout



Wetland



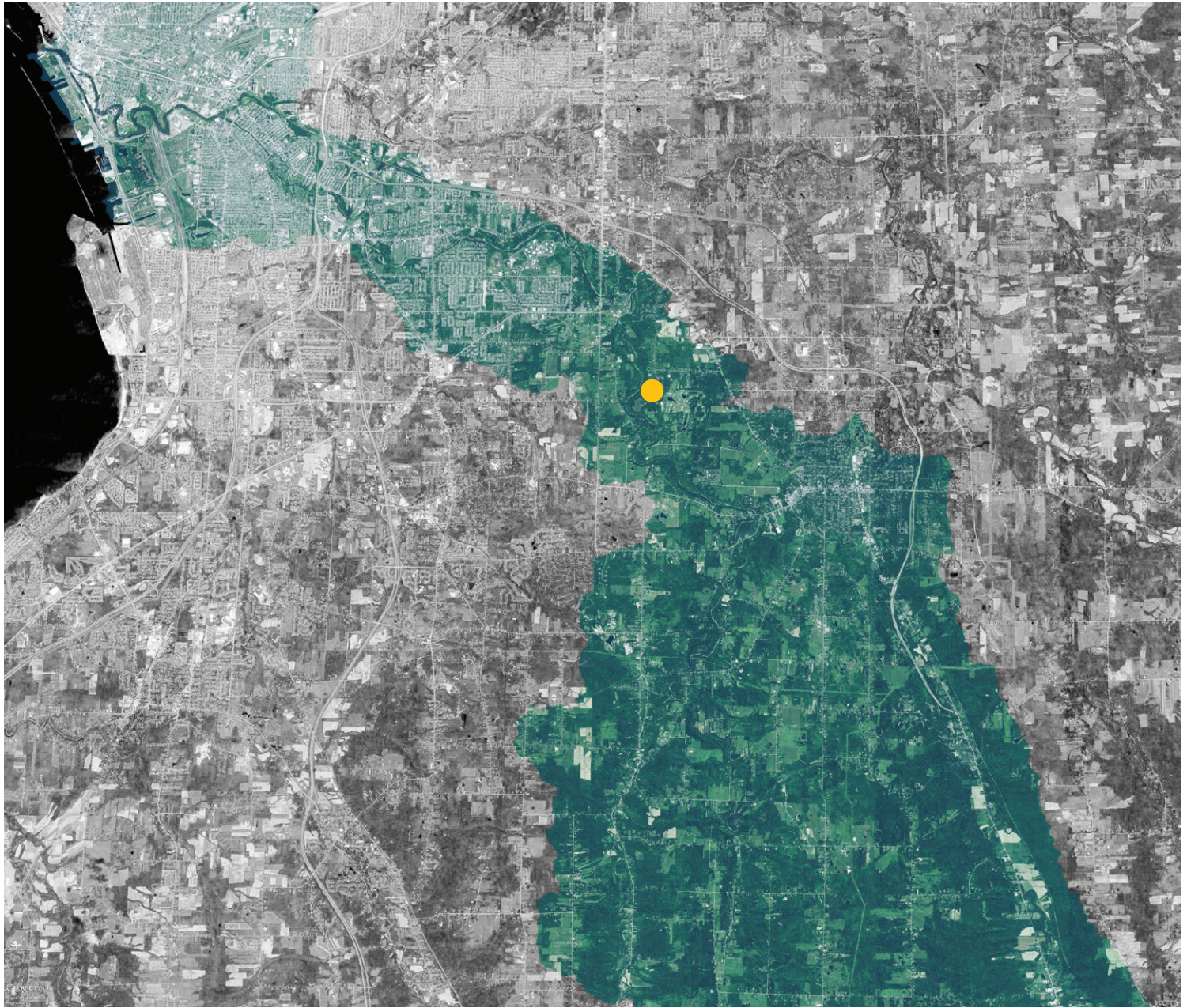
Swimming Point + Fire-pit



Cazenovia Creek



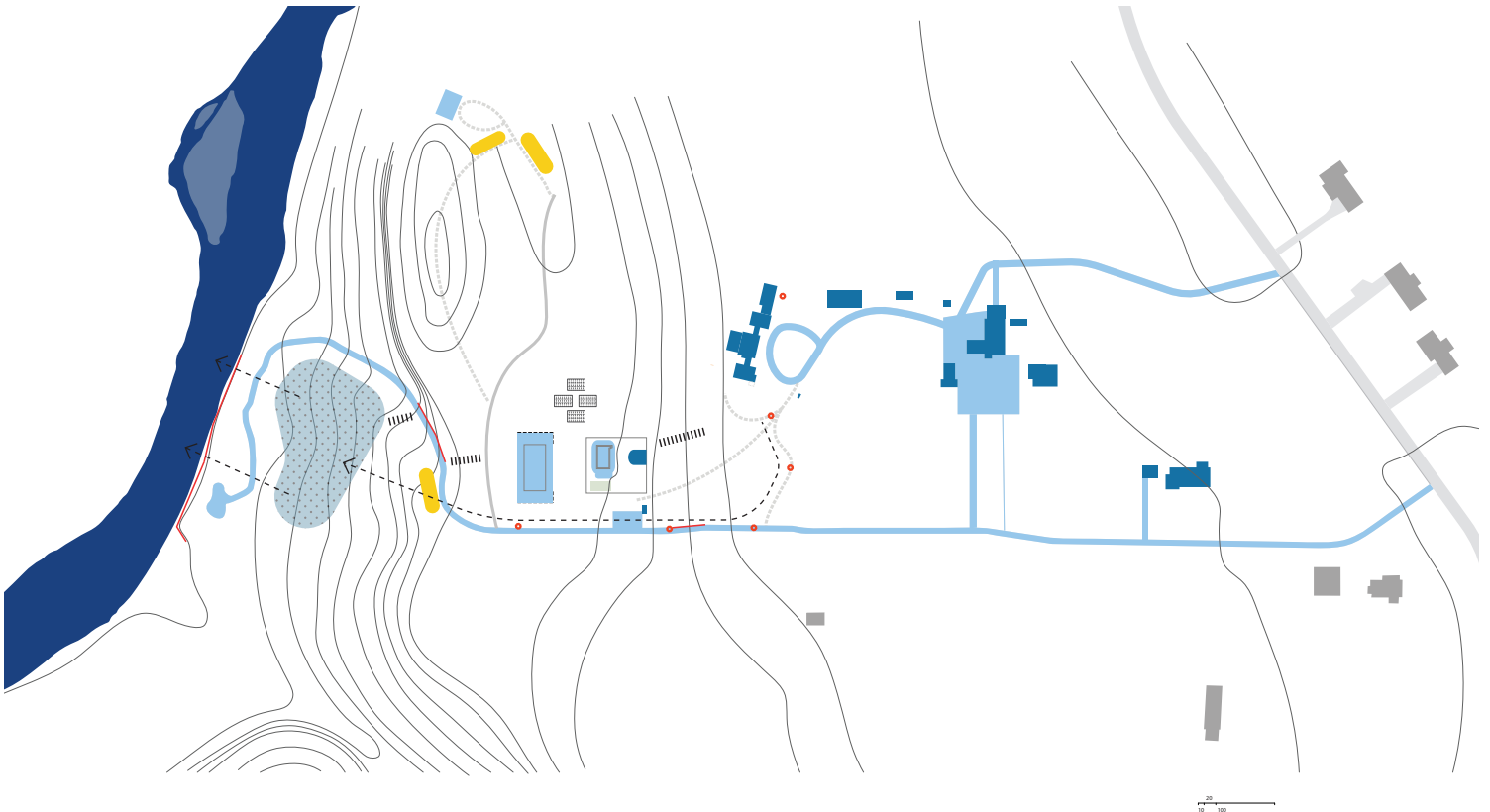
Regional Hydrology Context



Regional Hydrology

Running along the Western edge of the property is Cazenovia Creek. The Cazenovia runs north for 15 miles before meeting up with the Buffalo and Cayuga Creeks and forming the Buffalo River. In all the basin encompasses 440 square miles of primarily residential, agricultural and park land. The entire Buffalo River and Northernmost 1.5 miles of the Cazenovia are included in the Buffalo River Area of Concern. The vast majority of Beneficial Use Impairment in the Buffalo River AOC are associated with industrial process that occurred near the city and not from upstream contributions such as sediment or nutrients. However, the reduction of nutrients, erosion will bolster fish populations that eventually feed into the AOC area. It is the responsibility of upstream locations to remain vigilant in assuring the highest water quality possible reaches the shores of Lake Erie, even if they are not cited as begin a cause of concern.

Existing Site Hydrology



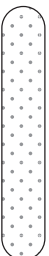
Drainage

The western portion of the property has a collection of surface drains. Most of these drains run along paved roads and trails and eventually lead to the Creek. With exception to the roads, they drain, most of the drains are located in permeable areas and are likely not necessary hydrologically.



Erosion+Nutrients

There are several location on the property experiencing significant erosion. The most extreme condition is along the trail leading down to the wetland. If unaddressable, the condition will make the trail impassable in the next 20years. The wetland trail also is presently the present location of a large quantity of horse manure. The location of this material on the steep slope is certainly producing nutrients that erode into the wetland area.



Retention

The wetland is the key factor in the present hydrologic operation of the site. The significant amount of runoff from the site settles here prior to flowing into the river. This condition provides the opportunity for the settling of sediment, the absorption of nutrients and the infiltration of water prior to discharge. This is also the only true wetland condition on the site, thus containing a unique mix of species, unavailable elsewhere on the property. The system seems to be functioning well in its present condition.

Existing Site Vegetation

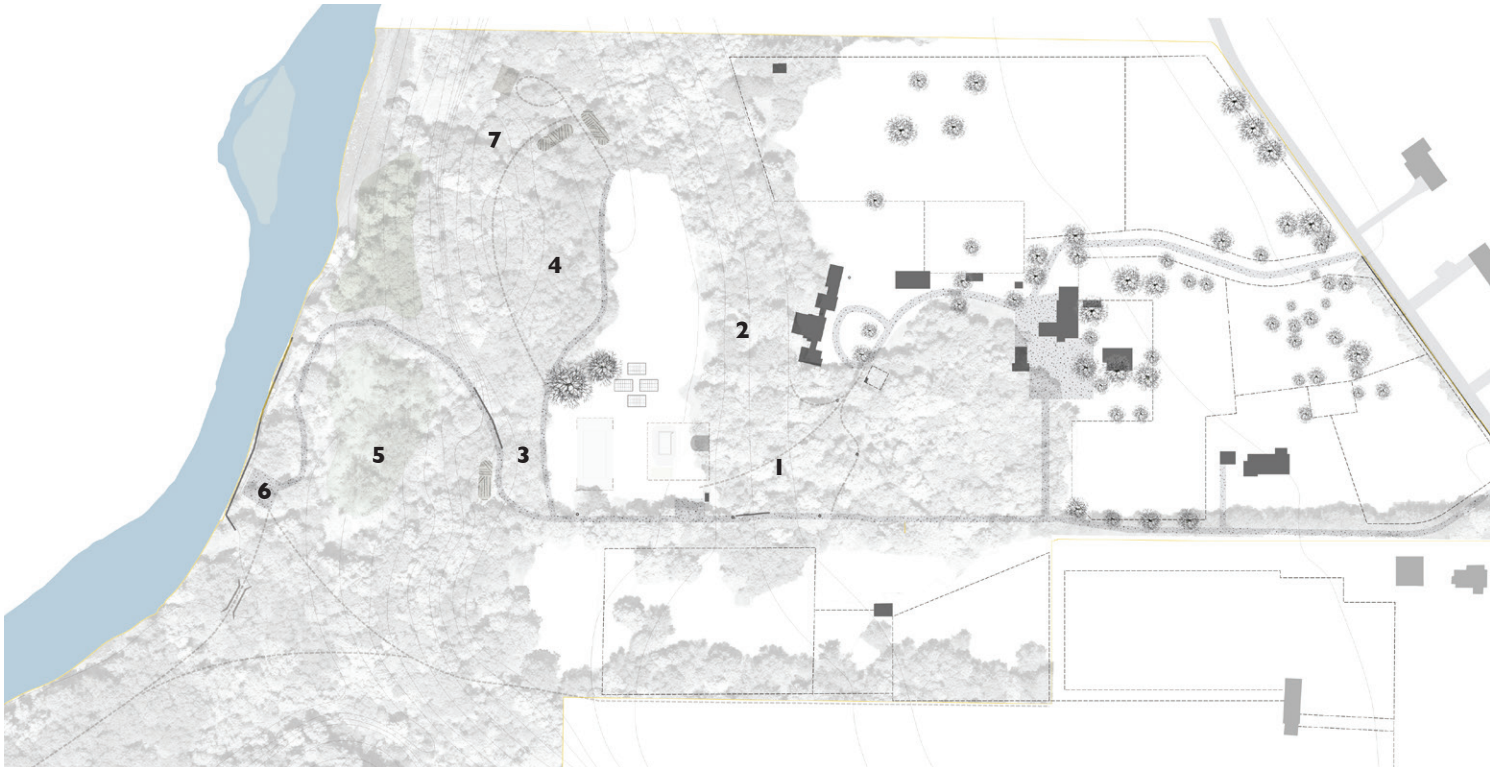


Site Vegetation

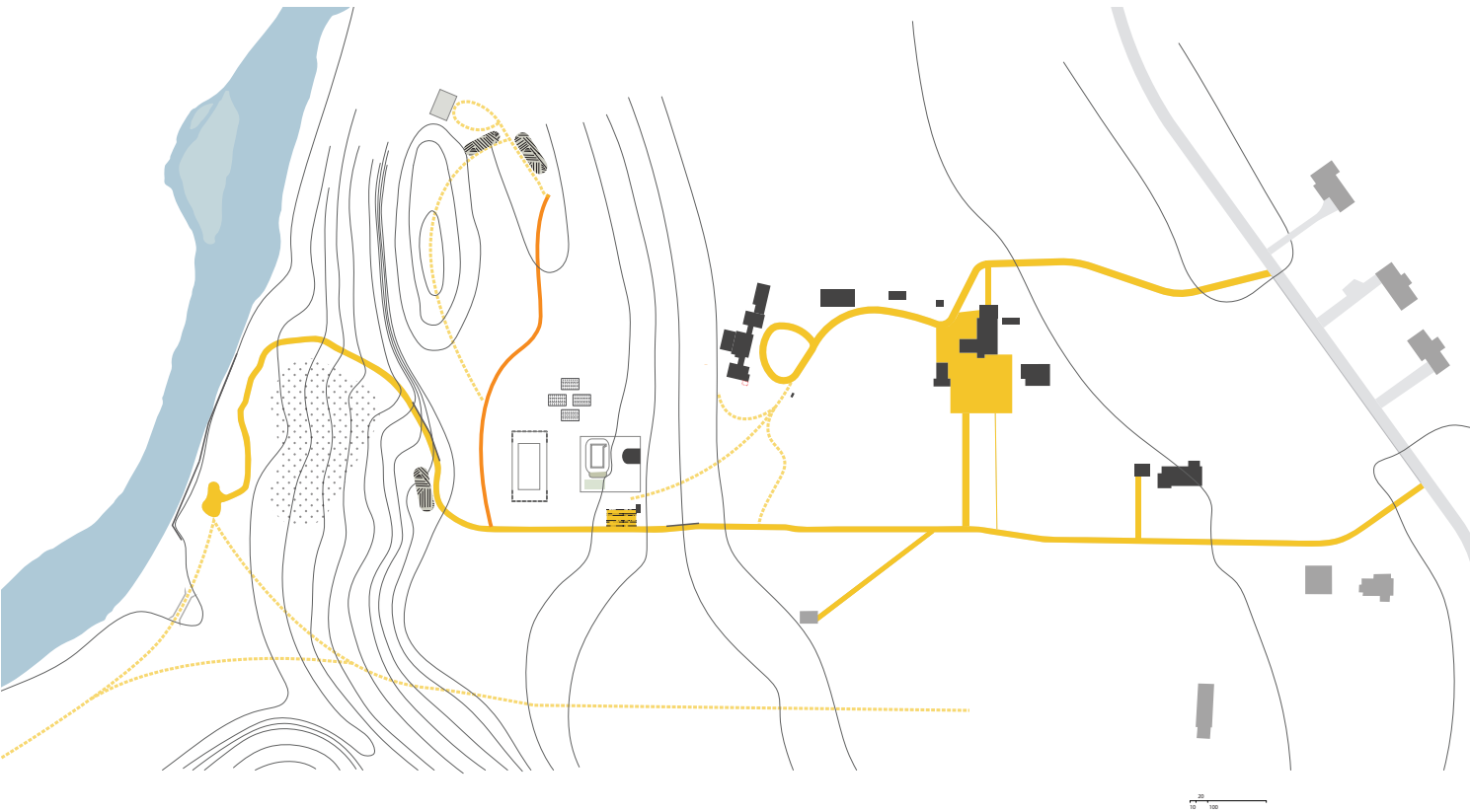
Speaking Generally the farm is located in what would be considered a Beech Maple hardwood. Other species that tend to be present in these forest include Hemlock, Oak and White Pine. Species on the property vary considerable beyond this due to differing disturbance regimes, soil hydrology, nutrient cycling and species introduction (voluntary and involuntary). The most abundant canopy tree species is Sugar Maple (*Acer saccharum*), and it tends to exist in large numbers within every zone of the property. The trees that accompany the Sugar Maple then vary from place to place based on the aforementioned conditions.

Invasive species are also somewhat prevalent in particular areas. Honeysuckle (*Lonicera* sp.), Japanese Knotweed (*Fallopia japonica*) and Garlic Mustard (*Alliaria petiolata*) have been seen on the property. While none of these currently appear to be out of control, observation should be taken in their distribution to ensure they do not become more serious problems. If disturbances are kept to a minimum, many of these species will remain under control. When disturbances are necessary, care should be taken in establishing native species in disturbed areas to prevent invasives from encroaching. It may also be obvious, but there is a fair amount of Poison Ivy in the forest that should be avoid if possible.

Existing Site Vegetation



Existing Site Circulation



Material	Concrete	Notes The use of paved material should be minimized. Exceptions include areas of heavy and continuous vehicular traffic. Repair of existing paved areas may be more cost effective than demolition/ disposal and reconstruction of another surface
Durability	High	
Maintenance	Infrequent	
Cost	High	
Permeability	Low	

Material	Aggregate	Notes In most cases, the use of aggregate will suffice for the circulation routes on the property. Annual maintenance should be expected to fill in ruts that could be dangerous to horses and people. An organic stabilizer could be used to increase longevity of the material.
Durability	Medium	
Maintenance	Annual	
Cost	Low	
Permeability	Medium-High	

Material	Aggregate	Notes Presently the non-vehicular trails on the site are composed of either compacted earth or aggregate. Material choice should match use intensity to ensure no trails are over-constructed
Durability	Compacted Earth	
Maintenance	Medium-High	
Annual	Annual - Semi	
Cost	Low	
Permeability	Medium-High	

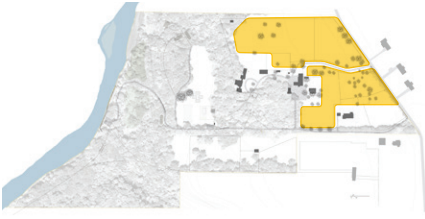
Zones of Interest



Zones of Interest

1. Horse Pastures
2. Horse Structures
3. Main House
4. Northern Field
5. Southern Field
6. The Brush Lookout
7. Hemlock Ridge
8. Lowland
9. Old Cabin Creek Lookout
10. Shoreline

Zones of Interest: Horse Pasture



View from the driveway



Pasture Orchard



Southern Pastures

Horse Pastures [8 acres]

Site Characteristics:

- Large open fields, a lot of sun at all times of day
- A few trees offer shade and break up the fields
- Visibility is generally good across the pastures
- Currently used for horses
- Gently sloped down towards the and drains to the creek
- Located at the entrance to the site
- There is an existing small orchard in the southeastern pasture
- Grass is cut at least once a month

Access:

- Paved road runs between the pastures and connects to Davis Rd
- Circulation presently controlled by fences + gate locations

Site Adjacencies:

- Road, Barn, Care-taker's house, Ali's parent's home

Opportunities:

- Open fields need the least preparatory work when being converted into other program.
- Could easily be converted into agricultural fields, orchards, fields to raise livestock, wetlands, playing fields, etc.
- Location on the street makes this the "front door" of the site.

Zones of Interest Horse Structure



View from garage of main horse barn



Horse jumps on southern edge



View to the east

Horse Structures [.9 acres]

Site Characteristics:

- 5 structures used primarily for horses
- Caretaker's home included in the zone
- Only zone that is primarily impermeable to rainwater
- Zone is presently the center of site use, highly active
- The structure include or are close to electricity and water access

Accessibility:

- Several paved roads traverse the area

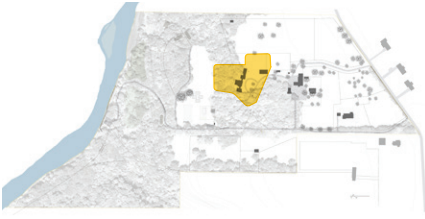
Site Adjacencies:

Main House, Horse Pastures

Opportunities:

- These are the first structures someone encounters when driving in.
- Wide range in scales of structures. Most are very open and could be easily converted if desired.
- Location of the Caretaker's home is very central to the property.
- When entire property is considered, this zone makes sense as the hub of activity, however, when just considering the western property, its location is not ideal.

Zones of Interest: Main House



Slope at back of house



Backyard and Porch



Front of the house

Main House [1.6 acres]

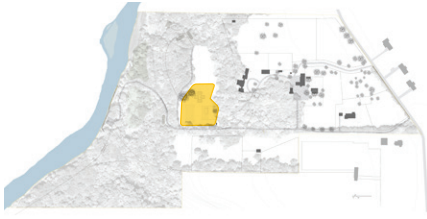
Site Characteristics:

- Includes the main house, the front of the house and garage, the chicken coop, the west facing slope behind the house and the small forest "island" on the south side of the house, made by forest trails.
- Many open outdoor areas both in the front and the back
- A number of large specimen trees have been planted around the house that help keep certain areas shady.
- House has many windows - this should be taken into consideration when thinking about designing more 'public' areas nearby
- House has a septic tank on west side of the house by the perennial garden and the leach field down below
- House has no gutter system to catch water from the roof
- Overall site drainage moves Northwest to the river
- Back slope has been thinned over the years to improve views down to the northern and southern fields and pool
- Accessible by paved/gravel road
- Receives water from the county
- Grass is mowed once or twice a month in the summer

Site Adjacencies:

- Northern and Southern Fields
- Horse structures and pastures

Zones of Interest: Southern Field



View of elements in South Field



View looking North from road



View to the east

Southern Field [1.8 acres]

Site Characteristics:

- Large field with a collection of “things” including a solar field, pool and kitchen garden, tennis court and a small, unconditioned pool house.
- Partially visible from the house
- Pool/Garden is fenced for both safety and deer control
- Tennis courts no longer used.
- Pool seldom used and is expensive.
- Lots of sunlight
- Currently requires mowing
- the solar system is a 25Kw system with 99 panels

Accessibility:

- Accessible by paved road to the South and dirt/gravel road to the West

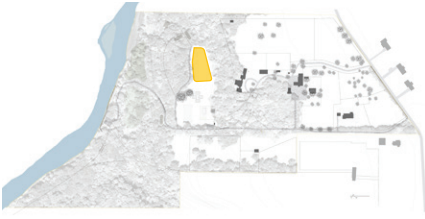
Site Adjacencies:

- North Field, Hemlock Ridge, Main House, walkway to Wetland and Creek

Opportunities:

- Intersects stormwater drain at road, could engage water management
- Connects to Main House directly via trail
- Tennis court is a prepared flat surface, if needed
- Can be accessed by paved road

Zones of Interest: Northern Field



View of field from house



Horse jumps on southern edge



View to the east

Northern Field [.5 acres]

Site Characteristics:

- Large open field
- Partially visible from the house
- Drains Northwest to the river
- Includes the leach field from the main house near the horse jumps
- Surrounded by fairly dense vegetation and forest on N, E, and W sides
- Receives water from the uphill/east edge of the site
- Currently used for running horses and has horse jumps on its southern edge
- Grass not irrigated, and mowed three times a year
- North/South orientation provide good sunlight during most of day.

Accessibility:

- Accessible by dirt/gravel road from the South.

Site Adjacencies:

- Southern Field, Hemlock Ridge, Main House, and the Lookout

Opportunities:

- Sunlight and lack of existing trees make the field an easy option for conversion into another use
- Site is one of the more secluded open spaces on the property.
- Could be combined or separate from the South Field

Zones of Interest: Hemlock Ridge



View along the Ridge toward the Creek



View to the east

Hemlock Ridge [.5 acres]

Site Characteristics:

- Topographic Mound existing between the North Field and the Creek
- Large number of Hemlock trees make very dark environment and open forest floor
- Density of vegetation limits views to both the Fields and the Creek
- The site feels very secluded
- Unique vegetation on the hill
- Trail through site maintained only through foot traffic

Accessibility:

- A forest trail runs along Ridge from gravel road on the West

Site Adjacencies:

- North and South Fields, The Brush Lookout

Opportunities:

- Hemlock Ridge has a flat open area on top that could be used.
- Height of the site could be used to establish views with selective clearing
- In many ways, the site is good as-is. Key is finding ways to leverage its unique conditions.

Zones of Interest: Brush Lookout



View of the manure piles in the forest



View from the Concrete Pad



View to the east

Brush Lookout [.6 acres]

Site Characteristics:

- Area has been used primarily for manure and brush storage
- Area to the north of the trail is low and wet and most likely capturing some of the runoff from the manure piles
- Looks to receive heavy traffic, road needs repair
- Has a wide range of forest types in close proximity
- Manure piles leach nutrients into water here more directly than the southern location (no receiving wetland)

Accessibility:

- Gravel / Dirt road leading to the site from the south.

Site Adjacencies:

Hemlock Ridge and North Field

Opportunities:

- Existing slab is perched with great view, but view- lines should be established.
- Existing slab could be used for other purposes such as material storage, processing or temporary structures.

Zones of Interest: Lowland



View of the Joe-Pie Weed Field



Large Cottonwood Trees

Lowland [1.2 acres]

Site Characteristics:

- Large drainage-fed wetland
- Provides infiltration for site stormwater
- Does have areas of stagnate, standing water
- Heavy vegetation and soil saturation make most of the area inaccessible
- Wetland condition creates unique habitat

Accessibility:

Site is largely inaccessible except for path along Western edge

Site Adjacencies:

Old Cabin Lookout, Creek Shoreline

Opportunities:

- Site presently serves stormwater management function. this should continue.
- Range of species here would be interesting to showcase
- Only place on site that could support species in need of constant soil saturation.

Zones of Interest: Old Cabin Creek Lookout



View toward the Creek



View into forest opening



Existing fire-ring

Old Cabin Creek Lookout [.1 acres]

Site Characteristics:

- Small forest opening at location of former cabin
- Situated within a dense collection of Beech and Hemlock trees
- Best views to the Creek
- Access to the water provided by rope to climb down rock incline.
- Most secluded area of the property
- Located within an easement that prohibits construction
- Trails from here to adjacent properties

Accessibility:

- Access provided by asphalt/gravel trail in high disrepair.

Site Adjacencies:

Lowland

Opportunities:

- Good point for views and water access.
- Secluded nature feels very removed from rest of property.
- Possible location for temporary structure

Zones of Interest: Shoreline



Poured Concrete Erosion Control Wall



Stormwater outfalls



View of Creek

Shoreline [n/a]

Site Characteristics:

- Shoreline has range of edge conditions ranging from unprotected, to rip-rap to poured concrete-reinforced.
- Views and water access are highly abated by vegetation.
- Some Japanese Knotweed (invasive) present

Accessibility:

Asphalt path leading to Cabin Creek Lookout passes by some shore line, but not all. Much of the shoreline is inaccessible by land.

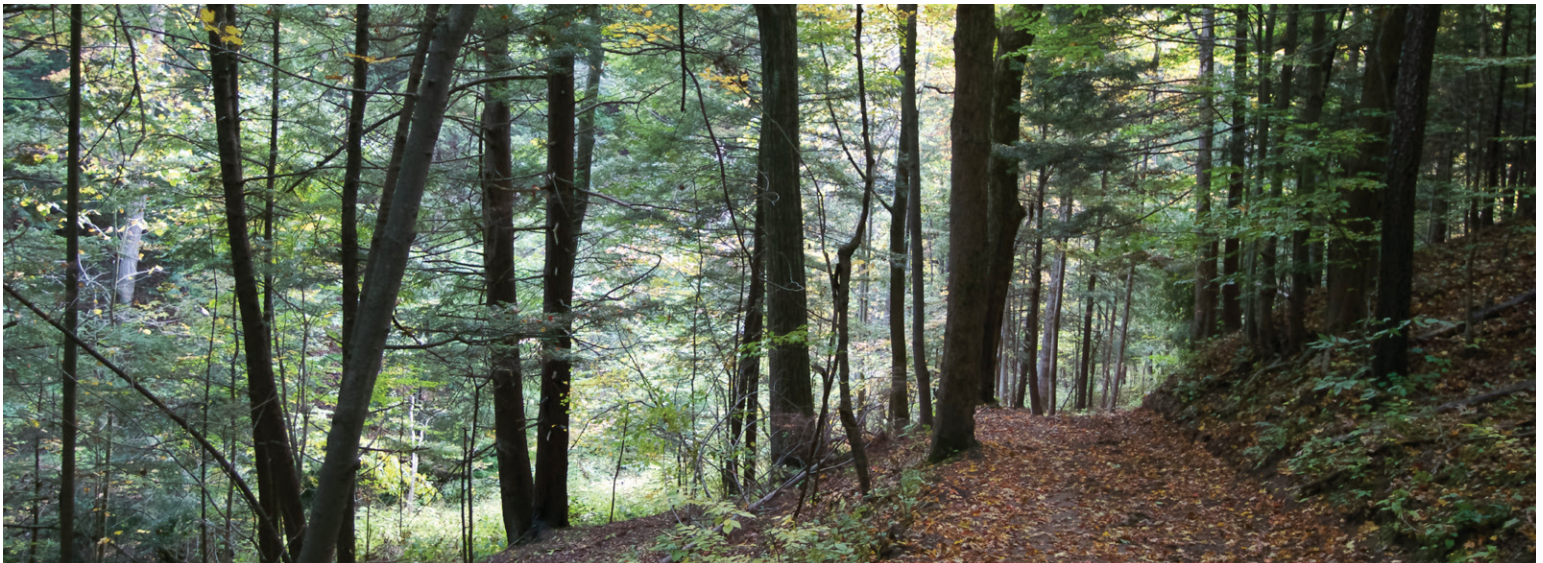
Site Adjacencies:

Lowland and Cabin Creek Lookout

Opportunities:

- Provide specific areas for access and views
- Experiment and evaluate different methods of erosion control
- Test invasive species control.

Three Scenarios



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- Scenario I: The Watershed Steward
- Scenario II: The Self-Sustaining Homestead
- Scenario III: The Entrepreneur

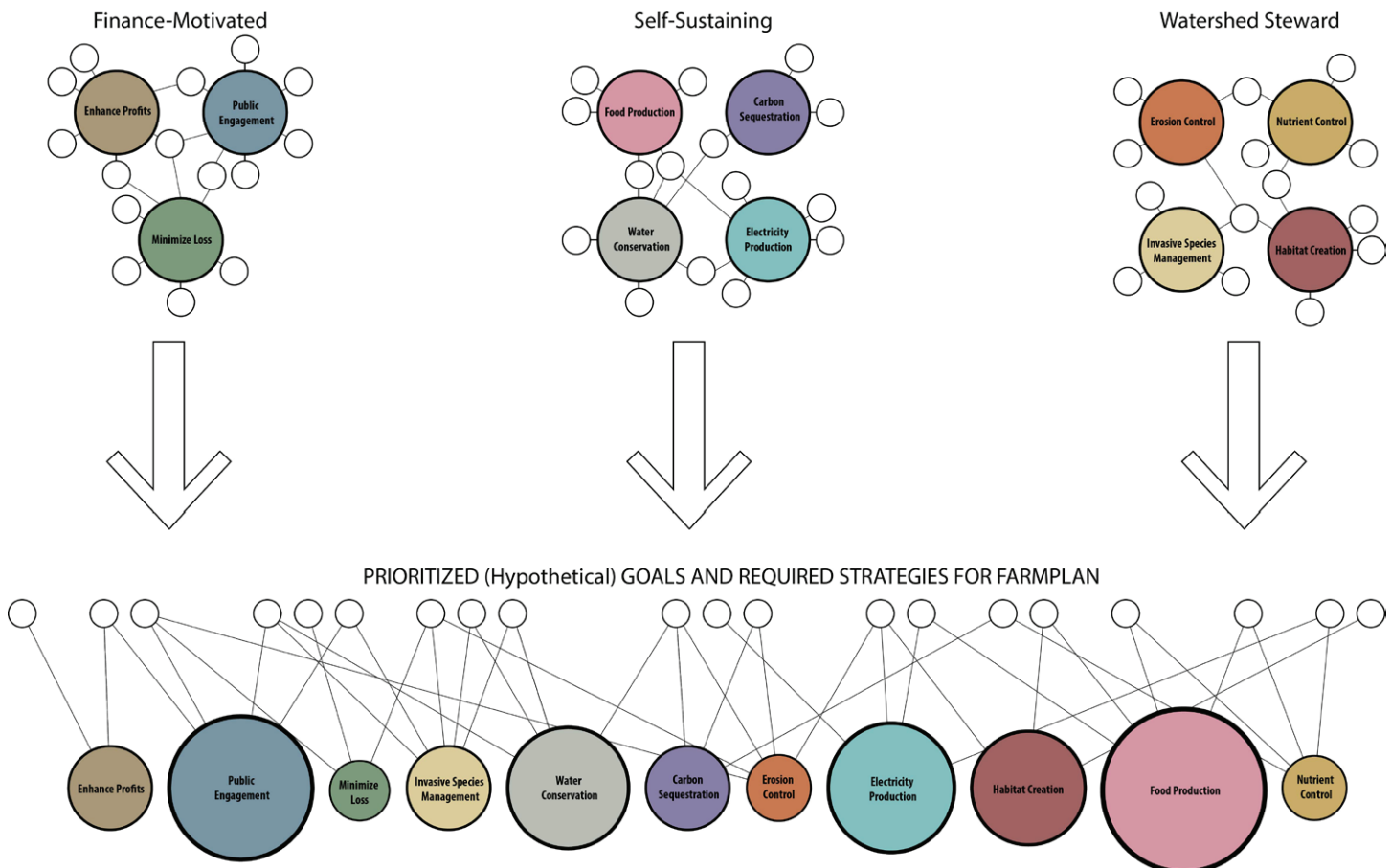
Three Scenarios

The second phase of the project consists of the establishment of three conceptual designs for the Niagara Share Farm. Each design operates under a different set of governing assumptions in order to explore the widest range of possibilities for use and production. It is assumed that none of options will be ideal in and of itself, but instead a hybrid scheme will be selected that pulls aspects from more than one of the designs.

The three scenarios include a design for a financially motivated production farm, a self-sustaining homestead and a watershed stewardship site. Each of these scenarios consists of a suite of goals it hopes to achieve. The goals of each scenario will be met by deploying a set of strategies on the farm site that, when working together, help generate the necessary conditions within that particular scenario.

After strategies for each goal have been established, a prioritized collection of goals will be chosen. This set of ranked goals will be the foundation of the preferred hybrid scenario. Then a set of spatial strategies will be selected to achieve the desired goals of the preferred scenario.

Phase II Workflow



Watershed Steward Scenario

This scenario will emphasize the water-cleansing, water-saving, and riparian protection management potential of the site.

Goals

- Capture and reuse as much water as possible
- Allow the water to be 'visible' across the site
- Manage erosion with techniques that minimize erosion elsewhere
- Establish nutrient control strategies
- Establish invasive species control strategies
- Promote desirable habitat creation

Strategies Employed:

Invasive Species Management

As a well established Beech-Maple forest, there are very few locations where invasive species have managed to gain a foothold. Where this does occur is within areas of disturbance where native vegetation is removed for some reason or the environmental conditions of a particular area are modified. On the property there are three particular invasive species that occur. These are Japanese Knotweed (*Fallopia japonica*), Common Buckthorn (*Rhamnus cathartica*), and Japanese Hon-eyesuckle (*Lonicera japonica*). While large-scale eradication is not necessary on the property, small scale control projects should be implemented to manage the numbers and spread of these particular species. This should occur by hand and should not incorporate herbicides.

Erosion Control Methods

There are several areas of the site that exhibit considerable erosion damage. Sediment from these areas washes into the creek and leads to shallower water levels, increased turbidity and elevated temperatures. Any areas with steep slopes that lack vegetation should be taken under consideration as locations of investment for erosion control methods. These methods could include slope reduction, terracing practices, erosion-control blankets, or the use of live stakes to re-establish vegetation.

Habitat Creation

Speaking generally, higher levels of biodiversity can be found in wetland or hydric location. Because of this, the development of wetland conditions generates the possibility of higher levels of plant and animal distribution, thus generating valuable habitat. When possible, the design should advocate for the creation or protection of wetland areas in order to maintain high levels of biodiversity, in addition to the possible creation of other types of habitat (e.g. old field grassland) that presently do not exist and that could introduce new native species to the site. In addition to habitat creation, these areas should be physically accessible when possible in order to perpetuate a stronger understanding and appreciation of their existence.

Nutrient Control

While merely observational, the transmission of nutrients from animal waste and stormwater drains constitute a significant issue to the water quality of the site. Nutrient loading perpetuates algae growth that cascades through the system and causes considerable damage to cold, small-order stream systems and to the larger lakes themselves. In the future, steps must be taken to protect the water by increasing the distance between manure storage/processing and the creek, reducing the slope of the landscape between the two, or by creating infiltration and treatment areas for the processing of nutrient-rich water prior to reaching the creek.

Water Management and Visibility

Water management can be performed in a range of ways, with a range of visibility. Traditionally an "out of sight, out of mind" attitude was taken for most water management, and it was placed in pipes that were hidden and transported water quickly. This omits the possibility for both the experiential/educational possibilities of the water in addition to the minimizing the opportunity for water treatment and infiltration during transport. Rainwater is currently being managed through a series of storm drains that empty out to the wetland on the southwest side of the property before it makes its way to the river. Care should be taken to ensure that all stormwater on the site is actually being diverted to these wetlands before making their way to the river. This will allow any contaminants (road salts, manure, any herbicide or pesticide) to settle out and reduce contamination into the river. Contaminants may be coming in from off the property so it is a good safe guard for the creek. Allowing the stormwater to collect in other areas could also help build wetland habitat and support species diversity across the site.

Roof Water and Gray Water

Water that is caught off of the roofs of buildings. As this water has not been contaminated from anything on the ground it is usually quite clean and safe to use in the house for washing and flushing the toilet and outside for irrigation and for animals. Note rainwater is not suitable for human consumption unless further treated. Gray water that is collected from household uses such as sinks, showers, washing machine, and dishwashers. Kitchen and utility sinks need different consideration in terms of oil traps and the such due to waste that is usually deposited in those sinks. Graywater does not include water that comes from the toilet. Graywater having light contaminants in it should be run through a series of sand, gravel, and/or wood filters after which it can be used for irrigation of plants and could feed a wetland habitat. It is good for immediate usage and should not be stored in tanks unless it has been thoroughly cleaned and tested.

Blackwater

Blackwater is water that comes from the toilet. This water is presently treated through a standard septic tank and leach-field system. After being properly treated it is best to be used for irrigation. There are special public health standards that must be met for the treatment of blackwater within the United States. Indoor systems (e.g. living machines) such as those developed by John Todd have proven to clean blackwater enough to make it drinkable and could be considered

Visibility

This project aims to maximize the visibility and experience of water moment and management on the site by minimizing sub-surface transport and highlighting water treatment areas in ways that are both experiential and educational. In addition to the water being managed on the site itself, consideration should also be taken in facilitating a stronger relationship between the site the Cazenovia Creek itself by way of view corridors and overlooks.

Short Term Phasing / Goals:

- Move horse manure and create a composting facility for its future processing
- Emphasize the site's connection and relationship with the creek by enhancing overlooks
- Install erosion-control systems on presently eroded areas of the site

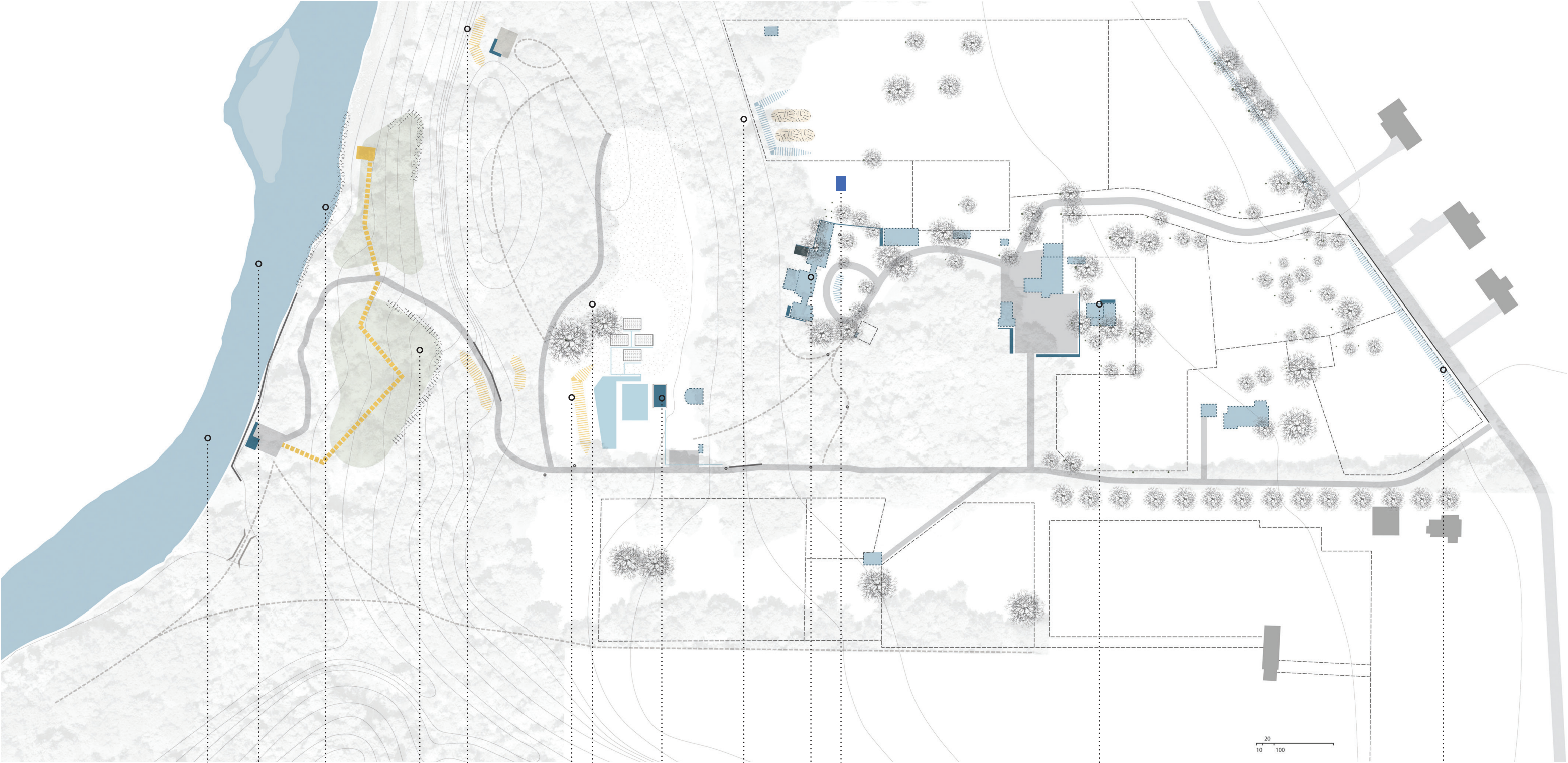
Long Term Phasing / Goals

- Monitoring and management of invasive species
- Creation of new habitat zones and walkways to access them
- Stream-bank modifications to soften or create new shoreline habitat



Watershed Steward Scenario





Lookout
Improvements

Wetland
boardwalk

Erosion
control/Lookout
Improvements

Prairie
Storm drain
water collection,
cleansing,
+ reuse (pool as wetland)

Black and/or
Gray water
collection,
cleansing,
+ reuse

Roof water + run off
collection, cleansing, +
reuse

Road run-off
catchment and cleansing

Invasive species
management

Erosion
control

Tennis court
debris used for
water capturing
berm

Manure and
Nutrient
Catchment

Entry
Wetland

Self Sustaining Homestead Scenario

The scenario will emphasize sites ability to full support a diverse, sustainable, small family farm through the deployment of water, waste, energy, and food systems that support a balanced lifestyle while offsetting carbon and reducing needless waste amongst the systems.

Goals

- Energy System: generate enough electricity to remove property from grid (unless adding back to the grid) and achieve carbon neutrality through the management of energy use and generation and through the carbon sequestration available through new tree plantings.
- Food System: create food systems that provide a balanced and diverse diet for a family year-round while efficiently reusing waste.
- Water System: deploy water management techniques that both provide and treat water in an effort to reach water neutrality with respect to both inputs and outputs.
- Outreach: site should provide learning and outreach opportunities

Strategies Employed:

Energy Systems

Presently the energy used on site is provided by a mixture of grid-source and local generation. Efforts should be made to increase local generation and reduce use to the point of independence. The large field areas of the site allow for the possibility of additional solar generation zones. Small wind generation could be possible in the area, but the visual implications of such strategies would require approval from local residents. A complete energy audit of the site structures should be completed to ensure that energy is not being wasted in the lighting and environmental control systems in order to reduce use. Carbon-burning engines should be converted to electric when possible. To offset carbon use of the site and its residents, Trees capable of sequestering high levels of carbon (e.g. tulip poplar) should be planted on the site wherever possible. While grid independence is the goal, connection to the grid should be maintained in order to feed back excess energy.

Food Systems

All food used by the family should be sourced from the property if possible. This requires a diverse range of plants and animals to generate a healthy diet. This diversity is also necessary to endure food security in the face of climate change that will alter growing conditions and viability of certain plant communities. Food production must also be considered a year-round process, thus the processing, preserving and storage of food must also be taken into consideration. A good deal of this processing (canning and storage) can occur within the existing structures, however a smokehouse could be created to aid in the processing of meat and a root-cellar for passive storage of tubers and other vegetables.

Plants

The suite of vegetable crops should be the product of a series of tests evaluating the possible growing conditions, general preferences of the family and the long-term suitability of the plants themselves. If done to truly ensure off-grid sustenance, a calorie/vitamin/fat assessment should be done for each possible plant to ensure a proper diet is possible. Types of plants would include both row-crops and orchard trees in the open areas of the site and berries (e.g. blackberries or raspberries) and nuts (e.g. english walnuts, chestnuts) within the forested regions of the property. Greenhouses or hoop houses should also be created to ensure cold-weather production of green vegetables to augment root vegetables. In addition to the growth of plants for the support of human populations, consideration must also be taken for the feeding of any potential animals, thus feed crop areas should also be established. Food waste should be incorporated into a composting system or recycled back into the feeding regime for farm animals.

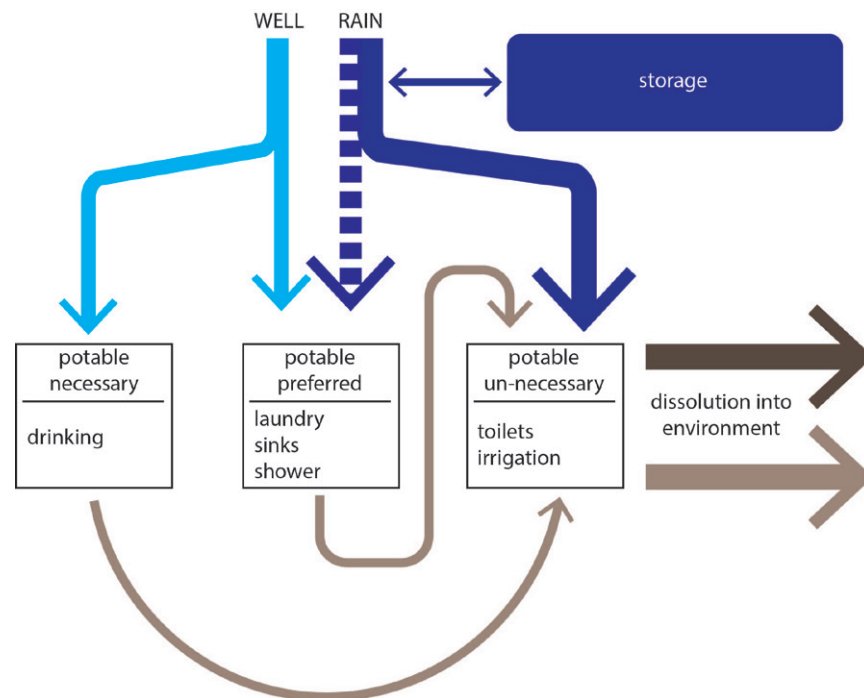
Animals

In order to provide a balanced diet, farm animals should be considered in order to provide protein-rich products such as milk, eggs and meat. The location selection of these animals can vary considerably, but are generally diverse and adaptable. The process of raising animals is more costly and complex than that of plants, and careful consideration should be taken in choosing what animals are selected based on the level of commitment that is required. Animals however offer the opportunity to serve multiple functions within farm systems such as multiple products or aiding in the recycling of wastes. Common animals that meet these requirements include pigs, goats, chickens, cows and sheep. Animal waste itself must be dealt with in a sustainable fashion through proper processing or recycling depending on animal.

Water Systems

Similar to other aspects within this scenario, the use and management of water should attempt to be neutral, meaning that all the water used should be obtained from the site and that all of the excess water should be processed on-site. While groundwater flow and other phenomena make this goal technically impossible, steps should be taken to attempt water neutrality on every level.

In order to meet water standard regulations, the site's potable water will likely need to be drawn from a local well or delivered from the city. However, the use of potable water for practices not needing potable water should be minimized. The flushing of toilets is a key example. Water recycling from other sources such as gray water or roof run-off could provide a source for toilets and irrigation. This water could be collected in cisterns from the roofs of buildings. The key here is to only use water at the cleanliness standard necessary for any particular use. Water use in general should also be minimized by using low-flow fixtures and regulating high-water activities such as showering and lawn irrigation. Near the farm a composting toilet could also be installed to reduce water use and to generate compost for certain non-edible plant products.



Outreach

The homestead scenario also advocates for a strong component of outreach and education with the assumption that more people following its principles would provide a positive impact on the surrounding community and region. These features should come in the form of educational events and programs that share the knowledge and experiences of the farm to the community in addition to other potential homesteaders. If successful, these events could be turned into revenue-generating workshops that attract people from farther reaches of the region. An internship program could be established where volunteers come and stay at the farm and work in return for room, board and the educational opportunity. Ideally this program would focus on citizens in need or who would take the knowledge they gain from the process back to locations in need of this knowledge, empowering them to make changes back home. On the site, the spaces for this work could be quite flexible. With the addition of the composting toilet, nearby, the pool house would be converted into a studio apartment for the interns.

Short Term Phasing / Goals:

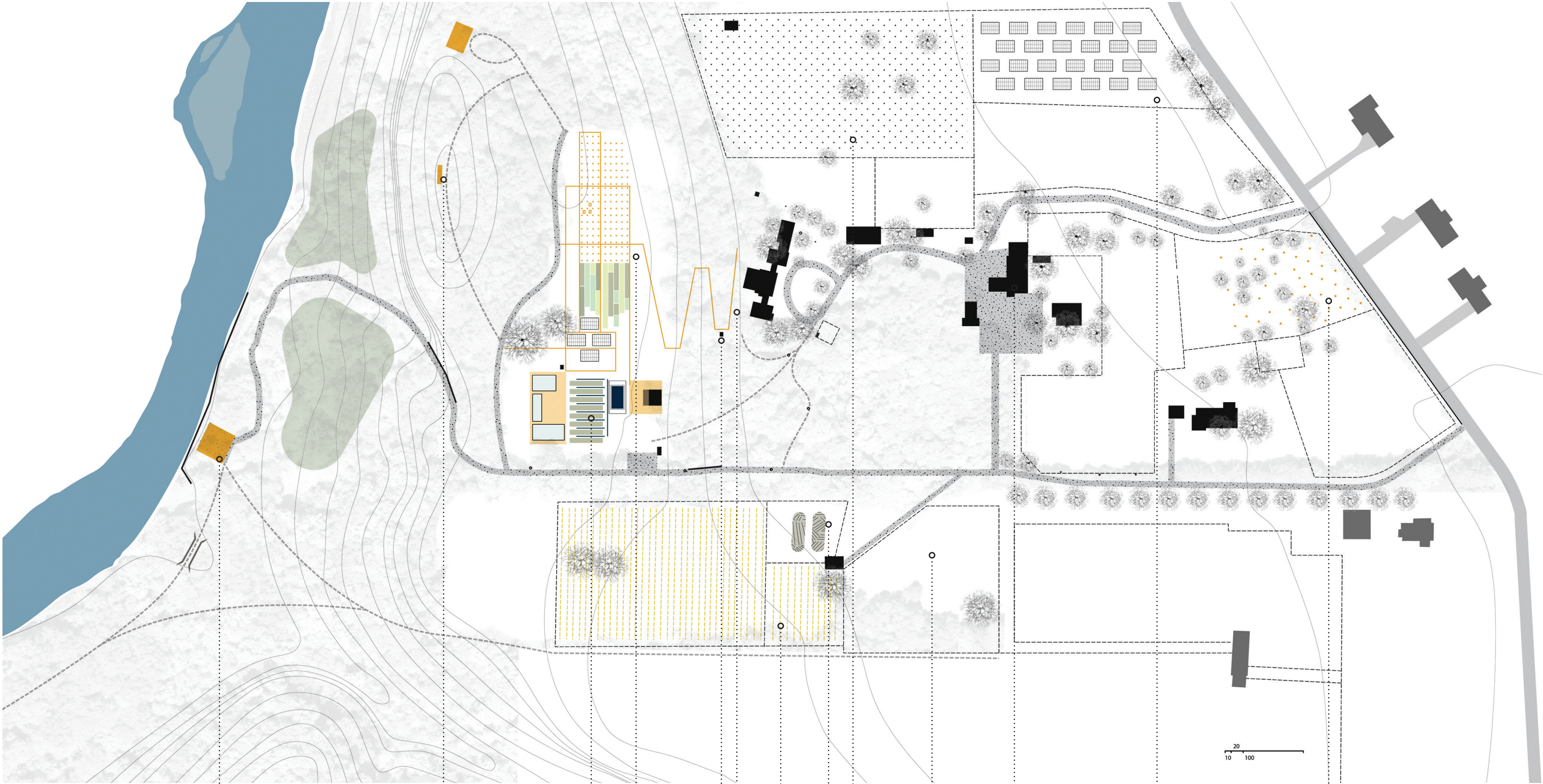
- Audit of current Energy, Food and Water use and projected need
- Assessment of plant and animal preferences and associated costs
- Construct a temporary hoop house to begin testing plants and production throughout the winter
- Testing of various plants and animals for suitability

Long Term Phasing / Goals

- Conversion of Pool into Cistern
- Construction of Permanent Green Houses
- Establishment of Internship Program

Self Sustaining Homestead Scenario





Community gathering point

Camping grounds

Water collection, and garden irrigation, green-houses, guest studio (pool as cistern)

Orchards, bees and garden plots

Terraced walk and gardens down to the field

Composting toilet

Grain for livestock

Re-forestation

Manure and Nutrient Catchment

Barn used for mixed husbandry

Fields for mixed husbandry

Expanded solar Fields

Expanded orchard

The Entrepreneur Scenario

This scenario will emphasize the site's potential generate a healthy profit from sustainable farm operations.

Goals

- Establish space and support systems for a few strong, highly profitable, sustainable, and socially engaging agricultural products.
- Integrate more public programming and event spaces.
- Establish a physical and virtual market identity.
- Minimize financial and ecological losses through testing strategies.

Strategies Employed:

Specialty Crops

The specialty crops are chosen with a few essential financial, ecological, cultural factors in mind. First, unlike the 'self sustaining homestead scenario', diversity in the entrepreneurial scenario should be more minimal. The farm should have a few different key crops and products in order to assist in its resiliency in the face of climatic or market fluctuations, that said, it is pertinent that this number of the different crops and products be kept to a select few. By focusing on only a few choice crops, the farm will be better able to focus its financial choices and physical efforts and market itself to buyers and distributors. Ecologically speaking, the crops chosen should be able to be produced organically without an incredible amount of maintenance and/or be able to establish themselves and easily harvested from a diverse habitat. Each crop, or product should also be considered for their spatial, social, seasonal and cultural values as they will be structuring the space, the conversations, and identity of the farm. The personal connection and significant interest in the crop or product should be considered as it will strongly influence identity and the ability to sell the product and develop relationships with buyers. The specific values of the crops chosen are discussed further below. While a number of crops are suggested in this scenario, ultimately the choice of what these specialty crops should be should come after at least a few seasons of trials of the crops on different areas of the property.

Hops:

Hops is a crop that is has some particularly strong financial and cultural potential. While currently in demand due to the growth of the number of local breweries and the interest in home brewing in New York State and the rest of the country, it is also a crop that has been in western New York since the 1800s. The fact that hops has been grown in the region for a long period of time bodes well for it as it means the local climate and soil may be more easily primed and need less manipulation to establish a successful hops crop. Historically there were issues with pests and diseases in area, but modern advances in specific hops species and pest management have made growing hops in the region much more viable. Hops may also be profitable with just a couple acres. Financial return is estimated at between \$8,000 - \$16,000/Acre (based on \$10-14/lb price and a 900-1200 lb/acre production potential.). Estimates by the Carey Institute suggest about a \$12,000/acre initial investment (this includes labor, 900 plants, trellises, irrigation, and equipment) that said, the farm probably has some of the equipment already and there maybe options to share large equipment with other small local hops farmers.

Growing hops on the site could be easily instituted in the open pasture areas. Needing full sun and a flat or gently sloped site, any of the fields could be suitable for planting as long as the soil tests come back with the appropriate pH levels. Installation and maintenance even at the one acre scale would require some additional workers. In this scenario, the hops are located in southern field and would welcome visitors into the site.

As a vine, hops grows up to 15-20ft long and can be trained into a variety of heights and shapes which could allow it to help structure some outdoor communal areas. Hops farming will connect the farm to the local brewing community and growth could also support a home brewing endeavor.

Cut Flowers + Woody Stems:

Flowers and woody shrubs are plants that bring both aesthetic value and financial profit to the site. Cut flowers and woody stems are commodities that sell well in farmer's markets and market stands. They are most often used for flower arrangements as well as for crafting baskets and wreaths. If perennials are grown such as lavender and dogwood, they do not have to be replanted each year, and just require annual maintenance after they are established. They are also elements that if left alone will still create habitat, beautiful settings for events, and help achieve carbon neutrality.

Ginseng:

Ginseng is a root crop that does well growing wild in the forest. It requires little maintenance and needs around 5 years to grow before it is harvested. It has shown to do well in areas where sugar maples are found which suggest that the site would be a good host for this crop. It is highly revered in China and believed to have numerous health properties. Wild American Ginseng has sold for around \$600/lb dried in recent years. It would not require much land and would almost be an 'invisible' crop on the site.

Maple Syrup:

As the site's forest already holds a great number of mature sugar maple trees, the maple syrup production potential on the site is great. At the very least, maple syrup harvesting would require a tap to be installed at the trees and a regular collection of the sap during the harvesting season. This could be done by an outside service who would pay for use of the trees and sap, it could be collected internally and processed off-site, or this could be collected and processed on-site which would require additional machinery and infrastructure to be purchased and maintained. Maple Syrup has great social potential as the harvesting can be a large communal winter event. Other than tapping the trees, little else would need to be done in terms of maintenance or initial investment.

Mushrooms:

Mushrooms have wonderful market potential both for consumption and within the growing market of mushrooms as a compost-able, sustainable building material. Mushroom production needs shade and moisture and may be propagated in the under-story of forests. Three varieties - shiitake, lion's mane, maitake, and winecap stropharia - are all mushroom varieties that have been successfully cultivated in the forests of Western New York. Mushroom cultivation involves no additional space beyond small clearings in the forest floor, and require very little maintenance.

Farm Stand

The farm stand offers a mode of on-site advertising along with opportunities for social engagement leading to both sale of products and opportunities to share knowledge of sustainable systems. The farm stand should have a highly visible sign from the street, the stand itself could be a small and only open on the weekends or during harvesting seasons. The farm stand should be well designed, as it will serve as a gateway into the larger facility. As a very site-based endeavor, it is incredibly helpful to allow customers a chance to be able to visit property and meet the people involved in the production of local products.

Event Space + Agri-tourism

One of the strongest elements of the entrepreneurial scenario is the public engagement that happens on the site. This public engagement can both be a source of revenue and a social, educational opportunity to that would allow Niagara Share to share its sustainable interests and values with the community. The site would accommodate this influx of public engagement in a few key ways. First, the main entrance to the site would now be located on the site's southern road and would lead people down to the area that was once the pool and pool house. The area, now designed as beer garden and a greenhouse, would act as the main event space. This means that while the infrastructure would support agricultural production, it would also be designed with event hosting in mind as well. For example the greenhouse will keep aesthetics in mind and be organized so that it may be able to fit tables and chairs, etc. In addition to providing event space, this scenario would also allow for the hosting of Agri-tourists either through the farm stand as previously discussed or through agricultural events, workshops, demonstrations, and if desired a small Bed and Breakfast endeavor.

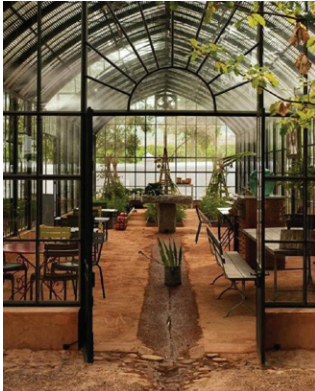
Short Term Phasing / Goals:

- Market research exploring revenue potential for various plants
- Soil tests to check for growing conditions
- Varietal and location test for various produce
- Design of Farm Stand and Greenhouse

Long Term Phasing / Goals

- Construction of Beer Garden
- Hiring of Farm Manager
- Reassessment of production plants and methods

The Entrepreneur Scenario





Groomed path
to creek for
visitors

Mushroom
fields

Event
Center
(pool as
beer garden)

Hop
fields

tree/woody plant
nursery

Barn used for
specialty animals/
or agri-tourism
BnB

Roadside market
new public
entrance

Green house
for herbs

Cut Flower
+ Lavender
gardens

Maple Syrup
+ Ginseng forest
production





Resources:

Fruit Production:

Penn State Extension Fruit Production Guide (buy book):

- <http://extension.psu.edu/plants/tree-fruit/tfpg>

Penn State Extension Apple Information:

- http://extension.psu.edu/business/ag-alternatives/horticulture/fruits/apple-production/extension_publication_file

Hops Production:

Cornell Cooperative Extension Hops Production Guide (buy book):

- <http://store.cornell.edu/p-190362-2015-cornell-integrated-hops-production-guide.aspx>

Cut Flower Production:

Penn State Cut Flower Information:

- <http://extension.psu.edu/business/ag-alternatives/horticulture/cut-flower-production>

Association of Specialty Cut Flowers:

- <http://www.ascfg.org/>

UMass Amherst Center for Agriculture, Food, and the Environment:

- <https://ag.umass.edu/fact-sheets/field-grown-annuals-for-cut-flowers>

Lavender Production

National Center for Appropriate Technology - Sustainable Agriculture Assistance Program ATTRA

- <https://attra.ncat.org/attra-pub/summaries/summary.php?pub=41>

Woody Plant Production

UMass Amherst Center for Agriculture, Food, and the Environment:

- <https://ag.umass.edu/greenhouse-floriculture/fact-sheets/crops>

Beekeeping

Penn State Extension Beekeeping Information:

- <http://extension.psu.edu/business/ag-alternatives/livestock/additional-livestock-options/beekeeping>

Garlic Production:

Penn State Extension Garlic Information:

- <http://extension.psu.edu/business/ag-alternatives/horticulture/vegetables/garlic-production>

Maple Syrup Production:

Penn State Maple Syrup Information:

- <http://extension.psu.edu/business/ag-alternatives/forestry/maple-syrup-production>

Cornell Cooperative Extension Maple Program

- <http://maple.dnr.cornell.edu/>

Ginseng Production:

New York State Department of Environmental Conservation Ginseng Growing Website:

- <http://www.dec.ny.gov/animals/7472.html>

New York State Department of Environmental Conservation Applications and Law Links:

- <http://www.dec.ny.gov/animals/7130.html>

New York Flora Association:

- http://www.nyflora.org/files/7012/9117/0364/NYFA_Newsletter_212.pdf

Virginia Cooperative Extension Information on Ginseng Growing:

- <http://pubs.ext.vt.edu/354/354-312/354-312.html>

Mushroom Production

Cornell Blog on Mushroom Production:

- <http://blogs.cornell.edu/mushrooms/>

Cows:

Penn State Extension Dairy Heifer Information:

- <http://extension.psu.edu/business/ag-alternatives/livestock/beef-and-dairy-cattle/dairy-heifer-production>

Goats

Penn State Extension Dairy Goats Information:

- http://extension.psu.edu/business/ag-alternatives/livestock/sheep-and-goats/dairy-goat-production/extension_publication_file

Pigs

Penn State Extension Swine Information:

- <http://extension.psu.edu/business/ag-alternatives/livestock/additional-livestock-options/swine-production>

Sheep:

Penn State Extension Milking Sheep Information:

- http://extension.psu.edu/business/ag-alternatives/livestock/sheep-and-goats/milking-sheep-production/extension_publication_file

Chickens:

Penn State Extension Chicken + Egg Information:

- http://extension.psu.edu/business/ag-alternatives/livestock/poultry-and-game-birds/small-scale-egg-production-organic-and-non-organic/extension_publication_file

Earthworm Production:

Penn State Extension Earthworm Information:

- <http://extension.psu.edu/business/ag-alternatives/livestock/additional-livestock-options/earthworm-production>

Agri-tourism Business:

Cornell Cooperative Extension Guide:

- <http://www.cceontario.org/cce-site-documents/Agritourism-Getting-Started-CCE.pdf>

Penn State Agritainment Information:

- <http://extension.psu.edu/business/ag-alternatives/farm-management/agritainment>

Local Small Farm Marketing:

Penn State Extension Small Farm Marketing and Roadside Market Information:

- <http://extension.psu.edu/business/ag-alternatives/marketing/fruit-and-vegetable-marketing-for-small-scale-and-part-time-growers>
- <http://extension.psu.edu/business/ag-alternatives/marketing/developing-a-roadside-farm-market>

New York State Department of Agriculture:

- <http://www.agriculture.ny.gov/>

Drip Irrigation Systems:

Penn State Extension Drip Irrigation Information:

- http://extension.psu.edu/business/ag-alternatives/horticulture/horticultural-production-options/drip-irrigation-for-vegetable-production/extension_publication_file

Organic Farming Methods:

Penn State Extension Organic Production Information:

- http://extension.psu.edu/business/ag-alternatives/horticulture/horticultural-production-options/organic-vegetable-production/extension_publication_file

New York State Department of Agriculture:

- <http://www.agriculture.ny.gov/AP/Organic/index.html>

Cornell Cooperative Extension on Niagara Area Farming Area:

<http://cceniagaracounty.org/program-areas/agriculture/profile-of-agriculture-in-niagara-county-ny/>

Cornell Cooperative Extension Erie County:

- http://erie.cce.cornell.edu/?_ga=1.94938780.1045822680.1444768272

Masterplan + Implementation



Contents

- Masterplan
- Upper Greenhouse Plan + Lower Field Plan
- Lower Field Perspective
- Implementation Phasing 1, 2, 3
- Key Site Elements, Details, and Diagrams

Masterplan



Phase I
Phase 2
Phase 3

River
Lookout

Wetland
Path

River
Lookout

Hemlock
Ridge
Camp
ground

Fruit
Orchard

Potted
Orchard
Field

Event
Green-
house

Test
Plots +
Family
Food
Garden

Meadow
+ Bees

Activity
Deck +
convert-
ed Pool
house

Path and
Flower
Gardens

Maple Syrup
+ Ginseng
forest
production

Hop
fields

Small
Green-
house/
Irrigation
Tank

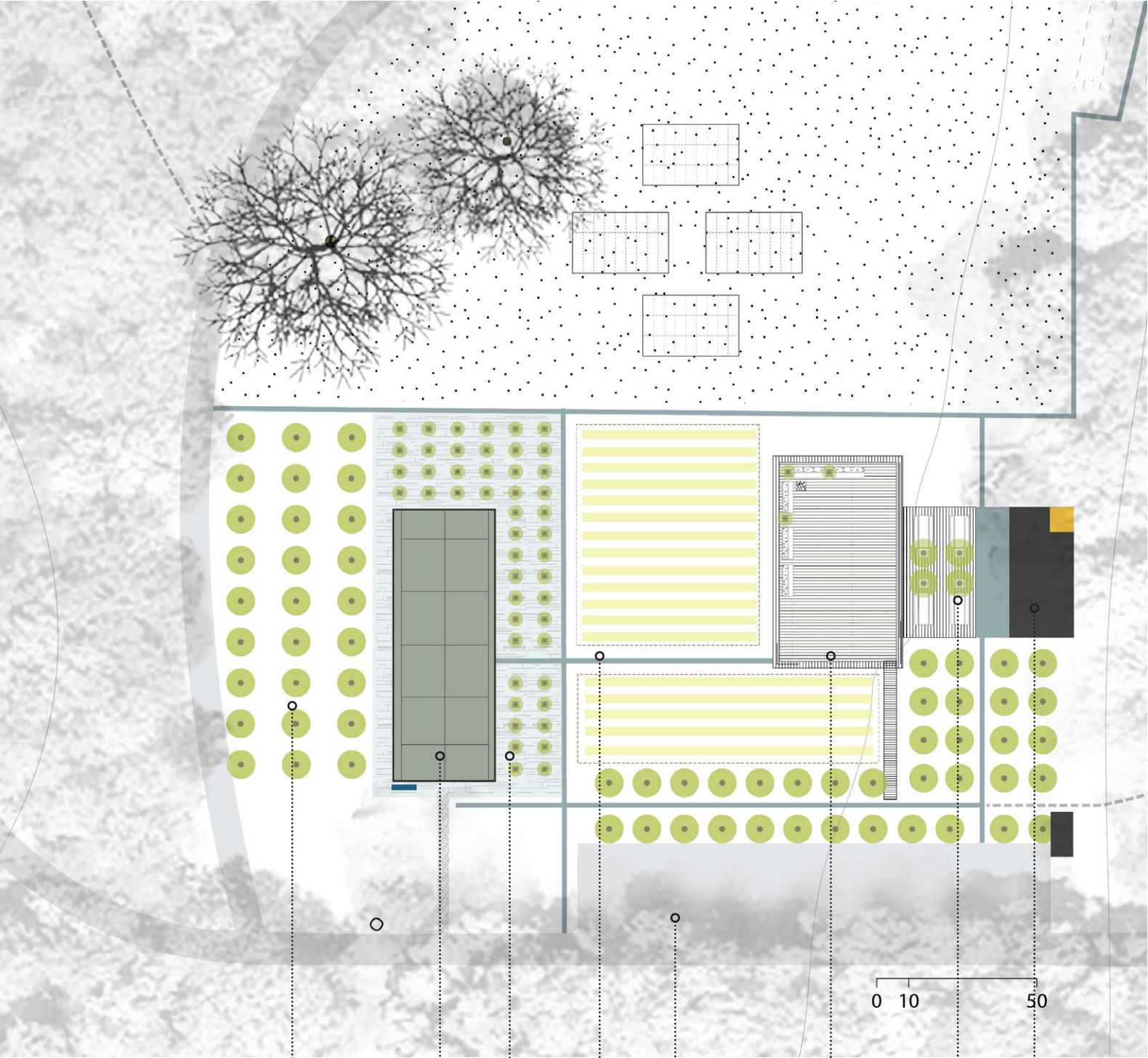
New Chicken
Coop + New
Manure Composting
Center

Barn used for
specialty animals/
or agri-tourism
BnB

tree/woody plant
nursery

Roadside market
new public
entrance

Lower Field Plan + Main House



Permanent Orchard

2,200 sq. ft. Greenhouse

8,000 sq. ft. of test plot gardens

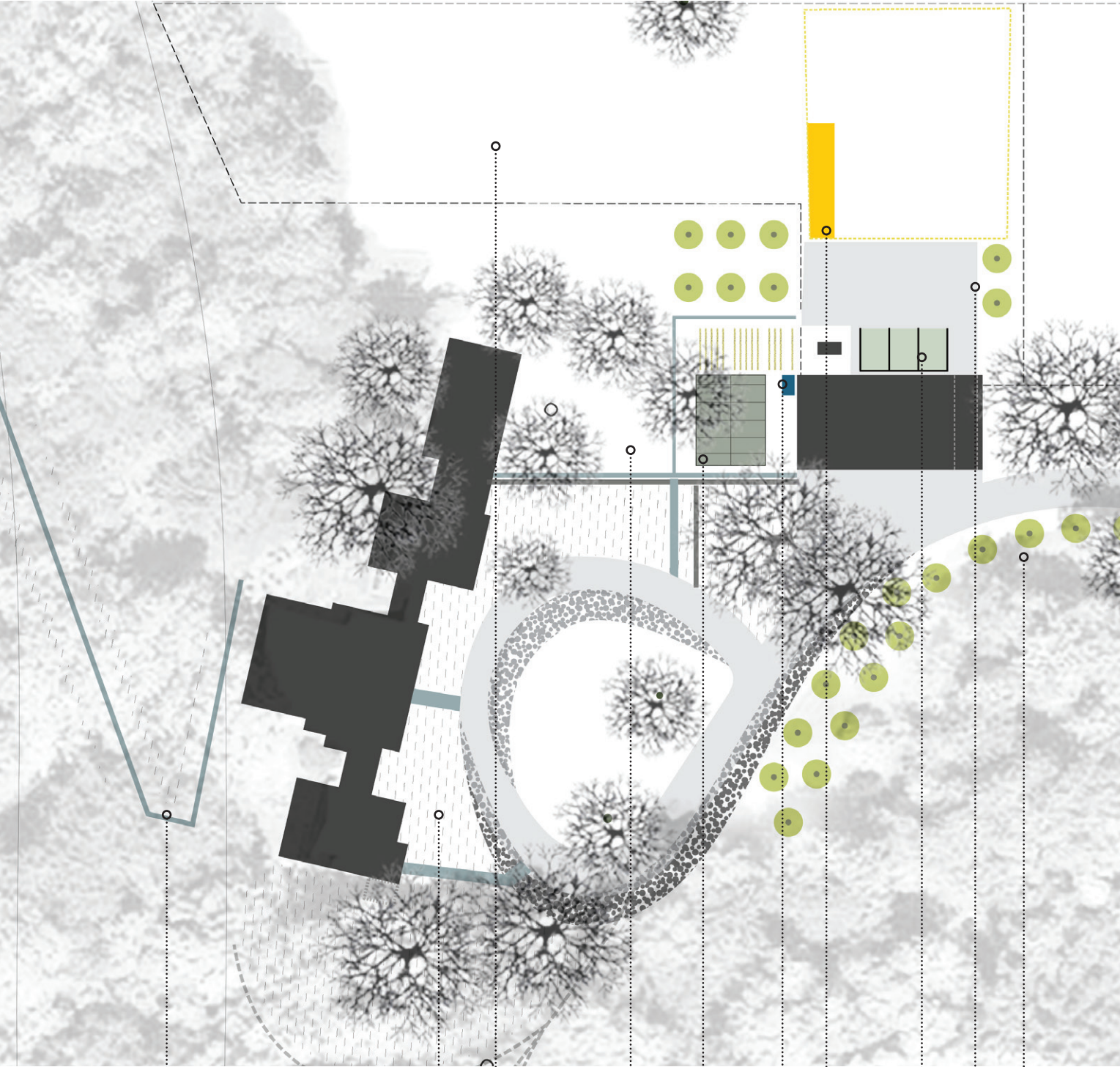
2,670 sq. ft. Activity Deck with ramp

Beer Garden

Renovated Pool house with composting toilet, root cellar, kitchen

Potted Trees + Shrubs (winterized in the greenhouse)

Extended Parking lot



Terraced Walkway

New Perennial +Woody Stem Gardens

Summer Broiler Chicken Field

Small garden plots

Small Green-house

Roof water Tank for Irrigation

Chicken Coop for layers

Manure Composting Bins

Turn-around for Manure tending

Fruit Trees Lining the drive

Lower Field Perspective



Phases I, 2, 3

PHASE I: 3-5 years,

Assumes no profit, structuring for better land use, and testing phases for profit ventures (est. budget \$100,000)

- Moving Manure + New Manure Composting Facility
 - \$2,500 in materials for the structure only
 - not including compost amendments
 - no pumps and pipes - based on hand turning
 - assumes ground placement without foundation
 - assumes self assembly
 - assumes tarp cover and not roof cover (+\$1,000)
 - access road to the new composting facility may be constructed through the current garage
- Crops and Test Plots
 - Hops plants - Hops plants could be trained on tennis court fence
 - 50 plants of mixed variety @ \$10 per plant = \$500
 - 18' Hop Trellis \$1000 (will vary based on design)
 - Ginseng plants
 - 50-70 3 year rootlets @ \$100
 - Mushroom bags + spores
 - Maple Syrup Collection
 - Depending on sugar content, cleanliness, and freshness sap can be sold to local syrup producers for between \$.10 to \$.70/gallon (based on PSU research), each tree can produce 10-20 gal/sap per season.
 - Small Woody Shrubs
 - 2-5 gal shrubs @ \$20-\$130/shrub
 - Orchard Trees
 - 15 gal trees @ \$70-\$150/tree
- Deer Fencing around Garden
 - Dependent on garden size
 - 2500 linear feet +/- \$500 - assumes one of the gardens for the first phase
- New Activity Deck over the pool
 - Could be built with wood harvested from onsite
 - \$10-\$75 sq foot depending on materials, size, and features
 - Does not include price of site furniture (chairs, fire pit, movable planters, shade structure, hammock) which will be key to making this a new highly used space
- New Chicken Coop
 - coop requirements 2sq ft per chicken
 - field requirement 20-25sq ft per chicken
 - assumes space for 60-100 layers
 - broilers could be place out in movable pens in different corners of the horse pastures when they become available
- New Gravel Access Road
 - road for access to the manure composting piles and chicken coop
 - could be run through the garage by opening up a back panel of the garage
 - should allow for space to turn skid steer around
- Small Greenhouse: \$1,000-6,000 depending on size, materials, and model
 - Assumes self assembly
 - Assumes non-electric heat source (compost, etc)
- Filling the Pool with Aggregate or Water Tanks
 - Assumes 20' x40' ft with 5' average depth
 - (4,000 Cubic feet/30000 gallons) 150 cubic yards of aggregate x \$50: \$7,500

Phases 1, 2, 3 cont.

- Tennis Court:
 - Roller rink/patio deck/planters in the summer
 - Hops plants could be trained on tennis court fence
- Wetland Path: \$10,000
 - Assumes 200 feet of 2ft wide wooden path
 - Does not include construction costs could be self assembled with small work crew
- Root Cellar: unknown cost
- Roof Water Collection Tanks for Irrigation
- Landscaping Close to the House
- Lower Field Meadow Planting
- Overlook clearing

PHASE 2: 5-10 years, Small income possible by successful plant sales and road-stand

- completion of items from phase 1
- path from house to lower field (erosion control and path gardens)
- expanded garden and cash crop production
- pool house renovation
- specialty animals introduced/tested (bees, pigs, goats, sheep)
- road side stand

PHASE 3: 10-20 years, focused on income and use and long-term financial viability

- large greenhouse constructed
- narrowing of plant species for cash crops
- agricultural expansion into former horse fields
- pool house completion
- event space completion

Key Element: Wetland Boardwalk

Access to the various wetland areas will aid in a larger appreciation for the range of ecosystem types that are present at the Niagara Share Farm and could be achieved in a relatively cost-effective manner. The primary objectives of these paths would be:

1. to provide clear, understated access to the wetland areas of the site.
2. to achieve a 8-10-year lifespan without significant maintenance.
3. to be constructible without the use of heavy machinery and primarily installed by the family.

As it is presently designed, the boardwalk would be installed using a screw-type foundation to support the joists for the deck boards. This will prevent the varied settlement in the area to affect the walking surface of the trail. A highly visible cable will be used as a handrail and to aid in visibility of the path. The exact location of the path itself will be dictated in the field based on accessibility and views.



Key Element: Tennis Court to Greenhouse + Potted Tree Nursery

The tennis court which is currently unused will take on new seasonal programs. The primary objectives of the new tennis court program will be:

1. To provide more fun, seasonal programs that support the properties newer agricultural and activity focus in this underused and underutilized area
2. To find better uses for the concrete pad and fences of the tennis court so they do not need to be removed
3. To utilize the sunny area where the tennis court is currently located

In the summer months, the tennis court can serve as a potted plant orchard. For example citrus trees that would be wintered in the large green house can be placed on the court during the summer months and help structure a place that can now be used for larger events with the addition of table, seating, tents, etc. These trees should be placed in planters that are movable (potentially on wheels) so that they can easily be moved to accommodate larger events .

Key Element: Pool House Update

The former pool house could play a significant role in the future of the lower fields. Much of this possibility hangs the cost associated with converting it into another use. Presently, the structure of the roof needs to be assessed as it does show signs of decay. Should the structure appear valid and safe, a complete clean-out of the pool house is strongly suggested in order to address any paint issues, mold or other such concerns. The pool house seems to be the logical location for a washroom in the lower field and this could be achieved by the construction of a composting toilet within (or next to) the structure. Inside, providing running water and work areas are probably the most immediate as the area could be used for food cleaning/preparation before bringing it to the house kitchen. A convection cooktop here could also make the process of preparations such as canning possible here instead of within the house. The in-ground nature of the structure aids itself for passive cooling and root-cellar type area could likely be achieved for storing canned food and tubers.

In the future, the pool house could be converted into an events kitchen by adding a convection oven that could allow for the preparation of meals for visitors to Niagara Share, in addition to containing a very small bedroom that would allow the structure to serve as a small apartment when necessary. This phase would however require sealing the structure with a large glass wall.

The roof of the pool house is tentatively accessible and could be made to be more officially accessible should the structure be seen as suitable. On the roof, water could be collected and sent to the pool cell while providing a small deck for visitors or the resident of the pool house that overlooks the primary production area of the farm.

Key Element: Water Collection + Irrigation

The productive nature of many future elements of Niagara Share will require the usage of water. While Niagara Share will still be supported by the city water, the use of sustainable water management and irrigation is incredibly important to being watershed stewards within the great Niagara Region and the greater mission of Niagara Share for their practices to be used educate the community. At the very least, fairly low cost methods of simple roof and gray water collection off should be used for irrigating new plants and trees around the property as well as using this water to clean animals and equipment.

Roof Water and Gray Water

Water that is caught off of the roofs of buildings. As this water has not been contaminated from anything on the ground it is usually quite clean and safe to use in the house for washing and flushing the toilet and outside for irrigation and for animals. Note rainwater is not suitable for human consumption unless further treated. Gray water that is collected from household uses such as sinks, showers, washing machine, and dishwashers. Kitchen and utility sinks need different consideration in terms of oil traps and the such due to waste that is usually deposited in those sinks. Graywater does not include water that comes from the toilet. Graywater having light contaminants in it should be run through a series of sand, gravel, and/or wood filters after which it can be used for irrigation of plants and could feed a wetland habitat. It is good for immediate usage and should not be stored in tanks unless it has been thoroughly cleaned and tested.



Key Element: Horse Manure Composting

The composting of horse manure has multiple benefits. First, the removal of large amounts of manure located on or near the streambanks of the Cazenovia Creek will reduce nutrient loading on the stream itself and help protect the overall water quality of the Buffalo River. Next, this processing of manure, depending on location, could reduce transport and handling of the material itself. Lastly, the processes of composting will generate a valuable resource (highly fertile soil) for the Niagara Share Farm to be incorporated into the agricultural production operations taking place. These three benefits alone justify the importance of the composting operation and its prioritization in the overall process of site development.

Design and Cost

The composting should take place closer to the horse boarding operations to limit transport of the manure and bedding. The compost structure itself should be constructed as a series of cells 8x8 where material can be stored, separated and accessed by a skid-steer for turning. Three cells should be adequate for 6 horses. The piles should have the ability to be covered with either a roof or with tarps to help regulate moisture content. Items such as moisture, temperature and carbon/nitrogen ratios will be important for successful composting and elimination of odor. Run-off from the pile should also be managed by way of a small infiltration ditch.

These three bins can be designed in several different ways, but in their simplest form consist of pressure treated wood boards and wooden posts. A three cell design, constructed in this manner would cost a bit under \$800 in material. Photos from the Washington State University example provided in the research book are shown below.



Key Element: Horse Manure Composting Management

Additional Materials —

Horse manure in its pure form has a carbon to nitrogen ratio of about 30:1, which is about perfect for composting. The addition of bedding or wood will elevate the carbon levels and inhibit proper digestion, in which case, fertilizer, food waste or urea can be added to raise nitrogen levels. If you are mixing other organic materials like food scraps in with the manure, make sure they are of a uniform size, about 1/2-inch in diameter. This will help produce a homogeneous product and keep the decomposition rates of the materials the same. Mix additional materials into the pile as it is built. This will help deter pests and flies and help keep the odor down. Avoid adding meat and dairy products to your pile, which may attract scavengers. Also avoid adding cat or dog feces to the pile, they can contain harmful parasites.

Water —

To monitor the pile, you will need to keep track of the moisture content and the temperature. An ideal compost mixture contains 50-60% moisture. You can test for moisture by squeezing a handful of compost. It is wet enough if a small amount of water comes out between your fingers. It will feel like a wrung out sponge. The moisture content of fresh horse manure is nearly ideal. Water provides an environment for microbes to live in. Too wet or too dry a pile will cause the essential microbes to die. So pay attention to the moisture content of your compost pile and, if necessary, add water when adding material or turning the compost. Keep the pile covered to help maintain proper moisture content.

Turning —

The more often you turn the pile, the faster it will compost. Turning the pile mixes the ingredients, provides oxygen to the microbes, rebuilds the porosity of the pile, and exposes all of the pile equally to the air in the outer layer and to the high temperature in the center of the pile. Turning the pile also eliminates anaerobic organisms that cause foul odors. For faster composting, turn the pile 3 times per week.

Temperature —

Decomposition of organic matter by microbes produces heat. The optimal temperature range of your pile should be between 122 and 145 degrees Fahrenheit. These high temperatures will kill pathogens and weed seeds. Don't allow temperatures to rise much higher or the microbes will also die. When the pile reaches 140 degrees, start turning the pile more and remember to keep it moist. The moisture will help keep the temperature from getting too hot. Spontaneous combustion can occur but generally in conditions when the pile is over 12 feet high and has only a 25-45% moisture content. Use a long probed compost thermometer to monitor the temperature, in the middle of the pile, every day if possible, and keep records.

Time —

The compost will be ready to use in 1-3 months in the summer and 3-6 months in the winter depending on how it is managed. High-grade compost, used in potting mixes, needs more time and more management. Lower grade compost, used on pastures or around the yard, requires less time and management.



Key Element: Greenhouses

Small Greenhouse

There are two greenhouses sited throughout the project. The first is a small greenhouse that is to be placed next to the garage. This greenhouse can be purchased as a kit and easily assembled as early as this fall. Sizes and materials range and many of these kits can be extended over time when necessary. The materials will determine the life span of the greenhouse. More expensive glass and metal constructions can often last 25 + years versus some of the simpler and cheaper plastic sheeting types which may only last a couple years. The greenhouse should be put in full sun and is set to be located next to the garage so that with the addition of gutters and a holding tank the water from the roof of the garage can provide water for irrigating the greenhouse. It is also located close to the manure composting pile and with the right piping, the manure compost may be able to heat the small greenhouse. It may also be heated by internal compost piles, or electric heaters. With proper heat, your greenhouse will provide the family with vegetable all year round and can help begin seedlings to be planted outside in the spring.



'Sunshine Mount Rainier'
10' height, 8'x8' \$3,200



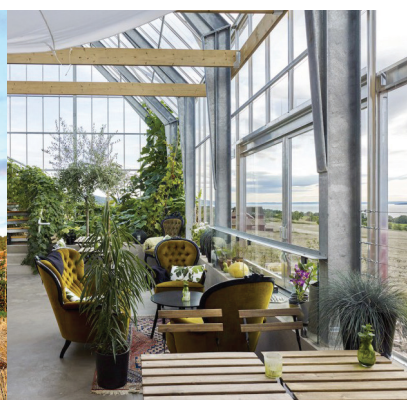
'Solex Early Bloomer'
6'3" height, 8'x8' \$1,270



'Halls Popular'
6'4" height, 10.5'x 6.5' \$1,364

Large Greenhouse

The large greenhouse is currently planned to be implemented in the third phase. This greenhouse could serve as the main event center on the farm and/or used for increased agricultural production. Regardless, it should try to implement the most advanced water and heating systems technology. A cheaper version of a large greenhouse should be considered if the sole purpose of the greenhouse is for production.



Swedish Greenhouse Nature Center

<http://inhabitat.com/swedens-house-in-a-greenhouse-grows-food-sustainably-with-recycled-wastewater/>

Resources:

- Heating the greenhouse:
 - Compost Trench - a trench is dug in the center of the greenhouse and compost is placed in the trench
 - ATTRA Sustainable Agriculture Resources for a compost greenhouse:
<https://attra.ncat.org/attra-pub/viewhtml.php?id=57>
 - Growing Power Urban Agriculture, Composting and Vermicompost workshops: <http://www.growingpower.org/workshops/>

Key Element: Specialty Crops + Test Plots

One of the keys to success to the Niagara Share will be the selection, enjoyable management, and distribution of agricultural products. For this to occur, a good deal of testing must take place in order to ensure productivity withing the particular environmental and management regimes possible at the farm. The first phase of the project calls for the construction of a series of plots that will permit the testing of not only a range of species, but also varieties within particular species. Initially, these plots will focus on two separate items - one being novel cash crops that are ties to the climate and interests of the farm itself and the other being used to experiment with new sustenance crops for the family.

Cash Crops

A series of cash crops have been selected through the process of design develop to initially test as possible revenue-generating operations for the farm. Of particular interest here is just how profitable these species can be, and how enjoyable/engaging their production can be to the farm and family. Presently the crops chosen include hops, ginseng, mushrooms, maple syrup, woody shrubs and orchard trees.

Sustenance Crops

As the family becomes more strongly tied to this new agrarianism, the production of food for consumption will likely become more important. Experimentation in new varietals, management strategies, and preparation techniques are all assumed to be likely. Providing areas to facilitate this exploration is necessary and will be provided. However, little specificity regarding species is being provided at this point, as it is assumed that the family themselves will be the prime motivators of this effort, although it could be speculated that this area of the operation could grow into areas of education and training should it be seen as locally valuable.

Specification:

Taking advantage of the heavily forested areas of the site has been seen as a necessary operation. To do this, both Ginseng and Mushrooms have been selected, as they are typically grown in forested conditions. These two species, more than others will need highly specialized locations in order to flourish. Unlike field-grown plants, these species will require several test areas within the forest. At least three areas for each should be chosed that attempt to exhibit the range of conditions these species would prefer. This process will likely take 5 years to see through, but upon completion, could become highly lucrative. Also within the forest, there are large quantities of sugar maple trees. These trees could be easily tapped and the sap sold to neighboring maple syrup producing facilities. Should this process become interesting or profitability appear significant, the development of such processing could be placed within the farm.

The growing of hops has been identified as one of the more exciting possibilities for the Niagara Share. The connection this crop has with food, social activity and its ability as a grown plant to generate interesting spacial conditions are all seen as advantages. Hops is also a plant that is well suited for the climate in Western New York. The selection of hops species will depend on availability, local demand and growing conditions. For this reason, a range of species should be tested on the farm to discover what will work the best. The growing of hops in a profitable fashion requires a good deal of knowledge and it is recommended that prior to initiation, some hops growing courses or equivalent education are undertaken. Consideration should also be made to the potential for the hops and their structures to generate interesting spaces and views on the farm. Testing should occur on a range of areas on the site, with and without deer protection. Initially the fence of the tennis court (with some modification) could easily serve as location for hops testing

In other areas of the farm, the linking of aesthetic priorities with production is something that should be explored. The use of orchard trees for the production of apples, pears and cherries will both create pleasing orchard areas on the site while also producing marketable fruit and providing resources for pollinators. The choice of shrubs around the site should also be done in a way that would allow for their maintained pruning for the production of woody stems and flowers for wreaths and flower arrangements.

Resources:

- See resource book

Key Element: Pool Filling

Finding a way to address the situation of the existing swimming pool has been presented as pressing. The daily use of water, electricity and chemicals necessary to maintain a resource that is seldom used makes little economic or environmental sense. It has also been difficult to imagine just how a swimming pool would fit into the proposed vision of the Niagara Share. For these reasons, off-lining the pool and converting it to a new function has become a priority. Over the course of the project, a wide range of possibilities have surfaced, ranging from wetlands, shallow pools and more elaborate water-treatment facilities. During this time, a set of principles have been established to guide just what strategy would make the most sense:

1. must happen quickly (in first phase)
2. must be cost effective
3. should not destroy the pool itself, thus allowing for the pool to be re-instated in the future
4. should attempt to take advantage of the physical conditions of the pool in every available way
5. should be able to hold high volumes of water to perhaps allow for the future inputs

With these in mind, the proposed solution would fill the pool with limestone aggregate, turning it into a large water collection cell without the concern of standing water. In this case, aggregate would take up +/- 66% of pool basin, allowing for +/- 33% of the basin to hold water. Upon filling, the pool area will be covered with a large wooden deck, transforming it into a surface that could be enhanced by family activities or events with friends. Along with this surface will be a water pump to pull water from the cell below in addition to an integrated fire pit, adding to the sense of gathering that the deck will provide.

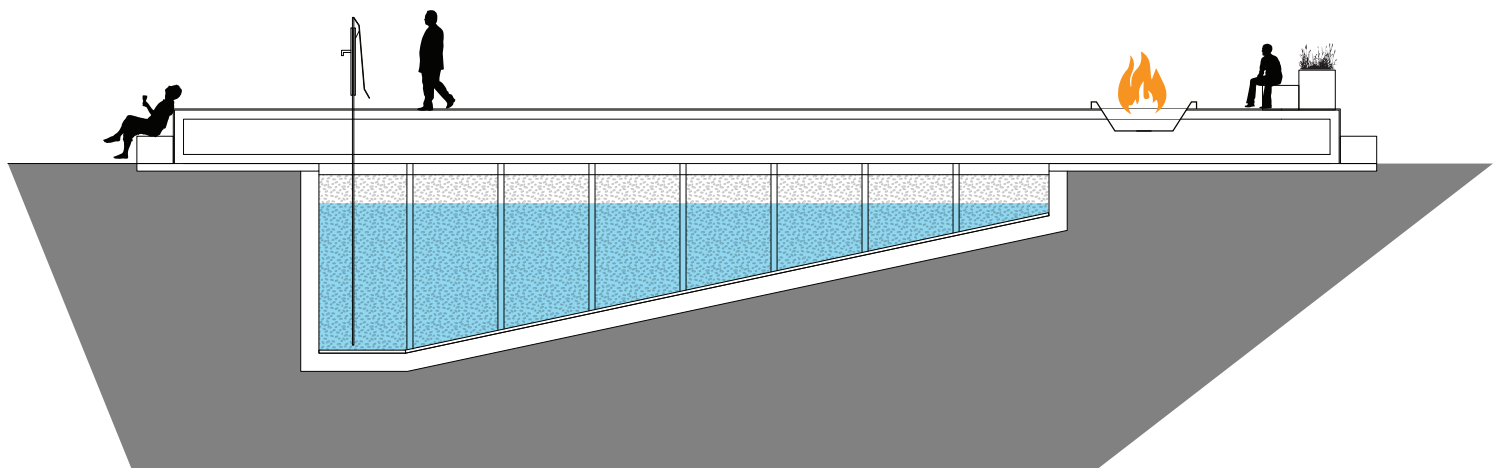
Specification:

-Filling the Pool with Aggregate or Water Tanks

- Assumes 20' x40' ft with 5' average depth
- (4,000 Cubic feet/30000 gallons) 150 cubic yards of aggregate x \$50: \$7,500
- Will hold +/-10,000 gallons of water when filled with aggregate
- Pipe and Pump: \$1000 to get water out for irrigation
- Could get water from the pool house and new larger greenhouse in later phases
- Could put in 7,000 gal tanks (3 tanks - 2,500 gal/tank at \$3,500 a tank), 1,000 worth of hardware connections and additional aggregate costs of around \$1,000
- Water supply from pool house roof \$2000

-Cover Pool Area with Deck: \$10,000

- Assumes wooden deck materials for 2,500 sq ft
- Does not assume construction
- Does not include accessories : chairs, planters, outdoor fireplace, canopy.



Key Element: Terraced Path to Lower Field

Connection between the house to the lower fields is currently provided via the road and a path leading down from the southern side of the house. This path leads through the woods, and exits near the existing pool house. While both the road and path are effective, they lack the true experience of the site. To address this, a new path is now proposed that leads from the main house, through the gradually sloping field, down to the lower field. Here, small amounts of re-grading will be done and the disturbed areas along the trail will be replanted with shrubs used for flowers and woody stem harvesting. In addition to harvesting, these new plantings will help to stabilize the slope. The alignment of the path will have to be tightly calibrated in order to avoid the existing trees. The surface of the path will be natural, as either compacted earth or natural aggregate.

