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USU Equine-Assisted Activities and Therapies Facilities Designed Master Plan

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USU EQUINE-ASSISTED ACTIVITIES AND THERAPIES FACILITIES DESIGNED MASTER PLAN

by

Lindsie Smith

A project submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF LANDSCAPE ARCHITECTURE

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ABSTRACT

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by

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Utah State University, 2020

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Equine-Assisted Activities and Therapies (EAAT) is recognized as a therapeutic approach for persons with disabilities. The USU Animal, Dairy, and Veterinary Sciences Department provides EAAT instruction and services; however, they do not have the appropriate facilities to model best-practices in the delivery of these services. This design research entailed the development of a phased masterplan to support the instruction and delivery of equine-assisted activities and therapies in an innovative and accessible environment that supports animal-assisted intervention and natural equine behaviors.

The methodology used to approach the master plan design was derived from Norman K. Booth's (1990) design process, as described in his book, *Basic Elements of Landscape Architectural Design.* Booth's design process provided the needed clarity and simplistic format to address the complex project. The designer's portion of the process was to complete the project acceptance, research and analysis, and design.

This design research argues that there is a better and more natural way to board domesticated horses other than typical methods, such as stalls or paddocks. These current

methods can jeopardize equine well-being and health by not providing the environment necessary to support natural equine behaviors. USU's EAAT program works closely with horses to promote human safety, healing, and learning. Their equine counterparts need to be predictable in order to ensure the successful execution of those goals. In order to be predictable, horses need to be healthy and happy. Environments that promote natural equine behaviors are proven to promote equine health and well-being.

This project resulted in a detailed master plan that not only meets the current and future needs of the EAAT program, but the results from the project research also produced design principles that should be implemented as a new method for equine boarding. The new boarding method is known as "Equine Living Systems" or "Track Systems." The discovered design principles mentioned in this document will promote natural equine behaviors, and, therefore, provide the appropriate environment of safety, healing, and learning for every user of the future EAAT facilities.

PUBLIC ABSTRACT

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Lindsie Smith

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CHAPTER I

INTRODUCTION

Objective

Equine Assisted Activities and Therapies (EAAT) is a recognized therapeutic approach for persons with disabilities. The USU Animal, Dairy, and Veterinary Sciences Department provides EAAT instruction and services; however, they do not have the appropriate facilities to model best-practices in the delivery of these services. This design research entailed the development of a phased masterplan to support the instruction and delivery of equine-assisted activities and therapies in an innovative and accessible environment that supports animal-assisted intervention and natural equine behaviors.

Disabilities and Equine Assisted Activities and Therapies

Equine Assisted Activities and Therapies (EAAT) is a recognized therapeutic approach for persons with disabilities. Equine-assisted activities (EAA) are activities centered on the horse, in which the purpose is to learn horse-related skills (e.g., riding) and improve a person's quality of life (Macauley & Gutierrez, 2004). EAA is a subtype of animal-assisted activities which can be provided by those who receive specialized training and certification (Delta Society, 2002). EAA is a recognized treatment for Autism Spectrum Disorder (Anderson & Meints, 2016) and helps improve behaviors of people diagnosed with emotional disorders (Tetreault, 2006).

Equine-assisted therapy (EAT), a sub-type of animal-assisted therapy, is the integration of the horse into goal-directed treatment and is provided by licensed therapists (Delta Society, 2002).

Equine-assisted therapy reduces psychological stress and enhances the well-being of participants (Klontz, 2007). EAT also benefits those recovering from injury and illness. The movement of the horse allows the rider to develop balance, coordination, and self-confidence. The physical benefits of riding have psychosocial and emotional value. Psychologists have found that EAT allows individuals who work with equines to discover and cope with fears, anxiety, and mistrust (Brinn 2018).

Hippotherapy is a specialization of EAT. The American Hippotherapy Association, Inc. (AHA) (2017) defines hippotherapy as a physical, occupational, or speech therapy treatment strategy that utilizes equine movement. Hippotherapy refers to the use of the movement of the horse as a treatment tool by physical therapists, occupational therapists, and speech-language pathologists to address impairments, functional limitations, and disabilities in clients with neuromusculoskeletal dysfunction, such as cerebral palsy (Meregillano, 2004). Responses from children with language-learning disabilities have noticeably improved following hippotherapy, with additional benefits of improved motivation and attention (Macauley & Gutierrez, 2004). Hippotherapy also improves symmetry in muscle activity in children with spastic cerebral palsy (Benda, McGibbon, & Grant, 2003).

Equine-assisted activities and therapies have shown physical benefits, such as gross motor function, spasticity, muscle symmetry, posture, balance, and gait in people with varying disabilities (Rigby, 2016). EAAT is a recognized therapeutic approach and has benefited people with amputations, Attention Deficit Disorder, Autism Spectrum Disorder, brain injuries, cerebral

palsy, cerebrovascular accident/stroke, deafness, developmental delay/cognitive delay, Down syndrome, emotional disabilities, learning disabilities, multiple sclerosis, muscular dystrophy, spina bifida, spinal cord injuries, and visual impairment (Smith).

USU EAAT Services

The Equine Assisted Activities and Therapies services at Utah State University provide students with a strong professional education in the core principles of facilitating equine experiential learning, therapies, and recreation (Smith, 2018). The EAAT program is a member of the Professional Association of Therapeutic Horsemanship International (PATH, Intl.) and provides service programs for the community, persons with disabilities, and veterans who have been affected by the physical and emotional wounds of war. The program partners with physical therapists who offer certified hippotherapy sessions. The EAAT program prepares students to receive two different professional certifications: Equine Specialist in Mental Health & Learning (ESMHL) and Therapeutic Riding Instructor (TRI). The number of students enrolled in the EAAT program has increased from 12 to 33 since December 2017, with 21 new students enrolled in entry-level EAAT courses for Fall 2019 (Utah State University, 2020).

There is rapid growth in the EAAT program and community service programs. The program is focused on expanding their resources to accommodate more students and provide more services for the community. However, they do not have the appropriate facilities to model best-practices in the delivery of services and are seeking assistance in developing a facility in an

innovative and accessible environment that supports both animal-assisted intervention and natural equine behaviors.

This design research involves the development of a phased masterplan to support the instruction and delivery of equine-assisted activities and therapies in an innovative and accessible environment that supports animal-assisted intervention and natural equine behaviors. Specifically, the design research produces innovative equine housing and track options, an indoor and outdoor therapy arena, treatment rooms, a veteran's center, and a fully accessible environment for maximum participation of individuals with mobility limitations. These future facilities and amenities will be constructed on a 13.5-acre lot at the Utah State University Equine Center in Wellsville, Utah (Utah State University, 2018).

CHAPTER II

LITERATURE REVIEW

Animal-Assisted Intervention

Animal-assisted intervention is a therapeutic approach to improve physical, social, emotional, and/or cognitive functioning of the person(s) involved, and in which a specially trained animal-handler team plays an integral part. Animal-assisted intervention may be provided in a variety of settings, may be group or individual in nature, and may be implemented for persons of any age. There are three main categories of animal-assisted intervention: Animal Assisted Therapy (AAT), Animal Assisted Education (AAE), and Animal Assisted Activity (AAA) (Animal Assisted Intervention International, DATE).

An AAT intervention is goal-directed and designed to promote improvement in the physical, social, emotional, and/or cognitive functioning of the person(s) involved. An AEE intervention is goal-directed and designed to promote improvement in the cognitive functioning of the person(s) involved. AAA intervention is less goal-directed, as specific objectives may not be planned. Each of these interventions requires a specially trained animal-handler team as an integral part of the treatment process. These animal-assisted interventions are also directed and/or delivered by a health and/or human service professional with specialized expertise within the scope of practice of their profession. There are a variety of appropriate settings that may provide animal-assisted intervention services. In each category, there are specific goals for each patient involved, and the process is documented and evaluated (Animal Assisted Intervention International).

Animal-assisted intervention therapy has demonstrated an increase in the quality of life for elders with dementia in long-term care facilities by increasing social behaviors and decreasing agitated behaviors (Sellers, 2006). Animal-assisted therapy is proven to be associated with reduced-state anxiety levels for hospitalized patients with a variety of psychiatric diagnoses (Barker & Dawson, 1998). Animal-assisted intervention programs are used as complementary intervention strategies for children with Autism Spectrum Disorder (Borgi, 2016). Animal-assisted therapy reduces pain in children and reduces stress during hospitalization (Braun, Stangler, Narveson, & Pettingell, 2009).

Environmental requirements for animals include access to fresh water, a diet to maintain full health and vigor, suitable shelters, a rest area, rapid diagnosis and treatment conditions that avoid mental suffering, freedom to express normal behavior, sufficient space, proper facilities, and company of the animal's own kind (AAII, 2018). These requirements form the foundation for the site planning of USU's EAAT facilities, which is focused primarily on equine-assisted therapies.

Facility Requirements

Utah State University is currently one of two AHA-approved facilities in Utah (American Hippotherapy Association, 2019). Three of their ultimate goals are to become a PATH Intl. Premier Accredited Center, a PATH Intl. Higher Education Center, and a regional AHA Educational Course Hosting Facility for Therapists. Each type of center has specific requirements that need to be met in order for the facility to be approved. The standard

requirements for each type of center have impacted the design of the EAAT facilities master plan.

Premier Accredited Center

"Accreditation is a voluntary process that recognizes PATH Intl. Centers that have met established industry standards. The accreditation process is a peer review system in which trained volunteers visit and review centers in accordance with PATH Intl. standards. A center that meets the accreditation requirements based on the administrative, facility, program, and applicable special interest standards becomes a PATH Intl. Premier Accredited Center for a period of five years." (PATH Intl., 2018)

"The purpose of the PATH Intl. Premier Accredited Center program is to provide a process of evaluation that recognizes that a center's program meets basic standards for health and safety and so promotes the well-being of all participants and equines." (PATH Intl., 2018, p. 3). The objectives for establishing a PATH Intl. Premier Accredited Center program include:

- Providing a formal means for accreditation and continued self-evaluation
- Providing resources to help other centers become accredited
- Building public confidence in a center's ability to provide quality services
- Assisting the public in selecting centers that meet established standards and promote public recognition of industry standards (PATH Int., 2018).

There is an extensive and tedious application and accreditation process that commences once standards are met. The accreditation process includes intensive evaluation from PATH Intl. representatives. To become accredited, centers are evaluated on mandatory standards and various

categories, such as Administration and Business, Facility, Equine Welfare and Management, Driving, Ground, and Medical/Mental Health. In order to achieve a passing score, centers must meet 100% of the mandatory standard requirements necessary for safety precautions, certifications, and liability. They must also receive a score of at least 75% in each category listed above and an overall score of 80% or better (PATH Intl., 2018).

After speaking with the client, it was understood that the Equine Welfare and Management Category was lacking and needed to be improved in order for USU's facilities to become an accredited center. Therefore, research and development of an appropriate equine boarding system would be critical to meet Equine Welfare and Management standards. Meeting PATH Intl. Premier Accredited Program requirements would also ensure that the EAAT facilities would become an AHA accredited educational course hosting facility and a regional training center for therapists.

Higher Education Center

PATH Intl. Higher Education Center Memberships include colleges and universities that incorporate PATH Intl. instructor training into their curriculum (Smith, 2018). Institutions must have an EAAT program on the institution's property (PATH Intl., 2015). Centers with a premier accredited program and an EAAT program can qualify for special EAAT participant funding (PATH Intl.). Becoming a Higher Education Center allows for more professional recognition and provides more funding opportunities.

AHA Educational Course Hosting Facility

The EAAT program is already a member of the American Hippotherapy Association, Inc. (AHA). The AHA has specific requirements for facilities to be recognized as an educational course hosting facility (American Hippotherapy Association, Inc. 2019). Each facility must:

- Be an AHA, Inc. Facility member.
- Currently provide treatment, including hippotherapy (OT, PT and /or SLP).
- Have access to a classroom facility.
- Have access to an LCD projector/screen, speakers, printer, copy machine, and paper.
- Provide a mounting ramp and block.
- Provide barn and therapy equipment.
- Provide safe and sound therapy horses.
- Provide up-to-date files/information on demo patients.
- Complete a special questionnaire with both an AHA, Inc. staff member and AHA, Inc.
- Include faculty members as required for new host facilities or host facilities which have not hosted in over 2 years or had major staff/ facility/equine changes since hosting their last AHA, Inc. course.

USU's EAAT program, associated with the Sam Skaggs Family Equine Education Center, has access to the necessary education equipment. The EAAT master plan is meant to address the remaining requirements and provide a mounting ramp, barn and therapy equipment,

and safe and sound therapy horses through creating an environment which supports natural equine behaviors.

Natural Equine Behaviors and Benefits

Domesticated horses are typically boarded using stalls and paddocks. These methods cause a horse's well-being and health to diminish because they do not encourage natural instincts. Horses are adaptable creatures and have survived under the domestic conditions' humans have enforced upon them. However, the fact that they have survived these conditions does not mean they have thrived in them. The EAAT program works closely with horses to promote human safety, healing, and learning. Because of this, equine counterparts need to be predictable in order to ensure the successful execution of those goals. In order to be predictable, horses need to be healthy and happy. Studies show that when horses are boarded in an environment that resembles their natural habitat, and in which their natural behaviors are encouraged, they are physically and mentally healthier (Equine Wellness, 2014). In this section, the basic social and physical factors and needs that constitute a natural equine habitat or home range are addressed.

Social Structure

Horses are a prey animal; flight is their primary means of survival. They are quick to react and have very acute senses. They see and hear exceptionally well, and they are extremely sensitive to touch. Horses have a variety of methods to communicate both vocally and

physically. They not only show signals of aggression, but also of friendship within their herd. A herd of wild horses consists of one or two stallions, a group of mares, and their foals. The leader of the herd is usually the oldest mare, but the stallions are the owners of it. A stallion's harem can have 2-21 individuals. When stallions grow too old or weak to protect the herd, a new stallion replaces him. Horses show dominance by forcing another horse to move against its will (Williams, 2004).

Natural Activities/Stimuli

Different herds can live within the same territory but have different routes. They normally claim their route through urine and feces. Foaling occurs in early May and June (Feist & McCullough, 1976). Horses naturally graze for 12 to 16 hours a day. Natural activities for horses are grazing, walking, and playing with other horses. Insufficient natural stimuli will cause a horse to invent its own stimuli call vices. Stimuli call vices include cribbing (biting into a fixed surface and sucking in air), weaving (horse stands by the stall door and shifts its weight back and forth on its front legs while swinging its head), stall kicking, stall walking, pawing, digging, biting, wood chewing, eating bedding, eating dirt, and self-mutilation (Williams, 2004).

Stalls are destructive to equine health. Isolation ignores the equine need for sociality and social hierarchy (Houpt, 1981). Domestic horses should be encouraged to behave and move naturally, according to their instincts. Creating an environment for horses to practice instinctive behavioral patterns produces physically and mentally healthier horses (Jackson, 2016).

Natural Equine Behavior Design Principles (Equine Living/Track Systems)

The equine living system design goal is to facilitate both physical and mental health in domesticated horses by creating a natural boarding environment. When horses are constantly moving in an environment that resembles their natural habitat, they are physically and mentally healthier (Equine Wellness, 2014). In this section, several researched-based design principles are discussed that promote equine well-being and should be implemented in each equine living system.

Equine Living System Form/Track

Tracks encourage natural movement by creating narrow paths. “Tracks” are manmade paths meant to mimic the natural routes taken by wild horses (see Figure 1). An inner fence is offset from the perimeter fence of the paddock about 10-15’ (Jackson, 2018).

Figure 1. Equine Living System/Track

One of the most important design goals to achieve is the facilitation of choice. The ability to choose permits horses to preform natural behaviors that are important to them. According to McGreevy (2013), “Because behavior is a response to an organism’s environment, the more restrictive an environment is, the more limited are the choices available to the organism. It is

possible that where choice is limited or eliminated, welfare may be compromised" (p. 17). Therefore, it is important that the equine living system include multiple paths to choose from, as well as other researched elements that promote natural equine behaviors.

The horse survival instinct is the driving force behind movement. Wider areas are designed within the track system (see Figure 2) for the horses to stop and camp, eat, sleep, rest, play, etc. (Equine Wellness, 2014). Trekking, rolling, and mutual maintenance behaviors are some of the cardinal signs of stability among groups of horses (McGreevy, 2013). The proper track system design prevents illness and disorders that afflict domestic horses due to living in stalls or other forms of close confinement (Equine Wellness, 2014). Consistent locomotion provided by track systems helps to prevent some potentially fatal diseases, such as laminitis (McGreevy, 2013). A standard paddock consists of about 1.5 acres (about half an acre per horse in the system). These 1.5 acres include the trail and pasture space inside the equine living system. The equine living system will house no more than five horses at a time, due to social hierarchy and the amount of resources provided within the paddock.

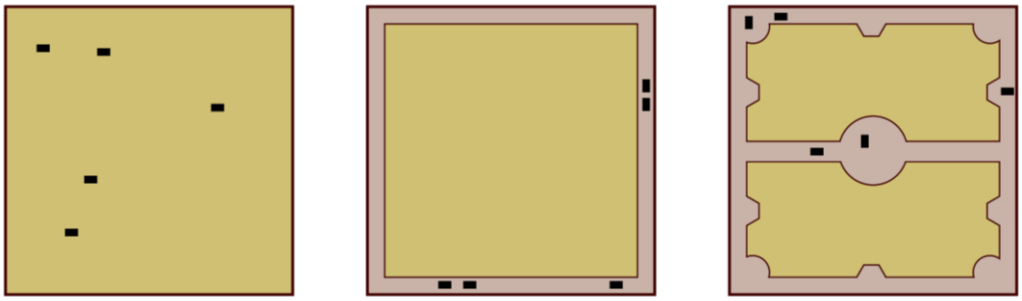


Figure 2. Normal fenced paddock with horses (Left), Track surrounding paddock (Center), Track with wider areas designated to promote natural equine behaviors (Right).

Feeding Stations

What guarantees a horse's movement throughout the track is its instinct to survive. In order to survive, horses need food and water. Wild horses naturally graze and forage 12 to 16 hours a day (Williams, 2004). In many facilities, horses are fed a large quantity of food at specific times throughout the day. However, a horse's digestive system is not designed to endure long absences of food interrupted by an abrupt consumption of large meals. Horses will not fast voluntarily for more than 3-4 hours at a time (McGreevy, 2013).

Track systems should have a "reasonably natural diet" through a variety of grass hays. The hay should be distributed throughout the track in piles, which keeps the horses constantly moving and eating (Equine Wellness, 2014). The piles of hay should be placed on the ground, or at least in a feeder that forces the horse to feed close to the ground (see Figure 3). Using hay nets or feeders are discouraged because they do not adhere to the horse's natural foraging posture. Unnatural feeding posture (see Figure 4) can lead to the disfunction of the ciliary escalator in the respiratory tract and cause pulmonary disease.

Figure 3. Natural Foraging Posture

Figure 4. Unnatural Foraging Posture

The feeding stations should be placed sporadically throughout the track. They should not be close together in order to avoid constant feeding. Horses that move between food

consumption reach maximum forage velocity. The primary function of a free-ranging state is for horses to pick high quality food (McGreevy 2013).

Within a feeding station, hay piles should not be placed in large quantities, as to encourage more foraging and movement. Hay piles should also have specific distance requirements. Horses maintain a personal space boundary when feeding. Hay piles should be placed at least 5 feet from each other to avoid discomfort. If the proper spacing and locations of feeding stations can be achieved, there will be less injuries and conflicts within the group. If a feeding trough is necessary, wire partitions located along the feeding trough reduce aggression by allowing subordinate horses to eat alongside dominant individuals (McGreevy, 2013).

Poor human management design practices can create more aggression in domesticated horses than free-ranging horses. Resources such as water, feeding stations, and even gates should be placed away from corners, due to aggression. In the natural social structure, more dominant horses can monopolize resources by trapping other horses in corners and/or kicking them. One way of preventing monopolization of a resource would be to provide one more portion of that resource than there are horses in the living system (McGreevy, 2013).

Additional Foraging Vegetation

McGreevy (2013) writes, “In a free-ranging state, the primary function of movement within a home range is the selection of habitat that allows horses to maximize their intake of high-quality food” (p. 196). It is natural for exercised horses to take slower but larger bites and to consume less energy-dense forages. Feral horses may spend 70% of their day foraging. Even if nutrition needs are met, a behavioral need for horses is to maintain gut-fill. Digestive anomalies

and behavioral frustration can stem from restrictions on feeding behavior. The most foraging bouts last 30 minutes to 4 hours in the early morning and the late afternoon. Besides the placement of feeding stations, placing vegetation such as non-toxic trees and shrubs (see Figure 5) along the track system will improve health and natural foraging instincts (McGreevy, 2013).

An observation of Icelandic ponies concluded that their natural instincts led them to select some medicinal plants (see Figure 6) while foraging. The plants selected helped to prevent worm infections. The researcher used the pharmacognosy example of chestnut leaves. He suggested that such leaves improved vigor. Providing multiple forages such as non-toxic trees and shrubs is likely to improve equine welfare by enriching their environments and encouraging highly motivated foraging behavior patterns. It is also proposed that this approach may reduce intestinal obstruction in horses by decreasing the amount of straw consumed (McGreevy, 2013).

Figure 5. Horse eating fruit off of tree

Figure 6. Herb Feeder

Sticks, Bark, Leaves, and Clay

It is suggested that the consumption of clay, bark, twigs, leaves (see Figure 7), and humus provides material that facilitates gut motility. Ingestion of bark may allow horses to acquire needed micronutrients (McGreevy, 2013). Bark chewing is a horse's natural reaction to get more fiber into their diet. Some ethologists consider bark-chewing a natural behavior of free-ranging horses (McGreevy, 2013). Therefore, twigs, sticks, branches, and/or even logs should be placed randomly throughout the equine living systems.

Figure 7. Horse eating leaves

Night Lighting

Nocturnal ingestions naturally promote drowsiness and sleep. For this reason, night foraging is healthy and should be encouraged through the track design. The location of the project site is prone to experience hot summers. Due to extreme heat in the summer, activities such as feeding can naturally be shifted to night-time. When horses graze at night, visual assessment of plants is limited. Therefore, horses are less selective. If toxic novel foods are consumed, this could lead to immediate illness (McGreevy, 2013).

It is suggested that lights be placed along the track, specifically by the hay and water stations. The lights would provide horses with better vision. Better vision allows horses to feel more secure and comfortable. Therefore, horses will be more motivated to participate in night foraging, and the horses would receive the benefits of nocturnal ingestions.

Saltlicks/Mineral Blocks

Quality foraging will make up most of a horse's mineral needs. However, salt content in grasses and hay is not sufficient for the amount a horse's body requires. The sodium and chloride intake requirement for an average-size horse (about 1,000 lbs.) is equivalent to one ounce of salt per day. More natural, uneven, granular or free-flowing forms of saltlicks are preferred because they have shown to increase salt and water consumption (see Figure 9). In order to achieve the needed nutrient levels, salt supplementation is essential. If the salt intake does not meet the demand, health consequences develop over time (Dvm, 2017).

Salt aids in the health and functionality of the equine nervous and musculoskeletal systems. Sodium holds water in tissues, and therefore plays an important role in healthy fluid dynamics within the body. Insufficient salt consumption can lead to hydration, fatigue, muscle weakness, and impaired performance. Some benefits of salt consumption include aid in blood sugar regulation, hormone balance, maintenance of healthy weight, hoof health, hair coat health, pH balance of the body, and its function as a natural antihistamine (Dvm, 2017). Salt intake may flux daily, depending on the levels of sweating due to exercise, climate heat, and humidity (Dvm, 2017). The constant movement of horses provides exercise. Exercise promotes loss of salt through sweating. Therefore, salt consumption is a natural instinct for horses in order to regulate

salt within their bodies. Excessive consumption of salt may result in polydipsia, an abnormal thirst (McGreevy, 2013). Therefore, only the necessary number of saltlicks should be placed in the equine living systems. The promotion of consistent movement and exercise is necessary for the safety of horses consuming saltlicks.

As part of the natural equine social system, the highest-ranked member leads the other horses to saltlicks (McGreevy, 2013). Free-ranging horses will dig mineral and salt deposits out of the ground with their hooves and consume it after grinding it to powder with their teeth. The calcium may help prevent cancer and satisfy other nutritional needs. The grinding action also helps to grind their teeth to avoid allowing them to become jagged. It is encouraged to place saltlick or mineral blocks partially in the ground or with a rocky area (see Figure 8) to encourage natural pawing behavior (Jackson, 2018). There are other elements that help promote equine locomotion and natural behaviors besides feeding and foraging.

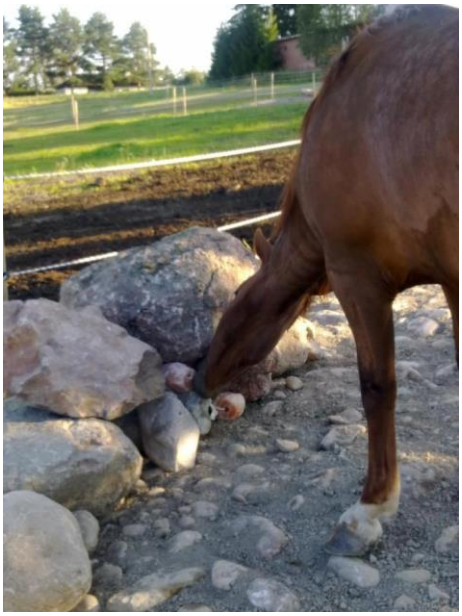


Figure 8. Horse licking hidden saltlicks among rocks

Figure 9. Natural Saltlick

Mounds/Slope

When horses move downhill, especially on steeper slopes with sandy surfaces, their front leg and chest muscles are strengthened, and their balance improves. Experts suggest that steeper slopes with sandy or loose surfaces force a horse to exert more effort, resulting in a better balance and strength exercise. When horses move uphill, it strengthens their hind end. To move up a slope, a horse's legs must be tucked further beneath their body before pushing forwards and upwards. This movement, in turn, strengthens those muscles. It is good for the horse's back legs to be strengthened because they provide propulsion (Pitman, 2016).

Mounds can be manmade if there are no natural slopes located within the desired area (see Figure 10). The project site is located on an old agriculture field and is fairly flat. The EAAT equine living system will need manmade mounds formed from a looser material.

Figure 10. Horses climbing up and down man-made mound/slope

Resting Areas

There are four resting states: idling, resting, drowsing, and sleeping. Idling is when a horse waits between more animated activities. It involves stationary standing and can be a group activity. Drowsing is when the horse is using very minimal muscular effort to stand while

somewhat sleeping. The horse may remain standing while resting in order to escape quickly if threatened. Drowsing occupies a couple hours of a horse's day, while sleeping occupies 3-5 hours (McGreevy, 2013).

The differences between drowsing and sleeping are the physiological characteristics of various states of wakefulness. You can tell which state of wakefulness horses are in by their positions. Very rarely do all members of a group sleep at once (see Figure 12). When forage is plentiful, resting behavior occurs more frequently, especially in the summer. Resting behavior also occurs more often in the summer months, due to the pressure of finding shade and avoiding insects. Specific sites are chosen by groups for laying down. Elevated sites are often ideal for resting sites because they provide more refuge from the heat and insects (McGreevy, 2013).

Multiple resting sites are naturally part of home ranges. Horses like to move to different locations throughout the day to rest (Jackson, 2018). The lead member usually initiates group activities such as resting. As part of the natural equine social system, the highest ranked member leads the other horses and gets first access to resources such as resting sites. When horses are more exercised, they tend to spend more time laying down (McGreevy, 2013). Therefore, the design of an equine system should have spaces big enough for multiple horses to rest and specifically lay at once (see Figure 11). Ideally, a couple of the resting sites within each living equine system would be elevated.

Figure 11. Horse Resting Site

Figure 12. Horse Resting Site

Rolling Sites/Sand Pit

The sand pit is meant to replicate a "dusting site." In a natural home range, dusting sites are areas in which the ground is pulverized into fine dust by the pawing and rolling of horses (see Figure 13). Horses usually take individual turns by rank. Once blown off by the wind, the dust produces shiny coats. Reasons as to why horses participate in this rolling behavior are still not fully understood. Some theories suggest that the sensation encourages the dedication to the behavior. Others suggest that it may deter insects (Jackson, 2018). Although the motivation or benefits may not be fully understood, it is proven to be a consistent and important natural equine behavior observed in home ranges and should be encouraged through design.

A horse's natural home range consists of rolling sites (McGreevy, 2013). Rolling is one of the cardinal signs of stability among groups of horses. As part of the natural equine social system, the highest-ranked member leads the other horses to resources, such as rolling sites. Generally, the highest-ranked member rolls last, so their scent prevails as a sign of dominance (McGreevy, 2013). To best replicate a rolling site, a sand pit will be placed in each equine living system to provide an immediate "dusting site."

Sand pits should be located away from the pond. Horses are known to participate in “mud baths” (Jackson, 2018). Right after they bathe, they tend to get itchy and begin the rolling after leaving the water, especially in dusty substrates (McGreevy, 2012). Thus, the sand pits, or “dusting sites,” are not meant to be wet. They are only meant to promote the natural equine behavior associated with “dusting sites” (Jackson, 2018).

As mentioned earlier, bathing is usually followed by rolling behavior along the banks of watering holes. These “mud baths” aid in horse coat health and are a natural protection from biting insects. The mud also contributes to hoof health by softening the outer keratinized protein, which, in turn, cements the hoof together (Jackson, 2018). To replicate a watering hole, a pond with a sufficient amount of sand (or other type of soil) to act as banks should be located within the equine living system to promote the natural bathing and rolling behaviors of horses.

Figure 13. Horse rolling in sand pit

Fencing

Fences promote feeding and grazing through safe containment. Horses sometimes injure themselves due to their natural flight instinct. In order to prevent horses from jumping fences, the minimum recommended height for perimeter pasture fences is 5’ (UGA Extension, 2015).

The client has requested that electric fencing be used within the equine living system. Electric fencing is great for flexibility and affordability, and it is easily stored and handled (Cooke, 2017). It also prevents horses from leaning on, biting, and breaking fences. A stronger, non-electric, and more permanent type of fencing will be used along the parameters of the paddock for long-term durability and aesthetic purposes (see Figure 14).

Equines function in social systems. There is a hierarchy to each equine social system, including leaders and followers. There are different relationships between horses. In many cases, horses will be bullied by their fellow equine peers as hierarchy in a group is being established, especially when competing for resources. There are ways through design to help prevent injuries from these types of scuffles. For example, living systems should have rounded corners to prevent subordinate horses from being cornered and injured by their field-mates. In addition, resources such as water, feeding stations, and gates should always be placed away from corners, even when rounded (McGreevy 2013).

Figure 14. More permanent fencing on the outside, temporary on the inside.

Watering Hole/Pond

A horse's natural home range consists of watering holes (McGreevy, 2013). As part of the natural equine social system, the highest-ranked member leads the other horses and gets first access to resources such as watering holes (McGreevy, 2013). The need to quench thirst promotes movement. Natural-care advocates believe that horse health is enhanced when they have the freedom to enter water. At watering holes, horses participate in drinking, bathing, and rolling. When entering water, horses will normally drink first, then wade and bathe afterwards. During the summer months, horses enjoy bathing and pawing the water (Jackson, 2018). During winter months, horses drink from watering holes by pawing ice until it cracks (McGreevy, 2013).

In order to promote natural bathing behaviors, a pond will be placed within the equine living systems to replicate a watering hole as would be found in a natural home range. The pond

must have a sufficient amount of sand (or other type of soil) to act as banks to promote the natural rolling behavior. The pond should reach a maximum depth of 3 feet and wide enough to hold multiple horses (see Figure 15). The pond should also be lined with water-impervious material to prevent leaking. A spigot should be located by the pond to keep a constant level of water and the edges muddy (Jackson, 2018). Even though there will be watering stations located around the track to quench thirst, a pond will be placed in the equine living system to promote essential bathing and rolling behaviors.

Figure 15. Horses playing in pond

Trees/Shelters

A horse's natural home range consists of shelters (see Figure 16), shade, and windbreaks (McGreevy, 2013). Each proposed equine living system includes each of these elements through manmade structures and the strategic placement of trees. Horses use shaded areas (see Figure 17), natural windbreaks, sunbaking, and wading in water to regulate their body temperature.

Structures also provide visual screening that may be used for sanctuary by bullied equines (McGreevy, 2013).

Shelter is critical for the health and well-being of equines. There are many diseases associated with exposure which can be reduced by providing shelter. Shelters also provide refuge from sun, wind, rain, and flies (McGreevy, 2013). For this reason, the shelters will be designed and angled in a way that manipulates shade and wind.

Dominant relations between horses are apparent where there are limited resources, including shelter (McGreevy, 2013). To minimize dominant behaviors, there will be multiple shelters located throughout the equine living system. Horses can sometimes be reluctant to use field shelters. This is due to their natural dislike to confinement, reduced surveillance, and visual contact (McGreevy, 2013). Therefore, shelters should also be designed to be as open as possible for the horses to feel comfortable and utilize the shelters.

Figure 16. Horse in Shelter

Figure 17. Horses under tree for shade

CHAPTER III

METHODS

The methodology used for designing the USU EAAT facilities master plan was founded upon the design process of Norman K. Booth as described in his book, *Basic Elements of Landscape Architectural Design*. The methodology is comprised of seven phases: Project Acceptance, Research and Analysis, Design, Construction Drawings, Implementation, Post-construction Evaluation, and Maintenance (See Figure 18, p. 36). For this project, the designer's responsibility consisted of Phases One through Three.

Phase One

In Phase One, project acceptance, both the designer and client accepted a written proposal. This required at least one meeting in which the two parties discussed the needs and requirements of the client. The designer also explained the type and scope of services offered. Next, a proposal was written by the designer, wherein the scope of services and products were described in detail. When the proposal was accepted by both the designer and the client, the proposal was signed. As an academic endeavor, this thesis proposal represents the proposal for this project, and its approval represents client acceptance of the scope of services therein.

Phase Two

Phase Two, research and analysis, was comprised of five different steps which were somewhat modified from Booth's original four steps. The first step was base plan preparation.

To complete this step, the client and designer worked together to provide the information needed for a base plan. The base plan contains the following information (Booth, 1990):

- A property line with distances
- The topography
- Other structures such as fences or walls
- Roads
- On-site and off-site utilities, including electric, telephone, gas, water, sanitary sewer, and storm sewer
- Immediate off-site conditions, such as adjoined roads and streets, nearby buildings, telephone poles, vegetation, etc.
- Any other elements considered necessary for developing the design

The second step was to conduct a site inventory and analysis. The purpose was for the designer to become familiar with the site to evaluate and determine the site's character, issues, and potentials (Booth, 1990). The third step consisted of another interview with the client. In this interview, the client shared detailed information with the designer about their needs and vision of the site. The purpose for this interview was for the designer to eventually create a design solution that would meet the needs and desires of the client. After discussing these needs and desires, part of the analysis included an assessment of future facility use, including research of EAAT facility requirements, natural equine behaviors, and evidence-based equine facility design practices.

Another important aspect of the second phase in the design process was program requirement research, step four of Phase Two. For this project, research on natural equine behaviors, their

benefits for both horse and human and best-practice implementation, was necessary in order to complete the design effectively. This research needed to be accomplished before the design phase due to the specific size, maintenance, and orientation requirements needed to implement natural equine behavior design principles and accomplish the desired EAAT goals regarding equine welfare. The fifth and last step of Phase Two consisted of development of the design program. The program acted as a summary of both the site analysis and the client interview. It also served as a checklist of required elements for the designer to implement in the final design solution. The required program elements determined in collaboration with EAAT program leaders included:

- Access Road
- Horse Shelter
- Small Outdoor Arena
- Four Natural Equine Behavior Promoting Enclosures/Tracks (Equine Living Systems) – Observation Space
- Buildings
    - EAAT Main Facility - multipurpose classrooms, office space, client rooms, lounge, a Hippotherapy Certified (Billable) Facility, and an indoor arena.
        - Indoor Arena - observation area/seating, restrooms, windows, warm room, access (ADA), tack room, cross ties, and stalls.
    - Veterans Center – lounge, office space, community event space, and kitchen.
- Covered Walkway – to transport horses to and from arenas.

- Family-Oriented Courtyard – playground, pavilion, and an outdoor arena observation area.
- Hay/Storage Barn – Space for horse trailer and hay bales.
- Parking Lot – 30-40 stalls, bus and ambulance access.

These program elements were proposed to be constructed in four phases, along with other elements provided by the EAAT program:

Phase 1:

- Access Road
- Utilities on Property
- Main Horse Shelter/Tack Room

Phase 2:

- Small Outdoor Arena
- Therapy Class Conditions
- 4 Equine Living Systems
- Mini Enclosure
- Hay Barn/Storage
- Sensory Trail

Phase 3:

- Main EAAT Facility/Indoor Arena
- Covered Walkway (Connected to Outdoor Arena)
- Parking Lot

Phase 4:

- Veterans Center
- Veterans Center Garden

Phase Three

Phase Three, design, was comprised of seven steps. The first was the production of an ideal functional diagram. This diagram allowed the designer to identify the most suitable relationship which should exist between major prosed functions and design spaces. The diagram was non-site related, but rather, it was focused on the design's functions and spaces in an abstract graphic manner (Booth, 1990).

The second step in Phase Three was to create a site-related functional diagram. This diagram was used to adapt the relationships created in the ideal functional diagram to the conditions and required program elements of the existing site. The outcome of this diagram should include the general scale and location of the major functions and spaces. The diagram should also show the relationships between those functions and spaces (Booth, 1990).

The third step in Phase Three was to produce a form of composition study. In this step, the designer focused less on the functional aspects of the design and more on the appearance and feel of the design. The designer then tested various themes of form, such as rectilinear, curvilinear, circular, angular, etc. The theme works to unify the entire space, from the landscape to the buildings.

The fourth step in Phase Three was to produce a concept plan. The concept plan acts similarly to the site-related function plan, but the concept plan is more specific. The concept plan includes bubbles labeled for pedestrian and vehicular circulation, plantings, meeting areas,

arenas, etc. For example, what was labeled generally as a “plaza area” would, within the concept plan, become segregated into a series of bubbles for walking, seating, planted areas, a playground, a pavilion, etc. According to Booth’s methodology, the form of composition study is meant to be completed after the concept plan. However, it was decided by the designer to complete the form of composition study before the concept plan.

The fifth step in Phase Three was to produce a preliminary master plan. A preliminary master plan is a composition of all program elements, including the concept plan and the form composition study. This is all done in a semi-complete graphic manner. The preliminary masterplan entails the study and selection of the following:

1. The general material of all elements and forms.
2. Plant materials as masses drawn to approximate mature size (general forms, not specific plants).
3. The tree-dimensional qualities and effects of the design, including tree canopies, fences, walls, etc.

The preliminary master plan illustrates the following:

1. Property line
2. Adjoining roads/streets
3. Outline or “footprint” of all buildings and structures
4. All major design elements of the site plan, illustrated with their proper graphic texture

The preliminary master plan also includes notes identified with the following:

1. Major use areas
2. Materials of design elements

3. Plant materials by general characteristics
4. Description or justification for special situations

The sixth step in Phase Three was to produce a master plan. After visiting with the client, the designer had to revise and restudy various portions of the design. The main difference between the preliminary master plan and the master plan is the graphic refinement.

The seventh step in Phase Three was to produce a design development plan. The design development plan acts as a way for the designer to portray the desired appearance of the design in critical areas. This was achieved by including visual images (drawings of elevations, perspectives, and other images) of how the site and material would look in critical areas of the site. The designer's responsibility in these phases consisted of Phases One through Three. As part of the designer's final contribution to the project, they provided the following:

- Final Phased Masterplan
- 3D Renderings of the Final Masterplan
- Illustrative Master Plan Suitable for Marketing Uses
- Final AutoCAD file
- Site Layout and Dimension Plan

Phases Four Through Seven

In Phase Four, construction drawings typically consist of a layout plan, grading plan, planting plan, and construction details. The contractors use these documents to build the form. At this

point, the focus is less on the aesthetic aspects of the design and more on the technical and mechanical issues.

Phase Five is the implementation of the design. After the construction documents are complete, they are ready for bid. After a construction contract has been signed, the contractor begins to build and install the design. The design may change slightly as unforeseen circumstances arise during implementation.

In Phase Six, post-construction evaluation, the project must be evaluated after being built. This will provide knowledge to the client and designer of what worked well and what could be improved. The evaluation will make future designs and upgrades more conducive to the future needs of the client (Booth, 1990).

The seventh and final phase consists of maintenance. The designer must take maintenance into consideration from the beginning of the design stages. Even if the design was constructed with quality, if not maintained well, the quality of the design will diminish. In many ways, the ultimate designer is the maintenance person. A quality maintenance plan must be implemented in order to retain a quality site (Booth, 1990).

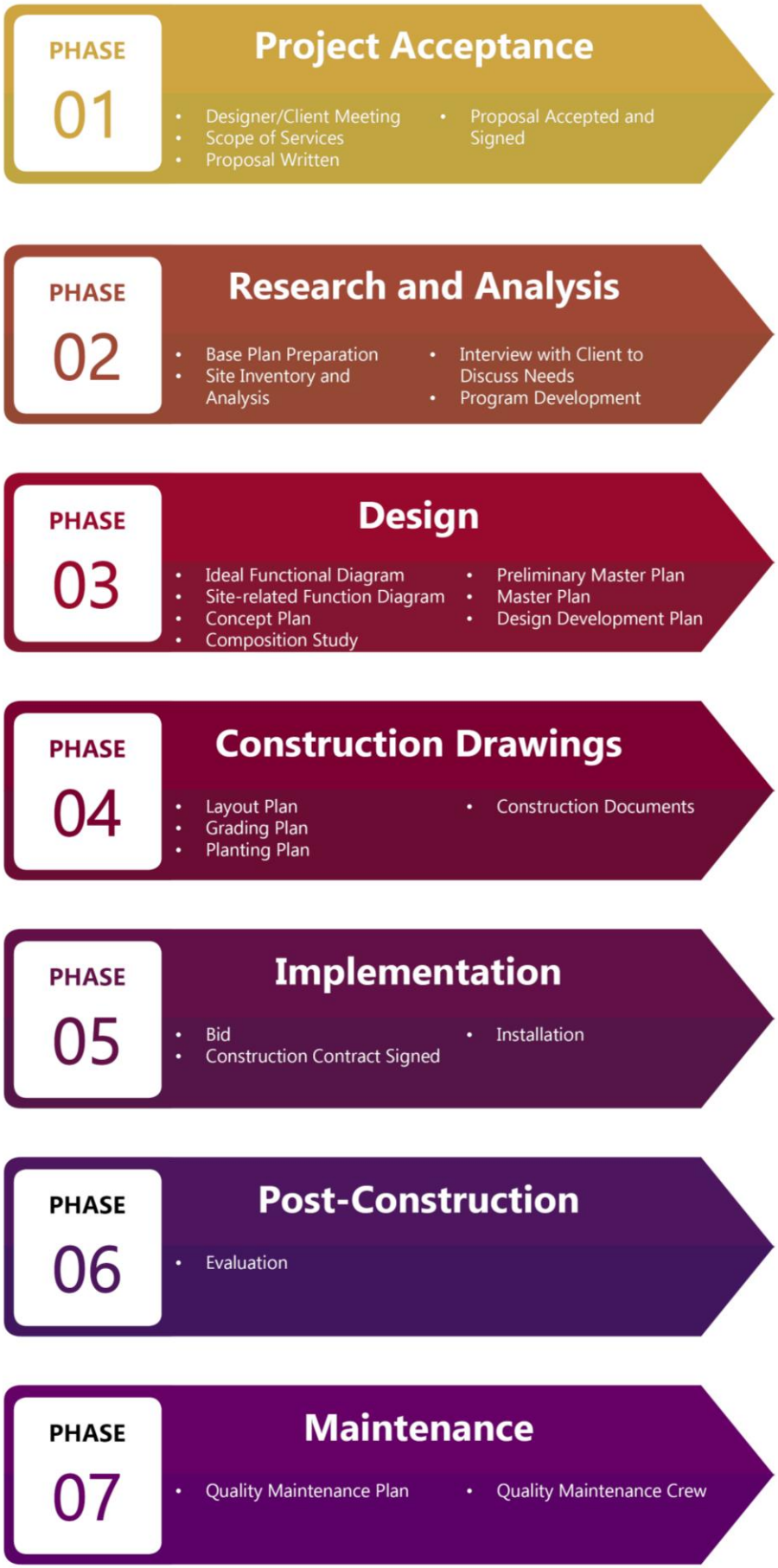


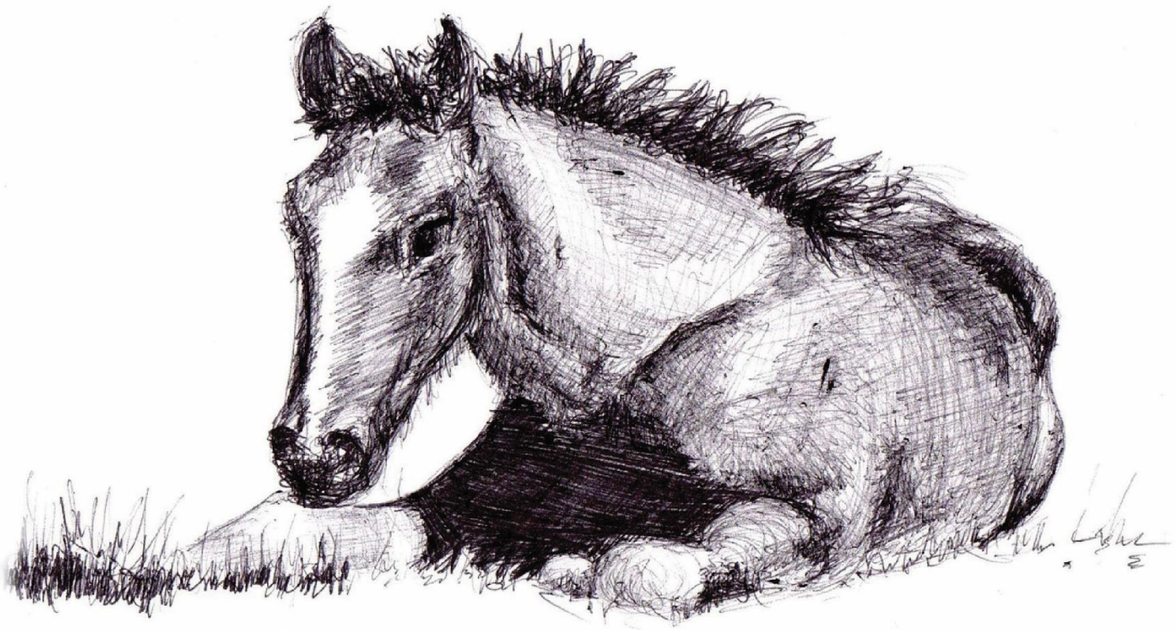
Figure 18. Norman K. Booth's Design Process. Recreated from *Norman K. Booth's Design Process*, by L. C. Smith, 2020.

CHAPTER IV

RESULTS

Utah State University | Equine Assisted Activities and Therapies Facilities Designed Master Plan

COLLEGE of AGRICULTURE and APPLIED SCIENCES
UtahStateUniversity.



PREPARED FOR...

This Master plan was prepared for the University Equine Assisted Activities and Therapies (EAAT) Program, a program within the Animal, Dairy, and Veterinary Science (ADVS) department. ADVS is part of Utah State University's College of Agriculture and Applied Sciences.

CONTRIBUTORS

Property Owner: Utah State University

Study Undertaken By: Utah State University | Department of Landscape Architecture and Environmental Planning (LAEP) | Graduate Thesis | Lindsie Smith | Spring 2018-2019

Thesis Committee: Keith Christensen PhD (LAEP Graduate Program Director) | David Anderson (LAEP Professional Practice Assoc Professor) | Judy Smith (ADVS Professional Practice Asst Professor)

DEDICATED TO...

This work is dedicated to my professor, Keith Christensen, for his excellent mentorship and positive attitude; to my parents, Charlie and Christi Smith who have always supported me in my educational goals; to my amazing husband, Michael Garside Smith for always being there for me, loving me, and inspiring me to shoot for the stars; and to our unborn daughter, who has given me extra motivation to finish this work even faster.

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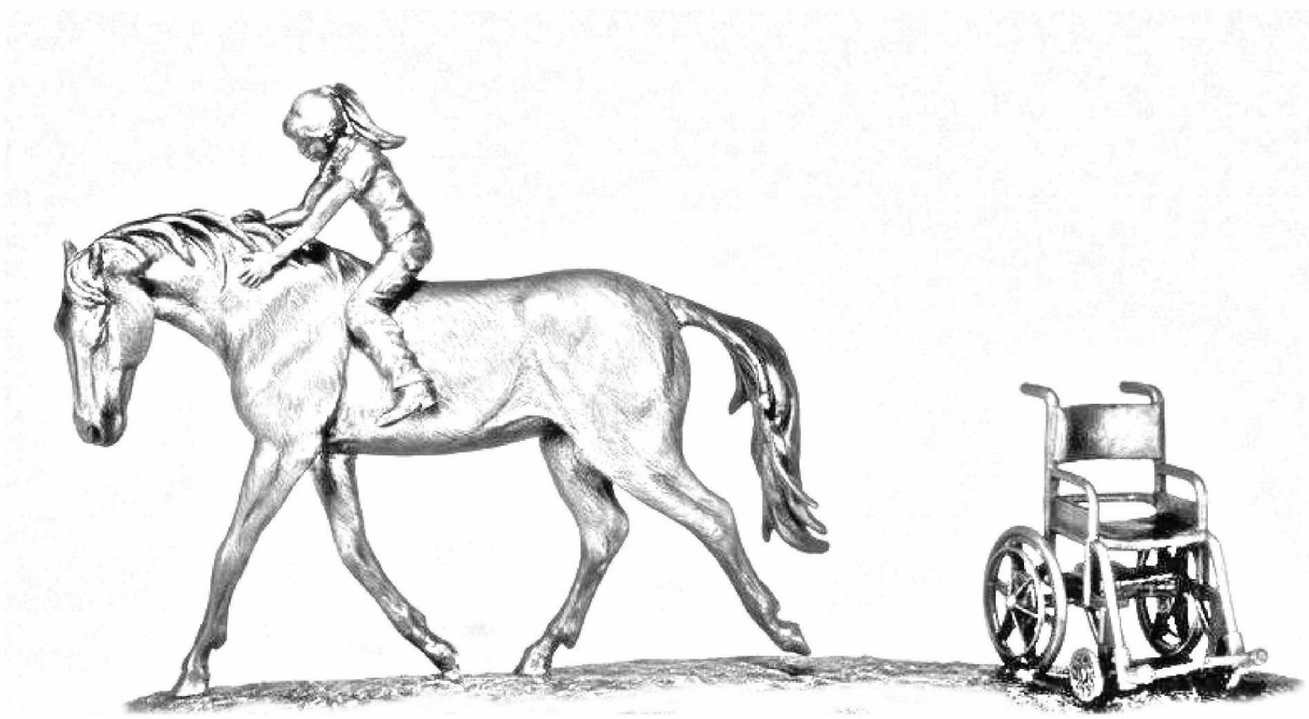
VISION AND PRINCIPLES



PROJECT DEVELOPMENT

OBJECTIVE

Equine Assisted Activities and Therapies (EAAT) is recognized as a therapeutic approach for persons with disabilities. The USU Animal, Dairy, and Veterinary Sciences Department provides EAAT instruction and services, however, the department does not have the appropriate facilities to model best-practices in the delivery of these services. This design research develops a phased master plan to support the instruction and delivery of equine-assisted activities and therapies in an innovative and accessible environment that supports animal assisted intervention and natural equine behaviors.

EAAT PURPOSE AND BENEFITS

Over the last 50 years, EAAT has become widely recognized as a valid therapeutic approach to assist persons with disabilities, including veterans, with a range of service related issues.

Horses are unique therapeutic companions due to their innate qualities. EAAT utilizes these characteristics to help individuals who face difficult challenges in life. EAAT is proven to positively contribute to the cognitive, physical, emotional, and social well-being of people. Not only does it benefit the persons with disabilities within communities, but also provides many opportunities for our veterans and service members.

Utah State University (USU) is cultivating the healing qualities of the equine and human bond by providing community engaged learning opportunities for students.

CLIENT NEEDS

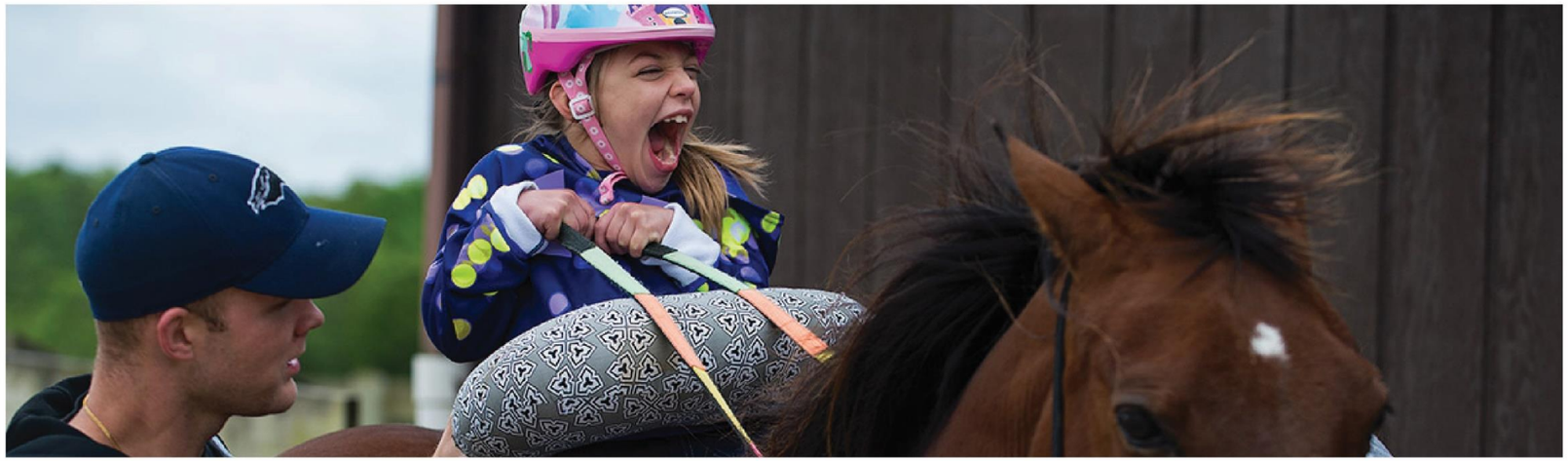
The EAAT services at Utah State University in Cache Valley, Utah provide students with a strong professional education in the core principles of facilitating equine experiential learning, therapies, and recreation (Utah State University, 2018). The EAAT program is a member of the Professional Association of Therapeutic Horsemanship International (PATH, Intl.) and provides service programs for the community, persons with disabilities, and military veterans who have been affected by the physical and emotional wounds of war. The program works with physical therapists who offer certified hippotherapy sessions. The EAAT program prepares students to receive two different professional certifications: Equine Specialist in Mental Health & Learning (ESMHL) and Therapeutic Riding Instructor (TRI). The number of students enrolled in the EAAT program has increased from 12 to 33 since December 2017 with 21 new students enrolled in entry level EAAT courses for Fall 2019 (Utah State University, 2020).

There is rapid growth in the EAAT program and community service programs. The program is focused on expanding to accommodate more students and provide more services for the community, especially veterans. However, they do not have the appropriate facilities to model best-practices in the delivery of services and are seeking assistance in developing an innovative and accessible environment that supports animal assisted intervention and natural equine behaviors.

There is a great need for a Veterans Center in Cache County, Utah. The closest Veterans Centers are in North Ogden, Utah and Pocatello, Idaho. These offices try to accommodate so many veterans but they cannot always meet the needs. The counties most affected in Utah are Cache, Box Elder, and Rich County. The counties that are in need in Idaho are Bear Lake, Oneida, and Franklin County. Together, these counties account for just over 7,000 veterans. Only 3,266 are enrolled in a VA health care. About 3,500 veterans live in Cache County alone.

Professional Association of Therapeutic Horsemanship International (PATH Intl.), is a nonprofit and federal registered organization. It promotes equine-assisted activities and therapies (EAAT) for individuals with special needs. PATH membership and certification are necessary to obtain in order to be a nationally recognized center. USU is one of two PATH International certified veteran programs in the state of Utah. USU is the only PATH International Equine Services for Heroes provider in Utah. The only other provider in the region is Ride for Joy Therapeutic Riding Program located in Caldwell, Idaho. The client wanted the project to include a new veteran center to fill this dire need for veteran health. The future EAAT program facilities would be an ideal location for a veterans center, especially for veterans utilizing equine therapy services.

This design research will develop a phased master plan to support the instruction and delivery of equine-assisted activities and therapies in an innovative and accessible environment that supports animal assisted intervention and natural equine behaviors. Specifically, this design research provides innovative equine living system options, a therapy arena, treatment rooms, a veteran center, and a fully accessible environment for maximum participation of individuals with mobility limitations. These facilities and amenities are to be located on this 13.5-acre site at the Utah State University Equine Center in Wellsville, Utah (Utah State University, 2018).

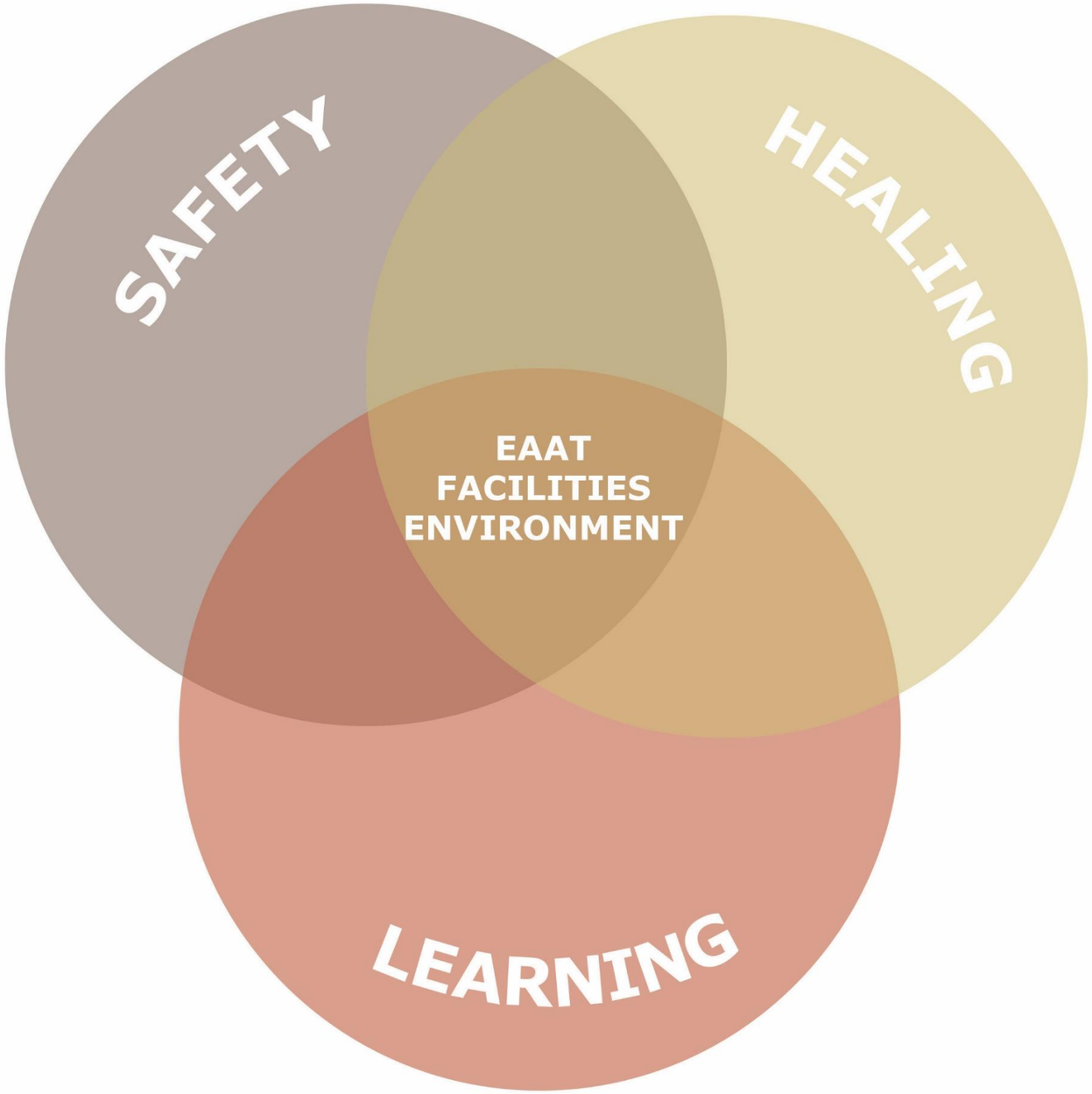


PROJECT VISION

The new EAAT facilities are designed to create an environment for exceptional safety, healing, and learning for all participants. The architecture and landscape reflects classic ranch/farm environment to promote a sense of place that promotes the core EAAT principles.

The equine living system design promotes natural equine behavior in an aesthetically pleasing manner. Designing to promote natural equine behavior supports equine well-being. The happier and healthier the horse, the more predictable the horse. The more predictable the horse, the better the participants experience will be.

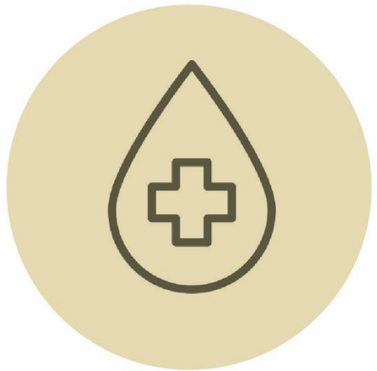
This place is to be a sanctuary for positive interactions between humans and horses.


SAFETY
HEALING
EAAT
FACILITIES
ENVIRONMENT
LEARNING

SAFETY

Many users of the site, especially clients, experience different forms of anxiety. It is sometimes an act of bravery to accept therapeutic help from others. Users need to understand that their struggles, experiences, and identity are safe on the site and to all students and professionals contributing to the client's healing process.

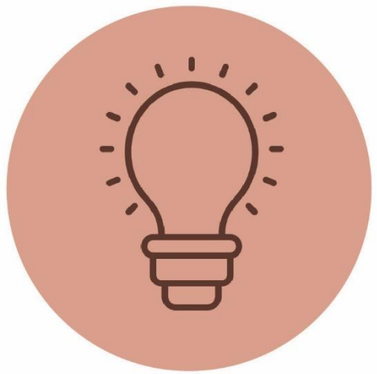
The equine living systems are designed to promote health and safety for all equines living within them. The healthier the horse, the safer they are when interacting with clients. This also promotes user safety.



HEALING

Equine assisted activities and therapies is a recognized therapeutic approach that requires specific types of interaction between the client and horse. Hippotherapy is a specialization of equine therapy which is a physical, occupational, or speech therapy treatment that utilizes equine movement. The EAAT Main facility accommodates both equine-assisted activities and hippotherapy. The activities and therapies are catered to each client's individual needs.

Equine-assisted activities and therapies are used in the treatment of autism, emotional disorders, psychological stress, injuries, illnesses, motor function, language-learning disabilities, trauma,



LEARNING

The USU EAAT site is meant to primarily be a place of learning. Faculty will be educating students and certifying them in equine therapy procedures. They will also be educating clients on how to cope with their challenges through equine intervention.

Veterans will also be given opportunities to learn how to cope with their challenges through educational and therapeutic experiences in the veterans center and garden.

PROGRAM

Main EAAT Building

- Indoor Arena (Min. 20,000 SQ. FT.) with option of dividers (Adaptive Sports/Medical Sides)
- Arena Seating
- 8 Equine Holding Space/Stalls (Possibly Pens Attached)
- Grooming Space
- 1-2 Tack Rooms (One on the side closest to the outdoor arena)
- Storage
- Dressing Room/Volunteer Check In
- Lounge (With Arena Viewing)
- Arena Viewing Room
- Indoor Play Area for Children
- Classroom
- Conference/Meeting Room with Kitchen
- Offices
- Treatment Offices 2-3
- Restrooms
- Patio/Garden/Pavilion Area/ Playground (Family Oriented)

Veteran's Center Building

- Offices
- Group Space
- Restrooms
- Additional Classroom/Meeting Space - Capacity of Maximum 40 people
- Patio
- Kitchen

Parking Lot

- Minimum of 31 Parking Stalls
- Bus/Ambulance Access
- Covered Drop-off Area

Access Road

- Fire Lane
- New Access Road Design

Small Outdoor Arena

- Min. 10,000 SQ. FT
- Covered
- Covered Walkways - To transport horses to and from arena

Main Equine Living System Shelter

- Central Open Access Through Shelter
- Accessible by 3-4 Separate Equine Living Systems
- 3,000 SQ. FT. Shelter/Feeding Area
- 450 SQ. FT. For Tack Room/Storage

Four Equine Living Systems (4 horses per 1 acer of land)

- Smaller Shelters
- Rolling/Resting Areas
- Hay Stations
- Water Stations
- Water Retention/Horse Pond

Manure Management Area

- No Manure Management Area Needed On-site.

Hay Barn
Equine Supplements
- Horse Trailer Parking

ATV-UTV Parking

Sensory Trail

**Potential Purchasing of Adjacent Property for equine grazing areas and trails.*

Program developed in collaboration with EAAT faculty, staff, and students.

CASE STUDY BRIEFS

Case Study 1 | Pegasus Project

Case Study 2 | Fieldstone Farm

Case Study 3 | Paddock Paradise

CASE STUDY 1

Pegasus Project, Yakima, WA

Pegasus Project is a therapeutic riding center that provides different programs such as therapeutic riding, hippotherapy, carriage driving, pony pals, and life skills. They have over 1,730 lessons annually.

Pegasus Project is the only PATH International Premier Accredited Center in the greater Central Washington region. This is one of the major goals of the USU EAAT Program, to become a PATH International Premier Accredited Program.

CASE STUDY 2

Fieldstone Farm Therapeutic Riding Center,
Chagrin Falls, OH

Fieldstone Farm Therapeutic Riding Center was founded more than 40 years ago. They have approximately 1,000 patients annually. They started by offering services to children, but now offer them to people of all ages including seniors and veterans.

Fieldstone Farm is also a PATH International Premier Accredited Center. Many of the client's ideas for the building programing were inspired by their visit to this therapeutic riding center.

CASE STUDY 3

Jaime Jackson's Paddock Paradise, Association for the Advancement of Natural Horse Care Practices Field headquarters, Lompoc, CA

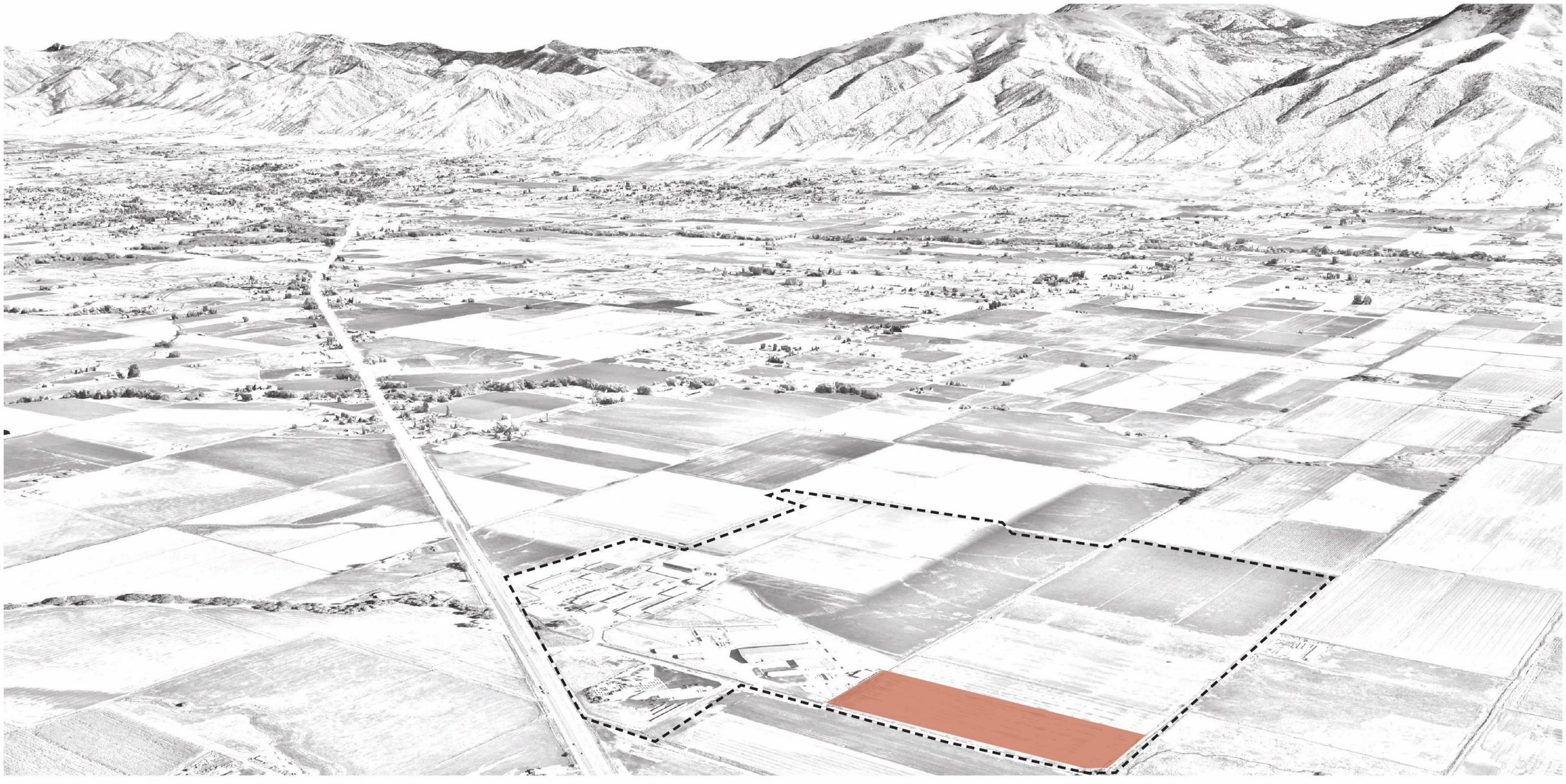
Jaime Jackson's Paddock Paradise is the first case study of equine living systems. Jaime is a professional hoof care specialist. He spent years observing wild and free-roaming horses in the U.S. Great Basin. While observing them, he recorded natural equine behaviors and decided to design a natural equine boarding method that would promote these behaviors.

The equine living systems in the EAAT facilities master plan are inspired by his natural equine boarding method. However, his design principles were only anecdotal. A major part of this project was to research natural equine behaviors and implement scientific evidence-based design principles into the equine living systems that promote these natural behaviors.

SITE ANALYSIS

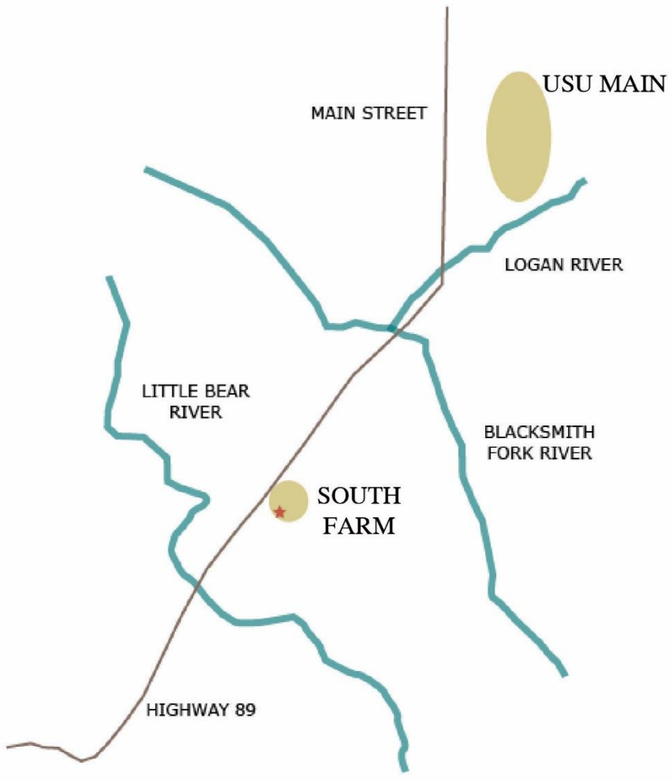
CONTEXT

PROJECT SITE

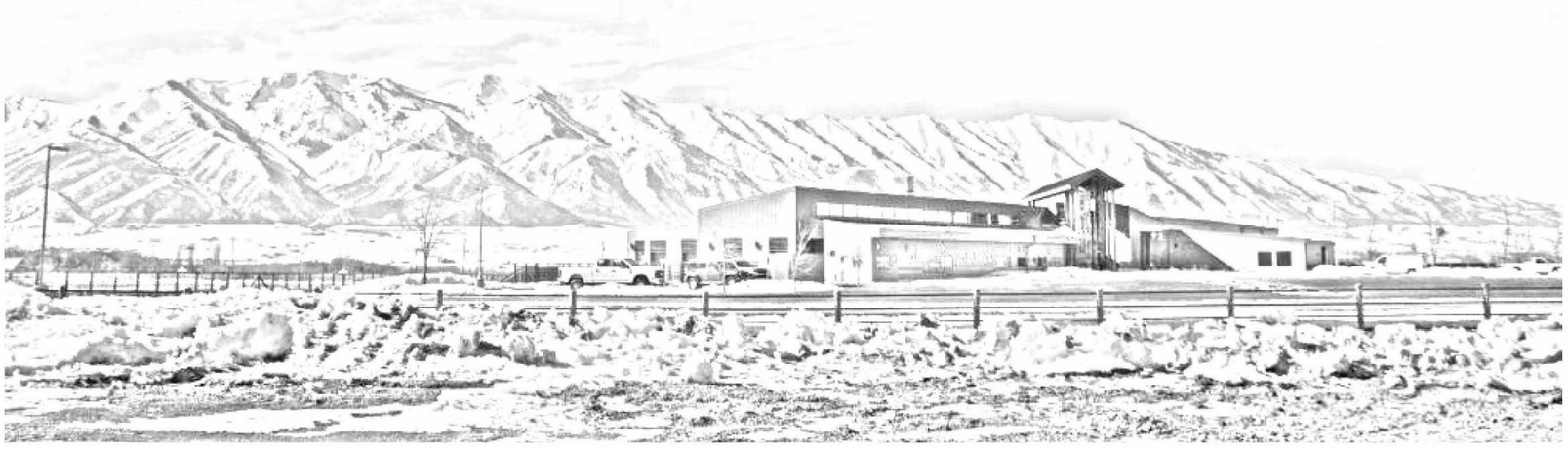


CONTEXT

The project site is located at USU's South Farm properties in Wellsville, Utah a small Cache Valley community. The South Farm is located about 8 miles southwest from Utah State University's main Logan, UT campus.



UTAH STATE UNIVERSITY, LOGAN, UT



UTAH STATE UNIVERSITY SOUTH FARM, WELLSVILLE, UT

South Farm

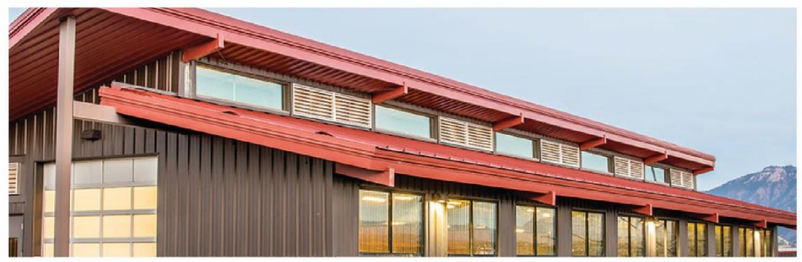
The South Farm is located in Wellsville right off highway 89. It is used by the Animal, Dairy, and Veterinary Sciences (ADVS) department.

South Farm campus serves various branches within the ADVS department. The south end of the farm is dedicated to equine sciences and the northern to animal research such as beef, goats, sheep, etc. The rest of the farm is made up of agricultural fields.

The project site (highlighted in light green), is located just south of the Sam Skaggs Family Equine Education Center. The project site is a 13.5 acre parcel previously used as an agricultural field.

1. ADVS Barns and Research Area

2. Mathew Hillyard Animal, Teaching and Research Center



3. Sam Skaggs Family Equine Education Center

PROJECT SITE

Opportunities/Constraints

- Because the site was previously used as an agricultural field, it is relatively flat. Proper drainage will be a challenge.

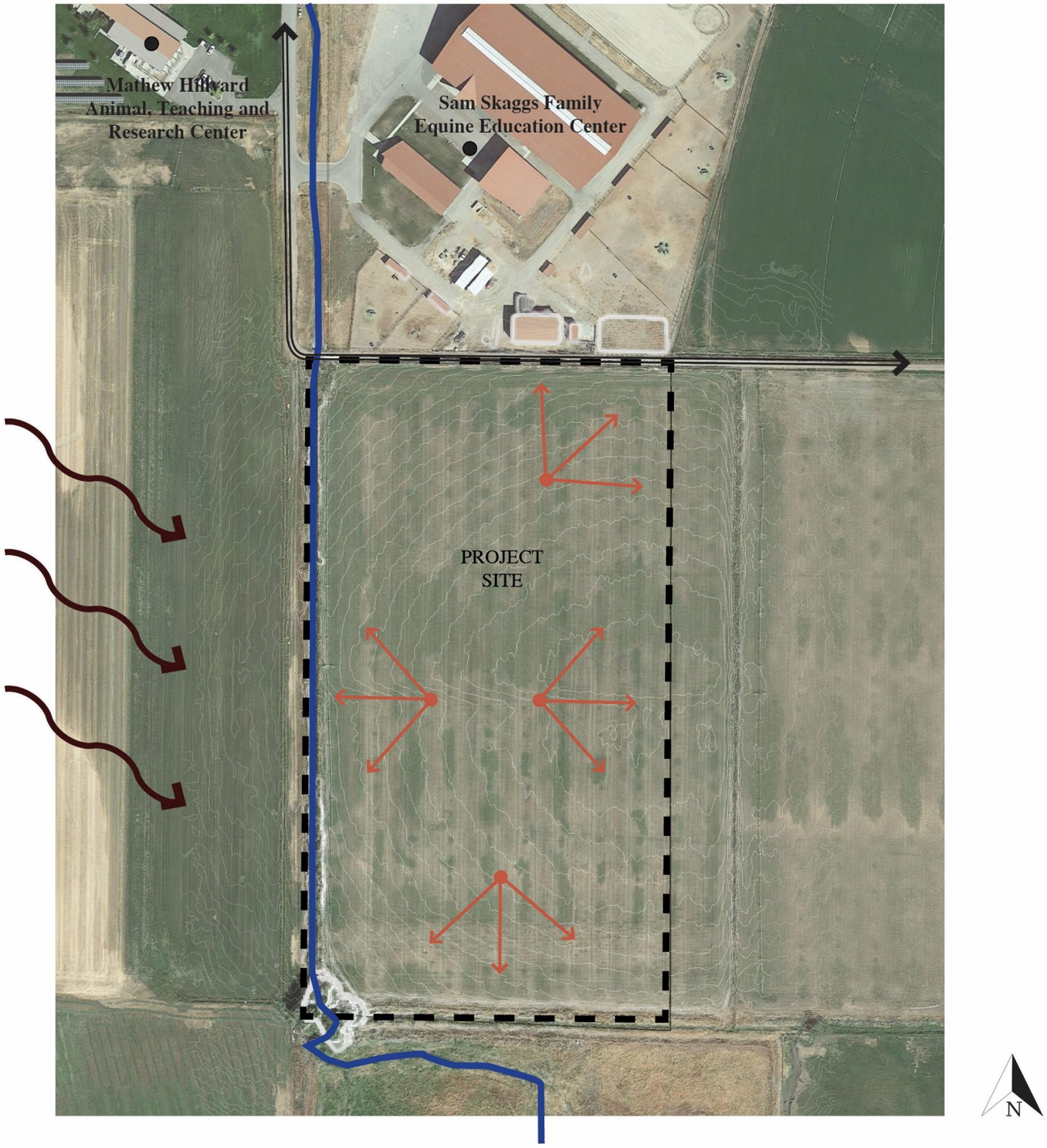
- Most existing South Farm buildings are oriented to the highway.

The property is currently accessible from South Farm by a gravel road on the southern edge. In order to be more accessible to different vehicle types and buses, this road will need to be improved

There is a natural stream that runs through South Farm and is channeled on the west side of the property. The water in the canal is very shallow and is not a visual or audible asset.

Since the property is located within the valley and surrounded by agricultural fields, there is a valuable view-shed of the surrounding valley and mountains that can be seen from anywhere on the property.

Highway 89 is located west of the site. Blocking out traffic noise will be a design challenge.



DESIGN

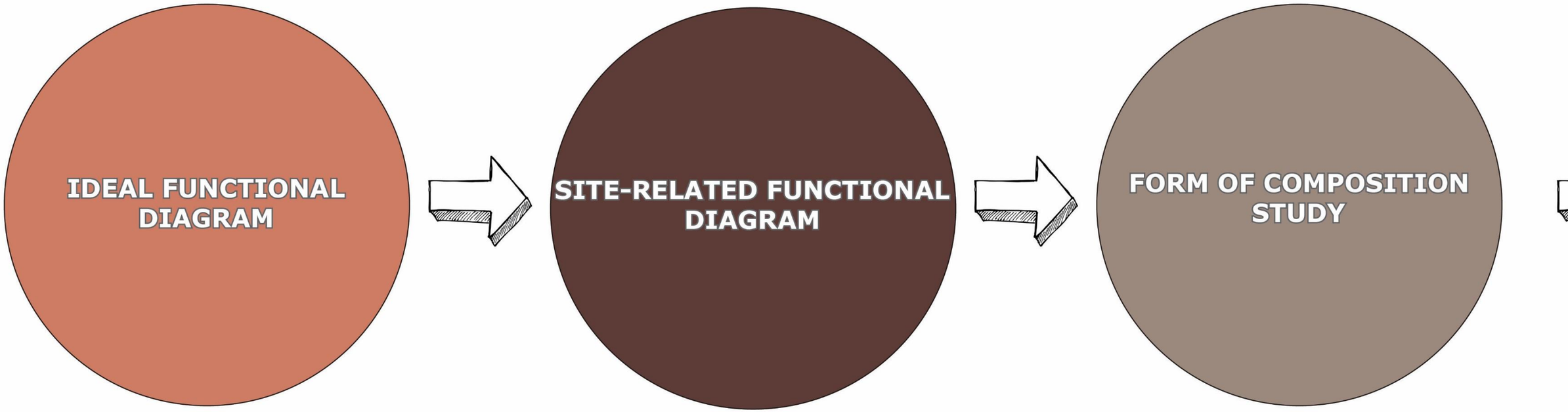
DESIGN PROCESS AND BUILDING PROGRAM

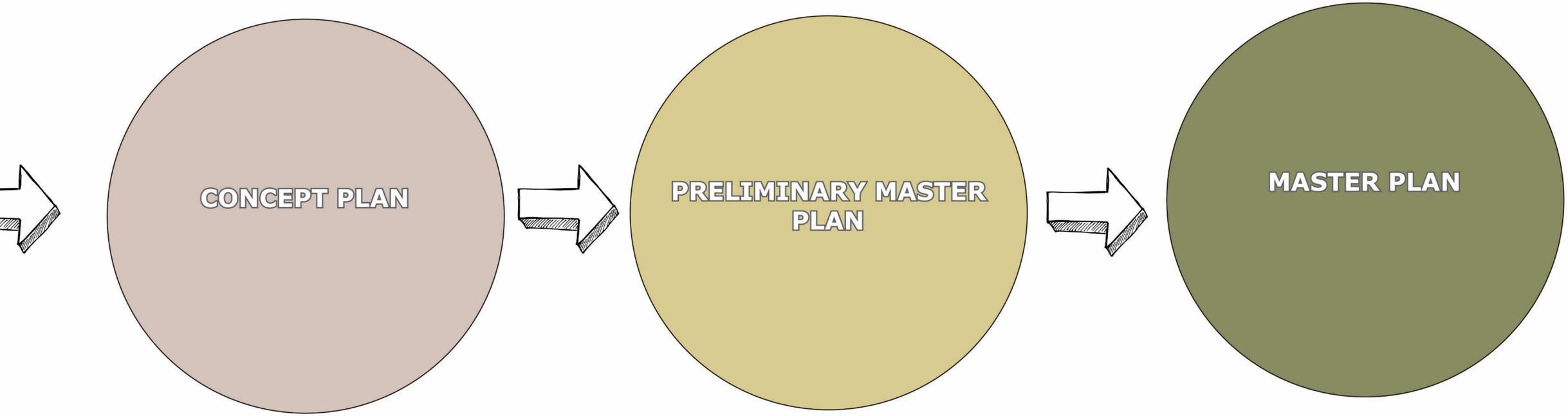
DESIGN DEVELOPMENT

PHASING

EAAT Main Building

DESIGN PROCESS




CONCEPT PLAN
PRELIMINARY MASTER PLAN
MASTER PLAN

IDEAL FUNCTIONAL DIAGRAM

Definition

"To identify the best and most appropriate relationship that should exist between the major proposed functions and spaces of the design."

- Norman K. Booth, Landscape Architect

Process

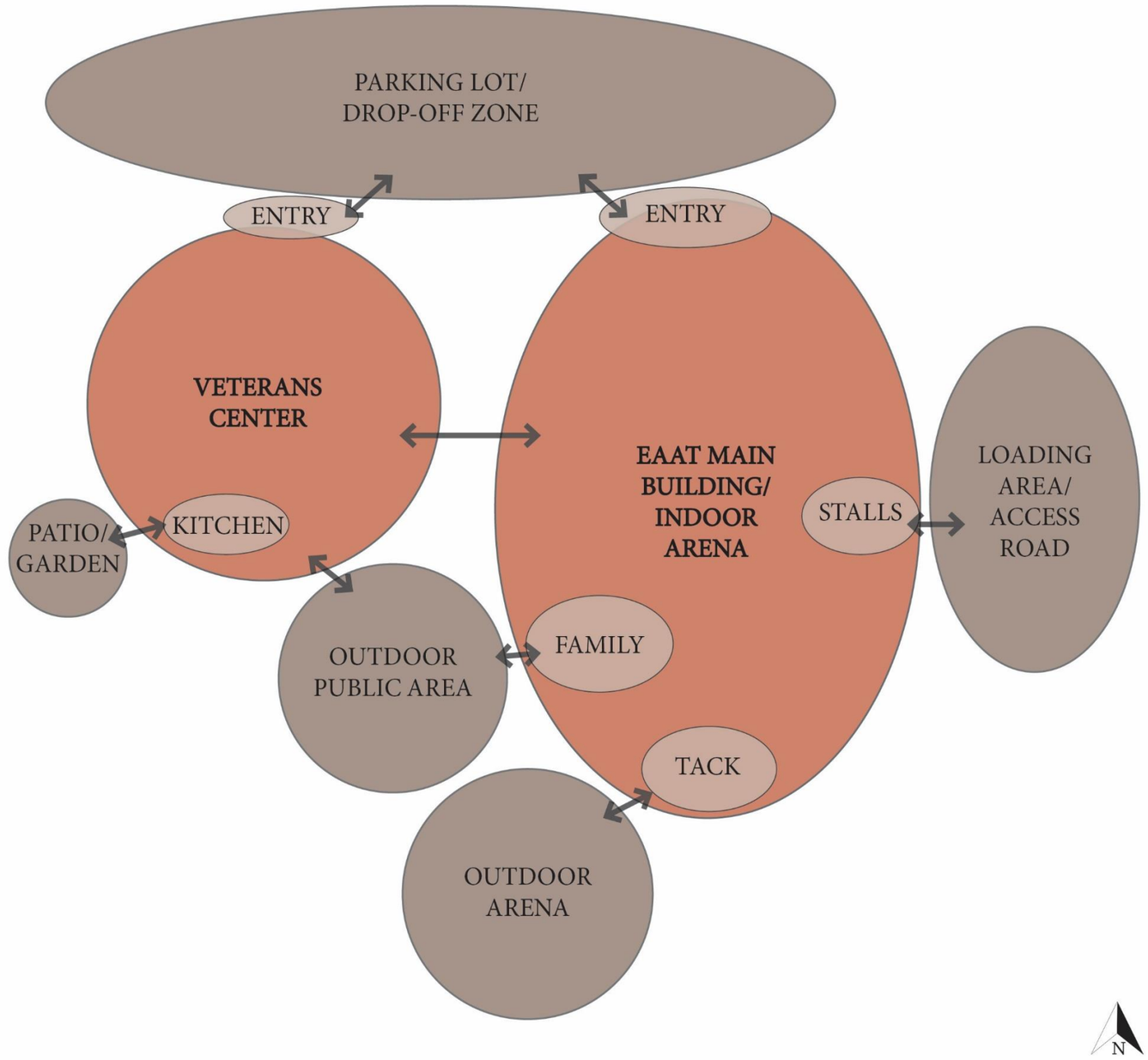
After meeting with the client, an ideal functional diagram was created in order to highlight key functional relationships between major spaces.

For example, it is appropriate for horse stalls to be close to a loading area in order to change out horses, allow maintenance vehicles to bring feed or haul out manure, etc. However, it would not be appropriate to locate a family public space next to a loading area where vehicles are constantly in motion and children can easily access dangerous equipment. This would be a liability hazard.

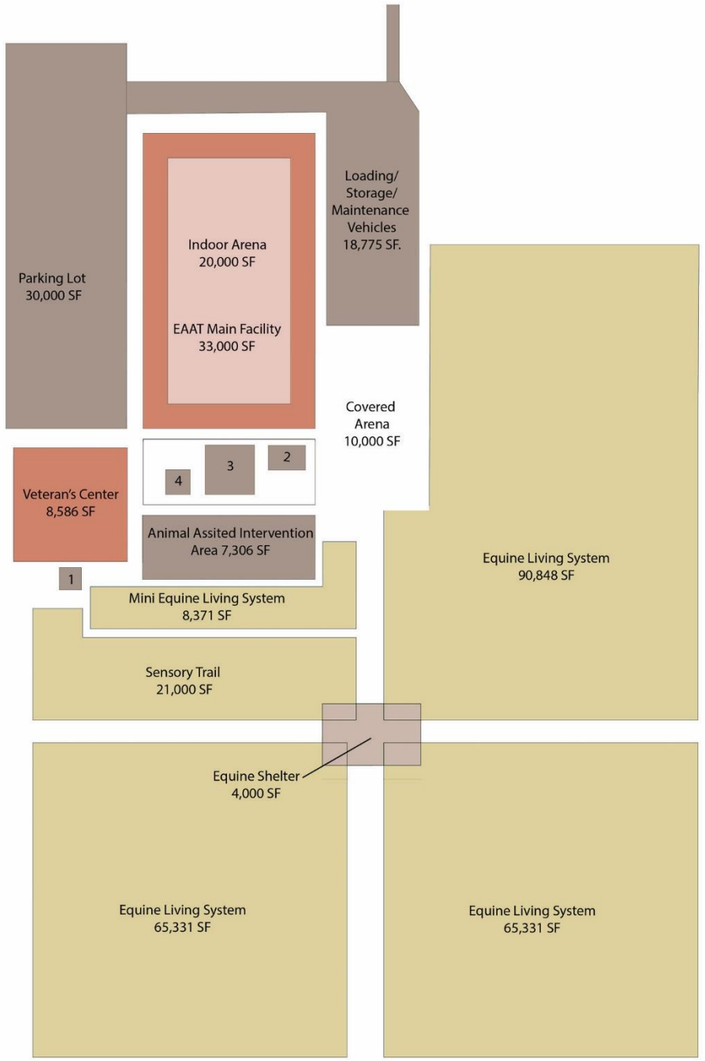
It is better for a family public space to be away from heavy equipment and close to where the users' family member will be participating in EAAT activities.

Each functional relationship was thoroughly considered as shown in the diagram. This diagram mainly concentrates on the functional relationship between human-related spaces.

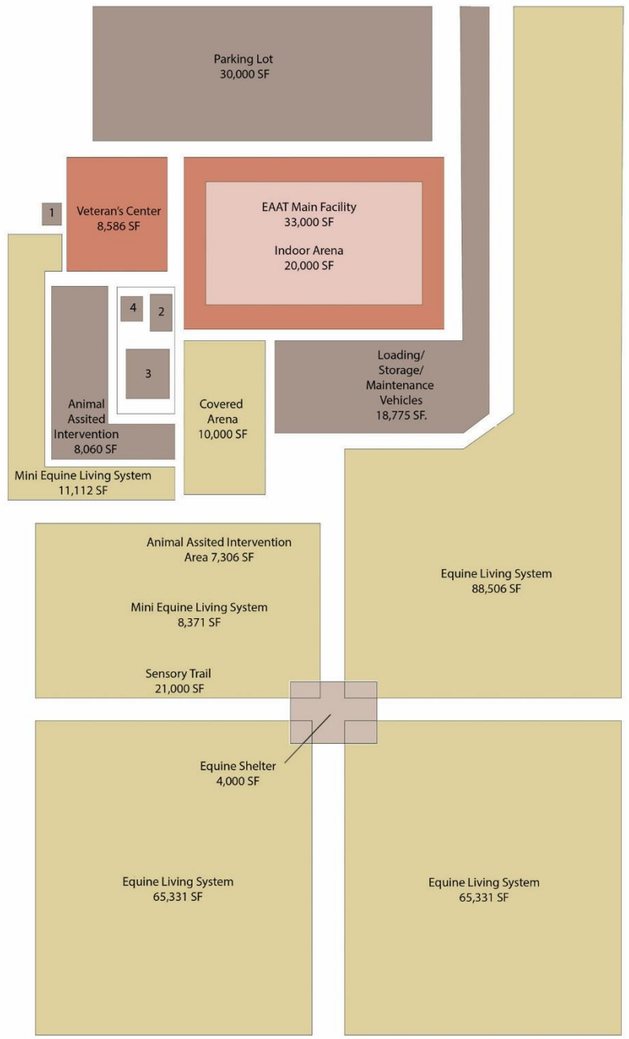
The location of the major equine-related spaces will be on the southern end of the property, behind the outdoor arena. The human-related spaces are located on the northern end of the property due to ease of access and the functional relationship between the future EAAT facilities and the rest of South Farm.



SITE-RELATED FUNCTIONAL DIAGRAM



Concept 1



Concept 2

Definition

"The site-related functional diagram should show the same information as the ideal functional diagram along with two additional considerations: (1) the functions/spaces should relate to the actual site conditions...(2) the functions/spaces should now be drawn keeping in mind their approximate size and scale."

- Norman K. Booth, Landscape Architect

Process

After meeting with the client, size estimates were created for each program element in concept 1 and concept 2 as depicted. Two different concepts were created. Each explored different building orientations, access points, and equine living system configurations.

After further communication with the client, it was decided that a hybrid of access points and building orientation would be explored during the conceptual design phase. However, general locations and spaces based off of the ideal functional diagram were approved.

Additional Areas:

1. Veterans Center Garden - 324 SF
2. Therapy Garden - 600 SF
3. Accessible Playground - 1,600 SF
4. Pavilion - 400 SF

FORM OF COMPOSITION STUDY

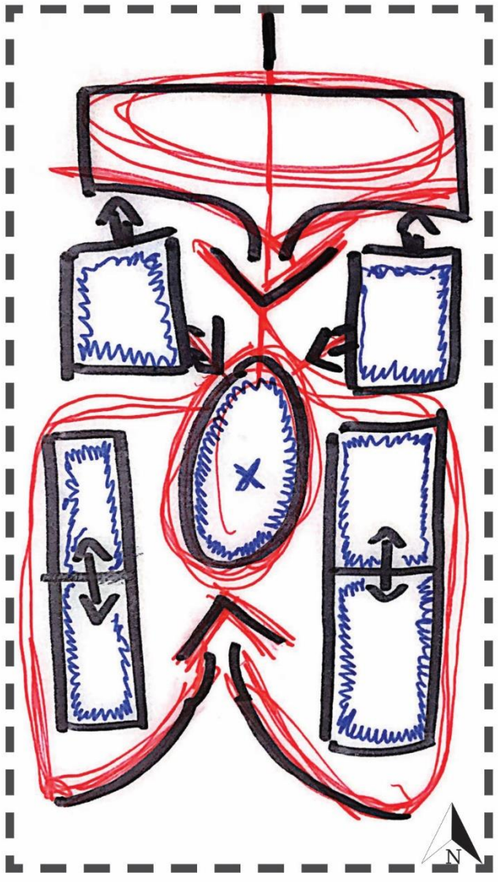
Definition

"While trying to adhere to the functional and spatial arrangement of the concept plan, the designer is also attempting to create a composition of forms that are attractive to the eye."

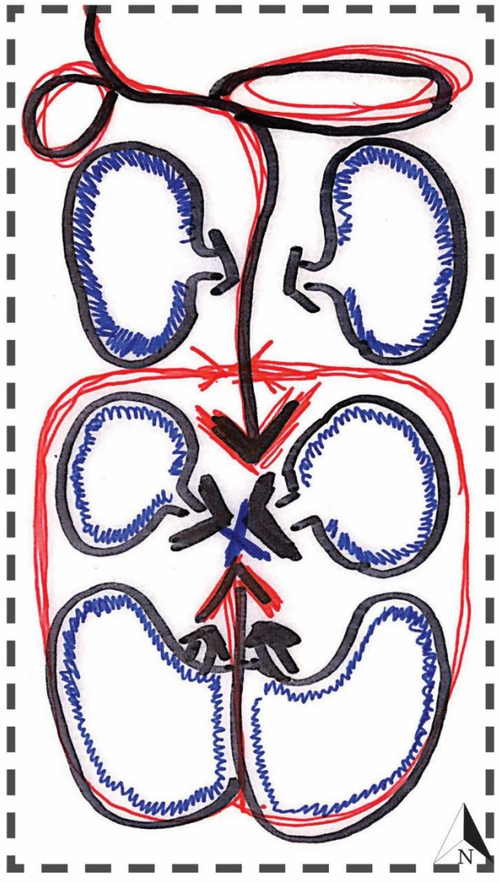
- Norman K. Booth, Landscape Architect

Process

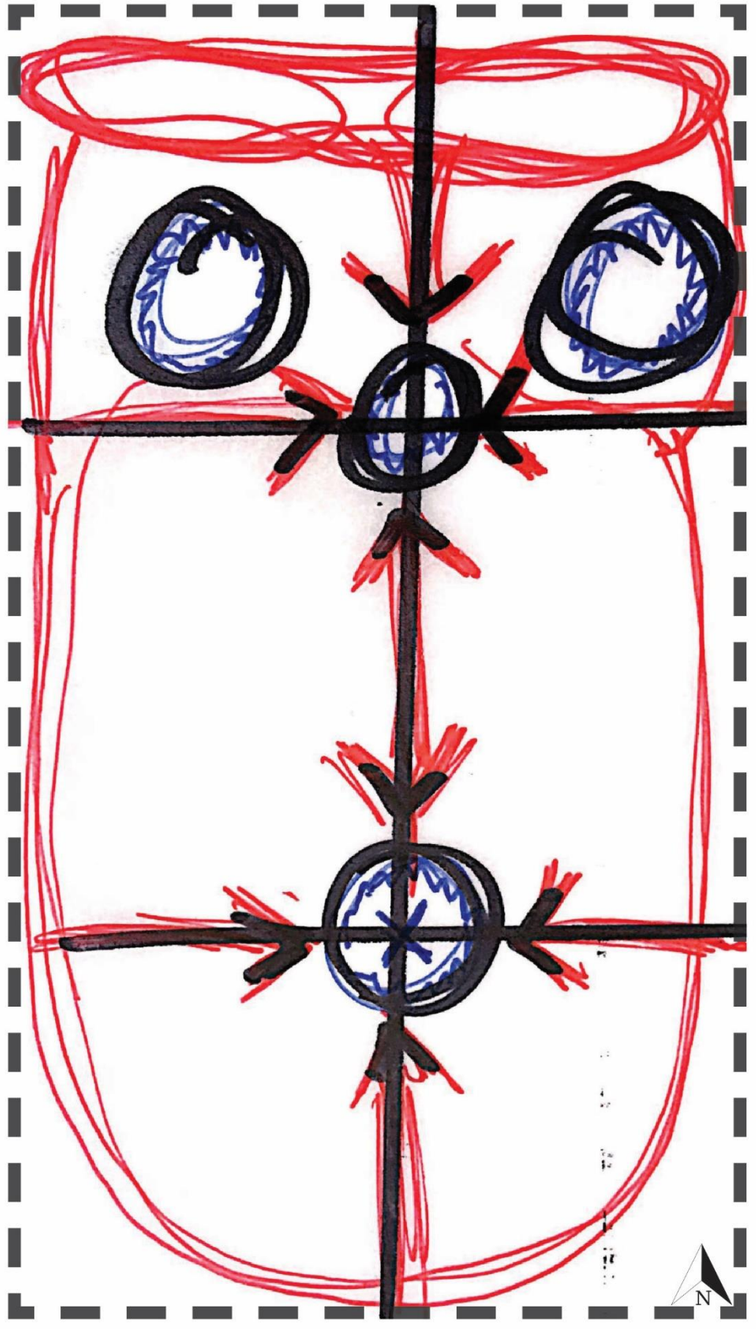
Different forms were explored. The curvilinear form in Study 2 included the client's desire to create a more natural feel. The rectilinear form in Study 1 and 3 accounted for the client's desire for simplicity and cost-efficiency. The decision was made to explore a concept for Study 2 and especially Study 3.



Study 1



Study 2



Study 3

SITE AESTHETIC PRECEDENTS

Buildings

The proposed buildings need to have similar materials and colors and relate to the existing South Farm buildings. The buildings represent a classical red barn country aesthetic, but instead of being constructed of wood, they are constructed with more industrial materials such as metal. Existing buildings have simple, utilitarian forms.

More windows will also be proposed to capture views and sustainability purposes.

Landscape

The goal is to have more natural and low-maintenance plants. Trees are desired for shade and wind breaks.

Overall, the site should allow users to feel like they are out in the country and away from everyday life.

BUILDING PROGRAM

Although the EAAT master plan includes a number of structures, this section will only address the two main facility buildings (Veterans Center and EAAT Main). With the exception of EAAT staff and some students, the majority of human users will only be accessing the EAAT main building/ indoor arena and the veterans center. Further detail on other structures will be provided later in the design process.

After numerous client meetings, general aesthetic architectural guidelines were established. The buildings need to have similar materials and colors to relate to the existing buildings on South Farm campus. Other architectural suggestions included:

- Orientation of buildings to be functional regarding shade, wind, and sunlight and capture surrounding views.
- Architectural features such as windows should also be designed to capture views and encourage sustainability.
- Building height, form, structure, color, and materials need to compliment a specific ranch or farm stylization.
- Facilities need to accommodate different types of users at the expected maximum capacity.

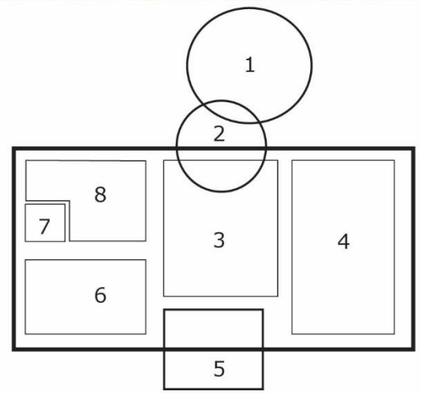
VETERANS CENTER

The veteran center will host local and regional veteran events. Cache County alone accounts for 3,500 out of 7,000 under-served veterans in the northern Utah and southern Idaho region. The building will act as a sanctuary for the veteran population. It will also accommodate VA staff and other medical professionals.

The building is oriented to the highway to be consistent with other South Farm campus buildings and create a stronger spatial relationship with the EAAT main facility.

Building Program:

1. Garden
2. Patio
3. Group Space
4. Classroom
5. Entrance
6. Offices
7. Restrooms
8. Kitchen



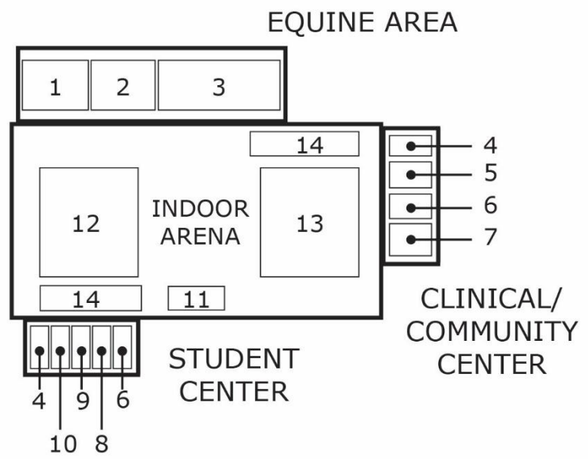
EAAT MAIN BUILDING

The EAAT main building and indoor arena will host numerous weekly events such as field trips, lessons, and clinics. It will also host several annual EAAT events. Not only will it be the main learning center used by students and faculty, but it will also be an equine therapy community center and clinic. On a weekly basis, this building will need to accommodate 60 plus people ranging from visitors to staff.

The building is not oriented toward the highway like the others in order to capture views, have better vehicle access, and take advantage of sustainable solar opportunities.

Building Program:

1. Grooming Space
2. Tack Rooms (1-2)
3. Equine Holding Space/Stalls (8)
4. Bathrooms
5. Treatment Offices
6. Offices
7. Lounge (With Arena Viewing)
8. Dressing Room/Volunteer Check In
9. Classroom
10. Conference/Meeting Room with Kitchen
11. Indoor Play Area for Children
12. Indoor Arena Divider Adaptive Sports Side
13. Indoor Arena Divider Medical Side
14. Arena Seating



CONCEPT PLAN

Definition

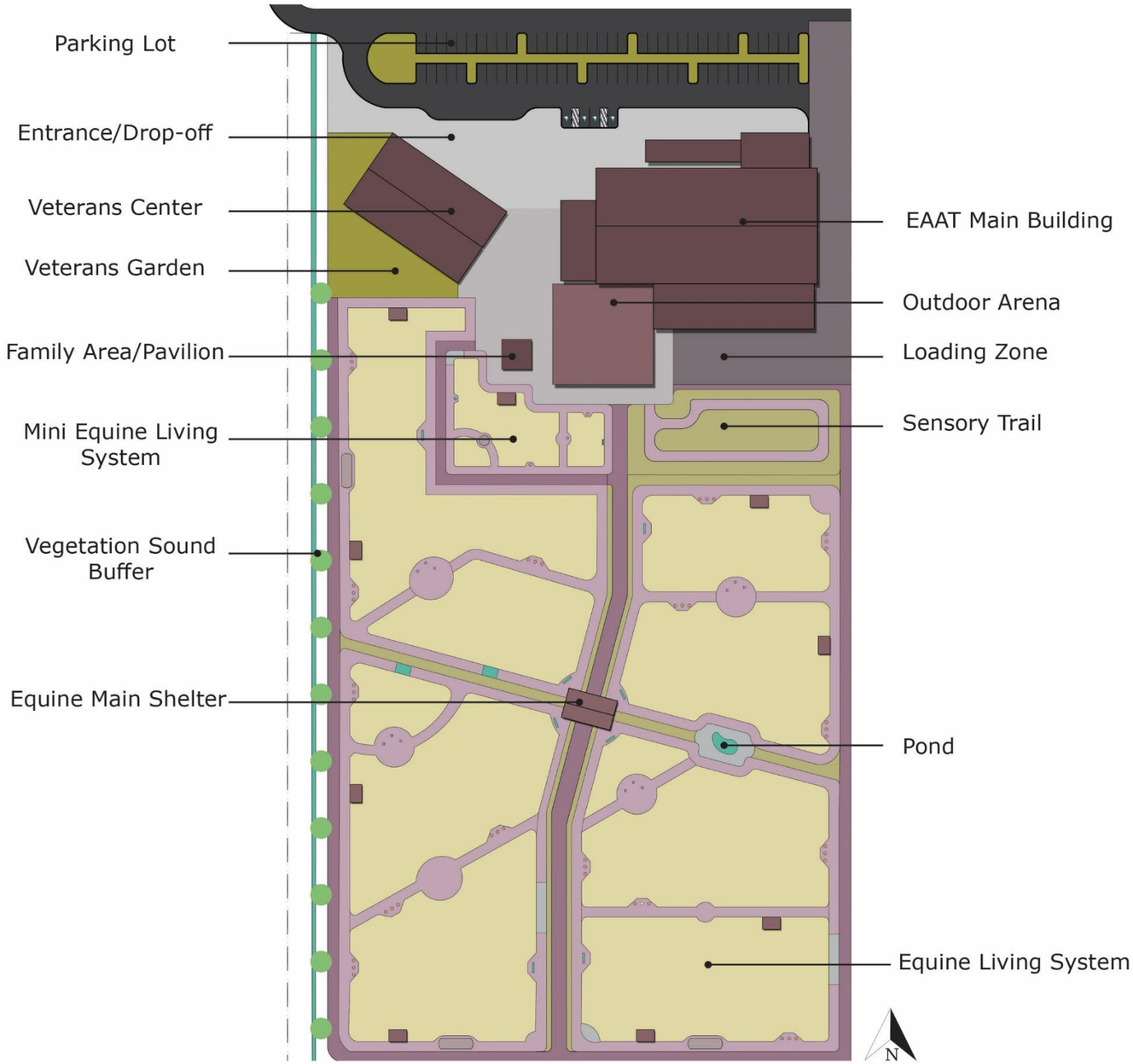
"The concept plan is a direct outgrowth and elaboration of the site-related functional diagram. The essential difference between the two is that concept plan is more detailed in both content and graphic representation."

- Norman K. Booth, Landscape Architect

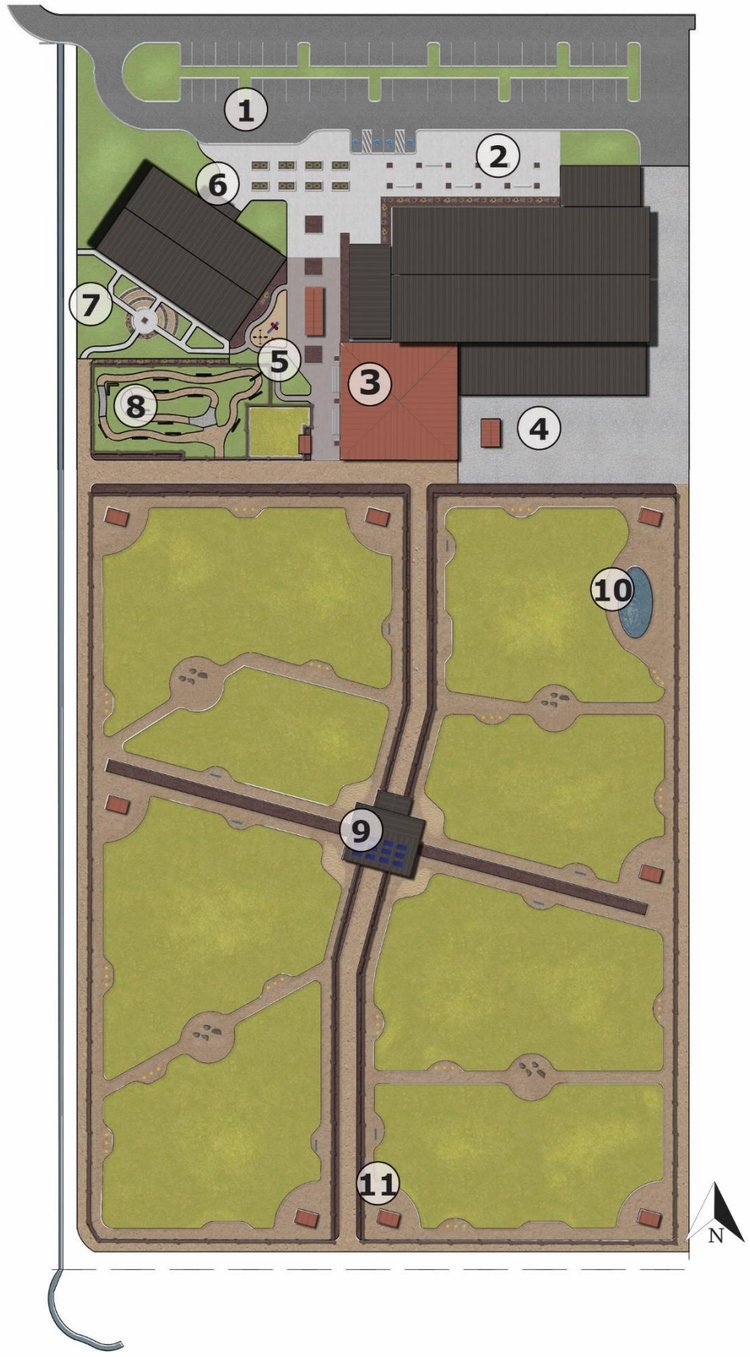
Process

Two concepts were presented, curvilinear and rectilinear. The rectilinear proved to be more cost effective and still have the potential to provide the desired aesthetic.

Curvilinear Concept



Rectilinear and Final Concept



PRELIMINARY MASTER PLAN

Definition

"In the preliminary master plan all elements of the design are put together and studied in association with one another in a realistic, semi-complete graphic manner."

- Norman K. Booth, Landscape Architect

Process

The plan has much more detail than the previous conceptual diagrams and plans. The major locations are identified and each numbered space will be described in greater detail in the *Design Development* section.

Major Spaces

1. Parking Lot/Drop-off Zone
2. EAAT Main Building Entrance
3. Outdoor Arena
4. Hay Barn/Storage/Loading Area
5. Family Area
6. Veterans Center Entrance
7. Veterans Center Garden
8. Sensory Trail
9. Main Equine Shelter
10. Pond
11. Equine Living System Amenities/Design Principles

MASTER PLAN

Definition

"In the master plan, the next step in the design process, is a refinement of the preliminary master plan."

- Norman K. Booth, Landscape Architect

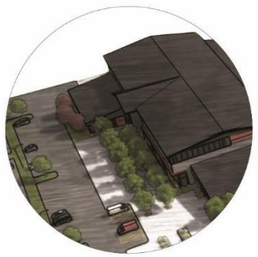
Process

After consulting with the client, no major modifications were necessary. This was approved as the final product.

DESIGN DEVELOPMENT

This section addresses each major location/space providing greater detail regarding plantings, materials, and the design purpose of those spaces.

1. PARKING LOT/DROP-OFF
PG. 28



2. EAAT MAIN ENTRANCE
PG. 29

3. OUTDOOR ARENA
PG. 30

4. HAY BARN/STORAGE/ LOADING
PG. 31

5. FAMILY AREA
PG. 32

6. VETERANS CENTER ENTRANCE
PG. 33

7. VETERANS GARDEN
PG. 34

8. SENSORY TRAIL
PG. 35

9. MAIN EQUINE SHELTER
PG. 36

10. POND
PG. 37

11. EQUINE AMENITIES
PG. 38-39

PARKING LOT/DROP-OFF

Parking Lot

The parking lot design needed to have at least 31 stalls. This number meets the city parking requirements for different facilities such as medical and educational facilities. The parking lot ended up having 74 stalls due to the need for buses to turn around within the parking lot. There are multiple events throughout the year that this size of a parking lot can accommodate. The asphalt parking lot will have street trees for shade and lights for security.

Drop-off

The drop-off zone is an important part of the master plan. It is the first impression for users who will be transported to the site by vehicle. It is designed to accommodate two buses at once. There are weekly field-trips from local elementary schools.

The drop-off is located in between the EAAT Main Clinical/ Community Center and the Veterans Center. Those are the locations where the majority of users in wheelchairs will need to access. The planting layout and design allow users to see beyond the buildings into the family area and provide areas for lingering. The drop-off planting/ sitting area will be surfaced of concrete.

EAAT MAIN ENTRANCES

Indoor Arena/Student Center

The entrance to the indoor arena and student center is designed for easy access from the parking lot. It is also designed with an allee of trees forming a canopied walkway with concrete benches . The area is landscaped with low-maintenance, colorful, and drought-tolerant.

Clinical/Community Center

The Clinical/Community Center entrance is located near the drop-off zone, the Veterans Center, and the family area. This is were the majority of clients and their families will arrive. This center will be built to meet hippotherapy certification requirements in order to be a recognized medical facility.

The entrances were designed with clear access, compliment the building style, and reduce stress/anxiety.

OUTDOOR ARENA

The outdoor arena is 10,000 SF. The client wanted it to be square shaped instead of the traditional rectangular shape due to latest best-practice research. The outdoor arena will have seating for families and be attached to the EAAT Main building by a covered walkway. The covered walkway is necessary for safety reasons especially during winter when ice is prevalent.

The outdoor arena will be used by all clients and students. The material and color will match the EAAT Main Building. Seating inside the arena will have direct access to the family area.

HAY BARN/STORAGE/LOADING

Hay Barn/Storage

The hay barn will be used for equipment and feed storage and maintenance purposes. It is located in the loading zone adjacent to the outdoor arena and equine living access road. It will be a place to store hay, ATVs, equipment, and a large two-horse trailer.

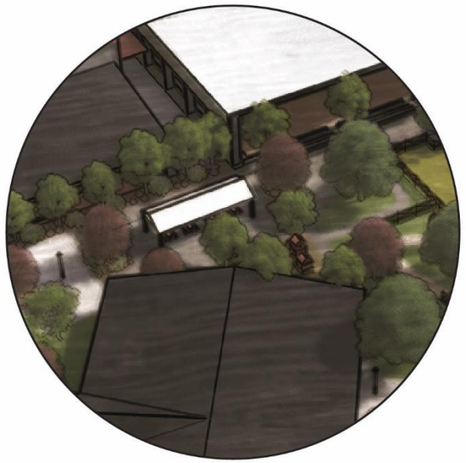
Loading Zone

This is where supplies, materials, horses, etc. will be loaded and unloaded on the site. The loading zone has direct access to the EAAT Main stalls, the equine living system access road, hay barn, and outdoor arena.

FAMILY AREA

The family area is meant to be a place where the families of clients can be entertained and enjoy their own space while their loved one is participating in equine therapies and activities. There will be a small playground, trees for shade, access to mini horses, and a pavilion.

From the family area, there will be a clear view into the outdoor arena and direct access to the arena seating. Not only will this space be for families, but will also be a place for groups to enjoy small events. The veterans garden will also have direct access into the family area.



Playground

The playground should be accessible for children with or without wheelchairs. The playground should be simple and have similar colors to the surrounding structures. This is meant to keep the ranch/farm theme consistent.

Mini Horse Access

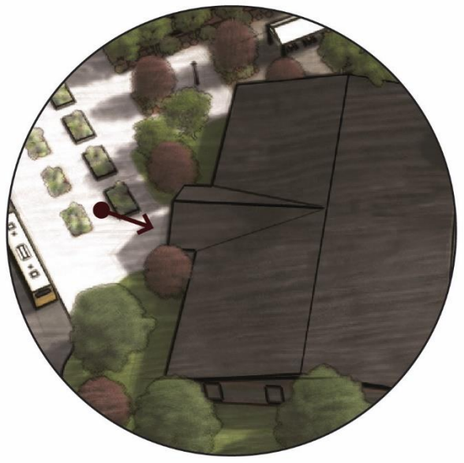
The Mini horses will be located right next to the family area. These horses love to socialize. Allowing visitors to interact with these mini horses will allow them to feel welcomed and part of the EAAT family while filling a social need for the horses.

Pavilion

The pavilion will be designed to match the materials and colors of the surrounding structures to promote the ranch/farm theme. Multiple events for the EAAT and veteran programs will be held at the pavilion. Outside of events, it will be opened to the public for use.

VETERANS CENTER ENTRANCE

The Veterans Center is meant to be a sanctuary for veterans. The architecture should allow all visitors to feel welcomed and comfortable. The entrance is designed to be covered with benches for sitting, visiting, and relaxing. There are also large trees and natural plantings to help lower anxiety and stress. The building materials and color will match the EAAT Main Building.



VETERANS CENTER GARDEN

The Veterans Center Garden is located on the southwest side of the Veterans Center. The Veterans center will have direct access and views to the garden.

Veterans and volunteers will learn to grow produce. The veterans will be able to keep produce that they grow or sell it to local farmers markets. This is a recognized therapeutic activity for veterans.

Not only will growing boxes be located within the garden, but also maintained planting beds and ornamental trees. When a veteran needs a time for reflection and relaxation, they will always be able to come to the garden for peace and refuge.

From the garden, veterans will have direct access to the equine living system of the horses they ride. This will allow veterans to strengthen their connection with their horse and provide a different kind of access when other options are not desired or available in the moment.

The garden walkways will mostly be concrete. The main access from the building to the garden will be made of concrete paver. In between the garden boxes, the paths will be compacted gravel that is ADA accessible.

SENSORY TRAIL

A sensory trail will be located just behind the Veterans Center Garden. The only access to the sensory trail will be through the main equine living system access road. This allows for easy transport of horses and appropriate seclusion.

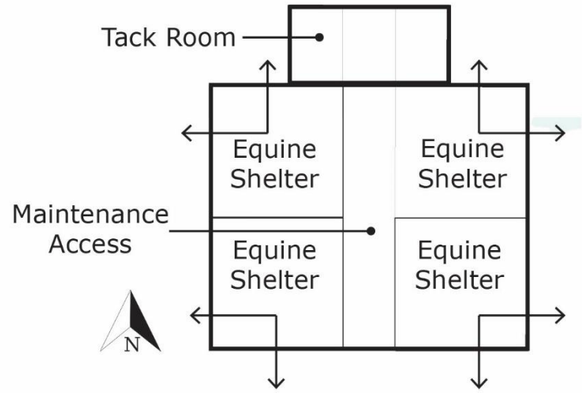
The sensory trail will have multiple therapeutic sensory stations for clients to interact with. The students will likely be designing and placing new stations annually throughout the trail. The sensory trail will be used by all clients.

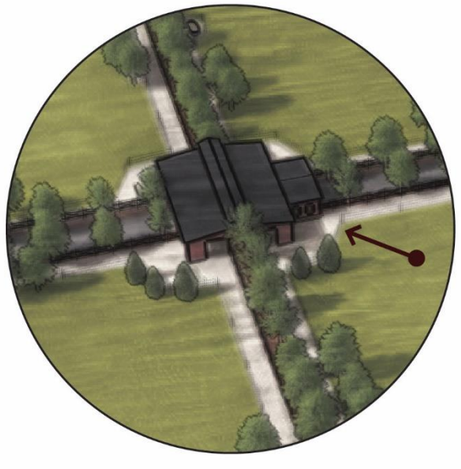
MAIN EQUINE SHELTER

The main equine shelter will be the unifying point for all four equine living systems. That provides a covered and separated shelter space from other equine living systems. There is also a main access path that goes right through the shelter which will allow maintenance vehicles to pass through.

On the northern end of the shelter will be a tack room. The tack room attached to the shelter is needed for functional purposes until the EAAT Main Building can be constructed. The shelter will be constructed before funds are raised for the EAAT Main building. Therefore, a tack room will be needed in the shelter.

The shelter is oriented on a 15 degree angle to take advantage of breezes and shade. Garage doors will be placed at all opening to adjust for winds at different times of the seasons. The shelter will be constructed of similar materials and colors as the rest of the facilities.



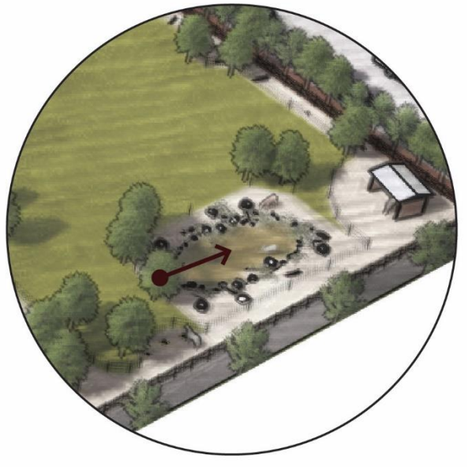


POND

Horses love to play and bathe in water. Especially during the summer months when it is hot and dry outside. Ponds are therapeutic for equines. The banks of the pond should remain muddy in order to promote the natural equine behavior of "mud rolling". This helps to protect their coats and cool them off.

The pond is located in one of the equine living systems. It is not all-accessible to that specific equine living system. It will be blocked off from the main track with electric fencing. All horses will have scheduled access to the pond.

The pond will also act as a seasonal retention pond for the entire site. However, water may need to be drained out of the pond into another retention or disposal source because it may not be able to hold the maximum capacity of water run-off. The pond should be no deeper than 3 feet and should be wide enough to hold multiple horses at once.



EQUINE AMENITIES DESIGN

Each equine living system is designed to be about 1.5 acres and will accommodate 4-5 horses. The horses will be placed in a living system with horses with similar energy levels and needs. Each system will have special amenities and elements that promote natural equine behaviors.

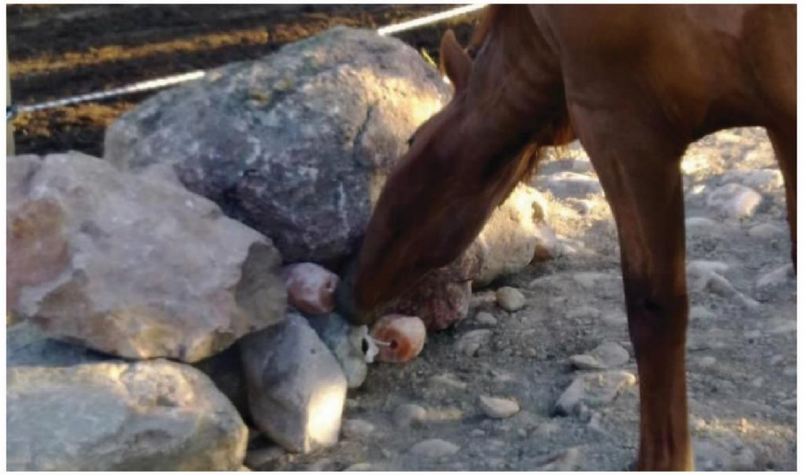
The living systems are designed to encourage the horse to move constantly throughout the day just like they would if they were in the wild. In the living systems they will search for food and water, find desirable minerals (salt), and be free to do as their natural instincts would have them do.

Natural equine behaviors are healthier for the horse to practice. The healthier and happier the horse, the more predictable. The more predictable they are, the safer they are when being ridden by the clients and students.

BARK, STICKS, LOGS, AND LEAVES

Random sticks, logs, and branches of various sizes will be placed along the living system tracks. Non-toxic leaves may also be placed along the tracks. The consumption of clay, bark, twigs, and leaves can promote gut motility.

Sticks and other objects can be placed in the living systems to promote balance and texture sensitivity as horses walk or step over them.



SALT LICKS

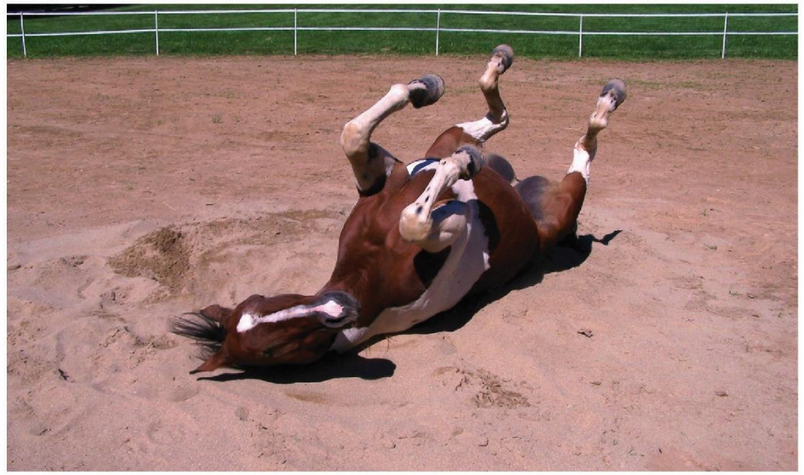
Salt licks will be placed in a designated location within all track systems. To encourage natural foraging, the salt licks will be placed within and along large rocks.

Salt is important for equines to have because it helps to regulate body fluid and aid in digestion. Horses are naturally drawn to minerals and salt because they lose so much by sweating.

MOUND

A range of slope allows the horses to exercise different muscles. It also satisfies their natural instincts to observe their surroundings and watch for predators. Higher ground allows them to get a better view, therefore, having a strong sense of security.

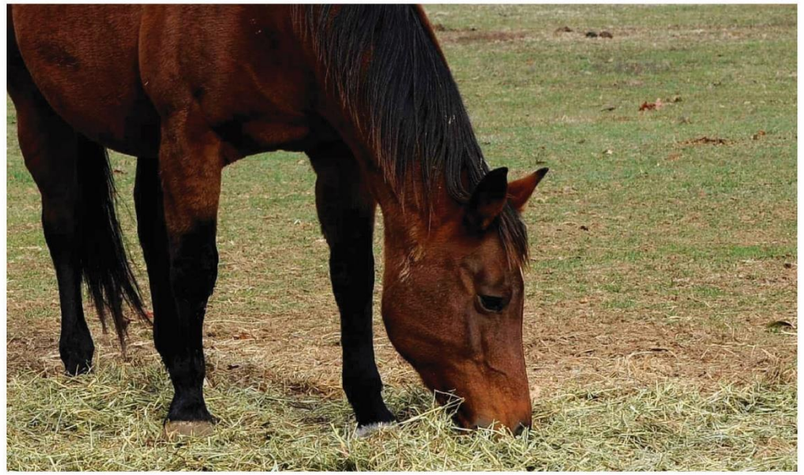
Horses also tend to rest in higher elevations because they are cooler and have less insects.



SAND PIT

Rolling in fine textured dirt or sand is a natural instinct of horses. There are different reasons that rolling, also known as 'dusting', could be customary for horses. It may protect their coats, filter out insects, give them a nice message, etc. Rolling sites are part of a natural equine home-range social structure and should be in each equine living system.

Sand pits should not be placed close to the pond. It will create unwanted mud pits. They should also be large enough to accommodate multiple horses at once.



FEEDING/WATER STATIONS

Feeding and water stations will be placed sporadically throughout the living system track. This will allow for horses to continually move throughout the day. It will also give them time in between feeding which is better for their digestive tracks. They should not eat from slow-feeders nor should they eat out of feeders that require them to lift their necks from the ground because unnatural foraging posture can lead to pulmonary disease. Dark sky compliant down light will be placed along track to promote nocturnal grazing which helps the horse to maintain a healthy sleep cycle.

Hay piles within a station should be spaced out at a minimum of 5'. In order to discourage stagnancy, copious amounts of hay should not be placed in a station at once.

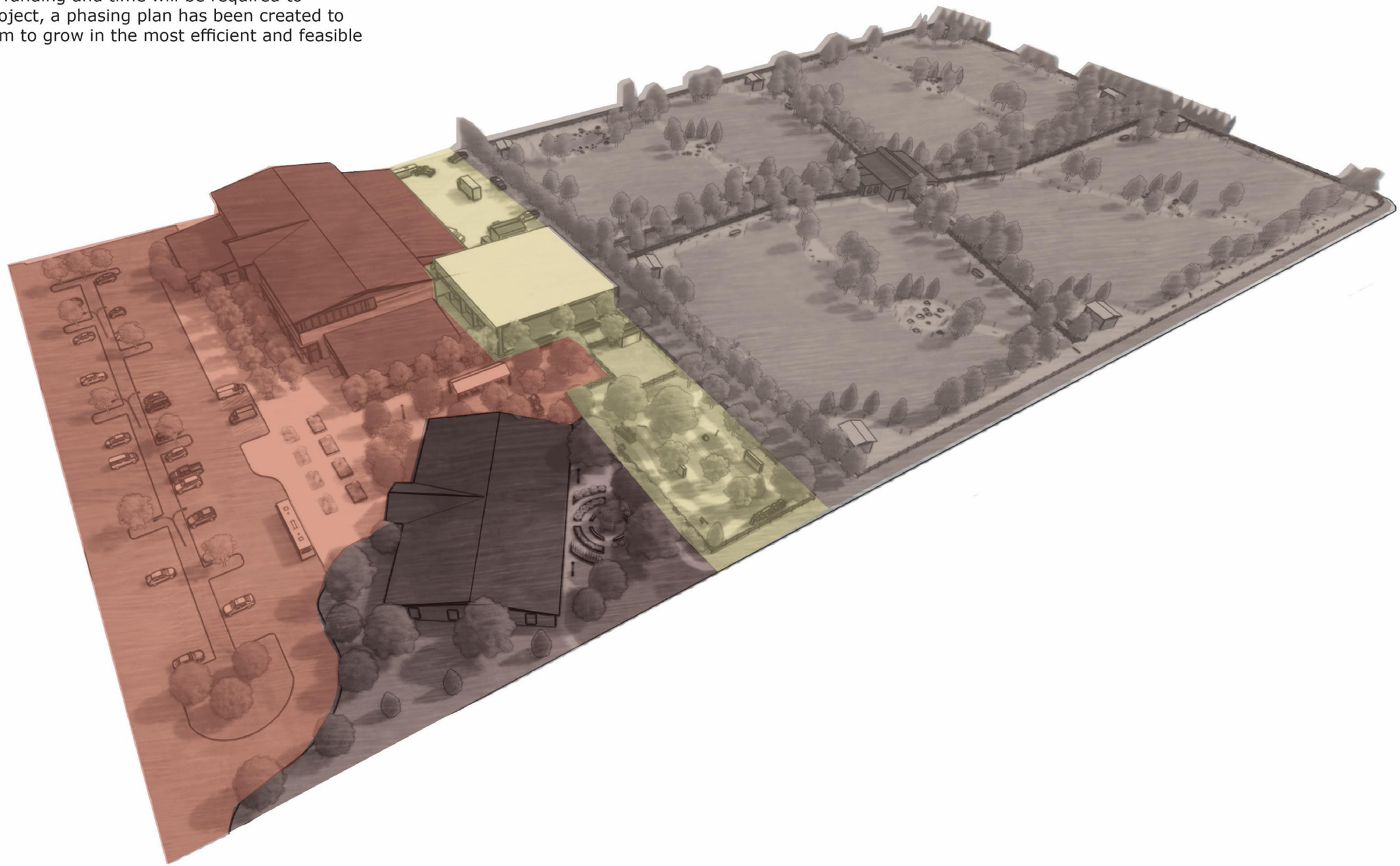
FENCING

Electric fencing is the best kind of fence that can be used within the equine living systems. It is adjustable and the program can change paths as they see fit. Electric fencing also prevents the horse from destroying the fencing by biting or learning on it.

The parameter fencing will consist of a more permanent fencing type. One that fits the desired aesthetic and is durable.

PROJECT PHASING

Since significant funding and time will be required to complete this project, a phasing plan has been created to allow the program to grow in the most efficient and feasible way possible.



PHASE 1

1. Main Equine Shelter/Tack Room
2. Equine Living Systems
3. Access Path

PHASE 2

1. Outdoor Arena
2. Sensory Trail
3. Mini Enclosure
4. Hay Barn/Storage

PHASE 3

1. Main EAAT Building/Indoor Arena
2. Covered Walkway (Connection to Outdoor Arena)
3. Family/Public Area
4. Parking Lot

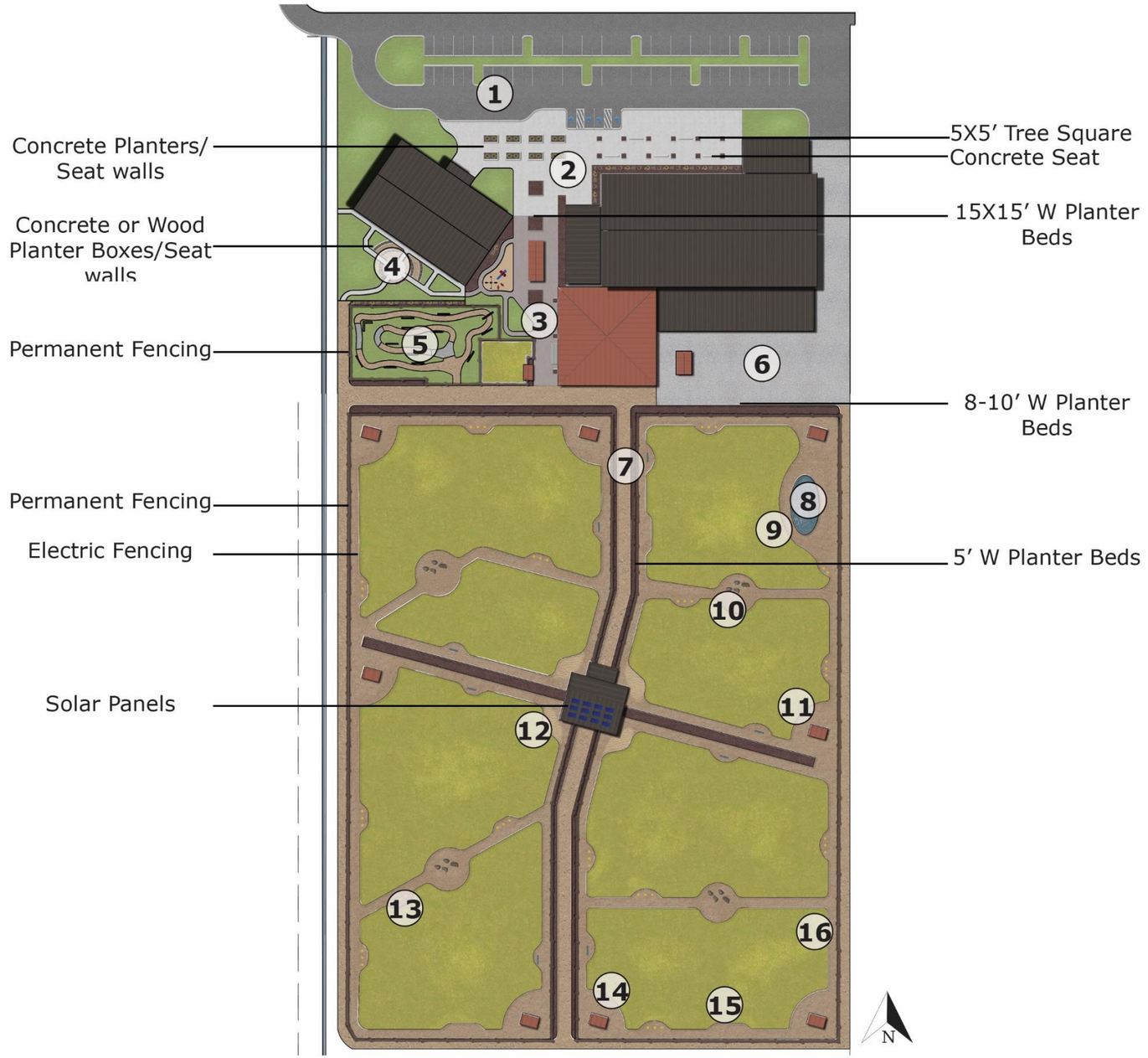
PHASE 4

1. Veterans Center
2. Veterans Center Garden

COMPLETED MASTER PLAN

MASTER PLAN MATERIALS/ DIMENSIONS

1. **Parking Lot** - surfaced with asphalt
2. **Entrance Area** - concrete sidewalk
3. **Outdoor Event/Family Area** - decomposed quartzite
4. **Veterans Center Garden** - concrete paver and sidewalk
5. **Sensory Trail** - dirt trail
6. **Loading/Hay Barn/Storage Zone** - gravel
7. **Main Maintenance Access Road** - dirt or gravel path
8. **Pond** - no deeper than 3', total area is 1,390 SF
9. **Pond Banks** - must remain muddy at all times
10. **Saltlick Areas** - total area is about 1,200 SF each
11. **Mini Shelters** - 18'X12'X12', shelters are to be double sided and need to be oriented in line with the main shelter
12. **Rolling Site/Sand Pits** - total area is about 400 SF each
13. **Feed/Water Stations** - should be about 20'-30' in length with a depth of about 10'
14. **Resting Areas** - total area is about 2,000 - 2,500 SF
15. **Mounds** - gravel and/or dirt
16. **Equine Living System Trail** - to be only 10-15' wide and are primarily dirt


Concrete Planters/
Seat walls
Concrete or Wood
Planter Boxes/Seat
walls
Permanent Fencing
Permanent Fencing
Electric Fencing
Solar Panels
5X5’ Tree Square
Concrete Seat
15X15’ W Planter
Beds
8-10’ W Planter
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5’ W Planter Beds
1
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IMAGE CREDITS

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a. EAAT Horse Image

https://advs.usu.edu/equine/index

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a. Horse Sketch

https://www.needpix.com/photo/download/322892/horse-drawing-pen-art-artwork-free-pictures-free-photos-free-images-royalty-free

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a. Girl, Horse, and Wheelchair (Edited)

https://i.pinimg.com/originals/27/91/2d/27912ded0d82b4b377582ac70a5aa249.jpg

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a. Girl Riding Horse

https://dailyegyptian.com/69421/news/equine-therapy-helps-kids-take-new-steps/#photo

b. Girl Face-to-Face with Horse

https://www.newportacademy.com/resources/treatment/equine-assisted-therapy/

c. Veteran with Horse

https://archive.defense.gov/dodcmsshare/photoessay/2012-08/hires_120802-F-UN972-005.jpg

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a. Icons

https://thenounproject.com/

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a. Boy Riding Class

https://www.pegasusrides.com/ways-to-be-involved/volunteer/

b. Fieldstone Farm Site

https://www.fieldstonefarmtrc.com/about-us/contact-directions/

c. Horses on Track System

https://secureservercdn.net/166.62.113.120/c5b.dbf.myftpupload.com/wp-content/uploads/PP-Lompoc-Jill-Willis-3.jpg

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a. Pegasus Project Boy Riding

https://www.yakimaherald.com/boldtype/dream-turned-mission-the-pegasus-project/article_761b7df0-63e6-11e6-a81a-7f3eace6ba91.html

b. Pegasus Project Logo

https://www.pegasusrides.com/wp-content/themes/pegasus-ridesh/dist/images/logo.jpg

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a. Fieldstone Farm Girl on Horse

https://www.fieldstonefarmtrc.com/about-us/

a. Fieldstone Farm Logo

https://www.fieldstonefarmtrc.com/wp-content/themes/plakat/img/fieldstone-farm-logo-orig.png

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a. Paddock Paradise Horses

https://secureservercdn.net/166.62.113.120/c5b.dbf.myftpupload.com/wp-content/uploads/Encourage-movement.jpg

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a. Old Main (Edited)

https://www.usu.edu/alumni/

b. South Farm Hillyard (Edited)

https://www.advs.usu.edu/facilities

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a. Sheep

https://www.youtube.com/watch?time_continue=6&v=Hdf_u7HgD30&feature=emb_logo

b. Hillyard Building

http://www.jacobsenconstruction.com/projects/usu-matthew-hillyard-animal-teaching-research-center/

c. Skaggs Building

https://advs.usu.edu/equine/education-center

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a. Classic Red Barn

https://agriskadvisors.com/new-tricks-for-an-old-ranch-adding-prf-to-the-risk-management-plan/

b. Naturalistic Planting

https://gardeninggonewild.com/wp-content/uploads/2015/08/holt_925_054_1500c.jpg

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a. Outdoor Arena

https://lichenoaksarc.org/facilities/

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a. Hay Barn and Storage

https://www.jonwilliamstables.co.uk/equestrianbuildings-assets/horseboxgaragehaybarn.jpg

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a. Playground

https://www.gametime.com/news/how-do-i-build-a-playground

b. Family Petting Mini Horse

https://i0.wp.com/eccurrent.com/wp-content/uploads/2019/03/Obloy-Farms-Petting-Zoo-14.jpg?ssl=1

c. Pavilion

https://www.gazebocreations.com/structurepath/221/pavilion

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a. Veteran Gardening

https://www.brainerddispatch.com/lifestyle/home-and-garden/4612905-Gardening-101-Young-and-old-learn-the-benefits-of-a-garden-at-Northland-Arboretum-classes

b. Female Veterans Gardening

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c. Veteran in Wheelchair Gardening

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a. Sensory Pipes

https://www.youtube.com/watch?v=usSzRGaNtl0

b. Sensory Noodles

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c. Sensory Birdhouse

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a. Pond with Horses

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a. Bark, Sticks, Logs, and Leaves

https://fineartamerica.com/featured/micah-and-his-stick-terry-kirkland-cook.html

b. Saltlick

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c. Mound

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a. Sand Pit

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b. Horse Feeding

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c. Electric Fence

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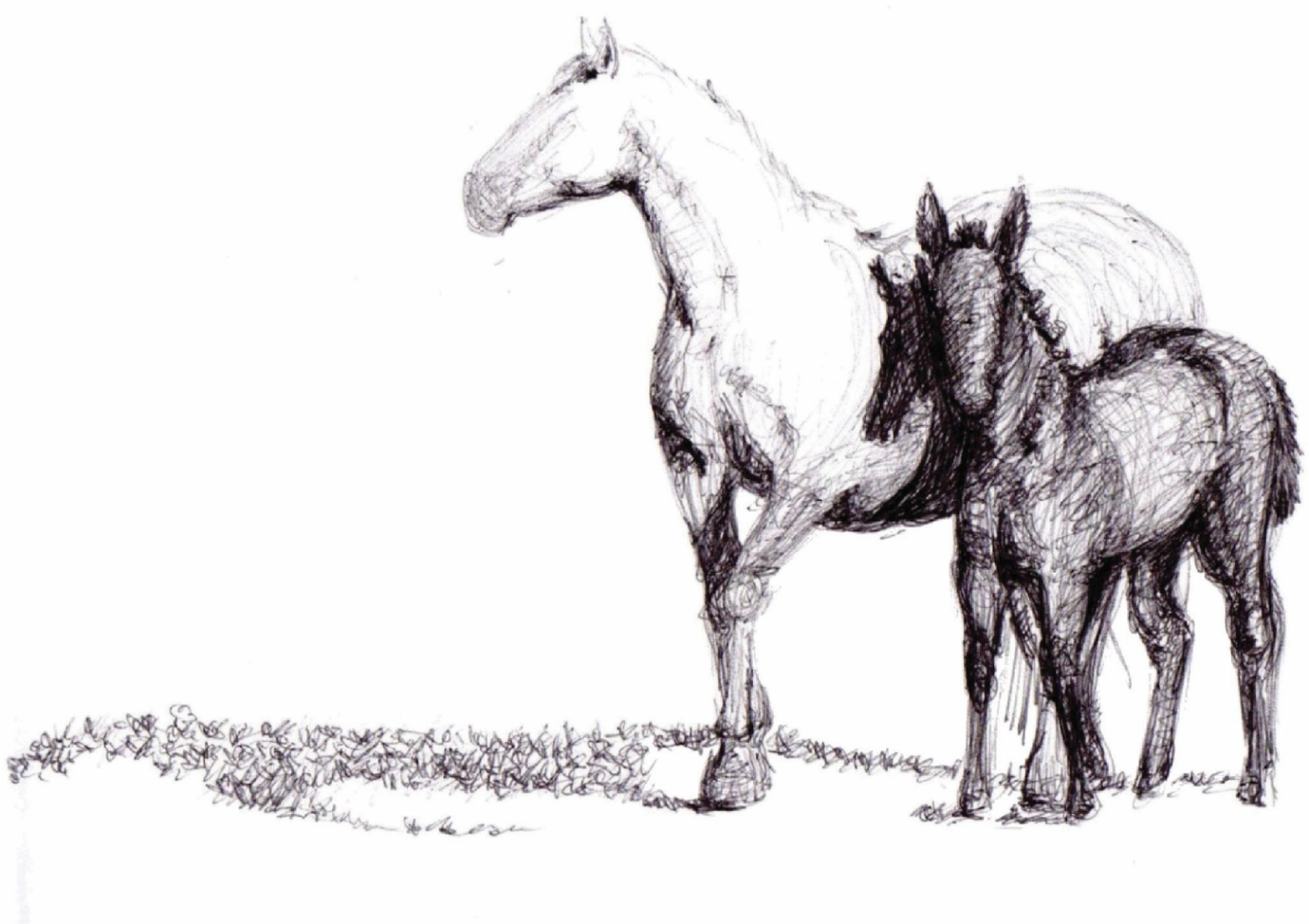
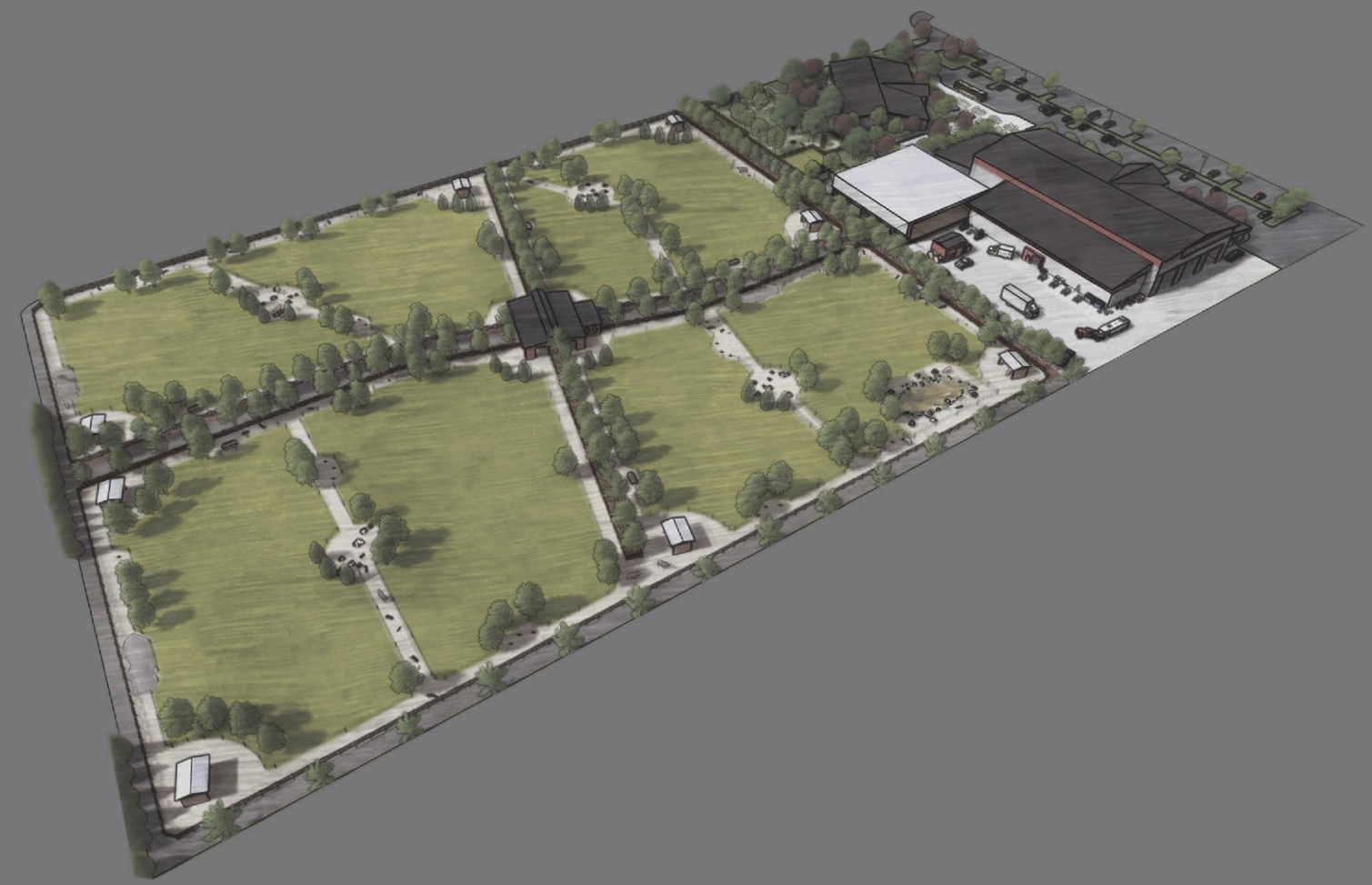
a. Mare and Colt Sketch

https://pxhere.com/en/photo/751468





CHAPTER V

DISCUSSION

Purpose Statement

Equine Assisted Activities and Therapies (EAAT) is a recognized therapeutic approach for persons with disabilities. The USU Animal, Dairy, and Veterinary Sciences Department provides EAAT instruction and services; however, they do not have the appropriate facilities to model best-practices in the delivery of these services. This design research development is a phased masterplan to support the instruction and delivery of equine-assisted activities and therapies in an innovative and accessible environment that supports animal-assisted intervention and natural equine behaviors.

Findings/Design Principles

After researching natural equine behaviors from various books and articles, multiple design principles to promote natural equine behaviors in a domestic setting were discovered. These design principles were applied to create a new way to board and care for domestic horses with the horses' well-being in mind. The idea of creating a more natural way to board and care for domestic horses stemmed from the book *Paddock Paradise: A Guide to Natural Horse Boarding* by Jayme Jackson. However, the design suggestions in his book are anecdotal. An evidence base was sought to support design principles based on natural equine behaviors. After further research on natural equine behavior and health, multiple suggested design principles by Jackson were supported, while others were not supported by the evidence base. Additional design principles were discovered as well. Most of these design principles derived from the

evidence presented in the secondary source *Equine Behavior: A Guide for Veterinarians and Equine Scientists* by Paul McGreevy, considered a seminal text regarding equine behavior.

Multiple design principles based on the equine need for consistent locomotion throughout the day provided form to the equine living system. A standard paddock consists of about 1.5 acres (about half an acre per horse in the system). These 1.5 acres include the trail and pasture space inside the equine living system. This equine living system model will house no more than five horses at a time, due to social hierarchy and the number of resources provided within the paddock.

The parameter fence of all paddocks will be a permanent fence structure. Fences at corners should always be rounded, in order to avoid fighting and injuries. Resources should never be located right by a corner. A 10-15' electrical inner fence will offset the parameter fence. This spacing encourages equines to keep moving around the perimeter of the paddock. It also gives space for two or three equines to walk side by side or pass one another. The fence must be electric, due to the fact that electric fences are easily adjustable to create different spaces to best meet the needs of the horses. The inside fences are adjustable in order to cater to the promotion of the natural equine need for choice.

Multiple pathways will be available to the horses within the equine living system, mimicking their natural home range. In the wild, equines do not constantly repeat the same route. In order to promote their natural behavior of choice through different routes, various types of resources will be placed along different paths, just like they would be in a home range. There will be wider areas within the track system to place varying amenities for the horses to stop, eat, sleep, and play. These areas should be large enough to accommodate the entire group of horses within the living system at once.

Since a horse's survival is the driving force behind their movement, multiple design principles are based on natural equine feeding and foraging behaviors. Horses naturally forage and graze the majority of the day (12-16 hours). To promote movement and encourage natural foraging behavior, feeding and water stations will be placed randomly throughout the living system.

Due to a horse's need for personal space while feeding, hay piles within a feeding station will be placed, at minimum, 5 feet apart. The hay piles will be placed on the ground because other methods, such as hay nets or troughs, do not adhere to the horse's natural feeding posture and can lead to pulmonary disease. Additional foraging vegetation and natural minerals, such as non-toxic trees, non-toxic shrubs, branches, logs, clay, saltlicks, leaves, and humus, should be placed sporadically throughout the living system as well to encourage the natural equine foraging behaviors and allow the horse to regulate its own body's mineral needs.

Saltlicks, in particular, require their own designated area. Salt is a necessary mineral that is a major part of home-range foraging and a major contributor to equine health. In order to promote natural equine foraging and pawing behavior, saltlicks should be placed partially in the ground or somewhat camouflaged in between or among rocks.

Foraging should not only take place during the day. Nocturnal foraging naturally promotes equine resting behaviors, such as drowsiness and sleep. However, visual assessment is limited for horses at night. Therefore, they are more reluctant to forage and are more likely to consume toxic novel foods. It is proposed that lights be placed by a couple of feeding stations and a water station at night to encourage nocturnal foraging.

Other behavioral instincts besides feeding and foraging promote movement throughout equine systems. As mentioned previously, there should be designated areas throughout the track

to promote varying types of exercise, resting, hygiene, and play. There should be multiple designated, semi-shaded wider spaces within the equine living systems to promote natural resting behaviors. Trees are also a good source of shade. The equine living system should be lined with tree clusters in order to create shade spots for horses. Trees also act as needed windbreaks to block cold and hot winds.

Horses also tend to rest in places of higher elevation. Since the project site is flat, a mound of dirt or gravel should be placed in a specific location within the living system. This not only provides a place for equines to rest but is also a good source of exercise. In addition, it allows equines to see further, which reduces anxiety by giving them the ability to survey their surroundings for predators, another natural equine behavior.

Other than the main equine shelter, other smaller shelters will be placed within the living systems. There should be a shelter in each "corner" of the track in order to prevent a more dominant horse from controlling resources. Enough space should exist between the shelter and the rounded fence corner to avoid conflict between horses for resources. The shelters should be located in the "corner" of a living system but should be located in a large enough space so as to not be close to an actual corner. Again, resources should not be placed directly in or close to corners, even if rounded. There should be four shelters in each equine living system to allow horses both constant protection from the elements and choice. Ideally, there should be a shelter and feeding/watering location for each horse within the track, so that each individual could have access to a separate resource if social conflicts arose within the group.

Other resources should only be singular because they promote social hierarchy and group bonding. One of these resources is known as a "dusting site" or rolling area. As somewhat of a social and hygienic ritual, groups will stand at a dusting site and take turns layering their coats by

rolling in the dirt. Therefore, a sandpit/rolling area should be placed in each equine living system. The sandpit should be large enough to fit a couple horses at once. However, there are no specific maximum size requirements.

Another resource is a watering hole or pond. Equine living systems can have more than one pond. A pond allows horses to drink, wade, bathe, and cool off during hot days. Ponds should be no deeper than three feet and should be able to accommodate multiple horses at a time. Ponds should have a constant water level and sloped banks, as horses enjoy rolling right after they get out of the water and typically use the banks of the pond for "mud rolling." A pond with muddy banks promotes natural equine hygienic and play behaviors. Other rolling/dusting sites should not be placed close to the pond. They are not meant to be muddy areas.

Master Plan Summary

The goals were to design a master plan for future facilities to accommodate both the growth of the EAAT program and the needs of the community. Reflecting the equine behaviors documented in the literature review and described previously, the master plan was designed to promote equine health for the benefit of the horse and those utilizing the horse for therapeutic purposes. Overall, the master plan will facilitate safety, healing, and learning for all users.
The final master plan consists of two main sectors, the equine living area and the human area. Since equines are meant to use part of the human area, a transitional area was also established between the two sectors. The human sector consists of the parking lot, a bus drop-off zone, an entry plaza, the Main EAAT Building, the loading/storage area, the Veterans Center and garden, and the public/family area (pavilion, outdoor arena observation area, and playground). The transitional sector consists of the hay barn, the outdoor arena, the sensory trail, and the miniature

horse enclosure. The equine living area consists of access and maintenance roads, a main equine shelter, four equine living systems (each designed according to research-based design principles), and a retention pond/water hole.

Lessons Learned

As a landscape architect, I have been trained to focus on the human elements of design. In some projects, I have also studied wildlife and the environmental impact of design. However, I have not yet designed any project specifically for a domesticated animal, such as a horse. Not only did I have to design to accommodate horses during their interaction time with humans, but I had to design specifically to promote their well-being.

It was incredible to study scientific information on equine anatomy, brain function, and social structure. I never realized how similar equine needs for freedom and choice were to our own. It was quite the process to research enough credible sources to identify and support new design principles to promote equine behavior. It really stretched my brain and brought me out of my comfort zone. I feel like I am a better designer as a result, because I better understand that there are major complexities to each organism, and it is necessary for their needs to be accounted for when designing.

Although the research and theoretical side of this project was generally straight-forward, the application part of this project, I later learned, was quite a complex process. Even when everything looked obvious on paper to me, involving the client and other professionals gave me a dose of reality. In those conversations, financial limitations, personal bias, and multiple discipline expertise were involved.

After meeting with the client, mutual understanding was clarified through the proposal process. I was able to come up with concepts and dimensions that fit the program needs and the client's desires. However, I have not been trained as an architect and could not produce real building footprints. As the project continued, architects came on board to come up with building footprints. This proved to be the most difficult challenge of the entire process.

As a graduate student, some professionals would not take me seriously. The architects would not take time to listen or understand that I had already identified the relationships they needed to know in order to design the buildings accordingly. They would ignore me and go straight to the client. The client would then have to explain to them what they had already taken hours, days, and weeks to explain to me.

After the architects attempted to start from scratch and ignore my thoroughly researched design and months of work, the university attempted to force them to work with me. I traveled multiple times to their firm to work with them on the project, but each time, I was directed to sit in a corner and work on the project with minimal collaboration. Later, they would present the client with designs we did not agree on. Eventually, they turned in their final product to the client. Not surprisingly, the client was displeased because it was not what they wanted.

Even though this was a frustrating experience, it taught me important lessons that I needed to learn. As a graduate student, I was very intimidated by professionals in the field, especially professionals that did not give me any credibility. However, I knew I had done my research and truly listened to the client. There was one meeting in particular that changed how I viewed myself as a professional. This meeting consisted of the university's facility development representatives, the EAAT program director, the ADVS department head, and the hired architects. It was the first meeting that my professor could not attend, so my crutch was gone.

During the meeting, the architects presented their latest unfinished design, ignoring some major design suggestions the client had mentioned in the previous meeting. I had also come prepared with a completed concept that addressed the client's desires. After the architects finished presenting their work, I knew that I had something the group would like and could give real feedback on. I was nervous, but due to my preparation, I had the research to back up all of my claims comfortably. I then shared my concept with the group. They were ecstatic. I was able to get real feedback while also earning credibility points. In that moment, I felt a boost of confidence I had never felt before. For once, I felt like I actually belonged in that room.

From this experience, I learned that preparation pays off. Even though I did not have years of experience, I had credible information that proved to be sufficient. I also learned that sincere communication is a major part of what I will do as a professional. Throughout the process, I was able to ask the client specific questions and pay close attention to their answers. After seeing my design, the client could tell I had been listening closely. A successful landscape architect needs to be a great communicator, and a great communicator needs to be a great listener.

Despite such confidence-promoting experiences, I also learned a great deal about the process of implementing a design. This design is not yet implemented, and due to needed funding, it most likely will not be fully implemented for a long period of time. However, I learned that hours of a designer's work consist of communication with the client. I also learned that for large projects, many, many hands are involved and necessary to make it possible to implement.

After meeting with facilities, I understood that there were certain maintenance limitations and opportunities that later helped me decide what did and did not need to be located on the site.

After speaking with the development accountant, I also realized that there was no pile of gold in the university's vault to pay for this. Donors would be a massive part of funding the project. As I better understood the potential financial limitations, I started to make design decisions that would reduce cost.

There are many lessons I have learned during this project. The experiences that allowed me to learn some of these valuable lessons, I would not trade for the world. These experiences have definitely helped lay a positive foundation for my future career. I now have more confidence in my abilities and the real-world experience needed to counteract some of the naivety that comes with being a student. I have seen and understand better the power of communication and listening. I have a deeper understanding of designing for complex systems. And I have significantly developed my problem-solving skills.

Limitations

There were multiple limitations to this study. One was that there was very limited information and credible case studies regarding natural equine boarding. And while design principles may have sufficient research to support their implementation, other ideas may prove more convenient or successful after implementation and observation of the design. There is a significant opportunity to conduct research on the design principles implemented in the EAAT master plan, using this site as a research setting.

Another limitation was my own limited knowledge of the EAAT program and current facility functions. Even though I had spent hours speaking with the client and students to understand these relationships, I still had a limited understanding. I covered the basics and could

comprehend many complexities. However, since I am not a daily user of the space, some design ideas may prove less efficient for those consistently using the facilities.

Another limitation is the fact that not all of the equine living system design principles will be implemented. Due to financial and maintenance limitations, certain design principles, such as non-toxic vegetation foraging and night lighting, will not be implemented. And as the project is being built, decisions may be made to discontinue implementation of various design principles. As a result, some of the principles may never be tested in this particular project.

Next Steps

The next steps include Phases Four through Seven: construction drawings, implementation, post-construction, and maintenance. The university will need to hire design professionals, such as architects and landscape architects, to finalize a master plan and create construction drawings. All of these steps will be preceded by fundraising activities to acquire the necessary capital.

This master plan was a best-practice experimental design. There are many future projects that can stem from the equine living system design in particular. Students can observe equine behaviors and confirm whether the suggested design principles prove accurate. Others can suggest new improvements to the equine living systems based on new scientific information regarding natural equine behaviors. Again, there are many future research opportunities that can stem from this project. Overall, the results of this project will positively impact the lives of each user for generations to come by providing an environment of safety, healing, and learning.

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Figure 2. Normal fenced paddock with horses (Left), Track surrounding paddock (Center), Track with wider areas designated to promote natural equine behaviors (Right). L.C. Smith, 2020.

Figure 3. Natural Foraging Posture. Retrieved from URL https://www.publicdomainpictures.net/en/view-image.php?image=304275&picture=pony-eating-hay

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