

Therapeutic Equestrian Trails

Sensory Trails in Hippo-therapy to Help Children and Young Adults Struggling with Anxiety and Depression Sensory Processing Disorder

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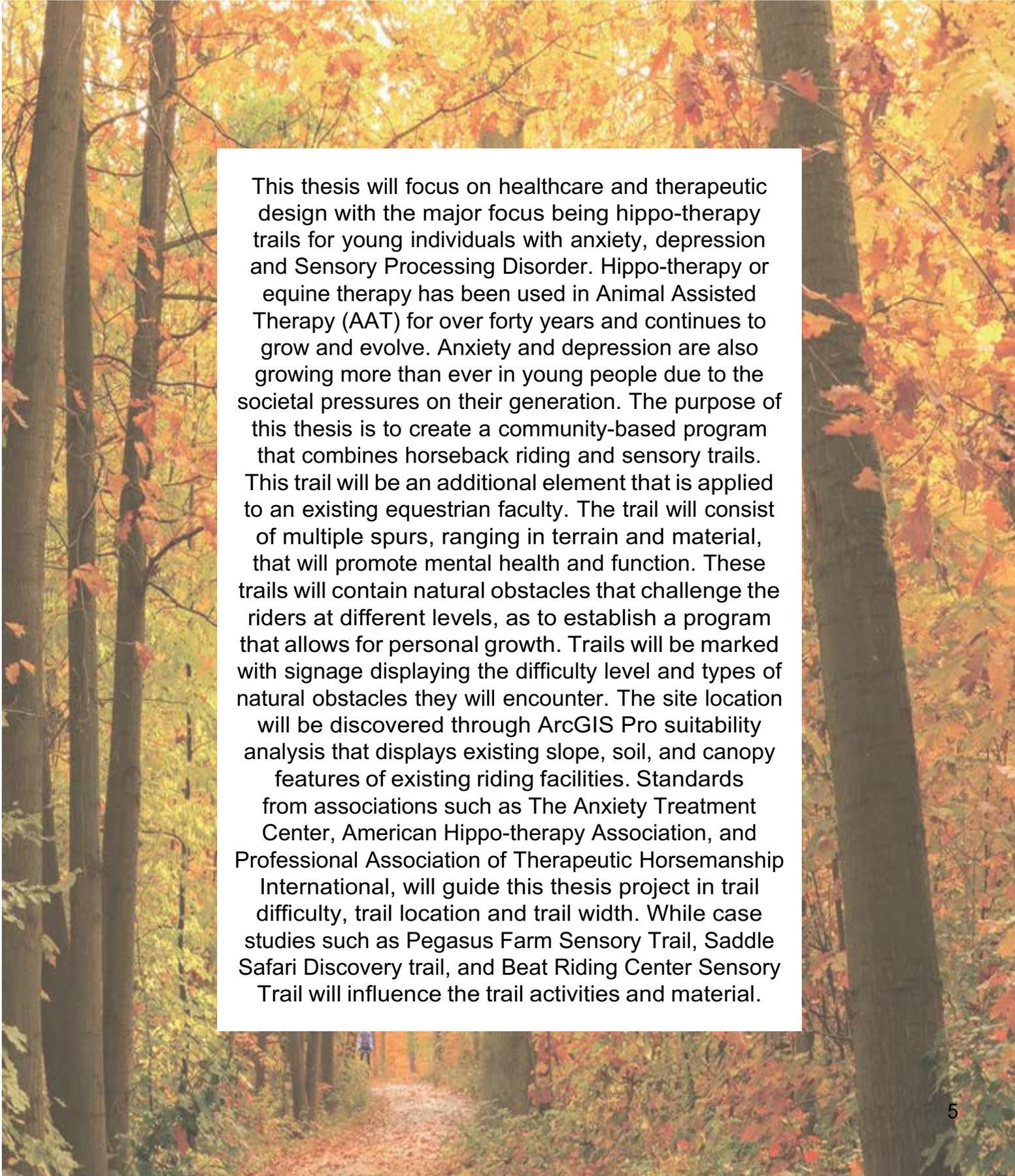
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Thesis Abstract



This thesis will focus on healthcare and therapeutic design with the major focus being hippo-therapy trails for young individuals with anxiety, depression and Sensory Processing Disorder. Hippo-therapy or equine therapy has been used in Animal Assisted Therapy (AAT) for over forty years and continues to grow and evolve. Anxiety and depression are also growing more than ever in young people due to the societal pressures on their generation. The purpose of this thesis is to create a community-based program that combines horseback riding and sensory trails. This trail will be an additional element that is applied to an existing equestrian facility. The trail will consist of multiple spurs, ranging in terrain and material, that will promote mental health and function. These trails will contain natural obstacles that challenge the riders at different levels, as to establish a program that allows for personal growth. Trails will be marked with signage displaying the difficulty level and types of natural obstacles they will encounter. The site location will be discovered through ArcGIS Pro suitability analysis that displays existing slope, soil, and canopy features of existing riding facilities. Standards from associations such as The Anxiety Treatment Center, American Hippo-therapy Association, and Professional Association of Therapeutic Horsemanship International, will guide this thesis project in trail difficulty, trail location and trail width. While case studies such as Pegasus Farm Sensory Trail, Saddle Safari Discovery trail, and Beat Riding Center Sensory Trail will influence the trail activities and material.

The number of adolescents reporting symptoms of major depression within a twelve months period increased 5 (from 8.7 percent to 13.2 percent) 2 percent from 2005 to 2017 and young adults reported a 63 percent (from 8.1 percent to 13.2 percent) growth. When adults were assessed at consistent times, they described no significant growth rate in depression. Experts researched explanations for this increase and determined the most like cause was social media use and decreased sleeping hours in young people. Sensory disorders are very common as well averaging 1 in 6 children have sensory issues.

Hippo-therapy or equine therapy is being implemented into many Animal Assisted Therapy (AAT) associations throughout the united states. Teaching responsibility, respect, and structure has proven beneficial in promoting mental health stability and are all qualities obtained through therapeutic horsemanship. Horses have been utilized in Animal Assisted Therapy (AAT) since the 1970's but writings on the health advantages of riding horse date back to 460 BC. In 1875, French neurologist Charles Chassaignac conducted an experiment where he recorded horseback riding improving mood, balance, and joint movement in his patients. More studies followed Charles Chassaignac's resulting in associations such as The Anxiety Treatment Center, American Hippo-therapy Association, and Professional Association of Therapeutic Horsemanship International.

Standards from these associations will guide this thesis project in trail complexity, trail location and trail size. While case studies such as Pegasus Farm Sensory Trail, Saddle Safari Discovery trail, and Beat Riding Center Sensory Trail will influence the program elements. Completing suitability analysis via Arc-GIS will locate optimal equestrian facilities for implementing this design feature.

Narrative Cont.

I had the privilege to grow up with horses and I continue to compete with them to this day. Currently my mother owns seventeen horses and leases them out to 4-Her's and their families. There are nine children at our barn and their all come from varying backgrounds and home-lives. I have seen amazing mental growth with the children that have had behavioral problems, show anxiety, depression, and SPD within the last few years. Riding became their sanctuary, their home away from home, the bond these children have made with their horses will last a lifetime. I want to see this mental health treatment grow to greater height and I believe that there is a way to do it through my career as a landscape architecture student.



Project Typology

The typology for this thesis will be sensory trails system with unique challenges for riders of various level and interests. This trail will be integrated into an existing hippo-therapy facility that caters to children and young adults with anxiety and depression.

This project will use existing hippo-therapy sensory trails to inspire a nature and plant material based trail that encourages the interaction between young people and the outdoors. This site consists of similar project elements but developed through the lens of landscape design.

The design of this all natural sensory trail form hippo-therapy will be easily applied to sites with similar typologies and programs. Creating an all natural version of hippo-therapy will allow clients to amplify there emotional healing through nature.

This new trail system will incorporate natural healing practices that are new in this line of therapy further integrating emotional therapy with equines. This result will be a design solution that provides a new innovative approach to the interfacing of landscape architecture and hippo-therapy.



The Pegasus Farm Sensory Trail

Case Study I

Location:

Brewster, N.Y.

Typology:

Sensory trail

Size:

7-acres

Mission:

“Pegasus Therapeutic Riding enhances the lives of individuals who have disabilities and challenges through equine-assisted activities and education.

Program Elements:

- Sniff and smell activity station allow young people to reach inside mounted boxes to explore different objects within
- Potted herb garden that allows student to explore the textures and smell of different herbs
- Steering hill to encourage bilateral coordination, reading/cognition skills, strength and auditory discrimination in all students
- Turtle rock sculpture that promotes exploration and visual appeal
- Touch and try station that focus on coordination and tactile defensiveness through activities such as foam noodle walls, tether ball, bridges and ground pole inclines.
- Mounted music station, created by local artist Matt



Frieburghaus, that helps
improve balance, core
strength and grasp/release
skills

Case Study I



Research Findings:

This site is similar to other sites in its typology through program elements such as the pool noodles wall, wood bridge, and the steering obstacle course. However, this course is uncommon in its use of herbs for sniff and smell activities, the utilization of sculpture in the touch portion of the trail, and the interpretive signage that helps the clients with identification, recognition and the memorization skills.

This site's response to the natural landscape around it utilizes the forest for these sensory stations. Pegasus Farms has created a program that integrates with their superior environment, creating an innovative healing environment.

Take-Away:

These sites display effective strategies for engaging students through landscape architecture. Their use of interpretive signage to pull in the young clients, their use of sculpture to encourage the sense of touch and provoke emotion, and their unique use of herbs to educate students and stimulate their curious nature are all reasons for their success. Their color palette is also another major success in their design, many focusing on nature but implementing colorful elements to increase curiosity and memorization skills in young people. For these reasons, this site was chosen as a thesis case study.



Case Study I



Saddle Safari Discovery Trail

Case Study II

Location:

Rockford, MI

Typology:

Sensory trail

Size:

1 mile

Mission:

“We improve quality of life through equine-based therapy to physically, mentally and socially/emotionally challenged individuals. Our unique program integrates academic, social and physical skills, using the horse as a catalyst “

Program Elements:

- “Click Crossing” creates a change in terrain to promote steering and control while providing shifts in ‘sensation’
- Discovery Quest station that active all five senses while allowing riders to discover mounted items
- Rain Stix that are mounted musical instruments that use natural pebble to create sound and simulate riders
- Secret pine trail that offers change in atmosphere that sifts in lighting to promote adaption skills
- Wild maze works on coordination skills while requiring patience and balance
- Scavenger hunt that utilizes signed to help clients complete the task
- Musical station that



incorporates a xylophone to
stimulate young riders

- Signage at each station to
promote consistency

Case Study II



Research Findings:

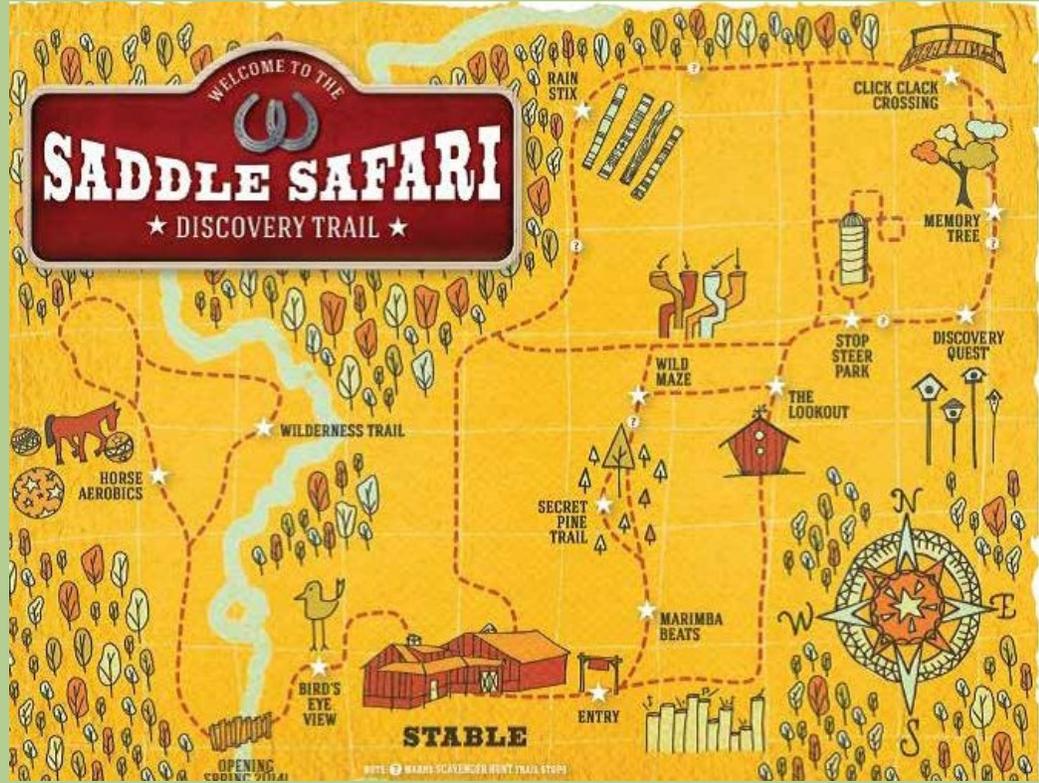
This site has similar features to locations with congruent typologies, some examples being their bridge, wind-chimes, and steering activities. The Saddle Safari Trail is top tier when it comes to their use of signage, overhead plane and lighting shift. These features are integral to the site and provide strong sensory changes that are required in healthcare design. In-hand trail opportunities for children that are unable to ride are another major element in this trail.

Take-Away:

The trail itself shows new ways of incorporation light as a method of therapy. This distinct concept allows for children and young adults with sensory disorders overcome their health issues. The site's utilization of existing wildlife viewing areas and natural features add a perception of tranquility to that site and its many activities.

The interactive mounted games for the students are unique to the site but could be demonstrated in a naturalistic way. Changes in vegetation variety are important to this site and create different spaces for students to exist within. These spaces provoke thought and contemplation of the mind while physical work stimulates the body. Finally, sifts in ground cover provide valuable auditory response and also guide the riders within the activity 13 areas.

Case Study II



Beat Riding Center Sensory Trail

Case Study III

Location:

Banks, OR.

Typology:

Sensory trail

Size:

Unknown

Mission:

“B.E.A.T. Riding Center, Inc. is a 501(c)(3) non-profit organization that exists to provide physically, mentally and emotionally challenged individuals an opportunity for emotional and physical growth through horsemanship. BEAT’s home is at Horsin-A-Round Stables 20 miles west of Portland in Banks, Oregon.”

Program Elements:

- Bridge crossing provides change in elevation and perspective
- “Careful footing” station to promote critical thinking skills
- Wind chime area provides auditory feedback
- Trench area provides change in elevation and encourages adaption skills
- Horse totter that helps build trust between horse and rider
- Balance beam helps with balance and steering skills
- Under the bridges creates an overhead plain for horse and rider to experience and helps frame the next obstacle



Case Study III



Research Findings:

This site is similar to other sensory trails in its typology and program elements such as the pool noodles wall, wood bridge, and the steering obstacle course. This trail stands apart in its elevation changes.

The large, elevated bridge, the staircase for equine, and the trench all succeed at making this otherwise flat site topographical interesting for young people. Simulation of the senses is accomplished through the trails use of natural material that mimic actual equestrian trail rides.

Take-Away:

This trail utilizes mostly natural materials that set it apart from most hippo-therapy program. Working in collaboration with elevation change their use of unconventional activities to challenge the riders and support coordination and tactile defensive skills.

Their use of berms and swales in an educational way could easily be improved through form and aesthetics. Their plant palette mainly consists of native/ existing horse friendly plants, providing reassurance for student and handler.

Using large wooden logs to guide the riders is a tactic use on some equestrian trail but aids greatly in the design and layout of this trail.

Case Study III



Case Study Summary

All case studies were chosen due to the relevance and integrating in hippo-therapy sensory trails. Each researched site attempts to provide a healing landscape interfaced with equine facilities. Consistent through all sites was the sensory trail typology and the dedication to children and young adult with anxiety, depression and more commonly Sensory Processing Disorder.

While all sites are of the same type, they are all aimed at different emotional, behavioral and sensory issues. While the Saddle Safari Discovery Trail was created specifically for children with Sensory Processing Disorder, the other two sites focused on a broad therapy group. As these sites were design for different audiences there are physical, mental and emotional differences between the activities and material used in each trail. The landscape that hosts each trail varies in size, plant material, and topography but each program was able to create diversity through-out their site. These exemplary case studies will guide my thesis and inspire the interfacing of hippo-therapy and landscape architecture.



Case Study Summary

The Pegasus Farm Sensory Trail touched on the importance of the leveling/ ranking of path difficulty for young people with different emotional needs. Their main goal, however, was to improve cognitive, social, and emotion skill through trail activities. This case studies show that through well designed stations students can excel in hippo-therapy. The simple signage creates clear communication between rider and handler which results in mental security for the student. This very important aspect of therapy is implemented in an interpretive and even artistic way.

The Beat Riding Center Sensory Trail demonstrate the revitalizing connection between people and natural materials. The native grass planting creates a peaceful environment for students, promotion interaction with the natural landscape. The use of natural mounds and berms to create topological diversity on a otherwise flat site stimulates the rider cognitive reasoning and problem solving skills. Their integration of natural material in the activity stations demonstrate the instinctual pull humans have to nature and its products.

In the Saddle Safari Discovery Trail their main attribute was the existing landscape their facilities exist within. They even state “Nature has many sights, sounds, smells and textures, creating an innately rich sensory environment. Equest’s Sensory Trail will utilize all that nature has to offer and then enhance it even further with meandering trails with slight inclines and declines. Trees and flowers will be strategically planted along the Sensory Trail to create varieties of colors, textures and scents.” Form this we can see the importance of nature to this groups therapy methodology and the importance of natural features in sensory trails

Major Project Elements

Edible/Touchable Canopy: This section of the trail will allow the rider to explore natural space through touch and taste. Plants will consist of highly textured plants and native fruit species.

Natural Obstacle Trail Spur: This spur will encourage coordination, reading/cognition skills, strength in all young riders.

Aroma Rooms: These spaces will highlight individual scents as to not overstimulate the children with SPD

Interactive Mounted Activities: Tailored activities/ stations along all trail spurs to increase emotional connection with the landscape.

Texture Sculpture Elements: This trail spur will educate rider on different natural features and why they are the way they are.

Interpretive Signage: Located along all trails, these way-finding signs will display trail difficulty levels, length of spur, and explanation of what to expect.

Wildflower Trail Spur: This education path will inform visitors about native wildflowers while using painting design to create artistic and visually stimulating planting beds.

Enhanced Sight Features: This section will highlight the sight by enhancing the existing natural features, allowing the sight to be more balanced.

Fragrant Land-Art: This section of the trail will challenge riders while provoking problem solving skills and creating changes in spatial comfort.

Winter Trail Spur: This section of the trail will explore and present the calmness of winter while adding sensory elements for a complete sensory experience in all seasons.

User/Client Description

Who is this designed for?

This project will be designed for children and young adult that currently struggle with anxiety, depression, and Sensory Processing Disorder but will be open to the public to express the importance of hippo-therapy within a sensory trail typology.

Who will run this program and manager the trails?

The connected facility would manage the upkeep along with volunteers from private facilities organizations such as 4-H, American Hippo-therapy Association, and Professional Association of Therapeutic Horsemanship International.



The Site

A suitability analysis will be completed through Arc-GIS Pro to determine the optimal location in Minnesota. Equestrian facilities will be located throughout the state of Minnesota and chosen based on their size, natural feature, plant diversity, and their topography. Facilities with already existing therapy programs will be considered first to provide a good foundation but other facilities that meant requirement will be considered as well. This analysis will reveal the most suitable site for the interfaced sensory trail. Arc-GIS will be used both in the locating of the site and the vegetation, soil, topography, and path layout, public trail connections.



Address: 6503 80th Street SW,
Stewartville MN, 55976

Acres: Total- 27.37 Focus area- 11.7

Typology: Private equestrian trails

Planting zone: 4b

This Site is located 7.5 mile away form Mayo Clinic, one of the leading hospitals for mental health. This site could then potentially be used as a form of therapy for patients visiting orliving in the surrounding areas.

Goals of the Thesis Project

Project Emphasis

This project will mainly emphasize new way to interface landscape architecture into sensory landscape while creating trails spurs to showcase the integration between the two disciplines.

Thesis Goals

Investigate the connection between nature and emotional healing:

In this I will reading on the mental health benefits nature can provide for patients struggling with anxiety, depression, and SPD.

Educate myself in the latest advancements in healthcare design:

For this is will look into different types of healthcare designs and how they have been implemented and utilized in the past. Focusing the research on site specifically designed for anxiety, depression, and SPD.

Learn how healthcare design has integrated itself in therapy:

Educate myself on what project elements and material aid in the integration of landscape and therapy.

Provide sensory trail that promote mental health:

Create a trail that combines the research and analysis complete at the end of thesis into a well interfaced and valid design solution.

Implement the interfacing of landscape architecture and hippo-therapy:

Successful apply the analysis to a design solution that will be displayed through a strong informational graphic presentation.

Plan for Proceeding

The Theoretical Premise/Unifying Idea

How can the combination of therapeutic horticulture and equestrian sensory trails promote positive mental health to children and young adults with anxiety, depression and SPD?

Project Typology

The typology for this thesis will be sensory trails system with unique challenges for riders of various level and interests. This trail will be integrated into an existing hippo-therapy facility that caters to children and young adults with anxiety and depression. This project will use existing hippo-therapy sensory trails to inspire a nature and plant material based trail that encourages the interaction between young people and the outdoors. This site consists of similar project elements but developed through the lens of landscape design.

Historical Context

The number of adolescents reporting symptoms of major depression within a twelve months period increased 5 (from 8.7 percent to 13.2 percent) 2 percent from 2005 to 2017 and young adults reported a 63 percent (from 8.1 percent to 13.2 percent) growth. When adults were assessed at consistent times, they described no significant growth rate in depression. Experts researched explanations for this increase and determined the most like cause was social media use and decreased sleeping hours in young people. Sensory disorders are very common as well averaging 1 in 6 children have sensory issues. Hippo-therapy or equine therapy is being implemented into many Animal Assisted Therapy (AAT) associations throughout the united states. Teaching responsibility, respect, and structure has proven beneficial in promoting mental health stability and are all qualities obtained through therapeutic horsemanship. Horses have been utilized in Animal Assisted Therapy (AAT) since the 1970's.

Plan for Proceeding

Site Inventory

This site is a private property that is currently underutilized equestrian trails. This site has two access points, one from an easement and the other from a pasture leading to the connected equine facility. The site has an existing sensory potential that is predominately based on sights. To mitigate the skewed sensory experience trails will focus mainly on the senses of smell, sound, touch and most importantly taste.

Programing requirements

Five sensory trail spurs that relate to the research results on depression, anxiety, and SPD general information, general disorder statistics, COVID-19 effects/statistics on individual disorder, common therapies, horticulture therapy benefits, and equestrian sensory trail benefits to guide the space allocation and design solution of this thesis project.

Methodology

This thesis project will use an mixed-method methodology that will rely on case studies, Correlation research, and historical evidence

I will look into the historically relevant information on healthcare design and how past experience will influence modern solutions.

The correlation research will investigate pattern, statistics, and the relationship between variable to establish a clear vision for the design. This research will also look into the typology of similar site and determine the cause for success.

Finally, the cases studies will provides necessary information such as contextual comparisons, general themes of similar sites and the common goals between case studies.

Research Results

Research Methods

How can the combination of therapeutic horticulture and equestrian sensory trails promote positive mental health to children and young adults with anxiety, depression and SPD?

The cases studies findings and the medical document findings is of particular interest in the landscape architectural approach to sensory gardens that this thesis explores. Establishing a relationship between the medical benefits in horticulture therapy and equestrian sensory trails will be the main goal of the research. This evaluation process may serve as a viable interfaced design analysis model that can guide landscape architecture projects that share similar interfacing and sensory aspirations.

Discovering the medical benefits of horticulture therapy, and how to apply techniques of this discipline to a mounted trail will provide viable base to the research. Horticulture therapy will provide possible plant palettes, program element form suggestions and how to connect the viewer to the landscape. In *Connecting to Self and Nature* by Christina Sabra She states, "Therapeutic Horticulture can bring about many benefits: social, psychological, physical and spiritual. It is also aesthetically pleasing.

This type of intervention is useful with many populations, such as individuals going through a rehabilitation process, the homeless, those diagnosed with a chronic mental illness, prison inmates, juvenile offenders, inner city youth, individuals with Alzheimer's, caregivers, the elderly and those living with a terminal illness." This article was published by the American

Research Results

Horticultural Therapy Association in the Journal of Therapeutic Horticulture corroborating its validation and relevance in this thesis (Sabra 33).

The benefits discovered through cases studies and reports on sensory gardens and equestrian sensory gardens will provide in depth insight into how they could be implemented in this thesis. Through the lens of landscape architecture this knowledge will be especially in creating a viable design solution and aid in integrating the two topics together into a cohesive application on site. This topic will also provide case studies that will inspire trail layout ideas, trail forms and lengths, trail difficulty/slope recommendations, sensory activity ideas, and therapeutic color suggestions.

Bridging the gap between horticulture therapy and sensory equestrian trails will result in the creation of multiple typologies of therapeutic equestrian trails in the thesis design. Many texts were read and formed a thorough understanding of both topics, which allows the following information to aid in the interfacing of both. The interfacing will occur within correlation research that will investigate pattern, statistics, and the relationship between therapeutic horticulture and equestrian sensory gardens, to establish a clear vision for the design. This research will also look into the typology of similar sites and determine the cause for success by examining the contextual comparison, general themes, and the common goals of all projects and texts.

Research Results

Mental Health

In this section the three mental health disorders, depression, anxiety, and SPD, were researched in attempt to find general information, general disorder statistics, COVID-19 effects/ statistics on individual disorders and common symptoms to guide the space allocation and design solution of this thesis project.

Due to physical, social, and emotional changes brought on by COVID-19 the mental health of US citizens has dropped significantly over the last year, because of this the effects and statistics of COVID-19 on these three disorders will be taken into consideration in this project, adding to this project's justification.

General Depression Disorder Results

General Information

American Psychiatric Association Definition:

“Depression (major depressive disorder) is a common and serious medical illness that negatively affects how you feel, the way you think and how you act. Fortunately, it is also treatable. Depression causes feelings of sadness and/or a loss of interest in activities you once enjoyed. It can lead to a variety of emotional and physical problems and can decrease your ability to function at work and at home.”

American Psychiatric Association Symptoms:

- Feeling sad or having a depressed mood
- Loss of interest or pleasure in activities once enjoyed
- Changes in appetite — weight loss or gain unrelated to dieting
- Trouble sleeping or sleeping too much
- Loss of energy or increased fatigue

Research Results

- Increase in purposeless physical activity (e.g., inability to sit still, pacing, handwriting) or slowed movements or speech (these actions must be severe enough to be observable by others)
- Feeling worthless or guilty
- Difficulty thinking, concentrating, or making decisions
- Thoughts of death or suicide

American Psychiatric Association Statistics on Depression:

- Depression affects an estimated one in 15 adults (6.7%) in any given year
- One in six people (16.6%) will experience depression at some time in their life
- Depression can occur at any time, but on average, first appears during the late teens to mid--20s
- Women are more likely than men to experience depression
- Some studies show that one-third of women will experience a major depressive episode in their lifetime
- There is a high degree of heritability (approximately 40%) when first-degree relatives (parents/children/siblings) have depression.

Mental Health America's COVID-19 Statistics on Depression:

- The number of people looking for help with depression has skyrocketed. From January to September 2020, 534,784 people took the depression screen, a 62 percent increase over the 2019 total number of depression screens.
- The number of people screening with moderate to severe symptoms of depression and anxiety has continued to increase throughout 2020 and remains higher than rates prior to COVID-19. Over 8 in 10 people who took a depression screen have scored with symptoms of moderate to severe depression consistently since the beginning of the pandemic in March 2020.

Research Results

- More people are reporting frequent thoughts of suicide and self-harm than have ever been recorded in the MHA Screening program since its launch in 2014. Since the COVID-19 pandemic began to spread rapidly in March 2020, over 178,000 people have reported frequent suicidal ideation. 37 percent of people reported having thoughts of suicide more than half or nearly every day in September 2020.
- Young people are struggling most with their mental health. The proportion of youth ages 11–17 who accessed screening was 9 percent higher than the average in 2019. Not only are the number of youths searching for help with their mental health increasing, but throughout the COVID-19 pandemic youth ages 11–17 have been more likely than any other age group to score for moderate to severe symptoms of depression.
- Rates of suicidal ideation are highest among youth, especially LGBTQ+ youth. In September 2020, over half of 11–17-year-olds reported having thoughts of suicide or self-harm more than half or nearly every day of the previous two weeks. From January to September 2020, 77,470 youth reported experiencing frequent suicidal ideation, including 27,980 LGBTQ+ youth
- People screening at risk for mental health conditions are struggling most with loneliness or isolation. From April to September 2020, among people who screened with moderate to severe symptoms of depression, 70 percent reported that one of the top three things contributing to their mental health concerns was loneliness or isolation.
- While rates of depression and suicidal ideation are increasing for people of all races and ethnicities, there are notable differences in those changes over time. Black or African American screeners have had the highest average percent change over time for depression, while Native American or American Indian screeners have had the highest average percent change over time for suicidal ideation.

Research Results

General Anxiety Disorder Results

General Information

American Psychiatric Association Definition:

“Anxiety disorders differ from normal feelings of nervousness or anxiousness and involve excessive fear or anxiety. Anxiety disorders are the most common of mental disorders and affect nearly 30 percent of adults at some point in their lives. Anxiety refers to anticipation of a future concern and is more associated with muscle tension and avoidance behavior. Anxiety disorders can cause people into try to avoid situations that trigger or worsen their symptoms. Job performance, schoolwork and personal relationships can be affected.”

American Psychiatric Association Symptoms:

- When anxiety is out of proportion to the situation or age inappropriate
- When anxiety hinders your ability to function normally
- Restlessness
- Feeling on edge or easily fatigued
- Difficulty concentrating
- Muscle tension or problems sleeping

American Psychiatric Association Statistics on Anxiety:

- 7 to 9 percent of U.S. adults have a specific phobia
- 7 percent of U.S. adults have social anxiety disorder
- 2 to 3 percent of U.S. adults have a panic disorder
- 2 percent of U.S. adults have agoraphobia
- 2 percent of U.S. adults have generalized anxiety disorder
- 1 to 2 percent of U.S. adults have separation anxiety disorder

Research Results

Mental Health America's COVID-19 Statistics on Anxiety:

- The number of people looking for help with anxiety and depression has skyrocketed. From January to September 2020, 315,220 people took the anxiety screen, a 93 percent increase over the 2019 total number of anxiety screens.
- The number of people screening with moderate to severe symptoms of depression and anxiety has continued to increase throughout 2020 and remains higher than rates prior to COVID-19. In September 2020, the rate of moderate to severe anxiety peaked, with over 8 in 10 people who took an anxiety screen scoring with moderate to severe symptoms.
 - Young people are struggling most with their mental health. The proportion of youth ages 11-17 who accessed screening was 9 percent higher than the average in 2019. Not only are the number of youths searching for help with their mental health increasing, but throughout the COVID-19 pandemic youth ages 11-17 have been more likely than any other age group to score for moderate to severe symptoms of anxiety.
- People screening at risk for mental health conditions are struggling most with loneliness or isolation. From April to September 2020, among people who screened with moderate to severe symptoms of anxiety, 70 percent reported that one of the top three things contributing to their mental health concerns was loneliness or isolation.
- While rates of anxiety and suicidal ideation are increasing for people of all races and ethnicities, there are notable differences in those changes over time. Black or African American screeners have had the highest average percent change over time for anxiety, while Native American or American Indian screeners have had the highest average percent change over time for suicidal ideation.

Research Results

Sensory Processing Disorder Results

General Information

American Psychiatric Association Definition:

Sensory processing disorder (SPD) is a neurological condition that exists when sensory signals don't get organized into appropriate responses. People with SPD find it difficult to process sensory information (e.g., sound, touch and movement) from the world around them. This means that they may feel sensory input more or less intensely than other people. SPD can therefore impact on a person's ability to interact in different environments and perform daily activities.

3 possible components of dysfunction of sensory integration:

Sensory Modulation Disorder is a problem with turning sensory messages into controlled behaviors that match the nature and intensity of the sensory information.

Sensory-Based Motor Disorder is a problem with stabilizing, moving or planning a series of movements in response to sensory demands.

Sensory Discrimination Disorder is a problem with sensing similarities and differences between sensations.

American Psychiatric Association Symptoms:

- Shows heightened reactivity to sound, touch or movement.
- Is under-reactive to certain sensations (e.g., not noticing name being called, being touched, high pain threshold).
- Appears lethargic/disinterested, appearing to mostly be in their

Research Results

'own world'.

- Has difficulty regulating their own behavioral and emotional responses; increased tantrums, emotional reactive, need for control, impulsive behaviors, easily frustrated or overly compliant.
- Is easily distracted, shows poor attention and concentration.
- Has poor motor skills; appears clumsy, has immature coordination, balance and motor planning skills, and/or poor handwriting skills.
- Has poor sleep patterns.
- Has restricted eating habits or is a picky eater.
- Becomes distressed during self-care tasks (e.g., hair-brushing, hair-washing, nail cutting, dressing, tying shoelaces, self-feeding).
- Loves movement. Seeks out intense pressure (e.g., constant spinning, running around, jumping, crashing in objects/people).
- Avoids movement-based equipment (e.g., swings, slides).
- Appears floppy or has 'low muscle tone', tires easily and is often slumped in postures.
- Performs tasks with too much force, has big movements, moves too fast, writes too light or too hard.
- Has delayed communication and social skills, is hard to engage in two-way interactions.
- Prefers to play on their own or has difficulty in knowing how to play with other children.
- Has difficulty accepting changes in routine or transitioning between tasks.
- Has difficulty engaging with peers and sustaining friendships.
- Muscle tension or problems sleeping

Research Results

SPD Network Sensory Processing Disorder Statistics:

- At least one in twenty people in the general population may be affected by SPD.
- In children who are gifted and those with ADHD, Autism, and fragile X syndrome, the prevalence of SPD is much higher than in the general population.
- Studies have found a significant difference between the physiology of children with SPD and children who are typically developing.
- Studies have found a significant difference between the physiology of children with SPD and children with ADHD.
- Sensory Processing Disorder has unique sensory symptoms that are not explained by other known disorders.
- Heredity may be one cause of the disorder.
- Laboratory studies suggest that the sympathetic and parasympathetic nervous systems are not functioning typically in children with SPD.

OT Plan COVID-19 Statistics on SPD:

Sight:

- Long lines to buy groceries
- Empty shelves at the stores
- “Social distancing” of at least 6 feet when interacting
- Parents and caregivers are now home
- New weekly morning routines
- Emergency items and extra food at home
- Signs on the store windows saying they are closed
- Signs reminding others to maintain social distance
- Signs stating new store hours
- Buildings removing furniture or items to reduce items to clean
- People in protective equipment (i.e., gloves, masks, gowns)
- People discussing COVID-19

Research Results

Sound:

- Hearing more worry in our tone of voice.
- Increased volume in the house because more people are home.
- If parents are working from home, they may have difficulty adjusting to the expectation of quietness around a workspace.

Smell:

- Frequent use of cleaning agents expose us to more chemical scents, which can overwhelm our sense of smell. Children who are sensitive to smells may not outwardly verbalize their discomfort, so it is important to be aware of this in order to recognize their discomfort and make appropriate changes.

Touch:

- Social distancing is a new social norm for how we go about greeting others and our expectations of personal space. As with adults, this can be awkward for children to navigate.
- Avoiding touching their face, especially their nose, eyes, and mouth may take some time to get used to.
- With all of the sanitizing, the textures of surfaces, door handles, toys, furniture, and even the dryness of their hands may change.
- Surfaces and items may feel wet from cleaning or they may feel grainy when the sanitizing agents dry.
- Items may need to be replaced due to being worn down.
- Clothing or bedding textures may feel different due to the frequency of washing.
- These changes may contribute to our children's emotional state, especially if it is unexpected or if they forget.

Research Results

Taste:

- Many restaurants have limited their services to take-out only
- Grocery stores may run low on certain foods, which may lead to missing out on favorite foods or having a limited selection of what is offered at home

Summary:

Overall, this information was integral in the design considerations and space allocation for the sensory trails. The design considerations and concerns were results of the mental disorder positive benefits and negative benefits shown in the following matrix. This figure below highlights the positive effects all five different senses can have on each disorder. Then the figure shown the results of the analysis by stating the possible concern or design considerations this thesis must follow.

Research Matrix

SENSORY ANALYSIS

Case Study Design Considerations

Inspiration

Anxiety

Depression

SPD

Sight



Positive: Blood pressure, heart rate muscle tension, and the production of stress hormones all decrease when nature is experienced by young people with anxiety. Nature and scenes of nature are associated with a meaningfulness, and vitality.

Negative: Lack of connection with nature can lead to stressful and negative experiences in urban settings.

Positive: Children and young adults with depression are positively affected by sights of nature, creating a strong emotional response that contributes to physical and mental health.

Negative: Urban location tend to weigh down individuals with depression, provide little to no emotional restoration/recooperation.

Positive: New experiences with sights encourage and promote a stable relationship between the individual and the environment they exist in.

Negative: Sudden changes in light and scenery can over stimulate the individual, possible resulting in over whelming and upsetting the child.

1. Long continuous pathways to encourage users to engage with elements
2. Combination of soft and hardscape and sensory activities adjacent to path
3. Visual accessibility for wayfinding that encourage movement
4. Avoid sudden changes in lighting
5. Bright mixed colored blossom utilized for stress relief encourage butterflies
6. Natural path material such as wood or natural grass cover are preferred
7. Landmarks and signage for navigation, memorable and recognizable features



Sound



Positive: Experiencing pleasing sounds and repetitive tones is greatly associated with lowering stress and anxiety, helping drive down blood pressure and enter into a state of relaxation. Sound and/or music therapy are being utilized to practice deep meditation as well.

Negative: Noise is 'unwanted sound' that can be a stressor to individuals with anxiety. The main source of this noise annoyance comes from aircraft noise and prompts a minimum distance requirement of 2.5 miles from airports.

Positive: Natural sounds influence the brain connectivity to reflect an outward-directed focus of attention and is associated with relaxation of the body.

Negative: Artificial sounds influence the brain connectivity to reflect an inward-directed focus of attention, similar to states observed in anxiety, post-traumatic stress disorder and depression

Positive: Sounds influence young people with SPD in extreme ways, but gentle nature sounds help decrease the overactive and overstimulation these individuals have.

Negative: Loud artificial noises tend to over stimulate children with SPD and cause meltdowns and temper tantrums due to their inability to process the sound well.

1. Encourage local bird populations and over local wildlife and consider overall noise compilation
2. Trail should aid in locating areas with sufficient water sounds and guide the user through that obstacle
3. Ground cover under hooves compared to people should be sound absorbing as to not over stimulate users
4. Screens, strategic location of elements, vegetation for noise reduction, separate sound trail from group activities to avoid over stimulation
5. 2.5 mile minimum distance from airport, and avoid direct path with runway
6. Acoustic properties of site materials, soft soil absorbs sound, topography change



Positive: Aroma molecules, as well as memory, stress and relaxing you

Negative: Preferences the value we place on and can trigger any of nature.

Positive: Essential oils have been shown to reach preventing true herb.

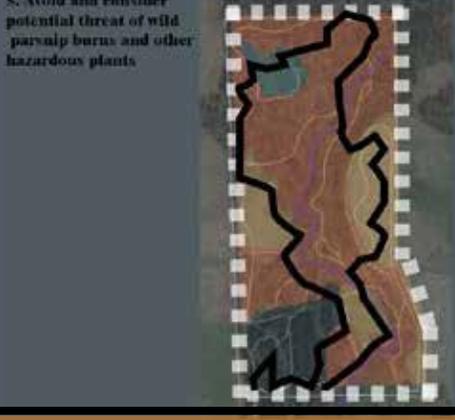
Negative: Certain aromas reach preventing true herb.

Positive: Activities for recommended with children to receive an close to the nervous system

Negative: Children with SPD are sensitive to smells and can't notice.

1. Provide and cultivate sensory trail
2. Use fragrant plants
3. Consider wind direction
4. Consider intensity
5. Consider how rain affects
6. Consider smells as
7. Use natural scents avoid artificial, lemongrass, mint, and verbena are preferred

Research Matrix

Smell	Touch	Taste
		
<p>Scents affect human behavior and physiological activation and mood reducing young individuals with anxiety.</p> <p>For odors seem to be associated with the objects associated with that smell, of the positive feelings we have about</p>	<p>Positive: The benefits of touch related specifically to the natural environment reduce stress when measured by blood pressure and heart rate of individuals.</p> <p>Negative: Most of the current research has to due with animal touch and not non-animal nature, so do to this there are limitations to the current literature.</p>	<p>Positive: Emotional effects of eating natural food help reduce stress and encourage cognitive function. Unknowingly we consume micro-particals that also lead to immune system activity.</p> <p>Negative: These micro-particals emitted by plants typically are directly ingested by visitors but they are not smelled or tasted because of the size.</p>
<p>It is typically obtained from plant material to decrease depression and plants like lavender to increase cognitive function.</p> <p>Aromatic plants have contradictory researches of every beneficial plant or</p>	<p>Positive: Touch stimulation is very important for people with depression, especially the connection with nature encourages motivation and concentration in children.</p> <p>Negative: Without this stimulation it they can become psychologically deprived. Tend to mostly focus on human and animal interactions.</p>	<p>Positive: The growing and consuming natural foods have been linked with a range of health and well-being benefits for young people with depression.</p> <p>Negative: Unfortunately taste is highly neglected in the context of nature experiences but is one of the most crucial senses.</p>
<p>For exploring the olfactory system are children with SPD. This experience allow them to process smells. This system also is part of the sensory system and thus evokes memories</p> <p>Children with this disorder tend to be hyper-sensitive to smells that most people can be distracted by smells that most people</p>	<p>Positive: Experiencing a large variety of natural materials through touch will provide significant benefits to the child's growth and sensitivity to touch.</p> <p>Negative: Children with SPD can either be hyper or under sensitive to touch creating different challenges for both sides of the spectrum in a natural setting.</p>	<p>Positive: Learning about and tasting fresh fruits, herbs, and vegetables allow the children to interact with the food in other senses before tasting, encouraging more stimulation.</p> <p>Negative: They have a defensive response to oral input, causing them to be resistant to oral sensory experiences like trying new foods</p>
<p>Use smell calendar as formal element in landscape design and shrubs to stimulate senses</p> <p>Consider fragrance, not to overwhelm users</p> <p>Can create/encourage a particular scent</p> <p>Wayfinding tools</p>	<ol style="list-style-type: none"> 1. Texture should be used carefully not to over stimulate or provide discomfort to user 2. Soft pine tree will replace the use of pool noodle obstacle commonly found in mounted sensory trails 3. Avoid direct contact with spruce trees 4. Provide plant touch activity for users to experience plants such as lamb's ear and moss 5. Avoid and consider potential threat of wild parsnip burns and other hazardous plants 	<ol style="list-style-type: none"> 1. Find edible berries, vegetables, herbs, and flowers and implement along path 2. Raised planting beds for access to low growing food plants while riding 3. Consider fruits trees, vines, and raised beds for mounted riders/users 4. Consider taste calendar along to path or located in gathering area where dismount and remount would be available
		

Literature Review

This literature review summarizes and critiques three texts which were fundamental to the research conducted in this thesis. The question investigated while evaluating these texts was, “How can both nature, design, and equine act as forms of therapy to children and young adults with anxiety, depression and sensory processing disorder (SPD)?” The theoretical premise behind my research is discovering how the combination of therapeutic horticulture and equestrian sensory trails promote positive mental health to children and young adults with anxiety, depression and SPD. These texts were relied heavily on for their information, consequently, they were analyzed prior to design and research to determine that they were in fact accurate and reliable.

Forest design for mental health promotion—Using perceived sensory dimensions to elicit restorative responses

About the Author(s):

According to the Scopus, Ulrika Karlsson Stigsdotter, and colleges that contributed to this piece of literature, are known for many works like this one. Making them very qualified and an important and viable resource for this thesis. Covering similar topics such as “Psycho-physiological stress recovery in outdoor nature-based interventions: A systematic review of the past eight years of research”, “I would really like to visit the forest, but it is just too difficult: A qualitative study on mobility disability and green spaces”, “From research to practice: Operationalisation of the eight perceived sensory dimensions into a health-promoting design tool”, “Nature is just around us! Development of an educational program for implementation of nature-based activities at a crisis shelter for women and children exposed to domestic violence”, and “From evidence to design solution—on how to handle evidence in the design process of sustainable, accessible and health-promoting landscapes”.

Literature Review

Health Promoting Forest Environments:

This section of the text talked about how focusing on natural environments has been a major element in mental health therapies but specifically forest areas have been a newer development in the health promoting natural landscapes. There is also an emphasis on the 'forest bathing' that is being researched in "Asian studies", the limitation of these studies lies with the lack of specification on specific forest qualities such as vegetation, forest type and density. A theory that helped guide a lot of the design solutions in this was the Attention Restoration Theory (ART). This idea was developed by the psychologists Rachel and Steven Kaplan in the 1980s and states that the capacity of an environment to facilitate the feeling of being away, extent, fascination and compatibility is crucial if restoration is to occur." This was crucial to the preliminary design and site location, pushing the location to embody the feeling of being away and combining that with the equine industry.

Sensory Dimensions:

This section of the text focused more on categorizing the elements that support the ART theory. There was a study completed that used a survey to discover the preference in landscape type. The graph used is shown in the next page and the results were that the Serene landscape type was the most sought-after landscape. This also guided this thesis design providing an overall guide about the site and the design element utilized. This study also did their own similar study and got very similar results which were "that room 4 with the PSD serene was rated as the most restorative room, followed by room 3 with the PSD rich in species, room 7 with the PSD nature and room 8 with the PSD refuge. The rooms rated less restorative were room 2 representing the PSD prospect, followed by room 1, social, room 6, space, and finally room 5, culture, which was rated as the least restorative room of the eight."

Literature Review

Nr.	PSD name	Images	Key nature qualities and features
1	Social		<ul style="list-style-type: none">• Possible to watch entertainments• Possible to watch exhibitions• Possible to visit a restaurant or a simpler open-air restaurant
2	Prospect		<ul style="list-style-type: none">• Plane and well-cut grass surfaces• Vistas over the surroundings• Cut lawns
3	Rich in species		<ul style="list-style-type: none">• Several animals, like birds, insects, ect.• Natural plant and animal populations• Many native plants to study
4	Serene		<ul style="list-style-type: none">• Silent and calm• No bikes• It is possible not to come into contact with too many people
5	Culture		<ul style="list-style-type: none">• Decorated with fountains• Decorated with statues• A wide range of foreign plants, ornamental plants and kitchen plants
6	Space		<ul style="list-style-type: none">• Spacious and free• Possible to find areas not crossed by roads and paths• Lots of trees
7	Nature		<ul style="list-style-type: none">• Nature like• Wild and untouched• Free growing lawns
8	Refuge		<ul style="list-style-type: none">• Many bushes• Kept animals that children and adults may feed and pet• Sandpits

Highlights:

This section of the text provided the highlight of the text which were, “The spatial dimensions of the environment influence the experience of restoration. The environment should have a balance between enclosed areas and open views. A natural and wild appearance of the forest with diverse vegetation is preferred. Memories and associations play an important role in restoration. The findings validate the PSDs most preferred for restoration.” These highlights also guided the end design and supported the site location.

Conclusions:

Overall, this text was the most influential to the design aesthetic and the location of the site. This text guided the design and spatial configuration of spaces in my final design plan. This text also prompted this thesis to consider how natural can create different emotions depending on the design, therefore strengthening the project and being irreplaceable to the design.

Literature Review

SELECTING DESIGN SERVICES FOR THERAPEUTIC LANDSCAPES

About the Author(s):

According to Texas Tech University “Kavanagh pioneered the study of the design of therapeutic landscapes in the United States. In 1995, she was recognized as one of the top women in landscape architecture. She was also active in community and professional programs, she served as an officer in the Texas Chapter of the American Society of Landscape Architects, the Horticultural Therapy Association, Sigma Lambda Alpha National Landscape Architecture Honor Society, and Council of Educators in Landscape Architecture (CELA),” proving that she is highly qualified source of information for this thesis project. Thomas A. Musiak was the chairman of the landscape architecture department at Texas Tech University as well.

History and Maintenance:

Reviewing Kavanagh’s and Musiak’s work in this text provided insight on the history and maintenance of horticulture therapy programs in the past. Specifically, this document covers comprehensive project management, master planning, project services, and construction. Eighty percent of respondents in a survey completed in 1992 stated that they did not utilize any professional services for design. This shows that this topic is still in its infancy, with first degree in horticultural therapy established in only 1972. Kavanagh and Musiak discuss how when larger installations are needed, the requirement of site planning becomes evident since organization, logical thinking, and efficient planning and design are all required in successful horticulture therapy sites. This relates directly to my thesis supporting my landscape architecture approach to a mounted therapeutic sensory trail over a large forest area. They stated that back when horticulture therapy was developing it was a fact

Literature Review

that programs were benefiting from the guidance and structure provide by the designers. They assert, “the ideal design team would include the cooperative efforts of both the horticultural therapy professional and the landscape architect,” which further supports the theoretical premise of my thesis, that therapeutic sensory trails will benefit from the designs and guidance of a landscape architectural approach.

Project Services:

The text then went on to describe the range of project services, talking about that the horticulture therapist should be the one to decide on the plant material. This statement directed me to investigate other therapeutic gardens that utilized a horticulture therapist and educate myself from those documents over sites that did not utilize this research. Taking this approach will strengthen and give credibility to my thesis plant palette and overall design. They also state the horticulture therapist should have the ability to adjust and reconfigure the site while the design is in progress.

Master and Site Planning:

The master planning and site planning section of this text described that therapeutic landscapes are especially prone to developing in stages. They discuss that the land around the site is just as important to look at because of the “existing or proposed activities or land use factors,” this is something that was taken into consideration when choosing the site for this thesis. Therapy requires careful design that can be disrupted when outside distractions are present, this text affirmed this fact that other sources were supporting as well. Another important topic this essay covered was the importance of site planning particularly the study of the site, the site factors, and the program elements. This was another affirming fact that helped shape the site analysis portion of this document.

Literature Review

Conclusion:

Overall, this text was good at reassuring the approach that this thesis will take but fell short in the creative and innovation aspects. This is not a surprise because of when this text was published, but their opinions on construction were irrelevant, the general information on who oversees the development of the construction documents provide no information to this thesis. The uninformative report on the documents, administration and evaluation relating to construction was too outdated to be relevant.

Therapeutic horticulture in clinical depression: a prospective study of active components

This text is very relevant as a medical document and provides good insight on the medical side of this thesis. The focus in this piece of literature was analyzing people with depression and how they are effects when put through therapeutic horticulture through a single-group study was conducted on a sample of 28 people with diagnosed clinical depression in 2009. They collected data with the Beck Depression Inventory, Attentional Function Index, Brooding Scale, and Being Away and Fascination subscales from the Perceived Restorativeness Scale. This would be great information if it was easier to understand, this is the main downfall of the document, the user-friendliness of this medical report was hard to sift through.

After educated my self on the terminology however, there was a lot of information on clinical depression and how their symptoms were improved. The sections on depression and attention, depression and rumination, depression and behavioral activation, depression and distracting activities, and theoretical framework for the intervention – attention restoration theory were especially integral in the sensory aspects on my research.

Literature Review

Depression and Behavioral Activation

This section of the text looked at behavioral activation which is “a cognitive psychotherapeutic process that promotes positively reinforcing activities and addresses behavioral avoidance patterns.” This was key to the design process of some of the trails because it led to the trails being even more interactive than originally planned. This was due to the aim of this activation method to increase the activity level of individuals with depression. This “active life-style” promoted by this study not only is a proven method of therapy but is also easily implemented into designing with horses.

Depression and distracting activities

The next way this text described, to alleviate depression, was “a distractive response style is hypothesized to alleviate, shorten and diminish episodes of depression.” This was yet another integral idea in the design of my thesis because of this idea of “switching the attention” of depression onto an activity that is positive or neutral to the individual. This relates to the horse-back riding aspect of the design. Horses are a great distracting for these kids and are a great way to provide an opportunity for the kids to focus on tasks other than every day ones. Therefore, supporting my thesis design and concept to improve the mental wellbeing of children and young adults with depression.

Theoretical framework for the intervention

Otherwise known as, attention restoration theory, the framework for intervention “proposes that restoration of depleted capacity to direct attention can proceed when attention can follow interest, without effortful inhibition of other thoughts and stimuli.” This was another element in this piece of literature that supported the overall idea of this project and that is to get more kids involved in horses. Horses are proven to relieve stress and lower blood pressure and combining that with nature will make for a more rounded experience.

Literature Review

Conclusion:

This text provided much needed background information on clinical depression and how activities to distract or refocus the individual are very beneficial but there were a few down sides to this one. The lack of the other two disorders made the text very specific and limited its knowledge on design for the whole site. The fact that the study focused on depression in all people instead of just children and young adults also proved to be a slight limitation to its usefulness but overall, the text was helpful to the thesis research.

Literature Review Summary

Summary:

Forest design for mental health promotion—Using perceived sensory dimensions to elicit restorative responses was the most influential to the design aesthetic and the location of the site. This text guided the design and spatial configuration of spaces in my final design plan. This text also prompted this thesis to consider how natural can create different emotions depending on the design, therefore strengthening the project and being irreplaceable to the design. SELECTING DESIGN SERVICES FOR THERAPEUTIC LANDSCAPES was good at reassuring the approach that this thesis will take but fell short in the creative and innovation aspects. This is not a surprise because of when this text was published, but their opinions on construction were irrelevant, the general information on who oversees the development of the construction documents provide no information to this thesis. The uninformative report on the documents, administration and evaluation relating to construction was too outdated to be relevant. Therapeutic horticulture in clinical depression: a prospective study of active components provided much needed background information on clinical depression and how activities to distract or refocus the individual are very beneficial but there were a few down sides to this one. The lack of the other two disorders made the text very specific and limited its knowledge on design for the whole site. The fact that the study focused on depression in all people instead of just children and young adults also proved to be a slight limitation to its usefulness but overall the text was helpful to the thesis research.

Project Justification

My thesis project is a community equestrian sensory trail that will serve as a form of therapy for children and young adults suffering from anxiety, depression, and sensory processing disorder. This trail will be implemented at our facility and will consist of many trails providing multiple forms of therapy with emphasis on all three mental health disorders.

Personal Reasoning

Growing up with horses made a major difference in my home life, especially when it came to my mental health. Through every emotion I went through I always had a barn to go to relax and rejuvenate myself, along with this the most pleasurable experience I have had on a horse was trail riding. The long trails filled with scenic views, forest wildlife, challenging terrain and water crossing allowed my young mind to revive in stressful times. Currently, our family has seventeen head of horses and leases the majority out to eleven girls ranging from age six to seventeen. We take these girls all over Minnesota to participate in horse shows to help develop their sportsmanship, friendship, attention to detail, critical thinking, and problem-solving skills. After observing how these girls have improved on all these skills in such a short time I began to wonder if I could apply this system at a large scale, to be more inclusive, and to reach more of my community by using my landscape architecture degree.

Academic and Professional Justification

A project such as this one is integral in my academic career because of the current social situation of the world and possibly the future. Covid-19 is preventing children and young adults from having enriching conversations and physical experiences needed for cognitive development. My thesis will provide socially distanced activities that simulate users both cognitively and physically while adding the mental

Project Justification

Academic and Professional Justification Cont.

calmness it takes to ride horse. As designers the way we design might be change forever due to this global pandemic and it is important that we start contemplation all the possible design solutions as early as we can starting in the academic realm and this will also lead into the professional world. Knowledge and research should be the base of all design and the experience that I will gain for this project will improve my knowledge of medicinal herbs, horticulture therapy, equine therapy, therapeutic gardens and nature as a form of therapy. In my professional career I would like to work in the realm of healthcare landscape architecture with an emphasis on landscape therapy so polishing these skills now will add to my credentials when looking for companies.

Economic Justification

From the economic point of view this project would be very feasible considering the barn owner has been desiring a system to be implemented on the under-utilized wooded trails connected to her barn. If the proposed trails were constructed there would be an opportunity for revenue to be created from trail passes, lessons, event planning, summer camps, etc. The project location is ideal because of its proximity to the top-ranking hospital in America and is also number 7 in the neurology department according to US News. The returns on investment or both tangible and intangible because of the possible income that the site could produce and the emotional and therapeutic benefits this site will provide to the viewers. This site has the opportunity to aid the therapeutic riding community by establishing and testing the ecological and therapeutic benefits of implementing a sensory trail that primarily utilized plant material instead of the typical artificial sensory trails. The end result would be to inspire a new era of mounted sensory trails for children and young adults with depression, anxiety, and SPD.

Historical, Social and Cultural Context of the Thesis

A project such as this one is integral in my academic career because of the current social situation of the world and possible the future. Covid-19 is preventing children and young adult from having enriching conversations and physical experiences needed for cognitive deployment.

My thesis will provide socially distanced activities that simulate users both cognitively and physically while adding the mental calmness it takes to ride horse. As designers the way we design might be change forever due to this global pandemic and it is important that we start contemplation all the possible design solutions as early as we can starting in the academic realm and this will also lead into the professional world.

Knowledge and research should be the base of all design and the experience that I will gain for this project will improve my knowledge of medicinal herbs, horticulture therapy, equine therapy, therapeutic gardens and nature as a form of therapy. In my professional career I would like to work in the realm of healthcare landscape architecture with an emphasis on landscape therapy so polishing these skills now will add to my credentials when looking for companies.

Fall Thesis Schedule

August

September

October

November

December

Proposal Draft

Proposal

Research

Spring Thesis Schedule

January

February

March

April

May



Preliminary Design

Final Design

Booklet

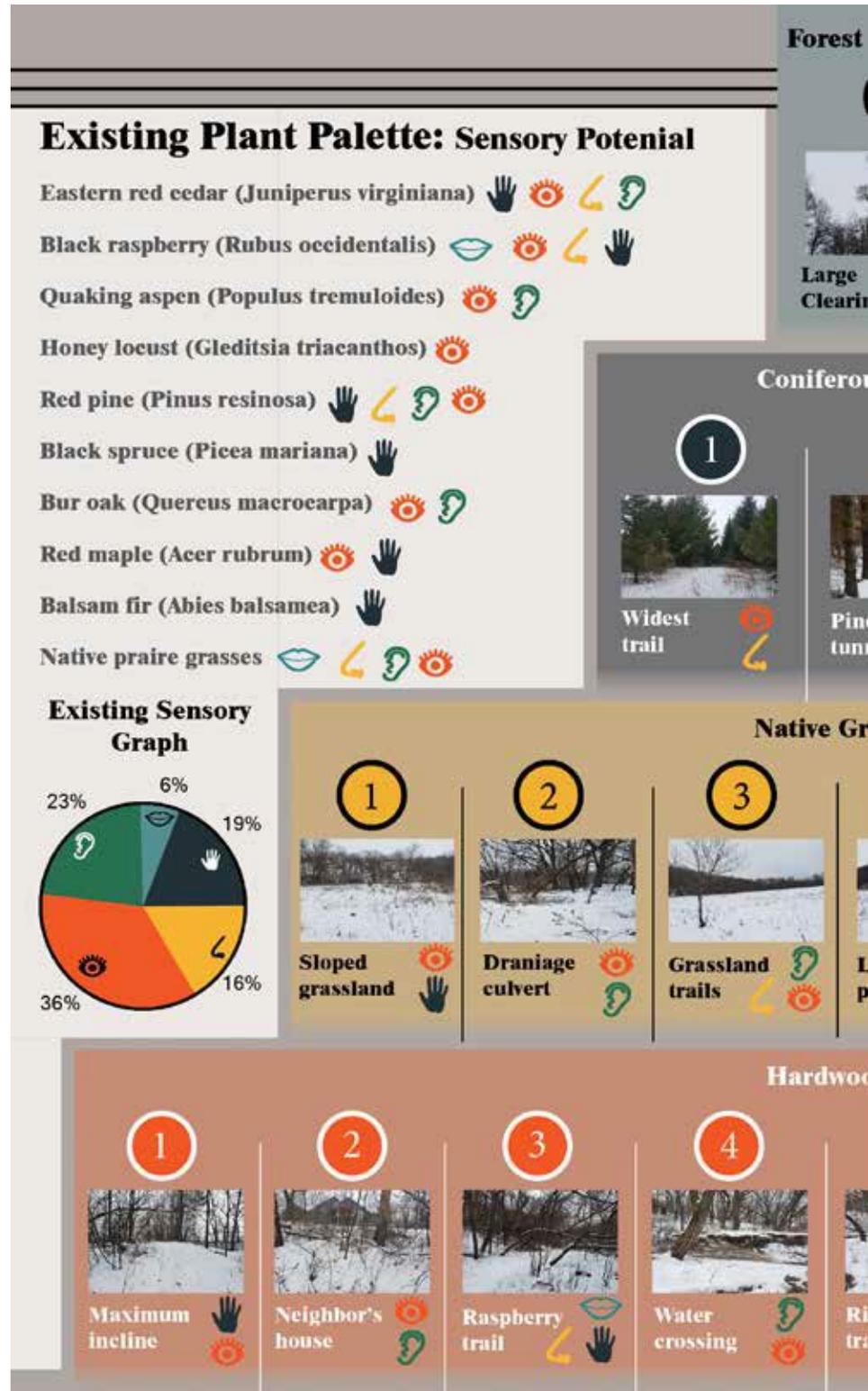
Site Inventory & Analysis

Inventory:

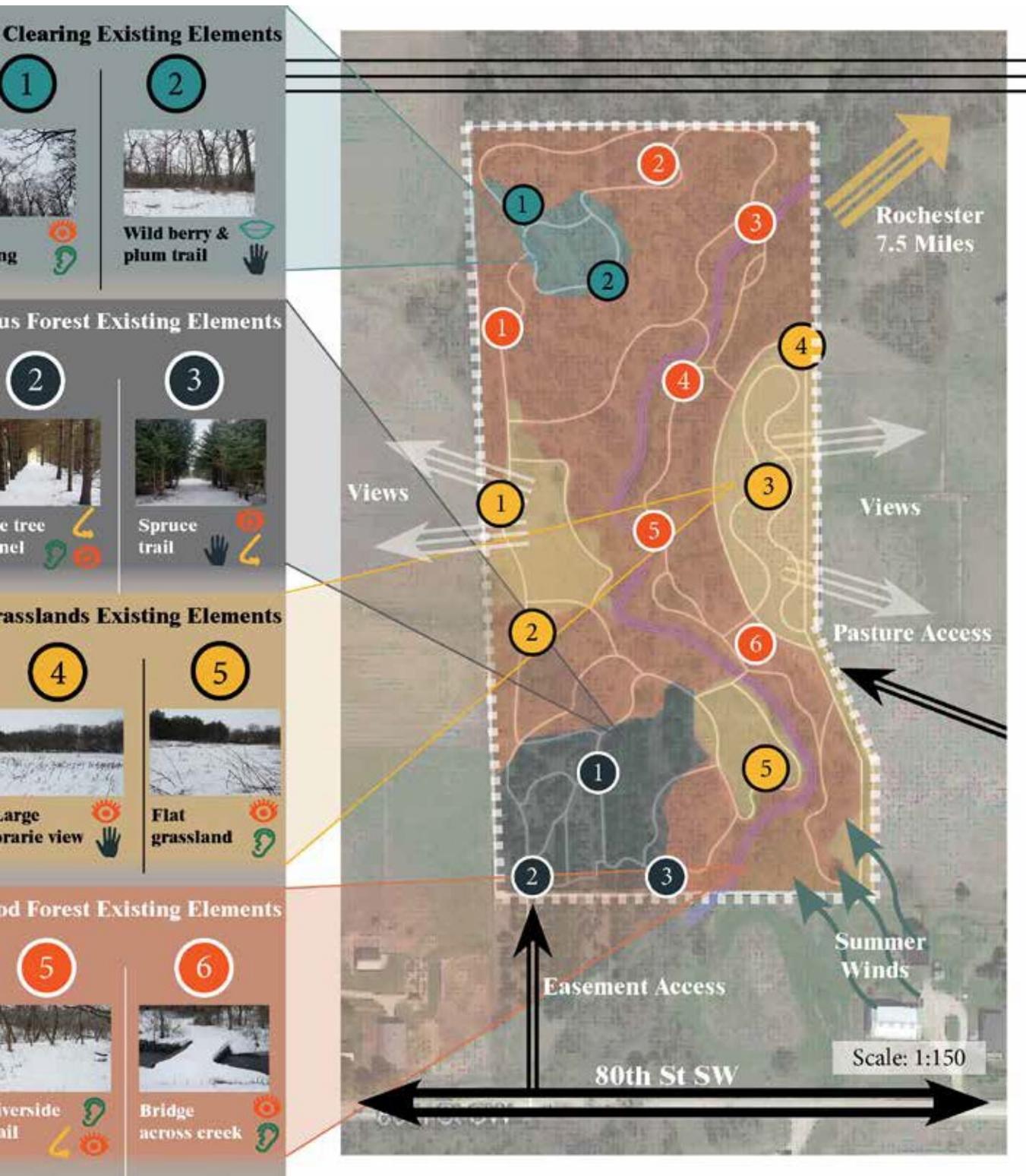
To the right you are able to see the picture inventory of the site showing the locations of each picture via the color coded numbers. To the right there is also a list of the main vegetation on site along with color coded existing typologies exiting within the chosen site. The views, mileage to Rochester, access points and summer winds are also depicted.

Analysis:

To the right you are able to see the existing plant materials sensory potential. This is shown through the icons located to the right of each plant, providing insight on how this plant might be used according to the research findings. The existing elements were also analyzed through the same method of assigning icons to each picture in the inventory. This process allowed me to better understand the current sight and also pushed me to balance the existing sensory graph, shown to the right, as to not overwhelm and over stimulate the users.



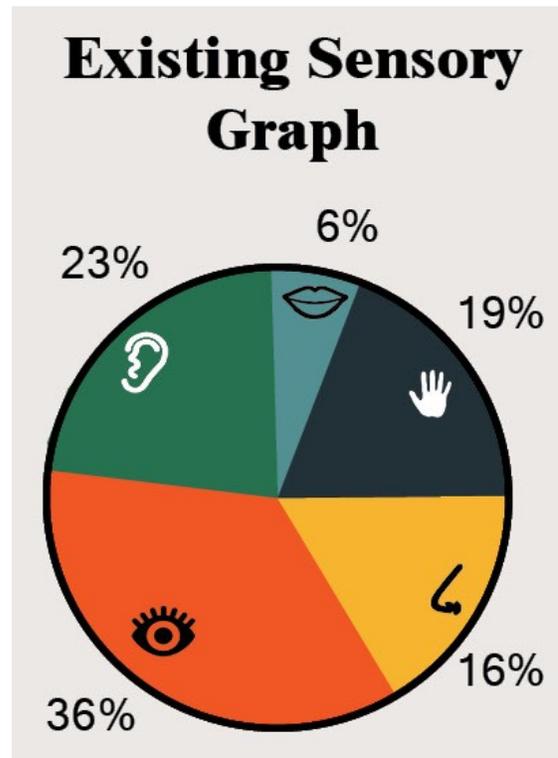
Site Inventory & Analysis



Performance Criteria

Performance Criteria Summary

In this thesis I will be measuring the sensory potential of the existing site. There will first be an inventory taken on the sites existing plant material and the existing program elements. There will then be an analysis conducted on both the plant material and elements to measure the existing sensory potential for each element. The combination of both resulted in the creation of the Existing Sensory Graph shown below.



The goal for the project is to design the site in a way that the sensory graph becomes more balanced. To achieve this goal I will focus my designs elements and trails on the senses of sound, smell, touch, and most importantly taste. The goal is to even out the sensory graph and create a balance end design.

Performance Criteria

Space Allocation

Sight

- Enhancing natural features
- Framing views

Sound

- Encouraging natural soundscapes
- Ground cover changes

Smell

- Aroma rooms
- Fragrant land art

Touch

- Edible canopy
- Taste calendar

Taste

- Touchable canopy/
Bermed vegetation
- Interactive sculptures



Design Development

Concept & Programming

Design Concept

Functional

All trail elements will be mounted or provide natural dismount stations for interaction with low elements

Natural

All trail elements will be constructed with natural material to mitigate the use of artificial materials commonly used in mounted sensory trails

Stimulating

All trail elements will be inspired by the five senses by highlighting individual senses to avoid over stimulation of the user

Programming

Sight

- Enhancing existing features
- Framing views

Sound

- Encouraging natural soundscapes
- Ground cover changes

Smell

- Aroma rooms
- Fragrant land art

Taste

- Edible canopy
- Taste calendar

Touch

- Touchable canopy/ Bermed Vegetation
- Interactive sculptures

The Design

SIGHT: ENHANCING EXISTING / FRAMING VIEWS



Visitor Entrance



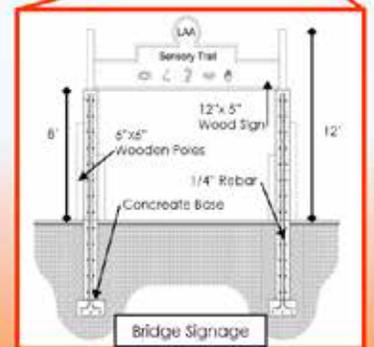
Framed Pine Trail



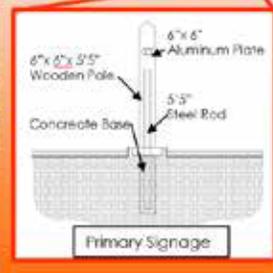
Employee Entrance



Wildflower Prairie



Enhanced Light Change



Bluebell Trail

SOUND: SOUNDSCAPES / GROUNDCOVERS



Quiet Pine Trail



Native Grass Groundcover



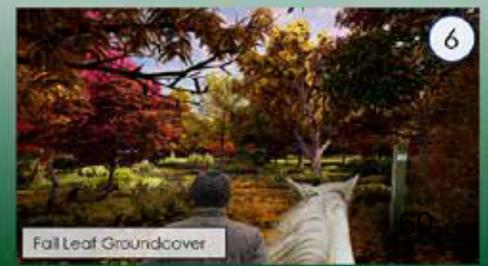
Clay Groundcover



Enhanced Water Crossing



Wildlife Clearing



Fall Leaf Groundcover

The Design

SMELL: AROMA ROOMS / FRAGRANT LAND ART

1 Mock Orange Aro. Room

2 Lemon balm Aro. Room

3 Mint Aro. Room

4 Lilac Aro. Room

5 Crabapple Aro. Room

6 Pine Aro. Room

Fragrant Land Art

TASTE: EDIBLE CANOPY / TASTE CALENDAR

1 Edible Willows

2 Maple Tree Sap Station

3 Raspberry Bush Station

4 Pear Tree Station

5 Apple Tree Station

6 Plum Tree Station

7 Pine Tree Station

8 Spruce Tree Station

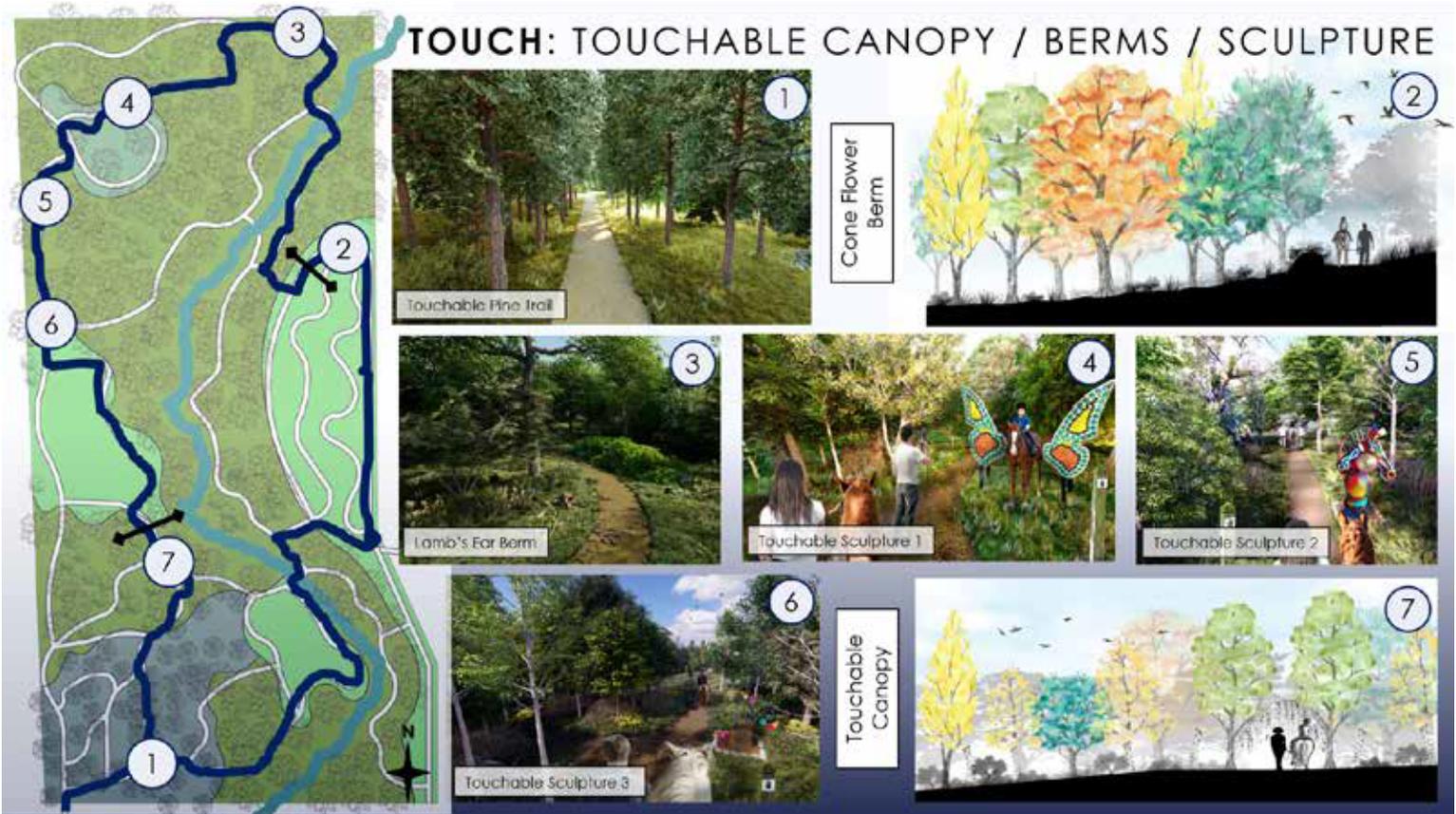
SPRING

SUMMER

FALL

WINTER

The Design & Results



TOUCH: TOUCHABLE CANOPY / BERMS / SCULPTURE



Cone Flower Berm



Touchable Canopy

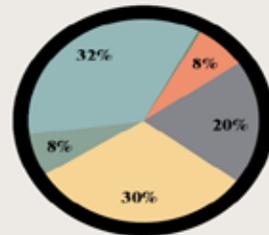


Sensory Results

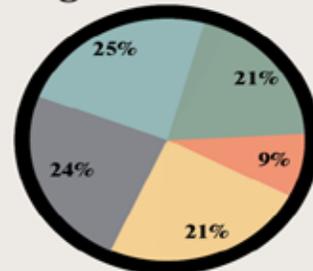
The final calculation of the new plant material and the new program elements in the proposed design has resulted in a well rounded and consistent sensory experience. The sensory graph depicted below shows the improved plant palette results, the proposed program element results and the existing sensory graph. For the final calculation, all categories were weighed evenly as they will all contribute to the overall site experience.

Program Elements

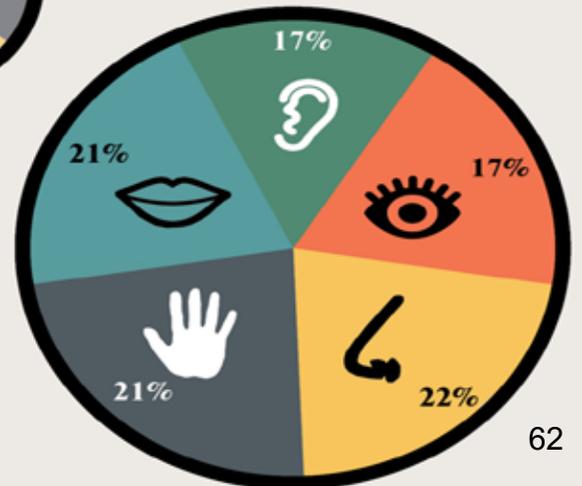
Plant Material



Existing



Results



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Previous Design Studio Experience

2nd Year Studio

Fall 2017

Kathleen Pepple

- Tea House; Moorhead, MN
- Residential garden Fargo, ND

Spring 2018

Dominic Fischer

- William Marshall Park;
Winnipeg, MB

3rd Year Studio

Fall 2018

Jason Kost

Gulik Plaza Chicago, IL

Spring 2019

Anna Maria Visilia

- Community Park
Amfissa, Greece

4th Year Studio

Fall 2019

Dominic Fischer

- Moorhead Center Mall
Moorhead, MN

Spring 2020

Jason Kost

- Estes Park Downtown Flood Mitigation
Estes Park, CO

5th Year Studio

Fall 2020

Matthew Kirkwood

- North Country Trail; Moorhead, MN

Spring 2020

Jason Kost

- Thesis

Personal Information



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From Rochester, MN



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