

Final Study Committee

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Dedication

To my professors, thank you for the tremendous amount of support, guidance, and honesty throughout the whole process of this project. I could not have arrived to this level of quality without you all pushing me and encouraging me each and every week.

To my family, thank you all for supporting me throughout my academic career. Whenever I needed advice or someone to talk to you all were there. I could not have made it this far without each and everyone of you.

To our veterans and active duty service members, thank you all for your selfless service and sacrifice to our great nation. You all have sacrificed so much, and many have made the ultimate sacrifice. I hope this project can act as a catalyst to promote alternative ways for you all to recover from the invisible wounds of war.

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Project Background

Salutogenics Resort

Salutogenics is an approach to human health that examines the factors contributing to the promotion and maintenance of physical and mental well-being rather than disease with particular emphasis on the coping mechanism of individuals which help preserve health despite stressful conditions.

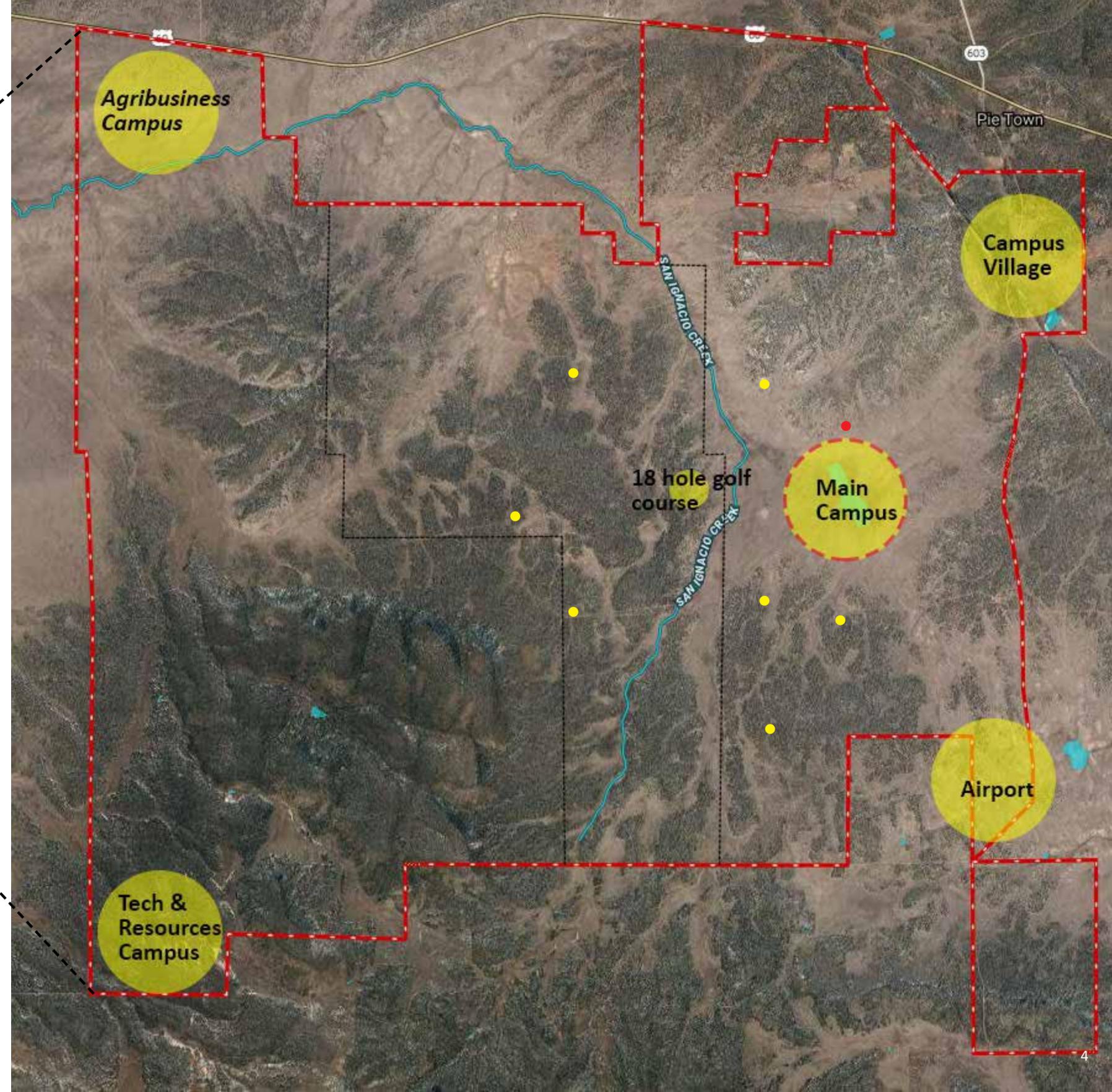
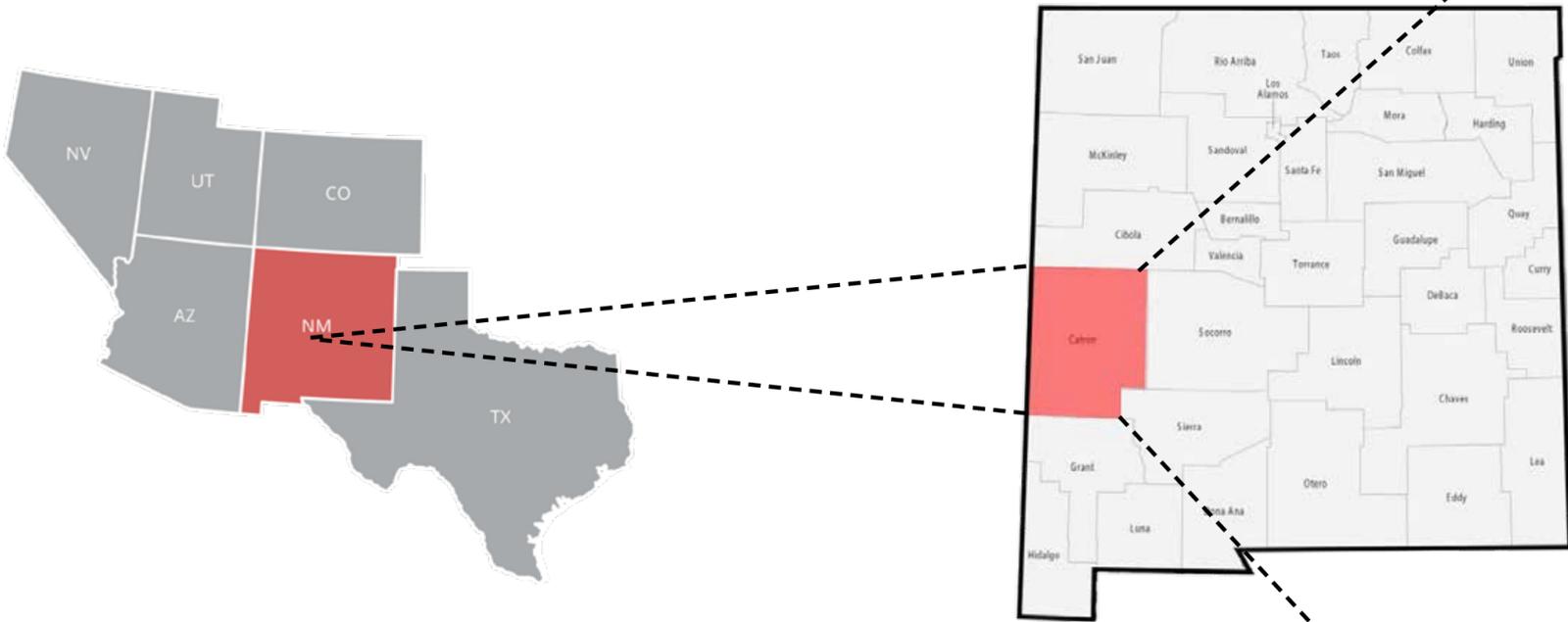
The mission of the Salutogenics resort is to establish a parallel healthcare network system in concierge medicine and sanatorium resorts. It is to be a borderless preventative medicine and healthcare system worldwide. The hallmark of the system is a series of sanatorium resorts, recreation, rehabilitation, convalescence, primary care, and elective surgeries. This project will establish a sanatorium resort complex at Southern Cross Ranch, New Mexico. The facility and its ancillary activities will be spread throughout the 29,000 acre ranch.

Located in remote West-Central New Mexico, Southern Cross Ranch straddles both sides of the continental divide. With a rolling terrain ranging in elevation from 7,300 - 8,200 feet, the 29,000 acre ranch is able to support trophy bull elk, antelope and mule deer in a Pinion Pine and Alligator Juniper forest with grassy meadows in between. The rehabilitation center is located in the heart of this expansive ranch situated on a hillside overlooking a valley with expansive views providing veterans with a unique experience where they can get into the right mind-set to process the trauma that they have endured in a calm and peaceful setting.

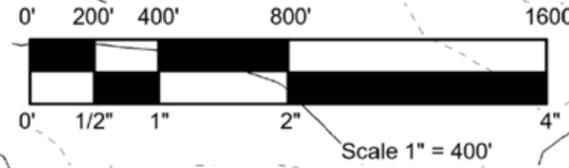
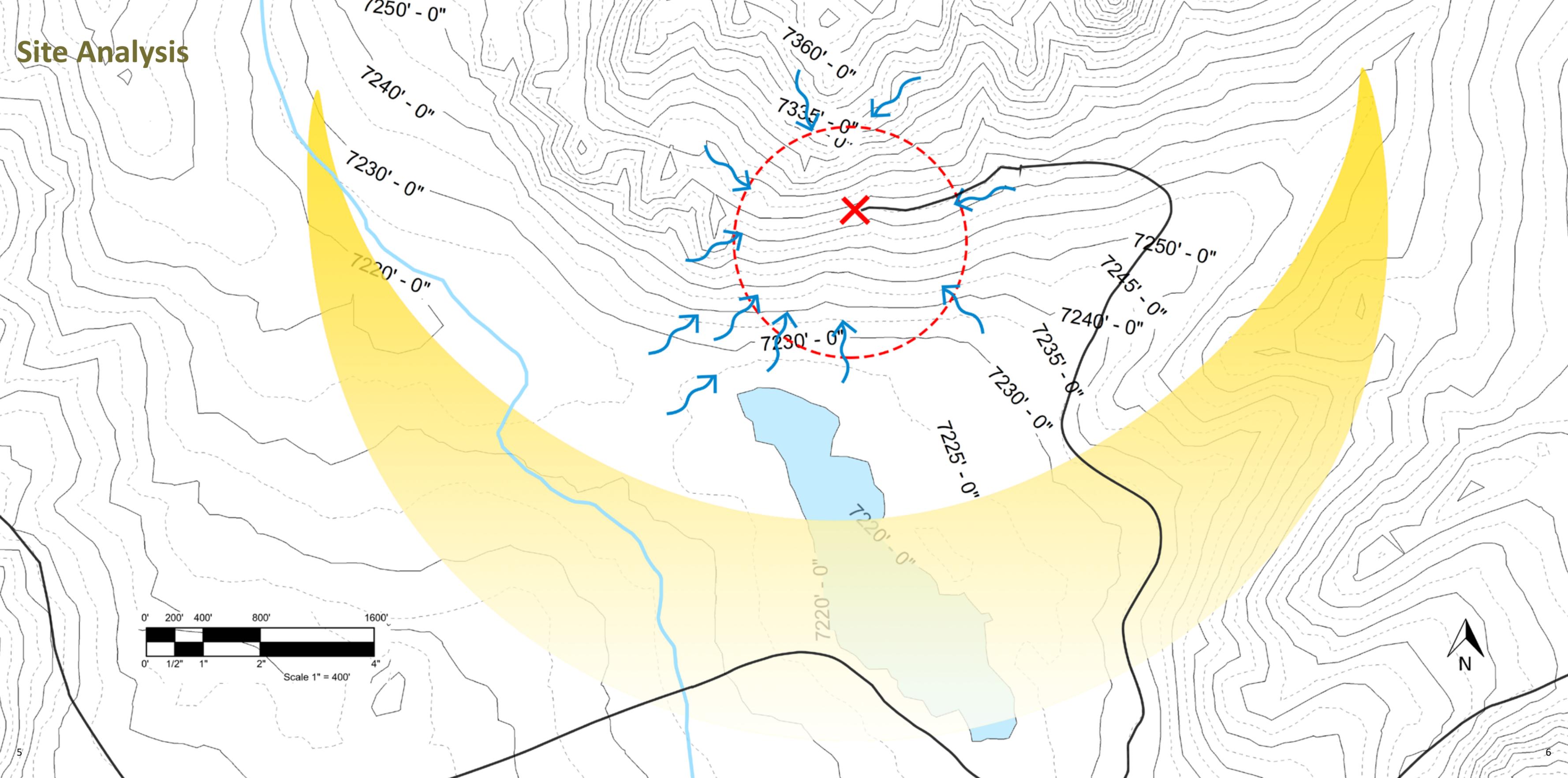
Derived from the concept of Salutogenics, Southern Cross Ranch is envisioned to serve the veteran community with a supportive and therapeutic healing environment to recover from the physical and psychological wounds of war specifically, Post-Traumatic Stress Disorder (PTSD) and Traumatic Brain Injury (TBI).



Southern Cross Ranch, New Mexico



Site Analysis



Research

Post-Traumatic Stress Disorder

Post-Traumatic Stress Disorder (PTSD) is defined as a psychiatric disorder that can occur in people who have experienced or witnessed a traumatic event such as a natural disaster, a serious accident, a terrorist attack, war/combat, rape or other violent personal assaults.

The combat environment has evolved over thousands of years, and today it may be the most extreme. Today, our service men and women experience extreme stressors in the combat environment. They may experience roadside bombs, improvised explosive devices (IEDs), suicide bombers, the handling of human remains, and human violence and death [Burnam, Meredith, Tanielian, & Jaycox, 2009]. All of these experiences in the combat setting increase the risk for PTSD. According to the U.S. Department of Veteran Affairs about 11-20% of veterans who served in Operation Iraqi Freedom or Operation Enduring Freedom have PTSD in a given year.

Recent data from a RAND study has estimated that about 18.5% of troops returning from Operation Iraqi Freedom and Operation Enduring Freedom (OIE/OEF) have met criteria on a structured survey assessing probable PTSD or depression [Burnam, Meredith, Tanielian, & Jaycox, 2009]. In this study researchers found that about only half of these individuals actually sought care from a provider in the past year, and of those fewer than half received minimally adequate care.

If left untreated, their symptoms can lead to other negative consequences such as, other mental and physical conditions, family/relationship problems. Lower productivity, premature mortality, suicide, and homelessness [Buran, Meredith, Tanielian, & Jaycox, 200]. There is no universal treatment for PTSD, each individual experiences different symptoms and responds to treatment differently.

There are several treatment methods available to treat PTSD these treatment methods include; Cognitive Behavioral Therapy (CBT) focuses on identifying PTSD triggers and confronting maladaptive behaviors. Cognitive behavioral therapy is a psycho-social intervention that aims to improve mental health. CBT focuses on challenging and changing unhelpful cognitive distortions and behaviors, improving emotional regulation, and the development of personal coping strategies that target solving current problems.

Avoid Talking of Trauma



PTSD Symptoms

Avoid Thinking of the Trauma



Always on Guard



Negative Mood



Flashbacks



Avoiding Places



Aggressive Behavior



Negative Thinking



Traumatic Brain Injury

Traumatic Brain Injury (TBI) is defined as a disruption in the normal function of the brain that can be caused by a bump, blow, or jolt to the head, or penetrating head injury. However, veterans usually succumb to a TBI due to an explosion experienced in combat. A TBI is classified in four different categories; Mild (concussion), which is the most common seen by members of the U.S. Armed Forces, moderate, severe, and penetrating being the most severe.

According to the U.S. Department of Defense (DoD), from 2000-2019 Q3 a total of 413,858 service members succumbed to a TBI. The majority of them were categorized as a Mild TBI.

- **Penetrating:** 5,279
- **Severe:** 4,110
- **Moderate:** 40,378
- **Mild:** 342,747
- **Not Classifiable:** 21,433

- Symptoms of TBI include:
- Loss of consciousness for a few seconds to a few minutes
 - Headaches
 - Nausea or vomiting
 - Problems with speech
 - Blurred vision
 - Ringing in the ears
 - Memory and concentration problems
 - Mood changes or mood swings
 - Feeling depressed or anxious

Car Accident



Causes of a TBI

Fighting



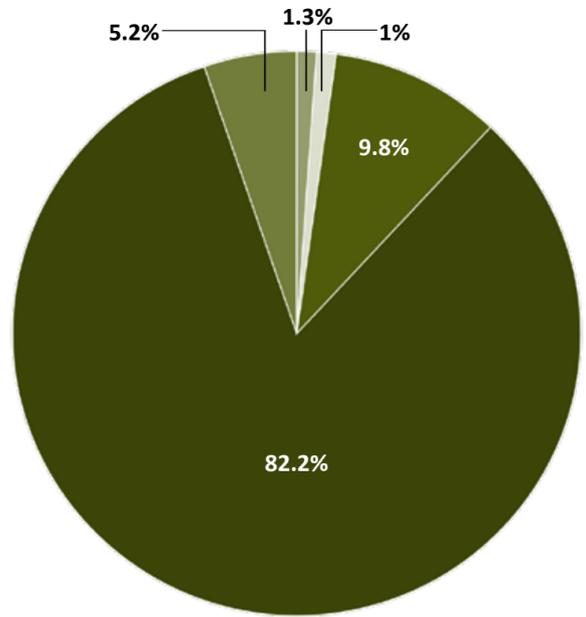
Sports



Combat Injuries



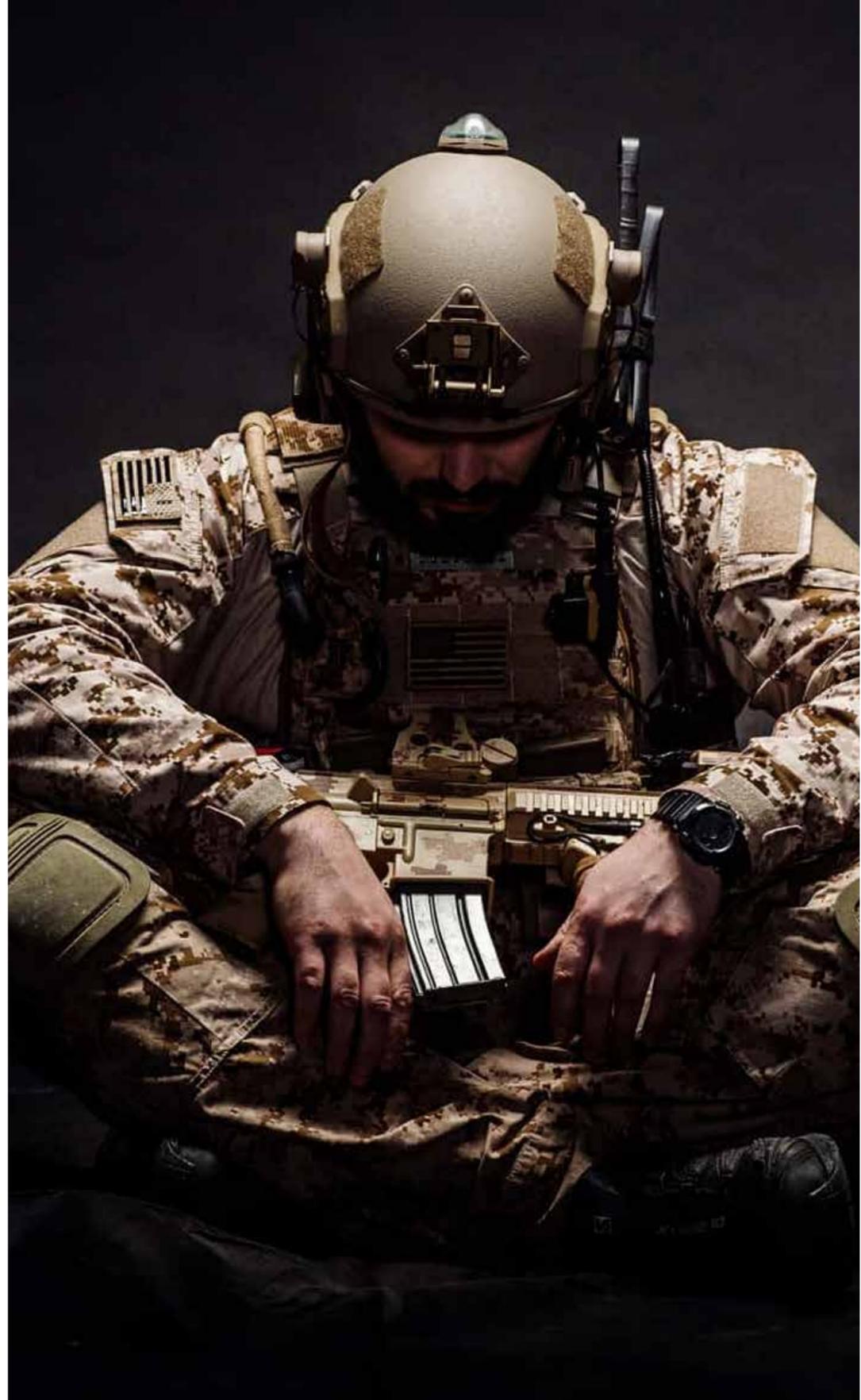
Falls



Warrior Culture

The veteran community is made up of a unique group of people, they have their own culture, humor, and aesthetic, different from what most people in the civilian world are accustomed to. The warrior culture promotes pride in inner strength, self-reliance, toughness, and being able to “shake off” ailments or injuries [Burnam, Meredith, Tanielian, & Jaycox, 2009]. With the warrior culture in mind, Southern Cross Ranch aims to captivate the camaraderie that is experienced in the armed forces and provide that same experience to the veterans who are receiving treatment. The goal of this facility is to provide veterans with an atmosphere where they are comfortable and surrounded by like-minded individuals who have been through similar experiences.

It is imperative that veterans with PTSD and TBI seek and receive treatment for their wounds. If left untreated, their symptoms can lead to other negative consequences such as, other mental and physical conditions, family/relationship problems. Lower productivity, premature mortality, suicide, and homelessness [Buran, Meredith, Tanielian, & Jaycox, 200]. There is no universal treatment for PTSD and TBI, each individual experiences different symptoms and responds to treatment differently. It is also important to take into consideration the symptomatology and triggers that veterans experience when designing a facility like this. At this facility veterans can expect to have several innovative treatment options available to them that have been proven to show positive results in veteran patients. In order to provide veterans with the best possible care, this facility aims to provide a holistic design that is mindful of the potential environmental stressors that can cause veterans to be triggered.



Case Studies Center for the Intrepid

Located at Brooke Army Medical Center in San Antonio, Texas. The center for the Intrepid was designed to provide military patients and veterans with severe extremity injuries, amputations, and burns the best opportunity to regain their pre-injury abilities in a supportive, healing environment. Because of its expansive space and elongated form, multiple rehabilitation activities can be conducted within and adjacent to it facilitating.

- Key Takeaways:**
- **Visibility and interaction** for patients, families, and caregivers
 - **Prosthetic manufacturing** integrated into the clinical setting
 - **Central atrium** is the focal point for the activities on all the floors and serves as a central way-finding element of the facility
 - Generous use of glass providing **views to the outside and natural daylight** for patients

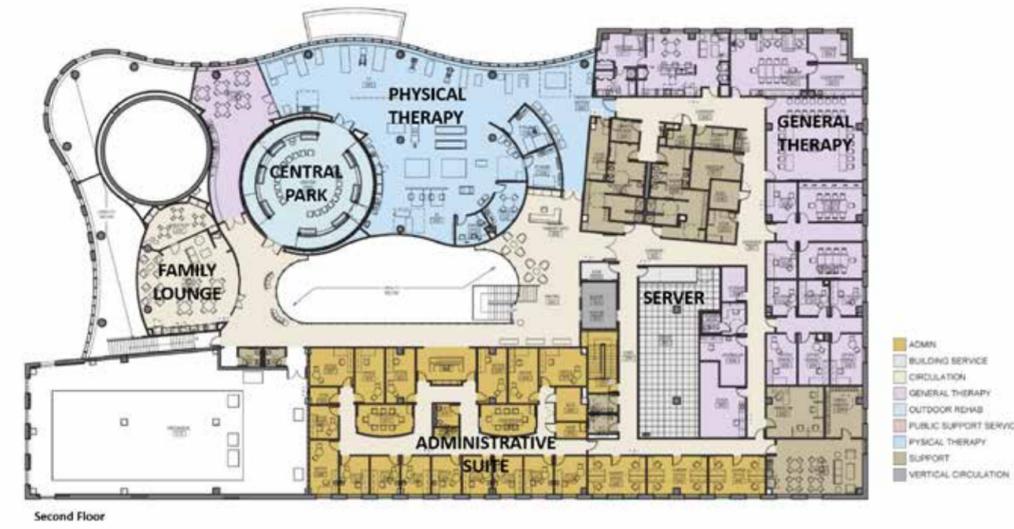


National Intrepid Center of Excellence

Located at Walter Reed Medical Center in Bethesda, Maryland. The National Intrepid Center of Excellence was designed to encourage all staff members of the diagnostic and treatment team to listen to the patient and family tell their story once, and to continuously collaborate to implement a treatment plan that is achievable for the patient to make strides in their recovery.

Recovery Therapies Available:

- Virtual reality
- Imaging
- Physical and occupational therapy
- Diagnostic and treatment clinic
- Case management
- Education
- Research



Warriors Heart

Located in Bandera, Texas Warriors Heart was built from the end-users point of view. The facility is meant to deinstitutionalize behavioral health facilities. The facility provides an uplifting positive experience. Mental health and chemical dependency is the main focus of this facility where they aim to treat active military, veterans, police, firefighters, and EMTs.

Amenities offered:

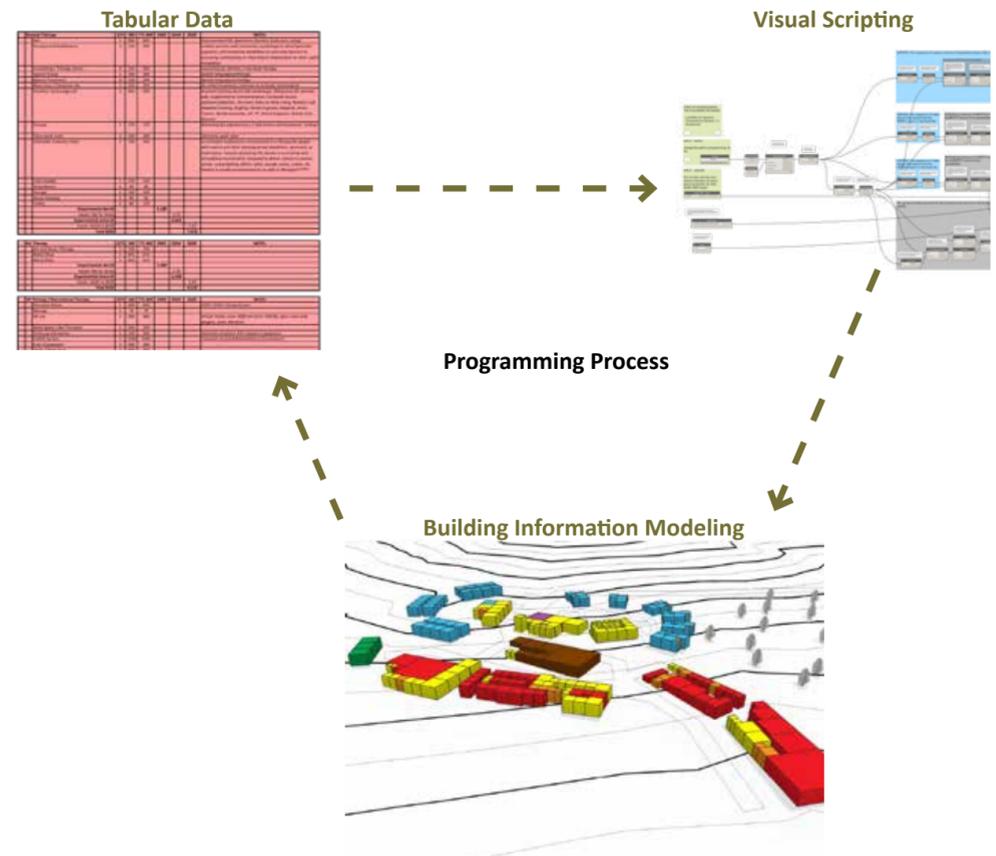
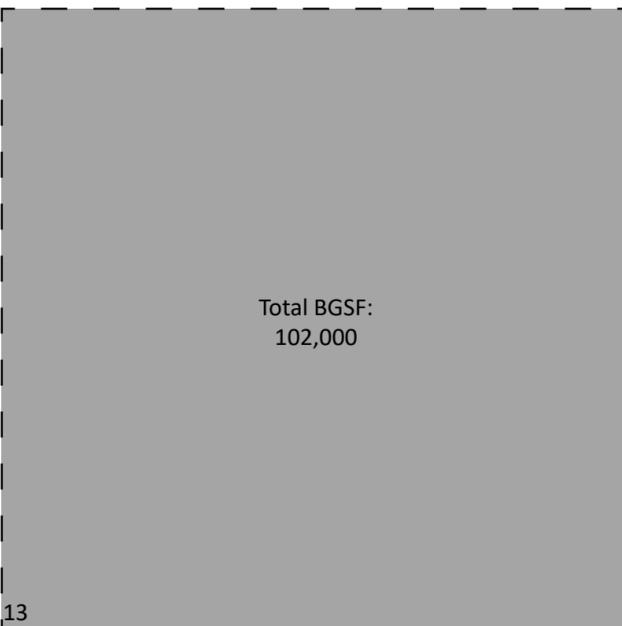
- Suite like rooms
- Recreational room
- Gym
- Running/walking trails
- Fire pit
- Wood and metal shop
- K-9 program
- Basketball
- Pool
- Wild game
- Jujitsu
- Offsite cross-fit center
- Offsite non-denominational church



Programming

Facility Program

A facility of this stature requires a very robust program in order to provide the best possible care. To meet the needs of this project, this 102,000 square foot facility was broken up into ten different departments, which consists of; a welcome center, intake and diagnosis, family and group housing, community space, physical therapy & occupational therapy, general therapy, art therapy, virtual reality therapy, education space, and administration space. Given that this facility is located in a remote location, incorporating this program into one single building would not fit into the context of the surrounding environment. For this reason, the program was broken down into several different buildings, based on function. This decision allows for a more intimate experience to be had throughout the facility evoking deep thought and a mental transition as one departs from their housing unit and meanders through the desert to their specified therapy.



Project Goals

Treatment Choice: Research shows that veterans with PTSD and TBI respond to treatment differently. It's not a one treatment fixes all. Providing choice also gives veterans more control in their treatment which in turn reduces their stress levels.

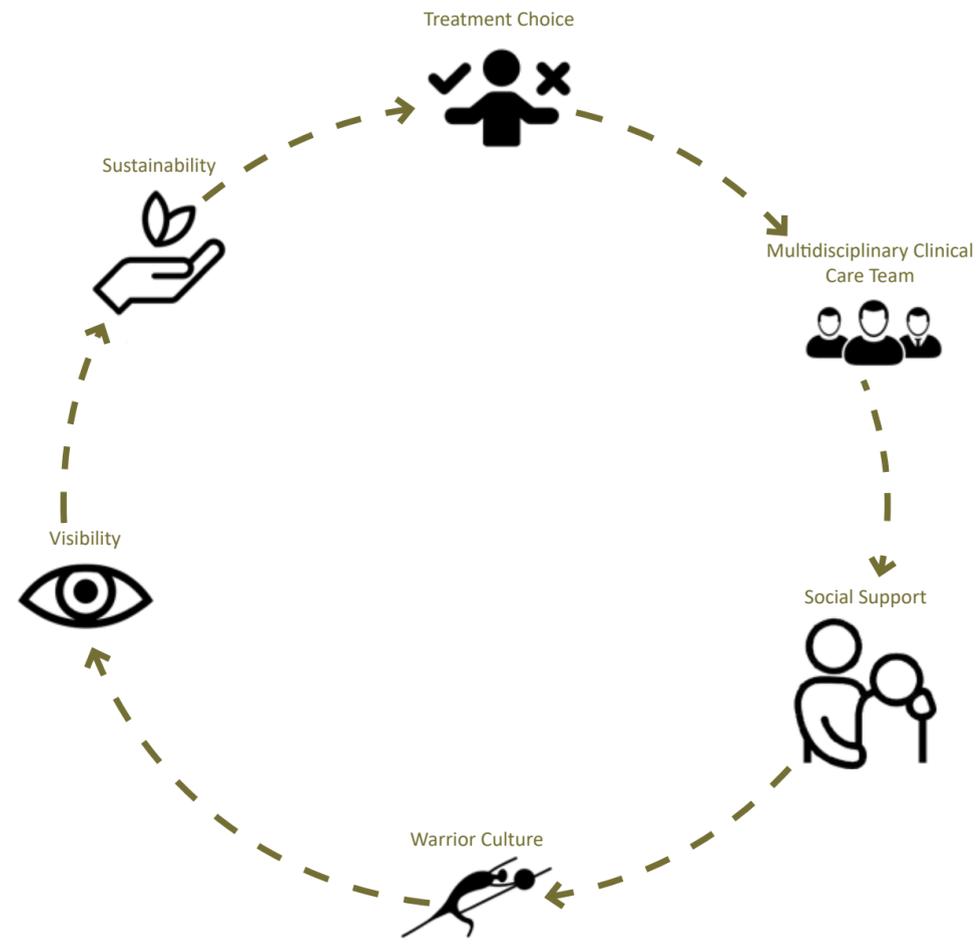
Multidisciplinary Clinical Care Team: This goal assigns a clinical care team to each veteran where they tell their trauma story once. Then the veteran, their family, and the clinical care team will work together to devise a treatment plan.

Social Support: The facility should aim to offer social support through design by providing spaces for casual encounters, and a facility where veterans and their families can gather.

Warrior Culture: The veteran population is very different from the civilian population. Veterans have their own distinct aesthetic, interests, and humor. Being surrounded by like minded people, veterans will feel more comfortable when discussing their trauma.

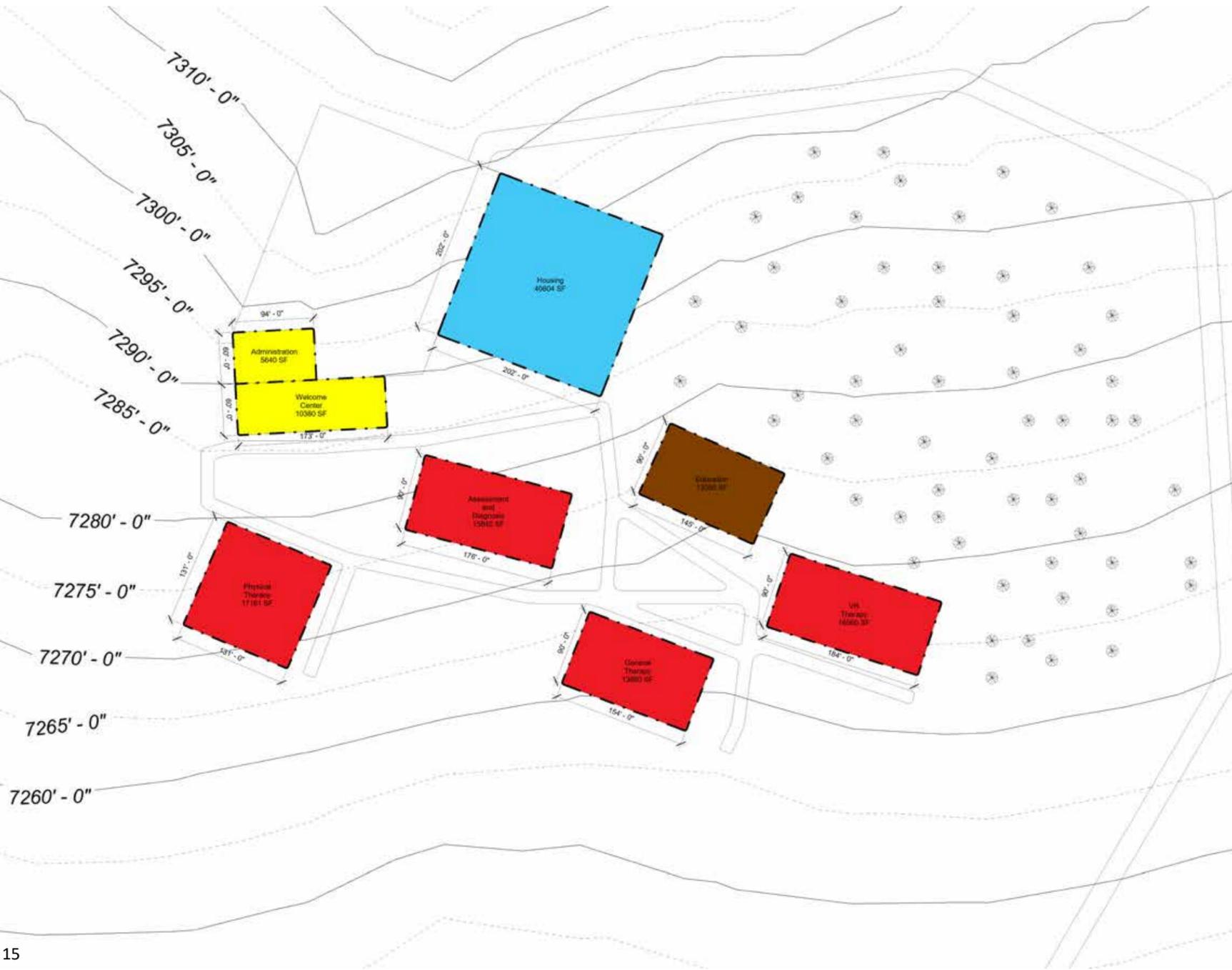
Visibility: To promote visual clarity throughout the site and clear sight lines within buildings. Veterans with PTSD can be very hyper aware, this will enable them to be aware and focus on where exits are located, and to see who's coming in and out of the building that they are in.

Sustainability: The facility should be constructed and sourced of materials that are native to the region in order to minimize the carbon footprint of this facility.

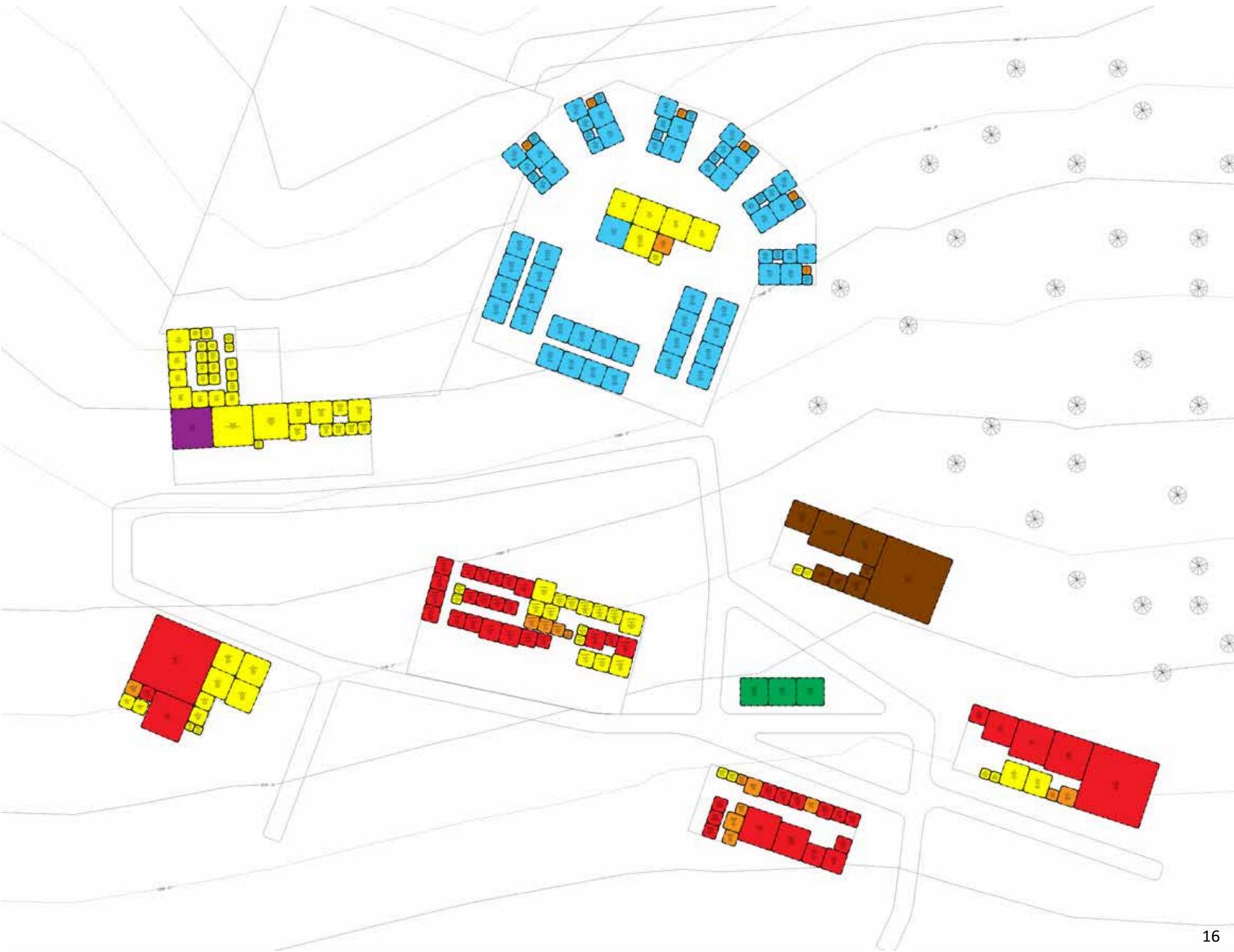


Gaming

The next step after solidifying a space program was the game boarding process. Starting from the macro scale, the departmental relationships were analyzed as individual buildings. This process then resulted into a deeper analysis of the spatial relationships in each building. After several iterations, the final design of the master planned site was configured.



Gaming Scheme 1



Driving Forces:

- Switch back concept throughout the site
- Views to the surrounding landscape
- Clustered housing

Pros:

- Housing units are clustered to provide a sense of community
- Parking is directly adjacent to housing units
- Housing units and treatment space are separated by distance

Cons:

- Buildings are far apart
- Proposed layout does not allow for feasible service entrances

Gaming Scheme 2

Driving Forces:

- Serpentine spine
- Centralized community house and welcome center
- Large building clusters

Pros:

- Buildings are clustered together, minimizing walking distance
- Site layout is more organic
- Layout promotes a walkable spine to foster an experience within the site

Cons:

- Family housing and group housing are too far apart, and lack the connection needed to provide a sense of community
- Layout calls for buildings with large footprints
- Layout does not promote visibility throughout the site



Gaming Scheme 3

Driving Forces:

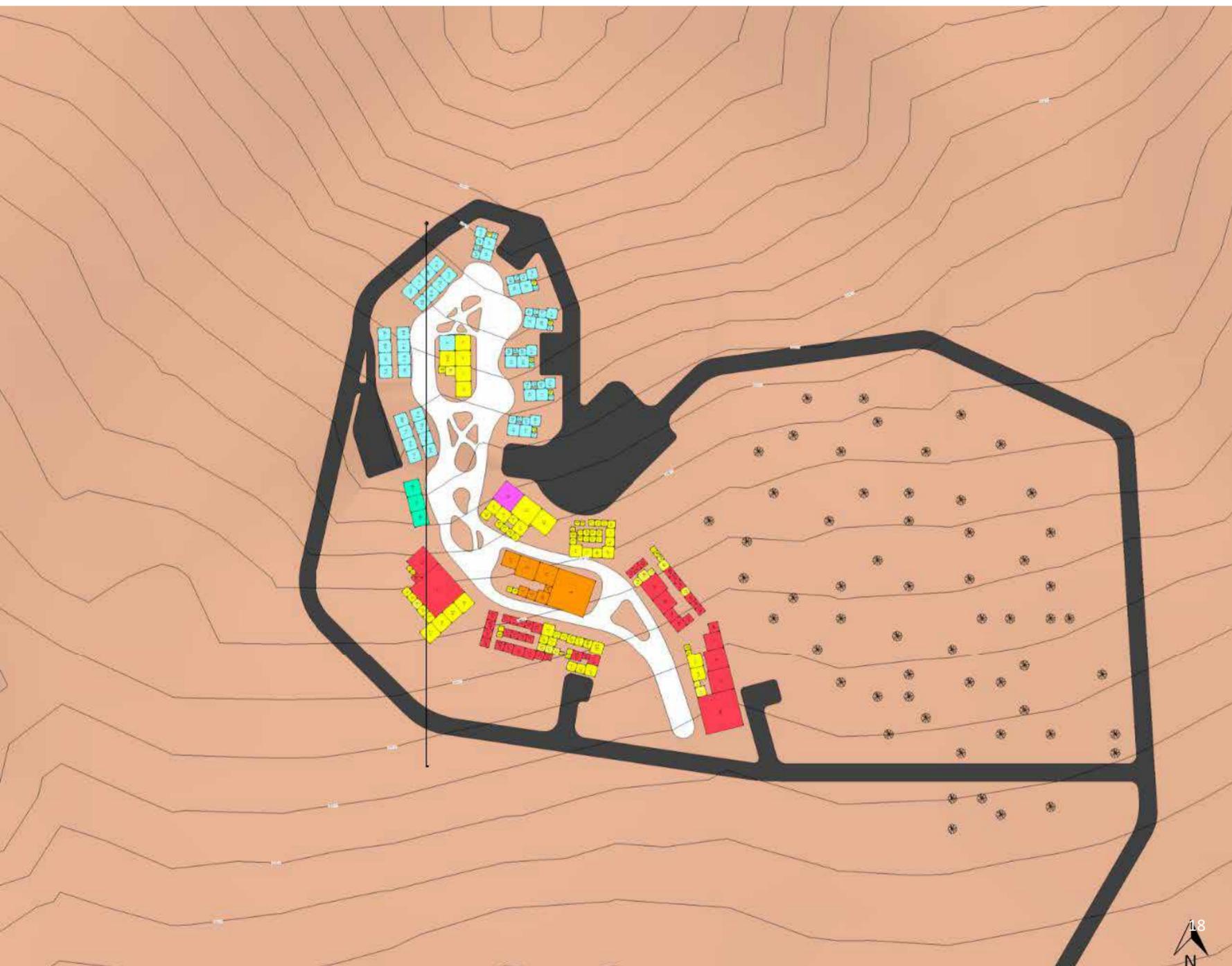
- Provide several walking trails
- Capitalize on views to surrounding landscape

Pros:

- Housing units foster a better sense of community
- Housing units have excellent views to the surrounding landscape
- Visibility is promoted throughout the site
- Accessible service entrances for each building

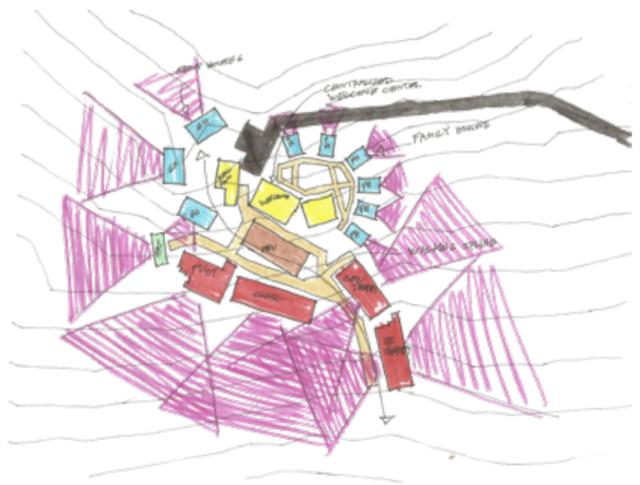
Cons:

- Long walking distance from housing to most extreme part of the site
- Site is too steep being perpendicular to topographical contour lines

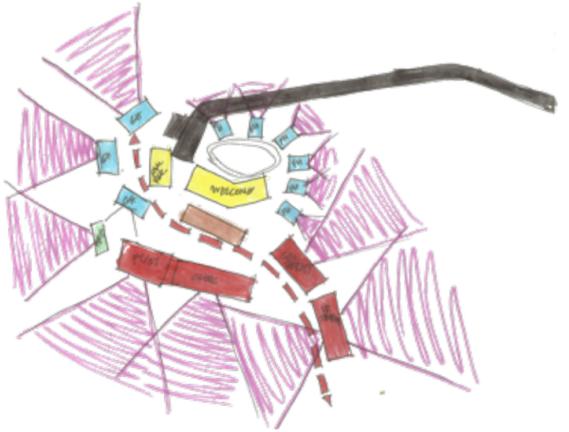


Concept Development

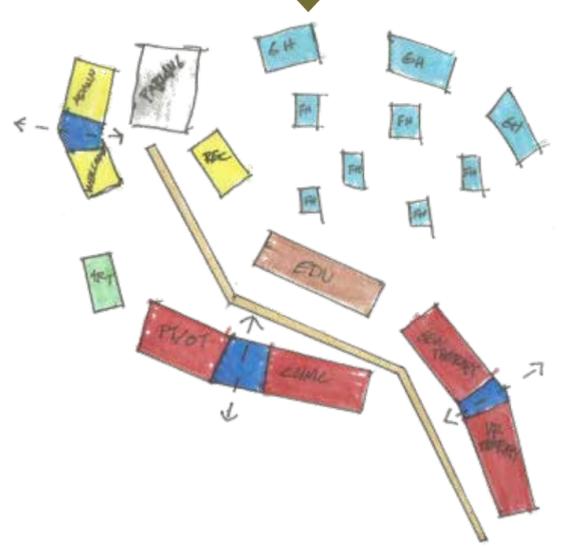
Views to surrounding landscape



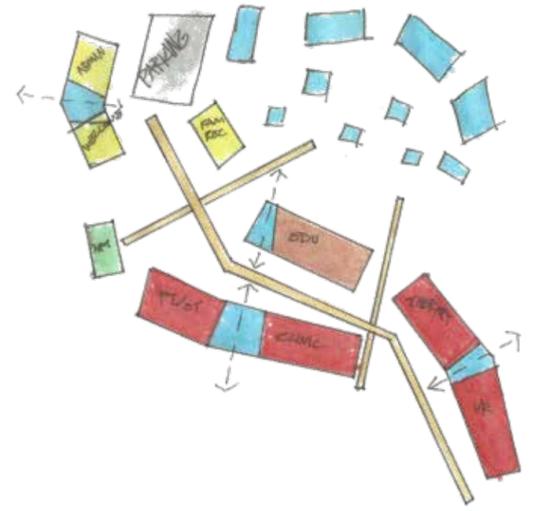
Serpentine Spine



Transparency



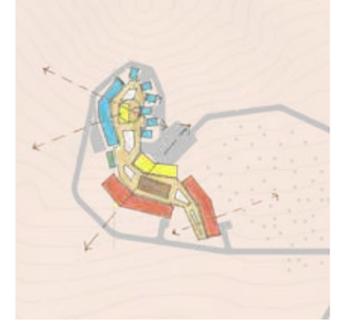
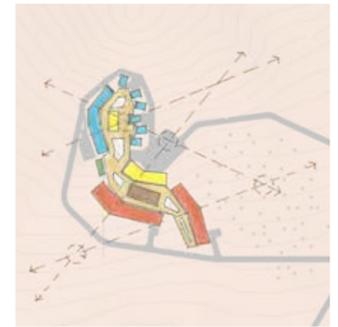
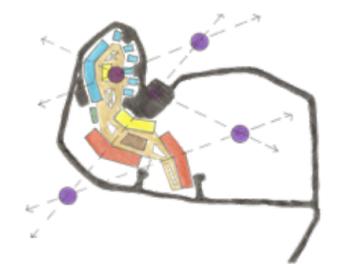
Visual Connection



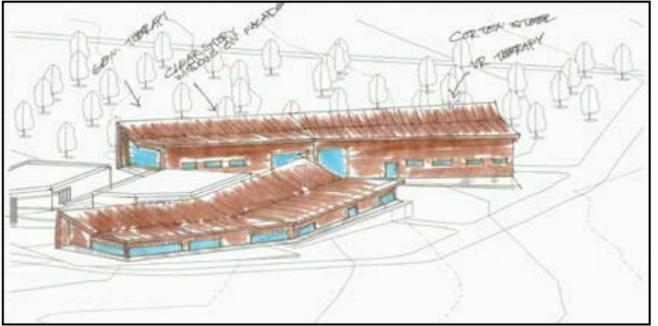
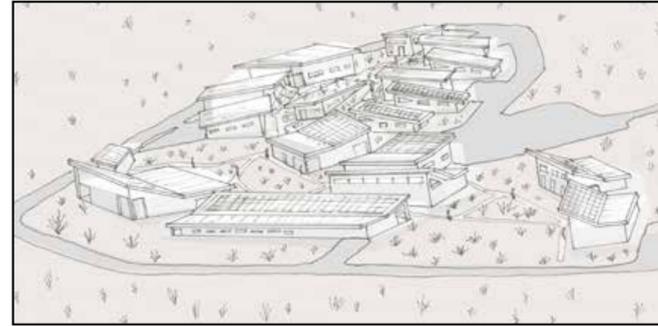
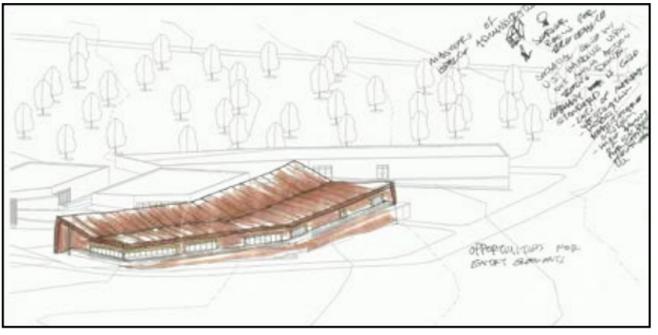
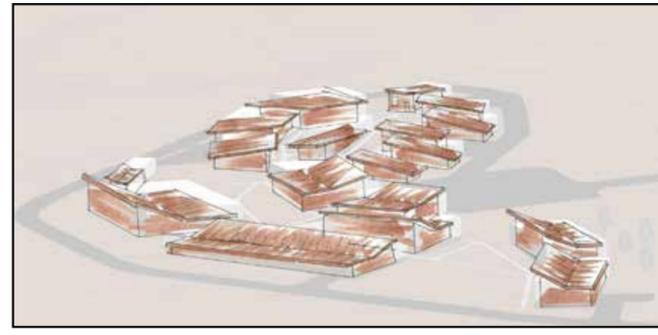
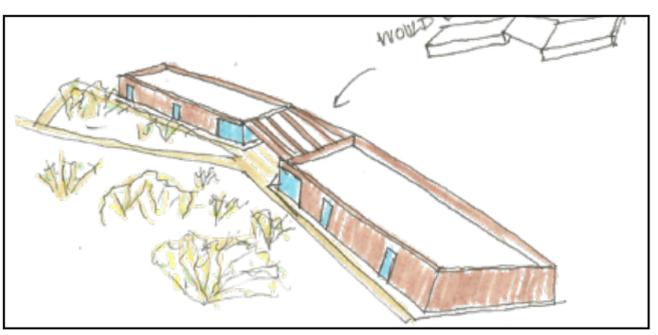
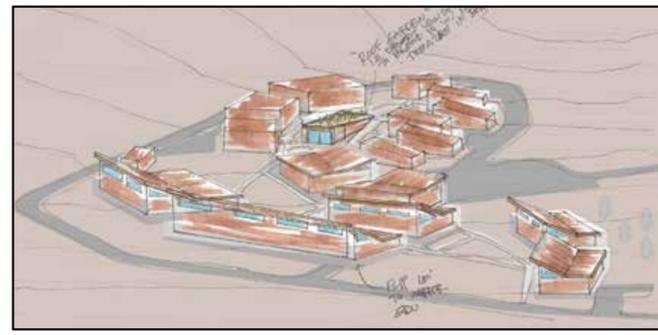
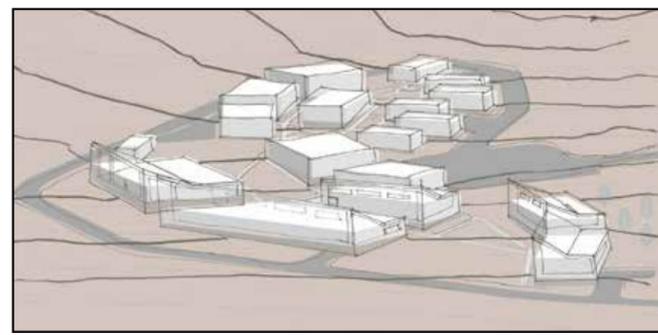
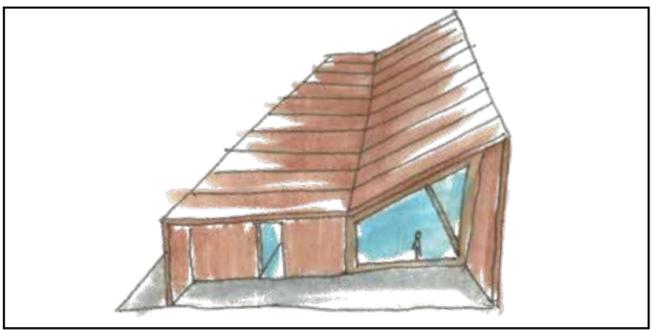
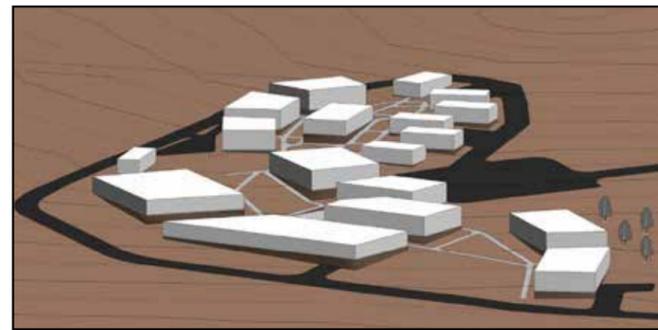
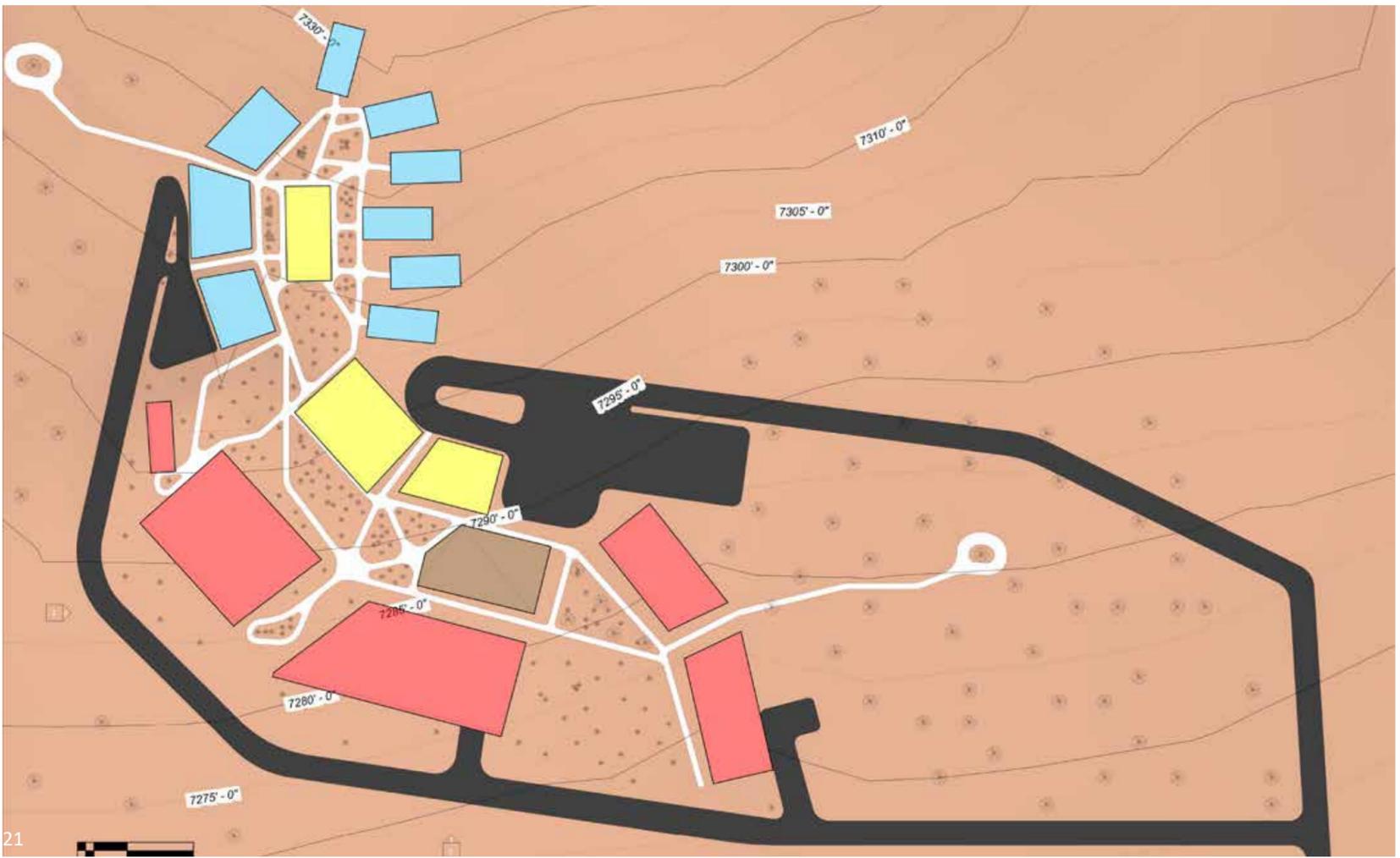
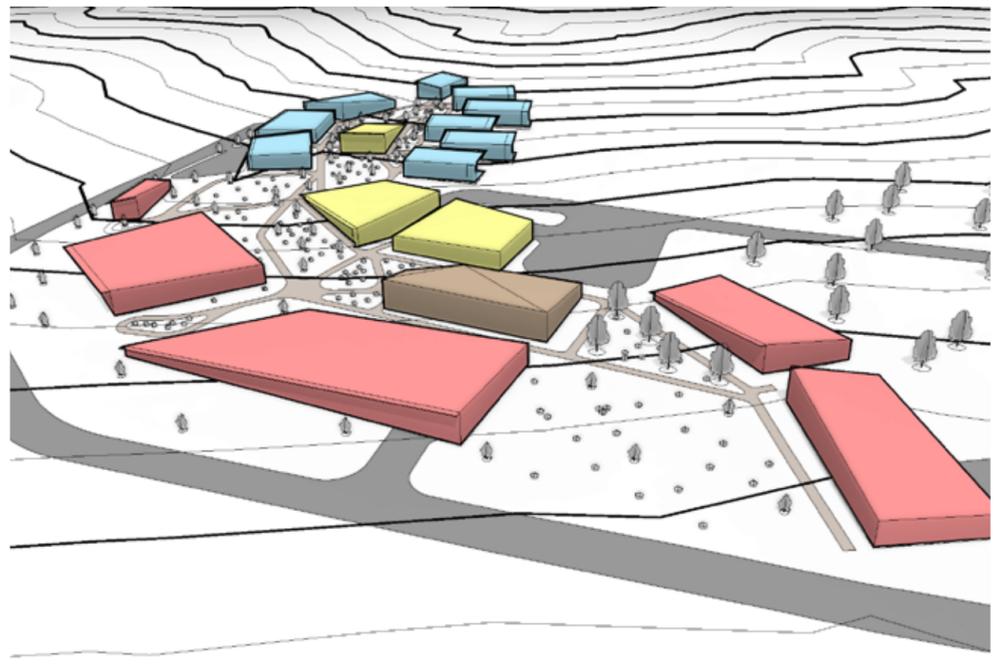
The completion of the third gaming iteration allowed for some additional exploration with the site layout through sketching.

During the sketching process, the visual intersections in purple began to present themselves. These were envisioned to provide a space where a veteran can take a short walk into the desert to be alone and reflect. These spaces would include some sort of a special landmark.

In addition to the visual intersections throughout the site, the design and layout of the walking path was also explored. The idea behind the narrow walking path was meant to emulate the experience one would get while walking through the desert. Although this provided more of an intimate experience to be had, it was not a realistic option as the walking path needed to be able to accommodate veterans with different levels of mobility, and the use of golf carts to move throughout the site.



This next series of images are a result of the overlaid sketches from gaming iteration three. The site plan below, and the birds eye view to the right were derived from these sketches. From there an exploration of the formal and material properties of each building began to emerge. The next series of sketches was the exploration of different possible forms when utilizing Adobe and Corten steel as the primary building materials. The intention was to have the buildings keep a low profile in order to blend in with the surrounding landscape.



Gaming Scheme 4

Driving Forces:

- Centralized facilities between housing clusters
- Minimize walking distance
- Capitalize on views to surrounding landscape
- Position buildings on East-West orientation to be parallel with topographical contour lines

Pros:

- Treatment and shared facilities are centralized
- Walking distance is minimized from housing units
- Housing units are clustered in groups creating a sense of community
- Site is not on a steep slope

Cons:

Roads will be visible from housing units and other facilities

After several gaming iterations and sketches, gaming iteration four was selected as the final site layout for this project. This iteration was successful because it provided housing on both the east and west portions of the site, which allowed all of the treatment and community space to be centralized. Additionally, the site layout and buildings are placed perpendicular to the topographical contour lines. This would minimize the slope one would have to walk up and down, as well as allowing each building to be accessible on the same level, promoting a more universal design approach.



Final Design

Inspired by the culture and vernacular adobe architecture of New Mexico, this facility seeks to provide a deinstitutionalized solution that is conscious of the possible stressors that buildings and environmental elements can have on veterans with PTSD or TBI. To compliment the geographical location of Southern Cross Ranch, adobe, heavy timber, and corten steel elements were chosen as the primary building materials. Thus, providing a more intimate and evocative environment for veterans to process their trauma.

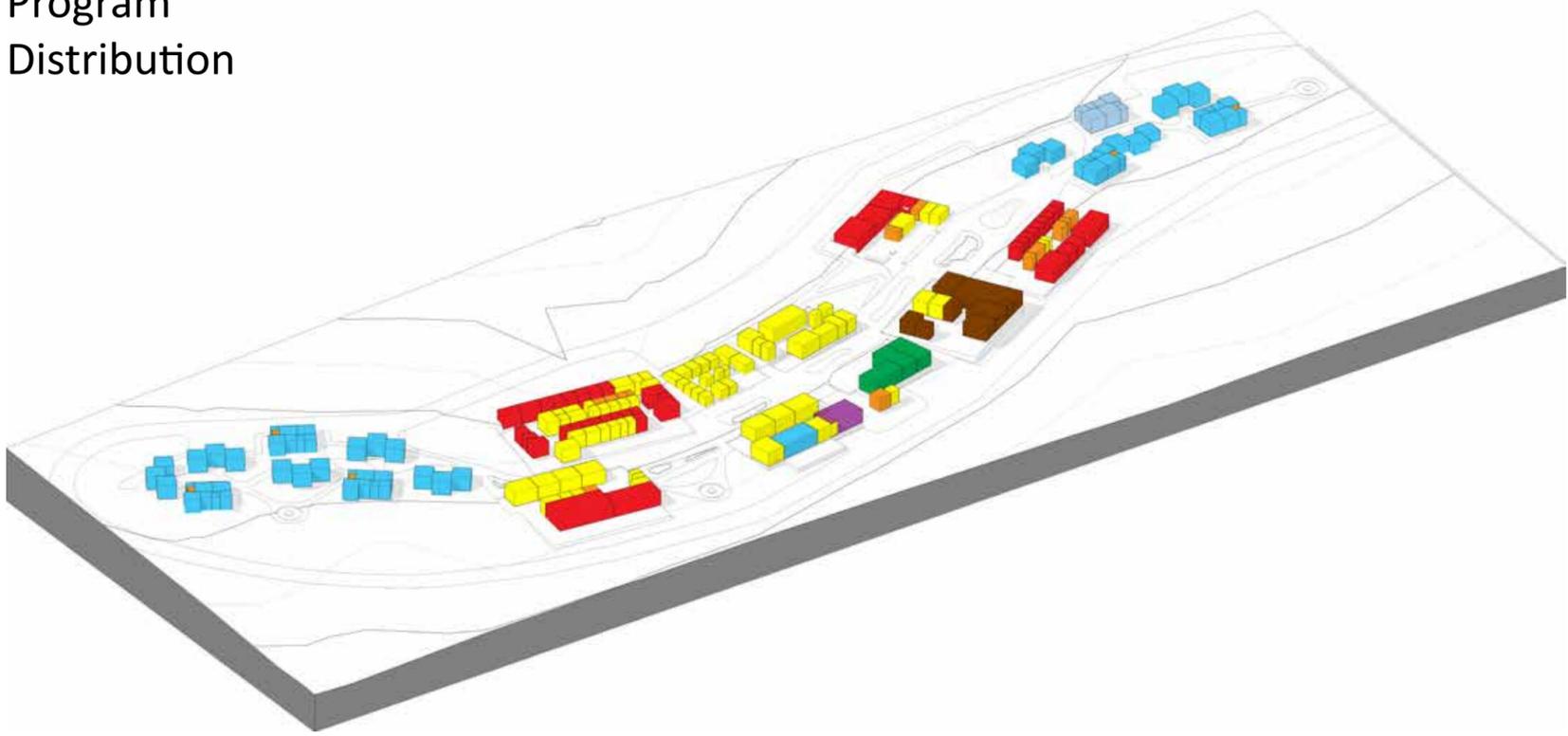
Heavy timber is the primary structural material for each building at this facility. The warming qualities of timber present a calming experience. Each building consists of a 20' x 20' heavy timber structural frame.

Adobe is a primary building material that dates back to the early Native American tribes that settled in New Mexico. Although adobe is an ancient building material, it is still a prominent material used today. One of the benefits of using adobe is for its exceptional thermal properties and wide availability throughout the region. Although adobe construction has load bearing capabilities, it will not be used in that capacity. Instead it will be used in a set of planes that define the extent of each building which also doubles as a thermal mass for each building.

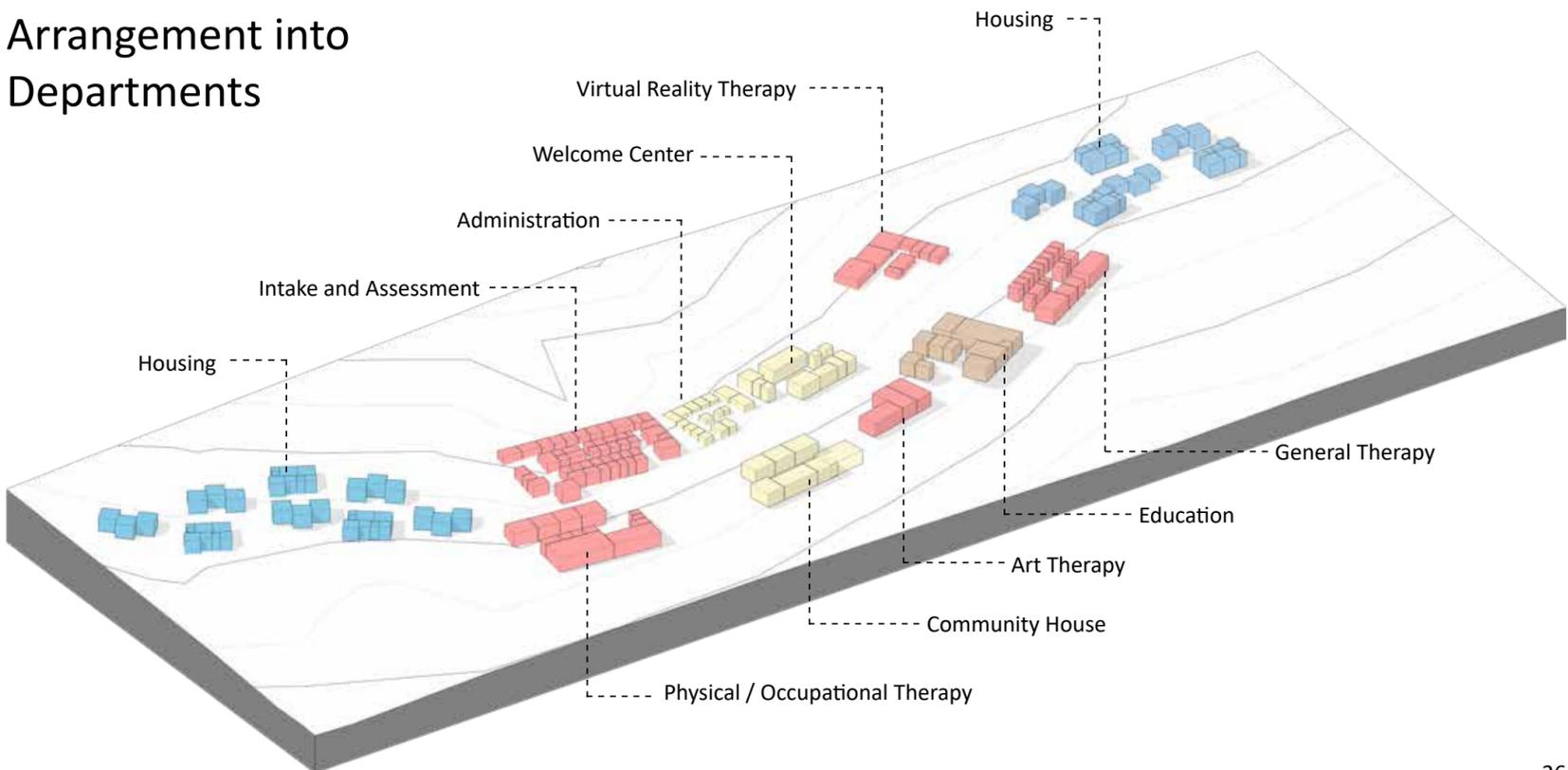
Corten steel was selected as a tertiary material to compliment the rough and rugged terrain, expressing an association between the course qualities of the steel and the veteran population. Corten is naturally weather resistant, as "it develops a tenacious oxide coating when exposed to the atmosphere that, once formed, protects against further corrosion and eliminates the need for paint or other protective coatings" [Fundamentals of Building Construction: Materials and Methods, p. 428]. Similarly, veterans can relate to the corten steel as they too are also strong but rough around the edges. Thus, inspiring them that they have the ability to withstand the test of time in spite of having suffered a life altering condition.



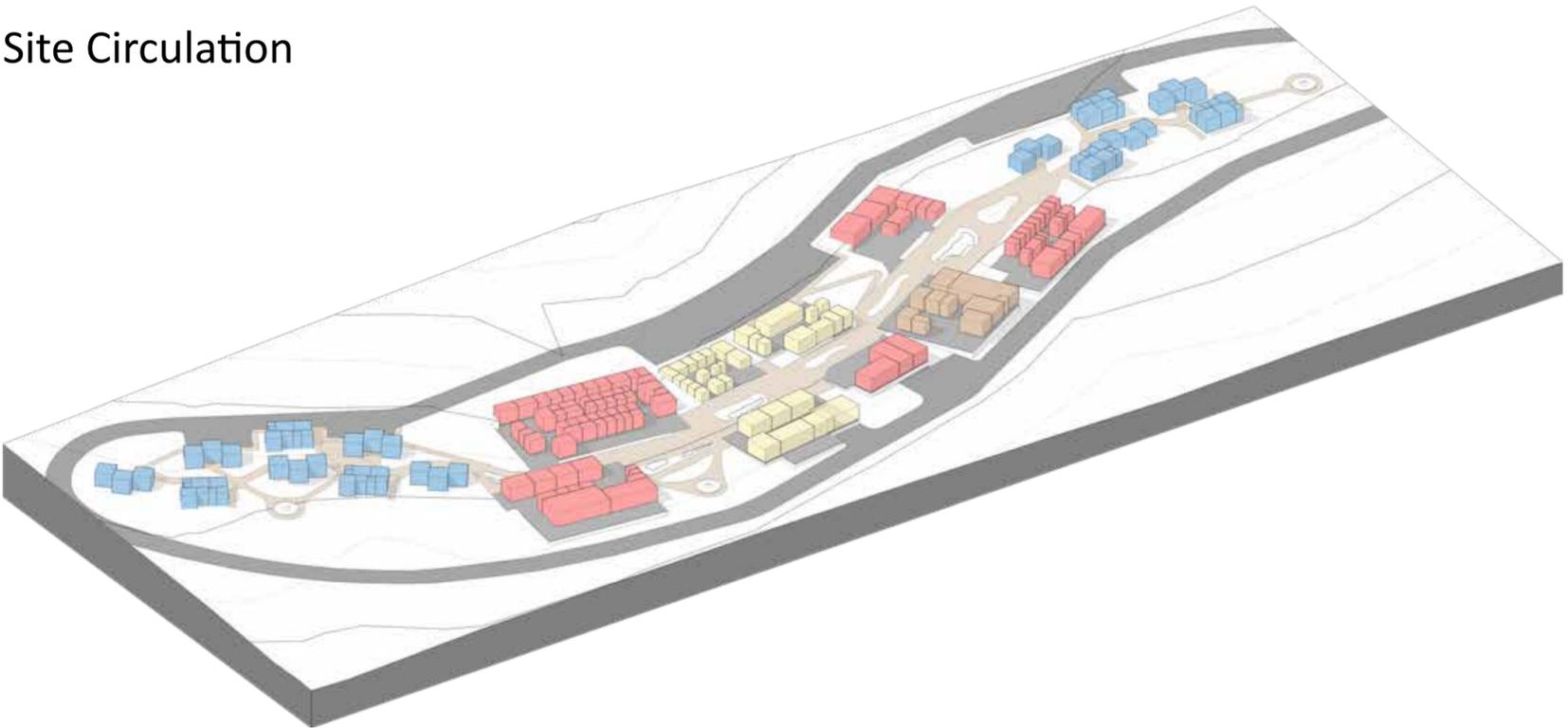
Program Distribution



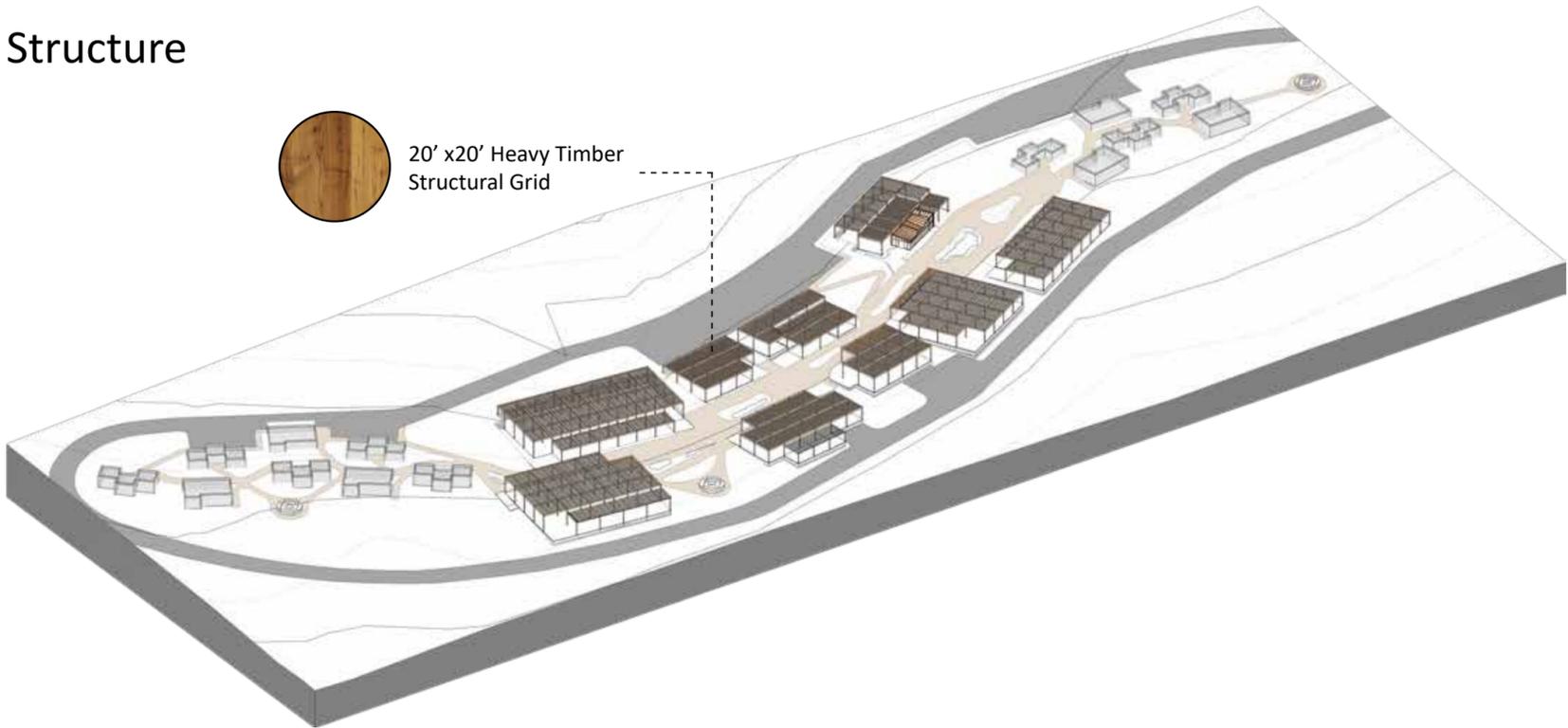
Arrangement into Departments



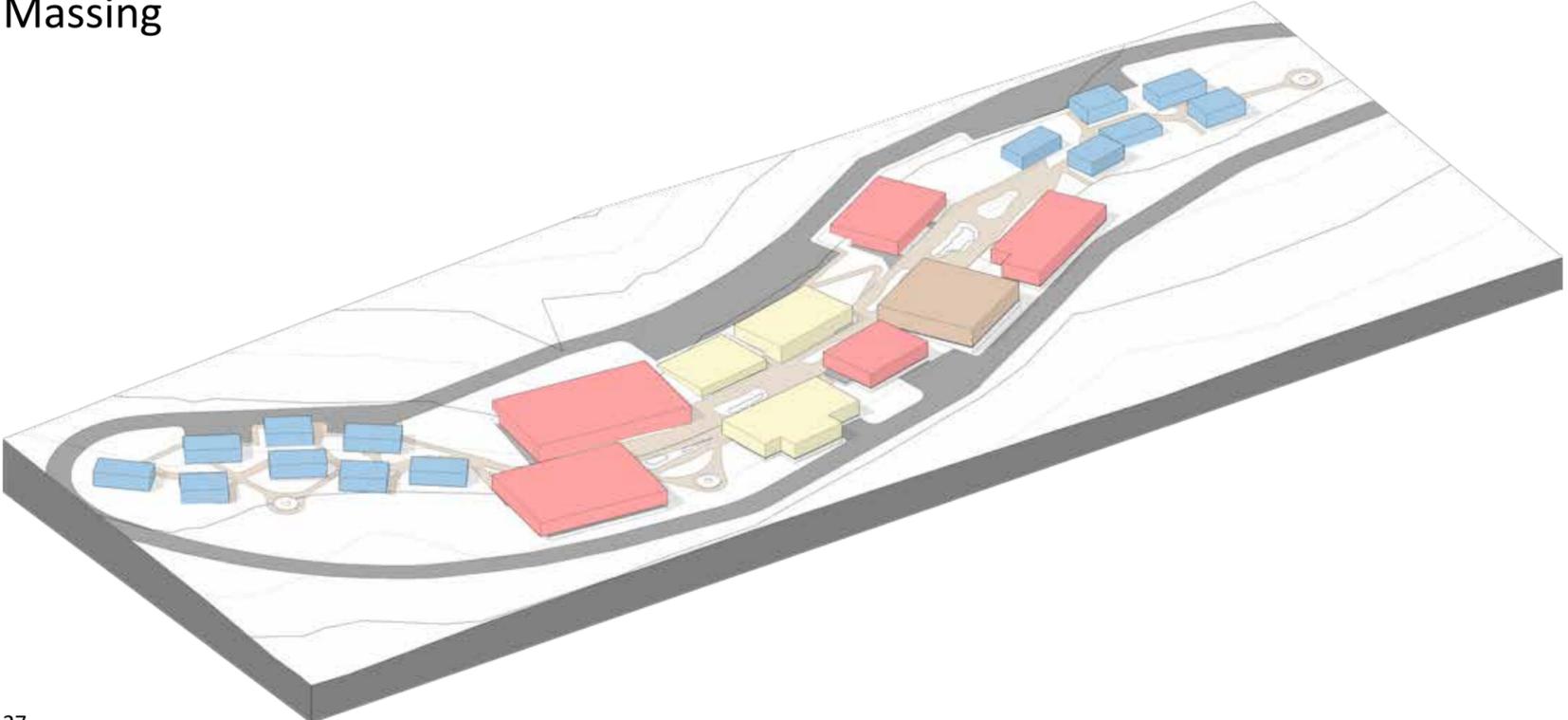
Site Circulation



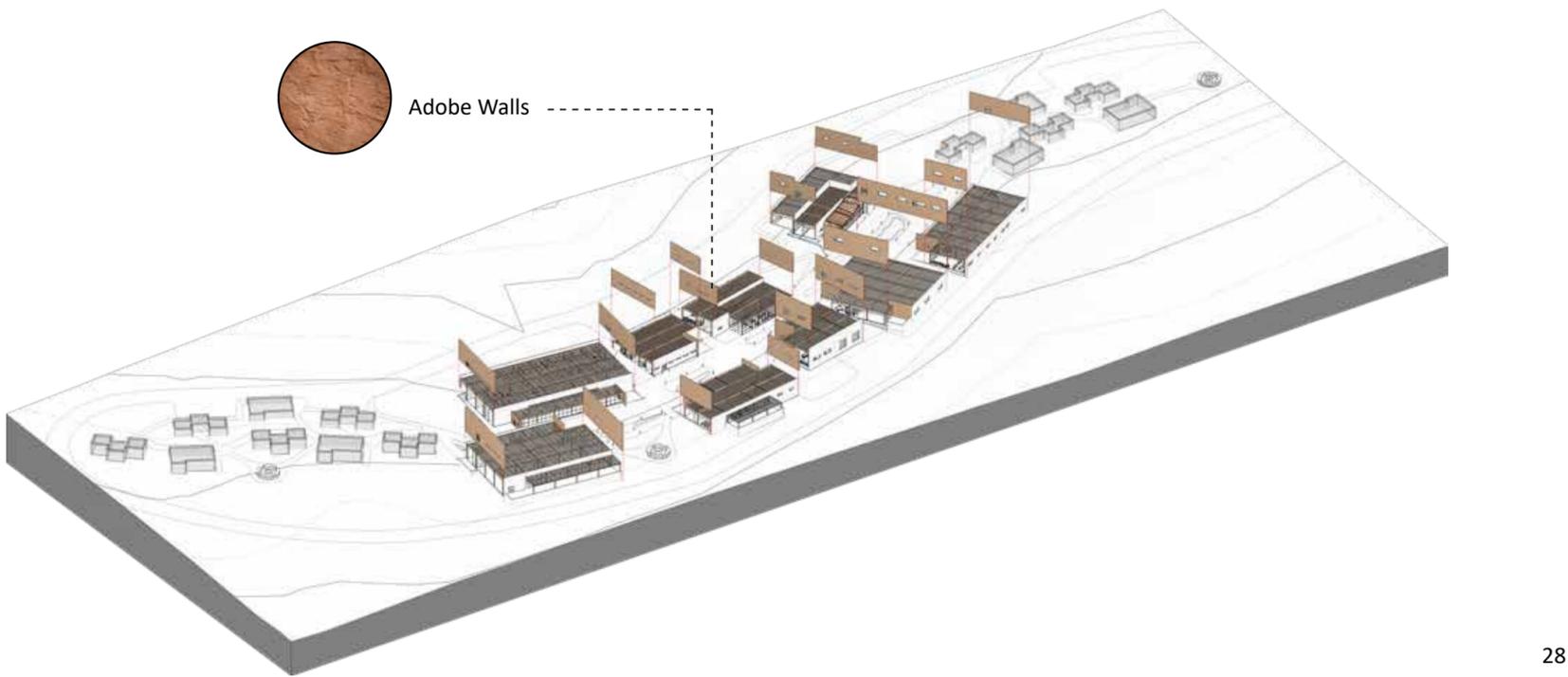
Structure



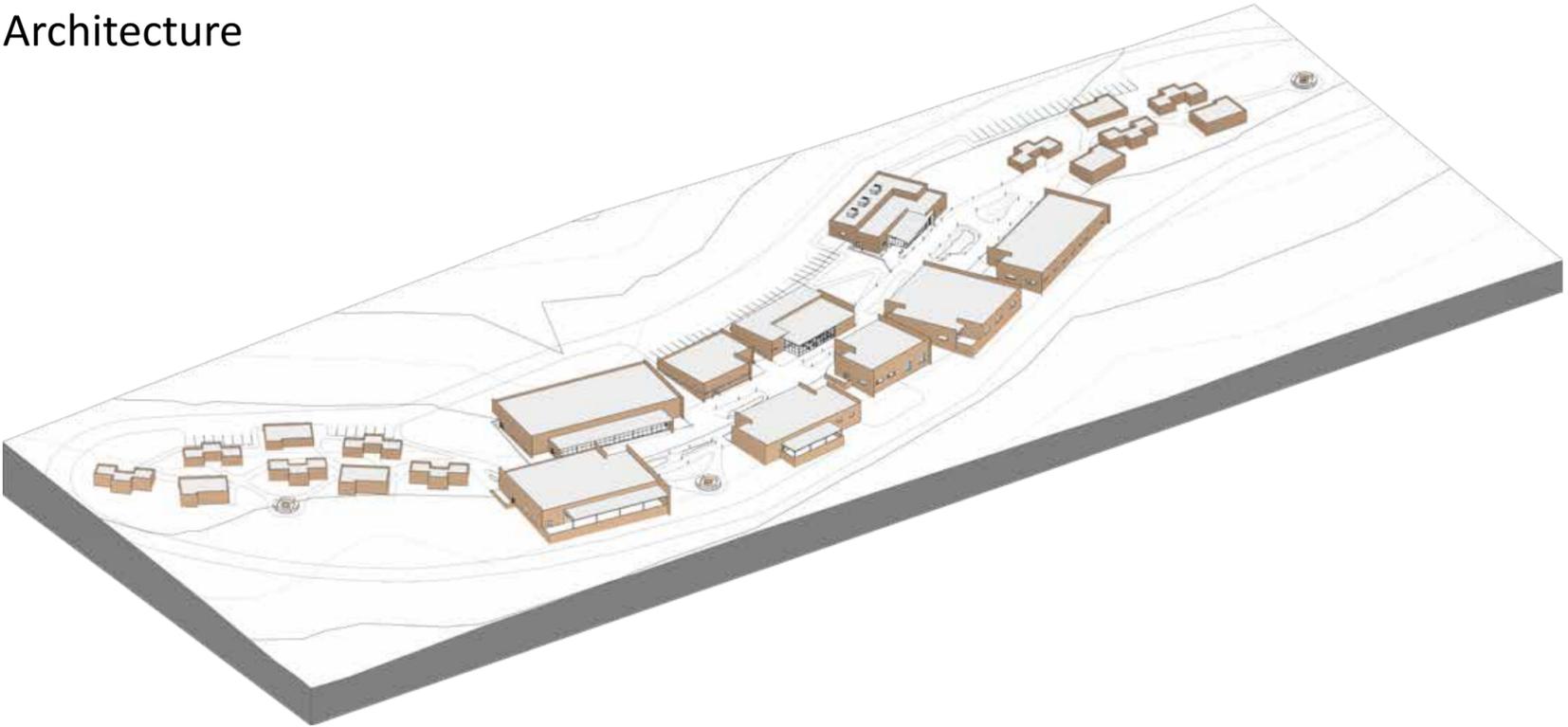
Massing



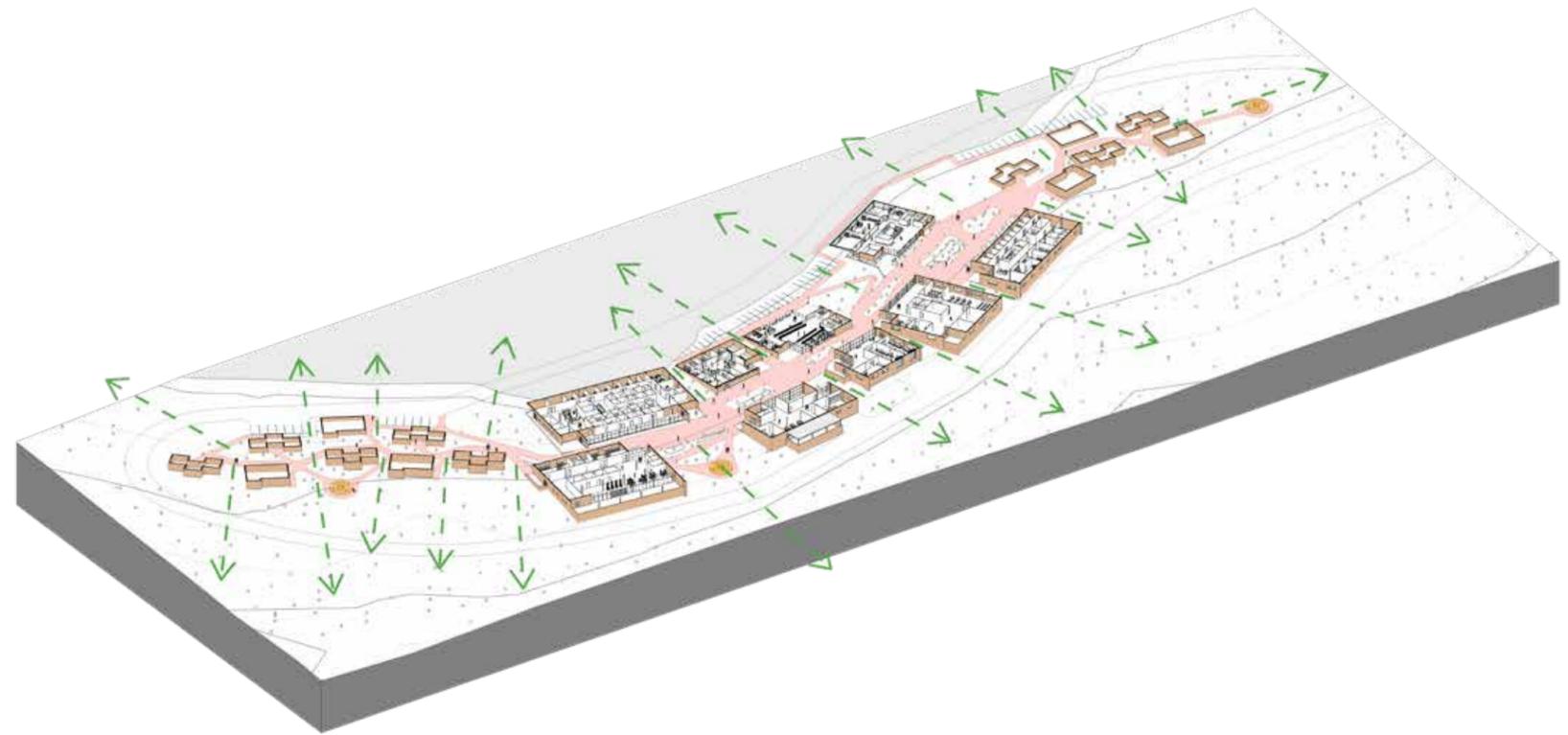
Planes



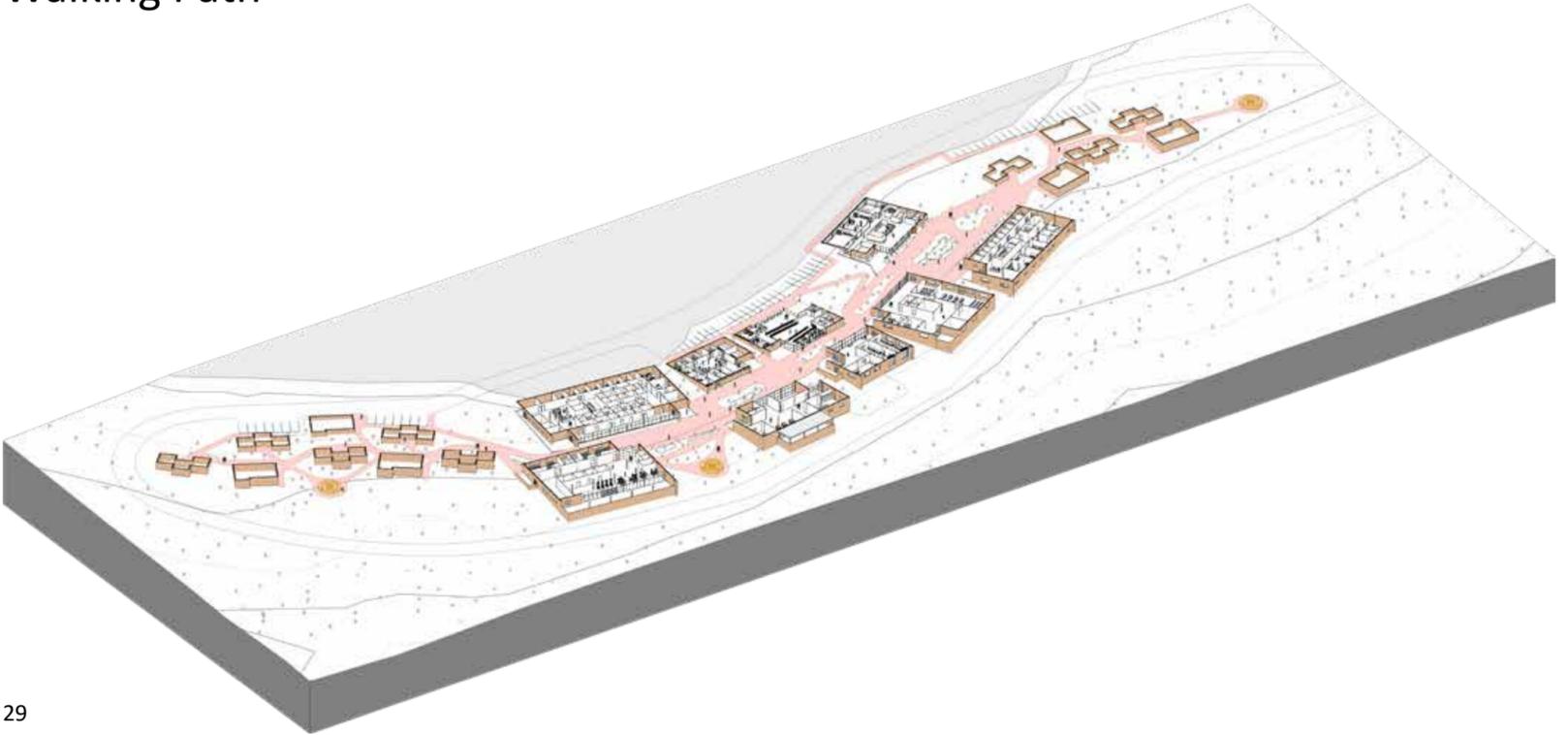
Architecture



Views to Landscape



Walking Path

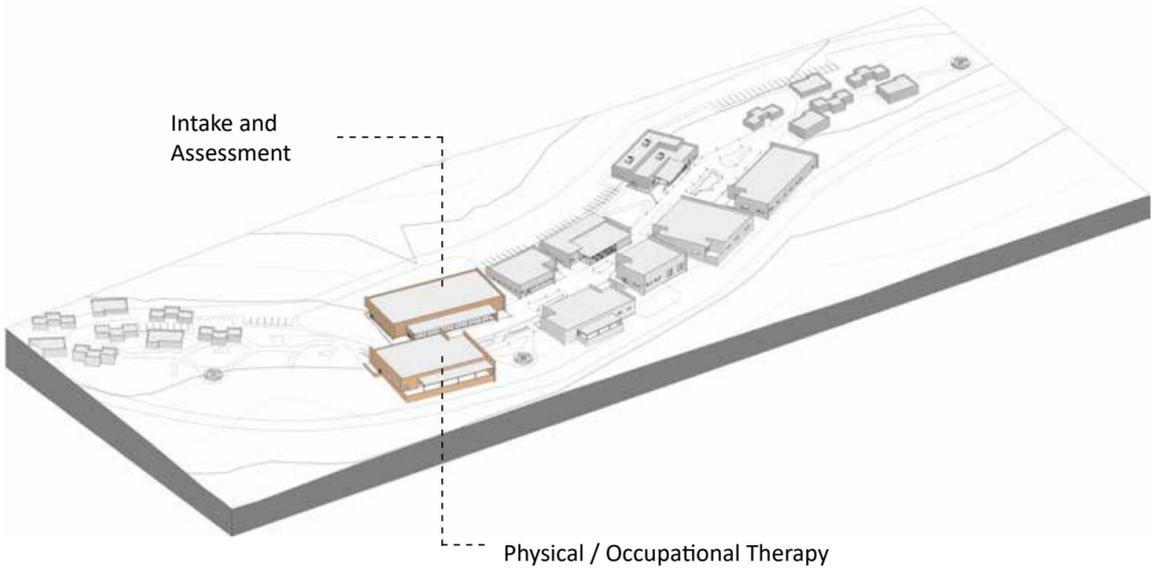


Site Plan

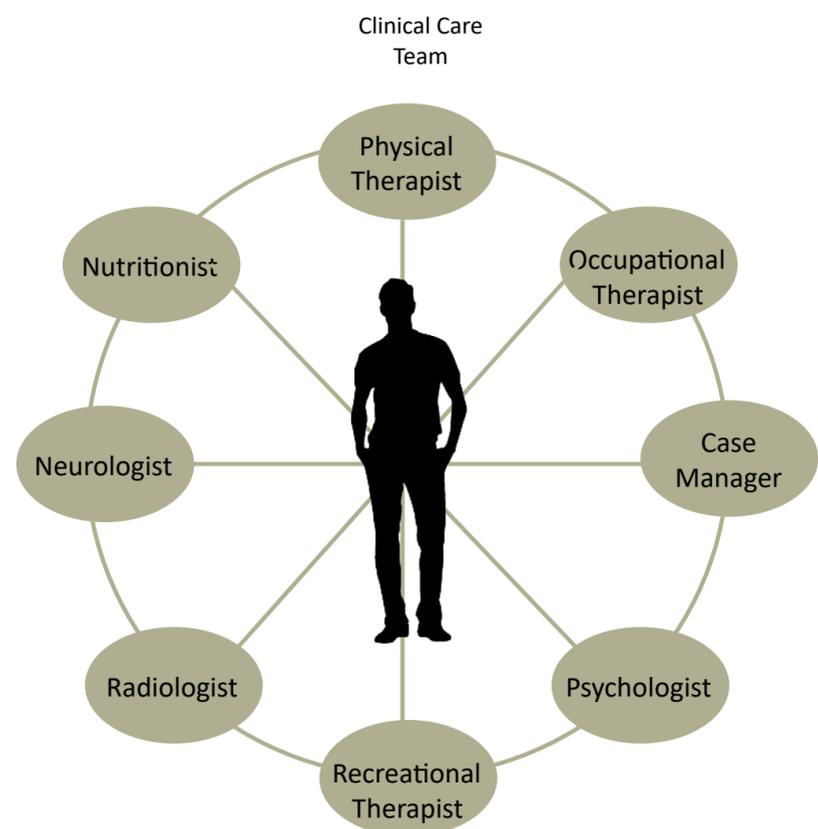


Assessment and Physical Therapy Cluster

Once the veterans and their families are settled in, the healing process will begin. Veterans will begin their healing process at the assessment and diagnosis building where they will undergo several diagnostic tests, and meet with their clinical care team. Although veterans may already know what they are suffering from, it is important that they meet with a clinical care team to tell their story and devise a treatment plan. During the design of this facility, it was a priority to provide several treatment options, in order to give veterans a sense of control in their treatment. Treatment choice is something that is important to offer as patients with PTSD tend to be avoidant by the nature of the disorder which can cause them to drop out of treatment. The more choices for efficacious treatments we can present, the more likely our PTSD patients will find one acceptable to them and complete a full course of treatment [Raunch & Rothbaum, 2016].



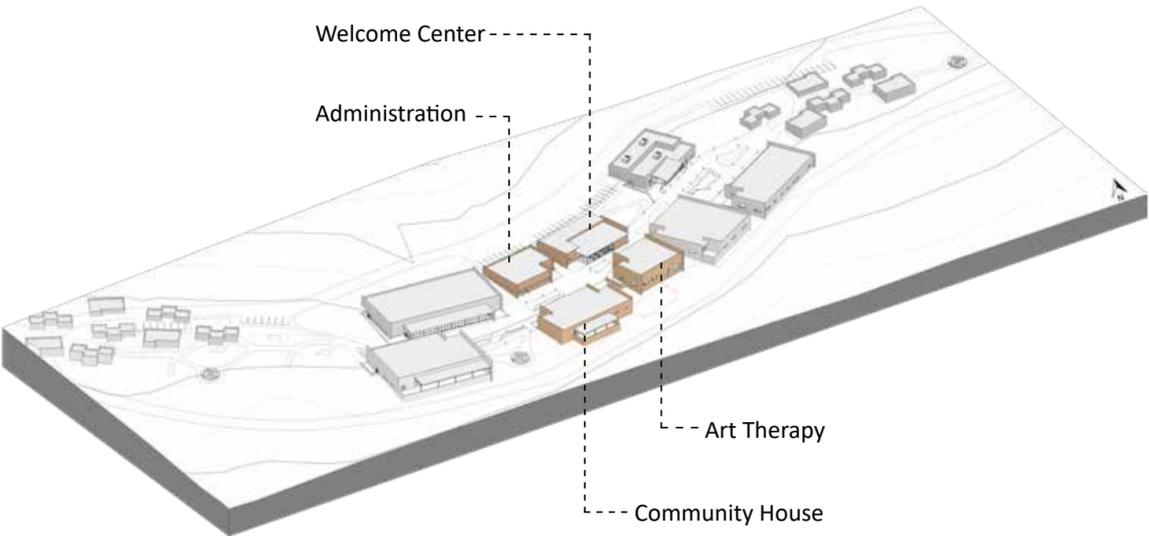
Additionally, veterans with PTSD and TBI can also be polytrauma victims. Polytrauma occurs when a person experiences injuries to multiple parts of the body and organ systems, but not always as a result of blast-related events. TBI frequently occurs in polytrauma in combination with other disabling conditions, such as amputation, burns, and visual damage, Spinal cord injury (SCI), Post-Traumatic Stress Disorder (PTSD), and other medical conditions. Veterans and Service Members with polytrauma require a high level of integration and coordination of clinical care and other support services. For this reason, a physical therapy building that offers both physical therapy and occupational therapy is required to meet the needs of the most critically injured veterans. The physical therapy gym aims to provide veterans with an ample amount of gym space that overlooks the expansive landscape into the valley. This facility also includes a viewing deck where veterans have the option to take their workouts outside with a view to the surrounding landscape.





Social Support Cluster

After having entered into the site, veterans and their families will navigate through the site to the east and west to their prospective housing units on a paved surface landscaped with desert plants, passing several buildings overlooking the vast landscape. The housing units have been broken up into two separate parts; group housing and family housing. This facility provides two housing options in an effort to provide social support for veterans who come with their families and for those who come alone. In an effort to provide the proper social support for veterans who come alone, the housing units were designed into clusters modeled after the battle buddy system. Something similar to what veterans would have experienced in their military. In addition to housing, this facility also includes a 'community house' in the center of the site. This building was designed to be inviting. It offers several amenities such as a chapel, game room, theater, and a cafe where veterans can gather throughout the day to socialize and have casual encounters. It also provides a viewing deck facing south overlooking the vast landscape. Research has shown that social support improves recovery outcomes from severe mental illnesses, including few hospitalizations, decreased symptomatology, increased self-esteem, improved social skills and increased satisfaction with health [Cohen et al., 2004].



Art therapy allows veterans to express themselves when words cannot, using several different forms of media such as mask painting, wood working, and metal working. This form of therapy can be useful when a patient does not consciously remember the sequence of events in visual trauma narratives. The goal of art therapy is to manage behaviors, process feelings, reduce stress and anxiety, while increasing self-esteem. According to Talwar (2007), "art making is hypothesized to involve bilateral stimulation, engaging the integrating and planning functions of the prefrontal cortex to sequence narratives using left brain functions. This integration between the left and right hemispheres of the brain allows for complete processing and storage of traumatic experiences in long-term memory".



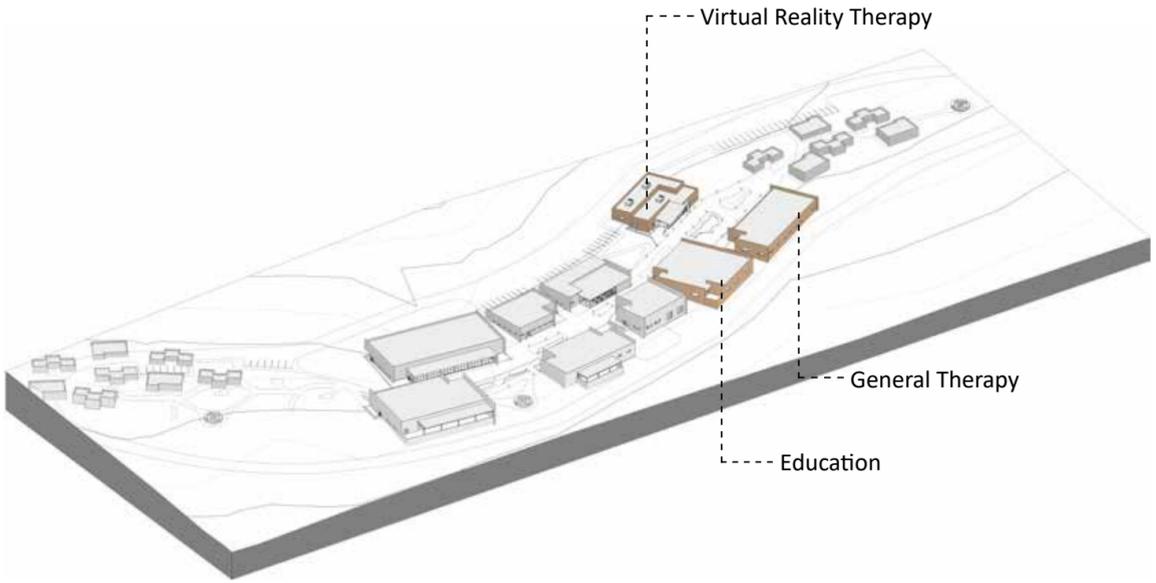


Therapy and Education Cluster

Along with the innovative treatments that are made available, there are also traditional treatment methods that are housed in the general therapy building. In this building one can expect to experience speech therapy, group therapy, counseling, there are also mock apartments that serve as Activities of Daily Living treatment areas.

The most innovative treatment that will be available at the Outpost will be Virtual Reality Exposure Therapy. Virtual reality exposure is a form of Prolonged Exposure Therapy which according to the American Psychiatric Association, is a specific therapy that teaches individuals to gradually approach trauma-related memories, feelings, and situations. With the application of Virtual Reality (VR) this trauma can be recreated in a digital world and experienced in doses. Preliminary research has shown that some patients who fail to respond to traditional therapy benefit from virtual reality exposure therapy, presumably because VR helps the patient become more emotionally engaged while recollecting, recounting, reinterpreting, and emotionally processing what happened during the traumatic event [Josman et al., 2006].

In addition to providing several therapy options for veterans. There is a dedicated building that is focused on educating veteran families about PTSD and TBI. The goal of this building is to allow the families to understand what their veteran has experienced, and to also educate them on different ways they can support their loved one during and after their treatment.





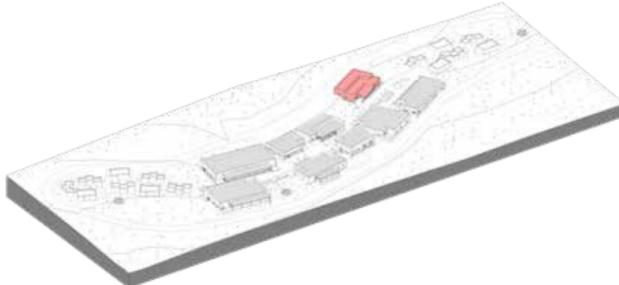
Architecture

Virtual Reality Building

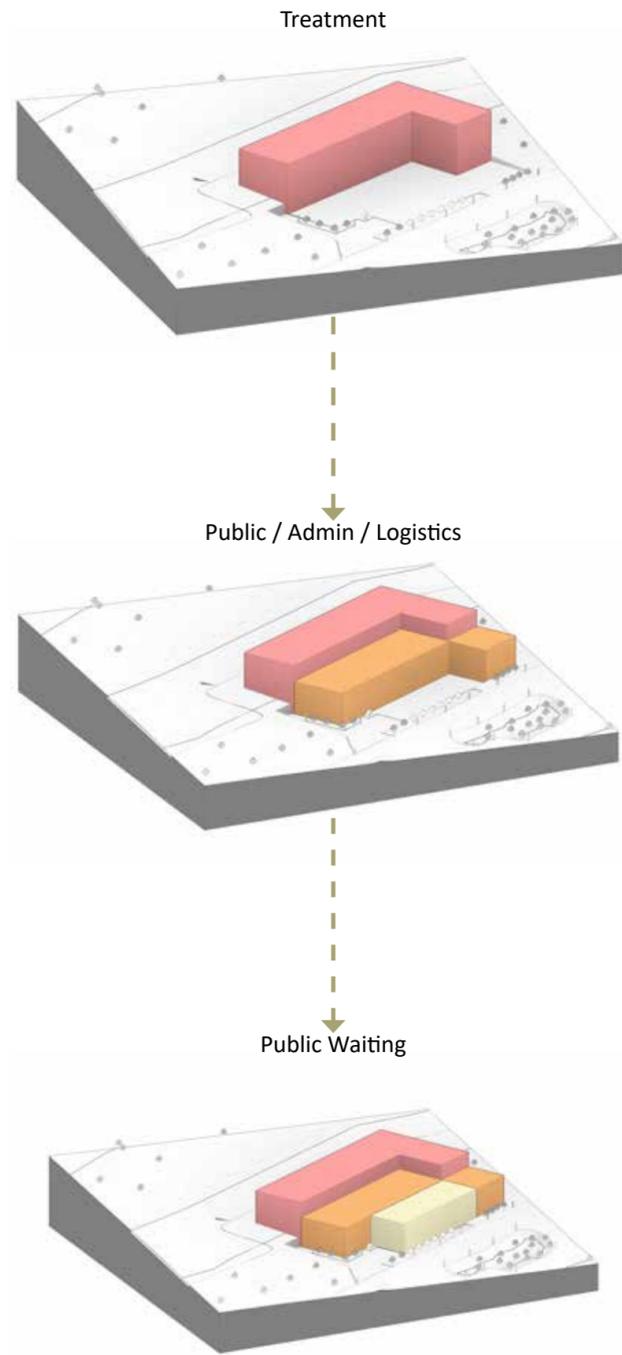
The purpose of the virtual reality building is to offer supplemental treatment to Cognitive Behavioral Therapy (CBT) and Prolonged Exposure Therapy (PE). This building consists of a virtual reality lab, a Computer Assisted Rehabilitation Environment, simulator room, and a vehicle simulator room.

Through the use of virtual reality and software such as “Brave mind”. Veterans and their care providers can replicate the scene of the traumatic event experienced in addition to the Prolonged Exposure therapy treatment process.

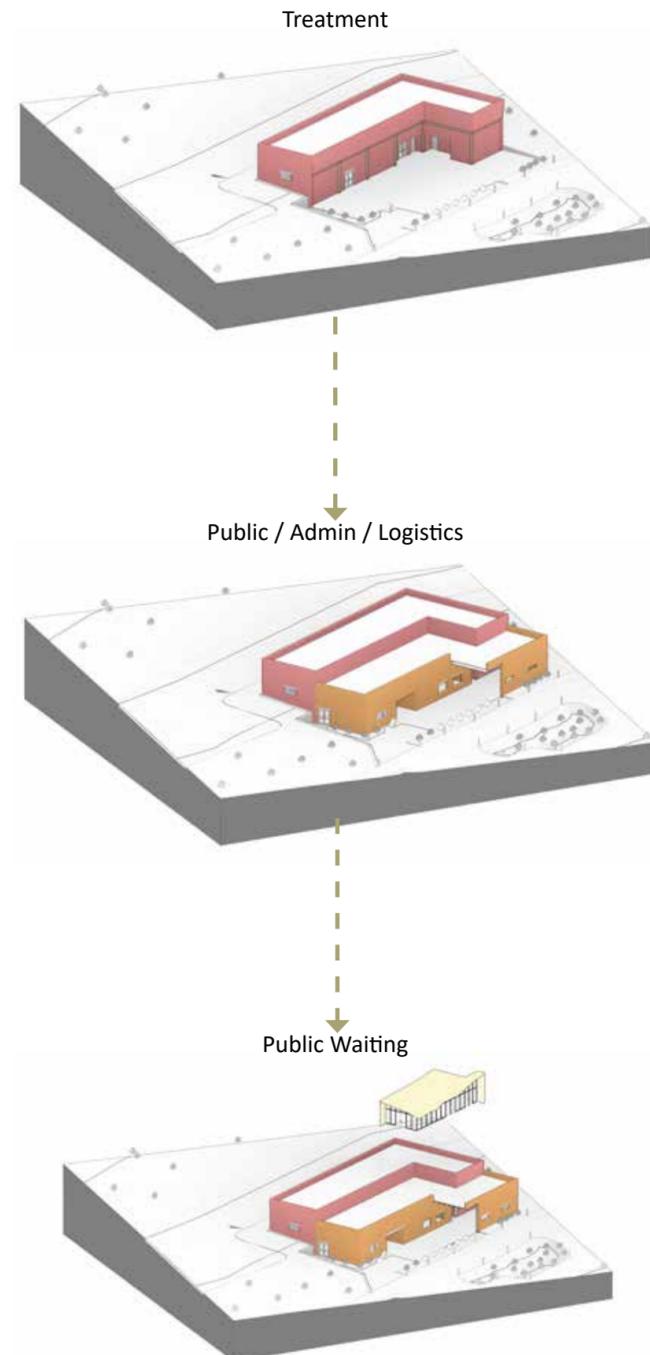
The design of this building will serve as the basis of design for the other buildings located in this site. The form of this building was inspired by the mountainous landscape surrounding the area. The corten steel roof is meant to mimic the mountainous terrain in this region.



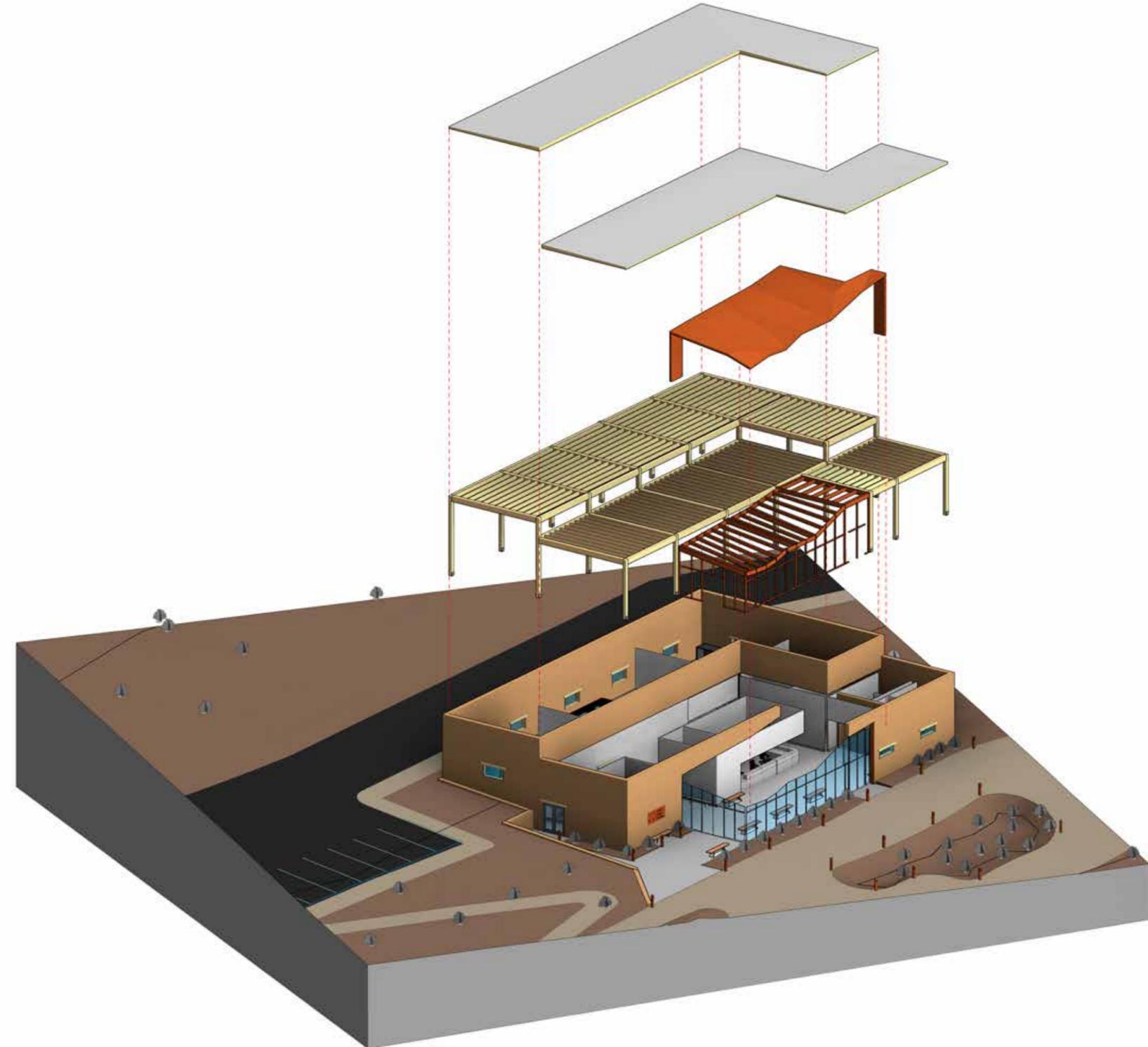
Concept



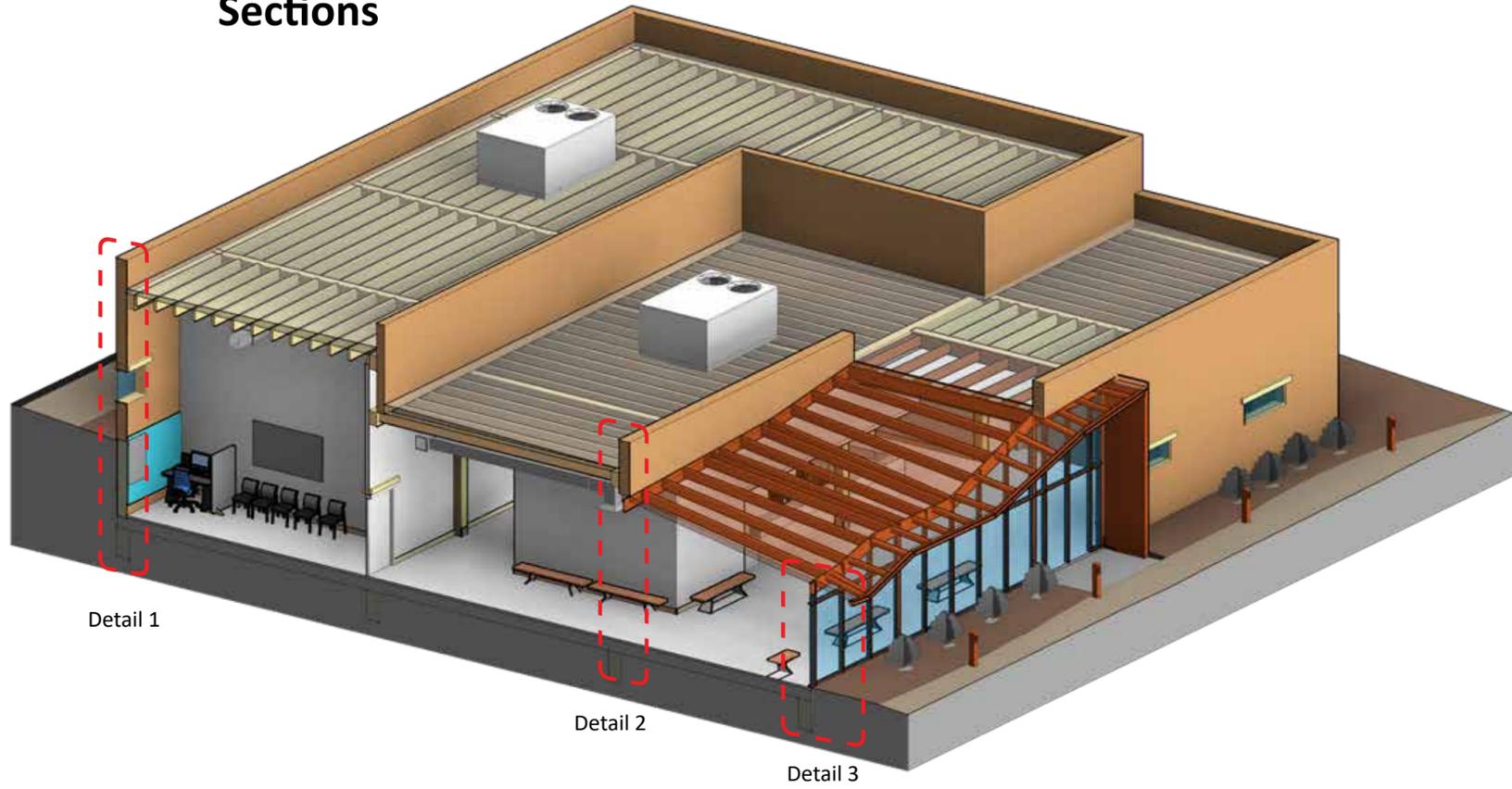
Architecture



Integration



Sections

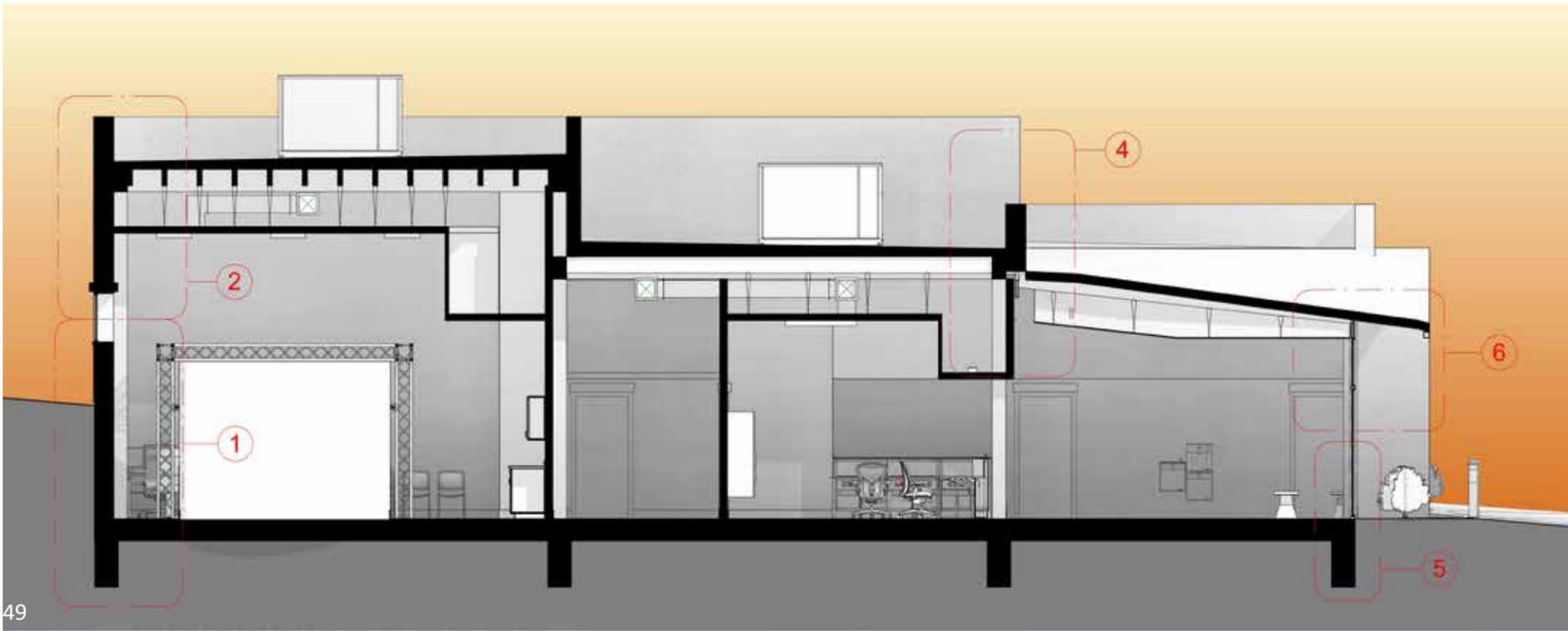
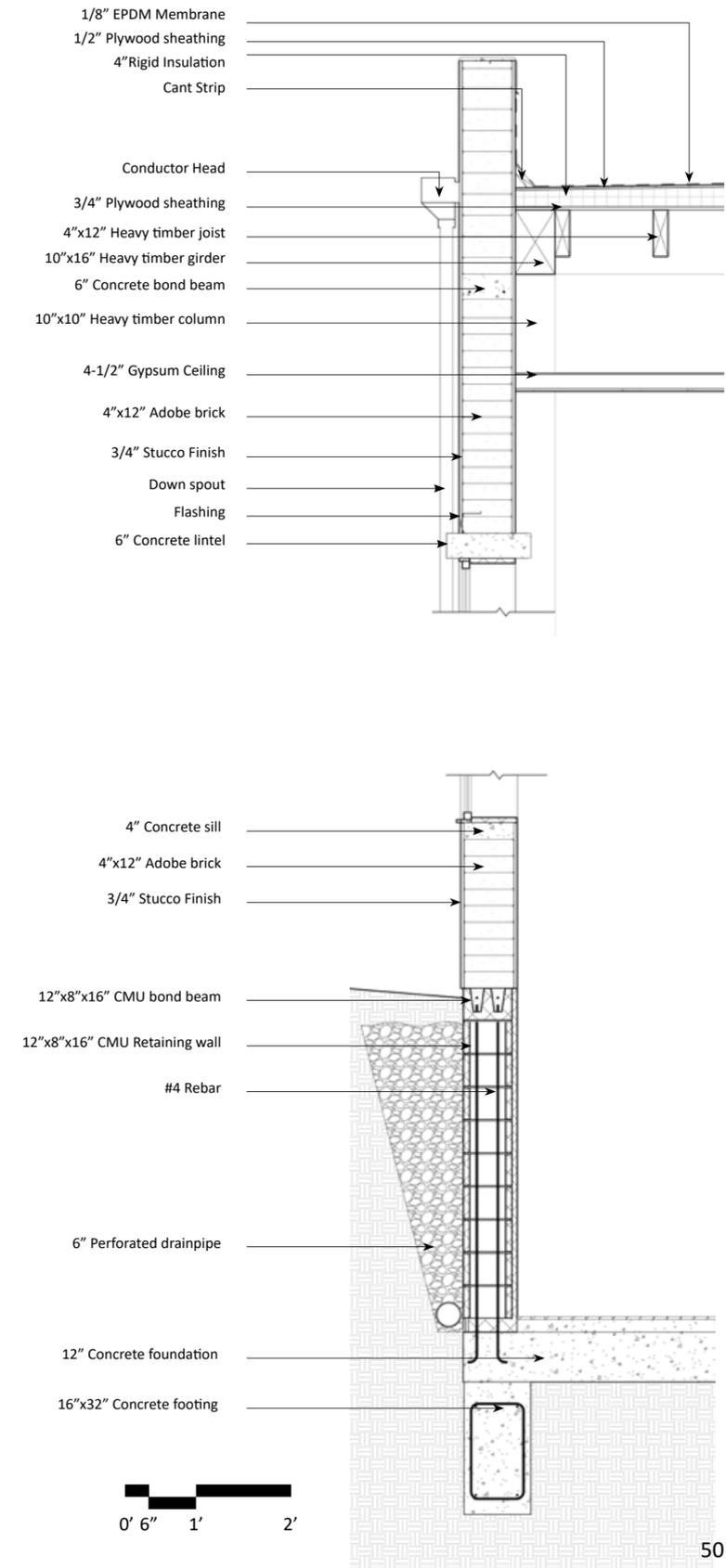
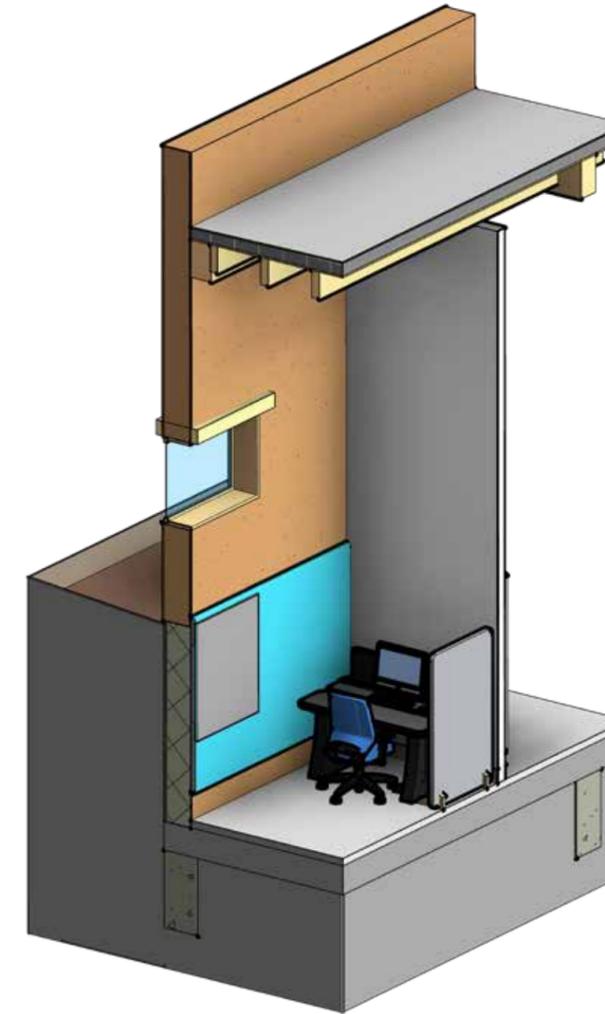


Detail 1

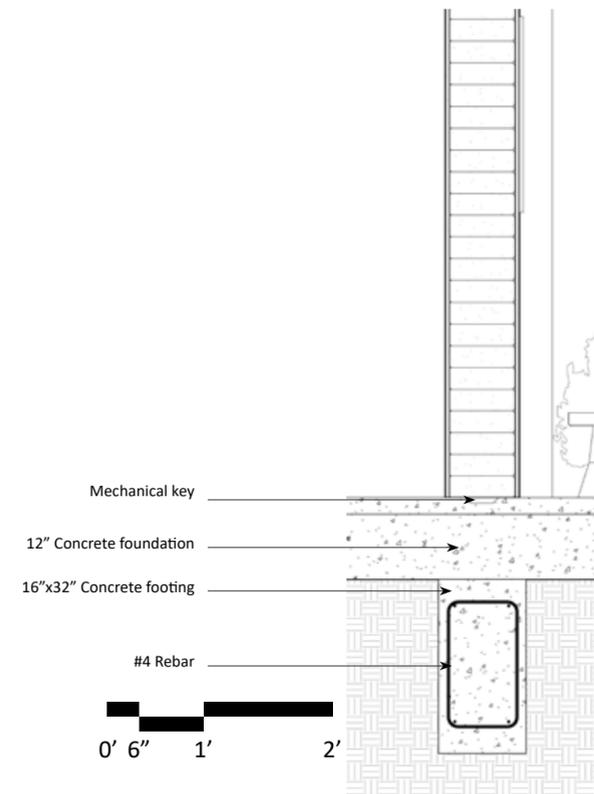
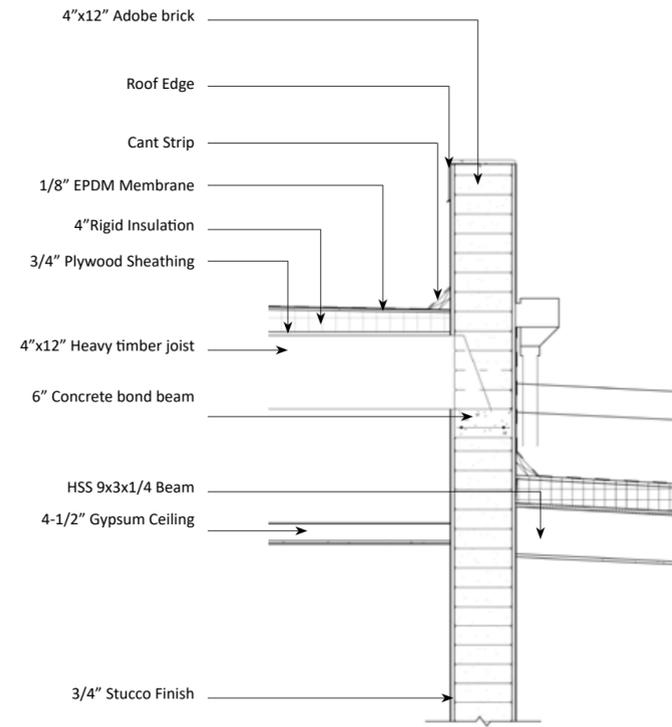
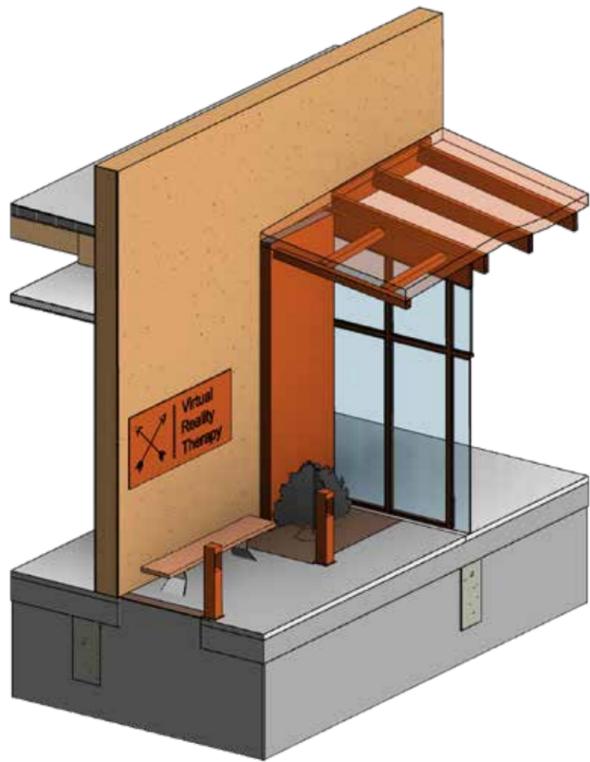
Detail 2

Detail 3

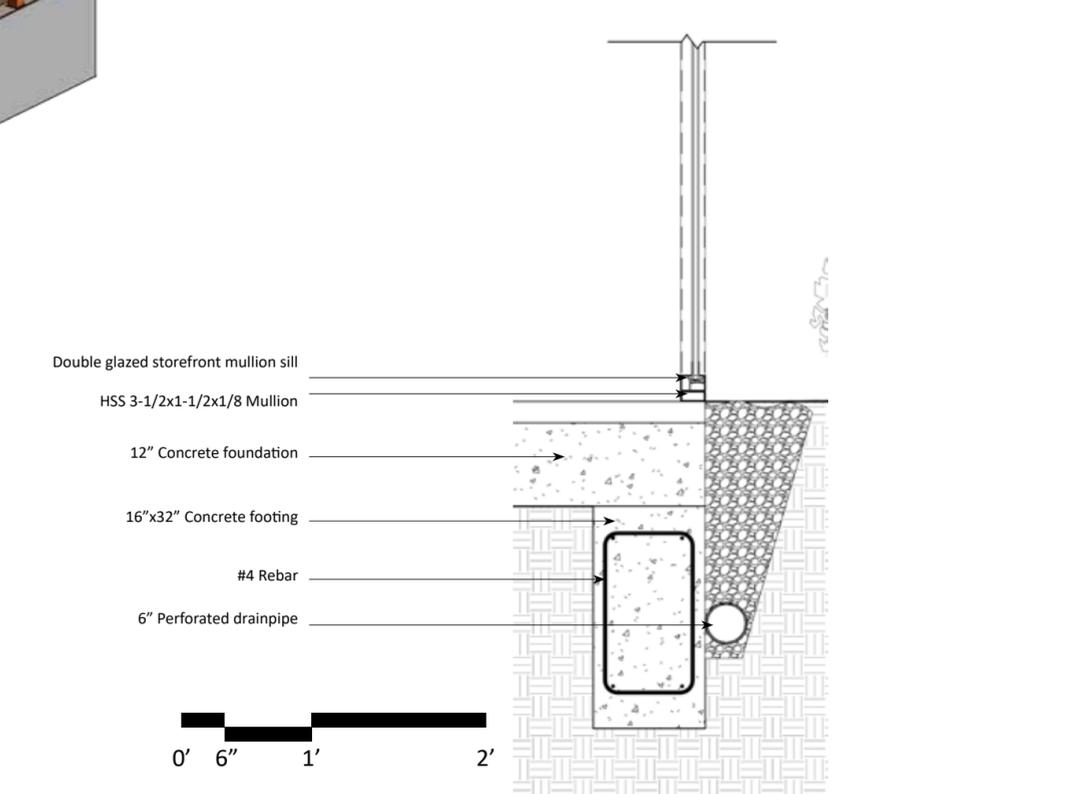
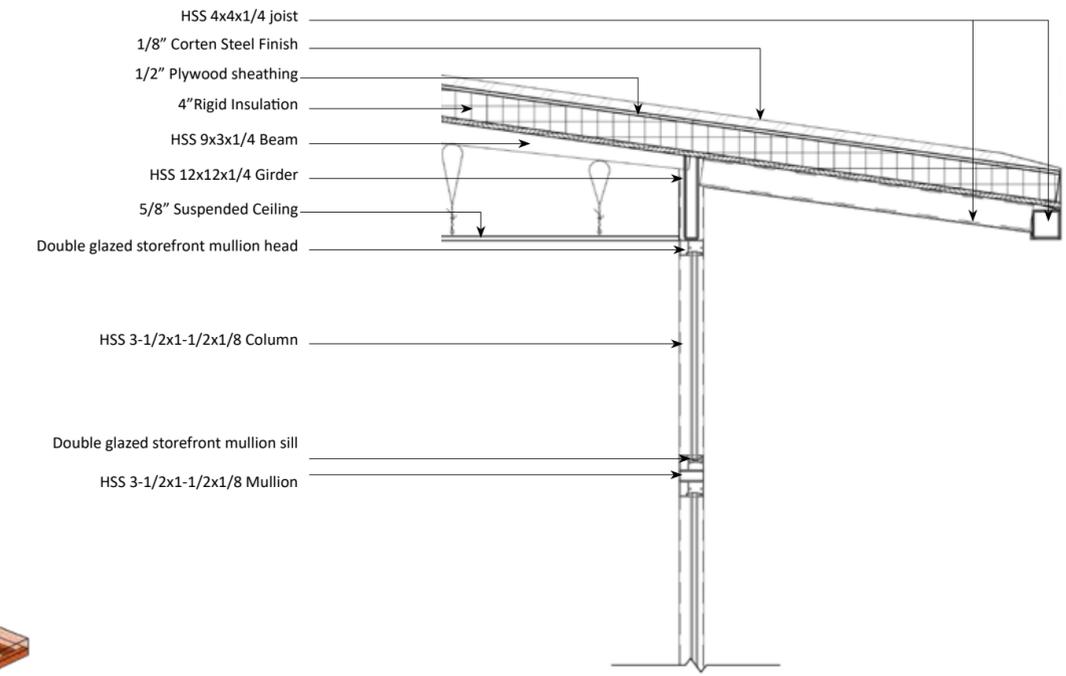
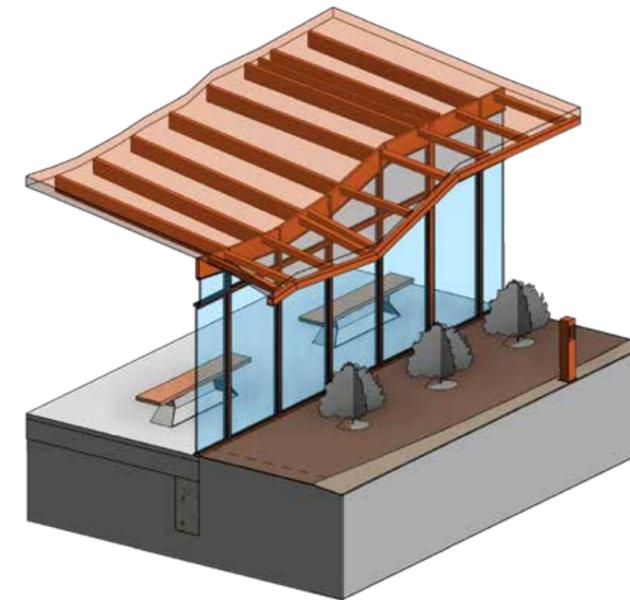
Detail 1



Detail 2



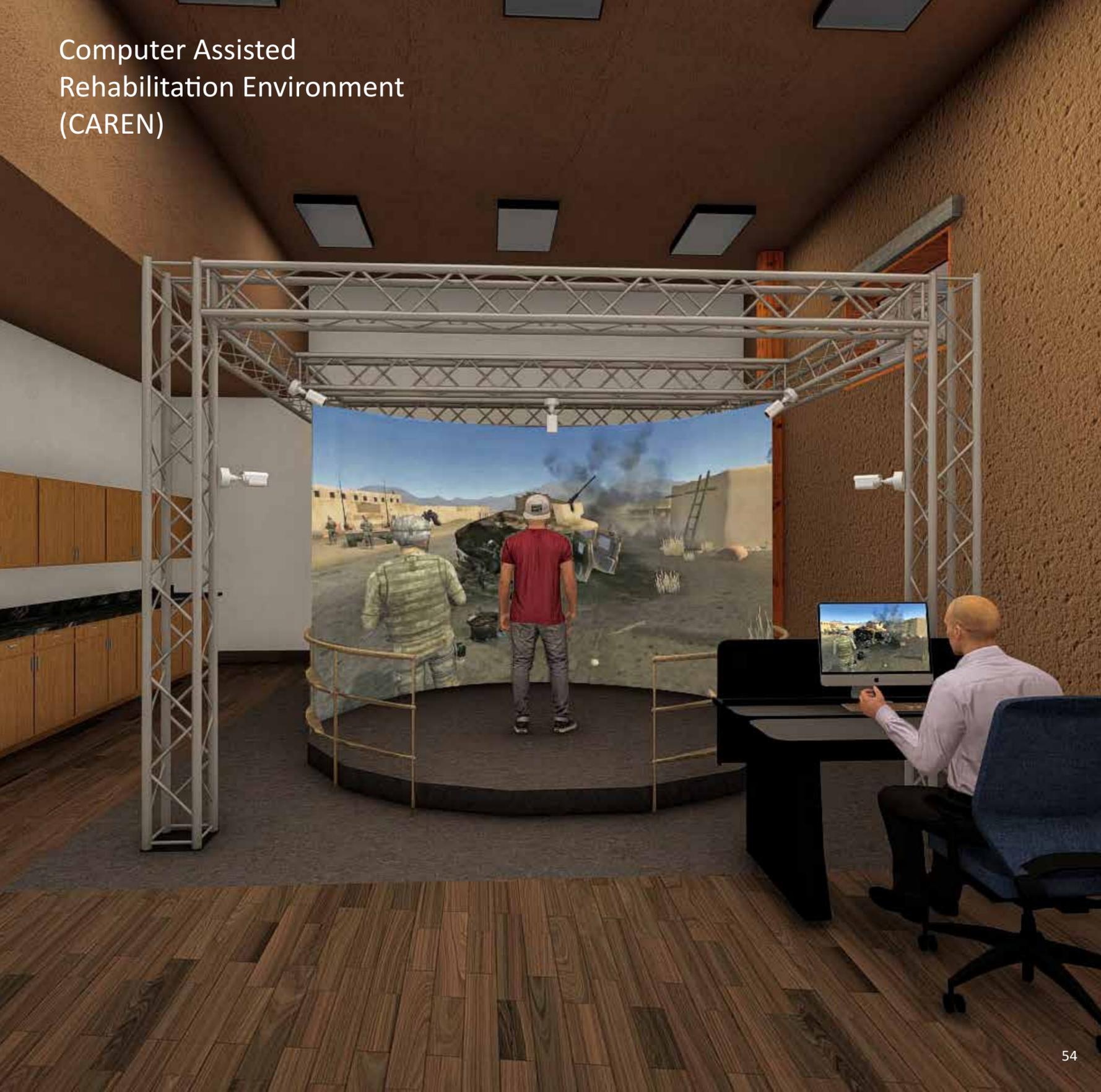
Detail 3



Virtual Reality Floor Plan



Computer Assisted Rehabilitation Environment (CAREN)









“The only one who knows what a soldier is going through is another soldier.”

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Image References

Center for the Intrepid Case Study Images [Page 10]

Image of Center for the Intrepid site plan. *The Center for the Intrepid, 10th Anniversary: A Look Back*, 20 Sept. 2020, https://www.smithgroup.com/sites/default/files/2018-07/cfi-10-year-anniversary_SG_0.pdf

Image of Center for the Intrepid exterior. *The Center for the Intrepid, 10th Anniversary: A Look Back*, 20 Sept. 2020, https://www.smithgroup.com/sites/default/files/2018-07/cfi-10-year-anniversary_SG_0.pdf

Image of patient using CAREN system. *The Center for the Intrepid, 10th Anniversary: A Look Back*, 20 Sept. 2020, https://www.smithgroup.com/sites/default/files/2018-07/cfi-10-year-anniversary_SG_0.pdf

Birds eye view of the Center for the Intrepid. *Fallen Heroes Fund, 6 June 2020*, <https://www.fallenheroesfund.org/about-us/center-for-the-intrepid>

National Intrepid Center of Excellence Case Study Images [page 11]

Art therapy mask, *Matthew Breitbart, 9 Sept. 2020*, <https://www.dvidshub.net/image/2808093/art-therapy-masks-nicoe-walter-reed-display-nmhm-aug-sept-2016>

Image of Level 1, *Smithgroup - National Intrepid Center of Excellence, 9 Sept. 2020*

Image of Level 2, *Smithgroup - National Intrepid Center of Excellence, 9 Sept. 2020*

Image of building, National Intrepid Center of Excellence at Bethesda Naval Hospital, 5 April 2020, <https://www.turnerconstruction.com/experience/project/12E0/national-intrepid-center-of-excellence-at-bethesda-naval-hospita>

Warriors Heart Case Study [Page 12]

Image of soldiers walking in arms, *Warriors Heart, 12 June 2020*, <https://www.warriorsheart.com/>

Image of building exterior, *Warriors Heart, 12 June 2020*, <https://www.warriorsheart.com/>

Image of Tomahawks, *Warriors Heart, 12 June 2020*, <https://www.warriorsheart.com/>

Image of living space, *Warriors Heart, 12 June 2020*, <https://www.warriorsheart.com/>

