The information in this proposal is intended as guidance for Ganado High School in their design of a new Career Technical Education (CTE) facility. The research, design process, and recommendations were made based on the best knowledge and judgment of the students along with their studio coordinator and are subject to verification by the Ganado High School CTE committee or other parties prior to implementation of any action. All photos, renderings, drawings, charts, or other content were taken or generated by students, instructors or Ganado High School representatives unless otherwise noted.

GANADO HIGH SCHOOL CTE COMMITTEE MEMBERS
Doris Nelson, Ganado HS CTE Director
Leander Thomas, CTE Agriculture Instructor

RII NATIVE PEOPLES TECHNICAL ASSISTANCE OFFICE
Claudia Nelson, Director

TRIBAL EXTENSION PROGRAMS UNIVERSITY OF ARIZONA
Trent Teegerstrom, Associate Director

UNIVERSITY OF ARIZONA
Laura Carr, Studio Coordinator
Rudy Chon
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Athena Myers
Nahal Entezam Nia
Zoe Sadorf
Pawel Sapiecha
Morgan Scott

COVER IMAGES:
Ganado High School CTE + FFA Students | Provided by Leander Thomas

June 2020
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STAKEHOLDERS

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BETSY GREENE, PHD | Extension Equine Specialist, University of Arizona
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ARC510E STUDIO

LAURA CARR | Lecturer, SOA, Studio Coordinator

MASTER OF ARCHITECTURE STUDENTS:
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As an innovative public-private partnership between stakeholders, this new facility will be focused on helping area students develop academic proficiency, technical skills and industry certifications for the high wage and high demand careers in the veterinary, meat processing and animal husbandry professions as well as the “soft skills” needed to assure success in careers and/or college.

Agriculture and livestock have always been key to the health of Navajo society and economy. As drought and food safety become critical issues, it becomes essential for students to have opportunities to learn how to sustainably produce food and fiber for private use and for sale in the local community. Food biosecurity is critical and proper husbandry methods and food handling need to be taught in a state-of-the-art facility. The socio-economic conditions on the Navajo Nation are highlighted by limited employment opportunities; the current unemployment rate is 48.5 percent, and average household income is $8,240, well below the federal poverty guidelines. These factors indicate a need for implementation of agricultural education programs, policies, regulations, and conservation programs to revitalize our rural economy for self-sufficiency. By exposing youth to hands-on career pathways, providing links to industry certifications and college credit and motivating students to stay in school and get their diploma before entering the workforce or going on to college, the Veterinary/livestock husbandry and Meat Processing programs strengthen our community which includes local Navajo Nation Chapters and reaches the University of Arizona with advisors and potential partnerships.

Additional CTE program areas are being identified by student interest, labor market analysis industry support, and state educational and economic priorities. Research indicates local industry and educational institutions have identified a critical unmet need for skilled workers to care for and raise food and fodder on the Navajo Nation. About 85% Ganado area students clearly need educational opportunities that inspire them to create a positive future for themselves and area industry needs a trained workforce. The closest facilities providing training of the proposed caliber are located some distance away in Kayenta, Arizona (MVHS AG Facility) and Crownpoint, New Mexico (Navajo Technical University). The proposed facility would provide an additional access point closer to the I-40 Corridor. A range of factors has inspired the Ganado stakeholders to dream BIG, inspired by the successes of the Kayenta Monument Valley High School Veterinary Science Facility and the New Navajo Technical College Veterinary Technician Program. Several consulting visits have been made by committee members to University of Arizona Veterinary School, Navajo Technical University, and Navajo Nation Veterinarians to ascertain the need for this project. The Ganado Unified School District Veterinary Technical Sciences Facility will allow our students to be self-sufficient in producing their own food and fiber for economic security.

Ganado High School CTE Committee Members
Doris Nelson, Ganado High School CTE Director
Leander Thomas, Ganado High School Agriculture Instructor
Architectural Education and the Community

The School of Architecture and the College of Architecture, Planning and Landscape Architecture at the University of Arizona have long been dedicated to engagement with the communities of the state of Arizona and the region of the Southwest. Not only is our community outreach important as a way to support local communities and to bring them design services to which they might otherwise not have access, it is also critical to the formation of our students. They learn to observe different peoples and ways of life in ways that build empathy and good citizenship while also honing their design skills in contexts that give them real purpose. In the end, we want our students to be both professionals and good neighbors—protectors of the land that we inhabit together and stewards of our other precious resources.

We were excited to learn that Laura Carr’s master’s level Advanced Design Studio in Spring 2020 would focus on Ganado High School and expansion of facilities for its Career Technical Education program. In the UA School of Architecture, we have long taken pride in the Native American students who have studied with us: names like Begay, Yazzie, Tsosie and Johns are well-known and respected. The beauty of this studio is that it introduced master’s students not only from Arizona—and in some cases not from the US—to the challenges and opportunities of work with Native American clients. That direct encounter is priceless. I witnessed the seriousness with which the students explained what they had learned about the land, climate, and culture of the Navajo Nation and the inventiveness and integrity with which they sought to solve the problems of the design brief. I think you will be intrigued by their work and inspired to ponder further possible interactions.

Laura Hollengreen
Associate Director, School of Architecture
Associate Dean for Academic Affairs,
College of Architecture, Planning and Landscape Architecture
The Native Peoples Technical Assistance Office is the key research and resource liaison to Arizona’s Indian Country on behalf of the Office of Research, Innovation & Impact and the Senior VP for Research. For almost 30 years, director Claudia Nelson has facilitated an array of projects and programs in partnerships with Native communities, calling upon the expertise of a diverse cadre of faculty, students and academic professionals.

The Ganado Career Technical Education Program Facilities Expansion Masterplan project represents a collaborative community-focused effort between the Ganado School District with Mr. Leander Thomas and Ms. Doris Nelson serving as project leaders and cultural advisors, and UArizona’s College of Architecture, Landscape Architecture & Planning (CAPLA) ARC510E Advance Design Studio led by Professor Laura Carr, and the College of Agriculture & Life Science (CALS) Tribal Cooperative Extension director Trent Teegerstrom. This design project provided an unparalleled opportunity for our students to gain direct field experience collaborating with the Ganado community, and we are grateful to the Ganado School District for entrusting us with this important assignment. This workbook is presented to the Ganado community with sincere appreciation for this collaboration.

Claudia Nelson
Director of the RII Native Peoples Technical Assistance Office,
University of Arizona
The University of Arizona Tribal Extension Program is the conduit between 1862 land grant institutions and Tribes involving collaboration, leadership, and development of programs and mutual trust between all involved entities. Through the Federally Recognized Tribal Extension Program (FRTEP), we have had a direct presence on Navajo Nation with four agents who identify and strive to meet the dynamic needs of tribal communities by developing and implementing culturally-appropriate, science-based programs that improve the lives of individuals, families, and communities throughout Native American land. As the UArizona Associate Director of Tribal Extension Programs and Extension Specialist, Trent Teegerstrom has worked with a variety of agricultural enterprises across the northeast, mountain west and southwest. Over the past 30+ years, he has provided extension services to tribal communities across the Nation assisting with agricultural production and economic development issues.

The Ganado Career Technical Education Program Facilities Expansion Masterplan project represents one example of tribal extension commitment to serve the needs of the community. The collaboration between Ganado High School, UArizona College of Architecture, Landscape Architecture & Planning (CAPLA) ARCS10E Advance Design Studio, UArizona Native Peoples Technical Assistance Office and the College of Agriculture & Life Sciences (CALS) Tribal Cooperative Extension Program is an example of our core mission to serve tribal communities and bring UArizona resources to the Navajo Nation.
PROJECT OVERVIEW

The proposed expansion of the Ganado CTE facility was initiated by Mr. Allen Blacksheep, on behalf of the Ganado High School CTE Program. The design underwent several iterations before being directed to the College of Architecture, Planning, and Landscape Architecture at the University of Arizona. The joint effort reflected in this book was facilitated by Ms. Doris Nelson (Director of CTE Programs, Ganado High School); Mr. Leander Thomas (Instructor of AG/Vet Science, Ganado High School); Mr. Trent Teegerstrom (Associate Director for Tribal Extension Programs at the University of Arizona (CALS)), and Ms. Claudia Nelson (Director of the RII Native Peoples Technical Assistance Office (NPTAO) at the University of Arizona). In December of 2019, NPTAO provided funding to send Laura Carr, Lecturer with the School of Architecture at the University of Arizona and acting coordinator for the ARC 510E MArch studio, to meet with Mr. Allen Blacksheep and Ms. Doris Nelson at Ganado High School and review the previous plans, share examples of student work and tour the project site.

In January 2020, CALS, NPTAO and the Ganado team worked together to design a plan for quickly bringing the students up-to-speed in terms of the knowledge required for a facility design of this complexity, and to provide proper introduction to the people, place and culture surrounding Ganado. Over the course of four days, the students toured the University of Arizona Meat Processing Facility with facility manager Samuel Garcia and facility architect Bill Carnell; attended a lecture with biosecurity expert Betsy Greene; traveled across the Navajo Nation to visit cultural sites such as Monument Valley and Canyon De Chelly; visited the historic Hubble Trading Post; and toured Chinle, Monument Valley and Ganado High School’s CTE programs with the instructors and students.

Back in the architecture studio, students gathered together what they learned to create a base program. Many students drew inspiration from the interactions in Ganado, particularly from the weavings displayed and discussed at Hubble Trading post. The students began their analyses, and from that, overlaid topics of demographics, food sovereignty, landscape and climate to their work. The studio also began to organize this thinking within the context of the book *Diné, A History of the Navajos*, by Dr. Peter Iverson. Dr. Iverson lived among the Navajo at Many Farms, teaching at Diné College and gathering stories, and today is Regents Professor of History (Emeritus) at Arizona State University with focused scholarly work in American Indian History. To contextualize the central foundations of the Diné, Dr. Iverson identifies four characteristics of the Navajo briefly summarized here:

**DEFENSE AND SURVIVAL**, which establishes the necessity of understanding that the people, the animals and the land must be defended in order for the Diné to survive.

**ADAPTATION AND INCORPORATION**, namely, the intentional act of incorporating new ideas, new people and new elements into Navajo culture and tradition. For example, basketball and rodeo are viewed as traditional pastimes; the Native American Church combines traditional and Christian beliefs; Asian patterns have been incorporated into weavings; clan systems include groups who were born Navajo and who chose to come live with the Navajo; and livestock acquired by the Spanish have become staples for Navajo families.

**EXPANSION AND PROSPERITY**, which is the belief that for society and culture to prosper, they must expand in a number of different ways. This happens in part by an expansion of territory, but it also happens in terms of services and systems provided for the people.

**IDENTITY AND CONTINUATION**, namely, to be Navajo means to respect the old ways and to find the means to continue in a new day. Changing Woman provides continued inspiration and reaffirmation, and while many situations have caused reasons to despair, the Navajo continue to celebrate the continuation of their people in this place.
STUDIO OVERVIEW

To translate these ideas into an architectural work, University of Arizona Professor Emeritus Dennis Doxtater joined the studio as a guest lecture exploring the question of “what is meant by designing culturally relevant architecture?” The students concluded that creating meaningful architectural work in this context is defined by work that communicates Navajo attributes over iconography. Professor Doxtater demonstrated to the students the ways in which he has translated these principles into his own work by establishing axes that connect geographical points of cultural significance as opposed to the more hierarchal alignments related to status seen in contemporary architecture.

With this foundation, projects began to take form, and technical criteria was introduced into the work - a resolve of the structural system, integration of mechanical, plumbing and electrical systems (MPE), designing for thermal comfort, and energy and water consideration. Lecturer Dan Maher supported the studio’s development of sustainable and energy conscious design and provided technical specifications for the building envelopes. Landscape Architecture Professor Bo Yang assisted in the landscape architecture design, assisting with proper design of bioswales, site circulation and locations for public space. The students had 1-1 sessions with Director Teegerstrom, who reviewed site plans and provided feedback on issues of biosecurity and the circulation of animals on site.

To everyone’s surprise, our fast pace came to an abrupt end when the spread of COVID-19 forced the University of Arizona and Ganado High School to close their facilities on March 15th. From that date, it took approximately two weeks to get the studio functioning again as an online course, and our communication with Ganado High School was disrupted significantly while they also transitioned to online instruction. Insofar as our timeline was concerned, this was an obvious setback, but more significant was the loss of the collective momentum gained by sharing the same physical space and interacting creatively on a regular basis. We also lost the opportunity to revisit Ganado and obtain public feedback on the designs. In light of these circumstances, it is a strong testament to the integrity of the students and their commitment to Ganado that their projects were completed to the level achieved by the end of the semester. No one would have chosen the path we traveled post COVID-19, but in doing so, we had the opportunity to exercise in our work some of the values we learned from our brief exposure to the Navajo way. Everyone ended the semester a better designer, and most importantly, with a broader world view that will serve a lifetime.

U OF A STUDENTS VISITING GANADO + MONUMENT VALLEY HIGH SCHOOLS
The project presented by the 510E studio is for a master plan and design of facilities at Ganado High School to house the Career Technical Education (CTE) Program. The master plan includes new facilities for programs in Nursing, Graphic and Architectural Design, Meat Processing, Veterinary Care and Culinary Arts. Advanced career training at the high school level provides students the opportunity to enter trades directly out of high school or to be competitively placed into advanced degree programs. Providing career training at Ganado High School protects the cultural, agricultural and economic health of the greater Ganado area, and continues the traditions and skills that have been cultivated for generations.

**GHS/CTE MISSION STATEMENT:** Our mission is to develop student empowerment through cultural values and workplace employability skills for a promising future, bringing their vision to life.

**GHS/CTE VISION STATEMENT:** Our vision is to provide focused, high quality educational pathways for students to succeed by developing community partnerships which will help inspire lifelong learning, a passion for success, and the confidence to move forward and thrive in a diverse society.
The focus of this proposal is the CTE Master Plan of a parcel located on the high school campus, as well as design development of the Meat Processing, Veterinary Care and Culinary Arts buildings. The program for these spaces was compiled by the students from data gathered from previous designs done for this facility, and from a precedent study done at the UofA Campus Farms, Monument Valley High School’s Veterinary Tech School and Chinle High School’s Meat Fabrication Facility (not currently in use). This data is recorded in the program tabulations contained in this proposal. Interview sessions with Ms. Doris Nelson, Director of the CTE program at Ganado High School and Mr. Leander Thomas, CTE Instructor in the Agriculture Program at Ganado High School, were done to establish project goals and document the CTE’s vision for the new facility. Total building area varies by design, with a range between 30,000 and 40,000 sqft. While each student has modified the square footage allocated to each function and additional program spaces based on their own design, all projects have the following areas in common:

**MEAT FABRICATION ~ 3,200 SF (EXCLUDING CIRCULATION)**
- Kill floor
- Meat processing and packaging
- Future USDA office
- Classrooms
- Service: offal, lockers, showers, restrooms, laundry, storage, mechanical/plumbing/electrical (MPE) spaces
- Public functions: market for selling meat products

**CULINARY ARTS SCHOOL ~ 8,000 SF (EXCLUDING CIRCULATION)**
- Teaching kitchen
- Classrooms
- Service: lockers, restrooms, storage, MPE spaces
- Public functions: banquet hall for 300, cafe, community kitchen

**VETERINARY TECH SCHOOL ~ 3,100 SF (EXCLUDING CIRCULATION)**
- Large and small animal exam
- Small animal surgery
- Indoor arena
- Classrooms
- Computer lab
- Vet office
- Service: lockers, showers, restrooms, laundry, storage, secure storage, MPE spaces
- Public functions: animal care for small and large animals

**NURSING AND GRAPHIC ARTS**
- Space allocated for future expansion in these areas
BIOSECURITY

According to the USDA, biosecurity refers to everything that’s done to keep diseases and the pathogens that carry them – viruses, bacteria, fungi, parasites and other microorganisms – away from birds, property, and people. This includes:

STRUCTURAL BIOSECURITY: Measures used in the physical construction and maintenance of coops, pens, poultry houses, family farms, commercial farms, and other facilities.

OPERATIONAL BIOSECURITY: Practices, procedures, policies that are consistently followed by people.

GUIDELINES

BETSY GREENE, PHD | Extension Equine Specialist,
University of Arizona

STRUCTURAL GUIDELINES
- Controlled entry
- Clearly marked, central entrance/exit controls traffic flow
- Keep a record of visitation
- Signs
- Make sure off-limits areas are clearly marked and enforced
- Maintain parking area away from manure and feed lanes
- Hand/Boot washing located near entrances and exits
- Staff present and available for questions
- Disallow or have strict guidelines for dogs

OPERATIONAL GUIDELINES
- Establish sanitation standards
- Who handles horses and in what order
- Track and control the use of tools and equipment
- Quarantine new animals a minimum of three weeks; treat any animal from outside or that has been exposed to outside events as if it could be sick
- Know the history of each animal, and have it checked by a vet at the first sign of illness
- Scrub and disinfect water tanks, feed tubs and supplement buckets on a regular basis
- Eliminate standing water and change water every 24 hours
- Protect your water source from contamitants
- Keep storage areas clean
- Discourage birds, rodents and pests

RISK LEVEL
LOW RISK: Do not own horses and rarely visit farms
ex: school field trip

MEDIUM RISK: Make regular visits to farms but don’t have contact with horses
ex: feed delivery personnel, repairmen

HIGH RISK: Make regular trips to horse farms and have close contact with animals
ex: vets, farriers, inseminators, trainers, international visitors
Students in the veterinary technician program spend 1-2 periods of their school day at the facility. Typical tasks would be working at the reception desk, treating small and large animals, tending to the animals in outdoor pens, learning in a classroom or testing for workplace certifications. Skills that students gain from this program are the ability to schedule and treat animals, quality animal husbandry practices, credits towards dual enrollment and certifications that improve their chances of employment and admission to veterinary schools.

Students in the culinary program spend 1-2 periods of their school day at the facility. Typical tasks would be working within the cafe, learning recipes and techniques in the kitchen, learning in a classroom and testing for workplace certifications. Skills that students gain from this program are industry standard training, knowledge of how to run a restaurant, the ability to prepare and serve large banquet or catering events and certifications that improve their chances of employment.

Students in the meat fabrication program spend 1-2 periods of their school day at the facility. Typical tasks would be working within the meat market, working on the kill floor, tending to the animal pens, learning fabrication techniques, learning in a classroom and testing for workplace certifications. Skills that students gain from this program are industry standard training, knowledge of how to butcher and fabricate large animals and certifications that improve their chances of employment.

Integration of the public into the CTE program operations is vital to achieving economic sovereignty. Animal examination fees, meat product sales and cafe goods represent revenue-generating opportunities for each CTE program. Events, workshops and public access to the CTE commercial kitchen encourage entrepreneurship, provide resources and skills to the community and reinvestment in the Navajo Nation.

Large animals such as cows, sheep, pigs and horses are able to be treated and maintained through the vet tech program or be processed through the meat processing program. There is an immediate need for large animal processing equipment at Ganado as many families keep cattle as an investment but are forced to sell to outsiders as there is no way to capitalize on the processing of these animals. Animal husbandry is a cornerstone of the Diné way of life and there needs to be convenient and quality access to services and resources in Ganado.

On the Navajo Nation there are many small animals such as dogs and cats that roam the landscape. Many households have numerous pets and look after many more that they do not directly own. There exists an urgent need for a facility to provide affordable, reliable veterinary care for these animals.

All of the CTE programs are heavily resource dependent. Tools and equipment, food products, cleaning supplies, etc. are key to the success of the facilities. Adequate space needs to be allocated to receive them, including capacity for large animals and associated equipment. If the revenue generating programs expand and potentially include distribution, space and infrastructure will need to be put into place in anticipation.

The new CTE facility is projected to enroll 125 students in the Vet Tech program and over 400 students in other CTE courses.

90% of CTE students will earn at least 8 college credits
95% or better CTE student attendance will be demonstrated
90% of CTE students will graduate high school
90% of CTE GUSD students will earn 2 or more industry-required certifications
90% of GUSD CTE students will participate in 1 or more of the following career exploration activities: mentor program, job shadow experience, paid/unpaid internships
100% of GUSD CTE students will develop employability skills, such as career searches, resume writing, mock interviews, public speaking, that are documented in a work portfolio
1. Enter school grounds through main entrance gate

2. Park in parking lot

3. Direct access to meat market, cafe, vet reception or outdoor arena
1. Leave Main Campus for CTE Class Period
2. Enter through a Classroom or Check in Area
3. Circulate to Assigned Zone: Small Animal Exam Room, Large Animal Exam Room, Vet Reception, Outdoor Arena, or PENS
3A. - OR - Circulate to Computer Lab for Lesson or Testing
USER SEQUENCING

**SMALL ANIMAL VET**
1. DRIVE THROUGH SCHOOL ENTRANCE PREFERABLY IN BACK
2. VISIT VET RECEPTION FOR CHECK IN
3. CIRCULATE TO SMALL ANIMAL EXAM ROOM

**LARGE ANIMAL VET**
1. DRIVE THROUGH SCHOOL ENTRANCE PREFERABLY IN BACK
2. VISIT VET RECEPTION FOR CHECK IN
3. PROCEED TO LOADING AREA
4. UNLOAD INTO A HOLDING PEN OR LARGE ANIMAL EXAM ROOM

**ANIMAL FOR PROCESSING**
1. DRIVE THROUGH SCHOOL ENTRANCE PREFERABLY IN BACK
2. PROCEED TO LOADING AREA
3. PLACED IN PENS OR ALLEYWAY
4. MOVED TO KILL FLOOR
5. PROCESSED THROUGH FABRICATION
6. DELIVER TO MEAT MARKET OR CULINARY KITCHEN
## PROGRAM | VET TECH

<table>
<thead>
<tr>
<th>Room Name</th>
<th>Square Footage</th>
<th>Equipment</th>
<th>Important Adjacencies</th>
<th>Other Notes / Requirements</th>
</tr>
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<tbody>
<tr>
<td>Reception</td>
<td>450</td>
<td>Seating- x0-5</td>
<td>File Room</td>
<td>Enough room for owner and pets</td>
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<tr>
<td></td>
<td></td>
<td>Scale- DRE 400 Vet Scale 33.4”L x 19.7”W x 3”H</td>
<td></td>
<td>Area for weighting scale</td>
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<tr>
<td></td>
<td></td>
<td>Desk</td>
<td></td>
<td>Separate entrances or waiting areas</td>
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<tr>
<td></td>
<td></td>
<td>Storage</td>
<td></td>
<td>for sick and healthy animals</td>
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<tr>
<td>File Room</td>
<td>320</td>
<td>Filing Cabinets- Storage</td>
<td>Recognition</td>
<td>Secure lock/Private files</td>
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<td>300</td>
<td>Examination table- 46&quot;W x 38&quot;H x 19.65&quot;D</td>
<td>Sterilization room</td>
<td>Floor slope-drainage**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wash table- VSSI (stainless steel wet prep)</td>
<td></td>
<td>Floor outlets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60’L x 24”W x 36”H or 48”L x 24”W x 36”H</td>
<td></td>
<td>Places for oxygen tanks to be stored externally</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Holding cages- VSSI (stainless steel x5)</td>
<td></td>
<td>Easy to clean surfaces</td>
</tr>
<tr>
<td></td>
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<td>X-Ray Machines</td>
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<tr>
<td>Small Animal Surgery</td>
<td>250</td>
<td>Surgery table- 44”L x 22”W, (x2-4)</td>
<td>Sterilization room</td>
<td>Floor slope-drainage**</td>
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<td>Storage- casework</td>
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<td>Floor outlets</td>
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<td></td>
<td></td>
<td>Surgery/ Operation Lights</td>
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<td>Places for oxygen tanks to be stored externally</td>
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<tr>
<td>Sterilization Room</td>
<td>250</td>
<td>Examination table- 46”W x 38”H x 19.65”D</td>
<td>Sterilization room</td>
<td>Floor slope-drainage**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Storage- Casework</td>
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<td>Floor outlets</td>
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<td></td>
<td>Small Animal Exam Room</td>
<td>Sterilization room</td>
<td>Floor slope-drainage**</td>
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<tr>
<td>Large Animal Exam /</td>
<td>268</td>
<td>Hydraulic squeeze</td>
<td>Sterilization room</td>
<td>Floor slope-drainage**</td>
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<tr>
<td>Processing</td>
<td></td>
<td>Horse Stall</td>
<td>Sterilization room</td>
<td>Floor outlets</td>
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<td>Outdoor Animal Holding</td>
<td>180</td>
<td>Holding Stalls (x3 or x4)</td>
<td>Sterilization room</td>
<td>Floor slope-drainage**</td>
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<td>Dirt Arena (Indoor)</td>
<td>1,400</td>
<td>stands/bleachers</td>
<td>Sterilization room</td>
<td>Lighting is important</td>
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<td>dances</td>
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<td>Easy clean surfaces</td>
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<td>124</td>
<td>Washer Dryer</td>
<td>Sterilization room</td>
<td>Places for oxygen tanks to be stored externally</td>
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<tr>
<td>Men’s Locker Room</td>
<td>100</td>
<td>Lockers</td>
<td>Sterilization room</td>
<td>Easy clean surfaces</td>
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<tr>
<td></td>
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<td>Restrooms</td>
<td>Sterilization room</td>
<td></td>
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<td>Showers</td>
<td>Sterilization room</td>
<td></td>
</tr>
<tr>
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<td>Lockers</td>
<td>Sterilization room</td>
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<tr>
<td></td>
<td></td>
<td>Restrooms</td>
<td>Sterilization room</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Showers</td>
<td>Sterilization room</td>
<td></td>
</tr>
<tr>
<td>Vet’s Office</td>
<td>160</td>
<td>Desk</td>
<td>Sterilization room</td>
<td></td>
</tr>
<tr>
<td>Classroom</td>
<td>650</td>
<td>Desk (x20)</td>
<td>Sterilization room</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Whiteboard Projector</td>
<td>Sterilization room</td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>60</td>
<td>(x2 or x3)</td>
<td>Sterilization room</td>
<td></td>
</tr>
</tbody>
</table>
## PROGRAM | MEAT FABRICATION

<table>
<thead>
<tr>
<th>Room Name</th>
<th>Square Footage</th>
<th>Equipment</th>
<th>Important Adjacencies</th>
<th>Other Notes / Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holding Pens</td>
<td>1080sf per pen x 6 + 10.5’ corridor = 1630sf</td>
<td>Paneling, Gates, Water, Lights, Roof structure</td>
<td>Truck Unload, Alleyway, Chute</td>
<td>Only holding 10-20 animals at once</td>
</tr>
<tr>
<td>Alleyway</td>
<td>~1500</td>
<td>Panels + Siding, Catenal, Shading, Etched concrete/Rubber Flooring</td>
<td>Cripple Entrance, Kill Floor, Holding Pens</td>
<td></td>
</tr>
<tr>
<td>Kill Floor</td>
<td>60 sf draining 200 sf skinning</td>
<td>Chute, Cripple Tool, Lift, Working Rail, Table, Knife Sanitation, Work Sink, Drainage, Hanging Scale, Cleaning Tools (Hoses, Solutions, Brushes)</td>
<td>Hot Box, Holding Cooler, Classroom</td>
<td>Size based off Chinle</td>
</tr>
<tr>
<td>Hot Box</td>
<td>60 sf</td>
<td>Working Rail, Refrigeration, Drainage</td>
<td>Holding Cooler, Kill Floor</td>
<td></td>
</tr>
<tr>
<td>Holding Cooler</td>
<td>~225 sf</td>
<td>Working Rail, Rail Splitter, Refrigeration, Drainage, Lighting</td>
<td>Hot Box, Classroom</td>
<td>Chinle 75 sf - Leeander estimated triple the space for desired storage of 20 carcasses Nails should allow for easy FIFO and specific selection, i.e. rails “keep” at front and back</td>
</tr>
<tr>
<td>Freezer Storage</td>
<td>~130 sf</td>
<td>Storage Racks,</td>
<td>Holding Cooler, Fabrication + Packaging</td>
<td></td>
</tr>
<tr>
<td>Offal</td>
<td>35 sf</td>
<td>Waste Pickup (Exterior)</td>
<td>U of A Meat Labs Offal Storage is 345sf</td>
<td></td>
</tr>
<tr>
<td>Fabrication + Packaging</td>
<td>~400 – 160 for mixing/ stuffing – 275 for processing</td>
<td>Grinder/Mixer, Vacuum Packing, Band Saw, Utility Tables, Digital Scales, 2 compartment sink</td>
<td>Holding Cooler, Storage Freezer + Cooler, Transportation Market</td>
<td>U of A Meat Labs is ~450sf</td>
</tr>
<tr>
<td>Classroom</td>
<td>600 sf</td>
<td>Working Rail, 30 stations, Whiteboard, Projection, Working Table (cutting tables), Drainage</td>
<td>Kill Floor,</td>
<td>based on NYS article of (17 sf per station x 30 students) + ~150 sf for enlarged instruction area for livestock</td>
</tr>
<tr>
<td>Shower + Restroom + Locker</td>
<td>120 sf Locker Room 72 sf Restrooms 4’ x 4’ Shower</td>
<td>Lockers, Showers, Benches, Laundry shower</td>
<td>Laundry</td>
<td>3’1” x 4’3” Changing Rooms, Showers open to 4’3” side, Laundry/Passthrough</td>
</tr>
<tr>
<td>Laundry + Storage</td>
<td>120 sf for laundry</td>
<td>Washer + Dryer, folding table, sink</td>
<td>Locker Rooms, Mechanical Rooms</td>
<td></td>
</tr>
<tr>
<td>Lab/Quality Control</td>
<td>405 sf</td>
<td>Spectrometer, refractometers, titrators, moisture analyzers, absolted analyzers, refridgerator, sink,</td>
<td>Based on U of A Required tests for Commodity or Retail USDA “Food Microbiology Analysis (Lactobacillus, Salmonella, Listeria, E. Coli, Staphylococci)</td>
<td></td>
</tr>
<tr>
<td>Electrical/Mech</td>
<td>~130 sf</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office</td>
<td>150 sf per office 75sf USDA Office</td>
<td>USDA offices require Shower, Dressing, Locker/Storage, Safe, Lock provided by USDA</td>
<td>Kill Floor</td>
<td>USDA office not including shower, locker room, etc.</td>
</tr>
<tr>
<td>Market</td>
<td>250 sf</td>
<td>Coolers, Display, Register, Drainage, Dry Storage</td>
<td>Packaging/Processing</td>
<td>More Public Entrance</td>
</tr>
<tr>
<td>Pit Roast + Gathering</td>
<td>Outside</td>
<td>Seating, Roasting Pit</td>
<td>Away from Kill area</td>
<td></td>
</tr>
<tr>
<td>Break Room</td>
<td>~150sf</td>
<td>Fridge, Tables, Chairs, Microwave</td>
<td>Locker Rooms, Laundry</td>
<td></td>
</tr>
<tr>
<td>Tannery</td>
<td>Outside</td>
<td>Stretching Table</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### References
- Tucson Foodie | Jackie Tran | https://tucsonfoodie.com/2018/07/18/local-meat-lab
### PROGRAM | CULINARY

<table>
<thead>
<tr>
<th>Banquet Space</th>
<th>3000-3600 sf</th>
<th>Tables, Chairs</th>
<th>Table Storage, Culinary Arts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lobby</td>
<td>944 sf</td>
<td>Reception, office</td>
<td>Lobby</td>
</tr>
<tr>
<td>Reception</td>
<td>109 sf</td>
<td>Desk, Storage</td>
<td>Lobby</td>
</tr>
<tr>
<td>Office</td>
<td></td>
<td>Lobby, Reception</td>
<td></td>
</tr>
<tr>
<td>Culinary Arts</td>
<td>2,341 sf</td>
<td>Working Stations, stove tops, ovens, microwaves, refrigerators, prep sinks, tables, chairs, shelving and tray racks, cabinets for storage, dishwasher</td>
<td>Banquet, Receiving, Cooler, Freezer, Boiler, storage Stainless steel</td>
</tr>
<tr>
<td>Laundry</td>
<td>124 sf</td>
<td>Washer, Dryer</td>
<td>Locker Rooms</td>
</tr>
<tr>
<td>Mens Locker Room</td>
<td></td>
<td>Lockers, Restrooms, Showers</td>
<td>Laundry Room</td>
</tr>
<tr>
<td>Womens Locker Room</td>
<td></td>
<td>Lockers, Restrooms, Showers</td>
<td>Laundry Room</td>
</tr>
<tr>
<td>Storage</td>
<td></td>
<td>Receiving, Culinary Arts</td>
<td></td>
</tr>
<tr>
<td>Receiving</td>
<td>76 sf</td>
<td>Storage, Banquet, Culinary Arts</td>
<td></td>
</tr>
<tr>
<td>Table Storage</td>
<td>428 sf</td>
<td>Banquet</td>
<td></td>
</tr>
<tr>
<td>Cooler</td>
<td>107 sf</td>
<td>Shelving/Storage Racks</td>
<td>Culinary Arts</td>
</tr>
<tr>
<td>Freezer</td>
<td>92 sf</td>
<td>Shelving/Storage Racks</td>
<td>Culinary Arts</td>
</tr>
<tr>
<td>Boiler</td>
<td>323 sf</td>
<td></td>
<td>Culinary Arts</td>
</tr>
<tr>
<td>Classroom</td>
<td></td>
<td>Computers (30-35)</td>
<td></td>
</tr>
</tbody>
</table>

Toasted Sister Podcast Navajo Tech University Students | Brian Tatsukawa | https://toastedsisterpodcast.com/2019/02/12/e48-culinary-arts-at-navajo-technical-university

Navajo Technical University | navajotech.edu/academics/certificate/culinary-arts
NAVAJO NATION

They are called the Navajo, but call themselves the Diné. The Navajo Nation is the largest American Indian reservation in North America encompassing over 25,000 square miles, overlapping Arizona, New Mexico, and Utah. Diné Bikéyah, the Navajo’s country, however is much larger and spans much greater distances than these boundaries. It lies within the four sacred mountains; Mt. Blanca to the east, Mt. Taylor to the south, the San Francisco Peaks to the west and Mt. Hesperus to the north. It is here where the Navajo believe they belong and know they will stay.

GANADO, ARIZONA

Ganado is part of the Navajo Nation, located about halfway between Holbrook and Chinle at an elevation of 6,400 ft. Located north of Ganado is Canyon De Chelly, occupied today as it has been for more than 5,000 years by Navajo families raising livestock and farming the land. Ganado is the home of the famous Hubble Trading Post, established in 1868. Today, the Ganado community holds many agricultural parcels managed by a local board of Farming Advocates, and is surrounded by ranches that provide organic beef and mutton.

GANADO HIGH SCHOOL + CTE PROGRAM

CTE prepares students for entering fields in agriculture, veterinary science and food science. High school students involved in CTE are more engaged, perform better and graduate at higher rates.

- Taking one CTE class for every two academic classes minimizes the risk of students dropping out of high school.
- The average high school graduation rate for students concentrating in CTE programs is 93 percent, compared to an average national freshman graduation rate of 80 percent.
- 91% of high school graduates who earned 2-3 CTE credits enrolled in college.
Ganado is located within the Colorado Plateau region of Northern Arizona and has an average elevation around 6,200 feet above sea level. The region is characterized by very cold winters and moderate summers. The area has vegetation represented in both the Pinyon Juniper biome as well as the Semi Desert Grassland / Shrub Steppe biome. High elevation deserts with these classifications typically include low bushy trees like junipers, and large expanses of grass lands. Some of the typical vegetation types are shown below. The Ganado area gets an average of 11" of precipitation a year. This generally happens most during monsoon season spanning July to September, and in the winter months as snow.
SITE CONTEXT | FORCES

LAND USE

VEHICULAR CIRCULATION

WIND + WATER + VIEWS

WINTER SOLSTICE

SUMMER SOLSTICE

EQUINOX
STUDENT PROPOSALS

This semester’s work has focused on the CTE Master Plan of a parcel located on the high school campus, as well as design development of the Meat Processing, Veterinary Care and Culinary Arts buildings. The program for these spaces was compiled by the students from data gathered from previous designs done for this facility, and from a precedent study done at the UofA Campus Farms, Monument Valley High School’s Veterinary Tech School, and Chinle High School’s Meat Processing Facility (not currently in use). Interview sessions with Ms. Doris Nelson, Director of the CTE program at Ganado High School and Mr. Leander Thomas, CTE Instructor in the Agriculture Program at Ganado High School, were done to establish project goals and document the CTE’s vision for the new facility. Students conducted site visits, interviews, and background research of the Diné and Ganado on topics of history, culture, population, climate, art, and agriculture. The master of architecture students worked towards combining public and school functions on the same site. Some of the issues explored by student proposals include:

- Privacy, accessibility and security
- Facilities derived from commercial prototypes refocused for educational applications
- Transporting, holding, moving and handling animals
- Maintaining biosecurity boundaries between the healthy and sick animals
- Designing culturally relevant architecture as an outsider, being sensitive to information shared and unknown.
- Responding to site and community in a rural context
In commenting on the COVID outbreak happening in the Navajo Nation, President Nez stated, “we are not going to feel sorry for ourselves, we have overcome past waves of disease and oppression, we are resilient!” Resilience and the beauty of endurance inspired the design of the Ganado Career Technical Education Center. Beginning as a single form, the building is split, shifted, and eroded in order to create linkages between the educational and public realms, to allow for air and light to activate space and to define space in the voids left behind. By using established construction methods, a climatically appropriate form, and durable materials the building is designed to last, to be resilient and serve the Navajo people for future generations to come.
GOALS + OBJECTIVES

PROCESS ORIENTED
This proposal aims to build an educational center that facilitates teaching animal husbandry, spanning well-being, processing and food preparation.

FUTURE-FACING
The building should be designed to primarily provide a safe and fulfilling technical education for students, as closely resembling real working environments as possible. Facilities should be designed to accommodate future growth and continued service to the community (Veterinary services, Meat Processing, Catering)

INTERDISCIPLINARY
Technical education spaces should be oversized to accommodate up to 30 students at one time, to allow for as many hands-on learning experiences as possible, including in linkage spaces to facilitate interdisciplinary experiences similarly resembling real life interaction.
Architecture requires light, air, and social engagement. To achieve this, the structural frame is pulled apart; air and light allowed to enter, and the activities inside revealed. Outdoor linkage spaces are created, and in some instances implied, to accommodate the need for certain functions to overlap and connect.
The portal frame is an efficient structural design capable of long spans with minimal material excess. Most commonly, these structures are seen in agricultural settings such as spanning open arenas, because they satisfy the functional needs of the space. Because of their minimal use of material and simple construction, they satisfy the economic constraints of the ranchers and farmers that erect them. These shared attributes between a structural system engineered for efficiency, and the functional and resilient nature of the agricultural industry, became a source of inspiration in the CTE facility design.
Architecturally, the shifting becomes evident in the facade design. Like a canyon revealing its geological evolution in its walls, the facade maintains the trace of the ‘shift’ with offset panels and varied patinas. The facade also maintains enough presence to keep the original portal frame design reading as a single structure, and connect the building to the low-lying landscape beyond.
PASSIVE STRATEGIES

This proposal hopes to utilize a site-wide passive strategy plan in order to create one cohesive working site. A shelter belt of vegetation to the northern edge of the site buffers the strong prevailing northern wind. The culinary arts building, primarily in a cooling condition, makes use of the controlled northern wind for cross ventilation to reduce cooling loads. The placement of the veterinary building to the south, with a solar collector in the floor, wall, or both, to reduce morning heating loads by the release of stored heat. To help maintain the soil integrity of the site, different local plant species would be placed to create a stronger more rootbound soil, such as cordgrass or sacaton. These areas could also be planted alongside species that help filter pollutants from entering groundwater supplies, such as wheatgrass or wild rose.
Through investigation of program and their necessary spaces it became apparent that all programs had overlapping requirements, from classrooms and offices to secure trash locations and locker rooms. An organizational method was employed to make the overall expansion as efficient as possible by locating these shared programmatic elements into a single building [or space] that would then link to each individual program. As much as possible the utility building should be thought of as an entry filter, gathering all students at the beginning of each period, preparing them for their classes, and then releasing them to their individual programs. This flow will help to reinforce student interaction, and therefore programmatic interaction.
The key elements articulated in the concept collage are the programmatic split between the large and small animal exam areas and the large operable openings between the large animal exam / indoor arena and the large animal drop off. The split between the veterinary programs is to help ensure biosecurity between small and large animals, safety of clients and students, and conceptually reinforce the programmatic differences between the spaces via interior finishes and arrangements (e.g. The small animal facility will be finished similar to a vet clinic, while the large animal facility will be finished similar to a working barn).
KEY PLAN

KEY
1. RECEPTION
2. BIOSECURE ENTRY
3. FILE ROOM
4. VET OFFICE
5. MED LOCK-UP
6. PRE-EXAM ROOM
7. EXAM ROOM
8. OPERATING ROOM
9. STERILIZATION ROOM
10. MECHANICAL
11. OUTDOOR ARENA
12. LARGE ANIMAL EXAM
13. STORAGE
14. TACK ROOM
15. WORKSHOP
Key components of the conceptual collage were the influences of Temple Grandon, both in the organization and flow of unloading and transporting livestock from trailers or pens. Temple Grandon’s influence can also be seen in the intentional shading of the processing chutes, and the arbitoir flooded with natural light. This relationship of quality of light, moving from dark to light creates a natural desire for animals to flow in that direction, creating the most humane animal harvesting process possible.
KEY
1. LOCKER ROOM
2. COMMUNITY ROOM
3. MECHANICAL / LAUNDRY
4. HOLDING PENS
5. ARBITOR
6. STORAGE FREEZER
7. AGING FREEZER
8. HARVESTING ROOM
9. CLASSROOM
10. STORAGE FREEZER
11. OFFAL

MEAT FABRICATION | PLAN + EXPERIENCE
概念上，厨房设施的组织围绕着热的流动和使用。利用内部的大量负荷和产生多余的热量，建筑在寒冷月份的室内供暖需求可以得到抵消。厨房被设置在能为宴会厅和咖啡厅提供服务的位置。咖啡厅延伸到一个大型户外用餐和聚会的区域。
CULINARY | PLAN + EXPERIENCE

KEY PLAN

KEY
1. CAFE
2. WORKING KITCHEN
3. TEACHING KITCHEN
4. OFFICE
5. CONCESSIONS
6. PREP AREA
7. PANTRY
8. REFRIGERATOR
9. FREEZER
10. MECHANICAL
11. STORAGE
12. TRASH
13. BANQUET
The CTE facility will serve as a hub or central point for the Ganado community. The skill development, resources and entrepreneurial opportunities it provides will radiate into the community. At the core of this facility is the arena, which symbolizes animals and their importance to the Diné culture. Animals represent the ever-present connection of the people to the land, as well as a major economic opportunity. The form of the CTE buildings reflects this by creating a rotational circulation pattern focused on the arena.
ANIMAL HUSBANDRY

“Livestock ownership and agriculture are timeless symbols of resourcefulness, prosperity and social status. Central to Diné philosophy of Nizhónígo ‘lina (beauty way of life). The adherence to this philosophy, identity and cultural uniqueness is maintained among the Diné people, and is recognized as the core foundation of our sovereignty.”

-Navajo Nation Department of Agriculture

PUBLIC ENGAGEMENT

Another key element in the effort to create economic sovereignty is buy-in and participation from the Ganado community. The services provided by the school benefit the public and in return, the public contributes to the school. This proposal seeks to prioritize those areas within the site that facilitate public engagement by providing clear and direct access points.

RESPOND TO PLACE

The building typologies present in the region, namely pre fabricated warehouses, were used as inspiration for design of this facility. These typologies were altered in order to demonstrate better environmental performance and were elevated by way of material selection and site organization.
SITE | SECTION PERSPECTIVE + COLLAGE

CULINARY BUILDING
OUTDOOR CAFE
CENTRAL ARENA + MEAT FABRICATION BEYOND
VET TECH BUILDING
ANIMAL PENS

SITE COLLAGE

CULINARY BUILDING
OUTDOOR CAFE
CENTRAL ARENA + MEAT FABRICATION BEYOND
**ANIMAL ACCESS**
It is important that sick and healthy animals be separated for biosecurity reasons. Because of this, all healthy animal holding areas are located on the north side of the site while the sick animals are housed on the east.

**STUDENT ACCESS**
The majority of student traffic will be coming from either the existing campus or parking lot along the west or the main school entrance located south of the site. From the main western facility entrance, students can circulate around the outdoor arena in order to get to their respective CTE building.

**PUBLIC ACCESS**
The existing parking lot and additional parking lot along the southeast side of the vet tech building serve as the main access points for the public. Quick access to the cafe, meat market and banquet space are provided on the west, while direct access to the vet reception area is provided on the southeast.

**SITE | ACCESS**

**PRECEDENT**
The prefabricated warehouse typology was apparent on the Navajo Nation from the CTE facilities we visited, to a general observation of buildings in the landscape. This is primarily due to the remote location of the reservation along with the low cost, low maintenance nature of their construction. These structures are easily modified to accommodate a range of programmatic needs and can grow over time. This proposal seeks to elevate this typology through choice of materials, siting and detailing for better thermal performance.

**PRE FABRICATED WAREHOUSE**

**MONUMENT VALLEY AGRI SCIENCE**

**CHINLE CTE BUILDING**

**PROJECT MATERIALS**
4 BUILDINGS CENTERED ON ARENA

AREAS IDENTIFIED FOR SEATING + GATHERING

GATHERING AREAS SUBTRACTED

ARENA + VECTORS ROTATED

BUILDINGS ROTATED + ADJUSTED TO CIRCULATE ARENA

VET BUILDING EXTENDED
SHADE STRUCTURE | LOGIC + RENDERING
PASSIVE STRATEGIES

Given the heating needs of this facility, the primary goal of the passive strategies is to maximize daylight. Given excess heat, ventilation serves as a second priority. Operable windows and skylights vent hot air via stack effect in interior spaces. Within the wall assembly, ventilation can occur up and out of the walls to prevent internal gain.
VET TECH | ELEVATION + PLAN

NORTH ELEVATION

KEY
1. VET CLASS + OBSERVATION
2. SMALL ANIMAL SURGERY
3. RESTROOM
4. RESTROOM
5. LAUNDRY
6. SMALL ANIMAL EXAM
7. FILE
8. RECEPTION
9. LOCKERS
10. OFFICE
11. MECHANICAL
12. LARGE ANIMAL EXAM
13. INDOOR ARENA

VET TECH | COLLAGE

VET TECH CLASSROOM

VET TECH INDOOR ARENA + LARGE ANIMAL EXAM
CULINARY BUILDING WEST ELEVATION

KEY
1. CAFE
2. OUTDOOR CAFE SEATING
3. MEAT MARKET
4. MECHANICAL
5. STORAGE
6. LAUNDRY
7. RESTROOM
8. RESTROOM
9. LOCKERS
10. CLASSROOM
11. TEACHING KITCHEN
12. COMMERCIAL KITCHEN
13. FREEZER
14. COOLER
15. BANQUET
16. TABLE STORAGE
17. MECHANICAL

PLAN
CULINARY | STRUCTURAL LOGIC
Hózhó is a belief central to Diné philosophy that nature is not perfect or symmetrical, but dynamic and balanced. The CTE proposal aims to delicately strike such a balance between the built and natural environment, and celebrate perfect imperfection. Rhythms which are regular and expected are broken by a dynamic and varied form adapted to accommodate the program spaces within and respond to the site.
GOALS + OUTCOMES

CONNECTION TO NATURE
Infusing elements of biophilic design and cultural values to emphasize the importance of nature to the facility and community.

CROSS POLLINATION
Create connections between programs to ensure students gain a holistic understanding and a sense of community is fostered.

RESPOND TO SITE
Employ specific strategies that respond to site-specific conditions and environment in a way that enhances energy efficiency within the building.
Simple linear building massing broken into two pieces with the building to the south shading the building to the north. The complex is oriented to the east to honor the Navajo tradition. Programs like culinary and meat processing are to the north to avoid heat gain.
CONCEPT

There is not one word in English for Hózhó, but it is a combination of beauty, order, balance and harmony. Hózhó does not try to strike a ‘perfect’ balance, but more of a balance in the way the natural world does. It is the type of balance that the cycle of the seasons have. There is a recognition that the natural world is full of movement, cycles, change and dynamism. This proposal aims to create a rhythm which is regular and expected, yet at the same time dynamic and varied and celebrates the idea of perfect imperfection.
PASSIVE STRATEGIES

- **CONDITIONED**
  - Highly Conditioned
  - Conditioned
  - Unconditioned
  - (Enclosed)

- **UN-CONDITIONED**
  - Unconditioned
  - (Enclosed)
  - (Open)

- **PARKING**

- **OUTDOOR ARENA**
  - Heat from solar panels on roof routed to hot water heater in building.
  - Atrium shaded by southern building.

- **CROSS VENTILATION**
  - Deciduous trees and plantings for shading and creating a microclimate.

- **HEAT FROM SOLAR PANELS ON ROOF ROUTED TO HOT WATER HEATER IN BUILDING.**

- **WARMTH FROM WINTER SUN**

- **ANIMAL HOLDING**

- **VERMONT RADIANT FLOORS W/ DOAS SYSTEM**
  - Boiler room for hydronic system.

- **DOAS UNIT**
  - Open to fresh air above hydronic coils.

- **ELECTRICAL CROSS VENTILATION**
  - Warmth from winter sun.

- **ATRIUM SHAD ED BY SOUTHERN BUILDING**

- **DECIDUOUS TREES AND PLANTINGS FOR SHADING AND CREATING A MICRO CLIMATE**

- **PASSIVE STRATEGIES**
BUILDING | STRUCTURE

CLT ROOF PANELS

STRUCTURAL BEAM CONNECTIONS

COLUMN CONNECTION
BUILDING | PLAN LEVEL 1

KEY
1. BANQUET HALL
2. CULINARY KITCHEN
3. CAFE
4. DISH PIT
5. WALK-IN
6. PANTRY
7. LAUNDY
8. LOCKER
9. CLASSROOM
10. PROCESSING
11. HOLDING FREEZER
12. HOT BOX
13. KILL FLOOR
14. OFFAL
15. RECEPTION + SALES
16. FREEZER STORAGE
17. INDOOR ARENA
18. LARGE ANIMAL EXAM
19. VET RECEPTION
20. FILES
21. SMALL ANIMAL EXAM
22. STERILIZATION
23. SMALL ANIMAL SURGERY
24. VET OFFICE
25. TECHING KITCHEN
26. STORAGE
27. ELECTRICAL
28. BOILER ROOM
29. ANIMAL HOLDING
30. ATRIUM
KEY
1. SURGERY OBSERVATION
2. COMPUTER LAB
3. STORAGE
4. MECHANICAL
5. ELECTRICAL
6. LIFT
BUILDING | ELEVATIONS + COLLAGES

WEST ELEVATION

SOUTH ELEVATION

ENTRY

CLASSROOM

CENTRAL ATRIUM
The form of the buildings is inspired by traditional Quonset, but it is modified and optimized to take advantage of modern building technologies and to meet progressive sustainability requirements. This summarizes the CTE concept; namely applying high-tech design to a low-tech typology as a way of responding to the past and creating a gateway to the future. In this way, the architecture captures the innovative and adaptive nature of the Diné people and becomes a symbol of possibility for the Ganado community.
GOALS + OUTCOMES

RESOURCESFUL APPROACH

In his book, *Diné, History of the Navajos*, author Peter Iverson identifies 4 central foundation themes to the Navajo, one of which is the notion of adaptation and incorporation. In the author’s view, the Navajo are unique in their practice of bringing in new ideas, new people and new elements and making these things Navajo. Examples cited include:

- Basketball and rodeo which are viewed as traditional pastimes
- Practices of traditional and Christian belief synthesized in the Native American Church
- Asian patterns incorporated into weavings
- Clan systems that include outside groups who chose to come live with the Navajo
- Livestock acquired by the Spanish now part of the staple livestock belonging to a Navajo family

ADAPTING TO LOCAL CONTEXT

The quonset is a form that already exists in Ganado vernacular architecture. Since its invention, it has represented a form of utilitarianism and efficiency. This proposal aims to present a high-tech interpretation of a quonset.

SEQUENCE OF PRODUCTION

Within the different programs of the facility there exists a process that leads to a product. For example, in meat fabrication, an animal is processed and the product is food. In this proposal, the buildings visually represent this process-to-product sequence, with the product portion being celebrated in architecture.
In the paper *Meaning of the Workplace: Using Ideas of Ritual Space in Design*, author Dennis Doxtater explains his theory that it is possible to find the axis of meaning within the organization of a building's spaces and that this is a more powerful means of communicating the values of an organization than using iconic representation such as symbols. A classic example of this is a large library space prominently positioned within an educational facility; or designating large window office spaces for the high-level managers of a business. In the case of Ganado CTE, there are two important axes to consider. The first is process, namely the technical and uniquely cultural act of harvesting meat for the provision of food and sustenance. The second axis is product, which results from the transfer of knowledge from master to pupil, manifesting in a celebrated commodity or experience. For this reason, rather than evoking symbols, the buildings organize to communicate the importance of both process and product, co-existing for the greater good. The process, where things begin, is located on one end of the axis in the shallower section of the structure and the product locates opposite in the taller, more celebrated section of the space. This also works in terms of energy and material conservation, keeping the highest concentration of energy-intensive use in the more controlled volume and allowing for more sporadic use such as a banquet or indoor arena to take advantage of the open and exposed volume.
CONCEPT

Each building houses a process that generates a product. Therefore the form of the buildings reflects this as a rectangular building that morphs into a dome. The rectangular portion represents the process and the dome celebrates the product.
PASSIVE STRATEGIES

Parts of the program that required cooler temperatures were placed in more opaque parts of the building, while opportunities for passive heat gain were treated with more glazing. The geometry and organization of overhangs and glazed panels directly follows environmental conditions on the site. Corridors are heavily glazed in order to warm interior spaces during winter but are shaded in summer. Wind direction was also used on site to filter air through vegetation corridors before passing through the facility.

RADIATION ANALYSIS WINTER

RADIATION ANALYSIS SUMMER

WINDFLOW + TEMPERATURE PLAN
STRUCTURAL LOGIC

MODIFIED QUONSET GEOMETRY TRANSLATED TO FLAT PANEL CONSTRUCTION

PANEL ORGANIZATION + PROPOSED APERTURE STRATEGY

BANQUET SECTION

PROCESSING SECTION
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<th>Meat Pens</th>
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**SITE | ORGANIZATION**

- Pit Roast + Gathering
- File Room Small Animal Exam
- Lab/ Quality Control
- Condemned Products Room
- Vet's Office
- Holding Pens
- Freezer Storage
- Womens Locker Room
- Hot Box  (Chill Room)
- Tannery
- Laundry Room
- Holding Cooler
- Kill Floor
- Outdoor Animal Holding
- Storage
- Break Room
- Mens Locker Room
- Offal
- Dirt Arena (Indoor)
- Arena (Outdoor)
- Classroom
- Laundry + Storage

**SITE | PLAN**

- CULINARY ARTS
- MEAT FAB
- VET TECH
- Plaza
- Parking
- Biosafety Boundary
- Dirt Arena
- USDA
- Boiler Room
- Lobby
- Parking
- Classroom
- Culinary Arts
- Laundry + Storage
- Construction Area
- Market Pen
- Receiving
- Storage
- Womens Locker Room
- Mens Locker Room
- Lab
- Banquet
- Kitchen
- Market
- Vet Front Desk
- Vet Class
- Quality
- Reception
- Meat Pens
- Meat Class
- Class
- Lab
VET TECH | PLANS

KEY
1. INDOOR ARENA
2. STORAGE
3. LAUNDRY
4. WOMEN’S LOCKERS
5. WOMEN’S RESTROOM
6. MEN'S RESTROOM
7. SMALL ANIMAL SURGERY
8. SMALL ANIMAL EXAM
9. MEN'S LOCKERS
10. LAB + STORAGE
11. STERILIZATION
12. RECEPTION
13. FILE ROOM
14. CLASSROOM
15. VET'S OFFICE

LEVEL 2 KEY
16. COMPUTER LAB
17. CLASSROOM
18. MECHANICAL

LEVEL 1 PLAN

LEVEL 2 PLAN
### MEAT FAB | ORGANIZATION

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### MEAT FAB | ELEVATION + SECTION

![Elevation and Section Diagram](image-url)

*Note: Diagrams and tables provide a detailed view of the facility's organization and elevation with sections.*
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CULINARY PLANS

KEY
1. BANQUET
2. CULINARY KITCHEN
3. STORAGE
4. WOMEN’S LOCKERS
5. WOMEN’S RESTROOM
6. MEN’S RESTROOM
7. MEN’S LOCKERS
8. LAUNDRY
9. BOILER ROOM
10. FREEZER
11. COOLER
12. RECEIVING
13. MECHANICAL
14. GREENHOUSE

LEVEL 2 KEY
15. LIBRARY
16. CLASSROOM
17. MECHANICAL
18. OFFICE
19. COMPUTER LAB