Prairie Earth

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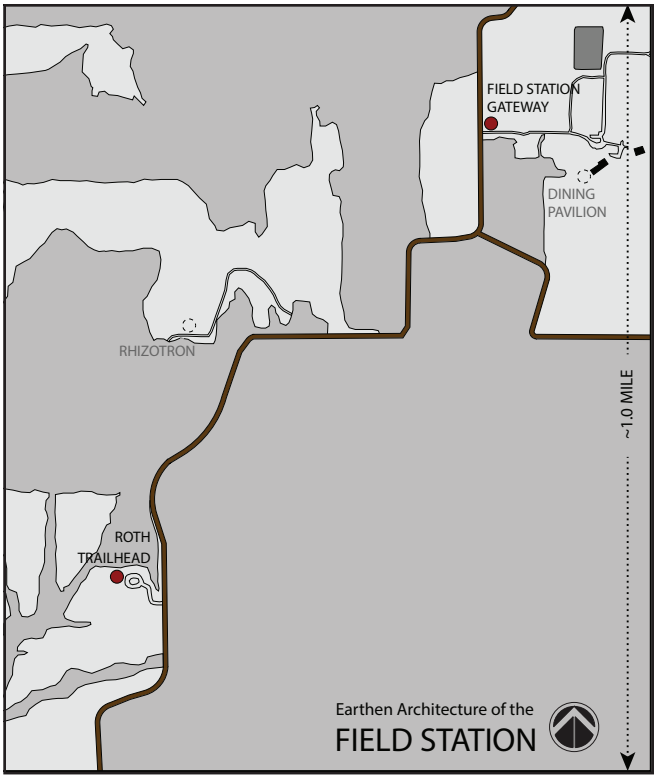
University of Kansas

ACSA Design Build Award Submission

PRAIRIE EARTH

EARTHEN ARCHITECTURE OF THE FIELD STATION



Earthen Architecture of the Field Station exists at the intersection between fundamental research into earthen architecture and a utilitarian project seeking to concretize natural phenomena in tectonic form.

This open-ended, on-going project is entering its third cycle with the Rhizotron Project, which is anticipated to significantly advance our fundamental research into microbially-stabilized earthen architecture as well as push our more theoretically-charged agenda. Presently, two modest works of architecture rest in the landscape as a testament to this endeavor - the Field Station Gateway and the Roth Trailhead.

Each studio cycle has involved ten to fifteen third-year architecture students, many of whom have had little design experience and almost no prior building experience.

Left: A map showing the relationship between the various cycles of the Earthen Architecture of the Field Station project.
Pages 2-3: The Field Station Gateway, on approach.
Pages 3-4: The Roth Trailhead, on approach.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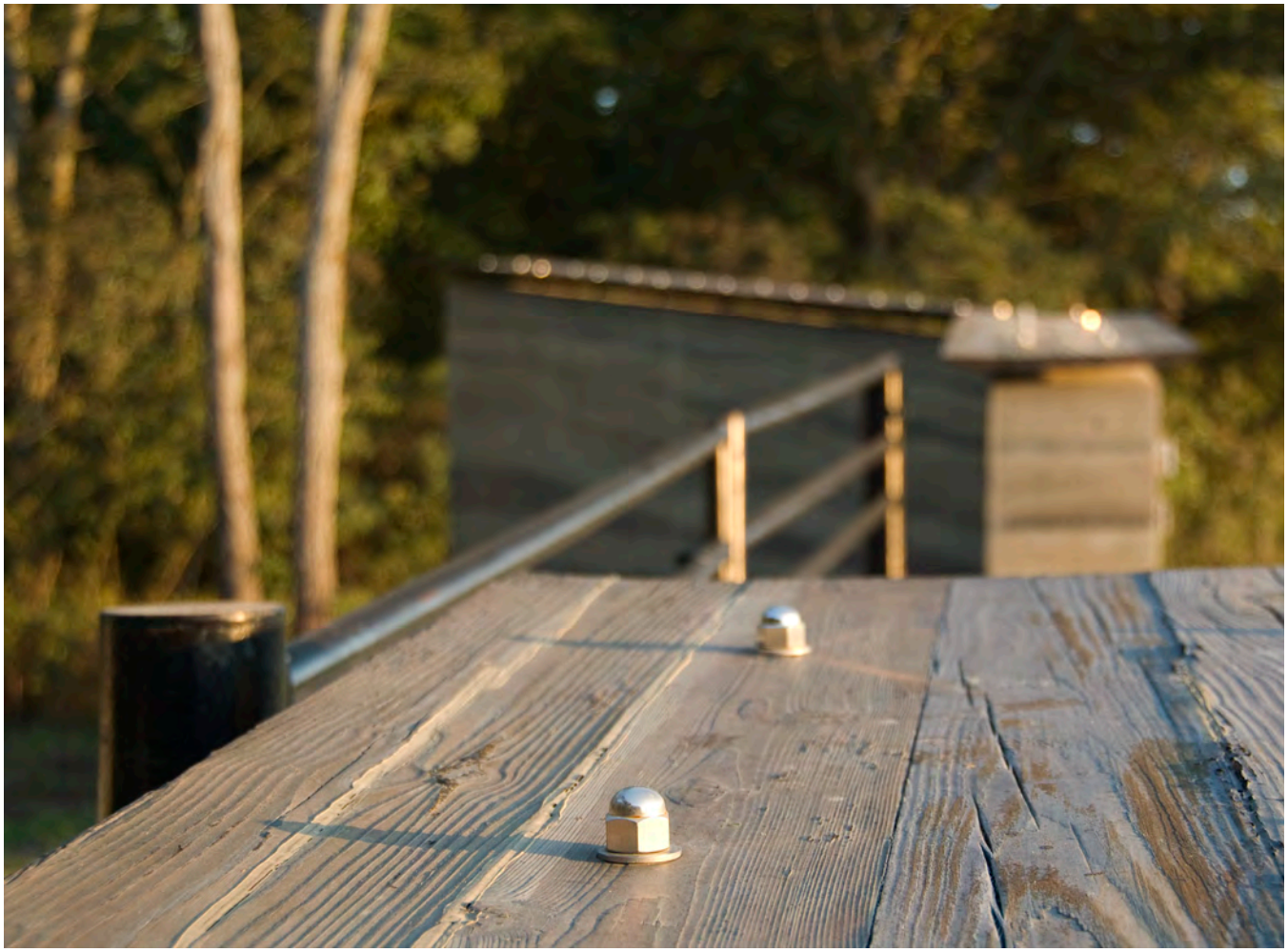
Field Station Gateway

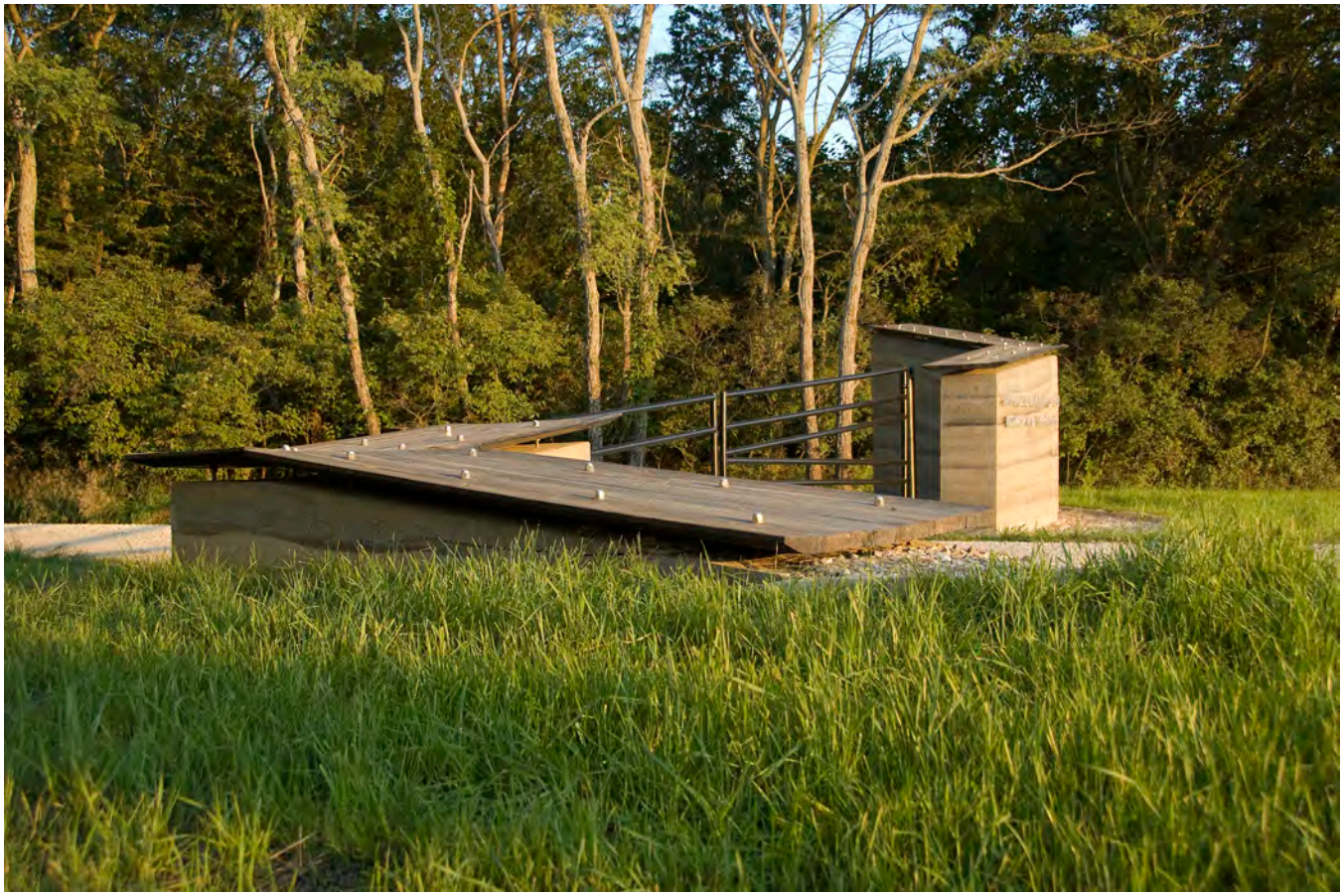
The Field Station Gateway stands as a public expression of the institution's identity. The project's location is characterized by transition - an edge mediating between a native prairie to the west and deciduous woodlands spreading out east and south.

The resulting insertion into the landscape attempts to draw from the latent potential of the place by concretizing this transition. From the horizontality of the prairie to the verticality of the woodlands, a thick wedge-shaped rammed earth mass rises and thins as it establishes the threshold through which one enters the tree-lined entry drive.

A floating charred cedar plane, elevated with rows of stainless steel anchors above the rammed earth mass, abstracts the forest canopy while shielding the aluminum signage below.

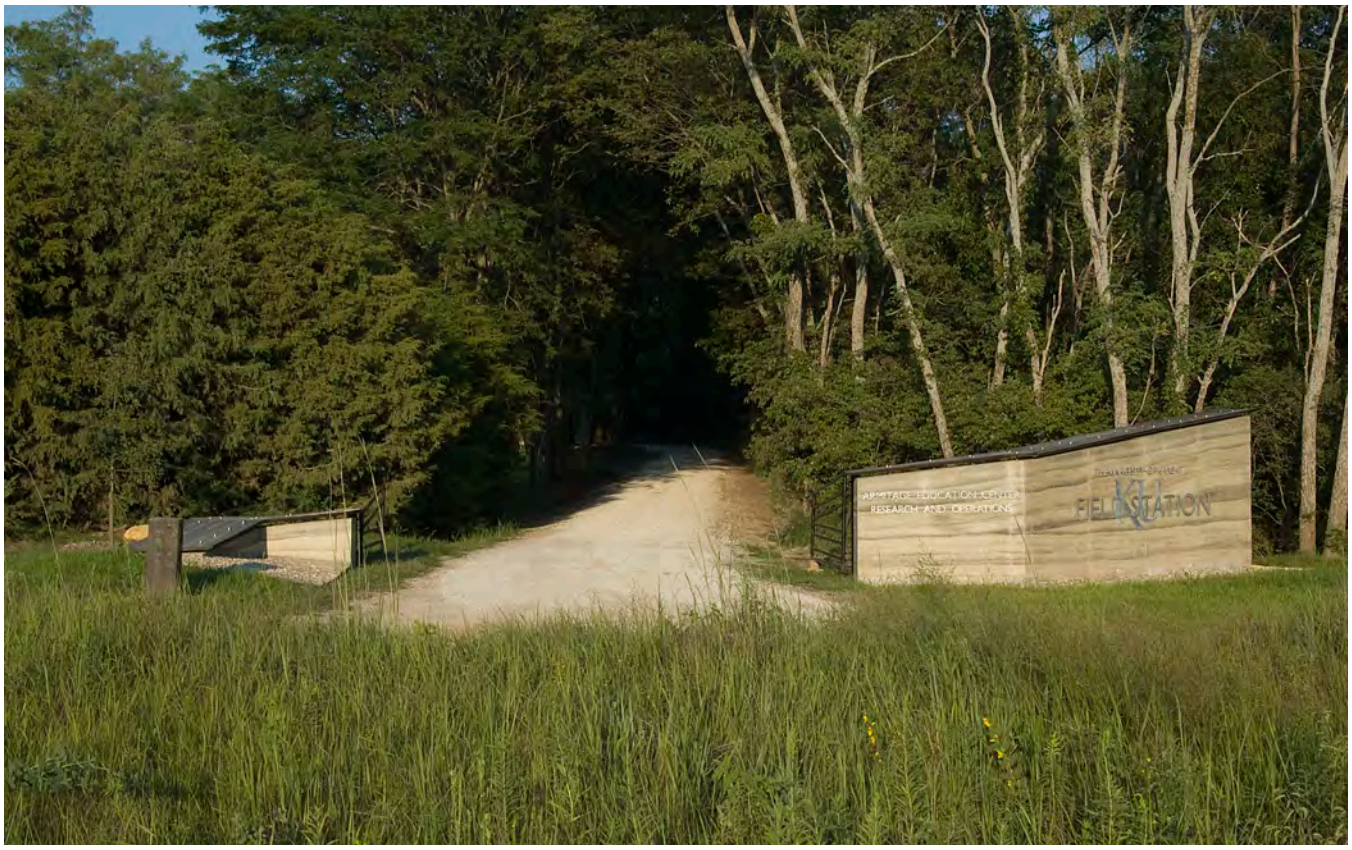


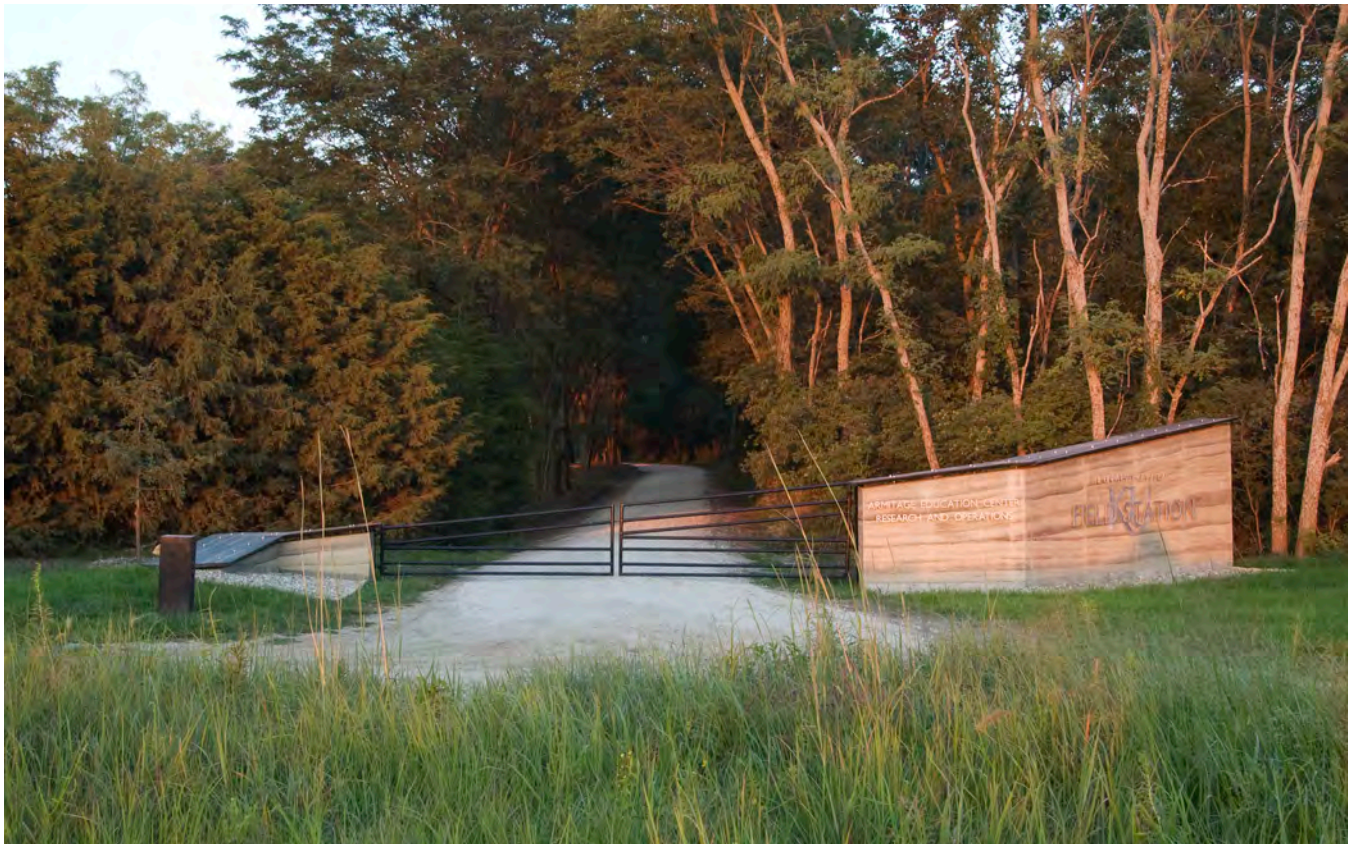
Top: The setting sun lights a rammed earth mass.
Bottom: A stainless steel studded charred cedar plane protects the rammed earth below.



Top: A charred cedar plane is elevated with stainless steel anchors above the rammed earth wall.
Bottom: A rammed earth mass rises from the grass.

Top: The layers of the rammed earth provide a textured backdrop for precise aluminum letters.
Bottom: The folded rammed earth mass strategically welcomes visitors.





Top: An opening in the rammed earth threshold allows passage into a tree-lined entry.
Bottom: A reclaimed and retrofitted steel gate aligns to the slope of the rammed earth threshold.

Roth Trailhead

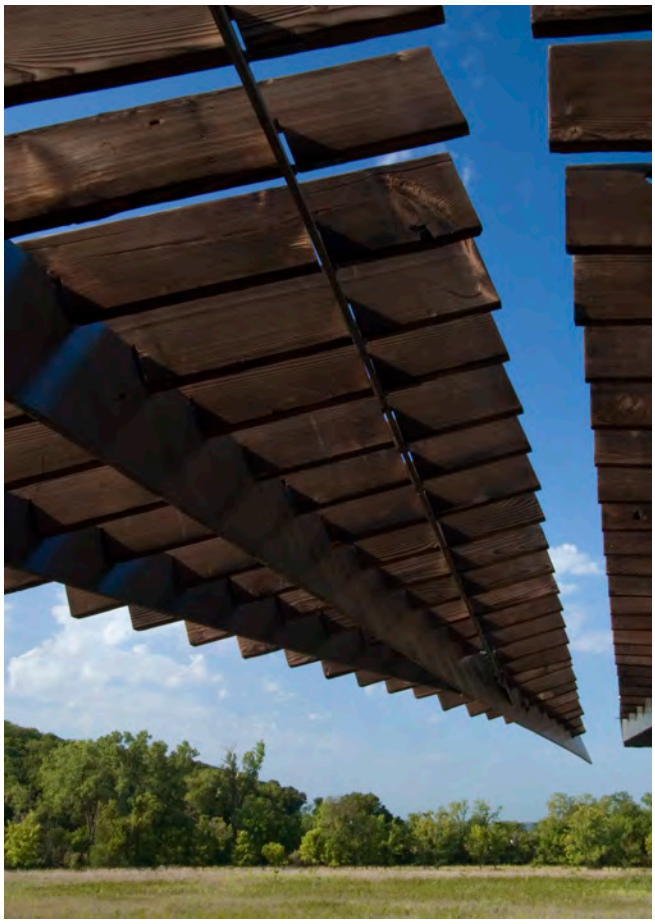
The Roth Trailhead, a reclaimed cedar and steel sun-shading canopy hovering over a one hundred and twenty-two foot long, two-foot thick punctuated rammed earth wall, extends perpendicularly from a wooded hillside like a prow over an expansive tallgrass sea.

A utilitarian structure as well as a phenomenological reflection on the landscape, the presence of the rammed earth wall registers the land's gentle topography. The charred louvers of the canopy evoke the burning of the surrounding prairie, extend the woodland shadows, and filter natural light. The choreographed stratification of the rammed earth wall echoes geological forces. Unapologetic imperfections in the wall's surface serve as its only ornament.

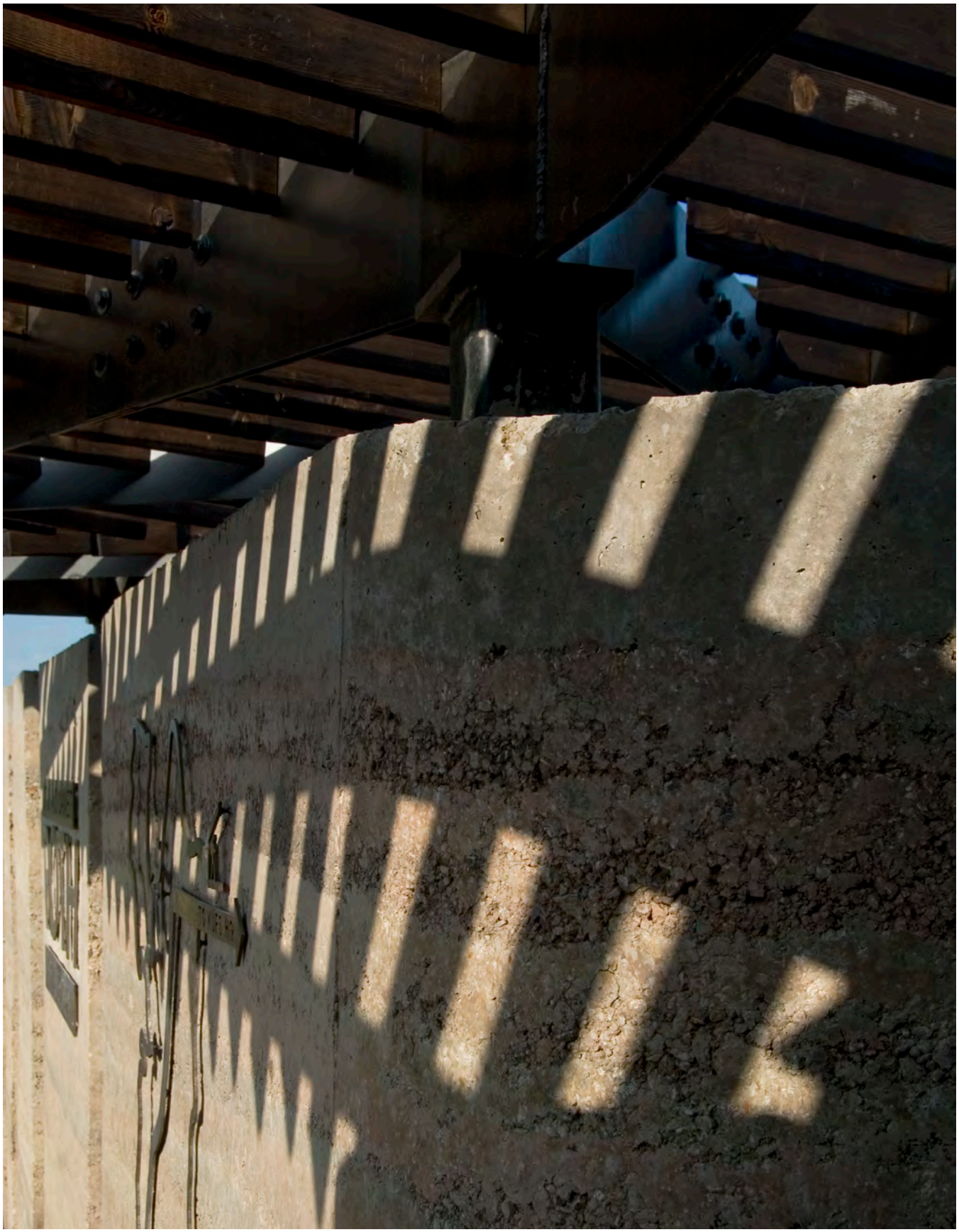
Slipping through the earthen wall along an inclined winding path simultaneously engages muscular, visual, and haptic sensations. This humble structure frames and intensifies the surrounding ecotone environment. Its design was discovered and gently coaxed out of the place, where it laid latent and waiting.

Top: A charred cedar canopy hovers over a tallgrass prairie.
Bottom: A rammed earth wall extends from the gentle topography.

Top: A charred cedar canopy is perched over rammed earth masses.
Bottom: The shadowplay of the canopy is cast upon the rammed earth.



Top Left: A slit of sky is visible through the canopy. Top Right: The underside of the cedar canopy. Bottom: A rammed earth wall; its imperfections along with traces of it having been made are its only details.



The rammed earth wall with steel signage and wooden canopy above.

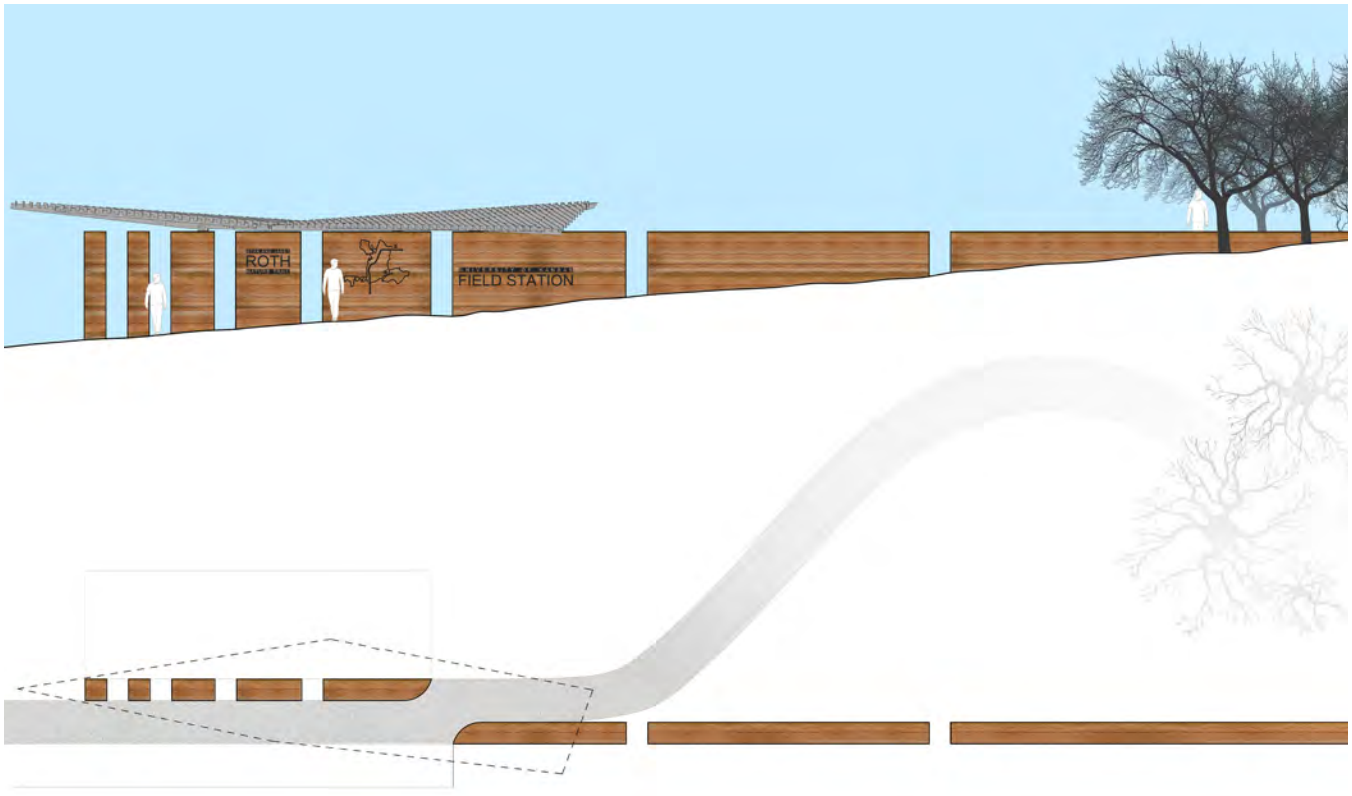
Fundamental Research and Embodied Craft

In response to the pressing need for a more sustainable built environment, earthen architecture in the contemporary Western world is beginning to experience a fragile resurgence. The work of this design/build studio aims to engage undergraduate architecture students in the development of fundamental research into a valuable material and method, one that otherwise risks fading into obscurity once again. Students are immersed in hands-on material research, exploring industrial and biological stabilizers for earthen materials. From the rigors of setting up an experiment and seeing it through, to probing relevant literature and collecting critical data, students are invited to participate in an undervalued dimension of the architecture profession - the creation of new knowledge.

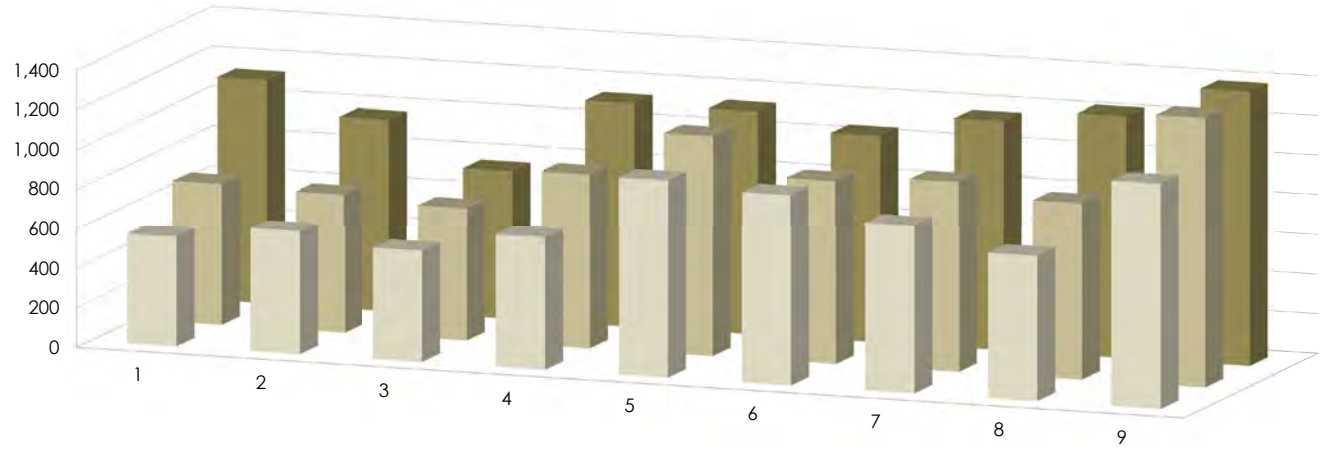
While the studio can be characterized by its embrace of rammed earth, our essential underlying aspiration is to instill in future architects an embodied ethos sympathetic to the act of making. Working in a highly collaborative environment, students collectively make design decisions, manage budgets, research materials, work out details, test solutions, improvise, lead, follow, compromise, and, ultimately, contribute something meaningful. They are provided an opportunity to fully exercise design thinking.

From concept to punch list, students are guided through nearly every stage of a small project. Each studio completes a set of construction drawings (a valuable experience for undergraduate architecture students), develops and maintains a budget; builds physical models and full-scale mock-ups to understand and test the design, materials, and techniques, and, finally, constructs a modest work of architecture. Over the course of one semester, the students work tirelessly to design and erect a unique and remarkable rammed earth structure.

Beyond the skills and experiences acquired in the studio, the lab, the field, and the conference room, the most significant benefit to students of the design/build studio - complimenting the traditional design studio - is the expansion of their professional habitus and the honing of their system of values.



Concept drawings for the Roth Trailhead.



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7 Day Test	553.06	620.70	561.02	668.45	998.70	962.89	847.50	732.11	1139.95
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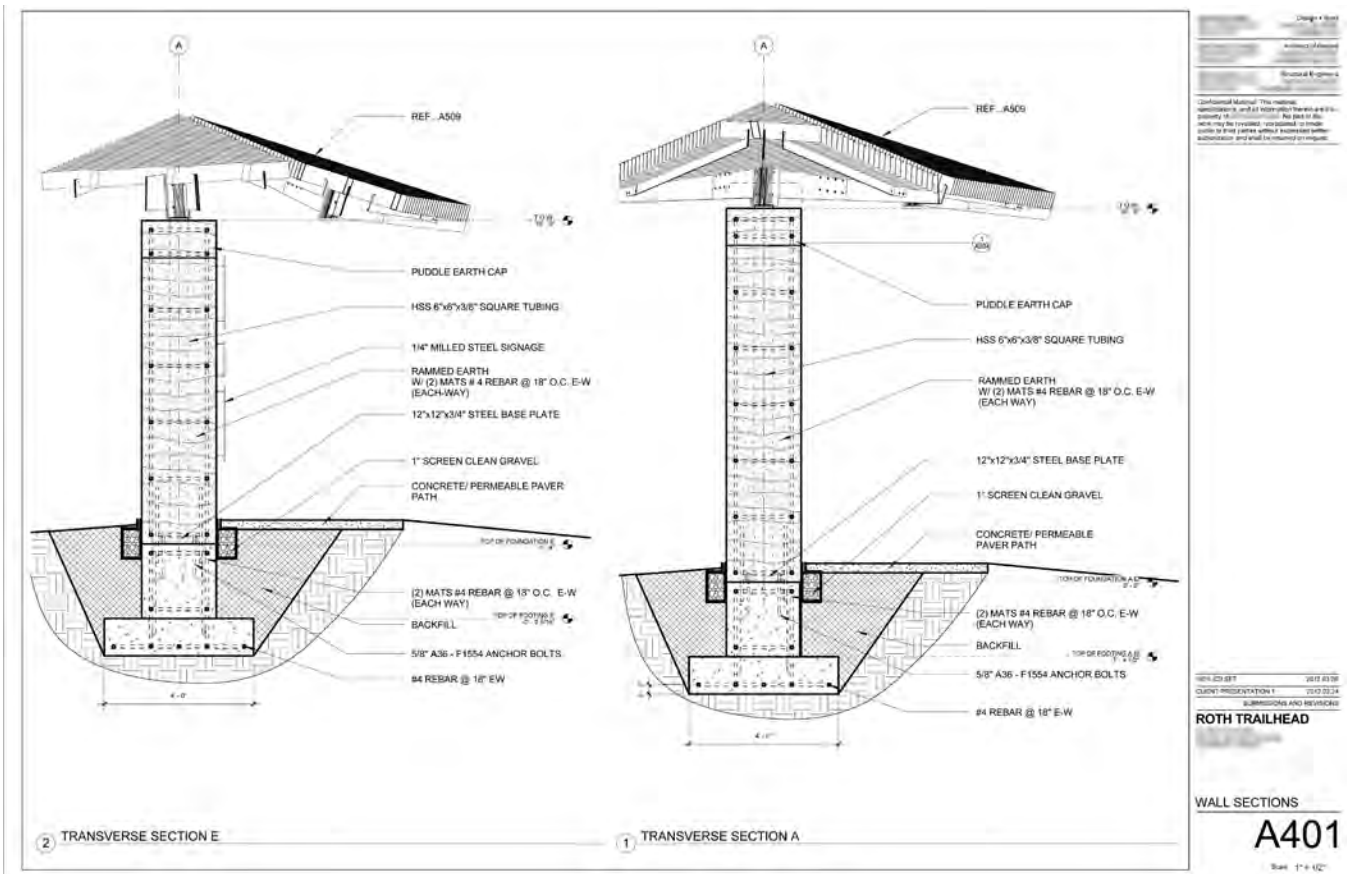
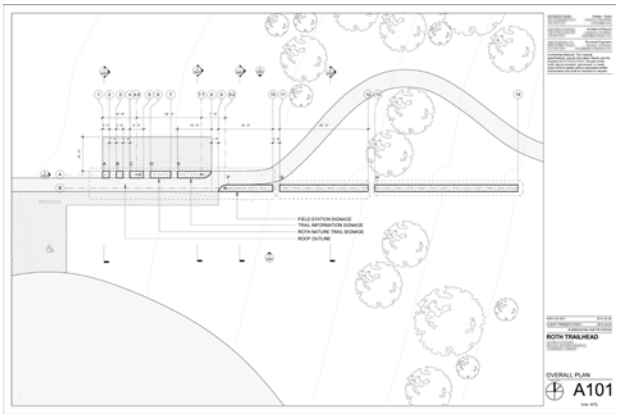
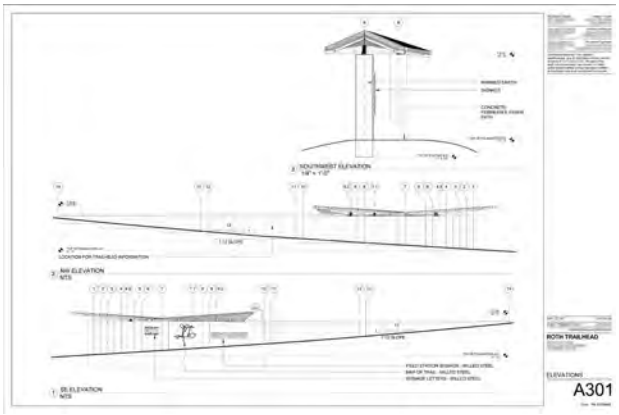
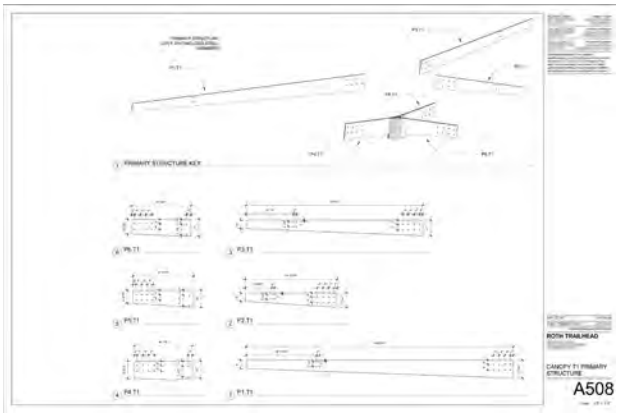
28 Day Test	1130.00	970.85	752.01	1130.00	1130.00	1046.44	1159.84	1223.50	1384.65

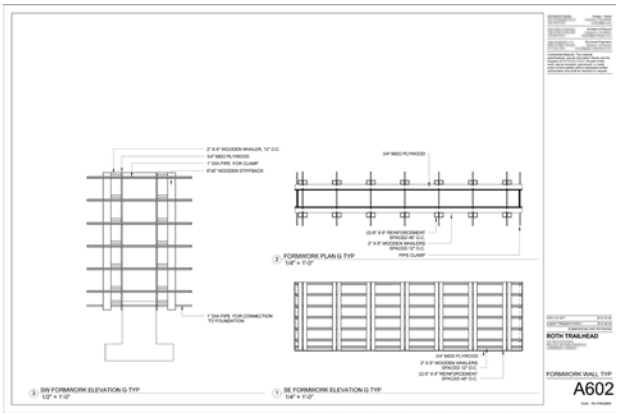
Top Left: Visualizing compressive strength data. Upper Middle: Conducting compressive strength testing on rammed earth cylinders. Lower Middle: Rammed earth test specimen. Bottom: Rammed earth aesthetic samples.







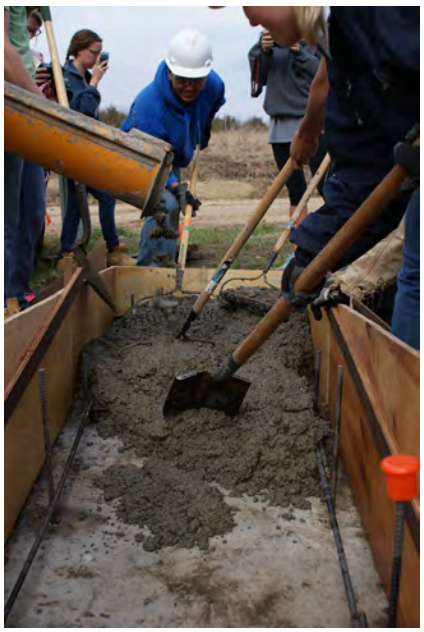




Excerpts from the construction document drawing set for the Roth Trailhead.

Design Build Studio: Transforming the Education of An Architect

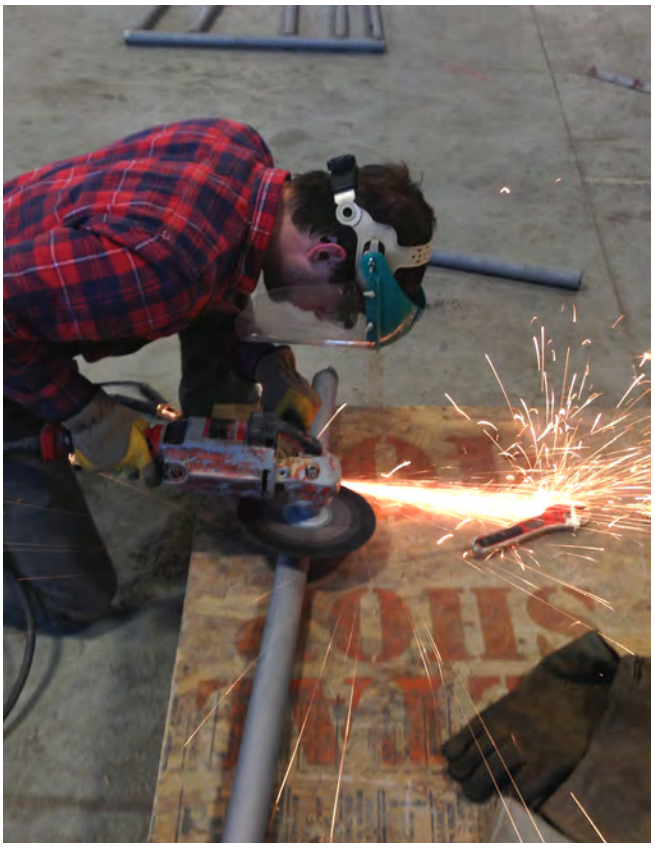
The Design Studio has been and continues to be the heart of the education of the architect, however, a complimentary model of teaching architecture has emerged in recent decades – the design/build studio. Since the early 1990's, design build activities in academia have been steadily growing. Today, design/build activities, in some form, can be found in the majority of architecture schools in the United States. At this university, design/build is 'bred in the bone' so to speak. All third-year students in the Master of Architecture program are required to engage in one studio focusing on materials and tectonics. The work presented here is an integral piece of the ethos of a School that prides itself on thinking and making.



Top Left: A student inspects the canopy slats set up in a jig.
Right Bar: Students present to clients, ram earth walls, and pour foundations.
Bottom Left: Studio members deliver soil to the formwork. Bottom Center: Studio members ram earthen walls.

Design Build, a Lesson in Collaboration

In addition to the numerous individuals who were instrumental in making these works possible - particularly our courageous clients, our stalwart consultants, and our generous vendors and material suppliers - the remarkable students who persevered in the face of great challenge deserve tremendous admiration; they poured their passion, creativity, and ingenuity into these works of architecture.



Top Left: Two students perch a skid-steer loader bucket, ready to assemble the structural fins of the steel canopy.
Top Right: A student prepares the reclaimed steel to be used in the new gate.
Bottom: Students enjoy the fruits of their labor at the ribbon-cutting ceremony.

Studio members ram the southern portion of the Field Station Gateway, layer by layer.