Planning as a Systemic Catalyst

Make no little plans; they have no magic to stir men's blood and probably themselves will not be realized. Make big plans; aim high in hope and work.

—Daniel H. Burnham

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PREMISE

Planning is fundamental to the success of any project, even more significant in the realm of Non-Profit and Public work. In our current economy where funding for projects that are for "the good of the people" are reduced, we need to make big plans that do not rely on big funding. Designers need to embrace this new paradigm of working as an opportunity for our plans to be implemented as the start of a larger systemic strategy. We need to determine the critical moves that accomplish more than the budget allows and establish succession plans that are self-perpetuating. Or at a minimum, develop planning strategies that shift current resource allocation from maintenance to efforts that are productive. We need to be entrepreneurial in our efforts to create agency, not just for designers, but for the community that we are engaging. Through systems analysis led master planning we can identify opportunities to for interventions that set in motion a larger plan rather than waiting for the funding to implement everything at once. Additionally, these plans need to provide the opportunity for community ownership and the flexibility for the co-opting and evolution of the design.

This challenge has been the basis for graduate design studios examining the role of systems analysis and entrepreneurial agency as a framework for masterplanning and a method for determining the critical first moves. The masterplanning had to accomplish the goals of the client working within the constraints of budget and regulation while also determining how a phased implementation could always feel whole without limiting the overall plan. Through long term planning, and an overlay of cost-benefit analysis, students determined the appropriate first phase of implementation. In some cases this was an evidencing through traditional representation. While in others it was constructing the first phase of the master plan as a prompt for the community to embrace the place, giving ownership of the process to the public rather than the institution. In all cases the first move is only the start of the larger plan, a catalyst for the site's development.

BUTTE, MONTANA

Butte is located in western Montana at approximately 5,538 ft above sea level atop the Boulder Batholith.[1] The copper and gold veining which cross the Butte district in an east-west

manner are contained within this host rock. These veins are the product of geologic processes along the Northern Rocky fault lines that generated an ore body that is 25 miles wide and 70 miles long and extends deep into the earth.[2] The ore veins of the region can stretch over 12,000 feet, have a vertical continuity of over 4,500 feet, and have mining widths approaching 50 feet. The subsurface resources available within the Butte Mining District have yet to be exhausted, and allow Butte to be still called the "Richest Hill on Earth."[3] It is this richness and depth of resources that contributed to the construction of a complex network of shaft mines that extend over a mile deep to reach the ore. Approximately 49 miles of vertical shafts and 10,000 miles of horizontal workings exist under the Butte Hill as miners followed the veins of valuable materials prior to the conversion to open pit mining.[4] It was the existence of this vast mineral resource, in this particular place of the intermountain west in the late 1800s, that set the stage for Butte to become the extraction metropolis par excellence.

In 1912, Walter Harvey Weed wrote "Heaps of waste are everywhere prominent, attesting by their great size the extent of the underground workings".[5] The existing landscape was made submissive to a desire for geologically-produced wealth that permeated all attitudes of occupation. The draw for wealth was so great, immigrants were often instructed "Don't stop in America, go straight to Butte!" And while the motivations of resource extraction are still clear, a very strong community developed, both physically and socially. Butte became one of the most culturally diverse cities in the country with foreign-born residents exceeding 45% of the population in 1890.[6] For a population that peaked at just under 100,000 in 1920, it built 7 large theatres hosting performances by Charlie Chaplin, Fred Astaire, Clark Gable, Bob Hope and many others. As for the physical landscape, in 1899 copper baron William Clark purchased 21 acres and invested one million dollars of his own money to construct the Columbia Gardens Amusement Park for the residents of Butte. Despite all of this, Butte's inseparable ties to the subsurface caused it to sputter. Journalist Ray Stannard Baker said of Butte "It gives one the impression of an overgrown mining camp awakened suddenly to the consciousness that it is a city, putting on the airs and properties of the city, and yet often relapsing into the old, fascinating, reckless life of a frontier camp".[7]

In Butte mining began with gold, but quickly shifted to copper as the country's growth and need for electricity fueled a round-the-clock extraction producing 30% of the nation's copper in 1920. As Butte transitioned from the labor intensive shaft mining to open pit mining in the 1950s this relationship between the subsurface wealth and the community extracting it radically changed. The city moved from a community that was integral to mining to one that is adjacent to it. At the turn of the last century, over 45 mining companies and almost 18,000 miners in 34 different labor unions were working the Hill. Everyone was in Butte because of mining. Today there is one active mining operation, Montana Resources at the Continental Pit, with approximately 350 employees. However, this community will forever be inextricably connected to the waste associated with extraction as over 660 million metric tons of waste rock are spread across the 25 square mile surface of the Butte hill.

The EPA's general mission is to protect human health and the environment through implementation of environmental laws enacted by Congress and assigned to EPA for implementation.[8] In 2006 the Environmental Protection Agency Record of Decision (ROD) for the Butte Priority Soils Operable Unit (BPSOU) stated that reclamation work would be given a T I Waiver, defined as a Finding of Technical Impracticability to clean the site given the large scale nature of waste. This finding determined that the majority of reclamation efforts would be a Waste Left In Place approach. This approach has resulted in an 18" thick cover of dirt over a regraded terrain of waste rock to reduce erosion of the cap in the most economical method resulting in an uninhabitable landscape. The reclamation efforts are further complicated by a population and economy that are much smaller than the scale of the built environment and the overlay of being the largest historic landmark district in the country.

THE BUTTE STUDIO

One of the primary motivations behind the studio was the exploration of how small interventions could instigate larger-scale change. It was important to develop the understanding of the role of the designer as an agent within nested larger systems as opposed to the generator of those systems. One of the clearest examples of this process can be taken from climate change, where small aggregate actions have triggered much larger world-wide changes. The example also illustrates one of the most significant challenges with engaging large systems—the difficulty of large-scale system perception or the comprehension of long-term time scales. For these reasons, the studio made an effort to select and frame particular systems in which to engage while being projective about their possible larger implications.

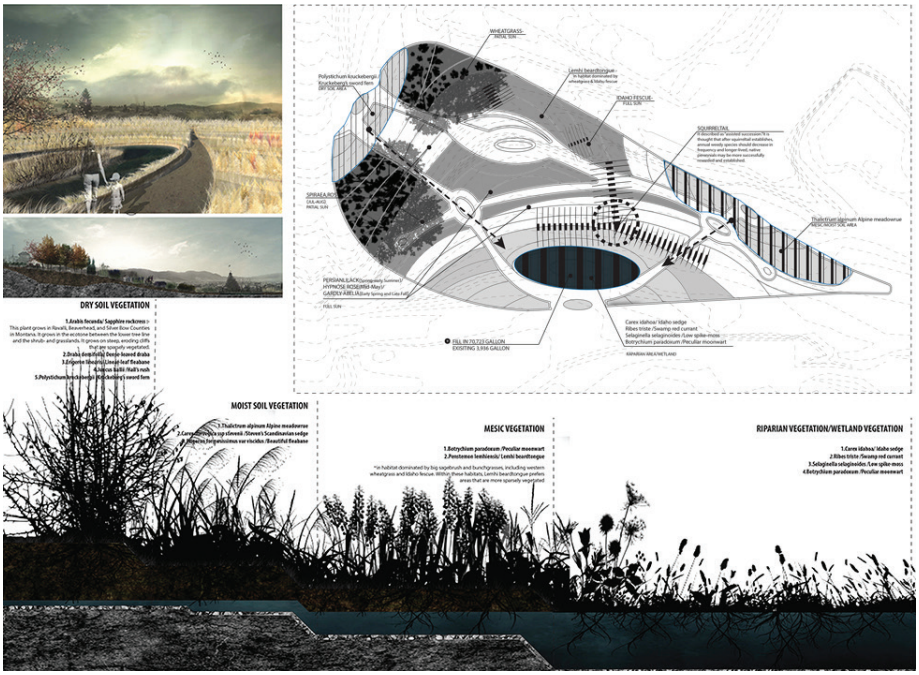
The studio also wanted to communicate that on any one site, many systems operate simultaneously and are in many cases contradictory of one another. All engagements within these systems as a designer imply or communicate value judgments or prioritization. Most dynamic systems can be placed into one of three categories; Ecology, Economics and Social. The point should be made that these systems are highly integrated and any attempt of distilling them into distinct entities requires the omission of some information, often critical to the existing fabric. With that note however, these three categories serve the purpose of generally illuminating the range of inputs and outputs of any given site. All three also have significant potential as agents for change if managed correctly.

Ecologically, the Butte region is incredibly complex. Highly disturbed landscapes have led to a wide range of ecological alteration over time. Now, adaptive organisms have found ways to thrive in the post-mining condition. An example of this is the fungus and bacteria discovered in the Berkeley Pit by Don and Andrea Stierle, researchers at Montana Tech.[9] Not only did this discovery refute the idea that the pit was a completely dead body of water, this new discovery has let to future research that points to the cancer-killing potential of these new organisms.[10] This new understanding of how a highly altered condition can produce both positive and negative results serves as an important lesson to designers. Systems evolve and adapt to modification. The more knowledgeable we are about how this adaptation occurs, the more likely we can predict outcomes and design for specific desired results. Hydrologically, the extraction of tremendous amounts of material have altered water movement systems. Numerous ditches, silt traps and detentions areas control where water goes based on what it has been in contact with. This hydrologic infrastructure is one of the most prominent features in Butte, thus water and its movement became a key focus for many of the studio projects.

Today, Butte's economy is still tied to the process of resource extraction, but at a smaller scale. In addition to the finances associated with the actual mining of material from the Continental Pit is the economy of reclamation. Much of this money is filtered through the federal government as part of the superfund reclamation project. In addition to this federal money, Butte has worked diligently to market itself as a destination city for a series of well-known regional events such as an enormous St. Patrick's day celebration, Evel Knievel days, the Montana Folk Festival and the Chinese New Year celebration which collectively draw over 250,000 people to the city each year. These events attempt to leverage the large number of tourists visiting the region for other sites such as Yellowstone and Glacier National Park. Tourism is the fastest growing sector of the economy for the state of Montana creating 7% of the workforce, annually bringing in 10 million visitors (10 times the population of the state) and 1.8 billion dollars.[11] The choice to focus the studio on both Terrain and Recreational program was strategic in that these are the two most funded elements in the region.

With a historical reputation for tough, scrappy miners who would give up everything to strike it rich on the "Hill", Butte quickly became one of the most populated and prosperous cities of

the West. Events such as the destruction of Columbia Gardens, Butte's premier public space, or massacres associated with labor strikes such as "Bloody Wednesday" in 1920 challenged this toughness through disinvestment.[12] Butte residents of today could also feel this type of disenfranchisement as the city focuses its attention on the attraction of tourists to the historic district of Uptown Butte to pay the bills. Many of these tourism-based undertakings do very little for the current residents beyond filling the streets with visitors a couple of days per year and exploit the vacancy of relics from a post mining condition. Finding ways to empower residents by providing them with useful public spaces that speak directly to their needs was also a driving force behind the studio.



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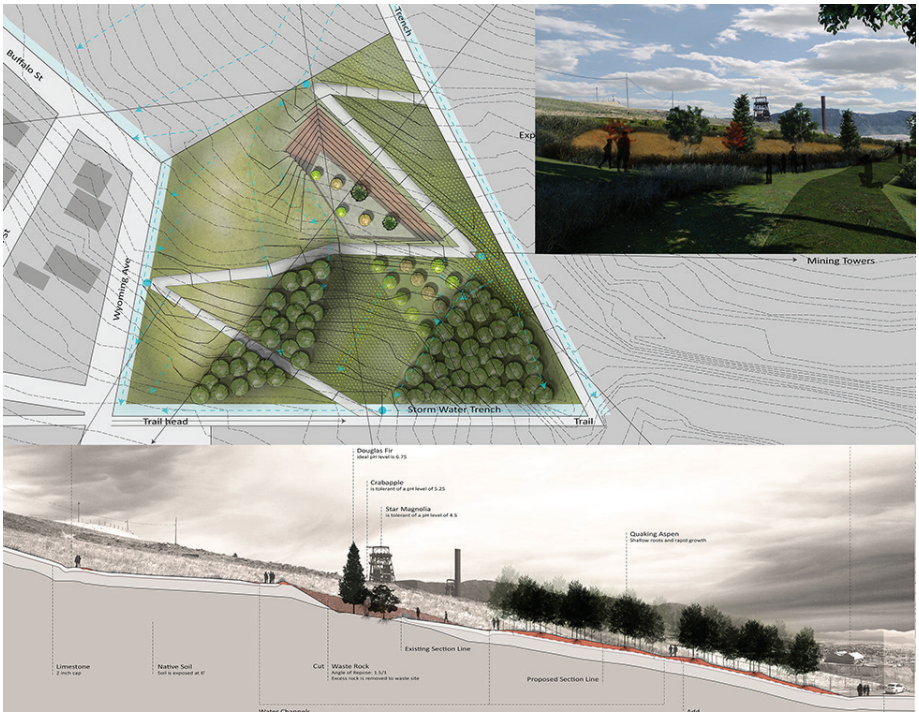
The relationship between Terrain and Program is manifold and manifests itself in many ways. Our environment is filled with our responses to dealing with terrain in order to create various desired programs. Road-cuts, debris basins and a myriad of soil-retention technologies all stand as evidence to this fact. Socially we can see examples of this engagement of Terrain with the class-sorting associated with elevation and the strange inversion of this in Butte, with the upper class resident's migration to lower elevations, away from the mining operations on the hilltop. The studio looked to explore this relationship between use and terrain by providing a series of existing terrain conditions that could be modified within limits set by the EPA and budget. The manipulations of site were to accommodate programs that specifically addressed the needs of the community and not those of the modern tourism economy, a new form of extraction for the region. The alteration of the terrain also needed to address the fragile nature of the ecology and erosion, a significant financial drain for Butte.

Pedagogically, there was also a desire to push the envelope of what students enrolled within an architecture program are expected to consider with respect to landscape. As subject matter that is in many cases overlooked within the curricula, the studio intended to couple these ideas of system-centric design with a sound knowledge of landscape vocabulary. Students were also pushed to develop programs for their sites that had the potential to instigate larger systemic changes for the community. Through this process of design development there is a transferrable knowledge in design thinking that could apply to architectural design, particularly in a time of significant transition within the field.

Figure 1: Clark Fork River Botanical Garden proposal by Meting Fu



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The programs proposed by the students included a Botanical Garden that referenced the loss of the Columbia Gardens and other botanic species along the Clark Fork River though specific species selection coupled with their relationship of available soil depth though site re-grading, see figure 1. Another project became a didactic slice into the waste rock of the region to uncover the native soil as a way to educate the public of the recent history and transformation of the region. This project also considered itself as a part of a larger agenda of the historic district by demonstrating the history of the reclamation work in one location, similar to the Tailings Observation Area located east of Anaconda along the former rail line where an area of contaminated landscape has been preserved because of its historical significance, see figure 2. Two projects looked at the larger connectivity of the region's trail system and leveraged stormwater management and sediment control as a way of initiating both new habitat creation and the restoration of historic pedestrian connections. These projects also addressed the economic implications on the reclamation work as a significant portion of money is spent on the cleaning of sediment basins full of toxic debris due to massive surface erosion. Two projects looked to leverage the economic impact of recreation in the region as a means of funding a community asset. Through the combination of a professional BMX track, a growing activity in the state, and an urban campground to be utilized by those traveling from Yellowstone to Glacier, one project determined that the revenues from these intermittent uses could fund construction. Two of the student proposals identified community reconnection as the driving force of restoration through gardening and gathering in a new type of landscape, one that could only exist as a result of design intervention within the reclamation process. One of these utilized the community to create the landscape over time by utilizing an organization strategy of compost piles to create fertile soil. This is especially important in a place that has limited top soil for the cap, resulting in the minimum standard for growing being utilized to reestablish plant life, see figure 3. All of this work has been evidenced to the community through public exhibition and has created a new dialogue surrounding the reclamation of Butte. It has also altered policy within the current reclamation strategies and is being utilized in discussions for reframing the funding for the former Bonanza Mine site. This site, an unreclaimed mine dump currently being used by neighborhood children as a place to play, is being utilized as a test site for alternative reclamation strategies and is currently seeking grant funding and public input.

Figure 2: Mining Slice proposal by Jordan Clark

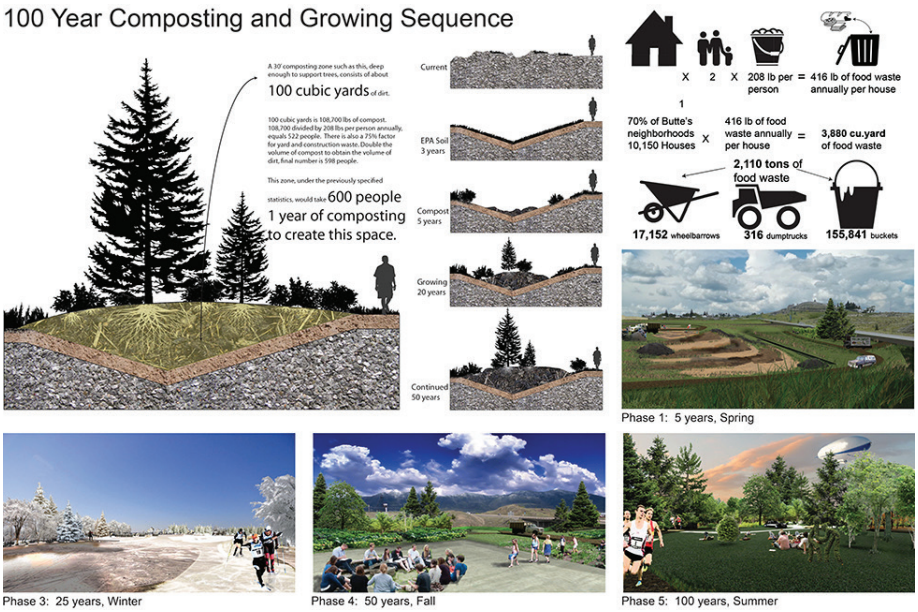


Figure 3: Communal Reclamation proposal by Gabe Lawhead and Dustin Talbert

ENNIS, MONTANA

Ennis is located along the Madison River in the southwestern portion of Montana in a valley defined by the Madison, Tobacco Root and Gravelly mountain ranges. To the north of town is the Madison hydroelectric dam which forms Ennis Lake. The valley receives approximately 13 inches of precipitation a year and is consistently windy given the open nature of the valley. The soil composition of Ennis is a mix of older alluvium and flood-plain deposits that has created a heavy mix of gravel, cobbles and boulders at the surface.

Ennis is a town of less than a thousand people that was founded in 1863 by William Ennis as a homestead site. The region is primarily a ranching community that doubles in population in the summer through tourism, recreation and fly fishing. It is located 30 miles from Big Sky Montana, the largest skiing resort in the country and just over 70 miles from the west entrance to Yellowstone National Park. These conditions create an attractive setting for individuals looking to move to Montana and live in a small town that is in proximity to the wilderness amenities of the region.

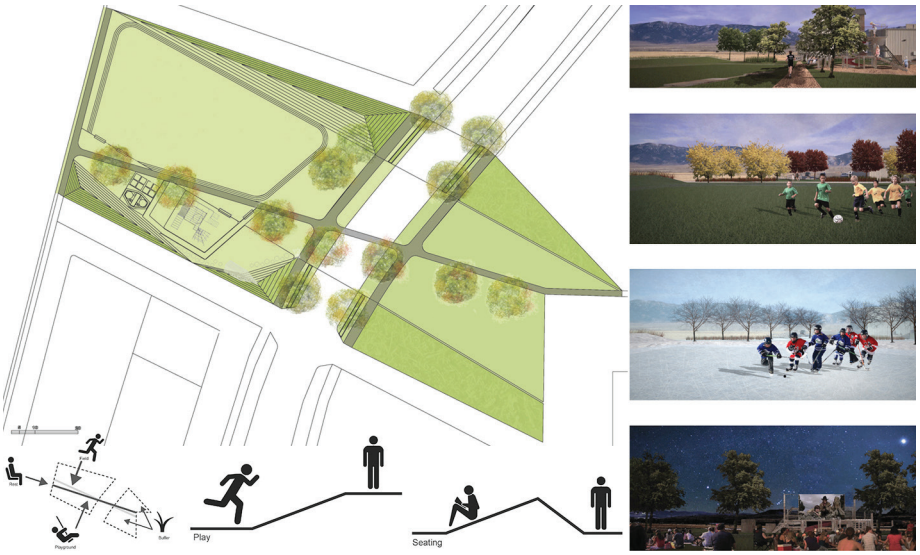
Like most of the country at the start of this century, Ennis was seeing the potential for growth through the housing boom and a desire to live in Montana. To the north of the historic downtown on US route 287 The North 40 Development Company assembled 40 acres as a mixed use extension of the community with a diverse range of housing. The site was platted in 2006 and the roads and infrastructure went in along with the first 3 acres of housing. Unfortunately the market changed and the remainder of the development has sat undeveloped as the town has remained flat in population since 2000, see image 8.

THE ENNIS STUDIO

In the fall of 2013 the School of Architecture was approached by North 40 Development Company with an opportunity to program and design one of the park spaces within the development to provide an amenity to those residents that have moved in and to help activate the space as a much needed park on the west side of town. The funding for the park is part of the development, but the space will ultimately be owned and maintained by the city. As the students developed the planning strategies for the park, it became clear that the goals of the project were much greater than the financial capacity of the developer at the time. Rather than reducing the scale of the park or the planned amenities the students developed a masterplan for the two parcels that could be implemented in phases. Through conversations with

the developer, the city and the residents of Ennis, it was clear that the phased implementation needed to be strategic in its execution such that at no time did the park feel incomplete while also allowing for the community to continue to add to their place.

Given the limitations of the budget, one of the most critical decisions was that multiplicity of use would be critical to each move made on the site. They began establishing program adjacencies and overlaps and coupled them with environmental responses, primarily associated with protection from the wind and collection of water to reduce the need for irrigation of the play field. Another important aspect of the design was to provide amenities for the entire community and not just a playground for young children. This combination of criteria generated the approach of designing a "playscape" that would be multidimensional in use and be performative in relationship to the environment, see figure 4. The depression of the large playing field is graded to collect rainwater in the summertime, but also to be a natural edge for a winter skating surface. The folded terrain not only acts as a means of defining space, but is fully integrated as a natural play surface for children and at angles to allow for lounging. The deployment of trees organize the connection of the two park parcels split by the road, but are also part of a traffic calming strategy. Finally, the large field and play structure create



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a venue for hosting movie nights under the stars to bring the community together.

Once the masterplan was complete and approved by the City of Ennis, the students began to evaluate what implementation on the site would have the largest impact in establishing the framework for the park within the existing flat and quite barren context. Through this process it was determined that the greatest impact would come from setting the organization for the overall site and to provide a vertical marker within the landscape to define place. This approach also leveraged the abundance of rounded cobbles and boulders that had been amassed from the grading of the 40 acre site. Truckloads of rocks were brought into the site to provide the rough grading of the folded terrain defining the south edge of the park and to be sorted as fill for the gabion benches. The gabion cages and bench tops were pre-fabricated on campus such that the first phase of work could be implemented in one day on site by the six students. The students staked the layout for the site and directed the excavator operator in setting the edges and elevation of the rough grading. The students then completed the fabrication of the gabion benches to provide a place to rest and further define the park through this initial phase of implementation, see Figure 5.

Figure 4: Ennis Playscape masterplan by Rachel Campbell, Elyse Casper, Andrew Norby

Through this activity on the site the community can begin to occupy this place and start the process of ownership of the park. The plans and details for all phases of construction were given to both the City and North 40 such that future phases could be implemented as either money or opportunity allows. One of the proposals to the community was to host a Saturday event in the park where residents could learn how to construct the gabion benches and

5

Figure 5: Photographs of the installation of gabion benches by students: Rachel Campbell, Elyse Casper, Andrew Norby, Jack Oldham, Hannah Stroebe and Kasey Welles

further contribute to the growth of the park with minimal cost. As the economy has shifted again, there are plans to further implement the park this coming summer, but it has already become a destination that is known through the modest initial installation by the students.

CONCLUSION

While these studios vary greatly in their scale and context, the understanding of large system connections and the micro-conditions of a specific site as agents for place-making were consistent. Students generated programs for the sites as a result of analysis and ecological action rather than being given a required program or list of spaces to be overlaid on the existing conditions. This understanding of system integration and program as an active participant informs the larger agenda of architectural education and the future of these particular students. The agency created by systems analysis coupled with design thinking can allow them to become entrepreneurial as designers by allowing projects to launch prior to achieving the funding for the entire project. Through this they can also assist their clients in further funding of the remaining phases through community engagement with the site. It can also help institutions and municipalities test ideas at a smaller scale understanding that the master plan is intend to be flexible within the parameters of the objectives for the site(s).

This way of systemic thinking is an absolute necessity in our dynamic world. Projects that can understand the implications of their existence in a larger, rapidly changing context are more responsible and realistic. Similar to our influence and response to climate change—sometimes proactive but more often reactive—design can overlook the small aggregate pieces that make the larger picture. An understanding of systems also allows one to manage the complexities of our current global condition and identify ways where designers can intervene in strategic ways to inform the larger condition. The Ennis studio focused on the smallest of implementation that could have the biggest impact as a way of responding to the community desires to occupy the site and the economic realities of the available funds. This intervention served as an amenity to the residents and as a catalyst for activating the development. The Butte projects prioritized the understanding of the small move, relative to context, and the significant effects it can have on the restoration of a place that includes the community and not just a naive notion of returning the site to its pre-mining state. These studios demonstrate how speculative strategies can create opportunities for implementation and how design thinking can be utilized to empower a community to not only make “big plans”, but to implement them with limited budgets. Ultimately these projects seek a maximum impact within their systemic context through the most minimal means, guided by the long term trajectory of the masterplan.

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