

Sustainable Solutions Competition Team

JFC Grant Proposal 2021-2022

1. Executive Summary

The Sustainable Solutions Competition Team at UC Berkeley has a mission to design and build a sustainable structure that would serve for communal benefit, while simultaneously supporting the personal and professional growth of all members. Competing against other schools for a chance of recognition and prizes, our main goal is to be the best team we can be while proudly representing UC Berkeley at the annual ASCE Mid-Pacific Conference in April. Another key goal along the way of achieving our mission during the 2021-2022 academic year includes recruiting many undergraduate students and exposing them to the concepts of sustainability, fabrication, construction management, and structural engineering. Additionally, the team's continuing outreach by contacting local organizations is a hands-on experience for community involvement. This team implements sustainable practices throughout the project phases by understanding project life cycle and material reuse.

2. Statement of Agreement to Terms & Conditions

After carefully reading the Terms & Conditions outlined in the Joint Fundraising Grant Program document, the Sustainable Solutions organization hereby agrees to all terms and conditions outlined in this document.

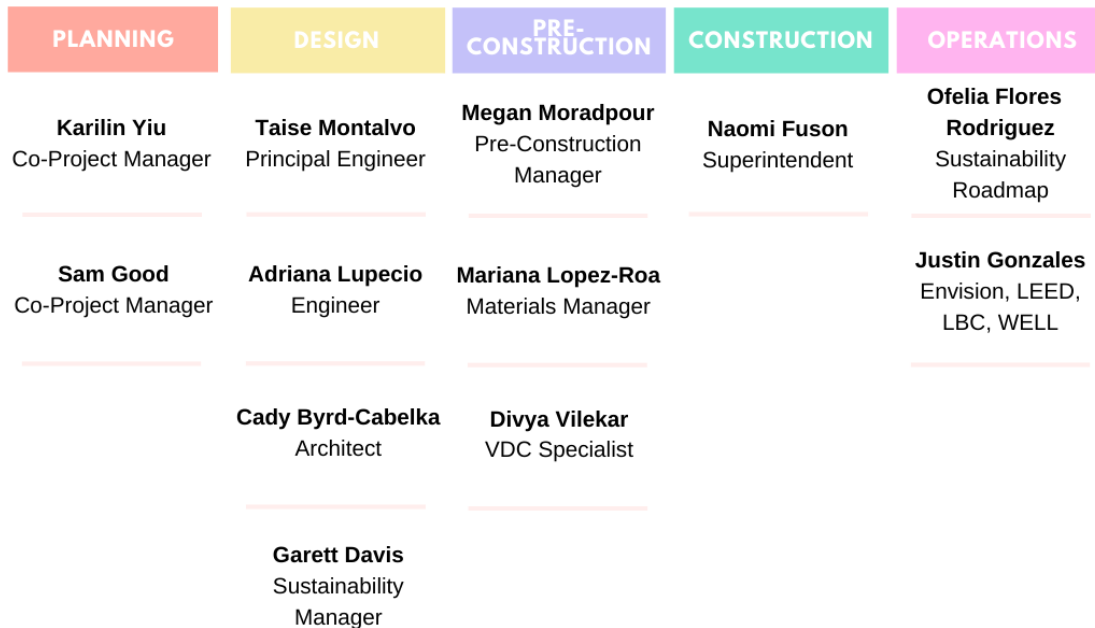
3. Organization Description and Management

Through discussion, research, design, and hands-on activities, the organization's purpose is to give students a complete dive into the duties, difficulties, and daily responsibilities of a Sustainable Design-Build team. Simultaneously, it offers an opportunity to participate in the DeCal's competition team entity competing in the ASCE Mid-Pacific Conference held in April 2022. Its role within the CEE community is to include students within and beyond the CEE major, not limited to majors in the College of Engineering or Natural Resources. This team allows students to implement the technical skills they have acquired in relevant courses thus far to a fun and challenging project. The competition team is composed of the following divisions: Planning, Design, Pre-Construction, Construction, and Operations.

- The Planning division will take charge in outlining project procedures, Pull Planning milestones, scheduling weekly tasks, and delegating roles and tasks accordingly.
- The Design division will focus on performing structural analysis calculations to ensure structural integrity, use computer software such as Revit to create 3D models, and brainstorm innovative features all while following sustainability standards.

- The Pre-Construction division will revolve around an established scope of work, budget estimation, and procurement of materials.
- The Construction division will manage the prefabrication of elements, facilitate build procedures and details, and always ensure safety for builders.
- The Operations division will be the greatest practitioners of sustainability as they will maintain and ensure sustainable methods are implemented, perform life cycle assessments, and adhere to different rating systems such as LEED and Living Building Challenge.

The following diagram represents such roles with last year’s team members:



Leadership roles consist of a Project Manager who facilitates the organization’s progress, plans weekly team meetings, and guides the team through its struggles along the way to the competition where the year’s worth of hard work is showcased at MidPac 2022. Moreover, the Project Manager is responsible for planning, keeping track of member attendance, and recording relevant information from meetings and practices. Lastly, the treasurer keeps track of organization expenses, submits requests for more allocations, and ensures the organization’s budget is used in the most effective manner possible.

- Project Managers
 - Justin Gonzales (jvstipher@berkeley.edu | 7079800025)
 - Adriana Lupercio (adrirolupercio@berkeley.edu | 3109089757)
- Treasurer
 - Cady Byrd-Cabelka (cadybyrdc@berkeley.edu | 6026172512)

Risk management processes include evaluating risks and proposing solutions. These processes will help to look out for signs and prevent incidents. Risks are to be assessed prior to meetings by Project Managers to minimize their occurrence. Through proper planning and scheduling, risks

will be mitigated in order of the severity of each risk, if multiple risks are identified. Project Managers will also analyze members' concerns and collaborate to provide solutions in an efficient and effective manner. Learning from these proposed risks and evaluating them will prevent their occurrence in the future.

4. Goals

The main goal for this organization is to work as a team with one common mission, to produce a unique and innovative product that does not just fulfill requirements, but goes beyond all expectations. From this, some key learning outcomes include learning the important principles of Sustainable-Design, Construction Management, and Structural Engineering. We want students to learn to work in a collaborative atmosphere, apply what they have learned in their various courses, and ultimately step outside of their comfort zone to gain the most out of this experience. Specific goals consist of producing a small-scale prototype of our structure by the end of the Fall 2021 semester, making improvements to the prototype and into a finalized, full-scale prototype one month before the competition, and lastly, putting together the final paper within the four weeks leading up to the competition date. In addition, quantitative goals consist of recruiting at least twenty new first-year and transfer students during the start of the Fall 2021 semester, fundraising a sufficient amount of funds to put away and use in urgent cases leading up to the competition date, visiting and volunteering at least two local community programs dedicated to sustainability, and ultimately winning first place at MidPac 2022. Achieving such goals requires a well-structured plan. Thus, the Fall 2021 course breakdown is shown below:

Week	Topic	Assignment
1	Intro to the class and competition format <ul style="list-style-type: none"> ● Explanation of different divisions ● Presentation of past project 	Reading: Chapter 4 of Statics <ul style="list-style-type: none"> ● One-page summary of reading. ● Study past projects.
2	Go over rules and competition template <ul style="list-style-type: none"> ● Highlight crucial requirements and expectations ● Discuss problems encountered in the previous year 	Reading: Chapter 1 of LCA <ul style="list-style-type: none"> ● One-page summary of reading. ● Study new problem statement and rules. ● Team interest form.
3	Fundamentals of Construction <ul style="list-style-type: none"> ● Intro to resources such as Bluebeam, Revit, estimation techniques, 3D modeling, etc. 	Reading: Chapter 5 of Statics <ul style="list-style-type: none"> ● One-page summary of reading. ● Practice using software.

	<ul style="list-style-type: none"> ● Hands-on exercise for team building and to introduce project management. 	
4	Fundamentals of Life Cycle Assessment <ul style="list-style-type: none"> ● In depth overview of logic and necessary components behind LCAs ● Intro to using EIO-LCA online tool 	Reading: Chapter 2 of LCA <ul style="list-style-type: none"> ● One-page summary of reading ● Research methodology of EIO-LCA and practice how to use it.
5	Statics and Mechanics of Materials Overview <ul style="list-style-type: none"> ● Equilibrium and Deformation ● Walk through problem solving 	Reading: Chapter 6 of Statics <ul style="list-style-type: none"> ● One-page summary of reading. ● Study common problem-solving procedures.
6	Sustainability Overview <ul style="list-style-type: none"> ● Economic, societal, and environmental implications of various processes ● Assignment of individual role based on interests and strengths 	Reading: Chapter 3 of LCA <ul style="list-style-type: none"> ● One-page summary of reading. ● Research different roles that are applicable to the team.
7	Establish Divisions <ul style="list-style-type: none"> ● Split team into divisions based on interest and strengths of members ● Institute goals and deadlines of each divisions' assigned tasks 	Reading: Chapter 7 of Statics <ul style="list-style-type: none"> ● One-page summary of reading. ● Discuss necessary steps and actions needed to reach goals within divisions.
8	Brainstorm New Design <ul style="list-style-type: none"> ● Initiate open discussion to new design and material ideas ● Identify pros and cons 	Reading: Chapter 4 of LCA <ul style="list-style-type: none"> ● One-page summary of reading ● Research proposed ideas.
9	Finalize New Design <ul style="list-style-type: none"> ● Perform structural analysis calculations ● Conduct LCAs on all materials and procedures planned to be utilized 	Reading: Chapter 8 of Statics <ul style="list-style-type: none"> ● One-page summary of reading ● Study calculation and assessment results and continuously improve.
10	Modeling	Reading: Chapter 5 of LCA (first half).

	<ul style="list-style-type: none"> ● Begin dimensioning, 3D modeling, and sketching ● Discuss budget and schedule of building 	<ul style="list-style-type: none"> ● One-page summary of reading. ● Study models and continuously improve.
11	Practice Run <ul style="list-style-type: none"> ● Construct small-scaled prototype ● Perform tests 	Reading: Chapter 9 of Statics <ul style="list-style-type: none"> ● One-page summary of reading. ● Study rests of testing
12	THANKSGIVING – No meeting	Reading: Chapter 5 of LCA (second half). <ul style="list-style-type: none"> ● One-page summary of reading. ● Discuss progress via the internet.
13	Final Fall Meeting <ul style="list-style-type: none"> ● Plus/Delta Session from Fall ● Identify areas of work for Winter Break ● Schedule possible Winter meetings (via internet) 	<ul style="list-style-type: none"> ● One-page summary of reading. ● Research methods of improvement for the upcoming semester. ● End of Semester feedback-and-evaluation form.

5. Long Term Investments

Currently, the team is not engaged in any long-term investments but would like to invest in recruiting materials (i.e. team banner, flyers, cards, etc.) to attract more students given that the team is relatively new and needs more members to thrive even more than before. Just to note, the team does not have any intention for a large purchase exceeding \$1500 at any time during the school year.

6. Affiliations

Stacy Naglestad – XL Construction

Kathleen Hetrick – Burrough Happold

Jessie Buckmaster – Hathaway Dinwiddie

Arpad Horvath – UC Berkeley CEE Department (faculty advisor)

All the industry professionals serve as coaches and mentors that provide helpful industry insight and tools to help guide the team in accomplishing our goals. They offer their personal insight into the material, lead the class in learning and discussion, and help guide our independent research as we study the particulars of each separate role within each sub-team. The nature of the relationship

with all affiliations rose from a direct connection to the Cal Construction Sustainability team in which they also serve as coaches for and volunteered to coach the Sustainable Solutions team as it branched off the Cal Construction Sustainability team to begin with.

7. Contributions

Aside from the minimum required contributions to JFC, the organization commits to being open and making our members available to help JFC and the CEE department as volunteers when needed for any additional event required, given that the organization is not busy hosting an event already (e.g. required info session). On top of that, the organization will reach out to volunteer at local organizations dedicated to sustainability and also collect material from construction sites all while representing the CEE department and the values it holds relating to sustainability. The organization will also reach out to students by tabling and advertising via flyers to attract them and spread the fun opportunities within the CEE department.

8. Performance Evaluation

Throughout the 2020-2021 academic year, the team performed extremely well, given the various challenges the team faced. From encountering limitations that arose due to the COVID-19 pandemic to having a smaller team than years past to not having as much experience as a whole, all members went above and beyond to learn the material needed to succeed and also put in so much effort to produce quality work for the competition. Goals consisted of creating an aesthetic and environmentally-friendly college campus recreational site plan within the dimensions of the rule book, writing a thorough final paper that exceeded standards, and developing our own personal and professional skills. All while having so much fun and learning more than the team could imagine, all goals were met. The most important lesson learned was that when there is a group of people together, all with the same vision and end goal, a lot can be accomplished through collaboration and creativity. This motto is what the organization now stands by and plans to stick with to succeed in the years to come.

9. Contingency Plan

In the event that the organization is unable to fulfill its role in the CEE community entirely, we will first seek help and guidance from our faculty advisor and coaches. With their input on the situation alongside team evaluation and discussion, a plan to solve the problem will be established and executed as soon as possible. The need for rehabilitation, suspension, or dismissal is to be brought to attention if, anywhere along the route to fix the problem, the steps established in the plan are not executed as expected. An immediate team meeting would be required for all team members, participation and collaboration encouraged from all members, and an anonymous voting poll to go about the situation will be held within the meeting with voting also required from all members. After the votes are gathered and a decision determined by majority vote, it will be passed

on to our faculty advisor and coaches to make the final decision as to whether the team needs rehabilitation, suspension, or dismissal.

Sustainable Solutions will assess its progress throughout the year by evaluating the progress made on the team's ASCE Mid-Pacific Conference project as well as in members attaining valuable skills. Adequate progress would consist of members completing project tasks to the best of their ability in accordance with the team's assigned deadlines through collaborating with peers and utilizing skills taught by Sustainable Solutions. The educational environment of Sustainable Solutions will be assessed in the willingness of members to collaborate and learn as well as upon their return in the Spring. Project Managers will request feedback and member input to assess Sustainable Solutions' educational environment and further build upon that information by implementing any given constructive criticism and suggestions that could benefit the workspace and its members as a whole.