

2017

## Sinatra Living: EERE 303 Statement of Project Objectives

University of Nevada, Las Vegas. Solar Decathlon Team.

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[Control Number: 1398-1513] [Mod Number: N/A]  
[Board of Regents, NSHE, obo UNLV]  
[Team Las Vegas (Solar Decathlon 2017)]

**A. PROJECT OBJECTIVES**

To design and build an attractive, renewably-powered energy-efficient, intelligent and marketable home in the Mojave Desert that changes the way the elderly maintain their health.

**B. TECHNICAL SCOPE SUMMARY**

The project consists of the proposed residence located in southern Nevada. The project is approximately 964 square feet of enclosed space with an adjacent courtyard and patio space of approximately 700 square feet. The proposed scope is to design and build the house, as well as ensure a final location for it after the competition. Please refer to the conceptual design package to identify the area of work. UNLV, in collaboration with local consultants, will provide architectural, interior design, landscape design, structural, mechanical, electrical, plumbing, and civil engineering services for this project.

**C. TASKS TO BE PERFORMED**

**BUDGET PERIOD 1 DESIGN & PLANNING PHASE**– The Design & Planning Phase will last through all of 2016 and will consist of schematic design, design development, construction documentation, and funding reviews.

**Task 1.0: SCHEMATIC DESIGN**

Time Period: 2016, Q1 – Month 3 of Q1

**Task Summary:** Data collection and schematic design will start in January of 2016 and be completed through engineering senior design and architectural studio courses in the Spring 2016 semester. This task entails the involvement of all colleges at UNLV to create an innovative and unique project that successfully addresses the target market. Collaboration will be required from the schools of Architecture, Engineering, Allied Health Sciences, Business and Social Work. Integration of work between the schools will allow the team to identify what technologies will be integrated to monitor and diagnose the health of retirees, and how those technologies will be integrated with the home's conceptual design and overall goal of the Solar Decathlon competition.

**Subtask 1.1: DESIGN PROGRESS**

**Task Summary:** The design will be 50% complete by the end of this task. The building program and the floor plan will be finalized, and major structural system and transportation design will also be determined. Preliminary finish materials, engineered systems, and other integrated technological features will be explored in the schematic phase.

**Subtask 1.2: SCHEMATIC DESIGN SUMMARY**

**Task Summary:** The Schematic Design Summary detailing non-standard design features, communications strategies, site-operations plans, and health & safety considerations will be submitted by the date required by DOE. A comprehensive contest scoring strategy will be created during this phase of the design, enabling the student team to evaluate every decision using the previously agreed-upon design criteria.

### **Subtask 1.3: Code Analysis**

**Task Summary:** Students will conduct a code analysis on the home and perform a preliminary review with code officials. Code will be compliant with the Solar Decathlon Building Code, the 2012 International Residential Code (IRC) of the International Code Council with amendments and the 2014 National Electric Code (NEC) of the National Fire Protection Agency (NFPA), as well as local codes adopted by Clark County.

**Milestone 1.1:** Detailed Construction Cost Estimate

**Milestone 1.2:** Completion of Design Calculations

### **Task 2.0: DESIGN DEVELOPMENT**

Time Period: 2016, Month 3 of Q1 – Month 1 of Q3

**Task Summary:** Design development will be continued from the previous Spring semester into summer, as an independent study course. This phase will conclude before the start of the Fall 2016 semester.

During this task, the Project Manual writing will be initiated.

The design will be 100% complete by the end of this task. The investigation and selection of finish materials, engineered systems, and integrated technological features will be finalized.

**Milestone 2.1:** Constructability Review

**Milestone 2.2:** Identify final location of proposed project

### **Task 3.0: CONSTRUCTION DOCUMENTATION**

Time Period: 2016, Month 1 of Q3 – Month 3 of Q4

**Task Summary:** Design development will be continued from the previous spring semester into summer, as an independent study course. This phase will conclude before the start of the Fall 2016 semester. Construction documentation will be produced in Autodesk Revit in order to maximize the capacity for an integrated design approach. All BIM models and documentation will be upheld to the latest version of the National U.S. BIM Standard. Training for Autodesk Revit will be provided by Autodesk Certified Professionals to ensure proper use of the software.

During this task, communication will be enacted between students and professionals to uphold the integrated design approach, and ensure that the project gets executed with proper structural analysis, detailing, and construction plans. Quality assurance and quality control process will be performed to ensure careful coordination of the drawings.

By the end of this task, the drawings, Project Manual, and Computer Animated Walkthrough will be completed. The drawings and project manual will be a full-time commitment and collaboration between architecture and engineering students. The computer animated walkthrough will be a collaborative effort between architecture, graphic arts, film, and marketing students.

**Milestone 3.1:** Quality Control Review

**Milestone 3.2:** 95% Construction Documents

**Budget Period 1 Go/No-Go Decision Point:** Performance Period 1 recognizes a Go/No-Go decision point between the end of the Design Development Phase and start of Construction Documentation phase. At this point, UNLV and Team Las Vegas will analyze the current design, feasibility, and status of financial resources and fundraising. Through a careful decision analysis, UNLV will decide whether the project is on schedule and can be executed properly.

**BUDGET PERIOD 2: CONSTRUCTION PHASE** - The Construction Phase will start in January of 2017 and will last until just before the competition in October of 2017. It will consist of construction of the house, construction administration phase, assembly/testing/transport, reassembly and disassembly after the competition. The annual go/no-go decision point will be evaluated at the start of this performance period.

**Task 4.1:** Health & Safety Plan

**Task Summary:** The Health & Safety Plan will be completed by February of 2017 as part of the deliverables required by the DOE. OSHA certification will be received by all construction participants by January of 2017.

**Task 4.2:** Construction

**Task Summary:** Construction will begin in February of 2017 and will last until deconstruction and permanent installation after the competition. This task entails the fully executed construction of the final design through a balanced collaboration between student workers and construction professionals. A construction course will be offered through the School of Architecture to provide any extra help during this phase.

**Task 4.3:** Final Deliverables

**Task Summary:** The Jury Narratives, Audiovisual Presentation, and Project Summary will be completed during this phase by the date required by the DOE.

**Milestone 4.1:** Completion of Final Scale Model

**Milestone 4.2:** Completion and Final Review of 100% Construction Documents, Project Manual, BIM Model

**Milestone 4.3:** Health & Safety Plan

**Milestone 4.4:** Submittals / Bidding

**Milestone 4.5:** Inspection

**Budget Period 2 Go/No-Go Decision Point:** The project team recognizes a Go/No-Go decision point at the start of the 2<sup>nd</sup> budget period. At this point, the funding review must find that 100% of the fundraising goal is met before construction is started. Construction documents will have a final review by professionals and will be evaluated for technical and financial feasibility. Through a careful decision analysis, UNLV will determine if the project will be able to be completed within the proposed project schedule.

**BUDGET PERIOD 3: COMPETITION PHASE** – This phase will start after construction and testing is completed, and the house is ready to be transported to the competition site in October of 2017. The phase will consist of disassembly for transport, assembly, operation and testing at the competition site, and disassembly after the competition.

**Milestone 5.1:** Complete competition setup

**Milestone 5.2:** Place house on permanent site

**Milestone 5.3:** Final Report

## **D. PROJECT MANAGEMENT AND REPORTING**

### **ORGANIZATION**

Project management will be a collaborative effort between student leaders and faculty advisors working under the Principal Investigator. The Principal Investigator, with consultation from Co-Project Investigators, will make all final executive decisions regarding the project. All student team members will report to student leaders, who will report to the Project Manager.

In response to the university's two-year effort towards the 2017 Solar Decathlon, UNLV will dedicate resources to hire one full-time staff member that will directly interface with the team and serve as a project manager for the UNLV's entry in the competition, and will also reassign an administrative assistant to support the project manager with contract and purchasing documents.

Proper schedule management will be integrated into the project management process to establish an accurate timeline for delivering the project. In order to avoid missing deadlines and key project deliverables, a comprehensive project schedule will identify all project stages, phases, and activities assigned to each team member.

## **GO/NO-GO DECISION POINTS**

UNLV's two-year plan and commitment to the competition recognizes one annual Go/No-Go decision point per performance period. The Go/No-Go decision points will be evaluated and decided upon by a committee that consists of members of advisory board, which includes the Principal Investigator, Project Manager, and UNLV Administration. Using a Go/No-Go decision checklist, the team will identify any serious gaps and deficiencies in the project and address them before moving further. The decision checklist will analyze the current metrics of the project relating to cost, constructability, and current performance to make an accurate decision.

## **CONFLICT RESOLUTION**

Team Las Vegas acknowledges that conflicts will arise during the design and construction of any project, and has a thorough understanding of the need for a clear and concise process that anticipates issues and provides clear resolution when necessary. The project structure provides a delivery system where design and construction are contracted as a single entity that will design, engineer, procure and execute construction. Within this structure, Team Las Vegas will utilize decision matrices and expertise of design-build professionals in the community to mediate issues and ensure issues are resolved in a timely and fair manner.

Team Las Vegas has identified three ways to combat any conflicts over the next two years:

- To reduce the number of conflicts, open dialogue and communication between all participants is crucial. Key to this is a successful and strong leadership team. The project manager and all team leaders have shown strong communication, leadership, and technical skills and will encourage discourse as a means to early and successful conflict resolution.
- While first relying on strong leadership in all five teams to meet the demands of Design-Build schedules and the rigorous requirements of the Solar Decathlon Competition, Team Las Vegas will utilize the architectural design concept as a basis for directing decisions and driving resolutions.
- Finally, the advisory committee set up to consult for the project will act as an arbitration board when necessary, as would be done on traditional Design-Build projects. The UNLV Advisory Committee consists of representatives from UNLV School of Architecture, Howard R. Hughes College of Engineering, and UNLV'S Center for Energy Research, and Las Vegas engineering and architecture firms.

Milestone Summary Table							
<b>Recipient Name:</b>		Board of Regents on behalf of the Nevada System of Higher Education (NSHE), University of Nevada, Las Vegas					
<b>Project Title:</b>		Team Las Vegas Solar Decathlon 2017 control number: 1398-1513					
Task Number	Task or Subtask (if applicable) Title	Milestone Type (Milestone or Go/No-Go Decision Point)	Milestone Number* (Go/No-Go Decision Point Number)	Milestone Description (Go/No-Go Decision Criteria)	Milestone Verification Process (What, How, Who, Where)	Anticipated Date (Months from Start of the Project)	Anticipated Quarter (Quarters from Start of the Project)
1.0	Schematic Design						
1.1	Design Progress	Milestone	1.1	Detailed Construction Cost Estimate	Work with the Construction Management Department and develop quantity takeoffs, review budget, and estimate total construction cost	4	2
1.1	Design Progress	Milestone	1.2	Completion of all structural, mechanical, and energy calculations.	Work with civil, mechanical, and electrical engineers to derive all calculations necessary for the project	4	2
2.0	Design Development						
2.0	Design Progress	Milestone	2.1	Constructability Review	Review current design with project team and local professionals to identify major design flaws and assess project feasibility	6	2
2.0	Design Progress	Milestone	2.2	Identify the final location of the proposed project	Work with local medical professionals to identify best location for completed house to continue research	6	2
3.0	Construction Documentation						
3.0	CD's	Milestone	3.1	Quality Control Review	Conduct a thorough quality control inspection of construction documents and BIM model	10	4
3.0	CD's	Milestone	3.2	95% Construction Documentation	Conduct a thorough review of 95% construction document set	12	4
		Go/No-Go	Go/No-Go #1	Analyze current design,	Through an advisory board,	6	2

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		Decision Point		feasibility, and status of financial resources and fundraising.	UNLV and project team will assess current status of project and its continuation.		
4.0	Construction						
5.1	Outdoor Testing	Milestone	4.1	Final Scale Model	Complete scale model to conclude design and inform construction	13	5
5.2	Deliverables	Milestone	4.2	100% CDs, Project Manual, and BIM Model	Complete deliverables and submit through EERE-Exchange	13	5
5.2	Pass lifetime Test	Milestone	4.3	Health & Safety Plan	Complete plan and get construction participants OSHA certified before start of construction	13	5
5.3	Initial Abrasion Test	Milestone	4.4	Submittals / Bidding	Submit necessary documents for approval, complete shop drawings identify contractors	13	5
5.3	Pass Abrasion Test	Milestone	4.5	Inspection	Complete all inspections	20	7
5.0	Competition						
5.1	Outdoor Testing	Milestone	5.1	Complete setup at competition site	Transport building, assemble at competition site and complete competition testing	21	7
5.2	Initial Lifetime Testing	Milestone	5.2	Place home at final location	Haul building back to Las Vegas, place at permanent site	23	8
5.2	Pass lifetime Test	Milestone	5.3	Final Report	Report will be uploaded to EERE-Exchange	23	8



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		Go/No-Go Decision Point	Go/No-Go #2	Analyze available funding and fundraising strategies to assess successful completion of project.	Through an advisory board, UNLV and project team will assess current status of project and its continuation.	12	4