



**Sustainable Structure
Doghouse Edition
Rules**

Table of Contents

Section 1: Mission and Summary	3
Section 2: Problem Statement	4
Section 3: Ethics	5
Section 4: Eligibility	5
4.1. Levels of Competition	5
4.2. Conference Competitions	5
4.3. Required Conduct	5
Section 5: Safety	6
Section 6: Scoring	6
6.1. Recording Data and Submitting Scores.....	6
6.2. Categories of Competition.....	6
6.3. Product	6
6.3.1. Aesthetics	6
6.3.2. Construction Speed.....	7
6.3.3. Lightness	7
6.3.4. Structural Integrity.....	7
6.3.5. Cost	7
6.4. Technical Paper.....	7
6.5. Presentation and Interview	8
6.5.1. Overall Performance.....	8
6.5.1.1. Cost	8
6.5.2. Technical Paper.....	8
6.5.3. Presentation and Interview	8
Section 7: Recommended Competition Schedule	8
Section 8: Definitions	9
Section 9: Technical Paper	10
Section 10: Presentation/Interview	11
Section 11: Material and Component Specifications	11
11.1. Material	11
11.2. Tools	11
11.3. Components	12

11.4.	Structure	12
11.4.1.	Panels.....	12
11.4.2.	Members.....	12
11.4.3.	Loose Bolts.....	12
11.4.4.	Loose Nuts	12
Section 12: Structural Specifications		12
12.1.	Functionality	13
12.2.	Usability	13
Section 13: Construction Regulations.....		13
13.1.	Construction Speed	13
13.2.	Pre-Construction Procedures.....	13
13.3.	Safe Construction Practices	14
13.4.	Accidents	14
13.5.	Construction Site	15
13.6.	Inspection	15
Section 14: Load Testing		15
Section 15: Host Supplied Equipment		15
Section 16: Judging.....		16

Section 1: Mission and Summary

The Sustainable Solutions Competition challenges teams of students to design and construct structures based on real world issues facing the civil engineering community. Through this intercollegiate competition, students gain awareness and valuable experience important issues in engineering practice which will supplement their classroom education, such as structural and sustainable design, aesthetics, construction costs, safety, teamwork, leadership, and project management.

Successful teams in this competition must emulate the following core values which are at the heart of the mission of the American Society of Civil Engineers (ASCE) to develop leaders in civil engineering and to serve the public good:

- **Sustainability.** ASCE and its members are dedicated to ensuring a sustainable future in which civil engineers maintain and improve the quality of life, without degrading the quantity, quality, or availability of natural, economic and social resources. In this lens, ASCE has adopted a [Sustainability Roadmap](#) to transform the profession and increase the societal, environmental, and economic value of engineering projects. The Sustainability Roadmap has four key priorities:
 - Priority 1: Sustainable Project Development – Do the Right Project
 - Priority 2: Standards and Protocols – Do the Project Right
 - Priority 3: Expand Technical Capacity
 - Priority 4: Communicate and Advocate

Students are expected to learn and demonstrate these priorities in the development of their project for the competition.

- **Teamwork.** The Sustainable Solutions Competition provides opportunities for teamwork, leadership and networking. It is intended to be an all-inclusive competition, involving all eligible members of the student chapter. Students gain maximum benefit by developing and managing the project as a team. *Students should fabricate and develop all elements of the project.*
- **Safety.** Safety is the priority at all competitions. Students must complete all work associated with the Sustainable Solutions Competition with safety in mind. This includes work at their school laboratories, or other locations where fabrication takes place, and competition sites. Risky procedures are prohibited. If the structure cannot compete safely in all aspects of the competition, then it will be withdrawn from competition.
- **Ethics.** This competition is to be conducted in the highest ethical standard. Students are referred to ASCE's Code of Ethics, which sets the standards of professional practice by all members of the Society.

The rules are intended to simulate a design build request for proposal which responds to a real-world issue. The sustainability goals for the competition are an integral part of these rules. Each section in these rules is intended to guide the student teams in the development of their project. Students and

teams should read these rules thoroughly and seek clarifications as necessary. The rules are intended to enable the student teams to be innovative in the development of their sustainable structure. They are intended to be prescriptive but may require interpretation.

This document, also available on the ASCE Student Competitions page of the ASCE Website, defines the 2019 Sustainable Solutions Competition and the rules for both the conference and national levels. Requests for information (RFI) should be sent to Student@ASCE.Org. Clarifications will be posted at <https://collaborate.asce.org/communities/community-home?CommunityKey=a1ae0c20-35cc-483e-b22b-c2b51c4d3458> on Friday of each week starting October 12th, 2018 until February 1st, 2019. Each Friday, clarification posts will address the questions received from the previous Friday through Thursday at 11:59PM.

Section 2: Problem Statement

Each year, thousands of people are displaced by natural and man-made disasters around the world. Along with the human toll from these catastrophes, countless pets and stray animals also lose their homes and must struggle to survive in often dangerous post disaster conditions. Organizations tasked with rescuing these animals provide medical attention, foster care, and transportation to help them recover and find a home. However, in the critical days following a disaster or emergency, animals often need temporary shelters to survive. For example, after Hurricane Harvey in 2017, thousands of animals were displaced, rescued, and eventually placed in shelters throughout the United States and the Caribbean.

Since Hurricane Katrina struck New Orleans in 2005, federal and state laws have been passed to include provisions for the evacuation, rescue and recovery, shelters, and tracking of animals as part of disaster plans. With this, and the need to enhance the speed and efficiency of search and rescue operations post emergency, animals require sustainable and temporary shelters to survive such emergencies.

The 2019 Sustainable Solutions Competition challenges student teams to design and build a temporary shelter which can house a displaced dog during the aftermath of a disaster or emergency. Disasters and emergencies can include earthquakes, hurricanes, wild fires, or other situations which displays populations. Along with satisfying programmatic and structural design criteria, the building must employ sustainable design and construction practices. Successful teams must demonstrate creativity and innovation to achieve their objectives, exemplifying the strategic goals of ASCE. Completed shelters will be donated to local animal rescue groups to make a lasting impact on the welfare of dogs where teams live, work, and study.

For the purposes of this competition, ASCE is seeking design-build proposals for the development of a sustainable structure which will satisfy the need to provide temporary shelter to a dog displaced by a natural disaster or other emergency. You are considered to be a design-build team responding to a Request for Proposals (RFP) to develop this sustainable structure. Successful proposals will be evaluated through three deliverables: a technical paper, presentation/interview, and the construction of a full-size version of the shelter. Successful structures must consider ease of assembly, commitment to sustainability, economy, and aesthetics. Proposers will be evaluated using a best value method using cost and technical evaluations of their work.

For the design of the structure, assume the displaced dog is large sized (60-75 lbs.) and will be malnourished, wet, and cold. It is expected the displaced dog will be staying in this structure for up to three days. The shelter must be designed to withstand post-disaster impacts.

Your deliverables must demonstrate how the structure incorporates sustainable engineering components, including an emphasis on how ASCE's Sustainability Roadmap influenced the development and delivery of the final product. Judging will be in accordance with the application of sustainable materials, as well as construction and fabrication methods. The teams will be judged on the innovative application of sustainable methods of fabrication and construction as well as the percentage of sustainable materials incorporated into the structure.

Section 3: Ethics

According to the ASCE Code of Ethics, Canon 5, "Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others".

In the context of this contest, "unfair competition" may include conduct such as the following:

- Failure to provide proper credit for past teams, plagiarism, or any other false statements concerning the source of material used in the contest;
- Taking other people's designs, artwork, or other creative content without permission (for an overview of Intellectual Property Laws, including Trademark and Copyright, visit <https://fairuse.stanford.edu/overview/introduction/intellectual-property-laws/>); and
- Any false or malicious statements about other teams, members, or others involved in the contest.

Section 4: Eligibility

A team shall consist only of undergraduate and graduate students in good standing with their ASCE student chapter and be National ASCE student members during all or part of the fall through spring of the current competition academic year.

4.1. Levels of Competition

There are two levels of competition: ASCE annual student conferences and a national conference. The national conference may be held in conjunction with other ASCE events.

4.2. Conference Competitions

Only one structure per college or university may compete in the ASCE Sustainable Solutions Competition. A college or university may compete in only one ASCE student conference.

4.3. Required Conduct

All participants shall act professionally and respectfully at all times. Failure to act appropriately can result in sanctions, disqualification, and loss of invitations to future competitions or national competitions. The inappropriate use of language, alcohol, materials, uncooperativeness, or general unprofessional or unethical behavior will not be tolerated.

ASCE student chapters hosting conferences may invite guest teams, which are teams from colleges or universities which do not have ASCE student chapters or from official ASCE student chapters assigned to

different conferences. Conference assignments are listed in the ASCE Official Register at www.asce.org/offreg, and conference host chapters are listed at www.asce.org/studentconferences.

Winning teams from the student conferences may be invited to a national event to be determined.

The student conference host shall promptly submit the completed official scoring spreadsheet for a conference competition to Student@ASCE.Org. Teams will not be invited to national events until this spreadsheet is received and eligibility is confirmed.

Section 5: Safety

Safety is the highest priority and risk of personal injury will not be tolerated. Judges are empowered to stop and prohibit any activity which is deemed to be hazardous.

Students should practice safe fabrication procedures and to seek appropriate instruction and supervision.

Section 6: Scoring

6.1. Recording Data and Submitting Scores

Scoring data shall be recorded for each team which competes. Official judging forms shall be used. The information from the judge's data sheets are entered into a spreadsheet which tabulates the official results of the competition.

Judges data forms shall be retained by the host student chapter for two weeks after the competition.

6.2. Categories of Competition

The competition will be judged with three basic best value categories – Product, Technical Paper, Presentation and Interview. These three categories will include individual elements as follows:

6.3. Product

6.3.1. Aesthetics

The complete structure will be judged for aesthetics. The structure shall be presented as it will be constructed in competition.

Structures will be judged on balance, elegance, proportion, and finish. Students are encouraged to add a whimsical element to their design.

Permanent identification of the structure consisting of the college or university name as listed on the ASCE student web site, www.asce.org/find-a-chapter. The name shall be applied with a placard, decals, or paint. The letters shall be a minimum of 1 inch high (note: decals with a field of 1 inch high with letters within this field may be a violation of this requirement). **A penalty of**

50 pounds will be added to the overall weight of the structure with a violation of this requirement.

The display shall consist of a poster describing development and design. This poster shall present the following:

Identification of the college or university, which shall be the same as the identification on the structure.

- Description of the inspiration and development of the design.
- Description of sustainable methods used in the development and construction of the structure.
- Scaled diagram of the structure.
- Structural considerations.
- The poster shall be:
 - Flat with dimensions of 24" x 36"
 - Single sided
 - Not have attached pages which must be lifted or turned
 - Written in English

Additional information which provides insight into the development and design may be included. Sponsors may be recognized on a separate poster. If English is not the dominant language where the competition is conducted an optional translation poster may be provided.

6.3.2. Construction Speed

The structure with the lowest construction time will win in this category. This is the complete tabulation of person hours necessary for construction of the structure in addition to penalties.

6.3.3. Lightness

The structure with the least total weight will win this category. This is the complete tabulation of structure weight as well as any penalties.

6.3.4. Structural Integrity

The structure will be tested for structural integrity. This is a pass/fail test.

6.3.5. Cost

The structure with the lowest construction cost will win in this category. The construction cost is calculated as:

Construction Cost = Total time (minutes) x number of builders (persons) x 60,000 (\$/person-minute) + penalties

Material Cost = (Total Weight + Penalties) x \$5,000/pound

6.4. Technical Paper

A technical paper which describes the development, design, sustainable aspects of the structure, and overall approach to management is required as part of this competition. This paper is an opportunity for the team to demonstrate the thought process used for the development of their

structure, including; design, sustainable elements and construction methods, and accelerated modular construction. Teams are encouraged to use the technical paper to completely discuss any aspects of the design which address the problem statement and goals of the competition.

6.5.Presentation and Interview

A presentation and interview on the approach and theory behind the development of the structure shall be delivered to a panel of professionals. This will be followed by questions from the panel. Teams are encouraged to use presentation technology as part of this presentation.

6.5.1.Overall Performance

The structure with the overall highest score will win in this category. This score will be a tabulation of the best value ranking process. These three categories will be evaluated as follows:

6.5.1.1. Cost

Cost scoring will be based on the calculation of the subject team's cost as compared to the lowest cost of all teams. The maximum score is 100 points.

The following equation will be used to determine the cost scoring:

$$\frac{\text{Lowest Competitive Cost}}{\text{Subject Team's Cost}} \times 100$$

6.5.2.Technical Paper

This will be a raw score based on evaluation by the judges.

6.5.3.Presentation and Interview

This will be a raw score based on evaluation by the judges.

Section 7: Recommended Competition Schedule

The recommended order of competition is as follows:

- The official scoring spreadsheet is downloaded from <https://collaborate.asce.org/communities/community-home?CommunityKey=a1ae0c20-35cc-483e-b22b-c2b51c4d3458>.
- Order of competition for each stage; oral presentation and construction to be determined.
- Structures are erected for display judging. This should be held at the same time other display judging is occurring.
- Structures are disassembled.
- A captains meeting is held to clarify construction logistics and rules.
- A judges meeting is held to clarify rules and procedures.
- Structure components are staged for construction.
- Timed construction.
- Technical inspection. Structures are inspected in their as-built condition.
- Testing for structural integrity.

- Data entry.
- Rankings are determined
- Host student chapter submits results to ASCE Student Services.
- Host student chapter keeps records for two weeks after the competition.

Section 8: Definitions

Accident – occurs when a builder drops an item or steps on or over a boundary. Accidents add penalty time to the construction of the structure.

Builder - undergraduate or graduate student who is part of the team constructing the structure.

Captain – undergraduate or graduate student who is the responsible party throughout the competition.

Constructed segment – the segment of the structure placed within the footing, in essentially its final position, which consists of panels, members, and nuts and bolts.

Footing – the location of where the structure is to be placed and constructed.

Ground – the floor inside the site boundary, including footings and staging yards.

Personal Protective Equipment – equipment worn by the builders includes a hard hat, meeting ANSI standard Z89.1 and protective eyewear or safety goggles meeting ANSI standard Z87.1. Personal Protective Equipment is considered an article of clothing and is provided by the team. Personal Protective Equipment is worn at all times during timed construction and load testing of the structure.

Pouch – an optional article of clothing used to carry nuts, bolts, and tools. This definition encompasses tool belts, magnets, lanyards, and other accessories worn by the builders and having the same function.

Site Boundary – the area which includes staging yards and footings which constitutes the area where the team construct the structure.

Staging Yard – marked areas which are part of the site where panels, members, loose nuts, loose bolts, and tools are located prior to the start of timed competition. This is also where builders begin and end timed competition.

Tool – a device used to construct the structure but is not part of the completed structure. A team provides its own tools.

Section 9: Technical Paper

The technical paper shall include, at a minimum, a discussion of the following; design (including calculations), design drawings, sustainable material selection, sustainable fabrication methods, technical considerations, project management (including organization chart and schedule), quality control, budget, and team considerations. The technical paper will be used to determine the overall responsiveness to the design problem and must elaborate especially on how the final project has been delivered in accordance with ASCE's sustainability roadmap. The paper will be evaluated on the following items:

- Application of sustainable fabrication and construction practices
- Design approach
- Application of sustainable and recyclable materials
- Project management
- Team inclusiveness
- Responsiveness to the design problem
- Organization and written product
- Alignment with ASCE's Sustainability Roadmap Priorities

Teams are encouraged to use the technical paper to demonstrate their approach to the problem statement and how each facet of the competition was addressed. Teams are encouraged to use figures, tables, photographs, graphs, project schedule, and other graphical elements to demonstrate the approach to the problem. Also, CADD drawings are required to be included in the technical paper.

The body and appendices of the technical paper shall be presented on white 8 ½ in. by 11 in. pages in portrait orientation. CADD Drawings and schedules can be shown in 11 in. by 17 in. if necessary. No background images or watermarks are permitted behind the text in the body or appendices of the paper. Appendix (if used) cover sheets are permitted but are not required. No blank pages shall be inserted into the report. All pages of the report, including the organization chart, project schedule, design calculations, design drawing(s), and appendices shall maintain a minimum of ½ in. margins on all sides.

Body text shall be in English and use 12-point, normal width character spacing, Times New Roman or Arial font, and be at least single spaced. Section headings and subheadings may be of any legible font type or size. The hard copy of the report shall consist of a single-sided report cover, single-sided pages for the body and appendices (if used), and a back cover.

Body pages, except for the Table of Contents and Executive Summary, shall be numbered beginning with the number one (1). The Table of Contents and Executive Summary shall be numbered with lowercase Roman numerals i and ii, respectively. Pages located in the appendices shall be numbered in such a way that the appendix and page number are clearly listed (e.g., A-1, A-2, B-1, B-2; A1, A2, B1, B2; etc.) as appropriate.

Captions for figures and tables shall be used and shall be no less than 10-point, normal width, and any legible font type. Items such as page numbers, logos, images/designs, section headings, etc. may be incorporated into the header and footer of the pages and are not subject to the font requirements of

the body text. The header and footer may be located within the margin itself (i.e., outside of the body text limits).

Headers and footers are not required on the Project Schedule or design drawings. Material on the report cover, appendix cover pages (if used), and Table of Contents may not be directly referred to in the body pages.

Section 10: Presentation/Interview

A presentation of up to seven (7) minutes shall be required for each participating school. All presentations shall be conducted in a professional manner (defined as a presentation that a professional engineer would give to a prospective client). Oral presentations shall be presented in English. Teams should use PowerPoint or some other presentation software in the development of their presentation. Presentation order shall be randomly selected before the competition begins and shall be provided no later than the time of on-site registration. The oral presentations, including the question and answer period, shall be open to the public for viewing. An additional ten (10) minute period shall be permitted for judges' questions immediately following the oral presentation. Questions are not to be permitted by members of the audience. The time required to set up equipment shall not exceed four (4) additional minutes for each school and the time required to take down shall not exceed four (4) minutes for each school.

As part of the presentation, teams are required to provide ninety (90) second video which provides additional insight into the development of the project. Students are encouraged to use video from the fabrication of the structure elements as part of this video. Students should consider a smooth transition between any PowerPoint (or other presentation software) and the video to maximize their use of the allotted time. All presentations will be stopped at the seven-minute point, regardless of where the team stands in the presentation. Presentations which are cut off will be judged as incomplete.

Section 11: Material and Component Specifications

11.1. Material

The use of sustainable materials shall be maximized in the design, fabrication, and construction of the structure. Sustainable materials are defined as those products which provide environmental, social, and economic benefits while protecting public health and the environment over the whole life cycle, from the extraction of raw materials until final disposal (https://esa.un.org/marrakechprocess/pdf/Issues_Sustainable_Products.pdf).

11.2. Tools

Power tools are not allowed. Individual pieces making up a tool shall not weight more than fifteen pounds and shall fit into a box measuring 3'-6"x6"x4". Tools which do not meet these specifications will not be allowed for construction.

11.3. Components

The teams shall consider the problem statement when selecting components of the structure. Components which enforce the ease of mobility of the structure are important considerations of the overall design.

11.4. Structure

The structure shall consist of panels, members, loose nuts and loose bolts. Screws are allowed in the construction of a panel but not allowed to be used during timed construction. Violations of subsection **Error! Reference source not found.** shall result in penalties added to the weight of the structure. These components will be checked by judges prior to the start of timed construction. **The penalty shall be 20 pounds for any non-compliant component.**

11.4.1. Panels

A panel is a rigid component of the finished structure. Panels are fabricated using screws, nuts, bolts, timber fasteners, or other sustainable products. A panel is fabricated prior to competition. A panel shall retain its shape, dimensions, and rigidity during timed construction and testing.

The maximum dimension of panels shall be 3' wide x 5' tall x 6" thick.

11.4.2. Members

A member is a rigid component of the finished structure. Members are fabricated using screws, nuts, bolts, timber fasteners, or other sustainable products. A member shall retain its shape, dimensions, and rigidity during timed construction and testing.

A member shall fit into a right rectangular prism of dimensions of 3'-6" x 6" x 4".

11.4.3. Loose Bolts

Loose bolts shall not have parts which flex or move. They shall be commercially available and not mechanically altered or modified in any way. Loose bolts may be painted.

The nominal length of loose bolts shall not exceed four and one half (4 ½) inches measured from the bottom of the head to the end. Loose bolts shall have threads that extend around the full circumference.

11.4.4. Loose Nuts

Nuts shall have a hexagonal shape and not have parts which flex or move. Nuts shall be commercially available and not be mechanically altered or modified in any way. Nuts may be painted.

Nuts shall have internal threads which extend for the full circumference and thickness.

Section 12: Structural Specifications

Conformance with these specifications will be checked with the structure in its as-built condition after termination of timed construction and before the structure is moved. The structure shall not be

modified or distorted from its as-built condition to conform with these specifications. Judges may touch the structure but shall not alter it in any way.

12.1. Functionality

If any specification in this section is violated, the structure will not be eligible for awards in any category.

The structure shall not be anchored or tied to the floor.

Teams shall accept, and structures shall accommodate, conditions at the competition site.

12.2. Usability

Specifications in this section are illustrated in the Site and Structure Diagram.

A weight penalty will be assessed for violation of each specification in this section which is violated. If there are multiple violations of the same specification, the structure will be penalized with the largest violation.

- 20 pounds for a dimensional violation not exceeding $\frac{1}{4}$ " ,
- 100 pounds for a violation greater than $\frac{1}{4}$ " , but not exceeding 1,
- 200 pounds for a violation greater than 1" , but not exceeding 2" , and
- If a violation exceeds 2" , the structure will not be ranked for awards in any category.

The structure shall include a floor and only rest on the ground within the defined footing.

The structure shall have a height of a minimum of 4 1/2 feet and a maximum 5 1/2 feet as measured from the ground.

The structure shall utilize an opening in one wall which is 15" x 24"

The structure shall utilize a roof style which provides drainage. The structure shall be designed to accommodate intense rain.

The structure shall have an eave no greater than six inches, as measured from the wall of the structure, at the rear and sides of the structure. The structure eaves do not have to fit inside the designated footing.

Section 13: Construction Regulations

13.1. Construction Speed

The cost of the construction is a factor in the overall scoring of the structure. However, there is a thirty-minute limit on construction time. A structure exceeding this time will be withdrawn from competition. Judges will notify the teams at the twenty-five-minute mark and again at the twenty-nine-minute mark.

13.2. Pre-Construction Procedures

Timed construction will not commence if any provision of this sub-section is violated.

Only builders and judges are allowed within the site boundary. Other team members, including; coaches, faculty, advisors, and spectators shall be in designated areas away from the construction site that ensures they are not at risk and cannot interfere with the competition.

The construction team shall have no more than four builders.

13.3. Safe Construction Practices

If any rule in this sub-section is violated during timed construction, the judge will stop the clock and explain the violation. Students will be given the opportunity to correct the problem. Before the clock is restarted, builders, tools, panels, members, and loose nuts and bolts are returned to the location they occupied prior to the violation. If the structure cannot be constructed safely then it will be removed from competition.

Builders, judges, host personnel, and spectators shall not be exposed to risk of personal injury at any time during construction. Only builders and judges are allowed in the construction site.

Personal Protective Equipment shall be worn in a proper manner, at all times within the construction site.

- Pouches, or other article of clothing, shall not be removed from a builder's person or held in the builder's hand(s).
- Nuts, bolts, or tools shall not be held in the mouths of builders.
- Throwing anything is prohibited.
- A builder, outside the staging yard, shall not simultaneously support or touch, directly or with tools, more than one panel or member, or the constructed segment.
- A builder must not use the structure, or a constructed segment, to support his or her weight.
- A builder shall not depend on another builder for support or balance.
- Construction of the structure begins by creating a constructed segment within the defined footing.
- At no time shall a builder or builders support the entire weight of a constructed segment.
- No part of the constructed segment shall extend beyond the site boundary at any time.

13.4. Accidents

The clock is not stopped during an accident. A penalty is assessed for each separate accident. If an accident is continuous then it will result in multiple occurrences.

Construction cannot depend on deliberately committing an accident. If work cannot continue without creating an accident, then the structure will be removed from competition.

Builders do not create an accident by retrieving a dropped item.

Penalty is 15 seconds for each item during each occurrence.

A panel, member, constructed portion, tool, loose nut, loose bolt, or personal protective equipment touches the ground outside the staging yard, or the floor outside the site boundary.

A panel, member, tool, loose nut, loose bolt, constructed segment, or personal protective equipment touched the ground outside the staging yard or the floor outside the site boundary.

13.5. Construction Site

The construction site is shown in the Site and Structure Diagram. The construction site consists of a staging yard for materials and tools used to construct the structure and a footing location where the structure will be located.

Only tools and structural components are permitted within the staging yard.

13.6. Inspection

Before construction begins, only builders, panels, members, loose nuts, loose bolts, and tools are allowed in the staging yard. Each panel, member, loose nut, loose bolt, and tool must be touching the ground and cannot be in contact with each other. The exception is loose nuts and bolts can be touching prior to timed construction. Builders are wearing tool belts and personal protective equipment. There shall be nothing in the construction site which is not in the staging yard.

Judges inspect panels, members, loose nuts, loose bolts, and tools as they are placed within the staging yard. Tools which do not conform to subsection **Error! Reference source not found.** will be removed from the staging yard. Additional tools, panels, members, loose nuts, or loose bolts shall not be added to the staging yard after inspection is complete.

Section 14: Load Testing

The structure will be tested by placing a 200-pound load using sandbags. This test will consist of placing the load at a location centered on the roof. The host school will provide sandbags for the loading process. **This is a pass/fail test.**

Section 15: Host Supplied Equipment

The host school shall supply the following for the competition. All teams are required to accommodate local conditions and equipment.

15.1. Scales

Four scales should be supplied to measure the total weight of the structure. These scales will be placed on the ground with the structure set upon them for weighing.

15.2. Load

Sandbags totaling 200 pounds in four 50-pound bags shall be provided for testing the structural integrity of the structure.

15.3. Box

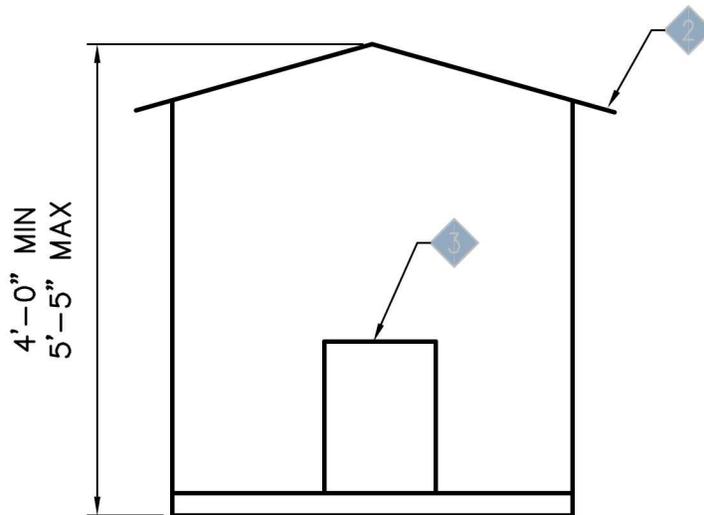
A box with inner dimensions of 3'-6" x 6" x 4" should be supplied to ensure that members and tools meet the dimensional requirements specified in sections XX. Wood or other non-deforming material is recommended.

Section 16: Judging

The host student chapter will have a minimum of three judges to review technical papers and for aesthetics judging. In addition, several judges will be needed to judge the construction of the structure. The judging panel should include educators and professionals and at least one member well versed in sustainability. Judges have authority over conduct of the competition as well as interpretation of the rules. The host chapter will ensure all judges are fully informed of the rules and procedures and are fully equipped to complete their tasks.



SITE PLAN
SCALE: NTS



STRUCTURE DETAIL
SCALE: NTS

NOTES:

1. Drawings are not to scale.
2. Eave has a maximum overhang of 6" at the sides and rear of structure.
3. Opening at the front of structure must measure 15" wide x 24" tall.

REV	BY	DATE	APP	REC NO.	EXPIRES	SEAL HOLDER	2018 RULES DESCRIPTION

DESIGNED BY D. SEPULVEDA
 DRAWN BY D. SEPULVEDA
 CHECKED BY RULES COMM.
 CHANGE S. HAMILTON
 DATE 10-05-18

SUSTAINABLE STRUCTURES
COMPETITION

ASCE SUBMITTED _____
 AMERICAN SOCIETY OF CIVIL ENGINEERS APPROVED _____

**SITE AND
STRUCTURE
DIAGRAM**

CONTRACT NUMBER _____
 DRAWING NO. DWG 1
 SCALE NTS
 SHEET NO. _____