Lakeridge Middle School, Oregon

SKANSKA

ASC Student Competition

Sparks, NV

February 9-10, 2023

Open Competition

Sustainable Building

Welcome to the 2023 ASC Open Competition Sustainable Building Problem Statement

We are excited that you've chosen to compete in this problem category. Skanska continues to be an industry leader in sustainable construction. We strive to create projects that have minimal impact on the environment throughout their construction and lifecycle. Sustainable construction continues to expand and encompasses a wide reach of topics including reducing waste, resiliency, carbon neutral practices, and occupant well-being. In participating in this problem statement, we hope that you will gain a better understanding and appreciation of the green building methods that the construction industry can employ in our day-to-day operations. More than that, we hope that you will look to implement these ideas into your careers and daily lives outside the workplace.

This year, we've organized the problem statement into three major categories – People, Planet, and Profit. We hope you enjoy this problem statement we have assembled for you.

E16 Bjørum Skaret, Norway

Sustainable Building Problem Statement Schedule

Thursday, February 09, 2023

6:30am	Introduction in Southern Pacific EF, and Issue RFP via Procore
2:00pm	Early Deliverable due via Procore
3:00pm	Emergency Action Plan Follow-Up Meeting
5:00pm	RFI Deadline for Proposals
9:00pm	Proposals due via Procore
9:00pm	Oral Presentation Order Assignment in Southern Pacific EF
9:30pm	Issue Oral Presentation Notice via Procore
11:00pm	RFI Deadline for Oral Presentations

Friday, February 10, 2023

6:00am	Presentation materials due via Procore
7:00am	Presentations start in Southern Pacific EF
5:00pm	Presentations End
6:00pm	Problem Statement Recap in Southern Pacific EF
7:00pm	Skanska Hospitality Event in Southern Pacific EF

Saturday, February 11, 2022

9:00am	Skanska Career Fair
12:15pm	Awards Ceremony

ASC Competition Rules

- Student teams must comply with ASC Competition Rules (revised 8/19/22).

- Once the kick-off meeting concludes, and until a team's oral presentation is completed, only the students identified as being team members shall be present in the team's room(s) or shall collaborate on the team's response to the problem statement. No additional person(s) may perform as a helper, runner, or assistant for any team for either the regional or open competitions. Teams will be disqualified if any team has more than 6 members participating in the process of creating a competition solution in any way. This includes food and supply runs! The use of cell phones to contact outside persons is not permitted except in an emergency or as deemed appropriate by the problem sponsor. Faculty advisor(s) may not interact with their teams once the competition has begun.

- Use of the internet is allowable and may be necessary for certain components of the problem.

- No phone calls or emails may be made to the Owner, Construction Manager, Architect, Civil, or Structural Engineer, or any other design consultants listed on the Drawings. Similarly, no components of the problem may be sent to others outside the team for assistance in completing the problem.

- A one-half (1/2) point deduction will be taken for each minute that the solution statement is turned in past the time that it is due. **Solution statements are due Thursday at 9:00pm PST via Submittals in Procore.** If internet issues arise, solutions can be submitted on a USB drive in the Southern Pacific EF room. The 9:00 pm deadline and point penalties listed above apply to USB submission as well. Other deliverable items, if applicable, will be due as specified.

- The Oral Presentation will be released by 9:30pm Thursday night. Presentation times will be determined Thursday evening. Presentation materials must be uploaded to Procore by 6:00am Friday morning. Skanska will provide the computer with all presentation materials for each team. No additional materials are allowed to be distributed or presented. Any additional equipment required for a presentation will be the responsibility of each team.

- Only registered participants accepted by ASC are allowed in a school's presentation room per ASC 2023 rules. Violation of this rule shall be cause for immediate disqualification from the competition.

- While the judges will endeavor to administer the problem with all fairness and appreciation for the team's perspectives, the decisions of the judges shall be final when deciding conflicts and scoring.

Request for Proposal Guidelines

Requests for Information:
RFIs will be asked and answered using the RFI tool in Procore. All RFIs submitted and answered will be viewable by the Skanska project team and all students participating in the sustainability competition.

Supplemental Information:
Some of the problems have additional supplemental information, reference materials, drawings, etc. They can be found in the Documents tool on Procore.

Supplemental Problems:
Supplemental Problems may be provided during the problem statement competition. Supplemental Problems may be additional information about a changing condition that needs to be incorporated into a team's final solution statement. A Supplemental Problem may also be requiring a response and/or solution to accompany the solution statement or may have an earlier deadline during the day. Student teams will need to make note of the conditions and requirements set forth in the individual supplemental problems issued and provide an appropriate response. Note: Supplemental Problems are not 'extra credit' and are accounted for in the total possible points related to their respective category.

Solution Submission Guidelines:
Solutions will be submitted as a submittal via Procore. Each team must create their own submittal via the instructions provided in the Documents section of Procore. All electronic submissions must be in the form of a PDF or other electronic format as stipulated in the problem statement. Other formats may be accepted on a case-by-case basis. Requests for an alternate format should be made before the RFI deadline.

Format of Submission:
In addition to the requirements for electronic submission noted above, the following proposal formats must be adhered to:

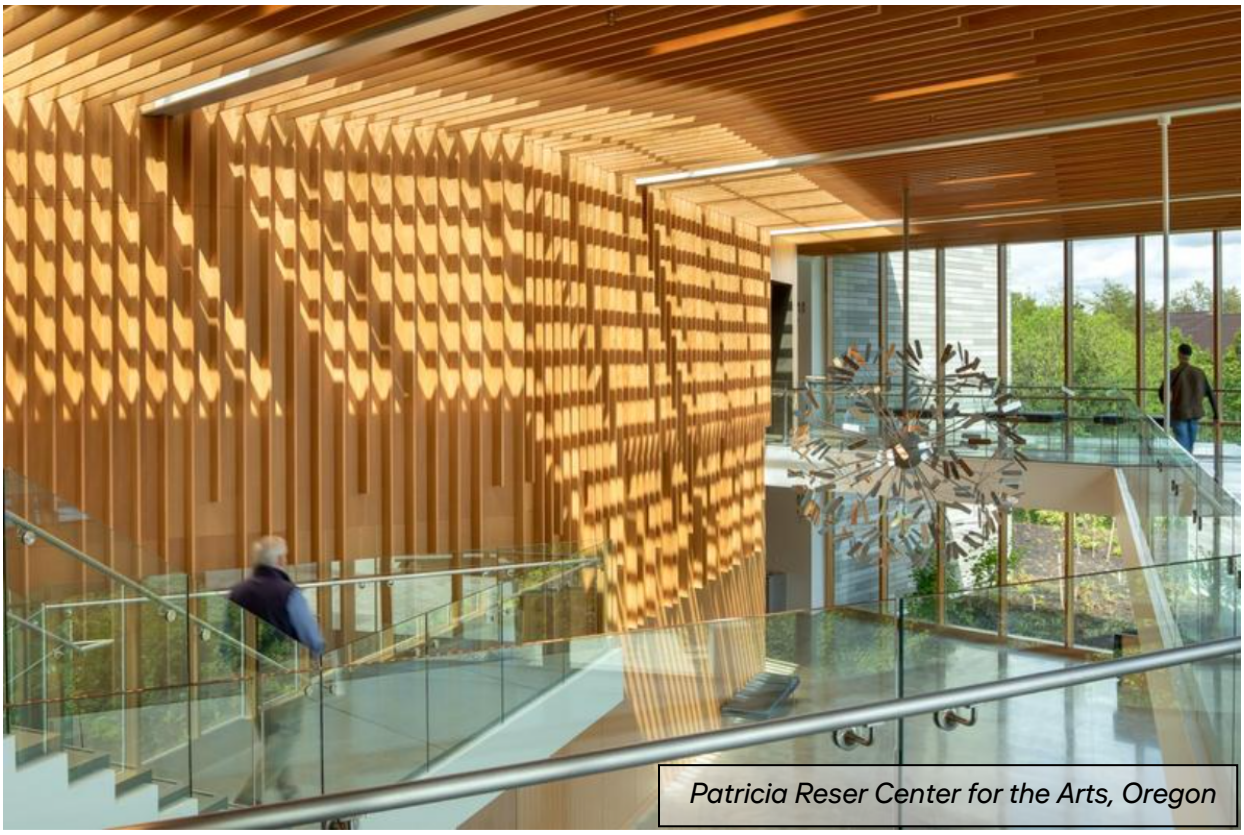
1. 11-point Arial font
2. 1-1/4" border around all documents, left justified
3. Maximum submission of 25 pages, including cover page, cover letter, schedules, or other documentation necessary to support your submission. All pages submitted will count unless specifically excluded in the written problem statement.

A two (2) point deduction from the overall team score will be assessed for each page over the page limit described above.

Scoring

Point Scales will be assigned to several elements of the written and oral problem statements. Awards will be provided to the three teams scoring the most overall points; 1st place, 2nd place, and 3rd place. Additionally, the judges may award a Judge's Selection award to a fourth team at their discretion.

Category	**Points Possible**
Prequalification Statement	5
Planet	34
People	33
Profit	33
Oral Presentation	20
Maximum Points Possible	125



Patricia Reser Center for the Arts, Oregon

Project Information

This year's problem statement focuses on two Skanska projects. More information about Lakeridge is provided below:

Lakeridge Middle School
Located in Lake Oswego, OR, Lakeridge Middle School (LMS) is 2 story 138,000SF new build that involves providing temp classrooms, build out of new school, demo of existing school, and right of way and site improvements. This project is performed for the Lake Oswego School District as part of a publicly funded bond measure to provide a higher capacity middle school for the district. The top three project goals for the new middle school include creating a learner centric environment, promoting equity, and delivering a highly sustainable building.

Lakeridge Middle School, Oregon

Project Information

This year's problem statement focuses on two Skanska projects. More information about L300 is provided below:

L300 Lynwood Link Extension
L300 is a light rail project north of Seattle from Montlake Terrace to Lynnwood, Washington. The project consists of 2 elevated stations, one in Montlake Terrace and one in Lynnwood and a 5-story, 1,670 space concrete garage structure along with nearly 4 miles of guideway and with two tracks. About half of the guideway is elevated and the other half is at grade. To the southwest of the Lynnwood station there is a wetland area called Scriber Creek. A focal point of this project is restoration efforts that include limiting project impact, wetland restoration, and habitat establishment.

L300 Lynwood Link Extension, Washington

Planet Portion

1. **Low-carbon concrete mix designs (6 points):** As cement production accounts for at least 8% of global carbon emissions, the Owner wants to be cognizant of concrete use and reduce Lakeridge Middle School's carbon footprint by making smart mix design choices. The Owner wants to focus on the courtyard portion as it interfaces with landscaping, which already incorporates optimized irrigation and planting details.

    a. How many CY of concrete paving type 1 are needed in Zone B of the courtyard? Perform a quantity takeoff and provide a total CY. Use the provided combined plan set.

    b. Per the structural notes, what is the f'c (psi) required for this paving?

    c. Compare the 4 mix designs in Procore Documents and determine the best one to pave the courtyard. Explain why and provide the carbon output (kg).

    d. Read the National Ready Mixed Concrete Association (NRMCA) article in Procore Documents, and briefly discuss how 3 of the 10 concrete carbon reduction methods can be applied to Lakeridge Middle School.

2. **L300 Scriber Creek Temporary Trestle Build-Out (9 points):** In order to build the final guideway over Scriber Creek, the construction team has determined that they will need to build a temporary means and methods trestle over the creek. The area includes many forested wetlands and wildlife habitat that will need to be considered during the construction of the Lynnwood Extension Project. Your team must come together and plan how this work will be executed with minimal impact on the surrounding environment. The Scriber Creek temporary trestle shop drawings are provided for reference in the Procore documents folder (Scriber Creek Temporary Trestle - Shop Drawings). Please complete the following deliverables:

    a. **Daily Hazard Analysis (integration with people category):** Skanska's Care for Life value represents our commitment to always working safely, while ensuring minimal impact to our environment. Each day, our goal is for employees to go home to their friends and family, uninjured. A Daily Hazard Analysis (DHA) is a tool used to identify hazards and put measures in place to mitigate these hazards. Prior to starting work, your team is required to complete a DHA for the pipe pile scope of work at Scriber Creek. Please use the provided DHA template (People & Planet Team – Scriber Creek – DHA Template). Items to consider:
        i. Environmental considerations – Please identify at least (3) environmental risks and mitigations.
        ii. People considerations - Please identify at least (3) safety requirements to mitigate risk when using the crane with an Oscillator (Use Hydraulic Oscillator pdf for reference).

    b. **Visual Logistics / Phasing Plans:** Using the provided template (Scriber Creek - Logistics Template), please create a logistics plan that incorporates the following items:
        i. Erosion control measures
        ii. Material lay down.

iii. Crane location & radius.
iv. Delivery routes.
v. Construction waste.
vi. Site fencing.
vii. Jobsite trailers.
viii. Trade parking.
ix. Legend.
x. Environmental considerations.

c. **Develop a Schedule (Part 1):** The owner is concerned that the short construction schedule for the temporary trestle will have environmental impacts on the local fish spawning and other Wetland species. They've asked the team to put together a 20-30 line item schedule with a start date of 01/01/2023 and completion date of no later than 12/31/2023. The schedule should be formatted as a Gantt chart and submitted in .pdf format. Please incorporate the following:
   i. Use the Scriber Creek temporary bridge build-out shop drawings (Scriber Creek Temporary Trestle - Shop Drawings) to identify activities and sequence of work.
   ii. Identify species of fish using the provided fish maps (Scriber Creek - Fish Maps) and incorporate the spawning season for each type of fish at Scriber creek. Construction cannot occur during the spawning season.
   iii. Durations for each activity.
   iv. Milestones:
      1. Cofferdam completion.
      2. Drilled shaft / pile completion.
      3. Steel 'topping out' (last piece of steel completion).
      4. Fish spawning windows start and end.
   v. Predecessors and successors.
   vi. Critical path.
   vii. "Part 2" considerations.

   Develop a Schedule (Part 2) - Additional Considerations: The owner has provided a series of considerations to ensure the contractor abides by the Federal permitting for Scriber Creek. Your team will need to determine if these considerations are applicable and if they should be incorporated into your schedule:
   viii. In accordance with the Migratory Bird Treaty Act: Migratory birds, their parts, nests, or eggs, lawfully acquired prior to the effective date of Federal protection under the Migratory Bird Treaty Act (16 U.S.C. 703-712) may be possessed or transported without a permit, but may not be imported, exported, purchased, sold, bartered, or offered for purchase, sale or barter, and all shipments of such birds must be marked as provided by part 14 of this subchapter: Provide, no exemption from any statute or regulation shall accrue to any offspring of such migratory birds.
   ix. The contractor shall, under the MBTA, conduct an initial site inspection for any migratory birds onsite. This inspection shall be requested of the owner with 24-hour advance notice and will take approximately 1 day to complete. This inspection should be conducted prior to any beginning construction activities.
   x. Contract Specification 01 56 39 (Scriber Creek – Specifications) requires that surveyed locations and arborist descriptions be provided for all trees 4-inch diameter at base or greater within the project limits or that may impact

construction activities. The owner has provided the Arborist Tree Inventory to the contractor that identifies 12 trees of approximately 16-inches diameter. Per spec, the contractor shall notify the Arborist 48 hours before removing these trees. The contractor can remove trees at a rate of 0.15 days per 12-inch diameter tree.

xi. During the owner's pre-inspection, Beaver Dams were observed downstream of the construction limits. The contractor has been notified of this observation, but no determination has been made as to whether these dams will impact construction. Your team should analyze whether these will impact work. If impacts are confirmed, modifications can be made to the dams, or the beavers can be relocated. Depending on your decision, modifications can take up to 3 days to process/complete and species relocations can take up to 7 days for trapping and removal.

3. **L300 Stormwater Management (6 points):** With constant rain in Washington, the Owner wants to ensure the rainwater on the L300 project is properly managed, regarding both environmental and safety concerns.

    a. **SWPPP:** Draft a stormwater pollution prevention plan (SWPPP) – Discuss the significance of rainwater management, and list four (4) potential hazards and suggested best management practices (BMPs) for mitigation. Show the BMPs on the L300 site logistics plan if not already addressed (2.a.ii.) and mark the direction of flow.

    b. **Runoff calculations:** The L300 project will be constructed within three basin areas: McAleer Creek Basin, Hall Lake Basin, and Scriber Creek Basin. Based on an environmental consultant study, below are the approximate area of construction per basin area:
        - McAleer Creek Basin: 1,564,160 SF
        - Hall Lake Basin: 572,615 SF
        - Scriber Creek Basin: 2,145,428 SF

        Given these areas, find the total gallons of rainfall in an average November, the wettest month of the year.

    c. **Stormwater treatment:** Briefly describe a water treatment procedure. The owner wants collection and containment suggestions, treatment options, and two (2) discharge locations along the length of the project.

    d. **Cost:** Provide a brief ROM estimate for the above water treatment procedure, for the month of November.

4. **Envision Certification (4 points):** The Owner has stressed the importance of construction in the vicinity of Scriber Creek and is concerned about the lasting environmental impacts. They have asked your team to provide three (3) different restoration objectives that can be submitted towards Envision Certification credentials. The owner has clarified that these scopes of work should be completed after the Trestle has been removed such that Scriber Creek is returned to better than original condition. Your team should identify 3 different construction objectives that can be implemented to restore Scriber Creek and define how each will contribute to the overall improvement of the Creek. Your team should also identify

3 different Envision Certification credentials and provide supplementary reasoning as to how each objective can be applied to a corresponding credential. The selected credentials should fall under the Resource Allocation, Natural World, and/or Climate & Resilience categories of Envision.

a. The following scopes may be used by your team as construction objectives but should be further elaborated on if selected. Your team may also propose solutions not included in this list.
    i. New installations: large woody debris, bat habitats, wetland buffer zones, remediation plants, storm drainage/detention systems
    ii. Removals: Invasive plant species; invasive insect species
    iii. Remediation activities: Soil incorporation, recycling trestle materials
b. Your team must select either NW2.2 “Manage Stormwater” or NW2.4 “Protect Surface & Water Quality” as one of the 3 applicable Envision credentials
c. Please reference the Envision Certification Checklist (Envision Certification – Checklist) for guidelines specific to your selected credentials. Please also reference the Envision Certification Manual (Envision Certification – Manual) for more details regarding each credential.

5. **Disaster Relief and Mitigation Plans *EARLY DELIVERABLE* (3 points):** Each bidder is to produce an emergency action plan for a natural disaster relevant to the assigned site’s geography (ex – consider if the location would be prone to wildfires, earthquakes, and/or draughts). This emergency action plan is to be:

- Submitted separately from the rest of the RFP in Procore by **2:00pm**
- No more than 2 pages long. Note that this submission does not count towards the overall submission page count
- Submitted in .pdf and .doc format

and is to include the following components:

- Brief narrative introducing the plan
- Summary of relevant emergency contacts (project superintendents, safety managers, etc.) with instructions on which order to notify critical personnel
- Emergency preparedness steps
- Emergency response actions
- Emergency recovery procedures

The objective of these plans is to outline the required protocol for securing the jobsite (the people working onsite, work in place, stored material, etc.) The site assignments for each bid team are as follows:

- *Lakeridge Middle School:* Brigham Young University, California State Polytechnic University San Luis Obispo, California State Polytechnic University Pomona, Clarkson University, Colorado State University, University of California Los Angeles, Virginia Tech

- *L300:* Brigham Young University Idaho, Santa Clara University, University of California Berkeley, University of California Davis, University of Cincinnati, University of Florida, University of Nebraska at Lincoln, University of Washington

In addition, each team is required to send their Environmental Health and Safety (EHS) Manager (1 person only) to the designated Skanska conference room at **3:00pm** for a group discussion on the submitted mitigation plans (about 45 minutes). Representation from each team is required and there will be a 10 point penalty for teams who do not attend. Come prepared to collaborate with members of other pursuit teams with a laptop/tablet and a digital copy of the submitted emergency action plan.

People Portion

1. **Social Sustainability and Vendor Diversity Questions (6 points)**: The goal is to create a vendor/diversity outreach strategy to create a more inclusive and diverse environment from procurement to closeout. In order for construction to be sustainable, we should be taking into account how people will use the space and build it to be accessible to all. In part of the design and construction process, it is now more common to bring in consultants from a wide range of backgrounds to discuss ideas, space utilization, accessibility and ADA, as well as allowing for the local communities and minority, women, and disadvantaged business enterprises to be involved with the construction process.

Acronyms:

MBE: Minority-owned Business Enterprise
WBE: Women-owned Business Enterprise
DBE: Disadvantaged Business Enterprise

   a. During procurement, it is important to implement strategies that will allow for spaces to be used for all people. Develop a vendor diversity outreach strategy. Please discuss at least 3 strategies in order to increase MBE participation on your project.

   b. During construction, it is important to support your MBEs on your project to ensure their success and the project's successful completion. Discuss at least 3 strategies in order to maintain a successful relationship with these firms and ensure they perform their required scope.

2. **Living Building Challenge and Lakeridge Questions (6 points):** The Living Building Challenge (LBC) has specific requirements centering around making all spaces accessible and inclusive for individuals. ADA-compliance is also a very important consideration for socially sustainable design and construction. One of our featured projects, Lakeridge Middle School, has various outdoor spaces that need to be accommodating for all. Reference the Living Building Challenge (Attachment A), the 7 Principals of Universal Design (Attachment B), and the 2010 ADA Standards Checklist (Attachment C) in the 'People' folder of supplemental information. Familiarize yourself with the Equity petal of the LBC and use that, as well as the other documents mentioned above, to complete the following questions.

   a. XYZ Architects Inc. have just submitted new drawings for Lakeridge Middle School, reference 'Lakeridge Drawings' (Attachment D). However, you've noticed certain elements of the design that don't seem to be completely ADA-compliant and pointed this out to your project manager. They've requested that you go through and review the drawings to see what else may have been missed. Use the provided '2010 ADA Standards Checklist' to go through the 'Lakeridge Drawings' document and find at least four elements that are not ADA-compliant. Indicate these elements on the drawings. Provide an explanation for why each of these elements is not compliant, which requirement in the checklist specifies compliance, and how you would improve each element. Upload the marked-up drawings as a submittal but include the explanations in your final problem statement submission. The submittal will not count towards your total page count.

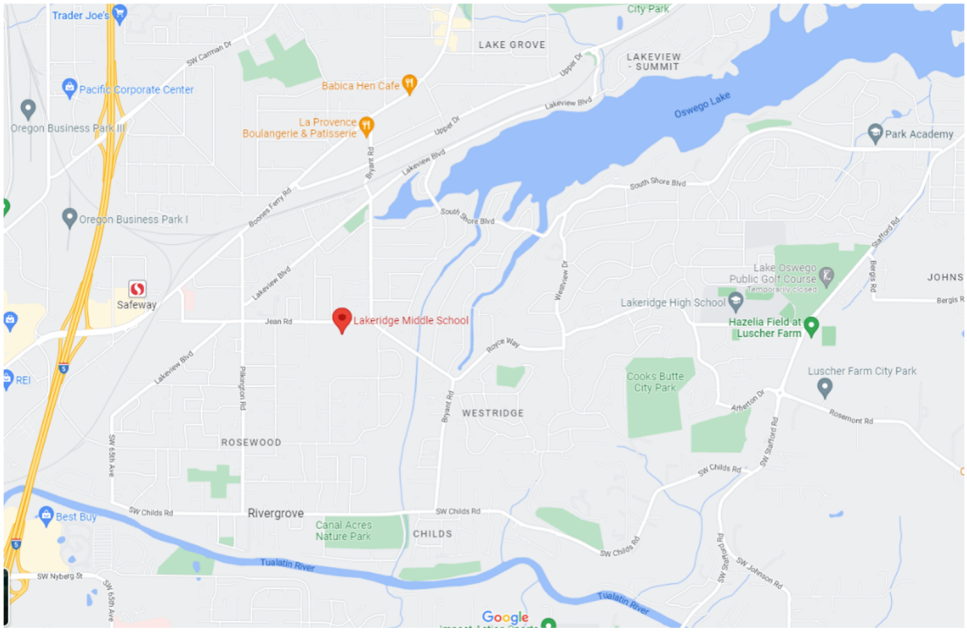
   b. Additionally, reference the 'Combined Courtyard Drawings' (Attachment E) document and provide two ideas of how you could improve the outdoor space to help the

project meet LBC requirements, specifically those outlined in the Equity Petal's Core Imperative 17 (I-17). Include a paragraph description of each idea, describing why you chose each one.

3. **Lakeridge and Technology (2 points):** Lakeridge Middle School is one of the first school projects that your firm has won, which means that this project will be setting your company's standard for the rest of the public-school projects coming out to bid in the future. With this in mind, your company has decided to invest in various construction means and methods that will set your company apart from other general contractors in the area. One of these methods is exploring innovative technologies that will make onsite work more efficient and safer for laborers.

    a. You're in charge of presenting technology options to help the project team decide which ones they will be piloting onsite. Find two innovative construction technologies that will improve worker safety and efficiency onsite. Put together a one-page proposal for each of these technologies, making sure to include:
        - Brief description of the technology and its impact
        - Vendor website
        - Summary of product features
        - Cost Information (if available)
        - Pilot opportunities
        - Comparable vendors and why you chose this one specifically

4. **Conflict Resolution (3 points):** Issues and conflicts will arise in various phases of construction projects and may concern different involved parties. There may be conflict due to subcontractor disagreements, the proximity of residential areas, or existing site conditions. Work through the scenarios below to detail how your project team would resolve various conflicts onsite.



Use the map above to review the area surrounding Lakeridge Middle School, located at 4700 Jean Rd, Lake Oswego, OR 97035. Notice the residential areas located right across the street from the project, as well as the proximity of Lake Oswego and the Willamette River.

a. Months into the project, you get a visit from several concerned residents that live in the neighborhood across the street. They're concerned about the safety of their kids due to the proximity of the construction site to their homes.
    - Describe how you would handle this altercation.
    - Put together a strategy for keeping the community involved in construction activities and project progress.

b. The Drywall subcontractor and the Electrical subcontractor have been butting heads throughout the project. The Drywall subcontractor has been bringing to your attention that the electrician has been moving at a slow pace, which has affected the drywall subcontractor putting them behind schedule. You have already given the electrical subcontractor formal notice and even requested a recovery plan, but they are still not where they need to be. The tension onsite between the electrician and drywaller has finally reached its boiling point, and although no physical altercations have occurred, the tension is still causing problems on site.
    - Come up with a strategy to solve this dispute on a subcontractor-to-subcontractor level.
    - After attempting to solve the dispute between themselves, there is still some tension between the electrician and drywaller. Come up with a strategy to escalate this conflict.

c. **BONUS (1 point)**: During construction, a member of your team believes they have discovered a fossil.
    - Design a plan for communications as well as what to do with this discovery.

5. **Lakeridge AQ Exposure Plan (6 points):** Each year, Oregon has seasonal forest fires. This season's fires are expected to be particularly bad. During the fire season, Oregon's DEQ predicts that winds will carry smoke and ash to your project site. Develop an Air Quality mitigation plan that considers the following:

    a. Are there air quality thresholds in the projects area? At what point does your company have to start implementing controls to mitigate exposure to poor air quality on site?

    b. What is NIOSH's hierarchy of controls? Give an example of a control you can implement at each level to lower worker exposure to the smoke and poor air quality.

    c. How is your project team communicating with site/project personnel throughout this time?

    d. The Lake Oswego School District is concerned about smoke intrusion in the building. How can your company mitigate smoke damage to the interior of the building?
        i. For context, at this point in time, Lakeridge Middle School has the envelope nearly complete, though there are some openings that are still pending final items like windows. The HVAC equipment is set and operational at this time, and interior finishes are in progress.

6. **L300 and SitesV2 (8 points):** L300 is currently pursuing a SitesV2 certification. The Project Owner and Design team have asked for your help in developing strategies to achieve credits in the **Human Health and Well Being section.**

    a. Identify which credits (minimum of 5 credits) of the Sites HHWB Section are most achievable for the L300 project and provide an explanation for each.

    b. For each credit you've identified please identify an aspect of the credit that should be addressed in the design phase, and one that should be addressed in the construction phase.

    c. Are there any credits in this section that the project team should not pursue? If so, please list them and provide an explanation for each.

    d. Take a look at Credit 6.11: Support Local Economy.
        i. Your team is already developing a vendor outreach plan. How can this plan be tailored to support the achievement of this credit? Please detail your strategies to fulfill 2 or more of the credit requirements to achieve this credit in full.

        ii. In pursuing Credit 6.11, the Owner of L300 is curious if there is a cost premium to achieve this credit. How does using a Living Wage, vs. Prevailing wage, vs. Market Rate impact the project's budget? Create a cost analysis to see the impact of using **Living Wage** vs. **Prevailing Wage** vs. **Market Rate**. What if it's a hard bid project? How do the Owner and General Contractor ensure correct wages are being carried by each bidder?

    Assumptions:
    - Assess wages for the following trades: Flaggers, Laborers, Surveyors, and Carpenters
    - Living Wage: Based off of data for Snohomish County, assume 2 Adults (1 working) and 1 child (https://livingwage.mit.edu/)
    - Market rate ($/hr):

Position	Flagger	Laborer	Surveyor	Carpenter
Journeyperson	$ 24.61	$ 35.00	$40.00	$ 35.00
Apprentice	$16.50	$ 17.10	$18.23	$ 20.25

    - Prevailing wage (Snohomish County): Reference Washington States Department of Labor and Industries – Prevailing Wage Rates for Public Works Contracts (https://lni.wa.gov/licensing-permits/public-works-projects/prevailing-wage-rates/)

7. **Worker Well-Being/Healthy Jobsites/Safety (3 points):** The Occupational Safety and Health Act of 1970 (OSHA) was passed to prevent workers from being killed or otherwise harmed at work. Under the OSHA law, employers are responsible for providing a safe and healthful workplace for their workers. Part of creating a healthy & safe work environment means educating people on site on policies and rules that everyone must adhere to.

Please choose a project (Lakeridge Middle School or L300) and create a power point presentation going over your health and safety policies. Upload your presentation as a submittal in PDF format. This submittal will not count towards your total page count. Below are some items to include in your presentation:

a. Introduction to the team
b. Site logistics plan (muster point, washing station, restroom, trailers etc.)
c. Include Skanska Values
d. Harassment Policy
e. Smoking Policy
f. Tools – Hand & Power
g. Housekeeping

Profit Portion

1. **Building Material Value Engineering (12 Points):** The Lake Oswego School District has hired your team to conduct a constructability review of the exterior envelope for the Lakeridge Junior High Replacement Project. The purpose of this constructability review is to investigate material costs, as well as thermal performance and embodied carbon emissions of the exterior building materials. The current design (basis-of-design) includes a mix of building materials, such as brick masonry veneer, concrete masonry units, fiber cement paneling, and metal aluminum paneling. The School District is interested in value engineering the exterior envelope by switching from mixed materials to a single material type if it will provide direct cost savings to the project. In addition to providing cost savings, the single material must also have a high thermal rating and/or low embodied carbon emissions to be considered. It is your team's responsibility to determine this information for the client and present your findings.

   The Lake Oswego School District is looking for the following deliverables:

   a. A one-page report summarizing your comprehensive material cost analysis of the exterior materials and recommendation(s) to the School District for value engineering. The report must include the following:
      - Company name.
      - Narrative to summarize your analysis. Include the current basis of design material costs, recommendation for switching to a single material type, and explanation for recommendation (incorporate any cost savings and your evaluation of material thermal ratings and embodied carbon emissions).
   b. Completed ***Profit Analysis Sheet for Competition*** sheet (include in report as back up).
   c. Copy of Bluebeam takeoff (include in report as back up).

   Criteria:
   - Conduct a takeoff of the basis-of-design to determine the square footage for each building material types utilizing Bluebeam. Use Drawing sheet A-201 only, take-off should include all four elevations.
   - Utilize the project specifications to obtain material product information.
   - Determine the cost per square foot of each building material type utilizing RSMeans pages with the information from reviewing the specifications.
   - Provide a cost analysis of the basis of design to determine a baseline cost for the building materials and total material square-footage.
   - Determine the cost to construct the exterior envelope with each of the following materials: masonry veneer (BR-1), CMU (BR-2), fiber cement panels (FCP-1), and metal panels (MP-1).
   - Determine the R-value of the associated building material types using the "R-Value of Building Materials" document.
   - Determine the Embodied Carbon emissions using the EC3 online program (https://www.buildingtransparency.org/). Create a free account.
   - Fill out the "Profit Analysis Sheet for Competition" Excel document with the information from above and answer the questions. Only the blue cells are editable.

   Assumptions:

- Windows and doors should not be included in takeoff/material quantities.
- Masonry Veneer (BR-1)
    - 25ga.x6”NLB Stud Backup.
    - What kind of bond? (Hint: check the specs)
    - Considered brick.
- Concrete Masonry Units (BR-2)
    - BR-2 = CMU-1.
    - CMU-1 normal weight = regular weight.
    - Concrete block wall.
    - 75% solid, 2000 PSI, no core fill.
- Fiber Cement Panel Siding (FCP-1)
    - Installed on 2” x 6” studs, 16” O.C., insul. Wall, w/ 5/8” text 1-11 fir plywood.
    - Considered hardboard (½ inch).
    - Considered cladding.
- Metal Aluminum Panel Siding (MP-1)
    - Steel, corrugated, or ribbed.
    - Colored
    - Considered cladding.
- Use the “TOTAL” value from the “COST PER S.F.” column for each material type on the RSMeans pages.
- EC3 (https://www.buildingtransparency.org/)
    - No performance specifications are required to be entered (I.e. R-value, thicknesses, etc.). Leave these blank.
    - Geography = “Global”.
    - Conservative values only.

2. **QAQC (5 points):** Quality control for materials, deliveries, protection, material waste management, etc. related to project to Lakeridge Middle School
    a. It is your responsibility to ensure the quality management of materials on the job, this includes:
        1. Receiving Material on Jobsite
        2. Footprint of laydown area, access to jobsite
        3. Protection of Material Prior to installation
        4. Management of quantities in relationship to laydown area. (Do you have room to store all materials for the job or will you need to stagger deliveries when materials are installed)
        5. Protection of Installed materials

    Using the site plan G-005, please mark up and create a site logistics plan that identifies and illustrates how you will address items 1 and 2. For items 3, 4 and 5, please write a short narrative advising how you would address these. Also include how you would address any non-conforming material to ensure it is not accidentally installed. i.e. segregated storage?

3. **Inflation Reduction Act (6 points):** The Owner of the L300 project has asked whether they can benefit from the 2022 Inflation Reduction Act. Your Project Manager assigned this to you, asking you to:
    a. Research the IRA and give a **brief** overview of the act and potential benefits outlined in it.
    b. Identify existing design features of the project, if any, which are covered by the act.

c. Give 2-3 options which could be added to the project which would give the Owner credits through the act.
d. For b&c above, include the following in your answer for each design feature you list:
    i. Using the IRA Guidebook provided, list the IRA Statutory Location applicable
    ii. Estimated potential savings
    iii. Estimated added project cost

Zero Net Energy Question (Two Parts)

1. **Part 1 (4 points):** Current conventional trailers are designed as temporary structures and constructed of low-quality materials. The trailers are used on project sites as permanent work environments but do not provide a high-quality and sustainable workspace. Typically, they are not energy efficient, have a high operational carbon footprint, and are made of unhealthy building materials. Skanska has begun investigating the concept of Zero Net Energy (ZNE) Jobsite Trailers as a solution to reduce our carbon footprint and to create a healthier work environment for employees.

   Skanska conducted an employee survey to understand the overall satisfaction of onsite jobsite trailers. Skanska executives would like your team to work on a proposal for Zero Net Energy jobsite trailers that will be used on all Skanska jobsites. Using the provided survey data in the Documents Procore folder (ASC 2023 – ZNE Construction Trailers – Graphs), please provide a narrative and rough sketch of a ZNE jobsite trailer that will satisfy the needs and wants of employees. Your narrative and sketch should include the following:

   - Solutions to the problems identified in the employee survey.
   - How will your new jobsite trailer reduce Skanska's carbon footprint, and what Net-Zero Energy design elements will you include?
   - Create a schematic design plan for the trailer. How would you arrange the office layout and furniture that will contribute to overall employee well-being. What criteria will your team use to ensure interior materials are not detrimental to human health? (Think LEED, LBC, Red-List Free materials, Low VOC Materials, etc.)
   - Off-grid vs. grid-tied pros/cons for energy savings, and improving the environment

2. **Part 2 (6 points):** The cost of an onsite construction trailer for a project is usually handled by **reimbursable general requirements**, and is rented on a month-to-month basis from a trailer company like William Scottsman, Construction Trailers Specialists, etc. The lead superintendent and project manager, together with the owner of the Lakeridge project are exploring the option of having a zero net energy, water efficient and aesthetically innovative construction trailer onsite. This trailer is to be used as a pilot for other projects to learn from in hopes for sustainable trailers to become more of a standard. Since it is a pilot, this will be a single-wide trailer 12'x60', that can fit four people comfortably. For this idea to come into fruition, the project team leads have asked you to obtain the following information, so that you can then present the idea to the owner:

   a. What are ***General Requirements*** of a project? Are they always reimbursable, and who is responsible for the reimbursements?

b. What could be some of the financial benefits for a construction management company to own their own trailer in lieu of renting it through the cost of the project? What are the drawbacks?
c. Provide an estimate of how much dollar savings could be potentially earned with having a net-zero energy trailer, as well as water efficient features or fixtures. Assume trailers currently spend $3.50 per case for 12-pack of drinking water, order 30 cases a month, and consume about 2,500 gallons a month for $60 per month for sanitary/ domestic purposes and spend $350/month on average for 1,110kwh/month average of energy usage. What could be some of the financial benefits of Off-grid vs. grid-tied pros/cons for $$.
d. What would your design elements from part 1 do to enhance the mental health and productivity of the project team? How will those additions be correlated to higher profits?