**Civil Engineering Infrastructure Project *in a Developing Country*:
Design and construction of a water tower for a rural village of 500 people in the country of \_\_\_\_\_\_\_\_\_\_\_\_\_.**

**Problem K3-6 1 2**

**OVERALL OBJECTIVE: Your firm is tasked with developing a summary design, construction, and maintenance plan for a water tower that will store and supply water for a rural village of 500 people in the country you have been assigned.**

**LONG-TERM DELIVERABLE (END OF SEMESTER): You will pitch your plans to the non-profit Mechanics Foundation in a 12-minute presentation at the end of the semester. Your plans must be developed thoughtfully enough to convince the foundation to provide funding for implementation of your plans in the near future. You will need to clearly identify the water demand for your location and present a detailed design with calculations and computer-generated detailed sketches, and include a budget and maintenance plan.**

**EXPECTATIONS: This should be a fun and thought-provoking exercise weaved throughout the semester that considers (a) technical content, (b) societal and economic benefits and constraints, and (c) an entrepreneurial mindset. Each group is expected to keep track of all time spent on the project, and include this time report in your final submittal. Overall, this project will be worth a minimum of 100 “problem set” points toward your final Problem Set and Other Submissions grade. Bonus points may be awarded for exceptional work.**

**FINAL TASKS: The final deliverable encompasses the following work:**

* **Reexamine the final interim design your team presented during Lecture 36 and make any appropriate adjustments based on feedback you received from the client.**
* **Design the vertical support elements (columns) and tank for your water tower. For the vertical elements (columns), consider a minimum of two different cross sectional shapes and provide an analysis similar to that conducted in Overarching Problem 3 for each cross section to verify if the design is technically feasible. Use appropriate material properties (for the materials you select) and appropriate factors of safety. Select a final cross section from the different alternatives considered.**
* **Prepare final drawings of your water tower in AutoCAD (or comparable software). Show elevation and plan views of your water tower as a whole, and show cross-sectional views of your vertical supporting members (for only your final design cross section). Include dimensions on all drawings. Be sure to incorporate any feedback given based on your interim drawings submitted in Lecture 36.**
* **Finalize a budget and maintenance plan for your water distribution system.**
* **Determine a specific monetary amount that you will ask the foundation for, and be able to explain how that money will be used. Identify any alternative funding sources (other non-profit, private, user, etc.) that could be considered to supplement funds provided by the foundation.**

**FINAL DELIVERABLES: The following items are due on the final day of class (Lecture 53):**

* **Prepare to pitch your plans to the non-profit Mechanics Foundation in a 12-minute formal presentation during Lecture 53. The presentation will be held in the CEER 205 and you must be able to effectively communicate all deliverables (from previous interim submittals and this final submittal) to the representatives of the Foundation using PowerPoint and any other forms of communication you desire. All teams will present in a randomly selected order, with other teams present in the room. All group members should have an active speaking role in the presentation. Remember, you are tasked with convincing the foundation that this is a worthy, economical, sustainable, and technically feasible project to support!**
* **Prepare two copies of each of the following to leave with the foundation for post-meeting review:**

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* **Slide printouts of your PowerPoint presentation**
* **Hardcopies of all drawings of your water tower and tank**
* **A professional quality calculation package demonstrating the technical feasibility of your water tower design (similar to the computations performed during Overarching Problem 3), with all sheets signed by an originator and a checker. Calculations should be provided for all cross sections considered and a brief explanation should be included on which cross section was selected for the final design and why it was selected.**
* **A one-page budget and maintenance plan that also clearly indicates the specific monetary amount that you are asking the Mechanics Foundation for and explains how that money will be used. The plan should also identify any alternative funding sources (other non-profit, private, user, etc.) that could be considered to supplement funds provided by the foundation.**
* **A one-page Adaptability Statement that addresses each of the following questions:**
1. **Is your current design easily adaptable to other developing countries? Identify any potential challenges to mass production of your concept for the developing world as a whole. Identify changes, if any, that could easily make your design more adaptable to other countries.**
2. **Assume you desired to approach a private investor about mass production of your water tower for the United States (for example, in remote rural communities), with the goal of making a profit. What design changes might you consider? What steps might you follow to pursue this goal?**