

ASCE Environmental Team Capstone

Meeting Agenda
September 14, 2017

To: Professor Alarick Reiboldt
From: Paige Reilly, ASCE Environmental Design Team Member
Re: Background Research

Facilitator: Paige Reilly
Minutes by: Cameron Rhodes
Members: Paige Reilly, Cameron Rhodes, Shelby Carawan, Alex Anzar
Time: 12:45pm
Location: EGR Room 112

| Time | Item | Discussion led by |
|---------|---|-------------------|
| 12:45pm | Research <ul style="list-style-type: none">● PR - Filter Design● AA - Water Quality● SC - Constraints and Criteria / Introduction● CR - Water Quality / Constraints and Criteria | Paige Reilly |
| 1:10pm | Editing <ul style="list-style-type: none">● All Members - Edit the entire document for grammatical and syntax errors, content, and overall structure. | Alexander Anzar |
| 1:45 pm | Final Paper <ul style="list-style-type: none">● All Members - compile final document, review, and send to Professor Reiboldt | Cameron Rhodes |
| 1:55pm | Set next meeting time | Shelby Carawan |

ASCE Environmental Team Capstone

Meeting Agenda
September 21, 2017

To: Professor Alarick Reiboldt
From: Shelby Carawan, ASCE Environmental Design Team Member
Re: PSWC Rules and Project Feasibility

Facilitator: Shelby Carawan
Minutes by: Alexander Anzar
Members: Shelby Carawan, Paige Reilly, Cameron Rhodes, Alex Anzar
Time: 12:45pm
Location: EGR Room 218

| Time | Item | Discussion led by |
|---------|---|-------------------|
| 12:50pm | Finalizing PSWC 2018 rules <ul style="list-style-type: none">• Uric acid versus urea as contaminant in water• Testing parameters consistent with contaminants | Shelby Carawan |
| 1:00pm | Testing capabilities <ul style="list-style-type: none">• Turbidity, pH, phosphate-phosphorus, nitrate-nitrogen, total coliforms, chlorine• What do we need to order?• Lab request forms | Alexander Anzar |
| 1:10pm | Club status <ul style="list-style-type: none">• Website name• Feasibility | Cameron Rhodes |
| 1:15pm | Begin discussion about overall design <ul style="list-style-type: none">• Last year's design and success rate• Competition designs• New designs/units to consider | Paige Reilly |
| 1:20pm | Set next meeting time | Shelby Carawan |

ASCE Environmental Team Capstone

Meeting Agenda
October 19, 2017

To: Professor Mark Lamer
From: Alex Anzar, ASCE Environmental Design Team Member
Re: PSWC Rules and Project Feasibility

Facilitator: Cameron Rhodes
Minutes by: Paige Reilly
Members: Shelby Carawan, Paige Reilly, Cameron Rhodes, Alex Anzar
Time: 12:30pm
Location: EGR Room 122M

| Time | Item | Discussion led by |
|---------|--|-------------------|
| 12:30pm | PSWC 2018 rules <ul style="list-style-type: none">• Review revisions• Consider changes• What can mentees do for the team | Shelby Carawan |
| 1:00pm | Club funding <ul style="list-style-type: none">• Funding packet | Cameron Rhodes |
| 1:15pm | Begin discussion about overall design <ul style="list-style-type: none">• Discuss last year's design and success rate• Consider new designs/units | Alexander Anzar |
| 1:25pm | Set next meeting time | Paige Reilly |

ASCE Environmental Team Capstone

Meeting Agenda
October 26, 2017

To: Professor Alarick Reiboldt
From: Alex Anzar, ASCE Environmental Design Team Member
Re: Scope and Scheduling

Facilitator: Alex Anzar
Minutes by: Shelby Carawan
Members: Shelby Carawan, Paige Reilly, Cameron Rhodes, Alex Anzar
Time: 12:45pm
Location: EGR Room 223

| Time | Item | Discussion led by |
|----------|---|-------------------|
| 12:50 pm | Scope of Work <ul style="list-style-type: none">● Review submission● Discuss items missed | Alex |
| 1:00pm | Starting Task 2, designing <ul style="list-style-type: none">● Review client's requests and comments● Past year's designs● Specific unit considerations | Shelby |
| 1:10pm | Scheduling <ul style="list-style-type: none">● Review client's expectations● Discuss tentative schedule for remaining semester | Cameron |
| 1:15pm | Time sensitive items <ul style="list-style-type: none">● Ordering testing supplies and other materials | Paige Reilly |
| 1:20pm | Set next meeting time | Alex |

ASCE Environmental Team Capstone

Meeting Agenda
November 2, 2017

To: Professor Terry Baxter
From: Paige Reilly, ASCE Environmental Design Team Member
Re: Scope and Technical Considerations

Facilitator: Paige Reilly
Minutes by: Shelby Carawan
Members: Alex Anzar, Shelby Carawan, Paige Reilly, Cameron Rhodes
Time: 12:45pm
Location: EGR Room 301

| Time | Item | Discussion led by |
|----------|--|-------------------|
| 12:50 pm | Scope of Work <ul style="list-style-type: none">● Review and provide feedback● Tasks | Cameron Rhodes |
| 1:00pm | Time sensitive tasks <ul style="list-style-type: none">● Schedule● Testing materials | Alex Anzar |
| 1:10pm | Technical Considerations <ul style="list-style-type: none">● Treatment Feasibility● Filter Design | Shelby Carawan |
| 1:15pm | Lab testing <ul style="list-style-type: none">● When should we start lab testing● What are the necessary steps that need to be taken to begin the testing process | Paige Reilly |
| 1:20pm | Set next meeting time | Cameron Rhodes |

ASCE Environmental Team Capstone

Meeting Agenda
November 9, 2017

To: Professors Terry Baxter and Alarick Reiboldt
From: Shelby Carawan, ASCE Environmental Design Team Member
Re: Scope and Technical Considerations

Facilitator: Shelby Carawan, ASCE Environmental Design Team Member
Minutes by: Cameron Rhodes
Members: Alex Anzar, Shelby Carawan, Paige Reilly, Cameron Rhodes
Time: 12:45 pm
Location: EGR Room 102

| Time | Item | Discussion led by |
|----------|--|-------------------|
| 12:45 pm | Greetings | Shelby Carawan |
| 12:50 pm | Review PSWC rules <ul style="list-style-type: none">● Simulated wastewater: Potting mix, White kaolinite clay, Lavender extract, WWTP effluent● Testing parameters: Turbidity, TN, TP, Chlorine, Coliforms, Odor● Budget: \$500● Construction and treatment time: 30 mins each | Paige Reilly |
| 1:00 pm | Review research <ul style="list-style-type: none">● Overall design<ul style="list-style-type: none">a) Chemical and physical processes onlyb) Units in parallel to reduce heightc) Easy access to units for cleaning● Treatment components for each parameter<ul style="list-style-type: none">a) Hard copy research document provided● Sequence of components<ul style="list-style-type: none">a) Screening, Filtration, Ion Exchange, Disinfection | Alex Anzar |
| 1:30 pm | Next steps <ul style="list-style-type: none">● Ordering materials | Cameron Rhodes |

| | | |
|---------|-----------------------|----------------|
| | 1) Lab testing | |
| 1:40 pm | Set next meeting time | Shelby Carawan |

ASCE Environmental Team Capstone

Meeting Minutes
September 14, 2017

Opening

The regular meeting of the ASCE Environmental Team Capstone was called to order at 12:45PM on September 14, 2017 in Room 218, Engineering Building by Paige Reilly.

Present

Cameron Rhodes, Alex Anzar, Paige Reilly, Shelby Carawan

Approval of Agenda

The agenda was unanimously approved as distributed.

Open Issues

- I. Continue to add more information to the environmental rules. Have rules completed and ready for ASU to review by next week. Once the review is completed submit rules to other participating school.
- II. Gather necessary information to reach club status. Submit necessary materials to ASNAU by next week. Decide which member will represent the team at the ASNAU meeting.

New Business

- I. Research possible filter designs that can be used for the competition.
- II. Research textbook and online sources to have multiple options for filter design.
- III. Investigate filter designs and capabilities.

Agenda for Next Meeting

- I. Finalizing PSWC 2018 rules
- II. Testing capabilities
- III. Club status
- IV. Overall design
- V. Next meeting time

ASCE Environmental Team Capstone

Meeting Minutes
September 21, 2017

Opening

The regular meeting of the ASCE Environmental Team Capstone was called to order at 12:50 PM on September 21, 2017 in Office 223, Engineering Building by Shelby Carawan.

Present

Alarick Reiboldt, Cameron Rhodes, Alex Anzar, Paige Reilly, Shelby Carawan

Approval of Agenda

The agenda was unanimously approved as distributed.

Approval of Minutes

The minutes of the previous meeting were unanimously approved as distributed.

Open Issues

- I. Technical adviser approval deadline extended in order to allow contact with Dr. Terry Baxter.
- II. Clarification concerning water constituents for competition: Uric Acid, Coliforms, Odor, Clay and Miracle Gro, other constituents eliminated
 - A. Uric Acid: Cheap reproducible simulates urine - Amount TBD or eliminated based on research
 - B. Coliforms: Added via wastewater effluent from Rio de Flag - Amount TBD
 - C. Odor: Added from herb or plant extract - Amount TBD
 - D. Miracle Gro: Added to increase nutrients - Same as previous amount unless research creates conflict.
- III. All the amounts based on livestock, agricultural, and river water quality research in developing regions.
- IV. The budget increased to \$500, possible scoring change with penalty for overages.
- V. "Volume treated" scoring section changed to cost per volume scoring based on a scaled model of each system, with scaled model treating 5,000 GPD.
- VI. Coliform scoring sliding scale, full points to team having least amount, done after 10 serial dilutions.
- VII. Continue to add more information to the environmental rules. Have rules completed and ready for ASU to review by Sep. 24th. Once the review is completed submit rules to other participating school.

New Business

- I. Research water quality in rivers, agriculture, livestock etc. to best model using constituents.
- II. Contact ASU about providing wastewater effluent.
- III. Talk with lab manager requesting HACH methods and specifying needed tests and when they need to be conducted. Complete Lab Request Form. Identify fastest test for each parameter. Plan equipment needs for each parameter. Contact schools for additional equipment.

Agenda for Next Meeting

- I. Finalizing PSWC 2018 rules
- II. Amounts of constituents
- III. Tests for parameters
- IV. Equipment inventory/availability
- V. Lab request form
- VI. Overall design
- VII. Next meeting time

ASCE Environmental Team Capstone

Meeting Minutes

October 19, 2017

Opening

The meeting of the ASCE Environmental Capstone Team was called to order at 12:30 PM on October 19, 2017 in Room 122M of the Engineering Building by Cameron Rhodes.

Present

Mark Lamer, Cameron Rhodes, Alex Anzar, Paige Reilly, Shelby Carawan

Approval of Agenda

The agenda was unanimously approved as distributed.

Open Issues

- I. Review PSWC 2018 competition rule revisions. Ensure we follow the World Health Organization (WHO) units and keep consistent throughout our analysis. Need to identify the identity of the WWTP effluent and transport.
- II. Consider PSWC 2018 changes as Mark approves of the specified contaminants.
- III. What can mentees do for the team? On the surface mentees can not do a whole lot, but keep them engaged by allowing them to help with decisions. Also, allow them to learn from doing and invite them to capstone meetings on Thursday.
- IV. Update on club funding packet. The funding is primarily for travel, hotel, gas, student registration fees, and vehicles. Funding must requested by Nov. 17.
- V. Begin discussion about overall wastewater treatment design
 - A. Discuss last year's design and success rate. This includes meeting client requirements by turning the competition into a legitimate competition, place in the top three, and request a lab key. Promptly, begin testing.
 - B. Consider new designs/units. Ensure we follow the WHO regulations and standards.
- VI. Set the next meeting time

New Business

- I. We will obtain the environmental lab key.
- II. We plan to collect all testing materials
- III. Testing will begin over the first week of winter break

IV. We will set up a meeting with Terry Baxter for technical advice and design approval.

Agenda for Next Meeting

- I. Scope of Work
- II. Starting Task 2, designing
- III. Scheduling
- IV. Time sensitive items
- V. Set next meeting time

ASCE Environmental Team Capstone

Meeting Minutes

October 26, 2017

Opening

The regular meeting of the ASCE Environmental Team Capstone was called to order at 12:45 PM on October 26, 2017 in Room 223, Engineering Building by Alexander Anzar.

Present

Alarick Reiboldt, Cameron Rhodes, Alex Anzar, Paige Reilly, Shelby Carawan

Approval of Agenda

The agenda was unanimously approved as distributed.

Approval of Minutes

The minutes of the previous meeting were unanimously approved as distributed.

Open Issues

- I. Review the scope of work including submission and any items that may have been missed.
- II. Discuss the start of task two by reviewing client's requests and demands, past years designs, and consider specific units (metric).
- III. Ensure scheduling is that of the client's expectations and discuss tentative schedule for remaining semester.
- IV. Order testing supplies and other materials. Contact Adam and obtain a lab key and fill out the appropriate forms.
- V. Set next meeting time.

New Business

- I. We will need to modify our schedule to fit our project needs and to ensure we will have enough time for testing and design construction.
- II. Begin to order supplies and contact the Rio de Flag wastewater treatment plant. Set a date for pickup.
- III. Fill out the necessary lab forms and receive approval from Adam Bringhurst.

Agenda for Next Meeting

- I. Terry Baxter will be in attendance.
- II. Review PSWC rules with Terry Baxter.
- III. Review research presented by the team.
- IV. Next steps: ordering materials, lab testing.

ASCE Environmental Team Capstone

Meeting Minutes
November 2, 2017

Opening

The meeting of the ASCE Environmental Capstone Team was called to order at 12:50 PM on November 2, 2017 in Room 301 of the Engineering Building by Paige Reilly.

Present

Terry Baxter, Cameron Rhodes, Alex Anzar, Paige Reilly, Shelby Carawan

Approval of Agenda

The agenda was unanimously approved as distributed.

Open Issues

- I. We need to speak with Adam in order to formulate a lab document.
- II. We need to figure out when the engineering building is closed during winter break. We may need to coordinate with Adam/Baxter in order to have access to the engineering building.
- III. We need to verify if we can start treatment immediately after construction phase or if it's strictly 30 minutes construction, 30 minutes treatment.
- IV. Trihalomethane might be an issue if we use chlorine/bromine and have organics in the water. The chlorine reacts with organics and we have a halogenated compound that is not happy in the human body

New Business

- I. We will test each system component individually for a certain parameter (e.g. find what unit works for turbidity, then nitrogen removal, etc.) then combine these units. Something to consider is that separating the units and testing them individually may present problems later on when we combine them.

Agenda for Next Meeting

- I. Review PSWC Rules
- II. Review Research
- III. Next Steps
- IV. Set next meeting time

ASCE Environmental Team Capstone

Meeting Minutes
November 9, 2017

Opening

The meeting of the ASCE Environmental Capstone Team was called to order at 12:50 PM on November 2, 2017 in Room 301 of the Engineering Building by Shelby Carawan.

Present

Terry Baxter, Alex Anzar, Shelby Carawan, Paige Reilly, Cameron Rhodes

Approval of Agenda

The agenda was unanimously approved as distributed.

Open Issues

- I. We need to speak with Adam Bringham in order to formulate a lab document. Adam (or Dr. Baxter) will process the order for materials. Something to consider is that NAU has a list of vendors and if we need something not offered by one of these vendors, it is a bit of a longer process. This is something that must be discussed with Adam.
- II. We need to figure out when the engineering building is closed during winter break. We may need to coordinate with Adam/Dr. Baxter in order to have access to the engineering building.
- III. We need to verify if we can start treatment immediately after the construction phase or if it is strictly 30 minutes of construction and 30 minutes of treatment.
- IV. Trihalomethane might be an issue if we use chlorine/bromine and have organics in the water. The chlorine reacts with organics and we have a halogenated compound that is not happy in the human body.

New Business

- V. Biological treatment of the wastewater is not feasible. Thus we will need to look at chemical and physical treatments for our system. Sand filtration can treat turbidity, while ion exchange should be considered for the removal of nitrogen and phosphorous.
- VI. We will test each system component individually for a certain parameter (e.g. find what unit works for turbidity, then nitrogen removal, etc.) then combine these units in an order that maximizes efficiency after considering the practical applications. Something to consider is that these components may not work the same after they are combined.
- VII. Regarding the sequence of treatments, turbidity will be treated first so that it does not interfere with the other treatment stages. We do not want particles occupying void space or interfering with ion exchange.

- VIII. The system will require a method to backwash, even if this is simply scraping off the gunk on the top or replacing the top layer of sand. This needs to be easily accessible. Instead of having a tall system, we will consider designing units in parallel.
- IX. In order to better understand the properties of the simulated wastewater, we will replicate it exactly. More specifically, we will let it sit for at least 25 minutes to see if there is color since activated carbon may be affected. Rates of removal will also be analyzed in terms of changing the temperature of the water since the competition takes place in Tempe where it is much warmer.
- X. We will practice a few standard testing methods in order to ensure we excel at performing them.
- XI. Regarding the schedule of our project, we will conduct data analysis and graphical plots as we progress, not at the end in order to save time. Individual model testing must be completed by mid-January. Our final idea needs to be ready for testing by early February so that we have time to adjust the design if something does not work as expected.
- XII. Turbidity, nitrogen, and phosphorous testing are not a problem. However, we need to check if we can test for chlorine residual. It is not difficult, it just has not been done in our environmental lab before. We need to look to the pool industry for this. Dr. Baxter will provide a copy of the Standard Method for odor from the 23rd edition. Judges will need to be notified ahead of time in order to abide by the necessary eating/smoking restrictions.

Agenda for Next Meeting

- I. The next meeting will take place at 12:45PM on Thursday, November 8, 2017. Both Terry Baxter and Alarick Reibolt will attend as well as the Capstone team members Alex Anzar, Shelby Carawan, Paige Reilly and Cameron Rhodes.
- II. The team will arrive with unit ideas for each parameter ready to discuss with the grader and technical advisor for their review and recommendations. The goal of the meeting is to have a proposed design finished so that the team may begin ordering materials and testing.