

## **The Environmental Challenge**

...a competition for University students

The Environmental Challenge (EC) is proudly hosted by the Pacific Northwest International Section (PNWIS) of the Air & Waste Management Association ([www.pnwis.org](http://www.pnwis.org)).

### **THE PURPOSE**

The EC Program is a student team competition to prepare and present an optimal solution to a complex “true-to-life” environmental problem. The program presented is of current value, representative of the conference, and requires multi-disciplinary approaches for success. The EC Program is designed to promote formation of student teams with the broadest feasible range of environmental disciplines including, but not limited to, engineering, planning, policy, and economics. Teams must research the problem background as well as the technical, social, economic, and political aspects of the situation. Teams must stay apprised of ongoing events related to the problem by adjusting their solutions appropriately leading up to and during the conference.

The challenge seeks not only technical and scientific analyses, but solutions that are presented in conjunction with the development of appropriate regulatory approaches and resolution of political and community issues. We do not give you a lot of numbers to crunch. We are more interested to hear how you dissect the issues involved, interpret the problem, arrive at your conclusions, and communicate your thoughts. We want you to have fun!

The EC gives student teams an opportunity to develop solutions to a mock environmental problem and have the experience of presenting their solution to a panel of environmental professionals. This exercise gives all conference attendees a chance to participate and gets the professionals of tomorrow interacting with the professionals of today.

The goals of the EC are to:

- Involve students in the PNWIS Annual Conference of the Air & Waste Management Association.
- Be a premier networking event for students to connect with internship and job opportunities.
- Provide experience in solving complex environmental situations in a fun and supportive atmosphere.
- Give students opportunities to display their talents.

Although winning solutions to the challenge must have sound engineering and technical bases, the solution generally does not require a full engineering design presentation. Similarly, all problems pose economic and political issues that must be addressed. Solutions are expected to provide reasonable resolutions applying basic engineering and scientific knowledge to research scenarios and critical questions.

Once teams reach the conference, preparation will be the key to a successful competition; so be sure to obtain broad background knowledge of the EC topic! Role players in the EC problem will be identified and available for students to ask questions and consult for opinions. Role players are made up of conference attendees and professionals in the environmental field; they provide a key interaction point for the EC participants by giving feedback on their solutions, asking questions to prepare the students for the project presentations, and enhancing the networking experience at the PNWIS Annual Conference. The role players also are critically involved in a “Tweak” (added complication to the problem) that tests the students’ knowledge of the challenge topic.

## **THE CHALLENGE**

The town of Sea Breeze, in the Puget Sound has seen significant growth and change over the last fifty years. It has transitioned from a lumber, fishing, tourist, retirement community to one of the many suburbs of the Silicon Forest, or, the greater Seattle area. The town has been slowly transitioning from lumber and fishing since the 1970s, as many have, when the community college opened with a focus on nursing and firefighting training. The college has the regional fire training grounds and certification centers in the state.

Further transformation includes a cluster of retirement homes and two large hospitals, which serve as the primary medical facilities on the Peninsula, support the retirement home population, and provide employment opportunities for many. With all the hospitals and retirement homes, two large industrial laundries have been built and process these facilities garments for the residents and employees, and fire-fighting school.

“I just love being able to give back to the community – it is why I became a nurse! I rotate through the hospital, and have another part time job at one of the local retirement homes. Although, due to an increase of population, including the aging population of the community, our hospitals and retirement homes are being pushed to capacity! We are working around the clock to keep these people healthy, happy” – Nellie Ursula, all around good citizen.

As with many communities around the Silicon Forest, the town of Sea Breeze has become a commuter haven with slightly more affordable housing. With all the development the town has struggled to keep up with building roads, sidewalks, utilities, schools, parks, and the sewage treatment plants. There is continued encroachment on the fire training area by residential home construction, and residents are starting to be impacted by and complain about air quality.

The City has had a combined sewer stormwater overflow system built about 30 years ago when the Publicly Owned Treatment Works (POTW) and the hospitals, retirements, and industrial laundries were constructed. Each winter, there are on average 10 to 20 overflows from the East and West Sea Breeze systems. See the below Figure 1 for a regional map of Sea Breeze, and Figure 2 for a diagram of their combined sewer overflow system. Due to the age and location of the current POTW, the system is unable to expand much beyond its current capacity.

Sea Breeze has a strong environmental group, South Pond Enviro-Watchers (SPEW), who has been turning their attention to the local rivers, streams and estuaries. They have been studying the local salmonid species for decades, and saw a decrease in juvenile and returning adult populations. In an attempt to determine why the population is dwindling, SPEW took river water and sediment samples at five locations, as depicted on Figure 1. Analysis came back, included in Table 1. Samples were analyzed for various constituents, with the standouts being polyfluoroalkyl substances (PFAs), various pharmaceuticals, and micro-plastics, at significant levels.

The decrease in Salmonids and the results of the sampling set off alarms and SPEW notified the Department of Environmental Recovery & Protection (DERP), the City, and the newspaper of their findings.

“These numbers are astounding, and now we know. DERP is making this a high priority, and we have to get these upland sources under control and clean up the river.” - Stevie Flowers, Sea Breeze Department of Environmental Recovery & Protection

To help the town figure out these issues, and ensure that DERP signs a clean bill of health for this community, you, the renowned environmental consultant have been hired to develop a plan of action. There are many potential sources of these contaminants of concern, and the impacts are wide reaching. You have been tasked with developing a plan and various remedies that *at least* include the following:

1. Identify contaminant sources and their pathways
2. Assess and communicate potential impacts to the town
3. Work with sources on remedies and potential costs
4. Develop sediment remedies and associated timelines

Figure 1. The town of Sea Breeze, large structures, and river water/sediment sample locations collected by South Pond Enviro-Watchers

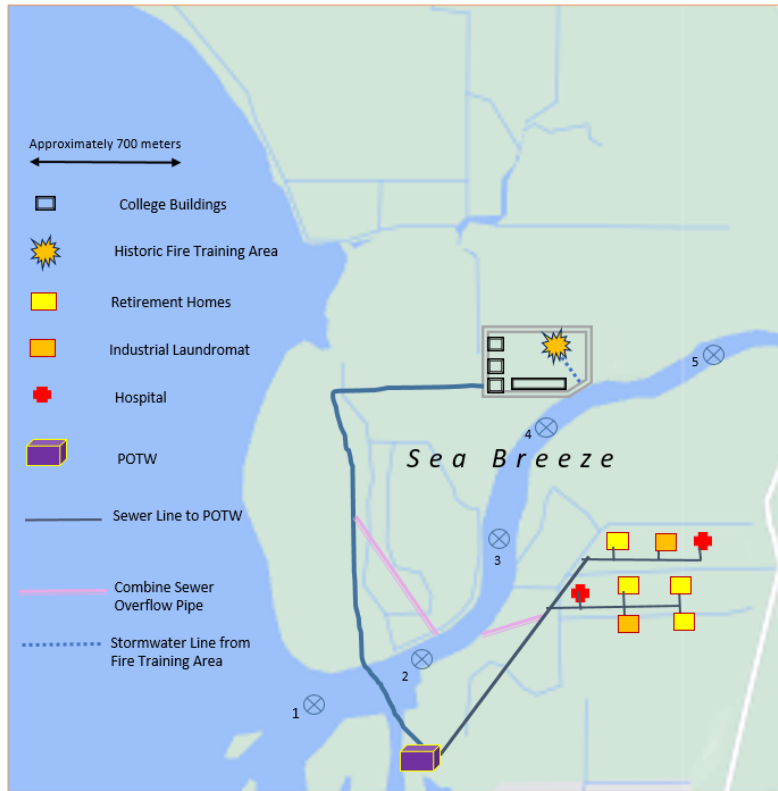


Figure 2. Depiction of Sea Breeze's combine sewer stormwater overflow system during dry and wet weather.

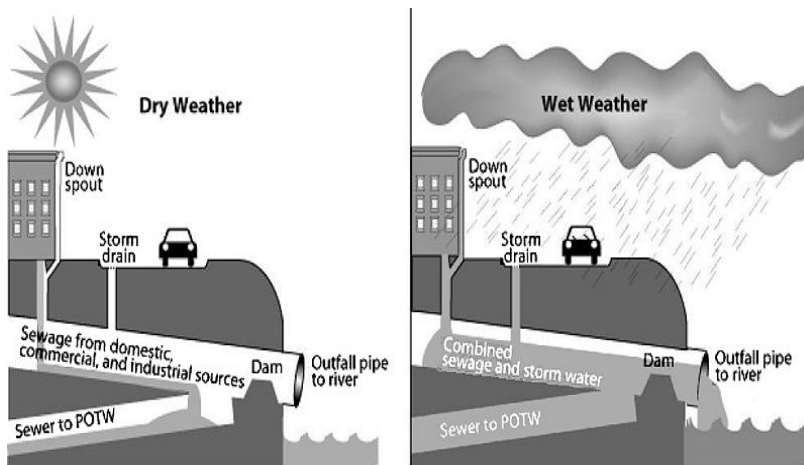


Table 1. Concentrations of contaminants detected within each of the five river water and sediment samples captured by SPEW.

Sample Locations	Contaminants Detected Above Action Levels or Levels of Suspected Concern*		
	PFA's	Pharmaceuticals	Micro-plastics*
1	Yes	Yes	Yes
2	Yes	Yes	Yes
3	Yes	No	No
4	Yes	No	No
5	No	No	No

### **Your Assignment**

You are being hired as the town’s renowned team of unbiased environmental consultants to address the who, what, where, when and why of what needs to be done to help the river health and potential contamination and associated upland source control measures. Your proposed plan needs to balance environmental impacts, discharges to water, waste issues, social license, and economic interests. To be successful in your presentation, you must tactfully and eloquently articulate issues, knowns, unknowns, and recommendations for the completion of this effort.

There is no easy answer that will please everyone completely. You must do your best to build public support, articulate how to address the concerns of community groups, and ensure the project provides the most tangible environmental, economic, and social benefits.

### **The Expectation**

Numbers are not what is most important – logic train, process, conceptualizations, and creativity are the most important considerations for your proposal and presentation. As you may notice, and as we have intended, you have not been given all the information you might require or desire to solve this problem. Such is life.

We encourage you to make assumptions, but you must be ready to defend them and pass the “straight-face” test. Keep in mind this is a competition, and every team may make assumptions with the given information differently. Remember the fundamental principle for success on any project is to KISS (keep it simple st...eve). You will be expected to present your thoughts in a public forum: eloquently, succinctly, and persuasively.

A note on professionalism: you will notice that a bit of humor is woven into this problem. PNWIS traditionally keeps the EC light so students have fun. We encourage you to do the same. That being said, choose wisely the humor you wish to employ.

The judges are a collective of professionals ranging from those who are young and early in their career, to those who are heads of companies and presidents of national organizations. You are under the microscope by an eclectic group of individuals, so keep it tasteful and be respectful.

### **The Proposal**

Submit your team’s proposal by **5 p.m. PST on Friday, October 30th, 2020**, via e-mail to [Melody.Kieneker@erm.com](mailto:Melody.Kieneker@erm.com).

The proposal should outline the team members by name and assumed project role (e.g. “David Bowie” is going to be engineer and will address waste issues, “Carl Sagan” is going to be your air quality expert and thermodynamics enthusiast, “Frederick Law Olmsted” is going to be your landscape architect, and “Kermit” is going to be your urban planner and sustainability champion). The proposal should illustrate the technologies and strategies your team has identified, along with a clear approach of how you will implement them.

### **The Tweak**

No matter how much you do and know, unexpected events and expectations can and do occur in real life. To this end, expect some late-breaking information that might alter your approach and require your plan to evolve, perhaps substantially. The problem and “the Tweak” will require that you find and talk to experts and attend various presentations during the conference for answers and important information. Details on where you need to be to interact with key players will be provided on the first day of the conference. Remember, those who are most successful in the “real world” are those that can identify what resources they have and use them. You are at a professional conference; what resources do you have?

When you submit your proposal, you will receive the Tweak via email prior to the conference. The sooner you submit the proposal the sooner you get the Tweak, but the earliest you will receive the Tweak is the day you submit your proposals.

Good luck and have fun!

### **PROTOCOL**

Pay close attention to the protocol and follow the rules to a tee. This is a game of points. The proposals need to follow the guidelines established in the protocols listed below. **READ THE BELOW PROTOCOLS!**

### **The Presentation**

Your team will need to demonstrate your understanding of the issues that you addressed in your proposal. You must include not only your key elements from your proposal, but also demonstrate adaptive management in dealing with the Tweak. Sustainable approaches for these and other site issues are of great interest to most stakeholders. The winning team presentation will be strong in logic, clarity, application, and creativity.

This year, all sessions will be held virtually. During the week of November 2-6<sup>th</sup> each team will have a TEAMS meeting with each role player to discuss their proposals and incorporate their feedback. This week will also contain any important meeting the teams need to participate in, and have available slots for meeting to discuss troubleshooting for technology, or general Q/A for the challenge. Final presentations will be held during the week of Nov 9 – 13. Scheduling of the calls will be coordinated with each team to ensure that the virtual sessions line up with other work or school commitments. This will be discussed closer to the event. If you have any direct concerns, please reach out to Melody Kieneker. For presentations, plan for no more than 15 minutes of presentation followed by 5 minutes of questions and answers. You will be timed, and the 15-minute rule is strictly enforced. If your presentation is shorter than 15 minutes, the extra time may be used for further questions.

### **EC Competition Preparation**

Once the problem is posted, students should immediately start to form teams and identify/recruit representatives from appropriate disciplines as needed to address the problem holistically. Just as corporations and other organizations pull together teams from their staff to most effectively address any given project, so too should each student team. Student teams may not contain more than 5 members and are generally comprised of 3 to 5 individuals.

Each team must send an e-mail to Melody Kieneker stating your intent to compete ([Melody.Kieneker@erm.com](mailto:Melody.Kieneker@erm.com)). This e-mail will serve as your enrollment in the EC competition. The email addresses that enrolled the teams will also be used

to deliver information of any changes prior to the competition. If you have questions, submit them to Melody Kieneker. Answers to the questions will be sent out to all teams.

Each team member must register for the PNWIS Annual Conference in addition to stating their intent to compete. See the conference website for registration links. (<http://www.pnwis.org/annualconference2019/>).

### **Eligibility**

The EC competition is open to all students who are registered for the PNWIS Annual Conference and have not been out of school for more than 1 full year. The competition will be a combined event for graduate and undergraduate students competing equally.

### **Expectations for proposed problem solutions**

Solid technical analysis, logic train, process, conceptualizations, and creativity are all critically important to the proposal and presentation composition. Clear and concise presentation of your thoughts in a public forum is paramount to success.

### **Written Proposal Guidelines**

Each team must submit a written proposal prior to the PNWIS Virtual sessions on Friday October 30, 2020, by 5 p.m. PST addressing the problem. The written proposal should provide an outline of the approach that your team is going to take, the issues that you will be discussing, and shall not exceed 3 pages (not including Title Page and up to 3 diagrams, tables, or figures). Please do not forget to include your school, student names, and roles of each team member.

#### **Proposal formatting guidelines include the following:**

- 10 Pt Font (Times New Roman or equivalent)
- 1.5 Line Spacing
- 1 Inch Margins
- Divide your proposal into ordered sections
- References in text must be fully cited at the end of the proposal.
  - Example:
    - Reference in text – (Kuhn, 1962)
    - Full reference at end – T. Kuhn. The Structure of Scientific Revolutions (University of Chicago Press, 1962), pp. 27-42

#### **Penalties for breaches in protocol:**

- Late Submittal (5 Points Per Day)
- Failure to Register with Melody Kieneker prior to proposal submittal (5 Points)
- Deviating From Formatting Guidelines (3 Points Per Infraction, up to 15 Points)
- Failure to Interview all Roll Players (Up to 10 Points Per Roll Player, at Roll Players Discretion)

## **Role Players**

This year, all sessions will be held virtually. During the week of November 2-6<sup>th</sup> each team will have a TEAMS meeting with each role player to discuss their proposals and incorporate their feedback. This week will also contain any important meeting the teams need to participate in, and have available slots for meeting to discuss troubleshooting for technology, or general Q/A for the challenge. Role player TEAMS sessions will be approximately 30 minute sessions per team to address questions.

These role players will be project proponent(s), regulators, politicians, activists and other expected or unexpected individuals critical to creating a solution to the problem. Role players will offer insight and clarify any additional questions each team may have in relation to the problem. Please use professionalism during all business meetings, technical sessions, and plenary sessions; have fun while remembering your environment. While these role players are critical, so are the technical sessions and exhibitors that are related to the problem.

## **Competition Information and Final presentation**

For the final presentation, teams must demonstrate their understanding of the issues in the written proposal and address the Tweak. A multi-faceted approach is essential. The solution must address technical, social, and environmental issues.

The winning team presentation will be strong in approach, logic, clarity, application, and creativity.

To further allow for students to network and talk with professionals (since this year is virtual), we will be coordinating some group TEAMS meetings or other forums for. Additionally, see the PNWIS conference website for a list of ongoing conference sessions for the event.

Winners will be announced after the final presentations on a group TEAMS call during the week of Nov 9-13 set up based on the availability of all teams. To be discussed upon orientation.

Good luck and have fun!

## **EC Timeline**

End-September 2020: EC Problem Posted

October 30: EC Proposal due by 5 pm PST

October 30: Tweak Sent to Teams after Proposal Submitted

November 2 - 6: PNWIS Role Player and Troubleshooting sessions

November 9 - 13: Virtual Final presentations with Role Players and Judges

November 13: Announcement of Winners (Time TBD)

If scheduling dates, times, or locations change all participants will be notified as soon as possible. Please reach out with any questions or concerns.

## **Submit Proposals and questions to:**

Melody Kienecker

[Melody.Kienecker@erm.com](mailto:Melody.Kienecker@erm.com)