



# The New York Water Environment Association, Inc.

## *The Water Quality Management Professionals*

525 Plum Street • Suite 102

Syracuse, New York 13204

(315) 422-7811 • Fax: 422-3851

[www.nywea.org](http://www.nywea.org)

## **NYWEA – Student Design Competition**

### **INTRODUCTION**

The NYWEA Student Design Competition (SDC) is intended to promote a “real world” design experience for students interested in pursuing an education and/or career in water engineering and sciences. This competition tasks teams of student members within NYWEA to design and present a project solution meeting the requirements of a problem statement that they have worked on together as a team. This competition is intended for both undergraduate and graduate students, typically completing a capstone project.

For More Information, contact:

Sara Igielski (she/her), SDC Subcommittee Co-Chair: 347-535-2735 or  
[sigielski@carollo.com](mailto:sigielski@carollo.com)

Stephanie Castro-Sánchez (she/her), SDC Subcommittee Co-Chair: 631-391-5216 or  
[stephanie.castro@arcadis.com](mailto:stephanie.castro@arcadis.com)

The NYWEA Young Professionals (YP) Committee established the SDC Subcommittee to facilitate the NYWEA SDC. The SDC Subcommittee is always looking for interested people to further promote, enhance, and contribute to the SDC. If you are interested in helping or becoming a member, please contact Sara Igielski.

### **STUDENT DESIGN COMPETITION**

Student Design teams compete in one of two categories, wastewater design (WW) and water environment design (ENV). Students will need to specify which group they believe their project falls into. Final grouping is at the discretion of the SDC Subcommittee. The wastewater design competition is intended to include traditional wastewater collection and treatment design projects, such as hydraulic capacity design, upgrades to existing treatment systems, biosolids handling, etc. The water environment design competition is intended to include contemporary engineering topics, such as stormwater management design, green infrastructure, low impact development, water reuse, wetland construction, distributed treatment systems, systems in developing countries, etc. Both competitions will follow the same guidelines and the same scoring system.

The competition consists of two portions, the written submittal and the presentation, which will take place virtually in May 2022.

The scope and extent of the project should be consistent with the level of a senior or graduate engineering/science design or capstone course. Students are expected to work with little assistance from an advisor, professor, and/or industry professionals/consultants. The students are expected to work together as a team to recommend a complete engineering design solution.



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Students may use whatever printed or digital references or resources they choose, with appropriate citations.

Students are expected to perform the necessary calculations for the project. This is not intended to be a study or research project or literature review. Although some initial literature review and/or research will be required, the bulk of the project should incorporate pertinent calculations for the design.

For example, if the project involved a wastewater treatment plant expansion, judges will look that each team performed the following:

- Decision matrix (provide why you ended up with that particular process or design etc.).
- Hydraulic profile.
- Preliminary sizing of major equipment (aeration basins, clarifiers, chlorine contact chambers, etc.).
- Incorporated information from different manufacturers.
- Population analysis to determine design flow rates; and
- Preliminary cost evaluation for both capital and operational costs.

All the design work should be submitted in the design report, clearly labeled and referenced. See below for information regarding the report.

Scoring of the project will be determined through an evaluation by a panel of judges selected from the NYWEA community of the written and oral presentation skills. Written and oral skills will be evaluated separately, and the scores will be added for the total score (see Exhibit A for the example judges scoring sheets).

Written data (submitted in electronic format) will be evaluated by the judges prior to the oral presentations. The data will be available to the judges during the oral presentation for their reference. After the oral presentation, judges are permitted to ask questions based on information provided in both the written submittal and oral presentation.

## **ENTRY FORM**

Each team shall submit an entry form for the competition that includes the names of team members and presenters by 11:59PM on April 15, 2022. Each university is permitted to send up to two teams to the competition, one in each category (WW and ENV).

## **PRIZES**

The two highest scoring teams (can be two teams from the same category) will be partially sponsored to compete and attend the WEF SDC held at the Water Environment Federation's Technical Exhibition and Conference (WEFTEC) in October 2022. Both winning teams should follow the WEF deadlines and guidelines for the national competition, located on their website at



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<https://www.wef.org/globalassets/assets-wef/2--membership/member-associations/students-and-young-professionals/2022-wef-competition-guidelines.pdf>.

The two highest scoring teams will be announced at the conclusion of the virtual SDC. The Awards presentation will be held at the NYWEA Annual Conference Awards Ceremony. Team members or designees of the team are encouraged to attend the Awards presentation.

### **GENERAL REQUIREMENTS**

The general requirements for participation in the competition are:

- Team size will be limited to a maximum of four presenting students per team, however additional supporting team members are allowed. All supporting team members shall play an active role and be listed on the “Summary of Project Team of Effort” with their associated role description. One team per school is allowed in each design category. It is recommended that schools with more than one team interested in a design category host an internal competition to determine the team who will compete at the NYWEA Student Design Competition. A school may sponsor two teams, one in each design category. Up to two graduate students could be part of the team, however teams of only graduate students will not be allowed.
- The sponsoring professor should provide limited assistance to the students on an as needed basis, keeping in mind that this project should be the students’ opportunity to showcase their knowledge gained throughout their time in school.
- The engagement of the professional community and the local chapters of the NYWEA is strongly encouraged. Project topics, design data, and feedback may be obtained from members of the professional community.
- Attendance at the virtual Student Design Competition in May.
- Each member of each team must be a WEF/NYWEA Student Member in good standing who:
  - Has been selected by their university to participate.
  - Have an established NYWEA student chapter and paid the required dues prior to the competition. The same holds true for continuing Student Members.
- Student members who have graduated at the time of the NYWEA Competition will be allowed to participate, if they were a registered student within the last 6 months. Students who have graduated must also be a member of WEF/NYWEA.
- NYWEA reserves the right to publicize material(s).
- A representative of the NYWEA will preside during the competition and ensure that there is adherence to the time schedule and event rules.



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### WRITTEN SUBMITTAL REQUIREMENTS

Design documents shall be created in a single PDF format file that is organized with over pages, table of contents, report sections, and appendices, if used. The single PDF file shall be emailed to Sara and Stephanie the co-chairs by the deadline. The design report shall include, in the following order:

1. **Cover Page** – with project name, university name (team name), year, and entrants' names.
2. **Table of Contents**
3. **Abstract/ Executive Summary** – Provide a brief overview/ summary of the design, not to exceed 200 words. This section is not counted as part of the 20-page limit.
4. **Summary of Project Team Effort** – Provide a 1 – 2-page summary of the project team effort, including:
  - Each team member's name and role in the effort
  - Names of any other individuals that assisted in the effort. This section is not counted as part of the 20-page limit.
5. **Project Description** – Provide a description of the design problem, alternatives evaluation, and recommended design solution (not to exceed 20 pages), including the following information:
  - Statement of design problem.
  - Discussion of alternatives evaluation – Discussion should provide a clear description of the alternatives and evaluation technique.
  - Description of recommended design solution – Discussion must cover the salient facts upon which the recommendation is made, present a clear recommendation of action, and provide bases for design. Relevant data should be presented in a clear manner. All elements shown on the judging form should be addressed, including economic analysis.
  - Formatting to include a minimum of 0.75-inch margins on all sides; Calibri, Arial, or Times New Roman font with a minimum 11-point font size.
  - Pages of the Project Description portion of the report shall be continuously numbered.
  - Color diagrams, graphics, plots, and photographs may be included that reflect the unique features of the project. Each is to be identified with an appropriate descriptive caption. Graphics/photos included within the project description will count toward the 20-page limit.
    - \*The number of pages used in the Project Description is checked to ensure compliance with the 20-page limit. Non-compliance may result in penalties.
6. **Supporting Documentation** – If needed, provide drawings, calculations, tables, vendor submittals, detailed cost estimates, and other voluminous documents, as appendices.
7. **References/Acknowledgements** – All references and resources used for this project shall be cited appropriately.



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The judges will be directed to focus their review on the Project Description section of the design reports. Teams shall develop their materials such that their complete analysis and design solution may be understood from the 20 pages of material provided in the Project Description.

Teams are encouraged to use a checklist to ensure all necessary documents are included in the design reports. Failure to ensure all documents are accounted for may result in a team penalty.

### **PRESENTATION REQUIREMENTS**

A presentation describing the teams design problem, approach, evaluation, design effort, and recommendations shall be created in PowerPoint format.

Each team will be allowed a thirty (30) minute block of presentation time, including a two (2) minute setup, twenty (20) minute presentation directly followed by an eight (8) minute question and answer session. There will be time warning signs given during the presentation when there are 5 minutes and 1 minute remaining to help the students from going over their time allotment. To stay on schedule, the presentation will be kindly cut off after 20 minutes, even if there are slides remaining. Therefore, time management and practice are important.

A team may have up to four presenters. Each presenter is encouraged to have a role in the presentation and in answering questions. If required, one additional team member (a fifth team member) may be on the presentation team but shall be dedicated solely to advancing the presentation slides. Questions are drawn from the judging panel only. The presentation will be hosted on a virtual conferencing platform.

### **SIGNIFICANT SUBMITTAL ITEMS AND DATES**

Each entry will consist of the following:

- A **Team Entry Form** submitted to the SDC Co-Chairs and NYWEA by 11:59pm on April 15, 2022. Please contact the SDC Co-Chairs in advance if a university has multiple teams interested in one category and is intending to hold an internal competition after the **Team Entry Form** deadline.
- Project reports must be received by the SDC Co-Chairs no later than 11:59pm on May 13, 2022.
- Project presentations must be received by the SDC Co-Chairs no later than 11:59PM on May 27, 2022.
- The presentations will be made end of May 2022.



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### **JUDGES AND JUDGING CRITERIA**

The event will be judged by an impartial panel consisting of members of academia, public agencies, and private consulting practices. The judging team shall have no direct affiliation/representation with any college participating, owner project, or engineering firm involved as part of the projects they will be judging.

NYWEA is a multi-disciplined environmental professional organization dedicated to quality in practice of the profession. Accordingly, judging will be based on the elements outlined below and in the scoring sheets provided in Exhibit A. The Student Activities Committee reserves the right to adjust the format and content of the scoring sheets provided in Exhibit A prior to commencement of the competition. Participating teams will be provided with a copy of the revised sheets prior to the competition if such adjustments are made.

Judges will use the scoring sheets provided as the basis for judging of the students' designs. The NYWEA presiding official will hold the results of the written submittal scores until after the presentations are complete and scored. The scoring sheets will be collected after the presentation and the scores will be added to the written scores and tallied. The team with the highest score in each category will be awarded First Place.

In the event of a numerical tie, the winner will be decided by the scoring of the presentations. The final scores may not be released; however, qualitative feedback will be provided to the students after the Student Design Competition.

### **DESIGN REPORT**

#### **Technical**

Was the Project Description section of the report organized effectively with a Statement of Problem, appropriate background information, clear description of the alternatives evaluated, etc? Was a continuous, logical sequence of steps taken to solve the design problem? Was the recommended solution feasible and appropriate to address the problem statement? Was a creative and innovative approach used? Was knowledge of subject matter demonstrated? Was the design solution analyzed for economic feasibility; was this analysis presented? Were works cited and credit to resources and assistance correctly presented? Was the complete analysis and design solution presented clearly within the 20 page Project Description?

#### **Presentation**

Were visual aids (graphs, supporting info, pictures, etc.), presented clearly? Were correct grammar, correct spelling, and appropriate technical writing methods used? Was the formatting and organization of the report presented in a logical manner?



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### ORAL PRESENTATION

#### **Content**

Was subject technical or general in nature? Was technical subject matter relevant to design? To what extent was subject of interest to a technical audience? Was knowledge of subject and presentation content exhibited by team members? Was the work presented independent and original? Was credit given for source of material or contribution by others? Was there any novel approach to the solution?

#### **Organization**

Was there sufficient background information provided in order to introduce the audience to the subject? Were facts developed in logical and continuous sequence? Was there a definite conclusion and was it adequately based on the facts or data presented?

#### **Delivery and Effectiveness**

Was appropriate volume used to reach all audience members? Did team members use proper English? Was the vocabulary used sufficient? Were the words distinctly pronounced? Was personal appearance appropriate? Were there any distracting mannerisms? Was the manner of delivery (conversation, memorized, read from manuscript) satisfactory? If visual aids were used, how effectively were they used?

#### **Discussion**

Did the presentation evoke spontaneous questions from the panel? Did questions indicate the need for clarification of facts presented or were they merely of the type seeking additional information? How readily and with what self-assurance did the speaker answer questions? Did the answers indicate knowledge of subject beyond that disclosed in the original presentation?

### PENALTIES

Penalties may be assessed for misconduct by any of the teams and are at the discretion of the SDC Subcommittee.

Penalties may include:

- Points taken off from the final score
- Disqualification of an individual team
- Disqualification of a school

Some of the items that can lead to penalties include:

- Failure to submit entries on time
- Failure to comply with abstract or report guidelines



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- Failure to comply with presentation guidelines
- Inappropriate assistance from a mentor, professor or other outside source
- Plagiarism (all sources and resources must be properly cited)
- Failure to obtain WEF/NYWEA memberships
- Misconduct by the team, sponsors or others associated with the team

### **SPONSORSHIPS**

In addition to NYWEA funding, the SDC is largely supported by the generous financial contributions of sponsors. If you know of an organization who is interested in sponsoring the SDC, please have them contact the SDC Co-Chairs below. All sponsors will receive recognition for their support and their logo will appear on all SDC materials and the NYWEA webpage.

### **QUESTIONS OR COMMENTS**

Please review the entire SDC Guidelines and contact the SDC Co-Chairs for any clarification on any of the rules or guidelines of the program. The Chair may be contacted at:

Sara Igielski, Carollo Engineers, Work: 347-535-2735

Email: [sigielski@carollo.com](mailto:sigielski@carollo.com)

Stephanie Castro-Sánchez, Arcadis; Work: 631-391-5216

Email: [stephanie.castro@arcadis.com](mailto:stephanie.castro@arcadis.com)

**EXHIBIT A**  
**NYWEA SDC SCORING SHEETS**

## SCORING TALLY SHEET 2022 NYWEA SDC

|   |                         |                               |              |
|---|-------------------------|-------------------------------|--------------|
| <b>Project Team &amp; University:</b>                         |                         |                               |              |
| <b>Project Title:</b>   |                         |                               |              |
|   | <b>Report<br/>Score</b> | <b>Presentation<br/>Score</b> | <b>Total</b> |
| Judge #1  |                         |                               |              |
| Judge #2  |                         |                               |              |
| Judge #3  |                         |                               |              |
| Judge #4  |                         |                               |              |
| Average Score   |                         |                               |              |
| <b>PENALTIES</b><br>(to be assessed by Subcommittee)          |                         |                               |              |
| <b>FINAL SCORE</b><br>(Sum of Average Scores minus Penalties) |                         |                               |              |

# SCORING SHEET

## 2022 NYWEA SDC DESIGN REPORT

Name of University: \_\_\_\_\_

Project Title: \_\_\_\_\_

Judge: \_\_\_\_\_

### Technical Content - 80 pts

1. Appropriate level of detail used in introduction, statement of problem, background information provided to ensure reader fully understands the scope of the project? (5 pts)..... \_\_\_\_\_
  2. Continuous, logical sequence of steps to solution presented including justification for decisions and clearly demonstrating the team's technical knowledge? (15 pts) ..... \_\_\_\_\_
  4. Was design solution feasible and appropriate to address problem statement? Were all relevant aspects required by the problem statement included in the final design solution? (15 pts) ..... \_\_\_\_\_
  5. Were creativity and innovative approaches applied?<sup>1</sup>(20 pts) ..... \_\_\_\_\_
  6. Was knowledge of subject matter demonstrated? (10 pts)..... \_\_\_\_\_
  7. Were appropriate economic and feasibility analyses presented? (10 pts) ..... \_\_\_\_\_
  8. Were appropriate citations use to credit resources? (5 pts) ..... \_\_\_\_\_
- TOTAL (80 pts).....** \_\_\_\_\_

### Report Appearance and Organization - 20 pts

1. Were visual aids (graphs, supporting info, pictures, etc.) presented clearly? (10 pts) ..... \_\_\_\_\_
  2. Were correct grammar, correct spelling, and technical writing methods used? (5 pts) ..... \_\_\_\_\_
  3. Was formatting and organization of report presented in a logical manner? (5 pts)..... \_\_\_\_\_
- TOTAL (20 pts).....** \_\_\_\_\_

**GRAND TOTAL (100 pts) .....** \_\_\_\_\_

### COMMENTS:

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1. "Creativity is the development of fresh ideas, while innovation is the procedure of making these ideas tangible so that they can be used in a design process... an innovation is the implementation of a new or significantly improved product (good or service), or process..." – Chetan Ghooli, Irfan S, Manjunath V. "Design Innovation and Creativity". International Journal of Advanced Technology in Engineering and Science, Vol. No. 5, Issue No. 03, March 2017, pp. 1154

The judges will evaluate whether the Project Team approached the problem in a creative way and assess if members went above and beyond (e.g., sampling, coordination/partnering with someone that may not be typical) as part of the design process. Higher scoring teams may consider including an evaluation or comparison of alternatives in order to validate and demonstrate understanding of the proposed design solution.

# EXAMPLE SCORING SHEET

## 2022 SDC PRESENTATION

Name of University: \_\_\_\_\_

Project Title: \_\_\_\_\_

Judge: \_\_\_\_\_

### Presentation technical Content - 45 pts

1. Presentation included sufficient depth of technical information (15 pts)..... \_\_\_\_\_
  2. Team displayed adequate knowledge of subject and presentation content (15pts)..... \_\_\_\_\_
  3. Recommended design solution was original and innovative (15 pts)..... \_\_\_\_\_
- TOTAL (45 pts).....** \_\_\_\_\_

### Presentation Organization - 20 pts

1. Sufficient background information was provided (5 pts)..... \_\_\_\_\_
  2. Essential facts were developed in a logical and continuous sequence (10pts)..... \_\_\_\_\_
  3. Recommended design solution was based on facts and data presented (5 pts) ..... \_\_\_\_\_
- TOTAL (20 pts).....** \_\_\_\_\_

### Delivery & Effectiveness - 25 pts

1. Presentation and visual aides were clear, legible, and effective (10 pts)..... \_\_\_\_\_
  2. Vocal delivery was appropriate (not memorized nor read directly; proper volume, distinct pronunciation, and appropriate vocabulary used) (10 pts) ..... \_\_\_\_\_
  3. Eye contact was made with judges and audience(5 pts)..... \_\_\_\_\_
- TOTAL (25 pts).....** \_\_\_\_\_

### Discussion - 10 pts

1. Answers to questions posed by judges were clear and technically correct (5 pts)..... \_\_\_\_\_
  2. Answers indicated knowledge of subject beyond presented material (5 pts) ..... \_\_\_\_\_
- TOTAL (10 pts).....** \_\_\_\_\_

**GRAND TOTAL (100 pts) .....** \_\_\_\_\_

### COMMENTS:

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