

CONTECH URBAN STORMWATER & DRAINAGE DESIGN COMPETITION

2024 CONTECH DESIGN COMPETITION

CONTECH DESIGN COMPETITION

Contech's Urban Stormwater and Drainage Design Competition offers an exciting opportunity for students to showcase their innovation and problem-solving skills in civil engineering. By participating, students not only tackle real-world challenges, but also gain invaluable experience for their future careers.

Building upon the success of our 2023 event, Contech is proud to announce the expansion of the 2024 competition, now featuring distinct Stormwater and Drainage tracks. This expansion allows for a deeper exploration of each area, providing participants with more focused challenges and opportunities to excel.

ELIGIBILITY

The competition is open to undergraduate students enrolled in accredited colleges or universities in the United States and its territories. Whether working individually or in teams of up to five members, students from relevant fields such as civil engineering and environmental sciences are encouraged to participate.

SCHEDULE

Mark your calendars! Registration for the competition begins on August 1, 2024, and closes on September 30, 2024. All project submissions must be received by November 10, 2024. Presentations will take place in early December 2024, with winners announced later that month.

AWARDS

The top teams from each track will be awarded cash prizes, recognizing their outstanding achievements. Prizes for each track are as follows:

- 1st Prize \$5,000
- 2nd Prize \$3,000
- 3rd Prize \$2,000

REGISTRATION

To participate, teams must complete the online registration form at www.conteches.com/Design-Competition during the registration period. Upon submission, teams will receive confirmation of their acceptance into the competition. Hurry, as participation is limited to 100 teams per track!

JUDGING

Our expert judging panels, comprised of professionals from various disciplines within Contech Engineered Solutions, will evaluate submissions based on the following criteria:

- Engineering: Accuracy and completeness of calculations (33%)
- Site Design: Efficiency and creativity of the design (33%)
- Communication: Clarity, completeness, and professionalism of project submissions and presentations (33%)

TEAM PRESENTATIONS

The top three teams from each track will present their projects to the judging committees via live online meetings. Teams are encouraged to utilize PowerPoint and other media to enhance their presentations, ensuring all elements from their written submissions are effectively communicated. Further details regarding the presentations will be provided to the selected teams.

Join us in shaping the future of urban stormwater and drainage management. Let your ideas flow and make a difference in the world of civil engineering!



DRAINAGE COMPETITION

In this design scenario, you will be designing a solution to address two existing runs of storm drains that need to be rehabilitated as replacement is not optimal. Students will have the opportunity to demonstrate their technical knowledge and gain valuable experience by presenting their solutions to industry professionals.



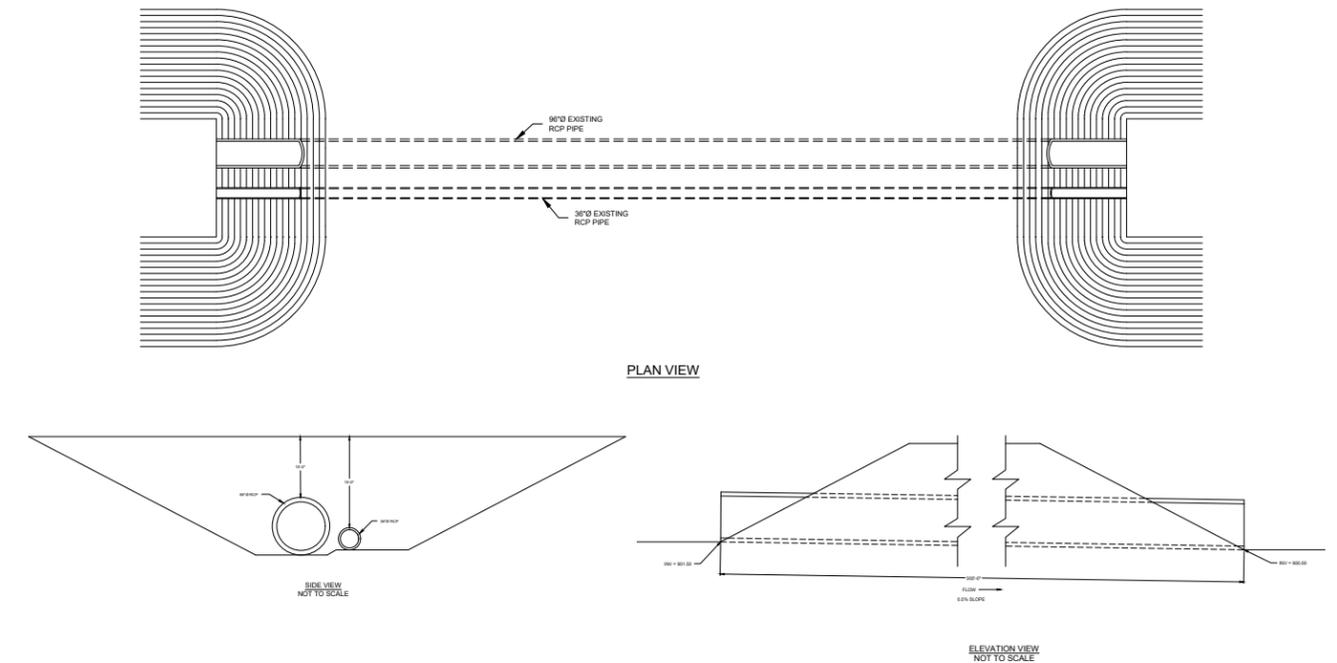
DRAINAGE DESIGN SCENARIO

There are two existing runs of reinforced concrete pipe (RCP) storm drain underneath a runway at the Cincinnati International Airport: an eight-foot diameter pipe and a thirty-six-inch diameter pipe. Both RCPs are 300 feet in length and slope at 0.50%. During a 100-year storm event, the eight-foot diameter pipe is expected to convey 400cfs of flow and thirty-six-inch diameter pipe is expected to convey 50cfs of flow. The top of the eight-foot diameter pipe is buried 10' below the pavement of the runway and the top of the thirty-six-inch diameter pipe is buried 15' below the pavement of the runway. Both pipes have been in service for 50 years and a maintenance crew has noted that the joints are separating and that there is exposed rebar. Despite the separated joints, the pipes have maintained a straight alignment, with no significant deflections from the inlet to the outlet. The airport is looking to rehabilitate the reinforced concrete pipes with a cost-effective solution. Because the existing pipes are underneath an active runway, the runway must remain fully operational during the rehabilitation (they cannot dig and replace).

As an engineering consultant, you are tasked with coming up with a solution to rehabilitate the storm drain structures while maintaining the hydraulic performance within 10% of the current capacity. The rehabilitation solution must be able to fully support the structural demands (dead load and live load) without any contribution from the host pipe. The solution must be able to maintain a service life of an additional 50 years.



DRAINAGE DESIGN COMPETITION DRAWING



DRAINAGE DESIGN COMPETITION DELIVERABLES

1. EXECUTIVE SUMMARY
 - 1.1 The Executive Summary should include the overall design process and final rehabilitation design solution proposed.
2. DESIGN CALCULATIONS
 - 2.1 Structural calculations of the rehab solutions that includes references to relevant AASHTO LRFD Design specifications with appropriate aircraft loading considered.
3. INDUSTRY SPECIFICATIONS
 - 3.1 Provide specification references for installation requirements of the rehab solution.
4. WRITTEN JUSTIFICATION
 - 4.1 Written justification for the proposed rehabilitation solution as well as how it will meet the required 50-year service life expectancy.
 - 4.2 A detailed hydraulic analysis of the proposed rehabilitation solution showing that it meets the 100-year storm event.
5. COST ESTIMATE
 - 5.1 Provide a cost estimate for all reline materials necessary to perform the proposed rehabilitation (e.g. material costs may include pipe material, liners, struts, grout materials, etc.). Total installed costs are not required – which may include manhours, rental equipment, etc.

ADDITIONAL INFORMATION

Additional information will be provided to teams after completing the registration process.

STORMWATER COMPETITION

In this scenario, students will be designing a stormwater management system at a new commercial development to meet local regulatory requirements for stormwater quantity and quality control. Participants will face a complex, real-world scenario that requires a deep understanding of hydrological principles, environmental regulations, and innovative design techniques.

This is your chance to demonstrate your ability to analyze complex data, utilize advanced modeling software, and propose practical, cost-effective solutions that address both engineering requirements and environmental concerns. You'll collaborate with teammates to integrate multiple disciplines, communicate your ideas effectively, and defend your design to a panel of industry experts.

STORMWATER DESIGN SCENARIO

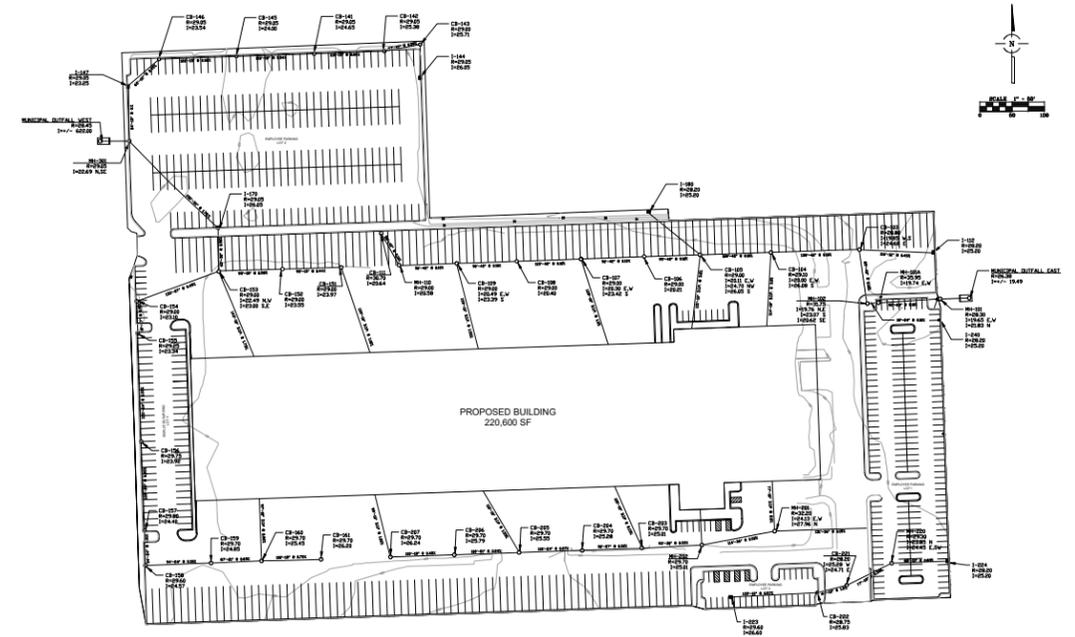
CES Logistics is developing a new site that will contain a warehouse facility for freight loading/unloading/sorting. Their priorities are to keep costs as low as reasonably possible, maximize usable space for truck and employee parking, minimize flooding/ponding in the lots, and ensure stormwater facility maintenance can be done without interrupting the facility activities.

This project is set in New York State and should comply with applicable stormwater management criteria for New York. Teams should utilize the 2015 NYS Dept. of Environmental Conservation (NYSDEC) Stormwater Manual and other resources on NYSDEC's website to obtain relevant stormwater quality and quantity control details.

2015 Stormwater Design Manual: <https://extapps.dec.ny.gov/fs/docs/pdf/stormwaterdesignmanual2015.pdf>

NYSDEC Stormwater Resources: <https://dec.ny.gov/environmental-protection/water/water-quality/stormwater/construction-stormwater-toolbox>

STORMWATER DESIGN COMPETITION DRAWING



STORMWATER DESIGN REQUIREMENTS

- EXECUTIVE SUMMARY
 - The Executive Summary should include the overall design process and choices made to determine the final design.
- SITE PLANS
 - Using the drawings provided, create a site plan (plan view) showing the selected BMPs' placement, including inverts and RIMs/grading elevations.
- DESIGN CALCULATIONS
 - The minimum Runoff Reduction Volume (RRv).
 - Water quality volume or equivalent flow rate.
 - Required detention volume and demonstration of post-construction runoff rates not exceeding pre-construction runoff rates.
 - Calculations to support BMP sizing.
- WRITTEN JUSTIFICATION
 - Written justification for the stormwater management system design and stormwater BMPs used, including ongoing maintenance plans of proposed stormwater BMPs.
- DRAWINGS
 - Standard details or site-specific drawings of BMPs.

WATER QUALITY EVENT

- Based on location of project, the water quality storm event is the 90th percentile, 1.5", NRCS Type III storm event.
- Selected BMPs should be sized to have sufficient capacity to capture and treat the resulting water quality volume or to treat the water quality flow.
- NYS requires that stormwater be retained and infiltrated onsite where feasible. However, this site has poor soils and high groundwater, which will not allow for this to be a viable design approach. Water quality treatment and water quantity control will still apply.

WATER QUALITY STANDARDS

- During the design storm, reduce TSS concentrations by at least 80% during the design storm.
- Reduce total phosphorus concentrations by at least 40% during the design storm.

ADDITIONAL INFORMATION

Additional information needed to complete the design scenario will be provided to teams after completing the registration process.



STORMWATER
SOLUTIONS



PIPE
SOLUTIONS



STRUCTURES
SOLUTIONS

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**SCAN TO LEARN
MORE HERE!**

TEAM REGISTRATION DUE BY SEPTEMBER 30, 2024.

WWW.CONTECHES.COM/DESIGN-COMPETITION

THE CONTECH WAY

Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

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