



Leadership on Regional Issues

Request for Expressions of Interest

2022 – 2023

Long Island Water Quality Challenge

to promote

project-based learning in

Science, Technology, Engineering, and Mathematics (STEM) in Long
Island schools

Issued: September 29, 2022

Letters of Interest Due: November 10, 2022

A PROJECT OF THE

LONG ISLAND NITROGEN ACTION PLAN

<http://www.NYSDEC.ny.gov/lands/103654.html>

in partnership with the **New York State Department of Environmental Conservation**,
the **Nassau County Soil and Water Conservation District** and
the **Suffolk County Soil and Water Conservation District**

NOTICE OF REQUEST FOR REQUEST FOR EXPRESSIONS OF INTEREST

- Project Name:** Long Island Water Quality Challenge: A STEM Competition to Curb Nitrogen Pollution on School Grounds
- Agency:** Long Island Regional Planning Council
1864 Muttontown Road
Syosset, NY 11791
516-571-7613
- About LIRPC:** The Long Island Regional Planning Council (LIRPC) serves as the Island’s chief planner and a leading advocate for issues affecting the economic, environmental, and social well-being of Long Island’s businesses, institutions, and residents. The LIRPC conducts research, surveys and studies, which address regional needs, issues and opportunities.
- The LIRPC is partnered with the New York State Department of Environmental Conservation on the Long Island Nitrogen Action Plan (LINAP), a multiyear effort to is a multiyear initiative to reduce the amount of nitrogen entering Long Island’s groundwater and surface water.
- Project Intent:** As part of LINAP, the LIRPC is seeking participation from schools in the *2022 – 2023 Long Island Water Quality Challenge: A STEM Competition to Curb Nitrogen Pollution on School Grounds*. The initiative is being conducted to promote project-based learning in Science, Technology, Engineering, and Mathematics (STEM) in Long Island schools – public and private. Any NYS accredited educational institution on Long Island (in Nassau and Suffolk counties) that serves students in grades 6 thru 12 is eligible to submit a Letter of Interest (LOI).
- Collaboration:** The *2022 – 2023 Long Island Water Quality Challenge* is in collaboration with the NYS Department of Environmental Conservation, Nassau County Soil and Water Conservation District and the Suffolk County Soil and Water Conservation District and the South Shore Estuary Reserve.
- Release Date:** **September 29, 2022**
- LOI Due:** **November 10, 2022**
- Information:** **Contact: Elizabeth Cole, Deputy Executive Director**
email: ecole@lirpc.org | phone: 516-571-7613 | website: www.lirpc.org

Introduction

Project Goals

The *Long Island Water Quality Challenge: A STEM Competition to Curb Nitrogen Pollution on School Grounds* has been established by the Long Island Regional Planning Council (LIRPC) as part of New York State's Long Island Nitrogen Action Plan (LINAP). This initiative is being conducted to promote project-based learning in Science, Technology, Engineering, and Mathematics (STEM) in Long Island schools. The LIRPC recognizes the need for greater interaction between professionals engaged in STEM pursuits and our schools to generate excitement about STEM learning and stimulate interest in STEM careers. The goal of this STEM initiative is to connect students, teachers and their communities with LINAP and two of the nitrogen-reduction actions promoted by LINAP to reduce pollutant loads to our groundwater and surface waters: (1) 'low input' landscaping (with native plantings) and (2) stormwater treatment.

Project Background & Overview

The *Long Island Water Quality Challenge: A STEM Competition to Curb Nitrogen Pollution on School Grounds* supports one of LINAP's goal of increased public understanding of the problems with excess nitrogen in the water. LINAP is a multi-year effort led by the State's Department of Environmental Conservation (NYSDEC) and the LIRPC along with both counties and others to reduce the amount of nitrogen entering Long Island groundwater and surface water from wastewater (sewers and septic systems), stormwater runoff, and fertilizers. Excess nitrogen has led to deteriorated water quality, fish kills, shellfish die-offs, harmful algal blooms, and the declining health of our natural systems, along with impacts to recreational and commercial fisheries, boating and tourism.

Suffolk and Nassau counties are taking steps to reduce nitrogen loading from wastewater by improving and expanding sewerage, and encouraging installation of alternative/innovative onsite wastewater treatment systems. Excess nitrogen from fertilizer use is also being addressed by both counties as well as LINAP. A set of recommendations for turfgrass fertilizer applications was developed by LINAP and are designed to help curb the pervasive over-application and misapplication of nitrogen-laden fertilizers, which leach into groundwater and surface waterbodies (e.g. harbors, bays and lakes).

Citizens can also make an impact by improving their management of stormwater runoff and by reconfiguring their lawns and gardens to 'low input' landscapes. Same goes for schools. This STEM Challenge presents an opportunity for students to research, plan and innovate at their schools. Specifically, student teams will focus on: (1) 'low input' landscaping (with native plantings) and (2) stormwater treatment.

1) 'Low Input' Landscaping (with Native Plantings)

Landscape maintenance requires inputs to insure healthy turfgrass, shrubs, and trees. These include water, nutrients (fertilizers), and sometimes pesticides to reduce/prevent diseases and insect damage. Fertilizers and pesticides seep into groundwater and find their way to surface water where they contribute to deteriorating water quality. Excessive watering (irrigation) can increase the flow of nutrients/contaminants into these waters. Students will identify ways to reduce these inputs, for

example by choosing different landscape designs and plant varieties that require fewer and less harmful inputs. *

***SEE ATTACHMENT FOR HELPFUL INFORMATION ABOUT WHAT A ‘LOW INPUT’ LANDSCAPING PROJECT WOULD ENTAIL. THESE DETAILS WILL NEED TO BE INCLUDED IN THE FINAL PROJECT PROPOSAL BUT NOT REQUIRED FOR THE LETTER OF INTEREST.**

2) Stormwater Treatment

Stormwater runoff contains a variety of pollutants including nitrogen. In some areas, runoff is collected in roadway or parking lot catch basins and piped to either recharge basins or the local harbor or bay. Soil bacteria in recharge basins provide some treatment, but none is provided when stormwater is discharged to surface water. Students will identify ways, e.g. bioswales, permeable pavement and rain gardens, to collect and treat some of the runoff from their school grounds to help reduce pollutants.

***SEE ATTACHMENT FOR HELPFUL INFORMATION ABOUT WHAT A STORMWATER TREATMENT PROJECT WOULD ENTAIL. THESE DETAILS WILL NEED TO BE INCLUDED IN THE FINAL PROJECT PROPOSAL BUT NOT REQUIRED FOR THE LETTER OF INTEREST.**

In addition to project design, schools can pursue the installation of their proposals if deemed feasible. However, evaluation and scoring will be limited to the project design. Students are encouraged to “think big” and be creative and innovative. Grants up to \$2500 will be awarded to the top proposals to go towards implementation. This budget should not inhibit design ideas.

Students and faculty are encouraged to explore the online resources available on the LIRPC website at the following link: <https://lirpc.org/water-quality-challenge/>

These resources include information on stormwater treatment and ‘low input’ landscaping, including best practices.

Submission Requirements and selection

Letters of Interest

The LIRPC welcomes Letters of Interest (LOI) for participation in the Long Island Water Quality Challenge. Letters of Interest should be signed by the faculty lead as well as the principal or district administrator and submitted by email (ecole@lirpc.org).

The LOI should be submitted on institutional letterhead and should include the following: 1) A brief description of the project including how ‘low input’ landscaping (with native plantings) and/or stormwater treatment will be incorporated; 2) the class(es), grade(s), number of students, and designated faculty representatives and assistants (including contact information) with their associated program (e.g. STEM, environmental, science) at the school; 3) briefly describe the students who will participate in the competition (e.g. are the students in a club or a specific class or classes or an entire grade or grades).

Please note the following:

- Project proposals can feature one or both focus areas: (1) ‘low input’ landscaping (with native plantings), (2) stormwater treatment.
- LIRPC will provide a *certificate of participation* that can be distributed to all students involved in the intra-school competition. Also, schools are welcome and encouraged to collaborate with other schools in the district.
- The LOI is not binding; therefore, the school may withdraw from the competition at any time.

Eligibility

Any NYS accredited educational institution – public and private – in Nassau and Suffolk counties that serves students in grades 6 thru 12 is eligible to submit a Letter of Interest. Letters of Interest must include the information noted in the prior section. Depending on the level of interest in the competition, LIRPC may need to limit participation to 25 schools. If the number of Letters of Interest exceed 25, LIRPC may request that schools within the same district collaborate with each other.

Project Requirements and Project Submission

Before the selected teams begin to work on their respective project proposals, LIRPC will answer any initial questions by posting responses to the LIRPC website. The basic project proposal requirements are outlined below:

- Project proposals must address ‘low input’ landscaping and/or stormwater treatment, *with a specific focus on the reduction of nitrogen pollution*.
- Identify current practices – include references, e.g. interview with school grounds maintenance officials.

- General description of the planned improvements – include references, e.g. interview with school grounds maintenance officials, reports, websites.
- Proposed design – include illustrations, aerial images, and basic map.
- Estimated budget – include major line items. Also note if there are matching funds for the project.
- Explain how the project, if implemented/installed, will be used to increase awareness among students and faculty and the broader community. Will this involve the use of print or electronic media?
- Explain annual maintenance requirements following project implementation/installation – just a general description, e.g. a few sentences.

A recommended format for project proposals is available on the LIRPC [website](#).

Communication with the LIRPC

The LIRPC will assist faculty/team leaders with technical advice and resources and will be available to respond to questions. The LIRPC also plans to have subject matter experts available from other organizations for detailed technical questions. All communication with the LIRPC should be conducted by teachers or their assistants. Direct communication between students and the LIRPC is discouraged. Remote visits between school participants and the LIRPC may be possible via conference or video calls.

Project Schedule

- **September 29, 2022** **Request for Expressions of Interest issued**
- **November 10, 2022** **Letters of Interest due**
- **January 27, 2023** **Final project proposals submitted**
- **March 2023** **Awardees announced**
- **April 2023** **Awards presented**

Evaluation of Final Project Proposals

Final written project proposals will be evaluated on originality, technical merit, quality of ideas, and practicality. Final project proposals will also be evaluated on the degree to which they are clear and understandable and make effective use of visuals to explain what is being proposed. **A recommended format for project proposals is available on the LIRPC [website](#).**

The evaluation criteria – used by the review team – will vary by the following grade categories:

- **Category 1:** Grade 6
- **Category 2:** Grades 7 and 8
- **Category 3:** Grades 9 thru 12

Recognition/Award Presentation

Following a review of the submitted project proposals, up to three (3) teams with the highest caliber project proposals will be recognized within each of the grade categories noted above and awarded a grant not to exceed \$2500. LIRPC will coordinate with each school on the presentation of a grant award and distribution of *certificates of recognition*. Every student that participates in the *Long Island Water Quality Challenge* will receive a *certificate of participation*.

Disclaimer

The LIRPC and its respective officers, directors, agents, members and employees make no representation or warranty and assume no responsibility for the accuracy of the information set forth in this RFEOI. Further, the LIRPC does not warrant, nor make any representations as to the quality, content, accuracy or completeness of the information, text, graphics, links or other facets of this RFEOI once it has been downloaded or printed from any server, and hereby disclaims any liability for technical errors or difficulties of any nature that may arise in connection with the LIRPC or other website on which this RFEOI may be posted, or in connection with any other electronic medium utilized by respondents or potential respondents in connection with or otherwise related to the RFEOI.

ATTACHMENT A

PROJECT DETAILS FOR CONSIDERATION

For full project proposal – NOT necessary for the letter of interest

'LOW INPUT' LANDSCAPING

On Long Island, fertilizer leaching into groundwater is the second largest source of nitrogen pollution. The Long Island Nitrogen Action Plan initiative will evaluate the effectiveness of existing strategies to minimize the impact that excess nitrogen from fertilizers is having on Long Island's waterbodies.

Defining the Inputs (Fertilizer and Irrigation)

- What inputs are currently used to maintain your school's landscaping? e.g. fertilizers, pesticides, topsoil, soil amendments, gasoline for power equipment
- How much turfgrass fertilizer is applied to the grounds of your school (approximate lbs/year)?
 - How much total nitrogen (lbs) is applied per 1,000 square feet per year?
- Is irrigation used for traditional/turfgrass landscaping on school grounds? (Like stormwater, irrigation water can carry fertilizer – as well as pesticide and topsoil – into lakes, rivers, and streams.)
 - How much irrigated water is used on school grounds?
 - What areas receive the most irrigated water?
 - Where does the water come from and where does it go?

Identifying the Environmental Impacts

- What impacts do the inputs have on the surface and groundwater?

Lowering the Inputs (Fertilizer and Irrigation)

- Could your school's landscape be sustained with fewer inputs?
 - Can fertilizer inputs be reduced and by how much?
 - How would that be better for the environment?
 - What sources were used in your research?
 - Can irrigation be reduced and by how much? (How and where turfgrass is placed/exists in the landscape can significantly reduce the amount of irrigation water needed to support the landscape. In addition, replacing turfgrass with native plantings can also reduce the amount of irrigation water required.)
 - How would that be better for the environment?
 - What sources were used in your research?

Designing the Solution

- What would a 'Low Input' landscape/garden look like?
 - What specific area(s)/use(s) could be improved?
 - What plantings would be best and what are their requirements? (Native plantings are encouraged. Once established, native and low water-using plants require little water beyond normal rainfall. Student project proposals should include an explanation of the benefits of native plantings.)
 - Will the 'Low Input' landscape make use of mulch? (Mulches aid in greater retention of water by minimizing evaporation, reducing weed growth, moderating soil temperatures, and preventing erosion. Organic mulches also improve the condition of soil as they decompose.)
- What are the inputs for a 'Low Input' landscape/garden?
 - Describe and quantify the required inputs and potential reductions.
 - How is the solution better for the environment?
- What are the costs?
 - What are the building and planting material costs and labor costs to install it?
 - How will it be maintained and at what cost?
 - Is the solution cost effective with respect to reducing inputs and improving environmental quality?
- How does the design support the goals and objectives of the Long Island Nitrogen Action Plan?

If project team seeks to install the 'Low Input' landscape or garden, please include the following information:

- When and by whom will the garden be installed?
- What, if any, approvals, and additional resources are needed?
- What is the implementation schedule?
- Communicating the Improvements –
 - How do the students plan to convey the connection between their project and LINAP concepts?
 - Who should learn about the project?
 - Will the project be incorporated into classroom learning?
 - Will the project be used to increase awareness in the broader community?
 - What would the message be?
 - What media will be used?
- What is the plan for on-going maintenance?

STORMWATER TREATMENT

Stormwater runoff commonly collects nitrogen compounds and other pollutants as it flows over farmlands, paved surfaces, and lawns treated with chemical fertilizers. The stormwater then deposits high levels of nitrogen into surface water, causing toxic conditions for fish and other aquatic life. The Long Island Nitrogen Action Plan initiative will evaluate strategies to minimize the impact that excess nitrogen from stormwater is having on Long Island's waterbodies.

Identifying Current Practices

- Is stormwater being collected? If so, how, and where on school grounds is stormwater collected?
- Do any areas flood? Identify a few specific areas.
- Is stormwater being treated? Are there current practices that address nitrogen pollution?
- Is the stormwater recharged or does it run off the property? Where does it go?
- What pollutants might be found in the stormwater?
- Estimate the quantities of stormwater and pollutants.

Improving Collection, Treatment, and Recharge

- How and where could stormwater collection be improved?
- What type of treatment would be most effective at treating nitrogen pollution?
- Why are these practices/solutions better for the environment?

Designing the Solution

- Which stormwater treatments are proposed?
 - Rain garden, swales, bioretention areas, permeable pavements, infiltration planters, trees and tree boxes, rainwater harvesting, other.
- What would each selected treatment look like?
 - What specific area is targeted?
 - What types and quantities of building materials are required?
 - What types and quantities of planting material are required?
- How much and what type of treatments are provided?
 - Describe the type of treatment and estimated quantity of stormwater treated.
- What are the costs?
 - What are the building and planting material costs and labor costs to install it?
 - How will it be maintained and at what cost?
 - Is the solution cost effective given the expected improvement with respect to reducing inputs and improving environmental quality?
- How does the stormwater treatment proposal support the goals and objectives of the Long Island Nitrogen Action Plan?

If project team seeks to install the stormwater treatment solution, please include the following information:

- When and by whom will the solution(s) be installed?
- What, if any, approvals, and additional resources are needed?
- What is the implementation schedule?
- Communicating the Improvements –
 - How do the students plan to convey the connection between their project and LINAP concepts?
 - Who should learn about the project?
 - Will the project be incorporated into classroom learning?
 - Will the project be used to increase awareness in the broader community?
 - What would the message be?
 - What media will be used?
- What is the plan for on-going maintenance?

*(*These details are for the full project proposal – NOT necessary for the letter of interest)*