

**RESOLUTION 2021-46**

**A RESOLUTION OF THE MAYOR AND COUNCIL OF THE BOROUGH OF  
MOUNT ARLINGTON, IN THE COUNTY OF MORRIS, STATE OF NEW JERSEY,  
AUTHORIZING A PROFESSIONAL SERVICES AGREEMENT  
WITH PRINCETON HYDRO, LLC**

**WHEREAS**, there exists a need for professional consulting services for the Beach/Park Restoration Plan for the Mount Arlington Municipal Beach and Watershed, Morris County, Mount Arlington, New Jersey (the "Project"); and

**WHEREAS**, Princeton Hydro, LLC provides such professional consulting services; and

**WHEREAS**, such professional consulting services are "professional services" as defined in the Local Public Contracts Law, N.J.S.A. 40A:11-1 *et seq.* (the "Local Public Contracts Law"),

**WHEREAS**, the Local Public Contracts Law requires that notice with respect to contracts for "professional services" awarded without competitive bids must be publicly advertised; and

**WHEREAS**, the Local Public Contracts Law further requires that the resolution approving a contract for "professional services" and the contract itself must be on file with the Borough and available for public inspection;

**NOW, THEREFORE, BE IT RESOLVED BY THE BOROUGH COUNCIL OF THE BOROUGH OF MOUNT ARLINGTON, IN THE COUNTY OF MORRIS, NEW JERSEY, as follows:**

**Section 1.** Princeton Hydro, LLC, Ringoes, New Jersey is hereby retained to provide the professional consulting services necessary in connection with the Project in an amount of not to exceed \$50,000.

**Section 2.** The Mayor is hereby authorized and directed to execute a professional services agreement and the Borough Clerk is hereby authorized and directed to attest to the signature of the Mayor to such fee agreement.


**Section 3.** The professional services agreement is awarded without competitive bidding as a "professional service" in accordance with the Local Public Contracts Law, N.J.S.A. 40A:11-5(1)(a)(i).

**Section 4.** The professional services agreement is awarded as a non-fair and open contract pursuant to *N.J.S.A. 19:44A-20.5 et seq.*

**Section 5.** A copy of this resolution as well as the professional services agreement shall be placed on file with the Borough Clerk.

**Section 6.** A notice stating the nature, duration, service and amount of the professional services agreement in accordance with the Local Public Contracts Law shall be published once in the official newspaper of the Borough.

**I HEREBY CERTIFY** this to be a true and correct Resolution of the Mayor and Council of the Borough of Mount Arlington and adopted on March 2, 2021.



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Matthew N. Bansch, Borough Clerk

THIS PROFESSIONAL SERVICES AGREEMENT (“Agreement”), made this 10<sup>th</sup> day of November 2020, by and between **BOROUGH OF MOUNT ARLINGTON** (hereinafter referred to as the “Client”) having a business address of 419 Howard Boulevard, Mount Arlington, New Jersey 07856 and **PRINCETON HYDRO, LLC**, (hereinafter referred to as “Princeton Hydro”), having a business address of PO Box 720, 1108 Old York Road, Ringoes, New Jersey 08551 (Client and Princeton Hydro may be collectively referred to as the “parties” and individually as a “party”).

WHEREAS, the Client desires to obtain professional consulting services from Princeton Hydro for the **Beach/Park Restoration Plan for the Mount Arlington Municipal Beach and Watershed, Morris County, Mount Arlington, New Jersey**, on the terms as herein provided, and,

WHEREAS, Princeton Hydro desires to provide professional consulting services to Client for the compensation and on the terms herein provided.

NOW, THEREFORE, in consideration of the terms and conditions herein contained, the parties agree as follows:

FIRST: Princeton Hydro shall perform the “Scope of Services” and the Client has agreed to the compensation as described in the proposal, a copy of which is attached hereto (“Proposal”), which is agreed upon by the parties, and made a part hereof.

SECOND: For its efforts in performing the Scope of Services, Client shall pay Princeton Hydro Fifty Thousand (\$50,000.00) Dollars as set forth in more detail in the Proposal.

THIRD: Princeton Hydro’s Standard Terms and Conditions of Professional Service Agreements, a copy of which is attached hereto, which is agreed upon by the parties and made a part hereof.

**BOROUGH OF MOUNT ARLINGTON**

By:




Michael Stanzilis, Mayor  
Printed Name

3/2/2021

Date Signed

**PRINCETON HYDRO, LLC**

By:



Geoffrey M. Goll, P.E.  
President

STANDARD TERMS AND CONDITIONS OF PROFESSIONAL SERVICE AGREEMENTS

1. Definitions. The following terms as used herein shall have the meanings stated:

**“Princeton Hydro”** PRINCETON HYDRO, LLC

**“Client”** BOROUGH OF MOUNT ARLINGTON

**“Fixed Price”** This is the compensation to be paid by Client to Princeton Hydro for the Scope of Services set forth in the Proposal, which is invoiced for a fixed total amount without detail.

**“Not-to-Exceed”** This is the upper limit of charges to be invoiced on a Time and Materials basis, and not to be exceeded, unless there is change in the Scope of Services, as accepted by the Client.

**“Practice of Engineering” or “Professional Engineering”**, is defined by the National Society of Professional Engineers. The Practice of Engineering or Professional Engineering services, involves: (i) the specialized knowledge of applied mathematics and sciences, dealing with the design of structures, machines, equipment, utilities systems, materials, processes, works, or projects, public or private; (ii) the teaching of advanced engineering courses in institutions of higher learning; (iii) the direction of or the performance of engineering surveys, consultation, investigation, evaluation, planning, and professional observation of construction of public and private structures, works, or projects; or (iv) engineering review of drawings and specifications by regulatory agencies.

**“Professional Service Agreement” or “Agreement”** is the Professional Services Agreement entered into by Princeton Hydro and the Client.

**“Project”** The overall product being designed, permitted, implemented, analyzed, or reviewed, which includes the services set forth within the Scope of Services. For this Agreement, the services set forth within the Scope of Services may entail all of the necessary components, or only a portion of the overall Project in development.

**“Proposal”** Is attached to the Professional Services Agreement between Princeton Hydro and Client and contains the applicable Scope of Services, Fixed Price, Lump Sum, or Time and Material Contracts.

**“Scope of Services”** The outline and detail of technical tasks to be completed for which Princeton Hydro has been contracted.

**“Time & Materials”** This form of compensation is invoiced at Princeton Hydro’s hourly rates and expense reimbursement (including subcontractors) and detailed with hours and expense amounts for the Scope of Services set forth in the Proposal.

2. Contract Formation. The Client entering into the Professional Services Agreement indicates assent and agreement to the terms and conditions hereof. Client entering into the Professional Services Agreement (which includes the attachments thereto) agreed to the contractual basis and billing structure for work to be performed by Princeton Hydro.

3. Practice of Engineering or Professional Engineering, only if explicitly described in the Proposal. Unless specified in the Proposal that the Practice of Engineering or Professional Engineering services is included/described within the Scope of Services, the Client, their authorized representative and agents understand that the Practice of Engineering or Professional Engineering services are NOT included in the services to be provided, regardless of the Princeton Hydro personnel assigned to the work. If such specific Practice of Engineering or Professional Engineering services are requested, a separate Proposal and Scope of Services pursuant to the Professional Services Agreement will be required to be prepared and agreed upon for that specific effort.

4. Price. The compensation prices stated in the Proposal are based on the expected time schedule set forth in Scope of Services (included in the Proposal). If there is no expected time schedule, then the normal period that Princeton Hydro devotes to a similar scope of services as set forth in the Fixed Price that Princeton Hydro includes in the Agreement with the Client. The prices are firm and are not subject to increase, except where a price escalation is stated in a multi-year Agreement with the Client. For Fixed Price services, if for reasons beyond Princeton Hydro's control, the Agreement extends beyond the expected time schedule (which is either included in the Scope of Services or within the ordinary performance of similar Project types), Princeton Hydro reserves the right to increase the Fixed Fee and the Client will be responsible to pay for such increase. For Time and Material agreements that extend over a year beyond the date the Agreement was executed, Princeton Hydro has the right to increase hourly rates and direct charges (i.e. photocopies, plots, equipment, etc.) to reflect customary increases to operating expenses and industry inflation. The Client will be notified 30 days in advance of such increases.

5. Payment. Payment shall be made to Princeton Hydro within thirty (30) days after date of invoices. Princeton Hydro shall be entitled, at its sole option, to terminate its obligations under the Agreement if any invoice is not paid within thirty (30) days of its receipt. Interest charges of 2% per month will be added to invoices outstanding after 30 days.

For services provided on a Fixed Price basis, the amount of each monthly invoice shall be determined on the "percentage of completion method" whereby Princeton Hydro will estimate the percentage of the total work accomplished during the invoicing period. Additionally, if the services provided include the procurement of contractors or subconsultants by Princeton Hydro, a separate invoice may be generated and forwarded to the Client upon completion and receipt of an invoice from said contractors or subconsultants within the same period of service of the monthly invoice described above, and shall be subject to the same payment terms.

6. Termination. In the event of termination of the Agreement by either party, the Client shall within fifteen (15) calendar days of termination pay Princeton Hydro for all services rendered and all reimbursable costs incurred by Princeton Hydro up to the date of termination, in accordance with the payment provisions of the Agreement.

The Client may terminate the Agreement for the Client's convenience and without cause upon giving Princeton Hydro not less than seven (7) calendar days' written notice.

Either party may terminate the Agreement for cause upon giving the other party not less than seven (7) calendar days' written notice for the following reasons:

- Substantial failure of the other party to perform in accordance with the terms of the Agreement and through no fault of the terminating party;
- Assignment of the Agreement or transfer of the Project by either party to any other entity without the prior written consent of the other party;

- Suspension of the Project or Princeton Hydro's services by the Client for more than ninety (90) calendar days, consecutive or in the aggregate; or
- Material changes in the conditions under which the Agreement was entered into, the Scope of Services or the nature of the Project and the failure of the parties to reach agreement on the compensation and schedule adjustments necessitated by such changes.

In the event of any termination that is not the fault of Princeton Hydro, the Client shall pay Princeton Hydro, in addition to payment for services rendered and reimbursable costs incurred, for all expenses reasonably incurred by Princeton Hydro in connection with the orderly termination of the Agreement, including, but not limited to demobilization, reassignment of personnel, associated overhead costs and all other expenses directly resulting from the termination.

7. Excusable Delay. Princeton Hydro shall be excused for any delay in performance hereunder arising from a cause beyond its control which it could not through the exercise of due diligence have avoided, including, but not limited to, an act of any governmental authority, an act of God, an accident such as a fire or explosion, which is not due to the negligence of Princeton Hydro, a strike, a riot, or a failure of public transportation facilities. Princeton Hydro shall give written notice and full particulars of the cause of delay as soon as possible after its occurrence.

8. Princeton Hydro's Opinion. In Princeton Hydro's professional opinion, services furnished hereunder shall be rendered competently by qualified personnel and in accordance with the accepted practice. For professional services, Princeton Hydro will exercise reasonable care, skill, competence, and judgment consistent with professional standards in performing the services and in meeting any estimate of cost or schedule set forth in the Proposal, subject to the terms in paragraph 9, below.

9. Accepted Risk and Adaptive Management. The Client understands that analyses, studies, and design (also the Practice of Engineering or Professional Engineering, but only if included in a Proposal and Scope of Services agreed upon by Princeton Hydro and the Client) provided by Princeton Hydro include the evaluation of natural systems (soil, rock, water, weather, climate, and biological function, etc.) ("Analysis") which have variable proportions of heterogeneity and predictability in behavior, including, but not limited to, the unpredictability caused by climate change. The Client acknowledges and accepts the intrinsic levels of risk in connection with the Analysis. In addition, regardless of implementation of services in accordance with Princeton Hydro's Analysis, the final product performance may vary and require modification after a Project is constructed in order to meet overall expectations due to impacts by unknowns (including, but not limited to, stream, wetland, stormwater system, dam foundation), which the Client accepts. The Client also acknowledges that they have evaluated the level of risk related to budget constraints and unforeseen conditions and has prepared and budgeted for adaptive management that may be necessary because of said risk.

10. Indemnification. Princeton Hydro agrees, to the fullest extent permitted by law, to indemnify, defend and hold harmless the Client, its officers, directors, owners and employees (collectively, "Client Indemnitee") against all claims, causes of action, damages, liabilities or costs (including reasonable attorneys' fees incurred in the defense in the event that Princeton Hydro does not defend Client Indemnitee) (collectively "Claims"), to the extent arising out of the Princeton Hydro (or its contactors or consultants) negligence, omissions or misconduct in the performance of professional services as set forth in, and subject to the terms of the Agreement that results in a claim by a third party against the Client Indemnitee; provided, however, the indemnification shall not apply to the extent that Claims are caused by the negligence, omissions or misconduct of Client or third parties.

The Client agrees, to the fullest extent permitted by law, to indemnify, defend and hold harmless Princeton Hydro, its officers, directors, employees, members and consultants (collectively, "Princeton Hydro

Indemnitee”) against all Claims to the extent arising out of the Client’s (or its contactors or consultants) negligence, omissions or misconduct in connection with the Project that results in a claim by a third party against the Princeton Hydro Indemnitee; provided, however, the indemnification shall not apply to the extent that Claims are caused by the negligence, omissions or misconduct of Princeton Hydro or third parties.

11. Right of Entry. The Client shall provide for Princeton Hydro’s right to enter the property owned by the Client and/or others in order for Princeton Hydro to fulfill the Proposal included hereunder. Although Princeton Hydro will exercise reasonable care in performing its services, the Client understands that the use of testing or other equipment may unavoidably cause some damage, the correction of which is not part of this Agreement, for which Princeton Hydro shall have no liability. The Client agrees, to the fullest extent permitted by law, to indemnify and hold harmless Princeton Hydro Indemnitees against any Claims by third parties arising or allegedly arising from procedures associated with testing or investigative activities or connected in any way with the discovery of hazardous materials or suspected hazardous materials on the property.

12. Confidentiality. Princeton Hydro agrees to keep confidential and not to disclose to any person or entity, other than Princeton Hydro’s, employees, subconsultants and the general contractor and subcontractors, if appropriate, any data or information not previously known to and generated by Princeton Hydro or furnished to Princeton Hydro and marked CONFIDENTIAL by the Client. These provisions shall not apply to information in whatever form that is in the public domain, nor shall it restrict Princeton Hydro from giving notices required by law or complying with an order to provide information or data when such order is issued by a court, administrative agency or other legitimate authority, or if disclosure is reasonably necessary for Princeton Hydro to defend itself from any legal action or claim.

13. Late Payment. In the event that Client fails to make payment to Princeton Hydro in accordance with Paragraph 5 or 6 of this Agreement, Client shall be responsible for all of Princeton Hydro’s costs, fees and expenses, including reasonable attorneys’ fees, in connection with collection actions instituted to secure payment of outstanding amounts due.

14. Code Compliance. Princeton Hydro shall exercise usual and customary professional care in its efforts to comply with all laws, codes, and regulations in effect as of the date of the enclosed Proposal. Design changes made necessary by newly enacted laws, codes and regulations after this date shall entitle Princeton Hydro to a reasonable adjustment in the Project schedule and additional compensation as necessary to complete the tasks outlined in the enclosed Proposal.

15. Judicial Proceedings. Any action or proceeding arising hereunder shall be brought in the Courts of the State of New Jersey; provided, that if any such action or proceeding arises under the Constitution, the laws or treaties of the United States of America, or if there is a diversity of citizenship between the parties hereto, so that it is to be brought in a United States District Court, it shall be brought in the United States District Court for the State of New Jersey or any successor court thereto. If a trial is conducted, the parties waive a trial by jury.

16. Limit of Liability. To the extent permitted by law, the Client agrees to limit Princeton Hydro’s liability for Client damages under the Agreement to the sum of \$100,000.00 or Princeton Hydro’s fee, whichever is greater. This limitation shall apply regardless of the cause of action or legal theory asserted.

17. Attorney’s Fees. In the event of any litigation arising from or related to this Agreement or the services provided under this Agreement, the prevailing party shall be entitled to recover from the non-prevailing party all reasonable costs incurred, including staff time, court costs, attorney’s fees and all other related expenses in such litigation.

18. Consequential Damages. Notwithstanding any other provision of this Agreement, and to the fullest extent permitted by law, neither the Client nor Princeton Hydro, their respective officers, directors, owners, employees, contractors or subconsultants shall be liable to the other or shall make any claim for any incidental, punitive, indirect or consequential damages arising out of or connected in any way to the Project or to this Agreement. This mutual waiver of consequential damages shall include, but is not limited to, loss of use, loss of profit, loss of business, loss of income, loss of reputation or any other consequential damages that either party may have incurred from any cause of action including, without limitation, negligence, strict liability, breach of contract and breach of strict or implied warranty. Both the Client and Princeton Hydro shall require similar waivers of consequential damages protecting all the entities or persons named herein in all contracts and subcontracts with others involved in the Project.

19. Permitting. Princeton Hydro shall assist the Client in applying for those permits and approvals normally required by law for projects similar to the one for which Princeton Hydro's services are being engaged. The assistance shall consist of completing and submitting forms to the appropriate regulatory agencies having jurisdiction over the construction documents, and other services normally provided by Princeton Hydro and as described in the Proposal or this Agreement. However, Princeton Hydro does not make any warranties, guarantees or representations as to the success of our effort on behalf of the Client. Compensation for services rendered by Princeton Hydro is not contingent upon the successful acquisition of these permits.

20. Hazardous Wastes, Materials, or Substances. The Client agrees, notwithstanding any other provision of this Agreement, to the fullest extent permitted by law, to indemnify and hold harmless Princeton Hydro Indemnitees from and against any and all claims, suits, demands, liabilities, losses, damages or costs, including reasonable attorneys' fees and defense costs arising out of or in any way connected with the detection, presence, handling, removal, abatement, or disposal of any asbestos or hazardous or toxic substances, products or materials that exist on, about or adjacent to the Project site, regardless of whether liability arises under breach of contract or warranty, tort, including negligence, strict liability or statutory liability or any other cause of action, except to the extent that it arise from the sole negligence or willful misconduct of Princeton Hydro.

21. Documents. All original sketches, tracings, drawings, computations, details, design calculations, and other documents and plans that result from Princeton Hydro's services under this Agreement are and remain the property of Princeton Hydro as instruments of service. Where such documents are required to be filed with governmental agencies, Princeton Hydro will furnish copies to the Client upon request. Reuse or modification by the Client is prohibited. Any unapproved use or modification shall be at the Client's or others' sole risk without liability or legal exposure to Princeton Hydro unless approved in writing by Princeton Hydro prior to such reuse.

22. Construction Services. Neither the professional activities of Princeton Hydro, nor the presence of Princeton Hydro or its employees and subconsultants at a construction/project site, shall relieve the General Contractor of its obligations, duties and responsibilities including, but not limited to, construction means, methods, sequence, techniques or procedures necessary for performing, superintending and coordinating the work performed by the General Contractor for Client and any health or safety precautions required by any regulatory agencies. Princeton Hydro and its personnel have no authority to exercise any control over any construction contractor or its employees in connection with their work or any health or safety programs or procedures. The Client agrees that the General Contractor shall be solely responsible for job site safety and warrants that this intent shall be carried out in the Client's contract with the General Contractor. The Client also agrees that the Client, Princeton Hydro Indemnitees shall be indemnified by the General Contractor and shall be made additional insured under the General Contractor's policies of general liability



insurance. A "General Contractor" is a separate entity that is contracted by Client to implement the design prepared by Princeton Hydro or others.

23. Mediation. In an effort to resolve any conflicts that arise during the design and construction of the Project or following the completion of the Project, the Client and Princeton Hydro agree that all disputes between them arising out of or relating to this Agreement or the Project shall first be submitted to nonbinding mediation conducted by the American Arbitration Association, by a mediator experienced in services performed by Princeton Hydro, unless the parties mutually agree otherwise.

The Client and Princeton Hydro further agree to include a similar mediation provision in all agreements with independent contractors and consultants retained for the Project and to require all independent contractors and consultants also to include a similar mediation provision in all agreements with their subcontractors, subconsultants, suppliers and fabricators, thereby providing for mediation as the primary method for dispute resolution between the parties to all those agreements.

**BOROUGH OF MOUNT ARLINGTON**

By:



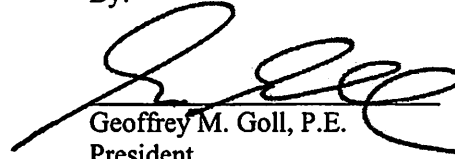
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3/2/2021

Date Signed

**PRINCETON HYDRO LLC**

By:



Geoffrey M. Goll, P.E.  
President



**Proposal for the Development of a Restoration Plan for  
the Mount Arlington Municipal Beach / Park and  
Associated Watershed**

**Submitted by the Borough of Mount Arlington**

419 Howard Boulevard  
Mount Arlington, New Jersey 07856

**Technical Input Provided by Princeton Hydro, LLC**

1108 Old York Road  
P.O. Box 720  
Ringoes, New Jersey 08551

**March 2020**

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## Introduction

Lake Hopatcong is the largest lake in New Jersey, located on the border of Morris and Sussex Counties in the New Jersey Highlands in the headwaters of the Musconetcong River. The lake provides regionally-significant environmental services and recreational opportunities; this includes fishing, boating, swimming, beach-use, and related activities centered on the use and aesthetics of the lake. In the summer of 2019, Lake Hopatcong was beset by a large and persistent Harmful Algal Bloom (HAB). Freshwater HABs are caused primarily by cyanobacteria, formerly called blue-green algae. These organisms often reach high density states or blooms, frequently manifested as particles, globules, and paint-like surface mats that tend to accumulate along shorelines, especially where vegetation, docks, floating lines, and similar obstructions arrest the movement of the accumulations.

Frequently, cyanobacteria HABs (CyanoHABs) are in response to elevated nutrient concentrations and weather conditions. While there are a number of environmental impacts related to these blooms, health risks to the public are of primary concern. Cyanobacteria produce a diverse class of chemical compounds called cyanotoxins. While these compounds are produced as a chemical defense, they can produce a wide range of adverse health effects. Recreational exposure pathways include ingestion, inhalation, and dermal contact. The health effects may be mild, such as skin rashes, to more severe or even lethal causing allergic-like reactions, respiratory irritation, gastroenteritis, liver diseases, and neurological impacts among others. Due to the widespread presence of a CyanoHAB in Lake Hopatcong, the New Jersey Department of Environmental Protection (NJDEP) issued a recreational advisory based on exceedance of NJ Health Advisory Guidance (measured as cell counts of cyanobacteria exceeding a threshold of 2,000 cells / mLs). As such, the advisory directed the public to avoid swimming, direct contact, drinking the water, eating fish from the lake, and keeping pets and livestock away from the water. A common response in 2019 by local and County health officials to these elevated cyanobacteria cell counts was to close the public beaches on Lake Hopatcong. These advisories and beach closures, made in the interest of minimizing potential health risks, had a significant impact on the recreational use of the lake and a devastating impact on the local / regional economy.

HABs management can be considered an emerging field for lake managers, health officials, and environmental regulators. While the risks of HABs to lake ecology, the local economy and public health have been recognized for a long time, as well as the need to manage these blooms, public awareness of the issue has grown exponentially in the past few years, most likely spurred by major HABs in Lake Erie that caused the loss of drinking water to a half million people. In the case of Lake Hopatcong, it was the persistent and lake-wide HABs over the summer of 2019, resulting in State advisories and the closing of beaches, which put these associated impacts in the public eye.

In addition, the occurrence and intensity of HABs is expanding, causing the issuance of public advisories for drinking water and recreation. Research into the health effects has shown

cyanotoxins-exposure to have higher risks than previously known. As such, there is a concerted effort to address these impacts and develop HAB management responses, approaches, and programs despite a lagging regulatory framework. Indeed, at this time there are no official Federal, State, or local regulations for cyanotoxins, although there are a variety of recommended threshold criteria and health advisory guidance, much of it based on the work of the World Health Organization (WHO). NJDEP has been working on this issue and released the Cyanobacterial Harmful Algal Bloom (HABs) Freshwater Recreational Response Strategy (revision 1.0) in June 2018, which has been developed to:

*Provide a unified statewide approach to responding to cyanobacterial HABs in freshwater recreational waters and sources of drinking water, and to protect the public from risks associated with exposure to cyanobacteria and related toxins.*

To help manage HABs the Recommended Four-Point Strategy for Addressing the Harmful Algal Blooms at Lake Hopatcong was developed. The third point of the plan discusses the development of Beach and Cove Restoration Plans. These plans are similar to the Watershed Plans conducted at a macro scale to address nonpoint source (NPS) pollution and other loading issues, often developed as a complement to Total Maximum Daily Load (TMDL) Plans, but conducted at a site-specific area to affect local water quality improvements. As with other points of the plan, the ultimate goal is to limit localized pollutant loading, particularly the nutrient phosphorus, in order to manage the development of HABs and meet water quality and public health criteria within the area of interest. As such, these plans will be designed to address both causes of water quality impairments and manage the symptoms.

## **Understanding of the Project**

The development of the Beach Restoration Plans in some sense represents a shift in scale from the watershed- or subwatershed-scale to a specific location. While addressing pollutant loading, particularly the nutrient phosphorus, is absolutely critical throughout the watershed to induce the long-term control of phosphorus and ultimately reduce eutrophication and the occurrence of HABs lake-wide, for most lake users the impacts of water quality impairments, HABs, nuisance aquatic macrophyte growth, and ultimately use advisories and beach closures are experienced at a local level. These plans therefore address the need and the desire to act at a local level to address site-specific problems and recognize the willingness of local entities to initiate and sponsor these management efforts. Watershed plans are iterative and address the needs of implementation throughout the watershed, and while these plans do address specific projects, often numbering in the dozens depending on watershed area and the nature of pollutant loading within the watershed, the iterative nature of implementation, as well as mandated timelines, can be daunting and may place excessive onus on directing implementation on the project sponsor rather than reflecting the diffuse nature of source loading. By reducing the scale of the plan and focusing on a specific area there is an inherent opportunity to more closely examine, analyze,

and manage the specific problems of that area. The proposed Beach Restoration Plan therefore is a vehicle to address site specific needs and concerns of lake users and other stakeholders, complement larger watershed management efforts, and provide guidance and voluntary responsibility to implement those management actions tailored for the area of concern.

The format of the Beach Restoration Plan will follow the US EPA mandated structure for watershed plans which must address nine elements, as does the forthcoming *Upper Musconetcong River Watershed Implementation Plan (WIP)* and related historical studies, plans, and reports. This format is not only a recognized standard used by the EPA and State regulators, but specifically addresses the required elements to develop a clear, concise, and implementable plan. The nine elements that will be addressed include the following:

- a) Identification of causes of impairment and pollutant sources that need to be controlled to achieve needed load reductions
- b) Estimate of the load reductions expected from management measures
- c) Descriptions of the NPS **and in-lake** management measures that need to be implemented to achieve load reductions / **in-lake improvements** and description of the critical areas in which those measures will be needed
- d) Estimates of the amounts of technical and financial assistance needed, associated costs, and sources and authorities that will be relied upon to implement this plan
- e) Information and education component to enhance public understanding of the project and encourage early and continued participation in selecting, designing, and implementing NPS **and in-lake** measures
- f) Schedule for implementing the NPS **and in-lake** management measures identified in the plan
- g) Description of interim measurable milestones for determining whether NPS **and in-lake** measures are being implemented
- h) Set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards
- i) Monitoring component to evaluate the effectiveness of the implementation efforts measured against criteria (item h)

Note, parts of the list of nine elements list above that are **in bold** have been added and focus more on in-lake conditions, with an emphasis on Harmful Algal Blooms (HABs).

This Beach Restoration Plan will address the Mt. Arlington Municipal Beach. The municipal beach facility provides various recreational opportunities including swimming, fishing, athletic courts, and passive recreation. The focus will therefore be on the roughly 3-acre park facility, but the catchment in this valley is considerably larger and will need to be considered within the plan. Indeed, an unnamed tributary of over a mile in length that roughly parallels Howard Boulevard drains much of the area to the south and east of the park and discharges to the lake at the beach. This stream passes through Memorial Park, where it is impounded to create a small pond that

acts as a regional basin and is subject to sedimentation requiring periodic maintenance dredging. The municipal beach is one of the few public beaches at the lake and therefore sees heavy use. The park is bound to the north by a marina and the remainder of the watershed is highly developed. The item of greatest concern here is beach closures and the occurrence of cyanobacteria HABs in the swimming area. Within the area stormwater management will likely be one of the primary areas of focus. Management of the Memorial Park Pond will also be crucial in affecting water quality improvements for the beach. Ideally, the plan will strike a balance between providing management recommendations within the study area to control source loading and related impacts and localized in-lake measures to reduce nutrient concentrations and the abatement of the frequency and severity of HABs.

## **Proposed Scope of Work**

The proposed scope of work to develop the Beach Restoration Plan for the Mt. Arlington Municipal Beach and Watershed area will consist of nine tasks corresponding to each of the EPA watershed plan nine elements. The project will be managed by the Borough through the office of the Municipal Engineer.

### **Task 1: Identification of Causes and Sources of Pollution**

The first task is the foundation of the entire project and will identify the causes and sources of pollution within the investigation area, which includes not only the beach but parts of Memorial Park as well. This will consist of four separate elements. The most important of these will be an **on-site assessment, essentially a watershed walk, of the investigation area to examine, in person, potential problem areas.** This will be conducted, at a minimum, by a Princeton Hydro environmental scientist and engineer in conjunction with the Municipal Engineer and designated Borough staff to take advantage of their intimate knowledge of site. In addition to identifying sources of pollution and impairments, this assessment will also be used to identify the characteristics of the site that would support an implementation project, be it structural or cultural practice. At the same time, and very much an important component of the assessment, will be identifying limiting factors, such as buried utilities, that would affect project implementation and siting. Early identification of these factors limits later modification to design concepts. Areas and factors to evaluate during the assessment include channelized flow, impervious areas, wastewater disposal, wetlands or sensitive environmental features, waterfowl usage, shoreline erosion, structures inhibiting lake circulation, and similar matters.

The second component will consist of a **bathymetric assessment of the pond at Memorial Park.** This assessment will focus on the collection of basic morphometric data including depth and sediment thickness. As mentioned above, this pond is subject to sedimentation and infilling as a result of its catchment area, development levels, and slopes, which has been addressed in the past through dredging. The collection of basic morphometry data will be used to determine

appropriate management measures for the pond to limit pollutant loading downstream at the beach. This will include determining whether dredging is appropriate. This data can also be used to refine the rate of watershed sediment and pollutant loading. The bathymetric assessment will consist of using a graduated sounding rod to locate the top of sediment as well as the point of refusal representing the original lake bed. These paired depths will be located with GPS. The data will be used to prepare depth and sediment accretion maps. In addition to the bathymetric work, the site will also be examined with respect to potential stormwater management, as well as the stability of the inlet and outlet channels of the pond.

The third component will be a **review of existing GIS layers and aerial photography, and other relevant information provided by the Borough.** Data to be examined would include: geology, soils, topography, hydrography, wetlands, floodplains, land use/land cover, and impervious surfaces among other. These are all factors that affect local pollutant loading and will be incorporated into site modeling. Other items to determine during this phase of the project are water quality classification and other similar regulatory issues.

The last element of the task will be to **review and synthesize existing studies and reports that focus on water quality, flow, TMDLs, watershed and implementation plans, and other studies that describe historical and current site conditions.**

#### **Task 2: Estimate of Load Reductions**

This task element will be modified somewhat from the original intent of the US EPA element. At the watershed-scale it is important to quantify total loads and reduction targets to achieve a water quality outcome consistent with the Surface Water Quality Standard (SWQS) or other regulations. At the site-specific scale identifying these reductions in comparison to targeted reduction is of less utility because nutrient concentrations in the lake will still largely be determined by watershed-wide processes. For example, the elimination of all phosphorus loading from a single site, even if possible, may still not be directly measurable in the lake as a whole depending on the characteristics of the site, and at a minimum will not exhibit a 1:1 relationship between pollutant reductions and in-lake concentrations. Even with those caveats it is still important to determine loads and hydrology both for the site in question and to complement the larger watershed-scale efforts.

**The first element of this task will be to calculate pollutant loading and hydrology budgets.** This effort will rely on the use of the MapShed model, a mid-level model recommended by the US EPA. Because pollutant loading and hydrology are innately connected the model calculates both pollutants loads and hydrology. The model utilizes land use, soils, slopes, and other characteristics as inputs and the runs the model simulation for each day over a 30-year period using a local climate dataset accounting for factors such as precipitation and temperature that modify system hydrology over time. In addition, the model is customizable and can be used to account for factors such as septic system loading, septic system failure, waterfowl loading, and



the use of various of Best Management Practices (BMPs). The model will be used to develop the water budget for the investigation area including precipitation, evapotranspiration, groundwater flux, runoff, and streamflow or discharge, and will output the data on a monthly basis. The model will also calculate the pollutants loads for nitrogen, phosphorus, sediments/solids, and bacteria, specifically fecal coliform which can also be transformed to yield *E. coli*. In addition to calculating total loads, it will identify those loads by source including various land use/land cover types, septic system contributions, erosion, animals and others. Sedimentation rates determined from the bathymetric assessment at the Memorial Park pond will also be used to validate the model. Ultimately, this data will be used to identify and prioritize source loading problems and develop the appropriate management actions.

**The second element will be to utilize the pollutant / hydrologic data to develop load reduction metrics.** These quantified load reductions can, in turn, contribute toward the larger, lake-wide phosphorus reduction goals, as identified in the lake's Watershed Implementation Plan (WIP). It will also be used to calculate trophic state (levels of algal productivity) using standards water quality models such as Reckhow, Carlson Trophic State Index, and similar models and compare these to broader lake water quality targets (as identified in both the lake's TMDL and associated WIP). Lastly, it will be used to show how local reductions will manifest in localized water quality improvements.

### **Task 3: Description of Management Measures**

While the first two tasks are the building blocks of the Beach Restoration Plan, a synthesis of the data, is the heart of the project: the identification and selection of prioritized management measures to address site-specific problems. The selection of management measures will be based on assessing the occurrence, distribution, frequency, and severity of problems and identifying the appropriate solution to manage the problem. As alluded to above, the identification of management measures will seek to strike a balance between management of the area of investigation, such as stormwater controls, and in-lake measures like harvesting, treatment of HABs and/or circulation. This balance therefore addresses both the cause of the problem and the manifested symptoms; however, the site conditions will be the ultimate determinant of this balance. The recommendation of management measures will also complement the WIP, and when possible incorporate the findings of the various demonstration projects in the lake in order to use empirically tested technologies and techniques with proven performance in Lake Hopatcong.

A wide variety of management measures will be considered for the investigation area. Some of the management measures are likely to be structural, while others will incorporate cultural practices. Many of these measures are already employed within the watershed, have been

identified for implementation, or are under consideration. A partial list of some of the management measures to be considered include the following:

- Septic Management – Inspection, Maintenance, Repair, Replacement, Sewering
- Stormwater Management – Stormwater Ponds, Stormwater Wetlands, Infiltration Practices, Filtering Practices, Water Quality Swales, Retrofits, Green Infrastructure, Low Impact Development, Manufactured Treatment Devices
- Streambank/Lakeshore Stabilization and Buffer Enhancements – Protection, No Mow Zones, Landscape Alterations, Buffer Planting, Bank Grading, Brush Mattress, J-Hooks, Live Fascines, Rootwad Revetments, Cross Vanes
- Pet Waste and Wildlife Management –Waste Receptacles, Enforcement, Goose Management, Habitat Modification
- Dredging/Sediment Management

In-lake measures would include:

- Nutrient Stripping or Inactivation – Aluminum Sulfate (Alum) Treatments, PhosLock Treatments, Alternative Media (Biochar, Bold & Gold, etc.)
- Destratification and Aeration – Submerged Destratification, Bubble Curtains, Nanobubblers
- Circulation – Mixers, Pumps, Fountains
- Mechanical Harvesting
- Herbicide and Algaecide Treatment – Copper, Peroxide-Based Algaecides, Herbicides
- Floating Wetland Islands
- Sonic Algae Control
- Selective planting of desirable, native wetland / aquatic vegetation

Ultimately a list of recommended management measures will be prepared drawing from the lists above and other sources but will be selected to address the site-specific problems and concerns at both the beach and the park. The recommended measures will also have a description of their intended function and estimates of pollutant removal and other quantifiable benefits. Simple concepts may be prepared for some of the structural measures as well as a description of site limitations that have driven selection or placement, but no additional design work or permit preparation will be performed. This information will be provided in draft form to the Borough for review and approval by the Municipal Engineer and designated Borough officials and staff.

#### **Task 4: Technical and Financial Assistance**

Implementation of plan elements and project concepts is dependent on securing the funding and technical assistance to support those goals. From a practical perspective, meeting water quality goals, designated uses, and user expectations is primarily constrained by funding. Simply stated,

effective management can be costly, and while many cultural BMPs are easily implemented without capital expenditure, like eliminating near-shore fertilizer use, even conceptually simple measures must account for permitting, design, materials, labor, and monitoring. In the case of Lake Hopatcong, prolonged use restrictions have spurred the availability of funding in order to address environmental, recreational, and public health concerns. **The first element of this task will be identification of potential sources of funding.** As a voluntary program, some level of financial responsibility can be expected on the part of the project sponsor, but other assistance will be available. Several local prominent actors will include the Lake Hopatcong Commission, the New Jersey Highlands Council, and the Lake Hopatcong Foundation. NJDEP will likely be a contributor through various programs including the 319(h) Nonpoint Source Grants and other State programs. Other sources will be explored including various federal agencies, such as the US EPA and United States Fish and Wildlife Service, non-profits and NGOs such as American Rivers and Trout Unlimited, and other sources.

In addition to identifying potential funding sources, **budgets will be prepared for program implementation including capital costs and maintenance.** Budget preparation will also include what are often hidden costs like engineering and permitting, construction management, oversight, project administration, surveying, overhead, site access, profit, and contingencies.

**Sources of technical assistance will also be identified.** This will include recommendations for identifying project roles such as sponsor, property owner, stakeholders, and regulators. Technical assistance will often be provided by paid consultants, but the US EPA, NJDEP, Soil Conservation Districts, academics, and other environmental organization and regulators offer a wealth of technical assistance and various sources will be described.

#### **Task 5: Information and Education**

Developing an information and education component is important in building stakeholder involvement and encouraging the adoption of the plan and implementation of the management measures. For this task a **discussion of developing outreach programs will be provided as well as some sample materials and technical resources.** Because HABs are a major issue of concern and a health risk, much of the effort should be focused in this area and be tailored to beach users, lifeguards, other visitors, and homeowners. The identification of algal blooms, mats, and other invasive species should be incorporated into these materials. In addition, summaries will be prepared for some of the most important management measures selected for the investigation area.

## Task 6: Implementation Schedule

Scheduling is a tool to provide a reasonably expeditious timeline to not only implement management measures, but affect positive improvements in problem areas. **The prepared schedule will focus on short-, medium-, and long-term periods for management implementation.** The short-term schedule will focus on implementing the highest priority items in terms of overall impact, but prioritization also focuses on ease and cost of implementation. In some cases, the easier projects can help secure forward momentum and build enthusiasm. Scheduling is also useful for projecting and distributing costs.

**In addition to an implementation schedule for the projects, an annual schedule for HABs management will be developed for a hypothetical typical year.** This schedule will discuss the general timing of blooms, conditions that can indicate bloom development, and actions that should be taken to address the bloom including assessments like cyanotoxin and/or cyanobacteria cell count analyses as well as potential in-lake measures.

## Task 7: Interim Measurable Milestones

Milestones are used to track project implementation and used to assess whether the schedule is being maintained. It is also useful when incorporated with outreach programs and stakeholders to demonstrate that actionable items are being addressed. It is important to note that these milestones are distinct from water quality, load reduction, and performance metrics. **A list of milestones that should be tracked will be created dependent on the selected management measures, some of which may correspond to regulatory reporting requirements.** A list of milestones may include the following examples: amount of funding awarded, start and completion dates of structural BMPs, number of informational fliers sent, and area of impervious surface managed.

## Task 8: Evaluation Criteria

While milestones are program indicators, evaluation criteria are performance metrics used to ascertain load reductions, concentrations, flows, or HAB events. **These criteria will be developed, as necessary at three basic levels.** This will include project specific criteria, such as comparisons of influent and effluent **phosphorus concentrations** to measure removal efficacy; monitoring surface waters for a host of **standard limnological parameters** like dissolved oxygen, pH, total phosphorus, phytoplankton cell counts, and cyanotoxins to assess changes over time in

conjunction with the adoption of management measures; and lastly satisfying **regulatory requirements**, such as attaining designated uses and meeting SWQS. As with other elements of the plan, the exact set of criteria will vary depending on which management measures are used.

Princeton Hydro is also working on developing a standard Cyano-Kit, which can be provided to clients that contain the appropriate sampling bottles and preservatives, sampling instructions, and provision for analysis of a broad range of parameters germane to suspected HABs.

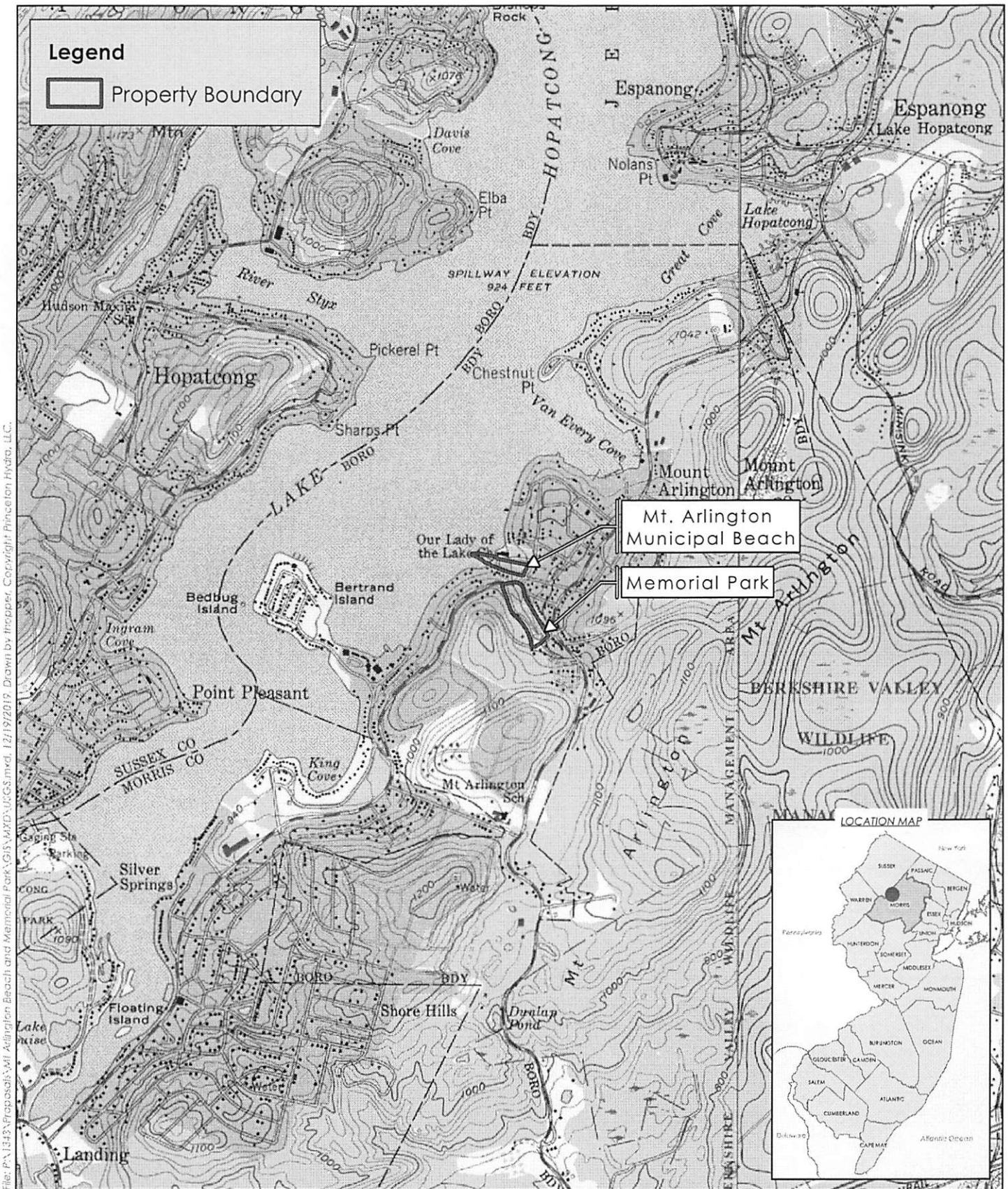
### **Task 9: Monitoring**

Monitoring is used to develop the data necessary to evaluate program goals. The monitoring component will incorporate those actions necessary to evaluate the criteria developed in the previous task. **Appropriate monitoring programs will be developed to focus on three elements: the monitoring of specific implementation actions, generalized surface water monitoring, and monitoring that triggers certain management measures**, such as herbicide treatment of aquatic macrophytes upon reaching nuisance density. Monitoring activities may include elements such as influent and effluent sampling, pre- and post-monitoring, longitudinal monitoring over time, control-impact, modeling, and standard limnological methods including *in-situ* profiles, aquatic macrophyte surveys, cyanotoxins, cyanobacteria cell counts, the use of the Cyano-Kits, and discrete sampling for laboratory analysis.

### **Deliverable and Budget**

The **final deliverable will include the Beach Restoration Plan Report** including chapters by task as described above. While all described elements are important, the main focus of the report will be the identification of problems and the list of recommended management measures to address those problems. The plan does not include sampling and will largely be a desktop analysis with the exception of the site investigations and interface with the Borough to assure that areas of greatest concern are accurately identified, described, and addressed in the plan.

With this submission, the Borough respectfully requests that the N.J. Highlands Council consider providing a Grant of **\$ 60,000** to fund the development of The Beach/Park Restoration Plan for the Mount Arlington Borough Municipal Beach/Park and Watershed.



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NOTES:  
 1. Property boundary obtained from New Jersey Geographic Information Network (NJGIN), Morris County 2016 Parcels.  
 2. USGS topographic digital raster graphic obtained from Terrain Navigator Pro, Stanhope, NJ quadrangle.


## USGS SITE LOCATION MAP

MOUNT ARLINGTON MUNICIPAL  
 BEACH & MEMORIAL PARK  
 BOROUGH OF MOUNT ARLINGTON  
 MORRIS COUNTY, NEW JERSEY



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 0 1,000 2,000 Feet  
 Map Projection: NAD 1983 StatePlane New Jersey FIPS 2900 Feet