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Framework for Submittal to Demonstrate Acceptable Water Quality and Design of a Novel Bathing Facility
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On January 5, 2024, Governor Kathy Hochul announced the New York Statewide Investment In More Swimming 'NY SWIMS' proposal. As part of this proposal, the state will help reimagine how New Yorkers can engage with the water, including rivers and lakes, by creating pathways and funding opportunities to encourage real innovation in swimming infrastructure. Governor Hochul will provide $60 million in competitive grant funding to municipalities for the deployment of innovative, floating pools that can allow New Yorkers to safely swim in natural bodies of water.

To help ensure floating pools meet all appropriate public health standards, the New York State Department of Health (NYSDOH) prepared the following guidance that will allow organizations to test the feasibility of innovative swimming pool designs within the state's natural waters. This is draft guidance, and subject to change as additional information becomes available on these innovative projects.

NYSDOH has developed this guidance to assist in the documentation and evaluation of health and safety considerations for the proposal of a novel bathing facility which does not fit within the traditional framework for a swimming pool or bathing beach regulated under Part 6 of the New York State Sanitary Code (NYSSC) and thus may need to request waivers for design and permitting of the novel facility. The exact nature of the necessary waiver request(s) will be dependent on the characteristics and design of the proposed bathing facility.

While this guidance focuses upon health and safety considerations, there may be aspects of a novel bathing facility that fall under the jurisdiction of another entity, for example, the New York State Department of Environmental Conservation or the US Army Corps of Engineers. This framework does not provide guidance to meet any additional applicable requirements necessary to obtain approval or permits from agencies other than the NYSDOH, including local health departments who are the permit-issuing official for Part 6 bathing facilities. Entities planning a novel bathing facility are strongly encouraged to meet with NYSDOH and the local health department to discuss the project and submit preliminary plans, specifications, and an engineer's design report for review prior to the preparation of final plans.

This guidance addresses a variety of possible designs and water quality conditions by providing examples of the public health criteria and documentation that would be needed. Proposals must be consistent with the provisions for a Part 6 application package, including submittal of plans, specifications, and engineering report prepared by a person licensed by the State of New York to practice engineering or architecture, a facility safety plan, and certificates of occupancy/compliance with the Uniform Code for applicable structural, plumbing, and electrical aspects. All designs will be evaluated to ensure they do not pose a bather entrapment hazard, contain projections or obstructions which could endanger patron safety, and do not entrap floatable debris inside and/or outside the structure.

I. Option 1- Floating dock/flow-through contained bathing area

a. Siting Requirements:

i. Conduct a sanitary survey per Section 6-2.19 (2.0 and 3.0) to identify water quality parameters that are not able to be met, including any sources of contamination that would be harmful to bather health. The bathing facility must be located in waters that meet the bathing beach design standards in Section 6-2.19 of the NYSSC, including but not limited to:

1. Meets all beach water quality criteria in 6-2.19 item 4.11 for bacteriological, physical, and chemical parameters. *E. coli* (fresh water only) or enterococci must be used to assess bacteriological water quality, with an upper value for the geometric mean of 100 cfu/100 mL for *E. coli* and 30 cfu/100 mL for enterococci instead of the thresholds listed in 4.11.1.
2. Meets 6-2.19 item 4.10: No waste-water discharges from sewage treatment plants, combined sewers or other sources shall be permitted within 750 feet of the bathing area.
3. A sanitary survey per Section 6-2.19 items 2.0 and 3.0 demonstrates there are no sources of contamination that would be harmful to bather health.
4. Water currents in the bathing area do not exceed 3 feet per second, per 6-2.19 item 4.9.

b. **Contained bathing area:**

i. Identify bottom and side wall material of the flow-through structure and address the mechanism for water flow and circulation within the bathing area, including estimated minimum and maximum flow velocities, to demonstrate it will not inhibit the flow of water into or out of the contained bathing area, pose an entrapment hazard, or contain projections or obstructions which could endanger patron safety.

ii. Submit documentation that demonstrates the flow-through structure will be designed and maintained so that continuous immersion in the water will not deteriorate the components or materials or lead to development of excessive biologic growth, including:

1. A life cycle analysis describing how the components and materials of the flow-through structure are expected to perform when challenged with anticipated source water quality and concentrations of contamination, including from bather loading and surrounding areas.
2. Routine and long-term operation and maintenance requirements for the flow-through structure and its components, including a replacement schedule.

II. Option 2- Sanitary survey indicates that water meets bathing beach design standards in Section 6-2.19 (as outlined in Option 1a. above) but water flow into or out of a contained bathing area is restricted by the containment structure and flow is provided in part or whole by mechanical means.

a. Pool Water Quality Maintenance:

i. Provide halogen disinfection of the pool water per Subpart 6-1 requirements to maintain water quality in the pool shell in light in contaminants introduced by bathers and the environment for a swimming pool in which there is insufficient flow-through volume or which is designed to recirculate water; or

ii. Submit swimmer risk assessment that demonstrates water circulation or other treatment will reduce contaminants introduced into the containment area by bathers and the environment and will meet beach water quality thresholds, (i.e., below a single sample Enterococci threshold of 60

cfu/100 mL and an Enterococci geometric mean of 30 cfu/100 mL (or, in fresh water, an *E. coli* single sample threshold of 190 cfu/100 mL and an *E. coli* geometric mean of 100 cfu/100 mL)).

b. **Pool Shell/Recirculation System Design:** Provide engineering plans, specifications, and reports for the pool shell and piping (inlets/return piping, etc.), including:

i. Submit a piping and instrumentation diagram that includes flow rates through each orifice and pipe section.

ii. Submit a model (e.g., Computational Fluid Dynamic (CFD) or hydraulic modeling) that demonstrates adequate flow when natural waters mechanically flow through a novel or innovative facility by pipes or other conveyances, and, when natural waters are treated by filtration and disinfection, shows the design and flow conditions needed for uniform pool mixing that simulates filtered water inflow into "pool", movement through pool, and egress from pool.

1. The model should include simulated swimmers that both alter flows and shed pathogens into the water according to the swimmer capacity of pool being proposed.
2. The model should estimate water turnover at various representative locations in the pool and bacterial concentration (*E. coli* (fresh water only) or Enterococci) at these representative locations.
3. The model should be able to simulate temporal changes over the course of the day as swimmers leave/enter the pool as well as simulate full capacity during all operational hours.
4. Modeling must be based upon engineering designs for the full-scale pool that includes flows in mechanical areas as well as in the pool itself, relationship/mixing between any sectioned areas of the pool. Modeling can be used in an iterative fashion to refine engineering design. Models where flow and turnover are achieved by pumps and conveyances shall indicate:
   a) Location of inlets and outlets;
   b) Size and material of return piping;
   c) Inlet design and flow calculations; and
   d) Adequate turnover in all areas of the vessel to ensure bather contribution of contamination is mitigated.
5. NYSDOH must be consulted with regarding the planned modeling and parameters prior to performing the model analysis.

iii. Submit documentation and/or construct and operate a prototype/pilot study demonstrating that the pool shell and recirculation system materials, components, and equipment are intended for use where the water is saline/brackish (if applicable), are of non-toxic material, corrosion-resistant, and able to withstand operating pressures, and will not deteriorate or develop excessive biologic growth under continuous immersion in the water at the chosen location, including:

1. A life cycle analysis describing how all components and materials are expected to perform when challenged with anticipated source water quality and concentrations of contamination, including from bather loading and the surrounding areas.
2. Routine and long-term operation and maintenance requirements for the flow-through structure and its components, including a replacement schedule.
3. Mechanisms to prevent or remove algae, biofilm or microbiological growth on constructed surfaces when natural waters are used in combination with fixed or floating vessels.
4. Submit detailed findings of any prototype/pilot study which document that all aspects of the pilot (items 1 – 3 above) were adequately demonstrated, noting any necessary adjustments to design elements to achieve acceptable water quality, and finalize an operations manual that addresses the necessary monitoring protocols and maintenance procedures for proper facility operation. If a prototype is not constructed and tested, any approval will be conditioned on a satisfactory review of the bathing facility's performance during the first full season of operation.

III. Option 3- Incoming water quality does not meet the bathing beach design water quality standards in Section 6-2.19 and water flows are restricted by containment structure.

a. Siting Requirements/Water Quality Assessment:

i. Conduct a sanitary survey per Section 6-2.19 (2.0 and 3.0) to identify water quality parameters that are not able to be met, including any sources of contamination that would be harmful to bather health, making sure to include those which would not be reduced by a fill water treatment system.

1. If beach water quality criteria are not met for microbial indicators (item 4.11; except that *E. coli* (fresh water only) or enterococci must be used to assess bacteriological water quality, with an upper value for the geometric mean of 100 cfu/100 mL for *E. coli* and 30 cfu/100 mL for enterococci instead of the thresholds listed in 4.11.1), provide documentation of how filtration/disinfection or other measures will be used to meet these parameters in a reliable and consistent manner including:
   a) Provide detailed engineering plans for the water treatment system which demonstrate that microbial indicator criteria can be met and achieve a 4-log reduction in viruses under anticipated worst-case scenarios associated with the sanitary survey (microbial load, salinity, turbidity, etc.) and that the pool water can be replenished at the flow rate determined to be necessary to move water though the pool to maintain water quality. This would include detailed information on filtration, UV disinfection, and any other water treatment that would be provided.
   b) When UV disinfection is proposed, third-party validation of the ultraviolet disinfection unit that meets the requirements of the United States Environmental Protection Agency Ultraviolet Disinfection System Guidance Manual (UVDGM) (or equivalent) must be provided. If UV disinfection is proposed in brackish or marine environments, third-party validation must demonstrate the pathogen reduction can be achieved in these environments.
   c) When filtration units are proposed, third-party validation of the filtration equipment must be provided.
2. If the beach water quality criteria in item 4.11.2 for chemical quality are not met, and Sanitary Survey indicates chemical contaminants of concern, consult with NYSDOH about the information that will be necessary to document the level of chemical contaminant risk and measures, if any, needed to mitigate these risks.
3. If the beach water quality criteria in item 4.11.3 for physical quality are not met, demonstrate how they will be met after water treatment.

b. Pool Water Quality Maintenance:

i. Provide halogen disinfection of the pool water per Subpart 6-1 requirements to maintain water quality in the pool shell in light in contaminants introduced by bathers and the environment for a swimming pool in which there is insufficient flow-through volume, or which is designed to recirculate water; or

ii. Submit swimmer risk assessment as described in **Option 2a.ii.** above that demonstrates the water quality indicator levels in the pool will be maintained based on the flow rate and pathogens introduced by bathers and the environment.

c. Pool Shell/Recirculation System Design: Provide engineering plans, specifications, and reports as detailed in **Option 2b.** above.

d. Develop Physical Prototype and Conduct a Pilot Study:

i. Construct and operate a physical prototype to demonstrate operational effectiveness of any proposed filtration, UV disinfection, and flow through aspects. Results of any additional benchtop or pilot testing conducted to demonstrate the capability and integrity of the structure may also be submitted to support the proposal.

1. The prototype must consist of a physical model that can simulate the key design elements and suitability of construction materials, and must allow for observations and conclusions to be extrapolated to the proposed containment structure, including that there will be:
    a) Effective filtration and UV disinfection to meet beach bacteriological indicator criteria under the water quality conditions of the location(s) chosen.
    b) Achievement of flows and pool water turnover rates as predicted by modeling.
        (i) Tracer dye studies can be used to document dilution, distribution, and water turnover in pilot studies.
    c) Adequacy of cleaning and maintenance procedures to prevent buildup of algae/ biofilm and enable operation as designed over the course of a full season of use.
2. Establish a Water Quality Monitoring plan for the pilot project, which should run a minimum of 90 days and during the intended summer operational season:
    a) Monitor prototype pool water quality and flows, including:
        (i) Daily bacteriological monitoring: Enterococci (fresh or marine water) or *E. coli* (fresh water) from inside the pool vessel and in the adjacent waterbody at or in close proximity to the intake point
        (ii) Flow rate – flow meters to ensure no blockage/interruption of flows at inlets, outlets, piping during normal operations
        (iii) Water clarity/turbidity
        (iv) Other monitoring parameters identified to be representative of water quality (consult with NYSDOH)
3. Determine the necessary system maintenance to achieve a consistently high level of pool cleanliness and operation as designed and document the necessary cleaning and maintenance protocols to prevent buildup of algae and other forms of biofilm that may create slippery conditions or affect inlets, outlets, piping, filters, UV chamber, etc.
4. Determine any needed adjustments to full-scale engineering plans to maintain bacteriological water quality and address any elevated chemical risks found.
5. Determine protocols to respond to out-of-compliance monitoring parameters.
6. After the pilot study has concluded, submit detailed findings which document that all aspects of the pilot (items 1 – 5 above) were adequately demonstrated, noting any necessary adjustments to design elements to achieve acceptable water quality, and finalize an operations manual that addresses the necessary monitoring protocols and maintenance procedures for proper facility operation.