NATIONAL ENVIRONMENT AGENCY, SINGAPORE
NEA SCHEME FOR TECHNOLOGY TRANSLATION (T^2)

REQUEST FOR PROPOSALS (RFP) ON IMPROVING WATER QUALITY IN AQUATIC FACILITIES (WATER PLAYGROUNDS)

Research Area	Improving Water Quality in Aquatic Facilities (Water Playgrounds)
Publication Date	Friday, 4 September 2026, 11 am
Closing Date and Time	Friday, 20 November 2026, 11 am
Proposal Submission	Applications shall be made via email to T2_Grant_Secretariat@nea.gov.sg Note: Proposals submitted after the closing date and time will not be considered
Instructions and Format of Submission	Please refer to the following websites: https://www.nea.gov.sg/programmes-grants/grants-and-awards/request-for-proposals-on-improving-water-quality-water-playgrounds

REQUEST FOR PROPOSALS (RFP) ON IMPROVING WATER QUALITY IN AQUATIC FACILITIES (WATER PLAYGROUNDS)

BACKGROUND

1. The National Environment Agency (NEA) is Singapore's authority on environmental public health standards, and is responsible for research, monitoring, enforcement, licensing, and outreach to safeguard public health. Since August 2021, amendments to the Environmental Public Health Act have required higher-risk aquatic facilities, including water playgrounds, to be licensed and regulated by NEA. This expansion reflects the growing popularity of such facilities and heightened public health risks they could pose.

2. A survey of international publications revealed that *Pseudomonas aeruginosa* has triggered aquatic facilities closures worldwide. In Maine, USA, a hotel pool was shut down after 23 guests developed rashes and ear infections traced to inadequate chlorine maintenance and the absence of a disinfectant feeder system.[1] Similarly, *Legionella* also poses a serious risk – it thrives in stagnant, poorly disinfected systems and causes *Legionellosis,* a severe respiratory illness with high hospitalisation and fatality rates. In the United States alone, reported cases rose from approximately 6,014 in 2020 to 7,837 in 2021.[2] Beyond bacterial pathogens, protozoan contamination has also forced closures — in Barcelona, Spain, a splash pad, i.e. water playground, was closed for 14 days in 2018 following 71 cases of acute gastroenteritis attributed to *Cryptosporidium* and *Clostridium perfringens*.[3] While Singapore has not experienced such outbreaks and public health incidents, these cases demonstrate the environmental and public health risk posed by waterborne microbes, even when conventional disinfection systems are present – making a strong case for strengthening Singapore's water quality monitoring and design standards for water playgrounds.

3. Monitoring and maintaining water quality in Singapore's water playgrounds presents ongoing challenges. Water playgrounds face dynamic contamination loads from high user turnover, environmental debris, and operational variability, with downstream effects on key water quality parameters such as turbidity, pH, free residual chlorine, and bacteria counts (e.g., *Pseudomonas aeruginosa*). Current water quality testing and compliance monitoring primarily rely on daily manual sampling and dosing by licensees or their engaged contractors, supplemented with periodic testing by a testing laboratory. However, this may not provide water quality information with sufficient accuracy, reliability, or timeliness for effective prevention and response to contamination events.

4. Addressing these gaps and ensuring consistently safe water quality requires an integrated, science-based framework that improves detection, enables rapid response, enhances system design, and translates findings into operational practice. NEA is launching this research call with the objective to strengthen Singapore's capability in safeguarding water quality at water playgrounds through the development and validation of practical, evidence-based monitoring, testing and risk management solutions. The research will improve the

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[1] Lamere, L., Smith, E., Grieser, H., Arduino, M., Hlavsa, M., & Combes, S. (2024). Pseudomonas Infection Outbreak Associated with a Hotel Swimming Pool - Maine, March 2023. MMWR Morb Mortal Wkly Rep 2024, 32–36.

[2] Barskey, A., Wallace, R., Lee, S., Hannapel, E., Smith, J., & Edens, C. (2025). Legionnaires' Disease Surveillance Summary Report, United States 2020-2021. Centers for Disease Control and Prevention.

[3] de Andrés Aguayo, A., Millet, J.-P., Álvarez-Bruned, L., Palma, D., Gómez, A., Gallés, P., . . . Rius, C. (2024). Clostridium and Cryptosporidium outbreak linked to a splash pad. BMC Public Health.

understanding of water quality risks under local environmental conditions, assess the suitability of current regulatory parameters, and produce deployable operational solutions for adoption by NEA, licensees and contractors.

SCOPE OF RFP

5. This RFP is an open call for integrated R&D proposals to strengthen Singapore's operational capability in monitoring and maintaining water quality at water playgrounds – defined as recreational areas equipped with artificial water features that operate with a water recirculation system designed for play and interaction (including interactive water fountains).

6. The RFP comprises five components: Core Outcomes 1 and 2 are the primary deliverables covering the validation and test-bedding of practical, deployable monitoring and testing solutions for adoption into NEA's regulatory and compliance guidelines and workflows; and Enabling Studies 1, 2 and 3, will run concurrently to provide the diagnostic and parametric evidence base required to calibrate these solutions to Singapore's specific conditions. As findings from the Enabling Studies emerge, they will be incorporated into the Core Outcomes. Together, these five components address the following questions for water playgrounds in Singapore:

a) How can water quality be monitored continuously and cost-effectively? (Core Outcome 1)

b) What testing equipment and performance standards should licensees or engaged contractors use for daily water quality testing? (Core Outcome 2)

c) Which types of water playgrounds are most likely to have water quality problems? (Enabling Study 1)

d) Which water quality parameters should be monitored and what thresholds should trigger an intervention – do current ones need to be revised or supplemented to better reflect Singapore's context? (Enabling Study 2)

e) Where and how should water samples be collected to best represent user exposure and support accurate public health risk assessment? (Enabling Study 3)

7. Applicants must submit an integrated proposal that addresses all five components, clearly demonstrating how findings from the Enabling Studies will inform the design and conduct of the Core Outcomes. A graphical abstract illustrating how the five areas (two core outcomes and three enabling studies) of the RFP scope relate to each other is shown in Fig 1.

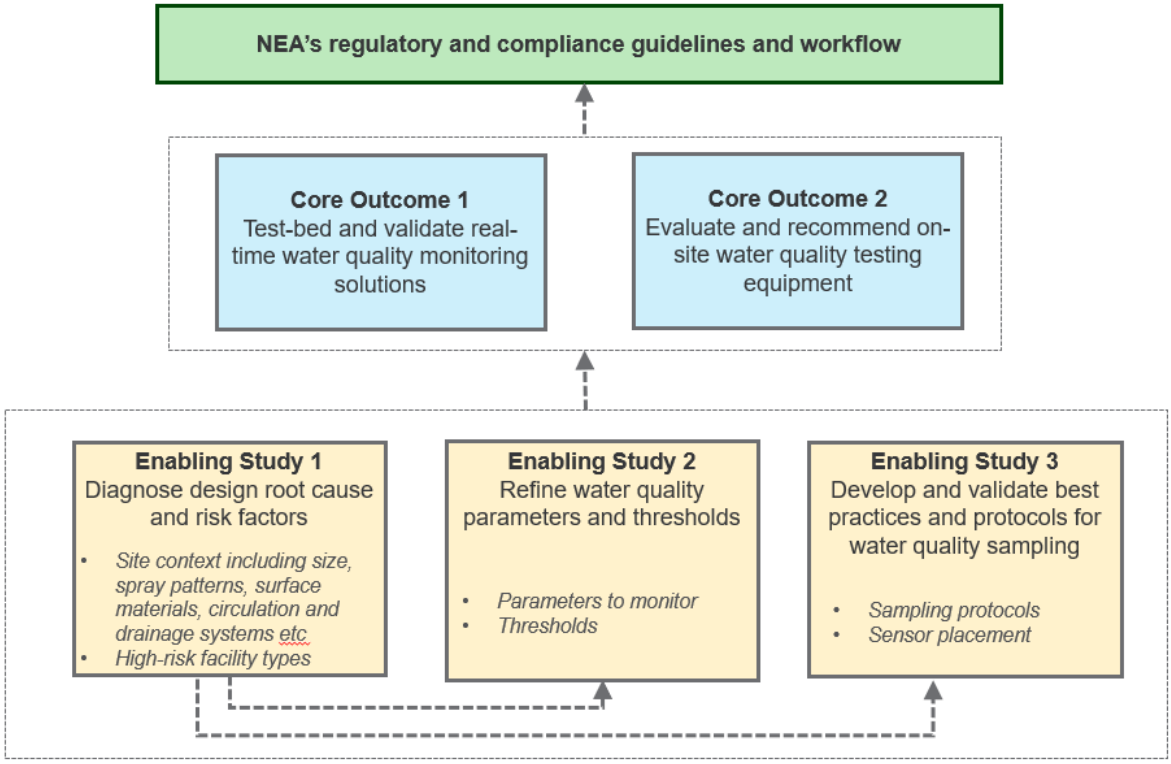

Fig. 1. Graphical abstract illustrating how the five areas of the RFP scope (two core outcomes (blue) and three enabling studies (yellow)) relate to each other

Core Outcome 1: Test-bed and validate real-time water quality monitoring solutions

8. For water playgrounds at higher risk of poor water quality, continuous and real-time water quality monitoring may assist NEA's regulatory and compliance workflows in ensuring safe water quality for environmental and public health. While cost-effective monitoring sensors and solutions exist for swimming pools, no equivalent solutions are available for water playgrounds settings, which may include zero-depth and shallow-depth pools. This limits NEA's ability to safeguard water quality and public health at these facilities.

9. Core Outcome 1 aims to test-bed and validate fit-for-purpose monitoring solutions that can be directly integrated into NEA's compliance and enforcement workflows.

10. The primary objectives of this outcome are to develop and/or implement and test-bed cost-effective, real-time, continuous water quality monitoring solutions at potentially high-risk water playgrounds, prioritising higher-risk sites identified in Enabling Study 1. This goes beyond the periodic point-in-time testing currently undertaken by licensees, and includes:

a) Developing, customising, or implementing sensors suitable for zero-depth and shallow-depth water playgrounds, ensuring that deployment and placement of water quality sensors use best practices and protocols for water quality sampling guided by Enabling Study 3, and consider and account for water playground design risk factors identified in Enabling Study 1. Sensors should be suitable, reliable, and sturdy for continuous deployment considering potential interference from water playground users (e.g. children);

b) Developing, customising or implementing a real-time, continuous monitoring system and dashboard with automated alerts through data collected by sensors in paragraph

10a; covering pH and free residual chlorine as baseline parameters, and any additional parameters that can be directly measured or reliably computed in real-time. The parameters measured and alert thresholds applied will be guided by the findings and recommendations from Enabling Study 2. Where direct real-time, continuous measurement of target parameters is not feasible, but alternative approximations such as computational methods with proxy measurements (e.g. deriving free residual chlorine from oxidation-reduction potential) are possible, applicants should propose and validate such techniques and demonstrate their accuracy, precision and reliability;

c) Validating sensor readings or computational approximations against accredited laboratory testing methods or established reference instruments and calibrating sensors based on recommended appropriate thresholds of water quality parameters identified in Enabling Study 2;

d) For parameters that cannot be measured or computed in real-time, proposing alternate monitoring protocols including sampling frequency, sampling locations, number of sampling points and sample testing methods to ensure adequate water quality monitoring with accurate results; and

e) Providing evidence-based recommendations for an integrated real-time and continuous monitoring system, comprising suitable sensors and an associated dashboard with automated alerts where appropriate. Recommendations shall be **supported by a structured assessment and comparison of viable system options**, including performance, indicative implementation, operational and maintenance costs, manpower and calibration requirements, and key advantages, limitations and trade-offs (e.g. response time, reliability and productivity impacts), to guide procurement and compliance decisions.

11. All solutions trialled and proposed should account for operational considerations including cost-effectiveness, variability in water playground design and conditions, potential interference from water playground users, etc.

12. **Proposals with solutions at Technology Readiness Levels (TRLs) 7–9 will be evaluated favourably,** and proposals should demonstrate a clear pathway towards operational deployment and adoption by NEA and/or industry. Please refer to **Appendix A** on TRLs, which are commonly used to describe maturity of research and development solutions.

Core Outcome 2: Evaluate and make recommendations for on-site water quality testing equipment

13. Licensees are currently required to carry out on-site water quality testing at least once daily to ensure that the pH value and the amount of residual disinfectant (free residual chlorine/ total bromine) are within regulatory limits (Refer to **Appendix B** for details).

14. On-site testing currently relies predominantly on manual colorimetric methods largely due to cost considerations. These methods are susceptible to human subjectivity and colour interpretation error, which limits their reliability as a compliance and early-warning tool. More accurate digital testing equipment and sensor-based systems could significantly improve compliance with regulated water quality thresholds and enable early detection of poor water quality. This outcome delivers the second core deliverable of this project: evidence-based equipment standards and recommendations that NEA can use to set minimum testing requirements for licensees and inform future regulatory guidance.

15. The primary objectives of this outcome are as follows:

a) Evaluate accuracy, precision, and reliability of various existing types or models of on-site water quality testing equipment (including those currently commonly deployed – refer to Fig. 2 for examples), ensuring that deployment and placement of water quality sensors use best practices and protocols for water quality sampling informed by Enabling Study 3;

b) Validate sensor readings against accredited laboratory testing methods or established reference instruments and calibrate test equipment based on recommended appropriate thresholds and water quality parameters identified in Enabling Study 2;

Fig. 2. Examples of on-site water quality testing equipment currently used

c) Recommend minimum accuracy, precision and reliability requirements for on-site testing equipment for potential adoption into NEA's regulatory framework; and

d) Provide evidence-based recommendations of suitable on-site water quality testing equipment for use by licensees/ operators, supported by a **structured assessment and comparison of available testing options**, including performance, indicative implementation, operational and maintenance costs, manpower and calibration requirements, and key advantages, limitations and trade-offs (e.g. response time, reliability and productivity impacts), to guide procurement and compliance decisions.

<u>Enabling Study 1: Diagnose design root causes for poor water quality and risk factors</u>

16. This enabling study runs concurrently with Core Outcomes 1 and 2. Its purpose is to establish the diagnostic foundation — ensuring that water quality parameters and thresholds refined under Enabling Study 2, sampling protocols developed under Enabling Study 3, and monitoring and testing solutions developed under Core Outcomes 1 and 2 are all correctly calibrated to Singapore-specific facility conditions and risk profiles, rather than derived from generic international benchmarks. Findings will guide all components iteratively as they emerge.

17. The influence of water playground design on water quality is not fully understood in the local context – for example, many water playgrounds use porous flooring material such as ethylene propylene diene monomer (EPDM) over non-porous alternatives due to its low costs, shock absorption and slip-resistance. However, the porous nature of EPDM may encourage

microbial accumulation risks in Singapore's tropical humid conditions. Biofilms can form on porous surfaces, spray nozzles, play features, and areas of poor circulation, creating protective environments for pathogens including *Pseudomonas aeruginosa* and *Legionella* that reduce disinfectant efficacy and likely contribute to persistent water quality failures.

18. The objectives of this enabling study are to:

a) Investigate how playground characteristics (e.g., size, physical layout, spray patterns, water depth, surface materials, infrastructure age, disinfection systems, circulation and drainage systems) affect various water quality parameters (e.g., analyse correlations);

b) Identify design elements and environmental or meteorological variables (e.g. proximity to contamination sources, land use factors and rainfall) that may contribute to the poor water quality outcomes and pinpoint key risk factors;

c) Develop a risk-based framework to identify high-risk facilities based on facility type and design features that have a higher likelihood of failing to meet water quality standards considering environmental and operational conditions, directly informing test-bed site prioritisation under Core Outcome 1; and

d) Provide evidence-based recommendations on water playground design elements that reduce risk factors for regulated water parameters, accounting for operational constraints such as waterproofing, durability, cost-effectiveness, slip-resistance, and compliance with safety standards. This may inform or guide NEA's regulatory framework for water playgrounds.

Enabling Study 2: Refine water quality parameters and thresholds

19. This enabling study runs concurrently with Core Outcomes 1 and 2. Its purpose is to ensure that the parameters measured, alert thresholds applied by monitoring solutions under Core Outcome 1, and the equipment accuracy standards set under Core Outcome 2, reflect Singapore's local environmental and operational context rather than general international standards. Findings will inform and guide work under both Core Outcomes as they emerge.

20. Water playgrounds are subjected to monthly and quarterly laboratory testing, where results are submitted to NEA. A list of regulated parameters required to be tested is provided in **Appendix B**. However, current parameters and thresholds may not be well calibrated to local conditions. For example, while *Pseudomonas aeruginosa* can cause infections and has triggered closures internationally, it is also ubiquitous and naturally occurring across many environments, including environments in Singapore. The current threshold may not accurately reflect the concentration at which it poses a health risk to users, potentially resulting in water quality compliance failures that do not correspond to actual environmental and public health risk. Current parameters may also insufficiently reflect the risks posed by other types of microbes relevant for water playground settings.

21. The objectives of this enabling study are to:

a) Review international water quality parameters and thresholds, including those from countries with well-developed regulatory frameworks and comparable environmental conditions and climate; and

b) Develop evidence-based recommendations for water quality parameters and thresholds for water playgrounds, guided by clinical, epidemiological and environmental data (including findings from Enabling Study 1 on local facility

conditions, design risk factors and environmental factors), tailored to Singapore's local environmental conditions, for potential adoption into NEA's regulatory framework for water playgrounds and as the calibration basis for continuous monitoring solutions in Core Outcome 1 and equipment standards in Core Outcome 2.

Enabling Study 3: Develop and validate best practices and protocols for water quality sampling and testing

22. This enabling study runs concurrently with Core Outcomes 1 and 2. NEA's existing guidelines specify that water sampling for water playgrounds should be conducted near spray nozzles — capturing treated incoming water[4]. However, this approach may not adequately reflect water quality at points of user exposure, potentially limiting the effectiveness of public health risk assessment. Additionally, existing guidelines for water quality testing in recreational water and aquatic facilities also differ in their recommended sampling locations (Table 1).[4,5]

Table 1. Existing guidelines vary for water sampling in aquatic facilities (water playground)

Framework	**Recommended Sampling Location**
NEA guidelines for water playgrounds	Near nozzles of the spray/water features (capturing treated incoming water)
NEA guidelines for swimming pools	1. No aerosol feature: Near outlets and far from treated water inlets 2. With aerosol feature: Near nozzles of the spray/water features
WHO guidelines for recreational water	Low-velocity areas away from inlets. For larger or more complex pools, multiple sampling points are recommended to ensure representative assessment

23. The objectives of this enabling study are to develop and validate best practices and protocols for water quality sampling and testing to ensure accurate sensor placement and representative sampling. These protocols should provide instructions on sampling frequency, sampling locations, number of sampling points, sample testing methods etc. where relevant, guiding both the implementation of real-time, continuous water quality monitoring sensors under Core Outcome 1 as well as on-site water quality testing under Core Outcome 2. Developing these best practices and protocols involves:

a) Reviewing international water quality sampling and testing guidelines and protocols – including those from international expert organisations such as the World Health Organisation, and countries with well-developed regulatory frameworks and comparable environmental conditions and climate – to identify best practices for water quality sampling locations, frequency, and other relevant techniques or protocols in water playgrounds without greatly increasing costs for the licensees; and

b) Validating such identified best practices and protocols through comparison to sampling across multiple points at water playgrounds, prioritising high-risk facility types identified

[4] National Environment Agency. Water Quality. Aquatic Facilities. Retrieved from National Environment Agency. Singapore: https://www.nea.gov.sg/docs/default-source/default-document-library/guidelines-for-managing-aquatic-facilities-in-singaporef9829871c52149c694d9e85647122519.pdf

[5] World Health Organization. (2006). Guidelines for safe recreational water environments. Volume 2, Swimming pools and similar environments. World Health Organization.

in Enabling Study 1 – considering areas of poor circulation, biofilm prone surfaces, and spray nozzle zones – and measuring parameters informed by Enabling Study 2.

EXPECTED PROJECT DELIVERABLES

24. Applicants should note that Singapore has 76 water playgrounds in total, all of which use chlorine-based disinfection systems (refer to **Appendix C** for the breakdown by premises type). For this project, applicants may wish to target water playgrounds managed by town councils and malls. Following project award, NEA will facilitate site visits to water playgrounds (if required), allowing the awardee to shortlist suitable sites for the project. NEA will also liaise with premise owners to facilitate access to selected water playgrounds for water sample collection, trials, and other necessary research or test-bedding activities, subject to premise owners' agreement.

25. By the end of the project, applicants should deliver the following:

a) Test-bed results for an integrated real-time and continuous water quality monitoring system(s), comprising suitable sensors and an associated dashboard with automated alerts where appropriate that are applicable across all types of water playgrounds. This should be guided by recommended parameters and calibrated against the validated sampling protocols and thresholds from Enabling Studies 2 and 3, and include deployment strategies, sensor validation results, and recommendations for suitable systems *(Core Outcome 1)*;

b) Recommendations on minimum performance specifications and suitable on-site water quality testing equipment for all types of water playgrounds, guided by the recommended parameters and calibrated against validated sampling protocols and thresholds from Enabling Studies 2 and 3 *(Core Outcome 2)*;

c) Recommendations shall be **supported by a structured assessment and comparison of viable testing options**, including performance, indicative implementation, operational and maintenance costs, manpower and calibration requirements, and key advantages, limitations and trade-offs (e.g. response time, reliability and productivity impacts), to guide procurement and compliance decisions *(for Core Outcomes 1 and 2)*;

d) A risk-based assessment framework for identifying high-risk water playgrounds based on design, facility type, environmental and operating conditions, and evidence-based recommendations on design elements that reduce water quality risk factors, accounting for operational constraints such as waterproofing, durability, cost-effectiveness, slip-resistance, and compliance with safety standards *(Enabling Study 1)*; and

e) Evidence-based recommendations on water quality regulation parameters and thresholds for water playgrounds tailored to Singapore's environmental and operational context, for consideration in NEA's regulatory framework for water playgrounds *(Enabling Study 2)*.

f) Validated best practices and protocols for water quality sampling, instructing sampling frequency, sampling locations, number of sampling points, and sampling and testing methods for water playgrounds. These protocols shall serve as the basis for developing and implementing real-time monitoring solutions in Core Outcome 1 and guide

recommendations for on-site testing and testing equipment in Core Outcome 2 *(Enabling Study 3)*;

PROPOSAL REQUIREMENTS AND SUBMISSION

26. All Proposals shall be submitted through email to T2_Grant_Secretariat@nea.gov.sg before the closing date and time, by filling in **Annex A Research Proposal (Grant Application) Template.** Applicants are to refer to [https://www.nea.gov.sg/programmes-grants/grants-and-awards/request-for-proposals-on-improving-water-quality-water-playgrounds] for detailed submission instructions and templates for submission of the proposal. Each email is subject to a size limit of 15 MB. Please send separate emails if the email exceeds the size limit.

27. The Proposal shall include but shall not be limited to the following information:

a) Detailed description of the research objective, scope and proposed methodologies to achieve the desired outcomes across the five components. Where applicable, applicants should illustrate the advantages of proposed methodologies over existing approaches and explain how your solution will address the specific challenges within each outcome/study.

b) Detailed description of specific technologies, standards, guidelines, tools and technical methods to be used to achieve the desired outcomes. Applicants should include references to prior studies and literatures, where applicable, explain how previous research studies or experience guides your selection of technology, identify what questions or problems remain unsolved that your solution will address and show that the proposed methods will work.

c) Detailed description of sensors, equipment and tools for measuring water quality. This should include the specifications (detection limits, accuracy and sensitivity) of the equipment, parameters measured by the equipment, operational requirements, laboratory and field test reports (if any) and reference to similar/relevant studies using the equipment. Applicants should also justify the number of samples and number of sites across which collection and testing have to be done, including the rationale for the proposed sampling frequency, sample size, and sampling methodology, and how these are sufficient to yield statistically meaningful and representative results. Where applicable, applicants should discuss expected performance in the context of Singapore's tropical environment and water playground facilities.

d) Project deliverables and timeline showing the research and technical milestones to be achieved with clear criteria for determining milestone completion and success metrics.

e) Proposed budget with detailed justifications and estimated costs for sensor systems, equipment, tools and other project expenses.

f) Research team composition, individual capabilities and relevance of project team members' expertise to the project, with reference to, but not limited to the following capability areas:

    i. Microbiology;

ii. Water sampling, testing, and analysis;
iii. Water treatment and management;
iv. Epidemiology;
v. Environmental public health;
vi. Sensor technology and IoT systems; and
vii. Data analytics and modelling

g) Detailed indication of all in-kind services, funding, and tangible contributions by industry partners, host institutions or other collaborators. In-kind services include labour, materials, facilities, and other services such as loaning of facilities and space. Applicants are encouraged to demonstrate the amount of institutional support (including access to necessary infrastructure, resources, etc.) and breadth of multidisciplinary expertise available to the project, as these will be considerations in the evaluation of technical capability.

28. Together with **Annex A (Research Proposal Template)**, filled in copies of **Annex B (CV template)** should be submitted for each principal investigator, co-principal investigator, applicant, co-applicant, or project team member.

29. The applicant shall recommend at least three (3) independent expert reviewers in the proposal **(Annex A: Research Proposal Template Part B – Proposed Solution – B6 Suggested Reviewers)**. Peer review may form part of the project evaluation process to evaluate the scientific merits and international competitiveness of the proposals.

30. Requests for data from Public Sector Agencies are to be submitted within the proposal **(Annex A: Research Proposal Template Part E – Data Requirements).**

PROJECT DURATION AND SCHEDULE

31. The project duration shall not exceed three (3) years, from initiation to the completion of the project.

32. The proposed project schedule shall include major milestones and phases **(refer to Annex A: Research Proposal Template Part B – Proposed Solution – B3 Project Schedule, Phasing Plans and Cash-Flow Projections).** The Proposal shall also explain how the achievement of the major milestones and phases are to be evaluated and determined.

ELIGIBILITY AND FUNDING SUPPORT

33. This RFP is extended to all Institutes of Higher Learning (IHLs), Research Institutes (RIs), and private sector entities. The RFP is to support R&D and test bedding work carried out in Singapore.

34. The proposal must address all five components to qualify for evaluation.

35. Funding support for awarded proposal shall be capped at a quantum of up to S$1.5 million.

36. The funding support for successful applicant(s) is indicated below:

S/N	Type	Max Direct Costs (DC) support
1	Public Sector Entities	100%
2	Small Medium Enterprises (SMEs)	50%
3	non-SMEs	30%

37. Funding of private entities for research projects (of total project budget >$500,000) and test-bedding/demonstration/scale-up projects (of total project budget >$2M) is conditional on collaboration with a public sector research performer. Funding for non-Singapore entities is conditional on the appointment of a Singapore Technology Licensing Office (STLO). More details can be found in **Annex C (Guidelines on Funding Private Sector Entities).**

38. Indirect costs will not be supported for all private sector entities (i.e. 0% of indirect costs will be provided). Indirect costs shall be funded at up to 30% of qualifying direct research costs for public sector entities. The definition of indirect costs is given in **Appendix A.2 of Annex A (Research Proposal Template)**.

39. Private sector entities and applicants are required to fill in **Annex A (Research Proposal Template Part F – Declaration – F2 Additional Declaration [For Private Sector Applicant(s)])**, as part of the proposal application.

40. Grant disbursement is made on a reimbursement basis upon achievement of agreed project milestones and deliverables, supported by documents as proof of the actual expenditure incurred and an external audited statement of account.

41. GST incurred by successful applicant(s) should not be supported by the grant except for cases such as non-GST registered organisations or where the organisation is unable to claim input GST incurred from IRAS (e.g. Institutes of Higher Learning).

42. All other terms and conditions governing the grant will be communicated to and mutually agreed upon with successful applicant(s) prior to the award of the grant.

INTELLECTUAL PROPERTY RIGHTS

43. The Project Intellectual Property (IP) shall, at the first instance, be owned by the successful applicant(s). This is without prejudice to any agreement that the successful applicant(s) may enter into with the Investigators or Project Personnel on ownership and exploitation of Project IP.

44. The NEA shall reserve a royalty-free, irrevocable, worldwide, perpetual and non-exclusive right to use any Project IP for their statutory functions, non-commercial and/or Research & Development (R&D) purposes, including continuing the R&D with any third party, and making and having made products based on the Project IP to fulfil statutory functions. Notwithstanding the foregoing, the successful applicant(s) may seek a waiver of this Clause from NEA, if such waiver would support the effective commercialisation of the Project IP by a third party pursuant to the National IP Protocol for Publicly Funded R&D. Any waiver would be at NEA's absolute discretion.

RESEARCH COLLABORATION AGREEMENTS

45. Successful applicant(s) may undertake work on the research in collaboration with a collaborator. Where and when this occurs, the successful applicant is responsible for putting in place research collaboration agreements that are undertaken by the successful applicant.

EVALUATION CRITERIA

46. Proposals will be evaluated against the following criteria:

S/N	Evaluation Criterion	Weightage (%)
1	Effectiveness of submitted proposal in achieving desired outcomes • Relevance of proposed scope • Technical feasibility and innovativeness of the proposed methodologies	60
2	Technical competencies of the research team • Track record of Principal Investigator(s) and collaborators • Relevant R&D capabilities and expertise of the Principal Investigator and team members	20
3	Project management, budget reasonableness, and cost-effectiveness of proposed monitoring solution • Clarity of proposed milestones, deliverables, and implementation schedule • Reasonableness of proposed budget • Cost-effectiveness of proposed water quality monitoring solution	20
Total Score		**100**

CONTACT

47. Please contact the Secretariat at T2_Grant_Secretariat@nea.gov.sg should you have any queries. Applicants should refer to the Instructions and Templates for Applicants on [https://www.nea.gov.sg/programmes-grants/grants-and-awards/request-for-proposals-on-improving-water-quality-water-playgrounds] as the primary source of information.

48. All applicants will be notified in writing of the outcome of their proposals and applications.

Appendix A: Technology Readiness Levels (TRLs)

TRLs	Description
TRL 1	Basic principles observed and reported
TRL 2	Technology concept and/or application formulated
TRL 3	Analytical and experimental critical function and/or characteristic proof of concept
TRL 4	Component and/or breadboard validation in laboratory environment
TRL 5	Component and/or breadboard validation in relevant environment
TRL 6	System/subsystem model or prototype demonstration in a relevant environment
TRL 7	System prototype demonstration in an operational environment
TRL 8	Actual system completed and qualified through test and demonstration
TRL 9	Actual system proven through successful mission operations

Appendix B: Regulated water quality parameters for Water Playground (including interactive water fountain)

Testing Frequency	Regulatory Test Parameters	Parameter Limits
Daily	pH – if Chlorine is used pH – if Bromine is used (indoor only) Free Residual Chlorine – if Chlorine is used (ppm) Total Bromine (indoor only) – if Bromine is used (ppm)	7.2 – 7.8 7.2 – 8.0 1 – 3 2 – 4
Monthly	Turbidity (Nephelometric Turbidity Units) pH – if Chlorine is used pH – if Bromine is used (indoor only) Free Residual Chlorine – if Chlorine is used (ppm) Total Bromine (indoor only) – if Bromine is used (ppm) Heterotrophic Plate Count (cfu/ml) *Escherichia coli* Count (cfu/100 ml)	max 0.5 7.2 – 7.8 7.2 – 8.0 1 – 3 2 – 4 max 200 <1
Quarterly	*Legionella* Bacteria Count (cfu/100 ml) *Pseudomonas aeruginosa* Count (cfu/100 ml)	<1 <10

Appendix C: Number of Water Playgrounds by Premises Types

Attraction	7
Club	4
Condominium	23
Hotel	1
National Parks Board	3
Office	1
School	1

Shopping mall	8
Sport Singapore	15
Town council	13