



Republic of the Philippines  
**Tourism Infrastructure & Enterprise Zone Authority**  
**REGULATORY OFFICE**

## **Technical Specifications**

Contract No. \_\_\_\_\_

Analytical Services for Water and Wastewater Monitoring Program  
for Boracay Island

### **1.0 OBJECTIVE**

The intent of the Contract is to procure water and wastewater quality analytical services in accordance with this Technical Specifications.

### **2.0 QUALIFICATIONS OF THE CONTRACTOR**

- 2.1. The Contractor must have at least a valid and current accreditation of **ISO 17025 and Department of Health (DOH) Laboratory Recognition for water quality analysis** and **ISO 17025 or DENR Laboratory Recognition for wastewater quality analysis**.
- 2.2. The Contractor must be able to handle the anticipated number of samples that will be submitted during the term of the Contract. A typical analytical request is described in **Appendix A**.

### **3.0. OBLIGATIONS OF THE CONTRACTOR**

- 3.1. The Contractor shall provide analytical services per the specifications in this Technical Specifications.
- 3.2. The Contractor shall provide, if deemed requested, properly cleaned/prepared sample bottles or containers, chemicals or reagents, coolers, and other materials necessary in the proper handling of the samples from sampling points or from the pick-up point to the laboratory so that the integrity of the samples will be maintained from time of collection up to the time of receipt by the testing laboratory.
- 3.3. During the term of the Contract, the Contractor shall maintain the necessary capability and capacity to provide the specified laboratory services within the required turnaround times.
- 3.4. The Contractor shall provide access to TIEZA Regulatory Office (RO) and its authorized personnel to audit the laboratory to assure the accuracy and reliability of laboratory results related to the work performed. Access shall be provided during normal business hours. Notice of audit is not required.
- 3.5. The Contractor shall perform all analyses listed in **Appendix A**. In any instance, sub-contracting shall not be allowed, except on the parameters specified in the same Appendix.
- 3.6. As most of the sampling points are located in Boracay Island, samples may arrive late in the afternoon/night at the airport or at the TIEZA RO. In such instances, the Contractor



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shall pick-up and receive samples during non-standard hours and conduct analysis within the required holding times specified in the latest edition of Standard Methods for the Examination of Water and Wastewater published by APHA- AWWA.

- 3.7. The Contractor shall pick-up samples from the airport (either Clark or NAIA for Luzon delivery, or any pick-up place previously coordinated with the contractor for Visayas delivery) at no cost to the TIEZA RO. However, TIEZA RO shall have the option to deliver the samples to the laboratory when circumstances warrant.
- 3.8. The Contractor shall assign a contact person to handle all concerns and works from TIEZA RO. The *contact person* shall be the point person for TIEZA RO staff for all the needs/matters relating to the Contract.
- 3.9. In case of anomalous or non-conforming results, the Contractor shall endeavor to explain such results, in writing, to the satisfaction of TIEZA RO.
- 3.10. In case of breakdown of major equipment in the laboratory which will result to non-analysis of specific parameter, the contracted laboratory shall seek to sub-contract the parameter affected but with the consent of TIEZA RO if the sub-contracted laboratory is acceptable or not, provided the cost of the analysis is still the same as what was stated in the contract. Payment of such to the sub-contractor will be under the account of the contracted laboratory while TIEZA RO will be billed based on the batch of sample submitted.
- 3.11. The Contractor shall notify TIEZA RO immediately of:
  - 3.11.1. Any changes in the aspects of its operation affecting its
    - legal, commercial or organizational structure
    - policies or procedures
    - premises
    - and other matters that may affect the laboratory's capability.
  - 3.11.2. Any revocation of its Certification of Recognition and/or Accreditation from the agency/body which issued the same.
- 3.12. The Contractor shall provide/deliver to TIEZA RO office either in National Capital Region or Boracay Office, at **no additional charge**, the following items:
  - 3.12.1. Sampling request forms, including Chain-of-Custody forms, and custody seals;
  - 3.12.2. Reagent grade chemicals and other materials necessary in the preservation of collected samples, such as, but not limited to hydrochloric acid, sulfuric acid or nitric acid in small dropper bottles, including pipettes which will be used in dispensing said chemicals;
  - 3.12.3. Certified clean sampling containers appropriate for the required tests, such as 125 ml pre-sterilized glass bottle with sodium thiosulfate (unless otherwise specified) for bacteriological analysis, etc., or other sample containers appropriate for the required test parameters, delivered to TIEZA RO Boracay Office at least two (2) working days before the sampling provided TIEZA RO

gives at least two (2) days advance notice for Contractor to prepare and send the sampling containers;

- 3.12.4. Coolers/ice chests, ownership of which shall remain with the Contractor. In general, "blue ice" may/may not be required from the Contractor provided the required temperature is maintained in order to preserve the sample.



## 4.0. TECHNICAL REQUIREMENTS

### 4.1 Analytical Methods

- 4.1.1. The Contractor must perform the required tests using methods of analysis specified in **Appendix B**.
- 4.1.2. The Contractor must have a valid and current ISO 17025 and DOH accreditation for water quality parameters and ISO 17025 or DENR recognition for wastewater quality parameters with the corresponding analytical method listed in **Appendices A and B**. However, it is anticipated that the Contractor may not have accreditation or recognition in all the parameters with the analytical method specified in **Appendix B**. In such case, the Contractor is required to submit a certified copy of the analytical method used by the Contractor in the measurement. The measuring method must be a standard method and fully documented, and must bear the approval from the Contractor's management. At the minimum, the documented method must include details of:

- Scope/ performance characteristics/ estimate of uncertainty
- Principles
- Hazards and disposal of waste materials
- Reagents and standards
- Equipment
- Sample collection, preservation and preparation
- Calibration procedure
- Quality control
- Calculation and reporting
- Reference for the method

Submission of the above stated documents must be for the unaccredited or unrecognized parameters only.

### 4.2. Control or Blind Samples

- 4.2.1. As part of its quality assurance/ quality control program in the laboratory testing procedure, TIEZA RO, from time to time, may be obliged to submit Certified Reference Materials (CRM) to the Contractor as blind or control samples, together with the samples collected at designated sampling points.
- 4.2.2. The control or blind samples shall be treated by the Contractor as regular samples submitted by TIEZA RO. Thus, the Contractor shall be required to submit test reports on the result of the analysis, including any deficiency associated with the control sample or each time a test result fails acceptable QA/QC limits.
- 4.2.3. In case of any quality control problem associated with the control or blind samples, the Contractor shall invalidate all results in all samples submitted with the control or blind samples. The Contractor shall, then, inform TIEZA RO, in writing, about the deficiency and request for a resampling. However, all samples collected in the resampling shall be analyzed, at the cost of the Contractor, including any control sample, if any.
- 4.2.4. Succeeding failures of the Contractor to analyze and report results within acceptable QA/QC limits can result in termination of the Contract.

### 4.3. Laboratory Audits



- 4.3.1 During the term of the Contract, TIEZA RO may conduct its own unannounced audit at the Contractor's laboratory to ascertain reliability and accuracy of the results of the analyses undertaken only on samples submitted by TIEZA RO.

#### **4.4. Sample Receipt**

- 4.4.1. Samples collected by TIEZA RO for the day shall be collected by the Contractor at the location stated in Item 3.7 where TIEZA RO sent its sample, if possible on the same day when the sample was sent. However, in case of unforeseen circumstances (e.g., cancelled flights, delayed flights, heavy traffic, traffic accident, etc.), TIEZA RO shall notify the Contractor, through SMS or phone call. The Contractor shall be available to extend the time of collecting the samples.
- 4.4.2. In the event that TIEZA RO shall submit samples to the Contractor's laboratory, the Contractor shall provide sample receipt until 5:00 PM.

#### **4.5. Sample Control**

- 4.5.1. Any sample or control/blind sample received by the Contractor's Laboratory that is in unacceptable condition, or rendered unacceptable for analyses while in possession of the Contractor, shall be reported to TIEZA RO within twenty-four (24) hours from the time of submission. The Contractor shall secure consent from TIEZA RO if analysis may still be proceeded.
- 4.5.2. A violation of this requirement is considered to have occurred when the Contractor renders a sample or control sample unusable. Violation shall result in a ten percent (10%) reduction in analysis fees for all requested analyses in which the violation has occurred. Violation in excess of four (4) times in a one-year period may result in the termination of the Contract.

#### **4.6. Record Keeping, Retention and Confidentiality of Reports**

- 4.6.1. The Contractor shall maintain documentation of all raw, final, and supporting quality control data of results of analyses made for a minimum of five (5) years.
- 4.6.2. The Contractor shall provide a written and/or electronic copy of any requested historical report within ten (10) calendar days, when requested.
- 4.6.3. The Contractor shall not disclose data or disseminate the contents of the final or any preliminary report of analyses to a third party without the prior written consent of TIEZA RO.

#### **4.7. Turnaround Time**

- 4.7.1 Analyses of all samples must be initiated or conducted within the required sample holding time dictated by the required test parameter. Similarly, analytical results must be submitted to TIEZA RO within a reasonable time.
- 4.7.2 Sample Turnaround Time.

The sample turnaround time is the time elapsed between the receipt of the sample by the Contractor and the time the analytical procedure was started. The sample turnaround time shall be within the limits defined by the analytical parameter in the Standard Methods.



TIEZA RO staff may require a specific turnaround time different from what is required by the parameter, as dictated by the purpose or urgency of the analysis.

No payment shall be made for analysis of samples if the required sample turnaround time is exceeded. This is to ensure that the integrity of the sample has been maintained from the time it was received up to the time the laboratory has completed the required test.

#### 4.7.3. Report Turnaround Time.

The Contractor must be capable of supplying TIEZA RO with reports of analysis, either written or through phone, within the turnaround times as follows:

Routine Priority	seven (7) calendar days from sample receipt date
Urgent Priority (upon request by TIEZA RO)	three (3) calendar days from sample receipt date

For potability test, the Contractor shall inform, through telephone or e-mail, TIEZA RO Operations and Customer Service Regulation Division (OCSRD) **without delay**, after any indication of positive results in the **presumptive test** for coliform bacteria when the Multiple Tube Fermentation Technique (MTFT) is used as the method of analysis. Upon request by TIEZA RO of an Urgent Priority, it is understood that the Contractor must use Membrane Filtration Technique or enzyme substrate test as a method of analysis.

However, in Heterotrophic Plate Count (HPC), the Contractor shall perform analysis and confirmatory test for total coliforms to all samples showing turbid culture in the absence of gas/acid production in the presumptive test culture when MTFT is used as the method of analysis. If results confirmed test is total-coliform negative, sample shall be reported as invalidated when the HPC result is  $\geq 500$  cfu/mL, and shall also be included in the report.

Prompt delivery of information, either through telephone or e-mail where the report of test results of analysis is not yet available, in cases of failure/s in any of the parameters requested to be analyzed shall also be carried out by the contractor. However, it is expected that the report of test results of analysis will immediately follow and be submitted/sent to the TIEZA RO.

## 5.0. DELIVERABLES

- 5.1. Reports shall be submitted in hard copy form and in electronic format acceptable to TIEZA RO.
- 5.2. Written report for routine samples, including control samples, if any, shall be submitted to TIEZA RO as stated in the report turnaround time.
- 5.3. Failure to deliver test reports within the above-specified limits shall result in the reduction of the Contractor's fee by three percent (3%) of the total cost per day in that batch of samples submitted.
- 5.4. A single analytical report shall be issued for all analyses submitted on a single chain-of-custody.

- 5.5. One (1) original hard copy and one (1) duplicate copy of analytical results shall be furnished for each batch of sample submitted for analysis, including chain-of-custody form and the request for payment form duly filled-up by the Contractor's authorized representative. Reports shall be delivered via courier or by hand to TIEZA RO.

## **6.0 REQUEST FOR PAYMENT**

- 6.1. Request for Payment accompanied by a detailed cost breakdown of analyses performed and a final written test report shall be submitted to TIEZA RO within ten (10) calendar days from the date of sample receipt.
- 6.2. Payments shall be processed per batch of samples submitted and shall only be made on the actual number of samples tested/analyzed.

# APPENDIX A. ANALYTICAL REQUEST

Item	Substance & parameter subject to monitoring	Sampling frequency	Annual sampling frequency
<b>I. WATER SUPPLY MONITORING PROGRAM</b>			
<b>1.1</b>	<b>Distribution System/Reservoir</b>		
1.1.1	total and fecal coliform	9 + 3 per month+ 50 resampling	194
1.1.2	HPC	9 + 3 per month+ 50 resampling	194
1.1.3	Cadmium	3 per quarter/WSP	24
1.1.4	Lead	3 per quarter/WSP	24
1.1.5	Color	3 per quarter/WSP	24
1.1.6	pH	3 per quarter/WSP	24
1.1.7	Iron	3 per semi-annual/WSP	12
1.1.8	Manganese	3 per semi-annual/WSP	12
1.1.9	Organo-chlorine Pesticide	3 per semi-annual/WSP	12
<b>1.2</b>	<b>Treatment Plant Outlet</b>		
1.2.1	total and fecal coliform	1 per month/WSP	12
1.2.2	HPC	1 per month/WSP	12
1.2.3	Arsenic	quarterly/WSP	4
1.2.4	Nitrate	quarterly/WSP	4
1.2.5	TDS	quarterly/WSP	4
1.2.6	pH	quarterly/WSP	4
1.2.7	Color	quarterly/WSP	4
<b>1.3</b>	<b>Raw water</b>		
1.3.1	total and fecal coliform	semi-annual/WSP	4
1.3.2	Arsenic	semi-annual/WSP	4
1.3.3	Nitrate	semi-annual/WSP	4
1.3.4	Color	semi-annual/WSP	4
1.3.5	pH	semi-annual/WSP	4



1.3.6	TDS	semi-annual/WSP	4
1.3.7	Organo-chlorine Pesticide	semi-annual/WSP	4
1.3.8	Iron	semi-annual/WSP	4
1.3.9	Manganese	semi-annual/WSP	4
<b>II. WASTEWATER MONITORING PROGRAM</b>			
<b>II.1</b>	<b>BIWCI STPs (Balabag, Manocmanoc &amp; Newcoast STPs)</b>		
II.1.1	total and fecal coliform	3 per month	36
II.1.2	BOD	3 per month	36
II.1.3	COD	3 per month	36
II.1.4	Oil & Grease	3 per month	36
II.1.5	TSS	3 per month	36
II.1.6	Surfactants	3 per month	36
II.1.7	Ammonia	3 per month	36
II.1.8	Nitrate as N	3 per month	36
II.1.9	Phosphate as P	3 per month	36
<b>II.2</b>	<b>Stakeholders ( BIWC=13)</b>		
II.2.1	total and fecal coliform	15 per quarter	60
II.2.2	BOD	15 per quarter	60
II.2.3	COD	15 per quarter	60
II.2.4	Oil & Grease	15 per quarter	60
II.2.5	TSS	15 per quarter	60
II.2.6	Surfactants	15 per quarter	60
II.2.7	Ammonia	15 per quarter	60
II.2.8	Nitrate as N	15 per quarter	60
II.2.9	Phosphate as P	15 per quarter	60
<b>II.3</b>	<b>Drainage and STP Outfall</b>		
II.3.1	total and fecal coliform	5 per month	60
II.3.2	BOD	5 per month	60
II.3.3	COD	5 per month	60

II.3.4	Oil & Grease	5 per month	60
II.3.5	TSS	5 per month	60
II.3.6	Surfactants	5 per month	60
II.3.7	Ammonia	5 per month	60
II.3.8	Nitrate as N	5 per month	60
II.3.9	Phosphate as P	5 per month	60



## APPENDIX B. PRESCRIBED ANALYTICAL METHOD

Item	Substance & parameter subject to monitoring	Method of determination
<b>Water Supply</b>		
1	Coliform bacteria/ fecal coliform	9221 Multiple tube fermentation technique (MTFT)
		9223 Enzyme Substrate
		9222B Membrane filter technique (MFT)
2	HPC	9215 B Pour Plate Method
		9215 C Spread Plate Method
		9215 D Membrane Filter Method
3	Cadmium	<p>Sample Prep.</p> <p>3030 E. Nitric Acid Digestion</p> <p>3030F. Nitric Acid-Hydrochloric Acid Digestion</p> <p>3030K. Microwave-Assisted Digestion</p> <p>Instrumentation</p> <p>3113 B. Electrothermal Atomic Absorption Spectrometric</p> <p>3120 B. Inductively Coupled Plasma Method</p> <p>3125 B. Inductively Coupled Plasma-Mass Spectrometry Method</p>
4	Lead	<p>Sample Prep.</p> <p>3030 E. Nitric Acid Digestion</p> <p>3030K. Microwave-Assisted Digestion</p> <p>Instrumentation</p> <p>3113 B. Electrothermal Atomic Absorption Spectrometric</p> <p>3120 B. Inductively Coupled Plasma Method</p> <p>3125 B. Inductively Coupled Plasma-Mass Spectrometry Method</p>
5	Color	2120 B Visual Comparison Method – for apparent color only
6	pH	4500 H <sup>+</sup> B. Electrometric method
7	Arsenic	<p>Sample Prep.</p> <p>3030 E. Nitric Acid Digestion</p> <p>3030 G Nitric Acid- Sulfuric Acid Digestion</p>

		3030 k. Microwave Assisted -Digestion Instrumentation 3114 B. Manual Hydride Generation/ Atomic Absorption Spectrometric Method 3113 B. Electro thermal Atomic Absorption Spectrometric 3120 B Inductively Coupled Plasma Method 3125 B. Inductively Coupled Plasma-Mass Spectrometry Method
8	Nitrate	4110 B. Ion Chromatography with Chemical Suppression of Eluent Conductivity 4110 C. Single Column Ion Chromatography with Direct Conductivity Detection. 4500-NO3 B. Ultraviolet Spectrophotometric Screening Method 4500- NO3 E. Cadmium Reduction Method. 4500- NO3 I. Cadmium Reduction Flow Injection Method. 4140 Capillary Ion electrophoresis 4500-NO3 D. Nitrate Electrode Method
9	TDS	2540 C. Total Dissolved Solids Dried at 180°C
10	Iron	A. Sample Preparation 3030 E. Nitric Acid Digestion 3030 F. Nitric Acid-Hydrochloric Acid Digestion 3030 K. Microwave Assisted Digestion B. Instrumentation 3111 B. Direct Air-Acetylene Flame Method 3111 C. Extraction/Air-Acetylene Flame Method 3113 B. Electro thermal Atomic Absorption Spectrometric 3120 B. Inductively Coupled Plasma Method  3125 B. Inductively Coupled Plasma-Mass Spectrometry Method  3599-Fe B. Phenanthroline Method
11	Manganese	C. Sample Preparation 3030 E. Nitric Acid Digestion 3030 F. Nitric Acid-Hydrochloric Acid Digestion 3030 K. Microwave Assisted Digestion D. Instrumentation 3111 B. Direct Air-Acetylene Flame Method 3111 C. Extraction/Air-Acetylene Flame Method 3113 B. Electrothermal Atomic Absorption Spectrometric 3120 B. Inductively Coupled Plasma Method 3125 B. Inductively Coupled Plasma-Mass Spectrometry Method



12	Organochlorine Pesticides	Please refer to Table A-4 of PNSDW 2017 Pages 16-17
<b>Wastewater</b>		
1	total coliform	Multiple tube fermentation technique (MTFT) - APHA- AWWA- WEF (2005) section 9221B or latest APHA edition, Enzyme substrate Test SMEWW 9223 B
2	Fecal coliform	Multiple tube fermentation technique (MTFT) -APHA- AWWA- WEF (2005) section 9221E or latest APHA edition
3	BOD	5-day @ 20°C BOD test -APHA-AWWA-WEF (2005) section 5210 B or latest APHA edition or other EMB approved method of analysis as contained in DENR MC no. 012 series of 2016
4	COD	Open Reflux Method SMEWW 5220 B Closed Reflux, Titrimetric Method SMEWW 5220 C Closed Reflux, Colorimetric Method SMEWW 5220 D
5	Oil & Grease	Liquid-liquid Partition- gravimetric method APHA- AWWA- WEF (2005) section 5520B or latest APHA edition , solid-phase, Partition Gravimetric Method -SMEWW5520G
6	TSS	Gravimetric, dried at 103-105C APHA - AWWA- WEF (2005) section 2540 D or latest APHA edition
7	Surfactants	APHA Std. Methods, (2005) section 5540 C or latest APHA edition
8	Ammonia	PhenateAPHA- AWWA-WEF (2005) 4500-NH3 F - or latest APHA edition or other EMB approved method of analysis as contained in DENR MC no. 012 series of 2016
9	Nitrate	Cadmium reduction method with Nitrite Correction using colorimetric method-APHA- AWWA-WEF (2005) section 4500- NO3 E or latest APHA edition  or other EMB approved method of analysis as contained in DENR MC no. 012 series of 2016
10	Phosphate	Stannous chloride method - APHA- AWWA-WEF (2005) section 4500-P-D or latest APHA edition or other EMB approved method of analysis as contained in DENR MC no. 012 series of 2016

  
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